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Insights for Pharmaceutical Manufacturers on New Age Women: Influence of Media on Purchase and Usage of Medication in India

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Abstract

Media is considered to be an important factor which may influence purchase behaviour. But for medicines bought without prescription of doctors there might be some other factors which the pharmaceutical companies need to probe in .This study envisage about the relationship between Media influence, Personal Reasons, Marketing factors with Brand Experience. Around 236 questionnaires were distributed to women in and around Tamilnadu in the medical shops. The findings of the study show the best relationship by applying multiple regression analysis by using Statistical Package for Social Science SPSS (21.0). The results shows that the brand experience of Indian women (between 18 to 53 years) is not related with respect to media and marketing factors but they are significant with respect to personal reasons alone. This research shall favour the pharmaceutical marketers to understand about the brand experience of Indian women.

Keywords: *Pharmaceutical Medicines, Brand experience, Personal reasons, Indian Women, Media Influence, Marketing factors.*

Introduction

According to Indian Brand Equity Foundation (IBEF), Indian healthcare sector, single highest mounting sectors will be US$ 372 billion by 2022. Indian pharmaceutical sector approximately accounts to 3.1 percent to 3.6 percent of the worldwide pharmaceutical trade[1]. The expected growth by 2025 is nearly US$100 billion. India's pharmaceutical export stand is likely to attain US$ 20 billion by 2020. For the period of April–September 2017, India exported pharmaceutical goods is worth Rs. 411.3 billion[2] . The direction of the pharmacy products is a substance of apprehension predominantly in Indian Women particularly in the age group of **28 to 48 years w**ho are termed as New Age.

Medicines without Prescription: Over-the-counter (OTC) medications, also acknowledged as non-prescription drugs, drug that can be obtained devoid of a prescription from the registered medical practitioner. These drugs are primarily used for the demeanour of the wellbeing that can be self-medicated.

OTC drugs are listed by government regulatory authorities as harmless for self-medication. According to Food and drug administration (FDA), there are surplus 300,000 OTC drug product present in the market, several familiar applications of OTC drugs are aches, itches and others.

Non-prescription drugs are most imperative and easily purchased by public as wellbeing aids for the treatment of general / mild conditions or symptomatic relief [3]. Over-the-counter drugs encompasses products like cough and cold products acne treatment to weight control products. Pharmaceutical manufacturers relied on physicians and pharmacists to offer the information about medicines to Passover to the patients,

Over-the-counter (OTC) drugs are medicines that are obtainable for sale directly to a consumer. According to the U.S. Food and Drug Administration (FDA), OTC drugs are definite as the medications that can be used safely and effectively by the general public even without a prescription.

Over-the-counter drugs are those which:

- Don't require a prescription provided by healthcare professional.
- Can be easily purchased in any stores.
- Ingredients, doses, formulations, and labelling are in substantiation with the existing monographs do not necessitate FDA review for marketing. Are used to self-treat minor symptoms / conditions that do not necessitate the advice of a physician.

The OTC drugs insist for cold, cough and allergy will engage the traditional seasonal drift, lashing a stable development during the estimated period. In such a scenario pharmacy brand should play a role in decision making .The intention is to find what predicts the brand experience .

Objectives of the Study

- To analyse the relationship between personal reasons, marketing factors and Media influence on brand experiences related to unprescribed medicines

Materials and Method

The research methodology[4] for the study is descriptive in nature.

Population: Any New age Indian women using OTC medicines (Infinite Population). **Target population:** New Age (18 to 48 yrs) literate Indian Women **Sampling Location:** Pharmacy outlets, Shopping Malls**,** Clinic/ Hospital**,** Ladies Hostels and few companies.

Sampling Element (Unit of Analysis): New Age (18 to 48 yrs) literate Indian Women based on the classified based on residence Urban, Semi Urban,Rural area of Tamilnadu **Sampling Technique:** Stratified Random Sampling (Infinite Population) and anysis will be done by statistical package for social sciences 21.0[5]

Sample Size: 236 questionnaire

The questionnaire consists of **Section A:** Consumers' demographic profile, like age, work experience, income, marital status, Number of members in family occupational sector, residence etc was the attributes listed in this section and **Section B:** This measures personal reasons, marketing factors, media influence and for purchase of branded OTC medicines the reliability of the questionnaire was more than 0.8 for all the four variables as well as for the total items [6] .

Data Anaylsis & Interpretations: To unite the independent and dependent variable a Multiple Regression analysis was performed. The items in the questionnaire was used to Compute variables done by SPSS 21.0 and four variables were created by adding the items in 7,8,9 and 10.

H_0:Brand Experience depends on Media Influence, Personal Reasons and Marketing Factors

Table No. 1 .Model Summary

Dependent variable	Independent variable
Brand Experience	Constant Media Influence, Personal Reasons, Marketing Factors
R	0.844
R Square	0.818
Adjusted R Square	0.601
F	6.836
Sig	0.000

From the above Table No.1, where the brand experience is the dependent variable, table no.1 provides inference that the ability of prediction for model was articulated by R value 0.834 and R^2 value 0.818 which shows 81.8% of variance exist in the dependent variable is from the independent variables. F-value is 6.836 showing that there exists a relationship between Media Influence, Personal Reasons, Marketing Factors with Brand Experience. The p-value is 0.000 which is <0.05 showing a significant relationship between Media Influence, Personal Reasons, Marketing Factors with Brand Experience. Hence from the above test we conclude that Media Influence, Personal Reasons, Marketing Factors Predict Brand Experience.

Table No. 2 Coefficients of the Model

Dependent Variable	Independent Variable	Unstandardized Coefficient		Standardized Coefficients	T	Sig
Brand Experience	(Constant) Personal Reasons Marketing Factors Media Influence	B	Std Error	Beta		
		23.57	2.161		10.906	.000
		.219	.084	.246	2.611	.010
		.115	.080	.153	1.425	.156
		-.011	.102	-.012	-.104	.917

From the above Table No.2, it is inferred that the beta value is 0.219 for variable 1 (Personal Reasons) and 0.115 for variable 2 (Marketing Factors) and –0.011 for variable 3 (Media Influence). There is a significant relationship between Personal Reasons[7] and Brand Experience the P value is <0.05 which is 0.010. There is no significant relationship found Influence OTC Medicine and Brand Experience since the P value is >0.05 which is 0.156. There is no significant relationship between Media Influence and Brand Experience since the P value is >0.05 which is 0.917. Thereby the final regression equation is derived by the incorporating the coefficients as follows:

Brand Experience=23.572+0.219
(Personal Reasons)
+0.115(Marketing Factors)-0.011(Media Influence)

From the above equation it is incurred that the Personal reasons is the most vital variables significantly contributing towards the brand experience of New Age Indian women[8] when they buy Medicines in Pharmaceutical outlets[9] .Chart No.1 is the histogram of the regression residuals and Chart No.2 is the P-P Plot which plots the samples in the regression line.

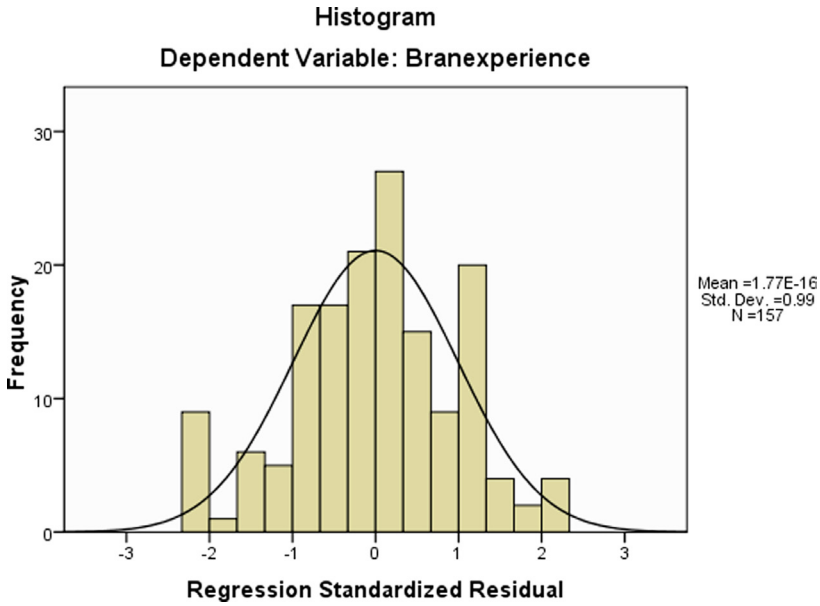


Chart No: 1 Multiple Regression

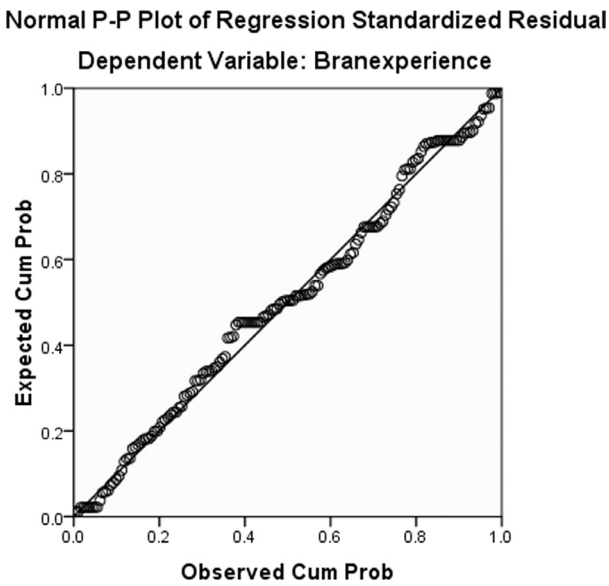


Chart No.2 P-P Plot

Conclusion

- Over all the factors for purchasing OTC is the perception about quality, Company name, brand image, No substitute, previous experience and easy to use. They are least bothered about the size or advertisement in this case.
- Personal reasons to select a branded OTC Medicine is Health Consciousness, Doctor's recommendation previously, healthy life, economical, effective and personal usage .They do not try any new product nor they are addicted to it .There by new age Indian women are health conscious to certain extent .
- The marketing factors are price and **Brand image**. They are not bothered about any sale or other patient referrals
- Television is the media which has influenced the purchase followed by magazine and banner .Then comes Websites, Newspaper and the least one is radio. There by the marketers should tap TV and print media to position their brands in the minds of new age and Gen Z Indian women.
- Spouse and parents play a vital role as Social factors followed by friends and relatives minor role for any sales representative as they do not interact directly to the consumers.
- Displays in shops and social media also do have much influence.

Conflict of Interest: The author assures that there is no conflict of Interest between any parties

Source of Funding: The study was conducted by self as part of extra learning in flexible curriculum system

Ethical Clearance: The questionnaire has statement of informed Consent for the respondents who volunteered for the study and no medication is administered to any respondent.

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A Study to Assess the Effectiveness of Yoga Therapy on Menopausal Symptoms among Women in a Selected Area at Mangaluru

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Abstract

Background: Many menopausal women use complementary therapies to cope with the symptoms and yoga is one among them. The evidence suggesting that even the short-term practice of *Yoga* can decrease both psychological and physiological risk factors for menopausal symptoms.

Objectives: The experimental study assessed the effectiveness of yoga therapy on menopausal symptoms among perimenopausal women.

Materials and Method: A menopausal rating scale (10 items) was used to assess the effectiveness of yoga therapy among perimenopausal women.

Results: The mean post test score 51.3 in the experimental group were found to be lesser than the mean pre-test scores 70.0. Mean post-test scores 69.3 and mean pre-test stress scores 72.9 in the control group had some variation. In order to find the significant difference, unpaired 't' test was computed for experimental group ('$t'_{(49)} = 25.27$; $p < 0.001$) and control group ('$t'_{(49)} = -7.8$; $p < 0.001$).

Conclusion: The study concludes by showing that yoga therapy was effective to reduce some menopausal symptoms of women.

Keywords: *Menopausal symptoms, yoga therapy, women*.

Introduction

A woman's life is divided into different stages beginning with the young girl, the ancestor virgin, who moves into maturity as the mother and at the end of her child bearing years, closing in on 50, she enters the ugly phase of her life[1]. This phase is one such transitional period which brings about important changes in a woman. One of those important changes that occur in this stage of her life is menopause.

In the developed countries, mean life expectancy for women is increased from 50-81 years. The life expectancy of the population around the world is estimated to be 75 to 80 years. It is estimated that there are over 200 million menopausal women worldwide and 40 million in India. The average age of menopause of Indian woman is 47.5 years[5]

Various health problems and complication are found during peri-menopause in a woman's life. The most common menopausal symptoms include hot flushes, night sweats, fatigue, pain, decreased libido, and mood changes. These symptoms may persist for several years after attaining menopause[9].

Three levels of approaches can be considered as treatment for menopausal symptoms like life style

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changes, alternative medicine, medication and surgery. Among these, lifestyle changes is a better way to treat the symptoms where as other therapies may lead to risk of different types of cancer, heart diseases and strokes among women. So the women can undergo natural therapy which also includes yoga therapy, an effective tool to reduce physical and psychological symptoms[11].

Materials and Method

Study setting and sample size: The research design selected for this study was quasi experimental non randomised two group pre-test post-test design. The study was carried out in Kotekar and Beeri area in Mangaluru taluk, Dakshina Kannada district. In the present study, samples consist of 60perimenopausal women 30 each in experimental and control group who were selected by Non probability Purposive sampling, based on inclusion criteria.

Tools and techniques: The tool consisted of demographic data and obstetric data (14items) to collect the baseline characteristics. Menopausal rating scale 10 items with 22 subheadings (r=0.791) to collect data on menopausal symptoms among perimenopausal women.

Data analysis: The data was collected after obtaining prior permission from the concerned authority to conduct the study. The participants were assured about the confidentiality of their responses. The data was analyzed in terms of objectives of the study using both descriptive and inferential statistics. The data obtained was plotted in the master sheet.

Results

Majority of the subjects,51.6% in experimental group and 60% of women in control group belongs to the age group of 46-50 years, 63.3% of participants and 45.2% in experimental group were housewife, 54.8% in experimental and 66.7% of women in control group did not have adequate information on effectiveness of yoga therapy [Table 1, Fig1].

Majority (56%) of experimental group and 73.3% of control group had marked level of symptomsThe post-test scores of present study depicted that, in experimental group and control group, all the women in experimental group and 56.7% of respondents in control group had reduced the symptoms from marked to moderate. and 43.3% had marked level of symptoms in control group [Table2, 3].

The post-test area wise mean, median and standard deviation were respectively 24.3+2.39 and 26.9+2.59, whereas in control group it was 34.4+2.47 and 34.9+2.67 in area one and two. In order to find the significant difference, unpaired 't' test was computed for experimental group ($t'_{(49)} = 25.27$; $p < 0.001$) and control group ($t'_{(49)} = -7.8$; $p < 0.001$) [Table 4, 5]

In the experimental group there is association of the pre-test level of menopausal symptoms with some of the selected demographic variables such as age ($\chi^2 = 12.44$, p=0.05), socio-economic status ($\chi^2 = 12.085$, p=0.017) and use of contraceptive ($\chi^2 = 18.596$, p=0.017) at 0.05 level of significance.

In the control group, there is association of pre-test level of menopausal symptoms with selected variable like age (χ^2=32.503, p=0.009) at 0.05 level of significance.

Table 1: Frequency distribution of women according to their pre-test level of menopausal symptoms in control and experimental group as measured by structured menopausal rating scale n = 60

Level of symptoms	Range of Scores	Experimental group		Control group	
		F	%	F	%
Asymptomatic	Score below 1	-	-	-	-
Mild	1-35	-	-	-	-
Moderate	36-70	13	43.3	8	26.7
Marked	71-105	17	56.7	22	73.3
Severe	106-125	-	-	-	-
Total		**30**	**100%**	**30**	**100%**

Table 2: Frequency distribution of women according to their post-test level of menopausal symptoms in control and experimental group as measured by structured menopausal rating scale n = 60

Level of symptoms	Range of Scores	Experimental group		Control group	
		f	%	f	%
Asymptomatic	Score below 1	-	-	-	-
Mild	1-35	-	-	-	-
Moderate	36-70	30	100	17	56.7
Marked	71-105	-	-	13	43.3
	Total	30	100%	30	100%

Table 3: Level of mean pre-test and post-test level of menopausal symptoms of women within the group n=60

Group	Mean pre-test score	Mean post-test score	Mean difference	df	Paired 't' test
Experimental group	70.06	51.33	18.3	29	25.27* P<0.05
Control group	72.93	69.36	3.6	29	2.63* P<0.05

$t_{(29)}$=2.05 *Significant

Table 4: Level of mean pre-test and post-test level of menopausal symptoms of women between the experimental and control group n=60

Group	Mean	Mean difference	df	Unpaired 't' test
Experimental group			58	7.82* P<0.05
Pre-test	70.0667	18.3		
Post-test	51.33			
Control group				
Pre-test	72.933	3.6		
Post-test	69.3667			

$t_{(58)}$ = 1.671 *Significant

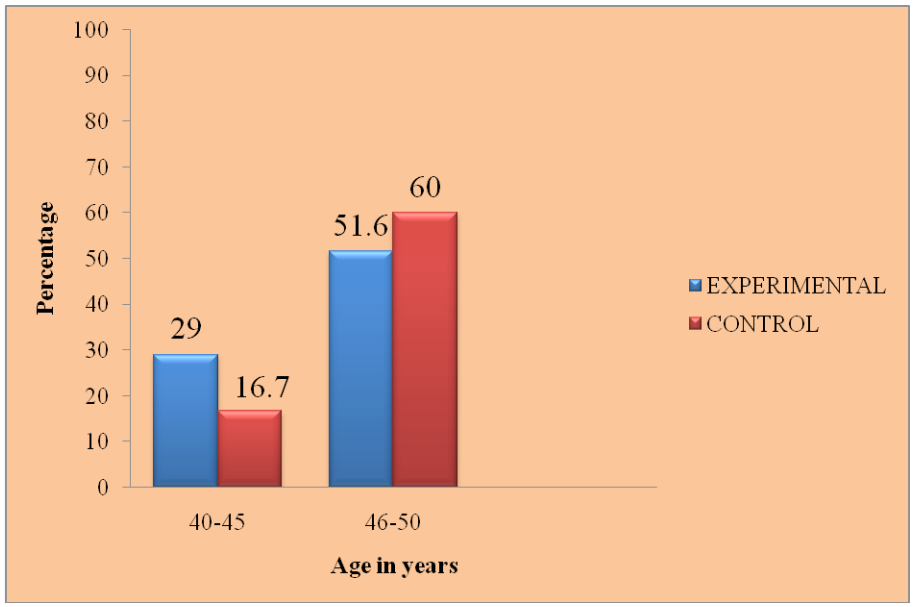


Figure 1: clustered column chart showing frequency and percentage distribution of women according to age

Discussion

The present study revealed that, in both experimental and control group, majority (51.6% and 60% respectively) of the samples were of age group 46-50 years. The study findings are supported by A cross sectional study conducted at anjarakandy, kerala revealed that the mean age of attaining menopause was 48.26 that is (44.3%). maximum number of women were educated 96.2% and 83.1% of women were home maker.

In the present study most (54.8%) of the women in experimental and in control group 66.7% of women did not have adequate information on effectiveness of yoga. A similar study was conducted at Isra university hospital, Pakistan, which was to determine the knowledge and investigate the symptoms experienced by women among 863 women of age group 42-80 years. Results showed that only 15.8% women knew about menopausal affects and symptoms while 78.8% of women had little knowledge on the same[54]

The mean post test score 51.3 in the experimental group were found to be lesser than the mean pre-test scores 70.0. Mean post-test scores 69.3 and mean pre-test stress scores 72.9 in the control group had some variation. In order to find the significant difference, unpaired 't' test was computed for experimental group ($t'_{(49)}$ = 25.27; $p < 0.001$) and control group ($t'_{(49)}$ = -7.8; $p < 0.001$). A randomized controlled trial was conducted at Gujarat to find out the effect of yoga on menopausal symptoms using MRS among 210 women. The result was observed that in the post test the scores in yoga group showed a reduction in score on all the subscales from moderate to mild[55].

Conclusion

The study depicted that most of the women are affected with one or the other menopausal symptoms with may lead to a serious condition, So the yoga therapy was effective in relieving some of the menopausal symptoms partially but not completely.

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Conflict of Interest: There are no conflicts of interest.

Ethical Clearance

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Compare the Physiological Parameters and Behavioural Responses among Mixed Fed Versus Formula Fed Preterm Babies

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Abstract

Introduction: Preterm birth is the most common causes of death among infants in worldwide. Prematurity causes the largest number of admissions to the Neonatal Intensive Care Unit (NICU). And appropriate nutrition is essential for the growth and development of preterm infants.

Objective: The aim of the study was to compare the physiological parameters and behavioural responses among mixed fed versus formula fed preterm babies admitted in AIMS, Kochi.

Method:A descriptive approach was taken, sample were selected by convenience sampling technique, data had been collected by semi structured questionnaires and used record sheet and FENTON Growth chart to assess the physiological parameters and behavioural responses of the preterm baby.

Results: Weight gain, length, head circumference in mixed fed preterm babies were highly significant compared to formula fed preterm babies. Body temperature was very highly significant between two groups. The heart rate and mean respiratory rates were progressively higher in formula fed preterm babies than mixed fed preterm babies. Blood pressure was very highly significant between two groups and was higher than formula fed preterm babies. In majority, the oxygen saturation level was decreased in formula fed preterm babies than mixed fed preterm babies. Sucking reflex was absent among 74.3% of formula fed preterm babies and it was statistically significant. Rooting reflex was also absent in 42.9% of formula fed preterm babies.

Conclusion: The study findings revealed that the mixed feeding is very effective and beneficial to gain weight, height, to maintain body temperature, heart rate, respiratory rate and oxygen saturation compared to formula feeding.

Keywords: *Physiological Parameters, Behavioural Responses, Mixed Feeding, Formula Feeding, Preterm Babies.*

Introduction

Birth of a baby is perhaps the most joyful moment for any parent. They want their baby to be healthy and have the best of emotional and physiological environment.[1] Due to some different risk factors like multiple pregnancies, pregnancy induced hypertension and placental problems, when the baby is born before 37 weeks of gestational age, is called preterm baby. Due to short transition from intrauterine life to extra uterine life; the preterm baby is having the state of physiological and anatomical immaturity of various organs and systems at the time of birth. Immaturity of various organ systems places babies at the risk for variety of complications like hypothermia, respiratory distress, weight loss, hyper-bilirubinemia, poor sucking pattern, altered heart rate and altered oxygen saturation etc.[2]

Preterm birth is the most common causes of death among infants in worldwide.[3] Prematurity causes the largest number of admissions to the Neonatal Intensive Care Unit (NICU). Preterm birth occurs for a variety

of reasons. Most preterm births happen spontaneously, but some of them are due to early induction of labor or cesarean birth, whether for medical or non-medical reasons.[4]

According to World Health Organization (WHO, November 2016) every year an estimated 15 million babies are born as preterm (before 37 completed weeks of gestation), and this number is rising. Preterm birth complications are the leading causes of death among children under five years of age, responsible for nearly one million deaths in 2015. Across 184 countries, the rate of preterm birth ranges from 5% to 18% of babies' born.[5] India has the highest number of death due to premature birth and ranked 36th in the list of preterm birth globally out of 199 countries. In India, total 27 million babies are born annually. Among them 3.6 million babies are born preterm according to Indian Foundation for Premature Babies (2010).[6]

Due to immaturity of various organs, preterm babies are not able to breast feed properly. Mother won't be able to provide enough breast milk to their preterm babies. As an alternative, mixed feeding (combination of breast milk and formula milk) or formula milk alone is provided to maintain optimum development.

The purpose of the study was to compare the physiological parameters and behavioural responses in mixed fed versus formula preterm babies. This study was also intended to find association between the physiological parameters and behavioural responses of the preterm babies with their selected demographic variables.

Materials and Method

A descriptive study was conducted among 70 preterm babies between 32-35 weeks of gestational age admitted in NICU at AIMS, Kochi. The data collection was started after obtaining Ethical Clearance certificate from the Ethics Committee and Scientific committee of Amrita Institute of Medical Sciences and Research Centre (AIMS), Kochi. The sample was selected by convenience sampling technique based on inclusion criteria. Data had been collected by semi structured questionnaire, used record sheet and FENTON Growth chart to assess the physiological parameters and behavioural responses of the preterm baby. Preterm babies were identified through their clinical records. After building rapport with the parents, written informed consent was obtained from each parent. The demographic and clinical data were collected by using a semi-structured questionnaire. After completing the questionnaire, the entire sample were observed on alternative day basis at the same time by the investigator.

The collected data were organized, tabulated, summarized and analyzed by using descriptive statistics and inferential statistics in terms of objectives of the study. Demographic data were analyzed in terms of frequency and percentage distribution. Physiological parameters and behavioral responses of mixed fed versus formula fed preterm babies were determined by paired t-test. Associations of physiological parameters and behavioral responses with the selected demographical variables were determined by chi-square test.

Results

During the study period, a total of 70 preterm babies were reviewed and among mixed fed preterm group 17 (48.6%) of them were boy babies and 18 (51.4%) were girl babies and among formula fed preterm group 20 (57.1%) of them were boy babies and 15 (42.9%) were girls.

n=70 (35+35)

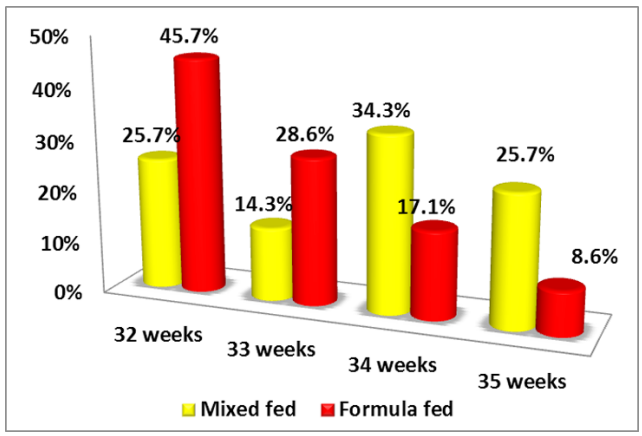


Figure 1: Comparison of gestational weeks of birth among mixed fed versus formula fed preterm babies.

Based on gestational week, Figure 1 shows that 9 (25.7%) of mixed fed preterm babies were born on 32 weeks of gestation, 5 (14.3%) of them on 33 weeks of gestation 12 (34.3%) of them on 34 weeks of gestation and 9 (25.7%) of them on 35 weeks of gestation. In comparison to formula fed preterm babies, 45.7% of them were born 32 weeks of gestation, 28.6% on 33 weeks of gestation, 17.1% on 34 weeks of gestation and 3 (8.6%) on 35 weeks of gestation.

Table 1: Standard deviation and p-value of body weight among mixed fed versus formula fed preterm babies. n=70 (35+35)

Body Weight	Mixed fed Preterm babies		Formula fed Preterm babies		p-value
	Mean	SD	Mean	SD	
Day 2	1.702	0.28	1.588	0.24	0.07
Day4	1.674	0.26	1.567	0.24	0.08
Day6	1.665	0.26	1.549	0.25	0.06
Day 8	1.688	0.25	1.543	0.24	0.019*
Day 10	1.722	0.25	1.551	0.24	0.006**

* p-value <0.05 Significant; ** p-value <0.01 Highly Significant; *** p-value <0.001 Very Highly Significant

Table 1 illustrated that there were significant changes in body weight with p-value <0.05 on day 8 and highly significant with p-value < 0.01 on day 10. According to the above table body weight among mixed versus formula fed preterm babies were not significant on day 2, day 4 and day 6.

Table 2: Mean body temperature among mixed fed versus formula fed preterm babies. n=70 (35+35)

Body Temp-erature	Mixed fed Preterm babies		Formula fed Preterm babies		p-value
	Mean	SD	Mean	SD	
Day 2	98.23	0.47	97.5	0.67	0.0001***
Day4	98.19	0.46	97.7	0.48	0.0001***
Day6	98.28	0.35	97.6	0.54	0.0001***
Day 8	98.25	0.46	97.7	0.48	0.0001***
Day 10	98.17	0.42	97.7	0.47	0.0001***

* p-value <0.05 Significant; ** p-value <0.01 Highly Significant; *** p-value <0.001 Very Highly Significant

Table 2 shows that, mixed fed preterm babies maintained their mean body temperature on day 2 in between (98.23±0.47) ºF, on day 4 (98.19±0.46) ºF, on day 6 (98.28±0.35)ºF, on day 8 (98.25±0.46)ºF and on day 10 (98.17±0.42) ºF. The formula fed preterm babies were maintained body temperature on day 2 (97.5±0.67) ºF, on day 4 (97.7±0.48) ºF, on day 6 (97.6±0.54) ºF, on day 8 (97.7±0.48) ºF and on day 10 (97.7±0.47)ºF. There were very highly significant changes in their body temperature with p-value <0.0001.

Table 3: Comparison of mean heart rate at different follow ups in both mixed fed and formula fed preterm babies. n=70 (35+35)

Heart rate	Mixed fed Preterm babies		Formula fed Preterm babies		p-value
	Mean	SD	Mean	SD	
Day 2	147.9	6.66	155.4	12.75	0.003**
Day4	147.6	6.95	156.1	10.70	0.0001***
Day6	149.2	7.76	157.4	11.2	0.001**
Day 8	146.4	20.22	157.34	10.10	0.006**
Day 10	146.3	19.85	157.69	13.41	0.007**

* p-value <0.05 Significant; ** p-value <0.01 Highly Significant; *** p-value <0.001 Very Highly Significant

Table 3 shows that, mixed fed preterm babies maintained their mean heart rate on day 2 in between (147.9±6.66) bts/min, on day 4 (147.6±6.95) bts/min on day 6 (149.2±7.76)bts/min, on day 8 (146.4±20.22)bts/min and on day 10 (146.3±19.85) bts/min. The formula fed preterm babies were maintained heart rate on day 2 (155.4±12.75) bts/min on day 4 (156.1±10.70) bts/min on day 6 (157.4±11.2) bts/min, on day 8 (157.34±10.10) bts/min and on day 10 (157.69±13.41)bts/min. On day 4 there were very highly significant changes in their heart rate with p-value <0.0001.

Table 4: Comparison of mean respiratory rate at different follow ups in both mixed fed and formula fed preterm babies. n=70 (35+35)

Respiratory rate	Mixed fed Preterm babies		Formula fed Preterm babies		p-value
	Mean	SD	Mean	SD	
Day 2	51.29	5.86	56.17	7.57	0.004**
Day4	50.8	6.73	57.4	8.10	0.0001***
Day6	52.09	7.00	57.03	8.46	0.010*
Day 8	54.2	6.83	57.86	8.09	0.04*
Day 10	53.3	7.81	58.46	8.58	0.01*

* p-value <0.05 Significant; ** p-value <0.01 Highly Significant; *** p-value <0.001 Very Highly Significant

Table 4 shows that mixed fed preterm babies maintained their mean respiratory rate on day 2 in between (51.29±5.86) breaths/min on day 4 (50.8±6.73) breaths/min on day 6 (52.09±7.00)breaths/min on day 8 (54.2±6.83)breaths/min and on day 10 (53.3±7.81) breaths/min. The formula fed preterm babies were maintained mean respiratory rate on day 2 (56.17±7.57) breaths/min on day 4 (57.4±8.10) breaths/min on day

6 (57.03±8.46) breaths/min on day 8 (57.86±8.09) breaths/min and on day 10 (58.46±8.58)breaths/min. On day 4 there were very highly significant changes in their respiratory rate with p-value <0.0001.

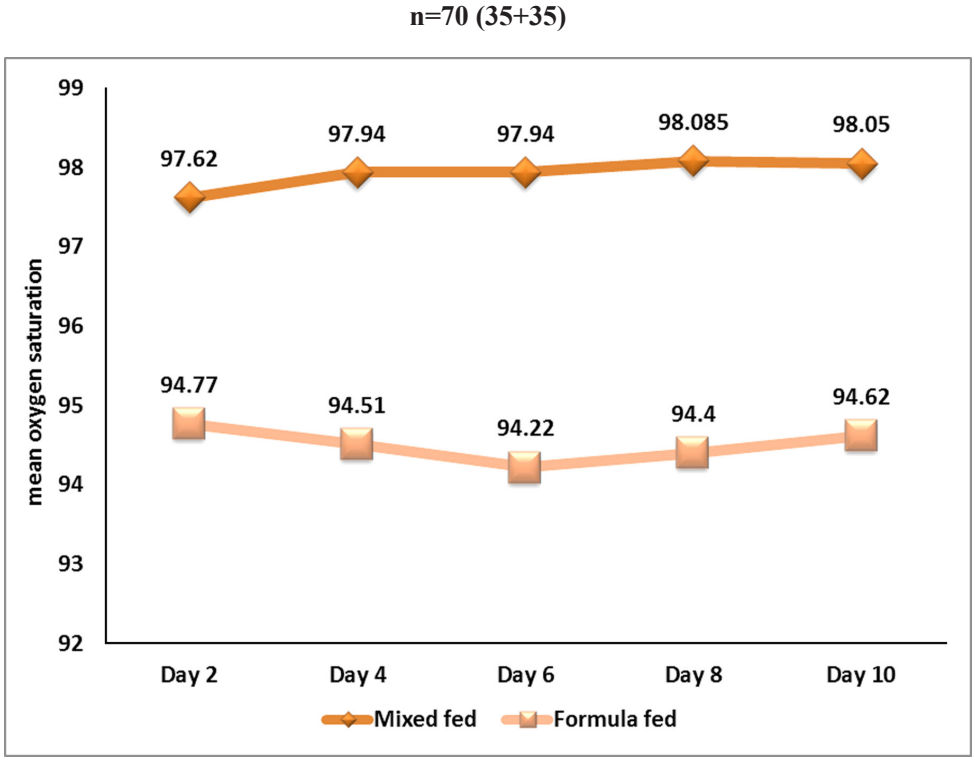


Figure 2: Comparison between mean oxygen saturation levels among mixed fed versus formula fed preterm babies

Figure 2 illustrated that from day (2-10) in mixed fed preterm babies mean oxygen saturation level on day 2 was (97.62±1.57)%, (97.94±1.32)% on day 4, (97.94±1.76)% on day 6, (98.08±1.46)% on day 8, (98.05±1.41)% on day 10 compared to formula fed preterm babies (94.77±1.41)%, on day 4 (94.5±1.63)%, on day 6 (94.2±1.84), on day 8 (94.4±1.76)%, day 10 (94.62±2.073)%.

Table 5: Comparison of rooting reflex at different follow ups in both mixed fed and formula fed preterm babies. n=70 (35+35)

Variables	Mixed fed Frequency (f)	Mixed fed Percentage (%)	Formula fed Frequency (f)	Formula fed Percentage (%)
Rooting reflex				
Present	24	68.6	20	57.1
Absent	11	31.4	15	42.9
Sucking reflex				
Present	23	65.7	9	22.9
Absent	9	34.3	26	77.1
Crying pattern				
Present	30	85.7	23	65.7
Less active	5	14.3	7	20
Absent	0	0	5	14.3
Pattern of sleep				
Good	34	97.1	34	97.1
Poor	1	2.9	1	2.9

Table 5 shows that 24 (68.6%) mixed fed preterm babies had rooting reflex and 20 (57.1%) formula fed preterm babies had rooting reflex. In case of sucking reflex, it was present 23 (65.7%) in mixed fed preterm babies and 9 (22.9%) in formula fed preterm babies. Crying pattern was present 30 (85.7%) in mixed fed group and 23 (75.7%) in formula fed group. Pattern of sleep (good) for both groups were 34 (97.1%).

Table 6: Comparison of rooting reflex at different follow ups in both mixed fed and formula fed preterm babies. n=70 (35+35)

Variables	Pearson Chi-square	p-value
Rooting reflex	0.97	0.322
Sucking reflex	11.28	0.001**
Crying pattern	6.25	0.04*
Pattern of sleep	0.0	1.0

* p-value <0.05 Significant; ** p-value <0.01 Highly Significant; *** p-value <0.001 Very Highly Significant

Table 6 illustrated that, between two groups, there were highly significant in sucking reflex with p value <0.001 and it were significant in crying pattern with p value <0.05. There were no such significant values for rooting reflex and pattern of sleep for both mixed fed versus formula fed preterm babies.

Discussion

Adequate nutrition is so important for the healthy growth and development of all new born babies. Preterm birth survivors are at a higher risk of growth and developmental disabilities compared to their term counterparts. Appropriate nutrition is essential for the growth and development of preterm infants. Early administration of optimal nutrition to preterm birth survivors lowers the risk of adverse health outcomes and improves cognition in adulthood.[7]

Weight gains in mixed fed preterm babies were highly significant with p-value <0.01 on day 8 and day 10, compared with formula fed preterm babies. The length and head circumference of both groups of preterm babies were statistically highly significant with p-value <0.01 from day 2 to day 10. D Singh, N Devi and TS Raghu Raman reported that the preterm infants lost an average of 90 g, at a negative growth rate of 12.80 g/d in the first week of their life. They had a brisk catch up phase with a growth rate of 20 g/d in the second week and 28-32 g/d thereafter.[8]

There were also studies which suggested results to the contrary. Cooper conducted a study on compared growth of a group of VLBW infants fed a formula specifically developed for such infants with another group fed expressed breast milk. The result showed that weight gain was faster in the formula-fed infants after a caloric intake of 100 kcal/kg/d was achieved. Increments in head circumference and skin fold thickness were also greater in the formula-fed group. In another study by the same authors, VLBW infants fed premature formula had significantly greater weight increments and length increments than those on own mother's milk.[9]

Consistent with other studies, preterm infants fed on breast milk or donor milk have significantly slower growth compared with those fed solely preterm formula. [10]

Body temperature was very highly significant in between two groups with p-value <0.0001. The heart rate was progressively higher in formula fed preterm babies than mixed fed preterm babies and it was very highly significant on day 4 with p-value <0.0001. The mean respiratory rate of formula fed preterm babies were increased from day 2 to day 10 progressively compare to mixed fed preterm babies. Blood pressure was very highly significant from day 2 to day 10 with p value <0.0001 between two groups. The blood pressures of mixed fed preterm babies were higher than formula fed preterm babies. Another study revealed that body temperature of the baby increases during breast feeding and oxygen saturation is decreased in breast feeding than bottle feeding and there is a change in physiological parameter during feeding conducted by Snell B J.[11]

In majority, the oxygen saturation level was decreased in formula fed preterm babies than mixed fed preterm babies. Crying pattern was more active among mixed fed preterm babies compared to formula fed preterm babies. Among both groups, rooting reflex was present in 68.6% of mixed fed preterm babies and 57.1% in formula fed preterm babies. Sucking reflex was absent in 74.3% of formula fed preterm babies and statistically significant with p value <0.001. Correlation was found for peripheral oxygen saturation when compared with gestational age and with the level of oral feeding skills.[12]

Conclusion

In the present study, the physiological parameter and behavioral responses compared in between two groups. The study result revealed that the mixed feeding

is very effective and beneficial to maintain physiological parameters and behavioural responses of preterm babies compare to formula fed. The formula fed preterm babies are not having adequate sucking reflex properly and mothers also not having enough milk production.

Conflict of Interest: None

Source of Funding: None

Ethical Clearance: Taken from Ethics Committee of Amrita Institute of Medical Sciences and Research Center.

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Household use Patterns of Iodized Salt in Urban Slums of Meerut

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Abstract

Background: The present study was carried out to estimate the consumption of adequate iodized salt by PSI salt testing kit, knowledge related to the health benefits of iodine and practices with respect to storage and use of iodized salt at the household level in the field practice area of Subharti Medical College, Meerut. **Aims:**To assess the level of knowledge and salt keeping practices among the households and to estimate the iodine content of salt and its determinants in those households. **Settings and Design:**This Cross Sectional study was conducted in 250 households in urban slums in Multan Nagar, Meerut by taking verbal informed consent from the family followed by interview with a self-designed schedule.

Method and Material: The households were selected by simple random sampling and rapid PSI (Plasti Surge Industries) spot testing kit was used in the survey to assess iodine content in the salt used in those households.

Statistical analysis used: The collected data was entered in Microsoft excel and analyzed using SPSS software version 19.0.

Results: More than half of the households (65.2%) had no knowledge regarding iodized salt and nearly 3/4th of the households (73.6%) had no knowledge about benefits of iodized salt. Practice regarding keeping the salt was found to be good as 98.8% of households stored salt in containers with lid and 96.8% buy packet salt.

Conclusions: There is a pertinent need for health education regarding proper use and keeping practices of iodized salt. For the prevention of iodine deficiency disorders, education campaigns should reach grass root level.

Keywords: *Iodized Salt, PSI Salt Testing Kit, Households.*

Introduction

Iodine, a known metallic trace element, is required by humans for proper growth and development. Iodine does not occur naturally in foods rather it is present in soil, ocean water and sea foods. The recommended dietary allowance (RDA) for iodine intake is150 microgram in adults, 220 microgram in pregnant women, & 290 microgram per day in lactating women[1].

Iodine deficiency is the world's single greatest cause of preventable mental retardation[2]. Iodine deficiency disorders affect 2 billion people worldwide[3]. Iodine deficiency disorder (IDD) has been recognized as a public health problem in India[2]. An estimated 167 million people in India are at risk of IDDs[2]. Surveys conducted in various states showed that no state in the country is free from IDD [4].

Globally iodine deficiency disorders are associated with many thyroid related diseases including hypothyroidism, hyperthyroidism, goiter and cretinism

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and also inherit real risk of coronary heart diseases[4]. The thyroid gland is home to the body's largest iodine stores as it requires the mineral for synthesis of hormone it secretes. It proves even more vital for pregnant and nursing mothers where iodine deficiency can lead to still births, spontaneous abortions, impede fetal and child development, and increase mortality.In fact this prenatal deficiency is the most common cause of preventable brain damage in the world. Iodine deficiency also decreases Intelligence Quotient (IQ)[2].

Iodine deficiency can be prevented effectively and inexpensively by supplying iodine from external source in food we commonly eat. Iodized salt is most suitable vehicle for iodine supplementation as salt is most important food item consumed everyday by everybody and most important ingredient used in the kitchen.

The salt iodization program was introduced in India in 1962 by the government of India as National Goiter Control Program (NGCP) aimed at replacement of ordinary salt by iodized salt, particularly in the goiter endemic regions. In August, 1992,NGCP was renamed as National Iodine Deficiency Disorders Control Programme (NIDDCP) with a view of wide spectrum of Iodine Deficiency Disorders like mental and physical retardation, deaf, mutisim, cretinism, still births, abortions etc[5]. Under the national iodine deficiency disorder program in India, level of iodization is fixed at minimum of 30 ppm (parts per million) at production level and 15 ppm at consumer level[6].Salt is iodized by addition of fixed amounts of potassium iodide or iodate as either a dry solid or an aquaeous solution at the point of production.

Salt may be sold to the consumer packaged or in bulk. Packaging materials in wide use in developing countries include paper, high-and low-density polyethylene, and woven bags made of jute, straw, or high density polythene.Salt samples stored in dry places were 1.5 times more likely to retainiodine compare to samples stored near to heat/fire or in a moist area.

Universal salt iodization has been truly one of the most successful interventions in eliminating IDDs as it is feasible, economical, safe and broadly accepted. Most Indian states have introduced mandatory salt iodization through legislation. The salt department and state government are responsible for monitoring the salt iodine content at both the consumption and production level.

Keeping this in mind, the present study was carried out toassess the level of knowledge and salt keeping practices among the households and to estimate the iodine content of salt and its determinants in those households of Multan Nagar, Meerut.

Method

It was a community based, cross sectional study doneto assess knowledge regarding iodized salt and salt keeping practices in urban slums of Multan Nagar, Meerut(catchment area of Community Medicine department of Subharti Medical College).

Considering the prevalence of consumption of iodized salt of Uttar Pradesh as 93.7% according to NFHS-4[8], permissible error of 3%, and a confidence interval of 95%, the sample size calculated was 250.67, rounded off to 250 households. Verbal informed consent was obtained fromthe participating member of the households willing to take part.After informing about the study, they were interviewed with a self-designed schedule. The households which were locked or themembers not present at the day of data collection and/or not willing to participate were excluded and the immediate next household was selected. The respondents were asked questions regarding salt purchasing and consumption habits, salt storage, awareness and benefits of iodized salt, iodine deficiency diseases and practicing regarding iodized salt.

Rapid PSI(Plasti Surge Industries)spot testing kit was used in the survey to assess iodine content. Salt samples (50 grams) were collected from selected households in airtight plastic pouches. They were stored in brown paper envelopes and coded accordingly.

The collected datawas entered in Microsoft excel and analyzed using SPSS software version 19.0. For test of significance chi square test was used and the statistical significance was set at p-value less than 0.05.

Results

In the present study, majority of the population were Hindu (88%) and belonged to Upper Middle Class (36%) & Middle Class (38%) and were found to be significant [Table1]. The association between Knowledge regarding Iodized salt and benefits of dietary iodine with ppm is found to be significant (Table 2). The maximum source of infection among households regarding importance of Iodized salt use is Television followed by Newspaper and

least by Friends and relatives (Graph1). The association of ppm (parts per million)with practices regarding iodized salt such as buying salt from fixed shop, buying packet salt, type of container used for storage of salt, place of storing salt, time of adding salt while cooking and habit of reading information on salt packets was also found to be statistically significant (Table 3).

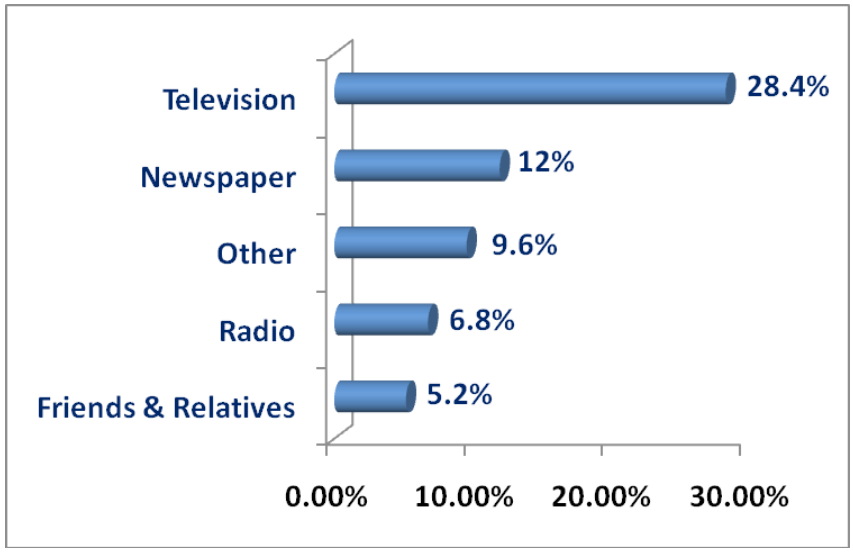
Table 1: Socio-Demographic Profile of the Study Subjects and Consumption of Iodized Salt (N=250)

Variables		Result ppm						Total		χ^2	p-value
		0		>15		<15					
		No.	%	No.	%	No.	%	No.	%		
Religion	Hindu	6	66.7	120	93.8	94	83.2	220	88.0	10.36	.006
	Muslim	3	33.3	8	6.3	19	16.8	30	12.0		
Number of Family Members	3 or less	0	0.0	38	29.7	21	18.6	59	23.6	44.06	.001
	4 to 5	5	55.6	69	53.9	57	50.4	131	52.4		
	6 to 7	2	22.2	19	14.8	34	30.1	55	22.0		
	8 to 9	1	11.1	2	1.6	1	0.9	4	1.6		
	10 or more	1	11.1	0	0.0	0	0.0	1	0.4		
Socio economic Status*	Upper Class	5	55.6	6	4.7	5	4.4	16	6.4	78.45	.001
	Upper Middle Class	2	22.2	66	51.6	22	19.5	90	36.0		
	Middle Class	2	22.2	46	35.9	47	41.6	95	38.0		
	Lower Middle Class	0	0.0	10	7.8	35	31.0	45	18.0		
	Lower Class	0	0.0	0	0.0	4	3.5	4	1.6		

*(Modified B G Prasad; 2016)[10]

Table 2: Knowledge regarding Iodized Salt in the Study Population (n=250)

Knowledge		result ppm						Total		χ^2-value	p-value
		0		>15		<15					
		No.	%	No.	%	No.	%	No.	%		
Knowledge regarding Iodized salt	Yes	2	22.2	82	64.1	3	2.7	87	34.8	100.396	.001
	No	7	77.8	46	35.9	110	97.3	163	65.2		
Knowledge regarding Benefits of dietary iodine	Yes	0	0.0	64	50.0	2	1.8	66	26.4	75.199	.001
	No	9	100.0	64	50.0	111	98.2	184	73.6		



Graph 1 Source of information regarding the importance of Iodized Salt use (n=250 for each response)

Table 3: Practices regarding Iodized Salt in the Study Population (n=250)

Practice		Result ppm						Total		χ^2-value	p-value
		0		>15		<15					
		No.	%	No.	%	No.	%	No.	%		
Using Iodized Salt	Always	3	33.3	66	51.6	11	9.7	80	32.0	186.879	.001
	Sometimes	1	11.1	62	48.4	102	90.3	165	66.6		
	Don't Know	5	55.6	0	0.0	0	0.0	5	2.0		
Buy salt from fixed shop	Always	3	33.3	107	83.6	78	69.0	188	75.2	34.118	.001
	More often	3	33.3	14	10.9	25	22.1	42	16.8		
	Less often	0	0.0	5	3.9	6	5.3	11	4.4		
	Never	3	33.3	2	1.6	4	3.5	9	3.6		
Buy packet salt	Yes	2	22.2	127	99.2	113	100.0	242	96.8	168.282	.001
	No	7	77.8	1	0.8	0	0.0	8	3.2		
Type of container	With Lid	8	88.9	128	100.0	111	98.2	247	98.8	9.321	.009
	Without Lid	1	11.1	0	0.0	2	1.8	3	1.2		
Place of storage	Dry & Cool	6	66.7	122	95.3	70	61.9	198	79.2	79.357	.001
	Moisture area	1	11.1	5	3.9	43	38.1	49	19.6		
	Fire Area	2	22.2	1	0.8	0	0.0	3	1.2		
Time of adding salt while cooking	In the end of cooking	4	44.4	4	3.1	9	8.0	17	6.8	30.058	.001
	In the middle of cooking	0	0.0	10	7.8	2	1.8	12	4.8		
	In the beginning of cooking	5	55.6	114	89.1	100	88.5	219	87.6		
	Anytime	0	0.0	0	0.0	2	1.8	2	0.8		
Habit of reading information on salt packets	Always	0	0.0	43	33.6	15	13.3	58	23.2	37.405	.001
	Often	0	0.0	7	5.5	7	6.2	14	5.6		
	Sometime	0	0.0	33	25.8	14	12.4	47	18.8		
	Never	9	100.0	45	35.2	77	68.1	131	52.4		

Discussion

The present study revealed that despite a long running National Iodization Program, there is major ignorance regarding the benefits and use of iodized salt. In the current study more number of households knew about iodized salt (34.8%) than knowing about the benefits of iodized salt (27.2%) and almost similar findings were obtained by Singh AK et al[6] in which 55.15% house holds knew about iodized salts and only 25.59% knew about its benefits (Table 2).

According to NHFS 4,coverage of households using iodized salt in rural areas of UP[8] was 92.4% while in urban areas it was 97.3%. Similarly, data for Meerut[9] was 96.8% and 97% in rural and urban areas respectively. In the present study similar findings were reported as it was seen that 98% of the study households were consuming iodized salt (Table 3).

In this study, it was found that nearly half of the households (51.2%) were using adequately iodized salt whereas 45.2% of the households were using inadequately iodized salt and 3.6% of the households were using salt with nil iodine. However in study done by Singh et al[6] in rural area of district Bareilly, U.P. 42% of the households were consuming adequately iodized salt, while about 44% of the households were consuming inadequately iodized salt. Nearly 14% of the households were consuming salt with nil iodine. Whereas in study done by Rupali Roy et al[2], 62.5% of the households were using adequately iodized salt.

In this study, the common sources of information for iodized salt, though less, were television (29.2%) followed by newspaper (12%). Other sources of information included the academic knowledge (9.6%) followed by radio (6.8%) and friends and relatives

(5.2%) whereas in study done by Roy R et al television (31.1%) and radio (30%) were the commonest sources of information regarding iodized salt[2]. In the study by Srivastava R et al, source of knowledge regarding iodized salt was mainly the newspapers (51%) and television (46%) followed by shopkeepers (21%), neighbors (18%) and radio (18%)[7] (Graph 1).

This study revealed that 96.8% of the households were using packet salt and rests of the households were using either open salt or crude salt (3.2%). Almost similar results were found by Roy R et al[2] where 93.7% of the households were using packet salt and rest of the households was using either open salt (2.8%) or crude salt (3.6%). Whereas, in study by Singh AK et al[6] 72.3% of households were using powdered salt and 27.7% were using crystal salt.Reasons for not using packet salt were-disliked the taste, influenced by relatives for using non iodized salt and believing in the fact that iodized salt is adulterated and non iodized salt being the purest form of salt (Table 3).

In the current study, 75.6% of the households always bought salt from a fixed shop followed by 20.8% of households which often and sometimes used to buy salt from a fixed shop and only 3.6% households never bought salt from a fixed shop. This finding was obtained in current study only and was not seen in other studies. Most of the people kept salt in plastic containers (91.2%) and with lid containers (98%) whereas 2% of the households kept salt in metal containers and only 8% of the population kept salt in glass containers. The place for storage of salt was dry and cool for 79.6% of the households and moisture area in 19.2% whereas 1.2% of the households kept salt near fire area/sun. In the study done by Singh AK et al[6] only 36.68% of households were storing salt in closed air tight container and maximum (63.32%) were storing in open container (Table 3).

Most of the households (93.2%) bought salt in 1 kg packets and only 23.2% of the households always read packaging of salt whereas 5.6% of the households often, 18.8% of households sometimes and 52.4% of the households never read the packaging of salt. Most of the population (87.6%) adds salt in the beginning of the cooking whereas only 6.8% of the population adds salt in the middle (4.8%) and end (6.8%) of the cooking. These findings were obtained in current study and were not seen in other studies (Table 3).

In conclusion, despite a successful NIDDCP(National Iodine Deficiency Disorders Control Programme), there is a pertinent need for health education regarding proper use and keeping practices of iodized salt. Till the education campaign reaches grass root level, this national effort will not reach its peak as far as the prevention of iodine deficiency disorders are concerned.

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Effect of Intermittent Pneumatic Compression Device (IPCD) Versus Graduated Compression Stockings (GCS) for Venous Thromboembolism Prophylaxis (VTE) in High Risk Surgical Patients

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Abstract

Background: VTE is a leading cause of morbidity and mortality in high risk surgical patients. VTE prophylaxis is recommended for approximately 60% of high-risk surgical patients and 40% of hospitalized medical patients.[4]

Objectives: The objective of the study is to assess the effect of Intermittent Pneumatic Compression Device (IPCD) versus Graduated Compression Stockings (GCS) for Venous Thromboembolism prophylaxis in high risk surgical patients

Materials and Method: An evaluative study with two group post-test only design was used to assess the effect of Intermittent Pneumatic Compression Device (IPCD) versus Graduated Compression Stockings (GCS) for Venous Thromboembolism prophylaxis in high risk surgical patients. 60 samples were taken using non-probability purposive sampling technique from selected hospitals, of which 30 were using IPCD and 30 were using GCS. The data was collected using self-structured demographic data, Caprini risk assessment scale and observation checklist.

Results: The analysis was done by using descriptive and inferential statistics. Researcher applied two sample t-tests for comparison of effects of IPCD and GCS in high risk surgical patients based on observation checklist. On first observation, average VTE risk score was 3.2 for GCS group which was 2.5 for IPCD group. On second observation, average VTE risk score was 2.9 for GCS group which was 2.1 for IPCD group. On third observation, average VTE risk score was 1.8 for GCS group which was 1.1 for IPCD group. T-values for this comparison were 1.7, 1.7 and 2 with 58 degrees of freedom. Corresponding p-values were 0.048, 0.044 and 0.023 which are small (less than 0.05), the null hypothesis is rejected. It is evident that the IPCD group had low risk of VTE which indicates that it acts as a better prophylaxis for VTE.

Conclusion: VTE can cause problems that may affect for the rest of life. One may have long-term problems with breathing, a higher chance of getting another clot and swelling that will not go away and may even lead to sudden death. It is important to check the different policies and protocol set for VTE prophylaxis and have the uniform protocols and standardization post-surgery among high risk patients in different hospitals.

Keyword: *Effect, Intermittent Pneumatic Compression Device (IPCD), Graduated Compression Stockings (GCS), Venous Thromboembolism prophylaxis, high risk surgical patient, Caprini risk assessment scale.*

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Introduction

Safer Surgery can be defined as a reduction in avoidable harm to a surgical patient. Surgery is regarded as a high risk and complex industry. Complications of surgical care have become a major cause of death and disability worldwide.[2] Venous thromboembolism (VTE) is the number one cause of potentially preventable death

in hospitalized patients. Venous thromboembolism accounts for 100 000 patient deaths per year.[3]

Surgical procedures are known to produce a high incidence of DVT because muscle relaxants, anaesthetic agents, and surgery itself affect each of the Virchow's triad of causes. Pharmacologic prophylaxis is currently widespread, addressing the blood coagulability changes during surgery; however, excessive bleeding can be a complication. Physical method of prophylaxis, in contrast, are less well known and have generally been thought to prevent venous blood stasis. [5]

Rudolf Virchow first described the DVT phenomenon in 1846. He has quoted stasis of blood flow, endothelial injury, and hypercoagulability as three factors in Virchow's triad of thrombosis that contribute to the pathogenesis of venous thrombosis. Trauma patients not only are exposed to these risk factors but often possess all three factors concomitantly.[6]

Graduated compression stockings are effective method of thromboprophylaxis during the long-term maintenance of volume in lymphedema. For superficial thrombophlebitis, there may be some benefit from wearing graduated compression stockings in combination with surgery.[7]

Intermittent pneumatic leg compression is an effective method for preventing postoperative deep vein thrombosis. Because deep vein thrombosis is the precursor for pulmonary embolism, it has been assumed that this widely used modality is effective in reducing the frequency of fatal and nonfatal pulmonary embolism.[8]

Thus, seeing the increasing incidence of venous thrombo-embolism in hospitalised patients and the different types of VTE prophylaxis used for post-surgery patient, the researcher felt the need to conduct a comparative study on assessing the effect of IPCD and GCS on venous thrombo-embolism prophylaxis in high risk surgical patient.

Materials and Method

Study objectives:

1. To assess the effects of IPCDs and GCS in high risk surgical patients.
2. To compare effects of IPCD and GCS in high risk surgical patients.
3. To identify the association between IPCD and GCS with demographic variables of high risk surgical patients.

Study design: The study used evaluative approach with two group post-test only design was used to assess the effect of Intermittent Pneumatic Compression Device (IPCD) versus Graduated Compression Stockings (GCS) for Venous Thromboembolism prophylaxis in high risk surgical patients. 60 samples were taken from selected hospitals, 30 of which used IPCD and 30 used GCS, using non-probability purposive sampling technique. The settings of the study is at Dr D.Y.Patil Hospital and Research Centre, Pimpri, Pune and Aditya Birla Memorial Hospital, Thergaon, Pune. The data was collected using self-structured observation checklist, Caprini risk assessment scale and demographic data.

Findings: Section I: Analysis of data related to the effects of IPCDs and GCS in high risk surgical patients

Table 1: Effect of GCS in high risk surgical patients based on Observational checklist n=30

Observation	Risk of VTE	GCS	
		Freq	%
OBS-1	Low risk (Score 0-7)	30	100.0%
	Moderate risk (Score 8-14)	0	0.0%
	High risk (Score 15-21)	0	0.0%
OBS-2	Low risk (Score 0-7)	30	100.0%
	Moderate risk (Score 8-14)	0	0.0%
	High risk (Score 15-21)	0	0.0%
OBS-3	Low risk (Score 0-7)	30	100.0%
	Moderate risk (Score 8-14)	0	0.0%
	High risk (Score 15-21)	0	0.0%

Table 1 indicates that in GCS group, all the patients had low risk of VTE at all the three observations.

Table 2: Paired t-test for the effect of GCS in high risk surgical patients based on Observational checklist n=30

Observation	Mean	SD	t	df	p-value
OBS-1	3.2	1.9			
OBS-2	2.9	1.9	2.1	29	0.024
OBS-3	1.8	1.3	4.3	29	0.000

Researcher applied paired t-test for the effect of GCS in high risk surgical patients. Average risk score based on observational checklist was 3.2, 2.9 and 1.8 on three observations. T-values for test were 2.1 and 4.3 with 29 degrees of freedom. Corresponding p-values were 0.024 and 0.000 on second and third observations.

This is evident that the GCS is significantly effective on second and third observations.

Table 3: Effect of IPCD in high risk surgical patients based on observational checklist n=30

Observation	Risk of VTE	IPCD	
		Freq	%
OBS-1	Low risk (Score 0-7)	30	100.0%
	Moderate risk (Score 8-14)	0	0.0%
	High risk (Score 15-21)	0	0.0%
OBS-2	Low risk (Score 0-7)	30	100.0%
	Moderate risk (Score 8-14)	0	0.0%
	High risk (Score 15-21)	0	0.0%
OBS-3	Low risk (Score 0-7)	30	100.0%
	Moderate risk (Score 8-14)	0	0.0%
	High risk (Score 15-21)	0	0.0%

In IPCD group, all of the patients had low risk at all three observations.

Table 4: Paired t-test for the effect of IPCD in high risk surgical patients based on observational checklist n=30

Observation	Mean	SD	t	df	p-value
OBS-1	2.5	1.6			
OBS-2	2.1	1.6	2.0	29	0.029
OBS-3	1.1	1.5	5.0	29	0.000

Researcher applied paired t-test for the effect of IPCD in high risk surgical patients. Average risk score based on observational checklist was 2.5, 2.1 and 1.1 on three observations. T-values for test were 2 and 5 with 29 degrees of freedom. Corresponding p-values were 0.029 and 0.000 on second and third observations. This is evident that the IPCD is significantly effective on second on third observation.

Section II: Analysis of data related to comparison of effects of IPCD and GCS in high risk surgical patients

Table 5: Comparison of effects of IPCD and GCS in high risk surgical patients based on observation checklist n=60

Observation	Risk of VTE	GCS		IPCD	
		Freq	%	Freq	%
OBS-1	Low risk (Score 0-7)	30	100.0%	30	100.0%
	Moderate risk (Score 8-14)	0	0.0%	0	0.0%
	High risk (Score 15-21)	0	0.0%	0	0.0%
OBS-2	Low risk (Score 0-7)	30	100.0%	30	100.0%
	Moderate risk (Score 8-14)	0	0.0%	0	0.0%
	High risk (Score 15-21)	0	0.0%	0	0.0%
OBS-3	Low risk (Score 0-7)	30	100.0%	30	100.0%
	Moderate risk (Score 8-14)	0	0.0%	0	0.0%
	High risk (Score 15-21)	0	0.0%	0	0.0%

Based on observational checklist, all the high-risk surgical patients for GCS and IPCD groups had low risk of VTE.

Table 6: Two sample t-test for comparison of effects of IPCD and GCS in high risk surgical patients based on observation checklist n=60

Observation	Group	Mean	SD	t	df	p-value
OBS-1	GCS	3.2	1.9	1.7	58	0.048
	IPCD	2.5	1.6			
OBS-2	GCS	2.9	1.9	1.7	58	0.044
	IPCD	2.1	1.6			
OBS-3	GCS	1.8	1.3	2.0	58	0.023
	IPCD	1.1	1.5			

Researcher applied two sample t-tests for comparison of effects of IPCD and GCS in high risk surgical patients based on observation checklist. On first observation, average VTE risk score was 3.2 for GCS group which was 2.5 for IPCD group. On second observation, average VTE risk score was 2.9 for GCS group which was 2.1 for IPCD group. On third observation, average VTE risk score was 1.8 for GCS group which was 1.1 for IPCD group. T-values for this comparison were 1.7, 1.7 and 2 with 58 degrees of freedom. Corresponding p-values were 0.048, 0.044 and 0.023 which are small (less than 0.05), the null hypothesis is rejected. It is evident that the IPCD group had low risk of VTE which indicates that it provides better VTE prophylaxis.

Discussion

Present study was done on 60 high risk surgical patients, to assess the effect of IPCD and GCS on VTE prophylaxis. The samples were divided in two groups, 30 patients using IPCD and 30 patients using GCS.

Comparison between effects of IPCD and GCS indicates that all the high-risk surgical patients for GCS and IPCD groups had low risk of VTE based on observational checklist. Researcher applied two sample t-tests for comparison of effects of IPCD and GCS in high risk surgical patients based on observation checklist. On first observation, average VTE risk score was 3.2 for GCS group which was 2.5 for IPCD group. On second observation, average VTE risk score was 2.9 for GCS group which was 2.1 for IPCD group. On third observation, average VTE risk score was 1.8 for GCS group which was 1.1 for IPCD group. T-values for this comparison were 1.7, 1.7 and 2 with 58 degrees of freedom. Corresponding p-values were 0.048, 0.044 and 0.023 which are small (less than 0.05), the null hypothesis is rejected. It is evident that the IPCD group had low risk of VTE which indicates that it provides better VTE prophylaxis.

Conclusion

The purpose of the study was to assess the effects of intermittent pneumatic compression device (IPCD) versus graduated compression stockings (GCS) for venous thromboembolism prophylaxis in high risk surgical patients. The research was a learning experience for the investigator which gave her better exposure. In this study since the ($p < 0.05$) H_0 (null hypothesis) was rejected. It is evident that the IPCD group had comparatively low risk of VTE than GCS group which indicates that they provide better VTE prophylaxis for high risk surgical patients. Researcher recommend to have uniform protocols for use of VTE prophylaxis across the hospitals.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Taken from Ethical committee of Dr. D. Y. Patil University.

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Assessment of Level of Streess among the B.Sc. Nursing Students

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Abstract

Back ground of the study: Nursing is a noble profession. Nursing education is tough and needs discipline and sincerely throughout the training period. During this period, students have to face different level of stress. Stress reacts physically, mentally and emotionally to various conditions. The aim of this study was to find out the level of stress among the students and its association with selected demographic variables.

Materials and Method: Study was conducted on 180 students of B.Sc. (N) course (1st yr, 2nd yr, & 3rd yr) of Hi-Tech College of Nursing. The research design used was non-experimental descriptive design.

Result: The present study reveals that 52% had average to high level of stress. Majority of the sample 75% had average level of stress among 2nd year students. A statistically significant association was observed for the stress and education and also with type of work.

Conclusion: Level stress during student period was observed among the students. Majority 70% had average to high level of stress during 1st year, majority 75% had average level of stress during 2nd year and majority 10% from each year students has low level of stress. Also, stress is significantly associated with type of work.

Keywords: *Assessment, Stress, level of stress, pss (perceived stress scale), B.Sc.(N) students (1st yr, 2nd yr & 3rd yr).*

Introduction

The term "stress' was first coined in late 1930s. Stress as a whole is defined as a state produced by a change in the environment that is perceived as challenging, threatening or damaging to the person's dynamic balance or equilibrium.

Stress is a state of physical and psychological strain which imposes demands for adjustment upon the individual. It has been reported that student nurses are affected with the stressors in academic, clinical, financial due to parental expectations, competition for grades and career choices.[1 & 2]

Naturally, student period gives some stress to the students. As per research, there is an excessive secretion of hormones. This process creates emotional stress which can be very severe. Stress is unfortunately a common and ordinary side effect of living. Stress can however be particularly harmful, thus it is important to take correct measures to reduce the stress and anxiety levels in student period. [3]

Aims and Objective: The aim of the study was to find out the level of stress among the nursing students (1st yr, 2nd yr, 3rd yr) B.Sc. (N) of Hi-Tech College of Nursing, Orissa, India.

Objectives of the Study:

1. Identify the stress among the nursing students in three years.
2. Compare the level of stress among the students in three years.
3. Associate the level of stress among the students and selected demographic variables.

Materials and Method

The study was conducted on 180 students and the sample were selected by convenience sampling technique based on inclusion criteria and rapport was established with them. The researcher explained the purpose of the study and obtained an informed consent from them and the tools were administered. The demographic data was obtained from the subject themselves.

The data regarding stress was obtained using perceived stress scale (PSS)[4] each sample took 15 minutes to fill the questionnaire. The data obtained was analyzed using descriptive and inferential. Statistics and association was assessed using chi-square.

Data Collection Instruments

1. **Tool-I:-Demographic proforma:** A semi-structured questionnaire was constructed to assess the demographic and other datas. The tool consists of two sections, section-A was socio-demographic data and it consists of questions regarding age, type of family, year of study, education, type of stay, monthly income, type of work etc.

   Section-B comprises questions regarding the problems related to education, sharing of the problem with anyone, way of facing stress, physical and psychological changes occur during stress, type of recreational activates used etc.

2. **Tool-II, Stress Scale:** The stress scale used for the study was a standardized tool:-Perceived stress scale (Pss). Pss is the most widely used psychological instrument for measuring the perception of stress. It is a measure of the degree to which situations in one's life are appraised as stressful. The questions in the PSS ask about their feeling & thoughts, problems etc. The scale contains 10 items and the data collected will be evaluated on the rating of-"o"-Never, I-Almost Never, 2-Sometimes, 3-Fairly often, 4-Very often.[5 & 6]

Results and Discussion

Section-I: Socio-demographic characteristic of the subject.

Table-I: Distribution of subjects based on socio-demographic characteristics. N=180

Variables	Frequency	Percentage
Age in years		
18-21	56	31.11
22-25	78	43.33
26-29	46	25.55
Year of study		
1st year	60	33.33
2nd year	60	33.33
3rd year	60	33.33
Education		
Higher secondary	72	40
Graduation	83	46.11
Post-graduation	25	13.88
Monthly income		
5000-10,000	42	23.33
10,001-20,000	68	37.77
>20,000	70	38.88
Type of work		
Sedentary	32	17.77
Moderate	120	66.66
Heavy	28	15.55
Type of stay		
Staying in Hostel	104	57.77
Staying with family	54	30
Others	22	12.22
Type of family		
Nuclear family	98	54.44
Joint family	48	26.66
3rd generation	34	18.88

Out of 180 students, Majority 78 (43.33%) belongs to the age group 22-25 years. Regarding education, 83 (46.11%) were undergoing nursing training after general graduation, 120 (66.66%) were moderate workers. Majority of the students 104 (57.77%) were staying in the hostel, Majority of them 98 (54.44%) belongs to nuclear family. Also, Majority of the students. 70 (38.88%) family income was > 20,000/-.

Level of Stress among the Students

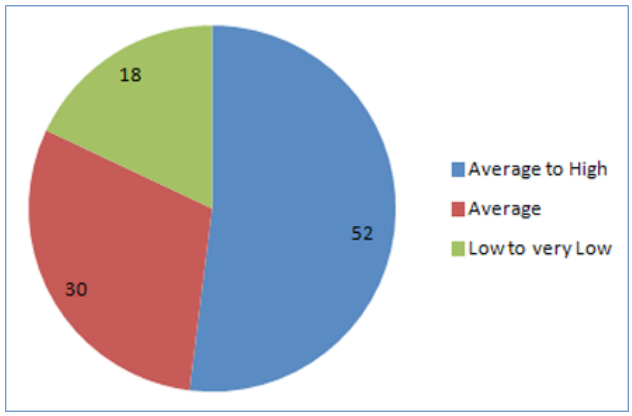


Fig I: Pie chart on stress level on the students

The study findings revealed that 52% had average to high level of stress 30% had average level of stress and 18% had low to very low level of stress during student period. (Fig-I).

Comparision of Stress among three Different Years of Study

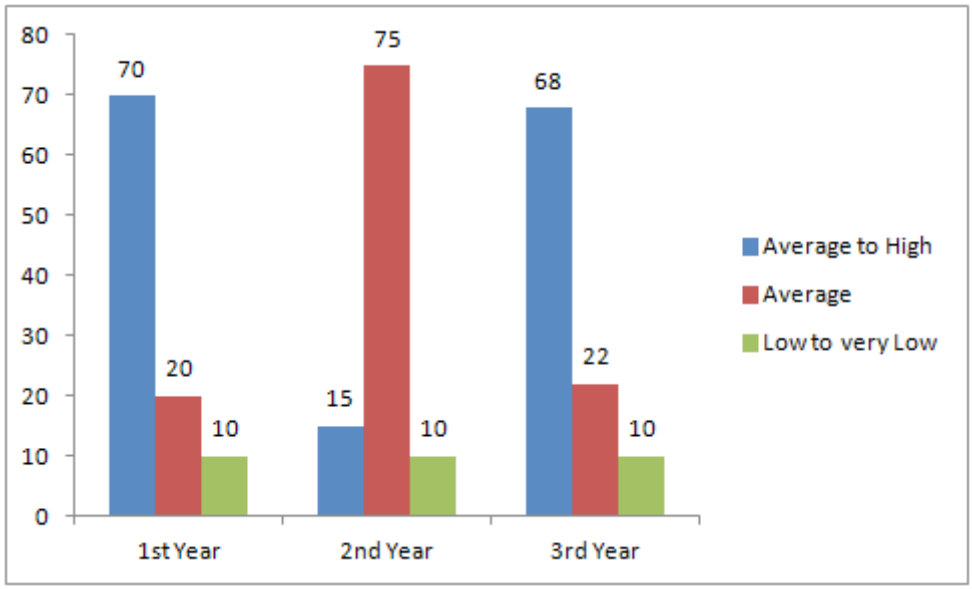


Fig. 2: Comparison of levels of stress among three different years of study

The study findings revealed that most of the students (70%) with average to high level of stress during 1st year while comparing stress among these three years. Most of the 2nd year (75%) students had average level of stress. In these three years in each group (10%) of the students had low to very low level of stress. (Fig-II).

Table 2: Association between the stress and selected demographic. N=180

Variables	PSS Very low + low	PSS Average + High	df	X^2 Value	P Value
Age					
< 20	82 (78.6%)	29 (52.2%)			
• 20	26 (49.2%)	43 (59.6%)	1	0.005	0.982
Education					
Higher secondary	38 (48.6%)	34 (43.2%)			
Graduation	43 (49.8%)	40 (46.2%)	2	0.702	0.619
Post-graduation	10 (40%)	15 42.3%)			
Type of work					
Sedentary	29 (43.2%)	31 (41.3%)			
Moderate + Heavy	86 (76.8%)	34 (43.2%)	1	4.723	0.049
Type of stay					
Hostel	83 (73.4%)	21 (50.2%)			
With family	38 (47.5%)	16 (43.2%)	1	0.105	0.649
Monthly income					
< 10,000	28 (41.2%)	14 (38%)			
• 10,000	78 (69.2%)	60 (49.2%)	1	0.543	0.701
Year of study					
1st yr	48 (49.9%)	12 (32%)			
2nd yr	36 (46.2%)	24 (50.1%)	1	1.823	0.123
3rd yr	32 (43.1%)	28 (52.1%)			

Data in Table-2 slows that there was significant association between the level of stress and type of work. (x^2 = 4.723, P = 0.049). However, no association was found between the level of stress and selected variables like age, education, type of stay, type of family, monthly income etc. Therefore, it can be stated that type of work has a direct influence on the stress experienced by the students.[7]

Discussion

Stress may lead to several problems. Stress reacts physically, mentally and emotionally to the various conditions. The present study reveals that 52% had average to high level of stress, 30% had average level of stress and 18% had low to very low level of stress. Another study conducted by Rajesh Kumar and Nancy in a private institute of nursing in Punjab affiliated with Baba Farid University of Health Sciences, Faridkot to assess stress level and coping strategies among nursing students. Total of 180 students participated in the study. Perceived stress scale-14 (PSS-14) was used to assess stress level and ACOPE was used to identify the coping strategies. Results revealed that 34% students were having moderate stress and 33% each were having mild and severe stress. Class of students and their courses were found to be significantly associated with the stress level of nursing Students.[8]

The findings of the present study reveals that there is a difference in the level of stress in different years of study. It is identified that comparatively higher level of stress (70%) was among the 1st yr students as they are new to the course, as well as to the college and hostel. Another study conducted by b. Kalavathi, S.S Shabana, Rajeswari. H and Indira A. A sample of 60 1st yr B.Sc Nursing students were selected by using simple random sampling technique. Modified student stress scale was used to assess the level of stress. Data was analyzed by using the descriptive and inferential statistics. It revealed that 15 (25%) students had mild stress. 22 (36.7%) students had moderate stress, 23 (38.3%) students had severe stress. In post test 15 (25%) students had very mild stress, 22 (36.7%) students had moderate and 16 (26.7%) had severe stress. Association between level of stress and socio-demographic variables is significant.[9]

The reason may be the fears, anxieties and stress related to the professional course, new environment as they are going to expose to the new college and hostel.

It is also identified that in the present study there is significant association between the level of stress among the students and type of work. Another study conducted by Prasad C.V, Suresh A, Thomas DK, Pritty M.K, Beelis, and Multarim V. aimed to determine the level of stress and coping mechanism adopted by 1st yr B.Sc (N) students. The sample size was 60 and non-probability sampling technique was used. The result shows that only one student (1.7%) has severe stress, 46.7%) has moderate stress and the remaining 51.6% has mild stress. Majority of the students (100%) had average coping.[10]

Conclusion

Nursing education and training is the tough one for the students. Nursing students are more prone towards stress. Stress creates emotional and physical disturbances which causes variety of problems in their personal and professional life, which will hamper quality education and training. Therefore, measures must be taken like providing continuous counseling and guidance, psychological support to reduce the level of stress among the students.

Conflict of Interest: Nil

Financial Support: Nil

Ethical Clearance: Obtained from research committee of Hi-Tech College of Nursing and Ethics committee of Hi-Tech Medical College & Hospital, Bhubaneswar.

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Assessment of Stain Removal Efficacy of Two Commercially Available Polishing Agents: Proxyt Paste (Active Ingredient-Xylitol) and Shine N Smile Paste (Active Ingredient-Alumina)

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Abstract

Background: Tooth polishing is a procedure carried out as a part of oral prophylaxis in most dental practices. In the present study, the stain removal efficacy of two commercially available polishing agents was compare: Proxyt paste (active ingredient-xylitol) and Shine N Smile paste (active ingredient-alumina).

Materials & method:20 subjects in the age group of 20 to 40 years with extrinsic stains were included in the studyand a split mouth study design was employed. After thorough scaling was done, a split mouth study design was employed for comparing the two pastes. On the right side proxyt pastewas used and on the left side Shine N Smile paste was used to polish the teeth using rubber cup technique for 15 seconds on each tooth. Lobene stain index was used to assess the intensity and extent of the stains before and after the polishing procedure was performed.

Results: Pre-treatment and post-treatment score difference for the proxyt group and Shine N Smile group was 0.98 and 1.23 respectively. Significant results were obtained while comparing the mean post-polishing score and difference (pre-treatment and post-treatment) score in between proxyt paste group and shine N smile group.

Conclusion: Shine NSmile paste showed better results in comparison to proxyt paste. However; further studies with larger sample size are recommended.

Keywords: *Polishing, Proxyt paste, Shine N smile paste.*

Introduction

In much the same way an artist uses brush and paint to create his or her art, we too must approach what we do using the teeth and our instruments to do the same (tooth polishing). Tooth polishing is a procedure carried out as a part of oral prophylaxis in most dental practices. It is an act of smoothening the tooth surfaces to make it glossy and lustrous.[1-3] Although the term polishing has been used to describe the professional removal of soft deposits and stains from the tooth surfaces, in reality, this includes both cleaning and polishing. Polishing helps in smoothening the tooth surfaces and makes them glossy and lustrous.[4-6] American Academy of Periodontology has defined tooth polishing as "the removal of plaque, calculus and stains from the exposed and unexposed surfaces of teeth by scaling and polishing as a preventive measure for the control of local irritational factors". Different abrasive and polishing agents being used are pumice, sodium bicarbonate, zirconium silicate, xylitol, aluminium trihydroxide, calcium carbonate, erythritol, glycine etc.[7,8] In the present study the stain removal efficacy of two commercially available polishing agents

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was compare: Proxyt paste (active ingredient-xylitol) and Shine N Smile paste (active ingredient-alumina).

Materials And Method

The present study was conducted at Department of Periodontology Gian Sagar Dental College Ramnagar Rajpura with the aim of comparing the stain removal efficacy of two commercially available polishing agents: Proxyt paste (active ingredient-xylitol) and Shine N Smile paste (active ingredient-alumina).20 subjects in the age group of 20 to 40 years with extrinsic stains were included in the study and a split mouth study design was employed.

Inclusion Criteria:

- Patients presenting with plaque, calculus and extrinsic stains
- Patients with full complement of teeth
- Patients having good general health

Exclusion Criteria:

- Patients presenting with contagious diseases
- Systemic diseases such as uncontrolled diabetes, patients with valvular heart disease, acute infections
- Patients with malocclusion or wearing orthodontic appliances.

After thorough scaling was done, a split mouth study design was employed for comparing the two pastes. On the right side Proxyt paste was used and on the left side Shine N Smile paste was used to polish the teeth using rubber cup technique for 15 seconds on each tooth. Lobene stain index was used to assess the intensity and extent of the stains before and after the polishing procedure was performed. All the results were analysed by SPSS software. Paired t test was used for assessment of level of significance.

Results

In the present study, 20 subjects in the age group of 20 to 40 years with extrinsic stains were included in the study and a split mouth study design was employed. On the right side Proxyt paste was used and on the left side Shine N Smile paste was used to polish the teeth using rubber cup technique for 15 seconds on each tooth. Mean score of the Proxyt paste group before polishing and after polishing was 2.3 and 1.32 respectively. Mean score of the Shine N Smile paste group before polishing and after polishing was 2.27 and 1.04 respectively. Pre-treatment and post-treatment score difference for the proxyt group and Shine N Smile group was 0.98 and 1.23 respectively. Significant results were obtained while comparing the mean post-polishing score and difference (pre-treatment and post-treatment) score in between Proxyt paste group and Shine N Smile group.

Table 1: Pre-polishing and post-polishing results

Observation	Polishing agent	Mean	Std. Deviation	Paired difference			
				Mean	Std. Deviation	t	Sig. (2-tailed)
Baseline (Before polishing)	PROXYT	2.30	1.58	0.032	0.217	1.137	0.260
	SHINE N SMILE	2.27	1.61				
After Polishing	PROXYT	1.32	0.98	0.286	0.249	8.879	0.000
	SHINE N SMILE	1.04	0.91				
Difference (Before-After)	PROXYT	0.98	1.10	-0.254	0.355	-5.545	0.000
	SHINE N SMILE	1.23	1.14				

Discussion

It is important to understand the patient's expectations when considering tooth polishing. They simply like the look and feel of polished teeth. Taste and smell are the next important factors from the patient's point of view. They prefer this procedure over debridement with instruments for many reasons. An important factor is that patients respond positively to the smooth and clean feel that polishing produces. Furthermore, it is less painful and stressful than scaling; and easier for the patient to understand and tolerate. Polishing produces tangible benefits, which the patients can see, and feel.[9, 10]

In the present study, 20 subjects in the age group of 20 to 40 years with extrinsic stains were included in the study and a split mouth study design was employed. On the right side Proxyt paste was used and on the left

side Shine N Smile paste was used to polish the teeth using rubber cup technique for 15 seconds on each tooth. Mean score of the Proxyt paste group before polishing and after polishing was 2.3 and 1.32 respectively.Mean score of the Shine N smile paste group before polishing and after polishing was 2.27 and 1.04 respectively. Chowdhary Z et al compared the efficiency of three different polishing systems on enamel as well as on cementum surfaces by scanning electron microscope (SEM). A total of 120 samples were divided into three groups randomly–Group 1 (bristle brush), Group 2 (rubber cup), and Group 3 (air polisher)–with 20 samples each of enamel and cementum, which were subdivided into 10 control and 10 test group (subjected to polishing). Polishing with bristle brush demonstrated less surface roughness and debris when compared to air polisher at P = 0.58, P = 0.03 for enamel surface and P = 0.003, P = 0.21 for cementum, respectively. The surface roughness was reduced considerably by rubber cup at P = 0.03 for enamel and P = 0.003 for cementum, compared to air polisher at P = 0.99 and P = 0.21 for enamel and cementum, respectively. The results indicated that polishing with rubber cup was more effective and statistically significant when compared to bristle brush polishing and air polisher for the crown and root surface smoothening and debris removal.[9]

In the present study, pre-treatment and post-treatment score difference for the proxyt group and Shine N Smile group was 0.98 and 1.23 respectively. Dental staining is one of the most common problems in aesthetic dental appearance. The use of a rubber cup and pumice is a widely known method among professionals to remove dental stains and plaque. However, this method has limitations because stains in grooves and maligned teeth cannot be accessed. To overcome these limitations, air polishing has been introduced for stain removal. The stain removal efficacies of a rubber cup with pumice and air polishing are similar, but the time required to remove all stains is longer for a rubber cup and pumice than for air polishing. In addition, air polishing can remove stains more efficiently than a curette.[10]

In the present study, significant results were obtained while comparing the mean post-polishing score and difference (pre-treatment and post-treatment) score in between Proxyt paste group and Shine N Smile group. Hongsathavij R et al compared the stain removal efficacy of sodium bicarbonate powders with grain sizes of 65 and 40 μm and to evaluate patient acceptance and operator opinion after using both air polishing powders. A double-blind, randomized, split-mouth study was conducted with 35 participants with moderate to heavy dental staining on both sides of the upper teeth. Removal of dental stains on the index teeth was performed using sodium bicarbonate powders with a grain size of either 65 or 40 μm. The time taken to completely remove all dental stains was recorded. After treatment, a questionnaire was used to evaluate patient acceptance and the operator's opinion. The average time for the removal of all stains by powder was 4.5 ± 3.6 min with a grain size of 65 μm and 4.4 ± 3.8 min with a grain size of 40 μm. The difference in the average time between the two groups was not significant (P = 0.461). The operator's opinions of the two powders were identical, and patient acceptance did not differ significantly between the two types of powders. The 40 μm sodium bicarbonate powder removed dental stains as efficiently as the 65-μm powder.[11]

Conclusion

Under the light of above results, the authors conclude that Smile N Shine paste showed better results in comparison to Proxyt paste. However; further studies with larger sample size are recommended.

Conflict of Interest: The authors declare that there is no conflict of interest regarding the publication of this paper.

Source of Funding: Self

Ethical Clearance: Ethical clearance has been taken from Institutional Ethical Committee

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Knowledge and Level of Awareness about the Use of Interdental Aids and Proper Brushing Techniques amongst Medical Students

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Abstract

Background: Oral hygiene practice is an effective measure for maintaining good oral health. The present study was conducted to investigate the status of knowledge and level of awareness about the use of interdental and proper brushing technique among medical students.

Materials & Method: The present study was conducted on 100 medical students of age group 18-22 years of both genders. A questionnaire was prepared that were served to medical students to elicit their response about interdental cleansing aids and proper brushing techniques.

Results: There were 23 male and 21 female with age <20 years and 31 male and 25 female with age >20 years. 28 males and 23 females brush once daily, 36 males and 31 females brush before meal, brushing method was directed seen in 42 males and 39 females, head was 28 males and 31 females were suing zigzag head king of brush, frequency of changing brush was bi-monthly seen in 33 males and 14 females, tooth pick was most common interdental aid used by males and dental floss by females. The difference was non-significant (P> 0.05).

Conclusion: The students had good knowledge on the basic oral health measures necessary to maintain proper oral health, but their attitude and practices towards oral health were relatively poor.

Keywords: *Awareness, Knowledge, Tooth brushing.*

Introduction

Oral hygiene practice is an effective measure for maintaining good oral health which is an integral part of one's general health. As plaque is the primary aetiological factor in the development of chronic inflammatory periodontal disease so measures should be taken to remove it thoroughly. Although brushing is successful in removing plaque at buccal, lingual and occlusal surfaces but it can't completely clean the interdental surfaces. So good interdental oral hygiene aids are required that can penetrate between adjacent teeth.[1]

Oral hygiene behaviour and seeking oral healthcare can depend on a number of factors. Patients comply better with oral healthcare regimens when informed and positively reinforced. Lack of information is the major reason for non adherence to oral hygiene practices.[2] Further, oral health attitude and beliefs are significant for oral health behaviour. Keeping a healthy oral profile requires joint efforts from the dentist as well as the patient himself. One of the most important factors that decide the dental health of a population is the outlook of its people toward their dentition.[3]

The prevalence of caries is related to a low frequency of brushing and a higher consumption of

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sweets.[4] Also consumption of fluoridated water coupled with a reduction in non-milk extrinsic sugar intake is effective means farcies prevention. Poor oral and dental health has also been linked to heart and lung disease, diabetes, stroke, low-birth weight, and premature births. Therefore, there exists a need to assess the association between knowledge and behaviour amongst individuals.[5] The present study was conducted to investigate the status of knowledge and level of awareness about the use of interdental and proper brushing technique among medical students.

Materials & Method

The present study was conducted in the department of community medicine. It comprised of 100 medical students of age group 18-22 years of both genders. The study was approved from institutional ethical committee. All participants were informed regarding the study and written consent was obtained.

A questionnaire was prepared that were served to medical students to elicit their response about interdental cleansing aids and proper brushing techniques. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

Results

Table I: Distribution of patients

Gender	<20 years	>20 years
Male	23	31
Female	21	25
Total	44	56

Table I, shows that there were 23 male and 21 female with age <20 years and 31 male and 25 female with age >20 years.

Table II: Oral hygiene habits among the study population

Habit	Male	Female	P value
Brushing teeth			
Once	28	23	0.35
Twice	26	23	
Brushing method			
Directed	42	39	0.87
Undirected	12	7	
Brushing time			
Before meal	36	31	0.94
After meal	18	15	
Type of toothbrush			
Hard	7	4	0.26
Medium	34	24	
Soft	13	18	
Head			
Straight	26	15	0.12
Zig-Zag	28	31	
Frequency of changing brush			
Monthly	21	32	0.002
Bi-monthly	33	14	
Interdental aid			
Tooth pick	29	15	0.07
Dental Floss	16	23	
Inter-dental brush	9	8	

Table II shows that 28 males and 23 females brush once daily, 36 males and 31 females brush before meal, brushing method was directed seen in 42 males and 39 females, head was 28 males and 31 females were suing zigzag head king of brush, frequency of changing brush was bi-monthly seen in 33 males and 14 females, tooth pick was most common interdental aid used by males and dental floss by females. The difference was non-significant (P> 0.05).

Table III: Knowledge regarding oral hygiene habits among the study population

Habit	Male		Female		P value
	Yes	No	Yes	No	
Do you brush your teeth regularly	51	3	43	2	0.82
Do your gums bleed while brushing	5	49	3	43	0.78
Have you heard about interdental aids	29	25	24	22	0.84
Do you floss regularly	7	47	5	41	0.81
Sharp objects like pins are harmful to gums	38	16	36	10	0.37
Do you know about powered toothbrush	19	35	16	30	0.94
Are you aware of oral irrigation devices	10	44	9	37	0.89

Table III shows that 51 males and 43 females brush their teeth regularly, 49 males and 43 females gums do not bleed while brushing, 47 males and 41 females do not floss regularly, 38 males and 36 females knew that sharp objects like pins are harmful to gums, 19 males and 16 females know about powered toothbrush, 10 males and 9 females were aware of oral irrigation devices. The difference was non-significant (P> 0.05).

Discussion

It has been observed that oral hygiene does not get the attention and seriousness it deserves. Majority of the people are unaware about the relationship between oral hygiene and systemic diseases. Many diseases show their first appearance through oral signs and symptoms and they remain undiagnosed or untreated because of the missing awareness. According to consumer usage and attitudes study done in 2010 nearly half of the Indian population does not use a toothbrush and only 51% brushed their teeth using a toothbrush and toothpaste.[6] A majority of the Indians are unaware of the fact that good oral health not only ensures freedom from pain and suffering associated with oral health problems, but is also essential for the overall health improvement and elevation of self-esteem, quality of life, and performance at work. Oral hygiene if adopted properly can help get rid of oral diseases. Many studies have proved that better knowledge in oral health practices and their attitude are linked to good habits with healthier oral cavity.[7] The present study was conducted to investigate the status of knowledge and level of awareness about the use of interdental and proper brushing technique among medical students.

We found that there were 23 male and 21 female with age <20 years and 31 male and 25 female with age >20 years. 28 males and 23 females brush once daily, 36 males and 31 females brush before meal, brushing method was directed seen in 42 males and 39 females, head was 28 males and 31 females were suing zigzag head king of brush, frequency of changing brush was bi-monthly seen in 33 males and 14 females, tooth pick was most common interdental aid used by males and dental floss by females.

A et al[8] found that 55.60% of population know that soft drinks will cause dental problems while 36.40% said it will not cause any problems and rest 8% had no idea whether it may cause dental caries or not. 33.6% of population visit dentist regularly while 32.80% don't visit regularly, 20% said that they had never been to a dentist and rest 13.60% said that they visit a dentist rarely. 21.2% had a dental consultation 3 months ago while 45.4% a year ago and the rest 32.4% recalled their exact visit to the dentist and few even mentioned that they didn't have a dental consultation.

In the present study, although brushing was the commonly used method of cleaning, the percentage of subjects brushing their teeth twice daily was 26% which is very less as compared with 58% of the recruits in a study by Dilip et al.[9] It is noteworthy that 58% of the respondents brushed their teeth using medium sized bristles which will jeopardize the tooth structure. This finding is in agreement with the study done by Gopinath et al[10] where 60% of the sample did the same.

33% participants changed their toothbrush bimonthly and surprisingly 67% changed their brush only when it is useless. There is generally lack of use of interdental aids as a preventive tool as only 5-7% had used any kind of interdental aid. In contrast, Kaur [11] found that 44% of sample they studied used interdental aids. This emphasizes the urgent need for educating and motivating the students to use this efficient method for oral health care. We found that 10% of the total subjects reported bleeding gums. This study was in contrast with studies of Al-Kheraif al[12] who showed that self reported bleeding gums was high in percentage. In the present study only 19% of individuals had heard about powered toothbrushes whereas only 10% were aware about the use of oral irrigation devices which indicates that the present population was not very much aware about these devices.

Conclusion

The students had good knowledge on the basic oral health measures necessary to maintain proper oral health, but their attitude and practices towards oral health were relatively poor. Oral health education programs should be conducted with reinforcement so that students can bridge the gap between knowledge and practice by changing their attitude from negative to positive one. Students should be educated not only about the proper brushing techniques but also about the usage of interdental aids so that they can maintain their oral health in an excellent state. They should be motivated to get regular dental check ups done, as they are the future health providers who pave the way for better society in the creation of better oral hygienic conditions.

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Ailments of Women Beedi Labourers in Tirunelveli District, Tamil Nadu

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Abstract

This paper major aim to address the ailments of women beedi labourers in Tirunelveli district, Tamil Nadu state. Women empowerment is a smart key to develop their any nation according to women skill and capacity. Now-a-days the plenty of people are living under below poverty line because they are not getting a minimum employment facilities in their life. Further, majority of the people are depends on indoor jobs such as match box works, candle works, and beedi works, especially, women people are dominated and working under indoor jobs than that of men. Beedi works is one of the informal or unorganized sectors in India. It plays a vital role for improving economic development like the beedi work provides employment facilities, improving their living conditions, reduce poverty also. Health is one of the major factors and this present research directly to measure the ill health effects of beedi rolling workers. The measurement of ill health effects in terms of the workers affected by headache, stomach pain, eye problems, skin pain and others. In view these circulstances, the research is based on ailments of beedi workers in Tamil Nadu. The main aim of this paper is to find out the ailments of women beedi workers among well-off households and poorer households in the study region. By this study has used primary data survey method and totally 51 sample respondents are taken from two villages like Alangulam and Sankarnagar in selected Alangulam block of selected district. As a result found that, the women of poorer household respondents have mostly affected such health problems like head ache, eye problems and skin problems as compared to that of women well-off household in selected area.

Keywords: *Ailments,informal sector, women health problems, employment opportunity,well-off households, poorer households.*

Introduction

Statement of the Problem: In view of this economic importance, the entire economy meets many controversial issues like poverty, employment problems, mass population, pollution and etc. These critical issues are leads to inflation or deflation, problems arising in exchange rate policy, and to collapse the economic development. Now-a-days the plenty of people are living under below poverty line because they are not getting a minimum employment facilities in their life. In view of this, majority of the people are depends on indoor jobs such as match box works, candle works, and beedi works, especially, women people are dominated and working under indoor jobs than that of men[3]. Ansari (2015) pointed out that, "beedi making industry is one of the age old industries and it provides largest job opportunities under unorganized sector in India. Further, the author stated that, most of them women workers are engaged under home based works like the beedi rolling activities who fall comes from below poverty line"[6]. Beedi works is one of the informal or unorganized sectors in India. It plays a vital role for improving economic development like the beedi work provides employment facilities, improving their living conditions, reduce poverty also. Since the beedi work is considered a major livelihood source in rural economy. The beedi work raw materials are provided by the contractors and finally the work is finished by the employee and it is replaced to the contractors[1]. Furthermore, it is engaged on labour intensive work, it is home based production activity work and the beedi roll is produced by manually. Further, the small scale industries occupy a unique position and

volatile of economic life of the home based workers[4]. At this juncture, the present study makes an attempt to analyse the ailments of women beedi workers among well-off household workers and poorer–household workers with special reference to Tirunelveli district, Tamil Nadu. In Tamil Nadu, the informal sector like the beedi rolling industry is one of the biggest industry with more than 5 lakhs labourers are involved in beedi works in Tirunelveli district[7]. Further, the other districts are also involved in beedi rolling works in Tamil Nadu like Vellore, Thoothukudi, Kanyakumari, Erode, Thiruvallur, Chengalpattu, Tiruvannamalai etc[10]. But, the Tirunelveli district is occupied prime position to involved in beedi works. Majority of the beedi workers are comes from rural area like Alangulam, Keelpacoor, Tenkasi, Pavoorchatthiram, Ambasamudram, Pappakudy etc. By and large, wage and health factors are ultimate role to improve their social status in any countries. Health is one of the major factors and this present research directly to measure the ill health effects of beedi rolling workers. The measurement of ill health effects in terms of the workers affected by headache, stomach pain, eye problems, skin pain and others. In view these circulstances, the research is based on ailments of beedi workers in Tamil Nadu.

Objectives:

1. To find out the ailments of women beedi workers among well-off households and poorer households in the study region.
2. To suggest the suitable measures to improve their health conditions among beedi workers.

Hypothesis:

1. Women poorer household workers may be affected more health problems as compared to women well-off households.

Methodology: Drawn from the present study is based on multi-stage random sampling method. This paper makes an attempt to field survey method i.e., the survey collected from primary investigation system and it is prepared by well interview questionnaire method. In view of this multi-stage sampling method, the first stage, the Tirunelveli district has selected in Tamil Nadu state, because this selected district is a pioneer district among the beedi work is involved in high level and most of them women are engaged to work in beedi rolling industries. Followed by the second stage, the Alangulam block has selected in Tirunelveli district, it is selected by using lottery method. Further, the Alangulam block is one of the revenue blocks in selected district. In third stage, two villages have selected like Alangulam village and Sankarnagar village in selected block. With respect to fourth stage, 51 sample households are selected and it is selected by using simple random sampling method. In view of these selected respondents in Alangulam village, 30 respondents are selected. Out of this sample household, 10 respondents are selected from women well-off households and the remaining 20 households are poorer households. On the other village i.e., Sankarnagar village, 21 respondents are selected. Out of this 21 respondent, 9 households are selected from well-off household and the remaining 12 respondents are covered from poorer household. In totally, 19 sample households are selected from well-off households and the remaining 32 sample households are selected from poorer households in selected villages in Tirunelveli district. By and large, the present study has employed with using percentage method for income pattern, opinion about health problems, and symtoms of health problem among beedi workers in selected district.

Results and Discussions

Table 1: Income Pattern of Women Beedi Workers

Income	Women Well-off Households	Women of Poorer Households	Total Respondents
Less than Rs 3000	2(10.5)	17(53.1)	19(37.3)
Rs 3000-4500	4(21.1)	10(31.2)	14(27.5)
Rs 4500-6000	6(31.6)	3(9.4)	9(17.6)
More than Rs 6000	7(36.8)	2(6.3)	9(17.6)
Total	**19(100)**	**32(100)**	**51(100)**

Source: Primary Data

Table 1 explains the distribution of selected workers according to their household monthly income basis. It is cleared from the table that, out of the whole respondents, majority 37.3% of them earned less than Rs 3000, followed by 27.5% of the respondents earned between Rs 3000 to Rs 4500, and the remaining each 17.6% of the respondents earned between Rs 4500-6000 and more than Rs 6000. According to women well-off workers most of them earned Rs more than Rs 6000 which constitute 36.8% followed by 31.6% at Rs 4500-6000, 21.1% at Rs 3000-4500 and the least income level at Rs less than Rs 3000 which constitute 10.5% . Whereas women of poorer household, and majority more than

half of them (53.1%) earned the monthly income level as Rs less than 3000, followed by 31.2% at Rs 3000-4500, 9.4% at the Rs 4500-6000 and rest of them 6.3% earned at Rs more than 6000. As result found that, the women well-off household respondents has earned more income as compared to that of women poorer households.

Table 2: Opinion about Health Problems of Beedi Workers

Health Problems	Women Well-off Households	Women Poorer Households	Total
Yes	8(42.1)	25(78.1)	33(64.7)
No	11(57.9)	7(21.9)	18(35.3)
Total	**19(100)**	**32(100)**	**51(100)**

Source: Primary Data

Table 2 indicates that health problems among the selected workers. It is observed from the table that on the whole, more than half of the respondents (64.7%) showed some health problems such as; burning of the eyes, head ache, etc., and the rests of them 35.3% of the respondents have good health in both households. According to women well-off household, 57.9% of the respondents stated that they have good health and the remaining 42.1% of the respondents argued not so for it. But in the case of women of poorer households, a majority more than three fourth of the respondents (78.1%) mentioned some health problems and the remaining 21.9% of the respondents spent out they have good health. The comparison between these groups, women of poorer household affected more health problems as compared to that of women well-off households.

Table 3: Opinion to welfare facilities in working places

Welfare facilities	Women well-off	Women of poorer	Total respondents
Yes	12(63.2)	9(28.1)	21(41.2)
No	7(36.8)	23(71.9)	30(58.8)
Total	**19(100)**	**32(100)**	**51(100)**

Source: Primary Data

Table 3 shows that the selected workers opinion to welfare facilities in working places. Out of the total selected respondents, more than half of the respondents (58.8%) stated that there is still needed to be provided with the benefits and welfare facility and the remaining 41.2% of the respondents have been attained welfare facility with benefits in both households. According to women well-off households a majority of 63.2 % of the respondents opined about they have attained welfare facility and benefits and rest of them 36.8% of the workers there are still demanded to be attained welfare facilities and benefits. Whereas the women of poorer households, nearly three-fourth of the respondents (71.9%) have demand to be provided welfare facilities and the remaining 28.1% of them recorded attained the welfare facilities and benefits. As a result found that, the women of the poorer households demand to be provided such welfare facilities and they required hospital facilities, medical facilities, and good environmental facilities.

Table 4: Ailments of Women Beedi Labourers

Ailments	Women Well-off Households	Women of Poorer Households	Pooled Respondents
Headache	2(25)	4(16)	6(18.2)
Burning of eyes	1(12.5)	5(20)	6(18.2)
Back/neck/ stomach pain	2(25)	7(28)	9(27.2)
Cough	1(12.5)	3(12)	4(12.1)
Skin problem	2(25)	4(16)	6(18.2)
Others	0(0)	2(8)	2(6.1)
Total	**8(100)**	**25(100)**	**33(100)**

Source: Primary Data

Table 4 analyse the ailments of women beedi labourers in selected area. The report includes various symptoms such as head-ache, burning of eyes, back pain, neck pain, stomach pain, coughs, skin problems and other related problems. It is clear from the table that, 27.2% of the respondents affected by back pain/neck pain/ stomach pain, followed by head ache, burning of eyes, skin problems have recorded 18.2% of the respondents each, 12.1% of the problem affected by coughs, and least 6.1% of the respondents opined that other such related problems in both selected households. It regards to women well-off household, 25% of them respondents each affected by headache,backpain/neck/stomach pain and the remaining 12.5% of the respondents each affected by burning of the eyes and skin problems. On the other hand the women of poorer households, 28% of them affected by back/neck/stomach pain, followed by 20% of the respondents affected by burning of the eyes, 16% of the respondents each affected 4 by headache and skin problems, 12% of them recorded to cough problems, and the least 8% of the respondents by other such problems such as, hand pain, leg pain, breathing problem, etc., It is focused from the table the women of poorer household

has majority affected by back/neck/stomach pain as compared to other problems. By and large, as a result found that, the women of poorer households have mostly affected such as many health problems as compared to that of women well-off households in Tirunelveli district.

Policy Suggestions:

1. The standard of living condition is poor among the beedi workers. Hence, the Government should try to provide hospital facilities, medical facilities, and housing facilities.
2. Among the beedi workers now get only low wages. Hence, the Government should take necessary action and to suggest follow the minimum wage rate policy.
3. More number of beedi workers is affected by health diseases. Hence, they require good working places, better air condition facilities and environmental facilities and further, they need for free health check-up facilities also. So, the Government should try to provide free health check-up facilities and other facilities also.

Ethical Clearance: Completed

Sources of Funding: Self

Conflict of Interest: Nil

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A Study on Internet Banking System and Customers Satisfaction in Namakkal District

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Abstract

The internet banking system is an innovative banking method and it is otherwise called online or electronic banking system. In view of this internet banking system is typically related with core banking system which has been operated by a bank with internet. The internet banking system refers to that the monetary transactions are involved through electronically from one person account to another person account with using internet, it does not depend upon physical transaction process. Under the following internet technologies, the banks have benefitted in several ways such as, it has the result found in reducing costs, saving time and energy, and has developing revenue from various channels. Further, the prime objective of the study is, to examine the usage of online banking facilities among gender wise classification in Morepalayam panchayat of Namakkal District. Next objective is that, to analyse the customer satisfaction among the usage of internet banking facilities in Morepalayam panchayat of Namakkal District. The design of the study is based on primary data analysis and using well-structured interview scheduled method. With respect to primary data collection, 85 samples have taken for this present research. Out of the whole 85 sample respondents, 48 respondents are male and the remaining 37 respondents are female. The period of the study is covered from 1st April 2018 to 31st July 2018. As a result found that, 41.18 percent of them respondents are strongly agree among the usage of internet banking facilities for the purpose of funds transferring from one account to another account.

Keywords: *Internet banking, customer satisfaction, fund transaction, technology and innovation.*

Introduction

The present contribute to summarize the role of internet banking system and customers satisfaction in rural areas. The internet banking system is an innovative banking method and it is otherwise called online or electronic banking system. At present the internet banking system plays a vital role to improve their banking transactions among rural areas in India. The internet or online banking system was first introduced by 1980s in New York (US). Almost simultaneously with the US, online banking system is also started in United Kingdom. The United Kingdom's pointed out that the first home online banking service is called Home-link was set up by Bank of Scotland at Nottingham Building Society in 1983[2]. In India, internet banking system was first announced by ICICI bank to its customers in 1996. In view of this internet banking system is typically related with core banking system which has been operated by a bank with using internet which enables them lower level of cost than that of traditional brick and mortar banks. In simple terms, the internet banking system refers to that the monetary transactions are involved through electronically from one person account to another person account with using internet, it does not depend upon physical transaction process[1]. Under the following internet technologies, the banks have benefitted in several ways such as, it has resulted in reducing costs with saving time, energy, and has developing income from various channels. Further, the number of customer need to their convenient in anywhere banking system. The internet and newer technology may be reduced human mistakes and errors[4]. The internet process is a way to access and analyse various data in anytime with providing a strong reporting system. Moreover the introduction of electronic funds transfer and the implementation of ATM channel have found that the convenient of any-time banking method.[5] By and large, the National Electronic Funds Transfer (NEFT) is contributing easiest way for electronic payment system according to the amount of funds transferred between one account to another account. Moreover, the Immediate Payment Service is

called IMPS; it is also one of the major processes for the funds transfer facility system and it is given by National Payments Corporation of India (NPCI) which is working in 24 X 7. At this juncture, the present study makes an attempt to analyse the online banking system and customer satisfaction in rural area.

Importance of Internet Banking System in India

i. The internet banking system is much easier and faster for both customers and banks.

ii. The major important view is that to save time and energy.

iii. It is easier to transfer the funds from one bank to other banks.

iv. It is well organized method for cash management through internet optimization.

v. The internet or online banking system is functioning throughout the year 24 X 7 from any place through internet access.

vi. It provides more privacy to customers by using newer technologies.

vii. It makes better relationship between customer and bank officers.

Research Objectives:

i. To examine the usage of online banking facilities among gender wise classification in Morepalayam panchayat of Namakkal District.

ii. To analyse the customer satisfaction through internet banking facilities in Morepalayam panchayat of Namakkal District.

Research Methodology: The present study has adopted primary data analysis method with using well-structured interview scheduled method. It is specified by multi-stage sampling techniques method and the simple random sampling method was used. In view of this content, Namakkal district has selected in first stage, followed by the second stage, Morepalayam panchayat has selected in Namakkal district. Among third stage, Paruthipalli and Ramapuram villages have selected. Among the fourth stage, the sample respondents have selected with proper interview scheduled method. On the basis of this primary data, 85 samples have taken for this present research. Out of the whole 85 sample respondents, 48 respondents are male and the remaining 37 respondents are female. With respect to that data collection, the period is covered from 1st April 2018 to 31st July 2018. Further, in view of this tools for analysis, the percentage method has used.

Results and Discussion

Table 1: Gender Wise Classification of Internet Banking Facilities

Age / Gender	Male	Female	Total
Upto 20 Yrs	6(12.5)	4(10.81)	10(11.76)
20–30	21(43.75)	18(48.65)	39(45.88)
30–40	14(29.17)	11(29.73)	25(29.41)
40–50	5(10.41)	4(10.81)	9(10.59)
Above 50 Yrs	2(4.17)	0(0)	2(2.36)
Total	**48(100)**	**37(100)**	**85(100)**

Source: Field Survey

Table 1 explains the gender wise along with age wise classification of sample respondents which represents the usage of internet banking facilities in selected Namakkal district. Out of the total 85 respondents, most of them 45.88 percent of the respondents are stated that funds transferred from one person account to another person account with using internet banking facilities fall under the age group between 20-30 years, next 29.41 percent of them pointed out that using internet facilities for the purpose of transferring funds among the age group of 30-40, 11.76 percent of them recorded under the age group of upto 20 years, 10.59 percent of them recorded among the age group between 40-50 years and the least 2.36 percent of them opined that using internet facilities for their funds transferring from one person to another person account as it fall in the age group of above 50 years. As a result found that the comparative between male and female respondents, the female respondents are using internet facilities for transferring funds from one person account to another person account as it is more than that of male respondents who are fall in the age group between 20-30 years.

Table 2: Types of Internet Banking Facilities

Age / Gender	Male	Female	Total
Mobile Banking	20(41.67)	15(40.54)	35(41.18)
NEFT Using	17(35.42)	13(35.14)	30(35.29)
Other Facilities	11(22.91)	9(24.32)	20(23.53)
Total	**48(100)**	**37(100)**	**85(100)**

Source: Field Survey

Table 2 interprets the types of internet banking facilities in selected district. It could be noticed that, the male respondents (41.67%) are using mobile banking facilities through internet at high level as compared to that of female respondents (40.54%). Followed by NEFT using facilities, the male respondents are recorded higher level (35.42%) as compared to female respondents (35.14%). Remaining other facilities through internet, the female respondents are recorded high level (24.32%) as compared to that of female respondents (22.91%). As a result found that most of them 41.18 per cent of the respondents are recorded their funds transferred from one account to another account with using mobile banking facilities through internet in selected area.

Table 3: Customer Satisfaction Through Internet Banking Facilities

Perception	Male	Female	Total
Strongly Agree	20(41.67)	15(40.54)	35(41.18)
Agree	13(27.08)	12(32.43)	25(29.41)
Neutral	10(20.83)	3(8.11)	13(15.29)
Disagree	2(4.17)	5(13.51)	7(8.24)
Strongly Disagree	3(6.25)	2(5.41)	5(5.88)
Total	**48(100)**	**37(100)**	**85(100)**

Source: Field Survey

Table 3 analyse the customers satisfaction through the usage of internet banking facilities in Namakkal district. It is noticed that, 41.67 percent of the male respondents are opined that strongly agree with high level satisfied among the usage the internet banking facilities as compared to female respondents which contribute 40.54 percent. Followed by the female respondents (32.43%) agree with high level using internet banking facilities than that of male respondents (27.08%). Under neutral level, the male respondents are satisfied with using online banking facilities as compared to that of female respondents. The female respondents (13.51%) are opined that disagree about using internet banking facilities than that of male respondents at 4.17 percent. By and large, the male respondents (6.25%) stated that strongly disagree with using internet banking facilities than that of female respondents at 5.41 percent in selected area. It could be resulted that, 41.18 percent of them respondents are strongly agree among the usage internet banking facilities for the purpose of fund amount transferring from one account to another account.

SWOT Analysis of Internet Banking Facilities

Strengths	Weaknesses
✓ It is possible for quick transaction between one account to another account among throughout the year 24 x 7 with internet access. ✓ It is possible for booking bus ticket, train ticket, boarding and lodging facilities through internet access. ✓ It gives more relationship between customers and bank officers. ✓ Using internet facility, it is optimized for cash management process in banking sector. ✓ Internet is a way for reducing cost and increasing efficiency.	× Need for huge investments for maintaining online banking method. × Lack of awareness about consumer side due to following digitalization process in our society. × Online banking system arise the gap between personal human touch. × Online banking system arises various types of risks and it is difficult to manage them. × Lack of Technology in rural areas × Lack of trained staffs

Opportunities	Threats
• To improving Customer Services • To reduce competitive pressure • To increase revenue • To replacing old scheme systems • To reducing human error • To encourage efficiency • To evaluate their technology and assess internet banking systems • To expand marketing through the usage of internet amenities.	• Outsourcing risks are high. • Operational risks are at high level. • Difficult to handling newer technologies. • Lack of well-trained staff • In remote villages, internet is not working in properly. • Legal risks are arising at various ways. • Arising information technology risks. • Internal audit problem also arising under online banking method.

Conclusion

In view of this economic importance, online banking system is a good driven for improving relationship between customer care support and bank officers. It could be noticed that, the internet banking system is support to assess the efficiency for technology. Further, the internet banking system is an innovative banking system and it growing business in the market. The internet banking system to facilitate account management for business people and it is useful for foreign currency transactions. By offering speed and fast internet system is to reduce time and to manage various transactions. Thus the study concluded that, our society need for quality and efficient

banking system like as eco-friendly manner, secure and privacy, convenient and reducing cost, saving time and go green method. The way of internet banking system is fully depends upon quality of services, to attain sustainable development, and maintaining customers satisfaction.

Ethical Clearance: Completed

Sources of Funding: Self

Add Conflict: Nil

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Quality of Life of People with Type 2 Diabetes

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Abstract

Purpose: A descriptive survey design has been used to assess the quality of life among people with type 2 diabetes.

Method: This descriptive survey was carried out among 180 people with type 2 diabetes who admitted to tertiary care hospital at Udupi from June 2015 to January 2016. Data collected were basic demographic information andclinical items like HbA1c and BMI. Quality of life (QOL) was assessed with quality of life instrument for Indian diabetes Patients (QOLID) tool.

Results: This study reveals poor quality of life among 22 (12.2%) people with type 2 diabetes and moderate level in 158 (87.8%) of them.

Conclusion: Considerable number (12.2%) of people with type 2 diabetes is experiencing poor quality of life which calls for appropriate intervention.

Keywords: *Type 2 diabetes, Quality of life, self management.*

Introduction

Diabetes is on the rise. Every 40 seconds a new case is diagnosed[1]. Individuals are living with diabetes across the world are estimated about 415 million and by the year 2040this number may rise to 642 million[2]. 75% of them will be living in developing countries. Concerning age group 40-59 years constitutes majority.

Estimated number concerning diabetes for south East Asia, is 78.3 million and India constitutes majority of them i.e. 69.2 million[2]. In India 1.1 million deaths occurred due to diabetes where the number for South East Asia is 1.2 million[3]. Prevalence rate of diabetes in urban Indian is about 8.7% which is a decade earlier when compared to western population. This reveals that young people i.e. below 50 years of age are affected with diabetes which is supposed to be most productive time of their life with a possibility of higher risk of complications[4]. Maintaining good quality of life challenging since diabetes is a chronic life long illness, require regular monitoring and evaluation throughout their life.

This present study aimed to assess the quality of life of people with type 2 diabetes at selected hospital in Udupi district. We alsoaimed to find out the associations of quality of lifeand demographic variables. Good understanding of it is essential to provide effective health care.

Summary Statement

What is already known about this topic?

- Quality of life among people with type 2 diabetes is a multidimensional construct.
- Perceived quality of life is considered as an essential output of an intervention

What this paper adds?

- This study focuses on various aspects of quality of life among people with type 2 diabetes which aids to become aware of it.
- Awareness about different aspects of quality of life will help to design interventions to improve it.

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The implications of this paper

- Shift of focus from symptomatic care to holistic approach where overall quality of life will be the goal of intervention.
- Innovative approaches to strengthen the ability of self management of their condition to maintain a good quality of life of people with type 2 diabetes

Materials and Method

A descriptive survey was carried out to determine the quality of life of people with type 2 diabetes in a selected tertiary care hospital at Udupi from June 2015 to January 2016. After satisfying inclusion criteria a total of 180 people who admitted with type 2 diabetes were participated in the study. Inclusion criteria were people with type 2 diabetes aged more than 30 years, suffering from diabetes for more than 3 months, able to communicate in regional language Kannada, willing to participate in the study, whose glycosylated haemoglobin (HbA1c) is 6% and above

Tool description

Demographic proforma: Demographic proforma was constructed to collect the characteristics of the study participants. This tool consisted of 12 items like age, gender, religion, education, occupation, family monthly income, dietary habit and clinical items like onset, duration of illness, regular check up, HbA1c and BMI.

Quality of life tool: Quality of Life Instrument for Indian Diabetes Patients (QOLID) tool developed by Jitendernagpal et.al was used in the survey with authors' permission. Tool consisted of 34 items covering 8 domains like general health, role limitations due physical health, symptom frequency, physical endurance, treatment satisfaction, financial worries, diet advice satisfaction and mental health. Items were scored 1 to 5, maximum possible score was 169 and minimum was 34. The quality of life was classified into good (125-169), moderate (79-124) andpoor (34-78)[5].

Data collected, analysed and interpreted as per the study objectives using descriptive and inferential statistics with the use of SPSS 16 version

Ethical consideration: This study was carried out after getting the clearance from institutional ethical committee and written informed consent from the study participants. Institutional ethical committee approval number: ECR/146/Inst/KA/2013

Results And Discussion

Sample Characteristics

Table 1: Frequency and percentage distribution of people with type 2 diabetes n=180

Variables	Frequency (f)	Percentage (%)	P-value
Age (Years)			
30-39	21	11.7	.835
40-49	32	17.8	
50-59	59	32.8	
60 -69	45	25.0	
70 and above	23	12.8	
Gender			
Male	121	67.2	.266
Female	59	32.8	
Income			
below 5000	27	15.0	.124
5001-10000	105	58.3	
10001-15000	39	21.7	
15000 above	9	5.0	
Dietary habits			
Vegetarian	72	40.0	.224
Non vegetarian	108	60.0	
Duration of illness			
Less than 1 year	40	22.2	.024
1-5 years	70	38.9	
More than 5 years	70	38.9	
Onset			
Before 30 years	2	1.1	.959
30 –39years	34	18.9	
40–49years	57	31.7	
50–59 years	53	29.4	
60–69years	31	17.2	
After 70 years	3	1.7	
Regular Check up in a year			
None	5	2.8	.333
Once	15	8.3	
Twice	69	38.3	
Thrice or more	89	49.4	
Don't know	2	1.1	
HbA1c (gm %)			
Below 8	94	52.2	.034
8.1 - 10	37	20.6	
10.1 -12	28	15.6	
Above 12.1	21	11.7	
BMI			
<25	84	46.7	.871
25 - 30	92	51.1	
>30	4	2.2	

Sample characteristics reveals that majority (57.8%) of the patients are in the age group of 50 to 69 years. Concerning to gender, 121 (67.2%) were males,167 (92.8%) belongs to Hindu religion, 121(67.2%) were had schooling not more than higher secondary,156 (86.7%) were married, 105 (58.3%) had monthly family income of 5001 to 10,000 Indian Rupees and 108 (60%) were non vegetarians.

Concerning to duration of illness 140 (77.8%) of them had diabetes more 1 year. Most of them i.e. 57 (31.7%) had onset of illness between41 to 50 years. Most of them i.e.89 (49.4%)gone for regular check up thrice or more in a year,92 (51.1%) had information regarding diabetes and its management. 94 (52.2%) maintained blood glucose level below 8gm%of HbA1c and96 (53.3%)had BMI more than 25.

Quality of life

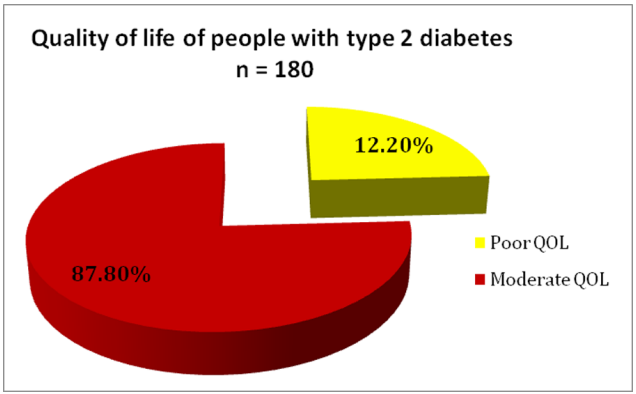


Figure: Pie chart on quality of life of people with type 2 diabetes.

Association between quality of life and selected variables among people with type 2 diabetes

Table 2: Association between quality of life and selected variables n=180

Variable	Freq-uency	Overall QOL		P value
		<Median (86)	≥ Median (86)	
Duration of illness				
Less than 1year	40	15	25	.299
1-5 years	70	36	34	
More than 5 years	70	36	34	
Onset				
Before 40 yrs	36	17	19	.419
41 - 50yrs	57	32	25	
51 - 60yrs	53	25	28	
After 60	34	13	21	
Regular Check up in a year				
Others	22	6	16	.060
Twice	69	32	37	
Thrice or more	89	49	40	
HbA1c (gm %)				
Below 8	94	45	49	.199
8.1 - 10	37	21	16	
10.1 -12	28	9	19	
Above 12.1	21	12	9	
BMI				
<25	84	38	46	.437
25 and above	96	49	47	

Data in the table 2 shows that there is no significant association found between clinical items like onset(P=.419), duration of illness(P=.299), regular check up(P=.060), information on disease condition(P=.771), HbA1c (P=.199) and BMI (P=.437).

Quality of life with regard to different domains

Table 3: Quality of life with regard to different domains n=180

Quality of life domains	Minimum	Maximum	Max. possible score	Mean	Std. Deviation	Median	Std. Error
Physical Health	10	22	30	15.61	2.439	16	.257
Physical Endurance	9	27	30	15.45	2.904	15	.306
General Health	4	12	15	7.585	1.426	8	.150
Treatment Satisfaction	6	17	20	10.56	1.991	10	.210
Symptom Botherness	5	13	15	7.87	1.605	8	.174
Financial Worries	5	16	20	9.75	1.850	10	.195
Emotional/Mental Health	7	23	25	12.67	2.484	13	.262
Diet Satisfaction	3	13	15	7.30	1.764	7	.186
Over all QOL	68	123	169	86.83	8.391	86.00	.884

Quality of life of people with type 2 diabetes was assessed in 8 different domains. Mean and standard deviation of physical health 15.61 ± 2.439, physical endurance 15.45 ±2.904,general health 7.585±1.426, treatment satisfaction 10.56±1.991, symptom botherness 7.87±1.605, financial worries 9.75±1.850, emotional/ mental health 12.67±2.484, diet satisfaction 7.30±1.764. And overall quality of life found to be moderate among people with type 2 diabetes. Major concern was seen in the area of financial aspect and diet also was other area of concern for the people with diabetes.

Discussion

This study revealed that 22 out of 180 i.e. 12.2% had poor quality of life. People with diabetes had a low mean score in all the domains quality of life[6]. Result showed that 30.6% had poorquality of life[7]. 32.9 % people with type 2 diabetes had poor quality of life[8]. The Health related quality of life also found to be poorin the study participants[9].

This study revealed that there was no association between quality of life and demographic variables. There were no statistically significant associations between health-related quality of life scores and age, duration of illness, education, marital status, and treatment type[10]. Quality of life assessment should be routinely practiced in diabetic clinics[11]. Selfmanagement of the condition will help to enhance the quality of life of people with type 2 diabetes.

Conclusion

This study revealed about quality of life of people with type 2 diabetes and domains which needs attention. Health professionals, patient and patient's support system can focus on those domains and efforts can be made to maintain better quality of life.

Conflicts of Interest: Nil

Source of Funding: Nil

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Effectiveness of Child to Child Programme on Knowledge Regarding Management of Minor Ailments among School Children

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Abstract

Background: Suffering from minor ailments is the most frequent episode in childhood experiences. A productive and energetic population cannot grow from unhealthy children who are chronically affected by repeated minor ailments. The school children could be equipped with the right knowledge in managing the ailments encountered in their day to day life through the child to child programme.

Objective: To evaluate the effectiveness of child to child programme in increasing the knowledge of school children regarding management of minor ailments among in selected schools of Udupi taluk.

Materials and Method: The present quasi experimental study was conducted among 50 school children(25 experimental and 25 control group) selected by simple random sampling from English medium schools of Udupi taluk. The demographic proforma and structured knowledge questionnaire was used to collect data. Child to child programme conducted in 1:1 ratio to the younger children.

Results: The results showed that majority of the children had average knowledge on management of minor ailments in the pretest both for the control group 24(96%) and experimental group 23(92%). A significant difference was found between the mean pretest and post test knowledge scores of the experimental group ($t=11.294$, $p<0.05$). The mean posttest scores of the experimental and control group ($t = 11.29$, $p<0.05$)was significantly different.

Conclusion: The study concluded that the child to child programme was effective in bringing the desired changes in the knowledge of the school children.

Keywords: *Child to child programme, Knowledge, School children, Minor ailments, India, Fever, Common cold, Diarrhoea, Worm infestation, Conjunctivitis, Dental caries, fainting.*

Introduction

Children are the future of a nation. It is absolutely essential to protect child's health if we are to build a sound foundation for the health of the nation.[1] School children are exposed to various epidemiological factors in the environment which influence their present and future state of health. Suffering from minor ailments is the most frequent episode in childhood experiences. A productive and energetic population cannot grow from unhealthy children who are chronically affected by repeated minor ailments. The common minor ailments among school children include fever, cough, common cold, dental caries, sore throat, conjunctivitis, diarrhoea, vomiting, worm infestations etc. The so called minor ailments if untreated are often the beginning of serious disabling disease.[2] A study done by Crocitti, etal. in

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2001 indicated that parents still have a problem to care the fever in children[3]. Acute respiratory tract infection account for 67% of all morbidity in India. The incidence of respiratory ailments in Bangalore's children has risen sharply from 9 % in 1979 to 30 % in 1999[4]. About 30-50% of rural children suffer from much morbidity like anemia, worm infestation, under nutrition, and dental carries. Worms affect an estimated 400 million school-aged children in the developing world. Health education to school children in their formative age is the most effective method for protection and promotion of their health. Innovative approaches to education for health are essential to gain the interest, support, involvement and commitment of students. A randomized control trial conducted by Walvekar PR, Naik VA and Wantamutte AS showed that child to child programme had made a significant improvement in the knowledge, change in attitude and practice of the study group students after the intervention when compared to control group students.[5] Child to child programme is based on the concept that children in schools and family members need to be considered as partners in spreading health messages as well as benefiting from them. They are makers of change.[6] In developing countries, where ill health is a problem "every school child is a health worker". As minor ailments continues as a matter of concern among school children, knowledge regarding the same in school children will ensure self helpwhich enables timely detection and management and thereby averting the unwanted complications. Moreover child to child programme has been proved effective in transferring knowledge and inculcating healthy attitudes and practices in young generation.[7] Therefore the researcher felt the need to equip the school children with the right knowledge in managing the minor ailments encountered in their day to day life, thus empowering the future generation to lead a healthy life and work as agents of change for improved health of their families and communities. The present study is an attempt to assess the effectiveness of child to child programme on management of minor ailments among school children in selected schools of Udupi taluk, Karnataka.

Materials and Method

The study was a quasi experimental study conducted among nineth and seventh class students from selected English Medium Schools of Udupi taluk. Simple random sampling was used for the selection of schools and the schools were randomly assigned to the experimental and control group. After the selection of schools, 25 nineth class students were randomly selected and trained to transfer the knowledge to the younger children in seventh class. An one hour teaching session for two days regarding selected minor ailments like fever, commoncold, cough, dentalcaries, conjunctivitis, worm in festations and diarrhea was discoursed to the nineth class children. The demographic proforma and structured, pretested, valid and reliable knowledge questionnaire was administered to the children. The knowledge questionnaire included multiple choice questions from various aspects of minor ailments like meaning, causes, signs and symptoms, management and prevention with a maximum score of 36. Each correct answer was given a score of one. The scores from the knowledge questionnaire were arbitrarily classified into good, average and poor knowledge.

The child to child programme was conducted in 1:1 ratio to the younger children. Child to child programme was a formal teaching programme done by 25 older children to 25 younger children. No intervention was given to the control group. A pretest was administered to both the invention and control group and after seven days of child to child programme, a post test was conducted. A structured knowledge questionnaire was used to assess the knowledge of the school children in both the groups.

Ethical Clearance was taken from Institutional Ethical Committee of Kasturba Hospital, Manipal. Administrative permission was taken from the school authorities.

The statistical analysis was done using SPSS version 16. Frequency, percentage, chi-square, independent t test and paired t test were the statistical tests used for the data analysis with the level of significance at 0.05.

Results

Among the older children, most 17(56.7%) of the children were in the age of 14 years and 10(33%) children were in the age of 15 years. Most of the children, 14 (46.7%) belonged to Hindu religion. Fifty percentage of the children had previous knowledge regarding minor ailments and teachers were the major source of information for them. Majority 17 (56. 7 %) of children had average knowledge in the pretest on management of minor ailments and only 4(13.3%)of children had poor knowledge.

Among the younger children, majority of the children in the experimental group 18(72%) and 11(44%) in the control group belonged to the age of 12 years. Most of the children 13 (52%) of the experimental group and 21(84%) of the control group belonged to the Hindu community. Majority 17(68%) of the children in the experimental group and most of the children in control group 10(40%) were from nuclear and extended family. Most of the children 13 (52%) and 12 (48%) in experimental group and control group received previous information about minor ailments and their major source of information was teachers and friends.

Majority of the children had average knowledge in the pretest on management of minor ailmentsboth for the control group 24(96%) and the experimental group 23(92%), whereas in the posttest, 19(76%) had good knowledge in the experimental group which showed that child to child programme had an influence in the increase of knowledge scores of the younger children in the intervention group. [Table 1]

There was a significant difference between the mean pretest (18.80 ± 4.072) and mean post test (27.88 ± 4.503) knowledge scores of the experimental group which indicated that the child to child programme was effective in improving the knowledge on management of minor ailments among the younger children. ($t=11.294$, $p<0.05$). The mean posttest knowledge scores of the experimental (27.88 ± 4.503) and control group (17.88 ± 4.622) was significantly different which proved that the child to child programme was effective in improving the knowledge on management of minor ailments among the younger children ($t = 11.29$, $p<0.05$).

The area wise analysis of data presented in the table 2 shows that there was an increase in the mean in the area of common cold and cough between the pretest (4.12 ± 1.269) and posttest (6.72 ± 1.061). In the area of dental caries, mean and standard deviation has increased from (2.92± 1.288) in the pretest to (4.16± 0.850) in the posttest. In diarrhea, the mean and standard deviation has increased from (2.36± 1.221) in the pretest to (4.60± 1.633) in the posttest. This shows that in all the areas of minor ailments, there was an increase in the knowledge scores after the child to child programme which shows its effectiveness.

Table 1: Comparison of pretest and posttest knowledge scores in frequency and percentage of experimental and control group n= (25+25) = 50

	Level of knowledge	Pretest		Post test	
		Frequency (f)	Percentage (%)	Frequency (f)	Percentage(%)
Experimental group	Poor	2	8	0	0
	Average	23	92	6	24
	Good	0	0	19	76
Control group	Poor	1	4	3	12
	Average	24	96	19	76
	good	0	0	3	12

Table 2: Area wise comparison of pretest and posttest knowledge scores on management of minor ailments among younger children of experimental group. n= 25

Areas of knowledge	Maximum possible score	Pretest		Post test	
		Mean	SD	Mean	SD
Introduction on minor ailments	2	1.36	0.490	1.80	0.408
Fever	3	2.24	0.879	2.84	0.374
Common cold and cough	8	4.12	1.269	6.72	1.061
Dental caries	5	2.92	1.288	4.16	0.850
Conjunctivitis	3	1.68	0.748	2.04	0.935
Worm infestation	4	1.92	1.288	2.76	1.012
Diarrhea	7	2.36	1.221	4.60	1.633
Fainting	4	2.44	1.158	2.96	1.207

Discussion

Child to child programmes plays a pivotal role in the transfer of knowledge from the older children to the younger children. The child becomes a teacher for spreading the health messages. It encourages the school-age children to have concern about themselves with regard to health and also take the responsibility of transferring the knowledge which they have acquired to their younger pre-school brothers and sisters, neighbors, their families etc. This will further benefit the community at a large scale.

The findings of the present study showed that majority of the children had average knowledge on management of minor ailments in both control group 24(96%) and the experimental group 23(92%).These findings of the present study are supported by another descriptive study conducted by Harikiran A G etal to assess the knowledge towards oral health among 11-12 year old school children in a government-aided missionary school of Bangalore city. The study findings revealed that 58.4%, received information regarding oral health mainly from television. Only 20.9% considered keeping natural teeth was important. It was found that 75.1% thought that brushing teeth prevents tooth decay and gum disease and 48.9% (46%: Male; 52.6% Female) knew the reason that eating sweets causes tooth decay. Only 36.3% knew that fluoride prevents tooth decay.[8]

Regarding the child to child programme,the findings of the present study shows that there was a significant difference in the mean post test level of knowledge on the management of minor ailments between the experimental and control group ($t= 11.29$, $p<0.05$).Thus the child to child programme was effective in improving the knowledge on management on minor ailments. The present study finding is supported by an evaluative study conducted by Shobha H J to assess the effectiveness of child-to-child approach through role play on prevention of Worm Infestation in school children of selected school in Bangalore in 2006. The results revealed that the pretest mean knowledge was 5.20±3.19 and posttest knowledge score was 18.03±1.87.The difference in mean knowledge about worm infestation score observed was statistically significant ($P<0.05$).[9]

Also a randomized control trial conducted by Walvekar P R,Naik V A, Wantamutte A S in 2006 to assess the impact of child to child programme on knowledge, attitude and practice regarding diarrhea among rural school children in Belgaum district in Karnataka showed that there was an overall improvement in the knowledge of study group students.[5]

Conclusion

Child to child programme was effective in bringing the desired changes in the knowledge of younger children on management of minor ailments. Hence, it can be used as an effective teaching strategy among the school children to spread health messages.

Conflict of Interest: Nil

Source of Funding: Nil

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A Comparative Study on Bilateral and Unilateral Task Oriented Exercises for Improving Upper Extremity Motor Function in Post-Stroke Subjects with Learned Nonuse Phenomenon

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Abstract

Objective: This study is to compare the effects of bilateral and unilateral task-oriented exercises and to determine the effective approach for improving the upper extremity motor performance in post-stroke subjects with learned nonuse phenomenon.

Method: 68 subjects were taken, 65 of them met the study criteria, and were divided into two groups by systemic randomized sampling, 33 in Group-A (Unilateral group) and 32 in Group-B (Bilateral group). 56 subjects completed the intervention. Both groups received 30 minutes of task-oriented training, Group-A performs the task exercises using only the affected upper extremity, where as in the Group-B tasks are performed using both the affected and unaffected upper extremities. These interventions were held for, 30 minutes 5 days a week for 4 weeks. The outcome measures in the study were Motor activity log (MAL),and its two components Amount of use (AOU) & Quality of use (QOU)And the Fugl Meyer assessment of upper extremity (FMA-UE).The pre-test and post-test assessment differences were taken to see the improvements.

Results: Statistical analysis data revealed that both the groups have shown improvement in motor function in post stroke subjects with learned nonuse phenomenon. There is no significant difference, in between the groups.

Conclusion: This study concluded that there is no difference in bilateral and unilateral task training in improving motor function in post stroke subjects with learned nonuse phenomenon, and they are equally effective.

Keywords: *Stroke, Bilateral task-oriented exercise, Unilateral task-oriented exercises, Fugl Meyer assessment, Motor activity log.*

Introduction

Stroke is one of the main causes of morbidity and mortality of adults in the developed world, resulting in a vast burden of disability [1]. About 10% of deaths in the industrialized countries were due to stroke [2]. One third of all strokes occur in the people who had a previous cerebrovascular attack. Hypertension, Heart disease and Diabetes are the major risk factors for stroke, where cigarette smoking, alcohol, blood cholesterols, obesity and physical inactivity are the other risk factors[3]. The Global burden of disease reports stated that the incidence of stroke in young and middle-aged adults was increased because of increase in metabolic risk factors like obesity and diabetes mellitus. Increase in stroke survivors in recent times was due to the modifiable stroke risk factors, population growth and as well as the improved stroke care[4]. Impaired motor functions, sensory deficits, visual and auditory deficits, aphasia are

seen in the stroke survivors where the rehabilitation is the key for recovery [3].

Functional recovery of the affected upper limb has been a long-standing struggle for 80% patients with a dominant functional limitation factor [5]. Patients use of affected upper extremity decreases because of dependency on the unaffected upper extremity for normal activities [6]. This leads to limited range of motion which can result in Non-use, which will be developed either after unsuccessful repeated attempt of using the affected arm or after negative results from paretic limb use. In order to improve the motor functions of the affected upper extremity patients should be provided with opportunities to use the affected upper extremity more [7].

"Non-use" is the difference between what the individual can do when constrained to use the paretic arm and what the individual does when given a free choice to use either arm [8]. Evidence suggests that task-specific practice may be the best way to promote functional recovery after stroke [9-11]. Task oriented training is the practice of goal-directed, functional movement carried out in a natural environment, involving a variety of practices to help patient to derive optimal control strategies for solving the motor problems. This task training mainly focuses on specific functional tasks that are associated with the musculoskeletal and neuromuscular systems[12].

Previous studies on bilateral task-oriented exercises for arm motor function concluded that there were improvements in motor function [5,13-16]. Studies on unilateral task training also showed improvement in the motor activity [17,18]. Some studies concluded that both interventions are equally effective without any significant difference in the outcome [19-21]. But future research is recommended with an increased number of tasks for better results, limited studies were present in relation to the learned nonuse phenomenon. According to our knowledge there is no study comparing these two groups in the post-stroke subjects with learned nonuse phenomenon till date. The aim of this study is to compare the effects of bilateral and unilateral task-oriented exercises in improving the upper extremity motor performance in post-stroke subjects with learned nonuse phenomenon. The hypothesis of the study is that the bilateral task training will be beneficial than the unilateral task training.

Materials and Method

This was a Prospective Cohort Study, with 68 patients, both men and women suffering with motor impairment of upper limb with learned nonuse phenomenon due to stroke were taken. Subjects who are willing to participate in the study were recruited from department of physiotherapy, neurology department, GSL Medical College and General Hospital, Rajahmundry, Andhra Pradesh, India. All the participants signed the informed consent and the rights of the included participants have been secured. As per the study 65 subjects met the study criteria.Inclusion Criteria: Age 30-80,oth male and female patients diagnosed with unilateral stroke, Residual movement capacity-30 degrees of shoulder Elevation,20 degrees wrist extension,10 degrees of finger extension, Opening capability of hand so that a ball can fit in and Considerable nonuse of the affected upper limb (Amount of use score-MAL<2.5).Exclusion Criteria: Stroke relapse/seizures during the intervention, Uncontrollable hypertension, Spontaneous recovery, Sensory impairments, Neurological/orthopedic conditions involving upper limb like per arthritis shoulder, Rheumatoid arthritis, Evidence of neglect, Inability to follow two-step commands, Balance problems and Patient following other treatments apart from drugs.

Subjects were allocated into two groups by systemic randomized sampling, 33 in Group-A (unilateral task exercises) and 32 in Group-B (Bilateral task exercises),the treatment duration was 30 minutes a day, 5 days a week, for 4 weeks (20 sessions),Study was held for 1 Year 2 months. (MAY -2017 to JUNE - 2018). Group-A-unilateral task-oriented exercises followed by conventional therapy, Group-B-bilateral task-oriented exercises followed by conventional therapy. The outcome measures were Motor Activity Log and Fugl-Meyer assessment upper extremity. The upper-extremity MAL-14 is a structured interview that elicits information about 14 activities of daily living. Patients are asked to rate Quality of Movement and Amount of Use for assessing how well and how often they use their more impaired arm to complete each activity[22]. The FMA-UEwas the most frequently used outcome measure, applied in 36% of the studies for Motor activity [23].

Tasks were selected in such a way that they can easily be implemented in both groups, there were 8 training tasks. The progression was done using shaping principles. All members in this study participated

in regular physiotherapy as of the regular treatment followed in rehabilitation setting. The training was carried out during the hospitalization period. Tasks include: i) Pick up a coin and manipulate it, ii) Catch a ball, iii) Sweep with a towel on table, iv) Elbow extension during horizontal reach, v) Lifting glasses, vi) Lifting a glass to drink and picking up a spoon to feed, vii) Reaching forward/upward for cup and replacing it elsewhere and viii) Staking cups and putting back in upright position.

Protocol for Unilateral Task Oriented Training Group–A: Subjects were made to sit in a chair in front of a table of comfortable height and perform specific tasks. In this group the subjects were asked to perform tasks using only the affected upper extremity,Each task is repeated for 8-10 times with a rest time of one minute between each task. The goal is to produce the movement by simple task-oriented training, by concentrating only on the affected extremity. Conventional physiotherapy treatment is followed by the intervention.

Protocol for Bilateral Task Oriented Training Group–B: Subjects follow the same treatment procedure of Group –A, the main difference in this is that the patients were made to perform tasks using both the hands that is the affected and the unaffected upper extremities. Both arms are used simultaneously/alternately according to task. Conventional physiotherapy treatment is followed by the intervention.

Findings: Statistical analysis was done using the statistical software SPSS 20.0 version for this purpose the data was entered into Microsoft Excel – 2007 spreadsheet, tabulated and subjected into statistical analysis. For all statistical analysis, $p<0.05$ was considered as statically significant. Descriptive statistical data was presented in the form of mean +/- standard deviation, percentage (%).56 subjects completed the entire study protocol of 4 weeks in the training session and 4 subjects were excluded 2 from each group. The groups mean ages were like group-A=55.3, group-B=54.3.To observe the treatment impact before and after the treatment in the groups, the analysis was carried out using statistical tests, for the outcome measures – MAL and FMA-UE,Within the group differences were checked with paired student-T test and between the group's differences are checked using independent student-T test.Both the components of MAL i.e. the Amount of use (AOU) and Quality of use (QOU), as well as the FMA-UE has shown differences in their pre-test and post-test values. But on comparing the means of both groups there was no significant difference to conclude that one intervention is superior over the other. Both the interventions have improved the motor activity in the post stroke subjects with learned nonuse phenomenon.

Table 1: Analysis of pre-test and post-test means of MAL-AOU, MAL-QOU& FMA-UE between Group-A and Group-B.

Outcomes	Group	Scoring	N	Mean	Std. Deviation	Std. Error Mean	P-Value
MAL-AOU	A	Pre-test	28	1.56	0.395	0.074	0.157*
	B		28	1.71	0.385	0.072	
	A	Post-test	28	2.79	0.246	0.046	1.157*
	B		28	2.89	0.279	0.052	
MAL-QOU	A	Pre-test	28	1.77	0.458	0.086	0.576*
	B		28	1.84	0.442	0.083	
	A	Post-test	28	3.03	0.270	0.051	0.091*
	B		28	3.16	0.299	0.056	
FMA-UE	A	Pre-test	28	34.78	5.652	1.068	0.748*
	B		28	34.35	4.165	0.787	
	A	Post-test	28	55.78	3.359	0.634	0.509*
	B		28	55.21	3.059	0.578	

* No significant difference.

Discussion

Both bilateral and unilateral task-oriented exercises were evidently effective in improving the motor function in post stroke subjects. In this study subjects were assessed for motor impairment and nonuse phenomenon using the MAL-AOU & QOU for evaluating nonuse

and FMA-UEfor motor functionat baseline and at the end of the intervention. There were nine drop outs from the study, fivein Group-A and fourin Group-B. There is a significant difference between pre-test and post-test values within the groups. But there were no significant differences in between the Group-A and Group-B.

Functional task training is considered to have more effect on the upper extremity motor functions recovery in stroke patients than training with simple movements. The unilateral training results in reorganization of the ipsilesional cortices. Bilaterally distributed neural networks linked via the corpus callosum, controls bilaterally identical synchronous movement that appears to occur centrally through and involves cortical and subcortical areas [8].

Thielman et.al, stated that subjects with decreased functional levels and coordination between the shoulder joint and elbow joints were improved when they underwent task-related training than performing gradual resistive exercises [9].Ackerley et al, concluded both unilateral and bilateral task exercises are equally effective, and also stated that the mechanism cannot be specific to bilateral training. And the mechanism may be because of the effects of rhythmic, synchronized movement, which facilitates a generalized increase in cortical excitability, possibly leading to use dependent plasticity [19].

Turton et al. explained that localized lesion of the primary motor cortex depletes the Cortico-motoneuron (CM) pool necessary for movements. The interconnections between CM cells which form the neural network for skilled actions are depleted by the lesion. This result in disruption of the unique temporal and spatial organization of CM excitability, which is required for a task execution, the CM recruitment is task-specific[24].On performing a strictly unilateral movements there will be a "non-mirroring" process that will restrict the motor output within the contralateral hemisphere and suppresses motor activation of the hand[25].

Neurophysiological studies stated both bilateral and unilateral synchronized movements facilitate an increase in cortical excitability during the rhythmic movements 'results in long-term improvements in synaptic efficacy of motor cortex. These neural changes will provide the optimal conditions for learning a new motor task [13].

The rehabilitation period is to provide patients with frequent and continuous chances to use the affected arm in their activities. In both types of training patients must use their most affected arm, both induce plastic changes in the central nervous system [21]. The study accepted null hypothesis as the statistical analysis has not shown any significant difference between the unilateral and bilateral task groups.

Conclusion

This study concluded that both bilateral task-oriented exercises and unilateral task-oriented exercises are equally effective. So bilateral task training is not superior to unilateral task training in improving the motor function in post stroke subjects with learned nonuse phenomenon.

Conflict of Interest: Nill.

Source of Funding: Self.

Ethical Clearence: Ethical clearance taken from-Institutional Ethics Committee GSL Medical College&General hospital, Rajahmundry, Andhra Pradesh, India.

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Correlation of Waist Hip Ratio with Standing Stork Test among College Students

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Abstract

Background: Standing stork test is a balance test which is used to assess the static balance state of an individual. Waist Hip Ratio is the measure of dimensionless ratio of waist circumference to the hip circumference. So this study was done to check how much Waist Hip Ratio plays a major role in standing stork balance test. The aim of the study is to find the correlation of Waist Hip Ratio with standing stork test among the college students.

Methodology: 30 participants of age 18-25 years, SRM college of physiotherapy participants were separated into four groups based on the category of the WHR norms. Each group of participants was asked to perform the standing stork balance test. Three trails were conducted and the mean value was noted. The outcome measures were done by standing stork balance test. The participants with recent fracture in leg, diabetes, any neurological conditions like CVA, vertigo, tinnitus were excluded in this study

Results and Conclusion: The mean values, standard deviation and p values are calculated and tabulated. The p value of Waist Hip Ratio (excellent, good and fair) categories are greater than 0.05 with Standing Stork Balance test. Hence, all the three categories of the Waist Hip Ratio do not correlate with the Standing Stork Balance test.

Keywords: *Standing stork test, waist hip ratio.*

Introduction

Waist Hip Ratio is a procedure in which is a measure ratio of circumference of waist to the circumference of the hip. According to the World Health Organization, waist circumference can be measured from the midpoint between the lower margin of the last palpable rib and the top of the iliac crest. Hip circumference can be measured from the widest part of the buttocks and the tape parallel to the floor. For both the measurements the person must be with equally distributed weight on both of the legs. While taking the measurement the person must be relaxed with normal respiration control. Some research shows that the apple- shaped bodies (more weight around waist) has more risk problem than pear – shaped bodies (more weight around the hips. It is mainly use as an indicator of health and the risk of developing serious conditions[1]. Waist Hip Ratio is considered as an useful tool in finding out the state of obese with waist and hip circumference and the early diagnosis of any related serious conditions. The National Institute of Diabetes, Digestive and Kidney diseases states that the women with Waist Hip Ratio of more than 0.8 and males with above 1.0 have more danger of health due to more amount of fat distribution. Normally Waist Hip Ratio is generally an important indicator for cardio vascular disease more than Body Mass Index and Waist circumference. The body fat percentage gives an exact measure of body weight more than that of relative weight[2].

Normally the deficiency in growth hormone also leads to increased Waist Hip Ratio measure for adults. Adults with untreated congenital growth hormone deficiency have increased measures. Growth hormone deficiency has been correlated with the Waist Hip

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Ratio in prepubertal children. It is also suggested that congenital adrenal hyperplasia also have increased measures. The stress hormone named cortisol is regulated by hypothalamic-pituitary-adrenal (HPA) axis which has been highly associated by abdominal fat thus increases the Waist Hip Ratio measure[3].

Balance is a stable condition in which all forces acting on the body falls in a same line. It is a dynamic process in which the position of the body is maintained in the equilibrium with the centre of mass or centre of gravity is maintained over its base of support. The centre of pressure is the point at which vertical projection of ground reaction force. Equilibrium is classified into two groups which include static equilibrium which is at rest and dynamic equilibrium which is a steady state of motion. The balance control is normally maintained by the musculoskeletal and nervous systems along with the contextual effects[4].

The body's position and control of the movements which is controlled by the visual, somatosensory and vestibular systems. There are three types of balance control which consists of Static balance control to maintain stable antigravity position while at rest such as when sitting and standing. Dynamic balance control to stabilize the body when the support surface is moving, Automatic postural reactions to maintain balance in response to unexpected external disturbances[4].

Standing stork balance test is a measure of static balance of an individual. Normally the person who performs the test with more than 50 seconds have an excellent static balance control, person with 40 – 50 seconds are good, 25 to 39 seconds are average, 10 – 24 seconds are fair and less than 20 seconds have poor static balance control[5,6]. The aim of the study is to find out the correlation of Waist Hip Ratio with standing stork balance test among college students.

Methodology: The study design was non experimental, Observational type. 30 samples were selected based on inclusion and exclusion criteria, Study setting was SRM college of physiotherapy. Subjects with any addiction to alcoholism, fracture in hip, knee and ankle or any musculoskeletal injuries or any neurological conditions like vertigo, Parkinson and Cerebro-vascular accidents were excluded from the study. The subjects with the age of 18 to 25 years of age college boys and the subjects with Waist Hip Ratio from less than 0.84 to 0.95 and above were included in this study. Institutional Ethical Committee approval and informed consent also obtained before starting the study. Outcome measure was done by standing stork balance test. The subjects Waist circumference and Hip circumference were noted and the ratio was taken. Waist Hip Ratio was calculated by waist circumference divided by the hip circumference. The participants were separated into four categories excellent(<0.85), good(0.85-0.89), average(0.90-0.95) and at Risk (>0.95)based on the Waist Hip Ratio criteria. After separating into groups the subjects were asked to perform the standing stork balance test. The standing stork balance test was done by removing the shoes and the hands were to be placed over the hips. The subject has to place the non supporting foot over the knee of supporting leg. After starting the stop watch the subjects have to stand on the ball of the foot. The subjects were given with one minute of practice time. The stop watch is stopped if the subject takes off the hand from the hip or the heel touches the floor or the subject hops in any directions. Three trials were done and the mean value was taken. The correlation of Waist Hip Ratio and standing stork test was calculated.

Data Analysis: Correlation of Waist Hip Ratio with the standing stork balance test values were measured and tabulated by using IBM SPSS version 20.

Table 1: Correlation of Waist Hip Ratio Excellent Category with the Standing Stork Balance Test

Variable name	Mean	r value	p value (significant)
Waist Hip Ratio	0.79	1	0.133
SSBT	10.19	.482	.133

In this table 1 shows that the person with an excellent WHR ratio of 0.79 performs a SSBT Score of 10.19 seconds averagely and has the p value >0.05. So Waist Hip Ratio excellent score and Standing Stork Balance Test were not significantly correlated

Table 2: Correlation of Waist Hip Ratio Good Category with Standing Stork Balance Test

Variable Name	Mean Value	R Value	P Value
Waist Hip Ratio	0.86	.075	0.827
SSBT	7.83	.095	0.780

In this table 2, the subject with the good WHR ratio of 0.86 performs a score of about 7.83 seconds averagely and has the p value > 0.05. The Waist Hip Ratio good category does not correlate with the Standing Stork Balance test.

Table 3: Comparison of Waist Hip Ratio Fair Category with Standing Stork Balance Test

Variable Name	Mean Value	R Value	P Value
Waist Hip Ratio	0.91	.772	0.072
Ssbt	5.25	.213	0.686

The table 3 shows that the mean value of Waist Hip Ratio fair category and the Standing Stork Balance Test is 0.91 and 5.25 respectively. The p value is >0.072 so that the Waist Hip Ratio fair category does not correlate with the Standing Stork Balance test.

Results

From the table 1, the mean values of Waist Hip Ratio of excellent category and the Standing Stork Balance Test is 0.79 and 10.19 respectively. The p value is > 0.05. Hence it shows that the Waist Hip Ratio of excellent category does not correlate with the Standing Stork Balance test.

From the table 2, the mean values of the Waist Hip Ratio of good category and the standing stork balance test is 0.86 and 7.83 respectively. The p value is >0.05. Hence it shows that the Waist Hip Ratio of good category does not correlate with the Standing Stork Balance test.

From the table 3, the mean values of the Waist Hip Ratio of fair category and the standing stork balance is 0.91 and 5.25 respectively. The p value is > 0.05. Hence it shows that the Waist Hip Ratio of fair category does not correlate with the standing stork balance test.

Discussion

The main objective of this study is to find out how much the waist circumference and hip circumference correlates with the standing stork balance test.

Normally in this study the subjects with the excellent Waist Hip Ratio of 0.79 performs the stork test for about 10.19 seconds, the person with good Waist Hip Ratio of 0.86 and the person with the poor has the stork balance score of 7.83 seconds, and the subject with poor Waist Hip Ratio 0.94 performed the stork test of average 5.25 seconds.

Benedicte I Deforche et al., concluded that the overweight prepubertal boys displayed lower capacity on static and dynamic balance. Overweight boys showed a poor postural sway velocity. With the body mass index increase in weight gain of a person would affect the proprioception of the joints so that the balance control is reduced for the overweight individuals. In this study, it is clearly shown that the person with an excellent Waist Hip Ratio have a better balance control than that of average and poor Waist Hip Ratio values. According to the criteria of the Standing Stork Balance Test the person with the holding time of< 10 seconds considered as a poor score of static balance control[7].

Johanna M seddon et al., concludes that the overall and abdominal obesity increased the risk of progression to advanced Age related muscular degeneration. Individual muscle strength, joint flexibility and good postural control can significantly helps to balance the body. Obesity is a state in which there will be an increase in the normal adiposity. It plays a central role in the patho physiology of diabetes mellitus etc. So the person with increased fat gain in the waist and hip can perform the balance activities well if he has a good muscle power and flexibility. Increase in Waist Hip Circumference also decreases the average value of standing stork balance test the with each other. This mean value proves to be that change in Waist Hip Ratio reduces the static balance control but it does not make a higher improvement in balance[8].

.**Ragiba Zagyapan et al.,** states that there was a relationship between the changes in the muscle length and the balance type. There is a significant correlation between the Waist Hip Ratio and the postural balance type[9].

Angyan L et al., states that there are various factors affects the postural stability among younger adults. The body mass index, back strength and endurance capacity plays an important role in maintaining the balance control. Weakened muscle strength, stiffness over the joints and tightness of the muscles also plays an important role in maintaining the balance control.

Limitations for the Study:

- Less samples are taken for the observation
- Three groups are considered. Subjects who are at risk as per WHR norms are not included in this study
- This study is conducted among the young students.
- Only men are included in the study

Recommendations for Study:

- More sample size has to be increased

- The fourth category (at risk) is to be included and must be correlated with balance
- This study must be conducted to all age groups in the further study.
- Further studies can be performed over women and men

Conclusion

This study concluded that the Waist Hip Ratio does not correlate with the standing stork balance test. Person with an excellent Waist Hip Ratio values perform a poor score of standing stork balance test and the subjects with fair Waist Hip Ratio values perform poor balance score. Hence, the circumference of the waist and hip of the body does not affect the balance control of an individual.

Source of Funding: Self

Conflict of Interest: Nill

Ethical Clearance: Taken from Institutional Ethical committee

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Patanjali Yoga Practice and its Effect on Mental Health and Moral Judgment amongst Juvenile Delinquents

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Abstract

Research awareness and involvement in yoga for health-related results are growing worldwide. PatanjaliYoga relieves stress and fatigue which haves turned into one of the few major challenges confronting the medical fraternity in present times. Yoga let go the body from any type of muscular or chronic strain and rejuvenates the body from exhaustion, body aches, stress, aids to ease the body and mind, enhances concentration and alertness, and frees the soul. It helps one to create integrity amongst his outward self as well as his innermost self. If the practices are followed meticulously then Patanjali Yoga develops a constructive effect both in the inward and outer selves of an organism. Patanjali's yoga practice aims to bind the individual self with the Ultimate One and one can achieve this union by regulating and discarding the ever- arising 'vrittis' or amendments of the mind. With Patanjali Yoga mind can be balanced through the exact kind of discipline and training. The purpose of this paper was to study the effect of Patanjali Yoga practice on mental health and moral judgment of experimental group of juvenile delinquents. Pre and post experimental design was used in this research work. Patanjali Yoga practices were used as independent variables whereas mental health and moral judgments of delinquents as dependent variables. A sample of 70 delinquents of age group (13-18 years) from Government Observation Home in Agra district was chosen with random selection method. There were two groups –experimental group (n=35) and control group (n=35). Patanjali Yoga practices were imparted to delinquents for 90 days with duration of one hour each day. For measuring the moral judgment of delinquents, moral judgment test by Juri Baruh (2004) and for measuring mental health, mental health battery by A.K. Singh and Alpana Sen Gupta(2008) were used. Mean, Standard deviation and t-test were carried out for data analysis. The findings suggest that mental health factors like emotional stability, adjustment, autonomy, security-insecurity and self-concept were found to be of average level and intelligence ranged from average to low in experimental and control group delinquents. It was also found that Patanjali Yoga plays a significant role by strengthening emotional stability, adjustment and self -concept in delinquents, however, the Patanjali yoga does not significantly affects mental health factors like autonomy, security-insecurity and intelligence in delinquents. The findings also concluded that Patanjali Yoga does not affect moral judgments of delinquents.

Keywords: *Patanjali Yoga, Mental Health, Moral Judgment, Juvenile Delinquents.*

Introduction

Children are greatest national asset and resource. Children should be allowed and provided opportunity to grow up to become robust citizens, physically fit, mentally alert and morally healthy, endowed with skills and activations needed by the society.

In recent years, it has become very clear that juvenile delinquency is the most important aspect of the subject matter of criminology. The juvenile is a child who is alleged to have committed/violated some law which declares the act or omission on the part of the child as an offence. Delinquency is an act or conduct of a juvenile which is socially undesirable. Juvenile delinquency generally means the failure of children to meet certain obligations expected of them by the society. Research awareness and involvement in yoga for health-related results are growing worldwide. Patanjali Yoga relieves

stress and fatigue which haves turned into one of the few major challenges confronting the medical fraternity in present times. Yoga let go the body from any type of muscular or chronic strain and rejuvenates the body from exhaustion, body aches, stress, aids to ease the body and mind, enhances concentration and alertness, and frees the soul. It helps one to create integrity amongst his outward self as well as his innermost self. If the practices are followed meticulously then Patanjali Yoga develops a constructive effect both in the inward and outer selves of an organism. Patanjali's yoga practice aims to bind the individual self with the Ultimate One and one can achieve this union by regulating and discarding the ever- arising 'vrittis' or amendments of the mind. With Patanjali Yoga mind can be balanced through the exact kind of discipline and training.In Patanjali's Yoga Sutra, the eightfold path is called *ashtanga*, which literally means "eight limbs" (*ashta*=eight, *anga*=limb). These eight steps which are Yama (control),Niyama (rules of conduct),Asana (posture),Pranayam (control of breadth),Pratyahara(withdrawal of sensory perceptions),Dharana (concentration),Dhyana (uninterrupted meditation), Samadhi (effortless meditation,absorption, equilibrium)basically act as guidelines on how to live a meaningful and purposeful life. They serve as a prescription for moral and ethical conduct and self-discipline; they direct attention toward one's health; and they help us to acknowledge the spiritual aspects of our nature.

Objectives of the Study

1) To study the effect of Patanjali Yoga Practice on mental health of experimental group of juvenile delinquents.
2) To study the effect of Patanjali Yoga Practice on moral judgment of experimental group of juvenile delinquents

Hypothesis of the Study

1) There is significant effect of Patanjali Yoga practice on mental health of experimental group of Juvenile delinquents.
2) There is significant effect of Patanjali Yoga practice on moral judgment of experimental group of Juvenile delinquents.

Operational Definition

Juvenile Delinquents: In the present study, Juvenile delinquents is in context with those who are unaccepted through society and are punished through law and justice and they are kept at government observation homes for improvement through rehabilitation method.

Mental Health: In the present research, mental health is in context with to six factors incorporated in tool constructed by Sen and Gupta (2008) and these six factors are emotional stability, adjustment, autonomy, security-insecurity, self-concept and intelligence.

Moral Judgment: In the present research, moral judgment is in context with in which a person takes decision in perspective of moral standards and moral values in different circumstances.

Patanjali Yoga: In the present research, Yoga is in context with Patanjali's Ashtanga Yoga and its three stages that is Asana, Pranayama and Dhyana.

Methodology

Method: In the present research, pre and post experimental design was used for studying the effect of mental health and moral judgment on juvenile delinquents.Juvenile delinquents were divided in two groups that is Experimental (N=35) and Control (N=35) group.Patanjali Yoga practices were imparted to Juvenile Delinquents for 90 days with duration of one hour each day.

Variables of the study: Patanjali Yoga practicesand its three stages that is Asana, Pranayama and Dhyanawere used as independent variables whereas mental health and moral judgment of delinquents are dependent variables

Sample of the Study: A sample of 70 delinquents of age group (13-18 years) from Government Observation Home in Agra district waschosen with random selection method.

Research Tool: For measuring the moral judgment of delinquents, moral judgment test by JuriBaruh (2004) and for measuring mental health, mental health battery by A.K.Singh and AlpanaSenGupta(2008) were used.

Statistical Techniques

Mean: In the present research, Mean was used for knowing average achievement of mental health and moral judgment factors of juvenile delinquents.

Standard Deviation: In the present research, standard deviation was used for knowing how much deviation is there between obtained scores of mental

health and moral judgment factors of juvenile delinquents from average sores.

T-test: In the present research, t-test was used for knowing significant difference between pre and post obtained scores.

Delimitation of the study

1) Present study was delimited to Government observation home in Agra district, India.
2) Present study was delimited to juvenile delinquents of 13-18 years of age group.
3) Yoga practices were delimited for 90 days with duration of one hour each day.
4) There was no usage of any other psychological treatment other than Patanjaliyoga practices.

Analysis And Interpretation Of Data: For knowing the effect of Patanjali yoga practice on juvenile delinquents the researcher calculated mean and standard deviation of obtained scores of pre and post patanjali yoga practice (after three months) as given in table1.

Table 1- Exhibiting mean, standard deviation and t-test value of obtained scores of mental health of juvenile delinquents in reference to Patanjali yoga practice

Group Test	Control Group (N=35)		Experimental Group (N=35)		T-test	Significance Level
	Mean	Standard Deviation	Mean	Standard Deviation		
Pre Test	71.51	13.72	72.28	12.16	0.90	<0.05
Post Test	71.97	11.42	87.20	6.94	6.95	>0.01

From table 1 it is revealed that before giving Patanjali yoga practice mean of obtained scores are 72.18 and 71.51 whereas standard deviation is 12.16 and 13.72. When t-test was computed value came out to be 0.90 which was found insignificant at 0.05 level of significance and hence at the time of pre-test there is uniformity between control and experimental group. From table 1 it is also revealed that t-test value has been found 6.95 between experimental group of juvenile delinquents whom Patanjali yoga practice has been given and control group of juvenile delinquents whom Patanjali yoga practice has not been given which is found significant at 0.01 level of significance. Hence, it can be said that Patanjali yoga practice makes mental health of juvenile delinquents remarkable.

From Table 2 it is revealed that there is significant effect of Patanjali yoga practice on mental health factor 'emotional stability' between experimental group of juvenile delinquents which has been given Patanjali yoga practice and control group of juvenile delinquents which has not been given Patanjali yoga practice which is confirm by t-test value which is found to be 5.45 which is significant at 0.01 level of significance.

Table 2: Exhibiting mean, standard deviation and t-test value of obtained scores of mental health factor emotional stability of juvenile delinquents in reference to Patanjali yoga practice

Group Test	Control Group (N=35)		Experimental Group (N=35)		T-test	Significance Level
	Mean	Standard Deviation	Mean	Standard Deviation		
Pre Test	8.40	2.52	9.14	2.18	0.27	<0.05
Post Test	9.17	2.53	11.94	1.32	5.45	>0.01

From the table 2 it is also revealed that before giving Patanjali yoga practice to experimental and control group of juvenile delinquents the t-test value found to be 0.27 on the basis of the obtained scores of mental health factor 'emotional stability' which is found to be insignificant at 0.05 level of significance. Hence, it can be said at the time of pre test there is uniformity between control and experimental group of juvenile delinquents.

From Table 3 it is revealed that there is significant effect of Patanjali yoga practice on mental health factor 'adjustment' between experimental group of juvenile

delinquents which has been given Patanjali yoga practice and control group of juvenile delinquents which has not been given Patanjali yoga practice which is confirm by t-test value which is found to be 5.34 which is found to be significant at 0.01 level of significance.

Table3: Exhibiting mean, standard deviation and t-test value of obtained scores of mental health factor adjustment of juvenile delinquents in reference to Patanjali yoga practice

Group Test	Control Group (N=35)		Experimental Group (N=35)		T-test	Significance Level
	Mean	Standard Deviation	Mean	Standard Deviation		
Pre Test	23.80	4.79	25.62	4.03	0.12	<0.05
Post Test	24.45	4.76	30.22	3.50	5.34	>0.01

From table 4 it is revealed that there is insignificant effect of Patanjali yoga practice on mental health factor 'autonomy' between experimental group of juvenile delinquents which has been given Patanjali yoga practice and control group of juvenile delinquents which has not been given Patanjali yoga practice which is confirm by t-test value which is found to be 0.24 which is found to be insignificant at 0.05 level of significance.

Table 4: Exhibiting mean, standard deviation and t-test value of obtained scores of mental health factor autonomy of juvenile delinquents in reference to Patanjali yoga practice

Group Test	Control Group (N=35)		Experimental Group (N=35)		T-test	Significance Level
	Mean	Standard Deviation	Mean	Standard Deviation		
Pre Test	9.77	2.71	9.54	2.16	0.72	<0.05
Post Test	9.25	2.04	9.82	2.37	0.24	<0.05

From table 5 it is revealed that there is insignificant effect of Patanjali yoga practice on mental health factor 'security-insecurity' between experimental group of juvenile delinquents which has been given Patanjali yoga practice and control group of juvenile delinquents which has not been given Patanjali yoga practice which is confirm by t-test value which is found to be 0.87 which is found to be insignificant at 0.05 level of significance.

Table 5: Exhibiting mean, standard deviation and t-test value of obtained scores of mental health factor security-insecurity of juvenile delinquents in reference to Patanjali yoga practice

Group Test	Control Group (N=35)		Experimental Group (N=35)		T-test	Significance Level
	Mean	Standard Deviation	Mean	Standard Deviation		
Pre Test	8.94	2.19	8.68	2.23	0.65	<0.05
Post Test	8.74	2.22	8.82	2.007	0.87	<0.05

From table 6 it is revealed that there is significant effect of Patanjali yoga practice on mental health factor 'self-concept' between experimental group of juvenile delinquents which has been given Patanjali yoga practice and control group of juvenile delinquents which has not been given Patanjali yoga practice which is confirm by t-test value which is found to be 3.28 which is found to be significant at 0.01 level of significance.

Table 6: Exhibiting mean, standard deviation and t-test value of obtained scores of mental health factor self -concept of juvenile delinquents in reference to Patanjali yoga practice

Group Test	Control Group (N=35)		Experimental Group (N=35)		T-test	Significance Level
	Mean	Standard Deviation	Mean	Standard Deviation		
Pre Test	9.14	2.95	8.17	2.34	0.10	<0.05
Post Test	9.34	3.13	12.11	1.94	3.28	>0.01

From table 7 it is revealed that there is insignificant effect of Patanjali yoga practice on mental health factor 'intelligence' between experimental group of juvenile delinquents which has been given Patanjali yoga practice and control group of juvenile delinquents which has not been given Patanjali yoga practice which is confirm by t-test value which is found to be 0.001 which is found to be insignificant at 0.05 level of significance.

Table 7: Exhibiting mean, standard deviation and t-test value of obtained scores of mental health factor Intelligence of juvenile delinquents in reference to Patanjali yoga practice

Group Test	Control Group (N=35)		Experimental Group (N=35)		T-test	Significance Level
	Mean	Standard Deviation	Mean	Standard Deviation		
Pre Test	11.65	5.09	11.40	6.12	0.80	<0.05
Post Test	11.00	5.05	14.25	2.68	0.001	<0.05

From table 8 it is revealed that there is insignificant effect of Patanjali yoga practice on moral judgment between experimental group of juvenile delinquents which has been given Patanjali yoga practice and control group of juvenile delinquents which has not been given Patanjali yoga practice which is confirm by t-test value which is found to be 0.018 which is found to be insignificant at 0.05 level of significance.

Table 8: Exhibitingmean, standard deviation and t-test value of obtained scores of moral judgment of juvenile delinquents in reference to Patanjali yoga practice

Group Test	Control Group (N=35)		Experimental Group (N=35)		T-test	Significance Level
	Mean	Standard Deviation	Mean	Standard Deviation		
Pre Test	17.97	3.97	18.17	4.34	0.84	<0.05
Post Test	16.34	4.35	18.68	4.14	0.018	<0.05

Findings and Conclusions

It can be said that Patanjali yoga practice makes mental health of juvenile delinquents remarkable. There is significant effect of Patanjali Yoga practice on mental health factors which are emotional stability, adjustment and self concept. It is also revealed that there is insignificant effect of Patanjali Yoga practice on mental health factors which are autonomy, security-insecurity and intelligence. It was also found that Patanjali yoga practice do not effect moral judgment of juvenile delinquents. Hence, after having conversation with authority it was clear that there was a positive change seen amongst juvenile delinquents due to Patanjali Yoga practice and they want these yoga practices to be contionusly scheduled from time to time.

Ethical Clearance: Not required as per study

Source of Funding: Not Applicable

Conflict of Interest: Nil

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Internalizing Behavioural Problems among Children of Alcoholic Parents

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Abstract

Context: Emotional and behavioural problem in children of alcoholic parents is an important public health issues. However, there is limited epidemiological evidence about internalizing behavioural problems such as anxiety, Depression and low self-esteem.

Aims: To assess the internalizing behavioural problems among children of alcoholic parents and to find out the correlation between anxiety, depression and self-esteem.

Method and Material: A cross sectional descriptive Survey research design was adopted for the present study. The study was conducted at Three Govt High school located in Bangalore urban. Hundred children of alcoholic parents were recruited by simple random sampling method. Children of alcoholic screening test (modified)were used for identifying children of alcoholics. This study utilized Spence Children's Anxiety Scale, Center for Epidemiological Studies Depression Scale for Children (CES-DC) and Rosenberg Self-Esteem Scale.

Statistical analysis used: Data were analyzed using Statistical package for the social Sciences software package (Version 23).

Results: The result shown that 23% of boys & 16% of girls are showing elevated level of anxiety, 31% of children are showing elevated depression,and 53% of children are having low self-esteem. Anxiety is positively correlating with depression (0.359) and Anxiety is negatively correlating with self-esteem (-0.223). A Very low negative correlation seen between depression and self-esteem (-0.166) which is not significant.

Conclusion: The study concludes that children of alcoholic parents are at risk for internalizing behavioural problems and a positive correlation was observed between anxiety and depression.

Keywords: *Anxiety, Depression, self-esteem and children of alcoholic parents.*

Introduction

Child mental health problems are reflected by a variety of categories of behaviour problems.[1] According to Achenbach & Edelbrock, behavior problems can be grouped into two major categories: internalizing and externalizing behaviors.[2] There is growing consensus that behaviour problems are apparent in early childhood, and that they often persist into adulthood – particularly those associated internalizing behaviour.[1]

Globally, around 10 to 20 % of children suffer from a mental health problem.[3] A study conducted in five developing countries suggest that 10.5 % of children suffer from mental health problems.[4] An Indian study shows that Prevalence of behavioural and emotional problems in adolescents was found to be 30%, with girls

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exceeding boys in all age groups. Internalizing syndrome was the most common (28.6%) problem.[5]

The family provides emotional support to an individual as well as plays a major role in the formation of one's personality. The quality and nature of the parental nurturance that the child receives will profoundly influence his future development.[6] Children growing up in families with substance abuse would expect to have deficits in coping skills and the dysfunctional family coping will result in negative and adverse effects on children's and adolescents' development.[7] Several studies shows that children growing under parental alcoholism are suffering from behavioural problems.[8,9] Father alcoholism shows greater internalizing symptoms among children of alcoholic parents. [10]

Research findings indicate thatchildren of alcoholic parents are having lower self-esteem[11] and lower academic performance in reading and arithmetic than did children of non-alcoholic parents.[12] A study conducted on High school students shows that male students with paternal drinking problems showed significantly increased risk of anxiety and female students with paternal drinking problems showed significantly increased risk of depression.[13]

The Studies have shown that child behavior problems have negative impacts on children's social, educational and economic performance in later life.[14] Childhood behavior problems also predict involvement in anti-social behavior and multiple substance abuse in later part of life.[15] The externalizing problems will be exhibited by child and can be noticed by parents and teachers, whereas internalizing problem gets unnoticed and results in complications during childhood and even in early adulthood. It is very important to identify problems at earliest age, in order to explore feasible, acceptable, and effective ways of addressing such problems.

The Objectives of the Study:

1. To assess the internalizing Behavioural problems among children of alcoholic parents.
2. To find out the correlation between anxiety, depression and self-esteem
3. To find out the association between Internalizing Behavioural problem scores with selected socio-demographic variables.

Method

A cross sectional descriptive Survey research design was adopted for the present study. 100 children of alcoholic parents were recruited by simple random sampling method at Three Govt High school, Pottery town, Hosaguddadahalli and attigupe, Bangalore urban and data was collected from June to August 2017. The sample comprised of 100 children of alcoholics. 497 children were screened; those who scored more than 3 in Children of alcoholic screening test (modified) and aged between 12-16 years are selected for study. Children with learning disorders and single parents are excluded from the study. The study protocol was approved from ethical committee of Kempegowda college of Nursing. Formal permission was obtained from Block Education Officer, Head Master and informed consent was taken from child and their parents.Data were analysed using Statistical package for the social Sciences software package (Version 23) and results were presented in table form.

Data collection Instrument:

1. Socio-demographic proforma: It includes questions on their age, sex, religion, class, educational qualification of Father, educational qualification of mother, Occupation of Father, Occupation of mother, Monthly family income, type of family, Number of siblings and Birth order.
2. Spence Children's Anxiety Scale: This scale was developed by Susan H Spence, self-administered four-point likert scale containing 44 items, of which 38 reflect specific symptoms of anxiety and 6 relate to positive, filler items to reduce negative response bias. Children are asked to rate on a 4 point scale involving never (0), sometimes (1), often (2), and always (3), the frequency with which they experience each symptom. The responses are summed to determine possible scores ranging from Zero to 114, with the higher scores indicating a severity of anxiety. A total score of 33 & above for boys and 39 & above for girls are classified as elevated level of anxiety. The internal consistency of the total score (Cronbach alpha =. 93) and sub-scales was high, and 12-week test-retest reliability was satisfactory. [16]
3. Center for Epidemiological Studies Depression Scale for Children (CES-DC): This scale was developed initially by Laurie Radloff and consists of 20-item self-report depression inventory with

possible scores ranging from 0 to 60. Each item is scored as follows: 0 = "Not At All" 1 = "A Little" 2 = "Some" 3 = "A Lot" However, items 4, 8, 12, and 16 are phrased positively, and thus are scored in the opposite order. A cut-off score of 15 as being suggestive of depressive symptoms in children and adolescents. Previous studies shows good internal reliability (α =. 86) and test-retest reliability (r = .85).[17]

4. Rosenberg Self-Esteem Scale: This scale was developed byDr. Morris Rosenberg and consists of 10 items 4-point Likert scale format ranging from strongly agree to strongly disagree. Items 2, 5, 6, 8, 9 are reverse scored. "Strongly Disagree" 1 point, "Disagree" 2 points, "Agree" 3 points, and "Strongly Agree" 4 points. Sum scores for all ten items. Higher scores indicate higher self-esteem. An Indian studies shows test-retest reliability of 0.80.[18]
5. Children of alcoholic screening test (modified) were used for identifying children of alcoholics.

Results

In the present study, Majority (41%) of the respondents were in the age of 14 years, most of them were male (55%). Majority (68%) of the respondents were Hindusand highest numbers (42%) of the respondents were studying in 8th std. Majority (29%) of the respondent'sfather educational qualification is Secondary education and mother educational qualification is No formal education (42%). Majority (45%) of the respondent'sfather occupation is private joband MotherOccupation is House maker (45%). Highest number (61%) of the respondent'sfamily monthly income is Rs 5000-9000 and Majority (60%) from Nuclear family. Majorities (69%) of the respondents are having Two Siblings and Majorities (53%)are born as first child. The findings shows that 23% of boys & 16% of girls are showing elevated level of anxiety with Mean of 35.32±7.89, 31% of children are showing elevated depression with Mean of 13.86±3.95 and 53% of children are having low self-esteem with Mean of 19.57±4.18. With regards to anxiety subscale majority (47%) of respondents scored positive for generalized anxiety followed by Separation anxiety & panic/agoraphobia (38%) and lowest number (10%) of respondents scored positive for Obsessive compulsive problems.

Pearson's correlation was calculated to examine the relationship between the anxiety scores, depression scores and self-esteem scores. Anxiety is positively correlating with depression (0.359), indicating that as anxiety scores are increasing depression scores also increased. Anxiety is negatively correlating with self-esteem (-0.223), indicating that as anxiety scores are increasing self-esteem scores decreases. A Very low negative correlation seen between depression and self-esteem (-0.166) which is not significant.

Chi-square was calculated to examine the association between anxiety, depression and self-esteem with selected demographic variables (Table 1). It is revealed that there is significant association found between anxiety with class in which children are studying. Depression with age group, class and birth order. Self-esteem with occupation of Mother. No association was found between remaining demographic variables.

Table 1: Association between anxiety, depression, and self-esteem scores with selected demographic variables. N=100

Demographic Characteristics & Categories	Anxiety			Depression			Self-esteem		
	≤Median (32.5)	>Median	Chi-Square & P valve	≤Median (14)	>Median	Chi-Square & P valve	≤Median (19)	>Median	Chi-Square & P valve
Age group									
14	21	20	5.30^{NS}	30	11	8.64*	21	20	2.55^{NS}
15	15	24	p=0.071	21	18	p=0.013	24	15	p=0.27
16 & 17	14	6		18	2		8	12	
Gender									
Male	32	23	3.273^{NS} p=0.07	37	18	0.17^{NS} p=0.68	27	28	0.75^{NS} p=0.38
Female	18	27		32	13		26	19	

Demographic Characteristics & Categories	Anxiety			Depression			Self-esteem		
	≤Median (32.5)	>Median	Chi-Square & P valve	≤Median (14)	>Median	Chi-Square & P valve	≤Median (19)	>Median	Chi-Square & P valve
Class									
8th	21	21	10.06*	30	12	8.32*	22	20	3.19NS
9th	15	26	p=.007	23	18	p=0.016	25	16	p=0. 20
10th	14	3		16	1		6	11	
Educational qualification of Father									
No formal Education	5	6		7	4		6	5	
Primary Education	14	11	.56NS	17	8	1.93NS	14	11	1.76NS
Secondary Education	14	15	p=0.96	20	9	p=0.74	17	12	p=0.77
PUC	11	11		14	8		9	13	
Degree and above	6	7		11	2		7	6	
Educational qualification of mother									
No formal Education	20	22	.20NS	29	13	1.73NS	23	19	0.127NS
Primary Education	20	18	p=0.9	24	14	p=0.42	20	18	p=0.93
Secondary Education & above	10	10		16	4		10	10	
Occupation of Father									
Government Job	4	3	3.34NS	6	1	2.23NS	3	4	1.14NS
Private Job	21	24	p=0.3	28	17	p=0.53	22	23	p=0.76
Business	18	11		21	8		17	12	
Others	7	12		14	5		11	8	
Occupation of Mother									
Private & Govt Job	17	14	1.01NS	23	8	0.86NS	15	16	6.25*
Business	13	11	p=0.6	15	9	p=0.65	18	6	p=0.04
House wife	20	25		31	14		20	25	
Monthly Family Income									
Rs 5000-9000	29	31	.19NS	41	19	1.02NS	28	32	2.80NS
Rs 10000-14000	15	14	p=0.9	19	10	p=0.6	19	10	p=0.24
Rs 15000 & above	6	5		9	2		6	5	
Type of Family									
Nuclear	27	33	1.5NS	42	18	0.07NS	28	32	2.41NS
Joint	23	17	p=0.2	27	13	p=0.79	25	15	p=0.12
Number of Siblings									
1	4	6	.57NS	6	4	0.45NS	4	6	0.80NS
2	36	33	p=0.74	48	21	p=0.80	38	31	p=0.67
3 & more	10	11		15	6		11	10	
Birth order									
First	26	27	.04NS	31	22	5.82*	28	25	0.001NS
Second & Third	24	23	p=0.84	38	9	p=0.016	25	22	p=0.97

NS-Non-significant * significant at 0.05 level.

Discussion

The study revealed that 31% of respondents scored positive for depression. Our findings echo previous research evidence which shows that elevated level of depression among COAs.[12] The study also revealed that 23% of boys & 16 % of girls are having elevated level of anxiety and this findings is supported many previous studies. [12] The Indian prevalence studies on anxiety among school children found prevalence from 2%- 24% and also found that females are affected more which is contradictory to our findings.[19]

The present study revealed that 53% of children are having low self-esteem and this is supported study conducted by Jenefer KMshows that significant association was observed between parental problem drinking and adolescents self-esteem.[11] The study revealed that a positive correlation between anxiety and depression (0.359) and this is supported by many previous studies which shows the comorbidity between anxiety and depression.[20] The study also revealed that anxiety is negatively correlating with self-esteem (-0.223) and this is supported by study conducted by Maldonado L

shows that adolescents with anxiety disorder had lower self-esteem.[21]

The study revealed that significant association found between anxiety and depression with class in which children are studying and this is supported study conducted by Rama rao KT shows that significant association was found between emotion and behavioural problems with high school students.[22] Early identification of developmental disabilities is a high priority for the World Health Organization to allow action to reduce impairments.[23] Even research findings shows that if problems are identified at earliest age, the impairment can be prevented. [11,12]

Limitations: The study is limited to small sample size (100) and small number of subjects limits generalization of the study.

Conclusion

The study findings shown that Children of alcoholics are at risk for anxiety, depression and low self-esteem. A behavioral problem during childhood is linked with variety of negative experience in adolescence and adulthood, so early identification by health care team is very important for prevention of complications. Further research is needed to identify effective strategies for using primary care for recognizing, diagnosing, and treating mental health problems in children and adolescents.

Source of Funding: Self

Conflict of Interest: Nil

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Effect of Dynamic Stretching Warm-Up Protocol on Hamstring Flexibility in Roller-Skaters: An Experimental Study

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Abstract

Purpose of the study: To find the effect of dynamic stretching warm-up protocol on hamstring flexibility in roller-skaters.

Materials and methodology: Subjects fulfilling the inclusion and exclusion criteria were included. After taking consent from parents, the skaters were assessed for their hamstring flexibility using the sit and reach test and 90-90 Straight Leg Raise (SLR). The skaters were then asked to perform set of 8 stretching exercises daily for 4 weeks. Prior to exercise the skaters had to do warm-up and post stretching, cool down. The entire protocol was supposed to be performed before their practice. After 4 weeks, post assessment was taken for their flexibility using the 90-90 SLR and the sit and reach test. Statistical analysis was done using the unpaired t test.

Result: The statistical analysis showed considerable extremely significant improvement in 90-90 SLR and Sit and reach test with p value <0.0001

Conclusion: The above study concluded that dynamic stretching warm-up had significant improvement on flexibility of hamstring muscles, both clinically and statistically.

Keywords: *Dynamic stretching, flexibility, hamstrings, sit and reach test, 90-90 SLR.*

Introduction

Hamstring, a bi-articular muscle lying in the posterior aspect of thigh is one of the frequently injured muscle in athletes.(1) Hamstring injuries are more common in sports requiring jumping, sprinting, etc. Muscle overload, imbalance, tightness, fatigue and poor conditioning often predisposes it to injuries. Quadriceps being more powerful than hamstring, there occurs an imbalance between the two and in-turn the hamstrings become fatigued more easily;thereby predisposing them to injury during high speed activities.(2) Age, gender, tissue temperature, strength training, and reduced warm-up period during exercise alters hamstring flexibility.(3)

Skating, a unique combination of athleticism, gracefulness, endurance involves many jumps, spins, and complex moves.(4) The most common musculoskeletal injury includes patella-femoral syndrome which occurs when the hamstrings and quadriceps have poor flexibility. Hence flexibility is an important factor in skaters.(5)Reduction in ability of muscle to deform leads to muscle tightness and in turn decrease in range of motion at the joint where is performs its action.(6) Hence a proper warm-up protocol is required to not only minimize but also prevent injuries.

Stretching, is a general term used to describe any therapeutic manoeuver designed to increase the extensibility of soft tissues, thereby improving flexibility by elongating structures that have adaptively shortened

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and have become hypomobile overtime. The various modes include static, ballistic, cyclic, proprioceptive neuromuscular facilitation and dynamic stretching technique. The techniques which produce positive effect on muscle are then incorporated as a part of routine warm-up protocol. The most common technique to be used is static stretching as according to literature, it is known to be the safest form.[7]

In static stretching, the soft tissues are elongated just past the point of tissue resistance and then held in the lengthened position with a sustained stretch force over a period of time.[8] However recent studies indicate that static stretching has little or no effect on muscle performance.[9,10] Itmay cause decrease in dynamic constantexternal resistance strength, maximal concentric isokinetic strength, maximal isometric strength, peak twitch force output and rate of force development, maximal power output and balance. This phenomenon has been collectively termed as the *stretching induced force deficit*.[11]

To overcome this, researchers have focused on dynamic stretching as an alternative to static stretching as evidence suggests that it has positive effects on muscle performance as well as on flexibility. It consists of functional based exercises which use sports specific movements to prepare the body for activity.[12, 13, 14] The muscles are actively and rhythmically contracted to stretch the target muscle thereby raising muscle temperature. In dynamic stretching, a contraction by the antagonist muscle causes the joint crossed by the agonist to move through the full ROM at a controlled, slow tempo. Stretching begins from a neutral position, followed by a slow movement (4-5sec), of the limb to the end range, a brief hold at the end range (4-5sec), and ends with slowly moving the limb back to the original neutral position using an eccentric contraction. The contraction by the antagonist causes the lengthening muscle to relax due to the principle of reciprocal inhibition. Therefore dynamic stretching is a more natural way to elongate the muscle.[13, 14]

The other benefits of preferring dynamic stretch over stretch include that rather than focussing on a specific muscle, it focuses on individual muscle, approaches to work on movements. Secondly, the dynamic nature helps to maintain the elevation effects of the first period. Thirdly, the movements are more specific to those found in the sport and lastly, it is extremely time efficient. Additionally it has a physiologically different approach. The physiological effects of dynamic stretching include elevation of core body temperature, enhancement of motor unit excitability, improvement of kinaesthetic awareness, maximization of active ROM and development of fundamental movement skills. This creates a more optimal power production by enhancing neuromuscular function. This phenomenon has been referred to as the*post activation potentiation*. In this way preparation for activity is enhanced as muscles are activated as well as mobilized through key movements as post activation potentiation has its greatest effect on fast-twitch fibres.[15]

In order to recommend dynamic stretching as a suitable stretching exercise during warm-ups for various sports activities, previous findings are insufficient. Hence, the effects of dynamic stretching exercise on flexibility needs to be examined.

Materials and Methodology

After ethical clearance, the skaters were screened for their inclusion and exclusion criteria. Accordingly, 38 skaters were selected. For assessment of hamstring flexibility, 90-90 SLR and sit and reach tests were used. The skaters were asked to perform exercises prior to their practice. The exercise protocol was as follows-Warm-up:5min

- Dynamic warm-up: 8 exercises (15sec of each)
- Cool down: 5min.
- Total duration: 12-15min

Warm-Up:

- Jogging
- Bench stepping
- Jumping jacks

Entire Body Dynamic Warm-Up Protocol:

Bear squatwith kneeling foot stretch: Kneel sitting ⟶ quadripud ⟶ mountain pose ⟶ kneel sitting

Spider stretch with hamstring: Start with high plank position ⟶ step right foot outside right hand ⟶ drop right elbow down into the step of your right foot. ⟶ Sit back on left heel and straighten right leg ⟶ feel a stretch down your hamstring.

Dynamic pigeon stretch: Sit on the ground and keep foot in front. Keep knee bent to 90° and feel a stretch in the glute. Straighten back leg as much as

possible. start by reaching out to the left and then slowly move your hands to the right. When you reach as far as you can to the right, sit up and circle back around to the left side. Switch to the other.

Butterfly stretch with reach: Seated, place the bottom of your feet together and then draw your heels in as close as possible. Press your knees down towards the ground. Then try to reach your feet. Repeat with other leg.

Dynamic squat stretch: Stand with feet shoulder width apart. Bend forward as much as possible and try to reach your feet while keeping your legs straight. Bend your knees such that you assume a squatting position. Extend your hands towards the ceiling, make sure your heels don't come off the ground. Straighten your legs and get back to standing position.

Standing quadriceps stretch with reach: Stand on your right foot, grab left ankle with left hand. Pull left heel into your buttock. Hold for a few seconds. Repeat with other leg.

Standing hamstring and IT band stretch: Standing, cross your left leg over right leg. Clasp your hands together and reach up overhead. Bend forward, reach the ground. Hold for a few seconds.

Plank with reach back and out.

Cool Down

- Jogging in place(light and easy)
- Bench stepping(light and easy)

After a duration of 4 weeks, the skaters were again assessed for their flexibility using 90 – 90 SLR and Sit and reach test. Statistical analysis was done using the unpaired t test and confirmed with instat software.

Results

1. Sit And Reach Test

Interpretation: The pre-interventional sit and reach was 20.08±5.12 and post intervention sit and reach was 23.37±5.27. The P value was<0.0001 which was statistically considered extremely significant (t=7.66) This shows improvement in sit and reach test.

The analysis was done using 'paired t test'.

2. 90 – 90 SLR

Interpretation: The pre –interventional 90 – 90SLR was151.16±17 and post intervention 90 – 90SLR was 156.11±17.14. The P value was<0.0001 which was statistically considered extremely significant (t=11.23) This shows improvement in 90 – 90SLR.

The analysis was done using 'paired t test'.

Discussion

The study "Effect of dynamic stretching warm-up protocol on hamstring flexibility in roller-skaters" was conducted to find out the effect of dynamic exercises i.e. sports specific exercises on the flexibility of hamstring muscles. Skating, a unique combination of athleticism, strength, endurance, gracefulness and artistry involves complex moves, jumps and spins thereby requiring a good combination of strength and flexibility. The most common injury includes patella-femoral instability which occurs due hamstring-quadriceps instability. Eccentric contraction of hamstrings is important for the skaters hence they need to have a good amount of flexibility.

Strength, flexibility and endurance is the basic necessity for maintaining normal mobility of the body. Prior to warmup teams participate in a warm – up program so as to prepare the body for activity thereby preventing injuries. Warm – up includes stretching and exercises. Benefits of stretching include increase in core body temperature, increase in extensibility of the tissues and in turn minimizing the risk of injury.

The most common means for pre – activity warm-up is the static stretch. According to literature, tension created during static stretch is approximately half than during other forms of stretching. However according to recent studies, static stretching has been shown to have little or minimal effect on muscle performance what is known as the *stretching induced force deficit.*

Researchers have focused on dynamic stretching as an alternative to static stretching as evidence suggests it has positive effects on muscle performance and flexibility. Dynamic stretching consists of functional based exercises which use sports specific movements to prepare the body for activity. The benefits of dynamic stretching include a more natural way of tissue elongation as contraction of the antagonist causes the lengthening muscle to relax, in accordance to the principle of reciprocal inhibition and it approaches to work on movements. Secondly, the dynamic nature helps to maintain the elevation effects of

the first period. Additionally, it also has physiologically different approach which include elevation of core body temperature, enhancement of motor unit excitability, kinaesthetic awareness, and maximization of active ROM, which is together known as the *post activation potentiation.*

The objectives of this study were to provide a precise and concrete protocol for pre-activity warm-up that targets specific muscles required for activity thereby eccentrically elongating them.

The study was conducted on 38 roller-skaters. They were selected based on their inclusion and exclusion criteria. Inclusion criteria was both girls and boys below 16yrs of age. Exclusion criteria was any history of musculoskeletal or neurological injuries and history of previous surgeries.

Prior consent was taken from them after – which they were assessed for hamstring flexibility. Sit and reach test and the 90 – 90 Straight leg raise test (SLR) was used to measure hamstring flexibility.

In the sit and reach test, the skaters were asked to bend forward as much as possible such that they try to touch their feet.

For assessing hamstring flexibility using the 90-90 SLR, the subjects were asked to keep their hip and knee at an angle of 90° after which their flexibility was measured using goniometer.

After assessment, prior to stretching, the skaters were asked to perform a set of warm-up exercises which included jogging, bench stepping and jumping jacks. Stretching includeda set of 8 exercises i.e. bear squat with kneeling stretch, spider stretch with hamstring, dynamic pigeon stretch, butterfly stretch with reach, dynamic squat stretch, standing quadriceps stretch with reach, standing hamstring stretch and IT band stretch and plank with reach back and out. This was followed by cool down exercises which included jogging in place(light and easy) and bench stepping (light and easy).

The whole treatment intervention was about 12-15min. After 4 weeks, post intervention assessment was taken. The results ofthis study indicated increase in hamstring flexibility. This was confirmed using statistical analysis by using the 'Paired T test.'

In the sit and reach test, pre and post intervention was statistically considered extremely significant ($p=<0.0001$) and the 90-90 SLR pre and post treatment was considered extremely significant($p= <0.0001$)

Post training improvement is considered to be due to increase in eccentric contraction of the hamstring muscle, development of fundamental movement skills, elevation of core body temperature. Among few participants, there may not be major changes, due to lack of regularity.

Conflict of Interest: Nil

Sources of Funding: Self

Ethical Clearance: Ethical clearance was given by Institutional Ethical Committee.

Conclusion

The above study concluded that dynamic stretching warm-up had significant improvement on flexibility of hamstring muscles, both clinically and statistically.

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Re-Engineering of Discharge Process with Emphasis on Sustainability: A Six Sigma Approach

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Abstract

A quality improvement initiative is incomplete if the improvement is not sustained. The concept of sustainability is not limited to achieving the change and adhering to it, but further commitment is required from the staff for continuous improvements in the organization. The application of Six Sigma for process efficiency and achieving break through results are quite obvious, but evidence on its sustainability is limited. So, the current study was designed to re-explore the applicability of Six Sigma to re-engineer the discharge process with emphasis on determinants of sustainability factors. The methodology chosen was DMADV approach of Six Sigma. Define phase involved scrutinizing the finer details of process and resources utilized. The mean Turn-Around Time was measured for credit (269 mins) and cash (241 mins) patients using a time motion study. The NHS sustainability model was utilized for assessing the existing sustainability score of process. Minitab and Minitab Companion software was used for analysis of process capability and value stream metrics analysis. The process was re-engineered by streamlining the activities based on the standards given by NABH 4th Edition, JCI 6th Edition and best practices followed in different healthcare settings. Specific roles and responsibilities of staff were re-defined for the improved process. Failure Mode and Effect Analysis and control and impact matrix was conducted and provided to process stakeholders for ease of implementation. Validation of process improvement was done by value stream metrics analysis and discussion with the hospital administrator. The outcomes of the study were simplified process and discharge pro-forma which can be further utilized for application of Six Sigma in similar healthcare settings.

Keywords: *Quality Improvement, Discharge Process, Six Sigma method, Sustainability, Re-Engineering.*

Introduction

Healthcare industry is undergoing tremendous transformation in recent years with the technological advances. The two views expressed in one of the study were, patient's view which is supported by urbanization and awareness about health needs. The standpoint of hospitals was to uphold quality as crucial factor[1]. *According to the study conducted across 195 countries to assess Healthcare Access and Quality using HAQ index in 2016 gave India 145th rank with the quality score of 41.2[2]. To improve this ranking further there is need for quality improvement initiatives in every healthcare setting.* The two concepts that all levels of staff in an organization need to focus are, to do the job efficiently and improve on a daily basis[3].

Six Sigma in Indian Healthcare: Six Sigma is an organized, parallel- meso structure to reduce variation in organizational processes by using improvement specialists, a structured method and performance metrics with an aim of achieving strategic objective[4]. Six Sigma targets improvements or solutions for root causes of the defects, it is believed to reduce or eliminate reworks. Healthcare industries' essence lies in understanding the ascendancy of minimally defined services, immense involvement of human resources, uncertainty of outcomes of care and regulations, and different modes of payment options like insurance, providers from non-profit organizations etc[5]. Several hospitals have been applied Six Sigma for process efficiency in Operation Theatre, Radiology, Laboratory and to reduce waiting time in several departments etc.

Sustainability of Process Improvements: The key for sustainability lies in having a same goal spread across the organization in terms of continuous

quality improvement. The levels of sustainability are individual, teams, departments, organization and the entire healthcare care system. As the scale of change grows there is upward surge of requirement of expertise, skills, and resources for sustaining an improvement in the organization[6]. Quality improvements are successful only when there is transformation in organization culture to fire prevention rather than only on firefighting. A comprehensive review done on assessing the effectiveness of Six Sigma methodology concluded 67% of the process improvement in key process metrics, and only 9% were reported with sustained improvements. 8% reported with enhanced revenue and 28% reporting of cost savings was noted. The study highlighted the need for further application of Six Sigma with significant focus on sustainability[7]. This leads to the current study by re-exploring the Discharge process at a tertiary hospital with emphasis on sustainability.

Literature Review: The review article on the discharge process improvement studies concluded that, core issue with the process is lack of standardization of process across hospital and involvement of staff in fragmented episodes[8]. Another major factor related to the quality of discharge process is the provision of discharge summary by the hospital. Often, the discharge summary is the only form of communication that accompanies the patient to the next setting of care[9]. A Veterans Affairs Hospital affiliated by the university was experiencing poor outcomes of care and often discontinuity which lead to design and implementation of the electronic discharge summary tool for maintaining the timeliness of discharge summaries. The variables evaluated during pre and post implementation were time lapsed from discharge orders till patient received comprehensive discharge summary note, availability of note of discharge summary and satisfaction of outpatient providers with the discharge summary note. The results achieved were in favor of introduction of a novel discharge summary tool. The outpatient providers 86% found the discharge note was comprehensive for continuity of care[10]. Boson Medical Centre conducted a study with the intervention of RED (Re-Engineered Discharge) a standardized program with an objective to provide essential information to patients and their caregivers, which would prepare them to continue with the care at home. Enhancing the information availability and quality of patient education for adult patients with basic educational background helped in reduction of unplanned re-admissions and improve patient experience. The National quality forum recognized the components of RED program as the best practices. The toolkit and components was developed in accordance with the Agency for HealthCare and Research[11]. A study with a concern for investigating the effectiveness of implementing Six Sigma for hospital process improvements conducted a pre and post intervention study for a period of 10months using DMAIC methodology. It focused on improving the administrative processes that contributed for delays. A complete statistical analysis was conducted to analyse trends in daily discharge times, special cause variation, common cause variation, and assess process stability. The prominent limitation of study was sustainability of the process and appropriate staffing and lastly the data reliability[12].

Methodology

Aim: The study aims to realize the nature of process and assess factors required for its enhancement such that better outcomes could be achieved and sustained.

Objectives:

1. To study the current discharge process and attributes for sustainability (Define phase)
2. To measure and analyze the process and sustainability factors (Measure and analyze phase)
3. To redesign the process incorporating sustainability factors (Design Phase)
4. To Verify/Validate the re-designed process

The objectives of the study were designed in accordance with DMADV approach.

The study was carried out in tertiary care hospital in Northern Bangalore. The inpatient ward chosen for study was Corporate General ward. The methodology adopted was observational, descriptive and cross sectional study. Convenient sampling was done. The turn-around time of 40 credit patients belonging to different specialties were tracked and 20 cash patients. The further method, resources and tools used are been described in DMADV phases below.

Define Phase: The process to be studied was defined and co-related with the existing literature. The existing Discharge policy of the hospital was scrutinized with NABH 4th Edition standards. The determinants of sustainability were explored. Define Phase further involved preparing a project charter and SIPOC (Supplier, Input, Process, Output, customer) tools.

Measure Phase: The data collection tool was prepared for recording the time for each activity and case specific delays. Process Baseline was measured and process capability test and run charts was done for credit patients. Probability tests were carried out for the cash patients.

Calculation Defects per million Opportunities and Current Process Sigma level: Total no of patients (Both Cash & Credit) = 58 Total opportunities for delay in core process steps = 6 per patient, Total defects = 75, DPMO = (No of defects/No of units * No of opportunities) * 1000000 = 215517

Process Sigma level = 2.29, Process yield (%) = 78.45, Defects (%) = 21.55

Sustainability Scores: The scores for process factors score was 15 and staff factors was 22.6 which were required to be improved for the simplified process.

Analysis Phase: The detailed process analysis was done and counter measures were first drafted. The causes of delays were analyzed with cause and effect matrix was carried out for prioritizing the factors to be addressed. The identified areas crucial for improvement were discharge summary sub-process, patients leaving the wards, and billing related.

Design Phase: The discharge policy redefined as required by NABH 4th Edition standards. Patient's readiness for discharge and resources allocation factors was included for discharge planning. Specific roles and responsibilities of staff were re-defined for ease of carrying out process with less hassle. Process was simplified by proper specified steps under planning of discharge and on the day of discharge. The sustainability factors were addressed by method to involve the senior and clinical leadership. Technological solutions were reviewed to select the best options available. Failure Mode and Effect Analysis (Annexure - 1) was done assessing the potential failures and action plans were provided.

Validation or Verification phase: First the process was discussed with administrator and the quality personnel for implementation purpose. Next Minitab companion software was used for value stream metrics analysis to show the reduced waiting time and non-value added activities in the process. The discontinuity in the process was prioritized and addressed. The waiting time was reduced for administrative activities.

In Control and High Impact 1. Prioritizing the Discharges 2. Assessing readiness of patient and planning for discharge 3. Availability of transport resources 4. Availability of investigation reports at the time of doctor's rounds	**Out of Control But High Impact** 1. Physician rounds 2. Adequate staff 3. Prior preparation of discharge summary draft
Low Impact but In control 1. Training general duty assistants 2. Training of staff for plan for discharge	**Low Impact and Out of Control** 1. Patients paying the bills

Fig: Control and Impact Matrix

Results

During the define phase with the resulted process map the areas of discontinuity and deficiency in the existing discharge policy were identified and evaluated. Measure phase involved real time data collection and case specific delays for analysis using Cause and Effect matrix and Pareto's chart. Six-pack Process Capability tool on Minitab software was used to assess the current process capability for credit patients. The mean turn-around time for credit patients was 269mins and process capability was only 0.7.

The current process capability is 0.72 which is lesser than the normal value which is 1.33 and far away from the Six Sigma value which is 2. This also interprets the process is incapable of providing the requirements or producing outside the specification limits. The analysis of delays in the process identified discharge summary sub-process, patient leaving the ward and provision of final bill estimation information for patients were the factors for improvements. The control impact matrix provided attributes that are under management and controlling and monitoring them on regular basis will enhance the process efficiency and sustainability of changes. Design phase involved simplification of process and appropriate staffing. Validation of process was done through discussion with hospital administrator and value stream metrics.

Discussion

The lack of standardized process is the first issue that is been common with study done in other institute[8]. The mean time recorded during the measure phase was 269 mins for credit patients and 241mins for cash patients. The two studies did have a closer or similar mean time during the measure phase i.e., 247mins[13] and 234.35mins[14]. The additional 15-20mins variation noted

could be with the type of staff and technological resources currently in use. Another potential reason for delay as noted by study conducted in another healthcare setting[14], was related to processing of bills at the multitask desk. The queue time was addressed by increasing billing hours. In the current study the critical issue with bills was no provision for prior information on estimated time for bills payment to patient's care takers/relatives.

The process simplification was done by removing over processing of work and defining the specific role and responsibilities for staff which was similar in the study conducted at a community hospital[15]. Appropriate use of enterprise resources planning software[13] was reviewed for ease of the process and support for the staff and in-charges. The cause and effect matrix was another tool to be compared with the study. During addressing the system changes an additional staff[14, 15] was been added for well-being of patients after discussion with staff. The current study focused on reducing the number of staff involved in order to reduce the opportunities for delay.

Previously re-engineering of discharge process has been done with a focus on reducing the re-hospitalization[16], patient safety, re-admissions and post hospitalization return to emergency department[11], optimizing bed utilization and discharges before afternoon[17]. Current study focused on sustainability of process improvements by simplifying the process for standardization, appropriate staffing, and introducing a process monitoring system.

The National Institute for Health Research Collaboration for Leadership in Applied Health Research and Care for Northwest London (CLAHRC NWL) evaluated the applicability of NHS sustainability model. From the on-going projects the responses and formal reviews were collected by three different teams. Of the 19 teams selected and the feedback from 12 teams was positive towards the use of model. The remaining teams had negative feedbacks and found its usefulness was questionable and required deeper understanding for better applicability[18]. Many different attempts have been made to develop organization specific success tools for sustaining the improvements. During final conclusion the authors found the importance of involvement of stakeholders in developing a practical tool that can be applied in the different healthcare settings[19].

Recommendations: The recommendations involved provision and implementation for simplified discharge process and defined roles of staff. Further upgradation of ERP software, reallocation of transport resources and process monitoring system would help in reducing the overall turn-around time and improve efficiency.

Conclusion

The current study scrutinized the number of staff involved in the process to be standardized with specific roles and responsibilities which can actually reduce the number of opportunities for causing defects or delays. The sustainability of process improvements can be assured with enhanced leadership training for staff in-charges and purpose of quality improvement adequately spread across the organization.

Ethical Clearance: Taken from Ramaiah University of Applied Sciences (RUAS) Committee.

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Nutritional Status of Pre-Schoolers in the Border Areas of Jammu

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Abstract

The nutritional status and overall development of children living in the border areas is affected to a greater extent due to restricted movements and lack of food during armed conflicts. Quality nutrition remains a distant dream for children residing in such areas due to lack of care and nourishment in their routine. Total number of 130 children aged 3-6 years were selected from border areas of R.S Pura (65) and Kathua (65), Jammu. Information regarding the socio-demographic profile, feeding practices and impact of armed conflicts on affordability, accessibility and availability of food was collected from mothers who voluntarily agreed to participate. Nutritional status was assessed by computing weight for age, height for age and B.M.I for age as per z-scores and percentiles by W.H.O. Data was entered into SPSS software version 23.0. Chi-square test was used for testing relationships between categorical variables, Pearson correlation to measure strength of linear association between two variables along with t-test to find mean differences between variables. Children of R.S Pura had better diet diversity scores (4.89 ± 1.10) compared to Kathua (4.32 ± 0.812) as majority of the father's were employed in government sector in R.S Pura (66.2%) and ration was provided during period of turmoil by government authorities. t-test revealed children to be normal for HAZ (-1.82 ± 1.520, -0.42± 2.150), WAZ (-0.05 ± 1.763, 0.62 ± 1.497) in both R.S Pura and Kathua however as per BMZ for age children were at a risk for being overweight in R.S Pura (1.86 ± 1.248) compared to normal children in Kathua (0.95 ± 1.430).Weaning was found to be statistically significant and 65.6% children were weaned at an appropriate age in R.S pura compared to 34.3% in Kathua.

Keywords: *Anthropometry, border areas, Jammu, Nurtritional status, ration facilities.*

Introduction

Malnutrition and diet are by far the biggest risk factors for the global burden of disease[1]. Childhood is a period of rapid growth and development,and nutrition is one of the influencing factors in this period[2]. Globally under-nutrition is associated with almost half of all childhood deaths[3]. India having a population of 1,236,344,631[3] and 112,782,125 children below the age 6 the prevalence of undernutrition is 42.5%[4] in comparison to 15% of under-six children in the world who are under-weight. According to National Family Health Survey-4 (NFHS- 4) estimates, nearly 42% of children in India are stunted and 38% are underweight in rural areas[5]. Jammu contributes to only 1% of India's share of population and the prevalence of undernutrition is 33.8%. *(NFHS III)*[6].

The environment in which a child grows affects the nutritional status especially in the armed conflict areas where everyday activities of children are affected due to restricted movements leading to compromised food choices and altered growth. Thus, anthropometric indices along with diet diversity are reasonably sensitive indicators for assessing immediate and general causes of undernutrition[7]. It has been postulated that the risk of mortality is inversely related to children's weight-for-age, height-for age and hence anthropometric indices have been useful to estimate the prevalence of under-nutrition among pre-school children[8,9]. Nutrition on other hand too has its fare share in contributing towards undernutrition. Children who become refugees,

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migrant and are uprooted from their homes due to armed conflicts are deprived of basic necessities/human right such as food which further contributes to nutritional deficiencies and ultimately undernutrition[10].Thus considering vulnerability of children in disturbed areas, observing the nutritional status of these children is of prime importance.

Materials and Method

The current study was a cross sectional study in which 130 stratified samples were chosen from disturbed areas of R.S Pura and Kathua, Jammu. Ethical clearance was obtained from Independent Ethical Committee of Symbiosis International University. Children aged 3-6 years were studied from November,2016 to February, 2017. 2 samples were excluded for incomplete information. The objective of the study was to assess the nutritional status of children in the disturbed areas of Jammu aged 3-6 years. Considering 33.8% as the prevalence rate of underweight children (NFHS III)[6] in Jammu, margin of error 8% and confidence level at 95% sample size was calculated using the formula $N= Z^2pq/e$. Based on the formula the sample size was 132.

Objectives of the study were explained to the principal, staff and mother of the children chosen. Written informed consent form was filled by those who voluntarily agreed to participate in the study. Information regarding date of birth,parents occupation were recorded from the school records..

Anthropometric data such as height, weight, Mid upper arm circumference and chest circumference were measured through caliberated instruments. Light indoor clothing was allowed to be worn and footwear was removed when readings were taken.

Nutritional status among 3-6 year old children was assessed by computing weight for age (z-scores and percentile), height for age (z-scores and percentile), B.M.I. for age (z-scores and percentile) using W.H.O growth charts. Dietary data was recorded using diet diversity questionnaire by FAO[11]. 24 hour diet recall was taken, various food groups consumed were recorded, scores assigned and accordingly dietary adequacy were computed as low, medium and high. Children who had dietary scores below 3 had low diet adequacy, those having 4-5 score had medium diet adequacy and high diet adequacy was for those having dietary score above 6.

The data was checked for completeness, coded and entered into Microsoft Excel and analyzed using SPSS version 23.0. The data was analyzed using descriptive statistics comprising of percentage, frequencies and measures of central tendency.

Growth parameters and their interpretation for the World Health Organization charts[12]			
Z Score (Percentile)	**Length/Height for age**	**Weight for age**	**B.M.I for age**
>3 (99)	May be abnormal	May be abnormal (Use B.M.I)	Obese
>2 (97)	Normal	Use B.M.I	Overweight
>1 (85)	Normal	Use B.M.I	Risk of overweight
0 (50)	Normal	Use B.M.I	Normal
< -1(15)	Normal	Normal	Normal
< -2 (3)	Stunted	Underweight	Wasted
< -3 (1)	Severely stunted	Severely underweight	Severe wasted

Result

Table 1: Feeding practices of children among the two areas

Initiation of breastfeeding	**Locale**		**Chi-square value**	**p- value**
	R.S Pura	**Kathua**		
<6 hours	52.2% (59)	47.8% (54)	1.692	0.193
>6 hours	35.3% (6)	64.7% (11)		
Weaning				
4-6 months	100% (11)	0% (0)	32.5	0.000**
6-12 months	65.6% (40)	34.4% (21)		
>12 months	24.1% (14)	75.9% (44)		

**Correlation is significant at the 0.01 level (2 tailed)

From table 1 it can be seen that feeding practices were better in R.S Pura than in Kathua. Even though initiation of breast feeding was not statistically associated with the locale of the child, 65.6%(40) children were weaned at an appropriate age (6-12 months) in R.S Pura when compared to 34.4%(21) in Kathua.

Table 2: Parent's occupation and nutritional status

Father's occupation	Locale		Chi-square value	p- value
	R.S Pura	Kathua		
Government employee	66.2% (43)	33.8% (22)	44.82	0.000**
Farmer + Daily wagers	8.2% (5)	91.8% (56)		
Mother's occupation				
Housewife	81.5% (53)	35.4% (23)	11.25	0.024*
Government employee	4.6% (3)	1.5% (1)		
Farmer + Daily wagers	13.8% (9)	63.1% (41)		

*Correlation is significant at the 0.05 level (2 tailed), **Correlation is significant at the 0.01 level (2 tailed)

The above table depicts that majority of the father's in R.S Pura were employed in the government sector(66.2%) ensuring fixed salary even during period of turmoil when compared to children in Kathua whose father's either practiced farming or were daily wage workers. Among the two areas, Kathua had relatively less number of housewives (35.4%) when compared to R.S Pura(81.5%).

Table 3: Meal intake and starvation period

Number of meals in a day	Locale		Chi-square value	p- value
	R.S Pura	Kathua		
2	1.5% (1)	4.6% (3)	13.25	0.004*
3	20% (13)	16.9% (11)		
4	43.1% (28)	67.7% (44)		
>4	35.4% (23)	10.8% (7)		
Starvation				
4-6 hours	27.7% (18)	33.8% (22)	2.005	0.367
7-12 hours	4.6% (3)	9.2% (6)		
None	67.7% (44)	56.9% (37)		

*Correlation is significant at the 0.05 level (2 tailed)

From Table 3 it was seen that 4.6% children in Kathua consumed limited meals to as much as 2 in a day. Children in R.S Pura showed better dietary patterns as almost 35.4% (23) consumed more than 4 meals in a day in comparison to 10.8% (7) in Kathua. Statistically starvation faced by children during armed conflicts was not associated with the border areas these children hailed from.

Table 4: Local market distance and ration facilities

Local market distance	Locale		Chi-square value	p- value
	R.S Pura	Kathua		
1-3 km	36.9% (24)	63.1% (41)	8.892	0.003
4-7 km	63.1% (41)	36.9% (24)		
Ration				
Yes	100% (65)	3.1% (2)	1.22	0.000
No	0% (0)	96.9% (63)		

**Correlation is significant at the 0.01 level (2 tailed)

Table 4 depicts the accessibility of food in terms of local market distance to the population living in both R.S Pura and Kathua region. It was found out that people living in Kathua had local markets nearby their place of residence i.e. within 1-3km (36.9%) whereas in R.S Pura 63.1%(41) had to travel 4-7km for buying the essential commodities. However during armed conflicts there was provision of ration facilities by the government authorities to the children of R.S Pura in comparison to those from Kathua.

Table 5 :Coefficient of correlation between meal intake

Component	Correlation test	p value	r value
Number of meals in a day	Distance between home and local market	0.000	-0.312**
	Diet diversity score	0.003	0.258**
	Mid-upper arm circumference	0.032	0.188*

**Correlation is significant at the 0.01 level (2 tailed), *Correlation is significant at the 0.05 level (2 tailed), (Mean value for MUAC =18.85 ± 1.75)

Table 5 shows that children whose meal consumption was appropriate for a day (more than 4 meals) had better diet diversity (p = 0.003, r = 0.258) and MUAC (p = 0.032, r = 0.188). However number of meals consumed in a day and market distance were negatively correlated.

Table 6: Anthropometric characteristics

Anthropometry 3-6 years	R.S Pura	Kathua	t value	p value
	Mean ± SD			
HAZ	-1.82 ± 1.520	-0.42± 2.150	-4.287	0.000**
WAZ	-0.05 ± 1.763	0.62 ± 1.497	-2.306	0.023**
BMZ	1.86 ± 1.248	0.95 ± 1.430	3.855	0.000**
Height for age (Percentile)	14.75± 26.25	40.58±40.38	-4.324	0.000**
Weight for age (Percentile)	48.71±38.20	63.38±31.627	-2.386	0.019**
B.M.I for age (Percentile)	86.55±22.36	71.42±28.76	3.350	0.001**

**Correlation is significant at the 0.01 level (2 tailed)

From Table 6 it can be seen that children in both R.S Pura and Kathua children were found to be normal for height-for-age and weight-for- age (z-score and percentile). However on assessing the z-score for B.M.I for age, children of R.S Pura were found to be at risk of being overweight (1.86 ±1.248) in comparison to children of Kathua who were normal (0.95 ±1.43) for their age.

Table 7: Consumption of food groups in disturbed areas

Food Groups	R.S Pura	Kathua	t value	p value
	Mean ± SD			
Cereals	3.25 ± 0.919	2.94 ± 0.76	2.07	0.04*
Carotene rich fruits and vegetables	0.74 ± 0.619	0.49 ± 0.64	2.22	0.028*
Dark green leafy vegetables	1.02 ± 0.71	0.75 ± 0.77	2.00	0.047*
Meat and Poultry	0.15 ± 0.40	0.03 ± 0.17	2.25	0.026*
Milk and Milk Products	1.00 ± 0.84	0.52 ± 0.58	3.72	0.000**
Diet diversity score	4.89 ± 1.10	4.32 ± 0.812	3.34	0.001**

**Correlation is significant at the 0.01 level (2 tailed), *Correlation is significant at the 0.05 level (2 tailed)

The consumption of food groups was very low as per recommended allowances for children 3-6 years in both the areas. However dietary adequacy of children in R.S Pura (4.89 ±1.10) was better than those who were residents of Kathua (4.89 ±1.10).

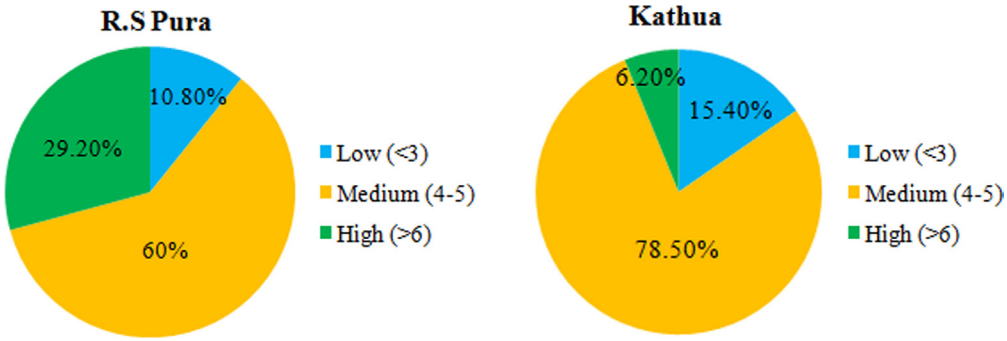


Figure 1: Diet diversity scores of children in R.S. Pura and Kathua

Due to the governmental aid and ration provided to the children of R.S Pura during period of turmoil, it can be seen that 29.2% children had high diet diversity score when compared to only 6.2% children having a high diet diversity score in Kathua. These dietary scores were computed on the basis of 24 hour diet recall in which exchanges of different food groups were taken into consideration and accordingly scores assigned.

Discussion

The findings of the current study reveal thatas per the z-score for B.M.I for age, children of R.S Pura were found to be at risk of being overweight (1.86 ±1.248) in comparison to children of Kathua who were normal (0.95 ±1.43) for their age. However in a study conducted by R Martorell et al in the border areas ofNepal[13] it was found that out of 510 children 65% were found to be stunted for their age.

Children in R.S Pura had better diet diversity scores (4.89 ± 1.10)better than those who were residents of Kathua(4.32 ± 0.812) due to better availability and food provided by government authorities during the period of turmoil.Steyn et al[14] in his study revealed that diet diversity scores were indicators of child growth.

It was seen thatas the distance between local market and place of residence increased, the number of meals consumed by a child in a day decreased due to restricted movement because of curfew imposed and ceasefire violations making it difficult to access food items from the nearby market.However it was seen that as the consumption of meals in a day increased,the diet diversity score improved along with the nutritional status as MUAC revealed that the children were well nourished($p = 0.032$, $r = 0.188$). Contradicting result was found in a studyconducted by Briend André, et al[15]where it was concluded that there was no significant correlation between weight of the child and MUAC. MUAC alone could be used as a preferable indicator for assessing the nutritional status of children

It was found that 23 children of R.S Pura(35.4%) consumed more than 4 meals in a day compared to only 7 children (10.8%) in Kathua.This could be due to reason that majority of children's father being employed in a government job and getting a fixed salary per month aiding to better affordability of food. It was also observed that only 1(1.5%) child consumed 2 meals in a day in R.S Pura region and 3(4.6%) children consumed 2 meals in a day in Kathua which is very less for children 3-6years old depriving them of the essential nutrients. Starvation during violations and armed conflicts along with lack of availability and affordability of food was the main reason for consuming such less meals.Even though children in R.S Pura 63.1%(41) had to travel 4-7km for buying the essential commodities in comparison to 36.9%(24) who had local markets nearby their place of residence i.e. within 1-3km in Kathua.However provision of ration by government authorities during conflicts was very active for people in R.SPura than in Kathua; Rice,sugar,wheat,oil the essential food items were made available within the vicinity of houses of R.S Pura by the government as ration facilities.

Initiation of breastfeeding and locale of the child were not statistically significant, however 65.6%(40)

children were weaned at an appropriate age (6-12 months) in R.S Pura when compared to 34.4%(21) in Kathua.Rasania and Sachdev observed a significant association between undernutrition in children when weaning was delayed[16].

Summary and Conclusion

The vulnerability of children living along the border areas increases as access to food, water and shelter is hampered due to ongoing armed conflicts which places health security at risk.Jammu has been witnessing such conflicts since Independence and nutritional status of children is affected to greater extent as extreme curfews,immobilization of human troops disrupts healthcare system,immunization schedules.Children cannot avail nutritional or healthcare services due to violence outside. It is of prime concern that authorities at the centre as well as state level adopt policies and schemes that would help organize camps and provide timely ration so that quality nutrition does not remain a distant dream to children who are prone to the armed conflict areas.

Conflict of Interest: None

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Ethical Clearance: The research was approved by the Research Advisory Committee (RAC), Symbiosis School of Biological Sciences in August 2016 and an expeditory approval by the Independent Ethics Committee (IEC) of Symbiosis International University in December 2016.

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Prevalence of Depression among Elderly in Rural South India

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Abstract

Objective: Depression is gaining a major attention in perspectives of public health problem. The present study aimed to survey the prevalence of depression among elderly in the Kancheepuram district, Tamilnadu, India. Further objectives were to find the relationship between Depression and Old age.

Method: The study was designed as a cross-sectional study to assess the depression level among elderly in Kancheepuram district of Tamilnadu, India. The simple random sampling method was used for selecting the research participants. A short version of the Geriatric Depression Scale consists of 15 questions was used as a tool for measuring their depression status. Based on the scoring criteria, level of the depression status was measured and categorized them as no depression, mild depression, moderate depression and severe depression.

Results: A majority of the subjects were in the age group of 60 to 69 years (76.5%). The mean age of the participants was 66 years (mean ± SD: 66 ± 3.8).The prevalence of depression in the current study was 72%. There was a statistically significant relationship between age and depression. There was no significant relationship between gender and depression, as both genders had depression approximately closer to each other**.** There is a negative association between sleeping hours and depression score. As the sleeping hours reduces, the depression score of the individual increases.

Conclusion: Thus the present study aimed to find the prevalence of depression among elderly in rural population of Tamilnadu, India. Increased age and sleeping hours are the major determinants of depression.

Keywords: *Depression; Elderly; prevalence.*

Introduction

Depression is gaining a major attention in perspectives of public health problem. According to literature, it is predicted that by 2020, depression would be the second major leading cause of morbidity after ischemic heart disease.[1] As per the WHO reports, one in twenty people reported having depression in their life due to various reasons. Depression ranges from mild illness to severe pathology seeking immediate attention.

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Individuals of 60 years and above constitute the elderly as per World Health Organization. There are nearly 104 million elderly persons in India as per Census 2011. In the words of Seneca; “Old age is an incurable disease”. As Sir James Sterling Ross said, “You do not heal old age, you protect it, you promote it and you extend it”. These are in fact the basic principles of Preventive Medicine.

India alone has around 100 million elderly at present, and the number is expected to increase to 323 million, constituting 20 percent of the total population, by 2050. Ageing is a Physiological process that affects almost all the systems of the body due to changes happening in body structures. Many elderly patients have an increased risk for malnutrition compared with other adult population.[2] It is estimated that depression affects one in seven people among elderly. However depression is not the natural process of aging, it is reversible with appropriate

treatment. Depression has a critical impact on well-being and quality of life of the elderly. Generally, Females tend to have more depression level than males.[3,4,5,6] The factors such as Co-morbidity, social network losses, low social support and negative life events.[7,8,9,10]

The present study aimed to survey the prevalence of depression among elderly in Kancheepuram district, Tamilnadu, India. Further objectives were to find the relationship between Depression and Old age.

Method and Materials

The study was designed as a cross-sectional study to assess the depression level among elderly in Kancheepuram district of Tamilnadu, India. The simple random sampling method was used for selecting the research participants. Kancheepuram consists of 15 blocks, in that totally Kattankulathur block consist of 39villages according to Census of India 2011. Eleven villages were selected by a lottery method in that 12 elderly peoples were selected from each village. Based on the overall prevalence of depression in India sample size is calculated, the sample size is 134 with the prevalence of depression 21.9%, 95% of the confidence interval and 7% of marginal error. Inclusion criteria are people aged 60 and above, those who all are the permanent resident of those particular areas (thirupporur,Kattankulathur). The non-respondents and those who are not willing to participate in the study were excluded. The study purpose was explained to the subjects. After which Oral and written consent were obtained from them. Pre-tested and validated geriatric depression scale (Short version) was used to assess their depression status.

Study instrument: A short version of Geriatric Depression Scale consists of 15 questions was used as a tool for measuring their depression status. Based on the scoring criteria, level of the depression status was measured and categorized them as no depression, mild depression, moderate depression and severe depression.

Results

A majority of the subjects were in the age group of 60 to 69 years (76.5%). The mean age of the participants was 66 years (mean ± SD: 66 ± 3.8).The prevalence of depression in the current study was 72%. In the present study, the prevalence of depression was found to increase with increasing age. It was found that nearly 30 % were at depression in the age group of 60 to 69 years, while 45% were depressed in the age group of 70 to 79 years of elderly people and it was 67% were depressed in the age group of 8 to 89 years. There was statistically significant relationship between age and depression (p-value<0.05)

Nearly 45% were belonging to the Upper middle class, 36% were in the middle-class group and 19% under lower class to the lower-middle-class group. In that 43% of the lower middle-class group had depression, whereas upper middle class was having 13 % of depression.

There was no significant relationship between gender and depression, as both genders had depression approximately closer to each other (p-value >0.05). Nearly 28 % of the respondents had no depression, while 39 % were having mild depression, 18% were having moderate depression and 19 % had severe depression. Overall 72 % of the elderly had depression in general, which signifies with high depression rate among elderly as per the reported documents.There is a negative association between sleeping hours and depression score. As the sleeping hours reduces, the depression score of the individual increases (Pearson correlation value = -0.077)

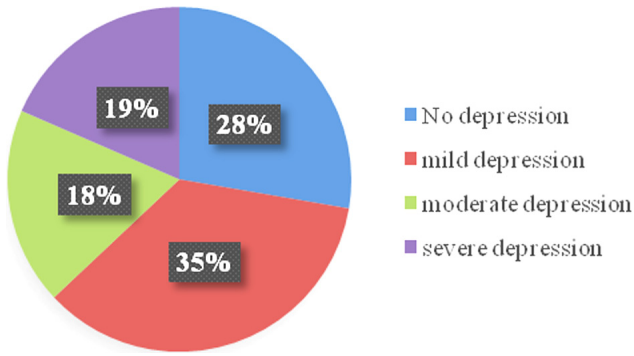


Figure 1: Depression Status n=134

Discussion

The chronic non-communicable diseases are rising as the geriatric population increases, therefore it is expected that magnitude of depression prevalence will also increase year by year. The result of this study suggests that prevalence of depression among elderly is approximately 72% which is very high compared to studies conducted previously. [11]The prevalence rate of depressive disorders reported between 4.7 to 16% as per the meta-analysis of 74 studies conducted among 487,275 elderly individuals and also suggested that higher prevalence rate of 21.9% in India.Similarly higher prevalence of depression was observed in a study conducted in Surat city with 39% prevalenceand a study in Udupi, Karnataka with the prevalence of 48%.

The prevalence of depression in the present study is comparatively high.[12,13,14,15]

This difference in the prevalence of this study might be due to the different instruments used for measuring depression and also their different sample size. In the present study, depression was found more among females as compared to males, but this difference was not statistically significant. In the same way, the observation was made from the study conducted in Manipal and Nellore district.[12,13] There was a significant statistical relationship between the depression and increasing age. As per the existing literature, the results validate that the depression is increasing among elderly as the age increases.[12,15]

To have a peaceful life, economic status of the individual act as one of the main factors in the day to day life. As per the study conducted in Pakistan which suggested that lower-middle-class people have depression that was due to increased age and lack of education, in our study people of the lower middle class have higher depression score when compared to other class people(43%). [16]Gender had no significant role in depression in our study. Similarly, the study conducted among community-dwelling elderly in Tamil Nadu found that age, female gender were not significantly associated with the depression score.[17]

Many article and literature suggest that sleep deprivation has a direct impact on our body as well as our mind. Seven hours of quality sleep is must for all, as it can seriously play a role in our daily activities. Insomnia and Depression are always related to each other and in our study, there is a negative association between sleeping hours and depression (Pearson correlation value = -0.077). As the individual sleeping hours decreases, the depression score increases which indicates, depression level of the individual increases.[18]

Conclusion

Thus the present study aimed to find the prevalence of depression among elderly in rural population of Tamilnadu, India. Increased age and sleeping hours are the major determinants of depression. By providing counseling and improving the general health condition can make the elderly patient less depressed and also sleep exercises are advised to them in order to attain proper sleep and thereby to improve the mental status.

Ethical Statement: The study was approved by Institutional Review Board of Ethics committee, School of Public Health, SRM University. Permissions were obtained from Panchayat president and Village Head members of the concerned villages for conducting the study.

Availability of data and materials: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Conflict of Interest: The Authors declare no competing interests.

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Working Women's Experiences on Domestic Violence and its Consequences: An Urban Mangalore Study

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Abstract

Context: Women experience gender inequality and violence in every society which has a negative impact on their life, triggering physical and mental stress that in turn leads to decreased quality of life.

Aim: To determine the pattern of domestic violence and its association with decision making power, economic status, educational status of both partners, age at marriage and to determine legal and health consequences on working women in urban Mangalore.

Method and Material: A cross sectional study done using pre-validated, structured and self-administered questionnaire among 210 working women selected by universal sampling method andchi square test was done to find associations.

Results: The prevalence of emotional abuse (28.8%) was more compared to physical and sexual abuse. 10 - 11% were slapped and beaten, 1 - 2% were hit with objects and kicked. 20% were humiliated, let down and teased often and 4.3% had forced to have sex. 11.8% were physically abused for arguing back and drunken husbands abused their wives often. 51.4% reported depression and 69% visited doctor for various reasons due to domestic violence in past one year. None filed case against their partner to save family reputation (14.3%) and fear on husband (3.8%). Husband's education had significant association with the act of beating, slapping, forceful sex and emotional trauma.

Conclusions: Women majorly suffered emotional abuse followed by physical and sexual abuse.

Keywords: *Women, Domestic violence, Urban, Physical abuse, Sexual abuse, Emotional abuse.*

Introduction

Domestic violence defined by Protection of Women from Domestic Violence Act 2005[1] as physical, sexual, verbal, emotional and economic abuse against women by partner or a family member residing in a joint family.[2] According to WHO, it is seen that women in South-East Asia are more prone to partner abuse when compared to their counter parts in Europe, Western Pacific and American[2,3] Global estimates show 35% of women experience either physical or sexual violence by intimate partner or non-partner sexual abuse in their lifetime.[4] India falls in the higher end of this range with third round of NFHS-3[5] reporting a burden of domestic violence as 37 percent among married women in reproductive age group.[2] In a patriarchal Indian society, deep rooted long standing cultural norms such that of female subordination, selective female foeticide are common factors and are responsible for domestic violence. In India, Protection of Women from Domestic

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Violence Act was passed in 2005. This was a milestone event against domestic violence.[6]

It is found that domestic violence varies with local social norms and literacy level of women[7] it is important to assess the problem for initiating supportive measures. The aim of this study is to determine the pattern of domestic violence and its association with decision making power, economic status, educational status of both partners and age at marriage of the women and to determine legal and health consequences of it.

Subjects and Method

A cross sectional study was conducted among all the married, educated women (teaching and non-teaching staff) working in a professional college of Mangalore city, Karnataka. Data was collected for 2 months from December 2017 to January 2018. The minimal sample size was calculated as 204, using the formula $4pq/d^2$ in which p=15%[8] of Spousal violence in Urban Karnataka and 5% allowable error. Universal sampling method was used. A standard, pre-validated and self-administered questionnaire consisting of 35 items prepared as per WHO guidelines given in WHO report of Violence on intimate partners[9] was distributed to the 385 women in the campus. The questionnaire included questions regarding physical, sexual and emotional abuse by their husbands/partners. The questions for reporting of health and legal consequences were added after the face validation and linguistic validation (Crohn backs alpha score being 0.82). [7] Informed consent was obtained from the participants. They were explained about the nature of the study and were made sure that the information provided will be maintained with utmost confidentiality. Women willing to participate were included in the study. Designated drop boxes were placed in different parts of the campus so that they may place their answered questionnaire in the box to maintain privacy. The participants were given one week time to fill and drop the questionnaires in these designated boxes. At the end of one week, we received 210 questionnaires back. Thus, the data was analysed based on responses from 210 participants.

This study had obtained ethical clearance from institutional ethical committee. The collected information was summarized using descriptive statistics such as frequencies and percentage. Chi square test was used to find association of domestic violence with respect to the decision-making power, economic status, educational status and age at marriage of both the partners. P value <0.005 was considered significant. Data management and analysis was done using Microsoft excel and SPSS version 16.

Results

Among the study participants, prevalence of physical, sexual and psychological abuse was found to be 13.3%, 4.8% and 28.1% respectively. Most the participants(72.4%) belonged to the age group 21-40, 63.3%of the women got married between the age 20 and 25 years and 70% were married for 1 to 10 years. On assessing the educational status of the wife, 40% of the women had graduated from college. 46.2% of the husbands held professional degree 48.1% of the women earned between 10,000 – 50,000 Rupees while 42.9% of husbands earned over Rupees 1, 00,000. 23.3% of women felt that the marriage was done only for the sake of social security and 18.6% felt that their husband is the boss of the home than a better companion for them. It was observed that in 71% of homes, husband was the major decision maker and in 15.2% homes, both the husband and wife take decisions. 35.9% of women reported that their spouses consume alcohol. **Table 1** lists the patterns of domestic violence faced by the women and extend of emotional abuse. It was observed that majority of them suffered Emotional abuse by their partners. **Table 2** elaborates various reasons for the domestic violence faced by the women as reported by them. It was observed that main reason for physical abuse was for not obeying their husband (24.1%) while most common reason (12.4%) for women emotional abuse was on the grounds of dowry and 2.4% were sexually abused by their alcoholic husbands. We also noted that some of the reasons were linked to more than one type of abuse. We also analysed the association of domestic violence with respect to decision making power, age and age at marriage of women and economic/education status of both partners. It showed that the educational status of the husband had significant association with physical, sexual and emotional violence (*p=0.021, p=0.006 and p=0.017* respectively) and majority of them were professionals with highest educational qualification. **Table 3** enumerates the health consequences of domestic violence among the women. Two-thirds of the women visited the doctor 1-3 times in the last year in relations to domestic violence. Most of the women (51.4%) suffered depression as reported by them. Less than 50% experienced headache as a long-term consequence of domestic violence. None of the women reported hearing

loss, vision loss, miscarriage, early delivery, mentally traumatising sexual acts, homicidal wounds or threats and STDs. None of the women reported a case on domestic violence. Various reasons as stated by them for not reporting were fear of losing family reputation (14.3%), 'ready to suffer domestic violence in silence' (7.1%) and fear of husband (3.8%).

Table 1: Patterns of Domestic violence among women and extend of emotional abuse

Patterns of Abuse	Responses (N = 210) N %	
Physical Abuse		
Slap	23	11.0%
Beat	22	10.5%
Kick	3	1.4%
Hit with objects	2	1.0%
Sexual Abuse		
Forced sex	9	4.3%
Abnormal sex	0	0
Emotional Abuse		
Letting down	43	20.5%
Humiliating	41	19.5%
Scolding	21	10.0%
Teasing	42	20.0%
Not caring for her	43	20.5%
Not talking to her	39	18.6%
Not bothered about her welfare	30	14.3%
Isolating her from others	7	3.3%
Monitoring her activities	30	14.3%

Table 2: Various reasons for Abuse as reported by women (N=210)

Reasons for Abuse	Responses (N = 210)		
	Physical Abuse N (%)	Sexual Abuse N (%)	Emotional Abuse N (%)
Not taking care of the family	9 (4.3%)	0	0
Refusing sexual intercourse	2 (1%)	0	1 (0.5%)
Disobeying the husband	52 (24.7%)	4 (2%)	9 (4.3%)
Dowry issues	14 (6.6%)	0	26 (12.4%)
Arguing with husband	25 (11.9%)	0	0
Doubting her loyalty	3 1.4%()	0	11 (5.2%)
Alcoholic husband	0	6 (2.9%)	6 (2.9%)
Complex problems	0	0	19 (9.8%)
Others	0	2 (1%)	6 (2.9%)

Table 3: Health consequences of domestic violence among women

Categories	Responses (N = 210) N %	
Physical Injury		
Cuts	4	1.9%
Scrapes	1	0.5%
Bruises	17	8.1%
Fractures	0	0
Psychological Stress		
Stress	19	9%
Depression	108	51.4%
Mood disorder	2	1%
Anxiety	3	1.4%
Insomnia	4	1.9%
Panic attacks	0	0
Suicidal thoughts	0	0
Visits To Doctor In Last Year		
1-3 times	145	69%
4-6 times	65	31%
>7 times	0	0
Long Term Health Consequences		
Headache	26	12.4%
Body ache	99	47.1%
Fainting	1	0.5%
Gastrointestinal disturbances	1	0.5%
Seizures	0	0
Substance abuse	0	0

Discussion

Due to the sensitivity of the subject and ones understanding of the questions related to violence, the results have been analyzed with utmost care and caution. Our data along with the world-wide literature confirm that domestic violence is a universal phenomenon existing in all communities.[8,10-16] Babu et al[6] in their study of married women from the states of Eastern India found urban residence, older age, lower education and lower family income are associated with occurrence of domestic violence. In our study, we noted that physical, sexual and psychological abuse were associated with educational status of the husband i.e. higher the education level, more the abuse was observed but a similar study done in Karnataka[7] showed lower the education, more the abuse. The proportion of physical violence is comparable in the two studies but the women in their study faced quadruple and double the amount of sexual and psychological abuse respectively, when compared to our study.

Pewa et al[17]in their study done in Rajasthan observed that more than half were physically abused (54.7%) and 20% were abused emotionally. This is higher than what was observed in our study. They report that alcoholism, low literacy status and having a girl child were the main reasons for domestic violence while we found that reasons such as not being a good wife, questioning the husband and not being an obedient wife were the main reasons for abuse.

In various studies conducted in northern India[10,18,19],they found reasons such as dowry and alcohol consumption, higher educational status and higher income of the wife where the patterns noted in households with higher percentage of domestic violence. On comparing with a multi- country study done by Garcia-Moreno et al[20] in 2006, the physical violence was almost same when compared to the women in Japan while the sexual violence among them was just over 3 times the rate seen in our study. As seen in our study, sexual violence had a lower prevalence than physical violence.

Ali et al[21] in their study explored the effects of domestic violence on mental health, that the women subjected to physical and sexual violence were 4 times at risk of having suicidal thoughts at some point. In our study, 51.4% reported to suffer from depression but none had reported suicidal thoughts.. It is observed that higher the education of husband more the violence being caused.

Conclusion

This study reaffirms the high prevalence of different types of violence that women face. Husband's with higher education is seen to be associated with more domestic violence. Domestic violence has an impact on the health of the women both physically and mentally. Institutions need to be created to cater the needs of women that face domestic violence. Literature reviews shows that women around the world still face domestic violence in some form. Our study reinforces the same and the need to bring more reforms and empower the women so that they are not subjected to different forms of domestic violence.

Major limitation to our study is that the responses of the women may vary according to their perspectives and understanding of abuse or violence which may cause information bias. Some women might not have been able to follow the questions as it is self-administered. Responses for health consequences were taken as reported by the women which may have caused discrepancies in the results.There is a need for recognizing this issue at the national level and there should be enough educational programs in all societies and cultures, both for women and men at all the levels.

Conflict of Interest: None

Source of Funding: Nil

Ethical Clearance: Obtained

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Structural Relationship between Dimensions of Psychological Empowerment, Customer Oriented Behaviour and Job Satisfaction of Employees in Public Sector Banks

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Abstract

This study aimed to examine the structural relationship between dimensions of psychological empowerment, customer-oriented and Job satisfaction among the employees in public-sector Banks. Psychological empowerment promotes the employees to use their knowledge, experience, capacities and innovative ness by bearing accountability for their jobs and it leads to customer-oriented behavior. Customer oriented behavior provides basis for forward progress and continued existence of banks in a highly competitive banking environment and increases their profitability. Customer oriented behavior is highly mediating relation between psychological empowerment and quality of service and it enhances satisfaction of customers and their loyalty towards banks. The results revealed that the impact, competence, self-determination and meaningfulness are positively and directly influencing customer-oriented behavior of employees in public sector banks. Besides, customer-oriented behavior is positively and directly influencing job satisfaction of employees in public sector banks. This study offers new insights into the existing literature and provides implications and directions for future research.

Keywords: *Employee empowerment, psychological empowerment, customer-oriented behavior, Job satisfaction.*

Introduction

The banking is a financial institution that offers services for effective managing of cash to customers, encompassing the operations of different portfolios and their bank accounts. The banking system in India is not only free from jumbles, but it has capability to overcome the problems due advanced technological improvements and also internal and external issues. For the last 40 years, Indian banking system has a numerous outstanding achievement to its magnificence. The public-sector banks are the main players in the financial market of India.

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In order to attain the goals and objectives of banking system in India, employees are the highly important resources for banks. The employees are the storehouse of, skills, competencies and capabilities that cannot be emulated by the competitive banks. At the same time, these employees are not efficiently utilized in Indian banking system. Nowadays, banks are ready to empower their employees psychologically, but employees are not ready to take responsibilities. Psychological empowerment provides the employees a certain level of power and authority and it influences their job satisfaction and commitment.

Psychologically empowered employees help the banks in increasing competitiveness, creativeness and responsiveness to their customers. Psychological empowerment enhances quality of services and exposes motivation and talents of employees. Psychological empowerment promotes the employees to use their knowledge, experience, capacities and innovativeness by bearing accountability for their jobs and it leads to

customer-oriented behavior. Customer oriented behavior provides basis for forward progress and continued existence of banks in a highly competitive banking environment and increases their profitability. Customer oriented behavior is highly mediating relation between psychological empowerment and quality of service and it enhances satisfaction of customers and their loyalty towards banks.

Literature Review anr Theoretical Background

Psychological/Motivational Empowerment: The psychological empowerment concept can be defined as "a state of mind in which an employee experiences the feelings of control over how the job can be done, have enough aware to the work tasks that being performed, a great level of responsibility to both personal work outcome and overall organizational advancement, and the perceived justice in the rewards based on individual and collective performance" (Melhem, 2006, p: 586).[14] Spreitzer (1995) also offers a more traditional definition of this concept, defining it as "a motivational state that reflects an employee orientation toward work characteristics that rely on four determinants that are competence, impact, meaning and self-determination" (Spreitzer, 1995, p: 1441).[2] Also, Borghei et al. (2010) view the psychological perspective as subjective feelings and phenomena, meaning that this perspective is considered an internal motivational construct.[10]

Customer Oriented Behaviour: "The ability to identify, evaluate, understand, and meet customer needs" (Reychav and Weisberg, 2009, p: 354). [13]Mechinda and Patterson (2011) define it as "specific behaviors that frontline employee displayed during service contact point with aim to make customer more satisfied with service" (Mechinda and Patterson, 2011, p: 103).[7]

Job Satisfaction: Job satisfaction refers to how well a job provides fulfillment of a need or want, or how well it serves as a source or means of enjoyment. Job satisfaction is the degree to which individuals feel positively or negatively about their jobs.

Need for the Study: The need for Psychological Empowerment gained great importance in service-oriented institutions like banks. As employees in a service organization have frequent contacts with the customer, they usually serve as representatives for both the organization and their products and services to the customer at contact point. When service interactions are not properly controlled and handled, the outcome is poor perception of service quality that leads to customer dissatisfaction. The quality of service and satisfaction that the customer may derive will be an assessment of the entire service experience. The employees play a major role in determining whether a customer would enjoy the experience or turn to their competitors for better solutions.

Research Methodology

The descriptive research design is applied for the present study. The present study is done in Thanjavur district. The public-sector banks namely Indian Bank, Indian Overseas Bank, State Bank of India, Canara Bank, Bank of India, Corporation Bank and Union Bank of India are chosen based on number of employees. The employees of these banks are selected by using simple random sampling method. The data are gathered from 517 employees of public sector banks through questionnaire method. The Structural Equation Model (SEM) is constructed to knowstructural relationship between dimensions of psychological empowerment,customer-orientedbehavior and job satisfaction of employees in public sector banks.

Findings and Discussions: To study the structural relationship between dimensions of psychological empowerment,customer-orientedbehavior and job satisfaction of employees in public sector banks, the Structural Equation Model (SEM) is built and the results are presented in table 1.

Table 1: Standardized Structural Path Coefficients

Path	Standardized Coefficients	CR	P-Value
COB ←SD	.451	4.977	***
COB ←CO	.463	5.133	***
COB ←IM	.502	5.866	***
COB ←ME	.413	4.299	***
JS ← COB	.671	8.723	***

Source: Primary Data *** indicates significant at one per cent level

From the above table, it is obvious that the standardized coefficient for Customer Oriented Behavior (COB) against Self Determination (SD) is 0.451, the standardized coefficient for Customer Oriented Behavior (COB) against Competence (CO) is 0.463, the standardized coefficient for Customer Oriented Behavior (COB) against Impact (IM) is 0.502

and the standardized coefficient for Customer Oriented Behavior (COB) against Meaningfulness (ME) is 0.413 and these co-efficient are significant at one per cent level. Thus, impact, competence, self determination and meaningfulness are positively and directly influencing customer-orientedbehavior of employees in public sector banks.

In the meantime, the standardized coefficient for Job Satisfaction (JS) against Customer Oriented Behavior (COB) is 0.671 which is significant at one per cent level. Hence, customer-oriented behavior is positively and directly influencing job satisfaction of employees in public sector banks.

The path diagram for job satisfaction of employees in public sector banks is shown in figure 1.

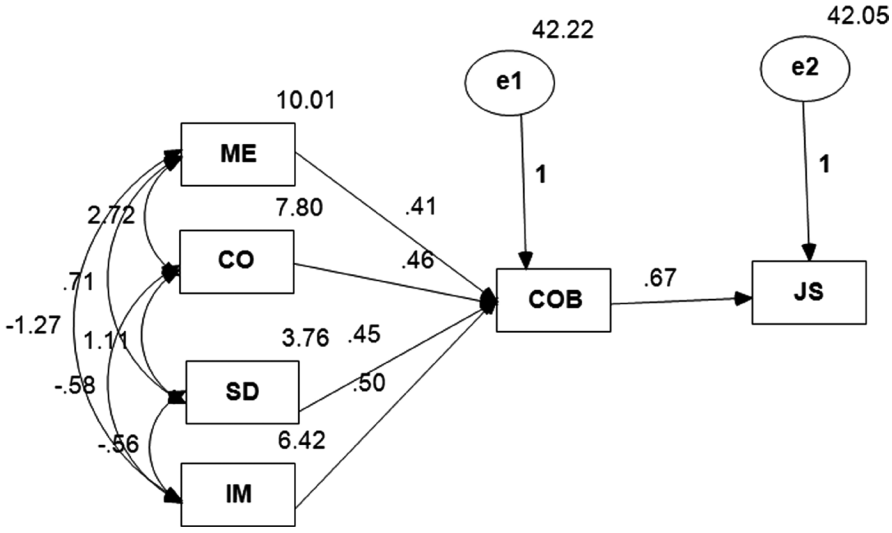


Figure 1: Path Diagram for Job Satisfaction of Employees in Public Sector Banks

The model fit parameters are presented in Table. 2

Table 2: Model Fit Parameters

Chi-Square Value	P-Value	GFI	CFI	RMR	RMSEA
1.44	.000	0.99	0.98	0.06	0.03

Source: Primary Data

The chi-square value of 1.44 is significant at one per cent level revealing that the model is an excellent fit. The Goodness of Fit Index (GFI) is 0.99 and Comparative Fit Index (CFI) is 0.98. These GFI and CFI show perfect fit.The standardized Root Mean Residual (RMR) is 0.06 and Root Mean Square Error of Approximation (RMSEA) is 0.03 indicating excellent fit.

Limitations of the Study: The present research is carried out in Thanjavur district. The present study is done based on data gathered from primary source of employees of public sector banks. The demerits and constraints of field survey are highly relevant to the present study. The data received from employees of public sector banks have recall bias.

Conclusion

On the basis of the results it is concluded that the impact, competence, self-determination and meaningfulness are positively and directly influencing customer-oriented behavior of employees in public sector banks. Besides,customer-oriented behavior is positively and directly influencing job satisfaction of employees in public sector banks. Thus,the bank employees like their jobs more when they find their work meaningful, when they feel capable of performing their work well, when they have freedom to make decisions about their work and when they feel that they can have an impact on organizational outcomes.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Nil (Not Required)

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Factors Influencing the Development of Chronic Cough Following Common Cold

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Abstract

Introduction: Following common cold most of the patients recover within a week. However a few people go on to develop chronic cough. There have been no studies looking at simple patient characteristics which may tell us which patients may go on to develop chronic cough.

Materials and method: The main Aim was to study factors that determine which group of patients develop chronic cough following common cold. A total of 131 patients were included in the study. They were followed up for 3 weeks. They were divided into 2 groups based on whether they had cough for more than 3 weeks and less than 3 weeks. The collected data was analyzed using Chi square test.

Results: Among 131 individuals who underwent study 45 had chronic cough. Age group less than 20 yrs and more than 60 years, smoking history and a low PEFR (Peak Expiratory flow rate) were associated with development of chronic cough.

Conclusion: Extremes of age, smoking history and low PEFR were associated with the development of chronic cough following common cold.

Keywords: *Chronic, Cough, Common cold, Characteristics, Predictors.*

Introduction

Following common cold most of the patients recover within a week. However a few people go on to develop chronic cough (more than 3 weeks). Chronic cough is associated with significant morbidity and interruption with daily activities of the individuals. As of now most of the studies that have looked at the duration of respiratory symptoms following common cold have mainly been done in pediatric age mainly by looking at factors like etiological organism (type of viruses) or in adults using special testing for airway hyper-reactivity using tests like methacholine challenge test. [1] There have been no studies looking at simple patient characteristics which may tell us which patients may go on to develop chronic cough.

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Materials

The aim of this study was to study which factors determine that the patients may develop chronic cough following common cold. This was an observational study done in a tertiary care centre in south India. The permission from the local ethics committee was obtained. Informed consent was obtained from all participants. All participants who were more than 18 years and who presented within the first week following common cold were included in the study. All patients who had prior respiratory diseases and who were on ACE inhibitors were excluded from the study. Sample size was estimated using the formula n= Z 2 pq/e. By using this formula with 80% power, 95% confidence interval, and adding 10% non-response error the sample size came to 110. Total of 131 patients who fitted into the inclusion criteria were included and these patients were followed

up for 3 weeks. Patient characteristics like smoking, allergic rhinitis, family history of atopy, post nasal drip, PEFR, occupational exposure were noted. Actual PEFR (Peak expiratory flow rate) was measured using peak flow meter. Ratio of test PEFR to predicted PEFR was calculated. Percentage of the ratio was obtained for each individual & divided into 3 class intervals. The patients were divided into 2 groups based on duaration of cough of more than 3 weeks and less than 3 weeks. Collected data was analyzed using Chi square test. P value of less than 0.05 was considered significant.

Results

Out of 131 subjects who were included in the study 45 had chronic cough. Among 45 patients who had chronic cough 32 were Males & 13 were females. In the age group below 20 years, 4 out of 11 had chronic cough, 11 out of 58 in the age group 21-40, 18 out of 44 in the age group 41-60 & 12 out of 18 in the age group above 60 years had chronic cough. Elderly individuals developed chronic cough. It was statistically significant with a P value of 0.02. Ratio of the test PEFR to predicted PEFR was calculated and divided into 3 class intervals. As seen in Table 1. Among 8 individuals in the class interval of 70-80%, 6 had chronic cough, 27 out of 45 in the 81-90% class interval had chronic cough, only 12 out of 78 in the class interval above 90% had chronic cough. People belonging to the group of 70-80% had statistically significant more chance of developing chronic cough with a P value of 0.03. Among the 29 smokers 24 of them developed chronic cough which was statistically significant (P value 0.002). When analyzing the family history of atopy, among the 17 individuals with family history of atopy, 7 of them developed chronic cough. This was not statistically significant. Total 13 patients had post nasal drip out of which 7 had chronic cough after 3 weeks. However when P value was calculated it was statistically insignificant.ROC curve plots were drawn in relation to PEFR ratio & chronic cough. As seen in Table 2. The area under curve was found to be highly significant with an area of 0.822. When a PEFR ratio percentage cutoff of 73.2 was taken it had a sensitivity of 100% & 0% specificity of predicting the development of chronic cough, When a cut off of 86.45 was taken it had a sensitivity of 88% & specificity of 62.2%, and a cut off of 92.3 had a sensitivity of 66.3% & specificity of 84.4%. Total 21 patients had history of allergy rhinitis out of which 8 developed chronic cough, which was statistically insignificant.

Table 1. Correlation of PEFR and chronic cough

PEFR (%)	Chronic cough Yes No	Total
70-80	6(75%) 2(25%)	8
81-90	27(60%) 18(40%)	45
Above 90	12(15.4%) 66(84.6%)	78
Total	**45(34.4%) 86(65.6%)**	**131**

Table 2. Area under the curve: Result Variable(s): PEFR Percentage

Area	Std. Error(a)	Asymptotic Sig.(b)	Asymptotic 95% Confidence Interval	
			Lower Bound	Upper Bound
.822	.040	.000	.744	.899

Discussion

In our study it's observed that 45 out of 131 (34.35%) had chronic cough. In a study conducted in Mysore prevalence of chronic cough was found to be 2.5%. [2] In another study they found that global prevalence of chronic cough was 9.6%.[3] Our study results showed males developed chronic cough more often and were different from the data showed in the study done by Mats Bende & Eva Millqvist where it showed females were more risk to have chronic cough.[4] Elderly developed chronic cough more often in our study Siilarly, Chabbra observed that age below 30 years had less prevalence & age above 70 years had high prevalence of chronic cough.[5] As the PEFR ratio decreased prevalence of chronic cough increased. Primhak PA in their study did not find any relation between PEFR and recent cold.[6] Significant number of smokers in our study developed chronic cough. The same conclusion was drawn by PA Mahesh in their study.[2] Family history of atopy did not show any correlation with the development of chronic cough in our study. There were hardly any studies that looked at this parameter in predicting the development of chronic cough. Post nasal drip was also a factor that did not show any correlation to the development of chronic cough. Our results were quite different from the study conducted by Pratter where he found that post nasal drip alone or in combination with other factors was the most common cause of chronic cough. When a PEFR ratio percentage below cutoff of 86.45 was taken it had a sensitivity of 88% & specificity of 62.2% of predicting the development of chronic cough. There were no studies that looked at this parameter to predict the development of chronic cough. Presence of allergic

rhinitis did not have any significant effect on predicting the development of chronic cough.

Conclusion

Following common cold it was found that elderly, males, smokers and people with PEFR of below 86.45 had a higher chance of developing chronic cough.

Ethical Clearance: Taken from the institutional local ethics committee before the start of the study.

Source of Funding: Self

Conflict of Interest: Nil

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A Study on Role of Human Resources Management (HRM) Practices in Training Transfer with References it/ites Organization

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Abstract

As organizations endeavor to improve execution through their human capital, trainers and professionals in the working environment are progressively anticipated to provide better results. HR today is a key benefactor towards unraveling authoritative issues and accomplishing significant business results. The market situation after the subsidence has prompt radical changes in the IT business. Now and again there is a requirement for the researchers to stop and think about the status of the HR practices. Best HR practices will help the organization in achievingradical improvement as opposed to incremental ones. The examination recognized two arrangements of primary factors, the traditional HR practices and the advanced HR practices.

The paper discusses the importance of training transfer and the role of human resources management in providing effective training and development practices to the employees in IT/ITES industry. Related theories on training transfer have been provided to justify the effectiveness of implementing training programs for the employees of the organizations. The paper used Structural Equation Modeling as an instrument to show the relationship between the variables as identified in the study.

Keywords: *HRM, Training transfer, HR practices, organizations, IT/ITES industry.*

Introduction

Human Resource Management (HRM) is a relatively new way to deal with overseeing individuals in any association. Individuals are viewed as the key asset in this approach. It is concerned about the general population measurement in management of an association. Since employees are a collection of individuals, their acquisition, development of aptitudes, motivation for more elevated amounts of achievements and in addition guaranteeing support of their level of commitment are generally critical activities that fall in the area of HRM. Huselid (1995)[1] stated in his observational examination that superior work practices and good fit of model should prompt positive results for a wide range of firms. Nevertheless, training involved in best practice reports, or particularly for the transfer of training is restricted due to lack of practicality or it's subjective in nature.

The current literature contains couple of actual researches led in India that feature the idea of human asset management (HRM) frameworks pertinent to the IT/ITES part and a significant part of the literature that is accessible on the Indian IT/ITES industry talks just about the ceaseless issue of high attrition rates of the business. The present examination centers on the nature and structure of work and association of Indian IT/ITES and in addition the vital pretended by HRM in such organizations. The discoveries feature the way particular HRM practices, for example, recruitment, training and development, execution evaluation and pay, prizes and recognition, vocation development, employee turnover and maintenance are actualized.

Overview of it/ites Sector: IT/ITES industry has two noteworthy segments: IT Services and Business Process Outsourcing (BPO). The development in the administration segment in India has been driven by the IT/ITES segment, contributing significantly to increment in GDP, exports and employment. As indicated by NASSCOM, the IT-BPO industry in the Indian IT division is required to develop at a rate of 12% to 14% for

Financial Year 2016-2017. The division is additionally expected to triple its yearly income at present to achieve US$ 350 billion by Financial Year 2025.

The spending on Information Technology by security and banking firms in India grew up to 8.6% year-on-year that resulted in US$ 7.8 billion in 2017. Though India's web economy is relied upon to reach 10 trillion (US$ 146.72 billion) by end of 2018, representing 5% of the nation's GDP. Top IT firms like Infosys, Wipro, TCS and Tech Mahindra in India are broadening their contributions and displaying driving thoughts in block chain and artificial intelligence to customers utilizing innovation hubs, R&D centers, keeping in mind the end goal to make separated contributions.

Training Transfer: There is a solid conviction that training is imperative not just in light of the fact that it is necessary for building and keeps up a powerful workforce, yet in addition since it drives corporate prosperity and furnishes organizations with a competitive favorable position. However, if training is to give organizations' a competitive advantage and enhance firm execution, learners should first apply and exchange what they realize in training at work. Training refers to learning skills and information for completing a specific occupation and expands skills required for work. Training is concerned about keeping up and enhancing present place of employment execution. Consequently, it has a transient point of view. Off-the-work training technique happens far from typical work situations, inferring that the employee does not consider a specifically productive specialist while such training happens. Off-the-work training technique likewise includes employee training at a site far from the real workplace.

Learner's Behavior: Learner's behaviorinclude attributes regarding the ability of a trainee, personality, motivation,expectations, perceptions, or attitudes that influence training transfer.

Trainer's Attitude: Knowledge of trainers on the topic, proficient experience, and information of encouraging standards is critical and they should have the adaptability to adjust to every learner's learning style and needs (Burke and Hutchins, 2008)[2].

Work Environment: Work Environmentrefers to any influence on training that occurs or happens outside the learning mediation including the assessment of training transfer.

Training Content: Training professionals must ensure to design training content in line with the job task which correlates with training transfer.

Employee Motivation: Positive personality traits, initiative, commitment to professional growth, self efficiency and love of learning influence the employees and motivate them for organizational learning and obtain better training transfer from professionals.

Organizational Performance: Organizational performance is identified by the behavior of the learners and attitude of the trainers which are important for training transfer to take place successfully within an organization (Baldwin and Ford, 1988)[3].

Theories on Training Transfer:

Theory of Identical Elements: E.L. Thorndike proposed the theory of identical elements which explains the part of identical elements between the learning circumstance and the implementation circumstance as a component of the procedure of training transfer. The examination could substantiate that similitude between training and day to day work circumstances positively affects both transfer training and transfer motivation. Yamnill & Mclean (2001)[4] identified that anemployee's focus during training session is estimated in high rate of participation. Similarly,attention of employees during problem solving and has no positive effect on training transfer or subjective transfer estimates.

As per this theory, conducting training transfer by the trainer to that of the learner is relative to the level of likeness in circumstances. In more straightforward words, it can be stated that the higher the likelihood, the effective and quicker, the transfer is. Moreover, the rate of transfer and additionally the pace of the transfer increase as the number of comparable components increases.

Cognitive Theory: Cognitive Theory is a cutting edge theory when contrasted with the elective speculations of the training transfer. As indicated by this hypothesis, the pace and the viability of the way toward transferring the training can extraordinarily be expanded by concentrating on the people's psychological models, maintenance of data and understanding. In addition, the principle indicates that makes it unique in contrast to other transfer hypotheses is its intense level of applicability under nearly a wide range of circumstances.

Capacity of training, especially intellectual capacity is a solid indicator of exchange results (Burke and Hutchins, 2007)[5]. Such evaluations regularly measure by and large insight, which mirrors people's capacity to comprehend complex thoughts, adjust to their surroundings, gain from encounters and take part in different types of thinking (Neisser et al., 1996)[6], which can all be basic to learning and applying preparing content.

Research Objectives:

- To determine the role of HRM practices in training transfer in IT/ITES organizations
- To provide suggestions for Human Resources Management in IT/ITES organizations to improve training and development activities

Need for The Study: Human resource is an essential intensity of IT Industry. It is basic to investigate the changes occurring in human resource strategies, variables, system and procedure, plan of selection and recruitment in IT sector. It is the strategy when innovation is changed with entry of time, code of HR which is being trailed by couple of decades additionally imperative to be changed to adapt up to the evolving environment. Moreover, IT division needs receptive, dedicated and idealistic individuals who are able of applying their cognitive behavior in a sensible and keen way to accomplish their organizational objectives and enhancing by and large operational adequacy. Along these lines, it is urgent for the IT/ITES part to give careful consideration to recruit and train the employees and to their expanding practices and complete methodical Human resource management practices for more years to come.

Review of Literature:

Barney (1991)[7] mentioned that attention to the organizations could create vital capability and for accomplishing this, the key objective will be to make firms, which are more intelligent and adaptable than their rivals. The human asset administration work has risen as one which goes about as the differentiator among different firms.

Hendry and Pettigrew (1990)[8] suggested that various inward factors, for example, the organizational culture, structure (situating of HR), initiative, level of innovation utilized and business yield specifically add to framing the substance of HRM.

Snell and Dean (1992)[9] concurred that Human Resource Practices were the essential means by which firms put resources into their employees. Human Resource Management has moved its concern from a residential concentration to multi-national concentration, all the more heightening concern for issues like a natural, social insurance, and lack of education. They likewise demonstrated that Human Resource Practices to be employee-driven and should be business-driven too.

Taylor (2009)[10]stated that the best HR Practices empower the organization to influence radical enhancements, not simply incremental ones.

Shantz et al (2012)[11] clarified the estimation of HR works in business and its effect on higher productivity, upgraded quality, better client benefit, great mechanical relations and lower cost which impact the gainfulness of an association. Viable HR practices could assume the important part in accomplishing all the significant factors.

Research Gap: Although previous literature review could recognize various investigations analyzing determinants which enhance transfer of training as the basic connections of and between the latent factors and interdependencies remain to a great extent overlooked. There is, at this moment, no complete, integrative studies on training transfer under consideration of input, the process and the output and in addition a methodical investigation of which vital determinants help or hold back the training activity. Keeping in mind the end goal to do the genuine intricacy of the exchange procedure integrity, there ought to be a more prominent comprehension of it as a multidimensional procedure. Future examinations must endeavor to expect a more far reaching and integrative point of view while deciding exchange of preparing impacts and determinants thereof.

Research Methodology: The research was limited to the study of a leading Development Group of IT/ ITES Organization, about the role of HRM Practices in Training Transfer. A structured questionnaire was developed using parameters identified from previous surveys.

Research Frame: The research frame considered for the present study involved employees serving in IT/ ITES Organizations.

Population: The initial number of respondents taken for this study was 330, out of which 29 responses were

eliminated due to ambiguity. Hence, the data collected from 301 respondents were appropriate to be used for the research analysis and the response rate was 80%.

Research Tool: Structural Equation Modeling (SEM) is the significant research tool used for analyzing the data gathered from the respondents.

Hypothesis

$H_{01.1}$ Organizational performance has positive impact on training transfer.

$H_{01.2}$ Employee Motivation has positive impact on training transfer.

Conceptual Framework

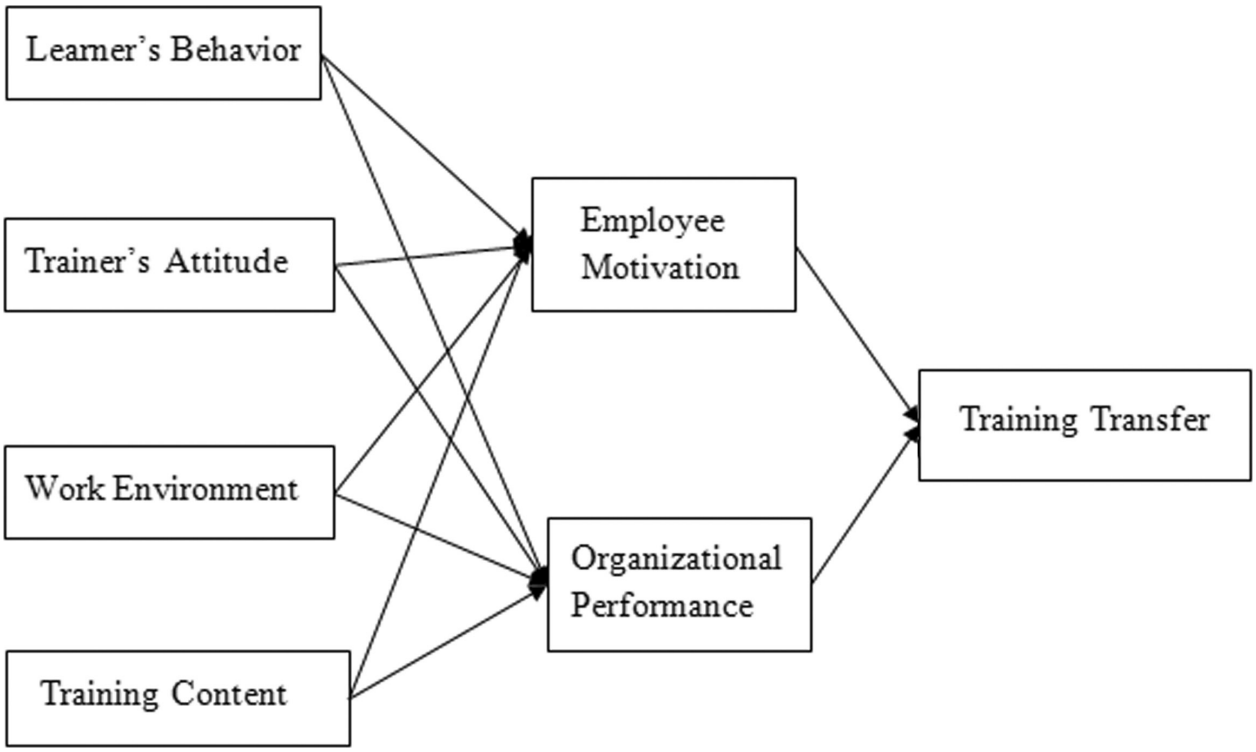


Figure 1: Conceptual Framework

The conceptual framework implies that HRM plays a significant role in providing Training Transfer to the employees which revolves around the behavior of learner, attitude of worker, work environment and relevant training content. These elements impact the motivational level of the employee and performance of the organization thus influencing training transfer.

Data Analysis and Interpretation: This chapter basically presents the results and analysis of the data gathered from the managerial department of IT/ITES organizations. The data are grouped appropriately to carry out the significant analysis. In the initial segment, it is proposed to exhibit in detail, the view of the respondents on different parts of Strategic Human Resource Management practice in Training Transfer in factors like Learners' Behavior, Trainer's Attitude, Work Environment, Training Content, Employee Motivation and Organizational Performance which paves way for better Training Transfer within the organization.

Structural Equation Modelling (SEM): Structural equation modeling is a multivariate statistical analysis technique that is used to analyze structural relationships. This method is preferred by the researcher because it estimates the multiple and interrelated dependence in a single analysis.

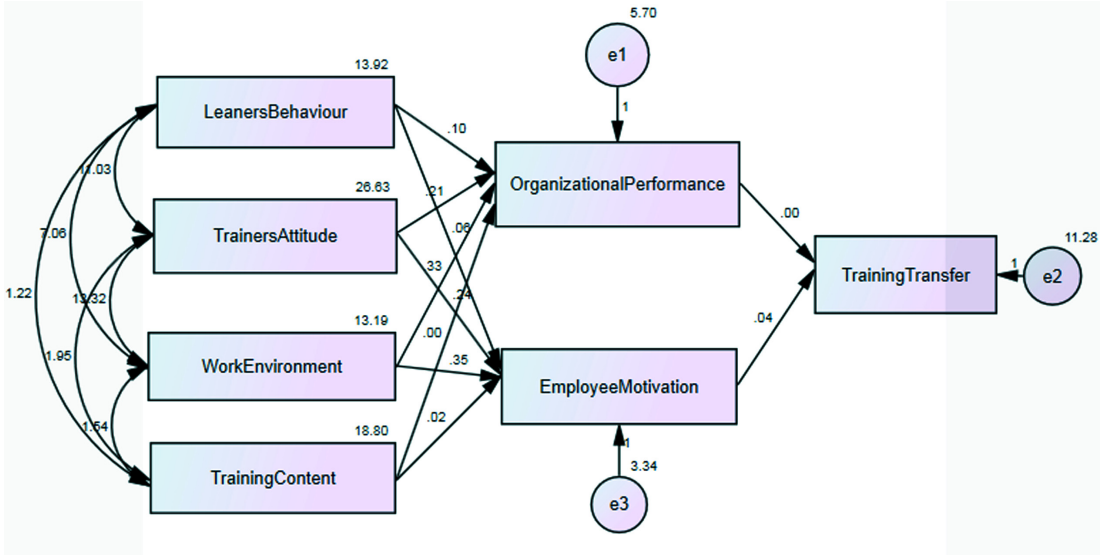


Figure 2: Structural Equation Model

According to Aragón et al (2014)[12], it can be comprehended that organizations must promote organizational learning capability in order to achieve better performance. Organizational learning and development helps in increasing organizational knowledge and understand the needs of the customers during any competitive situations. Training transfer helps in processing information faster and enables the employees to develop themselves as well as the workplace, thus taking the organization forward towards a competitive advantage.

Major Model Fit Indices Summary

Parameters	Acceptable values for Good Fit	Research Model Values
GFI	>0.9	0.927
AGFI	>0.9	0.921
CFI	>0.9	0.905
RMSEA	<0.06	0.039
RMR	<0.08	0.061

Source: Primary Data, SPSS AMOS output, Haier et al. (2009); Hooper et al. (2008); Steiger (2007); Hu and Bentler (1999).

Interpretation: The Goodness of Fit index (GFI) value was 0.927, Adjusted Goodness of Fit Index (AGFI) value was 0.921 and Comparative Fit index (CFI) value was 0.905. All these values were greater than 0.9 indicating a very good fit. It was found that Root Mean Score Error of Approximation (RMSEA) value was 0.039 (lesser than 0.06) and Root Mean Square Residual (RMR) value was 0.061 (lesser than 0.08).

Discussion

The result obtained from the analysis proves that the model fit is good for the research. Thus, employee motivation and organizational performance promotes a good training transfer for the employees within the organization.

Findings: The results indicate that leaner's behavior, trainer's attitude, work environment and training content show a positive relationship with Training Transfer, practiced by the HRM in IT/ITES organization.

Suggestions:

1. Rigorous training to be offered to individuals from staff on general basis keeping in mind the end goal to accomplish the destinations of the get together. Human resource management should concentrate more on creative training and development issues for workers to perform better.
2. Management of the organization should invest a feasible amount of money for improving the training and development practices.
3. Management must ensure to provide training with content relevant to the job.
4. It can also be suggested that human resource management must arrange on and off training sessions to the employees of the organization.

Conclusion

Employees were extraordinarily enhanced at their occupations because of preparing programs. It is subsequently simple to infer that organizations do complete preparing and advancement to a sensible degree, and this enhances their execution altogether. On the basis of the development, training and findings, it is a call for concern in the present developing society on the grounds that if performances of the workers are inadequate, it will influence the association. Being an imperative method for overcoming human resource management it is essential to determine the quality and lack of employees. They may make the essential move or remedial estimates in this way adjusting work approach vital in accomplishing the objectives and goals of the organizations. As of late numerous organizations have come to acknowledge the significance of the part of training and development as it increases the effectiveness, abilities and profitability of the organization.

Ethical Clearance: This research was approved by Head of the Department of Management Studies, Vinayaka Mission's Kirupananda Variyar Engineering College, Vinayaka mission's Research Foundation. The research was reviewed and discussed under the guidance of Research Supervisor of Vinayaka Mission's Kirupananda Variyar Engineering College, Vinayaka mission's Research Foundation.

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Conflict of Interest: There is no potential conflict of interest reported in light of the current research.

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Role of Human Resource Management Practices in Knowledge Management with Reference in it/ites Organisation

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Abstract

Human Resource Management (HRM) includes all the management decision and practices that directly affect the general population, or human resources, who work for the organization. The present study intends to survey the commitment of the businesses assigned to the HRM practices. The purpose of this paper is to research the role of human resource management (HRM) pactices in knowledge management in IT/ITES Organization.

This research paper highlights the context within which IT/ITES Industry has developed in India and the degree of human resource management (HRM) practices and systems practiced in the sector. The results feature particular HRM practices, such as, Recruitment, Performance appraisal, Training and development, Leadership and Career Management. Respondents considered for this empirical research are senior and center level managers over every practical department. An organized poll was directed at individual meetings to elicit respondent perspectives and proposals. Human Resource Management practices have likewise expanded in India and a great deal of research work is additionally completed on compelling implementations of HRM standards for the development of any business enterprise.

Keywords: *HRM Practices, IT/ITES Industry, knowledge management.*

Introduction

India had been seeing a remarkable development in its economy since 1990. The Information Technology/ Information Technology Enabled Service industry had enlisted a gigantic development of employment level from 1999 and till date the opportunities for pursuing job in this industry is enormous. The demand for web based shopping, cloud computing and social media are elevating and the interest for experts in the IT/ITES area are getting remarkable step by step and moving towards competitive edge. Also, the gauge extends the market size of Indian IT industry to develop at a rate of 12-14% for FY2016-17 in steady money terms. The area is likewise anticipated that would triple its present yearly income to achieve US$ 350 billion by FY 2025 (Vaish and Sengupta, 2017)[1]. Along these lines, with circumstance and development in the industry few overwhelming difficulties have additionally raised which calls for prompt consideration with unique reference to high steady loss rate in the activity section of IT/ITES organizations.

Human Resource Management (HRM) includes practices and decision making by the management that specifically influences the general population, or HR, who work for the association. Human Resources act as important strategic handler and help in sustaining competitive advantage. In this manner, HRM practices ought to be vital to the hierarchical system (Shahnawaz and Juyal, 2006)[2]. Knowledge Management has been broadly utilized as of late by firms and associations keeping in mind the end goal to enhance basic leadership, product development efficiency and benefits. Information is subject to individuals and that HRM issues, for example, enlistment and determination, training and improvement, execution administration, pay and reward, and in addition the production of a learning society are crucial for overseeing knowledge contained within organization (Edvardsson, 2008)[3]. Thus, it can be comprehended from the statements of the authors that the origin of Knowledge Management is traced to changes in HRM practices.

Role of HR Managers in IT Organization: HR Managers are in charge of providing training for career development and genuine execution feedback to workers, perceiving open doors for advancement, and provoking representatives about potential openings for work. Directors should successfully reinforce workers in characterizing clear destinations and individual objectives, assessing potential, recognizing vocation options, and giving development openings through assignments, formative tasks, visibility and introduction to various parts of the leaders and organization (Ijaz Khan and Shamsudin, 2016)[4]. Therefore, the role of Human Resources is to act as a device and provide resources to workers to manage their career and line up with business and organizational needs by acting as representatives for managers.

Career Management: The Chaos Theory of Career (CTC), proposed by Pryor and Bright in 2003 has added to the way toward trying to deal with contemporary profession improvement challenges together with inter alia, the board utilization of Information and Communication Technology (ICT), the velocity of progress, the globalization of business, the association of economies and particularly budgetary foundations all through the world and the authoritative and long winded nature of much contemporary work (Pryor and Bright, 2014)[5]. From the analysis of these statements, it can be implied that Chaos Theory of Career has both introduced new terms to the field and been able to integrate some recent concepts into a coherent theoretical framework.

Recruitment: Recruitment and determination work is being dealt with as an apparatus for acknowledging vital expectation. A portion of the basic recruitment systems incorporate continuous recruitment, worker referrals, and reasonable job reviews, assurance of obvious choice criteria. The organizations that opt to use Knowledge Management for the most part execute it in such conditions which are perplexing in eccentric circumstances. Updating the process of selection and recruitment process can help in gathering evidence with regards to knowledge building behavior of individuals (Khasnis, 2014)[6]. Thus, recruitment practice carried out by HRM is influenced by knowledge management process.

Training and Development: Individuals Development and Training are fundamental for the consistent achievement of each organization. Worker training and development empowers employees to build up the skills and abilities important to improve bottom-line results for their organization. Skill repetition is quick in the Indian IT Industry, with the changing time and even quick changing advancements Indian companies have begun understanding the significance of corporate training and to defeat this sign organization give the outrageous priority to training and skill enhancement programs consistently (Boateng, 2011)[7]. Therefore, all the employees of an organization has to be responsive of the latest technology and development in the industry. HR managers must motivate employees to increase professional knowledge and recruit people who can enhance the knowledge of existing employees in the organization.

Leadership: The HRM capacities in companies work on a collaborative model with their potential leaders, which implies that the job of individuals development isn't left to the HRM work or the leaders alone. Rather, the potential leaders are recognized and then their performance is connected to the empowering and strengthening of others to climb the chain. At the end of the day, the ability to spot talent and recognize leaders for what's to come is finished by both the HRM work and the senior management who work in tandem in this effort (Plessis and Sukumaran, 2015)[8]. Thus, Leadership is a mix of characteristic abilities and the organizational sustaining of the employees with those skills. Henceforth, this exchange amongst nature and sustain is the thing that decides the achievement or generally of the HRM work and the senior management endeavors to create leadership in companies.

Performance and appraisal: Performance is the reflection of the training, which works as a scale for the performance appraisal of a worker. It is an objective framework to judge the ability of an individual worker to play out his undertakings. Incentives to employees assume a vital role in propelling and retaining them in the organization. In addition to these, measuring the performance of an employee's work contribute to knowledge sharing (Horvat, Sharma and Bobek, 2018)[9]. Thus, the procedure of Performance Appraisal has turned into the core of the HRM framework in Indian IT Industries in relation to knowledge sharing activities.

Relation between HRM and Km in it/ites Organization: Knowledge workers are experts extending from HR and showcasing experts to programming engineers, venture chiefs, and business investigators. Information is the key component of their work, so they

expand and produce it regularly, yet they avoid random schedules. Since they are included with the outline of mechanical or intelligent items utilizing educational frameworks, they are relied upon to take in information, process it and disseminate it to different individuals from the association (Kumar and Balasubramanian, 2016)[10]. Thus, it is clear that the activities carried out by Human Resource Managament extend to the employees through knowledge sharing activity.

Theoretical Framework of KM Model: The KM procedure is part into four phases. Administration must find the wellsprings of knowledge. At that point, they should compose this knowledge in order to survey the company's strengths and shortcomings and decide its importance and reusability. This is trailed by socialization, where different strategies are utilized to encourage share and published it to whoever needs it in the association. At long last, the knowledge is internalized through utilizing (Louay et al., 2009)[11]. This is a consummately real way to deal with KM where the attention is on the sharing and recovery of existing information, yet it does not satisfy the extent of the knowledge management definition.

The Knowledge Management Process Model: This model attempts to offer a more realistic overview of the KM process. There are three wide classifications namely, Dissemination and knowledge sharing, Knowledge capture and organizing and Knowledge Creation and sensing have common characteristics. These three categories have common characteristics and interrelate to each other. The focus is on managerial initiatives. It is noteworthy that this model does include the creation of new knowledge as a specific KM initiative (Horvat, Sharma and Bobek, 2018)[12]. The model further shows which of the three categories are more people oriented and which are more technology focused. Whether or not knowledge sharing should be largely technology focused is certainly debatable and it is something that I will address in future sections (Tilchin and Essawi, 2013)[13]. However, for better or for worse, this is largely how organizations tend to approach the issue i.e. as a technological rather than organizational and social challenge.

Research Objectives

1. To study about the role of Human Resources Management in Knowledge Management
2. To analyse the influence of knowledge management on various practices of HRM in IT/ITES Organization
3. To analyse the casual relationship between the different study variables.

Review of Literature

Tiwari and Saxena (2009)[14] analyzed the HRM Practices executed by driving IT Companies, for example, TATA, Infosys and Wipro in India. They built up the Framework of HRM practices and recognized Training and Development, Employer-Employee Relations, Recognition through Rewards, Culture building, Career Development, Compensation and Benefits as imperative HRM Practices. Driving IT/ITES organizations pretty much take after, HR Practices, for example, Safe, Healthy and Happy Workplace, Open Book Management Style; Performance based Bonuses, 360 Degree Performance Management Feedback System, Fair Evaluation System for Employees, Knowledge Sharing, Open house dialogs, criticism Mechanism and Reward Ceremonies.

Minbaeva et al., (2010)[15] depicted the blend of ability, inspiration and opportunity as "conditions of individual activities". This tripartite construction is a key instrument for accomplishing knowledge streams within an organization.

Sheldon (1971)[16] mentioned about the managed and quality results, individuals within should haul out past the person and additionally workgroup levels and match them with the organizational yearning keeping in mind the end goal to make an effective contribution.

Barney and Wright, (1997)[17] A considerable measure of research work is done on HRM for the sheer reason of its significance in dealing with the firm and the measure of effect it makes on the performance of the firm. HRM practices, for example, job examination, recruitment and determination, training and development, work environment and performance appraisal may enhance the fitness of employees for elite separated from cooperation with innovation and procedures, relations with employees working within the departments and the collaboration of such effective teamwork choose the operational success.

Research Methodology: The research was limited to the study of a leading Development Group of IT/ ITES Organization, about the role of HRM Practises in Knowledge Management. A structured questionnaire

was developed using parameters identified from previous surveys.

Research Frame: The frame comprised HR manangers serving in IT/ITES sector.

Population: The response rate was 75% and the descriptive data for 617 respondents is presented below.

Research Tool: SEM (Structural Equation Modelling).

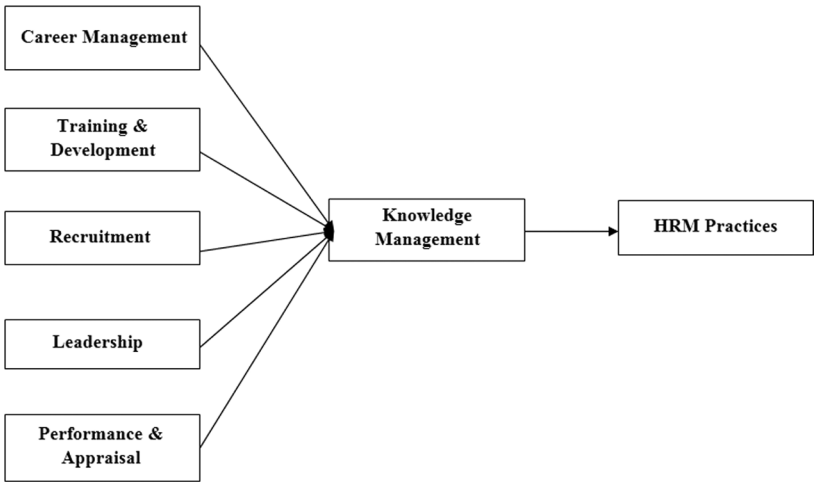
Hypothesis:

$\mathbf{H_{01}}$ HRM practices are influenced by knowledge management

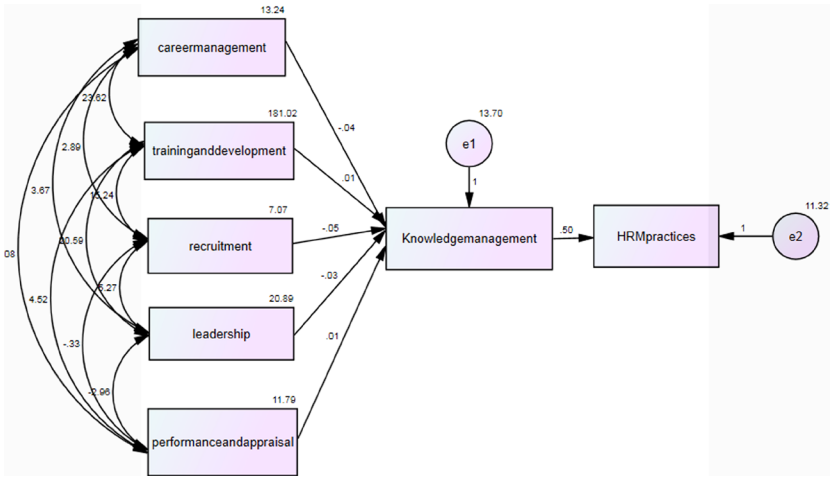
$\mathbf{H_{02}}$ Knowledge Management has a positive impact on HRM practices

Analysis and Interpretation: This chapter essentially presents the results and analysis of the data gathered from the managerial department of IT/ITES organisations. The data are grouped appropriately to carry out the meaningful analysis. In the initial segment, it is proposed to exhibit in detail, the view of the respondents on different parts of Strategic Human Resource Management rehearse in knowledge management in factors like recruitment, performance appraisal, training and development, Leadership and Career Management. The last part of the section has focused on testing of speculation. The entire research hypotheses which were formulated are tested using SEM.

Conceptual Frame Work



Structural Equation Modelling (SEM): Structural equation modeling is a multivariate statistical analysis technique that is used to analyze structural relationships. This method is preferred by the researcher because it estimates the multiple and interrelated dependence in a single analysis.



Major Model Fit Indices Summary

Parameters	Acceptable values for Good Fit	Research Model Values
GFI	>0.9	0.998
AGFI	>0.9	0.990
CFI	>0.9	0.979
RMSEA	<0.06	0.000
RMR	<0.08	0.04

Interpretation: The Goodness of Fit index (GFI) value was 0.998, Adjusted Goodness of Fit Index (AGFI) value was 0.990 and Comparative Fit index (CFI) value was 0.979. All these values were greater than 0.9 indicating a very good fit. It was found that Root Mean Score Error of Approximation (RMSEA) value was 0.00 (lesser than 0.06) and Root Mean Square Residual (RMR) value was 0.04 (lesser than 0.08).

Discussion

The result in the above table shows that the model fit is good for the research analysis.

Findings: The results indicate that recruitment, Leadership, Training and development, and performance & appraisal, Career Management show a positive relationship with knowledge Management, practiced by the HRM in IT/ITES organization.

Suggestions

1. Rewards have to be provided based on employees' performance and productivity to keep the motivational levels high.
2. HR managers must focus on knowledge management by constantly updating latest technology
3. Lateral employees must be recruited by HR department to enhance the knowledge of existing employees in the organization.

Practical Implications: Findings from this study should be beneficial for HRM managers in developing countries, who plan to develop a spirited, knowledge management competencies through the implementation of HRM practices.

Conclusion

The study of the role of HRM practices in knowledge management of IT/ITES organizations has been conducted and this study has analyzed the impact of key human resource management factors on the performance of an organization. It has likewise joined different factors like recruitment, performance appraisal, training and development, leadership and career management which were equally considered to be highly impacting the performance of the organisation. A research display which was created in broad view of literature review has been tried and all the research theories are observed to be impacted positively by the performance of the organization. A great deal of research can be taken upon the model produced for this study. It is earnestly anticipated that the findings and conclusions would really benefit all the organizations of IT/ITES industry.

Ethical Clearance: This research was approved by Head of the Department of Management Studies, Vinayaka Mission's Kirupananda Variyar Engineering College, Vinayaka mission's Research Foundation. The research was reviewed and discussed under the guidance of Research Supervisor of Vinayaka Mission's Kirupananda Variyar Engineering College,Vinayaka mission's Research Foundation.

Source of Funding: The research was self funded. This research obtained no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of Interest: There is no potential conflict of interest reported in light of the current research.

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Observational Survey for Assessment of Helmet Usage among Two Wheeler Users in the Metropolitan City of South India

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Abstract

Objectives: Assessment of helmet usage among the two wheeler users.

Method: It is a cross sectional study, where 1471 two wheeler riders, pillions were observed at randomly selected 6 traffic junctions using an observation checklist with different intervals of the time in weekdays and weekends.

Results: In observational survey 1471 two wheeler users were observed at the 6 selected traffic junctions, among riders (82.18%),pillions (72.82%) wore helmet. the helmet usage in weekdays was 6% more than in weekends among riders.

Conclusion: Nearly 20% of riders and 30%of pillions were not wearied helmets. Compliance to ISI (Indian Standard) helmets and buckling of the helmets was poor in both the users.

Keywords: *Helmet Usage,Helmet Compliance, Helmet law, Head Injury prevention, Bangalore, Karnataka.*

Introduction

Road traffic injuries are a major cause of death and disability globally, with a disproportionate number occurring in developing countries. Road traffic injuries are currently ranked ninth globally among the leading causes of disability adjusted life years lost, and the ranking is projected to rise to third by 2020[1].

In India 13 States accounted for 87.8 % of share in persons injured in road accident in the entire country during the calendar year 2016. Tamil Nadu stood on top in persons injured in road accidents in the entire country with a percentage share of 16.6 % followed by Madhya Pradesh 11.7 % and Karnataka 11.0 % respectively[2]

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The road accident scenario in Karnataka causes a great concern. More than 10000 persons die every year due to road accident[3] Nearly 90% of road traffic crashes are due to human errors and faulty human perceptions. Among fifty million plus population cities, Delhi reported highest number of deaths followed by Chennai and Bangalore [2]

Increasing individual modes of transport, heterogeneous traffic mix, rapid addition of high speed vehicles and less emphasis on the safety of vulnerable road users are some contributing factors. Increasing speeds, non-use of helmets, drinking and driving, poor visibility, failure to implement safety laws and poor trauma care are some factors recognized in India[4] The most vulnerable group for road traffic injuries is identified as pedestrians, cyclists and those using motorized two and three-wheelers, they account for 46 % of the global road deaths.

Two-wheelers being smaller in size and not highly visible on the road make the rider particularly vulnerable to crashes. In the event of a two-wheeler crash, the head of the driver or pillion directly hits a mobile or immobile

object causing injury. Several studies point to the fact that head is the most commonly injured organ among two-wheeler occupants in case of crashes. It is found that about 40 to 50 % of those injured and more than one-third of those killed in two-wheeler crashes are found to have sustained brain injuries such as concussion, contusion and haemorrhage [6]

Bangalore, a silicon of India,city is a capital of Karnataka state, which has a vehicular population of about 1.5 million, with an annual growth rate of 7-10% and two wheelers constitute more than 70% of the total volume. On November 6, 2006,Karnataka introduced partial (only for riders)helmet legislation at Bangalore, The Karnataka Motor Vehicle Rules,1989, rule 230 makes it mandatory for motor cycle riders[8]

On 1st January 2016 Karnataka state Government made Gazette notification that Karnataka motor vehicles, Rules 1989,in rule 230, for sub rule [1] Every persons while driving or riding (both for rider and pillion riders) a motor cycle of any type i.e to say motor cycles, scooters and mopeds irrespective of brake horse power of the vehicle within the limits of Karnataka state shall wear protective headgear (Helmet)[3]

Compulsory helmet law was enforced in Bangalore (2016) for riders and pillions. No study had been under taken to evaluate helmet law enforcement in Bangalore. Hence current study had been planned to evaluate the adherence of two wheeler users to mandatory helmet law.

Objectives of the Study:

1. To evaluate the compliance of motorized two wheeler users towards mandatory helmet law.
2. To assess the current compliance of motorized two wheeler users towards ISI standard and buckling of helmets.

Method

Study Design: A cross sectional study was conducted to assess the helmet usage among the two wheeler users direct observational survey method was used to obtain the data.

Study Settings: Bangalore city has two major traffic divisions such as, East and West. East had Twenty number of traffic divisions and west had Twenty three number of traffic divisions. Further junctions were divided in to outer and inner city junctions.

Total 6 junctions, three from each division were selected by random sampling method. Out of three selected junctions, two were from inner city junctions and one was from outer city junction. Madivala traffic junction, Wilson garden traffic junction from inner city junction and Konnapana agrahara traffic junction in outer ring road area were selected from East division. AnandRao traffic junction, K R Market traffic junction from inner city junction and Kodigehalli-Hebbala traffic junction in outer ring road area from West Division.

Data was collected by using observational survey to assess the compliance of two wheeler users. study was conducted from the July 2017 to December 2017.

Study Participants: Two wheeler users i.e Riders and Pillion riders

Variables: Independent variable as Helmet usage and dependent variables as different timings of the day, weekdays, weekends, inner city road users and highway road users,gender.

Data Sources: Direct Observation of two wheeler users was done standing at the safest road side at selected traffic junctions during both weekdays and weekends at different timings of the day such as morning 9-10:30 am, afternoon 12-1:30 pm and evening 5-6:30 pm, to ensure the change in traffic volume and traffic composition at different timings of the days.

Both two wheeler riders and pillions in each traffic junctions were observed at traffic junctions when vehicles were stopped for red signal. Riders and pillions of vehicles traveling in one direction and those who have stopped at one side of the curb were observed to avoid confusions. A pretested checklist was used to collect information's such as, gender, type of vehicle, rider/pillion, helmet/ no helmet, type of helmet and strapping pattern.

Study Size: Totally 1471 two wheelers were observed by at the selected traffic junctions.

Quantitative Variables: Helmet usage was taken as independent variable for both riders and pillion riders gender, different timings, weekdays and weekends, Standard of helmets, bucking of the helmets, inner city & high way road helmet usage percentage was measured.

Statistical Method: Data were expressed in frequencies and percentages, Odds ratio was done to assess the helmet usage among riders and pillions and Z–test was done to assess the mean proportion of helmet usage.

Results

Table 1: Helmet usage among riders and pillions

Helmet Users	No. of Observations	Helmet wearing %	95% CI	Odds Ratio
Riders	1471	1209(82.18)	0.8015-0.8406	1.755
Pillions	920	670(72.82)	0.6986-0.7560	

Helmet usage among riders and pillions: Observations in the current study showed that the odds of helmet usage among riders is 1.75 times more compared to pillions (Table 1).

Table 2: Helmet usage among riders and pillions in weekdays and weekends

Two wheeler users	Weekdays		Weekends		Z-Test	P-value
	No. of observations	Helmet users	No. of observations	Helmet users		
Riders	653	559(85.60)	818	649(79.33)	3.115	0.001
Pillions	450	331(73.55)	470	339(72.12)	0.486	0.6241

Helmet usage in weekdays and weekends: Usage of helmet by two wheeler users was more in weekdays compared to weekends and the difference of helmet usage by riders in weekdays and weekends was found to be significant ($p<0.05$) (Table 2)

Table 3: Riders and pillions adherence to strapping pattern of helmet

Strapping pattern	Riders N-1209	Pillions N- 670	Z test	P-Value
Strapped	880 (72.78)	430 (64.17)	3.889	0.001
Unstrapped	329 (27.22)	240 (35.83)	3.889	0.001

Adherence to ISI mark and fastening of helmets: Hardly half of the riders and one fourth of the pillions did use ISI marked (Indian Standard) helmet and more than 30% of helmet users never strapped the helmet (Table 3)

Table 4: Helmet usage among riders and pillions according different traffic locations in Bangalore

Two wheeler users	Inner City junction		Outer ring road junction		Z -Test	P-value
	No. of Observations	Helmet users	No. of observations	Helmet Users		
Rider	842	738(87.64)	629	471(74.88)	6.327	0.001
Pillions	772	587(76.03)	78	43(55.12)	4.017	0.001

Helmet usage in inner and outer city junctions: Helmet usage among riders in inner city junction (87.64%)was 12% more compared with outer ring road junction (74.88%) and also helmet usage among pillions in inner city junction (76.03%) was 15% more compared with outer ring road junction (55.12%). There was a significant difference in the compliance of two wheeler users to helmet in inner city junctions and outer city junctions. ($p<0.001$) (Table 4)

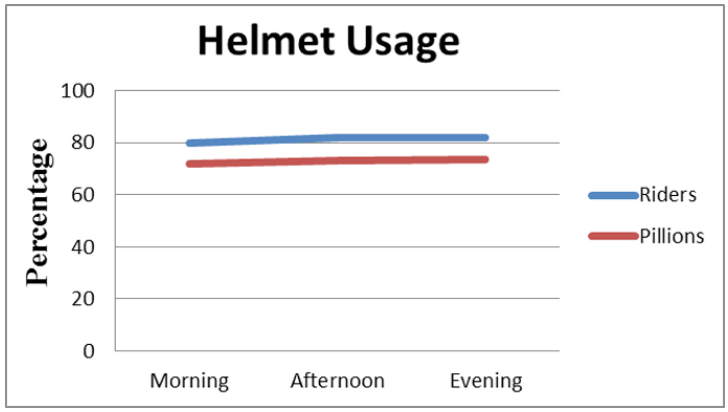


Figure 1: Helmet usage among Riders and Pillions in different timings of the Day

Helmet usage in different timings of the day: Observations did not show much difference in usage of helmet on different timings of the day but the usage of helmet between riders and pillions in different timings of the day found to be significant ($p<0.05$) (Fig 1)

Table 5: Gender and Helmet usage among Riders and Pillions in Bangalore.

Helmet usage	Male			Female		
	Riders N=979	Pillions N=670	Total N=1649	Riders N=492	Pillions N=250	Total N= 742
Helmet used	796(81.30)	482(71.94)	77.50%	413(83.94)	188(75.20)	80.99%
Helmet not used	183(18.70)	188(28.06)	22.50%	79(16.06)	62(24.80)	19.01%

Gender vs Helmet Usage: There was no much gender difference in helmet usage as a rider or pillions (table 4) but on the whole, total 3% more helmet usage was found among females (table 5).

Helmet usage in Bangalore before and after Mandatory helmet law for both riders and pillions: Various studies done to assess the helmet usage among riders before the Mandatory helmet law showed that the prevalence of helmet usage was below 65% in the riders. After the Compulsory Helmet law was enforced in 2016 for riders and pillions, the helmet usage was more in two wheeler users in Bangalore.

Discussion

The Indian motor vehicle act-1988 in its section 129, mentions that the driver and the person riding pillion on a motorized two wheeler (except in side car) in a public place, shall wear a helmet (Protective headgear) that conforms to the specifications of the bureau of Indian standards. On November 6,2006 Karnataka introduced partial helmet legislation (In selected cities and only for riders)This study is the first field based observational survey to assess the helmet compliance in both riders and pillions in Bangalore after the enforcement of compulsory helmet law for riders and pillions in the year 2016 following Karnataka state Government Gazette notification in January 2016.

Nearly 80% of riders wore helmet in Bangalore, where as a observation study done in Bangalore in 2010 by NIMHANS reported that nearly 60% of riders used of helmet[2]. Showed the increase of 20% since last six years. Usage of helmet among pillions was assessed first time in Bangalore through this study, which reported nearly 70 % of pillions using a Helmet.

Where as a study conducted in Delhi, an other city in India showed that 88.4% of pillions wore helmets following the enforcement[7]. This adds to the evidence that legislation and enhanced enforcement increases helmet use while the use decreases when the laws are repealed[8]

In the current study it was found that helmet usage among riders and pillions was 15-20% more in inner city junctions compared to outer or peripheral junctions, which is similar to a study in Bangalore in 2010[2]. which might be due to highly vigilant police at inner roads compared to outer or peripheral roads.

In the current study it was found that the helmet usage of riders in weekdays 6% more than in the weekends which is similar to the study done in Bangalore in 2010 which is similar studies done in parts of other developing countries like which reported drop in helmet usage over weekends[9 & 10]

In this study it was observed that helmet wearing status among riders and pillions was more in the morning compared to afternoon and evening. which is similar to study done in Cambodia[11] and China[9] Not more than half of the riders and one fourth of pillions were using ISI Standard (brand) helmets and more than 30% of them had not strapped their helmets. Similar study done by NIMHANS in 2010 reported that more than half of the riders who used helmets were wearing construction hat like helmets, and many had not strapped helmets, which were more likely to fall off any time[2] studies done in other low income countries showed hat 54% were using non-standard helmets[12] this might be due to increase cost of standard helmets or lack in strict enforcement of standard helmets. Making standard helmets available at affordable prices can increase helmet ownership while enhanced enforcement can encourage both helmet ownership as well as helmet usage[13]

Conclusion

Helmet usage was more after the enforcement of mandatory helmet law in 2016 but nearly 20% of riders and 30% of pillions were not wore helmets. Compliance to ISI (Indian Standard) helmets and buckling of the helmets was poor in both the users.

Conflict of Interest: None

Source of Funding: Self

Ethical Approval: Ethical clearance was obtained from Rajiv Gandhi Institute of Public Health and Centre for Disease control, Rajiv Gandhi of University of Health Sciences Bangalore.

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Awareness of PC PNDT Act among Mothers Attending Tertiary Care Centres in Dakshina Kannada: A Cross Sectional Study

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Abstract

Introduction: According to the 2011 census report, the 0-6 child sex ratio decreased by 5 points registering 947 female children to 1000 male children in Dakshina Kannada district as compared to the 2001 census. Pre-conception and Pre-natal Diagnostic Techniques (Prohibition of sex selection) Act passed in the year 1994 by Govt. of India was later amended in 2003 with the focus to prevent fetal sex determination.

Objectives: *(*a) To assess the Knowledge and attitude of PC PNDT Act among the mothers (b) To check association between knowledge, attitude and socio demographic factors

Methodology: A Cross sectional study was conducted in Tertiary Care Hospitals (Medical College) of Dakshina Kannada. Total sample size obtained using prevalence formula was 336. Pretested and validated questionnaire were used for data collection. Knowledge and attitude were graded. +1 was given for the correct answer and -1 for the incorrect answer. Chi-square analysis was done to find the association of the socio-demographic profile with knowledge and attitude towards the PC-PNDT Act

Results: 66.9% had an average knowledge and 70.4% had the good attitude to PC PNDT Act. There was a significant association of occupation, education, religion and annual income with knowledge. The significant association was found between type of family and attitude.

Conclusion: Majority had average Knowledge on PC-PNDT and attitude was found to be good in the majority. There is a need to raise the awareness regarding the consequences of declining child sex ratio.

Keywords: *Sex ratio, Pre-conception and Pre-natal Diagnostic Techniques Act, coastal Karnataka.*

Introduction

Ultrasonography (USG) a method used extensively for detection of foetal anomalies is now being used even for foetal sex determination. At a gestational age as early as 14 weeks, sex of the foetus can be determined with 99-100% precision by the use of ultrasonography.[1] This aids in sex-selective abortions in the late first trimester and early second trimester. According to the 2011 census report, the 0-6 child sex ratio decreased by 5 points registering 947 female children to 1000 male children in Dakshina Kannada district as compared to the 2001 census. [2] In 1994, the Government of India passed the Prenatal Diagnostic Techniques (Regulation and Prevention of Misuse) Act with the aim of

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preventing female foeticide. At this point, the focus was more on invasive procedures and centres were termed genetic clinics. It was later amended and replaced in 2002 by the Pre-conception and Pre-natal Diagnostic Techniques (Prohibition of sex selection) Act. After the amendment ultrasound was bought within its ambit and provision for more stringent punishments. The practice of female foeticide is evident by declining sex ratio in the country for the past few decades. Even after two decades of the introduction of Act the awareness of the PC-PNDT Act still remains limited. In a study done in Maharashtra, 46% of the radiologists admitted that over the last year they had been approached by patients for foetal sex determination during a routine ultrasound examination.[3] This lack of awareness can lead to conditions where they pressurize the doctor to know the sex of the foetus prenatally. PC-PNDT Act is one of the important medico-legal aspects about which the Indian radiologists need to be cautious about. The gravity of offense under the Act is "Cognizable, Non-bail able and Non-compoundable" i.e. arrest without warrant, non-issuance of bail and non-allowance for out of court settlement respectively.[4] A cross sectional study was done in Nasik district, Maharashtra by Tawri P et al showed that post awareness programme regarding PC-PNDT Act and declining trend of sex ratio the desire to know the gender of the fetus came down to 4% from 15%.[5] In spite of the implementation of Act like PC-PNDT in which we track the pregnancies, MTP's and birth registration in order to improvise the gender ratio awareness plays a key role.[6] This study aims to know the knowledge and attitude of mothers towards the PC-PNDT Act and also an association of knowledge and attitude with socio demographic characteristics of the population with which we can work towards raising awareness about PC-PNDT Act.

Methodology: A Cross sectional study was conducted in Tertiary Care Hospitals (Medical College) of Dakshina Kannada. The sample size for the study was calculated using the prevalence formula. Taking Knowledge of PC PNDT Act as 30% and d being 5% sample size was estimated to be 336. [3]

There is a total of 8 Medical college Hospitals in Dakshina Kannada District. Taking 50% as the sample (thumb rule) we have taken 4 Medical college Hospitals for obtaining sample required. From each Hospital 84 participants were taken.

For study fixed day survey method (random sampling) was used. Operational definitions were made for study participants. Mothers registered for pregnancy (mothers who are at least 8 weeks of pregnancy and attending ANC clinic in one of the teaching hospitals) mothers with under 5 children (mother having at least one under 5 child and in the reproductive age group 15 years - 49 years) were taken as study participants. Face validation (content and construct) and also the linguistic validation of the questionnaire was done before the data collection. All the investigators were trained to a level so that questionnaire administration is with uniformity. The questionnaire was administered after obtaining written informed consent. Ethical clearance was obtained from each Medical college separately before conducting the study.

Statistical Analysis: Data were cleaned and analyzed using SPSS Version 16. Knowledge was graded on the basis of knowing must know, should know and nice to know, +1 was given for the correct answer and -1 for the incorrect answer. Scoring was done. Score < 1 was considered as poor knowledge, 1-3 considered as average knowledge and >3 as excellent knowledge. The attitude was also scored, +1 was awarded for positive attitude and -1 was awarded for negative attitude. Score less than 1 was termed as poor attitude, 1-3 as average and more than 3 was taken as a good attitude. Chi-square analysis was done to find the association of the socio-demographic profile with knowledge and attitude towards the PC-PNDT Act. The p value <0.05 was considered significant.

Results

Majority of the study subjects were in the age group of 20-30 years and belonging to the Hindu community. It was found in our study that 26.3% had a poor knowledge i.e. score of <1, 66.9% had an average knowledge i.e. score of 1-3 and only 6.8% had an excellent knowledge i.e. score of >3 on PC PNDT Act. (Fig1) The attitude on PC PNDT Act was found to be in poor in 9.8%, average in 19.8% and good in 70.4% of the participants. Among homemakers, 60% had average knowledge regarding the Act and 74.2% had a good attitude regarding the Act. (Table 1) Among the participants who had completed education till 12th std. 70% had average knowledge on PC-PNDT Act. (Table 2) 76% of the study participants living in the joint family were found to have a good attitude towards

the Act. (Table 3) There was a significant association of occupation, education, religion and annual income with knowledge. The significant association was found between type of family and attitude. From the results, it is evident that the majority and average knowledge regarding the PC-PNDT Act but the attitude was good among the majority. 95.9% denied on having tried any method for sex determination. 95.3% did not know of any place where sex determination is done. 93.8% said that no one had discussed with them regarding the PC-PNDT Act. Only 26.8% of the participants said that they will discuss the Act with others.

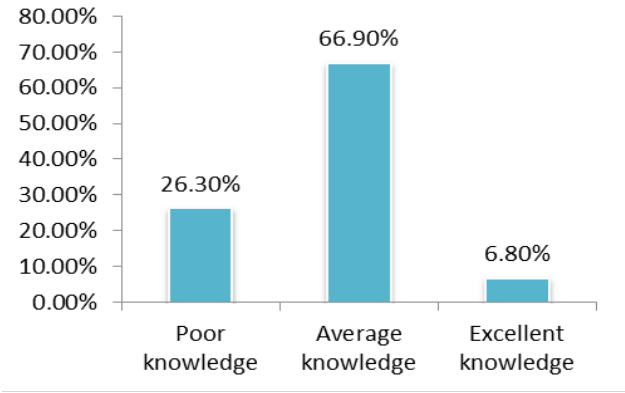


Fig 1: Showing knowledge on PC PNDT ACT

Table 1: Showing association of occupation with knowledge and attitude to PC-PNDT Act

Occupation	Knowledge			P value	Attitude			P value
	Poor	Average	Excellent		Poor	Average	Good	
Homemaker	65(32.8%)	120(60.6%)	13(6.5%)	0.018*	20(10%)	31(15.6%)	147 (74.2%)	0.098
Skilled	2(11.1%)	15(83.3%)	1(5.5%)		2 (11.1%)	1(5.5%)	15 (83.3%)	
Unskilled	8(23.5%)	24(70.5%)	2(5.8%)		5 (14.7%)	10 (29.4%)	19 (55.8%)	
Official	2(10%)	13(65%)	5(25%)		2(10%)	4(20%)	14 (70%)	
Businesswomen	3(21.4%)	11(78.5%)	0(0)		0(0)	7(50%)	7(50%)	
Professional	1(12.5%)	7(87.5%)	0(0)		0(0)	2(25%)	6(75%)	
Not answered	8(17.3%)	36(78.2%)	2(4.3%)		4(8.6%)	12(26%)	30 (65.2%)	

Chi square analysis, *p value <0.05

Table 2: Showing association of Education with knowledge and attitude

Education	Knowledge			P value	Attitude			P value
	Poor	Average	Excellent		Poor	Average	Good	
Up to 7th std.	21(43.7%)	26(54.1%)	1(2%)	0.001*	8 (16.6%)	7(14.5%)	33(68.7%)	0.376
Up to 10th std.	36(27.6%)	89(68.4%)	5(3.8%)		12 (9.2%)	28(21.5%)	90 (69.2%)	
Up to 12th std.	20(21.7%)	66(71.7%)	6(6.5%)		9(9.7%)	20 (21.7%)	63 (68.4%)	
Up to Degree	7(14.8%)	31(65.9%)	9(19.1%)		1(2.1%)	7(14.8%)	39 (82.9%)	
Professional and masters	1(11.1%)	6(66.6%)	2(22.2%)		1 (11.1%)	1(11.1%)	7 (77.7%)	
Not answered	4(33.3%)	8(66.6%)	0(0)		2 (16.6%)	4(33.3%)	6(50%)	

Chi square analysis, *p value <0.05

Table 3: Showing association of religion and type of family with knowledge and attitude

Religion	Knowledge			P value	Attitude			P value
	Poor	Average	Excellent		Poor	Average	Good	
Hindu	51(20.5%)	176 (70.9%)	21 (8.46%)	0.001*	23 (9.2%)	47 (18.9%)	178 (71.7%)	0.143
Muslim	33(44.5%)	40(54%)	1(1.3%)		8 (10.8%)	15 (20.2%)	51 (68.9%)	
Christian	1(12.5%)	6(75%)	1(12.5%)		0(0)	1(12.5%)	7 (87.5%)	
Not answered	4(50%)	4(50%)	0(0)		2(25%)	4(50%)	2(25%)	
Type of Family								
Joint family	43(27%)	103 (64.7%)	13(8.1%)	0.856	12 (7.5%)	26 (16.3%)	121(76.1%)	<0.001*
Nuclear family	34(25.9%)	89(67.9%)	8(6.1%)		11(8.3%)	22 (16.7%)	98 (74.8%)	
Not answered	12(25%)	34(70.8%)	2(4.1%)		10 (20.8%)	19 (39.5%)	19 (39.5%)	

Chi square analysis, * p value <0.05

Table 4: Showing association of annual income with knowledge and attitude

Annual Income	Knowledge			P value	Attitude			P value
	Poor	Average	Excellent		Poor	Average	Good	
<50,000	57(31.8%)	118 (65.9%)	4(2.2%)	*<0.001	12 (6.7%)	30 (16.7%)	137 (76.5%)	0.104
50000-100000	9(20%)	32(71.1%)	4(8.8%)		5 (11.1%)	9(20%)	31 (68.8%)	
100000-500000	5(11.1%)	28(62.2%)	12 (26.6%)		4(8.8%)	9(20%)	32 (71.1%)	
>500000	0(0)	2(66.6%)	1(33.3%)		0 (0)	1 (33.3%)	2 (66.6%)	
Not answered	18(27.2%)	46(69.6%)	2(3%)		12 (18.1%)	18 (27.2%)	36 (54.5%)	

Chi square analysis, * p value <0.05

Discussion

In this study, it was found that majority of the participants were found to have an average knowledge and good attitude on the PC-PNDT Act. It can be found that the majority of the professional women had average knowledge on PC-PNDT Act but the attitude was good in the majority. Even among homemakers even though the knowledge was average regarding the PC-PNDT Act was average attitude was found to be good. Knowledge was found to be significantly associated with the occupation of the participants while the attitude was not. In our study, it was found that TV (media) was the major source of information for knowing that prenatal sex determination is possible. Knowledge was found to be significantly associated with education, it can be observed that people who were educated up to 7th std had poor knowledge on PC-PNDT Act and as the educational status improves the majority of them had average knowledge. There was a significant association between the type of family and attitude towards the PC-PNDT Act, participants living with the joint family were found to have a good attitude. This is probably due to the family environment and the possibility of discussion of sensitive topics like this.

In this study, 19% of the study participants were found to have the awareness that pre-natal sex determination can be done by various techniques and 75% of them answered that ultrasound is the technique used for the sex determination. Similar studies conducted by Seema Mehta et al, Sonal R Deshpande et al, Roy A, where awareness of pre-natal sex determination was 77.5%, 80.5%, and 44.82% respectively.[7,8,9] The knowledge was found to be higher in other studies as compared to the current study. At the time of the interview, it was perceived that participants were anxious about answering the particular question. In our study, we can find that the majority of the participants i.e. 88.5% knew that pre-natal sex determination is a punishable offense. Similar studies in the past have shown that knowledge regarding the fact that prenatal sex determination is a crime was lower in the population. A study by Pavithra M B et al and Giri P showed that the percentage of participants knowing that prenatal sex determination is a crime was 59% and 53% respectively.[10,3] There is raising awareness that prenatal sex determination is a punishable offense. This is clearly evident by the study as more number of participants are aware of legal aspects of prenatal sex determination there is apprehension on even answering the question regarding awareness of the possibility of pre-natal sex determination.

Conclusion

Majority had average Knowledge on PC-PNDT and attitude was found to be good in the majority. There is a need to raise the awareness regarding the consequences of declining child sex ratio in the community.

Conflict of Interest: None

Source of Funding: Nil

Ethical Clearance: Clearance was obtained from individual institutional Ethics Committee.

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Tobacco and Betel Nut Chewing Behaviour and its Association with Potentially Malignant Disorders in Chennai

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Abstract

Background: Betel nut and tobacco chewing habit is considered to be common amongst the individuals of Asian origin. It is associated with oral and oropharyngeal cancer and other potentially malignant disorders (PMD). Attributes like the frequency, duration of chewing, placement of betel nut and tobacco seems to plays a significant role in the initiation of potentially malignant disorders and oral squamous cell carcinoma.

Aim: To assess the Tobacco & Betel nut chewing behaviour& its association with PMDs in chennai population.

Materials and Method: The study group consisted of 20 tobacco & betel nut chewing individuals from sub-urban and rural areas near Chennai with the habit > 1 year. A questionnaire consisting of 16 questions relevant to tobacco and betel nut chewing habits were given and the data was acquired, Clinical examination was done to document the oral findings of the study population associated with PMDs.

Results: There was presence of oral leukoplakia (50%), OSMF (34%) and oral lichen planus (18%) among the study population.

Conclusion: Betel nut and tobacco chewing behaviour and its patterns plays a major role in causing potentially Malignant disorders and it is considered to be one of the major risk factor for the development of Oral squamous cell carcinoma.

Keywords: *Tobacco, betel nut, Potentially malignant disorders, chewing habits.*

Introduction

Oral cancer is the most common malignant neoplasm which is found on the lip, floor of the mouth, cheek lining, gingiva, palate or in tongue. [1] Mostly oral cancer affects the people from the lower socio- economic status and people in rural area. Betel nut and tobacco chewing habits are considered to be the primary independent cause of oral cancer. [1]

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Betel nut and tobacco chewing habit is considered to be common amongst the individuals of Asian origin and is shown to have number of ill - effects on oral health.[2]Betel nut consist of major chemical components like arecoline, polyphenols like tannins and alkaloids contribute to oral submucous fibrosis(OSMF) like changes in the oral mucosa.[2] Whereas,Tobacco consist of nicotine which contributes to various potentially malignant disorders(PMDs) like leukoplakia, erythroplakia, OSMF and leads to the development of oral squamous cell carcinoma(OSCC).[3]

Regular chewing may induce chronic irritation and inflammation that damage epithelial cells of the oral cavity.[3]Arecoline and/or other areca nut components have been shown to induce a number of pro-carcinogenic changes including the production of carcinogenic agents like nitrosamines and reactive oxygen species which

induces the modulation of matrix metalloproteinases and their tissue inhibitors, inhibition of collagenases and increased collagen cross-linkage, up-regulation of heat-shock proteins and integrins and increased expression of inflammatory cytokines,which induces oral preneoplastic disorders with a high propensity to progress to cancer. [4]Attributes like the frequency, duration of chewing, placement of betel nut and tobacco seems to plays a significant role in the initiation of PMDs and OSCC.[5,6]

Therefore, a survey was conducted among the subjects with PMDs to assess the pattern, duration and frequency of tobacco and betel nut use and thereby correlate with the morphological characteristics of various PMDs and OSCC.

Materials and Method

Questionnaire: The study group consist of 20 tobacco and betel nut chewing individuals associated with PMDs from sub-urban and rural areas near Chennai who have the habit for a period of more than 1 year. The questionnaire consisted of socio demographic questions and 16 questions relevant to tobacco and betel nut chewing habits of the people associated with PMDs. The individuals were asked to fill the questionnaire and the data was acquired.

Clinical examination: The subjects were examined for the presence of PMDs. PMDs were diagnosed based on the WHO 2005 guidelines. The location, distribution, size, shape, consistency, colour and surface texture of oral mucosal lesions found associated with the individuals with PMDs were documented and subsequently correlated with their tobacco and betel nut chewing habits.

Statistical analysis: The collected data was entered in Microsoft excel worksheets and were subjected to statistical analysis using SPSS version 20. To describe about the data descriptive statistics mean and standard deviation were used. To find the relationship between the patterns and behaviour of the tobacco and betel nut chewing habit chi–square test was used. The p value was calculated and considered to be significant at $p < 0.05$.

Results

A total of 20 people were included in the study. The age group were between 16-30 years (10%), 31-45 years(53%), 46 to 60 yrs of age (33%), above 60 years (14%). The participants originated from rural (60%), semi- urban (36%) and urban areas (4%). A total of (76.7%) of the people were illiterate, (24%) completed high school, whereas (9%) of the people were graduates. (Table 1)

The participant responses to the duration, frequency and chewing practices are summarized in Table 2. On clinical examination, 10 out of 20 had oral leukoplakia (50%) whereas 7 people had OSMF (34%), and 3 people had oral lichen planus (OLP) with lacy patches (16%). (Table 3). Other symptoms associated with these habits are summarized in Table 4. The association between tobacco and betel nut chewing behaviour and the development of PMDs was found to be statistically significant. ($p<0.001$) The PMDs were found to be more common among males (86%) than females (14%). This was found to be statistically significant ($p<0.001$).

Around 82% of the people were ready to quit the habit on knowing the ill effects of tobacco whereas 16% were unwilling to quit the habit due to other reasons.

Discussion

This study was conducted with the objective of assessing the Tobacco and betel nut chewing behaviour and its association with PMDs in Chennai. Data were collected using a pretested survey questionnaire and the clinical examination of the individuals were assessed and the oral findings of the people examined were documented. The direct interview minimized incomplete submission and clarification if any were done on the spot.

From the present study, the overall prevalence of oral PMDs were as follows oral leukoplakia (50%), OSMF (34%) and OLP (18%).Similar findings and similar spectrum of distribution of oral PMDs were detected in a study in Taiwan. [7] In a recent screening program conducted in India by Warnakulasuriya[8], to detect PMDs within a workplace, a similar prevalence of leukoplakia (34%)was found. OSMF had highest prevalence (43%) among the diagnosed oral PMDs similar to the findings of Mehrotra.[9] In the present study, OLP was also found in 18% of the patients. OLP is considered an immunological disease, the findings of the present study indicate that it is also seen in individuals associated with the habit of chewing Tobacco and betel nut. The findings of the present study and other previously reported studies,[10] indicated a varied distribution in the prevalence of Oral PMDs. This may be attributed to difference in betel nut or tobacco consumption and cultural, dietary, and environmental factors.

In the present study, male gender was found to be significantly associated with development of oral PMDs with males being at higher risk to develop oral PMDs. In a review done by Nair, [11] the prevalence of oral PMDs and OSCC was found to be more in males. This gender discrepancy may be attributed to the fact that the habit of tobacco consumption is more in males which may lead to development of PMDs in males.[12]In the present study 84% were males and hence the high prevalence of PMDs among males.

In the present study, most of the individuals place the tobacco or betel nut in the buccal mucosa for >1 hr and they eventually chew and spit out, which had caused ill effects like burning sensation after eating food, xerostomia, decreased mouth opening which is similar to the previous studies [13,14] in which 56% of the participants had an history of chewing betel nut or tobacco and placing it in the buccal mucosa for a long time span. In the present study participants developed oral lesions, as most of them had the habit for more than 5 years. Similarly,Yuvette et al has shown results that the participants with PMDs had a long duration of use of tobacco and betel nut. [15]

In the present study, Major reasons for the first experience of this habit is said to be the peer pressure, it made them to continue this habit throughout as it relieves tension. Previous studies have shown that peer pressure is one of the major cause of the people ‘s first experience in chewing tobacco and betel nut. [16]These were the most common attitude of the people in chewing tobacco and betel nut with various PMDs and was found to be highly significant ($p< 0.001$)

More than 60 known carcinogens have been detected in tobacco and betel nut.[17] This chemical after coming in contact with oral mucosa accelerates inflammatory process and on long term abuse is responsible for atrophic and hypertrophic changes in the oral mucosa.[17]

Awareness regarding the negative health effects of the betel nut use was minimal. Therefore,there is a need to improve the level of awareness. [18] Although betel nut chewing may be a pratice of tradition, it is not a safe habit.[19] Various factors like the placement of the betel nut or tobacco, method of chewing,frequency of chewing, duration affects the mucosa and cause oral lesions, hence continuous use of this may lead to malignancy like OSCC.[20] The main strategy of the present study is to know about the association of tobacco and betel nut chewing behaviour among the people and to find its association with PMDs.

Conclusion

From the above results, we conclude that the betel nut and tobacco chewing behaviour and its patterns plays a major role in causing PMDs and it is considered to be one of the major risk factor for the development of OSCC. By conducting this survey and clinical examination we had covered a subset of the population with these habits.. It is noteworthy to know that most of the people are ready to quit the habit on knowing the ill effects caused by the tobacco and betel nut chewing habits, whereas the others were not ready to leave the habit due to many other reasons. We could examine more people by organising camps and creating an awareness about the ill effects of tobacco and betel nut chewing which may help in the early identification and prevention of various PMDs

Table 1: Socio-demographic data of the participants

Gender	**Percentage**
Male	84%
Female	16%
Age-Group	
31-45 years	53%
46-60 years	33%
Above 60 years	14%
Origin	
Rural	60%
Semi - urban	36%
Urban	4%
Level of education	
Illiterate	76%
Completed high school	24%
Graduate	9%

Table 2: Duration, frequency and Chewing practices among the participants.

Factors	Categories	%	Mean	SD	P Value
Presence of Betel nut or tobacco chewing habit	->Yes ->No	81.8% 18.2%	1.24	0.452	<0.001
Duration of the tobacco or betel nut chewing habit	->1 yr ->2 yrs ->3-4 yrs ->5 or more than 5 yrs	0% 4.3% 56.5% 39.1%	1.18	0.368	<0.001
Packets of betel nut or tobacco used per day	->1 ->2 >More than 2	43.6% 11.8% 54.5%	1.20	0.406y	<0.001
Betel nut used along with	->Tobacco ->Betel leaf ->Piper leaf ->PAN ->Slaked lime	38.2% 24.4% 4.8% 26.9% 16.2%	1.30	0.467	<0.001
Location at which the tobacco or betel nut is placed inside the mouth	->Buccal vestibule ->Labial vestibule ->Labial mucosa ->Floor of the mouth	60.9% 4.3% 17.4% 17.3%	1.54	0.568	<0.001

Table 3: Prevalence and Description of PMDs in the study population.

Potentially malignant disorders	No of individuals associated with the disorders	Description of the features
Oral leukoplakia	10 (50%)	• Location- Buccal mucosa,tongue • Size and shape – more than 3mm, non – uniform • Colour- White patches • Surface texture- elevated,wrinkled,corrugated surface texture.
Oral sub mucous fibrosis	7 (34%)	• Colour– White in colour, marble – like appearance. • Reduced Mouth opening • Surface texture – blanching of buccal mucosa • Palpable bands in buccal and labial mucosa.
OLP	3 (16%)	• Location – Buccal mucosa and labial mucosa • Size and shape – more than 3 mm, non – uniform • Colour- White in colour, redness • Surface texture- lacy patches.

Table 4: Comparison of various tobacco chewing habits and its association with PMDs

Potentially malignant disorder	No of individuals associated with the disorders	Location at which the betel nut and tobacco placed inside the mouth	Frequency of use of tobacco and betel nut per day	Duration of use of tobacco or betel nut per day	Clinical features seen associated to the people with potentially malignant disorders
Oral Leukoplakia	10(50%)	• Buccal vestibule (20%) • Labial vestibule (0%) • Labial mucosa (10%) • Tongue (10%) • Floor of the mouth (10%) • Buccal mucosa (50%)	• 1 packet (25%) • 2 packets(25%) • More than 2 packets (50%)	• 1 hr (40%) • More than 1 hr(60%)	• white patches (40%) • hyperkeratosis (10%) • elevated lesion (40%) • Burning sensation after eating spicy food (30%) • ulcerations 50%) • irritations (50%)
OSMF	7(34%)	• Buccal vestibule (28%) • Labial vestibule (14%) • Labial mucosa (14%) • Tongue (14%) • Floor of the mouth (14%) • Buccal mucosa (14%)	• 1 packet (25%) • 2 packets(0%) • More than 2 packets (75%)	• Few minutes(50%) • 1 hr(25%) • More than 1 hr(25%)	• blisters (60%) • inability to blow or whistle (30%) • Decreased mouth opening and tongue protrusion (35%) • Defective gustatory sensation (52%) • Increased salivation (55%) • white fibrous bands (55%)
OLP	3(16%)	• Buccal vestibule (33%) • Labial vestibule (0%) • Labial mucosa (0%) • Tongue (5%) • Floor of the mouth (0%) • Buccal mucosa (33%)	• 1 packet (0%) • 2 packets(50%) • More than 2 packets (50%)	• Few minutes(10%) • 1 hr(15%) • More than 1 hr(75%)	• red, swollen or white patch • Burning sensation after eating food(55%) • painful,thickened patches (43%) • inflammation of the gums (30%) • bleeding and irritation while brushing 60%) • discomfort in swallowing (50%)

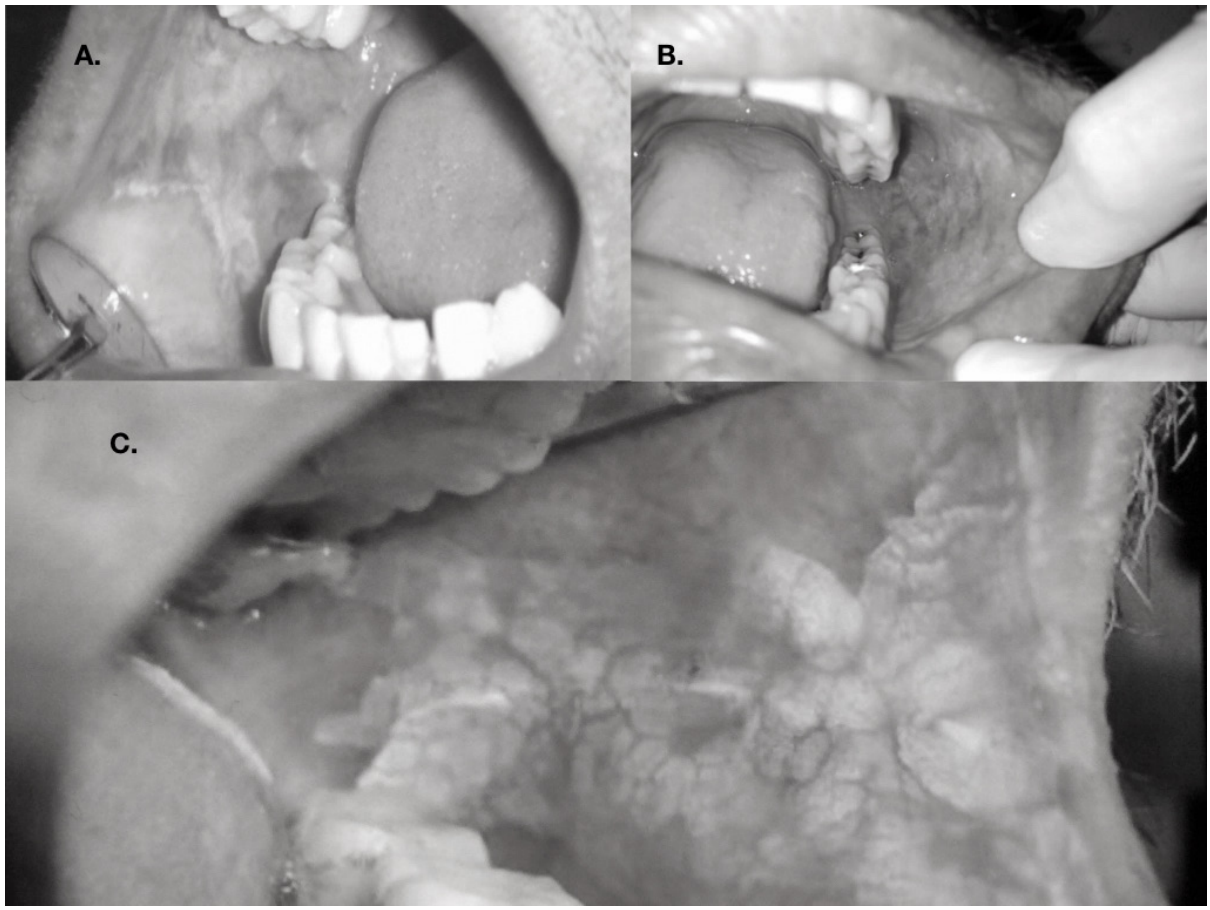


Fig 1 (A). Clinical Picture with OLP, (B). OSMF, (C). Oral Leukoplakia.

Conflict of Interest: Nil

Source of Funding: Nil

Ethical Clearance: Study approved by the Institutional Review Board.

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Evaluation of the Relationship between Maternal Periodontitis and Preterm Low Birth Weight Infants: A Case Control Study

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Abstract

Introduction: The relationship between periodontal disease in pregnancy and children born prematurely or with low birth weight has been increasingly investigated showing both positive and negative results. Various factors found to be associated with preterm and low birth weight infants include age of mother, height, weight, socio-economic status, ethinicity,smoking, alcohol, nutritional status and stress. The objective of this study was to evaluate the association between Maternal Periodontitis and preterm delivery or low birthweight.

Materials and Method: In this case-control study, 30 pregnant women without systemic diseases or other risk factors for preterm labour were chosen. The control group (n=15) had term labour (infants $\geq$ 37 weeks) and the case group (n=15) had preterm labour (infants< 37 weeks). Birth weight of the infant, bleeding index, plaque index, probing depth and loss of attachment of the mother were measured.

Results: The data of plaque index (cases 1.22 $\pm$ 0.36, control 0.83 $\pm$ 0.32), bleeding index (cases 2.16 $\pm$ 0.52, control 1.32 $\pm$ 0.51), probing depth (case 5.13 $\pm$ 0.32, control 3.20 $\pm$ 0.31), loss of attachment (case 3.25 $\pm$ 0.13, control 2.03 $\pm$ 0.03), and birth weight (case 2.34 $\pm$ 0.21, control 2.97 $\pm$ 0.52) (odds ratio 135.5, P value <0.0001) revealed a statistically significant difference between the two groups.

Conclusions: A noticeable relationship between periodontal health and duration of pregnancy can be established. Hence periodontal disease may be considered as a risk factor for preterm labour. Oral hygiene maintenance therefore should be considered a part of prenatal care protocol.

Keywords: *Periodontal disease, Pregnancy, Low birth weight, Preterm, Risk factors.*

Introduction

Periodontitis is an infectious disease that involves specific bacteria and characteristic humoral and cellular host responses. The host response is characterized by the dense infiltration of Tand B lymphocytes, macrophages in the inflamed connective tissues of the periodontium. The main etiological agents are varied microbial species organized in the form of a biofilm[1]. Periodontal diseases characterized by inflammation and degeneration of the gingiva, supportingbone, periodontal ligament and cementum. Biofilm bacteria colonize the subgingival area and forms colonies. They trigger inflammatory reaction, area below the junctional epithelium are affected and junctinal epithelium loses its attachment with the connective tissue. The epithelium of the gingiva migrates along the tooth surface forming periodontal pockets that provide an ideal environment for the growth and proliferation of the microbes[2].

There are various factors that have been found to be associated with preterm and/or low birth weight infants. Maternal risk factors include age, height, weight, socio-economic status, ethnicity, smoking, alcohol, nutritional

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status, and sometimes stress[3,4]. In addition to this, certain factors such as maternal hypertension, infections, and cervical incompetence may also be important[5,6].

The role of maternal infection on preterm delivery remains controversial, which might support as an indirect effect of production of inflammatory mediators that shorten the gestational age. It is also possible that micro-organisms may gain direct access to the amniotic fluid and foetus in several ways, ascending via the vagina through the cervix or via the endometrium which might have been previously infected, or through any other haematogenous route[7].

There are a number of studies that have established an association with severe periodontitis and a variety of systemic conditions. These include cardiovascular diseases, insulin dependent diabetes mellitus, and respiratory diseases[8,9].

Hence the aim of the study was to find the relationship between maternal periodontal disease and preterm low-birth weight infants in the patients reporting toSaveetha Medical College and Hospitals, Chennai.

Materials and Method

A case-control study was conducted involving populations attending Saveetha Medical College Hospitals, Chennai. A sample of 30 systemically healthy women were examined retrospectively after delivery and divided into 15 cases and 15 controls depending on whether they had preterm labour or term labour. Exclusion criteria was:

- women with systemic medical problems
- women receiving antibiotics at the time of examination
- womenwho had taken dental treatment within 6 months.

The nature of the study was explained to the subjects and consent was obtained for their participation prior to commencement of the study. Case defined as premature delivery occurring less than 37 weeks of gestation and generally accompanied by low birth weight i.e. birth weight less than 2500g. Control defined mothers with delivery occurring after 37 weeks without any previous complications, and newborns with birth weight $\geq$ 2500g.

History of information about age, education status of the mother, occupation, socio economic status of the family, number of previous pregnancies, previous preterm low birth weights and miscarriages were noted. Recording of the following parameters were done, Sillness and Loeplaque index, Muhlemann and Sulcus bleeding index, Probing depth and Loss of attachment. Probing depth and Loss of attachment were measured to the nearest mm at 6 sites per tooth, i.e. around mesiobuccal, midbuccal, distobuccal, mesiolingual, midlingual, distolingual, using disposable William's Periodontal probe. According to Gomes-Filho[10], women with probing depth > 4mm and loss of attachment > 3mm at the same site in at least 4 teeth is considered as localised chronic periodontitis. Weight of the newborn was analysed using a manual machine by the gynaecologist. The patient's hospital record was verified to confirm the data obtained for any variation. All the periodontal examinations were completed within three days post partum.

A statistical analysis was performed containing descriptive statistics and univariate/multivariate logistic regression analysis. Categorical variables were compared by chi-squared test and continuous variables by the student's t test. Statistical significance was defined as $P < 0.05$.

Results

When comparison of mean and standard deviations of different variables in cases and controls were done, bleeding index, plaque index, birth weight, and education status of the mother are highly significant whereas age does not show any significance, as shown in table 1.

Table 1: Comparison of different variables in case and control groups

Variable	Case	Control	P value
Age	22.5 $\pm$ 2.8	24.3 $\pm$1.5	0.74
Education status of mother			
schooling	73%	61%	<0.001
college	27%	39%	
Post graduate	0%	0%	
Socio economic status			
Lower	57%	60%	0.86
Middle	43%	40%	
Upper	0%	0%	
Previous pregnancies:			
No	96%	94%	0.7
Yes	4%	6%	
Previous preterm low birth weights			
No	7%	98%	<0.001
yes	93%	2%	

Table 2: Comparison of Variables in case and control groups

Variable	Case	Control	P value
Birthweight	2.34 ± 0.21	2.97 ± 0.52	<0.0001
Plaque index	1.22 ± 0.36	0.83 ± 0.32	<0.0001
Bleeding index	2.16 ± 0.52	1.32 ± 0.51	<0.0001
Probing depth	5.13 ± 1.52	3.2 ± 0.31	<0.0001
Loss of attachment	3.25 ± 0.13	2.03 ± 0.03	<0.0001

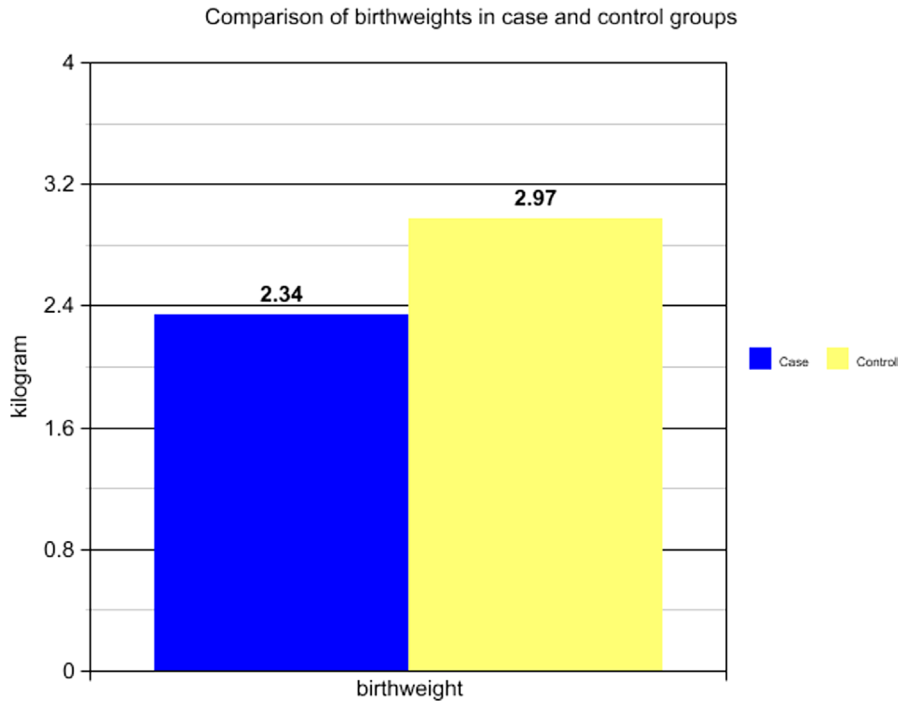


Fig 1

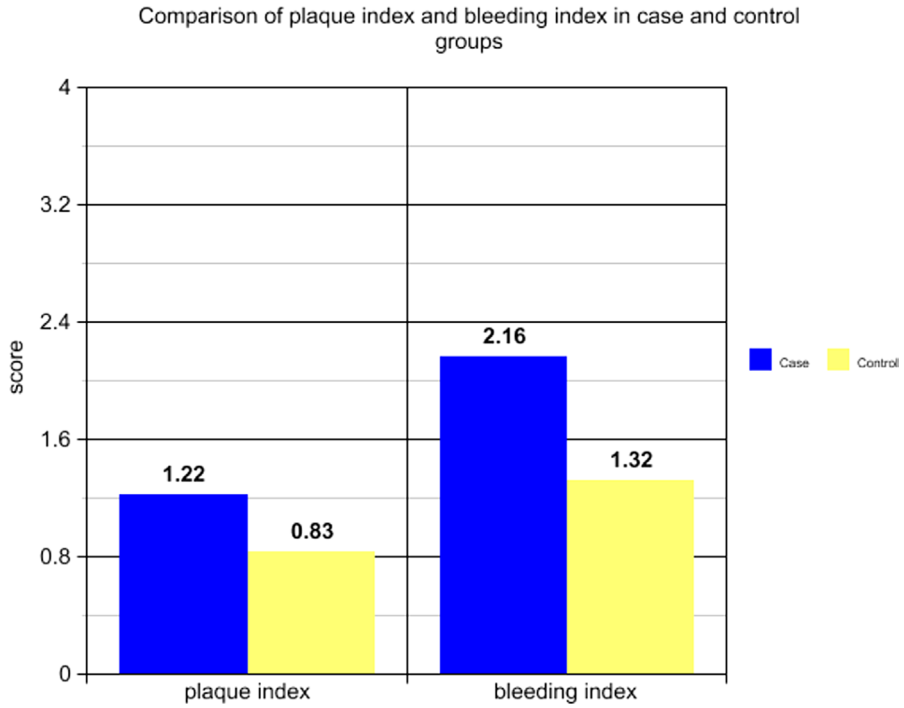


Fig 2

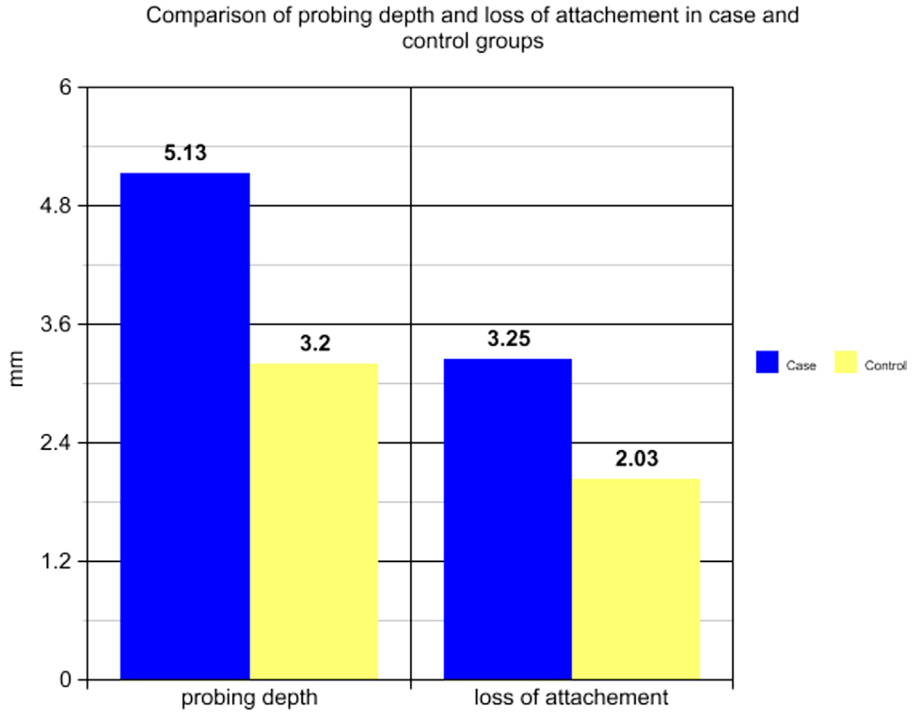


Fig 3

The comparison of mean values of different subjective variables in both groups are graphically represented in Fig 1, Fig 2 and Fig 3.

When the probing depth and loss of attachment were compared between the cases and controls, there was high significance observed at 1% level (P<0.001). This is seen in Table 2. When the education status of the mothers was compared at different levels between cases and controls, high significance was observed at 1% level (P<0.001). When the socio economic status of the families was compared at different levels between cases and controls, there was no observable significance, as seen in Table 1.

Table 3: Univariate Logistic regression analysis

Independent Variable		Regression Coefficient	P Value	Odds Ratio [95%CI]
Age		0.02	0.74	0.97[0.85 to 1.15]
Education status of mother	Schooling	2.75	<0.001	17.03 [2.85 to 106.56]
	College	1.67	<0.001	5.66 [2.42 to 14.90]
	Post graduate	---	--	1.0
Socioeconomic Status	Lower	0.09	0.86	0.92[0.45 to 2.06]
	Middle	0.09	0.86	0.95[0.45 to 2.08]
	Upper	--	---	1.0
Previous Pregnancies	Yes	6.87	0.7	134.5
	No	7.58	0.7	134.5
Previous Low birthweight	Yes	6.59	<0.001	1435.65
	No	7.95	<0.001	1435.65
Birth weight		2.64	<0.001	3.44[1.45 to 8.88]
Plaque Index		3.58	<0.001	23.45[6.90 to 113.5]
Bleeding Index		1.54	<0.001	4.21 [2.06 to 8.65]
Probing Depth		4.53	<0.001	135.51[25.52 to 685.11]
Loss of Attachment		4.92	<0.001	135.51[25.52 to 685.11]

As seen in the univariate logistic regression analysis(Table 3), the age comparison between the case and control groups was found to have an Odds ratio of 0.97. The education status was found to have an odds ratio of 17.03 and 5.66 for schooling and college respectively. The socioeconomic status was found to have an Odds ratio of 0.92 and 0.95 for lower and middle class respectively. Comparison of the incidence of previous pregnancies was found to have an odds ratio of 134.5. Significant associations were found between pre term low birth weight and periodontal disease (P<0.001) when univariate logistic regression was done. Plaque index, bleeding index, probing depth, loss of attachment, and education status of the mother were significantly associated with pre term low birth weight in the univariate analysis. Other non significant variables include age of the mother, socio economic status and previous pregnancies, as shown in Table 3.

Discussion

Most of the variables were found to be well known risk factors associated with pre term low birth weight, showing high significance between periodontitis and pre-term low birth weight. However, age of the mother did not show much of significance, this may be due to the presence of several antenatal factors such as socioeconomic conditions, infections, or any other complications.

The plaque index showed highly significant differences (P<0.001 with an odds ratio 23.45) in both cases and controls. This is similar to the study conducted by Yalcinet al[11]. It was suggested that during pregnancy, the oral microflora uses the progesterone and estrogen hormones as vitamin K growth factors and they form plaque on the gingival and tooth surfaces. However, in the studies conducted by Radnaiet al[12], there were insignificant plaque index values in cases and controls.

The bleeding index also showed significant differences (P<0.001 with an Odds ratio of 4.21) in both cases and controls. This is similar to the findings of Zadeh-Modarreset al[13]who indicated that the control group had a better periodontal condition than the case group. This may be attributed to the increasing levels of progesterone in the body, which cause increased dilatation of the gingival capillaries, causing increased permeability with gingival exudates which can result in increased redness and bleeding. Also, physiological female hormones during pregnancy also affect these tissues.

Highly significant association between probing pocket depth and loss of attachment with preterm low birth weight was observed (P<0.001). This is similar to the studies conducted by Goepfort[13] and Aguedaet al[14]. However, this was not the case in studies conducted by Gursoyet al[15].

In the present study, the periodontal status of the mother was found to be highly influenced by her educational status (P<0.001). This is similar to the findings of Siqueriaet al[16], and Toygar et al[17]. This may be due to the fact that educated mothers would take more preventive measures than less educated mothers. On the contrary, an insignificant difference was found in some studies such as that conducted by Davenport et al[18].

In case of previous pregnancies, an insignificant association (P<0.7) with pre term low birth weight was observed. This is similar to the findings conducted by Davenport et al[18]. This may be because most of the women were admitted for their first delivery.

A significant association was found between previous low birth weight and pre term low birth weight (P<0.001) in the study. This is similar to the studies conducted by Augedaet al[14], and Davenport et al[18], who found significant results between previous preterm low birth weights are pre term low birth weight.

Thus the results of the following study establish a strong evidence that maternal periodontal disease is an independent risk factor for an adverse outcome of pregnancy, iepre-term low birth weight, showing significant differences in both cases and controls. This is in agreement with several studies conducted bySatheeshMannemet al[19], and Pitiphat et al[20]. This can be attributed to the following mechanisms. First, women with periodontal disease may experience more frequent and severe bacteremia than periodontally healthy women. As a result, the uterine cavity may get exposed to periodontal bacteria and their byproducts. Once they reach the maternal fetal unit, oral bacteria may elicit an inflammatory cascade. It leads to production of prostaglandins and they have the tendency to cause uterine contractions. These uterine contractions which are premature to normal gestational period leads to preterm labour. Secondly, cytokines generated within the periodontal disease may enter the systemic circulation and precipitate a similar cascade, again leading to spontaneous preterm labour and birth[21]. On the contrary, certain studies conducted by several authors did not

provide a connecting link between maternal periodontitis and preterm delivery[22].

On the basis of these findings, periodontal infections in pregnant women can be viewed as a potential obstetric risk factor. Increasing awareness among women about risk periodontal infections during pregnancy remains of utmost importance[22, 23]of considering the fact that periodontal infections are both preventable and readily treated, this study provides opportunities for intervention strategies to reduce the incidence of preterm low birth weight.

Conclusion

From the above results, the following conclusions were arrived at

1. Periodontal disease in women is an important obstetric risk factor for preterm low birth weight.
2. Chronic periodontitis is associated with preterm low birth weight
3. Antenatal factors and periodontal status contribute for preterm low birth weight in pregnant women.
4. Thorough dental examination is advised for mothers who are planning for gestation

Compliance with Ethical Standards: Authors Radhika Murali and Jaiganesh Ramamurthy hereby declare that there is no conflict of interest for this study

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008.

Informed consent was obtained from all patients for being included in the study. Study was presented to our institutional review board and approved for the same.

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Ridge Augmentation: An Overview

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Abstract

The amount and standard of bone is a big antecedent for success of any prosthesis. Alveolar ridge defects are common and might be a significant problem in any dental treatment and rehabilitation. Following extractions, dimensional changes takes place in ridge morphology. Starting with initial rapid resorption in the first 2-3 months, the process continues. Periodontal diseases,trauma, tumour or congenital diseases could be the possible cause of alveolar ridge defects. Since this possesses a great degree of functional,hygienic and esthetic concern,it is imperative for the clinician to be aware of the same and execute it in treatment planning protocol. This article reviews the available materials for alveolar ridge augmentation and highlights on their success rates and possible complications.

Keywords: *Prosthesis; Alveolar ridge defects; Alveolar ridge augmentation.*

Introduction

Surgical placement of implant in a posture where the function and esthetics of dental prosthesis is not compromised is the most crucial step. For the placement of implant at the posture where function and esthetics will not be affected, the reconstruction of deficient alveolar ridge is very influential. The sufficient amount of horizontal and vertical bone measurement ensures the success of implant. Advances in biologic understanding of bone regenerate technique have increased the chances of reconstruction of ridge defects. It is very contrasting to note that the similar rate of success for implant is reported for augmented bone and natural bone. So all the cases exactly do not require bone augmentations. It should be done in esthetic area or when there is proximity to anatomic structure i.e. maxillary sinus or mandibular canal.

Carlson et al 1967 reported that 25% of bone loss occurs after first year and 40-60% after three years of loss of tooth. The ridge deficiency that follows causes gradual loss of horizontal dimension as well as loss of bone height.[1]

Seiberts classification of alveolar crest defects (1983)[2]

Class 1: Bone deficiency in horizontal direction

Class 2: Bone deficiency in vertical direction

Class 3: Deficiency in both horizontal and vertical direction

Hammerle and Jung classification of crest defects in fresh extraction sockets[3]

Class 1: Intact bone wall around socket

Class 2: Socket with marginal dehiscence or fenestration of buccal bone after one month of extraction

Class 3: Large dehiscence in buccal wall after tooth extraction.

Objectives of treatment: To establish sufficient availability of bone for safe and predictable implants and get adequate bone thickness around implant.

To get 2mm of bone on buccal side and avoid complication around functional implants.

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Bone augmentation therapy:

Melcher 1976 developed the concept of use of barrier membranes to guide the biologic process of wound healing.[4]

Nyman et al 1982 observed that exclusion of soft tissue invasion of defect by barrier membrane allowed regenerative potential cells to migrate to site. [5]

Principle of Bone Regeneration

Scaffolding: The fibrin clot that forms initially after wound formation acts as a scaffold.

Protection of clot-according to Schenk et al 1994,this is important for formation of granulation tissue and bone formation.[6]

Space creation beneath membrane-To completely isolate the defect to be regenerated.

Cell exclusion-to prevent the ingrowth of epithelial cells and fibroblasts into wound.

Factors assisting in wound healing:

1. **Primary wound closure promotion-**there should be passive and tension free wound closure.
2. **Enhancement of cell proliferation and differentiation-**to provide blood, nutrients and oxygen to tissues acting as a source of angiogenesis and osteogenic cell.
3. **Protection of initial wound stability and integrity.**

Barrier membrane: Non resorbable-e-PTFE membrane requires a second surgical intervention to remove them.

Hammerle and Jung 2003(3) reported that e PTFE barriers have demonstrated more favourable results when compared to resorbable devices due to their ability to make space, long barrier function, lack of resorption.

Resorbable:

a. Synthetic membranes include polylactide, polyglycolic acid, Cargile membrane, vicryl mesh etc.

b. Natural collagen membrane

Bone Graft

Nature of ideal bone graft should be:

1. Easily conformable.
2. It should not promote ankylosis.
3. Easily available.
4. Should activate osteogenesis and cementogenesis.
5. Innocuous.
6. Biocompatible.

Materials available for bone grafting: Based on properties like osteogenicity, osteoinductiveness, osteoconductiveness and their combinations various materials are used for bone grafting

On the basis of their origin, they are classified into natural and synthetic material.

Natural materials: Autograft, allograft, xenograft

Synthetic materials

- Alloplast are synthetic materials. These were developed to overcome problems like disease transmission associated with autografts and xenografts. Example-synthetic hydroxyapatite, tricalciumphosphate, bioactiveglass, dicalcium phosphate
- Autografts are obtained from the sites within the same individual.They can be cortical, cancellous or combination of both.
- Allografts are harvested from members of same species. These are mostly prepared as fresh, frozen,froze-dried,mineralized and demineralised.
- Xenograft are derived from the species other than humans. They are considered to be bio-compatible and have osteoconductive properties. Commonly used are bovine bone grafts and coralline calcium carbonate (obtained from a natural canal, rites).

Currently, BMPs (Bone morphogenic proteins) are being researched and developed as they have the ability to differentiate osteoprogenitor cells into mineral forming osteoblast and stimulate vascular proliferations.

Choice of bone graft material: Xenografts have slower resorption rate demonstrated better preservation of socket walls than for small bone defects requiring horizontal bone augmentation, use of xenografts and

alloplasts have given better results than nongrafted site.[7] For horizontal and vertical defects, block grants are better.[8]

Ridge augmentation procedures

1. **Ridge preservation:** Vignotelli et al 2012 reported that any therapeutic approach that is immedietly carried out after extraction aims to preserve architecture of socket and provide maximum bone around implant.[9]
2. **Ridge split or expansion:** Increases lateral bone width.
3. **Vertical ridge augmentation:** GBR, onlay bone block grants, distraction osteogenesis.
4. **Horizontal bone augmentation**
5. **Bone regeneration in extraction wound.**

Newer technologies

Cell therapy: They can accelerate edentulous ridge regeneration through primary to mechanism.

a. Cells used as carriers to deliver growth or cellular signals.

b. Provision of cells are able to differentiation into multiple cells types to promote regeneration.

c. Collagen tubes with bone and hydroxyapatite (**Gongloff RA** 1992)[10]

d. Growth factors-To increase bone volume

Example PDGF

BMPs

e. Computer based application is scaffold design and fabrication.

f. Scaffolding matrices to deliver cells and genes.

Conclusion

There are technical and biological limitation that continue to challenge implant dentistry. However,ridge regeneration procedureshave become predictable with various available technique and biomaterial that are key to success rate.

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Oral Piercing Fascinations and Complications

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Abstract

Oral piercing is one of the very popular body art among younger generation. Piercing considered as a growing phenomenon in Western culture also reflects all the fashion, risk, daring, independence or sexuality whereas other people do it on impulse and to enhance perceived body image or for spiritual reasons. The aim of this paper is to present the local and systemic complications and the usual effects of oral piercing.

Keywords: *Oral piercing, Complications, Dentist recommendations*

Introduction

"Piercing" is a term which is a practice usually done without anaesthesia in order to pop in the jewellery on a site which gets drilled through needles into the skin.[1] Now society has begun to be broader minded with open self-expression that most of us nowadays come across different forms of body arts. Oral piercing is one of the very popular body art among younger generation. Piercing considered as a growing phenomenon in Western culture also reflects all the fashion, risk, daring, independence or sexuality whereas other people do it on impulse and to enhance perceived body image or for spiritual reasons. Oral and peri-oral piercing has now became exceptionally popular in industrialized countries are also associated with religious, tribal, intellectual or sexual symbolism.[2,3]

Oral piercing sites: Tongue, lips and cheeks are the most popular oral piercing sites. Based on the arithmetical absence of most important vessels or nerves, such as the midline of the tongue or lip, oral piercing site is chosen and done without local anaesthesia. Jewellery consists of studs, barbells or hoops made of stainless steel, 14-18 carat gold, titanium or niobium. The jewelleries should be removable. There is the demanding popularity of tongue and lip piercing, where there is insertion of jewellery into soft oral tissues including the lips, cheeks and tongue and rarely uvula.[4,5] It is found that the most prevalent oral piercing site is tongue which is typically pierced in the midline and just anterior to the lingual frenum.[6]

Down the line, dentistry as well as dental treatments are one of the needed aspects of a healthy normal life, fashion aspects and aesthetics are also getting incorporated into it. Dentistry have developed into box fashion where more than normal aesthetic plus smile enhancing procedures are getting incorporated which include oral piercings, dental tattoos plus tooth jewellery. The aim of this paper is to present the local and systemic complications and the usual effects of oral piercing. This article also help to enhance the awareness of generalpublic toward oral piercing in addition to significance of dental professionals are important in the prevention and treatments of the most regular infections developed from oral piercings and in the treatment of the sequels connected.

History of oral piercing: The ancient Aztecs, Mayans, and tribes of the American Northwest pierced their tongues. Religious rituals performed by shamen and priests and their purpose are to communicate.[7] During the Epic of Mahabharata: masked as Brahmin, Krishna asks for gold in donation where as Karan proves his worth by donating his gold filled tooth which indicates the reality of dentistry even around 2500 BC, where defective teeth were restored with gold.[7] Around 700 BC Piercing tongue was first done by the Mayans and later. But in 1521, the Spanish conquistadors reached on the

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American continent and they wiped out the practice of tongue piercing ofthe Aztec people.[8]

Transition of piercing into mainstream: Oral piercing gained popularity in the 1970's. Piercing becomes more widespread form of body art with self expression in the society trends and was also glamorized by the media. In 1992, first case tongue piercing was recorded in western medical literature.[8] Unlike many other piercings, the appearance of tongue piercing in current times has deep sexual connotations.[8] Even today also in many parts of the world lip piercing has been practiced for thousands of years. The members of the ethnic grouptribal people as a sign of great beauty and their ownership,wooden plugs into the lips of women were inserted by the men of the African Makololo tribe.[9]

In tongue splitting process literally a person's tongue is splitted into two halves which resembles a "forked" like appearance. For splitting tongues lay people used various primitive techniques like without anaesthesia, scalpels are used followed by a cauterizing pen, or fishing line may be threaded through the pierced tongue and pulled forward.[5,8]

Varieties of Piercing used in the mouth: Frequently applied oral and perioral piercings are captive-bead ring, labret and barbell. The captive bead ring opens at the end of which is screwed as a metal ball and also widely used as the first piercing in the labial area. This captive bead ring is easy to maintain and it does not create any early edema.[10, 11] The lip piercing is usually applied on the lower lip near the corners of the mouth where the lips meet but it can be made anywhere on the vermillion border.[12] Inside the oral cavity the site for tongue piercing can be on the dorsal-ventral or dorsal lateral side, but dorso ventral is the most common and safer among them. Proper care should be taken while piercing as tongue piercing is commonly made in the middle of the tongue which requires the avoidance of major blood vessels during the procedure.[13] Another type of piercing is tongue frenulum piercing which is done through the frenulum underneath the tongue and is also known as the frenulum linguae.[14]

In the cheek portion of the face, piercing is usually done at the level of the dimples ahead of the first molar to minimize the risk of damage of the Stensen duct, which opens in the vestibule in the correspondence of the second upper molar. According to statistical data, the tongue piercing is very less documented with complications as compared to the cheek piercing which is associated with frequent complications. Piercing studios are inspected every 2 years in Texas and are subject to more frequent inspections depending on the number of complaints against the establishment. No formal license or CPR certification is required of the piercing artist. [12, 15]

Common side-effects of oral piercing[16-21]: During X-ray examinations Oral and perioral piercings must not be worn as they produce radiopaque areas thus the piercings must be removed.

Localized horizontal bone loss in or perioral piercings.

Bone dehiscence has been reported in various studies due to constant contact between jewellery and mandibular gingival.

Stimulation of salivary flow (sialorrhea) due to piercings in the oral/perioral cavity has been observed up to 63% in various studies.

Adverse effects of oral piercing[16-22]: Because of the presence of piercing jewellery inside the oral cavity and especially on the tongue, there is a disturbance in normal functioning that hampers chewing, phonation and speaking and distorts the pronunciation of certain sounds, e.g., "s", "sh", "th", "ph", "t" or "v".

Digestive or respiratory disorders:The jewellery can be ingested or aspirated in piercings with barbells, labrets or rings, because of incorrect fixing, poor handling during placement or exertion of high pressure,

Magnet piercing has higher risk of ingestion. There is now substantial controversy that has arisen over the need to take out oral piercing during surgery under general anaesthesia.

Short Complications of oral piercing: Infection and bleeding at site on piercing is common of aseptic procedures are not followed. Inflammation or swelling of the tongue after piercing is very common with severe pain. Severe cases lead to serious breathing difficulties. Excessive bleeding may happen if blood vessels are split within piercing process. [22]

Long term complications

a. Infection

b. Prolonged bleeding

c. Pain and swelling

d. Chipped or cracked teeth

e. Injury to the gums

f. Nerve damage

g. Hypersensitivity

h. Blood-borne diseases

i. Endocarditis

j. Ludwig's angina

k. Cerebellar brain abscesses

Influence of tongue piercings on speech received only little attention. Studies reported speech difficulties during the first days or weeks after piercing. [23-25]

Adolescent and Young Adults and Trend in Piercing: Firoozmand LM et al observed that the use of oral piercing among students aged 14-18 years was 3.6% where as Bosello R et al found that tattooing and piercing among adolescents is 4% and 24% respectively by. 19 years old remains the mean age of an individual having his tongue pierced and around 49 adolescent children have their oral piercing in five high schools of New York. Students from state schools have more number of oral piercings than those from private schools. According to a MEDLINE search which is conducted by Lester B et al revealed that tattoo prevalence ranging from 10% in adolescents to 25% in 15-25-Year-old. Mayers LB found 50% of University undergraduates to have some type of piercing. Levin L et al observed in a study in the age group of 18–24 years that 81 patients are having some form of oral piercings.[26-32]Life span of oral piercings

Oral piercings can stay in your mouth indefinitely providing your mouth remain free of infection as well as do not interfere with normal function. But at the early sign of pain or problems, be very sure to visit your dentist immediately.[21]

Advice for those who choose to pierce: Piercing should always be done is in a safest place which should be a well equipped professional like studio with all sterilization and infection control procedures. All individuals whoever will be doing the oral piercing upon themselves should enquire for a public health services inspection certificate and should looked into all the sterilizing procedures such as an autoclave sterilizer and disposable items such as gloves and swabs must be there. Jewellery and all devices must be stored in sterilized packages. There should be enough knowledgeable studio staff should be present to answer questions and explain the procedures required for preventing post piercing complications.[22, 33]

Dentist recommendations after oral piercings: If you have oral piercings then some mandatory instructions must be followed to lessen the complications. Good quality plastic jewellery is preferable than metallic ones. Remove jewellery before joining any sports and before sleeping. After having a piercing, regular to visit dentist in every six months is mandatory to monitor any potential damage to lips, teeth and gums.[22]

Conclusion

In this fast modern and cosmetic world, oral piercings are a growing trend now and is getting incorporated to dentistry. Having adequate knowledge to provide quality care to such patients and to educate the patient about the possible complications of oral piercings prior to the procedure is important in our ever-more-cosmetic society. As compared to other practitioners dental professionals can provide better awareness of the adverse effects with closer follow-up of patients with oral and perioral piercing. Therefore, individuals with oral/perioral piercing should do a visit to the dentist in regular interval for oral examination to detect early detection.

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Growth Hormone Disorders and its Oral Manifestations

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Abstract

Hormones are organic substances that are mainly produced by the endocrine glands and are secreted into the blood stream directly. Human Growth Hormone (HGH) Somatotropin is a peptide that stimulates growth, cell production and cell generation in humans and animals and is of importance in development of humans. Individuals with growth hormone deficiency develop pituitary dwarfism with delayed growth of skull and facial appearance for their age. There is a marked effect on oral and facial structures due to the hypo and hyper pituitarism. Excessive action of the glandular epithelium of the anterior lobe leads to Hyperpituitarism and diminished functional activity of the anterior lobe causes Hypopituitarism.

Keywords: *Growth hormone, Disorders, Gigantism, Oral manifestations.*

Introduction

The endocrine system is made up of several endocrine glands that are located in different parts of the human body. Endocrine glands are sometimes called-ductless glands because they secrete their products directly into the blood or into the interstitial space. Endocrine disorders, apart from diabetes mellitus and thyroid diseases are uncommon. They are rare causes of oral disease, but occasionally oral changes can lead to their diagnosis. Hypersecretion of growth hormone results in gigantism or acromegaly, a condition associated with significant morbidity and mortality, while deficiency of growth hormone results in dwarfism, growth retardation in children, and the growth hormone deficiency syndrome in adults. This article aims at reviewing the various oral manifestations seen in pituitary gland disorder.

Somatotropin: Somatotropin is a Growth hormone composed of 190 amino acids synthesized and secreted by cells in the anterior pituitary (somatotrophs)[1]. It participates in control of several complex physiologic processes such as growth and metabolism.

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Growth Hormone and its Physiologic Effects

It has two types of effects:

Direct effects: Growth hormone binds to its receptor on target cells. Adipocytes have growth hormone receptors. The growth hormone stimulates the adipocytes to break down triglyceride and thereby supresses the ability to take up and accumulate circulating lipids[2].

Indirect effects are primarily mediated by insulin-like growth factor-I (IGF-I)[3].

Effects of somatotropin on Growth: Growth is a complex process, and requires the coordinated action of several hormones. Growth hormone has a direct effect on growth of bone by stimulating differentiation of chondrocytes. The major role of growth hormone is to stimulate the liver and other tissues to secrete IGF-I which in turn enhances chondrocytes stimulation and increases bone growth[4].

Effects on metabolism: Growth hormone has important effects on lipid,protein and carbohydrate metabolism. IGF-I is sometimes the critical mediator, and in some cases both direct and indirect effects are at play.

- **Protein metabolism:** growth hormone stimulates protein anabolism. This effect is reflected by increase in amino acid uptake, increase in protein synthesis and decrease in oxidation of proteins.

- **Fat metabolism:** Growth hormone increases the utilization of fat by stimulation of triglyceride breakdown and hence oxidation in adipocytes[5].
- **Carbohydrate metabolism:** Growth hormone serves to maintain blood glucose within a normal range. Sometimes administration of growth hormone stimulates insulin secretion, leading to hyperinsulinemia[6].

Control of growth hormone secretion: Many factors modulate the production of growth hormone secretion. Ex. Stress, sleep, nutrition, exercise, GH itself. Primarily controlled by 2 hypothalamic hormones-GHRH and somatostatinand a stomach hormone **Ghrelin**[7].

Disease States: Growth hormone deficiency and excess states relate to the importance of this hormone in normal physiology. Such disorders can be seen either in the hypothalamus, the pituitary or in target cells. There can be a deficiency state from a deficiency in production of the hormone nor in the target cell's response to the hormone.

The manifestation of growth hormone deficiency depends upon the age of onset of the disorder and can result from either heritable or acquired disease.

Hyperpituitarism: It results from hyper function of anterior pituitary. Under this heading we place Acromegaly and Gigantism.

Gigantism and its Oral manifestations: A rare condition characterized by abnormal growth in children. There is excessive growth and increase in height that is significant and more than average. Prognathic mandible, dental malocclusion,frontal bossing, and spacingin interdental region are the few oral abnormalities associated with this condition. Intra oral radiographs have shown hypercementosis of the radicular region[8].

Acromegaly and its oral manifestations: This condition is seen in adults. Pituitary gland produces excessive growth hormones leading to this condition[9]. Usually associated with a pituitary gland tumor, it is known as pituitary adenome. There is occurance of soft tissue swelling. Hands, feet, nose, lips and ears are enlarged. Unique featue is brow protrusion along with ocular distention (frontal bossing). Facial changes are large lips and nose, frontal skull bossing and cranial ridges, mandibular prognathism and overgrowth along with spaces between teeth. There is buccal tipping due to enlarged tongue.

Health problems can be seen as Acromegaly progresses. Its complications may include

- High blood pressure
- Spinal cord compression
- Vision loss
- Diabetes mellitus
- Cardiovascular diseases, particularly enlargement of the heart
- Sleep apnea

Hypopituitarism: Deficiency in hormone secretion by anterior lobe.

Pituitary dwarfism is a disease resulting when the body fails to use the pituitary growth Hormone (GH). In pituitary dwarfism anomalies of the dental apparatus from morphological profile and in terms of development are seen[10].

The maxilla and mandible of affected patients are smaller than normal and face appears smaller. Cranium and face develop slowly, face is small compared to Cranium. Frontal sinuses are underdeveloped. There is retardation in development of teeth and jaws. Retarded growth of the ramus causes failure in increase of the height of the mandible. There is reduced inter maxillary space and crowding of teeth[11].

Table 1: Overall picture of clinical features.

Pituitary Gigantism	Acromegaly	Hypopituitarism
Malocclusion	Large sized tongue	Wrinkles around eyes
Hypercementosis of radicular region	Mandibular prognathism	Crowding of teeth
Generalised spacing between teeth.	Malocclusion class 111	Delayed eruption of teeth

Conclusion

The oral cavity being in critical anatomical location has a role in many physiologic processes, such as digestion, respiration, and speech. In many instances, appearance of other symptoms or lesions at other locations is preceded by oral manifestations. Endocrinologist and dental practitioners must communicate with each other to for conducting diagnostic tests, compare the results

and monitor treatment plans, and prescribe medications that addresses the problems. The dental professional should be able to detect the pituitary disease and also the first healthcare provider to come across such patients.

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Scars in Orthodontics: A Review

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Abstract

Orthodontic treatment helps to establish a balance between functional harmony and an improved esthetics, yet, rendering such treatment comes across with potential risks in terms of both hard and soft tissue damage. Such potential risks to various hard and soft tissue damages may include–enamel demineralization, pulp degeneration, root resorption, gingival enlargement, lacerations, allergic reactions and Temporomandibular joint disorders, apart from the fact that the treatment procedure may fail in itself. All such potential risks should be considered and addressed while making the final decision to render orthodontic treatment on an individual. The benefits achievable from the treatment should outweigh the risks involved with it. The orthodontist, thus, should have a thorough knowledge of all the risk factors to which the patient gets susceptible and preventive measures should be taken accordingly. This article reviews the various risks that may be associated with orthodontic treatment and the ways to manage them.

Keywords: *Esthetics, root resorption, gingival enlargement, lacerations, risk factors.*

Introduction

Some of the concerns that make an individual seek orthodontic treatment includes–crowding, spacing and protruded teeth. While the orthodontist is able to address almost all of these concerns and also improve appearance, function and self-esteem of the patient, sometimes the orthodontic appliances also carry certain risks.[1] Some patients, in this context, are at more risk than others and have to be identified early to manage them accordingly.

The treatment process itself causes pain and discomfort to the patient, along with probable damage to the hard and soft tissues. Orthodontic scars may also sometimes manifest during or after treatment and has to be addressed appropriately to achieve a successful result.[2] A broad classification of the orthodontic scars has been given here. (Table 1)

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Various problems associated with different orthodontic scars

1. **Dental problems**

   a. **Enamel decalcification/White spot lesions:** During fixed orthodontic treatment, poor oral hygiene standards results in bacterial plaque accumulation around the orthodontic attachments and release acid.[3] This causes demineralization of the enamel surface. The early manifestation for such a lesion are white and opaque spots[4] (**Figure 1**) which, with further demineralization can progress to frank caries.[5] Their prevalence ranges between 2%–96%with the male patients being more susceptible than females.[6] The most common site is the labiogingival area of the lateral incisors where the lesions start clinically manifesting within first 4 weeks of treatment.[7] They are less common in the Maxillary posterior segments though.[8] The enamel demineralization scale is given in **Table 2**.

   Prevention: Oral hygiene maintenance is essential to prevent white spot lesions. In addition, use of anti-cariogenic agents such as fluoride application in the form of–0.05%

sodium fluoride[9], 1.2% acidulated phosphate fluoride[10], 0.4% stannous fluoride gel[11] and fluoride varnish[12] can be done for compliant patients. In case the patient is non-compliant, fluoride containing cements/bonding agents[13] and fluoride releasing elastomeric ligatures[14] are available.The use of such agents also prevents the colour changes to enamel brought about by composite resins for bracket bonding.

b. **Physical damges on enamel (Enamel wear/ Enamel fractures):** Enamel damage usually occurs from occlusal/incisal contact with ceramic brackets, followed in the order by metal and composite brackets. Thus, the incisal edges of the upper anterior teeth, buccal cusps of the upper posterior teeth and upper canine tips are the ones most frequently affected.[15] Other causes of enamel damage include– trauma from band seaterorband remover, large restorations with unsupported enamel cusps as well as debonding of both metal and ceramic brackets.[16]Zachrisson et al reported fractures in about 6% of the debonded or banded teeth compared to only 4% in untreated teeth.[17] Lau et al concluded that ceramic brackets make the teeth 9 to 38 times more prone for fracture compared to the metallic brackets.

These can be prevented by–restoring all carious lesions before the start of orthodontic treatment, avoiding direct contact between the orthodontic brackets and opposing teeth, and use of a night guard. Special precautions should be taken in deep bite cases, where ceramic brackets should not be used in the lower incisors until adequate overjet has been obtained. The same should be followed for bonding ceramic attachments on canines while they are in a class II relationship and maxillary incisors during retraction.

The debonding technique should be appropriate and aimed to break the link between the adhesive and the bracket. The residual bonding materials should then be removed with tungsten carbide burs at a low speed, followed by pumicing to prevent plaque accumulation. Ogaard and Field reported that horizontal enamel cracks are almost always associated with orthodontics.[18] Enamel erosions if present prior to orthodontic treatment should be recorded and they should be asked to avoid carbonated drinks and pure juices during fixed appliance therapy.

c. **Pulpal degeneartion:** Orthodontic forces are known to disturb circulation within the pulp, and especially so when a greater force is used or the force is applied for a longer time. Although this leads to a reversible or transient pulpitis and loss of vitality is rare, yet it is advisable to only apply light forces to bring about tooth movement and the pulp should be monitored every 3 months to check its vitality.

d. **Root resorption:** Rudolf stated that orthodontic treatment makes a patient 20 times more susceptible to root resorption with the predilection being greater in females than males. Root resorption is more common in the incisors and the apical third is most commonly affected.

The root resorption can be classified into 3 types;

i. **Surface resorption:** These constantly appear as micro-defects periapically and repair normally by themselves when the inciting agent is removed.

ii. **Inflammatory resorption:** These occur when resorption has progressed into the infected pulpal tissue.

iii. **Replacement resorption:** Bone replaces the resorbed tooth surface causing ankylosis of the tooth.

The factors that influence root resorption include local factors such as–periodontitis, diabetes, allergy, agenesis, ectopia, traumatized tooth, and endodontically treated tooth. The systemic factors include–hypothyroidism, hypopituitarism, hyperparathyroidism, hyperpituitarism, hypophosphatemia and Paget's disease. Orthodontic reasons such as– heavy retraction forces using headgear, increased treatment duration and tooth movements like intrusion and torquing. (**Figure 3**).

Prevention: Root resorption can be avoided by rendering orthodontic treatment for a shorter duration and using light forces. Care should also be taken to avoid moving the roots into cortical bone.Periapical radiographs should be taken every 6 months and if root resorption is detected, then active treatment should be

suspended for 2–3 months.

2. **Periodontal tissues**

   a. **Gingivitis or Gingival enlargement:** Gingival inflammation is inevitable with almost all orthodontic procedures initially. The inflammation is greater in the interproximal areas than the facial surfaces and posterior teeth greater than anterior teeth.[19] (**Figure 4**) These, however, subside in a few weeks after debonding. Adult patients with their pre-existing periodontal condition and presence of systemic diseases such as–diabetes and epilepsy are at a greater risk. Phenytoin-based drugs can cause gingival hyperplasia. Treatment modifications should be–application of light forces, quarterly periodontal checks and routine scaling.[20]

   b. **Gingival recession:** Alveolar bone loss and gingival recession have often been associated with orthodontic tooth movement.[21,22] This is more common during the labial movement of the mandibular incisors, and due to the use of bands which are subgingivally placed.

   c. **Dark triangles:** These appear when crowded and rotated teeth are corrected orthodontically, and there is loss of periodontal attachment resulting in open gingival embrasures.[23]

   These can be prevented by following proper oral hygiene instructions while making use of adjuncts like–sonic electric toothbrushes, interproximal brushes, chlorhexidine and fluoride mouthwashes etc. If they have already developed, then reshaping the proximal surface and moving the contact point more apically too finally close down the space would help.[36,37]

3. **Soft tissue damage:** Intraoral and extraoral soft tissues can be damaged in the following ways:

   a. **Direct damage by removable or fixed components:** Removable appliances are used to carry out minor orthodontic corrections or as retainers following fixed orthodontic treatment. These appliances make the patient susceptible to tissue injury from wire components–clasps, springs, retractors. Allergy to unpolymerized material of acrylic resin is also a risk with these appliances. Sharp edges from the acrylic should be carefully rounded off to prevent trauma.

   During Fixed appliance therapy, archwires, brackets and bands cause lacerations and ulcerations of the gingiva and oral mucosa. This happens due to the rubbing of the lips and cheeks with the appliance. Such trauma can be prevented by using dental wax, rubber tubing etc. while also carefully rounding off sharp edges of the appliance.

   Transpalatal arches: The use of transpalatal arch may cause trauma to the tongue, palate and lingual mucosa if adequate clearance is not given during their fabrication.

   Headgears: Headgears can also cause injury if they get dislodged during sleep or while playing. The inner bow of the facebow is usually contaminated with microorganisms and any eye injury with it would lead to serious infections. Safety precaution would be to properly disengage the strap of the headgear before removing the facebow.[24]

   Loops and utility arches: Tissue impingements with these may result in tissue hyperplasia around the loop which may later require surgical excision for removal.

   Accidental ingestion of appliance parts: If the accidentally ingested parts reach the gastrointestinal tract, it has a 90% chance to be passed off uneventfully. However, any tracheobronchial obstruction would result in coughing, dyspnoea or choking and call for its immediate removal.

   Burns: Procedures like–acid etching, electro thermal debonding and hot sterilized instruments have the ability to inflict thermal or chemical burns and appropriate care should be taken while using them.

   b. **Indirect damage by allergic reactions**

   Nickel: Hypersensitivity to Nickel is present in 30% of the general population with a predilection for females.[25] They may manifest symptoms while undergoing orthodontic treatment with wires, brackets, bands and headgear which contain nickel. Intraoral signs may include–metallic taste, numbness, loss of taste, burning sensation, soreness at the lateral borders of the tongue, erythema, gingivitis even without plaque, and angular cheilitis.[26,27] For such symptoms to manifest intraorally,

however, nickel concentrations have to be very high. In patients sensitive to nickel, epoxy coating of the wires are recommended.

Latex: Latex allergy is manifested most commonly in the gingiva and tongue of sensitive patients while using latex gloves, intra and extraoral elastics and elastomeric ligatures.[28-30] In such patients, use of steel ligatures and self-ligating brackets can be promoted. The treatment plan should be modified to avoid use of class II or class III elastics for traction unless non-latex elastics are made available.[46]

c. Soft tissue complications related to implants[31,32]: The microimplants provide excellent skeletal anchorage and their ease of use makes them comfortable to the patient. However, they can bring about the following complications:

i. Inadequate primary stability if the cortical bone thickness is less than 0.5 mm with a low trabecular bone density.

ii. Trauma and ulceration to the soft tissue overlying the implant is likely. This can be prevented by covering the implant head with a layer of composite or a piece of wet cotton.

iii. The gingival tissue around the implant may get inflamed causing peri-implantitis. Thus, maintenance of a high level of oral hygiene using 0.2% chlorhexidine mouthwash is necessary.

iv. Delayed mobility of the implant occurs if forces beyond 450 N is applied. Such screws then have to be removed and replaced.

v. Lateral forces during miniscrew removal or partial osseointegration on being left in the patient's mouth for a very long time may result in implant fracture.

4. Miscellaneous

a. Temporomandibular joint problems: Orthodontic treatment should aim at producing occlusal harmony while eliminating centric prematurities and non-working contacts during mandibular excursions. Any failure to achieve this would result in TMJ disorders.

b. Cross-infection: Infections spreading between patients, between the doctor and patient or by a third party should be prevented by using masks, gloves, sterilized instruments and a clean working area.

c. Infective endocarditis: Patients suffering from endocarditis would require antibiotic coverage for procedures like–extraction, separator placement, band placement and band removal following consultation by a cardiologist. It is preferable to use bonded attachments in these patients in order to avoid separators and bands.

d. Cytotoxicity of polymers: Cured orthodontic bonding resins still leach chemical components which interferes with atmospheric oxygen to compromise the polymerization. Thus, excess bonding adhesives should be removed from teeth using scalers.

Table 1: Classification of orthodontic scars

Orthodontic scar	Associated problems
1. Dental problems	a. Enamel decalcification/White spot lesions b. Physical damages on enamel (Enamel wear/Enamel fractures) c. Pulp degeneration d. Root resorption
2. Scars of Periodontal tissues	a. Gingivitis/Gingival enlargement b. Gingival recession c. Dark triangles
3. Soft tissue damage	a. Direct damage by removable/fixed appliances and their component parts: i. Impingements–by lingual arch, loops, archwires, brackets and bands ii. Lacerations–due to brackets, molar tubes and ligature ties iii. Ulcerations–due to brackets, molar tubes and ligature ties iv. Injury to eyes–by headgears, facebow injury b. Indirect damage by allergic reactions to: i. Nickel ii. Latex c. Soft tissue complications related to Implants i. Primary mobility ii. Ulceration of overlying soft tissue iii. Periimplantitis iv. Delayed mobility and failure v. Fracture during removal
4. Miscellaneous	i. TMJ problems ii. Cross infection iii. Cytotoxicity of polymers

Table 2: Enamel demineralization scale

Scale	Enamel demineralization
0	No enamel opacity or surface disruption
1	An opacity without surface disruption, or mild demineralization
2	An opacity having a roughened surface, or moderate demineralization
3	An opacity requiring a restoration, orsevere demineralization

Figures with Captions



Figure 1: Post-debonding photograph showing areas of enamel decalcification



Figure 2: Colour changes integrated to usage of composite resins for bracket bonding



Figure 3: Radiographs showing Changes in the root apex due to orthodontic treatment



Figure 4: Gingival inflammation after placement of fixed appliance

Conclusion

Iatrogenic damage during orthodontic treatment can occur from innumerable sources. However, patients with severe malocclusion would benefit more from treatment and hence show a greater motivation. The benefits should be weighed against the risk factors involved to decide the course of treatment for each individual patient. A discontinuation of treatment before its completion would leave the malocclusion worse than it was before treatment.

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CAD CAM Nasoalveolar Molding and its Recent Advances

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Abstract

Among the various congenital craniofacial defects, one of the most common congenital craniofacial defect is cleft lip and palate. Its treatment requires a group of doctors whose primary motto is to restore the normal form and function of the patient by reconstructing the nasoalveolar segments. Before the reconstruction, the impaired tissues should be stretched and the ill positioned structures should be positioned in their actual place before surgical treatment. In patients with cleft lip and palate, nasoalveolar molding helps to develop the nasal deformity with a stent or prosthesis and this has to modified because of the continuous growth of the individual leading to change in size of the dentoalveolar region or there might be some improvement in the cleft. During the modification the stent has to be placed on a new plate. This requires long patient appointments or multiple appointments. To minimize the long and multiple appointments, few studies have been done and a quick chair side procedure for the nasal stent exchange has been introduced, which is referred to as Rapid NAM. The CAD/CAM NAM and its advanced version Rapid NAM drastically improved the height of the cleft-nasal side and a considerable symmetry of the nose was achieved. The quick lock technique reduces the wire adaptations as the previously used prosthesis or stent can be made to use again. This advanced technique is a combination of the CAD/CAM technology and the conventional components of NAM.

Keywords: *Cleft lip and palate, CAD/CAM, Nasoalveolar molding.*

Introduction

Nasoalveolar molding was started by Grayson et al. By one week of birth, the nasoalveolar molding is done and generally, it persists till the first lip and nasal reconstruction. Firstly, a simulated model of the defective dentoalveolar region is made which is one the important aspect of the treatment. The nasoalveolar molding appliance is made physically by methyl methacrylate polymer from the simulated model.[1] Due to growth, there are certain changes which requires frequent adjustment to eventually mold the dentoalveolar region into an approximately exact position they should ideally be placed. Extraoral taping and combined nasal stent allows a more structured orientation of the soft tissue structures such as the deformed nose and lip. With more and more development in this field, the conventional presurgical infant orthopedics has been now a days done in combination with the new approach of NAM appliance. Nasoalveolar morphology has conventionally been measured by detecting landmarks on a 2D photograph to make different measurements. In the recent times, computers have led to the rise of better and refined means of evaluation. A sur-face laser scanner was used to capture 3D denture images, and *x*, *y*, and *z* coordinates were digitized to analyze and compute the morphologies.[1,4]

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CAD CAM Nasoalveolar Molding: The simulated planning of the nasoalveolarmoulding is easily attainable by the sequential production of casts and the 3D printed nasoalevolar appliances that are designed digitally, after the introduction of CAD/CAM technology in orthodontics. 3D simulated models can be manipulated with the help of CAD/CAM technology for performing and visualizing the treatment plan along with the evaluation of the outcomes of the respective treatment.[1-2,5]

Quan et al. modified the conventional nasoalveolar molding technique in cases with unilateral cleft lip and palate with the help of CAD technology. In the last 10 years, the CAD/CAM development has taken the science from a world of visual-tactile simulated protype models to a world of touch-understand-influence.[2] There was a study regarding the analysis of the anatomic changes in the cases of unilateral cleft lip in maxilla following a CAD/CAM nasoalveolar appliance. The 3D prototype model which was designed digitally was evaluated by the reverse engineering software system. The study revealed that the computer aided nasoalveolar therapy markedly decreased the alveolar cleft gap and the length of the arch. The alveolar defect width and the sagittal length of anterior region of the arch was also reduced with nasoalveolar molding. Few other studies have also cited the same results as the above. The deviation in the midline due to the cleft was also fixed with the CAD NAM. The non-affected side of the maxilla was adjusted by reducing the bulge and the rotation in the outward direction. the alveolar contour was also modified as the growth of the patient continued.[2]

Rapid NAM: The plate is frequently modified due to the changes in the maxillary bone as a result of growth. The stent is fabricated again with the modifications after the fit and retention of the plate is checked on the maxillary arch. Thus,there is frequent as well as long appointments which may lead to the apprehension that nasoalveolar molding is a long treatment procedure. Therefore, a refined version of CAD/CAM technique is developed, known as RapidNAM, which acts a semi automation of CAD/CAM NAM. The aim of the developers was to alter the already existing CAD/CAM technique for the production of molding plates. This allows a faster chairside modification of nasal stents thus lessening the time taken for the treatment procedure. This technique is a combination of the conventional and the well-known characteristics of the nasoalveolar molding with the benefit of additive fabrication (Figure 1).[3]

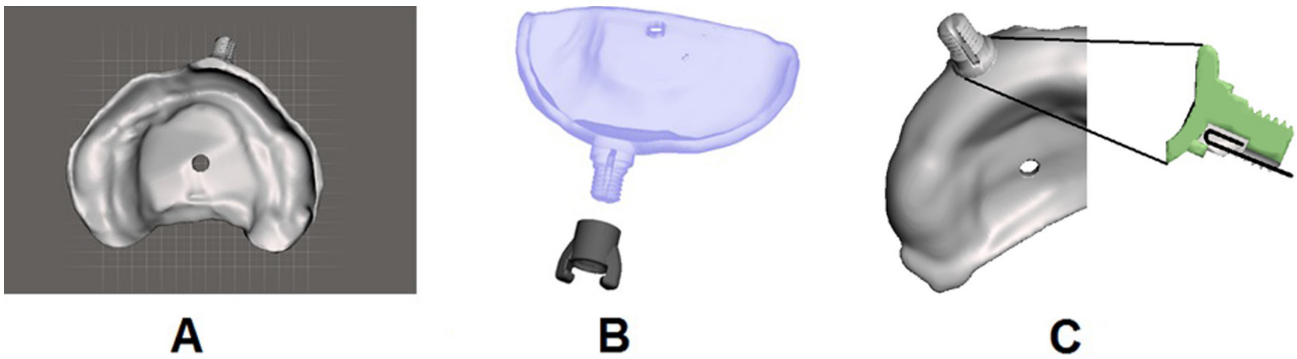


Figure 1: (A) Virtual "Rapid NAM plate" along with the retention pin and screw thread (B) Respective nut with retentions for the buccal tapings (C) Caudal view of the retention pin with the retention groove and profile view

Measurements: In a study where both the techniques were compared, the plaster models designed digitally were physically measured by using the software "Python (Python software foundation, version 2.7, Netherlands; The scientific Python development environment, Spyder developer community, version 2.3.4)" based on the landmarks selected. The following points on the nasal area were chosen by two different observers. "AB, AB' indicates alar bases, NT for nasal tip, SN for subnasal point, CA denotes the most anterior point of the columella and NT, NT' top and NB,NB' bottom of the nostril on the unaffected and cleft side, NL,NL' and NR.NR' indicates the inner rim of the both nostrils. The columella angle was denoted by the angle formed by the lines crossing through AB, AB' and Sn; CA" For a generalized evaluation of the previously known CAD/CAM-technique and Rapid NAM, plaster models of CAD/CAM-NAM-treated children were digitally evaluated again using the same reproducible landmarks in both treatment groups (Figure 2).

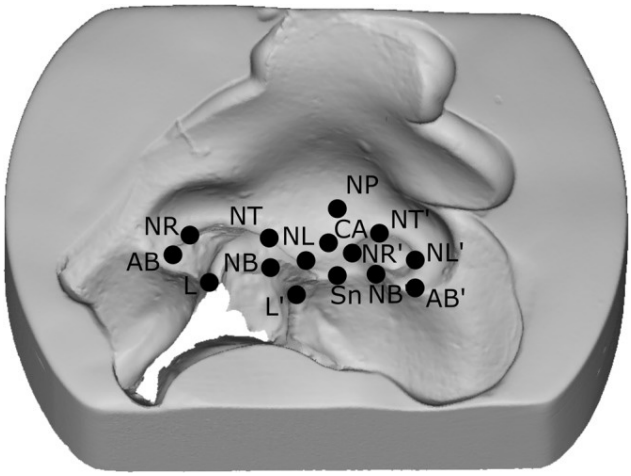


Figure 2: Selected landmarks

Still many studies and discussions are going on regarding thepost treatment outcome related to the nasal esthetics and functional improvements. Nasoalveolarmolding therapy has also showed improvement in the nasal symmetry and thus led to the reduction in the frequent surgeries. A study was done and designs oftwo nasal stents were evaluated. One stent was made by the conventional "CAD/CAM" molding plates and the other was made by semi-automated "RapidNAM" plate design. The techniques used were the result of the conventional Nasoalveolar molding with the usual wire activation, despite distinct plate and retention pin designs. The wire permits accurate positioning of nasal bulb. The outcome of study indicated that both the techniques markedly improve the nostril position on the cleft side with height increase of more than approximately 75% as compared to the non-affected side on the other nostril. The angle of the columella was significantly increased in both the groups, however the starting values varied between both the groups. The columella increased in length by 55% in the CAD/CAM group but in the RapidNAM group it was 31%. When the results were evaluated at the end in total, they were matching with the results of the other studies. The goals of NAM that are the nasal symmetry improvement, lengthening of the columella and the nostril height increase and increasing the columella angle, have all been attained. Further surgeries performed to close the lip will again correct some amount of the nasal symmetry left and few authors have suggested to do over correction in this aspect to prevent the chances of relapse (Figure 3)..[3]

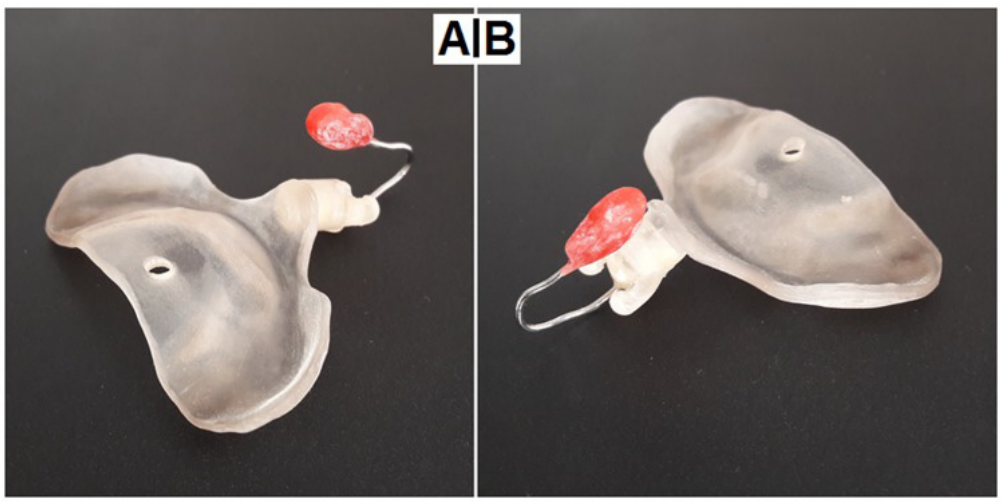


Figure 3: (A) Dorsal view of the "RapidNAM plate" with the nasal stent attached (B) Frontal view of the "RapidNAM plate" with the stent attached

The benefit of the new pin and the nasal stent design is easy modification and fabricationwhen a new plate is fabricated. This technique overcomes the traditional CAD/CAM techniques which required physical manipulation of stent parts or attachments. As the RapidNAM plates consists of a pin having same measurements, an already fitted nasal stent can be eliminated by unwinding the screw and can be relocated on to the new plate fabricated. Before the actual complete usage of the nasal stent, the wire length taken should be long enough to cause activation during the course of the treatment with no need of the stent exchange. This retention technique can be fabricated manually by experts in CAD/CAM software and thus this overcomes

the low availability of this system through the world. After the designing, the retention pin can be placed virtually upon the intraoral molding plates with a "Boolean operation". 3-dimensional photography aids in the recording of the soft tissue relationships, particularly the various movements of the face for an appropriate placement of the pin in the case where the pin is designed later. More efforts are made to place the pre-fabricated stents of various dimensions and loop angles. Based on the clinical cases, the exact size can be selected and the required modifications can be done rapidly thus saving a lot of time of both the patient and the doctor. Also, to avoid the frequent manipulation of the resin pattern, the retentive 180-degree knee will be refined.

Conclusion

The combination of the "CAD/CAM" system for the frequent NAM plate fabrication in the cleft treatment signify a distinct field with a high potential ability. This work is the first step in a case including the self-automation with a less usage of manpower for the NAM therapy in pre surgical cleft lip and palate treatment. "Geomagic studio" allows easy designing of the plates is simple. The final plate adaptation has to done intraorally in the infant. The following steps will be to combine the 3D growth factor and also for the frequent fabrication of "NAM appliances" to refine the planning of the virtual NAM treatment. This area needs further studies and research in its software and the programming steps.

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Ethical Permission: Approved

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Endodontic Sealers: Current Concepts of Sealers

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Abstract

The main objective of root canal treatment is the total removal of the microorganism the invaded the root canal system of the tooth. The three-dimensional sealing of the root canal system is achieved by the root canal sealers along with solid core material. The main part of this sealers is to adapt the rigid gutta percha to the canal walls, and to fill the voids, accessory canals. In endodontic treatment, Sealers plays a very important role in the outcome of the procedure, because of its perfect combination of sealing ability and biocompatibility with the root canal system. This article explains briefly the current concepts related with the usage and recent concept of endodontic sealers in root canal treatment, along with evaluation between different types of sealers properties.

Keywords: *Root canal treatment; three-dimensional sealing; endodontic treatment; biocompatibility.*

Introduction

The complete root canal treatment procedure depends on various phases of the treatment such as removal of microbial contaminants, cleaning and shaping of the root canals and the actual sealing of the root canal. The accomplishment or the failure of this whole procedure be contingent mostly on the accomplishment of the final phase that is the sealing of the root canal system. The main components are the solid core material and the sealers, they also consider as true implants as they are basically placed in the vital tissues of our body. The most commonly used solid core material is the gutta-percha, which occupies the majority of the canals, and the root canal sealers which fills the interface between the core material and the dentin wall, the voids and the accessory canals are also filled with the sealers and hence they provide more support and strength to the restoration[1].

The properties of an ideal sealer are to create a bond among the solid core material and the dentinal surface of the root canal, to prevent leak. It should have a nontoxic nature and can also enhance the healing procedure in the periapical lesion.

A various variation of endodontic sealers isaccessible commercially, they differ from each other in matter of composition from each other. It is recognized that the three-dimensional sealing properties of the root canal has the major clinical standing for the long-term achievement of endodontic treatment. While some of the clinical outcomes have been described with the practice of these non-bonding root canal sealers, but there is unremittingexploration for some alternate sealers or procedures that helps in better bonding of the endodontic sealers with the canal wall dentine as well as with the core materials[2,3].

Classification of Sealers: The various types of sealers that are available now commercially in markets are Zine oxide eugenol-based sealers, Epoxy resin-based sealers, Silicon based sealers, MTA based sealers, Calcium silicate phosphate-based bio ceramic sealers, Methacrylate resin-based sealers, Calcium phosphate-based sealers. These endodontic sealers are classified historically according to its eugenol content, usage, absorbance etc[4].

Recent Endodontic Sealers

Proroot Endo Sealer: It is a calcium silicate-

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based root canal sealer that is planned to be used with root filling material. Powder components–tricalcium silicate, dicalcium silicate, calcium sulphate as a setting retardant, bismuth oxide as a radio pacifier, tricalcium aluminate in small amount. Liquide components water-solublepolymer. This sealer on reaction with water also produce calcium hydroxide[5].

Herbal Sealer: Its type of a copaiferamultijuga oil resin. These trees are basically found in north America mainly in the amazon rainforest.

Nanoseal Plus Root Canal Sealer: The most shared problem in root canal treatment is the incapabilityto seal the accessary canal of the roots. One of the modern updates in the endodontic dentistry is the expansion of the first nanotechnology based endodontic sealer. This type of sealer is very useful as it seals the tiny gaps and therefore prevents infection. Its composition is basically calcium phosphate hydroxyapatite nanoparticles ranging from 40-60 nm. Its special charactersare this sealer penetrate the wall (dentinal tubules) and arrive of the accessory canals the seals the gaps effectively[6,7].

Hybrid Root Seal: It is accessible in the market in powder and liquid form, it is the fourth-generation self-adhesive dual cure sealer. It can be used with gutta percha or resilon as it is insoluble, radiopaque material.

Gutta Flow 2 Sealer: It stands the cartilage form of the original gutta flow sealer. It is the choice of sealer because of its excellent flowable nature. Later gutta flow 2 was introduced, which has a slightly better enlargement after mixing which helps in better sealing. It is available in the syringe form[8].

IROOT SP/Endosequence BC Sealer: It has the capacity to form hydroxyappetitethroughout the setting progression and produce a chemical bond amongst dentine wall and the sealer.It is expedient, ready to use, injectable white cement paste development for enduring root canal filing and sealing application. This sealer is also termed as bio ceramic sealer in general.

The Concept of Monoblock: Franklin R. Tay is the first one to defined the concepts of Monoblock in endodontics.

Primary Monoblock: It is a type of a simple, one surface bonding. Hydron sealers is another example of this concept. The main drawback of primary Monoblock is the lack of strength and stiffness that is necessary for a perfect sealing, due to this reason the development of secondary Monoblock is taken into account[9].

Secondary Monoblock: It is a type of a two-surface interface bonding material. The simple case for a secondary Monoblock is the bond between the sealer material with the canal walls and the gutta percha during obturation. In this type there is one bond between the gutta percha and sealer and another bond are between the sealer and root canal walls.

Endodontic Sealers are Compared: Orstavik has given some of the limitations that can easily evaluate the different properties of endodontic sealers[10].

Leakage: The main property that matters in an endodontic sealer is leakage it is the key factor for the failure of the root canal therapy. It provides a barricade that prevents bacterial opening from the oral cavity. Zine oxide-eugenol sealer, methacrylate-based resin sealers are found to be most effective.In bacterial leakage test of sealers Epiphany and resilon were superior to gutta percha and various other sealers, it has been reported that it provides instantaneous coronal seal[11]. Instantaneous coronal seal gives clinically advantage,since the canal can might be exposed to oral environment and can be re-contaminated to bacterial environment.Weller et al suggested the newly introduced sealer that is calcium silicate based pro root endo sealer that has a better sealing property then ZOE-based sealer[12].

Biocompatability: Its principle requirement of the endodontic sealer is it should be non-cytotoxic and immunologically well-matched with outlyingtissue. ForSelection of a sealer for dental restoration, the biocompatibility and antimicrobial property is an important factor that should be taken in consideration. Calcium hydroxide-based sealers encourage calcification but energeticallyitsnegotiations the restoration seal. Glass ionomer sealers may bond with the tooth structure perfectly but it also promotes the announcement of prostaglandins in periapical tissue[13].

Antibacterial Activity: Now a days the properties of antimicrobial activity as its primary property is not taken into account, but most of the sealers has some such properties.The new cohort sealers are also proved their antimicrobial worth of a widerrange[14].

Conclusion

The degree of endodontic success is directly proportional to a clinician's knowledge of the root canal

anatomy and the techniques selected while performing treatment. Properly performed endodontic therapy is the cornerstone of restorative and reconstructive dentistry. Three-dimensional sealing of the root canal is one of the main goals of endodontic treatment to prevent the reinfection of the canal and for preserving the health of the periapical tissues, thereby ensuring the success of root canal treatment. Thus, several types of endodontic sealers have been recommended to achieve this goal. It is important to note that not only the apical seal of the root canal but the coronal seal is of equal importance for the success of endodontic treatment. Ideally, further directions should focus on materials that penetrate the patent dentinal tubules, bind intimately to both organic and inorganic phases of dentin, neutralize or destroy microorganisms and their products, predictably induce a cemental regenerative response and strengthen the root system.

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Bite Mark Analysis in Dentistry: An Emerging Probe of Criminal Investigation in Judicial System

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Abstract

Bitemark analysis is now-a-days an emerging tool used by dentists for criminal investigation purpose. In spite of a number of method used for bitemark analysis, 3-Dimentional method of analysis is the most reliable and commonly used method. Bitemark analysis process includes registration of both bitemark from the victim and the assailant's dentition, comparison of the bitemark and dentition and inspection of similarities and dissimilarities. Forensic Odontology is defined as the branch of dentistry which in intertest of justice deals with proper handling, examination and comparison of dental evidence and presentation of dental findings.

This article discusses about the highlights of importance and method of bitemark identification in judiciary system.

Keywords: *Bite Mark Analysis, Forensic Odontology, highlights of importance and method of bitemark analysis, Assailant dentition.*

Introduction

According to Mc Doland (1974) mark formed by teeth either alone orin combination with other parts of mouth like tongue[3]. By Beckstead (1979)-imprints caused by the cutting edges of teeth on an object due to closing of the mouth[4.] In cases of sexual assault bite marks are commonly seen in specific body parts as in neck, genitals and breasts. Also in cases of violent fights and child abuse bite marks can be seen on buttocks, shoulder, arms and other areas like that on thighs. Hence cross-matching of bite-marks to an potential assailants dentition may aid the judicial system by solving the criminal cases.

Thus, in order to consider bite-marks as an reliable record of identification requires analysis of a set of peculiar dental features which include[5]; Shape and size of each tooth, Missing tooth, Maxilla-mandibular relationship, Form of the dental arch, Mesiodistal measurement of tooth, Any dental anomalies like as mesidens, paramolars, diastemas, rotation, peglateral, buccoverted or linguoverted and many more.

Classification of Bite-Marks:

Based on Origin[6,7]:

1. Animal bite Marks-caused due to biting of animals.
2. Human bite marks-inflicted by humans itself.

Based on manner of causation[6,7]:

1. **Criminal-**bite-marks seen in any criminal cases of sexual assault or child abuse. They are of two types.
   a. **Offensive bite-marks-**bite-mark made upon the subject by the assailant.
   b. **Defensive bite-marks-**bite-mark made upon the assailant by the victim.
2. **Non-Criminal bitemark-bite-**marks caused by own self or others, eg. Love bites.

Based on the etiology: (by Mc Donald in 1974)[8:]

1. **Tooth Pressure Marks-**bite marks caused by the incisal edges of the anterior teeth.

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2. **Tongue Pressure Marks-**caused when ample amount of soft tissue is taken in mouth, the tongue presses it against the hard areas of mouth like the lingual aspect of tooth and the rugae.
3. **Tooth Scrape Marks-**bitemarks due to the irregularities in teeth caused due to fractures or restorations.
4. **Complex BiteMarks-**it is combination of all the above types of bite marks.

Based on the degree of indentation and borders of the bite marks (by Shashikala K in 2003)[9]:

1. **Haemorrhage:** bite marks with a small bleeding point.
2. **Abrasion:** bite marks on skin without any damaging of the overlying skin.
3. **Contusion:** Bite-mark on skin appearing as a bruise due to rupture of the blood vessels.
4. **Laceration:** almost near to damaging of the skin.
5. **Avulsion:** bite marks showing removal of the overlying skin.
6. **Artefact:** bitten off piece of the body.
7. **Clearly Defined-**bite mark resulting from the application of a small magnitude of pressure.
8. **Obviously Defined-**bite mark caused by the application of first degree of pressure.
9. **Quite Noticeable:** bite mark caused due to application of violent pressure leading to laceration of the skin.

Clinical Appearance of Bite-Marks:

Characteristically, human bite-marks appear as a round or oval mark with a central area of contusion bruise or ecchymosis caused by the mandibular and maxillary arches, where ecchymosis being the result of the tongue pressure.[10]

Common Location Sites for Bite-marks: Bite-marks can be found on any body parts with specific sites associated with specific type of assault. According to Pretty and Sweet, in feminine gender bite marks are usually found on the breasts, shoulder and lower extremeties (mostly on inner aspect of thigh) as result of any physical or sexual assault.[2]

In cases of male child abuse, bite marks are usually seen on the genital areas. But as for cases of adult male sexual assaults bite marks are commonly found on phalanges, fore arm, shoulders, as a result of fights in his defense.[11] Also self caused bite marks in adults and adolescence age group people are commonly seen on the inner aspest of Hand.[12,13]

Evidence collection in Bite-mark Analysis: Saliva swabs: A cotton swab wettened with distilled water is used. This hydrates the dried cells in the bitten region. The swab is then dried for about half an hour at normal room temperature and then kept in labelled packets and stored at a temperature of 4^0C in order to prevent DNA rupture and microbial growth.[2]

Double Swab Technique: In this technique first the bitten site is wettened using a wet cotton swab with sterile saline, then drying the bitten site using another dry swab. And both the cotton swabs are sent for the bite-mark analysis.[14]

Bite-mark Photograph: Immediate photographs of the injury sites should be taken because rapid changes occur in appearance due to healing. Both colour and black and white pictures should be taken from various angles.

2 types of photographic views which are used are[2]:

1. Orientation images: depicts the location of bite marks on the body.
2. Close-up images. Images of the bite-marks are taken using chromic photographic films and high resolution cameras.[15]

Impressions of the Bite Injury: Material of choice for impression making is Vinyl Polysiloxane.[16] *Transillumination of the excised bite*-mark in the deceased subject.[17] *Test Bites.*[16]

Method used in Bite-marks Analysis:

1. **Direct Method:** In this method, direct comparison of bite marks on the skin of the subject is done with the dental casts and images obtained from the potential assailant.[18]
2. **Overlays:** Overlays are colourless transparent acetate sheets used to transfer information from the dental cast. Overlays are then used to compare the cutting edges of the assailants bite-mark photography.[2]

3. **3-Dimensional Comparison:** this is one of the most reliable method used now-a-days for bite-mark analysis. This is done using 3-D overlays and geometric morphometric analysis. This method is completely machine controlled.[19]

Softwares in Bite-mark Analysis:

1. **Adobe-Photoshop-Software:** widely used software in bite-mark analysis.[2]
2. **Dental-Print software:** developed by the Dept. Of Forensic Medicine and Forensic Odontology; University of Granada.[20]

Concluding Statements in a Bite-mark Analysis:

By Levine and American Board Of Forensic Odontology (ABFO):[2]

Definite Biter: medical certainty+ bitemark pattern similar to assailant dentition.

Probable Biter: degree of specificity with assailant teeth > matching points

Possible Biter: non-specific match.

Not a Biter: not at all consistent.

Conclusion

Bite-mark analysis, being a newer aspect of Forensic Dentistry, needs to be established as a potent and reliable probe of investigation in the judiciary system. But due to not so advanced technologies and errors while collection of evidence and its analysis and comparison, sometimes results in wrongful accusation of the innocent leading to incorrect verdict in a criminal investigation. Hence it is the utmost need of the time that standard criterion should be developed for evidence collection and comparison of the bite marks.

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Alloys Used in Fixed Prosthodontics: An Overview

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Abstract

Various types of metals have been used in dentistry, since ages. The properties, manufacturing process, reaction within the oral cavity are to be studied by the clinician to decide a treatment for the patient. Alloys are made of two or more metals. The basis of mixing two metals is to obtain a product that has improved properties, ideal for utilization. Alloys are used as filling materials like amalgam. They are used for all-metal fixed partial denture casting; metal sub-structure for ceramic-veneered fixed partial denture casting;removable partial denture framework casting; in implant body, fixture, component fabrication by manufacturer. The most commonly used alloy now is cobalt-chromium-nickel alloy. This article is a short overview about some commonly used alloys and their applications such as silver-palladium, cobalt-chromium, cobalt-chromium-nickel and also titanium alloys. These are a few among the various alloys formulated. A thorough knowledge about these materials and their properties are necessary by the clinician to obtain a desired outcome. This article shall also highlight the new trends being observed in alloy selection.

Keywords: *Alloy;Casting alloys; Mechanical properties; metallic materials, dentistry, properties.*

Introduction

Alloys are used in fixed prosthodontics for crown, bridge, coping and framework fabrication. These materials are selected on the basis of their reaction in the oral cavity and their mechanical properties. Alloys are a combination of two or more metals in molten metal. Single metals are not used clinically because the properties are not conducive for the physical, chemical and mechanical challenges provided by the oral environment. According to Glossary of prosthodontic Terms, "alloy is a mixture of two or more metals or metalloids that are mutually soluble in the molten state; distinguished as binary, ternary, quaternary, etc., depending on the number of metals within the mixture; alloying elements are added to alter the hardness, strength, and toughness of a metallic element, thus obtaining properties not found in a pure metal; alloys may also be classified on the basis of their behavior when solidified."[1]

Dental service can be rendered by a team of dentists, dental assistants and dental lab technicians with the help of dental materials. Metals are indirect restorative dental materials. The primary goal of dentistry is to maintain or improve the oral health of the patient, which includes a variety of dental materials. Dental casting alloys must satisfy certain criteria, which must be a balance of factors that influence its application. It is therefore important to know the properties of dental materials, in order to understand their behavior in the oral cavity and predict the outcome of the patient's health.

Review of Literature: Metallic alloys being used in dentistry have been classified according to presence of noble metals in them. Highly noble alloys contain precious metals like Gold, Silver, Palladium, etc. and are used used for full-metal prostheses, Metal substructures for ceramic layering and also partial denture framework. These contain higher percentage of gold. Noble metal alloys such as Silver-palladium alloys contain precious metals also, but the percentage of precious metals are lower. These alloys are mostly used for substructure and full metal fixed dental prostheses. Predominantly base metal alloys including cobalt-chromium, cobalt-chromium-nickel, titanium alloys are also used for full-metal prostheses, Metal substructures for ceramic layering and also partial denture framework.

Four most common alloys have been discussed in the following:

Gold alloys: Gold is one of the oldest metals used in dentistry. Gold has been used in fabrication of inlays and onlays; post–cores; crowns and bridges; implantology also. Earlier, casting was the major process for gold fabrication. " Lost wax technique " is employed in casting. Nowadays, galvanoforming is also being utilized for gold. Mostly, gold sub-structures for ceramic layering are prepared for fixed prosthesis, utilizing electrolysis process. This method makes the gold framework or sub-structure fracture-resistant, as compared to those fabricated by traditional casting method.[2]

Silver-palladium alloys: This alloy contains precious metals other than gold. Zinc, copper, Manganese, etc. are added to improve the strength of the alloy. Castability and ceramic-binding properties are improved by adding ruthenium and indium, respectively. This material is grey in color due to its silver content.[3,4] These are used for mostly as sub-structure material.

Cobalt chromium alloys: This is a base-metal alloy. The use of Co-Cr-based alloys for metal ceramic applications was first mentioned in the 1959 Weinstein patent for dental porcelain. This alloy is very economical, though it requires technical set-up for being casted. These are used for Removable Partial denture framework casting, for metal substructure; metal prosthesis for fixed dental prosthesis. This alloy was first called " Stellite" due to its metallic luster.[4,5]

Cobalt-Chromium–Nickel alloys: These alloys have been launched in the 1950's. Their typical chemical composition is: 40% Co, 20% Cr, 15% Ni, 15.8% Fe, 7% Mo, 2% Mn, 0.16% C and 0.04% Be. They have excellent resistance to corrosion and tarnishing. Hardness, yield strength and tensile strength are the same as for stainless steel, while the ductility is higher in softened condition, but it is less after hardening. In addition, it provides the corrosion resistance and allows the elasticity and toughness to alloys. However, nickel is not completely safe for the patient's health, especially for the female population, because it can cause allergies and dermatitis.[4,5]

Titanium alloys: Titanium has been the most popular metal in dentistry for use in implants. Pure form of titanium has also been used in restorations and have been fabricated by casting procedure. A special type of ceramic is being used for the same because it requires less fusion temperature. Titanium to ceramic bond is still questionable as the bond-strength is lower than Nickel chromium bond with ceramic. But, shear strength is better than Gold-ceramic bond.[6,7,8]

Discussion

In-vitro studies on nickel-chromium and even gold alloys conclude that there have been traces of cytotoxic materials being released into the oral cavity. Pure gold is non-toxic in nature. But, gold alloy may release some harmful substances. Thus, gold should not be considered completely bio-compatible by practitioners.[9]

There are multiple options in nonprecious or basemetal alloys for prostheses fabrication, other than those used for implants. Titanium alloys and Cobalt-chromium alloys have the advantage of being corrosion-resistant in the complex oral environment. Research for new materials are being done for better materials.[6,10] Titanium is now being viewed as a versatile material and many studies are being done to prove the same.Its properties make it conducive not only for implantology, but also for use in removable and fixed dental prostheses fabrication. Among all metallic dental materials available, titanium alloys are very much preferable due to better properties and their biocompatibility.[11,12]

Conclusion

With so many materials and newer ones coming up, the dentist should have in-depth knowledge about alloys; their properties; composition of the indicated alloy. It is preferable to use materials that are backed by research and are produced by trust-worthy manufacturers. Knowledge about any allergic content or proper evaluation of patient-history should be done before prescribing a particular material for a patient. Accordingly, instruction should be given to the laboratory technician. Co-ordination of knowledge and application can bring out desired results.

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Cantilever Fixed Dental Prosthesis on Periodontally Treated Abutment: A Case Report

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Abstract

Cantilever fixed dental prosthesis is a popular choice of treatment in ideal cases with missing lateral incisors, after implants. Prosthodontic evaluation of edentulous area and abutment teeth/tooth; periodontal evaluation and endodontic evaluation of abutment teeth should precede the treatment planning. This article is a case-report of a rehabilitation of a missing lateral incisor with cantilever fixed dental prosthesis following periodontal therapy of canine which was used as abutment tooth.

Keywords: *Biomechanics, Crown-To-Root Ratio, Mobility, Periodontally Compromised Dentition.*

Introduction

According to Glossary of Prosthodontic Terms," cantilever is a projecting beam or member supported on one end cantilever bridge. Cantilever fixed dental Prosthesis is a fixed complete or partial denture in which the pontic is cantilevered and retained and supported by one or more abutments."[1] Goldfogel and Lambert described the design for cantilever fixed dental prosthesis for replacing missing maxillary lateral incisor, with canine as abutment. [2]

Various factors determine the success of these kind of prosthesis. Periodontal condition of abutment tooth is one of them. Besides, prosthodontic factors, periodontal factors should be evaluated for proper treatment planning which would lead to good prognosis of the cantilever prosthesis.

Clinical Report: A forty-two years old female patient reported in Department of Prosthodontics and Crown & Bridge, Institute of Dental Sciences, Bhubaneswar with the chief complaint of missing right lateral incisor and she wanted replacement of the same tooth. Patient also informed that she was conscious even to smile and speak because her front tooth was missing. The reason for tooth loss was trauma. Period of edentulism was for more than five years and patient was using a temporary partial denture for more than two years. There was no relevant medical history. The intra-oral examination was done. Figure 1 shows the pre-operative Ortho Pantomo Graph. There was missing maxillary right lateral incisor and presence of generalized deposition of plaque, calculus, extrinsic stains with periodontal pockets in some regions. Figure 2 shows the pre-operative photograph of the patient. Thus, she was referred for periodontic consultation.

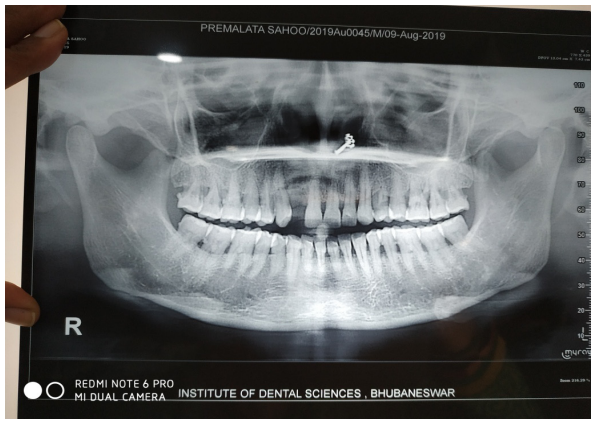


Figure 1: Pre-operative Ortho Pantomo Graph

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Fig 2: Pre-operative probing depth of maxillary right canine

On examination, the patient had minimal deposits with generalized subgingival calculus in the first quadrant. Bleeding on probing was present with respect to all the teeth in the first quadrant. The upper right canine was found to be grade II mobile according to Glickmann's classification and slightly mesially drifted with a 8mm deep periodontal pocket on its distoproximal aspect. On examination of the rest of the sites of the first quadrant, generalized periodontal pockets were found. The first premolar had a pocket depth of 5mm on both the disto and mesioproximal aspects, the second premolar had a pocket depth of 5mm interproximally, first and the second molar with a pocket depth of 6 mm each interproximally. Endodontic consultation was taken to rule out any pulpal pathology. Radiographic evaluation revealed generalized horizontal bone defect extending upto the middle third of the root with generalized radiopacity in the interproximal areas suggestive of flecks of subgingival calculus. There was no medical or family history associated. Patient had no adverse habits like smoking, drinking or parafunctional habits like bruxism or tongue thrusting. Patient had a history of extraction of the lateral incisor in the first quadrant (time period). A preliminary diagnosis of generalized Stage III Grade B Periodontitis was made according to 2017 World Workshop Periodontology. Clinical pictures were taken and it was decided to begin with the phase I periodontal therapy which included scaling and root planing followed by oral hygiene instructions which included brushing technique. Once the Phase I therapy was over, patient was recalled after 4 weeks for re-evaluation of plaque, calculus and loss of attachment. On reevaluation after 4 weeks it was found that there was persistence of residual pockets and loss of attachment. However, the patient's oral hygiene was maintained with minimal plaque and calculus. Therefore, the decision to initiate phase II periodontal therapy was taken to gain attachment as the primary objective. Open flap debridement using Kirkland flap was done under local anesthesia. Osteoplasty was done to achieve proper bone contour. Then the flap was re-approximated and sutured with 4-0 Mersilk sutures. Post surgical instructions were given to the patient and medications were advised to the patient and the patient was recalled after 1 week for suture removal. The sutures were removed after a week, and the patient was placed on a maintenance and recall program, which included a recall visit every 2 weeks for first 1-month followed by every 3 weeks for 3 months postoperatively. At the end of three months 5mm of attachment gain was seen with respect to the canine with no mobility and an attachment gain of 3mm was seen with respect to the other teeth in the quadrant, as seen in figure 3.



Fig 3: Post-operative probing depth of maxillary right canine after 3 months follow-up

Patient was then referred to address the chief complaint in department of prosthodontics. All the treatment options ranging from Removable dental prosthesis, fixed dental prosthesis and also implant therapy was also explained to the patient. Occlusion was found to the canine-protected. Implant therapy option was eliminated because patient did not find it economical. Since, patient was using a removable prosthesis, she informed that she was unsatisfied with the same and wanted a fixed option. She was explained about conventional, cantilever and resin bonded bridge. A conservative approach for the treatment was followed. A canine-supported cantilever prosthesis was finalized, as canine has the longest root and the improved periodontal condition of the the canine also improved the prognosis.

The edentulous area classification had Siebert's class 2 defect. Vital tooth preparation for porcelain-fused to metal crown was done in 13 with shoulder finish line, under local anaesthesia. Alginate impression was made for provisionalization and final fixed denture prosthesis. Shade of prepared tooth structure and adjacent tooth was selected. Self-cure, tooth colored provisionals were prepared in the institute laboratory immediately. Occlusal adjustments were done with occlusal contact of the lateral incisor pontic with the opposing tooth and they were luted with Zinc-oxide eugenol cement. Patient was recalled after 7 days for the final prosthesis. The bisque trial was done. Occlusal adjustments with articulating paper was made and labial contour was checked. Then, the prosthesis was glazed and luted with Glass Ionomer Cement. Post-insertion instruction were given to the patient and she was recalled for a follow-up after 24 hours and 7 days. **Figure 4 and 5 show the post-operative pictures**. Patient had esthetic demand and was satisfied with the treatment outcome.



Fig 4: Labial view after luting of final prosthesis



Fig 5: Labial view after luting of final prosthesis

Discussion

Canine has the longest roots. This is the reason why canines are being used as abutment for cantilever prosthesis to replace missing lateral incisors.[3] The crown–root ratio represents the bio-mechanical and periodontal status of the tooth. The crown-root ratio was adequate to provide support to pontic i.e. lateral incisor which is a much smaller tooth.[4,5,6, 7,8] Cantilever FDPs usually should utilize two abutments, but in case of missing lateral incisor, canine provides adequate support.[9,10] Ovate pontic was used because of its esthetics in anterior region and for maintenance of good oral hygiene.[11,12]

Conclusion

Cantilever prosthesis is preferred over removable prosthesis, as it is more comfortable to patient and is a fixed prosthesis, in all age groups. It requires less follow-up and comparatively less patient compliance. The periodontal condition and alveolar support of abutment teeth or tooth should be properly evaluated. Vital teeth/tooth as abutment are more beneficial than non-vital ones. Though, implants are the best options to replace single missing tooth, time and financial factors play an important role. There-fore, it is upto the clinician to conduct proper intra-oral examination with ideal abutment, crown-root ratio, periodontal condition, edentulous area for a good treatment outcome of the selected prosthesis type.

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Diagnosis of Impacted Canine: An Overview

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Abstract

Impaction of maxillary and mandibular canines is a frequently encountered clinical problem, the treatment of which usually requires an interdisciplinary approach. Surgical exposure of the impacted tooth and the complex orthodontic mechanisms that are applied to align the tooth into the arch may lead to varying amounts of damage to the supporting structures of the tooth, not to mention the long treatment duration and the financial burden to the patient. Hence, it seems worthwhile to focus on the means of early diagnosis and interception of this clinical situation. In the present article, an overview of the incidence and sequelae, as well as the surgical, periodontal, and orthodontic considerations in the management of impacted canines is presented.

Keywords: *Diagnosis, etiology, impacted canines, orthodontic techniques, prevention, surgical techniques.*

Introduction

The treatment of impacted teeth has caught the imagination of many in dental profession. However, the orthodontic/surgical modality has achieved the most satisfactory result in long-term. Order of teeth getting impacted: Mandibular third molar, Maxillary canine, Mandibular second premolar

Canine playing an important role in esthetics, being corner tooth of mouth and function deserves special attention for its impaction to be properly diagnosed and managed[1].

When Can A Tooth Considered To Be Impacted?: Under normal conditions, tooth erupts with a developing root and with approximately ¾ of its final root length. Hence in simple terms, a tooth can be considered impacted if its root is completed but still has not erupted. Applying this concept to maxillary and mandibular canines, they generally have their ¾ root completed by 11-12 yrs and 9-10 yrs respectively. According to Shafer, Hine and Levy, Impacted teeth are those which are prevented from erupting by some physical barrier in the eruption path[2]."

Incidence: Dachi and Howell reported that the incidence of maxillary canine impaction is 0.92%, and mandibular canine impaction is 0.35%. Asians present more of buccal canine impactions. Impactions are twice as common in females (1.17%) as in males (0.51%). Of all patients with maxillary impacted canines, it is estimated that 8% have bilateral impactions[3].

Etiology

Generalized Factors

Endocrine deficiencies,

Febrile diseases, and

Irradiation.

Localized factors

Tooth size-arch length discrepancies,

Prolonged retention or early loss of the deciduous canine,

Abnormal position of the tooth bud,

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The presence of an alveolar cleft,

Ankylosis,

Cystic or Neoplastic formation,

Dilaceration of the root,

Iatrogenic origin and

Idiopathic condition with no apparent cause

Theories Put Forth for Maxillary Canine Impactions[4,5]:

1. **Long path of eruption:** This theory was believed during the early days of Broadbent in 1940. This was the most common reason been given those days. Tooth had much to travel from floor of orbit to oral cavity, hence had greater chances of "losing its way".
2. **Crowding:** Acc. to Hitchson in 1956, crowding could have been the major cause for buccal canine impaction. He stated that developmental position of lateral incisor and 1st PM is palatal to line of arch, and the canines are the last teeth to erupt. Hence due to inadequacy of space end up in being blocked.
3. **Non-Resorption Of Root Of Deciduous Teeth:** Lappin in 1951 believed that it was failure of the resorption of root of deciduous teeth which led to palatal deflection of eruption path of permanent canine which led to its impaction. Many authors have done subsequent studies supporting spontaneous eruption of previously impacted canines, following extraction of deciduous canine. Critics of this theory state a simple clinical evidence–" presence and advancing eruption of the permanent tooth provides a stimulus for resorption, and a portion of root distant from unerupted permanent tooth may be unaffected by the process."
4. **Trauma:** Acc. to Brin et al in 1993 trauma to the permanent erupting canine by following ways could lead to its impaction.
   - May cause movement of lateral incisor
   - By conduction, movement of canine bud itself
   - Shortness of lateral incisor root, whose development ceased as a result of trauma.
5. **Presence of chronic irritation:** Fearne in 1988 correlated chronic irritation in the form of inflammation associated with deciduous canines as the reason for impaction.
6. **Peg Laterals:** Becker et al in a study done in 1981 found small lateral incisors were found to be 8 times more frequent and peg laterals 9 times more frequent in palatal impacted canine cases as compared with normal population. Anomalous small and peg shaped laterals develop much later than normal laterals.
7. **Guidance Theory of Miller:** Miller in 1963 found prevalence of impacted canines to be high with congenitally missing lateral incisors. Permanent canines lack the normal guidance provided by the distal aspect of lateral incisors.
8. **Heredity:** Zilberman et al in 1990 studied familial trends in palatal canines and anomalous lateral incisors and found that prevalence of small peg shaped and missing lateral incisors, late developing dentitions and other missing teeth among close relatives were very high in addition to palatally impacted canines.This states impacted palatal canines to have a genetic cause.

Complications of Untreated Impacted Canines[6,7]

A. **Morbidity of deciduous canine:** Root of the deciduous counterpart is resorbed and small leading to eventual mobility and shedding.Deciduous canines also exhibit high susceptibility to caries.

B. **Cystic change:** Loss of vitality of deciduous canine leads to development of periapical pathology at the root apex which being in close proximity with the follicular sac of erupting permanent canine communicates with it leading to its enlargement and ultimate result being an cystic change.

C. **Permanent canine crown resorption:** Long standing impacted canine as seen in the figure may lead to degeneration of the reduced enamel epithelium (REE), which brings the enamel in direct contact with the surrounding bone which generates an osteoclastic reaction leading to replacement resorption of the permanent canine. In few years the radio opacity of bone and the impacted canine appear to be almost same and indistinguishable.

D. **Resorption of roots of adjacent teeth:** Brin et al in 1993 studied the resorption of roots of lateral incisors adjacent to impacted canines and concluded the resorption to have rapid onset and an aggressive conduct.

Diagnosis: Impacted canines can be diagnosed and localized by following a routine clinical examination[8,9]

Inspection: Following points should raise suspicions of an impacted tooth: Non-appearance of permanent canine clinically by its eruption age. Presence of antimere. Presence of anterior spacing for a long period. Persistent median diastema. Abnormal morphology of lateral incisor or presence of peg laterals. Improper angulations of adjacent teeth.

Palpation: Bulge of per. canine could be palpated buccally above the deciduous canine 2-3 yrs before its eruption. It should be palpated deep above attached gingiva in the sulcus where mucosa reflects. Deciduous canine should be checked for mobility. Palpation should be done in abnormal locations after getting clue from inspection.

Radiography: After getting clues from inspection and palpation, next step would be to localize the impacted canine in order to plan a treatment[10].

Radiographs can be classified as

Periapical view: First simplest and most informative view

Advantages

1. Root development, pattern and integrity
2. Crown resorption
3. Root resorption of adjacent tooth
4. Minimum of surrounding tissue is exposed which increase accuracy and resolution.
5. Minimal radiation exposure

Disadvantage:

1. 2D picture of 3D object
2. Cannot determine bucco-lingual posn of tooth & vertical position of impacted tooth.

Maxillary anterior occlusal: Does not show exact cross section of anterior teeth making it difficult to find bucco-lingual position of impacted teeth.

Maxillary true (vertex) occlusal: X-ray beam runs parallel to long axis of incisors. It is possible to get cross section of anteriors. It allows for exact localisation of bucco-lingual position of impacted canines.

Maxillary true (vertex) occlusal ONG'S Projection: An alternative technique was given by Ong in 1994. Extra-oral technique for vertex occlusal view was given which had advantages:

1. to increase clarity
2. reduction in exposure was found due to use of intensifying screen.

Mandibular Occlusal: To determine bucco-lingual position of the impacted tooth in 2 regions:

1. **90° to OP**–cross-section of premolar, molar region
2. **110° to OP**–cross-section of incisor region

Lateral Cephalogram: Periapical views can be misleading to determine vertical position of canine. A lateral cephalogram gives an accurate location of canine in vertical and saggittal plane.

OPG: Chaushu et al in 1999 gave a method to localize the impacted maxillary canine using single orthopantomogram. When mesio distal width of canine crown was 1.5 times larger (i.e. 15% larger) than the adjacent central incisor, then the canine is palatally placed This is only true in cases where canine should not be at a higher level.

Tube shift technique or Clarke technique (Parallax Method)[11]: It was given by CLARK in 1909. It is based on binocular principle.

Disadvantage: In cases when canine is highly placed and Periapical film shows no superimposition of canine with the roots of erupted tooth or when superimposition is only in the periapical region the result may be misleading.

Vertical Tube Shift Method: Left canine is highly placed in OPG. In IOPA left canine moves towards apical 1/3 of lateral incisor. Left canine is labially placed, as it moves in opp. direction of tube shift.

Radiographic Views at Right Angles: Similarly any two views taken at right angles can help in 3-D localisation. For e.g. lateral cephalogram & a frontal cephalogram.

2. mandibular posterior periapical film & a true occlusal film.

CT Scan: The above mentioned plain film method are inadequate in fully describing 3D location and relationship to adjacent structures particularly in B-L plane and relation to adjacent teeth roots.

These shortcomings are taken care of by CT scan and newly introduced CBCT.

Disadvantage:

1. Expensive.

2. Increased radiation exposure than any other method.

Rapid Prototyping: In 2006 Faber et al published a new tool for diagnosis and treatment planning of impacted canines which made it possible to construct 3D prototypes of the impacted tooth and allowed to fabricate customized attachments for its traction.

Classification Of Palatally Impacted Canine[12]: Based on two variables:

1. Transverse relationship of the crown of the tooth to the line of dental arch which may be

   (a) Close

   (b) Distant (nearer the midline)

2 Height of the crown of the teeth in relation to the occlusal plane which may be

   (a) High

   (b) Low

Group 1: Proximity to the line of arch–close.

Position in the maxilla–low.

Group 2: Proximity to the line of arch–close.

Position in the maxilla–forward, low & mesial to the lateral incisor root.

Group 3: Proximity to the line of arch–close.

Position in the maxilla-high.

Group 4: Proximity to the line of arch-distant.

Position in the maxilla high.

Group 5: Canine root apex mesial to that of lateral incisor or distal to that of first premolar.

Group 6: Erupting in the line of arch in place and resorbing the roots of incisors.

Conclusion

The management of the severely impacted canine is often a complex undertaking and requires the joint expertise of a number of clinicians. It is important that these clinicians communicate with each other to provide the patient with an optimal treatment plan based on scientific rational.

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Cleft Lip and Cleft Palate: A Review

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Abstract

Cleft Lip and Palate is one of the most common facial deformity that occurs in 1 in 1000 newborns. This congenital deformity occurs mainly due to some defects in genes or is teratogenic or occurs due to some unknown cause. However, cleft lip and palate can be detected during 3rd week on the intrauterine life. It not only effects the aesthetics, speech and impaired hearing or feeding but also effects the growth of maxilla, proper functioning of the facial muscles, eruption of teeth and the arch form of the palate.

Keywords: *Cleft Lip, Cleft Palate, Embryology.*

Introduction

The first description of cleft lip and palate dates back to several centuries where it was illustrated in the form of oil paintings, drawings and sculptures. The first time ever cleft lip was illustrated in the field of medicine was in 1564 Abroise Pare, in which he showed pin and "figure of eight" suture in the treated patients of cleft. Clefts, particularly of lip with or without involvement of palate (CLP) that are non-syndromic, Isolated Cleft Palate (ICP), are the most common facial deformity that affect newborns worldwide. The large impact of this defectare on the growth of face, various roles performed by the structures and social incorporation which makes them the major health problem worldwide[1].

The environmental factors contributing to this anomaly has been proven but the genetic factors responsible for the development of this facial deformity is still been studied.

Epidemiology of "Cleft lip and Palate": Cleft lip affects more males and cleft palate affects more female. The occurrence of cleft lip and palate have been seen highly dependent onethnicity, which occurs maximum in Asian population and Native Americans, then in Caucasians, the minimum chance of occurrence is in African American populations. Unilateral clefts accounts of more 80% when compared to bilateral that accounts for merely 20%. In Unilateral Clefts, left side are more commonly seen[2].

Aetiology of Cleft Lip and Palate

1. Heredity (Genetic predisposition).
2. Lack of nutrition or impaired nutrition supply
3. "Physiologic", "Emotional" and "Traumatic" stresses during development
4. Impaired blood supply to the affected area
5. Mechanical disturbances (Tongue size may interfere)
6. Effect of certain drugs ("Aminopterin", "Cortison", "Thalidomide", "Anticancer Drugs" etc.)
7. Alcohol consumption during pregnancy
8. Radiation exposure
9. Lack of inherent forces that are responsible for development
10. Infection
11. Smoking during pregnancy

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12. Syndromes Associated with cleft lip and palate

    ("Down's Syndrome", "Wardenburg's syndrome", "Vande Woude's Syndrome", ":Orofacial digital syndrome", etc.)

Issues faced by the patients of cleft lip and palate

1. Issues with feeding: New born babies with "Cleft lip and palate" does not have the ability to form the mouth seal, so they cannot breastfeed or or use nursing bottles for feeding
2. Problems with speaking: Majorly, in the older age group with untreated "cleft palate" the words that requires the nose for pronunciation are not clearly heard. However, with speech therapy and early surgical intervention this problem is solved.
3. Problems associated with auditory canal: In "Cleft lip and Cleft palate patients" there is continuous collection and secretion of pus in the auditory canal, which results in impaired hearing abilities of the patient.
4. Orodental Problems: During the eruption of teeth in these patients, the teeth is aligned properly in the arches, due to which there is collection of food debris and plaque as the brush cannot approach such areas. This can cause periodontal problems and endodontic problems.

The best way to prevent these issues are surgical repair, regular therapies of the patient and also making the parents aware of the problems[3].

"Embryology of cleft lip and palate"

"The Cleft Lip": The 1st, 2nd and 3rd branchial arches has a contribution in the growth of the face, mouth and tongue. At 24th day of intrauterine life the" frontonasal process" can be appreciated, which is surrounded on every side by "maxillary processes". At end of 4th week there is a two-pronged oval-shaped thickening of the surface ectoderm (called as"nasal placodes") that grow on every side of the inferior part of "frontal prominence". After this, the relocation of neural crest cells into region of front-nasal and the area where the "maxillary prominences" will grow. It results in proliferation of the mesenchyme to proliferate at the margins of the nasal placodes, resulting in the formation of the horseshoe-shape "medial nasal process and lateral nasalprocesses[4]."

Now, the "maxillary process"grows medially and shortly move towards both the" medial nasal process" and "lateral nasal processes". After this, these three processes grow downward and forward but the way they interfere and harmonize is still not understood.[1.] The "maxillary prominences" now shows growth in the medial direction which pushes the medial nasal process in the direction of midline, and fuses with its matching part from the contrary side, eradicating the "fronto-nasal process", which occurs around 6th week of the intrauterine life. Along with this undergoing procedure the "medial nasal prominences" joins together and take the shape of the "inter-maxillary segment". This segment gives grows into the middle portion of the upper lip also called as "philtrum", as well as the primary palate.

When the "placodes" are placed close to the midline in an abnormal way, it could result in the formation of clefts on the face. Also when the medial nasal process and the lateralnasal process looses the ability to grow, it prevents its fusion and forms clefts in between itsderivatives.[2] In minor situations, the clefts may be restricted to the "vermillion border of the upper lip". In more major situations, the the tissue of the lip develops unilateral or bilateral cleft lip, and may sometimes engage the side of the nose (obliqueclefts)[5].

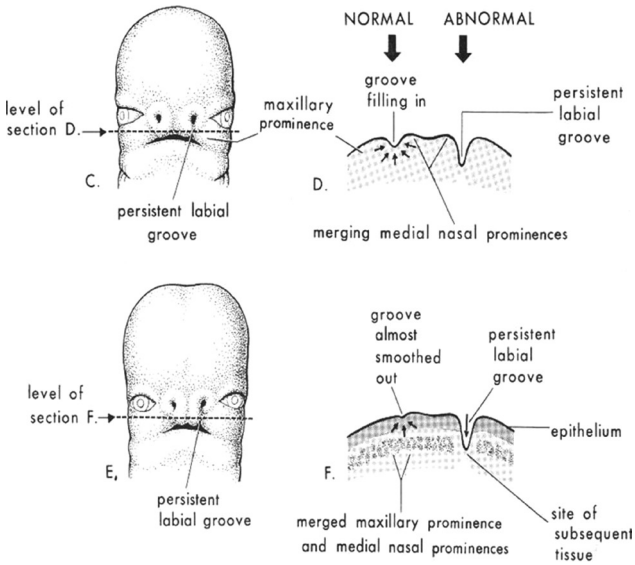


Figure 1. The development of "cleft lip"

"Cleft Palate": The initiation of development of secondary palate occurs at around 6th to 7th week of the intra-uterine life from the Secondary palate begins to develop in the sixth week from the projections of the maxillary processes, referred as the palatal shelves or lateral palatine processes. In the beginning, the shelves are positioned in the vertical direction on both the sides of the tongue that is still developing, however, with the growth of mandible in the downward direction, the

shelves acquire a horizontal position so that they can move towards each other. These shelves then fuse the with the primary palate. There are certain intrinsic forces that elevate the shelves, which are in turn are produced by the hydration of hyaluronan,[3]which are produced by the collagen fibers, the mesenchymall cellsand contractive forces within thepalate.

During the 9th week of the intra-uterine life the palate begins to fuse anteriorly, which on the 12th week of the intra-uterine life is completed with the posterior merging of the palate.During this undergoing fusion, there is epithelial apoptosis, immigration or alteration and results in mesenchymal permanence.[4.] The outer epidermal layer is shed off which occurs before there is fusion of the shelves and the basal epithelial layer is what remains behind. Shelves shows development in the direction of midline and each palatal shelf approaches towards each other and forms the midline epithelial seam, which is later on sloughed off., leading to convergence of these 2 shelves.

Alterations caused by"genes","mechanical", or "teratogenic" factors can occur at any of the step of palate development, and may result in a cleft palate[2]. The most important cause of the development of cleft palate is failure of tongue to descend and allow the "palatal shelves" to fuse. This occurs because of progressive action of "musculature", this includes, opening of the jaw and forward positioning of the tongue, and the way the lower jaw grows.

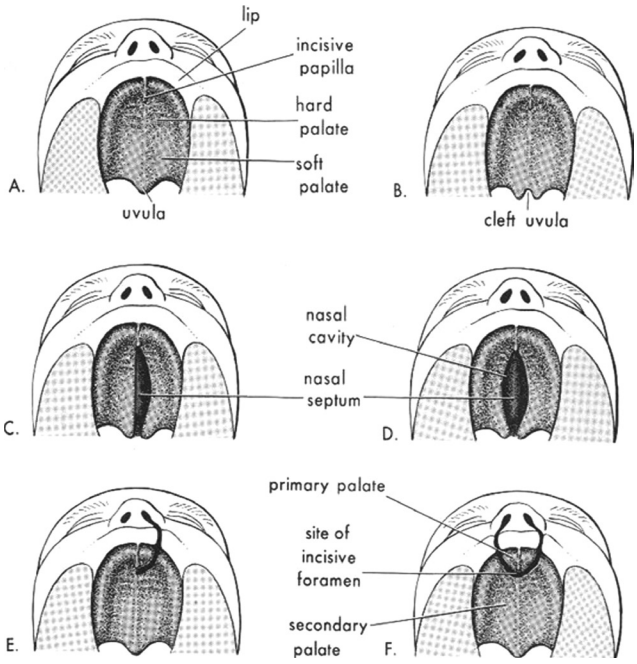


Figure 2. Development of "cleft lip and palate"

Diagnosis

Most cases of "cleft lip and cleft palate" are easily seen right after birth and doesn't need any tests for the diagnosis. However, the tests to confirm the presence of this anomaly is ultrasound before the baby is born.

Ultrasound before birth: A prenatal ultrasound is a test that uses sound waves to create pictures of the developing foetus. When we view the pictures, a doctor may observe a variations in the structures of the face."Cleft lip" may be diagnosed using ultrasound beginning around the 13th week of the pregnancy. As the foetus continues to develop, it becomes easier to diagnose the cases of Cleft Lip. However, the diagnosis of Cleft palate by the means of ultrasound is more difficult to diagnose using the ultrasound[5,6].

If prenatal ultrasound confirms the presence of cleft, your doctor may a ask you to undergo a procedurein which the sample of amniotic fluid from your uterus (amniocentesis)is taken. The fluid test may further confirm the presence of Cleft lip and cleft palate and various other inherited syndromes that can cause defects to the newborn.

Effects :f Clefting[7,8]

The Effect of Cleft Lip and Palate on the palatal arch form

There exists a stability between forces generated by the muscles of tongue and face.

a. The superficial zone of muscles, the orbicularis oris, buccinator, and superior constrictor muscles together form a ring which exhibit compressive forces on the palatal and mandibular arches as well as the teeth.

b. Tongue exerts the forces of expansion on the teeth and arches

The alignment of the teeth is determined by the above two factors.By cleft formation the ring of stability formed by orbicularis oris-buccinator-superior constrictor muscles changes the mechanism of force application which displaces the tissue masses.

Effect on Tensor Veli Palatini and Eustachian Tube: Due to clefting, the mechanism of action of tensor veli palatini muscle on the Eustachian tube (which is mostly dilatory) results in recurrent otitis media with effusion.[5.]

Effect on Teeth Eruption:

- Delay in dental development or tooth eruption
- Multiple supernumerary teeth
- The teeth that are present close to the cleft area are seen to erupt late when compared to the teeth that are resent away.



Figure 3. Cephalogram showing effect of clefting on dentition

Psycosocial Effects of Clefting: The patient of "Cleft Lip and Palate" who suffers from phycological or psycosocial problems are very difficult to identify. The surgery solves the aesthetics but the emotional damage done is very difficult to cure. The studies have been done in this field but are not so significant that can make us understand the reality behind this issue. More studies are required, in which the studies are done on the members of family and not only on the patient[9,10].

Treatment: Cleft lip and cleft palate treatment aims to improve ability of a child to eat, to speak and hear and to have a appearance of the face close to or absolutely normal.

A team of doctors and experts are required to completely treat the patients of "Cleft lip and palate", this team includes

- Surgeons: plastic surgeons or ENTs
- Oral surgeons
- Ear, nose and throat doctors (ENTs, also called otorhinolaryngologists)
- Pediatricians
- Pediatric dentists
- Orthodontists
- Nurses
- Specialists inn hearing and auditory
- Speech therapists
- Genetic counselors
- Social workers
- Psychologists

Surgery: Surgery in the correction of "Cleft lip and palate" totally depends upon the current situation of the child while he/she is undergoing surgery. After the "cleft repair" is done, the appointed doctor might recommend the patient to various following surgeries that helps in improving the speech and appearance of lips and nose[11].

The order in which the surgery occurs is as follows:

- Cleft lip repair – within the first 3 to 6 months of age
- Cleft palate repair – by the age of 12 months, or earlier if possible
- Follow-up surgeries – between age 2 and late teen years

The surgery occurs under General anaesthesia. Several various surgical procedures are available that are used to surgically repair "cleft lip and Cleft palate", to rehabilitate the areas that are affected (eg. Surgery to repair the ear tube) and also to prevent any issues that might occur after the surgery)[12].Surgery can significantly enhance aesthetics of the patient, quality of life, and ability to eat, breathe and talk.

Possible risks of surgery

Possible risks that might occur in patients after surgery. Some complications ate:

- Bleedingat the surgical site
- Infection of the treated area
- poor healing of the wound
- widening or elevation of scars
- and temporary or permanent damage to nerves, blood vessels or other

Conclusion

Orofacial clefts mainly cleft lip and palate is the second most common developmental anomaly affecting new born. For the proper treatment and restoring the normal profile of the patient, the deep study of the embryology plays very important role. Though, late treatment of it is possible but as early as possible the treatment occurs, it would serve to be the boon to the patients and family members. However, deeper study on the effect of cleft lip and palate on the psychology of patient and response of the family is required. The post surgical treatment should involve the speech therapy and the regular appointments of the patient and family members with psychiatrist for the moral upliftment. The entire team is responsible for the success of the treatment, the team includes: dentists (An orthodontist, endodontist and Oral surgeon), psychiatrist, actively participating family members and the always positive patient. The parents of the patient should keep a lot of patience, as the treatment time with proper result is long i.e. 18-19 years.

Conflict of Interest: None

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Altered Microflora in Orthodontic Patients

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Abstract

Oral/Sub gingival micro biota is always affected by Orthodontic therapy. Presence of appliances in the mouth might be accompanied with a higher incidence to caries and might cause inflammation of the periodontal tissues. Various researches have shown that the presence of orthodontic appliances in the oral cavity can alter the basic nature of dental plaque that would increase in the microbial population, mainly Streptococcus and Lactobacillus. It has been observed that fixed appliances causes difficulty in maintaining oral hygiene, due to which the sub ginival microbiota is also affected, since presence of appliance favors bacterial plaque to hold on to the surface. This leads to bacterial colonization that is accountable for the inflammation of the gingiva and also for the destruction of the periodontium and alteration in the enamel surface. Therefore, instructions for oral hygiene maintenance are essential in all cases of orthodontic therapy.

Keywords: *Oral micro biota, fixed orthodontic appliances, altered micro biota, oral hygiene.*

Introduction

Health of the periodontium is of utmost importance in all age group and needs proper examination before beginning with the Orthodontic therapy. Maintaining the periodontiumis one amongst many goals of the Orthodontist, which has led to the introduction of specific oral hygiene maintenance protocols for those undergoing orthodontic treatment.

Various studies have found that orthodontic appliances in the oral cavity of patients alter the nature of dental plaque causing changes in its basic structure, metabolic activity and the composition. There has also been found an increase in the microbial population, mainly Streptococcus and Lactobacillus.[1]

The sub gingival microbial environment is also altered by presence of any Orthodontic appliance in the mouth allowing accumulation of plaque and deepening of the gingival sulcus.[2]

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Lack of adequate oral hygiene maintenance during Orthodontic therapy is followed by various consequences such as formation of dental caries and periodontal diseases. Presence of appliances in the oral cavity creates retentive sites favorable for accumulation of plaque and inflammation.

Normal Oral Micro Biota: The oral cavity comprises of various surfaces, coated with abundance of bacteria, also called as the bacterial bio film. Among all these bacteria, few of these bacteria have been detected in contribution of various oral diseases such as dental caries and periodontitis. It has been a known fact that oral bacteria colonize in various surfaces in the oral cavity because of presence of specific adhesins on the surface of bacteria that binds to the specific receptors on a given oral surface.[3]

Saliva of an adult human contains about 6 billion microorganisms per mililitre such as Streptococci, Peptostreptococci, Neisseria, Nocardia, Fusobacterium, Bacteroides, Lactobacilli, Veillonella, Corynebacterium Actinomyces, Spirochaetes, Yeasts, Protozoa, etc. Various studies indicate that saliva comprises of 47% streptococci, 21% to 55% of the facultative streptococci on the tongue, and 10% of the facultative streptococci on the cheek. S. sanguis has found to be predominantly present streptococci in early plaque form on the teeth surface. It contributes to only a minor portion of the oral

microflora in the cavity. Hence, dental plaque is not the major contributor to the salivary micro flora, but the main source appears to be the tongue.[4]

Altered Microflora During Orthodontic Therapy: There has been an increase in demand, for Orthodontic therapy in the general population along with the increasing demand in facial esthetics. There is an increase in the incidence of dental caries, gingivitis and periodontitis in presence of Orthodontic appliances in the oral cavity. The presence of appliance in the oral cavity makes it difficult in cleaning of the tooth hence allowing deposition of plaque. Along with it, there is restriction of the self-cleansing action of the tongue, cheek and lips to remove food debris from the tooth surface. Thus, food debris mostly the carbohydrate that is fermentable supports the growth of the bacteria that is cariogenic like Streptococcus mutans and Lactobacillus[5]. Mostly the bacterial growth site is seen on the gingival margin and on the edges of orthodontic bands. Presence of these attachments promotes the retention and accumulation of dental plaque that contributes to formation of white spot lesion and causes demineralization of the enamel if the oral hygiene is not well maintained.[6]

Altered Microflora with Various Brackets

Self Ligating Brackets (SLB): Various studies demonstrated an increase in bleeding on probing and worsening of the periodontal index in patients being treated with SLB. Another 2 studies exhibited an increase in gram negative bacterial colonization with or without the use of elastomeric rings with SLB. While one more study showed increased concentrations of S Mutans and Lactobacillus spp in patients undergoing treatment with SLB as compared to the control group, another showed a decreased concentration of S Mutans, 3 months after initiation of treatment.[7]

Lingual Brackets: Three out of four analytical studies have found that lingual brackets worsen the periodontal index and gingival health. 2 studies showed increased levels of S Mutans and Actinobacillus Actinomycetemcomitans at one month after initiation of treatment.[8,9]

Removable Appliances: Six analytical studies have been performed on the usage of removable appliances. 1 study showed increased S Mutans and Lactobacillus spp in patients using different interceptive appliances. Levrini et al. studied and analyzed Invisalign, revealing that at 3 months after treatment initiation, periodontal index, bleeding on probing and bacterial components had reduced. While Türköz et al. performed a study on thermoplastic retainers, showing an increase in levels of S Mutans and Lactobacillus spp., Farhadian et al. managed to cause a reduction in S Mutans levels at 7 weeks by the incorporation of silver nanoparticles.

Another study that was performed on space maintainers showed an increase in BOP, bacterial count and also increased candida levels. D'Ercole et al. performed a study on long term use of sports mouthguards showing aggravated bleeding on probing & periodontal index.

Oral Hygiene Maintenance Protocol: Orthodontic treatment aims at improving the overall function and esthetics by correcting the occlusion and mal alignment of the natural dentition. Esthetic enhancement also improves self esteem of the patients. Despite the numerous advantages, the major problem faced by the dentist and the patient is increased plaque accumulation which can further cause complications such as halitosis, gingivitis, dental caries etc. That is why a stricter hygiene maintenance protocol must be followed to prevent any complications that might compromise the treatment plan and hence the treatment.

The patients must brush for 2 minutes after every meal to avoid food and debris accumulation around the brackets. The techniques commonly advised are Ramfjord method, Modified Stillman, and Bass method. All these method reduce the plaque and gingival index.

A bi-level Orthodontic tooth brush cleans the tooth surfaces all around the bracket. But there are various studies that compare the effectiveness of a conventional toothbrush and a bi-level orthodontic brush and the results are conflicting. Various studies show that electric toothbrushes are extremely effective in plaque removal. But with the correct brushing technique, conventional toothbrushes can also be equally effective.

Another aspect of hygiene maintenance protocol is fluoridated mouth rinses, especially containing 0.05% sodium fluoride, to reduce enamel decalcification and gingivitis, both of which are very common during Orthodontic treatment.[10]

The recommended effective oral hygiene measures should include at least several of the following:[11,12]

(1) Mechanical plaque removal–tooth brushing, flossing, and regular prophylaxis (2) Fluoride therapy–

at-home (fluoridated toothpaste and mouth rinse) and in-office (topical fluoride) (3) Mechanical protection of tooth surfaces–sealants and glass ionomer cements (4) Diet–reduction in consumption of foods that increase acidity of the oral environment (5) Motivational communication–delivering and reinforcing proper oral hygiene instructions before, during and at the completion of treatment.

Discussion

Improper oral hygiene maintenance leads to incomplete plaque removal and thereby initiation of dental caries and periodontal diseases. Combined with fixed appliances, the plaque retention increases due to availability of more surfaces for adherence, thereby increasing the risk of developing the associated complications at a faster pace. Corrective orthodontics is an integral part of dentistry today. But it comes with the major problem of plaque accumulation, which, despite advances in materials and techniques, is still a lingering issue for both the dentist and the patient. Other major complication is white spot lesions due to enamel demineralisation. Removable retainers exhibit bio film formation due to interaction between bacteria, yeast, saliva and serum proteins that needs to be cleaned regularly.

Studies have shown a direct relation between levels of pathogenic flora with the duration of treatment, which can get aggravated by poor oral hygiene maintenance.[13]

Conclusion

Any form of Orthodontic treatment, be it fixed or removable, significantly affects the oral micro biota. Oral micro flora exhibits maximum change at 1 month post treatment initiation. Fixed appliances cause more severe changes to the oral environment as compared to removable ones. Oral hygiene protocols need to be more aggressively implemented by the dentist and reinforced to the patient to avoid the complications associated with Orthodontic treatment. It is the responsibility of both the treating dentist and the patient to make sure that all oral hygiene instructions are followed as advised.

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Antibiotic Drug Resistance: A New Initiative

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Abstract

We can call antibiotics are the" miracle drugs" that can kill the micro-organisms. Anti-microbial agents play important role and are the greatest benefaction of 20th century to therapeutic uses. For decades, a lot of different kinds of antibiotics have been used for multiple purposes like agriculture and animal husbandry. Now-a-days microbes have become resistant to common antibiotics. So, we need comprehensive efforts to minimize the increase level of resistance. The aim of this article is to discuss the emergent micro-organisms, mechanism of microorganisms and its antimicrobial agents.

Keywords: *Antibiotic, Drug Resistance, Multidrug resistant bacteria.*

Introduction

Antibiotics are substances produced by micro-organisms, which selectively suppress the growth of or kill other micro-organisms. They can suppress the synthesis of bacterial cell, protein synthesis, RNA, DNA. For inhibition of protein synthesis, anti-microbial agents can penetrate the cell wall of microbes and then bind to ribosomal sites using the energy-dependant transport mechanisms. To fight against infective diseases and micro-organisms, their significance is really blessing in the developing nations that has saved mankind[1].

Anti-bacteria drug resistance refers when the micro-organisms are unable to respond the antimicrobial agents and is similar to the phenomenon of tolerance seen in higher organisms. If antibiotics are used for long enough, at certain point of time microbes can't be killed by theses antibiotics and this is known as antibiotic resistance. Existing infective diseases are caused by bacteria resistant to some antibiotics. The existence of antibiotic resistant bacteria creates the danger of life threatening infections that don't respond to antibiotics. There are multiple reasons for the development of antibiotic resistance. Some micro-organisms are always resistant to certain anti-microbial agents because of their lack of metabolic process. Examples; gram negative bacilli are normally unaffected by penicillin G, M.tuberculosis is insensitive to tetracyclines. Resistance may be developed by mutations and gene transfer. Acquired resistance results from a mutation in the bacterial chromosomes or the acquisition of extra chromosomal DNA. Antimicrobial resistance refers to 'superbug' that means strains and species of bacteria become resistant to antimicrobial agents. One of the commonest and important causes of antibiotic resistance are overuse and misuse of antibiotics. Overuse of antibiotics, like penicillin, erythromycin, cephalosphorine, has been associated with emerging antibiotic resistance[2].

Origin of Antibiotic Resistance: Antibiotics are medicaments that fight against the growth of the bacteria to control the infectious bacterial diseases. Overuse of antibiotics lead to resistance that can select the specific organisms and scrape away its clinical benefits. Bacteria may obtain resistance by mutations or by several method of gene transfer. Mutational drug resistance may be low degree resistance, can be resistant to certain drug at a time, and is not transferable[3]. Transferable drug resistance is high degree resistance, is not prevented by use of combination of drugs. Now the origin of resistance is now being known. The verifications hold up large bacteria resistome. Resistome is gathering of all the antibiotic resistance genes and their progenitor

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in both pathogenic and non-pathogenic microorganisms. These genes may be seen on antibiotic producers, may be found on pathogenic bacteria. These genes may be recognized on cryptic resistance gene in which these genes are submerged in the bacterial chromosomes[4].

Development of Antibiotic Resistance: Antibiotic resistance occurs when bacteria diminish the efficacy of antibiotics. So the bacteria live in the body and can multiply causing harm to the body. The occurrence of resistance process can depend on gene level mutation. Several bacterial colonies are genetically mutated that can lead existence of resistance. Now-a-days consumption of antibiotics is main factor of level and development of the resistant infections[5]. It can be occurred if the individuals don't complete their antibiotic drugs dosages. So bacteria may accumulate multiple resistances and can become resistant to various types of antimicrobial agents. Example; Existence of resistance seen in staphylococci from mutations of chromosomes and genes, infective transport aminoglycoside and enzyme modification. It's not mandatory that a specific antibiotic can only resistant to that particular drugs. It can occur with other drugs of same class too. Example; Broad-spectrum drug tetracycline can resistant to drugs of same classes like doxycycline, chlortetracycline, oxytetracycline, minocycline[6].

Mechanism of Antibiotic Resistance: Antibiotics can interrupt some crucial and necessary structures and procedures in bacteria. This can lead either to kill the bacteria or continuing the multiplication of bacteria. The role of antibiotic drug resistance is to cease the microorganisms from reaching its target. It can be possible If the membrane of bacterial cell reduces its permeability of that bacterial membrane. Destruction of antibiotic by some bacterial enzymes leads to resistance. Drug resistance occurs by modification of the target. It can be possible by alternative proteins[7].

A Worldwide Operation to Minimize the Antibiotic Resistance: Like global warming, existence of noticeable antibiotic resistance is out of control and has no apparent way out. Worldwide it is a major serious problem in public health. Over several decadesdecades, scientists, clinicians, physicians were not aware of existence of antibiotic resistance. But bacteria resistant already recognized before the discovery of first antibiotic drug penicillin. For this consequences, WHO declared and promoted antibiotic resistance as a global health problem. The World Health Organization recently published a book called " The evolving Threat of antimicrobial resistance–options for action"[8]. This book narrated the major problems of resistance seen in worldwide and how to control the use of antimicrobial agents. Due to several reason antibiotics are used unwisely such as person's fulfillment over doctor's prescription, ill-suited information about antibiotics, inappropriate diagnosis, quackery in many countries[9]. Having lack of discovery of newer antibiotics,this part of problem is quite tough to deal. So the individual should take antibiotics when prescribed by certified health care provider. If doctors don't prescribe antibiotics, patients shouldn't demand or request for antibiotics. To minimize the increasing resistance, the policy maker can improve surveillance of antimicrobial-resistant infectious diseases. Use of alternative therapies can control the infectious diseases. These therapies include biological therapy, vaccines against drugs[10].

Conclusion

Increasing antibiotic resistance is now major problem in world wide. The importance and value of antimicrobial agents are magnified and we are totally dependent on them for the treatment of infectious diseases. Use of antibiotic is increasing day by day in humans, animal and agriculture. At the same time antibiotic resistance is increasing at an alarming rate.

For internal and foreign policies we need to stop overuse and misuse of antibiotics to prevent the resistance of antimicrobial agents. So to minimize the drug resistance in infective diseases, we should know about its origin, administrations, varieties of resistance chromosomes.

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Assessment of Dehiscence and Fenestration in Bilateral Cleft Lip and Palate Patients

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Abstract

Cleft lip and palate are breaks in continuity of tissues of upper lip, the hard and soft palate or both. It can be unilateral or bilateral. It results due to incomplete fusion of the facial structures during growth. It poses many problems to the child such as difficulty in feeding,swallowing, nasal twang to voice and chronic ear infections. Dental problems include absence or missing one or more teeth, deformation in the normal tooth morphology, and a lack of adequate amount of soft and hard tissue in the affected area. Preoperative orthodontic treatment is a must to align the teeth in the arches before any orthognathic surgery is performed to correct the underlying skeletal imbalance. It is imperative to evaluate the amount of bone level before planning any orthodontic, periodontal and surgical therapy. The amount of alveolar bone loss in an ungrafted cleft region of cleft patients has been evaluated using various radiographic method and it has been reported that there was increased amount of loss of alveolar bone in the affected site compared with controls. Very few studies have used CBCTas a method of evaluating the bone level in cleft patients. Hence this article discusses the evaluation of dehiscence's and fenestrations in bilateral cleft lip and palate patients using cone beam computed tomography.

Keywords: *Dehiscence, fenestration, cone beam computed tomography, cleft lip and palate.*

Introduction

Cleft lip and or cleft palate is one of the most common orofacial malformations that occur during the embryological growth period of a child. Clefting results due to lack of proper fusion between the facial structures at various stages of growth. They usually present as birth defects only or can also be in conjunction with many conditions or syndromes that may be inherited.[1] They can be unilateral or bilateral. (Figure 1).

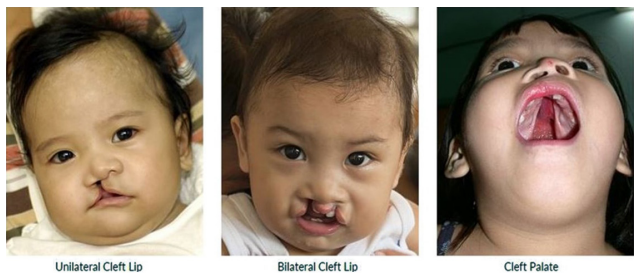


Figure 1. Types of Cleft lip & cleft palates

Incidence: Epidemiological studies show substantialvariation in orofacial clefts based on numerous factors, including the sample population and method of study.[1] Oral clefts in any form occur in about one in every 700 live births. Higher rate of incidence and prevalence has been seen in south east Asian countries (one in 500 births), whereas African-derived populations show decreased rates (one in 2,500 births). Isolated cleft palate is more commonly seen in girls when compared to boys, in a ratio of 2:1. On the other hand there is a 2:1 girl-to-boy ratio for cleft lip with or without cleft palate.[2]

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Etiology: There is no single cause of cleft lip and cleft palate. It has a multifactorial etiology Potential causes may include medications taken by mother during pregnancy. Certain drugs like: anticonvulsant drugs, anticancer drugs, drugs used for treatment of acne and auto immune disorders. They may also occur as a result of exposure to various microorganisms or chemicals during the development stage of the foetus. In other situations, it may be associated with other medical conditions or syndromes.[3]

Features: A child affected with 'cleft lip and palate' presents with variety of features depending onnumber of factors, including the type and severity of the area involved. These individuals may face difficulties in the following (Figure 2).

- Difficulty in articulation
- Nasal voice
- Regurgitation of food and fluids during feeding and swallowing
- Dental problems like tooth malformations, ectopic eruptions, supernumerary teeth and anodontia, periodontal problems. Inability to maintain good oral hygiene.
- Skeletal imbalances of the jaws
- Recurrent ear infections
- Psychosocial Impact



Figure 2. Difficulties faced by affected children

Diagnosis: Cleft lip/cleft palate can be detected as early as 16 weeks into pregnancy in most of the cases with the help of ultrasonography. Confirmation is then done at birth with a thorough visual and physical examination. In one of rare cases when the individual has a mild cleft involving soft palate only which neither is visible in an ultrasound nor noticeable visually until the child experiences difficulty in feeding. The clinician should carry out a comprehensive examination so as to diagnose the exact nature of the problem.[4]

Treatment: The treatment of cleft lip and palate is a multi–disciplinary approach due to the numerous problems associated with it. A team of health care professionals work to design a plan to customize the treatment plan according to the patient's needs. Treatment usually begins in infancy and often continues through early adulthood.[5] This multidisciplinary team includes (Figure 3)

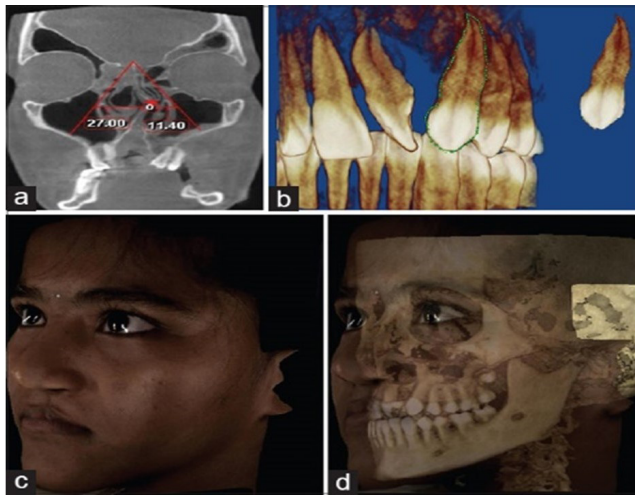


Figure 3. Treatment Protocol

- **Plastic surgeon** to carry out surgeries.
- **An ENT surgeon** to assess problems associated with hearing and its management.
- **An oral surgeon** to correct skeletal imbalances of the jaws
- **An orthodontist** to align teeth
- **A prosthodontist** to provide prosthesis for replacement of missing orofacial tissues that aims at improving the aesthetics and function.
- **A speech pathologist** to assess problems associated with speech
- **An audiologist** to assess problems associated with hearing
- **A nurse** to supervise health of the child
- **A psychologist** to provide psychological assistance to the child and his family
- **A geneticist** for genetic counselling

Multiple surgeries are required to repair the defects associated with cleft lip and palate till 18 years of age. The initial surgery for palatal repair is usually performed as early as 6 months of age. This creates a functional

palate reducing the regurgitation of fluids and food and also helps in the proper growth of the dentition and facial bones.

Once the permanent teeth are erupted, orthodontic treatment is required to correct the malocclusion. Additional surgeries may be performed to improve aesthetics. Final repairs are not done until grow this fully completed.[6]

Oral Care for Children with Cleft Lip and/or Palate: The dental treatment needs of children with clefts and non-clefts are usually the same. Since children with cleft lip and cleft palate may have numerous problems related to the dentition such as missing, deformed, or maligned teeth which requires regular follow ups and strictmonitoring[2].

- **Early dental care includes** regular oral prophylaxis, balanced diet, and fluoride treatment at appropriate intervals in order to prevent the teeth from decay.. Routine dental check-up should ideally begin at around 1 year of age.
- **Orthodontic care.** The predentate stage is the best time to consult an orthodontist as it helps in assessment of orofacial growth and development. After the permanent dentition sets in, further evaluation is needed to identify treatment needs of the child.
- **Prosthodontic care.** A prosthodontist may provide replacements for the missing teeth or fabricate appliances called "speech bulbs" or "palatal lifts" to help in normal phonation.

Problems faced during the orthodontic treatment of cleft lip and palate patients: The osseous clefts show poorly developed bone morphology and topography associated with weak supporting periodontal tissues. Such areas subjacent to the cleft are associated with delayed tooth formation and eruption, and cause problems in orthodontic movement of the involved teeth. So, it very crucial to evaluate the level and amount of bone underlying the cleft before planning any orthodontic tooth movement as weak and decreased level of hard and soft tissues can lead to anatomical defects such as dehiscence and fenestrations due to additive trauma caused during orthodontic treatment jeopardising the tooth involved[3]. According to a study conducted by Salvi et al it was concluded that patients with orofacial clefts have a greater risk of periodontal destruction progression than control sites.[4]

What is dehiscence and fenestration?: Dehiscence is defined as the reduction in the cortical bone to the level of root of a tooth, at least 4 mm apical to inter-proximal bone margins whereas "fenestration" is described as a defect where the root surface is denuded of bone. It is seen mostly at the apex or the middle third, but does not involve the alveolar margin. Fenestrations are most commonly found in the upper arch, especially in the first molar and canine region (Figure 4). Dehiscence are seen mostly in the mandibular anterior region predominantly on buccal surfaces. The bone anatomy in the maxillary first premolars is such that it becomes narrower upwards hence the maximum fenestration cases in maxilla. Since the bone density becomes less as one goes from back to the front region of jaw most of dehiscence were associated with the lower jaw. Various factors, such as the direction of tooth movement, the frequency and magnitude of orthodontic force applied and the health status of supporting tissues contribute to the occurrence of these anatomical defects[5]. Best way to avoid these issues it is important to assess the alveolar morphology before commencing orthodontic treatment through imaging.[7]

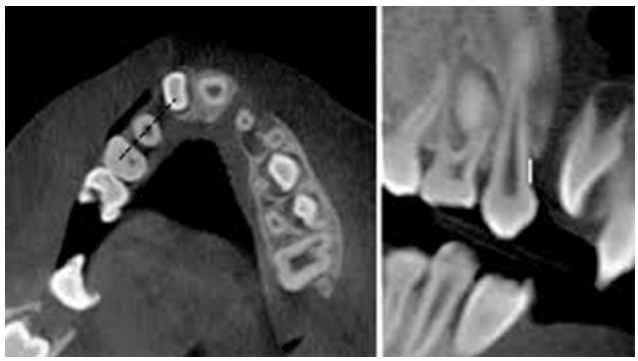


Figure 4: Fenestrations

Presence of dehiscence and fenestration can best be confirmed by CBCT[6]. The main advantage of CBCT i.e. IMAGING 3D is the ability to assess the actual anatomy without being superimposed by the neighbouring structures with increased accuracy and sensitivity. The small voxel size in the CBCT enables us to visualise images in high resolution. Also, it is more cost effective and has less radiation dose compared to conventional CT.[7] Earlier conventional radiographs were used to evaluate these anatomical defects but this has now been replaced by CBCT because of the obvious advantages.[7,8]

Studies done to assess dehiscence and fenestration in 'cleft lip and palate' patients: Previous literature shows that not many studies have been conducted to

evaluate the anatomical defects using CBCT and further studies still need to be done to confirm that dehiscence and fenestrations are more commonly seen on the cleft affected side that the non-cleft subjects."Buyuk et al"in 2015 had done a study to assess dehiscence and fenestration in unilateral CLP patients using cone-beam computed tomography (CBCT) (Figure 5) and stated that those patients showed greater prevalence on the anterior teeth of upper arch when compared with unaffected individuals[8]. Another studydone by "Mevlut Celikoglu" et al in Department of Orthodontics in Turkey in the 2017 supports the fact that cleft affected site is at a higher risk of developing these bony defects as compared to the unaffected individuals owing to decreased level and density of bone in that area.[9]

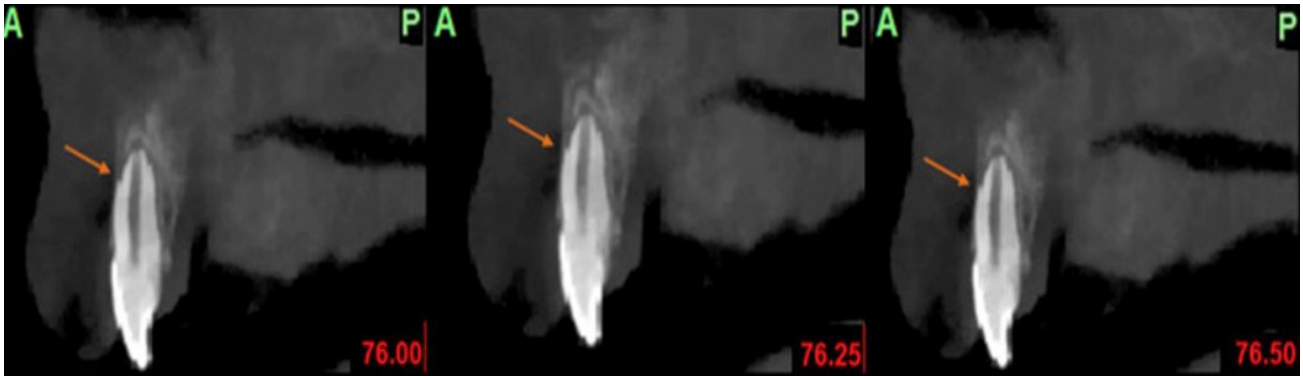


Figure 5. CLP patients using cone-beam computed tomography

In this retrospective study CBCT scans of maxilla and mandible offifty-onepatients were taken. They were categorised into 2 groups (group 1 consisting of twenty one patients affected by BCLP; with mean age; 14.62 ± 2.89 years; and group 2 consisting of thirty patients as the non-cleft control group; with mean age, 14.22 ± 1.05 years) These CBCT images were used to assess bony defects of the anterior teeth in both groups. Exclusion criteria for cleft group was no past history of orthodontic or prosthodontics treatment with the CLP repair if done should be done before the age of three years, on the other hand the exclusion criteria for the control group was no previous history of trauma, disease or any prosthodontics or orthodontic treatment. All images were obtained with CBCT machine (New Tom 5G, QR, Verona, Italy) using standard operating conditions of scanning time, 18 seconds; collimation height, 13 cm; exposure time, 3.6 seconds; slice thickness, 0.25 mm and voxel size, 0.15 mm. The assessment was done with Simplant Pro software (ver. 16.0; Materialise, Leuven, Belgium) after the images were converted to DICOM format. The sagittal and axial slices on the buccal and lingual surfaces were taken for assessment of roots of all anterior teeth of upper jaw. In areas where the height of bone was greater than 2 mm from the cement-enamel junction it was recorded as dehiscence, where as when crest of alveolar bone was unaffected, it was recorded as fenestration. All the assessment was done by an experienced orthodontist (S.K.B.), who had been trained before for the study without knowing the patients' group. Data analyses was then done using "Pearson's x2, Student's t-test" and Fischer exact test

Results

Results of the study revealed that when comparison of the BCLP subjects and controls were made it was seenthat the BCLP group had a significantly greater prevalence of these anatomical defects than did controls. BCLP group showed prevalencerate of 61.11% in the upper and 48.41% in the lower anterior teeth, whereas the rates in the control group were 7.78% and 16.67%, respectively ($P < 0.001$). Further it was seen that fenestrations were more common in the maxillary anterior teeth on the BCLP patients compared with controls, whereasno statically significant difference was seen for maxillary lateral incisors ($p>0.005$) (Figure 6)

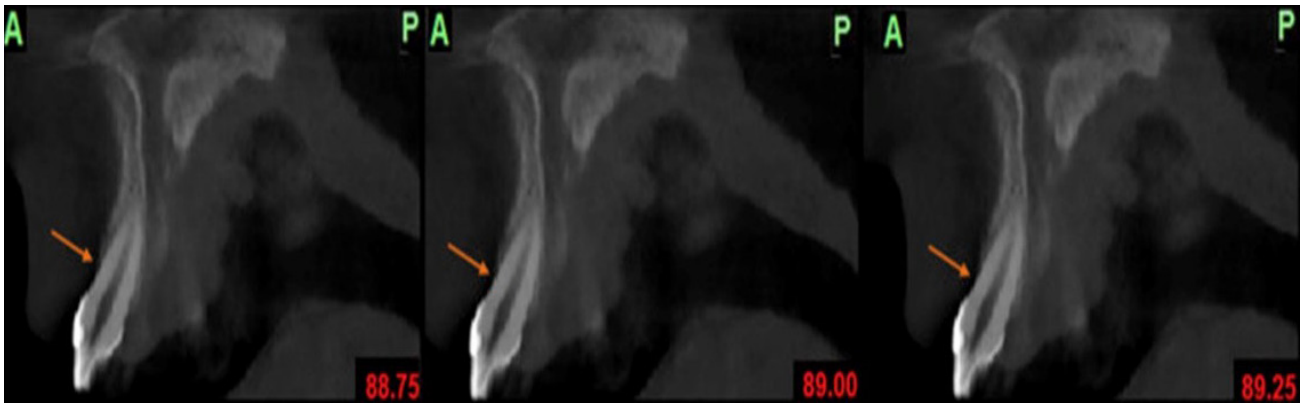


Figure 6. Comparison of the BCLP subjects

Discussion

Many studies have proved that "dehiscence and fenestration" are very commonly seen in various forms of malocclusions. And these defects can lead to decrease in the level of marginal gingiva and more amount of loss of bony architecture during orthodontic treatment,hence more chances of relapse or undesirable orthodontic treatment finishing. Since cleft patients have some form dental and skeletal imbalances, it is very crucial to diagnose these defects to carry outproper orthodontic therapy. The evaluation of these anatomical defects has long been neglected. Thus, this study was one using CBCT to present the important findings of alveolar defects in bilateral cleft lip and palate patients. Many factors contribute to the various rates of bony defects including different ethnic backgrounds, dental and skeletal problems, angulation of the teeth, crowding, cortical bone thickness, and the supporting tissues. This study shows a prevalence rate of 61.11% of dehiscence in the upper and 48.41% in the lower anterior teeth, whereas the controls had 7.78% and 16.67%, respectively[10]. Studies have shown that patients with BCLP had backwardly placedupper and lower arches, short effective jaw lengths and vertical growth patterns when compared with the controls. Hence increase in rates of both dehiscence and fenestration in BCLP patients might be due to decreased density of cortical bone in the maxillary anterior teeth at the cleft site. In contrast to the previous literature which states fenestration was more common in the upper teeth,the results of this study show it was same for both jaws of the control group. Thus, CBCT imaging is a muse prior to commencement of any orthodontic therapy. This study had severallimitations in that the periodontal status of the subjects were not assessed clinically. Moreover 0.25 mm slices were taken to study the images which is inefficient in detecting thin bone layers. Hence further studies are needed in this regard.[6-10]

Conclusion

Before commencing orthodontic treatment, the orthodontist should be aware of the morphology of theorofacial tissues of the area of interest. Most of the unwanted effects can be easily prevented by taking certain precautionary measures before,during and after the treatment. we can achieve aesthetically and functionally balanced treatment outcomes if each step starting from wise case selection, diagnosis, treatment planning, monitoring, timely intervention, and good patient cooperation,is taken into consideration.

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Nicotine Replacement Therapy: A Review

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Abstract

The products that are available in the market can be adhered to the skin if the patient is not comfortable with chewing as in transdermal patches but the patient might feel irritation on the skin. Thus, different products are produced in order to provide wide range of option to the consumer so that he/she can choose whichever way he/she likes to quit the habit. Nicotine replacement therapy (NRT)s have been so successful that they are now widely accepted.

Keywords: *Nicotine, Nicorette, Inhaler, Nicotine Vaccine.*

Introduction

A wide range of products are available in market to help tobacco cessation. In 21st century with advancing science and technology we have been benefitted in a way that we can stop the core cause of various oral cancer and pathologies. The products that are available in the market can be adhered to the skin if the patient is not comfortable with chewing as in transdermal patches but the patient might feel irritation on the skin.[1] Thus, different products are produced in order to provide wide range of option to the consumer so that he/she can choose whichever way he/she likes to quit the habit. NRTs have been so successful that they are now widely accepted. However, there are certain clinical guidelines recommend NRT as first line of treatment for de-addiction from tobacco and related products. This review aims in summarizing all the available method of NRT and its possible new approaches in future to handle tobacco products addiction.[2]

Mechanism of action: Nicotine acts by stimulating neural nicotinic acetylcholine receptors in ventral tegmental area of brain. This releases dopamine in nucleus accumbens. Dopamine leads to reduction in nicotine withdrawal symptoms in regular smokers who refrain from smoking. The coping mechanism-NRT provides coping mechanism thus making tobacco products least rewarding. It never completely eliminates the symptoms of withdrawal as none of the available nicotine delivery systems reproduce the rapid and high level of arterial nicotine achieved whenever a tobacco product is consumedsince most of the products rely on systemic venous absorption and never achieve rapid systemic arterial delivery.[3]

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Available Nicotine Replacement Therapy

Transdermal patch: These are normal patches that have to adhered to the skin and it comes with glue which helps in its adherence to the body. It delivers nicotine through skin at steady rate. There are wide ranges and doses so that a higher cigarette smoker can take a patch of stronger dose and occasional cigarette smoker can take a patch of lesser dose. Such wide range of doses helps the patient to gradually taper their nicotine intake over a period of time to enable gradual adjustment of their bodies to lower level of nicotine and finally to a free from nicotine stage. Main advantage is it is simple, and it delivers nicotine at a slower rate compared to acute NRT formulations. They are available in various doses -5mg to 22mg of nicotine over 24 hours. The most frequently reported disadvantages are local skin reactions and sleep disturbances.[4]

Acute dosing nicotine products: In this the user has the control over both amount and timing of doses.

Therefore, the smoker with greater need can get a higher nicotine dose and those who are not can reduce their intake as per need. Acute dosing nicotine products include gum, lozenge, sublingual tablet, oral inhaler, and nasal spray.[5]

Nicotine gum: Ferno in 1969 started experimenting on himself with this gum and he quit smoking after one year of use. The first nicotine chewing gum was produced by AB Leo in 1971. It should never be chewed and thrown out like an ordinary chewing gum but it has to be held in oral cavity for 30 minutes so that the release of nicotine can occur. It is available in 2mg and 4mg dosage forms. The dose should be tapered gradually till it is no longer needed. Acidic drinks interfere with mucosal absorption of nicotine; thus patients should avoid acidic drinks for 20 minutes before and during chewing gum.[6]

Nicotine lozenge: Nicorette is the brand name of a number of products for nicotine replacement therapy that contain nicotine.It was developed in late 1970s in Sweden. Nicotine lozenge contains nicotine polacrilex which is a nicotine bound to an ion-exchange resin. It is available in 2mg and 4mg formulations. The method of use is similar to that of gum, but this is not chewed rather it is allowed to dissolve in mouth slowly for approximately 40 minutes with some changes across individuals. The amount of nicotine absorbed through lozenge if higher than gum.[7]

Nicotine sublingual tablet: Nicorette microtab was the commercial product produced by Nicorette company. Like the lozenge, the tablet has that advantage of not chewing the microtab is kept sublingual and since the sublingual route is faster the nicotine reaches the systemic circulation rapidly.The levels of nicotine obtained by use of lozenge and sublingual tab is similar. It has to be used at least for a period of 4 months and then tapering of dose should be followed.[8]

Nicotine oral inhaler: It comes in a similar design of asthma inhaler containing a mouthpiece and a plastic cartridge which contain nicotine. Although it is named as inhaler but majority of nicotine content goes to the oral cavity followed by oesophagus and then stomach, only a little amount reaches the lungs. Since most of the absorption occurs through the oral cavity the rate of absorption is similar to that of gum. 10mg nicotine cartridges are available and it delivers 2-4mg of nicotine pre puff.[9]

Nicotine nasal spray: It was designed for rapid delivery of nicotine. Yildiz D et al quoted "It is available as multi-dose bottle with a pump mechanism fitted to a nozzle that delivers 0.5 mg of nicotine per 50µ squirt. Each dose consists of two squirts, one to each nostril. It is the most rapid delivery system available among the all other NRT available. Patients should be started with 1 or 2 doses per hour, which may be increased up to max 40 doses per day". A single dose of nasal spray per hour for 10 hours produces average plasma concentrations of 8ng/ml.

High-dose nicotine patches: These patches of 22mg can replace half of serum nicotine and cotinine levels in smokers. Brokowski L, Chen J, Tanner S quotedin their article"A systematic review concluded that the safety and efficacy of high dose transdermal NRT for tobacco cessation have not been established in medical literature".

Rapid release gum: Niaura R, et al. quoted in there article "A rapid release gum has been formulated to provide a biphasic nicotine delivery, starting with elevated delivery in order to promote rapid craving and then levelling off to abstain overdosing. It is faster, and has high efficacy than the current nicotine gum".

Combined patch plus acute forms: Kornitzer M et al, quoted in his article "to improve the efficacy of NRT by combining nicotine delivery with other medication that permits rapid nicotine delivery. The rationale for combining NRT medications if that smokers may need both slow as well as a faster acting preparation that van be administered on demand for immediate relief of break through cravings and withdrawal symptoms. Combining the nicotine patch with an oral form of NRT has been shown to increase quit rates by 34-54 % compared to using the patch alone".

Future advances: Nicotine preloading: Lam C west quoted in his article "The use of nicotine replacement therapy before quitting smoking is called nicotine preloading". It is also known as pre-cessation or pre-quitting NRT. A review suggests that a patch use should be initiated for a brief period before making a quitting attempt, is affectively more operative than patch use initiated on the quit date itself.[10]

True pulmonary inhaler: Henning field JE quoted "It would transport nicotine to the lung in a manner more analogous to cigarette smoking. This would be predicted to deliver a dose of nicotine sufficient to

reduce background cravings and withdrawal symptoms, and would allow for more faster relief of acute cravings and morning craving. As this delivers nicotine directly into the lung it would effectively mimic the effects of smoking on a physiologic level, the smoker could eliminate the need for tobacco, and as well as taper the nicotine level over time to alleviate dependence upon nicotine together".[11]

Nicotine Vaccines: Carrera, M. R., Ashley, J. A., Hoffman, T. Z., Isomura, S., Wirsching, P., Koob, G. F.et al quoted "Nicotine vaccines represent a new approach to the treatment of nicotine dependence and is under research. As nicotine is small molecule and incomplete antigen, it can be linked to a carrier protein in order to stimulate necessary immune response. Nicotine based vaccines can prime the immune system to recognise nicotine as foreign substance and to attack it by immunologically. By doing so it decreases the amount of nicotine penetrating the brain. However, there are some drawbacks of this firstly there is difficulty in achieving sufficiently high antibody titres, the fact that vaccines are generally short lived, and significant inter-individual variation in response to the vaccine typically observed".[12]

Conclusion

With advancing research there is higher chances of more advancements in newer nicotine replacement therapy method. Even with many nicotine replacement therapy products available in market, it solely depends on the consumer whether he/she wants to quit the habit or not. Making them aware of the consequences of not quitting habit may provide a trigger to them to start taking these products. But proper counselling must be provided and benefits of using these products should be told elaborately. NRTs increase the rate of quitting by 50 to 70%.It is essential for the health professionals to know about all the available forms of NRT to be able to answer those who are willing to quit the habit.

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Fibrous Dysplasia: A Rare Case Report

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Abstract

Fibrous Dysplasia (FD) is a disorder of bone that occurs rarely in which abnormal fibro-osseous tissues is replaced by normal bone. Several bones are involved including the long bones, ribs, craniofacial bone and pelvis. Out of all the FD monostotic (MFD) is found in 30% cases which involved the facial and cranial bones. It often occurs in children and stops in adulthood. FD is twice more commonly seen in maxilla than in the mandible. In most of the cases of FD it is unilateral and is commonly seen in the posterior region of jaw.

Keywords: *Fibrous Dysplasia, Maxilla, Deformity.*

Introduction

Fibrous Dysplasia (FD) is a rare bony disorder in which fibrous tissue (scar like appearance) grows in place of regular bone. This irregular bony tissue can deform the bony structure or may even lead to fracture because of weakening. In most of the patients suffering from FD the site of involvement is single but in many cases involvement in multiple site is also reported. Event thought FD is a genetic disorder in which gene mutation is seen but is not passed on from parent to the child. There is no specific cure reported to this disease. The treatment often includes symptomatic relief, which might be surgery, it focuses in improving the quality of life like relieving pain and repairing or stabilizing bones to carry on with functional uses.[1,2]

Case Report: A 23 years old male patient reported at the department of Oral Medicine and Radiology, Institute of Dental Sciences, SUM hospital, Bhubaneswar with the chief complain of swelling on the left side of the face for the past 1 year, which had been growing slowly to reach the present size. The swelling was insidious in nature, painless and was progressive resulting in the gross deformity of the face. On extra oral examination, a diffuse swelling present on the left middle 1/3rd of face measuring 8x7 cm in size, of skin colour, ill-defined margins, smooth surface and extending anteroposteriorly from lateral border of nose to imaginary line drawn from corner of mouth to the tragus, superoinferiorly infraorbital margin to left maxilla. On palpation, the swelling was bony hard in consistency, with diffuse edge and attached to the bone [Figure 1]. On intraoral examination, a bony hard swelling present in the alveolar mucosa from 24 region to 28 regions, with normal mucosa over it. It was non compressible and non-reducible in nature. Radiographic examination in an Intra oral periapical radiograph revealed obliteration of maxillary sinus, with narrowing of periodontal ligament space, distinct lamina dura, taurodontism and increased radiopacity of maxillary sinus on left side [Figure 2]. An Orthopantomograph evaluation revealed the lesion tending to blend into the surrounding structures obliterating the Floor of orbit, Zygomatic arch and Ground-Glass appearance [Figure 3]. The biopsy of the lesion was sent for histopathological examination and was confirmed to be MFD. The management of the patient was done in a conservative surgical approach and is under observation.

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Figure 1. Swelling was bony hard in consistency, with diffuse edge and attached to the bone



Figure 2. Intra oral periapical radiograph



Figure 3. Orthopantomograph evaluation

Discussion

Fibrous Dysplasia of bone is an uncommon congenital, non-genetic, metabolic skeletal disorder. Out of all bone tumors it is almost 2.5% and out of all benign bone tumors it is about 7%.[1] It is characterized by replacement of normal bone and marrow by fibrous tissue. The maturation of bone is arrested in the woven bone stage. It may affect single bone (monostotic) MFD, multiple bone (polyostotic) fibrous dysplasia (PFD). FD involves the facial and cranial bones in nearly 50% of PFD patients and in 10%–27% of MFD patients.[2]

Etiology: The etiology of FD is the molecular mechanism for fibrous dysplasia is a post zygotic activating mutation of the GNAS1 gene. That results constitutive activation of the adenylyl cyclase enzyme and over production of 3',5'-cyclic adenosine monophosphate. Excess cyclic adenosine monophosphate impairs the ability of stem cells to differentiate into a mature functioning osteoblast.

Clinical Features

- 70% of fibrous dysplasia (monostotic) often involves jaw
- Most common sites are ribs, femur, tibia
- Patients with jaw movement complain of unilateral facial swelling or an enlarging deformity of alveolar process.
- Polyostotic type usually found in children younger than 10 years where monostotic type found in slightly elder age group.[3]
- Pain and pathologic fractures are rare
- Pain less enlargement of the affected bone is most commonly seen
- The patient is not able to recall the onset of swelling
- Maxillary and mandibular fibrous dysplasia is associated with significant facial and palatal asymmetries present, heterogenous dental anomalies (taurodontism, enamel hypoplasia, malocclusion, displacement, high caries index seen.

Radiologic Features:

- Ground glass appearance due to superimposition of thin and poorly calcified trabeculae.
- The lesion of fibrous dysplasia is usually ill defined radiographically, they tend to blend into the adjacent bone.
- Radio-dense area obliterates maxillary sinus and involves zygoma and lower rim of the orbit.
- Involved dentition shows narrowing of pdl space with ill-defined lamina dura that blends with the abnormal bone.

Differential Diagnosis: The differential diagnosis of FD includes simple bone cyst, nonossifying fibroma, osteofibrous, dysplasia, adamantinoma, low-grade intramedullary osteosarcoma, Paget's disease.[6] The best method of diagnosis of FD id histologically proven fibrosseous lesion with poorly defined with not clearly defined margins with are then reconfirmed by radiologic evaluation.[7]

Treatment: FD treatment protocols involves the following 3 steps: Observation, Medical treatment & Surgery.

Various clinical studies have shown that the FD lesions do have any risk of pathologic fracture or related deformity. To improve various signs of FD such as pain relief, enhanced functions and to reduce the risk of fracture in certain patient's medical treatment with bisphosphonates might be beneficial.[5] Surgery can be a treatment of choice in certain cases. That might include for examination of the bone (biopsy), surgically correcting the deformity, further prevention of the fracture resulting from the pathology and/or for the eradication of symptomatic lesion.

Conclusion

Conservative supervision has been the customary of care, which involves removing the diseased bone via an intraoral approach. Cortical bone grafts are superior to cancellous bone grafts or bone-graft substitutes because of the excellent quality of the remodeled cortical bone. After a confirmatory biopsy, our case was diagnosed with symptomatic MFD. After discussion with the patient, she refused invasive surgical treatment and chose conservative management with regular recall and clinical observation. The reported prevalence of malignant transformation of FD is 0.4%–4%.

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Dental Implants in Diabetic Patients

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Abstract

Implants are the ideal treatment method for the Patients with missing tooth, as it is not only very much perfect aesthetically but also anchors into the bone directly and provides a strong stability. Diabetes Mellitus is classified as one of the crucial risk factors while deciding about Implant placement, as these Patients experience a delayed wound healing process, Osseointegration being very important part of Implant treatment procedure, is tremendously affected due to delayed wound healing leading to failure of Implant. But this condition may not be similar for the Patients with controlled Diabetes. Thus, we need to focus on preventive strategies as well as various selection criteria while working with Implant in Diabetic Patients.

Keywords: *Dental Implants, Diabetes, Osseointegration, Hyperglycemic.*

Introduction

These days edentulous cases are very common in dental Patients of age varying from middle age to old aged. According to modern treatment method a dentist can provide a lot of options for the replacement of an edentulous area in the dental arch depending on various factors like aesthetics and cost factors.[1] Various options for replacement of the edentulous area in the Patient are- Removable Partial Denture (RPD), Fixed Partial Denture (FPD), Complete Denture (CD), Implants, Implant supported complete Denture, Over Denture. Among all of these prosthesis Implants are more aesthetically perfect and a permanent solution but unfortunately for some Patients these Implants has some systemic disease related boundaries like it can be really risky for Patients with Diabetes Mellitus, Hypertension, Less Bone Density, Patient with acquired bleeding Tendency, Chemotherapy treated Patients.[2]

Implants: An endosteal Implant, is an alloplastic Material which is surgically inserted into a residual bony ridge, primarily as a Prosthodontic Foundation.[1]

Prefix-"Endo" meaning "within" and "osteal" meaning "bone"[2]

A dental Implant is a surgical component that Interfaces with the bone of the jaw or skull to support a dental prosthesis such as a crown, bridge, denture, facial Prosthesis or to act as an Orthodontic Anchor. Hundreds of different Type of Implant body designs are available, we can generally relate to 3 different categories: 1. Cylinder Implants, 2. Screw Implants, 3. Combination

Cylinder Implants provide Press Fit and their root form depends on a coating or surface condition to provide microscopic retention and bonding to the bone and usually are pushed or tapped into a prepared bone site. They are of different shapes like-straight, tapered, conical. This offers the advantage of ease of placement even in difficult access location.

Screw Root Form: They are threaded into the bone site, and have macroscopic retentive elements for initial Bone fixation. They can be machined, textured, or coated. 3 Basic screw thread forms are V-shaped, Buttress Thread, Power (square) thread designs that are again combined with different geometric shapes. Combination Root Form have the macroscopic features of cylinder and Screw Root forms. 3 different parts of Implant Body are: Crest Module, Implant Collar, Apex.

The Implant must the considered as the apically Extended part of the restoration. The design of the restoration should be planned and the planned design should guide the surgical placement of the Implant. This concept is known as Prosthetically Driven Implant Placement.[3] The above-mentioned theory says, Implant is nothing but the apical part of the restoration. Planning for the location of the Prosthesis placement and designing should be done earlier to the surgical procedures for the placement of the Implant.

Implants and bone loss: An Implant allows normal muscle function and it also stimulates the

bone and maintains its dimensions similar to healthy natural teeth. Crestal Bone Loss can result in increased bacterial accumulation resulting in secondary Peri-Implantitiswhich can further result in loss of bone support, which may lead to occlusal overload resulting in Implant failure.[4] Studies says marginal bone loss is very common. It is mostly seen during the 1st year of the Prosthetic Loading. So crestal Bone Preservation is one of the very important steps to be taken before the marginal method of Implant placement. As Implant failure is seen due to occlusal overload, Peri-Implantitis, loss of Bone support but also causes resorption of the marginal bone leading to unaesthetic appearance of gingival contours and loss of Interdental Papilla. The concept of "Platform Switching" says about the use of a smaller diameter abutment on a larger-diameter Implant Collar. Thus, the perimeter of the Implant-abutment junction (IAJ) is shifted a little inward towards the Central Axis (middle) of the Implant.

Diabetes: A disease in which the body's ability to produce or respond to the hormone Insulin is impaired, resulting in abnormal metabolism of carbohydrates and elevated levels of glucose in the blood. Diabetes is a disease that occurs when your blood glucose also called blood sugar is too high. Blood glucose is your main source of energy and comes from the food you eat. Insulin, a hormone made by the pancreas helps glucose from food get into your cells to be used for energy. Sometimes your body doesn't make enough-or any Insulin or doesn't use Insulin well. Glucose then stays in your blood and doesn't reach your cells. Overtime having too much glucose in your blood can cause health problems. Although Diabetes has no cure, you can take steps to manage your Diabetes and stay healthy. Diabetes Mellitus can be classified into three types: Type-1, Type-2, Gestational Diabetes, Prediabetes.

Bone healing and diabetes: Dental Implants success has been dependent on the Bone-to-Implant contact. Formation of Bone on and around dental Implant has been achieved by normal mechanism of Bone remodeling. Diabetes Mellitus affects the Metabolism of Carbohydrate, Lipid, Proteins and thus this hypoglycemic condition of the body affects the tissues of the body resulting in multiple complications of the body including micro and macro-vasculature. Thus, Lipid deposition will result in atherosclerosis, microangiopathy including Alveolar Bone and Periodontal Tissue The persistent hyperglycemic condition in a Diabetic individual results in activities of osteoblast which alters the parathyroid hormone response regulating the metabolism of Ca and P,reduces the collagen formation which is required during callus formation, including cells apoptosis of bones and progression of osteoclastic activity, as result of persistent inflammatory response. It also induces effects the bone matrix and diminishes growth and accumulation of extracellular matrix, which decreases the growth by extracellular matrix accumulation which results in reduced bone formation during healing.[5-12]

Insulin and implant treatment: The first line of treatment in the Diabetic Patients is diet. Diabetic Patients can be Insulin dependent or Non-Insulin Dependent. Insulin dependent Diabetic Patients are controlled with Regular Injections or may be with subcutaneous Insulin Infusion Pump.[13] Whereas Non-Insulin-dependent Diabetic Patients are provided with Oral Tablets, that helps in stimulating Insulin secretion, prevents glycogenolysis in the Liver, Increases Tissue sensitivity to Insulin, decrease hepatic glucgluconeogenesis, or slow the digestion and absorption of glucose from the Intestine. Insulins are also available in variety of preparation and duration of action like– It could be Long (20-30 hours), Intermediate (16-20 hours), Short (4-12 hours), Rapid action (less than 5 hours).[13]

Dentist should be familiar with the effects and side-effects due to the long duration and being not so expert, should always communicate with the Patient's Diabetologist for the best treatment plan, especially once the Implant placement is scheduled. Generally, these Implant surgeries are preferred to perform in the Late morning hours for the Diabetic Patients, just after administration of their medication and an appropriate meal, which can avoid the most common in-office Medical Emergency: Hypoglycemia, Moreover the length of the procedure would not affect the trouble of food intake. The clinician should design the treatment plan and duration of Implant Surgery according to the expected length of time a specific medication is active.[13]

Osseointegration and diabetes: Numerous studies and experiments are done on the surgical procedure of Implant to cheek the failure and success rate of Osseointegrated Implants in Hyperglycemic Patients i.e.,Diabetic Patients. The most important factors to be considered: the duration of Diabetes: The longer the duration, the higher the failure.[14] The control of Diabetes over time: The HbAIc should not exceed 7%. The Prevention of Infection: Application of antimicrobial therapy and antiseptic mouth rinses are advised for better outcome.

Success and failure of implants in diabetic patients: More failures were seen in Type-2 Diabetic Patients than Type-1 Diabetes. This is a fact which should be considered and taken seriously before designing and Planning for animplant placement in a Diabetic Patient. Most Studiessays high percentage of early Implant failure in Diabetic Patients are seen than Late Failure. Duration of Hyperglycemic effect in that particular patient significantly affects the success of the surgical procedure of placement of Dental Implant, may be due to Microvascular complications which leads to delay of healing the surrounding of the Surgical area thus early failures of Implants are more commonly seen. Few studies report failure rate seen in Type-1 Diabetes are seen more in number than Type-2 Diabetes, may be due to reduction in Insulin amount in tissues of Type-1 than in Type-2.[15-19]

In a case report, Implant was placed and intended to support an overdenture, for a patient of 65 years old Diabetic women, was retrieved after 2 months due to Prosthetically unfavourable conditions. But when histologically analysis is done, no symptoms of Implant failure recognized, with 80% bone Implant contact ratio.[20]

A Disease Mellitus Type-2 case, having Implant failure within 6 months, was reported by Park JB, and also concluded-As there was no sign and symptoms of failure before loading.[21] So Osseointegration was not affected by Diabetes Mellitus. If Plasma-glucose level were under normal range, Immediate Loading won't affect the survival of Dental Implants.[16,14,22,23] Balshi SF reported 100% success of 18 Implants after 2.5 years of placement, followed by Immediate Loading, in a 71 years old Diabetic Patient. The study suggested-For Osseointegration and Implant survival, controlled mechanical stimuli over Implant can be beneficial.[23]

Conclusion

This is a study for the restoration of Diabetic Patients with Edentulous arches in their oral cavity. It is a risk factor for placement of dental Implants in patients with Diabetes Mellitus, where the post surgical conditions are not seen as normal as in Non-Diabetic Patients and thus leads to Implant failure. But studies saypost-surgical conditions can be as normal as Non-Diabetic Patients, if the patient's Diabetes is well controlled. During surgical method the Insulin Infusion and its duration of action is another most important point of concern. Stabilization of Diabetes and preventive measures against infection can increase the success of dental Implantation in Diabetic Patients to a satisfactory rate of 85-95%.

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Initial Management of Maxillofacial Trauma

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Abstract

Trauma create a huge bulk of the figure of lives lost, exclusively in the effective age group. Trauma related deaths acquire a trimodal circulation: First, at site or on removal due to harshness of trauma injuries. The injury could be so severe that nothing can be done to save the life of that trauma victim. Second phase of death is usually due to hypovolaemia and are often treatable and avoidable. Timely and appropriate intervention at this stage can reduce the effects of trauma and prevent morbidity secondary to the injury. The third phase includes those patients who die of complications of trauma such as infection,embolism,sepsis, ARDS, and septic shock. A well-managed second phase is likely to reduce the incidence of the third phase. A systematic approach to a victim is very necessary so that any life-threatening injury is not missed. The approach to trauma must be done in the following steps: Primary survey and resuscitation, secondary survey and definitive care. This article outlines the various steps of the various steps of the initial management of trauma.

Keywords: *Trauma, ATLS (Advanced trauma life support); GCS (Glasgow coma scale).*

Introduction

Traumaisa primary donor facing the global task of disorder. Those who struggle primary trauma keep genuine & usually different injuries combine with active probability of death or injury.[1]

Prehospital care: Any maxillofacial trauma patientscome to the hospital, it is absolutely very much essential for the trauma team to look after each and every hemodynamic parameter of the patient. If the patient arrives in golden hour of trauma the expectancy of chances of survival is more. Airway of patient has to be managed first. In a case of maxillofacial trauma, once the patient arrives in the hospital, the trauma team, neurosurgeons, accidental emergency staffs, maxillofacial surgeons & orthopaedic surgeons, the entire team has to be allotted.[1] The hospital administration has to call these health care providers so that a decision can be taken immediately regarding the treatment plan for the patients. The GCS score of the trauma patient has to be calculated so that the patient can be categorized whether to be intubated or not. If GCS score is very low then the patient is intubated and shifted to ICU. If any intra oral bleeding is there, adequate suctioning has to be done. If any foreign body present inside the mouth it should be removed.[2]

Trauma scoring (GCS): GCS was the first system to quantify the severity of head injury. The variables are-Eye opening (E): Verbal response (V); Motor response (M).

Motor response is used to assess the level of CNS function. Verbal response shows ability of CNS to integrate information. Eye opening demonstrate brainstem activity. Total score ranges from 3-15, highest score represents the increase level of consciousness. Letter T used to designate patient was intubated at the time of examination. GCS 8 or less is generally accepted

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as definition of coma. At this level a monitor placed to measure intracranial pressure (ICP).Patient having moderate head injury (GCS 9-13) approximately 10%-20% will deteriorate end lapse into coma. For severe head injury (GCS 3-8) urgent management is critical. These patients are at greatest sign for mortality and morbidity. They will generally have endotracheal placed to protect their airway. Airway protection can be complicated on head injury patient because there are often can concomitant maxillofacial injuries.[2,3]

Airway: The airway is one of the most important factors in maxillofacial trauma patient. If airway is clear the survival of the patient increase, provided there is no head injury. If there is a dento-alveolar fracture or midline palatal split present, then in the emergency dentoalveolar wiring should be done, so that the bleeding can be arrested. Ahigh-volume suctioning has to be done so that if the patient is vomiting or any bleeding is present, chances of aspiration will beless. If GCS score is very low, then oral intubation should be done. A cervical collar has to be placed in all trauma patients. In that way cervical injury chances reduces. The nasotracheal intubation is avoided, if there is head injury there may be fracture of cribriform plate of ethmoid bone. Injury to ethmoid bone may cause CSF leakage. So NETI is contraindicated. If the intubation technique is difficult at that particular point of time, cricothyroidotomy can be prefer in most of the situations.[4]

Breathing: Breathing can be determined by looking at the patient's chest, the rhythm rate and depth has to be monitored. By using of the stethoscope, the entire lungs are auscultated. If saturation is getting low the operator can plan for oral intubation. An immediate chest x-ray can determine the status of the lungs. If there is any fracture present in the ribs it can also be detected and managed with the help of chest x-ray.[5]

Circulation: If a patient comes to the hospital with a hypovolemic shock or during the course of accident or trauma there is a greater amount of blood loss. The skin become pale, cool and sweaty and the patient colour of the skin looks like cyanotic. In that situation it is very difficult to administer fluid through vein flam. So, insertion of central line can save the life of the patient. The chance of deep vein thrombosis and hypovolemic shock are, more if the patient had a massive blood loss. Patient 'cross matching and blood grouping has to be done immediately. Once, the patient blood grouping has obtained immediate blood transfusion should be done. In few places, if the blood bank is not there the crystalloids and colloids plasma expenders has not given.[6]

Secondary survey: "The secondary survey is a complete re-assessment of the patient and injuries. A more complete and traditional history and physical exam is performed. Multiple sources (friends, relatives, law enforcement, and emergency services personnel) often are required to obtain a complete history. It can be learned from the mechanism of injury. The type and magnitude of the potential energy transfer provides many clues to potential injury patterns. Patients with a history of high energy transfer (e.g., high speed crashes, falls from great heights) are at higher risk for occult injury regardless of their initial clinical presentation. Single vehicle crashes, unexplained falls, or potentially self-inflicted injuries will require assessment of the patient's underlying mental state and potential for further self-harm.[7] The physical examination commences at the head of the patient and proceeds toward the toes. The experienced trauma specialist realizes that painful, distracting injuries and a less than precise examination may leave some injuries unidentified. Throughout this portion of the evaluation, the patient should be monitored with continuous cardiac rhythm with pulse oximetry, frequent blood pressure measurements, mental status exam, and clinical assessments of peripheral perfusion. End–tidal carbon dioxide monitoring can be useful also. Invasive monitoring by means of pulmonary artery catheters is rarely feasible in an ED setting. If at any time during the secondary survey the patient's clinical status deteriorates, the examiner should return to the elements of the primary survey.[8] Once the secondary survey is completed, more specific imaging and diagnostic studies can be obtained. If the patient is hemodynamically stable, and the physician has a low concern for life-threatening injury, transport to the radiology department or CT scanner for more accurate diagnostic testing is reasonable. The patient should be accompanied and monitored by a nurse at all times until the initial evaluation is complete."[9]

Tertiary survey: In tertiary survey the occult injuries, those that are not yet been detected while more life-threatening issues are managed are identified and managed properly. Other than this, the patients those are intoxicated with alcohol or other chemicals, who are unable to cooperate with the diagnosis and management of their potential injuries may require endotracheal intubation which helps to facilitate their secondary survey and diagnostic imaging.[10-12]

Conclusion

Critical responsibility authority should know the initial treatment of trauma patients. Dividing the patients into primary, secondary and tertiary groups helps in management of severely injured patients expeditiously. Primary survey includes patients having severe life-threatening complications that should be manage immediately. Secondary survey includes the remaining major injuries that required definitive treatment. The tertiary survey includes management of hidden injuries.

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Antibiotic Use in Dental Practice: A Review

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Abstract

Antibiotics are used in the management of many dental infections since decades. Antibioticsare requisite drugs for the management of oral and maxillofacial infections. They are used for the treatment of odontogenic infections, non-odontogenic infections and as prophylaxis against local infections spreading to surrounding tissues and organs. It has been estimated that 10% of all antibiotics prescriptions are linked to dental infections, the combination Amoxicillin-clavulanate is the most preferred antibiotic amongst dentists. The concurrent prescription of non-steroidal anti-inflammatory drugs (NSAIDs) can slightly alter the bioavailability of antibiotics. Over the years various new concepts are been devised in the antibiotic usage, but there is a universal abuse of antibiotics in both medical and dental field. The ultimate indication for the use of antibiotics is bounded and distinct. Pregnancy, kidney failure and liver failure are certain situations which demands special attention on the part of the professionals while indicating antibiotics.

Keywords: *Antibiotics, Prophylaxis, Infection.*

Introduction

Antibiotics were first discovered in 1929 in the form of sulfa drugs (1935), penicillin (1941), tetracycline (1948), and erythromycin (1952).[1] Endodontics and surgical therapy in cases like odontogenic infections, antibiotics are more judiciously used. Patients who are medically compromised such as diabetic or having organ transplants also require antibiotic coverage. In case of dental infections, penicillin is the first drug of choice. For avoiding less alterations in the gastrointestinal tract, narrow spectrum antibiotics are mainly preferred. Dilemma is often noticed among the dental practitioners concerning the use of antibioticsin dental practice.[2]

Indications

Antibiotics act as an adjunct in cases of dental intervention. They are mainly indicated when clinical signs are visible. Antibiotics are majorly used in dental procedures which includes bleeding in the oral cavity. Also In immunocompromised cases and infections which are progressing rapidly antibiotics usage is vastly seen.[3]

Odontogenic Infections: In cases of odontogenic infections, penicillin is the first drug of choice. They are more susceptible to gram positive bacteria (aerobes and anaerobes) and microorganisms found in alveolar and periodontal abscess also necrosis involving the pulp.[2] Penicillin are more prone to both aerobic and anaerobic microorganisms. Infections caused by penicillinase producing staphylococcus, ampicillin like drugs are preferable. Penicillin with clavulanic acid can be preferred for infections involving staphylococci, Streptococci and pneumococci. Patients having resistance may be prescribed with clindamycin as the first choice of drug and also azithromycin and metronidazole. Since cephalosporin group falls under the broad spectrum antibiotics, it is advisable in delayed allergic reactions to penicillin where erythromycin is restricted.[4] Tetracycline are important in cases of gingivitis as they are bacteriostatic in nature and inhibits the binding of Aminoacyl-t-RNA to the ribosomal acceptor site. Ciprofloxacin is mainly used in cases of endodontic infections. Therefore penicillin followed by clindamycin is more commonly used by health professionals.[5]

Non Odontogenic Infections: Non odontogenic infections such as syphilis, tuberculosis, leprosy and other. Infections of bone which are non-specific, for them, a prolonged antibiotic coverage is required.[3] New antibiotics such as fluoroquinolones is the drug of choice for non-odontogenic infections. Fluoroquinolones are prescribed in cases of joint infections, respiratory tract infection, and urinarytract infection. They have a broad spectrum of action. Tuberculosis require a

prolonged duration of antibiotic therapy which consists of rifampicin, pyrazinamide, isoniazid, streptomycin and ethambutol. Penicillin G benzatine is used for the treatment for syphilis.[6]

Antibiotics Usage JN Infective Endocarditis: Infective endocarditis is an uncommon and serious condition which may impose certain life threatening condition. An intricate sequence of events are involved with endocarditis. The adherence of microorganisms is determined by various anatomic sites.[7] Various research has found that dental procedures sometimes lead to infective endocarditis. Similarly a poor oral hygiene with compromised periodontal health impose as a risk factor. Antibiotics therapy work by not only destroying the microorganisms but also inhibiting its adherence.[8] The first drug of choice includes high dose of amoxicillin in both children and adults, one hour prior to dental procedures. 2g of oral amoxicillin should be given to adults. In case of patients who are resistant to amoxicillin or B-lactamase, clindamycin can be given. In patients with amoxicillin and penicillin resistance, first generation cephalosporin can be given. Patients having prosthetic valves in heart, vancomycin and streptomycin is used. Negligence to administer proper antibiotics at time may lead to worst consequences for patients.

Antibiotic Prophylaxis in Case of Local Infections: Various surgical and medical conditions are routinely prescribed with antimicrobials which also includes impacted third molars, orthognathic surgeries, implants, periapical surgery, benign tumor surgery and immuno compromised patients. In case of endodontics, antibiotics should be prescribed in case of fever and signs of local infection. Researches show that post-operative pain reduce to certain extent after the usage of antibiotics in cases of removal of impacted third Molar.[9] Abu Taa et al compared the pre and post-operative antibiotics in patients undergoing periodontal surgery. Amoxicillin is the preferred choice of drug after third molar removal in a dose of 2000 mg for five days.[5] As the site of periodontal surgery is contaminated with microorganisms, it is highly recommended to use antibiotic coverage. Immuno compromised patients are a special division for dental professionals as they are more prone to bacteremia which may lead to septicemia. In such cases dental extractions, deep periodontal cleaning is to be avoided as much as possible. Also, a hematologic, oncologic, and other microbiologist should be consulted with. Other Cases include dental implant placement, surgery related to tooth apex, intra-ligamentary local anesthetic injections and subgingival placement of antibiotic fibers.[10] In case of Diabetic patients, antibiotics are also prescribed. Only when the risk factors are controlled the treatment can proceed. Dental professionals play a vital role in treatment of medically compromised patients who undergo dental treatments as early diabetes is diagnosed during the treatment period. It's the dentist's job to be involved in the health care team and help in the reduction of the diseases. Various studies have found the correlation between prosthetic joint infections and dental procedures. Cephalexin 2g given one hour prior is suggested for patients who are non-allergic to penicillin and clindamycin 600mg for them who are allergic to penicillin.[11]

Antibiotic Regimen with Precautions: Antibiotics prophylaxis should be considered in kidney, liver failure and pregnancy with caution.

Renal failure affects the hard and soft tissues of mouth. After organ transplants, consultation from the physician is strictly advised. In case of prevention of adrenal crisis, additional need of corticosteroids is required.[9] Dose is increased to 30-40mg per day. It is better to perform. Dental treatments after three months of surgery. Six months are considered best. In case of invasive dental treatment antibiotics coverage is necessary.[11] To compensate with increased plasma drug concentration dose adjustments are required in case of kidney impairment. Penicillin, clindamycin and cephalosporin are the preferred antibiotics. Periodontitis disturbs the renal function in kidney transplant patient. Patients are advised to get their dental procedures done on non-dialysis days to ensure the absence of heparin. The six months just after the kidney transplant is considered to be unfavorable to do any treatment. 25 mg of hydrocortisone administered IV reduces the risk of adrenal crisis. In case of liver failure dose of ethryomycin, clindamycin, metronidazole, and antitubercular drugs should be reduced. Zinc supplements is to be prescribed to the patients to decrease health related issues In case of hepatic encephalopathy.[12] Douglas et al in cases of liver failure have restricted the use of tetracycline and anti-tuberculosis drugs. As tetracycline and aminoglycosides have teratogenic effect on fetus it is contraindicated. Shrout et al gave importance to antibiotic prophylaxis for pregnant patients as it decreases bacterial load of periodontal pathogens.[13] Azithromycin, cephalosporin, erythromycin, penicillin with or without beta lactamase inhibitors are prescribed cautiously during pregnancy. The use of NSAIDS during early pregnancy is involved

with spontaneous abortion.[14] Risk is also involved with use of diclofenac, naproxen, celecoxib, ibuprofen and rofecoxib alone or in combination. Every pregnant women is advised to get both medical and dental treatment during the period of pregnancy. Antibiotics are mandatory and essential in both medicine and dentistry. Penicillin is mostly the drug of choice in treatment of dental infections, patients having infective endocarditis, immuno compromised patients and dental procedures which may produce bacteremia. Physician consultation is required before any dental procedure in organ transplants and pregnant patients. Thereby certain complications can be avoided at ease. The prescription should de adjunct to dental treatment.[15]

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Squamous Cell Carcinoma Secondary to a Verrucous Carcinoma of Tongue and Redial Fore Arm Free Flap as a Reconstructive Option: A Case Report

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Abstract

Verucous carcinoma is unusual variant of squamous cell carcinoma which is locally invasive and local recurrence may also common. In this type of carcinoma distance metastasis occur rarely so the prognosis is also good for them. They generally occur in the head neck region and possibility of transformation of these lesions into squamous cell carcinoma is high, for which prognosis become worst. Here in this article we discuss about a case who primarily diagnosed with verrucous carcinoma on right lateral border of tongue and undergone surgery for the same. Recovery was also uneventful but within 4 months of time again he developed a lesion on the right lateral border of the tongue. The clinical and histopathological study of the lesion suggestive of squamous cell carcinoma (early invasive). For the same we decided for aggressive treatment plan to prevent further spread of the lesion. Patient undergone right side hemiglossectomy along with SOHND on right side and reconstruction of the tongue with radial forearm free flap which proved to be functionally helpful for the patient.

Keywords: *Verrucous carcinoma (VC); squamous cell carcinoma (SCC);hemiglossectomy; free flap, reconstruction.*

Introduction

Verrucous carcinoma(VC) First described by a Ackerman (in 1948)the tumor which is comparatively uncommon variant of squamous cell carcinoma which is well differentiated, slow growing and having least metastatic possibility. Growth appears to be exophytic. Recurrence of these lesions are not uncommon. Commonest site for occurrence of these lesions are oropharyngeal region, planter aspect of foot and anogenital region and less commonly involve the other mucosal or cutaneous part.[1] Main cause of oral VC often associated with use of chewing tobacco or snuff for which it is also known as "Snuff diper's cancer". Human papilloma virus infection is also associated with the pathogenesis of this neoplasm. Other causative agents of this neoplasm are chewing of betel nut, alcohol consumption and chronic irritation or mutation in genes. Patient with verrucous carcinoma are at high risk of development of squamous cell carcinoma secondarily. Which cause poor prognosis and need aggressive treatment to prevent further spread of the malignancy. Depending upon TNM staging of planning for the treatment done. In this case we planned for right hemiglossectomy along with right side neck dissection up to the supraomohyoid level after histopatologial study of the secondary lesion suggestive of early invasive carcinaoma.[2] For reconstruction purpose we use radial forearm free flap which proved to better for the same than the other available option like antero-lateral thigh flap and jejunal free flap.[3]

Case report: A man who was in his third decade of life reported to our department complaining of overgrowth on right side of tongue since last 2 years and

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the is no improvement after receiving treatment from multiple medical facility and there is no history of pain and burning sensation on taking spicy food. The lesion is gradually increasing in size with time.The patient had habit of pan chewing along with betel nut and tobacco since last 10 years. There was no relevant medical history of the patient.

On extraoral examination: No significant swelling or ulceration present extra orally. Submandibular lymph node palpable and tender on palpation on right side measuring about 0.5 cm in diameter

On intraoral examination: Exophytic lesion with papillomatous growth measuring about 3 cm*1.5 cm present on lateral border of the tongue involving anterior one third of the tongue. Multiple finger like projection present on the surface of the lesion. There is cleft like structure in between the finger like projection. Tender on palpation. The lesion appears white in color with no surface ulceration. Having problem on mastication due to the growth. Mouth opening is restricted. On radiographic examination, nothing significant was found (Figure 1).



Figure 1: Lesion of verrucous carcinoma on right lateral border of tongue.

Management

At this stage first incisional biopsy of the lesion done which suggestive of verrucous carcinoma. After obtain histopathological report wide local excision of the lesion done followed by primary closer of the defect was planned for the patient. Primarily there was difficulty in mastication and speech was not clear which was overcome by the patient within 2 months of time period. Patient was advised for follow up at regular interval (monthly) as there is a chance of recurrence of the lesion and development of squamous cell carcinoma secondarily. On follow up on 4th operative month there was small ulceroprolifarative lesion in the right lateral border of the tongue measuring about 0.5 cm * 0.3 mm in dimension. Lesion was Irregular in shape with creamy white color. Submandibular lymph node was palpable, firm, tender but not fixed. TNM staging was determined as $T_1N_1M_0$.

Primarily incisional biopsy taken from the lesion and send for histopathological study which appeared as early invasive scc. Followed by the histopathology report right hemiglossectomydone along with removal of level I level lI and level lll lymph node i.e., supraomohyoid neck dissection done. Defect created because of hemiglossectomy was reconstructed with the help of radial forearm free flap which harvested from right forearm measuring about 4cm * 2 cm and anastomosed with the with superior thyroid artery and facial vein to maintain its blood supply (Figure 2a, b, c & d). Donor site is covered with the help of split skin graft taken from left thigh region. The flap is folded and simulating the shape of the tongue. Along with other postoperative medication aspirin 150 mg given to maintain blood supply of the flap. On 6th postoperative day water started orally. On 7th day nasogastric tube removed and oral liquid diet started and discharged on 15th day (Figure 3a, b, c & d).Histopathological study reveals early invasive SCC of the right lateral border of tongue and no nodal involvement. Therefore, no planning for the chemotherapy and radiotherapy.

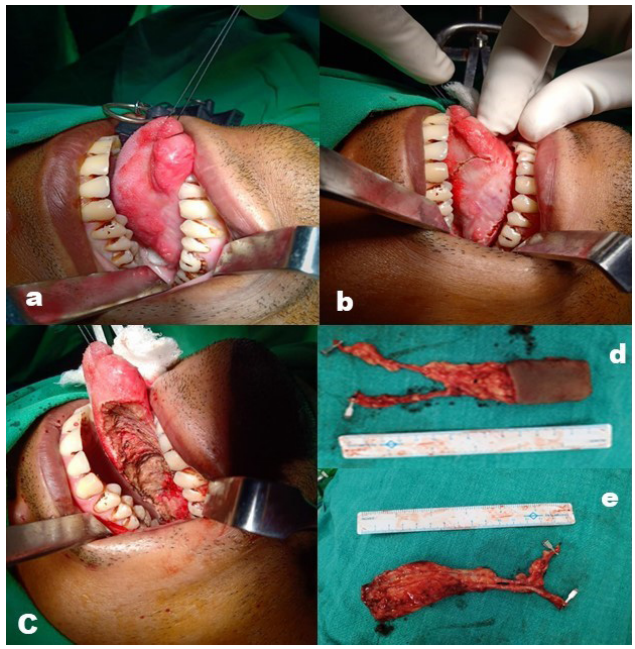


Figure 2a. Secondary SCC lesion on right lateral border of tongue; 2b. Hemiglossectomy margin; 2c. After Hemiglossectomy; 2d. Harvested RFFF

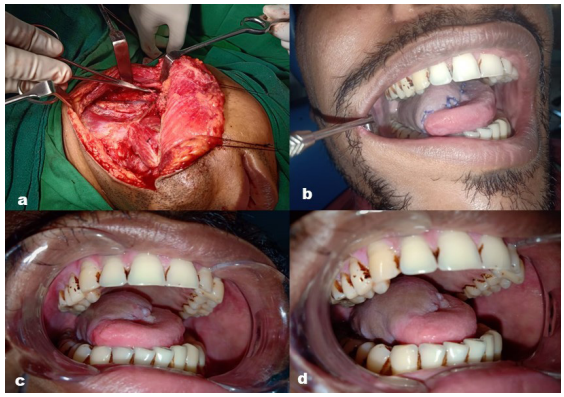


Figure 3a. Supraomohyoid Neck Dissection; 3b. Appearance of Tongue On 15th Post-Operative Day; 3c, d. Appearance of Tongue On 2 Month Review

Discussion

This type of secondary lesion is challenging for the surgeons as early detection of the lesion is needed for better outcome of the surgery and provide a better quality of life and prognosis to the patient.[4] Main goal of management of such cases is the cure the malignancy along with preservation of the normal function of different anatomical structure and provide the patient a good quality of life following surgery. Involvement of tongue made this more for the surgeon as tongue is directly involve in speech, mastication, swallowing of food.[5] Transfer of harvested free tissue with in the oral cavity for reconstruction change the total scenario of the procedure and prove to be helpful for this patient in later days. Radial free fore arm flap is chosen because it can be harvested easily by two synchronous surgical team, amount of obtained pliable skin and soft tissue and length of the flap pedicle, sensory nerve innervation potentiality and caliber of the vessles.Tongue defect is classified by Haughey et al as "hemiglossectomy, three quarter glossectomy, total oral glossectomy and base of tongue defects. They advocated the longitudinal fold technique for hemiglossectomy defects.[6] A small amount of overcorrection about (30%) is needed to allow for decrease in volume of the flap. This is the technique that was used on our patient to allow for closure of the floor of the mouth defect but at the same time simulating normal tongue appearance with a thin flap. This was evident in the acceptable appearance of the reconstructed tongue, good tongue mobility with intelligible speech and good deglutition of the patient".[7] Donor site morbidity should also be considered in this patient. A prospective study shows that there is "32% reduced radial nerve sensation, 14% cold intolerance, 14% restriction of wrist movement and 28% poor aesthetic appearance". Later it confirmed by Toschka et al. The patient shown a little restricted wrist movement except his there was no other complication. On first month follow up there was some difficulty in speech which was overcame by the patient in next 2 months duration. Therefore, radial for arm free flap can be used as suitable option for reconstruction of tongue with acceptable functionality and minimum morbidity of the donor site.[8-12.]

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A Case of Orthodontic Treatment-Induced Invasive Cervical Resorption

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Abstract

A 24-year-old patient sought endodontic treatment for swelling in the upper right canine and premolar region. Surprisingly her past dental history revelled orthodontic treatment five years back. It was a non-extraction orthodontic intervention. Total orthodontic treatment time was 23 months. Twenty-seven months after debonding, a swelling appeared at the buccocervial region of the right premolar which subsides on its own after few days. It used to keep appearing and disappearing on its own since then. Radiographic evaluation on cone-beam computed tomographic scans revealed a severe case of invasive cervical resorption on premolar region. Treatment proceeded with an endodontic approach, and the invasive site reinforced with a biodentine.

Keywords: *Orthodontic Treatment, Induced Invasive Cervical Resorption;Radiographic evaluation; cone-beam computed tomographic scans.*

Introduction

A rare and aggressive form of external resorption is Invasive cervical resorption (ICR), which primarily occurs in any tooth in the permanent dentition. Because of its location and aggressive, there is loss of tooth structure in no time. Numerous factors are held to be responsible for the aetiology of ICR, 2 of which are orthodontic treatment and surgical intervention.[1] The condition is usually painless, and often teeth give no visual signs and diagnosis is usually the result of a routine or sometimes a chance radiologic examination. The process of resorption initiates below the epithelial attachment of the tooth. It progresses coronally and apically along the root dentine.[2]

The clinical features vary from a small defect at the gingival margin to a pink coronal discolouration of the tooth crown resulting in ultimate cavitation of the overlying enamel which might be painful if pulpal or periodontal infection supervenes.[2] Internal resorption could be a differential diagnosis of ICR. Radiographs are elusive in these cases. Cone-beam computed tomography is the correct approach to diagnose such cases.[2,4,5] A plethora of approaches for the treatment of ICR is present in literature. Most appropriate therapy is to expose the resorption and remove the granulomatous tissue. Glass ionomer cement, light-cured resin composite, amalgam, and mineral trioxide aggregate (MTA) is preferred restorative material to fill the defect.[6] Among the options available, a new bioactive cement, Biodentine (Septodont, St. Maur-des-Fossés, France), can also be used as a repair material for the defect.[7]

The objective of this case report is to emphasize on the management of ICR using Biodentine.

Case Presentation: A 24-year-old male patient presented to the Department of Endodontics with a complaint of painless swelling in the maxillary right premolar region. Medical history of the patient was noncontributory. The documents of clinical examination done five years ago revealed that she had undergone non-extraction orthodontic treatment with a temporary

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anchorage device in the area of interest. Clinical examination demonstrated that the maxillary right premolar was non-sensitive to percussion and also showed swelling of attached gingiva).The periodontal probing depth was 4mm. A periapical radiograph was inconclusive. Because pulp sensability test revealed that this tooth was not vital, an Endo perio lesion was suspected. Cone beam computed tomography (CBCT) of the area revealed a V-shaped defect present on the cervical area of buccal aspect of the tooth in question (Figure 1). The diagnosis then made was of invasive cervical root resorption (ICR).

The patient was informed of the treatment plan, potential risks before giving her consent to the treatment. Followed by the administration of infiltration anaesthesia in the vestibular of maxillary right first premolar. An intrasulcular incision was made from the mesial surface of maxillary left lateral to the distal surface of maxillary right second premolar; buccally full-thickness mucoperiosteal flaps were elevated (Figure 2). Granulomatous tissue around the cervical area of the affected tooth was present. Granulomatous tissue within the defect area and from the inner aspect of the flap were cautiously eradicated by 4R/4L curette (Hu-Friedy, Chicago, IL). Because of the defect was involving the root canal and was present specific to location,the diagnosis was clinically confirmed. The root surface was carefully and completely scaled and planed with 1/2 Gracey curette (Hu-Friedy) and round bur. The surgically exposed area was then rinsed with sterile saline solution.

The access cavity was shaped with the round bur. Canal was prepared to size 25 by using K-files (Diadent, Grenoble, France). The root canal was irrigated between each file with 5% sodium Hypoclhlorite (Prevest, India), EDTA 17% (Prevest, India) and sterile saline by using a long needle alternatively. A size 25 master cone radiograph was taken, and the root canal was obturated with single cone technique. The resorption site was subsequently sealed with Biodentine (Figure 3). The flap was repositioned with nonabsorbable silk sutures. This procedure also prevented communication between Biodentin and oral environment. The access cavity was restored with a tooth colour restorative material composite (Clearfil Majesty; Kuraray, Osaka, Japan). After the surgery, the patient was prescribed amoxicillin 1 g twice a day for one week, Ibuprofen 200 mg twice daily if the pain was present and 0.2% chlorhexidine mouthwash 15 mL twice a day for two weeks. Because of the uneventful healing, the desired gingival contour was achieved; the patient was symptom-free one-weekpost-surgery, and the sutures were removed (Figure 4).

At 1-year follow-up, the periodontal status of related tooth demonstrated no mobility with normal probing depth, no gingival recession, and no loss of clinical attachment. There was reattachment between the sulcus and the Biodentin. In the radiographic examination, the related tooth and surrounding tissues showed no pathologic changes.

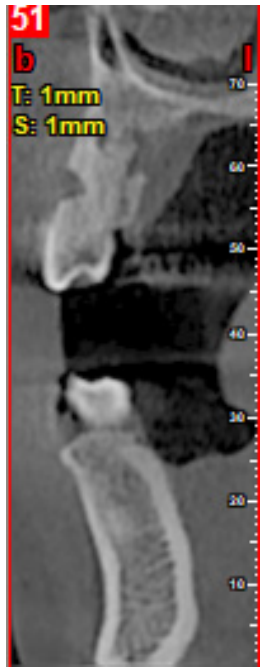


Figure 1: CBCT scan showing resorption at the cervical area of 14



Figure 2. Defect involving the root canal of 14



Figure 3. Defect site restores with Biodentin



Figure 4. Comparison of pre-operative and post-operative site

Discussion

Many predisposing factors are present to initiate ICR. Since the patient gave a history of orthodontic intervention and placement of TAD, one can suspect that both can induce ICR in the otherwise healthy tooth.[8-10] Different techniques and strategies can be adopted to treat these root lesions cause by ICR.[11] In this case, resorption lacuna was surgically explored; the root canal treatment and repair of root resorption was done simultaneously. Surgical procedures of varying degrees of invasive cervical resorption has generally involved periodontal intervention which included reflection of flap, curettage, either amalgam, composite resin, or glass ionomer cement restoration of defect, and repositioning the flap to its original position. In the case report by Yilmaz et al. there was no periodontal attachment with MTA seen.

Biodentine is a calcium silicate-based material was explicitly designed as a "dentine replacement" material. Biodentin exhibits many advantages over MTA one of them being that has better handling, which allows it easy to place in areas of resorptive defect and needsmuch less time for setting.[7] Periodontal attachment at the cervical area creates a biological seal around the reparative material, which is another crucial aspect to be considered for long term survival of the tooth.[12]

In this case, Biodentin can establish healthy periodontal attachment at the site of the defect. Biodentine also inhibits the activity of bacteria, sets in the presence of moisture and blood, and because of its hydrophilic characteristic, therefore becomes an ideal material for repairing and managing ICR cases.

Conclusion

Although this case report presents a favourable clinical outcome, further studies are necessary to provide more information about the use of Biodentin for the treatment of invasive cervical resorption.

Conflict of Interest: None

Ethical Permission: Approved

Funding: Nil

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An Alternative Treatment Method Using a Minimally Invasive Approach Employing: Ceramic Veneer to Replace Discolored Composite Veneer: A Case Report

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Abstract

A 26-year-old Indian female patient had a discolored tooth colored restoration in maxillary right central incisor A resin composite veneer had been placed to manage Eliis Class II fracture of 11. Her oral hygiene was excellent, and the gingival tissue was healthy. The treatment plan to manage discolored composite restoration with ceramic veneers using IPS Empress Esthetic ceramic system.

Keywords: *Discolored tooth colored restoration; Ceramic veneer; Minimally invasive approach.*

Introduction

Esthetic treatment of a single discoloured restored tooth represents a significant challenge to the dental practitioner. Due to the ageing and exposure to smoking, food, acidic beverages, temperature changes, function of the teeth, saliva and biofilm on the direct composite materials tend to degrade at a faster rate compared to indirect restorations. Direct composite veneers, therefore, require frequent replacement.[1]

Laminate veneer restorations are the treatment of choice for esthetic reasons and minimally invasive treatment concept. Ceramic Veneers provide colour stability, mechanical strength, clinical longevity, esthetic appearance and compatibility with periodontal tissues-make this material the right choice for such treatment. We present a case of restoration of a single, highly darkened anterior tooth with a feldspathic porcelain veneer. The resolution involved preparation of the dental structure guided by orientation grooves and provisional restoration using composite resin, a silicone impression and adhesive luting. Minimal invasive procedure of porcelain laminate veneers provides satisfactory esthetic outcomes and preserves sound tooth structure.[2]

This case report describes replacement of composite resin restoration with minimally invasive laminates in a patient seeking improved smile esthetics.

Case Presentation: A young woman 26 years old presented at our dental specialty clinic complaining of discolored composite resin restorations in her upper anterior teeth (Figure 1). Past dental history revealed she had a history of trauma due to fall five years back. Since then she has replaced her composite restoration twice due to color mismatch and staining. She came seeking for more permanent and esthetic restoration. Gingival and periodontal health was excellent.



Figure 1: Discolored anterior composite restoration present in relation to 11

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Maxillary right central incisorgave a normal response to Cold test with Miracold Plus (Hager). An intraoral periapical suggested of healthy peri radicular area11. Substitution of the resin restorations by minimally invasive ceramic laminates was suggested to the patient. Initially, dental prophylaxis was performed using an ultrasonic instrument. A full mouth impression was taken with alginate (3M ESPE) for diagnostic cast and wax up. A gypsum model was obtained, and a wax-up of this model was performed. A silicon impression (Coltene Affinis) was then developed from the wax-up. The color was selected using Vita Tooth guide 3d-Master in natural light before removal of the composites to prevent dehydration of the substrate.



Figure 2: Partial Veneer with Incisal palatal butt joint preparation of 11

The initial preparation for veneer was done using depth marking diamond bur of 0.5 mm (DIATECH crown and Bridge preparation kit) on the labial aspect (Figure 3). Partial veneer with butt joint incisal overlap was prepared to the depth marked by the depth marking grooves. The preparation removed the old composite restoration as well. A silicon impression with both putty and light body (Coltene Affinis) was made after the final reparation preparation and sent for preparation of Ceramic veneers. Provisional restorations were made using bis-acryl resin (Cool Temp, Coltene). Temprorary restorations made from bis-acryl resin do not need to be cemented. However, excess gingiva must be removed. Dies were carefully made to allow for the precise development of the emergence profile. An IPS e.max press (Ivoclar Vivadent) was used to make the ceramic laminates. The cervical and proximal finish were done using stones and ceramic rubber (Shofu, Porcelain veneer Kit).



Figure 3: Veneer etched with HF

After three days, the ceramics were tried in the mouth using a try-in clear paste (Nexus™ 3, Kerr Dental Corporation, Orange, CA, USA). After receiving consent from the patient, the restorations were etched with hydrofluoric acid for 20 seconds (10% Hydroflouric Acid Angelus Dental). Each inner surface was washed for 20 seconds and dried using a triple syringe. Silane (Monobond S, Ivoclar Vivadent) was applied as the bonding agent, and 60 seconds were allowed for drying. Adhesive (Tetric N-Bond, Ivoclar) was applied, and polymerization was activated. The tooth was etched using phosphoric acid (Meta Bio-med) for 30 seconds; the surface was then washed and dried. Tetric N-Bond adhesive was also applied to the teeth and polymerization was activated. Light-curing luting composite (Ivoclar Variolink N Lc) was applied to the inner aspect of the restorations and placed in position with Optrastick (Ivoclar). The excess cement was removed using a microbrush and floss. The restoration was cured for 120 seconds using a curing light (Coltene SPEC 3 LED). All materials were applied according to the manufacturer's instructions. An incisal adjustment with ceramic rubber was prepared. The final smile in this patient is shown in Figure 4.



Figure 4: Final restoration of 11 with ceramic veneer

Discussion

Patient selection plays a pivotal role in the success of veneers. A young patient with sufficient enamel thickness, normal overjet, overbite, absence of parafunctional or unhealthy habits and lastly presence of favourable smile line make them ideal to receive ceramic veneers.[3]

Currently, porcelain veneers afford predictable and successful restoration, with relative survival of 10 years. IPS E.max is reinforced lithium disilicate ceramics which have excellent optical and mechanical properties. They provide sufficient strength and enhances esthetic appearance when compared with direct composite resins s that had initially been used in this patient. These materials are biocompatible restorative materials that are harmonious with periodontal tissues due to their surface smoothness.[4]

The only drawback of these veneers is that since their thickness is restricted to 0.3-0.5mm they can easily fracture before bonding. Therefore, they need careful handling. However, etched enamel and porcelain, combined with the bonding composite resin luting agent with a silane coupling agent, provides a long-lasting and durable restoration.[5]

The advantages of incisal overlap include masking of the otherwise noticeable incisal finish line, thicker ceramic and reinforcement of incisal edge, and positive seating of ceramic veneers.[6] Since preparation was restricted to the enamel, this favours adhesive cementation. Retention of the restoration is also helped by the use of hydrofluoric acid and by silane coupling agents. A photopolymerizable resin cement should be used for thin restorations because these are translucent. Use of this technique shortens clinical time and make the outcome more predictable.[7] After six months of clinical follow-up, the restorations in our patient proved to be adequate from both the functional and aesthetic aspect, with the maintenance of periodontal health.

Conclusion

Discolored or stained resin composites restorations can be replaced by minimally invasiveceramic laminates in a safe and esthetically pleasing manner.

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Conflict of Interest: None

Ethical Permission: Approved

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Nutrition & Oral Health: An Overview

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Abstract

Nutrition is defined as intake and absorption of nutrients from foods and drinks. Availability of proper nutrition is essential for growth, development and maintenance of overall health. From gestational period to end of life, nutrition influences the structural and functional integrity of dentition and supporting oral tissues, directly or indirectly. If the diet taken doesn't supply enough nutrients needed to support tissues, malnutrition may develop. Poor nutritional intake affects nearly every structure of oral cavity causing further systemic disease. This article basically aims at describing importance of specific nutrients and their effects as well as results of their deficiency on oral health. Knowledge of the relationship between nutrition and oral health will help the dentists to question the patient about dietary habits, early detection of nutritional deficiencies and eventually guiding the patient to lead a healthy lifestyle.

Keywords: *Nutrition, nutrients, oral health, malnutrition.*

Introduction

Nutrition is the form of process by which an individual take and utilizes food. A well balanced, nutritious diet is important for good oral as well as general health. The food we eat supplies nutrients to body, bones, teeth, gums and also helps to fight against various infections. Hectic lifestyle, poor diet can contribute to oral diseases like Dental caries, Enamel and Dental Hypoplasia, Scurvy, Cleft lip and Cleft palate. However, poor nutrition associated with unhealthy habits can lead to progressive oral diseases such ascandidiasis, leucoplakia, squamous cell carcinoma etc.[1]

In dependent and elderly individual undernutrition are prevalent to several health problems, reduced appetite and poor quality of life. Poor oral health and Xerostomia are usually associated with reduced BMI and difficulty in mastication. Reestablishment and well maintenance of masticatory function improves nutritional status and quality of life.[2]

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Effects of Nutrition on Oral Health: Notional intake influences oral health and vice versa. This interdependency promotes healthy oral tissues as of Periodontium, salivary glands, tongue, teeth, mucous membranes etc as well as overall health.[3]

Oral diseases that have strong association with national intake are:

1. Dental caries
2. Periodontitis
3. Poor development of oral cavity
4. Dental erosion
5. Oral cancer
6. Potentially malignant lesions
7. Oral candidiasis
8. Recurrent apthous stomatitis
9. Gene disease
10. Alveolar osteoporosis

1. **Dental Caries:** It is a multifactorial microbial disease, characterised by demineralisation of inorganic components and destruction of organic substances of tooth, leading to cavitation[4]

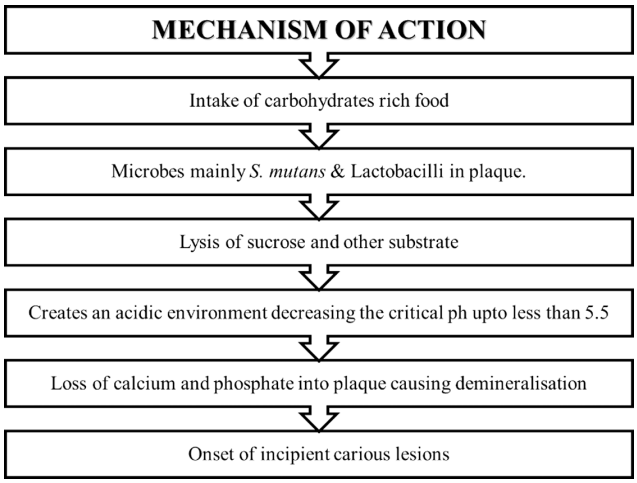


Figure 1. Mechanism of action for Dental caries

Oral Manifestation:

1. **Pre-eruptive effect:**

- Dental dysplasia causing odontoclasia in deciduous dentition
- Yellow teeth in permanent dentition
- Infantile melanodontia
- Linear hypoplasia of deciduous incisors.

2. **Post-eruptive effect:** Salivary protein deficiency can cause decrease salivation and level of Ig A level there by decreasing host defence mechanism.

Prevention

- However controlled consumption of sugary foods with proper maintenance of oral hygiene can decrease in prevalence of dental caries.
- In pre-eruptive and post-eruptive stages fluoride application can also decrease prevalence of dental caries.[5]

2. **Periodontal Disease:** Periodontal disease involves more of undernourished population. The pathology starts from gums and gradually involvesperiodontal ligament and alveolar bone.

Predisposing factors

- Poor oral hygiene associated with malocclusion
- Diabetes
- Obesity
- High carb rich diet
- Vitamin c deficiency leading to decrease collagen formation and haemorrhagic gingiva.
- Calcium and phosphorus deficiency leading to alveolar bone density and ridge resorption.

Prevention: Sufficient intake of vitamin c, vitamin B complex, calcium and phosphorus can improve the situation.[6]

3. **Poor Development of Oral Cavity:** Deficient intake of vitamin and mineral during pregnancy can influence the development of oral structure.[7]

Insufficient supply of carbs leads to

- Alternation of organogenesis
- Dental caries
- Insufficient supply of protein leads to-
- Degeneration of lingual papilla
- Alteration of dentigenisisandcemetigenesis
- Altered development of maxilla
- Malocclusion
- Hypoplastic enamel
- Insufficient lipid lead to-
- Parotid swelling
- Mucosal atrophy

4. **Dental Erosion:** It is a progressive irreversible loss of dental tissue due to chemical corrosion by acids of intrinsic and extrinsic origin.

- **Extrinsic acids**–derived from food beverages containing citric acid, Ascorbic acid and maleic acids
- **Intrinsic acid**–gastrointestinal reflux disease

Prevention

- Dietary modification. Such as increase intake of iron and calcium rich food
- Optimization of fluoride regimen with adequate oral hygiene measure.[7]

5. **Oral Cancer:** There is strong association between diet and oral cancer causing uncontrolled and uncoordinated growth of tissue.[8]

Etiology

- Consumption of carcinogenic initiators such as tobacco, alcohol etc.
- Nutritional deficiency of vitamin A, beta carotene, vitamin C, vitamin E and iron

Prevention:

- Cessation of habit
- Supplementation with iron, vitamins and antioxidant[8]

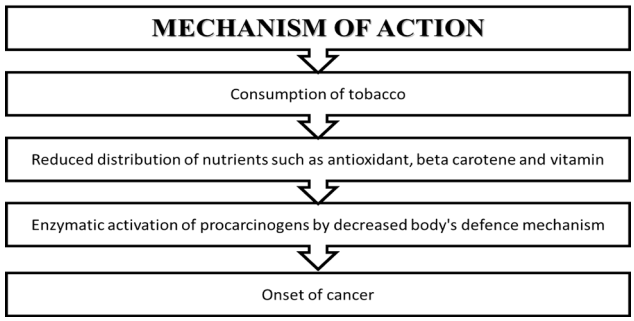


Figure 2. Mechanism of action for oral cancer after chronic tobacco consumption

6. **Potentially Malignant Lesion:** This includes a variety of lesions characterised by increased risk of malignant transformation under some favourable conditionse.g.: leucoplakia, oral lichen planus.

Etiology: Deficiency of retinol, beta carotene, vitamin B12, vitamin A, folic acid and marks onset of the lesions.[8]

Prevention: Consumption of food and vegetables rich in antioxidants and folic acid.

7. **Candidiasis:** It is the most prevalent opportunistic infection affecting oral cavity caused by *Candida albicans*.

Prevention:

- Maintenance of proper oral hygiene.
- Consumption of food stuff rich in folicacid, vitamin A, B1, B2, C and K.

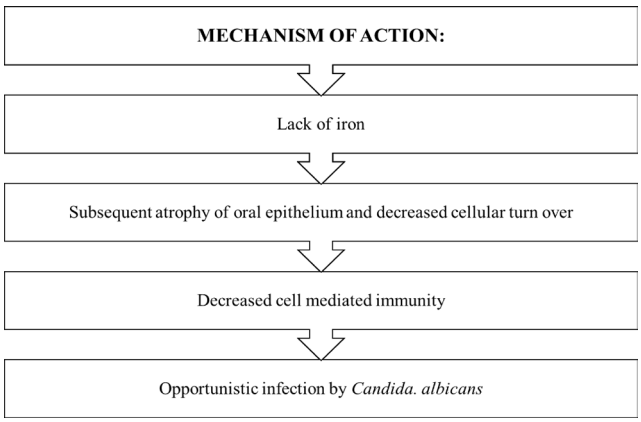


Figure 3. Mechanism of action for opportunistic infection by Candida albicans

8. **Recurrentrecurrent Apthous Stomatitis (RAS):** It is a benign painful oral mucosal disease consist of single ormultiple nonspecific ulcers.

- Predisposing factors-hematinic deficiency.
- Oral manifestation includes depapilationand atrophy of tongue.

Prevention: Consumption of diet rich in iron, folic acid and vitamin B12.[8]

9. **Geneticdisorder:** Folate deficiency during embryonic development cause defect in neural tube formation. Genetic mutation of maternal gene "MTHER" causes folate deficiency in blood which increases the risk for cleft lip and palate.[7,8]

10. **Alveolar Bone Osteoporosis:** It is anage-related condition characterized by low bone mass with consequent increase in bone fragility and fracture susceptibility.

Prevention: In elderly people, adequate amount of calcium and vitamin D, vitamin C, folic acid, iron rich food should be included.[7,8]

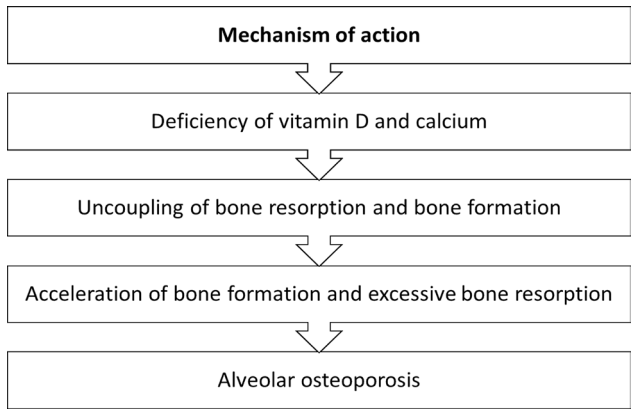


Figure 4. Mechanism of action for alveolar osteoporosis

Table 1: Oral manifestation of nutrition deficiency

Nutrient Deficiency	Clinical Manifestations
Vitamin A	Gingivitis, periodontitis Hyperplasia of gingiva
Thyamin (Vitamin B1)	Crack lips, A satin looking gingiva and tongue, Angular cheilitis, ulcerative gingivitis
Vitamin B6	Tooth & Bone decay, Periodontal disease, Anaemia, Sore tongue, Burning sensation of oral cavity
Vitamin B12	Angular Cheilitis, Halitosis, Bone loss, Detachment of periodontal fibres
Vitamin C	Bleeding gums, Delayed wound healing, mobile tooth

Balanced Diet: A balanced diet might be described as one providing each nutrient in amount needed to maintain optimum health.[9]

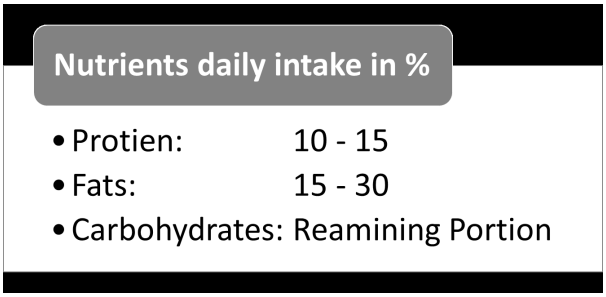


Figure 5. Daily nutrition intake

Effects of Poor Oral Health on Nutrional Absorption: Poor oral health can affect quality and quantity of dietary absorption which in fact increase susceptibility towards systemic disease.

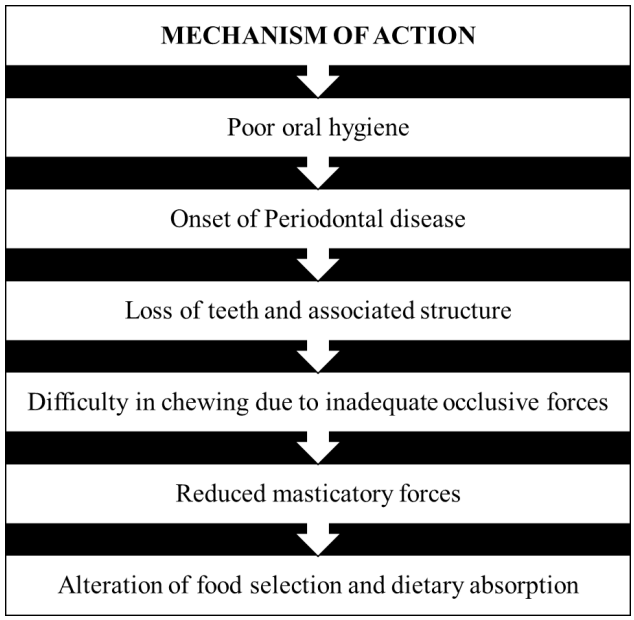


Figure 6. Mechanism of action for alteration of food selection and dietary absorption

- Studies revel people with more tooth tends to have more grinding of food, consume fewer calories including more fibres, vegetables, less saturated fat hence improved dietary quality and nutritional status.
- Loss of tooth causes decrease in masticatory ability even after use of dental prosthesis. ln elderly individuals edentulousness causes oral discomfort during chewing leading to weight loss. Iii fitting denture cause poor grinding of food leading to inadequate intake of nutrition. Edentulous or denture bearing people tend to consume more over cooked processed food containing more refined sugar, cholesterol which predispose to systemic disease.[10]

Conclusion

Nutrition is vital to human growth, development and health maintenance. Malnutrition can cause poor oral health and poor oral health can indirectly cause malnutrition. To break the interdependency dental and general health workers should reach a large number of individuals to provide clinical assessment of nutritional risk factors during regular health check-ups. Education and motivation regarding nutrition and health should be given on a regular basis. Periodic monitoring and follow ups should be included to evaluate the counselling results.

Conflict of Interest: None

Ethical Permission: Approved

Funding: Nil

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Gingival Enlargement, a Diagnostic Indicator of Leukaemia?

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Abstract

The mouth is considered as a mirror of the body reflecting the changes both in health and in disease. It is well known that certain systemic diseases are diagnosed due to their characteristic appearance in the oral cavity. The gingiva is enlarged due to many systemic conditions and diseases including pregnancy, hormonal variations, drugs, hypersensitivity, infections, as well haematologic malignancies. Gingival enlargement has been linked to leukaemia and that too as an early diagnostic indicator of this possibly fatal disease, which when identified early can help reducing the morbidity and mortality by referral to haemato-oncologist and initiation of chemotherapy. Leukaemia is a haematologic malignancy arising from production of anomalous haemopoietic stem cells with uncontrolled regulations, differentiation and apoptosis. We report a case of leukemic gingival enlargement in a young male patient with a brief discussion on the mechanism and clinical features.

Keywords: *Diagnostic indicator, gingival enlargement, leukaemia, systemic disease.*

Introduction

Leukaemia is a hematologic malignancy in which there is proliferation of immature leukocytes (precursor or blast cells) in the bone marrow.[1] The blast cells do not mature into leukocytes and they aggregate in the marrow spaces suppressing the hematopoietic stem cells resulting in deficient formation of all the blood cells.[2] Due to the collapse of the hematopoietic system there is pancytopenia. The abundance of the blast cells surpasses the capacity of the bone marrow and they spill into the blood as well as soft tissues, including the gingiva where it leads to gingival enlargement. [3]

The aetiopathogenesis of Leukaemia is not clear. Abnormalities in chromosomes (Philadelphia chromosome), chemicals, exposure to irradiation as well viral infections have been implicated. [2,4] The incidence of this grave disease is about 0.04% with a significantly high morbidity and mortality rate. It is said that among all the deaths due to malignancies, Leukaemia accounts for about 4%.[5] The disease is classified on the basis of its onset, types of cells lineage involved and the rate of progression. It is fatal, when left untreated.

Case Report: A 25-year-old male reported with swollen gingiva for 2 months which was associated with pain and bleeding. The past medical, dental and family histories were non-contributory.

He also reported of low-grade fever, loss of appetite and weight loss. Physical examination revealed submandibular lymphadenopathy and generalized pallor. Intraorally generalized enlargement of the gingiva was seen with pseudo pockets in both maxillary and mandibular arches, and erythema, bleeding, haemorrhagic slough in some areas. [Figure 1a] Clinical differential diagnosis of leukaemia, fibromatosis gingivae and inflammatory gingival enlargement were considered.

Panoramic radiograph did not show any alveolar

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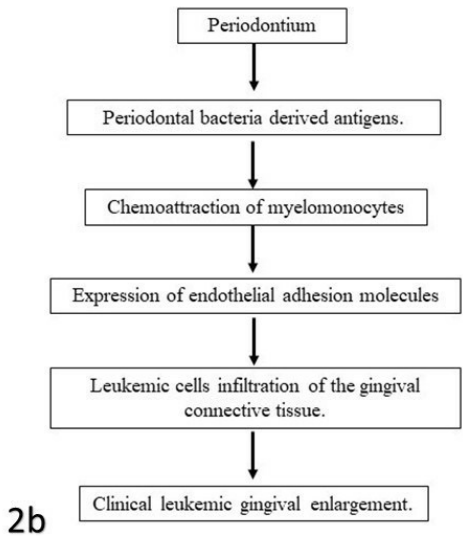
bone resorption. Peripheral blood smear revealed about 80% blast cells, faggot cells with multiple Auer rods were seen suggestive of acute promyelocytic leukaemia. [Figure 1b] Complete hemogram was performed and it was seen that the patient had anaemia, thrombocytopaenia and leucocytosis. [Figure 2a] For confirmation, flow cytometry and fluorescent in situ hybridization (FISH) assay were performed. It was seen that CD13, CD33 and CD 17 were expressed and HLA-DR and CD14 were absent, Cytogenetic or FISH analysis of acute promyelocytic leukaemia-Retinoic acid receptor alpha (PML/RARA) fusion genes was positive, confirming the diagnosis of PML. The patient was referred to the haemato-oncologist for treatment and was started on induction chemotherapeutic regimen but was lost to follow up.



Figure 1: (a) Intraorally generalized enlargement of the gingiva was seen with pseudo pockets in both maxillary and mandibular arches, and erythema, bleeding, haemorrhagic slough in some areas. (b) Peripheral blood smear revealed about 80% blast cells, faggot cells with multiple Auer rods were seen suggestive of acute promyelocytic leukaemia

Test	Result	Normal Value
Total White Blood Cells (WBC)	40.0 x 10^3/µl	4-11 x 10^3/µl
Total Red Blood Cells (RBC)	3.63 x 10^6/µl	2.5-5.5 x 10^6/µl
Hemoglobin (Hb)	11.2 g/dl	11-18 g/dl
Packed Cell Volume (PCV)	33.1 %	35-50 %
Mean Corpuscular Volume (MCV)	91.2 fl	76-96 fl
Mean Corpuscular Hemoglobin (MCH)	30.9 pg	26-34 pg
Mean Corpuscular Hemoglobin Concentration (MCHC)	33.7 g/dl	31.8-36.3 g/dl
Total Platelet Count	20 x 10^3/µl	120-450 x 10^3/µl
Differential Leukocytic Count		
Neutrophils	5 %	40-70 %
Basophils	0 %	0-1 %
Eosinophils	2 %	1-6 %
Monocytes	1 %	2-10 %
Lymphocytes	5 %	20-40 %
Blast cells	87 %	

2a



2b

Figure 2: (a) Complete hemogram was performed and it was seen that the patient had anaemia, thrombocytopaenia and leucocytosis. (b) Flowchart depicting the mechanism of leukemic gingival enlargement

Discussion

Leukaemia is a haematologic malignancy involving the leukocytes which presents as a high count of immature blast cells in the peripheral blood and their proliferation in the bone marrow at the expense of the normal erythrocytes, leukocytes and thrombocytes resulting in pancytopenia[1,2,6] Depending on the cells implicated, Leukaemia can be myeloid or lymphoid and depending on the onset, it could be classified as acute or chronic. While chronic leukaemia starts with a slower onset, runs a gradual course ranging from months to years, usually showing more differentiation of cells, acute types have characteristically loss of differentiation of the blast cells, which suddenly proliferate and are so aggressive that within a short time could lead to death if left undiagnosed/untreated. [7]

The acute myeloid series of leukaemia are attributed with the manifestations of gingival enlargement and the present case is no exception. Depending on the maturation the leukaemiais further classified into subtypes. The French-American-British classification of acute myeloid leukaemia is given in Table 1:[8]

Table 1. French-American-British classification of acute myeloid leukaemia

M0	Undifferentiated leukaemia
M1	Acute myeloblastic leukaemia
M2	Acute myeloblastic leukaemia with maturation
M3	Acute promyelocytic leukaemia
M4	Acute myelomonocytic leukaemia
M5	Acute monocytic leukaemia
M6	Acute erythroblastic leukaemia

The signs and symptoms that we encounter in the leukemic patients are due to the result of the proliferation of the malignant blast cells and their subsequent effect on the normal haematopoietic stem cells. Since erythrocytes are not formed it leads to anaemia, fatigue, breathless on exertion, mucosal pallor and generalized debility. [9,10] Due to the decrease in the leukocytes, the immunity decreases, the patients are prone to infections and are febrile. Spontaneous unprovoked bleeding especially in the gingiva, purpuric patches and clotted blood in the oral cavity are due to the decrease in platelets. [11] Besides hepato-splenomegaly, lymphadenopathy and involvement of the central nervous system are common.[12]

Oral manifestations are the most frequently encountered in the acute types and occur because of the infiltration of the blast cells in the tissues directly or indirectly due to the decrease in thrombocytes, erythrocytes and leukocytes.[13,14] Oral manifestations can lead to diagnosis of many systemic diseases, one of them is leukaemia. Oral mucosal pallor, gingival enlargement, unprovoked gingival bleeding, palatal petechiae, haemorrhagic sloughs on the gingiva and ulcerations are the hallmark of leukaemia.[15] Leukemic gingival infiltration occurs only in about 5% of cases of acute myeloblastic leukaemia (AML).[16] The antigens derived from the periodontal bacteria serve as chemo-attractants for the leukemic cells. Due to the micro-anatomy of the gingival vasculature, and expression of endothelial adhesion molecules, the infiltration of leukemic cells is further facilitated resulting in gingival enlargement.[17] [Figure 2b] It has been seen that the leukemic gingival enlargement is responsive to chemotherapy, even without any sort of periodontal treatment leading to regression in the enlargement. [18]

Dentists/oral physicians are concerned about the oral problems of the patients and are faced with a predicament whether dental treatment could worsen the leukemic situation changing the systemic status of the patient. Oral hygiene measures like oral prophylaxis will cause transient bacteraemia which would lead to considerable morbidity. However, any therapy for the disease needs removal of foci of infection, periodontal status needs to maintained and debridement may be done when warranted and even dental extraction under suitable prophylactic measures.[19,20] It may be further emphasized that all dental procedures ought to be undertaken with the supervision of the consultant haemato-oncologist and only palliative emergency dental care needs to be provided.

Conclusion

It must be emphasized that dentists and oral physicians need to differentiate between gingival enlargement seen in different conditions and recognize the oral manifestations of leukaemia aiding in their early diagnosis, ensuring prompt treatment reducing the morbidity and mortality associated with the disease.

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Central Ossifying Fibroma of the Mandible: A Case Report

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Abstract

Central ossifying fibroma is a benign fibro-osseous lesion of mesenchymal origin, mostly prevalent in second and third decade of life. Women are affected more with a strong predilection for the mandibular premolar and molar areas. They are usually slow growing asymptomatic tumor which treated by curettage enucleation and sometimes by enblock resection. This case report presents the central ossifying fibroma of a twenty-three-year-old female which was diagnosed, operated and rehabilitated successfully.

Keywords: *Central ossifying fibroma; fibro-osseous lesion; curettage enucleation.*

Introduction

Central ossifying fibroma (COF) is one of the most common benign fibro osseous neoplasm in oral and maxillofacial region. It is prevalent in the second and third decades of life Normally, females are affected, preferably in the mandibular premolar and molar areas.[5-7] Being a fibro osseous lesion, it looks a lot like fibrous dysplasia, cemento-osseous florid dysplasia or cemetifying periapical dysplasia. This painless lesion requires complete excision to avoid recurrence. The present case report deals with the surgical and prosthetic rehabilitation procedure of a young patient with COF of mandible.

Case report: A 20-year-old girl reported to the Department of Oral Medicine with a gradually increasing painless swelling in the right vestibular region of mandible for three months. The extra-oral examination revealed a single diffuse swelling in the right side of face about 1 cm below the angle of mouth. No lymphadenopathy was there. On intra oral examination, bicortical swelling was seen 46, 45, 44 regions, with normal overlying mucosal colour. On palpation swelling was lobulated,bony hard in consistency and was non-tender. Expansion was there both lingually and buccally, without involving lower border of mandible.

Analysis of the panoramic radiograph revealed a well-defined lesion with mixed radiopaque and radiolucent appearance. It was extending from 43 to 47 mesio-distally and from the alveolar crest to 1.5 cm above the inferior borders of the mandible supero-inferiorly. A radioopaque mass was present in relation to 45 and 44 with multiple foci of calcification throughout. It was surrounded by a radiolucent zone (Figure 1). Though roots of 46 and 45 were displaced, there were no external resorptions of any root resorption. The histopathological examination of incisional biopsy, showed mature bony trabeculae with osteoblastic rimming in a highly cellular fibrocollagenous stroma, suggestive of central ossifying fibroma (Figure 2).[1] Noperitrabecular clefting was there, which differentiate it from fibrous dysplasia.[2] Based on the above clinical findings, imaging results, and histopathologic features, a diagnosis of central ossifying fibroma (COF) was confirmed.

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Figure 1: Pre-operative radiograph of patient with central ossifying fibroma

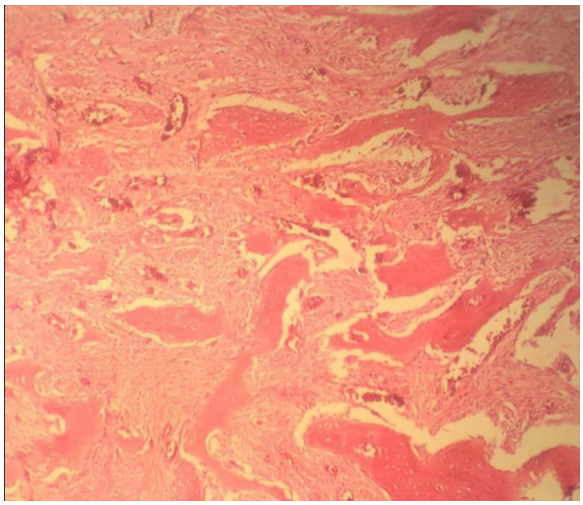


Figure 2: Histopathologic feature of central ossifying fibroma

Surgical treatment: Having a definitive diagnosis and extension of the lesion in mind, surgical excision and reconstruction with bone graft was planned. The lower border of the mandible was free from the lesion. So,a marginal mandibulectomy was planned with informed consent of the patient. With standard submandibular incision, the lesion was exposed. Marginal mandibulectomy was done from 43 to angle of the mandible. A rim of healthy bone at the lower border of the mandible was kept intact and was reinforced with 2.5 mm reconstruction plate.[3] A block of corticocancellous bone graft from the iliac crest was harvested and secured to the surgical defect on the remaining lower border of the mandible. Bone graft was fixed to the reconstruction plate with the help of soft stainless-steel wire (Figure 3a) The graft area was then covered with plasma rich fibrin(PRF) membrane and tension free closure of the flap was carried out. Post-operative instructions were given to the patient.

On her recall visit she has a good facial symmetry, mandibular contour, intact mucosa and proper occlusion. Her post-op panorex x-ray showed good graft position and size(Figure3b). The patient was followed up for a period of twelve-month. As there was no recurrence of the lesion,it was deciding to rehabilitate the case prosthetically.Post marginal mandibulectomy, a Kennedy's class II situation was created with missing teeth numbers of 48,47,46,45,44 and 43 (Figure4a).[4] Various treatment options ranging from implant supported prosthesis to cast partial denture were discussed with the patient. As the patient was not interested for a second surgery, a cast partial denture was planned for her.

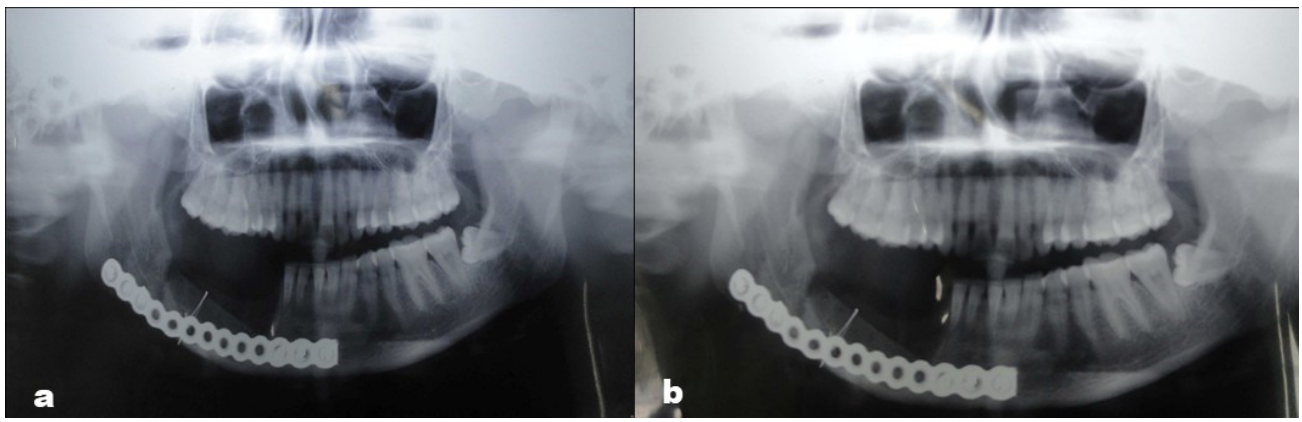


Figure 3a: Radiograph showing reconstruction of mandible with iliac crest graft and reconstruction plate; 3b: Post-operative radiograph of the patient during follow up period.



Figure 4a: Intra oral view showing Kennedy class II situation; 4b: Metal frame work Try in; 4c: Try in of waxed up prosthesis; 4d: Acrylised Prosthesis; 4e: Intra oral view of delivered Prosthesis

Initially diagnostic cast obtained from primary impression was surveyed to determine the areas of undercuts, guiding plane, aesthetics, and area of insertion and removal of prosthesis. Mouth preparation was done based on this information. It included teeth preparation of 37,36 to receive metal crown and rest seat on 34 with an extension in 33. After cementation of metal crowns, definitive impression was made with addition polyvinyl siloxane materials of medium and light body consistencies (Affinis, Coltene) on a special tray. Regular laboratory procedures were then carried out to obtain the cast framework. Embrasure clasp was given in the 37,36 and a bar clasp in 43 region for direct retention. Occlusal rest was given on 34 with a canine extension on 33 for indirect retention. The metal framework obtained after casting was then tried and adjusted in patient's mouth (Figure 4b). This was followed by jaw relation, try in and acrylization of denture to get the definitive prosthesis. The prosthesis was inserted in patient's mouth and occlusion was adjusted (Figure 4c, d & e) Proper instructions were given to the patient regarding denture care and maintenance. Routine check-up was done in every three months. Patient was satisfied with the final outcome aesthetically and functionally (Figure 5).



Figure 5: Extra oral view of delivered prosthesis

Discussion

Central ossifying fibroma (COF) is the most common benign fibro osseous neoplasm of the oral and maxillofacial region. This lesion tends to occur in the

second and third decades of life, commonly in women, and in the mandibular premolar and molar areas,which is similar to present situation.[5-7] In contrast,juvenile ossifying fibroma, though having similar features is more prevalent in age groups of 5-15 years whereas fibrous dysplasia is predominant in age group of 4th and 6th decade of life.[8] It was a painless lesion without involvement of lower border of mandible, which is the characteristic feature of COF.[9,10]

Radiographically, the lesions can be either completely radiolucent, mixed orcompletely radiopaque surrounded by a radiolucent rim depending on the amount of calcification.[11] Radiolucent ones can be misdiagnosed withfocal cement osseous dysplasia, odontogenic cyst, periapical granuloma, traumatic bone cyst, unilocular ameloblastoma, and central giant cell granuloma. But the present case is circumscribed radiolucent lesion with well-defined margins and intralesional calcification suggestive of COF.[12-14] This differentiate them from fibrous dysplasia usually appears as a diffuse, homogeneous ground-glass, radiodense region radiographically ill-defined border and located mostly in periapical region.[15] COF is also differentiated from sarcomas by presence of well-defined margins.[16]

Most COFs have a good prognosis and can be treated by conservative surgical excision through the use of curettage, enucleation, or excision.[17] A conservative marginal resection followed by immediate reconstruction of affected side mandible with iliac crest bone graft was planned. As the size of defect was more than five-centimetre, reconstruction using iliac crest graft was preferred.[18, 19] The simultaneous resection and reconstruction resulted in good anatomical and functional recovery. Moreover,as the reconstruction was done in one single surgical procedure, any distortions, deviations, atrophies and scarring inherent to secondary surgeries was avoided, making this technique much more reliable.[20,21]

It is challenging to prosthetically rehabilitate such iliac crest graft cases, as a proper stress distribution is required during chewing. In this case,it was achieved through a dual impression technique, broad coverage and clasp design.[22] Embrasure clasps was given on 37 and 36 opposite to edentulous area, as direct retainer which also helped in cross arch stabilization. Intentional undercuts were given in metal crowns of 37, 36 for direct retainer to be effective. Movement of the frame work further avoided by use of semi anatomic teeth.

Conclusion

Though not malignant, these types of cases require an early diagnosis, appropriate surgical intervention, prosthetic rehabilitation and follow-up for long term success. Rehabilitation of the post-surgical COF patient with CPD is a simple and cost-effective treatment. It is a good treatment option when precision attachment or implant prosthesis is ruled out.

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Chemo Mechanical Caries Removal Technique: A Review Article on Lost and Found Approach towards Painless Dentistry

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Abstract

With the advent of Minimal Invasive Dentistry in trend, chemo-mechanical caries removal technique has been a recent and unprecedented addition to it. Being non-invasive and atraumatic one, It has emerged as an unrivalled replacement of conventional technique that were instilled with an idea of unwanted drilling, extensive cavity preparation with high speed hand pieces resulting in weakened tooth structure. This review delineates the comparative evaluation of clinical efficacy of various chemo mechanical caries removal agents evolved till date.

Keywords: *Chemo mechanical caries removal, GK-101, GK-101E, Carisolv, papain,biosolv.*

Introduction

Earlier, restorative dentistry was based upon the concept of G.V. BLACK's principle of "extension for prevention" leading to extensive cavity preparation for adequate resistance and retention.

For serving this purpose, high speed hand pieceand rotary instruments came into the light. The commencement of these instruments brought the new era of operative dentistry but at the same time invasive one. The rotary intervention often led to noise, vibration, pain, unwanted drilling and loss of viable tooth structure. There by, instigating fear, absence and anxious attitude, especially in paediatric patients. Such factors were not only contrary to philosophy of minimal invasive dentistry but they eventually result in advancement of decay process that may require emergency and complex treatment in near future. However, the introduction of chemo mechanical caries removal methodology almost 3 decades ago[1]. Has surpassed the drawbacks of traditional drilling approach & simultaneously potential adverse effects of soft & hard tissues due to heat & pressure. Claimed to be one of the most efficient therapeutic alternatives, it mediates its action through chemical chlorination of decayed dentin, causing alteration in quaternary/secondary structure of collagen. Thus, smoothening the excavation process without the need of anaesthesia[2.]

Evolution of Chemo-mechanical Agents: In late 19th century, various attempts were made using the agents like EDTA, collagenase, sodium dodecyl sulphate, etc but were proven clinically inefficient due to their time-consuming process.[3-5] In last decade several amendments were made so as to improve their clinical effectiveness and are still in progress. Nowadays, with the ingression of diverse agents, CMCR has been broadly classified as1. Na-O-Cl (sodium hypochlorite) derivative;

Enzyme based derivative: Sodium Hypochlorite Derived CMCR Agents: 5% sodium hypochlorite was used as CMCR from 1972.[7]

Mechanismof action: Its proteolytic actiondisrupts H bonds of partially degraded collagen fibrils of decayed dentin resulting in its gentle removal. But because of its high instability, corrosive nature and lack of differentiation

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b/w infected dentin & affected dentin, it has now been discontinued[8]. To overcome its shortcomings, the amino acids (Sorensen's solution) were added for subsequent versions. Sodium hypochlorite is further classified as–

1. GK101;
2. GK101E-Caridex;
3. Carisolv

GK-101: Introduced by Goldman & Kronman in year 1976[1.]

Composition and use: 0.05% N-monochloroglycine (NMG) & sodium hypochlorite (Na-O-Cl). It is prepared by mixing of two solutions i.e. Solution A-25ml each of 2M NaCl,2M glycine,2M NaOH. Solution B-10ml of 4-6% of Na-O-Cl. t requires a special delivery system that includes reservoir (meant for warming freshly prepared solution at 41°C) & a pump (similar to hand piece in shape) attached to needle of delivery tip of 20 gauge. Application has to be done with minimal pressure in paintbrush motion so as to avoid any patient discomfort.

Mechanism of action-Irreversible denaturation of organic structure of carious dentin by conversion of hydroxyproline (essential factor for structural stability of collagen) to pyrrole 2 carboxy-glycine.

Mean Excavation time-8.5 min:

- **Advantages-**no potential harm to pulp & other oral tissues[9.]
- **Disadvantages:** Inefficient in removal of entire carious lesion & for achieving the adequate finishing of excavated sites, use of burs become mandatory; Time consuming procedure and require great quantity of solution to achieve caries free surface[16].

GK-101 E: To overcome the limitations of GK-101, glycine was substituted by amino butyric acid. GK-101E got FDA approval in 1984 & was marketed as **'caridex'** in 1980.

Composition: It is an ethyl derivative [N monochloro-DL2 amino butyrate (NMAB)].

Mechanism of action: GK-101E acts in a similar manner to GK 101 by denaturation of collagen with additional cleavage of denaturised collagen fibrils resulting in oxidation of glycine residue.

Mean excavation time: when compared to GK-101-time duration, there was not much significant improvement except the lag period of 30-90 seconds.

Advantages: Increased specificity of solution towards infected dentin than affected dentin; Addition of urea to caridex enhanced its efficiency in caries excavation in deciduousteeth.[9]

Disadvantages: complex delivery system was still an issue; It was not still clinically superior to conventional rotary in caries removal.

Carisolv: Developed by med team Goteborg, Sweden in 1998 and later on modified by fure & lingstorm[10] in 2004, in 2013 a new carisolv system evolved as new alternative.

It is only commercially available sodium hypochlorite derived CMCR agent currently.

Composition: Original moiety was red in colour and consisted of 2 syringes–one containing carboxymethyl cellulose based gel and 3 amino acids (glycine, leucine & lysine) and another is composed of 0.25% Na-O-Cl.

Carisolv gel composition was modified (in 2004) into single all in one syringe by removal of red colouring agent and reducing the concentration of amino acid to half and subsequently increasing sodium hypochlorite solution to 0.475%.Special instrumentation is needed for its application-earlier it was with non cutting tip hand instruments that were replaced by power driven endodontic motor with non-cutting tip burs which ensured great control over tissue removal at very low sound vibration[11.].

Mechanism of action: Chemically, mono amino butyric acid was replaced by 3 differently charged amino acids that bind with different elements of carious lesion through electrostatic action. This electrostatic inter action disrupts the protienaceous structure of degraded collagen fibrils ending in further dissolution of carisolv into infected dentin. Dissolution leads to continued breakdown by chloramines softening the decayed dentin layer (Ericson et al.)

Meanexcavation time: As per the demonstration of 2 studies, original carisolv gel showed prolonged time duration of 10.4+6.1 min & 12.2+4.1min respectively[12,13] However, new carisolv gel exhibited shorter time duration in deep carious lesion 9.0+7.0 min[10] in converse of its action in moderate sized lesions. Overall mean excavation time is 5.5 min.

Advantages:

a. No requisite of either prior heating or special delivery system because of its gel form.

b. Improved handling properties due to the high viscosity of carboxymethylcellulose.

c. According to Bullet et al., it exhibits both bactericidal and haemostatic impact on exposed pulp tissue promoting its regeneration.

d. Apart from its role as CMCR, it can be utilised in other halves of dentistry as plaque removal, irrigating solution, treatment of oral ulcer.

e. Root caries can be effectively removed by this gel[10].

Disadvantages: a) proven to be less effective than rotary technique due its gradual process, customised instrument & large usage of solution (which leaves the dentin surface irregular) thus, making it cost effective; b) Patient often complaint of bad taste/odour similar to that of chlorine. [14]

Enzyme based CMCR: Even after its establishment as clinically successful CMCR to some extent, its cost effectiveness and long excavating period was still a big concern

Papacarie: Introduced in Brazil in year 2003[15]. 'Papacarie' word is derived from Portuguese literature which means 'caries eater'.

Composition: Its main ingredients are–Papain, Chloramines, Toluidine blue, Preservatives, Stabiliser, Deionised water & thickener

Papain: Also known as papaya protease I, is a cysteine protease enzyme derived from the latex of papaya (carica papaya) & mountain papaya. It belongs to a family of protein with wide range of activity i.e. both exopeptidase & end peptidase activity.

Chloramines: It is basically a monochloroamine with bactericidal & disinfectant property.

Toluidine blue: As a colouring agent, it also exhibits the property of photosensitivity towards bacterial membrane.

Mechanism of action: Papacarie has got the papain enzyme which is a proteolytic itself. This proteolytic enzyme acts on infected dentinal tissue which lacks the plasma protease inhibitor i.e. alpha-1 anti-trypsin but still précised mechanism is not clear[15].

Mean excavation time: For primary teeth-4.2 min & for permanent ones -4.17 min (S Gupta et al.)

Advantages:

a. papacarie gel is easily available on commercial basis with low cost effectively.

b. Highly effective with shorter excavation period

c. Papain, being the main constituent has got the bactericidal & anti-inflammatory properties, thus being the most biocompatible.

d. There is no requisite of either special instruments or extensive training thereby, making it user friendly.

Disadvantages:

a. the mechanism of action is still unclear.

b. It is reported that papacarie somewhat affects the mechanical properties of mineralised dentin.

Carie-care system: By Unitech pharmaceuticals (India, 2010) is another papain derived gel; its modified version Papacarie duo was released in 2011 with improved properties.

Biosolv (SFC-V & SFC-VIII, 3M-ESPE AG, Seefeld, Germany): Introduced by Clementino-Luedemann et al., is still under the wraps because of its confusing and contradictory limited data.It demands the special instrument **star V1.3** for its application.Based upon the manufacturer's information it constitutes the pepsin enzyme dissolved in phosphoric acid & sodium phosphate buffer.

Conclusion

For any treatment outcome to be successful, patient's behaviour and attitude is as necessary as performing manoeuvres. The philosophy of minimal invasive dentistry has enlightened this idealism by tissue preservation as far as possible with minimal intervention. A chemo mechanical caries removal agent {being one of the atraumatic moieties of MID concept} has substantiated its potency towards anxious, disabled & paediatric patients especially. Thus, looking at their clinical prevalence, it can be concluded that CMCR withholds the promising future of dentistry.

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Antimicrobial Activity of Moringa Oleifera Extracts against Common Periodontal Pathogens: Potential Application in the Prevention and Treatment of Oral Diseases

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Abstract

This study assessed the antimicrobial potential and Minimum Inhibitory Concentration (MIC) of *Moringa oleifera* leaves and fruit extracts in contradiction to common periodontal pathogens. Agar well diffusion technique was used to evaluate the ethanol and petroleum ether extracts against *Porphyromonas gingivalis* and *Prevotella intermedia*. Analysis of Variance (ANOVA) and t-test were used for statistical analysis. All the extracts showed powerful antimicrobial action with MIC values fluctuating from 0.2-0.8 µg/ml against *P. intermedia*. Least MIC values of 0.2µg/ml against *P. intermedia* was observed in ethanol and petroleum ether fruit extracts. All extracts showed zone of inhibition that were statistically significant ($p<0.05$) at highest concentration (75 µg/ml) against *P. gingivalis*. Extracts of leaves and fruit of *Moringa oleifera* were found to be effective and contain compounds with therapeutic potential against *Porphyromonas gingivalis* and *Prevotella intermedia.*

Keywords: *Agar, plant extracts, Moringa oleifera, Porphyromonas gingivalis, Prevotella intermedia.*

Introduction

Oral infections endure to be a significant medical issue globally.[1] Dental caries and periodontal ailments are amongst the utmost vital comprehensive oral health glitches.[2] There is a significant evidence connecting deprived oral health to long-lasting conditions,[1-3] and also systemic diseases.[4] Tooth loss, caused by poor periodontal health (influencing 20% of adult population around the world) can lead to substantial illness and untimely demise.[2,3]

Despite the fact that pharmacological industries have delivered various new antibiotics over the most recent three decades, confrontation to these medications by microbes has augmented.[5] It is necessary to advance investigation to realize the transmissible schemes of resistance, and to advance with studies to develop novel reasonable medicines, either synthetic or natural. A conclusive objective is to offer reasonable and capable antimicrobial drugs to patient. As per World Health Organization (WHO) medicinal plants would be the best source to acquire an assortment of medications.[6,7]

Moringa oleifera is one of the world's most valuable trees, as virtually each portion can be utilized for nourishment or has some other positive assets. It is an

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extremely nourishing vegetable tree with an assortment of probable usages. Also, *Moringa* contains explicit plant pigments with established effective antioxidant properties making them a significant nutritional part in the body's defences against free radical damage.[8]

In developing countries, similar to India there is higher frequency of dental and periodontal disease due to neglect and lack of consciousness. Dental care services are often too expensive, rare or entirely absent, particularly in rural areas.[9,10] Periodontal disease includes two most basic microorganisms-*Porphyromonas gingivalis* and *Prevotella intermedia*. There is incredible lack of data on, antimicrobial activity of herbal extracts of plant-*Moringa oleifera*., against these microorganisms, thus the current study was undertaken to evaluate the in vitro antibacterial properties and to determine the minimum inhibitory concentration (MIC) of various extracts of *Moringa oleifera* against common periodontal pathogens.

Material and Method

Procurement of plant material: Leaves and fruit (drumsticks) of *Moringa oleifera* gathered from Agriculture University of Rajasthan, were identified and established in Department of Pharmacognosy, Pacific College of Pharmacy, Udaipur.

Extraction: Leaves and drumsticks were carefully washed, air dried at room temperature (30°C) for two days, pulverized to a fine powder utilizing a sterilized blender processor and stored in two sealed bottles, leaves and fruit independently. Two distinct solvents namely petroleum ether and ethanol were utilized for withdrawal to get a sum of four concentrates, two from leaves and two from fruit. A 10g amount of pulverized leaves were independently absorbed in 100ml of petroleum ether and ethanol for one day. Additionally, a similar sum (i.e. 10g) of pulverized fruit was submerged in 100ml of petroleum ether and ethanol for a day. Each preparation was filtered through Whatman No.1 filter paper and the sifted extract was concerted under vacuum underneath 40°C using Heidolph, VE-11 rota-evaporator. Dried out extract consequently attained was subjected to UV rays, checked for sterility and stored in a freezer at 4°C.[11]

Qualitative analysis on phytochemical constituents.[12]

Test for tannins, saponins, flavonoids, terpenoids, cardiac glycosides, alkaloids and carbohydrates were done as per the standardized laboratory procedure.

Test Microorganisms: *P. gingivalis* ATCC 33277, and *P. Intermedia* ATCC 2564 were procured from Microbial Type Culture Collection, IMTECH, Chandigarh, grown in brain heart infusion broth accomplished from HiMedia Laboratory Pvt. Ltd., Bombay and incubated anaerobically at 37°C. Documentation of complete strains was acknowledged by typical biochemical and straining procedures.

Screening for Antimicrobial Activity: Agar well diffusion technique was utilized for antimicrobial screening. Media was punched with 7mm width wells, loaded up with varying concentrations of extracts 5µg/ml, 10µg/ml, 25µg/ml, 50µg/ml and 75µg/ml and incubated at 37ºC for one day. Following incubation, Vernier callipers was used for estimating the zone of growth inhibition. Each extract was confirmed five times and recorded in millimetres.

Determination of MIC: MIC is the lowest concentration of a compound that totally impedes the development of microbes in 24h.[13] For MIC, 9 dilutions of each extract were done with brain heart infusion (BHI) broth microdilution assay. Tubes were then incubated at 37°C for 24 hours and perceived for turbidity.[14]

Statistical analysis: One-way analysis of variance (ANOVA) and t-test with a p-value ≤ 0.05 was used for statistical analysis.

Results

Antimicrobial activity of *Moringa oleifera* leaves and *Moringa oleifera* fruit extracts against P*orphyromonas gingivalis* varied greatly in different solvents (Table 1). Ethanol fruit extract showed significantly highest zone of inhibition at highest concentration of 75µg/ml (15.2±0.837, p=0.007) and also at 50µg/ml (10.2±0.837, p=0.001). Ethanol fruit extract was effective against *P. gingivalis* at all concentrations and the mean zone of inhibition significantly increased with increase in concentration (p=0.001).

Table 1: Mean zone of inhibition (mm) of all extracts of Moringa oleifera leaves and Moringa oleifera fruit (drumstick) on Porphyromonas gingivalis

Extracts	Concentrations (Mean ± SD)					P value
	75 µg/ml	50 µg/ml	25 µg/ml	10 µg/ml	5 µg/ml	
Moringa oleifera leaves						
Ethanol	10.2±0.837	8±0.707	R	R	R	0.000*
Petroleum ether	10.2±0.836	10±0.707	R	R	R	1.000
Moringa oleifera fruit						
Ethanol	15.2±0.837	10.2±0.837	10.6±0.894	9.8±0.837	10±1.00	0.001*
Petroleum ether	10.6±0.548	R	R	R	R	-
P value	0.007*	0.001*		-	-	

Test applied-ANOVA, t-test.; *P≤0.05 statistically significant

Antibacterial effect of *Moringa oleifera* leaves and *Moringa oleifera* fruit extracts presented in Table 2 showed that *Prevotella intermedia* was resistant against *Moringa oleifera* leaves extract in both solvents (petroleum ether and ethanol) while *Moringa oleifera* fruit (drumstick) extract showed zone of inhibition at higher concentrations (75µg/ml) in both solvents.

Table 2. Mean zone of inhibition (mm) of all extracts of Moringa oleifera leaves and Moringa oleifera fruit (drumstick) on Prevotella intermedia.

Extracts	Concentrations (Mean±SD)					P value
	75 µg/ml	50 µg/ml	25 µg/ml	10 µg/ml	5 µg/ml	
Moringa oleifera leaves						
Ethanol	R	R	R	R	R	-
Petroleum ether	R	R	R	R	R	-
Moringa oleifera fruit						
Ethanol	11.2±0.837	R	R	R	R	-
Petroleum ether	10.6±0.894	R	R	R	R	-
P value	0.987	-	-	-	-	

Test applied-ANOVA, t-test; *P≤0.05 statistically significant

Based on the MIC values of all extracts (Table 3) *P intermedia* were most sensitive to *Moringa oleifera* drumstick extract with both ethanol and petroleum ether solvents (MIC value: 0.2µg/ml). It was also sensitive to ethanol *Moringa oleifera* leaves extract (MIC value: 0.4µg/ml) and petroleum ether *Moringa oleifera* leaves extract (MIC value 0.8µg/ml). *P. gingivalis* was sensitive to all extracts with MIC value of > 50µg/ml.

Table 3. Minimum Inhibitory Concentration (MIC) of Moringa oleifera leaves and Moringa oleifera fruit (drumstick) extracts against periodontal pathogens on specific media for each microorganism.

Extract	P. gingivalis (µg/ml)	P. intermedia (µg/ml)
Moringa oleifera leaves		
Ethanol	50	0.4
Petroleum ether	50	0.8
Moringa oleifera fruit (drumstick)		
Ethanol	50	0.2
Petroleum ether	50	0.2

Table 4. Phytochemical analysis of Moringa oleifera extracts.

Chemical Constituent	Moringa oleifera leaves		Moringa oleifera fruit	
	Ethanol	Petroleum ether	Ethanol	Petroleum ether
Alkaloids	+	-	+	-
Sterols	+	+	+	+
Carbohydrates and glycosides	+	-	+	+
Fixed oil and fats	-	-	-	-
Tannin and phenolic	+	+	+	+
Protein	-	+	+	+
Triterpenoides	+	-	+	+
Saponins	+	+	+	+
Mucilages	-	-	-	+
Flavonoids	+	+	+	+

Discussion

Crude plant extracts are generally a mixture of active and non-active compounds.[15] Contrasts in antimicrobial effects of plant species exists because of phytochemical properties and variances amongst species. Preliminary phytochemical examination revealed presence of secondary metabolites like tannins, steroids, cardiac glycosides, etc. in both parts of the plant (Table 4).

Our study was directed to acquire preliminary data on antimicrobial action of ethanol and petroleum ether extracts of *Moringa oleifera* leaves and fruit. Antimicrobial viability is generally determined by examining MIC, bactericidal impacts and different microbial culture techniques.[16-18] Agar well diffusion was employed as culture method which offered a few focal points such as selective quantification of microorganisms[19] however was arduous and just count microscopic organisms that can develop on agar.[16-18]

Results of current study demonstrated that at lesser concentration (5µg/ml) only ethanol *Moringa oleifera* fruit extract was found effective and produced highest zone of inhibition at highest concentration (15.2±0.837) against *P. gingivalis*, likely because of sturdier extraction capacity of ethanol which could have delivered more prominent number of active constituents liable for antimicrobial activity.[17] *P. intermedia* were most sensitive which couldn't survive even at lowest concentration (0.2µg/ml) in both ethanol and petroleum ether *Moringa oleifera* fruit extracts.

Whereas in ethanol *Moringa oleifera* leaves extract, *P. intermedia* survived upto 0.4µg/ml. Moringa oleifera fruit extracts showed higher antibacterial properties than leaves extracts. Gram-negative microorganisms are found less susceptible to plant extracts in prior investigations.[20,21] However, we observed that all extracts were active against both gram-negative bacteria tested. This may be due to its variation in phytochemical constituents like alkaloids, flavonoids, saponins, tannins, aminoacids and carbohydrates. Flavonoids, are strong antioxidants, with effective antimicrobial substances *in vitro* contrary to a varied collection of microorganisms by impeding membrane bound enzymes.[22] *Moringa oleifera* leaves likewise contain alkaloids found to have antimicrobial possessions because of their dimensions to interpolate with DNA of microorganisms.[23]

Rahman et al (2009) reported that powder from fresh leaf juice, ethanol and cold-water extracts of fresh leaves of *Moringa oleifera* were active against all the Gram-negative bacteria.[24] Lowest MICs were determined for two Gram-negative bacteria such as *S. sonnei* and *P. aeruginosa*. These results propose that *Moringa oleifera* leaves used contain bio-components whose antibacterial possibilities are exceptionally practically identical with that of antibiotic tetracycline.[25]

Currently, utmost pathogenic creatures are flattering impervious to medicines.[26] To combat this distressing issue, detection of innovative lively complexes compared to novel targets involves desperation. Antimicrobial properties of plants have been examined by various investigations worldwide and many utilized as therapeutic options due to their antimicrobial properties.[9,27-29] However, to use plant extracts for medicinal determinations, questions on safety and toxicity need to be justified.

Conclusions

P. gingivalis and *P. intermedia* both were found to be sensitive against extracts of both parts of *Moringa oleifera* i.e. leaves and fruit. On comparison, it was observed that extract of *Moringa oleifera* fruit emerged as a highly potent agent exhibiting antibacterial activity compared to that of leaves extract.

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Gorlin-Goltz Syndrome: Multiple Approach to Diagnosis and Treatment

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Abstract

Gorlin-Goltz syndrome (GGS) is an autosomal dominant disorder associated with multiple systemic disorders. The incidence rate is approximately 1 in 57000 to 1 in 250000. It has a rare characteristic of multiple odontogenic keratocysts (OKCs), bifid ribs and other abnormalities. Occasionally GGS is associated with malignant lesions like rhabdomyoma, medulloblastoma, leiomyosarcoma, etc. The major and minor criteria based on the clinical and radiological findings are accessed for the diagnosis of GGS. We report a case of an 18 years old female patient, presenting with a swelling in the right side of the face which was diagnosed as GGS by correlating the clinical and histological findings. Advanced imaging tools and techniques were used for analysis. Early diagnosis and treatment have significant importance in reducing the severity of this syndrome.

Keywords: *Gorlin-Goltz syndrome, Odontogenic keratocysts, CBCT*.

Introduction

Gorlin-Goltz syndrome (GGS) is an autosomal dominant inherent disorder that has many systemic involvement presenting with variable symptoms.[1] In 1894 Jarisch and White discovered this condition while examining a patient who had multiple basal cell carcinomas, scoliosis, and learning disability. Further in 1960 Robert James Gorlin and William Goltz described the relation of these classical triads (multiple basal cell carcinoma, keratocysts in the jaws, and bifid ribs) and established the diagnosis of this syndrome.[2] According to Rayner et al. modification in 1977, cysts had to present in combination with calcification of the falx cerebri or palmar and plantar pits.[3] Later Evans et al. in 1993 elaborated the major and minor criteria for the diagnosis of GGS.[4] Kimonis et al. in 1997 stated that the diagnosis of GGS can be done only when at least two major and two minor criteria are present.[5]

The typical representative criteria for GGS are multiple odontogenic keratocysts (OKCs) (75%), BCC (50%–97%), bifid ribs (40%), palmar and plantar pits (60%–90%), and ectopic calcification of falx cerebri (37%–79%).[6] The estimated incidence rate is approximately 1 in 57000 to 1 in 250000 in normal population with 1:1 male to female ratio, and clinical symptoms arise in the 1st to 3rd decades of life.[7] GGS represents a wide spectrum of clinical defects including skin, eyes, central nervous system (CNS), endocrine system and bones.[8] It has been studied that germline mutations of the PTCH gene may lead to GGS.[9]

The early diagnosis of GGS is important to reduce the severity of the syndrome which may cause permanent maxillofacial deformities and hamper the normal functioning. In this case report, we had used new imaging modalities and radiographic techniques to emphasize our diagnosis.

Case Report: An 18 yrs. a female patient reported to our Institute of Dental Sciences, Bhubaneswar, with a

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chief complaint of swelling in her right side of face since 2–3 months and reduced mouth opening since 7–10 days. The swelling slowly progressed into the present size which caused facial asymmetry.

On general examination, the patient had an average built and all the vital signs were normal. Extraoral examination revealed there was a diffuse swelling involving the right upper and middle one-third of the face, extending from the extra-temporal region to the zygomatic region [Figure 1]. On palpation, the swelling was firm in consistency, non-tender, and there was no local rise in temperature. Restricted mouth opening was recorded at 4.8cm. On intraoral examination, there was a mild swelling noticed at the posterior 27 region with missing 28. There was no carious or infected tooth associated with the swelling. Aspiration from the swelling was blood-tinged, viscous fluid.



Figure 1: Extra oral view

Based on the clinical findings of missing 28 and reduced mouth opening, a provisional diagnosis of an infected dentigerous cyst, secondary to impacted 28 was given. Moreover, OKC and ameloblastoma were listed as a differential diagnosis.Panoramic radiograph and reformatted panoramic cone-beam computed tomography (CT) [Figure 2] image of maxilla and mandible showed multiple radiolucencies with impacted teeth. There were large multilocular radiolucencies associated with 28 and 48. 3D radiograph showed no cortical bone expansion or perforation in maxilla or mandible. Panoramic image of right maxilla showed superiorly displaced 28 with pericoronal radiolucency extending into the maxillary sinus.

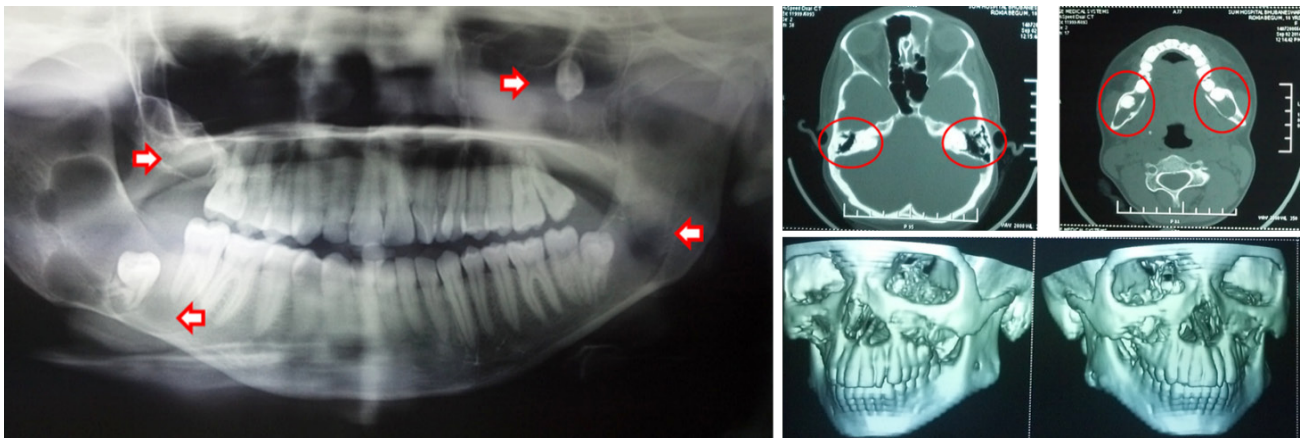


Figure 2: Panoramic radiograph, CT & 3D radiograph

As multiple jaw cysts were present, we further examined the syndromic association, hence further investigations were carried out, which revealed the presence of calcification in the falx cerebri and bifid rib [Figure 3].

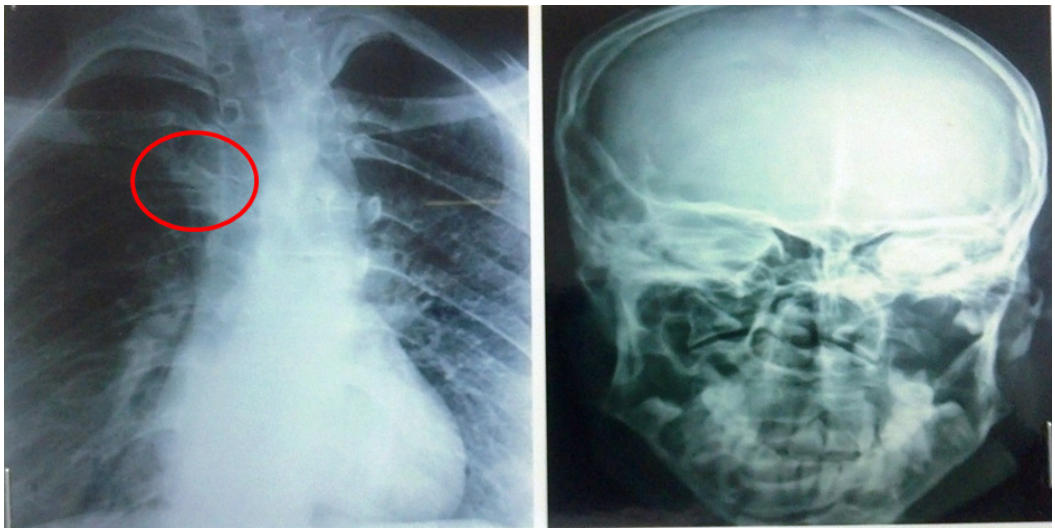


Figure 3: Bifid rib, Calcification of Falx cerebri

The enucleation of the cysts in maxillary and mandibular region was done along with the extraction of impacted third molars. Histological examination revealed para keratinised lining epithelium with surface corrugations. High power (40x) magnification revealed a uniform epithelial cell thickness of 8–10 layers. The basal cell layer showed a palisading pattern of nuclear arrangement with polarized and intensely stained nuclei [Figures 4]. All these findings revealed the presence of multiple OKC which was in accordance with our diagnosis of GGS. The patient is being followed up at 3 months interval and no recurrence has been noticed.

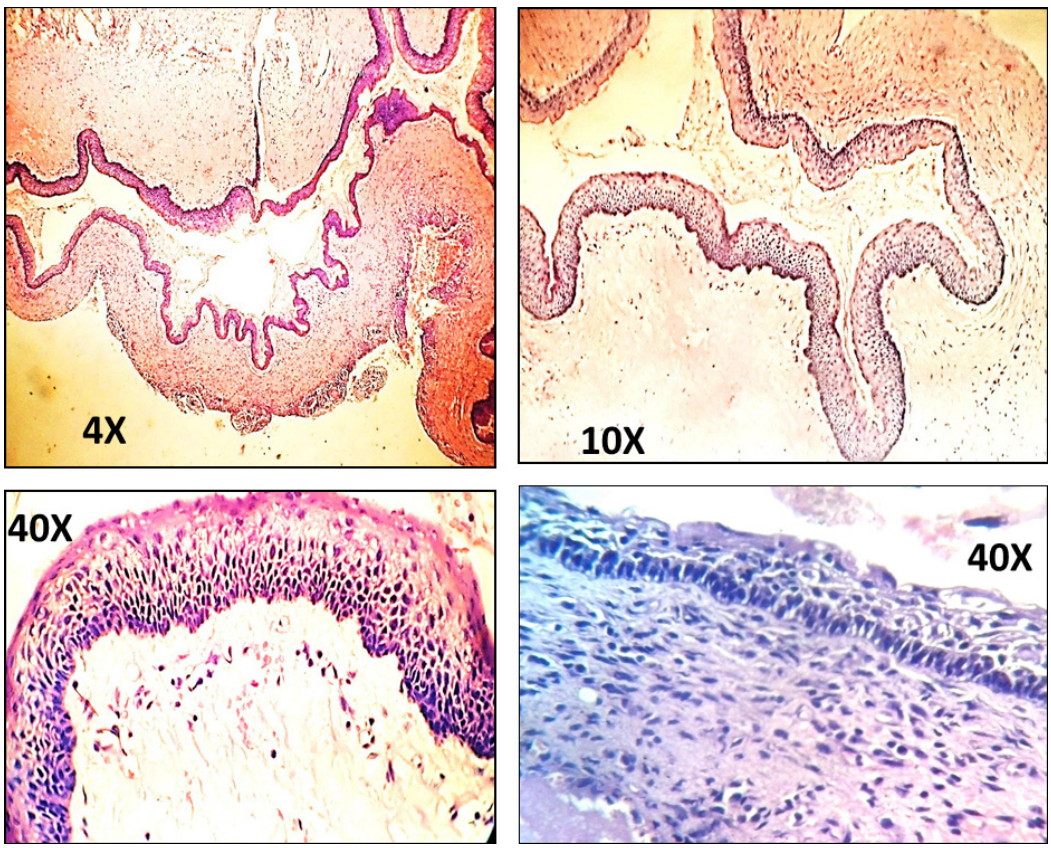


Figure 4: Histomorphograph

Discussion:

Gorlin Goltz's syndrome is also known as nevoid basal cell carcinoma syndrome (NBCCS), always associated with multi-systemic abnormalities. GGS, is an autosomal dominant disorder occurring due to mutation in the patched–1 (PTCH1) gene located on chromosome 9q23.3-q31, and encodes a transmembrane receptor for the ligand sonic hedgehog (SHH).[10] A study suggests 20%-40% of GGS occurred due to de novo mutation of PTCH1 gene.[11] The product of this PTCH1 gene has tumor suppressor activity. This reveals the ability of PTCH1 genes to alter the fundamental protocol that controls growth of normal tissues.[12]

The diagnostic criteria for GGS was given by Evans et al. in 1993 and later it was modified by Kimonis et al. in 1997.4,5 These criteria are listed in the following Tables [Table 1].[6] The diagnosis of Gorlin Goltz syndrome can be established when two major criteria are present or one major and two minor criteria are present. In our patient, there were three major criteria present that are multiple OKC, bifid rib and calcification of falx cerebri which confirm our final diagnosis as GGS.

Table 1: Diagnosis Criteria

Evans et al., 1993	
Major Criteria	• More than 2 BCCs, or One BCC in patients younger than 30 yrs. of age or more than 10 basal cell nevi • Any odontogenic keratocysts or polyosteotic bone cyst • Three or more palmar or plantar pits • Ectopic calcifications in patients younger than 20 years of age (lamellar or early falx cerebri calcification) • A positive family history of NBCC
Minor Criteria	• Congenital skeletal anomaly (bifid, splayed, fused or missing rib or bifid wedged or fused vertebra) • Occipital-frontal circumference greater than 97 percentiles, with frontal bossing • Cardiac or Ovarian fibroma • Medulloblastoma • Lymphomesentric cysts • Congenital malformation (cleft lip/palate, polydactilism or eye anomaly)
Kimonis et al. 1997	
Major Criteria	• More than 2 BCCs, or One BCC in patients younger than 20 yrs. of age • Odontogenic keratocysts of jaw • Three or more palmar or plantar pits • Bilamellar calcification falx cerebri • Bifid, fused or markedly splayed rib • A first degree relative with NBCC
Minor Criteria	• Macrocephaly • Congenital malformation (cleft lip/palate, frontal bossing, coarse faces, and moderate or severe hypertelorism) • Other skeletal anomaly (Sprengel deformity, marked pectus deformity, marked syndactyly of the digit) • Radiological anomaly (bridging of the sella turcica, vertebral anomaly, modelling defects of the hand and feet or flame shaped lucencies of the hand and feet) • Ovarian fibroma or Medulloblastoma

Odontogenic keratocyst is predominantly present in 75% of GGS cases and often is the first sign of diagnosis. The male-female ratio of OKC associated with this syndrome is 1:1 which usually developed in the second to third decades of life.[13] In younger patients, the cysts may be associated with un-erupted or impacted teeth which leads to tooth displacement and root resorption of adjoining teeth. These cysts may achieve a larger size as they grow anteroposteriorly inside the jaw bone without causing cortical expansion or perforation.[6] The major differences between OKCs associated with GGS and solitary OKCs are listed in Table [Table 2].[14]

Table 2: Difference between Solitary and Syndromic OKC

Feature	Solitary OKC	Syndromic OKC
Age	Middle or Old age	Younger age
Site	Single	Multiple in number
Recurrence rate	Low (61%)	High (82%)
Epithelium	More thickness	Less thickness
Cystic islands	Less	More frequently

Muzio in 2008 suggested the investigation protocol for GGS, these include family history-past medical and dental history; clinical examinations–oral, skin, head circumference, eyes, genitourinary system, cardiovascular system and skeletal system; radiographs–chest, anteroposterior view and lateral skull, panoramic radiograph, cervical and thoracic spine (AP and lateral), ovarian ultrasound for ovarian fibroma, and echocardiogram of children for cardiac fibroma.[15]

Two basic treatment approaches are carried out for the treatment of syndrome associated with multiple OKCs. These are conservative method, i.e. simple enucleation with or without curettage and marsupialization and aggressive method i.e. peripheral osteotomy, chemical curettage with Carnoy's solution and resection.[13]

Conclusion

The presence of three major signs (multiple OKCs, bifid rib, and calcification of falx cerebri) confirmed our patient was a case of GGS. Early diagnosis of GGS, is important to confirm conservative treatment and restore the aesthetics of the patient. Health specialists must have good knowledge of the diagnosis criteria of GGS so that the patient can be treated early and further monitored.

Conflict of Interest: None

Ethical Permission: Approved

Funding: Nil

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Flap Design in Third Molar Surgery: A Review

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Abstract

Amongst all the surgical procedures the third molar surgery is the most common procedure considered by the and max-facial surgeons in the world. There have been many surgical procedures involved in extraction of third molar which determines the success of the surgery. Third molars may present to be complete or partially retained and may present in mucosa, sub mucosa or completely embedded in jaw. Incision is quite technique sensitive and thus plays a very important role in surgery, hence the type of incision and the design of incision determines the wound healing.

Keywords: *Flap Design, Third Molar Surgery, Wound Healing.*

Introduction

Any tooth can be impacted in the dentoalveolar process. The accessibility influences the difficulty in removing the third molar. The exposure surgically also helps in the ease for the removal of the third molar. The article we will review various types of flap design. Impacted third molar in the lower jaw is the most commonly practised procedure and it has many complications like swelling, trismus, alveolar osteitis.[1] To reduce the number of complications surgeons across the world have investigated the various uses of flap designs in third molar extraction. The basic principle in flap designing is to receive good accessibility, adequate blood supply, adequate visibility, proper space available for instrumentation, protection of the soft tissue to reduce trauma and allowing anatomically repositioning of the flap. The incision given should always allow to elevate and reflect the tissue and without causing any harm to the adjacent tooth structure.[2]

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Many factors influence the result of impacted 3rd molar extraction which also involves the mucoperiosteal flap design. In this study we are going to review an update of various flap design and their followed outcome in third molar surgery.[3]

Basic principles and Classification of flap design: The mucoperiosteal flap for the third molar surgery has a broad classification such as Envelope flap, Triangular flap, ward incision, Kruger envelope flap, Berwick tongue shape flap, Henry incision, Killy and Kay incision, Nageshwar Comma Shaped flap, Triangular flap, pedicle flap, bayonet flap, broader flap base than the free end to ensure adequate blood supply. The flap should be prepared according to the requirement of the soft tissue reflection for proper visibility. As periosteum is required for bone healing full thickness flap should be preferred. The accurate anatomical positioning of the soft tissue should be achieved at the end of the surgical procedure. The given incision must lie on the healthy bone wherever possible.[4]

Preferably long and straight incision must be done to have a good healing capacity. The incision must be placed firm through the mucosa and periosteum to the bone by a stroke which is given smoothly. While placing the incision we should use the pen grasp. The soft tissues present must have to be cut perpendicularly to the underlying bone. By using a gentle pressure, the mucoperiosteal flap should be reflected from the bone.[5]

Sequencing and comparison of flap design technique: The mucoperiosteal flaps that are used for removing of the impacted molar and are divided into triangular and envelope flap and few other variables. Howe describes a mucoperiosteal flap in which the anterior is given forward from the distobuccal corner of the crown portion of the second molar and it ends along the side of that same tooth by the distal incision and then it was extended buccally along the gingival portion to the external oblique ridge. Ward recommended a larger but similar kind of mucoperiosteal flap for improvement in access in 1956.[6]

Kruger in 1959 described envelope flap in which the first part of incision was similar to vertical incision that begins from the medial external oblique ridge and extends to distal lower angle of second molar followed by sulcular incision which was given from distofacial angle of second molar to mesio-facial angle of first molar. Barwick in 1966 described vestibular tongue shaped flap. This tongue shape flap extends to the buccal shelf of mandible with an incision line which did not lie over bony defects, that was created during removal of impacted tooth, and had its base in distolingual side of second molar to the PDL of adjacent tooth.[6] Henry in the year 1969 described the trepanation technique for excision of developing mandibular third molar and was then reported by kaj and Klein Feldt as it was having no late complications. This technique was based on the assumption after the evaluation, so that the third molar would be impacted.[7]

Killy and Kay in 1979 advocated the flap that start along the gingival crevices of second molar. Healing of the gingival crevices from this incision has been unsatisfactory. Nageshwar in the year 2002 proposed a distolingual flap, that was designed buccally in a comma shaped flap for removing the mandibular 3rd molar impacted tooth. The incision for this flap is given at a point below the 2nd molar and is curved upwards to meet the gingival crest of the 2nd molar at the distobuccal line angle, from that point it continues as a crevicular incision around the distal aspect of the second molar. Flap for this design was designed to minimize drawbacks of conventional incisions where there will be dissection of temporalis muscle tendon and flap which lies over the bony defect.[8]

Envelope flap: This incision was made starting from the medial to the external oblique ridge and was then extended up to the middle point of the distal line angle of the 2nd molar. Further sulcular incision is given from the distofacial line angle of the first molar.

Modified triangular flap: This flap design as described by Szmyd is similar in the first part of the incision to the envelope flap design. However, it is different from the original incision design as described by Szmyd.[10]

Pedicle flap: This flap was proposed by Goldsmith S, et al. in the year 2012. By a distal incision the flap is elevated which enable rotation for complete closure of the surgical wound and enable soft tissue advancement. This designing includes a pedicle flap that is the buccal envelope flap. The incision in the buccal gingival sulcus is placed from the mesiobuccal line angle of first molar to the most distal visible part of third molar. In subperiosteal plane the lingual flap is elevated while protecting the lingual nerve. The releasing incision is extended towards the external oblique ridge. The buccal soft tissue that can be incorporated along the defective region which thus allow the complete closure of wound. This flap technique prevents blood loss and the blood coagulum and minimize the bone loss.[10]

Bayonet flap designis described to place on ascending ramus following the mid portion of the third molar and then extended as sulcular incision up to the midpoint of buccal sulcus of second molar following an oblique vestibular releasing incision.[11]

Koener's flapis a modified flap incision that is placed as the distal extension, beginning from the external oblique ridge in the lateral mandible. The incision should be extended forwardly and medially towards the middle portion of the distal surface of the 2nd molar terminating at mesiobuccally line angle of the second molar.

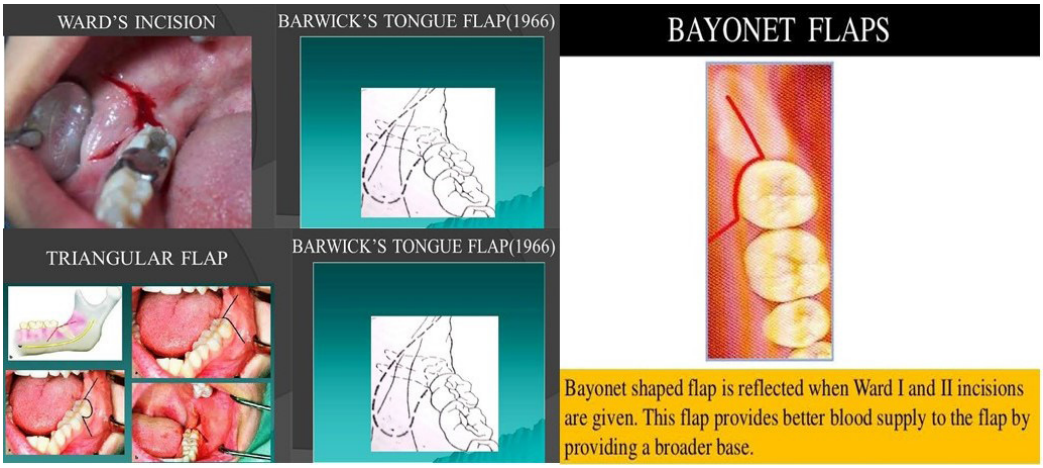


Figure 1: Types of Flap

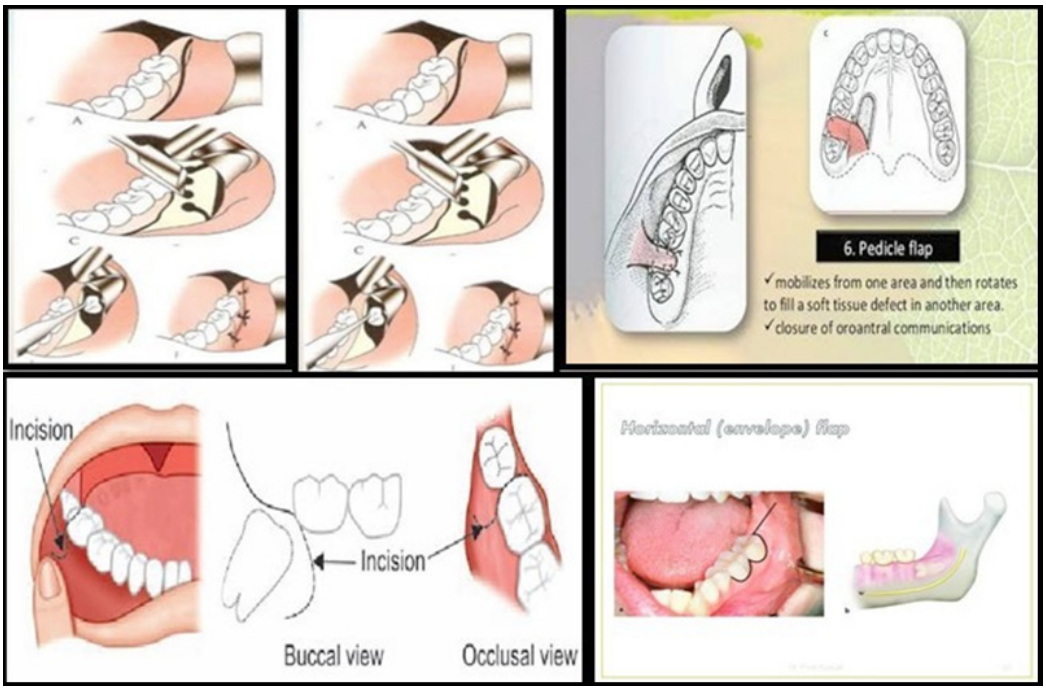


Figure 2: Flap design technique

Discussion

Depending on how good the surgeon handles the tissues, differentiate an average and an excellent surgical outcome. Handling a tissue is an essential aspect, with the implementation of proper incision and flap design techniques. The variety of proposals for describing the surgical procedure of the impacted third molars, are generally unknown but the finding of this work and tend to be disagreed by some people. Many studies lack with small number of cases and variables under further investigation could be exclusive, talks a lot for the experience of the surgeons that they have done to avoid the complications at the time of operation. However, every procedure has complications as like trismus, pain, swelling, difficulty in mouth opening.[9-11]

Conclusion

There are many proposals that tell us about the incisions of impaction of third molars, but the conclusions are accepted and these surgeries tend to be controversial and many studies lacks small number of cases and variables, hence the investigation may be done carefully and discus with the surgeons to avoid complications in the operative time. The envelope flap and triangular flap are the mostly performed technique by the surgeons in their daily clinical practice. There are

no significant differences described with respect to post-operative pain. The clinical difference that the authors have noticed is the exposure of the surgical site and damage to the flap. The surgeon who is to operate must have a thorough knowledge of the different types of flaps and should be skilled enough to decide and implement proper technique in day to day practice to execute the procedure uneventfully as each flap design has its own advantages and disadvantages.

Conflict of Interest: None

Ethical Permission: Approved

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Safeguarding the Socket: A Review of Techniques

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Abstract

From the time of extraction till the implant placement, there are remarkable alterations in the volume of bone as well as its morphology which can make the implant reestablishment very challenging. The alveolar bone architecture is restored by the socket preservation technique and this technique also arrests the hard and soft tissue collapse, minimizing the necessity for future augmentation procedure. Therefore, in order to place implants in the extraction socket, which were thought to be compromised, distinct techniques have been invented to achieve socket preservation. Therefore, the aim of this review is to direct on several techniques for rebuilding the socket following the placement of implant.

Keywords: *Extraction socket, socket preservation, bone grafts, GTR, PRF, dental implants.*

Introduction

Due to tooth extraction,there are morphological diversification occurring in the alveolar process which includes both vertically and in the width of the residual bone.[1, 2] As far as horizontal dimension is concerned, the buccal aspect undergoes the influential rate of alveolar alteration. After the tooth loss, the tooth–dependent structure that is the buccal bone being constantly thin and composed of mainly bundle bone starts vanishing. The resorption of the alveolar wallsoccurs due to loss of tooth as a result of which the soft tissue sags into the alveolus, hence, the true aboriginal alveolar proportions are depleted. It is noticed in the first three months after the extraction of tooth that around 50% of the primary alveolar width is shrunk, although a great interindividual variability exists, and the phenomena of remodelling may sustain up to around one year afterextraction.[3]

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'Socket preservation' is a surgical procedure done after extraction marked to conserve the alveolar ridge with an aimto exile the requisites for future surgical augmentation procedures for implant-prosthetic reformations. The utilization of bone or the substituted bone grafts in coalescence with or without membranes has been carried out in the socket preservation technique. Theen richment of the healing process of alveolus by utilization of biological mediators is another approach for socket preservation. There are various functions of platelets apart from the haemostatic one. The integral role in soft and hard tissue healing is played by the activated platelets released cytokines for example, platelet-derived growth factor, primary growth factors of fibroblast, fibrinogen, fibronectin, transforming growth factor β1, vascular endothelial growth factor, angiopoietin–2,as well as insulin-like growth factor-I.[3]

Greenstein (1985) with Ashman and Bruins (1985) were the first one to describe, post-extraction how to prevent the loss of alveolar bone. The term **Socket Preservation**, first coined by Cohen (1988), is a technique formulated for prosthetic maintenance of the socketalong with ridge preservation and augmentation. Basic socket preservation, although similar in all cases, varies with the method of socket closure.[1]

Indications for Socket Augmentation:

1. When instant implantation is notcommended.
2. Deficient buccal cortical plate: The presence of fenestration and dehiscence amplifies the postextractionosseous remodeling, resulting in buccal concavity in the alveolar bone. Thus, it appears foresightful to avoidalveolar socket eradication and make attempts to sustainthe ridge followed extraction.
3. Areas where esthetics is important: The most important consideration in the aesthetic zone is to preserve marginalsoft-tissue contours. In the areas with thin labial bone, extraction of tooth results in loss of labial plate and collapse of soft tissue into the extraction socket, which results in the loss of bone volume and gingival contour within the extraction socket, socket augmentation help to achieve bony fill. The preservation of vertical height of the bone helps in bracing the soft tissues at the site of extraction. This stabilized and improved soft tissue contour marginally and placement of implant is improved with an increased predictability in the aesthetic area. 4) In adolescent individuals shaping of the ridge for standard treatment with prosthesis.
5. Diminishing the requisiteto elevate the sinus floor.[9]

Different Socket Preservation Procedures:

1. Connective tissue graft (Langer and Calangar, 1980)
2. Socket seal or free gingival graft (Landsberg and Bichacho, 1994)
3. Bio-Col or resorbable hemostatic plug technique (Sklar, 1999)
4. Guided bone regeneration
    a. Nonresorbable membrane
    b. Resorbable membrane
    c. Normal restorability (4–6 weeks)
    d. Extended restorability (4–6 months)
5. Alloderm or acellular dermal graft (Misch, 1998)
6. Prosthetic “pontic” socket plug
    a. Removable (Misch, 1998; Kois and Kan, 2001)
    b. Fixed (Kois, 1998; Spear, 1999; Sklar, 1999)
7. Combination epithelialized subepithelial connective tissue graft (Stimmelmayr 2010)
8. Composite graft incorporated Modified socket seal surgery (Misch and Misch, 1999)
9. Socket Shield Technique (Hurzeler, 2010)

Materials Used in Socket Preservation

Platelet Derived Growth Factors: After injury variable growth factors from the platelets are released into the tissues. Epidermal growth factor (EGF), insulin growth factor (IGF), platelet derived growth factors (PDGF) and transdermal growth factor–β (TGF-β) are included in the seacting as differential element on the regenerating periodontal tissues. The PDGF has properties which are angiogenic and has the ability to trigger the chemotaxis and reproduction of connective tissue cells and deposition of matrix.

Platelet Rich Plasma (PRP) can be utilizedin regeneration of bone as it is a potential source of concentrated platelets. Centrifugation of a unit of freshly garnered autologous blood is done at 5.600 rpm that separates the platelet poor plasma which is eventually removed. Further centrifugation at 2400 rpm, of the specimen, is done that segregates the packed red blood cells and the PRP. The rest of the PRP containing 500 000 to 1 000 000 platelets, forms a gel after blending with a thrombin/calcium chloride (1,000 units/10%) solution. This gel can then be made use of, along with the materials of bone regeneration for example HA or DBM as a source for autogenic growth factors. Increase of the maturation rate of a bone graft in PRP is revealed to be up to 2 fold when used in amalgamation with autogenous bone. This also elevates the bone density of the graft. [6]

Bone Graft Substitutes: Since years, bone-replacement graft materials have been playing an important role in regenerative dentistry. Today’s concept in tooth extraction shall routinely consider maintenance of the existing extraction socket dimensions with some sort of bone-replacement material. This procedure has been called ridge preservation.[6]

The 3 marked properties of graft materials are: osteogenesis, osteoconduction and osteoinduction. Each property has a distinct feature in bone healing.

- The formation of a new bone by cells that are present in the graft is referred as **Osteogenesis**.
- The physical effect by which the matrix of the graft provides a scaffold favouring the cells present

outside to infiltrate into the graft and create new bone is known as **Osteoconduction**.

- A chemical process by which molecules(Bone Morphogenetic Proteins) contained in the graft converts the cells neighbouring to it into osteoblast, this in turn forms the bone, known as **Osteoinduction**.

Sources of Grafting Material

Type of bone graft	Source of the grafting material
Autogenous grafts (autografts)	Material is transferred from one position to another within the same individual. Graft may be intraoral or extraoral depending on the site of harvest.
Allografts	Material is transferred from a donor of the same species. The most common grafts are freeze-dried bone grafts, which may be mineralized or demineralized.
Xenografts	Material is transferred from a donor of another species, processed appropriately. Primarily porous deproteinized bovine bone mineral.
Alloplasts	Synthetic materials, usually inert, used as a substitute for bone grafts.

Examples

Autogenous Grafts

1. Bone from Intraoral Sites (Eg. Osseous Coagulum, Bone Blend, Cancellous Bone Marrow Transplants, Bone Swagging)
2. Bone from Extraoral Sites (Eg.Illiac Autografts)

Allografts

(Eg.Undeccalcified Freeze–Dried Bone Allograft, Decalcified Freeze-Dried Bone Allograft)

Xenografts

(Eg. Kiel bone, Anorganicbone,Calf bone)

Allografts

(Eg.Dura, Cartilage, Plastic Materials, Calcium Phosphate Biomaterials, Sclera,Bioactive Glass, Plaster Of Paris, Coral–Derived Materials). [8]

Guided Bone Regeneration: According to the Guided Tissue Regeneration (GTR) principle, which initiated in 1980s, particular type of tissue regeneration is attained when cells with such capacity are allowed to inhabit the defect during healing.

(Nyman et al. 1982; Gottlow et al. 1984).

The notion GBR treatment was based on the same theory asGTR principle. Hence, the rationale behind GBRwas to mechanically exclude the unnecessarygrowth of soft tissues into the osseous defect, hence, only osteogenic cell populations acquired from the progenitor bone is permittedto repopulate the osseous wound space (Dahlin et al. 1988; Hammerle et al. 1995).

The GBR treatment protocol allows surgical placement of a cell occlusivemembranefacing the bone surface, in order to mechanicallyplug off the bone defect site in need for regeneration (Dahlin et al. 1988). Additionally, the membrane creates as well as maintains an isolated room, hencecontributesan environment to the osteoprogenitor cells, due to whichosteoprogenitor cells are attracted and proliferates, differentiation along the osteoblastic lineage occurs and osteogenic activity is expressed.

(Linde et al. 1993; Karring et al. 1993).

In experimental and clinical studies, different non-resorable and resorbable membrane materials have been used for GBR treatment. The characteristic requisites of barrier membranes used in case of GBR therapy comprehends biocompatibility, integration, cell occlusion properties by the host tissues, clinical manageability and potential to make space.

(Karring et al,1993). [11]

Advantages, Disadvantages and Examples of Both the Membrane Categories Used in Guided Bone Regeneration Procedures Including Socket Preservation:

Membrane category	Advantages	Disadvantages	Commercial examples
Nonresorbable	• Numerous studies demonstrate their success • May be titanium reinforced • Remain intact until removal • Easily attached with titanium or resorbable tacks • Greater bone fill if membrane not exposed • Minimal tissue response if membrane not exposed	• Require a second surgery for removal • Increase patient morbidity • If exposed, must be removed • Can be technique sensitive	• ePTFE membranes, e.g., Gore-Tex (Gore Medical, Flagstaff, Ariz.) • Titanium-reinforced Gore-Tex
Resorbable	• Numerous studies demonstrate their success • Does not require surgical removal • Decreased patient morbidity • Improved soft-tissue healing • Tissue-friendly reaction to membrane exposure • Cost effective; one surgery only • Does not have to be removed if exposed	• Uncertain duration of barrier membrane function • Difficult to tack down • Slightly less bone fill than nonresorbable membranes • Inflammatory response from tissues may interfere with healing and GBR • Can be technique sensitive	• Neomem (bovine collagen matrix; Citagenix Inc., Laval, Que.) • Bio-Gide (porcine collagen matrix; Geistlich AG, Wolhusen, Switzerland) • Ossix (cross-linked collagen barrier; Implant Innovations Inc., Palm Beach Gardens, Fla.)

ePTFE = expanded polytetrafluoroethylene; GBR = guided bone regeneration

Alloderm or Acellular Dermal Graft: In several surgical procedures for example root coverage for defects in gingival recession (Minsk 2004), to increase the girth of attached gingiva (Schulman 1996), in the management of soft tissue ridge defects (Batista et al. 2001) as well as for repairing oronasal fistulae (Cole et al. 2006; Kirschner et al. 2006), an acellular dermal matrix allograft AlloDerm®has been commended for use as an alternative for autogenous connective tissue graft.[12]

Human soft tissue obtained AlloDerm®, has underwent several chemical procedureso as to remove all epidermal and dermal cells (antigenic cells) while conserving the persisting bioactive dermal matrix. The constituents of bioactive matrix are blood vessels, collagen, bioactive proteins and collagen which has the potential to support natural cell repopulation, revascularization and tissueremodeling (Biohorizons 2005). As the ultra-structural integrity of the acellular matrix is preserved, which leads to the prevention of stimulation of inflammatory reaction. (Batista et al. 2001; Minsk 2004). [12]

Preparation of Donor Tissue/Alloderm Rehydration Procedure: According to the manufacturer's instruction, preceding to the surgical procedure, the acelluar dermal matrix allograft (AlloDerm®) was rehydrated. At a temperature of 37°C, the tissue was first completely immersed and soaked in normal saline, for approximately 10 min. The paper backing was removed and the tissue was then immersed in another dish after the tissue was rehydrated.[12]

Best Socket Preservation Method for Safeguarding the Socket: Most of all of the socket preservation techniques such as bovine bone, mineralized versus demineralized allograft, autogenous bone tricalcium phosphate, membrane versus non-membrane, etc work by decreasing dimensional changes in the bone in the extraction site area. In order to find out: "Which Socket Preservation is the best?", as if now there is no one *best* way and, according to some researchers: "The scientific evidence does not provide clear guidelines in regards to the type of biomaterial, or surgical procedure."

According to othe review paper: "There is limited data regarding the effectiveness of alveolar ridge preservation therapies when compared to the control. Overall the socket intervention therapies did reduce alveolar ridge dimensional changes post-extraction, but were unable to prevent resorption. Histology did demonstrate a large proportion of residual graft material that may account for some of the difference in alveolar ridge dimensions at follow up."

The use of demineralized allograft (DFDBA) versus mineralized allograft (FDBA) accounts for more vital bone versus residual graft material present in the socket after grafting, as per the recent research. In fact, "this study provides the first histologic and clinical evidence directly comparing ridge preservation with DFDBA versus FDBA in humans and demonstrates significantly greater new bone formation with DFDBA."

Recent research shows that " There is significantly more negative results than that of the less-demanding flapless procedure, with an increased width resorption of the post-extraction site, when it comes to raising a full thickness flap."

As in dentistry, implants are trending, it is important to consider whether the patient is willing for implants or not in the future. If it is yes, then the research is transparent that there will be significant changes in the overall bony architecture surrounding the extraction site, if the preservation is not carried out. Therefore, more research and clinical studies have to be carried out, in order to find out the best protocol for socket preservation.[13]

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Occlusal Appliance-When and Where? Management of Temporomandibular Joint Pain Dysfunction Syndrome

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Abstract

TMJ pain is a commonly occurring situation but not so commonly and effectively treated. A detailed and thorough knowledge of the joint diseases is a prime requisite for efficient management of the condition. It has been not yet found for TMD the main etiology. The treatment customary in such disorders are by splint given occlusally, cognitive behavioral treatment, hypnosis, acupuncture, physiotherapy, and surgery when all the other conservative type of treatment are not successful. Purpose of this article is to present a view of Temporomandibular joint pain dysfunction syndrome providing prosthodontic management of a confusing clinical problem with a simple and comprehensible approach to the diagnosis. A proper appliance selection is a need, that aimed to eliminate etiologic factors by enlightening on specific indication and use of various occlusal appliances for joint pain dysfunction syndrome cases management i.e. when and where to use it. Occlusal appliance, proved in many studies with a successful rate of 70-90% for patients with TMD this is the efficient type and commonest treatment. Occlusal appliance, being a non-penetrating and reversible appliance is an important benefit. Apart from this, dentist must check for problem if any in the muscles and that in the joints and should think of treatment available to be considered seriously, as a treatment means before the appliances to be used is decided.

Keywords: *Occlusal Appliance; Temporomandibular joint pain; Treatment & management*

Introduction

The condition is not well understood by most dental and medical practitioners, even with the popularity of the subject and relatively common occurrence as the dental literature concerning the problem of Temporomandibular joint pain dysfunction syndrome is extensive. A difficulty in obtaining its natural history and symptoms is the probable reason related to the diversity of views expressed.[1]

This article's motive is to give an outlook of the temporomandibular joint pain dysfunction syndrome which allows an easy and comprehensive way to prosthodontic management of a confusing clinical problem and diagnosis. A proper appliance selection is a need, that aimed to eliminate etiologic factors by enlightening on specific indication and use of various occlusal appliances for temporomandibular joint pain dysfunction syndrome management cases i.e. when and where to use it.[2]

Etiopathogenesis: Understanding its etiology is complex, although in the system of stomatognathic type the symptoms and signs are commonly found. The account of all the signs and symptoms of TMDs, there

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is no single etiology; hence the following formula is suggested to simplify how TMD symptoms arise:

Function normally + an (Contributory factors) event > Tolerance physiological--→ Symptoms of TMD.

So contributing factors[3], which can initiates, the TMDS are:-Occlusal discrepancies, Emotional stress, Trauma, Parafunctional habits, Deep pain input. Different theories have been documented for initiation and progressions of TMDS are: [4]

1. Mechanical Displacement theory: Lack of molar support of functional occlusal prematurities causes direct eccentric position of the condyle in the fossa leading to pain, dysfunction and ear symptom.
2. Neuromuscular theory: In the presence of stress and tension Para-function such as grinding and clenching cause the occlusal interferences. This leads to muscle spasm and hyperactivity.
3. Psychological theory: Emotional disturbance initiating centrally induced muscular hyperactivity led to Para function and so indirectly to occlusal abnormalities.

Classification:

Currently the TMDS is divided into three major categories:

1. Myofascial pain dysfunction syndrome (MPDS)
2. Internal derangement (ID)
3. Degenerative joint disorders (DJD)

Management of Temporomandibular joint disorder syndrome (TMDS): Accurately diagnosing and treating temporomandibular joint disorders can be a difficult and confusing task. This is often true primarily because patients' systems do not always fit into one classification. In many instances several classifications seem to be appropriate because in reality the patient is suffering from more than one disorder. The interrelationship of various TM disorders always needs to be considered in the evaluation and treatment of patients. Following treatment therapies are indicated for the management of TMDS is as follows:

Definitive therapy

a. Reversible therapy: Occlusal splint, Muscle stabilizing appliance, Anterior positioning appliance, Anterior bite plate, Posterior bite plate, Soft or resilient appliance.
b. Irreversible therapy: Correction of occlusal interferences.
c. By selective grinding.

Other supportive therapies are

a. Education & motivation of patient
b. Soft diet
c. Physical modulation: Coolant therapy, Thermotherapy, Ultrasound therapy, TENS. Manual manipulation (hands-on-therapy): Soft tissue mobilization, Muscle conditioning, Passive exercises, stretching exercises, Resistance exercises
d. Pharmacological treatment
e. Psychological treatment
f. Relaxation therapy
g. Self-hypnosis
h. Meditation
i. Yoga
j. Bio-feedback therapy.

Above are the different treatment modalities for treating TMD.

Now we are in detailed discussion about the definitive therapy includes reversible therapy i.e. different types of occlusal appliances and its indication and mode of action, and in short about the irreversible therapy.

Definitive Therapy: The elimination in the other hand the factors etiologically due to this disorder are the direct aim of the definitive treatments. An accurate diagnosis is essential since it is directed towards the etiology.

Further the definitive therapy can be categories into following headings:

Reversible occlusal therapy: All the initial treatment should be conservative, reversible, and non-invasive. It alters temporarily the patients' occlusal condition along with an occlusal appliance and best accomplished.

Occlusal appliance: By many studies it is proved with successful rate of 70-90% for patients with TMD the treatment efficient and commonest is the occlusal appliance. These occlusal types of appliance have important benefits that is these appliances are

reversible and not penetrating. Occlusal appliance is used to temporarily orthopedically stable joint that encourages normal muscle function that reorganizes the neuromuscular reflex activity and the activity of reflex neuromuscular is reorganized when optimum condition is introduced occlusally.[5]

Proper appliance selection is a need that aimed to eliminate a Specific etiologic factor. The importance of through examination and diagnosis is thus emphasized.[6] Various types of occlusal appliances are available for treating the different condition of TMDS are[7]:-Muscle relaxation appliance/stabilization appliance/permissive splints (muscle deprogrammers.), Anterior repositioning appliance/orthopedic repositioning appliances since the position of the mandible is the goal to change, Anterior Bite plate, Posterior bite plate, Pivoting appliance, Soft or resilient appliance

Muscle Stabilizing Appliances: Provides the occlusal relationship considered stable along with condyle in musculoskeletally stable position and is generally fabricated in the maxillary arch, in this way the appliance of muscle stabilizing is fabricated generally (Figure 1,2)

Indicated for Myofascial pain dysfunction syndrome (MPDS) are:

1. Muscle hyperactivity,
2. Local muscle soreness or myositis,
3. Internal derangement i.e. anterior disc dislocation with reduction.



Figure 1. Muscle Stabilizing Splint



Figure 2. Intra-Oral View of Muscle Stabilizing Splint

Mechanism of Action of Muscle Stabilizing Appliances: In TMD patients the reduction in muscle activity during clenching indicates the reduction of compressive force transmitted on the temporomandibular joint. This may reflect an involuntary pain-avoidance response. In TMD patients the muscle is already in a contracted position due to presence of any pathological condition, such as occlusal interference, which interferes with the normal closure of the mandible. Hence the muscles, which regulate the mandibular movements, try to close the mandible in a least damaging pattern, thus acquiring ENGRAMS according to that condition. This is the body's protective mechanism. In this condition the muscles are in a contracted position and cannot attain the normal physiologic length. If this perimeter of muscle length is changed, the tension recorded in muscles and tendon proprioceptors is altered. These alterations in tension reflect the reduced contractile activity of the muscles in question. This may reflect an involuntary pain-avoidance response.[8]

So, the muscle stabilizing appliance, which is made 1 mm above at centric posterior contact, encompasses the occlusal interferences and it will help to eliminate the muscle Engram. As the muscle Engram eliminates the masticatory muscles attend their original physiological length i.e. minimal tonic contraction.

By photographing occlusal registrations before and after each splint adjustment visit it was shown that the stabilization of occlusal patterns as resolution progressed gave a good indication of the success of treatment in most patients.[9]

Anterior Positioning Appliances (Apa): Indications are:

1. Internal derangement i.e. anterior disc dislocation without reduction,
2. Patient with joint sound,
3. Intermittent or chronic locking of joint,
4. Inflammatory disorders retrodicitis.

APA anterior repositioning implements to provide better condyle disc position in the fossae so normal function will be reestablished which eliminates the signs and symptoms associated the disc derangement disorders and the mandible is encouraged for an alignment intercuspally rather than the alignment excess anteriorly (Figure 3,4)



Figure 3. Anterior Positioning Appliance



Figure 4. Intra-Oral View of Anterior Positioning Appliance

Directive splints i.e. APA are not indicated if correctly aligined condyle disc assembly and its maintenance during function. Aps should not be considered unless discs reduction is verified. APS is indicated if reduction of discomfort is noticied in short time of 2 to 3 weeks. Patient should be on soft diet average time of treatment is 3 months. Side effects are expense, discomfort of wearing APS splints.

The position of the mandible is not altered permanently but only to change temporarily is the goal of the treatment, to enhance adaptation of retrodiscal tissues and to eliminate the effects of neuromuscularreflex that directs the mandible to close repetitively into maximum intercuspation.[10]

Soft appliances

Soft appliances are advocated for several use commonly as a preventive means for person commonly receiving trauma to dental arches such as bruxism and clinching.

The teeth opposing with contact is simultaneously and evenly achieved which is the goal of this treatment. Though the scientific evidence supports the reduction of the symptoms related to parafunctional activities by the use of hard appliances. Soft appliances are not well documented in scientific literatures. Advantage; since the soft material equally distributed occlusal load because it was considered as "self-adjusting".[11]

Drawbacks of soft appliances are:

1. The requirements exactly of the system of neuromuscular region is not accomplished as the soft type of material does not get adjusted readily so difficult to accomplish precisely,
2. Difficult to adjust and polish,
3. Poor retention,
4. Perforations during functioning,
5. Because of flexibility patient play with appliance.

In the treatment of TMD many authors have different opinions by attention specially to the soft and hard appliances of occlusal type. The hard splint is a customary application with that of the efficacy regarding disagreements of many, based upon much research and patients suffering with disorder functionally in the system of mastication which has most successful outcome.[12-15] The condition is altered occlusally and permanently in the position of the mandible is the treatment i.e. grinding selectively is the irreversible therapy. Need irreversible

occlusal therapy is followed by the success or failure of therapy of reversible type. It is indicated for irreversible therapy, occlusally in this case successfully the patient responses to occlusal reversible therapy.

Conclusion

The need for future health care being reduced, eliminating or reducing pain, restoring the functioning of the lifestyle normally and the restoration of the function of the jaw normally are the goals of TMDS. To restore in the region of muscleto normal posture, the motion range of joint fully by exercise and length are the strategy of term which is short. The long-term strategy includes reducing the symptoms through muscle rehabilitation while helping the patient to reduce contributing factors, muscle tension and strain, and return to normal function without the need for future health care. Behavioral and psychological evaluations should be conducted on all patients who have persistent pain to determine complexity and contributing factors. Reversible therapies are often adequate and should be attempted first. Various occlusal appliances design has been recommended in the literatures, Prosthodontist must evaluate the clinical situation and must select the appropriate appliance advocated for different clinical situations.

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Implant Protective Occlusion–Modern Gnathological Concepts

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Abstract

Depending on the meticulous surgical protocol and on understanding the concepts of occlusion there is high standards of success rates of osseointegrated implants. In osseointegrated prosthesis the concept of occlusion suitable is similar to that of gnathologic occlusion. The concept of disocclusion is generally recommended, in order to minimize the horizontal loading during the eccentric movement. So as to increase the longevity of the prostheses the anterior group function and posterior disocclusion concepts are recommended. This article presents modern gnathological concepts i.e. implant protective occlusion (IPO) for rehabilitation of patient with osseointegrated implant to enhance functional efficiency, esthetic and psychological stability.

Keywords: *Osseointegrated implants, occlusion, eccentric movement, anterior group function, concept of disocclusion, implant protective occlusion (IPO).*

Introduction

The successful completion of restorative implant Prosthodontics is dependent on the effective implementation of occlusal principles. The different physiologic conditions lie between the osseointegrated implant and natural teeth. It should be emphasized that the osseointegrated implant does not have periodontal tolerance like the natural teeth, nor does it have specific defence mechanisms against occlusal forces[1]. The high standards of success rates of osseointegrated implants depends on understanding the concepts of occlusion and also on the meticulous surgical protocol[2].

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With the osseointegrated implant, the prosthesis is connected firmly to fixtures so that any occlusal stresses generated, are transmitted directly to the surrounding bone. Therefore, the prosthesis must be fabricated as accurately as possible, in order to achieve long term success. Occlusion should be a key factor to the overall success rate.

Occlusal Scheme: Same as the gnathologic occlusion is basically the concept of occlusion suitable for osseointegrated prosthesis. All the posterior teeth have contacted and all the anterior teeth have a clearance of about 30µm for occlusion in centric. If the entire arches are restored with osseointegrated prosthesis it will be easier to establish an occlusion such as fully bone anchored bridge. In the mixed dentition which is composed of natural teeth and osseointegrated bridge network, it becomes more complicated to obtain a good occlusion. On its function approximately about 30µm the natural tooth moves, axially [3]. It does not sink which is supported by only by the bone in an osseointegrated bridge. Hence in osseointegrated fixed bridge the centric

contact is needed to adjust slightly more open than the natural teeth. This can be done with the use of photo occlusion wafers, a computerised device such as the T-scan, or very tedious occlusal equilibration with the help of articulating paper of 30µm[4]. Accordingly, the opposing teeth under the short bite pressure should not contact with the osseointegrated bridge in centric. The bridge should contact the natural teeth intrudes approximately 30µm under strong bite pressure. The osseointegrated bridge begins to contact after the contact of all the natural posterior teeth. If the osseointegrated bridge is adjusted to contact at soft bite pressure, under the hard bite pressure, all the occlusal load will be born only by the bridge and will overload the bone structure. In order to avoid the overloading of the occlusal surface the osseointegrated prosthesis should not have plane-to-plane contact. Now this contact point chiefly of cusp to cusp type but long centric occlusion is preferred (freedom in centric) [5]. The concept of disocclusion is generally recommended in order to minimize horizontal loading during eccentric movement. To produce the posterior disocclusion of the anterior segment of osseointegrated prosthesis should guide the mandible. For osseointegrated prosthesis canine guided occlusion is not recommended as it generates excessive occlusal forces into the single implant fixture which is placed in the canine area[6].In order to distribute the stress over entire fixture the anterior group function is recommended.

The ideal place to bear the horizontal load is the trapezoid area, in cases of those surrounded by the osseointegrated implants. Those formed are most medially located fixture to the most distally located fixture and to form the furthest right-side fixture to the furthest left side fixture. This rule can be altered to the anterior extensions of the osseointegrated prosthesis. For example, even if anterior arch is located slightly more anterior than the most anteiorly located fixture, the load applied by the mesial extension is small because it is far away from the condyle. Therefore, it is not so destructive when the load is transmitted to the fixture on the contrary, if the prosthesis is extended distally, it is more destructive. Therefore, anterior group function and posterior disocclusion are recommended for osseointegrated prostheses[7].

It is not clearly understood in cases of osseointegrated prosthesis the specific amount of disocclusion. According to measurements of samples that have the ideal natural dentition and are free from TMJ symptoms, the disocclusion amount[8] while the condyle moves from the centric of the mandibular first molars (mesiobuccal cusp tips) this is observed, as follows:

Average amount of disclusion in protrusion is 1.1+0.6mm

- The average amount of disclusion is 1.0+0.6mm on non-working side
- The average amount of disclusion on working side is 0. 5+0.mm
- These numbers can be used to determine the amount of disocclusion necessary for osseointegrated prosthesis.

Osseointegrated Prosthesis Classification:

Classification of osseointegrated prosthesis[2] is

(I) Anchored bridge fully bone

(II) Freestanding bridges

i) Kennedy's Class I

ii) Kennedys Class II

iii) Kennedys Class III

iv) Kennedys Class IV

(III) The natural teeth are connected with bridge

(IV) Replacement of single tooth

Discussion of occlusion in each case: Fully bone anchored bridge: The fully done anchored bridge is used for edentulous cases. It is very successful for the mandibular arch because there is no anatomic limitation for placing fixture between the right and left mental foramen. Usually four to seven fixtures are installed in this area and the prosthesis is connected into these fixtures. Mandibular fully bone anchored bridges can be extended to a maximum of 15 to 20 mm posteriorly. It is not necessary to make a maxillary bone anchored bridges because there are anatomic limits made by nasal and sinus floor. Also bone structure is poor in the maxilla. The amount of bone is limited. If the maxillary bone is available, usually six to seven fixtures can be installed between the mesial of the first premolars, and a fully bone anchored bridge can be screwed on the fixture. It can be extended posteriorly a maximum of 10mm.

For a fully bone anchored bridge, the mutually protected occlusion is recommended[9]. To be in centric, it is needed for the posterior teeth to have centric stop and the anterior region to have a 30µm. The disocclusion

is applied for elimination of harmful horizontal stress. The anterior group function is functioned, to prevent the stress from localization[10]. The anterior guidance should be slightly flatter than the natural teeth to protect from the fixture getting overstressed. So, this gives rise to less quantity of disocclusion in bridges of fully bone anchored is following: 1.0 mm Protusive, the working side is 0.3mm and the non-working side is 0.8 mm.



Figure 1. Fully bone anchored prosthesis

Occlusion for Overdenture: An overdenture is often used for the maxillary edentulous case. Even though the patient has poor bone structures is the maxillary canine area, one can quit often find bone for a fixture installation. Usually it is possible to place fixtures in this area and by connecting two fixtures, it can support overdenture. The function of the overdenture makes this prostheses suitable for the maxillary arch because it gives good phonetic function, facial support, and aesthetics. In this regard, an overdenture is often recommended for maxillary arch rather than a fully bone anchored bridges. The mandibular overdenture is usually used the patient who cannot afford many fixtures or for patient who wants to have natural check support.

The fully balanced occlusion with lingualized occlusion is the occlusion for overdenture (Figure 2).[2] The osseointegrated overdenture accepts the concepts applied to regular denture. In centric small clearance is preferred in the anterior for mandibular fully bone anchored bridges case and of an edentulous maxillary overdenture. Concurrently the posterior teeth contact. The lateral movement, non-working and working side and the amount of disocclusion in protrusive is 0mm.

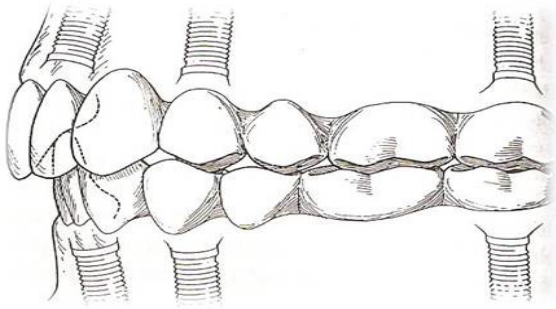


Figure 2. Fully balanced occlusion with lingualized occlusion

Occlusion for Freestanding Bridges

(i) Kennedy's class I:-bilateral cases: For Kennedy's class I situation, both side arches reinstated by osseointegrated bridges as they preserve the vertical height[12]. For determination of clearance amount given to natural anterior dentition, careful consideration should be taken. During functioning the osseointegrated prosthesis does not sink, mentioned earlier. The anterior teeth clearance should be smaller than the natural teeth. For this case the amount of disocclusion required is the same to that of natural dentition for the reason that natural dentition shows the as the contralateral side of the arch will maintain the anterior guidance (Figure 3).



Figure 3. Kennedy's class I

1.1 mm protrusive, nonworking side 1.0 mm, working side 0.5mm.

(ii) Kennedy's class II: Unilateral: The other side is restored by osseointegrated bridges as the contralateral side of the arch will maintain the ideal height and the situation ideal for osseointegrated freestanding bridges is the Kennedy's class II[13].

When in centric it includes less stress to the implant. Under strong bite pressure it begins to contact and as centric, anterior teeth should have 30µm openings while the posterior osseointegrated bridges should have 30µm open contacts. The occlusal load can be beared safely as the anterior teeth are natural teeth in situation of Kennedy's classII. The amount of disclusion in this case is same as for natural dentition (Figure 4)



Figure 4. Kennedy's class II

1.1 mm Protrusive, 1.0 mm is non-working side, 0.5 mm is working side.

iii. **Kennedy's class III:** By natural teeth the vertical height is maintained and situation ideal for implant of osseointegrated is the Kennedy's class III. Under strong bite pressure the osseointegrated bridge only contacts, in centric. The natural dentition guides the eccentric movement. The amount of disclusion in this case is same as for natural dentition (Figure 5).

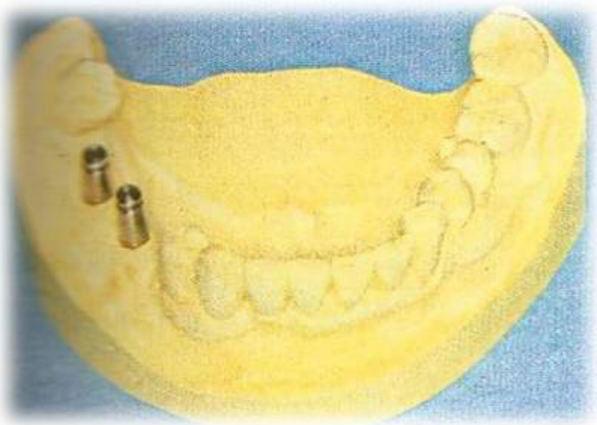


Figure 5. Kennedy's class III

1.1 mm Protrusive, 1.0 mm is non-working side, 0.5 mm is working side.

iv. **Kennedy's class IV:** The Kennedy's class IV case requires an anterior freestanding bridge, and it is another indication for the osseointegrated bridges (Figure 6). In a Kennedy's class IV, such as missing the eight teeth from first premolar regular fixed bridge is contraindicated because it produces a fulcrum. If the teeth are restored with removable partial denture, it also produce fulcrum and introduce tremendous torque to the abutment teeth. However this case is easily restored with an osseointegrated bridge. Anterior eight-unit fixed bridge can be supported by four fixtures without creating a fulcrum.



Figure 6. Kennedy's classs IV.

The osseointegrated bridges guides the posterior disclusion in a Kennedy's class IV case. The group function occlusion is preferred, introduced to the implant site in order to minimize the horizontal load. The non-working site is discluded while the horizontal load during lateral movement can withstand by the posterior teeth on working side. The posterior disclusion is produced during protrusive movement and an osseointegrated bridge will guide the mandible. During protrusive movement, in order to minimize the load the anterior guidance should be flatter than natural dentition. For this case the amount of disclusion is as follows: 0.8mm Protrusive, 0.4mm non-working, 0.0mm working.

For Natural Teeth Connection: The natural teeth as fixture must be connected to the mesial end of the bridge which prevents the loosening of the screw by rotation of the bridge and is used to restore the bridge. This osseointegrated implant is not depressed during its function but the natural teeth is as mentioned earlier. When the osseointegrated implant prosthesis and the

natural teeth are connected rigidly, under the occlusal load the implant receives majority of stress and is overloaded. This non-rigid connector is used inorder to prevent this. The female key is placed on distal end of the retainer supported by natural tooth and the key is connected to osseointegrated bridge which is engaged into the keyway. Hence the natural tooth can be depressed freely without the interference of the osseointegrated bridge.

Thus, based on long-term observation, produces gap between key and keyway by the natural tooth which are depressed permanently. The key is extruded to a visible amount in osseointegrated prosthesis along with that the retainer cemented to the natural tooth is depressed. It's not clear by the reasons when the keyway and the key are made precisely, HENRY believes that this phenomenon is caused. The natural tooth is depressed permanently, the keyway and the key are locked sometimes in cases where the natural teeth are depressed.As some suggest to prevent this phenomenon to connect the osseointegrated bridge, the telescopic crowns are used. Through a long-term observation, the natural tooth is depressed often it was found often. The outer crown to the inner crown washed out, producing plaque accumulation is the cement connecting.

The rigid connector is used presently rather than a non-rigidconnector between the natural tooth and the osseointegrated bridge. The absorption of the alveolar bone or creating resorption of the root, resulting from ankylosis of the abutment tooth. Slowly this progress. So the situation mentioned above is not preferred rather than to this. The freestanding procedure is preferred and the connection of the natural tooth is questionable.

For Single Tooth Replacement: For single tooth replacement the determined factors[14] are occlusal table width of the prosthesis, crown contour, functional surface area.

Occlusal table width: The Implant Protective Occlusion (IPO) is when the width of the implant body is related directly to the width of the occlusal table. A wider occlusal table favours offset contact (cantilever effect) as compared to narrow occlusal table during mastication or parafunction. A narrow occlusal table combined with a reduced buccal contour(in the posterior mandible) improves the axial loading and in the manner to a tooth, permits sulcular oral hygiene easier.

Crown contour: In IPO the crown contour of the prosthsis depend on the amount and position of bone. In Division A bone, in an edentulous ridge with abundant height and width and little resorption, the implant may be placed in a more ideal position for occlusion and esthetics. The most common implant placement corresponds to a central position in the residual ridges. In esthetic regions the facial aspect of maxillary implant crown should remain similar to the natural tooth. Lingual contour and cusp may be reduced to minimise offset load from opposing natural tooth. In case of mandibular posterior implant mandibular buccal cusp is reduced in width, and height. Primary contact is with maxillary lingual cusp. In Division B bone, with resorbed height and width in an edentulous ridge, implant body to be placed in lingual cusp region of the original natural tooth (in mandibular posterior). Lingual contour of the implant crown remain same but buccal cusp must be reduced in height and occlusal table is reduced from the facial region.

Functional Surface Area: An important parameter in IPO is the adequate surface area to sustain the load transmitted to the prosthesis. A greater area of bone contact at the crest occurs rather than the narrow implants (resulting from their increased circumferential bone contact area) in cases with wider diameter root forming implants. In wider implants compared with narrow ones, the mechanical stress at the crest is reduced for a given occlusal load.

As the natural dentition the occlusion required for this restoration is same. For implant prosthesis should contact only under heavy load because natural teeth depress under heavy load, it must have a clearance of 30μm for anterior teeth in centric; in the osseointegrated restoration the amount of contact to be given must be carefully designed. In order to create anterior group function, the anterior restoration should contact with the opposing teeth during eccentric movement. For implant prosthesis, the restorations should avoid lateral stress and need to disclosed during eccentric movement.

Conclusion

Basically, as the Gnathological design is, for osseointegrated prosthesis is the same in the concept of occlusion. The natural tooth sinks about 30μm during function rather than an osseointegrated bridge which is supported by the bone does not sinks. Rather than the

natural teeth in osseointegrated fixed bridge is slightly more open and it's necessary to adjust the centric contacts. The concept of disocclusion is generally recommended in order to minimize horizontal loading during eccentric movement.

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Chemotherapy in Head and Neck Squamous Cell Carcinoma: An Overview

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Abstract

The term, Head and neck cancer comprises a heterogeneous group of malignancies spreading from the lips to the cervical oesophagus, with squamous cell carcinoma illustrating the ultimate ubiquitous histology. Treatment strategies are designed according to disease stage, sites of primary tumour, patient's age,operability conditions and performance status. Management approaches include surgery, chemotherapy, radiation therapy, brachyor external beam or combination of these therapy. The use of chemotherapy in head and neck squamous cell carcinoma has expanded considerably in past several years. This article summarizes the current evidence that guide the use of chemotherapy for advanced disease, unresectable tumour or unwilling patients to undergo surgery.

Keywords: *Chemotherapy; Head & Neck Cancer; OSCC.*

Introduction

Head neck cancer is more frequent than any other malignancy. The survival rate of approximately 5-years from these carcinomas has consequently remains the same in past 30 years and i.e. approximately 55%.[1-4] The ratio of head and neck cancer in male is more prevalent than female i.e 2:1 over decades, but it almost becomes same in sanctitude. Oral head and neck cancer are a disease of increasing age: approximately, 96%of them found in old age people. Tobacco and alcohol are the major predisposing factor of head neck cancer. Tobacco and alcohol are independently carcinogenic, and their combination has a synergistic effect rather than an addictive effect.[5,6] In India and Southeast Asia, where the use of tobacco, betel nuts, or lime to form a quid is widespread, the incidence of oral cancer is high; cancer of the oral cavity represents about 35 % of all malignant tumours.[5,7] Other identified risk factors include, exposure to various noxious fumes and chemicals also may predispose to cancer of the upper aero-digestive tract. Up to 15 percent of patients with head and neck cancer may have a viral etiology implicated in the genesis of their tumours. An association between Epstein-Barr virus (EBV) and nasopharyngeal carcinomas has been suggested by the high incidence of elevated EBV titres in patients with nasopharyngeal carcinoma. 1, 7 Many head and neck squamous cell carcinomas are preceded by various pre-cancerous lesions. Such lesions may present in the form of leucoplakia or erythroplakia. Histologically these lesions range from hyperkeratosis, parakeratosis, atypia, dysplasia, or carcinoma in situ to varying grades of frankly invasive cancer. In poorly differentiated tumours, it is sometimes difficult to determine the exact histologic nature, and electron microscopy or immunohistochemical stains may be necessary to differentiate between poorly differentiated squamous carcinoma, undifferentiated carcinoma, lymphoma, and melanoma.[4-7]

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Clinical examination of the primary tumour: Many of the primary sites of head and neck carcinomas are not easily visualized and therefore, tumours do not present until quite advanced. The signs and symptoms of patients with head and neck cancer vary according to the site of the lesion and the extent of disease. Physical

examination of the oral cavity and oropharynx should include a thorough inspection and bimanual palpation of the floor of the oral cavity, tongue, gums and cheek. The nasopharynx, hypo-pharynx and larynx can be inspected with an indirect mirror examination or a flexible naso-pharyngoscope. Careful inspection of the neck is mandatory. Exophytic, endophytic, ulcerated, invasive, or infiltrative are some of the types of primary tumour.In addition, a complete head and neck examination entails careful evaluation of the scalp, skin of the face and neck, regional lymph nodes, thyroid gland, major salivary glands, and cranial nerves; and mirror or endoscopic examination of the nasal cavity, nasopharynx, hypopharynx, and larynx.[8-10]

Evaluation of cervical lymph nodes and other sites: Proper inspection of the regional lymph nodes of the neck is a major part of a complete head and neck examination. The regional lymphatics draining in head and neck region are situated in the specific anatomic locations as depicted. An adequate examination of the neck should assess the presence of palpable adenopathy; features of palpable lymph nodes; and clinical manifestations of extra capsular extension of disease.[7]

Aims of treatment: The principal aim of any malignant tumour is proper treatment that will cure it. However, there are important secondary goals such as the preservation of form and function to retain a good quality of life. There are three main method to treat cancer i.e. surgery, radiation therapy and chemotherapy. Mechanism of Chemotherapy is cessation of growth of cancer cells. It is one of the three main method used to treat cancer. W chemotherapy is very potent as it has the capability to control the metastatic cancer that has spread to different parts. So, chemotherapy plays a vital role in treatment of cancer.[11-14]

Mechanism of action of antineoplastic agents

Traditional chemotherapy drugs: Production of DNA during the S phase of the cell cycle serve as a selective template for the synthesis of specific forms of mRNA, tRNA and rRNA. The specific mRNA regulates the enzymes that will be synthesized in the cell. Function, structure, metabolism, and proliferative rate of the cells are the responsibilities of the enzymes. Mechanism of action of anti-neoplastic drugs is the inhibition of synthesis of either enzymes or substrates essential for the production of nucleic acid. Based on the mechanism of drug action, agents that are useful in HNC can be classified as follows:

1. Antimetabolites: They inhibit biosynthesis purine or pyrimidine. Methotrexate, for example, prohibitsformation of reduced folates, that is necessary for synthesis of thymidine.
2. Alkylating agents:These Drugs impede either the structure or function of the DNA molecule, such as Cyclophosphamide alter the DNA structure, and arrest cell replication. On the other hand, antibiotics such as dactinomycin and doxorubicin get embedded with the nucleotide sequences of the DNA molecule and block the synthesis of mRNA.
3. Mitotic inhibitor: Vinca alkaloids, such as Vincristine and vinblastine, and the Taxanes paclitaxel and docetaxel cease cell division by disturbing the microfilaments of the mitotic spindle.

Selection of treatment: Head neck cancer is associated with pronounced cosmetic and functional morbidities resulting from both disease and its treatment heighten its relative importance. As a result, these tumours require the multidisciplinary care and expertise of head and neck surgeons, radiation and medical oncologists, prosthodontists, speech and swallowing therapists, pathologists, radiologists, dietitians, psychiatrists, nurses, and social workers.[15]

The treatment mode should be decided on the basis of feature of the primary tumour and stage of cervical lymph nodes. Other factors that determine the treatment of choice are cost, convenience, compliance, complications.[7] The primary modality of treatment for early stage disease (AJCC stage 1 and 2) is surgery and/or radiation therapy. Combined therapy plays a major role in advanced stage of cancer. Previously, these treatment method also applied to patients with locally advanced disease (AJCC Stage 3 and 4) if it was found to be respectable.[14-16]

Patient with cancer were offered radiation therapy only, with complete response rate of less than 30%. Treatment failure commonly occurred within the first 2 years, indicating that surgery and/or radiation therapy could not solely eradicate the cancer cell. 1 Multimodality attention enhance the consequence for HNC patients. It has been recorded during the last decade that larynx preservation is possible in up to two-thirds of stage III and IV larynx and hypopharynx patients who has undergone chemotherapy earlier to radiation therapy. Chemotherapy along with radiation therapy improve the survival potency as compared with radiation therapy alone for patients with unresectable HNC.[16]

Single agent chemotherapy: At the beginning, chemotherapy was implemented in the patients with recurrent or metastatic disease. With a median survival rate of 4 months was seen in patients who are left untreated.

Combination cytotoxic chemotherapy regimens: Recurrent and metastatic cancer shows a great response with the implementation of Combination chemotherapy regimens of the head and neck in comparison with each respective single agent but have not demonstrated an enhancement in survival.

Aggregation Chemotherapy with Cisplatin/5-Fu: Several randomized clinical trials have provided conclusive evidence for the superiority of cisplatin/5-FU (PF) as the standard in this patient population. The primary method of administration for this doublet regimen is cisplatin 100 mg/rn2 on day 1 and continuous-infusion 5-FU 1 g/m on days 1 to 4 or 5.A large phase III randomized trial of combined cisplatin/5-FU versus each respective agent was initiated by Jacobs and associates; an improved overall response rate was determined for this doublet regimen at 32% (P =.035) versus cisplatin (17%) versus 5-FU (13%) in advanced head and neck cancer. (55) The median time to progression of approximately 2 months for the combination (P =.023) was minimal. The median survival in all three arms was approximately 5.7 months (P =.489).

Although the aggregation of cisplatin J5-FU was deemed to be greater in response, this was at the expense of increased vomiting (35%) in comparison with the single-agent arm of cisplatin (18%, P =.02).

A large randomized phase III trial conducted by the Southwest Oncology Group (SWOG) determined that the response rates of cisplatin/5-FU (32%) and carboplatin/5-FU (21%) exceeded that of single-agent Methotrexate (10%).

Forastiere and colleagues randomly assigned 272 patients with SCC to one of three arms:

- Cisplatin (100 mg/m2) continuous-infusion 5-FU (1000 mg/m2/day, days 1 to 4) repeated every 21 days;
- Carboplatin (300 mg/rn2) / continuous-infusion 5-FU (1000 mg/m2/day, days 1 to 4) repeated every 28 days; and
- Methotrexate (40 mg/rn2 weekly)

Although the combined chemotherapy arms clearly had an improved response when compared with Methotrexate, median survival was found to be equivalent in all 3 arms. Various method of enhancing the cytotoxicity of chemotherapy agents have been explored, including the use of interferon-a. In vitro studies of interferon-a have revealed enhanced cytotoxic effects of 5-FU when administered in combination. Based on this premise, investigators examined the combination of cisplatin/5-FU/interferon-a in a pilot trial.[12] An overall response rate of 30% was seen. A larger phase III trial of PF with randomization to interferon-a, was pursued in patients with head and neck malignancy who had a poor prognosis. After completion of the study, no statistical difference in response rate or median survival benefit could be ascertained. Increased toxicities of anorexia, fever, leukopenia, and thrombocytopenia were noted to occur in the interferon-a arm. Unfortunately, these and other phase III trials have been unable to establish an improved benefit in survival when a combined regimen is used, and increased toxicity is often noted. A critical drawback to several of the earlier studies was the consideration of response rather than overall survival in the setting of recurrent or metastatic disease as the primary endpoint. Moreover, a majority of studies failed to determine the impact of treatment on quality of life, an important consideration in patients with a poor prognosis. Clinical investigators in cancer of the head and neck have recently recognized quality of life as an important facet in the success of clinical trials, and they continue to evaluate the impact of both acute and chronic sequelae.[18-20]

Combination chemotherapy with the taxanes

Docetaxel/platinum combinations: Novel combinations incorporating the Taxanes have been initiated and continue to be evaluated. Previously, several phase II clinical trials have examined the benefits of docetaxel combined with cisplatin or 5-FU. The EORTC investigated the combination of docetaxel (100 mg/m2) Cisplatin (75 mg/rn2) every 21 days in taxane-naive patient. Forty-one patients were eligible for treatment and 31 patients were evaluated for response. The median number of chemotherapy cycles received was four in this novel combination. A favourable ORR of 53.7% was determined on an intent-to-treat analysis (14.6% complete remission [CR], 39% partial remission [PR]), with a median duration of response of 18 months and a median survival at 1 year of 50%. A majority of the adverse events noted were primarily

hematologic, resulting in anaemia (98%) and leukopenia (79%). Asthenia developed in 47% of patients with this combination regimen and is a known frequent toxicity associated with docetaxel. The favourablen response rate in this combination setting may be a result of the minority of patients (six totals) with distant metastatic disease. However, the encouraging response rate and duration of response require that this novel taxane combination be considered in the primary treatment of locally advanced disease. A Japanese study using a lower dose of docetaxel (60 mg/m2) had similar findings for the combination of docetaxel/cisplatin with an ORB of 42.4%.[21]

Paclitaxel/platinum combinations: Numerous studies have combined paclitaxel with cisplatin in the setting of recurrent cancer of the head and neck, resulting in a wide range of response rates from 30% to 70%. Both high-and low-dose paclitaxel combinations have been created to determine if a dose-response relationship exists for 24-hour infusion of paclitaxel. The myelosuppressive effects of paclitaxel often require hematologic support with granulocyte colony-stimulating factor (G-CSF) if high doses are to be administered.[22]

Current clinical approaches of induction chemotherapy: The Dana Farber Cancer Institute has recently reported the maximal tolerated dose of cisplatin when given in combination with docetaxel and 5-FU as induction chemotherapy in patients with locally advanced head and neck cancer. Patients received-three cycles of docetaxel (75 mg/m2, day 1), cisplatin (75 mg/m2 or 100 mg/m2) and continuous-infusion 5-FU (1000 mg/m2 on days 1 to 4) repeated every 21 days, followed by hyper fractionated radiotherapy and neck dissection for bulky disease. Empirical antibiotics were provided on days 5 to 15. If a PR was achieved following the completion of chemotherapy; patients underwent definitive therapy at the institution's discretion. Toxicities were similar at both dose levels, consisting of chemotherapy-induced electrolyte imbalance in 30% of patients and grade Ill/IV neutropenia in 95% of patients. Patients were considered evaluable for response if more than 2 cycles were completed. The overall clinical response rate was 94% (40% CR, 54% PR). Post-treatment biopsies were completed in 25 patients (58%). 92% of patients with a primary site CR had a negative biopsy; 54% had a pathologically confirmed PR.[22]

Intertumoral and Intra-Arterial Administration: Other method to deliver chemotherapy outside of traditional intravenous method have been explored. One example is direct intra-arterial infusion of chemotherapy for loco-regional disease to target the dominant blood supply of the targeted tumour. A phase I study by Robbins and colleagues assessed the maximum dose intensity of cisplatin by selective intra-arterial infusion. Forty-two patients received escalating doses of intra-arterial infusion of cisplatin (160 to 200 mg/m2). Approximately half of patients had been previously treated. Patients received sodium thiosulfate to neutralize the systemic toxicity of cisplatin. The maximal tolerated dose (MTD) was 150 mg/m2 weekly for 4 weeks. The ORR was 86% for previously untreated patients and 62% for patients with recurrent disease. One drawback to the intra-arterial infusion technique is the risk of subcutaneous necrosis of the surrounding tissue.

Conclusion

A multicenter clinical trial of intravenous PV7O1 has been performed in the treatment of patients with advanced or recurrent solid tumours. One CR (head and neck) and two PRs (colon and mesothelioma) were observed at higher doses, and six patients with diverse malignancies had measurable tumour reduction. The MTD was determined to be 12 biffion plaque-forming units/m2. A multi-institutional phase I study has since been initiated to determine the MTD of PV7O1 via intra-tumoral injection in patients with locally advanced HNSCC.

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Osseointegration: A Comprehensive Overview

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Abstract

Dr. Branemark developed the first concept of Osseo integration. Osseointegration is defined as,"direct structural and functional connection between the living bone and the surface of a load bearing artificial implant, typically made of Titanium." The process of Osseo integration needs the formation of new bone around the implant fixture and the process of healing of implant is somewhat same as the healing of a primary bone. The formation of bone on the surface of Titanium needs a film of oxide simultaneously with the aggregation of protein and calcium phosphate. Nevertheless, Osseointegration is the indirect bonding that is formed by an amorphous layer that includes Osteoclastin and Osteopontin that are being used as scaffolds by Osteoblasts, not any direct bond between the titanium surface and the bone. Several clinical studies show the ratio between the bone and implant contact is (40 to 60) % where the Osseo integration was successful. Many researches and studies are being performed to discover the best modification of surface of implants so as to increase the score of the implant and bone contact. Most newly the treatment of surfaces such as acid etch, glow discharge or ultra violet irradiation have been shown to be effective for the Osseointegration process. Many more changes and researches are needed to find the best method of Osseointegration and in maintaining it.

Keywords: *Osseointegration; Implants; Titanium; Dentistry*

Introduction

P.I Branemark a Swedish orthopedic surgeon with his wide ranging work finally lead to the discovery of the commercially available pure titanium, which when was located in the ideally placed in the prepared site of the bone, can result in fixation in that place because of the close bond that eventually grows between the bone and implant, a spectacle that he later called and described it as Osseo integration. These states had both the functional as well as the anatomical dimensions, as it necessitatesin cooperation a close contact between the implant and surrounding healthy bone and the ability to transmit functional loads over an extended period without deleterious effects either systemically or in the adjacent tissues. Osseo integration is not defined in terms of the extent of the bone-implant contact, provided that functional requirements are met and tissues are healthy.[1] Many of the factors that predispose to the development of OI are now known, and where these exist a successful outcome will probably follow the placing of a suitable implant. Similarly, failure is more likely where factors known to predispose to an unsuccessful outcome exist.[2] Occasionally, implants fail for no apparent reason, sometimes in group in one patient-the so called 'cluster phenomenon'. It is therefore important to advise patients that a satisfactory outcome cannot be guaranteed.[3]

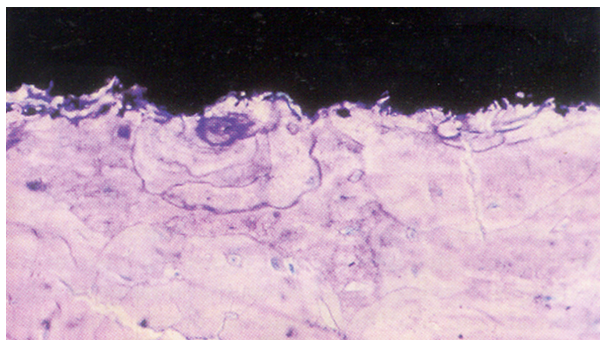


Figure 1. Close physical approximation between the surface of a dental implant and vital bone is a key structural characteristic of osseointegration, which also has important functional parameters

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OI is currently viewed as the optimum implant-bone interface, without which success cannot be obtained, and great emphasis has been placed on its production and maintenance. Nevertheless, it is only one component of successful dental implant treatment from failing. While absence of OI is equated with treatment failure, its achievement does not guarantee success, which is dependent on the design and performance of the final prosthesis. This may be precluded by an inappropriately placed implant, even if it is integrated.[4] While the osseointegrated interface and associated soft tissue cuff where the implant penetrates the oral mucosa are often thought of as dental analogues, they have a number of important differences. In particular, the interface is more rigid and less displaceable than the periodontal ligament, and behaves essentially elastically as opposed to the viscoelasticity of the periodontal ligament, and behaves essentially elastically as opposed to the viscoelasticity of the periodontal ligament. The stability of the interface also precludes implant repositioning by orthodontic maneuvers, but may permit dental implants to be used as an anchorage for fixed orthodontic appliances. The osseointegrated interface is also associated with a slow rate of loss of crestal alveolar bone, typically less than 0.1 mm per annum after the first year of implantation. As a result, most implants can be expected to be functional throughout adult life.[5]

Inflammation of the tissues around an endosseous implant is sometimes observed; it is described as peri-implant mucositis when it involves only the soft tissues and peri-implantitis where loss of the bone interface occurs. While the microorganisms associated with these lesions are similar to those seen in periodontal disease, it is currently unclear whether they cause the lesion or colonize the region subsequently. [1,2]

Factors Affecting Osseointegration: A number of systemic and local factors have been identified as being associated with the production of an osseointegrated interface. Fewer systemic factors are now thought to be of significance than was once believed, and are considered below. Local factors are as follows.

Materials

Osseointegration was originally believed to be unique to high purity titanium and this material still forms the basis of the technique however, it is known that range of other materials can also form intimate bonds with bone. This included zirconium and some ceramics, particularly hydroxyapatite; however, they have not been as extensively researched as CPTi for dental implant applications.[4]

Surface composition and structure: It is thought that CPTi owes its ability to form an osseointegrated interface to the tough and relatively inert oxide layer, which forms very rapidly on its surface. This surface has been described as osseoconductive, that is, conducive to bone formation. Other substrates also have this property and may also stimulate bone formation, a property known as osseoinduction. While the initial bone implant contact with such a material can be more extensive and occur sooner than around CPTi, the long-term benefits are less evident. Nevertheless, there is a considerable clinical and research interest in modifying the composition of implant surfaces for the purpose of obtaining more rapid OI and/or a mechanically and clinically superior host/implant interface. This can take the form of surface coatings, changes in the composition of the implant material by selective surface coping with small quantities of other elements, or the local use of biochemical molecules involved naturally in mediating bone formation, such as bone morphogenic protein (BMP).[5,6]

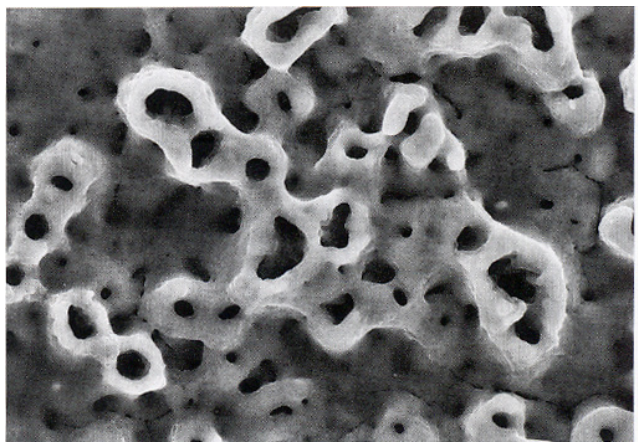


Figure 2. Manufactures have modified the surfaces of their dental implant with the intention of improving tissue responses so as to enhance osseointegration. This picture shows the TiUnite surface utilized by Nobel Biocare.

Implant surface structure is also known to influence cellular behavior, and a range of micro structured surfaces has been shown to modify cell spreading and orientation on the implant, benefitting initial anchorage in bone. The influence of these factors on OI in the long term, however is not known.[6]

Heat: Heating of bone to a temperature in excess of 47°C during implant surgery can result in cell death and denaturation of collagen. As a result, OI may not occur, instead the implant becomes surrounded by a fibrous capsule and the shear strength of the implant-host interface is significantly reduced. For these reasons great care has to be taken when preparing implant sites to control thermal trauma. This is related to drill speed, drill design, amount of bone being removed at one pass, bone density and use of coolants. In general, slow drill speeds and use of copious amounts of coolant is recommended.[7]

Contamination: Contamination of the implant site by organic and inorganic debris can prejudice the achievement of OI. Material such as necrotic tissue, bacteria, chemical reagents and debris from drills can all be harmful in this respect.[7]

Initial stability: It is known that where an implant fits tightly into its osteotomy site then OI is more likely to occur. This is often referred to as primary stability, and where an implant body has this attribute when first placed failure is less probable. This property is related to the quality of fit of the implant, its shape, and bone morphology and density.[1] Thus screw shaped implant will be more readily stable than those with little variation in their surface contour. Soft bone with large marrow spaces and sparse cortices provide a less favorable site for primary stability to be achieved. Some manufacturers produce 'oversized' and self-tapping screw design to help overcome these problems.[8]

Bone Quality: The properties of bone are well renowned by clinicians however it is more challenging to measure scientifically. Number of indices are being used to describe the bone quality and it is a function of bone density, anatomy and volume. Most widely used classifications are of lekholm and zarb and of cawood and Howell for describing bone quality and quantity. Bone quality means the thickness and density of cortical and cancellous bone, and bone quantity means the amount of bone resorption. Even though bone volume doesn't influence OI it is a relevant determinant of implant position. Where there is no bone bulk, then small implants can be used with a risk of mechanical overload and implant failure.[1,2,7]

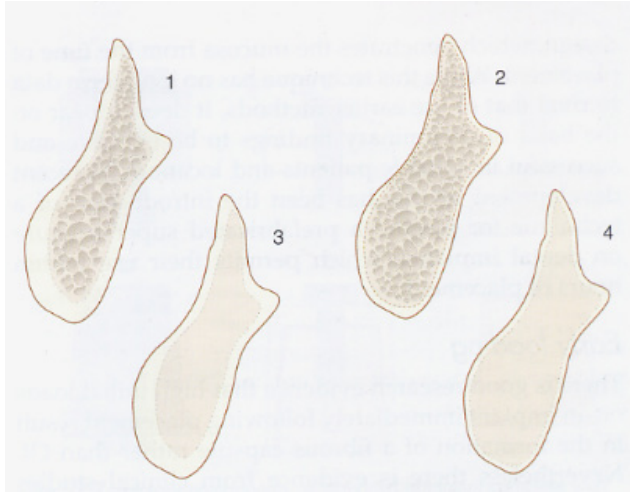


Figure 3. A scheme for classifying patterns of bone in the edentulous jaw: (1) thick cortex and plentiful cancellous bone; (2) thin cortex and plentiful concellous bone; (3) dense cortex with minimal cancellous bone; and (4) sparse cancellous bone and a thin cortex.

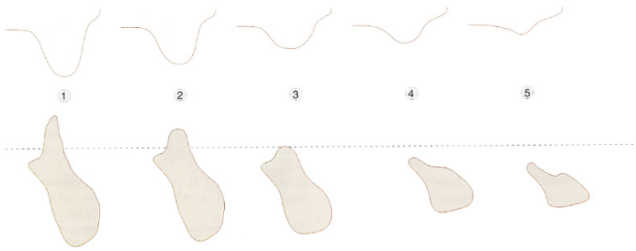


Figure 4: A scheme for classifying the extent of bone resorption in the edentulous maxilla and mandible based on the proposed by Cawood and Howell in 1988.

Epithelial downgrowth: Early implant designs were often associated with downgrowth of oral epithelium, which eventually exteriorized the device. When the newer generation of CPTi devices where introduced great care was taken to prevent this by initially covering the implant body with oral mucosa while OI occurred. The implant body was then exposed and a superstructure added, since it was known that the osseointegrated interface was resistant to epithelial downgrowth.[1] More recently, there has been a growing interest in using an implant design, which penetrates the mucosa from the time of placement. While this technique has no long-term data to rival that of the earlier method, it does appear on the basis of preliminary findings to be effective and successful in suitable patients and locations. A recent

development of this has been the introduction of a technique for placing a prefabricated superstructure on dental implants, which permits their use within hours of placement.[7]

Early loading: There is good research evidence that high initial loads on an implant immediately following placement result in the formation of a fibrous capsule rather than OI. Nevertheless, there is evidence from clinical studies that where the implant has good primary stability, early loading does not apparently preclude OI, below an ill-defined threshold.[3]

Late loading: It has been shown that excessive mechanical loads on an osseointegrated implant can result in breakdown of the interface with resultant implant failure, and it is generally considered that overload is therefore to be avoided. This could arise as a result of bruxism, in patients who habitually use high occlusal forces, and as a result of superstructure designs in which the use of excessive cantilevering causes high forces on the implants. The research evidence for a link between occlusal loads and loss of OI is, however, not extensive, and there are currently no clinical guidelines as to its determination in a particular patient other than by general principles.[4] Since bone is a strain sensitive material, the modeling and remodeling of which is influenced by deformation, it is thought that there is probably a range of strains that are associated with bone formation and could thus be of therapeutic value.[6-8]

Systemic and local factors affecting implant treatment: Implant treatment is but one of a range of procedures available to the restorative dentist to help the partially dentate or totally edentulous patient. Its use must be set within comprehensive assessment of the patient's needs and most suitable method of helping them. Treatment with dental implant does not in itself negate the need for care in patient assessment, treatment planning and provision, and cannot overcome neglect of basic principles or the use of inferior techniques. It is subject to the normal constraints on restorative and minor surgical procedures imposed by systemic conditions. In addition, there is a range of conditions that are associated with or thought to be associated with increased risk of implant failure.[9]

Systemic factors having known links with implant failure

Tobacco smoking: The use of tobacco shows an increased risk of an implant failure.

Implant failure resulting from certain associations of systemic disease:

- Active chemotherapy.
- Diphosphonate therapy.
- Ectodermal dysplasia.
- Erosive lichen planus.
- Type 2 diabetes: especially in the cases of uncontrolled DM.
- Operator has less or limited knowledge and less experience in implantology.[10]

Local factors having strong associations with implant failure:

- Resorbed maxilla implant placement
- Implant site has an history of irradiation.
- Usage of a designed implant in a press fit cylindrical design.

Matters less strongly associated with a risk of implant failure:

- In the infected sites of extraction, the implant placement.
- In the back-tooth region of maxilla use of little number of implants
- The usage implants that are short as compared to long.[11,12]

Conclusion

A major revolution that can be considered in the advancement of clinical treatment is the successful rehabilitation of edentulous area by the method of tissue integrated implants. The idea of knowing the prosthesis i.e. implants has been in a continuous process of evolution since past 4 decades starting from experimental phases to clinical practice of evidence-based dentistry.

Conflict of Interest: None

Ethical Permission: Approved

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Evaluation of Biomarker: A Review

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Abstract

Biomarkers are frequently used for understanding the physiological processes which are changing with age or any disease which developed and closely related to age also to aging process itself. Some of the best examples' biomarkers are pathological analysis, imaging pattern lipids and protein. The biomarkers are created in our body by response to any systemic disease or by any tumour biomarkers are very useful in spectrum of disease progression. During the time of diagnosis, biomarkers can determine staging, grading, and selection of initial therapy. During treatment, they can be used tomonitor therapy, select additional therapy, or monitor recurrent diseases. Recent advances in, proteomics and molecular pathology have created lots of candidate biomarkers with highly potential clinical value. In the near future, introduction of biomarkers, identified using new advanced technologies, into medical practice will be necessary to achieve "personalization" of treatment and disease prevention.

Keywords: *Biomarkers, Evaluation of biomarker.*

Introduction

Now a days in most of the studies of human population biomarkers are frequently used for understanding the physiological processes which are changing with age or any disease which developed and closely related to age also to aging process itself. Some examples of important biomarkers are pathological analysis, imaging pattern lipids and protein. The biomarkers are created in our body by response to any systemic disease or by any tumour biomarkers are very useful in spectrum of disease progression. In disease screening process biomarker can be used before any final diagnosis of disease. Markers help in diagnosis of disease by grading, staging and gives idea about which therapy is suitable for that disease. Biomarker also select additional therapy and observe the recurrent diseases.[1]

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Due to recent advancing in the technology field the close relationship or different oral diseases like cancerous and pre-cancerous lesions, dental caries periodontitis comes to our knowledge's most commonly occurring disease of oral cavity such as dental caries, periodontitis, oral cancer has some tremendous history of in their progression with evidence of bone loss attachment loss, pocket formation, enamel structure loss and various inflammatory process. Before the development of advance technology different oral disease were diagnosed by clinical examination, by using of different probes, radiograph and by asking the history of the disease. These method were time consuming or may give false negative or false positive results can not help properly for getting suitable therapeutic interpretation. Biomarker can provide early sign for development of disease or negative health output in near future. In regular routine check-up biomarkers role is essential because they can truthfully identify the mechanism of different disease progression.[2,3,4,5]

Different category of Biomarkers[6]: Inrecent year of molecular biology, biomarkers meanmolecular biomarkers they are classified in to three importantcategories:

1. Type 0 Biomarkers-their duty is to trace the disease progression in and compare with clinical measures
2. Type 1 Biomarkers their duty to check efficacy power of different drug
3. Type 2 Biomarkers-they act as surrogate end points in every clinical trial study

Some important definitions-6

Biomarker: An indicator of physiological or pathological response.

Risk marker: An attribute or event that is associated with increased probability of disease but is not necessarily a causal factor.

Risk indicator: An event that is associated with an outcome only in cross sectional studies.

Valid of biomarker-6

A biomarker is valid when allits evidence is clinically significant.

Classification of Biomarkers:

Biomarkers are classified under different ways:6

1. By their method of use
2. By their utility
3. By their the relation on clinical progression

Based on the method of use [6]

The first type of classification which is based on the method of use is further subclassified into:

1. Disease biomarkers: This is type 0 Biomarkers.
2. Diagnostic biomarker: frequently used in molecular diagnostics procedure.
3. Drug discovery Biomarker
4. Prognostic biomarkers: helps in outcome of disease.
5. Target biomarkers: Reports interaction of the drug with its target
6. Predictive biomarkers: To help in predicting disease at pre-symptomatic stage.
7. Toxicity biomarker: gives accurate idea about toxic effect of a different drug.

According to the Utility:

1. Early detection biomarker: Useful in screening procedure to detect early disease.
2. Prognosticbiomarker: Useful in assessing the survival rate.
3. Predictivebiomarker: Useful in monitoring the efficacy of treatment.
4. Targetbiomarker: Useful in detecting the molecular targets of therapy.

Different important uses of biomarker:[7]

In recent days different uses of biomarkers in medical field are

1. Biomarker as diagnostic tool.
2. Biomarker is used asstaging of disease.
3. Biomarker is used as best indicator of disease.
4. Biomarkers used as predicting and monitoring to clinical response of an intervention.

In medical science in recent year biomarkers are suitable predictors of disease occurrence and progression. These biomarkers frequently used to predict clinical responses of treatment procedure and in most of the cases they are representing the potentiality drug targets. Biomarkers can be obtained from the solid tissues and bio-fluids. Biomarker can refer to non-molecular risk like life-style information and physiological signals. Various types of biomarkers (TYPE-0,TYPE-1, TYPE-2) have been frequently used in different clinical practice to find out the progression of disease and predict clinical outcomes. At very first "Biomarker" term was popular in biomedical research but at that time it is not clear of its first use in biomedical research. The word Biomarker was collected in 1960"s but the 1st use of biomarker in a journal article title (in PubMed search) was in l980. The biomarker term is gained from biological and marker. Biomarker has a great role in describing a broad range of chemicals and physiological phenomena. [8,9]

Edwin Smith Papyri written around fifteen hundred B.C. and evidenced on the earlier work of Imhotep (27th century B.C.), details report of 48 trauma cases as well as therapeutic and prognostic coditions.[10]

The examination of all kinds of biologic specimens can also be tracked to ancient times, with reference to the qualitative and quantitative examination of urine and stools referenced in the Assyrian Book of Prognoses in six hundred fifty BC. It was not a surprising case but all the prognosticprocedure;different diagnostic findings around that time were based on purely spiritual mysticism. Hippocrates in three hundred fifty B.C. made

some advance technology forbiologic specimens in their proper diagnosis and prognosis.Ancient Greek men advocated a proper systematic approach for the diseases suffering people. the systemic approach for inspecting patients were physical examination of patients, inspection of body fluids. Greek physician employed his five senses to examine the patient's secretions and excretions to conclude the prognosis of a different types ofdisease and their treatment procedure treatment.[10]

The 19th century brought tremendous advances that allowed for the generation of huge amount of clinical data. Various types of instruments like electro cardiogram sphygmomanometer stethoscope, ophthalmoscope, laryngoscope, spirometer allowed for better qualitative physical examination and different physiologic measurement scale. In addition, the X-ray, microscope, new advanced laboratory based chemical and microbiologic techniques rapidly increased the physician's diagnostic procedure quality. This development process allowed for an unparalleled degree of specific goal oriented with respect to the assessment of biologic parameters of normal and abnormal biologic activities. As a result of which, all medical practitioner was able to build a standards and calculated deviations of human physiology.[1]

In the 20th century, all types of pathological laboratories were opened in a hugenumber of hospitals. Analysis of various types of blood culture and different urine samples made reference levels for a variety of analyses procedure, interlinked variations in disease states and gives clear-cut idea about different metabolic pathways in health and disease states. Recent advances in various analytic procedures like chromatographic separation and colorimetric sensitivity of analyses facilitated clinical tools and resulted in the ability to assess a increasing number of different biologic markers to trace the each and every changing condition of the patient. Now a days, all the practitioner became very much dependent on various chemical analysis of bodily fluids in the process of disease monitoring, final diagnosis procedure or as prognosis of different disease and follow-up the response to different interventions. By understanding of the pathophysiologic progression which is the most etiologic factor in that specific progressive nature of disease.11

From the results, biomarker have become unique in the scientific research field with considerable private and public sources now dedicated to simplify the utility of different types of biologic markers in speciallyall aspects of health sector. Novel measures of biological functions will prove critical in the research field, serving as surrogate last point indifferent types of clinical trials that promise to line-up the development of pharmacologic and non-pharmacologic therapeutic treatment.[12]

The journey of evolution of different biomarkers in recent times[6]

1. 1847: Protein cancer biomarker, Bence Jones protein in urine was discovered.
2. 1954: The measurement of transaminases in myocardial disease discovered.
3. 1960: "biomarker"term appears in the different literature and its close link with metabolites and biochemical abnormalities, connected to various diseases.
4. 1967: discovery of a qualitative test for myocardial infarction based on a suitable biomarker serum creatine phosphokinase.
5. 1971: Report of carcinoembryonic antigen (CEA) as biomarker of cancer.
6. 1987: Troponin I as a biomarker for myocardial infarction.
7. 1990: Accelerator mass spectrometry used for analysis of biological samples for biomarkers.
8. 1995: Applications of proteomics for discovery of biomarkers and use in molecular diagnostics.
9. 1999: Emergence of metabolomics for study of biomarkers
10. 2000: Sequencing of the human genome completed opening the way for discovery of gene biomarkers.
11. 2005: Discovery and application of biomarkers becomes a major activity in biotechnology and biopharmaceutical industries

Conclusion

Different Biomarkers have achieved immense scientific and highly clinical value and interest in the clinical practice of medicine. Biomarkers are truthfully essential along the whole journey of spectrum of the disease progression. Before any final diagnosis, biomarkers could be utilised for screening procedure and high-risk assessment. During the time of diagnosis, biomarkers can determine staging, grading, and selection

of initial therapy. During treatment, they can be used tomonitor therapy, select additional therapy, or monitor recurrent diseases. Recent advances in, proteomics and molecular pathology have created lots of candidate biomarkers with highly potential clinical value. In the near future, introduction of biomarkers, identified using new advanced technologies, into medical practice will be necessary to achieve „personalization‟ of treatment and disease prevention.

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Non-Invasive Chairside Diagnostic Techniques: A Review

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Abstract

Oral potentially malignant disorders (OPMDs) refers to a varied collection of disorders that are described by increased threat for malignancy causing Oral squamous cell carcinoma, most common being leukoplakia, erythroplakia, palatal lesions as a result of reverse smoking, oral lichen planus, oral submucous fibrosis, actinic cheilitis, and discoid lupus erythematosus. The initialdetection along withdiagnosis of these OPMDs are vital for carcinomainhibition and cure of disease. Currently, there is a budding and determined requirement for innovative non-invasive, diagnostic proceduresthat might simplify the primary recognition of oral PMDs. In this review article, we take an account on these non-invasive diagnostic procedures for easy diagnosis of oral PMDs.

Keywords: *oral potentially malignant disorders, oral cancers, light detection systems.*

Introduction

The conventional method for screening of oral PMDs are clinical inspection and palpation of the lesions. Nevertheless, elusive lesions may pass undiagnosed, and it is problematic to categorize among benign, premalignant, and malignant conditions of the oral cavity.[1] As Oral cancer is the sixth most common malignant tumor and is the prime cause of morbidity and mortality having metastatic and aggressive ability, an early detection is necessary before its advancement into oral carcinoma. [2] The stated 5-year rate of survival of the patient is around 50-63%. OSCC is usually headed by premalignant condition.[1]. The incidence is 7-17/100,000 persons every year with 75,000-80,000 fresh cases disclosed every yearly basis in India. Detecting oral cancer in its early stages radically affects survival rates rather than detecting it in later stages.[2] OPMD might procced into carcinoma in a proportion fluctuating within 5-18% of cases.[3] The frequency of oral cancer universally is nearly 500,000 new cases per year, proceeding to 3% of all carcinomas.[4]According to the risingrate of head and neck cancers, difficulties accompanying with delayed diagnosis, and the public health problems they give rise to, it seems judicious to endorse screening procedures to assess people at high risk. Initial diagnosis would permit for conservative beneficial methodologies with early recovery and better prognosis of the patients.[5].Currently, dentists have developed an oral cancer screening device that supports in prompt detection of OPMDs.[2] In the last few span of years, widespread non-invasive method have been established for revealing of oral PMDs besides the standardized techniques of biopsy.[1]

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Light Operated Detection Systems: A variety of light-based discovery method have been recognized for diagnosing oral PMDs and oral carcinomas. Mucosal tissues have altered absorbance and reflectance properties because they undergo abnormal metabolic or structural changes when it comes across numerous method of light sources, permitting the credentials of the changes of oral mucosa. [1]In the pastera, light-based equipment has been improved and promoted for detection of lesions in the oral mucosa.[6]

The term bioluminescence has been documented in the year 1500. German physician, Henning Brand gave the first evidence of chemiluminescence in 1669, on

discovering phosphorus and the terminology was first devised by Eilhardt Weidemann in 1888. [7]

Classification[8]

- According to reflecting property of the tissue-Vizilite,Vizilite plus Tblue system,Orascoptic DK, Microlux
- According to autofluroscence property of the tissue–VELscope
- According to both reflecting and autofluroscence property of the tissue-Identafi 3000 ultra
- Marketed chemiluminescence kits include ViziLite, ViziLite Plus, Microlux/DL and Orascoptic DK.

VIZILITE: The terminology chemiluminescence defines the production of light on account of a chemical response. Due to the resemblances in the visual appearance of OSCC and cervical SCC, this skill has lately been modified for applicationinside the oral mucosa named as ViziLite. [6]

Components: The Vizilite kit has 1% acetic acid solution, a capsule which releases light and a retractor. The Vizilite capsule consists of an external chamber of bendable plastic cap consisting of acetyl salicylic acid andinternalbrittle glass ampoule having hydrogen peroxide.

The elements in the outer and inner compartments counter to yield bluish-white color light having wavelength between from 430 to 580 nm. The light persists for roughly 10 min. Vizilite is composed of 1% acetic acid solution having water, acetic acid, sodium benzoate, flavouring agent, propylene glycol base and alcohol whereasVizilite Plus have three swabbing constituents: 1% acetic acid dye in two swabs, including a post-dye decolorizer and a single swab containing metachromatic vital tissue dye, and toluidine blue.[7]

Patient is asked to rinse the mouth with 1% acetic acid which aids to eliminate the glycoprotein barrier, somewhatdesiccate the oral mucosa and improves theprominence of epithelial cells within the tissue. The ambient light is lowered and a turgid bluish-white chemiluminescent light is concentrated over the tissue. Normal cells absorb light under this bluish-white light, and they look bluish whereas abnormal cells causes reflection of the light and appear acetowhite having brighter followed bydiscernible borders. [8]

Vizilite Plus: It applies an alteredmethod containing Vizilite and Toluidine Blue Marking arrangement which containsestablished clearance from Food and Drug Administration for observing the oral mucosa, in the form of an adjuvant technique. Toluidine blue is an acidophilic metachromatic dye which stains the acidic components of mucosa selectively such as carboxylates, sulfates, and phosphate radicals, thus staining the cell DNA and RNA.

It also decolorizes the cells undergoing dysplasia and the anaplastic cells that have excess of nucleic acids as compared to normal mucosa. Also, the cells undergoing malignancy may enable morepermeation of the dye due to the occurrence of canals within the cells.

Following conventional examination, all the lesions are examined underVizilite. The lesion discolored using toluidine blue is undoubtedly observed even in the absence of light device and exact area for biopsy may be designated. With Vizilite Plus System, there is 100% sensitivity and the cancerare visualized by 60%. [8]

Microlux Diagnostic Light: Microlux Diagnostic Light practices light emitting diode (LED) having fiberoptic source, operated on battery whichproduces a blue-white light of low energy. Thistechnique is comparable to Vizilite and Orascoptic Dk. The benefitof it is the re-usable property. Microlux DL has the capacity to improvethe visibility of the lesion.It is poor in discerning lesions with inflammation, traumatic, or malignant lesions. [8]

Oral examinations with the help of toluidine blue (TB) was prepared by 1% acetic acid wash along with1% solution of toluidine blue rinse in a time span of 30 seconds. Additional stain was debarred by smearing 1% acetic acid for a period of 30 seconds. The oral lesions were inspected by Microlux/DL+TB to observe the extent of reserveddiscolored areas and finally explanation of the staining procedures was done. [9]

Orascoptic DK: Orascoptic DK is aadaptable, device that uses a LED light source held in hand along with three substitutable distinctive diagnostic tools such as Oral lesion screening Instrument, Trans-illuminating Instrument and Lighted Instrument with Mirror. The DK Trans-illuminating instrument aids to picturise fracture tooth and dental caries having apenetrating, focused source of light. The DK Lighted Mirror comes with a potent LED light source to lighten up the reflection obtained from the mirror thus helping inclearly visualizing the unapproachable areas within the oral cavity.[8]

The technique is comparable to Vizilite. The conventional oral scrutiny is done using an incandescent light. The oral mucosa is again examined witha Oral lesion screening instrument, upon rinsing with 1% acetic acid mouth rinse, and bluish white light is emitted. The 'acetowhite lesions' looks brighter thus helping in better visualization of lesions.[8]

Velscope:

(Visually Enhanced Lesion Scope)

VEL scope uses excitation of blue light within the range of 400 and 460 nm wavelengths to improve oral mucosal anomalies by using principle of direct tissue auto fluorescence. The normal oral mucosal layer is related with a pale green fluorescence when observed through a filter, while abnormal mucosa is related with absence of auto fluorescence (LAF) and seems darker in appearance. Though these excitation wavelengths are applied in labsto distinguishregular oral mucosa from dysplastic cells, carcinoma in situ (CIS), and carcinoma showing invasion, the makerinferred these verdicts to designate that VELscope can assist inidentifying oral mucosal anomalies invisible in white light inspection.

The VEL scope is a handheld device that produces a visible blue light which stimulates the oral mucosa and makes it fluorescence. The oral mucosa is thensurveyed as real image, improving the expert'scapability to genuinelyrecognize suspicious mucosa that may necessitate further examination. [10]

VELscope has a fairly high rate of false Positives. This proposes that VELscope differentiates poorlyamongst benign and dysplastic lesions. [11]This procedure enables to discriminate inflammatory lesions when compared to neoplasia because inflammatory lesions classicallydemonstrate totaldiascopictype of fluorescence, but not in case of neoplastic lesions. [11]

IDENTAFI 3000 Ultra: The Identafi is a type of screening methodin multispectral way involving three altered lights namely white, violet and amber green light, which are intended to be applied in order to promote intraoral inspection. Themethod work based on both reflecting and fluorescence property of the tissues.

White light is used in the beginning for conventional oral examination, followed by violet light of wavelength 405nm, which is focused on the tissues. Itassesses the auto florescence of oral tissues usingsupplementary photosensitive filters as compared to VELscope. Lastly, the green-amber light operating at 545 nm wavelength gives theimpression of light reflecting principle from tissuesto outline the blood vessels in the underlying mucosa.[11]

Photodynamic Therapy: Photodynamic therapy (PDT) is a management method that employs light to initiate photosensitizing agent (photosensitizer) using oxygen. The introduction of the photosensitizer to light effects in the development of oxygen species, and free radicals, producing localized area of photochemical damage and cell death. PDT encompasses three components: a lightsource, a photosensitizer element, and oxygen. The benefit of PDT over predictablemanagements is established on its minimal invasiveness and tumor destruction selectively, with the protection of healthy soft tissue. Some of the photosensitizers have the necessary property of concentrating in tumor cells (and in different proliferating tissue) comparative to the adjacent healthy tissue.[12]

5-aminolevulinic acid (ALA) is an efficient photosensitizer for oral PMDs and oral carcinomas, which instead of fluorescing by its own, forms protoporphyrin IX (PPIX) fluorescence in the human tissues. The oral cavity is rinsed with 0.4% ALA solution for a period of 20 min to perform PDT.

Topical use of 5-ALAin excess amount causes formation and cellular accretion internally of highly fluorescent PPIX in tissues undergoing dysplasia and malignant changes, which is agitated by brief contact to light (wavelength 405nm). Tissues appearing fluorescent are considered doubtful for malignant alteration and only biopsy can give confirmation. To increase the indicative specificity, a 5-ALA facilitated fluorescence endoscopic imaging technique viewed digitally has beenimplemented.[12]

The ratio between red-to-green and red-to-blue concentrationin cells undergoing dysplastic changes and malignancy are greater than seen in benign tissueswhen quantificationof PPIX fluorescence endoscopic images are done. When the ratio between the red-to-blue intensity in the ALA-induced PPIX fluorescence images seen under endoscope were measured, itrevealed that it could delivernobleddiscrepancyamongst benign dysplastic changes and malignancy. It was seen that oral submucous fibrosis mucosa had the lowermost ratio in the red-to-blue intensity region [1].



Figure 1: Orascopic DK



Figure 2: Vizilite

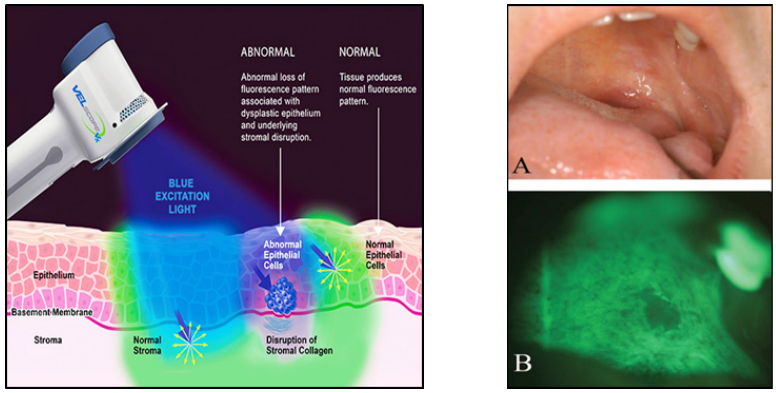


Figure 3: Velscope

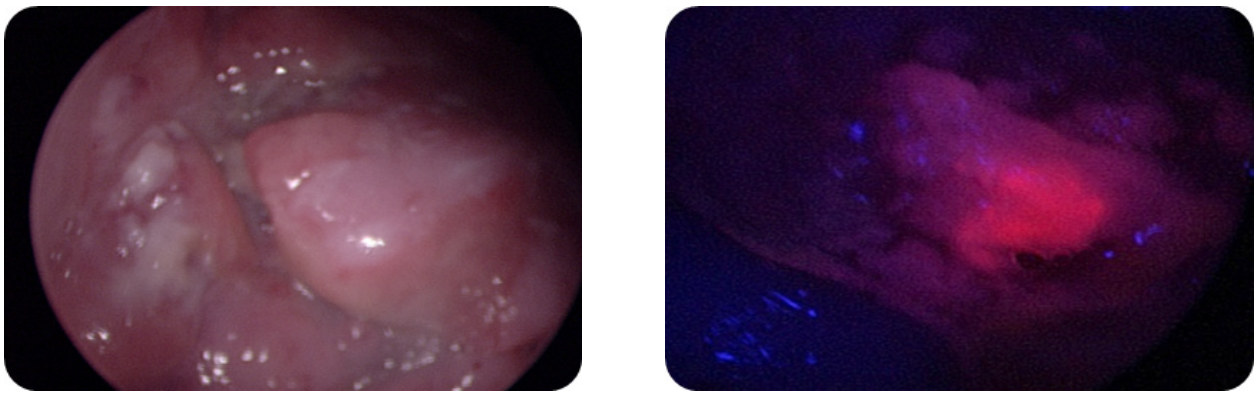


Figure 4: Photodynamic Therapy

Conclusion

Improving oral cancer detection and analysis have long been major perplexing facing both dental and medical sources in the world. Screening and early recognition in inhabitants at risk have been suggested to decrease both morbidity and mortality associated with the oral cancer. However, the subjective explanation of the inoffensive lesions by COE with the vivo examination tests significantly enhanced the diagnosis at an early stage. Many investigative procedures are tried to eradicate surgical biopsy which is the golden standard, but these tests are not the substitute for surgical biopsy rather, they can be used as an adjuvant.Maximum non-invasive diagnostic method assessed indicated great prospective for screening along with observing oral

PMDs. Furthermore, there is inadequate indication to mentioneither for or against the unrelated application of any technique inrecognizing oral PMDs.

Conflict of Interest: None

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Inappropriate Prescribing of Antibiotics by Practitioners

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Abstract

Antibiotics, in this world, are very much needed in the treatment and prophylaxis of diseases in patients who can be infected by any bacterial or any other microbial disease. Over and under use of antibacterial agents is a global concern. It results in superfluous treatment costs, is a potential hazard for the development of antibiotic resistance and results in side effects. Dental practitioners frequently prescribe antibiotics to treat dental infections. Uses of systemic antibiotics in dentistry are confined since management of acute dental conditions is principally based upon extraction of teeth or extirpation of the pulp. However, the literature present evidence of inappropriate prescribing practices by practitioners, due to a number of elements from incomplete insight to social factor. To improve the standards of care, dentists need to keep themselves refurbished with the current patterns of antibiotic prescription and their use. It is thus essential to map local prescribing patterns of antibiotics in order to examine the need for improvement and to impede the consequences of their inappropriate prescription.

Keyword: *Antibiotics, prescription, resistance, practitioners, dentists.*

Introduction

Antimicrobial agents are among the most impressive example of the advances of modern medicine. Many infectious diseases once considered fatal, incurable and lethal are now responsive to treatment with a few pills.[1] An avoidable consequence of antimicrobial usage is the selection of resistant micro organism. Overuse and inappropriate use of antibiotic has fuelled a major increase in prevalence of multi drug resistant pathogen, leading some to contemplate that we are nearing the end of the antibiotic era.[2]

This growing problem has contributed significantly to the morbidity and mortality due to infectious diseases, with increasing death rate for communicable diseases. The World Health Organization (WHO) admits this global problem and declared the theme for the year 2011 as "Antibiotic resistance; No action today, No cure tomorrow".[2]

Developing country such as India has been rated as one of the biggest consumers of antibiotics in the world. And its misuse and overuse is uncontrolled. As a result, 'super bugs' that are resistant to all known types of antibiotics are starting to flourish. For some, the last line of defence is a delusion. It doesn't prevail. With both humans and the poultry/livestock industry overusing antibiotics, the window of efficiency for new anti-bacterial drugs is getting briefer.[3]

In dentistry, antibiotics are used for the prevention of life-threatening disease and to avoid postoperative infections. Amoxycillin or penicillin group is the first line of drug in managing odontogenic infections as they are sensitive to Gram-positive aerobes, intraoral anaerobes, organisms found in alveolar abscess, periodontal abscess, and necrotic pulps. Aerobic and anaerobic microorganisms are sensitive to penicillin group.[4] The prescription of antibiotics by the superiority of the dentists is vastly on empirical basis without the need for antibiotics many times just to avoid unpleasant complications and prophylactic purpose.[5]

The major reasons behind antibiotic resistance are due to the over prescription by the health care personal, improper use by patient and also due to the resistance developed by the bacteria.[2] This is backed by the evidence collected to how the significant relationship between increase of antibiotic resistance and utilization with higher resistance level in bacteria isolated from area of high antibiotic utilization.[6]

Evidence Aquisition: Computerised searches consisting of published articles received from Google, PubMed, PMC free article, Google Scholar, Science direct, Medline, EMBASS. Different keyword including antibiotic, antimicrobial agent, resistance, mechanism of resistance, health professional, practitioners, prescription, knowledge, dental care, dentists, prevention were used in the literature search. Moreover, the reference of all paper was again searched for further relevant studies.

Discussion

Antibiotics are the greatest gift of the 20th century to therapeutics. Their importance is magnified in the developing countries, where infective diseases predominate. As a class, they are one of the most frequently used as well as misused drugs.[4] Problem that arise due to overuse of antibiotic are-

- **Toxicity:**
  - Local irritancy like gastric irritation, pain and abscess formation
  - Systemic toxicity like kidney and liver toxicity, bone marrow depression, hearing loss
- **Hypersensitivity reactions:**

  Almost all antibiotic are capable of causing hypersensitivity reactions
- **Drug resistance:**
  - It is defined as the insensitivity of bacteria to a specific antibiotic.
  - It is of two types-natural and acquired. Acquired resistance occur as a consequence of a antibiotic therapy and is the result of the selection of resistant organism. Drug resistance is the main reason of failure of antibiotic and is mainly due to the overuse of antibiotic and inappropriate prescribing of them by the practitioner.[3]
- **Superinfection (Suprainfection):**

  It is defined as the presentation of a new infection as a consequence of the previous antimicrobial treatment.
- Nutritional deficiencies:

  Mainly vitamin B complex deficiency.[3]

Inflammatory diseases are the most frequently seen oral disease in India. An appreciable amount of pain of dental origin entail from acute and chronic pulpitis which require treatments like Root canal treatment or normal restorative procedure and therefore doesn't require antibiotics as such unless the periapical region is infected. The antibiotic can't penetrate the pulp of a tooth as it is enclosed in a 'closed box' surrounded by dentin and cementum and hence, antibiotics should not be prescribed in such cases. Therefore, these cases should be treated without antibiotics and emphasis should be given on use of operative procedures.[1]

A review from a survey conducted in South India showing the dentists prescribing antimicrobials for patient coming with dental pain and related symptoms in the clinical practice.[8]

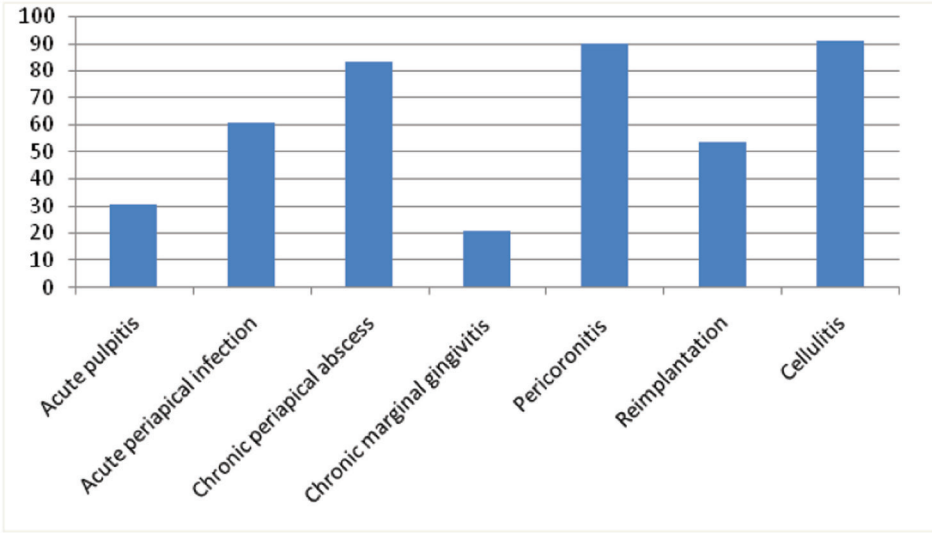


Chart 1: Percentage of dentists prescribing antimicrobials for patient coming with dental pain and related symptoms in the clinical practice[8]

The above chart represent the knowledge of some of the dentists from South India regarding the demand of prescribing antibiotic for dental pain and other symptoms in which there were no clinical sign of spread to the system. The given percentage of dentists prescribed antibiotics for above conditions where antibiotics will not work and only operative intervention will suffice. They often prescribe prophylactic antibiotics as an adjunct to the operative treatment which is mostly irrelevant.[8]

Another study from the same survey showed the various other components which affect the antibiotic prescription by the dentist which shown below in the chart 2.

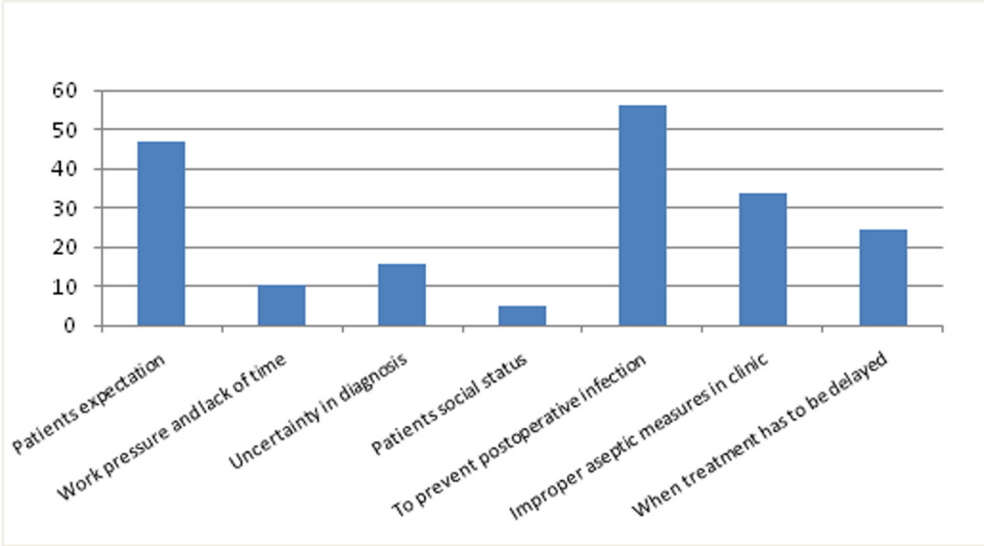


Chart 2: Percentage of various other components which affect the antibiotic prescription by the dentist[8]

Many dentists prescribed antibiotic according to the patient expectation from the treatment or due to improper aseptic measure in the clinic. More interestingly the dentists are prescribing antibiotics as a prophylactic medicine to prevent postoperative infection where it is not even required.[8]

As per the study done in Jaipur city, Rajasthan, on knowledge regarding antibiotic drug action and prescription practices among dentist, showed that the greater part of the dental practitioner utilized broad spectrum antibiotics. There is impressive assertion that the penicillin with clavulanic acid is the antibiotic agent of choice for these procedures as there are no hypersensitivity reactions or intolerances. Amoxicillin + metronidazole were recommended antibiotics for apical periodontitis by the dental practitioner.[16]

Some dentists prescribe antibiotic for abscess even though the guideline for abscess treatment clearly states simple incision and drainage or exodontia and then drainage, before the prescription of antibiotics.[10] If antimicrobials are used, they are used as a supplement with the operative management and to reduce edema and also help in reducing the spread of infection to the local areas and the body.

Antimicrobial agents are often not indicated for chronic conditions such as periodontitis; but in conditions where local or systemic spread of the infection has occurred, or where incision and drainage can't be performed, the antibiotics can be prescribed to limit the spread of infection. Submicrobial dose of doxycycline is widely used in periodontal therapy as an adjunct to mechanical therapy, although resistance is not reported if taken for a short period but there are studies which have reported doxycycline resistance if they are prescribed for prolonged periods.[1]

Self-medication is an alarming concept in a developing country like India. People often skip the consultation of a trained doctor and thrive on the medications prescribed earlier or to someone else who has had almost the same symptoms earlier.[16] The developing countries lack the basic health care centres, low income, poor financial status which leads to low awareness of the risks regarding these kinds of practising.[16]

Even practitioners teaching in hospital have a poor habit of prescribing antibiotics in irrelevant situation. Many studies have supported this and have been shown that 91% of the practitioners write irrelevant antibiotics on a daily basis.[17]

After careful evaluation and establishing the requirement of an antimicrobial agent in a patient, which can't be resolved with operative intervention alone, one has to choose the right and the most specific antibiotic from a lot of options in the market.[2] The choice depend on-

- Age may affect kinetics of many antibiotics, and certain antibiotics produce age-related effects.
- Liver and kidney failure-careful use and dosage management of antibiotics (with maximum therapeutic index) becomes extremely important when the organ responsible for the elimination of the drug is not functioning.
- Local factors-The location of the infection and the condition of that site, greatly influence the mechanism of the drug
- Drug allergy
- Impaired host defence
- Pregnancy[2]

The indiscriminate use of antibiotic, it resistance and it adverse effect can be limited by the practitioners by-

1) Avoiding the indiscriminate use by ensuring that the dosage and the time duration are appropriate.
2) Usage of antibacterial combination in appropriate circumstance
3) Continuous evaluation of resistance pattern in a hospital or community (altering the dose and duration of antibiotic used for empirical management when their resistance becomes prevalent) and relevant measures should be taken to control the spread of these resistant microbes.
4) Decreasing the antibiotic use, following the agreement between the clinician and microbiologist; resistant microbe which can proliferate following the use of that drug may require restricted usage.
5) Selection of the appropriate antibiotic is absolutely important[5]

Conclusion

With the increasing resistance of bacteria against the antibiotics and their ability to decrease the efficiency of the antimicrobial agent, it is now of absolute importance for the humans to fight against them and collect all the knowledge possible to combat antibiotic resistance. The teaching and practice in the hospitals and institutes should be carefully monitored regularly and certain CDE programmes should be conducted at regular intervals, to provide latest updates to obtain successful results from antimicrobial agents. As a lot of non-clinical factors are affecting the prescription practice among the doctors, only doctors should not be held responsible for the growing antibiotic resistance. But as a dental surgeon, it is our duty to overcome the clinical and non clinical factors, to provide quality treatment to our patients and prevent the hazard of antimicrobial resistance.

Limit injudicious use of antibiotics. Superfluous and injudicious use of antibiotics can be prevented by,

1. Using it as an adjunct and not alone as a treatment option
2. Using antibiotic sensitivity tests and using infection specific antibiotics
3. Using narrow spectrum antibiotics

Limit prophylactic antibiotic prescription. Prescribing antibiotics as prophylaxis is a subject of debate. Limiting prophylactic antibiotic prescription in healthy individuals with those having no underlying systemic diseases or no immuno compromised conditions is recommended. Knowledge and education of all the dental practitioners needs to be revised and updated to increase awareness and enhance prescribing practice to provide good patient care and avoid the occurrence of any adverse events arising as a result of erroneous drug prescription which could endanger patient's life.

Therefore, it is recommended that the local managing bodies associated with continuing dental education and dental associations organize programs to help private practitioners update their knowledge and be in sync with the ever-changing field of medicine. The programs should be easily accessible and specific to the changes occurring in prescription of antibiotic therapy. The focus should be on emphasizing the existing knowledge and updating it with modern and newer antibiotic regimen, their posology and proper use based on the clinical situation. The private dental practitioners should be

self-motivated to be a part of this continuance. This would be a step not only for the well-being of the patient but also for dentist to avoid any detrimental event just because of sheer lack of awareness.

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Ethical Permission: Approved

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Application of Bisphosphonates in Dentistry: A Review of Literature

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Abstract

Bisphosphonates have been of great use since many decades for their property of bone biomodulation which is very much evident. There is a lot of studies for beneficial effect of bisphosphonate across various dental treatments. Implant dentistry with Bisphosphonate coating has been shown to significantly increase retention and density in human mode. Orthodontics with application of bisphosphonates has benefits of reduced root resorption and maintaining of good anchorage. Bisphosphonate terminate osteoclast activity and their IV or oral uses have been reported to be linked with osteonecrosis of the jaw. The aim of this literature is for Application of Bisphosphonates in Dentistry.

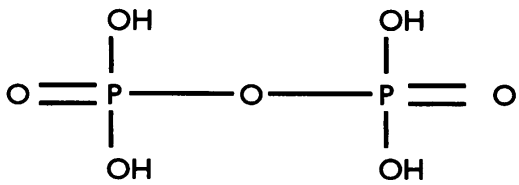
Keywords: *Bisphosphonate, Osseointegration, IV or Oral Route, Osteonecrosis of Jaw.*

Introduction

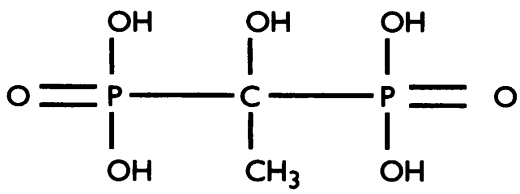
Bisphosphonate is a group of drugs used to treat osteoporosis and prevent the loss of bone density. Bisphosphonate such as alendronate, risedronate, ibandronate and clodronate are important class of drugs. The prime categories of bisphosphonate are first generation non nitrogen (clodronate, tiludronate) and second and third generation nitrogen containing (alendronate, risedronate). Oral bisphosphonate is used for treatment such as osteoporosis and Paget's disease, whereas intravenous bisphosphonate is used to patient of breast cancer, multiple myeloma and malignant hypercalcemia.[1] A major complication in patient using oral or intravenous bisphosphonate is osteonecrosis of the jaw which is characterized by susceptible bone of the maxilla or mandible that poorly heals during 6 to 8 weeks. These facts indicate that the dental society and public are increasingly interested in the possible interaction between dental implant treatment and bisphosphonate medication.[1,2]

The Structure of Bisphosphonate: Bisphosphonates are formed by two carbon phosphorus bonds, the carbon atom replacing the pyrophosphate bond P-O-P (phosphorus-oxygen-phosphorus) and the chemical and enzymatic hydrolysis resistance bond P-C-P (phosphorus-carbon-phosphorus). Various substitutions on the carbon atom produced several different bisphosphonates, each with its own unique pharmacological properties. Etidronate was the first bisphosphonate to be used therapeutically, followed by the development of many others. Main bisphosphonates to increase the potency of antiresorptive action are etidronate, tiludronate, clodronate, pamidronate, alendronate and risendronate.[3]

Pyrophosphate



Etidronate



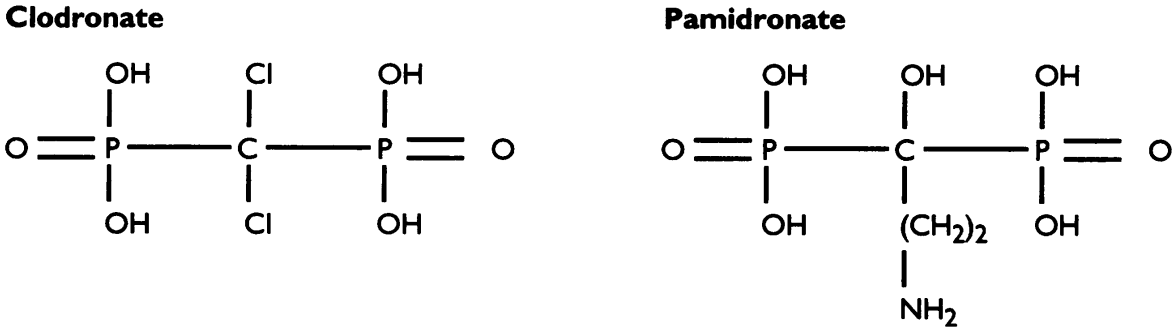


Figure 1. Chemical structure of pyrophosphate and three bisphosphonates

The Role of Bisphosphonate: Bisphosphonate is used in the management of osteoporosis where imbalances in bone remodeling lead to lower bone density and quantity. To decrease the risk of fracture, it is administered orally (e.g. daily, weekly or monthly) or intravenously (every 3 months or annually). Bisphosphonate is used in antineoplastic therapy to treat bone metastatic spread complication including: pain, hypercalcemia, and pathological fracture.[3,4]

Mechanism of Action: Bisphosphonate is usually a bone resorption inhibitor that is treated with osteoclast. Nitrogen-containing bisphosphonate such as alendronate or risedronate is bound to resorb osteoclast by hydroxyapatite on bony surfaces. During bone resorption, bisphosphonate taken up by osteoblast inhibits the farnesyl pyrophosphate synthase enzyme, a key enzyme in the mevalonate pathway. Metabolites shaped in this way are important regulatory proteins for the osteoclast function of the cell membrane.[4]

Older bisphosphonate (with no side chain nitrogen) such as etidronate and clodronate is transformed into Adenosine Triphosphate (ATP) which makes it hydrolysis-resistant. The accumulation of this non-hydrolysable adenine-containing metabolite ultimately results in osteoclast cell death. There is some evidence that they induce osteoclast precursor cell proliferation and osteoblast development of osteoprotegerin due to their direct action on osteoclasts alone. But the mechanisms of osteoblasting are not as well known.[5]

Literature review:

Implantology: Dental implant placement is a traumatic operation requiring osteotomy site bony removal and subsequent osseointegration healing. Osseointegration is characterized by a bone-implant union that, in close application to the implant surface, relies on early woven bone remodeling to shape mature bone. Records of delayed wound healing associated with oral systemic bisphosphonate are not surprising. Nevertheless, it is relevant that a systematic review of the literature found that there was no significant difference relative to control groups in the short-term survival of oral BP patients.The American Association of Oral and Maxillofacial Surgeons (2014) does not recommend a ban on the insertion of dental implants in patients receiving oral BPs, but explicitly warns doctors against a procedure involving direct bone damage in patients receiving intravenous BPs anti-angiogenic cancer therapy.[6]There is some evidence that when used as a surface coating, bisphosphonate can have a positive effect on the dental implant's osseointegration, specifically increasing early implant fixation. The reason for using BPs in implant placement is to avoid bone resorption at the osteotomy site. Changes in the dental implant surface structure (e.g. sand blasting and acid etching) and chemical composition (e.g. surface coating) by electrochemical techniques are studied as a means of assisting the formation of peri-implant bone. Hydroxyapatite, tricalcium phosphate (TCP), bioglass and more recently bisphosphonate are researched ground finishes.Bisphosphonate-coated implants are prepared by covalently binding a fibrinogenic metal-coated matrix to which BPs, specifically Panidronate and Ibandronate, are bound and absorbed. Most studies are based on animal models, but some studies are limited to human studies as well. Nevertheless, it is recognized that there is a lack of standardization of procedures and factor primary and secondary outcome measures, making it difficult to compare these studies directly.[7]

Orthodontics: Possible benefits of bisphosphonate are considered in orthodontics in the form of root resorption and safety of anchorage. Root resorption is a popular but unwanted side effect of orthodontic

treatment and it has been shown by a limited number of animal studies that bisphosphonate has a potential role to play in its prevention. A split mouth study in mice showed during fixed appliance therapy that local bisphosphonate solution injection resulted in significantly lower root resorption. This phenomenon is thought to be the outcome of bisphosphonate-induced odontoclastic apoptosis.[8]

A similar study by Liu et al. found that injection of local subperiosteal clodronate, a bisphosphonate of nitrogen, resulted in a significant reduction in root resorption at treated sites relative to rat control sites. Besides the small sample sizes used in this study, prevention of root resorption is also important in the sense of overall reduction. Current anchorage repair approaches are suboptimal based on patient adherence (e.g. head gear, elastics) and invasive procedures (e.g. mini-screw positioning of implants).Studies have suggested beneficial effects on the anchorage of bisphosphonate. Earlier study by Liu et al. found that subperiosteal injection of clodronate caused a significant decrease in movement of the tooth and a decrease in dose dependence. Bisphosphonates can also indirectly facilitate anchorage, as local zoledronate injection into implant osteotomy sites has expressed a significant improvement in the stability of mini-screw implants by promoting increased trabecular bone formation around implants. These small-scale animal studies have demonstrated several potential effects of bisphosphonate to prevent root and tooth resorption. The work is at an early stage, so it is necessary to look carefully at the potential application of this research for humans.[9]

Paget's Disease: Paget's disease is characterized by increased bone resorption due to both increased bone turnover and increased length of resorption cavity. The number and volume of osteoclasts present is significantly increased. The etiology of the disease is not established, although a viral origin has been suggested. Paget's disorder is dominant, typically affecting multiple locations of the skeleton. Bisphosphonates have become the preferred treatment for Paget's disease in term of response rate, degree and period of remission, and loss of secondary resistance in up to one-fifth of calcitonin patients.The dose-related reaction may extend the remission period by up to two years. This prolonged remission is likely to result from persistence of bone bisphosphonates after administration and subsequent low release. Post-relapse retreatment's effectiveness is close to the initial course.[5,6]

During care, the progression of the disease and its changes can be monitored biochemically using serum alkaline phosphatase and urinary hydroxyproline or bone turnover markers for deoxypyridinoline and pyridinoline. The rate of decrease in serum alkaline phosphatase activity and the degree of therapy-related suppression are positively induced and the initial incidence of the disease is inversely related to the period of remission. Failure to respond to bisphosphonates is extremely rare in Paget's disease, although it may occur. In these situations, the addition of calcitonin can lead to remission. Etidronate was most commonly used for the disease of Paget and is still the only bisphosphonate approved to treat this disorder in Britain.[7]

Nevertheless, histological changes have been reported after intermittent intravenous pamidronate, indicating reduced mineralization. No adverse health effects have been reported, but the reliability of these findings requires further study. Clodronate is available in Britain for oral and intravenous use, although the treatment of Paget's disease such as pamidronate is not approved. Effective treatment of disease results in one to six months of oral doses of 800-1600 mg daily. Conversely, equivalent medical and biochemical results emerge from a 5-day course of 300 mg daily intravenous injections.[5,6]

Periodontium: Periodontitis is an infectious disease that causes inflammation within the teeth's supporting tissues.28 Conventional treatment involves medical mechanical and antimicrobial agents used to extract plaque biofilm. Currently, due to an improved understanding of periodontal disease pathogenesis, attention has been given to an additional therapy approach with respect to modulation of the host response. Current evidence indicates an association of osteoporosis with human periodontal disease onset and progression. Numerous studies have shown that low bone mass is separately associated with alveolar crest height loss and tooth loss. Systemic loss of bone density in osteoporosis, including oral cavity, may provide an increasingly susceptible host system to infectious tissue degradation. A strong link between systemic and oral bone loss is indicated by some research to date. Research on animals has shown that systemic administration of bisphosphonate prevents bone loss.Buduneliet al11 showed that by inhibiting multiple inflammatory mediators in gingival crevicular fluid, alendronate and/or doxycycline may have beneficial effects in periodontal treatment. Many studies have shown that systemic alendronate administration

has a positive effect on the alveolar bone mass, but has no effect on the clinical parameters of gingival inflammation or plaque. The duration of treatment plays an important role in the outcome; A short duration of risedronate administration may be useful in inhibiting periodontitis bone resorption, although prolonged duration of administration may be useless. The local or topical application of bisphosphonates was also found to prevent alveolar bone loss in animal models. Similar results in human studies have been published.[5,6]

Postmenopausal women receiving oral bisphosphonates reported better clinical periodontal parameters and higher levels of alveolar bone compared to control. In a 12-month review, Lane et al demonstrated the effectiveness of oral bisphosphonates in improving outcomes of non-chirurgical periodontal therapy in patients with severe periodontitis. Some researchers found that bisphosphonate therapy improved periodontal disease clinical parameters, while others did not find such an effect. Developing bisphosphonates to slow the process of periodontal disease depends on identifying an effective dosage regime and delivery system that would reach the target site in the periodontium while limiting unwanted side effects.[1-3] Therefore, bisphosphonates may be effective not only to prevent osteoclast-mediated bone loss, but also to promote bone development under suitable conditions. Etidronate in general has been shown to reversibly inhibit bone mineralization, which would improve bone matrix formation. Once the excess matrix has been formed, etidronate discontinuation would then allow mineralization to occur, resulting in increased bone formation. Etidronate could therefore be used to promote the development of the bone matrix around titanium end osseous dental implants.Bisphosphonates may be useful not only for the treatment and prevention of periodontitis-related bone loss, but also as diagnostic and early intervention aids. Their affinity for new bone mineralization or active bone remodeling makes these drugs ideal in combination with radiolabels for the diagnosis of periodontal bone loss.[4-6]

Discussion

A research outlines recent literature that supports potential benefits from the use of bisphosphonate in numerous dental fields. There is confusion with regard to the form of bisphosphonate to be used and the correct dose and application process. There is growing evidence that, despite the association of high doses of systemic bisphosphonate with this undesirable condition, topical treatment does not cause jaw osteonecrosis. While the results of these experiments are positive, long-term human studies are not adequate and therefore should be viewed with caution. This dimension of bisphosphonates requires more study.[4]

Bisphosphonates are artificial pyrophosphate analogs that are non-biodegradable and inhibit bone resorption. For different compounds, the efficacy of their antiresorptive activity varies widely. Bisphosphonate intestinal absorption is small (< 1% to 10%) and the skeleton has a very long half-life. The main therapeutic use of bisphosphonates in diseases is characterized by improved bone turnover. These are the medication of choice for Paget's disease and hypercalcemia for malignancy.[5] Bisphosphonates also show promise in osteoporosis, especially in their prevention. Nevertheless, there was no strong evidence of beneficial effects on the incidence of fractures. The toxicity of bisphosphonate is small and varies from compound to compound. Many bisphosphonates have adverse effects on bone mineralization in doses used to inhibit bone resorption. The creation and analysis of new bisphosphonates is an important topic of research on osteoporosis. Crucial and unresolved issues include optimal (continuous v intermittent) regimens, the comparative effectiveness of different compounds and the potential for anabolic bone damage.[6]

Bisphosphonate production represents a major clinical breakthrough and is now the preferred treatment for Paget's disease and malignant hypercalcemia. In the prevention and treatment of osteoporosis, bisphosphonates do show great promise. Evaluation of osteoporosis caused by postmenopausal and corticosteroid has shown beneficial effects on bone mass, particularly in the spine, although a decrease in fracture frequency remains to be firmly established.[7]

In all of these cases, the long half-life of bisphosphonates in the bone provides a rational basis for sporadic treatment, but active regimens for Paget's disease and osteoporosis have yet to be identified; and the need for calcium supplementation in osteoporosis remains unproven. Adverse mineralization effects are a possible source of concern, at least for some bisphosphonates, and patients with long-term effects of osteoporosis on bone turnover need more detailed information. Overall, however, bisphosphonates are well tolerated and safe, and the outcome is eagerly awaited by clinical trials addressing the issue of osteoporosis fracture.[8-10]

Conclusion

It is critical for physicians to be aware of the potential threat of either oral or IV-infusion treatment of patients receiving bisphosphonate therapy. As reported on the website of the American Academy of Periodontology on bisphosphonates:'' regarding the precaution, however, periodontists are advised to decide whether a patient requires IV bisphosphonate therapy. If so, it is necessary to avoid unnecessary dental procedures, unless absolutely necessary. In comparison, if a periodontist is aware that a patient will be treated with IV bisphosphonates, any appropriate invasive dentistry should be done before such treatment is started, if possible.While this does not include oral use of bisphosphonate, this case report indicates that clinicians should be aware of the potential threat of long-term oral use of bisphosphonates as it may present some danger in certain populations of patients. There is certainly inspiration for future studies in this field.

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Dentistry as a Career Option: A Gender-based Study about Scope of Dental Education

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Abstract

Aim: To assess the opinion of dental students and interns regarding dentistry as a career option based on the course, curriculum and their future plans.

Materials and Method: A pre-piloted questionnaire was distributed among the final year undergraduate students and interns of dental institutes in Odisha, India. They were surveyed in relation to their opinion about dentistry and its scope as a career option.

Statistical Analysis Used: Age, gender and the batch to which the students belonged to were the only criteria for segregating the students. Chi-square, Fisher Exact and 2 sample T-tests tests have been used to find the significance of study parameters on categorical scale between two or more groups (gender based).

Results: 67.9% of the respondents were females which show a strong inclination among the female gender towards choosing health care as a career option. 61.2% female respondents compared to 58.8% of males preferred pursuing post-graduation after under graduation.

Conclusion: Due to the societal orientation which regards women as primarily home makers, the responsibilities for family caretaking continue to fall disproportionately on women. This study provides valuable information to the curriculum and policy makers of dental education in India which will help make dentistry a better and viable career option for many in future and in particular for the female gender to challenge these strict gender divisions.

Keywords: *Dental Education, Gender, Career, Students.*

Introduction

Dental training across the globe has witnessed a plethora of changing trends in the past century and the changing scenario could be attributed to the local geo-political demands as well as the changing mind sets of the controlling bodies. The dental students overall face a challenge to overcome the hurdles of changing patterns of dental education and thereby the need and demands of the society in general, and also want to be globally accepted with the Indian qualification. With the increasing need for highly trained dentists in India, it is imperative that the various academic institutions become more efficient in training their students based on their aptitude. Moreover, the Indian society currently is driven mainly by three factors family, economic stability and

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competitive instincts. These three factors play a major role in deciding the career aspirations of any student in India. The Indian middle class which is a male dominant society is driven by high career aspirations which would enable them to live with an affluent lifestyle. The students are from varied backgrounds with contrasting mind-sets and expectations and a curriculum is required which can satisfy the expectations of the society without compromising the students' personal ambitions and goals.

The current curriculum of dental education in India is similar to the curriculum in most of the countries with the exception of the overall expectations of the students from the dental profession which is a direct result of the factors motivating them to choose dentistry as a career in first place. India with its growing population and economy is challenged by a low dentist-to-population ratio and also the current dental education model. Moreover, given the limited number of jobs for qualified dental surgeons the competitive factor plays a major role in deciding the future plans of a dental student.

The Indian society has been a spectator to gender bias in almost all spheres. Women in India have always been considered a step behind their male counterparts. But like various other areas such as music, dance, politics, and social movements, women are making inroads in the field of dentistry too. The structure of the dental profession provides unique opportunities for both women and men to exercise a high degree of autonomy and flexibility and at the same time, enjoy the status awards associated with being a healthcare provider.[1] Worldwide, we are seeing an upward trend in women making a mark for themselves as dentists.[2] Women also represent an expanding pool of possible applicants for dental schools, who break the traditional barriers of gender discriminations and set the standards for those who followed in their path as dental professionals.[1,3] Presently, the number of women in dentistry is increasing significantly.[4,5] But once women have entered a career path, they often encounter obstacles in continuing or advancing in their careers. Those attitudes include insensitivity to gender, lack of female role models and mentors, dual family and professional responsibilities, lack of parity in rewards such as career advancement and salaries, gender discrimination and sexual harassment and special needs of minority women.[6]. There are many unique challenges that women face in achieving professional excellence beginning from choosing a career to striving and sustaining in that very career and this has been given little attention by the researchers.

In such a scenario a study which can give an insight into the mind-set of the dental students, was very essential. Understanding the students' thoughts and aspirations can, in turn, guide the academic institutions into tailoring their courses more towards the incoming students while benefiting the society as a whole.

The aim of this study is to provide the people involved in dental curriculum design with an insight into the mind-set of a subset of undergraduate dental students. This may help them in formulating a dental curriculum that doesn't fuel further gender discriminations and in turn during a period of time lead to the evolvement of a dental curriculum where females do not have to take decisions regarding dentistry as a career keeping in mind several family and social obligations.

Materials and Method

This study commenced after full review exemption from the Institutional Review Board of the university. The study was granted full review exemption as it involved not more than minimal risk to the study participants and no potential identifiers were utilized during the response collection. Strict confidentiality and anonymity were maintained throughout. Data for this study was collected using a pre-validated 7-point questionnaire which was reviewed for content validity, readability, and structure by five selected dental students who were not a part of the final study population. The questionnaire was self-explanatory with each question either having a multiple choice or binary choice answer. Data was collected from undergraduate dental students from three dental colleges in Odisha, India. The questionnaires were distributed in the lecture halls of these dental colleges among the third year, fourth year and interning students. First-and second-year dental students were excluded because their curriculum to that point was primarily didactic with little clinical exposure. The questionnaire distribution and data collection were performed by one of the co-investigators (PKP). The questionnaire also required the respondents to provide information about their age, gender and year of study. After the survey was completed, data were analyzed using Chi-Square and Fisher's Exact Test. Analyses were performed within each respondent group (males and females). For each group, the responses for the confidence and perception items were compared between males and females using Fisher's Exact Test. A p-value of <0.05 was considered statistically significant.

The explanatory variable was gender. The statistics were obtained using the IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp. software and Minitab 16 software. Microsoft word 2013 and Excel 2013 have been used to generate the tables.

Results

The overall response rate was 77.4%. Sixty-eight percent of the respondents were females. The average age of both the genders was 21 years. Sixty-six percent of female respondents compared to 57. 5% male students responded that dentistry wasn't their first choice. Among students who had chosen dentistry as their first option, male students (45.9%) were more likely to have always wanted to be a dentist as compared to (26.9%) female students. Among students for whom dentistry wasn't the first career option, more than 57.9% female students and more than 64.0% male students chose dentistry because they couldn't get a seat in MBBS program.

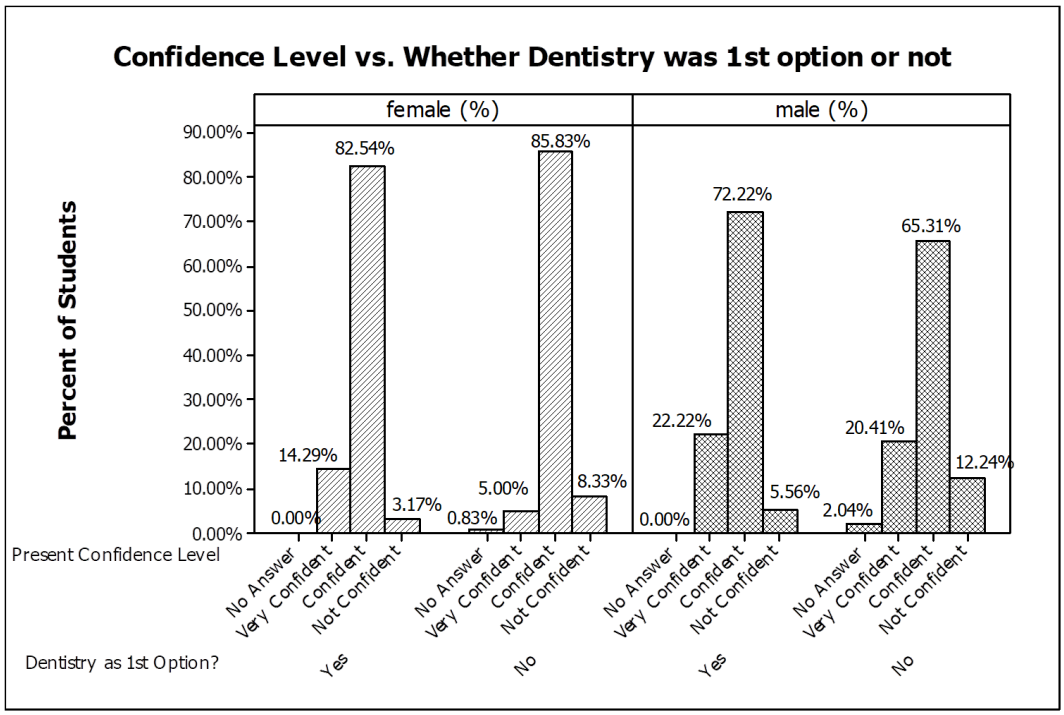


Fig.1: Bar graph showing academic confidence level of respondents compared to their choice of dentistry as a career option

Amongst students for whom dentistry was the first career option, 82.5% percent of females as compared to 72% of males were confident during the course. Amongst students for whom dentistry was not the first career choice, 86% females as compared to 65% males were confident during the course (Figure 1).

Oral Pathology was perceived to be the easiest subject amongst females while Periodontics was considered the easiest subject amongst male respondents (p-value<.005). While both the genders agreed on Prosthodontics being the most difficult subject, the second most difficult subject was Oral & Maxillofacial Surgery (10.38%) in females and it was Public Health Dentistry (12.94%) in males.

A majority of the respondents thought of pursuing higher studies (MDS) (61.2% female and 58.8% male students) or taking up clinical practice after completing their BDS (26.23% female and 32.94% male students). When asked about their preferred subject for post-graduate specialization (MDS), most students mentioned Oral & Maxillofacial Surgery, Conservative Dentistry & Endodontics or Orthodontics. The preferred subject for male respondents was Oral & Maxillofacial Surgery while that of female students was Conservative Dentistry & Endodontics.

Discussion

Out of the 271 respondents more than half of the

respondents were females which showed a strong inclination among female students towards choosing healthcare as a career option. This trend has also been reported in other parts of the world like the United States, Denmark, France, the UK. The advancement of women in academic and research careers requires global attention and strategies. The same trends are occurring amongst Indian students also. About 50 to 60% of students in all dental schools in India are female.[1-14]

While more than fifty percent of the respondents said dentistry was not their first career choice. The proportion of females was higher than males amongst this group. A large number of students chose dentistry as a career when they didn't get admission in the medicine stream. This shows the scenario of the Indian society where dentistry has always been an alternate career for those students unable to get admitted into the medicine program. Students prefer dentistry if not medicine as a career option in order to pursue their career aspirations in the healthcare sector.[1, 15-20.]

Most of the female respondents preferred subjects like oral pathology, dental materials over clinically demanding subjects like prosthodontics, which they found to be the most difficult one. On the contrary, the male respondents preferred subjects such as periodontics, conservative dentistry and endodontic which are the more clinically intensive subjects. But still found prosthodontics to be the toughest subject.[21].

A higher percentage of male respondents preferred to pursue clinical practice after graduating from their undergraduate course while more female respondents chose to go for specialization or post-graduation.[22] Among the students who chose to pursue post-graduation, conservative dentistry and endodontics was seen as the most favoured specialization among the female respondents while Oral and Maxillofacial surgery was the subject of choice for the male respondents.[23] This separation in the choice of subjects between male and female students was somewhat expected given the social expectations. Oral surgery is a clinically demanding subject which requires long hours of ward duties and night duties in hospitals. It appears that most female students take into account the long hours of clinical duties which may interfere with their other priorities such as taking care of household responsibilities and decide on a less rigorous subject. It can be said that dental institutions should keep the choices of the students and their aspirations in mind while preparing the curriculum and tailor the courses to the students. The concept of gender is rooted in societal beliefs about the appropriate roles and activities of men and women and in the behaviours and status that result from those beliefs. Gender difference is dynamic and socially constructed, and that what is considered appropriate gendered behaviour can be changed over time. Hence, the goal is not just ensuring equal numbers of men and women (gender equality), but also guaranteeing fairness and justice in the professional opportunity structure (gender equity).[24] Encouraging students especially females, to explore the challenges in each subject may change the gender gap in choice of subjects. Overall, it will require significant thought and effort on the curriculum designers and hopefully, this study will provide them with helpful insights into the dental students' minds.

On the personal front, since biological differences between males and females are unavoidable, programs such as paternity leave, childcare centres, increased involvement of father in childcare and family, extended family support along with flexible practice time, and job sharing that integrate family care with professional needs are likely to guarantee that the talent and the productivity of female dentists are not lost. To assist in overcoming barriers at the institutional level, efforts should continue to be made to identify and reduce barriers to women's advancement in science and research.[25]

Conclusion

Hence it can be said that the Indian dental education has witnessed some significant changes over the years with the focus moving to economic sustainability in the highly competitive Indian society. Therefore, the dental curriculum in India needs to be tailored to suit these varied aspirations of the dental students which would fulfil their career aspirations and, in the process, benefit the society. Even though gender inequality is on the decline in India, still some prejudices related to choices made by female students related to post-graduate specialization should be reason enough for the governing body of dental education in India and the society as a whole.

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Implant & Dental Plaque: A Close Bonding

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Abstract

The oral cavity has the most suitable environment for the growth of microorganisms as compared to any different body parts. Bacteria presents in dental plaque are the main causative factors of caries, gingivitis, periodontitis, and peri-implantitis, etc. Peri-implantitis is a destructive inflammatory response that leads to loss of supporting bone structure around a failing but functional implant. It is found that in 65% of disease in peri-implantitis and periodontitis there is the association of dental plaque. In this review article importance given on understanding the growth of dental plaque surrounding dental implants and their capacity to develop peri-implant diseases.

Keywords: *Dental implant; Plaques; Infections; Peri-implant diseases.*

Introduction

Biofilm is described as a relatively indefinable microbial community blended with tooth surface or any hard non-shedding material.[1] "Biofilms form on virtually all surfaces covered in physical aqueous environment, e.g., water pipes, living tissue, tooth surface, implanted medical devices such as dental implants, etc., Biofilm adhesion-mediated infections most commonly seen are on the implanted heart valves, venous catheters, vascular prosthesis, fracture fixation devices, breast implants, intraocular lenses, and dental implants.[2] Biofilms consist of one or more than one communities of microorganisms nonrandomly distributed in a glycocalyx. These biofilms allow the microorganisms to adhere and multiply on the surfaces." The interactions among the several bacterial species residing and growing in the biofilm takes place by metabolic exchange, exchange of genetic information, indicating molecule-mediated information.[3]

"Biofilms accumulated on the tooth surface are called dental plaque. Bacteria proliferating in the dental plaque from the main etiologic factors for the majority of the dental diseases, e.g., caries, gingivitis, periodontitis, and peri-implantitis. Microbial invasion has been cited as the foremost cause of the dental implant failure." Biofilms are responsible for their association of about 65% of diseases including peri-implantitis and periodontitis.[4,5]

Although bacteria are frequently noticed as being harmful to the human body causing complications such as syphilis and tuberculosis, periodontal diseases are infections that originate from indigenous bacteria. Disease occurs when the harmony between the host and the microbiota is disrupted, particularly in a susceptible host or when the microorganism is profoundly pathogenic. Peri-implant diseases comprise inflammatory reactions in the host tissues and include

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peri-implant mucositis or peri-implantitis. Peri-implant mucositis also known as "ailing implant" is defined as a reversible inflammation localized to the soft tissues with no signs of supporting bone loss.[5,6,7]Peri-implant mucositis may resolve by itself or persist for an undetermined period with the possibility of developing peri-implantitis and implant failure." Periimplantitis regards to a destructive inflammatory reaction with evidence of loss of supporting bone around a failing but functional implant.[8]

"The timing at which implant failures occur describes different physiological processes. Hence, an early implant failure indicates an initial lack of osseointegration due to a failure to build an intimate bone-to-implant contact. Several factors may contribute to early implant failures such as premature loading, surgical trauma, or impaired healing response.[9,10]Late failure, on the other hand, occurs after initial integration, physiological remodeling, and loading. Causes of late failures include overloading and bacterial infection (*e.g.*, peri-implantitis) with most failures occurring after the first year of loading.[11,12,13] In fact, biofilms have been associated with infectious diseases such as periodontal and peri-implant diseases. Because the role of bacterial biofilm in peri-implant diseases has been recognized, knowledge of microbiology around dental implants is the essence of adequate diagnosis and treatment of certain diseases. This article focuses on understanding the development of oral biofilms around dental implants and their role in peri-implant diseases.[14]

After exposure of an osseointegrated implant in the oral cavity through a transmucosal abutment, an acquired pellicle is formed on the implant surface through selective adsorption of the environmental macromolecules such as alpha-amylase and serum albumin.[15] This pellicle is derived from components in the saliva, as well as bacterial and host tissue outcomes. It acts as a substrate for bacterial colonization, which occurs as early as 30 minutes after implant exposure in the oral cavity.[16] In comparison to natural teeth, the acquired pellicle on dental implants has a lower albumin adsorption capability, which contributed to the lower plaque formation around implants.[17] Biofilm describes an organized structure within which microorganisms interact metabolically as a community. Biofilm formation throughout implants occurs similarly to teeth. Next to the formation of the acquired pellicle, bacterial attachment with initial colonizers followed by cell-to-cell adhesion with secondary colonizers occurs on the implant surface.[18] Biofilms are favored for most bacteria because they facilitate the interchange of nutrients and shield the bacterial community from competing microorganisms.[19] Moreover, biofilms also contribute to the spread of antibiotic resistance.[20]

Implants with deeper probing pockets showed the presence of a minor number of coccoid and higher levels of the spirochetes. Biofilm development on dental implants and the teeth follow the alike pattern of microbial colonization.[21,22]

"Biofilm formation throughout natural teeth occurs in minutes and the specific species start colonizing as early as 2-6 hours. The reason attributed possibly lies in the fact that the clean tooth surfaces are suitable to have remnants of unattached microbiota that can immediately multiply and provide a favorable surface for the attachment of the late colonizers.[23] The pristine surfaces of the implants lack the desired indigenous microbiota and demand the early colonizers to set the stage for the complex communities to grow.[24] The pellicle starts forming on the implant surface after the implant is disclosed in the oral cavity (which is about 30 minutes of expose).[25] The acquired pellicle on the dental implants owing to their lower albumin absorption capacity causes a moderate plaque formation around implants. Early colonizers are predominantly the gram-positive cocci, rods, and actinomyces species.[26] The periodontal pathogens colonizing on the *Streptococci i.e. P. gingivalis, P. intermedia,* etc are the causative microorganisms responsible for peri-implantitis and periodontitis.[27] The osseointegration around the dental implant is largely influenced by its surface roughness.[28] Greater is the surface roughness, higher is the rate of the biofilm formation around the implant.[19] The attachment of the microorganisms to the hard surfaces, i.e., teeth and implants, besides their interactions with the surface components i.e. roughness also require certain specific characteristics of these interacting surfaces in terms of their wettability/hydrophobicity and surface free energy. In an *in vivo,* study a smooth titanium abutment and a sandblasted titanium surface was evaluated for the biofilm accumulation. The results revealed that surface roughening harbored a lower percentage of the coccoid cells (64.2%) as compared to the smooth abutments (81%)."

"A majority of the studies have pointed out comparative rates and the composition of the microbiota joined with teeth and implants in health and disease. The

microbiota in healthy peri-implant tissues is dominated with gram-positive facultative cocci and rods.[30] A typical variation in the microbial profile of the peri-implant microflora in certain in vitro studies shows the affinity of the Staphylococcus aureus for the titanium surface but it is not a common microflora around the teeth. Staphylococcus aureus has a high ability to adhesion for titanium surfaces and has been associated with bleeding on probing and suppuration. Several specific adhesins are expressed on the surface of Staphylococcus aureus that interacts with various host proteins such as fibrinogen, fibronectin, and laminin. Certain surface adhesions have been referred to as microbial surface components recognizing adhesive matrix molecules. Next to the placement of the implant, they are coated with the host plasma constituents including extra cellular matrix i.e. ECM. The outcome of the implant surface may be imagined as race for the surface involving ECM, host cells and the bacteria. The adhesion mechanism of the Staphylococcus aureus facilitates their adhesion to the biomaterials and the ECM deposited on the implant surface.[29] Transformation from health to disease (peri-implantitis) causes a shift of the microflora from predominantly gram-positive to gram-negative microorganisms. Microflora of the implant in peri-implantitis has a high prevalence of the red and orange complex species as defined by Socransky." This microflora is predominated with the red complex species as *P. gingivalis*, and *T. denticiola*, the orange complex species as *F. nucleatum, P. intermedia. Candida albicans* has been found to have increased adhesion to titanium implants in certain in vitro studies.[30]

"The success of dental implants lies in successful osseointegration. The basic principles of biofilm formation are equally applicable in context to implants as they implement positive grounds for bacterial adhesion. Researchers should have to focus on implant design surfaces that inhibit biofilm adhesion. The approach of the antimicrobial photodynamic therapy has added a new dimension in the treatment of the biofilm-related peri-implant infections. However, long-term randomized clinical and microbiological trials are required to reinforce the beneficial effects of this therapy in combating the disastrous infections caused by biofilms. Recently, an *in vitro* study was performed on the principles of electrochemistry with the hypothesis.[28,30] If it can be used as a method to disinfect the implant surface."

Conclusion

The certain conclusions for this study were in favor of a reduction in the bacterial count. Research needs to be carried out in this dimension on the animal models of peri-implantitis and improve the design of the implant.

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A Rare Case Report on Temporomandibular Dislocation

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Abstract

In Temporomandibular joint dislocation, mandibular condyle is displaced from its articulation and it require prompt medical attention due to crucial impact of airway, nutrition and communication. It may be acute, chronic recurrent or chronic persistent. Prolonged or protracted TMJ dislocation is an uncommon condition and rare. Many techniques and method are developed for its management. Acute dislocation can be managed by conservative method butlong-standing dislocation cases can be managed by surgical procedures. We presented a case of prolonged bilateral TMJ dislocation managed with midline mandibulotomy followed by bilateral condylotomy where other indirect reduction technique had not achieved the desired result.

Keywords: *TMJ joint, long standing dislocation, management,midline mandibulotomy, Condylectomy.*

Introduction

TMJ dislocation represents 3% of all reported dislocated joints. A dislocation or luxation is a condition where a joint is displaced from its articulation, due to enormous mobility of condyle beyond an articular eminence with partition of articular surface i.e. open lock. In this condition patient is unable to close his mouth after wide opening. This can be precipitated by trauma, yawning, oral intubation or endoscopy. There may be various types of TMJ dislocation in relation to glenoid fossa. Anterior dislocation is the most common type and it has also been seen that bilateral dislocation is more common than unilateral type.[1,2] If the acute dislocation is left untreated for 72 hours or more than that then it is called as chronic persistent dislocation and if the situation persists more than one month, it is called as prolonged/protracted/long standing dislocation. Lee at al explained an indirect surgical procedure where midline mandibulotomy was done, that permitted reduction of both the joint separately.[3]

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Case report: A 29-year-old male patient reported in Dept. of oral and maxillofacial surgery of institute of dental science, Bhubaneswar having complain of difficulty in closing his mouth and pain while chewing food. Having history of road traffic accident 2 months back and admitted under department of neurosurgery for head injury for 15 days. Along with maxillofacial injury he had complete paralysis of right upper limb and under rehabilitation for the same. The patient is having a broad face and has a difficulty in closing his mouth properly. His speech was not transparent. There was no scar in her facial profile. On palpation, depression over preauricular region found and condyle of the TMJ palpated 2-3 cm in front of the depression. No tenderness present over TMJ and masseter muscle.

The orthopantomogram reveals bilateral condylar fracture and anterior displacement of the condyle. A clinical diagnosis of bilateral Condylar dislocation of TMJ was given and manual reduction was attempted after injecting 2% lignocaine into the glenoid fossa bilaterally. Manipulation was attempted without success and patient planned for reduction of the joint under general anesthesia. Under general anesthesia manual reduction tried first, after that one intermaxillary fixation screw placed over the ramus region through submandibular approach, wiring done and traction given to reduce the joint but this procedure appears unsuccessful. Then mandibular midline split of the mandible done through mandibular vestibular approach to reduce

the joint which was unsuccessful too and ultimately bilateral condylar shaving/condylotomy done through previous submandibular incision to achieve occlusion. After condylotomy, normal occlusion achieved and temporary intermaxillary fixation done and plating of the mandibular symphysis done. Temporary intermaxillary fixation released movement of the mandible checked and occlusion check done and mandibular vestibular approach and submandibular approach closed by means of layer by layer suturing. On 3rd postoperative day elastic given to achieve proper occlusion and after 24 hours rigid intermaxillary fixation done by means of wire for 21 days.

Discussion

There are various types of classification temporomandibular joint dislocation depending upon the head of the condyle and its relation with the glenoid fossa. If the condyle deviates it path from the articular eminence then it is called TMJ dislocation, the anterior dislocation of the condylesis most commonly found in the dislocation.[4]

Several causes may head to dislocation like habitual wide opening of oral cavity, when yawning or taking, prolonged mouth opening during minor and major surgical procedures. Some anti-psychotic drugs may cause dislocation that has been reported by various authors. Ehler Danlos syndrome, Marfan syndrome are some of the syndromes where the patients usually have a complain of joint dislocation. Whatever may be the reason, movable joint is very likely to undergo dislocation. The factors which determines the mobility of the joint are the laxity of the ligaments and the muscles surrounding the temporomandibular joint.

Several factors can cause temporomandibular joint dislocation for example seizures, during yawning and chewing hard foods, it has also been reported that the patient those are having hypermobility of the joint, flat articular eminence and weak muscle surrounding the temporomandibular joint may have TMJ dislocation.[5-7]

The TMJ dislocation can clinically be diagnosed in the first visit of the patient. Mandibular pain while opening mouth, disarranged occlusion, pre-auricular depressions, inability to chew food properly. Diagnosis of TMJ dislocation in any of the above-mentioned symptoms can immediately be confirmed through radiograph. It is obligatory that the intervention is carried out without any delay because various complications such astrismus, severe atrophy of masseter and temporalis, maycause difficulty in reducing the condyle in its proper anatomical position, so it is advisable to do the reduction of Condyle as soon as the patient reported to the hospital.[8]

On encountering long-standing TMJ dislocation, most dental surgeons try to reduce the joint using manual common Hippocratic method that usually fail, knowledge about the etiology, period of dislocation, changes which took place in the joint, and various nonsurgical and surgical techniques to treat such condition are important in the management of such cases. No standard treatment conventions or algorithms have been set down for the management of such dislocations in the literature. The choice of the technique used depends entirely on the surgeon.[9]

According to various article mostly TMJ dislocation is seen in female than in male. Various author has also suggested condylotomy, resection of lateral pterygoid usually brings back the classs-1 occlusion, but patient has to be on elastic traction for 15-20 days after condylotomy. Some authors also described eminectomy to reduce the condyle into proper anatomical position. In 1973, Laskinan intraoral surgical approach to the muscle through coronoid incision was recommended by to Performa temporalis myotomy. In 1976, Adekeya et al. described a technique to restore the occlusion by means of the inverted L-shaped osteotomy of the ramus Other authors have also recommended the use of vertical or oblique ramus osteotomy and bilateral sagittal split osteotomy for rectifying the occlusion. But it had many disadvantages like the risk of damage to the inferior alveolar bundle, less bone contact, and impingement/ impaction of the coronoid process on the condyle for which it was not accepted. [10]

Augmentation of the articular eminence can be done by autogenous bone grafts like the iliac crest or the calvarial bone. L-shaped pins, vitallium mesh implants, and mini implants are some other tomaterials usedto enhance the eminence. Silicone wedge blocks and coralline hydroxyapatite blocks have also been used by few authors. There are few drawbacks like looseness, displacement, and immune reactions for silicones.[11]

The treatment of TMJ dislocation is personalized as per the underlying cause. Autologous blood, sclerosing agents, and tarsorrhaphy are used for treatment of Hypermobility or subluxation. Acute dislocation can be managed by Manual reduction. Chronic protracted

and chronic recurrent dislocations are among the most challenging index to manage. These are treated using surgical procedures.[12] The treatment of TMJ disorders as early as possible is the best mode to avoid further complications. This boost up the success rate of treatment of TMJ disorders. If the dislocation persists more than 1 month or the patient reported to the hospital more than 45 days of dislocation then it will be difficult to reduce manually. Various author has suggested that if the dislocation persist more than 45 days, open surgical method ex: condylotomy oreminetomy to bring the patient's occlusion into normal position. Few literatures also suggested long standing after the condylotomy if the occlusion is not achieved orthognathic surgical procedures (bi lateral sagittal split osteotomy can be performed to get back the patient's occlusion into normalcy. The goal of management of TMJ dislocation should be putting the mandible into correct anatomical position, Whole range of jaw movement should be achieved. It has been reported that many cases of TMJ dislocation can be manage through manual reduction.[10-12]

Ugboko etal in their study reveals that the TMJ dislocation can be managed by MMF (Maxillo Mandibular Fixation) and manual reduction. The surgical approaches for the management of temporomandibular joint dislocation are bilateral or unilateral condylotomy/ ramus osteotomy. Other authors have also stated orthognathic surgery, injecting of sclerosing agents in the joint can also reduce the frequency of dislocation. Several reviews in the literature has stated that the use of autologous blood and injecting it in to the joint space in an interval of weekly once for one month will reduce the frequency of dislocation. Few of the authors has also inserted wires in the angle of the mandible and pulled it downward to bring the condyle to its correct position. Some authors also used midline osteotomy in the symphysis region of the mandible for treatment of temporomandibular joint dislocation. The major complication of this procedure is fracture of the root apices of the central incisor of the mandible,derangement of the occlusion, plate infections.[10-12]

Conclusion

By reviewing various literature, we concluded that most of the temporomandibular joint dislocation can be managed by manual reduction, putting the thumb in the molar areas of the mandible and pressing it downwards and backward, injecting sclerosing agent and autologous blood in the temporomandibular joint space.

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Unicystic Hemangioameloblastoma: A Rare Clinical Entity

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Abstract

Ameloblastoma is a benign epithelial odontogenic tumour which has many histological variants. "Unicystic Hemangioamleloblastoma is a rare variant" which shows unique histopathological features varying from conventional ameloblastoma. This present case is of a 30-year-old male patient with a swelling extended in the right-side body of lesion, angle of the mandible region with egg shell crackling. It was extended anteriorly up to the corner of the mouth, posteriorly up to the ramus of the mandible and inferiorly to lower border of the mandible. It has mixed radiolucent-opacity, which on enucleation histopathologically revealed ameloblastomatous areas with extensive vascular component.

Keywords: *Ameloblastoma, haemangiomatous, vascular component.*

Introduction

Ameloblastoma is a benign epithelial tumour which arises from rest of dental lamina from developing enamel organ. It is defined as unicentric, non-functional, anatomical benign and clinical persistent. Unicystic ameloblastoma comprises approximately 6% of ameloblastomas.[1] Haemangiomatous ameloblastoma (HA) is a very rare variant which shows unique histopathological features varying from conventional ameloblastoma. More than 90% of unicystic ameloblastoma are found in the mandible usually in the posterior region 1. The lesion is often asymptomatic, painless slowing swelling of the jaw. Here we report a case on detailed below.

Case report: A male patient of around 30-years presented with a chief complaint of painless swelling on the right side of the mandible for three months to the Department of Oral Pathology and Microbiology, Institute of Dental Sciences, Bhubaneswar. Initially, it was a very small swelling which gradually grew to the present size. His medical, dental, habitual and family history was not significant. On examination it was found that the swelling is oval in shape, having well-defined margins and measuring approximately 6x6 cm in size. The colour of the lesion was similar to the normal adjacent skin. The swelling extended in the right-side body of lesion, angle of the mandible region with eggshell crackling. Inferiorly to lower border of the mandible, posteriorly up to the ramus of the mandible and anteriorly up to the corner of the mouth. No visible pus discharge was seen. On palpation, the findings were confirmed and the lesion was bony hard with the central region showing variable consistency of hard and soft areas. The lesion was not tender. On intraoral examination, firm, smooth, non-fluctuant swelling was seen extending from 41 to the anterior border of the ramus. The mandibular left first molar and second premolar have been extracted previously. The first premolar was carious.

A panoramic radiograph revealed a well-defined mixed radiopaque-lucent multilocular lesion, bone loss in the right side of body and angle region of the mandible extending from the second premolar to the

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coronoid process. Few septae were arranged in tennis racquet appearance. Cytology test was done to confirm the diagnosis, cytology smear revealed brownish yellow colour fluid. A provisional diagnosis of ameloblastoma and clinical differential diagnosis of the dentigerous cyst was made. After obtaining patient's consent, enucleation was done and multiple bits of the soft tissue specimen of approximately 6cm X 6cm X 3cm were sent to the Department of Oral Pathology and microbiology. On macroscopic examination single bit of formalin-fixed tissue was received, whitish brown in colour, firm in consistency, rough surface, measuring about 0.7×1cm×0.2cm in size. On microscopic examination, the given haematoxylin and eosin section revealed multiple bits of tissue showing cystic capsule. There is the presence of tall columnar ameloblastic cell lining over which there are stellate reticula like cells and many blood-filled small vessels. The collagenous cystic capsule shows the presence of many small and large ameloblastic follicles. A mild degree of chronic inflammatory cells infiltration is present. A diagnosis of Unicystic Haemangiomatous Ameloblastoma was made.

Table 1: Review of literature

Author/Year	Age	Sex	Site	Treatment	Follow up
Aisenberg MS/1950 [6]	48	Female	Right posterior mandible	Enucleation	Uneventful
Lucas RB/1957 [9]	43	Female	Right mandible	Resection of affected portion	Uneventful and no complaint after follow up
Van Rensburg LJ/2001 [10]	26	Female	Left mandible, 3rd molar region	Partial hemimandibulectomy Planned but patient refused	No follow up could be done
Ide F/2001 [2]	56	Male	Anterior maxilla	Enucleation and curettage	Good healing after 6 months follow-up
Tamgadge AP/2010 [1]	31	Male	Left mandible premolar molar area	Enucleation and curettage	Good healing after 4 months follow-up
Sharma VK/2012 [11]	15	Male	Maxillary right molar area	Enucleated	Followed for 6 months
Harshvardhan SJ/2012 [12]	42	Male	Rt post. mandible	Hemimandibulectomy	Uneventful and no complaint after follow-up for 2 years
Sarode GS/2013 [13]	18	Male	Rt post. mandible	Curettage	Patient lost to follow up
Rajmohan M/2014 [14]	20	Male	Rt post. mandible	Hemimandibulectomy	Patient lost to follow-up
Maruthi Devi K et al./2015	35	Female	Lt. post mandible	Enucleation	Patient lost to follow up
Our case	30	Male	Rt antero–posterior mandible	Enucleation	



Figure 1. Showing extraoral swelling on the right side of mandible



Figure 2: Picture showing intraorally painless swelling of the buccal mucosa

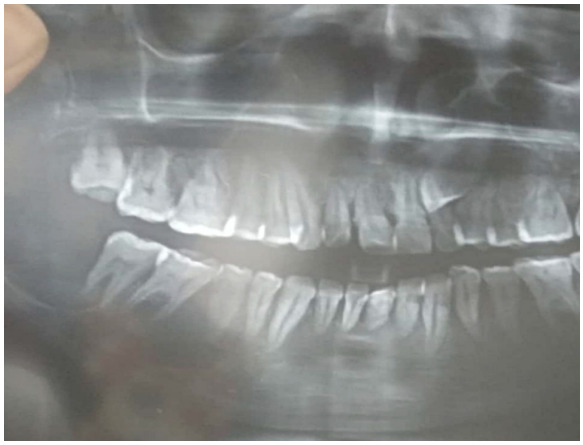


Figure 3. Shows OPG ofthe mandibular right side with bone loss in the angle region extending second premolar up to the coronoid process

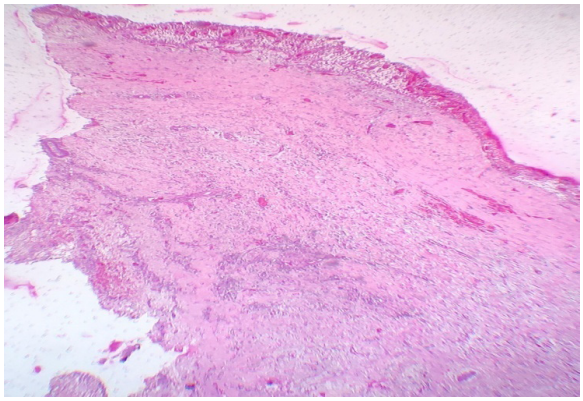


Figure 4: Showing lowpower view (4x) showing unicystic lining odontogenic islands with loose vascular tissue in the connective stroma.

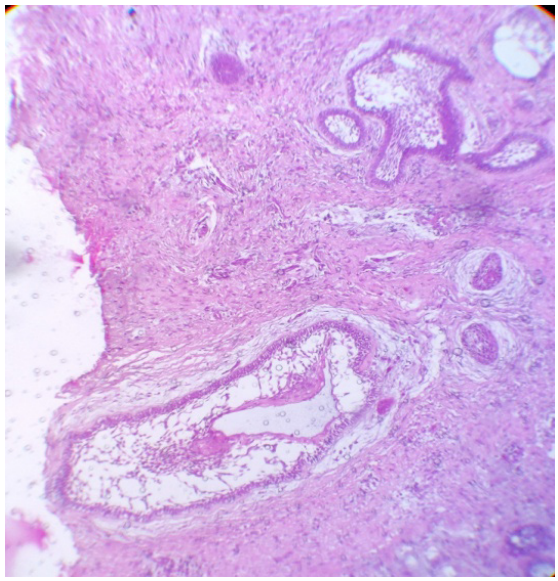


Figure 5: High power (10x view) shows follicular ameloblastomatousareas with stellate reticulum like cells are present.

Discussion

The most common odontogenic tumours are Ameloblastoma which is 11% of the tumours. It is categorized into three types: solid or multicystic, unicystic, and peripheral based on clinico-radiological features.[1,2] When there is a deviation from the normal process of odontogenesis it results in odontogenic cysts and tumours. In ameloblastoma, there is abnormal differentiation of enamel organ.[2,3]

Various histological variants of ameloblastoma have been described in the literature like follicular (most common), plexiform, acanthomatous, granular (most aggressive), basal cell and desmoplastic.[4] Variants like the clear cell, papilleferous, keratoameloblastoma and haemangiomatous ameloblastoma have also been reported in the literature. It has been studied that the histological variants do not differ significantly in either biological behaviour of the tumour or its prognosis after treatment. Desmoplastic and haemangiomatous ameloblastoma are exceptions with the former thought to be less aggressive than the latter due to its extreme vascular component which has complications in surgery. However, in many cases have been reported with a mixture of these patterns.[4-6]

Haemangiomatous ameloblastoma is a very rare variant of ameloblastoma. It refers to any ameloblastoma in which the stroma has spaces filled with blood or large endothelial-lined capillaries. The first case of Haemangiomatousamelobalstoma was described by Kuhn (1932) as a combination of haemangioma and adamantinoma. In Haemangiomatous Amelobalstoma the stromal component is mostly replaced by vascular component.[7]

Earlier haemangiomatous ameloblastoma was documented as ameloblastic haemangiomas, adamantino haemangiomas and haemangioma ameloblastomas.[5,6] As very few cases of haemangiomatous ameloblastoma are reported, the origin of its vascular component is still debatable and not clearly understood. Some authors consider the vascularity as hamartomatous growth and some consider it as a part of the neoplastic process or separate neoplasm. Smith did not consider haemangiomatous amelobalstoma as a separate variant of ameloblastoma but the extensive vascularity might be due to other causes.[8,9] To summarize the various theories proposed to explain the pathogenesis of the vascular component of haemangiomatous ameloblastoma are[6-10,11]

1. Angiogenesis during the development of the tumour.
2. As a separate neoplasm,
3. Hamartomatous growth,
4. Traumatic incident,
5. Secondary changes,
6. HA representing a collision tumour.

When there is an abnormal induction of blood vessels during odontogenesis, it results in their abnormal proliferation. Such proliferated vessels will turn into a component of tumour.[11] Trauma during procedures like extraction of teeth might induce the epithelial cell to proliferate and results in formation of tumour. Usually after any injury the injured tissues undergo repair to retain their original condition, so any disturbance in the repair process of damaged tissues involves excessive granulation tissue formation, which consists of proliferating endothelial cells and new capillaries.[12,13] The presence of extensive vascular component in our case might be due to stimulation and proliferation of blood vessels due to trauma created during extraction of teeth and subsequent repair phenomenon.Haemangiomas, telangiectatic osteosarcoma, angiomatoid malignant fibrous histiocytoma lesions should be included in the differential diagnosis. In telangiectatic osteosarcoma, there are large spaces filled with blood and huge areas of necrosis. Whereas, angiomatoid malignant fibrous histiocytoma contains characteristics of a fibrohistiocytic tumour and avascular tumour.[7]

Pathogenesis, clinical features, treatment modality and prognosis ofhaemangiomatous ameloblastoma until now is not completely understood as only very few cases have been reported. Few authors considered Haemangiomatous Ameloblastoma as a collision type of tumour, in which two separate tumours develop in the same area and collide, and their components blend together.[12,13] According to Lucas the vascular component in haemangiomatous ameloblastoma is purely a secondary cystic degeneration which occurs in the stroma. In plexiform ameloblastoma, and during the formation of the cyst some blood vessels persist and dilate resulting in vascular component as seen in haemangiomatous ameloblastoma.[9,12-15]

Conclusion

Haemangiomatous Amelobalstoma and other such lesions with the extensive vascular component may lead to fatality even following minor procedures. Our case clearly demonstrates the distinctive histologic pattern and should be kept in the differential diagnosis of vascular lesions large number of such cases has to be studied thoroughly to exactly know the origin, nature and behaviour of Haemangiomatous Ameloblastoma.

Conflict ofinterest: None

Funding Source: None

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Birn's Hypothesis and its Implications

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Abstract

Dry socket is a commons post-extraction complication developing within may 48 by of extraction very severe re reverberate pain. Most frequently occurs in the mandible 3rd molar region. Males show a lower incidence of occurrence than funds. Helotism is almost always a parent. Treatment of dry socket rinsing of the socket with Chlorhexidine or Saline Water, placement of ZOE paste or allergy above & inspirit of a home rising of the socket with chill & saline water.

Keywords: *A0, Dry socket, occurrence, Management.*

Introduction

Dry socket can be defined as the interim of the extraction socket occurring within 48 has of extraction postoperatively, characterizes by in these reverberate pain. Require of disintegrated clot & food debris in the socket & halitosis. Present with dull pain & can be moderate to severe.[1] Causes are clot has failing to form at the extracted tooth socket and Infection. Preventions are avoided excretion drawn the presence of acute intuition, aseptic preparation of the surgical site, advise the patient to stop smoking, use disposable pedicles, proper wound debridement, avoid repeated use of the same needle. Different factors have been found to be associated with an increased risk. The extraction of 3rd molars mainly imputed the lower third molar. Mandibular teeth more predilected them maxillary teeth mainly single tooth/one tooth extraction, poor oral hygiene, ulcerative gingivitis or pericoronitis, smoking, patient aged between 25 to 40 years, female predilection rather than male.[2] Wherever possible, oral hygiene measures to reduce plaque level to a minimum should be instituted and all patients should be given a 0.12% chlorh```exidine mouth rinse immediately preoperatively.

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In case the presence of active pericoronitis or acute ulcerative gingivitis, lower third molar should be avoided. In the case of immuno compromised, appropriate antibiosis prophylaxis should be prescribed. Smoker patients should be quite the habit preoperatively for at least 15 days post-operatively while the extraction socket head. Whenever possible, for formulae patients using oral contraceptive extractions should be performed during days 23 through 28 of the menstrual cycle/tablet cycles. All extraction should be completed with the minimal amount of trauma, the maximal amount of came & as rapidly as possible commensurate with their degree of difficulty & the experience of the operator. On completion of the procedure, the operative site should be irrigated with copious amounts of sterile saline followed by 15ml of 0.12% chlordane mouth rinse for the following 7 days. Advice to all patients should be a return to the hospital/clinic if they develop increasing pain or a bad taste.[3]

In the case of established dry socket, patients should be managed along the following lines, the affected socket should be gently irrigated with wormed 0.12% chlorhexidine, and all debris dislodge and aspirated. In extremely painful cases, a local anesthesia may be required before socket irrigation can be performed. Wherever possible, regional nerve blocks should be employed. The socket should be lightly packed with a dressing that contains on obtundent for pain relief & non-irritant antiseptic bacterial a fungal growth. The dressing should prevent the completion of ford debris/ food patients & protest from irrigation to the inspire

bone. Providing antibiosis is not routinely required because there are no sins of systemic infectious, effective system analysis should be prescribed, & the patient's progress should be reviewed the following day a frequently thereafter until full healing has occurred. Krogh (1957) reported that after the removal of 6403 teeth 4403 where simple extractions and 2000, including 353 impacted teeth, were removed surgically) 138 cases of alveolar osteitis (2.17%) resulted (7 were in the upper jaw & 181 in the premolar & molar regions of the lower jaw) despite excellent post-operative care. Others have reported an incidence of 3% 4%.[4]

The cause of alveolar osteitis is variably ascribed to preexisting infections, trauma to the bone during the extraction, decreased bleeding because of the hemostatic effect of the epinephrine or other vasoconstrictor injected with the local anesthesia (leaner, 19681, infection entering the socket after the tooth has been removed, the presume of dense bone, general debilitation and loss of the clot because of revising the mouth or sucking the would none of the explanations is completely tenable. The trauma of extraction and or subsequent infection of the socket sums to offer the best explanation. Birn (1973) has suggested that trauma and infection cause inflammation of the bone marrow with the resultant release of tissue activators that convent the plasminogen in the clot to plasmin. The fibrinolytic agent then dissolves the blood clot and at the same time, releases mins from the kininogen, which is also are the clot, leading to severe pain. Birn was able to demonstrate both tissue activators and plasmin in the alveolar bone adjacent to the affected socket sockets. On the basis of his findings, he suggested that the term fibrinolytic alveolitis be used to describe the condition.[2,3]

Birn's hypothesis (1973) expands the previously popular concept that trauma damages the alveolar bone and thereby reduces its resistance to infections and that bacterial enzymes cause dissolutions of the clot. It is possible that all these factors may play varying pants in the etiology of the process. The bacteriologic examination of the cultures from alveolar osteitis generally shows a mixed infection, but the presence of a large number of fusiform bacilli and Vincent's spirochetes may point to a low-grade putrefactive process. The treatment of Alveolar Osteitis is directed primarily towards the relief of pains that can be accomplished in two ways, local thereby consists of irrigation of the socket with a warm's sterile isotonic saline solution or a dilute situation of hydrogen peroxide to remove necrotic. Material & other debris, followed by the application of either an obedient (eugenol or guaiacol) or a topical anesthetic i.e. Butacaine, Benzocaine).[4]

The drug may be applied to a piece of sterile gauze or in the form of a paste. In addition to local thereby, an antipyretic analgesic or a narcotic such as codeine sulfate (1/2gr) or meperidine 50mg every 3 to 4 hours should be prescribed for the patent. The agent of choice depends on the severity of the pain. The patient is re-examined in 29 hours. If the pain has stopped, the medication in the socket need not be replaced. If pain persists, however, the irrigation & dressing of the socket should be repeated as necessary. Curettage should never be employed in the due treatment of A.O. This procedure not only predisposes the patient to the spread of infusion but also destroys any previous attempt at normal healings. Moreover, since the socket is already infected, any new blood clot formed also will subsequently undergo lysis.[4,5]

The routine use of antibiotics in the treatment of alveolar osteitis is not recommended because the major problem is one of pain control rather than of unlimited infection. Certainly, the use of antibiotics alone is an ineffective method for the relief of the patient's pain. In the rare instance where suppuration does exist, the antibiotic should be used systemically rather than topically in the socket. Not only one topical antibiotic of little value therapeutically. But also, being acidic substances, they may actually add to the pain.[5]

Some post-extraction dressings:

1. **Alvocure:** Alvocure is a dry socket treatment and post-extraction dressing. It provides a soothing effect throughout the healing process. Its fibrous consistency allows for the easy falling off the socket. The active agents and eugenol, butamben & iodoform.[6]

2. **Alveogyl Paste:** Alveogyl paste may be used post-operatively after a difficult extraction. It relieves pain, destroys infective organisms and causes the return of blood to the socket. Indications–Dry Socket.[6]

Features & benefits: With a fibrous consistency thanks to Penghawar fiber for an early filing of the socket and good adherence to the alveolus. It provides a soothing effect on the alveolar tissues thus helping to rapidly alleviate the pain. Convenient and easy to use: Alveogyl is a one-step, self-eliminating treatment

requiring no suturing and no special attention other than observation of the healing process. May also be used as a post-extraction dressing in patients with a history of dry sockets.[7]

Prevention of Post-operative Pain: Since a great deal of post-operative pain can be prevented, every effort should be made in this direction. During surgery, tissues should be handled with the utmost lane. The periosteum and mucous membranes are well supplied with unmyelinated free never endings and are therefore extremely sensitive. Sharp instruments must be used to avoid excessive trauma. One should see that no foreign bodies such as tooth fragments, filling materials or bone chips are left in the wound. All injured bone should be removed, sharp edges, smoothed, and whenever possible, the soft tissues sulfured. Since excessive post-surgical edema and hemorrhage can produce pain by distending the tissues, pressure dressings and cold applications should be used when feasible.[8]

Analgesic drugs should be administered before the outset of pain, i.e., either before surgery is started or immediately post-operatively. The patient should be given specific instructions about how often and for how long the drug should be taken. As previously, recommended, the minimal effective also should be used at short intervals and a drug selected that is sufficiently potent to manage the amount of pain expected.

Management

As the pain serves the patient is given sedative dressings in the form of line Oxide and Oil of cloves of cotton wool or gauge is loosely tucked into the socket. This dressing is often referred to as 'Pom-Pom'.[9] The curettage of the socket to induce fresh bleeding is recommended, however, it is not advocated as the pain may get aggravated and there one chance of the infection spreading in the deeper tissue planes. Prophylactic use of antimicrobial drugs such as metronidazole and clindamycin has been shown to reduce its incidence though it is not a universal finding. The antibiotic therapy with beta-lactam group of antibiotics with metronidazole is usually adequate.

Conclusion

It must be understood that it is evident from the clinical and microbiological finding. The role of antibiotics should not be overemphasized. Empirical therapy should be primarily directed against staphylococcus (common bacteria is oral equity). Deep-seated infections require broad-spectrum antibiotics and investigation for possible surgical intervention.

Conflict of Interest: None

Ethical Permission: Approved

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Sports Dentistry: A Recent Upcoming Field in Dentistry

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Abstract

Dental trauma in sports is the major linking channel between sports and dentistry. Sports dentistry deals with the prevention and management of athletics related orofacial injuries and their manifestations. Many athletes are not aware of the health implications of a traumatic injury to mouth and thus dentist can play an imperative role in informing the importance of preventing orofacial injuries in sports.

Keywords: *Dental trauma; Orofacial injuries; Sports dentistry; Prevention and management.*

Introduction

There is definite growth seen in this type of injury which is due to growing number of participants in sports and game. General dentists are seeing more dental trauma these days because patients are participating more in contact sports like football, rugby, lacrosse, ice and roller hockey, racket ball, skateboarding, cycling, basketball, wrestling, martial arts & games at very tender age.[1]

Dentistry & Sports: Jackson proposed a systemic approach for how a dental professional should interact with sports world, including opportunities for dentist in athletics. The Autor also emphasized for a "Team Dentist" from high school to professional teams.

Padilla emphasized that dentists can add sports dentistry to their practices by-

a. Making themselves available for emergency trauma care.

b. Making themselves visible and available to coaches, sports physicians, trainers, sports therapists, health clubs, youth sports league and women athletics.

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c. Offering to speak at organization meeting, attend their games/events and developing mutual trust and credibility through community involvement.

d. Contacting trainers in school, high school or health clubs and providing brochures on injury prevention, contributing to their newsletters and explaining the need for professionally made mouth guards.[2]

Factors Playing Significant Role in Modifying Sports Injury:

They can be classified into two groups:

I. Extrinsic factors and

II. Intrinsic factors.

Extrinsic factors:

a. Improper training

b. Quality of playing surface

c. Status of equipment used/worn

d. Climatic condition e.g.: ice, rain, extreme hot etc.,

e. Quality of supervision of participants.[3]

Intrinsic factors:

a. Age: including growth & development, physical maturity, body strength, coordination & healing ability risk of injury decreases with increasing age.

b. Gender: men are more prone as there is apparent tendency for boys/men to select aggressive contact sports.

c. Body size: excessive height and weight predispose athletes to injury.

d. Central motor control: children with muscular imbalance, cerebral palsy, epilepsy and other physically handicapped children are more prone.

e. Psychological and psychosocial factors: stress, anxiety, low self confidence & performance pressure may lead to sports injury.

f. Other factors: It includes body type, nutritional status, metabolic variation and multiplicity of genetic factors.[4]

Various Sports Related Injuries:

They are classified in three categories

I. Soft–tissue injuries

II. Hard–tissue injuries/ Bone fractures

III. Dentoalveolar injuries (12%)

I. Soft–tissue injuries: They are most common maxillofacial injuries found in sports they are classified as

Injuries

- Abrasion
- Laceration
- Hematomas
- Cuts
- Burns

II. Hard–tissue injuries / Bone fractures (Figure 1).

Bone fractures	**Mandibular (56%)** Frequently seen in young persons male Frequently seen in mandibular condylar process	**Types** **1. Symphyseal** **2. Body** **3. Angle** **4. Ramal** **5. Condylar – most common** **6. coronoid**
	Zygomatic Fracture Complications include diplopia & loss of sensation in infra – orbital nerve.	
	Nasal Fracture (26%)	
	Mid facial fracture (31%)	**1. Lefort I** **2. Lefort II** **3. Lefort III**
	Frontal sinus facture Classified according to involvement of -	**Supra or bital rim** **Anterior wall** **Posterior wall** **Sinus floor**

Figure 1. Classification Hard tissue injuries / Bone factures[5]

III. Dentoalveolar injuries

- Tooth intrusion
- Tooth extrusion
- Crown and root fractures
- Tooth avulsion

These types of fractures are highly preventable by using mouthguards. Children's who are in mixed dentition period have a disadvantage with regards to dentition. When the tooth germ lies in the fracture line, the tooth can fall during healing or have delayed development that does not manifest clinically until the permanent tooth erriysts.

Prevention of Sports Related Traumatic Orofacial Injuries[6]: The use of helmet, face masks and mouthguards reduce the likelihood and severity of sports related traumatic injuries.

Helmets–They protect the scalp, brain, face etc., and prevent from direct concussions, unconsciousness, cerebral hemorrhage, brain damage, paralysis, death etc.,

Face mask: They are designed to protect eyes, nose, zygomatic arch etc., prevent from direct fractures of those bones. They are designed of different types out of which full cage mask provides greatest protection.

Mouth guards: These are appliances which aids in reducing dentoalveolar fractures, condylar fractures, neck injuries, serious CNS damage and death.[7]

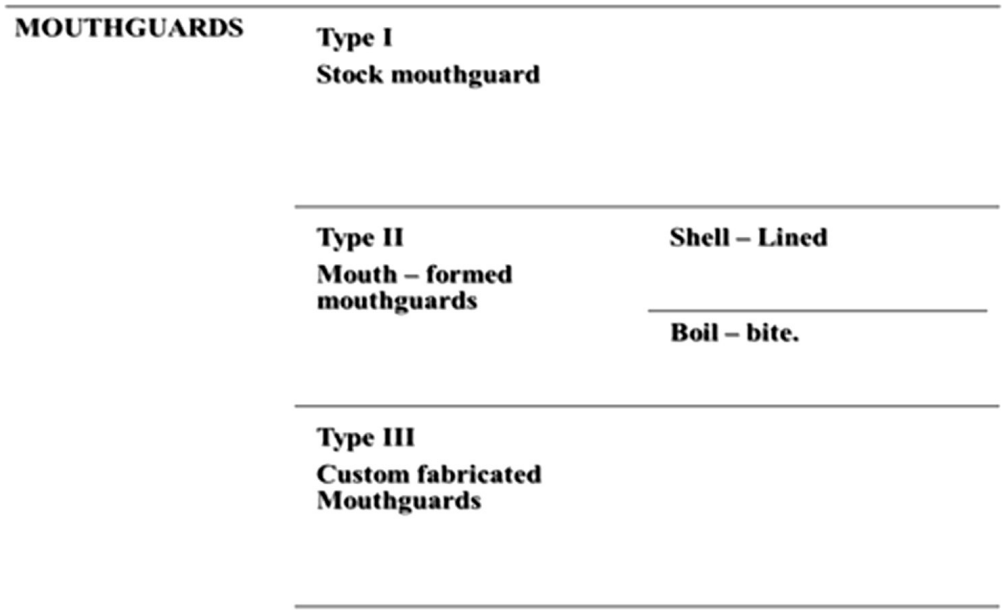


Figure 2. Types of Mouthguards

Recently academy of sports dentistry listed some 40 sports in which mouth protection will be advantageous for the participants.

- **Stock mouthguards:** They are least expensive mouthguards found in sporting goods store, and comes in different colors and styles with or without straps. They are not adapted to dentition & so held by the athlete by biting teeth together.
- **Shell–Lines mouth formed mouthguard:** They are fabricated by freshly mixed ethyl methorylate into a hard shell, which is then maxillary teeth and soft tissues, until the material sets. Though it is relatively adaptive to tooth surface but it is bulky and have unpleasant odor and taste for which it is not preferred by athletes.
- **Boil–Bite mouth formed mouthguard:** This type of mouthguard is largely used in todays world. It is fabricated by thermoplastic material placed in athletes' mouth, after softening in boiling water and molded with finger pressure as well as facial & intraoral musculature to enhance adaptive. After removal from athletes' mouth it is dipped in cold water until the shape sets firmly. It comes in wide variety of colors with or without straps.
- **Custom–fabricated mouthguards:** They are made professionally over a dental cast of athlete'sarches. They are considered superior from all types of mouthguards as they conform more closely to athletes' mouth, the material thickness can be better controlled during laboratory fabrication. They interfere least in breathing.[8-10]

Conclusion

Sports dentistry encompasses a wide range of preventive and treatment modalities of oral/facial athletic injuries and related oral diseases and their manifestations. It is the responsibility of every dentist to identify, educate and provide the athletes preventive measures e.g. mouth guards.

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Diagnosis and Evidence Based Interventions for Oral Potentially Malignant Disorders: Are We Vigilant Enough?

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Abstract

Oral potentially malignant disorder is lesions with compound intraoral presentations which often obscure clinician's diagnostic skill. A missed diagnosis can subject the patient to the risk of malignant transformation as well as bring down clinician's existing reputation. This study was conducted to understand the knowledge of diagnosis and intervention of OPMDs by clinicians practicing in India through a detailed web-based questionnaire survey. Three hundred responses were collected out of three hundred fifty dental practitioners contacted. Response with respect to each question of the questionnaire was analysed. There are several aspects of diagnosis and interventions in OPMDs about which the clinicians need to update themselves so as to prevent the malignant transformations of those lesions.

Keywords: *OPMD*; *Diagnosis & Intervention; Web-Based Questionnaire Survey.*

Introduction

Oral Potentially Malignant Disorder (OPMD) are defined as morphologically altered tissue noted on clinical examination in which cancer is more likely to occur than in normal tissue.[1] It is common in south east Asian countries like India with an incidence rate reported as 0.6 to 30.2 per 1,000.[2] It is mostly attributed to tobacco. Leucoplakia, Erythroplakia, Reverse Smoker's palatal lesions, Oralsubmucous fibrosis, Lichen planus, Actinic keratosis and Discoid lupus erythematosus are few commonly encountered OPMDs. Leucoplakia, the most commonly encountered OPMD is defined as white plaque with an increasing questionable oralcancer risk after excluding other known disorders that donot increasetherisk. Lichenplanusis defined as chronic inflammatory disorder demonstrating some immunepathology chiefly characterized bywhite striae. Oral submucous fibrosis (OSMF)is defined as chronic, complex, condition of the oral cavity, characterized by progressive fibrosis of the submucosaltissues. Variants of leucoplakia and lichen planus when appropriately termed shall help in communication between clinicians and accurate prediction of the lesions. Most of the OPMDs present as white and/or red lesions which can be either innocuous or aggressive. The objective of this study is to discuss the difficulties that exist amongst clinicians during diagnosis and treatment of oral potentially malignant disorders. The present studyattempted to assess the knowledgeand awareness of a cohort of dentists inseveral states of India regarding appropriate early diagnosis and evidence-based interventions of OPMDs through conducting a web-based survey.[3]

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Methodology: 350 dental practitioners were selected randomly from various parts of India. A pilot study using web-based questionnaire survey was conducted among twenty-five randomly chosen dentists. The dentists were duly contacted personally through google forms over a due course of six months. The purpose of the study

was well explained to each dental practitioner. The questionnaire was re-modified after collecting responses in the pilot study. Cronbach's alpha was estimated to be 0.85 which tested the reliability of the responses. Total 300 responses were received and results were analysed using the statistical package for the social sciences (SPSS, version 21.0, Chicago: SPSS Inc). p value <0.05 was considered as significant. A pictorial presentation of methodology is depicted in Figure number 1.

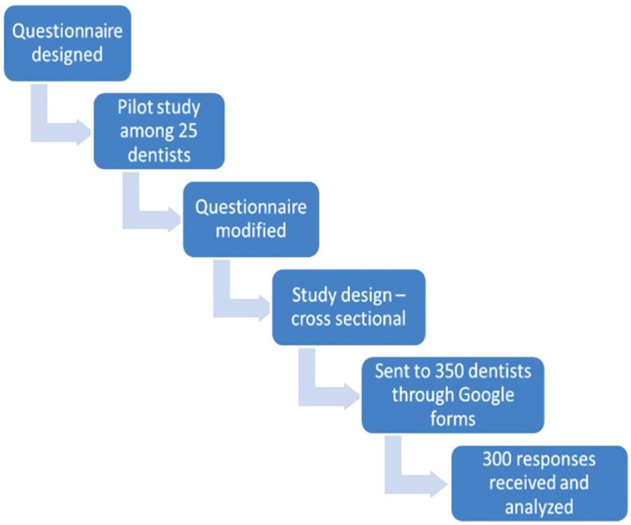


Figure 1. Methodology pictograph

Results

Three hundred responses were collected and response with respect to each question of the questionnaire was analysed and presented in table number 1. 22% of dental practitioners were ignorant of the change in terminology of oral precancer lesion and condition to oral potentially malignant disorders. While 60% of dentists get to see approximately 2-4 patients per month with OPMDs and lichen planus is the most commonly encountered OPMD followed by leucoplakia and oral submucous fibrosis.

Although leucoplakia is not a difficult diagnosis by dental practitioners however 42% of dentists were not able to diagnose proliferative verrucous leucoplakia. Furthermore, diagnosing erosive lichen planus is a difficulty for 62% dentists. 66% dentists encounter confusion in making a diagnosis between lichen planus and leucoplakia. Lichenoid reaction is not excluded by 32% dentists while attempting to diagnose lichen planus.

While determining factors to choose area of biopsy 85% dental practitioners prefer surface and consistency, duration and site were chosen by 45.7% and 33.3%. 70% of dentists do not prefer any of the chair side method to sleet biopsy area other than the visual examination only. 30 %, 20.2% and 6% of dentists chose toluidine blue, brush biopsy and light-based detection method respectively.

While almost all dentists counsel patients regarding de-addiction 74% of dentists are unaware of Tobacco Intervention Initiative programme (TII).As topical application Triamcinolone followed by vitamin A were favoured by 60% and 48% of the dental practitioners respectively whereas Antioxidants was found to be advised by 87% dentists. Diet modification was advised by only 50% of dental practitioners. Similarly, in the initial stages of oral submucous fibrosis lycopene with antioxidants and topical corticosteroid were advised by 69% and 60% of dental practitioners respectively.

Table 1. Web-based questionnaire & response

Questions	**Response (%) 78%**
Frequency	2-4–60%; 5-7–26% (Lp-lkp-osmf)
Determinantsforbiopsy	84 %–surface and consistency
Areaofbiopsy	51%-none
Difficulty in implementing early detection kits	45%-time 20%-not effective
sendYOURspecimen	Oral pathologist–80%
whentodiagnosePVL	42%-No
whentodiagnoseELP	62%-yes
confusionbetweenLKPandLP	66% sometimes
excludelichenoidreaction	68% yes
counselpatients	99% yes
Tobaccointerventioninitiative program	74%-No
Topicalapplicationin leucoplakia andlichenplanus	Triamcinolone–60% Vitamin A–48%
oralintakein leucoplakia andlichenplanus	Antioxidant–87% Diet modification–50%
treatmentinearlystageofOSMF	Lycopene with antioxidant–69% Topical corticosteroid–60%

Discussion

The present questionnaire-based study revealed the knowledge of Indian dental practitioners regarding diagnosis and interventions of Oral potentially malignant disorders (OPMDs).

Prevalence of oral mucosal lesions was reported to range from 16.8% to 54.18% among various Indian

populations.[4-7] This study observed a frequency of 2-4 cases of oral mucosal lesions specifically potentially malignant disorders per month. The frequency of lichen planus in this study precedes the frequency of leucoplakia and oral submucous fibrosis. While Hallikeri et alreported an prevalence of OSMF followed by leucoplakia and lichen planus, Bhatnagar et al reported highest prevalence of leucoplakia followed by OSMF and lichen planus.[4,5] The variable frequencies may be attributed to factors like population specificity, increasing stress in recent days and the ever-existing diagnostic dilemma between leucoplakia and lichen planus. There are several variants of Leucoplakia like Homogenous leucoplakia, speckled leucoplakia, Candidaleucoplakia, verrucous leucoplakia, nodular and hairy leucoplakia. Proliferative verrucous leucoplakia (PVL) is another variant which is defined as multifocal white patch characteristically present in non-habitués and females having highest potential of malignant transformation nearing about 100%.[8] The clinician should understand that the mucosa in patients with PVL has an increased propensity to develop oral precancer and cancer as because of multiple genetic abnormalities in the tissue as a whole.[9] Therefore, biopsy followed by follow up is mandatory in such patients.

Similarly, there are several variants of lichen planus like reticular, papillary, atrophic, bullous, plaque and erosive lichen planus. Erosive lichen planus has got the highest potential of malignant transformation and it should be biopsied to exclude benign mucous membrane pemphigoid, pemphigus vulgaris and OSCC. Both lichen planus and Lichenoid reaction are presented by bilateral reticular, papular and/or erythematous areas but unilateral occurrence and presence of pain differentiates lichenoid reaction from lichen planus.[10] While lichen planus is mostly stress induced lichenoid reaction is initiated by systemic medications and local allergens present in toothpaste and amalgam restorations. Immunocompetent drugs are the drug of choice in lichen planus and elimination of drugs or local allergens are the therapy of choice in lichenoid reactions.[11, 12]

The toing and froing between plaques type of lichen planus and leucoplakia is a continuous dilemma for many clinicians. Appropriate History, Bilateral presence, slightly elevated and Press with slide to see the striae are few features which help to exclude plaque form of lichen planus from leucoplakia.[13] Oral submucous fibrosis starts with marble like soft palate, faucial pillars, pharyngeal mucosa followed by shrunken uvula, blanching of buccal mucosa and retromolar region and lastly fibrosis and de-papillation of tongue and fibrosis and pigmentation of lower lip. Malignant transformation rate of OSMF ranges from 7 to 13%.

Intervention for OPMDs may include de-addiction Counselling, biopsy to rule out malignancy and pharmacologic interventions. Tobacco intervention initiative is the chief component of De-addiction Counselling. Professionally-led "call to action" programme to eradicate tobacco addiction while striving for a `tobacco free India' aiming at improving the oral health of Indians by the year 2020. Certified dental clinics where dentist offer counselling at individual, group level, behaviour therapy, self-help materials, educational CDS and books along with Nicotine Replacement Therapies (NRT). It is hereby suggested that every dental clinic may enquire a thorough habit history of patients, report that in the prescription as well as offer de-addiction counselling. In fact, patients readily accept tobacco and alcohol cessation counselling offered by the dentist.[14]

A lesion to undergo biopsy shall meet four determinants namely a non-healing ulcer, an ulcer of size more than 200 mm2, lesions with non-homogenous area, lesions in lateral border of tongue among non-habitués and females. However, this study shows that biopsy is a hard row to hoe for many dentists. The difficulty is mainly encountered during selection of appropriate site of biopsy, chair side detection method and handling of biopsied tissues. Wrong selection of biopsy site yield blunders in diagnosis and thereby increases in mortality in diseases like oral malignant neoplasms. Non homogenous areas, indurated areas and erosive areas are the appropriate sites for biopsy (reference). Biopsy from not-so-representative site may diagnose a malignant ulcer as non-specific ulcer (Figure 2). Vital staining, tissue autofluorescence and chemiluminescence are certain principles based upon which chair side screening and biopsy site determination of oral premalignant and malignant lesions is preferred. However, this study is demonstrating a high proportion of dentists (70%) not following any of the prescribed method of early detection rather they use visual examination alone for diagnosis of OPMDs. This report is supported by Kujan et alwho identified that 80% of dental practitioners strongly rely upon visual examinations alone whereas contradicted by Jaberwho identified only 24% of dental practitioners relying upon visual examinations alone.[15,16] This high percentage may have happened due to lack of knowledge in selecting the method and unavailability of cost

effective chair-side, less technique sensitive and ready to use diagnostic device. Handling of biopsied tissue is another arena where the emphasis should be given for correct diagnosis. Fixation of biopsied tissue in 10% formalin is a critical determinant of handling biopsied tissue. Oral pathologist should be given preference over general pathologist for more accurate diagnosis because of the familiarity of oral pathologist with oral lesions.[17] Histopathology report of following every biopsy especially white lesion should be carefully interpreted by dental practitioners. White lesions with presence of severe dysplasia should be excised and white lesions with mild to moderate dysplasia should be followed up in 2-4 months interval.[18] Adjunct visualization tools may be used in the follow-up of patients with dysplasia to facilitate the identification of subtle clinical changes.[18]

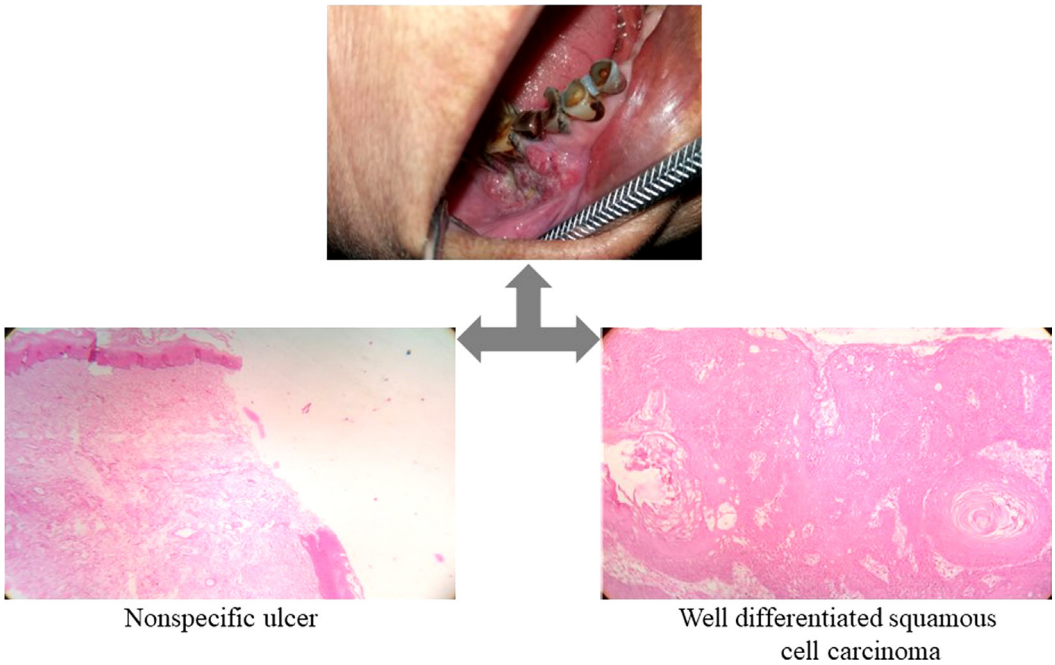


Figure 2. Importance of taking incision biopsy from appropriate site.

Triamcinolone followed by vitamin A is the choice for topical applications whereas antioxidants followed by prednisolone are the systemic medications followed by majority of dentists for the treatment of leucoplakia and lichen planus. For OSMF antioxidants followed by topical corticosteroids are the drug of choice for majority of dental practitioners. However the evidences for vitamin A in leucoplakia are low.[19] Lycopene has shown fair evidence for treating leucoplakia, lichen planus and OSMF.[20-23] Topical steroid for lichen planus and intralesional injection for betamethasone are providing fair evidence for lichen planus and OSMF respectively.[23] Although zinc is proven to be highly effective in both lichen planus(24) and OSMF the questionnaire did not include zinc which may be looked upon as a limitation of this study. There is high level of evidence for intralesional injection of dexamethasone, hyaluronidase and chymotrypsin together in treating oral submucous fibrosis.[23] Translating Evidence into Clinical Practice is the purpose of publishing quality research. This can offer the acceptable clinical care and meet the increasing awareness of the patient population. Therefore, it is better to adopt evidence-based interventions sooner rather than later. De-addiction counselling, stress management and arecanut withdrawal are first line therapy for leucoplakia, lichen planus and oral submucous fibrosis. Small size of leucoplakia requires lycopene as the drug of choice whereas large size with non-homogenous surface requires excision and lycopene as the treatment modality.[20]Follow up at regular interval is mandatory for leucoplakia irrespective of its size.[20] Anaesthetics, steroids and analgesics may be selected for topical application of lichen planus without erosive changes.[25] Tacrolimus (0.03%) once/twice a day for 6 months is In Lichen planus with ulcerations betamethasone 1mg BD for 1month followed by weekend therapy (5mg sat+ 5mg sun) as pulse therapy is the treatment of choice.[25] Intralesional injection of dexamethasone, hyaluronidase

and chymotrypsin together is the treatment of choice for oral submucous fibrosis.[23] Lycopene, diet modification along with physiotherapy only in OSMF are the adjunct therapy in leucoplakia, lichen planus and OSMF.[23]

Conclusion

Making diagnosis of potentially malignant disorders is a systematic procedure that every dental practitioner needs to understand. The process of diagnosis through careful intraoral examination is schematically presented in figure number 3. Apart from visual examination alone the clinicians are recommended to practice using various screening aids which can detect oral precancer and cancer at a very early stage thereby improving the prognosis of oral cancer and decrease the burden of mortality. There is a continuous update regarding surgical and pharmacologic interventions of OPMDs which every dental practitionerneeds to understand and implement in the clinical practice.

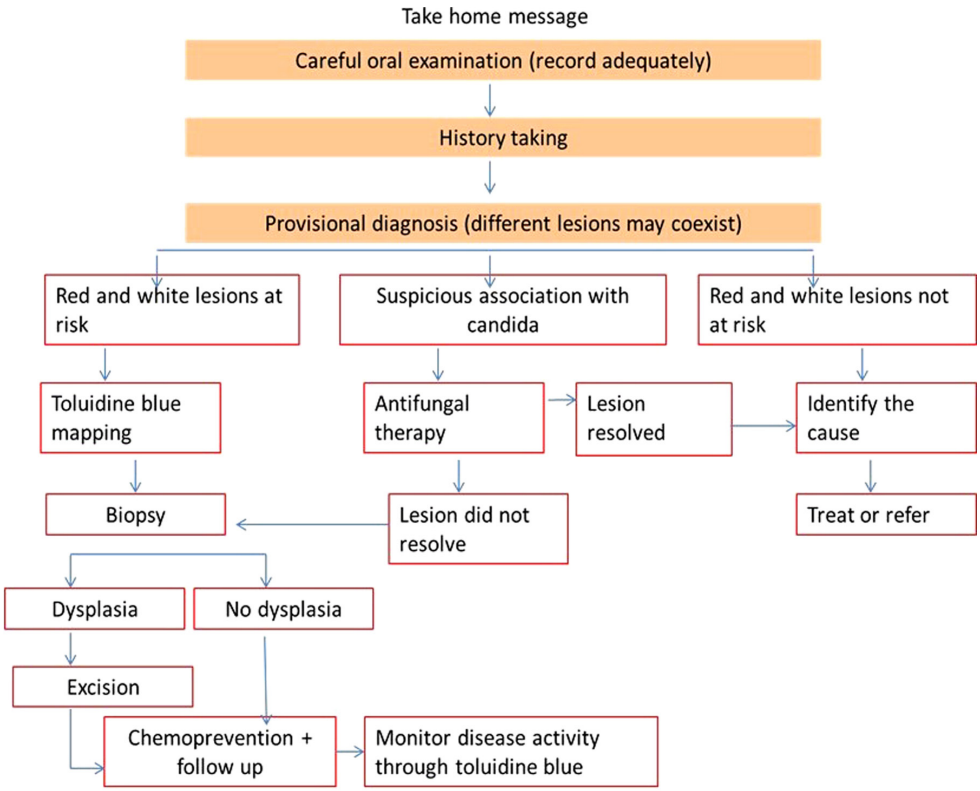


Figure 3. Systematic flow chart for managing Oral Potentially Malignant Disorder

Funding: None

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Occupational Hazards Associated with the Use of Mercury in Dental Office

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Abstract

Use of mercury in dental offices comes with a lot of disadvantages of posing threats towards both patients and the dental professionals. The clinicians are at a higher risk from the hazards of mercury. It has been found that the body fluids of the clinicians using mercury contains more amount of mercury than the clinicians of the control group.[1] The world now is approaching towards a mercury-free dentistry, where the clinicians are more inclined towards using dental materials without mercury. There are many on-going studies and researches regarding the development of ways and method to avoid mercury, i.e., Amalgam being used in the dental practice.Moreover, the proper disposal of amalgam or mercury is of utmost importance, but is being highly neglected. This article would review the proper storage, handling, disposal and recycling of mercury.

Keywords: *Mercury, Amalgam, Restorations, Disposal.*

Introduction

Dental caries, its prevention and its treatment have gained significant importance in the dental research fields. Amalgam, because of its strength and durability, has been a material of first choice by the clinicians since long.[2,3] But, because of the toxic effects of amalgam, the world health organisation has proposed "phasing down" the use of amalgam in dental office and the initiation of restorative dental materials without the involvement of mercury.[4] Because of the fact that amalgam carries the advantage of being easier to be placed in the cavity, less expensive and being durable, it still remains as the first choice for the dental professionals in the lower or middle socio-economic regions around the world.[3]

Different forms of mercury used in the dental offices: The US Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry have stated the following:"A person can be exposed to mercury from breathing in contaminated air, from swallowing or eating contaminated water or food, or from having skin contact with mercury. Not all forms of mercury enter your body easily, even if they come in contact with it; so, it is important to know which form of mercury you have been exposed to, and by which route (air, food, or skin). When you swallow small amounts of metallic mercury, virtually none (less than 0.01%) of the mercury will enter your body through the stomach or intestines, unless they are diseased. When you breathe in mercury vapours, (from elemental mercury), however, most (about 80%) of the mercury enters your bloodstream directly from your lungs, and then rapidly goes to other parts of your body, including the brain and kidneys. Once in your body, metallic mercury can stay for weeks or months. When metallic mercury enters the brain, it is readily converted to an inorganic form and is "trapped" in the brain for a long time. Metallic mercury in the blood of a pregnant woman can enter her developing child".[5]Not only does it affect the patient, but it also affects the foetus in case of pregnant females as it crosses the placental barrier.[6]

Elemental mercury and its toxic effects: The Centre for disease control in the US, in a review

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regarding occupational hazards in industries using elemental mercury, in 1999 (and updated in 2006) has stated that,"Short-term exposure (hours) to high levels of metallic mercury vapour in the air can damage the lining of the mouth and irritate the lungs and airways, causing tightness of the breath, a burning sensation in the lungs, and coughing. Other effects from exposure to mercury vapour include nausea, vomiting, diarrhoea, increases in blood pressure or heart rate, skin rashes, and eye irritation. Damage to the lining of the mouth and lungs can also occur from exposure to lower levels of mercury vapour over longer periods (for example, in some occupations where workers were exposed to mercury for many years). Levels of metallic mercury in workplace air are generally much greater than the levels normally encountered by the general population. Current levels of mercury in workplace air are low, due to increased awareness of mercury's toxic effects. Because of the reduction in the allowable amount of mercury in workplace air, fewer workers are expected to have symptoms of mercury toxicity".[5] This goes true as well with the field of dentistry as the same rules applies for the dental professionals regarding the storage, disposal and recycling of mercury, either elemental or in the form of amalgam.

FDA has stated that dental amalgams, in the form of restorations, are deemed safe for children above 6 years and adults because the exposure to mercury from restorations are proved to be far less than the lowest limit oh posing harm to the patients.[7] But, studies have revealed that mercury is released from the restorations on chewing food.[7,8] The harmful effects of mercury on the other systems, i.e., immune system, renal glomerular system, gastrointestinal system and on the intestinal bacteria of human beings, have also been documented.[6] It has also been proved that higher the number of dental amalgam restorations, more is the mercury levels in blood and plasma and the level rises within 3–48 hrs of amalgam removal and then drops.[9] Hence, the removal also requires a strict protocol, like hair covers, drapes, protection for eyes, rubber dam isolation and a high vacuum suctioning system.[10]

Global protocols for mercury disposal in dental offices: As published in a pamphlet by the United Nations Environment Programme (UNEP) on under the headline of "*Mercury Use In Healthcare Settings And Dentistry*", its stated that the teeth having an amalgam restoration should be considered as an amalgam waste, the wastes should be kept sealed in plastic containers and may be disposed by licenced waste disposal companies who recycle mercury and other metals, and that either placing an amalgam restoration or its removal should be avoided in pregnant ladies.[11]The American Dental Association has also published a pamphlet on the same context as "*Best Management Practices for Amalgam Waste*" in 2007.[12]Along with the disposal of mercury, its export also has seen many restrictions. The Unions in Europe, the US and Japan have banned the export of mercury since 2008.[13]The OSHA (Occupational Hazards and Health Administration) governs the environment of dental clinics regarding the safety of the patients as well as the dental officials.[6]

Requirement of informed consent from patient: In many countries, the legislation has set out rules for requirement of an informed consent from patients requiring an amalgam restoration. Countries like, Norway, Finland, Denmark in Europe have forced laws stating that the patients should be informed about the type of restorations to be placed before deciding and going ahead with the restoration. Similar laws have been enforced in few countries in the US too.[6]

Alternatives to dental Amalgam–Gallium: Because of the concerns by the public regarding the use of mercury as a restoration, dental researchers have come up with the option of using Gallium as an alternative to mercury and amalgam. They have found that when Gallium is mixed with tin and copper/nickel produces a mass which can be used as a restoration and can achieve adequate desirable properties of a restorative material.[14]

Conclusion

In spite of having the advantages of its physical properties as a restorative material, mercury use has long been tried to be avoided in dentistry. The awareness of the public regarding the toxicity of mercury also has forced the researchers to take care of the toxicity, while rendering the desired service to them. Hence, alternatives to amalgam restorations have come up and proper protocols have been followed in the storage, usage, removal and disposal of mercury in the dental offices.

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Awareness, Mindset & Method Associated with Infection Control Measures in Dental Students

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Abstract

Aim: The aim of this study was to find the association between attitude and practice of infection control among 3rd, 4th and intern dental students of the College of Odisha.

Materials and Method: The study sample comprised of 625 students of the 4 different Colleges of Odisha. 15 Questionnaire was prepared related to different barrier techniques, vaccination status, infection control practices, and awareness. The sample was calculated using the statistical formula of comparison of means. The questionnaire of the CDC (Center of Contagious Diseases) was used to measure the described variables. Informed consent was taken from all the participants before the distribution of the study questionnaires.

Results: From the result of this study it was found that 62% of the students preferred to use oral rinsing agent before starting a treatment, 85.5% used the autoclave as the primary equipment to sterilize their instruments in the dental clinic, 69.8% considered that isolation is important in the control of the infection, 56.70% confirmed that hepatitis B is the most infectious disease, and only 26.51% considered it to be tuberculosis. On the other hand, it was found that the scores of knowledge, attitudes and practices were 3.74 ± 1.16, 4.59 ± 0.88, and 4.29 ± 1.73 respectively.

Conclusions: The level of knowledge was low among the students evaluated. As far as the level of practices and attitudes was considered high. The results suggest that this topic must be reinforced in the study materials so that dental students understand the importance of the risks that exist to get infected with any disease inside or outside of the dental office.

Keywords: *Infection Control Measures; Awareness; Dental Students.*

Introduction

In the medical field the high risk and chance of cross infection in dental department, in that Dentists are at high risk of exposure to blood-borne pathogens. In the dental operatory the dentist and dental assistant will be in direct contact with blood and saliva which is the important source of infection and the indirect root are contaminated instruments or environmental surfaces[1].

US Centers for Disease Control and Prevention (CDC) give the guidelines regarding the control of blood born infection and give the instructions to all the health care unit that precautions became necessary to effectively protect health-care workers, leading to the recommendations by the concerning the prevention of HIV and hepatitis B[2].

The measures for the control of infectious diseases is an important aspect for practicing dentistry as the environment where the dentist works contains many sharp instruments and involves many invasive

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procedures. Various pathogens are also present in the dental office environment. Therefore, it is essential to provide better information on protection and biosecurity and to motivate everyone to comply with the infection control standards in the dental office. The identification of these risk factors is important for the creation of some sanitary strategy that prevents the control of infections in dental office[3-5].

Dental schools have the important role in the training of dental students, give them adequate knowledge regarding the biomedical waste and how maintain the infection free department to all the patients and employee working there hence, the aim of the present study was to investigate attitude and practice of infection control procedures among dental students of the 4 different College of Dentistry in Odisha, India.

Material and Method

All the individuals signed the informed consent before participating in the study. A no total of 625 undergraduate dental students were evaluated, which were evaluated in 4 different dental colleges in Odisha, May & June 2019. The sample size was calculated based on the scores obtained in the pilot test of the level of knowledge, attitudes, and practices using the mean comparison formula by software Stata 12.0, establishing a level of significanceof 0.05.

The participants were selected in strict compliance with the following criteria: Inclusion criteria: All the Undergraduate students of four dental colleges were invited to participate in the study. Students who were in good physical and mental condition and agreed to sign the informed consent were included in the study

Exclusion criteria: Students who do not want to sign the informed consent or were diagnosed with any infectious contagious disease were excluded from the study.

For the application of the instrument, the value of 0 was assigned to an incorrect answer and the value of 1 was assigned to a correct answer for each item. It was also obtained that the maximum score for knowledge was 6, for attitudes 4, and practices 5, according to the questions that were made within the questionnaire. It is worth mentioning that this methodology was repeated according to Singh et al.[6-8]

For the evaluation of quantitative variables such as the level of knowledge, attitudes, and practices, the mean and the standard deviation were obtained. For the descriptive analysis, we used the percentage (frequencies) of the qualitative. The Pearson chi-square test was used for the bivariate statistical analysis using the Stata 12.0 software.

Results

According to year of study of the students, it was found that there is statistically significant difference was found between different groups.

a) question P3 (use oral rinse before starting any procedure of a treatment) with p=0.002

b) question P6 (sterilizing the instruments in the dental clinic) with p<0.001

c) question P7 (minimum time required for autoclaving) with p<0.05

d) question P8 (temperature for autoclaving) with p=0.234

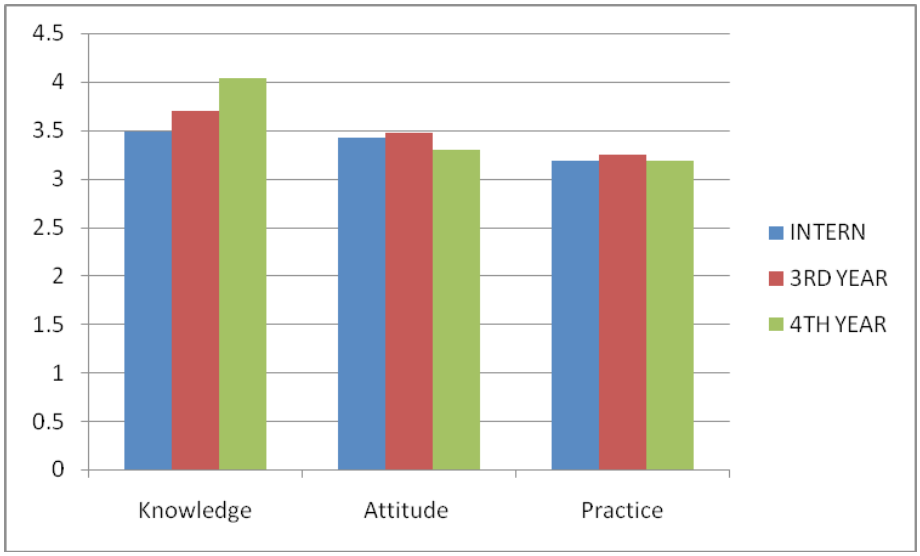
e) question P9 (highest rate of transmission through of saliva) with p<0.05

f) question P10 (immediate action taken in case of direct blood contact with a patient with HIV) with p=1.023.

Table 1. Questionnaire used in the study
Student's awareness, mindset and method in association with infection control measures

Question	Answer	3rd	4th	Intern	p*
Q1: Washing hands before and after patient examination?	Yes	249	198	124	0.327
	No	51	2	1	
Q2: what do you prefer for washing hands?	Normal soap	225	157	100	0.287
	Detergent	2	3	0	
	Medicated soap	73	40	25	

Question	Answer	3rd	4th	Intern	p*
Q3: use of mouth rinse before any procedure?	Yes	223	187	118	0.002*
	No	77	13	7	
Q4: isolation is important or not?	Yes	201	180	125	0.432
	No	99	20	0	
Q 5. Vaccinated with?	Hepatitis B	99	55	120	0.008
	Tetanus	85	86	5	
	Tuberculosis	0	0	0	
	None	116	59	0	
Q6: Method of sterilization in the dental clinic	Autoclave	296	196	125	<0.001*
	Boiling	0	4	0	
	Washing	4	0	0	
Q7. Time required for sterilization in Autoclave	5 min	10	0	0	<0.05*
	10 min	130	2	0	
	15 min	160	198	125	
Q8: what is the required Temperature for sterilization in autoclave	100° C	167	35	0	0.234
	120° C	102	140	125	
	150° C	31	25	0	
Q9: Highest rate of transmission via saliva?	Hepatitis B	99	102	120	<0.05
	AIDS	72	70	5	
	Tuberculosis	30	8	0	
	Do not know	99	10	0	
Q10: Immediate action taken in case of direct blood contact with an HIV patient?	Anti-HIV immunoglobulins	82	40	80	1.023
	Anti-HIV drugs	72	96	25	
	Blood tests	68	64	20	
	Do not know	78	0	0	
Q11: After needlestick injury, odds of HIV transmission.	0.1%–0.4%	230	45	90	
	1-4%	8	55	5	
	10%–40%	40	23	3	
	70%–90%	22	77	27	
Q12: Protective measures taken prevent yourself from injury?	Face mask and gloves	280	180	101	1.034
	Eyewear	8	0	0	
	Protective clothing	2	0	0	
	All the above	10	20	24	
Q13: Do you dispose gloves after use?	Dispose them	280	195	125	<0.05*
	Reuse them after wash	2	5	0	
	Reuse them after sterilization	18		0	
Q14: Transmission of infection from one patient to another	Yes	256	198	125	1.234
	No	10	2	0	
	Do not know	44	0	0	
Q15: Disinfection of other dental equipments is required or not?	Yes	207	200	125	2.345
	No	3	0	0	
	Do not know	90	0	0	



Graph 1: Variations showing the knowledge, attitude and practice among interns, 3rd Year and 4th year

Discussion

42% of the students are not vaccinated with the hepatitis B vaccine in our results. The knowledge level was poor among the students regarding the infection control measures. In 2010 Dental Council of India has made hepatitis B vaccination mandatory for dental students prior to admission.[9-12]

Inferable reasons could be lacking preparing for contamination control measures, deficient supply of individual defensive hardware, and heedlessness. Most understudies (94.3 percent) in our examination utilized an autoclave to sanitize instruments.[13-15] Duffy RE et al conducted a ten-year concentrate to survey frames of mind and conduct of dental understudies concerning contamination control rules.[16] In 1995, most understudies utilized an autoclave to clean instruments (83.8 percent), and this rate expanded in 2005 (95.9 percent). No understudy could depict the right weight, temperature, and sanitization time in either 1995 or 2005[17]. In any case, in our examination, 98 percent of the understudies addressed effectively about temperature and cleansing time, separately. The high level of right responses to inquiries concerning sanitization method uncovered a decent information. Method for learning, frames of mind, and practice scores were 3.75 (1.01), 3.40 (0.75) and 3.35 (1.04), separately. Staff are bound to consent to a contamination control program and presentation control plan on the off chance that they comprehend its justification. Plainly composed arrangements, techniques, and rules can help guarantee consistency, productivity, and powerful coordination of exercises.[18]

Conclusion

As per our results we find thatinadequate knowledge regarding sterilization and cross infection among the dental students and also the trainee who took part in the study. Basic sterilization protocol and how to implement it in dentistry should be taught not only to the dental students but also dental clinic staffs and paramedicos.

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Dental Problems in School Children: An Overview

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Abstract

Oral health is an important aspect of a child's overall health. Untreated oral and dental disorder can lead to severe consequences. Dental caries, pulpal and periapical lesions, trauma, Malocclusion and oral habits are most common dental problems seen in school children. Dental caries is one of the most frequent cause to seek dental care for a child. Untreated dental caries can result in pain, infection, tooth loss, difficulty in eating or speaking and poor appearance. Infection of the pulp due to dental caries result in pulp and periapical lesions. Dental trauma is extremely common in school children as they are susceptible to falling or accidentally hitting hard objects. Most common type of injury include crown fracture, luxation and avulsion. Another major problem that young children frequently engage in are oral habits. These include digit sucking, Tongue thrusting, lip biting or sucking and mouth breathing. These habits can result in various other dental problems such as gingivitis and Malocclusion. Malocclusion refers to abnormal occlusal and craniofacial relationship. In this article we will focus on these dental problems, their impact and their management and prevention.

Keywords: *Oral health, school children, dental problems.*

Introduction

Oral health is considered as the primary component of anindividuals general health. According to former US Surgeon General C. Everett Koop, "you are not healthy without good oral health". Children are more frequently affected by various dental problems. Most common dental problems seen in children include Dental Caries, Pulp and Periapical lesions, Trauma, Malocclusion and Oral habits. These dental problems can cause a severe impact on a child's social, functional and educational aspects of life[1,2].

Dental pain makes a child emotionally unstable and prevents him or her from involvement in social activities such as playing. Malocclusion reduces attractiveness and makes the child less acceptable. Traumatic dental injury especially in anterior teeth makes children anxious about others perception of them. They do not enjoy contact with other people and avoid smiling.

According to a study conducted by Jackson et al in 2008 at North Carolina, shows that poor oral health status was associated with increased parental report of low school grades. In this study low school performance was associated with school absence because of dental problems[3].

In another study conducted in 2013 dental problems were significantly associated with reduction in school performance and psychosocial well being. About 30% of children had problems in school and 80% miss at least one school day per year for illness or injury. Frequent unhappiness, feeling inferior and shyness were relatively common.

Children of all age groups are affected by various dental problems whose treatment options are expensive as well as demanding. The best option is Prevention which is acceptable and economical, especially in a country like India where there is limited man power and resources[4].

Dental caries: Dental caries is one of the most common dental disease seen in children. It is 5 times more common than asthma. About 60-90% of school children are affected by dental caries. In a survey conducted in 2004 throughout India shows prevalence of dental caries at

- 51.9%-5 years old
- 53.8%-12 years old
- 63.1%-15yeras old

It is defined as a microbial disease of the calcified tissues of the teeth characterized by demineralization of inorganic portion and destruction of organic substance of the tooth.

The most important etiologic factor for dental caries is the interrelation of the host factor;i.e, the teeth and the saliva, diet and the microflora. Saliva serves as the nutrient for the bacteria that is present in the plaque biofilm. These bacterial produce acid from the fermentable carbohydrates that is present in our diet. This acidic biofilm causes tooth decay. The critical pH for the dissolution of enamel should be 5.5. *Streptococcus mutans*is the major caries producing organism within the biofilm. Other microorganisms that cause tooth decay include *Lactobacillus acidophilus* and *Streptococcus sobrinus.* The caries susceptibility of the teeth does not only depend on carbohydrate content of the diet but also on its frequency of intake and retention of the food on tooth. Sucrose is considered the most important factor in causation ofdental caries. Other etiologic factors include socioeconomic status, presence of pits and fissures on the tooth and crowding of the teeth[5].

Pulp and Periapical lesions: Untreated dental caries and severe dental injury can lead to pulp and Periapical lesions. Microorganisms enter through these routes and cause infection of the pulp. The infection from the pulp spread into the Periapical region leading to Periapical lesions such as Periapical abscess. Dental caries is the main route of entry for the microorganismsin causation of these lesions. These lesions can affect the developing tooth buds of the succeeding permanent tooth[6].

Trauma: Trauma to the tooth is frequently seen children as they are at more risk of accidentally falling or hitting hard objects. Upper anteriorteeth are more commonly injured[7].

Classification:

By Ellis And Davey(1970)

- CLASS 1-Simple fracture involving only enamel and only little or no dentin
- CLASS 2-Extensive fracture of crown, involving considerable dentin but not pulp.
- CLASS 3-Extensive fracture of crown involving considerable dentin and exposing pulp.
- CLASS 4-Non vital tooth with or without loss of crown
- CLASS 5-Teeth lost as a trauma.
- CLASS 6-Fracture of root with or without loss of crown
- CLASS 7-Displacement of tooth without fracture of crown or root
- CLASS 8-Fracture of the crown en mass and it's replacement.

By Andreason:

- Injuries to the hard dental tissues and pulp
  - Crown infarction-an incomplete fracture of enamel without loss of tooth substance
  - Uncomplicated crown fracture–feature involving enamel and dentin but not exposing pulp.
  - Complicated crown fracture–fracture involving enamel dentin and exposing pulp
  - Uncomplicated crown root fracture–fractureinvolving enamel dentin and cementum but not exposing pulp.
  - Complicated crown root fracture–fracture involving enamel dentin cementum and exposing pulp.
  - Root fracture–fracture involving dentin cementum and pulp.
- Injuries to periodontal tissues
  - Concussion–An injury to the tooth supporting structures without abnormal loosening or displacement of tooth.
  - Subluxation–An injury to the tooth supporting structures with abnormal loosening of the tooth but without displacement of teeth.
  - Intrusive luxation–displacement of the tooth into the bone socket
  - Extrusive Luxation–displacement of the tooth partially out of the socket.
  - Lateral Luxation–displacement of the tooth in a direction other than axially.
  - Exarticulation–displacement of the tooth completely out of the socket.
- Injuries of the supporting bone
  - Comminution of alveolar socket

- Fracture of alveolar socket wall
- Fracture of the alveolar process
- Fracture of the maxilla and mandible

- Injuries to gingiva or oral mucosa
  - Laceration–a shallow or deep wound in mucosa resulting from a tear usually produced by a sharp object.
  - Contusion–a bruise usually produced by an impact from blunt objects
  - Abrasion–a superficial wound produced by rubbing or scraping of mucosa.

Severe trauma to the primary teeth can affect the germ of the developing permanent teeth. It can lead to various anomalies such as ectopic eruption, cessation of root development, dilacerations etc. Severe injuries can also lead to pulp and periapical lesions due to pulp exposure.

Therefore it is necessary to make precise diagnosis and carry out early intervention. The signs and symptoms should be recorded accurately to assess the pulp and surrounding tissues for any possible complications[8,9].

Oral habits: Young children often engage in unconscious oral habits die to some deep rooted psychological basis. These habits can create abnormalpressure on teeth and alveolar ridges leading to change in position of teeth and occlusion. These habits include[10,11].

a. Thumb sucking: Thumb sucking or digit sucking can be defined as placement of thumb or digit at various depths of mouth. Thumb sucking is considered normal till 1-2years old. If it persists beyond that it is considered abnormal and it can lead to various malocclusion.

The digit that is involved becomes reddened. The lip becomes short and hypotonic. Therefore is proclination of maxilla and retroclination of mandible which later gives rise to anterior open bite due to excessive eruption of posterior teeth. Thumb sucking causes constriction of maxillary arch due to excessive cheek pressure resulting in v shape arch.

b. Tongue thrusting: Tongue thrusting is the phenomenon in which the is placed forward and touches any tooth anterior to molars while swallowing. This results in various anomalies. Lip becomes incompetent. Proclination of maxillary anterior teeth, generalized spacing between the teeth, constriction of maxillary arch, proclination or retroclination of mandibular teeth and anterior or posterior open bite can be seen as a result of tongue thrusting.

c. Mouth breathing: It is a phenomenon in which the child has a habit of breathing through mouth instead of nose. The most common cause of mouth breathing is obstruction of nasal airway. Children with mouth breathing have an increased facial height, Adenoid facies and retroclined upper and lower anterior. Gingiva becomes inflamed and irritated because of continuous air drying.

d. Lip habit: Lip habit includes lip sucking and lip biting. The cause of lip habits may be previously present malocclusion or emotional stress. This can lead to protrusion of maxillary incisors and retrusion of mandibular incisors[12].

Malocclusion: Malocclusion is referred to the condition in which the arrangement of teeth is deviated from normal and there is abnormal occlusal and craniofacial relationship. This leads to poor esthetics and altered function. In children malocclusion can occur due to various reasons such as trauma to the developing tooth bud, oral habits such as digit sucking and tongue thrusting, various developmental anomalies like supernumerary tooth, anodontia(absence of some or all teeth), retained deciduous tooth, fusion and germination, and ectopic eruption.

During primary dentition period spacing is usually present which are called physiological spacing. The space that is present mesial to maxillary canine and distal to mandibular canine are called primate spaces. Absence of these spacing during primary dentition period can cause crowding in permanent dentition.

During mixed dentition period when the first permanent molar erupts, if the upper and lower second deciduous molars are in flush terminal plane then the permanent molars also erupt in flush or end on relationship. By the shifting of first deciduous molars to utilise the physiological space or the leeway space the permanent molars can come to class 1 relationship. If the deciduous second molars are in mesial step terminal plane then the permanent first molar erupt into class 1 relationship which later becomes class 3 if forward growth of mandible persists. If the primary second molar

is in distal step terminal plane then the permanent first molar erupt into class 2 relationship. Permanent incisors are larger than primary incisors. The difference between space that is required and that is available is called incisal liability which can be overcome by utilisation of physiologic spaces, increase in inter-canine width and change in incisor inclination. During the exchange ofdeciduous canines and molars with permanent canines and premolars some amount of space is seen known as the leeway space of Nance which is later utilized for mesial drift to attain class 1 relationship[13].

During eruption of permanent caninesthey displace the roots of the lateral incisors and central incisors mesially which results in distal divergence of their crowns. This results in midline diastema. This phenomenon is called ugly duckling stage or Broadbent's phenomenon. This condition gets corrected when the canines are erupted.

Discussion

Various preventive measures can be taken to reduce the occurrence of these dental problems. Parents should be informed about the child's oral health status and should be educated about various preventive measures. In case of dental caries pit and fissures sealant, fluoride application etc can be done. Pits and fissure sealants are used to cover the pits and grooves present on the permanent teeth to prevent accumulation of bacteria and penetration of fermentable carbohydrates as a result of which it prevents dental caries[14].

Fluoride application is very important for control and prevention of dental caries in children because of its cariostatic property. Fluoride helps in remineralisation of demineralised tooth and the remineralised tooth contains fluorohydroxyapatite crystal that are more resistant to future attack. Fluoride can be delivered in various ways. Fluoride ingestion helps in its incorporation in the enamel and dentin of unerrupted teeth which makes it resistant to caries. Communal water supply or the school water supply is the fluoridation of the water supply of the community and school. Children should always use fluoridated dentifrices. Topical fluorides can be used in form of solutions, gels, foams, varnish and mouth rinses.

Children should avoid soft foods that easily cling to the tooth and freely fermentable carbohydrates. Sugar substitutes such as aspartame, saccharine, sucralose, xylitol etc. can be used. The National Academy of science and US department of Agriculture designed a Food Guide Pyramid for school children that helps in assessing the adequacy of their diet. Prevention of dental caries can prevent the occurrence of pulp and periapical lesions. In case of infection of pulp the vital pulp can be preserved by various pulp therapy such as pulpotomy, direct pulp capping and indirect pulp capping.

In case of severe trauma parents should immediately contact a dentist after dental trauma to prevent worsening of prognosis. In case of Avulsion, parents should ask the child to keep the Avulsed tooth within the mouth below the tongue or they should store it in milk. Parents should be advised to bring there child for regular visit to the dentist to re-examine the traumatized tooth to prevent future complications.

Children involved in contact sports are more prone to dental injuries and this can be prevented by use of mouth guards. For prevention of oral habits parents counselling is most important. Parents should be asked to spend more time with the child so that they do not feel insecure. They should help the child to engage in other activities. Prolonged breast feeding and bottle feeding should be avoided. In case of thumb sucking chemicals such as cayenne pepper, quinine and asafoetida can be used over the skin. Ace bandage and thumb cap are other method of correcting the habit. Appliances that can be used for the correction of oral habits along with myofunctional exercises and speech therapy are tongue crib, vestibular screen and lip bumper

Various myofunctional appliances can be used for the correction malocclusion. Space maintainer can be used in case of early removal of deciduous teeth to prevent crowding and guide the eruption of permanent tooth, Numerous studies have been done for prevalence of these dental problems.

In a study conducted in cuttack Odisha in 2002, 1257 children of age 5, 8, 11 and 15 were examined for prevalence of dental caries. It showed increase in prevalence of dental caries from 5 to 8 years old and decreased from 11 to 15 years of age. About 63.6% children required treatment. Another study was conducted in Karnataka for prevalence of dental caries in 6-11 years of children.This showed overall caries prevalence to be 78.9% which is higher compared to other countries. In another study 333 children were examined out of which 197 children were having dental problems.

- Poor oral hygiene-41.4%
- Periodontal disease–26.72%

- Dental caries–44.4%

A study conducted on 4590 school children showed that 29.7% had habits out of which 3.1% had digit sucking, 4.6% mouth breathing, 3.2% tongue thrusting, 6.2% bruxism, 6% lip biting, 12.7% nail biting, 9.8% pencil biting and 0.09% maschistle habit. In another study 1029 children were examined out of which 57.73% had oral habits. Among them 28.8% had tongue thrusting followed by 19.5% nail biting, 12.4 % thumb sucking, 10.6% mouth breathing, 8.3% lip biting and 2.8% bruxism.

Conclusion

Establishment and maintenance of good oral health is of great importance. Good oral health can help children develop various physical and social functions. The conditions discussed in this article can help to know there impact on child's life and about there prevention and management.

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Serological Investigations in Denistry

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Abstract

It's important for health care professionals to be aware of the medical status of their patients, so as to give them the optimal care that they can give. It helps the care giver with planning treatments and adjusting them according to the need of the patient. Serological tests are an important tool in screening the patients who are yet to be aware of their diseased state as some blood-borne pathogenic diseases like HBV, HCV etc. may remain asymptomatic. Rapid diagnostic tests can be used to get results quickly, in about 15-20 minutes, and are easy to use on site. It can further help in eliminating accidental percutaneous puncture wounds, human errors concerning safety precautions etc. which will facilitate the efforts of health-care professionals to prevent cross-contamination.

Keywords: *Health Personnel, Hepatitis B, HIV Infections, T-Lymphocytes, Helper-Inducer, Tuberculosis.*

Introduction

It's imperative for healthcare personnel, working in a dental set-up, to take appropriate safety precautions in order to avoid potential cross contamination. A set of protocols should be established by the dentist and followed strictly by the involved professionals in order to prevent transmission of communicable diseases to the patients as well as themselves. Though it's ethical for patients entering any medical set up to disclose any current or previously contracted infectious diseases, many, inadvertently or due to social stigma associated with certain diseases, are far from honest with their medical history. Many diseases like hepatic viral diseases do not show any overt signs and symptoms, therefore though infected, patients may not be aware of it. Moreover the universal safety precautions are not foolproof when variables like accidental needle-stick injuries are added to the equation[1].

Almost all dental procedures, those require the use of hand pieces and ultrasonic scalers, produce aerosols and droplets containing secretions such as oral bacteria, saliva and blood. And thus play an instrumental role in exposing a wide range of pathogenic microorganisms to the dental treatment rooms. As such, it's crucial to set a basic screening procedure for the most common communicable infectious diseases[2].

Aerosol Infection encountered in dental procedures: There is a risk of infection in every clinical setting, as patients themselves are the primary source of infection, may they be suffering from it or at convalescent stage or as healthy carriers. And the instrument used, any contacts made directly with the patients or aerosols and splatter produced by ultrasonic scalers, air-rotors etc. become the route of transmission.

Thus, the instruments play a pivotal role in exposing the clinical setup to the potential of cross contamination. Dental health-care professionals are most vulnerable to exposure from micro-organisms like mycobacterium tuberculosis, Hepatitis B (HBV), Hepatitis C (HCV), streptococci, staphylococci, herpes simplex virus type 1, HIV, mumps, influenza, and rubella[1,2].Though majority of these issues, in the occupational setting, may be mitigated through adoption of universal safety precautions, but exposure though percutaneous injuries or mucocutaneous routes (needle stick injuries, broken skin etc.) cannot be predicted.

As such, blood borne viral diseases become the

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primary concern for healthcare workers and diseases like HBV, HCV and HIV, the most hazardous because of their persistent viral load in the blood.

HIV: It's a lifelong condition that has no cure till date. HIV targets the immune system by attacking a specific type of immune cells called helper T cells or the CD4 helper cells. Furthermore, it uses these cells to replicate itself, thereby causing the CD4 cells swell and burst. If left untreated the CD4 count drops below 200 per cubic millimetre and the infected person progress to more advanced stage of HIV, AIDS, within a decade (normal CD4 count in a healthy individual ranges from 500 to 1,500 per cubic millimetre). And the life expectancy of people with AIDS is about 3 years as the immune system becomes too weak to combat other opportunistic infections[3].

Prevalence: According to the India HIV estimation 2017 report, total no. of people living with HIV in India, is estimated at 21.40 lakhs (15.90 lakhs-28.39 lakhs) in 2017[4].

District-wise prevalence of HIV in Odisha: According to a report published in Odisha sun times bureau in 27th July 2015, the district of Ganjam topped the list with 35.3% of the total number of HIV infected patients[5] (Table-1).

A recent report published in The New Indian Express on 2nd December 2018 cited that total no. of HIV infected patients to be 46,264, with the district of Ganjam the most affected and Boudh the least with 59 cases[6] (Table-2).

HBV: Hepatitis B virus comes from the Hepadnaviridae family and constitutes as one of the major cause of liver disorders and later causing cancer. It's a DNA virus with some unusual retroviral characteristics. The replication of these viruses occurs through a RNA intermediate. They have the ability to integrate into the host genome and is capable of persisting in the infected cells. Immunocompetent individuals if infected have chances of recovery but in 5% to 10% cases become fatal as it progresses to liver cirrhosis or cancer. Many of the infected patients remain unaware of their infected state as acute HBV infection can be present without any symptoms indicative of the infection[7].

Prevalence: Statistics reveal that approximately one third of the world's population is infected with HBV and about 257 million being chronic carriers. Based on the prevalence surface antigen, India comes under intermediate endemicity zone. The HBsAg positivity amongst general population ranges from 1.1% to 12.2% with an average prevalence of 3-4% in India. 40-50% of hepatocellular carcinoma and 20-30% cases of cirrhosis are found amongst the chronically infected patients. Though the overall prevalence percentage remains comparatively low, India's contribution to the HBV carriers of the world ranges from 10-15% due to its huge population density[8].

HCV: Hepatitis C virus belongs to the family Flaviviridae, genus Flavivirus. They are closely related to hepatitis G, dengue and yellow fever viruses. They are said to produce atleast 10 trillion new viral particles each day. The natural targets for HCV are hepatocytes and possibly B lymphocytes. Viremia is usually accompanied by hepatic inflammation and fibrosisin case of infected patients. 50% of hepatocytes may get infected with HCV in patients suffering from chronic Hepatitis C.

Patients infected with acute HCV infection or chronic HCV infection do not show any symptoms, so patients or health care providers are unable to detect these conditions. As the initial symptoms of HCV infection are extrahepatic, astute observation for these symptoms is necessary[9].

Prevalence: In 2015, an estimated 71 million people are living with chronic HCV infection. In India, alone the anti-hepatitis C virus anti-body prevalence is estimated to be between 0.09-15% that accounts to about 6-12 million people. Among the patients suffering from chronic HCV infection, 12-32% suffers from Hepatocellular Carcinoma and cirrhosis in India[8].

Even if the primary route of transmission of HBV and HCV is through percutaneous injuries or mucocutaneous route, the virus present in the nasopharyngeal secretions spreads to the environment of the clinical set-up through aerosol or splatter produced during dental procedures[10]. HBV and HCV are found on the exposed surfaces and devices that are primarily contaminated with blood, as hepatitis B virus can survive on dried blood at room temperature for about a week, with survival up to 6 weeks on dry surfaces. Thus it becomes essential for health-care professionals to disinfect the environmental surfaces as well as properly package and heat sterilize the infected instruments[11].

Screening Method

HIV:

Three primary types of test for HIV:

1. Antibody tests
2. RNA (viral load) tests
3. Combinations tests that determines both antibodies and viral protein (P24)

No test is perfect, as such, test results may be false positive, false negative or impossible to interpret.

1. **HIV antibody tests:** when someone is infected with HIV, their body produces antibodies in order to neutralize the pathogens or the unique protein of HIV. The presence of these antibodies serves as a marker to detect if someone is infected with HIV. An enzyme-linked assay called ELISA or EIA is used on the blood sample for antibody testing.
2. **Rapid HIV testing kit:** Generally used in a health-care professional's office or points of care. Most kits require blood if not all but it can also be done using a finger stick, in some cases.
3. **HIV RNA tests:** This test has been developed to calculate the amount of HIV in the blood or the HIV viral load as the HIV RNA is different from all human RNA. These uses PCR or polymerase chain reaction technique and are helpful in screening new-borns of HIV positive mothers as it may be possible for maternal antibodies to cross the placenta and be present in the newborn. And can be used to detect HIV infection in the first four weeks after exposure, before the development of antibodies. It's not possible to perform this test routinely for screening purposes as they are costly.
4. **HIV antibody-antigen test:** It's an important test as it allows for earlier detection of HIV infection, even before the production of antibodies after initial infection. A reaction known as "chemiluminescence" is used to detect antibodies and p24 protein antigen. This test is also used to detect the type of infection, HIV-1 or HIV-2[12].

HBV: Three screening tests are done to detect three types of antibodies produced in response to three antigens present in HBV, surface, core and e. Hepatitis B surface antigen tests determines the current state of infection in the patient. Hepatitis B core antibody tests determine if the patient has ever been affected. Hepatitis B surface antibody tests determines if the persons has cleared the virus after infection or has been vaccinated and is now immune to future infection[13].

HCV: After a person is infected with HCV infections, it generally takes at least 6-8 weeks for the body to develop sufficient antibodies to be measured in screening tests. It can takes even longer for people who have suppressed immune system (e.g. HIV infected patients), and the presence of antibodies detected can't always be taken as an indication for the infected state. A positive HCV antibody test can be found in a person who is chronic carrier of HCV, or in a person who was infected but the infection has resolved, or in an acutely infected persons.

Rapid antibody test for HCV is used for individuals 15 years old or older showing hepatitis symptoms or for individuals at risk. It uses a test strip that provides results in approximately 20 minutes[13].

Table 1: District-wise prevalence of HIV in Odisha

Name of the district	No. of patients
Ganjam	12,511
Cuttack	4,696
Angul	1,234
Balesore	1,119
Khurda	1,705
Koraput	1,927
Sambalpur	1,856
Boudh	34

Table 2: Total No. of HIV Infected Patients in Different District

Name of the District	Number of Patients
Ganjam	15,034
Cuttack	6,264
Sambalpur	2,745
Khurdha	2,523
Koraput	2,356
Angul	1,652
Balasore	1,460
Balangir	1,334

Conclusion

Not every universal safety precautions are fool proof. When barrier protection like masks, gloves etc. are considered, leakage cannot be avoided when masks are not well-fitted, and masks only filter out 60-90%

of aerosols. Aerosol cloud remains in the operatory 30 minutes after the procedure has been carried out, so the masks cannot protect after its removal. Operators generally do not use two disposable gloves on each hand, which is necessary to avoid accidental needle-stick injuries. According to studies conducted, double-gloving or wearing two disposable gloves on each hand can reduce exposure to blood by upto 87%.

If the infected state of the patient is known beforehand, then the operators as well the concerned professionals can be more prepared and try their utmost to avoid any accidental errors or injuries. It will be easier to initiate appropriate post-exposure prophylaxis in case of exposure to blood-borne pathogens. Moreover, the treatment procedures may need to be adjusted according to the viral load in the blood. In case of HIV infected patients, their CD4 counts should monitored at regular intervals and contact with the patient's primary care giver should be established so as to adjust the treatments accordingly.

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Various Surgical Managements of Oroantral Fistula

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Abstract

An epitheliazed, morbid, unnatural connection connecting the oral fissure to the maxillary sinus is called as oroantral fistula, which is formed by the accident of face, surgical procedures of tumours or syphilis. For closure of this fistula there are various surgical procedures like buccal flap advancement operation, intranasal antrostomy, ashley's operation, combination of buccal and palatal flap.It require immediate attention without delay. It should be treated to avoid further complications.

Keywords: *Oroantralfistula, Buccal, palatal, flap, management.*

Introduction

Oroantral fistula evolves upon the failure of the closure of the connection. It is still remained obvious and epithelisation is also occurred. Themaxillary sinus was first described by Nathaniel Highmore in 1651. So maxillary sinus is also called as antrum of high more. These are two in numbers,one on the either side of maxilla. They are the largest paranasal air sinuses. Through the lateral wall of the nose this sinuscommunicates with other paranasal sinuses. They may be identical or asymmetrical in size and shape. Approximately the average dimension of sinus is 3.2 in height * 2.5 cm in width * 3.5 in anteroposterior (according to turner 1902). The density of the maxillary sinus is 15-30 ml. The ostium which is 3-6 mm in diameter opens into the middle meatus of the ear. One can describe it as a pyramidal shape which consists of base, an apex and four sides. The maxillary sinus base is created by the lateral wall of the nose. The apex of maxillary sinus projects laterally into zygomatic process of maxilla and it may extend into the zygomatic bone when the sinus is very large. The four walls of the maxillary sinus which looks like pyramid shaped are created by the roof of antrum which is also called as orbital floor the anterior, and infratemporal surface of the body of the maxilla and the alveolar process of maxilla which is also called as the floor of the maxillary sinus. The roof of the maxillary sinus is formed by the thin orbital plate, separating it from the orbital contents.[1-4]

The infraorbital canal, containing the blood vessels and the nerves, runs down along the roof. The maxillary sinus floor is created by the lateral hard palate, alveolar process of the maxilla carrying the roots of the premolars and the molars. The posterior wall separates the maxillary sinus from infratemporal and pterygoid palatine fossa. It is pierced by the posterior superior alveolar nerves which travel to the maxillary molar teeth. The anterior wall of the maxillary sinus is the facial surface of the maxilla.[5]

Oroantral fistula can result from several causes like extraction of teeth, Destruction of the portion of the floor of sinus by periapical lesion, perforation of the floor of sinus and sinus membrane with injudicious use of instruments, forcing a tooth or a root into the sinus during attempted removal,extensive trauma of face,surgery of maxillary sinus, removal of large cystic lesions encroaching on the sinus cavity, chronic infection of maxillary sinus such as osteomyelitis, Infected maxillary implant dentures, teratomatous destruction of maxilla such as gummainvoving palate, malignant disease such as malignant granuloma etc. Clinically in early stage patient may experience escape of fluid, epistaxis, escape of air, enhanced column of air, excruciating pain and in late stage patient may experience postnasal drip,

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popping out of an antral polyp, persistent purulent or mucopurulent foul unilateral nasal discharge, possible sequelae of general systemic toxaemic condition.[6,7]

Review of Literature: Closure of Oroantral fistula is a majorpredicament regarding unwanted cost of infection in sinus closure of Oroantral fistula should be performed to protect sinus from oral microbial flora,to prevent escape of fluids to eliminate existing antral pathology to establish drainage through inferior meatus. Various surgical procedures includes 1)local soft tissue flaps which have A) buccal flaps like rehrmann flap,buccal advanced flap,buccal fat pad flap, pedical buccal fat pad, buccal flap combined with displacement of the buccal fat pad. B) Palatal flaps like palatal rotation advancement flap,palatal pedicled flap, anteriorly based palatal flap,palatal hinged flap,palatal mucoperiosteal rotation flap, palatal straight advancement flap, palatal pedicled island flap, modified submucosal connective tissue flap, submucosal connective tissue pedicle flap, submucosal island flap, random palatal flap etc. C) Grafts like free mucous graft, subepithelial connective tissue graft. 2) Autogenous distant flap which have tongue flap,auricular cartilage,septal cartilage, temporalis muscle flap. 3) Autogenous bone graft–extraoral and intraoral 4) Autogenous fibrin [platelet rich fibrin]5) Allogenous–fibrin glue, dura 6) Xenografts–collagen, gelatin film, bio guide/bio oss7)Tooth transplantation 8) GTR [guided tissue regeneration], 9) Interseptalalveolotomy 10) splint 11) Biostimulation with laser light[8]

Axhausen is a professor and chair person of the transport. He was a german oral and maxillofacial surgeon who narrates the buccal flaps as a slim layer of baccinator muscular fibres which are responsible for closing of oroantral fistula. Berger advocated a procedure which is called as baccal sliding flap technique in which the closing of small to medium sized fistulas(size of less than 1 c.m) occurs. The fistulas are certainly situated laterally or centre of alveolar process. Two vertical cut are given for creating a flap with adequate dimensionfor closing of oroantral fistula after removing the epithelial margins. It is also needed to remove the epithelial covering of the palatal mucosa which usually lies behind the connection. This flap, which is trapezoidal in shape containing of both the epithelium and connective tissue, then the flap is placed over the oroantral site and sutured by using horizontal mattress sutures which is from buccal mucosa to palatal mucosa. The benefits of this buccal flap technique are that, this procedure is indicated in case of when the height of the alveolar ridge is low and in case of mesially situated fistula but, the main disadvantage is that the loss of the depth of the vestibule which needs an extra procedure which is also called as vestibuloplasty in patients with partial dentures which is usually removable.[8,9]

Egeyadi and Hao, represents that the BFP flap which is called as Buccal Fat Pad is an acceptable procedure in which the closure of the oroantral fistula takes place. The particular characteristic feature of the buccal fat pad stack is that an cut is done in posterior mucosa in the zygomatic buttress part, later that the periosteal cut is made to the affected area after that the incision of fascia which contains buccal fat pad, takes place. A fine curved artery forcep is used during the procedure of a gentle dissection for exposing the yellowish colour buccal fat. The benefits of these procedures consisting of batter and proper epithelialisation and increase the rate of achievement but decreases the vestibular height. Ashley described a palatal flap operation in which the fistula is covered with palatal flap. Therefore, the landmarks of suturing will be placed on the firm bones at the buccal aspect of orifice.[10]

Palatal tissue is denser than the buccal tissue, although it is less flexible than the buccal tissue. The sufficient supplement of blood in the area of palatal tissue structures enhanced better healing. The height of the buccal vestibule is not affected by the technique which includes the palatal flaps. Palatal rotation advancement flap enhances sufficient mobility and tissue density to the respected flap, but movement of the huge quantity of palatal tissue is needed and sometimes it leaves the scars followed by the movement of the flap which leads to venous congestion. Kruger narrated that the folding of the flap is decreased by the v shaped exclusion of the minor angulations of the flap.[7-9]

Intranasal antrostomy: It is performed to facilitate the drainage at the conclusion of an operation performed. (1) to close an oroantral fistula, or (2) to remove a tooth or a root from a sinus.An aim for the closure of major defects by the contained flaps which results failures. This procedure is called as the combination of buccal and palatal flaps. A two layered closing develops the sturdiness of the flaps and minimizes the shrinking and possibilities of infection.

A procedure, in which accessing into maxillary sinus through the canine fossa including nasal antrostomy is called as Caldwell-Luc procedure. It is given by George

Coldwell in 1893. After that Henry Luc also informed the similar technique in 1897. The indnications are: 1) open reduction for removing of pieces of roots, 2) for treatment in case of chronic maxillary sinusitis with lining of hyperplasia and polypoid deterioration of lining mucosal layer.

Another access for the closing of oroantral fistula: Ziemba reported a two layered flap procedure for closing of the fistula. According to ziemba, the benefits of using the two flaps on one flap are the procedure in which the superior surface and inferior surface of the restored area were covered by the steady covering of epithelium. These two flap techniques decreases the events ofthe contractilityand it also decreases the infection. The probability of collapsing the wound is also decreased by this two flap technique which also results the defect to be occurred ever again.[11]

Batra et al described a method for the closure of the oroantralfistula. According to him a double layer flap closure method can be used for the closure of the oroantralfistula. In this double layer flap closure method, the defect with the covering closure which includes a layer of BMF (buccal mucosal flap) is covered by BFP(buccal fat pad).[12]

The free end of the flap should have an adequate blood supply. The buccal flap is so designed, that the base should be wider than the apex; to ensure adequate vascularisation at the apex. The palatal flap should be so designed that the greater palatine vessels are incorporated in the transposed tissues and should be long enough to swing across the fistulous opening without tension or twisting at the base.Suture line is well supported by sound bone.Mobilization of either buccal or palatal flap should be done in such a manner that there is no tension on the suture line.Antibiotics,analgesics,anti-inflammatory drugs should be given for 5 days patient is instructed not to blow the nose,have soft diet and no vigorous gargling.[10-12]

Conclusion

If the oroantral fistula is identified at the correct period of occurance or at the early period, it; oroantral fistula, the alveolar ridge height, the depth of vestibule, the tenacity of defects, the inflammatory condition or infection of sinus and normal health condition of a patient etc. are contemplated as a different criteria for the different surgical procedures for it. We can close a small fistula of a size less than 5 mm in diameter immediately and by using stitching procedure, it can be effectively doneby stitching the gum with a 8 shaped stitch.

A flap technique is recommended if it doesn't enhances enough and adequate closure. Small openings can heal eventually. For closing of small and medium fistuals, buccal flap combined with buccal advancement is acceptable and in case of large oroantral fistulas palatal rotational flap is acceptable. For the defect which is placed in the 2nd and 3rd molar site, the combination of the buccal flap and the buccal fat pad is suitable. There are some widely used grafts using in current years, such as Free Mucosal Grafts(FMG) or Connective Tissue Graft (CTG). The treatment procedure for the closing of oroantral fistula must be done according to the indications and the experience of dental surgeon.**:**

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Effect of Hormonal Imbalance on Jaw Growth

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Abstract

Endocrine system is an important regulator of growth and development. In childhood, it determines the longitudinal bone growth, skeletal maturation, and acquisition of bone mass. In adulthood, it is necessary to maintain bone mass throughout life. Although an association between craniofacial and somatic development has been clearly established, craniofacial growth involves complex interactions of genes, hormones and environment. Moreover, as an anabolic hormone seems to have an important role in the regulation of bone remodeling, muscle enhancement, jaw and tooth development. In this paper the influence of hormonal imbalance on jaw growth is discussed.

Keywords: *Growth hormone deficiency; Growth hormone replacement therapy; Craniofacial skeleton; Maxillary length; Ramus height; Upper facial height.*

Introduction

The activities of various organs in our body are controlled by two systems namely, nervous system and endocrine system. Most of the functions of nervous system are executed by hormonal substances. And most of the endocrine functions are controlled by nervous system. The endocrine system constitutes endocrine glands which are situated in different part of body. The functions of these glands are mediated by chemical substances which are called chemical messengers or chemical mediators or first messengers or hormones. The endocrine glands are also called as ductless glands because the hormones secreted by them are directly release into blood[1].

Hormones secreted by major endocrine glands

A. Anterior pituitary

a. Growth hormone (GH)

b. Thyroid stimulating hormone (TSH)

c. Adrenocotricotropic hormone (ACTH)

d. Follicle stimulating hormone (FSH)

e. Luteinizing hormone (LH)

f. Prolactin

B. Posterior pituitary

a. Antidiuretic hormone (ADH)

b. Oxytocin

C. Thyroid gland

a. Thyroxine (T_4)

b. Triiodothyronine (T_3)

c. Calcitonin

D. Parathyroid gland

a. Parathormone

E. Pancreas

a. Insulin

b. Somatostatin

c. Pancreatic polypeptide

d. Glucagon

F. Adrenal cortex

a. Mineralocorticoids

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b. Glucocorticoids

c. Sex hormone

G. Adrenal medulla

a. Adrenaline

b. Noradrenaline

c. Dopamine

H. Testis

a. Testosterone

b. Androstenedion

I. Ovary

a. Estrogen

b. Progesterone

The Pituitary Group of Hormones[2,3]

Hypopituitarism: Decreased secretion of pituitary gland causes a condition called hypopituitarism. Decrease secretion of growth hormone may cause a condition known as pituitary dwarfism.

Clinical features:

1. Deficiency in early childhood causes stunted sphenoid bone especially spheno-occipital suture, naso-orbital configuration.
2. The nose is short, root of nose is depressed and the nasal bridge broad and flat.
3. Ossification of the cartilaginous centers is delayed and fontanels may persist to the time of adolescence.
4. In Lorain type hypopituitarism–teeth size is small.
5. In Mongolism–facial and cranial anomalies present, especially underdevelopment in the anteroposterior dimension. There is a progressive mandibular prognathism with a comparatively large tongue, cross bite and open bite.
6. Thyropituitarism–is a combined deficiency of thyroid and anterior lobe of pituitary gland. The calcification of teeth is retarded and retardation of general as well as jaw growth. The teeth are irregular and eruption is delayed.
7. The dental arch is smaller than normal and therefore cannot accommodate all the teeth so that a malocclusion develops.
8. The roots the teeth are smaller than normal.
9. Hypopituitarism in adults is usually due to an infarction of the pituitary called simond's disease, in which lips become thin and an immobile expression. No specific dental changes have been described.
10. The osseous development of the maxilla is not as retarded as that of the mandible.

Hyperpituitarism[4]: An increase in number of granules in the acidophilic cells or an adenoma of anterior lobe of pituitary is associated with hyperpituitarism. If the increase occurs before the epiphyses of the long bones are closed, gigantism results. If the increase occurs later in life, i.e. after epiphyseal closure, acromegaly develops.

Clinical features: Gigantism is characterized by a general symmetric over growth of the body, attaining a height of over 8 feet. The teeth in gigantism are proportional to the size of the jaws. The roots may be longer than normal. Acromegaly is a relatively rare disease in which lips become thick and Negroid. The tongue also becomes enlarged and shows indentations on the sides from pressure against the teeth[5].

The mandible, because of accelerated condylar growth, becomes large. The resulting prognathism may be extreme, giving the head a typical acromegalic appearance. The teeth in mandible tipped to the buccal or labial side, owing to the enlargement of the tongue.

Thyroid hormone: Thyroid is an endocrine gland situated at the root of the neck on either side of trachea. It is larger in female than in male. Its function is slightly increased during pregnancy and lactation and is decreased during menopause. Diseases of thyroid gland are more common in females than in males[6].

Thyroid gland secretes 3 hormones

1. T_3
2. T_4
3. Calcitonin

Functions of thyroid hormone

A. To increase the overall metabolic rate in the body.

B. To stimulate growth in children.

Hypothyroidism: A failure of thyrotropic function on the part of pituitary or an atrophy or destruction of the thyroid gland leads to an inability of the thyroid to produce sufficient hormone to meet the requirements of the body[7]; Cretinism, Juvenile myxedema, Myxedema

Clinical features

- Stunting of growth
- Infantile skeletal proportions and naso-orbital configurations.
- Delayed and defective tooth development.
- Epiphyseal dysgenesis.

Congenital hypothyroidism affects

1. Bone of cartilaginous origin.
2. Bone of intra membranous origin.
    - The cranial base which is of endochondral origin is disturbed and arrested in growth.
    - Length of the cranial base is shortened.
    - Retardation in normal rate of deposition of calcium in the bones and in the development of the tooth buds in the fetus.
    - In the thyroid cretinism patient has a large head and face which dull and infant facial expression.
    - Dental retardation in hypothyroidism parallels endochondral ossifications, which is extremely delayed.
    - Delayed ossification of tooth bud.

Hypothyroidism after age 6 years and before puberty can manifest itself as a juvenile myxedema. It is characterized by decrease in rate of maturation which shown itself as follow[8]:

1. Retardation in normal rate of deposition of calcium in bones and in tooth buds.
2. Disharmonies in the eruption of the teeth.
3. In adequate development of maxilla.
4. Prolonged retention of the deciduous teeth.
5. Permanent teeth are slow to erupt.
6. Mesio or disto-occlusion and crowding of teeth.
7. Malposed maxillary and mandibular incisors and canine with loss of proximal contact.
8. Openbite due to tongue enlargement.
9. Abnormal dental calcification and root resorption.
10. Alveolar bone become osteoporotic.
11. Dentoalveolar prognathism.

Hyperthyroidism: In this case there is increase in rate of maturation increase in BMR and exopthalmic goiter. Premature eruption of disturbed resorption of the roots of the deciduous teeth with early eruption of permanent teeth. Bones become fragile and secretion of saliva is increased. Acceleration of skeletal ossification. Hyperthyroidism is rare in children but when it does occur eruption of teeth accelerated; occasionally some of teeth may be present at birth. Acceleration of eruption of teeth permanent by as much as 2 years or more ahead of their normal time. Teeth may show bluish white colouring. Osteoporosis may be present. This would contraindicate orthodontic treatment[9].

Parathyroid hormone: The function of parathyroid is to maintain a normal level of diffuse calcium and phosphorus in the blood plasma and to keep constant the ratio of these minerals to each other. The act as a check on the thyroid gland parathyroids are important organs in ca metabolism and play a leading role in calcification of teeth. However, once the teeth are formed, there is no evidence found of ca withdrawal from teeth due to parathyroid disturbances. The parathyroids are important in regulating blood ca level, but have little or no direct effect on growth or tooth eruption[10].

Hypoparathyroidism: In this case Blood ca may fall to as low as 7mg/100ml (10mg/100ml is normal)**.** It Causes delay in tooth eruption and can affect morphology of teeth. Enamel defects are seen. Teeth have white appearance but later turn brown through staining. They are brittle, pitted with opaque areas and fractured easily because of poor calcification. Irregularities in occlusion of permanent teeth. In neonatal hypoparathyroidism– enamel aplasia or hypoplasia present[11].

Hyperparathyroidism: There is Increase in shifting of Ca from bones to blood stream and to excretion. Demineralization of bone occurs. Early distortion of trabecular patterns demineralization and disappearance of lamina dura may seen. In growing children there may be interrupted tooth development. Formation of osteodentin and osteocementum also may occur. The tooth may become loose as a result of loss of cortical bone resorption of the alveolar process[12].

Adrenal hormones: The hypofunction of adrenal gland has no as such effect on jaw bone and teeth. The adrenocortic hyperfunction brings about decrease in bony matrix into which calcium is deposited when bone is formed, interfering with bone formation. Height age, bone age and tooth eruption are accelerated.

Thymus: With overgrowth of thymus, general bodily growth is accelerated. Hypertrophy of the thymus may result in delayed eruption of the deciduous teeth and poor tooth calcification. The teeth may appear of bluish white colour and of uneven size.

Clinical consideration: Growth hormone and its mediators–

Mode of action on different varieties of cartilage.

1. The growth of epiphyseal cartilage of the long bones, cartilage of spheno occipital synchondrosis, lateral cartilaginous masses of the ethmoid and cartilage between the body and greater wings of the sphenoid is subject to general extrinsic factors and more specifically to GH and somatomedin. In this case orthopedic devices can modulate the direction but not the amount of growth.
2. The growth of condylar cartilage, coronoid and angular cartilage of the mandibular cartilage in some cranial sutures and cartilage in post fracture callus is subject to local extrinsic factors as well as growth hormone and somatomedin. In this case appropriate orthopedic devices may modulate both direction and amount of growth.

Growth hormone and somatomedin as well as testosterone and estrogen are seen to play a primary role in extrinsic control of postnatal growth of upper jaw. There effect is direct and indirect.

Direct effect: In represents almost the entire influence of GH and somatomedin on growth of the s-o synchondrosis and nasal septal cartilage, lateral mass of ethmoid bone and between body and greater wing of sphenoid.

Indirect effect: Indirect effect of GH somatomedin occurs through a number of intermediators.

1. Forward growth of septal cartilage
   a. Thrust effect
   b. Septomaxillary ligament traction effect.
   c. Labionarinary muscle traction effect
2. Outward growth effect of Frankel lateral vestibular–shields on widening of upper jaw.

Control of mandibular growth: Any research investigation on the control mechanism of craniofacial growth should take into account not only local and regional extrinsic factors but also general factors.

Growth in mandible is due to

1. Postural hyperpropulsor

   Function appl–Lat pterygoid muscle activity–increase in rate and amount of condylar cartilage.
2. Class II elastics
3. Herren–type activator

Conclusion

Anomalies of endocrine gland origin manifest themselves dentofacially as follows Characteristic changes in facial appearance due to retardation or acceleration of the growth of face. Changes in rate of eruption, order of alignment and relationship to each other or individual and groups of teeth in the same jaw or in the opposite jaw.

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Recent Advances in Local Anaesthesia

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Abstract-

From that of the operator to that of the patient research continues in both dentistry and medicine with the goal to improve experience of all areas of the local anaesthetic, as local anaesthesia remains the backbone of pain control in dentistry. Much of this research is focusing on advancement in the area of local anaesthesia safer syringes and needles; articaine hydrochloride and oraqix like newer drugs; reversing local anaesthetic like phentolamine mesylate; Intraosseous anaesthesia; electronic dental anaesthesia (EDA), transcutaneous electrical nerve stimulation (TENS) and computer-controlled local anaesthetic delivery (C-CLAD) systems; clonidine as an adjuvant to local anaesthetics for peripheral nerve blocks; vibrotactile devices like vibraject and jet injections like syrijet. These devices and drugs are part of the mainstream for control of pain in the various parts of the world in recent days. The article reviews the up to day advancements in the agents and techniques for local anaesthesia, depicting the most mandatory aspect of today's dentistry and enlightening some of the advancement of the same.

Keyword: *Local Anaesthesia, Lingual Nerve, Pain Management, Paresthesia.*

Introduction-

Since the early 19th century local anaesthesia has proved its vital role for the subsidence of pain related to invasive procedures in the clinical dentistry especially proving its importance in oral and maxillofacial field. Adequate amount of anaesthesia of the working field must be achieved in order to increase patient's cooperation as well as comfort. Local anaesthesia has proved its designation as one of the most important drugs in dentistry. Pain control has remained the building block of all the dental procedures. Thus we are putting forward a bird's eye view over the advanced anaesthetic techniques that have came into existence till date. "Local anaesthesia has been defined as loss of sensation in a circumscribed area of the body caused by depression of excitation in nerve endings or inhibition of the conduction process in peripheral nerves".[1]

Articaine: In the month of April 2000, the Food and Drug Administration (FDA) approved articaine as a newest addition to the local anaesthesia. 1:100,000 or 1:200,000 epinephrine in the strength of 4% is the available amount of for Articaine hydrochloride(HCL). As liked that of other local anaesthetics agents the amide structure of the articainesuch as low systemic toxicity along with its wide therapeutic range. Diffusion of it is superior through bone and soft tissue than other various local anaesthetics. 60% to 80%of the articaine HCl approximately being bonded tog-globulins and serum albumin, thereby helps in getting expeditiously plasma is having the similar structure on a contradiction that it is not having a benzene ring rather contains a thiophene ring and an extra ester group, thereby permitting articaine to be subjected to biotransformation in the plasma (hydrolysis with the help of plasma esterase) along with in the liver (with the help of hepatic microsomal enzymes). For meeting the purpose to be used in clinical dentistry simultaneously satisfying the clinical needs for most importantly pain management in the maximum of the patients undergoing dental procedures[1,2].

Rather than other amide type local anaesthetics the properties of carboxyes terase to its primary metabolite–articainic acid–that being an inactive metabolite being secreted by the kidneys, 20 minutes being the half life of the elimination. Of about approximately 2 hours for nerve block and up to 1 hour for infiltrations of

the complete anaesthesia simultaneously within 1 to 9 minutes after injections the onset of the anaesthesia occurs. 2 ml of Articainehydrocloride boosts the extraction of teeth in maxillary arch (without any palatal injection) to the buccal vestibule of the tooth as comparison to the lidocaine, due to the articaine's better soft tissue and bone diffusion and penetration property. For the production of adequate anaesthesia in mandibular premolars and mandibular anterior teeth with the help of localized field blocks(infiltrations) without administration of mandibular blocks,Articaine has received a lot of popularities in such cases[3].

A randomized prospective, double blind cross over study looked at lidocaine andarticainebuccal infiltration anaesthesia in mandible, and the study depicted that "mandibular buccal infiltration is more effective with 4% articaine with epinephrine than with 2% lidocaine with epinephrine in achieving pulpal anaesthesia. Both injections were associated with mild discomfort. When articaine was compared with mepivacaine 2%, the results indicated that 4% articaine was superior to 2% mepivacaine in depth of anaesthesia, mainly over the first 60 minutes." With the application of articaine HCl paresthesia of the tongue, oral tissue and lips have been reported which is persistent, with slow, incomplete or no recovery. This adverse event is reported mostly following inferior alveolar nerve block and seems to involve most oftenly the lingual nerve.[4]

The articaine's metabolism appeared of being age-independent in those of the healthy male volunteers, thus there is no requirements in changing the dosage of the elderly patients, on a note of contradiction patients with having history of heart blocks should be handled cautiously, aswellas in patients at the time of or after the administration of potent general anaesthetic agents, as because such conditions may lead to cardiac arrhythmias. Many cases have been reported of having systemic allergic conditions due to the administration of Artcaine. Under the Pregnancy Category C,the Articaine is classified and is only prescribed during pregnancy on the basis of the condition that the benefit is anticipated for justifying the risk to the fetus"[5].

Oraqix (Lidocaine & Prilocaine Periodontal Gel 2.5%/2.5%)[6]: In 2004, a topical anaesthetic agent was introduced which was basically designed to be used by dental hygienists,namely Oraqix (Dentsply Pharmaceutical, York, PA, USA). The Oraqix had been approved by the FDA especially for the periodontal applications. It is designed basically for those who necessitate localized anaesthesia in the periodontal pockets during root-planing and/or scaling procedures and is basically a needle free subgingival anaesthetic.[7]

In order to facillitate easy application into the periodontal pockets that demand scaling and root planing, Oraqix is available as oil in the room temperature. It is solidified into an elastic gel at body temperature, facillitating it to stay in proper position while the anaesthetics take effect, once the application procedure is over[8].

By the use of a blunt Oraqix applicator, it is applied onto the margin of gingival of the chosen tooth. After 30 seconds of the application procedure, scaling and root planning may be started and the effect of anaesthesia remains for a duration of around 20 minutes[9].

Reversing Local Anesthesia: At the time of the follow up appointments, many individuals having comparatively less invasive procedures like restorations have complaint to their operator regarding the difficulty and displeasure of unable to drink, eat, or speak normally after their dental session for many hours after the treatment, due to the fact that tongue and/or lip of the patients being numb. The fact of a patient leaving the dental office with continuing soft tissue anaesthesia persisting for several hours is quite not acceptable as because most of the dental treatments are not at all invasive to such extent[10]. The reversal of the local anaesthesia must be followed for the patients having minimal invasive procedures along with those of the pediatric patients, so that they can be satisfied.

Thus for reversal of the anaesthesia of soft tissue and the associated functional deficiency which originates from a local anaesthetic agent, the FDA approved OraVerse (phentolamine mesylate) in May 2009. OraVerse is accepted for usingin both children and adults; however, for the children not older than 6 years or weighing not more than 15 kg, it is highly contraindicated to use.[2]

"OraVerse is an assemblance of phentolamine, which is basically a-adrenergic antagonist. The hypothesis for the mechanism of action is that phentolamine acts as a vasodilator, resulting in faster diffusion of the local anaesthetic into the vascular system and away from the site, thereby reducing the unwanted side effects of lingering lip and tongue numbness".[2]

Buffering Local Anaesthetic in Dentistry: The prefilled local anaesthetic cartridge is the primary problem(as related to buffering) in dentistry. It is practically not desirable for the manufacturer of a local anaesthetic to introduce buffered cartridges due to the reason that the addition of NaHCO3 must be occurred within minutes of injection. By defenestrating a volume of local anaesthetic from the cartridge and interchanging it with the same volume of NaHCO3, thus dentists make an effort to buffer the local anaesthetics. This in turn leads to buffering led to originate results at variance[11].

A means of routinely buffering cartridges of local anaesthetic along with a pH range is between 7.35 to 7.5 is being provided by a newly introduced product(February 2011).[1]

Electronic Dental Anesthesia (EDA): The Gate Control theory is proposed by Melzack and Wall in the year of 1965 explain the mechanism of EDA by which acute pain in the course of any dental or surgical procedure is prevented. EDA is used at a higher frequency (> 120 Hz). At this frequency, a special sensation is experienced by the patient is caused by EDA. The sensations of pressure, touch and temperature is transmitted by larger diameter nerves (A fibers), which is stimulated by EDA.

If a minimum threshold intensity of a fiber stimulation is maintained by the patient; then impulse of the pain induced by the surgical or dental apparatus like blade, curette or high speed drill that is more slowly transmitted to central nervous system through the smaller C and A-δ fibers, will come on a close gate. Hence, it will not be able to get in the brain, where physical pain is translated by it. Thus, central transmission of overall effects of small fiber input is inhibited by the large fiber input. The sensation of the pain does not arise because the impulse of pain fails to reach the brain.[12] The pleasant recovery postoperatively from local anaesthesia is provided bythe application of EDA at a low frequency setting for 30 to 60 minutes at the completion of operation.

Transcutaneous Electrical Nerve Stimulation (TENS): In order to shorten the duration of residual soft tissue anaesthesia in the year of 1980 this technique named TENS(Transcutaneous electrical nerve stimulation) became successful. In order to rehabilitate from the injury related to the soft tissue as wellas for the medicines to be used for sports, TENS is used.

Anelectrical current of low frequency deliver to the area once after the electrodes are placed at the site of the injury. The patient in benefitted in two ways after the low frequency (2.5Hz) electrical current is applied to the site of the recently injured area. i.e. perfusion of the tissue produced by arteriolar and capillary dilation is increased by its action and along with the contraction of skeletal muscle is stimulated. The area of application of the current is a cyclic process of pumping actions which is the resulting effect of these two above mentioned processes. Thus in order to reduce oedema (skeletal muscle stimulating effect) a treatment of 1hour duration is given at a low frequency therapeutically, and thereby increasing the perfusion and skeletal muscle stimulation thus portraying for “cleansing” of the injury breakdown products of the tissue area.[13]

Computer-Controlled Local Anaesthetic Delivery (C-CLAD): It is invented in the year of 1997. Primitively it is called the WAND and later renamed as the Compu Dentis the first local anaesthetic delivery system which is controlled by computer.

With the help of C CLAD devices practitioners can precisely supervise the rate of delivery of the local anaesthetic solution. In addition, a concept of disposable handpiece weighing not more than 10 gis introduced by C CLAD which facilities clinician to grasp it in a pen-like fashion, so tactile control is increased and dexterity during injection is improved. C-CLAD devices represent a significant improvement for injection which is given subcutaneously and have markedly give better results and also involvements for so many of patients over the last 10 years, helping toreduce the “fear factor” which is become so intimately associated to the dental visits.

In 2001, Hochman and colleagues advanced the science and understanding of subcutaneous injection fluid dynamics by identifying a predictable method for measuring the precise value of fluid exit-pressure in situ (at the tip of the needle) during drug administration. This led to the next significant improvement in C-CLAD technology–the development of an instrument for medical and dental injections capable of controlling all variables of a subcutaneous injection event. This instrument was initially named the Compu Flo (Milestone Scientific). This approach to fluid injection dynamics is called dynamic pressure-sensing (DPS) technology, which was developed for the delivery and aspiration of medicaments.[1]

Clonidine as an Adjuvant to Local Anaesthetics for Peripheral Nerve and Plexus Blocks:

Clonidine, an α_2 adrenergic agonist, was initially used for its antihypertensive properties. For blocking peripheral nerve and plexus it may be a fruitful ancillary to local anaesthesia. The anaesthetic duration and blockage of sensation is lengthened by about 2 hours. However, risk of arterial hypotension, bradycardia, fainting and sedation are enhanced by clonidine, and also span of the motor block islengthened by it.[4]

For dental extraction by infiltration anaesthesia in maxillary arch adrenaline at 10 μg/ml and clonidine at 15 μg/ml can use as add-on with the lignocaine harmlessly; an equal profit over use of only lignocaine can be achieved with inclusion of any of these two drugs; in terms of prolonging the span of anaesthesia and lowering the blood loss but, with no momentous hemodynamic changes and with no disparity in the onset of anaesthesia.[5]

Vibrotactile Devices: Relieving pain with the help of vibrotactile stimuli is a renowned aspect; dentists use vibrations to reduce the pain which arise from infiltration anaesthesia in maxillary arch for numerous years. To divert the brain from the disquiet of the anaesthetic injection by pinching and shaking the cheek is extensively employed with enormous profit. The sense of pain from thrust of the anaesthetic solution entering to the tissue is reduced as a result of the cerebral cortex of brain is concentrated on the vibration.[2]

Recently 4 devices are marketed in the United States that tries to decrease pain at the site of injection by depending on vibrations. Examples like Vibra Ject, Dental Vibe & Accupal.

Jet Injections: The principle of Jet-injection technology is utilizing a mechanical source of energy to builda release of pressure adequate to push the liquid medication through anorifice which is very small, developing a thin fluid column with sufficient force that it can pass through soft tissue without a needle into the subcutaneous tissue.[2]

Advantages of jet-injectors over classical needle injections are it is easy and fast to use, deliver less pain, less trauma to tissue,from injection site drug absorption is faster. Chances of infection are also less because of needle free injectors which can occur from a procedure using needle. Jet-injection used exclusively for topical anaesthesia (not pulpal anaesthesia) because of its major drawback in dentistry is that only sufficient amount of anaesthesia can express to anaesthetise the soft tissue. Examples: Syrijet, Med-Jet.

Intraosseous Injection: Local anaesthetic is less efficacious in patients having pain of irreversible acute periradicular inflammation or pulpitis. In this technique local anaesthesia is deposited into cancellous bone directly alongside to the tooth is indicated to anaesthetise and mostly used for endodontic purpose. Example: Stabident, X-Tip, IntraFlow.

Conclusion

This article thus deals with inkling the newer anaesthetic techniques together with its aspects dealing with the safety, efficacy, and simultaneously dealing with the negligible soft tissue infuriation.

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Bisphosphonates Related Osteonecrosis of Jaws

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Abstract

Bisphosphonates are the resorptive drugs prescribed for treatment of osteoporosis. Bisphosphonates related Osteonecrosis of Jaws is an adverse effect of bisphosphonate therapy. There are some associated risk factors like dentoalveolar surgery, duration of therapy and immunosuppressant therapy. This can be treated conservatively or surgically but prevention of this condition is preferred. This paper briefly reviews osteonecrosis associated with bisphosphonate therapy.

Keywords: *Bisphosphonates, Osteonecrosis, Osteoporosis.*

Introduction

Bisphosphonates are drugs used for treatment of post-menopausal and glucocorticoid induced osteoporosis, Paget's disease, osteolytic and osteoblastic bone metastases, Fibrous dysplasia, heterotrophic ossification, myositis ossificans and also used with radioactive technetium for bone imaging.[1,2] Osteoporosis is the most common resorptive disease worldwide which has increased the use of antiresorptive drugs including bisphosphonates.[3] Bisphosphonates suppress osteoclasts and decrease remodelling of bone thus raising bone density. Bisphosphonates are used as first line drugs for treatment of osteoporosis as they show decreased risk of fracture and are widely used.[4]

Although it is the most commonly used drug and has many benefits, Bisphosphonates Related Osteonecrosis of Jaws (BRONJ) is a severe side effect of bisphosphonate.[5-8] The first article on BRONJ was published in 2003.[5] After that many cases were reported[9-12]

Definition: The American Society for Bone and Mineral Research defined BRONJ to discriminate it from other conditions as:[13]

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a. History of treatment or undergoing treatment with a bisphosphonate;
b. Bone in the maxillofacial region that has been exposed and has persisted for >8 weeks
c. No radiation therapy to jaws

But, in stage 0 BRONJ the bone is not exposed so the definition was updated to "exposed or otherwise necrotic bone."[4]

Pathogenesis: Bisphosphonates cause inhibition of osteoclasts and decrease remodelling of bone, but remodelling is necessary for healing.[1] Invitro, they produce toxic effect on the soft tissue of oral cavity during oral administration but in vivo it is not clear if it attains toxic levels to effect soft tissues.[1] Bisphosphonates have antiangiogenic property i.e. suppress angiogenesis, regeneration of capillaries and epithelial growth factor.[5] Osteonecrosis due to bisphosphonates is due to high turnover of jaw to outside environment through teeth and periodontal ligament.[2,6]

Epidemiology: BRONJ was found to be 0.7/100,000 persons/year of exposure.[7] In a study in Australia it was found that patients treated weekly with Alandronate showed a frequency of 0.01-0.04%.[8] In long-term oral bisphosphonate recipients prevalence of BRONJ was found to be 0.06% whereas for Alandronate it is approximately 4%(9 out of 208 patients).[1] By first report from Asia, prevalence of oral BRONJ was noted as 0.05-0.07%.[1,9]

470 cases of BRONJ were assessed in a multicentric

study from Europe and 37 were due to oral use(7.8%). According to AAOMS mostly those cases were not having any risk factors for BRONJ. BRONJ occurs more with IV use than oral use.[10,11]

Risk Factors

By AAOMS:

I. Drug related:

a. Bisphosphonate potency: Zolendronate is mostly used as intravenous drug for treatment as it is more potent than bisphosphonates and intravenous bisphosphonates cause more Osteonecrosis. Bisphosphonates are of two types

- Nitrogen Containing: Alendromate, Risedronate, Ibandronate. Have higher risk of BRONJ.
- Non Nitrogen Containing: Etidronate, Tiludronate, Clodronate. Have lesser risk of BRONJ.

According to a study by Deniz-Freitas et al, Alandronate was mostly prescribed compared to Ibandronate which explained higher cases of Osteonecrosis due to Alandronate or it can be due to the dose, potency and half-life and factors related to absorption of drug.[12]

b. Duration of therapy: Bioavailability of oral bisphosphonates is lower than intravenous so used for longer duration but treatment for >2 years has higher risk of BRONJ. Due to higher and faster accumulation of oral bisphosphonates in bones there are more cases of BRONJ[13]

II. Local risk factors: Surgical procedures like periapical surgery, extractions, implants and periodontal surgery, poor oral hygiene are other risk factors.[1] Injury due to ill-fitting dentures may cause BRONJ as bisphosphonates decrease proliferation of keratinocytes.[1] According to researchers, patients with infections in mouth and receiving bisphosphonate therapy have more chances of developing BRONJ.[14] Trauma to the bone cause BRONJ as bisphosphonates reduce remodelling of bone.[1] It is mostly seen in mandible and thin mucosa over bony prominences.[15]

III. Demographic and systemic factors: Elderly patients (>65 years) are more commonly effected as post-menopausal women mostly have osteoporosis and are given bisphosphonates.[22] Diabetes, kidney diseases, immunosuppressant therapy, smoking, decreased haemoglobin, rheumatoid arthritis are systemic risk factors. Prednisone and methotrexate also cause BRONJ due to further decrease in remodelling in cases of bisphosphonate therapy.[16,17,18]

IV. Genetic factors: BRONJ may be caused by single nucleotide polymorphism in cytochrome P450 and IGF-1 genes[1]

V. Preventive factors: Risk of BRONJ can be reduced by regular dental checkups and treating other oral diseases before starting bisphosphonates (as recommended by AAOMS Taskforce on BRONJ)[17]

Clinical features and other findings: Patients may or may not show symptoms. Exposed alveolar bone may be found during routine dental checkup. There may be pain or other infections. It may be due to some dental prosthesis or other dental treatment but at times no obvious factors may be detected.[16] Detection of BRONJ can be done by panoramic radiographs, dental cone beam or spiral computed tomography. But panoramic radiographs and computed tomography are not very useful in detecting early stages of BRONJ. Scintigraphy, MRI or PET scan can detect BRONJ even there is no clinically exposed bone. Risk of BRONJ may be detected by the marker serum C-Telopeptide crosslink of Type 1 collagen(CTX) but its role is controversial.[19,20]

Management: Preventing infection of necrotic bone and reducing symptoms is the aim of BRONJ management. No treatment is required for patients at risk but patient education regarding symptoms and clinical manifestations is important.

Stage 0-Patients can be given analgesics when indicated.

Stage 1-When there is no sign of inflammation, the patient should be advised antimicrobial mouth rinses to prevent infection of exposed bone and evaluation should be recalled and re-evaluated every 3 months.

Stage 2 and 3-Oral antibiotics and mouth rinses are indicated. Surgical procedures may be required for removing necrotic bone. To reduce soft tissue irritation superficial debridement should be done. If systemic conditions allow, bisphosphonate therapy may be modified or stopped. Aggressive surgery is controversial as bisphosphonates affect remodelling of bone but for

large area of necrotic bone or pathological fractures, radical surgeries like resection may be done to mitigate infection and pain.[21,22]

Hyperbaric oxygen, platelet-rich plasma, lasers and parathormone may be used.[23,24] Hyperbaric oxygen increase tissue repair, angiogenesis and kills micro-organisms and reduce edema. It also ameliorates wound healing.[25] Parathormone increases bone remodelling and healing capacity. But in patients with metastatic cancers it should be avoided as it may cause skeletal metastases.[26,27]

Prevention: Risk of BRONJ can be reduced by prevention strategies. Oral hygiene of the patient should be improved before starting bisphosphonate therapy. Risk of developing BRONJ is seen in therapy for >3 years. So, for surgery, adjustments should be made based on the duration of bisphosphonate therapy. For patients on therapy for <3 years or with no clinical risk factors no modifications are required before surgery and CTX levels may not be evaluated. Regular follow-up is required for patients with implants. Drug should be stopped at least 3 months before surgery if a patient is on corticosteroid and bisphosphonate therapy for <3 years with existing systemic conditions.[1,17] According to Marx et al if CTX value is >150pg/ml or higher surgical procedures can be performed on a patient without any risk of osteonecrosis but if it is <150pg/ml then the surgery should be delayed or drug should be stopped.[22,27] It is to be resumed only after healing.[1]

As the bone turnover markers are inhibited even after years of cessation of bisphosphonates, the exact period of pathological effects of the drug are not clear.[1,20]The American Dental Association disapproves the use of CTX as a resorption marker and support the idea of cessation of bisphosphonates if there are potential risks of fractures and decreased bone density, not because of the risk of development of BRONJ.[28,29,30,31]

Prognosis: The consequences and clinical course of BRONJ is dependent on the preceding factors and the concomitant status. It was found in a study consisting of 30 patients that patients with BRONJ healed in 8 months but in patients with extracted tooth and BRONJ healed after 18 months and those with concomitant conditions took a longer time to heal(20 months).[29]

Table 1.: As suggested by Ruggiero et al at American Association of Oral and Maxillofacial Surgeons (AAOMS) in 2009. Clinical staging of BRONJ [1, 17, 21]

At risk category	No evident necrotic bone seen in patients who were treated with either oral or IV bisphosphonates
Stage 0	No clinical evidence of necrotic bone but non-specific clinical findings and symptoms
Stage 1	Exposed/necrotic bone in patients without symptoms and without manifestation of infection
Stage 2	Exposed/necrotic bone with accompanying infection indicateded by pain and erythema in the area of the exposed bone with or without pus discharge
Stage 3	Exposed/necrotic bone in patients experiencing pain, infection and one or more of the following:, Fistula present extra-orally, Pathological fracture or osteolysis upto the inferior border

Conclusion

Bisphosphonates are one of the most prescribed anti-resorptive drugs used for treatment of osteoporosis. The chances of BRONJ is very rare but it should not be disregarded. Patients who do not undergo regular dental check-up or have associated risk factors like poor oral hygiene, immunosuppressant therapy, cancer are required to go through thorough dental check-up before or after beginning of therapy. Quitting smoking and drinking, regular dental checkups and educating the patients regarding initial symptoms of BRONJ is required. Early detection and management brings favourable outcomes. Wherever possible, invasive surgeries should be circumvented in cases with bisphosphonate therapy and associated risk factors.

Endocrinologists, physiatrists, rheumatologists are the physicians who prescribe bisphosphonates for osteoporosis, should be acquainted with the risk of development of BRONJ and should work in line with dentists.

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Distraction Osteogenesis for Correction of Mandibular Deficiency and Disorder: An Overview

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Abstract

Distraction osteogenesis is a worldwide accepted recent approach in the field of surgery. As on date the craniofacial surgeons, across the globe, prefer the distraction osteogenesis technique over conventional reconstructive surgery by bone graft. This paper attempts to review a brief knowledge of the mandibular distraction osteogenesis and the latest developments in the field.

Keywords: *Distraction, Osteogenesis, Correction, Mandibular Deficiency, Disorder.*

Introduction

Distraction osteogenesis (DO) is a modern alternative to many of the traditional orthopaedics surgery. It is the biological process for de novo formation of new bone and adjacent soft tissue between surgically osteomised bone segments, gradually separated by traction force with the help of various distraction devices (DD). The forces exerted by the distractor not only forms callus and its mineralisation but also stimulates the surrounding soft tissue which is termed distraction histogenesis. Application of DO in craniofacial surgery created a new era for facial malformed bone reconstruction and rectification over traditional orthognathic surgery. Mandibular deficiency and disorder may be congenital or acquired[1]. The mandible is reported to be the most susceptible bone for growth anomalies than any other osseous structure in the human skeleton. DO being the versatile and promising technique is gaining momentum for surgeon's choice to rectify the mandibular deficiency and reconstruction[2]. The present review is aimed to give an overview of the principle, devises and mechanism, distraction histogenesis of DO in general and mandibular distraction osteogenesis (MDO) in particular through review of pertaining literatures.

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Principle and mechanism of DO: The mechanical devises as the distractors and biological principles of DO together enhance the healing process and success in the mandibular reconstruction. DO is a process of new bone formation through a reconstructive surgical sequence. Osteogenesis is initiated at the osteotomy site when haematoma is formed surrounding the osteomised bone segments and promote the formation soft callus. The callus is stretched by some DD in the principle of "tension–stress"[3]. Thus, a new dynamic microenvironment leads the cellular proses of osteogenesis. The sequential process of DO can be described under two major sub headings viz. presurgical phase and operative phase

i. **Presurgical or preparatory phase:** This is a planning phase where the radiodiagnosis helps the planer to assess the magnitudes of mandibular deficiency or disorder for distraction, selection of DD, vectors (direction and amplitude) and adequate mandibular bone stock for placement of the distractor[4]. Sometimes presurgicalorthodontic preparation also helps to guide the distraction for occlusal correction. In this phase the approach for exposure (intraoral or extra oral) and length of invasion are also decided.

ii. **Operative phase:** The targeted mandible is accessed

with minimal invasion and adequate bone stock is exposed for fixation of the DD. The alignment of device and screw holes is made on the mandibular site. The distractor is then temporarily fixed in the appropriate position. Osteotomy line is drawn on the bone and the distractor are removed. The distraction protocol further carried out in four more phases viz. a) Osteotomy, b) Latency, c) Distraction, and d) Consolidation.

a. Osteotomy: This is the phase where osteotomised bone segments are formed by a suitable osteotome. The osteotomy may be complete or limited to the corticotomy. Complete mobilisation of bone segment is not always mandatory because distraction process progressively prompt the osteotomy. After osteotomy, repositioning of the DD is done on the bone fragments. Before the closure of soft tissue, a trail operation is essential to ensure the correctness of the distractor movement. Generally, at the end of osteotomy a gap of 1.0 mm is created.

b. Latency: During this period a lot of histogenesis activities are triggered for initiation of the fracture healing process. Initially a haematoma is formed which in turn is converted to a clot leading to formation of inflammatory cells and fibroblasts. This become more fibrous due to formation of adequate collagen, in addition the mesenchymal stem cells from bone medulla and periosteum are also differentiated.[5]Thus, the fracture site slowly turns to the soft callus. Generally, a latency period of 5-7 days is recommended with exception for some case specific distraction.

c. Distraction: Once the traction force is applied it continued with a recommended magnitude and frequency or rhythm for the entire period of distraction. The tension–tress exerted by the DD in rhythm stretches the soft callus along the distraction axis. On the progress of distraction, a central fibrous interzone is formed in the callus which becomes rich in chondrocyte-like cell, fibroblast and many other histogenic elements. The newly recruited osteoblast at this site contributes osteoid along collagen bundles and subsequently mineral crystallisation occurs. The recommended duration of this phase is about 1-2 weeks and the recommended rate of distraction may be 1 mm/day with single or multiple rhythm of splited increment. Due to distraction force the instant fracture healing process is delayed and bone lengthen process is augmented.

d. Consolidation: At the end of the distraction period when desirable bone lengthening is achieved, distractor is ceased keeping the distraction device in position with a rigid fixation device. This rigid fixation device keeps the distractor undisturbed throughout the consolidation period. During this period mineralisation and corticolization of compensatory bony structure completes its process. The recommended period for this phase generally varies from 8-12 weeks. Finally, the distraction devices are removed with supported retainer if required. However, for all these successes, a suitable DD plays the pivotal role.

Discussion

There has been a hand full of review articles on the age as a factor for successful mandibular reconstruction by distraction osteogenesis. A common consensus has been drawn that MDO is not wise to be performed in the age group under two years unless the aetiology is life threatening. It is suggested to undertake MDO after the patient is achieved the skeletal maturity. Some neonates and infants as their congenital disorders develop glossoptosis leading to upper airways obstruction. Nasopharyngeal intubation or tracheostomy is the immediate temporary arrangement to restore the respiration. In the recent past MDO has been proved to be an important tool for treatments of such neonates and infants. Among the pioneers, Sidman et al. [6] reported success in MDS and treated 11 children for airways obstruction. Scott *et al.*[7]described MDO in 19 patients under the age of 12 weeks (ranged from 5–85 days) as the most secured surgical intervention for elevating the upper airways obstruction to overcome morbidity and mortality. In this study all these patients were micrognathic and upper air ways obstruction was due to glossoptosis. They claimed that the airways obstructing tongue base could be brought forward by mandibular advancement and supraglottic airways made free.

Thus, it prevents the tracheostomy and, in some cases, prompted for decannulation. Similar observation was made by Hong and Benzulhy[8] in a recent review. Ow and Cheung[9]reported that bilateral MDO could prevent tracheostomy successfully in 90% out of 646 cases. Although MDO technique in infants is a lifesaving option of treatment, there is every possibility of tooth bud injury during osteotomy and distractor placement. Besides, there are possibilities of teeth migration in course of distraction process. Sever loss of tooth follicle and nonappearance of molar tooth were also reported in 13 children of MDO treatment out of 17 cases [10]. However, in a case study of ten children at primary dentition age, Hong *et al.*[11]recorded no remarkable complication for primary molar tooth development. They claimed this success was due to their planning for inverted 'L' shape osteotomy based on preoperative radio-imaging study to save tooth buds.

TMJ Ankylosis may be congenital or acquired by trauma and infectious and inflammatory diseases. Intervention such as gap arthroplasty, interposition arthroplasty, and correction of malocclusion are some of the traditional treatment procedures [12,13]. Sometimes facial symmetry is deviated more due to loss of ramus condylar height [14,15] Application of MDO has currently adopted to achieve better perfection of mandibular reconstruction and reduction of TMJ ankylosis[16,17]. Sharma et al.[18] obtained 30 mm mean incisal opening in five cases of gap arthroplasty with ipsilateral and contralateral coronoidectomy. After a constant follow up for one year those patients underwent DO with vertical 'L' shape cut to create a transport disc directed towards glenoid fossa by suitable intraoral distractor. Thus, they claimed the neocondyle distraction is a successful intervention for mandibular reconstruction. A step ahead, gap arthroplasty and intraoral distraction could be done simultaneously. Sharma et al. and Debal et al. and Rao et al. respectively [15,19,20] could show the gap arthroplasty and intraoral distraction osteotomy as a single step treatment for TMJ ankylosis and mandibular correction. Recently Khan *et al.*[21] described one-stage DO and interpositional gap arthroplasty in 5 patients and could increase the length of both corpus and ramus with angular osteotomy and oblique placement of distractor.

As the recent advances MDO not only overcome the donor site morbidity but also reduces the prolong anaesthetic use and graft related complicacy. However, MDO has its own limitation and complicacy which has been reviewed to educate and to enhance the skill of surgeons [22,23,24]. Balaji[21] described the limitations under three categories viz. intra-operative, intra-distraction and post-distraction complicacies. Improper and unstable device fixation, problem faced during distractor activation, inadequate device dimension, unforeseen decision on force and vector etc. are some of the mistakes came across by surgeons. Nørholt et al.[22] reported some instances of incomplete osteotomy where persistent pain was experienced during activation of the DD. They found the risk of neural injury more in the patients who underwent bilateral sagittal split osteotomy and distraction. In a different study 57 % of complication was reported on apraxia of inferior alveolar nerve (IAN) due to surgical injury of IAN of different grades by Wijbenga*et al.*[24].The risk of injury to the tooth buds by improper osteotomy and screw pin placement in children and infants have also been discussed at length by few reviewers[22].

The Ilizarov philosophy of 'Tension stress' not only effect the osteosynthesis of mandibular but also trigger the distraction histogenesis of gingiva. Ever since the first application of Ilizarov the principle in mandibular reconstruction a few fundamental researches have been revealed the scientific basis present behind the principle [25,26]. Further the focus of MDO is concentrated on the biological stimulation of osteogenic and soft tissue regeneration which could reduce the treatment period to minimize the morbidity and to improve the comfort of the patients. Various modern technique of treatment such as application of low intensity pulsed ultra sound (LIPUS), electrical simulation, hyperbaric oxygen therapy (HBOT), incorporation of several growth factors and stem cells, intermittent administration of parathyroid hormone etc. have been reported for prompt tissue regeneration and easy recovery [25]. Bashardoust*et al.* while reviewing some of the human clinical trials of LIPUS application found the statistically significant early cortical bridging in fresh fracture[27]. Some of the current reviews on the subject contradict the above finding and reported that there is no statistically significant impact of LIPUS application on distraction osteogenesis[28, 29]. In a clinical study the effect of DC electrical stimulation on MDS was evaluated and found to be a factor for new bone formation and promote the healing process of the soft tissue as well[30]. Hyperbaric oxygen therapy (HBOT) is a principle of treatment based on enhanced oxygen concentration to improve the diffusion ingredient and promote the oxygen supply even to the dipper tissue. Re *et al*[31] in a recent study are hopeful for application of HBOT in mandibular reconstruction surgery.

Conclusion

MDO has several advantages over traditional craniofacial surgery. As it is the novel science and practice of last two decades, it needs further streamlined protocols, skill development and incorporation new technology of wound healing process for easy recovery and patient comfort.There is immense scope for further development of osteodistraction of the craniofacial skeleton. The areas where further study is needed may include: Modification of the osteotomy; Design of the distraction device; Enhancement of regenerate maturation with pharmacological agents such as growth factor and cytokines; Development of new techniques to monitor distraction regenerative formation and remodelling.

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Current Status and Call for Action: Regenerative Endodontics

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Abstract

From past few years, Endodontic therapy shows high rate of success to prevent diseased tooth. It help to decrease the pain and swelling, and after completion of endodontic therapy. In children are more prone to caries due to high carbohydrate diet and bed food habits. So in early case we have plan for regenerative endodontic procedures which help in replace the damaged tissue including dentin and root structures. Sir Dr. B.W. Hermann was first ever clinician to carry regenerative endodontic procedure in a patients. In his case report, he used calcium hydroxide paste in vital pulp amputation which shows great results after 21 days. In this review article we focus on current aspect of Regenerative endodontic procedures.

Keywords: *Endodontic therapy, Regenerative endodontic procedures, Cell based and gene based therapies.*

Introduction

The main goal of the regenerative endodontic procedures to establish the normal function of damaged cells or tissue. There are two treatment approaches cell based and gene based therapies which help to restore the lost structure. In the era 2000 the main focus of all the clinicians and researchers are to restore the lost tissue or part of the tooth by various method, these method are applies the concept of tissue engineering to repair the lost part of dental tissues. These method includes scaffold of implant, gene therapy, the process of revscularization and many more new advancement.[1]

The aim of this article is to review the prospects of endodontic regeneration.Future clinical research would likely focus on translating basic research findings into improved regenerative procedures, such as formation of cementum-like material on the dentinal walls that might lead to studies evaluating benefits of revascularization procedures for overall tooth resistance to fracture. Controlled differentiation into odontoblasts is an important area of research and amenable to tissue engineering concepts. The development of the delivery systems might permit structural reinforcement of the cervical area that might provide clinical opportunities to regenerate lost tooth structure, thereby permitting natural teeth to be retained. Clinical significance: Expanding the scope of regenerative medicine, researchers have also developed and applied regenerative procedures in oral soft and hard tissues.[2]

Regenerative Endodontic Therapy: Objectives arerevascularization, tissue regeneration and continued root development. Protocol given by American Academy of Endodontists for RETonly minimum instrumentation was done on dentinal wall needed to remove the smear layer.[2]

First visit: After local anesthesia given to the patient, rubber dam placement was done with respected tooth. Round bur was used to make access opening during the biomechanical preparation 1.5% sodium hypochlorite (NaOCl) then irrigated for 5 minutes with 20 ml of ethylenediaminetetraacetic acid (EDTA) or saline, safe irrigation was done to prevent periapical extrusion of the chemical, which may lead to severe pain and swelling in site after proper irrigation final irrigation was done with saline liquid, then drying of the canal with paper point. CH or double/triple antibiotic paste was placed into the canals sealed with the temporary restoration.

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Second visit: Patient recalled after 21 to 30 days, if there is no pain and infection in peri-apical, local anesthetic without vasoconstrictor is administered and the canals gently irrigated with 20 ml of 17% EDTA before being dried. The periapical tissue is briefly over-instrumented 2 mm beyond the open apex to cause bleeding and to produce a blood clot extending in the canals up to the CEJ. A resorbable matrix may be placed over the clot before placing MTA/tricalcium silicate cement/bioceramic over it, and then a restorative material. (Figure 1) Reassessment is recommended every 6 months for 2 years to evaluate bony healing, ideally with no symptoms, and continued root development.

Biologic Mechanism to Explain RET[3-5]:

1. Overinstumention in periapical area cause blood clot formation in that area.
2. RET act as scaffold and matrix containing undifferentiated cells
3. Stem cells + HERS= responsible for root development
4. Low concentration of Naocl was used to decrease the cytotoxic effects and EDTA increase viability of stem cells
5. HERS cells are able to promote differentiation of pulp stem cells and thereby dentin repair

Clinical Outcomes[5-7]: In the review process we found the significant results were found that in a apexification process using CH or an MTA barrier technique. In found the RET have 98.9% success rate as compare to apexification of 88.6%, respectively. No significant differences were found in bone density, and continued root development following RET varied.

Adverse events associated with RET[8]: In various clinical trials we found that after successful treatment of 3-4 months in post operative radiograph root resorption, apical periodontitis and tooth discoloration seen in almost patients.

Discussion

Revascularization has change the treatment aspect to save the disease tooth;the rationale behind this procedure is that it has now been shown that tissue in the periapical region of a nonvital tooth has the potential to regenerate and that the host's own pulpal cells can be utilized to achieve apex closure.[9]

Calcium hydroxide was the first choice in fractured traumatic tooth during apexification. It's help in thickening of the root walls and help increased root length. In other words, it allows normal root maturation to take place as opposed to just the formation of a calcific barrier induced by apexification with calcium hydroxide.[10]

Conclusions

New approaches to regenerative endodontics continue to be evaluated. Future research into specific signaling molecules that could promote pulpal regeneration has been recommended, as well as the development of improved scaffolds. The clinicians are doing research to preserve non vital teeth which can be a boon in the field of regenerative endodontics.

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Ceramic Veneers: Technique Overview with a Case Report

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Abstract

Ceramic veneers are layer of tooth colored material used to restore esthetic. The main objective of this article is to provide an overview on the techniques to be followed at all steps of restoration with a ceramic veneer. Careful treatment plan and appropriate selection of case provides a good treatment option with the use of veneers. This report describes the case of a young female patient with generalized diastema in the anterior teeth region. Ceramicveneers were fabricated for six maxillary anterior teeth for the patient to improve the esthetics.

Keywords: *Ceramic veneers, dental ceramics, esthetics.*

Introduction

A veneer is a layer of tooth-colored material that is applied to a tooth to restore localized or generalized defect and intrinsic discolorations. Veneers are made directly by applying composite, or could be fabricated indirectly by composite, porcelain or ceramic. The veneer is a conservative option to full crown for improving the esthetic of an anterior tooth. To improve the tooth size, shape and colour, veneers are the least invasive aesthetic treatment options. Ceramic veneers in absolute indications and comprehensive planning provide excellent result. They show biocompatibility with the periodontal tissues and can be handled in low thicknesses.(1)

Indications:

1. Discoloration of tooth due to tetracycline,fluorosis, advance in age,non-vital teeth
2. Diastema present between the central incisors.
3. Enamel hypoplasia, small cracks in the enamel gradually due to age.
4. Peg laterals and rotated teeth
5. Multiple Diastemas
6. Mesial Angle Fractures

Contraindication:

1. Full coverage crown prosthesis should be given when little or no enamel is present
2. In Patients with parafunctional habits such as bruxism, forceful clenching, pencil chewing, nail biting
3. Severe crowding of teeth.
4. Class III & edge to edge bite occlusion.

The esthetic smile design should be conducted with a proper treatment planning. The amount of enamel reduction to be done and the remaining dental structure plays significant role in determining effects of load on to the tooth structure that could lead to failure of ceramic veneers.(2) The treatment planning helps to assist the cosmetic intervention and develop esthetic smile. Therefore, a proper set of guidelines should be followed by the clinician to achieve desired goal. The efficacy of ceramic veneer is improved through the appropriate cementation procedure and understanding the nature of the ceramic used. (3)This paper aims to describe the

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protocols and steps that should be followed to achieve minimum thickness ceramic laminate veneers and create esthetically beautiful smile.

Techniques: The tooth preparation greatly influences the durability and shade of the veneer, since the amount of reduction will decide the intaglio surface contour and ceramic thickness. This stage is determined by evaluating the condition of the teeth and the ceramic material chosen for the restoration (feldspathic or glass ceramic).[4]

Earlier concepts proposed minimal or no tooth preparation for the ceramic veneers in order to protect the underlying tooth, but the current concept advocates removing varying amount of tooth structure so that sufficient bulk of ceramic can be provided for the restoration and also this shall prevent fracture of the veneers and simultaneously it should allow for the proper marginal adaptation.[5] Care should be taken to confine the preparation completely in the enamel to achieve anoptimum bond with the ceramic veneer. Newest generation dentin bonding systems show optimal bonding with dentinestill the bond strength of porcelain to enamel is found better than the bond strength of porcelain to dentin.[6,7]

The difference in preparation is only at the incisal part of the tooth. The margin preparation of the veneer is equigingivalor slightly subgingival for the anterior teeth with a chamfer finish line. To maintain adequate depth while conserving intact enamellayer is difficult, therefore the reduction depth should be approximately 0.3 mm. At themiddle third, the depth should be approximately 0.5–0.8 mm. At the incisal third, the preparation differs which can be categorised in to three types. (Figure. 1)

First type is the "window" preparation, the most conservative and maintains enamel in incisal third, but the disadvantage with this design is discernible line between enamel and ceramic veneer layer, furthermore the remaining tooth structure becomes more prone to fracture upon load.

Second type is **"feather"** preparation, which covers the incisal of the tooth and ends lingually. The difficulty in this preparation is the technique sensitivity while positioning the ceramic restoration during cementation of the veneer and in matching the optical properties of the remaining incisal tooth surface to that of the veneer. In order to obtain optimalcolour properties and translucency at the incisal third of the ceramic veneers, the preparation should provide a thickness of 1.5–2.0 mmceramic, and this can be obtained with the **"overlap"** type of preparation. And at the proximalregion, the preparationshould follow the papilla and extenduntil interproximal contact. [8,9]

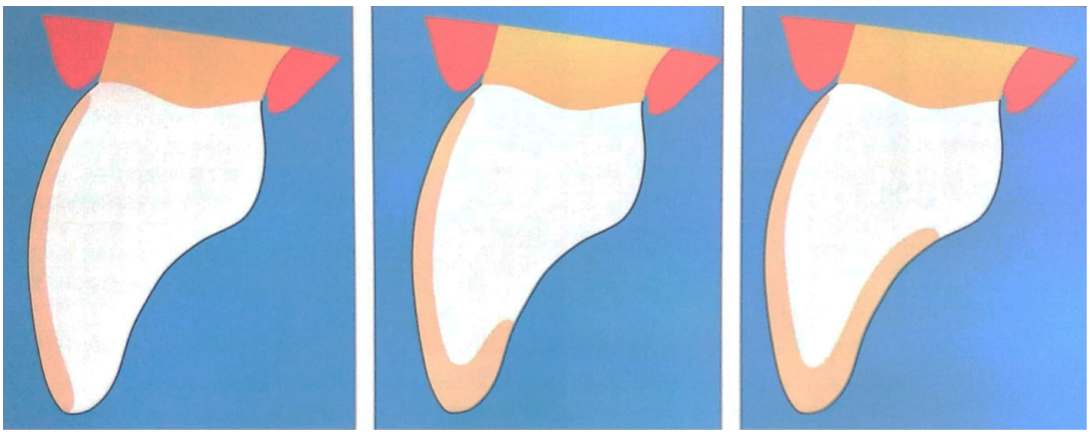


Figure 1. Different preparation design for Veneers(a)window (b) feather (c)overlap

Impression Procedure: A custom tray with perforations should be fabricated to make the impression of the prepared tooth. Before the impression procedure, gingival retraction is necessary in order to obtain accurate margin details in the impression. Preparation sites are cleaned using a disinfectant surface tension reducer. Tray adhesive should be applied on the tray, andthen high viscosity of either polyether or polyvinyl siloxane impression material has to be loadedon to the custom tray,and light body impression material is applied on the tooth. Hydrophilic polyvinyl siloxane is material of choice for excellent accuracy, detail reproductionand

dimensional stability. Putty consistency should not be used as it displaces light body material. The loaded tray is then placed on the acrylic block, and a single-step impression (dual-viscosity impression technique) is made as it provides easy access to all margins. Wash impression technique is not recommended for the ceramic veneer preparation. All the impressions were then poured in type-IV die stone material.

Clinical Procedure for Bonding Laminate Veneers: The longevity of the ceramic veneer is mainly dependant on the strength and toughness of the bond formed between the three different layers of the bonded veneer complex: the tooth surface, the porcelain veneer, and the adhesive cement. Bonding to teeth depend on the adequate preparation and conditioning of the involved surfaces, the ceramics and dental tissues.

Tooth/enamel surface treatment: The conditioning of the enamel surface should be done with 37% phosphoric acid. This step leads to an increase in the surface area of the prepared tooth, which results in perfect wetting of the tooth surface to bond with the tooth structure. At this stage, use of rubber dam isolation can reduce contamination with moisture and saliva.

Ceramic surface treatment: Alteration of the surface structure through etching will lead to the change in the surface area of the porcelain veneer and enhance its wetting properties. This is done in order to create undercuts that increases the bond strength of the resin luting cement. The ceramic veneers are conditioned with hydrofluoric acid and silane coupling agent. Acid conditioning with 2-10 % hydrofluoric acid helps to remove the superficial micro cracks and round off surface flaws thus decreasing stress concentrations. It is done for glass ceramics or silica-based ceramics only. Silanization of ceramic with a bifunctional coupling agent offers a chemical link between the resin based luting agent and ceramic. It is done for the alumina or zirconia ceramics.

Luting cement: Intrinsic brittle nature of ceramics compels to use adhesive cementation to increase fracture resistance by going deep into flaws and irregularities on internal surfaces, diminishing crack propagation, and resulting in a more effective stress transfer from the restorative part to supporting tooth structure.

Cementation of ceramic veneers warrants the use of a light-curing luting composite. Light-curing luting permits a longer working time as compared to dual cure or chemically cured luting agents. Removal of excess composite becomes easier for the dentist prior to curing and significantly shortens the time required for finishing these restorations. Color stability of light cured material is better than dual-cured or chemically cured systems.

First a primer is painted on the tooth and the ceramic veneer, followed by resin bond; lastly the luting resin is applied on the ceramic veneer. The veneer is placed onto tooth by a specific instrument (Accu-placer) or with a plastic handle with mounted wax ball to hold the veneer. Curing is done on all surfaces of the tooth for complete polymerization of the luting composite.

Case Report: A 19-year-old female patient reported to Department of Prosthodontics with the chief complaint of generalized spacing in her maxillary anterior teeth region. Radiographic and clinical examination were done. The patient was initially counselled for the orthodontic treatment for the correction of diastema but she refused to undergo the orthodontic therapy due to the longer time frame for the treatment and she wanted immediate results. So, correction of multiple diastema with ceramic veneers was opted as the treatment plan. Clinically, the amount of spacing and discrepancies present between the incisors and canines was observed. (Figure 2) The gingival zeniths were at different levels in all the anterior teeth. Gingivectomy was performed to correct the zeniths. (Figure 3 A and B) Diagnostic casts were obtained and wax mock-up was done to define shape and form of the teeth that will assist in the treatment planning as well as for the fabrication of the ceramic veneers. (Figure. 4a) Putty index was prepared from wax mock up. Forth is case, ceramic veneers of minimum thickness were indicated for the six maxillary anterior teeth.



Figure 2. Pre-Operative

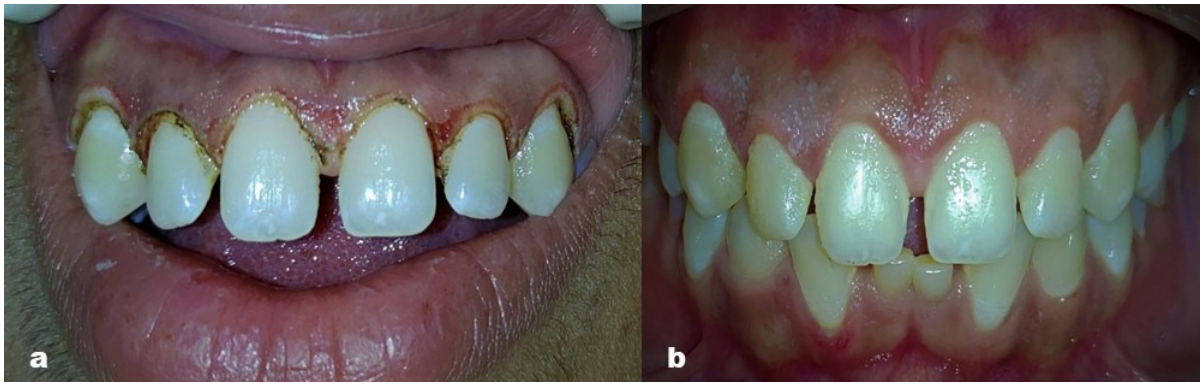


Figure. 3A After Gingival Surgery to correct the Zenith; 3B. After healing post gingival surgery

Tooth preparation comprised of feather reduction i.e. covering the incisal edges of the incisors and canine and extending the preparation palatally with a diamond bur.(Figure 4b) Followed by 0.3 mm tooth reduction at the cervical portion and 0.5mm reduction at the middle third of the teeth. A chamfer finish line was placed at the level of gingival crest. Proximally the preparation followed the papilla and extended till the interproximal contact area.

Provisionalisation was done with the help of putty index. Shade selection was done and impression was made using retraction cords. The impression was made using a poly vinyl siloxane rubber base material (Affinis, Coltene, India). The heavy-bodyconsistency was loaded onto the tray andlight-bodyconsistency was applied on the maxillary anterior teeth. The impression along with wax mock-up was send to the lab for the fabrication of the ceramic veneers. Ceramicveeners were fabricated with a lithium disilicate reinforced glass ceramic material (IPS emax Press, Ivoclar–Vivadent, Liechtenstein), using heat press technique. A layer of ceramic was added at the incisal edges of the veneers to improve the translucency thereby providing a natural appearance to the restorations and enhancing the esthetics.

On subsequent appointment after 1 week,etching of internal surfaces of veneers was done with hydrofluoric acid for 20 seconds. (Figure.4c) Bondingagent was applied and light-cured. The tooth was conditioned with 37% phosphoric acid (Figure 4d) The veneers were cemented with a light-cured resin cement. The polymerization was completed using LED-curing unit for 30 s from all aspects of each tooth. Presence of any occlusal interferences was evaluated and removed. Final finishing and polishing at the marginal area of the restoration was done. The patient was highly satisfied with the treatment and the esthetics of the anterior tooth. (Figure.5) The patient was followed up at an interval of 7 days, 1 month and 6 months and 1 year.

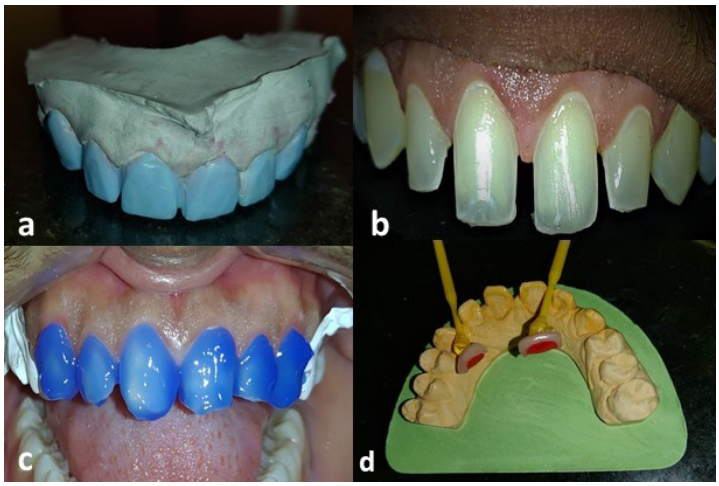


Figure. 4a Wax up on diagnostic cast; 4b, Tooth Preparation; Figure 4c. Acid etching, 4d. Etching of Ceramic veneers with Hydrofluoric Acid



Figure. 5 After cementation of Ceramic Veneers

Conclusion

The success criteria for ceramic veneers are absolute indication for the patient and the proper use of the restorative materials and suitable techniques available for it. This report described the case of esthetic restoration in a young female patient. The patient was satisfied with the esthetic outcome.

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Diagnostic AIDS for Detection of Oral Precancerous Condition

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Abstract

In this Modern–world, the world of Medicine and its technologies is growingrapidlyin a Phenomenal Manner.Today it is very easy toexamine the oral cavityof a personto know the hazardous factorsfor the oral–cancer. There is a hugeopportunity to enhance patient'soutcomesthroughproper examination plus proper evaluation along with accurate treatmentto reduce thepremalignant lesions before the development of Invasive oral-carcinoma. The advancement in the field of medical sciences are extremely important to improve the Penurious & life-threatening outcomesassociated with oral cancer due to our lack of ability to diagnose andtreat this disease at an early, preventablestage.

Keywords: *Precancerous condition, neoplasia, biopsy, OSCC.*

Introduction

Cancer has a major Impact on Society across the world. According to the statistics in 2018 an estimated 1,735, 350 new cases of cancer is been diagnosed in the United Statesand 609,640 people die from this disease. The world which is challenged by this Impactful disease, the incidence of oral cancer is growing tremendously. Incidence rates for oral–cancer vary in men from 1 to 10 cases per 100000 population in many countries.[1]In South Central Asia, cancer of the oral cavity stands amongthe three most common types of cancer. In India, the age standardized incidence rate of oral canceris 12.6 per100 000 population. Oral cancerrates are significantly higher for males than for females. The incidence of oral–cancer has increased from past few decades and is usually diagnosed when the condition is worst and at anend stage.[2] The over-all 5-year prognosis for oral cancer have remained very less at around 50% for the past fewdecades and have remained among one of the top causes of death rates, considerably lower than that for colorectal, cervix and breast origin. This is due to lack of knowledge & skill to diagnose the disease by health professionals at an early stage. The aim of this article is to outline the different diagnostic technique which is provided and marketed to the health–professional for early diagnosis of potential cancerous lesion.

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Clinical Sign and Symptoms of oral cancer: Oral cancer refers to cancer that occur in any part of the mouth which includes gums, tongue, lips, soft palate, inner lining of the cheeks, hard palate, and floor of the mouth. Mouth cancer is one of the several types of cancers group in a category called head and neck cancers. The signs and symptoms may comprise a mouth uncomfortable that doesn't cure,a white or reddish patch inside the mouth¸ loose teeth, anextra growth or long inside the mouth, mouth pain, ear pain and difficult or throbbingswallowing.[3]

Risk factors contributing to oral neoplasia: The factors that can enhance themenace of oral tumor:

- Tobacco use of any kindscontaining Cigarettes, pipes, khaini, snuff, cigars, etc.
- Heavy liquor use.
- Extremesun exposure to our lips.
- A sexually spreadvirus called human papillomavirus (HPV).
- A weekend immune system.

Screening: Recognition and diagnosis of oral neoplasia has conventionally relied comprehensively on the clinical skill of the examiner and his or her ability to identifyoften subtle morphological changes. However, some early malignant lesions are clinicallyvague from benign lesions, and some patients develop carcinoma in the absence of clinically identifiable OPLS. Moreover, it can be difficult even for health providerto determine which OPLS are at greaterrisk to develop into invasive carcinoma. Therefore, an exact, independent and non-invasive procedure that aid to identify pre-malignant lesions and to differentiate those at a risk of malignant conversion is needed.[4]

Diagnostic Aids: Oral–cancer is the sixth most common cancer in the world and in India oral cancer ranks in the top 3 of all cancers. Amongst all oral cancers, more than 90% are squamous cells carcinomas (OSCC) while the remaining 10% of the cases are mainly melanomas, sarcomas, minor salivarygland carcinomas and metastatic cancers. Several technologies are used to detect and diagnosis of oral cancer which includes.[5]

Biopsy and cytology: These are three ways to take a biopsy to detect for oral cancer[6]

- **Exfoliative cytology:** The doctors will scrap some cells from the suspicious lesion and will put them in the slide. This technique can be performed in a doctor's office.
- **Incisional-Biopsy:** The doctor will cut out a small sample of tissue. In the suspicious area is easy to reach then your doctor can numb your mouth and do this in his / her office. If the area is deeper in the mouth or throat, this is done in the operating or laboratory room.
- **Fine-Needle Aspiration:** The physician may noticea lump in your neck. If so, then he or she uses a thin needle to remove a small sample of tissue. This can be performed in a doctor's office. Once the biopsy is completed, the pathologist examines the tissue samples in a lab. A biopsy is the only sure way to tell it the patient have cancer or not and if it persists then what type of cancer it is.

Non-Invasive tools for earlydetection: These are the new and advance technology towards detecting the oral cancer, the following new techniques have recognized the world of cancer which includes:

- **Toluidine Blue:** The test aims in detecting various types of malignant and pre-malignant lesions in early stage. The sensitivity of toluidine blue in detecting pre-malignant or malignant lesions was found to be 97.8% and overall specificity was found to be 100%. It is a basic thiamine metachromaticwith high affinity with acidic tissue components, there by staining tissues rich in DNA and RNA.[7]
- **Fluorescence Imaging Techniques:** Oral cancer is a challenging health problem in through out of the world. Most of the oral cancer patients are diagnosed at a late stage, when treatment is less successful with treatment associated mobility is more severe and complicated. In particular, autofluorescenceimaging has emerged as a promising adjunctive method to improve early detection at oral pre-malignant lesions. Direct visual inspecting of tissue autofluorescence has shown encouraging results in high prevalence, populations but the technique requires subjective interpretation and depends on the visual reorganization skills of the examiner. High resolution fluorescence imaging is a new modality that can be used in conjunction with wild filled imaging to improve specificity by imaging sub cellular detail of neoplastic tissues.[8]
- **Saliva as a Diagnostic tool:** Saliva from patients is been used in a peculiar way to provide molecular biomarkers for oral cancer detection. The wide spectrum of molecules present in saliva provides valuable information for clinical diagnostic applications. Molecular markers for the diagnosis of oral squamous cell carcinoma can be identified in three levels. 1) Changes in cellular DNA, 2) Altered rnRNA transcripts, 3) Altered protein levels. Hence in future the salivary diagnosis test can replace the serum diagnostic procedure.[7]
- **Identify 3000:** Theidentari ®uses the identari multi spectral feuroscenesand reflectance technology to enhance visualization of mucosal abnormalities such as oral cancer or pre-malignant dysplasia that may not be apparent to the naked eye. The identari uses white, violate and amber wave length of light to excite oral tissue in distinct and Unique ways. As a result, biochemical changes can be monitor with feuroscenes, while morphological changes can be monitored with reflectance. The combine system of feuroscenes and reflectance uses the body's natural tissue properties as an adjunctive tool for oral

mucosal examination. Conventional examination of tissue is performed using a highly concentrated white light.[9]

Role of histological slides (Aids a way for Detection): Now a days the oral pathologist in dental and medical colleges and in laboratories preparing the histological slides for detecting the oral precancerous lesion and different types of cyst and tumors. A vital role which is played by oral pathologist for detecting this impactful disease has a high rate of accuracy in detecting any kind (Benign & Malignant) type of cancer.[10]

Procedure:

1. **Tissue Fixation**: The slide preparation starts with fixation of the tissue specimen. There are many types of fixative agents are used in which 10% neutral buffered formalin is used maximally. Formalin containers should be capped properly and it should be leaked proof with proper labelling.
2. **Specimen transmission to cassettes**: After fixation specimens are trimmed using a scalpel to enable them to fit into an appropriately tissue cassette. Specimen should not be big as they can fit into the cassette ideally, they should be less than 4 mm otherwise they risk being waffled when the cassette lead is closed.
3. **Tissue Processing**: It is done using a paraffin block usually. The steps as follows:
    i. Dehydration
    ii. Clearing
    iii. Embedding: Which is the final stage where specimen are infiltrated using embedding agent usually Paraffin wax.
    iv. Sectioning: In this step the wax is removed from the surface of the block to expose the tissue. The blocks are chilled on a refrigerator plate or ice try for minutes before sectioning.
    v. Staining: The histochemical stains typically Hematoxylin & Eosin are further used to provide contrast to tissue sections making tissue structures more visible and easier to evaluate.

Conclusion and Ensuing Directions: The modern tools and its techniques which has brought a lot of change in this medical scenario of the world, the dentist and technicians should have proper skill, knowledge and education in detecting oral cancer at its pre-cancerous phase which is the key to prevent its progression to the later stages. A depth of knowledge and its proper utilization can bring a drastic change in treating this dangerous outcome. The survival rate from oral cancer better than 90% at 5 years, whereas late-stage dieses survival rate is only 30% and this method of diagnostic-aids can change a scenario of the survival–rate, if it is used in its up to the mark. In a developingcountry like India, where large account of population is not well educated and are not aware of any health complication, cancerspecially plays an important role for death among population. Among cancers, oral cancer is very common in society and the commonest to be neglected. The dentist or physician should create a proper awareness among the public regarding the oral health and its consequence and the govt. should be taking part in it to encourage this mission. Government must take strict action against that factory. That manufactures products that are responsible for cancer.Product labelling must showsaturator warning so that people can understand it and avoid using such life-threatening disease-causingproducts. In primary health care level, there must some awareness program camps to be organized so that people will be aware about these hazardous product & avoid using such products. With the help of mass education lot of people can be benefitted and at the same time educated about these things. With the combine effect of govt. Plus people and us (the medical specialists) lets beat cancer.

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Radiographic Differential Diagnosis of Ossifying Fibromas of the Jaws. A Case Series

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Abstract

Ossifying fibromas are bony tumors, which derived from the cells of the periodontal ligament. They behave like, a benign bone neoplasm. In a recent WHO classification (2005), "the term 'cemento-ossifying fibroma' was replaced with 'ossifying fibroma'." These lesions usually grow slowly and are painless. These lesions are more common in girls and women rather than men and these lesions are seen during third and fourth decade of life. This bone tumour entails highly cellular, fibrous tissue which comprises of aggregates of calcified tissue similar tocementum,bones or both of them. We have reported a few cases of ossifying fibroma of maxilla and mandible and their clinic-radiological presentation.

Keywords: *Ossifying fibroma; Clinicoradiological presentation; Radiographic differential diagnosis.*

Introduction

Ossifying fibroma (OF) is usually well thought-out to be a type of fibro-osseous lesion (FOL) and which usually affects both maxilla and mandible, and usually more frequent in the mandible. The bone tumour contains, "highly cellular,fibrous tissue that comprises of variable amounts of calcified tissue similar tocementum, bone or both".[1]In a recent WHO classification (2005), the term, " 'cemento-ossifying fibroma' was replaced with 'ossifying fibroma'. "These lesions are more common in girls and women rather than men and these lesions are seen during 3rd and 4th era of life.[2] COF very closely look like lesions such as "fibrous dysplasia, cementifyingperiapical dysplasia or cemento-osseous florid dysplasia."Central ossifying fibroma is believed to instigate from the periodontal membrane.[2] This neoplasm occurs in patients of a varied range of age, but the most of cases are seen during the 3rd and 4th decades of the life. Occurrence is usually high among females with a ratio of 5:1. The most common site where COF occurs is mandibular premolar area.[4-6] When viewed radiographically, COF displaysaamount of patterns depending on the degree of mineralization of the lesion.

Case Study: In our case study, the radiographic features of COF have 2 types: mixed density lesions and cyst like appearance. The radiographic appearance is concentric, with equal expansion in all sides. The outer cortex is displaced and perforated in giant tumours thinned, restsin one piece, particularly in those giant tumours. The lesion has mixed density in nature and the core structure may be a concoction of radiolucent and radiopaque tissues. As the tumour expands displacement of the inferior alveolar canal or the teeth can take place. "Lamina dura"generallyabsent in those involved teeth and root resorption may occur in these affected teeth. Some lesions show increase in expansion. Some juvenile ossifying fibroma can involve the complete jaw .Cancellate dense lines with medium-density mass are often seen in these pattern of lesions. However,"Ossifying Fibroma"might present as irregular in shape, mainly when the tumour recurs or grows quickly in a small period of time. In such cases, "the tumors always nurture along jaws, sometimes involving the complete jaw." These phenomenons put forward

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that "Ossifying Fibroma"canexpressdestructive local growth.[1]

"Hansen and Buchner"observed that the mineralized tissues in peripheral ossifying fibroma can be of 3 basic types.

- The structure of bone can be trabecular lamellar, or woven,at times enclosed by osteoid tissue.
- It can be "Cementum"-like material that are seen as spherical bodies or oval eosinophilic bodies which coalesce to form islands.
- Areas of Dystrophic calcification.[5]

The periodontal membraneis believed to be the origin of Central Ossifying Fibroma, which are alayer of "fibrous connective tissue"neighbouring all tooth roots. The periodontal membrane'sconnective tissue harbours the potential for elaboration of both cementum andbone. Thompsonand Bernier speculated that infection that resulted in the fibrosis andinflammation of the peri-apical area might arouse the periodontal membrane. Subsequentlyafter a traumatic event such as exodontia and road traffic accident, the enduring periodontal tissue may aid as the origin of Central Ossifying Fibromawhich are attached to the wall of the "alveolus".[6]

Another type of benign lesion is JOF, which is analogous to Ossifying Fibroma but is early on onset and is more aggressive. The case proposes that Ossifying Fibroma, usually in children (below fifteen years of age), can show rapid growth and erosion or incursionto adjacent tissue. In this type of distinct case, it is unfortunate that the tumour became too big for surgical excision. As quickly as possible it is necessaryto resect the tumour. Treatment of choice for Ossifying Fibroma usually involves radical surgery because it has a propensityto reoccur and has a risk of malignant transformation.[1]

Recurrence of Ossifying Fibroma was experienced in all those patients whounderwent complete or particular resection. It can reoccur and it isall the time unpredictable, extending from 6 months to 7 years after the surgery in the reports done by us. So, the follow-up period should be long enough of at least 10 years. Presence of 3 different radiological appearances: Unicystic;Multicystic.

Radiopaque mass; were noted during these follow-ups. The differential diagnosis of Central Ossifying Fibromaconsists of other lesionsthat comprise of radiopacities within a distinct radiolucentmass. These lesions are: "Fibrous Dysplasia, Chondrosarcoma, Squamous Cell Carcinoma, Odontogenic cysts, Osteosarcoma; Gorlin's cyst, Pindborgtumour". The distinctborders of Central Ossifying Fibroma help it to differentiate from aggressive carcinomas and sarcomashas atypical ground glass appearance is seen in Fibrous dysplasia. Grolin cysts and Pindborgtumours are very tough to discriminate and can only be found onhistologic examination.

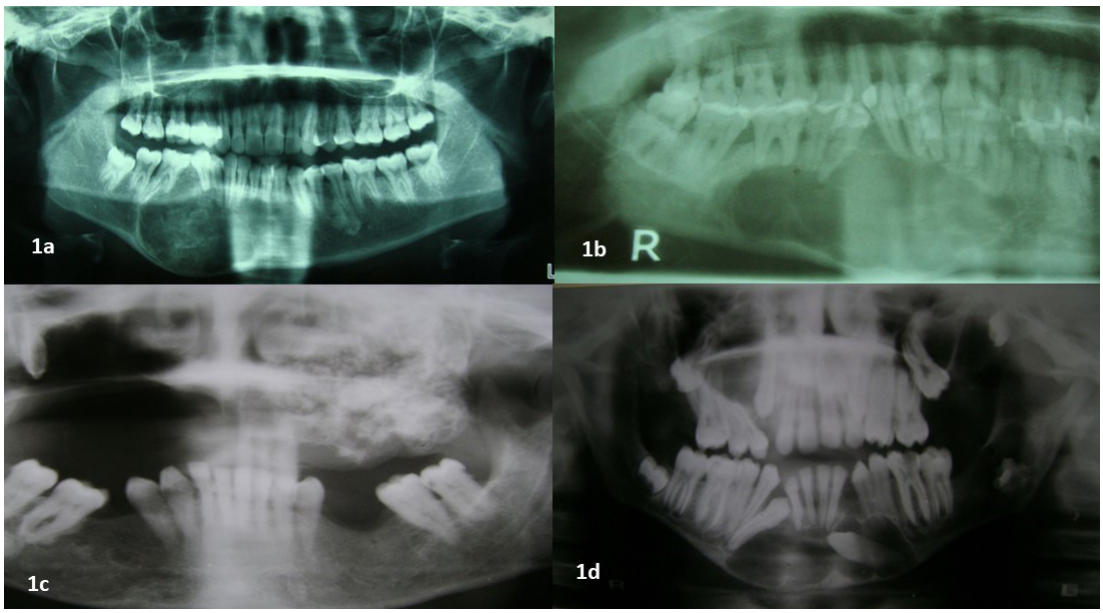


Figure 1. Radiographic Images



Figure 2. Radiographic Images

Table 1: Description of radiographic images

Figure No.	Location	Appearance	Border	Internal Structure	Cortical Expansion	Impacted Tooth	Root resorption	Tooth Displacement	Inferior Border of Mandible
1a	Anterior and right body of mandible	Mixed radiolucency and radiopacity	Well-corticated opacity	Diffuse opacity in radiolucency	present	absent	present	present	Expanded but intact
1b	Anterior and right body of mandible	Mixed radiolucency and radiopacity	Well-corticated opacity	Diffuse opacity in radiolucency	present	absent	absent	present	Expanded but intact
1c	Left posterior maxillary region	Mixed radiolucency and radiopacity	Ill-defined border	Dense radiopacity	present	absent	Absent due to edentulous area	Absent due to edentulous area	present
1d	Anterior mandible	radiolucency	Well-corticated opacity	Radiolucency present	Absent	present	absent	present	Intact
2a	Left posterior body of mandible	Mixed radiolucency and radiopacity	Well-corticated opacity	Diffuse radiopacity in radiolucency	Not appreciable	present	absent	absent	Expanded but intact
2b	Left posterior body of mandible	Mixed radiolucency and radiopacity	Well-corticated radiopaque border	Diffuse opacity in radiolucency	present	absent	absent	absent	Expanded but intact
2c	Right posterior body of mandible	Mixed radiolucency and radiopacity	Diffuse border	Mixed opacity and radiolucency	present	absent	absent	absent	Expanded with perforation of inferior border

Table 2. Clinical features of cases

Case Numbers	Chief Complaint	Clinical Features
1	swelling on the right side of the lower jaw for 3 years	no history of tooth ache, trauma, discharge, fever associated with the swelling
2	swelling in his lower jaw 1 ½ years back	history of trauma, with no associated discharge from swelling
3	Swelling in the left upper jaw for 2 years	No history of trauma, edentulous patient with palatal perforation
4	Swelling with respect to upper and lower jaw	Multiple impacted teeth present with swelling in the right side of the lower jaw
5	Swelling in the left lower jaw	Swelling in the left lower jaw with impacted molar teeth
6	Swelling in the left lower jaw	Swelling in the left side lower jaw with grade II mobility
7	Pain in the right side of the lower jaw	Tenderness with respect right side lower molar teeth

Discussion

The term ‘‘ossifying fibroma’’ was first used in 1927, and since 1968 tumors showing cementum were grouped together. During 1971, the “World Health Organization (WHO)” classified 4 types of cementum-containing lesions which were “fibrous dysplasia”, “Ossifying fibroma”, “Cemento-ossifying fibroma” and “Cementifying fibroma.” Conferring to the 2nd WHO classification, in the oral and maxillofacial region benign fibro-osseous lesions were classified into two categories, non-neoplastic bone lesions and osteogenic neoplasm. COF belonged to the category of osteogenic neoplasm. But later ‘‘cementifying ossifying fibroma’’ was again renamed in a WHO classification during 2005 as Ossifying Fibroma.[1] Some Ossifying fibromas contain prevalent cementum-like calcifications and while bone-like material is seen in others, but in few lesions’ combination of both cementum and bone-like materials has been studied.[2]

Ossifying fibromas are formed from pluripotent mesenchymal cells that are usually get originated from the periodontal ligament. Bone tissues and cement are formed from these cells. “There is a school of thought that previous exodontia or localized periodontitis might provoke a spur,[3,12] or that the formation of “ossifying fibromas” might be a commotion of bone maturation of congenital origin.”[3] In 1872,” Yih et al. and Sciubba et al. accredited the 1st description of this disorder to Menzel.” At 1927, Montgomery first coined the term ossifying fibroma, by which the lesion is now recognized. Other authors have also used this name simultaneously. Up to 1948, it was thought that fibrous dysplasia and ossifying fibroma were both one of the “similar entity” or variations of a similar lesion.[4]In that same year, Sherman and Sternberg issued a detailed depiction of the histological, pathological, radiologicaland clinical characteristics of ossifyingfibroma, and after that most researchers correspond in considering the 2 lesions to diverse clinical entities.[4]Though it can befall at any age, numerous authors have confirmed that Ossifying fibroma of the mouth inclines to ensue mostly in the middle-aged patients. Ossifying fibroma of the jaw bone shows female predilection as compared to males. The females were more affected than males in our case.Central Ossifying Fibroma mostly affects the craniofacial bones and hardly encompasses the long bones. In the maxillofacial region, Ossifying fibroma most commonly occurs in the mandible, usually inferior to molars and pre-molars.[1]

Conclusion:

“Ossifying fibromas” represents a plethora of radiopaque radiolucent benign lesions manifested in the maxilla and mandible ranging from slow growing benign lesions to aggressive juvenile ossifying fibromas, one needs to be thorough with the various radiographic appearances, growth pattern, areas of involvement and clinical manifestations for proper diagnosis and treatment planning.

Ethical permission: Approved

Conflict of Interest: None

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Revolution of Graphene in Dentistry

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Abstract

Graphene has been discovered to have unique properties that could revolutionize the world. The reason graphene is such a beneficial material is due to its 2D like nature and short/strong bonds. Biomedical researchers have begun to make use of the properties of graphene. Its derived substances open a completely new research path in tissue engineering as well as regenerative dentistry and medicine. This paper aims to review and present the useful properties of graphene and its revolution in the era of modern dentistry.

Keywords: *Graphene; regenerative dentistry; medicine; biomedical research.*

Introduction

The material graphene consists forms of allotrope of carbon as a single layer of atoms in a 2D hexagonal lattice where one atom forms each different vertex honeycomb sheet of carbon atoms.[1] It contains all the basic structural element of different allotrope which includes graphite, carbo nanotubes, charcoals and fullerenes. Its striking physical, electronic, and mechanical properties originate from the two-dimensional (2D) electron confinement within a one-atom-thick layer.[1,2]

Graphene was discovered in 2004 by Andre Geim and Konstantin Novoselov at the University of Manchester.[3,4] Their discovery gave them Nobel Prize in 2010. Novoselov stick a crumble of graphite to a scotch strip and after that exfoliated it to split the graphite layers and repeated this process several times to reduce the thickness of graphite until few layers of Graphene sheet was inaccessible.[2] The word graphene material was latersuggested by the lUPAC commission to re-establish the old term "graphite layers" that was suitable in the research of single carbon single layer structure, since a three-dimensional configuration is identified as graphite.[1]

Graphene sheets are building blocks for other graphitic material: a) stacked on top of each other they make graphitemm thick graphite contains about 3 million layers of graphene); b) rolled up they make a carbon nanotube(cut and folded into a spherical shape they make a fullerene)

Graphene forms: Graphene nanoplates; Graphene nanoflakes; Graphene powder; Graphene thin sheets; Graphene foam

The discovery of graphene's extraordinary properties has led to a stampede in research and development and a patent land rush with 31,000 patents and hundreds of thousands of scientific papers. [5]

Properties of graphene [6]

1. **Atomic width:**Single atom thick ("two-dimensional"), about 0.335 nanometers
2. **Electron mobility:**Maximum electron mobility with theoretical limit of200,000 cm 2/(V•s) (>100x higher than silicon)
3. **Strength:**Monolayer graphene is the strongest material ever tested with a strength of 42 N/m.
4. **Toughness and Stretchability:** Comparatively brittle, it can be stretched by up to25%–highly relevant for flexible electronics.

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5. **Stiffness:**Same as diamond.
6. **Impermeability:**Even the minimum atom(helium atom) cannot pass through a sheet of graphene
7. **Electrical resistivity:**1x10-8Ω•m among the lowest of any known material at room temperature (~35% less than copper)

There are well over 100 graphene producers worldwide and growing. The estimated market value for graphene: €100 million in 2020; €150-550 million in 2025 [5]

Applications in General: Super capacitors, Energy storage, Wireless power, Super sensitive touch screen, Ultra-thin batteries, Instant de-icing of aircraft, Nano-scale transistors, Thermo conductive lubricants, Water filtration & desalinization

Applications in Biomedical field

a. **Medical applications:** Graphene based biosensors are used for detection of small biomolecules (dopamine, glucose, etc) proteins and DNA. They are also used in bio-imaging, photo thermal therapy, drug delivery, gene delivery, tissue engineering. Some of the reliable ultrafast biosensing platforms are fluorochrome based nano-optical biophonic detection system such as FRET/CRET.[7]

   1. **DNA Detection:** Graphene has been widely used[8]

      a. to detect aromatic molecules as well as single stranded DNA through pi-pi stack interactions.

      b. can incandesce a wide range of wave-length (from near infrared to ultraviolet)and can efficientlyput out the fluorescent dyes.

      c. useful material in fabricating fluorescence resonance energy transfer (FRET) sensors.

      d. By combining the optical properties of graphene oxide along with its interaction with nucleic acid, target DNA will be able to be identified and quantified.

   2. Drug delivery: Graphene oxide and its derivatives exhibits properties used to carry DNA, proteins and antibodies.[6] High surface area of graphene allows high drug loading capacity that can be compared to other nanomaterials. But due to poor rigidity cell penetration, the success of grapheme based drug delivery tool is dependent on three factors such as, a) constructing optimal loading capacity, b) to confirm degree of toxicity and c) designing a system which will be able to release drugs in a controlled manner at the required site(tumour) for successful therapy.[8]

b. **Dental application:** Dental diseases like caries, periodontal problemsare closely associated with microorganisms such as *Streptococcus mutans*, *Fusobacteriumnucleatum* tend *Porphyromonasgingivalis*. Zisheng.[8]

Detection of Bacteria: Sensors and interfacing electronic devices with biomaterials are gaining interest for decades. But such device designs involve either mechanical mounting of components by clamps or other additive or implantation of electrodes into the tissue surface. Specialization have been made to identify the specific type of organism.[7]

1. **In Restorative Dentistry:** Natural tooth surfaces are subjected to stresses and wear repeatedly due to forces applied over to the tooth while chewing and masticating. Those surfaces which undergo wear develop caries or produces sensitivity in later period which require restorations as a treatment approach. The commonly used materials like silver amalgam, glass ionomers, composites and ceramics can also undergo wear over a long period of time. Graphene fillers supplementaryinto restorative materials maximizes the strength and durability of the restoration. Though ceramics are the best material for indirect restorations their use is limited because of low fracture toughness, poor creep, brittleness. Presence of impurities, pores and cracks can cause pure ceramic extremely brittle. They if integrated as fillers in ceramics can also get better fracture hardinessas well as other mechanical properties.[9]
2. **Bone tissue engineering:** Major bone rebuilding is a worldwide health crisis and represents a great challenge. Materials such as polycaprolactone (PCL). But these polymers lack cell adhesion sites and may require chemical modification for stem cell adhesion. Also, their byproducts on degradation can trigger immune response. Because of the differential and significant properties of graphene has as a show's potential material for stem cell research. They allow stem cell adhesion, growth along with they also improve osteogenic segregation.[10]

3. **Periodontal tissue regeneration:** Chemical vapour deposition (CVD) is a reliable processto make high definition qualityof graphene in huge scale that can be shifted to a variety ofother substances. CVD grown graphene is hydrophobic along with is a non-cytotoxic substance that permit stem cell connection and proliferation. The substance is competentenough to maintain the induced pluripotent stem cells (iPSC) in the undeferential state as well as also to induce stem cell differentiation into specific lineages.[10-12]

4. **Cancer Therapy:** Cancer stem cues (CSC) or tumour stimulating cells are resistant to predictable therapeutic approaches. Drug resistant CSC can cause in unfavourable chemical outcomes. Studies suggest that GO can also be directly used as a beneficial agent for targeting CSC as a differential agent. GO execute its belongings on CSC by inhibiting numerous key signal transduction pathways. GO can be delivered as a therapeutic agent that will depend on the site of tumour, GO flakes can also be utilized as a lavage solution during surgery,with the aim of preventing tumour recurrence and distant metastasis.[12]

5. **Coating for implants:** Graphene strips acts as an anti-bacterial, anti-biofilm, anti-adherence activity of GR coated tooth surface over the implants which can inhibit *S. mutans* biofilm formation. Graphene strips also stimulates osteogenesis aswell as bone regeneration thereby preventing peri-implantitis.[13]

6. **Antibacterial activity of Graphene:** Graphene oxide destroys bacterial cells through ceU-wrapping, on the other side reduced graphene strips stops bacterial cells through cell-trapping.[14,15]

Advantages.[6,8]

a. It is the thinnestyet the strongest

b. It is a good conductor of heat and electricity

c. It is both pliable and transparent

d. Used in production of high-speed electronic devices

e. Enhance differentiation of stem cells

f. Biocompatible

Disadvantages[16]

a. Graphene is prone to oxidative environments in the form of catalyst.

b. Through its jagged edge graphene penetrate cell membrane as well as distrupts normal function

c. Super expensive

Conclusion

Graphene has been discovered to have unique properties that could revolutionize the world. The reason graphene is such a beneficial material is due to its 2D like nature and short/strong bonds. It is the strongest material ever discovered;however, its brittle nature cannot be used structurally but only used to reinforce other materials. It is found to have various applications in medical field, further research is needed to ensure its usage in dentistry.

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Antioxidants and its Role in Periodontal Health

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Abstract

Periodontitis is a chronic inflammatory disease of the periodontium resulting from the pathogenic bacteria which are present in the plaque biofilm. Excessive reactive oxygen species plays an important role in the pathogenesis of periodontal disease. Increased polymorphonuclear count and activity is a reason for high rate of REACTIVE OXYGEN SPECIES(ROS) release which in turn leads to oxidative stress in periodontal tissues. Antioxidants(AO's) are the substance present at low concentrations which retards the oxidative stress.As Reactive oxygen species and Antioxidants are in active harmony so any disturbance in one would cause change in the latter. This review will be solely focused on the role of ROS, AO's and oxidative stress in causing periodontitis.

Keywords: *Periodontitis; Reactive Oxygen Species; Antioxidants.*

Introduction

Periodontitis is a chronic inflammatory disease of the periodontal tissues as a result of noxious bacteria present in the dental plaque which results in periodontal loss of attachment and subsequent exfoliation of the tooth.In recent years, reactive oxygen species (ROS) have gained special attention due to their special role in inflammatory disease progression.[1]

These ROS are a product of regular cellular pathways and are located within all tissues. Antioxidants (AO' s) are another category of substances present in cells which works by efficiently delaying or inhibiting "ROS-induced oxidative stress" which in turn presents ROS-mediated tissue damage[1]

The aim of this review article is to highlight the role of ROS and AO defense system in the pathophysiology of periodontitis.

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Effects of Reactive Oxygen Species on Periodontal Tissue: The reactive oxygen species affects periodontal tissues by following mechanisms

- Degeneration of the Ground substance
- Direct or indirect collagenolysis due to oxidation of proteases.
- Enhanced proinflammatory cytokine release by NK-KB activation
- PG-E_2 production via lipid peroxidation of superoxide release both of which have been linked with bone resorption[2].
- In a cell there is harmony between development and obliteration of free radicals. The harmonical balance takes a radical turn by excessive generation of free radicals due to low levels of antioxidants.[2]

Mechanisms for Periodontal Tissue Degradation by Reactive Oxygen Species: Although ROS have very short acting half-lives (10^{-9} to 10^{-6} s), they are capable of causing considerable tissue destruction by starting free radical chain reactions.

Different pathways mediating tissue destruction are:

- DNA Damage
- Lipid peroxidation (by activation of "cyclo-oxygenases" & lipo-oxygenases)

- Protein damage of gingival hyaluronic acid and proteoglycans.
- Oxidation of certain enzymes eg."anti-proteases"like α_1-antitrypsin.

Recent studies have also shown that ROS are produced by osteoclastic activity and it has a hand in resorption.[3] Moreover ROS like superoxide and Hydrogen peroxide have been linked with activation of osteoclasts and on the other hand, Nitrous oxide(NO) is believed to curb bone resorption.

Antioxidants:

- Antioxidant is a substrate which in low concentrations than its oxidizable counterpart prevents or delays of that substrate.
- Several biologically important compounds have antioxidant properties. These include "vitamin-C" (ascorbic acid),"vitamin E" (α-tocopherol), "vitamin A" (retinol) "β-carotene", NADPH, Adenosine co-enzyme Q10, cysteine. taurine,methionineetc.

A functional classification of antioxidant system based on the way they act (Nikki1996) feels most important.[4]

Table I: A functional classification of Antioxidants.

Types of defense systems	Mode of Action	Examples
Preventive anti-oxidants	Subdues the formation of free radicals; nonradical decomposition of lipid hydroperoxide and hydrogen peroxide. Sequestration of metal by chelation.	Catalase, GPX' serum-transferase
Radical scavenging antioxidants	Quenching of active oxygen. Scavenge radicals to inhibit chain initiation and break chain propagation.	Superoxide dismutase, carotenoids, lipophilic vitamins e.g. Vit A and Vit E
Repair and de novo enzymes	Repair the damage and reconstitutes the membrane	DNA repair enzyme, proteases, transferases, lipases

Table II: Classification based on their origin.[5]

Exogenous	Synthetic	Endogenous
Carotenoids Ascorbic acid Tocopherols Polyphenols Folic acid Cysteine	N-Acetyl cysteine Penicillamine Tetracyclines	Catalases Superoxide dismutase Ceruloplasmin Transferrin Ferritin Proteases

Effects of Antioxidants on Periodontal Health:

- Antioxidants are those molecules that inhibits oxidation. It works by terminating the chain reaction caused by free radicals and thus inhibits cell damage or death.

  Major rich sources of antioxidants in diet includes:

  - Broccoli
  - Berries
  - Beans
  - Avocados
  - Red wine
  - Kiwi
  - Dark chocolate
- Panjamurthy (2005) reported that there were increased levels of antioxidant enzymes but the level of Vitamin-C, Vitamin-E and GSH were decreased in periodontalsubjectsin spite of accommodating the protein levels which he ascribed as a protective mechanism to oxidative stress.[6]
- Battino et al (2005) described the antioxidant activity of toothpaste and established the antioxidant activity of sodium ascorbyl phosphate in vitro. The antioxidant property of zinc chloride and sodium fluoride were due to the ability of Zn+2 ions to shield thiol groups and prevent formation of Hydrogen peroxide and Superoxide dismutase which formed due to reaction with transition metals and capability of Fluoride to form complex divalent iron ion.[4]

Conclusion

Current scenario clearly depicts a strong connection between oxidative stress and periodontal disease. The

balance between antioxidant mechanism and Reactive oxygen species is of utmost importance for improved periodontal health. Increased Reactive oxygen species activity or decreased antioxidant mechanism can cause huge impact over the equilibrium in periodontal tissues resulting in periodontitis. For avoiding periodontal diseases daily adequate consumption of natural antioxidants,omega fatty acids,Vitamin D and calcium are of utmost importance. There is increasing evidence showing higher the intake of antioxidants lowers the risk of Oxidative stress and simultaneously lower the risk of lipid peroxidation and finally leading to a good overall periodontal health.

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Botox and Dermal Fillers: Expanding the Horizon of Dentistry

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Abstract

BOTOX and DERMA FILLERS are coveted twin-faces in the world of facial esthetics as well as cosmetic dentistry. Botox is a neurolysin derived from the bacteria Clostridium botulinum which freezes or reduces the tonicity of the muscles after being injected while Dermal fillers contain injectable ingredients such as hyaluronic acid (Juvéderm, Restylane) and calcium hydroxyapatite fillers (Radiesse), that act as plumpers and add fullness to areas that have thinned due to aging. There is no doubt that Botox (since 2002) and dermal fillers (since 1981) are well known for their esthetic results in terms of smooth, wrinkle free skin and enhancing or replacing lost volume in the face by soft tissue augmentation, especially in the oral and perioral areas. Though in recent years, they have paved their path into Dental practice for both dental esthetics as well as therapeutic uses. In this article, we will focus on the mechanisms of their actions, their therapeutic uses in dentistry as well as other body parts, side effects and contraindications in maxillofacial areas along with their future implications in the world of dentistry.

Keywords: *Botox, Dermal fillers;Dental Esthetics; Therapeutics.*

Introduction

It's a general thinking that Botox and Dermal fillers are primarily used for cosmetic purposes regarding fine lines and wrinkles on the face, but they both have a golden history of various therapeutic uses as Strabismus, Blepharospasm, Axillary hyperhidrosis, Crow's feet etc. Both furnish most noteworthy, least invasive procedure at affordable cost with limited to negligible recovery time. Today Botox and Dermal fillers both go hand in hand for rejuvenative, cosmetic as well as therapeutic procedures. The Dental Quality Assurance Commission (DQAC) of Washington has given an elucidate statement effective July 26, 2013, which now ratify the ability of general dental practitioner to use Botox and dermal fillers when "used to treat functional or aesthetic dental conditions and their direct aesthetic consequences and the treating dentist has appropriate, verifiable training and experience." Similarly, Michigan board of dentistry and New Jersey state board also affirms the use of Botox and dermal fillers by general dental practitioners.[1,2]

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Botulinum Toxin or Botox: Botulinum neurotoxin, famously known as BTX or BoNT is derived from a gram positive anaerobic, spore forming bacillus, *Clostridium botulinum.* BoNT is divided into 7 different neurotoxins,categorized as type A, B, C [C1, C2], D, E, F and G which are serologically and antigenically vivid but structurally identical. Among these neurotoxins, three forms of BTX type A (Botox, disport and xeomin) and one form of BTX type B (MyoBloc) are available commercially for multiple esthetic, cosmetic and medical procedures. Although BoNT may lead to botulism, a serious life-threatening condition in humans and animals, still it can be used as an effective and potential medication in required terms.[3]

Mechanism of Action of Botulinum:

- Administration of BoNT type A in muscles
- Inhibition of exocytosis of Ach on nerve endings
- Prevention of attachment of Ach containing vesicles to the neurotransmitter prone sites
- Blockage of release of Ach by neurons
- Decreased muscle activity or partial paralysis of muscles (for around 3 to 4 months)

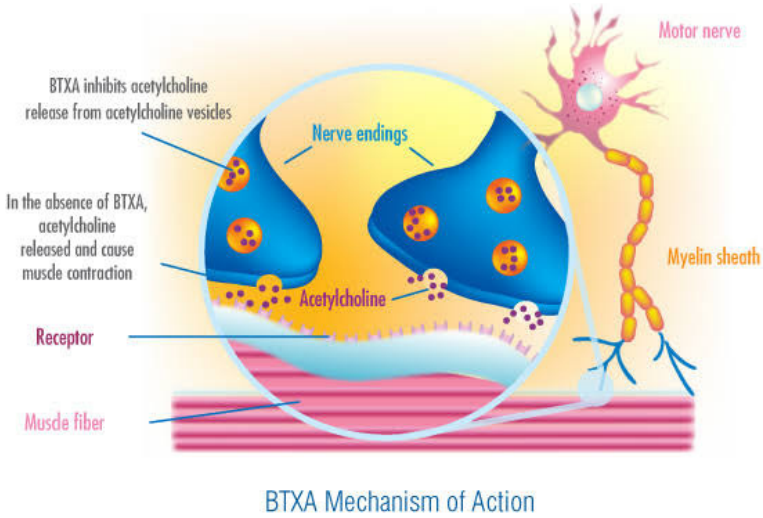


Figure 1: BTXA Mechanism of action

Botulinum as Dental Therapeutic:

Temporomandibular joint disorders or syndrome: This includes all the conditions that affect the synovial joint between mandible and temporal bone (jaw joint), as well as related neurological and vascular integrant, leading to pain and impaired movements of the joint and the surrounding associated muscles as well.

It commonly includes TMDS i.e. Temporomandibular joint Dysfunction Syndrome and MPDS i.e. Myofascial Pain Dysfunction Syndrome.

Aetiology: The preponderance of TMJ disorders include a myogenic factor as,Hyperactive muscular activity; Repetitive subconscious jaw movement associated with bruxism and clenching; Inflammatory disorders; Stress (external); Ankylosis; Neoplasia

Signs and Symptoms: Pain in jaw movement; Trismus or Reduced mouth opening; Deviated mandible on opening; Clicking or popping sound on opening of jaw; Facial pain; Headache (generally at temples); Indistinct Toothache.[4]

How BoNT can be used to treat TMDs?: Generally, there are trigger points in muscles associated with TMD cases. On palpation, pain emerges from these points which instantly get transmitted along associated muscles or neuronal tracks. Interruption of these trigger points may cause relief, either for short-term or long-term.

Certain agents as sterile Saline and Local Anaesthetics together have been injected directly into these trigger points, but their effect does not last very long i.e. from few minutes to a few days, so have limited benefits. On the contrary, the use of BoNT can reduce the strength of muscle contraction with the effect lasting for around 3 to 4 months, thus are surprisingly beneficial in painful TMD cases. [5]

Bruxism: Bruxism is an oral parafunctional activity characterized by excessive grinding of teeth or clenching of jaw or gnashing. It can be **Nocturnal** i.e. Occurs while in sleep and **Awake** i.e. Occurs while wakefulness. Bruxism leads to hypersensitive teeth with wear facets, aching muscles of jaws, headache, facial pain, along with aggravation of periodontal diseases.

Treatment: Bilateral administration of neurotoxin in masseteric as well as temporalis muscles, even if only one side of the face is affected. The proper and accurate amount of BoNT (5 to 6 injections) will not only diminish the strength of contraction of muscles of mastication by partially paralyzing them and reducing their ability to clench and grind the jaw forcefully, but also improve the ability for masticating and talking. This effect may be noticeable by the next day and usually lasts for about 3 to 4 months with occurrence of disuse.[6]

Masseteric hypertrophy: This condition is usually seen in patients who are chronic jaw clenchers and is characterized by unilateral or bilateral enlargement of masseter muscles. Symptoms include facial disfigurement, trismus, protrusion and bruxism. Pain may also occur but most frequently patients consult clinicians for cosmetic purposes.

Treatment: Initially, surgical reduction of the jaw muscles was done which resulted in substantial contracture of the muscles. But in recent years, Botox has gained quite remarkable status regarding treatment of hyperactive muscles. Administration of right amount of BoNT in both sides of the masseter results in sustained reduction of muscle's hyperactivity as well as concurrent reduction in overall size of masseter over time. For pain relief, muscle relaxants can be used. [7]

Removable prosthesis: Overactive muscles can affect the retention, stability and support of removable dentures. Lack of these can hamper mastication, speech as well as esthetics which can cause psychological issues to the patients. BOTOX can provide an excellent relief in such cases as it will decrease the tonicity of overactive muscles, thus neutralising the force responsible for denture instability and so will aid in retention of the removable prosthesis.

Post-orthodontics Therapy: BOTOX can also be used to prevent relapses of orthodontic treatment in case of patients having stronger muscle activity as that of hyperactive mentalis muscle. Hyperactive mentalis muscle can often cause disruption in the alignment of teeth as well as muscle spasm leading to pain. Botox can reduce the strength of muscle contraction without hampering its normal functional activities. But this therapy should be done prior to any major irrevocable dental procedure for better results. [8]

Oro-mandibular Dystonia: It is a rare, focal neuro-dystonia characterized by strong and assertive contractions of muscles of face, jaw with or without involvement of tongue, thus causing distressed opening and closing of mouth in lateral, vertical and protrusive directions. It can lead to several dysfunctions as impaired mastication, dysphagia, dysphonia, TMD and many others.

Treatment: BOTOX acts as a promising therapy for treating OMD as it inhibits the release of Ach by neurons at presynaptic levels, thus causing transitory chemical denervation of skeletal muscles.

Sialorrhea: Sialorrhea or Ptyalism is nothing but excess salivation or inability to hold saliva in mouth. It is usually witnessed in ALS patients, Parkinsonism, Frey's Syndrome, Bell's palsy etc.

Treatment: BOTOX can be used to treat sialorrhea as it inhibits the release of Ach by neurons at cholinergic synapses of ANS, thus can block cholinergic parasympathetic secretomotor fibers of salivary glands leading to diminished salivation. But while administration of the toxin, care must be taken as too much of BoNT can cause impaired mastication, dysphagia and dry mouth.

Trigeminal Neuralgia: It is a neurological disorder affecting trigeminal nerve (Vth Cranial nerve) and its branches and is characterized by chronic, unilateral, episodic and transitory, lancinating type of pain and is usually associated with trigger zones.

Treatment: BOTOX can be used as an adjunct for treating this disorder. Administration of 25 to 75 unit of BoNT in pericranial muscles can provide symptomatic relief from headache, facial pain etc. It relaxes the associated hyperactive muscles by inhibiting the nerve impulses that trigger contractions.[9]

Gummy smile: It is excessive exposure of gums of maxilla (generally) while smiling. It is an issue of both oral hygiene as well as cosmetic concerns.

Treatment: Botox is a non-surgical and least intrusive treatment alternative for rectification of gingival smile. It is advisable when the gummy smile is because of over functional upper lip elevator muscles. Administration of BoNT in overactive elevator muscles of lip blocks it's immoderate contraction and thus deter the lip from being wrenched too far up while smiling.

Contraindications:

- In mentally challenged patients.
- Patients having neuromuscular disorders as Myasthenia Gravis.
- Patients being hypersensitive to any component of the formulation.
- In pregnant or lactating women.

Dermal fillers: Dermal fillers are kind of magical stuffs that are administered underneath the skin for soft tissue augmentation, smoothening the perioral wrinkles and folds and plumping out the areas of reduced volume. In addition to prevent the process of ageing and for other cosmetic issues, dermal fillers can also be used as a promising dental therapeutic agent.

Ideal properties: It should be, safe, economical, ready to use, painless while administration, hypoallergenic, operator as well as patient friendly,

long lasting with reliable results and low possibility of complications. [10]

Classification of Dermal Fillers:[11-12]

A. On the basis of longevity:

1. Temporary or non-permanent fillers

   It is biodegradable and degrade in less than 1 year.

Types:

- Bovine collagen
- Human tissue derived collagen
- Synthetic fillers as Hyaluronic acid-based fillers

2. Semi-permanent fillers

   It is also biodegradable and degrade in 1 to 2 years.

3. Permanent fillers

   It is called as non-biodegradable and degrade in more than 2 years.

B. On the basis of placement site:

1. Dermal fillers
2. Sub-dermal fillers
3. Supraperiosteal fillers

C. On the basis of origin of filler material:

1. Autografts
2. Allografts
3. Heterografts
4. Synthetic materials

Indications:[11-12]

- Facial wrinkles and folds
- Enhancement of lips
- For facial disfigurement or imperfections
- Deep scars as **Traumatic, Post-surgical** or **due to acne and other diseases.**
- Soft tissue augmentation as for Breasts, buttocks.
- In case of periorbital melanosis or hyperpigmentation
- Sunken eyes
- Dermatological disorders as **Scleroderma, AIDS induced lipoatrophia.**

Contraindications:

- Patients having autoimmune diseases
- Hypersensitive patients
- Psychologically unstable patients
- Patients having tendency of secondary healing, leading to keloid formation
- Pregnant and lactating women

Dental therapeutic uses:[11-12]

1. For construction of esthetic dental lines and smile lines as an auxiliary to crown elongation, gingivectomy and veneers.
2. For augmentation of lips and perioral volume for better retention of removable prosthesis.
3. For eradication of dental embrasures i.e. 'Black triangles' form in between teeth after periodontal and implant surgery.
4. For treatment of angular cheilitis.
5. Soft tissue augmentation of lips for better phonetics.
6. For abolishment of gummy smile.

Conclusion

In recent years, Botox and Dermal fillers have created their own identity in dentistry for therapeutic purposes as well as cosmetic concerns. Since these are minimally invasive substitutes for surgically treating cases, they have gained popularity in quite some time. Nevertheless, much more is yet to be discovered before their daily use in dental practice for several different purposes. There is no dubiety that they both have expanded the horizon of dentistry and are prevailing dental practitioners to avail them in day to day practice.

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Different forms of Tobacco and its Bad Effects on Our Health and Society

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Abstract

Better health is achieved by good nutritive food. Different constituents reside in the food have their individual role in betterment of our health. But there is certain harm full product like (different forms of tobacco chewing and non-chewing tobacco) which has very dangerous effect directly on our systemic health and oral heal. In other hands it also affects environment economic status of that country. Due to heavy use of different kinds of harm full tobacco product most of the people develops non communicable diseases like oral cancer, lung cancer, chronic obstructive pulmonary diseases, chronic heart disease. After the development of these non-communicable fatal diseases they have to spend a huge amount of money for the management of these diseases. Ithas direct impact on the productive capacity of that individual and that community also.

Keyword: *Tobacco; Effects of tobacco; Healthcare; Society; Awareness.*

Introduction

"Tobacco habit appears to be the Hydra of our modern society" *Kenneth JR*

Use of tobacco is most popular habits among every community worldwide now days. Any form of tobacco use weather Smoke or smokeless is one of the top most risk factors of chronic diseases or non-communicable diseases, including cancer, lung diseases, and cardiovascular diseasesalso high etiologic factor responsible for various oral mucosal lesions and periodontal diseases.[1]

Four hundred year back Portuguese introduce tobacco in India. Rapidly tobacco became an integral part of different socio-cultural in various communities.[2] In the process of tobacco production and tobacco use India is the second largest tobacco after republic China.[2,3] Every form of tobacco products made entirely or partly from leaf of tobacco as raw material and then these are used as smoked and smokeless tobacco. These tobaccoscontain highly addictive psychoactive constituent named–Nicotine. This nicotine makes every tobacco user addicted to different form of tobacco and making it very difficult for the habituated tobacco users to quit the tobacco habit. Highly dependence of tobacco is a chronic condition for every tobacco user and it requires high dedication constant effort to overcome.[4]

It has been seen some countries throughout the world, children from low socio-economic status family are frequently engaged in tobacco cultivation to support their family income. These children are in high risk group for exposure to **"Green Tobacco Sickness."**[2]

The vast use of tobacco is one of the dangerous threats to global health. Consumption of tobacco is the most important factor in the growth of non-communicable diseases in developing countries as well as developed country.[4]

Now a days wide use of tobacco in every society and the growing burden on heavy tobacco use and its health output. Tobacco use in any form is the the major

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public health problems and top most cause of death in the world today.

As wide use of tobacco is the main causes of changes in the role and economic stage of a person in the society and that change affects directly to the change in social, cultural, and economic factors. Aggressive and seductive advertise with the idea of independence, sex appeal, slimness, glamour, and beauty of tobacco, targeted to people who are the triggering factors behind increase in tobacco use.[5]

All countries high-income (HICs), low-income and middle-income (LMICs) have experience of bad negative effects related to various types of smokeless and smoked tobacco production, their destructive impact differs heavily between HICs and LMICs. Now a days it has been seen a stable shifting of tobacco production from HICs to LMICs, which enhancing the economic and environmental impacts of tobacco production in LMICs is now a important consideration.[6]

Impact on Environmental: During the late 1970s, growing concerns have been expressed about the "energy" or "fuel wood" crisis caused by tobacco production, with emphasis being placed on deforestation caused by the outstanding rate of soil nutrient depletion and considerable usage of wood. The tobacco production has direct negative impact on the public health and to the environment in long term and in other hand substantially outweigh to the benefits of employment, huge income and foreign currency exchange.The huge amount of tobacco production directly affects the socio-economy status of the population those who are engaged in that field. The huge tobacco production affects the agriculture production rate.A report from Bellagio on different forms of tobacco and sustainable development concluded that, in the growing world, "tobacco is a major challenge, not to the health, but also tothe environmental sustainability." An organisation of united nation (FAO Food and Agriculture Organization), has noticed the deforestation created by excess amount of tobacco production in the form of fuel wood shortages among those people residing in rural area in the developing world.[7,8,910,11]

From the data of population statistics, wood consumption and forest density it is cleared that those area where tobacco production is more in developing countries those people are facing severe wood deficit condition. It also implies that the increasing deforestation is going to create loss of land sources, biodiversity and also can create food insecurity.[7]

It is estimated that two lakh hectares of woodlands are removed by tobacco cultivation every year. Tobacco–related deforestation is a serious emerging threat to our environment, mainly in Southern Africa, Middle East countries, South and east Asian country, South America and in the Caribbean countries. [7]

In another hand, tobacco cultivation may be linked with lowering of ground water resources, sedimentation of rivers, irrigation and also in changing of climate. It directly affects to habitat and overexploitation.[8] Its directly also have narrative effects on every human health and livelihoods.

Economic impact: The use of different form of tobacco and various health problems including systemic as well as oral heal has known to each and every population throughout the world. Tobacco use directly affects the economic system of every individual. Tobacco and poverty have very close connection. It has found from various studies conducted throughout the world that in low socio-economic class families ten percentage of total house hold expenditure money spends on tobacco use so for that reason expenditure for the basic item like food, education and on health care became less. Tobacco is another main cause for mal nutrition. Higher illiteracy rate is due to high tobacco consumption because lots of money spends on tobacco use instead of education. [10,11]

The economic costs of tobacco use are equally devastating. Apart from economy loss of family different forms of tobacco causesdifferent kinds of systemic and fatal oral diseases, tobacco kills people at their developing stage of their productivity, depriving families of breadwinners and nations of a healthy workforce. Tobacco consumers productive capacity is less as compared to non-tobacco consumers they are just alive due to increased sickness.[10]

The World health organisation Framework Convention on Tobacco Control has also taken steps on protection of the environment from the adverse effects of tobacco farming and the health of each individual who are employed in tobacco farming. Throughout the glove it is estimated from each and every tobacco industry thirty-three million population attached to tobacco farming most of them are part time worker in tobacco production in addition to other work. From the

thirty-three million workers half of that member works at different areas throughout the world on tobacco product manufacture, distribution and retailing. Except these people another ten million are employed in supplier industries, providing materials and services to the different tobacco industry throughout the glove.[12,13,14,15]

India ranked 9th globally in the exporter of different form of tobacco product and tobacco. After Brazil and China, India stood third in rank for production of more than ten percent of world's raw tobacco in the year 2003 and 2004. Expenditure in health problem after using of tobacco product is a serious burden to annual budgets of every country mostly developing countries like India. It is estimated from an estimate India spent approximately 6.2 million us dollar in the year 2003 and 2004 for the treatment of various diseases and ill health caused by heavy tobacco consumption.[15]

Tobacco industry and market in India: India has become third most country after Brazil and Chna in tobacco production and consumption. India has the biggest bidi production industry in the glove. In the year nine teen ninety-eight, 858 billion beedi were consumed by bidi user in India and this number touches to 1031 by the year 2007. Pan masala and gutkha user are more in India in young population. These gutkha and pan masala are available in different packet in the market with very low price. Some of the top most tobacco companies of India are now facing competition withunorganized bidi production company.[16]

Costs of tobacco use: For the management of tobacco related different kind of systemic diseases and oral diseases, especially the three main diseases-lung cancer, coronary artery disease (CAD) and chronic obstructive lung disease, oral diseases like squamous cell carcinoma of different intra oral structure like tongue, buccal mucosa etc. throughout the glove widely. A lot of studies in these aspects proved that there is some close connection between morbidity rate, mortality rate and tobacco use, which affects to the financial condition of the country [17]

Rath,Chaudhary. in 1999 took astep to estimate the total national costs spent on the three major tobacco-related diseases. [17]

For the improvement of public health control of different forms of tobacco use is very much essential now a day. Many organisation, professional and different government of different countries are working in this field. But it is very difficult task to fight against the tobacco use and achieve the results. Each and every small steps and big steps are huge successes for our health and quality of life of every community in the world.[18]

Though the rate of use of different tobacco product in United States lowered, but death rate due to tobacco use is approximately 6 million every year. The fatal rate due to tobacco use is eighty per cent in low-and middle-income countries. Most of the developed countries like US achieve success in control of tobacco use by increasing the tax on tobacco product creating tobacco free areas. Some other countries have created some policies like tobacco promotion on TV, radio, higher the taxes on tobacco product, graphical warning on different tobacco product for creating awareness among different communities. [19]

Tobacco Control Programs evaluation: The government of each country should regularly monitor the progression and implementation of tobacco control policies by tracing the development of the ordinances, rules and laws. The area under tobacco farming, annual different tobacco production, major category of tobacco product and regular annual export of tobacco, tax return from tobacco and different diseases developed from tobacco use should thoroughly studied as national indicators. Minimum ten per cent of the budget of every local project should spend on tobacco control for better health and quality of life.[20]

Conclusion

Well organised tobacco control is dependents on good implementation of demand and supply reduction policies by the Government and inter-sectorial approach which involvesstakeholder departments and ministries. The implementation of the well organised Government policies, synergized with tobacco control initiatives by each community are pivotal in reducing prevalence of different forms of tobacco use in the country which also reduce the fatality rate of that country and increase the productive capacity of community and economy of the countries.

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Toxic Effects of Amalgam on Body

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Abstract

Amalgam is constantly used in dentistry for its durability, strength and low cost. It has been under use for more than hundred fifty years as of now, in dentistry. If patient does not care about aesthetics, then it can be used in individuals of all ages. It is long-lasting and needs very less techniques from the operator. But with all that is good with amalgam; there is also a bad side to the use of amalgam, lately there has been a rising concern among people that amalgam is the reason for mercury toxicity. Mercury is present in our environment all around us, so everyone is exposed to measurable but small amount of mercury in urine and blood, although these amounts are raised by dental amalgam restorations. It is the mercury from removal or placement of dental amalgam from tooth that exposes the body to mercury toxicity. Amalgam canproduce hyper sensitivity reactions in some people,if proper mercury hygiene procedures are not followed the risk of bad health effects grows extraordinarily. This study sheds a light on the day to day use of amalgam in dentistry and how mercury toxicity affects the patient and the practitioner.

Keywords: *Amalgam, mercury toxicity in dental office, prevention and safety measures, substitutes, conclusion.*

Introduction

Amalgam can be defined as an alloy of mercury. It is a greatdental material used for restorations. It has beenused in dentistry for hundred fifty years. Its low cost, ease of application, durability has given amalgam its reputation as one of the most used restorative materials in dentistry. However, it is being used less and less due to the rising concerns about its adverse health effects, environmental pollutions and aesthetics. Natural white colour of teeth does not go with metal colour of amalgam aesthetically,so many patients and also dentists themselves prefer restorative materials that resembles the tooth colour. amalgam consists of amix of copper, silver, zinc and tin mixed with mercury. These particles form a matrix containing gamma-1 (Ag_2Hg_3) and gamma-2 phases. ($Sn_{7-8}Hg$). Early breakage and failure of amalgam restorations is caused by gamma-2 phase, so copper was added to avoid gamma-2 phase, replacing the tin mercury phase with a copper tin phase (Cu_5Sn_5).[1] Louis Regnart, is called the father of amalgam, he improved on boiled mineral cement. He added mercury which extraordinarily reduced the high temperature originally required to pour the cement on a tooth. In 1890s, GV Black gave us a clinically acceptable formula, which also gives good performance and it wasn't changed of at least 70 years. In 1959, Dr. Wilmer Eames raised low mercury to alloy mixing ratio. As a result,the mercury to amalgam ratio which was 8:5 was brought down to 1:1. The modern amalgams are created from encapsulated alloy containing of 45% mercury by weight.[2] These are easy to use and gives us some degree of certainty that the material has not been contaminated before use. But today various research papers around the world proves that amalgam restorations release mercury into the body.[3]

Mercury toxicity in dentistry: Mercury is a known toxin. It is a bio accumulative material. Dental amalgam restorations are a major carrier of mercury into the body. Brain, nervous system, kidney etc are affected by the mercury release. The silver filling used in dentistry

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aremade up of a metal amalgam which contains mostly 50%of elemental mercury and 50% other metals which is basicallycopper and tin.[4] The Amalgam we use in our day to day practice in dentistry contains mercury and it affects the safety and health of the patient. Amalgam releases tiny amounts of mercury vapour through time and patient unknowingly ingests and inhales the vapour. As a vapour metallic mercury is more harmful as it would be inhaled and absorbed by the alveoli of the lungs at an alarming rate of 80% efficiency.[5] It is the main entry of mercury to our body. Also while removing the amalgam by bur the friction of bur on the amalgam surface creates a mercury cloud and more than 65% of the particles in this cloud are less than one micron in size which are absorbed by the body and mercury breaks down to systemically affect the body in the course of few days. Toxic effects of mercury depend upon the amount of accumulated mercury, amount of expose and length of expose. Mercury exposure in dental office can occur while amalgam is being stored, in use, during trituration. Exposure can occur during finishing and polishing.[6]

Signs and symptoms of mercury toxicity: Symptoms of mercury poisoning can occur either rapidly or over long periods of time. The symptoms of elemental and vaporised mercury poisoning are mood swings, insomnia, headache, tremors, weakness and decreased cognitive functions.[7]

In oral cavity, mercury causes bleeding gum, loosening of teeth, alveolar bone loss, excessive salivation, metallic taste in mouth are seen. It also causes GIT problems like inflamed colons, cramps and diarrhoea. Mercury causes CVS problems like weak pulse, increased BP, chest pain. Respiratory problems and neurological problems like headache, vertigo and twitching in various areas of the body. In pregnant women, the effects of toxicity on their children was studied and importantly the foetal brain was shown to be very sensitive to methyl mercury.[8]

Diagnosis and prevention: Exposure to elemental organic and inorganic forms of mercury causes toxicity. Various diagnostic tests or method are there to diagnose the level of mercury inhuman body which includes the test for blood, urine, saliva. By using atomic fluorescence spectrophotometry, we can detect fast and trust worthy results of mercury toxicity in blood and urine**.** A thorough physical exam alerts the physician to the potential for mercury poisoning. Mercury poisoning can be detected by mercury levels in blood. A normal mercury level is less than 10µg/L and less than 20 µg/ Lin urine. We can also do complete blood count to detect mercury poisoning.[9] We can use encapsulated alloys which eliminates the possibility of a bulk mercury spill. We can use amalgamator fitted with cover. We can also remove the remaining amalgam from the mouth by the use of high-volume suction or high-volume evacuation after a restorative procedure. We can use masks; we can dispose the mercury contaminated items in sealed bags according to applicable regulations.[10]

Amalgam Substitutes: Composites, GIC (glass ionomer cements) and many hybrid structures are emerging as very convenient replacement of amalgam restorations. Amalgam possess greater lifespan than composites, but this disadvantage is disappearing by the constant changes that are brought in the field of Dentistry by constant research to produce a superior composite resin. Amalgam is slightly forbearing to the presence of moisture during restoration.[11] On the contrary composite restoration needs high skill and sensitive techniques to perform. More and more research are needed to make composite better for the day to day and widespread use of composites. Good research and an abundance of follow up to successful cases is needed for this change from a grass root level. Amalgam use is decreasing day by day but to make it a day practice among dental practitioners is still a long way to go.[12]

Conclusion

If the required mercury hygiene procedure is followed, the risks and bad health effects in dental office could be minimised. The complete and definitive replacement of amalgam is yet to see its success in a large scale. The dentists of every country, whether a private practitioner or an undergraduate student has to take initiative in replacing amalgam with other suitable restorative materials in their day to day practise which can benefit both the dentist's and the patient's overall health.

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Peripheral Odontogenic Fibroma: A Case Report

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Abstract

The tumors of odontogenic origin generally present as swellings present within the bone, but they may be seen superficial to the bone on the gingival tissues which are known as peripheral odontogenic tumors (POTs). These are not seen commonly but the most common of these is Peripheral odontogenic fibroma which is a slowly progressing benign enlargement of the periodontium. This type of enlargement generally has a substantial chance of recurrence, but the exact figure is unknown. This paper presents a case report of "Peripheral Odontogenic fibroma" with the clinical and histological findings.

Keywords: *Peripheral Odontogenic Fibroma, Odontogenic Tumors, Histological Findings; Benign Enlargement.*

Introduction

The oral mucous membrane is constantly subjected to various types of stimuli resulting in a wide variety of diseases. One of the most common findings is gingival enlargement which can be caused by a multitude of factors. It was proposed by Cook that all gingival enlargements are basically "Epulis" which commonly present itself in the maxillary anterior region.[1] They are generally seen in the interdental gingiva region due to irritation from dental calculus, faulty restorations or dental caries. "Odontogenic fibroma" is a benign tumor arising from the ectomesenchyme which has fully developed collagenous tissue and differential quantity of odontogenic epithelium. There is a slight female predilection for the same as has been reviewed by Daley et al.[2]

The World Health Organization defines it as "benign odontogenic neoplasm of fibroblastic origin characterized by relatively mature collagenous fibrous tissue and varying amounts of odontogenic epithelium with potential to occur in either a central or an extra osseous location. The extra osseous counterpart is designated as peripheral odontogenic fibroma".[3]

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Case Report: A 21-year young female patient reported to the Department of Periodontics and Oral Implantology, Institute of Dental Sciences, Bhubaneswar with the chief complains of a slowly enlarging painless swelling in the upper front teeth region for 6 months. On enquiring about the history of the swelling, she mentioned that she was apparently alright 6 months back and noticed a small gum swelling in her maxillary front teeth region. It was not associated with any other symptoms and it gradually increased to its present size. On physical examination, she appeared to be moderately built and nourished and cooperative in nature. On enquiring about her medical and family history, nothing was contributory. We specifically enquired about her diabetic status as it has been reported to alter wound healing[4] and she gave a negative history for the same. She gave a history of oral prophylaxis which was done 2 years back. She had no adverse or deleterious habits and used to brush once daily with a medium bristle toothbrush and a fluoridated toothpaste. Intraoral examination revealed presence of twenty-eight teeth with all the third molars missing. There was no abnormality seen in the buccal and palatal mucosa, tongue, lips as well as the hard and soft palate. There was no gross facial asymmetry seen, profile was convex,

no abnormality detected in the temporo-mandibular joint and the patient had competent lips. She had a fair oral hygiene with mild stains and calculus predominantly in the maxillary and mandibular anterior region.

Moving to the area of chief complain, there was a diffuse gingival swelling present in the interdental area of upper right central and lateral incisor. It was slightly erythematous, pedunculated and measuring about 10mm x 8mm in size. (Fig.1) There were no symptoms associated with it except for occasional bleeding while brushing or physical irritation. It was firm in consistency with no sign of induration. Diascopy was negative ruling out the possibility of vascular lesion. Radiograph of the particular area was also noncontributory with no abnormal findings seen on the intraoral periapical radiograph. Based on the complaint, oral and radiologic findings, a provisional diagnosis of inflammatory gingival hyperplasia was given. Differential diagnosis included Irritational fibroma, pyogenic granuloma and peripheral ossifying fibroma.



Figure 1. Pre-operative stage

The patient was explained about the condition and it was decided to do an excisional biopsy of the lesion with subsequent histopathologic examination. A written informed consent was taken from the patient explaining the procedure in detail along with the complications associated with the surgical procedure. A detailed blood investigation was carried out prior to the procedure and all the values were well within the normal range. On the day of the surgical procedure, external facial disinfection was done with povidone iodine and sterile drape was used for the patient. Under aseptic conditions, local anesthesia was administered to the patient (Lignocaine hydrochloride with 1:80000 adrenaline as a vasoconstrictor). After confirming for the objective signs and symptoms, we decided to go ahead with the procedure. An excisional biopsy was performed with a no 15 bard parker blade and handle and the entire tissue was removed in toto. After that a mucoperiosteal flap was raised and the root surface was thoroughly debrided to remove any surface irritant and was copiously irrigated with a disinfecting solution. Upon satisfactory debrided, interdental ligation was performed with direct loop sutures by using sterile silk sutures. The entire enlarged tissue was immediately stored in formalin and sent for histopathological examination. The surgical site was debrided and coe pak was applied to prevent the surgical site from mechanical and thermal injury. (Figs. 2 & 3)



Figure 2: Excised Growth



Figure 3: Periodontal Dressing

The hematoxylin and eosin stained section showed a stratified squamous epithelium overlying a cellular fibro collagenous stroma. There were islands and strands of odontogenic epithelial cells seen in the stroma along with presence of diffusely arranged minimal chronic inflammatory cells. (Fig.4) Based on this, a final diagnosis of "Peripheral Odontogenic Fibroma" was made.

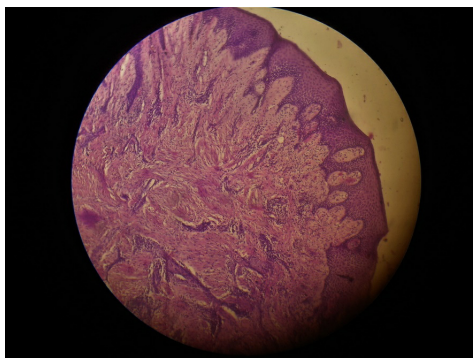


Figure 4: Histopathologic slide

Discussion

In 1982, Gardner mentioned about the peripheral odontogenic fibroma and described it as the superficial equivalent of the central odontogenic fibroma.[5] Itwas showed by Siar and Ng in 2000 that peripheral odontogenic fibroma accounts for 1.2% of all cysts and tumors of odontogenic origin.[6] It is generally seen as a diffuse enlargement mainly in the maxillary anterior and premolar region, it can be sessile or pedunculated, generally pinkish in color which may or may not be ulcerated. It generally needs to be diagnosed properly to separate it from other lesions like peripheral giant cell granuloma, peripheral ossifying fibroma and pyogenic granuloma due to its different course of progression.[7]

WHO has described peripheral odontogenic fibroma as a very uncommon benign neoplasm of odontogenic origin.[8] It was studies extensively by Daley and Wysocki[2] and they found out that peripheral odontogenic fibroma was the third most prevalent neoplasm of odontogenic origin and the most prevalent peripheral odontogenic tumor (POTs). Peripheral odontogenic fibroma is believed to be having a high chance of reappearing even after excision with as high percentage of 38.9%.[9] It was seen mostly in cases of non-calcification type.

Peripheral odontogenic fibroma generally does not cause displacement of the tooth which was seen in this case as well. It has to be kept in mind that esthetic issues are not encountered after excision of this growth and happens only if the lesion encroaches upon the attached gingiva which is quite rare.[10] Periodontal plastic surgical procedures can be employed if it is involved, though in this case it was not.

Due to its similarity with other lesions of the gingiva, it should be differentiated with pyogenic granuloma, peripheral giant cell granuloma and ossifying fibromas as well.

Conclusion

The peripheral odontogenic fibroma is an extremely uncommon enlargement of the gingiva which can be easily confused with other inflammatory hyperplastic lesions due to the clinical similarity. It should be diagnosed properly with the clear cut clinical and histologic features and monitored closely due to high chances of recurrence.

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Evaluation of Correlation between Chronological Age and Delayed Eruption in Down Syndrome: An Original Research

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Abstract

Purpose: To obtain the correlation between Down syndrome and a delayed eruption of permanent teeth according to the chronologic age of the individual.

Method: 80 children within the mixed dentition period of 6–12 years were included in the study. 30 among them were children with Down syndrome and 50 healthy ones. The clinical examinations and radiographic evaluations were carried out in order to differentiate between the chronologic and dental age of the individual.

Results: The Down syndrome was found to influence the delayed eruption of teeth ($p<0.001$) in children, as compared to healthy children with a weighted average of delay at 1.20 years.

Conclusion: The children with Down syndrome should be evaluated regularly to provide for a good health and a high standard of life.

Keywords: *Children, chronological age, Down syndrome, dental eruption, mixed dentition.*

Introduction

Down syndrome is an autosomal disorder caused by trisomy 21.[1] With an incidence of 1/700, it is amongst the most prevalent forms of intellectual disability.[2] The first description of a child with Down syndrome was provided in the year 1838.[3] The risk of occurrence is related to the mother's age and represents an etiological factor for various medical conditions.[4]

A child having Down syndrome has a typical physical appearance. The craniofacial features involved include–Brachycephaly, flattened facial appearance, short neck, flat occiput, generous nuchal skin, neuromuscular hypotonia, a low nasal bridge over a small nose, hypotonic maxilla, small anteverted nares, flat nasal bridge, upward-slanting palpebral fissures, and hypertrophy of papilla. The lobes may be hypoplastic or absent, smaller ears, hearing difficulties, and epicanthal folds present[5], along with a markedly decreased brain volume, temporal lobe, parietal cortex and impaired neural development. These typical features result in a mental retardation.[6] Computerized anthropometry is used for quantitative examination of the facial characteristics of Down syndrome.

The oral complications routinely associated with this syndrome in children includes–mouth breathing, macroglossia, open-bite, hypodontia, microdontia, angular stomatitis, fissured tongue and lips, malocclusion, delay in the eruption of primary and permanent dentitions, incidence of dental caries etc.[7] Eruption, determined using clinical examination and radiographs forms the most important aspect of morphological development. In children with Down syndrome, there will be a delay in the eruption timing for both deciduous

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and permanent teeth. The least affected ones, however, are the central and lateral incisors and the first molars. Asymmetry, commonly affecting the canines are more frequent between 10–14 years, while between 7–9 years they are less common.[8]

The delayed eruption of teeth in children having Down syndrome could be influenced by decreased peripheral blood circulation, delay in the growth of the maxilla and mandible.[9] Other local causes could be– caries, periapical lesions of the deciduous teeth, trauma etc. This study aims to evaluate the association of Down syndrome and delay in the eruption of permanent teeth in relation to chronological age in children.

Method

80 children, between 6–12 years of age, having mixed dentition were considered for this study. 30 among them were children with Down syndrome, whereas 50 children were healthy. The eruption sequence of permanent teeth, and eruption disorders, if any, were evaluated in all the quadrants using clinical examination and radiological techniques. Data were obtained concerning family history, dental history, growth indices and state of dentition for each patient, and they were then recorded in the dental examination sheets.

The consents for the examination were taken from the parents and the university. The study was subsequently conducted between 2016 and 2017.The dental age was determined by clinically examining for the presence, absence, and the number of the permanent teeth. A statistical calculus of correlations and regressions were considered to establish the relationship between Down syndrome and delay in the age of tooth eruption. The software used for this purpose is the SPSS software. A test was carried out on variation Inflation Factor (VIF) to eliminate multicollinearity with the maximum acceptable limit below 10 that allows acceptance. Also, a simple and ordinary least squares regression was done to evaluate the significance of the adopted model which was set at $p < 0.05$.

Results

On examination both clinically and radiographically, 10 children demonstrated concordance between the dental and chronological ages. 8 children each had a difference of 2 years and 3 years respectively between the two ages. 4 children presented with the greatest discrepancy of 4 years between the two ages.

Among the 50 children in the control group, 45 presented with a correspondence between the chronological and dental age or a difference of within 1 year, whereas 5 children demonstrated a 2-year delay. Thus, overall 25 children with Down syndrome (75%) presented with delayed eruption as against only 10 children (17%) from the control group. This difference is statistically significant. The correlation coefficient between presence of Down syndrome and delay in tooth eruption was found to be 0.609. This can be considered as between average and high-resolution value between the two variables. The statistical calculus of regression value came at 0.37 with a 99% level of significance. A positive correlation coefficient, at the level of 99% ($p < 0.001$) was found between presence of Down syndrome in children and delay in tooth eruption. The weighted average value of discrepancy in the study group was 1.20 years (Figure 1).

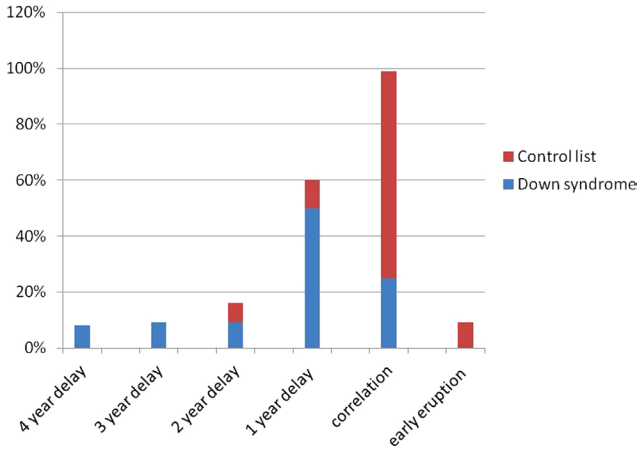


Figure 1. Average value of discrepancy in the study group

Discussion

From a statistical viewpoint, the results of this study, significantly correlate with other studies. Authors in a study on 41 children with Down syndrome between 6–10 years of age, have obtained a statistically significant correlation with a delayed tooth eruption ($p<0.004$).[10] Bagherpour et al 2010, Hedge et al 2002, Baghdadi et al 2012 have described the Demirjian's method to be accurate, whereas, Nik-Hussein et al 2011, Cruz Landeira et al 2010 had mentioned of its various drawbacks.[11,12,13,14,15]

Diz and Limeres carried out a study to assess the discrepancy between chronological age and dental age in children having Down syndrome, cerebral palsy and Intellectual disability respectively. 37 patients

between 3–17 years of age formed the group with Down syndrome. Out of them, 30% presented a delay of 2 years, 2.5 years and 3 years respectively, with a p value of 0.02 at 95% level of confidence. However, since only female patients had shown statistically significant results, the results remained inconclusive.[16] Ogodescu, in his study, demonstrated an increased dental age in girls and an advanced chronological age in boys between 5.5 to 14.4 years.[17] When the results from our study were compared with previous studies conducted on Caucasian and Black samples, most of them suggested the chronological age to be more advanced than the dental age. Karatas et al in 2012, conducted a study on Turkish children from the Anatolia region with a delayed dental age of 0.48 years in boys and 0.38 years overall.[18]Leurs in his study on a Dutch sample, revealed the dental age to be lower than the chronological age by–0.6 years in girls and 0.4 years in boys.[19]Studies in India by Serene Koshy and Hedge also reported similar results. Rizig in a sample of Sudanese children also found the dental age to be lower than the chronological age for both boys and girls.[20]

In the Nordic countries, studies revealed the dental age to be more advanced than the chronological age. According to a study by Mornstad, the difference varied between 0.4–1.8 years in boys and 0.5–1.8 years in girls.[21] The difference was by 0.2 years in boys and 0.3 years in girls when Nykanen performed the study on a population in Norway.[22] Nystrom, in 1986, found the difference to be 0.7 years in boys and 0.9 years in girls when he carried out the study in a Finnish population.[23] Similar results were again observed by Rozylo-Kalinowska et al in 2008 on a population of French children.[24] Rizig in 2013 and Hedge et al in 2002 stated that the differences of sample structure in terms of its age, sex, size, nationality, ethnicity, socio-economic status, diet and the statistical analysis led to a discrepancy between the chronologic age and dental ages when measured by Demirjian's method.

The interval of delay in the eruption can be due to–different study group structure, regional/ local and general factors. Estimations on the stage of development of the Dentofacial complex is significant for the orthodontist as well as the maxillofacial surgeobn, in determining the perfect time to initiate the treatment. This also helps the surgeon to decide on the extraction of the deciduous teeth. A precise diagnosis is always essential to decide on the correct treatment plan.

Conclusion

The presence of Down syndrome in children strongly influences the delayed eruption of teeth as against children who do not have this syndrome. Thus, the children with Down syndrome should be regularly monitored to identify abnormalities in their dental eruption, and in turn provide a good health and quality of life.

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Storage Media to Preserve the Avulsed Tooth

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Abstract

Complete loss or exarticulation of tooth out of the socket resulting from trauma and mutilation of periodontal ligament. Immediate reimplantation is the most preferred treatment but is not always practically possible. So, the only option is to have interim storage media to transport the avulsed tooth in least possible time for the best possible outcome. Ideal medium is expected to have pH and osmolality conducive to retain viability of periodontal cells during the extra-alveolar time period. This review focuses on all the available storage mediums and also the medium which are newly proposed and needs further research.

Keywords: *Avulsion, Interim Storage Media, Emdogain.*

Introduction

Advances in dentistry over past decade have progressed and aimed at preserving the natural teeth in every possible. Dental and oral pathology. Complete loss or displacement of tooth out of its socket in the alveolar bone due to trauma is known as dental avulsion and has been categorized as Ellis Class V fracture.This has diverse complications and more importantly in children affecting their growth as well as psychosomatic development. Tooth is normally held in the socket by means of periodontal ligament which gets stretches and splits resulting in loss of teeth. Earlier time the only line of management was to discard the teeth, but now there has been extended research in storage and transport media which assures the vitality of cells and tooth can be successfully reimplanted. The most important criteria are the time and media for storage.[1,2]

Permanent incisors are the most commonly injured teeth and there has been sufficient literature supporting the reimplantation. Also there has been scanty reports about reimplantation of deciduous teeth as well as few cases of delayed reimplantation. Unanimously all studies have shown that if the teeth are stored in ideal media and reimplanted within 15 min reimplantation shows good prognosis. This review focuses on the available storage media as well as on newly developed medias which are on horizon.[2]

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Storage Media is a physiological medium which closely simulates the oral environment and preserve the viability of cells of periodontal ligament. Its osmolarity and pH matches with physiological environment and thus sustaining the cells of pdl.[3]

Tap water: Easily available but least desirable and most unacceptable storage media because of it is hypotonic, has pH 7.4-7.9 and osmolality not conducive for pdl cells along with higher chances of bacterial contamination. This causes fastened destruction of pdl cells which is almost similar to storing it dry condition. [4]

Normal Saline:0.09% w/v solution of sodium chloride with osmolality 280 mosm/kg, even though it is found to be compatible to the cells of periodontal ligament but it lacks nutrients which are necessary for the metabolism of cells. Pileggi et al did the study and concluded that viability of cells was reduced to 55% after 4hrs of storage and 20% mortality after 45 min of placement.[5,6]

Saliva: Owing to its easy availability and pH of 7.4-7.9 this can be used safely for storage shorter period of

time. It causes swelling and membrane damage of cells and enhances the chances of replacement resorption. The only advantage is its easy availability but it can be stored only for shorter period of time 2-3hrs.[7]

Milk: It is considered as one of the most acceptable transport medium especially cold milk.

Various studies have conducted to evaluate its efficacy for extended period of time up to 6 hours and have proven to be satisfactory. Marino et al in their study concluded that low fat milk and chilled milk showed better results for longer periods of time. The main drawback is that the presence of antigen in the milk may interfere with the reattachment process.[8,9]

HBSS (Hanks Balanced Salt Solution) introduced by Hanks in 1975 for tissue culture preservation. This is considered as the gold standard and used as comparison criteria to assess the efficacy of medias. This is accepted by American Academy of Endodontics because of its ability to maintain the cells and its capacity to proliferate up to 48 hours. This is composed of sodium chloride, potassium and calcium chloride, anhydrous magnesium sulfate and D-glucose. Its pH and osmolality favor the cells and tissue viability until 24hrs. It is marked as Save–A-Tooth, but its knowledge and use in India is limited and not even readily available.[10,11]

Quest for search of ideal storage and transport media continued leading to trial of various commonly and naturally available and chemically feasible options such as coconut water, aloevera, pomegranate juice, mulberry, propolis, ascorbic acid, growth factors,emdogain, powdered milk etc.

Propolis is plant-based product derived from buds of conifer trees. It is a sticky resin with antibacterial and anti-septic properties. Mori et al evaluated its efficacy and deduced the cell maintainaceuntil 6hrs. Also being immunomodulatory did not interfere in reimplantation. 10% and 50% propolis showed no significant difference in effect on cells of periodontal ligament and the outcome.[12,13]

Coconut Water is natural pure and sterile solution rich in minerals, vitamins, and minerals. Along with it possess regenerative and antioxidant properties so it can be more effective in preserving the periodontal cells. The activity is however dependent on concentration and can be used to store avulsed tooth for longer period of time up to 45 minutes. Thomas et al concluded efficacy of coconut water and HBSS to be equivalent. Silva et al studied the cytotoxic activity of coconut water in comparison to HBSS and found both to be least toxic. Thus, owing to its superior properties and natural easy availability this has been recommended as one of the preferred storage media.[14-16]

Green Tea Extract contains polyphenols which attribute to its health benefits and it is easily commercially available and thus has been tested for being used as storage media. The major polyphenol known as epigallocatechin 3-gallate provide its antioxidant, anticariogenic, and antiseptic property. Hwang et al and Jung et al reported excellent results with almost 90% of cell viability for almost 24 hours similar to HBSS.[17,18]

Aloe Vera belong to Liliaceae family. Inner part is gel like material which can be used but it should be for at least time as possible. Various concentration of aloe vera (10%,30%,50%) was studied by Badakhsh et al and proved to be supplemental culture media up to 9hrs and cell viability was found to be 90% thus aloe Vera can be recommended as suitable media for storing avulsed teeth.[19,20]

Pomegranate Juice have antioxidant, anti-inflammatory and anticarcinogenic property and thus an extraordinary fruit with medicinal power. At concentration of 1% and 2.5% it showed profound proliferative effect at 1hour. It also shows enhanced cell attachment. Pomegranate juice like HBSS produces spindle like morphology of periodontal fibers in 24 hours of storage. However further research is needed to design recommendation.[21]

Egg White has increased protein content, water, vitamins, lesser chances of microbial contamination and can be easily obtained at the site of trauma. In comparison to milk egg white showed better cell viability and fastened healing. With pH of 8.6-9.3 and osmolality of 258 mosmol/kg this can be a suitable media as in comparison to milk. Few researchers have also advocated its use in cases of teeth requiring delayed replantation and avulsed teeth can be stored up to 10 hrs.[3]

Ascorbic Acid being known to stimulate the type I collagen production and also enhances the expression of specific marker for osteoblastic activity such as alkaline phosphate and osteocalcin, this has been proposed to enhance outcome of reimplantation of avulsed teeth. For successful attachment of periodontal fibers to the

socket ascorbic acid plays crucial role and thus serve as prospective storage media.[22]

Growth Factor mediates and regulates numerous activities of the wound healing and also has been proven to promote healing of periodontal fiber regeneration and attachment. Platelet derived growth factor and insulin-like growth factor enhance the formation of periodontal apparatus almost up to 5-10-fold especially during the initial phase of wound healing.[23]

Emdogain (Enamel Matrix Derivatives, EMD) extracted from enamel of porcine origin and contains exceptional matrix proteins. Various researchers have concluded that the matrix proteins influence the attachment of periodontal ligament, proliferative and biosynthetic activity of PDL cells. However, these are among the mediums on the horizon to be further evaluated and compared.[24]

Conclusion

Reimplantation of avulsed tooth is established treatment line to preserve the natural teeth. However, it is influenced by various factors such as growth stage of the tooth, extra-oral time, storage media to maintain viability of PDL cells and delicate handling of the tooth. With so many options available, still there is need to further exploration to have storage media which suits all the criteria and should be easily available and cost effective.

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Hypothesising the Research Question

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Abstract

With an increase demand in the field of research, it is crucial to have good knowledge about the fundamentals of research. Some of the major setbacks in research can be attributed to a faulty research question, unsatisfactory hypothesis and impractical research objectives. The afore mentioned form the founding stone of a good research paper. Hence, a thorough knowledge about writing a research question, hypothesis and objectives is quintessential. This review provides a simple outlook on penning down a research question.

Keywords: *Research question, hypothesis, objectives.*

Introduction

"Your manuscript is both good and original; but the part that is good is not original, and the part that is original is not good."

Samuel Johnson: After deciding on the research topic, the investigators have to think carefully about the desired outcome of the research and to do so, a research statement or question or hypothesis is essential. This forms the quintessential base of the research. Careful and meticulous reasoning is required to frame an appurtenant research question or hypothesis. A well composed research question with clear objectives helps in the development of a precise study design and hence can produce an outcome which would be authentic and valid.[1,2] This paper aims to help the readers in overcoming the hurdles of framing a research question, with suitable hypothesis and objectives.

Research question: In order to develop the research design, the research topic often has to be changed to a research question, and the research question should be *defined* and *refined* so that it can be answered with precision. The research question defines the "area of interest" but it is not a declarative statement like a hypothesis.[1,3]

While framing a research question one should follow a funnel approach i.e. go from the general focus of the study to the more specific focus areas. A research question should be answerable. The research question should be *right* for the concerned research topic. It should be important, unambiguous, justified for the research topic.[4,5] Apart from delving into the vast knowledge of medical literature, research question designing can be made simpler by following guidelines given by Hulley et al in 2007.[6]

The criteria of the FINER highlight useful points that may increase the chances of developing a successful research project. A good research issue should specify the population of interest, be of interest to the scientific community and beneficial to the public, have relevance, significance and add on to the existing literature.[6]

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Table 1: FINER criteria for a good research question[6]

F	Feasible	**Adequate Number of subjects:** • Preliminary sample size • Estimate No of subjects available • No. of subjects who would be excluded or refuse • No. of subjects that would be lost to follow up • Conduct a pilot study whenever necessary **Technical Expertise:** • Subject recruitment • Measurement of variables • Data analysis **Cost:** • Estimate early • Modify design / discard question **Scope** • Don't attempt to accomplish too much • Avoid multiple research questions • Narrow the goal and focus on important question
I	Interesting	• Getting the answer intrigues investigator and community • Benefit for the researcher
N	Novel	• Confirms, refutes or extends previous findings • Old research can be modified based on study populations, variable under study or can add on to the previous findings
E	Ethical	• Amenable to a study that institutional review board will approve • Confirms confidentiality • Follows the helsiki declaration
R	Relevant	• To scientific knowledge • To clinical and health policy • To future research

Whereas the FINER criteria outline the important aspects of the question in general, a useful format to use in the development of a specific research question is the PICO format.[6]

Table 2: PICOT criteria[7]

P	Population (patients)	• What specific patient population are you interested in?
I	Intervention (for intervention studies only)	• What is your investigational intervention?
C	Comparison group	• What is the main alternative to compare with the intervention?
O	Outcome of interest	• What do you intend to accomplish, measure, improve or affect?
T	Time	• What is the appropriate follow-up time to assess outcome

PICOT helps the researcher streamline the study towards specific focus area which can in turn, narrow down the population, cutting costs in carrying out the research. If required, a pilot study can be conducted to further strengthen or modify the research question. Few more things to consider early in designing a research question is to involve a biostatistician as early as possible. They can help in designing a good methodology by selecting an appropriate study design and give an accurate sample estimation.[5,7]

Generating the research hypothesis: Hypothesis: an idea or theory that is not proven but that leads to further study or discussion. It is a tentative and formal prediction about the relationship between two or more variables in the population being studied, and the hypothesis translates the research question into a prediction of expected outcomes. Hypotheses are designed to express relationships between variables. If this is the nature of your question, a hypothesis can add to your research. If your question is more descriptive or explorative, generating a hypothesis may not be appropriate.[6,8]

The experimental or medical hypothesis is formulated on the basis of the research question and is summed up to provide a framework for experiments, statistical and eventually clinical relevance–testing method, intervention (if applicable), correlation and outcome parameters. A research question should be based on the hypothesis rather than the available data. Hence to formulate a good hypothesis one needs to look at variables under study, target population and the relationship between the variables.[6,8,9]

Following the conception of a research question, a researcher also should be able to formulate and alternative hypothesis. The criteria for the research issue in the form of a null hypothesis and an alternative hypothesis should be indicated as the relationship between two or more variables. The null hypothesis and alternative hypothesis should have clear implications for the testing and identification of the relationship. It is essential to refine the research question to design a good and valid research. Finetuning the research question often leads to elimination of ambiguity.

Hypothesis are broadly classified under two categories, namely the 'null hypothesis' and 'alternative hypothesis'. Null hypothesis generally states that there is no relationship between a given set of variables, it can also be called as a statistical hypothesis while alternative

hypothesis states that there is a relationship between a given set of variables. Alternative hypothesis can sometimes be called as working hypothesis or research hypothesis.[9,10]

The design of a research hypothesis is supported by a good research question and will influence the type of research design for the study. The study can then proceed confidently with the development of the research objective based on the principles of appropriate hypotheses.[10]

Research objectives: Research objectives help in making the expected outcomes clearer and specific. A good set of research objectives help in planning a good research design, with minimum flaws and maximum output. A guideline proposed by National Institute of Health in 2016 helps in effective designing of an objective.[11]

S = Specific

M = Measurable

A = Attainable/Achievable

R = Realistic

T = Time Bound

Specific: A specific goal is far more likely to be accomplished than a general purpose. Provide sufficient detail so that it is not undecided what precisely needs to be done. Specific objectives need to focus on the "what" rather than the "why". To successfully design an objective we need to know the nature of the problem or situation we are dealing with.

Measurable: Choose an objective that can be calculated, so that one can see the improvements as they take place. A tangible goal has a quantifiable and evaluable result. Not just the outcome, an objective should also be able to measure the magnitude of the problem.

Attainable/Achievable: An acceptable objective is a realistic outcome, given the current resources and time available to the individual, whether personal, economic or cultural. If the outcome is difficult to begin with, the goal achievement may be improbable. The objective can try to achieve the outcome step by step instead of trying to get everything in one shot.

Realistic: The objective should be relevant and realistic for the particular research question and the study population. The objective should do justice to the need of the population as well as need of the researchers.

Time Bound: A time bound objective is essential to the study as without a time frame, the resources including an investigators time will not be effectively utilized. A time frame can aid in effective evaluation of an ongoing research and can provide adequate leeway for any necessary modification.

Conclusion

A successful research question needs a thorough review of the literature and a deep insight into the particular area to be investigated. The research question needs to be focused and basic with a base of a good hypothesis. Work that is motivated by such a problem can have a wider impact in the field of social and health research by contributing to the current knowledge and simultaneously opening new research prospects.

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Comparing the Anti-Plaque and Anti-Gingival Effectiveness of Punica Granatum and Chlorhexidine Containing Mouthwash: A Single Blinded Randomized Clinical Trial

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Abstract

Objective: The objective of this current research is to compare the anti-plaque and anti-gingival effectiveness of Punicagranatum and chlorhexidine containing mouthwash.

Materials and Method: A single blind randomized controlled trial was conducted among 20 healthy individuals. The participants were randomly allocated into two groups: Group I (Experimental group-Punicagranatum), GroupII (Controlled group-Chlorexidine). Before conducting the trial, the study design was explained to the qualifying participant and informed consent was obtained from the voluntary patients who were willing to participate in the study. Erythrosin disclosing solution was used to disclose the plaque. The plaque index and gingival index was recorded at baseline and 7th day. Wilcoxon signed Rank test used to compare the mean differences before and after treatment within each group for Plaque and Gingival index score. Mann-Whitney 'U' test to estimate differences between the mean Plaque and Gingival index score between the groups.

Results: A statistically significant reduction in mean Plaque and Gingival Index score was observed in both Group I and Group II at baseline and 7th day follow up. But there was no statistically significant difference was observed between the groups at 7th day of follow up.

Conclusion: To conclude, there was no statistically significant difference was observed in mean plaque index and gingival index between group I and group IIat 7th day of follow up. Hence, PunicaGranatum mouthwash can be used as an effective antimicrobial oral hygiene measure against plaque and gingival diseases.

Keywords: *Dental plaque, mouthwash, gingivitis, oral hygiene, Index.*

Introduction

Dental plaque is defined clinically as a structured,resilient substance composed of bacteria in a matrix of salivary glycoprotein and extracellular polysaccharides that adheres to intra-oral hard surfaces[1]. The unimpeded accumulation of dental plaque on gingival margin triggers inflammatory effects. The widely recognized factor in the initiation and progression of many oral diseases is dental plaque[2-4].

The principle means of preventing the progression of dental plaque is through mechanical removal by tooth brushing[5]. But for the people who are mentally and physically challenged and as well as those people who lack that skill and motivation,mouthwashes aids in preventing the plaque accumulation[6]. It is the duty of dental professionals to recommend effective oral hygiene to control dental plaque and accumulated inflammatory

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components to maintain optimal oral health[2]. The mouthwash has various therapeutic uses which includes reducing inflammation,halitosis and deliver fluoride for caries prevention[7]. However mouthwash should only be used as conjunction with mechanical measures[8].

Chlorhexidine mouthwash is found to possess the most superior anti-plaque property and is considered to be the gold standard among chemical plaque control measures. Its use began as a disinfectant which has a wide anti-microbial spectrum.But there is existence of some side effects which include brownish discolouration of teeth and long term use of this mouthwash may impair taste sensation[9,10]. Thus many alternative herbal mouthwashes has been introduced on daily basis to maintain the oral hygiene and to treat plaque induced gingival diseases as effectively as chlorhexidine[11].One among them is Punicagranatum mouthwash.

Punicagranatum or pomegranate belongs to the Punicaceae family and is the major source of bioactive compounds such as polyphenols,flavonoids,tannins,min erals and vitamins[12]. It acts as astringent, hemostatic agent and as well as drug for diabetic control[13]. It also has various actions like it acts like an anti-oxidant including radical scavenging ability,ferrous ion chelating and ferric ion reducing anti-oxidant power.But nowadays it has been used in dentistry[14]. Pomegranate rinsing significantly decrease the salivary activity of enzyme aspartate.Lowered saliva activities of alpha-glucosidase,an enzyme that breaks down sucrose,it increased the activities of ceruloplasmin,an antioxidant[15]. As it acts as antioxidant it attacks the causes of tooth decay at biochemical level. According to several studies,there is positive clinical result on pomegranate and suppression of oral bacteria[16]. It also has anti-plaque and anti-gingival activity.Thus this study is designed to evaluate and compare the anti-plaque and anti-gingival effectiveness of chlorhexidine and Punicagranatummouthwash.

Materials and Method

Study Design: It is a singleblinded, parallel group, randomized controlled clinical trial.

Study Population: Final year dental students and Interns of saveetha dental college and hospital, chennai were recruited for a double blinded, parallel group, randomized controlled clinical trial.

Eligibility Criteria

Inclusion Criteria:

(a) Apparently Healthy patients without any known history of systemic illness above 18-25yrs of age.

(b) Dental students with Good to Fair Plaque index score.

(c) Dental students with mild to moderate gingivitis.

(d) Dental students with habit of tooth brushing twice daily

Exclusion criteria:

(a) Dental students with positive history of usage of anti-microbial therapy and routine use of oral antiseptics in the previous 3 months

(b) Dental students with history of allergic and idiosyncratic reactions to product ingredients.

(c) Dental students undergoing orthodontic treatment.

(d) Dental studentswith presence of systemic diseases that could alter the production or composition of plaque and saliva.

Sample Size Determination: Sample size was calculated based on study by FarinKiany et al. (2016)[16] using *a priori* by G*Power 3.1.2 software. The minimum sample size of each group was calculated, following these input conditions: power of 0.95 and $P \leq 0.05$ and sample size arrived were 10 per group.

Ethical clearance: Prior to the start of the study, ethical clearance was obtained from the institutional ethics committee, Saveethauniversity.

Randomization

Sequence Generation: Computer generated block randomization with a block size of five were used to generate the assignment schedule well in advance by a third person who was not related to the study. The investigator was blinded to the sequencing of the block and allocation of the groups.

Allocation Concealment: SNOSE (sequentially numbered, opaque, sealed envelopes) method was implemented for allocation concealment which conceals the sequence until interventions were assigned. Patients were assigned their study numbers as they sequentially entered the study.Based on the group assigned, respective treatment was carried out as described in the procedure.

Blinding: Investigator was unaware about the treatment groups. Therefore the investigator was blinded in this study.

Study Procedure

Step 1: Obtaining preoperative details and informed consent from study participants-Prior to the treatment, a careful medical and dental history was taken. Preoperative data for each participant was recorded in the predesigned proforma which includes age, gender and address. The study design was explained to the qualifying participant and informed consent was obtained from the voluntary patients who were willing to participate in the study.

Step 2: Application of disclosing solution- Disclosing solution was generously applied to the surfaces of the teeth with the help of applicator brush (Refer fig 1). The study participants were instructed to rinse the mouth.

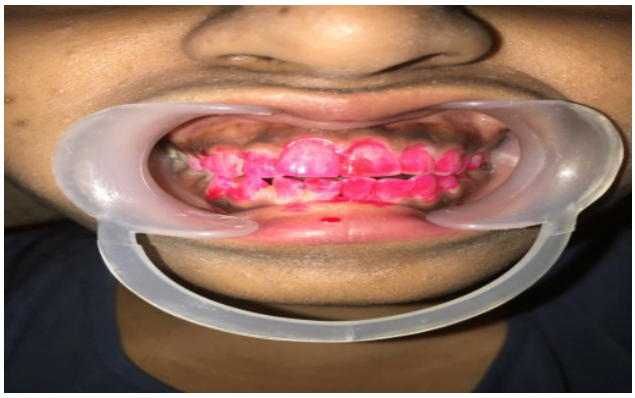


Fig 1: Application of Disclosing agent

Step 3: Scores and Criteria for recording Plaque (Silness and Loe) and Gingival index (Loe and Silness): Plaque index was recorded for the indexed teeth.The mean score of plaque and gingival index is recorded in the pre structured proforma

Step 4: Oral hygiene instructions and tooth brushing technique and Use of mouthwash: A standardized toothbrush and the toothpastes were allocated according to the group. Oral hygiene instructions withan emphasize on the appropriate brushing technique were given.

Direction of use for the Group I and Group II mouthwash (Refer fig 2): Fill cap to the "fill line" (15 mL). Swish in mouth undiluted for 30 seconds, then spit out. Use after breakfast and before bedtime. Or, use as prescribed. NOTE: To minimize medicinal taste, do not rinse with water immediately after use.



Fig 2: Study Groups

Group I-Punicagranatum mouthwash

Group II-Chlorhexidine mouthwash

Step 5: Follow up at 7th day: The above mentioned steps were repeated at 7th day of follow up.

Outcome Measure: The investigator recorded the mean score of plaque and gingival index after the use of tested products at baseline and 7th day.

Statistical Analysis:

- Data was entered in Microsoft excel spread sheet and analysed using SPSS software (version 17).
- Numerical data were presented as mean and standard deviation values.
- For test, a p value of <0.05 is to be considered statistically significant.
- **Wilcoxon signed Rank test** used to compare the mean differences before and after treatment within each group for Plaque and Gingival index score.
- **Mann-Whitney 'U' test** to estimate differences between the mean Plaque and Gingival index score between the groups.

Results

Fig 3 depicts changing trends of Mean Plaque Index score of Group I, II at baseline and 7th day. A significant reduction was observed in mean plaque Index score of Group I from baseline value of 0.52 to 0.37 at 7th day of follow up and in Group II, Plaque Index score dropped

from 0.53 to 0.37. Fig 4 shows the Changing trends of Mean Gingival Index score of Group I, II at baseline and 7th day. A significant reduction was observed in mean Gingival Index score of Group I from baseline value of 0.31 to 0.21 at 7th day of follow up and in Group II, Gingival Index score dropped from 0.28 to 0.19 respectively. Table2: Comparison of Mean Plaque and Gingival Index scores at Baseline, and 7th day time points of Group I and II. A statistically significant difference was observed in mean Plaque Index and Gingival Index score at Baseline and 7th day of follow up using Wilcoxon signed rank test. Table 3 depicts comparison of Mean Plaque and Gingival Index scores of Group I and II at Baseline and 7th day. There was no statistically significant difference was observed in mean Mean Plaque and Gingival Index between the Groups using Mann-whitney U test.

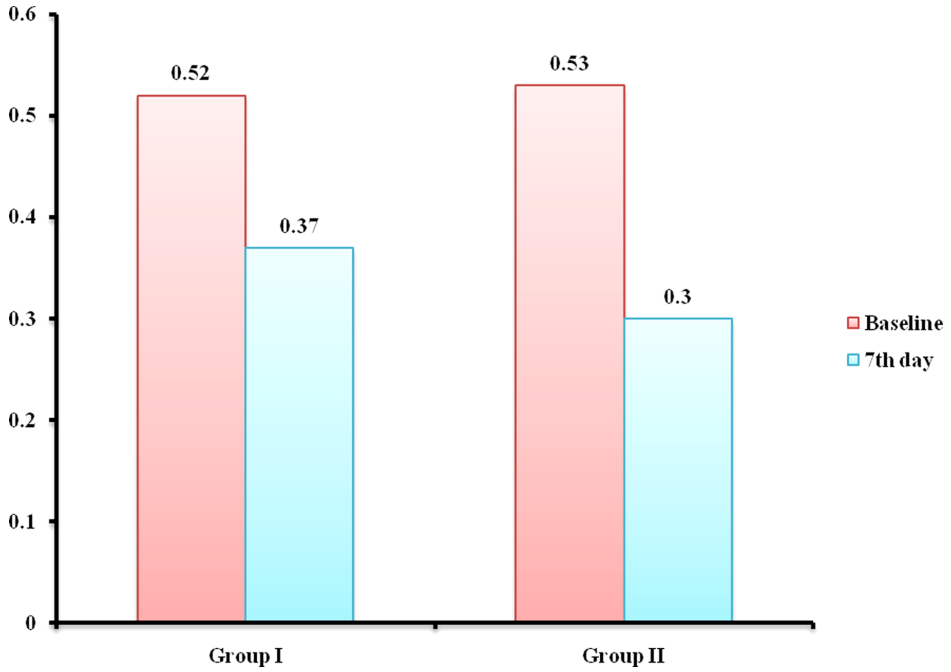


Fig 3: Changing trends of Mean Plaque Index score of Group I, II at baseline and 7th day

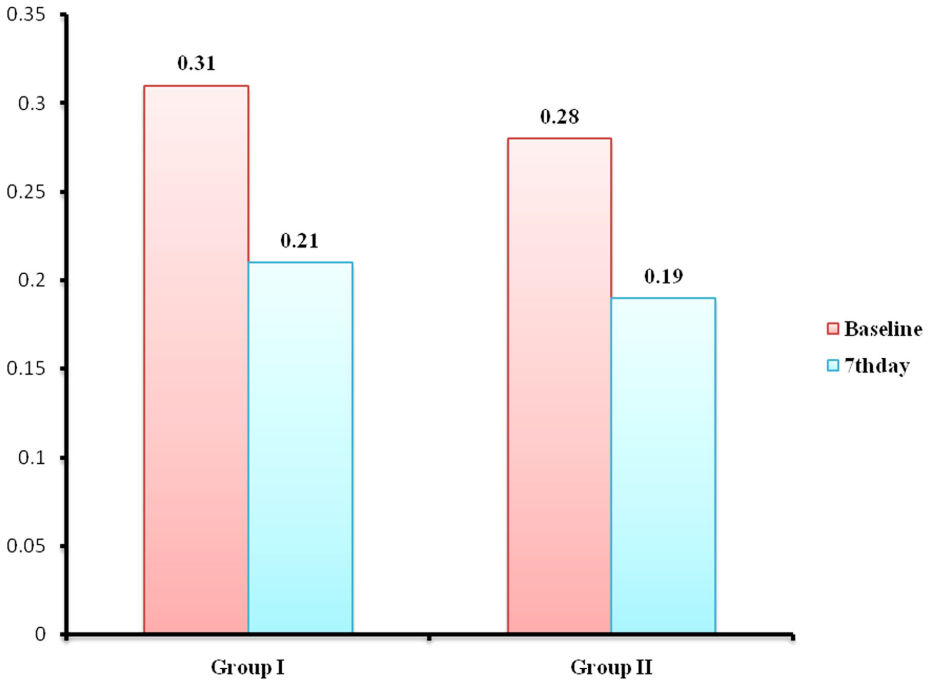


Fig 4: Changing trends of Mean Gingival Index score of Group I, II at baseline and 7th day

Table 1: Comparison of Mean Plaque and Gingival Index scores at Baseline, and 7th day time points of Group I and II

Index	Groups	Time Points (Mean±SD)		Wilcoxon signed Rank test
		Baseline	7th day	P value
Mean Plaque Index	Group I	0.52±0.16	0.37±0.11	0.04*
	Group II	0.53±0.16	0.30±0.12	0.05*
Mean Gingival Index	Group I	0.31±0.09	0.21±0.05	0.03*
	Group II	0.28±0.06	0.19±0.06	0.04*

Wilcoxon signed Rank test (P<0.05)

Table 2: Comparison of Mean Plaque and Gingival Index scores of Group I and II at Baseline and 7th day

Index	Time Points	Groups		Mann Whitney U test
		Group I	Group II	P value
Mean Plaque Index	Baseline	0.52±0.16	0.53±0.16	1.00
	7th day	0.37±0.11	0.30±0.12	0.42
Mean Gingival Index	Baseline	0.31±0.09	0.28±0.06	0.54
	7th day	0.21±0.05	0.19±0.06	0.39

Mann Whitney U test (P<0.05)

Discussion

In the present study, a statistically significant reduction in mean plaque index and gingival index scores was observed in both the groups at baseline and 7th day using Wilcoxon signed Rank test. Eventhough there was no significant difference in mean plaque index and mean gingival index was observed between the groups at 7th day of follow up, but Group II showed an higher reduction when compared to Group I. Our results were found to be controversial when compared with the study done by Ahuja et al., where pomegranate mouth rinse was found to be more effective. This can be due to the smaller sample size and lesser follow up period. According to a study done by Danubia Robertade Medeiros Nobrega, there was a reduction in the mean values of the PI index between the first and the 7th day of assessment in both groups (Chlorhexidinegluconate and Punicagranatum). However, no variation was observed between the 7th day and the 14th day of assessment. There was a reduction in the mean values of the gingival index in both groups. Nevertheless, this reduction was statistically significant only in the control group using 0.12% chlorhexidinedigluconate[17]. According to a study, the zone of inhibition against S.mutans by chlorhexidine mouthwash was found to be 19mm[18]. Our study is in contrast with a study done by Batista ALA et al., where there effective reduction of gingival index of the subjects using Punicagranatum mouthwash for 15 days[19]. A similar study done by SakshiAhuja showed significantly more reduction in plaque score seen in chlorhexidine group as compared with pomegranate and Mean ± SD for pomegranate group has decreased from 3.941 ± 0.257 at baseline to 3.498 ± 0.4206 at 7 days and 3.069 ± 0.4577 at 15 days with% reduction of 11.24% and 22.13%, respectively (P<0.05).Also significantly greater reduction was seen in chlorhexidine group, i.e., from 3.882 ± 0.42918 at baseline to 3.26 ± 0.4356 at 7 days and 2.667 ± 0.6360 at 15 days with% reduction of 16.02% and 31.3%, respectively (P<0.05).But in this study, there is significant reduction in bleeding on probing in subjects using Punicagranatum mouthwash as compared with chlorhexidine [20]. P. granatum was used in other forms, different from mouthwash, or in combination with other herbal medications.It was shown that mouth rinsing with pomegranate mouthwash resulted in lowering of total protein content in saliva in relation to placebo. Total saliva protein is normally higher among people with gingivitis and may correlate with plaque-forming bacterial content. Pomegranate-treated participants also experienced significant decreases in the salivary activity of the enzyme aspartate aminotransferase that is considered a reliable indicator of cell injury and is elevated among patients with periodontitis[16]. Pomegranate peel (Punica granatum) is a nutritive-rich byproduct [21]. It is rich in antioxidants, has antibacterial activity, and has been found effective in treating dental diseases [22]. Therefore, Traditional plants and natural phytochemicals can treat bacterial infections and are considered to be a good alternative to synthetic chemicals [23].

Conclusion

To Conclude, there was no statistically significant difference was observed in mean plaque index and gingival index between groupIand group II at 7th day of follow up,but group II (Chlorhexidine mouthwash) showed higher reduction than group I. In an urge of looking for better antiplaque and antigingivitis mouthwash with limited side effects compared with chlorhexidine, various herbal mouthwashes have

been tried with positive results. Punicagranatum is a recent herbal product used in field of dentistry. More clinical trials are required to know the effectiveness of *Punicagranatum* and its advantage over chlorhexidine, which is still a gold standard for reduction of dental plaque.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Institutional Ethics Committee, Saveetha University.

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Adherence of Hypertension Drugs among 30 Years and above Age Group Urban Population of Eluru, India

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Abstract:

Background: Hypertension is a chronic condition and has got significant role in the development of coronary heart disease, stroke and other vascular complications. To prevent some of the complications of hypertension regular intake of the prescribed treatment in the form of medicines (pills) is essential.

Objectives: 1. To find the adherence status among hypertension individuals. 2. To find the source of diagnosis of hypertension in study population.

Materials and Method: The present community based cross sectional study was conducted at urban area of Eluru, Andhra Pradesh, during the period from June 2013 to June 2014. A total of 533 individuals were selected randomly from the urban field practice area of AlluriSitaRamaraju Academy of Medical Sciences. Results were analyzed and necessary statistical tests were applied.

Results: In the present study overall prevalence of hypertension wasfound to be 24.9%.Majorityof the hypertensive had diagnosed incidentally that was 48.8%, less percentage 17.3% were got diagnosed by the health care providers visit to patient.majority(64.6%) were using beta blockers as anti hypertensive drugs and very less proportion of people were using combination of drugs that is 4.5%.Among 133 hypertension individuals who were on treatment, among them 42.1% were found to have adherence to drugs (taking regularly 6/7 days) and 57.9% were taking drugs less than 6/7 days.

Conclusions: based on the above study results, compliance of hypertensive drugs was poor as study population was taking drugs six days out of 7 days in a week. But majority taking 5 days or 4 days regularly out of seven days in a week due to ignorance and other factors. Good compliance of anti hypertensive drugs reduces the incidence of hypertension associated mortality and morbidity.

Keywords: *Age, Hypertensive Medication, Source of Diagnosis, Type of drugs, Adherence.*

Introduction

Uncontrolled hypertension will lead to cardiovascular complications such as myocardial infarction, heart failure, peripheral arterial diseases and aortic aneurysm. It may lead to renal complications like chronic renal failure, end stage kidney diseases etc and neurological complications like cerebrovascular accidents such as stroke. Most of these complications will occur without obvious signs and symptoms. Hence this disease, hypertension is called as "silent killer"[1].

Globally cardiovascular disease accounts for approximately 17 million deaths in a year, nearlyone third of the total deaths. of these, complications of hypertension account for 9.4 million deaths worldwide

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every year. Hypertension is responsible for at least 45% of deaths due to heart disease and 51% of deaths due to stroke[2].

Epidemiological studies shows that there is significant geographical difference in the occurrence of hypertension and its complications both between and within the countries: this is considered to be influenced by the interaction of nutritional and environmental factors with the subjects genetic predisposition/susceptibility to hypertension[3,4,5].

The WHO definition of adherence is "the extent to which a person's behaviour taking medication, following a diet, and/or executing lifestyle changes, corresponds with agreed recommendations from a health care provider[7-9].Detection of hypertension is not sufficient for the reduction of health problem in the society and also one must take care about regular treatment at least 6 days of treatment out of 7 days treatment means 85% adherence would bring the disease control as well as complications reduction in terms of mortality and morbidity. Many studies taken adherence criteria as 6/7 days of treatment in a week.Hypertension is an iceberg disease and the many studies were conducted on hypertension prevalence in many urban areas mainly in metro cities. Still some data is lacking, as such as in small towns like Eluru regarding hypertension prevalence and adherence of hypertension drugs status. Earlier many studies found that hypertension was observed in above 40 years of age group. As per my knowledge there is no much studies conducted in and around Eluru city regarding adherence of hypertension more than 30 years age group. Early onset of hypertension leads to decreasing life expectancy and also leads to pre mature deaths and disability. Hence, I have taken this particular study to find out adherence of hypertension drugs among 30 years and above age group and how factors associated with hypertension.

Objectives:

1. To find the adherence status among hypertension individuals.
2. To find the source of diagnosis of hypertension in study population.

Materials and Method

This was a community based cross-sectional study conducted among the adult individuals (aged ≥ 30 years) residing in the urban field practice area of a Alluri Sita Ramaraju Academy of Medical Sciences, Eluru. It would also serve the purpose of providing base line data of Hypertension in the target population of the Urban Health Training Centre, for future follow up and studies. The study has been conducted from June 2013 to June 2014 (including 6 months of field work) individuals above 30 years of age residing in the field practicearea of AlluriSitaRamaraju Academy of Medical Scienceswas included in the study. Systematic random sampling method was used for collecting the data. Based on JNC VII [6]criteria, a person was considered hypertensive if Systolic Blood Pressure ≥140 and/or Diastolic Blood Pressure ≥90 mmHg and Persons already on anti-hypertensive treatment. Data was collected by listing all the areas which comes under urban field practice area. As there were no prevalence studies in this area above 30 years age group, for calculating required sample size for the study, a pilot study was undertaken by considering 50 subjects above 30 years of age in one of the urban field practice area and the prevalence of hypertension was found to be 25% and as per the global statistical report 2010 the prevalence of hypertension in urban area was also 25%. So, by taking the mean prevalence of Hypertension in this age group was 25%. Fixing the allowable error to be 15% the minimum required sample size was calculated by using the formula n = 4 pq/L2. Hence sample size was arrived 533 and response rate in the study was 91%. Compliance criteria in our study was those who taken medicines regularly 6 days out of 7 days in a week.

Statistical Analysis: Necessary statistical tests like simple proportions were used with 95% confidence intervals.

Table No. 1: Age and sex wisedistribution of study population

Age in yrs	Male	Female	Total
30-40	138 (52.5%)	125 (47.5%)	263 (100%)
41-50	76 (53.1%)	67(46.9%)	143 (100%)
51-60	37(52.8%)	33 (47.2%)	70 (100%)
>60	26 (45.6%)	31(54.4%)	57 (100%)
Total	278 (52.1%)	255 (47.9%)	533 (100%)

In the present study, out of 533 sample 52.1% were males and 47.9% were females. 49.3% (263/533) of the study population in the age group of 30-40 years remaining 50.7% were in 40 years and above age group.

Table 2: Hypertension status among study population

Status	Hypertension individuals	Percentage
Diagnosed	83	15.6%
Newly diagnosed	50	9.3%
Total	133	24.9%

Table 2 shown out of 533 study population, 133 individuals were having hypertension. of which total of 133 hypertensives, 15.6% were already diagnosed hypertension and 9.3% were newly diagnosed during the study.

Table 3: Source of diagnosis of hypertension among hypertension population

Source of diagnosis	Hypertension
Incidental	65 (48.8%)
Periodical health check up	45 (33.9%)
Health care providers visit to patient	23 (17.3%)
Total	133 (100%)

Table 3 depicts thatthe hypertension among the study population were diagnosed. Majority of the hypertensive had got diagnosed incidentally that was 48.8%, less percentage 17.3% were got diagnosed by the health care providers visit to patient.

Table 4: Type of drug usage among hypertension population

Type of drugs	Hypertensive individuals
Beta blockers	86 (64.6%)
Calcium channel blockers	15 (11.2%)
Diuretics	5 (3.7%)
Alpha blockers	14 (10.5%)
ACE inhibitors & receptor blockers	7 (5.2%)
Combination	6 (4.5%)
Total	133 (100%)

Table 4 shown that among 133 hypertensive individuals majority (64.6%) were using beta blockers as anti hypertensive drugs very less proportion of people were using combination of drugs that is 4.5%

Table 5: Adherence to drugs in hypertension population

Adherence	Number of people	Percentage
Present	56	42.1%
Absent	77	57.9%
Total	133	100%

Table 6 shown that among 133 hypertension individuals who were on treatment, among them 42.1% were found to have adherence to drugs and 57.9% were not found be non adherence to drugs among study population.

Table 6: Reasons for non adherence in the study population

Reasons	Number of people	Percentage
Cost	31	40.3%
Distance	24	31.2%
No idea	10	13%
No family support	8	10.3%
Other factors	4	5.2%
Total	77	100%

In the hypertension population, about 40.3% were giving reason for non adherent was cost of the medicine and about 31.2% were giving reason as distance to house for getting the medication.

Discussion

The present study was conducted to study the Adherence of hypertension in urban field practice area of AlluriSitaRamaraju Academy of Medical sciences, Eluruand to study the factors associated with hypertension.A total of 533 study subjects were selected comprising of 278 males and 255 females. Most of the study population belonged to age group 30-40years.

In our study the overall prevalence of hypertension was found to be 24.9% These results were comparable to the rates obtained by shymalkumar etal [15] in his study titled ‘prevalence of hypertension in urban population of west Bengal, representing eastern India, where the prevalence of hypertension has been reported to be 24.9 in urban adults and also similar rate was obtained by Renu rani etal[16] among adults in urban area of Jammu in 30 years and above age group.

In the present study, among 133 hypertensive individuals majority were using beta blockers as anti hypertensive drugs very less proportion of people were using combination of drugs that is 4.5%. Among 133 hypertension individuals, who were on treatment, among them 42.1% were found to have adherence to drugs and 57.9% were not found as adherence to drugs among study population.About 40.3% were giving reason for non adherent was cost of the medicine and about 31.2% were giving reason as distance to house for

getting the medication.An Open access peer reviewed E-Journal research article on Antihypertensive Drug Compliance across Clinic and Community Settings[18], in Thiruvananthapuram, South India found it difficult to purchase medicines from commercial outlets on a long-term basis. A similar finding was reported from Sudan where 36.8% of the patients cited lack of money to purchase anti hypertensive drugs as the reason for non-compliance[17].

In the current study the prevalence of poor adherence to their anti-hypertensive treatment was found to be 42.1% which was quite similar to the findings of the studies done in Kasturba Hospital, Manipal by Sheilini M et al.[10] and in Mangalore by Kumar N et. al[11] where prevalence were 49.2% and 45.8% respectively. In the study by Khanam M A et al[12]among people of rural Bangladesh the prevalence of non adherence to treatment hypertension was 26.2% in the study population (25 years and above) which was low in comparison to this study. This wide difference in the prevalence of non adherence compared to our study could be because the study participants were aged 25 years above and in our study the age of the participants was 30 years andabove. Our study findings are similar to studies from China[13] and Malaysia[14] where overall 52% and 53.4% of the participants were found to be adherent to their anti-hypertensive medication respectively.Noncompliance to antihypertensive drug treatment is a complex issue, which needs to be corrected by the implementation of multifactorial strategies. The recognition and proper understanding of these complexities are expected to facilitate the development of effective solutions. Just detection of prevalence of hypertension does not give solution to the community and also researchers must focus on adherence to treatment and problems for poor adherence and multi dimensional strategies to be implemented in terms of education, diet and drugs and facilities etc.

Conclusions

Based on the study results, The adherence of hypertension treatment in the study population was little low comparatively other studies. All factors need to be synchronized so that adequate compliance, reasons for poor adherence to the treatment and blood pressure control is to be achieved in the affected population, thereby reducing the morbidity and mortality associated with hypertension.

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Ethical Clearance: Taken from Institutional ethical Committee

Source of Funding: None

Conflict of Interest: None

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A Study on Attitude of Female Teachers Towards Inclusive Educationwth Special Reference to Schools in Chennai District

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Abstract

The study was carried out to find the attitude of teachers towards inclusive education and the factors affecting it. A total of 60 teachers as respondents were involved in this study. The researchers conducted the research using the Descriptive Research Design. Descriptive Research is a scientific method which involves opening and describing of an individual without influencing the individual in any way. The tools used for data collection from the sampling were questionnaire. This questionnaire was prepared after a considerable and deep understanding of the research problem, discussion with experienced researchers, extensive study of pertinent literature and contextual imagination. The tentatively formed questionnaire was pre-tested with few samples to detect the shortcomings. The questionnaire used in this study included a scale which was derived from various other scales used to study the attitude of teachers towards inclusive education. The researchers used convenient sampling as sampling design to select the schools and teachers for gathering information. The researchers used convenient sampling due to many schools unavailability and used convenient sampling to select teachers due to unavailability of a proper list of teachers to select randomly. The respondents in this study are primarily having a positive attitude towards inculcating inclusive education in their respective schools, but are widely influenced by the type of disability that the children have when inclusion is decided upon.It can be found that most of the respondents are aware about what inclusive education is, its advantages as well as the difficulties it brings but still have a positive attitude towards inclusive education.

Keywords: *Inclusive education, attitude, teachers, Descriptive.*

Indroduction

The attitudes of teachers are shaped through a variety of factors which are both internal as well as external and which play a major role in determining whether the attitude reinforced is positive or negative. Teachers' past experiences as learners are powerful in shaping conceptions and expectations about teaching students, and form beliefs about the process of teaching during their pre-service training, and once a belief has been held for a long time it becomes difficult to change.[1] In India, a majority of children with special needs don not receive any formal education, in spite of the practice of inclusive education is some schools. This is because children with disabilities and learning deficiencies are segregated from mainstream schools and other regular routines and social activities of normal children. Inclusive education is more in tune with the social model of disability which sees the system as the problem.[2] The teachers and the education system as a whole are enabled to change in order to meet the individual needs of all learners. Teacher development has to be the heart of initiatives for developing inclusive practices in schools. There is need for strengthening knowledge, competence, skills and attitudes of teachers for creating inclusive ethos and learning environment in schools.[3]

Meaning Of Inclusive Education: Inclusive education means that all students attend and are welcome by their neighbourhood schools in age-appropriate, regular classes and are supported to learn, contribute and participate in all aspects of the life of

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the school.Inclusive education in Chennai as the same could prove to be helpful in findings the solution to the problem besetting inclusive education and make improvements is considered as one of the primary goals behind creating sustainable communities for the future.[4] Inclusive education is defined as a process in which all school systems welcome all learners despite their background, disability or other personal characteristics. Inclusive education helps in not only shaping the lives of the differently-abled into that of normal ones but also in exposing the minds of young normal children to the various disabilities and developing a welcoming attitude. Inclusion is not an experiment to be tested but a value to be followed. All the children whether they are disabled or not have the right to education as they are the future citizens of the country. At the "World Conference on Special Needs Education: Access and Quality" (Salamanca, Spain 1994), the principle of inclusive education was adopted and it was also restated at the World Education Forum (Dakar, Senegal 2000).[5]

Objective of the Study:

- To study about the demographic characteristics of teachers
- To know the type of attitude the teachers have towards inclusive education
- To study the influence of different types of disability in children on attitude of teachers

Sampling: All the regular schools in Chennai (Tambaram and surrounding areas) and their teachers. 5 regular schools and 50 schools teachers (10 teachers from every school). Convenient Sampling for selecting schools: Convenience sampling is a non-probability sampling technique where subjects are selected because of their convenient accessibility and proximity to the researchers. Any 5 regular schools are chosen to fulfil the research process. Convenient Sampling for selecting teachers: Almost all schools have more than thirty teachers. The researchers couldn't get an appropriate list of all the teachers present in that particular school and hence could only choose the teachers according to their availability and the researchers' convenience.

Tools Data Collections: A questionnaire was used to collect data for the study. A questionnaire is a research instrument consisting of questions or other types of prompts for the purpose of gathering information from the respondents.

Age of the Respondents: This table was studied to find out the age of the respondents

Table 1: Age of the Respondents

Age	Frequency	Percentage (%)
29 and Below	13	26
30-39	27	54
40 and Above	10	20
Total	**50**	**100**

Source: primary data

Table 1 shows that among 50 respondents, 54 per cent of the respondents are in the age group of 30-39 years, 26 per cent of the respondents are in the age group 29 and below and 20 per cent of the respondents are in the age group 40 and above. From the above data, it can be inferred that the highest frequency of age of most of the teachers falls under the 30-39 years category and that is usually the average age of an experienced teacher in schools. It can also be observed that there are very less percentage of teachers in the 40 and above age group indicating that schools prefer middle-aged teachers more than elderly ones.

Gender of the Respondents: This table was studied to find out the gender of the respondents

Tabel 2: Gender of the Respondents

Gender	Frequency	Percentage (%)
Male	13	26
Female	37	74
Total	**50**	**100**

Source: primary data

Table 2 shows that among the 50 respondents, 74 per cent of the respondents are female teachers and 36 per cent of the respondents are male teachers. From the above data, it can be inferred that the majority of the respondents are female and male teachers are very less in number. This may be due to the fact that most of the teachers being employed nowadays are female. It can also be that teaching in schools has traditionally been considered a profession for the women due to their ability to take care of children and also male teachers' reluctance to take care of children in schools.

Table 3: Teaching Class Of Respondents

Respondent	Frequency	Percentage (%)
Elementary	8	16
Primary	12	24
Middle	6	12
High	24	48
Total	**50**	**100**

Source: primary data

Table 3 shows that 48 per cent of the respondents are teaching in high school, 24 per cent of the respondents are teaching in primary school, 16 per cent of the respondents are teaching in elementary school and 12 per cent of the respondents are teaching in middle school.

It can be inferred from the above data that that most of the teachers are from the high school and also a small percentage of the majority are from the primary school and hence most of the data collected is based upon the attitude of teachers towards inclusive education in high schools. It can also be observed that due to the lottery method more number of high school teachers was selected which is indicative of presence of more high school teachers in a school.

Significant Levels of Interaction with Person with Disabilities: The table is used to study the significant level of interaction the respondents have had with children with disabilities.

Table 4: Significant Level Of Interaction

Interaction	Frequency	Percentage (%)
Yes	21	42
No	29	58
Total	**50**	**100**

Source: primary data

The data shows that 58 per cent of the respondents haven't had significant interaction with persons with disabilities and 42 per cent of the respondents have had significant interaction with persons with disabilities. It can be inferred from the above data that more than half the respondents haven't had significant interaction with persons with disabilities and it shows the lack of opportunities and interest most teachers have when interacting with children with disabilities. But due to the percentage being less skewered, we can also conclude that there is a positive intent among teachers to interact with children with disabilities. It also shows that due to half of them having less or very less interaction with persons with disabilities, their very few experiences may be determining their attitude towards children with disabilities.

Knowledge of Local Legislation Policy Regarding Disability: This table is used to study about the respondents' knowledge of local legislation policies regarding disabilities.

Table 5: Knowledge of Local Legislation Policy Regarding Disability

Knowledge level	Frequency	Percentage (%)
Very good	1	2
Good	13	26
Average	26	52
Poor	2	4
None	8	16
Total	**50**	**100**

Source: primary data

The above data shows that 52 per cent of the respondents have an average level of knowledge regarding local legislations, 26 per cent of the respondents have a good level of knowledge, 16 per cent of the respondents are not aware of any legislations, 4 per cent of the respondents have a very poor knowledge level and 2 per cent of the respondents have a very good knowledge level.

It can be inferred from the above data that most of the respondents have some level of knowledge regarding the legislations for disabilities. The data also shows that most of the teachers have either something or the other knowledge about the local legislation policy due to increased awareness campaigns and more socially aware public in general.

Level of Confidence in Teaching a Student with Disability: This table is used to study about the level of confidence of respondents in teaching a student with disability.

Table 6: Level of Confidence in Teaching a Student with Disability

Level of confidence	Frequency	Percentage (%)
Very high	5	10
High	23	46
Average	20	40
Low	2	4
Very low	0	0
Total	**50**	**100**

Source: primary data

The above data shows that 46 per cent of the respondents have a high level of confidence in teaching student with disability, 40 per cent of the respondents have an average level of confidence, 10 per cent of the respondents have very high level of confidence and no respondent has very low level of confidence in teaching children with disabilities.

It can be inferred from the above data that most of the respondents have average to high level of confidence in teaching children with disabilities. It shows most of the teachers are confident or confident enough to teach children with disabilities even though they are not qualified or trained enough. This is due to the inherent ability and confidence of teachers which they possess to deal with any kinds of problems they face.

Major Finding:

- The study found that majority of the respondents have a positive outlook towards inclusive education and have an attitude which would progress the implementation of inclusive education in regular schools at a faster rate
- According to the study, the demographic factors played a major role in influencing the attitude of teachers towards inclusive education. It is due to reasons such as previous experience, gender and continuous exposure to disability and students with disability which shape their thoughts and prejudices.
- The study also found out that the attitude of teachers are vastly influenced by the type of disability which curtails a student among other factors and this was observed in the respective interpretation when the respondents were divided upon the type of attitude which they have towards inclusive education when it pertains to various disabilities.

Suggestions: Inclusive education is one of the most trending topics in modern education system and inclusion is the norm in today's world of bigoted, racist and cattiest people. Segregating normal children from children with disabilities in the name of special schools and special attention in another form of marginalization and division and it denies both groups the chance of getting to know each other and in the process getting to know themselves. One powerful group which can put an end to this are the educators and the teachers who are the driving force behind the education system in this country.

Teachersshould try to be more aware and gain knowledge about disability and try to be more ready to handle children with disabilities when the time of inclusion comes. Experiential learning should be a must for all newly appointed teachers who need to be appointed based on their expertise in dealing with all types of children. Inclusion is natural; teachers need to embrace it as their own.

Conclusion

The study has been completed successfully with the help of various people who have helped at various times during the research process. Inclusion is very essential in bringing in the marginalised communities in our society along with normal people and this is the way humans are intended to be, together and with unity in diversity.[6] Such diversity must be celebrated from a very young age and inclusive education plays a major role in it. There is a generally positive attitude among teachers for inclusive education and most of them seem ready if given the task of being an inclusive educator. The research was successful in determining the various aspects of inclusive education which influence the attitude of teachers towards inclusive education.

Conflict of Interest: Completed.

Source of Funding: Self

Ethical clearance: Nil

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A Descriptive Study to Assess the knowledge on Fertility and Infertility among Adolescent Girls in a Selected College at Kanchipuram District Tamil Nadu, India

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Abstract

A descriptive study to assess the knowledge on fertility and infertility among adolescent girls in a selected college at kanchipuram District TamilNadu. The objectives were to assess the knowledge on fertility among adolescent girls in a selected college at Kanchipuram District,Tamil Nadu, India., To assess the knowledge on infertility among adolescent girls in a selected college at Kanchipuram District Tamil Nadu, India, To compare the knowledge on fertility and infertility among adolescent girls in a selected college at Kanchipuram District,Tamil Nadu,India, To associate demographic variables With the knowledge on fertility and infertility among adolescent girls in a selected college at Kanchipuram District,Tamil Nadu, India.Hypothesis of the study were 1. There is no significant co relation between the knowledge on fertility and infertility among adolescent girls in a selected college at Kanchipuram District,Tamil Nadu, India,2. There is no significant association between the selected demographic variables with the knowledge among adolescent girls in a selected college at KanchipuramDistrict,Tamil Nadu, India. The convenience sampling was used to select 78 samples. The data collection tools were validated and reliability was established. The data were collected by self-administered questionnaire. The collected data tabulated and analyzed. Descriptive and inferential statistic were used. The study showed that 60 adolescent girls had poor knowledge on fertility where as 4 had adequate knowledge on fertility, 39 adolescents had poor knowledge where as 9 had adequate knowledge on infertility.There is a weak positive correlation between knowledge on fertility and infertility among adolescent girls were r=4.586.There is no significant association between the knowledge on fertility and infertility among adolescent girls with the selected demographic variables.

Keywords: *Fertility, Infertility, Adolescent Girls.*

Introduction

This is a list of the states and union territories of India of ranked in order of number of children born for each woman. Recent surveys show that majority of Indian states fertility rate has fallen well below the replacement level of 2.1 and the country is fast approaching the replacement level itself. The total fertility rate of India stands at 2.2 as of 2017. In seven years Indians will cross the 1.44 billion mark and the nation will go on to have a bigger population then china, according to a U.N.report [7]

The world population prospects :The 2017 revision report released on June 21,2017 recorded two other dramatic facts :The fertility rate of Indians have more then halved over the last 40 years to 2.3 and Indians have added almost a decade to their life expectancy in the past 25 years which is now nearly 69 years. [7]

Materials and Method

Research Approach: In this study, researchers assessed the level of knowledge on fertility and infertility among adolescent girls by using **Quantitative approach**

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Research Design: Descriptive research design was used for the present study.

Research Setting: The study was conducted in Tagore College of Nursing at Kanchipuram District, TamilNadu, India.

Population: The entire set of individuals or objects having some common characteristic(s) selected for a research study; sometimes referred to as the universe of the research study.

Target Population: The entire population in which the researchers are interested and to which they would like to generalize the research findings

Accessible Population: The population of the present study comprises of all the adolescent girls in a selected college who were all available during the period of data collection in selected College, at Kanchipuram District, Tamil Nadu.

Sample: Adolescent girls in the course of first year B.Sc Nursing in Tagore College of Nursing at Kanchipuram District, TamilNadu, India.

Sample Criteria

Inclusion Criteria

- Girls who are in age group of 17 and 18 years
- Girls who are in the course of first year B.Sc Nursing
- Those who are willing to participate
- Who are able to understand English

Exclusion Criteria

- Girls who are not available at the time of study.

Sampling Technique: Non Probability-convenience sampling technique was adopted for this study.

Sample Size: The sample size=79

Description of the Tool

Data Collection Tool: A self-administered questionnaire was used as a tool for data collection. It was consisted the following parts.

Part-A: A description of the demographic characteristics of the sample like Age, Educational status of the father,Educational status of the mother, Occupational status of father, Occupational status of mother.

Part-B: Question to assess the knowledge regarding fertility among adolescent girls which contains10 questions Each sample has taken 10 minutes to fill up.

Part-C: Question to assess the knowledge regarding infertility among adolescent girls which contain 10 question Each sample has taken 10 minutes to fill up.

Score And Interpretation

Total number of knowledge question-20. Each correct answer was given 1 mark.

Score	Level of Knowledge
Above 76%	Adequate knowledge
51-75%	Moderate knowledge
Below 50%	Inadequate knowledge

Analysis of data: Data was analyzed using Descriptive and Inferential statistics.Data were analyzed using computer software MS Excel,The sample's characteristics were reported as percentages. The association was reported by using chisquare. The comparison was done by using correlation coefficient.

Results and Discussion

The study showed that 60 adolescent girls had poor knowledge on fertility whereas 4 had adequate knowledge on fertility, 39 adolescents had poor knowledge whereas 9 had adequate knowledge on infertility

Table 1: Frequency and Percentage of knowledge level on fertility

Grade	Frequency	Percentageof Sample
Adequate knowledge (76-100%)	04	5.127%
Moderate knowledge (51-75%)	14	17.94%
Poor knowledge (50%)	60	76.92%
Total	**78**	**100%**

Table 2: Frequency and Percentage of knowledge level on infertility.

Grade	Frequency	Percentageof Samples
Adequate knowledge	09	11.53%
Moderate knowledge	30	38.46%
Poor knowledge	39	50%
Total	**78**	**100%**

There is a weak positive correlation between knowledge on fertility and infertility among adolescent girls were r=4.586.

There is no significant association between the knowledge on fertility and infertility among adolescent girls with the selected demographic variables.

Findings of the study were presented under the following headings based on the study objectives

The findings of the present study reveals that

60 (76.92%)of adolescent girls where had poor knowledge on fertility where has only 39(50%) of adolescent girls had poor knowledge on infertility, above table shows that the adolescent girls need to be educated on fertility and the association with demographic variables revealed that There was no significant association between the age and the level of knowledge on fertility and infertility among adolescent girls x^2 =3.5093,p<(0.05),There was no significant association between educational status of the father and the level of knowledge on fertility and infertility among adolescent girls x^2 =5.3082,p<(0.05),There was no significant association between occupational status father and level of knowledge on fertility and infertility among adolescent girls x^2=6.7008.p<(0.005),There was no significant association between occupational status of mother and level of knowledge on fertility and infertility among adolescent girls x^2=5.0879,p<(0.005)

Conclusion

As our study state that adolescent girls had poor knowledge on fertility and infertility which is alarming. So researchers were given health talk to the adolescent girls on fertility and infertility

Conflict of Interest: No

Source of Funding: Nil

Ethical Clarence: In this study the researchers have got prior permission to conduct the study and got informed consent from each participant. we ensured that no physical harm to the samples. Confidentiality maintained

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A Descriptive Study on Practice of Self Medication in Urban Field Practice Area of Perambalur Municipality, Tamil Nadu, India

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Abstract

Introduction: Allopathic medicines in India are available through pharmacies and a doctor prescription is essential for procuring any allopathic drug. There are few medicines that are available over the counter (OTC) without doctors prescription. However in India, medicines are available without doctors prescription.

Objective:

1. To study the profile and practice of self medication among the urban residents of Perambalur district in India.
2. To understand the various factors influencing self medication among the study participants.

Materials and Method: Its a questionnaire based cross sectional study conducted in the urban field practice area of a medical college involving 150 participants.The study subjects were interviewed after they purchased medications from pharmacy.The study was intended to study the profile of practice of self medication rather than trying to estimate the prevalence.The study was conducted for a period of 6 months from Jan 2018 to August 2018.The study data was analysed using microsoft office excel.

Results: Fever was the most common condition (72%) closely followed by headache (67%) for which pharmacy was approached for self medicaton followed by Respiratory infections (55%), general body pain (40%), diarrhoeal problem (8%) and lack of sleep (8%).

Conclusion: The practice of self medication was found to be deeply inculcated in the minds of the participants and the participants did not feel that prescription by pharmacist without consultation of a doctor is going to be dangerous for their long term health. The knowledge regarding the medications and its side effects was negligible among the study participants. There is an urgent need from the health system planners to address this issue in a comprehensive manner before this burden goes out of control.

Keywords: *Self Medication, Over the Counter drugs, Prescription.*

Introduction

Medicines are important for treating diseases, and they are responsible for improving the population's life quality. However, indiscriminate use of medicines might cause health risks. Self-medication is defined as obtaining and consuming drugs without the advice of a physician either for diagnosis, prescription or surveillance of treatment.[1]The practice of self-medication is worrisome because of the easy access to medicines.There is a bewildering variety of medicines available without prescription in various parts of the world.They include paracetamol, nonsteroidal anti-inflammatory drugs (NSAIDs) as aspirin and ibuprofen, and opioids (usually codeine), as well as numerous 'complementary therapies' and 'herbal' products.[2,2–6]

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They may be available in different formulations, such as standard tablets, fast acting tablets, effervescent powders, or liquids. Packaging and branding can make it difficult to identify similar products or to compare them[7]. Patients often have limited knowledge of the properties of OTC drugs and how to use them appropriately. [3,8,9] Increased availability of OTC drugs has previously been suggested to lead to more relaxed attitudes towards the use of these drugs. There is evidence that patients are unaware of the adverse risks associated with concurrent use of OTC drugs with other drugs and agents [5,6,]and the long-term use of certain OTC drugs in general.[6,7,] The Practice of Self medication is a global problem and its extent of practice in developing countries like India is not fully explored. The availability of medicines without prescription is largely unregulated in India and hence this study was conducted to analyse the extent of self prescription practices in India.

Objective:

1. To study the profile and practice of self medication among the urban residents of Perambalur district in India.
2. To understand the various factors influencing self medication among the study participants.

Methodology

Study Design: Descriptive Crosssectional study

Study setting: Urban residents of Perambalur Municipality, Perambalur district, Tamilnadu.

Study Period and Duration: From May 15, 2018 to July 15, 2018

Sample Size: Assuming the prevalence of selfmedication practices as 50% and taking allowable error of 15% with 95% confidence levelusing the formula 4p (1−p)/d^2, the minimum sample size was calculated to be 142.68 which was rounded off to 150.

Sampling technique: Non probability convenience sampling.The people who bought the medications from the urban area pharmacy was interviewed after they purchased the medications from the pharmacy.This was done to ensure that the participants purchased some form of mediation and the possibility of bias is minimized.

Inclusion criteria:

1. Persons who were 18 years of age and who were able to read and write the local language (Tamil or English) were included in the study after informed consent explaining the purpose of study.

Exclusion criteria:

1. Participants belonging to medical, paramedical and pharmacology fields were excluded from the study survey to avoid selection bias as they are well aware with potential side effects of self medication and expected to have lower self medication rates.
2. Participants with intellectual, psychiatric and emotional disturbances that could affect the reliability of their responses were excluded from the study.

Data Collection: A pilot study was conducted initially to test the questionnaire on 20 subjects who fulfilled the inclusion criteria of our study in the same setting. In the light of responses obtained, ambiguities from questionnaire were removed before its implementation in the final study.The data from pilot study was not included in the final results.

Data were collected by interview using semi-structured pretested questionnaire which was administered to the participants. Prior written informed consent was obtained from the study subjects. The data was collected from the field practice area of urban health centre in Perambalur.

Data collection tool: We used paper based questionnaire which was divided into 2 parts for data collection. Each section was preceded by the statement to elaborate the type of question that would follow, for the better understanding of participants. The first part assessed the demographical features of the subject followed by second part which dealt with the prevalence and practice of self medication. The entire tool used consists of close ended questions only.

Data Analysis: The prevalence of self-medication was reported in percentages. Various determinants of self-medication use were analyzed using either Chi-square test or Fisher's exact test using Epi Info. The $P < 0.05$ was be taken as statistically significant.

Results

The average age of study population was around 44.6 yrs. Among the study participants majority of the participants were male (86%). Education plays a major role in practices such as self medication. Hence the education and occupation was assessed and it was

found that all most all of the population who participated in this study were literate barring only 4% rest 96% were literate. It was found that about 56% of the study population were involved in semi skilled occupation mainly farming. (Table 1).

Table 1: Socio Economic Characteristics of the Study Population

Variable	Frequency	Percentage
Age	44.6±3.8	
Gender		
Male	129	86
Female	21	14
Education		
Illiterate	6	4
Literate	144	96
Occupation		
Skilled	48	32
Semi skilled	84	56
Unskilled	18	12

It is expected that the population which is economically superior might be less interested in obtaining medicines from pharmacy without prescription. As expected it was found that about 47% of the lower socio economic strata of people were the majority who were indulged in self mediation practices. (Table 2).

Table 2: Distribution of subjects according to the socio economic status

Socio Economic Class	Frequency	Percentage
Upper	27	17.6
Middle	51	33.3
Lower	72	47.1
Total	150	100

Table 3 shows that there could be various clinical conditions for approaching a pharmacy. Hence the analysis was done to find out the common clinical conditions for which pharmacy was approached and it was found that fever was the most common condition (72%) closely followed by headache (67%). The other conditions for which a pharmacy was approached are Respiratory infections (55%), general body pain (40%), diarrhoeal problem (8%) and lack of sleep (8%). In India over the counter dispensing of medications is so unregulated such that even sleeping pills are available over the counter for general population without restriction.

Table 3: Frequency distribution according to the various clinical conditions & medications

Clinical conditions	Frequency (%)	Medications	Frequency (%)	Form of medicines	Frequency (%)
Headache	99 (67)	Paracetamol	105 (70)	Tablets	141 (94)
Fever	108 (72)	Cetrizine	12 (8)	Syrup	60 (40)
Respiratory infection	84 (55)	Analgesic	6(4)	Ointment	9 (6)
Body Pain	60 (40)	Doesn't know	96 (64)	Injections	42 (28)
Diarrhoeal infection	12 (8)				
Lack of sleep	12 (8)				

Coming to the knowledge of medications consumed over the counter among the participants it was found that paracetamol was the most common known medication (70%) among the participants. However knowledge regarding other medications are very minimal. In fact most of the study participants did not have any knowledge about the medication prescribed by the pharmacist.

Among the medications obtained from the pharmacy it was found that 94% of the particpants obtained medicines in the form of tablet followed by Syrup (40%) and Injections (28%). This is another feature of Indian health care scenario wherein even injections are given by the pharmacist.

Further we analysed who is the key person behind determing what medicine to be given to the participants and it was found that in 56% of the cases it is the pharmacist who decides what medicine should be given and in 32% of the cases the participants themselves decide about the medicine to be purchased. Friends and relatives also seem to play a role in prescribing the medicines for purchase (14%). Also we wanted to understand whether the location of health centre has any influence on self medication practice. It was found that in 76% of the cases, a pharmacy is located near their place of residence while in 24% of the participants, hospital was located near their place of residence.

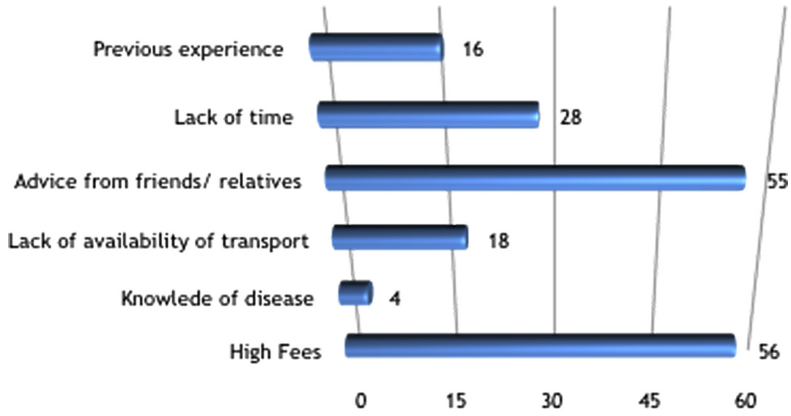


Figure 1: Percent Distribution of various reasons for self medicationpractice among the participants

The important component of this study is to analyse the various reasons responsible for self medication among the study participants and it was found that High fees charged by the doctors. Other reason for self medication were high fees, lack of time for consulation with the doctor(28%), previous experience with the disease (16%) and knowledge about the particular disease conditions (4%).

Table 5: Various other factors pertaining to self medication practice among the participants

Factors	Frequency of positive responses (%)
Suggestion of Medications to others	84 (56)
Any known person taking self medications	111 (74)
Is the Self medication effective	135 (90)
Any side effects with Self medications	33 (22)
Knowledge about side effect of Self medications	3 (2)

In Table 5 it was found that the knowledge about the side effects of self medication was very minimal (2%) among our study participants. About 90% of the participants responded that the medication was effective. However 22% of the respondednt said that they had some side effects with self medication and they consulted the doctor for the same. Further about 56% of the respondents was found to be willing to suggest self medication for others.

Discussion

The present study was conducted among the participants who used self medication. This study analyses the various practice profiles ofself medication among the urban population of Perambalur town. In our study the mean age of study population was found to be around 44.6 yrs. Other studies done in India also shows that younger population below 45 years are more likely to use self medication than the old [4,13,14]

However the male preponderence among self medication users in our study is similar to another study done in Nepal where male sex was more likely to get involved in self medication practices than females. [13]

It was found that about 53% of the upper and middle socio economic strata of people were the majority who were indulged in self mediation practices and almost 47% of the lower socio economic class of people were also involved in self medication practices. The upper socio economic strata of people might prefer self medication because of various reasons such as knowledge regarding the disease and medication, previous experience with the illness, advice from the friends & relatives and nearby location of the pharmacy and confidence over the chemist.The lack of regulation among the pharmacies is a major factor contributing to this harmful health care scenario. The findings were similar to other studies done with respect to these factors.[15–20] Fever was the most common condition (72%) closely followed by headache (67%). Similar findings were found among other studies which showed higher percentage of visit to pharmacies was for fever and painful body conditions.[13,15,15,21] The other conditions for which a pharmacy was approached are Respiratory infections (55%), general body pain (40%), diarrhoeal problem (8%) and lack of sleep (8%). In India over the counter dispensing of medications is so unregulated such that even sleeping pills are available over the counter for general population without restriction. Such unregulated practice indirectly promotes various social evils in the society such as crime and suicide. However majority of the participantsdidnt

have any knowledge about the drugs and they simply procured from the pharmacies. So the drugs that they use are the discretion of pharmacist who is formally unqualified for drug prescription. Pharmacist role is only drug dispensing but this rule is frequently overruled and the scenario is the pharmacist take up the role of doctor and in due course of time becomes a doctor himself. Tablets and syrup were the most commonly dispensed drugs for self medication.However about 28% of the respondents said they receive injections from the pharmacy.Injections have to be given only after proper training and injections by untrained personnel can lead on to complication varying from abscess to dangerous complications such as axillary and sciatic nerve palsy. However it is seen that without understanding the risk involved the participants are approaching the pharmacy for injections.Most of the participants are of the opinion that pharmacist prescriptions are very effective and they dont have any knowledge about the side effects of these medications. Thus its imperative enough that urgent intervention is needed with respect to self medication practices in India.

Conclusion

The practice of self medication was found to be deeply inculcated in the minds of the participants and the participants did not feel that prescription by pharmacist without consultation of a doctor is going to be dangerous for their long term health. The knowledge regarding the medications and its side effects was negligible among the study participants. There is an urgent need from the health system planners to address this issue in a comprehensive manner before this burden goes out of control.

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Prevalence and Determinants of Depression among the Elderly in Rural Field Practice Area of a Medical College in Perambalur District, Tamil Nadu: A Cross-Sectional Study

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Abstract

Introduction: Depression is one of the most common psychiatric disorders worldwide, with the elderly population being the most vulnerable group. As a result of changing lifestyle & increase in nuclear families, elderly people lose their support & importance in their own family. They are often neglected, leading to loneliness & depression. It is commonly seen in the rural population.

Objective: To estimate the prevalence of depression among elderly in the rural field practice area of DSMCH and to assess the socio-economic factors influencing the depression among the study population.

Materials and Method: A community based cross-sectional study was conducted among 400 elderly people aged 60 years and above in the rural field practice area of Dhanalakshmi Srinivasan medical college and hospital, Perambalur district, Tamilnadu. The study subjects were contacted through household visits for data collection. The study was conducted for a period of 3 months (April 2017 to July 2017) using a pretested semi-structured proforma. The collected data was analyzed using SPSS software trial version. A p-value of <0.05 was considered statistically significant.

Result: The prevalence of depression among the study subjects was 56%. A statistically significant association was found between the prevalence of depression and the elderly who were aged ≥70 years (p value = 0.0015), females (p value = 0.0048), illiterates (p value = 0.0071), class V socio economic status (p value <0.0001), living alone (p value = 0.0205), widows & separated family (p value = 0.0117%), economically dependent (p value <0.0001), neglected & just taken care by family members (p value <0.0001).

Conclusion: The prevalence of depression was found to be higher in our rural population and many socio-economic factors influence the depression among them. Health policy makers should take necessary steps to include a mental health programme for the elderly within the purview of the primary health care.

Keywords: *Geriatric, Depression, Psychiatric disorders.*

Introduction

Aging is a usual physiological processthat is associated with the decreased physical activity[(1)]. Worldwide the proportion of aged population is projected to increase to a greater extent. Globally the proportion of aged more than 60 years in 1950 was 13.7%, in 2017 it was 23.2% and in Asia it was 11.0% in 1950 and 21.8% in 2017. In India in 1950 it was 8.9% and in 2017 it was 16.3% and in 2030 it is projected to increase to 22.3% and in 2050 to 35.1%[(2)]. Mental and neurological disorders among older adults account for 6.6% of the total disability for this age group. Approximately 15% of adults aged 60 and over suffer from a mental disorder[(3)]. According to the WHO global burden of disease report 2004, depression was the leading cause of burden of

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disease during 2000-2002, ranked as third worldwide[4]. In olden days elders are given priority in their family, their blessing and decision are frequently sought[5] but as a result of changing lifestyle & increase in nuclear families elderly people lose their support & importance in their own family[6]. They are often neglected, leading to loneliness & depression. Depression is a disorder that is characterized by sadness, changes in appetite, altered sleep patterns, feelings of dejection or hopelessness and sometimes suicidal tendencies[7] but studies to assess the depression among the elderly population has hardly been done in this part of the country and very few in the rural community. So this study would help in understanding the magnitude of depression among geriatrics in a rural area of south India which would further help in the planning and assessment of geriatric welfares programmes and measures.

Objectives:

1. To estimates the prevalence of depression among elderly in the rural field practice area of DSMCH.
2. To assess the socioeconomic factors influencing the depression among the study population.

Material and Method

A community-based cross-sectional study was done among elderly more than 60 years from April 2017 to July 2017 in the field practice area of the rural health training center, Dhanalakshmi Srinivasan medical college and hospital, Perambalur district, Tamilnadu**.** Assuming the prevalence (p) of depression among the elderly as 55% from various studies and taking the 5% allowable error (*l*) with a 95% confidence level, the sample size was calculated to be 400 by using the formula $\{\frac{4pq}{d^2}\}$. By **simple random sampling**, 6 villages were chosen from 18 villages in the rural field practice area of DSMCH, Perambalur. The number of samples required from 6 villages was calculated by population **proportional to the size** of villages. 200 male subjects and 200 female subjects were selected.

Method of Data collection: Ethical approval was obtained from the Institutional ethics committee on human subjects, DSMCH. The study subjects were contacted through household visits in the study ward for data collection. The door to door survey was carried out. In each household, the head of the family or any other responsible adult was contacted and the nature & purpose of the study were explained to him/her. Written and informed consent was obtained

Inquiries regarding the old age persons of that particular family were made i.e. a Total number of old age persons present in that house, their age, and sex. Information regarding the age was cross-checked by asking children's age, relating to major events, verifying with the records like ration card, etc. if present. Where the subject was living alone or living with his/her spouse i.e. Nuclear family, the nature and the purpose of the study was explained to the study subjects themselves. Informed consent was obtained before the study.

Study Tool: The randomly selected elderly under this study was interviewed personally using a questionnaire which was developed to achieve the statistical objectives. This questionnaire was validated by experts and field tested in a pilot study among 10% of the study population before being used in the main study.

The pre-designed, pre-tested, semi-structured questionnaire consisted of two parts: The first part of the questionnaire contained questions relating to personal, family and socio-demographic characteristics (age, sex, level of education, marital status, occupation, income, living status etc). The second part of the questionnaire was regarding depression, Jerome a Yesavage geriatric depression scale(short version)[8] was used since this scale was used in most[9]of studies. Socio-economic status of the study subject was assessed using the Modified Kuppuswamy classification. While assessing the socio-economic status, the family was taken as the unit instead of the individual i.e. the study subjects of the same family/house was given the same scoring.

Analysis of data: The data was entered and compiled in a Microsoft Excel sheet. The analysis was done using SPSS software 16th version. All qualitative variables are presented as frequencies and percentages. The prevalence rates are given in percentages. Pearson Chi-square test of significance was used to find the association between variables. P-value of < 0.05 was taken asstatistically significant

Results

Table 1: Frequency distribution of the study population according to socio-demographic profile

S.no	Variables		Frequency N = 400	Percentage (%)
1	Age	60-70	276	69
		71-80	95	23.75
		> 81	29	7.25
4	Literacy status	Illiterate	194	48.5
		Primary education	124	31
		Secondary education	77	19.25
		Higher secondary & above	5	1.25
5	Marital status	Married	238	59.5
		Separated & widowed	162	40.5
6	Occupation	Not doing any work	201	50.25
		Unskilled worker	30	7.5
		Semi-skilled worker	147	36.75
		Skilled worker	22	5.5
7	Living arrangement	Living alone	80	20
		With spouse	159	39.75
		With children	66	16.5
		With spouse & children	88	22
		With siblings	7	1.75
10	Socio-economic status	Other classes	114	28.5
		Class 5	286	71.5
11	Economic dependency	Independent	163	40.75
		Partially dependent	153	38.25
		Totally dependent	84	21
12	Status in the family	Neglected	24	6
		Just looked after	279	69.75
		Looked after well	64	16
		Respected and consulted	33	8.25

The study was conducted among 400 elderly populations in rural field practice area of DSMCH. The mean age of the study population was 71.28±7.85. The table 1 shows that 69% of the study subjects were in the age group of 60 to 70 years and 31% belonged to ≥70 years of age.200 Male and 200 Female subjects were selected equally for the study. Nearly half of the study participants were a widow or separated. Half of the elderly (50.25%) were not doing any work. About 48.5% of the geriatric population was illiterates. It was observed that 71.5% belonged to the lower class according to Modified Kuppuswamy socio-economic status Classification. In this study, 80.75%% of the elderly population was living with Family members. It was observed that nearly three fourth (75.75%) was neglected by their family or just looked after. Male was respected and consulted more than female in our study population.

Table 2: Prevelance of depression in association with socio demographic variables (n=400)

S.no	Socio demographic character		Depression Present (%)	Depression absent (%)	χ^2 value	P value
1.	Age	>70 years	84(67.74)	40(32.26)	10.06	0.0015*
		60-70 years	140(50.72)	136(49.28)		
2.	Sex	Female	126(63)	74(37)	7.955	0.0048*
		Male	98(49)	102(51)		
3.	Literacy status	Illiterate	122(62.89)	72(37.11)	7.250	0.0071*
		Literate	102(49.51)	104(50.49)		
4	Occupation	Not working	117(58.21)	84(41.79)	0.8001	0.3711
		Working	107(53.77)	92(46.23)		

5	Socio economic	Class 5	202(70.63)	84(29.37)	87.16	<0.0001*
	Status	ther class	22(19.30)	92(80.70)		
6.	Economic	Dependent	155(65.40)	82(34.60)	20.86	<0.001*
	Dependency	Independent	69(42.33)	94(57.67)		
7.	Marital status	Widow	103(63.58)	59(36.42)	6.349	0.0117*
		Married	121(50.48)	117(49.16)		
8.	Living	Alone	54(67.50)	26(32.5)	5.367	0.0205*
	Arrangement	With family	170(53.13)	150(46.88)		
9.	Status in family	Neglected & just cared	197(65.02)	106(34.98)	41.23	<0.0001*
		Taken care well	27(27.84)	70(72.16)		

In table 2 the Chi-square test of significance was used to test the association between socio-demographic factors and depression. The prevalence of depression was found to be higher among subjects aged more than 70 years of age (67.74%) as compared to another age group (50.72%). It is found to be statistically significant (p-value 0.0015). Nearly 63% of depression was observed among females and 49% among males. It is statistically significant (p-value 0.0048). Nearly 62.89% of depression was observed among illiterates and 49.51% among literates. Association between literacy status and depression was found to be statistically significant (p-value 0.0071).Nearly 63.58% of depression was observed among widowed and 50.84% among the married elderly population. Marital status was found to be statistically significant (p-value 0.0117). The prevalence of depression was found to be more among the elderly population living alone (67.50%) than the elderly living with family. It is statistically significant (p-value 0.0205). Depression was found to be higher in economically dependent (65.40%) than independent group and statistically significant (p-value <0.001). It was observed that those who were either neglected or just taken care of by their family members (65.02%) were more depressed as compared to elderly who were taken care well and respected by their families (27.84%). A significant association between depression and status in the family was found in this study (p-value <0.0001). It was found that depression was higher among the geriatric population who were not doing any work (58.21%) as compared to elderly who were working (53.77%). But there was no significant association found between depression and occupation in this study (p-value 0.3711). It was observed that depression was higher among those whobelonged to class v according to modified BG Prasad classification (70.63%) as compared to other class groups (19.30%) and found to be statistically significant (p-value <0.0001).

Discussion

The prevalence of depression among the elderly was found to 56% which was similar to the study done by vafaei et al (50.3%) in Isfahan[10] and higher than the study by Gadit M et al in Pakistan (45.98%)[11], Sau A et al in Kolkata (45.7%)[12] and in Europethe prevalence of depression varies from 8.8%-23.6%[13]. The difference in rate of prevalence might be due to different study setting and geographic variation across countries and the reason for increased prevalence in our study might be due to various social factors like sudden loss of respect in family after retirement and increased rate of dependency. In our study more than 70 years of age group were more depressed, which is similar to Dasgupta A et al study in West Bengal and their prevalence was 58.8%[14].In comparison between the gender, we found that females are more depressed than males which is similar to Javed s study in Pakistan[15] and the reason might be due to the feeling of dejection and fear of death is more among rural women. According to Maulik'sstudy[6] illiterateare more depressed which is corresponding to our study and the reason might be due to the reduced self esteem among the study participants. In our study widowed subjects were more depressed similar to the study done by RadhakrishnanS et al[2] inSalem.This might be due to a feeling of loneliness and feeling of no one to share at the end stage of life. Unemployment was a major risk factor which is similar to Suganthan S et al [16] study done in Porur, Chennai. The reason could be due to the lack of source of income and dependency upon others for their basic needs. The depression was more among persons who live alone.Similar findings were observed by Ramachandran V etal[17] in Chennai and by Chong M et al, in Taiwan[18]. In our study significant association between depression and economicalldependence was found which is similar to the findings by ChuiP et al, Hong Kong[19] and comparatively lower in astudy

done by Swarnalatha et al in Chittoor district[9]. The variation might be due to poorer status of living and fear of fulfilling for daily needs. In a review by Grover et al [20]in India the socio-demographic factors related to depression in elderly are widowed elderly, residing in rural locality, being illiterate, increasing age, lower socioeconomic status, and being unemployed and the psychosocial factors includes loneliness, poor family support, isolation, dependency, lack of family care, and affection which are similar to our study findings.

Conclusion

The prevalence of depression was observed to be quite high in this rural population.Depression was found to be positively associated with increasing age, female and economic dependency. The prevalence of depression was inversely proportional to education and socio-economic status. The burden of depression among the geriatric population of developing countries needs to be addressed as a priority before it becomes a public health menace. With increasing number of old people and with a radical change of social structure even in the rural area, it is high time that health policymakers take steps to include mental health programme for the elderly within the purview of the primary health care. Regular counselling, supply of effective and affordable drugs in the PHC, regular training programmes for primary care providers on geriatric care, research on preventive and promotional aspects of depression preventive measures and aggressive education-awareness campaigns to fight depression at individual,community and national level are some of the recommended measures to reduce the prevalence of geriatric depression.

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CT Guided Radiofrequency Ablation of Osteoid Osteoma

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Abstract

Aim: To evaluate the therapeutic efficacy of CT Guided Radio Frequency ablation of benign bone tumour-Osteoid osteoma.

Materials and Method:

1. **Study group:** *Patients who presented with typical history and were clinically diagnosed as Osteoid osteoma were subjected to radiological evaluation. The patients graded their pain at day and night on a visual analogue scale between Grade 0-No pain and Grade 10-Unbearable pain. We evaluated 16 patients of Osteoid osteoma in whom Radio Frequency Ablation (RFA) was performed between November 2015 and October 2016. The lesions were located in the femur (n = 10), tibia (n = 5) and fibula (n=1).*
2. **Study design:** *Prospective Interventional study*
3. **Method:** *MDCT guided RFA procedure was performed using a STAR med VIVA RF Generator and cooled tip probe standard technique under spinal anesthesia.*

Results: Significant pain relief was observed in 15 out of 16 patients on first week post-operative visual analog scale. Immediate complications included a case of minor thermal skin burns in 3 patients, which healed on its own. There were no delayed complications. The average follow-up period was 2-3 months. One patient (6.25%) had persistent pain even after one month, following ablation which was due to residual lesion. Complete pain relief was achieved after a second ablation in that case. Thus, our primary and secondary clinical success rates were 93.8% and 100%, respectively.

Conclusion: RFA is a safe, quick, minimally invasive, and extremely effective method for the management of Osteoid osteomas.

Keywords: *Osteoid osteoma, Radio Frequency Ablation and Visual analog scale.*

Introduction:

Bone neoplasms have been routinely treated by either chemotherapy or radiotherapy/surgery. Current practice in the treatment of benign neoplasms like Osteoid osteoma is inclining towards minimally invasive procedures like chemo or thermoablation[1]. In ablative procedures, neoplastic cells are subjected to temperatures over 60°C and destroyed completely. This can be achieved by radiofrequency (RF) energy, microwaves or laser therapy. Cryotherapy is also a form of ablation technique in which neoplastic cells are destroyed by freezing to temperature less than-20°C[1]. MR guided focused ultrasound is an advanced non-invasive, radiation-free modality. where sharp focus of ultrasound waves targeted towards lesions eventually lead to thermo-ablation (> 57°C). Benign bone tumours like

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Osteoid osteoma and Osteoblastoma can be completely cured using RFA. It is also effective in alleviating pain in malignant lesions like metastasis[2].Our study is focused on evaluating the technical and therapeutic efficacy of radiofrequency ablation in the management of Osteoid osteoma and to assess the technical limitations and post procedural complications.

Materials and Method

Patients attending the OPD of Orthopaedics department of Govt. Kilpauk Medical College, presenting with typical history and clinical diagnosis of Osteoid osteoma were included in this study. They were later subjected to radiological evaluation after obtaining informed consent.

The study was carried out as a prospective interventional study for a period of 1 year (From November 2015 to October 2016) which included 16 patients with age group from 8 to 28 years(mean age-16 years), which includes 14 male patients and 2 female patients.

Criteria for diagnosis of Osteoid osteoma:

- **Clinical criteria:** Patients presenting with pain getting worse at night, relieved by taking aspirin and with visual analog scale grade above 6.
- **Radiological criteria:** Radiolucent nidus of less than 1.5 cm with adjacent bony osteosclerosis and cortical thickening on thin slice CT (1 to 3 mm).

Inclusion Criteria:

- Patients who met clinical and radiological criteria.

Exclusion Criteria:

- Patients who are symptomatically silent.
- Patients with lesions close to neuro vascular bundles (within 2cm).
- Non-consenting patients.

Methodology: All patients included in the study, were radiologically confirmed cases of Osteoid osteoma and posted for radiofrequency ablation. Day time & night time pain intensity of 16 patients were noted using visual analog scale (Grade 0-No pain and Grade 10-unbearable pain). The procedure and its alternatives were thoroughly explained to the patients & informed written consent was obtained in all cases. Before the procedure, Hemoglobin, clotting time, bleeding time, prothrombin time and INR were confirmed as normal. All the patients obtained anesthesia fitness and were planned to RFA under spinal anesthesia. Prophylactic antibiotics were administered, prior to the procedure. Radiofrequency ablation machine and all anesthesia equipments were shifted to the CT scanner room. Radiofrequency ablation was done under spinal anesthesia (conscious sedation). Dispersive grounding pads were applied on either side of patient's thighs, in correct alignment with each other and with appropriate skin contact; both of them were kept at almost equal distance from the place of ablation.

The RFA equipment (figure 1) comprised of STAR med VIVA RF generator (**S**olutions for **T**hermo **A**blation with **R**F medical technologies, South Korea), STAR RF cooled tip electrode with tip exposure 5-10mm, 13G COOK bone biopsy needle, a K-wire and a driller.

Lesion localization: The lesions were targeted with the help of a 16 slice MDCT scanner (Toshiba medical systems, Tokyo, Japan) with multi-planar evaluation to assess accurate needle position within the lesion.

Procedure: Skin preparation and proper sterilization was done. Small skin incision was made using 11' blade.13-guage bone biopsy needle was introduced into the lesion under CT guidance. And, in patients where there is marked peri-lesional sclerosis, the tumor was reached through a drill advanced over an appropriate Kirchner guidewire. Biopsy was taken and sent for HPE in formalin. Under aseptic precautions, a 350 mm long, 15-gauge single cooled tip electrode with exposure tip of 5-15 mm length was then introduced into the centre of Osteoid osteoma nidus (Figure 2).The electrode was connected to the RF generator and coolant pump with cool saline so that it reduces impedance and favour ablation without over "burning" the lesion area. RF machine settings changed to continuance mode and kept at 20 watts for 6 minutes. The RF output is generated continuously with the setting value. Finally a small compressive dressing was applied at the percutaneous puncture site.

Follow-up: Post procedure, day and night time pain intensity was measured at 1 week and 4 weeks using visual analog scale. Follow up CT/MRI was taken at 4 weeks (Figure 1). HPE reports were collected within a week.

Criteria for assessment of success of the procedure: Technically, success was considered when the tip of the electrode was rightly placed into the nidus

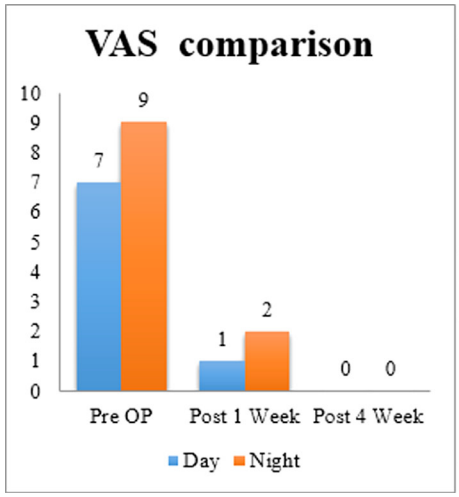
and was heated for the appropriate time, at correct parameters. Clinically, success was considered when patients get complete relief from pain and getting back to normal activities.



Figure 1: Axial section of Thigh CT of a 17 year female patient showing left neck of femur Osteoid osteoma with RF probe noted within the nidus. Follow up MR Axial STIR and Coronal T1 MR images at 4 weeks shows no evidence of nidus. No marrow edema was noted.

Statistical Analysis and Results: The collected data were analysed with IBM, SPSS statistics software version 20.Descriptive variables were expressed in terms of frequency. Categorical variables were expressed as percentage and continuous variables were expressed in terms of mean and standard deviation.For the multivariate analysis in the repeated measures (Pre, 1 week & 4 weeks) the Friedman test was used. To find the significance in categorical data Chi-Square test was used. In all the above statistical tools the probability value 0.05 was considered as significant level.

In our study, the mean age was 16 years with mean nidus size of 6.6 mm and most common bone involved was femur (n = 10), followed by tibia (n = 5) and fibula (n = 1). Commonest location in bone was cortical (n=13), sub-periosteal (n =2) and intramedullary (n= 1).



Ranks

	Mean Rank
Pre op VAS day	3.00
post op vas at 1 week day	1.97
post op vas at 4 weeks day	1.03

Test Statistics[a]

N	16
Chi-Square	31.524
df	2
Asymp. Sig.	.000

a. Friedman Test

Ranks

	Mean Rank
Pre op VAS night	3.00
post op vas at 1 week Night	1.97
post op vas at 4 weeks night	1.03

Test Statistics[a]

N	16
Chi-Square	31.524
df	2
Asymp. Sig.	.000

a. Friedman Test

Figure 2:Comparison of pre-procedure day & night VAS with post procedure day & night VAS at 1 week and 4 weeks

Multivariate analysis using Friedman test, revealed statistically significant p values (< 0.05) between day Pre op VAS, day Post op VAS at 1 week and at 4 weeks. Similar values were obtained for night VAS multivariate analysis too.

We experienced residual lesion in a 22 year old patient and treatment was completed successfully after second RFA procedure. We had 3 patients with mild skin burns which got healed by its own with no major complications.

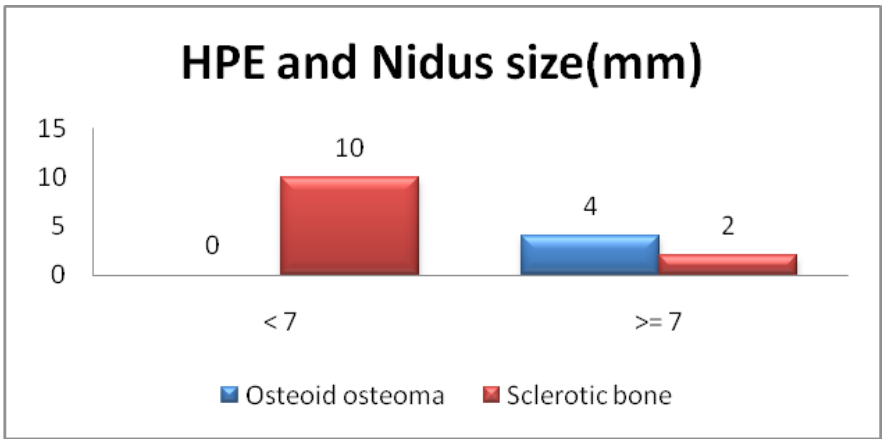


Figure 3: Comparison between nidus size and histopathological report

Six patients had nidus size of more than or equal to 7 mm, of which 4 patient's HPE turned positive for Osteoid osteoma. Rest of 10 patients had nidus size of less than 7mm and their HPE reports came as sclerotic bone. This was statistically significant with P value < 0.05 using fisher's exact test.

Discussion

In our study with 16 patients, day time pre-treatment median VAS was 7 and post-treatment median VAS at one week was 1. Night time pre-treatment median VAS was 9 and post treatment median VAS at one week was 1. The VAS reduction for both day and night time was statistically significant. Several supportive studies to our results include De Palma et al., who reported in their study of 20 patients that night time pre-treatment mean VAS was 8.5 and post-treatment VAS was 0.5 and day time mean VAS as 5.95 pre and 0.9 post-treatment[3,4]. Karagoz E. et al., reported in their study of 18 patients that night time median VAS as 9 pre and 0 post-treatment and day time median VAS as 7 pre and 0 post-treatment[3]. Morassi et al., in 2014 evaluated 11

patients and they observed the significant reduction in visual analog score in pre and post procedure evaluation from 8.6 to 0. And, our study too revealed significant reduction in visual analog score from 8 to 1[5].

Patients getting complete pain relief following treatment ranged between 1 day and 2 weeks. A study by Vanderschueren et al., in 2002 which included 54 patients reveals 87% patients got completely relieved from pain on day 1 and 13% patients recovered at two weeks[6]. Another study in 2001 by Lindner et al., reported that complete pain relief was obtained at the end of 1 week[7]. Whereas, Karagoz et al.,[3] reported pain relief between 3 to 10 days post ablation. In our study except one patient with residual lesion, all were relieved of pain by around 8 to 9 days.

In our study with 16 patients, 15 (93.8%) patients achieved technical and clinical success after one sitting of RFA and remaining one patient achieved technical and clinical success after second sitting of RFA. The problem we encountered in that one case was high impedance probably, because of large size drill compared to electrode size which did not allow adequate ablation, that was needed to cook the nidus[8].However, the success rates of our study were comparable with several other studies like Cantwell CP et al., in 2004. Yang et al., in 2007 observed technical success of near 100%, clinical success of 76 to 100% and after second Radio Frequency ablation the success rate was near 100%[9,10].A study by Rehintz et al., in 2013 which included 72 patients showed 99% primary clinical success rate and 100% secondary clinical success rate[11]. Another similar result i.e., 100% technical success, 94% Primary success and 100% secondary success rate was obtained in study by Karagoz et al., in 2016[3].

In our study, we had 3 patients with mild skin burns with no major complications. All three had lesions in mid tibial shaft and distance between lesions and skin was less than 1 cm. Skin burns might have occurred due to some transient contact between electrode tip and skin while ablating. However, all three skin burns healed after topical application. None of the patients had any other complications.

In a study by Jankhariaet al., in 2009[8] out of 40 patients, one patient had skin burn of around 6 mm near probe insertion site in mid arm i.e., diaphysis of humerus and the nidus was 1.7cm deep to skin surface. They also experienced one more complication, a small bony chip fracture occurred in entry site. Since, it was a sclerotic bone it can be negligible and patient was advised rest for few weeks. Rosenthal et al., in 2003[12] and Lindner et al., in 2001[7]observed neural injury as complications of RF Ablation when the lesions are close to nerves i.e., within 1 cm, particularly while ablating spinal and hand Osteoid osteomas.

In our study, we found that the lesions with nidus size of less than 7mm (in 10 patients) HPE revealed only sclerotic bone. Whereas, if nidus size exceeds 7mm HPE came as Osteoid osteoma (in 4 out of 6 patients) which possibly explains that the smaller nidus might have been destroyed while drilling itself.

Limitations of the study: Smaller sample size. RFA treatment assessment is not done in other less common sites of Osteoid osteoma like spine, ribs, hands and feet. Hence the success rates in those sites are not assessed. Average follow up period in our study is only 2 to 3 months which is not adequate as most of the recurrences occur in between 3 to 6 months only.

Conclusion

Radio Frequency Ablation is a safe, quick, minimally invasive and extremely effective method in Osteoid osteoma management. We have been able to achieve a high technical and clinical success rate with less morbidity & complications.

Ethical Clearence: This study was duly accepted by the ethics committee of Govt. Kilpauk Medical College, Chennai-10, Protocol ID no: 04/2015 dated 02.11.2015.

Source of Funding: Self

Conflicts of Interest: None

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Factors Affecting the Unmet Dental Needs and Dental Service Utilisation among Urban Slum Dwellers of Chennai City, India

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Abstract

Objective: This study explores the association between the sociodemographic factors of the urban slum dwellers with unmet dental needs and dental service utilization pattern.

Method: A cross sectional study conducted among 430 slum dwellers of Chennai city.. Using a structured proforma socioeconomic data was collected. DMFT, TI(Treatment Index) and TNI (Treatment Need Index) were recorded.

Results: About 59.9% of them had never utilised dental services. Income was found to have a direct relation with Treatment need index. Education and occupation had a moderating effect.

Conclusion: From the present study we can conclude that overall utilisation of dental services is low among slum dwellers. However income is the main detrimental sociodemographic factor in the minds of the people living in slum areas.

Keywords: *Socioeconomic status, slum dwellers, DMFT, dental services, Utilisation, Unmet needs.*

Introduction

Inequalities in oral health are profound worldwide, affecting the overall health and quality of life of millions. These inequalities are seen most often in association with racial and ethnic minorities, lower socioeconomic levels, in groups defined by gender or differences in environment and cultural factors, and patterns of utilization of care[1]. When this scenario is applied to India context, millions of people are affected due to lack of socio economic equality [2]. Studies have documented disparities in oral health services among urban, suburban and rural regions of India. Residents of rural and suburban regions have increased unmet dental needs compared to people living in urban areas[3]. This can be further substantiated by the inverse care law which states that availability of good medical care tends to vary inversely with the need for it in the population served, which implies decreased utilisation of health services among the slum dwellers[4].

United Nations Human Settlement Program (UN-HABITAT) defines slum as residential areas that are physically and socially deteriorated and in which satisfactory family life is impossible[5].These people also lack durable housing of permanent nature, sufficient living space, access to safe water, inadequate sanitation in form of toilets and insecure tenure, hence have compromised general health status.

Evidences are suggesting that socio-demographic factors, such as place of residence, age, gender, family income and education and individual factors in terms of

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oral health behaviors directly or indirectly influence oral health outcomes[6].Therefore; there is a need to explore the influence of social factors on oral health and its utilisation.

There are reports that suggest dental patients only visit the dentist when in pain and never bother to return for follow-up in most cases[7]. Epidemiological studies have shown underutilization of dental care services among the people with low socioeconomic status[8].

But,there are very few published studies that have investigated the unmet dental needs and dental service utilisation rate among slum dwellers making it difficult to understand the pattern of oral health status in this marginalized community. Also, there is not much data on the oral health status of people residing in slums in India. Therefore, this study explores the association between the sociodemographic factors of the urban slum dwellers with unmet dental needs and dental service utilization pattern.

Method

This is a cross sectional,study done in a slum dwelling regions of Chennai city. This study was carried out as there is sparse literature about oral health status among marginalised population. The study proposal was approved by the Institutional Review Board ofour college.The research was carried out in compliance with Helsinki declaration.A verbal informed consent was obtained from the participants as per the suggestions provided by the Ethical Board.

Study Site And Population: The study was carried out in the slum dwelling regions of Chennai city. Though definition of slums varies from nation to nation, in India according to the Slums Areas Improvement and Clearance Act 1956, they are defined as places unfit for human habitation due poor health and sanitation**.**

Study Sample: A convenience sampling technique was used. Sample size was calculated by keeping the medium effect size as 0.08, alpha error as 0.05 and power as 95%. Based on these, the total sample size was estimated to be 425.To attain this sample randomly 71 participants from each region-Tondaiyarpet, Manali, (North) Sholinganallur, Perungudi,(Central)Parry's corner and Ambattur (South) were taken into the study. Participants between the age group of 21 to 60 years, who did not suffer from any systemic diseases and those who gave consent to participate were included in the study.

Data Collection

Questionnaire administration: A questionnaire was structured in the regional language (Tamil) which included information about age, gender, family income, family size, occupation,education and utilization of dental services was used to record the responses of the participants**.** All variables recorded were categorized for further analysis**.**The data was collected from October 2017 to February 2018.

Clinical examination: Two calibrated dentist examined all the subjects and the inter rater reliability was found to 0.9.Oral health status of the participant was recorded in terms of DMFT index[9].All the subjects were examined under adequate illumination and general oral examination was carried out to check the caries experience using DMFT criteria 1997 [9]. The examination was conducted with a mouth mirror and probe by the calibrated dentist based on WHO level 3 examination.

Variables of interest: The dependent variables of this study were unmet needs of the participants, utilisation rate, treatment Needs Index [TNI], Treatment Index [TI]. We hypothesized a mediation analysis to be carried out between TI and TNI with income and education occupation as mediators. For this study purpose, utilisation of dental services was calculated by asking the question "Whether the person had visited the dentist before?".Treatment Need Index calculated the causal relationship between untreated decay teeth and teeth treated with restorations or extractions [due to caries], and was calculated as follows:

$$TNI = \frac{\text{Decayed}}{\text{Filled} + \text{Missing}}$$

Treatment Index predicts the proportion of teeth that had received treatment and was calculated as follows:

$$TI = \frac{\text{Missing} + \text{Filled}}{\text{DMF}}$$

Data Management: Data obtained from questionnaire and clinical examination were entered into Microsoft excel Sheet (Version 2007) and were analyzed using SPSS software (Version 20).

Statistical Analysis: Descriptive statistics were done to determine the distribution of the study variables in the population. Pearson Chi-square test was done

to compare the association between unmet needs, and utilization of dental services with the sociodemographic variables like age, income, education, occupation and family size. Independent t test was performed to check for the relation between TI, TNI with the predictor variables.The statistical significance was kept at $p \leq 0.05$, significant variables were later subjected to linear regression (backward model). Poisson regression was run for the Independent variables and DMFT.

Results

A total sample of 430 participants comprising of 227 males(57.2%) and 204 females (47.3%) were included for the study. The mean age of the study population was 39.4 ± 4.6 years. Table 1 represents the study characteristics of the population.

Gender, Income, occupation, education and utilisation of dental services of the respondents were significantly ($p < 0.05$) associated with decay component of DMFT as well as with the utilisation of dental services, (table 1) while other factors like age and family size did not show any significant association with utilisation and Decay component of DMFT. Poisson regression was computed for all independent variables and DMFT, and it was found that only gender were significant with DMFT. (Table 2).

The results of the linear regression analysis of the predictor factors for Treatment Index and Treatment need Index are shown in Table 3. A backward model was performed for income, education, occupationwith TNI, TI.Since education and occupation are interdependent to income and was found to be significantwith TI and TNI,all the three variables were added to the models. Model 1included income education and occupation, income showed a significance with standardised β coefficient value of 0.199 and 0.155 with TI and TNI respectively.In model 2education and income were added, and a decrease in standardised β coefficient value for income was seen as 0.198 and 0.148.In this model 3income was included as predictor variables for TNI and TI, and good decrease in standardised β coefficient value of 0.195 was seen with TI and a slightdecrease in value of standardised β coefficient of 0.146 was seen with TNI. The models developed had a R^2 value of 38% and 23% respectively which was found to be acceptable.The change in β coefficient value for income alone indicated that education and occupation had a moderating effect over the outcome, as these two variables were found to be statistically insignificant with TNI and TI in regression model.

Table 1: Distribution of Sociodemographic characteristics, comparison of mean distribution of DMF components and association of the independent variables with DMF and utilisation of dental services among the study population.

Sociodemographic variables	Frequency N (%)	Decay Mean ± SD	Missing + filled Mean ± SD	p value (df)
Gender [a]				
Male	227(52.7)	3.79±2.95	2.28±1.46	0.000†(121)
Female	204(47.3)	4.56±3.16	2.43±1.96	0.003∞ (11)
Education[a]				
Not completed high school	275(63.8)	3.19±2.18	2.30±1.87	0.000† (55)
Completed high school	55(12.8)	4.22±2.92	2.15±1.23	0.00∞ (44)
Graduate	16(3.7)	5.00±3.63	2.44±1.26	
Postgraduate	-	-	-	
Diploma	10(2.3)	7.60±3.60	2.50±0.85	
Not educated	75(17.4)	4.36±3.36	2.64±1.60	
Income[a]				
<Rs5,000 per month	150(34.8)	3.70±2.81	2.68±1.75	0.027† (44)
5,001-10,000 per month	157(36.4)	4.39±3.29	2.21±1.39	0.002∞(44)
10,001-15,000 per month	108(25.1)	4.22±3.02	2.11±2.08	
15,001-20,000 per month	11(2.6)	4.73±3.58	2.27±1.19	
> 20,001per month	5(1.2)	7.80±3.42	2.00±1.00	

Sociodemographic variables	Frequency N (%)	Decay Mean ± SD	Missing + filled Mean ± SD	p value (df)
Occupation[a]				
Unskilled	204(47.3)	4.06±3.06	2.41±1.94	0.000† (11)
Semi skilled	207(48.0)	4.08±3.00	2.26±1.54	0.005∞ (33)
Skilled	13(3.0)	6.08±4.15	2.54±0.96	
Highly skilled	7(1.6)	5.57±3.91	3.00±1.29	
Family Type				
Joint	209(48.5)	3.99±2.99	2.21±1.33	0.188† (11)
Nuclear	222(51.5)	4.32±3.13	2.54±2.12	0.163∞ (11)
Utilisation of dental services[b]				0.00∞ (11)
Had Visited before	201(46.6)	2.91±2.23	2.61±1.78	
First Visit	230(53.4)	5.25±3.21	2.12±1.63	

a- Variables having significant difference of p value less than 0.005 with D component and utilisation of dental services, b- Variables having significant difference of 0.00 with D component alone, ∞- p value for association between D component and other variables, †- p value for association between Utilisation of dental services and other variables

Table 2: Poisson regression shows significance between predictor variables and DMFT

Sociodemographic variables	IRR	Likelihood Ratio	Sig [CI 95%]
Gender			
Male	1.14	56.034	0.001*
Female (1)			[-0.20,-0.055]

* p< 0.05 indicates significance

Table 3: Socioeconomic variables associated with Treatment need Index and Treatment Index. Linear regression analysis, Backward model.

Dependent Variables	Model 1[a]	Model 2[b]	Model 3[c]
	B(Sig) [CI 95%]	B(Sig) CI 95%]	B(Sig) [CI 95%]
TI	-0.199 (0.00)* [-0.067,-0.023]	-0.198(0.00)* [-0.065,-0.023]	-0.195(0.00)* [-0.065,0.023]
	0.028(0.58) [-0.10,0.006]	0.028(0.56) [-0.10, 0.006]	
	0.005(0.1) [-0.029, 0.033]		
TNI	0.155 (0.002)* [0.13,0.58]	0.148(0.002*) [0.124,0.56]	0.146(0.002)* [0.11,0.59]
	0.029 (0.54) [-0.58,0.11]	0.029(0.59) [-0.58,0.10]	
	0.024 (0.62) [-0.40, 0.24]		

* p< 0.05 indicates significance, a-Predictor variables = Income, Education, Occupation, b-Predictor variable= Education and Income, c-Predictor Variable =Income

Discussion

Equity in health reflects an apprehension to reduce disparate opportunities to be healthy associated with affiliation in marginalized groups, such as poor people, tribal population and slum resident. Social exclusion is perhaps one of the biggest factors which influence all the wider determinants of health[10]. Several challenges are faced by the marginalised population in accessing the oral health services due to poor accessibility, affordability and limited availability[11]. So the present study was

designed to evaluate the impact of the socioeconomic factors on unmet needs and utilisation of dental services among the slum dwellers of Chennai city.

In the present study, it was observed that there was almost equal gender distribution among the participants, and most of the respondents were living in a joint family. Similar results from other studies have shown illiterate patients (70%) belonged to low income group (50%)[11].

In the current study, the mean tooth decay was found to be higher among females (4.56 ± 3.16) than males (3.79 ± 2.95). Our present study also presented a incidence rate ratio of 1.14, was seen among females than male in relation to DMFT, which was in unison with the findings of Heaton et al(2004)[12] which reported an value of 1.12 among females than male.

The mean tooth decay was highest among the illiterates (7.36 ± 3.36)and lowest among the graduates(3.00 ± 2.63) which is similar to that reported by Jairo et al (2011)[13]; also about 59.9% of the respondents never utilised the available dental services in their area. This could be explained by the fact that higher education provides increased awareness about oral health importance hence a better utilization of dental services leading to decreased decay status among the graduates[14].

Similar to the present study, Poudyal et al (2006)[14] showed 44% of the patients never visited dental clinics for their oral problems whereas the study done by Varene et al (2006)[15] showed only 27.7% used oral health services which was far less than the present study findings. This non utilisation of dental services can also be substantiated by the fact that education, occupation and income were negatively correlated to utilisation of dental services which is in concurrence with reports of Kertz et al(2014)[16], who mentioned similar results.

Among those utilized (46.6%) majority of them had tooth extraction followed by restoration of decayed tooth, which was similar to findings of Poudyal et al(2006)[14]. This difference in treatment choice could be explained by the bivariate regression analysis which revealed Income to be a significant predictor value for TI and TNI. Since occupational status, education and income share a commonality under socioeconomic status and serve as a measure for each other[17], three models were developed for multiple linear analysis using income, education and occupation for TI and TNI which showed a direct relation with income and a moderating effect by education and occupation. Therefore it can be stated that socioeconomic factors play a major role in his/her willingness towards dental care services which in turn plays a pivotal role in oral health status of the person.

Conclusion

From the present study we can conclude that overall dental attendance is low among slum dwellers and income is the main determinant which influences their utilisation of dental services. Also, illiterate people showed higher unmet dental needs than the educated ones. Hence, it can be concluded that the socioeconomic factors play a pivotal role in determining the dental service utilization pattern among the urban slum dwellers of Chennai city.

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Alteration of Serum Vitamin D in Patients of Myocardial Infarction and Ischemic Heart Diseases

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Abstract

Background: Cardiovascular disease (CVD) is the one of the major cause of morbidity and mortality. Experimental studies have demonstrated physiological functions of vitamin D metabolites on cardiomyocytes and endothelial and vascular smooth muscle cells. In view of a complex scenario to understand cardiac disorders linking with vitamin D the currentstudywasundertaken oncardiac patients of MI and IHD.

Methodology: The cross sectional study was conducted on patients who were suffering fromcardiovascular disease (CVD). Study included 150 CVD patients (age 18 to 79 years)who wereadmitted in ICCU of a tertiary care hospital.). Patients were divided in to two groups namely myocardial infarction(MI) group 1(n=75) and ischemic heart disease (IHD) group 2 (n=75).Anthropometric, physiological and biochemical parameters were measured using standard techniques. Data was expressed as mean ± Standard Deviation (mean ± SD). The level of statistical significance was observed at $P<0.05$, $P<0.01$ using SPSS software 16.0.

Results: There is increase in the blood pressure mainly mean arterial pressure in both MI and IHD patients. Biochemical parameters which shows normal levels of serum sodium, potassium and creatinine, higher levels of CPK-MB and reduction in serum calcium and vitamin D of both MI and IHD patients compared to normal recommendedvalues although these values are not statistically significant between MI and IHD patients.

Conclusion: The significant role of vitamin D for calcium homeostasis may be considered as important marker for assessment of severity and morbidity of MI and IHD.

Keywords: *Cardiovascular disease, serum calcium, vitamin D.*

Introduction

Cardiovascular disease (CVD) is the one of the major cause of morbidity and mortality. It is also the number-one cause of death globally. People with CVD, or those who are at high CVD risk, need early detection and management of their condition, through either counseling or medication.[1] In recent years, deficiency of vitamin D has been associated with clinical atherosclerosis in coronary calcification as well as with cardiovascular events such as myocardial infarction, stroke, and congestive heart failure.[2] Experimental studies have demonstrated physiological functions of vitamin D metabolites on cardiomyocytes and endothelial and vascular smooth muscle cells. Low vitamin D levels are associated with left ventricular hypertrophy, vascular dysfunction, and renin-angiotensin system (RAS) activation.vitamin D deficiency is prevalent in 30% to 50% of adults in developed countries.[3] Molecular, animal and human studies have established

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that both calcium and vitamin D are associated with cardiovascular diseases (CVD).[4]

In view of a complex scenario to understand cardiac disorders linking with vitamin D dependent alteration of calcium homeostasis, the current study has been undertaken oncardiac patients of myocardial infarction(MI) and ischemic heart disease(IHD)in a tertiary hospital of Vijayapura, Karnataka,India

Materials and Method

The cross sectional study was conducted on patients who were suffering fromcardiovascular disease (CVD). Study included 150 CVD patients (age 18 to 79 years) who wereadmitted in ICCU of a tertiary care hospital of Vijayapur (Karnataka). Patients were divided in to two groups namely myocardial infarction(MI) group 1(n=75) and ischemic heart disease (IHD) group 2 (n=75).Patients suffering from hyperthyroidism, chronic kidney disease, metabolic andmalignant bonediseases whichaffect calcium homeostasis, and patients who is with supplementation of calcium, vitamin D, calcium containing antacids were excluded from the study. Written informed consent was obtained from all patients and were subjected to detailed history.Anthropometric parameters like height in centimetres (cms), weight in kilograms (kg), body mass index (BMI) in kilograms per square meter (kg/m^2) and body surface area (BSA) in square meter (m2) and physiological parameters like heart rate (HR) in (beats/minute), systolic blood pressure (SBP) in millimetre of mercury (mmHg), diastolic blood pressure (DBP)(mmHg), pulse pressure (PP) (mmHg) and mean arterial pressure (MAP) (mmHg) were recorded by using standard procedures. All the recordings were done in the morning between 9-10 am at room temperature. Blood sample was collected from antecubital vein by means of dry disposable syringeto estimate biochemical parameters like serum electrolyte such as $Na^+$and K^+[by Ion Selective Electrode (ISE)method],serumcreatinine,CPKMB,serum calcium(byCresolthelinemethod), vitamin D kitmethod)in all patients. The study protocol was approved by the Institutional Ethics Committee(IEC Ref No-251/2017-18 dated March 20, 2018) as per the ICMR guidelines 2006.

Statistical analysis: Data was expressed as mean±Standard Deviation (mean±SD). The data have been expressed in the form of tables and diagrams. Differences between mean values of parameters between MI and IHD were evaluated by one-way ANOVA followed by Post-Hoc test (Least significant difference). The level of statistical significance was observed at $P<0.05$, $P<0.01$ using SPSS software 16.0.

Results

Table 1 showsweight, height, BMI, BSA, HR and BPof both MI and OHD patients.There is no significant difference in between the observed groups but there is increase in the blood pressure mainly mean arterial pressure in both MI and IHD patientsfrom normal recommended range.

Table 1: Physical anthropometryand physiological parameters in MI and IHD patients

Parameters	Myocardial infarction (n=75)	Ischemic heart disease (n=75)	p-value
Age (yrs)	54.92±9.96	58.9± 14.5	0.214
Height (cms)	159.36± 6.62	160.54 ± 4.2	0.494
Weight (kg)	64.24± 10.65	66.8 ± 11.63	0.394
BSA (m^2)	1.67±0.15	1.7 ± 0.14	0.484
BMI (kg/m^2)	25.20± 3.09	25.86 ± 3.84	0.508
HR (bpm) (65-75bpm)	83.62 ± 15.06	86.24 ± 13.58	0.898
SBP (mmHg) (120-130mmHg)	130.73 ± 18.6	128.93 ±29.7	0.3647
DBP (mmHg) (80-90mmHg)	81.63 ± 11.1	78.32 ±11.37	0.150
PP (mmHg) (40-50mmHg)	52.24 ± 12.3	51.5 ± 20.7	0.802
MAP (mmHg) (90-93mmHg)	**100.12 ± 13.6**	**95.33 ± 15.6**	**0.207**

Table 2 shows biochemical parameters which alsoshows normal levels of serum sodium, potassium, creatinine withhigher levels of CPK-MB andreduction in serum calcium and vitamin D of both MI and IHD patients as compared to normal recommended values although no statistical significance were observed in between MI and IHD patients

Table 2: Showing biochemical parameters in MI and IHD patients

Parameters	Myocardial Infarction (n=75)	Ischemic heart disease (n=75)	p-value
Sodium (133-146mEq/L)	138.76±4.19	136.76±5.2	0.269
Potassium (2.8-5.2mEq/L)	4.21±0.67	4.23±0.68	0.712
Serum creatinin (0.9-1.4 mg/dl)	0.95±0.72	1.41±1.39	0.061
CPK-MB (**0-26 U/L)**	**33.70±17.89**	**30.72±15.13**	0.156
Serum calcium (**8.5-10.2mg/dl)**	**8.48±0.59**	**8.32±1.32**	0.617
Vitamin D **(20-50 ng/ml)**	**12.8±2.30**	**12.83±1.93**	0.760

Discussion

Results of our study shows lower calcium and vitamin D in MI and IHD patients which is indicative of altered calcium homeostasis in both MI and IHD patients. Possibly vitamin D might have played a significant role to control calcium homeostasis in case of cardiovascular disorders including MI and IHD.Emerging studies show that vitamin D deficiency is a highly prevalent condition and is independently associated with most CVD risk factors and to CVD morbidity and mortality.[5]Vitamin D and calcium deficiency is associated with ischemic heart disease and myocardial infarction[6]. Vitamin D and calcium status is prognostic for major post infarctionadverse events, such as heart failure, recurrent acute myocardial infarction, death [7-8]. Some case reports of patients suffering from heart failure support our hypothesis that low serum levels of vitamin D metabolites might be an important cause of the reduced serum Ca^{2+} level and of cardiac dysfunction.[9-11]Many recent studies have demonstrated a strong association between low levels of vitamin D and hypertension [12-14]Results also indicate that lower vitamin D levels irrespective of MI or IHD are suggestive of a relationship between vitamin D and cardiovascular health.

New findings reinforce that vitamin D deficiency is an important public health problem. Future studies are still required to establish clinical guidelines for vitamin D supplementation required to achieve adequate vitamin D levels in people who are at risk for CVD.

Conclusion

The significant role of vitamin D for calcium homeostasis may be considered as important marker for assessment of severity and morbidity of MI and IHD.

Conflict of Interest: The authors have none to declare.

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Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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A Study to Assess the Level of Knowledge on Water Borne Disease among Adults in Selected Village at Kanchipuram District, Tamil Nadu, India

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Abstract

A Descriptive study was conducted to assess the level of knowledge on water borne disease among adult in selected village at Kanchipuram district, Tamilnadu, India. The objectives of the study were to assess the level of knowledge on water borne diseases among adults in selected village, Kanchipuram district, Tamilnadu and to associate the knowledge on water borne disease with selected demographic variables. The review of literature was done and organized under various aspects on studies related to water borne disease. The research approach used for the study was quantitative approach and the design selected was Non experimental-Descriptive research.70 samples were participated in the study by using Simple random technique. Demographic variables were assessed by using the statistical measurement. The level of significance selected was $p<0.05$ level. Data was analyzed by inferential statistics and presented through tables and figures. Findings revealed that variable like monthly income was found to be significant and variables like age, sex, types of family, education, occupation. The numbers of adults having moderate knowledge were 29(41%), inadequate knowledge were 39(56%) and adequate knowledge were 2(3%). The Mean value and 23.3 and standard deviation (SD) was 15.62.

Keywords: *Assess, knowledge, water borne disease, adults.*

Introduction

Water borne diseases are the diseases which are all supported, carried or transmitted by water. Water borne diseases are viral, bacterial and parasitic diseases which use water as a common means of transmission. Some pathogens spend most of their lives in the water environment and only coincidentally encounter a host(1). Water borne diseases spread by the contamination drinking water systems with the urine and faeces of infected animals or peoples[12]. In worldwide water borne diseases represent a major burden on human health. Water borne diseases are simple to explain but very complex to understand.In developing countries four fifths of all the illnesses are caused by water borne diseases [11]. In rural areas, there are no proper water supply and sewage systems so water contamination can be attributed to infiltration, leaching, and surface run-off through pastures, lacing and leakage of sewerage disposal systems in villages. Poor water quality is responsible for disease outbreaks in many parts of the developing world [8].

Methodology: Research approach used for the study is Quantitative non-experimental evaluative approach. The research design is non-experimental descriptive research design was adopted for conducting the present study. The study was conducted at selected village Kanchipuram district, Tamil nadu with the population of Adults are available among the age group of 19-59 years and the sample size is 70. Simple random technique was used to select the adults for conducting the study.

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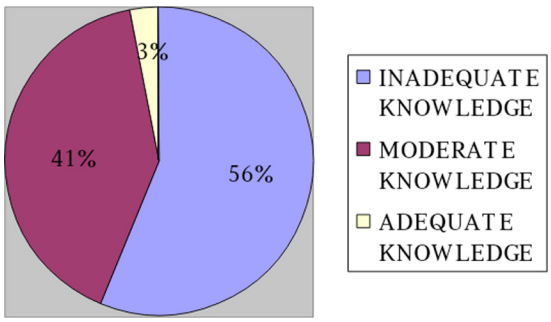
Description of Tool

Part 1: Demographic variable: It consists of demographic variables of adults such as Age, sex, education, occupation, monthly income, previous knowledge about water borne disease, source of drinking water, how do you stored drinking water, toilet facility.

Part 2: Structured interview schedule on knowledge regarding water borne diseases: It consists of 20 objective type questions. Each question consists of 4 options. This was framed to assess the level of knowledge on water borne diseases among adults.

Study Findings: The majority 25(36%) of the adults belongs to the age group of 14-28 years, the majority 38(46%) of them are female, the majority of the adults 35(50%) of them belongs to nuclear family, the majority of the adults 28(40%) have high school and higher secondary education, the majority of the adults 24(34%) has own business and the majority of the adults22 (32%) monthly income is of Rs.7, 001-10,000.The findings shows that there was no significant association between demographic variables like age, sex, types of family, education, occupation and there was significant association between demographic variable like monthly income. Overall mean in knowledge aspects of adults with water borne disease was found to be 23.3 and with SD of15.62. The maximum score for the knowledge were adequate knowledge 2(3%).

Percentage distribution of knowledge on water borne disease N=70



Discussion

Findings of the study are presented based on the objectives:

1. To assess the level of knowledge on water borne disease among adult.
2. To associate the level of knowledge on water borne disease among adult with demographic data.

Distribution of demographic characteristics of adults: Majority of the adults 25(36%) with in the age group of 19-28Years, Majority of adults 38(54%) are female, Majority of adults 35(50%) are belongs to nuclear family, Majority of adults 28(40%) are belongs to high school and higher secondary education, Majority of adults 24(34%) are doing business andMajority of adults 22(32%) are belongs to monthly income of Rs.7001-10000

Hence it is stated that there is significant association between the levels of knowledge on water borne disease with selected demographic variable of adult like monthly income. With regard to the hypothesis H_1 is accepted.

The major finding of the study was discussed under the objectives:

Objective-1: To assess the level of knowledge of water borne disease among adult 56% had inadequate knowledge, 41% had moderate knowledge and 3% had adequate knowledge. Overall mean and SD of mothers with related to knowledge aspects.

From the above discussion, it is seen from the results that the highest mean score noticed is 23.3.

Objectives II: To associate the level of knowledge on water borne disease among adults with selected demographic variables.

The findings shows that there was no significant association between demographic variables like age, sex, types of family, education, occupation and there was significant association between demographic variable like monthly income.

Mean and standard deviation of knowledge aspects of adults with water borne disease: Overall mean in knowledge aspects of adults with water borne disease was found to be 23.3 and with SD of15.62. The maximum score for the knowledge were adequate knowledge 2(3%).

Conclusion

The numbers of adults having moderate knowledge were 29(41%), inadequate knowledge were 39(56%) and adequate knowledge were 2(3%) and overall mean in knowledge aspects of adults with water borne disease was found to be 23.3 and with SD of15.62. The maximum score for the knowledge were adequate knowledge 2(3%).Hence the administrators should

initiate health education programme on water borne disease in community by utilizing the trained staff and encouraging them in such activities and facilitate to implementation of various health education programme on water borne disease among adults to improve their knowledge level on water borne disease.

Conflict of Interest: Nil

Sources of Funding: Nil

Ethical Clearence: Obtained clearance from the community health nursing department, Chettinad College of Nursing.UG committee clearance was obtained; Institutional human ethical committee clearance was obtained from Chettinad University; written permission was obtained from the Dean and HOD of community health nursing department-CHRI; the written consent was obtained from the study subject before collecting the information.

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Working Capital Management and Ratio Analysis of Paper Mills

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Abstract

The working capital management has a significant contribution for firm's profitability as well as to maintain liquidity powers. The motive of this study is to find out working capital adequacy and its impact on profitability [1]; to investigate the relationship between profitability and liquidity of firms. The amount invested in working capital is often high in proportion to the total assets employed and so it is vital that these amounts are used in an efficient way.

Working capital management main aims at maintaining a balance between liquidity and profitability while conducting the day to day operations of business concern. Improper working capital management not only decreases the profitability of business but also ultimately lead to financial problems, Chowdhury and Amin (2007). The study aims to provide empirical evidence about the effects of in current assets and current liabilities of JK Paper Mills Limited and Emami Paper Mills Limited.

Keywords: *Working Capital, Liquidity Ratio, Short Term Liquidity Position, Current Ratio, Acid Test Ratio, Cash Ratio, Current Liabilities and Current Assets.*

Introduction

Today, most of the management is wants to know their financial ability to make best of availability of resources to the maximum extent and able to sort out its weaknesses to promote and implement suitable actions to improve its industrial operations in terms of profitability, efficiency. The management can use various techniques like, trend analysis, common size statements, comparative statements, schedule of changes in working capital, fund flow statements, cash flow statements, cost-volume-profit analysis and ratio analysis for its financial position and performance. It is a process of establishing and interprets the quantitative relationship between individual figures and group of figures. If ratios are properly analyzed and interpreted the management can strengthen its solvency position, enhance its efficiency and growth in profits. Taking this as central idea, a research work on comparative analysis was undertaken on JK Paper Mills Ltd., and Emami Paper Ltd., at micro level to examine and evaluate its current financial areas in terms of solvency, liquidity, efficiency and profitability by adopting Ratio Analysis. An attempt has been made to analyze the financial results basing on the financial statements from 1st April 2008 to 31st March 2017.

The main aim of this article is to find out the impact of Working Capital Management on solvency of the Paper mills. This is performed by developing a unique empirical framework first used by Shinand Soenen (1998) and the subsequent work of Deloof (2003). The study is exclusively on the Paper mills limited. The data reported in this paper were collected for a period of 2008 to 2017. As a part of study used to examine solvency and working capital management from financial area. And the primary data was collected by in person to the production unit and having personal interviews with the employees concerned and the secondary data collected through audited financial statements, broachers, bulletins, statistical returns and company profiles.

Review of Literature: Many researchers have studied working capital from different views and in different environments. The following study were very interesting and useful for our research: According to Eljelly, 2004, working capital management requires planning and controlling current assets and current

liabilities in such a way that eradicate the threat of inability to meet short term t short term liabilities and evade excessive investment in these assets[2].

Amit, Mallik, Debashish and Debdas (2005) in their study regarding the relationship between working capital and profitability of Indian pharmaceutical industry found and concluded that no definite relationship could be established between liquidity and profitability. Vishanani and Shah (2007) studied the impact of working capital management policies on corporate performance of Indian consumer electronic industry by implemented simple correlation and regression models.They found that no established relationship between liquidity and profitability exist for the industry as a whole; but various companies of the industry depicted different types of relationship between liquidity and profitability, although majority of the companies revealed positive association between liquidity and profitability.

Reheman and Naser (2007) found in their study negative relationship between profitability and liquidity of firms and also Ganesan (2007) studied working capital management efficiency in Telecommunication equipment industry and the study revealed significant statistical evidence and negative relationship between profitability and liquidity[3]. Bhunia (2007) studied liquidity management of public sector Iron and Steel enterprise in India. He has found that the actual values of working capital lower than the estimated value of working capital for both companies under study and poor liquidity position in case of both companies.

Objectives of the Study

The objectives of the study are:

- To study the concept and importance of working capital and the concept of ratio, utility of ratio analysis, and compiling of ratios.
- To examine the financial performance through Ratio Analysis of JK Paper Mills Ltd., and Emami Paper Ltd., on comparative basis in terms of short term.
- To interpret the summary of findings in form of conclusions and suggestions for effective functioning of JK Paper Mills Ltd., and Emami Paper Ltd.,

Plan of Analysis: The primary data collected through general discussions and the secondary data collected from various published sources have been taken in find with the objectives of the study and relevant tables were equipped. In the analysis of data usual statistical techniques like percentages and averages have been used.

Field Study: The period for the study is April 2008 to 31st March 2017. The field study was conducted from 1st April 2016 to June 2016. The personal interview method was used. In this regard, impulsive help has been received from executives. However, there were few problems in the gathering of information, owing to the tendency of people to keep the facts in privacy, fear about tax assessment, poor memory and reluctance of respondents. These problems were partially finished by prompting information through discussions.

Scope of the Study: The current comparative study was mostly confined to JK Paper Mills Ltd., and Emami Paper Ltd., This is an effort to have a micro level imperial analysis in the financial progress and performance of paper mills. The findings and suggestions throw light on the directions for future policy formulation and implementation for the active functioning of paper mills in other districts of the state and the country also

Limitations of the Study: The ratios have been designed, analyses and interpreted for the period under study i.e. from 1st April 2008 to 31st March 2017. Ratios are calculated on the basis of historical financial statements[4]. Henceforth, future performance of the industrial units not reflected. The financial declarations are subject to window dressing.

Ratio Analysis: The short term creditors of a firm are primarily involved in knowing the company's capacity to understand its present or short-term duties as and when these become due. This paper contracts with a dangerous evaluation and analytical interpretation of the financial performance of JK Paper Mills Ltd and Emami Paper Ltd as a comparative study relating to short-term solvency for the study period from 2008 to 2017.

Short Term Liquidity Position

Current Ratio (Working Capital Ratio): This ratio dealings the liquidity position in short term by creating relationship between current assets and current liabilities [5]. The formula to calculate current ratio is as follows.

Current Ratio = Current Assets/Current Liabilities

The statistical data involving to calculation of current ratio was calculated over the financial statements mentioned in their respective annual reports of JK and Emami paper Ltd for the study period from 2008-09 to 2016-17 are signified in the below table.

Table 1: Assets and Current Liabilities of JK and Emami paper Ltd 2008 to 2017 (Rs. in Lakhs)

Year Ending 31st March	JK paper Ltd			Emami paper Ltd		
	Current Assets	Current Liabilities	Ratio	Current Assets	Current Liabilities	Ratio
2008-09	13866	7983	1.74:1	14192	7879	1.80:1
2009-10	15234	8112	1.88:1	15171	10492	1.45:1
2010-11	15300	8771	1.74:1	17250	12229	1.41:1
2011-12	15602	14487	1.08:1	17919	12703	1.41:1
2012-13	18165	12562	1.45:1	21512	14010	1.54:1
2013-14	22010	13344	1.65:1	23535	16631	1.42:1
2014-15	23901	15975	1.50:1	21246	11819	1.80:1
2015-16	24835	12840	1.93:1	22709	10584	2.15:1
2016-17	28986	14455	2.00:1	36715	11022	3.33:1

Source: Annual Reports

Interpretation: As a conservative rule, a current ratio of 2:1 is measured satisfactory. This rule of thumb should not recklessly be followed because, low current ratio specifies that the unit may not be having satisfactory funds to pay off liabilities or it may be trading beyond its ability. cash and bank balances may be untruthful idle because of insufficient investment opportunities. This ratio is below the accepted standard norm both in JKPL and EMAMI PL in the entire study period, except 2010-11 in JKPL, 2009-10 and 2010-11 in EMAMI PL. It clearly specifies, the usual general accepted solvency to meet their current obligations in time is not acceptable during 2002-2009. This ratio just reached at standard in 2010-11 in JKPL compared with previous years. In both companies the current ratio is stable with effect from 2009-10 which designates the short term financial position is quite satisfactory. However, the management of JKPL must initiate essential steps to employ its idle cash and bank balances in good-looking investments or to pay back its short term liabilities.

Quick Ratio (Acid Test Ratio): Quick ratio is harder test of liquidity than current ratio. It founds the relationship between quick or liquid assets and quick liabilities [6]. The formula to compute quick ratio is as follows.

Quick Ratio = Quick Assets/Current Liabilities [7]

The statistical data relating to calculation of quick ratio found through the financial statements mentioned in their own annual reports of JKPL and EMAMI PL for the study period from 2008-09 to 2016-17 and are showed in the below table.

Table 2: Quick Assets and Current Liabilities of JKPL & EMAMI PL 2002 to 2011 (Rs. in Lakhs)

Year Ending 31st March	JK paper Ltd			Emami paper Ltd		
	Quick Assets	Current Liabilities	Ratio	Quick Assets	Current Liabilities	Ratio
2008-09	5888	7983	0.74:1	11393	7879	1.45:1
2009-10	6530	8111	0.80:1	10829	10491	1.03:1
2010-11	6675	8771	0.76:1	12556	12230	1.03:1
2011-12	7509	14487	0.52:1	12924	12703	1.02:1
2012-13	9218	12562	0.73:1	16016	14011	1.14:1
2013-14	11529	13344	0.86:1	16482	16631	0.99:1
2014-15	10376	15975	0.65:1	14041	11818	1.22:1
2015-16	13248	12841	1.03:1	17928	10583	1.69:1
2016-17	16879	14486	1.17:1	32227	11021	2.92:1

Source: Annual Reports

Interpretation: A quick ratio of 1:1 is measured to represent a acceptable current financial condition. A quick ratio of 1:1 does not unavoidably mean suitable liquidity position, if all debtors cannot be understood and cash is needed directly to meet current obligations. A low quick ratio does not unavoidably mean a bad liquidity position as inventories are not a completely non-liquid. It is detected from the above data the quick ratio is less than the accepted norm in JKPL from 2008-09 to 2016-017, whereas it is just above the standard in EMAMI PL Further the quick ratio is above the standard in JKPL from 2015-16 to 2016-17.In EMAMI PL this ratio is at standard from2010-11 to 2011-12 with a slight fall in 2013-14. Thereafter it is increasing increasingly. It is noticed in the arrangement of current assets; the percentage of inventory in total assets is high in amount in JKPL compared to EMAMI PL seeing other current assets like debtors, loans, advances, cash and bank balances. Therefore, quick ratio is more satisfactory in EMAMI PL with JKPL in the total study period.

Cash Ratio (Absolute Liquid Ratio): Cash is the greatest liquid asset. The association between cash including cash at bank and short term marketable retreats with current liabilities is examined to know the instant solvency [8]. While receivables, debtors and bills receivable are generally more liquid than inventories, yet there may be fears regarding their understanding into cash immediately or in given time. The formula to compute the cash ratio is,

Cash Ratio = Cash in hand and at bank + Marketable Securities/Current Liabilities[9].

The statistical data relating to computation of cash ratio got through the financial statements referred in their respective annual reports of JKPL and EMAMI PL for the study period from 2008-09 to 2016-017 and are depicted in table 3 with its graphical representation.

Table 3: Cash +Marketable Securities and Current Liabilities of JKPL & EMAMI PL 2008-09 to 2016-017 (Rs. in Lakhs)

Year Ending 31st March	JK paper Ltd			Emami paper Ltd		
	Cash and Bank Balance	Current Liabilities	Ratio	Cash and Bank Balance	Current Liabilities	Ratio
2008-09	564	7983	0.07:1	4603	7879	0.58:1
2009-10	795	8112	0.10:1	4789	10492	0.46:1
2010-11	612	8771	0.07:1	5957	12230	0.49:1
2011-12	777	14487	0.05:1	6189	12703	0.49:1
2012-13	972	12563	0.08:1	7210	14011	0.51:1
2013-14	1329	13345	0.10:1	8045	16631	0.48:1
2014-15	807	15975	0.05:1	6441	11818	0.54:1
2015-16	1376	12841	0.11:1	9168	10583	0.87:1
2016-17	2068	14456	0.14:1	2884	11021	0.26:1

Source: Annual Reports

Interpretation: The perfect cash ratio is 1:2 or 0.5 or 50 percent. This ratio in APPML is less than the standard and not hopeful for the whole study period i.e. 2008-09 to 2016-17. The cash ratio is above the standard in SSPBL in 2008-09 and a quick decrease up to 2010-11, thereafter solidly increased to 87 percent in 2009-10. But then it has fall to 26 percent in 2010-11, which is less than the standard. The percentage of cash and bank balances in total assets in APPML was 1.27 in 2008-09, reduced to 0.90 percent in 2010-11 and subsequently with increasing trend reached to 1.71 percent in 2010-11. Hence, cash ratio is not satisfactory mainly in JKPL as compared with SSPBL. It needs the concentration of the management to introduce sufficient effective actions for proper maintenance of working capital needs by utilize available cash and cash at bank balances.

Net Working Capital Ratio: Working capital is very much requisite sufficiently for any association for effective performance of its operation successfully[10]. Usually, working capital is directly related to sales. Net working capital is as the difference between current

assets and current liabilities. This ratio can be considered by using the following equation.

Net Working Capital Ratio = Net Working Capital/ Net Assets.

The statistical data involving to net working capital ratio obtain through the financial statements referred in their particular annual reports of JKPL and EMAMI PL for the study period from 2002-03 to 2010-11 and are depicted in the table.

Table 4: Net Working Capital and Net Assets of JKPL and EMAMI PL 2008 to 2017 (Rs. in Lakhs)

Year Ending 31st March	JK paper Ltd			Emami paper Ltd		
	Net Working Capital	Net Assets	Ratio	Net Working Capital	Net Assets	Ratio
2008-09	5882	43471	0.14:1	6313	35952	0.19:1
2009-10	7122	44236	0.16:1	4679	34381	0.14:1
2010-11	6528	48118	0.14:1	5021	40549	0.12:1
2011-12	1115	45748	0.01:1	5218	41100	0.13:1
2012-13	5602	103752	0.54:1	7502	57596	0.13:1
2013-14	8665	110065	0.08:1	6903	74806	0.09:1
2014-15	7026	115899	0.07:1	9427	74860	0.13:1
2015-16	11995	116895	0.10:1	12126	74306	0.16:1
2016-17	14531	120156	0.12:1	25694	87383	0.29:1

Source: Annual Reports

Interpretation: The net working capital ratio in JKPL was solid during 2008-09 to 2016-17 It was augmented to 54 percent in 2006-07 which was ever maximum due to irregular increase in current liabilities in the applicable period. Thereafter, this ratio vary from 8 percent to 12 percent from 2014-15 to 2014-16. This ratio was between 12 percent to 19 percent in EMAMI PL between 2008-09 to 2016-17 and presently decreases to 9 percent in 2007-08. Thereafter, it was steady between 13 percent to 29 percent during 2012-13 to 2014-15. The percentage of current assets in total assets was 31.35 in JKPL in 2002-03 reduced to 17.45 percent in 2006-07 and registered a reasonable increase up to 24.12 percent in 2010-11. It was observed that the percentage of the investment was at 8.25 in JKPL in 2008-09 decline to 1.39 percent in 2016-17 as against 2.19 percent in 2008-09 in EMAMI PL reach to 2.66 percent in 2016-17.

Conclusions

From the above study we can investigate that, the management of JKPL must begin essential steps to utilize its idle cash and bank balances in attractive investments or to pay back in short term liabilities. (Current ratio). The low quick ratio may also have liquidity position, if it has fast moving inventories and is more acceptable in EMAMI PL with JKPL. Cash ratio is not acceptable in JKPL as compared to EMAMI PL and it needs the notice of the management to encourage effective utilization of cash and bank balances.

Ethical Clearance: Taken from NIL committee.

Source of Funding: Owned fund.

Conflict of Interest: (If any then mention it otherwise write it as nil)-Nil

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A Study on Farmers' Opinion Towards Marketing of Agricultural Seeds: An Analysis

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Abstract

This research paper presents the farmers' opinions towards marketing of agricultural seeds-an analysis. Agriculture sector is an important sector in development of economy in our country. It provides direct employment to more than two third populations in our country. Marketing of agricultural seeds can be made effective if it is looked from the collective and integrative efforts from various quarters by addressing to farmers, middlemen, researchers and administrators. It is high time we brought out significant strategies in agricultural marketing with innovative and creative approaches to bring fruits of labour to the farmers. In this backdrop it is necessary to marketing of agricultural seed and quality management in Cuddalore district.

Keywords: *Farmer, Agricultural Seeds, Agricultural Marketing, Problems of Farmers.*

Introduction

In a country like ours agricultural sector is a dominant one. The agricultural production is depending upon various factors like the fertility of the land, availability of water or the irrigation system, the technology adopted and the quality of the seed. of these factors the seed quality alone is affecting the output by 15 to 20%.Realising the fact that the seed is the pivotal in the enhancement of the agricultural production in the country, the government of India has implemented. "National Seed Project phase-I" in 1977-78, phase-II in 1978-79 and phase-III in 1990-91 Also the government has pronounced New Seed Development Policy in 1988-89.[1]

The Indian seed industry is occupied by both the governmental agencies and private seed traders in the Indian agricultural sector. A major portion of agriculturists are either using their own seeds or they procure from the local agriculturists who are having surplus seeds The green revolution during the 70's enabled the private commercial traders to enter into the Indian Seed Industry.[2] The economic liberalization made it possible to import seed from abroad and thereby the entry of foreign companies to market genetically improved varietiesof seeds. Apart from these players in the Indian Seed Industry, State Seed Corporation is also playing a vital role in the production and marketing of seeds.[3]

Agricultural Marketing: The National Commission on Agriculture defined agricultural marketing as a process which starts with a decision to produce a saleable farm commodity and it involves all aspects of market structure of system, both functional and institutional, based on technical and economic considerations and includes pre and post-harvest operations, assembling, grading, storage, transportation and distribution.[4] In the olden days selling of agricultural produce was easy as it was direct between the producer to the consumer either for money or for barter. As it is well known more the number of mediatory more will be the costs as each transaction incurs expenses and invites profits. Ultimately when it comes to the producer the cost of the produce goes up steep. In the entire process of marketing the producer gets the lowest price and the ultimate consumer pays the highest as the involvement of more middlemen in the entire distribution process.[5]

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Statement of the Problem: There has been spiraling demand for quality seed in India, despite the implementation of seed certification and the enactment of the Indian Seed Act, 1966. The entry of private companies in the Indian Seed Industries and establishment of State Seed Corporations has not resolved these problems entirely. There has been a vast gap between the demand and supply of seeds. In the state of Tamilnadu the actual requirement of seed was 2.79 lakhs tonnes but supply has been 1.05 lakhs tonnes. In India the seed production has been steadily increasing. The total production of seeds was 1.0396 tonnes during 2002-2003 and it was spurred up to 2.5035 million tonnes, during 2008-2009 (Seed Division of DAC) Even then, the demand for seed has not been fully met. The seed certification has not improved the quality of seed available to the Indian farmers as a major portion of them are using locally available seeds. Hence, a study ofthis nature is considered timely and urgent for assessing the quantity available of selected seeds and the quality of the seeds used by the farmers. Unfortunately, our agricultural seeds sector is really suffocating due to a variety of problems. Generally, the price of a commodity must be either cost based or demand based. The present study is an attempt to look into these aspects for the purpose of gathering more information for improving marketing of agricultural seed in Cuddalore district.

Objectives of the Study: To analyze of problems faced by agricultural seeds cultivators in Cuddalore district

Research Methodology: The study is primarily aims at assessing the availability of quality seeds in Cuddalore district. For the nature of this study, survey method is found suitable. Hence, it is proposed to undertake this study by following survey method. Samples are going to be selected by stratification. It is also proposed toadminister two schedules, one to the sample agricultural farmers and another to the sample seed marketing traders.

Hypotheses

Ho1: There is no significant difference between problems faced by farmers relating to agricultural seeds and demographic profile.

Sampling Struture: Purposive sampling method was adopted for the collection of data from the sample respondents for the study. Sample data were collected from agricultural farmers and seed marketing (firms) traders. The study is confined to only Cuddalore district. 60 samples were selected from each taluk and farmers who have been engaging actively in the cultivation of paddy, black gram, and green gram were chosen as samples for the study. So the total sample size of the study was 480 and it was considered adequate for the main objective of the study.

Statistical Tools: The collected data will be subjected to different statistical analysis such as percentage analysis, mean, standard deviation, co-efficient of variation, correlation analysis, regression analysis, chi-square test, 'T' test, ANOVA, factor analysis, reliability test, Friedman Kandall's "W" Test and descriptive statistics using SPSS package for 20.0.

Age of the Respondents: Age is an important determinant in marketing of agricultural seeds. Generally young farmers have more capacity to assess each and every part of the quality management, cultivation of seeds, problems relating to the marketing of agricultural seed. But the older peoples' advice and their suggestions are important to strengthen of agricultural activities

Table 1: Age of the Respondents

Age	No of respondents	Percentage
20-30	16	3.33
31-40	23	4.79
41-50	129	26.88
51-60	159	33.13
Above 60	153	31.88
Total	**480**	**100**

Source: Primary data

It is evident from the Table 1 that majority of the respondent farmers 159 (33.13 per cent) belong to the age group of 51-60. Out of total 480 respondents 31.88 per cent in above 60 years and 26.88 per cent in 41-50 years. It is evident that 92 per cent of the respondents have an age of above 40 years, of which 31.88 per cent are above 60 years. From this, it is obvious that the aged borrowers dominate the sample population and only 8.12 per cent respondents are up to 40 years of age. This is an indication of the reluctance of the youngsters in agriculture activities.

Sex of the Respondents: One of the important profiles is the sex of farmers. Since the sex has its own influence on the awareness, understanding and availing of the existing benefits in the cultivation of seed, it is included as one of the variables.

Table 2: Gender of the Respondents

Gender	No of respondents	Percentage
Male	421	87.71
Female	59	12.29
Total	**480**	**100**

Source: Primary data

The Table 2 shows that among 480 sample farmers, 412 (87.71 per cent) are male and 59 (12.29 per cent) are females. Agriculture as business or livelihood is carried on more by men by women. Yet women are engaged as labourers for major agricultural activities like cropping, weeding, and harvesting.

Occupation of the Respondents: Occupation is a widely accepted and probably the best documented measure of social class, because it implies occupational status. The importance of occupation as a social-class indicator is dramatized by the frequency which people ask others when they meet for the first time, what do you do for a living.

Table 3: Occupation of the Respondents

Occupations	No of respondents	Percentage
Government employees	32	6.67
Semi government employees	28	5.83
Private employees	57	11.88
Agriculture	356	74.17
Others	07	1.46
Total	480	100

Source: Primary data

The Table 3 shows that majority of the 356 (74.17 per cent) respondents are doing agriculture as a main occupation. Among the sample respondents about 32 (6.67 per cent) are working as a government employee. Likewise 28 (5.83 per cent), 57 (11.88) and 7 (1.46) of respondents are working as a Semi-Government Employee, private employee and others. But all the employees are doing agriculture as partly.

Own Agriculture Land: The Own Agriculture land of the respondents has been included in marketing of agricultural seed with respect to quality management.

Table 4: Own Agriculture Land of the Respondents

Agricultural land	No of respondents	Percentage
Yes	453	94.38
No	27	5.63
Total	**480**	**100**

Source: Primary data

The Table 4 shows that the majority of the respondents 453 out of 480 are having own land which is 94.38 per cent and remaining 27 are not having own land which forms 5.63 per cent of the sample respondents.

Testing of Hypotheses (Problems in Seed Cultivation and Marketing): This section is to testing the significant difference between farmers' annual income, how many years are cultivating lands, how many years are engaged in agriculture and type of land cultivated with respect to problems in seed cultivation and marketing towards quality management in Cuddalore district.Testing the significant difference between problems in seed cultivation and marketing on the basis of the annual income (demographic profile) one way ANOVA was applied to ascertain if there were any significant difference between problems in seed cultivation and marketing on the basis of the annual income and the following null hypotheses has been framed:

Ho1: There is no significant difference between problems in seed cultivation and marketing on the basis of the annual income.

Table 5: Anova for Problems in Seed Cultivation and Marketing on the Basis of the Annual Income

Variables	Annual Income	N	Mean	SD	F-value	P Value
Financial Problems	Below 25,000	34	32.71	4.707	1.868	0.134 (NS) Accepted
	25,001-50,000	85	34.06	4.734		
	50,001-75,000	149	34.65	4.493		
	Above 75,000	212	34.41	4.310		
	Total	**480**	**34.30**	**4.484**		

Variables	Annual Income	N	Mean	SD	F-value	P Value
Maintenance Problems	Below 25,000	34	20.47	3.535	1.052	0.369 (NS) Accepted
	25,001-50,000	85	21.12	3.992		
	50,001-75,000	149	20.96	3.678		
	Above 75,000	212	20.41	3.794		
	Total	**480**	**20.71**	**3.778**		
Low Yield in Agricultural Seeds	Below 25,000	34	22.53	4.315	6.599	0.001 (S) Rejected
	25,001-50,000	85	24.81	5.088		
	50,001-75,000	149	24.73	5.075		
	Above 75,000	212	22.92	4.305		
	Total	**480**	**23.79**	**4.781**		
Labour Problems	Below 25,000	34	25.97	2.844	4.032	0.008 (S) Rejected
	25,001-50,000	85	24.04	3.887		
	50,001-75,000	149	23.58	3.702		
	Above 75,000	212	24.05	3.564		
	Total	480	24.04	3.656		
Problems faced by the Farmers towards Agricultural Seeds	Below 25,000	34	58.65	8.521	4.308	0.005 (S) Rejected
	25,001-50,000	85	61.58	7.122		
	50,001-75,000	149	62.94	7.223		
	Above 75,000	212	60.49	8.302		
	Total	480	61.31	7.875		

Source: Computed From Primary data, NS-Not Significant

The Table 5 inferred the F-value of financial problems on the basis of their annual income. The calculated F-value (1.868) is not significant. Hence, the stated hypothesis is accepted. Therefore Rs.50, 001-Rs.75, 000 annual income groups of respondents has highly face financial problems than the other groups.

The F-value of maintenance problems on the basis of their annual income, the calculated F-value (6.599) is not significant. Hence, the stated hypothesis is accepted. Therefore Rs.25, 001-Rs.50, 000 annual income groups of respondents has highly face maintenance problems than the other groups.

The F-value of low yield in Agricultural Seeds problems on the basis of their annual income, the calculated F-value (1.868) is significant. Hence, the stated hypothesis is rejected. Therefore Rs 25, 001-Rs.50, 000 annual income groups of respondents has highly face low yield in agricultural seeds problems than the other groups.

The F-value of labour problems on the basis of their annual income, the calculated F-value (4.032) is significant. Hence, the stated hypothesis isrejected. Therefore below Rs.25, 000 annual income groups of respondents have highly face labour problems than the other groups.

Problems Faced by the Farmers towards Agricultural Seeds: The analysis of problems in seed cultivation and marketing namely financial, maintenance, low yield in agricultural seed cultivation, labourproblems and problems relating to the crop cultivation and also problems faced by the farmers problems faced by the farmers in agricultural seeds cultivation, these challenges making the agricultural farmers

Table 6: Problems Faced By the Farmers Towards Agricultural Seeds

SNo	Variables	N	Mean	SD	Rank
1	Water scarcity, drought	480	4.00	1.187	1
2	Crops were lost due to the heavy rainfall and floods	480	3.86	1.093	7
3	Cyclone	480	3.69	1.136	14
4	Pest and diseases	480	3.74	1.125	11
5	Irrigation problems	480	3.67	1.438	15

SNo	Variables	N	Mean	SD	Rank
6	Non availability of inputs (seeds, fertilizers and pesticides)	480	3.98	1.127	3
7	Low price of the products	480	3.89	1.249	5
8	Power problems	480	3.70	1.464	12
9	High price of inputs	480	3.81	1.469	8
10	Canals overflowed due to heavy rainfall	480	3.87	1.152	6
11	Collapse of Irrigation System	480	3.70	1.313	13
12	Heat Wave and Cold Wave	480	3.75	1.250	10
13	Change in Production/ Climate Change	480	3.99	1.141	2
14	Spurious seeds	480	3.76	1.360	9
15	Poor fertility of land	480	3.96	1.151	4
16	Crop loss due to Livestock/Others	480	3.91	1.344	4

Source: Computed from Primary data

It is noted from the Table 6 shows that problems faced by the farmers towards water scarcity, drought first rank the mean value=4.00 and standard deviation value = 1.187 followed by Change in production/climate change of mean value=3.99 and standard deviation value = 1.141, Non availability of inputs of mean value=3.98 and standard deviation value = 1.127, Crop loss due to livestock of mean value=3.91 and standard deviation value = 1.344, Low price of the products of mean value=3.89 and standard deviation value = 1.249, Canals overflowed due to heavy rainfall of mean value=3.87 and standard deviation value = 1.152, Crops were lost due to the heavy rainfall and floods of mean value=3.86 and standard deviation value = 1.093, High price of inputs of mean value=3.81 and standard deviation value = 1.469, Spurious seeds of mean value=3.76 and standard deviation value = 1.360, Heat Wave and Cold Wave of mean value=3.75 and standard deviation value = 1.250, Pest and diseases of mean value=3.74 and standard deviation value = 1.125, Collapse of Irrigation System of mean value=3.70 and standard deviation value = 1.313, Cyclone of mean value=3.69 and standard deviation value = 1.136 and finally Irrigation problems of mean value=3.67 and standard deviation value = 1.438. Hence, it is concluded that problems faced by the farmers towards water scarcity drought the first rank, the mean value=4.00 and standard deviation value = 1.187 followed by Irrigation problems last and fifteenth rank, the mean value=3.67 and standard deviation value = 1.438.

Suggestions:

- Improved verities and high quality seeds are basic requirements for productive agriculture, which is the basis of sustainable economic development in developing countries.
- The number of new verities increased after the introducing of plant variety protection.
- Currently in developing countries there is not an adequate seed quality assurance infrastructure with respect to seed testing and this is required to increase crop productivity and provide enhanced food security.
- The evolution of seed quality determination has not reached an end point and there are interesting developments in the pipeline that take account of the changing needs of the market.
- In the seed technology area transparency in and scientific exchange of the latest results remain of crucial importance for continued progress.

Conclusion

The present study concluded that, the necessary reforms coupled with proper price discovery mechanism through regulated market system will help streamline and strengthen agricultural marketing. In order to avoid isolation of small-scale farmers from the benefits of agricultural produce they need to be integrated and informed with the market knowledge like fluctuations, demand and supply concepts which are the core of economy.[6] Marketing of agricultural seeds can be made effective if it is looked from the collective and integrative efforts from various quarters by addressing to farmers, middlemen, researchers and administrators. It is high time we brought out significant strategies in agricultural marketing with innovative and creative approaches to bring fruits of labour to the farmers.[7]

Conflict of Interest: Completed.

Source of Funding: Self

Ethical clearance: Nil

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A Study on Consumer Behaviour Towards Durable and Non-Durable Goods in Cuddalore District

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Abstract

The purchasing is done by keeping all these factors in mind. Today, price is not the only consideration as it was a few years back when prices played a major role in purchasing. The automobile industry in general and two wheeler industries in particular have shown a tremendous growth over the recent years. Tomorrow's consumer will focus more on technology and credit purchase. To become a successful producer of milk products, they should think about price, quality and health consciousness of those products. Offers, gifts, price discount etc, can be given to attract more customers. This article paper highlights the consumer behaviour on durable and non-durable goods.

Keywords: *Consumer behaviour, Durable goods, Non-durable goods, Automobile industry.*

Introduction

The India consumers today are highly aware about the product, price, quality and the options available with them. The purchasing is done by keeping all these factors in mind. Today, price is not the only consideration as it was a few years back when prices played a major role in purchasing.[1] The automobile industry in general and two wheeler industries in particular have shown a tremendous growth over the recent years. Tomorrow's consumer will focus more on technology and credit purchase. Number of nuclear families will increase. Health care will become very important in the coming years. Talking of the two wheeler industry, the names that effortlessly come to us is Bajaj Auto, Hero Honda, TVS motor, Yamaha Motor, kinetic and others.[2] The two wheeler segment has played an important role in giving a push to the automobile industry in India. In fact, the production, sales and export of the Two Wheeler is a fair indication of the growing importance that it enjoys in this country's manufacturing economy.[3] The total sale of Two Wheeler in India has touched the figure of 7.86 million units by March 2007 up 11.42% from the previous fiscal figures of 7.05 million. Production during the period reached 8.63 million units.

The production of Two Wheeler in India is expected to reach a staggering 17.85 million units by 2010-11, double than the current production level. The two-wheeler production capacity is to reach 22.31 million units in 2011-12, compared with 10.78 million in 2006-07.[4]

Consumer Behaviour: Consumers behaviour is a composition of four aspects viz., consumer preference, information search purchase decision and post purchase behaviour or satisfaction. These aspects are explained in detail in the following pages. Define consumer behaviour as "those acts of individuals directly involved in obtaining, using, and disposing of economic goods and services, including the decision processes that precede and determine acts.

Importance of the Study: Today the company's image is built and made know by its customers. Thus the success of a firm is determined by how effective it has been in meeting the diverse consumer needs, by treating each customer as unique. Consumer is the king and it is the consumer who determines what a business is. Therefore, a sound marketing programme should start

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with a careful analysis of the habit, attitude, motives and needs of consumers.[5]

Need of the Study: India consumers are increasingly becoming aware of the importance of health and hygienic. Hence companies are making products to suit their health like low calorie, low fat food etc., they acquire knowledge about the product by collecting information through different medias, friends and relatives. Similarly they are buying milk products by undertaking their health as one of the important factor in their minds. Milk products are perceived differently at various types of purchasing places.[6] The most important variable explaining individual differences in consumer behaviour regarding purchase of milk products are trust, quality, origin, price of product, fat contents, and doctor's suggestions and so on.

Scope of the Study: The study aims at analysing consumer behaviour relating to Two Wheeler and Milk products. The scope of the study has been limited to certain buying behavioural aspects of purchase decision process namely information search, product awareness, interest, product evaluation process, brand preference, factors of motivation, price and quality consciousness, purchase and post purchase behaviour. The study broadly aims at examining perceptions of the consumer mainly in terms of the information gathered, sources of information, location where the purchase is made and the ultimate purchase decision.

Objectives of the Study

1. To identify and comparatively evaluate their article evaluation process, information search for the products.
2. To examine the association between demographic variables and elements of consumer behaviour.

METHODOLOGY

The sources of data are primary as well as secondary. The data collected from the consumer's survey primary and information gathered through books, journals, magazines, reports, dailies consist of secondary data. The data collected from both the sources are scrutinized, edited and tabulated. The data are analysed using SPSS (statistical package for social sciences) computer packages. The primary data is obtained through a well framed questionnaire as research instrument. The perception of consumers of two-wheelers and milk products are considered as main source of study.

Sample Size: Sample selected for the study covers different areas of Cuddalore district. Totally, 400 consumers of Two Wheeler and milk products are considered for research. They are selected on a simple random sampling method.

Review of Literature: The previous discussion of the literature identified significant gaps that will be explored in the thesis. Most of the studies in the area of consumer behaviour are limited for comparing with respect to Two Wheeler and non-Two Wheeler products neglecting the various elements of the behaviour. These issues are examined from the perspective of that behaviour and rarely take note of the dealer's opinion.

Perspectives on Consumer Research

The Rational Perspective: The economists were the first to dominate model building, in the area of buying behaviour. The early economic view considered consumer behaviour in terms of a single act of purchase itself, and post-purchase reactions. Economic theory holds that purchasing decisions are the result of largely "rational" and conscious calculations. Thus, the individual buyer seeks to spend his income on those goods that will deliver the most utility (satisfaction) according to his tastes and relative prices.

The Behavioural Perspective: As mentioned above, in contrast to the economic view which underscores the importance of internal mental processes in consumer decision making, the behavioural perspective emphasizes the role of external environmental factors in the process of learning, which it is argued causes behaviour. Thus, the behaviourists approach the consumer, as a "black box" and thereby assume that consumer behaviour is a conditioned response to external events.

The Cognitive Perspective: In contrast to behavioural theories of learning, the cognitive perspective stresses the role of information processing in consumer decision making. This perspective views people as problem solvers who actively use information from the world around them to master their environment. However, much debate surrounds the issue of whether or when people are actually aware of these learning processes. On the owned hand, there is some evidence for the existence of unconscious procedural knowledge.[7]

Analysis of Consumer Behaviour

Gender: Gender plays a vital role in determining behavioural aspects of consumers. In fact most of the

behavioural studies have identified the significant differences between the male and female consumers. In in this study the sample units execute the following frequency distribution of the gender.

Table 1: Gender Wise Respondents

Gender	Frequency	Percentage
Male	226	56.5
Female	174	43.5
Total	**400**	**100**

Sorce : primary data

From the above table it is ascertained that in the sample unit, a maximum of 56.5 per cent are male consumers and 43.5 per cent are female consumers. So it can be deduced that the sample unit comprises of more male consumers and reasonable number of female consumers of Two Wheelers and milk products.

Age: Age being one of the demographic characteristics of consumers influences the buying behaviour of consumers to a greater extent. The following table shows the distribution of respondents belonging to the different age groups.

Table 2: Age Wise Respondents

Gender	Frequency	Percentage
Below 20	06	1.5
20-30	115	28.5
30-40	132	33.0
40-50	127	32.0
Above 50	20	5.0
Total	**400**	**100**

Sorce : primary data

From the table 2 it is known that 33 per cent of respondents are between the age group of 30 to 40, 32. per cent are under the age group of 40-50, and 28.5 per cent are under the age group of 20-30. Negligible percentages i.e. (1.5 per cent) are belonging to the age group of below 20. Therefore it is understood that the respondents selected for the study are more or less evenly distributed.

Marital Status: The table given below depicts the marital status of the respondents selected for the study.

Table 3: Marital Status Wise Respondents

Gender	Frequency	Percentage
Married	286	71.5
Single	114	28.5
Total	**400**	**100**

Sorce : primary data

The table 3 shows that 71.5 per cent of the total consumers selected for the study are married and the remaining 28.5 per cent are single.

Present Status: While studying about the buying behaviour of the consumers, it is necessary to take into account the status of the consumers as the status also influences the behaviour. The distributions of status of the consumers are tabled below;3

Table 4: Present Status Wise Respondents

Gender	Frequency	Percentage
Salaried	275	68.75
Self-employed	16	4.0
Housewife	31	7.75
Student	40	10.0
Professional	38	9.5
Total	**400**	**100**

Sorce : primary data

The above table clarities the level of income of the consumers selected for the study. 36 per cent of the respondents belong to the income level of below Rs.10,000. 28.75 per cent of the consumers are under the category of above Rs.40,000. From the above it is understood that the respondents selected are evenly distributed to all categories of income.

Income: The level of income influences the purchase decisions of the consumers. The income distribution of the respondents is given in the following table;

Table 5: Income Level Wise Respondents

Gender	Frequency	Percentage
Beloe 10,000	144	36.0
10.001-25,000	78	19.5
25,001-40,000	63	15.75
Above 40,000	115	28.75
Total	**400**	**100**

Sorce : Primary data

The above table clarities the level of income of the consumers selected for the study. 36 per cent of the respondents belong to the income level of below Rs.10,000. 28.75 per cent of the consumers are under the category of above Rs.40,000. From the above it is understood that the respondents selected are evenly distributed to all categories of income.

Educational Qualifications: The data regarding the educational qualification of the consumers are also collected as it affects the buying behaviour of the consumers to greater extents. This is given in the following table;

Table 6: Educational Level Wise Respondents

Gender	Frequency	Percentage
School Level	19	4.75
Graduate	79	19.75
Post Graduate	222	55.5
Professional	82	20.0
Total	**400**	**100**

Sorce : primary data

The table indicates the educational qualification of the respondents. 55.5 per cent of the respondents belong to the category of PG level education. 20 per cent are professionally qualified category, 19.75 per cent belong to graduate level and the negligible level of just 4.75 per cent belongs to the school level education.

Suggestions: Since brand consciousness is predominant among two wheeler customers in Cuddalore district, the two wheeler marketers should concentrate on their brands to increase their characteristic features and innovative technology to attract maximum customers. Innovation in case of model, technology, pollution free vehicle will definitely help to increase the market share of that particular product.[8] To become a successful producer of milk products, they should think about price, quality and health consciousness of those products. Offers, gifts, price discount etc, can be given to attract more customers.

Conclusion

From this article concluded that the promotional offers for milk products entirely depend on offers and attractive schemes. It is concluded that there is significant association between cluster classification and size of the family, cluster classification and gender, clusters of milk products and status, clusters of buyers of milk products and income and clusters of buyers of milk products and their educational qualifications. The consumers treat shopping as an enjoyable activity while buying their two wheelers whereas they treat it as a waste of time while buying their milk products. The consumers often buy their milk products from the same store each time. They purchase their favourite brands in case of two wheelers.[9] The buyers buy their two wheelers on cash, credit card and instalment basis whereas they often buy milk products on cash basis rather than on their basis.

Conflict of Interest: Completed

Source of Funding: Self

Ethical Clearance: NIL

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Magnetic Resonance Imaging Evaluation of Normal Ocular Anterior-Posterior Diameter and Interzygomatic Length in Healthy Adult and Pediatric Eastern Indian Population: A Retrospective Study

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Abstract

Purpose: To determine the anterior-posterior diameter of both eye balls by use of magnetic resonance imaging (MRI) and to find out possible association between the ocular anterior-posterior diameter with inter-zygomatic length, age and sex of healthy individuals.

Material andMethod: Retrospective study of ocular APD and inter zygomatic length (IZL) was carried out in Department of Radiology. About 403 cases with normal MRI findings of brain and orbit were retrospectively analyzed by two senior radiologists independently keeping in view of inter observer variability. Study includes T2 weighted axial imaging of brain and orbit from January 2017 to Jan 2019. Data were analyzed using SPSS software version 22.0 for Microsoft Windows 10.

Results: The normal anterior-posterior diameter of the right and left globe of male person were 22.97 ± 0.946 mm and 22.94± 0.928 respectively. The normal anterior-posterior diameter of the right and left globe of female person were 22.48 ± 0.919 mm and 22.42± 0.921 respectively. The IZL was 97.6±4.297 and 94.05±4.277 in male and female individual respectively. Male individuals had higher ocular APD and IZL than female individuals ($P < 0.001$).

Conclusions: The normal ocular APD will help the clinicians, ophthalmologists and radiologist to quantitatively evaluate patients with abnormal ocular size and/or refractive errors.

Keywords: *Ocular, axial, eye,zygoma,magnetic resonance imaging.*

Introduction

The anterior-posterior diameter (APD) of eye ball is an important parameter than other ocular biometry as it helps in calculation of lens power before cataract surgery and predicts the risk of retinal detachment.[1,2] APD is measured in magnetic resonance imaging at the level of inter-zygomatic line and lens level objectively form anterior to posterior ocular pole. The inter-zygomatic line (IZL) joins the anterior margins of the zygomas.[3,4] Previous studies in rural population of central India suggest the average length of eye ball to be 22.6±0.91 mm in normal healthy adult.[5] Race, ethnicity, and genetics can influence the axial ocular length.[6] The ocular APD increases with age upto adult after which the APD remain unchanged. The average APD in newborn and adults were about 16 mm and 19.5 respectively.[7] The APD is an important dimension of eye than other diameters and is larger in myopia and smaller in hypermetropia.[8] Anterior chamber depth, lens thickness, crystalline lens refractive power, and variations in APD affect the refractive error in older aged people especially 50 years

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or older.[9] The variation of ocular APD is associated with refractive errors and few retinal diseases like age-related macular degeneration, and glaucoma.[10] The sonographic evaluation of eye is operator dependant. Computed tomographic evaluation of eye involved ionizing radiation. However MRI of orbit is safer alternative for ocular biometry and it can give additional information about optic nerve, intraocular and orbital pathology. MRI of orbits provides accurate anterior-posterior diameter as compared to A-scan ultrasonography. APD measurements with MRI match reliably with that measured by A-scan ultrasonography.[11] Present study will provide useful ocular biometric information from retrospective analysis of MRI study of head and orbit of healthy individuals.

Materials and Method

This study was based on retrospective analysis of 403 brain and orbital magnetic resonance imaging (MRI) examinations without contrast enhancement in our institution between January 2017 to January 2019. The study was conducted in 1.5 T MRI (GE) systems with head coil for the acquisition of the images. The study population was aged 10-80 years (average age was 48.2), there were 230 male and 173 female. Cases with history of orbital/head trauma, metabolic or systemic diseases, glaucoma or other ophthalmologic diseases such as microphthalmus, staphyloma, buphthalmos, and macrophthalmous were excluded from the study. The images showing movement artifacts, asymmetry sections of eye balls, eye with intraocular lens and lateral deviation were also excluded from the study. All the MRI reports stated no significant abnormality, so the study population was considered as representative of general Asian race population. T2-weighted axial images of brain/orbit were used for all ocular measurements at lens level. The IZL was drawn with electronic calliper and used as a reference line. The APD of the eyes was obtained with the aid of electronic calipers at lens level from posterior aspect of corneal apex to posterior globe wall-fat interface (Fig. 1).

Statistical Analysis: Statistical analysis was done inSPSS software version 22.0 for Microsoft Window. Values were expressed in terms of the mean and standard deviation (SD). The difference in APD between male and female was analyzed using the independent t test. The differences of the estimated APD obtained by right and left sides were compared using paired t test. Correlation between different parameters was tested by Pearson correlation test. The $P < 0.05$ was considered statistically significant. The ethical committee approval was not needed as this is a retrospective and non-interventional study. However institutional research committee was informed about the study.

Results

Total 806 globes of 403 individuals were studied. The mean age of individuals was 48.5± 18.83 years. Two hundred thirty (57%) of the cases were males while one hundred seventy three (43%) were females. The right and left globes paired samples correlation and paired samples test showed no statistically significant differences between right and left globes (Table 1). Age wise distribution of APD of right and left eye ball is shown in Table 2. There was no statistical significant correlation between age, right and left eye ball anterior-posterior diameter. However, IZL is more in elder individuals which is statistically significant (Table 3). The mean APD of the right globe is 22.76 ± 0.905 mm, while that of the left is 22.73 ± 0.915. There is no significant difference of APD between right and left eye ball. (P =0.22). The male individuals had more APD of eye ball and inter zygomatic length than female individual (Table 4). The IZL shows weak positive correlation with right and left eye ball anterior-posterior diameter (Table 5).

Table 1 Difference in the right anterior-posterior diameter (RAPD) and left anterior-posterior diameter (LAPD)

Parameters	RAPD	LAPD	Mean Occular APD	P-VALUE	IZL
Mean±standard deviation (SD)	22.76±0.905	22.73±0.915	22.73±0.911	0.22	90.06±4.60

Table 2 The means and standard deviations of the right anterior-posterior diameter (RAPD) and left anterior-posterior diameter (LAPD) by age groups

Age Groups	Number	IZL (mm) Mean±SD	RAPD (mm) Mean±SD	LAPD (mm) Mean±SD
≤ 19 Years	33	93.18±6.400	22.55±0.869	22.58±0.867
20-39 Years	97	95.95±4.307	22.82±1.010	22.71±1.040
40-59 Years	138	96.34±4.494	22.75±0.989	22.72±0.974
≥ 60 Years	135	96.59±4.262	22.78±0.928	22.75±0.912

Table3 Correlation of age with the right and left globes APD

Parameters	Coefficient of correlations (r)	P value
RAPD	0.014	0.784
LAPD	0.045	0.367
IZL	0.161	0.001

Table 4 The means and standard deviations of the globes APD by gender

Parameters	Male (N=230) Mean±SD	Female (N=173) N=173 Mean±SD	Mean difference	P value
Age (years)	51.43±18.372	44.67±18.861	6.757	<0.001
IZL (mm)	97.60±4.297	94.05±4.277	3.549	<0.001
RAD (mm)	22.97±0.946	22.48±0.919	0.490	<0.001
LAD (mm)	22.94±0.928	22.42±0.921	0.523	<0.001

Table 5 Correlations of IZL with right and left ocular measurements

Parameters	Coefficient of correlation (r)	P value
RAPD	0.301	<0.001
LAPD	0.280	<0.001

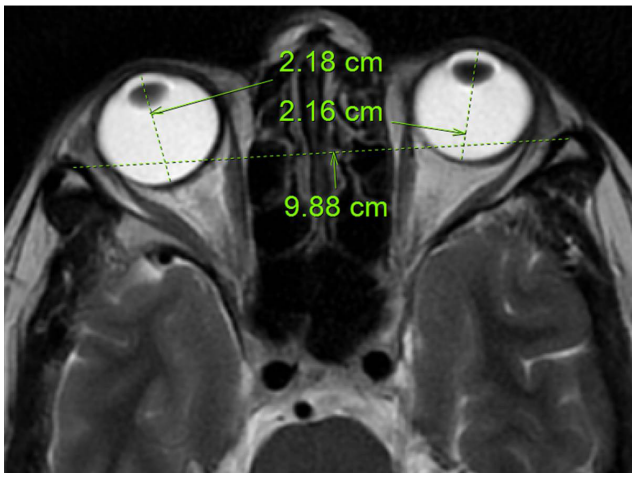


Fig. 1 Axial T2 weighted image of brain shows the measurement of anterior-posterior diameter of right and left eye ball and inter-zygomatic length at lens level.

Discussion

The APD of the globe is defined as the distance from the corneal apex to an interference peak corresponding to the retinal pigment epithelium/Bruch's membrane.[12] The IZL represents the size of face and its mean length in our entire study was 96.06 ± 4.6 mm. IZL is higher in male than female in our study (P < 0.001). The mean value in males and females are 97.6±4.297and 94.05±4.277 mm respectively. Our observation is consistent with the larger male head size than female head and with the findings of other authors.[13,14,15] Ozgen et al. and Jong Soo Lee et al. found larger IZL in male individual than female by use of MRI and CT imaging respectively.[14,15]Among adult populations in eastern India, the mean ocular APD in our study was found to be 22.73 ± 0.911 mm (Table 1). Nangia V et al.[16] studied the APD of globe by use of ultrasonic biometric method in rural Central India with mean age 49.4± 13.4 years and found the mean APD as 22.6 ± 0.91 mm which is similar to our study. George et al.[17] also showed similar mean APD value (22.28 ± 0.8 mm) as obtained in our study. However He M et al.[18] and Wickremasinghe et al.[19] conducted study in South China and Rural Mongolia respectively and found the APD value as 23.11 and 23.1 mm which are larger than our study. Beaver Dam Eye Study by Lee et al.[20] and Epic EPIC-Norfalk eye study by Foster et al.[21] study in England show the mean APD as 23.69 and 23.80 respectively. Huang Q et al. carried out ocular biometry in western china by partial coherence laser interferometry in patient with 50 and

above age with cataract and shows the average APD as 24.32±2.42 mm.[29] Bikbov MM et al. conducted study in Russian population and shows the average APD of eye ball is similar to Beijing and Singaporean population.[30] The difference of APD measurement in all above studies could be due to racial variation and environment influence.[22] Ozgen et al.[14], Jong et al.[15]and Detorakis et al.[23] did not find any statistically significant difference between data for the right and left globes. Salaam et al. reported no significant difference of APD between globes in their sonographic evaluation of eyes in Nigeria population.[24] There is no significant difference in right and left eye ball APD in our study. The APD of the male eyes has higher values than that of female. The APD of the right globe in males was 22.97±0.946 mm while that of the females was 22.48±0.919 mm($P < 0.001$), and the mean APD of the left globe among males was 22.94±0.928 mm compared to 22.42 ± 0.921 mm for females ($P < 0.001$). Tanjong-Pagar and Angeles Latino Eye studies[25, 26] had similar sexual dimorphism. Study conducted by Albashir SI, Saleem M et al. shows statistically significant higher axial eye ball length in male than female.[28]

In our study, there was no positive correlation between participants' age and the ocular APD. This differs from the observations of some authors. [16,19,25,27] The studies conducted by Lee et al.[20] (Beaver Dam Eye Study) and Wong et al.[25] (Tanjong-Pagar study) showed that the APD decreased with increasing age while a central Indian Eye and Medical Study by Nangia et al.[16] showed that the APD increased with increasing age. Similar observation was also noted by Guo et al.[27]and Wickremasinghe et al.[19] The contrast observed between our findings and that of these authors may be due to racial variations, environmental influences and/or technique employed in the studies. Weak statistical correlation is seen between IZL and APD of globe in our study.

Limitations of the study: The sample size is relatively smaller. A large prospective study after ruling out ocular abnormality/refractive error by ophthalmologist is advised for further study.

Conclusion

Sexual dimorphism is seen in APD of globe with males having higher values. The mean APD obtained in this study is matching with the study of central India and differs from the values obtained in China and Britain which further confirms that racial variation and environmental influences affect the APD of the globe as supported by other studies also. This normative data will help the ophthalmologist, clinician and radiologists for better quantitative evaluation of ocular and refractive abnormality such as small eye, large eye and refractive errors.

Conflict of Interest: All authors declare no conflict of interest.

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Assessment of Quality and Safety Aspects of Home Healthcare Services Provided by Tertiary Care Hospital

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Abstract

The present study is based on Home Healthcare service provided by Tertiary Care Hospitals in Mumbai. These tertiary care hospitals provide services like Nursing Care, Physiotherapy Care, Home Sample Collection and providing the reports and X-ray at patient's home environment. The purpose of this study was to determine the quality and safety of the Home Healthcare services.

The questionnaires were prepared by taking under consideration the JCI guidelines for Home Healthcare Patient Safety 2016 for all the four services viz. Nursing Care, Physiotherapy Care, Home Sample Collection and X-ray. The patients 'data was collected for the period of five months through telephonic medium which was further compiled and analysed. The study revealed satisfaction percentage which were above 95% for nursing care and home x-ray services, physiotherapy and home sample collection need improvement where percentage was between 80% to 90%. Further gap analysis was done where mean score of service dimensions like reliability, responsiveness, assurance and empathy were calculated.The highest gap observed for empathy dimension (0.24) followed by responsiveness (0.15) and assurance (0.12). Home Healthcare service is an emerging field in today's world;hence, this research will help the hospitals in understanding the gaps in home healthcare services, which will in turn enhance the quality and safety of health care services at patient's home environment.

Keywords: *Home Healthcare Service, Quality, Safety, Gaps.*

Introduction

It was a common practice of caring for someone medically at home before modern medicine era set in. Hospitalization was rare phenomenon. People believed in traditional way of giving treatment and comfort to the ailing person. Today, with a growing trend toward reduced hospital stays, home healthcare is gaining in popularity. While caregivers of the past were generally family members or friends, home healthcare today usually consists of a professional healthcare team working toward a common goal[1]. Home healthcare is defined by the National Clinical Homecare Association (2011) as "the provision of medical supplies and/or clinical services directly to patients in the community[2].

Home healthcare services aims at helping individuals to improve health and live with greater independence. It aids in promoting the client's optimal level of well-being; and assist the patient to remain at home, avoiding hospitalization or admission to long-term care institutions. Consultants may refer patients for home health care services, or family members or patients themselves may request the services[3] [4].Home health care is a system of care provided by skilled practitioners to patients in their homes under the direction of a physician. Home health care services include nursing care; physical, occupational, and speech-language therapy; and medical social services[5].

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The home healthcare market is expected to reach USD 349.8 Billion by 2020 from USD 227.5 Billion in 2015, growing at a CAGR of 9.0% from 2015 to 2020. Major factors driving the growth of this market include rising aging population, increasing incidences of chronic diseases, growing demand for affordable healthcare delivery systems due to the increasing healthcare costs, technological advancements, and government initiatives to promote home healthcare[6]. Health care is a big concern in India, the land of nearly 1.12 billion people 4 and the second most populous country in the world. It is estimated that lifestyle diseases will account for a whopping 74% of total deaths by 2030 (compared with 56% in 2008) with Cardiovascular, Cancer and Diabetes accounting for a majority. Home-based healthcare is an initiative to reach to such households beyond the boundaries of traditional hospital infrastructure [6]. With growing geriatric population, where India stands second, it is essential that such services are promptly promoted and utilized.Home Healthcare is a need of the today's world. With increase in number of chronic diseases and increase in need of convenience, the Home Healthcare sector is emerging day by day. In such services, it is very important to maintain and quality and safety of the service as home healthcare services are provided at patient's home, which is completely different from hospital setting[7].

Thus, a study was planned by the tertiary care hospitals, to find out satisfaction among the patients who have received such care services in the comfortable environment of home and also to find out the gaps and suggest recommendation the to reduce the same.

Various aspects of quality and safety were studied; these aspects include Appointment Booking Procedure, Punctuality of the Home Health staff, behavior of Home Healthcare staff towards patient and reporting Facility. In addition to this patient's safety aspect such as asking for doctor's prescription before doing any procedure, educating the patients regarding the procedure carried out, taking the blood sample in one prick were also taken under consideration.

Methodology

This cross-sectional study done for the home healthcare services provided by the tertiary care hospital in the city of Mumbai. Data was obtained from the patient who had availed these services in the year 2016. The study period was for five months, i.e. from January to May 2016.

For the purpose of data collection, four types of services were chosen namely:

- Home Nursing Care
- For Home Physiotherapy
- For Home X-ray Service
- For the Home sample, collection

Sample Size Obtained:

- Home Nursing Care: 144
- Home Physiotherapy Care: 11
- Home X-Ray Service: 24
- Home Sample Collection Service: 459

Thus, the total patients surveyed were-638

The feedback was taken from the patients using the patient satisfaction questionnaire prepared for each of the four departments under home healthcare of tertiary hospital about their satisfaction level with respect to:

- Appointment booking procedure.
- Patient Identification
- Punctuality
- Patient safety precautions

Results and Discussions

Home Nursing Care: Nursing care provided by hospital is for routine and specialized care. The nurse attendants re well-qualified registered nurses, who are on roll of employment with the hospital. The nursing staff is also trained in basic life support by American heart Association making them well qualified and equipped for the job. This as seen in the percentage of satisfaction in table 1, which is above 95% in all parameters. Patient safety is of upmost importance in home healthcare services. Criteria like asking for doctor's prescription before the procedure, educating the patient regarding the procedure and making patient comfortable ***during*** the procedure were taken under consideration, which scored high in terms of satisfaction

Table 1: Satisfaction Percentage on parameters related to home healthcare services

Services	Parameters-Satisfaction Percentage			
	Appointment booking procedure	Patient Identification	Punctuality & Reporting	Patient safety precautions
Home Nursing Care (n= 144)	98.5%	100%	97%	95.5%
Home Physiotherapy Care (n=11)	100%	81%	90.9%	94.9%
Home X-Ray Service(n=24)	94.4%	100%	97.2%	95.8%
Home Sample Collection Service(n=459)	94.10%	94.7%	98.55%	86.6%

Home Physiotherapy Care: The physiotherapy care provided is mainly for orthopedic patients and post operatives cases. The aim is to help patient regain strength, movement and function. The physiotherapist are also well qualified with bachelors of physiotherapy and adequate experience. Usually electrotherapy like Ultrasound, IFT, TENS along with manual therapy like mobilization and soft tissue techniques like Myofascial release and Trigger point therapy is carried out for patients with periodic re-evaluation and follow up. The no. of patients availing the service is gradually going up. With respect to patient safety. However, measures needs to be taken for patient identification where satisfaction percentage is 81% other parameters score high as compared to this one.It is important to ask patient/ family members regarding the medication history of the patient before giving the physiotherapy treatment, risk assessment of the patient's home environment and make patient comfortable during the physiotherapy treatment. Here the percentage is 94.9% as depicted in tale 1, which can be worked on where ample care should be taken to follow all the procedures and protocols before administering the treatment along with punctuality and reporting.

Home X-Ray Service: This service is mainly targeted for senior citizens who find it difficult to come to hospitals for getting their X-ray done. Thus, a team of medical assistants is sent along with portable X-ray machine to provide simplified and stress free experience. With appointment procedure, 94.4% patients were satisfied. For patient safety aspects such as confirmation of name and prescription of the patient, not allowing family members inside the house during X-Ray procedure and taking X-Ray in one attempt etc. re included to which 95.8% patients were satisfied as per table 1. As this facility is brought to the comfort of the home, people have to pay little above the regular price, thus making this aspect where 84.3% are satisfied with the cost of X-Ray.

Home Sample Collection Service: This is the widely used service of the hospital, for which they have employed trained technicians who are good communicators as well. As per table 1, 94.10% are satisfied with appointment procedure, rest they feel it takes little longer for them to take appointment when they call. It is also suggested that there should be on line system for ease of taking appointment. With punctuality of phlebotomist, staff 94.7% patients are satisfied. Patient Identification scores 98.55% for satisfaction. Patient Safety which include 3 aspects such as washing hands before procedure, wearing gloves, and taking sample in single prick, this aspect has 86.6% satisfied which needs improvement tremendously as it may lead to certain hazards which can be harmful for patients and end up earning bad reputation for the hospital.

Moreover, with more competitors operating in the market. It becomes even more imperative to take care of these parameters for sustaining the patient base.

Table 2: Gap Analysis between Patient Expectation and perception of care providers of various Service Dimensions

Service Dimensions	Mean Score (Customer Satisfaction)	Mean Score (Perception of care providers)	Gap between customer expectation and employee perception
Reliability	3.77	3.99	-0.23
Responsiveness	4.03	3.99	0.15
Assurance	3.89	3.775	0.12
Empathy	3.99	3.8	0.24

Table 2 shows the gap analysis between patient expectation & employee perception of various service dimensions. The highest gap is observed for empathy dimension (0.24) followed by responsiveness (0.15) and

assurance (0.12). Positive gaps indicate where hospital should focus more and should make improvement on above dimensions of services so that gaps can be filled. In case of reliability (-0.23) is negative which shows customers are satisfied with what services are offered by the hospital to them.

Conclusion

Home Healthcare service is majorly provided to the patients who are in need of convenience or for patients who find difficulty in travelling all the way to the hospital for availing medical services.

The Home Healthcare service is a one of the best option for the patients because they have the trust of getting quality care from this hospital. It was revealed from the study that certain parameters score above 90% in satisfaction where as there are only few parameters where attention and focus needs to be given in order to enhance patient experience. It is important for the home healthcare service to provider to maintain the quality and safety of the services because the care is given outside the hospital setting. Hence, the home healthcare staff should follow a proper protocol so that the patient feel satisfied after receiving the services, a continuous improvement-training program is also necessary. There is a great need to increase the patient base hence proper implementation of strategies should be done to reach out to large number of patients. Home healthcare service is a necessity of today's world because of increasing geriatric population and chronic diseases with acute shortage of hospital beds, patients want alternative sources. Hence, Home Healthcare is the best option to consider catering to the healthcare needs of the population.

Recommendations

For quality improvement

- A proper protocol should be maintained so that uniform care is provided to all the patients.
- Home healthcare staff can be given refreshment training on patient safety protocol.
- Regular monitoring of most common systemic diseases like Diabetes, hypertension and thyroid problems.
- Phlebotomist should be certified and diploma holder with proper training.
- An Online Appointment Booking can be started to ease the appointment booking procedure and reduce the time required for booking the appointment on Call.
- Psychological counseling of geriatric patients should be done on regular basis by healthcare staff.
- Report Facility of sample collection service needs lot of attention. A system can be developed where a patient can track his/her report or patient can be informed via SMS or Call about the report when it is ready for delivery.
- A confirmation from patients can also be taken after the report is delivered to them.
- Training can be given to the staff regarding identifying the patient correctly using Name, Address or Contact Number.
- The patient's and test information barcodes can be stuck on the sample as soon as sample is collected from the patient as this will reduce the risk of misplacing sample or performance of wrong test and can give assurance to patient that the sample is labelled correctly.
- As per the patients' feedback, the cost of X-Ray service is expensive, hence it needs to be revised and competitive pricing can be done.
- Online Mode of payment can be introduce for home healthcare services offered.
- Each call has to be recorded by the Home Healthcare department to know exact calls being converted into successful appointment.

To reach out to more number of patients:

- Need to track the discharged patients from the IPD and patient need to be informed about the home healthcare service of the hospital.
- The Advertisements films can be shown on the television in the OPD/Visitors lounge areas.
- The Live Chat can be introduced on the website to clarify the doubts of the patient visiting the website, as this can also help to reach more number of patients.
- Need to prepare more informative website portal for Home Healthcare Service of the Hospital.

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Ethical Clearance: IEC of Symbiosis International (Deemed University).

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Myocardial Bridging and Coronary Artery Dominance: A Cadaveric Study

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Abstract

Background: In the left coronary artery dominant people the total left ventricle is purely supplied by left coronary artery. Left coronary dominant people has an poor prognosis in acute coronary syndrome when compared with the right coronary dominance. Left coronary dominant with myocardial bridged may be an additional risk to the coronary artery disease.

Objectives: To evaluate the incidence of myocardial bridging and cardiac dominance pattern in myocardial bridged hearts in cadavers.

Material and Method: As this is a cadaveric study 100 heart specimens were obtained from routine dissection conducted for undergraduate students in the department of Anatomy, Maharajas institute of medical sciences, Vizianagaram and department of Anatomy IMS & SUM Hospital Bhubaneswar. After simple dissecting procedure myocardial bridges and coronary dominance pattern were observed.

Results: Myocardial bridging was seen in 41(41%) specimen with major involvement of mid-segment of left anterior descending artery (LAD). Out of 41 myocardial bridged herats right coronary dominance is present in 35 (85.37%) hearts and left coronary dominance present in 6(14.63%) hearts.

Conclusion: The dominance pattern of heart had great role in coronary heart disease. The left dominant heart was found to have significantly higher mortality than the right dominant heart and mixed type. In addition to the left dominance if the single and multiple myocardial bridges are present over the epicardial coronary artery there may be increased frequency of myocardial ischemia.

Keywords: *Left anterior descendind artery (LAD), Myocardial bridging (MB) Coronary dominance.*

Introduction

A myocardial bridge exists when one of the coronary arteries tunnels through the myocardium rather than resting on the epicardium. Usually, the coronary arteries branch out from the ascending aorta and rest on the surface of the heart muscle and feed blood down into smaller vessels that populate throughout the myocardium. But if the muscle grows around one of the larger arteries, then a myocardial bridge is formed. During systole as the heart contracts, the muscle exerts pressure across the bridge and constricts these arteries. This is a congenital defect and may manifest with signs of angina.

Epicardial coronary arteries usually pass over the interventricular and atrioventricular grooves. Myocardial Bridge (MB) can be defined as a band of myocardium which crosses the coronary artery during its course[(1)] Due to the MB, a segment of the epicardial coronary artery lies deep to the myocardium during its course thus termed as tunnelled artery[(1)]. The myocardial bridge (MB) is an anatomical variant that is often seen on the left

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anterior descending coronary artery (LAD) and located commonly over the middle segment of the LAD[2]. Myocardial bridging usually has a benign character but in some cases is associated with myocardial ischemia, infarction, coronary spasm, arrhythmias and even sudden death has been reported.[3] Anomalous origin and distribution of the coronary arteries were shown to be a cause of sudden death in young and adult patients during exertion [3]. The word "Coronary Dominance" was coined to show which coronary artery supplies the heart's diaphragmatic surface, based on the origin of the posterior interventricular artery (PIVA). Origin of the PIVA from the right coronary artery(RCA) was termed 'right dominance'; from the circumflex artery was called 'left dominance'. Origin from both the RCA and the circumflex artery was known as balanced pattern.[4] Left dominance and balance type was associated with higher mortality due to acute infarction and a higher incidence of atherosclerosis[5]. MB was itself sometimes considered to be one of the risk factor for coronary artery diseases (CAD) and if MB is associated with left dominance then risk for CAD will be increased. So this study was undertaken to correlate coronary dominance in MB with CAD.

Materials and Method

The sample size used for this study is 100 heart specimens. The specimens of hearts used for this study were obtained from routine dissection conducted for undergraduate students from the Department of Anatomy Maharajas institute of medical sciences, Vizianagaram and Department of Anatomy, IMS & SUM Hospital Bhubaneswar. Institutional ethical committee clearance was taken. The hearts were preserved in 10% Formalin and dissected. Visceral pericardium and subepicardial fat were removed. A total of 41 myocardial bridged hearts were identified. The coronary arteries and its branches were carefully dissected and traced unto their termination. The PIVA running in the posterior interventricular sulcus was identified and reviewed along its course up to its termination and its origin and course was noted. Photographs were taken and data analyzed statistically.

Results

The present study was done on a total 100 heart specimens, out of which 41 had myocardial bridges. Majority of bridges were seen in mid segment of left anterior descending artery (LAD). Single myocardial bridge(MB) were present in 36 cadaveric hearts, double myocardial bridges were present in 4 cadaveric hearts and triple myocardial bridges were present in only one cadaveric heart. PIVA originated from RCA in 35 hearts and from left circumflex artery in 6 hearts. Right coronary dominance is present in 35 cases and left coronary dominance present in 6 cases. Balance type of coronary dominance was 0.

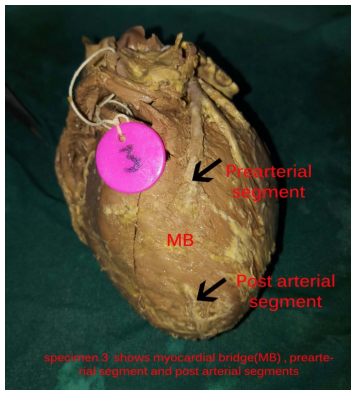


Figure 1: Specimen no. 3 showing the presence of myocardial bridge over the left anterior descending artery (LAD).

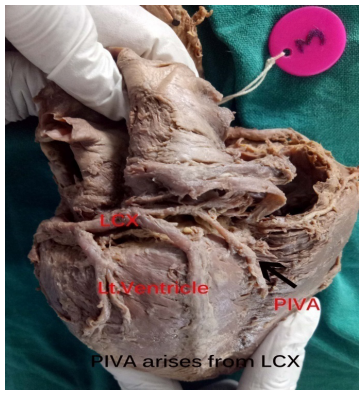


Figure 2: Showing the Posterior interventricular artery (PIVA) arise from the left circumflex artery (LCX).

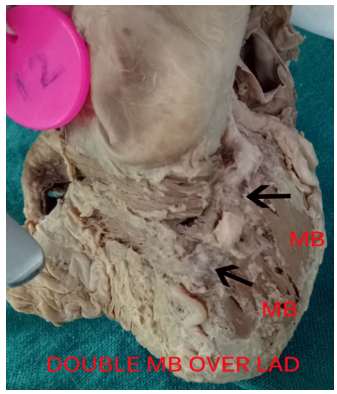


Figure 3: Showing the double myocardial bridge (MB) LAD = Left anterior descending artery

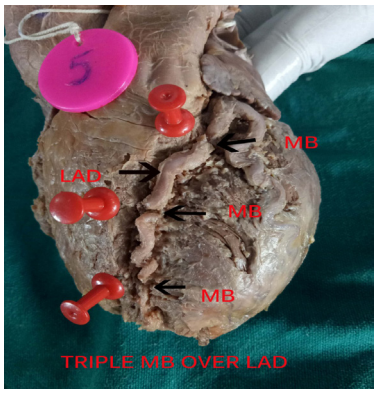


Figure 4: Showing the triple myocardial bridge (MB) LAD = Left anterior descending artery

Discussion

The dominance pattern of heart had great role in coronary heart disease. The left dominant heart was found to have significantly higher mortality than the right dominant heart and mixed type[6].It was found that left circumflex artery(LCX) length will be more and supplies the major part of myocardium in left dominant people but in right dominant people posterior intervententricular artery which is a branch of right coronary artery supplies only the diaphragmatic surface of the heart. So in lesions of LAD and LCX in left dominant people most of the myocardium will be damaged leading to heart failure.[7] It was found that in left dominance anterior wall, lateral wall and most of the diaphragmatic surface of the heart will be affected and in right dominance Sinuatrial (SA) node and Atrioventricular (AV) node. In inferior wall myocardial infarction the arterial supply to SA node and AV node will be cut off and so heart blocks can occur. [8]Myocardial bridge (MB) present in the heart causes compression of the epicardial coronary artery during systole and may be responsible for ischemia.[9]

The Right dominance, left dominance and codominant or balance type of classification was first introduced by Banchi in 1904.[10] Schlesinger described that if the right coronary artery runs beyond the crux point of the heart and projects its branches to the posterior wall of the left ventricle,there is always dominance of the right coronary artery. He classified as mixed type to only those cases where each ventricle is supplied with blood from the relevant artery, i.e. right from the right and left from the left. The dominance of the left coronary artery was appropriate only for those cases when the circumflex branch ran over the crux cordis, forming the posterior interventricular branch and supplying the entire posterior part of the ventricular septum.[11]

Autopsy and intravascular ultrasound studies have shown that the intramural and distal segments of bridged vessels remain free from atherosclerotic disease while the proximal segment of the vessel is prone to developing atherosclerosis.. Clearly, complex and dynamic biomechanical factors influence the blood flow within and at the exit of the bridge that in aggregate appear to attenuate the proatherosclerotic stimulus of low WSS observed distal to the bridge. These data suggest that both systolic and diastolic flow impairment contribute to myocardial supply-demand mismatch in patients with myocardial bridging.

Table 1: Distribution of origin of Posterior interventricular artery from RCA and LCA (n=41)

PIVA Origin	Number	Percentage
RCA	35	85.36%
LCA	6	14.64%
TOTAL	41	100.00%

Table 2: Dominance pattern compared with other studies

Author	Rt. dominnce (in%)	Lt. Dominance in (%)	Balanced in (%)
Harika Das (2010)	70%	18.57%	11.43%
Puli Darmender (2014)	83.11%	16.88%	0%
Caroline E.Veltman (2014)	86%	9%	5%
Jaisree H (2015)	83%	14.5%	2.5%
Madhushree Pal (2016)	70%	22%	8%
Present study	85.37%	14.63%	0%

Most of the authors have reported higher incidence of right dominance and even in the present study 85.37% of right dominance was observed. Balance type of dominance is 0% in present study which is similar to found by some authors [12]. The difference between the present study and tabulated authors is, in the present study dominance pattern was observed in the myocardial bridged hearts where as in other studies dominance pattern was observed in nonmyocardial bridged hearts.

Statistical analysis done by using Chi-square test to distribution of origin of posterior interventricular artery from RCA or LCA and distribution of hearts according to number of myocardial bridges (MB) over left anterior descending artery. p value is $p<0.0001$ and shows that right dominance is statistically significant followed by left dominance and balance pattern is insignificant in distribution.

Conclusion

In addition to the left dominance if the multiple myocardial bridges are present over the epicardial coronary artery there may be increased frequency of myocardial ischemia. Thus coronary artery disease proportion increases in presence of myocardial bridges.

Patients with myocardial bridging are commonly encountered clinically and may present with exertional symptoms of myocardial ischemia, syncope, and even sudden death. An array of noninvasive and invasive diagnostic modalities that have shed light on the pathophysiology of myocardial bridging can be deployed to evaluate symptomatic patients. Medical therapy with beta-blockers and calcium channel blockers remain the mainstay of treatment. For select patients refractory to intensified medical therapy, surgical intervention, or less preferably PCI with DES, can be considered. Larger registries and randomized clinical trials are warranted to shed light on optimal strategies for patients with myocardial bridging refractory to medical therapy.

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Somatotype Characteristics of School Going Children with Visual Disabilities

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Abstract

Objectives: The main objective of this study was to describe the somatotype characteristics of school-going children with visual disabilities and to establish a somato profile chart for visually disabled children.

Method: A total of 25 (twenty-five) male school-going children with visual disabilities participated in this study. The ages of the participants were between 12-18 years. Selected 10 (Ten) anthropometrical dimension were examined to calculate somatotype characteristics of visually disabled persons: stretch stature, body mass, four skinfolds (triceps, subscapular, supraspinal, medial calf), two bone breadths (bi-epicondylar humerus and femur), and two limb girths (arm flexed and tensed, calf).[27] developed a computer program somatotype is used to calculate somatotypes.

Results: Results of the study shown that the range of the age of 12 to 18 years of the visually challenged persons were 80% ectomesomorphic. However, from the youngest to the oldest age group considered, the mean values of all the three components change gradually. Among the three components of somatotype (endomorphy, mesomorphy, and ectomorphy), mean values for mesomorphy dominate, while that of endomorphy remain lowest as mean values of mesomorphy 7.61 ± 1.73, ectomorphy 3.74 ± 1.80 and endomorphy 0.66 ± 0.20 respectively. On the whole, the visually disabled person physique could be described as showing a high musculoskeletal development with relatively least fat.

Keywords: *Somatotype, Morphology, Visual Challenged, Anthropometry, Visual Disability.*

Introduction

Somatometry is a fundamental scientific process of measurement of bodily size and proportions in living individuals in anthropology. They are used in different field of sports, physical education, health care, fitness industry, education, rehabilitation, industry, etc [4]. somatotype is usually used to expressed in three numbers-rating where each of them represents one of the three basic components endomorphy, mesomorphy, and ectomorphy of body composition [1]. Heath and Carter empirically define the body composition based on the percentage of fatness, musculoskeletal structure and the body linearity [7].

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The majority of the national or international studies reported that the physical growth and development significant influence with different endogenous and exogenous factors. The endogenous factors are gender, heredity and hormonal state, and gender, while exogenous factors are a lifestyle, disability, disease, diet, social and economic status and physical activity [9]. However, when talking about the visual disability of school-going children, we can see that studies were dealing with a visual disability, somatotype and physical activity, though rare and less include both endogenous and exogenous factors, especially physical activity. It was noted that the visual disability of children influences on motor abilities and function, including overall body functionality [5, 6].

The participation in physical activity of the visually disabled person are more restricted due to visual disabilities, have a lower level of physical fitness and have higher levels of obesity than their peers without

visual disabilities[3]. The fear of injury is one of the key reasons for visually challenged person lack of participation in physical activity. In active life style leads to different kind of bodily changes as compared with their peer without disability[2]. The main aim of the study is to find out the somatotype characteristics of the visually disabled person and compare with the peer without disabilities. This study also helps to understand the impact of visual disability on physical activity and body characteristics.

Methodology

Participants of the Study: This study mainly focused on somatotype characteristics of visually challenged school going children. Twenty Five (n-25) visually challenged school going children (male) without any multiple disabilities from Ahmadi School for the Visually Challenged, Aligarh Muslim University, Aligarh were selected as subjects of the study.

The ages of the participants were between 12-18 years. Each subject was somatotyped by the Heath-Carter Anthropometric Method[1].

Measurement Techniques: Selected Ten (n-10) anthropometrical dimension were selected to calculate somatotype characteristics of visual disabled person: body mass, stretch stature, four skinfolds (subscapular, medial calf, triceps, supraspinale), two bone breadths (femur and biepicondylarhumerus), and two limb girths (flexed arm and calf tens). Height was calculate with a standard stadiometer to nerest 0.1 mm. Body mass was measured using Actofit digital weighing machine. Skinfold variable were measured using a standard caliper. Three measurements were taken and intermediate score were recorded. Flex arm was a largest variable under maximum voluntary contraction and calf measurements were recorded by using non stretchable tape. The femur and humerus diameters were recorded with a Mitutoyo pachymeter [12].

Procedures to Prepare Somatochart: Developed a computer program SOMATOTYPE[27] (Computer Programs for Somatotype Analysis) was used to calculate somatotypes, descriptive and comparative statistics and plotting somatocharts (http://www.somatotype.org/2012).

Results

Analysis of Project Report on the Basis of Collected Data on Somatotype in Visually Disabled Persons.

Following table presents descriptive statistics of 10 anthropometric data were recorded for the assessment of anthropometric somatotype. Mean value of height was 162.96 cm (SD 7.56 cm) and of weight was 52.50 kg (SD 11.19 kg) respectively. Descriptive statistics of other skin folds, breadths and girths measurements are shown in Table 01.

Table 1: Descriptive Statistics of Anthropometric Measurements of Visually Challenged Participants.

Descriptive Statistics Table				
Variable	**Mean**	**Median**	**SD**	**Range**
ENDOMORPHY	0.66	0.70	0.20	0.30-1.00
MESOMORPHY	7.61	7.10	1.73	05.80-13.30
ECTOMORPHY	3.74	4.00	1.80	0.10-6.50
SAD	2.02	1.90	1.44	0.60-6.80
HWR	43.98	44.49	2.86	35.91-47.91
AGE	14.64	15.00	1.95	18-12
HEIGHT	162.96	164.00	7.56	145-178
MASS	52.5	52.10	11.19	36.05-85.20
TRICEPS SF	3.20	3.40	0.84	01.50-4.40
SUBSCAPULAR SF	3.40	3.60	1.06	0.70-4.60
SUPRASPINALE SF	2.90	2.70	0.80	0.90-4.50
CALF SF	3.36	3.50	0.98	0.50-4.70
ARM GIRTH	25.6	25.00	3.68	19-35
CALF Girth	31.52	31.00	3.60	27-45
HUMERUS B	9.05	9.10	0.49	08.00-10.00
FEMUR B	11.62	11.50	0.51	10.90-13.00

Table-2: Descriptive statistics for somatotype variables of visually challenged participants.

		Somatotype Variables				
N	**Statistics**	**Endomorphy**	**Mesomorphy**	**Ectomorphy**	**SAD***	**HWR***
25	Mean	0.66	7.61	3.74	2.02	43.98
	Standard Deviation	0.20	1.73	1.80	1.44	2.86

*HWR = Height Weight Ratio (height 3 Weight), *SAD = Somatotype Attitudinal Distance

Table 3: Brief Description of the Somatotype Document

Individual Somatotype						
	Profile					
S.No.	Endomorphy	Mesomorphy	Ectomorphy	HWR	SAD	Region
A	0.7	6.2	4.7	45.52	1.7	Ectomorphic Mesomorph
B	0.6	7.3	4.6	45.28	0.9	Ectomorphic Mesomorph
C	0.7	6.2	5.0	45.89	1.9	Ectomorphic Mesomorph
D	0.9	9.4	2.4	42.38	2.2	Ectomorphic Mesomorph
E	0.3	7.6	4.3	44.89	0.7	Ectomorphic Mesomorph
F	0.8	10	0.9	40.12	3.7	Balanced Mesomorph
G	0.5	8.5	1.4	40.98	2.5	Ectomorphic Mesomorph
H	0.9	6.7	4.6	45.35	1.3	Ectomorphic Mesomorph
I	0.9	6.5	5.5	46.52	2.1	Ectomorphic Mesomorph
J	0.7	6.0	5.9	47.12	2.7	Mesomorph Ectomorph
K	0.5	7.1	2.8	42.84	1.1	Ectomorphic Mesomorph
L	0.6	5.8	6.5	47.91	3.3	Mesomorphic Ectomorph
M	0.9	7.1	3.7	44.16	0.6	Ectomorphic Mesomorph
N	0.3	13.3	0.1	35.91	6.8	Balanced Mesomorph
O	0.8	10.7	0.1	38.39	4.8	Endomorphic Mesomorph
P	0.7	6.9	6.2	47.47	2.6	Ectomorphic Mesomorph
Q	0.8	6.0	5.2	46.11	2.2	Ectomorphic Mesomorph
R	1.0	6.8	4.0	44.49	0.9	Ectomorphic Mesomorph
S	0.9	8.0	3.1	43.27	0.8	Ectomorphic Mesomorph
T	0.6	6.9	5.5	46.62	1.9	Ectomorphic Mesomorph
U	0.5	7.4	2.6	42.54	1.2	Ectomorphic Mesomorph
V	0.6	6.0	4.7	45.4	1.9	Ectomorphic Mesomorph
W	0.3	8.3	3.9	44.4	0.8	Ectomorphic Mesomorph
X	0.4	8.1	3.2	43.38	0.8	Ectomorphic Mesomorph
Y	0.6	7.6	2.6	42.59	1.1	Ectomorphic Mesomorph

The Category Chart is a key which shown different dimension of somatotype.

Category Chart Key[1]

1. Endomorph-Ectomorph
2. Ectomorphic Endomorph
3. Balanced Endomorph
4. Mesomorphic Endomorph
5. Mesomorph-Endomorph
6. Endomorphic Mesomorph
7. Balanced Mesomorph
8. Ectomorphic Mesomorph
9. Mesomorph-Ectomorph
10. Mesomorphic Ectomorph
11. Balanced Ectomorph
12. Endomorphic Ectomorph
13. Central

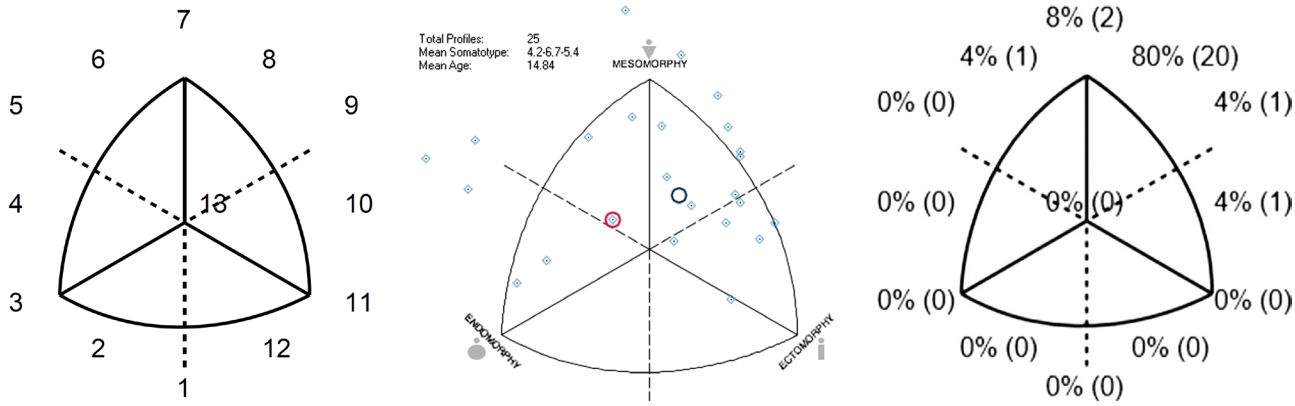


Figure 01. Category Chart Key, the Mean Somatotype for All the Profiles, and Category Chart

Table 4: Shows total number of people and total number percentage which fall under the category of Balance Mesomorph, Mesomorph-Ectomorph (04%), Ectomorphic-Mesomorph (80%), Mesomorphic Ectomorph (04%) and Endomorphic Mesomorph (04%) from overall Somatotype.

S.No.	Major Somatotype Categories	Number of People	Percentages
1	Endomorphic Mesomorph	1	04%
2	Balanced Mesomorph	2	08%
3	Ectomorphic Mesomorph	20	80%
4	Mesomorph-Ectomorph	1	04%
4	Mesomorphic Ectomorph	1	04%
	Total	**25**	**100%**

Discussions

The present study was undertaken to report the somatotypes of visually disabled persons. One of the objectives of the study was to explore the changes with visual disabilities in mean somatotypes. It is clear from table No. 4 that the ranges of the age 12 to 18 years of the visual challenged person were 80% ecto-mesomorphic. However, from the youngest to the oldest age group considered, the mean values of all the three components change gradually. Among the three components of somatotype (endomorphy, mesomorphy, and ectomorphy), mean values for mesomorphy dominate, while that of endomorphy remain lowest as mean values of mesomorphy 7.61 ± 1.73, ectomorphy 3.74 ± 1.80 and endomorphy 0.66 ± 0.20 respectively. On the whole, the visually disabled person physique could be described as showing a high musculoskeletal development with relatively least fat.

Somatotype Categories: Twenty five (n-25) visually challenged persons were found to be distributed among 05 out of 13 somatotypes categories. The visually challenged person fall under endomorphic-mesomorph, balance mesomorph, ectomorphic-mesomorph, mesomorph-ectomorph and mesomorphic-ectomorph. However, at least 80% of the boys with visual disabilities fall under the category of ectomorphic-mesomorph, 08% fall under the category of balance mesomorph and 04% equally distributed under the category of endomorphic-mesomorph, mesomorph-ectomorph and mesomorphic-ectomorph.

Differences: In order to evaluate population similarities/differences, one of the objectives of the present study was to understand the present findings with other such studies. Therefore, the somatotypes of visually disabled persons were compared with boys of comparable ages from other populations of the Indian region. Majority of the studies were found to compare selected somatotype parameters with the same age group from North India. But no studies were found till date to compare selected somatotype parameter of the disabled person. Most of these studies have followed the Heath Carter method of somatotype which was most significant with our study. However, so many studies were compared in which few of the studies were reported present mean somatotypes at age groups similar to the present study (i.e., 12 to 18 years).

The comparisons of the present study with a normal population of Indian context helps us to understand the relationship of visual disability with somatotype. Visually challenged populations were highest on mesomorphy, lowest on ectomorphy, and very low on endomorphy in comparison with the normal population of North-India.

Visually challenged persons of the present study were closest to Tibetan (J & K) in endomorphy. Endomorphy rating of visually challenged person is significantly less as compared to the studies [16, 17, 18, 19, 20]. The present studies show that Mesomorphic and Ectomorphic rating of visually the disabled person was highest as compare with the normal population as reported previous studies i.e. [18, 20, 21, 22].

Carter divided somatochart into 13 various sectors [23]. According to sector division of visually disabled persons were placed in ectomorphic-mesomorph 80% of the total population, 08% of balance mesomorph, endomorphic-mesomorph, mesomorph-ectomorph and mesomorph-ectomorph 04% respectively. Ectomorphic-mesomorph sector along significant high with Tibetan, Bodh, and Baltis of Jammu and Kashmir, and GaddiRaj put of Himachal Pradesh but by visually disabled persons show a somatotype (balanced mesomorph 08% of the total population) which was quite different from that of the other populations compared.

Studies were reported change in component dominance during adolescence [24, 25]. Tanner had reported that there were not many changes in somatotype ratings during the course of growth of normal population [11]. Almost all studies show some change in the component ratings as the children. From the comparisons presented above it becomes clear that though at the ages 12 the somatotype of visually challenged person may have some similarity to the somatotypes of some other populations, but by the age of 18 years the visually challenged show a somatotype (balanced mesomorph) which was quite different from that of the other populations compared.

One of the aims of the present study was to make some suggestions in the light of the findings of the present study.-In an earlier study [26] it was suggested that one of the major applications of somatotype is to explore changes with disability in the physique. The findings of the present study reveal that on the whole visually disabled person ecto-mesomorphic higher in rating, though average values of all the three components register changes with disability. Among the three components, mesomorphy dominates, while endomorphy was at the lowest. In other words, the physique of visually disabled persons may be described as showing a high musculoskeletal development with relatively less fat. The present study of somatotypes shows a tendency to move away from the upper axis of endomorphy towards the upper axis of mesomorphy. Considering the total sample of 25 visual disabled persons, a majority (88%) fall in two categories, i.e., ectomorphic-mesomorph and balanced mesomorph.

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Conflict of Interest: Nil.

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The Effects of Exercise on the Sympathovagal Regulation of Heart and Functional Capacity in Patients Following Coronary Artery Bypass Grafting

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Abstract

The autonomic dysfunction of heart and persistent tachycardiais seen with reduced functional capacity following surgical revascularization. Evidence on the role of exercise training is limited in sympathovagal dysfunctions. This Randomized controlled trail included stable post coronary bypass surgery patients in control (13) and study group (12). The study group received thrice/week training for 12 weeks after discharge and the control group received a routine care. The R-R Interval Variabilityand the functional capacity (6-minute walk test)assessed before and after 12 weeks of the training. The study group had increase in functional capacity and a positive correlation between the RRIV analysis and functional capacity after training ($p<0.05$).Phase II exercise training after coronary bypass surgery had a significant improvement of the functional capacity. There was a significant positive correlation between R-R interval variability and the functional capacity in the training group.

Keywords: *R-R Interval, CABG, functional capacity, heart regulation.*

Introduction

Coronary Artery disease (CAD) is one of the leading causes of non-communicable disease increasing mortality in India. The Indian prevalence of Coronary Artery disease is about 7-13% in urban and 2-7% in rural population and is on increase.[1] Coronary Artery Bypass Grafting (CABG) have become the standard and reliable method of management for CAD. Imbalance in the autonomic function is seen after the CABG especially after the sixth day of CABG and is expected to be restored at the 3rd month after surgery.[2,3] The autonomic dysfunction happening after CABG could increase the risk of ventricular arrhythmias and sudden cardiac death results. The autonomic dysfunction also would cause early attainment of maximal heart rate which reduces the exercise capacity of the patient, thus delaying the recovery time and also result in premature functional capacity ceiling. The phase-II Cardiac Rehabilitation exercise training program results in an increase in R-R interval due to improvement in the parasympathetic/vagal dominance. This improvement in the parasympathetic dominance could cause reduction in the mortality rate and can also improve the functional capacity of the patients following phase II cardiac rehab. Hence individualised supervised exercise training is recommended for all the patients who undergo CABG surgery. It has been proved that there is improvement in maximum oxygen consumption, maximal heart rate and the resting heart rate following supervised exercise training.[4-8] The research finding on such analysis in Indian subset is sparsely available. Owing to differences in the exercise participation rate, socio-cultural variations and rehabilitation facilities and attributes in India, it's worth exploring the utility of autonomic function effects on functional capacity analysis in Indian population before generalising the other study results to this population.

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Methodology: This study was conducted in a multi-specialty hospital after getting clearance from the Institutional Ethical Committee (IEC No. CSP/13/MAR/27/59). This is a Randomized control trail design with sample size estimated to be 25 based on the power analysis with 80% power at 95% Confidence Interval. Assuming attrition rate of 25-30% for this study the sample size was estimated to be 40. The sampling design was restricted randomized sampling method. The patients at low risk as per American Heart Association (AHA) guidelines and patients without any neurological impairment or musculoskeletal diseases or injury affecting the mobility and patients with uncomplicated clinical course during hospitalization were included for the study. The patients with moderate and high risk as per AHA guidelines, uncontrolled arrhythmias, post-cardiac arrest survivor, recent Myocardial Infarction, co-existing pulmonary disease were excluded for the study. In this study 66 patients who had undergone CABG were screened, 40 were randomly assigned to control and experimental group. 25 patients were analysed for the study. Patients in both the groups were subjected to low level exercise testing i.e. 6MWT prior to and after 12 weeks of discharge. The supervised group exercise training in the physiotherapy department thrice a week for about 12 weeks was done.

Exercise Training protocol: The exercise training for both the groups includes the warm-up, training session and cool-down period. The warm up session included the breathing exercises, active movement to the limbs and the large group muscle flexibility. The training session was advised twice a day lasted for 20-30 minutes each with warm up and cool down for about 5-10 min each and training session for about 20 minutes. The training session included the strength and endurance training in alternative days, and walking session. The strength training was given based on one repetition maximum and the progression was done based on their exercise tolerance. The walking was done twice a day as tolerated by the patient without any symptoms.

Control group (Unsupervised training group): Patients were counselled regarding exercises and to be done in a self-paced manner with telephonic reviews and guidance once a week for 3 months. Experimental group (Supervised training group): The patients in this group attended a low intensity phase II cardiac rehabilitation program training session thrice a week for about 12 weeks. The exercise training includes the following. Before starting the exercise session patients were checked for their vitals i.e. heart rate and saturation using the pulse oximetry, Pulse rate, and respiratory rate. Then warm up exercises were given for about 10 min, exercise session of about 20 min and cool down for about 10 min. After the exercise session again the patient was monitored for their heart rate and saturation using pulse oximetry and pulse rate and respiratory rate. If the exercise response is satisfactory they were instructed to continue the same exercise in the home for 1 week. If they had any doubts regarding the exercise they were cleared through telephone conversation or by face to face clarification. Progression in the intensity and duration of exercise was done based on the patient's response to the exercise tolerance. The R-R Interval Variability was assessed by using the NIHON KOHDEN-NCS/EMG/EP equipment, by an independent assessor who was blinded to the study details, after three months for all the patients. The interpretation is taken up for the statistical analysis. The statistical analysis was performed using the SPSS version 15.1. The normally distributed data were expressed as mean and standard deviation. The Kendal taub test was used to analysis the relation with the R-R interval variation (RRIV) dysfunction and RRIV normal with that of the SMWD. The paired t-test was used to find out the difference between the control and the experimental group.

Results

Totally 66 subjects were screened for the study, out of which 49 were selected, 9 patients were not willing for the study and other 40 were randomly assigned in to control and experimental group. In the control group 1 was expired, 5 did not turn for follow up and 2 patients migrated to other place. In the experimental group 1 was expired, 3 did not turn for follow up 2 patients had travelling problem and 1 had migrated to other place. Other 25 patients were analysed for the study. Both the groups were received the education about the secondary prevention measures based on their condition. The baseline characteristics are expressed in table 1. The age, BMI and sex distribution are more similar and not of much difference. The present study results shows that there is no relation of the RRIV analysis function with the SMWD ($p>0.05$). The results shows that the pre mean values of both the control and the experimental group (212.91 ± 63.85, 201.15 ± 73.20) respectively has increased at the end of the training session (416 ± 49.78, 490 ± 50.62) but the experimental group had statistically significant increase in the post SMWD following training ($p<0.00$). The study also shows that there is significant

correlation between the RRIV analysis measurements and functional capacity after post 5 min, and post 10 min in the Post SMWD ($p<0.05$).

Table 1: Characteristics of the sample

Baseline Characteristics	Study Group	Control Group
Male, Female (%)	92,8	92, 8
Age (Years)	59.46 ± 5.58	57.5 ± 4.81
Body Mass Index (Kg/m^2)	24.86 ± 3.32	23.79 ±3.54
Hypertension (%)	23	41
Diabetes (%)	61.5	50
Heart Rate Variability (%)	15.3	33
Smoking Status (%)	38	41

Table 2: Comparison across ANS dysfunction & Normal (Overall both groups)

Variables	ANS Dysfunction Mean ± SD	Normal Mean ± SD	Tau Value	P Value
Resting	825.00 ± 121.8	864.39 ± 176.62	0.468	0.644
HV	772.72 ± 60.71	870.13 ± 367.95	0.581	0.567
Post 2 Min	791.38 ± 76.97	902.41 ± 226.62	1.067	0.297
Post 5 Min	810.90 ± 51.29	1004.85 ± 505.61	0.843	0.408
Post 10 Min	802.50 ± 29.98	982.26 ± 360.49	1.097	0.284
PreSMWD	213.40 ± 59.68	205.15 ± 70.89	0.239	0.813
PostSMWD	413.60 ± 62.42	464.70 ± 59.00	1.714	0.10

ANS-Autonomic Nervous System, SMWD-Six Minute Walk Distance

Table 3: Comparison of functional capacity in Control and Experimental group

Pre SMWD	Mean ± SD	t-value	p value
Control	212.91 ± 63.85	0.427	0.674
Experimental	201.15 ± 73.20		
Post SMWD			
Control	416 ± 49.78	3.681	0.001**
Experimental	490 ± 50.62		

Table 4: Correlation between RRIV analysis and SMWD

RRIV	Pre SMWD		Post SMWD	
	Tau value	p-value	Tau Value	p-value
Resting	0.034	0.815	0.245	.088
Hyperventilation	.040	0.779	0.111	.440
Post 2 min	0.074	0.607	0.279	.052
Post 5 min	0.081	0.575	0.306(*)	.033*
Post 10 min	0.195	0.175	0.340(*)	.018*

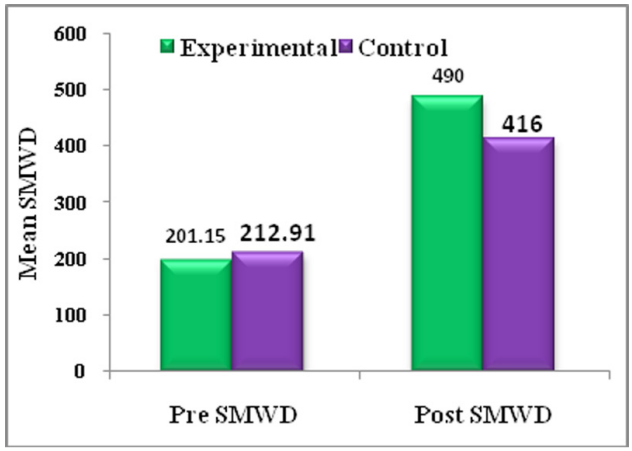


Figure 1: Comparison of SMWD between groups

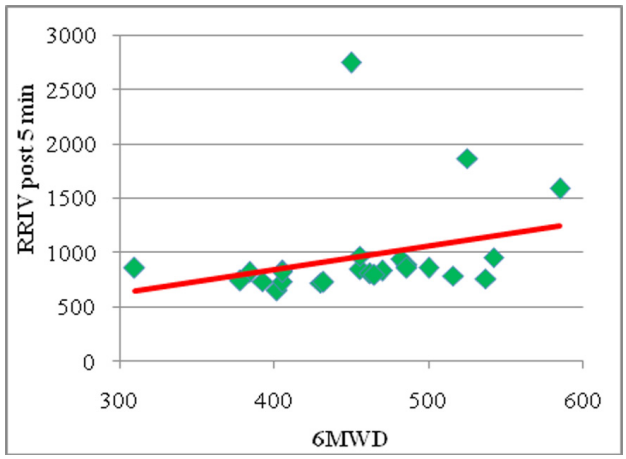


Figure2: Correlation of SMWD and RRIV parameters

Discussion

This study results shows that there is autonomic dysfunction with both the training group after the training session. Following CABG immediately there is autonomic dysfunction of the heart[3,4] with further recovery after 2 months. In this study while comparing

within 2 groups the dysfunction is more in the control group than the study group. These effects could be due to the supervised training. The same has been replicated in the previous studies.[5,6,10,11] They have concluded that Phase II CR exercise training has a significant improvement in the autonomic activity of the heart. The autonomic activity of the heart acts as the independent predictor for the mortality,[12] also increase in the sympathetic activity of the heart can cause early attainment of the target heart rate, thus it reduces the functional capacity of the subject. Following exercise training improvement in the autonomic activity can improve the functional capacity.[9]

This study shows that there is improvement in the SMWD for both the groups but the supervised training group showed a statistically significant improvement compared to the control group. Another study also had showed in his study that there is a significant change in the haemodynamic parameters that has caused improvement in the functional capacity for the experimental group.[8] Also, other studies,[4,10] have concluded that following supervised exercise training there is significant improvement in the Vo2 max. Previous studyhas concluded that following exercise training there is significant increase in the 6MWD for the women population.[13]But one Indian study has showed that the unsupervised exercise training with regular follow up has shown increase in the 6MWD for both the rural and urban population.[14]This study shows that there is relationship between the autonomic function and the functional capacity. The same has been concluded in previous study that the Heart Rate Variability (HRV) is independent of 6MWD and peak Vo2 max.[11]This study also reveals that there is significant correlation with the SMWD and RRIV parameters at post 5 and 10 minutes ($p<0.05$). This study suggests that the supervised exercise training has shown to be more effective in improving the autonomic activity and the functional capacity following CABG. Thus supervised exercise training can be advised for the patients following CABG and thus improve their hemodynamic status and functional status.

Conclusion

This study concludes that there is significant improvement of the functional capacity in the experimental group than the control group. Also there is significant positive correlation between R-R interval variability and the functional capacity in the training groups.

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Assessing the Awareness of Anti-Tobacco Laws among Adults in Chennai-Need for Strengthening Legal Actions

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Abstract

Introduction: Tobacco use is a serious public health challenge in several regions of the world. Current trends show that more than 8 million deaths will be associated with tobacco use worldwide by 2030. According to the world health organization (WHO), tobacco is the single greatest cause of preventable death globally.

Aim and objective: To assess the awareness and attitudes towards tobacco control measures developed by COTPA.

Materials and method: The cross-sectional study was designed to assess the awareness and attitudes towards tobacco control measures developed by COTPA.. Following convenience sampling, equal representations from all 4 zones were taken. Questionnaires were distributed to the individuals and data was collected. Data was analyzed using SPSS software (Version 20.0).

Results: There is association between awareness, age and education. As the age increases the awareness about anti-tobacco laws also increase. As the education increase the awareness about anti-tobacco laws also increase. There is no significance between gender and awareness.

Conclusion: In this community based study to see the awareness and attitude towards COTPA, good awareness was reported by 44% and positive attitude by 92% of the population.

Keywords: *Tobacco, oral cancer, anti-tobacco law, COTPA, FCTC.*

Introduction

Tobacco use is a serious public health challenge in several regions of the world. According to the 2008 World Health organization report on the global tobacco epidemic, currently 1.3 billion persons use tobacco in the world out of which 5.4 million people die every year[1].

According to Global Adult Tobacco Survey, 34.6% adults of which 47.9% males and 20.3% of females use some form of tobacco in India. Among 13-15 year old school-going children, the current use of any tobacco product varies from 3.3% in Goa to 62.8% in Nagaland[2].

Among minors (age 15-17), 9.6% consumed tobacco in some form and most of them were able to purchase tobacco products. About five in ten adults (52.5%) were exposed to second-hand smoke at home and 29% at public places (mainly in public transport and restaurants). Three in five current tobacco users (61.1%) noticed the health warning on tobacco packages and one in three current tobacco users (31.5%) thought of quitting tobacco because of the warning label[3].

In India, more than 40 percent of cancer cases are due to tobacco use. Tobacco contains more than 2500 chemical constituents, many of which are known human carcinogens, of which at least 250 chemicals known to be toxic or carcinogenic[4]. World is heading towards various types of non communicable diseases, which are

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also known as modern epidemics. Among these modern epidemics cancer is the second commonest cause of mortality in developed countries[5] A serious need was felt for framing a comprehensive national legislation on tobacco control, which would ensure uniform and effective enforcement of measures to achieve desired results.

The relationship between oral cancer and tobacco can be assessed from the WHO estimates according to which 91 percent of oral cancers in South-East Asia are directly attributable to the use of tobacco[6]. India has been a forerunner in the fight against the tobacco epidemic. In order to curb this epidemic, India has enacted comprehensive tobacco control legislation.

The Framework convention on Tobacco control (FCTC) is the first international treaty negotiated under the auspices of the WHO aimed at curbing tobacco related deaths and diseases. The WHO FCTC, a multilateral treaty with more than 150 parties, was the first step in the global fight against the tobacco epidemic[7].

Large amount of information was provided by the report on tobacco control in India by Reddy KS and Gupta PC on behalf of Ministry of Health and Family Welfare, Government of India[8]. Accordingly, the tobacco control act, 2003 was introduced. As an impact of the act, public smoking is banned by legislation.

There is an immediate need to curb this much publicized evil of our society[9]. In India, the extent of public support and public opinion on COTPA remains largely unknown. No study has been done in Tamil nadu to see the awareness and attitude of the people toward the act. From the public perspective, such information may be of great importance with respect to understanding the degree to which public support and opinion may have on the successful implementation of the tobacco control policies and legislation.

Therefore, this study is designed to gather baseline information from the adult population of Chennai, Tamil nadu about awareness and attitudes towards four key tobacco control measures developed by COTPA.

Aim:

- To assess the awareness and attitudes towards tobacco control measures developed by COTPA.

Objectives:

- To assess the knowledge of adult population of Chennai city towards Cigarette and Other Tobacco Products Act (COTPA).
- To assess the attitude of adult population of Chennai city towards Cigarette and Other Tobacco Products Act (COTPA).

Materials and Method

The cross-sectional study was designed to assess the awareness and attitudes towards tobacco control measures developed by COTPA. The study population consisted of selected individuals of 18 years and above under the juridisction of Chennai corporation.

Inclusion Criteria: Individuals of 18 years and above and willing to participate.

Exclusion Criteria:

- Individuals who were below 18 years.
- Individuals who were not willing to participate.

Prior to the start of the study, ethical clearance was obtained from the Institutional Ethics Committee, Saveetha University.Data collection was scheduled for the period of September 2017 to October 2017.

Sample Size: N=201(95%power @5%alpha based on a study done by Indrani Sharma et al10 in 2010)

The city of Chennai has been divided into 4 zones namely North, South, Central and West zone. Following convenience sampling, equal representations from all 4 zones were taken.During the research period, all the individuals of 18 years and above were eligible for the study. Following convenience sampling, samples were selected. Data was collected during interview by using a data collection form.

A pre-tested structured and self administered questionnaire was adapted from the questionnaires used previously by Indrani Sharma et al[10]. After a brief introduction on the purpose and intent of the study with the help of information sheet, questionnaires were distributed to the individuals and data was collected. Data was entered in Microsoft Excel spreadsheet and analyzed using SPSS software (Version 20.0).

Results

Table 1: Socio-demographic characteristics of the sample population

Variable	Frequency (%) N=201
Gender	
Male Female	135(65.5) 66 (32)
Education	
<=10 years of schooling >10 years of schooling	65 (34) 136(66)
Occupation	
Currently Not Employed Currently Employed	43(20.9) 153(79.1)
Marital status	
Currently married Single	133 (64.6) 68 (33.4)
SES (Rs)	
<=6221 6222-19465 >19465	82(40.8) 102 (51.0) 17 (8.2)

Table 1 shows the Socio-demographic characteristics of the sample population. About 65.5% of the population were males and 32% were females respectively. About 34% had less than 10 years of schooling and about 79.1% were currently employed. About 40.8% were of low socio-economic status and only about 8% were of high socio-economic status.

Table 2: Tobacco use practices among the Sample population

	Negative Attitude* (%)	Positive Attitude* (%)	Total N=201	χ^2 P-value
Awareness of the Act				
Poor awareness*	13 (6.5)	101(50.2)	114	< 0.015
Good awareness*	2 (1)	85(42.3)	87	

Table 2 shows the Tobacco use practices among the Sample population.. Only about 27.2 were current users of tobacco. About 19.9% use smoke type of tobacco and about 25.7% have family members used to tobacco.

Table 3: Association of awareness of COTPA with the attitude towards COTPA.

Variables	Frequency (%)
Current Use	
Yes	56(27.2)
No	145(70.4)
Type of tobacco	
Smoke	41 (19.9)
Smokeless	11 (5.3)
Anyone in family use tobacco	
Yes	53(25.7)
No	148(74.3)

*Chi-square test. Significance p<0.05

Table 3 shows the Association of awareness of COTPA with the attitude towards COTPA. It shows that the awareness and attitude were significant. As the awareness about anti-tobacco laws increases, the attitude towards it also increase

Table 4: Association of socio-demographic factors with Awareness of COTPA

Poor Awareness (%)		Good Awareness (%)	Total	χ^2 P-value
Age (N=201)				
18-35 years	97 (48.3)	64(31.8)	161	0.001
36-50 years	0	29 (14.4)	29	
50+ years	0	11 (5.5)	11	
Education				
<=10 Years of schooling	65(32.3)	32(15.9)	65	0.000
>10 Years of schooling	0	104(51.7)	136	
Gender				
Female	36(48.3)	30(14.9)	66	0.212
Male	61(30.3)	74(36.8)	135	

* Chi-square test. Significance p<0.05

Table 4 shows the Association of socio-demographic factors with Awareness of COTPA. It shows that there is association between awareness, age and education. As the age increases the awareness about anti-tobacco laws also increase. As the education increase the awareness about anti-tobacco laws also increase. There is no significance between gender and awareness.

Table 5: Association of socio-demographic factors with attitude towards COTPA.

Poor Attitude (%)		Good Attitude (%)	Total	χ^2 P-value
Age (N=201)				
18-35 years	8 (4)	153(76.1))	161	0.026
36-50 years	5(2.5)	24(11.9)	29	
50+ years	2(1)	19(4.5)	11	
Education				
<=10 years of schooling	15(7.5)	0	15	**0.000**
>10 years of schooling	50(24.9)	136(67.7)	186	
Gender				
Female	3(1.5)	63(31.3)	66	0.211
Male	12(6)	123(61.2)	135	

*Chi-square test. Significance p<0.05

Table 5 shows the Association of socio-demographic factors with attitude towards COTPA. As the age increases the attitude about anti-tobacco laws also increase. As the education increase the attitude about anti-tobacco laws also increases. There is no statistical difference between gender.

Discussion

Cigarettes and Other Tobacco Products Act (COTPA) intended to protect and improve public health, encompasses various measures to reduce tobacco consumption. Less awareness and negative attitude towards the Act may lead to non implementation or poor implementation of the Act which will result in increase tobacco use in the population. Oral cancer is one of the serious and growing health problems worldwide[11].This is a matter of great public concern.

In this study almost everyone 84 percent was aware that tobacco causes health problem unlike the study in Kolkata where 20 percent of the cases and control had no idea about the adverse effects of tobacco use[12]. This is a positive aspect because if people are aware of the health problems caused by tobacco with a little more effort to implement the Act, we can expect the population to accept the Act and support it.

The awareness on harm caused by second hand smoke was quite high (79 percent) which was contrary to other studies done in Wellington and Sydney[13,14], but is comparable to a study in China where half of the Chinese urban smokers and 4 in 5 non-smokers believed that second-hand smoke (SHS) is harmful[15]. Steps should be taken to encourage the vast majority of non smokers, to recognize their right to life and health.

About 84% of the population was aware of any tobacco control law in India contrary to the study in Kerala and Azerbaijan where most respondents had low levels of awareness about existing national tobacco control laws and the FCTC[16]. In this study there was good awareness about ban on smoking in public places and specified health warnings on all tobacco products. This may be due to the recent enforcement of both the provisions of the Act. Chandigarh is the first city in Southeast Asia and India to be declared as a smoke free city from 15th July 2007.This was possible because the law was strictly enforced following all the norms and the Government as well as the enforcement officials in Chandigarh considered tobacco to be a very serious issue[17].

People in the study were not much aware about the ban on sale to minors and prohibiting sale of tobacco within 100 yards of educational institutions. All the enforcement officials including the staff of the school should be empowered to take actions against violations[18,19]. In this study about 60.7 percent of the population was aware of the ban on advertisement of tobacco products. Cigarette companies have developed sophisticated campaigns targeting men, women, and children in different socioeconomic groups. Understanding these marketing strategies is critical to minimise the exploitation of loopholes in tobacco control legislation[20]. As age increases the attitude towards COTPA increases significantly. This could be because the elderly people do not want the younger generation to become addicted to tobacco. Smokeless tobacco proved to be highly associated with oral cancer[21,22]. They must have seen and experienced the harmful effects of tobacco and thus they don't want the younger generation to suffer. As education improves the attitude towards COTPA also improves similar to the study in China[23].

As age increases the good awareness of COTPA increases significantly. This may be due to the exposure of the older people to anti tobacco advertisements on television or radio. Most of the older people in this study were retired, so they stay at home and they pass their time by watching television or listening to the radio. Anti tobacco messages are delivered in those medias. Education campaigns are needed to raise public awareness about oral cancer and its links with tobacco

and alcohol consumption[24], This could be one reason why the awareness is high among them.

Conclusion

In this community based study to see the awareness and attitude towards COTPA, good awareness was reported by 44% and positive attitude by 92% of the population. Efforts should be made to increase the awareness about the Act focussing on younger population, less educated, and those belonging to the low Socio-economic status. Educational campaigns should also focus on effects of second hand smoke.

Understanding the population's attitudes and behaviours before implementing policies that will affect them will likely increase their effectiveness. Violations should be reported to the concerned authorities and followed up to check for the actions taken. All the enforcement officials should be notified about the law and they should be empowered to take actions. Proper training should be provided to the enforcement officials.

Ethical Clearance: Taken from Saveetha institutional committee.

Source of Funding: Self

Conflict of Interest: Nil

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Personal Mastery Model on the Ability to Self Care in the Primary Hypertension

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Abstract

Elderly was someone who has reached 60 years and over. One of the factors that affect the physical condition of the elderly is the cardiovascular problem that most suffered by the elderly. As a result of the aging process the blood vessels become stiff and cause the left ventricular wall to decrease its elasticity, resulting in a progressive increase in pressure progressively. Increased peripheral vascular resistance due to vasoconstriction or constriction of blood vessels is a factor in the occurrence of hypertension. Physically someone who has entered the old age all the function of the organs will decrease, so it will affect the daily activities of the elderly. A person who enters the elderly and suffers from hypertension will experience a decrease in physical function so that it will disturb the elderly in meeting their daily needs (Activity Daily Living). The purpose of this research was to develop the elderly Personal Mastery approach model on the ability of elderly self care with primary hypertension. This type of research uses a cross sectional approach. This research was conducted in community health center of Jember Regency in 2017. This research uses rule of thumb, so it needs sample of 100-155 respondents or 5-10 times indicators (observed variables) in the model used is 150 elderly. Instrument collected data with questioner. Analized data used PLS.The result of this research showed that elderly factor, nurse factor, family factor, Integrated Coaching Post service factor, personal mastery, self efficacy, self care agency have an effect on the improvement of self-care ability in Elderly with Primary Hypertension.

Keywords: *Personal Mastery, Self Care, Ability, Elderly.*

Introduction

Aging according to Law No. 13 of 1998 is someone who has reached 60 years and over. In 2050 it is predicted that the elderly will amount to 434 million people. Data from the Central Bureau of Statistics shows that the elderly population in Indonesia in 2000 was 14,439,967 (7.18%), in 2010 it increased to 23,992,553 people (9.77%). Physically someone who has entered the old age all the function of the organs will decrease, so it will affect the daily activities of the elderly [1]. One of the factors that affect the physical condition of the elderly is the cardiovascular problem that most suffered by the elderly. As a result of the aging process the blood vessels become stiff and cause the left ventricular wall to decrease its elasticity, resulting in a progressive increase in pressure progressively[2]. Increased peripheral vascular resistance due to vasoconstriction or constriction of blood vessels is a factor in the occurrence of hypertension. A person who enters the elderly and suffers from hypertension will experience a decrease in physical function so that it will disturb the elderly in meeting their daily needs (Activity Daily Living) [3]. The problem that arises in the elderly with hypertension is a discrepancy between expectations and reality, namely the physical condition that occurs due to weakness due to hypertension[4]. Then the elderly are required to choose between healed or still suffering from hypertension. Hypertension in the elderly tends to increase at the age of 55-64 years reaching 45.9%, aged 65-74 years reaching 57.6% and in the age group > 75 years reaching 63.8%[5].

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Indonesia ranks fourth in the world with 24 million elderly people at 4.24%. Jember Regency was ranked 2nd with the highest number of elderly population at 308,792, after Malang Regency was ranked first. In the theory of Personal Mastery emphasizes how the elderly continue to strive in improving the quality of health by way of determining personal vision, self-awareness, empathy and communication. So that the elderly can improve the Self Efficacy they have that aims to fulfill Activity Daily Living (ADL) with the help of the Self-Care Agency owned by the elderly[6].

Method

The type of this research approach is cross sectional. The first stage in this study collected data about the factors of elderly, nurse factors, family factors, Integrated Counseling Post service factor, interpersonal factor elderly and self-care fulfillment in elderly primary hypertension. This research was conducted at community health center of Jember Regency 2017. This research uses rule of thumb, so that the number of samples at least 100-155 respondents or 5-10 times indicators (observed variables) in the model used is 150 elderly. Results from the analysis using PLS which is a variance-based Structural Equation Analysis. Simultaneously this method can do model testing. Structural model testing in PLS is done with the help of Smart PLS software version 2 for windows.

Results

Table 1: Hypothesis Test on the Model

No	Influence	Koef Orginal	(Bootstrap n = 1000)			Information
			Koef.	T Statistik	T Table	
1	Factors of the elderly → Personal Mastery	0,001	-0,001	1.367	1,96	Not significant
2	Nurse factor → Personal Mastery	0,023	0,016	1,416	1,96	Not significant
3	Family factor → Personal Mastery	0,244	0,309	4,087	1,96	Significant
4	Integrated post coaching service factor → Personal Mastery	0,426	0,373	3,804	1,96	Significant
5	Personal Mastery →Self care agency	0,103	0,126	4.267	1,96	Significant
6	Personal Mastery → Self efficacy	0,512	0,511	1,583	1,96	Significant
7	Self Efficacy → Self care agency	0,372	0,364	5,643	1,96	Significant
8	Self care agency → Self care activity daily living	0,316	0,312	5,096	1,96	Significant

After to do validity and reliability tests on all valid and reliable latent variables, the bootstrap sample test B = 1000 gives significant results, then continued in the model analysis with the diagram form presented as follows on table 1 shows that:

1. Factors of the elderly have no effect on personal mastery. This can be seen from the value of Statistics T of 1.241 which is smaller than T-table = 1.96. There is no relationship between elderly and personal mastery.
2. The nurse factor does not affect the personal mastery. This can be seen from the Statistics T value of 0.989 which is smaller than T-table = 1.96. The nurse factor has nothing to do with the personal mastery. This means that the nurse factor does not significantly influence the personal mastery
3. Family factors have a significant and significant influence on Personal mastery. This can be seen from the path coefficient that has a positive sign of 0.244 with a statistical value of T of 3.290 which is greater than T-table = 1.96. Family factors directly affect the personal mastery of 3,290, which means that any increase in family factors will increase personal mastery of 3,290. This means that family factors significantly influence the personal mastery.
4. Integrated coaching post service factors have a significant and significant personal mastery. This can be seen from the path coefficient which is positively marked by 0.426 with a statistical value of T of 9.078 which is greater than the T-table = 1.96. Integrated Coaching Post service factor directly affects the personal mastery of 0.426, which means that if there is an increase in the Integrated Coaching Post service factor, it will increase the personal mastery by 0.426. This means that the Integrated Coaching Post service factor significantly influence the personal mastery.

5. Elderly factors have an effect on and significance to self efficacy. This can be seen from the path coefficient which is positively marked by 0.041 with the value of Statistics T of 2.026 which is greater than T-table = 1.96. There is a relationship between elderly factors and self efficacy.

6. Factor nurses have an effect on and significance to self efficacy. This can be seen from the value of Statistic T of 5,519 which is bigger than T-table = 1.96. The nurse factor is not related to personal mastery. This means that the nurse factor has a significant effect on self efficacy.

7. Positive and significant family factors for self efficacy. It can be seen from the coefficient of positive sign of 0,512 with the value of Statistic T equal to 5,839 which is bigger than T-table = 1,96. Family factors are effective on self efficacy of 0.512, which means that there is an increase in family factors, it will increase self efficacy by 0.512. That is, the factors of significance to self efficacy.

8. Positive counseling postal service factor and significant self efficacy. This is evident from the coefficient of the path marked positive by 0.372 with the value of Statistics T of 5.845 is greater than T-table = 1.98. Integrated counseling service post directly on self efficacy of 0.372, which means there are some integrated coaching post service factor then it will raise the self efficacy of 0.372. Factors that positively affect self efficacy.

9. Self efficacy, positive and significant towards personal mastery. This is evident from the coefficient of the path marked positive by 0.363 with the value of Statistic T of 3.371 is greater than T-table = 1.98. Direct self efficacy on personal mastery is 0.316 which means that every self efficacy will increase personal mastery by 0.316. This means that self efficacy has a significant effect on personal mastery.

10. Personal mastery has a positive and significant effect on daily self-care activities. This can be seen from the path coefficient which is positively marked by 0.803 with the value of Statistics T of 5.576 which is greater than T-table = 1.98. Personal mastery directly on the daily self-care activities of 0.803, which means any increase in personal mastery will increase the daily self-care activities by 0.803. This means that personal mastery significantly influence the ability of self-care fulfillment.

Discussion

Model simulation is done in an effort to solve problems by providing intervention in the form of knowledge in the form of counseling and group discussion involving elderly and family as well as health workers. When elderly difficult to meet the needs of self care then the action to be done is with the level of elderly personal mastery and self-afficacy that will increase the ability of elderly to do self care agency to meet the self care activity daily living[7].

Nursing care for the elderly with a personal mastery and self afficacy approach helps the elderly in fulfilling self care activity daily living which includes food diet, stress coping and activities. Elderly with high personal mastery will be easier to do self care. Elderly and family will be assisted with a structured module that aims to make the elderly know and understand the importance of improving personal mastery 8. And in the module there are also materials that can be a guide in maintaining the self care activity daily living. In addition, health workers will continue to work so that the elderly continue to be actively present in integrated coaching post activities, because Integrated Coaching Post is one of the means to do positive activities and control blood pressure routinely. Hypertension is one of the blood vessel disease, known as Silent Killer, because it often does not cause symptoms. The majority of hypertensive patients in Indonesia are not detected, generally unaware of the condition of the disease and only a small proportion are treated regularly 9. By 2025 around 29% of adults worldwide will suffer from hypertension. Cardiovascular disease ranks 4th or 15% of causes of death[10]. Therefore need serious attention to reduce the number of elderly hypertension. The theory explains that the occurrence of hypertension is caused by several factors that influence each other, where the main factors that play a role in pathophysiology are genetic factors and at least three environmental factors, namely salt intake, stress, and obesity[11]. In general, people with hypertension are people-people aged over 40 years, but currently does not close the possibility suffered by young people. Most primary hypertension occurs at the age of 25-45 years and only in 20% occurs below the age of 20 years and over 50 years.

The result of this study is that the variable self-care agency has a positive effect on self care activity daily living. Although the activity indicator is still in the less category. But the whole contains significant value. The

ability of the elderly to do self care is shown by the ability of the elderly to maintain and choose good for the body, the elderly are also able to control emotions when there are problems, and the elderly are able to do light activities that are very beneficial for the body and keep blood pressure stable. Therefore, modules that have been prepared can be used in implementing nursing care, so the target of nursing care is easy to reach

Findings: Integrated Coaching Post service factor, personal mastery, self efficacy, self care agency have an effect on the improvement of self-care ability in Elderly with Primary Hypertension.

Conclusion

Based on the results of research and discussion that has been done can be concluded that:

a. Family support factors consisting of instrumental support, informational support, assessment support, and emotional support have an effect on increasing elderly hypertension personal mastery.

b. The role of integrated coaching post service is very helpful in improving elderly personal mastery which includes facilities, financial officer, nurse communication.

c. Personal mastery is the main basis in improving the ability of the elderly in the process of self care activity daily living. Personal mastery is the main focus in helping elderly people to do self care.

d. Self care agency is one component in nursing theory. The self care agency focuses on the ability of the elderly formed from the knowledge and motivation of the elderly.

e. Daily living self care activities become the main target in this study which includes food diets which means that the elderly are able to maintain and choose foods that are not at risk for increased blood pressure. Mild exercise is one solution besides being able to maintain stable blood pressure can also help bone health

Suggestion: Elderly with good personal mastery will always learn to achieve life goals in this case the elderly can recover from high blood pressure. Self awareness, knowledge and motivation become the main capital in improving self-care abilities. This is what attracts researchers to take personal mastery in elderly hypertension. The theoretical review states that the central role of personal mastery is to achieve a personal vision by continuing to learn from a life. The application of personal mastery is expected to be applied anywhere and in any condition.

Ethics approval and consent to participate: The experimental procedures on responden were approved by institutional ethics committee of Publict Health Faculty, Airlangga University Indonesia.

Informed Consent: Informed consent was given to the respondent along with the explanation that the research included anonymity and confidentially

Conflict of Interest: The authors declare that they have no competing interests. We have no conflicts of interest to disclose. It as nil

Source of Funding: From self collect data

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A Study to Assess the Effect of Community based Educational Programme Regarding Prevention of Anxiety Related to Child Birth among Primi Gravida Women in Selected Rural Community of Pune District

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Abstract

Introduction: Childbirth is one of the greatest events in every woman's life, especially among primi gravida mothers. Having had fantasies about pregnancy and motherhood when confronted with the reality many of them doubt their ability to cope with this great event in their lives. Many of the mothers do not know about what changes takes place and their role in the presence of childbirth. At this time, the mother to be needs lot of help for the realization and acceptance of childbirth as a normal physiological phenomenon[1].

Objectives: To assess the anxiety regarding child birth process among Primi gravida women, To compare the effectiveness of community based education on anxiety related to child birth among Primi Gravida women, To determine the association between the selected demographic variables with post assessment level of anxiety among Primi Gravida women.

Materials and Method: Pre Experimental, One group pre-test-post-test design was usedon 60 women of primigravida in selectedrural area. Non probability purposive sampling technique was used for data collection. Modified Zunkself-rating scalewas used. Community based education was given.

Result: Paired t-test was used to assess the effectiveness of community based education on anxiety related to child birth. Average anxiety score in pre-test was 49.4 which reduced to 39.9 in post-test. Corresponding p value was 0.000, which is small (less than 0.05), the null hypothesis is rejected.

Conclusion: This study concludes that, through community based education anxiety related child birth was reducing among primigravida mothers.

Keywords: *Anxiety; community based education; Primi Gravida.*

Introduction

A woman's ability to adapt to the changes and challenges of pregnancy is unique and the level of the stress she experiences affects the outcome of pregnancy. Most studies reported varied prevalence rate from different parts of the world and majority of them explored general anxiety than pregnancy-specific anxiety. Prevalence of high anxiety disorders in pregnant women was found to be undiagnosed and untreated[2].

Childbirth has an intense event and strong emotions, both positive and negative, can be brought to the surface. Abnormal and persistent fear of childbirth is known as tokophobia[3].

Need of study: Each year, complications from pregnancy and childbirth result in about 500,000 maternal deaths, 7 million women have serious long term problems, and 50 million women have health negative outcomes following delivery. Most of these occur in the developing world[4].

In 2015 there were about 135 million births globally. In that 15 million were born before 37 weeks of gestation[5].

Hypothesis: H_{0}_There is no significant effect of community based education on anxiety regarding child birth in Primi parous women.

Material and Method: Quantitative approach Pre Experimental One group pretest post-test design was used. The sample was chosen for this study was 60 primigravida women by using purposive sampling technique which filled the inclusion criteria and were selected from rural community of Pune district. The tool used for this study was demographic data (age in years, antenatal visit, L.M.P., education, occupation, current living status, injection TT, family income per month).

Inclusion Criteria: Women who is giving first time birth to the child. Women in the third trimester.

Exclusion criteria: Women who are not willing to participate in the study. Primi gravida women who has diagnosed as high risk pregnancy. The women who are going for a prenatal classes. Women who has taken a fertility treatment.

Data Collection: A formal letter seeking approval to conduct the main study was taken. The data collection was carried out from 20/2/2018 to 29/3/2018. A systematic plan was prepared for the study and efforts were to made to stick to the planned scheduled.

Findings: The data and findings have been organized and presented under the following sections:

Section I: Analysis of data related to demographic data in terms of frequency and percentage.

Table No. 1: Distribution of demographic variables (N= 60)

Characteristics	Category	Frequency	Percentage
Age	below 20	29	48.2
	21-30	31	51.6
	31-40	0	0
	above 40	0	0
Antenatal visit	first visit	0	0
	second visit	13	21.6
	third visit	47	78.3
Education	Graduates and above	3	5
	Post high school diploma.	27	45
	High school certificate.	20	33.33
	Primary school certificate.	11	18.3
Occupation	Profession	3	5
	Farmer	16	26.6
	skilled worker	5	8.33
	unskilled worker	13	21.6
	house wife	23	38.3
Current living status	mothers house	10	16.6
	In laws house	26	43.3
	Independent	24	40
injection TT	first dose	0	0
	second dose	60	100
family income per month	>41430	0	0
	20715-41429	3	5
	15536-20714	11	18.3
	10357-15535	26	43.3
	6214-10356	15	25
	2092-6213	5	8.3
	<2091	0	0

Section II-level of anxiety among primigravida mothers.

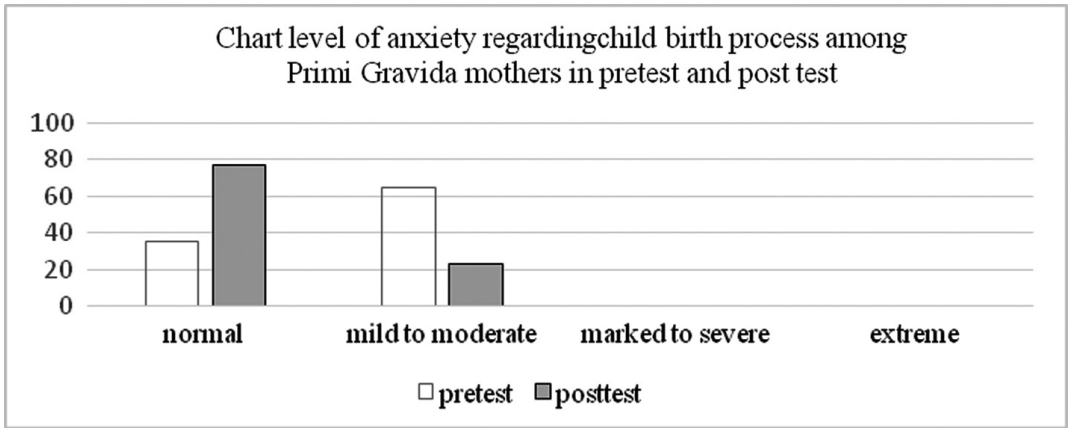


Fig. No. 1: Level of anxiety among primigravida mothers (pre-test and post-test). N=60

Fig. 1 Shows that, in pre-test, 35% of the primi gravida mothers had normal anxiety and 65% of them had mild to moderate anxiety. In post-test, 76.7% of the primi gravida mothers had normal anxiety and 23.3% of them had mild to moderate anxiety. This indicates that the anxiety related to child birth among Primi Gravida women reduced remarkably after community-based education.

Section III: Analysis of data related to the effectiveness of community-based education on anxiety related to child birth among Primi Gravida women.

Table no. 2: Paired t-test for effectiveness of community-based education on anxiety related to child birth among Primi Gravida women N=60

	Mean	SD	T	df	p-value
Pre-test	49.4	5.7	20.6	59	0.000
Post-test	39.9	4.1			

Table 2 shows that paired t-test used for effectiveness of community-based education on anxiety related to child birth among Primi Gravida women. Average anxiety score in pre-test was 49.4 which reduced to 39.9 in post-test. T-value for this test was 20.6 with 59 degrees of freedom. Corresponding p-value was 0.000, which is small (less than 0.05), the null hypothesis is rejected. It is evident thatthe anxiety related to child birth among Primi Gravida women reduced significantly after community-based education i.e. community-based education is significantly effective in reducing the anxiety among primi gravida mothers.

Section IV: Analysis of data related to association between the selected demographic variables with level of anxiety among Primi Gravida women

Table 3: Fisher's exact test for association between the selected demographic variables with post assessment level of anxiety among Primi Gravida women N=60

Demographic variable		Mild to moderate	Normal	p-value
Age	21-30	20	11	1.000
	Below 20	19	10	
Antenatal visit	Second visit	11	2	0.114
	Third visit	28	19	
Education	Graduate and postgraduate	3	0	0.542
	High school certificate	12	8	
	Intermediate or post high school diploma	18	8	
	Primary school certificate	6	5	

Demographic variable		Mild to moderate	Normal	p-value
Occupation	Farmer	12	4	0.186
	Housewife	16	7	
	Profession	3	0	
	Skilled worker	3	2	
	Unskilled worker	5	8	
Current living status	In laws house	16	10	0.215
	Independent	14	10	
	Mothers house	9	1	
Family income per month	Rs. 10357-15535	16	10	0.548
	Rs. 15536-20714	7	4	
	Rs. 20715-41429	3	0	
	Rs. 2092-6213	2	3	
	Rs. 6214-10356	11	4	

Since Antenatal visit, Occupation and Current living status, p-values are less (smaller than 0.5), so this demographic variable was found to have significant association with the level of anxiety among primi gravida mothers.

Discussion

This findings are supported by the study which was conducted by Rut Khaikin, Yehudit Marcus, Shoshana Kelishek, Chaya Balik, on "The effect of childbirth preparation courses on anxiety and self-efficacy in coping with childbirth", shows that After completing the preparation courses the anxiety level dropped significantly in the long and short course groups (p =.04 and p =.01, respectively). The anxiety in both groups was significantly related to the self-efficacy for coping with childbirth (r =-0.26, p =.03 and r =-0.48, p =.001, respectively)[6]

Megha Kadam Dr. S. G. Joshi, conducted a study on "Effect of Prenatal Teaching on Pregnancy Wellbeing" and they found the almost complications occurred because of lack of knowledge regarding prenatal care and health facility in low-resource settings, and most could have been prevented. Findings revealed that pre-test knowledge score was less. After prenatal teaching 42(70%) of them possess good knowledge and 18 (30%) under average score. It was observed that there is significant difference between pre-test and post-test knowledge score. The findings suggest that increases in knowledge level after prenatal teaching and it helps to create awareness in community[7].

Conclusion

One of the major roles that nurse play is educating the client and community regarding various health related facts. Community based education given to the group and it found effective in reducing anxiety related to child birth. This study help to know the level of anxiety and also the effect of education on that anxiety among the rural women.

Conflict of Interest: Nil

Source of funding: Self-funded

Ethical consideration: Permission has been taken from the institute Ethical committee of Symbiosis International (Deemed University). Village Sarpanch permission has been taken prior to the pilot and main study. Informed consent has been taken from the each subjects. Confidentiality of the subject has been maintained.

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Customer Perception Towards Organic Products: An Exploratory Study

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Abstract

Organic products are obtained by processes which are friendly to the environment, by crop techniques that consider both the attributes of final product and production method. The consumption of organic food has increased in recent years as a result of its direct impact on consumer health, lifestyle and social convenience, as well as on the environment and sustainable development. The demand for organic products in India has been growing significantly during the last five years. Consumers are willing to pay more for organic products. This article investigates the customers' perception and attitude towards organic products. The data was collected from 200 respondents using questionnaire and analyzed by descriptive and inferential statistics. The findings revealed that the willingness of consumers to buy organic products is influenced by limited and erratic supply, higher price of products and very limited access and information.

Keywords: *Consumer Behavior, Organic Produce, Environmental Sustainability.*

Introduction

The rapid growth in industrial development along with the population explosion is increasing the pressure on agricultural production method to improve crop yield. Many studies have raised concerns about the Increase levels of chemical fertilizer use to increase the yield of food production. Awareness about the harmful effects of these highly polluting food products is growing among the consumers. As an alternative to these, more people are turning to organic food products. Organic foods are part of agricultural food products that are not treated with chemical fertilizers, pesticides, herbicides and other synthetic chemicals during their production, processing and storage. In addition, organic food products they do not contain genetically modified materials, with the aim of achieving a sustainable agriculture system. In Cattle breeding, organic method does not use growth hormones, antibiotics and other chemicals to improve the increase. The growth and consumption of organic food products have increased dramatically in recent years due to the increase of health consciousness. Before a product can be labeled as "organic," a Government-approved certifier inspects the farm where the food is grown to make sure the farmer is following all the rules necessary to meet US Department of Agriculture (USDA) organic standards before it is certified.

Organic food market in India–Current Scenario: Organic farming is an ancient concept in India in terms of the extensive agriculture that takes place in the country. The organic food market is worth USD 129.3 million and shows great potential for growth in the future. The growing export market and government support, has boosted the market. An analysis of the drivers explains the factors for the growth of the industry including the huge export market, the improved organized retail distribution network, government initiatives and the increase of health awareness among consumers. The main challenges identified include the high prices of organic food, the lack of an integrated supply chain and the difficulties for farmers, the barriers to certification. The competition section provides an overview of the competitive landscape, including brief profiles of key national producers and promoters of organic food products. The key development sections provide an overview of the developments related to the last year. Under current government policy, it takes approximately three years for a conversion farm to be certified as organic, and the costs are hefty for the small farmer.

Scope And Importance of the Study: With rising concern of health issues and food safety, many consumers have turned their site to organic products. The increased consumers' interest in organic has been

attributed among others to the growing demand for food free from pesticides and chemical residues. This study attempted to gain knowledge about consumer motivators towards organic product consumption,consumer's perception towards organic products, willingness to pay for organic product and intention to purchase organic will be the main agenda of this study.

Objectives of the Study

- To investigate the motivators and inhibitors for the purchase and use of organic products.
- To study the consumers' consumption pattern of organic products with demographic variables.

Literature Review: Actual purchasing patterns, seeking to quantify the extent of purchase of organic food and the consumer′s commitment Davies *et al*. (1995)[1]. Estimation of the influence of consumers' views of specific food aspects (attributes) and personal attributes on demand for organic foods Onyango *et al.* (2007)[2]. What is known, as well as what is not known, about consumers of organic food Dimitri *et al.* (2012)[3.] Consumer preference for fresh vegetables labeled as organic in combination with health and environment related quality traits Mondelaers *et al*. (2009)[4]. U.S. consumer attitudes toward organic foods in order to demonstrate that multiple and meaningful segments can be identified based on attitudes and beliefs rather than demographics and that a more targeted marketing strategy could likely create a better fit with consumer wants and needs Stanton*et al*. (2010)[5]. Determine the factors influencing consumer behavior towards organic food Paul*et al*. (2012)[6]. The demographic differences between the with respect to Swedish consumers' attitudes towards organic foods (milk, meat, potatoes, and bread), purchase frequency, purchase criteria, perceived availability, and beliefs about organic foods Magnusson *et al.* (2001)[7]. Respondents are willing to pay a premium if they have already purchased organic products, have good health, strong ethical and environmental concerns, think that organic products provide greater quality and health benefits, and reside in the city Sriwaranun *et al*. (2015)[8]. Insight into the purchase of organic food products by consumers and to explore the main factors driving this process Xie*et al.* (2015)[9].

Methodology

In order to identify the perceptions and attitude of Indian consumers about organic products, the researchers used descriptive research design. Convenience sampling method was employed for the study. Information's were gathered by both primary and secondary data sources. For the purpose of primary data structured questionnaire was used and for the secondary sources books, journals, and research papers are used by the researchers. Self administered questionnaires were distributed to 200 individuals in order to elicit the organic consumers' perception and attitude towards organic products and the factors that positively contributed for the formation, change and maintenance of these attitudes. The data collected were coded, computed, and analyzed using the Statistical Package for Social Sciences (SPSS) version 21 software.

Limitations

- The study focuses only on the Consumers' attitude towards organic products.
- The study conducted for the short period of time with 200 samples.
- The study has been conducted in the Chennai city only.

Data Analysis & Discussion

Table 1

S.No.	Variables	Frequency	Percentage
1	**Gender:**		
	Male	93	46.5
	Female	107	53.5
2	**Age:**		
	18-25	180	90.0
	26-35	20	10.0
	36-45	0	0
	Above 45	0	0
3	**Education:**		
	Higher Secondary	9	4.5
	U.G	19	6.5
	P.G	176	88.0
	Others	2	1.0
4	**Occupation:**		
	Student	189	94.5
	Employee	7	3.5
	Businessmen	4	2.0
	Housewife	0	0
5	**House Hold Monthly Income:**		
	UPTO Rs 20,000	85	42.5
	Rs 20,001-Rs 50,000	77	38.5
	Rs 50,001-Rs 1,00,000	23	11.5
	Above Rs 1,00,000	15	7.5

Demographic Profile: It can be observed that of the total respondents, majority are female respondents. 90% of the respondents are in the age group of 18-25 years. The distributions of the respondents based on their educational qualification reveals that post graduates constitute 88.0% of the sample unit. It can be deduced that student constitute a maximum of 94.5%. Respondents with household income of up to Rs.20,000 and between Rs.20,001-Rs.50,000 constitute a maximum of 42.5% and 38.5% of the sample unit respectively.

Table 2: Gender wise opinion of consumer preference on organic products

Products	Male		Female	
	Frequency	Percentage	Frequency	Percentage
Produce	11	11.8	12	11.2
Processed foods (Cereal etc)	23	24.7	20	18.6
Meat, Egg, Poultry	32	34.4	19	17.7
Vegetables	27	29.1	56	52.5
Total	**93**	**100**	**107**	**100**

The above table reveals that female respondents (52.5%) are majority when compare to male in preferring organic vegetables, whereby male respondents are showing most of the preference to meat, egg, Poultry (34.4%), processed foods (24.7%), Produce (11.2). It is inferred that most of the male respondents are preferring varieties of organic products and female respondents prefer only vegetables.

To identify the respondents' opinion on Environmental concerns and Eco-friendly products, t test was used to analyze the data and the results are presented below.

Table 3: Independent t-test on Attitudes

Groups						
Statements	**Variable**	**N**	**Mean**	**Std. Deviation**	**T-Value**	**Significance**
Experience major ecological disaster	Male	93	4.24	.107	3.946	0.000
	Female	107	3.98	.911		
Agreement to change the current standard of living	Male	93	3.88	.750	4.924	0.000
	Female	107	3.88	.844		
Exaggeration on environment problems	Male	93	3.82	.073	6.980	0.000
	Female	107	3.75	.870		
Consumers power to remove polluted products in the market	Male	93	3.97	.814	12. 903	0.000
	Female	107	3.98	.879		
Organic products not different from conventional products	Male	93	2.78	.160	14.792	0.000
	Female	107	3.44	.933		
Preparedness to buy organic products though expensive	Male	93	3.67	.036	26.442	0.000
	Female	107	3.93	.669		

T test was applied to identify the Gender wise attitudes of the respondents on environmental concerns and eco-friendly products. The results show that there is significance at 5% level in the opinion of the respondents. The study reveals the following.

- With regard to the opinion on the effect of environmental degradation male respondents agree to a great extent that environmental degradation will lead to environmental disasters.
- With regard to the opinion on compromising the

current living standard to protect the environment, there are differences in the opinion of male and female respondents.

- Male respondents optimistically agree that the current claims that environmental problems are changing the earth's climate are exaggerated.
- Regarding the power of the consumers to avoid the products that pollute the market the opinion of the female respondents are better than the male respondents.
- Majority of the female respondents are of the opinion that organic products are not different from conventional products.
- Majority of the respondents agree that people should be prepared to buy organic product though it is expensive.

To test the significant difference among demographic variables with respect to Environmental concerns and Eco-friendly products ANOVA was used.

H_0–There is no significant difference between demographic variables and opinion on eco-friendly products.

H_1–There is significant difference between demographic variables and opinion on eco-friendly products.

Table-4

Anova					
Variables	**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
Age	4.448	14	.342	4.696	0.000
	13.552	186	.073		
	18.000	200			
Education	6.457	14	.497	1.720	0.060
	53.698	186	.289		
	60.155	200			
Occupation	8.061	14	.620	3.481	0.000
	33.134	186	.178		
	41.195	200			
Monthly Income	14.737	14	1.134	1.423	0.152
	148.143	186	.796		
	162.880	200			

While analyzing the significant difference on the demographic variables and respondents' opinion on attitudes toward eco-friendly products, the above table reveals that the results are statistically significant for two demographic variables namely gender and age. Thus the null hypothesis is rejected and alternative hypothesis is accepted. For the variables on education (0.60) and monthly income (.152) the P values are not statistically significant at 5% level.Since the P values are greater than.050 the null hypothesis is accepted. Therefore it can be inferred that there is significant difference in the opinion of the respondents on organic products with reference to environmental degradation, cost of organic products, willingness to buy organic products, and on the difference between organic and conventional products. But based on education and income there is no significant difference in the opinion on organic products.

Findings & Conclusion

Demographic profile of the respondents

- Majority (53.5%)* of the respondents are the female.
- Majority (90%)* of the respondents are in the age group of 18-25 years.
- Majority (88%)* of the respondents are post graduates.
- Most (42.5%)* of the respondents have monthly income of Up to Rs 20000. Majority (94.5%)* of the respondents are students.

*(for the above result refer table 1)

Motivators and Deterrents of Consumers' Purchasing Organic Products: T test was applied to identify the Gender wise attitudes of the respondents on

environmental concerns and eco-friendly products. The results show that there is significance at 5% level in the opinion of the respondents.

*(for the above result refer table 3)

The results are statistically significant for two demographic variables namely gender and age. Thus the null hypothesis is rejected and alternative hypothesis is accepted. For the variables on education and monthly income the values are not statistically significant at 5% level. Hence the null hypothesis is accepted. There is significant difference in the opinion of the respondents on organic products with reference to environmental degradation, cost of organic products, willingness to buy organic products, and on the difference between organic and conventional products. But based on education and income there is no significant difference in the opinion on organic products.

*(for the above result refer table 4)

Consumers' Consumption Pattern of Organic Products: Majority of the female respondents (52.5%)* are preferring organic vegetables when compare to male, whereby male respondents are showing most of the preference to meat, egg, Poultry (34.4%)*, processed foods (24.7%)*, Produce (11.2)*. It is inferred that most of the male respondents are preferring varieties of organic products and female respondents prefer only vegetables.

*(for the above result refer table 2)

Conclusion

Consumer behavior plays a major role in Organic products segment. The marketers of organic products need to be innovative and dynamic in order to complete with the changing purchase behavior in the Organic food products market among consumers. The importance of organic food products was ignored for quite a long period. As a result of environmental sustainability, importance is shifted towards Organic food products rather than conventional farming. The study brought out the fact that the people were aware of organic products, but not entirely converted in to organic. Knowledge and awareness about organic products could affect attitudes and perceptions about the product and, ultimately, buying decisions of the consumers. Vegetables followed by Meat, Eggs are the most preferred and highly demanded commodities at present. So we conclude that Consumers' willingness to purchase organic products is influenced by limited and erratic supply, higher price of the products and very limited access and information.

Conflict of Interest: There is no conflict of interest in this paper.

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Ethical Clearance: This is an independent work of the author. We have not published this article with any other publishers.

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Assessing the Knowledge of Post Natal Mothers Regarding Danger Signs of Neonates at Various Health Facilities in Bihar: A Survey

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Abstract

Introduction: India accounts for 25% of the mortality around the world. According to the National Family Health Survey (NFHS-4) report and data shown by Niti Ayog in 2013, the neonatal mortality rate (NMR) in India is 28 per 1,000 live births, which accounts for more than half of the under-five child deaths (50/1000). The majority of the new-born deaths occur at home where a few families recognize signs of newborn illness. Delay in recognizing the signs of neonatal illnesses contributes to the death of a neonate.

Aim: To assess the knowledge of post natal mothers regarding danger signs of neonates at various primary health centres in Bihar, India

Methodology: A descriptive cross sectional survey was conducted at 54 health facilities of 16 districts in Bihar in the month January, 2017 using self developed, pretested and validated structured questionnaire. Tools were validated and reliability was tested ($\rho = 0.74$). Data collected from 277 post natal mothers were analysed. Knowledge of mothers was classified into three categories, poor knowledge (score 1-5), average knowledge (score 6-10) and good knowledge (score 11-15).

Result: More than one third (35.7%) mothers were third to fifth gravida. Most of the mothers (41.2%) attended two antenatal visits. Around half (50.6%) of the mother responded that they are aware of any danger in neonate. More than one third (45.5%) of the mothers were aware of fever as neonatal danger sign. Most of the mothers (39.7%) had poor knowledge regarding danger signs.

Conclusion: The finding of the study showed at health facilities post natal mothers had poor knowledge regarding danger signs of neonate. This alarms the need of continuous monitoring of post natal educational services and it also depicts the enhancement of educational efforts for effective education of mothers regarding early recognition of danger signs of neonate.

Keywords: *Knowledge, post-natal mothers, danger signs, neonates.*

Introduction

There are 25 million babies born every year in India, of which, one million die in one year. This accounts for 25% of the mortality around the world. Child health is the important indicator of health for a country. Therefore, eight millennium development goals (MDG) were set by United Nations in the year 2000. Out of 8 MDGs, MDG 4 was aimed to reduce child mortality rate by two third till the end of year 2015. Now the sustainable development goal (SDG, 2015) also aims towards good health and well being for all.[1,2]

According to the National Family Health Survey (NFHS-4) report and data shown by Niti Ayog in 2013, the current neonatal mortality rate (NMR) in India is 28 per 1,000 live births, which accounts for nearly 68% of all the infant deaths (41/1000) and more than half of the under-five child deaths (50/1000).In India, the neonatal mortality rate varies widely among the different states, ranging from 6 per 1000 live births in Kerala to 37 per thousand live births in Odisha. According to a report,the four big states namely Uttar Pradesh, Madhya Pradesh, Bihar and Rajasthan account for 46% of all births and

57% of India's neonatal deaths. Odisha, Chattisgarh contribute tohigh neonatal deaths in India.[3,4 5]

A recent systematic analysis suggests that around 44% of the under-5 mortality occurs during neonatal period, thereby emphasizing the importance of neonatal period for improving child health indicator[1].The primary causes of neonatal deaths are sepsis (52%), birth asphyxia (20%), prematurity (15%) and otherscause (13%).[6,7]There is slow progress of illness in neonates and hence they are often present with non-specific signs and symptoms of severe illness[8]. Even the single sign of feeding difficulty can be indicative of severe sickness in neonates. The majority of the new-born deaths occur at home where a few families recognize signs of newborn illness. Delay in recognizing the signs of neonatal illnesses contribute to the death of a neonate therefore, early recognition of these signs and seeking prompt medical care is necessary for improvement of health indicators of children[6, 9].

There are several studies conducted in southern and northern parts of the India to assess the knowledge of mother regarding danger sign of newborn but no study has been conducted yet in Bihar to assess the knowledge of post natal mothers regarding danger signs Therefore, the present study was undertaken to find out the postnatal mothers' knowledge regarding danger signs of neonates at various health facilities in Bihar. Findings of the present study would help us in planning some interventions for the postnatal mothers in future.

Material and Method

A descriptive study aimed to assess the knowledge of post natal mothers regarding danger signs of neonatesat various primary health centres in Bihar, India.

Setting: Current study was conducted in Bihar, the 12th largest state of India. Bihar is located in the eastern part of the country (between 83°-30' to 88°-00' longitude). Bihar is the state with 38 districts in it, total 534 blocks in it. It contributes to the huge population of India that is 10,38,04,637 (Census 2011)[10.]

For improvement in maternal and child health indicators CARE India with the collaboration of government of Bihar launched a mentoring programme named as AMANAT (apatkalin matritva evam navajat tatparta karyakram) in year 2013. The programme was launched in 4 phases in different districts of Bihar in order to cover the maximum health facilities of Bihar. Current study was conducted in 54 health facilities of 20 districts where the Phase IV AMANAT programme was going on. Out of 20 districts, pilot study was conducted in 4 districts named as Vaishali, Nawada, Gaya and Supaul districts on 30 sample and study was found feasible. The distribution of the districts where data was collected for study is given below in the map:

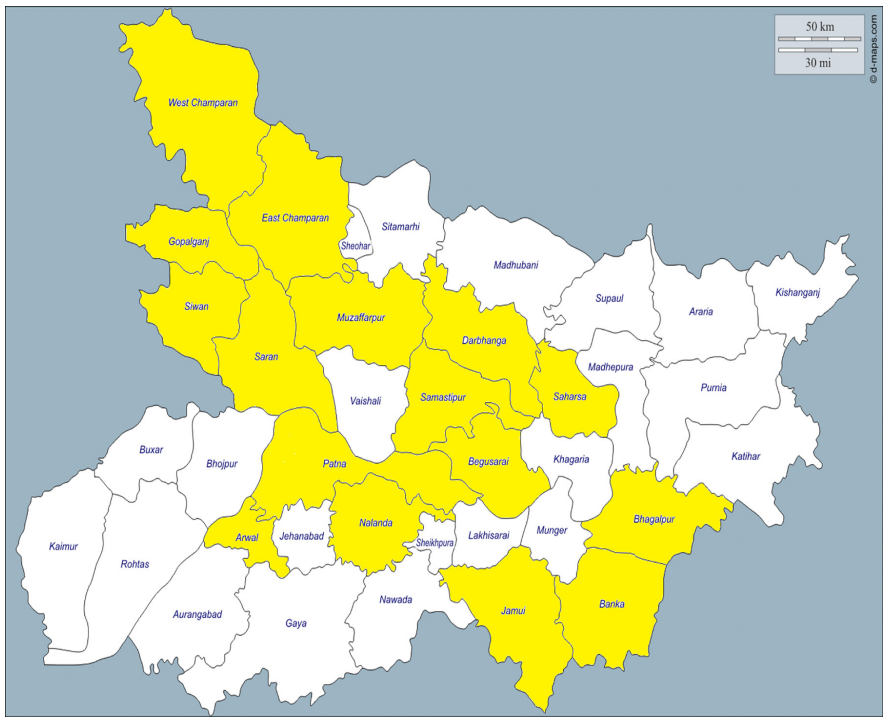


Figure 1: Represents the map of Bihar. Area indicates the districts selected for data collection.

Sampling and Data collection: The present cross sectional survey was conducted at various health facilities of Bihar in the month January, 2017 using self developed, pretested and validated structured questionnaire. Tools were validated by five experts. Reliability was tested by split half method and cronbach's alpha was found to be 0.74. WHO's neonatal danger signs were included in the tool. Convenient sampling method was used. Mothers who responded yes for having knowledge of neonatal danger signs were asked for the signs they know and for each correct response score given was 1 and for incorrect response 0 score was given. Knowledge of mothers was classified into three categories, poor knowledge (score 1-5), average knowledge (score 6-10)and good knowledge (score 11-15). Based on the previous studies the calculated sample size was 310. Out of 310, data from 33 sample was lost during storage. Therefore, data from 277 mothers were finally analysed.All mothers who delivered in facility and stayed for more than 2 hours after delivery and agreed to participate in the study were enrolled. Each participating women was explained the purpose of study. Confidentiality and anonymity was ensured. Written informed consent was obtained from participating mothers; those who were illiterate were asked to give left thumb impression on a consent form that was read to her before data collection.

Results

Table 1: Socio-demographic profile of mothers n=277

Variables	Frequency (f)	Percentage (%)
Location of residence		
Rural	254	91.7
Semi-urban	19	6.9
Urban	4	1.4
Religion		
Hindu	240	86.6
Muslim	36	13
Christian	01	0.4
Caste		
General	63	22.7
Other backward caste	135	48.7
Schedule caste	64	23.1
Schedule tribe	15	5.4
Level of education		
Illiterate	102	36.8
Primary education	35	12.6
Matriculation	100	36.1
Intermediate	24	8.7
Graduation and above	16	5.8
Occupation		
House wife	264	95.3
Labour	7	2.5
Farmer	2	0.7
Service/job	4	1.5
Monthly family income (in Rs.)		
Less than 5000	149	53.8
5000-10000	99	35.7
More than 10,000	29	10.5
Parity		
Primigravida	91	32.9
Secondgravida	80	28.9
Third–fifth gravida	99	35.7
Equal to or more than 6	7	2.5
No. of Antenal visits attended		
No visit	31	11.2
One visit	59	21.3
Two visits	114	41.2
Three or more than three	73	26.4
Facility opted for ANC visits (if attended)		
Anganwadi	156	63.4
Subcentre	22	8.9
Primary health centre	54	21.9
Subdivisional/ district hospital	12	4.8
Private clinic/ private hospital	2	0.8

Mean age of mothers were 24.04 with standard deviation of 3.43. Majority (91.7%) of mothers were residing in rural area. Majority (86.6%) belonged to Hindu religion. Most (48.7%) of the mothers were from other backward caste. More than one third (36.8%) of the mothers were illiterate and 36.1% were educated up to matriculation. Majority (95.3%) of the mothers were housewives. Monthly family income of more than half of the mothers (53.8%) was less than Rs. 5000/-. More than one third (35.7%) mothers were third to fifth gravida and 32.9% were primigravida. Most of the mothers (41.2%) attended two antenatal visits. Out of those who attended antenatal visits, most (63.4%) mothers opted anganwadi for antenatal check up.

Table 2: Response of mothers regarding awareness of danger signs of neonates n= 277

Variables	Frequency (f)	Percentage (%)
Do you know any danger sign in neonate		
Yes	140	50.6
No	137	49.4

Around half (50.6%) of the mother responded that they were aware of any danger in neonate.

Table 3: Knowledge of mothers regarding danger signs of neonates n= 140

Variables	Frequency (f)	Percentage (%)
Not feeding well	71	25.6
Convulsion	14	5.1
Drowsy or unconscious	28	10.1
Movement only when stimulated or no movement at all	14	5.1
Fast breathing	49	17.7
Neonate is producing sound during breathing	14	5.1
Severe Chest indrawing	13	4.7
Fever	126	45.5
Baby cold to touch	92	33.2
Bluish coloured baby	12	4.3
Yellow palms and soles	16	5.8
Umbilicus red or draining pus	16	5.8
Skin boils	26	9.4
Eyes draining pus	9	3.2
Diarrhoea	65	23.5

More than one third (45.5%) of the mothers were aware of fever as neonatal danger sign. Out of 140 mothers who responded yes about One third (33.2%) of the mothers were aware that baby cold to touch is neonatal danger sign. Not feeding well and diarrhoea were known neonatal danger signs by 25.6% and 23.5% of the mothers respectively.

Table 4: Knowledge score of mothers regarding danger sign n= 140

Category	Frequency	Percentage
Poor knowledge	110	78.6
Average knowledge	27	19.3
Good knowledge	3	2.1

Most of the mothers (39.7%) had poor knowledge regarding danger signs. Very less 2.1% of mothers had good knowledge and 19.3% of mothers had average knowledge regarding danger sign.

Discussion

Mother is primary care taker for a child. Study have shown that unawareness regarding danger signs increases in the delay in seeking medical care, ultimately leads to high neonatal mortality rate. At facility level various efforts has been taken by the Bihar government to counsel the post natal mothers regarding post natal care of mothers as well as of baby. The present study was conducted at various facilities in Bihar to assess the knowledge of post natal mothers regarding danger signs of neonates delivered at facility. In the present study the knowledge of mother regarding danger sign was poor. Most of the neonatal were found having deficient knowledge regarding danger signs the result is in line with the study Uchenna Ekwochi et al[11] which also showed that mother were not aware regarding WHO danger signs. The resultsare also in line with study done by Jacob Sandberg[12]which also showed that mothers had poor knowledge regarding danger signs. In the present study fever (45.5%), baby cold to touch (33.2%), not feeding well (25.6%), and diarrhoea (23.5%) were known danger signs by post natal mothers. Most of the mothers identified fever as danger sign. In the study done by Shally Awasthy in U.P. also showed that majority of mothers are aware of fever as danger sign. The study results shows that danger signs which are specific to respiratory distress were not known to mothers. The umbilical area pus discharge which shows sepsis was not noticed by the mothers as danger sign. The present study showed that only few post natal mothers had good knowledge regarding danger sign, A study conducted by Solomon Gedlu Nigatualso showed that very less number of mothers had good knowledge regarding danger sign.

Limitation of the Study: Data was lost during the study so this study could not be produced on large sample size.

Recommendation: The present study was conducted in post natal mothers the similar study can be conducted in all mothers whose babies are neonates and those who are residing in community.

Conclusion

The finding of the study showed at health facilities post natal mothers had poor knowledge regarding danger

signs of neonate. This alarms the need of continuous monitoring of post natal educational services and it also depicts the enhancement of educational efforts for effective education of mothers regarding early recognition of danger signs of neonate.

Ethical Clearance: Taken from CARE India organisation, Bihar.

Conflict of Interest: Nil

Source of Funding: Self

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Effectiveness of Structured Teaching Programme on Prevention of Urinary Tract Infection among Women with Type 2 Diabetes in Selected Teritary Care Hospital, Kanchipuram District, Tamil Nadu

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Abstract

Background: Urinary tract infection is the second most commonly seen bacterial infection in the health care sector Each year, more than 8 million people were diagnosed with UTI. According to the National ambulatory medical survey, urinary tract infection accounted for nearly 7 million outpatient visits and 1 million emergency room visits, resulting in 1,00,00 hospitalizations.[4] Patients with type 2 diabetes mellitus are at increased risk of infections, with the urinary tract being the most frequent infection site.

Aims: The objectives were to assess the knowledge on prevention of UTI and to find out the association between the knowledge on prevention of UTI and selected demographic variables.

Materials and Method: This was a pre experimental one group pretest and post test design used over a period of 4 months. The sampling technique was simple random sampling technique with the sample size 32 women with type 2 diabetes mellitus and structured questionnaires was used to assess the knowledge on prevention of UTI. Seven days interval was kept between pretest and post test after the implementation of STP on prevention of UTI. Ethical clearance was obtained. The collected data was tabulated and analyzed. Descriptive and inferential statistical were used.

Result: The study result reveals that Pretest level of knowledge on prevention of Urinary Tract infection mean score was 4.62 and the Post test level of knowledge mean score was 9.37 which projects 't' value of 10.68 which was statistically significant at $p<0.05$ level. The post test knowledge score is greater than the pre test knowledge score. The Mean difference was 4.75. This indicates the structured teaching programme on prevention of urinary tract infection is effective in increasing the knowledge level, thereby it may reduce the frequency of UTI among type 2 Diabetic women.

Keywords: *Urinary tract infection (UTI), Structured Teaching Programme (STP), Type 2 Diabetes mellitus.*

Introduction

The prevalence of diabetes mellitus has increased over the past decades and it is now approaching epidemic proportions.Worldwide, 371 million people have diabetes and it is estimated that by 2030 this number will reach 552 millions,with larger increases in the developing than in the developed world. Changes in lifestyle,aging of the population and the increasing prevalence of obesity are responsible for this dramatic situation. Urinary tract infection are more common, more severe, and carry worse outcomes in patient with Type 2 diabetes mellitus. UTI more often caused by resistant pathogens. Various impairments in the immune system, poor metabolic control, and incomplete bladder emptying due to autonomic neuropathy may all contribute to the enhanced risk of urinary tract infection in these patients. The new anti-diabetic sodium glucose co-transporter 2 inhibitors have been found to significantly increase the risk of symptomatic urinary tract infection. Symptoms of urinary tract infection are similar to patients without

diabetes, though some patients with diabetic neuropathy may have altered clinical signs.

As per the WHO statement the urinary tract infection is most common among Type 2 diabetes women. All types of UTI are more frequent in patients with type 2 diabetes. Various studies have reported the overall incidence of UTI among these patients. A meta-analysis of 22 studies, published in 2011, found a point prevalence of 12.2% of ASB among diabetic patients versus 4.5% in healthy control subjects.[6] In a recent study from Europe, asymptomatic bacteriuria was more prevalent among women with diabetes (26%) than in women without diabetes (6%).Diabetic patients are at a high risk of development of UTIs, so it is recommended that special attention is paid to them, especially for the management of bacterial UTIs. Various risk factors such as sexual intercourse, age, duration of diabetes, glycemic control, and complications of diabetes are associated with UTI.[9] A cohort study of over 6,000 patients enrolled in ten clinical trials found an incidence rate of 91.5 per 1,000 person-years in women and 28 per 1,000 person-years in men, and a cumulative incidence of 2% during 6 months. An American database study during 2014 found that a UTI diagnosis was more common in subjects with diabetes compared to those without diabetes (9.4% vs 5.7%, respectively)[5]. Another study done in America with over 70,000 patients with DM type II found that 8.2% were diagnosed with UTI in 1 year (12.9% of female and 3.9% of male, with increasing incidence with age [7]. A Canadian study demonstrated that diabetic females were 6–15 times more frequently hospitalized for acute pyelonephritis than non-diabetic females, and diabetic males were hospitalized 3.4–17 times more than non-diabetic males. Asymptomatic bacteriurea was reported to have an increased prevalence in diabetics by about 8% to 25%, and was also found to have amplified occurrence with in patients with longer duration of diabetes [10].

The increased risk of UTI among diabetic patients, coupled with the increase in the incidence of type 2 diabetes mellitus worldwide in recent years, may impose a substantial burden on medical costs. In addition, the high rates of antibiotic prescription, including broad-spectrum antibiotics for UTI in these patients may further induce the development of antibiotic-resistant urinary pathogens. There are likely several reasons for people with diabetes more prone to UTIs. First, people with diabetes may have poor circulation, which reduces the ability of white blood cells to travel in the body and fight off any kind of infection. Second, high blood glucose levels can also raise the risk of a UTI. And third, some people with diabetes have bladders that don't empty as well as they should. As a result, urine stays in the bladder too long and becomes a breeding ground for bacteria. Diabetic patients are at a high risk of development of UTIs, so it is recommended that special attention is paid to them, especially for the management of bacterial UTIs.[7] The aforementioned literature motivated the researchers to assess the effectiveness of structured teaching programme on prevention of UTI among women with type 2 diabetes.

Objectives

- To assess the pretest level of knowledge on prevention of Urinary tract infection among women with type 2 diabetes mellitus.
- To assess the Urinary tract infection symptom severity within 24 hours and past history of Urinary tract infection.
- To determine the effectiveness of structured teaching programme regarding prevention of urinary tract infection in terms of gain in knowledge among women type 2 diabetes mellitus.
- To find out the association between the post test level of knowledge on prevention of Urinary tract infection among women with type 2 diabetes mellitus in the selected demographic variables.

Method

A Quantitative approach, pre experimental one group pretest and post test design was used for this study and conducted in selected tertiary hospital, Chennai. A pilot study was conducted prior to the main study with 10 samples and Reliability and practicability of tools and method was identified. The study was conducted in Out patient department after the written permission from the higher authorities. 32 Samples was selected using simple random sampling technique who was diagnosed with Women with Type 2 Diabetes. The objective of the study was explained and Informed consent was obtained from the Samples. Demographic data and Pretest was collected by using structured questionnaire. Urinary tract infection symptom severity assessment scale used to evaluate the UTI symptom within 24 hours and past one month history of Urinary tract infection. The Structured teaching programme on Prevention of UTI was conducted for 20 minutes.The Post test level of Knowledge was assessed by investigator after seven

days. The nurse investigator thanked the participants for their cooperation throughout the data collection period.

Results and Discussion

Majority 53% of the samples age was between 41-50 years, 57% of women having 5-6 years duration of diabetes mellitus and 50% of women are experienced urinary tract infection in the past one month. Majority of patients 26(82%) had inadequate knowledge, 3(9%)of patients had moderate and 3(9%)of patients had adequate knowledge on prevention of urinary tract infection in pre test. After the post test the majority of sample 21(66%) had adequate knowledge and only 8(25%)of patients having moderate and 3(9%) were under the category of inadequate knowledge. The study result also shows that fifty percentage samples having history of UTI and remaining 50% of people did not had History of UTI. Among 50% of the history of UTI samples majority that 50% of had history of severe symptom of urinary tract infection, 31% were had of mild symptom and 19% of moderate symptom of urinary tract infection in the past one month period among type 2 diabetes mellitus women. The pretest mean score for knowledge on prevention of urinary tract infection was 4.62 and standard deviation was 2.36. The post test mean score was 9.37 and standard deviation was 1.56. The mean difference was 4.8. The t value 10.68 was greater than the table value and therefore its significant at $p<0.05$ level. This study result reveals that the structured teaching programme on prevention of urinary tract infection is effective in increasing the knowledge level among type 2 diabetic women. There was no association between demographic variables and knowledge on prevention of urinary tract infection at 0.05 level.

A similar study conducted in Bangalore to assess the effectiveness of structured teaching programme on prevention of micro vascular complication among patient with diabetes mellitus at KC General Hospital. The research design selected for this study was quasi experimental design. The sample size consists of 50 diabetic patients. Purposive sampling technique was used to select the respondents. A structured knowledge questionnaire was administered to assess knowledge in pre test among experimental group on the first day. Structured teaching programme was administered on the same day of pre test to experimental group.After 7 days of administration of structured teaching programme a structured knowledge questionnaire was administered to assess the effectiveness of STP. The results of major findings indicate that the DM patients had inadequate knowledge regarding micro vascular complications and its prevention's. The study concluded that the STP on prevention of micro vascular complications of diabetes mellitus was an effective method for providing moderate to adequate knowledge and help the DM patients to enhance the knowledge to prevent vascular complications. The teaching programme content was different in the above study but both the study results indicates that structured teaching programme increase the knowledge among type 2 diabetic patients.

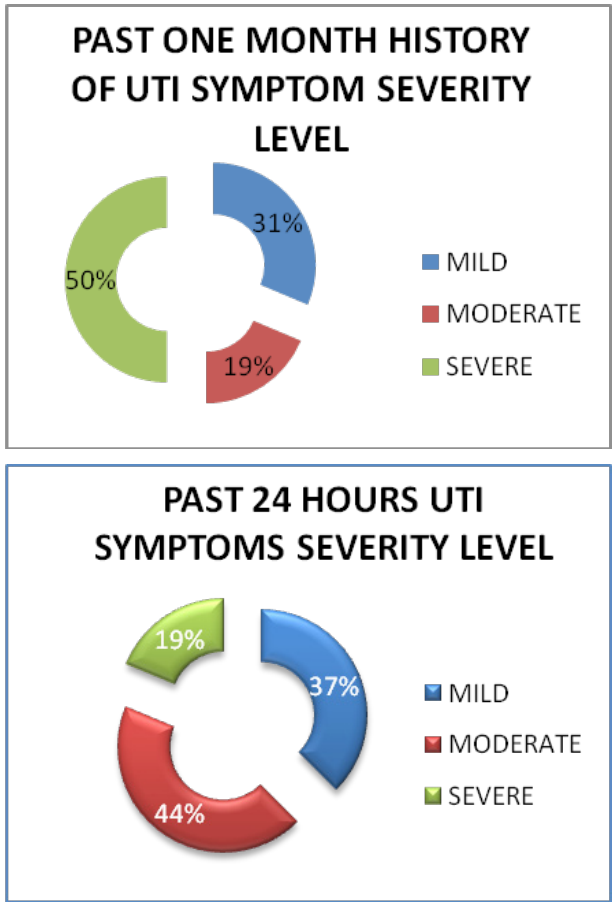


FIG 1: Percentage distribution of patients experienced symptoms severity Level of UTI past one month and within 24 Hours.

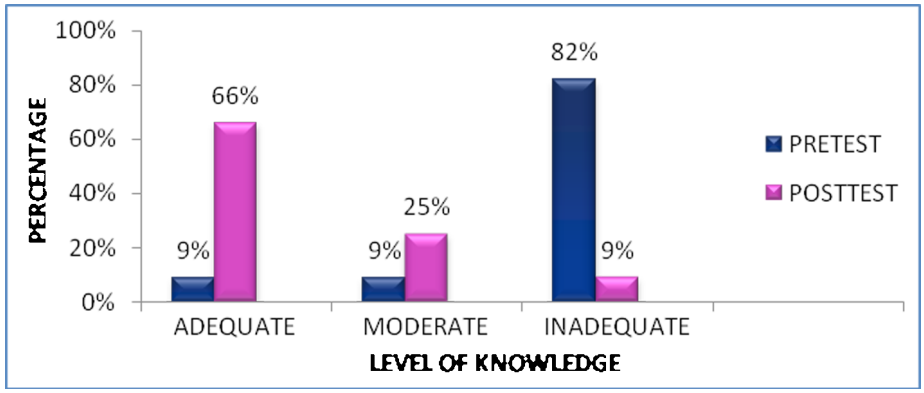


Fig 2: Percentage distribution of knowledge on prevention of urinary tract infection among type 2 diabetes women.

Table 1: Comparison of Pre test and Post test Knowledge on Prevention of Urinary Tract Infection Among Women with Type 2 Diabetes Mellitus. N=32

Sample	Group	Mean	Standard Deviation	Mean Difference	't' Value
Women with type 2 diabetes mellitus	Pre test	4.62	2.36	4.8	10.68* Significantat p<0.05
	Post test	9.37	1.56		

Implications for Nursing Practice and Research: The present study will enable, nurses to apply theory into practice as the educative material and IEC are currently playing major part in clinical area and use this in their daily practice on patients to reduce the recurrence of UTI. Nurses can conduct more research studies to demonstrate prevalence of urinary tract infection among diabetic and non diabetic women and the effects of Structured teaching programme on prevention of urinary tract infection can be evaluated. There is a need for extensive and intensive research in this area to provide evidence based care since the increased prevalence of Diabetes and the increasing incidence of UTI among Diabetic Women gives red alarm to the health care professionals.

Conclusion

Urinary tract infections frequently occur in diabetic patients due to an impaired immune status and increased glucose content of the urine, among other reasons. This makes UTI very important to investigate. Complicated cases of UTI may be infrequent but are more common in diabetics with far more severe consequences, and so warrant further investigation. The proper management of UTI in diabetics is crucial, as prompt diagnosis and correct treatment is essential. Prevention is better than cure.So,the present study concentrated on prevention of UTI among diabetic women. In conclusion the discussion of the study findings shows that there was a significant difference in the level of knowledge among type 2 Diabetic women after receiving the Structured teaching programme on prevention of urinary tract infection. So it can be used as a routine teaching programme in the medical out patient department.

Ethical Clearance: The ethical clearance obtained from "Institutional Human Ethics Committee" Chettinad Academy of Research and Education,Proposal No.34/ IHEC/3-18.

Source of Funding: Self

Conflict of Interest: Nil

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Migrant Labour Resource Management a Channel for Sustainable Development in Tamil Nadu

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Abstract

Seasonal migration for work is a pervasive reality in rural India. An overwhelming 120 million people or more are estimated to migrate from rural areas to urban labour markets, industries and farms. Migration has become essential for people from regions that face frequent shortages of rainfall or suffer floods, or where population densities are high in relation to land. Areas facing unresolved social or political conflicts also become prone to high out migration. Poverty, lack of local options and the availability of work elsewhere become the trigger and the pull for rural migration respectively.

Migration is a form of geographical mobility or spatial mobility between geographical unit and another, generally involving a change in residence from the place of origin or place of departure to the place of destination or place of arrival. Such migration is called permanent migration and should be distinguished from other forms of movements, which do not involve a permanent change of residence. Migration is a very selective process. Migration is not for a pleasure. Migration is not merely the physical movements of individuals and groups involve a lot of strain in their social, economic, cultural and other aspect of life. It is a subject of keen interest not only to the demographers but also to sociologist, anthropologist, economist and political scientist movements of people, specially rural people from the land to the cities, from one country to another and from one continent to another is an international phenomenon and not a phenomenon of modern times. It concerns not only developing countries but also those which are highly industrialized and affects not only the more or capitalized countries but also the socialist change of the move or open the voluntary and involuntary nature of the act and destination. Is made between external and internal migration.

Keywords: *Migration, geographical, social, economic, cultural, labour markets.*

Introduction

Tamil Nadu is home to more than a million migrant workers, a government-commissioned survey has found[1]. The just-concluded survey conducted by a private consultant on behalf of the state labour department shows that a majority of the 10.67 lakh migrant workers in the state are unskilled workers. About 27% are employed in the manufacturing sector, 14% in textile industries and 11.41% in the construction sector. The numbers may be under-reported, say social workers, but the data will help them get healthcare and other benefits[2].

Experts say relatively better wages and employment opportunities in TN draw workers from West Bengal, Odisha, Bihar, Jharkhand and Assam. "Migration has been so much that Hindi and Bengali have become languages of communication in urban areas. Workers from West Bengal have proved their skill in laying granite floors, while those from northeastern states are sought after for security and hospitality services," he said. In the construction sector, activists complain, several migrant workers are not registered under the Tamil Nadu Construction Workers Welfare Board, leaving them at the mercy of builders and contractors[3]. A senior official in the labour department said the survey

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was but a beginning. "This will help us keep a tab on the working and living conditions of migrant labours across the state," he said.[4] According to the migrant worker survey, 20.9% of migrant workers in Tamil Nadu live in Kancheepuram district. Most of them work in manufacturing companies. Kancheepuram has units including Ford, Hyundai, BMW and Nissan where several migrant workers are working. The top three districts-Kancheepuram, Chennai and Tiruvallur-house 51.3% of the migrant worker population. Real estate projects and the metro rail work have attracted migrant labour.

The second maximum number of jobs are offered by textile and allied industries which employ 1.5 lakh workers, evidently why Coimbatore has 12.1% and Tripura has 9% of the state's migrant population.

Tamil Nadu now home to 1 million migrant workers: Tamil Nadu is home to more than a million migrant workers, a government-commissioned survey has found[5]. The just-concluded survey conducted by a private consultant on behalf of the state labour department shows that a majority of the 10.67 lakh migrant workers in the state are unskilled workers. About 27% are employed in the manufacturing sector, 14% in textile industries and 11.41% in the construction sector. Migration has been so much that Hindi and Bengali have become languages of communication in urban areas. Workers from West Bengal have proved their skill in laying granite floors, while those from northeastern states are sought after for security and hospitalityservices.

In the construction sector, activists complain, several migrant workers are not registered under the Tamil Nadu Construction Workers Welfare Board, leaving them at the mercy of builders and contractors. A senior official in the labour department said the survey was but a beginning[6]. According to the migrant worker survey, 20.9% of migrant workers in Tamil Nadu live in Kancheepuram district. Most of them work in manufacturing companies. Kancheepuram has units including Ford, Hyundai, BMW and Nissan where several migrant workers are working. The top three districts Kancheepuram, Chennai and Tiruvallur house 51.3% of the migrant worker population.

Objectives

- To study the socio economic status of migration workers.
- To analyses the reasons for migration.
- To identify the problems faced by migrant labors.

Methodology: The researcher came to know about the large scale out migration from Kanchipuram districtand also the surrounding areas. Experience the same in the past by means of focus group discussion the respondent was confirmed the same and select Kanchipuram purposively for this study. Researcher has adopted the systematic random sampling technique[7]. To select the respondents for collecting the primary data. By adopting random start technique the researcher has selected the head of the households as respondents for the purpose of field investigations. Researcher has used the structured interview schedule as tool of data collection which was supplemented by observation technique for primary data collection. These are two types of data collected for his research which are primary data, and secondary data. Researcher had collection primary data by means of interview schedule. Researcher collected the secondary data through various sources like books, journals, magazines and News paper.

Analysis and Interpretation

Table: 1. Age of Daily Migrant wage Laborers

Age group of years	No. of Respondents (%)
16-25 15	(12.50)
25-35 54	(45.00)
35-45 40	(33.33)
45-55 6	(5.00)
55 and above	5(4.17)
Total 120(100.00)	**120(100.00)**

Source: Primary Source

The above table shows that out of 120 (100.0%) there are 15 (12.50 %) respondents belong to the age group of 16-25 years. 54 (45.00 %) respondents belong to the age group of 25-35 years, 40 (33.33%) respondents belong to the age group of 35-45 years. 6(5.00 %) respondents belong to the age group of 45-55 years and 5 (4.17%) respondents belong to the age group 55 and above years. Thus, it indicates that majority (45.00 %) of respondents are in the age group of 25-35 years and lowest number (4.17 of respondents are in the age group of 55 and above years. It means that more migrants are of younger (25-35 years) age group

Table 2: Education Status of Daily Migrant wage Labourers

Educational Status	No. of Respondents (%)
Illiterate	15(12.50)
Primary	17(14.17)
SSLC	39(32.50)
Hr. Sec	25(20.83)
Degree	6(5.00)
Others	3(2.50)
Total 120	120(100.00)

Source: Primary Source

The above table shows that out of 120 (100.0%) there are 15 (12.50) respondents have no education, 17 (14.17) respondents belong to primary education group, 39 (32.50) respondents belong to SSLC education group, 25 (20.83) respondents belong to Hr. Sec education group, 6 (5.0) respondents belong to graduate and 3 (2.5%) respondents are any other education. This indicates that majority (32.50) respondents are SSLC and short number (2.5%) respondents in any other education. It means that migrant has been there connected with illiterate group.

Table 3: Nature of Job of Daily Migrant Wage Labourers

Nature of Job	No. of Respondents (%)
White Wash	25(20.83)
Contractor	19 (15.83)
Wages Labour	76(63.33)
Total 120	Total 120(100.00)

Source: Primary Source

The above table shows that out of 120 (100.0%) there are 25 (20.83%) respondents doing white wash work, 19 (15.83%) respondents are doing the Contractor work and 76 (63.33%) respondents are doing the wage labour work. This indicates that majority (79.5%) respondents are doing the wage labour work and lower number (9.5%) of respondents are doing the Contractor work. It means that migrant has been there connected with wage labour works.

Table 4: Causes of Daily Migrant Wage Labourers

Causes	No. of Respondents (%)
Non-Availability of work	24
Less wage	16
Seasonal cause	45
Conflict in family	21
Any other (hesitation, ego, Problem)	14
Total 120	100

Source: Primary Source

The above table shows that out of 120, 24 respondents are migrating due to non-availability of work in their villages, 16 respondents are migrating due to less wage in the villages, 45 respondents are migrating due to seasonal lack of work, 21 respondents are migrating due to conflict in family and 14 respondents are migrating due to other problems. Thus, the above facts show that majority of respondents (45 out of 120) are migrating due to non-availability of work in the villages. Other causes are numerically lesser but still important e.g. less wage, seasonal unemployment and family conflict.

Major Findings

- The majority (45.00%) of respondents is in the age group of 25-35 years and lowest number (4.17%) of respondents is in the age group of 55 years and above. It means that more migrants are of younger (25-35 years) age group which is the most productive age group.
- The majority of the male respondents‟ (61.67%) live in the thatched houses, whereas, majority of the female respondents‟ dwell in the sheet form of houses.
- The majority (32.50)of respondents are SSLC and very small number (2.50)of respondents have any other education. It means that migrants largely SSLC or very less educated.
- The majority (53.33)of respondents have daily income of 60 to 80 rupees per day and smaller number (10.0%) of respondents have daily income of 120 rupees and above. It means that large majority of migrants get less wages i.e. 60-80 rupees daily.
- The large number (30.83)of respondents gets work for 15 to 20 days per month and the smaller number (13.33) of respondents get work for minimum 6-10 working days. It means that larger number gets work for 15-20 working days.

Conclusion

The contribution of migrant workers, both high-skilled and low-skilled, has led to India’s top remittance position in the world. Interstate migrant workers seem

to travel in an invisible carriage way to Chennai. The carriage way has been built over time by the friends and relatives of the migrant workers that carry more and more streams of migrant workers to Chennai.[8] The most prominent carriage way evident from our survey is the one that originates in North East and runs through the Eastern states to reach Chennai. However, a sizable section hail from marginal small farmer households and could mobilize the required financial resources to migrate. They are not educated much nor or they skilled to readily fit into the requirements in the destination. They leave behind their families and keep remitting most of their wage earnings and visit them at least once in a year. Thus one can conclude that these migrations are not driven by distress and despair. Thus there is a moral obligation for the state to bestow the complete citizenship to the migrants by instituting appropriate policies. As of now, it remains a silent spectator leaving the migrants at the mercy of the employers.

Ethical Clearance: Completed

Source of Funding: Self

Conflict of Interest: Nil

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The Impact of Natural Disasters on Economic Growth: A Study of Kerala Floods

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Abstract

Natural disasters have potentially large economic impacts on developing nations. There is a small, but growing literature analyzing these impacts on variables such as gross domestic product. In this study the state of Kerala are studied to measure the impact that disasters have had on economic growth especially tourism industry. It is hypothesized that the number of natural disasters that a country faces has a negative impact on economic growth rate as measured by GDP. As the quantity of disasters experienced in any given year increases the overall disruption of the economy is predicted to be greater, thus leading to lower levels of economic growth in the short term. The causes of the high frequency of severe natural disasters have become popular research topics, and the findings have improved the understanding of the relationship between human activities and the environment. However, the exploration into the relationship between natural disasters and long-run economic growth in Kerala tourism has not been minimal. This paper fills this gap by investigating the economic effects of post-disaster rebuilding activities in the current Kerala economic environment.

Keywords: *Natural Disasters, Economic Growth,Tourism, Kerala.*

Introduction

In late August 2018, severe flooding affected the south Indian state of Kerala due to unusually high rainfall during the monsoon season. It was the worst flooding in Kerala in nearly a century Over 445 people died, 15 are missing within a fortnight, while at least a million 45 people were evacuated, mainly from Chengannur, Pandanad, Aranmula, Aluva, Chalakudy, Kuttanad and Pandalam. All 14 districts of the state were placed on red alert.According to the Kerala government, one-sixth of the total population of Kerala had been directly affected by the floods and related incidents. The Indian government had declared it a Level Calamity or 'Calamity of a severe nature[1]. Thirty-five out of the fifty four 13 dams within the state were opened for the first time in history. All five overflow gates of the Idukki Dam were opened at the same time, for the first time in 26 years. Heavy rains in Wayanad and Idukki have caused severe landslides and have left the hilly districts isolated[2]. The situation was regularly monitored by the Prime Minister and the National Crisis Management Committee coordinated the rescue and relief operations

Table 1: Rain Fall from 1 June 2018-17 August 2018

District	Rainfall (mm)	Normal (mm)	Increase %
Alappuzha	1648.1	1309.5	29%
Ernakulam	2305.9	1606	48%
Idukki	3211.1	1749.1	89%
Kannur	2450.9	2234.9	10%
Kasaragod	2549.94	2489.1	12%
Kollam	1427.3	985.4	51%
Kottayam	2137.6	1452.6	50%
Kozhikode	2796.4	2156.5	30%
Malappuram	2529.8	1687.3	52%
Palakkad	2135	1254.2	75%
Pathanamthitta	1762.7	1287.5	44%
Thiruvananthapuram	920.8	643	45%
Thrissur	1894.5	1738.2	16%
Wayanad	2676.8	2167.2	26%
Kerala			

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Causes Heavy Flood In Kerala: Kerala received heavy monsoon rainfall on the mid evening of August 8 resulting in dams filling to capacity; in the first 24 hours of rainfall the state received 310 mm (12 in) of rain. Almost all dams have been opened since the water level has risen close to overflow level due to heavy rainfall, flooding local low-lying areas.18 For the first time in the state's history, 35 of its 13 dams have been opened[3].

Most of the regions affected by this monsoon were classified as ecologically-sensitive zones (ESZs) by the Western Ghats Ecology Expert Panel, the Gadgil Committee. Most of the recommendations and directions by the committee was either neglected or rejected. Chairman of the committee Madhav Gadgil accused the state government and its irresponsible environmental policy for the recent landslides and floods. The Government of Kerala argued in the Supreme Court that the sudden release of water from the Mullaperiyar Dam by the Tamil Nadu government was one of the reasons for the devastating flood in Kerala[4]. The Tamil Nadu government rejected the argument saying that Kerala suffered the deluge due to the discharge of excess water from 80 reservoirs across Kerala, spurred by heavy rains from within the state; It also argued that the flood surplus from the Idukki dam is mainly due to the flows generated from its own independent catchment due to unprecedented heavy rainfall while the discharge from Mullaperiyar dam was significantly less.

Though it is difficult to attribute a single event to climate change, its possible role in causing the heavy rainfall event over Kerala cannot be discarded24. Recent research indicates that rising temperatures have led to huge fluctuations in the monsoon winds carrying the moisture from the Arabian Sea, resulting in heavy-to-extreme rains over the Western Ghats and central India, lasting for two to three days.

Impact of Flood in Kerala: A state official told AFP that 370 people have died, while The Economic Times has reported that 33,000 people have been rescued. 82627 The Kerala State Disaster Management Authority has placed the state in a red alert as a result of the intense flooding. 28 A number of water treatment plants were forced to cease pumping water, resulting in poor access to clean water, especially in northern districts of the state. Over 5,645 relief camps4 have been opened at various locations to accommodate the flood victims. It is estimated that 1,247,496 people4 have found shelter in such camps.3031 The flooding has affected hundreds of villages, destroyed an estimated 10,000 km (6,200 mi) of roads and thousands of homes have been damaged or destroyed[5]. The Government has cancelled Onam celebrations, whose allocated funds have been reallocated to relief efforts.

Kerala Economy and Tourism: Tourism is an important contributor to the growth of service sector in Kerala. The total revenue (including direct and indirect means) generated from tourism during the year 2015 comes to 26,689.63 crores showing an increase of 7.25 per cent over the last year. During the last decade, the total revenue from tourism registered a compound annual growth rate (CAGR) of 11.33 per cent. It grew from 7,738 crores in 2005 to 26,689.63 crores by 2015. The annual growth rate of income from tourism reveals a fluctuating trend between 2005 and 2015. Between 2013 and 2015, a declining tendency of the growth rate was noticed: from 12.22 per cent in 2013 to 7.25 per cent by 2015.

Table 2: Contribution of Tourism Sector to Total Employment between 2009 and 2015, in per cent

Share in Employment (in per cent)			
Country/ State	**Direct Impact**	**Indirect + Induced Impact**	**Total Impact**
India	4.4	5.8	10.2
Kerala	9.9	13.6	23.5

Foreign Exchange Earnings: The foreign exchange earnings from tourism increased from 1552.31 crores in 2005 to 6949.88 crores by 2015 registering a CAGR of 14.6 per cent. The earnings from foreign tourism showed a steady increase over the years, except for the year 2009 when the global financial crisis affected the flow of foreign tourist Arrivals and led to a decline in foreign exchange earnings. Figure 9.8 captures the data on foreign exchange earnings of Kerala over the last ten years[7].

Table 3: Allocation and Expenditure on Tourism in the State Plan over Various Plan Periods, in lakh

Period	**Total Plan Outlay**	**Outlay for Tourism**	**Percentage share of Tourism**	**Actual Expenditure**
I Plan	3003	--	--	--
II Plan	8701	13	0.15	8
III Plan	17000	50	0.29	22
Annual Plan	14254	31	0.22	19

Period	Total Plan Outlay	Outlay for Tourism	Percentage share of Tourism	Actual Expenditure
IV Plan	25840	50	0.19	55
V Plan	56896	71	0.12	79
Annual Plan	39296	130	0.33	132.27
VI Plan	148755	672	0.45	556.8
VII Plan	221100	850	0.38	833.69
Annual Plan	144200	650	0.45	816.95
VIII Plan	687648	5301	0.77	5707.85
IX Plan	1575500	19266	1.22	17397.8
X Plan	2522643	2777	0.11	2487.68
XI Plan	4560547	48873	0.15	61774
XII Plan	1E+07	110140	0.29	67506.24*

Objectives of Paper:

- To study the impact of Flood inthe State of Kerala.
- To analyze the impact of Flood on Tourism Industry in Kerala.
- To compare the impact of Kerala and Other State

Research Methodology: The paper is based on secondary data. The data has been collected from internet and News papers, Graph and percentile method has been used to analyze the data.

Research Method :Netnography: Netnography is online ethnography conducted in a specific manner. It is an interpretive research method that adapts the traditional, in-person participant observation techniques of anthropology to the study of the interactions and experiences that manifest through digital communications (Kozinets 1998). The word "netnography" is a portmanteau combining "network" and "ethnography" and was a particular kind of research process which was developed and named in 1995 by Robert Kozinets during his dissertation research at Queen's University on Star Trek fans. Netnography was originally a consumer research method, but use of the method has spread to a range of other disciplines, including education, library and information sciences, hospitality, tourism, computer science, psychology, sociology, anthropology, geography, urban studies, leisure and game studies, and human sexuality and addiction research.

Data Collection: In a netnography, data takes two forms: data that the researcher directly copies from the computer-mediated communications of online community members, and data that the researcher inscribes. Although some netnographies have been conducted using only observation and download.

Data Analysis: Netnography is based primarily upon the observation of textual discourse, ensuring trustworthy interpretations requires a different approach than the balancing of discourse and observed behavior that occurs during in-person ethnography. Although the online landscape mediates social representation and renders problematic the issue of informant identity, netnography seems perfectly amenable to treating behavior or the social act as the ultimate unit of analysis, rather than the individual person.

Findings: Kerala Floods 2018: Flood-Hit Kerala's Tourism Industry Grinds to a Halt. Kerala is reeling under the aftermath of the devastating flood, so do the tourism industry, which has been hit hard by the deluge. The southern state, which is considered as one of the top tourist destinations, is still recovering from the impact of floods that claimed lives of over 300 people.

The tourism industry in Kerala, which accounts for 12 percent of the state's economy, has come to a grinding halt as the floods damaged roads, airports, rail lines, forcing tourists to cancel their trips."International flights are cancelled. Since its Onam, and at the same time we have monsoon tourism, we expected good business but suddenly hotels, restaurants, and home-stays are empty," he added.As the situation has subsided, the locals and the government are trying to bring Kerala back to normalcy. Tourism industry estimates losses worth Rs 20 billion due to Kerala floods.

The tourism industry in Kerala is estimating losses worth Rs 20 billion due to the floods which include Rs 15 billion as the opportunity lost during the last two months and another two to three months. Sabarimala, one of the major pilgrim centres in South India, has seen a loss of around Rs One billion and is expecting the situation to remain bleak during this pilgrimage season if at least a bridge is not built for the pilgrims to travel to the Lord Ayyappa Temple.

The properties were not affected except for Kumarakom. While the damage was massive in the hill stations of Munnar and Wayanad, properties were not affected, but the road connectivity has been affected. Tourism in Kerala is a Rs 300-350 billion industry. Opportunity lost due to the floods is expected to be at Rs 15 billion for the last two months and the next couple of months.

Conclusion

Kerala had witnessed 10.94 per cent growth in 2017, compared to the previous year, with 1.91 million foreign travellers and 14.6 million domestic tourists visiting the state[8]. Tourism contributes over 10 per cent to the state GDP. Kerala was promoting the Neelakurinji blooming in Munnar, which is still cut off from the rest of the state due to many landslides. The Neelakurinji blooms once in 12 years and has been a big draw for local public and of late, the tourism department has been promoting it to incoming tourists as well. Flooding on the scale seen in Kerala could have killed 10 times more people a decade ago, but India's disaster management capacity has improved significantly in that timeKerala received over 40 per cent more rainfall than usual this monsoon, forcing authorities to release water from dozens of dams, which compounded the flooding. But other man-made problems were also to blame. Kerala is one of India's wealthiest states and has seen rapid unplanned development in recent years, with luxury resorts, residential complexes, power plants and mines built on floodplains, often in violation of the rules.

Ethical Clearance: Completed

Source of Funding: Self

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Impact of Self-Efficacy of Middle-Level Managers on Implementing Innovation

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Abstract

The paper explores to know the impact of self-efficacy of middle-level managers towards implementing innovation in their work The researcher has chosen the leading 4 private sector banks in Chennai city namely ICICI, Kotak Mahindra, Axis and HDFC. The researcher has directly visited the branches for collecting the primary data through well structured questionnaire. The researcher has used the stratified random sampling method for collecting the data from 345 respondents. The data analysed using percentage analysis, one sample t-test, Chi-Square analysis and Karl Pearson Correlation. The study inferred that middle-level manager who has high sense of self-efficacy could have high level of implementing innovation in their job. The study also proved that there is strong correlation among self-efficacy of middle-level manager and implementing innovation in their job.

Keywords: *Middle-level manger, self-efficacy, implementing innovation, impact.*

Introduction

In changing scenario, banking sectors plays crucial role in the economy. Hence, the banking sectors have to be innovative and creative in order to meet the customers' needs. The success of any organization lies in the hands of effective management. This can be possible only by the managers who have high sense of self-efficacy. Self-efficacy of the person can greatly help to create impact in their thinking, behaving, motivating, coping the behaviour to take situation in perspective way. Luszczynska (2005) opined Psychologist Albert Bandura view on self-efficacy as "one's belief in one's ability to succeed in specific situations or accomplish a task. One's sense of self-efficacy can play a major role in how one approaches goals, tasks, and challenges".[1] Self-efficacy of the manager helps to accomplish the organization goal effectively in competitive environment. The managers who have high sense of self-efficacy can tackle the tough situation where as the person who with low level of self-efficacy get frustrate easily in the tough situation and drop out from the responsibility. Thus, there is a greater demand to improve the self-efficacy of the managers in order to sustain in the competitive world.

Objectives:

- To identify the self-efficacy of the middle-level managers of selected private sectors
- To identifythe implementation of innovation of the middle-level managers of selected private sectors in Chennai city.
- To study the association between the level of self-efficacy of the middle-level managers and level of implementing innovation among the middle-level managers in selected private sectors banks in Chennai.
- To study the impact of self-efficacy of middle-level managers on implementing innovation.

Review of Literature: Bessant, J. & Tidd, J. (2011) according to them, effective change management is inevitable to implement innovations. The skills consist of highly developed understanding of the process and its various components, project planning and management, teamwork skills in uncertain conditions, leadership–having a vision and the ability to implement innovation, learning skills–the ability to analyze, identify positive and negative events and their causes, the ability to correct the process on their basis[2]

Cherian and Jacob (2013) the study explores the impact of self-efficacy on motivation and performance of employees. The study revealed that theory of self-efficacy could influence work related performance.[3]

Grauet al. (2001) emphasis that self-efficacy is a moderator in the occupational stress process. Specifically, it analyses the complementarily between two self-efficacy measures: generalized and professional. The study was conducted with 140 workers who performed their task on new technology. The study revealed that self-efficacy controls the stress strain association. i.e, low levels of self-efficacy is related to high degree of occupational stress. It was also found that individuals with low levels of self-efficacy expressed more emotional excretion.[4]

Katarzyna et al. (2014) the study focused to identify essential managerial competencies would promote and enhance innovation in companies. The study carried among managers of top, middle and operational management level in companies operating in Poland. The research has found key competencies of managers in the context of implementing innovation in the company as well as differences resulting from the level of management in the organization. It also to identify discrepancies between the current levels of competencies needed to achieve organizational objectives, and the expected level ensuring maximum efficiency during their implementation of innovation.[5]

Persing (1999) explores that individual creative and innovation idea create employee to higher level in the organization.. The findings indicate that the task of the manager in the innovation process is not to generate new products, concepts, new ideas, but to strengthen and increase creativity of team of employees. Important skills include the ability to motivate others, to persuade orders and build relationships and trust. The manager's personal motivation has to come primarily from aspiration, excitement, persistence and perseverance.[6]

Quinn et al.(1990) asserted that the manager's awareness make inevitable changes in the business environment and provide opportunities for innovation and development. An organization which is readily adapts change and innovation will meet demands and changes of contemporary society. The innovator envisions change and a more effective way of doing things.[7]

Ruba Osama Hawi, Dina Alkhodary and Tareq Hashem (2015) the study investigate relationship between the managerial competencies and the firms' performance in Jordan. The data collected from 4 reputed airways organization and distributed to 62 managers. The result shows that strong association with the organizations performance in the airline sectors in Jordan. Further, it asserts that organizations innovations have linked to the strategic competency, while client focus linked with the organization competitive advantage.[8]

Hypothesis:

- There is no self-efficacy among the middle-level managers of selected private banks in Chennai city.
- There is no implementing innovation among the middle-level managers of selected private banks in Chennai city.
- There is no association between level of self-efficacy and level of implementing innovation among the middle-level managers in selected private sector banks in Chennai city
- There is no correlation between overall self-efficacy and overall implementing innovation among the middle-level managers in selected private sector banks in Chennai city

Scope of the Study: The study aims to identifyself-efficacy of the middle-levelmanagers, implementation of innovation in the selected private sectors banks in Chennai and also to know the association between the level of self–efficacy of middle-level managersand level of implementing innovation. The study emphasised to know the impact of self-efficacy of the middle-level mangerson implementing innovation.

Methodology: The study consists of both primary data and secondary data. The primary data are collected from 345 respondents from the selected private sector bank of middle-level managers in Chennai such as ICICI bank, HDFC bank, Kotak Mahindra bank and Axis bank. Stratified random sampling method was used for collecting the data. Percentage analysis, one sample t-test analysis, chi-square analysis and Karl Pearson correlation analysis has been used to analysis the data. The secondary data were collected from books, websites and journals.

Limitation: The sample which used pertains to select four private sector banks in Chennai city only. Therefore, it is considered as the prime limitation. The study constraints only middle-level managers of the banks.

Data Analysis and Interpretation

Null Hypothesis: There is no self-efficacy among the middle-level managers of selected private banks in Chennai city.

Table 1: One-sample test for self-efficacy

Factors	N	Mean	Std. Deviation	t-value	P-value
I will be able to achieve most of the goal that I have set for my self	345	3.25	1.207	3.881	0.000**
When facing difficult tasks, I am certain I will accomplish them	345	3.26	1.246	3.846	0.000**
In general, I think I can obtain outcomes that are important to me	345	3.19	1.161	3.106	0.002**
I believe, I can succeed at most any endeavour to which I set my mind	345	3.18	1.304	2.560	0.011*
I will be able to successfully overcome many challenges	345	3.21	1.187	3.265	0.001**
I am confident that I can perform effectively on many difficult tasks	345	3.21	1.232	3.102	0.002**
Compared to others, I can do most of the tasks well	345	3.33	1.230	4.990	0.000**
Even when things are tough, I perform quite well	345	3.19	1.220	2.957	0.003**

Source: Computed from primary survey
Note: **denotes significant at 1% level, *denotes significant at 5% level

The above table shows the results of one sample t-test for self-efficacy of the respondents of the middle-level managers of selected private banks. The factors of self-efficacy of the middle level manager's p-values are less than 0.01 and statistically significant at 1% with respect to following aspects such as "In general, I think I can obtain outcomes that are important to me" (3.19), "Even when things are tough, I perform quite well" (3.19), "I will be able to successfully overcome many challenge" (3.21), "I am confident that I can perform effectively on many difficult tasks" (3.21), "I will be able to achieve most of the goal that I have set for myself" (3.25), "When facing difficult tasks, I am certain I will accomplish them" (3.26), "Compared to others, I can do most of the tasks well" (3.33). The p-value of the following statements "I believe I can succeed at most any endeavor to which I set my mind" (3.18) is less than 0.05. Thus, it proved that statistically significant at 5% level. The study concluded that self-efficacy exist among the middle-level managers of selected private sectors banks in Chennai city and also the mean value of all the variables are more than (3.00) which means all the variables of self-efficacy are agreeable. Hence, it inferred that self-efficacy of the middle-level managers is high among the middle-level managers of selected private sectors banks.

Null hypothesis: There is no implementing innovation among the middle-level managers of selected private banks in Chennai city.

Table 2: One-sample test for implementing innovation

Factors	N	Mean	Std. Deviation	t-value	P-value
I focus on developing solutions in day-to-day operations	345	3.13	1.146	2.161	0.031*
I feel reliable operation has the highest priority at our workplace	345	3.15	1.177	2.380	0.018*
I am good at collaborating across the workplace	345	2.43	1.063	-9.928	0.000**
I emphasis on developing own solutions	345	2.53	1.289	-6.806	0.000**
I work by learning systematically from our mistakes	345	2.80	1.425	-2.569	0.011*
I value people who come with new ideas	345	3.65	1.479	8.154	0.000**
I find that it is easy to reuse good ideas	345	3.69	1.271	10.080	0.000**
I work by systematically incorporating the employee's differences(Education, Age and Gender)	345	3.20	1.443	2.537	0.012*

Factors	N	Mean	Std. Deviation	t-value	P-value
I work by systematically incorporating citizen's and/ or companies points of view	345	3.28	1.183	4.413	0.000**
I work actively in comparing ourselves with other workplaces that are similar to us	345	3.18	1.489	2.206	0.028*

Source: Computed from primary survey
Note: **denotes significant at 1% level, *denotes significant at 5% level

The above table indicates the results of one–sample t-test for implementing innovation. The result highlights the mean value, standard deviation, t-value and p-value of the all the statements of implementing innovations. The mean range of all the variables 2.43 to 3.69 and standard deviation range from the 1.063 to 1.289. From the above table, the p-value of "I am good at collaborating across the work place "(2.43), "I emphasis on developing own solution'' (2.53), "I value people who come with new ideas"(3.65), I find that it is easy to reuse good ideas"(3.69,) " I work by systematically incorporating citizen's and/ or companies points of view"(3.28) are less than 0.01 and statistically significant at 1% level. Therefore, the null hypothesis is rejected at 1% level of significance. The p-value of "I work by learning systematically from our mistakes" (2.80), "Ifocus on developing solutions in day-to-day operations" (3.13), "I feel reliable operation has the highest priority at our workplace" (3.15), "I work actively in comparing ourselves with other workplaces that are similar to us" (3.18) and "I work by systematically incorporating the employee's differences" (3.20) are statistically significant at 5% of level. Therefore, the null hypothesis rejected at 1% level of significance. The study found that there is implementing innovation exists among the middle-level managers of selected private sectors banks in Chennai city.

Null Hypothesis: There is no association between level of self-efficacy and level of implementing innovation among the middle-level managers in selected private sector banks in Chennai city

Table 3: Chi-square test for level of self-efficacy and level of implementation innovation

Level of Self-efficacy	Level of Implementing Innovation			Total	Chi-square value	P-value
	Low	Medium	High			
Low	108 (89.3%) [61.0%]	13 (10.7%) [11.4%]	0 (0.0%) [0.0%]	121 (100.0%) [35.1%]	118.700[a]	0.000
Medium	54 (32.1%) [30.5%]	68 (40.5%) [59.6%]	46 (27.4% [85.2%]	168 100.0%) [48.7%]		
High	15 (26.8%) [8.5%]	33 (58.9%) [28.9%]	8 (14.3%) [14.8%]	56 (100.0%) [16.2%]		
Total	177 (51.3%) [100.0%]	114 (33.0%) [100.0%]	54 (15.7%) [100.0%]	345 (100.0%) [100.0%]		

Source: Computed from primary survey
Note: Figures in () indicates row percent; Figures in [ ] indicates column percent

The table denotes the results of chi-square between level of self-efficacy and level of implementing innovation. The calculated chi-square value is 118.700 and p-value is 0.000 which is lesser than 0.01 and statistically significant. Hence, it proved that there is significant association between level of self-efficacy and level of implementing innovation.

Hypothesis: There is no correlation between overall self-efficacy and overall implementing innovation among the middle-level managers in selected private sector banks in Chennai city

Table 4: Karl Pearson correlation between overall self-efficacy and overall implementing innovation among the middle-level managers

Correlation			
		Overall Self-Efficacy	**Overall Implementing Innovation**
Overall Self-efficacy	Pearson Correlation	1	.491**
	Sig. (2-tailed)		.000
	N	345	345
Overall Implementing Innovation	Pearson Correlation	.491**	1
	Sig. (2-tailed)	.000	
	N	345	345
**Correlation is significant at the 0.01 level (2-tailed).			

Source: Primary Data

The above table shows the results of Karl Pearson correlation analysis between overall self-efficacy and overall implementing innovation among the middle-level managers. The p-value is 0.000 which is less than 0.01 and statistically significant at 1% level. The mean value indicated that about 49% of correlation between overall self-efficacy and overall implementing innovation. The study inferred that self-efficacy of the middle-level managers have strongly influence the implementation of innovation among the middle-level managers. Hence, it concluded that there is an association between overall self–efficacy and overall implementing innovation.

Findings and Conclusion

- The study found that 65.8% of the respondents are male and 34.2% of the respondents are female from the total respondents of 345.
- The study established that 25.2% of the respondents are from the age group of below 30 years and 30.4 % are from the age group of 31-35 yrs.
- The study originated that 25.8% of the respondents are from ICICI bank, 25.2% of the respondents are from HDFC bank, 24.9% of the respondents are from Axis bank and 24.1% of the respondents are from Kotak Mahindra Bank. It reveals that nearly equal responses are received from the selected private sector banks
- One sample t-test analysis shows that self-efficacy of the middle-level managers is high among the middle-level managers of selected private sectors banks.
- One sample t-test analysis found that there is implementing innovation exists among the middle-level managers of selected private sectors banks in Chennai city.
- Chi-square analysis proved that there is significant association between level of self-efficacy and level of implementing innovation.
- The Karl Pearson correlation analysis showsthat there is an association between overall self–efficacy and overall implementing innovation.

It concluded that middle-level managers possessed high sense of self-efficacy, the study also shows that implementing innovation exist among the middle-level managers in selected private sector banks and also it creates greater impact on implementing innovation. Hence, the self-efficacy of middle-level managers placed important role in implementing innovation in the respective field. So, the study recommended that banking sector should give importance to improve self-efficacy of the employee through giving proper training, mastery in their field in order to sustain in the competitive business world.

Ethical Clearance: Not applicable

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A Cognitive-neuroscience Module to Enhance Spiritual and Physical Well-being

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Abstract

Despite the fact there is a huge advancement in cognitive-neuroscience, it hasn't brought about any substantial change in the way human beings think and feel. The estimation we have of ourselves is almost the same as the people of the prescientific era. However there are vast potentials, if only we would start applying the findings of science to our own mind processes. By culling out the essential discoveries of neuroscience that can contribute to a deeper understanding of our own psychology, this article argues that there is a close agreement between the tallest aims pitched by Religions and the functional design of brain as brought out through a large number of studies.

Keywords: *Learning, Memory, Synapse, Plasticity of Brain.*

Background

The modern scientific era began with the discoveries of the celestial system and it had remarkable ripples on the conventional beliefs of Religions founded a few millennia earlier. The victory march of science, ever since, has revolutionized our knowledge of the stellar universe as well as life on planet earth and it has led all the way to the impressive discoveries on the structure and function of human brain. However, belying all expectations, cognitive-neuroscience can hardly claim to have made as much of an impact in human psychology as has been the case with biological and technological innovations.

The complexity, of course, is much greater here. The rift that has come about between the pursuers of science and the followers of religion over the past few centuries is yet another reason as to why substantial attempts in applying the fruits of neuroscience to the traditional belief system has not come about in the expected way.

However this is an arena of huge significance. A vast field of opportunities lie open largely unutilized. There's a crying need to come up with the points of convergence as well as clarifications at the crossfire of the recent findings on brain and the traditional ways of constructing our personality.

One of the major discoveries of neuroscience is that the plasticity of neural links has allowed the formation of specialized locations in human brain for speech comprehension and production. Language, as is well-known, is a social arrangement of communication and it has found an adequate support system in the structural evolution of human brain. Such major modification of brain structure that occurred in less than two million years indirectly implies that any new conclusive insights obtained by human beings redefining their perception of themselves as well as the mighty reality of existence will definitely make similar impressive changes in the already existing neural connections. At the level of consciousness, these changes might be experienced as the generation of a higher level of positive emotions and self-confidence born of increased mental certainty.

This article in fact would present a module of such a program. Even if the topic of this nature is too vast for a single experimental set-up and consequently for a single article of this kind, we would make some introductory attempts by briefly summarizing the advances made in cognitive-neuroscience and projecting a set of implications that would assist the pursuit of self-knowledge, joy and ethical values.

Material and Method

Neuroscience has made impressive progress in the last two centuries. The physical input starting off at a specific part of the body gets converted as low voltage electric signals and it is passed on through a one-way

stretch of neural links to some specific destination of the brain. Cognitive-neuroscientists have identified the major functions of the different destination areas of the brain. It has also been basically established that once the signal reaches the brain system, multiple circuits triggering multiple actions get initiated, although each of it still maintains the fundamental characteristic of one way link between any two neurons. And this trigger can happen both voluntarily as well as involuntarily starting right from brain processes themselves.

In his seminal book, *In Search of Memory*, Eric R. Kandel[1] captures the major developments of neuroscience over the past two centuries. By examining the neural basis of sensitization, habituation and classical conditioning, Kandel has adequately dealt with the brain regions and functions of implicit and explicit memory, both in their short term and long term modules.

And there's an astonishing similarity of neural mechanisms experimentally verified across species, starting from very simple systems. Indeed the breakthrough for Kandel came via experimental studies on the marine snail, which was later expanded to the mammalian system. The action potential of neural firing across all species is just one and the same-A rest potential of-70 millivolts shoots up to +30 millivolts, if and when the action occurs. And the signal is carried on to the successive neuron lying in an extreme proximity called synapse and this is achieved through the exchange of chemical signals called neurotransmitters. The mediatory synaptic action between any two neurons is accomplished through the release of glutamate from the pre-synaptic terminal to the post-synaptic one. A modulatory circuit is also found across most species enabling the effective learning processes of sensitization and conditioning. This circuit acts on the central body of the signal carrying neurons without directly interfering at the synaptic connections.

As per the remarkable summary of Kandel, serotonin plays the modulatory role in shaping the memory of involuntary behavior and dopamine plays the modulatory role in shaping the memory of voluntary attention and behavior. Attention, however, is always to a specific sensation or a group of sensations. The human ability to acquire knowledge and the ability to control emotions are indeed built around the basic neural system of learning and retaining memory. Since language is nothing but a group of sound, gesture or pictorial format, these sensations could be registered as memory and the connections found in the law of nature could be expressed verbally with the support of the short-term and long-term brain memory system.

According to Kandel, short term memory is a functional optimization of existing synaptic connections, while long term one is a result of the growth of new synaptic terminals. Kandel has also described how repeated pulses of dopamine induced through training leads to long-term explicit memory. In such cases, gene expression followed by protein formation results in the growth of new synaptic terminals.

The modulatory circuit releasing dopamine is thus responsible for short-term memory caused by a single powerful incident and long-term memory produced out of training or emotional rapture.

Kandel's study on explicit memory was restricted to the action of hippocampus to form spatial memory in mammals like rodents. But as we know, the explicit memory of human beings is certainly lot more than the spatial memory of escape routes. Language which is essentially a memory of the sound and picture of words has enabled human beings to move into the stage of abstract thinking and reasoning and one must extend the molecular study on explicit memory to the language process and apply it even to the practice of self-talk that goes on within a human being. In recent times, cognitive-neuro scientists[2] have turned their focus towards the role of hippo campus in forming semantic memory.

Apart from the generic studies on memory, more especially the semantic memory required for our purpose, specific experiments on cognitive generation and control of emotions have also yielded some uniform results. In an excellent review of the available studies on "The Cognitive Control of Emotions", Kevin N. Ochsner and James J. Gross[3], have succinctly described the evidence for both attentional influence[4, 5, 6] and cognitive control of emotions[7,8,9]. A clear map of the different regions that are activated in such processes of generating, controlling or avoiding emotions is also given in this excellent review.

The studies on placebo effect[10,11], for instance, have clearly shown the evidence for the reduction of pain when the subject generates the belief that the placebo cream or drug blunts pain. The experimental studies have established the plasticity of brain to accommodate any new learning that takes place. The cognitive control of emotion, a traditional skill undertaken by all human

beings across all cultures, was upheld scientifically by instructing the subjects to ruminate over an upcoming emotional stress event or joyful event or by observing the neural reappraisal system while the subjects attempt to reinterpret the meaning of an emotional stimulus. The brain evidence for the conditioning of mind with the objective of avoiding an existing habit of emotional arousal has also been established. Studies on the effect of training on compassion leading to a better sharing of resources have also been undertaken.[12]

The challenge, however, is this. While experimental studies are restricted to some controlled types of learning and regulation of emotions, they can't be uniformly applied to each and every human context. The complexity here hardly allows mathematical extension or model replication of the kind seen in physical and biological technologies. And yet human culture has immensely distinguished itself from the rest of the species, by simply making use of the sensations and the language built on sensations.

After enriching oneself with the knowledge of neural structure and functions, it is therefore entirely left to the individual to take the findings as examples and to start applying them in the larger context of their life. Each human being is indeed capable of evaluating much more than a simple emotional cue generally taken up for an experimental study. With the availability of the senses and the facility of language, we can in fact go ahead and make some definitive statements about the structure and nature of the whole of cosmic evolution, including the way our own mind has evolved over time. It is this kind of holistic search for meaning that brought about faith systems in olden times. Many of the physical truths found in the religious systems might have been proved wrong given the extraordinary scientific instruments developed in modern era. But despite all discoveries, science is still unable to explain the fact of fine-tuning observed in the universe leading to such extraordinary developments as the sustained expansion of cosmos, the wonder of life and the birth of consciousness. A holistic explanation is possible only under the assumption that there's an intricate planning similar to our own setting up right from Big Bang mutually relatable components that continue to evolve on their own terms to bring about even more complex components in an endless progress of change.

The universal pattern of evolution substantiates some of the tallest teachings of Religion. Under the common paradigm of little components building complex constructs, there can be noseparate thing such as 'atom', 'molecule', 'cell', 'self', 'caste', 'religion', 'race' or 'nation', although for all practical purposes they have been facilitated to evolve and function as separate entities. By imbibing the facts discovered by science, the human mind would necessarily become far more capable of moving in and through all these carefully-built-up entities and to discover the manner in which they can be assembled and the manner in which they can be disintegrated. To top it all, the findings of neuroscience have enabled us to verify for ourselves how through bits and pieces of memory chemically stored in different regions of our brain, an individual self or an individual memory system has been constructed.

A Module for Change of Perception from the findings of Neuroscience

- As different regions and molecular systems have been implicated both for the arousal of emotion, speech and their control and regulation, the traditional judgment built by our memory system can often be on a mistaken platform. Each individual must reassess the directly experienced mental state acquired largely through culture and tradition by breaking it down to the simple sensations from which the entire construct has been built right from childhood.
- Once we focus on the fact that there are universal features in our brain systems supporting learning, the generation of emotion and memory, it becomes that much easier for us to mingle into the entire evolutionary development, rather than just holding on to our memory as if it has come from nowhere.
- The evidence found in our brain system for the cognitive control of emotion and reappraisal of a situation instantly validates the tireless effort carried on by Religion and Wisdom literature in training human beings to evolve into socially responsible individuals each developing a mental fortitude of their own. The modulatory circuit playing a crucial role in brain functions has only been taken a step further through the relentless teachings of Religion and our own individual efforts of conscious control of life to excel as exemplary human beings. Indeed with the extent of knowledge that we already command, we need to aim at far greater ideals of the kind given to us through religions.

- Thanks to the symbolic sensations called language, we are now capable of understanding the connections and commonalities of the entire flow of cosmic events. Yet our emotions and touch sensations causing pain and pleasure are largely dictated by the immediate and close reality, which in any case is mighty little in comparison to the whole universe. It now becomes incumbent on the individuals to repeatedly remind themselves of the utter paucity of the judgments and emotions the neural system manages to present to them. The current system of the natural flow of emotions and judgments definitely calls for revolutionary corrections in the context of the integrally connected expansion of the universe.
- If the placebo effect has been scientifically verified, it immediately follows that the traditional religious statement inviting human beings to feel as if they are the secretive plan and strength of the entire universe, can indeed make remarkable changes in the build-up of their own psychic strength. Smaller the belief that we entertain, smaller will be the results as well.
- We have been jumping from one argument to another without realizing that there's a chemical basis for each of the statement that we make. The repeated attention paid to this simple fact would necessarily make it clear that we have no distinctive existence of our own and that whichever effect we reflect upon is nothing but a continuation of our brain activities.
- Each sensation including the sensation of language does indeed have a unique feel and an exclusive nature of self-intelligibility. Just reflecting over this specialty that has come our way via physical evolution and by reflecting over the strong possibility that the entire universe might be dependent on such exclusive feel of intentional plan and arrangement, the individual can bring about a secret union between their own ability to learn the structure of everything and the mysterious ability to move all things as per a constructive scheme of its own.
- Ultimately the individual can easily understand that the current emotions he or she experiences must be vastly upgraded in accordance with the fact that the meaningfulness he or she experiences and the intricate planning that has brought about the entire universe can easily be seen as one and the same root and sprout.

Conclusion

When human beings keep up the journey of discovering the real nature of connections of all things outside and inside one's own consciousness and throw away the myths, exaggerations and the misplaced priorities and orders, this would necessarily reflect itself in the new pathways of neural connections as well. The special arrangements our brains have made to retain language memory offers definite hope that the emotional wirings would also undergo significant changes with the additional discoveries, insights and the conscious efforts that we take up to improve our psychic health.

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Does Season Worsen Air Quality: Comparison of Pollutant Levels for Summer and Winter in New Delhi

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Abstract

The present study endeavours to compare pollutant levels for summer and winter season at selected sites in Delhi, namely-Pusa in Central Delhi, ITO in East Delhi, Dwarka in South West Delhi and Rohini in North West Delhi. The 24 hour average of prevailed ambient levels of Particulate Matter ($PM_{2.5}$), Nitrogen dioxide (NO_2) and Nitrogen oxide (NO) air pollutants were documented. Results indicate that ambient levels of selected pollutants in winter season were significantly higher than summer season. Pollution levels were lowest in Pusa (in summer and winter) followed by Dwarka, Rohini and ITO.Crop stubble burning, crakers during festival of Diwali and adverse ambient atmospheric conditions makes the winter air worse. Effective political will, implementation of regulations, awareness amongst residents and tree-plantation could help offset winter pollution.

Keywords: *Air quality, Pollutants, Seasonal change, Summer, Winter, Vegetation, Delhi.*

Introduction

Since the enactment of Air (Prevention and Control of Pollution) Act, 1981, air pollution control programs have focused on point and area source emissions, and many communities have benefited from these control programs. Nonetheless, most cities in the country still face continuing particulate non-attainment problems from aerosols of unknown origin (or those not considered for pollution control) despite high level of control applied to many point sources.

Being a major centre of commerce, industry and education, Delhi has experienced a phenomenal growth in recent years. Like many other large cities, Delhi is adversely affected by problems of urbanization. The burgeoning population coupled with rapid growth in terms of vehicles, construction, and energy consumption has resulted in serious environmental concerns in Delhi.

Air pollution in Delhi is caused mainly by industry and vehicular traffic present both inside and outside Delhi. Delhi's annual average concentration of PM_{10} is highest among major Asian cities, and was between three and four times the Indian standard in 2001–2004. Balachandran et al (2000)[1] and HEI, (2004)[2] reported that PM_{10} concentrations exceeded national standards, and that roughly half the PM10 mass in Delhi could be attributed to fine particulate matter. The number of vehicles in Delhi is ever increasing causing great concern regarding concentration of NO_x.

In some studies, the pollution levels were reported worse in winter compared to other seasons due to emissions from heating and unfavourable meteorological conditions for dispersion. (Guttikunda and Gurjar, 2012).[3] At the beginning of winters, fog starts to set in and at this time the farmers resort to crop stub burning, leading to formation of smog thus increasing the

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pollutant levels and compromising air quality. Cracker burning during festival of Diwali too coincides with the same season further worsening the situation. This spurt in pollution during winters has definite deleterious effects on air quality, health of people and the environment. On the other hand, rains may precipitate the pollutants, thus reducing the pollutant levels. It is therefore important to study the effect of seasons on the pollutant levels in the city.

The present study endeavours to quantify this worsening of air quality, through ascertaining the levels of pollution during winters and comparing them with summers and also analysing the health effects.

Methodology: This Observational-analytical study was undertaken at New Delhi, India, which has an elevation of 216 m above sea level, The area of NCT Delhi is 1484 sq km (latitude 28°.64'N, and longitude 77°.21'E). The study was undertaken over five months and ambient air pollution levels were monitored during winter (January-March 2018) and summer (April-May 2018).

Four sites were selected, to cater for the four directions of Delhi, i.e. North, East, Central and South-West. They were located far away from each other, namely:

1. Dwarka (DAV School)-South West Delhi
2. ITO (Metro Station)-East Delhi
3. DTEA Senior Secondary School, Pusa Road-Central Delhi
4. Rohini (Delhi Technical University)-North West Delhi.

Data of $PM_{2.5}$, NO_2 and NO levels, on daily basis was downloaded from Central Pollution Control Board (CPCB) nearbymonitoring sites displayed on website (https://app.cpcbccr.com/ccr/#/caaqm-dashboard-all/caaqm-landing/data)for the entire study period.[5]

Results

Pollutant Concentration: Winter

Average pollutant concentration for the three pollutants, namely $PM_{2.5}$, NO_2 and NO for winter from the four sites is depicted in Table 1.

Table 1: Mean Pollutant concentration for winter months (January-March 2018)

Site	Level of Pollutant		
	$PM_{2.5}$(µg/m^3)	NO_2(µg/m^3)	NO(µg/m^3)
Pusa	91.5	24.5	29.0
Dwarka	157.4	40.0	27.0
Rohini	205.4	26.8	41.2
ITO	146.2	73.5	129.6
Standard	60.0	80.0	80.0

From Table 1 it is observed that pollutants were highest in ITO except for $PM_{2.5}$ which was highest in Rohini. $PM_{2.5}$ at all four sites exceeded standard values, and also exceeded prescribed standard (60 µg/m³). NO_2 levels were highest at ITO and lowest in Pusa. However none of these exceeded the standard. NO levels were highest at ITO and lowest in Dwarka. At ITO, NO levels exceeded standard.

Mean Pollutant Concentration: Summers

Table 2: Mean pollutant concentration for Summer months (April-May 2018)

Sites	Level of Pollutant		
	$PM_{2.5}$ (µg/m^3)	NO_2(µg/m^3)	NO(µg/m^3)
Pusa	53.8	53.5	31.5
Dwarka	104.5	35.5	16.0
Rohini	97.3	7.3	16.4
ITO	81.7	138.1	142.7
Parameter	60.0	80.0	80.0

Table 2 depicts pollutant level for summer being highest in ITO except for $PM_{2.5}$ which was highest in Dwarka. $PM_{2.5}$ value at Pusa was lower than standard. But for other three sites $PM_{2.5}$ value exceeded standard.

NO_2 levels were highest at ITO and lowest in Rohini. NO_2 values at ITO exceeded standard, while being lower than standards at other three sites. NO levels were highest at ITO and lowest in Dwarka and Rohini. At Pusa, Rohini and Dwarka, NO levels were below, while at ITO it was higher than prescribed standards.

Table 3: Difference of Means (Winters & Summers) in Level of Pollutants and Statistical Significance (p) [n=66]

Sites	Seasonal Difference of Means and Statistical Significance (p)					
	$PM_{2.5}$ (µg/m^3)	p	NO_2 (µg/m^3)	p	NO (µg/m^3)	p
Pusa	37.75	<0.05	28.99	<0.05	2.47	>0.05
Dwarka	52.89	<0.05	4.48	<0.05	11.02	<0.05
Rohini	108.14	<0.05	19.52	<0.05	24.81	<0.05
ITO	64.49	<0.001	64.61	<0.001	13.14	0.84

The seasonal difference of means and statistical significance (p) were obtained for the three pollutants at four selected sites. **Table 3** depicts a significant difference of means between winter and summer pollutant levels for $PM_{2.5}$, NO_2 and NO at Dwarka and Rohini ($p< 0.05$).The same exists for Pusa and ITO sites for $PM_{2.5}$ and NO_2 levels. However, the difference of means for NO levels(summer and winter) at Pusa and ITO are not significant ($p> 0.05$).

Discussion

There are many types of pollutants present in the air namely, Sulphur Dioxide, Nitrogen Oxides, PM_{10}, $PM_{2.5,}$ Carbon Monoxide, Carbon Dioxide, Lead, etc. Three major pollutants were chosen for the study i.e. $PM_{2.5,}$ NO_2 and NO, as these are dangerous for health and environment.

Pollution Levels in Delhi: The site at ITO had the highest level of pollutants followed by Rohini, Dwarka and Pusa. In January 2017, the pollution levels at ITO were maximum. According to Times of India, $PM_{2.5}$ average at ITO between December 18, 2016 to January 2, 2017 was 309µg/m^3, more than five times the 24 hour standard and more than 12 times the WHO guidelines.[6]

Levels are highest at ITO being a traffic intersection and most of the land is concretized. An IIT study found that Pusa was one of the least polluted areas in Delhi followed by Dwarka and Rohini.[7] Present study also depicts similar results. Pusa and Dwarka have lower pollution levels due to high abundance of trees, lesser construction activities and lower traffic. Rohini is an industrial area with lots of construction work and smoke being emitted from industries.

Seasonal changes in level of Pollution: Pollutant levels were significantly higher in winter as compared to summer. Apart from NO and NO_2 values of summer at ITO; $PM_{2.5}$, NO_2 and NO values at the four sites were also significantly higher for winter. One of the major reasons for increased pollution levels in winter is crop-stubble burning in Haryana and Punjab which release excessive smoke. Certain specific reasons for increased pollution in winters are elaborated further:

Fog and Smog: North Indian planes undergo a sudden change in weather during November-December. The visibility goes down and even flight schedules go hay-wire due to fog! People resort to burning wood/ stubs/coal for warmth. This generates smoke, which was not present till then. Fog and smoke merge forming smog. This impedes sunlight, hampering dissipation of smoke and encased pollutants. The vicious cycle continues, worsening the situation.

Diwali: The festival of Diwali, observed at outset of winters, worsens the situation. Crackers add harmful chemical pollutants to the already compromised winter environment. This not only harms the environment, but also compromises health esp. the elderly and young children.

Crop-stubble Burning: Punjab and Haryana generate 30 million tonnes of paddy straw which are later burnt to reduce the time between harvesting paddy and sowing the winter wheat crop. This burning of crop residue results in smog, lots of smoke and increased levels of $PM_{2.5,\ 10}$ etc which are harmful for humans and environment. Despite repeated ban orders issued by courts and National Green Tribunal, this practice continues unabated. As per farmers, there is no affordable alternative to stubble burning. Increased mechanisation of harvesting process has also contributed to the problem. The use of mechanised harvesters result in stubble of 10-30 cm in the field, which was not the case earlier with manual harvesting, which used to be smaller (thus less polluting).[8]

Health and Environment Effects: Particles in the $PM_{2.5}$ size range travel deeply into respiratory tract, into lungs. Exposure causes short-term health effects such as eye, nose, throat and lung irritation, coughing, sneezing, runny nose and shortness of breath besides affecting lung function and worsening asthma,chronic bronchitis, and

increased mortality from lung cancer and heart disease.

When nitrogen is released during fuel combustion, it combines with oxygen forming nitric oxide (NO) and nitrogen dioxide (NO2), together referred to as (NOx)[4]. NOx gases react to form smog and acid rain besides formation of fine particles (PM) and ground level ozone, both of which compromise health.

High NOx levels have negative effect on vegetation, including leaf damage, reduced growth, making vegetation more susceptible to disease and frost damage. Pollution is likely to significantly influence forest-ecosystems as well.

Tackling Winter Pollution: Controlling crackers during Diwali, through public awareness and legislation could help tackle the problem. Equipment that processes the stubble and convert it to fuel for biomass based power plant can be an alternative to stubble burning. Crop residue can also be used for mushroom cultivation, bedding for cattle, paper production, etc. Other solutions include government offering subsidies to make these implements accessible to larger number of farmers or alternatively, the co-ownership models for these agri-implements. In Punjab, farmers have started using environment friendly waste decomposer solution. The small bottle of solution costs Rs 20 and is developed by National Centre for Organic Farming and Ministry of Agriculture and Farmers Welfare. Officials claim that it can decompose 10000 tons of bio-waste in 30 days. The emphasis must be on ways in which authorities can scale up implementation of such solutions. This requires political will. Any success on this front will make it easier for farmers to dispose or utilise crop residues without polluting air[8].

Conclusion

Delhi is one of the most polluted cities in the world. Every year the pollutant level rises to such a level the it becomes almost impossible to go out for work, school or have fun. This study evaluated concentrations of three important pollutants, $PM_{2.5}$, NO_2 and NO at four sites in Delhi ie. Pusa, Dwarka, Rohini and ITO over summer and winters. It was found that in winter, pollutant levels were significantly higher as compared to summer. This is due to the excessive burning of crops in Haryana and Punjab and Diwali festival. The crop burnings and crackers burnt during Diwali causes smog leading to ill health and harm to trees and environment. Delhi government has taken steps to reduce pollution levels, like, launching plantation drives, odd-even rule for vehicles, use of CNG in vehicles, green-cess, banning old diesel cars etc. The government also considered alternatives to crop burning like crop residue use for mushroom cultivation, bedding for cattle, paper production, etc, offering subsidies for implements for farmers. If these steps are implemented correctly and under good supervision by the authorities, the pollution concentration especially in winter will reduce significantly.

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Implementation Challenges of Universal Health Coverage– Arogya Karnataka in a Tertiary Care Hospital

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Abstract

This paper explores the importance of the Universal Concept of Health which is emerging globally, is achieved through implementation of different disciplinary perspectives for the long-term sustainability. It also represents the multi-dimensional concept of the Universal Health Coverage in terms of Population coverage, financial protection and accessibility to the quality of health care needs. As a health economic study, which explains the emanation of the Out-of-pocket expenditure, comprehensive medical services, minimum basic health package through implementation of shared fiscal systems for the effective function of the Universal Health Coverage. It also emphasizes on the implementation challenges regarding the hospital charges in empaneled private hospitals with the Arogya Karnataka (UHC) scheme package rates to the complex secondary and tertiary care treatments. A descriptive study was conducted to determine the average hospital charges for complex secondary and tertiary care treatments for the period of six months in a tertiary care hospital, where the secondary data is collected from the IT Billing Department. The Quantitative analysis is done by using the pie charts and pareto's diagram for the average total charges of hospitalization. The results showed the average total hospital charges for the complex secondary and tertiary care treatments are 32% and 54% where the Arogya Karnataka packages covered for the selective procedures respectively. The Comparative analysis of the subsumed existing schemes into one comprehensive Arogya Karnataka scheme showed that only Trans Urethral Resection Prostate (TURP) procedure has been revised and relatively increased when compared to selective procedures. Based on the result analysis, there is requirement of reformulating the health policy and regulations as the Out-of-pocket expenditure continues for more than 50%. In a long run, it's not viable for the hospital to accept the government insured patients without any revised package rates of Arogya Karnataka.

Keywords: *Universal Health Coverage, Arogya Karnataka, Complex Secondary and Tertiary care, Out-of-Pocket expenditure, Package rates.*

Introduction

All over the World has declared that the Health as a Fundamental Human Right by the World Health Organization's (WHO) in 1948 and the prime objective of the Constitution is to provide 'Health for all' by the Declaration of Alma-Ata in 1978 were pragmatic behind the Universal Health Coverage. In 2005, the World Health Assembly introduced the concept of UHC for the financing systems of healthcare sector to emphasis on the predefined and sharing mechanisms aimed to achieve the Universal Health Coverage. Based on this principle, the WHO defined the UHC as "access to key promotive, preventive, curative and rehabilitative health interventions for all at an affordable cost, thereby achieving equity in access''. According to the World Health Report 2013 states the well-structured and defined foundation based on the research evidence would lead to facilitate the evolution of UHC to all the countries. The United Nations, the United Nations Children's Fund, International Labor Organization, the World Bank, United States Agency for International Development, the Gates Foundation, the Rockefeller Foundation and other health institutes took the initiative to promote the UHC across the countries and also considered as the rational approach to achieve the overall health outcomes

of the Sustainable Development Goals by many leading health agencies. Universal Health Coverage by 2030 has been widely recognized as the primary health related concept defined under the Sustainable Development Goals on the occasion of United Nations Summit held in September 2015.[1]

The WHO has stated the Universal Health Coverage as "the desired outcome of health system performance whereby all people who need health services receive them, without any undue financial hardship". The Universal Health Coverage concept is a multi-dimensional which requires the healthy perspectives covering the three main dimensions, they are Populace coverage, fiscal protection and accessibility to health care services.

Expanding the Health Insurance to the Unaffordable in India: Generally, the extending the health Insurance coverage is major venturing thirst in the UHC which ensures the individual from the financial risk for the health care facilities by the pooling mechanisms of the health care systems. Out-of-pocket payment is another type catastrophic health expenditure among the poor families. According to the WHO study showed that in 2007, most of the low-economic countries does the direct Out-of-pocket expenditure showed more than the 50% of the total health expenditure.[2]

The National Governments are most reliable on the domestic resources for the Universal Health Coverage like domestic tax revenue, because the poor nations always depends on the governments to provide the fiscal support for the basic health needs. Expansion of the financial occupancy for the health budget and proper allocation of the pooling funds with continuous monitor is important even for the high income countries to sustain the Universal Health Coverage.[3]

Due to high Out-of-pocket expenditure which lead the huge population to the poverty and poor quality of health. Based on radical restructuring of the health care system with an integrated approach will build the equity in health and reducing the poverty has been drafted in National Health Policy 2015 by the Indian Government.

Arogya Karnataka Implementation: Karnataka government took the initiative as first state to implement the Universal Health Coverage and has decided to introduce the UHC under "Arogya Karnataka" from 23rd February 2018, bringing all government health schemes under one comprehensive health scheme by subsuming the following Yeshaswini Scheme, Vajpayee Arogyashree Scheme,Rajiv Arogya Bhagya Scheme, Rashtriya Swasthaya Bima Yojana including senior citizens, Rashtriya Bala Swasthaya Karyakram,Mukhyamantri Santwana Harish Schemeand Indira Suraksha Yojane health schemes, are reimbursed through the Suvarna Arogya Suraksha Trust.

Literature Review: The study describes about the effectiveness of the essential health package as per UHC. Due to the poor implementation and inequitable distribution of both public private partnership which led to the inequities in the populace coverage and fiscal protection among the Malawi people. The gaps identified such as no emergency services, inadequate medical personnel, no medical supplies and difficulties in transportation should be addressed by the Malawian Government to the local context reforming the strategic reformation of appropriate demand and supply interventions for the health care services.[4]

Universal Health Coverage defines Health as legal right which is essential to provide the health care services for all. It also describes on basic health needs in access to health care services without any barriers on both demand and supply with appropriateness and quality, health infrastructure, health financing, qualified health care professionals, resource allocation and medical supplies to deliver the quality of health as per Universal Health Dimensions.[5]

To ensure the UHC globally, there is requirement of health policy reforms and sustainability in the health financing system, equity, quality of care, efficiency and cost control strategies. The restructuring of the health care reforms may become barrier for the long-term sustainability of the health financing and market failure if the health care cost and quality control measures decreases simultaneously. Thus, the health financing systems does not sustain, if the high out-of-pocket extends further leading to the inequity in the healthcare.[6]

The study conducted in China demonstrated the Challenges in the Universal Health Coverage to the health insurance sector by the managers and administrators. There is lack in resources management of public healthcare facilities, huge inequity in healthcare and limited financial protection. However, there is requirement to increase the pooling of funds and develop the health policy and to reduce the out-of-pocket expenditure among the people.[7]

The Disproportionate distribution of the health financing leads to inequity and out-of-pocket expenditure among the poor and vulnerable population. Thus, robust constructive and emphatic regulatory policy frameworks by the Government can help in minimizing the gaps in the current health care sector and adopt to improve on the notion of the Universal Health Coverage.[8]

In Asian region, many low and middle economic countries are aiming towards the UHC finding the variations in the health care system–structures, resources and competences and identifying the leading challenges to the health care delivery. Indonesia introduced the UHC in its country in assurance mode which led to face the barriers in the logistic and administration with regards to the inadequate supply of medicines, human resources, health financing, weak governance in the health care service delivery.[9]

Methodology: This study was conducted in a Tertiary care hospital, Bengaluru which is 850 bedded hospital. This study includes the quantitative analysis of the secondary data collected during the study period for about six months. Two procedures were selected based on the highest rates done during the period of 3 months under seven different departments from the Medical Record Department and Operation Theatre in the complex secondary and tertiary care services provided by the hospital. The secondary data collected from the IT Billing department which contains the average of total hospital charges including the procedure cost, ward charges, food charges, pharmacy charges, post-hospitalization charges (post discharge medicines, travel conveyance and review) admitted in the general ward for the selected procedures.

It includes the patient data of an annual year from 01/04/2017 to 31/03/2018 who were admitted to the general ward (cash paying category) and also general concession patient (as per hospital concession policy) adding 20% to the gross total to get enough data on general ward patients. The Average total of hospitalization charges includes pharmacy charges which were collected from the private ward for the same procedures as they do not intend the medicines to general ward (25% of the total hospital charges).

The Arogya Karnataka patients are eligible for accessing the medical care for complex secondary and tertiary care treatments in government empaneled private hospitals subjected in predetermined package rates only for General ward.

Results and Analysis

Table 1: Differential amount between the Arogya Karnataka package rates and total hospital charges for the selected Complex secondary and tertiary care treatments

Procedures	Arogya Karnataka Package rates (Rs./-)	Grand Total of Hospitalization- (Rs/-)	Differential amount b/w AK and Hospital charges (Rs/-)
Lap. Assisted Vaginal Hysterectomy (LAVH)	11500	44789	33289
Vaginal Hysterectomy with Pelvic floor repair (Cystocele, Rectocele & Perineorraphy)	15000	34123	19123
Arthroscopic Cruciate Ligament (ACL) Reconstruction	19000	67016	48016
Simple Compound Fracture with internal/external fixation along with implants (ORIF)	21000	63729	42729
Tonsillectomy + Styloidectomy	12500	27871	15371
Cortical Mastoidectomy	6250	38090	31840
Lap. Hiatus Hernia Repair Abdominal	20000	61054	41054
Lap. Appendicectomy	10000	27811	17811
Percutaneous Nephro Lithotomy (PCNL) inclusive of stent	10000	37458	27458
TURP (Trans Urethral Resection Prostatectomy)	30000	32270	2270
Gastro Jejunostomy	30000	65597	35597
Splenectomy	45000	88828	43828

Table 2: Complex secondary care treatments of Arogya Karnataka package rates coversaverage of 32% of the total hospital charges

Departments	Complex secondary Treatments	A K rates to the Total hospital charges
Obstetrics and Gynaecology	Lap. Assisted Vaginal Hysterectomy (LAVH)	25.68%
	Vaginal Hysterectomy with Pelvic floor repair (Cystocele, Rectocele & Perineorraphy)	43.96%
Orthopaedics	Arthroscopic Cruciate Ligament (ACL) Reconstruction	28.35%
	Simple Compound Fracture with internal/external fixation along with implants (ORIF)	32.95%
ENT	Tonsillectomy + Styloidectomy	44.85%
	Cortical Mastoidectomy	16.41%
General Surgery	Lap. Hiatus Hernia Repair Abdominal	32.76%
	Lap. Appendicectomy	35.96%
Average Total Percentage		**32.61%**

Table 3: Tertiary care treatments of Arogya Karnataka package rates covers average of 54% of the total hospital charges.

Departments	Tertiary care Treatments	AK rates to the Total hospital charges
Genito Urinary	Percutaneous Nephro Lithotomy(PCNL) inclusive of stent	26.70%
	TURP (Trans Urethral Resection Prostatectomy)	92.97%
Oncology GI Tract and Oesophagus	Gastro Jejunostomy	45.73%
Neonatal and Paediatric Surgery	Splenectomy	50.66%
Average Total Percentage		54.01%

The results showed the Out-of-pocket expenditure for the complex secondary and tertiary care treatments continues to be 68% and 46% respectively.

The Hospitalincurring the additional benefits of providing the food charges and post-hospitalization to the Arogya Karnataka insured patients. Thus, the hospital has to initiate cost-cutting strategies in diagnostics and pharmacy like generic medicines or Janaaushadis on pharmacy provision as it incurs the 25% of the total hospital charges.

The Comparative analysis of the Arogya Karnataka and other subsumed schemes showed that excluding the Trans Urethral Resection Prostate (TURP) procedure has been increased and other procedures are comparatively decreased and some are unrevised for the selected procedures.

Discussion

Universal Health Coverage has been introduced as 'Health for all' objective under the Sustainable Development Goals as imposed on all the states of the country that stratified as legal right to the health for the delivery for the delivery of the Universal Health Coverage on National Governments after the failure to achieve Millennium Development Goals.

Due to low spending on the health resulted in inadequate supply of resources, lack of skilled human resources, huge inequity in health and high financial rick protection by the weak governance and poor accountability which created the large chaos for the Health care services providers. These identified barriers may not sustain for the long term by the modified design for the existing funds and not enough to provide the satisfactory solution. However, there is significant need to increase the capacity of the funds by the pooling mechanisms to develop unified and consistent health regulatory and policies for both the public and private sectors of the health system in terms of Out-of-pocket expenditure.[10]

People centered political decisions regarding the betterment of health were not successful and stable in the previous objectives of the Health agenda.As a result, frequent changes in the health policy reform have led to poor sustainability, low efficiency, large inequity causing

the poor quality of health care leading to the market failure in terms of the cost control and accessibility in the healthcare sector.[11]

Conclusion

By the considerable facts, the Universal Health Coverage still continues to be Out-of-pocket expenditure more than 50-60% for the people. Hence, increase the public health expenditure to 2-3% of gross domestic product and pubic private partnerships in case of adequacy in delivering the service with proper planning and monitoring would help in the assessment of the Universal Health Coverage program.

The Government of India has taken the initiative in introducing the 'Ayushmann Bharat', a central government insurance scheme announced in the Union Budget 2018.

The Government has to rule out the health policy and regulations pertained to the unauthorized private sector and increase the shared mechanisms and strategic purchasing with pooling the funds and allocate the resources optimally and increase the expenditure on health would bring the expected change in the health outcomes.

The Universal Health Coverage (Arogya Karnataka) has to take the initiative to define the package rates accordingly without any hardships to the patients and health care service providers with prioritized budget for the health care system.

Limitations: The obtained data was limited to calculate the pharmacy charges in the general ward and considered the general concession patients are included for the general ward cash paying patients. No proper data available to determine the average hospital charges for the other procedures. Thus, actual costing of the procedures would overcome the financial barriers of the Arogya Karnataka scheme.

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Ethical Clearance: None

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Evaluation of Serum IL-21, TNF-α and hsC-Reactive Protein in Patients with Chronic Periodontitis

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Abstract

Chronic inflammation isthe hallmark of periodontitis. The inflammatory events are suggested by the action of microbes in tissue cells that lead to release of several cytokines and soluble mediators. Among them TNF alpha and Interleukine-21 are known to play an important role.C-reactive protein is an acute phase protein, highly sensitive marker used to indicate inflammatory tissue. This study evaluates serum levels of Il-21, TNF α, hsC-reactive protein in patients with chronic periodontitis and periodontally healthy individuals. Total 46 participant, 30 cases of chronic periodontitis, 16 systematically healthy subjects, with age and sex matched were included in study.The serum levels of IL-21, TNF alpha, were assessed by using Enzyme Linked immunosorbant assay. hsC-reactive protein assessed by particle enhanced immunoturbidometer. Statistical analysis was performed using statistical software. Data were expressed as mean ± SD and interquartile ranges and comparison of controls and cases by Mann Whitney Test. Levels of IL-21, TNF α, hsC-reactive protein were notably higher in chronic periodontitis group than control. ($p<0.001$). IL-21, TNF α, hsC-reactive protein, highly expressed in patients with chronic periodontitis than control subjects and linked. Therefore these markers can be used for diagnosis of chronic periodontitis.

Keywords: *Interlukine-21, TNF α, hsC-reactive protein, chronic periodontitis, Diagnostic biomarker.*

Introduction

Periodontitis is one of the most common chronic inflammatory diseases worldwide. It is a persistent polymicrobial infection of multi-factorial etiology which evokes both innate and adaptive responses leading to irreversible destruction of periodontal ligament and alveolar bone.[1-2] It has been shown that exaggerated disproportionate immune response of host responsible for tissue destruction and bone loss. The host immune response is due to production of proinflammatory cytokines produced by activated T-cells in diseased gingival and periodontal tissue[3] These include tumor necrosis factor alpha (TNF-α),IL-1β,IL-6,IL-7,IL-11and prostaglandins.

Interleukin-21 (IL-21) is a recently discovered proinflammatory cytokine, member of the type-1 cytokine family and expressed by activated Th-1 and Th-17 lymphocytes[4]. IL-21 regulates innate and adaptive immune responses. It plays a key role in antitumor and antiviral responses, and has major effects on inflammatory responses[5-6].

The acute-phase response is part of innate immune response which is a nonspecific process responding to injuries to host including infections. Among several acute phase proteins,TNF-α is a dominant cell signaling protein involved in systemic inflammationand itregulates immune cells, induction of apoptosis and inflammation[2]. It is key periodontal pathogens-induced

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early inflammatory cytokine in destructive periodontal disease[7-8].

Another important acute phase protein is C-reactive protein used as a marker of tissue inflammation and damage and regulated by several cytokinesincluding tumor necrosis factor-α[9]. TNF-α and C-reactive proteins are present in low levels in healthy but markedly raised in tissue injury [10-11].

The objective of the study was to investigate the role of IL-21, TNF-α and C-reactive proteinin periodontitis and compare the levels with healthy to evaluate their use as a diagnostic marker of chronic periodontitis.

Materials and Method

The study was carried out in the Department of Microbiology ofour Institute in association with Department of Oral Medicine & Radiology.Study was approved by the Institutional Ethical Committee. Written informed consents were obtained from participants before enrollment and collection of samples.

Study involved 46 participants, 16 healthy subjects, 30 chronic periodontitis of both genders with age group of 25-55 years. Periodontal parameters such as probing depth and clinical attachment loss were measured by using UNC-15 probe.Subjects with known systemic disease, malignancies, blood disorders, smoking, alcoholism and drug abuse were excluded. Those with <20 teeth and or had undergone any dental treatment or received antibiotic therapy were excluded. Inclusion criteria for chronic periodontitis were presence of at least 4 sites with >5mm pocket probing depth and attachment loss. The criteria for healthy group were no sites with >3mm pocket probing depth and attachment loss.

Blood sample collection and storage: Standard operatingprocedure was followed for collection of blood samples. 5 ml blood samples was collected from subjects from cubital vein by using aseptic technique and transferred to serum separator tubes. Blood was allowed to clot for 15 minutes andcentrifuged for 10 min at 3000 rpm. Serum was separated and aliquoted kept at-80°cuntil laboratory analysis.

IL-21quantification: IL-21was assessed by ELISA kit (Krishgen Biosystems 15375 Ashley Ct. Whittier,CA; Lot No 1211015).Manufacturer's instructions were strictly followed during the assay. Results were calculated using standard curve produced in assay and expressed as pg/ml.The sensitivity of the assay was 8.0 pg/ml

hsCRP quantification:Serum hsCRP levels were assessed by particle enhanced turbidimetric immunoassay technique (PETIA) on Dade Dimension clinical chemistry system.Results were expressed in mg/dl.The assay range of the kit was 0.05-25.0 mg/dl.

TNF alpha quantification:TNF-αwas assessed by ELISA (Booster Biological technology Co, Ltd.).Results were calculated using standard curve produced in assay and expressed as pg/ml. The sensitivity of the assay was, 1pg/ml.

Statistical analysis: Mean and standard deviation were calculated for both the groups. Pearson's correlation was used to assess the correlation between chronic periodontitis and healthy for serum IL-21, TNF-α and hsCRP. In this study, *P* value of 0.05 was considered as significant. Statistical (SPSS) version 15 was used for statistical analysis. For comparison of mean IL-21, TNF α and hsCRP between chronic periodontitis and control by Independent samples t test and Mann-Whitney test was performed.

Results

Group I 30 patients with chronic periodontitis with mean age 31.5± 4.3. Group II comprised of 16 healthy controls with mean age group 36.6 ± 6.5. Difference between both sexes could not evaluate since of small sample size.

Figure 1 shows results of all three parameters in both the groups. Serum levels of IL-21 in healthy subjects ranged from 15.8 to 193.3 pg/ml (mean 65.34 pg/ml) where as in chronic periodontitis patients the levels were much higher with a range from 67.0-694.5 pg/ml with a mean of 497.78pg/ml (Fig 1a).The concentrations of TNF-α in group I and group II were and 17.94 ± 10.5 pg/ml (6.8 to 29.0 pg/ml)and 70.37 ±18.5 (28.0 to 138.0 pg/ml)respectively (fig 1b).Levels of hsCRP in group I were 0.96 ± 0.46 mg/dl (0.1 to 1.46mg/dl)and in group II were 3.57 ± 2.27 (1.2 to 6.92 mg/dl)respectively (fig 1c). It could be seen that all three parameters were significantly increased in patients with chronic periodontitis when compared to healthy subjects.

Fig. 1,2 & 3. Distribution of IL-21 (Fig.no.1), TNF α (Fig.no.2), and hsCRP (Fig.no.3) in the blood samples of healthy and chronic periodontitis subjects.

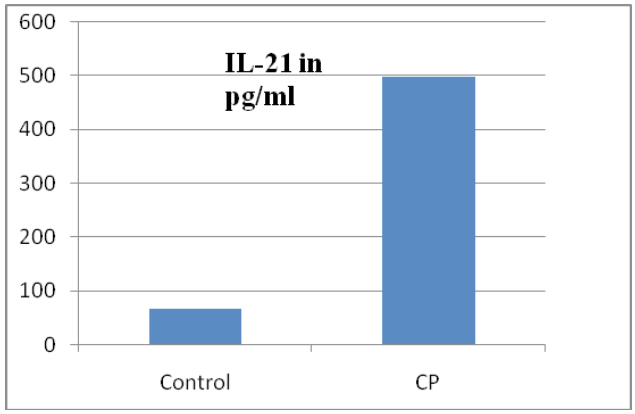


Fig. No. 1

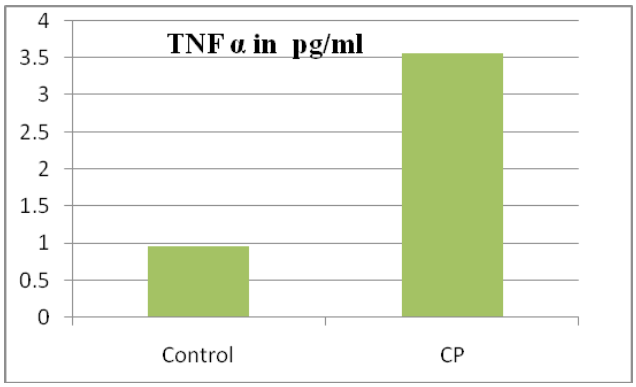


Fig. No. 2

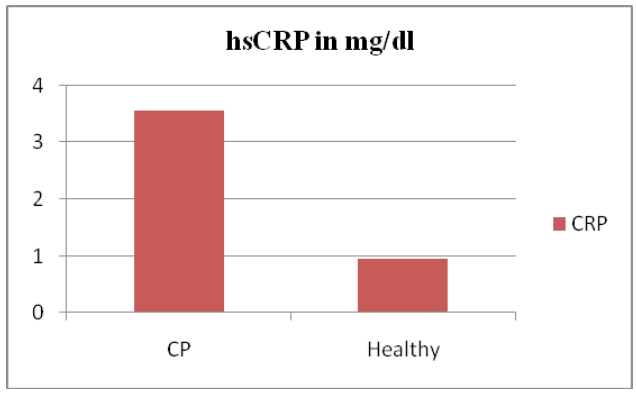


Fig. No. 3

The difference in the levels of IL-21, TNF-α and hsCRP between the two groups was highly significant with p< 0.001 by Mann-Whitney test and independent sample T test (Table 1).

Table 1: Comparison of parameters done by independent sample T test and Mann Whitney test.

Serum Marker	Group	N	Mean	SD	t-value	p-value and significance	Mann-Whitney test
IL-21	Periodontal disease	30	497.78	297.06	10.18	<0.001, Significant	<0.001, Significant
	Control	16	65.34	42.66			
TNF	Periodontal disease	30	70.3767	18.50515	10.43	<0.001, Significant	<0.001, Significant
	Control	16	17.9438	10.55045			
hsCRP	Periodontal disease	30	3.5757	2.27008	4.50	<0.001, Significant	<0.001, Significant
	Control	16	0.96	0.46			

SD-Std. Deviation, P<0.001-highly significant

Pearson's correlation showed highly significant positive correlation between the IL-21, TNF-α and hsCRP in Periodontal disease (p= 048). However, there was no significant relation when only healthy groups were analyzed (0.506) (Table 2).

Table 2: Correlation between IL-21, TNF-α and hsCRP analyzed by Spearman's correlation coefficient

		Periodontal disease	Control
IL-21 TNF α hsCRP	Correlation Coefficient	0.364*	0.179
	p-value and Sig. (2-tailed)	0.048, Significant	0.506,not Significant
	N	30	16

*p<0.0500 significant

Discussion

Periodontitis is the most common infections affecting gingival and tooth supporting tissue[12].During progression of periodontitis, endotoxins released that lead to periodontal inflammation, characterized by macrophage activation, production of cytokines, inflammatory mediators and acute phase proteins[13]. Cytokines play an important role in triggering the acute phase response mainly these are TNF-α,IL-1β,IL-6,IL-7,IL-11,IL-17 and Prostaglandins. Among them, we chose three molecules IL-21, CRP and TNF-α which are known to play a role in the inflammatory process of periodontal disease, but so far, their synergistic role has not yet been studied. According to our literature survey this is the first study conducted in India which has included IL-21, TNF-α and CRP to assess their collective role in chronic periodontitis patients.

Interleukin-21 is a member of common-γ chain (γc) family of cytokines, produced by activated T cells but it targets lymphoid and myeloid cells of immune system. It has the potential to impact innate and adaptive immune responses, recognized to contribute to the development of Th17 cells which have been shown to play an important role in the pathogenesis of periodontitis[14-15]. TNF-αis considered as a major inflammatory mediator produced by activated macrophages, CD 4 Tcells, NKcells, neutrophils and mast cells[16].TNF-αis the key periodontal pathogens-induced early inflammatory cytokines in destructive periodontal disease[7,17].

CRP isone of the major acute-phaseproteins synthesized in response to pro-inflammatory cytokines. It belongs pentraxin family of proteins and plays a significant role in immune reaction[18]. The serum levels increase rapidly within 24 to 72 hours in conditions of inflammation[19, 20]. CRP also is increased in chronic periodontitis[9,20-21].

Present study shows that levels ofIL-21, TNF-α and hsCRP significantly raised in patients with chronic periodontitis in comparison to those of healthy individuals.

Several investigators have studied IL-21 levels in GCF, saliva and gingival tissue from patients with chronic periodontitis and used different method as Immunohistochemistry, western blot, PCR and ELISA [21]. Very few studies have analyzed IL-21 in serum samples [5-6].Inall of these studies, the levels of Il-21 were significantly higher in chronic periodontitis patients when compared to healthy subjects. The results of our study are in agreement with these findings. Some investigators have also shown significant correlation of IL-21 levels with periodontal parameters[5,21.]

Studies have also been conducted to assess the levels of TNF-α in periodontal health and disease[7-9,16].A cross-sectional study attempted to correlate periodontal disease with risk indicators for high levels of systemic inflammatory markers and showed that higher TNF-α is associated with periodontal disease[22].

Studies shown significant association between TNF-α and CRP and decrease in levels after periodontal treatment[10,17.]Another recent report describedserum CRP and TNF in pseudoexfoliation syndrome and suggested TNF alpha is a proinflammatory cytokine and hsCRP is a predictor marker of inflammation and endothelial dysfunction while and both involved in pathogenesis of PEX[23].

In thepresent study IL-21 and TNF-α were assessed by ELISA method. It is one of the most sensitive and reproducible assays, used for the detection and quantitation of antibodies against specific molecules. Literature survey shows that ELISA has been the most popular method for the study of cytokines from various body fluids in health and disease [24].

We investigated hsCRP levels in the present study by Particle enhanced turbidometric immunoassay (PETIA) with detection limit of <1 mg/dl. This technique is regarded as the most rapid, sophisticated, accurate and sensitive method of detecting, and measuring CRP in body fluids [18]. Other investigators have used different method such as nephalotubidimetry, turbidometry, enzyme immunoassay and PETIA [10-11,18,20]. Our results are in concurrence with the findings of other authors.

Currently, diagnosis of periodontal disease relies primarily on clinical and radiographic parameters. These measures are useful in detecting data of past disease, or verifying periodontal health, but offer only incomplete information about sites at risk for future periodontal crash[25]. Hence there is a search for appropriate biomolecules which can aid in diagnosis as well as predict future onset of disease at periodontal sites. In this connection, our data demonstrate that IL-21 TNF α,hsCRPcan beused as diagnostic and prognostic marker in chronic periodontitis. However, more studies with larger sample size are needed to confirm our findings.

Conclusion

Overall the present study suggest that IL-21,TNF α and hsCRP are predictive markers of inflammation and involved in pathogenesis of periodontitis. These marker can be used as diagnosticaid.

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Conflict of Interest: None

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Community Household Survey Utilization of EPI Cluster Sampling Style

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Abstract

This is an article trying to explore the utilization of EPI cluster sampling style in the prevalence survey for childhood injury. The EPI cluster sampling provides the researcher a low cost way for performing the household survey. There can be a bias in the prevalence estimation because of meeting the participants at a single point of time and the limitation associated with cluster sampling.

Keywords: *Cluster sampling, survey.*

Introduction

The monitoring of health status of the population and planning interventions for them is only possible with very accurate and most recent information. Cross sectional surveys are the best choice to answer these needs.

Children and injuries represents an important global health problem[(1)]. Unintentional injuries among children gives a high impact on mortality morbidity and the health care costs. These type of injuries contribute to the top 15 causes of deaths in all age groups of children world wide[(2)].

Children of age 2 years to 5 years spend a very long time in the home, and this place is crowded with a variety of hazards, hence a major amount of childhood injuries occur there [(3-5)].

Unintentional accidental injuries occur at home in various severity majority doesn't need a hospitalization and management so they become unnoticed [(6)]. These are actually a threat to the health of any country. World health organization report of 2004 warns out injuries in children as the sixth leading cause of morbidity and mortality [(7)].

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Many studies have been carried out in India and in various parts of the world to find the epidemiology of injuries in children. Majority of them happened at a hospital basis [(8)]. The present cross sectional survey was planned in a household basis. The aim of this survey was to establish a baseline information prior to the planning of a community based intervention.

Sampling Strategies for Community Survey: There are so many sampling strategies which can be used to estimate the prevalence of injuries among children in a community. The simple random sampling is the simplest but often the most difficult sampling method to perform. Simple random sampling being the most simplest method is often difficult to execute. Each member of the population gets involved in the sampling frame and gets equal chance of being selected. Generating a sampling frame of all eligible members is often a difficult task. To some extent, the census system in India provides the frame of a population. However, the completeness of the census is limited due to the inaccuracies in the enumeration and recording of migrants and new births.

The diversity of India's geographical distribution makes the selected sampling units to be widely disperse. Contacting one or two such isolated samples in the remote areas diverts the resources from major areas of concern or from other health programmes. All these makes simple random sampling a less preferred measure[(9)].

One of the sampling method which eases the administration of simple random sampling is the cluster

sampling. In this method the primary sampling units are clusters [10]. The clusters in a survey can be various blocks in the city if it was planned in an urban setting, villages if it is in a rural setting.

The cluster sampling requires a complete list of clusters. Generation of sampling frame for cluster sampling comprising of the list of clusters along with the cluster size is relatively easier than that of individual members for a simple random sampling. The complete list of individuals in the selected clusters is needed. Simple random sampling is often the most commonly used method to select individuals within the clusters [11]. One of the major advantages of this method is, as the cluster size increases the amount of resources needed to list the elements are considerable.

The cluster sampling method assumes that the selection of one household in a cluster is not independent of the selection of other households, the members of the cluster are similar. The "design effect" may give a serious effect in situation where one particular infectious or communicable disease is prevalent in that cluster.

One of the example which was talked over time was the one developed as a part of Expanded Programme on Immunization (EPI) by the World Health Organization[12,13]; with an aim to estimate the vaccination status among young children. In this project a 30 clusters (villages or the like) are identified and 7 children of required age selected from each of the selected clusters.

The ideal EPI cluster surveys consisted of 30 clusters of 7 children each (for immunization coverage surveys)[13,14]. Various modifications of this method were done as selecting 20 clusters with 14 children from each clusters was used for immunization coverage, oral rehydration and breast feeding and dietary information [15,16], clusters of hypertension in Guinea [17], 125 children in 8 cluster used for iron fortified complimentary treatment for Malaria [18], 14 cluster with 7 sample in a tuberculosis study [19], 30 cluster of 70 children survey on Goitre (at present this is 90 children with 45 each of males and females) among children in Jamnagar [20], 30 cluster 23 children diarrhoeal out break mortality study at Botswana [21], 30 cluster 98 children obesity assessment study at Pondicherry [22].

A cluster sampling design is the best practical solution for most of the community surveys to cover wider geographical areas. When the study need to assess multiple centers multistage cluster sampling could be a choice.

Many studies have altered the selection 30 clusters to larger or smaller number of clusters. Eg. 46 cluster with 118 new births in a breast feeding financial incentive study at UK [23] and 16 cluster 60 sample counselling intervention for asthmatic children [24].

A cluster sampling most of the time uses simple random sampling within clusters, but EPI cluster sampling uses convenient sampling technique for the second stage sampling.

The present article report the utilization of modified 30 cluster EPI sampling technique for the selection of households in a household survey in Karnataka.

Method

Survey population: The survey population was children between 2 years to 5 years of age and their primary caregivers.

Definitions

Respondent: The respondent of the survey was the primary caregiver of the child.

Household: A group of people living together under one roof and eating in the same place.

Injury: Any unintentional or accidental harm which affect the child physically, psychologically and or socially.

Sample Size: Sample Size was calculated by using the formula $n = \frac{(Z\alpha)^2 P(1-P)}{d^2}$ X Design effect.

The prevalence of injury among children in India was 24.5 (3). Considering this as the anticipatory injury rate for children with a relative precision of 10% at 95% confidence level and a design effect of 1.5 the sample size was estimated. The estimated sample size was 1780.

Selection of the area: Karnataka state is divided into 30 districts and 4 administrative divisions. As per 2011 census, the state is having a population of approximately 6.11 crores. Among these 30 districts, Udupi is one of the highly literate (86.4%) district with a population of 1,177361 with 562,131 males and 615,230 females ((COI))[25]. The total under-five population estimated was 35401.

Description of Udupi: This district was formulated in 1997, the three taluks Udupi, Kundapur and Karkala merged together to form Udupi District. The administrative headquarters is Udupi. The press reports Brahmavar and Byndoor also will become separate taluks[26]. At the time of planning of the survey there were only three taluks with Udupi as headquarters. Udupi taluk consists of 108 villages comprised of 16 census towns, 6 out growth areas and 86 villages. The population among the villages vary from 867 to 144960.

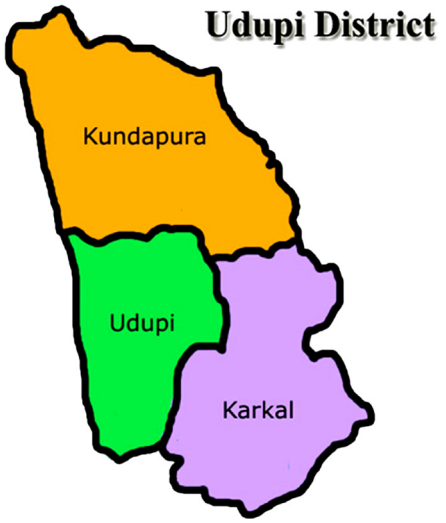


Figure 1. Udupi District Map

Sample Selection: This can be done in various stages: a nation divided into states, districts, taluks and choose villages from taluks. Villages may be treated as clusters and households can be selected from them. In order to make sure the adequate representation of the area as a whole, a multistage cluster random sampling technique was adopted.

Selection of clusters: The selection strategy used for the selection of village is the same as that of EPI method. A list of all villages from the intended region of where the survey coverage was retrieved from the census 2011. The data provided average population size as well as the number of children in the area. It is very important to have the average community size. The average village size was estimated based on the 2011 census. In case the size of any village is too small, it is clubbed with the adjacent village.

Selection of the villages was done using *Probability proportional to size.* In EPI methodology, this is carried out after creating a cumulative list of community population and selecting systematic sample of clusters with a random start.

The village (cluster) selection was done as described below.

Udupi taluk has 108 villages and it was decided to include one third of the total villages that is to select 34 villages (clusters). The total under 5 population estimated was to be 35401. The sampling interval was obtained by dividing the total under 5 population by the number of villages to be selected. Thus, the sampling interval was (35401/34 = 1041.2 rounded to1042. The random start for the systematic selection of the clusters was done by selecting a random number from 1 to 1042. A person not involved in the study, selected the random number to be 856. The village corresponding to a cumulative population equal to or greater than 856 is identifies as the first sampled village. In the list 856 lies between the cumulative population of 503 and 949 and thus the village number 2 was selected as the first cluster. The second village is identified by adding the sampling interval to the first random number (1042+856 = 1898), the number got is 1898 which lies between 1506 and 1913, hence the village number 6 got selected. This process was continued till the selection of 34 villages (Table 1).

This procedure very well leads to the selection of villages with a probability proportion to size. This procedure will automatically bring a representation of all types of villages in the survey.

Table 1: Cumulative method of village selection

Village number	Population size	Cumulative population size
1	503	503
2	446	949
3	307	1256
4	89	1345
5	161	1506
6	407	1913
7	186	2099
8	302	2401
9	243	2644
10	151	2795

Selection of Households: The survey defines household as a group of people living together under one roof and eating in the same place by sharing a common kitchen. The survey considered this as a sampling unit. Since the survey expecting to have equal chance for all households, it was decided to have a constant number

of households to include from each cluster. The sample size calculation estimated a size of 1780 children. This type of sampling procedure is known as *self-weighting.*

The EPI suggests to select the first household with some selective measure like identifying a central point, or locating a landmark and move either right or left, or use the "spin the bottle technique". Once the procedure is clear then in a straight line all the houses which meet the inclusion criteria need to be surveyed.

The cross sectional survey estimated a sample of size 1780 requiring 1780/34 = 52.3 rounded to 55 or 60 under five to selected per village. The sampling frame consisted of villages having more than 55 eligible members. Only one eligible member from each household was included in the study.

Conclusion

EPI cluster sampling is a simple, faster and low cost measure of performing cluster surveys compared to simple random and stratified random sampling method. One of the important things to remember is that the sampling error decreases as the number of clusters increases. At the same time this measure can result in estimation bias and differences compared with simple random or stratified random sampling. The household survey was conducted in a District of Karnataka state. The selection of villages and the household selection is the description in this article.

Ethical Clearance: Ethical clearance received from Institutional Ethics Committee (IEC07/2014).

Source of Funding: Self

Conflict of Interest: Nil

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Radiological Study on the Anterior Loop of Inferior Alveolar Nerve

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Abstract

Aim: The inferior alveolar nerve, branch of the mandibular nerve consists of an anterior looping at its end which acts an important factor during certain dental procedures such as implant placement. The principle aim of this study is to scrutinise the anterior loop of inferior alveolar nerve using cone beam computed tomography.

Methodology: Thirty CBCT scans were evaluated among which, 16 of them were males and 14 of them were females and was visualised with Planmeca romexis software. The anterior loop was measured bilaterally. In the axial slices, the radiolucent canal was traced beyond the mental foramen. This measurement was reconfirmed by taking measurements in the panoramic scale by tracing the canal anterior to the mental foramen using the nerve tracing tool.

Results: From the data obtained, it was seen that the maximum length of the inferior alveolar nerve on the left side was 12mm and the maximum length of the inferior alveolar nerve on the right side was 15mm. The mean length of the loop on the left side was 1.07mm and 2.217mm on the right hand side. The mean length of the inferior alveolar nerve on the left side was found to be 2.21mm and on the right side, the mean length of the nerve was 5.04mm.

Conclusion: The anterior loop of inferior alveolar nerve is discernible in the orthopantamograph. This study helps to establish the anterior loop more clearly in the CBCT and also ensures the safe placement of implant away from the mental foramen.

Keywords: *Mental foramen, CBCT, paraestheisa, planmeca, romexis.*

Introduction

The mental foramen is one of two foraminain the body of the mandible at an equal distance from the superior and the inferior border and it is located below the interval between the premolars, and mental nerves and vessels passes through it. They occur as a pair and are either round or oval. The mean vertical diameter on the right and left are 2.3±0.64mm and 2.29±0.6mm and the mean horizontal diameter are 2.63±0.85mm and 2.61±0.85mm.[1] The mental nerve, a terminal branch of inferior alveolar nerve and the mental vessels leave the mandibular canal through it.[2] The mental foramen has a tendency to migrate inferiorly with ageing.

The mandibular nerve is the third and most inferior division of the trigeminal, or fifth, cranial nerve. The upper branch of the trigeminal nerve is the ophthalmic nerve, which innervates the forehead.The middle branch, the maxillary nerve, innervates the maxilla and the midface. The lower branch, the mandibular nerve,

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innervates the teeth and the mandible, the lateral mucosa of the mandible, and the mucosa and skin of the cheek, lower lip, and chin.[3] The Inferior alveolar nerve (IAN) is a branch of the posterior division of the mandibular nerve that contains both sensory and motor fibers. It enters the mandibular foramen, runs in the mandibular canal, and supplies the mandibular teeth. It leaves the mandibular canal through the mental foramen as the mental nerve. Within the canal, the nerve is about 3 mm in diameter, and its course varies. It can run with a gentle curve toward the mental foramen, or it can have an ascending or descending pathway. [3]

The inferior alveolar nerve may extend beyond the mental foramen in an anterior and inferior direction, curving back to the mental foramen and forming a loop, which has been termed the anterior loop of the inferior alveolar nerve of the mental nerve or of the mandibular canal. Although it is a benign anatomical variation, its accurate identification is very much essential for surgical planning, particularly for dental implant placement, in order to prevent iatrogenic complications. [4] Damage to the anterior loop of the inferior alveolar nerve will result in mental nerve damage which in turn may result in paraesthesia, dysthesia, or even overt pain in the area innervated by the mental nerve. The mental nerve supplies sensation to the labiomental area and gingival tissue upto the mandibular second premolar.[5] Altered sensation in the region may impede the ability to perform routine activities like eating, shaving, speaking, tooth brushing etc. Therefore, the anterior loop of inferior alveolar nerve should be identified accurately so as to enhance the outcome of the surgical procedures done in that area. [6]

Cone-beam computed tomography (CBCT) presents various advantages, such as allowing the three-dimensional (3D) assessment of craniofacial structures without distortion or overlapping images, in addition to a lower radiation dose than multislice CT. [7]

It is very important to precisely identify and to preserve neurovascular bundles in order to avoid sensorineural damage in the interforaminal region. The aim of this study was to use the CBCT scans to evaluate the prevalence and extent of the anterior loop of the mandibular canal.

Materials and Method

In this study, the anterior loop of inferior alveolar nerve was identified using the cone beam computed tomography. Thirty CBCT scans were evaluated and visualized with Planmeca romexis software.

The anterior loop was measured bilaterally. In the panoramic slices, the radiolucent canal was traced beyond the mental foramen. Then, panoramic slices were moved upwards or downwards according to the requirement. This measurement was reconfirmed by taking measurements in the panoramic scale by tracing the canal anterior to the mental foramen using the nerve tracing tool.

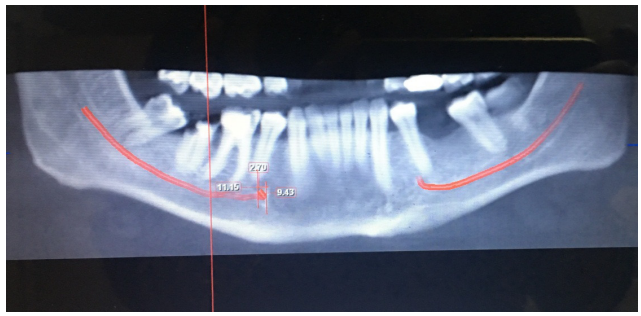


Figure 1: Panoramic slice showing the loop

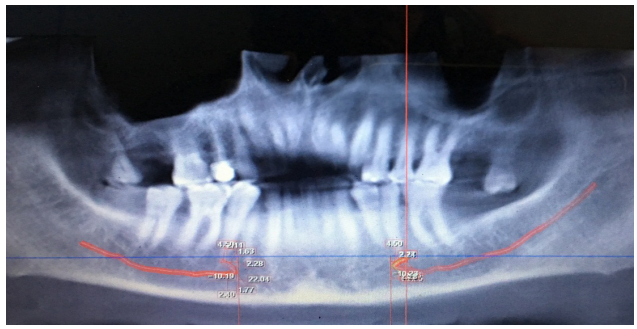


Figure 2: Panoramic slice showing the loop

Results

Among the thirty CBCT scans that were evaluated, 16 of them were of males and 14 of them were of females. The minimum age group of the participants was 16 years and maximum was 72years. The mean age group was found to be 53.50. The maximum length of the anterior loop on the left side was 6cm whereas the maximum length of the anterior loop on the right side was found to be 6.4mm. On the other hand, the maximum length of the inferior alveolar nerve on the left side was 12mm and the maximum length of the inferior alveolar nerve on the right side was 15mm. The mean length of the loop on the left side was 1.07mm and 2.217mm on the right hand side. The mean length of the inferior alveolar nerve on the left side was found to be 2.21mm and on the right side, the mean length of the nerve was 5.04mm.

On comparing the length of the loop on the right and the left side, the p value was found to be p<0.05. The length of the inferior alveolar nerve on the right and the left side was compared and the p value was p<0.01

Table 1: The mean length of the loop and nerve for the left and right side

	N	Mean	Std. Deviation
Length of Loop-Left	30	1.07	2.001
Length of Nerve-Left	30	2.21	4.112
Length of Loop-Right	30	2.217	2.3984
Length of Nerve-Right	30	5.04	5.477

Discussion

The inferior alveolar nerve enters the mandibular bone through the mandibular foramen and runs inside the mandibular bone in the mandibular canal, which ends at the mental foramen, although it may present an anterior loop and which has ethinic variations. [8]At that location, the mental nerve emerges to innervate the inferior lip, chin and buccal gingiva. A smaller branch (i.e. the incisive nerve) continues within the mandibular bone to innervate the anterior teeth. The inferior alveolar nerves supply sensation to the lower teeth. The terminal portion of the inferior alveolar nerve may pass beyond the anterior rim of the mental foramen, before curving back to exit the mental foramen. The portion of the inferior alveolar nerve anterior to the mental foramen is termed the anterior loop of inferior alveolar nerve. [9]

One of the most severe complications when performing intraoral surgical procedures is the injury of the inferior alveolar nerve.[10] Nerve damage can be manifested as paresthesia, dysesthesia, analgesia or anesthesia. The predominant nerve injuries have occurred secondary to surgical procedures in the mental foramen area.[11-13] Although panoramic radiography may be useful, it is not completely adequate to identify the mental foramen. Hence a multiplanar imaging like CT /CBCT is essential to study its morphology.

In the study conducted by Xiao Li et.al, on sixty-eight Chinese,patients were scanned by 64-slice spiral computed tomography, and the prevalence, length, and position of the anterior loop were assessed. An anterior loop could be identified in 83.1 % of the cases, with a mean length of 2.09 mm. The mean distance from the superior border of the mental foramen to the alveolar crest was 13.00 mm, and the mean distance from the superior border of the origin of the anterior loop to the alveolar crest was 17.83 mm.[14] However, this study is in accordance with our study.

Another study conducted by Zeba et al, a cross-sectional study was conducted in which a total of 1075 patients reported for CBCT scan at randomly selected Diagnostic and Research Centre (Delhi-NCR), India, during the period of study (January 1, 2014 to December 31, 2014. In this study, out of 193 CBCT scans evaluated, anterior looping of IAN was identified in 72 (37.3%) CBCT scans. Prevalence of anterior looping of IAN was 40.4% among male and 33.7% among female study subjects.[15] In our study, the mean length of the anterior loop on both sides were compared and analyzed which is indifferent from the study conducted by Zeba et al.

Kheir MK et al, had done a study in an Iranian population 180 projections were analyzed in different sectional planes. The results showed that 32.8% of images had anterior loop. The mean lengths of anterior loop in the right and left sides were 2.69 mm deviation and 2.36 mm, respectively. [16] There were no statistically significant differences between the mean lengths of the anterior loop in both sides. However, in our study the mean length was different between the sides probably due to ethnic varation

Eduarda Helena Leandro do Nascimento et al, had conducted a study in a Brazilian population. CBCT images from 250 patients obtained for various clinical indications were randomly selected and evaluated to determine the presence and length of the anterior loop. The length of the anterior loop was then compared based on gender, age, and the side of the mandible. The data were analyzed using the Pearson chi-square test and linear regression analysis. An anterior loop was identified in 41.6% of the cases, and its length ranged from 0.25 mm to 4.00 mm (mean, 1.1±0.8 mm). The loop had a greater mean length and was significantly more prevalent in males (p=0.014). [17] No significant differences were found between the right and left sides regarding length (p=0.696) or prevalence (p=0.650).The p value in our study after comparing the length of the loop on both the sides was found to be p<0.05.

In the study conducted on Mexican participants by Del Valle Lovato Juan et al, Fifty-five computed tomography (CT) scans were made and were visualized with In Vesalius software. Anterior loop measurements were made on 3-dimensional surfaces. Ninety percent of participants showed the anterior loop of the inferior

alveolar nerve. The length of the anterior loop ranged between 0 and 6.68 mm, with a mean of 2.19 mm. No significant differences were found between the left and right sides or between men and women.[18] In our study the length of the anterior loop ranged between 0 and 6.4mm, with a mean of 1.07mm on the left side and 2.217mm on the right side.

Maryam Rastegar Moghddam et al conducted a study in the Iranian population. The anterior loop was observed in 106 quadrants (23.5% of 451 quadrants) of 95 patients (40.6% of 234 patients), of whom 11 had bilateral anterior loops. The mean anterior loop length was 2.77 ± 1.56 mm (95% CI: 2.5-3.1 mm), without significant sex differences. [19]This research is in absolute accordance with our study.

Conclusion

There are various studies conducted to determine the location of inferior alveolar nerve prior to the implant placement procedure and there are very few studies regarding the anterior loop of inferior alveolar nerve.In this context, this study is an important addition to the existing literature. This study indicates the presence or absence of the loop using the cone beam computed tomography scan. The anterior loop on right and left side of the mandible was evaluated and measured. The longest length of the anterior loop was found to be 2.77mm whereas the minimum length of the anterior loop was 1.07mm. The measurement was typically made easier by the three-dimensional method of CBCT. The inferior alveolar nerve on both the sides of the mandible was also measured and compared.

Ethical Clearance: The data used for the study was from the retrospective data available in the Radiology department. Further the patients sign a consent form to use their clinical data except photographs for research purpose, the Institutional Ethical Committee, SIMATS felt that a clearance is not required.

Conflict of Interest: Nil

Funding: Self Funded

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Refugee Women: Problems and Health Concerns

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Abstract

Record numbers of people, across the world, are forced to be displaced because of conflict or other violations of their human rights, thus becoming refugees. Often, refugees not only have a higher burden of disease but also compromised access to healthcare, as they face many barriers, such as limited knowledge of the local language. However, there is very limited knowledge on the lived experiences of this population. Moreover, the strategies people might develop in their efforts to access healthcare have not been explored in depth, despite their value in establishing peer-support, community based programs.

This paper is an attempt to discuss the issues concerning the refugee women and children and the steps taken by the Government of India and other organizations in addressing such issues in order to stabilize the socio-economic status and attainment of basic human rights for such women and children.

Keywords: *Access to healthcare, Disadvantage, Refugees, Refugee and asylum seeker healthcare, Women's health.*

Introduction

On 10.12.1948, the Universal Declaration of Human Rights proclaimed that "all the human beings are born free and equal in dignity and in rights without distinction of any kind."[1] Yet, displacement since 1948 has risen on account of armed conflict within the states, persecution and other serious human rights violations. Such unstable environment further leads to sex discrimination and inequality wherein women and children are identified as most vulnerable. These women and childrenare exposed to particular protection problems related to their gender, cultural and socio-economic position and legal status. International displacement especially, weakens the existing community and family protection mechanism and exposes such refugees to a range of human rights violations, including sexual and gender-based violence ("**SGBV**"), abuse and exploitation[2]. As of 2014, India has been a host to more than 2 lakh refugees in India according to the United Nations High Commissioner for Refugees ("**UNHCR**")[3] from Tibet, Sri Lanka, Bangladesh, Afghanistan, Myanmar, Iran, Iraq and even to the Pakistani Hindus, (many of these refugees being women & children) even though India does not have any particular national refugee protection legislation in place. Thus, it is the Indian Foreigners Act, 1946 applies to all classes of non-nationals, including refugees and asylum seekers, and the refugee policy is determined on an ad hoc basis, however, in general India respects the principle of non-refoulement of the UNHCR.

Status of Women and Children Refugees in India: Since India is not party to the Conventions relating to the Status of Refugees, 1951 and Protocol Relating to the Status of Refugees, 1967 (collectively referred to as "**1951 Convention**"), the status of refugees in India is governed mainly by political and administrative decision rather than any codified law[4] on an *ad hoc* basis as stated above. The *ad hoc* nature of the Government's approach results in varying treatment of different refugee groups. The lack of a strong teethed refugee policy means the refugees may be at the subjective and ideological discretion of every incoming government. For instance, the current government in India is more adamant on refusing migrants belonging to the religion of Islam from entering the country from the eastern borders without appropriate permissions and approvals. Some groups are granted the entire gamut of benefits including, legal residence and the ability to the legally employed, while the others are criminalized and denied access to the basic social resources. To enable the refugee and asylum-seekers basic support, the UNHCR set upits operation in New Delhi[5], India in 1981. UNHCR in India conducts Refugee Status Determination

("**RSD**") procedures, which involves a detailed process to registration of individual refugees in order to enable them the protections and provisions meant enabled for refugees in India. UNHCR also provides a range of services to support the refugees and asylum-seekers in health, education, legal counselling, vocational skills and livelihood. UNHCR has certain centers across India, which implement the aforesaid services:

a. Socio-Legal Information Centre (Delhi): provides legal assistance to protect persons under the UNHCR mandate;

b. Bosco (Delhi): Assists refugees in accessing government hospitals, dispensaries and other medical facilities;

c. Gandhi National Memorial Study (Pune): assists refugees and asylum-seekers in Pune;

d. Confederation of Voluntary Agencies (Hyderabad): assists refugees and asylum-seekers inHyderabad;

e. Development and Justice Initiative (Jammu, Mewat and Jaipur): assists refugees and asylum-seekers in Jammu, Mewat and Jaipur;

f. UNHCR along with its partner, Delhi Police, has been organizing self-defense training for refugee women;

g. UNHCR also endeavors that all refugee and asylum-seeker children attend public schools. This has been corroborated by the passing of the Right of Children to Free and Compulsory Education, 2009, under which every child between the age of 6-14 years has the right to free and compulsory education.

a. Sri Lankan Refugees:

(i) Even though the Indian Government provides basic medical care and free education till Class XII, including free course readings, uniforms, bicycles, noon meals, transport passes and tablets to school-age Sri Lankan Childrenas well as subsidized food grain for the camps' inhabitants, they are not permitted the free movement within India. Furthermore, these camps are generally poor with insufficient health and sanitary facilities.

b. Burmese Refugees:

(i) While the access to education is formally ensured for every child, however, educational institutions require a birth certificate and papers for registration and fees, which refugees cannot always provide. In government schools, the medium of instruction is Hindi, which acts as a barrier to education. Further, the cultural differences and language barriers prevent assimilation, and cases of bullying and safety concerns result in the children being sent to school catering for Burmese Community such as Prospect Burma.[6]

c. Majority of the Burmese women are from the Chin state–and they are uneducated, unskilled, with no abilities and thus lack the skills to adapt to the day to day skills of city life. They are also poor, are usually widows and/or the heads of families and are forced to live in overcrowded accommodation in highly unsanitary conditions. In addition to taking care of the family members, these women also work to provide for them. Such women refugees are regularly harassed at work, and if they work at night shifts, the risk of harassment and assault increases even more. Because of their peculiar status, they are wary to approach for police protection, even if they are victims of crime.

d. Somali Refugees:

(i) Majority of the Somali community in India cannot speak English or Hindi and are even discriminated against, because of their ethnicity. Somali women face, particular problems in accessing transport, healthcare and education, they are subjected to prejudicial treatment and unwarranted scrutiny on the suspicion of human trafficking, prostitution and drug rackets.

(ii) In the *"Urban Profiling of Refugee Situations in Delhi: Refugees from Myanmar, Afghanistan and Somalia and their Indian Neighbours: A Comparative Study"*, 35% Somali refugees do not have any education. And Somali refugees have reported that they frequently need to face discrimination at the government schools and sit in a class without seats and at alternate times, they were made to sit at the back of a classroom. Further, they even have to confront verbal and physical abuse by their classmates and even instructors and returned with wounds from school.[7]

e. Afghan Refugees:

(i) A large population of the Afghan community are widows and single mother Workers in

the informal sector and work very long hours and Afghani Muslim women are particularly discriminated against.

(ii) Even though education is open to all Afghan refugee children, most Afghan boys only study up to primary level before startingwork to support their families. The dropout rate among Afghan girls is also high in the primary level, in order to take care of ill relatives, they are engaged/married off, or for financial reasons.

f. Pakistani Hindu Refugees:

(i) Even though the children of Pakistani Hindu Refugees are born in India and are natural citizens of India, however, they are not eligible for jobs in the government sector.[8]

g. Rohingya Refugees:

(i) Out of all the Refugees, the Narendra Modi-led government has taken the most stringent stand on the Rohingya refugees. Thus, the conditions for such refugees are abominable, where women are afraid to step out of the camps, and during the monsoon the children reportedly got bitten by snakes[9]. Because the Rohingya do not have identity documents, they cannot send their children to government schools or even use health services at government hospitals.[10]

(ii) Further in Salehdi, a refugee camp in northern India, the situation is dire for pregnant women, mothers and their new-born children apart from the general population where hunger is a constant. The women are falling sick with diarrhea from the dirty water they have to drink, robbing their fetuses and breastfeeding children of critical nutrients. Others are deprived of iron in their diets, leading to anemia and heightened risk of giving birth prematurely.The nutritional status of the Rohingya refugees has suffered without guaranteed access to housing and public relief and assistance programs.[11]

(iii) Most expectant Rohingya mothers are blocked from access to a basic maternity benefit program that provides pre-and post-delivery care and vaccinations for new-borns. They are also locked out of the *Pradhan Mantri Maternity Scheme*, which provides lactating mothers with roughly $100, which they could use to buy food and improve their diet.

With lack of any detailed refugee laws, the refugees from different nationalities have varying treatment in India. Even thoughthe Constitution of India, 1950 ("**Indian Constitution**") is empowered to regulate citizenship and naturalization. Accordingly, the Parliament passed the Citizenship Act of 1955 ("**Act**"), which has been amended twice since, once in 1986 and later in 2003. Section 3 of the Act regulated the citizenship by birth between 26.01.1950 to 01.07.1987, however, one such parent ought to be an Indian. Thus, despite the refugee children having been born in India are not granted the Indian citizenship and have even fought their basic fundamental rights. One such case is of Namgyal Dolkar. Even though she was born in Kangra, Himachal Pradesh in April, 1986, she was denied many opportunities on account of being a foreigner. However, the Delhi High Court vide its order[12]explicitly stated that Ms. Dolkar was indeed a citizen under the Indian Constitution.

I. Steps Taken by the Indian Government & Other Organizations

1. Despite such failures, the Indian Government has taken various steps to mitigate the risk that basic fundamental rights are not deprived to the refugees in India, with particular attention to women, girls & children. Firstly, the 2013 Criminal Law (Amendment) Act ("**Amendment Act**") that came into effect on 03.02.2013, whereby the Indian Penal Code, 1860 ("**IPC**") was amended as well as certain new sections were included with regard to various sexual offences, including acid attack, sexual harassment, voyeurism, stalking.

2. Further, as per the Amendment Act, the police will be penalized for failing to register First Information Reports. The Amendment Act introduced unprecedented provisions in the IPC which amended the legal provisions to protect the privacy of individuals. The reported instances of SGBV affecting refugee women & girls have reduced by 20% in 2015 due to improved national response on SGBV and inclusion of refugees in national DGBV prevention and response mechanism and programs.[13]

3. Another key facet which one needs to take a note of is the proactive support of the Indian Judiciary to these communities as a flag bearer

of human rights and custodian of the Indian Constitution. The Indian Judiciary, especially the Supreme Court of India has progressively interpreted Articles 14 and 21 of the Indian Constitution, particularly bearing in mind the tenets of Universal Declaration of Human Right, 1948, resulting in effective protection of refugees in India. For instance, the Apex Court in *Vishaka v. State of Rajasthan (1997)*, stated that international law and the municipal law ought to be interpreted harmoniously, in conjunction with each other, and in the absence of any domestic law occupying the field, the contents of International conventions and norms are significant for the purpose of interpretation of Articles 14 and 21 of the Constitution of India.

4. The Apex Court has been sympathetic towards the cause of refugees in India and has stitched many rights of the refugees within the four folds of the Indian Constitution. In the case Hans Muller of Nurenberg v. Supdt. Presidency Jail (1955), The Supreme Court has held that despite a good cause, extradition being a discretionary right of the government may refuse so. In interpreting the Foreigners Act, the Apex Court stated that the power to make order under Section 3, vests with the Central Government, and even though subordination of power is permissible, the same ought to be used judiciously, setting aside the order passed by the district superintendent of police. The fundamental rights of the foreigners in India, however, Luis De Raedt v. Union of India (1991), the Apex Court held[14] are restricted only to Article 14 and 21 of the Indian Constitution and does not include the right to reside and settle in India, as specified in Article 19(1)(e), which is applicable only to the citizens in India.

    a. *Development and Justice Initiative ("***DAJI***"):* DAJI, a registered public charitable Trust in New Delhi as a public charitable Trust, works mainly with urban poor, migrant workers, refugees and displaced people. It is particularly concerned with rights and safety of children, women, and elderly, differently abled people, Dalits, Minorities and Indigenous Peoples.

    b. *Save the Children India (***"SCI***"):* Started in 2008, SCI India is working in 18 states in India and has reached more than 9 million children, including 2.7 million in 2017. SCI strives to provide quality education, healthcare, protection from harm and abuse and life-saving aid during emergencies to children. As a UNHCR-implementing partner SCI seeks to reduce the vulnerability of refugees/asylum seekers especially women, children and youth to protection risks by enabling them to meet their basic needs.

Conclusion

We stand at a juncture where diplomatic relations amongst the International Community is at its weakest. The ongoing conflicts in the West Asia and North Africa region and countries like Venezuela, Myanmar etc. is leading to the emergence of a Global Refugee Crisis. However, the untiring efforts of the United Nations coupled with the efforts of the nations like Canada and European Union, specially Germany have stepped in right direction to give protection to these refugees and have helped keeping a check on the refugee problem. This is a ray of hope in an otherwise emerging global crisis.

But, unfortunately at the same time, the increase in the number of asylum seekers all over the world during the past few years has led to the diminishing of protection space laying a heavy burden on the economies and resulting in specific terrorist attacks supposedly based on religion. Against the broader background of the difficult socio-economic conditions, the tradition of tolerance has been undermined. This has led to countless women and children fetching for their lives on the roads. Certainly, one can understand the concerns of the government relate to the limited resources and the land mass which is already overburdened by the ever-growing population and the threat to national security. However, this should not be an excuse for the genuine cases. The progress made in India as a stakeholder of emancipation of refugees especially women and children is commendable. But we still have a long road ahead of us in the field of refugee rights. The key stakeholders in the International arena including India should throw light onto this problem. The plight of these vulnerable women and children should change and to bring in such change and strong teethed concrete law should be enforced. Policy makers have time and again attempted to persuade the government to

make a more liberal enactment for opening the doors of India to these refugees.

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Investors Attitude Towards Investment in Private Insurance Companies in Madurai City, Tamil Nadu State

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Abstract

The business of insurance is concerned with the economic values of assets. Every asset has a value. The asset would have been created through the efforts of the owner, in the expectation that, either through the income generated there from or some other output, some of his needs would be met. The main objective of the study is to analyse the various investment options of the investors and to study the customers' perception on investing in private sector insurance companies. The secondary objectives of this study include analysing, the investing habits of the investor, the factors influencing the investor in investing in insurance. This study is compiled with the help of primary data and secondary data. Primary data were collected from 260 respondents with the help of structured Questionnaire method in various places in Coimbatore city. Cluster Random sampling technique has been adopted to select the respondents. The Secondary sources of data are company profile, organization Website and other related library books. The Simple Percentage analysis, Weighted Average Method for ranking was used for analysing the collected data.

Keywords: *Private Insurance, Investment, Individual attitude, market risk, insurance policy.*

Introduction

The business of insurance is concerned with the economic values of assets. Every asset has a value. The asset would have been created through the efforts of the owner, in the expectation that, either through the income generated there from or some other output, some of his needs would be met. However, the assets get lost earlier being destroyed or made non-functional, through an accident or other unfortunate event, the owner and those deriving benefits there from suffer. Insurance is a mechanism that helps to reduce such adverse consequences.

Importance of Insurance: Assets are insured, because they are likely to be destroyed or made non-functional through an accident occurrence. Such possible occurrences are called Perils. Fire, floods, breakdowns, lighting, earthquakes, etc., are perils. The damage that these perils leads to the asset known as the risk. The risk only means that there is a possibility of loss or damage. It may or may not happen. There must be an uncertainty about the risk. Insurance is done against the contingency that it may happen.

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Objectives

1. To identify the investors' attitude towards various investment alternatives
2. To study the customers' perception on investing in private sector insurance companies.
3. To analyze the factors influencing the investor in investing in insurance
4. To determine the Sector and Plan Preferred by investors.
5. Toanalyze the factors influencing the investor in investing in Private insurance companies.

Need for the study: The last few years have been a watershed for assured return plans. As the insurance sector has developed, there's been a growing acceptance by most policyholders that the assured return era is a thing of the past. The private insurance companies are focusing on the Market Linked Plans. This study aims to

study the investors' attitude towards various investment alternatives and to study the customers' perception on investing in private sector insurance companies. The study would also analyse the acceptance level of Market Linked Plans, which is being the current era. This has been done by preparing the questionnaire which contains questions put forth to the perspective investors which would help in analyzing the profile and investing habits of the investor, factor influencing the investor in investing in insurance and level of acceptance of private insurance companies.

Limitation of the Study: The area of study is limited to various places Madurai city; hence the results may not be true for other geographical areas. Validity & Reliability of the data are obtained depends on the responses from the customer.

Research Methodology: Research is an intensive study in a particular field to achieve at a better conclusion of a problem. Research Methodology is a systematic way of solving the problem. The methodologies followed for this study are as follows.

Nature and Sources of Data: Both primary and secondary data is used in this study in order to meet the requirements of the purpose. Under this study primary data was collected by using Questionnaire. The primary data was collected from individuals residing in Madurai city with the help of questionnaire. The secondary data are sourced from Life Insurance Companies, Magazines, Books, Pamphlets, Periodical Surveys and Websites etc. The data collection has been done through questionnaire by means of personal interview. A questionnaire is consisting of a number of questions printed in a definite order on a form.

Sample size: Since the population of Madurai city is large in number, researcher was unable to collect information from all individuals due to limitation of time, so part of the population is taken for analyzing and generating the findings, which is applicable for total market. The size of the sample is 260.

Sampling Method: Cluster Random Sampling Method is used, as data are collected according to the clusters divided. The city is mainly divided into four clusters, like North, South, East and West. A total of 65 samples were collected from each cluster due to the limitation of time by the researcher.

Tools Used: The collected data were analyzed with the help of Simple Percentage analysis, Chi-and Weighted Average Method.

Review of literature

Brigid Goody Sc. D, Renee Mentnech M.S and Gerald Riley M.S.P.H[1] in their article, over the last decade, various laws have been passed to increase the likelihood that lower income individuals and families would have access to health insurance coverage. Through the Health Insurance Premium Payment Program enacted in 1990, States could use their Medicaid funds to pay the employer-sponsored health insurance premiums of Medicaid eligible individuals and families.

Chang Hoon You, et al[2] in their research article, It was confirmed that diabetic patients insured by SPHI had more use of hospital services than those who were not insured. People insured by SPHI seem to be more likely to use hospital services because SPHI lightens the economic burden of care.

Avi Dor, Joseph Sudano and David W. Baker[3] In this paper we investigate whether the presence of private insurance leads to improved health status. Using the Health and Retirement study we focus on adults in late middle age who are nearing entry into Medicare.

Subba Lakshmi Tirukoti[4] The paper explores the reasons for purchasing private health insurance and to identify the determinants of private health insurance in East Godavari District of Andhra Pradesh. Economic development programs should help enhance income to reach a higher standard of living and in doing so boosts their economic access to health insurance policies and the relevant health services.

Minsung Sohn and Minsoo Jung[5]: The moral hazard behind insurance membership, depending on how NHI maintains policies to confer benefits, may give rise to differences in medical utilization. This phenomenon must be closely monitored to find a way to reform NHI when the rights of medical service consumers are solidified through PHI.

Influencer of the Investors: There are many influencer for the insurance policy. On our study there are 5 major influencers, such as Auditors, Family influence, word of mouth by friends, Advertisement in Electronic media and Articles through dailies, magazines and other written advertisement.

Table 1: List of Influencers for Investment Decision

S.No.	Influencers	No of Respondents	Percentage
1.	Auditor	22	8.46 %
2.	Family	100	38.46 %
3.	Friends	50	19.23 %
4.	Advertisement	32	12.31 %
5.	Article	31	11.92 %
6.	Others	25	9.62 %
	Total	260	100 %

Source: Primary Data

From table 1, it can be viewed that, 38.46 % of the Respondents are influenced by Family,19.23 % of the Respondents are influenced by Friends,12.31 % of the Respondents are influenced by Advertisement, 11.92 % of the Respondents are influenced by Article,8.46 % of the Respondents are influenced by Auditors and9.62 % of the Respondents are influenced by others.

Table 2: Objectivein Investment

S.No.	Objective	No of Respondents	Percentage
1.	Return	71	27.31 %
2.	Tax Benefits	52	20 %
3.	Security	83	31.92 %
4.	Children	54	20.77 %
	Total	260	100 %

Source: Primary Data

From table 2, it is clear that 32 % of the respondents choose Security as their Objective in Investment,27.31 % of the respondents choose to return as their Objective in investment,21 % of the respondents choose Children as their objective in Investment, 20 % of the respondents choose tax benefits as their objective in investment.

Table 3: Sector Preferred by the Respondents

S.No.	Sector	No of Respondents	Percentage
1.	Public	192	73.85 %
2.	Private	66	25.38 %
3.	Nil	2	0.77 %
	Total	260	100 %

Source: Primary Data

From table 3, it can be viewed that,74 % of the respondents prefer only Public-Sector Insurance Companies,25 % of the Respondents prefer only private sector insurance companies,1 % of the respondents does not prefer any sector.

Table 4: Factors Influencing to Gofor Private Life Insurance Company

S.No.	Factors	No of Respondents	Percdntage
1.	Service	58	22.31 %
2.	Return	69	26.54 %
3.	Security	40	15.38 %
4.	Premium Amount	20	7.7 %
5.	Flexibility	23	8.85 %
6.	Market Linked Plans	32	12.31 %
7.	Nil	18	7 %
	Total	260	100 %

Source: Primary Data

From table 4, it can be viewed that, 26.54 % of the Respondents has given Return as the Influencing Factor to go for Private Life Insurance companies,22.31 % of the Respondents has given Service as the Influencing Factor to go for Private Life Insurance companies,15.38 % of the Respondents has given Security as the Influencing Factor to go for Private Life Insurance companies,12.31 % of the Respondents has given Market Linked Plans as the Influencing Factor to go for Private Life Insurance companies, 8.85 % of the Respondents has given Flexibility as the Influencing Factor to go for Private Life Insurance companies, 7.7 % of the Respondents has given Premium Amount as the Influencing Factor to go for Private Life Insurance companies,

Table 5: Expectation overinvestment Using Weighted Average Method

Rank Weight (X)	1 5	2 4	3 3	4 2	5 1	Total	Weighted Average	Rank
Rate Of Return (y1)	69	74	62	36	19	260		
x.y1	345	296	186	72	19	918	3.53	2
Security (y2)	123	62	28	34	13	260		
x.y2	615	248	114	68	13	1058	4.07	1
Liquidity (y3)	9	29	54	63	105	260		
x.y3	45	116	162	126	105	554	2.13	5
Tax Benefit (y4)	37	65	53	54	51	260		
x.y4	185	260	159	108	51	763	2.93	3
Service (y5)	22	30	63	73	72	260		
x.y5	110	120	189	146	72	637	2.45	4

From table 5, it is inferred that,the respondents have ranked security as first in respect to expectation over investment. The respondents have ranked Rate of Return as recond in respect to expectation over investment and they have ranked Liquidity as Fifth in respect to expectation over investment.

Table 6: Ranking of Private Life Insurance Companies Using Weighted Average Method

Rank Weight (X)	1 11	2 10	3 9	4 8	5 7	6 6	7 5	8 4	9 3	10 2	11 1	Total	WA	Rank
HDFC	30	84	44	22	15	10	7	6	12	5	8	243		
X.Y1	330	840	396	176	105	60	35	24	36	10	8	2020	8.3	1
MAX	4	7	11	29	32	26	16	27	37	36	18	243		
X.Y2	44	70	99	232	224	156	80	108	111	72	18	1214	5	9
ICICI	71	29	34	17	20	12	9	11	9	18	13	243		
X.Y3	781	290	306	136	140	72	45	44	27	36	13	1890	7.8	2
KOTAK	15	14	14	20	31	32	27	22	37	17	14	243		
X.Y4	165	140	126	160	217	192	135	88	111	34	14	1382	5.7	7
BIRLA	19	18	21	27	27	26	31	27	18	13	16	243		
X.Y5	209	180	189	216	189	156	155	108	54	26	16	1498	6.2	4
TATA AIG	10	29	17	25	17	34	31	28	25	16	11	243		
X.Y6	110	290	153	200	119	204	155	112	75	32	11	1461	6	5
SBI	47	28	25	17	27	14	22	16	11	20	16	243		
X.Y7	517	280	225	136	189	84	110	64	33	40	16	1694	7	3
ING VYS	21	15	23	13	19	28	30	36	18	18	22	243		
X.Y8	231	150	207	104	133	168	150	144	54	36	22	1399	5.8	6
BAJAJ	7	7	19	34	22	25	27	20	40	25	17	243		
X.Y9	77	70	171	272	154	150	135	80	120	50	17	1296	5.3	8
AVIVA	8	6	28	14	22	12	17	25	26	40	45	243		
X.Y10	88	60	252	112	154	72	85	100	78	80	45	1126	4.6	10
METLIFE	10	6	8	25	12	24	24	24	13	32	65	243		
X.Y11	110	60	72	200	84	144	120	96	39	64	65	1054	4.3	11

From table 6, the respondents have ranked HDFC Standard Life Insurance Company as first in private life insurance companies, ICICI Prudential Life Insurance Company assecond, SBI Life Insurance Company as third in Private Life Insurance companies. Likewise, the respondents were not much aware of the two new

recently entered insurance companies, AMP Sanmar Life Insurance Company Ltd and Sahara India Insurance Company Limited, so default these companies were ranked last.

Findings: From the study the following findings have been made:

1. Most of the respondents are salaried people.
2. Most of the respondents choose Security as first and rate of return as their second it expectation over investment.
3. Most of the respondents are influenced by family and friends to make the investment decision,
4. Majority of the respondents' objective on investment is Security and Return.
5. 78 % of the respondents accept insurance as agood investment Option.
6. 74 % of the respondents prefer only public sector.
7. Majority of the respondents do not have a plan to go for private life insurance in future.
8. Majority of the respondents are influenced by benefit factor to take life insurance policy.
9. The respondents have ranked HDFC and ICICI private life insurance as the mostly preferred companies.
10. Majority of the respondents i.e., 62% preferbonus-based plans.

Suggestions: Since Security and Return is the main expectation of investors, it is suggested that this aspect be reinforced while wooing prospective investors. The annual income of most of the respondents are below 1 lakh and this segment goes for investment in insurance. It is suggested that while marketing this segment be considered. The awareness of LIC is most and other private insurance companies remains untapped. It is suggested that an attempt be made to bring out the advantages of other companies and schemes. Only few Respondents have plan to go for private life insurance, so the schemes and advantages of private insurance companies must be promoted greatly. While dealing with prospective investors, according to their occupation the objective on investment varies, so this factor should be considered the most. The awareness of market linked schemes to the people is low. The respondents who prefer return as their investment option will prefer Market linked pans when its advantages known, so steps should be taken in this area to create good awareness.

Conclusion

It has been found that the salaried person is more interested in having insurance as an investment avenue for various reasons. LIC and money back are the well-known company and scheme. The private insurance companies are accepted to certain extent only and it has to be tapped to greater extent. It has also been found that insurance advisor is the one, who are the main source of information on schemes and advantages of private insurance companies, to the investor.

Ethical Clearance: Completed.

Source of Funding: Self

Conflict of Interest: Nil

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The Economic Impact of FDI in Indian Chemicals Sector

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Abstract

With the increasing demand for the chemical products in global scenario, India has witnessed the significant growth in both chemical and petrochemical sector in the past decade. The increased flow of Foreign Direct Investment in the Chemical Industry in India has helped in the development, expansion and growth of the industry. The current study throws light on the economic impact of Foreign Direct Investment in Chemical and Petro-chemical industry. Chapter 1 exposes the current position of Indian Chemical Industries. Chapter two enlists the review of literature. Chapter three narrates the sector policy of Chemical industry. Chapter four analyses the Economic impact of FDI in Indian Chemicals Sector through SWOT analysis. Chapter five portrays the future scope of Chemical Industry. The last chapter concludes with imperative economic effects of FDI in chemical and petro-chemical industries.

Keywords: *Chemical industry, SWOT, FDI, Economic growth, PCPIR, Petrochemical.*

Introduction

The Indian Chemical industry is sixth largest in the globe and third largest in Asian continent by output and India is the fourth largest producer of agro chemicals after US, Japan and China, in case of the supply side. On the demand side, the Indian chemical industry is the sixth largest consumer of the chemicals of the world. The Chemical and petro chemical sector in India is an integral part of many major sectors like agricultural sector, Construction sector, leather industries etc. The highlighting criteria of Indian chemical industry growth are sufficient irrigation facility, innovation in indigenous research, raw materials availability, demand growth, low labour cost, largest peninsula and proximity to the Middle East countries, and low-cost production. Encouraging potentials of Agro chemical industry enlighten the performance of Indian chemical industry. The modern era of chemical industry has grown with investment regions scheme.

Review of Literature: The following studies supports the current research article with respect to FDI.

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Nadide Sevil Tuluce and Ibrahim Dogan[1] The influence of FDI not only affect the labour and capital market but also the trade patterns and economic growth. The FDI effects in the receiving country, extended to multinational enterprises (MNE) with specific economic advantages which is higher than the host country. The main specific advantage is the technology transfer from the parent firm to local firm which in turn the economy.

Mohammed Amin Almfraji and Mahmoud Khalid Alumsfir[2] The relation between the Foreign Direct Investment is significantly positive in most of the cases, while in few cases it is negative or even null. There are many factors which are influencing the relation between FDI-EG, such as Adequacy of man power, the well-built financial markets and services, Provision of exchangeability between domestic and foreign investment and the open trade operations, etc.

Jorge Bermejo Carbonell and Richard A Werner[3] The lion share of global FDI inflow directed to developed economy rather than developing economy.. Single-country case studies are to be conducted, due to the Complexity relationship between FDI and economic growth, and due the global impact of FDI on growth is said to be largest in liberlized, advanced developed countries with an educated and skilled workforce and well-built commercial and capital markets.

Majid Mahmoodi and Elahe Mahmoodi[4] The current study expresses the connectivity of developing economies of Europe indicates indicate bidirectional connectivity between GDP and FDI, and unidirectional connectivity from GDP and FDI to exports in limited time intervel. On the other hand, the developing countries of Asia, there is bidirectional connectivity between exports and economic growth in limited time intervel.

Niels Hermes and Robert Lensink[5] This study counter that the well-developed financial system is the pre-requisite for the Foreign Direct investment and which will result in positive significance, on economic growth. State of financial system is directly proportion to the process of technological diffusion with the FDI and collaborations.

V N Balasubramanyam, S Salisu and David Sapsford[6] This article is witness that, Foreign Direct Investment gains its importance in economic growth. Construction of theoretical framework, pave way to understand the role of FDI in the growth and size of the domestic market and secondly, the competitive climate in relation to local producers.

Sector Policy of Chemical Industry: FDI Inflows to Chemicals industry in India has increased over the last few years due to the several incentives that have been provided by the government of India. The increased FDI Inflows to Chemicals industry in India has helped in the growth and development of the sector. 100% FDI is allowed in chemicals under the automatic route in India.

In order to promote the foreign Direct investment, the Ministry of Chemical and Petro chemicals has set up set up PCPIRs (Petroleum, Chemicals and Petrochemical Investment Regions) as an integral part of Special Economic Zones. Under the PCPIR policy, Government of India has conceptualized PCPIRs in a cluster approach for promotion of Petroleum, Chemical and Petro chemical sectors in an integrated and environment friendly manner on a economies scale. It is to be noted that the PCPIR unit is a specifically delineated investment region having a land area of 250 sq. km approximately and minimum of 35 to 40 percent allotted for the processing activities. Chemical and petro-chemical ministry has constructed PCPIR in Vishakapatnam in the State of Andhra Pradesh, Dehej in the State of Gujarat and Paradeep in the State of Odisha and Cuddalore and Nagapattinam in the state of Tamilnadu. The expected Foreign Direct Investment out of these PCPIR about USD 117 billion, and planning to generate 34 lakh employment opportunities. As of now, we have received nearly USD 28 billion and 2.93 lakh persons are employed through these PCPIR.

The scheme aims to set up necessity based plastic parks and progress of a strong ecosystem along with provision of common facilities through cluster development approach. Indian government provides endowment finance up to 50% of the project cost, subject to a upper limit of USD 6 million per project. And, the rest of the project cost is to be financed by State Government or State Industrial Development Corporation. Four States of the economy initiated the Plastic Parks, Madhya Pradesh, Odisha, Assam & Tamil Nadu respectively, are being implemented under the scheme of Plastic Parks. However, all the project must be subject to the industrial license and approval from the environmental protection legislation.

There are several schemes for the purpose of export promotion to grant incentives. Some of the schemes are export promotion capital goods scheme, Duty drawback scheme and Merchandise Export from India Scheme etc. The other financial incentives for the this chemical industry with respect to research are discussed in the future scope of Chemical industry chapter.

SWOT Analysis–Economic Impact of FDI on Indian Chemical Industry

Strength

1. 6th largest producer of chemicals in the world
2. Third largest producer of ASIA
3. Key industry for agriculture, construction and leather industries.
4. 6th largest consumer of chemicals in the world
5. Proximity of Middle East
6. 100 percent automatic route for FDI approval.
7. Economies of Scale

Weakness

1. Currency devaluation,
2. Political instability,
3. Environmental Issue,
4. Water pollution
5. Air and Sand Pollution.
6. Adverse to health status
7. Environmental pollution.
8. Hazardous chemicals injuries to health
9. Abandonment of plastic products

Economic Impact of FDI on Indian Chemical Industry

Opportunities

1. Special Economic Zone
2. PCPIRs (Petroleum, Chemical and Petrochemical Investment Regions)
3. CoEs (Centre for Excellence)
4. Plastic Park
5. Raw materials availability
6. Low cost of production
7. Abundance of labour supply
8. CIPET (Central Institute of Plastic Engineering and Technology)
9. Chemicals Promotion Development scheme

Threats

1. Skilled workforce are in scarcity
2. Infrastructural problem prevailing in the private sector
3. Colourant chemical industry
4. Environmental pollution,
5. Environmental degradation,
6. Hazardous Chemicals
7. Problems of Agro-Chemical Industry.

Source: Prepared by author.

Future Scope of Indian Chemical Industry: Provision of Grant-in-aid to educational/research institutes for setting up Centre of Excellence (CoE) with a view to improve existing petrochemicals technology and promote development of new applications of polymers and plastics. The Department of Chemicals and Petrochemicals has set up five Centre of Excellence (CoE).

1. CoE for Sustainable Polymer Industry through Research, Innovation and Training (CoE-SPIRIT) at National Chemicals Laboratory, Pune.
2. CoE for Green Transportation Network (GREET) at Central Institute of Plastics Engineering & Technology (CIPET), Chennai.
3. CoE for Advanced Polymeric Materials at IIT, Delhi.
4. CoE on Sustainable Green Materials at CIPET, Bhubaneswar.
5. CoE for Sustainable Polymers at IIT, Guwahati.

A new scheme called CPDS, called Chemicals Promotion Development Scheme, in which our central government provides Grant-in-aid for creation of intellectual products through educations, investigation,

data bank, preferment materials etc. in order to enable development of the sector. Under the scheme of CIPET, Central Institute of Plastic Engineering and Technology, the government instigated sector framework to strengthen civil and technical infrastructure, research and development capacities and academic and training initiatives, budgetary allocations are made in the Union Budget.

There are two provisions from Income tax act encourages more economic activity in Chemical and petro-chemical industry. A weighted tax deduction is given under section 35 (2AA) of the Income Tax Act and Weighted deduction of 200% is granted to assess for any sums paid to a national laboratory, University or institute of technology, or specified people with a specific direction and that the said sum is used for scientific research within a program approved by the prescribed authority.

Section 35 (AB) of the Income tax act, 1961 provides Section 35 (2AB) of the Income Tax Act, 1961 provides weighted tax deduction of 150% of expenditure incurred by a specified company, on scientific research in the in-house R & D centers as approved by the prescribed authority. This does not include expenditure on the cost of any land or building. Further, the weighted tax deductions of 150% are effective till 31st March'2020. Consequent upon that, the weighted tax deductions will be 100%.

Apart from the above, each state in India offers additional incentives for industrial projects and Incentives are in areas like

1. subsidized land cost and relaxation in stamp duty exemption on sale/lease of land,
2. power tariff incentives,
3. concessional rate of interest on loans,
4. investment subsidies/tax incentives,
5. backward areas subsidies,
6. special incentive packages for mega projects etc.

Conclusion

Most successful encouragement from the government is the area based incentive, particularly, Incentives for units in Special Economic Zones (SEZ) and National Investment and Manufacturing Zones (NIMZ) as specified in respective Acts or setting up projects in special areas like the North-east, Jammu & Kashmir, Himachal Pradesh & Uttarakhand. The Economic impact of FDI on Chemical sector can be summarized with current focus of the central government. The Union budget 2018, the total budget allocation amount made towards Department of Chemicals & Petrochemicals during the year 2018-19 is USD 30 million. The following central government schemes are allotted with the project funding under the Union Budget 2018-19,

1. Assam Gas Cracker Project (USD 1,538),
2. Chemical Promotion and Development Scheme (USD 0.46 million)
3. Promotion of Petrochemicals (USD 8.53 million).
4. CIPET (Central Institute of Plastic Engineering and Technology) has been allocated USD 12.86 million.

As far as Agro-Chemicals industry is concerned the Indian agrochemical industry is worth USD 4.9 billion, and around 50% of it is export oriented.

Ethical Clearance: Completed.

Source of Funding: Self

Conflict of Interest: Nil

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A Study on Labour Laws with Special Reference to Industrial Dispute Act, 1947

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Abstract

Successful implementation of any legislation depends on the need and purpose of the act and provision to reach the right destination. The current study throws light on the pre requisite for industrialization and the penalties of violation of rule in labour law. For this purpose, an attempt to make a study on Industrial Dispute Act, 1947 (IDA 47), in terms of its concepts and penalties. Chapter one initiates the basics of IDA 47. Chapter two portrays the methodology of the study. Chapter three enlists the literature review. Chapter four discusses with concepts of IDA 47 and chapter five envisages the penalties of IDA 47. Last chapter concludes with the need of voluntary arbitration.

Keywords: *Industrial Dispute, Labor laws, conciliation, adjudication, Legal framework.*

Introduction

This paper deals with the Industrial Disputes Act, 1947. The Industrial Disputes Act 1947 extends to the whole of India and regulates Indian labour law so far as that concerns trade unions. It came into force April 1, 1947. The objective of the Industrial Disputes Act is to secure industrial peace and harmony by providing machinery and procedure for the investigation and settlement of industrial disputes by negotiations. The laws apply only to the organised sector. Chapter V-B, introduced by an amendment in 1976, requires firms employing 300 or more workers to obtain government permission for layoffs, retrenchments and closures. A further amendment in 1982 (which took effect in 1984) expanded its ambit by reducing the threshold to 100 workers. The Act also lays down the provisions for payment of compensation to the workman on account of closure or lay off or retrenchment, the procedure for prior permission of appropriate Government for laying off or retrenching the workers or closing down industrial establishments, unfair labour practices on part of an employer or a trade union or workers.

Methodology

Objectives:

1. To critically analyze about the concept of the Industrial disputes Act, 1947
2. To critically analyze about the penalties under the Industrial disputes Act, 1947

Hypothesis:

H_0: Industrial Dispute Act is settling the labour issues to make the industries to run in good and efficient way.

H_1: Industrial Dispute Act is not settling the labour issues and make the industries to run in good and efficient way.

Source of study: As the current study analysis with the particular act of labour laws, it uses only the secondary data sources and researchers have referred books, journals, and research articles, unpublished thesis, working papers, conference proceedings, dailies and online sources.

Limitations: Non availability of firsthand information always remains a limitation while doing this assignment and the assignment consumes lot of time and efforts since the information is not direct and time is consumed in the transformation of the indirect facts.

Chapterisation :

1. Introduction
2. Methodology
3. Review of Literature
4. Concepts of Industrial Dispute Act, 1947

5. Penalties under Industrial Dispute Act 1947
6. Conclusion

Review of Literature:

K.M. Pillai[1] in his book, Labour & Industrial Laws, has dealt with various kinds of Acts and rules made by the parliament of India. This book deals with the Industrial disputes Act, 1947 and relating case laws, latest relevant judicial decisions and legislative amendments.

Palak Varma and Aditya Tomer[2] in their article, discussed the concepts of industrial disputes and individual disputes under the Industrial Dispute Act, 1947. A dispute is an industrial dispute even where it is sponsored by a union which is not registered where as an individual dispute is espoused by union the question of employee being a member of the union when the cause arose is immaterial.

The Indian Express[3] "With the proposed amendments in the Industrial Disputes Act, the state government is trying to change the definition of labour and diverting it to increasing the compensation. By putting a three-year bar on raising an industrial dispute, it is throwing the labourers out of the legal framework," said Vishwas Utagi, convener of the Trade Union Joint Action Committee.

Richard Mitchell, Petra Mahy and Peter Gahan[4] in their study, a survey of the literature in the field, examining the various periods through which Indian labour law has evolved up the present time and extent to which the labour law system can be seen to have fulfilled its two core objectives: protection of labour and maintenance of industrial peace.

Concept of Industrial Disputes Act, 1947: The Industrial disputes Act,1947 is the first effective measure of all India application for tye settlement of industrial disputes. Under this Act, various tribunals have passed awards regulating wages and other relations in many industries. The Act regulates the relationship of the employers and employees in many matters irrespective of whether the employer is the State or not. This Act makes provision for delegation of powers to the State and Central Government in the matter of making rules. This invariability enables the State Government to make amendment to the Act so as to suit the local conditions.

Definitions: Clauses (a) to (s) of Section 2 provide for defining the important terms and phrases which have a bearing on the Industrial Disputes Act, 1947. The section opens with the qualifying words "unless there is anything repugnant in the subject or context' so as to give emphasis to the natural or ordinary meaning as well as to the context in which it is made. The Industrial Disputes Amendment Act, 1982 has redefined the concept of industry by recasting S. 2(j). The new definition was necessitated to overcome the impact of the decisions of the Supreme Court.[5]

Industrial Dispute: The collective bargaining ideal is implicit in the definition of industrial dispute. A dispute between the employer and a workman will not be an industrial dispute under section 2(k) unless it is sponsored by the union or a substantial number of workman. This is subject to section 2A. Industrial Dispute is defined in Section 2(k) as-

(a) Any dispute or difference between the employers and employers or

(b) Between employers and workmen or

(c) Between workman and workman which is connected with

  (i) The employment or non-employment or

  (ii) The terms of employment or

  (iii) With the conditions of labour of any person[6]

Employer: Employer is defined in section 2(g) to mean in relation to an industry carried on by or under the authority of any department of the central government or state governments., the authority prescribed in this behalf or when no authority is prescribed, the head of the department and in relation to an industry carried on by or on behalf of a local authority prescribed in this behalf or when no authority is prescribed, the head of the department and in relation to an industry carried on by or on behalf of a local authority, the executive of the authority. Thus, the definition of employer is very comprehensive to include the government, their agencies and private individuals. In *Heavy Engineering Mazdoor Union v. State of Bihar,* the Supreme Court made it clear that the central or state Government is the employer in relation to industries carried on directly by a department under its control and authority, or one carried by such department through the instrumentality of an agent. Rule 2(g) of the industrial Disputes (Central) Rules, 1957, in this connection makes it clear that in relation to an industry carried on by or under the authority of a department of the central Government or State Government, the

officer in charge of the industrial establishment shall be 'employer' in respect of that establishment, and in relation to an industry concerning railways, carried on by or under the authority of a department of the central Government, the officers mentioned in rule 2(g)(ii)(a)(f) and (c) shall be 'employer'

Industry: The Industrial Disputes Act, 1982 has redefined the concept of industry by recasting S. 2(j). The new definition was necessitated to overcome the impact of the decisions of the Supreme Court in the late 70s particularly that of in the *Bangalore Water Supply and Sewage Board v. Rajappa.*

In this case the Supreme Court evolved a triple test, namely:

1. There is systematic activity with the co-operation between the employer and employees for the production and distribution of goods and services calculated to satisfy the human wants and wishes.
2. absence of profit motive or gainful object is irrelevant; and
3. the true focus is functional and the decisive test is the nature of the activity with special emphasis on the employer-employee relations.

Applying this test, the Supreme Court held that the Bangalore Water Supply is comprehended in the term 'industry' and that the provisions of the Industrial Disputes Act, 1947 will govern the settlement of the disputes beyond the board and their employees.

Workman: The definition of 'workman' was restricted in its present form by the Industrial Disputes (Amendment and Miscellaneous provisions) Act, 1956 and it is broadly based on the definition in the English Statute. Section 8 of the Industrial Courts Act, 1919 (English Statute) defines a 'workman' thus: "The expression 'workman' means any person who has entered into or works under a contract with an employer, whether the contract be by way of manual labour, clerical work or otherwise, be express or implied, oral or in writing, and whether it be a contract of service or of apprenticeship, or a contract personally to execute any work or labour."Under Section 2(s) of the Industrial Disputes Act, 1947, a 'workman' means any person who has entered into or works under a contract with an employer, whether the contract be by way of manual labour, clerical work or otherwise, be express or implied, oral or in writing, and whether it be a contract of service or of apprenticeship, or a contract personally to execute any work or labour.

The terms of employment may be expressed or implied. The person concerned must have been employed in an activity which is an 'industry' as defined in Section 2(j) of the Act. In other words, the persons employed or engaged in an activity which does not fall within the definition of 'industry' will not be treated as workmen When the activity in question is brought within the definition of industry, then not only the persons who are employed in the actual operation of the industry, but also those who are engaged in anywork which is incidently connected with the main industry would come within the ambit of the expression "employed in any industry" and hence would be workmen under Section 2(s) of the Act.

Penalties Under The Industrial Disputes Act, 1947: The Industrial Disputes act prohibits certain acts and penalizes the violation thereof. A complaint can be made only by the appropriate Government or under the authority of the appropriate government. No court below a first class Magistrate can take cognizance of an offence punishable under this Act.

1. Prohibition of financial aid to illegal strikes and lock-outs.

Section 25 of the Act prohibits financial aid both to illegal strikes and lock outs. It says that no person shall knowingly spend or apply any money in direct furtherance or support of an illegal strike or lock-out. It is clear that the persons spending or applying the money must know that the strike or lock-out is illegal. Thus mens rea is necessary element of an offence under this section. It will be attracted only if a strike or lock-out is illegal and not otherwise. For violation of the provisions of this section, punishment is provided by section 28. Even a person who is not a workman can be penalized under section 28 for violating section 25. The combined effect of sections 25 and 28 to sustain a prosecution and conviction requires the following factors:

(i) The strike or lock-out in question was illegal

(ii) The accused had knowledge that the strike or lock-out was illegal and the money spent or applied by him was in direct furtherance of support of strike or lock-out; and

(iii) That the money was actually spent or applied by the accused.

It is only spending of money in support of a strike or lock-out that is prohibited by the Section. Therefore, giving assistance to the strikes in any other form like supplying cloth, food, etc. is not prohibited by this section.

Penalty for commencing and continuing illegal strikes or lock-outs: Section 24 of the Act enumerates the circumstances under which strikes and lock-outs would be illegal. Section 26(i) imposes on a workman punishment for commencing or continuing or otherwise acting in furtherance of an illegal strike. Such person guilty of the above act may be imprisoned up to one month, or fined up to Rs. 50 or both. Under Section 26(2), any employer who commences, continuous or otherwise acts in furtherance of a lock-out which is illegal may be punished with imprisonment which may extend to one month, or fine which may extend to Rs. 1,000/-, or both.

Penalty for instigation: More severe punishment is imposed against instigation or commencing or continuing illegal strike or lock-out. This is with a view to deter the outsiders from disturbing industrial peace and harmony y inciting the workers to resort to strike or employers declaring lock-out Section 27 of the Act thus imposes a punishment up to six months' imprisonment, or fine up to Rs. 1,000/-or both.

Penalty for breach of settlement or award: The settlement arrived at or the award given after industrial adjudication is given sanctity under the act. Under section 29, any person who commits a breach of any term of settlement or award which is binding upon the parties has been made punishable with imprisonment up to six months, or with fine, or with both a continuing breach of a settlement is also punishable with an additional fine up to Rs. 200 for everyday during the continuance of the breach after conviction of the first breach.[7]

No offence within 30 days of award of publication: Since the award is not enforceable before the expiry of 30 days from its publication, no obligation is to be discharged by the employer within those 30 days. Therefore, no offence would be deemed to be committed by an employer within 30 days after the publication of the award if he does not implement within that time.

Penalty for disclosure of confidential information: Under Section 30 of the Act, any person who willfully discloses any such information in contravention of Section 21 is liable to imprisonment up to six months, or fine up to Rs. 1,000 or both. The word 'willfully' denotes that the disclosure must be not only knowingly but also deliberately. A mere casual or inadvertent disclosure will not be penal. Section 21 provides for certain matters to be kept confidential in general interest of industrial peace. Under the section, the Conciliation Officer, Board, Labour Court, Tribunal or National Tribunal charged with the duty to investigate and settle industrial disputes referred to them are not to include in their report and awards any information obtained by them in the course of conciliation or adjudication proceedings if a specified request was made by the trade union, person, firm or company for keeping such information confidential. But this protection is not available in giving false evidence or fabricating false evidence.

Penalty for other offences: nder Section 31(1) of the Act, the employers who contravene Section 33 are punishable with imprisonment for a term which may extend up to six months, or a fine which may extend up to Rs. 1,000/-or with both. Section 31(2) as a residuary clause provides for punishment for the contravention of any other provisions of the Act or rule made thereunder for which no penalty has been prescribed by the present Act or rule made thereunder for which no penalty has been prescribed by the present Act.

Conclusion

The Industrial Disputes Act, 1947, which provides the legal framework for the Government's intervention in Industrial disputes through conciliation and adjudication, has not undergone any major changes in this regard, despite the demand of the labour and recommendations of various commissions and committees for a thorough reform of the Act with a view to shifting the emphasis in favour of collective bargaining. Though an attempt was made to promote harmony in Industrial relations through many Act, no much changes has taken place. Disputes are characteristic of society and more so in an industrial society. The inherent conflicting interests of capital and labour in an industrial organization give rise to disputes between the employer and workmen. These disputes have to be resolved from time to time by the formula of reconciling the interests of both the parties, as they cannot altogether be eliminated. The Industrial disputes Act provides a machinery for resolving the industrial disputes through different method such as settlement between the parties works committees, conciliation, investigation, voluntary arbitration.

Ethical Clearance: Completed.

Source of Funding: Self

Conflict of Interest: NIL

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The Economic Impact of FDI in Indian Shipping Sector

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Abstract

A well favored Geographical position of a country is the gift of nature but economic growth and development come by state practice. The world largest peninsula, 12 Major ports, 187 minor ports, huge man power, pioneer of international business, enormous natural resources etc., are the gift of nature to India and the Government of India have initiated number of developmental policies and strategies in order to achieve economic development and growth. The current study throws light on the economic impact of Foreign Direct Investment in Indian Shipping sector. Chapter one imitates with details of Indian shipping sector. Chapter two enlists the review of literature. Chapter three narrates the FDI policy in Indian Shipping Sector. Chapter four reason out the 'why to invest in Indian Shipping sector', in terms of SWOT analysis. Chapter five portrays the investment opportunities in Indian shipping sector and the final chapter summaries the economic impact of FDI in Indian Shipping Sector.

Keywords: *Economic impact, FDI, Indian Shipping, automatic route, Coastal line.*

Introduction

India has the longest coastal line about 7500 k.m., out of which nearly 5750 k.m. is also the mainland and rest of the coast line is along with islands. The Ministry of shipping is taking care of 12 more ports and 187 minor ports. 6 major ports, Kandla (Gujarat), Mumbai (Maharastra), Jawaharlal Nehru (Maharashtra), Marmugao (Goa), New Mangalore (Karnataka) and Cochin (Kerala) are situated in West Coast line and other 6 major ports are situated in Tuticorin (Tamilnadu), Chennai (Tamilnadu), Ennore (Tamilnadu), Visakhapattnam (Andhra Pradesh), Paradip (Orissa) and Kolkata, Haldia (West Bengal). These 199 ports are handling Export Import Cargo.

The need for the study arises, as the government want act in concert with all shipping owners for the promotion of the country's economy and are looking forward to a long and mutually beneficial relationship, the government had invited 100 percent Foreign Direct investment(FDI) into the country's shipping sector. Unforutnately, more a decade not a single dollar had come in. During 2010 FDI begins with American Eagle Tankers flagging in their first vessel under Indian registry. Now the scenario is different in Indian shipping. The total cargo handling capacity of major ports during 2016-17 was 1065.83 MTPA Million metric tonnes per annum. With the substancial focus on capacity enhancement and infrastructure development, cargo handling capacity at major ports increased to 1065.83 MTPA in 2016-17 from 744.91 MTPA in 2012-13.

During 2016-17, the traffic handled by the major ports was 648.40 million tonnes, witnessing an increase in traffic by 11 percent from 2014-15. 12 major ports in India handle approximately 57 percent of the total cargo traffic specifically Petroleum, Oil, Lubricants, Containers, Thermal & Steam Coal, Iron ore & Pellets, Finished fertilizers and other miscellaneous cargo.

Review of Literature

Joseph P. Daniels and Marc von der Ruhr[1] found that transportation costs have a positive and statistically significant relationship with US total and manufacturing FDI, suggesting a substitute relationship between FDI and trade flows consistent with horizontal MNE activity.

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As one would expect, these costs are insignificant for service stocks.

Joseph Fonseca[2] Foreign direct investment begins to flow into the Indian shipping sector commencing with American Eagle Tankers' flagging in their first vessel under the Indian registry. This comes almost a decade after the government having permitted 100% FDI in shipping

Girish Gujar et al[3] their study reveals that the total factor productivity of the sector might be adversely affected due to the heavy market presence of the government thus causing the FDI inflows into this sector to slow downfurther.

Atri Mukherjee[4] FDI to India has increased significantly in the last decade. However, the growth in FDI flows has been accompanied by strong regional concentration. The findings of the study reveal that market size, agglomeration effects and size of manufacturing and services base in a state have significant positive impact on the regional distribution of FDI flows in India. The impact of taxation and cost of labour is negative. While the impact of quality of labour is ambiguous, infrastructure, however, has a significant positive impact on FDI flows

S R Keshava[5] in his research paper, he compared the effect of FDI with two Asian countries, India and China. The result of the study, except GDP other variable of economic indicators are not significant but positive.

FDI and other Sector Policies in Indian Shipping Sector: The post liberalization era has witness that India significant improved in economic status. The foreign policy of Government of India enhanced the Foreign Direct Investment in terms of automatic route. 100 percent FDI is allow under the automatic route for projects related to the construction and maintenance of ports and harbours. Apart from that major ports are under the jurisdiction of the Government of India and is governed by New Major Ports Authorities Bill, 2016 replacing the Major Port Trust Act, 1963. Non-major ports are under the jurisdiction of the respective state government's maritime boards. In 2016, a New Berthing Policy for Dry Bulk Cargo for all major ports was rolled out in 2016 to drive higher cargo throughput from major ports. A new Stevedoring and Shore Handling Policy, 2016 was implemented for all major ports with a view to increase operational efficiency of ports. To increase investments into the port sector, Government revised Model Concession Agreement (MCA) for PPP projects in major ports. This includes establishment of Society for Affordable Redressal of Disputes-Ports as dispute resolution mechanism.

Why to invest in Indian shipping Sector?: There are many factors involved in Indian shipping sector which makes the investment more meaningful. Foremost is the geographical factor, the largest peninsula of the globe with more than 7500 km coast line surround by Bay of Bengal, Arabian Sea and Indian Ocean. Indian economy has 12 major ports and 187 minor ports. The total cargo handling capacity of all these 12 major ports was more than 1050 Millionmetric Tonnes Per Annum. The new policy of Ministry of Shipping started with the name National Maritime Development Policy (NMDP) to target the Foreign Direct Investment from abroad with the planned outlay of US$ 15 billion. The 12th five year plan includes port plan involving investment of over USD 10 billion has been identified for the upcoming five years and 21 dry port projects are under development. Further new non-major ports are notified for the purpose of enhancing the cargo handling capacity. In 2016-17, 57 projects worth of USD 14 billion created for the additional capacity of 103.52 MTPA. Further in 2017-18, 59 additional projects are targeted.

SWOT Analysis–Economic Impact of FDI on Indian Shipping Sector

Strength

1. Largest peninsula
2. More than 7500 km of Coastal line,
3. rapid improvement in infrastructure,
4. 12 major ports and 187 minor ports,
5. 100 percent investment in Indian shipping.,
6. Stable Cargo handling capacity
7. Abundant supply of labour forces
8. World's 6th largest Economy

Weakness

10. Currency devaluation,
11. Political instability,
12. Low per capital income,
13. Unstable government policies and their loop holes in implementation part,
14. Non-cooperation of indigenous work force,
15. Noncompliance of legal frame work and other legislations
16. Environmental pollution.

Economic Impact of FDI on Indian Shipping Sector

Opportunities

1. Automotive Mission plans,
2. Total allocation made to Ministry of Shipping in 2018-19 stands at USD 28 million, an increase of 20% from that in 2017-18.
3. An allocation of USD 25 million has been made towards development of major ports and USD 21 million towards minor ports.
4. Promotion of internal trade and reduce logistic cost.
5. The opportunity to serve the spill demand from major ports.
6. Port support services
7. Ship repair facilities in ports and dry docks and set up ancillary repair facilities.

Threats

1. Single hull tankers to operate the Coastal water
2. Nearly a decade, no 100 percent FDI investment was received after the announcement of FDI Policy
3. Hurdles in implementing FDI policy-INSA
4. Environmental pollution,
5. Environmental degradation,
6. Problems in maneuvering, dry dock and official hurdles of Register of Shipping.
7. Flooding in Manpower.(both in deck side and engine side)

Source: Prepared by author.

Investment Opportunities in India: In Indian scenario, the shipping sector has witnessed tremendous growth and it is projected, cargo traffic to be handled by Indian ports by 2021-22 is expected to be 1695 million metric tonnes as per the report of the National Transport Development Policy Committee (an increase of 643 million metric tonnes from 2014-15). Total 2422 million metric tonnes of cargo handling capacity would be required in Indian Ports by 2021-22. For this, additional cargo handling capacity of 901 million metric tonnes is required to be created in Indian Port in the next 6 to 7 years. Ministry of Shipping initiated National Maritime Development Policy (NMDP) with a planned outlay of USD 15 billion. Port projects involving Investment of over USD 10 billion identified for award for the upcoming five years. Small ports are supported with Industrial Cities and Industrial Clusters to be developed at selected ports. 21 Dry port projects

are under development. Increase trade activity and private participation in port infrastructure development. Focus on the development of terminals that deal with a particular type of cargo, for eg: LNG (Liquefied Natural Gas). India's increasing integration into Global Value Chains requires a well-established port infrastructure.

Conclusion

As far as the Indian service sector is concerned, both railways and seaways have strong base as Indian railways is the largest monopoly of the world and Indian shipping has the largest peninsula of the world. The economic impact of the FDI on Indian shipping sector can be summarized as India is the best destination for the import and export business through seaways. After liberalization policy and new industrial policy, the economic growth has witnessed significant growth in GDP and cargo handling capacity. During the last decade, the growth in the shipping sector is comparatively high, due the policy framework of Foreign Direct investment. Different promotional measures are taken, in order to improvise performance of cargo handling and logistics of specified items. There is a wide scope in the Indian shipping sector, either in terms of level of investment, Employment opportunities or both.

Ethical Clearance: Completed.

Source of Funding: Self

Conflict of Interest: NIL

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Interlinking of Rivers of India; Problems and Prospects

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Abstract

The proposed Interlinking river network is a mega project comprising of a system of interlinked projects and has to be therefore subjected to multi-disciplinary scrutiny. It is a large scale Civil-Engineering project. The people involved in the decision making of rivers do not look into the holistic view of the situation but only examined it by associating it with their knowledge and expertise in special fields, democratic action enlightened self-interest by all citizens of India in the need of the hour. The ILR should be implemented in an eco-friendly manner and that the benefits will surely outweigh the cost.

Interlinking of rivers is (ILR) government of India's proposal to link 37 rivers through 30 links, dozens of large dams and thousands of miles and canals making it the largest water project in the world. It aims to transfer water from water-surplus to water–deficit areas and thus proposes to provide a permanent solution the paradox of floods and droughts. Of the thirty links proposed fourteen are in the Himalayan and sixteen in the peninsular component

Keywords: *Interlinking River, Water–Surplus, Eco-Friendly.*

Introduction;

British Colonial era;during 19th century Arthur cotton proposed the plan of Interlinking of major river in order to export of goods. **Post-Independence**; in the year former irrigation Minister K.L.Rao proposed the 'National Water Grid' He was concern about southern areas shortage of water, He suggested that Brahmaputra and Ganga have surplus water and repetitive flooding, He plans to divert that in to deficit areas in south. Several inter basin were successfully interlinked.[1] The Cauvery river water dispute between Tamil Nadu and Karnataka dates back to 19th century. The agreement is lapsed in 1974. The demand made by Tamil Nadu since 1970, In May 1990 Supreme Court directs center to constitute Cauvery water dispute Tribunal., June 2, 1990 center notifies [CWDT] Cauvery water dispute Tribunal, but it was rejected, again TN appeals in 1991, June 1991: The CWDT announced Karnataka ordered to release 205 tmcft., Karnataka government passes an Ordinance. Supreme Court intervenes, strikes down Karnataka's ordinance and upholds the interim award of the CWDT. Karnataka refuses to oblige. December 11, 1991: The Interim award is published in the Government of India gazette.[1]

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History of ILR

1974: Garland Canal proposal by Captain Din Shaw J. Dastur, a Pilot, both plans were rejected due to technical infeasibility and huge cost and

1980: ministry of water resources frames the national perspective

Reports conducted that it saw "no imperative necessity for massive water transfer in the peninsular component" and that the Himalayan component would require more detailed study. August 15th 2002, President Abdul Kalam mentioned the need for river linking in his Independence Day speech based on which the senior advocate Ranjit Kumar filed a PIL in Supreme Court. October 2002, Supreme Court recommends that the government formulate a plan to link the major Indian rivers by the year 2012. December 2002-Government appointed a task force on Interlining of waters (ILR) led by Mr. Suresh Prabu. The deadline was revised to 2016.

Uneven water availability

1. India as highly uneven water availability in space and time
2. The country receives rain fall for only 3-4 months
3. The Brahmaputra–Barak-Ganga basin accounts for 60% of surface water resources
4. This region is also rich in ground water
5. Western and Southern India experiences water deficit in both surface and ground water
6. 60% of the country experiences water deficit, while parts of the country surface from floods

Himalayan Rivers Development/benefits: Construction of reservoirs on the principle tributaries of Ganges and Brahmaputra in India, Nepal,and Bhutan. Along with interlinking canal system to transfer surplus flow of the eastern tributaries of Ganga to the west. Apart from linking of the main Brahmaputra and its tributaries with Ganga and gang with Mahanadi

Peninsular River Development/benefits: Rivers and building storages at potential sites in these basins. Irrigation to the coastal areas in Maharashtra. Interlinking of Ken-Chambal Rivers. Diversion of other west flowing Rivers. Heavy rain falls on Weston side of the Weston Ghats. Runs down numerous streams, which empty in to the Arabian Sea.[2]

Benefits: The Peninsular component is expected to be provide additional irrigation of about 30 million hectare and is expected to generate about 4 million KW of power. Engineering works for mass transfer of water across the river basins.Basically, the scheme is convey floodwater in the Ganga and Brahmaputra river basins to the arid and semiarid area of Rajasthan and Madhya Pradesh, and to the Peninsular river of south India.There are essentially three method to achieve the same.

- Canal option to construct lengthy canals
- Pumping option–to convey the water under mountains
- Pumping option–to pump water over mountains

The enormous drain of water in to the sea.The Paradoxical and perennial storage of water for irrigation and drinking and floods in many parts of the country have prompted the idea of networking the rivers. The Former President Dr. Abdul Kalam has said that the plan must be accorded top priority. It is hoped it will kick start the economy and mitigate the problems of unemployment. This according to him will convert the country in to a developed nation. The project is also certain to integrate the rural and urban economies and bridge the gap in great rural-urban divide.Dr.Kalam had adumbrated certain requirements so that the grandiose plan is successfully implemented. They are as follows

a. The need to development greater tolerance, compassion, hard work, dedication, and an ability to feel and realize the problems of others and the readiness to help, Avoiding narrow political ambition and greed. Leaders must foster inter and intra communal harmony. The country as a whole must realize the economic need for such a project that would stimulate growth.

b. The second priority is political. Water must be moved from the state list and included in the concurrent list, with over weaning central control. The need for bringing water under central control has been amply demonstrated by the non-implementation of several river water sharing awards between the states.

c. An immediate dialogue with Pakistan and Bangladesh to seek their approval for their networking is an essential priority as per Dr. Kalam. The project will not be successful without linking the Ganga and Indus the Brahmaputra. The Ganga and Yamuna and Brahmaputra combine in Bangladesh before entering the Bay of Bengal. Similarly, the Indus and its tributaries–the Ravi, the Beas, the Sutlej, the Jhelum and the Chenab merge in Pakistan before entering the Arabian sea

d. The next priority would be to look at and review the land acquisition laws. This River-networking project would require a lot of land across the country and also would need access rights from several million land owners.[3]

e. The fifth priority is to design an acceptable management structure to plan this project and implement and monitor it. Once-completed this network would last several generations and change the face of the country this would also cost an enormous amount of money.

Expected Benefits of Interlinking of Rivers: Surface water irrigation 25 million Ha', Ground water irrigation 10 million Ha 'Hydropower generation; 34 million KW ', Improved agriculture;, It will help in ensuring food security 'Flood and Drought control',

alternative means of transport; River transport is cheap and non-polluting 'Higher GDP growth; creation of more employment opportunities will approximately lead to a 4% growth in the GDP lead to a national unity and national security

Disadvantages of this networking project: Projects have been enumerated below and later there are some details elaborating the same.

No inclusion of the people's participation

Lack of consensus among the citizens

Crises-cross construction of the dams and canal systems, which will cause displacement of people

Submergence of land forest and reserves

Negative impact on flora and fauna

Acquisition of large track of land

It controls is transferred to the center than decision might be taken under political pressure.

Arguments against interlinking of rivers: The legal angles and election tangles; at presents there are serious disputes between various states of the Indian Union concern sharing of the river water. The disputes occur on account of the chief executive of any state having to take decision and make claims in the interest of the people of his/her state since after all, that is the purpose for which he /she is elected. A central law to dictate water sharing between all the states from the network has the potential to precipitate new problem. This is because that there is no guarantee for change in the very political climate that causes interstate disputes in the first place. Despite the present of river sharing agreements and authorities. Furthermore it control is transferred to the center then decisions might be taken under political pressure.[4]

Financing: The effect of huge borrowing an enormous amount of money [estimated today at Rs. 5.6 lakhs crores as conveyed by Government of India to the Supreme Court, but it would surely increase] needs to be reconsidered. This especially India is almost in debt trap with rising debt servicing almost equaling loans received from financial institution like world Bank or Asian Development Bank. It is also necessary to consider whether we will be in the financial and physical position to maintain the huge assets. When created [dams, canals, tunnels, captive electric power generation plants etc..]In order for the system to continue to function and give the benefits for which it is designed.

If we cannot maintain the network the capital asset created will deteriorate and be lost and the benefits of the project and incomes from it will not available. Though the loan liability would remain. This will inevitably lead to take over of assets by the creditors Banks to consolidate the entry of foreign interest in to India. The political aspect of forcible project implementation is increasing disaffection among displaced people who already number tens of million since Independence

Flood period: The basic idea of networking river is to convey unwanted flood waters from one place to another where it is deficient and needed. But this idea does not consider that the period when it is surplus in the donor area [July to oct.in the Ganga Brahmaputra basins] is not the time when it is needed most in the recipient area [January to May in the peninsular rivers]. In such a situation it will be necessary to construct enormous holding reservoirs that will add to financial social environmental costs.

Desertification: Flooding parse is not desirable because it results in deposition of alluvium particularly in the delta areas of rivers to maintain the fertility of the land by compensating loss of top soil due to natural erosion. Any system that prevents or severely reduces natural flooding [by diversion of flood water] will cause land fertility will gradually reduce over the years. Thus decertifying the land. The greatest loss that land can suffer is desertification by loss of top soil. The land that will be so lost to cultivation is most fertile delta land and therefore the impact of these on total food production needs to be factored in to the discussion.

Reducing the flow in the Ganga by diversion will increase the concentration of the pollution in the river. A live example is the Yamuna. From which Haryana and Delhi draw so much water that it barely flows Delhi and water quality at Delhi is so poor as to be positively poisonous. It is relevant to note that the expensive project to clean the Ganga has not succeeded even with annual flooding. This is not argue that pollution of river water is inherent and never is checked at source, but that this factor is yet another that needs to be included in the legitimacy check for the project.

Security: India has a National electric power grid that functions with difficulty because supply does not

meet Demand. However it is kept functional. Because electric power can be switched from one circuit from another in the grid. Further it is not easy to deliberately interfere physically with the flow of very high voltage [up to 132KV] electricity on overhead conductors atop huge pylons. But a National Water Grid is entirely different because water does not flow instantaneously like electricity it cannot be switched like electric power and it can very easily be tampered with enroot to divert pump out or interrupt flow

A canal breached deliberately or due to natural circumstances combined with poor maintenance would spell disaster for the areas around the breach. Water is basic for human survival unlike electric power, and motivation for interference is that much more maintenance of network of canals, dams, etc…will have to be done under central supervision. Flow can be prevented or caused by the simple expedient of taking control of sluice gates as demonstrated by former during the recent Cauvery water problem. Thus security of the network will be an enormous load on security forces of central and state Government in contrast, decentralized system can be maintained, repaired and protected by those who benefit from them and live nearby.

Land acquisition: One cannot consider the acquisition of 8000 sq km of land when acquisition of land in acres is a vexed issue which as taken years even if fresh legislation makes it possible within a short period its implementation will cause untold misery and injustice to the displaced people in obtaining compensation due to systemic corruption. Besides land or resettlement is mostly not available. Thus we must scrutinize closely guard against our tendencies to address the political challenges of progressive policy of and law making for resolution of conflicts over natural resources with technology heavy solution.

Interlinking Rivers Projects–First Model; Ken-Betwa-Mahanadi & Santosh: In New Delhi, Sixth meeting of Interlinking of Rivers projects Union Water Resource Minister Uma Bharti addressing the special committee, Ken-Betwa would be ambitious for inter river linking projects, the process is in advanced stage, after obtaining statutory clearances Government plan to implement the National project. **Present Status of Interlinking of Rivers; Press Information Bureau, Government of India, Ministry of Water Resources, 03-March-2011 17:31 IST**

National Water Development Agency [NWDA] under the Ministry of Water Resource [MOWR] gives the feasibility report to the Government out of these 16 links in peninsular and 14 in Himalayan component. From this 2 portions of Indian portion of Himalayan rivers were linked. The five inter State rivers peninsular like1. Ken-Betwa, 2. Pārbati-Kalisindh-Chambal. 3. Damanganga-Pinjal, 4. Par-Tapi-Narmada, 5. Godavari Polavaram-Krishna Vijayawada,The one priority link Ken-Betwa was completed between the States utter Pradesh and Madhya Pradesh. Second one Par-Tapi. The Minister Shri. Vincent H. Pala said in loksabha, the proposal of NWDA gives the additional benefits of irrigation to 25 million hectare, and 34000 MW of power generation, and speaking about the Intra State. River linking it is difficult and it will take time to proceed. The NWDA has 36 intra-State river link proposal from 7 States, and 12 Intra-State river link have been completed.

Modi's $87 billion river-linking project set to take off as floods hit India: Government spends $87 billion to the scheme of connecting 60 rivers in our country.

This may sort out the problems in flood and dragging, In India larger land mass has flooded and in south people suffer in water scarcity especially the contrast between Mumbai and Tamil Nadu, This plan helps the farmers from the fickle monsoon rains, and it brings millions hectare of cultivation land under irrigation, and which also generate electricity, best one is Ken-Betwa connection, Sanjeev Balyan, the junior water resource minister said 'got the clearance in record time from the Government, The Ken-Betwa interlinking tops the priority. But some experts say India would be better off investing in water conservation and better farm practices. Environmental and wildlife enthusiasts have also warned of ecological damage.

Conclusion

The proposed river network is a mega project comprising of a system of interlinking projects and has to be therefore subjected to multidisciplinary scrutiny. The people involved in the decision making about networking of rivers do not look in to the holistic view of the situation but only examine it by associating it with their knowledge and expertise in special fields. Democratic action and enlightened and self-interested by all citizens of India is the need of the hour/the ILR

should be implemented in an eco-friendly manner and that the benefits will surely overweigh the costs.

Ethical Clearance: Yes

Source of Funding: Self.

Conflict of Interest: Nil.

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Availability and Sectoral Demand for Water in Tamil Nadu

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Abstract

The demand of water is also increasing day by day not only for Agriculture, but also for household and Industrial purposes. The perennial rivers are becoming dry and ground water table is depleting in most of the areas. Country is facing floods and drought in the same year in many states. This is because, no concrete action was taken to conserve, harvest and manage the rain water efficiently. Due to the nature of the terrain and distribution of rainfall, it is estimated that only 69 million hectare meter run-off can be harnessed for irrigation 175 million hectare meter water enters soil, of which 130 million hectare meter is retained in the soil and 45 million hectare meter is added to ground water every year. The demand for water, currently estimated at 75 million hectare meters, is expected to rise to 105 million hectare meters in another 25 years. Agriculture and allied activities make the single largest contribution to the Gross Domestic Product (GDP), accounting for almost 27 percent of the total. Agriculture growth has direct impact on poverty eradication and also an important factor in contain inflation, raising agricultural wages and for employment generation. Water resource contributes to agricultural production in three ways; It raises productivity by inducing the use on complementary inputs, like fertilizer, HYV of seeds, etc., increases the cropped area by making double or multiple cropping possible, and bring out a change in cropping pattern.

Keywords: *Water, Fertilizer, Seed, Economic good, Water Infrastructure.*

Introduction

Water is the most important factors in modern agricultural production; it offers opportunities for improving livelihood, particularly in rural areas. Access to reliable, good quality irrigation reduces the cost of production and increases the quantum of food production by reducing the risks faced in rain fed agriculture. The demand for water, currently estimated at 75 million hectare meters is expected to rise to 105 million hectare meters in another 25 years. That is almost all the utilizable potential will have to be harnessed to meet the demands of agriculture, industry, energy generation and domestic consumption. These figures released by the Indian Water Resources Society in 1995, foretell the shape of things to come.[1]

Due to irrigation, India has been in a comfortable position with regard to the availability of food grains over the last ten years. The productivity differential between irrigated and un-irrigated lands being quite substantial, irrigation has acquired a pre-eminent place in the Indian Planners Agenda for agricultural growth along a stable path. As the incidence of rural poverty has been found to be inversely related to both the rate of growth of crop output and the irrigation factor investment in irrigation becomes an indirect instrument for eradicating much of the rural poverty in India. Irrigation is the essential input to increase agricultural production. The current state of agriculture provides a contrasting picture of low growth of food grain and productivity. Among the inputs, water is the basic input essential for applying new technology in agriculture.[2]

Water as an Economic Goods: Chirapunji gets more than 11,000mm of average annual rainfall but face drinking water problem before monsoon commences whereas in Ralegoan Siddhi, in Maharashtra there is no water scarcity problem though the annual average rainfall is only about 450mm. Hence to mitigate water problem drought etc., there is an urgent need to follow our ancestral way of water harvesting and the latest technologies adopted in Soil and water conservation. Need has come to harvest the rainwater including roof

water to solve the water problems everywhere not only in the arid but also in the humid region. For the improvement of water infrastructure in the developing world, subsidies are vital.[3] The principle of full cost recovery sometimes handicaps developing nations that are striving to provide basic needs by subsidizing their basic water infrastructure. However, water is a basic human need and access to minimum quantities of safe water (20 liters per person per day) should be everyone's right. Lack of access to safe drinking water, sanitation, and irrigation is directly related to poverty and poor health. For example, in South Asia 300million people have no safe drinking water and 920 million people have no adequate sanitation.

Climate Change and Demand for Water: Climate change could result in global, large scale changes in natural and social systems. In many developing countries, the very poor actually pay a great deal for water relative to their income, but these costs are often hidden. Water is priced by all urban societies, and the poor often have no choice but to pay high prices, spending between 5-10% of their income; however, in contrast in most industrialized countries, the lower-middleclass spends 1-3% of their income on potable water and sanitation. For example, in OPEC countries, households spend about 1% of their income on water; on the other hand, in Onitsha, Nigeria, the poor spend as much as18% of their income on water.[4] The application of economic principles to the allocation of water is acceptable, and provides a simple tool for the development of water services in a more efficient direction. However, water should not be treated as a market oriented commodity when it comes to domestic use for very basic needs particularly for people in extreme poverty. More discussion, analysis, study, and commitment are needed in deciding whether water is a common or an economic good. Global demand for water has tripled since the 1950s, but the supply of fresh water has been declining. Half a billion people live in water-stressed or water-scarce countries, and by 2025 that number will grow to three billion due to an increase in population. Irrigated agriculture is the dominant user of water, accounting for about 80% of global water use. Population and income growth will increase the demand for irrigation water to meet food production requirements and household and industrial demand. The global population is projected to increase to about 9 billion by 2050. In response to population growth and rising incomes, worldwide cereals and meat demand has been projected to increase by 65% and 56%, respectively. Being the largest user of water, irrigation is the first sector to lose out as water scarcity increases.[5]

Water and Agricultural Production: Agriculture takes major share of the existing water resource.Thus increasing the productivity of water used in agriculture is essential to meet the enhanced requirement of food, fodder and livelihood security. Some action plans *viz.,* change in water use of agriculture, fight poverty by improved productions, improve environment ecosystem, upgrade rain fed farming systems, conservation of water bodies and indigenous technology of water and its resources management etc., are needed to mitigate the water problems. Water management, crop genetic material, agronomic practices and economic and policy incentive to produce are the essential components of water productivity.[6] As a result of growing population, the per capita water availability is reducing day by day. The estimated annual per capita water availability which was 5177 cubic meters in 1951 has come down to less than 1700 cubic meters. At the same time, certain unplanned activities for the development of water resources have resulted in unsustainable exploitation of water, also affecting its quality. It is estimated that 69% of worldwide water use is for irrigation, with 15-35% of irrigation withdrawals being unsustainable. In some areas of the world irrigation is necessary to grow any crop at all, in other areas it permits more profitable crops to be grown or enhances crop yield. Various irrigation method involve different trade-offs between crop yield, water consumption and capital cost of equipment and structures. Irrigation method such as furrow and overhead sprinkler irrigation are usually less expensive but are also typically less efficient, because much of the water evaporates, runs off or drains below the root zone. Other irrigation method considered to be more efficient include drip or trickle irrigation, ground level. These types of systems, while more expensive, usually offer greater potential to minimize runoff, drainage and evaporation. Any system that is improperly managed can be wasteful; all method have the potential for high efficiencies under suitable conditions, appropriate irrigation timing and management. One issue that is often insufficiently considered is salinization of sub surface water.[7]

Availability of Water: The demand of water is also increasing day by day not only for Agriculture, but also for household and Industrial purposes. The perennial rivers are becoming dry and ground water table is depleting in most of the areas. Country is facing

floods and drought in the same year in many states. This is because, no concrete action was taken to conserve, harvest and manage the rain water efficiently. The availability of water in the world, in India and in Tamil Nadu is given below with rainfall.[8]

Table 1: The Availability of Water in the World, in India and in Tamil Nadu

Places	Rainfall in mm	Population	Availability of Water/Person/ Year in m^3
World	840	6.99 Billion (United States Census Bureau 2011)	700
India	1150	1.21 Billion (India's Census2011)	2200
Tamil Nadu	925	72.1 Million (India's Census2011)	750

Source: Various sources of secondary data

If the availability of water is 1700 M^3/p/y, there will be occasional water stress, and if it is less than 1000 M^3/p/y, it is under water scarcity condition. Though India is not under water stress conditions but Tamil Nadu state is already under water scarcity condition, but there is no need for panic since it is possible to manage this condition as in the case of Israel where the availability is only about 450 M^3/p/ y, by means of water harvesting, water conservation and water management.

Future Requirements of Water: The requirement of water for various sectors has been assessed by the National Commission on Integrated Water Resource Development (NCIWRD) in the year 2000. This requirement is based on the assumption that the irrigation efficiency will increase to 60% from the present level of 35 to 40 percent. The Standing Committee of Ministry of Water Resources (SCMWR) also assesses it periodically. These are shown in the following table.

Table 2: Projections of Water Requirements of Various Sectors of Indian Economy

Sector	Water demand in BCM*					
	Standing Committee of Ministry of Water Resources (SCMWR)			National Commission on Integrated Water Resource Development (NCIWRD)		
Year	2010	2025	2050	2010	2025	2050
Irrigation	688	910	1072	557	611	807
Drinking water	56	73	102	43	62	111
Industry	12	23	63	37	67	81
Energy	5	15	130	19	33	70
Others	52	72	80	54	70	111
Total	**813**	**1093**	**1447**	**710**	**843**	**1180**

Billion Cubic Meters
Source: Govt. of India, Planning Commission.

Conclusion

Irrigation is the essential input to increase agricultural production. The current state of agriculture provides a contrasting picture of low growth of food grain and productivity. Adequate availability of water resources is a precondition for applying new types of raw materials, mechanization and modern method of cultivation. Among the inputs, water is the basic input essential for applying new technology in agriculture. While analyzing the role of irrigation, point out that in many places, the constraint on agricultural development is the supply of water for irrigation, rather than the supply of land. The major advantages of irrigation are: it helps in increasing crop yields, and hence to attain self-sufficiency in food, optimum utilization of water is made possible by irrigation, mixed cropping and multiple cropping. The timely availability of water reduces cost of production and increases output. Therefore, planning and implementation of irrigation schemes are essential.[9] The March 22nd has been dedicated as World Water Day and UNESCO is celebrated the year 2012 as International Year of Water Co-operation. The goal of International Year of Water Co-operation is to make awareness on the potential for increased co-operation in water management as there is an increase in scarcity of water. It also tries to highlight how to use water effectively and identify steaming issues on water scarcity. It is said that,

if there is any chance of third world war it will be for water. There is an increased chance of conflict between neighboring countries or state which share same water resources.

Ethical Clearance: Completed

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Physical and Financial Performance of Women Welfare in the Marriage Assistance Schemes of Tamil Nadu

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Abstract

The present analytical paper has been writer for the general awareness of women welfare of the Tamilnadu. The authors have identified the certain schemes are not taken growth both the physical and financial performance in the women welfare assistance schemes. To implicate the policy maker, the authors have taken steps to identify where and when the lacking has happened. The results of the findings of the paper will implicate the society. The present analytical article is mainly concentrated on women welfare schemes, particularly marriage assistances, widows remarriage, poor widow daughter's marriage, orphan girl marriage assistance and inter-caste marriage assistance. Again the government has taken the steps to give the marriage assistance to help the poor parents financially in getting their daughters married and also to promote the educational status of poor girls. The hindrances of each scheme are also the higher affinity to accumulate the money from the government projects for future and future generation; it is the very big problems of each benefit schemes. Therefore, the policy makers should consider the above findings and suggestion to assist the women welfare and for the financial assistances for their marriage.

Keywords: *Assistance Scheme, Women welfare, Physical and financial Performance.*

Introduction

In Tamilnadu Government, various schemes are given for the assistance of women welfare. The assistances are in the form of monetary benefits, the government has been allotted the funds for every year. The target and the achievements of the select schemes are slacked many times due to various conditions prevailed in the State and also in the Central government policy for changing environments of economic, society, institutional and political. The authors have taken the secondary data available in the Tamilnadu Government Portal of document repository. The present analytical article is mainly concentrated on women welfare schemes, particularly marriage assistances, widows remarriage, poor widow daughter's marriage, orphan girl marriage assistance and inter-caste marriage assistance.[1]

Marriage Assistances Scheme: Moovalur Ramamirtham Ammaiyar Ninaivu Marriage Assistance Scheme has been started from 1989 onwards, due to financial crisis of the government of Tamilnadu it has been stopped from 2002 to 2006. Again the government has taken the steps to give the marriage assistance to help the poor parents financially in getting their daughters married and also to promote the educational status of poor girls. The beneficiary of the scheme should not entitle their annual income not exceeding Rs.24000 during the period of 2006-07 to 2009-10. It has been increased (w.e.f. 23.05.2016)and stands at Rs. 72,000 during 2017-18. The benefit amount from the scheme is Rs. 20000 during 2006-07 and it has been increased to Rs. 25000 for scheme-I and Rs.50000 for scheme-II along with One Sovereign (8 Grams) 22 carat gold coin for making *Thirumangalyam*.[2] The following table describes that the growth of the schemes during the present decade.

Table No. 1: Marriage Assistance Scheme

Year	Target	Achievement	Target	Achievement
2008-2009	65000	8999	13000.00	17999.80
2009-2010	75000	125125	15000.00	15000.00

Year	Target	Achievement	Target	Achievement
2010-2011	120000	160228	30000.00	37265.75
2011-2012	164552	163228	48638.15	62015.00
2012-2013	166687	138656	70161.38	58929.00
2013-2014	158780	130035	70161.38	56319.14
2014-2015	158500	125029	69964.85	59478.36
2015-2016	160000	149111	65170.68	62894.40
2016-2017	160000	123449	65170.68	68052.35

Source: Women Welfare, Performance and budget of Tamilnadu Government,

From the above table inferred that the financial performance of Marriage Assistance Scheme of Tamilnadu and itstargets and achievements are got the significant level of growth during the present decade. The consistency of the growth is better and also the p-value is highly significant at 0.005 percent level. It denotes that the scheme is going in a better way in its growth. Though the growth is better but there is difference of target and achievement. The achievement is lower than the target has identified. Hence, the government should take necessary steps to achieve the target at a possible ways that will help the women who poorly faced their daughter's marriage.

Widows remarriage Scheme: Dharmambal Ammaiyar Ninaivu Widows Remarriage Assistance Schemehas been started from 1975 onwards. This scheme is to give the marriage assistance to Rehabilitation of widows as well as to encourage remarriage of widows by financially helping them for re-marriage. The beneficiary of the scheme should above 20 years of age. Minimum age for bride is 20 years. Maximum age limit for bridegroom is not more than 40 years. The bridegroom should produce Death Certificate separation Certificate of his first wife / wives, in case if already married. The benefit amount from the scheme is Rs. 20000 during 2006-07 and it has been increased to Rs. 25000 for scheme-I and Rs.50000 for scheme-II along with One Sovereign (8 Grams) 22 carat gold coin for making Thirumangalyam.[3] The following table describes that the growth of the schemes during the present decade.

Table No. 2: Widows Remarriage Assistance Scheme

Year	Target	Achievement	Target	Achievement
2008-2009	166	167	25	25.15
2009-2010	167	181	33.4	36.2
2010-2011	175	154	35	33.3
2011-2012	140	117	51.09	50
2012-2013	250	142	161.8	70.22
2013-2014	170	112	161.8	43.36
2014-2015	170	75	76.25	44.05
2015-2016	170	121	76.25	56.9
2016-2017	170	52	76.25	36.65
2017-2018	170	35	76.25	18.14

Source: Women Welfare, Performance and budget of Tamilnadu Government,

From the above table inferred that the financial performance of Widows Remarriage Assistance Scheme of Tamilnadu and its targets and achievements are got the insignificant level of negative growth during the present decade. The consistency of the negative growth is obviously taken place during the study decade and also the p-value is highly insignificant at 0.05 percent level. It denotes that the scheme is not reached its growth as per the target. Though the growth is better on the target but there is highly difference of target and achievement. The achievement is in negative than the target has identified. Hence, the government should identify where the slacking has been happening in the financial performance of Widows Remarriage Assistance Scheme of Tamilnadu. After 2014-15 it has taken the sudden downtrend in its path. But since the beginning of the decade, the volatility of the beneficiaries and financial targets and achievements is existed. Therefore it expresses the mismanagement of the scheme is exposed. That should be corrected in the future.

Poor Widow Daughter's Marriage Assistance Scheme: E.V.R. Maniammaiyar Ninaivu Poor Widow Daughter's Marriage Assistance Schemehas been started from 1981 onwards. This scheme is to help the poor widows for the marriage of their daughter. The bride of the scheme should be between 18 and 30 years.

But it later there is no upper age limit. The beneficiary of the scheme should not entitle their annual income not exceeding Rs.24000 during the period of 2006-07 to 2009-10. It has been increased (w.e.f. 23.05.2016) and stands at Rs. 72,000 during 2017-18. The benefit amount from the scheme is Rs. 20000 during 2006-07 and it has been increased to Rs. 25000 for scheme-I and Rs.50000 for scheme-II along with One Sovereign (8 Grams) 22 carat gold coin for making Thirumangalyam. The following table describes that the growth of the schemes during the present decade.

Table No. 3: Poor Widow Daughter's Marriage

Year	Target	Achievement	Target	Achievement
2008-2009	1,533	1,600	230.00	320.00
2009-2010	2,000	4,899	400.00	979.80
2010-2011	5,500	7,264	1,100.00	1,846.00
2011-2012	7,244	6,145	1,810.88	3,001.00
2012-2013	8,322	6,883	3,503.07	2,580.35
2013-2014	7,490	5,608	3,503.07	2,186.96
2014-2015	7,770	7,011	3,771.09	3,582.56
2015-2016	7,770	7,176	3,771.09	3,267.80
2016-2017	7,770	4,941	3,771.09	2,603.80
2017-2018	7,770	5,528	3,771.09	3,354.93

Source: Women Welfare, Performance and budget of Tamilnadu Government,

From the above table inferred that the financial performance of Poor Widow Daughter's Marriage Assistance Schemeof Tamilnadu and its targets and achievements are got the significant level of growth during the present decade. The consistency of the growth is better and also the p-value is highly significant at 0.05 percent level. It denotes that the scheme is going in a better way in its growth. Though the growth is better but there is difference of target and achievement. The achievement is lower than the target has identified both the physical and financial performance. During 2009 to 2012 the achievements are higher than the target but after 2012 it has lower than the target. Hence, the government should take necessary steps to identify the slacking on the achievements.

Orphan Girl Marriage Assistance Scheme: Annai Teresa Ninaivu Orphan Girls Marriage Assistance Schemehas been started from 1985 onwards. This scheme is to help the orphan girls financially for their marriage. The bride of the scheme should be between 18 and 30 years. But it later there is no upper age limit. The beneficiary of the scheme should not entitle their annual income not exceeding Rs.24000 during the period of 2006-07 to 2009-10. It has been increased (w.e.f. 23.05.2016) and stands at Rs. 72,000 during 2017-18. The benefit amount from the scheme is Rs. 20000 during 2006-07 and it has been increased to Rs. 25000 for scheme-I and Rs.50000 for scheme-II along with One Sovereign (8 Grams) 22 carat gold coin for making Thirumangalyam. The following table describes that the growth of the schemes during the present decade.

Table No. 4: Orphan Girl Marriage Assistance Scheme

Year	Target	Achievement	Target	Achievement
2008-2009	273	285	41	42.75
2009-2010	274	509	54.8	101.8
2010-2011	530	563	105.9	128.3
2011-2012	675	682	168.81	437
2012-2013	828	846	373.75	315.52
2013-2014	1,110	717	373.75	282.36
2014-2015	1,110	796	373.75	355.82
2015-2016	2,450	4,088	1,000.00	2121.75
2016-2017	2,450	2,572	1,000.00	1,308.75
2017-2018	2,450	2,361	1,100.41	1,903.20

Source: Women Welfare, Performance and budget of Tamilnadu Government,

From the above table inferred that the financial performance of Orphan Girls Marriage Assistance Scheme of Tamilnadu and its targets and achievements are got the significant level of growth during the present decade. The consistency of the growth is better and also the p-value is highly significant at 0.001 percent level. It denotes that the scheme is going in a better way in its growth. The achievement is higher than the target that is remarkable in its performance. Hence, the government

should keep achievement in future that will help the orphan girls' marriage.

Inter-Caste Marriage Assistance Scheme: Anjugam Ammaiyar Ninaivu Inter-Caste Marriage Assistance Schemehas been started from 1967 onwards. This scheme has been renamed as Dr. Muthulakshmi Reddy Ninaivu Inter-Caste Marriage Assistance Scheme since 08.07.2011. This scheme objective is to abolish Caste and Community feelings based on birth and for wiping out the evils of untouchability and to abolish caste based discrimination by encouraging inter-caste marriages. The bride of the scheme should have completed 18 years old. There is no upper age and income limit. It has two type of schemes in which, one of the spouse should belong to SC/ST community and Marriage should be between Forward Community and BC/MBC community spouses.[4] The benefit amount from the scheme is Rs. 20000 and Rs.15000 respectively during 2006-07 and it has been increased to Rs. 25000 for scheme-I and Rs.50000 for scheme-II along with One Sovereign (8 Grams) 22 carat gold coin for making Thirumangalyam. The following table describes that the growth of the schemes during the present decade.

Table No. 5. Inter-Caste Marriage Assistance Scheme

Year	Target	Achievement	Target	Achievement
2008-2009	2075	2896	400	524.6
2009-2010	2900	2713	525	513.35
2010-2011	2,771	2,483	535.5	518.1
2011-2012	2,895	1,828	734.38	1,185.00
2012-2013	1,901	1,583	800	656.87
2013-2014	2,450	1,409	800	632.56
2014-2015	2,450	2,269	1,000	982.32
2015-2016	2,450	4,088	1,000.00	2121.75
2016-2017	2,450	2,572	1,000.00	1,308.75
2017-2018	2,450	2,361	1,100.41	1,903.20

Source: Women Welfare, Performance and budget of Tamilnadu Government,

From the above table inferred that the physical and financial performance of Inter-Caste Marriage Assistance Schemeof Tamilnadu and its physical targets and achievements are got the insignificant level of growth during the present decade. The consistency of the growth is better but the p-value is highly insignificant at 0.1 percent level. It denotes that the scheme is not performed well due to various political, judicial and government inability against of social issues inherent with the Inter-Caste Marriage forced by the non SC/ST communities. Even there is practice of higher protections given by the law many people are lost their life against of communal affinities.[5] there is no improvement in the targets of physical and finance after 2013-14 to 2017-18. The government should identify the forward community who really married with SC/ST communities. The government should give opportunities in the reservation of employment, education, election, self-employment business, government papers and stamps and income tax concessions. It will definitely create as 'all are equal'.

Table No. 6. Physical and Financial Performance of Women Welfare in the Marriage Assistance Schemes of Tamilnadu (CAGR in %)

Women welfare marriage assistances schemes	Physical Target	Physical Achievement	Financial Target	Financial Achievement
Marriage assistances	6.54	12.69	19.95	16.18
Widow remarriage	0.24	-14.36	13.51	-0.63
Poor widow daughter's marriage	17.02	7.12	34.77	20.82
Orphan girl marriage assistance	30.98	27.88	46.98	48.59
Inter-caste marriage assistance	-0.33	0.49	11.30	16.08

Source: Computed Secondary Data

From the above table the growth of the physical and financial performance of women welfare in the marriage assistance schemes of Tamilnadu is identified. Among the schemes widows' remarriage and inter-caste are not

reached better. Hence, the government should supported to the inter-caste marriage even the political hurdles are played. The poor widow daughter and orphan girl marriage are able to identify the target and possible to done the financial assistance directly without any hindrances of public. Most of the murders have done by the foreword communities. The government and the judicial systems are unable to do against of the political force and playing strength of money is determining the strength of judgment is the situation is prevailed. The support of political alone the schemes are achieved its target. The government also not bothers about the people affected in the downtrodden level in various benefit schemes.[6] The most of the schemes are not aware by people, only the political persons are aware and they do in favour of their parties and communities. The ultimate aims of the most of the schemes are created for the benefit of the people. But what happening really, the academician can only do the research and can implicate the policymaker.

Suggestions

- The government should take actions to achieve the target at a possible ways that will help the women who poorly faced their daughter's marriage.
- The government should identify where the slacking has been happening in the financial performance of Widows Remarriage Assistance Scheme of Tamilnadu. After 2014-15 it has taken the sudden downtrend in its path. But since the beginning of the decade, the volatility of the beneficiaries and financial targets and achievements is existed. Therefore it expresses the mismanagement of the scheme is exposed. That should be corrected in the future.
- The government should take necessary steps to identify the slacking on the achievements.
- The government should keep achievement in future that will help the orphan girls' marriage.
- The government should identify the forward community who really married with SC/ST communities. The government should give opportunities in the reservation of employment, education, election, self-employment business, government papers and stamps and income tax concessions. It will definitely create as 'all are equal'.

Conclusion

From the above findings and suggestions authors have concluded that the government is ready to give all the schemes to particular people. The hindrances of each scheme are also the higher affinity to accumulate the money from the government projects for future and future generation; it is the very big problems of each benefit schemes. Therefore, the policymakers should consider the above findings and suggestion to assist the women welfare and for the financial assistances for their marriage.

Ethical Clearance: Completed

Source of Funding: Self

Conflict of Interest: Nil

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An Analysis of Women Empowerment through Self Help Groups

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Abstract

The Government of India in quest of new social order and poverty free society drafted the constitution with great emphasis on equality, liberty and fraternity. Self help groups are a small group of individual members who voluntarily come together and form an association for achieving a common objective. Various intervention approaches have been developed in order to address the needs of the women which ultimately reveal modifications not only in social policy approaches to third World Development, state policies relating to women but also in the overall economic policy of the country as a whole. The human development reports of the UNDP published annually have declared that women's empowerment is not merely important but crucial if development is to be sustainable. In a developing society, women in particular and more specifically rural and illiterate women never get portrayed as agents of change. In 1970's there was shift from the welfare to development of women. In 1980's and onwards the shift took place from the development to the empowerment of women. The major land mark in the field of women empowerment was brought by 73rd and 74th Amendment Acts in the Parliament which brought 33% reservation to the women in the Panchayats and Municipalities. These amendments have empowered about 1000000 women and gave them political power for taking social, economic and other development measures for the all round growth of their women counterparts.

Keywords: *Women Empowerment, Micro Credit, Self Help Group.*

Introduction

The Government of India in quest of new social order and poverty free society drafted the constitution with great emphasis on equality, liberty and fraternity. Self help groups are a small group of individual members who voluntarily come together and form an association for achieving a common objective. In most cases SHGs are constituted by persons known to one another and coming from the same village community or neighborhood, that is, SHGs are small in size with membership ranging from 10to 20 are homogenous and has certain pre groups binding factor. This concern for low-income women's needs has coincided historically with recognition of their important role in development. Various intervention approaches have been developed in order to address the needs of the women which ultimately reveal modifications not only in social policy approaches to third World Development, state policies relating to women but also in the overall economic policy of the country as a whole. The empowerment approach is the most recent and is aimed at empowering women through greater self-reliance and internal strength. Empowerment as a concept was introduced at the International Women's Conference at Nairobi in 1985. The conference defined empowerment as "A redistribution of social power and control of resources in favour of women. It is "the process of challenging existing power relations and of gaining greater control over the sources of power".[1]

Dimensional Views on Women Empowerment: Women Empowerment refers to an increase in the strength of women such as spiritual, political, social or economic. The most common explanation of "Women's Empowerment" is the ability to excise full control over ones actions. The human development reports of the UNDP published annually have declared that women's empowerment is not merely important but crucial if development is to be sustainable. In a developing society, women in particular and more specifically rural and illiterate women never get portrayed as agents

of change.[2] Women in India constitute 48% of total population in which 43.88 lakh women are engaged in organized sector and 17.77 lakh in private sector. In the decade of 1960's the issue was for the welfare of the women. In 1970's there was shift from the welfare to development of women. In 1980's and onwards the shift took place from the development to the empowerment of women. The major land mark in the field of women empowerment was brought by 73rd and 74th Amendment Acts in the Parliament which brought 33% reservation to the women in the Panchayats and Municipalities. These amendments have empowered about 1000000 women and gave them political power for taking social, economic and other development measures for the all round growth of their women counterparts. 93rd amendment was passed in the Parliament which changed its colour from Directive Principle under Article 45 to Fundamental Right under Article 21-A for free education to all children in the age group of 6-14 years. The International conferences sponsored by the United Nations started from Rio through Vienna, Copenhagen and Beijing have generated a lot of interest on the social development and highlighted the growing feminization of poverty an possible impact on women the structural adjustment process. The 4th World Conference on Women held in Beijing (1995), reveals that women's empowerment and their full co-operation on the basis of equality in all spheres of society are fundamental for the achievement of equality, development and piece. Tamil Nadu is one of the predominate state to encourage to form SHG's next to Andhra Pradesh and Kerala. The NGOs and Banks are provident credit facilities to SHGs members. But the roles of NGOs are larger than banks to facilitating credit to poor people, because the banks are not extending to this service to the poor. Many studies estimate that the micro finance is one of instrument to remove poverty in rural areas. The promotional efforts especially under taken be NABARD in the last two years have resulted in a significant growth of programme beyond expectation. [3]

Table 1: Number of SHGS in India (2010-11 to 2015-16)

Year	Number of SHGs	Growth Rate
2010-11	2238565	109.47
2011-12	2924973	30.66
2012-13	5009794	71.28
2014-15	6121147	22.2
2015-16	6959250	13.6

Table 1 evident that the total number of SHGs is increased in the period of 2010-11 to 2015-16. SHGs were linked with the banks. In 2010-2011 the number of SHGs has been increased by 109.47 growth rate i.e. 22, 38,565. In the year 2011-12 growth rate was 30.66, in 2014-2015 growth rate was 71.28 in 2008-09 growth rate was 22.2 and in 2015-16 Growth rate is 13.6. The variation is grater in growth rate.

Table 2: Progress of Women SHGS as on 2015-16

Particulars	Total SHG's (Lakh)	Women SHG's (Lakh)	Women SHG's Total SHG's	Total Amount (Crore)	Women SHG's Amount (Crore)	% of Women SHG's to Amount to Total SHG's
Savings Linked SHG"s	50.1	22.38	44.67	3785.39	3108.65	82.12
Loan Disturbed	12.28	10.4	84.69	8849.26	7474.25	84.46
Loan Outstanding	36.26	29.17	80.45	16999.91	13335.61	78.45

Source: Status of Micro Finance 2015-16, NABARD

The purpose for which SHGs are formed varies from managing a common pool resources such as an irrigation facility and tree plantation on common land & providing such basic amenities as a school, health centre and so on. In the context of micro finance, SHGs are formed around the theme of saving and credits.

SHG phenomenon definitely brings group consciousness among women, sense of belongingness, adequate self confidence. Infact, what she cannot achieve as an individual, can accomplish as a member of group with sufficient understanding about her own rights, roles, privileges and responsibilities as a dignified member of society in par with man. When she becomes a member of SHG, her sense of public participation, enlarged horizon of social activities, high self-esteem, self-respect and fulfillment in life expands and enhances the quality of status of women as participants, decision makers and beneficiaries in the democratic, economic social and

cultural spheres of life.The opportunity provided in safe savings as well as availability of need-based credit has led to more and poorer people keen to join SHGs. The members use the credit for a variety of purposes like small businesses, agriculture, health, education of children, festivals and so on.[4]

Table 3: Progress of Women SHGS as on 2015-16

Particulars	Total SHGs (Lakh)	Women SHGs (Lakh)	% of Women SHGs to Total SHGs	Total Amount (Crore)	Women SHGs Amount (Crore)	% of Women SHGs Amount to Total SHGs Amount
Saving linked SHGs	61.21	48.64	79.46	5545.62	4434.3	79.96
Loan Disbursed	16.09	13.74	85.39	122253.51	10527.38	85.91
Loan Outstanding	42.24	32.77	77.58	22679.84	18583.54	81.93

Source: Status of Micro Finance 2015-16, NABARD

Table 4: Progress of Women SHGS as on 2015-16

Particulars	Total SHGs (Lakh)	Women SHGs (Lakh)	% of Women SHGs to Total SHGs	Total Amount (Crore)	Women SHGs Amount (Crore)	% of Women SHGs Amount to Total SHGs Amount
Saving linked SHGs	69.53	53.10	76.37	6198.71	4498.66	72.57
Loan Disbursed	15.87	12.94	81.54	14453.30	12429.37	85.99
Loan Outstanding	48.51	38.91	80.33	28038.38	23030.36	82.14

Source: Status of micro Finance 2015-16, NABARD

The role of women outside the home has become an important feature of the social and economic life of the country and in the years to come this will become still more significant. From this point of view, greater attention will have to be paid to the problems of training and development of women. The education of girls, therefore, should be emphasized not only on grounds of social justice but also because it accelerates social transformation.[5]

Women Empowerment in India: The year 2001 had been declared by the Government of India as "Women's Empowerment Year" to focus on a vision where women are equal partners like men". Because the Constitution of India grants equality to women in various fields of life. In the past, the position of women was miserable in the society and even women were not ready to undertake any assignment or job due to many reasons like fear, shyness, male dominance in the society and purda system but time has been changed now. Women of today are not like the early days. Now, they are always ready to come forward and want more economic independence, their own identity, achievements, equal status in the society and greater freedom. And Government of India has provided for Self Help Groups (SHGs) to them so that proper attention should be given to their economic independence through self employment, entrepreneurial development and well being that ultimately leads to its contribution. SHGs have been emerged as a powerful instrument in order to alleviate poverty and for the empowerment of women in the rural economy. SHGs through the network of commercial banks, co-operative banks, regional rural banks, NABARD and NGO's has been largely supply driven and a recent approach in the provision of financial services to the poor and further upgrading their status in the society.[6]

Conclusion

Women empowerment aims enabling them to realize their identity, potentiality and power in all spheres of their lives. It has mainly five dimensions viz., economic, political, social/cultural, physical mobility. Woman is important part of society and her empowerment is must of development. In developed countries every member of society is in equal position. But in developing nations we need to empower people who are not receiving equal treatment. Empowerment of women is possible only when a woman has increased access to economic resources, more strength and courage for entering into the power structure, more involvement through social/ cultural relationships and participation, more self-motivation and confidence, and more say in the family matters.[7]

Ethical Clearance: Completed

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Agriculture and Women's Health

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Abstract

Agriculture is the backbone of India and the most important sector among all. The role of Agriculture is significant in the overall Socio-economic development of India. It accounts for 18% of India's GDP and 50% of Indian population is depending on Agriculture for employment. Agriculture not only provides food and fabrics, it also helps in the development of major industries by providing raw materials and enhances the healthy life by contributing natural medicines. Health is a prime factor of a Country's development. Development of Health and development of Economics are interlinked. The Country's Economic performance is mainly depending on Health status of the people in the Country. Wealthier Countries have Healthier population. WHO (World Health Organization) has estimated that 80 percent of the people Worldwide are depending on medicines from plants. As per research data, it is found that three-quarters of the World population is relying on Agriculture for their well-being. Plants and plant extracts serve the nation by fulfilling human health care needs. Especially Women are mostly relying on herbal products for their day to day requirements. Moreover economically weak, Poor and marginalized people, who cannot access or afford to Modern medicines, depends on Traditional medicines for their Health care needs[1]. This study elaborates some of the women's problems and remedies through medicinal plants.

Keywords *Agriculture, Health economics, Natural/Traditional medicine, Women's Health, Medicinal plants, Dysmenorrhea.*

Introduction

Health is a prime factor of a Country's development. The Country's Economic performance is mainly depending on Health status of the Country. Women play a vital role in preserving the health and well being of their societies."Healthy Women leads to Healthy Children and it leads to Healthy Population which in turn creates Healthy World". Women are the caretakers of healthy family healthy society.

According to Geetha S. Iyengar, The wealth of a nation and the health of the future generation depend upon women's physical and mental well-being.[2] Woman is soft, tender and flexible and this makes her move with ease and grace. Woman's muscles are soft and light. Woman does not have broad skeletal structure like man. In spite of that, by nature's characteristic gift, she has the power to withstand physical strains and mental pressures to a far greater extent.

Nature has, in addition, endowed her with the responsibility of perpetuating mankind. To fulfill her tasks, woman is being dependent on nature. Nature helps her in maintaining her physical body, her changing physiological functions and emotional states through Traditional plants[3].

Generally speaking, the plants and plant products surrounding us will help us in solving our health issues. Himalayan sage scholars of Traditional Medicine have said

"Nanaushadhi Bhootam Jagat Kinchit" i.e. there is no plant in the world, which does not have medicinal properties.' We can get all which we desire from plant for our betterment, if we treat it to be in its own way without

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disturbing the law of nature. The Health maintenance is being done by the food we take daily. The crops that we cultivate bring harmony and ensure overall development of human body[4]. There is no need to search a plant with a medicinal quality. Every plant and plant products we use for food acts as a medicine, proving "Food is Medicine". Generally the plants surrounding will definitely have the medicinal qualities to solve the health problems of the domicile as per the law of Nature[5].

Research Objective: To analyze the role of Medicinal plants in solving the Women's health disorders, in order to accelerate healthy Economy.

Stages in Women's life: There are three important stages in woman's life beginning with youth, passing through middle age, and ending in old age.

1. Menstruation
2. Pregnancy and delivery
3. Menopause.

These are the three periods and milestones of a woman's life. In all the three stages Women face lot of problems physically as well as mentally.

In human females, the menstrual cycle occurs repeatedly between the ages of menarche-when cycling begins, until menopause-when it ends. In the menstrual cycle, changes occur in the female reproductive system as well as in other bodily systems. A woman's first menstruation is termed menarche, and occurs typically around age 12-16. The end of a woman's reproductive phase of life is called the menopause, and this commonly occurs somewhere between the ages of 45 and 55.

Menstrual cycle: Themenstrual cycle is the cycle of natural changes that occurs in the uterus and ovaries as an essential part of making reproduction possible. The menstrual cycle is essential for the production of eggs, and for the preparation of the uterus for pregnancy. The average menstrual cycle takes about 28 days. It occurs in three phases: 1) Follicular phase (development of the egg), 2) Ovulatory phase (Release of the egg) and 3) Luteal phase (Implantation of fertilized egg).

If the egg is not fertilized, levels of hormones get decreased and the lining of uterus prepared for the pregnancy breaks down and sheds. Shedding of endometrium, the uterine lining is called menstruation or period. Women can experience lots of complaints during this period.

Three out of four experience menstrual discomforts. One of the problems during menstruation is extremely painful period or Dysmenorrhea.

Dysmenorrhea: Dysmenorrhea is the medical term for the painful cramps that may occur before or during the menstrual period. Menstrual cramps are caused by contractions in the uterus, which is a muscle. The uterus contracts throughout a woman's menstrual cycle. If the uterus contracts too strongly, it can press against nearby blood vessels, cutting off the supply of oxygen to the muscle tissue of the uterus. Pain results when part of a muscle briefly loses its supply of oxygen.

Prostaglandin is hormone like substance that does contraction and relaxation of smooth muscle. Higher levels of prostaglandin are associated with more–severe menstrual cramps. Endorpins counteracts Prostaglandins. It interacts with the receptors in the brain which reduces the perception of pain and also it triggers a positive feeling in the body

Medicinal plants for Women's health: During the menstrual cycle, hormone levels rise and fall in an effort to prepare the lining of the uterus to thicken for ovulation and then shed if pregnancy doesn't occur. In this period women suffer with backpain, body pain, pain in the thighs, abdomen, hip, bloating, nausea, constipation, diarrhea, tiredness, headache, vomiting, giddiness, sweating, dizziness, fatigueness, depression, stress, irritability and mood changesetc. Deficiency of vitamin B12, vitamin B6, vitamin C and vitamin D can lead to nausea and dizziness during periods[6].

The following Medicinal plants help to solve the discomforts of Dysmenorrhea[7]:

- Licorice root–Adhimadhuramver in Tamil–Can moderate spasms and alleviate pain. Contains glycyrrhizin & flavonoids which are antioxidants known to improve circulation and relieve tissues damage and also reduces inflammation.
- Foods with high Flavonoid-Onion, blueberries, black tea, green tea, bananas, all citrus fruits
- Ginger–Soothe menstrual trouble and fight the fatigue.
- Fennel–Perunjeeragam in Tamil–Contains anethole (a compound with anti-spasm effects)
- Chamomile tea–Samandhi in Tamil–Has pain relieving properties. Contains Hippurate-a natural

anti-inflammatory drug helps to decrease the prostaglandin production.

- Derris trifoliate–Angaravalli in Tamil–For painful periods
- Menthaarvensis–Mint or Pudhina in Tamil–For painful periods
- Meliaazadiracta–Common name Neem–Vembu in Tamil–Acts as a Pain killer.
- Trigonellafoenumgrace–Common name Fenugreek–Vendhayam in Tamil–Acts as a pain killer.
- Black gram–Ullundhu in Tamil–For Uterine strength.
- Dolichosbiflorus or Kollu in Tamil–For strengthening the Uterus and to reduce the menstrual pains.
- Vetiveriazizanoides–Vettiver in Tamil–Regulates Menstruation.
- Daucuscarota–Common name Carrot–Roots regulate menstrual disorder.
- Desmodiumtriquetrum–Common name Sakuli–Sakkaraivalli in Tamil–Tender leaves regulate menstrual disorder.
- Riccinuscommunis–Common name Castor–Amanakku in Tamil–For sterility after Menstruation.
- Piper beetal–Common name Betal–Vetrilai in Tamil–Gives relief from perspiration and menstrual odor.
- Allium sativum–Common name Garlic–Poondu in Tamil–Fights against bacterial and fungal infections[8].
- Vitamin B6–Can be obtained from Avacado, Sunflower seeds and Sesame seeds
- Vitamin B12–Can be obtained from Mushrooms, Broccoli, Soya beans and Asparagus.
- Vitamin C–Can be obtained from Kiwi, Guava, Orange, Papaya, Pineapple, Mango, Banana, Lemon, Grapes, Tomatoes, Strawberries, Broccoli, Cauliflower, Peas, Green bell pepper, Red pepper, Black currant, Parsley, Brussels sprouts, Honey dew.
- Vitamin D–Can be obtained from Orange juice, Soya milk and Cereals. Important in preventing menstrual cramps.

Conclusion

The traditional food and systematic lifestyle, adopting medicinal plants as food of our older generation kept their health in good condition. But present generation's food habits and negligence of the olden culture results in deterioration of self as well as future generation's health. Moreover medicinal plants do not have side effects and also it is economically cheaper. Especially at present women get Health awareness and utilize the traditional medicines for their well being.

Discussion

The general observation is that the agricultural sector feeds the population, animal population and also supplies raw materials to the development of agro-based industries. Infact, the agricultural sector also facilitate and promote women health through precious herbals. The herbal medicines are easily available especially in rural areas. When we properly cultivate herbal plants it will generate more income to the farmers as well as we can supply those precious supply of plants to prepare medicines and treat women's ill health. This effort will make people to avail herbal medicines at lesser price or at free of cost for all types of human ailments. The practice of herbal medicine will be more economical, natural and it will cut short the medical expenditure of the society. It is to say that this will lead to intergrated agricultural activities, natural way of life and healthy motherhood.

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Finger Theraphy-Clensing and Revitalizing Human Health

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Abstract

All living and non-living beings are part and parcel of Universal system. There is an invisible energy which makes universe dynamic and it is found and present in the smallest particles as well as in the biggest sun and the moon. This is true to the smallest insects, plants, trees, animals, and human beings. The flow of Universal energy spreads everywhere in the Universe. This is the vital energy makes the human body dynamic and it vibrates constantly. Infact, obstruction in the energy flow causes ailments in human body. This is balanced by stimulating the particular energy centre on meridians under acupuncture and acupressure system. This is balanced by balancing three doshas in siddha and ayurvedic system. This is also balanced by various generic method such as varma therapy, panchakarma, hand mudras, finger therapy, yogasanas, balanced diet, breathing exercises,etc. The authors in this paper examine the impact of finger therapy to cleanse and revitalize the human energy for healthy life and healthy aging.

Keywords: *Law of nature,Universal energy, physical energy, human ailments, five elements, chakras, finger therapy and hand mudras.*

Introduction

In the process of development inventions and innovations take place in all the sectors throughout the world. People enjoy more comforts and the benefits of modern technology but each technology that we introduce to the society has sting on its tail. Therefore, all inventions and innovations have their own merits and demerits. All modern gadgets make people static and inactive which leads to life style disorder. As per law of nature especially, law of vibrations everything vibrates in nature which is indispensable for healthy life. It implies that our body needs proper movement, actions, physical exercise, such as walking, jogging, cycling, laughing, hobbies which involves hands and legs, but the modern life style is static and sedater just against the law of vibrations which results in so many non-communicable diseases.[1]

Infact, our emotions may be expressed through fingers and hands. Our inner emotions and ailments are reflected through emotions and physical complains. Chronic negative emotions such as aggression, depression, dissatisfaction, fear, anger, frustration can weaken our organs and they inturn cause non communicable physical and mental ailments such as, digestive problems, blood pressure, pain, diabets, weight gain, insomnia, poor vision and so on. Emotional fluctuations, can be balanced gradually by practicing finger therapy along with proper diet and life style.[2]

In addition, human brain should be active especially at the time of chronic illness or bed ridden. Inactive brain prone to human ailments so quickly as there is less flow of energy between universe and human. Therefore, it is through the practice of mudrabrain gets activated and regenerated. There is a positive influence on the brain waves, particularly when the fingertips touch each other.

Statement of the problem: As per the law of correspondence the individual organs and elements are associated with fingers which help to heal the human ailments. *The purpose of mudra is to activate the prana sakthi or universal energy.* Constant flow of this energy is responsible for the existence of human body by generating and balancing the vital energy with the presence of pancha poothas through five fingers. This is depicted in many Indian dance, architecture, painting, martial arts and yoga. Human body is made up of five elements and the fingers are the representatives of them. Thumb finger represents fire or sun, index finger represents wind or air, middle finger represents sky or space, ring finger represents earth and little finger represents water element. Excess of certain emotions affect organs. Infact, anxiety and joy affects heart and

lungs, fear affects kidney, pensiveness affects stomach and spleen and anger affects liver.

Objective: The authors in this article made an attempt to examine the impact of finger therapy to cleanse and revitalize the human energy for healthy life and healthy aging.

Review of literature: The origin, place, time and the practice of mudra is time immemorial This has been in practice in Asia and Europe from their age old time till now. In our tradition and culture we are using hands and fingers to show our emotions interms of clapping, applause, shaking hands, greeting others, saluting other, sending off others, and so on. In India, mudras are a part and parcel of day to day activities and it is also depicted in the statues of hindu deities too and through their hand mudras they portray the nature and the special power of the deity. In Indian traditional dances, like bharathanatiyam, kuchupudi, kathak, kathakali and other Indian folk dance and dramas, hand mudra, eyes and body movements are use to express their emotions.

The practice of mudras are effectively engaged and influenced our body and mind by bending, crossing, extending, or touching the fingers with other fingers.[2] In Hatha Yoga,there are 25 mudras and these include eye and body positions namely asanas and locks known as bandhas. It expresses the many states of mind, such as mourning,joy, anger, and serenity, through gestures and body positions and they influence our physical body and mind positively. In Kundalini Yoga, the hand mudras are used in the body postures to intensify their effect with spiritual consideration. The kundalini expert Lothar-Riidiger Liitge explains that " Kundalini Yoga assumes that every area of the hand forms a reflex zone for an associated part of the body and the brain. In this way, we can consider the hands to be a mirror for our body and mind."[3] Each mudra ultimately creates a special connection to cosmic consciousness. This is exhibited through chin mudra where the thumb is symbol of cosmic energy or divine power and the index finger is symbol of individual human consciousness and their union is ultimate or primary goal of yoga. That is union of mankind with cosmic consciousness. The human being express their desire, by intuition and inspiration through this mudra because the index finger represents inspiration i.e.energy from the outside and the thumb stands for intuition i.e. inner energy connected with cosmic world.

Mudra specialist Ramm-Bonwitt describes that," The hands are the bearers of important symbols, which are still universally understood in the East today. With his or her hands, the Indian dancer expresses the life of the universe. Through its variety of interpretive possibilities, the rich symbolism of the dance's language of gestures gains a greater significance for the mind than words could express. The spiritual meaning of the mudr as found its perfect expression in Indian art. The gestures of the deities depicted in Hindu and Buddhist art symbolize their functions or evoke specific mythological occurrences."[4]

Ways and means of doing finger therapy: Infact, hand mudras are popular among the people which is being practiced in the east and the west. There are many mudras which can heal human ailments when we practice hand mudras regularly. Hand mudras also include finger therapy which is part and parcel of exercise for the fingers. Finger therapy means holding a finger or giving gentle massage to particular finger will heal common human ailments such as anxiety, head ache, body pain, irregular blood circulation, constipation etc., Hence, the practice of mudras and finger therapy may balance energy flow in the body which may lead to normal health.

Generally, hand mudras can be done by joining the hands, joining the tips of different fingers and holding the fingers. Observing the normal flow of the breath while doing mudras is a very important way to enhance the benefits of doing mudra.

One can actually practice the mudras at any time and in any place but the good result may be enhanced when it is practiced while in a good mood and in a positive atmosphere. It is because, feelings and thoughts influence the energy fields and the flow of energy in a negative or positive manner.

A good time to practice mudras is a few minutes before getting up and a few minutes before falling asleep, before or after meals. It is good to practice one or two mudras at a time according to their ailments.

Mudras can be done while we are in padmasana, sukasana and vajrasana for good result. If we sit on a chair while doing them, our back should be straight and our feet should have good contact with the floor. It is important to be relaxed and calm while we do mudras.

For chronic complaints, the Indian mudra researcher Keshav Dev, recommends holding one mudra per day for 45 minutes. This time duration can be divided into three time periods of 15 minutes each. To heal a chronic ailment practice of mudra should be routine at the same time and for the same length of time. Acute complaints such as respiratory and circulation problems, flatulence, exhaustion, or inner restlessness mudras should be practiced till the appropriate effect is achieved[5].

The effect of a mudra may be realized immediately or only after a certain amount of time. in the way of feeling warm, the sense of freshness and pain fade away, improving mood status and refreshed mind through clear thinking and action. But some time, some people may also experience just opposite like tired, or start to feel cold and shiver. However this is also a positive sign of the effect.

Mudra is even used a symbol because it is a processes of consciousness with eye positions, body postures, and breathing techniques. So mudras engage certain areas of the brain and soul and exercise a corresponding influence on them. There is a direct relationship between the hands and the neck since the nerve paths run through the arms, hands, and fingers. The flexibility of the hands always influences the flexibility of the neck. Therefore, hand exercises relieve tensions in the neck. Moreover, spreading the ten fingers creates a reflex that causes the thoracic or chest vertebrae to spread out. This increases the tidal volume of the lungs. The hands and fingers also have an additional direct relationship to the heart and lungs. With increasing age, many people can no longer properly stretch their fingers. This shows tension in the heart area, which often indicates to heart disease or a tendency toward osteoporosis.

Finger therapy for healthy life: Finger therapy means holding gently the fingers for 10 to 15 minutes will stimulate the particular organs. Be polite and try to feel the heart beat in the finger which you hold it.As per the astrological perspectives all the planets are indicated in our hands especially fingers and palm. For example, little finger represents mercury and water element, ring finger represents to sun and venus and earth element, middle finger represents Saturn and ether element, index finger represents Jupiter and air element and thumb finger represents mars and fire element[6]. Therefore, gentle massage or holding the fingers will stimulate the respective organs. For instance;

- Joining the tips of ring finger with thumb will arrest any ailments related to stomach, joining the tips of little finger with thumb will arrest any ailments related to kidney and urinary bladder.
- Holding thumb for 10 to 15 minutes will relieve headaches, stomach pain, stress, and skin issues
- Smooth massage or gentle pressure at the base of thumb will solve the problems related to the respiratory system.
- Holding or pressing index Finger will alleviate heartburn, muscle pain, toothaches, and back pain.
- Holding or pressing middle Finger will help us to over come anxiety, indecisivenessand it will also improve the eyesight, blood circulation, and menstrual cramps.
- Gentle massage of ring finger helps to improve colon and lung function,respiratory issues, asthma, skin problems, and digestive conditions.
- Holding and pressing little finger will increase our confidence level and cure stomach bloating, throat pain, and various heart issues.
- Pressing center of the Palm will alleviate any digestive issues and stomach pain or cramps.
- Gentle massage of exterior Palm will control or reduce high sugar levels in the blood.

Managing our daily routine work through fingers: Proper exercise and work to the fingers like doing handicrafts, playing an instrument, washing the hands, or massage will have long-lasting effects.Press the four fingers of one hand together with the other hand and turn the fingers you are holding to both sides. Then make fists, open the hands again, and spread the fingers. Or vigorously rub both palms together. Cross your fingers with each other, turn the palms outward,and stretch our arms. This will refresh you, improveour breathing, and strengthen your heart.

Conclusion.

Generally, we have been using our hands and finger in some way or other by playing games, instruments, writing, drawing, and doing some other activities such gardening, cooking. grinding, cleaning vessels, washing, ironing etc, but now a days we donot practice many of these activities due to the mechanized life. This makes people static, sedater and inactive which results in life style disorder with so many non-communicable and

unknown diseases. Therefore, it is pertinent to say that along with physical exercises such as walking, jogging and cycling people can practice finger therapy inorder to keep their health in tact.

Discussion

People at present are experiencing cut throat competition in their day to day activities and they have to struggle to prove themselves in the society by compete with each other throughout the day. In addition, the so called modern machine–life leads to life style disorder and suffering from non-communicable diseases. Infact, gentle finger therapy or holding fingers will facilitate to heal physical and mental ailments. Therefore, clapping, massaging our palm, rubbing both the hands, gathering both the hands to greet along with the practice of finger therapy will cleanse and revitalize human energy for healthy life and healthy aging.

Ethical Clearance: VELS Research Committee.

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Conflict of Interest: Nil

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Energy Medicine & Herbal Brain–Top Five Brain Inducing Herbs of India its Impact on Health and Economy

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Abstract

Brain functions through its chemical secretions and electrical signals it generates, if there is excess or shortage of these signals or secretions it leads to various mental disorders. It has been observed that for treatment of Brain disorders any invasive procedure creates long term complications and unwanted side effects in majority of the cases, hence there is a clear need to look at some of the traditional and ancient healing method. This is a review article with a primary objective to trace five of the top beneficial brain strengthening herbs along with their medical and scientific properties which are currently in various stages of research both in conventional and traditional medical practices. There is an economic angle for their cultivation or wild foraging of these herbs and it plays an important role in its authenticity and efficacy of the finished herbal drug. If these herbs Vallarai, Neer Brahmi, Amukkara, Nithyakalyani and Vishnukranthi herbs are consumed as prescribed by a qualified medical doctor it produces anti-stress nervine tonic, anti demential brain tonic which helps in strengthening of the brain and prevents the brain from auto neuro degeneration. It also enhances the overall learning and memory abilities.

Keywords: *Herbal Brain, memory, Health Care Economy, Indian Herbal Medicine.*

Introduction

What drives humans? is it the healthy strong body or the agile brain, if you look around world leaders or top scientists, or leading academicians you will find them doing extraordinary things which for majority of the population is impossible to think and execute and this is possible only through the agile brain which is driving their bodies to do super human things. We have so many examples where particular race or sects of people have demonstrated significant learning or business skills compared with other parts of the population. We could trace their behavior, attitude towards the specific diet regimen they follow as one of the leading examples.

In a society every human being participates using his physical and mental abilities, based on his contribution through his faculties he gets compensated for his efforts in cash or in kind or both cash and in kind. This is the basis of economic development and defines individual, family, community, regional, national prosperity index. Each human being differs at physical and mental ability levels even though skill sets of homogenous nature is administered through education and training. Given this paradox how does one human being who has similar physical make up and similar educational background and skills training fares better or different than the other human being–this question is being taken up to find the answer as part of this research article. Healthy body and an even more optimally functioning brain become a huge asset for the possessor, for the society and the country at large for wealth and health creation thereby increasing quality of life.

Statement of the problem: This brings us back to the question if Brain leads the body to achieve

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extraordinary results can the brain be kept healthy like the body through herbal diet systematically?

Materials and Method

This is a review article to analyze and examine the impact of agile Brain and its role in human health and societal economics and to understand if five of the identified medicinal herbs have direct influence on making a not so normal brain an agile and healthy one from various sources including Materia medica books, journals, old tamil Siddhars texts and from the world wide web.

Brain: The Brain is a mass of soft, spongy, pinkish gray tissue that weighs about 1200 gms in a human, it is contained in the head within the cranium comprising of Forebrain, Midbrain and Hindbrain. The human brain consumes the major portion of the entire energy that is generated in the human body. To be exact, the brain consumes 20% of that energy despite the fact that it only represents 2% of the total body weight. The brain is made up of 100 billion of nerve cells or neurons that are in constant communication with each other through electric signals, intricately connected with each other.[1] It contains nerve centers which control many involuntary functions, such as circulation, thermostat regulation, respiration, to interpret sensory impressions received from the eyes, ears, nose, skin and tongue. Consciousness, emotion, thought, and reasoning are functions of the brain. It also contains centers or areas for memory which allows for recording, recalling, and playing back past experiences.

The neurons transmit messages with the help of electrochemical processes. This electrochemical process can be understood as the movement of sodium, potassium, and chloride ions in and out of the cells with the help of flowing regulated electric current through neurotransmitters. The brain contains several hundred different types of chemical messengers or neurotransmitters. They in turn are categorized as either excitatory or inhibitory. An excitatory messenger like Serotonin, Norepinephrine, dopaminestimulates the electrical activity of the brain cell, whereas an inhibitory messenger like Gamma aminobutyric acid (GABA) calms this activity. The activity of a brain cell is largely determined by the balance of these excitatory and inhibitory process.

Brain Disease: Brain diseases are broadly classified under infections, trauma, stroke, seizures, tumors, vascular condtions, auto immune conditions and neuro degenerative conditions.

Mental Disorder: A mental disorder, also called a mental illness or psychiatric disorder, is a diagnosis by a mental health professional of a behavioral or mental pattern that may cause suffering or a poor ability to function in life. Such features may be persistent, relapsing and remitting, or occur as a single episode.

Herbal Medicine: Food as medicine and medicine as food has been the lifestyle for many cultures around the world especially the Tamil civilization which originated from the South of India has embraced this and have furthered this concept by creating its own system of medicine called Siddha which is entirely based on using different parts of Plants, Animal, metals and minerals. This system of medicine also specializes in anti-ageing by using specific herbs to increase longevity. Siddhars who were the earliest proponents of the system also have understood the chemical compounds secretion by the brain and have mapped it back to certain herbs which induces brain functions like controlling neuro degenerative diseases and mental disorder management.

Herbal Medicine and its action: Medicine entry into the body happens through Oral or mouth passage, nasal, eyes, skin, rectum and ears. The most common method of administering medicines are always oral because of its convenient quotient. The other important aspect of medicines is how well and with what its packaged and administered with ensures the delivery of the medicine for better absorption in the blood stream.

The Chemical compounds in the herbal medicine mediate their effects on the human body through processes identical to those already well understood for the chemical compounds in conventional drugs; thus, herbal medicines do not differ greatly from conventional drugs in terms of how they work. This enables herbal medicines to be as effective as conventional medicines[2].

Top Five Herbs of India Inducing Brain Power: For centuries mankind has been using herbs to improve the function and memory of the brain but it was always shrouded with mystery and secrecy for various reasons. There have been enough references in our ancient scriptures and texts about the use of specific herbs which was used by the likes of King Solomon and was called as the secret of Solomon for his mental prowess. In the Dravidian history there were three kingdoms which shaped up itsculture, arts, religion and medicinal

practices they were the Cholas, Cheras and the Pandyas between them there are numerous instances where they have used specific herbs to increase their brain power, valour, longevity etc.

From actually increasing intelligence to improving memory, tissue oxygenation, balancing chemical secretions and even regenerating neuronal connections, these five superstar herbs are in a class of their own when it comes to improving brain function and creating long lasting neurological health.

1. Neer Brahmi, Water Hyssop, bacopa monnieri
2. Amukkara, Ashwagandha, Indian Ginseng, Winter Cherry, Withania Somnifera
3. Vallarai, Gotu Kola, Brahmi, Asiatic Pennywort Centella asiatica
4. Nithya Kalyani, Periwinkle, Catharanthus roseus
5. Vishnukranthi, Sankhapuspi, Speed Wheel, Convolvulus pluricaulis

1. **Neer Brahmi (bacopa monnieri):** Neer Brahmi is a Siddha herb utilized by Indians for thousands of years. Neer Brahmi is said to work by supporting our nervous system and brain. Neer Brahmi acts as a micro-nutrient in the Siddha therapy known as Karpa Marunthu or Rasayanam was shown to retard brain ageing and help in regeneration of neural tissues. Neer Brahmi, is also believed to provide adrenal support, and helps with emotional resilience[3].

2. **Amukkara (withania somnifera):** Siddha herb, Amukkra or ashwagandha has been found to inhibit the formation of beta-amyloid plaques in preliminary research. It's also indicated that ashwagandha may benefit the brain by reducing oxidative stress (a factor that may contribute to the development and progression of Alzheimer's disease).

The herb also reduces tumor GSH levels which may contribute to the enhancement of radiation response. Amukkara can reverse paclitaxel (cancer chemotherapy drug that works by slowing or stopping cancer cell growth) induced neutropenia[4] (Neutropenia is an abnormally low concentration of neutrophils in the blood. Neutrophils make up the majority of circulating white blood cells and serve as the primary defense against infections by destroying bacteria, bacterial fragments and immunoglobulin-bound viruses in the blood. Patients with neutropenia are more susceptible to bacterial infections and, without prompt medical attention, the condition may become life-threatening).

3. **Vallarai (centella asiatica):** Vallarai or Brahmi herb is a tonic for brain. Traditionally it is used for treating brain disorders, skin diseases, neural disorders and insomnia due to its adaptogen, central nervous system relaxant, sedative, antibiotic, detoxifier, blood-purifier, laxative, diuretic, emmenagogue properties. It reduces tension, stress, anxiety and sleeplessness due to its sedative, tranquilizing and relaxant activities. Vallarai is used in Siddha, for improving memory, intelligence and speech. The intake of herb overcomes mental confusion and supports better thinking.

The intake of Vallarai herb overcomes mental confusion and supports better thinking. It has cooling, sedative and relaxing effect. The tea prepared from Vallarai induces sleep and gives relief in insomnia. Centella can elevate the level of cerebral glutamic acid and temporarily increase the gamma-aminobutyric acid (GABA) level in the brain. It is believed that the endogenous increase in brain glutamine may be helpful in the learning process.

4. **Nithyakalyani (catharanthus roseus):** Nithyakalyani or Periwinkle is used by herbalists to treat nervous disorders, epilepsy, hysteria, and nightmares. Exciting new research into this delicately beautiful plant shows that vinpocetine, a derivative of vincamine, a natural compound in periwinkle, helps transport oxygen and glucose to the brain. Since the brain needs both to function optimally, Nithyakalyani or periwinkle may be beneficial for assisting to ease brain disease.

Vinpocetine is a powerful free radical scavenger. Used regularly, periwinkle, or its active ingredient, vinpocetine, may help to prevent senility and dementia, by preventing damage to the blood vessels in the brain caused by free radicals. With around one hundred studies conducted on vinpocetine's effects on humans, mostly in Hungary, it is not surprising that it has been used by doctor's world over to treat senility and blood vessel disorders in the brain for twenty-five years. In these studies, it appears to boost memory and cognition in healthy people and in those with mild to moderate forms of dementia.

5. **Vishnukranthi (convolvulus pluricaulis):** Vishnukranthi herb works on nerves, plasma, and reproductive system. It helps in mental, nervous, excretory and reproductive disorders. It promotes intelligence, enhance memory and retention, reduces

stress, anxiety, depression, confusion and induces peaceful sleep,It is psychotropic and nootropic agent drug that cures nervous debility and dementia, it also acts as a brain tonic, alterative, febrifuge, vermifuge and anti-inflammatory. It is beneficial in rejuvenating the brain and hence works as a Psycho-stimulant and tranquilizer. It is also a known herb to induce production of Dopamine which calms the brain.

Economic burden of Brain Disease: The Economic burden of mental disorder is not very easy to ascertain due to various reporting issues, but NIMH (National Institute of Mental Health) puts the mental health care figures equal to cancer health care[5]. But unlike cancer, much of the economic burden of mental illness is not the cost of care, but the loss of income due to unemployment, expenses for social supports, and a range of indirect costs due to a chronic disability that begins early in life which can be measured through DALYs (Disability adjusted life years).[6] It is estimated that 1.46 trillion US dollar is being spent annually on global mental disorder medicine and care.

Conclusion

It is clearly understood that the identified five Indian herbs contain the saponins called bacosides and adaptogens, which appear to affect certain neurotransmitters in the brain. Brahmi seems to increase the effects of serotonin, gamma aminobutyric acid or GABA and acetylcholine. Vallarai effects on these neurotransmitters, along with its antioxidant and neuroprotective actions in the brain, they include enhancing mental function and easing anxiety and depression. Nithyakalyani or Periwinkleits active ingredient, vinpocetine, may help to prevent senility and dementia, Vinpocetine is also a powerful free radical scavenger. Vishnukranthi produces psychotropic and nootropic agent drug that cures nervous debility and dementia. Overall these five drugs[7] are shown to reduce oxidative stress and GSH levels which may contribute to the and strengthening of learning and memory abilities. As conclusion we can significantly increase the capacity to deal with stress and improve mental and physical performance with the use of these five Indian adaptogen herbs. The economic costs of these five Indian herbs are relatively much lower than conventional medical treatments for mind disorder which might include invasive and non-surgical procedures. The other significant benefit of these five Indian herbs is that it could be taken along with conventional medicines which also could lower the health care costs.

Discussion

As per the law of mentalism everything is mind and mind is in everything. All scientific advancements and developments, inventions, innovations, discoveries are the outcome of human mind and it is the replica of human brain which is the part and parcel of the human body. Body and mind are inter-related and reinforce each other butmind is more subtle and powerful than the physical body. Purity in mind will indicate healthy mind which inturn will provide healthy physical body. Unfortunately, mind is polluted by various factors in the modern life that leads to all sorts of human ailments. Hence, it is indispensable to keep our mind healthy through herbals such as Neer Brahmi, Amukkara, Vallarai,, Brahmi,. Nithya Kalyani and Vishnukranthi. If these herbs are consumed as prescribed by a qualified medical doctor it produces anti-stress nervine tonic, anti demential brain tonic which helps in strengthening of the brain and prevents the brain from auto neuro degeneration. It also enhances the overall learning, memory abilities and longevity.

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Blood Pressure–Some Issues and Traditional Remedical Measures

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Abstract

Human ailments may be classified into communicable and non-communicable diseases. Thanks to the technological advancement in the medical field, many communicable diseases such as cholera, tuberculosis, HIV/AIDS, gonorrhea, influenza, measles, hepatitis–A, hepatitis–B, typhoid etc are in control to a large extent. In contrast, due to life style disorder, poor diet and environment the number of causalities increases due to non-communicable diseases such as cardio–vascular disease, cancer, chronic respiratory diseases, dysfunction of kidneys, diabetes, etc. Abnormal blood pressure may be the cause for most of the non-communicable diseases. Therefore, the authors examined the causes and consequences of abnormal blood pressure and also presented a few traditional remedial measures to over come the same.

Keywords: *Abnormal blood pressure, life style disorder, circadian rhythm,Physical and mental health, yoga and hand mudras.*

Introduction

In the modern world, people are very busy and active in their efforts to eke out their living. Many people spend most of the time in travel, preparation for their official and personnel works. Our social, personal responsibilities and obligations influence our physical and mental conditions which inturn imbalances body metabolism and it ends with physical and mental ailments. Human ailments may be classified into communicable and non-communicable diseases. Thanks to the technological advancement in the medical fields many communicable diseases such as cholera, tuberculosis, HIV/AIDS, gonorrhea, influenza, measles, hepatitis–A, hepatitis–B, typhoid etc are in control to a large extent. In contrast, due to life style disorder, poor diet and environment the number of causalities increases due to non-communicable diseases such as cardio–vascular disease, cancer, chronic respiratory diseases, dysfunction of kidneys, diabetes, etc. Abnormal blood pressure may be a cause for most of the non-communicable diseases.

Statement of the problem: Blood pressure, in general, is one of the major indicators of good health. It is the pressure of circulating blood on the walls of blood vessels, in large arteries with systemic circulation. Blood pressure is usually expressed in terms of the systolic pressure is maximum during one heart beat over diastolic pressure which is minimum in between two heart beats and is measured in millimeters of mercury (mmHg). Blood pressure is influenced by cardiac output, total peripheral resistance and arterial stiffness and it varies depending on situation, like emotional state, activity, and relative health/disease status. Blood pressure is regulated by baroreceptors which act via the brain to influence nervous and endocrine systems. Normal resting blood pressure in an adult is approximately 120 millimetres of mercury (16 kPa) systolic, and 80 millimetres of mercury (11 kPa) diastolic, abbreviated "120/80 mmHg".Low blood pressure is called hypotension, and high blood pressure is called hypertension. As the abnormal blood pressure leads to many human ailments, the authors in this article examined the causes and consequences of abnormal blood pressure and also presented a few traditional remedial measures to overcome the same.

Objectives of the study: Toexamine the causes and consequences and also to suggest a few traditional remedial measures to balance the Blood Pressure.

Blood circulation Mechanism in human body: Blood circulation provides nutrients and oxygen to every tissue, muscles, organs and cells through blood circulation from the heart to every part within the body. To understand healthy blood pressure range, it is necessary to know systolic and diastolic blood pressure.

Systolic blood pressure is the blood pressure number when the heart contracts (beats).Diastolic blood pressure is the blood pressure number between heartbeats (when the heart rests).The heart is a muscular pump that pumps blood throughout the body during our entire life span. Low oxygen blood enters into the lungs and reloaded with oxygen and oxygen-rich blood is sent throughout the body. The heart pumps out blood with some pressure so that it can easily reach extremes. This pumping of heart generates blood pressure.

Functions of brain and blood pressure: Baroreceptors are sensors in the blood vessels that sense the blood pressure and send it to the brain and it maintains a healthy blood pressure by communicating with the kidneys, arteries, veins, and heart to increase, decrease, or maintains blood pressure, as needed. Its function is to ensure sufficient blood supply to all the organs, cells and tissues.

If our blood pressure is too high, baroreceptors send a signal to the brain and it instructs the heart to beat slower, pump less blood per beat, relaxes the arteries that carry oxygen-enriched blood from the heart and constrict the veins that carry oxygen-depleted blood to the heart which results in a drop in blood pressure until it attains healthy blood pressure. On the other hand, if our blood pressure is too low, baroreceptors send signals to the brain and it instructs the heart to beat faster, pump more blood per beat and loosen the arteries that carry oxygen-enriched blood from the heart andrelaxes the veins that carry oxygen-depleted blood to the heart which results in rise in the blood pressure until it attains healthy blood pressure.

If the above said control loop not able to maintain healthy blood pressure, then next master control system is kidney. If the blood pressure is high, kidney pulls more water out of the blood by excreting more urine than usual thus decrease blood pressure.If the blood pressure is low, kidney keeps more water in the blood by excreting less urine than usual thus increases blood pressure.

Review of literature: Generally, an individual's blood pressure varies with exercise, emotional reactions, sleep, digestion and time of day. Blood pressure fluctuates from minute to minute and normally shows a circadian rhythm over a 24-hour period, with highest readings in the early morning and evenings and lowest readings at night.[1] Loss of the normal fall in blood pressure at night is associated with a greater future risk of cardiovascular disease and there is evidence that night-time blood pressure is a stronger predictor of cardiovascular events than day-time blood pressure.[2]

Various other factors, such as age and sex, also influence a person's blood pressure. In children, the normal ranges are lower than for adults and depend on height.[3] Standard blood pressure values have been developed for children in different countries, based on the distribution of blood pressure in children of these countries.[4] As human grows older and older systolic pressure tends to rise and diastolic pressure tends to fall.[5] Consequently, in the elderly, systolic blood pressure often exceeds the normal adult ranges,[6] this is due to increased stiffness of the arteries. [7]

Consequences of high blood pressure: Poor diet and physical inactivity among the people may cause increased blood pressure, blood glucose, blood liquids and obesity which inturn increase the risk of developing cardio-vascular disease such as heart attack, stroke, coronary artery disease, cerebrovascular disease, peripheral artery disease and congenial heart disease. It also leads to weak heart, weak bones, rigid joints, weight gain, low energy,and increased stress levels. Diabetes also leads to heart disease, vision loss and kidney injury.

Traditional remedial measures to balance the blood pressure

a. Mind-body relationship

In a normal situation breathe directs lungs, lungs influences heart, heart influences blood circulation, blood circulation influences brain, brain influences mind, mind creates thoughts and the nature of thoughts feeling and emotions create different vibrations in the body. The external objects also influence our mind and create thoughts, feeling and emotions. Feelings and emotions are also part of thought. They may be formed and expressed as love, fear, hatredness, jealousy, worries, angry, anxiety, depression, frustration and so on. These different feelings and emotions may also imbalance blood circulation in our body. These entire mental functions imbalance the physical functions of the body, because body and mind are inter-related. Depressed mind can depress the physical body. Poor physical condition can depress the mind. However, mind is more powerful than physical body. Therefore, body–mind harmony will stabilize the total health status of the man-kind. Hence, the practice of pure, satvik, positive,

neutro, optimistic,ethical, disciplined and synthesizing mind may be useful to maintain the normal blood pressure.[8]

b. Exercises

Exercise can help to increase the secretion of nitric oxide, improve blood vessel's elasticity, and lower our blood pressure. Exercise makes our heart stronger, pump more blood with less effort, the force on our arteries decreases, and lower our blood pressure. In addition, regular exercise helps to maintain a healthy weight, another important way to lower blood pressure. Some exercises like household chores such as trimming and cleaning the lawn, gardening, rake leaves, and cleaning floor/utensils, and also playing indoor and out door games. Riding bicycle,swimming or attending water aerobics class anddancing also will help to maintain blood pressure.

c. Diet

Balanced and hygienic food, proper food habits, avoiding jung foods, also keep our general health in tact. Nutrients useful to lower blood pressure are potassium, magnesium, and vitamin D. Nutrients useful for vascular health care are vitamin E, C & B3.

- Potassium rich foods include coconut water, beans, dark leafy greens, potatoes, squash, yogurt, fish, avocados, acorn squash, mushrooms, wild-caught salmon, bananas, and pomegranate seeds.
- Magnesium rich foods are Spinach, Chard, Pumpkin Seeds, Yogurt, Almonds, Black Beans, Avocado, Figs, Dark Chocolate, fish (salmon, mackerel & halibut) and Banana.
- Vitamin D rich foods include Salmon, Mushrooms, Beef Liver, Eggs, Milk, Yogurt, Butter, and Orange Juice.
- Vitamin E rich foods include Sunflower Seeds, Spinach, Peanuts, Broccoli, Asparagus, Almonds, Sweet Potato, Avocado, Wheatgerm, Palm Oil, Butternut squash, Trout, and Olive oil.
- Vitamin C rich foods include Oranges, Red Peppers, Kale, Brussels Sprouts, Broccoli, Strawberries, Grapefruit, Guava, Kiwi, Green Peppers, Peas, and Papaya.
- Niacin (vitamin B3) rich foods include Turkey, Chicken breast, Peanuts, Mushrooms, Liver, Tuna, Green peas, Grass-fed Beef, Sunflower seeds, Kidney Beans, Bell Peppers, and Avocado.and
- Proper exposure to sun light.

In addition to that we can reduce the problem of hyper tension more effectively by cutting down sodium salt intake and increasing potassium-containing vegetables, fruits, nuts, seeds, legumes,milk and milk products, meat, fish and poultry foods and coconut water.

d. Alternative therapy

- Yoga

Constant practice of morning and evening for fifteen minutes certain yogasanas may balance high blood pressure namely savasana, sethu bandasana, vibaritha karani, vajrasana and padmasana

- Mudra

Constant practice of morning and evening for fifteen minutes, certain hand mudras such as apana vayu mudra, akash mudra, Gnana mudra, prana mudra may balance high blood pressure.

- Acupressure points

Constant practice of morning and evening by stimulating the meridians for three minutes namely LI 4 (hand web), LV 3 (Leg web), K1(back of foot below the middle finger), GB-20 (below the base of the skull both sides), CV-12 (four cun above the naval point), LI 11 (Outer crease of the elbow), SP 6 (just above the crown of the inner ankle) and ST 36 (below the bottom of the knee cap and one thumb width out side of the leg)

- Relaxation technique of meditation

we can relax our body while in savasana telling that "my toes are relaxed, my feet are relaxed, my ankles are relaxed, my knees are relaxed, my hip is relaxed, my abdominal muscles such as kidney and urinary bladder are relaxed, my liver and gall bladder are relaxed, my small intestine and large intestine are relaxed, my stomach and spleen are relaxed, my pancreas is relaxed, my diaphragm is relaxed, my lungs are relaxed, my heart is relaxed, my pericardium is relaxed, my triple warmer is relaxed, my central nerve system is relaxed, my chest is relaxed, my shoulders are relaxed, my hands are relaxed, my neck and throat are relaxed, my head is relaxed, my brain is relaxed, my eyes are relaxed, my nose and mouth are relaxed and my ears are relaxed. My body and all its organs, bones, muscles, nerves, tissues and cells are relaxed. This technique

may also be practiced while we sit in sukkasana sukkasana means comfortable way of sitting on the ground or chair[9].

Hypo blood pressure: Low blood pressure is the condition where vital organs such as heart, brain, kidney and other organs receive inadequate oxygen and nutrients due to insufficient blood pressure. It may bedue to hormonal changes, widening of blood vessels, medicine side effects, anemia, heart, & endocrine problems,severe infection, allergic reaction, nutritional deficiency, and neurological disorder.

Risk of Hypo blood pressure

1. Dizziness or light-headedness
2. Fainting
3. Sleepiness.
4. Palpitations (a rapid, or irregular, heartbeat)
5. Lack of concentration or confusion
6. Blurred vision
7. Nausea
8. Cold, clammy, pale skin
9. Rapid, shallow breathing
10. Fatigue or weakness
11. Depression
12. Thirst
13. Breakage of bones due to fall
14. Stroke and other cardiovascular diseases.

Remedial measures for hypo blood pressure

Diet: Along with healthy diet with increased sodium intake raisins, almonds milk,juice made up of tulsi, beetroot, carrot, lemon, ginger and rosemary help to increase blood pressure. And also follow the below said suggestions to mange normal blood pressure.

Drink more liquids, avoid alcohol,take coffee moderately, use compression stockings,be slow in the activities,sleeping slightly head elevated position, managing proper leg movements and emotions.

Alternative medicine

1. **Herbs:** Some herbals may be used to overcome low blood pressure such as Turmeric, Cinnamon, Ginger, Pepper, Cardamom, Ashwagandha, and Indian spikenard.
2. **Yoga:** Constant practice of morning and evening for fifteen minutes of certain yoga asanas such as Uttanasana, Adho Mukha Svanasana, Supta Baddhakonasana, Viparita Karani, Savasana and pranayamas may be useful to over come low blood pressure.
3. **Acupressure:** The following acupressure points may be stimulate to overcome the problem of low blood pressure : LV 3 (Leg web), SP 6 (just above the crown of the inner ankle), ST 36 (below the bottom of the knee cap and one thumb width out side of the leg), CV 6(1.5 cun below the naval point) and H 7(located directly in line with the inside of the little finger at wrist)
4. **Hand Mudra:** Constant practice of morning and evening for fifteen minutes of certain mudras such as prana mudra, apana mudra and linga mudra may help to overcome lower blood pressure.

Conclusion

Health education and awareness among the people on communicable and non-communicable diseases and their causes and consequences of the diseases may be helpful to keep health in tact. The ideal condition of natural way of life makes man happy and keep them in harmony. But, in the modern society due to life style disorder, unhygienic environment, social economic responsibilities and obligations, deviate the people from happiness and healthy life. Therefore, it is indispensable for us to practice yogasana, meditation, hand mudra and acupressure and content, selfless and ethical life may normalize blood pressure which inturn help us to overcome the problem of any non-communicable diseases.

Discussion

Now–a–days due to complicated health issues not only increase medical expenditure in the total family budget but also reduce work hours, productivity and make people frustrated and unhappy. Of late, number of deaths due to non-communicable diseases increases and makes medical expenditure recurring in nature forever. As the problems of hypertension and hypo tension are the root cause of many dangerous non-communicable diseases, it is pertinent to arrest them with the combined efforts of conventional and alternative medicines. Definitely, the alternative way of treatment may complement the conventional treatment more effectively.

Ethical Clearance: VELS Research Committee

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Conflict of Interest: Nil

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An Analysis of Health Status in Tamil Nadu

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Abstract

Health services are an important indicator to understand the healthcare delivery provisions and mechanisms in the State and are subdivided into three categories viz. primary, secondary and tertiary health care systems. Nutritional status is one of the indicators of the overall well being of population and human resources development. Malnutrition is the cumulative effect of factors like poverty, inadequate access to food, illiteracy, large size of families, poor environmental sanitation, lack of basic minimal health care, lack of personal hygiene, lack of easy access to adequate safe drinking water and lack of awareness. In this study eighteen determinants, namely number of Primary Health Centers, population per bed ratio, number of doctors and nurses in primary health centre, population per doctor ratio, female literacy rate, per capita food availability, PHC per million population, per capita income at current prices, public health expenditure, literacy rate, employment in organized sector, provision of drinking water villages covered, couple protection rate, fertility rate, sex ratio, density of population, beds and hospitals are taken as determinants of health status in Tamil Nadu. The study period is 15 years from 2002-03 to 2016-17. The first objective of the present study, namely, to study the levels of health in the study area is based entirely on secondary statistics.

Keywords: *Health, Indicators, Life Expectancy.*

Introduction

Good health is an essential pre-requisite which contributes significantly both to the improvement in labour productivity and human resource development. Considerable achievements have been made in Tamil Nadu in health indicators like life expectancy at birth, infant mortality rate and maternal mortality rate. Among the major States Tamil Nadu ranks 'fourth highest' in terms of life expectancy at birth, 'second lowest' next only to Kerala in terms of infant mortality rate and birth rate, 'third lowest' in terms of maternal mortality rate and 'tenth lowest' in terms of death rate. Small pox, polio and guinea worm have been eradicated. Life Expectancy at Birth indicates the average number of years that a newborn is expected to live if current mortality rates continue to apply.[1] with the improvements in the prevention and control of major childhood infectious diseases, nutritional status, housing condition and modern medical care resulted in an increase in life expectancy in the State.

Health Care Institutions in Tamil Nadu: Health services are an important indicator to understand the healthcare delivery provisions and mechanisms in the State and are subdivided into three categories viz. primary, secondary and tertiary health care systems. The Primary Healthcare System consists of Primary Health Centre (PHCs) and Health Sub-Centre (HSCs). Secondary healthcare system comprises of District Head Quarters Hospitals, Taluk Hospitals, Women and Children Hospitals, Dispensaries, Mobile Medical Units, Police Hospitals and Non-Taluk Hospitals etc., Tertiary healthcare system covers multi-specialty hospitals[2]. In addition to Government efforts, the private sector is also contributing to the provision of Health Care Services. In the absence of data relating to private sector health services, an attempt has been made to assess only the efficacy of Government healthcare system.

Indian System of Medicine: Indian System of Medicine (ISM) encompasses not only Siddha, Ayurveda, Yoga and Naturopathy but also Unani and Homoeopathy systems. The increasing cost of medicine in Modern System and the incidence of toxicity with

associated side effects have once again highlighted the need importance and relevance of traditional system of medicine in the world

Nutrition: Nutritional status is one of the indicators of the overall well being of population and human resources development. Malnutrition is the cumulative effect of factors like poverty, inadequate access to food, illiteracy, large size of families, poor environmental sanitation, lack of basic minimal health care, lack of personal hygiene, lack of easy access to adequate safe drinking water and lack of awareness.[3] The manifestations of malnutrition could be seen in the prevalence of specific nutrient-deficiency disorders such as protein-energy malnutrition, anemia night blindness, goitre, susceptibility to a number of infectious diseases, low birth weight of children, high IMR and MMR, lack of resistance to illnesses among mothers and children, growth retardation (both physical and mental) and stunting among toddlers.

Trends in Indicators of Health: In the present study four health variables, namely, life expectancy at birth, birth rate, death rate and Infant mortality Rate are used for measuring the levels of health status in Tamil Nadu. These health variables are known as health indicators. The health indicators are influenced by many determinants. In this study eighteen determinants, namely number of Primary Health Centers, population per bed ratio, number of doctors and nurses in primary health centre, population per doctor ratio, female literacy rate, per capita food availability, PHC per million population, per capita income at current prices, public health expenditure, literacy rate, employment in organized sector, provision of drinking water villages covered, couple protection rate, fertility rate, sex ratio, density of population, beds and hospitals are taken as determinants of health status in Tamil Nadu. The study period is 15 years from 2002-03 to 2016-17. The first objective of the present study, namely, to study the levels of health in the study area is based entirely on secondary statistics. They are collected from various statistical reports, published by Government of Tamil Nadu, Directorate of Medical and Rural Services, Chennai, Directorate of Public Health and Preventive Medicine, Chennai, Directorate of Family Welfare, Chennai Department of Economics and Statistics, Chennai Joint Directorate of Health and Medical Services, School Health Programme mainly emphasizes on providing comprehensive healthcare services to all students studying in Government and Government aided schools. Under this programme care has been taken to identify heart diseases, eye disorders, nutritional disorders, skin diseases and dental problems.[4] The students those indentified with problems and need of higher medical treatment are referred to higher medical institution.

Objectives of the Study:

1. To analyze the health status in Tamil Nadu.
2. To examine the health care expenditure in Tamil Nadu.

Staement of the Problem: Tamil Nadu has performed well in health sector when compared with other states in India. Tamil Nadu is the leading state in implementing various government health programmes as per the observations made by UNICF AND WHO. The studies on health status in Tamil Nadu show the rosy picture of the health status in the state are based on aggregates and they conceal rather than reveal the inequalities that exist in the health conditions in the state.

Tools of Analysis:

- Simple Regression Model
- Method of Least Squares
- Multiple Regression Model

Indicators of Heath in Tamil Nadu: Table 1 reveals various data related to life expectancy, birth rate, death rate and infant mortality rate in Tamil Nadu for the period from 2002-03 to 2016-17.

Table 1: Indicators of Health in Tamil Nadu for the Period from 2002-03 to 2016-17

Year	Life Expectancy	Birth Rate	Death Rate	IMR
2002-03	64.09	20.3	8.0	54
2003-04	64.10	19.5	8.0	53
2004-05	64.14	19.0	8.0	53
2005-06	64.29	19.2	8.5	53
2006-07	65.31	19.3	8.0	52
2007-08	65.41	19.3	7.9	51
2008-09	65.09	19.1	7.6	49
2009-10	65.11	18.5	7.7	44
2010-11	65.15	18.3	7.6	43
2011-12	66.22	17.1	7.5	41
2012-13	67.11	16.5	7.4	37
2013-14	67.21	16.2	7.5	37
2014-15	67.31	15.8	7.2	35
2015-16	67.75	16.0	7.4	31
2016-17	67.98	16.3	7.6	28

Source: Directorate of Medical and Rural Services, Chennai.

Table 2: The Results of Trends in the Indicators of Health in Tamil Nadu for the Period from 2002-03 to 2016-17

Sl. No.	Health Indicators	Coefficients		R^2
		a	b	
1.	Life Expectancy at birth	63.3587	0.661* (11.948)	0.917
2.	Birth rate	20.6152	-0.3235* (-10.269)	0.890
3.	Death rate	8.2123	-0.0607* (-4.998)	0.657
4.	Infant Mortality Rate	66.7430	-1.1034* (-4.257)*	0.582

Source: Computed from secondary data.

From Table 2 the trend and the annual rate of change of four health indicators have been observed. Life expectancy at birth has registered an increasing trend and its annual rate of changes is, 0.661. The birth rate, death rate and infant mortality rate have shown a declining trend, with the annual rate of changes being-0.3235,-0.0607 and-1.1034 respectively. All these rates are significant statistically.

Table 3: Health Determinants in Tamil Nadu for the Period from 2002-03 to 2016-17

Year	Number of PHCs + HSCs	Population per Bed ratio	Number of Doctors + Nurses	Population per Doctor Ratio	Female Literacy Rate	Per capita food availability (in Kgs)
2002-03	10106	1926	22262	20511	55.41	143.00
2003-04	10102	1954	23354	20698	56.77	167.20
2004-05	10099	1977	22416	20784	58.12	107.40
2005-06	10090	1995	22470	20853	59.48	114.90
2006-07	10091	2031	22504	20978	60.84	133.00
2007-08	10096	2015	22608	21010	62.20	126.50
2008-09	10099	2017	22664	21018	63.36	135.00
2009-10	10100	2018	22700	21025	64.55	146.60
2010-11	10103	2019	22761	21034	65.31	147.21
2011-12	10106	2021	22799	21045	67.91	149.24
2012-13	10109	2023	22816	21051	68.21	150.15
2013-14	10110	2025	22861	21063	68.31	151.21
2014-15	10113	2027	22893	21065	68.43	152.14
2015-16	10115	2079	22909	21068	68.54	152.31
2016-17	10117	2030	22968	21069	68.91	152.43

Source: 'Tamil Nadu–An Economic Appraisal'

Table 4: Results of Trends in Health Determinants in Tamil Nadu State for the Period from 2002-03 to 2016-17

Sl. No	Determinants of Health	Coefficients		R^2
		a	b	
1.	PHCs and HSCs (X_1)	10092.79	1.3678* (4.051)	0.558
2.	Population per bed ratio (X_2)	1957.95	6.5642* (5.086)	0.666
3.	Doctors and Nurses (X_3)	22514.16	27.2714* (1.859)	0.210
4.	Population per doctor ratio(X_4)	20703.58	30.986* (5.412)*	0.693
5.	Female literacy rate (X_5)	55.543	1.026* (15.192)	0.947

Sl. No	Determinants of Health	Coefficients		R^2
		a	b	
6.	Per capita food availability (X_6)	128.893	1.624 (1.862)	0.210
7.	PHC per million population (X_7)	0.040	0.0047* (15.958)	0.951
8.	Per capita income (X_8)	10033.58	698.16* (5.768)	0.719
9.	Public Health expenditure (X_9)	23581.867	2712.008* (7.983)	0.830
10.	Literacy rate (X_{10})	64.972	1.005* (37.601)	0.991
11.	Employment in organized Sector (X_{11})	-39012.68	7814.92 (1.740)	0.1889
12.	Provision of drinking water–Villages Covered (X_{12})	8258.590	829.167* (19.027)	0.9653
13.	Couple protection rate (X_{13})	50.03009	1.0298* (31.394)	0.9869
14.	Fertility rate (X_{14})	2.20381	-0.0371* (-8.925)	0.8596
15.	Sex rate (X_{15})	978.971	1.053* (13.939)	0.9372
16.	Density of population (X_{16})	451.780	2.4357* (7.443)*	0.8099
17.	Beds (X_{17})	30155.304	62.903* (6.1427)	0.7437
18.	Hospitals (X_{18})	307.628	1.0714* (7.368)*	0.8068

Source: Computed from secondary data.

Determinants of Health in Tamil Nadu: From the Table 4 it has been revealed that in terms of determinants in Tamil Nadu, all the determinants were significant except one determinant namely per capita food availability which has not recorded any significant trend. All others have shown significant and positive trends except PHC per million populations and the fertility rate which are favorable to improve the health status. Among the 18 selected determinants, 15 determinants have significant and positive trends. Per capita income at current prices, public health expenditure, and provision of drinking water villages covered, have shown the highest growth rate; whereas female literacy rate, literacy rate, couple protection rate, sex ratio and number of hospitals have shown the lowest growth rate. The growth rate of other determinants was moderate during the study period in the state. The favorable and unfavorable monsoons during the study period resulted in fluctuations in food production and output. This was the reason for insignificant and negative trend in per capita food availability in the state. Secondly, PHC per million populations was statistically significant and its growth was marginally negative. Thirdly the fertility rate had also negative trend which exhibited the awareness of people in small family norms. Per capita income at current prices in the state had increased from Rs.7352 to Rs.18314 that is, a two fold increase during the study period.[5]

Determinants of Health Status: In this section, an attempt has been made to analyze the influence of the determinants on the health indicators, in the study area from 2002-03 to 2016-17, using secondary data collected for Tamil Nadu State. Four important health indicators are selected to evaluate the health status. They are (i) life expectancy at birth, (ii) birth rate, (iii) death rate and (iv) infant mortality rate. Secondary data were collected for the selected 18 health determinants. Several

combinations of determinants were tried, taking into consideration, the interrelation among the determinants and suitable models were arrived at. Hence out of 18 determinants, only 10 health determinants are used for the purpose of analysis.

To analyze the influence of first six determinants on health status namely life expectancy and birth rate in the study area, a multiple regression model of the following formula has been used.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + U$$

It is estimated by the method of least squares separately for Tamil Nadu. The study period is about 15 years from 2002-03 to 2016-17. The computed results are in the Table 4 for life expectancy.

Table 5: Results of Multiple Regression Analysis for Tamil Nadu Life Expectancy at Birth

Variables	Parameter Estimates Tamil Nadu
Intercept	0.781
X_1	-2.941* (-3.110)
X_2	0.048 (0.101)
X_3	1.214 (1.018)
X_4	0.162 (0.311)
X_5	0.241 (1.041)
X_6	-5.271 (-0.816)
R_2	0.939
No. of observations	15

Source: Computed from secondary data.

From Table-5 it has been inferred that the number of PHCs and HSCs was significant and influencing the life expectancy at birth at state level. The number of PHCs and HSCs, the number of doctors and nurses, and per capita food availability were significant with marked influence on the life expectancy at birth at District level.

Conclusion

There is much that other states can learn from Tamil Nadu's public health system. Tamil Nadu's system is replicable in other states because its administrative foundations are similar to those of most other states.[6] As in other states, Tamil Nadu's health department is headed by an IAS officer and staffed at state and district levels by medical officers. While the general problems affecting a state bureaucracy do affect Tamil Nadu's health department, the very existence of a specialized cadre with a clear, focused mandate, means that it is much better placed to protect public health than a more generalized and many of the health targets are still remained unachieved.

Ethical Clearance: Completed

Source of Funding: Self

Conflict of Interest: Nil

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An Analysis of Industrial Labourer in India with Special Reference to Tamil Nadu

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Abstract

Labour markets play a significant role in determining the success of the economic restructuring policies and their impact on the population. The social aspects of minimum wage and job security regulations are necessary to promote the welfare of the workers. Rapid growth of employment and real wages should be of primary interest to workers in any country. They are also justified in view of varying conditions of demand and supply and varied job requirements like skill, knowledge, aptitude, ability, experience etc. but the object of the government is to minimize income inequalities and inequalities in the distribution of wealth. Human Resource managers are expected to understand these varying approaches because they provide them theoretical underpinnings for much of the role of Human resource management. The three popular approaches to industrial relation are unitary approach, pluralistic approach, and Marxist approach. This reflects that no proper implementation of rules and monitoring authorities is apparently found with industries. The analysis Age-wise distribution of workers revealed that 32.22 per cent of workers belong to the age group of 21 to 30 years followed by 25.56 per cent of workers in the age group of 31 to 40 years. This indicates that 57.78 per cent of the workers fell in the age group of 21 to 40 years in all the three category of industries.

Keywords: *Industrial Labour, Employment, wages.*

Introduction

Labour markets play a significant role in determining the success of the economic restructuring policies and their impact on the population. The social aspects of minimum wage and job security regulations are necessary to promote the welfare of the workers. Rapid growth of employment and real wages should be of primary interest to workers in any country.[1] An international comparison involving countries South Asia, East Asia, Latin America and the developed world reveals that over the last 25 years or so. While employment and real earnings per employee in the manufacturing sector have risen only slowly in India, the performance of the East Asian countries has been most outstanding in this respect. The rapid growth of employment and real earnings per employee in East Asia is the combined result of labour policies along with a whole range of successfully implemented export orientated industrialization policies which yielded rapid GDP growth. Wages and employment are two variables which vitally affect the economic well-being of a substantial segment of population of any nation.[2] it is worthwhile to take a look at the place occupied by wages and employment in major schools of economic thought. If one takes a broad sweeping view of economic theory as it has evolved over time, one can discern at least five types of approaches to the issues of wages and employment determination. Wage differentials on the basis of occupations, units and areas (when real wages are taken into account) can be justified on the basis of equal pay for equal work among workers. They are also justified in view of varying conditions of demand and supply and varied job requirements like skill, knowledge, aptitude, ability, experience etc. but the object of the government is to minimize income inequalities and inequalities in the distribution of wealth.[3] Thus wage differentials are not desirable in a socialistic pattern of society. However, formulating uniform wage policy ignoring differences in individual Skills, knowledge etc., units ability to pay, varying living costs in different regions, varying demand and supply conditions, differences in occupations etc., is practically not possible. Hence, a compromise between uniform wage policy and wage differentials has to be

developed in view of the principle of socialistic pattern of society Inter-personal, inter-unit, inter occupational differentials are more predominant in unorganized sector of Indian economy. But even in organized sector and public sector units, wage differentials are quite common. But the tendency appears to be towards minimization and regularization of personal wage differentials and to narrow down the gap between maximum and minimum wage in a unit. [4]

Structure of Minimum Wages in Tamilnadu

Table 1: Comparative Minimum Wages Rates Across States in Tamilnadu (in Rs.)

Sl. No.	Industries	Rates as on 31.12.2004	Rates as on 15.11.2010
1.	Spinning, Printing, dyeing	57.40	170.72
2.	Power loom	59.25	81.91
3.	Finishing, bleaching	98.54	170.72

Source: 1. Labour Bureau Government of India, 31.12.2004
2. Department of Labour and Employment, Tamil Nadu, 15.11.2010

Industrial Labour Relations: Existence of conducive labour relations is critical for promoting economic development in general and industrial development in particular. A study of data on number of strikes and lockouts in India reveals a declining trend. It is a welcome feature on the industrial front. It augurs well for the Indian economy. The number of man-days lost because of lockouts has continuously been on the decline. In regard to the spatial dispersion of the incidences of strikes and lockouts, it is observed that Gujarat, Andhra Pradesh, kerala, and Rajasthan are the most affected states.[5] among sectors, financial intermediaries (excluding insurance & pension funds) recorded the maximum number of strikes and lockouts)

Table 2: Strikes and Lockouts (Man-Days Lost, in Millions)

Year	Strikers		Lockouts	
	Number	Man-days lost	Number	Man-days lost
2004	236	4.83	241	19.04
2005	227	10.81	229	18.86
2006	243	5.32	187	15.01
2007	210	15.06	179	12.11
2008	250	7.02	182	10.46
2009	91	2.05	31	0.84

Source: Labour Bureau, shimla

Approach to Industrial Relations: The scenario of industrial relations is perceived differently by different people, For some, industrial relations is related to class conflict, others perceive it in terms of mutual co-operation and still others understand it in terms of competing interests of various groups. Human Resource managers are expected to understand these varying approaches because they provide them theoretical underpinnings for much of the role of Human resource management. The three popular approaches to industrial relation are unitary approach, pluralistic approach, and Marxist approach.[6]

Trade Union Membership: As of today, there are more than 66,000 registered unions and most of them are affiliated to one of the other central trade union. Table 3 presents details about the Central Trade Unions, their affiliates, political affiliation, date of establishment and membership claimed.

Trade Union Membership

Table 3: Details of Trade Union Membership in India

Year	No. of Unions Registered	Membership ('000)
1990	52016	7019
1991	53535	6100
1992	55680	5746
1993	55784	3134
1994	56872	4094
1995	57952	6538
1996	58805	5613
1997	59968	7408
2008	66000	8207

Source: Various issues of Labour Year Book-2010.

As Table 3 shows, there has been a steady increase in the number of registered unions, but their membership fluctuated from year to year. The figure slipped to all time low in 1993, but increased in the years that followed.

Industrial Relations

Table 4: Trade Union Facility, Grievance Procedure and Labour Enforcing Authorities of Industrial Workers

Industrial Relations Facility	Number of workers			Total Number of Workers
	Cotton spinning	Cotton weaving and processing	Power Loom	
Extent of Trade Union				
Available	33 (27.50)	–	–	33 (9.17)
Unavailable	87 (72.50)	120 (100.00)	120 (100.00)	327 (90.83)
Total	120 (100.00)	120 (100.00)	120 (100.00)	360 (100.00)
Grievance Procedure				
Available	41 (34.17)	42 (35.00)	36 (30.00)	119 (33.06)
Unavailable	79 (65.83)	78 (65.00)	84 (70.00)	241 (66.94)
Total	120 (100.000)	120 (100.00)	120 (100.00)	360 (100.00)
Labour Welfare Enforcing Authorities				
Available	41 (34.17)	54 (45.00)	52 (43.33)	147 (40.83)
Unavailable	79 (65.83)	66 (55.00)	68 (56.67)	213 (59.17)
Total	120 (100.00)	120 (100.00)	120 (100.00)	360 (100.00)

Source: Survey data. Note: Figures in parentheses are percentages to respective totals.

Of the 360 selected workers 33 workers have trade union membership and all of them are cotton spinning industries. About 327 workers are not the members of trade union. Since all other industries do not permit any involvement in trade union activity. In the cotton weaving and processing and power loom industries no one gets enrolled himself/herself as member of any trade union. Among the three sample industries out of 360 industrial workers, 41 in cotton spinning, 42 in cotton weaving and processing and 36 in power loom industries follow the prescribed grievance procedures for the redresses of workers Problem. 241 workers opined that no proper grievance procedure is available and practiced in the industries. However, grievances, if any, are settled through mutual discussion between the workers and the management. Table 4 also depicts that the visit of labour enforcement authorities availability among three industries. 147 workers consented that the facility is available, whereas 213 reported that no such labour enforcement authorities visited the industries. This reflects that no proper implementation of rules and monitoring authorities is apparently found with industries. The industrial workers belong to three categories of industries viz. cotton spinning, cotton weaving and processing and power loom industries in the study area. The analysis Age-wise distribution of workers revealed that 32.22 per cent of workers belong to the age group of 21 to 30 years followed by 25.56 per cent of workers in the age group of 31 to 40 years. This indicates that 57.78 per cent of the workers fell in the age group of 21 to 40 years in all the three category of industries. The gender-study of Industrial workers explores that 224 (62.22%) are male and 136 (37.78%) are female workers. It is also to pin point that out of 360 industrial workers 31 are male children workers and 14 are female children workers. This reflects employment of child labour is seen in the industries.

Suggestions

1. The practice of social security measures must be applied to the ground so as to elicit employee motivation and involvement and the consequent gratification. Nothing strokes employee motivation like assured social security measures.
2. Strategic planning and continuous strategy development need to be environment-friendly to be free from the risk of ‘set-up to-fail syndrome’.
3. Industrial workers clamoring for more wages and bonus payment produce the unpleasant effect of disturbing industrial peace and harmony. They must be brought to the mainstream through nurturing a shared vision where intellect and acumen reign supreme along with brawn power.
4. All industrial workers need to own themselves with full freedom to join trade unions to create

the competing values framework of collaboration creation competition and control. Employers and Employees should not prey upon one another.

Conclusion

Labour is the most dynamic agency in the process of production. The inestimable importance of labour in terms of its productivity has been emphasized with the appearance of the Robinsian Scarcity approach to theory of economics. The promotion of economic development through flexibility and swiftness of production hinging on this indispensable agency has therefore become conspicuous in itself.[7] Industrial establishments need to be aware of the imminent cleavages between the employers and employees resulting from preventable factors such as factious labours, dullness of morbidity of labourers resulting from lack of fluidity of market factors, unpleasant spread among the stages of production resulting in dehumanizing labour and rendering it more and more mechanical.

Ethical Clearance: Completed

Source of Funding: Self

Conflict of Interest: Nil

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An Analysis of Tax Revenue and Non Tax Revenue in Tamil Nadu

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Abstract

The State Governments maintain law and order, administer justice, build up social and economic infrastructure and ensure a social safety net for the poor. Tamil Nadu has been subsidizing the provision of power, food, health services and nutrition and education with the overall welfare perspective in mind. The Consolidated Fund is the principal head in which resources flow and expenditures are incurred under the Revenue Account and Capital Account of the Fund. There was a turn round in the Revenue Account from deficit to surplus because Revenue Receipts exceeded the Revenue Expenditure during 2011-12. Non-Tax Revenue is comprised of State's Own Non-Tax Revenue and Grants-in-Aid from the Central Government. Grants-in-Aid accounted for 54 percent and State's Own Non-Tax Revenue 46 percent. There was a fall in non-tax revenue during 2009-10 because of the decline in the quantum of grants-in-aid from the Centre as well as the receipts from own non-tax revenue. Among these two components' the decline was more pronounced in grants-in-aid (22.7%) as compared to own non-tax revenue receipts (12%). In the subsequent years, non-tax revenue registered increases ranged between 0.6 percent in 2012-13 to 29.9 percent in 2013-14. The main problem of Tamil Nadu is that the growth rate of Tax Revenues is very slow growth. In the backdrop of sluggish economic growth that witnessed both at all India and in Tamil Nadu, the 12th Five Year Plan as well as Annual Plan had been formulated in the State. All India had an average growth rate of 8 percent during the same period.

Keywords: *Tax Revenue, Non-Tax Revenue, Economic Development.*

Introduction

In a growing economy the role and functions of the State Government have been expanding both in terms of more extensive coverage and in terms of intensity. The responsibility of delivering many resources intensive public services is vested with the State Governments which are also closer to the people. The State Governments maintain law and order, administer justice, build up social and economic infrastructure and ensure a social safety net for the poor. Tamil Nadu has also been subsidizing the provision of power, food, health services and nutrition and education with the overall welfare perspective in mind. The Consolidated Fund is the principal head in which resources flow and expenditures are incurred under the Revenue Account and Capital Account of the Fund. There was a turn round in the Revenue Account from deficit to surplus because Revenue Receipts exceeded the Revenue Expenditure during 2011-12.[1] It is the main source of fiscal imbalance with serious implications for public investment and growth of the economy. The revenue surplus in the subsequent period mirrors fiscal correction. It is a change for the better because fiscal situation had really bettered compared to earlier years. However, the slowdown in growth at the all India level has affected the revenue receipts in 2013-14, narrowing the revenue account surplus. The Capital Account deals with assets created in the form of capital expenditure and outstanding loans receivable by the Government. All through the years, it has exhibited a deficit which is desirable as it represents an excess of capital investment over capital receipts.[2] Non-Tax Revenue is comprised of State's Own Non-Tax Revenue and Grants-in-Aid from the Central Government. Grants-in-Aid accounted for 54 percent and State's Own Non-Tax Revenue 46 percent. There was a fall in non-tax revenue during 2009-10 because of the decline in the quantum of grants-in-aid from the Centre as well as the receipts

from own non-tax revenue. During 2009-10 and 2010-11 the receipts from State's own non-tax revenue had declined. The fall in 2009-10 was mainly on account of the decline in receipts originated in economic services and in 2010-11 it was mainly due to fall in interest receipts and dividends and profits. According to Dalton, "is concerned with the income and expenditure of public authorities and with the adjustment of one to the other, adjustment not necessarily to equality, but to whatever arithmetical relationship. A series of additional resources mobilization measures taken by the State has helped to sustain and improve its own tax revenue base.[3]

Table 1: Growth of Share of Central Taxes of Tamil Nadu (Rupees in lakhs)

Year	Income Tax	Index No	Annual Growth Rate
1980-81	8067	100	-
1981-82	8198	101.62	1.62
1982-83	9106	112.87	11.07
1983-84	9432	116.92	3.58
1984-85	9913	122.88	5.09
1985-86	13968	173.14	40.90
1986-87	16339	202.54	16.97
1987-88	19504	241.77	19.37
1988-89	20743	257.13	6.35
1989-90	29950	371.26	44.38
LGR = 30.14			
1990-91	32680	100	-
1991-92	40473	123.84	23.84
1992-93	48119	147.24	18.89
1993-94	61373	187.79	27.54
1994-95	67888	207.73	10.61
1995-96	75339	230.53	10.97
1996-97	89753	274.64	19.13
1997-98	140178	428.94	56.18
1998-99	962223	2944.37	586.42
1999-2000	266700	816.09	-72.28
LGR = 79.56			
2000-01	278375	100	-
2001-02	53484	19.21	-80.78
2002-03	51399	18.46	-3.89
2003-04	57295	20.58	11.47
2004-05	77623	27.88	35.47
2005-06	97565	35.04	25.69
2006-07	121182	43.53	24.20
2007-08	154543	55.51	27.52
2008-09	175250	62.95	13.39
2009-10	172658	62.02	-1.47
2010-11	192865	69.28	11.70
LGR = 3.41			

Source: Tamil Nadu Economic Appraisal, Various issues, 2011-12.

Growth of Income Taxes of Tamil Nadu: The income tax of Tamil Nadu was Rs.8067 Lakh in 1980-81. It increased and reached Rs.29950 lakhs in 1989-90. The average income tax is Rs.19659 lakh per year. The linear growth rate comes about 30.14 per cent. The index number increased from 100 to 371.26 in 1989-90. The highest annual growth rate registered is 44.38 per cent in the year 1989-90. During the second period 1990-91 to 1999-2000, the Income Tax was Rs.32680 lakhs in 1990-91 and it touched the highest Rs.962223 lakhs in 1998-99 and it decreased Rs.266700 in 1999-2000. Industry is 76416 lakhs per year. The linear growth rate works out to 79.56 per cent. The index number has increased to 816 in 1999-2000. The highest annual growth rate is 586.42 per cent in 1998-99. In 2000-01, the value as income tax is Rs.278375 lakhs and it touched the highest Rs.192865 lakhs in 2010-11. The average of Food Products is Rs.173554 lakhs per year. The linear growth rate comes about-3.41 per cent. The index number has come declined 69.28 in 2010.11. The highest annual growth rate registered is 35.47 per cent in 2004-05.

Growth of Land Revenue of Tamil Nadu: The land revenue of Tamil Nadu was Rs.434 lakhs in 1980-81. It increased with fluctuations and reached Rs.2591 lakhs in 1984-85 and touched the highest Rs.1382 lakhs in 1989-90. The average land revenue is Rs.1312 lakhs per year. The linear growth rate comes about 24.27 per cent. The index number increased from 100 to 318 in 1989-90. The highest annual growth rate registered is 308.67 per cent in the year 1984-85. During the second period 1990-91 to 1999-2000, the land revenue was Rs.1443 lakhs in 1990-91 and it touched the highest Rs.6031 lakhs in 1997-98 and it declined touched Rs.4723 lakhs in 1999-2000. The average was Rs.3558 lakhs per year. The linear growth rate works out to 25.25 per cent. The index number has increased to 882 in 1999-2000. The highest annual growth rate was percent in 1991-92. In 2000-01, the value as land revenue was Rs.5572 lakhs and it touched the highest Rs.20773 lakhs in 2008-09. The average of Food Products is Rs.14532 lakhs per

year. The linear growth rate comes about-3.03 per cent. The index number has come upto 322.11 in 2005-06. The highest annual growth rate registered is 311.44 per cent in 2004-05.

Table 2: Growth of Share of Central Taxes of Tamil Nadu (Rupees in lakhs)

Year	Land Revenue	Index No	Annual Growth Rate
1980-81	434	100	-
1981-82	966	222.58	122.58
1982-83	1017	234.33	5.27
1983-84	634	146.08	-37.65
1984-85	2591	597.00	308.67
1985-86	1646	379.26	-36.47
1986-87	1289	297.00	-27.68
1987-88	1698	391.24	31.73
1988-89	1506	347.00	-11.30
1989-90	1382	318.43	-8.23
LGR = 24.27			
1990-91	1443	100	-
1991-92	2650	183.64	83.64
1992-93	1930	133.74	-27.16
1993-94	3187	220.85	65.12
1994-95	3527	244.42	10.66
1995-96	2521	174.70	-28.52
1996-97	1877	130.07	-25.54
1997-98	6031	417.94	221.31
1998-99	2829	196.04	-53.09
1999-2000	4723	327.30	66.94
LGR = 25.25			
2000-01	5572	100	-
2001-02	4000	71.78	-28.21
2002-03	4482	80.43	12.05
2003-04	1750	31.40	-60.95
2004-05	7195	129.12	311.14
2005-06	17948	322.11	149.45
2006-07	12068	216.58	-32.76
2007-08	13923	249.87	15.37
2008-09	20773	372.81	49.19
2009-10	8787	157.69	-57.69
2010-11	3879	69.61	-55.85
LGR =-3.03			

Source: Tamil Nadu Economic Appraisal, Various issues, 2011-12.

Table 3: State's Own Non-Tax Revenue

Year	State's own Non Tax Revenue	% Change	Total Non Tax Revenue	Total Revenue Receipts	GSDP
2009-10	5027.05	-12.0	47.07	9.0	1.0
2010-11	4651.44	-7.5	40.5	6.6	0.8
2011-12	5683.57	22.2	43.8	6.7	0.9
2012-13	6554.26	15.3	50.2	6.6	0.9
2013-14	7857.34	19.9	46.3	6.7	0.9

Source: Budget Documents, Government of Tamil Nadu.

Non-Tax Revenue: Non-Tax Revenue is comprised of State's Own Non-Tax Revenue and Grants-in-Aid from the Central Government. Grants-in-Aid accounted for 54 percent and State's Own Non-Tax Revenue 46 percent. There was a fall in non-tax revenue during 2009-10 because of the decline in the quantum of grants-in-aid from the Centre as well as the receipts from own non-tax revenue. Among these two components the decline was more pronounced in grants-in-aid (22.7%) as compared to own non-tax revenue receipts (12%). In the subsequent years, non-tax revenue registered increases ranged between 0.6 percent in 2012-13 to 29.9 percent in 2013-14. On an average during the five year period ending 2013-14 the revenue realization from this source registered a growth rate of 6.9 percent. In the State's total revenue receipts the share of non-tax revenue witnessed a steady decline. On an average during the five year period 2009-10 to 2013-14 its share in total revenue receipts worked out to 15.6 percent. It's ratio to GSDP more or less remained constant at 2.0 percent.[4]

Conclusion

It is concluded from the analysis that the Tax Revenues is mounting. The main problem of Tamil Nadu is that the growth rate of Tax Revenues is very slow growth. In the backdrop of sluggish economic growth

that witnessed both at all India and in Tamil Nadu, the 12th Five Year Plan as well as Annual Plan had been formulated in the State. All India had an average growth rate of 8 percent during the same period. The targeted growth rate in Tamil Nadu could not be achieved in all the sectors viz. agriculture, manufacturing and services and this could be attributed to fallout of global economic crisis, erratic and inadequate monsoon rains, rising oil prices, shortage of power and lack of demand in export-oriented industries.[5] Therefore, it is absolutely necessary to speed up the rate of growth of Tamil Nadu economy so as to make the increase the revenue service.

Ethical Clearance: Completed

Source of Funding: Self

Conflict of Interest: Nil

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Socio-Economic Development and Gender Inequality in India

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Abstract

This paper focus on Gender is a common term where as gender discrimination is meant only for women, because females are the only victims of gender discrimination. Eleventh plan witnessed economy strength in many dimensions and is well prepared to achieve faster, sustainable and inclusive growth. Twelfth five year plan aims at inclusive growth which should result in lower incidence of poverty, broad-based and significant improvement in health outcomes, universal access for children to school, increased access to higher education and improved standards of education, including skill development. The study of status of women is very much complicated. In a developing nation like India, women's lower status is reflected not only in their work being underpaid, un-recognized, but also in their limited access to productive resources and support services such as health and education. The focus of this paper is on issues concerning gender disparities in the context of India so as to examine the nature of prevalent discrimination and biases against women. It is clear from the above cited information is that our government is keen in feminine advancement. All these schemes have a positive impact on female advancement. Girl baby's birth rate which was considered as negative in many parts of India, government awareness programs had changed this negativity. Infant Mortality Rate (IMR) though has decreased considerably during 2007 to 2016.

Keywords: *Gender discrimination, Women Empowerment, Economic Independence.*

Introduction

Gender is a common term where as gender discrimination is meant only for women, because females are the only victims of gender discrimination. Gender discrimination is not biologically determined but it is determined by socially and the discrimination can be changed by the proper and perpetuate efforts. Denial of equality, rights and opportunity and suppresment in any form on the basis of gender is gender discrimination. India adopted five year planning strategy from Russia to accelerate economic growth. We are now in 12th five year plan (2012-17) its theme is "Faster, more inclusive and sustainable growth". According to the National Sample Survey Report (2011-12), the workforce participation rate of male is 54.4% and female is 21.9%. As per the India Country Report, 2015 by Ministry of Statistics and Program Implementation on the Millennium Development Goals, the percentage share of females in wage employment in the non-agricultural sector during 2011-12 increased to 19.3% which is higher than 18.6% reported during 2009-10 by National Sample Survey Organization. Office of the Registrar General and Census Commissioner and Ministry of Statistics and Program Implementation are involved in collection and dissemination of data covering wide range of issues that affect women's empowerment.[1] The report titled "Women and Men in India–2015" by Ministry of Statistics and Program Implementation, Government of India highlights the status of women covering health, education, work and decision making along with social obstacles in women's empowerment. Eleventh plan witnessed economy strength in many dimensions and is well prepared to achieve faster, sustainable and inclusive growth. Twelfth five year plan aims at inclusive growth which should result in lower incidence of poverty, broad-based and significant improvement in health outcomes, universal access for children to school, increased access to higher education and improved standards of education, including skill development. It should also be reflected in better opportunities for both wage employment and livelihood, and in improvement in provision of basic amenities like water, electricity,

roads, sanitation and housing. Women and children constitute 70% of the population and this twelfth plan aims to give special attention to them in terms of reach of relevant schemes in many sectors. I could say this five year plan took 360 degree measure to empower female gender in all aspects.[2]

Objectives of the Study

1. To understand and analyze gender inequality in India.
2. To suggest cures to reduce gender inequality in India.

Research Methodology: The status of poor women in India can be analyzed by identifying underlying themes that affect their socio-economic development. The study is based on secondary sources of data. The secondary sources like books, journals, magazines and articles have been examined for this study.

Statement of the Problem: Reflects the extent of socio-economic development. Over a period of time that achievements in India's developmental process have been significant. The goal of reducing gender inequality has held a prominent place in international organizations and in national strategy statements.[3]

Data Collection: For the present work, data for the study have been collected from the Statistical Abstract of India and other related documents published by Census of India, and from other world reports on India.

Area of the Study: The study of status of women is very much complicated. In a developing nation like India, women's lower status is reflected not only in their work being underpaid, un-recognized, but also in their limited access to productive resources and support services such as health and education. The focus of this paper is on issues concerning gender disparities in the context of India so as to examine the nature of prevalent discrimination and biases against women.[4]

Results Discussion

Constitution of India not only grants equality to women but also enforces continues measures of positive discrimination in favour of women. Our government always strives for women's advancement in different spheres. In that way 12th five year plan adopted and implemented numerous schemes which focuses on feminie gender equality and female empowerment.[5]

It is clear from the above cited information is that our government is keen in feminine advancement. All these schemes have a positive impact on female advancement. Girl baby's birth rate which was considered as negative in many parts of India, government awareness programs had changed this negativity. Infant Mortality Rate (IMR) though has decreased considerably during 2007 to 2016.

Table 1: Infant Mortality Rate

Year	Female	Male	Total
2012	44	41	42
2013	42	39	40
2014	40	37	39
2015	39	35	37
2016	36	33	34

Source: Ministry of Women and Child Development

Literacy rate of girls as also witnessed a remarkable growth in this 12th five year plan which is evident from the below data.

Table 2: Literacy and Education

Indicators	Gender	Ratio
Literacy 2011	Total	73.0%
	Female	64.6%
	Male	80.9%
Gross Enrolment Ratio at Primary level–2015-16	Total	99.2%
	Female	100.7%
	Male	97.9%
Gross Enrolment Ratio at Upper Primary–2015-16	Total	92.8%
	Female	97.6%
	Male	88.7%
Gross Enrolment Ratio at Secondary level–2015-16	Total	80.0%
	Female	81%
	Male	79.2%
Gross Enrolment Ratio atHigher Secondary Level–2015-16	Total	56.2%
	Female	56.4%
	Male	56%

Source: Ministry of Women and Child Development.

Women's mean age at marriage at all India level is 22.1 years and the same in rural and urban areas are 21.6 years and 23.0 years respectively. The women's mean age at marriage has shown an increasing trend in all the major States and at all India level it has increased from 21.2 to 22.1 years during 2011 to 2015. This gives an opportunity for the women to set up their career and be financially independent. For female growth to be inclusive government must create adequate

livelihood opportunities and add to decent employment commensurate. 12th five year plan as sited above has introduced various new schemes and enhanced existing schemes to encourage livelihood opportunities.[6]

In 2011, the Workforce Participation Rate at all India level was 25.51% for females and 53.26% for males. The current work force the number of female entrepreneurs has doubled over

Table 3: Workforce Participation

Participation in Economy		
Labour Force Participation Rate (LFPR) (15+ years) 2015-16	Total	52.40%
	Female	27.40%
	Male	75.50%
Unemployment Rate (15+ years) 2015-16	Total	3.70%
	Female	5.80%
	Male	3.00%
Worker Population Ratio (15+ years) 2015-16	Total	50.50%
	Female	25.80%
	Male	73.30%

Source: Ministry of Women and Child Development

The past ten years to about 10 million mostly due to the rise in enterprises. Their share rose in all sector and women now account large percent in total entrepreneurs.

Table 4: Women Enterprises

Year	Indicators	Registered Sector	Unregistered Sector	Economic Census-2005*	Total
2010-11	No of Women Enterprises (in lakh)	2.15 (13.72%)	-	6.40 (4.34%)	8.55 (18.06%)
2015-16	No of Women Enterprises (in lakh)	2.15 (13.72%)	18.06 (9.09%)	6.40 (4.34%)	26.61 (7.36%)

Source: Ministry of Women and Child Development

Female owned enterprise had experienced a drastic growth in this last five years. This increased female enterprise has positive impact on employment generation results in reduction of income inequalities. Twelfth Plan has to meet the aspirations of millions of young men and women.[7]

Gender Inequality in India: The Ministry of Women and Child Development is administering following schemes for gender equality socio-economic development of women. Swadhar and Short Stay Homes to provide relief and rehabilitation to destitute women and women in distress. Support to Training and Employment Program for Women (STEP) to ensure sustainable employment and income generation for marginalized and asset-less rural and urban poor women across the country. Rashtriya Mahila Kosh (RMK) to provide micro-finance services to bring about the socio-economicupliftment of poor women. National Mission for Empowerment of Women (NMEW) to strengthen the overall processes that promotes all-round Development of Women. Rajiv Gandhi National Creche Scheme for Children of Working Mothers (including single mother) to provide day care facilities for running a crèche of 25 children in the age group 0-6 years from families having monthly income of less than Rs 12,000. One Stop Centre to provide integrated support and assistance to women affected by violence. [8] Scheme for Universalisation of Women Helpline intended to provide 24 hours immediate and emergency response to women affected by violence. In order to strengthen the process of gender budgeting the Ministry of Women and Child Development has been undertaking various capacity building measures for the officials of the State Governments by organizing training programs workshops regularly. In order to improve employability a separate Ministry of Skill Development and Entrepreneurship has been created. Equal Remuneration Act, 1973 provides for payment of equal remuneration to men and women workers for the same work of similar nature without any discrimination.

In order to ensure social security to the workers including women in the unorganized sector, the Government has enacted the Unorganized Workers' Social Security Act 2008. The Maternity Benefit Act, 1961 regulates employment of women in certain establishments for a certain period (12 weeks) before and after childbirth and provides for maternity and other benefits. Indira Gandhi MatritvaSahyogYojana (IGMSY) Scheme is being implemented as Conditional Maternity Benefit for pregnant and lactating women to improve health and nutrition status to better enabling environment by providing cash incentives to pregnant and nursing mothers to partly compensate wage loss both prior to and after delivery. The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013 has been enacted, which covers all women, irrespective of their age or employment status and protect them against sexual harassment at all workplaces both in public and private sector, whether organized or unorganized.[9]

Conclusion

In nutshell, various welfare programs are implemented by government to secure female gender and in favour of women empower. It is even apt to say that government took 360 degree measure to have positive discrimination for female. This five year plan witnessed remarkable growth in female gender but still there are lots more to overcome, government has to pay more heed to elevate females. Education is the most important way to erase gender inequality. So, steps must be taken in order to promote education among women. Women should be given free education up to post-graduate level. Every girl must get the opportunity to go to school. Sufficient number of seats must be reserved for the eligible women candidates for services in all autonomous institutions, semi-government and government institutions. More police protections should be given around cities and towns especially during nights so that the employed women can move on freely to complete their tasks. More political and decision making power must be given in the hands of women.

Ethical Clearance: Completed

Source of Funding: Self

Conflict of Interest: Nil

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Knowledge, Awareness and Attitude Regarding Organ Donation Associated With Socio-Demographic Data among General Population in Selangor Darul Ehsan

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Abstract

Organ donation is a process where the organs are surgically removed from one person and being transplanted into other person for the medical purpose. However recent statistic shows that there is a shortfall of organ donation globally. Malaysia's organ donation rate is among the lowest. Malaysia is a country with a multiracial resident which are Malay, Chinese, Indian Buddhism, and Christian. This study analysed knowledge, awareness and attitudes regarding organ donation within each group. The present study was conducted at Shah Alam area in Selangor. A total 369 questionnaires were completed. 73.2% agree to donate organs to different races where Chinese were less willing to do so (19.8%) followed by Malay (23.6%) and Indian (29.8%). About 48.5% of the respondents had a good knowledge where Malay is the highest (18.2%) and Indian is the lowest (13.8%). Meanwhile the level of attitudes shows no significant difference among the races with p=0.271. Fortunately, 96.7% of the respondents are aware about the allowance of each religion in organ donation. Unwillingness to donate organ has been influenced by culture-religious perceptions and concrete beliefs towards medical system. So, identifying the barriers and education to the community are of utmost need to overcome the shortage.

Keywords: *Organ donation, Knowledge, Awareness, Attitude and Population etc.*

Introduction

Organ donation is an effective way to save life and it became the standard procedure to cure lives of the patients that have the chance to survive. Most organ and tissue donations occur after the donor has died with the consent of the next of kin, some organs can be donated while the donor is alive. Organ donation is usually the only option of treatment in many end organ diseases.

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Nevertheless, the shortage of organs has become a worldwide concern since the demand exceeds the number of donors. Despite that, the highest organ donation rate in the world is in Spain, with 31.5 donors per one million people, other European countries have a mean of 15 donors per one million people.[1] Higher education, younger age and factors associated with political affiliation determined respondents' willingness to donate organs, and consent was given to donors' relatives.[2]

Materials and Method

Data Collection: Self-conducted questionnaires were distributed among 369 respondents to obtain data on respondents' knowledge, awareness and attitude. The ranges on level of knowledge and attitude were categorized using scoring scheme. For level of knowledge, (0-4= Poor, 5-8= Moderate and 9-13=

Good) meanwhile for level of attitude, (0-4=Poor, 5-8= Moderate and 9-12= Good).[3]

Data Analysis: Data obtained during the study was analyzed by using Statistical Package for Social Science (Version 23). The descriptive statistics,frequency and percentage had been used in presenting the result, which was used to analyze the knowledge, awareness and attitude. In order to check for association between socio-demographic variables, Chi-square test had been used. Later, the results were presented in words and depicted in tables & graph.

Results

In this study, 380 respondents were approached for participation but only 369 questionnaires were managed to be collected (98% response rate). The frequency analysis of each socio-demographic data has been tabulated in **Table 1.**

Table 1: Frequency Distribution Table of Demographic Data of Respondents

Variable	Answer	Frequency	
		n	%
Age	<40 years old	308	83.5
	>40 years old	61	16.5
Gender	Male	141	38.2
	Female	228	61.8
Level of education	Primary	4	1.1
	Secondary	65	17.6
	Diploma/equivalent	92	24.9
	Degree/equivalent	189	51.2
	Master/phd	14	3.8
	Informal education	5	1.4
Religion	Muslim	123	33.3
	Buddha	83	22.5
	Hindu	109	29.5
	Christian	54	14.6
Ethnicity	Malay	123	33.3
	Chinese	123	33.3
	Indian	123	33.3

As shown in table-1, the age group of less than 40 years was the highest at 83.5% compared to the age group of more than 40 years at 16.5%. The percentage of female respondents (61.8%) was higher than males (38.2%). The percentage of the degree holder is the highest at 51.2% followed by diploma at 24.9%, secondary schools at 17.6%, master at 3.8%, informal education at 1.4% and lastly primary school at 1.1%. In term of religion, Muslim respondents was the highest at 33.3% followed by Indian at 29.5%, Buddha at 22.5% and Christian at 14.6%. In this study, the prevalence of each ethnicity is same which is one hundred and twenty-three participants (33.3%).

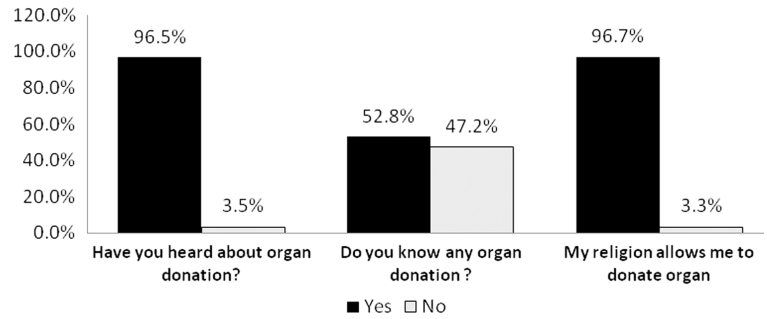


Figure 1. Awareness Component of Organ Donation

Level of Knowledge & attitude Regarding Organ Donation: With regards to level of knowledge, a score out of 13 has been categorized into levels where a score 0-4 indicates 'Poor knowledge', 5-8 indicates 'Moderate knowledge' and 9-13 indicates 'Good knowledge' about organ donation. Out of 369 respondents, 179 (48.5%) achieved good knowledge while 164 (44.4%) had moderate knowledge and 26 (7%) had poor knowledge. Malay is the highest at 54.5% had good knowledge followed by Chinese at 49.6% and Indian at 41.5%. This finding is different with the previous study where Malay showed the least percentage of being good in knowledge regarding organ donation (Table 2)

Table:2: Socio-demographic Variables Associated with Knowledge on Organ Donation

Independent Variables	Good		Moderate		Poor		Chi-square
	n	%	n	%	n	%	
Age							
< 40 years old	149	40.4	141	38.2	18	4.9	0.102
< 40 years old	30	8.1	23	6.2	8	2.2	
Gender							
Male	77	54.6	56	39.7	8	5.7	0.173
Female	102	44.7	108	47.4	18	7.9	
Level of Education							
Primary	0	0.0	3	0.8	1	0.3	0.036*
Secondary	26	7.0	30	8.1	9	2.4	
Diploma/equivalent	37	10.0	48	13.0	7	1.9	
Degree/equivalent	104	28.2	77	20.9	8	2.2	
Master/Phd	8	2.2	5	1.4	1	0.3	
No formal education	4	1.1	1	0.3	0	0.0	
Religion							
Muslim	67	18.2	50	13.6	6	1.6	0.043*
Buddha	43	11.7	30	8.1	10	2.7	
Hindu	43	11.7	61	16.5	5	1.4	
Christian	26	7.0	23	6.2	5	1.4	
Ethnicity							
Malay	67	18.2	50	13.6	6	1.6	0.030*
Chinese	61	16.5	48	13.0	14	3.8	
Indian	51	13.8	66	17.9	6	1.6	

In this study, level of education, religion and ethnicity were found out to have a significant association with level of knowledge regarding organ donation. (Education: p-value=0.036, Religion: p-value=0.043, Ethnicity: p-value=0.030) and there is no significant association between age and gender with the knowledge on organ donation. Besides in Figure 2, it could be seen that Muslims show the highest percentage at 34% followed by Hindus at 29%, Buddhist at 23% and Christian at 14%.

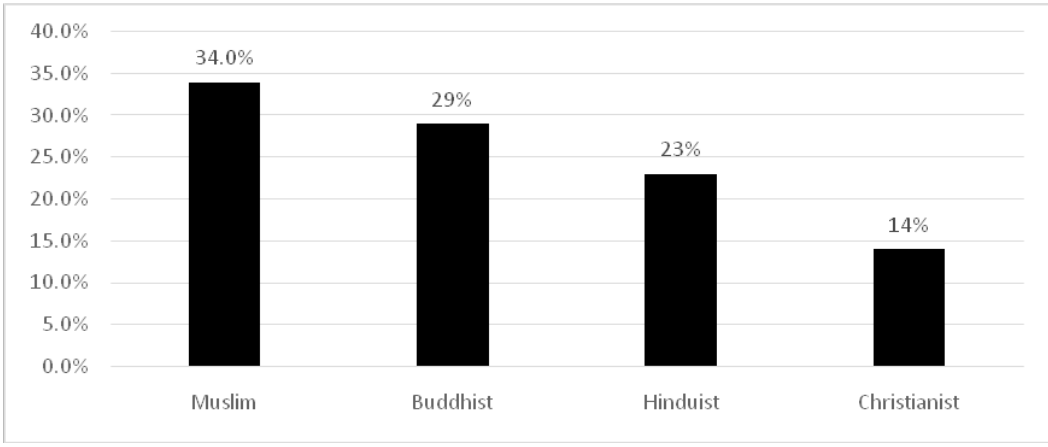


Figure 2. Allowance of Organ Donation Regarding Religion

With regards to level of attitude, a score out of 12 has been categorized into levels where a score 0-4 indicates 'Poor attitude', 5-8 indicates 'Moderate attitude' and 9-12 indicates 'Good attitude' about organ donation. Out of 369 respondents, 313 (84.8%) achieved good attitude while 54 (14.6%) had moderate attitude and 2 (0.5%) had poor attitude. Out of our ethnic groups Indians shows positive attitude at 111 (30.1%) followed by Chinese at 103 (27.9%) and Malay at 99 (41.5%. However in poor level, it stated that Chinese and Malay are at the highest percentage (0.3%) meanwhile Indians show no prevalence of poor knowledge. (Table 3).

Table 3: Socio-Demographic Data Associated with Attitude on Organ Donation

Independent Variables	Agree		Disagree		Neutral		p-value
	n	%	n	%	n	%	
Age							
<40 years old	203	55.0	46	12.5	59	16.0	0.001*
>40 years old	32	8.7	21	5.7	8	2.2	
Gender							
Male	90	24.4	29	7.9	22	6.0	0.461
Female	145	39.3	38	10.3	45	12.2	
Level of education							
Primary	0	0.0	2	0.5	2	0.5	0.070
Secondary	46	12.5	9	2.4	10	2.7	
Diploma/equivalent	59	16.0	13	3.5	20	5.4	
Degree/equivalent	120	32.5	37	10.0	32	8.7	
Master/Phd	6	1.6	6	1.6	2	0.5	
Informal education	4	1.1	0	0.0	1	0.3	
Religion							
Muslim	69	18.7	22	6.0	32	8.7	0.001*
Buddha	38	10.3	31	8.4	14	3.8	
Hindu	97	26.3	6	1.6	6	1.6	
Christian	31	8.4	8	2.2	15	4.1	
Race							
Malay	69	18.7	22	6.0	32	8.7	0.001*
Chinese	60	16.3	38	10.3	25	6.8	
Indian	106	28.7	7	1.9	10	2.7	

In this study, none of the socio-demographic variables were found out to have a significant association with level of attitude regarding organ donation. Table 4 shows the proportion of respondents with good, moderate and poor knowledge in relation to the socio-demographic variables.

Relationship between Socio-demographic variables with the Willingness on Donating Organ: Based on the finding out of 369 respondents, 235 (63.7%) agreed to donate their organ meanwhile those who disagree and neutral towards the willingness are 67 (18.2%) respectively. It has been established that less than 40 years old respondents have high anticipation to donate organ at 55% compared to the elder group of age and in terms of gender, females show high anticipation 39.3% than males. In terms of education, degree holder respondents show the highest anticipation at 32.5%.

In this study, it can be seen that Hindus show the highest anticipation of willingness to donate organ at 26.3% compared to Chinese and Malay and this finding was similar with the previous study (Loch et al). In term of ethnicity, Indians were the highest in willingness to donate organ at 106 (28.7%) compared to Chinese at 38 (10.3%).

Table;4: Socio-demographic Variables Associated with the Willingness on Organ Donation

Independent Variables	Good		Moderate		Poor		p-value
	n	%	n	%	n	%	
Age							
<40 years old	263	71.3	43	11.7	2	0.5	0.594
>40 years old	50	13.6	11	3.0	0	0.0	
Gender							
Male	123	33.3	17	14.6	1	0.3	0.519
Female	190	51.5	37	10.0	1	0.3	
Level of Education							
Primary	4	1.1	0	0.0	0	0.0	
Secondary	56	15.2	9	2.4	0	0.0	
Diploma/equivalent	78	21.1	12	3.3	2	2.2	0.618
Degree/equivalent	158	42.8	31	8.4	0	0.0	
Master/Phd	13	3.5	1	0.3	0	0.0	
Informal education	4	1.1	1	0.3	0	0.0	
Religion							
Muslim	99	26.8	23	6.2	1	0.3	
Buddha	69	18.7	14	3.8	0	0.0	0.130
Hindu	101	27.4	8	2.2	0	0.0	
Christian	44	11.9	9	2.4	1	0.3	
Ethnicity							
Malay	99	26.8	23	6.2	1	0.3	
Chinese	103	27.9	19	5.1	1	0.3	0.271
Indian	111	30.1	12	3.3	0	0.0	

Based on Table 4, it can be found that socio-demographic variables of age, religion and ethnicity have a significant association with the willingness to donate organ where (Age: p value: 0.001, Religion: p value: 0.001, Ethnicity: p value: 0.001). In addition, the socio-demographic variables of gender and level of

education do not significantly affect the respondent's willingness to donate their organs.

Discussion

Level of Knowledge Regarding Organ Donation: Firstly, in regards with knowledge, we believe that it has an association with the willingness towards organ donation and other study have confirmed it.[4] In this study, most of the respondents have a good knowledge. The existed studies stated that awareness regarding organ donation has an association with the level of knowledge as seen inYiieHuern S, et al.[5]The health care providers were the right source of information to spread the importance of organ donation since they are informed about organ donation, similar toAgarwal S; 2015[6] There is a significant association between the socio-demographic variables of level of education (p=0.036), religion (p=0.043) and ethnicity (p=0.030) with knowledge on organ donation (Table 1).

Level of Attitude Regarding Organ Donation: The attitude towards organ donation has influenced on the rate of organ donation in the communityas observed inVijayalakshmi AP et al.[7]Based on Table 2, 313 of the respondents which more than half show a positive attitude regarding organ donation. In this study, none of the socio-demographic variables have significant association with attitude regarding organ donation, because there are no vast differences among each variables. In Malaysia, even though they have lived harmoniously for a longtime but it is clear from this study, that there is still a sense of separation that is maintained. Dissimilar in attitude towards organ donation have been noticed but those who were less likely to donate usually consist of the ethnic minorities based on western country studies byBilgel H et al.[8] In this study, 96.7% of the respondents aware that their religion allows the organ donation procedure and this is differ from the previous study that stated that most of the respondent misunderstanding and unclear about the allowance in their religion. In addition, it could be said that level of knowledge has an association with the attitude regarding organ donation. However previous study stated that different religions had a significant association with the attitude on organ donation where Hindus and Chinese were likely to have positive attitude[5].

Relationship between Socio-demographic Variables, Level of Knowledge and Level of Attitude with The Willingness on Donating Organ: With regards to the willingness, it has been established that 235 (63.8%) of the respondents are willing to involve in organ donation and organ transplant. Based on the finding results in Table 3, there is a significant association between socio-demographic data of age (p=0.00), religion (p=0.001) and ethnicity (p=0.001). Meanwhile gender and level of education have no significant association with the willingness regarding organ donation. However it has been stated in the previous study that the educational level was associated with the willingness to donate organ.[8] Compared to the older group, the younger shows high anticipation to donate organ and it is because of the thought that their organs are too old to be transplanted and they want to be buried with a complete body parts,similar study was noticed in Vijay Kumar M, et al.[9] In this study the Malays' knowledge are not corresponding to their willingness. This can be due to the dilemma that always being faced by Malays that they are not clear about the allowance,similar to Noordin N, et al.[10] Total knowledge of participants being high and higher willingness towards organ donation where 40% of respondents willing to donate had a good knowledge. [5]This finding also corresponds with the previous study that found out that who are young and with higher education had more positive attitudes towards donating organ.[7]

Conclusion

From this study, it can be concluded that this study's finding are various and different at certain points with the previous study. Most of the respondents are aware about the organ donation and the level of knowledge is good. However,opinion between ethnicity differ. In addition, attitude of the respondents also is good but it is also differing within the ethnicity. According to the relationship, there is a significant association between socio-demographic data of ethnicity, education and religion on total knowledge on organ donation. Meanwhile there is no significant association regarding attitude, where we failed to reject the null hypothesis. Besides, data has been analyzed to observe the relationship between the socio-demographic variables with the willingness in donating organ and there is an association with the age, religion and ethnicity. Most importantly, though a majority of the respondents were aware and supported organ donation, but in reality, most of them have not registered as organ donor**.**

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The Study Relating to the Adverse Effects of Obesity among Resident in Seksyen 13 Shah Alam, Selangor Darul Ehsan

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Abstract

Obesity or excess body weight is considered a public health concern worldwide. Being obese significantly increases the risk of numerous clinical disorders like heart diseases, type II diabetes mellitus, hypertension, stroke and others. Obesity is now common in both gender. The aim of the study was to find out the relationship between the prevalence of related dominant diseases of obesity and each category of obesity according to WHO. This cross-sectional study was conducted at Seksyen 13, Shah Alam area in Selangor. A total of 260 questionnaires were distributed equally to 130 male and 130 female. The results showed that obesity have a higher prevalence in hypertension (p=0.001) with 69.24% (Class I=8.08%, Class II=38.08%, Class III=23.08%), followed by diabetes mellitus type II (p=0.039) 60.38% (Class I=21.15%, Class II=26.15%, Class III=13.08%), heart problem (p=0.001) 42.69% (Class I=10.00%, Class II=16.15%, Class III=16.54%) and stroke (p=0.004) 4.23% (Class I=0.38%, Class II=1.15%, Class III=2.69%). Results showed significant difference in all variables which is less than 0.05. Even though the causes of excess body weight are multi-factorial, Hence, lifestyle modification can significantly reduce the risk of morbidity and mortality.

Keywords: *Obesity, Body mass index, Hypertension, Stroke, Heart diseases, Diabetes.*

Introduction

Obesity is a major public health problem and becomes an important epidemic in both developed and developing countries and is associated with considerable reduction in life expectancy. Overweight and obesity have been evaluated by anthropometric measurement of weight-for-height. More recently, BMI has been used. The normal range is 19-24.9 kg/m2, overweight is 25-29.9 kg/m2, and obesity >/= 30 kg/m2. obesity is classified into three classes,

Class I has BMI of 30.00-34.99,

Class II has BMI of 35.00-39.99 and

Class III BMI is over or more than 39.99.[1]

Obesity among adolescent undeniably important as this will reflect on prevalence of other related diseases in future.[2] Therefore, obesity is a multi-factorial phenomenon.

According to Frank Q. Nuttall, MD, PhD.[3] Blood Glucose Control in People with Type 2 Diabetes).in one of his articles stated that the body mass index (BMI) is the metric currently used for defining anthropometric measurement of height/weight characteristics in adults and for classifying them into several groups. From previous research also stated that hypertension, ischemic heart disease, diabetes, and recurrent stroke were the most common risk factors for obese people. The prevalence of hyperlipidemia, ischemic heart disease, and diabetes was significantly different between the age

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groups. Hyperlipidemia, diabetes, and ischemic heart disease were more common in age groups of 41-50, 41-60 and above 60, respectively.[4]Hence, the negative effects of obesity on the health are beyond dispute. The excessive body fat represents a strong risk factor for several medical diseases, the most important of which are type 2 diabetes, hypertension, cardiovascular diseases and osteoarthritis.[5]

Methodology

Questionnaire were distributed among resident in Seksyen 13, Shah Alam. A cross-sectional study is a research method that involve observation of all populationat one specific point of time. A cross-sectional study was conducted among 260 of general population in Seksyen 13, Shah Alam, Selangor.

Data obtained during the study was entered, sorted and analysed by using Statistical Package for Social Science (SPSS) IBM (Version 20). For descriptive statistics, we used frequency distribution table and percentage, mean,standard deviation and medianrange. For inferential statistics, we used Chi-square for nominal data to test the hypothesis. We used odds ratio and 95% confidence interval as the measure of association. Significance level was set at 0.05. P value less than 0.05 was considered significant

Results

Table 1: Socio-Demographic Studies of Respondents

Variable	Answer	Frequency	
		n	%
Gender	Male	130	50.0
	Female	130	50.0
Age	18-27	36	13.8
	28-37	65	25.0
	38-47	99	38.1
	>47	60	23.1
Race	Malay	120	46.2
	Chinese	37	14.2
	Indian	91	35.0
	Others	12	4.6

In this study, a total of 260 respondents participated. 130 each were male and females. The age of the respondents were divided into four groups 18-27,28-37,38-47, and >47 and the race was also divided into four which include Malay, Chinese, Indian and others. The participation of Malay respondents is 46%, 14.2% from Chinese,35.0% from Indian and 4.6% from others.

Table 2: Prevalence of Obesity among Gender associated with the category of Obesity

Obesity Classification	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
Class I	43	16.5	33	12.7	76	29.2
Class II	66	25.4	58	22.3	124	47.7
Class III	21	8.1	39	15.0	60	23.1

Table 2 showed that male have a higher prevalence of obesity in Class I which is 16.5% compare to female at 12.7% and also in Class II which is 25.4% compare to female at 22.3%.In Class III, the prevalence of obesity in female is higher than male with the difference of 6.9%. Class II has the highest prevalence in both gender which is 47.7% followed by Class I (29.2%) and Class III (23.1%). The result from this table showed that the p-value is 0.027. So, the null hypothesis for the first specific objective was rejected. Thus, there is significant relationship between the prevalence of obesity among gender associated with the category of obesity.

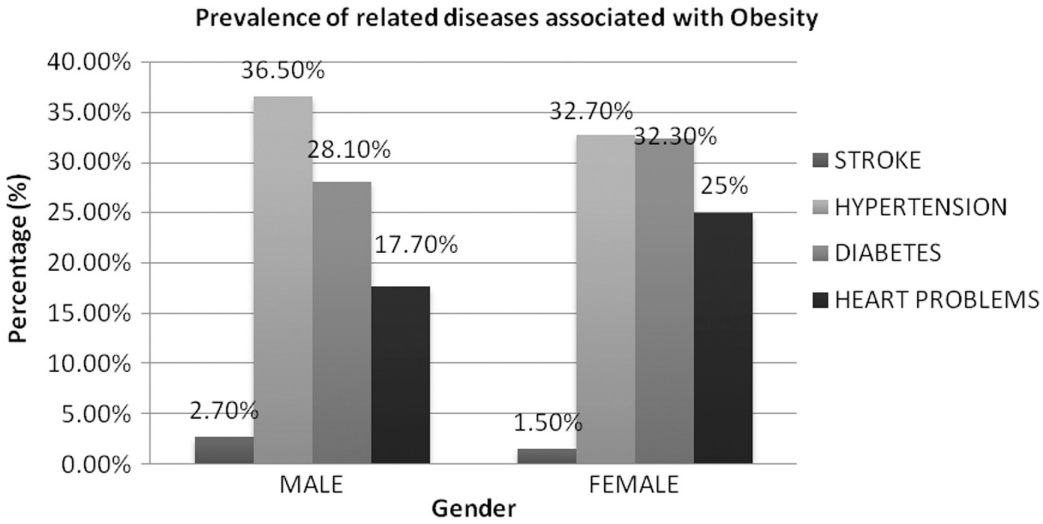


Figure 1: Percentage of related diseases associated with obesity

Table 3: Prevalence of Related Diseases Associated with Obesity

Disease	Male		Female	
	Frequency	%	Frequency	%
Stroke	7	2.7	4	1.5
Hypertension	95	36.5	85	32.7
Diabetes	73	28.1	84	32.3
Heart problems	46	17.7	65	25.0

Table 3 showed that between four major diseases that associated with obesity, hypertension is the most dominant disease that occurred in obese people with the percentage is 69.2% followed by diabetes (60.2%), heart problems (42.7%).Stroke is the least common disease compared to the others which occuredin 11 out of 260 respondents with the percentage is 4.2%.The p value is 0.001, Reject null hypothesis. Thus, there is significant relationship between the prevalence of related disease with the obesity population.

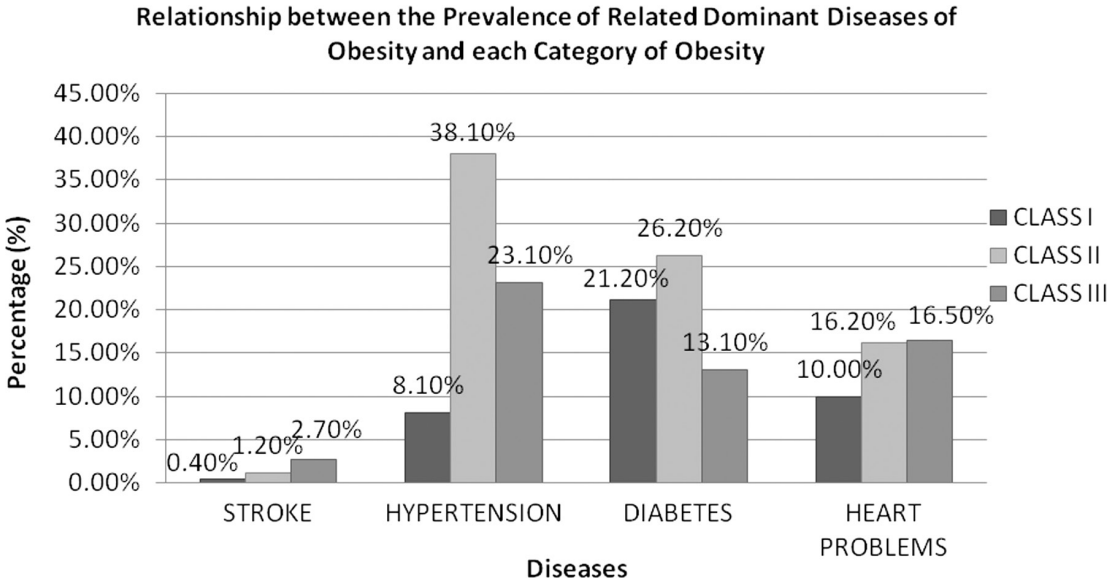


Figure 2: Percentage of related dominant diseases of obesity in each categoryof obesity

Table 4 : Relationship between The Prevalence of Related Dominant Diseases of Obesity and each Category of Obesity

Disease	Classification of Obesity					
	Class I		Class II		Class III	
	n	%	n	%	n	%
Stroke	1	0.4	3	1.2	7	2.7
Hypertension	21	8.1	99	38.1	60	23.1
Diabetes	55	21.2	68	26.2	34	13.1
Heart problems	26	10.0	42	16.2	43	16.5

Table 4 showed that diabetes is the dominant disease that occur in people in Class I obesity with the percentage is 21.2%. In Class II, the highest prevalence of disease that happen in the respondents is hypertension with 38.1%. Hypertension is also most dominant disease in Class III obesity with the result 23.1% followed by heart problem, diabetes and stroke. The results showed that obesity have a higher prevalence in hypertension (p=0.001) with 69.24% (Class I=8.08%, Class II=38.08%, Class III=23.08%), followed by diabetes (p=0.039) 60.38% (Class I=21.15%, Class II=26.15%, Class III=13.08%), heart problem (p=0.001) 42.69% (Class I=10.00%, Class II=16.15%, Class III=16.54%) and stroke (p=0.004) 4.23% (Class I=0.38%, Class II=1.15%, Class III=2.69%). Since all the p-value is less than 0.05, thus, there is a relationship between the prevalence of related dominant diseases of obesity and each category of obesity.

Discussion

Data from this study showed that socio-demographic studies of respondent had given a variation values. Firstly, gender of the respondents obtained that male and female had given the different values of the prevalence of obesity according to the types of obesity. Apart from that, the number of respondent was divided equally which is 130 from male and another 130 is female. The age was divided into four groups to find out whether obesity can develop diseases in different age groups. Generally, the old aged group with obesity showed more complications to their health status compared to middle aged. Gender-specific differences in the relationship between BMI and body fat were largely explained. Excess weight-for-height attributable to lean and bone tissue rather than body fat was observed as high prevalence of overweight men according to BMI criteria,similar to the study ofVan Den Beld AW, et al;[6] Thus, there is a likely underestimation of adiposity by BMI in elderly people for whom there is a loss of lean tissue, particularly skeletal muscle, and bone, as seen in Van Den Beld AW and Pasco JA, et al;[6,7] Race is also one of factorial phenomena that associated with obesity due to their religious beliefs and traditions based on MR B. in 2002.[8]

The results of the analysis confirmed the first hypothesis that there is association between the prevalence of obesity among gender associated with category of obesity. BMI of male respondents showed that male have a higher prevalence of obesity in Class I and Class II than female. Meanwhile, female have a higher prevalence in Class II obesity. Another factor affecting greater likelihood of obesity among women is weight gain related to hormonal transitions.

From this research study, The data analysis showed that between the four major diseases t associated with obesity, hypertension is the most dominant disease followed by diabetes, heart problems and stroke. In other research, obesity was obtained as a strong predictor for diabetes and related disease such as hypertension, cardiovascular disease, dyslipidaemia and albuminuria similar to the study of Ko G.[9]

The evaluation from this research also obtained that there was relationship between the prevalence of related dominant diseases of obesity and each category of obesity. It showed that diabetes was the most dominant diseases among Class I obesity. However, in Class II and Class III obesity, the highest prevalence of disease was hypertension.

Furthermore, from this research it had been proven that the cross-sectional study had linked obesity to hypertension, diabetes, heart problem and stroke. Firstly, the prevalence of elevated blood pressure dramatically increases with weight gain, particularly among individuals

< 55 years old,which is similar with the previous research by Must A, et al.[10]In hypertensive subjects, being overweight is associated with cardiovascular abnormalities such as increased progression of left ventricular hypertrophy similar to De Simone G, et al.[11]

Moreover, the link between obesity and diabetes is supported by evidence from research reported byMurtagh J. 2015.[12] The association of these two variables occurs as a result of peripheral insulinemia, from increased free fatty acids in the liver and inhibition of hepatic clearance

of insulin which could cause decreased peripheral insulin sensitivity as shown in previous study Daneshfard B, et al. and Mozaffarian D, et al.[4,13] However, this study and previous research have demonstrated a significant association between BMI and risk of stroke among men,similar to Jood K, et al; 2004.[14]

This study also obtained that obesity is the risk of heart disease is present due to the fact that obese persons have the tendency to produce high levels of free fatty acids,which leads to the hypertriglyceridaemia and an increase in production of low density lipoproteins (LDL), while high density lipoproteins (HDL) cholesterol is low. The ratio of LDL to HDL is high leading to greater atherogenic risk. A study from this research found that almost 42.7% of heart problem like coronary risk was attributable to a BMI >25 kg/m2 similar with a research by Nanchahal K, et al.[15]. For supporting this study, the American Heart Association (AHA) continues to recognize obesity as an independent cardiovascular disease risk factor,as seen by Ferreira-González I, 2014.[16] Evidence from this studies and recent studies supported the AHA's statement that obesity increases the risk of heart diseases events.[17,18]

However, since correlation study on the prevalence of related dominant disease of obesity and each category of obesity showed a significant relationship, it is easily understood that, the classification of obesity may indirectly change the prevalence of associated diseases with obesity in this country.

Conclusion

From this study, it can be concluded that classification of obesity had given a variation of result on the related diseases. The classification of obesity showed that all of the types gave a high risk to develop health problems (WHO, 2016). According to the findings, it showed that Class II obesity is the highest prevalence in both gender compared to Class I and Class III. The most dominant disease that usually occurred to the obese person is hypertension, second is diabetes, third is heart problem and the least common is stroke. Apart from that, the common disease in Class I is diabetes, the common disease in class II and Class III is hypertension, but class II and III have a higher possibility to get other diseases like heart problem, diabetes and stroke e. So, there is significant association between the prevalence of related dominant diseases of obesity and each category of obesity among resident in Seksyen 13, Shah Alam. Moreover, data been analyzed to observe the correlation between prevalence of obesity among gender associated with category of obesity, which showed that study had rejected null hypothesis. Thus, there is significant relationship between the prevalence of obesity among gender associated with the category of obesity. Similar finding also obtained for correlation between prevalence of related diseases associated with obesity. Hence, study had rejected null hypothesis and thus proving the significant association between the prevalence of related diseases with the obesity population. Based on the data of the relationship between the prevalence of related dominant diseases of obesity and each category of obesity, the correlation study between these two variables give the significant association observed between them, where study had to reject the null hypothesis.

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Haematogenous Spread of Fluconazole Resistant Candida Tropicalis from Mycobiome of Respiratory Tract in COPD Patients

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Abstract

The association between candidaemia and particularly the drug resistant candidaemia with COPD is largely unknown, although COPD patients with drug resistant candidaemia show very high mortality rate. Thus in this study we aimed to find whether there is a significant association between COPD and drug resistant *Candida tropicalis* isolated from blood and sputum from such cases as this species is now commonly isolated from blood. After isolation of the *C. tropicalis* from blood fluconazole resistance was confirmed by broth dilution technique following CLSI guidelines and then association with COPD was statistically analyzed. Fluconazole resistant *C. tropicalis* in blood was 53.3% in patients with COPD, while it was only 12.5% in patients without COPD. Similarly in the sputum fluconazole resistant *C. tropicalis* was 100% in COPD cases while they were only 33.3% in non- COPD cases. Although recently there is development of many newer antifungal agents but the mortality due to candidaemia still remains very high particularly in COPD patients. Thus early initiation of the proper antifungal treatment is essential in such cases.

Keywords: *Cndida tropicalis, Fluconazole, COPD.*

Introduction

Invasive *Candida* infection commonly occurs in patients with compromised immune system and COPD is frequently found associated as a co-morbid factor in such infection. In Indian subcontinent, *Candida tropicalis* is the commonest *Candida* species isolated from blood [1] and COPD is an important co-morbidity in about 10.3% patients suffering from *Candida* infection in the blood. In patients suffering from COPD, the role of bacteria and fungi has not yet been clarified [2,3]. The European Academy of Allergy and Clinical Immunology recently indicated our poor knowledge regarding the association of fungal infection in COPD cases [4].

Mycobiome is a collective term of respiratory pathogens in patients suffering from COPD which includes *Candida* spp.[5,6] and *Candida* spp. isolated from COPD patients are quite different than those isolated from healthy persons[6]. In COPD patients frequent antibiotic treatment due to associated infections often leads to proliferation of *Candida* growth in the respiratory passages[7]. Thus the research on *Candida* spp. in COPD patients is extremely important, this is because the respiratory tract is the main point of entry of fungi, upon which they can exacerbate the COPD and invade the body.

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Materials and Method

The patients: Patients who were admitted in ICCU were included in this study after permission taken from the Institutional Ethical Committee. Only those patients were considered where they showed *C. tropicalis* isolated from their blood. From the clinical history of the patient presence of COPD was confirmed. In this way a COPD group and a non-COPD group was separated. Other demographic data of the patients were also recorded.

Confirmation of the isolated fungal strains: Assimilation tests and other biochemical tests were

performed to confirm the diagnosis of the isolated fungus as *C. tropicalis*. A negative germ tube test was also observed.

Antifungal drug sensitivity test: The isolated *C. tropicalis* were then tested for the fluconazole resistance initially by disk diffusion method with Hi Media disk and then MIC values were determined by serial broth dilution method as recommended in CLSI guidelines. In this way fluconazole resistance was confirmed.

Analysis of the data: After collection of all data significance of the drug resistance *C. tropicalis* isolated from blood in COPD patients was determined by statistical analysis.

Results

Fluconazole resistant *C. tropicalis* in blood was 53.3% in patients with COPD, while it was only 12.5% in patients without COPD. Similarly in the sputum, fluconazole resistant *C. tropicalis* was 100% in COPD cases while they were only 33.3% in non- COPD cases. The details of the findings are given in Table 1 and Fig. 1. Statistical analysis between fluconazole resistant *C. tropicalis* isolated from blood in COPD and non-COPD cases showed a Chi-squared value of 7.396 with a p-value of 0.0065; similarly differences between fluconazole resistant *C. tropicalis* isolated from sputum in COPD cases and non-COPD cases was also highly significant with Chi-squared value of 5.893 and p-value of 0.0152.

Table 1: Showing increased drug resistant *C. tropicalis* in blood and sputum in COPD patients

	Fluconazole Sensitive Candida Tropicalis		Fluconazole Resistant Candida Tropicalis	
	Without COPD	With COPD	Without COPD	With COPD
Total number of cases	21	7	3(12.5%)	8(53.3%)
Sex	M 13 F8	M5 F2	M1 F2	M6 F2
Age in years range	17-52	20-64	27-53	24-48
Presence of Candida tropicalis in sputum	8(38.1%)	6(85.7%)	1(33.3%)	8(100%)

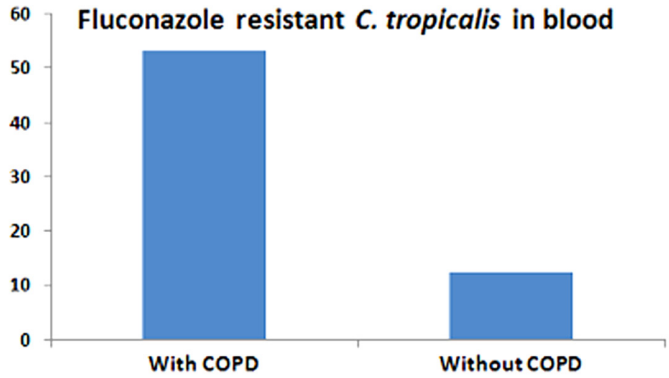


Fig. 1: Cadidaemia patients showing more fluconazole resistance in COPD patients

Discussion

It was Castellani who described "tea tasters cough" long ago, and after that there was an extensive study on the role of the yeasts on respiratory tract infections, but still it is not solved whether there is a definite relation between them or not.

The term candidiasis denotes a fungal infection caused by different species belonging to the Genus *Candida*, which are yeast like fungus. Although most *Candida* species including C. tropicalis are also found in animals but *C. albicans* is found only in human beings. In many persons this fungus may present normally in mouth, vagina, intestine etc. In immune-compromised patients this fungus can spread easily throughout the body. In patients with COPD also they can spread easily in comparison to an otherwise normal person. They can also spread through contaminated inanimate objects like air-conditioning vents, food, clothing etc and can cause infection. Before infection there is always increased colonization of them in the vulnerable areas of the body particularly in the lining of the respiratory tract. When normal microflora of the part is diminished as in antibiotic treatment they can spread without difficulty in different

parts of the body. Respiratory tract candidiasis is usually associated with sore throat, hoarseness, dyspnoea, fever, and cough[1-4]. Among different organisms isolated from blood, Candida species is the fourth most commonly isolated organism. Candida, Aspergillus and Mucorales are the three fungal groups which are commonly isolated from respiratory tract materials in patients admitted in ICU. It was found that 18-56% incubated patients harbor *Candida* species in ICU [3] and about 10% patients admitted in ICU are suffering of *Candida* infection. The presence of *Candida* in respiratory samples usually indicates multifocal colonization, in presence of COPD they easily invade the surrounding tissue and finally can cause candidaemia, in COPD cases isolated *Candida* species is usually drug resistant which causes a very high mortality rate in this group of patients. Ostrosky-Zeichner prediction rule and the *Candida* score are two important assessment method which should be used in such cases.

A novel proteinase – tropiase of *C. tropicalis* increases vascular permeability and haemorrhagic activity. Two other virulence factors of *C. tropicalis* namely phospholipase and biofilm formation are also key factors in the pathogenecity. The growth of *Candida* spp. is enhanced due to decreased mucociliary clearance thick mucus, and altered immune reaction [8]. These factors ultimately lead to colonization [9,10]. Many bioactive elements like collagenase, elastin, chitin, β glucan, trypsin, gliotoxins etc. are present in the *Candida* spp. which can degrade tissue matrix particularly in patients of COPD and can easily enter the blood [11-15]. This damaging action usually causes a Th-1 type response in healthy people but this can initiate Th-2 type response in COPD patients. The pathogen-associated molecular patterns (PAMP) of *Candida* triggers inflammation [16].

Conflict of Interest: The authors declare that there is no conflict of interest.

The authors declare that it is an original work and has not been sent to any other journal for publication.

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The Purchase of Over the Counter Medicines (OTCM)

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Abstract

Purchase of over the counter medicines (OTCM), commonly known as self-medication is a common practice visible among majority of people curing majority of minor ailments. The practice is common not only in developing countries but the pace is equally evident in developing nations. The trend of OTCM is getting more and more popular over time. In this busy world, people generally prefer OTCM in order to save money and time in the form of doctors' fee and long waiting line. In majority of the cases OTCM is supported by high end advertisements, personal promotion and word of mouth publicity. Moreover the virtual platform in the form of online marketing has made it more accessible, cost & time saving practice by getting home delivery. The results of the present study support the investigation done by the researcher that the proposed factors are significantly associated in making an overall perception towards purchasing OTCM.

Keywords: *Purchase Decision, Consumer Involvement, Information, Evaluation.*

Introduction

Conferring to Martins et al[1] the term self-medication can be defined as the use of non-prescription medicines under an individual's own initiative. It generally refers to use of non-prescription medicines, usually over-the-counter (OTC) drugs, to treat certain 'minor' ailments, by patients themselves without consulting a medical practitioner and without any medical supervision or consultation. Supported by Zafar et al[2], it comprises of acquiring medicines without a prescription, purchasing drugs by resubmitting/ reutilizing an old prescription, taking medicines on advice of relative or others, or consuming leftover medicines already available at home (Clavinjo[3]). The study of Gupta et al[4] determine that lack of sufficient money to go and consult to doctor may be another reason for self-medication. Supported by the World Health Organization[5] (WHO), that responsible self-medication can help prevent and treat ailments that do not require medical consultation and provides a cheaper alternative for treating common illnesses. However, it is also recognized that self-medication must be accompanied by appropriate health information supported by Kafle and Gartoulla[6]. Studies on self-medication are influenced by many factors, like education, family, society, law, availability of drugs and exposure to advertisements. A high level of education and professional status has been mentioned as predictive factors for self-medication (Hebeeb, and Gearhart[7]).

The most common medications used for self-medication are analgesics and antimicrobials (Shankar, Partha and Shenoy[8]). Self-medication may be seen as part of the greater drive towards self-care whereby individuals assume greater responsibility for their own health, and undertake activities to improve their health, prevent and limit disease and restore health after injury or illness (Hughes, Mcelnay and Fleming[9]; Bond and Bradley[10]; Nettleton[11;] Bessell et al[12]).

There has been a tendency for the public to perceive OTC medicines to be safer than prescription medicines (Bissell, Ward and Noyce[13]; Hughes, Whittlesea and Luscombe[14]), but it has been recognised that OTC medicines have the possibility for harm as well as advantage (Lessenger and Feinberg[15]). This may result in what has been variously referred to as the misuse or abuse of OTC medicines and their potential to cause

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addiction and dependency. Similarly Lessenger and Feinberg[15] suggested medicines such as stimulants, laxatives, sedatives and dissociative substances such as dextromethorphan as being liable to abuse. The latter are available for purchase in many countries and combine codeine or dihydrocodeine with either ibuprofen or paracetamol and have led to particular concerns about addiction and also gastric or hepatic damage, respectively (Reay[16] 2009; Frei et al[17]).

As identified by Bruden[18] that in a number of developing countries many drugs are dispensed over-the-counter without any medical supervision. Serious threat of self-medication is that it often gives temporary, superficial relief and thus guises symptoms possibly revealing of a more serious problem. Secondly some might actually be ineffective, e.g. taking antibiotics for viral illness. In developing countries like India easy availability of wide range of drugs coupled with inadequate health services result in increased proportion of self-medicated drugs compared to prescribed drugs (Phalke, Phalke and Durgawale[19]; Durgawale[20]). In several studies it has been found that inappropriate self-medication results in wastage of resources, increases resistance of pathogens and generally entails serious health hazards such as adverse drug reactions, prolonged suffering and drug dependence (Kiyingi and Lauwo[21]).

Background of the Study

As OTCM has been concerted in other disciplines, like medical sociology, pharmacy practice, public policy, environmental science, etc., but little focus has been towards consumer decision making process, the present research tries to fill the gap and is a step towards determining the parameters of consumer decision making process and the relationship of various factors in managerial perspective towards over-the-counter medication.

OTC medication offers advantages like easy access to medicines, self-management of minor ailments with the involvement of pharmacists, and utilization of available resources. However it is not always safe and has been associated with negative health consequences (Bertoldi et al[22]).

A study conducted by Nga et al[22] showed that frequent reported reason for buying antibiotic was cough in urban setting and fever in the rural setting. Then Hollis et al[24] comprises a combination of self-profiling to understand the mind of the consumer, and conjoint analysis to understand the choice of features and communications. Comparing a variety of marketing mix variables such as brand, price, and retailer reputation, Dawar and Parker[25] found brand to be the most important signal used by consumers to evaluate product quality.

For health care providers who recommend OTC drugs to patients, the study of Catlin, Pechmann and Brass[26] suggests the possibility that the instructions given should go beyond simply recommending the drug and assuming the label will provide all the rest of the information. Provision of more detailed information or instructions may be beneficial to patients in some cases. Cooper[27] concluded that, OTC medicine abuse is a recognised problem internationally but is currently incompletely understood. Research is needed to quantify scale of abuse, evaluate interventions and capture individual experiences, to inform policy, regulation and interventions.

Despite label instructions about storage and administration, Schaefer, Shehab, Cohen and Budnitz[28] found that both unsupervised over-the-counter cough and cold medication consumption by children two to five years of age and caretakers' inappropriate administration (e.g., giving a higher dosage than recommended) accounted for most visits to the hospital emergency department due to an adverse drug event. The prevalence of supplying antibiotics by community pharmacists without prescription is illegal and alarming. Pharmacists and patients' perception, knowledge and attitude are crucial in developing interventions to improve the current practices of dispensing medicine (Himmelstein, Miron-Shatz, Hanoch and Gummerum[29]; Nagaraj, Chakraborty and Srinivas[30]; Abdasaeed et al[31]). Likewise the report of Malvi, Papiya and Sonam[32] supported that pharmacist should be more attentive towards the people who take the medicine without the prescription. Helping the peoples to know about the drugs very clearly can reduce the incidence of any adverse effect in future due to indiscriminate and unnecessary self-medication.

Objectives: To examine and evaluate the role and influence of various factors like: Involvement, Information and Evaluation criteria on Purchase Decision towards Over the Counter Medication.

Methodology

The present research is a survey based study conducted at Islamic University of Science and Technology in Awantipora town of Pulwama District

of Jammu & Kashmir during March to June-2018. The structured questionnaire was distributed personally to the respondents on the basis of Convenience Sampling Technique. The validity of the overall scale has been tested by reliability analysis, showing that a valid/ reliable scale (with Cronbach's Alpha = 0.739) has been developed for the study. It has been accepted by Hair, Anderson, Tathan and Black[33], so further analysis is permitted. Descriptive statistics, Linear Regression Modeling, Mean Scores were used to test the variables in order to get inferences.

Results and Discussions

The results and discussions are presented under various headings as:

ANOVA Results: ANOVA test was conducted in order to know the feasibility of all the variables in the model and the results were significant with $P < .05$, F Value = 196.519, Friedman's Chi-Square value = 3433.394, & Kendall's coefficient of concordance W = .986 (it is used for measuring agreement among raters, W rages from *0*-no agreement to *1*-complete agreement).

Model Assimilation: Based on the researchers own impression of relating the variables. The results show that there is a significant & effective relationship between the variables. Each of the factors has been assigned its statistical values based on the performance in the test. In the Linear regression model each of the three factors (Demography= INV, Information=INF & Evaluation=EVAL) were entered as input factors/ predictor variables and two factors (Purchase Decision=PD & Frequency of Purchase=FoP) has been entered as output factors/target variables. Individually the input factors have significantly contributed towards the Purchase Decision in the study. The analysis presented in table 1 shows that the conceptual model developed for the study fits the test very well.

Table 1: Statistical Results

Variables	Av. M.	Adj.R2	Model M.	Model SD	F-Value
INV-FoP	1.89	.163*	55.44	4.18	6.666
INV-PD	1.89	.134*			
INF-PD	3.19	.597*			
EVAL-PD	3.64	.230*			
PD-FoP	1.73	.767			
INV, INF, EVAL-PD	55.44	.897*			196.519

*= P<0.05

Managerial Implications: The term 'misuse' is applied to the use of a drug for medical purposes but in an incorrect manner, for example, use over an extended period of time or at an increased dosage. By definition, all products available for self-medication can be misused. Patient deaths have occurred as a result of the abuse of non-prescription products. The likelihood of inappropriate use occurring is increased by the ease of access to many of these products from a range of outlets, advocated by (Hughes, Mcelnay and Hughes[34]; Barragry and Morris[35]). Further Hughes[36] analysed self-medication with non-prescription drugs is likely to expand due to continued deregulation of products and patients assuming greater responsibility for their own health. Pharmacists are in a prime position to oversee the safe and effective use of such products through advice and counselling, but this role will require support through technology to assist monitoring, and evidence-based guidance on what is the most appropriate product in the management of a particular condition.

Moreover Jafari, Khatony and Rahmani[37]; Ali, Ibrahim and Palaian[38] suggest the need for interventions that may include awareness programs for the university students, medicine refund policies and any other novel initiatives that could minimize the medicine storage and self-medication practices. The level of medical knowledge and the patient's awareness of the information are important factors for appropriate self-medication, if the patient is adequately informed and directed, many side effects can be prevented (Dimitrijevic et al[39]; Uday, Nagesh, Venkat[40]).

Conclusion

Health care and health protection is every person's right. Every individual has the right to get sufficient

information and counselling regarding advantages, drawbacks, risks and limitations in order to evaluate over-the-counter medicines. The present research is also supported by several previous studies in the field of over-the counter medication, like the study of Chawla, Agarwal and Arora[41] which emphasize the need for proper education and training regarding need for rational prescribing, physician should do judicious prescribing while there is also an urgent need for legal measures to restrict the over the counter purchase of drugs so that pharmacist can dispense drugs only on prescriptions. Studies which categorize the types of barriers or determinants which lie between patients and services in terms of geographical, social, economic, cultural and organizational factors should be carried out to bridge the gap between patient and health system (Nath et al[42]).

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Clear

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Effect of Internet Use in Adolescents: A Scoping Review

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Abstract

Introduction and Background: Internet has a wide variety of uses in our daily life, like sharing files and information, communication, education, work, entertainment, shopping etc. Internet use has been found to be more in adolescents. Many studies have identified both positive and negative correlates of internet use among adolescents The aim of this scoping review was to find the literature available on the positive and negative effects of internet use in health of adolescents and also to find its effects on the occupational functioning in adolescents.

Method: Scoping review was conducted by collecting the studies done on adolescents and internet use from major online databases available in Manipal Academy of Higher Education library. Full text studies related to positive and negative effects of internet in healthy adolescents that were published in English between 2000 and 2017 were included for review. Our literature searches initially gathered 136 studies. 40 full text studies were found to be relevant and were independently screened by three investigators.

Result: Out of the 40 studies identified, 12 studies positively and 26 studies negatively discussed about the effect of internet use on adolescents. 2 studies found that internet use had both positive and negative effects on adolescent health. The positive effects on health included improved self-awareness, improved peer interaction etc. and the negative effects included loneliness, decreased energy etc. There were 4 studies that discussed about the effect of internet use on occupational functioning of adolescents.

Conclusion: Internet use may have both positive and negative influence on health of adolescents and if it is used in the supervised environment can have beneficial effects on health and occupational functioning among adolescents.

Keywords: *Adolescents, Adolescents age group (12-20), Consequence, Effect, Health, Impact, Internet use, Mental health, Occupational functioning, Outcome, Physical health, Result, Social health, Socialmedia.*

Introduction

The Internet is a basic system of net worked computers that have an ability to share the data around the world[1]. It has a wide variety of uses in our daily life, like sharing files and information, communication, education, work, entertainment, shopping etc. According to one of the surveys, 54.4% of the world population use internet in December 2017[2].

In recent years, internet use has become a major part of the occupations that human beings engage in[3]. The use of internet has either replaced many existing occupations of many individuals (e.g.: Internet based games instead of outdoor games) or have eased many of the occupations that individuals engage in(e.g.:online shopping).

According to a survey conducted in Europe in 2016, internet use has been found to be more in adolescents. In a study by Tsitsika[4], the authors have stated that internet is a basic tool for information, communication, and

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entertainment among adolescents. Internet use may have both positive and negative effects on adolescents[5].

Since, adolescence is a stage of swift physical, psychological, social and development changes[6] and time spent in internet use is more in adolescents[2], it is important to find the positive and negative influence of internet on health. Occupational therapists are always interested in understanding the effect of various occupations on functioning of individuals A literature base is necessary to help us in identifying the influence of internet use on the health and thus on the occupational functioning of adolescents. Hence, it is important to find how the internet usage can influence the occupational functioning in adolescents.

The research question for the current scoping review is: What is the current literature available on the effect of internet use in adolescents?

The aim of the current scoping review was to identify the current literature available on the effect or influence of internet usage in adolescents The objectives were to find the positive and negative effects of internet usage in health of adolescents and to understand how internet usage affects occupational functioning in adolescents.

Method

Articles were accessed through the single widow search from MAHE Library which includes databases such as Scopus, PubMed/MEDLNE, ProQuest, Springer Link, Up to Date, SCIFINDER, WEBOF SCIENCE, Journal Citation Reports, RESEARCH TO PUBLICATION, MU Digital Repository, SciVal, ACCESS Medicine, Adis Insight, Clinical Key, Dyna Med Plus and CINAHL Plus Full Text.

The keywords used were "Adolescents", "Adolescents age group (12-20)", "Consequence", "Effect", "Health", "Impact", "Internet use", "Mental health", "Occupational functioning", "Outcome", "Physical health", "Result", "Social health" and "Social media".

All literature focusing on effect of internet use on adolescents from January 2000 to December 2017 were considered for the current scoping review. Studies conducted in healthy adolescents, English articles on effect of Whats App, Facebook, Instagram, and twitter through phone and computer in adolescents were included in this review. Studies on effect of online video games in adolescents and with any one of the keywords in the title were considered for this review.

Studies on effect of television, offline phone games or video games and iPad games in adolescents were excluded from the current review.

Procedure: Our search yielded 136 studies with any one of the keywords in the title. A total of 109 studies remained after excluding the duplicates. Abstract screening of 109 studies was done based on inclusion and exclusion criteria. 78 studies were fully reviewed after excluding 31 studies that did not meet the inclusion and exclusion criteria. It was found that 38 studies did not discuss about the effect of internet use on health or occupational functioning of adolescents as they were conducted on adolescents with physical or mental illness and few were on parent's perspectives or collective write-ups on internet use in adolescents. Finally, 40 studies were found to be relevant for our research question and were reviewed by the three investigators independently and were charted.

Results and Discussion

The aim of our study was to identify the literature on the effects of internet use on adolescents in regard to health and occupational functioning.

Out of the 40 studies, 12 (30%) studies have found that internet use has positive effects on adolescent's health whereas 26 (65%) studies have found that internet use has negative effects on health of adolescents. 2 (5%) studies have concluded that internet use has both positive and negative effects on health of adolescents. Out of 40 studies, 4 studies (10%) have discussed the effect of internet use on occupational functioning in adolescents.

The geographical distribution of the study population in all the 40 studies included in the review is described in Table 1.

Table 1: Geographical distribution of the studies done on internet use by adolescents

Continent	Europe	Asia	North America	South America	Australia	Africa
Number of studies	16 (40%)	10 (25%)	7 (17.5%)	2 (5%)	4 (10%)	1 (2.5%)

Though the percentage of population using internet is very high in India[2] only 2 studies have been conducted on the effect of internet use on Indian adolescents.

All the studies included in this review comprised of qualitative and quantitative designs like cross-sectional studies, cohort studies randomized controlled trails etc. 16 (40%) of the studies on the effects of internet use on health of adolescents were cross-sectional, 10 (25%) of the studies were surveys, 7 (17.5%) studies were randomized controlled trails, 1 (2.5) of them was a pilot study, 1 (2.5%) was a longitudinal study, 1 (2.5%) was a cohort study and 4 (10%) studies were observational studies.

Positive effects of internet use on adolescents: One of the studies done to identify the effect of online fitness programs on health of adolescents have found that online fitness programs improved the quality of food intake and physical fitness in adolescents[7]. But it can be noted that these programs may not have caused direct impact on health of adolescents. Instead, they might have improved the knowledge of adolescents on maintaining a healthy lifestyle. Adolescents accessed online information for knowledge related to fitness and this has found to assist physical health promotion in adolescents[7,8]. Few studies have also identified that online based sexual education programs at school helped in improving the sexual health and awareness in adolescents[11,12,13].

Interaction with distant friends enabled expression of emotional needs among adolescents using online communication method such as Facebook, online video chatting etc.[9, 10] Online tasks and education classes on emotional balance strategies for adolescents by involving them in online mental health based classes have found to improve emotional regulation in adolescents. These online tasks and educational classes taught various problem solving techniques and coping strategies to the participants[14].

Occupational functioning of adolescents in terms of academic performance was studied and was found that internet use improved language skills [15] and information gathering skills about curricular subjects[9,10] through online dictionaries and blogs. Peer interaction was another component of occupational functioning which improved in adolescents by joining and seeking help from social media pages[14, 18]. Most of the studies have found that adolescents who used the internet under parental supervision showed better quality of life in terms of health & occupational functioning[36].

Negative effects of internet use in adolescents: Prolonged exposure to internet is found to have harmful effects on mental health of adolescents. It was found that internet use can cause depressive symptoms such as mutism, mood swings [16-21], loneliness and introversion[22], reduced self-esteem and loss of interest in pleasurable activities [23-27] in adolescents. Adolescents were found to. involve themselves in risk taking behaviors such as online interaction with strangers and revealing personal details to strangers online[22, 28]. Aggressive behaviors were found to be more in adolescents using internet for prolonged time[21,22,29,30,31].

Adolescents involved in internet use for longer time were also found to have increased Blood Pressure[32] and Body Mass Index [32]. Internet addiction led to lack of energy and sleep deprivation [33] in adolescents. Many studies have identified that prolonged internet use led to decreased social interaction with family and friends[17,18,23,30,33,34,35]. Internet addiction was also found to have negative influence over academic performance in adolescents [29]. Adolescents who accessed internet in unsupervised environment were likely to develop Internet Addiction, Problematic Internet Use (PIU) and Internet Use Disorder[36].

Implications, strengths and limitations: The findings of the current scoping review can be used in creating awareness on the effect of internet use on health in adolescents. The scope of using internet in rehabilitation can be explored. This preliminary scoping review to identify the research on the effects of internet use on adolescents may help in identifying research gaps and aid for further research. Future research may be conducted to identify the influence of internet on the areas of occupational functioning. The strengths of the current study are that the data collection was done from major online databases and all the steps involved from screening of abstract to full text analysis was done by three investigators independently. Titles of certain studies conducted on adolescent's internet use might not have been captured by the search strategy used in this review.

Conclusion

Internet use may have both positive and negative influence on health of adolescents. Internet, if used in the supervised environment can have beneficial effects on health and occupational functioning among adolescents. If internet is used in unsupervised environment can have

harmful effects on health as well as on occupational functioning among adolescents.

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Stress Levels among Medical Students of Various Years INA Medical College, Thiruchirapalli, South India

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Abstract

Background: The medical education aims to create citizens who care for the nation's sick, promote public health. Medical schools that produces doctors seem to exert more stress which many students fail to cope up with making them a vulnerable group in the society. This could have a negative impact on patient care, patient safety and their professional career. This study helps us to identify the level of stress with different years of medical students and compare among males and females.

Methodology: A Cross sectional study was conducted among 200 medical students of all four years selected randomly of a private medical college and hospital at Trichy (Thiruchirapalli) for duration of 2 months from august to October, 2018. Data was collected using a pre-tested and semi-structured questionnaire [13].The questionnaire contains five indicators related to physical, sleep, behavioural, emotional and personal.

Result: From the study,Overall dangerous levels of stress is seen among 27% of the total students. Very high levels of stress is seen among 39% of the total population. According to physical indicators, dangerous levels of stress is seen among 4th year girls and among males, it is more common with 1st year. According to sleep indicators, 4th year male students tend to have dangerous levels of stress while it is more common with 1st year female. Behavioural indicators of stress show that there is dangerous level of stress with 2nd year females and 3rd year males. With personal indicators, dangerous levels of stress are seen with 4th year girls and among 1st year males. Dangerous levels of emotional stress is seen with the female students of 4th year and male students of 1st year.

Conclusion: The stress levels seem to vary between males and females of each year of study. Study shows there is high levels of stress among medical college students of Trichy.

Keywords: *Medical Students, Trichy, Stress Indicators, Depression, Academic Pressure, Pattern*

Introduction

The goal of medical education is to create a knowledgeable, competent, and professional physicians meant to care for the nation's sick, advance the science of medicine, and promote public health. Medical schools undertake an extensive selection process to identify intelligent and altruistic individuals with a strong commitment to these goals and they spend four years trying to prepare to achieve these goals.[1]The fact is that education itself is a stressful process to many students. Admission into medical school currently is achieved after years of hard work[2]

Stress is defined as "a highly subjective phenomenon and it is a nonspecific response of body to any demand for change. And now this factor has merged to become an inevitable part in a medico's life[3].

Medical school being recognized as a stressful place could exert a negative effect on the academic performance, physical health and emotional wellbeing

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of the students [4]. This stress has serious consequences which may lead to the development of depression and anxiety and may even have a negative impact on patient care, patient safety and professional career [5]. Studies on psychological problems such as stress, depression and anxiety among medical students have found that these disorders are under-diagnosed and under-treated [6] Failure to detect these disorders unfortunately leads to increase psychological morbidity with unwanted effects throughout their careers and lives [7].

Other factors including academic pressure, financial concerns, sleep deprivation [8]and a "hidden curriculum" of cynicism [9]have been hypothesized to contribute to this decline in students' mental health. Fear of failure, volume of subjects that are to be mastered and the high level of expectations from parents do also play its part. [10]Very few studies have been done among the south Indian medical students in this field. This study aims to bring out the amount of stress undergone by medical students of various terms of medical student.

Objective: To determine the stress levels among medical students during various years of their study period.

Materials and Methodology

A Cross sectional study was conducted among 750 medical students of all four years, excluding interns, among which 200 students were selected randomly. Study was conducted at a private medical college and hospital at Tiruchirapalli for duration of 2 months from august to October, 2018. Datawas collected using a pre tested and semi structured validated questionnaire. The questionnaire consisted of socio demographic factor of students along with **Stress indicators questionnaire** developed by the counselling team international [11]. Questionnaire first explained to the students and then students were asked to fill the questionnaire. The questionnaire contained five indicators related physical, sleep, behavioural, emotional and personal. Each indicator had questions and its scores ranges from 1to 5. Sum of total scores for each indicator is categorised into five stress levels (very low, low, high, very high, danger), based on the scale stress levels among different year students, both gender were analysed. Data was entered into M S Excel and data was analysed with SPSS software 16 software. Chi-square test was used to find the difference between stress levels among different groups.

Results

Study was conducted among 750 medical students of all four years, among which 200 students were selected using systematic random sampling. Around 50 students from each year were taken, among which 1st year consisted of 28 female and 22 males, while 2nd year had 29 females and 21 males, 3rd year 31 females and 19 males and 4th year 36 females and 14 males.

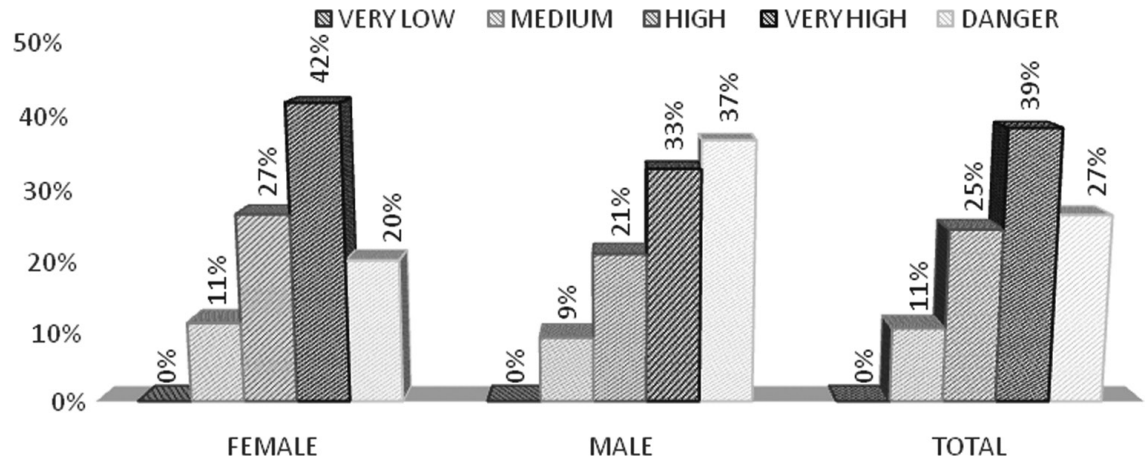
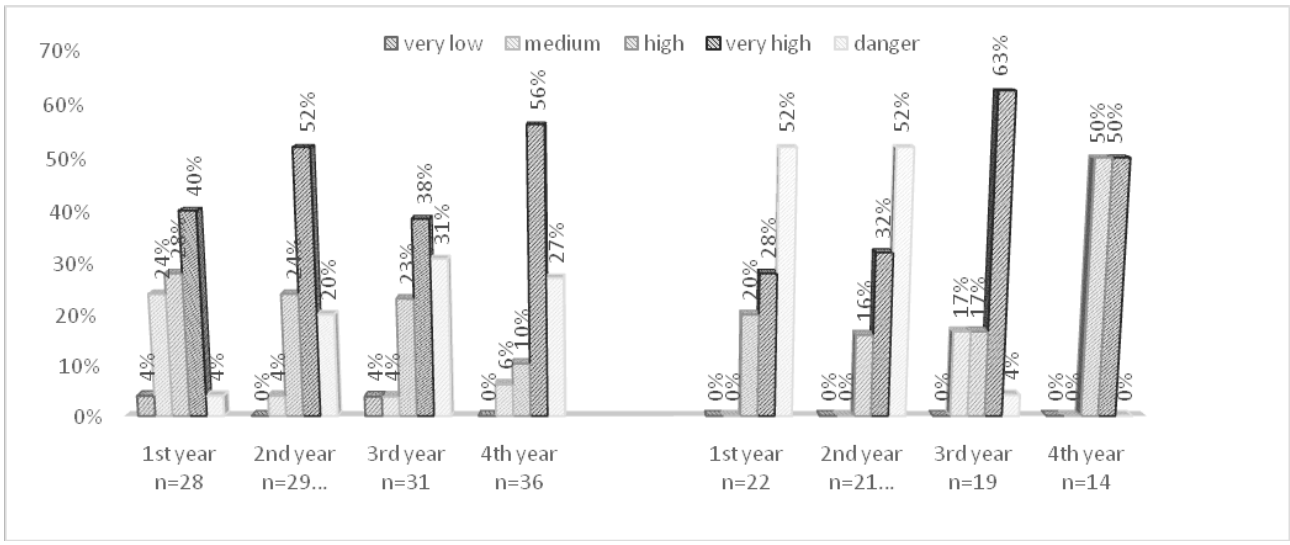


Figure 1: Gender Wise Distribution of Overall Stress among Students

Overall dangerous levels of stress is seen among 27% of the total population. It is about 20% of the total female and 37% of the total males. very high levels of stres is seen among 39% of the total population of which 42% females and 33% among males. high levels are seen among 25% of total population of which 27% among females and 21% among males.

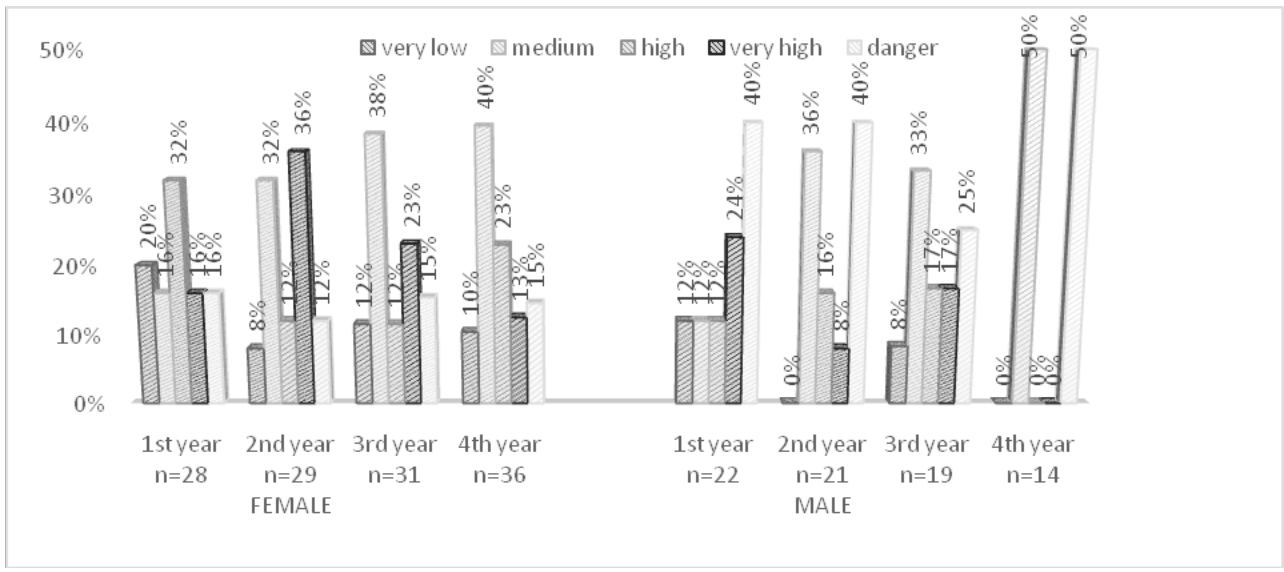


*According to chi square test p value for female is 0.046(significant): males is 0.003(significant)

Figure 2: Gender and Year Wise Distribution Stress Based on Physical Indicator

Very high level of Physical indicator of stress tends to be seen among 4th year students which is about 27% of the entire study population. Amongst girls, very high levels are seen among 4th year students which accounts for about 56%of the 4th year girls and nearly 27% seems to have dangerous levels of physical stress. But in case of boys very high levels are seen among 3rd year students, of about 63%. Interestingly, dangerous levels are seen among 1st year boys which is about 52% compared to 1st year girls where about 4% of students seem to have dangerous levels

Most common physical indicator of stress complained among students is generalized feeling of tense all over the body**.** Other common symptoms include decreased intake of diet and lack of vigorous exercises. The stress difference among females of different years was significant with p value of 0.046 while in males was highly significant with value of 0.003

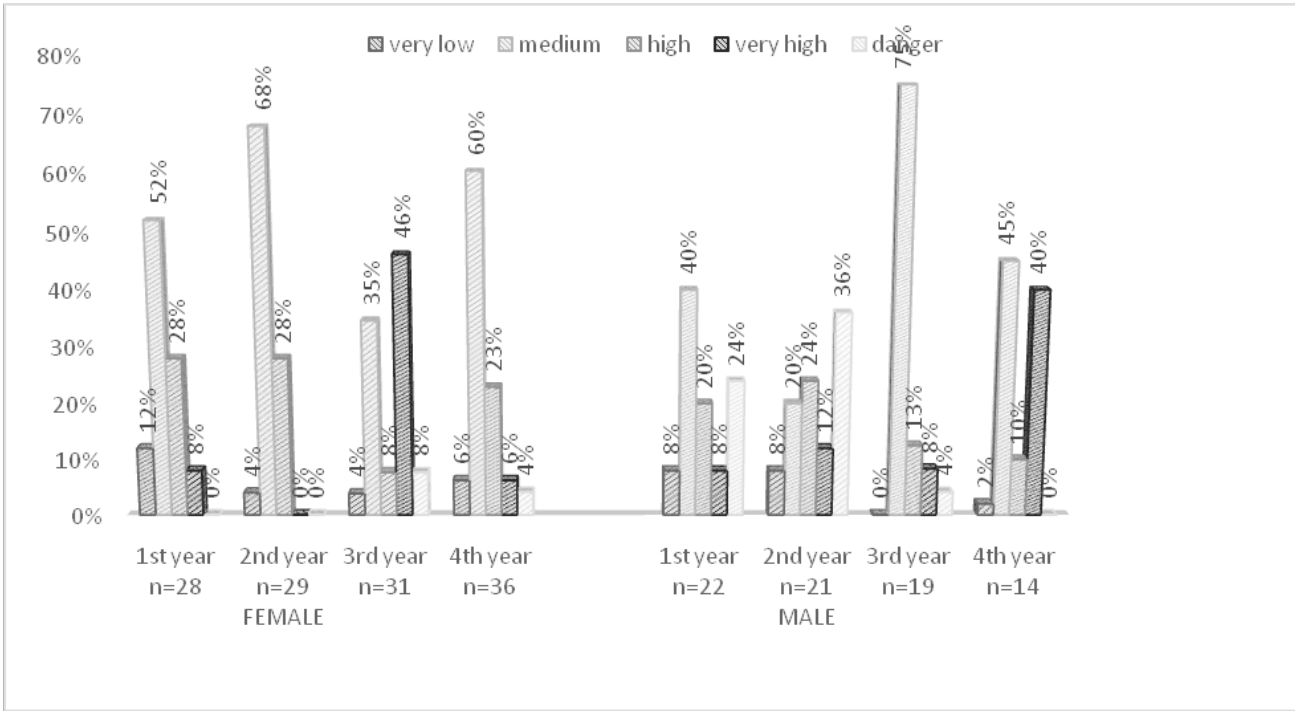


*According to chi square test p value for female is 0.992(not significant): males is 0.332(mot significant)

Figure 3: Gender And Year Wise Distribution Stress Based On Sleep Indicator

Sleep indicators reveal that stress would have a dangerous impact on the sleep of the final year male population. About 50% of 4th year male students tend to have dangerous levels of stress among 4thyear males students. Girls of 1st year seem to have dangerous level of stress affecting 16% sleep among whole 1st year girls. Study shows that very high levels of stress is seen among 2nd year female which is about 36% of the same year female, accounting for 4.5% of the entire people under study. Among boys very high levels of stress is present with the 1st year students which is about 24% of the class boys. 1st year girls have very low impact on sleep which is about 20% of the 1st year girls and among boys very low levels is seen with 1st year male students which is 12%.

Among Sleep indicators most common symptom seems to be tiredness during awake despite adequate hours of sleep. Other common indicators include insomnia and nightmares. The stress difference among females of different years was not significant with p value of 0.992 while in males was significant with value of 0.332.

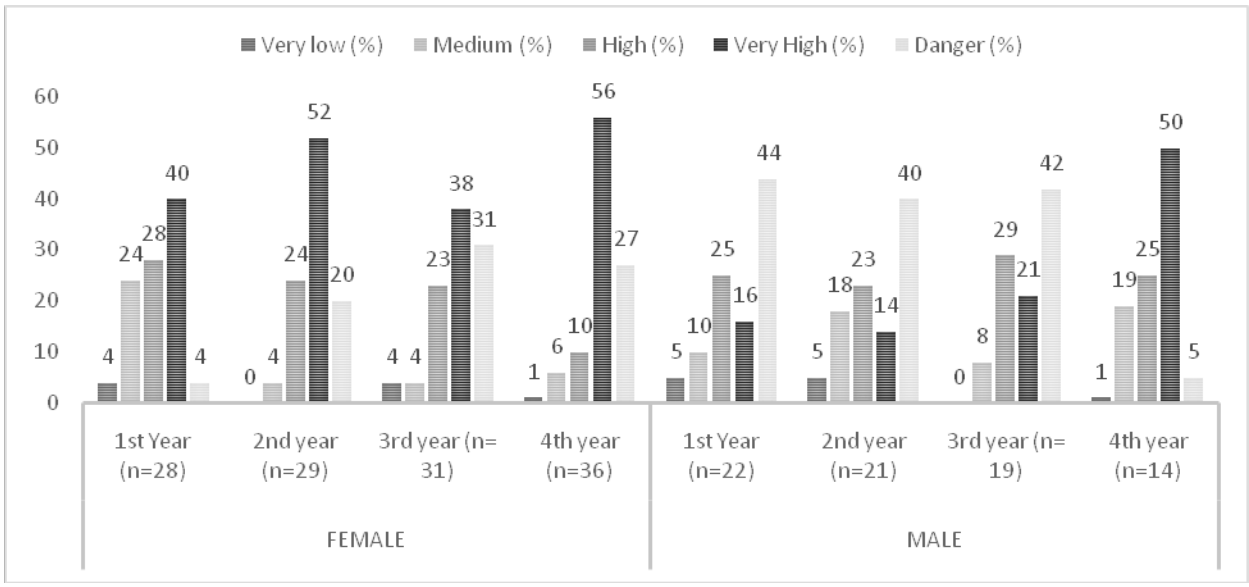


*According to chi square test p value for female is 0.001(significant): males is 0.043 (significant).

Figure 4: Gender And Year Wise Distribution Stress Based On Behavioural Indicator

Behavioral indicators of stress show that there is dangerous level of stress of about 36% among 2nd year male students which accounts for about 4.5% of totalpopulation understudy. Among females dangerous levels are seen with 3rd year which is about 8% of all females.

Very low levels of stress are seen among 1st year female students about 12% of the total female of the same year. Among males low stress levels is seen among 1st and 2nd year students which is about 8% of the respective year population. Within study group, most common indicator of being stressed appears to be studying despite of being sick, thus taking very less self-care. Other common indicators includes taking more time to study than usual and stuttering while speech. The stress difference among females of different years was highly significant with p value of 0.001 while in males was significant with value of 0.043.

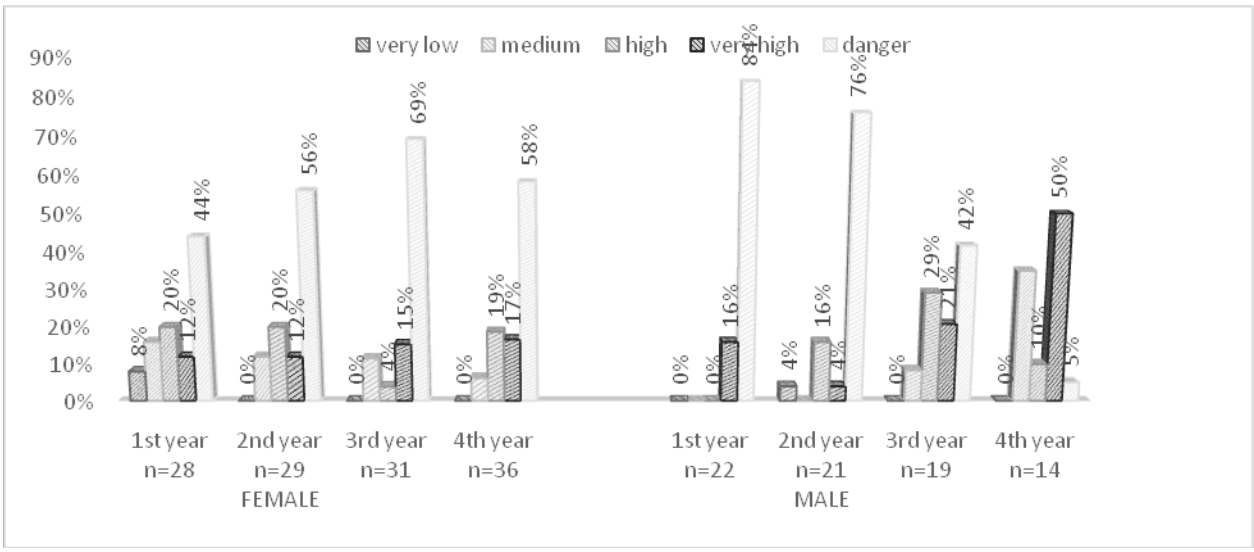


*According to chi square test p value for female is 0.922(not significant): males is 0.332(not significant)

Figure 5: Gender And Year Wise Distribution Stress Based On Personal Indicator

Among personal indicators of stress, dangerous levels is seen with 4th year female which is about 39.3% of all 3rd year female and about 4.8% of the entire study group conversely dangerous levels of stress is seen among 1st year boys with 44% among the group of first year and shows a gradual decline in personnel indicators with 5% among 4th year boys. Among girls very high levels is constantly seen among all years. Very low levels of personnel stress are common in3th year boys.

Among personnel indicators of stress, decrease in hours of television watching seems to be the most common indicator of stress with a mean of 2.90. Other common indicators include difficulty in proper planning of work and decreased interest over hobbies. The stress difference among females of different years was not significant with p value of 0.922 and males also were not significant with value of 0.332.



*According to chi square test p value for female is 0.272(not significant): males is 0.001 (significant)

Figure 6: Gender And Year Wise Distribution Stress Based On Emotional Indicator

Emotional indicators of stress among medical undergraduate students show that dangerous levels of emotional stress is seen among the female students of 4th year which is about 14% of the entire population and accounts for 58% among the 4th students seem to show dangerous levels of stress. Among male students dangerous levels of emotional stress is seen among 1st year students with 10.5% among the entire sample size and 84%among the 1st year male students. Among female students, there is an increasing trend of very high levels of emotional stress with 1stand 2nd years showing 12% in each year, 3rd years with 15.4% and final years with maximum of 17%.Among male students very high levels of emotional stress is seen among the 4st year students with 50% of the male students of the same year.

Very low levels of stress is seen among the 1st year female students with 8% of this entire 1st year female population. Among boys very low levels is seen among the 2nd year with 4% of the same year boys. Trying to hide their emotions from their family members seems to be the most common emotional indicator causing stress among the medical students. With a mean of 2.84. temper outburst also seems to be an important behaviour among students which is more common among the 4th year students (mean 2.39).The stress difference among females of different years was not significant with p value of 0272 while in males was highly significant with value of 0.001.

Discussion

According to physical indicators, dangerous levels of stress is seen among 4th year girls of about 6.5%of the total population and Interestingly among males,it is more common with 1st year boys which are about 7%.Generalized feeling of tense all over the body seems to be the most common symptom.

According to sleep indicators, 1% of 4th year male students tend to have dangerous levels of stress. Conversely, among girls of 1st year 2% seem to have dangerous level of stress affecting sleep. Most common symptom seems to be tiredness during awake despite adequate hours of sleep.

Behavioural indicators of stress show that there is dangerous level of stress of about 4.5% among 2nd year femalesand 4% with 3rd year males. Most common behavioural indicator of stress is lack of self-care.

According to personal indicators, dangerous levels of stress are seen with 4th year girls which are about 8.5% of the total population. Inversely, dangerous levels of stress are seen among 1st year boys about 10%. Decrease in hours of relaxation like television watching seems to be the most common indicator of stress

Dangerous levels of emotional stress is seen with the female students of 4th year(14%) and male students of 1st year (10.5%)trying to hide the emotions from their parents seem to be the most common cause of stress among the medial students.

According to the results there is variation in different parameters of stress between male and female students of south india when compared to other developed countries[12].among the early college years women seem to be more stressed when compared to males[5]. In first year students high levels of stress is seen with47% of students which is low when compare to medical students of Andhra Pradesh(78%)[3]. About 65% of the total students under study seem to show high levels of stress which is higher when compared to developed countries like Malaysia (56%),Saudi Arabia (57%)[13], Thailand (61.4%) [14].

Conclusion

Based on the study it is inferred that there is high levels of stress is seenamong medical college students of Trichy when compared to other countries. But among first year students stress seem to be much lower than the neighbouring states of south India.Male students tend to show higher levels of stress during their early years and gradually tend to get accustomed.Study load does not seem to have a great impact on their stress level during 4th year of study. Among females high stress is seen among 4th year compared to 1st year indicating that study load seems to have a greater impact on their stress levels. Orientation programmes, counselling and tutorship might help the first and final year students to reduce their stress. Friendly relationship with their parents could help students to cope up with stress.

Ethical Approval: Obtained from Institutional Ethical Committee.

Conflict of Interest: Nil

Funding: Self

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Isolated and Combined Effect of Continuous Run Alternate Pace Run on Selected Motor Fitness Physiological Haematological Variables among Male Athletes

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Abstract

The study aims to determine the isolated and combined effect of continuous run, alternate pace run and combined training on the selected motor fitness variable (Muscular Endurance), physiological variable (Breath Holding Time), and hematological variable (Red blood corpuscles) among the male athletes of Alagappa University affiliated colleges. The research involved a random subject selection of forty athletes with age ranging from 17-25 years and had four equally divided groups namely experimental groups A, B, C and control group D with 10 athletes each. The groups endured the training activities for twelve weeks with a schedule of thrice a week whereas the control group remained with no activities. The data procured in prior and after the training programme was examined with the application of Analysis of Covariance and the fixation of level of significance at 0.05. Scheffe's test was applied at the significance of 'F' ratio in order to evaluate the differences that occur significantly between the paired means. The study revealed that the selected variables of the combined group with the two endurance trainings outperformed the other groups.

Keywords: *Continuous Run, Alternate Pace Run, Muscular Endurance, Breath Holding Time, Red Blood Corpuscles.*

Introduction

A mission for perfection is often confronted with numerous difficulties. To improve the sports performance the athlete needs to take part in systematic training by the way of scientific method of training. Therefore athletes or players need proper systematic training to improve their performance through different kinds of training .[1]Significant improvement in VO2 max may not be possible when the runner reaches a plateau. It is, therefore, suggested that more emphasis should be given to improve the anaerobic threshold level of athletes.[2] Actual effect of training depends upon several factors such as training loads, means of recovery, assessment of load and performance capacity, sports equipment, nutrition, psychological characteristics and method adopted for imparting theoretical instruction. [3] The tendency of the systems of heart and blood vessels, lungs, body temperature regulators, body constituents, and the function of muscles and skeleton upon the capacity of an athlete leads to the enhancement of sports performance.[4]

Continuous running: Continuous running boosts the heart rate to the vicinity of 130 and 160 thumps for a given period of time at a relentless pace or power. The average time span of such running will be more than 30 minutes for a youthful competitor and from 60-120 minutes for an adult. Continuous training structures the reason for all other preparing techniques both anaerobic and aerobic.[5] Ernst Van Aaken, German physician and coach, is credited with introducing and popularizing this system of training. Ernst Van Aaken's work in this area started in 1920's but received widespread support at the later. Continuous training differs from maximum force constant action of slow time span to minimum-force action of a broadened span, long-slow distance, or "LSD" method. The long distance sprinter keeps up a pace that is simply beneath his dashing pace, despite the fact that this will rely upon the overall distance and the distance of preparation runs.

Alternative pace run: Running for long time at a speed with a variation in progressive stretches in accordance with a plan is Alternative pace run. In

general, for a person at slow pace for 1.0 km, the heart rate ranges from 130 to 150 beats per minute while considering fast pace for 0.5 km, the heart rate ranges from 170 to 180 beats per minute. The maximal oxygen intake at a subsequent distance of 1.0 km is stirred up. The alternative pace run supports the consumption of oxygen and the ability of varying speed.

Muscular endurance: Muscular endurance is very important for the football game. A long duration sport is to improve the muscular endurance. Enhancing muscular endurance gives an assortment of wellbeing and fitness, benefits, decreases fatigue, injury, back pain and develop the good posture.[6]

Breath holding time: Breath holding time is the period when one can hold the breath without inspiration and expiration.[7]It is characterized as a person's capacity to hold the breath, an intended maximal inward breath without exhalation during the period of holding the breath. Breath holding time is the times consumed to keep or without taking the breathing action as much as possible.

Red blood corpuscles: RBCs the non nucleated in the blood are the carriers of oxygen to every part of the body. Their haemoglobin content acts as carrier to all the body tissues. It enhances the rate of action between CO2 and water 250 times and thus facilitates CO2 carriage. RBCs are produced in bone marrows and the life span ranges between 90-140 days.[8]

Statement of the problem: The purpose of the study was to find out the Effect of Continuous Running, Alternate Pace Run, on selected motor fitness, physiological and hematological variable of male athletes.

Methodology

The research was designed to discover isolated and combined effect of continuous run, alternative pace run on the selected motor fitness variable (Muscular Endurance), physiological variable (Breath Holding Time), and hematological variable (Red blood corpuscles) among the Alagappa university college's athletes. For this purpose, forty athletes from the college were chosen randomly as subjects for the study and their age ranged between seventeen and twenty five years.

Test administration of the selected variables

i. Sit-ups (Bent knees) to evaluate the muscular endurance of the abdomen.

ii. Breath Holding Time to estimate the capability of the subjects in holding the breath for an extended period of time.

iii. Red blood corpuscles count to find out the number of red blood cells in the blood.

Training programme: The experimental groups I, II, III and IV were subjected to twelve week of continuous run (Group I), alternative pace run (Group II), combined training (Group III) and control (Group IV) on three alternative days a week. Each of the training programmes extended from 60 to 90 minutes with a schedule in the morning from 6.00 am to 8.00 am. The control group underwent usual exercises and was devoid of any specific training. The subjects underwent their respective programme under strict supervision prior to and during every session. They experienced a 10 minutes warm up and cool-down exercises which included jogging, stretching, striding and push-ups. A regular self-analysis of the stature of the subject was done during the whole training session and none reported of injuries whereas muscle soreness that occurred in the earlier weeks lowered down in the later period.

Statistical techniques: The design of the experiment and the random group involved forty as subjects who were divided into four groups containing ten each. This study was based on the chosen criterion variables such as motor fitness, physiological, hematological variables namely muscular endurance, breath holding time, red blood corpuscles. The four selected group underwent continuous run, alternative pace run, combined method and controlled training respectively. The study mainly aimed at finding out the effects of different endurance trainings among the subjects on selected criterion variables. The data was obtained from the four experimental groups and the control group at the beginning and after the conduct of the test. The procured data was statistically examined for significant difference using the method of analysis of covariance i.e., ANCOVA. Due to the involvement of the four various groups and at the significance of the F ratio for the adjusted post mean, the post hoc test utilized the Scheffe's test to measure the difference of the paired means.

Results and Discussions

Table I: ANCOVA for the data extracted from the pre and post tests of the training groups of Continuous, Alternate Pace Run, Combined and Control method on Muscular endurance (Sit-ups means count in No of attempt per minute)

Test	CNG	APG	CMG	CTG	Source of Variation	Variation in Sum of Squares	Df	Squared Mean	'F' Ratio observed
Pre test Mean	26.4	26.6	26.1	26.7	Between	2.28	4	.570	.074
SD	2.22	3.37	2.60	3.16	Within	345.9	45	7.687	
Post test Mean	28.8	29.7	31.5	26.1	Between	180	4	45	4.345*
SD	2.57	3.77	2.67	4.38	Within	466	45	10.35	
Adjusted post test mean	28.82	29.52	31.81	25.82	Between	215.26	4	53.817	19.331*
					Within	122.49	44	2.784	

*Required table value with significant level at 0.05, degree freedom 4 and 45 and 4 and 44 are 3.20 and 3.21 respectively. B.M., W.G, B.S, W.S are Between Means, Within Groups, Between Sets, Within Sets respectively.(Sit-ups means count in No of attempt per minute)

The data analysis done statistically from the Table I indicates that the mean values of pre-test of the training groups of continuous, alternative pace running, combined and control method are 26.4,26.6,26.1 and 26.7 respectively. The F ratio .074 obtained for pre-test observed to be lesser than 3.20 of table value for the degree of freedom 4 and 45 necessary for significance level at 0.05. The means of post-test of the training groups of continuous, alternative pace running, combined and control method were found 28.8,29.7,31.5 and 26.1 respectively. The F ratio 4.345 obtained for post-test was greater than 3.21 of table value for degree of 4 and 45 necessary for significant level specified at 0.05. And the resultant means of the adjusted post test scores of the training of continuous, alternative pace running, combined and control method were 28.82,29.52,31.81 and 25.82 respectively. The ratio of F for the adjusted post-test 19.331 was also greater than 3.21 table value for the degrees of freedom 4 and 45 necessary for 0.05 specified as level of significance. The analysis mentioned above shows that the result has a significance of difference of the means of adjusted post-test of all the groups. For post hoc test Scheffe's test as was used in order to identify which specific group had the significant difference and to evaluate which paired means showed significance of difference and also the conclusions are given in Table II.

Table II: Scheffe's Method Showing Differences of Paired Means of Adjusted Post-Test on the Variable of Muscular Endurance (Sit-Ups Means Count in No of Attempt per Minute)

CNG	APG	CMG	CTG	Difference in means	C.I Value
28.82	29.52	-	-	.701	2.40*
28.82	-	-	-	2.20	
28.82	-	31.81	-	2.99*	
28.82	-	-	25.82	2.99*	
-	29.52	-	-	1.49	
-	29.52	31.81	-	2.29	
-	29.52	-	25.82	3.70*	
-	-	31.81	-	.799	
-	-	-	25.82	5.19*	
-	-	31.81	25.82	5.99*	

*Required C.I Value 2.40*at 0.05 level

Table III: ANCOVA for the data extracted from the pre and post tests of the training groups of Continuous, Alternate Pace Run, Combined and Control method on Breath Holding Time(Breath Holding Time means count per minute)

Test	CNG	APG	CMG	CTG	Source of Variation	Variation in Sum of Squares	Df	Squared Mean	'F' Ratio observed
Pre test Mean	37.3	37.5	37.8	37.6	Between	1.480	4	.370	.025
SD	3.59	3.65	4.10	4.24	Within	671.00	45	14.91	
Post test Mean	3.763	3.773	3.523	3.523	Between	448.48	4	112.12	7.701*
SD	.069	.036	.092	092	Within	655.2	45	14.56	
Adjusted post test mean	43.69	43.91	45.36	37.03	Between	450.505	4	112.626	33.97*
					Within	145.875	44	3.315	

*Required table value with significant level at 0.05, degree freedom 4 and 45 and 4 and 44 are 3.20 and 3.21 respectively. B.M., W.G, B.S, W.S are Between Means, Within Groups, Between Sets, Within Sets respectively.(Breath Holding Time means count per minute).

The analysis of the data done statistically shown in the Table III indicates that the mean of training groups of continuous, alternative pace running,combined and control method are 37.3,37.5,37.8 and 37.6 respectively. The F ratio .025 for the pre-test was lesser compared to the table value 3.20 for degree of freedom 4 and 45 necessary with a significant level at a specification of 005. The means of post-test of the training groups of continuous, alternative pace, combined, control method were 43.5,43.9,45.6 and 37.1 respectively. The F ratio 7.701 obtained for post-test was greater than 3.21 of table value for degree of 4 and 45 necessary for significance level specified at 0.05. The means of adjusted posttest scores of the training groups of continuous, alternative pace running, combined and control method were 43.69,43.917, 45.356 and 37.03 respectively. The ratio of F 33.97 for post test scores was greater than 3.21 of table value for degree of 4 and 45 necessary for significance level at 0.05. The analysis mentioned above shows that the means of adjusted posttest measures of the all the groups differed significantly. For post hoc test Scheffe's test as was used in order to identify which specific group had the significant difference and to find out which paired means showed significance of difference and the derived results are given in Table IV.

Table IV: Scheffe'sProcedure Indicating The Differences Among The Paired Means of Adjusted Post Test on Breath Holding Time(Breath Holding Time Means Count Per Minute)

CNG	APG	CMG	CTG	Difference in means	C.I Value
43.692	43.917	-	-	.226	2.61*
43.692	-	-	-	.913	
43.692	-	44.356	-	1.664	
43.692	-	-	37.03	6.661*	
-	43.917	-	-	.687	
-	43.917	44.356	-	1.439	
-	43.917	-	37.03	6.887*	
-	-	44.356	-	.752	
-	-	-	37.03	7.574*	
-	-	44.356	37.03	8.326*	

*Required C.I Value 2.61*at 0.05 level

Table V: ANCOVA for the data extracted from the pre and post tests of the training groups of Continuous, Alternate Pace Run, Combined and Control method on Red Blood Corpuscles (RBC) (RBC count means count by millions)

Test	CNG	APG	CMG	CTG	Source of Variation	Variation in Sum of Squares	Df	Squared Mean	'F' Ratio observed
Pre test Mean	5.52	5.83	5.80	5.75	Between	.909	4	.227	1.191
SD	.458	.435	.429	.537	Within	8.592	45	.191	
Post test Mean	6.03	6.09	6.29	5.64	Between	2.264	45	.566	4.685*
SD	.346	.347	.144	.529	Within	5.437	45	.121	
Adjusted post test mean	6.12	6.01	6.23	5.61	Between	2.491	4	.623	9.407*
					Within	2.912	44	.066	

*Required table value with significant level at 0.05, degree freedom 4 and 45 and 4 and 44 are 3.20 and 3.21 respectively. B.M., W.G, B.S, W.S are Between Means, Within Groups, Between Sets, Within Sets respectively.(RBC count means count by millions).

The Table V indicates that the mean values of the pretest belonging to the training groups of continuous, alternative pace running, combined and control method are 5.517, 5.83, 5.80 and 5.75 respectively. The derived F ratio 1.191 for the pretest was lesser compared to 3.20 of table value for degree of freedom 4 and 45 necessary for a level significance specified at 0.05. And the means derived from the scores of posttest of the training groups of continuous, alternative pace, combined, control method were 6.03,6.09,6.29 and 5.64 respectively. The F ratio 4.685 obtained for post-test was greater than 3.21 of table value for degree of 4 and 45 necessary for a significant level at a value of 0.05. The means of adjusted post-test of the group of continuous, alternative pace running, combined and control method were 6.124,6.011,6.233 and 5.609 respectively. The F ratio 9.407 obtained for post-test was greater than 3.21 of table value for degree of 4 and 45 necessary for significance level at 0.05.The analysis mentioned above shows that the result has a significant difference of the means of the adjusted post-test of the all the groups. For post hoc test Scheffe's test was used in order to identify which specific group had the significant difference and to evaluate which particular paired means showed significance of difference and the conclusions are shown in Table VI.

Table VI: Scheffe Procedure for Differences Among Paired Means of the Adjusted Post Test On Red Blood Corpuscles (RBC Count Means Count By Millions)

CNG	APG	CMG	CTG	Difference in means	C.I Value
6.124	6.011	-	-	.113	0.37
6.124	-	-	-	.060	
6.124	-	6.233	-	.109	
6.124	-	-	5.609	.515*	
-	6.011	-	-	.174*	
-	6.011	6.233	-	.222	
-	6.011	-	5.609	.402*	
-	-	6.233	-	.049*	
-	-	-	5.609	.624*	
-	-	6.233	5.609	.624*	

*Required C.I Value 0.37 at 0.05 level

Discussion on Findings

The current study clearly reveals the significant improvement of the combined training group on the chosen variables such as muscular endurance, breath holding time and red blood corpuscles when compared with the groups of continuous, alternative pace run group, combined training and control trainings.

Discussion on Findings: The hypothesis of the study is that the combined training would have significant improvement from base line to post treatment on motor fitness physiological and hematological variables of inter collegiate men athletes. The result of the study indicates that all the motor fitness, physiological and hematological variables improved significantly after the 12 weeks of treatment. Hence the investigator's first hypothesis was accepted at 95% of confidence level.

Conclusions

The combined training group showed significant improvement with the influence of motor fitness, physiological and hematological variables in comparison with the groups of continuous training, alternative pace run and control training.

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Source of Funding: Self

Conflict of Interest: Nil

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An Evidence-Based Approach for Decision Making in Dental Implants

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Abstract

The purpose of this article is to discuss clinical decision-making and treatment strategies in the management of periodontal patients. Both benefits and risks or treating periodontally compromised teeth/dentitions in combination or not with implant placement are accounted for. Also the benefits and risks of using implants to cost-effectively improve the prognosis for the mobile natural tooth or tooth-supported fixed partial dentures are presented.

Keywords: *Dental implants, fixed prosthesis, desicionanalysis, ridge augmentation, markov model.*

Introduction

The evidence-based approach, a process for reviewing large volumes of clinical and scientific data, emerged in medicine and dentistry during the 1990s. This approach was implemented in therapeutic decision-making with the aim of maximizing the potential for successful patient care outcomes. Information derived from clinical trials is considered more reliable than information based on intuition, authority, or custom. There is a hierarchy when considering the levels of evidence. Systematic reviews of randomized controlled trials are considered to be at the highest level, whereas expert opinion is considered the lowest level of evidence.

Advanced periodontal breakdown will call for extensive cause-related treatment of the disease to achieve and maintain periodontal health. It may also require comprehensive prosthetic reconstruction to restore function and aesthetics to the patient[1]. During the last decades careful scientific documentation has provided a solid base for implant therapy as a reliable treatment modality to replace the lost teeth. Today we know that treatments including implant-supported single crowns or fixed partial dentures as comprehensive therapy will generally have a good prognosis when performed on the correct indications and followed by proper oral hygiene measures and supportive care.[2]

Dental implants or dentures?: According to Smith & Pell, 'the effectiveness of an intervention has to be judged relative to nonintervention. Observational studies evaluating patients before and after treatment with dental implants have demonstrated great advantages with regard to function, esthetics and psycho-social factors[2,3].

Old vs. New implant techniques and components: Essentially, the same type of implants and strict protocols were used during the first 30 years of osseointegration, which means that these factors were well controlled in clinical studies. The influence of other factors such as jaw, age, bone quality and health, could be evaluated and risk factors have been identified in retrospective analyses of the literature. Based on this information, patient selection and surgical techniques could be improved without altering the components[4] Implant surface modification is a well-documented fact that a slight increase of surface roughness results in more and earlier bone-implant contacts as well as a higher resistance to removal torque forces. The few randomized controlled trials comparing implant surfaces have used two-stage procedures in patients with good bone conditions. When evaluating the literature on implant treatment in more challenging situations, such as soft bone, immediate loading and bone grafting, it seems moderately rough implants perform better. However,

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randomized controlled trials are needed to prove this point scientifically.[5] At present, the third generation of implant surfaces is already a clinical and commercial reality, often based on nanotechnology. However, the new surfaces on well-documented implant designs are probably not hazardous for the patients and may result in a faster integration, which theoretically would allow for shorter healing periods prior to loading[6].

The decision-making model: The decision-making model describes two major components, the normative and the descriptive, which are involved in decision making. The normative aspect of decision making relies on quantitative information derived from systematic reviews and predictive models on the probabilities and uncertainties of treatment outcomes. Clinical outcomes, such as survival or success of a tooth or a restoration, are assessed based on the utility they offer to the patient and then cost. Normative analyses allow quantitative comparisons of alternative therapies and can identify optimal treatments for multiple attributes. The descriptive aspect in decision making involves cognitive processes and biases of both providers and patients that translate the normative information into clinical action. Although implant-supported prostheses have become the treatment of choice in an increasing number of patients, it remains controversial under which conditions retaining a tooth may be futile and replacing in tooth with an implant-supported prosthesis may be considered over-treatment. Owing to the complexity and variability in designs of revocable dental prostheses, the discussion will be limited to fixed dental prostheses[7].

Overall scheme of dental decision making (Adapted from Chapman &Sonnenberg, 2000)[8].The normative components of decision making are marked in blue and the descriptive components are marked in redThomas et al., in his systematic review did not show enough evidence to demonstrate superiority of and particular type of implant or implant system, or between a one-stage vs. a two-stage implant placement..

Smoking has been identified as a significant risk factor for implant failure. In patients with periodontitis-associated tooth loss compared with patients who lost their teeth largely unrelated to periodontitis, the risk for developing peri-implantities was significantly increased over a 10-year follow-up period (risk ratio of 9, 95% confidence interval: 3.94-20.57%). Despite the higher incidence of biological complications in patients with periodontitis-associated tooth loss, survival rates of implants were not significantly different from those found in patients with periodontitis-associated tooth loss. The 5- and 10- year survival rates were reported to be greater than 90% in both groups of patients.[9,10]

Impact of implant-supported dental prostheses on oral health-related to quality of life: Conclusive evidence has indicated that patients with implant-supported overdentures in the mandible report improved satisfaction with chewing compared to patients with conventional complete removable dental prosthesesAlthough patients rated the Implant-supported complete denture higher than the conventional complete denture for chewing ability and function, the overall rating was not significantly different between the two types of prostheses. The available information is insufficient regarding the economics of different treatment modalities, perception of esthetics, therapies avoiding active treatment (e.g. adoption of a shortened dental arch compared with the prosthetic provision) and quality of life outcomes with respect to fixed conventional prostheses compared with implant-supported or removable prostheses.[13]

Outcomes of oral implants placed in augmented bone: Cumulative survival rates for implants in bone that has been regenerated by barrier membranes ranged from 79.4% to 100% after 5 years of function. The survival rates of implants in augmented bone were found to be similar to those generally reported for implants placed in nonaugmented sites[14]. The method of bone augmentation does not seem to affect the outcomes of implant therapy because implant survival rates were comparable following guided bone regeneration and distraction osteogenesis (95.8% and 96.5-97%, respectively).[14]

The use of autogenous bone alone or as a component of a composite graft does not seem to affect implant survival. Implant survival rates were higher when a membrane was placed over the lateral window (93.6%) compared to when no membrane was used (88.7%). Similar results were found by other authors who reported an overall survival rate of 91.5% when implants were placed in grafted sinuses. The implant survival rate in grafted maxillary sinuses was found to be 87.7% with autogeneous bone grafts, 94.9% when autogenous bone was combined with various bone substitutes, and 96.0% following the use of bone substitutes along[15].

Decision analysis: Another approach to decision-

making, which so far has not been applied to implant dentistry, is decision analysis. Decision analysis provides a methodology for comparing alternative treatment strategies by calculating expected values of the resulting outcomes. Quantitatively describing the possible events and their likelihood enables an assessment of the effect of variations in basic assumptions on the optimal therapy. It provides a mechanism to evaluate the same clinical decision along multiple outcome dimensions, such as survival, utility and costs.

Markov Model: The Markov model is more convenient for using to model the prognosis of clinical problems with ongoing risk and will be applied to decision making in implant dentistry. Basic assumptions of the Markov model include a tooth or prosthesis, is always in one of a finite number of health states, referred to as Markov states, and that there is no memory in the process. If appropriate data are available, each state can be assigned to a utility and a cost. All events are modelled as transitions from one state to another, using transition probabilities. The time horizon of the analysis is divided into equal increments of time that are called Markov cycles[16].

The state-transition diagram for a tooth undergoing periodontal therapy is described. Arrows emanating from and returning to the same state indicate that the tooth has a certain chance of remaining in the same state during subsequent cycles. Tooth loss is the absorbing state as there can be no further transition to another state from this point. For the purpose of this analysis, the cycle length was set to 1 year as most available data present transitions from one health state to another in the form of annual rates. Annual transition rates *r*retrieved from the literature were transformed into transition probabilities *P[t]* using the following formula: $P_t = -e^{-rt}$, Constant transition probabilities were used in accordance with the assumption of the Markov chain because there is little information indicating that transition rates change over the modelled time frame.

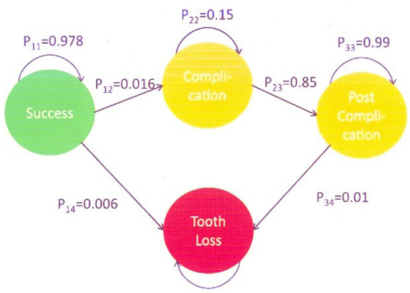


Fig A – Periodontal therapy aimed at tooth retention

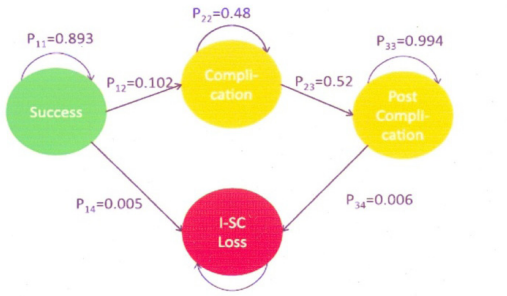


Fig B. tooth extraction and replacement using an implant-supported *single crown*

Markov models adapted for the treatment of decision of a single tooth presenting with periodontitis is used. Three Markov processes were developed for alternative therapies, including (i) periodontal therapy aimed at tooth retention (Fig. A), (ii) tooth extraction and replacement using an implant-supported single crown (Fig. B), or (iii) tooth extraction and replacement using a tooth-supported fixed dental prosthesis (Fig. C). Transition probabilities for implant-supported single crowns and tooth-supported fixed dental prostheses were derived from the literature

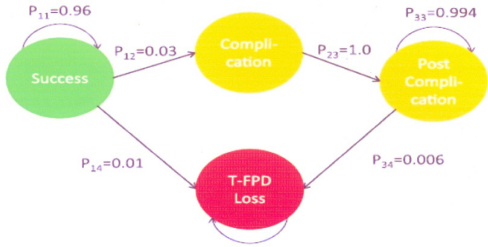


Fig C. Tooth extraction and replacement using a tooth-supported fixed dental prosthesis.

Conclusion

Decision analysis holds great promise for aiding providers and patients in shared decision-making regarding the retention or replacent of diseased teeth with implant-supported dental prostheses. By quantifying outcomes for alternative treatments it may help to identify the most appropriate care for individual patients based on utility and costs and thereby mitigate under-treatment and over-treatment. With the increasing availability of electronic health records and progress in health informatics, robust decision-support tools may become available that can be integrated into the clinical workflow.

Ethical Clearance: Nil

Source of Funding: Self

Conflict of Interest: Nil

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Emerging Trends of Pharma Industry Policies for Ensuring Women Retention "New-Fangled Women Friendly Policies Which Foster Gender Neutral Workplace"

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Abstract

Today, behaviour of women employees has changed the environment of the private organization. Young women employees always ready to switch over whenever she dissatisfy with any reason in the job. Retention strategy is a powerful recruitment tool. Private organizational issues matters as lost knowledge and training time. HR managers should identify the needs of the women employee and then devises the retention strategies. As different individuals have different priorities does not fit one strategy. HR professionals face the vital challenge to retain talented women employees. Retention strategies are fall into four categories- job enrichment, salary, working conditions and education, addressing these issues this article demands a specialized approach that emerge new fangled women friendly policies which foster gender neutral workplace in developing retention strategies.

Keywords: *Retention strategies for female employees, scope, trends and policies.*

Introduction

The fast developing knowledge economy coupled with the information technology during the last two decades has totally changed the complexion of our business and employment relations. The globalized economy and the labour market have further added new dimensions to this phenomenon. India has taken advantage of this growing trend entering the Pharmaceutical sector of economy and industry[1]. Though the Indian is fast responding and taking the challenge head on and competing effectively in the new Pharmaceutical dominated global market the industrialist-employer in the Pharmaceutical industry are facing another challenge, namely, finding suitable people to recruit to the jobs being generated by them. When and where they are able to find people who can meet their expectations, they are facing the new challenge that this is coming their way in the form of retaining the people working with them. In fact, recruitment and retention are two sides of the same coin. Economically and financially employee retention, of late has acquired greater significance.[2] It is much more costly and time consuming to find the right replacements. Resultantly the employee retention has turned out to be a critical challenge to the employers. They have become very sensitive to the problem of employee retention. Researchers also are seized of the situation and getting involved in this challenge.

Researchers have found that workplace culture and women's personal character traits play major roles in retention. So what are the things that make a difference? Women prefer workplaces that are collaborative rather than hierarchical, explains Heather Metcalf, director of research and analysis at the Association for Women in Science[3]. And they are more apt to stay in work environments that allow for creativity and flexibility, she says. Conversely, women are fleeing companies that encourage employees to practically live at work, she says. While 71 percent of women with young children work outside the home, according to the Pew Research Center, women still shoulder more responsibility for child care and elder care than men. So living at the office to show they are committed to their jobs is not an option."Creating workplaces that have a lot of flexibility, that allow for people to work in a way that fits best with them, boosts creativity and job satisfaction," Metcalf says, and these are the settings where women stay and thrive. No matter what type of organization women work for, large or small, public or private, their

relationships with their immediate bosses are critical to whether they feel engaged and content[4]. The ideal supervisor is committed to his or her subordinates' advancement and development, assigns stretch projects, and provides necessary support and feedback to help them be successful, Bilimoria says[5]. And workplaces that employ women in higher levels are more apt to retain women at the lower levels.

Objectives of the Study

1. To identify the emerging trends and policies for retaining women employees in Pharmaceutical industry
2. To identify the scope of ensuring women retention in Pharmaceutical industry
3. To suggest new policies that are women friendly and that will foster gender neutral work place

Scope of the Study: Keeping in view the critical problem the organizations in the Pharmaceutical industry have been facing ever since the Pharmaceutical industry came into existence in India to retain their performing employees at different levels, this study seeks to understand the different strategies of different organizations for retaining their employees and examine whether those strategies have any universal base and comparison with the experiences of high-tech organizations or organizations depending on the knowledge workers or professional employees and if so what are these common employee retention strategies being in practice in different organizations in the Pharmaceutical industry in Chennai.

The scope of this study is confined to Pharmaceutical industry in Chennai. The study throws light through valuable suggestion to increase the female employees' retention in the organization. This study can help the management to find the weaker parts of the female employee feels towards the existing organization retention strategies and also helps in converting those weaker part in to stronger by providing the optimum suggestions or solutions. This study is a clear guide for the solution seeker about the factors which induced women employees to stay back in the same organization. Special attention has been shown in this research about their empowerment in the society economically as well as professionally. Career development is an existing trend to be stay in their organization and how these factors induced them; all those answers will be make this research unique and an find an enhanced approach towards balancing gender at workplace.

Emerging Trends for Retaining Wowen Employees

More Women Leaders: The first thing that gives a woman confidence at her workplace is having women leaders to look up to[6]. This also indicates that the company offers them an environment conducive to scale the corporate ladder. It would be more beneficial if women leaders took on the role of mentors in mentorship programmes that are already at work in certain companies.

Sexism-Free Work Culture: Every workplace must offer a safe and secure environment for employees that help them grow personally and professionally. But it is a sad reality that this is not always true in India. Some of the biggest companies here lack sexual harassment cells and policies against discrimination at the workplace. Create a culture that does away with sexism at work by educating your employees about 'unconscious biases' and 'benevolent sexism'.

Pay men and women equally: When you hire talented women, understand that they put in the same amount of hard work and time as the men and acknowledge that with equal pay. Offer them equal opportunities and trust them with responsibilities similar to what their male counterparts are given to foster increased confidence and professional growth.

Transparent Performance Evaluation Policy: Make it clear to all employees how they are going to be evaluated and about the requirements to be met to make career advancements. It is commonly seen that most organisations promote men on potential and women only on measurable and proven performance. Check your talent management systems and do away with such biases.

Flexible Work Schedules: Many Indian companies already offer flexible schedules to their employees, but most often they turn out to be only the freedom to choose their shifts. True flexibility means allowing your employees to adjust their work schedules to maintain a healthy work-life balance without being penalised. [7]As long as they turn in their work on time and are producing results, their physical absence from office shouldn't be a concern. Having flexible schedules end up in happier, more satisfied and extremely productiveemployees. Good intentions, alone, are not enough to make women

employees want to work for your company. Treat them well, provide them opportunities for professional development and create a culture that values their talents and respects them as individuals.

Paternity Leave: Reputation being known as a company that promotes gender equality will go a long way in attracting top female talent. And offering a generous paternity leave policy is one of the most effective ways to demonstrate a commitment to women and working families. While paternity leave is designed for men, it ultimately benefits working mothers and children. Furthermore, since most states don't require it by law, implementing paternity leave shows that an employer is willing to go above and beyond to promote equality and inclusion.

Empower Female Employees to Shape Company Culture: Startup land has become famous for offering a fraternity-like atmosphere: free beer, video games, and personalized goodiesf[8]. While it's not fair to say women don't like these perks, tech companies should include women on the teams that are shaping company culture. Expanding the activities beyond those evoking college dorm rooms will help attract talented women who don't feel connected to those traditions.

Finally, it should go without saying that the best way to attract female talent is to offer competitive wages and excellent benefits that will support them in their life choices regardless of if they decide to have children or not. While the grand gesture of Face book and Apple will surely help their recruitment efforts, our corporate culture as a whole needs to focus on making small, but important, everyday changes and sticking with them

Career Development Program: Every individual is worried about her career. You can provide them conditional assistance for certain courses which are beneficial from your business point of view. Conditional assistance means the company will bear the expenses only if she gets an aggregate of certain percentage of marks. And entrance to that course should be on the basis of a Test and the number of seats to be limited. For getting admitted to such program, you can propose them to sign a bond with the company, like they cannot leave the company for 2 years or something after the successful completion of the course.

Timely increments: Timely Increments in salary makes talented employees to stick to the organisation for long time. Many researchers have found that the salary and increments were the core reasons behind leaving of employees to other organisations and competitor organisations attracts talent by showing sole monetary benefits, indeed most of the talent is getting attracted for this reason. It is universal fact and one has to accept that the monetary benefit is the core reason for an employee decision-making on retention in the organization

Conclusion

In a competitive business climate, retaining key employees is vital for the health of the company. But when these key employees are women, many corporations and industries continue to be befuddled as to how to retain this valuable cohort. Indeed, it's surprising how many supposedly modern institutions are caught in a time-warp. Unfair compensation, gender imbalance in senior management positions, inflexible schedules and even active discouragement of female employees continue to plague companies large and small. The good news is, above few simple strategies can vastly improve conditions for female employees. Women who are trained to develop an executive-type persona in terms of gravitas that is, confidence, poise under pressure and decisiveness – as well as communication and appearance become more confident and are better able to command a room, thereby clearing a path to high-stakes and high-visibility positions. By utilizing some or all of these ideas, companies can benefit from a healthier and more balanced work environment. It just makes sense.

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To Assess the Marketing Practices on Social Media in Selected Tertiary Care Hospitals in Bangalore

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Abstract

Social Media is becoming more utilized by hospitals and health care professionals and patients; from 2002 traditional media advertising has been replaced by digital media. Social media marketing is the use of social media platforms and websites to promote a product or service. Social media marketing is becoming more popular for both practitioners and researchers. Firms can allow customers and Internet users to post user-generated content that is online comments, product reviews, also known as "earned media," rather than use marketer-prepared advertising copy. This study focused on review of literature for measuring the effect of social media on hospital industry, barriers of social media marketing, uses of social media in hospital for patients and health care providers. It was a retrospective study. This Study attempted to check the strategies which can be implemented on social media in health care industry and a comparative Study was conducted on three corporate hospitals marketing practices on their official page of social media such as Facebook, twitter, and LinkedIn. From the comparative study the industrial gaps were found and analysed. The corporate hospital-Ashowed an average post of 4.2, Hospital B showed average post of 1.1 and Hospital C showed average post is 0.1 on daily basis on their official page. From the comparative study it was found that Hospital A was extremely active on their official page where they had posted theme based posts, videos and health education compared to Hospital-C. Hospital -B was moderately active on their official page compared to Hospital-C. Based on the gaps recommendations was given to Hospital-C were timely post, engaging with followers, targeting audience, responding to quarries,theme based post, health care tips post.

Keywords: *Social media, marketing, comparative study, gaps, recommendations, strategies, Facebook, twitter, LinkedIn.*

Introduction

Social media marketing is a form of internet marketing strategy that utilizes complete social media networks/websites as a marketing tool. The gaol of socialmedia is to produce contents that users will share with their social network to help an organization to reach and to exposure to the customer. Sites: Example-Facebook, Twitter, LinkedIn, Google+, Wikipedia, YouTube, etc.

One of the key components of social media marketing is social media optimization. Likesearch engine optimization, is a strategy for drawing new and unique visitors to a website.

Social media marketing helps a company get direct feedback from customers (and potential customers) while making the company seem more personable. The interactive parts of social media give customers the opportunity to ask questions or voice complaints and feel they are being heard. This aspect of SMM is called social customer relationship management. Social media marketing became more common with the increased popularity of websites such as Twitter, Facebook, Myspace, LinkedIn, and YouTube.[1]

Advantages of Social Media Marketing in Health Care Industry: When using social media for marketing products, social media could be easily utilized to create cost effective strategies and campaigns that can create viral results. Social media has the power to drive traffic to your website, blog, articles, etc. Social media is able to bring people together, especially when promoting global products or cause-related campaigns and ideas since it

allows people from the different geographical location to meet at a single point and express their views. Social media could be the spark you are looking for to attract attention to your site, product or service. It could also be used to further build loyalty and long-term relations with your audience. Social media marketing could always be a fun and creative method of doing business.[2]

Disadvantages: The wrong online brand strategy could put organizations at a viral social disadvantage and may even damage organization reputation, that is, when you make a mistake offline, a few will know but when you make a mistake in front of hundreds or thousands of you online audience, most of them will know Using social media for marketing and advertising could be more time consuming than companies expect. In order to get social media's full effect, organizations need to understand how it works, when and how to use it and which channels to focus on depending on organization end goal of using social media. And also Social media can have a negative influence on worker productivity. Employees may waste valuable time using social media channels such as Facebook and Twitter. They can also use social media to attack the company's reputation.[2]

Literature Review: The study indicated about the social media importance in present situation for business marketing and what is the importance of communication via social media to the brand awareness, conducted survey at Malaysia university two hundred questions asked and 75 percent of response rate they have got. In the study two propositions and two hypotheses were developed & tested using mean & regression analysis. After hypothesis test result showed in the study online marketing communications & online advertising are very effective in brand promoting & product purchase through organizations website & SM platforms. The study results shows social media marketing creates more purchasing intension of brand in this generation people are relaying on Social media to know information about organization's & services.[3] A study on usage barriers & measurement of social media marketing an exploratory investigation of small & medium Brand to Brands. Study has been conducted in order to identify the difference between users & non-users of based on organization's innovations T-test has been conducted. The results indicate significant differences in terms of organizations, &Reliability acceptances was a=.83. SNS users & M=2.46, SD=0.71 & non-users M=3.1 SD=1.34 t (88) =2.94 pb.005 found result through t-test.[4] Study purpose is to determine the impact of SM as a health communication and to understand the evolving impact of SM effectiveness and consumers preference's for health care. It involves both survey and interviews the survey questionaries' carries website content analysis of two hospitals. This shows significant results when consumers select a hospital Results shows trusted sources are word of mouth and traditional channels are more effective in n100 most of them are believed in traditional channels and social media, results have showed people are believing traditional channels unless special events example patients experience on the Facebook page,and marketing communication is more effective of sending messages to target population/audiences.[5] The study objectives are to discuss various interventions used in SMM for Health promotion and education and to discuss various interventions used in Social media marketing for promotion of public health. The Social media marketing sites like Facebook, blogs, YouTube and various organizations Social media tools. Results are the clinic which was chosen shows blog mainly used for video and audio featuring. Researchers provide context for their medical news and experiences and at the same time clinic provides Facebook and YouTube support system for patients when they required information. And clinic podcast blog where you can hear watch and download news on stories and conditions physicians updated blogs to read hear about innovations has been analyzed in the study how blogs are useful to patients and on what basis they provide information to the patients.[6]

Aim: Is to analyze the various marketing strategies practiced by selected tertiary care hospitals in Bangalore

Objectives

1. To study implementation strategies of social media marketing practices in health care
2. To conduct comparative analysis of the social media practices of hospitals
3. To analyse the gaps of social media marketing practices in Tertiary Care hospital
4. To recommend marketing strategies via social media

Methodology

A retrospective study was conducted from March to June 2018 at a tertiary care hospital in Bangalore. The study was conducted on social media marketing practices of three different corporate Hospitals.

The study focused on Implementation strategies of various social media practices from different websites. The data was collected for a period of four months where the content of social media official page such as Facebook, twitter, and LinkedIn wascompared among three different hospitals. From the above comparative study gaps were identified and analyzed and recommendations were given as per the results.

Results and Analysis

Implementation strategies: Various marketing strategies were taken from different websites. Through analysis it was seen that, advertising, ensuring patients queries, updating about hospital achievements, giving health tips responding to the all kind of comments in blog ensuring content with inspiring and educating your audience were the various marketing strategies adopted by hospital industry.

Comparative Study: Comparative analysis of different hospital practices the data was collected from the official page of three different corporate hospitals and was analyzed.

Table 1: Face bookdata

Facebook data	Hospital A	Hospital B	Hospital C
Number of Posts	513	135	22
Likes	21,288	15,712	7,697
Share	990	249	101
Comments	416	37	129
Number of Videos	20	6	2
Likes	2,617	1,834	3,204
Views	5,605	12,142	12,008
Share	39	62	6
Comments	14	8	1

Table 2: Facebook photos post data

Facebook data	Hospital A	Hospital B	Hospital C
Health education photos	79	61	1
Likes	4,836	1,187	10
Share	75	15	0
Comments	28	5	0
Time line photos	298	104	37
Likes	16,580	13,220	2,933
Share	264	181	85
Comments	144	22	147

The above table represents the marketing practices of three corporate hospitals. It is a comparative statistics of three hospitals Facebook data. The data was collected from hospitals Facebook official page for the duration of four months. Hospital A posts are theme base which changed on weekly basis and their post mainly focuses on health education, achievement of hospital, promotion of the services which creates brand image with attention seeking slogan, which creates awareness about the hospital services. Hospital B posts are mind test posts, creating awareness about services of hospital, and discounts of services provided by hospital prompting brand by introducing the hospital new doctors,services,videos,health education posts. Hospital C post and videos are very less compare to Hospital A and Posts are not theme basis it's all about events of hospital and some posts are achievement of doctors and a very less health education post. When the Hospital-A and B posts regarding success rate of the surgeries by the hospital, offers on hospital services, and health educational tips are mostly liked, shared, and commented by the customers, the hospitals responds to the quarries of the customers.

Table 3: Linked in data

LinkedIn data	Hospital B	Hospital C
Number of Post	95	19
Likes	137	50
comments	2	0
Videos	3	1
Likes	3	1
Comments	0	0

The above Tables represent the marketing practices of two corporate hospitals. It is a comparative statistics of two hospitals Facebook data. The data was collected from hospitals LinkedIn official page for the duration of four months. Hospital B posts are brand promoting, creating awareness about services of hospital, and events of hospital prompting new services by introducing the hospital new doctors,services,videos,and hospital technology. Hospital C post and videos are very less compare to Hospital A and Posts are not on daily basis it's all about events of hospital and some posts are achievement of doctors and a very less videos.

Table 4: Tweets data

Tweets data	Hospital A	Hospital B	Hospital 3
No of tweets	519	100	20
Likes	1,025	139	42
Direct message	30	8	0
Re tweets	186	27	25
Reply	139	6	0
Number of Videos	7	3	0
Likes	26	45	0
Direct message	2	1	0
Retweets	1	0	0
Reply	1	0	0
Views	69	21	0

The above Tables represent the marketing practices of three corporate hospitals. It is a comparative statistics of three hospitals tweets data. The data was collected from hospitals twitter official page for the duration of 4 months. Hospital A posts are theme base which changed on weekly basis and their post mainly focuses on health education, and videos contains content about health educational and informative about particular diseases and achievement of hospital, promotion of the services which creates brand image with attention seeking slogan, which creates awareness about the hospital services. Hospital B posts are mind test posts, creating awareness about services of hospital, and discounts of services provided by hospital prompting brand by introducing the hospital new doctors,services,videos,health education posts responding the queries of audience. Hospital C post and videos are very less compare to Hospital A and Posts are not theme basis it's all about events of hospital and some posts are achievement of doctors and a very less and activity is very less compare to Hospital A and Hospital B.

Analysis of gaps

Table 5: Average Number of posts

Average	Facebook	Tweets	LinkedIn
Hospital A	4.20	4.25	Not present
Hospital B	1.10	0.81	0.77
Hospital C	0.18	0.16	0.15

The above Tablerepresents marketing practices of three different corporate hospitals Comparative study was done. The study shows Hospital A was found to be extremely active on Facebook and twitter the data shows they average post on Facebook was 4.20/day and in twitter 4.25 tweets/day. Hospital B was found to be moderately doing good data shows average post in Face book 1.10 /day and in twitter 0.81 per day and in LinkedIn 0.77/day. From the comparative study industrial gaps were found in hospital C the average post in Facebook was 0.18/day and in twitter 0.16 per day and in LinkedIn 0.15/day and doesn't have live chat in Facebook page, average post and videos are very less, not theme base post, health education photos are very less on all three official page.

Discussion

The study showed examination of only two hospitals[5] but the research was done on three different corporate hospitals determining their marketing tools. organizations should carefully choose from social media options coming up every day. Side by side Organizations have to update to the latest additions on the social media circuit and which one of them is current favourite for optimum results. From the study it showed that Facebook, linkedin. twitter were the most favourite or optimum used social web page.[6] From the study only literature reviews were condisered for the study but the reseach used observational an inevestigating the content on social media.[7]

Recommendations: Identify Topics & Trends on Daily basis: The healthcare industry is completely changing rapidly, and social media plays an important role in understanding how individuals are talking about their communities, their preferences and even a particular organization. If organization notice a trend in conversations, seize the moment send a social post on social media site. It can help to understand what exactly organization followers want based on their like and comment and interest also it helps to create brand awareness.

Organization can ask them to leave their reviews and feedback as comments or direct readers to your review page. If happy reviewers leave their opinions, they provide valuable information for those who have not yet decided whether or not they wish to use your service and you should respond to their feedback immediately.

Incorporate images in organization posts: One of the most powerful tools organization can use to help to increase social media engagement is to incorporate visual content. Instagram, and Snap chat have thrived the power of visual storytelling and Facebook. Brand has a wide variety of choices to increase social media

engagement through visual content. Organization can also shareimages of new services that are inculcated within the organization to reach the people.

Step-1: Document who is your ideal customer

Step-2: Create a social media matrices statement

Step-3: Research Your Social Competitive Landscape

Step-4: Identify key success matrices

Step-5: Create creative content and video to engage

Step-6: Engage with customers/followers don't ignore

Conclusion

Social media is a one of the best and trending practice at current situation, followers are increasing daily on all kind of social media sites example Facebook, Twitter, YouTube, Google+, and LinkedIn. By studying current practices of three hospitals and by comparing the hospitals practices in Facebook, Twitter, and LinkedIn data it was identified average posts on daily basis that showed Hospital A is doing extremely well and Hospital B is moderate when compared to Hospital C, Hospital C posts are less in all the sites and posts are not theme base but other two hospitals are active on sites their posts and are theme based and hospitals also getting many likes, shares, comments, follower's views interaction on their official page. Study identified gaps of Hospital C practices were analysed and recommended for the best practices on social media to engage with patients, create awareness, to market the services to respond feedbacks and to monitor the success rate and sustain with competitors.

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Employees' Perspective of Knowledge Management in Health Care Industry on their Performance

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Abstract

Knowledge Management embraces a variety of practices employed by healthcare industry to identify, represent, create, and allocate knowledge for awareness, reuse and learning. The importance of the research was to identify the employees' perspective of knowledge management in health care industry on their performance. The research was conducted in Chennai. The sample frame of the study is Chennai district alone. Convenience sampling technique was adopted. The analysis found that there is influence of employees' perspective of knowledge management on employees' performance in healthcare industry. It is also found that there is influence of employees' performance on performance of health care industry. The analysis also found that there is positive relationship between knowledge creation and knowledge sharing. Hence it is concluded that highly encouraging incentive system must be incorporated within the healthcare industry, especially to technical and nontechnical employees so that their aspirations and happiness level can be duly met. This will surely enable the young talents to go a long way in enriching employees' performance in healthcare industry.

Keywords: *Knowledge creation, knowledge sharing, employees' performance, healthcare industry.*

Introduction

Knowledge Management embraces a variety of practices employed by healthcare industry to identify, represent, create, and allocate knowledge for awareness, reuse and learning.

KM is a situate of integrative procedure of synchronizing infrastructures and technical & managerial tools, storing, designed towards creating, sharing, diffusing, capturing, and efficiently using knowledge by groups and individuals, in search of healthcare industry goals by providing time, space, tools and encouragement. It is a administration discipline (i.e. handle, govern, direct, control, plan, coordinate, organize, enable, facilitate and empower) that look for to improve healthcare knowledge processing**,** with the reason of contributing to the formation and maintenance of an organic, producing, unified whole system, enhancing, maintaining, acquiring, and transmitting the health care's knowledge base.

Healthcare deliverance relies greatly on evidence and knowledge based medicine; in addition, deliverance of care replies on collaboration of several buddies that require exchanging their knowledge in order to offer quality of healthcare. This is predominantly true in healthcare setup, but also in public healthcare where the conclusion making is mostly based on data and confirmation collected by knowledge. In healthcare, knowledge management is organism developed mostly in the field of electronic healthcare documentation management and healthcare organization management; in this context, earlier researches in the business field have been tailored and functional to the Healthcare KM. But Healthcare knowledge management raises various issues and challenges due to the own personality its Knowledge.

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While KM systems use Information Technologies to administer the storage, creation, sharing and reuse/use of knowledge; healthcare presents particular challenges to the use of KM such as impact of medical errors, system complexity and substantial growth of knowledge in the medical field. We will indication each of these dimensions in the following paragraphs; then we will look at the function that knowledge management can play in healthcare, its challenges and advantages; lastly we will position at perspectives of healthcare KM.

Healthcare deliverance involves healthcare professionals such as family physicians, nurses, specialists, counselors, technology technicians, social workers, radiologic lab technicians, psychologists, etc. It also engages third parties such as hospital and clinic administrators, human resources, managers in finance, drug companies, health care ministry, activists groups, health care insurance companies, research communities, education organizations, etc. Besides; partners in healthcare delivery are discrete around a lot of geographical areas while they are drama on the same patient.

Review of Literature

Jawad Karamat, et al. (2019) found that performance-based drivers and healthcare related drivers have considerable positive relationship with KM implementation. The research concluded that government involvement to encourage KM implementation is essential particularly in upward nations[6].

Manivannan, et al. (2019) found that there is significant difference towards information technology and knowledge utilization and knowledge motivation and do not differ towards knowledge storage, knowledge sharing enablers and knowledge creation with respect to gender groups. It is noted that independent sample t test result that moderately perceived towards knowledge management with respect to gender group of the bank employees. Hence it is concluded that the current team building efforts in bank management should be sustained to promote the integrated strategy in knowledge management.

Manivannan M. and Kathiravan (2016) concluded that there is a positive relationship and betweenknowledge management and employee's performance among the bank employees[9].

YadollahHamidi, et al. (2016) recommended that training programs should be detained in organize to learn how to use obtainable technologies such as email, discussion groups, intranet, blogs, office automation and to use KM processes[12].

Manivannan M. and Kathiravan (2016) found that there is influence of information technology, knowledge, top management support, organization and innovation on knowledge management among bank employees in Chennai City[8].

Edward T. Chen (2014) suggested that that KM will also promote the healthcare industry if KM execution is correctly designed and implemented. KM will modify the method in which hospitals, patients and doctors interact. KM can be pertained to gather the requirements for healthcare that is rising with the raise of population and the slow leaving of baby boomers[3].

Zaeem, et al. (2013) identified that there was a positive correlation between KM process and healthcare performance. In additional words, whatever activities of KM procedure were enhanced, organizational performance will be enhanced to the same quantity.

Shabani, et al. (2012) stated that all factors of the model namely find, learn, apply, share, create, evaluate, maintain and eliminate knowledge effected on the implementation of KM and all factors were in good position excepting learning and eliminating knowledge[5,10].

Ehsan Borousan, et al. (2012) studied that the entitled on implementing knowledge Management system in healthcare. Sample size of the research was 235 from medical centre users. The research paper identified that the there is impact of perceived usefulness, incentives for KMS users, perceived ease of use, organizational support and concerns of data security and confidentiality on affecting the implementation of a KM system[4].

Acharyulu (2011) identified that Web technology allows healthcare industries to build web and knowledge portals that can grip considerable amount of data and finished it reachable to customers anywhere anytime[1].

Christo El Morr and Julien Subercaze (2010) stated that in the near future, they will see a joining between semantic web technologies and health 2.0 the developed by HCLSIG. The ensuing functions might moderately develop computerized knowledge management associated to healthcare[2].

HosseinZadeh, et al. (2010) found that part of knowledge storage was minimum than the normal among the analyzed components. Hence, it is necessary to expand the significance of knowledge storage among the libraries employees and use knowledge storage systems [5,13].

Materials and Method

Research Design: Descriptive research design was adopted. The research design includes organization of the collected data, tools to get the relevant data, monitorial availability to perform the research, varied skills and the abilities of the researcher and the guide and time frame for each steps of research within the allotted spell of time (Srivastava, 2008)[11]. Based on these balanced steps are structured to perform this investigation.

Framework

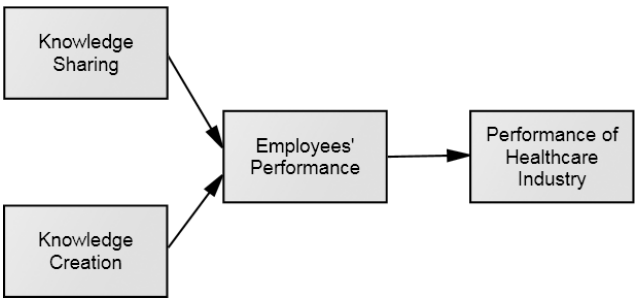


Figure 1: Conceptual framework of the study

Altogether this study includes four different variables. Knowledge sharing and knowledge creation were the independent variables; employees' performance was dependent variable; performance of healthcare industry was the outcome variable.

Objectives of the Study:

- To study the influence of employees' perspective of knowledge management on employees' performance in healthcare industry.
- To know the influence of employees' performance on performance of health care industry.

Hypotheses of the Study:

- There is no influence of employees' perspective of knowledge management on employees' performance in healthcare industry.
- There is no influence of employees' performance on performance of health care industry.

Tool for Data Collection: A well-designed questionnaire was used to gather the data for this research. The questionnaire contains four sections are presented. The section-I was constructed to obtain the demographic outline of the employees of healthcare industries; The section – II scale was used to know the Knowledge sharing and knowledge creation; the Section – III was used to know the employees' performance and the section-IV was used to analyze the performance of healthcare industry.

Reliability Analysis: Reliability analysis was also applied to test the reliability of the factors presented in above table. The reliability range from 0.78 to 0.94, which satisfies the Cronbach's alpha, should be at least 0.70 to be considered as acceptable.

S.No.	Variable	Reliability
1	Knowledge Creation	0.80
2	Knowledge Sharing	0.78
3	Employees' Performance	0.90
4	Performance of Healthcare Industry	0.94

Sample Design of the Study: The sample frame of the study is Chennai district alone. The respondents of the study are healthcare industries employees only. Though the healthcare industry included all the constructions under the technical and non technical alone is considered in this study.

Sample Size: Totally 145 questionnaires were distributed. 130 questionnaires were received. 15 questionnaires were not received. Out of 130 received questionnaires 125 were eligible and the remaining 5 were with flaws. Hence, the sample strength was 125.

Sampling Technique: Convenience sampling technique was adopted even though several researchers do not consider it as a better method (Srivastava, 2008)[11]. Data thus collected were verified for the eligibility for the adoption of the further processes. Care was taken to pair responses of the two schedules correctly.

Tool for Data Analysis: Path analysis was adopted for primary data analysis.Knowledge sharing and knowledge creation were the independent variables; employees' performance was dependent variable; performance of healthcare industry was the outcome variable.

Analysis and Interpretation:

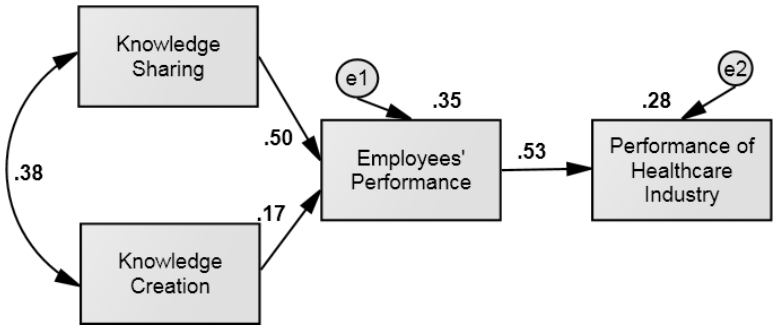


Figure 2: path analysis of employees' perspective of knowledge management in health care industry on their performance

Table 1: Model Fit Indication

Indicators	Observed Value	Recommended Value (Premapriya, et al. 2016)
Chi-Square	2.164	---
P	0.236	Greater than 0.050
GFI	0.998	Greater than 0.090
AGFI	0.965	Greater than 0.090
CFI	0.998	Greater than 0.090
NFI	0.996	Greater than 0.090
RMS	0.012	Less than 0.080
RMSEA	0.001	Less than 0.080

Source: primary data

The results shown in above table outline of the model fit, which contains the RMSEA score was 0.001 and RMS was 0.012 are well nearby the recommended limit of less than eight percent. All the goodness of fit indicators falls

into best level of fit. The chi-square value was 2.164 and probability value was 0.236 as against the recommended level and suggested by Saminathan, et al. (2019). In this model, the research has obtained GFI, AGFI, NFI and

Compared Fit Index were greater than 90 percent as against the recommended level.

Table 2: Regression Weights

DV		IV	Estimate	S.E.	C.R.	P	p
Employees' Performance	<---	Knowledge Sharing	0.374	0.027	13.968	0.504	0.001
Employees' Performance	<---	Knowledge Creation	0.161	0.035	4.609	0.166	0.001
Performance of Healthcare Industry	<---	Employees' Performance	0.963	0.063	15.263	0.533	0.001

Source: primary data

H_0: Knowledge sharing has significant influence on employees' performance.

Influence of knowledge sharing on employees' performance computed CR value was 13.968 and the probability value was 0.001. Hence, the hypothesis was rejected. The computed standard regression weight was 0.504. It shows that the one unit increase of knowledge sharing leads to increase of 50.4 percent on employees' performance. Hence, it is finished that there is influence of knowledge sharing on employees' performance in healthcare industry in Chennai. This finding is supports the study of Manivannan and Kathiravan (2016) found that there is a positive relationship and betweenknowledge management and employee's performance among the bank employees.

H_0: Knowledge creation has significant influence on employees' performance.

Influence of knowledge creation on employees' performance computed CR value was 4.609 and the probability value was 0.001. Hence, the hypothesis was

rejected. The computed standard regression weight was 0.166. It shows that the one unit increase of knowledge creation leads to increase of 16.6 percent on employees' performance. Hence, it is finished that there is influence of knowledge creation on employees' performance in healthcare industry in Chennai.

H_0: Employees' performance has significant influence on performance of healthcare industry.

Influence of employees' performance on performance of healthcare industry computed CR value was 15.263 and the probability value was 0.001. Hence, the hypothesis was rejected. The computed standard regression weight was 0.533. It shows that the one unit increase of employees' performance leads to increase of 53.3 percent on performance of healthcare industry. Hence, it is finished that there is influence of employees' performance on performance of healthcare industry in healthcare industry in Chennai.

Table 3: Covariance

IV		IV	Estimate	S.E.	C.R.	R	p
Knowledge Creation	<-->	Knowledge Sharing	8.673	1.015	8.546	0.377	0.001

Source: primary data

H_0: Knowledge sharing has significant relationship with knowledge creation.

Influence of knowledge sharing on knowledge creation computed CR value was 8.546 and the probability value was 0.001. Hence, the hypothesis was rejected. The computed standard covariance value was 0.377. It shows that the one unit increase of knowledge sharing leads to increase of 377 percent on knowledge creation. Hence, it is finished that there is positive relationship between knowledge sharing and knowledge creation in healthcare industry in Chennai.

Findings

- The analysis found that there is influence of employees' perspective of knowledge management on employees' performance in healthcare industry. This finding is supports the study of Manivannan and Kathiravan (2016) found that there is a positive relationship and betweenknowledge management and employee's performance among the bank employees.
- It is also found that there is influence of employees' performance on performance of health care industry. This finding is supports the study of JelenaRasula, et al. (2012) result showed that knowledge management practices positively influence organizational performance[7].
- The analysis also found that there is positive relationship between knowledge creation and knowledge sharing.

Recommendations

- Knowledge sharing as positively influences on employees' performance. Hence, it is recommended that the healthcare management involves a broad integration of knowledge sharing mechanisms which effort to promote innovation, such as the allotment of a budget for providing sufficient training for knowledge transfer, the linking of employees-turnover to the making of new ideas, or the formation of teams systematically dedicated to new initiatives generation.
- The result indicated thatKnowledge creation as positively influences on employees' performance. Healthcare management should require enlarging the number of social meetings between employees and individual and patients outside of work to increase the inter-organizational knowledge flow. Training programs should be provided to the employees on timely basis. Whenever new system is being introduced adequate training should be given to the employees to bring in knowledge creation.
- It is recommended that highly encouraging incentive system must be incorporated within the healthcare industry, especially to technical and non technical employees so that their aspirations and happiness level can be duly met. This will surely enable the young talents to go a long way in enriching performance of healthcare industry.

Conclusion

Knowledge Management embraces a variety of practices employed by healthcare industry to identify, represent, create, and allocate knowledge for awareness, reuse and learning. The importance of the research was to identify the employees' perspective of knowledge management in health care industry on their performance. The research was conducted in Chennai. The sample frame of the study is Chennai district alone. Convenience sampling technique was adopted. The analysis found that there is influence of employees' perspective of knowledge management on employees' performance in healthcare industry. It is also found that there is influence of employees' performance on performance of health care industry. The analysis also found that there is positive relationship between knowledge creation and knowledge sharing. Hence it is concluded that highly encouraging incentive system must be incorporated within the healthcare industry, especially to technical and non technical employees so that their aspirations and happiness level can be duly met. This will surely enable the young talents to go a long way in enriching employees' performance in healthcare industry.

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Sterilization and Disinfection in Orthodontics: A Literature Review

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Abstract

Microorganisms are ubiquitous in nature and are responsible for causing infection, contamination and decay. The practicing dentists in general and orthodontists specifically, along with their personnel are routinely at risk of being exposed to patients with blood borne diseases like HIV/ AIDS, Hepatitis B and C and air borne diseases like Tuberculosis. These infections can directly be transmitted by oral fluids, blood, contaminated instruments and surfaces and through the respiratory system. Thus, preventing the spread of infection and cross-contamination in this field is absolutely important. The older strains of microorganisms rapidly develop resistance, whereas the newer strains evolve equally fast, thus, providing a constant challenge to orthodontists. Sterilization is defined as "the process by which an article, surface or a medium is freed of all the living organisms either in vegetative or spore form. This article reviews the various sterilization techniques pertinent to the orthodontic armamentarium and set-up for an effective orthodontic practice.

Keywords: *Orthodontists, respiratory system, sterilization, spores, AIDS, Tuberculosis.*

Introduction

Infectious microorganisms are ubiquitous and pose a big challenge to Orthodontists. Starnbachstated that "Orthodontists have the 2nd highest incidence of Hepatitis B among dental workers". Saliva remains the most common mode of transmission. Other factors include skin lesions, puncture wounds, Dental aerosols and instrument contamination.Both patients as well as practitioners remain at risk for spread of infection such as Hepatitis B, AIDS, Tuberculosis because of the diverse bacterial flora in the oral environment. Thus, accomplishing proper infection control through sterilization and disinfection becomes essential to prevent cross-contamination.[1]Sterilization is defined as "A process by which an article, surface or medium is freed of all the living microorganisms either in vegetative or spore state". Disinfection, on the other hand, is "the destruction of all pathogenic microorganisms capable of giving rise to infection". The various sterilization protocols pertaining to orthodontics have been discussed in this review.[2]

History:

1. **AntonieVan Leeuwenhoek (1632 – 1723):** Studied debris surrounding teeth and observed bacteria using a crudely built microscope.
2. **Sammelweis in Vienna and Holmer in USA:** Stated that hand washing is necessary to prevent the spread of disease-causing agents.
3. **Louis Pasteur and John Tyndall:** Advocated the destruction of vegetative bacteria and spores using heat.
4. **Joseph Lister (1827–1912):** Emphasized on washing hands, surgical linens with phenols and boiling the instruments before surgery to reduce complication.

Sterilization techniques

A. **Physical agents:**

   1. **Sunlight:** Sunlight possess germicidal effect due to a combination of ultraviolet rays and heat.
   2. **Dry heat:** This method of sterilization causes – denaturation and coagulation of proteins, along with loss of functional integrity of membrane molecules. This also significantly changes the loading and unloading properties of nickel-titanium wires with an increase in its stiffness.[3]

      i. **Hot air oven:** Thistechnique is widely used for dry heat sterilization. Different

materials can be sterilized using different method as follows –

- **160°C for 1 hour –** for glassware, scalpels, scissors, forceps, glass syringes, swabs, dusting powder, liquid paraffin, grease and fats.
- **190°C for 6 – 12 minutes –** for orthodontic pliers, mirrors, burs.[4]

ii. **Flaming:** Tip of the instruments like loop of wires, searing spatulas and point of forceps are held in a Bunsen flame till redness. Scalpels, needles, mouth of culture tubes, cover slips and glass slides are made to pass without making them red hot.[5]

iii. **Glass bead sterilizer:** This method uses a metal cup and glass beads of diameter between 1.2 – 1.5 mm at a temperature of 218°C – 240°C for 3 – 5 seconds. This method is useful for sterilizing orthodontic bands. A single molar band requires 220°C for 45 seconds to have a sporicidal effect.[6]

3. **Moist heat:**

i. **Pasteurization:** This is done at 63°C for 30 minutes to reduce the bacterial population of a liquid like milk. Spores are not affected by this method.

ii. **Boiling:** Vegetative bacteria are killed immediately at 100°C. Spores may require prolonged periods of boiling.

iii. **Autoclaving:** This method is considered the gold standard of sterilization and is the most popular. It is based on the principle "when pressure inside a closed chamber increases, the temperature at which water boils also increases, liberating 518 calories of heat". This method is useful for – Heat resistant plastics, dental instruments, dental handpieces, cotton rolls, gauze, aesthetic syringes, towel packs, glass slab.

Vandrell et al reported that orthodontic ligature cutting pliers sterilized either with steam autoclave or dry heat did not show any significant difference in mean wear.[7]

The recommended cycles for various articles are as follows:

i. Settings for general wrapped items:

Temp. - 121°C, Pressure - 20 PSI

Time - 30 min Setting

ii. Settings for bottled solutions:

Temp. - 121°C, Pressure - 20 PSI

Time -- 30 min Setting

iii. Setting for "Flashing" an unwrapped instrument:

Temp. – 132°C, Pressure - 30 PSI

Time - 4-7 Min Setting

This method can be used for a broad variety of items such as instruments, clothing, glassware, cotton.

4. **Filtration:** This method is effective in removing microbes from heat-labile liquids like serum and other blood products, drugs, vaccines, IV fluids, enzymes and culture media. They can be of the following types:

- **Candle filters:** Unglazed ceramic filters, Diatomaceous earth filters
- **Asbestos filters:** Seitz filter, Sterimat filters
- **Sintered glass filters:** Finely powdered glass particles
- **Membrane filters:** Cellulose Esters

5. **Radiation:** This can further be classified as follows -

A. Non-ionising radiation:

- **Infrared radiation:** Rapid mass sterilization of prepacked items like syringes, catheters
- **Ultraviolet radiation:** For disinfecting operation theatres and laboratories

B. Ionising radiation:X-rays, gamma rays and cosmic rays

6. **Vibrations:** These consist of Ultrasonic and sonic vibrations using high frequency of sound waves. The sensitivity of this technique among microoranisms are variable though.

B. Chemical agents:

1. Ethylene oxide sterilization: Ethylene oxide is a gas above 10.8°C, having excellent penetrating

ability and sporicidal action. The procedure involves releasing the gas into a tightly sealed chamber where it circulates for upto 4 hours and then mixed with CO_2 and nitrogen to reduce its concentration. Once the sterilization is done, flushing should be done for 8 – 12 hours to remove all the ethylene oxide and hence prevent "chemical burns".

This method is used for sterilizing leather, paper, metal, wood, rubber etc. The Conventional orthodontic marking pencils, hence, can effectively be sterilized by this method.[8]

2. **Chemical immersion/Cold sterilization:** This technique of sterilization is effective only for heat sensitive nonsurgical instruments and impressions using alginate.

    - 2% glutaraldehyde, which is a colourless liquid and having pungent odour, is a popular disinfectant used in dentistry for inactivation of bacterial spores. Metallic instruments, heat sensitive plastic rubbers, face masks and fiber optics can safely be immersed in this solution and kept for 6 – 10 hours at room temperature without corrosion. Long immersion time, odour, irritation to the eyes and mucous membrane are relative disadvantages.

This method is useful for sterilizing elastics such as elastomeric modules. Plastic items and cheek retractors can also be effectively sterilized. They may bring about a pitting corrosion of orthodontic instruments compared with surface corrosion by other method.[9]

- Alcohols such as Ethyl and isopropyl alcoholare effective as a disinfectant for instruments and a skin antiseptic. Isopropyl alcohol is a better fat solvent, less volatile and more bactericidal than Ethyl alcohol at a concentration of 50% - 70% and hence is preferred for denaturation of proteins and lipids along with disintegration of cell membrane. It is also useful in sterilizing the skin before cutaneous injections as it is a dehydrating agent.

Isopropyl alcohol, however, lacks sporicidal activity in the presence of blood and saliva and also causes corrosion of metallic instruments. This method can be used for sterilization of orthodontic archwires and elastic moduli.

- Aniline dyes such as Brilliant Green, Malachite Green and Crystal violet and Acridine dyes like Proflavine, Acriflavine, euflavine and aminacrine are effective against gram positive microorganisms.
- Halogens such as Iodine and Chlorine have markedly bactericidal and moderately sporicidal activity. Hence they are used as skin disinfectatnts and antiseptics.
- Phenols such as Lysol and Cresol, which are obtained by distillation of coal tar between temperatures of 170°C and 270°C, causes damage to the cell membrane.
- Metallic salts such as Salts of silver, copper and mercury are effective disinfectants with mild antiseptics. Copper salts, in addition, are fungicidal.
- Surface active agents alter the energy relationships at interfaces, thus, producing a reduction of surface tension. They possess both hydrophilic and hydrophobic properties and are widely used as wetting agents.[10]

(3) Laser (Light amplification for stimulated emission of radiation): Various lasers such as CO_2, Argon, and Neodymium-doped yittrium aluminium garnet (Nd:YAG) lasers are also useful in sterilizing instruments, operating rooms and surface of wounds. They are very expensive and this limits their use.[11]

Sterilization and disinfection of orthodontic instruments and materials:

(1) Sterilization of orthodontic pliers: Corrosion is the most common consequence, which should be prevented by drying the instruments with pressured air before sterilization. Otherwise, ions' react to create a loose layer of rust. Autoclaving, too, blunts and corrodes the sharp cutting edges of orthodontic instruments and is also more time consuming. 1% sodium nitrate can be thought of as an alternative. Glass bead sterilization at 218°C for 15 seconds can also be used effectively. For larger instruments, however, an ultrasonic bath using Sekusept 5% is recommended.[12]

(2) Disinfection of orthodontic brackets: 0.01% Chlorhexidine is the disinfectant of choice for both metal and ceramic brackets. Although this do not affect the adhesion ability of metallic brackets, the ceramic brackets do show a sub-clinical level reduction in the attachment ability.[13]

(3) Decontamination of orthodontic bands: The stainless-steel bands of various sizes frequently need to be tried on patients' mouth during fixed orthodontic treatment. The tried but unused band should be kept separately without mixing them up

with the new ones and processed through a pre-sterilization cleaning procedure and stored them separately. Later, they should be decontaminated from saliva and blood and autoclaved before further use.

(4) Sterilization of orthodontic archwires: Pernier et al (2005) conducted studies on 6 different archwires by autoclaving them at 134°C for 18 minutes and their surfaces were analysed. No significant changes were observed on the surface of the archwires that would restrict their use.[14]

(5) Disinfection of elastomeric ligatures: Polyurethane polymers which are frequently used as ligature and chains are sterilized through cold sterilization. Repeatedly disinfecting the same elastic destroys the cross-links in the molecules of polyurethane polyesters.[15]

(6) Bacterial contamination and disinfection of removable acrylic appliances: Use of removable appliances results in the formation of a biofilm layer on the areas beneath hooks and springs and the smooth acrylic surfaces of the appliance. This biofilm mostly contains Lactobacillus and Streptococcus mutans. Toothbrushes are not efficient enough to remove these microorganisms. Soaking the appliance in a chemical solution such as Chlorhexidinegluconate and Cetylpyridinium chloride was found to effectively eliminate *Streptococcus mutans*.[16]

(7) Sterilization of elastomeric ligatures and chains: Chemical sterilization is not done for elastomeric materials since they destabilize their physical properties. Elastomeric modules, however, can be cut into smaller sections, covered with a clear tubing and then cold sterilized.[17]

(8) Sterilization of Alginate impression: 2% glutaraldehyde and 1% sodium hypochlorite are commonly used disinfectants for alginate impressions. The alginate impression, however, should not be immersed in the disinfectant solution for more than 10 minutes to protect their surface characteristics. Nowadays, self-disinfecting alginates are also commercially available.[18-20.]

Table 1
TECHNIQUES OF STERILIZATION

- Physical
  - Sunlight
  - Heat
    - Dry heat
      - Red heat
      - Flaming
      - Incineration
      - Hot air oven
      - Infra red
    - Moist heat
      - Below 100°C
      - At 100°C
      - Above 100°C
  - Vibrations
  - Radiation
    - Non ionizing radiation
    - Ionizing
      - Electromagnetic
      - Particulate
- Chemical
  - Liquid
    - Alcohols
    - Aldehydes
    - Phenolics
    - Halogens
    - Heavy metals
    - Surface active agents
    - Dyes
  - Gaseous
    - Formaledhyde
    - Ethylene oxide
- Physiochemical

Figure 1. Various techniques of sterilization

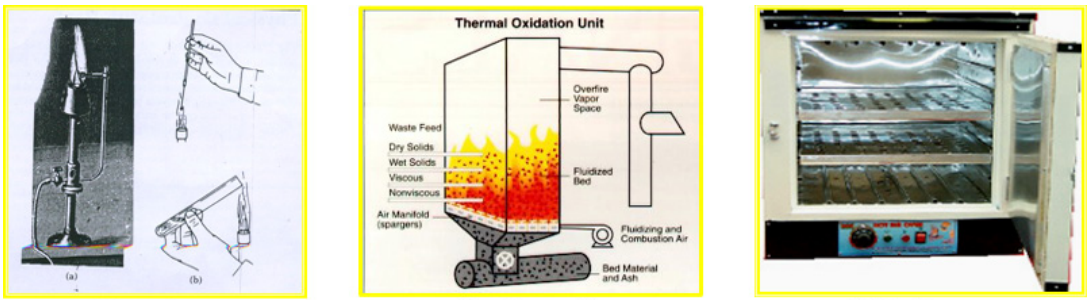


Figure 2. Various dry heat techniques

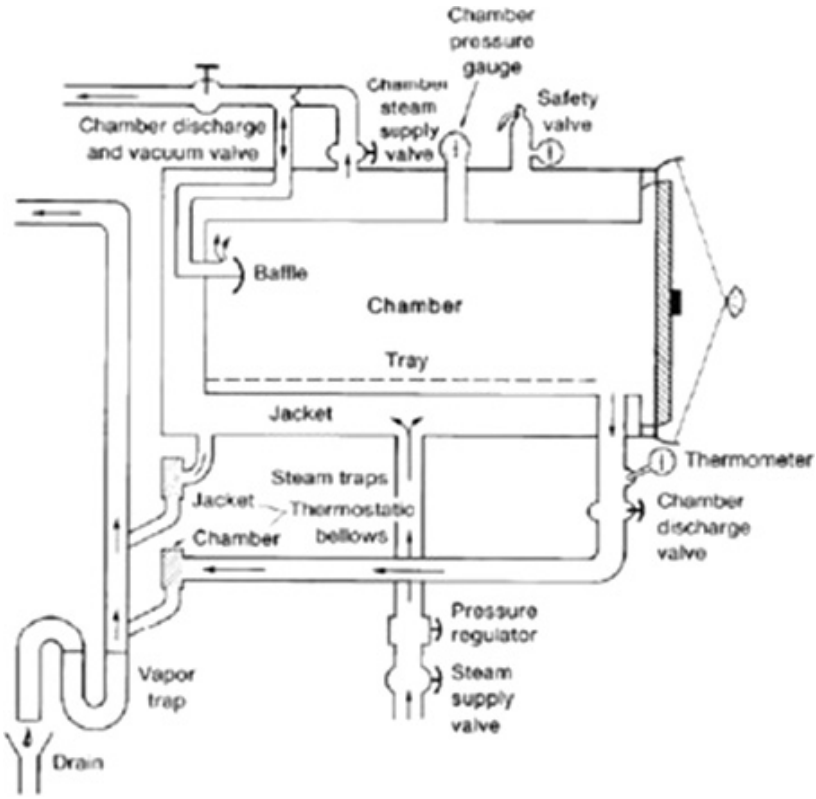


Figure 3 Components of an autoclave

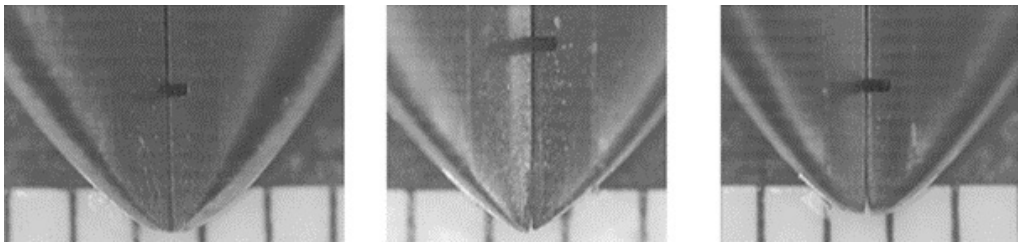


Figure 4: Orthodontic pliers and cutters should be sterilized properly before their use

Conclusion

As the saying goes – "cleanliness is next to Godliness", it is important for orthodontists to run their practice setup in a way that would restrict the spread of infection. Transmissible diseases such as AIDS, Hepatitis B and C make it essential for the practitioners to protect their clinic staff and patients using proper sterilization techniques. A thorough understanding and application of the sterilization techniques will help achieve the safety that our profession demands from us.

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Triphala: A Wonder Therapy in Dentistry

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Abstract

From the medieval terminologies of the Sanskrit language, the word "Ayurveda" came into existence. It essentially beholds the meaning "essence of life" and symbolizes longevity. It emphasized on the plant derived and animal product-based treatment to cure ailments pertaining to physical existence and mental health. Triphala is one such plant that acts as a Rasayana and enriches oneself with vitality and boosts his/her immune system through its adaptogenic, immuno-modulatory anti-oxidant and detoxifying properties. These effects implore us to discover its usefulness in the field of dentistry in contrary to preferring systemic antibiotics. Systemic antimicrobial therapy causing resistance and superinfection is rechanneling us to come across newer effective solutions for dental diseases.

Keywords: *Ayurveda, Triphala, Myrobalans, Longevity, Periodontic therapy, endodontic therapy.*

Introduction

For centuries, drugs have been an essential part of the therapeutic and preventive armamentarium. Drugs can be naturally derived, synthetically manufactured, or biologically extracted. The collective effort in the amalgamation of chemistry and biology opened doorways for pharmaceuticals and allopathic medicine. However, new drug discovery is on the verge of experiencing massive setbacks due to the evolution of pathogens into multi-drug resistant strains and causing major side effects further discomforting the patients. Unchecked use of anti-microbial medicine is failing to serve their purpose and their increased usage is causing toxicity leading to systemic failure.[1]

This is compelling us to go back to the traditional sciences of the Indian alchemy i.e. Ayurveda, Unani, homeopathy which is still considered as age old valuable resources. Ayurveda has immense potential in the treatment of various ailments if used in safe and rational formulation. It can be an inspiration to path breaking discovery maneuvering us towards integrative medicine.[1]

Triphala is one such traditionally formulated drug that has taken a life of its own. It is the drug of choice in various metabolic disorders, systemic conditions and in the treatment of carcinoma. It empowers inherent immunity and delays the natural degenerative processes taking place within our human body. It is extremely beneficial to mankind as it is natural and bereft of any toxicity. It is easily affordable and widely available. Triphala has various pharmacological applications in the field of medicine and dentistry, and further research is necessary to strengthen and promote its importance and usage.[1]

History of Triphala

Triphala has been used in folk medicine for 1000 years. Charaka one of the greatest physicians mentioned Triphala in his compilations Charaka Samhita. Charaka believed that Triphala along with ghee and honey can increase the life span of a human being upto a hundred years.[1] Sushruta is known as the Father of surgery and the author of Sushruta Samhita has also written about this drug in his book. Sushruta considered Triphala effective in the management of wounds and ulcers. Sushruta called "Periodontium" as "Dantamula" and Periodontal

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diseases as "Dantamulagatarogas" in Sushruta Samhita and associated the use of Triphala in Dantamulagata rogas.[2]

In the Ayurvedic texts, Nighantu has classified Triphala into three types. They are

1. Swalpa Triphala-composed of Draksha, Parushaka, Kharjura[3]
2. Sugandhi Triphala-composed of Kasmarya, Kharjura, Draksha[3]
3. Madhura Triphala-composed of Ela, Jatiphalam, Lavangam[3]

Ingredients and Formulations

As the name suggests "tri" means "three" and phala means"fruit". Myrobalans are fruit bearing plant species. Triphala constitutes of the myrobalans namely *Terminalia chebula, Terminalia Terminaliabellerica, and Emblicaofficinalis.* The pericarps of each fruit after removing its seeds are powdered and then formulated in equal proportions.

Amalaki

Botanical name-*Emblica officinalis:* It has excellent healing ability due to the treatment of various systemic diseases such as diabetes, cardiac ailments, anemia and carcinoma due to its immune-stimulatory actions and anti-oxidant actions. It acts as an efficient anti-microbial substance against various micro-organisms such as *K. pneumoniae, P. mirabilis, E. coli, S. paratyphi* A and B. The best aspect about amalaki is that even after its diverse usage for various diseases it does not cause any side effect on long term use. This is only possible due to cytoprotective and anti-ulcerogenic nature.

Hiritaki

Botanical name-*Terminalia chebula:* The most important constituent of this fruit is tannin, which chiefly contains acids such as chebulic, gallic, chebulagic along with corilagin. Due to its broad anti-microbial spectrum it acts as an anti-viral, anti-fungal and anti-bacterial effective against numerous gram stained biofilms. Its radical scavenging and effective wound healing capacity make it effective for usage in diabetes and vitreoretinopathy. It also used to increase gastrointestinal motility due to its anti-spasmodic action. It also acts as a hypolipidemic or anti-hyperlipidemic reducing cholesterol levels.

Bibhitaki

Botanical name-*Terminalia belerica:* It is widely used as folk medicine and contains various essential acids, polyphenols and lignans. It is also made up of triterpenoids, beta-sitosterol, and cardiac and saponin glycosides. Its cardio-protective aspect allows us to use it in hypercholesterolemia and cardiac disorders. Due to its gastroprotective and hepatoprotective aspect it is widely used in the treatment of gastro-intestinal disorders such as colic, indigestion and diarrhea. It is useful in treating chronic lung conditions as it acts as a bronchodilator. It is also used in systemic diseases due to its hypoglycemic and hypotensive effect.

Other Active Ingredients Present in Triphala are:

1. **Vitamin C:** It has anti-oxidant properties and is an essential nutrient necessary for tissue repair.It also contains several enzymes which are important for the immune system. It also plays a crucial role in the wound healing and formation of collagen.*Emblica officinalis* contains Vitamin C.[4]
2. **Tannins:** These are polyphenolic compounds which contain the property of astringency and are water soluble. They also prevent cellular oxidative damage. They are potent antimicrobials. Due to their anti-oxidant property they also act as anti-carcinogens and anti-mutagens. They also inhibit protein glycation. *Terminalia chebula*contains tannins.[4]
3. **Flavones:** They belong to a class of Flavonoids comprising of non-saturated 3 carbon chain. They have been extensively explored due to their neuroprotective property. They also have anti-amyloidogenic and anti-inflammatory properties.[4]
4. **Gallic Acid:** It is a trihydroxybenzoic acid. It is used as an intestinal astringent and also as an anti-diarrheal. It also contains epigallocatechingallate. *Terminalia belerica*contains gallic acid.[4]
5. **Quinones:** Quinones belong to a class of cyclic organic compounds. Vitamin K is a napthoquinone and is widely used due to its anti-hemorrhagic properties. *Terminalia chebula*contains anthraquinones.[4]

Ethnopharmacology of Triphala

1. **As an Anti-Neoplastic Agent:** It has immunostimulatory effect. It causes apoptosis of the carcinogenic and mutagenic cells. It also

facilitates the cytotoxic T-cells and NK cells. All these properties make it a potent chemopreventive and chemoprotective agent.

2. **As an Anti-Inflammatory Agent:** It is used as an analgesic, anti-pyretic, anti-microbial without any potential ulceration and damage to gastric epithelial lining. When these properties of Triphala at a concentration of 500 / 1000 mg/kg body wt and indomethacin at a concentration of 10 mg/kg body wt was compared Triphala showed excellent potency.[5] All these activities make it an effective anti-inflammatory agent

3. **As an Anti-Oxidant:** It acts on the molecular level and increases Vitamin C and Glutathione.Its enzymatic effects show enhancement in the level of glutathione (peroxidase, reductase, transferase) and reduction of myeloperoxidase and xanthine oxidase levels. Inhibition of lipid peroxidation is also observed. Triphala when administered 1g/kg/body wt for 48 days inhibited gamma-radiation induced activity and scavenges superoxides.Thus the polyphenols in Triphala act as potent anti-oxidants.[5]

4. **Use in Wound Healing:** It is effectively used in the management of burns and wounds seen in diabetic patients.It enhance nourishment to the tissues and decreases the effect wound healing delaying factors such as infection and collagenolytic activity. It shows significant approximation of wounds when used as an ointment. It also facilitates regenerative capacity and enhances wound healing when used with collagen sponges.[5]

5. **Use in the Treatment of Diabetes:** Triphala is known to have hypoglycemic property. It acts as an anti-diabetic by downregulating the digestive enzymes and glycation enzymes reducing glucose absorption. It also inhibits alpha-glucosidase and alpha –amylase. These convert polysaccharides into smaller glucose molecules.

6. **Anti-Microbial Spectrum of Triphala:** It exerts broad antimicrobial activity. It inhibits 37.96% of fungal species especially Aspergillus *in vitro*. It effectively inhibits *E. coli, S.aureus, P.vulgaris, S. typhi* and *P.aeruginosa.*[1].

7. **Triphala as a Stress-Reducer:** Humans experienced increased stress due to modernization of life style. Stress is simply described as a state of disharmony. It effectively reduces stress induced due to cold and noise. 1g/kg/body wt for 48 days could effectively control 100dB noise for 4hr/day for 15days. It reduces cortisone levels along with lipid peroxidases and efficiently reduces cold-induced stress.[5]

8. **Other Uses:**

(a) It acts as a colon purifier and cleanses the gastrointestinal tract

(b) It is also used in arthritis management

(c) It acts as an anti-obesogenic[1]

(d) It is also a neuroprotective agent and used in parkinsonism and alzheimers disease.

(e) It is used in chronic eye infections such as retinopathy.

Triphala in Dental Management

Since ancient times Triphala has been used for various medicinal and dental purposes due to its wide range of effectiveness and low side effects. It is also proven that Triphala is at par with many chemical drugs used in the treatment of various field of dentistry. In future Triphala might be used as an adjunct to various dental therapy in the effective management of dental problems.

Triphala in Conservative and Endodontic Therapy

1. **Anti-carious property:** Triphala extract inhibits the two mechanisms by which the micro-organisms colonize on the enamel surface. It prevents the attachment and accumulation induced by sucrose and glucose breakdown products. It also acts as a bacteriostatic and restricts the growth of *S.mutans*along with the reduction in the bacterial glycosyltransferases thereby reducing the incidence of pit and fissure caries by about 40%.[4]Thus by inhibiting the salivary pellicle formation and accumulation of acids causing demineralization of enamel, it prevents the carious activity. Triphala when used twice daily reduced the streptococci count by 17% and 44% at 48hr and 7days respectively in comparison to CHX which showed only 16% and 45% reduction.[6] Potent anti-cariogenic activity is seen when 0.6% of Triphala is used as a mouthwash without any extrinsic or intrinsic staining.[4]

2. **As An Endodontic Irrigant:** Various tissue dissolving agents, antibacterial agents and chelating agents are used for chemical debridement of the

complex root canal morphology i.e. inaccessible to instrumentation. But these irrigants are toxic and distasteful. Some of them are also inefficient in removing the smear layer. This led to the use Triphala and other unani medicine as root canal irrigants. It has notable antimicrobial action against the three and six weeks old opportunistic micro-organisms infecting the root canal. Hence, it acts as an alternative to other chemical irrigants such as sodium hypochlorite(NaOCl). Its action is superior to NaOCl when the concentration of NaOCl is 0.5% and 1%. Triphala in conjunction with 10% dimethyl sulfoxide actively eliminates *E.faecalis.*[1]

Triphala in Periodontal Therapy

1. **As an Anti-plaque agent:** Triphala in 50 µg/ml concentration inhibits the growth of *S.mutans*.[4] Hence it decreases the formation of plaque by inhibiting the adherence of the bacteria. It also adsorbs to the cell surface of the micro-organism leaching out its cellular constituents and denaturing its enveloping proteins leading to bacterial cell death. This occurs due to the presence of tannic acid. 10% Triphala mouthwash when used in teenagers showed effective anti-plaque activity in randomized clinical trials.[1]

2. **As an Anti-collagenase agent:** Most of the periodontal destruction occurs due to the presence of the key biomarker i.e. matrix metalloproteinases. These are a group of enzymes that activate cascade mechanism are gradually led to the production of collagenases especially MMP8 and MMP13. and gelatinases MMP2 and MMP9.The most potent inhibitor of these MMPs is Doxycycline. However, its prolonged use leads to a wide range of side effects and systemic toxicity which is not observed in the usage of Triphala extract. 1500 µg/ml of Triphala efficiently inhibits the production of MMP9 which is within its therapeutic dosage range.[4]

3. **Use in Gingival Inflammation:** The cardinal signs of inflammation are calor, rubor, tumor, dolor and loss of function. Due to the presence of Vitamin C and tannins there is reduction in the bleeding of gingiva on probing and enhanced healing of the gingival tissues after non-surgical and surgical therapy. Triphala mouthwash when combined with non-surgical periodontal therapy showed effective reduction in the values of various gingival indices such as bleeding indices, oral hygiene indices and plaque indices.

4. **Use in Periodontal Therapy:** Significant improvement in the clinical parameters and reduction in the signs of periodontal destruction such as clinical attachment loss, mobility, pocket probing depth and sensitivity when Triphala was used as a mouthwash along with powdered formulation for 1 month. There was noticeable amount of reduction seen in the clinical indices' values.

Conclusion

Triphala is a promising herbal drug that acts on myriad of diseases and has multidimensional applications. It is having notable therapeutic usage for maintaining the physiological equilibrium which finally results in preventing and inhibiting the progression of diseases. This review summarizes several evidence-based results obtained by scientific studies which describe various pharmacological uses of Triphala. However current data is insufficient and additional research work and clinical survey is necessary to embolden its use in dentistry.

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Diet Counseling: Prevention for Early Childhood Caries

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Abstract

Diet counseling plays a very important role for adopting a healthy lifestyle.Researchers suggested that diet counseling is neglected all over the world day by day. So that dentists are facing a lot of diseases in the oral cavity.Therefore, diet counseling is mandatory for all. This is more beneficial when this process begins earlier. The goal of the diet counseling is to get rid of harmful eating habits,to continue the balance diet and the avoidance of the diseases.The future eating habits can be shaped in a healthy manner by providing children nutrition education..though the parents are not well familiar with the harmful food and the harmful eating habits of their children,the duty of the dentist is to make the parents well educated about what to prefer for the children to have on their diet and what not to have. It is very prodigious to know what is harmful and what is useful for their child.

Keywords: *Diet Counseling, Preschool Habits, Nutrition Education.*

Introduction

Nutrition is defined as the total of series that worried in the process of increase in size, preserving a condition or situation or the state of being preserved and restore the living body as entire or its parts of whole.Nutrition is a science food and its state of being connected to health.[1] Balanced diet is one which contain something fit to be eaten in such quantities and proportion the need for energy, aminoacids, vitamins, fats, carbohydrates and other nutrition is consecutively met for maintaing health, vitality and general well being and also makes provision for a short duration of leanness.[1] Up to five year of a child life is a period of rapid physical, mental and emotional development. They communicate up to extreme level during this year.The preschool is the perfect time to help children to change the attitude towards healthy food and to teach them goodeating habits. The poor quality and inaccurate nutrition badly impacts the physical and mental development and learning ability of the child during the preschool period. For the normal growth and development of a child and to prevent a number of nutrient related diseases.It is necessary to consumption of healthy diets.[2, 3]

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Diet counseling: Before counseling a child and mother, dentist should know what the child is eating.The purpose of diet counseling should explain to the patient in the first appointment.[1]

- To correct the imbalance diet which could affect the general health of the patient and sometimes it is also reflected in his oral health.
- That we are looking for possible dietary causes of the caries problem of patient, so that we can reduce the risk offuture caries by dietary means.[2]
- What beneficial outcome could be available for him in better oral health and appearance and possibly improved health in general.

This program is based on a step by step progression through:

- The diet diary of a child should introduce with a brief discussion for the intention of diet counseling.
- To get an idea of food that the child is consuming a 24-hour diet record should prepared.[1]
- A weakly diet chart is advised to prepared by the patient.

- Reducing the sugar factors.
- Educating the patient about the decay process of sugar.
- To consumption of more acceptable food rather than more cariogenic food.[1]

Guidelines for counseling: For the successful diet counseling the accurate and truthful statement is that the patient, not the counselor bears the responsibility for making changes in food selection and eating habits.[4] The guidelines are:

- Gathering information about the patient.
- Evaluate and interpret information.
- Development and implement a plan of action.
- Cooperation of the patient's family in all aspects of dietary changes.

For the normal growth and development of a child and to prevent a number of nutrient related diseases it is necessary to consumption of healthy diets.

Diet Charting for Preschooler: Preschooler between the age of 2-3 years are able to eat a variety of healthy foods.

Daily caloric and protein requirement for the preschooler is

- Caloric – 1500
- Protein – 2g

Sample menu for a preschooler: During the preschool years child should be eating the same food as the rest of the family.This included fresh vegetables and fruits, non fat or low fat diary product[milk, yogurt, cheeses], lean meats[chicken, turkey, fish, lean hamburger] and whole grain cereals and bread and the same time eliminate the junk foods.

Sample 24-hour menu for preschooler[5, 6]

- **Breakfast:** ½ cup non-fat milk, ½ cup cereal, 4-6 oz or ½ cup cantaloupe or banana.
- **Snacks:** ½ cup non fat milk, ½ cup fruits such as banana or berries, ½ cup yogurt.
- **Lunch:** ½ bowl rice, or 2 slice whole wheat bread with 1-2 oz of meat, veggies, ¼ cup green vegetables
- **Snacks:** 1 teaspoon peanut butter with 1 slice whole wheat bread or some fruits.
- **Dinner:** ½ cup nonfat milk, 2 ounces meat, fish or chicken, ½ cup pasta or rice, ¼ cup vegetable

How much to eat from the food you offer it is child should decide. Nobody should force the child to eat or restrict the amount of food allow them to eat. Day by day child's appetite can change. They might eat more some days and some days they might eat less. So, it is necessary to plan adiet chart according to day and weak (Table 1-6)[7].

Table 1. 24-hour sample diet chart for prescho

Meals	Food
Breakfast [6:30 AM -7:00AM]	2 sandwich, 2cup milk or 2 bread omelet
Mild morning [11:00AM]	1 Stuffed paratha paneer and one fruit
Lunch [1:00PM]	1 small plate rice, 1/2 cup dal or curd, 1/2 cup mixed vegetable
Eveningsnacks [5:00AM]	1 cup milk, 4-6 biscuits
Dinner [8:00PM]	2 pieces chapati, 1/2 cup dal, 1/2 cup vegetable
Night [11:00PM]	1 cup fruit custard

Table 2. 7 days sample diet chart for preschooler[9]

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Breakfast	1 egg omelette, 1 cup of mik	1 bowl of ceregrow with 6-10 chopped almonds, 1 cup of mik	1-2 idlis and vegetable samber, 1 cup of milk	1 bowl of ceregrow, 1 cup of milk	1 slice of whole grain toast and avocado, topped with tomato slices, 1 cup of milk	2-6 inches whole wheat pancakes topped with peanut butter and berries, 1cup of milk	1bowl of ceregrow topped with raisins, dried cranberries
Morning snacks	1 bowl papaya cubes	1 cup fruit salad	Fruit smoothie with spinach	½ chopped apple with 1 spoon peanut butter	1 banana, 2-3 walnut	1 Banana with 1 spoon peanut butter	Single slice tomato cheese sandwich

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Lunch	Small bowl of rice with dal, gourd curry	Mixed veg curry, 2-3 chapatis	Small bowl of rice, egg curry	Small bowl of rice, sambar, green bean curry	2 chapatis, egg bhurji with vegetable	Small bowl rice, curd, tomato raita	2 chapatis, dal, mixed vegetable
Early evening snacks	1 bowl of cerebrow with walnut and dried cranberries	1cucumber, tomato and cheese sandwich [1-2 slice of bread]	1bowl of ceregrow with chopped cashews and raisins	½ cup oat meal topped with ½ cup chopped berries, 1 cup of milk	1 bowl of ceregrow topped with nuts and dry fruits	1 bowl of ceregrow	2-3 whole grain, 1 cup of milk
Dinner	2 chapatis, green beans, 1 cup of milk	Rice, rajma curry, 1/3 cup of yogurt	1chapati, vegetables, 1/3cup of yogurt	Mixed vegetable pulao, cucumber and tomato raita	Bowl of dal palak khichidi	2 chapatis, paneer bhurji with capsicum	Curd rice, drumstick sambar

Diatary Goals

- Sugar should reduce about 48% in the food.
- Reduce overall fat consumption approximately 40%-30%.
- Reduce saturated fat consumption.
- Reduce cholesterol consumption to about 300mg/ day.
- Sodium intake reduce about 5g/day.

Table 3: Food Group Score[10]

Food	Rda	No. of Servings
Milk	3	X8
Meat	2	X12
Fruit and vegetable	1	X6
Vitamin C	1	X6
Others	2	X6
Bread and cereals	4	X6

Table 4: Nutrient Score[10]

Protein and niacin	cheese, dried peas, dried beans, eggs, fish, meat, milk, vitamin A.
Iron	beef, eggs, liver, green leafy vegetables.
Folic acid	cereals, spinach, yeasts
Riboflavin	broccoli, chicken breasts, eggs, milk, mushrooms
Vitamin C	grapefruits, green peppers, oranges, strawberries, tomatoes, calcium and phosphorus cheese, eggs green leafy vegetables, milk

Table 5: Sweet Score

Liquid	[X5] soft drinks, fruit drinks, cocoa, sugar and honey in beverages, ice cream, flavoured yogurt, pudding, custard
Solid and sticky	[X10] cake, doughnuts, sweet rolls, pastry, canned fruit in syrup, bananas, cookies, chocolate candy, caramel, chewing gum, dried fruit, jelly, jam.
Slowly Dissolving	[X15] hard candies, breath mints, antacid tablets, cough drops

Table 6: Assessment of Dental Health Diet Score

Score	Result	Interpretation
72 – 96	Excellent	Counseling not required
64 – 72	Adequate	Educate the patient
56 – 72	Barely adequate	Counseling required
56 or less	Not required	Counseling with diet modification

Conclusion

Preschool is the most vital period of a child in which the child develops most of his personality which is remain shaped for rest of the life. It has a huge impact on the adulthood of the particular child. A good nutritional habit will leads to a healthy living with a healthy oral cavity. So it is the rights of every child to have a disease free life and a disease free oral cavity. Good nutrition and healthy eating habit build a healthy foundation of life.

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Conflict of Interest: None

Ethical Permission: Approved

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Incidentally Significant Finding in an Asymptomatic Patient

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Abstract

The oral physicians have been playing a significant role in diagnosing systemic diseases from their oral manifestations. Not only from the clinical findings in the orofacial region but also from dental radiographs valuable diagnostic information regarding the diseases affecting the body can be detected. Dental panoramic radiographs have been used as screening radiographs for the diagnosis of oral and dental diseases. In addition to this they have been employed as valuable tools for age determination, prediction of osteoporosis and even for diagnosing calcified atherosclerotic plaques in common carotid arteries in asymptomatic patients. A dental panoramic radiograph of a 54-year-old man was taken for checking the alveolar bone height to treat periodontitis and plan prosthesis. Incidentally it was seen that both carotids had calcified masses and warranted further investigation. Ultrasonography revealed the presence of stenosis of the common carotid artery on the left side and outflow obstruction, thereby preventing a possible cerebrovascular incident in an otherwise healthy patient. The case is shared to increase awareness regarding the role of the dentist in prevention of stroke in unsuspecting individuals.

Keywords: *Atheromatous Plaque, Calcifications, Common Carotid Artery, Panoramic Radiograph.*

Introduction

Atherosclerosis is a frequently encountered disease caused by cholesterol deposits on the arterial walls and they form adherent plaques, which may later calcify and cause obstruction in the flow of blood. [1]As these atheromatous plaques increase in size, they reduce the lumen of the blood vessels and hence the blood supply is compromised, and depending on the size of these plaques, the quantity of oxygen supplied to vital organs is determined. The less the oxygen supply the more effect on the functionality of the organs and it can eventually endanger the life of the individual.[2] It takes time for the changes to be clinically visible and felt by the patient and by the time it is diagnosed already a considerable damage is done. Hence it is imperative that the disease is detected early so that interventions can be promptly executed.[1,2] There is a need to find a cost-effective, early diagnostic tool for diagnosing this life-threatening condition. The dental panoramic radiograph which is a common screening radiographic procedure employed in dental patients for oral and dental diseases as well to obtain an overview of the orofacial structures, also could be used to visualize the cervical vertebrae area in which calcifications of atheromas in the carotid artery can be visualized, thereby providing early diagnostic information.[3,4]

On digital panoramic radiographs, Lande and Friedlander, detected the common carotid artery calcifications first in a study published in 1981.[5] Thereafter in Baker and Friedlander in 1994 showed that panoramic radiographs can be used to detect the risk of cerebrovascular accidents in asymptomatic patients. [6]The appearance of these carotid artery calcifications appears as radiopaque masses which are irregular or sometimes circular in shape, heterogenous, may appear as concentric rings and seen either unilaterally or bilaterally. As the size increases, they may appear rectangular or linear. [7-9] The location of these structures is posterior to the angle of the mandible and a little above it and at the level of the third and fourth cervical vertebrae, adjacent to the hyoid bone. [2,10]

Case Report: A 54-year-old male patient reported to the dental hospital for treatment of periodontal disease and evaluation for placing dental implants. He was advised for a dental panoramic radiograph. On the panoramic radiograph, besides his dental and alveolar bones status evaluation, it was incidentally detected

that multiple concentric irregular spherical calcified masses, largest one having about 0.6cm in greatest diameter, were seen in between the third and fourth cervical vertebrae bilaterally, hinting at calcifications of the common carotid artery. Since the patient was a chronic hypertensive patient, he was advised to undergo an ultrasonographic evaluation of the neck region based on findings of the dental panoramic radiograph. Ultrasonogram of the patient revealed 42% stenosis in the left common carotid artery and decreased blood outflow in both the common carotid arteries, but significantly obstructed on the left side. The patient was referred to the cardiologist for management.

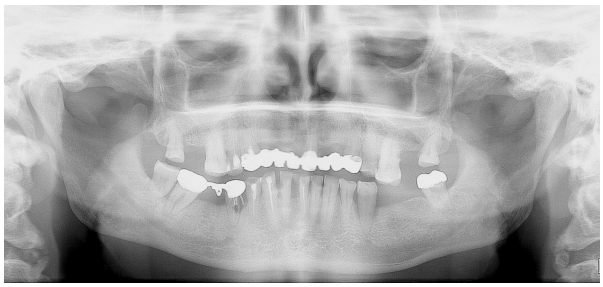


Figure 1. Panoramic radiograph showingmultiple sub-centimetric concentric irregular spherical calcified masses, largest one having about 0.6cm in greatest diameter, were seen in between the third and fourth cervical vertebrae bilaterally, possibly calcifications of the common carotid artery.

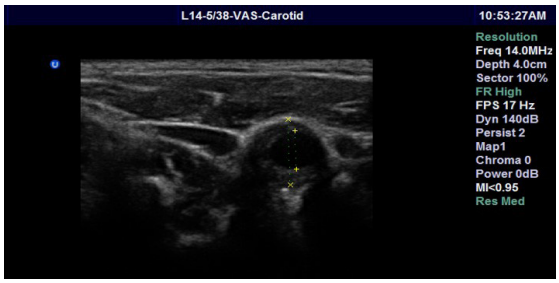


Figure 2. Ultrasonogram showing 42% stenosis in the left common carotid artery.

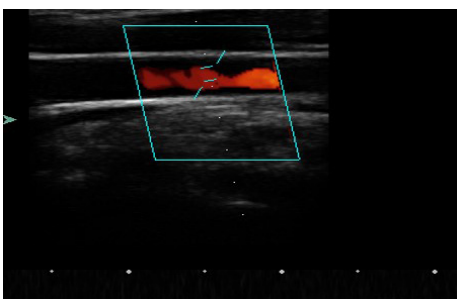


Figure 3. Colour doppler ultrasonogram of the left common artery showing severely decreased blood outflow suggestive of stenosis.

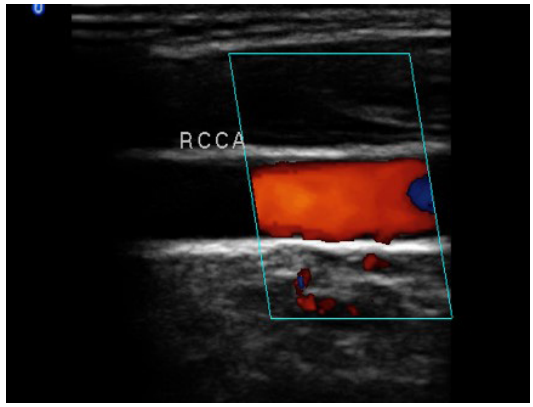


Figure 4. Colour doppler ultrasonogram revealed decreased blood outflow in the right common carotid artery.

Discussion

The carotids are the principal arteries supplying blood to the brain and traverse through the neck diving into the two terminal branches at the level of the superior thyroid cartilage.[4] Since the carotid atheromas can significantly reduce blood flow to the brain their early detection of paramount importance. The atheromas occur with severe coronary heart disease and can cause stroke in elderly individuals above fifty.[2]

It was reported by Cohen and Friedlander [11] that carotid atheromas detected by dental panoramic radiographs in about a fourth of elderly patients had a history of adverse vascular events like stroke, angina, myocardial infarction, etc. Even in a study reported by Griniatsos et al [12]it wasfound patients who have carotid calcifications on panoramic radiographs had suffered from cardiac disease. However, Sisman and Ertas[13] associated these panoramic radiographic findings with chronic smoking while others liked them to diabetes mellitus [14,15], hyperlipidaemia [16], hypertension.[17] and increasing age. [18-20]Not only that women were more frequently affected and the presentation was usually unilateral. [21,22]

It must be noted that common carotid artery calcifications have to be differentiated from other physiologic and pathologic structures which could be visualized on the same region like the thyroid cartilages, styloid process, calcified stylohyoid ligament, sialoliths, lympholiths, tonsilloliths and phleboliths.[23,24] Hence adequate knowledge of the radiographic landmarks of the different anatomic structures present in the cervical region is essential to correctly diagnose carotid calcifications on dental panoramic radiograph.

Conclusion

The literature emphasizes the presence of calcifications of the common carotid arteries on a dental panoramic radiograph is common in an elderly and susceptible population. The incidence of such findings in a general population is about one-fifth to that found in individuals with systemic diseases. It may be emphasized that panoramic radiography plays a vital role in the early detection of calcified atheromas in the common carotid arteries in asymptomatic individuals and referral to the cardiologist can help save lives.

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Conflict of Interest: None

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Oral Manifestation of Viral Disease in Children

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Abstract

Viruses are integral to infection and a basic insight into the characteristics of commonly encountered micro-organisms is inertial for good infection control practice. Oral manifestation of viral infection will lead to specific discomfort and irritation in children. Neonates and natals are more prone to infection due to on developing immune system. Site and source of exposure of the infections dependant to the sign and symptoms. Disease such as Herpetic gingivostmatities, secondary harpies, herpes labials caused by 'Varicella zoster virus'. Other virus diseases like measles, Rubella, AIDS seen in the children, are highly contagious in nature. disease can be diagnosed clinically and by laboratory diagnosis by immmunofluorosence & culture. Antiviral medications are given to the children who are suffering from viral diseases. Antiviral therapy typically involves a delicate interplay between host cellular functions & viral target of action.

Keywords: *Viral Infections; Oral manifestations; Antiviral therapy.*

Introduction

Oral manifestation of various viral infection & ulcerative lesion are very subjective to the identity for the early diagnosis. Early diagnosis is important for the early up taking of medications and management of infections. Parents are not well familiar with the infections lesions seen in the children's oral cavity. A dentist should aware about the lesions on the child's mouth during the dental practices. These viral infections demands discomfort and irritation of the child, which distract the child's from its daily routinary life, some of viral infections in the children are:[1-4]

Human Herpesvirus: Herpes simplex virus infections are common vesicular and ulcerative lesion of skin and mucosa found mostly in the children, transmitted through saliva or body fluids. Usually occurs in early childhood and pre-school period. Which period is more prone caught infection, due to frequent exchange of saliva. [5-8] They are classified as Primary herpetic gingivostmatities & Secondary or recurrent herpetic lesion.

Primary herpetic gingivortomatitis: This called as acute herpetic gingivostmatities. Most of the cases are subclinicall and known as primary lesion. Occurs in early childhood & Pre-school period. The incubation period is 5 to 7 days. Site of occurrence is hard palate, attached gingiva, dorsume of the tongue, brccalmucoca, lips. It appears in the form of mulitiple inflammatory small vesicle with thin walled covering, which arereptured frequently. Samll, shallow, oval shaped discrete ulcer covered with greyish white oryellow plaque. Serosanguinous fribrin like exudates from lips, there is difficulties in speech,and mastication becomes extremely painfull. The disease is self limiting in nature. Lesion begins to heal in between 7 days to 14 days and leaves no scar.[1, 5-8]

Recurrent oral HSV infections: Secondary herpies is the result of re-activation of the virus present before. Occurs due to re-infection in sero-positive persons. There is 40% chance of secondary herpes when the antibody is already present inside. In 10% individuals in which it is asymptomatic. HSV transmitted through saliva. Occurs widely in certain interval in some patients it is once a month or in some patient it is once a year. Prodominal Symptoms are Tingling & burning sensation and feeling tautness in the site of infection. Presence of oedema at the site of lesion, formation of clusters of small vesicle can be seen. Mainlyoccurs in vermillion border of lip, surrounding with skin. Greyish white vescile present which ruptured very quickly leaving red ulcerations having a size of 1-3 mm to 1-2 cm. The lesion heals gradually within 5-10 days and leaves no scars. CNS complications and vagiinal fungal infection may occur.[5-8]

Vericella Zoster: Also called as "varicella". It is an acute disease occurs in the children mostly in the seoson of winter and springs. Incubation period is 2 weeks and mode of contamination is by air borne droplets or direct contact with infected persons. Small blister like lesion present involving the oral mucosa, tongue, gingiva, palates and also in the mucosa of pharynx, which rupturs forming minor acute ulcerations. Appearancace is slightly raised vesicle surrounded by erythema. Ruptures very soon after formation, and forms a small eroded ulcer with red margins. Patient should be rehydrate to control pruritirs warm baths with soap or baking soda, application of calamine lotion is recommended. Anti-viral drug Acyclovir 800mg five times/day for 5 days. Valacylovir 100mg TDS or fumicyclovir 500mg TDS for 7 days. [5,8,9]

Coxrackie Virus: Another virus commonly cause hand, foot-mouth lesions. Oral manifestation in children shows herpangina & acute lymphonodular pharyngitis. Transmitted through oro-fecal route and nasopharyngeal droplets. Highly contagious disease seen in kids below the age 5 years in seasons of summer & spring. Site of infection is buccal mucosa, tongue, soft palate. Appearance is vsicular or papular lesion surrounded by zones of erythematous halos. Management is mainly be Maintenance of hydration. [5-8] **Measles**. Measles is also called "Rubella" or "Morbilli". It is an acute viral dermatotropicinfection,which is contagious & priority affecting the children. Transmitted through the droplet infection or by direct contact by person to person. [5] Incubation period is 8 to10 daysProdomal symptoms are Onut of fever, molaics cough & coryza. Oral leision proceed 2-3 days before continuous rash. Site of infection is Buccal muccosa

Koplik & Sporls: They are bluish white specks surrounding with a bright red erythematous covering. Marginsare Small irregularly shaped blocks, subjected as "grains of salt" on red background. Swelling and focal ulceration of gingiva, palate & throat.

Diagnosis: Mainly by Clinical diagnosis: kplik's sports. Lab diagnosis; Antibody titters. Antibody appears in 3 days.

Management: Vaccine MMR: One injection of life, attended measles virus given subcutaneously in children, over one year and second dose of vaccine is given in 12-15 months.

Passive immunization: Human immunoglobulin given in dose 250 mg for children under 1 year & 500 mg for over age of 1 year.

Rubella: Known as germen measles cause by Jogovirus. Transmitted through droplets, injection, if may be congenital results in birth defect. Baby with rubella called congenital rubella syndrome. Incubation period is 14-21 days.

Foreselhemei's right: In the soft palate there is presence of small, discrete and dark redpapules.

Petechiae: Petechiae can be seen for the palate.

Management: Human rubella immunoglobulin given after exposure.1, 5-8

Human immune deficiency syndrome: HIV infection transmitted to the child from the mother during the pregnancy or during the birth. Other route of spreading is the transfusion of blood and its products, from a infected person.when breast milk are also consider to be a source of infection. Oral candidiasis may be seen in child with HIV infection. Oral candidiasis may leads to esophagial candidiasis. Gingivitis may be seen. Parotid swelling is most common in children than elder individuals.[6-10]

Conclusion

Viruses are like hijackers. Thy invade into living normal cells & use those cells to multiply and produce other infections cells like themselves. This can kill damage or change the cell & can make a person sick. Antiviral medication, they work by interfering with the production of viral DNA/RNA. Antiviral medications are more effective when they are taken earlier. The most challenging thing in viral lesion is the differential diagnosis of infection in children because, most of them will show the similar clinical picture misleading the diagnosis. The dentist plays a very vital & major role in diagnosis, treatment & prevention of contamination of such contagious infection. 6,9,10

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Oral Focal Mucinosis: A Rare Clinical Entity

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Abstract

Oral focal mucinosis (OFM) is a very uncommon clinical entity whose exact cause remains unknown. It is a soft tissue lesion which presents clinically mainly on gingiva, usually not associated with pain. It may appear as a sessile or pedunculated mass having the same colour as that of the surrounding oral mucosa. The histopathological picture of oral focal mucinosis is that of myxoid degeneration of the surrounding connective tissue stroma in a focal pattern. It mainly occurs in adults during the 4^{th}–5^{th} decades but rare cases affecting the children and young adults have also been reported. The final diagnosis depends totally on the histopathological picture in such cases and complete surgical removal is regarded as the treatment protocol with no recurrence reported so far. We present here a case of oral focal mucinosis which is rare and requires proper clinical and histopathological screening so as to avoid wrong diagnosis and also to rule out all the other myxoid lesions which may be indicated in its differential diagnosis.

Keywords: *Mucinosis, Myxoid degeneration, Gingiva, Soft tissue lesion.*

Introduction

OFM is a rare clinical entity most commonly affecting the gingiva. It usually presents as an ingenious, symptomless and sessile swelling or with a pedunculated base with a higher predilection in females. It is considered to be the correspondent oral lesion of cutaneous focal mucinosis (CFM).[1] Though its exact etiology remains unidentified, an excessive production of hyaluronic acid by the fibroblasts may be related to its occurrence.[2] Histopathologically, areas of myxomatous connective tissue with collection of mucins like material in a fibro-collagenous connective tissue stroma are evident with foamy and fibroblast like cells in well localized areas in the myxoid matrix. Oral focal mucinosis quite difficult to diagnose based upon its clinical presentation and it is often misdiagnosed as fibroma or granuloma.[3] Thus, a proper biopsy followed by histopathological examination becomes necessary for its proper diagnosis followed by the appropriate treatment measures to avoid any recurrence.

We present here a case of oral focal mucinosis in a 22-year-old young female which was clinically diagnosed as fibroma but its histopathology revealed an entirely different diagnosis.

Case Report: A 22-year-old female presented with gingival swelling in relation to the right mandibular posterior tooth region since the past 1 year. On examination, a painless, pedunculated gingival swelling was present in the lingual aspect of 48 measuring about 1cmx1cm in greatest dimension. Based upon these findings a provisional diagnosis of fibroma and fibroepithelial polyp was given. It was excised completely and sent for histopathological examination

Histopathological findings: The Hematoxylin and eosin stained sectionshowed a keratinized stratified squamous epithelium beneath which loose myxomatous

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connective tissue stroma was noticed. Sparsely distributed stellate shaped fibroblasts were also evident in the lesioned tissue. The underlying connective tissue stroma was minimally inflamed and moderately vascular.

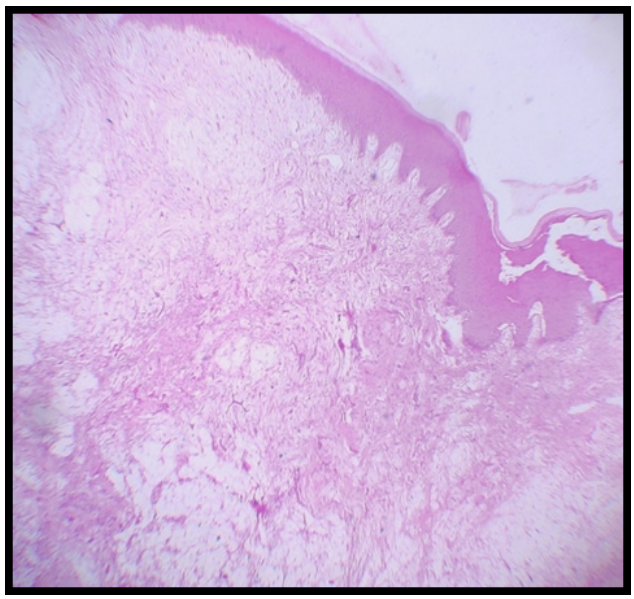


Figure 1 (4x view): The photomicrograph of hematoxylin and eosin stained section showing keratinized stratified squamous epithelium with underlying myxomatous connective tissue stroma.

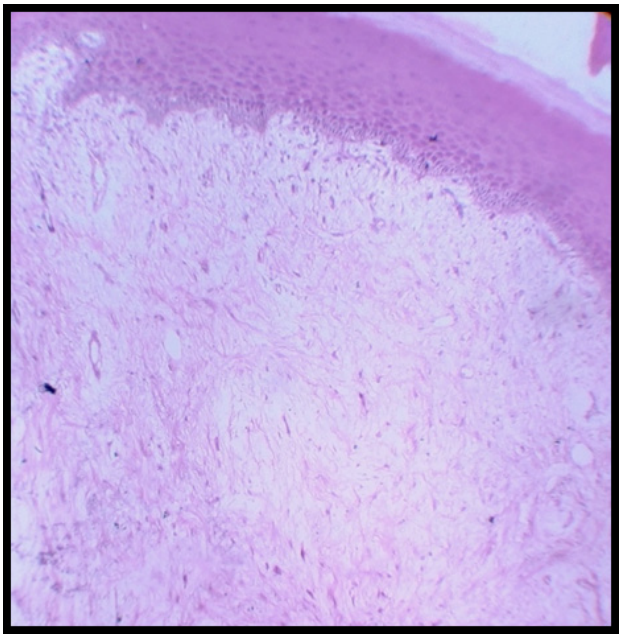


Figure 2 (10x view): The photomicrograph of hematoxylin and eosin stained section showing stellate shaped fibroblasts in a minimally inflamed myxoid stroma.

Based upon these findings a final diagnosis of Oral focal Mucinosis was rendered.

Discussion

Being an uncommon lesion, oral focal mucinosis is often misdiagnosed thus a proper and thorough understanding of its histopathology becomes mandatory. It is the oral correspondent of cutaneous focal mucinosis also known as cutaneous myxoid cyst.[1,4] Majority of the cases involve the gingiva or the hard palate as a painless, sessile swelling without any colour changes.[5] OFM does not show any distinct clinical features and hence there is no case reported in the literature that was diagnosed correctly based upon its clinical presentation.[3,6] However, the histopathological features are distinct and final diagnosis is always based upon the microscopic evaluation. It is characterized by a focal collection of loosely arranged myxoid connective tissue stroma with mucinous material. Fibroblasts and foamy cells are often present in this myxomatous stroma. Sometimes the overlying stratified squamous epithelium may show loss of rete ridges if the lesion is not deep enough. Connective tissue stroma is mostly moderately vascular and shows minimal inflammation.

Pyogenic granuloma, fibroma and minor salivary gland tumor are some of the lesions to be considered in its differential diagnosis.[3] The treatment of Oral focal mucinosis is complete surgical excision and there is no recurrence if it is done properly. It should be asserted that such lesions are impossible to diagnose clinically due to their extremely rare occurrence. OFM must always be ruled out in the soft tissue lesions affecting the adults and for this purpose the role of histopathological examination is inevitable.

Conclusion

The case presented in this paper highlights the role of an oral pathologist in the final diagnosis of such myxoid lesions involving the oral cavity and to rule out the differential diagnosis although the exact cause of oral mucinosis still remains unexplored.

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Endoscopic Approach to Maxillofacial Trauma

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Abstract

The article reviews the manner in which the endoscope assisted techniques is applied for "the treatment of maxillofacial trauma" and enlightening some aspects of these techniques and mentioning the experience of ours. Over the past few decades, "diagnostical imaging, surgical techniques and development of surgical instruments put forwarded tremendous progress in the facial fracture management. Having a bird's eye view over some authors, "endoscopic interventions" to "maxillofacial trauma" has become a usual method for the reduction of "zygomatic arch, orbital blow out, medial orbital wall, frontal sinus, and last but not least the sub condylar mandibular fractures" in the recent years. Substituting the open reduction with that of the reduction of "facial fractures" combining with that of an endoscope has boost the management of the patients with less complications beyond desire and more painless procedures. On the other hand, endoscopic approach enables to decrease per surgical morbidity helping the surgeons to achieve results somewhat true to expectations. Inkling to "endoscopic reduction" is represented by "dimension, extension and sites of the fracture and so the surgeon's perspicacity".

The rate of morbidity along with the extra time of hospitalization can be shortened with the introduction of this instrument called endoscope in the field of maxillofacial surgery depicting the true scenario of modern health care along with the advanced section of biomedical engineering and research.

Keywords: *Endoscopic approach, maxillofacial trauma.*

Introduction

The first endoscope was developed in 1806 by Philipp Bozzini in Mainz with his introduction of a "Lichtleiter" (light conductor) "for the examinations of the canals and cavities of the human body. The first to use an endoscope in a successful operation was Antonin Jean Desormeaux whose invention was the state of the art before the invention of electricity. The use of electric light was a major step in the improvement of endoscopy. Endoscopes are minimally invasive and can be inserted into small incisions and openings of the body. Endoscope was first used by Tagaki in 1918 to examine and describe the knee joint in the early twentieth century. In the last few decades the endoscopic technique has undergone tremendous progression and changes in terms of complexity and capability with the introduction of the endoscopic approaches in the diagnostic procedures. [1] At the present scenario it has become finest necessity of the modern health care simultaneously with the advanced section of biomedical engineering research. The surgeons can treat the facial fractures innovatively with the help of endoscope. Oral and maxillofacial surgery involves exquisite and tiny anatomical structures and leads to limited access to the to the operative field for performing intraoral procedures which gave rise to the need of increment of magnification and illumination of the operative area. [2]

"Hence the endoscopic approach in maxillofacial trauma has been reported in treatment of zygomatic arch, orbital fractures, frontal sinus fracture, and sub condylar mandibular fractures with acceptable results. "[3]The management of oral and maxillofacial region has undergone dynamic changes in the last 2 decades. To start with the digital radiographyuntil the introduction of ultrasonography and endoscopy in the diagnosis as well

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as treatment planning. These devices have increased the accuracy and capability of the diagnostic procedures. Endoscopy has become promising tools to accomplish these objectives. Endoscopic surgery, or minimal invasive surgery, has found wide acceptance in many surgical specialtiesendoes and in many cases has become the standard of care. Endoscopy in health sciences in short refer to look into a hollow cavity or organ for medical problems with the help of an endoscope. The instance that looking into a hollow cavity which is not practically possible to naked eyes comes dated back 2500years. Hippocrates reports the use of a speculum to examine a rectum forth century BC. Abulkasim was reported to use a mirror to examine the cervix in 10 century AD. In 1805 Bozzini introduced **"The Lichtlriter" an illumination device. Desoman** was first to develop an effective endoscope in 1843. The digital video camera was used in 1982. [4] In the 21st century endoscope has been used by clinicians to examine the cavity that don't have an external opening. Thus, in the field of maxillofacial region the application of endoscopic surgery includes "fractures of the floor and medial wall of the orbit, sub condylar fractures of the mandible & last but not least fractures of the zygomatic arch. "

Medial wall and orbital floor fracture: The term Facial trauma commonly grips the orbital region mostly causing esthetic deformities and functional problems.

Indications of surgery after the orbital trauma: Intraocular and intra orbital pain, Diplopia, enophthalmos (posterior displacement of the eyeball within the orbit), The eyeball displacement, Local edema, Local hematoma, Restricted ocular mobility, Epistaxis. These complications need some surgical techniques to be treated which involve various surgical approaches and use of various reconstruction materials. The surgical approaches in orbital trauma is broadly divided into trans antral approach involving trans nasal and trans maxillary technique and transcutaneous approach involving subciliary, transconjunctival, midtarsal and infraorbital coronal techniques. On the other hand, reconstruction materials include autologous bone grafts usually the iliac crest bone, high density porous polyethylene and titanium plates/meshes.

With the intervention of new endoscopic instruments, the older techniques that have been used for the repair of orbital floor fractures have been renewed with time. Through a definitive Caldwell-Luc incision can be easily carried out. Thus risk here the risk of eye deformity is alleviated, and there is an improvement in the visualization of the fracture. As a setback it cannot be used in certain cases though, where the repair of the orbital rim and floor, both are undertaken. As noted, paranesthesia of the infraorbital nerve might still be a case of risk with a transient occurrence.

Regardless these techniques being considered as esthetic surgeries sometimes complicate the predicament. The decision of whether to operate or not to depends upon the type fractures and thus in turn the incisions involved. Thus, the endoscopic approach in orbital trauma came into process in case of less complicated orbital fractures such as diplopia caused by the entrapment of the periorbital tissue and for those kinds of fractures that require open access involving high esthetic considerations. Eyelid retraction, scleral show or ectropion are some of the major drawbacks which go hand to hand with that of the correction of the fractures through surgical method. As for the same, "The Trans antral approach associated with the reduction and fixation of fractures through the endoscope have been proposed by some of the authors". [5] Thus undoubtedly the involvement of"endoscopic technique" provided us with better illumination and assessment in term leadingto fewer complications. The process is highly technique sensitive. Thus the endoscopic approaches enables the repair of orbital floor fractures with no facial scars and risk of ectropion

Fractures of the zygomatic arch: The well-grounded and dependable form of the zygomatic arch fabricates it as one of the most delicate structure in the maxillofacial trauma. Hence the traditional coronal approach put forwards with many complications as well as drawbacks which include "scar alopecia, scalp dysesthesia, significant blood loss and injuries to the frontal branch of the facial nerve". Thus the endoscopic assisted surgical approach in zygomatic arch repair helps in minimizing the complications related to surgery along with reduces the post- surgical scar succoring the extensive access incision. "An optical cavity between the superficial and deep temporal fascia" is made by maneuvering of a periosteal elevator. As a result the facial nerve is preserved from getting injured. Thusthe superior orbital rim marks the end of the dissection, which ensures the incision of the periosteum of the arch followed by arch reconstruction. "Goal of zygomatic arch repair includes restoration of its preinjury shape and stability. Endoscopic assistance is indicated in complex zygoma-fractures, Lefort III level injuries, isolated arch

fractures of patients with prominent contralateral arch contours as discussed by LEE". [5]

Mandibular sub-condylar fractures: Represent an absolute indication to reduce through open access" the dislocation in the middle cranial fossa and in the external ear canal, the dislocation of the joint, the inability to obtain an adequate occlusion and the presence of an open wound of the joint, with presence of foreign body and/or infection".[6] Two of the techniques which are used consists of use of intraoral incision and a dissection along the mandibular ramus which boasts the placement of the endoscope and the second one consisted of performing a cutaneous incision close to the mandibular angle's inferior border as a "mini-Risdon approach". The first technique is best known to avoid scar formation as compared to the first one. The intervention of endoscope to repair the sub condylar fractures of mandible as a whole helps to reduce the risk of "facial nerve injury, lower morbidity, faster postoperative recovery, reduced rate of ischemic avascular necrosis of the condyle, and most importantly on the esthetic point of view no scars". On the stumbling block point of view it takes prolonged surgery times with high costs of equipment and more technique sensitive. "The development and testing of a new osteosynthesis device to stabilize the fixation of a sub condylar fracture, as discussed by Meyer, may represent a further stimulus to the use of endoscopy in the reduction of such fractures."[5]

Patients: "According to the report of the cases of 8 patients endoscopically treated with sub-condylar displaced fracture of the mandible, there were 5males and 3 females, aged between 34 and 61 years old. At a 46, . 4 years. In 6 of the 8 patients, the fracture was unilateral, in 2 patients the fracture was bilateral. In the patients with bilateral fracture, both condyles were displaced medially out of the respectively Glenoid fossae, and clinically could be observed a pre-contact of the posterior with anterior open bite. In the 6 patients with unilateral fracture were clinically evident malocclusion, facial asymmetry and a cross bite and a limitation in mouth opening. All patients in the test group were carried out CT Scans before and after surgery, 2 days later and a year later".[5]

Conclusion

The man-oeuvre of endoscope in maxillofacial surgery depicts one of the vital scenario of modern healthcare stitched together with the advanced sectors of "biomedical engineering and research". The requisition of endoscope in the field of maxillofacial trauma has become one of the most eye-catching field to study upon as it uses laser surgical approaches than those of the classical surgical method for surgery. It in terms reduces the time of hospitalization and the morbidity rate in the field of maxillofacial surgery. As our field basically covers a very small area thus we believe that the endoscopic intervention is going to put forward good outcomes in surgical cases in lieu of aesthetics primarily.

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Recent All Ceramic Systems in Dentistry: A Systemic Review

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Abstract

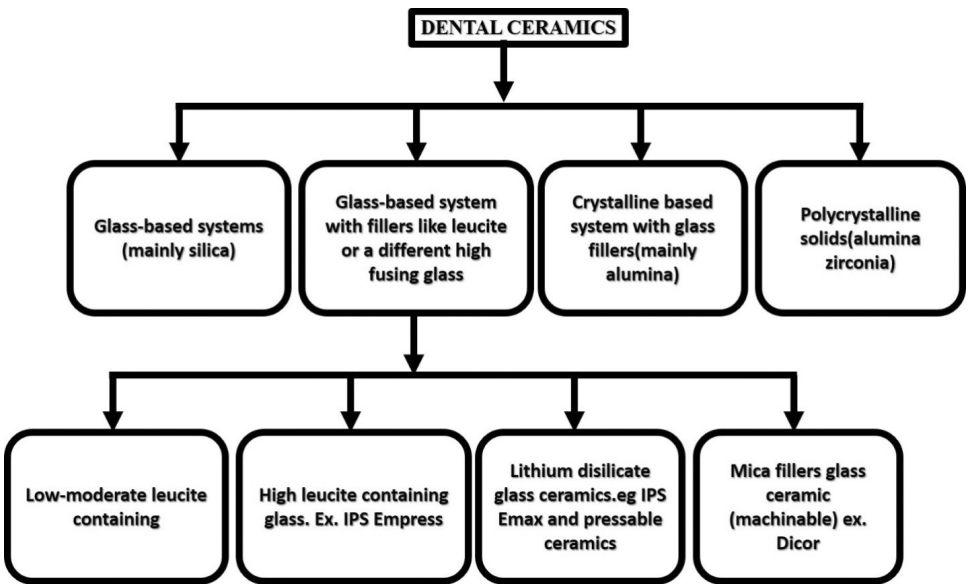
This article encompasses the variety of all ceramic materials available now a days and their clinical applications. It will help the clinicians understand the advantages and disadvantages of different types of ceramic materials available based on their microstructure, processing method and usage area. Although PFM or Porcelain fused to metal crowns had rampant use because of their long-term clinical success rate, the quench for more esthetic, more biocompatible materials led the way for the usage of new all-ceramic crowns-a new age dentistry destination.

Keywords: *Ceramics; Dentistry; Biocompatible; Clinical applications.*

Introduction

The word "CERAMICS" comes from a Greek word meaning "of pottery" Or "for pottery". Ceramics is defined as an inorganic, non-metallic crystalline solid prepared by the action of heating and subsequent cooling. The use of ceramics in dentistry is encouraged by their bioavailability, esthetics and durability. Dentalceramics, since introduction have undergone numerous modifications in terms of chemistry, aiming at the need for dental usage. Although PFM or Porcelain fused to metal crowns had rampant use because of their long-term clinical success rate, the quench for more esthetic, more biocompatible materials led the way for the usage of new all-ceramic crowns-a new age dentistry destination.[1]

Classifications of Dental Ceramics: The variety of ceramic compositions and different types of manufacturing techniques led the clinicians to make wise choices for the usage of all ceramics (Figure 1).



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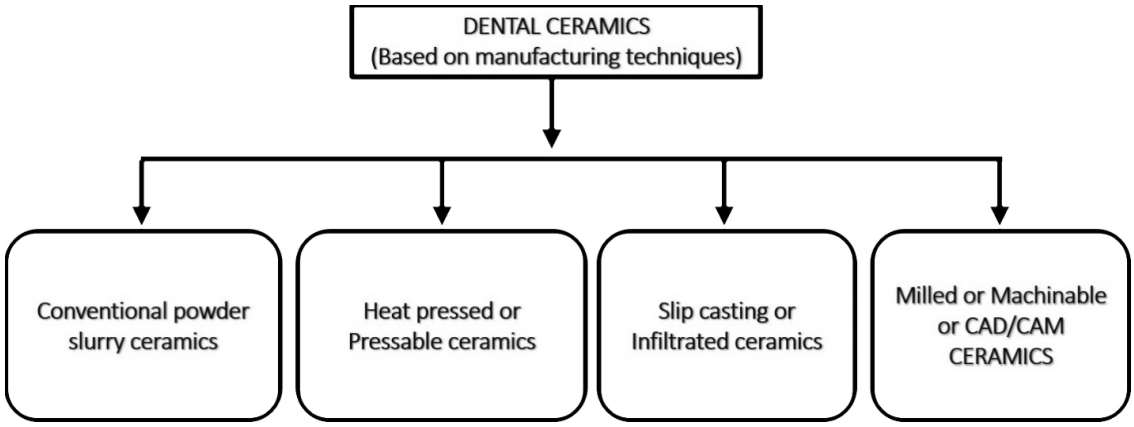


Figure 1. Classification of ceramics

Conventional Powder Slurry Ceramics: It involves ceramic powder available in various shades and translucencies and deionized water to produce a slurry. It's applied over refractory die with a brush and vibrated and compacted to remove excess moisture. It is then fired under vacuum to improve density and esthetics.[2]

Use: It is typically applied as veneer layer on all ceramic frameworks as it has good translucency.

Heat Pressed/Pressable Ceramics: They are available in monochromatic ingots made of crystalline particles distributed throughout a glassy material.The lost-wax method is used with heat pressed technique. The final restoration is subsequently stained and glazed to achieve the final esthetic result.

Use: It is used for making inlays, onlays, veneers, crowns, anterior fixed partial prosthesis, 3/4th crown, and also for coping on which conventional powder porcelain is built to achieve final shape and shade.[3]

Example: IPS Empress, Ivoclar Vivadent/IPS Emax Press

Slip Casting: This technique consists of preparing stable suspensions, the slip and fabricating structures by building a solid layer on the surface of a porous mould that absorbs the liquid phase by means of capillary forces. The slip is the homogeneous mixture of ceramic particles suspended in afluid, usually water, which is applied over gypsum die. It uses crystalline i.e., Alumina based ceramics infiltrated with glass fillers.

Fine grain alumina particles are sintered to form a porous substructure, which is infiltrated with molten glass, which flows into the pores by capillary action. The final core is fully sintered before final application of veneering porcelain. This procedure gives the final restoration of outstanding properties. The double sintering procedure gives the final restoration excellent fit and high strength. The only disadvantage of this procedure is it includes many complicated steps.

Use: It is used for making onlays, veneers, crowns, anterior fixed partial prosthesis and posterior fixed partial prosthesis.[4]

Example: Inceram Alumina (by VITA Zahnfabrik)

Milled (Machinable Ceramics): This machinable ceramic blocks for CAD/CAM restorationsare available in

1. Feldspathic Porcelain based ceramic
2. Leucite Reinforced glass ceramic
3. Lithium Disilicate glass ceramic
4. Glass infiltrated ceramic
5. Polycrystalline Alumina
6. Polycrystalline Zirconia

Computer aided designing and machining can involve any of the two procedure:

I. Hard Machining-where fully sintered ceramic block is milled resulting in significant tool wear and residual flaws.

II. Soft Machining/green Machining-where the partially sintered ceramic blocks is milled and then subsequently fully sintered to eliminate porosity.

Here the individual blocks are bar coded with actual density of each block for shrinkage calculation and the milling machine automatically changes its tools according to need.[5]

Example:

1. Vitablocks (VITA Zahnfabrik)
2. Inceram Spinell (VITA Zahnfabrik) alumina fillers
3. Procera (Nobel Biocare)
4. Lava (3M ESPE)
5. Cercon (Densply)

} Zirconia fillers

The flexural strength of alumina is about 350-450Mpa while that of zirconia is 650Mpa.

1. Polycrystalline ceramics are more difficult to process than glassy ceramics. These higher strength ceramics tend to be relatively opaque compared to glassy ceramics. So, they are usually used as substructure material upon which glassy ceramics are veneered.
2. Polycrystalline Alumina: The first fully dense polycrystalline material used for dental application is developed in 1983 with PROCERA Alumina system by Nobel Biocare. It has the highest strength among alumina-based materials though its strength is much lower than zirconia.
3. Polycrystalline Zirconia: In its pure form zirconia oxide is a polymorphic material that occurs in three crystalline forms that are temperature dependent

a. Monoclinic (room temp-1170 degree Celsius)

b. Tetragonal (1170-2370 degree Celsius)

c. Cubic (2370-melting point)

This reversible tetragonal-monoclinic (t-m) phase transformation is accompanied by increase in volume upon cooling. This transformation can be prevented by stabilizing tetragonal zirconia by adding 3mol% yttria. Stabilized tetragonal zirconia exhibit excellent mechanical properties. It is well established fact that grinding or sandblasting leads to phase transformation to monoclinic and associated development of compressivestress. So chairside polishing to a mirror finish successfully eliminates the thin layer of monoclinic phase and compressive stress but may not fully remove deep defects due to grain pullout. It is also well-established fact that glazed zirconia is more abrasive than polished zirconia. But when monolithic zirconia is used rougher surface leads to increased wear of antagonist enamel. Thus, in case of monolithic zirconia it should be carefully done if any grinding adjustment needed. Zirconia processed by microwave sintering can have smaller grain sizes and increased translucency compared with those of conventional firing. [6, 7]

Conclusion

The evolution of dental ceramics over past few years is most interesting from glass ceramics to zirconia. Remarkable progress has been made in ceramics processing and development and further breakthrough will occur in near future with emerging interpenetrating phase composites. However successful application of these materials will depend upon clinician's ability to select the appropriate material, manufacturing technique, bonding procedures and esthetic and functional requirements.

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Post Operative Care: A Review

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Abstract

Optimal post-operative care has a multidisciplinary group of healthcare professionals and a patient oriented approach in order to avoid any post-operative complications & enables a rapid return to normal health. In the last 10 years, there has been an enhanced recovery after surgery, various implementation of programsover the world to reduce any complications and length of stay challenging the models of intra operative care. Various aspects of intra operative care have consensus guidelines without any controversy, while others like perioperative fluid management therapy remains contentious.

Keywords: *Post-Operative Care; Diet; Nutrition.*

Introduction

Post-operative care deals in managing the patient after surgery. This includes care which is given during the immediate post-operative period both in the operating room and the post anesthesia care unit/ICU as well as during the stay in the hospital.[1] Goal is to prevent any complications such as infection, to promote healing of the surgical wound and to return the patient to the state of normal health.

Phases of Post Operative Care:

(a) Immediate post-operative care

(b) Surgical ward care

(c) Rehabilitation and convalescence.

Post-Operative Observation:[1]

(1) Care for first 24 hours

(2) Care after 24 hours.

Care for first 24 hours: Vital signs, respiratory status, status of pain, the incision and any drainage tubes should be monitored for every 1-2 hours or at least for 8 hours. Body temperature must be monitored, as the patients are hypothermic after surgery & may need warm blanket or warm intravenous fluid.

Care after 24 hours: After the first 24 hours, if patient is stable, vital signs to be monitored every 4-8 hours. Surgical wound to be monitored for amount of drainage and any sign of infections. Dressing should be done using sterile technique.[1]

Airway obstructions and Management[2]

Obstruction by tongue: Muscle tone loss can cause the fall back of tongue against the posterior pharyngeal wall which may be aggravated by masseter spasm during emergence from unconsciousness.

Obstruction by foreign bodies: Dentures must be removed before any operations.

Laryngeal spasm: Can occur at light level of unconsciousness and is an aggravated by stimulation.

Laryngeal edema: May occur in small children after traumatic attempts of intubation or during epiglottitis.

Bronchospasm / Bronchial obstruction: Mechanical ventilation via a cuffed endotracheal tube may still be needed if an adequate PaO_2 or $PaCO_2$ cannot be maintained [9]. The American Society of Anesthesiologists[9] (ASA) defined a difficult airway as

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the clinical situation in which a conventionally trained anesthesiologist may experience difficulty with either mask ventilation or tracheal intubation or both. of all, cricothyroidotomy is the life-saving procedure, and is the final 'cannot ventilate, cannot intubate' option.

Techniques for Performing Cricothyroidotomy[9]:

(1) Conventional preparation technique.

(2) Rapid four step technique[16]

Conventional surgical Tracheostomyis the most preferred method of Airway Management. This has remained the gold standard, having been used in elective and emergency cases. Surgical approachis identifying the isthmus of thyroid which can be retracted upwards or downwards to expose the tracheal ring.[1, 11, 12]

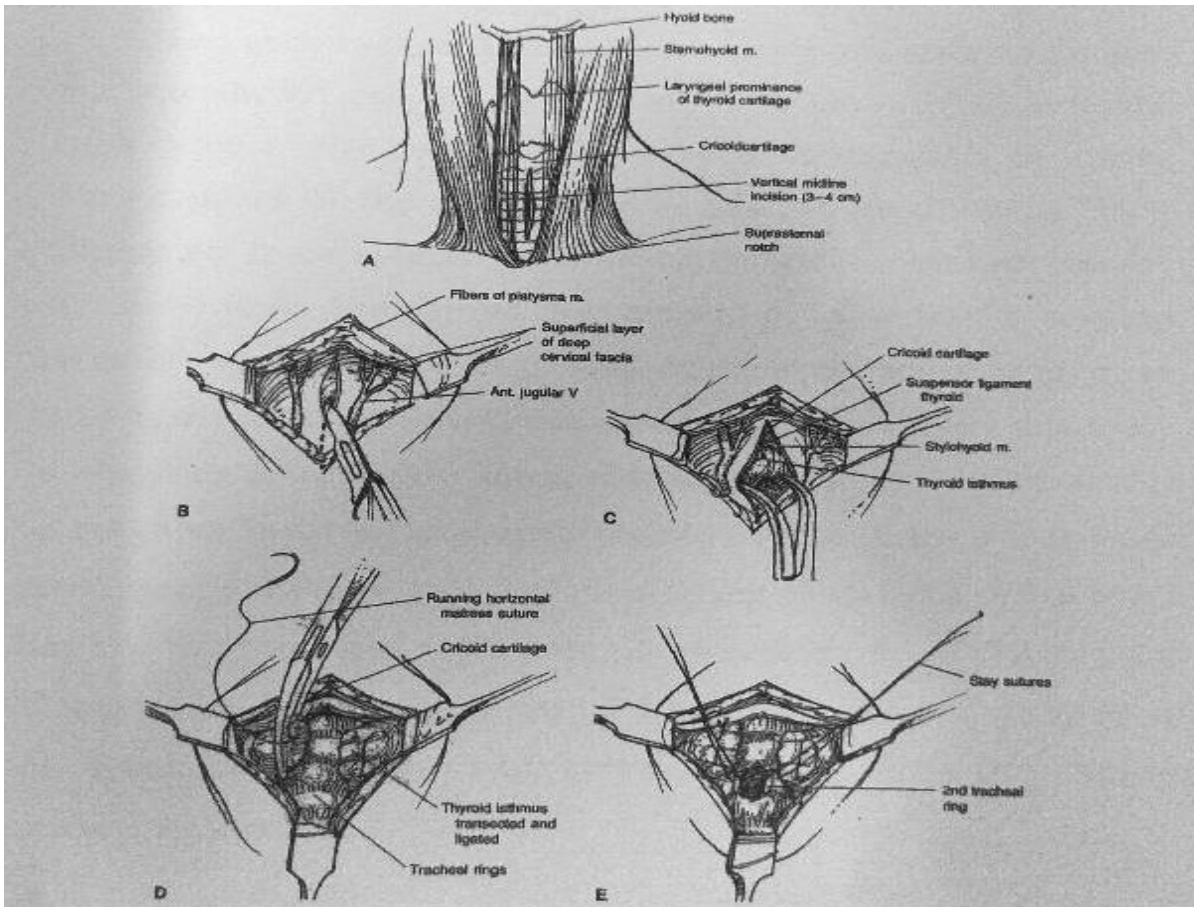


Figure 1. Surgical Tracheostomy

Loose suturing should be done as tight suturing may lead to mediastinal emphysema.

Fluid Imbalances:

(1) **Respiratory alkalosis:** Common in early post-operative occurs with hyperventilation.

(2) **Respiratory Acidosis:** Occurs with hypoventilation.

(3) **Metabolic Acidosis:** Management is resuscitated and ensure good reperfusion. Replacementof bicarbonate is required in severe acidosis.

(4) **Metabolic alkalosis:** Relatively uncommon, depletion of acid or loss of hydrogen ion results in this condition.

Input and Output of Fluids[13]: Normal individual takes an average of 2000 to 2500ml of water in a day and normal output is around 1500ml. Minimum urinary output is 500ml & insensible loss (skin 75% and lungs 25%).

Fluid and Electrolyte Balance[5]: An adult requires 70gm of protein in 24 hours. Protein requirement may be ignored in first 48 hours as there is no hypoproteinemia. The need of potassium should be remembered as its

deficiency is not seen in 1st 2-3 days, so potassium chloride of 0.2% should be added to glucose saline.

Measurement of Blood Loss is done using weighing gauze, measuring suctioned blood and adjusting the volume of irrigation during operation.[8]

Reasons for Replacement to hypovolemia, hemorrhage and third space loss i.e from intestines and insensible loss i.e burns.[6]

Types of Fluid Replacement:[3] Red blood cells, colloid, crystalloid.

Shock: Defined asa condition in which circulation fails to meet the nutritional needs of the cells and at the same time fails to remove the metabolic waste products.[13]

Types of Shock: 1) Haematogenic/ Hypovolemicshock 2) Traumatic shock. 3) Neurogenic shock. 4) vasovagal shock. 5) psychogenic shock. 7) septic shock. 8) Cardiogenic shockusually caused due to injury to heart, cardiac arrhythmias or congestive cardiac failure.[13, 15]

The compensatory mechanisms which includes i adrenergic discharge. ii)hyperventilation iii) release of vasoactive hormones. iv)resorption of fluid from interstitial tissue v) resorption of fluid from the intercellular to extracellular space. Vi)renal conservation of body water and electrolytes.

Management of Hypovolemic shock: 1) resuscitation. 2) immediate control of bleeding. 3) extra cellular fluid replacement. 4) drugs like sedatives, chronotropic agents[13] (used for patients in bradycardia) 5) inotrophic agents (improve strength of cardiac muscle contraction) 6) Vasoconstrictors (used in neurogenic shock) 7) Beta blockers (cardiogenic shock with stiff myocardium and rapid heart rate) 8) Diuretics (reduced vascular volume).

Management of Postoperative Nausea:

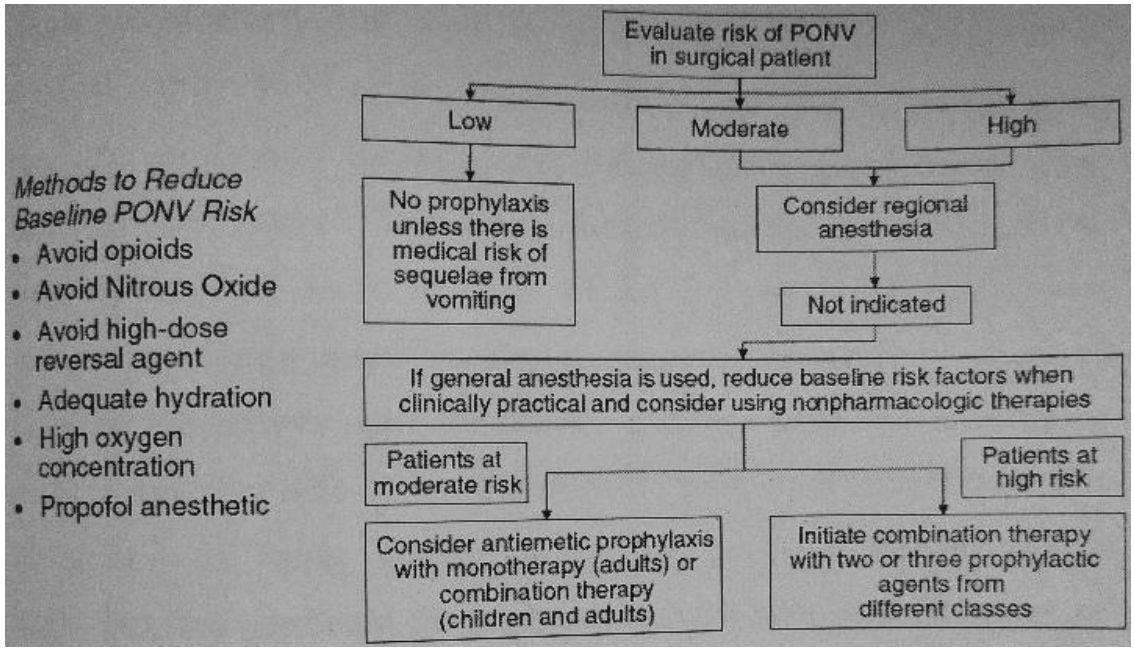


Figure 2. Flowchart showing postoperative nausea (PONV)

Fever: It happens when pyogenic stimulation might activate thermal control centers.

Post Operative Fever Management[4]: Medications like opioids, sedatives and NSAIDS possess immune modulator effects. It may be a normal inflammatory response induced by surgical stress & not by infection. Interleukin-6 concentration seems to be a good predictor of post-operative fever and it acts as a pyrogen in post-surgical patients.

Post Operative Pain Management[2]: A combination of local anesthetic blocks, neuraxial blockade, parental medications like narcotics and non-steroidalanti-inflammatory drugs are used to relieve from pain. Sometimes constant monitoring is required which is carried out in high dependency unit (HDU).

Respiratory Complications And Management[2]: Post-operative respiratory complications include atelectasis, aspiration pneumonia and other pneumonias. Preoperative treatment with incentive spirometry and chest physical therapy is useful. Sometimes pulmonary infection such as bronchitis or pneumonia should always be treated and operation delayed if possible, with the use of anesthetics has the potential for causing a severe pneumonia after operation. Use of bronchodilator aerosol or ultrasonic mist aerosol, incentive spirometry and oxygen therapy are useful.

Deep Venous Thrombosis Management[2]: It includes a low-dose subcutaneous heparin (5000 units 8 or12 hourly), graded compression support (thromboembolism deterrent) or TED stockings. Thrombosis confined to calf vein carries a low risk of pulmonary embolism so that the patient is given TED stockings and mobilized. INR measured daily until ratio stabilizes.

Traumatic Pneumothorax[13]: Air in pleural cavity is known as pneumothorax and when it is due to trauma is known as traumatic pneumothorax. 3 types: closed, open and tension pneumothorax. Patient may show signs of dyspnea, pain, shock and cyanosis. Hyper-resonance on percussion note and absence of breath sounds on auscultation are seen.

Cardiac Complications[2]: Cardiovascular complications include dysarrthmias, myocardial infarction, ventricular failure and hypertension which is managed by careful volume management and use of diuretics, digoxin afterload reduction therapy and oxygen therapy.

Acute Chest Pain[15]: Commonly encountered are angina pectoris, hyperventilation and myocardial infarction.

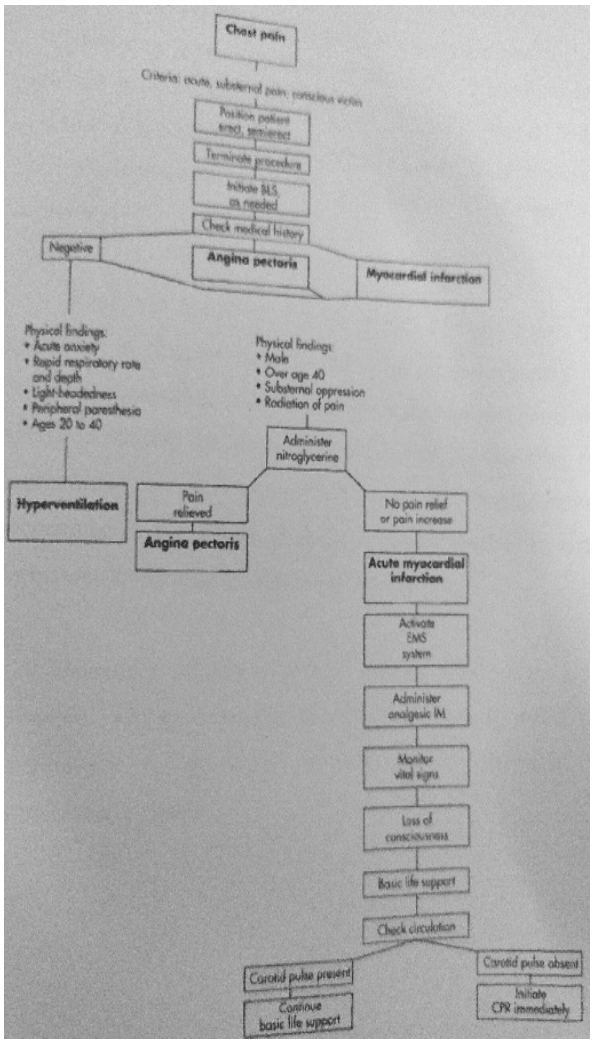


Figure 3. Algorithm showing management of acute chest pain[15]

Post Operative Bleeding Assessment and Management[17]: Reactive bleeding occurs within 24-36 hours of operation. Secondary bleeding usually occurs 7-10 days after operation as deep-seated infection. Reoperation is generally needed after correction of hypovolemic shock.

Hiccups[14]: Caused by spasmodic contraction of diaphragm. Hiccups requires insertion of nasogastric tube and aspiration through such tube. Inj. Pethidine may be required.

Nasogastric Tube[20]: It is inserted before, during or after surgery. Purpose is to decompress the stomach and prevent nausea and vomiting and aspiration. It is removed when bowel sounds are present, flatus or stools have passes and total amount of aspirate is less than 200-300ml in 24 hours.

Diet and Nutrition: For first 6 hours after operation the patient takes liquid diet. Normal diet may be given after post anesthetic nausea has passed off. Routinely intravenous injection of 100ml of 25% glucose in the morning as well in the afternoon. Oral intake should be commenced as soon as possible after surgery.

Suture Removal: Normally after 7 days suture is removed. After suture removal, Steri-Strips are applied over Mastisol liquid adhesive, the area is prevented from getting wet, so that the strips remain for 5-7 days. Most cutaneous infections are treated with cephalexin (Keflex) 500mg twice per day for 7-10 days. Patients allergic to penicillin are placed on clindamycin (cleocin) 150mg QID for 7-10 days.

Conclusion

Careful postoperative care is as important as preoperative preparation for a successful outcome of surgery. Management of post-operative complications by awell-trained critical care unit can better eliminate the morbidity and mortality on a high-risk patient, who underwent surgery.Many complications can be prevented by thorough pre-operativeevaluation, yet the patient who is predisposed to many diseases will be susceptible to complications after surgery. Post-operative care remains an important part of a maxillofacial surgeon's responsibility. Meticulous post-operative care, can decrease the incidence of complications and can enhance the patient's overall recovery. Advances in medical knowledge and technology have bought about a steady decrease in post-operative complications.

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Platelet Rich Fibrin: A Promising Innovation in Periodontics

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Abstract

The periodontal diseases are usually complex and multifactorial, and causes a loss of connective tissue attachment. Thus, regenerating the lost periodontal tissues becomes an important part of the therapy. Procedures such as bone grafts, Guided tissue regeneration (GTR), root biomodifications are routinely used to achieve regeneration but their success rates are limited. Platelets have an important role in regenerating the lost periodontal structures since they release growth factors when they come in contact with damaged tissues. Platelet rich plasma (PRP) and Platelet rich Fibrin (PRF) are platelet concentrates which can be obtained from patient's own blood. Choukroun's PRF is a natural biomaterial which is fibrin based and prepared without any addition of anticoagulant. The slow polymerization speed used during centrifugation renders it to be a better healing material. This article reviews the preparation of PRF and the efficacy of using it in regeneration of various periodontal structures.

Keywords: *Centrifugation, healing, platelets, platelet rich fibrin, regeneration.*

Introduction

Periodontics is defined as "the scientific study of periodontium in health and disease".[1] These diseases are usually complex and multifactorial causing a connective tissue detachment with the resultant breakdown in periodontal tissues. Thus, therapy is aimed at preventing progression of the disease and regenerating the lost tissues which is possible due to biological events like cell adhesion, migration, proliferation and differentiation.[1] Several procedures such as bone grafts, GTR, root biomodification, which are routinely used to achieve this regeneration[2] achieve only a fraction of the total volume of tissues.[3]

Blood, whose main function is to supply oxygen and nutrients to different parts of the body and in turn also carries the metabolic wastes from them, consists of 4 components – RBCs, WBCs, platelets and plasma. Platelets are important in the initiation of wound healing by releasing growth factors, which causes cellular organization, remodelling, migration and proliferation at the site of injury.[4] These properties led to the consideration of platelet concentrates for the purpose of therapy.

Historical background: Regenerative potential of platelets had been considered for use in wound healing since the 1970s and by 1980s their clinical applications had begun with the following timeline:

- 1970- Fibrin Glue by Matras
- 1997- Platelet Rich Plasma by Whitman et al
- 1999- Plasma Rich In Growth Factor (PRGF) by Anitua et al
- 2006- Platelet Rich Fibrin by Choukroun et al
- 2006- Concentrated Growth Factor (CGF) by Sacci

In the initial years, the use of fibrin adhesives clinically was limited due to the complex preparation procedure and the cross-infection risks that it carries. PRP is prepared by collecting patient's own blood in a test tube in which anticoagulants are added. After the first spin, three different layers are formed:

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i. Superficial layer is rich in platelets and some WBC.

ii. Intermediate layer, which is very thin, is rich in WBC.

iii. Deeper layer separates the RBCs.

- For production of Pure – PRP (P-PRP), the upper layer, which is rich in plasma along with superficial buffy coat is collected for 2nd spin.
- For production of Leukocyte rich PRP (L-PRP), the entire buffy coat and a few RBCs are collected for 2nd spin.
- After 2nd spin, the platelet pellets are collected and homogenised by mixing it with lower 1/3rd of plasma and upper 2/3rd is discarded.

However, PRP has some drawbacks[5]:

i. The quality of PRP depends on the numberof platelets and leukocytes, type of anticoagulant used and time of placingthe fibrin scaffold after clotting.

ii. The bovine thrombin which is used as an anticoagulant for production of PRP can develop antibodies against clotting factors such as V, XI and thrombin, which can in turn affect the process of coagulation.

iii. In PRP, the fibrin network is immature and consists mainly of fibrillae with small diameter due to simple fibre polymerisation. This fibrin network supports platelet application during surgery but dissolves quickly.

These limitations led to the development of 2nd generation of platelet concentrates by Choukroun known as Platelet rich fibrin.

Platelets and Platelet Rich Fibrin: Platelets are tiny, irregularly-shaped cells,devoid of nucleus which are derived from larger cells called megakaryocytes. They have a life span of 7 – 10 days. During any injury, when the platelets come in contact with an exposed endothelium, they release certain growth factors to facilitate wound healing.[6] (Table 1)

Table 1: Various growth factors and their functions

Growth factors	Functions
Platelet-derived growth factors (PDGFs)	Cell proliferation, cellular migration, collagen production to repair wound.
Transforming growth factor (TGF)	Angiogenesis, Re-epithelialisation, Regeneration of Connective tissues.
Vascular endothelial growth factor (VEGF)	Angiogenesis, Tissue Remodelling.
Endothelial growth factor	Proliferation and multiplication of endothelial and mesenchymal cells leading to epithelialisation

The platelet concentrates can be classified depending on their leukocyte content and fibrin architecture as follows[10]:

First Generation:

(1) Platelet Rich Plasma (PRP)

(2) Pure Platelet Rich Plasma (P-PRP) / Anitua's Plasma Rich Growth Factor (PRGF)

(3) Leucocyte Platelet Rich Plasma (L-PRP) / L-PRP Gel

Second Generation:

(1) Platelet Rich Fibrin (PRF)

(2) Pure Platelet Rich Fibrin (P-PRF)

(3) Leucocyte Platelet Rich Fibrin (L-PRF)

(4) Concentrated Growth Factor (CGF) (Solid fibrin material with leucocyte)

(5) Advanced Platelet Rich Fibrin (A-PRF)

(6) Injectable Platelet Rich Fibrin (I-PRF): (used to prepare sticky bone)

(7) Titanium Platelet Rich Fibrin (T-PRF)

Preparation of PRF: Choukroun's PRF preparation protocol, given in Nice, France[8] requires a blood collection armamentarium, 10 ml dry glass test tube without the anticoagulant, and table centrifuge.

Once the subject's blood is collected and placed in a test tube, it is centrifuged for 12 minutes at 2700 rpm.[9] This results in the blood samples settling to various layers and a coagulation cascade sets off immediately in the absence of an anticoagulant. Thus, the following layers are formed (figure 2):

i. Superficial layer – Straw coloured acellular plasma

ii. Intermediate layer – Fibrin clot

iii. Deeper layer – RBCs

The superficial layer consisting of the acellular plasma is removed. The intermediate layer consisting of the fibrin clot is separated from the deeper layer consisting of RBCs.[10] After removing the clot, it is kept

between two gauge pieces and squeezed to produce the fibrin membrane.[11] The exudates from serum containing proteins Vitronectin and fibronectin hydrates graft materials, rinses surgical site, and storesthe graft. The clot is then placed inside a PRF box and covered to squeeze out the fluids (figure 3). In this way a PRF membrane with a constant thickness that remains hydrated for several hours is obtained.

Clinical implications of PRF[12,13]:

(1) In sinus floor elevation procedures, PRF can be combined with bone grafts to accelerate healing.

(2) In ridge augmentation procedures – to stabilize and protect graft materials.

(3) To preserve the sockets following extraction.

(4) In root coverage procedures for single and multiple tooth recession.

(5) In 3 – walled osseous defects for regeneration.

(6) Treatment of furcation defects.

(7) For cystic cavity filling.

(8) In Implantology, PRF is used for a better osseointegration on the surface of implant.

(9) In the Guided tissue regeneration of periodontal ligament, alveolar bone and cementum.

Advantages of using PRF over PRP[14]:

(1) The preparation technique is simple and cost effective with a single step centrifugation.

(2) It is obtained from an autologous blood sample that requires minimal manipulation.

(3) An external addition of Bovine thrombin is not required, thus averting immunological reactions.

(4) It allows a favourable healing due to a low and completely natural polymerization process.

(5) It can be used solely or in combination with bone grafts to accelerate the healing of the grafted bone.

(6) In case a fibrin membrane is used, a surgery at the donor site becomes unnecessary, thus reducing patient discomfort.

Disadvantages[15]:

- Since an autologous blood is used, the final amount obtained is low.
- It is highly technique sensitive and the PRF protocol has to be strictly followed.
- The clot polymerization necessitates use of a glass-coated tube.
- An experienced clinician is required for PRF manipulation.

Future directions[16,17,18]: A very limited literature is available on the result of using PRF for periodontal surgery and its mechanism of action. There is a need to quantify the release of growth factors over time. Various factors are responsible such as presence or absence of leukocytes and its amount, type of activation, number of platelets, composition of cell and the type of preservation during collection, transportation and centrifugation. The parameters related to centrifuge such as its size, duration, and vibration is also important. Other factors that are essential are cost, ergonomics and amount of the final product formed. Further application of platelet concentrates in clinical practice should be done to acquire more knowledge on PRF.

Conclusion

Choukroun's PRF technique is a simple and inexpensive that brings about a successful regeneration of periodontal tissues. The use of an autologous platelet rich fibrin enhances healing while reducing the disease transmission through blood. However, further clinical trials involving a large number of subjects is required for the long run.

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Minerals and Oral Health

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Abstract

Human body requires abundant amount of minerals, essential elements for proper working and their nonappearance or abundance may bring about serious breaking down of the body and even demise in outrageous cases. Urbanization have influenced the human eating regimen with slanted inclination towards refined eating routine but healthfully denied low quality nourishment and mineral intake reduces immunity and often lead to different oral and systemic diseases. Minerals even in small amount plays a crucial role in growth and development and maintainance of craniofacial and oral structure.

Keywords: *Mineral, Oral Health, Risk factors.*

Introduction

Appropriate support of all metabolically cells and tissues is essential to the overall well-being of the human body. Follow components are compound micronutrients which are required rather in moment amount yet assume a fundamental job in keeping up the uprightness of different physiological and metabolic procedures happening inside living tissues. Anyway there had been constrained knowledge, importance given by oral physicians with respect significance of trace elements.

Classification of Minerals[1]

(A) Major Minerals: Calcium, phosphorous, sodium, potassium, magnesium.

(B) Traceelements: Iron, iodine, fluorine, zinc, copper, cobalt, chromium, manganese, molybdenum, selenium, nickel, tin, silicon, vanadium.

(C) Trace Contaminants With Known Function: Lead, mercury, barium, boron, aluminium

Role of Major Minerals

(A) Calcium: The best natural sources are milk and milk products, eggs and fish.

Its function are:

- Formation of bones and teeth.
- Coagulation of blood.
- Contraction of muscles.
- milk creation.
- keeping the cell membranes undamaged.
- Metabolism of enzymes and hormones.

A day by day admission of 400 to 500 mg is required for adults. No obvious disease because of insufficiency has been observed.

Sources: Milk, yogurt, cheese, beans, and kale.

(B) Phosphorous: It is widely distributed in food stuff. It is essential for the formation of bones and teeth although specific requirements have not been recommended, some researchers have recommended that its admission ought to be atleast equivalent to calcium consumption.

(C) Magnesium: Magnesium constructs strong enamel for your teeth and counteracts the development of cavities.

Sources: Spinach, kale, dark chocolate.

(D) Potassium: Needed for nerve function and muscle contraction.

Sources: Vegetables, legumes, fruits, milk, cheese, variousmeats, whole grains.

Role of Trace Elements and Contaminants

1. **Copper:** Copper is the third most rich follow component with just 75-100mg. Copper is available in pretty much every tissue of the body and is put away mainly in the liver alongside the heart and kidney[2]. Copper is transferred to the liver in the gut and discharged into bile.

Biological Functions: A noteworthy number of metabolic enzymes work appropriately because of copper.

- Plays a vital role in aerobic respiration energy production.
- production of hemoglobin.
- Melanin production.
- Thyroid hormone thyroxine production[3].
- Copper can be an antioxidant as well as a prooxidant.

Role in Oral Health and Diseases

- Long-term dietary deficiency of Cu, particularly during active growth stages causes deficient keratinisation and anemia[4].
- Infections: decreased immunity may lead to different oral cavity infections due to accompanied neutropenia[5].
- Bone defects and pain: bone deficiency modifications include loss of cortex thinning trabecular formation. Osteoporosis and formation of occipital horns may occur owing to copper-requiring enzyme functional deficiency.
- Oral lesions: India's average intake of copper is 2.1–3.9 mg / day, whereas it is more than 5 mg / day owing to intake of areca nut.It cause OSMF and leukoplakia.
- Cu is also believed to possess caries promoting property.

2. **Zinc:** There are 2–4 grams of Zn spread all over the human body. Zinc is stored in the prostate, eye, brain, muscle, bone, kidney, and liver parts. It is the second most abundant transition metal after iron in humans[6].

   Biological Functions: Zinc can be split into three primary classifications: catalytic, regulatory, and structural. The catalytic activity requires a big amount of enzymes[7]. It plays a major role in the function of immune, wound healing, protein synthesis, DNA synthesis and cell division. For proper sense of taste and smell zinc is required.

Role in Oral Health and Diseases

- Zinc naturally occurs in the oral cavity in plaque, saliva and enamel. Zinc is converted into oral health products to regulate plaque, decrease malodor and delay calculus formation.
- Taste disorders: the role of zinc in taste functions can be valued at various organizational levels, such as taste buds, sensory nerve transmission, and brain[10].
- Zinc-deficient diet may lead to normal orthokeratinized oral mucosa parakeratosis. Zinc deficiency may therefore be a potential risk factor for oral and periodontal diseases.
- As transferrin carries iron and zinc, zinc levels increase as iron levels decrease in patients with iron deficiency.. Thus, OSMF patients with iron deficiency anemia also show higher serum zinc levels.

3. **Iron:** Iron is the human body's most abundant essential trace element. The total iron content in the body is approximately 3–5 g, most of it in the blood, and the rest in the liver, bone marrow, and hememuscles[11].

   Biological Functions: Heme is the major ferrous or ferric iron-containing substance found in hemoglobin, myoglobin, and cytochrome. Heme forms covalent bonds to create hemoglobin, the main oxygen carrying pigment, in mammalian RBCs with the globin protein[8].

Role in Oral Health and Diseases:

- Iron deficiency anemia is the most frequent expression of low serum concentrations of this significant trace element.
- Oral premalignant lesions and conditions: OSMF patients encountered important decreases in serum iron levels with elevated complete iron binding ability.

4. **Cobalt:** Cobalt is an important trace element that can happen for the human body in both organic and inorganic forms. It is an essential component of organically formed vitamin B12 and plays an important role in the creation of amino acids and neurotransmitters. The human body is poisonous through inorganic cobalt forms.

Biological Functions:

- Cobalt is needed to efficiently form amino acids and various proteins for myelin sheath manufacturing. Cobalt also plays a crucial role in producing the neurotransmitters that an organism needs to operate properly[9].

Role in Oral Health:

- In relation to erythropoiesis, vitamin B12 also plays a significant role in nerve repair and regeneration.
- Cr, Co, Ni and amalgam alloys released from metal alloys frequently used in oral cavity dentistry were connected with lichen planus and oral lichenoid responses.

5. **Chromium:** Chromium exists in the oxidation states of both insoluble and soluble forms.The total body content of chromium is relatively low and is about 0.006 g in an average healthy human adult. Trivalent Cr is an essential trace element and, by serving as a cofactor for insulin action.

   Chromium exposure was correlated by occupation through inhalation with multiple lung, GIT, and central nervous system cancers. Chromium is primarily excreted in urine and faeces and tiny quantities in hair, sweat and bile[10].

   Biological Functions: Chromium helps in controlling blood sugar and lipid levels. It improves the efficiency of insulin and stimulates glucose absorption from muscles and other tissues.

   Role in Oral Health and Diseases: Hyperglycemic status of undiagnosed chromium-deficient patients may lead in a broad spectrum of oral manifestations observed in diabetes such as delayed wound healing, suppurative periodontitis, multiple oral fungal infections, premature periodontal illnesses, and hyposalivation[11].

6. **Selenium:** Selenium is a essential trace element in antioxidant enzymes such as glutathione peroxides and reductase of thioredoxin. Too much is detrimental to the human body.

   Biological Functions: Selenium has anti-proliferative and immunomodulatory properties.

   Role in Oral Health and Diseases: Trace components such as selenium is an significant rationale for the treatment of pre-malignant tumors such as leukoplakia, situations such as OSMF, and oral cancer patients to decrease oxidative pressure in the body.

7. **Molybdenum:** In 1778 Carl Wilhelm Scheele discovered the element and in 1781 Peter Jacob Hjelm first isolated it.

   Biological Functions: Also influenced is protein synthesis and body growth. High levels of molybdenum can decrease copper absorption and lead to copper deficiency[12].

Role in Oral Health and Diseases

Molybdenum have a cariostatic effect.

8. **Fluorine:** Fluorine makes the body mass negligible and enters the system through food and water.

   Biological Functions: In bone and teeth, fluorine appears in the form of fluorapatite crystals. Fluoride is also believed to stimulate osteoblastic activity in combination with calcium[10].

   Role in Oral Health and Diseases: Dental caries was correlated with low concentrations of fluoride in water. Excessive levels of fluoride may lead in a sort of enamel hypoplasia during the calcification phase of the teeth.

9. **Iodine:** Iodine is required in all periods of life during the formative years. Maintaining the daily functions of the body is essential and due to deficiency or excess there may be effects on the body.

Biological Functions

Iodine plays an important role in thyroid hormones.

It helps in

- Metabolism
- Development of brain.
- Immune function.

Role in Oral Health and Diseases: The most frequently reported symptoms of iodine deficiency are extreme fatigue, irritability, mental disorders, weight gain. Iodine deficiency in children causes cretinism.

Adult hyperthyroidism can result in Addison's disease.

Conclusion

Deficient consumption of an important trace element may reduce important biological functions within tissues, and restoring the physiological concentrations of that element may facilitate or deter impairment.Preventive medicine has gained more oral attention nowadays and general health can not be considered separately and as a matter of reality the oral cavity can efficiently mirror systemic health the combination of different micronutrients and trace components has been used as a therapy for oral illnesses such as oral leukoplakia, oral submucous fibrosis. And so on, as their collective result

is more useful than being applied alone. Consequently, for both general and oral physicians, understanding of clinical aspects of trace elements is becoming essential.

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Ozone-Boon in Dentistry

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Abstract

Since the knowledge of extensive array of actions of **ozone,** it has been proposed to be used in dentistry owing to its antimicrobial, antiseptic, healing property and considerable **biocompatibility**. There have been scattered reports of cases and trials but still lacks enough data to compile recommendations. This review presents with its chemical and biological actions of ozone and its different uses in dentistry in every field.

Keywords: *Ozone, Bactericidal, Dentistry.*

Introduction

Ozone is derived from Greek word "OZEIN" meaning odor. It was first mentioned by Martin Van Marun in 1785 but in 1840 Christian Friedrich Schoenlein, Professor in University of Basel explained the different properties of oxygen and ozone. Since 19th century ozone has been used for various therapeutic purposes. [1] Ozone molecules comprises of three oxygen atoms and present in small amounts in upper layer of atmosphere abundantly. It is known to have protective effects against ultraviolet rays and self-cleansing property as well.[2]

With proven bactericidal, fungicidal and disinfectant activity ozone has been widely used in medical fields surgery, cosmetics as well as in dental infections. Most commonly concentration in medical and dental field ranges from 1-100gm/ml which is 0.05-5%. There are basically three forms of availability: gaseous form, ozonated water and oil form. [3]

Mode of Action

Antimicrobial Effect: As per the available scientific literature, ozone has been effective in killing wide range of gram positive and gram-negative bacteria including those which are antibiotic-resistant. It acts mainly by chemically damaging the bonds in cytoplasmic membrane and altering intracellular contents which occurs due to secondary oxidants effects. However, these actions are non-specific but selective to microbial cells and cause no damage to human cells which carries inherent antioxidant ability. Thanomsub et al also proved enhanced antimicrobial activity in aqueous environment with acidic pH.[4-5] In 2003, Babior BM made a striking discovery that ozone can be produced in vivo within neutrophil which are activated physiologically and pathologically. This discovery also emphasized its bactericidal activity which is also a part of amplifying processes in inflammation and activating associated genes.[6]

Action on Immune system: ozone affects cellular as well humoral immune system. Also, it enhances proliferation of cells in immune system and immunoglobulins. It increases sensitivity and activity of macrophages intensifying phagocytosis process.[7] Viebahn- Hansler R reported that use of ozone-based therapy resulted in increased interferon production, tumor necrosis factor and interleukin-2 which subsequently lead to torrent of immunological based reactions. Thus, indirectly hinting towards its efficient use in patient with compromised immune systems.[8]

Action against inflammation and Pain: various available literature has well proven the fact that ozone has both analgesic as well as anti-inflammatory effect. It acts in various ways on different targets by decreasing the production of inflammatory mediators, inactivating the metabolic products of pain pathway by oxidation and also by enhancing the vascular supply which in turn improves oxygen availability to tissues and thereby eliminating toxic products. Ozone being negatively

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charged ion neutralizes the acidic environment of infection.[9-10]

Uses of Ozone in Dentistry: Multifaceted antibacterial action of ozone makes it a potential therapeutic and preventive agent to be used in different fields of dentistry in different forms.

Dental Caries: Being a microbial associated disease process ozone have been suggested as alternative to arrest or reverse the carious lesions justifying era of minimal intervention dentistry. It has been proven to eliminate and thus reduce the bacterial load.[11] Baysan proved in his study that bacterial load is considerably reduced in carious root lesion and progression of dental caries clinically ceases.[12]

Liquid and gaseous forms of ozone have shown remarkable antimicrobial activity against *E. fecalis* and *S. mutans* in vitro as well as in ex-vivo conditions thus can be recommended to be used in medical management of dental caries. These forms can be easily accessible and suitably used with toothbrush and other chairside procedures.[13]

Documented trials have also been done to assess the effect of ozone treatment in crown lesions as well as on root lesions and it significantly proved that intervention using ozone stops or regress the dental caries process. Combination of ozone with photodynamic treatment have shown little effect on microbial colonies in plaque biofim.[14]

However still there remains need for further exploration withmore robust research design to provide with suitable and viable alternative form with more documented evidence for clinical use widely.

Dental Plaque: Dental caries and periodontal diseases are mainly plaque derived diseases.

Ozone being bactericidal has been proposed to control microorganisms constituting dental plaque. Oil form has been used for treatment of acute necrotizing ulcerative gingivitis. Because of its bactericidal property and enhanced oxidizing activity it has been effectively used as subgingival irrigant. Aqueous form of ozone has shown similar antimicrobial and antifibroblastic activity as 2.5% sodium hypochlorite. It is a potent antiseptic with less cytotoxicity and demonstrate supreme biocompatibility for use in oral cavity. This can be used as an adjunct to conventional restorative and periodontal therapy owing to its multivariate antimicrobial actions.[15]

Oro-mucosal Conditions

Apthous Ulcer: certain reports have suggested its topical use for recurrent aphthous ulceration in tongue and lip, however it needs further investigation for validation. It has also been tried in aphthous stomatitis in cases of patient with compromised immune system and other available options failed to give desirable results.[16]

Mucositis: Scattered reports in literature indicated use of ozone gas and oil form to be advantageous in use for treatment of chemotherapy and radiotherapy induced mucositis. Currently various research is going on to derive treatment protocol using ozone as preventive agent in these cases.

Temporomandibular Joint Disorders: Daif conducted a randomized controlled study to evaluate effect of administration of intra-articular ozonated water in cases of internal derangement of temporomandibular joint and disc displacement and proved its efficacy in 87% of patients. However additional scientific evidence is required to provide more considerable results.[17]

Endodontic uses: With the change in concept from mechanical to chemical preparation of root canal system morefocus is given on disinfection of root canal system reducing bacterial load thereby assuring increase in success rate. Ozone water had been proposed and investigated to be used as root canal irrigant. This has been found to be efficacious in reducing endodontic pathogens mainly *E. fecalis, Candidaalbicans*, *Pseudomonas aeruginosa.*[18]

Oil form of ozone has been used successfully with equal efficacy as sodium hypochlorite and sodium peroxide combination. This also eliminated the odor caused due to anaerobic activity in teeth with chronic infection.[19]

Bleaching: Use of ozone for 3-4min on inner aspect of root canals of discolored and non-vital teeth provided significantly superior results and esthetic outcome.[20]

This was first attempted by Tessier et al in growing rats experimental model in reducing the stains on incisors by tetracycline. further studies are required for its potential use clinically.[21]

Root Sensitivity: Use of ozone spray for 60 seconds on exposed dentin followed by wash with mineral water in cyclic manner resulted in quick relief. This effect of desensitization lasted longer as ozone could

successfully remove the smear layer on root surface, opening of dentinal tubules and efficaciously plugging thereby reducing exchange of fluids and thereby sensitivity. Thus, it is a quick and long-lasting method for desensitization. Various combinationshave been tried by different researchers in assessing its effect in molar incisor hypomineralisation and showed effective and prolonged reduction in sensitivity with CPP-ACP paste.[22]

Wound Healing: ozonated water and oil has been used in cases of aphthous ulcers, herpes labialis, ANUG, alveolitis, gingival infections, etc. as it enhances physiological healing as well as controls opportunistic infections. It has shown significant reduction in time post extraction as it forms a pseudomembrane and thereby protecting from any further trauma. It has noteworthy impact in healing of jaw bones which has compromised vascular supply due to radiotherapy, thus used as adjunct in therapeutic bone healing postoperative. [23-24]

Prosthodontics & Implants: Plaque accumulation on denture comprises of several microorganisms mainly C.Albicans which leads to denture stomatitis causing immense discomfort to the old patients. Thishave been proficiently controlled by topical application of ozonated oil over the mucosal surface as well as acrylic surface ensuring complete disinfection. Also using ozonated water(2-4 mg/l) as mouth rinse for 1min by the patient wearing dentures have proven to be effectively reduce incidence of stomatitis and reducing growth of candida albicans.[25]In field of implantology ozone works as miracle as it aids in regeneration of periodontium similar to natural teeth. When used along with cyclosporine, ozone oil has demonstrated increased bone density and quality of osseointegration of dental implants.

Pediatric Dentistry: Ozone has been a boon to pediatric dentistry especially in children with phobias. It has been used in managing carious lesions by exposing the lesion to ozone for 60 seconds as it results in sterilization of the lesion and in turn promoting remineralization. Though till now there is not enough data to substantiate its use as solo agent for the treatment of dental caries but can be used in combination with conventional restorative techniques.[26-27]

Conclusion

With ever changing concepts and innovations in dentistry the concept of treatment has changed from surgical to medical management of lesions. Ozone being a wide spectrum antiseptic available in various forms and having considerable biocompatibility proves to be a viable alternative to treat wide range of problems in dentistry. It can be either used solo or as adjunct or in combination with other traditional and conventional treatment regimen. However, this calls for further research and more compiled data to derive the protocol and design recommendation for usage of ozone in dentistry.

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An Unusual Presentation of Laryngopharyngeal Reflux in a 12 Year Old Boy: A Case Report

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Abstract

Laryngopharyngeal reflux (LPR) refers to laryngopharyngeal involvement of gastroesophageal reflux disease. Finding of LPR is carried out by surveying the clinical indications, videolaryngoscopic assessment of the larynx and by double probe pH monitoring. Hoarseness of voice is an important symptom for diagnosis of LPR in children and frequently the only presenting symptom. Double probe pH monitoring which includes esophageal and pharyngeal is both specific and sensitive for finding of LPR. Early diagnosis and treatment often results in improvement of hoarseness and prevent complications. Endoscopic examination of larynx and hypopharynx is vital for patient choice as preferred findings are associated with diagnosis, treatment & outcome. Treatment incorporates the way of life adjustments & medications.Here we are presenting vocal process granuloma, unusual presentations of prolonged laryngopharyngeal reflux in a 12 year old boy.

Keywords: *Laryngopharyngeal reflux, hoarseness of voice, pediatric age, granuloma.*

Introduction

Laryngopharyngeal reflux is a typical clinical substance characterized as the retrograde progression of gastric substance to the larynx and pharynx.[1] It happens when the upper and lower esophageal sphincters don't function effectively and permit the gastric contents & acid dribble into larynx which cause edema and inflammation. LPR gives several indications and ranging from foreign body sensation throat to subglottic edema. The various clinical presentations of LPR in children are usually non-specific. The clinical presentations are postnasal drip, globus sensation in throat, throat clearing,cough, chocking sensation in throat. The endoscopic picture of larynx may cause posterior commissure hypertrophy, ventricular obliteration,vocal fold edema, subglottic edema, presence of granuloma, diffuse laryngeal edemaand thick endolaryngeal mucous.[2] Here, we present a case of LPR in young boy with giant granuloma at posterior larynx.

Case Report: A male child of age 12 year presenting with irritating dry cough ever since five months and dysphonia since 3 months. He was obese child with habit of taking frequent carbonated drinks and exposed to passive smoking from family members. He had a breathy voice, with inability for completing sentence. He has also complain of sensation of fullness in throat, repetitive throat clearing habit since last 2 months. The hoarseness of voice was gradually becoming worse and accompanied by occasional throat pain. He had no past history of prolonged intubation or any traumatic intubation. On examination with flexible nasopharyngolaryngoscopy, there were swollen, reddish mass at both vocal process (Figure 1). Bilateral vocal folds were mobile and congestions seen in posterior part. Sputum sent for acid fast bacilli and found out negative. Chest X-ray appears normal. Routine blood tests were within normal limit. The patient was sent to gastroenterologists for further

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evaluation and to rule out gastroesophageal reflux disease and after 24 hour pharyngeal pH monitoring appears to be laryngopharyngeal reflux. This confirmed acid reflux induced granuloma at the posterior commissure. Patient was planned for micro-laryngeal excision of the both granulomatous lesions of the larynx at vocal process. The both side vocal process granulations were excised and sent for histopathological examinations. The histopathological report revealed non-specific inflammations. The child was beginning on hostile anti-reflux treatment by omeprazole 20 mg orally day by day with steam inhalation for 2 months. He had also undertaken speech therapy after surgery. The parents of the child were counselled and advised for avoiding passive smoking, carbonated drinks, coffee chocolates and reduction of weight of the child. After two months of treatment, there was complete resolution of all the symptoms. Examination of the larynx (Figure 2) by fibreoptic nasopharyngolaryngoscopy revealed normal appearance after 3 months of follow up.

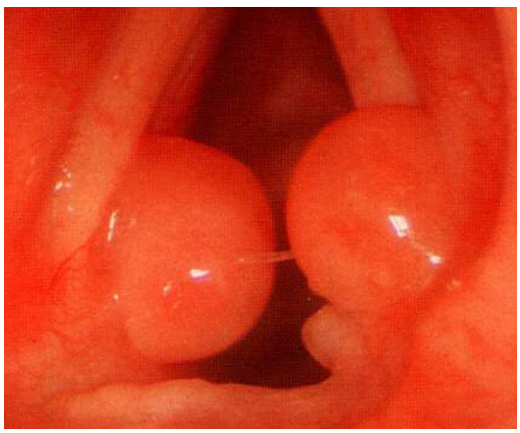


Figure 1. Fibreoptic Laryngoscopic picture of giant granuloma at bilateral vocal process

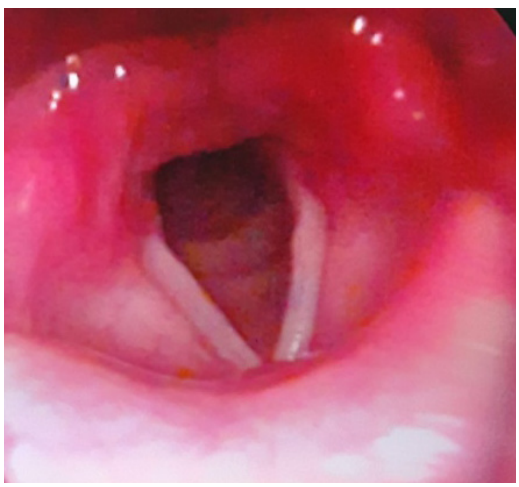


Figure 2. Post-operative view of Larynx after 3 months of treatment.

Discussion

Laryngopharyngeal reflux (LPR) is an inflammatory disease due to back flow of the gastric acid into the larynx and pharynx, where it contacts to the tissues of the upper aerodigestive tract. [3]The physiological hindrances for counteracting LPR are lower esophageal sphincter, esophageal freedom affected by esophageal peristalsis, gravity, saliva and upper esophageal sphincter. At the point when these physiological obstructions fall flat, stomach substance come/corrosive in contact with the laryngopharyngeal tissues, prompting harm of epithelium, ciliary brokenness, adjusted affectability and aggravation. The quality of voice is affected in 6-23% of school going children.[4] LPR is a well-established etiology for hoarseness of voice in children.[5]The most frequent medical symptoms are persistent cough, clearingof throat,globus pharyngeus and roughness of voicein LPR protuberance or foreign body in throat and non-agonizing in nature.[6,7] Heartburn is a common symptom in gastroesophageal reflux disease (GERD) and seen above than 75% cases whereas found less than 40 percents patients with LPR present indigestion/ heartburn.[8]

There are a few hazard factors for creating back laryngeal granulations like delayed intubation, awful intubation, improper endotracheal cylinder site, high sleeve weight and strange laryngeal life structures.[9] However there was no such factor identified in this case. The pathogenesis of vocal process granuloma and association with LPR is still unclear, however it is likely identified with an interference of typical mending process after damage or constant chemical injury of arytenoids or vocal process of the larynx. The critical role of LPR in causing laryngeal granuloma of the vocal process has been exhibited via the reality that the greater part of vocal progression of granuloma determine by clinical treatment of an acid reflux.[10]

Laryngoscopic examination is done by using flexible trans-nasal or rigid trans-oral laryngoscope. The laryngeal findings are vocal fold edema, redness and edema localized to posterior larynx,arytenoid and inter-arytenoid area. Sometimes patients present with having subglottic edema, contact ulcers,granuloma & also pseudosulcus. These phenomena are also frequent pronouncements seen during laryngeal examinations for assessing dysphonic patients. Accurate Laryngoscopic assessment in LPR patient is often difficult,so it isn't informed to cause determination

with respect to LPR exclusively dependent based on Laryngoscopic discoveries.[11] Diagnosis of LPR might be built up by posing inquiries of the manifestations, videolaryngoscopic assessment of the larynx or twofold test pH checking. Mobile 24-hourtwofold test (esophageal and pharyngeal) pH observing is exceptionally delicate and explicit for conclusion of LPR.[12]There is no ideal diagnostic method for LPR in pediatric age. There are different method available for diagnosis of LPR and these are pH monitoring, intra-luminal impedance, barium studies, scintigraphy, ultrasound, fluoroscopy and esophageal biopsy. The present highest quality level test for LPR is the double test 24 hour pH checking. In any case, it is an obtrusive test with false negative outcomes coming to as high as half.[13] Some extra examinations like radiography, esophageal manometry, spectrophotometric estimation of bile reflux and biopsy from mucosa.

Most of the post-intubation injuries on posterior larynx resolves spontaneously whereaswhile nearness of indigestion has been related with delayed danger of damage at the back larynx.The symptomatic improvement is improved by altering the dietary routines. Patients be supposed to eat food untimely i.e. at least 2 hours before bedtime.They are additionally educated against ingestion with respect to extreme espresso or carbonated beverages which influence sharpness and lead to reflux.[14] Highly spiced foods,high fat foods,chocolate and high calorie diet aggravates acid reflux, so should be avoided by patients.[15]LPR patients are advised to stop or avoid smoking.Weight reduction is an important criterion for patient experiencing LPR because of predominance of the manifestations in corpulent patients.Patients are advised for regular exercises of atleast 30minutes each day as less active children are more prone for developing of LPR.[16] In case of giant granulomatous lesions at vocal process affecting laryngeal function, need micro-laryngeal surgery and biopsy as done in this case.

Conclusion

Laryngopharyngeal reflux (LPR)suspected from the patient history and endoscopic findings. Granuloma at posterior larynx is a long term and severe complications of LPR. Multichannel intra-luminal impedence and pH monitoring studies are useful for confirmation of LPR. There are no specific tests for diagnosing LPR. Empirical treatment with PPIs has been broadly acknowledged as an analytic tests & treatment alternatives of LPR. Other treatment are dietary adjustments and life style modification like avoid passive and active smoking and drinking alcohol, weight loss and avoid caffeine.

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Oral & Perioral Piercing: Fashion or Vandalization from Dentists' Perspective

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Abstract

Oral & perioral piercing has been an age-old tradition among people throughout the world including India. Until most recently seen among the youth primely, apart from various tribal communities- as signs of traditional norms, maturity in adolescents, trend setting or various cultural & religious faith. Being an extremely painful process, it possesses various complications that are deleterious & can be overcome to a larger extent with proper counseling and post-operative care. The aim of this review article is to throw light upon cons of this body adornments & character played by dentists in overcoming such complications.

Keywords: *Oral & Perioral Piercing, Adolescents, Dentists, Complications.*

Introduction

Oral piercing is a form of beautifying procedure in which a needle is inserted, generally without anesthesia into the oral cavity or perioral structures followed by different forms of jewelry that can be made of metals or acrylics[1]. Various reasons associated with these customs are religious beliefs, style statements, symbol of bravery, adding to glamour, mark of puberty in some boys & girls, after nuptuals, identity of various tribal communities, self-distinctiveness for adolescents[2,3].

History: The foremost depiction of piercing was in the frame of a dog fabricated by 1500 BC, in Egypt, regarded as a symbol of grandeur and was revived by 1970s in the West. Body discerning is also evident in the Bible. Oral piercing specially started among the ancient forest ethnic groups residing in Indonesia, Africa and South America. American races like Haida, Mayans, Tlingit & Aztecs began piercing tongue as a grand custom- believed to please deities. Even Asian & Middle Eastern Sufis & Fakirs daunt pierced tongue. Eskimos show labret pressed into lower lip as a representation of transition to manhood in boys and as an act of sanctification in girls. Males & females from Ethiopia have also been seen to use diverse visage piercings, with a belief that the lip lamella in females help to acquire prestige and demand an upgraded matrimonial price. African tribal ladies don lip lamellae known as "Pelele" adorned over upper lip for venereal reasons. Two tribal groups The Nubas & The Dogon punch their lips, specifically with a ring, a tradition discrete of Africa. The Mayans & The Aztecs pierced their lips with labrets while the Makololo tribes adorned lip plates. In Hindu and Chinese cultures, the lips, cheek or tongue are punched as an age-old custom. In Indian places like West Bengal, Karnataka, etc an old practice of perforating the tongue or cheek using an iron bar, only taken out as the person performs a round of the village collecting alms, held each year as a ceremony. The punk movement put piercing back into fashion in developed countries along with a broader "body painting", i.e., the discretionary moderation of bodily aspects by tattoos, searing, scars or punching. Scully and Chen in 1992, first reported piercing of tongue in medical records[4-9].

Prevalence of Oral Piercing According to Age and Gender: A recent study revealed that oral and/or peri-oral piercings can be found in almost 5.2% of youths found 4-fold greater in females in comparison to males, and higher in athletes compared to their counterparts. The most prevalent ages are 18- 30 years[10]. Firoozmand

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LM et al stated that students, 14 to18 years had 3.6% oral piercing[11]. Adolescents exhibited 4% and 24% tattooing and piercing respectively by Bosello R et al[12]. Average age of a person having pierced tongue is 19 years[13]. 5 New York high schools had 49 adolescents who had oral piercing[14]. A study in England showed prevalence of lip piercings about 0.5% & 0.7% in males and females respectively while tongue piercings around 1% & 1.9% respectively in men and women[15].

Materials used for Oral piercings: Less allergenic and nontoxic materials should be used for jewellery insertion or perforation. Generally, Titanium, 14 or 18K gold, acrylic, stainless steel, stone, wood, bone or ivory are used[16].

Sites of Oral & Perioral Piercings:

1. **Tongue:** Vertical piercing along middle of tongue, anterior to lingual frenum, most common piercing site Dorsoventral. It can also be pierced several times, laterally along the whole width-dorsolateral. These sites increase risk of nerve injury or excessive post-operative bleeding. A more explicit form of piercing of tongue involves separation of anterior region into two different halves, thus giving rise to bifid tongue cut either with a scalpel or by passing a nylon thread within the piercing site and then braiding it for weeks, until his thread moves fully along anterior region of tongue. Tongue piercings usually require initial long barbell, to allow for postoperative healing to occur. Once the wound starts healing (i.e within 2-4 weeks), a smaller jewelry must be put in through to avoid further complications[17].
2. **Lip:** The lip is next most commonly pierced site in oral cavity or midline, also known as Monroe piercing, might also be pierced a bit off the mark at times. Captive-bead rings are mostly preferred over labrets for postoperative swelling and are easily cleaned than labrets. Once the swelling has subsided, ring may be replaced with a labret. The lower lip usually pierced through mucosal tissue just below the vermillion and the size of jewelry depends upon tissue thickness pierced[18].
3. **Frenum:** Mandibular lingual frenum and Maxillary labial frenum are most commonly pierced. Buccal frena are rarely pierced. Piercing done through fold of mucosa present under the tongue for the lingual frenum and under lining mucosa of upper lip between central incisors for labial frenum. These piercings are relatively simple and quickly healing but postoperative care for lingual frenum piercings are complicated as food contaminates the area each and every time. Both ring and barbell can be worn in these punchings[18,19].
4. **Uvula:** Uvula is least commonly pierced site due to its critical anatomy, chance of jewelry aspiration and difficulty in normal functional activities like swallowing. Captive bead ring is mosly used jewelry[18].
5. **Cheek:** Cheek piercing is generally seen near dimples. It involves perforation of cheek from external tissue towards oral cavity. The usual placement of jewelry is symmetrical on either side of the face. jewels like barbells or labrets are commonly used[19].
6. **Tooth:** This has been, tried earlier but could not be succeeded due to functional difficulties of piercing the teeth through and through for donning rings, until most recently the trend setter is dental gems or jewelries being cemented to the labial surface of maxillary and mandibular incisors or cuspids after drilling the tooth slightly[18,].

Dental inlays and crown: The use of dental inlays and crown for beautification, is a form of mere tooth disfigurement encountered within present day people in the outskirts of tropics, carried out to mark prosperity or any memorable noble incident of their lives. In India too, the teeth of Hindu kings were restored using inlays of glass or pearls. The ancient Roman civilization also provides many such evidence of gold- dental restoration. In Muslims, the presence of a gold crown on an anterior tooth symbolizes his/her visit to the holy pilgrimage of Mecca[20].

Short term & Long-term complications of oral and perioral piercing

1. **Pain:** Mainly due to the fact that these piercings are done by un-trained professionals, without local anaesthesia, using unsterilized armamentarium, thus are quite painful to the wearer because of inflammation as an immediate response to the wound[21].
2. **Hemorrhage:** Due to punching of tissues, the blood vessels and vascular nerves might be harmed and mutilated, which is of major concern in case of medically compromised patients and in case of tongue piercing as tongue being a majorly

vascularized tissue. Some cases have also witnessed hypotensive syncope. Lip piercing can also depict profuse bleeding in case of tear or trauma though bleeding can be controlled in most of the cases[22,23,24].

3. **Swelling & Inflammation:** Ulceration followed by inflammation is quite painful and is evident in 9% of recipients. Swelling is evident within 6- 8 years of piercing and reaches its maximum potential by 3rd day, which can compromise deglutition speech and even breathing[25-30].

4. **Nerve damage & paraesthesia:** It is to be kept in mind during tongue piercing so that lingual frenum id not damaged, which can give rise to serious complications[25].

5. **Anaphylactic reactions:** Allergic contact dermatitis can be seen due to the material used in different forms of jewellery the Europian union has strictly advised to reform the nickel content of jewelries to be not more than 0.05%, and gold used to be of 14-18 K[22,25,26].

6. **Localized Infections:** As the dental or oral jewelry bearers are not always provided with adequate infection control measures, so the instruments that invade the subcutaneous tissues are the prime cause of localized infections in these folks. Moreover, the aggregation of plaque and calculus worsens the condition of infection[31-33].

7. **Tissue Alterations or hyperplasia:** This is mainly a long term complication giving rise to hyperplastic scarring or hyperplastic overgrowth of the tissue over the jewelry itself, making it extremely painful and mandating surgical removal followed by a sterile labret insertion, which is found to recurr[34-36].

8. **Dental Trauma:** A complicated late presentation of tongue or lip piercings are mainly tooth attrition, fracture, dental decay, erosion, faulty oral habits of playing with the jewelry etc. which is deleterious for both oral and dental health[37-38].

9. **Increased salivary flow and speech impediment:** In case of any foreign material insertion within the oral cavity tends to increase the salivary secretion. Moreover, the tongue piercings cause transient disphonia, which normalizes within a week or two[39].

10. **Bacterial plaque accumulation, Gingival Recession, Clinical attachment loss & Bone Changes:** These are all these long-term results of faulty or specifically oversized oral jewellery, that acts as the major irritating factor thus giving rise to fenestrations[40].

11. **Aspiration or Ingestion:** A real time emergency in case the bar ball type of oral piercing has got loose threads and thus slips down the throat to reach the lungs or even during its removal slacks suddenly[41].

12. **Ludwig's Angina:** It is a life-threatening health condition that demands immediate professional care, mainly arises due to increased tongue swelling, respiratory tract obstruction & rapid transmission of infection to all three spaces, from either tongue, lip or cheek piercings[41].

13. **Communicable diseases:** Blood borne diseases namely bacterial endocarditis, HSV, Epstein Barr Virus, HIV and many such are caused mainly due to faulty infection control and improper hygiene of the piercing parlours[42,43].

14. **Radiographic alterations:** These create radio opacities thus giving rise to artifacts during panoramic radiographies, which must be avoided during radiographic exposure[41].

Post-Operative Oral care[40]

- Cold and liquid diet for 24 hours followed by soft food.
- Cold pack application both externally for half an hour with intra oral ice compression for 45 minutes on an average for at least 5 days post injury.
- Using alcohol free mouthwash containing 0.02% Chlorhexidine for at least 2 weeks.
- Avoid consumption of caffiene, alcohol, cigarettes, tobacco during the healing period that interferes with re-epithelialization.
- Talking less, mostly preferable for comfort and easy oral tissue recovery.
- Exchange a long sized jewellery with a shorter one after healing, as it is advisable for both dental hard tissue safety & oral hygiene maintenance.
- Try to maintain thorough oral prophylaxis so that the wound healing along the piercing is proper. Use a soft bristle brush to avoid any irritation.
- Check for any fulminating infection both peripherally as well as under the piercing site, in case it persists consult oral physician as soon as possible.
- In case of threaded piercings, check for proper fit

every second or third day a week, to avoid any mishap.

Conclusion

Thus oral & perioral piercings which is a trend, most commonly seen in the youths of both developing and developed countries along with several tribals, pose an extremely dangerous threat to not only oral health but systemic health as well. According to the AAPD guidelines, these practices should be abandoned. But in case of any such practices, young children should obtain proper approval of their parents. Moreover, the persons practicing these as occupation should also abide by all the universal infection control measures, to avoid any infections following piercing. Dentists being the prime and first professionals to face these consequences should try to impart a powerful message regarding the ill effects of such behavioral executions to specially the youth, which is falling prey to these malpractices most easily.

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Patient Centered Care: A Paradigm Shift in the Delivery of Oral Health Care

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Abstract

Patient centered care is a nonlinear and archetypal approach towards treatment planning of patients which acknowledges the patient as an individual with his/her own tale to tell. It enhances trust and rapport, provides clarity and characterizes the patient's symptoms and concerns. After generating and testing many hypotheses patient-oriented care lays the robust foundation for an ongoing treatment. The two pillars of patient centered care are oral health literacy which helps in non-judgmental articulation of where the patient and the oral health care provider's level "is at" and oral health coaching which primarily focuses on the intentional behavioral change and evolving towards positive attitude towards any treatment. Yet the backbone of this approach is the dental team performance because outcomes of any dental treatment are deeply interlinked with team performance. Through effective communication low level of health literacy can be identified and patients can be empowered, encouraged and motivated to take responsibility of their self-care. Thus, this review article provides a holistic approach using a rich history of social and psychological science citing major perspectives and insights from behavioral sciences, clinical practice management and public health, coupling it with patient empowerment and comprehensive care.

Keywords: *Patient centered care, oral health care, oral health literacy, oral health coaching, health behavior, motivational interviewing.*

Introduction

Any dental treatment however precise and accurate is rendered unsuccessful without patient compliance. In the 18th century, Voltaire quoted that "Doctors are men and women who prescribe medicines of which they know little, to cure diseases of which they know less, in human beings of whom they know nothing". In today's fast paced digital era of dentistry majority of the dentist's time is dedicated directly on providing oral health care with relatively less time spent on patient interaction and evaluation. Patient centered care is one such gateway which allows the health care providers to have a better understanding of their patients even before looking into their signs and symptoms. It is prototypically individualistic with an emphasis on the unique aspects of self, personal attributes and personal goals[1]. In patient-centered care, a patient's specific health needs and desired health outcomes are the driving force behind all health care decisions. This oral health care approach has paved its way to the center stage wherever quality of dental treatment and effective delivery of oral health care is being prioritized[2]. This approach has become the need of the hour and is worthy of our attention because 54% of the patients symptoms are missed and 45% of patient's concerns are not disclosed by the patient[3]. Dental institutions, clinical practitioners, congressional representatives are now including this phrase in their lexicons but the complete understanding of patient centered care in the dental setting is still largely in its infancy. To understand the ideology of patient centered care one has to have a clear picture of the commonality

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and cohesiveness of this methodology of care with oral health literacy, dental team execution, oral health coaching and above all the power of communication in transforming lives. The prime objective is to be more of a human and then clinician in the process of oral health care delivery.

Values of Patient Centered Care:

1. Shift from being an authoritarian to being a coach
2. Prioritizing patient preferences and expectations
3. Providing optimum comfort and support emotionally and physically
4. Transparency in informing and educating patients about their clinical status, associated risk factors, progress and prognosis of the treatment
5. Increasing the role of family and friends in decision making and patent experience.
6. Continuity of maintenance of oral health care
7. Active collaboration between patients, families and providers.
8. Ease of access to care[4].

Milestones of Patient Centered Care

1. Oral health literacy
2. Dental team performance
3. Oral health coaching

Oral Health Literacy: Oral health is an essential constitutive of overall health and well-being. Oral health literacy is the ability of the individuals to comprehend, attain and plan out an appropriate approach to taking oral health care decisions. It is one of the most crucial factors in determining and executing an efficient treatment plan as it as a strong predictor of individual health status, and their level of general and oral health risk factors

Roadblocks to Oral Health Literacy:

1. Age
2. Social stigma
3. Socio-economic status[5]
4. Fear of the unknown
5. Communicational and linguistic barriers
6. Cultural barriers
7. Health care provider himself can also act as a barrier

Consequences of Poor Oral Health Literacy

1. Lack of understanding of pre and post-operative instructions
2. Lack of patient involvement in the treatment planning
3. Haphazard communication between patient and dentist
4. Inability to achieve the desired result and outcome of the treatment
5. Poor continued maintenance of the oral health after treatment
6. Decreased follow up and poor prognosis of the treatment due to lack of internal motivation

Instruments of Measurement of Oral Health Literacy: Studies on Oral health literacy have been extensively carried out to find tools of assessment for measuring oral health literacy. Some of them are:-

1. Rapid Estimate of Adult Literacy in Dentistry-30 (REALD-30)[6].
2. Rapid Estimate of Adult Literacy in Dentistry-99 (REALD-99)[7].
3. Rapid Estimate of Adult Literacy in Medicine and Dentistry (REALM-D)[8].
4. Test of Functional Health Literacy in Dentistry (TOFLiD)[9].
5. Test of Functional Health Literacy in Adults (TOFHLA)[10].
6. Oral Health Literacy Assessment (OHLI)[11].
7. Health Literacy Management Scale(HeLMS)[12].

Dental Team Performance: Dental teams are at a unique position to provide brief interventions and prevent health risk behaviors to benefit the patient, beyond the remit of solely improving their dental condition. When one decides to enter into the noble profession of health care, he/she has great duty and even greater moral responsibility towards society and the needful people who require medical and dental attention due to plethora of reasons. But the evolution from an amateur to being connoisseurs of care leads to increased perplexity, complexity, steering the physician towards entanglement in cobweb of competition, technology, advancements in the medical and dental field. Hence it becomes even more imperative to go “Back to Basics”. Similarly, in a

dental setup the dentists should have a common goal and work as a team to provide best possible treatment.

Traits of a Dental Team:

1. Be in a constant state of self-reflection
2. Hone and polish their soft skills
3. Be a collaborator rather than a competitor
4. Have a competent diagnostic acumen and skill set
5. Should be amiable and approachable
6. Should exhilarate interdependency and synergy
7. Have the ability of critical thinking and evidence-based decision making
8. Able to effectively cater to needs and expectations of the patient
9. Ability to distinguish between active and quiescent disease and interlink them with risk factors
10. Show compassion, civility and dignity towards the patients, their family and friends
11. Maintain a conducive and professional dental ambience.

Oral Health Coaching: Oral health coaching though neglected and poorly understood is a vital part of patient centered care. It is a dynamic process in which an inquisitive, empathetic broad-minded oral health physician conducts a multidisciplinary step wise assessment to identify certain health risk behaviors and educate the patients to promote their health using a tailored style of communication. Bringing intentional change in the behavior of the patient is dynamic and full of uncertainties.The journey from paternalism to partnership is cumbersome but necessary. In an era where dentistry aims at delivering care-based treatment on the causes of oral diseases instead of their consequences in depth study and various models of health behavior are being proposed.

Conceptual Models of Modifying Health Behavior[13].

1. The Health Belief Model developed by social psychologists at the U.S. Public Health Service in the 1950s
2. Social Cognitive Theory started as the social learning theory in the 1960s by Albert Bandura[14]
3. The Precaution Adoption Process Model was first discussed in 1988 by Weinstein[15]
4. The Theory of Reasoned Action and The Theory of Planned Behavior was formulated by Ajzen and Fishbein[16]
5. The Integrated Behavioral Model was integrated by Fishbein[17]
6. Health Locus of Control Theory is the framework of Rotter's social-learning theory of personality (1954)[18]
7. The Transtheoretical Model of Behavior Change also called as Stages of Change Model was developed by Prochaska and Di Clemente in the late 1970s[19]

Key theories that have unified and evolved out of previously proposed theories are:

- Information, motivation, behavior skills
- Motivational interviewing

Information, Motivation, Behavior Skills: This theory allows for the close inspection of minutiae in behavior. Behavior is the way in which one conducts oneself especially towards others. Behavior arises from one's level of consciousness and most of the unacceptable behavior comes out of insecurity.

The triple aim framework of this theory is

1. Knowledge and information about the behavior
2. Motivation in the individual to perform the behavior
3. Necessary skills to perform the behavior[20]

We as dental physicians have the sapience to inter-relate the risk determinants to the signs presented by the patient and advise the most efficacious treatment to the patient. But we can take a step ahead to educate and guide the patients in the dental set up by informing them about what led to their deteriorated dental and general health conditions and why are they experiencing discomfort in the first place. We should also put forward all the possible treatment options available along with their outcomes, advantages and disadvantages. Then comes the responsibility of motivating the patient towards choosing their individualized treatment option (after thoroughly studying patient behavior, compliance, socio-economic status etc.). Lastly we have to make the patient believe that they are fully capable of holding the reigns of their health in their own hands and the prognosis of the entire process is majorly dependent on their response, attitude and readiness to the treatment.

Motivational Interviewing: Direct persuasion and confrontation are least likely to be effective and successful in modifying any patient's attitude regarding dental treatment rather it can lead to increased resistance towards the health care delivery. It is important to observe patient's verbal and non verbal signs and signals so that we can accurately gauge his readiness towards the treatment as well as behavior change. Motivational interviewing is driven by the ideology that intrinsic motivation resides within the individual and can come to limelight by eliciting certain desirable response from the patient. It is effective in dental practice as it changes the role of the clinician from "telling the patient what to do" to "guiding and supporting them in their decision propelling them towards an achievable goal. Motivational interviewing has been a successful approach for alcohol dependent patients[21] and regular smokers[22].

Coherent Communication: George Bernard Shaw very rightly said that "The single biggest problem in communication is the illusion that it has taken place." The "Lack of Knack of Coherent Communication" is the doom of the dentists. Very often our impaired judgment tends to become a significant limitation in the flow of information from patient to physician during history taking and from physician to patient while giving health care instructions. The similitude in all the three concepts i.e. oral health literacy, dental team performance, and oral health coaching is the need for plain sailing communication. Effective communication is the pre-requisite to appropriate history taking which in the fullness of time facilitates correct diagnosis.

From Conundrum to Communication:

1. Use of open–ended questions to facilitate communications between patient and the dentist
2. Reflective deep active listening to enhance clinical reasoning
3. Being attentive and vigilant and noting the miniscule details
4. Improving linguistic skills as patients are most comfortable in conversing in their native language
5. Being deprived of any pre formed notion and look into each patients with a "fresh set of eyes"

Conclusions

Terry Canale said *"The patient will never care how much you know, until they know how much you care."* As practicing dentists, we should have this clarity that we are not just dental care providers. Dentists now are being redefined as Doctors Engineers and Artists. As doctors they are trained tomanage oral ailments; as engineers they utilize scientific knowledge and principles to analyze and contrive a successful health care delivery framework; as artists they sculpt the dentofacial structures in the most esthetic manner. Consequentially, it is a matter of paramount importance that we start redesigning the care processes and making them more dynamic and personalized by delineating the stereotypical guidelines and introducing new gold standards. This exemplary approach not only diagnoses, restores, preserves, aligns, reconstructs, transforms the oral and maxillofacial structures of the patients but also their lives.

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Microbial Host Interaction in Periodontal Diseases

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Abstract

Various studies were performed to understand the molecular basis of the host microbial interaction. It is the interaction of the microorganisms with the host which determines the course and extent of the periodontal disease. Entry of bacteria itself or bacterial products into the tissues may be important in the disease process and to evade the host defence mechanism. Periodontal diseases such as gingivitis and periodontist are common inflammatory disorders caused by microbiota inhabiting the plaque. This paper highlights the various interaction courses which leads to progression of periodontal disease. It can be stated as a multifactorial disease as collective interactions of etiological agents and host responses along with environmental factors play an important role in the onset and progression of the disease.

Keywords: *Periodontal disease, Bacteria, Host defence.*

Introduction

Periodontal disease is the manifestation of direct or indirect interaction of bacteria or bacterial substances with the host tissue which eventually leads to tissue degradation and expression of the disease. As the disease progresses various serial events takes place in different levels including the bacterial plaque, in the gingival sulcus in epithelium in bone and connective tissues due to imbalance in the tissue homeostasis. The microbial flora triggers the various immune response innate, inflammatory, and of adaptive nature which stimulate periodontal breakdown and collagen destruction and determine the susceptibility of the host to develop the destructive or progressive periodontitis under influence of factors like behavioural, genetic and environmental.[1-3]

The virulence properties of the microbes can be studied as

(a) Factors that favour bacterial species colonisation and invasion of host cells.

(b) Factors responsible for causing direct or indirect tissues degradation.

The defence mechanism of the host comprises of two distinct sets of responses

(a) Innate immunity

(b) Acquired immunity

These responses against the pathogenic bacteria are activated sequentially during the disease progression. Innate immunity can be seen acting immediately and is responsible for recognising the specific bacterial pathogen based on the cell surface receptors. Whereas for acquired immunity it takes a week to develop significant response on the cellular and humoral level.[4]Thus, it can be stated that both host immune and bacterial factors play a dependent role in advances of the diseased state and for bringing various notable changes in the microbial flora present in the oral cavity and to the affected cells.

Evidence acquisition: Computerised searches consisting of published articles received from Google, PubMed, PMC free article, Google Scholar, Science direct, Medline, EMBASS

Different keyword including periodontal disease, bacterial plaque, pathogenesis, virulence, host defence, adherence, coaggregation, invasion, evasion, tissue destruction was used in the literature search. Moreover, the reference of all paper was again searched for further relevant studies.[5]

Discussion

In order for simple understanding of the interaction of the microbes and hostit has been described step by step as

(A) Adherence of bacterial species for colonisation and survival: For survival of any bacterial colony it is necessary for the bacteria to attach itself to any available surface as of primary importance to avoid displacement by the flow of fluids in the oral cavity. Hence adherence can be interpreted as first step of interaction of bacterial species with the host. This is mainly achieved by large molecules called as adhesins present on the bacterial surface. They are categorised as

(a) Fimbrialadhesins

(b) Non- fimbrialadhesins

- Fimbrialadhesins are further classified into five major categories as 1) Chaperone- usher pili 2) curli 3) typeIV pili 4) type III secretion pili 4) type IV secretion pili.
- Non- fimbrialadhesins are 1) auto transporter adhesins2) outer membrane adhesin 3) secreted adhesins 4) biofilm formation associated adhesins.

The attachment can be seen to the pellicle or the saliva coated tooth surface. This adherence as studied on *Actinomyces viscosus* and *Porphyromonas gingivalis* shows attachment of fimbriae on the bacteria surface to the proline rich proteins on the saliva coated tooth surfaces.

Other form of adherence is of *P. gingivalis* to the epithelial cells and fibroblasts, fibronectins through fimbriae.

Studies on plaque present in oral cavity have revealed adherence between different bacterial strains, referred to as coaggregation. The bridges formed by these associations among the initial colonisers help numerous later colonisers to associate with the microbial community. A relevant example is of *A. viscosus* attachment of surface fimbriae to the polysaccharide receptors of *Streptococcus sanguius.*[5]

Few examples of adhesins and target substrates are:

- *A. viscosus*

Attachment surface – tooth or the tissues or *S. sanguis*

Substrate- saliva coated mineralised surface or the epithelial cells.

Bacterial adhesin – fimbriae

Receptors- salivary hydroxyapatite or galactosyl residue

- *P. gingivalis*

Attachment surface- tissue

Substrate- connective tissue

Bacterial adhesion- membrane protein

Substrate receptors- fibrinogen, fibronectin

- *F. nucleatum*

Attachment surface- Pre-existing plaque

Substrate- *P. gingivalis*

Bacterial adhesion- heat and protease sensitive protein

Substrate receptors- galactosyl residues

(B) Host tissue invasion: The bacterial presence in the host tissues have been recognised for years, based on various histological studies it has been seen that there are two method through which bacterial invasion takes places in the host cell. One by causing ulcerations in the epithelium of the gingival sulcus or of the adjacent pockets and have been traced in the intercellular spaces of the gingival tissues. Another mean of tissue invasion may be seen as direct penetration of bacteria into the host epithelium or the connective tissue cell. This have been demonstrated in *A. actinomycetemcomitans, P. gingivalis, F.nucleatum* and *Treponema denticola* during the laboratory investigations.[1,2]

This ability of invasion has been proposed as a key factor to distinguish between the pathogenic and non-pathogenic forms of bacterial species. Localization of bacterial species affect the organism, the host cell by forming an environment which constantly delivers toxic molecules and enzymes to the host tissues. Some studies and investigators suggest that the "bursts of disease activity" observed in periodontitis is related to phases of bacterial invasion in the host tissues. It has also been seen that recolonization of bacterial species may be due to persistent presence of these species in the periodontal pocket acting as a reservoir.

As for the host, it recognises different bacteria and antigens with help of different receptors present in periodontium. Junctional epithelium through its special

structural framework and form along with epithelial and non-epithelial components perform antimicrobial mechanism.[3]It acts as a barrier in terms of physical and chemical dynamics against the pathogenic properties of the microbial film. This is achieved by giving a favourable environment for local immune recognition process. The leukocyte infiltration and antigen diffusion from the gingival crevice into gingival laminators propria is facilitated by smaller connections between the no of desmosomes and gap junction epithelium and by the wide intercellular spaces of junctional epithelium. The gingival epithelial cells, fibroblasts and inflammatory cells respond to the microbes by increasing cytokine expressions and release of growth factors and metalloproteinases. Thus, the chemotactic factors play an important role in maintaining protective response against pathogen of the plaque biofilm.[6,7]

(C) Bacterial evasion of host defence mechanism: For the survival of the bacterial species following neutralisation processes are carried by the species and the host in response. As production of extra cellular capsule-studies have revealed isolation of encapsulated *P. gingivalis* strains from the host tissues and a hypothesis suggests that capsular bacterial strain is protected from the host immune system. Other mechanisms seen are opsonisation in which immune cells known as phagocytes target bacteria and bacterial products and destroy them. To counteract this defence mechanism. Specific bacterial species produce immunoglobulin degrading proteases to destroy phagocytes. They also suppress activity of lymphocytes of polymorphonuclear leukocytes involved in host defence system. As studied in *A. actinomycetemcomitans*, they release two toxins leukotoxin and cytolethal distending toxin that enhances the pathogenicity of the microorganisms in aggressive periodontitis and in chronic state of the disease.[8]

Observations have released that *P. gingivalis* is capable of inhibiting production of interleukin-8, a pro inflammatory chemokine released during the pathogenic entry of the bacteria in the epithelial cells. It can thus be seen that various molecular changes in the bacteria and its effect on the host cell gives it an advantage to evade PMN- mediated destruction.[9-11]

(D) Host tissue damage by the microbes: There are various factors involved in a disease process which gradually cause tissue destruction while progression of the disease. According to studies, it has been seen that in *P. gingivalis*, three compounds of enzymes collectively called fungi pains are responsible for the 85% of total protein degradation activity. There are cysteine protease and are multifunctional protein that helps in tissue degradation, host defence evasion and have role in adhesion process. Bacteria also cause tissue destruction by mechanism of induction, indirectly induces host tissue proteinase such as elastase and matrix metalloproteinases which also cause tissue damage. Hence various interactions and processes interplay which gradually leads to disease formation and severity. It has also been noted that metabolic by product's like ammonia, fatty acids, indoles, volatile sulphur compounds produced by bacteria alter and inhibit the growth of host tissue cells and disturb the metabolic balance of the cell.[12]

Conclusion

Thus, by understanding the molecular basis of periodontal disease by studying the process of interaction between the bacteria and host we can gain opportunities for therapeutic manipulation of the disease and discover various agents and techniques to minimise or to find the cure of the disease. It can also be concluded that *P. gingivalis, A. actinomycetemcomitans* and *T. forsythia* are pathogens when present in sufficient number cause disease state or are main cause for aggressive condition of the disease. The gram-negative bacteria which are the major constituent of the plaque release endotoxins which leads to induction of cytokines production by the host cells. These products result in inflammatory changes like the vascular permeability increase, the blood vessel engorging. Thus, the active host responses are both protective and destructive. The inflammatory chemical mediators released by affected cells such as interleukins, metalloproteins and prostaglandins cause actual destruction of tissue and bone. Hence various articles reviews and researches carried for better understanding of these chemical changes will help researchers to recognise and evaluate disease and formulate method of prevention and cure. As doxycycline, matrix metalloproteinase (MMP) inhibitors.[12] are already being used to treat periodontal conditions. Similarly, cytokines inhibitors, antagonists or destructive cytokines interleukin-1 and tumor necrosis factor which interrupts cell signalling pathways are seen as competent local agents for future use in treating disease and in-patient care.

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Effects of Tobacco in Females all Over the World

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Abstract

Tobacco addiction is one of the greatest public health challenges and a major health issue in both developing and developed nations. It is considered as an epidemic all over the globe and every year over 4.9million deaths are caused due to tobacco use. The World Health Organization (WHO) estimated it to rise up to 10 million annually. In India 40% of the total population including males and females have either smoked or chewed tobacco in some or the other forms. On an average 10.3% of women are smokers in India. Tobacco smoking and chewing is linked with some serious health issues including cancers of any form, cardiopulmonary diseases, low birth weight and other illnesses. All these issues are seen to be increasing in women all over the world. Smoking was found to be a significant risk for various negative health outcomes including oral health problems in women of reproductive age groups. Most of the consequences of tobacco can hamper the normal bodily functions including delayed wound healing to complicated issues like birth defects and even premature death of the baby and the mother. The aim of this review is to highlight the effects of tobacco products on females all over the world and the remedies that can be thought to prevent the population from its abuse.

Keywords: *Tobacco; Smoking; Oral health; Cancer.*

Introduction

Chewable tobacco is more prevalent towards the poor, less educated and socially backward class. When exposed to tobacco the saliva alters its behavior and loses the antioxidant quality which leads to increased number of harmful bacteria, killing the good microbial flora. The epidemic of tobacco use is one of the greatest threats to global health today, and India is the fourth largest consumer and third largest producer of tobacco after China and Brazil. According to the most recent study by the WHO, in June, 2019 there were 8 million deaths globally due to this and 30% of them were women. More than 7million of these deaths are directly linked to tobacco addiction while 1.2 million are the result of second hand smoke. There are various ways to use tobacco, it can be sniffed sucked or smoked. The leading cause of mortality and morbidity in India is because of tobacco and its byproducts and studies have shown that India had the highest number of deaths because of oral cancer.[1-9]

Smoking in women is directly linked to 80% of the COPD deaths each year, which is greater than stroke. The risk of dying of lung cancer is 20times more in female smokers than nonsmokers.[4] Tobacco smoke contains thousands of noxious chemicals including the gaseous and solid particulate phase.[10] The gaseous phase contains carbon monoxide, ammonia, formaldehyde, hydrogen cyanide and many other deadly irritants including 60other carcinogenic compounds. While the solid phase is also called the 'tar' which itself is made out of toxic chemicals like benzene. So passive smoking also known as "second hand smoke" is also as dangerous and cause of lung cancer with heart ailments for the women who have never smoked. Women using tobacco have an increased risk of periodontal and gingival diseases, dental caries and halitosis.[4, 10]

On the aesthetic point of view women who smoke age faster, which is a growing concern in the population. Smoking tobacco of any kind causes facial wrinkles and graying of hair prematurely. It has many adverse reproductive and early childhood effects including increased risk of infertility, premature delivery, stillbirth, low birth weight and sudden infant death syndrome (SIDS). Women users have observed to be showing early menopausal symptoms 3-4 years prior to the actual age with a lot of complications. And women who smoke post-menopausal have low bone density which later leads to osteoporosis and even risk of hip fracture.[4]

The Surgeons general report also suggested that women smokers are more likely to suffer from depression and anxiety disorders than the later. Tobacco usage also have harmful effects on clinical outcomes including surgical and non-surgical therapies among women, as it affects the healing process. On the oral cavity, Tobacco not only causes discoloration of teeth, periodontitis, dental caries, gingivitis,ANUG,but also pre-cancerous lesions like erythroplakia, leukoplakia, oral sub mucous fibrosis.[1]

Nicotine: Nicotine is the main component in tobacco products that makes tobacco users addicted to it. It is a stimulant with properties similar to cocaine and other amphetamines [(1)]. Nicotine is one thousand times more addictive than alcohol, 10-100 times more than barbiturates and 5-10 times morethan cocaineor morphine. The addictive effect of nicotine is due to its capacity to release the happy hormone or dopamine- a chemical in the brain that is associated with feelings of pleasure.[(1)] Hence with time this effect wears off and smokers and chewers need greater amounts of nicotine in any form to achieve the same level of satisfaction. Therefore, the Tobacco users self-medicate themselves by continuing the use of different products. The Oral changes due to tobacco are 1) irritation of the oral mucosa 2) mucosal drying 3) higher intraoral pH 4) alterations of immune response.[1] Tobacco can be used in the form of chewable and smoke, these include beedi,cigarettes, hookah,paan, zarda etc.[1]All these items also contain arsenic and recently in a study, it was revealed that the concentration of arsenic in the scalp hair and blood samples of tobacco chewing patients is more prevalent than non-chewers.[8] Arsenic is one of the most dangerous and life threatening elements to be found in a human body causing several bodily dysfunctioning.[8]

Health Effects of Tobacco: Globally smoking accounts for 1 in 20 deaths among females.[10] Smoking both actively and passively is injurious to health.[10] Approximately half of these users die early before the age of 45-50years. Below are some harmful health effects of tobacco that are important for women to be aware of:

Reproductive Issues:

Women smokers are likely to develop

- More painful and irregular periods
- Low estrogen levels leading to mood swings, fatigue and vaginal dryness
- Early onset of menopause
- Issues for pregnancy

Respiratory Isuues:

There is no cure for COPD which occurs commonly among tobacco smokers. Every year more women die of COPD than men in an alarming amount.[5]

Cardiovascular Issues:

- Tobacco users have increased risk of heart diseases than non-users.[5]
- Women who smoke while using oral contraceptives and are above the age of 35years have a greater risk of heart diseases.[5]
- Women users are more prone to die from an abdominal aortic aneurysm, which is weakening of the blood vessels that carry blood from the heart to the body.[5]

Cancer:

- Tobacco users are facing increased risk of several kinds of cancer including cervical,lung, kidney, ora l,pancreatic,breast,colorectal cancers,etc.
- As already mentioned earlier the carcinogenic property of nicotine that is present in tobacco is the main culprit behind the cause of several kinds of cancer.[5]
- When female smokers become smoke free the mind and body begin to heal by itself and helps the patient to fight the cancer.[5]

Pregnancy and Tobacco:

- There are several effects of tobacco over the pregnant woman and her child. It hampers the normal brain function and development before birth and during early childhood.[5]
- The risk of developmental anomalies in these cases is higher causing syndromes like cleft lip and cleft palate.[5]
- Above that it also affects the fertility of the individual with increased frequency of pelvic inflammatory diseases, which is also a huge factor in ectopic pregnancy.[5]

And last but not the least

Weight Gain:

- Smoking which is one of the most common media of tobacco is directly linked with the sensitive subject of weight gain in females.

- Women are particularly sensitive with weight gain issues at all stages of smoking.
- Compared to their non-obese peers, obese women are more likely to develop nicotineaddiction. And among women who are trying to quit smoking are held back by the fear of gaining weight again.
- And hence it should be made clearer and more aware that in the process of quitting this habit of smoking a significant amount of weight is gained but this decision can avoid other life-threatening effects of smoking.
- Moreover, post cessation weight can always be reduced easily by healthy food choices and exercise.[6]

Conclusion

For some unknown reason some of the effects due to the usage of tobacco vary from male to female and is seen to be more deleterious in females.[6] Hence it is said that if we educate the women, we educate the society, for that interventions among both men and women are required. These awareness programs and discussions should not only be limited to the well to do families but also reach the population with lower socioeconomic status who require the most of these programs.[9]

This can be achieved by two ways:

1. By the government in form of camps, acts, street plays and in general motivating the population to visit the nearest hospital to the dentists and hygienists
2. By the dentists, with the help of public health dentists: They can play an immense role by acting as a role model and a mentor to the affected population and show them the correct path.

Tobacco cessation centers (TCC) should be set up to counsel the patient for a healthier lifestyle and to motivate them for the greater good. This can be achieved with the help of 5As approach that is Ask,Advice,Assess,Assist and Arrange and the 5Rs approach at the chair side which is Relevance,Risk,Reward,Roadblock,Repeat. These procedures should be discussed and interacted with the patient at her every visit. Prevention is always the economical option and hence the government with the help of dentists should find out the high-risk group and divide the users into high, medium and low risk groups and act accordingly. These groups should be at first identified properly and then approached in an individual or community level.

Urban and rural health centers might also help with more visual aids like pamphlets,posters,ads etc. of the effects of tobacco in both oral and general health of the patients. All these efforts must surely motivate the females of all generations to choose a healthier lifestyle and quit tobacco for the better future

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Ethnomedicinal Plants of Odisha: An Alternative Therapeutic Choice Against Multidrug Resistant Bacteria

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Abstract

From the time of second world war, the field of medical microbiology has witnessed emergence of multidrug resistant (MDR) strains of bacterial pathogens, due to many obvious factors. Moreover, empiric therapy also adds 'fuel to the fire' the MDR problem. Unfortunately, there are genetic recombination method, transformation, conjugation and transduction operative in nature facilitating the upgrade of genetic makeup of pathogens from drug sensitivity to resistance. Commensals, *Staphylococcus aureus* and *Escherichia coli* have epitomized the upgrade of genetic makeup deeply, in causing utmost clinical consternations, as *S. aureus/* MRSA is the superbug in the health domain. Notorious MDR *Pseudomonas aeruginosa* is a great killer, by UTI infection. Today, the torrent of MDR pathogens has been recorded to get circulated in communities and escalate to hospitals, causing damnedest shenanigans of 'infection dynamics. Down the ages, plants have been an unwitting source of natural products for human health. World Health Organization is widely holding medicinal plants, nowadays, as the best source of drugs. Approximately 80% population of the developed nationsstill use phytomedicines; therefore, phytomedicines or phytodrugs should be investigated more in order to understand their chemical properties and efficacy as medicines

Keywords: *Ethnomedicinal Plants; MDR bacteria; Therapeutics; Odisha; Antibiotic resistance.*

Introduction

In present day, 70% of population in developing nations are still dependent on customary prescription of plants for their essential medicinal use. Natural medications are as of now are the most sought-after source and their prominence is expanding step by step.[1] Around 1000 plants with therapeutic uses are referenced in ancient vedas and around 800 plants have been utilized in customary medicinal medications. The different indigenous frameworks, for example, Siddha, Ayurveda, Unani and Allopathic utilize a few plant animal varieties to treat distinctive aliments.[2,3] The utilization of home-grown medications getting to be mainstream because of poisonous quality and reactions of allopathic drugs. This prompted unexpected increment in the quantity of home-grown medication makes.[4] Home grown medications as the real cure in customary arrangement of drug have been utilized in medicinal practices since centuries. The practices proceed with today on account of its therapeutic properties just as spot in social convictions in numerous pieces of world and have made a huge commitment towards keeping up human wellbeing. Plants are essential components of medications and one-fourth of pharmaceutical remedy in the US contain no less than one plant-inferred fixing. In the last century, approximately 121 pharmaceutical items were planned dependent on the customary learning acquired from different sources.[5]

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Treatment using plants is an ancient process, practiced from beginning of human origin. The relationship between mankind and their search for drugs is recorded and documented in all civilization, across the world. Knowledge of plants with medicinal properties and their usage is an outcome of years of research and trials by various ancient health care workers to modern day doctors and researchers.[6] Modern day science has approved and accepted the phototherapy and plant-based medicine, known by traditional and ethnomedicinal literatures are being explored now. The information of the growth of concepts linked to the usage of herbal therapeutics with cognizance has improved the capability of healthcare workers and doctors to reply to the queries that have arose with the dispersion of professional services in easing of human's lifecycle.[7] Despite documentation and examinations of numerous phytocompounds and plant-extracts having therapeutic efficacy by researchers no drug/compound has yet been articulated with technical precision for controlling a specific disease.[7] There is a gap between research outcomes and herbal drugs trade till now, since the main stream therapeutic system remains resistive to herbal drugs irrespective of frequent failures of synthetic medicines.[8] In future for more specific needs herbal drugs would serve properly, if those could be used as therapeutic agents, without any dyslogistic prejudgment. Another system, integrative medicine spearhead now-a-days, wherein the regular chemical synthetic drugs are mixed up with herbal medicines for treating critical ailments including cancer.[9]

Emergence and Spread of multidrug resistant bacteria: In last 30 years and more, resistance of pathogenic bacteria to antibiotics and drugs created problems in the control of infectious diseases. Particularly, millions of people of all age groups die each year from infectious diseases such as tuberculosis, respiratory, wound and enteric infections, worldwide.[10] Particularly, due to bacterial diarrhea, 3 million people die each year. The situation becomes leg-shivering due unhygienic and sanitation facilities in developing countries. Virulent enteric bacteria, *Klebsiella*, *Enterobacter, Salmonella, E. coli, Shigella* and a few more are still active in the non-hygienic rural India and these are the causative organisms of high infant mortality and outbreak of epidemics in several tribal pockets, and need due attention, with a proven fact that these pathogens are also multidrug resistant.[11] The emergence and spread of MDR bacteria both in hospital and community settings has been well established by several surveillance reports WHO and other from associated organizations. In fact, it has become the most important challenge for the authorities to control these superbugs. Specifically, enteropathogenic bacteria, *Escherichia coli, Enterobacter aerogenes, Salmonella typhi*, *Salmonella paratyphi, Shigella sonnei, Shigella dysenteriae*, *Klebsiella oxytoca*, *Vibrio cholerae*, and *Enterococcus faecalis* etc. createlife-threatening situations, where more than one kind of infection is diagnosed in patient.[12] Since, the field of medical science depends a lot on the empiric therapy, these bacteria get heavily exposed to antibiotics without any reason, and slowly develop the resistance mechanisms. Particularly the part of our body like oral cavity, gut, skin where we have the maximum population of bacteria, the horizontal transfer of the resistance genes becomes easier and rapid.[13] Antibiotic resistant strains of *Enterobacter* species and other bacteria belonging to Enterobacteriaceae family are the major causative agents of gastrointestinal infections and they spread rapidly in both hospital and community settings. MDR *Klebsiella oxytoca* strains isolated from patients of our hospital are now resistant to almost all antibiotics un the market and it's a leading cause of urinary tract infections.[14] Unscrupulous and unprescribed use of antibiotic is major reason behind the development antibiotic resistance and its spread. As a result, several infectious diseases are becoming increasingly difficult to treat. Moreover, not many new antibiotics are coming to the market which solve this problem of antibiotic resistance and certain bacteria are resistant to the current generation of antibiotics too. If this process of development of antibiotic resistance is not halted, the human and animal society is looking toward a dreadful medical disaster in near future. The medical and scientific fraternity must think of an alternative to antibiotics for the treatment of infectious diseases. Medicinal plants are one of the major alternatives that can be sought after.[15-17]

Ethnomedicinal plants of Odisha: Odisha has typically deciduous rain forests. The Eastern Ghats runs in the western side of state including the Kandhamal district. Eventually, there an undulating terrain in Kandhamal district that leads to ridges which becomes dried up in summer & in furrows the green belt, continues throughout the year. But the vegetation in the mountain top (ridges) gets affected during the hot summer. Secondly, practice of shifting cultivation as well as collection of flowers from *Mahua* plant, forest

fire lit by local inhabitants. This entails obliteration of rare flora (& fauna) from the forest base.[18] From time immemorial the inhabitants belonging the schedule cast and schedule tribe people depends on the forest for their house construction purpose, food, cultural practices as well as health care system. Plants required for house construction purposes are certain timber yielding plants including *bamboo*. The cultivated food species include the upland rice, ragi and corns. Cash crops like turmeric and ginger are produced by them. To grow these crops, they clear the forests which yields them firewood plant and timber plants. This leads to disturbances in natural phytodiversity.[19] For their health care system, they collect wild plants parts & totally depend on them so much that, they do not get from modern medicinal system (Government hospitals). Prima facie, plant-extracts shall be used for control of all pathogenic MDR bacteria, *in vitro,* asslowly, uses of phyto-drugs are deeply held today for their obvious holistic action on the health domain. In other words, a phyto-drug used against one ailment has ameliorating effect on another.[20] Moreover, the ethnic information on plants is a boon to scientific workers, during work on drug targeting. This work should help apothecary in locating phyto-drugs in complementary /supplementary drugs to treat these MDR bacteria. During the last several decades, many phytocompounds have been identified and are used against infections/other ailments.[21] Considering the vast potentiality of plant-drugs as antibacterial and antifungal agents, a systematic investigation would be useful to locate newer ones, which would serve as alternative/ supplementary control agents against MDR pathogens, including against the MDR tubercle bacillus.[22]

Conclusion

To put in sotto voce, a cavalier rather an intransigent attitude for an in-depth study of plants, for health care needs in this present state of rapid emergence of MDR pathogens, would be a pharmacological infraction, not least because chemical drugs cannot be explored, but phytochemicals as antimicrobials too have other health-ameliorating effects.

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Oral Health Related Quality of Life Following Third Molar Surgery & its Complication

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Abstract

Third molar surgery is the most common oral and maxillofacial surgery performed worldwide. Complication of third molar surgery includes pain, dry socket, swelling, bleeding & infection which is most common. Factors affecting third molar surgery include age, sex, medical history, poor oral hygiene, smoking, type of impaction, time taken, surgical technique, use of antibiotics, use of antiseptic subjects & use of intra-socket medicines. In this article, after third molar surgery, we review oral health related quality of life & its complication.

Keywords: *Oral health; Quality of life; third molar surgery.*

Introduction

One of the most common oral and maxillofacial procedures is the surgical removal of the impacted third molar. Many third molar surgeries are done without complication. This may lead to severe patient problem, such as hemorrhage, pain and swelling, infection and dry socket, paresthesia. Major complication of third molar tooth extraction include post-operative neurosensory deficits. In third molar removal, complication rates increased due to accidental injury during the procedure and other factors such asage, health condition,smoking, contraceptive medication intake, deficient oral hygiene and surgical treatment. Complication rates shows that female patients are most commonly affected than male patients. The resulting risk is directly associated with impaction complexity and the patient's age.[1]

Factors Affecting Third Molar Surgery

Bleeding: Hemorrhage is one of the major complications of the surgery but happens rarely if appropriate measures are taken during the procedure. It can be primary or secondary bleeding; it can be reduced by using proper surgical technique and preventing flap tearing or unnecessary soft tissue overlapping.

Edema: The most complication after third molar operation is post operative edema. It may be caused by tissue reaction to pressure or trauma during surgery, swelling persists after surgery for 48 hours. Use ice packs on the face to make the person feel more comfortable and sweat reduction. Medications used for edema control are corticoids, analgesics, hyaluronic acid.

Trismus: Trismus is a normal & expected outcome of third-party molar surgery. Jaw rigidity typically peaks on the second day & reduces by the end of the second week upon removal of the impacted third molar, postoperative pain to reduce the opening. Treatment for trismus are heat therapy, Analgesics, A soft diet & muscle relaxants.[2]

Pain: The most common affective post-operative condition expected after third molar operation is pain. The post-operative pain starts when the regional anesthesia effects have faded away. Analgesic such as metamizole, paracetamol & other nonsteroidal anti-inflammatory analgesics are used to reduce the pain. Before surgery, the use of non-steroidal analgesic can contributeto the role of helping in post operative pain control. Men may be less sensitive than women to post operative pain, so they need more pain relief.[3]

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Infection: An abnormal postoperative can differ with the removal in infection of the affected third molars. Infection after third molars surgery is not so common complication. Antibiotics, oral prophylaxis reduces the risk of infection. But it also leads to an increased risk of moderate, negative effects. Few post operative infections are significant enough for surgery, antibiotics & hospitalization. Use of clindamycin as an alternative drug for aerobic & anaerobic treatment.

Management: Postoperative infection involves the systemic administration of an antibiotics & surgical drainage. Penicillin appears to be a safe first choice antibiotic given to the patient after infection or streptococcal disease, although there has been documented increased resistance to penicillin.

Dry socket: After extraction, the sequence of normal healing does not always occur. In some cases,premature necrosis of the clot causes early formation of the clot in the socket, accompanied by pain & halitosis. Dry socket is characterized by painful tooth socket containing bare bone & broken-down blood clot. Infection of socket may occur either before, during, or after the extraction. Vasoconstrictor in local an aesthetic solution may lead to 'dry socket' by with the blood supply of the bone. People who use contraceptive drugs are more likely to develop dry socket. Dry socket occurs more frequently in wounds which has poor fillings with blood clot in immediate postoperative period. Dry socket is most likely found to be higher in smoking patients. Dry socket incidence can be minimized by different techniques. Most of the technique used to reducing the bacterial infection of the surgical site such as insertion into the socket of either antibiotics or steroids at the time of extraction. When dry socket occurs, it can be treated the relief of pain & the speeding of recovery. The socket should be irrigated with warm saline & all degenerating blood clot removed. A loose dressing, composed of Zinc oxide on cotton wool is placing into the socket. For several days, the dressing may need to be changed on a daily basis some topical antibiotics such as metronidazole are used for healing the dry socket.[4]

Management: In reference to dry socket prevention in literature,it is possible to differentiate into two groups such as-Non pharmacological & pharmacological preventive measures. Pharmacological measures are anti bacterial agents, antiseptic agents, steroids anti inflammatory agents, clot supporting agents & anti fibrinolytic agents. Non pharmacological preventive measures include the use of high quality current preoperative radiographs, proper preparation of procedure, use of good surgical theory, extraction should be carried out with minimum amount of pain & maximum amount of care & finally verify the presence of blood clot after extraction.

Nerve Disturbances: One of the most complication of third molar surgery is lingual and inferior alveolar nerve neurological damage. Neurosensory may also present as anesthesia, hypoesthesia, hyperesthesia, dysesthesia in distribution of lingual nerve & inferior alveolar nerve. The lingual nerve is weakened during examination of soft tissue flap,whereas the inferior alveolar nerve is injured when the roots of the teeth are pushed out the socket, the lower alveolar nerve is damaged. There are many types of neurosensory can be used assess impartially the severity of nerve injury & observe recovery of the sensation. Risk factor of the inferior alveolar nerve are depth of impaction & dental accessibility to alveolar canal. The treatment available after third molar surgery for lingual nerve or lower alveolar nerve injury tends to have impulsive clinical outcomes and rarely lead to full recovery. Surgical treatment of neurosensory deficits are external neurolysis, direct suturing, autogenous vein graft bridging nerve defect, bridging nerve defect deficits after third molar surgery. vitamin B, laser therapy, corticosteroids & acupuncture are not surgically handled for neurosensory deficiencies.[5]

Temporomandibular Disorders: TMJ disorders affects the jaw joint & the jaw-controlled muscles. Due to how complex the joint is, they may be difficult to diagnose and treat. TMJ disorder is a disease that directly affects the TMJ. According to the study woman are affected more than men to experiencing severe pain & restricted jaw movement. There are so many causes of Temporomandibular disorders such as Physical injury, grinding the tooth during sleep, autoimmune diseases, dental surgery & infections. Genetic, hormonal or environmental may be other triggers. As a precipitating activity for temporomandibular joint dysfunction, third molar removal was involved. Treatment of temporomandibular disorders may require anterior splints, casual splints, occlusal adjustment & removable therapeutic partial prosthesis & also physiotherapy may be need to cure temporomandibular disorders.

Management: There are two types of management occurring in the temporomandibular disorders such as conservative treatment modality & surgical

management. Conservative treatment modalityismoist heat, ice application,soft diet,sleep on one side. Surgical management are arthroscopy, arthrotomy & TMJ implants.

Maxillary tuberosity fracture: Maxillary tuberosity fracture is a possible sequel to maxillary posterior teeth removal. Often a small fragment of the bone can be dissected carefully from its periosteum & delivered with the tooth. One of the major complication of maxillary third molar removal is the fracturing of maxillary tuberosity. Excessive force can cause fracture of maxillary tuberosity. Proper support & controlled force can prevent the complications of maxillary tuberosity fracture. There is various type of technique should be taken to prevent the causes such as proper analysis of the radiographs of tooth & surrounding structures, correct technique of extraction with careful force application & lastly support to the alveolus during extraction of maxillary third molar.

Management: It is a removal of comminuted bone and teeth loss fracture and soft tissues repair. Delay in teeth removal in case of 6-8 weeks maxillary tuberosity. Fractured tuberosity tooth splinting into other standing teeth for 1 month.[6]

Mandibular fracture: Mandibularfracture isinfrequent but acute complication of third molar excision. During & after third molar removal, mandibular fracture is rare. Complication during surgery usually occurs within the first 4 weeks of post surgery. Factors include age, gender, angulation, severity & degree of impaction, tooth volume in the jaw, infection, associated bone lesions that lead to the risk factors. Fractures may occur in the patients who are older than 30 years. In some cases,women are more affected than men due to lower biting force rates compared to men. Patients with full denture are able to produce higher levels of biting forces, which are transferred during mastication to the soft mandible. Postoperative mandibular fracture as a result of extraction is difficult to establish. Post operative fractures were more common than intraoperative fractures. Intraoperative fractures were more common among the females. Anterior to the mandibular angle was found pathological mandibular fractures.To prevent the surgeons command of applied force by the mandibular fracture, the patient should be on the right side relative to the left side.

Hemorrhage: It is defined as loss of blood escaping from the circulatory system. There are various types of hemorrhage includes capillary, venous, secondary, internal,secondary,intermediate,primary,external, arterial. Hemorrhage causes multiple trauma, hypertension,bleeding disorders, any surgical emergency. Emergency treatment is required for cerebral hemorrhage. It is usually involving medication & close monitoring in an intensive care unit. In rare cases, surgery may be required to relieve pressure around brain.

Method: This was aretrospective clinical study for postponement of teeth removal in case of 6-8 weeks of maxillary tuberosity fracture. All mandibular third molar surgeries performed in the maxillofacial oral surgery unit. Surgery in clinical practice was conducted after dental school by staff physicians,oral and maxillofacial surgeons, or residents with at least 1 year of experience in dentoalveolar surgery. Neither patient nor surgeons were rewarded for taking part in the study.Criteria for Inclusion & exclusion has shown that patients are stable between 14-40 years of age and free from severe periodontal disease and have no history of psychiatric illness. Womencannotbe pregnant or lactating.A typical surgical arrangement between medical centers includes procedures common in united states operations such as intravenous anesthesia asses to the third molar from buccal aspects and bone extraction with rotating directions for the lower third molars. After surgery, both patients were evaluated 1 poor for access to wound healing status, and the existence of neuro-operation deficits apply to the third molar tooth.[7]

Indications for Removal of Impacted Third Molar

Pericoronitis: Soft tissue infection which usually occurs around a partially damaged tooth's crown. Transient declines can lead to a bacterial infection leading to mild to severe pain or trismus. Infection may be spread to adjacent spaces in the head & neck.

Periodontal diseases: Retention of an impacted third molar can damage the second molar's bone and may results in periodontal defects. It can cause recession & periodontal gaps, which can contribute to root caries & mobility.

Caries: The later part of the third molars raises a hygiene problem for majority of patients. Over increasing age, dental caries and pulpal necrosis lead to a growing number of third molar removal.

Root resorption: Root resorption is normal in the 21-30 age group associated with an impacted third molar. Middle third of the distal surface of the adjacent second molar is the most common root resorption site.

Pathology: Several forms of tumors & cysts are associated with impacted teeth follicles. If the affected teeth have a specific pathology, they should be removed and the pathological cyst or tumor should be sent for histopathological examination.[8]

Management of facial pain: Due to proximity of the temporomandibular joint and the associated muscles, third molars may cause pain.

Prevention of pathologic mandible fracture: When the tooth is lodged in the mandible, it takes up space that would otherwise contribute to its strength. This situation can predispose a person in the field of impaction to fracture of the mandible.

Contraindication for Removal of Third Impacted Third Molar

Damage to adjacent structures: Many critical structures cover third molars and these areas are affected by excessive degrees of risk. During surgery to remove these teeth, careful clinical & radiographic analysis is required.

Patient's age: Third molar can be removed at any age, but when done in patients in their late teens or early 20's, surgery is simpler and associated with less morbidity. Older patients tend to respond less favorably to the removal of teeth, particularly affected third molars, due to bone stiffness.

Medical compromise: It is important to check the medical history of the patient and advise the patient before beginning the operation. Consider delaying surgery in cases of cardiac or respiratory disorders, immune damage, or severe coagulopathy.

Factors affecting risk: Factors that increase the risk of complications after divisions are presence or absence of underlying systemic disease that can interfere with normal healing such as diabetic mellitus, chronickidney disease, hepatic disease, etc. Aging is not seen in patients as a significant risk factor. With an increase in age, local third molar removal complication molar become more frequent & severe. Certain considerations such as anatomical location of the tooth, root morphology, adjacent tooth status, certain conditions contributing to restricted oral cavity access, patient cooperation or complaints,bulk of supporting bone in the maxilla or mandible, ankylosis of the tooth, presence or absence of acute or chronic infection, presence or absence of related diseases or pathologies, occurrence or absence of other regional bone or soft tissue disease, occurrence of maxilla or mandible fracture associated with it, history of temporomandibular joint disease & disorder.[7,8]

Treatment after third molar surgery: These are three types of treatment should be taken after third molar surgery such as pain management and relaxation below the molar removing the tooth flap or removing the tooth. To managing the pain dental surgeons may use local anesthesia to help with the pain during the process. If there is swelling or pain present antibiotics like penicillin or erythromycin should be prescribed. After the extraction oral surgeons may also recommended home treatments like over the counter pain relievers, warm salt water rinses, oral water irrigators, good oral hygiene including brushing & flossing & to avoid using hot compresses near the extraction areas.[8,9]

Conclusion

Although there is a good understanding of clinical condition associated with retained third molars, little is known about the effect of these conditions on the quality of life of patients affected. There is that recognition that an important outcome is the effect of oral conditions on quality of life that can be quite useful in making treatment decisions. This study allowed assessment ofthe incidence of post-operative complications associated with removal of impacted third mandibular molars. The success of the operation depends on the experience of both doctors and on the health status of patients.

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Mucocele on Lower Lip Excision Through Laser: A Case Report

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Abstract

Mucocele are a common benign lesion of oral mucosa involving salivary glands and their ducts. They develop following traumatic severance of a salivary duct, causing extravasation or retention of mucous material from salivary glands in subepithelial tissue. More predilectionsareseen towards children and young adults with trauma being the number one etiology. The motive of this report is to narrate a clinical case of a male patient aged 13 years visiting the Paediatric and Preventive Dentistry department, having a complain of swelling in the lower lip for1 month. On intra oral examination a well circumscribed swelling was present in the lower lip mucosa adjacent to the lower right canine tooth in the line of occlusion. Treatment plan was to excise it through laser under topical anesthetic spray. Surgery was quick, bloodless, and well received by patient. Post-surgery problems, discomfort, pain and scar were minimal on follow-up post 7 day.

Keywords: *Mucocele, Extravasation, Traumatic, Laser, Paediatric.*

Introduction

Mucous extravasation phenomenon, mucous escape reaction or mucocele is a common lesion of the oral mucosa involving salivary glands and their ducts. They result from traumatic injury of a salivary duct, due to biting of the lip or cheek, crowding of teeth, pinching of lip by extraction forceps or any kind of accidental trauma leading to spillage of mucin into the subepithelial tissues. Mucocele are not true cysts as they lack an epithelial lining.[1] The causative factors include calculi, faulty restorations, chronic cheek and lip biting and sharp bone spicules and rough irregular borders of the appliances. The lower lip is the region where the occurrence of mucocele is the highest. Mucocele is apainless swelling which can measure from a few millimeters to a centimeter. Appearance of a blue colour lesion post injury is indicative of mucocele. Often a peripheral lesion is traumatic causing it to collapse, butchances of recurrence are high under these conditions.[2]

Mucocele is the most routine salivary glandlesion in the oral cavity seen in more than 60% of cases. There are two types of mucocele, extravasation type and retention type. In child and young patients, extra vasation type of mucocele is more and the later type of mucocele is very rare. These extra vasation mucoceles under go metamorphical changes. In the first stage, mucus spills and diffuses from the excretory duct into then eighboring tissues. In the next resorption stage, due to foreign body reaction, formation of granuloma takes place. In the last stage, pseudo capsule (no epithelial lining)circling the mucosa is formed.[3]

Clinically it can be seen as a bulge or bubble; inelastic on palpation, asymptomatic, of different sizes and having a smooth surface. The colour of the lesion can be blue or similar to that of the surrounding mucosa, depending on the extensionof the lesion into the tissue. The patient oftenreports a bubble that has burst and fills up again, discharging a liquid having salty taste.[4] Treatment planning can include surgical excision, cryosurgery, laser excision ormarsupialization.

Case Report: The motive of this report is to narrate a clinical case of a male patient aged 13 years visiting

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the Paediatric and Preventive Dentistry department, Institute of Dental Sciences (IDS), Bhubaneswar, Odisha presenting a chief complain of swelling in thelower lip for 1 month. Patient had a history of trauma and habit of lip biting. On intraoral examination the patient had lower anterior crowding. The swelling was raised, domed shapedvesicle,well circumscribedpresent in lower lip mucosa adjacent to the lower right canine tooth in line of occlusion. The margin between the swelling and normal tissue were relatively clear and well defined. It appeared normal in colour as compared to the adjacent mucosa. Its size was 0.5 x 0.5 cm, smooth surface and firm in consistency. The child was having no problem in oration or mastication. No other abnormal oral findings were detected. Based on the above history and clinical features a provisional diagnosis of mucocele with respect to 31,32 and 33 wasgiven.Treatment plan was to excise it through laser and patient was made aware about the benefits of using laser for excision and all the required informed consents were taken prior to the laser surgery. Routine blood investigations were conducted and results were found to be under normal limits.

Phase I: Oral prophylaxis was done and then the area around the lesion was made sterile by applying betadine solution using a tweezer and gauge. Surfaceanesthetic spraycontaining Lignocaine U.S.P (15% w/v) was sprayed over the lesion. The patient, chair side assistant and the clinician wore the laser protective eye glasses. The laser tip was activated using a cork prior to surgery.

Phase II: The lip was then pushed upwards with finger pressure to increase the lesion's prominence. First the excision of the base of the lesion was started using a 940 nm diode laser [ilASE^{TM} diode laser from BIOLASE Inc.] in continuous contact mode at 1.8 Watt of power around the margin of the swelling and simultaneously continuous suction was done. The margin of the lesion was excised using an in and out brushing motion, and later it was made deep to completely separate the lesion and its remaining tissue tags. The tip of laser was regularly cleaned with gauge dipped in saline to remove charred tissue remnants. Tissue forcep was used to simultaneously pull the tissue during laser excision. Once the lesion was excised the surgical area was cleaned with a sterile gauze using (0.9% W/V) normal saline.Post-op instructions recommended 0.2% chlorhexidine mouthwash rinses thrice daily for one week and the patient was advocatedorthodontic treatment for the correction of lower anterior crowding to avoid recurrence of the lesion.Surgery was quick, bloodless, and well received by the patient. Post-surgery problems, discomfort, pain and scar were minimal on follow-up post 7 day.

Histopathology: Microscopic examination of the completely excised biopsy sample showed mucin filled cyst like cavity below the mucosal surface. Minor salivary glands and granulation tissues were present below and lateral to the spilled mucin. The histopathological examination was suggestive of Mucocele.



Figure 1. Pre-operative view of the Mucocele in relation to teeth no. 31,32,33 in lower lip.



Figure 2. During the process of laser excision with laser safety eye glasses.



Figure 3. Immediate post- operative image of the lesion



Figure 4. Fully excised biopsy tissue.



Figure 5: 7th day follow up image showing complete healing.

Discussion

A mucocele lesion in a 13-year old male patient was treated with laser excision in the Paediatric and Preventive Dentistry department,Institute of Dental Sciences, Bhubaneswar, Odisha. Clinically, the mucocele presents as an asymptomatic vesicle with blue or pinkish color. The size can vary from 1 mm to few centimeters. The lesion is routinely due to injury to the minorsalivary glands and having a prevalence of 0.2 casesper 1,000 persons.[5]

The term mucocele is derived from the Latin word "Mouco" meaning mucus and "Coele" meaning cavity. They are basically "mucus filled cavities" usually present in the oral cavity, lacrimal sac, and paranasal sinuses. Mucocele are the most frequently occurring lesion of the minor salivary glands. It is second only to irritation fibromas in being the most common benign soft tissue tumor of the mouth.The prevalence of mucocele is 0.4%to 0.8% with very minor differences between males and females. The most affected site is the lower lip (40% to 80% of all cases), similar to this case, followed by mucosa of cheekand floor of the mouth.[6-8]

In the present case, the patient gave a history of trauma and lip biting habit in the 32, 33 areas, which ultimately lead to mucocele formation at the site due to the repeated trauma. The primary objective in the treatment of mucocele is the complete resection of the lesion in order to prevent its recurrence. We have to completely remove the affected and surrounding glands along with the main lesion to avoid recurrence.[9,10]Several conventional techniques are used for excision of mucocele, but in our case laser excision was well tolerated by the paediatric patient with excellent hemostasis and faster and clean surgery. Postoperative problems, discomfort, and scarring were minimal on follow-up.[11-15]

Conclusion

Mucocele is a very common salivary gland lesion and is seen more in cases of paediatric patients. Paediatric patients are very often fearful and un cooperative towards injection and surgery. Laser excision is a very good alternative to conventional surgery and can also be performed under topical surface anesthetic spray leading to better compliance in children. Laser provides a clean, painless, bloodless surgery. The post-operative complication rare and suturing is not done. The chances of scar formation are minimal. The patient imbibes a positive attitude towards dentistry.

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Awareness of Patients towards Different Prosthetic Rehabilitation Like Fixed Partial Denture, Removable Partial Denture, Implants at Institute of Dental Sciences, Bhubaneswar

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Abstract

Objective: Assessment of the patient attitude and knowledge towards various tooth replacement option at a tertiary care dental hospital.

Study Design: A cross sectional descriptive study.

Materials and method: A survey was conducted on 150 partially edentulous male and female patients above the age of 20 years, using a self-explanatory questionnaire. Complete edentulous and dentulous patients were excluded in study. Age, gender and attitude of the patients towards each type of prosthetic replacement was noted. Data were analyzed using SPSS 25. Frequencies of age, knowledge and source about each replacement procedure and limiting factors were calculated.

Results: Ninety five percent of patients were aware of various prosthetic rehabilitation procedure. Dentists were the main sources of information regarding the prosthetic option followed by friends and relatives. Ninety percentage had awareness about removable fixed partial, 85% about fixed partial dentures and 65% about dental implants. A majority of patients (52%) had objection on the cost of fixed partial. Major disadvantage and deterrent for implant therapy were cost and surgery and for fixed partial denture were sacrifice of healthy natural teeth.

Conclusion: The study showed that most of the patients were aware of different prosthetic rehabilitation options. The awareness about this were created by dentist and electronic media. But it was found that cost was a major deterrent for implants and fixed partial denture.

Keywords: *Prosthetics rehabilitation, missing teeth, awareness, implants, oral health.*

Introduction

For general wellness of an individual we seldom give much importance to teeth, but loss of teeth not only affects the body physiology, it also affects the psychological aspect of an individual. So, in prosthodontics we not only aim in restoring function and esthetics of edentulous patients but also the psychological health of that individual.[1] Removable partial dentures are a very popular and cost-effective prosthetic rehabilitation option for partially edentulous patients. The major advantage of this is that it is a reversible procedure and can be given in wide range of age group. However, it also has its own set of demerits like pain, discomfort, soreness and loss of attached gingiva in abutment teeth.[2] Fixed partial dentures are a gold standard in treatment option for patient wanting a fixed prosthetic

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rehabilitation. These have a good esthetic, functional and psychological compliance by the patient. However, they have the disadvantage of loss of tooth structure of abutment tooth, Postoperative sensitivity, caries and fracture of abutment tooth[3]. So overall prognosis is good for the rehabilitation procedure.

After the advent of implants the treatment option available to prosthodontics has been broadened[4]. Partially edentulous and complete edentulous patients can be given different treatment options like fixed, semi fixed or hybrid dentures and removable partial dentures. Dental implants are now an accepted treatment of choice for replacing single missing tooth[3]. Implant supported prosthesis provide increased masticatory efficiency, improved esthetics & phonetics and above all reduce the bone resorption of the alveolar ridge.[5]Since the prosthetic treatment planning has to be devised according to patients concern and needs, understanding patient's knowledge, attitude towards prosthetic replacement prior to receiving treatment is the necessity.[6,7]

Yusuf and Fakiha had evaluated the awareness and attitudes of patients towards prosthetic rehabilitation of missing teeth at the university dental Hospital, Riyadh, Kingdom of Saudi Arab. They concluded that 53.1% of the population surveyed did not get their teeth replaced. They have emphasized on the need of motivation and education of patients leading them to make the decision favourably.[8] Shigli K, have surveyed the attitude towards replacement of teeth among patient at Institutes of Dental sciences, Belgaum, India and concluded that majority of study subjects were only aware of mastication function performed by teeth.[9].The present survey is aimed towards assessment of attitude and knowledge of patient about prosthetic rehabilitation options. And utilization of dental services by patients who reported to Institute of Dental Sciences, Bhubaneswar located in east India in state of Odisha.

Materials and Method

This descriptive cross-sectional study was done over a period of 6 months during Jan 2019 – June 2019 for assessment of the knowledge and attitude of patients towards prosthetic rehabilitation options. Non probability consecutive sampling technique was used. Two hundred partially edentulous patients of age 20 years and above, having history of no systemic disease attending department of prosthodontics and implantology of Institute of Dental Sciences Bhubaneswar were included in the study. Completely dentate and completely edentulous patients were not part of the study. A self- designed questionnaire containing total 14 questions, out of which 8 were knowledge based and remaining 6 were attitude-based questions were used for data collection. After taking informed consent from the patients, a questionnaire was filled in by the principal investigator containing questions about age, gender, income, education, occupation, level and sources of information regarding different prosthetic treatment options and awareness and knowledge of each treatment. Data were analysedusing SPSS25 Mean ±S.D was calculated for quantitative variables like age. For qualitative variables like gender and knowledge, frequency and percentage were calculated.

Results

Evaluation of data sheet of the selected sample for the study (n=200), the result showed that the mean age of the patient was 45.04 ± 8.5. Sixty-fivepercentage of the patient were of the age 30-50 years and patients above 50 years were 30%. 123 patients (62%) were male patients while 77 patients (39%) were female as is shown in Table 1.The awareness level in patients about the different prosthodontic rehabilitation options like removable partial denture, fixed partial denture and dental implants were assessed. Ninety percentage had awareness about removable partial dentures, 85% about fixed partial dentures and 65% about dental implants.

Table 1. Demographic data of the patients

S.No.		No	Percentage (%)
Age			
1	Under 30 years	10	5
2	30-50 years	130	65
3	Above 50 years	60	30
Gender			
1	Male	123	62
2	Female	77	39
Income per month			
1	Below Rs 20,000/-	70	35
2	Rs 20,000/- 40,000/-	90	45
3	Rs 40,000 and above	40	20
Education level			
1	High School	60	30
2	Graduate	100	50
3	Postgraduate	40	20
Occupation			
1	Student	10	5
2	Professional	110	55
3	Buisnessman	40	20
4	Housewife	40	20

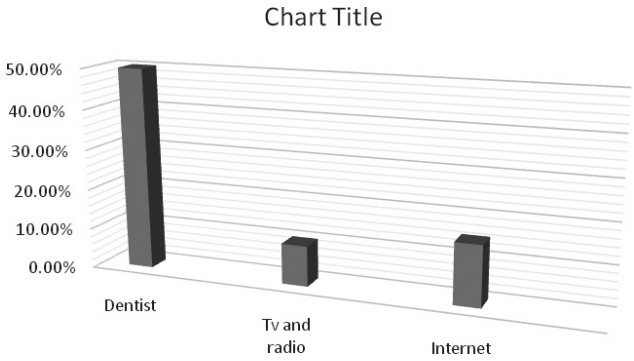


Figure 1. Awareness of different prosthodontic options in patients

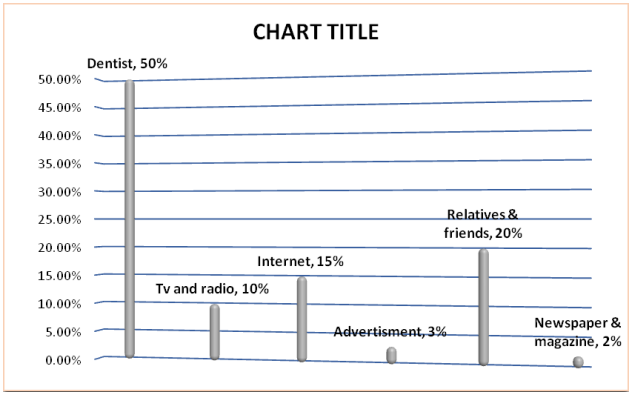


Figure 2. Major source of information for the patients about the prosthodontic rehabilitation option

Discussion

Internet and social media have made information available to a vast majority of persons who were previously unaware of prosthodontic rehabilitation procedures. So, loss of teeth which was previously thought to be an accepted norm of ageing is now being challenged by procedures like implant and fixed partial dentures. Implant has been a tried and tested procedure with overall success rate of 94%.[10]Most of the geriatric patients as found in the present study showed disinterest in dental rehabilitation due to lack of information or financial concern. And the patients with greater financial opportunity, higher education were more aware of prosthodontic rehabilitation options. Most of the patients were satisfied with removable partial denture, and patients wearing fixed partial denture were significantly happier with it. No significance difference was found in awareness between male and female patients, but female patients were more concern about aesthetics in comparison to males.

With the advent of implants,it has become a viable treatment option for restoration of edentulous sites due to its excellent biocompatibility, strength and long-term success. Even thorough 65% of the patients knew about implant restoration but were not keen for it as it had a high cost, and involved a surgical procedure. Tapper et al reported in their study that patients believe the durability of implant is more than 10-20 years, it needed less care[11]. But they also found patients are not opting for implant was it high cost.[11] In the present survey it was found that 50% patients were aware of the treatment options mostly from the dentist followed by other medias like Tv, radio and internet. But in a study in Japan by Akagawa et al it was found that only 20% of patients received their information from the family dentist.

So, in India a lot of educational program and advertisement has to be done to educate the patients about the various prosthetic rehabilitation option. The implant as a treatment option has to be propagated and measures should be taken in India to reduce it cost. And there is a need for dental insurance to cover the maximum population in India to reduce the cost of dental treatment and make the option of various rehabilitation procedure available to common man.

Conclusion

Within limitations of this study, as it was done in a mostly urban population, it was found that the patients were aware of different treatment options. The main source of information was from the Dentist, followed by relatives and internet. And the cost was the most prohibitory factors for the various treatment options.

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Conventional Techniques and Newer Advances of Painless Local Anaesthesia Delivery in Paediatric Dentistry: A Review

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Abstract

Behavior shaping of children during local anesthesia delivery has been one of the most important and determining step in pediatric dentistry. Along with several conventional, the more comfortable and non-invasive method are wand, cclads, vibraject, accupal, dental vibe, syrijet mark li system and many more. The advantages of theses recent advances are that the operator can control the amount of local anesthesia being administered while making the patient's injection experience as painless as possible. Therefore, a constant research is opening up many such prospects that can make the life of both a pedodontist and a child way more smoother and hassle free.

Keywords: *Local anesthesia, newer method, painless dental anaesthesia.*

Introduction

Administering a completely painless local anesthesia in pediatric dentistry is not only the most challenging task for a pedodontist but also a myth. We can rather transform their experience into a more comfortable one.[1] As pain during any dental procedures can make a child unco-operative for following visits to a dental operatory thus imparting a negative perspective to child's mindset.[2] Thus to counter-act this fear related to needle prick in patients, a lot of researchers have been working to find out and substantiate the regular local anesthetic delivery systems.[3] So, the aim of this review is to highlight various conventional as well as new & improved devices featuring different techniques that can make the patient's local anesthetic experience as painless as possible.

Conventional Method

The various techniques that has been used to decrease the pain perception of a patient are:

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1. Buffered anesthesia: Sodium bicarbonate is added to common anesthetic solutions like lidocaine or articane, before administration to neutralize the acid. Moreover carbon dioxide formed as a by product has a topical effect in the form of CO_2 microbubble and has a diffusion trapping effect i.e. the basic anesthetic solution is converted to acidic by CO_2, providing prolonged anesthetic effect because the changed molecules need time to be converted back to basic form by the body, to cross the nerve membrane. Additional benefits are short time of onset, reduced pain perception and burning sensation during injection. However, research shows that some patient factors like stress levels, fatigue and uncontrolled diabetes can lower the buffering capacity to some extent.[4] Though many of the study results have shown that there are no significant results with buffered solutions, [5,6,7] in contrast to a single study by Kashyap et al[8].
2. Warming anesthetic solutions- Higher temperatures like 42°C, body temperatures (21°C) etc. imparts less pain during truncal anesthesia or infiltrations than compared to room temperature.[9] Studies have also shown varying results in terms of degradation of drug and vaso-constrictors which is inconsistent with electronic databases.[10,11]
3. Cooling-Cooling the site before anesthetic administration using various method like ice

popsicles under pressure, applying cotton soaked in dichlorodifluoromethane spray prior to palatal injections work by the gate control theory thereby increasing the pain threshold and decreasing post anesthetic discomfort to children.[12]

4. Camouflaged Needles help to distract the child while reducing dental treatment anxiety and at the same time maximize patient co-operation.[13]

5. Needle size & length - Short needles (10,20 or 30mm) of 27 or 30 gauge specially help in administering the local anesthetic in a difficult -to -manage child, during maxillary or inferior mandibular nerve blocks, thus reducing the pain and fear both[14].

6. Topical anesthetic - EMLA (eutectic mixture containing lidocaine & prilocaine local anesthetic) - 5%, benzocaine - 20%, lidocaine cream - 5% and spray - 10% can act as topical anesthetics by reducing the pain of needle pricks and takes around 2-3 minutes to act, thus making the whole experience subtle[14].

Newer Advances

Electrical Based:

1. Computer controlled local anesthetic delivery system: CCLAD was first used in the mid-1990s which uses computerized flow rate & pressure using needle for local anesthetic delivery. Advantageous due to lesser pain sensation from fluid pressure over syringe a continuously monitored flow rate.[15]

2. Comfort control syringe- It is a device that comprises of five pre-designed speeds for different injection techniques used in oral cavity. Administration of anesthetic solution goes on very slowly for beginning 10 seconds then at the pre-set speed for rest of the solution, which gives a better tactile sensation to operator.[16] Though marked differences in terms of advantages over conventional syringes have not been reported so far.[17]

3. The WAND- It has three parts namely a central unit, foot bar & throwaway handpiece that holds the anesthetic cartridge through which the solution passes within the needle to intended tissue. The foot bar keeps a check over flow rate and on aspiration prevents unintended vascular infiltration. It also features three formulated speed settings-moderate (0.005 ml/s), quick (0.03 ml/s) and jet (0.06 ml/s).[18] Studies substantiate its better acceptability among pediatric population.[19]

Vibration Based

1. **Vibraject:** Vibration incorporated anesthetic delivery system first used in U.S, 1995, that works upon the gate control theory to reduce pain(blocked by vibrations in the dorsal grey horn of spinal cord)[20] during, both needle insertion within tissues and solution deposition with an additional soothing effect due to the humming sound produced.[21] Studies have shown positive results in most of the subjects within some exception as well.[22,23]

2. **Dental vibe:** It is a processor -driven- motor-operated device consisting of an u-shaped probe that vibrates concurrently and provides with an oscillating vibration to the site of injection. It makes the patient experience as much painless as possible while injecting the local anesthetic, intra-orally at any site. [24]

3. **Accupal:** This wireless motor operated device uses both pressure as well as vibration, to administer anesthetic solution to palatal and alveolar regions just adjacent to the site of injection. Its head comprises of a hollow slot bearing needle connected to the motor that works by blocking the painful stimulus, thus using the gate control theory. [25]

Needle Less Injection System

1. **Jet injector:** Uses a high-pressure jet of solution to pass through a small pore into the hypodermic region without a needle under heavy mechanical force. Can be used for rubber dam clamp placement, provide a slit during abscessed tooth, space maintainer fabrication etc.Syrijet MarkII and MED-JET are most commonly marketed jet injectors.[26]

2. **Injex:** This needle less system uses a spray of anesthetic that spreads subcutaneously under the syringe pressure in a horizontal layered fashion. Most feasible for giving supra-periosteal injections but not for blocks. Though studies have shown variable patient acceptance.

3. **Comfort-in™:** It is a spring-loaded injection system without needle for the subcutaneous administration of any liquid medication. A compact power device that delivers up to 0.5 ml/50 units of any given solution, through a micro-orifice (0.15 mm) by means of a narrow, high velocity jet injection, which penetrates the skin in less than one-third of a second. Nozzles are disposable and intended for one time use only. Depth of penetration ranges from 2.1 mm to 6.1mm, subcutaneously in a cone like fashion.

On Horizon

Buzzy system: It is a very new and innovative device that comprises of a bee- shaped gadget producing vibrations & cooling through freezable wings. The purpose of the cold and vibration is to delay or diminish the transmission of pain stimuli to the central nervous system. Baxter et al. (2009)stated that Buzzy involved three nonpharmacological mechanisms of pain relief. These were gate control theory, descending noxious inhibitory control, and distraction. even to this day a lot of studies are going on regarding its efficacy in using during intra-oral injections, whereas it has been successfully used in other phlebotomy & intra dermal injections of injections.

Conclusion

Thus, to conclude it is to be understood that pain and anxiety, which is one of the prime causes for stress among children is the environment of the dental operatory, dentists and above all the fear of the anesthetic syringes. This might even lead to drop-outs from further appointments. Thus, the most prime call of the hour is to tame the mind of the child before taming the child himself or herself. In this whole procedure the most important step towards inculcating a positive behavior among the psychology of a very young child is to alleviate this very fear of the unknown from young minds. The various conventional and newer method of painless local anesthetic delivery is already showed improved results over the following years and we are also hopeful that these procedures are also going to inculcate a very bright future in the history of pediatric dentistry in the years to come the most recent advances of needle- less injectors and also the buzzy system is actually going to create a buzz in the coming times.

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Oral Manifestations of Dermatologic Diseases

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Abstract

Diseases of all organ systems of the body have the potential to create an impact on the oral cavity. These oral mucosal changes may be either the first, the only or the most severe form of that disease, the primary target of the therapeutic protocol and the most significant reason for morbidity or lowering the quality of life in individuals. The skin is sometimes considered the largest organ of the body helping in preventing many diseases by serving as a physical barrier. However, there are numerous dermatologic diseases which may be infectious, auto-immune or as a result of a hypersensitivity reaction. Since the diseases and their manifestations are many, the important ones are described briefly in this overview to increase awareness regarding the diseases of the skin and their effects in the mouth.

Keywords: *Dermatologic disease, diagnosis, immune-mediated, underlying disease.*

Introduction

Many of the dermatological diseases produce oral manifestations which are characteristic. The reason why skin diseases affect the mucosa is that the mucosa and skin have same embryological derivation. Mucosa and skin merge one another and they have similar histological structures. The commonly encountered diseases with their characteristic oral lesions are presented here in this paper.

Measles: Young children, will develop suddenly, a rise of temperature and in oral mucosa, an erythematous area, white small dots or elevations will be seen and these are called "Koplik's Spots" the presence of Koplik's spots is a diagnostic sign that the patient is suffering from measles.[1]

Ectodermal dysplasia: Some patients may present with no teeth at all in the mouth. On taking history the patient will reveal that the teeth have not erupted and on radiographic examination, if no teeth were found in the jaw, this is congenital absence of teeth called as "Total anodontia".Total anodontia is a clinical sign to diagnose "Ectodermal Dysplasia".[2]

In Ectodermal Dysplasia, there is a defect in ectoderm and all structures developing from ectoderm are defective. The patient will have thin, scanty, lustreless hair, depressed nose, absence of eyelashes and eyebrows and the patient will be very sensitive to hot as his skin has no sweat glands and the skin is very dry, susceptible to infections as there is no sebaceous gland. The nails are dystrophic in appearance. Thus, total anodontia in mouth helps to diagnose Ectodermal Dysplasia.

Ellis–Van Creveld Syndrome: The patient has few missing teeth and few erupted teeth are malformed. The important observation in these patients is that the labial mucosa is fused with alveolar mucosa. This characteristic oral sign is a diagnostic point to diagnose Ellis – Van Creveld syndrome or Chondroectodermal Dysplasia. It is a hereditary condition in which ectoderm and mesoderm are affected. As a result, structures developed from ectoderm are affected and the mesodermal structure, cartilage is also affected.[3]

The patient will have stunted growth with short, long bones due to chondrodysplasia associated with features of ectodermal dysplasia. The patient will have polydactyly or syndactyly and cardiac malformations.

Epidermolysis Bullosa Dystropica: The patient develops oral bullae frequently, and ruptures to form ulceration. When the ulcers appear in the mucosa, it produces pain and difficulty in oral cavity. The lesion heals and produces scar and again bulla develops, ruptures, ulcerates and heals. This oral manifestation suggests that the patient is suffering from Epidermolysis Bullosa Dystropica.[4]

Erythema Multiforme: The patient has acute

inflammatory erythematous patches which develop following vesicle formation and rupture of the vesicle. The ulcers are painful and reddish and covered with encrustations, excess salivation, inability to take food and drinks. This clinical sign of oral cavity suggest that the patient is having Erythema multiforme.

Erythema multiforme is an acute inflammatory disease of skin and mucosa characterized by erythema and oedema. Numerous vesicles develop bilaterally and symmetrically, rupture and form ulceration in the skin. The erythematous ulcer is painful and heals from center to periphery giving a target of iris or Bull's eye appearance.[5]

Steven–Johnson's Syndrome: The patient will have vesicles or bullae which ruptures and leave surface covered with a thick white or yellow exudate, ulcerations of the lip and bloody crusting with erosion of pharynx also occur. If these oral signs occur along with eye lesions, skin and genital lesions it is suggestive of "Steven Johnson's Syndrome" which is a very severe bullous form of erythema multiforme.[5,6]

Bechet's Syndrome: Sometimes the patient will complain of painful ulcers which occur in crops at any intra oral site with erythematous border and covered by grayish or yellowish exudates. These oral manifestations, occurs along with genital and ocular lesions, it is indicative that the patient is affected by "Behcet's Syndrome".

The oral epithelium or some cross-reacting microorganisms act as antigen to stimulate normal antibody and cell mediated immune response which causes the pathological lesion. The immunologic competence and cytotoxic potential might cause epithelial damage resulting in ulceration.[7]

Ehlers–Danlos Syndrome: In some patients, the oral mucosa becomes excessively fragile, and easily bruised with delayed would healing, gingival bleeding, periodontal diseases and severe bleeding following tooth extraction. Enamel hypoplasia, recurrent subluxation of temporomandibular joint with radiographic findings such as stunted and deformed roots, large pulp stones in pulp chamber with high cusp, deep occlusal fissures in premolars and molars are present. These oral findings associated with hyper elastic, fragile skin, fragile blood vessels with immediate injury following minor trauma and positive Gorlin sign which denotes the ability to touch the nose with tongue are characteristic features of Ehlers–Danlos–syndrome, which is a generalized defect of connective tissue essentially of collagen. [8]

Reiter's Syndrome: If the patient presents with painless, red, slightly elevated, granular or vesicular areas with white circinate borders on the lips, buccal mucosa and gingiva along with palatal lesions appearing as bright red spots, which darken and coalesce, and if these oral changes occurs along with urethritis, arthritis and conjunctivitis, it is suggestive that the patient it suffering Reiter's syndrome. [9]

Pemphigus: The patient has multiple erythematous ulcers with severe burning sensation and pain. These ulcers develop after vesicle formation and rupture of that vesicle. The ulcer remains in the mouth for a long time and cause disturbances in mastication. The oral mucosa peels leaving erythematous area on pressure. This clinical sign is suggestive of pemphigus vulgaris.[10] Pemphigus is a serious chronic skin disease with oral manifestations characterized by the appearance of vesicle and bulla which rupture and form ulcer.

Pemphigoid: In some individuals large sized hemorrhagic bullae on oral mucosa which ruptures to leave a fibrin covered superficial ulceration which heals by scar formation are present with diffuse gingival involvement leading to chronic desquamative gingivitis. Chronic blistering diseases of mucous membrane of skin mouth, eye, nose, larynx, pharynx, esophagus and penis resulting in permanent scarring of the affected areas, are suggestive features of pemphigoid, which is an autoimmune disease.[11]

Lupus Erthematosus: The patient has got an oral lesion in the lip in the form of erythematous patch with white dots. This patch is elevated and central portion is depressed. The elevated margin is slightly indurated, surrounded by whitish border. The ulceration in the superficial area is covered with crusting and margins of the lesion have little keratinisation associated with white striae. This clinical sign suggests that the patient is having lupus erythematosus.[12]Lupus erythematosus is a rather common disease, and it is an autoimmune disease. Lupus erythematosus may be discoid lupus erythematiosus or systemic lupus erythematosus.

Scleroderma: Sometimes the lips of the patient may become rigid and the oral aperture narrows considerably, skin folds are lost around the mouth giving a mask – like appearance to the face. The tongue also becomes hard and rigid, causing difficulty in speaking.

Involvement of esophagus causes dysphagia. Restricted movements of the mandible are seen causing pseudo ankylosis.[13] The radiographs may reveal uniform thickening of periodontal membrane especially around the posterior teeth and calcinosis of soft tissues around the jaws. The presence of these manifestations suggests that the patient is suffering from scleroderma.

Lichen Planus: In some cases, the buccal mucosa, tongue gingival may exhibt interlacing white lines forming lattice network, annular arrangement, plaque papular, bullous or atropic ulcerative lesion. On the surface of these lesions, the line of intersection of these radiating violaceous lines delicate grayish white streaks named as wickham's striae is present. Chronic desquamative gingivitis and symptom of burning sensation on taking spicy foods are characteristic findings of oral lichen planus which are more common in individuals under stress. This manifestation is suggestive of lichen planus and skin lesions may also be there. On the skin, flat polygonal papules of violaceous colour present on the flexor aspect of fore arm, wrist, neck trunk and genitalia are present associated with pruritis. If the patient is suffering from diabetes mellitus, hypertension associated with Lichen planus, the features are suggestive of Grinspan syndrome.[14]

Psoriasis: Some patients exhibit variety of oral mucosal changes such as yellowish white round or oral lesions which can be scrapped off leaving a bleeding surface, geographic tongue with marked fissuring and diffuse erythema, associated with angular cheilitis, which are oral findings characteristic of psoriasis. These patients have extensive sterile pustules with shedding of nails, dry scaling silvery white patches on skin which on scrapping leaves raw bleeding points called Auspitz sign are present. Psoriaris is a chronic genetically determined, inflammatory disease of skin characterized by rapid cell turnover with increase mitotic activity.[15]

Leprosy: While examining the teeth, if we find a pink colour tooth without mobility, it may be pink spot or non-vital tooth, but on taking radiograph, if there is no destruction of dentin within root canal and if periapical infection is absent, tooth may not be a pink spot or non-vital tooth, but the pink colour may support it may be a leproma, a granulation tissue found in the pulp of the tooth in leprosy patients. If we search for systemic change, patient may have depressed nose, mobility of anterior teeth, maxillary and palatal destruction, cutaneous nodules and loss of skin sensation. Thus pink tooth in mouth is a diagnostic feature to diagnose systemic disease leprosy.[16]

Conclusion

Oral mucosal lesions may pose a diagnostic challenge for the oral physicians and dentists as many different dermatologic diseases look similar owing to the overlapping clinico-pathologic presentation of these diseases irrespective of the aetiopathogenesis. The diseases may be infectious, autoimmune, allergic or idiopathic but affect the oral mucosa with a myriad of abnormal changes.

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Knowledge and Attitude Regarding Local Anesthesia among Dental Professionals and Awareness in General Population

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Abstract

Background: Local anesthetics (LA) are stereotype drugs in dentistry. Though these drugs are used routinely, most of the dentists are unaware of the dose calculations, effective dose or complications and another vital knowledge about the drug. The objective of the survey was to evaluate the knowledge, attitude of dental professionals regarding local anesthesia and its implementation in their daily practice. Awareness of local anesthesia among general population and their expectations from the clinicians was also evaluated.

Method: A survey was conducted on 1080 patients and 540 dental professionals of Odisha through google form survey and hand forms. Questionnaire were made in English and Odia language. Data were analyzed using SPSS statistics 24.0.

Result: Out of 504 dental professional 31% were general dentist, 32.5% were specialist and 36.5 % were undergoing post graduate training. 73.3% of the clinicians didn't knew the equivalent weight of adrenalin in 2% local anesthesia with 1:200000 concentration. 76.2% were wrong regarding dosage of lignocaine. 84% of the clinicians lacked in knowledge about LA allergy testing and 91.8% were unaware about Articaine. MDS especially more than 15 years of experience (100%) were found to be more knowledgeous and have a positive attitude towards local anesthesia when compared with PGs and BDS but when it comes to practice MDS (51.1%) with <5years (40.4%) experience implement better. Out of 1080 general population, 50% have fear for injections. 75.6% are unaware about the different complications of local anesthesia. 83% are unaware about different techniques of nerve block. 84.1% of the patients expect their clinicians to explain the techniques to them.

Conclusion: Desired level of knowledge regarding local anesthesia is lacking among dental professionals, and a deliberate effort must be made to improve it. Lack of awareness of local anesthesia was found among general population.

Keywords: *Local anesthesia, Knowledge, Practice, Awareness, Public.*

Introduction

Field of anesthesia has evolved leaps and bounds over the past few decades. It targets for inhibition of nerve conduction during various dental procedures.[1] The success of local anesthesia administration depends on various factors like site of administration, injection techniques, dosage and allergic complications.[2] The practice of local anesthesia in dentistry has unfortunately spawned carelessness regarding an appreciation of the amount of anesthetic that can be administered to the patient and such attitude continue to predominate even in many respected and well established institute[1]. A 2% LA implies 2 gram of the drug dissolved in 100ml of solution i.e. 20mg/ml. Though these dose calculations appear simpler, most of the dentists are not confident

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in doing it.[3] Misdirected needle placement may lead to facial paralysis, inferior alveolar and lingual nerve paresthesia and muscle trismus among others. Use of more concentrated solutions may also be less safe or toxic effect in patients. LAs, if delivered in excessive dose or injected directly into the bloodstream, they may cause major systemic toxicity.[4]

We have developed great skills in maintaining safety to patients who are subjected to anesthesia but we do not take effort to convey our skills to the lay persons. On the other hand, patient's awareness has increased and they are very much concerned about the operative aspect of their treatment. Thus, the objective of the study was to evaluate the awareness of local anesthesia among general population and their expectations from the clinicians. Knowledge, attitude of dental professionals regarding local anesthesia and its implementation in their daily practice was also evaluated.

Materials and Method

This study was approved by the Institutional Review Board of SOA University, Bhubaneswar. The cross-section questionnaire was designed for both groups in Department of Conservative Dentistry and Endodontics, Institute of Dental Sciences, Bhubaneswar.

A total of 1080 patients and 540 dental professionals including both males and females were included in this study. Two sets of questionnaires were prepared in two language (English and Odia) for general population and dental professionals based on KAP. Validation of the questionnaire was done and were circulated among the dentists and general populations of Odisha and distant population were approached through online google survey forms forwarded through mails and other social media. Questionnaires for clinicians comprised of 35 questions. Questionnaires for general population comprise of 17 questions.

The inclusion criteria are:

- Dentists of India having BDS or MDS degree
- Practicing interns of different hospitals or institutes who have completed their four years of BDS course with passed status.
- Patients who came to the OPD of Institute of Dental Sciences and Hospital, Bhubaneswar for any treatment.
- Patients above the age of 18 years and below 70 years.

The Exclusion criteria were:

- Students continuing their BDS course.
- Patients below the age of 18 and above 70 years.
- Psychologically unstable patient.

Results

The survey data was subjected to statistical analysis by SPSS statistics 24.0, SPSS South Asia Pvt Ltd., www.spss.co.in using ANOVA, post-hoc test and the mean difference is significant at the 0.05 level. 504 dental professionals and 1080 patients participated in the study. Out of 504 dental professional 31% were general dentist, 32.5% were specialist and 36.5 % were undergoing post graduate training. Table 1 showed the response of the clinicians towards different questions regarding local anesthesia. 73.3% of the clinicians didn't knew the equivalent weight of adrenalin in 2% local anesthesia with 1:200000 concentration. 76.2% were wrong regarding the safety dosage of lignocaine with adrenalin. 84% of the clinicians lacked in knowledge about LA allergy testing and 91.8% were unaware about Articaine. Table 2 showed the response of the patients towards different questions regarding local anesthesia. 50% patients still have fear for injections. 75.6% are unaware about the different complications of local anesthesia. 83% patients are unaware about different techniques of nerve block. 84.1% of the patients expect their clinicians to explain the techniques to them. Table 3 revealed the KAP analysis based on qualification and experience. It was observed that MDS (100%) especially with more than 15 years of experience (100%) were more knowledgeful and have a positive attitude towards local anesthesia when compared with PGs and BDS but when it comes to practice MDS (51.1%) with <5years (40.4%) experience. Responses of BDS, MDS and PG students were significantly different ($p<0.05$) in all the question asked.

Table 1: Clinician's Questionnaire

Knowledge Based Question	Correct Answer	Wrong Answer
Most commonly used local anesthetic agent in India	100%	0%
Onset of action of lignocaine as nerve block anesthesia is	65.1%	34.9%
Preservative in local anesthetic agent	82%	28%
Concentration of lignocaine used for topical application (gel form)	21.8%	78.2%
Equivalent weight of adrenalin in 2% LA with 1:200000 concentration is	26.7%	73.3%

Knowledge Based Question	Correct Answer	Wrong Answer
Systemic complication of LA	62.4%	37.6%
Safety dosage of lignocaine with adrenalin is	23.8%	76.2%
To obtain a nerve block, local anesthetic agent should be injected	84%	16%
Aspiration is recommended to avoid	39.5%	60.5%
Most common immediate complication of LA	48.8%	51.2%
Hypersensitivity reaction are most common in	50.4%	49.6%
Which symptom(s) reminds you of anaphylaxis	83.1%	16.9%
Which drug should be used as first choice in management of anaphylaxis	59.7%	40.3%
Alternative anesthetic to those who are allergic to lignocaine	43.7%	56.3%
Are you aware about pressurized syringe technique	56.8%	43.2%
Are you aware about pulpal anesthesia	90.4%	9.6%
What is the recommended dose for injecting LA for testing LA allergy	29.3%	70.7%
For LA allergy test, needle should be inserted into	16%	84%
Which is the preferred route for epinephrine in local anesthetic injection in case of allergy	43.1%	56.9%
Concentration of Articaine with 1:100000epinephrine that can be used as a primary buccal infiltration of the mandibular 1st molar	29.3%	70.7%
Equivalent weight of Articaine with 1:100000epinephrine that would be effective for primary buccal infiltration of mandibular 1st molar is	8.2%	91.8%
Attitude Based Question	**Yes / Correct Answer**	**No / Wrong Answer**
Do you test for LA allergy before injecting LA to the patient	85.5%	14.5%
Do you use any topical anesthesia before injecting LA	82.8%	17.2%
Do you prescribe any premedication before injecting LA	12.1%	87.9%
What length of needle do you use most often during infiltration	61%	39%
What length of needle do you use most often during block	63.9%	36.1%
What gauge of needle do you use most often during infiltration	62.1%	37.9%
What gauge of needle do you use most often during block	62.1%	37.9%
Do you regularly ask your patients if they have any LA allergy before the treatment	86.3%	13.7%

Knowledge Based Question	Correct Answer	Wrong Answer
Practice Based Question	**Yes / Correct Answer**	**No / Wrong Answer**
Have you ever tried any alternative therapies other than LA for anesthesia	15.4%	84.6%
What emergency drug do you keep in your clinic?	62%	38%
How much time do you take to inject a 1.8ml cartridge	29%	71%

Table 2: Patient's Questionnaire

Questions	Yes	No
Do you feel nervous in hospital environment?	58.4%	41.6%
Do you have fear of oral injection?	50%	50%
Are you aware about LA?	63.6%	36.4%
Have you ever been injected orally?	67.8%	32.2%
Have you ever been prescribed any medication prior to LA?	80.5%	19.5%
Are you aware of any complication related to LA?	24.4%	75.6%
Did you ever have any allergy due to LA?	95.1%	4.9%
If the previous answer is yes, was your clinician successful in managing it?	86.8%	13.1%
Do you mention your medical complications prior to any treatment?	65.5%	34.5%
Are you aware about different techniques of LA?	17%	83%
Do you expect your clinicians to explain the techniques to you?	84.1%	15.9%

Table 3: KAP analysis (ANOVA & Post HOC Test)

Knowledge	Qualification	**BDS**	**Good**	**Average**
			0 %	100 %
		PG student	20.7 %	79.3 %
		MDS	41.3 %	58.7 %
	Experience	<5 years	0 %	100 %
		6-15 years	43 %	57 %
		>15 years	100 %	0 %
Attitude	Qualification	BDS	Good	Bad
			0 %	100 %
		PG Student	4.3 %	95.7 %
		MDS	100 %	0 %
	Experience	<5 years	0 %	100 %
		6-15 years	83.5 %	16.5 %
		>15 years	100 %	0 %

Practice	Qualification	BDS	Practicing	Not practicing
			50 %	50 %
		PG Student	21.4 %	78.6 %
		MDS	51.1 %	48.9 %
	Experience	<5 years	40.4%	53.9%
		6-15 years	35%	65%
		>15 years	0%	100%

Discussion

Failures to analyze the dose of LA that can be safely administered to patients is seen to be a very common issue among the dentists irrespective of whether they are general practitioner or specialists. Only 23.8% of the dental practitioner responded correctly the questions related to safety dosage of lignocaine with vasoconstrictors and correct response to equivalent weight of adrenalin in 2% local anesthesia with 1:200000 concentration was only 26.7%. The obtained results confirm that most of the dentists use local anesthetic routinely to perform various dental procedures without having proper knowledge of doses to be used. Various complications arise due to incorrect administration of LA injections, few of the complications are permanent and can harm patients or can also be life threatening.[3, 5-7]. Remaining 76.2% of the dentists are still confused regarding the dosage of lignocaine with or without vasoconstrictor. Such confusions are problematic, especially when anesthetics are administered to medically compromised patients.[8-10]

Aspiration prior to injecting LAs prevent accidental intravascular injection. Few authors recommend to perform at least two negative aspirations prior to injecting local anesthetics but dentists often fail to appreciate this importance of applying such procedures to all injection events.[11,12] 39.5% of dentists know the importance of aspiration when injecting local anesthetics, while is similar to another study in which 38-43% of practitioner perform aspiration. 60.5% are still not aware about the toxicity can occur due to positive aspiration.[1,13] This is upsetting since high levels of toxicity occurs due to accidental intravascular injection of the local anesthesia.

Hematoma is commonly encountered by the dentists in their clinics (48.8%) followed by syncope (37.6%) followed by failure to achieve anesthesia (16%). The unintentional nicking of the blood vessels (artery or vein) with needle during the injection of local anesthesia might result in effusion of blood into extravascular space with subsequent hematoma formation. Although anaphylaxis is not common in their routine practice dentists should be aware of the signs & symptoms of it, and treat the severe reactions in the light of recent advance.[14] Similar to a study by Moore PA et al,[15] the present study shows that the most of the dental professional are aware of this fact. In contrast to Eskandari et al[16], 59.7% of the dental professionals use epinephrine as their first choice of drug in the management of anaphylaxis. Additional agents include aminophylline and corticosteroids for managing asthma, allergic, or anaphylactic reactions[17] According to Eskandari et al[16], most dentists who encounter patients with anaphylaxis in their clinics do not seem to be aware of the urgency of this conditions, this increased in this field in the last few years.[18] These results are similar to the present study, as only 12% of the dental professionals are aware of the use of corticosteroids after the administration of epinephrine. To treat severe systemic reactions, systemic corticosteroids and antihistamine may also be used, but it is not preferred choice of drug prior to or as a substitute for epinephrine for the treatment of anaphylaxis.[19] From practice-based questions, it was observed that, dentists are practicing with their outdated knowledge and are not getting updated with the recent advancements and keeping their choices to few possibilities.

Among the respondents of general population, 67.8% have experienced oral injections and 63.6% were aware about local anesthesia. It was disappointing to know that only 24.4% of the patients were aware about the complications of local anesthesia. The fact that 74% of the patients considers local anesthesia as a painful procedure, is a huge disappointment. For this, improper injection technique could be the possible reason. From the feedbacks, it was also seen that patient expects a detailed explanation of the treatment to be done. Busy hospital schedule not giving doctors enough time to explain the risk factors could be the reason.

Conclusion

Desired level of awareness regarding local anesthesia is lacking among dental professionals, and a deliberate effort must be made to improve it. Upgradation of the academic knowledge and reflecting them into practice is the most essential step that every practitioner must follow. Undergraduate students to be encouraged to acquire and reflect the theoretical knowledge before each clinical activity. Effective doctor–patient communication (verbal and nonverbal) influences variables like patient satisfaction, patient compliance and medical outcome,

assessments of communication skills should be an integral part of the academic training.

Enlightenment of patients and their relatives about the procedure, will improve the quality of work remarkably. These few considerations will help patients to experience a complete painless dentistry

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Medication Impact on Dental Prosthesis

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Abstract

Dental implants are a type of artificial prosthesis, which is used, in treating patients with partial or complete edentulism. Implants have been is use in dentistry as a very reliable prosthesis since the past 30 years. Dental implants mainly attribute their success on the process of Osseointegration. Osseointegration includes in itself the processes of bone remodeling and healing. Systemic medication can interfere with these processes. The sole objective of the followingreview article is to acknowledge the association between systemic medications consumption and the subsequent effect it has on bone metabolism and their impact on dental implant failure.

Keywords: *Implant; Osteoporosis; Osseointegration; Bone Remodeling; Medication.*

Introduction

An implant is any object or material such as an alloplastic substance or other tissue that is partially or completely inserted or grafted into the body for therapeutic, prosthetic or experimental purpose. Dental implant is defining as a substance that is placed into the jaw to support a crown or fixed or removable denture. The success of implants in dental practice is dependent on the process of Osseointegration. Osseointegration – is the apparent direct attachment or connection of osseous tissue to an inert, alloplastic material without intervening connective tissue. This review article emphasizes on the impact of systemic medications on implant prosthesis.[1-3]

Bisphosphonates: Bisphosphonates (BSPs) are the category of drugs used in the prevention and treatment of bone related disorders likemultiple myeloma, osteoporosis or any other cancer metastasis that spreads secondarily to the bone.[4]

Commomly used BSPs are Alendronate, Risedronate, Ibandronate and Etidronate.

BSPs cause selective deposition of bone by:

(a) Promoting osteoclast apoptosis [programmed call death]

(b) Impairing osseous blood supply

(c) Showing higher attraction for hydroxyapatite crystals [which constitute the bone]

The adverse effects of prolonged use of BSPs leads to the occurrence of Bisphosphonate-related Osteonecrosis of Jaw [BRONJ]

This could be a possible risk factor for dental implant therapy. Despite this BSPs aren't an absolute contraindication for success of dental implants and patients under BSP therapy can safely undergo implant procedures. The possible reasons for this maybe:

- Sterile operating conditions
- Frequent bone irrigation
- Efficient use of antimicrobials
- Regular check up, recalls and prompt management of wounds

Proton pump inhibitors: Proton Pump Inhibitors (PPIs) are the category of drugs that are used in the reduction of gastric acid production and hence used for the treatment of Gastric Esophageal Reflux Disease {GERD} and gastric ulcers. Commonly used drugs are Rabeprazole, Pantoprazole, Omeprazole, Esomeprazole and Lansoprazole. Long-term use of PPIs can cause osteoporosis due to its effect on calcium metabolism. This can in turn lead to increased bone loss and fractures.[6-8] The ways in which the calcium metabolism is altered can be:

(a) Reduced calcium absorption from stomach and intestine as an acidic environment is needed to facilitate calcium absorption.

(b) It can affect bone resorption by inhibiting osteoclastic proton transport system.

(c) It decreases urine calcium excretion.

Non-steroidalanti-inflammatory drugs: Non-Steroidal Anti-Inflammatory Drugs {NSAIDs} are the category of anti pyretic, analgesic and anti-inflammatory drugs used very commonly for management of dental pain and in systemic conditions such as arthritis, cold, headache and joint injuries. Commonly used drugs are Aspirin, Paracetamol, Ibuprofen, Aceclofenac, Diclofenac and Ketorolac. 8NSAIDs inhibit COX-2 enzyme and the production of Prostaglandin that has a pro-inflammatory role and even facilitates normal bone healing, bone formation, osteoclastic activity and angiogenesis.[9,10]

So, use of NSAIDS can cause:

(a) Perio-implant bone loss

(b) Delayed bone healing

(c) Decreased bone to implant contact

(d) Decreased bone area and bone density

So, it is recommended to keep the patients off of NSAIDs for control of pain and oedema prior to and post implant placement and opt for alternative medications for the management of pain and oedema.[11]

Selective serotonin reuptake inhibitors: Selective Serotonin Reuptake Inhibitors (SSRIs) are the most common group of drugs used for treatment of depression and anxiety disorders. Commonly used drugs are Fluoxetine, Sertraline, Paroxetine and Escitalopram. These drugs increase the concentration of serotonin by inhibiting serotonin reuptake from synaptic clefts. SSRIs show their action on Serotonin receptors and transporters which are present in osteocytes, osteoblasts and osteoclast found in bone and thus alter the function of these cells all of which are involved in bone remodeling.[12]

This results in defective bone metabolism by

(a) Increasing osteoclast differentiation.

(b) Anti-anabolic skeletal effects causing degrading impact on mineral quantity in bone and the trabecular pattern of bone architecture.

(c) Decreased differentiation and mineralization of osteogenic cells.

(d) Reduction of osteoblast marker genes including alkaline phosphatase, osterix and osteocalcin.

(e) Problems encountered with mechanical loading.

This in turn results in bone loss, defective Osseointegration and hence implant failure.So careful surgical treatment planning is recommeneded in such patients.[13]

Anti-hypertensives: Anti- hypertensives are a group of drugs that reduce blood pressure by different mechanisms.

Commonly used drugs are:

1. Beta-Blockers like Atenolol, Bisoprolol, Propranolol and Metoprolol.
2. Thiazides diuretics like Chlorthalidone, Hydrochlorothiazide and Metolazone.
3. Angiotensin-Converting Enzyme {ACE} Inhibitors like like Captopril, Enalapril, Lisinopril and Perindopril.

These drugs indeed have a beneficial effect on implant therapy. This is achieved by,

1. Blocking their beta 2 adrenergic receptors [also known as Beta Blockers]
2. Increasing calcium absorption [Thiazide Diuretics]
3. Shifting balance towards bone deposition by inhibiting Renin-Angiotensin System [ACE Inhibitors]

So, these Anti-hypertensives can be given to patients planned for implant therapy without them causing any hindrance in the treatment.[14]

Cyclosporine: Cyclosporine belongs to the category of immunosuppressive drug used to stop the occurrence of transplant rejection and for the treatment ofvarious immune-mediated diseases. Cyclosporine have been reportedly causing osteoporosis by,

(a) Anti-anabolic effects on osteoblast.

(b) Suppressing T-Lymphocytes required for bone modeling.

(c) Creating a loss of balance between bone resorption and deposition that may result in osteopenia and enhanced bone loss.

(d) Increasing incidence of bone fractures.

(e) This in turn will have a negative impact on implant supported prosthesis and will affect its prognosis.

Chemotherapeutic agents: Chemotherapeutic agents are also known as Antineoplastic agents. These drugs are used directly or indirectly to deteriorate the proliferation of rapidly growing cells especially malignant cells. Commonly used drugs are Methotrexate, Capacitabine, 5-Fluorouracil and Cisplatin. They lack the selectivity between fast growing cancer cells and normal cells, which have accelerated cell cycle like the cells of bone marrow cells, hair follicle, etc. This in turn has detrimental effects on the process of bone healing. They also affect patient's nutritional status, which in turn impairs the process of osseointegration and healing. So due consideration should be given to such patients at the time of implant treatment planning.[15-17]

Glucocorticoids: Glucocorticoids are a group of drugs that are indicated in the treatment of various inflammatory and chronic conditions such as rheumatoid arthritis, bronchial asthma, Idiopathic Thrombocytopenic Purpura, Inflammatory Bowel Disorders and many other autoimmune diseases. Commonly used drugs are Beclomethasone, Budesonide, Betamethasone, Cortisone, Dexamethasone, Hydrocortisone and Prednisolone. One of the most common side effects of glucocorticoids is bone loss, which in turn negatively affects implant Osseointegration. Glucocorticoids promote apoptosis of osteoblast and also favour differentiation of bone marrow cells into adipocytes. They directly stimulate PTH production.

These have also been shown to be associated with decreased bone formation and enhanced bone resorption by increasing osteoclastic activity and impairing maturation of osteoprogenitor cells into osteoblasts. They decrease Vitamin-D dependent intestinal calcium absorption and increase renal excretion of calcium and phosphate ions. However various clinical studies conducted in this regard have concluded that glucocorticoids have less effect on Osseointegration in mandible and significant effects in skeletal bone. So, these drugs aren't much of a contrainidication in placement of dental implants.[18-24]

Conclusion

Various systemic medications alter the success of implant therapy by mainly regulating the process of bone remodeling which directly affects the Osseointegration process that forms the backbone of implant therapy.Hence very careful consideration by the dentist is essential before performing implant placement procedures.

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Laser Excision of Fibrous Epulis in a 11-Year-Old Boy: A Case Report

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Abstract

Fibrous epulis is a commonly occurring benign localised growth of the gingiva that exhibits slow growth and is painless. It has a multifactorial etiology, most commonly being irritation due to calculus deposition because of poor oral hygiene, periodontal diseases and hormonal changes. A 11-year-old boy reported to the Department of Paediatric and Preventive dentistry with a complaint of a slow growing painless gingival mass in the mandibular anterior region since the last 6 months causing difficulty in mastication. After proper clinical, radiographic and blood investigations a decision to excise the lesion with a Diode laser under local anaesthesia was taken. Laser provides for a more rapid, more precise, sterile and bloodless field of surgery and is better accepted by paediatric patients. Intra-operative co-operation of the patient was good and a 7-day post-operative follow up showed satisfactory uneventful wound healing.

Keywords: *Epulis, Excision, Diode Laser, Paediatric.*

Introduction

The epulis can be categorized as one of the most frequent lesions of the mouth, benign in nature.[1] The term epulis can be traced from old Greek and is a non-specific generic clinical term that denotes it as tumour like lesion "of the gingiva".[2] Epulis fall under the category of reactive lesions, and not a true neoplasia. They usually have a fluctuant growth rate while remaining asymptomatic]. The dental literature summarizes 3 main subtypes of epulis based on histology -fibrous, granulomatous (pyogenic granuloma), and giant cells epulis (myeloid).[3,4]. Etiological factors that precipitate epulis growth and recurrence are yet to be known. Several factors however could beaccounted for including history of traumatic injury, status of nutrition, level of oral hygiene being maintained, addiction habits to nicotine and alcohol, medications being taken and body hormonal configuration, pregnancy.[5] Some studies show a female predilection for such soft tissue tumours.[6] The gingiva of the anterior teeth region is most frequently affected. Fibrous epulis commonly presents as pinkish to dark red in colour; round, oval or lobular; pedunculated or sessile;may also sometimes be ulcerated. Epulis are highly vascular that causes them to bleed.[7,8] Surgical excision under local anaesthesia is usually the treatment of choice. In paediatric patients where patient co-operation is an important aspect, use of laser is preferable as it minimizes the chances of bleeding.[9]

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Case Report: A 11-year-old male child patient reported to the Department of Paediatric and Preventive Dentistry at Institute of Dental Sciences, Bhubaneswar with a chief complaint of a mass growing in his lower front teeth and gum region resulting in a difficulty to chew food, since the last 6 months. The mass had a history of slow growth with no associated pain and had created a space between the two mandibular permanent central incisors. Clinically the patient elicited good general health. Intraoral examination revealed a pale pink, circular, isolated, firm and non-fluctuant swelling of about 2 x 2 centimetre in size with a sessile base extending lingually interdentally with respect to teeth number 31 and 41 (Figure-1). The gingival and periodontal status of other teeth was below satisfactory.

Imaging with periapical radiograph did not reveal any abnormalities. Results of routine blood investigations were found to be normal. The patient was made aware of the advantages of surgery using laser in paediatric patients and a decision to surgically excise the lesion using diode laser.

Oral prophylaxis was performed prior to the planned surgery. The area around the lesion was anesthetized with 2% lidocaine with epinephrine (1:2,00,000) without infiltrating directly into the body of the lesion. Protective eyewear was put on by the clinician, the patient and the chairside assistant before the commencement of the procedure. Resection of the lesion was started base first using a 940nm diode laser (iLASE^{TM} diode laser from BIOLASE Inc.) in continuous contact mode at 1.8 W of power rating in the presence of a high-volume evacuation. The laser tip was wiped frequently during resection to clear off the attached charred tissue. The margins of the lesion were resected using a brushing motion, that were later made deep to completely separate the lesion along with any remaining tissue tags. Post-operative haemostasis was achieved satisfactorily. The whole procedure was completed in under 10 minutes and was well tolerated by the patient (Figure-2). The patient was prescribed the use of topical anaesthetic gel and was educated on proper oral hygiene practices. A 7-day follow-up of the patient showed satisfactory and uneventful post-operative healing (Figure- 4).

Histopathology: After complete excision tissue sample was transferred to the Department of Oral and Maxillofacial Pathology for histopathological examination in 10% formalin-buffered solution (Figure-3). The haematoxylin and eosin stained section showed parakeratinised hyperplastic stratified squamous epithelium proliferating into the underlying densely collagenous stroma. Minimal chronic inflammatory cells were seen with few engorged blood vessels in the stroma. The histopathological examination was suggestive of fibro epithelial hyperplasia.



Figure 1: Pre-operative clinical view of epulis in relation to mandibular anterior gingiva and tooth number 31 and 41.



Figure 2. Immediate post-operative view

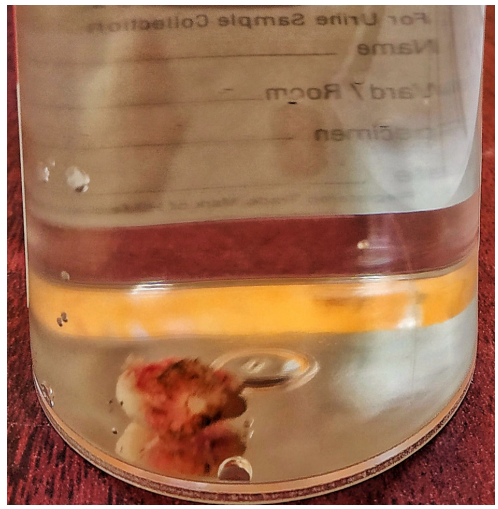


Figure 3: Excised tissue stored in 10% formalin



Figure 4: 7 days post-operative view showing satisfactory healing

Discussion

Virchoff in 1864 was the first to describe the term epulis [10]. Fibrous epulis is usually characterized by a well-demarcated mass of tissue, with a smooth surface and broad base, firm and non-fluctuant in consistency, mostly occurring in maxillary anterior gingiva and teeth region.[3, 11-12] These features seem to be consistent with our case. Epulis may be caused, among other factors due to long standing irritation from decayed teeth, poor quality restorations and calculus deposition.[13-14] This seems to be in line with the findings of our case as the child presented to our department with significant

amount of calculus deposition. The lesion is usually common in the 4th to 6th decade of life and has a male to female ratio of almost 1:2, which makes the occurrence of the lesion in our case in an 11-year-oldmale child quite rare.[15] Our case is also in accordance with most reports in the dental literature that show the most common site for growth of fibrous epulis is the anterior region of the oral cavity, which can be due to the fact that the anterior region is most likely to be affected by calculus deposition compared to the posterior part of the oral cavity, along with other factors like crowding of anterior teeth that makes oral hygiene maintenance difficult.The treatment of choice in such cases is surgical excision of the lesion followed by correction of the local cause of irritation, which reduces the chances of the lesion occurring again in the future.[16] In our case, diode laser was chosen to be the machinery for excision as it Is ideal for paediatric patients as it is better accepted by patients and parents alike while also enhancing treatment outcome.[17, 18] Laser also provides a plethora of other benefits such as a highly sterile surgical bed, eliminating the need for post-operative antibiotics; faster rate of healing and increased precision while performing the surgery.[19]

Conclusion

Due to its multifactorial nature the diagnosis and treatment of epulis often proves quite challenging even for the seasoned clinician. Although usually painless and asymptomatic, they can grow to large enough sizes to hamper with occlusion and mastication. Complete excision of the lesion is considered the best possible management protocol in such cases. Lasers provide an excellent alternative to the traditional scalpel for surgery in paediatric patients, that promises enhanced patient co-operation intra-operatively and patient satisfaction post-operatively.

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Conflict of Interest: None

Ethical Permission: Approved

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Cavernous Hemangioma of the Tongue: A Rare Case Report

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Abstract

Over 50% of hemangiomas are found in the head and neck region with the most common sites of involvement being the lips, buccal mucosa, tongue and the palate. These are basically considered to be developmental vascular malformations or hamartomas instead of true neoplasms. We present here a case of cavernous hemangioma on lateral body of tongue in a 63-year-old male who was diagnosed clinically simply as hemangioma. Histopathology plays a vital role in the final diagnosis of such lesions. Other important factors like the age of the patient, the size and site of the lesion and its association to some vital structures play a major role in treatment of the lesion and its surgical approach.

Keywords: *Cavernous hemangioma; head and neck cancer; Histopathology.*

Introduction

The vascular developmental deformities having a divisional growing stage followed by a gradual retrogradation are broadly characterized as hemangiomas with 60-70% of them occurring in the head and neck region.[1] The tumor originating from vascular tissue is mainly divided into two types: Hemangioma and a simple vascular malformation. Hemangioma can be again subdivided into capillary and cavernous types based upon its histopathological presentation.[2] Upon histopathological examination, capillary hemangioma displays a picture of single layer of endothelial cells lining many small capillaries in a moderate to densely inflamed connective tissue stroma whereas in case of cavernous hemangioma, epithelial cells lining large and thin walled vessels and sinusoids are seen which are usually separated by connective tissue septa.[3]

These tumors are described having a benign nature by 3 stages: division of endothelial cells, an accelerating growing stage, and lastly an impromptu regression. Pathogenesis of hemangiomas is associated with genetic as well as cellular elements, mostly the monocytes as they are regarded as the precursors of the endothelial cells present in hemangioma. A lack of balance in angiogenesis leading to the rampant growth of endothelial cells in combination with vascular endothelial growth factor, basic fibroblast growth factor and indole-amine 2,3-dioxygenase (IDO) are considered to initiate its development.[4]

Case Report: A 63-year-old male patient presented with a painless growth in tongue from past 2 years. On intraoral examination, a painless and symptomless reddish growth was present in the lateral border of tongue which was oval in shape and approximately 2cm in size. It was soft in consistency, reducible and compressible. Based upon these clinical findings a provisional diagnosis of Hemangioma was given and the tissue was incised and sent for histopathological examination.



Figure 1. Reddish growth present in relation to the lateral border of tongue.

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Histopathological Findings

The hematoxylin and eosin stained section of the specimen revealed a parakeratinized stratified squamous epithelium with blunt rete ridges. Large cavernous spaces lined by endothelial cells and enclosing abundant amount of red blood cells were seen in the minimally inflamed connective tissue stroma. Occasional lymph spaces containing lymphatic fluid were also evident.

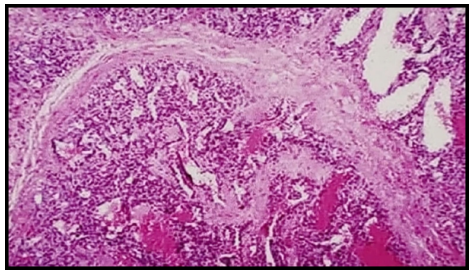


Figure 2 (10x view). The photomicrograph of H & E stained section showing large cavernous spaces lined by endothelial cells separated by scanty connective tissue septa.

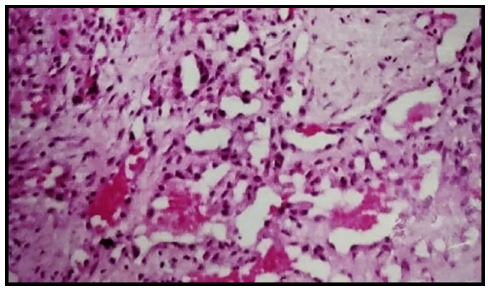


Figure 3 (40x view).The photomicrograph of H & E stained section showing abundant amount of red blood cells within the cavernous spaces.

Based upon these histopathological findings a final diagnosis of Cavernous Hemangioma was given.

Discussion

Hemangiomas mostly occur in the head and neck region with the face, oral cavity, and lips being affected the most with a higher predilection in females.[5] The word cavernous hemangioma basically indicates large vascular channels present in the lesion.[4] These large vascular channels made up of thin walled endothelial vessels or sinusoids and separated from each other by connective tissue septae are some of the characteristic features of cavernous hemangioma.[6]

As reported in the literature around 80% of these lesions are solitary and involve the head and neck region when number and location are considered.[4]

Clinically they present as a sessile or pedunculated soft and smooth mass which may vary in size from a few millimeters to centimeters. Color may also vary from pink to reddish purple and blanching of the lesion is usually present. A spontaneous hemorrhage may also occur as a result of some minor trauma.[6] In spite of maximum head and neck involvement, intraoral hemangiomas are very rare to be diagnosed by clinicians. Radiographic imaging becomes inevitable when is large lesions may compressupon the underlying vital anatomical components, like the facial nerve or orbit. Computed tomography (CT) and magnetic resonance imaging (MRI) are also employed in the volumetric analysis of hemangiomas and vascular deformities. These techniques also hold great importance from the diagnostic point of view as well as size, extension and location can also be easily analyzed.[5] Differential diagnosis like capillary hemangioma, pyogenic granuloma and angiosarcoma must be considered and ruled out clinically as well as histopathologically in the cases of cavernous hemangioma.

Rare sites such as tongue when affected by hemangioma brings along a variety of problems and discomfort to the patient like aesthetics, speech difficulties, inability to eat and swallow and may also show recurrent hemorrhages. Depending upon the size, stage, site of the lesion and the age of the patient, the treatment is decided. Radiotherapy and chemotherapy of tongue lesions are rarely indicated because of their side effects. Carbon dioxide laser when used as a treatment modality causes difficulty in speech, chewing and deglutination.[1,7]Surgical treatment is mostly advised in cases of unresponsive systemic treatments or when aesthetics is concerned. A complete surgical excision is performed. Conservative method of treatment are indicated in more aggressive lesions of the tongue however recurrence may sometimes occur with such procedures where as a loss in function may result after an aggressive surgical procedure.[5,6] Greater success rates have been achieved after treating such cases with cryotherapy.

Conclusion

Cavernous hemangiomas occur as a result of uncontrolled division of the endothelial cells and are basically considered as developmental aberrancies rather than an actual neoplasm. Though most commonly involving the head and neck region, they are very rare intraorally. When congenital, they usually regress

without any treatment but surgery becomes a treatment of choice in cases of such solitary tongue lesions.

Conflict of Interest: None

Funding: None

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Comparison between Alvogyland Zinc Oxide Eugenol Packing for the Treatment of Dry Socket: A Clinical Study

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Abstract

Background: Dry socket is most common post-operative complication seen after extraction of third molar or surgical tooth. Patient come to next day of surgery complains of severe pain in the extraction socket and foul smell from mouth. The main objective to treat the dry socket is relief in severe pain by local dressing materials.

Aim: The main objective of the study was to evaluate two dressings material in pain relief of dry socket.

Materials and Method: 30 patients were selected after taken the informed consent those were underwent extraction. The patient selected for the study was those who have severe pain after one day of extraction and proper examination the diagnosis was dry socket are equally and randomly to control and test groups (Zinc oxide Eugenol) and Group B (Alvogyl).

Results: At 7-day Alvogyl (2.90+.738) showed the highly statistically significant difference in relieving pain as compare to Zinc oxide eugenol (4.10+.316) dressings.

Conclusion: Alvogyl better than the ZOE dressing for providing pain relief in dry socket.

Keywords: *Dry socket; Post extraction complication; Alvogyl; Zinc Oxide; Eugenol.*

Introduction

After extraction dry socket is most common complication occurred in the dental practices it is due to interferes with the healing process that takes place after a tooth extraction. Blum (2002) defined alveolar osteitis as post- operative pain around the extraction socket which increases after few hours of the extraction accompanied by a partial or total disintegrated blood clot within the alveolar socket with or without halitosis".[1]

"Dry socket" was first described by Crawford in 1896.[2] The name dry socket is used because the socket has a dry appearance after the blood clot is lost and debris washed away. It will occurs due dislodgement of blood clot in 1-2 hr after the tooth extraction due this dislodgment the bone surface exposed in the oral environment which cause bone infection and more bacterial growth on the bone surface, cause severe pain in next 5-6 hour of extraction, it is commonly seen in the third molar extraction case because more bone cutting is required and not maintaining the irrigation protocol during the surgery.[3,4]

"Many literature reviews suggest that the aetiology for dry socket was due dislodgment clot from the extraction socket. Several contributing factors have been reported in literature to be associated with increased risk of dry socket.[5] They include traumatic extraction, preoperative infection, smoking, gender, nutritional deficiency, site of extraction,use of oral contraceptives, use of local anaesthetic with vasoconstrictor, inadequate

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postoperative irrigation and low level of operator experience.[6] Increased age and systemic conditions, such as diabetes and immune-suppression have also been associated with a greater risk for dry socket. Several modalities have been advocated to reduce the incidence of dry socket in patients. They include the use of antiseptic mouth washes, antifibrinolytic agents, antibiotics, steroids, clot supporting agents and intra-alveolar dressings.[7] As a specific etiology has not yet been determined, it is necessary to follow preventive measures in the daily practice of tooth extraction starting with the patient's medical history."

"The most common management usually used by every dentist of dry socket include irrigation of socket toughly with normal saline, removes the tooth and bone fragments, necrotic tissues and food debris and inter alveolar medicament with potent antibiotic and NSAIDS. Placement of intra-alveolar paste is controversial in literature because it causes other complications.[9] Surgical intervention in the form of administering anaesthesia, curettage and irrigation of the socket to cleanse it of necrotic bone, tooth fragments, induce bleeding and primary closure by advancement flap, to protect the clot and enhance healing by primary intention.[10] The aim of the study was to elevate the pain Alvogyl and Zinc oxide eugenol dressings placed intra alveolar for the management of dry socket."

Materials and Method

30 patients were selected for the study that underwent extraction of teeth and complains of severe pain after 1 day. Prior to start with the procedure approval was taken from research and ethical committee. The selection criteria were pain around the extraction socket after 1-day, foul smell, total or partial loss of clot were selected for the study and randomly divided into test and control group. Visual Analogue Scale (VAS) for pain intensity reading were recorded at baseline and 7 day.[13] Pain was assessed on a 10 cm scale continuous interval scale with two ends-points representing the left endpoint marked ''no pain'' and the right endpoint marked "worst pain."

Treatment Protocol

Control group: The local anaesthesia was applied by giving the block the socket is cleaned by the saline irrigation. Curettage is avoided to prevent the surrounding tissue after the clean the socket the ZOE paste is mixed in the clean glass slab mix with fibber of gauze pieces and make thick stick mix place in the area of interest.

Test Group: After doing the same procedure instead of ZOE Alvogyl dressing was given. The gauze was removed after 5 min. The pain level was assessed by visual analogue scale after baseline and 7 days after placement of the medicament.

Statistical analysis: Statistical analysis was carried out in the computer-based software using (SPSS Inc., Chicago, IL, version 16.0 for windows). Test for qualitative variables, mean and standard deviation were calculated. To test the significance of difference of mean rank of VAS between two groups was test by **unpaired t-test**.

Results

Intragroup comparison: On intra group comparison, the mean VAS scores reduced significantly at 7 days from baseline ($p<0.001$) in both the groups. (Table 1). The post hoc comparison of the scores also showed that the mean VAS scores had reduced significantly from baseline to 7 Days

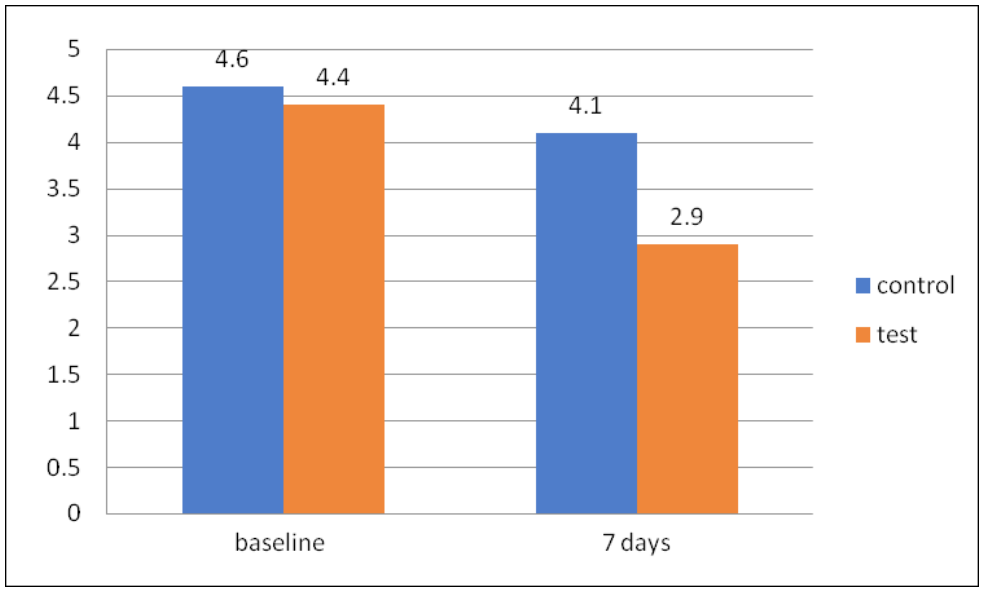
Intergroup comparison: The mean VAS score at baseline in control and test groups were 4.60 ±.699 and 4.40 ±.699 respectively. At 3 months the mean VAS score was found to be 4.10±.316 and 2.90 ±.738 in the control and test group respectively. (Table 1, Graph 1).

The **unpaired t test** was used to compare the mean VAS scores between the two groups was statistically significant ($p>0.05$) at all the time intervals viz. baseline and 7 days.

Table 1. Comparison of visual analogue pain scale test and control groups

VAS	Groups	Mean (mm)	Std. Deviation	t-test value	P-value	Mean Difference
Baseline	Control	4.60	.699	.435	-.781	.200
	Test	4.40	.699			
At 7 Days	Control	4.10	.316	.001*	-3.430	1.200
	Test	2.90	.738			

Unpaired t-test; *significant difference (p-value<0.05).



Graph 1. Show the vas with time in different groups incorporated in the study

Discussion

Dry socket is the most common complication following extraction of teeth by general dentists and specialists. It is difficult to know the extract aetiology of dry socket and commonly seen in daily practice. The main goal after dry socket formation is to minimise the level of pain by using local dressing and pain killer. The main ingredient of local dressing is eugenol which potent pain killer and reduce the bacterial load in the socket. Alvogyl also contains butamben (anesthetic) and iodoform (antimicrobial). Blum, [2] Ahmad and Bloomer suggested using Zinc oxide eugenol in the management of dry socket.[7, 8] Bloomer and Alexander recommend Alvogyl in managing dry socket.[8, 9] Retardation of healing and inflammation were reported by Syrjanen and Syrjanen when using Alvogyl.[10]In our study, the statistically significant difference was obtained in the pain scores among patients treated with zinc oxide eugenol and Alvogyl. In our study we found that the Alvogyl showed the statistically significant difference in relieving pain than Zinc oxide eugenol dressings. Alvogyl required a smaller number of dressings when compared to zinc oxide eugenol.

Conclusion

Alvogyl dressing is a better alternative for Zinc oxide eugenol dressing for the treatment of dry socket.

Conflict of Interest: None

Ethical Permission: Approved

Funding: Self-funded.

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Dental Radiography in Pediatric Dentistry: A Review

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Abstract

Diagnosis and proper treatment planning in dentistry relies on dental radiography especially in cases of extent of caries, periodontal diseases, developmental disorders and oral pathologies. In pediatric dentistry management of child while taking radiograph can sometimes become challenging as it can affect the whole treatment plan and psychology of the child towards dental treatment. Thus, it becomes imperative to be aware of modifications needed in techniques of obtaining radiographs. This review emphasizes on all the possible alteration in techniques that can be used in infants, children through adolescence including those with special health care needs,along with recent advances.

Keywords: *Dental radiography, Children, Lollipop radiograph.*

Introduction

A thorough examination of oral cavity of the child is best supplemented by dental radiology aiding in precise diagnosis and treatment planning. Most commonly radiographs in pediatric dentistry are indicated for detection of caries, assessing status of dental injury, evaluating tooth development and eruption status, diagnosing any pathological conditions etc. However, in cases of infant, children, adolescents and children with special needs is challenging and needs special attention and precision so that radiography can be used with minimal but should be able to provide reliable information required for diagnosis and treatment planning.[1,2]

Projection Method: After obtaining detailed medical and dental history dental radiographs are needed for completing the clinical examinations. In pediatric dentistry there needs some modifications while taking radiographs depending on patients age, cooperation, and medical conditions. For example, while taking radiographs for very young patient xray film can be held by the parent or the guardian. In some cases, using biteblock or holding the film with the hemostat also helps. Also, the film can be held in occlusion by the patient eliminating the dependency on holding it stably by anyone.[1,3]

For infants (<3 Years): usually size 0 intra-oral radiograph is used for recording. This is most challenging because of very young age of the child and placement of radiograph in molar region is difficult. In maxilla placement leads to gagging and coughing and in case of mandibular it irritates the sublingual tissues and reflex tongue movement makes it further difficult.[4]Yet another problem encountered while dealing with them is stabilizing the head during taking the radiograph to avoid distortion. In these cases, parental / guardian help is needed to hold the film and controlling head movement of the child. Also, both the child and guardian are asked to face the same direction limiting the movements.[1]

Special Children: In cases of special children with limited ability to comprehend mentally and physically, the intraoral film with bitewing tabs are used to hold them in place. In some cases, an 18-inch floss is tied through the tab for retrieval and as a safety factor. Safety measures like lead apron, thyroid shield should be strictly used in these cases and also for the accompanying parent/guardian.[5]Cases where intraoral radiography is impossible to obtain, in such patient extra-oral radiographs like panoramic, lateral jaw or 45

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degrees projections can be used. Various modified intra-oral holders have been proposed though but its use still remains impractical.[6, 7]

Children with gag reflex: Apprehensions increases the tendency to gag in children. It is mostly interpreted as effort by the child to protect himself as reflex defense mechanism against invasion. This is the main reason using tell show do and use of euphemisms are needed to make the child aware of the procedure before taking them for the radiograph. Most common method to reduce the gagging is distraction. This is done by asking them to raise one leg or hand, taking long breath or counting numbers. Also, it is advisable to take the radiograph in the morning hours than afternoon or evening. Also, to be noted is that when the child is empty stomach or half–filled the tendency to gag is more.[8]

Various sedative and topical anesthetic have been proposed to be used for managing gagging like phenothiazine derivatives, barbiturates, antihistamine and nitrous oxide. Temporary relief can be obtained by use of topical application or rinsing with xylocaine. Precise placement of radiographic film and manner needs to be modified in children to accommodate with gags in children. Especially in children with smaller jaws, shallow lingual vestibule or nasal obstruction commonly presents with this difficulty.[8]

Modifications in intra-oral periapical films: To reduce the anxiety or gagging and to minimize discomfort film packets can be modified as per the requirement of patient. These modifications include using the occlusal film and bending it while placement, using a smaller size or wetting and bending the corners of the film to decrease the irritation to sublingual tissues. Use of cotton rolls and tapping of x-ray films have also been suggested by few authors.7, 9

"Reverse bitewing" has been used as one of the alternative techniques in which the film is positioned in buccal vestibule and the x-ray beam is directed from the opposite side of the patient's head through the jaws.10

Management of child's behavior: Managing child behavior in dental office in itself is a difficult task which becomes even more challenging when it needs intervention with different equipment. Various techniques have been used, rather combination of behavior management techniques is advocated to deal with children.In children aged less than 3 years, desensitization technique is employed. Tell show do technique is the most commonly used method combined with use of euphemisms naming x-ray tube as a 'camera' to take photo of the teeth. This not only helps in reducing the anxiety of the patient but also comforting the child. In the first dental visit it is recommended either to not take radiographs or use the least difficult one without causing any discomfort to the child.Though use of small radiograph and bending of radiograph is advocated but it results in distorted image."Lollipop radiography" is another term used which mainly is practical application of concept of desensitization. In this child is asked to lick a sugarless lollipop, and after few licks x-ray film is placed and child is asked to hold it like the lollipop. Once the child is stabilized, radiograph is taken.[11]

Advanced Imaging Techniques

Computed tomography (CT): In conventional radiography the representation of athree-dimensional object in a two-dimensional manner leads to image distortion, overlapping of structures, and low contrast masses. CT is a more advanced digital and mathematical imaging technique which creates sections where tomographic slices is not distorted by adjacent structures. It validates differentiation and is most commonly used non-invasive procedures. This is a quick and patient friendly method.However, this being more expensive than routine radiography, these are indicated in cases of intracranial diseases, facial fractures, tumors, temporomandibular joints, neonatal teeth, supernumerary teethor extent of developmental disorders.[12]

Xeroradiograhy: It is an electrostatic imaging technique that uses xerographic based copying technique to record images. This was invented in 1937. Most commonly used in imaging of skull, respiratory tract, TMJ, mandible, and dental structures. This is mainly advantageous owing to its accuracy in recording of tissues with different thickness in single film. No special skill is needed for copying and maintaining these. For periapical imaging the plate used is comparatively smaller than conventional x-ray film. These features make it more advantageous in cases of children.[13]

Cone Beam CT (CBCT): Also known as dental volumetric radiography or dental CT. The prime feature of CBCT is acquisition of multiple planar projection with rational scan producing volumetric data set and inter-relational images. 2D digital array combined with 3D x-ray beam with circular columniation results in

production of cone and hence the name "cone-beam". In pediatric dentistry this is used in cases of skeletal malocclusion, evaluation of tumor or cyst, cleft lip and palate, craniofacial anomalies, localization of supernumerary teeth or impacted teeth. Precise details help in appropriate treatment planning and predictable prognosis.[14]

Magnetic Resonance Imaging (MRI): It is non-ionizingradiation-based method associated with radio frequency band of electromagnetic spectrum of wavelength 109-1011nm. This is non-invasive imaging technique which uses magnetic field to produce image. This is mainly advantageous in detection of diseases, assessing the healing and soft tissue lesions, intracranial hemorrhages, extent and rupture of vessels etc. MRI has also been used in diagnosis and assessing the outcome of medical management of carious lesion being able to differentiate with accuracy the diseased and healthy enamel or dentin. This can be used in special children and syndromic patients being a non-invasive technique thus well accepted by the children as well as parents.[15]

Conclusion

With knowledge of proper behavior management techniques and radiographicrecommendations added with improved innovative radiographic techniques dental radiography can be obtained with minimum discomfort and maximum accuracy. A pediatric dentist should not only be compassionate but must be aware of modifications of the techniques to be employed in patients as and when required.

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Tooth Supported–Conventional Overdentures: Two Case Reports

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Abstract

Rehabilitating the completely edentulous patients poses many challenges in the prosthetic dentistry. Providing them with the conventional denture prosthesis is the standard treatment protocol. But the major drawback of this treatment protocol is that the patients generally face difficulty in adapting to the denture prosthesis such as difficulty while mastication, looseness of the denture prosthesis, unstable while speech. To overcome this, tooth supported conventional denture prosthesis has evolved as treatment plan which showed acceptable clinical results and the patient satisfaction was better than as compared to the conventional complete denture prosthesis. Due to the tooth supported denture prosthesis there was reduction in the bone resorption process, stable prosthesis, the esthetics and occlusal functions such as mastication and speech. In this case we shall be discussing two case reports one with mandibular tooth supported over denture prosthesis other one with maxillary tooth supported overdenture prosthesis.

Keyword: *Tooth supported, overdenture, Retention, Stability.*

Introduction

As long as the tooth is present, the volume of bone is maintained in the arch. Along with the tooth loss, there is loss of the periodontal ligament which paves the way for the resorption of the alveolar bone which is very fast initially after the extraction, later the resorption rate is reduced. Because of this reason, the residual alveolar ridges gradually become compromised and are unable to provide adequate retention, stability and support to the final denture prosthesis. So, in order to prevent the loss of the alveolar bone and the resorption process of the ridges, tooth supported denture prosthesis can be provided as a treatment modality to the partially edentulous patients. These Tooth supported over dentures provide retention of the definitive prosthesis, preserve the alveolar bone and maintains the proprioception there by enhancing the treatment quality and level of patient satisfaction.

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Rationale for over denture concept[1]

- Extraction of all teeth and replacing it with complete denture prosthesis should not be considered as the best treatment option
- Preventive prosthodontics focuses on the procedures which can eliminate further prosthodontic problems to the patient. The over denture is a method in preventive prosthodontics which helps to maintain the periodontal ligament support to the ridge and prevent the bone loss process.

Indication:

1. Partially edentulous patient (fewer no. teeth). Mostly in the younger population
2. Patents with mutilated dentition
3. Cleft palate cases
4. For congenital diseasessuch asmicrodontia, in certain cases of partial anodontia.[2]
5. Amelogenesis imperfecta and dentinogenesis imperfecta
6. Rehabilitation of patients with maxillofacial trauma

Contraindication:

1. Uncooperative and under motivated patients

2. Patients with poor oral hygiene
3. Tooth with lack of periodontal support
4. Inability of the patient to afford the treatment procedure.

General considerations to be kept in mind during treatment plan formulation:

Periodontal consideration: Presence of any Periodontal inflammation, periodontal or gingival pocket with the abutment teeth, horizontal or vertical bone defects and poor zone of attached gingiva should be addressed before the commencement of the treatment procedure.[3,4]

Endodontic consideration: Prior to the treatment, the abutment teeth should be treated endodontically as :

1. This helps to alter the crown root ratio
2. Clinical crown reduction creates interocclusal clearance, which furthers helps in teeth arrangement for the denture prosthesis
3. Provides channel for connecting the attachments.

Treatment procedure

1. This comprises of Endodontic therapy of the abutment teeth, management of dental caries if present, location and distribution of abutmentteeth, gingival and periodontal contemplation.
2. Management of the carious abutment teeth: restoration of those teeth followed by frequent recall check-ups and periodic fluoride application on to those abutment teeth.[1]

Location of abutment teeth: In an ideal tooth supported overdentures, there should be presence of two abutment teeth on each side of the quadrant that provides equal distribution of forces on to these abutments and also helps to retain the definitive prosthesis.[5]

1. Canines, second premolars or second molars in eachquadrant
2. Mandibular canines being the last teeth to be lost, they are more frequently used for the overdenture prosthesis
3. Mandibular incisors are sometimes preferred as abutment teeth if the mandibular arch form is intact.

Clinical procedure: (For tooth supported over denture)

1. Extraction of teeth with poor prognosis
2. Periodontal therapy
3. Restoration and Endodontic therapy of abutment teeth
4. Tooth preparation of the abutment teeth for the overdenture coping
5. Application of fluoride over the prepared abutment, placement of the metal copings over theabutment teeth.
6. Primary and secondary impressions procedures and subsequent steps of recording the jaw relation, try in of the denture in fabrication of a conventional complete denture
7. On the intaglio surface of the final denture prosthesis, the areas near to gingival margin should be relieved to prevent the impingement of the denture on to the soft tissue area. If necessary, resilient liner can also be used for the patients.

Case-1: A 55-year-oldmale patient reported to the Department of Prosthodontics, Institute of Dental Sciences, Bhubaneswar with the chief complaint of difficulty in chewing food due to loss of teeth. Clinical examination showed loss of vertical dimension (figure no.1) and upon intraoral examination, revealed a completely edentulous maxillary arch and partially edentulous mandibular arch with presence of 32,35,41,42,44(figure no.9). Radiographic and clinical examination revealed that 41 and 32had poor periodontal support and there was large amount of bone loss around these teeth leading to the grade -III mobility with poor prognosis whereas there was minimal bone loss with respect to 35,44,42 and these teeth had better prognosis as compared to 41 and 32. Patient was explained regarding the treatment plan of extracting the tooth with poor prognosis and using the remaining teeth as abutment for a tooth supported overdenture prosthesis. Atraumatic extraction of 41 and 32 were done followed by endodontic therapy (root canal treatment) of the remaining abutmentteeth (35,44,42) (figure no.2 & 3). After the healing of the extraction socket and competition of the endodontic procedures, the tooth preparation was commenced providing a chamfer finish line and dome shaped structure to the abutment teeth with only 2 mm of clinicalcrownremaining (figure no.4). Impressionwas made with alginate and cast was poured with type-1Vdie stonematerial. Metal coping (0.3mm thickness) was fabricated on the obtained casts.These Metal copings were then checked in the patients mouth and cemented using type-1 Glass ionomer cement (figure no.5). After

1 hour, a preliminary impression of the maxilla and mandible was made using alginate in a stock tray which was later poured using type-II dental plaster. Primary casts were obtained over which the custom trays were fabricated for both maxillary and mandibular arch with a 2mm thick spacer wax and 4 tissue stops of 2*2mm dimensions. Border molding was done and secondary impression were made using light body in relation to mandibular arch and zinc oxide eugenol in relation to maxillary arch. Facebow record was made to determine the orientation of the maxilla and mount the maxillary cast in a semi-adjustable Corident CSA-600 articulator (figure no.6). Over the obtained casts, the denture bases and occlusal rims were fabricated which is later used to record the tentative jaw relation and helps in mounting the lower cast on to the articulator. Teeth arrangement was done followed by wax try-in (figure no.7). After the final consent of the patient, the dentures were processed using heat cure acrylic resin which was then trimmed, finished and polished. Laboratory remounting and occlusal correction was also done. Extensions of the denture was checked inside the patient's mouth on the day of denture insertion (figure no.8).Final Denture insertion was done, the retention and stability of the prosthesis was checked (figure no. 10). Follow up of the patient was done in 24 hours, after one month and after 3 months. The patient was highly satisfied with the rehabilitation process.



Figure 1. Preoperative facial profile

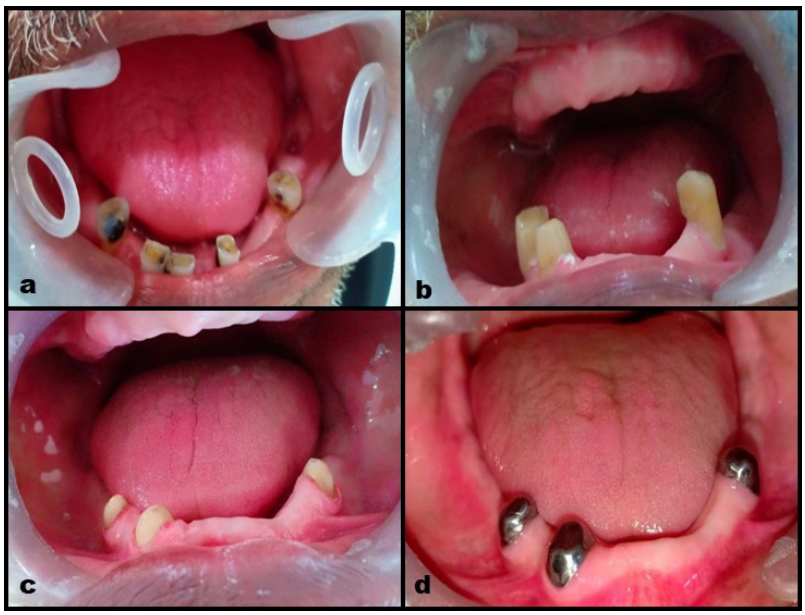


Figure 2a. Pre extraction photograph; 2b. post extraction intra oral of mandibular arch photograph of maxilla & mandible; 2c. Abutment tooth preparation; 2d. Cementation of metal copings



Figure 3a. Facebow Record taken; 3b. Wax Try-In; 3c Denture inserion; 3d. Post -operative photograph

Case-2: A 55 year old female patient reported to the Department of Prosthodontics, Institute of Dental Sciences, Bhubaneshwar with the chief complaint of difficulty while chewing food and also was quite unhappy with the appearance of her teeth ((figure no.11). Clinical examination showed loss of vertical dimension and upon intraoral examination, revealed a completely edentulous mandibular arch and partially edentulous maxillary arch with presence of 13, 15, 23, 24, 25(figure no.12 & 13). Upon radiographic assessment revealed that there is very minimal amount of bone loss around these abutment teeth in the maxillary arch. Thus, the patient was proposed with tooth supported overdenture prosthesis with respect to the axillary arch and implant supported over denture with respect to mandibular arch. But due to the financial constraint of the patient agreed for the Tooth supported maxillary overdenture and conventional mandibular complete denture prosthesis. Endodontic treatment was done for the abutment teeth in the maxillary arch after which the tooth preparation was done to provide a chamfer finish line with only 2 mm of crown structure remaining beyond mucosa and thereby giving these crowns a dome shaped structure (figure no.14). Metal copings of 0.3mm thickness were fabricated from the casts obtained from the primary impression and were cemented after checking intraorally using type -1 glass ionomer cement (figure no.15). Primary impression of the maxilla was made using alginate and the mandibular impression was made using impressioncompound after the fabrication of the custom trays, the Border molding was done using low fusing compound and secondary impression was made using light body poly vinyl siloxane impression material in relation to maxillary arch and zinc oxide eugenol impression material in relation to mandibular arch. Then the subsequent steps in fabrication of a conventional complete denture prosthesis was followed i.e. Jaw relation was done followed by try-in (figure no. 16). Final Denture processing was done followed by trimming, finishing and polishing of the denture and was inserted later on the same day (figure no. 17). The patient washighly satisfied with the esthetics of the denture, phonetics and mastication efficiency. She was followed up after 24 hours, 7 days, 15 days and 1 month, 3 months.



Figure 4. Pre-operative facial profile

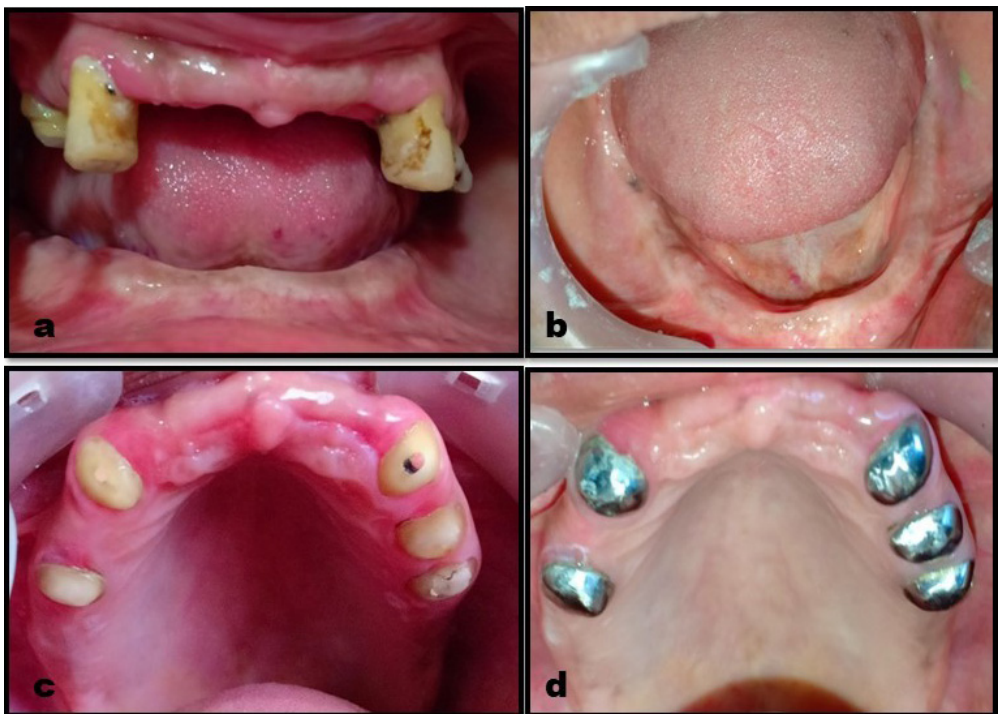


Figure 5a & b. Pre-operative intraoral pictures of maxilla and mandible; 5c. Abutment tooth preparation; 5d. Cementation of metal copings



Figure 6a. Wax try-in; 6b; post-operative photographafter denture insertion

Discussion

Preserving the residual alveolar ridge is very cardinal for the success of the final denture prosthesis. As long as tooth are intact, the alveolar bone is conserved. Tooth supported overdenture are inclinically practice since many decades and is proven with increased retention and stability and patients' satisfaction. Retaining natural teeth as abutments for dentures can considerably reduce the progress of residual ridge resorption. Multiple abutments can be used. The stress concentration can be shared between the denture bearing areas and the abutments. The over denture has numerous advantages andits applicationsare more as compared with conventional completedenture prosthesis.

Advantages of conventional over denture:

1. Adequate Proprioception
2. Increased Retention
3. Prevents shrinkage of surrounding alveolar bone
4. No significant pressure on to the alveolar ridges.
5. Positive psychological Motivation to the patients through the presence of teeth.

But along with its advantages the overdenture also poses certain limitations such as:

1. In order to prevent periodontal diseases, the patient should maintain adequate oral hygiene
2. Overdenture prosthesis are slightly bulkier
3. Frequent maintenance of the prosthesis and periodic recall of the patients are necessary
4. Slightly more expensive than conventional complete denture prosthesis.[6]

Conclusion

A tooth retained overdenture is generally advised when the patient has few teethremaining with good support or the patient doesn't want to undergo extraction of the natural dentition. This procedure actsas an alternative to rehabilitation with dental implants or even total edentulism. The success of overdenture prosthesis depends upon adequate case selection with critically analysing each step in the fabrication of the denture prosthesis. The tooth-supported overdenture is a best treatment option since the proprioception is maintained and there is improvement in the stability and retention of final prosthesis. It is necessary to have patient awareness about good oral hygiene to maintain the abutment teeth, so that rehabilitation process remains satisfactory for a long time.

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Eating Disorders: A Comprehensive Review

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Abstract

Eating disorders are regarded as "psychiatric syndromes"characterized by irregular eating habits and severe distress about body image. A multidisciplinary approach of a dentist, a psychiatrist and a physician are important and mandatory for correctly diagnosing and proper management of the patient with these disorders. The oral manifestations should be treated at the earliest, failure to which it may lead to more severe systemic complications. This review elaborates the current data regarding the aetiology of each, investigative features, risk factors involved, associated complications and treatment modalities that will be efficacious for the clinician in management of such disorders.

Keyword: *Anorexia Nervosa, Bulimia Nervosa, Binge Eating Disorder, Oral Manifestations.*

Introduction

Psychological issues manifest by disorders in body structure, weight regulation and dieting patterns are referred to as eating disorders. The specific types of eating disorders are:

- Anorexia Nervosa
- Bulimia Nervosa
- Binge Eating Disorders

These are considered as group of psycho-pathological disorders affecting the patient's relationship with food and his/her own body. These disorders generally are seen in young females. Anorexia nervosa involves anoutline of "self-starvation, but also include binge eating and purging". A pattern of binging and purging are involved in bulimia. Binge eating disorders are generally characterised by episodes of uncontrolled eating without the purging behaviour.

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Anorexia Nervosa

Anorexia was 1st described as "a nervous loss of appetite" in the medical literature in nineteenth century. It is considered as psychiatric disorders which is characterised by irregular eating behaviours, severe self-induced weight loss and psychiatric co morbidities. In 1970, Early criteria emphasised anorexia nervosa as a "behavioural disturbances (self-starvation, loss of body weight), endocrine disturbances (loss of menstrual cycle, loss of sex derive) and psychopathological disorder (fear of fatness)".

Incidence and Prevalence: As per several researches AN is more dominant in females than compared to men by almost 10%. 0.3% has been recorded in as an average prevalence rate for females who are young as per several epidemiologic studies. Each year in out of 10000 population there is an incidence of AN of about 8 cases. It has been noted that the in industrial western societies there is a predominance where there is an idealisation of thin body types.

Theories of Aetiology

There are primarily 3 theories of aetiology:[2]

1. Cognitive – behavioural
2. Biological
3. Psychodynamic theories

In Cognitive behavioural theory it focuses on the role of severe fear of gaining weight and disturbance in the body image which in turn is motivation of the anorexic individual to be subjected to certain behaviour such as "restrictive eating, excessive exercise" to maintain the weight reduction or accomplish loss in weight.

A combination of numerous variables like "personality characteristics, interpersonal stress, pressure to be thin, body image disturbances and social modelling (media representation of extreme thinning as beauty)" often interrelate to motive the onset and maintenances of eating disorders.

Biological perspective takes into interpretation the title role of genetics and pre morbid temperament or personality characteristics that might play a role in the development and care of the illness.

Psychodynamic theory hypothesizes that individual's grief from AN find a sense of self and identity in the existing disorder. Here it states that the individual possesses a dangerous terror of maturation including "weight gain, puberty and sexuality" and finds a sense of safety with a disorder that avoids the feared events.

Signs and symptoms[8]

Physical signs	Behavioural signs
• Excessive Weight loss • Dry skin • Brittle nails • Low blood pressure • Abnormal heart rhythms • Scanty menstrual periods • Alopecia Xerosis • Bloated stomach	• Refusing to eat • Distorted self perception • Obsessive compulsive disorders • Depression

Causes:

- During puberty or pre pubertal period, having positive history of severe trauma or any emotional stress
- Irregularities in brain chemistry- "serotonin" may play a part which is involved in depression
- Due to high cultural value for lean body
- Aninclination towards perfectionism
- Positive familial history

Risk factors

Includes:

- Weight gain
- Dieting
- Suffering from OCD
- Participation in any events that prize a lean body
- Pessimism attitude
- History of any traumatic events in life
- Experience of any big life change eg- moving to new places or new school

Diagnosis

This includes a questionnaire, some laboratory examinations and most important – the clinical examination.

"**SCOFF** questionnaire"[6] developed in Great Britain is generally used by the doctor for diagnosis.

"S = do you feel sick because you feel full?"

"C= do you lose control over how much you eat?"

"O = have you lost more than 13 pounds recently?"

"F= do you believe that you are fat when others say that you are thin?"

"F= does food and thoughts of food dominate your life?"

Some important laboratory investigations routinely done for AN –

- Blood investigations to look for anaemia, electrolyte imbalance, cholesterol levels, liver and kidney functions.
- Electrocardiogram
- Bone density test for osteoporosis

Treatment

Nutritional rehabilitation and **psychotherapy** are considered corner stones of treatment.[6]

Nutritional rehabilitation helps the individual to reach a healthy weight, normalise eating patterns and their perceptions towards hunger and fullness.

Goals of weight gain are:

"2 – 3 lbs (0.9-1.4 kg / week) for hospitalized person.

0.5 – 1 lbs (0.2 – 0.4 kg/ week) for outpatient".

Enteral and parenteral nutrition: Individual requires tube feeding or intravenous feeding nutrition. Parenteral nutrition is through veins. Intravenous feedings must be administered slowly and very carefully to avoid refeeding syndrome. This can cause hazardous hormonal and metabolic variations that disturbs electrolyte equilibriums. This may result in heart failures. The "MAUDSLEY APPROACH" [8] is used for adolescent and other young people in the early stages of AN. This approach for refeeding may be effective. The family being the central player in person's nutritional recovery family therapy is advised.Parents take charge of planning and supervising all of their child's meals and snacks.

Psychotherapy and medications[2]: Considered as main therapeutic approach. This should be given in an individual, group or family setting.

Anti-depressants: Studies suggests that individuals suffering from OCD could be useful from this anti-depressantmedication.

Nutritional suppressants: Vitamins such as – "vitamin B 12, C. D and minerals, calcium, iron, zinc and magnesium supplements" may be recommended.

Bulimia Nervosa: In 1979, it was 1st recognized as a "psychiatric syndrome" where overeating is followed by vomiting and considered as an aberrant pattern of behaviour.Characterised by excessive concern towards body size, binge eating and inappropriate compensatory behaviours.[7]

Demographic features: Women are more bulimic than man. Teenage girls and young women are commonly affected.

Signs and symptoms: With bulimia nervosa, this also happen several times ina day for plentiful months which often lead which prevents weight gain due to purging.

Purging may include

- Forced vomiting
- Extremeworkout
- Use of laxatives, enemas or diuretics

Symptoms

- Investing a lot of time in workout
- Suddenly consumption large amounts of food or purchasinghefty amounts of food that disappear right away.
- Repeatedly going washroom after meals
- Eliminating away packages of laxatives, diet pills etc

Causes

- The exact cause isnot known.
- Individual is aware of his/her abnormal eating pattern.
- Fear with binge purge disorder may be present
- Genetic, psychological, family, society factors may play a pivotal role.

Types[8]

1. **Purging type** – people who binge and purge using vomiting, laxatives, diuretics oe enema.
2. **Non purging type** – those who exclusively use fasting and workout as compensatory behaviour.

Diagnosis

A physical examination will be done for these patients showing-

- Ruptured blood vessels and eyes (from strain of vomiting)
- Dryness of the mouth
- Pouch like appearance for cheeks
- Flushes and reactions present
- Evident minute cuts on top of finger joints

Blood investigations may show imbalance in electrolyte level or dehydration.

A detailed dental inspection may show dental caries and marginal gingival inflammation.

Wearing away of enamel or pitting are present due to prolonged exposure to acid during vomiting.

Treatment

- Amalgamation of nutritional, counselling, psychotherapy and medication.

"Nutritional counselling with cognitive behavioural therapy" is ideal psychotherapeutic approach.

- Anti-depressants

"Selective serotonin re uptake inhibitors" (SSRIs) used such as:

1. Fluoxetine
2. Sertraline

During initial days of treatment above medications increase the risk for suicidal so adolescent and young adults should be cautiouslywatched.

Psychotherapy[8]

1. **Cognitive behavioural therapy:**

   This may include: During the initial sessions consistent eating schedules of 3 meals /day and schedule snacks are built up. Dairy will be maintained for eating patterns. Exercises will be assigned by the therapists that will further help in changing the behavioural responses to unhelpful thought pattern.

2. **Interpersonal therapy:** Here the therapists do not deal with weight, food or body image. The goals are to:

- Feelings Should Be Expressed
- Tolerance of Uncertainty and Change Should Be Discovered
- Development of a strong sense of individuality and independence should be done.

3. **Motivational enhancement therapy:** Therapy is reinforced in an individual or group setting and manages to give an empathetic approach to help people have a better understanding and change their attitude concerning food.
4. **Focal psychodynamic therapy:** Focuses on how unresolved early childhood experiences may a role in later development of eating disorders. Therapists helps to gain insight into how certain stresses and conflicts in early years may have created emotional patterns and negative way of thinking.
5. **Diaelectrical behavioural therapy:** This incorporates mindfulness, acceptance skills and emotional regulations.
6. **Family therapy:** This therapy helps to grow a better understanding between all the family members and their complex nature of eating disorder with improving their communication skills with one another and train on coping up with stress and adverse feelings.

Binge Eating Disorder

Characterised by "presence of binge eating and three or more behaviour indicators related to over consumption of food". This must happen two days per week for six or more than six-month duration in minimum, and vomiting as inappropriate compensatory behaviour is not associated with this disorder.

Theories of aetiology:

- Depression is often associated and lowtemperament often implicated in aetiology
- Neurotransmitter and hormones have been hypothesised in onset of this disorder including "cholecystokinin, somatostatin, endogenous opiates and serotonin". [5]

Clinical Features Characterised by:

- Due to lack of self-control, individual consumes huge amount of food which is larger than normal amount within two hours period.
- Individual should have at least three of these additional findings- person consumes more amount of food than normal required, continue to eat until feels uncomfortable, even when not hungry consumes large quantity of food.
- Intake of food in secrecy.

Treatment: FDA approved "**lisdexamfetamine dimesylate (Vyvanse)"** as the first ever medication for the treatment for bingeveating disorders in the year 2015. It is a CNS stimulant which was previously approved to treat "attention – deficit – hyperactivity disorders". [5] Other psychotherapy treatment are similar to bulimia nervosa.

Complications of Eating Disorders[8]

Gastrointestinal complications

- Frequent use of laxative causes bloating, dehydration, electrolyte imbalances.
- Frequent forced vomiting causes irritation of gut lining resulting complications include gastro oesophageal reflux disease, gastritis and oesophagitis.

Heart complications

- Bradycardia is a common finding in such patients.

Hormonal complications

- Hormonal changesoccur due to prolonged starvation which further worsens the health consequences. Hormones commonly affected are – "growth hormones, stress hormones and thyroid hormones".
- This leads to irregular menstruation. Infertility, pregnancy complications, thinning bones (osteoporosis).

Bone complications

- Patients with A.N experiences osteopenia and osteoporosis. It leads to bone density loss.

Blood complications

- Anaemia is common result of malnutrition and starvation.

Skin complications

- Dry, flaky skin are commonly encountered implications associated with brittle nails and hairs.

Neurological complications

- Seizures, numbness in hands and feet (peripheral neuropathy), disordered thinking are encountered among patients.

Emotional complications

- Anxiety disturbances along with depression are frequently seen. These individuals have higher risk for substance abuse including smoking, alcohol and drug abuse.

Oral Manifestations[1]

Eating disorders share similar oral manifestations. These are some most common encountered manifestations

1. Dental erosion

- "Hell, storm and Hurst" et al initially reportedthe impact of eating disorders.
- Secondary to frequent vomiting, gastric reflux, Perimyolysis is a specific type of enamel erosion seen. This usually cause increased tooth sensitivity to touch, hot and cold temperature.

2. Dental caries

- Prevalence of caries remains unclear among normal populations and eating disorder patients.

3. Periodontal diseases

- Generally poor oral hygiene leads to inflammation of the gingiva and which further predispose to periodontitis. Vitamin C deficiencies may also affect marginal periodontitisleading to gingivitis.

4. Mucosal lesions

- Angular cheilitis, candidiasis, glossitis and mucosal ulcerations are common findings encountered in these individual.
- Soft palate is generally injured by objects used to induce vomiting.
- Due to offending action of acid during vomiting to the epithelial surfaces, erosions are commonly encountered.

5. Salivary findings

- Enlarged parotid glands due to "sialadenosis" which is a non-inflammatory expansion of the salivary glands.
- Xerostomia as sideeffect of many anti-depressant medications.
- Necrotizing sialometaplasia and association with bulimia has been reported.

6. Miscellaneous-

- Includes stomatopyrosis and dysgeusia.
- Accelerated alveolar bone loss due to osteoporosis is common.

Dental management

- While taking history, questions related to eating disorders should be included.
- Custom trays and 1.1% neutral fluoride gel are recommended by the researcher.
- Due to increased chances of tooth wear, individual should avoid brushing during initial hours after vomiting.
- Intake of acidic drinks, low calories beverages should be reduced.
- Composite restorations reducesensitivity.
- Full mouth reconstruction and occlusal rehabilitations should be done by porcelain veneers.
- Regular dental check-ups should be encouraged.

Conclusion

Eating disorders being considered as psychiatric

disorder require specialized diagnostic and treatment approaches. These diseases are markedly different from obesity where the latter is often considered as a "chronic medical disorder". Therefore, the clinician should be able to correctly diagnose and distinguish between the eating disorder and obesity. A multidisciplinary approach of a dentist, a psychiatrist and a physician are important and mandatory for correctly diagnosing and proper management of the patient with these disorders.[1] The oral manifestations should be treated at the earliest, failure to which it may lead to more severe systemic complications.

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Pigmented Lesion of Oral Cavity

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Abstract

In the oral fissure most commonly pigmented lesion is seen.Lesion depicts a large diversityof clinical entities,from anatomical to systemic illness manifestation. Systemic history,dental history,drug history,extra oral and intraoral study is needed for the evaluation of patient.some cases laboratory exploration and biopsy are being done.

Keywords: *Diagnosis, Exogenous Pigmentation, Drug Induced Pigmentation, Endogenous Pigmentation.*

Introduction

In the oral fissure most commonly pigmented lesion isseen. Lesion depicts a large diversity of clinical entities from anatomical to systemic illness manifestation. Pigmentation designate as process of deposition of pigments in tissues. Different pestilence will escort to variety of tinge in the mucosa. Pigmented lesion of oral fissure is due to escalation of melanin pigments,expanded number of melanocytes, drumming out of accidentally introduced exogenous materials. Oral pigmentation may be anatomical or inveterate. Morbid pigmentation can be sorted into exogenous and endogenous based upon the germ.[1,2]

Exogenous pigmentation is actuated by drugs, tobacco, smoking, amalgam tattoo, or heavy metals instigated.

Endogenous pigmentation can be analogous with endocrine disorganization, syndromes, infections, chronic irritation, reactive or neoplastic.[2]

Classification

Burket's classification:

Endogenous: Focal melanocytic pigmentation: Freckle/ephelis, Labial melanotic macule, Oral melanoacanthoma, Melanocytic nevus, Malignant melanoma

Multifocal or diffuse pigmentation: Physiologic pigmentation; Drug induced melanosis; Smokers melanosis; Inflammatory hyperpigmentation; Melasma

Melanosis associated with systemic or genetic disease: Addison'sdisease; Cushing's disease; Graves' disease; Primary biliary cirrhosis;Vitamin b12 deficiency; Peutzjeghers syndrome; HIV/AIDS associated melanosis; Café au lait pigmentation;

Idiopathic pigmentation: Laugier- hunziker pigmentation;

Depigmentation: Vitiligo

Haemoglobin and iron associated pigmentation: Ecchymosis; Purpura; Hemochromatosis;

Endogenous pigmentation: Amalgam tattoo; Graphite tattoo; Ornamental tattoo; Heavy metal pigmentation; Hairy tongue; Drug induced pigmentation; Medicinal- metal induced pigmentation.[3]

Based on Hue: Red- Blue-Purple Pigmentation

Blanching: Haemangioma; Varix

Non-blanching: Thrombus; Hematoma

Brown pigmentation: Melanotic macule; Pigmented nevus; Melanoma; Melanoacanthoma

Blue–grey pigmentation: Amalgam tattoo; Other foreign body tattoos; Blue nevus

Drug-induced pigmentation: Anti-malarial drugs; Bleomycin; Clofazimine; Tetracycline; Oral contraceptives; Doxorubicin; Ketoconazole; Minocycline; Zidovudine

Differential verification of oral pigmented lesion: Appraisal of the patient depicting with a pigmented lesion should add on a full systemic and dental history, drug history, extra oral study, intra oral study with some laboratory exploration.

- Onset and duration of contusion should be included in the history such as,
- Presence of congenital signs and symptoms.
- Associated skin hyperpigmentation presence.
- Use of non-prescription and prescription drugs.
- Smoking history
- Pigmented contusion on lips, perioral skin, face should be distinguished.
- Evaluation of number, distribution, size, shape, and hue of lesion.
- Non neoplastic lesions depictregularborders, tiny, symmetric and uniform in tinge, whereas irregular borders, hue variation and surface ulceration show neoplasm.
- Diascopy is also as a tool for verification.

Melanotic macule: It is most commonly seen in oral mucosa which is of melanocytic origin. In adult females' patients tiny, isolated, well defined, uniform pigmented lesions are visualised. Lower rim, gingiva and palate are most common site. Factors affecting melanotic macule is localised trauma, functional hyperactivity, differential confirmation is amalgam tattoo, melanoma, melanocytic nevus, focal ecchymosis.[4]

Melanoplakia: When there is a benign variation without any aggressive changes of melanin pigment is "melanoplakia". Depth of tissue and amount of melanin presence determines the clinical presentation of melanoplakia. Incase of women when one consumes oral contraceptives temporary light brown pigmentation is seen. Pregnancy and increased level of estrogen and progesterone causes the same.[5]

Lentigo: The persistent changes seen on face and perioral region which are related to prolonged solar damage. They are tan to dark brown tint and size ranges from 2mm to 2cm. Hyperplasia of basal melanocytes and elongation of rete pegs is seen in histologically.

Leopard syndrome: Autosomal, dominant disorder with characteristic features that include multiple lentigines café au lait spots electrocardiographic condition, ocular hypotelorism, obstructive cardiomyopathy, pulmonary stenosis, abnormal genitalia, retardness of growth and deafness.

Laugier–hunziker syndrome: Acquired benign macular hyper pigmentation. Occurs due to alteration in the function of melanocytes which causes increase in synthesis of melanosomes subsequent transport to basal cell layer.

Drug Induced Pigmentation

Antimalarial drug: Prolonged use of antimalarial drug depicts slate –grey in color,which resembles silver asplenamine.

Minocycline: Tongue, gingiva, mucous membrane, hard palate is predominant site for deposition which is brown in colour.

Malignant melanoma: Melanocytic origin malignant neoplasm also known as melanoma or melanocarcinoma. Lacks pigmentation clinically but presence of melanin histopatthologically which is composed of non-pigmented melanocytes.

Etiology: Xeroderma pigmentosum, increased number of melanocytic nevi, ultraviolet exposure, genes affecting are RB1, CDKN2A, Melanocortin-1receptor gene.

Types: Nodular melanoma, Amelanotic melanoma, Acral lentiginous melanoma, Mucosal lentiginous melanoma.

Seen in palate, maxillary alveolar ridge which is a deeply pigmented disorder.

Most deadly primary skin carcinoma. Cutaneous melanoma is mostly observed in white crowd. Male predilection is common of mostly over the age of 45 incidence is increasing which is a suggestive study of epidemiology. ABCDE CRITERIA is best explained in cutaneous melanoma; asymmetry, irregularborders, variegation of colour, diameter greater than 6mm, andevolution or surface elevation. Looks of nodular lesions,which implies invasion into the deeper connective tissue which gives a sign of good prognosis. Poor prognosis is associated with the level of tumour involvement in the dermis [**Clarks level of invasion**], neurotropism, surface ulceration, lymphatic or vascular invasion, thickness of tumour [**Breslow tumor thickness**].

Differential diagnosis: Haemangioma,Traumatic haematoma, Blue nevus, Traumatized nevus.

Treatment planning: Mode of treatment planning in malignant melanoma is wide local excision in early stage.Wide local excision along with regional lymph node dissection is doneif there is involvement of lymph and also bone removal is also indicated if there is involvement of jaw in case of more advanced stage. In case of metastatic lesion chemotherapy and radiation therapy is being done.[6]

Addison's disease: 1 in 100,000 people are affected by this rare endocrinal disorder termed as Addison's disease. Female and male predilection is same and it is observed in all age groups. Thomas has first elaborated this disease in 1855 in the book entitled [On the constitutional and local effects of the disease of suprarenal capsule].Manifestation of this disease is weight degradation, prolonged worsening fatigue, overall weakness, appetite loss, hypotension.{bronzing} narrates the hyper pigmentation which is generalized and mainly seen on sun exposed skin and over pressurized area just like elbow and knee, which are induced by escalated levels of beta lipotropin. Hyperkalaemia and hyponatremia are associated gastrointestinal distress like anorexia, nausea, vomiting. Palate, tongue, buccal mucosa, vermillion border of lip area is the first evidence of intra oral pigmentation.[7]

Cushing's disease: ACTH dependent [80%]and ACTH independent [20%]is responsible for chronic glucocorticoid excess. Later are mainly due to benign [60%] or malignant[40%] adrenaltumours.

Classification

ACTH dependent: bilateral adrenal hyperplasia, adrenal adenoma, adrenal carcinoma,ectopic ACTH secretion,Cushing's diseaseor ACTHsecreting pituitary adenoma.

ACTH independent: Iatrogenic Cushing's syndrome.

Pseudo Cushing's syndrome: Obesity, alcoholism, depression.

Clinical manifestation is buffalo hump, circular face, obesity, fragile bone[osteoporosis], hypertension, menstrual abnormality, hirsutism, anxiety, purple to red and wide abdominal cutaneous striation, insomnia, retardation of growth, euphoric ruddy face.

Diagnosis: When there is establishment of diagnosis of Cushing's syndrome segregates into disorders of excessive ACTH and ACTH independent primary adrenal over production of cortisol disorders [bilateral micronodular/macronodular hyperplasia, carcinoma, adenoma] in which plasma ACTH significance are less or unnoticeable. To determine the cause ACTH is measured. The patients with low/unnoticeable values should next encounter adrenal gland imaging along with computed tomography or magnetic resonance imaging to recognize unilateral masses with bilateral disease or adjacent contralateral atrophy. Those with normal or upraised ACTH values should undergo additional testing, usually with pituitary MRI, 8mg dexamethasone suppression, corticotropin releasing hormone, inferior petrosal sinus sampling. Spotting and successive resection of abnormal ACTH or cortisol-producingtissue/ tumour, involvement is there in the optimal treatment of Cushing's syndrome. First line of treatment of Cushing disease is transsphenoidal surgery.[8]

Medical treatment-to minimise ACTH production proopiomelanocortin transcription factors evaluation is being done. These add on the somatostatin analoguepasireotide and dopamine analogue cabergoline for the proper functioning. [9]

Peutz–Jjeghers syndrome: It is a pigmented mucocutaneous lesion, an inherited, autosomal dominant disorder differentiated byhamarmatous polyps in the gastrointestinal tract. From 1in 8300to 1in 280000 individuals are estimated in this disease. It is also associated with remarkable morbidity, variety of clinical course, mostly seen in small bowel

History: Description was given by CONNOR in 1895 and illustration by HUTCHINSON in 1896 described in a pair of identical twins first with melanotic macule. Peutz in 1921 of Dutch family had given the primary description of Peutz Jegherssyndrome which was published. Nasal polyposiswas described by PEUTZ and JEGHERS enumerated a description in 10 cases from various families in his work in 1949, and defined the relation between pigmented lesion, gastro intestinal polyposis and elevated risk of neoplasm, approximately half of his patients has encountered gastrointestinal neoplasm.

Gene responsible for this disease is only the remarkable mutation inducing PJS affect the STK11 [serine/threonine protein kinasealias LKB1] which is located on chromosome19P13.3. STK11 is the

official nomination for LKB1by the human genome organization. This gene was named in 1998. It encrypts versatile serine threonine kinase, which is dominant in second messenger signal transduction. The serine threonine kinase harmonizes cellular multiplication, regulates cell polarity, and noticed to have a predominant role in responding to low cellular energy levels. The STK11 protein is responsible for inhibition AMPK activated protein kinase and signals downstream to stop rapamycin mammalian aim.

Clinical features of PJS are in intestinal mucosa, anal area, palms, soles of the feet, and sparely on the fingers, on the buccal mucosa, orbits, nostrils, and perioral region, and in rim mucocutaneous macules are seen as hyper pigmented lesion. 95%of the patients shows the characteristics pigmentation and are induced by pigment laden macrophages in the derma. They appear particularlyflat, blue-grey to brown spots 1-5mm in dimension. Neoplastic degeneration of these lesion is extremely seldom. These macules can be differentiated from common freckles as they never seen in the oral cavity. Hyperpigmentation may fade during the period of adolescence.

Treatment planning: Intra operativeenteroscopy [IOE] and double balloon enteroscopy [DBE] is the two-prime mode of diagnosis and treatment of tiny bowel hamartomas. In intra operative enteroscopy is a mixture of laparotomy [or laparoscopy] withendoscopy. It allows arrangement to confirm the small bowel is appreciated and nearly all polyps are eradicated in an endoscopic or surgical manner. Double balloon enteroscopy technology that permits the inspection and remedy ofjejunum and ileum mostly in everypatient. The system comprises of a 200 cm enteroscopy and a 145 cm over tube which is having a latex balloon at their ends. By implementing these balloons to hold the intestinal wall, the endoscope can be pierced further without making expendable loops of intestine. [10]

Café au lait pigmentation: Café au lait macule [CALM] are termed after their typical coffee and milk tinge and a color only slightly darker shade than the surrounding dermis. CALM is mainly of two varieties they are coast of California and coast of maine. Coast of California is the most common which is having a fairly regular border, clearly and distinct margins. They may range in dimension from few mm to several cm and may be appeared as multiple or solitary spots. Coast of maine is second and less frequent type of CALM that is having irregular border and usually appears bigger and solitary. CALM is mostly seen in neurofibromatosis-1 [NF1] having an autosomal dominant condition differentiated in presence of numerous neurofibromas. [11]

Graves' disease pigmentation: Cutaneous manifestation is clinically associated with thyrotoxicosis which is having features of telangiectasia, erythema, hyper pigmentation hyper hydrosis, heat intolerance, warm dermis and the dermis illustrates direct role of thyroid hormone on dermal tissue. Direct thyroid hormone role in dermis is arbitrated through the thyroid hormone receptor. Thyroid hormone receptors were discovered in epidermal keratinocytes, vascular endothelial cells, Schwann cells, sebaceous gland cells, smooth muscle cells, skin fibroblasts, hair erector pillu muscle cells, and number of variety of cells that builds the hair follicle. Responsive genes of several thyroid hormones have been discovered in dermis. Thyroid hormone plays a vital controller of epidermal homeostasis. Thyrotoxic epidermis is seems to be slender but not atrophic. Clinical inspection has been complexing by the data that mostly thyrotoxicosis may add autoimmune mediated glycosaminoglycans accumulation with thickened dermis outcomes. The hair in thyrotoxicosis is often soft and fine. Plummer nails which is having a concave contour escorted by distal onycholysis. A diffuse, non-scarring baldness isalso remarked. In thyrotoxic patients, hair growth is enhanced which is a suggestive invitro studies. [12]

Amalgam tattoo: The pigmented lesion depicts unaccompanied, numerous or diffuse pigmentation. The introverted pigmented lesion which picturises dark hue are ephelis[freckles], tattoos and the mouth melanotic macule. Dental amalgam tattoo which is a most common solitary pigmented lesion. It occurs in almost 0. 4% to 0. 9% of the US and 8% of Swedish population among adults. It happens as an outcome of colouring of the tissue by foreign pigmented which was injected within or subepidermal either accidentally or intentionally. Amalgam fillings and metal molecules from prosthetic restoration which are soaked up accidentally is mostly used for dying of oral mucosa. Region of marginal gingiva or buccal mucosa is the clinical site where mostly oral mucosa tattoos is being observed. By the method of clinical examination or an x-ray, the metal fragments –the dust from amalgams or other metals inside the tattoo may be distinguished. During various dentistry arbitration the metal particles may accidentally approach the site of the oral mucosa. Hence it is feasible

that while doing the systematic preparation of the cavity, the gingival sulcus is hampered and the amalgam particles may invade into the epithelium. While doing the placement of restoration. While removing old amalgam restoration or removal of old fixed prosthetic fillings, the gingiva may be destroyed, and creates an entry point for the metal flecks. The tattoo is known asa modification in the hue of the oral fissure which is clearly appreciated in its setting without crushing, it remains static, polished and of dark grey to blue tint which is seen clinically. Surgical arbitration and excisional biopsy are the most common treatment modality. [13]

Graphite tattoo: Likely to occur on the palate and appeared traumatic implantation from a lead pencil. The lesions depict unusually macular, grey or black also focal appearance. Graphite bear a resemblance to amalgam in tissue although special stains can separate the two microscopically.[14]

Haemangioma: Most common tumour of infants which is distinguished by an initial proliferation during infancy followed by spontaneous involution over the next 5 to 10 years, evacuating a fibro fatty residuum. Tumour of microvasculature is considered to infantile hemangioma.4-10% of infants is affected in infantile haemangioma with a predisposition for female, Caucasian, less birth weight and premature infants.[14]

Lingual varix: Caviar tongue is also regarded as lingual varicosities and sublingual varices, which is thought as a physiological change, involved with advancing age, usually developed due to superannuated elastolyticdetoriation of sublingual veins. It is predominantly observed at the under surface of the tongue along the sublingual glands where the mucosal surface is slender and translucent which enables visualization of submucosal vascular construction. On dermoscopy test, dark blue lacunae propose absence of it. Less number of lacunae contained haem which was characteristically deposited in the lowest part of the lacuna shows an appearance [HYPOPYON]of the eye a new dermatologic symbolic term is used to elaborate significant character as half and half lacuna.[15]

Black hairy tongue: It is an acquired, benign state characterized by the looks of abnormally hypertrophied and filiform papillation elongation of dimension more than 3m on the dorsal surface of tongue.It is also regarded as hyperkeratosis of tongue, lingua villosanigra, keratomycosis linguae.Male predilection is more, elderly group, person who consume excessive black tea or coffee, alcohol and does smoking, and having poor oral hygiene, patients having antibiotics such as penicillin, neomycin, doxycycline and xerostomic agents, and antipsychotics drugs are mainly suffers from this disease. Patient should maintain good oral hygiene, gentle debridement with a soft toothbrush or tongue scrapper to encourage desquamation of hyperkeratotic papillae. Rinsing with diluted hydrogen peroxide or baking soda topical application is done to upgrade desquamation of keratinized filiform papillae.[16]

Conclusion

Pigmentation is known as the process of accumulation of pigments in tissues. Numerousdiseasesinduce varieties of hue in the mucosa. It can be emerged from intrinsic and extrinsic factors which can be anatomical or pathological. Dentist should be aware of proper diagnosis and treatment modalities.

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Biomaterials in Oral and Maxillofacial Surgery

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Abstract

Aim: This review aims in giving a brief idea on evaluation of the pros and cons of different hard tissues biomaterials and how the implementation of these biomaterials has aided in restoring the function of traumatized connective tissues.

Introduction: Over the years, there has been a significant difference in the use of biomaterials. The biomaterials however having an animal origin on synthetic origin have been used, yet there are many that need to be reported with passing years. Some researchers have revealed that implementation of the synthetic biomaterials show a lower rate risk in the transmission of disease. The use of the biomaterials in medicine and dentistry provides us with a thorough understanding of the scientific basis of these applications. The biomaterials had their discrete use for the hard tissue traumas and for the soft tissue traumas as well, according to the specifications and requirements the biomaterials that would best replicate the physiologic body part and would restore its normal function were used. The advances made in last decade have made the utility and applications in the clinical conditions possible.

Discussion: The hard tissue biomaterials with passing time went through proper research, a lot of implementation with few failures and improper cognizance of biomechanics finally paved a way to its successful contrivances in the treatment of traumatized hard tissues. The steady long-term improvement that has been seen successfully in case of the joint replacements for the TMJ serves a testament to this. The hard tissue biomaterials also play a major role craniofacial surgery with the skeletal fixation.

Conclusion: Consequently, it has to be noticeable from these frames of references that the applications of biomaterials currently being used, demand structural functions even in those organs and systems having no such structural importance in their nature or very effortless chemical or electrical functions.

Keywords: *Bone grafts, Implants, Plates, Screws, and Ceramics.*

Introduction

Biomaterials were not put into practice until the approach of on a sterile surgical procedure was introduced by Dr. J. Lister in the 1860s. With due course of time various biomaterials came into play, some proved to be successful and some exacerbated the infections. Biomaterials are the kind of materials that are used in the replacement of the part of the body in a much efficient, safe, steadfast, lucrative and biocompatible manner. It helps in restoring the normal functioning of the part that has been replaced. They come in both natural and synthetic forms. They have been further classified as Alloplasts, Allografts, Autografts, and Xenografts. The basis on which the materials can be considered as compatible materials for replacement are that it should be steady enough to be easily sized in an operating room, should be biocompatible, non-allergic, non-carcinogenic, and non-toxic with chemically inert nature. It should be dependable much to physically replicate those of the tissues that has to be replaced. The materials should be able to retain its new form with memory. They should

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entitle the fixation to the host bone by the screws, sutures and wires. The materials should be synergistic enough not to enhance the growth of microorganisms nor foster the resorption of underlying bone or distortion of the adjacent tissues; it should be radio-opaque in order to permit the radiographic evaluation. It is the responsibility and outlook of the clinician to have a thorough appraisal of the diversity of the materials available and hence use them for the appropriate clinical procedures.[1,2]

The long-drawn biocompatibility of a material is reliant on the active relationship between host and implant and is dominated by many factors.[1] Calnar reported, the alloplastic implants may initiate 6 different biological responsesi.e.[1], Immediate inflammation with early rejection, Delayed rejection, Fibrous encapsulation·Incomplete encapsulation with progressive cellular response, Slow resorption and Incorporation. The successfulness of the biomaterials that is incorporated in the body not only depends on its physical and mechanical properties but also depends upon the surgical technique used by the surgeon along with the patient's activities and health condition, how the body is reacting to the materials also plays a major role. There can be certain failure due to deplorable effect of the materials on the body's immune system; for example, Implant might have effects like toxicity, induce allergic reactions, carcinogenic. So, taking the adversities into account the implants should be biocompatible enough not to provoke or irritate the surrounding tissue structures and should be accepted by the tissues along with whole of the body.[3]

Materials Used

Metallic biomaterials: Metals are used as biomaterials due to their outstanding mechanical properties with admirable thermal and electrical conductivity with some having anti-corrosion properties. Some metals aid as a passive substitute for hard tissue replacement such as temporomandibular joint, whole hip and the knee joints. These are even used fracture healing aids such as bone plates and screws, dental implants and for the spinal fixation devices. There are certain metal alloys that have been magnificent and actively used in devices like, vascular stents, catheter guide wires and orthodontic wires. Vanadium steel has been known to be the first metal alloy developed specifically for human use. It helped in the manufacture of bone fracture plates and screws. The metals such as, Iron (Fe), chromium (Cr), cobalt (Co), nickel (Ni), titanium (Ti), tantalum (Ta), niobium (Nb), molybdenum (Mo) and tungsten (W) were used in for the manufacture of implants as these can be pretty well tolerated by the body in minute amount.[4]

Stainless Steels: In order to overcome the minor disadvantages offered by the vanadium steel, stainlesssteel 18-8 type (type 302 in modern classification), came into practice for the first time for implant fabrication as it was stronger and corrosion resistant than the vanadium steel. Due to the corroding nature of vanadium steel in vivo, its being no longer used. With time 18-8sMo stainless steel came into play containing a small percentage of molybdenum to overcome its corroding property which came to be known as 316L stainless steel. Later in 1950s the carbon content of 316 stainless steel was reduced to have a better anti-corrosion effect.

CoCr Alloys: Substantially there are two types of cobalt-chromium alloys; Catastable CoCr alloy and CoNiCrMo alloy. The castable CoCrMo alloy has been used in dentistry and reasonably used in constructing artificial joints. The wrought CoNiCr alloy is relatively new and is mostly used in the stems of prostheses for joints like knee and hip. The molybdenum helps in making the grains finer leading to better strength after casting and the chromium enhances the anti-corrosion property. In vitro studies have suggested that particulate Co is toxic to human osteoblasts cell lines and restrain the synthesis of type-I collagen, osteocalcin and alkaline phosphatase in the culture medium. Howbeit, the particulate Cr and CoCr alloys are well tolerated by the cell lines with no visible toxicity.[5]

The Clemson university Advisory Board for biomaterials has been formally defined as to be "a systemically and pharmacologically inert substance designed for implantation within or incorporation with living systems."[1]Black defined biomaterials in as "a non-viable material used in a medical device, intended to interact with biological systems".[1]

Hard Tissue Biomaterials

Bone Repair and Joint Implants: With the advancement of the biomaterials and its various types through meticulous clinical researches have paved new pathways in the treatment of traumatized hard tissues, degenerated connective tissues. These researches have further lead to an escalation in the design quality, with a higher performance rate in vivo of the biomaterials. With due course of time the surgeons and researchers

have done advancement in the treatment of the joints, including Temporo mandibular joint (TMJ) by using fixation devices and artificial TMJ.There are various devices used in the treatment of hard tissues and are as follows.

Screws: Screws are the devices that have gained a wide acceptance over a period of time for the affixation of shredded bone particles. Basically bone screws are categorized into two types:

Cortical bone screws, these have compactthreads, and Cancellous screws, these have wide threads for getting more thread-to-bone contact. The threads might have a 'V' or a buttress shape. The cortical screws can be further classified on the basis of the following criteria, Penetrating power, Self-tapping and Non-self tapping. The self-tapping screws are known to have cut flutes which helps to thread the pilot drill-hole while positioning. On contrary, the non-self-tapping screws require a tapped pilot drill for the positioning. The grasping capacity of screws depends on the size of the hole of the pilot drill, depth of screw engrossed, the outer diameter of the screw and the quality of the bone. So, the designation of the screws ought to be based on the analysis of the calibre of the bone at time of insertion. Mainly the implementation of bone screws is done in the following case;As inter-fragmentary fixation device to "lag" bone fragments together, Attach a metallic plate to bone. The screws are used for the affixation of mandible fractures, fractures involving cancellous bone, oblique fractures in cortical bone and in bone plate fixation.[6]

Plates: Plates help in the fixation of fragments of the bone. They can be categorized as, firm or very rigid which is used to gain primary bone healing. And the other one is relatively flexible which helps in the physiological loading of bone. They come in a wide range of varieties. The cross-sectional shape decides the strength and rigidity of the plate.

Stainless steel plates: These aim in increasing the healing rate of the fracture, lessen the loss of bone in the site safe-guarded by the plate. Thereby it also helps in decreasing the occurrence of re-fractures that is usually seen in plate removal. As the bone and plate make a complex structure, they need a proper interlinkage. The interfragmentary compression causes friction atsurface, resulting in increased resistance to torsional loads. Contrastingly exceeding compression results in micro fractures and necrosis of the bones in contact as a result of the vesicular canals getting collapsed. The compaction between the fracture fragments can be acquired with a precise type of plate known as a dynamic compression plate. The most common mode of failure seen in bone plate-screw installationis loosening of screw and falling through of the plate.[7]

Osseous grafting materials: The successful outcome of the bone defects is totally determined by the growth of the new bone at the affected site. A global range of materials has been noticed to be suitable for the treatment of osteal defects. The materials used in the treatment of osseous defects has the properties that are expedient enough such as biocompatibility, osteoconductivity, osteoinductivity, availability, mechanical strength, restorability and ease of application. The materials used for the reconstruction of defects in the periodontium are categorized as Bone graft, Ceramics, or Synthetic polymers.

Bone Graft: Autograft- Bone graft that is achieved from the patient is known as autograft. It proves to be advantageous over other material, as osteogenic factors and progenitor cells serve as the wholesome source of them. It has been noticed that a large number of autografts have been obtained from the iliac crest. Nevertheless, the assemblage of graft demands a second surgical procedure and thereby leads to certain complications as in, creates donor-site morbidity and prospective fracture risk. The restricted accessibility of autograft can be outmaneuvered by using a relatively small volume of graft to elevate a synthetic bone graft as a substitute.[8]

Allograft: Osteal defects have been treated accompanied by a donor bone. It serves as a fallback mode to autograft. The allograft needs to go through a series of filters to take the edge off the risk disease transmission. Moreover, allograft is not readily available. The clinical studies utilizing allograft bone in reconstruction of bone defects showed a good result of new bone formation. The periodontal defects when treated with demineralized, freezed dried bone allograft (DMB) allowed a good sign of new bone growth with periodontal attachment.

Xenograft: It has been seen that; huge amount of the graft material has been attained from bovine-extracted anorganic bone. Xenograft has shown a visible change in new bone growth at the affectedsite, with limitation in the periodontal rejuvenation.

Ceramics: Hydroxyapatite: These can be derived naturally from corals or can be synthetically attained. It has been seen that the calcium phosphate compounds having chemical formulas similar to that of the anorganic bone are known to be defect fill materials. These materials have the potential to embody alveolar bone in patients having deformity in the periosteum. Although a recent clinical study suggested that the hydroxyapatite materials do not show a visible rejuvenation in the periodontium.

Bioactive Glass: These materials serve as a replacement for the synthetic graft materials aiming to aid in new bone formation. Precisely these materials intend to revitalize new bone formation at the site of implant-bone interface. Although this material has its set back, yet it has proved to be better in the reconstruction of periodontium as compared to the hydroxyapatite materials.[6-8]

Conclusion

Hence, while considering the biomaterials to be used all the pros and cons that have been discussed needs to be taken into consideration. Despite a huge number of materials available to surgeons, the applicability must be given utmost importance. If an implant is subjected to stress or local recurrent trauma, an inflammatory response and an eventual extrusion of the implant can occur, in order to overcome these there must be adequate recipient tissue available to cover the implant and shield it. With every passing day new breakthrough in the surgical method and instruments have allowed these materials to be used in ways that were less frequent.

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Intracanal Irrigants Used in Pediatric Endodontic Treatment: A Review

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Abstract

Root canal therapy success in deciduous teethis achieved by meticulous removal of debris and necrotic tissue.Anatomy and root resorption increasethe complexity of the primary root canal system during instrumentation. Also, the formation of smear layer during instrumentation of root canal hinders the cleaning and shaping of root canal system. These are the major hindrance in complete eradication of bacteria while performing *cleaning* & *shaping* of root canal systems. The use of irrigants in root canalalong with mechanical instrumentation is very effective during procedure of cleaning and shaping in endodontic treatment. The irrigants that are most routinely used include saline, sodium hypochlorite, EDTA, chlorhexidine and MTAD. None of the irrigants alone fulfill the ideal requirements for optimal activity. Various studies have shown that anirrigating solution when used in a particular sequence is better in attaining optimal irrigation. The purpose of this article is to study the effectiveness & correlation among various available root canal irrigants used in pediatric dentistry.

Keywords: *Root canal irrigants, Primary teeth, Smear layer, Intracanal medicaments, Sodiumhypochlorite.*

Introduction

Maintenance of primary teeth areas essential as permanent teeth for the balanced development of occlusion, arch length maintenance, speech and mastication for healthy oral environment.[1] Advancing carious primary teeth generally required endodontic therapy as caries progression occurs at fast rate in primary teeth.[2] Successful endodontic treatment *relies* on the *combination*of *biomechanical preparation, irrigation* & *obturation*. Anatomy and resorption of root increases the complexity of the primary root canal system during instrumentation. Also, the formation of smear layer during instrumentation and presence of accessory canals, ramifications of root canals hinders the cleaning and shaping of root canal system. Intracanalirrigation at present is the best method of working for lubrication, microbial destruction, removal of dentin debris, and tissue residues duringbiomechanical preparation of root canal system.Intracanal irrigants facilitates mechanical debridement by emptying out necrotic loose wastes, disintegrating tissue residues & also helps in disinfecting the root canals. Studies haveshown that microorganisms recovered from asymptomatic teeth are different from those present within a clinically symptomatic tooth. The most frequent bacterial species in infected primary root canals were *Treponema denticola, Enterococcus faecalis and Porphyromonas gingivalis* reported by Cogulu et al in 2008.[3]

Ideal requirements of irrigants used in pediatric dentistry are[4]

a. It should have broad antimicrobial spectrum activity.
b. It should have high efficacy *against* anaerobic microorganisms & facultative microbial colonies organized in the bio film.
c. It should be *able* to disintegrate remnants of necrotic tissue of pulp.
d. It should *inactivate* endotoxin.

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e. It should either suppress the formation of a smear layer during instrumentation in endodontic procedure / disintegrate the latter once it has formed.

f. It *should b*e nontoxic systemically when they come in contact with the *vital tissues* & should be *not caustic* to *periodontal* tissues with very slight possibility to result in anaphylactic reaction.

Normal Saline: It is isotonic to the body fluids and the most common used irrigating solution in endodontic treatment. It has been recommended to use in combination with other root canal irrigants or should be used in between intracanal irrigations with other solutions.[5] It is safe even if it is pushed into periapical tissues.[6]

Sodium Hypochlorite [NaOCl]: 0.5 % Sodium Hypochlorite was used initially for irrigation of infected wounds by Henry Drysdale Dakin and Alexis Carrel.[7]Sodium Hypochlorite is weakly *alkaline* which acts on the protein *albumin*, denatures & turn them soluble in water.[8] Hypochlorous acid and hypochlorite ions are present in NaOCl solution which when unite with organic tissues of root canals act as solvent & releases chlorine and this chlorine combines with the protein amino group to form chloramines. This ultimatelyled to degradation of amino acid and its hydrolysisand thus, they interfere with cellular metabolism. *Chlorine*is *a strong oxidant* possesses *antimicrobial action*, which impedes bacterial enzymes actions through irreversible oxidation of theirsulphydryl group. NaOCl is used in concentrations ranging from *0.5% to 5.25%;* it is a potent antimicrobial agent which effectively *dissolves pulpal remnants* and organic components of *dentin*. It is usedin concentrations of 0.5– 5.25% solution at pH 11 and 0.5% solution (Dakin's solution) at pH 9. NaOCl is well recognized for its antibacterial activity. *25°C* increase in temperature,increases the *effectiveness* of sodium hypochlorite by a *factor of 100* but it gets decrease when diluted.[9] NaOCl has been commonly used but it has unpleasant taste and odor; inability to completely remove smear layerand relatively toxic to periradicular tissues and damages permanent tooth follicles, damages oral mucosa and peripheral tissue.[10]

Hydrogen peroxide: It is popularly used for disinfection and sterilization in dentistry in concentration ranging from 1% to 30%[11]. It works by creating effervescence which removes debris and also acts as an oxidizing agent which efficiently denatures bacterial proteins and DNA. *Studies* have shown that in *higher concentration*, it is not tolerated by patients and also has the possibility of inducing cervical resorption.[1]

Chlorhexidine gluconate: Chlorhexidine *[CHX]* gluconate is used in dentistry because of *antimicrobial* properties. It has a wide antimicrobial spectrum & is effective against both gram *(++)* andgram *(--)* bacteria as well as yeasts.2% CHX is used in *endodontic procedure*. It acts by adsorbing onto the cell wall of the microbes & results in leakage of the *intracellular* constituents. Studies have shown that at *low concentrations*, small molecular weight substancesespecially phosphorus & potassium leak out showing bacteriostatic effect of CHX. It also shows bactericidal effect caused by the precipitation or coagulation of the cellular cytoplasm,which is attributable to cross-linking proteins at high concentration[12]. *Studies have* depicted that CHX in liquid form eliminate bacteria more quickly than the CHX gel. 2.5% NaOCl in combination with 0.2 % CHX showed greater antimicrobial effect than that of either irrigant used separately. But their combination result in carcinogenic product which can possibly leak into surrounding tissues. Its use as final irrigant in endodontic treatment is contraindicated by khademi et al because of its limited effect on gram negative bacteria when compared to its effect on gram positive bacteria[13]. CHX gluconate, in concentrations *0.2%-2%,* offers a *very good alternative* for root canal irrigation with because of *antimicrobial activity*. Many *studies* have shown that it has optimal biocompatibility in clinically used concentrations. It is foundthat in bactericidal concentrations, it isinjurious to canine embryonic fibroblasts & aid continuance to bacterial lifecycle at low concentrations.[14]

Ethylenediamine Tetraacetic Acid (EDTA): *EDTA* is a *chelating agent*routinely used for the removal of *thei*norganic portion ofsmearlayer in endodontic procedure.The very frequently used method to remove the smear layer is using 17% concentration of EDTA for one minute followed by a final rinse with NaOCl. The prolonged exposures cause*excessive removal* of both peritubular & *intratubular* dentin[15]. *EDTA* (17% percent) does not possess antibacterial activity. EDTA acts by reacting with the calcium ions in dentin which results into soluble calcium chelates.[16] The continuous rinse with 5ml of EDTA (17%)as a final rinse for 3 minutes; efficiently removes the smear layer from root canals[17]. Studies conducted shownthat when EDTA used as an irrigant in primary teeth, it deleteriously affected the dentinal tubules which may be the cause for primary tooth erosion later.[18]

Citric acid: Citric acid also used as airrigant for removal of smear layer. Generally, it is used in range of 1%-50% concentrations[19]. Studies showed that 10% citric acid when used as a final irrigant results in good removal of smear layer from apical root-end reported by Gutmann*et al*[20]. Also found that 25% concentration of citric acid was not much effective in *eradication* of biofilm of *E. faecalis* after 1, 5,10-minute interval of exposures.[21, 22]. Studies have shown 6% citric acid for 15 to 30 seconds is quite effective in removing the smear layer of the primary teeth but at higher concentrations peritubular dentin destruction was observed.[23,15]

MTAD: Torabinejad et al developed a MTAD irrigant which is combination of chelating and antibacterial properties. *MTAD* is a combo of *tetracycline isomer*(i.e. 3 % doxycycline), *4.25% citric acid*, and *detergent* (tween-80).[24] Acid removes the smear layer & doxycycline shows *antibacterial* effect. It is advised to use MTAD clinically for *20 minutes* as initial irrigant then irrigated by 1.3% NaOCl which is followed by final rinsing with *MTAD* for 5 minutes.[25] The results depicted that MTAD is effective for the removal of the smear layer but does not cause change in the structure of the dentinal tubules. Nara et al conducted a study to compare the antimicrobial efficacy of *3% NaOCl,* MTAD & *propolis* against E. faecalis and found that MTAD was more effective than 3% NaOCl and propolis against*E. Faecalis.*[26] *Venkataram et al* conducted study to differentiate the *effectiveness* of *chamomile, MTAD* and 2.5 percent of *sodium hypochlorite* on removal of smear layer from the root canal system of deciduous teeth and found MTAD is most effective among all.[27] Studies have shown that MTAD irrigant is less cytotoxic when compared with other irrigants like 3% hydrogen peroxide, EDTA. But there is chance of discoloring the young permanent buds present below the primary teeth. Thus,MTAD use is limited in primary teeth.[26]

Maleic acid: Maleic acid is anirrigant which is actually a mild organic acid. *Ballal et al* in 2009 reported that 1 min *final* irrigation with 7 percentconcentration of maleic acid was more efficient than using 17% concentration of EDTA in removal of *smear layer* from the apical 1/3rdof the root canal.[28]

Tetraclean: Tetraclean is a combination of doxycycline hyclate, an acid, and a detergent. Tetraclean is similar to *MTAD* with a reduced amount *of doxycycline* [50mg/5ml in place of 150mg/5ml for *MTAD*], polypropylene glycolas surfactant, cetrimide, *citricacid*. It is suggested to use, it as a 5-minute final irrigant rinse to remove microbial population & smear layer of the infected root canals.Studies have shown that *Tetraclean*induced a high degree of biofilm disintegration in following time intervals i.e. 5, 30, 60 minutes at *20°Cwhen* compared *withMTAD.*[29]

Smear Clear: Studies have shown that Smear Clear is a chelating agent consisting of (17%) EDTA solution along with cetrimide & extra proprietary surfactants when used for 1 minute. These contents help in removal ofthe residual inorganic matter from the canal during endodontic procedure. Smear Clear consists of cetrimide (quaternary ammonium*compound*) & a *cationic detergent* which is *effectiveagainst* gram++ and gram– microbes.[30]

Herbal Irrigants

Triphala: Indian medicinal herbal formulations *Triphala* consistof dried & powdered fruits of 3 medicinal plants. They are named as Terminalia Bellerica, Terminalia Chebula & Emblica Officinalis. Studies reported that Triphalaobtained 100 percent destruction of E. faecalisat *6* minutes. *It contains fruits* that *are rich in citric acid* removes thesmear layer.[31]

Morinda Citrifolia

Morinda Citrifolia commercially known by Indian Mulberry or Noni is considered indigenous to tropical countries. Its juice is broadly used for the sanative effects such as *antibacterial, antihelmenthic, analgesic, hypotensive antiviral, antitumor & anti-inflammatory.* Various invitro studies were conducted which reported that the *Morinda Citrifolia* was effective to remove smear layer in primary teeth[32].

German Chamomile and Tea tree oil

Anothermedicinal plant namelyGerman Chamomile (*Marticariarecutitia L.*) used mostly for its analgesic, anti-microbial, anti-inflammatory, sedative and antispasmicproperty. *Tea tree* oil (*Melaleuca alternifolia*) isan Australian plantwhich has antiseptic, an antifungal & a mild solvent property. Tea tree oil's important active constituent is terpineol (usually 30- 40%), which possess *antibacterial* & *antifungal* properties. An SEM study was conducted using *german chamomile* extract & *tea tree oil*as aroot canal irrigants. Also, found that the effectiveness of chamomileinremoval of smear *layer* was predominant to *NaOCl* effectivenessbut *less than*the combination of sodium hypochlorite & EDTA.[33]

Conclusion

Through the time of biomechanical preparation smear layer is produced which consists of organic and inorganic components which interferes with the mechanical debridement of root canals. Thus, use of intracanal irrigants supplements the chemicomechanical debridement of root canal system.Irrigation plays important role in success of endodontic procedure of primary teeth. Further researches required for finding a suitable single irrigant which possess all the ideal requirements in pediatric endodontic treatment.

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Methodological Errors in Research: A Review

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Abstract

Errors occur in research either from ignorance or neglect. These when present undermine the generalizability of the study and compromise its authenticity. The list of errors in research is exhaustive but an attempt is made to list the most common methodological errors and the ways to prevent them.

Keywords: *Error, bias, research, methodology, study design.*

Introduction

Designing and conducting a research takes time, skill and knowledge. If the researcher does not go through the process diligently with a clear goal and method, it is very likely that the results obtained will be skewed or depict an inaccurate picture. Because research studies are carried out on people and are liable to practical and ethical constraints, they are almost invariably subject to bias or errors in research. Errors should not be interpreted as 'Mistakes' – rather errors are sources of uncertainty, both in estimates in the data and the inferences about the results.

Errors in research can occur due to various causes and reasons, but can be broadly classified into methodologic or non-methodologic errors. Methodological errors in research are of various types: random or chance variation, measurement bias, selection bias, reverse causation and confounding. Non-methodological errors in research include problems with execution of the study, reporting of results and issues influencing blinding, quality and completeness of data. The list in each category of error above is exhaustive as there are many potential sources of errors in any research. The aim of this review is to comprehensively address methodological errors, its types and points to be kept in mind to reduce them while conducting research.

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Methodological errors:

1. **Random variation:** It is also called random error and caused by factors which vary from one measurement to another. They are caused due to natural variability or 'noise in the system'. It is a chance occurrence and hence idiosyncratic, might not occur in repeat studies.[1] It leads to false association between cause and effect. Parameters resulting from laboratory analyses can vary each time, over time. E.g. Reading on the weighing scale changes each time stance or position changes. Asking multiple questions and multiple analyses done on same set of data can also lead to increase in source of random error.

   Chance of errors tend to average out in studies with larger number of samples, repeating the measurements and better study design. Hence, predicting the effect of these errors and establishing a threshold which limits errors but permits execution of an efficient study in terms of expenditure and time are highly preferred. Also establishing the outcomes to be assessed and measured before the start of the study and use of single appropriate statistical analyses will reduce the possibilities of chance errors.

2. **Systematic Error:** Systematic error is defined as 'an error having a non-zero mean, so that its effect is not reduced when observations are averaged.'[2] Systematic errors are also known as BIAS. Bias is due to error either in study design, analysis or interpretation of results. Bias affects the validity (internal and external) of research. Systematic errors unlike random errors, stay even after multiple repetitions of the study as they are integral to study design and hence cannot be controlled by increasing the sample size. Systematic errors creep into research generally through a worn-out instrument, incorrectly calibrated instrument or a person consistently recording an incorrect measurement.[2,3] Systematic errors are caused due to selection bias, measurement bias and reverse causation.

2.1. Selection Bias: Including patients or subjects in a non-random way leads to selection bias. This causes the sample selected to be not representative of the population to be studied. Hence the findings of the study cannot be generalized. The following are different types of selection bias.

2.1.1. Sampling bias: Results from non-random selection of subjects, where certain subjects are selected over others, resulting in a biased sample.[4]The subjects are hence not balanced out and objectively represented. The external validity of the study is compromised due to sampling bias, whereas selection bias in contrast affects internal validity. Examples include exclusion of subjects due to dropouts, screening for participants before the trial etc.

2.1.2 Time Interval: Terminating a trial as soon as the preferred results are reached/ obtained leads to bias.

2.1.3. Exposure: The different types of exposure bias are:

- **Clinical susceptibility bias:** Occurs when one disease influences the occurrence of another disease.[5] E.g. Diabetics are predisposed to delayed extraction healing. Hence follow up of different impaction techniques among diabetics would actually give an untrue picture of which approach has lesser complications.
- **Protopathic bias:** Occurs when there is a lag time between the emergence of the first symptom of the disease and the start of treatment, both done before the diagnosis of the disease.[5,6,7]E.g. Prescription of painkillers for pain from an undiagnosed tumor may lead to the faulty conclusion that, the painkiller caused the tumor. This can be overcome by introducing a time-lag and excluding all exposures before the start of study.
- **Indication bias:** Occurs when there is a confusion about the timeline regarding cause and effect, especially when treatment influences exposure[7]. E.g. When a population is at high risk of developing a disease, a treatment initiated in them might lead to afaulty conclusion that the given treatment initiated the disease.

2.1.4. Data: Post hoc alteration of data to obtain results in bias. This can be either done by

- Cherry picking:When data is manipulated to give the desired results, while the real data is ignored in fear of obtaining hard to explain results.[8]
- Rejecting bad data on post hoc basis instead of predetermined criteria and excluding outliers (data that is significantly different from the others). This causes loss of information that could have been derived from these wayward observations.

2.1.5. Studies:

- Conducting multiple experiments and reporting only the expected and desirable outcomes.
- Including only the most desirable studies while doing a meta-analysis.
- Data dredging to present the most acceptable and significant results.

2.1.6. Attrition: It is similar to survivorship bias or failure bias. It occurs due to dropouts or withdrawal or nonresponse or protocol deviators. It excludes the subjects who

don't reach the end of the study. Hence, it can give results that are biased in relation to exposure and outcome.[9] For example, in a clinical trial for use of nicotine gum as an aid for quitting smoking, the researcher can obtain biased results if he excludes the dropouts as they dropped out because the gum was not effective.

2.1.7. Publication Bias: The results that don't conform with the beliefs, interests and prejudices of the publishing house or sponsor don't tend to be accepted for publication. Hence, most commonly the most acceptable ideas tend to be published than negative results, even though they might provide fresh view.[10]

2.1.8. Confirmation Bias: Occurs from the tendency to alter experiment design or results to conform with confirmatory evidence rather than trying to disprove hypothesis.[11]

2.2 Measurement Bias: The variability in data measurement, availability or quality that is not occurring by chance leads to bias in measurement.[12]It is also known as "detection bias".

For Example: A scale measures 1 kg as 1.1 kg due to some error. When used to measure weights of all respondents in research:1 kg = 1.1 kg; 10 kg = 11 kg; 100 kg = 110 kg

There are different types of measurement bias:

2.2.1 Recall Bias: This is usually seen when data is collected about an occurrence in the past. Some events are generally more remembered than the others, while others are remembered incorrectly and someothers, completely forgotten.[13] It depends on the way the events of the past are recollected by the participant. It is also referred to as response or reporting bias.Recall bias is most common in case-control and retrospective cohort studies where the researcher depends on self-reporting. For Example: Cancer patients may remember more exposure in their life that they consider 'toxic', but forget many other life experiences (visit to a nuclear thermal plant) that could have contributed to their diagnosis. Improper blinding of the researchers can lead to overzealous questioning expecting a specific answer from casesrather than controls. Hence, it can be prevented by stringent blinding and collection of data prospectively.

2.2.2 Observer/ Researcher/ Experimenter Bias: This occurs when the research is prejudiced to see what it intends to see. It results in systematic differences in the real scenario due to bias in the process of observation.[14]Observer bias is frequently possible as all medical tests interpretation is most commonly open to varied interpretations. Observer bias can be minimized by ensuring that the observers/ investigators are well trained and calibrated;screening priorly for potential prejudices; and have clear rules and criteria in place.

2.2.3 Attention Bias: This occurs when the study subjects alter their behavior because they are aware of being studied/ observed. This isalso popularly known as Hawthorne effect.[15,16]In this bias, the expected change is usually observed initially when the subjects are aware of being studied/ observed and then gradually reverts back to the original after the novelty of being observed wears off. It is more commonly seen in behavioral studies. In clinical trials, attention bias can be avoided by having a control group which ensures that the Hawthorne effect is present in both the groups equally. It can further be controlled by blinding of the participants. In observational studies, attention bias can be reduced to a great extent by discarding the first set of observations and permitting the subjects to get accustomed to being observed and hence safeguard against the effect of this bias.

2.2.4 Expectation Bias: This occurs when the researcher expects the subjects under the trial group to do better than those in placebo.[16] That is, the researcher errs in measuring the data in order to obtain the expected outcome. This can be overcome by blinding of the observer or those who are recording the outcome.

2.2.5 Verification Bias / Detection Bias / Work-up Bias / Referral Bias: This occurs due to improper use of gold standard test in the study. When the gold standard

is used selectively that is, it is used on some while others are excluded it results in increase of sensitivity (True positive results) and decrease in specificity (True negative results) of the diagnostic test.[17] This is especially seen when the gold standard is deemed expensive, invasive or risky limiting its widespread use and hence different gold standards are used in different patients.

Example: In emergency room, people with ankle swelling are more likely to get x – rays for fractures than those without swelling. People with ankle fractures without swelling are left out. This increases the sensitivity of the diagnostic test (Over estimation) and decreases the specificity(Under estimation).

2.2.6 Insensitive Measurement Bias: This occurs when the tool that is to measure the outcome lacks accuracy. The outcome measures selected are incapable of detecting clinically significant changes or difference thereby leading to Type II or β error. To reduce Type II or β error, power of the study has to be increased 16. Power of the study can be increased by increasing the sample size. Hence, to reduce insensitive measurement bias, a larger sample size has to be chosen for detecting a practical difference when one might not exist.

2.2.7 Lead time Bias: This is seen in scenarios of screening for diseases where the disease would have been left undiagnosed but for the screening test. Hence, the diagnosis of the undetected condition gives a false picture of longer survival.[18]

Example: Squamous cell carcinoma patient with metastasis dies at age 70 years. Cancer was diagnosed 1 year back at age 69 years (Survival rate of 1 year). But, if cancer is detected in routine screening at 65 years, and subject died at 70 years, then survival rate would be misinterpreted to be 5 years (Lead Time). This gives a false impression that screening of a disease increases the survival rate of a subject from the specific disease.

2.2.8 Response Bias / Volunteer Bias / Self-Selection Bias: It occurs when patients enrol themselves in a trial, which results in a non–representative sample. When patients self-enrol for a trial, representation of the sample is compromised.[19,20.] Also, the people who respond to a survey tend to be different from the those who choose to ignore it. It is the way a respondent answers a question to erroneously mislead because of an expectation to impress the investigator. E.g. No one really admits to a question on drunken driving even when they might have done so on some occasion.

2.3 Reverse Causation / Reverse Casualty: In cases where disease is determined by multiple factors and complex pathophysiology, the direction of causation is questionable. Usually the factor that appears first is deemed causal while the other factor appearing later is assumed to be outcome but in retrospective studies where establishing a timeline is difficult, the potential for reverse causal error arises.[3] E.g. In studying the relationship between smoking and depression,there is likelihood the causal relationship can be either ways. Observational studies in general are not clear in pointing out the direction of causality, and hence they need to be supported by interventional studies when feasible.

2.4. Confounding Bias: Confounding factor is a third variable, that distorts the observed relationship between the exposure and outcome. It causes error in characterization of relationship between two factors. Confounding involves a third factor as opposed to reverse causality where two factors are erroneously associated.[3] The presence of this undetected or unknown third factor causes flawed association between the two factors. The two factors appear to demonstrate a statistically significant relationship, which may not be supported by a biological relationship but by the presence of the third factor, which is commonly known as the confounding factor. These factors are independent risk factors for the study outcome and associated with both outcome and exposure. If confounding bias is not controlled, then it may cause an over-estimate the true association (Positive confounding) or under-estimate the association (Negative Association).

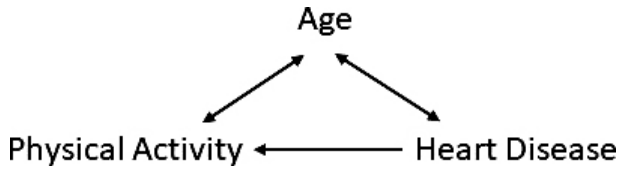


Figure 1. Age is a confounder as it is associated with both physical activity (Exposure) and Heart disease (Outcome)

In the above example, age is a confounder as it is associated with both physical activity (Exposure) and Heart disease (Outcome) (Figure 1). The effect of confounding can be overcome during the study design by restriction (Restricting the selection of variables with respect to confounder), matching and randomization. The effect of confounding can be overcome during the analysis by stratified analysis and regression analysis.

Conclusion

There is plethora of errors in research and can occur during the planning, data collection, analysis and publication phase. Understanding various types of errors in research allows an investigator to critically and independently review the scientific literature and avoid potentially harmful or suboptimal treatments for the patients. Evidence based dentistry practice demands a thorough understanding of errors in research and how it affects the study results and its outcomes. This review explores only methodological errors comprehensively without exploring non-methodological errors. Hence further reviews exploring non-methodological errors are much appreciated in future.

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Role of Colours in Paediatric Dental Clinic Setup

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Abstract

Dentistry decoration is very important in children. Anxiety and fear of dental treatment in children is seen in many countries**.** An attractive and comfortable environment should be designed for both children and parents. If the dental environment colour can have a beneficial effect on the baby, these colours may contribute to the child's comfort, thereby decreasing dental anxiety. The uses of child friendly colours like yellow, blue in the dental work place enhance a positive dental attitude in the child. It is important for the dentist to establish a friendly relationship with children to combat fears and deliver effective and efficient treatment.

Keywords: *Colours, Paediatric Dental Clinic Setup, Dental anxiety,friendly relationship.*

Introduction

Dental anxiety affects children as a prevalent issue. It has been of concern for many years and it is still a barrier to dental care.[1] Dental anxiety in childhood is stressful for both the kid and the parents. Friendly atmosphere in dental clinic can reduce dental anxiety of children. Colour plays an imperative role in child's life.[2] Colouris one of the best ways of transferring messages and meaning. Colour stimulates and works synergistically with all of the senses, symbolizes abstract concepts and thoughts,expresses fantasy or wish fulfilment or produces emotional responses.Colour can be viewed biologically, mentally and could therefore provide psychological answers.[1] The colour of the dental setup can have a beneficial effect on the behaviour of the baby, decreasing dental anxiety.[2] By adding bright colours to the dental system and colourful equipment, the kid would feel great and be comfortable in the dental clinic. If environment colours can have positive influences,then those colours will make more comfortable, reducing their stress.[3] Some kids respond positively in a paediatric dental practice, while others are anxious.[1] Using child-friendly colours in the dental office could generate a favourable atmosphere for them all.

Role of Colour: Colour is an important characteristic in the lives of a child. Colour is an essential component of today's life and is seen in all we perceive. It has been commonly recognized that colours play a crucial role in our emotions and expression. Colour preferences in particular are related to whether a colour conveys favourable or negative feelings.[2] A child's environment including his/her clothes, toys and accessories convey many psychological messages through colours.[1] A child sometimes express his/her emotions through colours. The colour of paediatric dental clinic should be such that, the child gets more attracted and comfortable. If the child sees his/her preferred colour they get more surprised and happier, which gives a positive response to the dentist.[4] If the colours chosen are found not to be preferred by the child, they express a negative emotion. Specific colours generally elicit specific feelings, but for each person, the specific feelings engaged are by no means the same. The emotion caused by a colour relies on nationality, past experiences and private preferences at times.[1]In our exercise, the use of colours helps both the kid and the employees feel more comfortable while in a dental setup. Terwogt and Hoeksma conducted a survey with comparable purpose in which fundamental emotions such as anger, happiness, sadness, fear, surprise and disgust were represented by the colours red, blue, yellow, green, black and white.[2] The associations of some mood tones with specific colours have been discovered to be more evident and accurate than others.[5] Happiness, cheerfulness and a favourable emotional state are connected with the colour yellow. Secure, calm, comforting is associated with the colour blue. Red with anger, aggression, excitement, and black with depression or anxiety.[1] Neutralcolours such as beige or light shades of green and blue for the wall decor promote a tranquil feeling. Children require free, empty spaces to move around. They usually don't seat in one place. So, as soon as they enter a dental clinic there must be a space provision or play room area.[6-8] The walls

of the play room area should be painted with bright colours such as yellow, blue. In accordance with bright colours the walls can also be painted with cartoons and animals so that the child gets more attracted. So, with such attractive walls it's better to engage the children in some interesting activity to relieve their anxiety before their turn comes for dental check-up or treatment. Selectedtoys, building blocks and wall attached activity centres have proved to be the main attraction for the children of all ages.[9,10] So, this should also need to be considered according to their preferablecolours. Often clinics have roof to floor tiles for easy maintenance and cleanliness, andcolours projecting office ambience. Children imagine and accept bold, bright fresh colours such as yellow,blue,orange,pink,green and may dislike grey, black and white, brown etc. Undoubtedly, the use of happy colours is very important for designing the children's waiting room. You can also use a colourful background for the waiting and treatment room. The degree of darkness and brightness of colour should only be considered for these two rooms. It is better to use the same colour for both the waiting room and treatment room.[4] In this situation, patient who got familiar with the waiting room before will also get familiar with the new environment without any stress. The accessories used in paediatric dental clinic should also be made up of attractive colours. The colour of dental chair should not be dull rather it should be bright and attractive. The dentist can also incorporate use of colourful gloves with mint smell which will make the child feel good and comfortable. The drapes used should also be of bright colours with pictures on it.[11,12] It will make the patient happier. Pope DJ et.al. studied girls preferring pink colour, while most boys preferred blue to be positive. This may be due to cultural imparity as most parents in their toys, clothes and room accessories bring up girl children in a pink setting and boys in a blue environment.[2] So this should also be a topic of concern for the dentist in preferring colour scheme for dental clinic setup. A pleasant and colourful environment relieves the anxiety of children and also projects the office ambience. By defining the child-friendly colours, we can integrate such radiant colours into the clinical configuration that will assist decrease children's anxiety and thus decrease the time consuming and stress-free dental procedure.[2]

Conclusion

The colour relationship and its emotional impacts are based on colour perception and environment perception. The dental clinic's colour and atmosphere have an important effect on the behaviour and reaction of a child to therapy. Thus, by adding appealing colours to the dental setting and integrating colourful equipment, a favourable attitude could be enhanced and the kid could be at ease.

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Aesthetic Clinical Crown Lengthening: an Answer to an Aesthetic Smile

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Abstract

To achieve an ideal smile, anterior maxillary labial gingival margin position plays a vital role. The gingival margin position is sometimes disturbed during or after the orthodontic treatment, which is mainly due to difficulty in plaque control, resulting in gingival enlargement. Anterior surgical crown lengthening may be undertaken to treat the gingival enlargement. A 23-year-old girl came to Department of Periodontics, with a chief complaint of anunaesthetic smile resulting from orthodontictreatment. Under local anesthesia, gingivectomy and frenectomy were carried out in the anterior maxillary arch (13 to 23) and periodontal dressing was given and followed up to 6 months. She was very satisfied with the aesthetic result.

Keywords: *Crown lengthening, frenectomy, gingival enlargement, gingivectomy, orthodontic treatment.*

Introduction

Aesthetic smiling depends upon the management of dental malocclusion and gingival zenith in varying degrees for many years.[1] Recently, patient awareness along with expectations have reached to a point, that is not less than ideal aesthetics result. But only orthodontic treatment may not provide an acceptable outcome (Morley, 1999).[1] Specially, in the maxillary anterior region, the gingival labial margin position acts as a vital parameter to achieve an ideal smile. Anterior surgical crown lengthening may be accepted to treat the complication such as gingival enlargement resulted from orthodontic therapy.[2,3] The putting of fixed orthodontic appliances is a favorable condition for plaque deposition, which is mainly due to the difficulty in the regions between labial gingival marginand brackets. Without plaque removal regularly, can give rise to several diseases like gingivitis, gingival enlargement, and clinical attachment loss (in severe cases).[4]The present case reportdiscusses crown-lengthening procedures of maxillary anterior teeth associated with plaque induced gingival enlargement and ismainly focused to obtain an aesthetic outcome.

Case report: A 23-year-old girl came to our Department of Periodontics, with a chief complaint of an unaesthetic smile resulting from orthodontic treatment (figure 1,6).



Figure 1: Preoperative view showing enlarged gingiva of maxillary teeth

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The patient was free from any systemic diseases, and without tobacco chewing habits. Conventional orthodontic treatment had been carried out over a period of 2 years. There was favorable tooth alignment after orthodontic treatment, but however there was enlarged gingivain the anterior maxillary arch due to poor plaque control, which was ultimately compromised the aesthetic outcome on smiling.

Treatment: Oral prophylaxis was carried out. After 1 month, under local anesthesia (2% lignocaine hydrochloride with 1:80,000 epinephrine), surgical crown lengtheningor gingivectomy[5,6] was carried out in the anterior maxillary arch (13 to 23)after marking for external bevel incision (this is based on repeated ratio) (figure 2). To provide ideal smile, Chiche and Pinault (1994)[7] has given the following repeated ratio formula:

Width of tooth = 0.75 to 0.80 (ideal ratio)

Length of the tooth: Frenectomy was also performed in order to reduce the relapse of midline diastema (figure 3).[8,9] A significantly increased clinical crown in maxilla anterior region was obtained. Then periodontal dressing (Coe-Pak, GC America INC, USA) was given to minimizes the postoperative infection and hemorrhage (figure 4).[10] It also assists healing by preventing surface trauma during mastication, and protects against pain,which is induced during mastication, as a result of the wound contact with food or the tongue.[10-13]

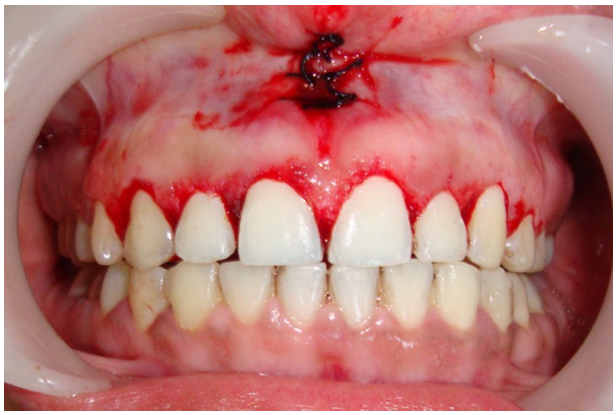


Figure 2: Marking for external bevel incision



Figure 3: Postoperative view on the same day.



Figure 4: Coe-Pak placed on the surgical site



Figure 5: 2 week postoperatively

Results

The present case was weekly follow-up visits forthe first month (figure 5).The reason was to have meticulous plaque control and had an optimum healing. Later on, recall visits were done monthly during the next 6 month (figure 7) and onwards. These recall visits revealed that the patient maintained oral hygiene perfectly, and was very satisfied with the aesthetic outcome.



Figure 6: Preoperative view



Figure 7: 6 month postoperatively

Conclusion

Aesthetic clinical crown lengthening or simply gingivectomy can be carried out in anunaesthetic gingival margin following conventional orthodontictreatment to provide an aesthetic pleasant smile.

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Ethical Issues: Approved

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Advances in Bracket System: The Newer and Aesthetic Approach: A Review Article

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Abstract

Aesthetic brackets gained admiration due to growing requirement for improved aesthetics throughout fixed mechanotherapy. The bracket systems have modernized from pin and tube to lingual, self-ligating and invisible aligner system. The new advances in Orthodontic brackets have contributed in making the treatment a pleasant experience for the patient by boosting their confidence and have also reduced the chair side time for the clinician. This article discusses the recent advances in the Orthodontic bracket systems.

Keywords: *Aesthetic brackets, Advances in brackets, Lingual, Self-ligating, Ceramic, Invisalign.*

Introduction

Orthodontic patients, these days demand for aesthetics during fixed mechanotherapy which has led to an enormous amount of research & development in introducing bracket systems that are aesthetically pleasing without compromising the desirable performance of the required appliance. Several developments have been made in the field while each approach is unique and desirable in its own way; each has its own drawbacks as well. Such as, developments of smaller stainless-steel brackets provide the same performance but the metal display inevitable. Lingual brackets are more aesthetic or almost equal to invisible, but increase the technical difficulty for the clinician, thereby increasing the chair side time. Recently, a new addition to the Orthodontist's armamentarium is the invisible aligners or the clear aligner system, which incorporates a transparent plastic aligner for correction of minor malocclusions, especially in adult cases. But the biggest hurdle with this system is the treatment cost.

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Rise of these various aesthetic bracket systems has occurred at a faster rate due to the rising need of the patients. The purpose of this review article is to discuss the recent advances in orthodontic bracket system and how it benefits the Orthodontist to deliver better treatment aesthetically.

Recent advances include:

1. Plastic brackets
2. Ceramic brackets
3. Self-ligating brackets
4. Lingual brackets
5. Invisible aligners

Plastic brackets: Newmann was the first person to introduce these brackets that came into the market in the early 1970's. Originally it was made from acrylic, but due to various drawbacks later was manufactured from polycarbonate. [1] These brackets could not be adopted worldwide by the Orthodontists because of its numerous drawbacks. Few of setbacks of these bracket system included staining and odour, mainly its low strength and low stiffnessraised problemsat the time of bonding such as - tie wing fractures and permanent deformation. Due to lack of strength and rigidity, "high-grade medical polyurethane brackets and polycarbonate brackets reinforced with ceramic or fibreglass fillers and/or metal slots have been recently introduced and are becoming increasingly popular".[2]



Figure 1. Plastic brackets



Figure 2. Ceramic bracket

Ceramic bracket: Since their introduction in the 1980s, in comparison to traditional appliances, ceramic brackets have proved to be more advantageous.[3]

They excel in terms of strength, wear resistance, stress deformation, color stability and more importantly aesthetics during the treatment phase which is a primary consideration for most patients opting for orthodontic treatment.

The basic material is aluminium oxide, which based on the method of fabrication can be monocrystalline or polycrystalline.[4]

Monocrystalline alumina: This is pure crystalline form of alumina that does not contain any binder.

Polycrystalline alumina: This material contains a binder along with alumina to make it mouldable into a desired shape from which brackets are easily cut out.

Polycrystalline Zirconia: Available in three crystalline forms namely cubic, tetragonal and monoclinic, zirconium was also used for bracket fabrication.[4, 5]

Inspire of rigorous research in development in the field of ceramics, only alumina ceramics have shown consistent improvement in the field, making it the most favourable material for bracket fabrication for clinical use.

Ceramic brackets will all the advantages also have their drawbacks such as: bonding and bond strength, frictional resistance, bracket breakage and low fracture resistance, iatrogenic enamel damage and problems while removal of the bracket. Various studies have measured and compared the bond strength of ceramic brackets with different retention mechanisms and it has been found brackets that have been retained with mechanical measures, tend to have sufficient bond strength and seem to result lesser damage to the enamel during debonding as compared to the chemically retained bracket.[5] Modification of bond strength can also be done by selection of correct adhesive, various types of enamel conditioner and varying the etching time.

Self-ligating Bracket: As the name suggests, this is a ligature free system with a locking clip to keep the arch wire in place. Depending on the interaction of the bracket and wire, it may be an active or passive bracket. The absence of ligature wire results in lesser soft tissue trauma to the labial and buccal mucosa. Leading points of self-ligating brackets are full arch wire engagement; low friction between bracket and arch wire; less chair side assistance; faster arch wire removal and ligation, thus lesser chair side time.[6]

The evolution of self-ligating brackets is shown in the figure below:

System Year Introduced
Russell Lock 1935
Edgelok (Ormco) 1972
Mobil Lock (Forestadent) 1980
Speed (Strite Industries) 1980
Activa ("A" Company) 1986
Time (Adenta) 1994
Damon SL5 ("A" Company) 1996
Twinlock (Ormco) 1998
Damon 2 ("A" Company/Ormco) 2000
In Ovation (GAC) 2000
In Ovation R (GAC) 2002
Philippe (Forestadent) 2002
Smartclip (3M Unitek) 2004
Sure (Denrum) 2005
Quick (Forestadent) 2005
Damon 3MX (Ormco) 2006
Smartclip 2 (3M Unitek) 2006
In Ovation C (GAC) 2006
Clarity SL (3M Unitek) 2007
Smartclip 3 (3M Unitek) 2009

Figure 3 The evolution of self-ligating brackets

*Recent advancements in orthodontic brackets - A review. A Kakadiya et al.

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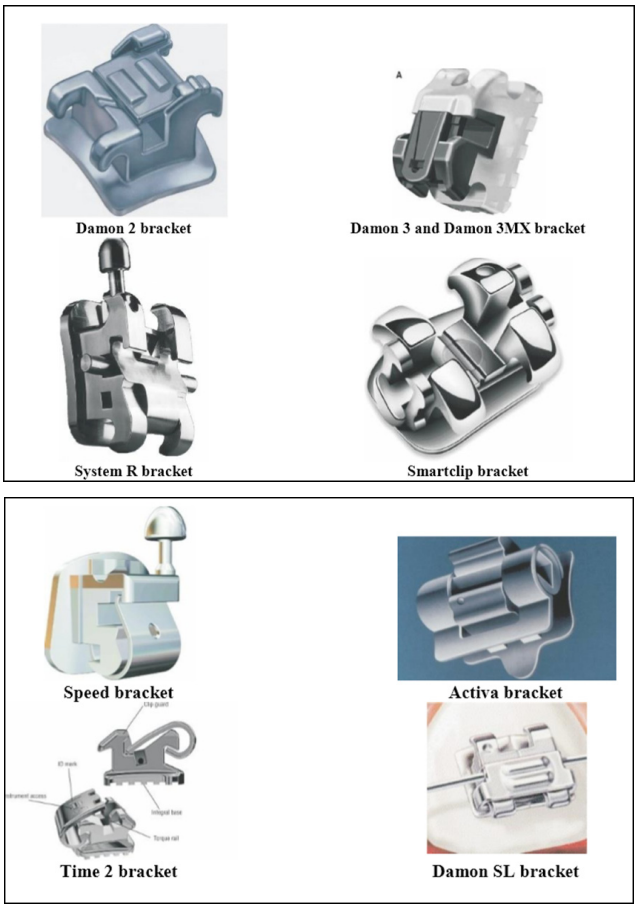


Figure4. Self ligating brackets

Recent developments of self-ligating brackets are the tooth coloured or aesthetic self-ligating brackets.

Self-ligating brackets have gained popularity because of the robustness offered along with the easy usability saving precious time of both the clinician and the patient. [7]

A study of treatment efficiency by Harradine concluded the following:

1. Less chair side time due to non-usage of ligature wire
2. Reduction of treatment duration by approximately 4 to 6 months
3. An overall reduction of the number of patient appointments needed for active therapy to 12 months from 16 months
4. Same PAR score reduction in matched cases[6]

Similar findings were also reported by Dr. Robert Fry at the annual AAO session in Toronto in 2001.[8]

Currently available self-ligating bracket systems, today, exhibit extremely low friction in addition to secure engagement of the full bracket which, in addition to reduced duration of treatment, fulfils anchorage requirements especially involving tooth movement of a larger magnitude with ease and predictability.

Lingual Brackets: The technique begun in 1970 and Dr.Kinya Fujita introduced the mushroom shaped arch wire in 1979.[9] The system enables successful treatment of patients with certain specific social and professional requirements with high aesthetic requirement that does notallow them to get orthodontic treatment done using the conventional method, where the brackets and the arch wire are visible. Since its introduction in 1970, the lingual system has been extremely popular and has undergone extensive evolution to have gained success and acceptability.[10, 11]



Figure 5 Lingual brackets

The most significant change in design is the size of the bracket. The new lingual brackets are smaller and more closely adapted to the lingual vestibule. The shape of the bracket has also been dramatically changed. There are three small wings (two occlusal and one gingival) and a 0.018" x 0.025" slot for the arch wire.[12] The absence of a hook and bite plane further reduce the overall dimensions of the bracket leading to greater patient comfort.

Invisible Aligners: Clear aligners are the most recent development in the field of orthodontics and have gained immense popularity since their introduction as they have the highest esthetic quotient. With an increase in the number of adult patients demanding orthodontic tooth correction, most of them being working individuals, clear aligners become an important option for both the clinician and the patient in spite of smaller appliances and even ceramic brackets as they are much more noticeable. The tooth movement occurring in clear aligners is mostly uncontrolled tipping with the center of rotation being located between the center of resistance of the tooth and the root apex. Some studies suggest limitations of this appliance in form of anchorage control. To counter the limitations of the system, aggressive research and development is continuously pouring into the technique that, over a period of time, has eventually led to more efficient and successful treatments.[13, 14]There are several companies that are manufacturing these aligners, such as Clear correct, 3M Clarity aligners, K line etc.The drawbacks of the system make case selection a tedious task as they add onto other criteria that need to be addressed while treatment planning such as age, bone quality and tooth morphometrics.[15]

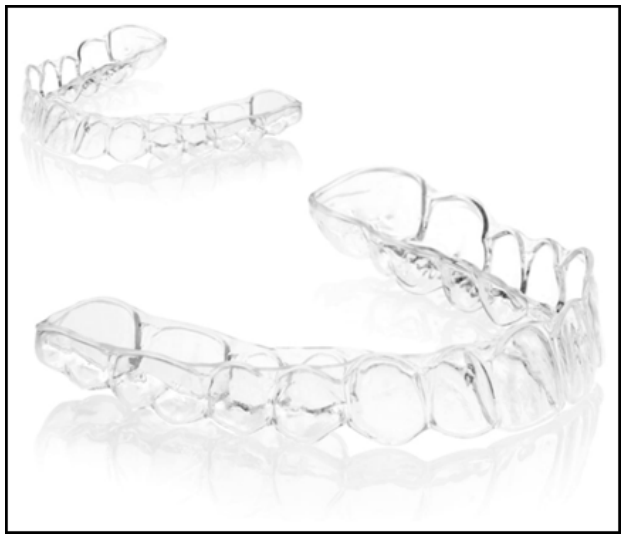


Figure 6 Clear aligner

Conclusion

The article summarizes the recent advancements in Orthodontic brackets along with a brief description of the plastic brackets, ceramic brackets, self-ligating bracket, lingual bracket, and the new clear aligner system. As technology advances soon these brackets will also be obsolete and newer ones would take their place. Keeping up with the technological advancement is a tough job. The rise in quality also comes with a rise in its cost. The Orthodontist should wisely choose which bracket system would be best for the selected case and also fulfil the aesthetics requirements of the patient.

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Preventing Dental Caries through Microbiome Manipulation

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Abstract

Oral microbiome is natural and has a harmonious relationship with the host by delivering important benefits. But sometimes this dynamic balance gets interrupted either by high sugar intake or low saliva flowwhich decreases the pH level in biofilm. This increases the risk of caries or what we call dysbiosis. Several studies and new insights are put forth to promote symbiosis and prevent dysbiosis. This article focuses on the various method that can achieve our motto i.e. maintenance of equilibrium. Numerous proposed ecologicalapproaches been brought into clinical practice for this purpose. Probiotics, prebiotics,quorum-sensing targets, sugar polyols, antimicrobial peptides, replacement therapy with designer bacteria are some of the discussed approaches in the review some of which have undergone successful clinical tests setting milestones in the field of dentistry.

Keywords: *Oral microbiome, Dental caries, Biofilm, pH, Prevention.*

Introduction

Dental caries concept has evolved through years and now considered to be a "multifactorial" disease with no single causation pathway. Previously the main goal was elimination of dental plaque but later several studies have highlighted the beneficial aspects of oral microbiome such as acting as a barrier for opportunistic pathogens, carrying out metabolic processes beneficial for the host,preventing erosive enamel lesions and hypersensitivity. Thus, "shotgun" suppression of microbiome may not have a long-termsuccess, but targeting the cariogenic bacteria or virulence factor has provedto have an effective outcome.[1-3]

Ecological Approaches

Antimicrobial Peptides: Antimicrobial peptides (AMPs) are heterogeneous group of molecules that has antifungal, antibacterial and antiviral property which is mediated by selectively interacting with the membrane's phospholipids leading to disruption of membrane and cell death. Besides naturally AMPs in saliva, some are synthetically produced in labs like STAMP (Specifically Targeted Anti-Microbial Peptide) which targets *Streptococcusmutans* withoutharming beneficial bacteria. Other synthetic AMPs include KSL-W, L-K6, GH12,1018. But despite of its remarkable outcomes;questions still remain whether it will be able to work against excess acid production in high caries risk individuals.[4-6]

Probiotics: Probiotics are harmless effector strains which are introduced into host microflora. It can have both systemic and local effects. Local effects include competitive inhibition with caries producing bacteria,bacteriocin-producing probiotics targeting *Streptococcus mutans*. But again, the probiotics have their darker part too. Some strains like *Lactobacillus* and *Bifidobacterium* are themselves acidogenic and aciduricand contribute to caries progression. But very recently two oral commensal species, *Streptococcus dentisani*and *Streptococcus A12* have been introduced where they inhibit the growth of *streptococcus mutans* as well as lower the plaque pH through arginolytic action. But still these are on trials for whether they inhibit dental cariesor not.[3, 7]

Prebiotics and Arginine Metabolism: Prebiotics involve nutritional stimulation of beneficial species to maintain balance and promote oral health. Arginine, arginine-rich peptides and urea are commonly used in prebiotics which have alkalizing effects which counteract the acidic environment created by caries-inducing bacteria. Many commensal bacteria use arginine or urea to produce ammonia which in turn play a great role in pH balance and alter the remineralisation-demineralization equilibriumbeneficially. Further a systematic review and meta-analysis on anticaries effects of arginine formulated in dentifriceshas revealed that when arginine is combined with fluorides it produces synergistic effects against caries as compared to fluorides alone. Thus,this

has proved to be a promising strategy for caries control.[8-12]

Sugar polyols: Sucrose being one of the main reasons behind caries progression;sugar substitutes have grabbed a lot of attention. These are believed to have anticaries action through number of mechanisms. Xylitol; a non-nutritive sugar substitute has been under researchsince years and have potential cariostatic effects. It inhibits *mutans* growth by disruption of the energy processes leading to futile energy cycle and cell death. The common vehicle for xylitol delivery isdentifrices,gums,candies, lozenges and mouth rinses. Erythritol anticaries effects can stay up to 3 years.[13-15]

Quorum-sensing (QS) targets: Another approach for a healthy plaque ecology can be brought about by interfering with the fundamental cell-cell communication in the biofilm. This process is called QS which is mediated through pheromones and their specific receptors. As QS is not directly related to the bacterial growth;so,emphasizing in this would allow less harmful bacteria to grow andabsence of selective pressure which can lead to antibiotic resistant strains.[6, 16,17]

Replacement therapy with "Designer"bacteria: Modification of the dental plaque can be brought about by introduction of avirulentcounterparts of *S.mutans* in the biofilm in place of the cariogenic strains. Several "designer" bacteria have been studied under bacteriotherapy against cariogenic biofilms including glucansynthesis-defective mutant of *S.mutans,*variants of *S.salivarius*(TOVE-R) and a recombinant alkali-generating ureolytic strain of *S.mutans.*Most genetically modified strain used is a wild type *S.mutans* which naturally produces mutacin 1140; an antibiotic which can kill cariogenic stains of *S.mutans*.[17]

Natural Products: Includes secondary metabolites and phytochemicals derived naturally i.e. from plants, herbs,shrubs,fruits, etc. Potential cariostatic properties include:

- Inhibition of bacterial growth
- Inhibition of acid production
- Inhibition of glucan synthesis
- Inhibition of bacterial adhesion

Polyphenols from propolis and cranberry proanthocyanidins have been into much consideration are potent inhibitor of water-soluble glucan and decrease the acid production. Propolis consist of apigenin and tt-farnesol which when combined with fluorides suppress dental caries substantially.Likewise, cranberry proanthocyanidinscan lower acidogenicity and glucan synthesis. Bioactive molecules likexanthorrhizol(from*curcumaxanthorrhiza*)or macelignan(from*Myristicafragrans*)can be almost compared to chlorhexidine. Another phytochemical named '*Gallachinesis*'can beneficially regulate demineralization-remineralizationof the dental film.Natural products still remain unexplored source of potent anti-cariogenic and non-toxic antibiofilm moleculesthat can be combined with fluorides and conventional microbicides like chlorhexidine and triclosan.[18,19]

Other Approaches: Calcium phosphate-osteopontin(inhibit biofilm formation), Nano particles Graphene oxide, Ceramic water.[20]

Conclusion

Fluorides no doubt will remain the most economical,conventional and sought-after prevention protocol for dental caries but however fluoride alone cannot offer complete protection against this multifactorial disease. Hence the search for cariostatic agents goes on every year around which can be combined with fluorides and synergistically improve the cariostatic property.Introducing these ecological method into clinical practice can definitelybring a new era in dentistry where prevention with lead to long term disease control. Present scenario and culture make it difficult to achieve and sustain behavioral dietary changes;Thus, these approaches can help clinicians and practitioner to shift the way of management of a disease more biologically.

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Pediatric Implants

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Abstract

Absence of teeth in children and young adolescence has long term effects the normal function, alveolar growth, speech, aesthetics as well as negative impact on the psychosocial development of these growing children. Partial or complete anodontia could be either genetic or induced by trauma or dental caries. Owing to growing phase and transitory changes the takes place in and around dentoalveolar structures poses a greater challenge for clinician to devise a treatment place suiting all needs of the children without hampering the growth aspects. Various options for replacement of teeth ranges from removable partial dentures, semi-fixed dentures and most recently pediatric implants have been introduces. This paper encompasses all the aspects of pediatric implants along with the clinical consideration.

Keywords: *Implants, Children, Anodontia.*

Introduction

Teeth loss may cause function lease which can lead to various problems of alveolar origin and can also hinder the psychological development of the child due to displeasing aesthetic.[1] Congenital partial anodontia and traumatic tooth loss are frequently encountered in pediatric patients.[2]. Missing maxillary and mandibular anterior can hamper the child's living quality.[3] As these children are in their growing phase several changes occur in their skeletal framework including jaws and treatment option will thus be limited. A There are a number of removable and even if few there are some fixed options for children[4]. Many authors suggest the use of implants for those children but this option again comes with its own pros and cons.Hence, it is important to measure benefits of implants placement in growing patients against the concerns regarding their premature placement.[5] A careful diagnosis, treatment planning and a coordinated health care practice can help us to confer ultimate treatment results.[6]

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Implant Interrelationships

Implant Growth Interrelationships:

Effect of Transverse growth of Maxilla on Implant Placement: After 10 years of age there will only be a little amount of change in the intercanine distance which is 10mm (0.9mm). So, during this phase if an implant body is placed in the position of central incisor then there are chances that midline diastema can occur in between the implant placed and the adjacent natural tooth which can further shift the midline towards implant side. Around the age of 15years the midpalatal suture usually closes.[7]

Effect of Saggital growth of Maxilla on Implant placement: Due to the maxillary growth in downward and forward direction, the implant can lose its labial bone. If the implant is placed in the anteriors then it might fail to follow the natural teeth and may become relatively more palatal and if the implant is placed in the lateral region then it could not stop its mesial drift which can result in asymmetric arch form.[7]

Effect of Vertical growth of Maxilla on Implant Placement: Cronin and Oesterle introduced the vertical dimension of the maxillary growth as the most disturbing implant-positioning factor.39 Ranly calculated that an implant inserted in the anterior part of maxilla at the age of 7, will 9 years later be located 10mm more apically than the neighboring teeth.[8]

Effect of Transverse growth of Mandible on Implant placement: The relative lateral movement of the bone in the premolar region by bone apposition on buccal side and bone resorption on lingual side, is the cause of eventual lingual positioning of an implant if in case it is placed before growth completion.[7]

Effect of Sagittal growth of Mandible on Implant placement: The condylar growth causesa lengthening of a mandible, but this has no direct impact on implants. The height of the mandible increases mainly through bone apposition at the dentoalveolar complex, especially during the tooth eruption phase and the growth at the condyle. The latter makes the mandible undergo a limited rotation. Superposition was performed based on the small implants placed in the corpus mandibulae.[7]

Effect of Vertical growth of Mandible on Implant placement: The mandibular rotational growth of the significantly affects the anteroposterior and vertical eruption patterns, which are thus intimately connected. This rotation is important for implant insertion because the variation in compensatory amount and direction of incisor eruption could affect the relationship of an implant to an adjacent tooth.[7]

Interrelationship of Implant placement with type of Anodontia[9, 10]: Sharma and Vargervik's classification, which can provide basic indications and timing of implant placement in adolescent.

Group I

Children congenitally missing a single tooth and having adjacent permanent teeth: For those patients the development of dentoalveolar complex adjacent to the edentulous space is of prime concern. As the patient grows there is increase in height of maxillary and mandibular alveolus. Hence forth if the implant is placed before the growth completion then there are chances that it can get submerged as compared to the adjacent natural tooth.

Group II

More than a few teeth missing but adjacent to the edentulous lite there is presence of permanent teeth.

They are the most complex patients to be dealt with. There is need of orthodontic optimization and consolidation of edentulous space. So, in those cases it is always better to wait till growth completion which can be ascertained when there will be no change in two lateral cephalograms taken 1 year apart.

Group III

Complete Edentulous Arch: Usually the patients of ectodermal dysplasia come under this category. As there is no teeth so, the dentoalveolar growth will not be a major concern. The only problem that can be caused can be due to downward and forward growth of mandible whose sequel can be jaw size discrepancy. But this will not adversely affect the implant positioning.[11]

Implant placement in patients with Cleft lip and palate: Treatment of the cleft lip and palate patient involves a multidisciplinary team that encompasses multiple specialists is necessary to achieve the desired result. Alveoloplasty represents an essential procedure to assure a bone foundation that permits an adequate orthodontic treatment and a final dental rehabilitation. Between 10% and 50% of patients undergoing alveoloplasty do not achieve an adequate orthodontic treatment closure of the dental spaces.[12]

Closure the dental space by means of a dental implant is a relatively recent modality of treatment. In fact, it was first published by Verdi et al.[13] One of the success criteria of alveoloplasty is the volume of bone that remains in the cleft alveolar region. If there is not an adequate volume of bone it is not possible to insert the implant; a common situation due to the lapse of time between alveoloplasty and implant insertion.

According to literature the secondary alveolar bone grafting should be done between 8 and 11 years and implants should be placed between 6months of bone grafting to avoid resorption. Longer implants said to have longer duration of survival than shorter implants. Other implant factors as if diameter, surface texture etc. does not have much effect on longevity of implant.[14]

Mechanism of Integration of Endosteal Implant: Two concepts of endosteal implant–tissue reaction have been proposed [15]. They are:

- Dr. Per Ingvar Branemark - osseointegration
- Weiss - Fibro – osseous integration

Osseointegration: Osseointegration is defined as "1) Osseous integration (1993) the apparent direct attachment or connection of osseous tissue to an inert alloplastic material without intervening connective

tissue. 2) The process and resultant apparent direct connection of the endogenous material surface and the host bone tissues without intervening connective tissues. 3) The interface between alloplastic material and bone."– Glossary of Prosthodontic Terms.

Factors affecting osseous integration – Load on the occlusal table, design and surface texture of the implant, material biocompatibility and infection control.

Fibro-Osseous Integration: According to Weiss in-between the bone and implant surface there is presence of collagen fibers which leads to formation of a fibro-osseous ligament which is similar to that of a periodontal ligament. He supports the concept of early implant loading.

Osseointegration Vs Biointegration: Putter, in 1985, proposed 2 different ways of implant retention which can either be mechanical or biomechanical. Where the implant body is of metal there, we get a mechanical retention by help of vents, slots, dimples, threads etc. In those cases, retention solely depends on surface area as there is no chemical bonding.

In cases where bioactive retention needed to be achieved there the implants are coated with hydroxyapatite. Those bioactive material help in forming a physicochemical bond by simulating bone formation.

Controversies on Age of Implant Insertion: In the consensus meeting held in 1995, there came a decision that in partially edentulous cases implant placement should be delayed till the craniofacial and skeletal growth completion. In girls the growth spurts are expected to occur at 12 years and for boys it will be at 14years of age. Individual variation of about 6 years needed to be considered i.e. 9-15 years for girls and 11-17 years in boys. Thus, the chronological age is not reliable factor for assessment of growth cessation. Other diagnostics such as seriel cephalometric radiographs taken 6 months apart for at least 2 years, change in dental positioning by eruption of 2nd molar and evaluation of skeletal age are considered to more reliable indicators of growth cessation. A combination of more than 1 method isalso preferable.

Even if superimposing tracing of serial cephalometric radiographs for over a 1 year is considered to be more reliable method but this consumes a lot of time and radiation exposure to patient which indeed causes delay in implant placement.[7]

Recommendations for Implant Placement[7,10]

Anterior Maxilla:

- This area is very unpredictable regarding growth. So, considered as the riskiest site.
- In this area there is prominent vertical growth.
- If the implant placement is too early then that can lead to requirement of transgingival and transmucosal lengthening of implant which can result in poor implant prosthesis ratio.
- When the implant is placed prematurely the maxillary transverse growth also gets adversely affected as the mid-palatal suture remains open till puberty.
- The adjacent natural teeth also can get adversely affected.
- So, it's better to place an implant in this area after skeletal growth completion

Posterior Maxilla: If an implant is placed too early in this area then it can become occlusally submerged as the vertical growth of maxilla occurs by apposition of bone on the alveolar aspect resorption in nasal or maxillary sinus area.

It can have a poor long-term prognosis both on implant and the adjacent tooth due to implant infra-occlusion. Therefore, implants need to be placed after growth cessation

Anterior Mandible: The transverse and sagittal growth in this area is completed relatively earlier as the mandibular symphysis gets closed in early childhood. So, this area has a better potential to support implant prosthesis in children.

Posterior Mandible:

- Premature insertion of implants in these areas can lead to infraocclusion of implant and can adversely affect the natural adjacent teeth as the mandible still undergoes rotational growth which causes a significant change in alveolus and mandibular boarder and those changes are mostly influenced by various facial growth types.
- So better to insert an implant after skeletal growth completion.

Guidelines for Implant Placement: Guidelines for implant placement in younger patients by Misch et al (2005)

These are as follows:

- **Chronological age of patient:** Placement of implants in anterior mandible should be delayed for females upto age of 15years and for males the age consideration is 18 years. This is to be taken into consideration that mostly the patient's chronological age is sometimes lesser than the patient's biological age.
- **Endocrine changes:** This factor is somewhat relative. The female patient should have their menstrual cycle started and there should be at least voice change and body hair presence in case of male patients, and most often need to shave.
- **No growth during last 6 months:** Growth and development of jaws are considered to be nearly completed if no sutural growth had occurred during last 6 months.

Present Scenario

Mini Implants: Mini-implants have been used extensively in a wide variety of situations, such as: it stabilizes the dental arch against the forces directed occlusally while the main fixture heals; it can give anchorage to removable prosthesis; an orthodontic anchor; it can help in preserving teeth affected with; a temporary anchor for transplanted teeth; and a support for a single prosthetic rehabilitation.[16]

Biomimetic Implants: There can be improvement in integration of endosseous implant by bio modifying its surface. Bio modification is the process in which biologically active proteins such as extra cellular matrix protein, RGD peptide sequence are inserted into the titanium surfaces. In early stage of implant insertion, it simulates the osteogenic cells and hence accelerates osteogenesis around implant surface. There are draw backs such as reduced availability of materials, possible immunogenicity, unpredictability in enzymatic degradation and comparatively higher cost. Therefore, to attain a favorable tissue response, RGD or non-RGD sequences, which contains synthetic small peptides those make close contact to integrins, are considered to be effective alternatives. Currently peptidomimetics is playing a pivotal role in biomimetic approaches to dental implantology. [17]

Conclusion

Dental implant insertion can be a possible mode of rehabilitation in children and adolescents. Yet long-term clinical studies are necessary for sound conclusions. Published reports on the use of dental implants in young patients are as yet very limited; Even if many case reports but yet the success rate had not been much satisfactory as there had always been a need of further modifications either by surgery of the maxilla or mandible or by modification of the prosthesis till the child had grown into an adult. This again consumes lot of time of operator as well as the of patient and his/her parents and its always a troublesome issue to expose the child to various repeated surgeries which ends up in making the child and mostly their parents more apprehensive. Another most striking issue in implant placement cases is the cost factor. The parents of an anodontia or oligodontia patient not always belong to an upper-class society so, even if they want the treatment of their child to be done but the cost factor pulls them back. Specially in case of growing children there is a need of cost-effective implant.

So, there is need for further research in this field to known the type of implant specification in case of growing children, to understand proper arch morphology and bone density for a proper treatment planning and if possible, to make a cost-effective dental implant for those patients who suffer silently.

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Palatogingival Groove and the Perio-Endo Lesion: Management through Endo–Perio Regenerative (IPRF) Approach: A Case Report

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Abstract

Palatogingival groove is an anatomic malformation commonly occurring in maxillary lateral incisors. It frequently goes undetected andis often associated with complex Periodontic-endodontic lesions. Palatogingival groove harbour microbial plaque and cause pathological changes thereby resulting in lesions involving the periodonto-pulpal complex. This case report presents a complex perio-endo lesion associated with a palatogingival groove in maxillary lateral incisor which was successfully managed with both endodontic and regenerative periodontal therapy with the use of injectable platelet rich fibrin (iPRF).

Keywords: *Palatogingival groove, periodontal regeneration, perio-endo lesion, iPRF.*

Introduction

Palatogingival groove (PGG) is adevelopmental anatomic malformation present on the lingual surface of the teeth. It is most commonly found in maxillary lateral incisor[1]. PGG originates when the central fossa on the palatal aspect and crosses the cingulum,extending to varying distances apically. There have been several reported classification of PGG based on location of groove[2], degree of invagination of the groove towards the pulp cavity and degree of severity based on microcomputed tomography studies[3]. However, the most clinically relevant classification among them is mild, moderate, and complex types based on their depth and complexity[4].Several etiologies have been put forth for PGG from being a mild form of dens invaginatus[5], to incomplete attempt of a tooth to form another root[6]. Also, proposed area genetic mechanism[7]and racial link[8].

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This innocuously present anomaly may often go unnoticed and result in a pathology which may lead to loss of tooth[9]. Simultaneous involvement of periodontal disease and dental pulp may complicate diagnosis and treatment planning.While an endo-perio lesion with initiation of the pathology from infection of dental pulp is common, periodontal lesions are less commonly seen to be involving the pulpo-dental system. Such cases need a multidisciplinary approach for best prognosis[10]. We present a complex perio-endo lesion associated with a palatogingival groove in maxillary lateral incisor which was successfully managed with both endodontic and regenerative periodontal therapy with the use of injectable platelet rich fibrin (iPRF).

Case report: A 22 year male patient reported to the Department of Periodontics and oral Implantology of Institute of Dental Sciences, with a chief complaint ofpain and occasional gum swelling in relation to upper front toothregion which was associated with loosening of tooth and discharge from gums. He was apparently alright when he noticed gum swelling 6 months back. Pain was dull aching and intermittent which subsided after taking analgesic. The patient was worried about losing his upper front tooth which would hamper his looks.

On clinical examination a deep periodontal pocket of greater than8 mm depth was found onthe mesial aspect of left upper lateral incisor(22). A palatogingival groove (PGG) was found which extended into the gingival sulcus (Fig 1). Tooth was grade I mobile with mild tenderness on percussion. The crown was intact with no evidence of dental caries or fracture.A draining sinus was seen on the facial aspect in relation to tooth # 22 (Fig 2). Radiological examination revealed a peri-apical radiolucency in relation to toot # 22.A gutta-percha cone tracing into the sinus tract and periodontal pocket revealed a communication with the periapical area. No response was recorded in an electric pulp testing.



Fig 1: Pre-operative view - Palatal aspect; Deep periodontal pocket



Fig 2: Pre-operative view - facial aspect; Draining Sinus

Based on the clinical and radiological findings a diagnosis of primary periodontal and secondary endodontic lesion secondary to deep palato-gingival groove was arrived. A treatment plan of Endodontic treatment and regenerative periodontal surgery was planned.First phase of treatment included endodontic treatment for 22. Endodontic treatment was completed in a single appointment using a crown-down technique. The pulp chamber was accessed from the palatal aspect of the crown. After determination of working length, biomechanical preparation was done using rotary endodontic files (ProTaperNiTi files, Dentsply; Tulsa, Oklahoma). 3 % Sodium hypochlorite (Parcan, Septodont, Saint-Maur, France) and 17% ethylene diamine tetraacetic acid a.k.aEDTA (Prime Dental Products Pvt. Ltd, India) were used during the cleaning and shaping of the root canal. After thorough saline irrigation, the canal was finally irrigated with 2% chlorhexidine solution (R4, Septodont, Saint-Maur, France) and dried with paper points.Dry canal was obturated and sealed with thermoplastized gutta-percha along with a resin-based sealer (AH Plus,De Trey, Dentsply, Konstanz, Germany).

Second phase of treatment included regenerative periodontal therapy. After administration of local anesthesia, on the facialside (Fig 3), a mucoperiosteal flap was reflected after placing the sulcular and two vertical releasing incisions. On the palatal side, a mucoperiosteal flap was reflected after placement of sulcular incision only (Fig 4). Reflection of the flap on the facial side revealed a window like defect involving the root of the tooth. On the palatal side, reflection of the flap exposed the PGG completely. The PGG was seen to be extending from the crown to almost the entire length of the root portion.

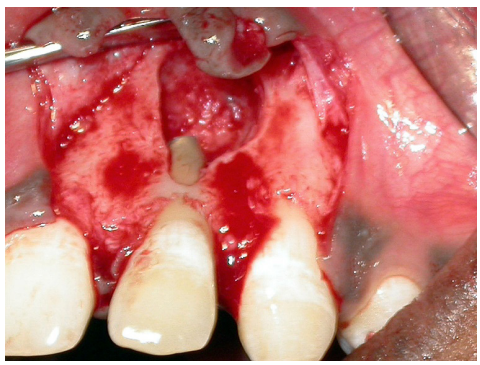


Fig 3: Osseous defect facial side

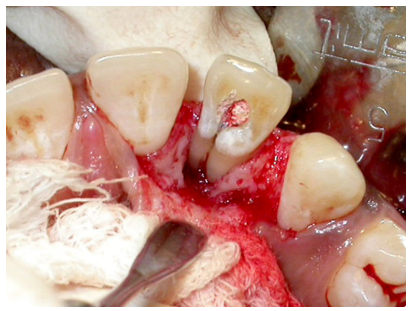


Fig 4: Deep palatogingival groove on the palatal aspect

On the palatal side, the root was cleaned and planed using periodontal curettes (Gracey Curettes # 1-2, Hu-Friedy, USA). Bleeding was arrested and PGG was

obliterated with glass ionomer cement (GC FUJI IX GP, GC Corporation, Tokyo, Japan).

On the facial side, the defect was debrided to remove all granulation tissue and the cystic epithelial lining if present. Apisectomy was done by bevelling the root end and restored with glass ionomer cement (GC FUJI IX GP, GC Corporation, Tokyo, Japan). The defect was then filled with injectable platelet rich fibrin (iPRF)[11] (Fig 5). Flap was sutured back using interrupted sutures. Post-operative instructions were given. Suitable antimicrobials and analgesics were prescribed.

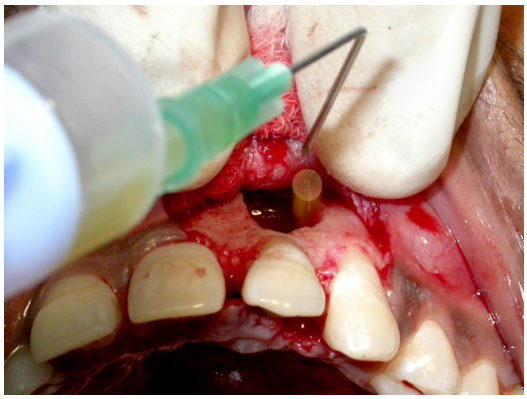


Fig 5: iPRF application into the osseous defect

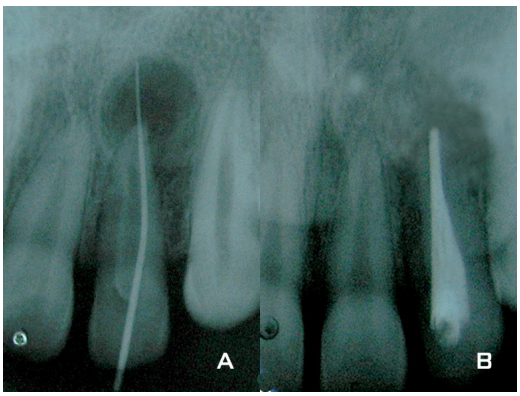


Fig 6: (A) Pre-operative Radiograph (B) Post-operative Radiograph

Patient was asymptomatic with minimal discomfort postoperatively. Sutures were removed after 10 days. The patient was placed on review for periodic monitoring. After 9 months there was a minimal residual pocket of 4 mm on the palatal side, no mobility and radiographic evidence of defect fill (Fig 6).

Discussion

An un-detetectedpalatogingival groove often is associated with a deep-seated severe pathology. Therefore, it is important to carefully undertake a clinical examination. Although in our case there was a draining sinus in the facial aspect, sometimes it is difficult to find a probe a very narrow pocket. In these cases, gutta percha tracing has been of much benefit. PGG is most likely seen in the maxillary lateral incisor and less frequently in the maxillary central incisor.

Obliteration of PGG is essential to convert the groove into a maintainable area which can be kept plaque free. GIC has been often used as a material of choice for this purpose. The same was also used as a root end sealing material after bevelling the root apex. Glass Ionomer cement has been a choice material for obliteration owing to its favourableproperties for both the tooth surface and periodontal tissues. GIC is resistant to degradation by water and has good sealing ability through chemical bonding[1].

A regenerative surgery was done owing to severe bone loss around the root. A good result was obtained after nine months with significant bone fill. This may be due to the fact that unlike bone loss associated with a deep periodontal pocket which has a communication to the oral cavity, periapical bony cavity is a contained one.Combining regenerative procedures with platelet-rich fibrin (PRF) has been extensively investigated and shown effective results[12]. In this case injectable PRF[11]has been used and the results were satisfactory. PRF has and its types such as iPRF, L-PRF[13], A-PRF[14] and PRGF[15] have been extensively utilised in regenerative therapy. This is based on the fact that after activation of the platelets entrapped within fibrin matrix, growth factors are released and it stimulates the mitogenic response during normal wound healing[16].

The success of treatment of palato-gingival groove depends on the ability to remove the irritants that are inflammatory, and followed by sealing the groove.

Conclusion

A combination of endodontic and periodontal treatment along with regenerative therapy including autologus platelet concentrates could give a satisfactory result in the management of complex perio-endo lesion associated with a palatogingival groove.

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Ethical Permission: Approved

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Plasma Cell Gingivitis: A Rare Finding

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Abstract

Plasma Cell Gingivitis is anunusual type of gingival enlargement that has distinctive features of infiltration of plasma cells into the sub-epithelial tissues of the gingiva. It is considered to be a hypersensitivity reaction to allergens. Allergens found mostly in consumables like tooth pastes, Khat leaves, chewing gums, etc.Here we have reported an unusual case of an 18 year of girl with gingival involvement in both maxillary and mandibular arches. There was resolution of symptoms after discontinuation of irritant.

Keywords: *Plasmacytosis of gingiva, Allergens, Marginal Gingiva.*

Introduction

Plasma Cell gingivitis is otherwise also known as Atypical gingivitis, plasma cell gingivostomatitis, Allergic gingivitis, plasmacytosis of the gingiva and idiopathic gingivostomatitis. Although the aetiology is not well defined. It is an immunological or allergic response to the irritants present in food items or other consumables. The primary irritant is cinnamon aldehyde widely used as a flavouring agent. These agents are commonly used in dentifrices, gums etc. Literature review classifies these lesions into 3 types allergic, neoplastic or of unknown origin.[1]

Case report: A 18yrs old female patient reported with a complaint of pain in the lower front teeth in the past 2 months. Pain was dull & vague which aggravated on having food with no relieving factors. The patient also gave history of bleeding gums on slight provocation while cleaning teeth 2 years back for which she had got her oral Prophylaxis a year ago. She also gave history of ulcerations on lips and nose which healed by self in 7 days. It was associated with mild fever in 2 times since a period of last 6 months. She gave a history of Cleaning her teeth using babul twigs once daily along with an herbal tooth paste



Figure 1. Red marginal and attached gingiva

On extraoral examination there was a healed crusted lesion at the ala of nose. Intraoral examination revealed

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gingival enlargement at the free & attached gingiva with distinct mucogingival junction, With a brightred colour of the free & attached Gingiva. It was soft & oedematous withLoss of stippling'spositioned coronal to CEJ with bleeding on probing & presence of generalised pseudo pockets (Figure 1). For this a provisional diagnosis of Chronic inflammatory gingivalenlargement, Recurrent herpes labials & Dentinal caries – 37,38 was given. The blood investigations revealed normal values of Hb%- 12 gm %, CT- 4 min 20 sec, BT- 2 min 45 sec, RBC – 4.1 ml/mm cube, Platelets: 2,10,000 /mm cube, TLC: 9,000/ mm.



Figure 2. Panoramic Radiograph with mild bone loss

Panoramic Radiograph revealed interdental bone loss (Figure 2). Excisional biopsy of the gingival tissue was done and Histopathological examination revealed oral epithelium spongiosis with infiltration of inflammatory cells a damage to the lower spinous & basal layers with dense infiltration of plasma cells extending in to oral epithelium & dissecting type of injury. Thus, a final diagnosis of Plasma Cell Gingivitis & Dentinal Caries irt 37,38. Follow up after 15 days on discontinuation of babool twigs and the herbal toothpaste revealed marked decrease in the lesion (Figure 3).



Figure 3. Follow up after 15days

Discussion

Plasma Cell Gingivitis is an unusual type of gingival enlargement that has a distinct feature of infiltration of gingival sub epithelial by plasma cells. The localized lesions are plasma cell granuloma where as in plasma cell gingivitis there is mild marginal gingiva enlargement extending to the attached gingiva.[2] These lesions are considered asan allergic reaction to antigens present in consumables and food products. These allergens can be identified as cinnamon, aldehyde or anyflavouring agents present in chewing gums and dentifrices. These could be due to use of herbal toothpaste as in this case.[3] Siteis oral aspect of attached gingiva and primarilyoccurs at the anterior gingiva with maxilla more commonly involved than the mandible. They involve themarginal gingiva but not the entire width of attached gingiva. Gingiva appears red, friable, granular that bleeds easily on slight provocation and doesn't induce a loss of attachment. It could be classified into 3 types caused by an allergen, Neoplastic nature and of unknown origin.[4]Traditionally treatmentinvolves conventional therapies like plaque control and maintain a complete dietary history to find out the possible allergen & eliminate that. If no such agent is identified, then detailed allergic antigen testing is done including the patch test.[5]

Treatment consists of both medical and surgical procedures. Corticosteroids (topical, intralesional, and systemic) antibioticsis given. LASERS could be used for destruction of the tissues. Gingival excision of the tissueis done if no underlying cause is identified and an Immunofluorescence test could be followed. This would help in identification of polyclonal plasma cells. In some cases, although all the evaluations and therapeutic interventions are carried still some patients do not respond to the treatment and no cause for the disease is identified.[6,7]

Conclusion

Importance of detailed history-taking, examination, and conduction of appropriate diagnostic tests, to arrive at a definitive diagnosis, is emphasized. An early diagnosis would direct the clinician toward an appropriate treatment plan, especially for unusual conditions masquerading as common lesions, which are refractory to conventional therapy.

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Differences in Distance between Maxillary Posterior Root Apices and the Sinus Floor According to Malocclusion: A Review Article on Various Radiographic Images

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Abstract

The paranasal sinuses are bony cavities at the beginning of upper airway has a pyramidal shape and situated on both sides of the maxilla. They are first to develop and reach their maximum at which all the permanent teeth except the third molars have erupted. The floor of maxillary sinus extends upto the alveolar process of maxillary arch and the hard palate thus, sharing a close anatomic and functional relationship with posterior teeth. In Orthodontic procedures the close relationship of the inferior border of the sinus and maxillary posterior root apices of teeth makes it an absolute prerequisite for clinicians to have an in-depth knowledge of the aspect. This relationship makes it an indispensable diagnostic criterion in determining an orthodontic treatment which involves mesialisation or distalization of the molars, intrusion of the maxillary posteriors or micro-implant anchorage. A sound knowledge of the anatomic extensions of the maxillary sinus, especially the floor of the sinus, is fundamental tool to prevent damage to nearby vital structures.

Keywords: *Maxilla, Paranasal sinus, Maxillary sinus.*

Introduction

Paranasal air sinuses are hollow spaces filled with air, surrounded within the bones of the nasal cavity.[1] There are 4 paired sinuses in humans lined with pseudo stratified columnar epithelium. According to the location, each sinus is named.

1. **Maxillary sinus:** Amongst all the sinuses, it is the largest. Located under the eyes in the maxillary bone.
2. **Ethmoid sinus:** It is situated beneath the bone of the inner corner of each eye and resembles a honeycomb like formation of 6-12 small sinuses.
3. **Frontal sinus:** Located bilaterally, confined by the bone of the forehead and is located above the eye level and nasal bridge.
4. **Sphenoid:** One sinus is located on each side, behind the ethmoid sinuses and inside the sphenoid bone.

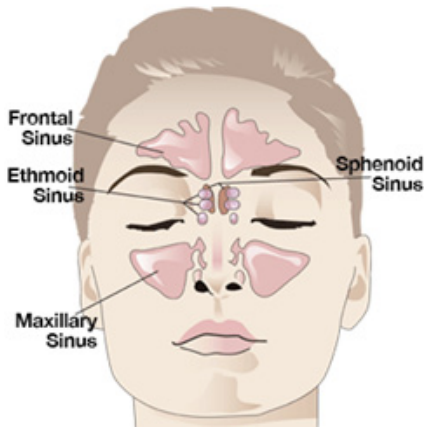


Fig. 1 Paranasal Air Sinuses

The maxillary sinuses are pyramidal in shape and lies in the body of the maxilla. They are the ones which develop at first during the second month of intrauterine

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life.[1] These sinuses serve multiple purposes such as: moisturizes the air, equalizes variations in air pressure, maintains resonance expanding the olfactory mucosa area, reduces cranium weight, as well as plays a chief role in development of facial structures.[2,3] Reaches their maximum size by,with the eruption of permanent teeth.[4, 5, 6]

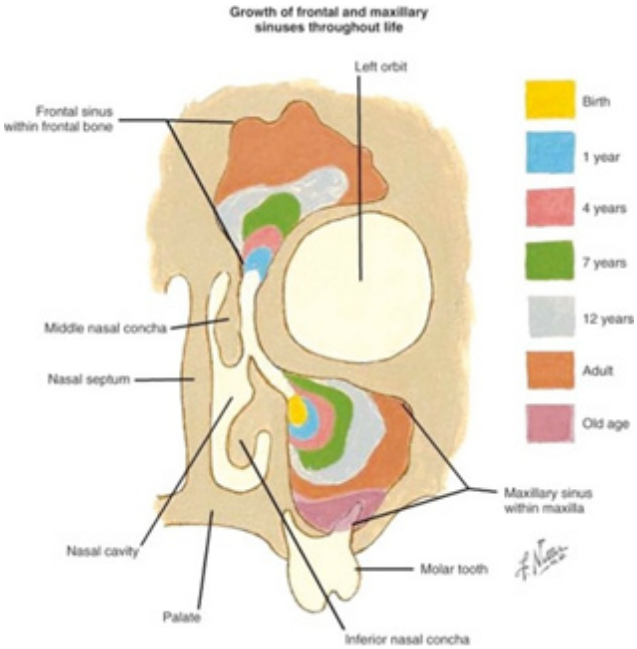


Fig. 2: Growth of maxillary sinus with age

Maxillary sinus floor is formed by thealveolar process of maxilla, sharing a close anatomic and functional relationship with posterior maxillary teeth.



Fig. 3 Maxillary sinus border

In a few cases the floor might overlap the root apices of the maxillary second premolars.[7, 8]And cases where the first molars are absent, for a longer duration of time, the sinus might occupy the alveolar process space of missing site thus invading more inferiorly, and hindering Orthodontic tooth movement (intrusion or protraction) as a result of the approximation of the maxillary sinus floor with tooth roots.[9]It is an indispensable diagnostic criterion to determine the relation of the maxillary sinus and the posterior teeth before Orthodontic treatment which involvesmesialisation of the second molar (in case the first molar is missing) or intrusion of the maxillary posteriors.[10]Proper assessment of the maxillary sinus is required to determine and treat dentofacial structures approximating or perforating the maxillary sinus. The evaluation also plays a chief role in movement of teeth those areapproximating the sinuses, placement of Temporary Anchorage Devices (TAD), and in some surgeries where the maxillary sinus contour is involved during Orthognathic surgery to prevent complications such as perforation of sinus and trauma to maxillary posterior teeth root apices.[11, 12,]

Clinical Consideration: The adult sinus has variable extensions. Its floor may extend towards the crestal bone between adjacent teeth or in the inter-radicular area of multi rooted teeth, and creates elevations (also referred as hillocks).[13]

14-28% of cases the root extensions overlapped by the sinus exhibit a cortical lining running along the root apex. The close relationship of the apex of the maxillary posteriors to the sinus, especially in second molar and first molar region, has various implications during treatment planning, such as:

1. **Extraction complication:** Displacement of root into the sinus cavity or Oro-antral fistulaeafter extraction of the first and second molars is a frequent complication. Hence the clinician must study the radiograph in detail and be cautious while handling the apical portion of the roots in close proximity to the maxillary sinus floor.
2. **Implants:** Wehrbein and Diedrich wrote about relation between the root length projection on the maxillary sinus and amount of sinus pneumatization post-extraction in panoramic radiograph and found that sinus expansion after extraction can greatly decrease the bone height available for placement of the implant.
3. **Endo antral syndrome:** Pulpallyinfected teeth near the maxillary sinus sometimes might spread into the sinus and lead to serious complications.
4. **Orthodontic:** Intrusion or bodily movements of the teeth across the sinus floor by Orthodontic tooth movement, cause greater amount of tipping and mild

to moderate apical root resorption sincesinusfloor is highly corticated.

5. **Periodontalor** periapical pathology in maxillary premolars and molars may spread beyond the boundaries of the supporting dental tissue into the maxillary sinus, which might lead to inflammation of the sinus or sinusitis.

Thus, knowing the anatomical relationship is necessary for diagnosing and planning a proper dental procedure.

Orthodontic Research Consideration: Accurate evaluation of the maxillary sinus is of utmost importance considering anatomical variations, close relation to the maxillary posteriors, and the implications that pneumatization of the maxillary sinus may possess. Supra eruption of maxillary posterior teeth, as is seen commonly in cases of missing opposing mandibular teeth, can also cause the floor of maxillary sinus to droop down leading to sinus pneumatization, in these cases requirement of intrusion with temporary anchorage devices (TADs) might be planned. Tooth movement across the sinus floor, particularly, is associated with a risk for root resorption and/or a higher degree of tipping. Orthodontic tooth movement despite the above-mentioned anatomical limitations is possible.

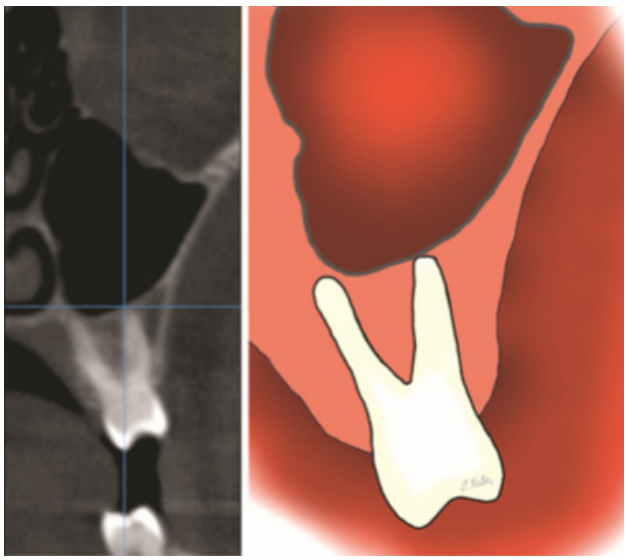


Fig. 4: Tangential view of left second molar tooth.

Movement of tooth through sinuses could be achieved in both antero- posterior and vertical directions by application of light and continuous forces.Cacciafesta et al., Re et al., Oh et al., Park et al. and Kuroda et al. found that the overall translation involves initial tipping followed by up righting.[14] MS Yao et al. said that for the intrusion of molars slight distal tipping is required.[15] Various studies have found, maxillary second and first molar in intimate relationship to sinus with the disto-buccal root of the maxillary second, being closest to the maxillary sinus followed by the mesiobuccal root of second molar. Maxillary first premolar is considered to be farthest away from the sinus followed by the second premolar. For Orthodontic tooth movement the thickness of lower border of maxillary sinus and its relationship with the posterior teeth is important. Evaluation of this relationship gives us a basis for appropriate force application during Orthodontic tooth movement. Thus, understanding anatomy and relationship or approximation to the apices of maxillary posterior teeth is of utmost importance before planning the treatment in relation to this specific area, especially the first and second molars. In cases where the maxillary posterior teeth are missing orare extracted, Orthodontists desire translation of adjacent posteriors for closing the spaces. Light-continuous force is advisable to reduce iatrogenic effects during Orthodontic treatment through the sinusfloor.

A study was conducted using Computed Tomography for measuring the average distances between the root of maxillary posterior teeth and the sinus floor. Scans from those 12 subjects, revealed that the apex of the mesiobuccal root of maxillary second molar was found to be closest to the sinus floor and farthest from the buccal bony surface whereas the apex of the buccal root of the maxillary first premolar was found to be closest to the adjacent lateral bony surface and farthest from the sinus floor. A study performed by Eberhardt et al. concluded that mean distance between the apex of the maxillary posterior teeth and the sinus floor was approximately 1.97 mm. 40% cases showed intimate relationship between the sinus floor and the root apices of the maxillary first and second molars. In 20% of cases the palatal roots are in close proximity to the sinus floor than to the palate. Before attempting Orthodontic tooth movement, the maxillary sinus floor and the posterior teeth in proximity must be studied properly and evaluated thoroughly via two-dimensional and three-dimensional radiography to ensure an improved prognosis of the finalised treatment plan.[15]

Conclusion

Maxillary sinus growth and development greatly affects the dentofacial structures. Regarding the approximation of the floor of the maxillary sinus and

the root apices,one must be careful whilecarrying out proceduresinvolving the maxillary posterior teeth. The application of light to moderate forces (by Temporary Anchorage Devices, segment and multibrackets) to for gradualmovement of the teeth through maxillary sinus in adults appears to be practical and secure. Translation of the teeth can be achieved, but the teeth tend to tip easily initially, resulting in root resorption. In a few cases, unpredicted complications such as root resorption, pulp ischemia, alveolar bone loss, and perforation of the sinus membrane were found to occur while moving the teeth through the maxillary sinus.Thus, all the above-mentioned elements should be surveyed prior to planning the treatment in patients requiring Orthodontic treatment.

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Natural Tooth Pontic: Instant Esthetic Yet Temporary Functional Solution to Solitary Missing Tooth: A Case Series

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Abstract

Loss of a tooth in the anterior esthetic region hampers patient' esthetics and function along with jeopardizing the social life. Among the available options to replace the missing tooth, utilizing the patient's own natural tooth as a pontic comes as an instant esthetic yet temporary functional solution. A case series of two cases is presented in which the natural tooth was successfully used as a pontic for the management of single missing tooth in the maxillary and mandibular arches.

Keywords: *Natural Tooth Pontic, Anterior Esthetic Region, Resin-Reinforced Fibre Splint, Single Missing Tooth.*

Introduction

Loss of a tooth in the anterior esthetic zone is quite unpleasant for the patients of all ages, both gender and having any level of education[1,2]. It severely affects their looks, speech, confidence, morale and eventually their quality of life[3]. Almost all of them desire for not losing the tooth and if inevitably so, an immediate replacement to avoid adverse impact on their social life[4].

An immediate esthetic replacement of the tooth can be of a temporary nature, semi-permanent or permanent treatment. Patients mostly opt for a secure, fixed tooth replacement. Regular options for replacement of a single missing tooth include treatment partial dentures, Marylandbridges, fixed partial denture (Metal, Ceramic or Metal-Ceramic) and dental implant. The best suited option would consider esthetics, functions and economic concerns of the patient all considered simultaneously.

Utilizing the patient's own tooth to replace the failing or missing tooth as a natural tooth pontic (NTP) gives an additional option and is beneficial in several ways such as perfectly matching shade, shape and size[5]. Additionally, it provides a positive psychological support at minimal cost and chair-side time. It also almost requires very little laboratory procedure, all that can be done in a single visit[6].

We present a case-series of two cases in which the natural tooth was successfullyused as a pontic for the management of single missing tooth in the maxillary and mandibular arches.

Case Report

Case 1: A 58-year-old male patient reported to our outpatient department with a recently exfoliated lower anterior tooth. He was concerned about his looks and wanted to get the missing tooth replaced. He was apparently alright two years back when he noticed loosening of one lower anterior incisor. The loosening increased progressively leading to exfoliation of the tooth 5 days back. On examination the mandibular right central incisor (Tooth # 31) was missing (Fig 1). The overall oral hygiene was poor with moderate stains and calculus. There was no mobility in the adjacent teeth or any other tooth. This was patient's first dental visit. His family history and medical history was non contributory. Patient revealed that he was carrying the exfoliated tooth which he had carefully stored in a bottle immersed in tap water in a hope that the same could be re-fixed.

All options for replacement of a single missing tooth were explained to the patient. However, taking

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into account of his concern for esthetics and immediate need, a treatment plan for a Natural Tooth Pontic was made. Patient was made educated and motivated for maintenance of oral hygiene. He was also explained about procedure, advantages, disadvantages and the temporary nature of the NTP. He intended to go for asingle tooth implant prosthesis after 2 months and deferred it owing to his financial constraints. A written consent was obtained before commencement of any treatment.

Full mouth supragingival and subgingival scaling was done in the same appointment.Scaling and polishing was done on the extracted tooth to remove all stains and deposits on them. The crown portion of the natural tooth was then sectioned from the root using a tapered diamond bur (Mani, Japan) at a distance from the cemento-enamel junction so that the apical end of the root was just short of the underlying mucosa and thus making a sanitary ridge-lap surface (Fig 2 (2)). The position of tooth was repeatedly checked before bonding to ensure perfect alignment in the edentulous space. The pulp chamber of the tooth was then cleaned and sealed with composite resin (Filtek™ Z350, 3M ESPE). A floss template was used to determine the length of resin-reinforced splinting strips (SPLINT –IT, Pentron Clinical Technologies, USA). The entire mesio-distal length of one adjacent tooth on either side was considered to be included in the bonding area. Abutment teeth (32 & 41) and the natural tooth pontic (31) were then etched on the lingual sided with 37% phosphoric acid (Total-Etch; IvoclarVivadent AG, Liechtenstein) for 25 seconds, thoroughly washed, and dried. Following this, a bonding agent (Adper Single Bond, 3M ESPE) was applied to the etched surface of enamel and cured for 20 seconds. A layer of flowable composite (Filtek Z350xt ™, 3M ESPE) was placed across the tooth # 41 and # 32 and the natural tooth pontic. The previously cutresin-reinforced splint was moderately wetted with the bonding agent (Adper Single Bond, 3M ESPE) and placed over the composite. The natural tooth pontic and the split werestabilized in the desired position cured. An additional layer of composite (Filtek™ Z350, 3M ESPE) was applied over the splint, carved and shaped before curing to ensureall part of the splint was covered by the composite. Allundesiredrestorative material was removed using diamond burs (Mani, Japan). Occlusal interferences in protrusion movement and lateral excursions were checked and removed. Finishing and polishing procedures was done using composite finishing kit (Super-Snap, SHOFU INC, Kyoto,Japan) (Fig 2 (3)).

The patient was happy with the final outcome of the procedure (Fig 2.(4) & Fig, 2(5)). Detailed post-operative instructions were explained to the patient. He was trained to use an interdental brush for maintenance of the natural tooth pontic area and was put on a maintenance recall schedule.

Case 2: A 41-year-old healthy male patient reported to our outpatient department with the chief complaint of mobility and extrusion of anterior teeth. He was concerned about his appearance and was apprehensive that his tooth might fall-off and wanted to get it treated. He was apparently alright one year back when he noticed loosening of one upper anterior incisor. The mobility of the tooth increased progressively with slight extrusion to reach its present state. There was no pain or swelling associated. On examination upper left central incisor (Tooth #12) was grade III mobile with extrusion(Fig 3). Patient revealed that this was his first dental visit. He was hypertensive and was on medication for the same since six months.

The tooth had a hopeless prognosis and was indicated for extraction. However, the patient needed an immediate replacement as he was concerned about his looks, thus a natural tooth pontic was planned with immediate extraction. After detailed explanation, a written consent was obtained before commencement of any treatment.

An atraumatic extraction of #12 was performed under local anesthesia (Fig4 (1)). The natural tooth was used as a pontic in a similar manner, as has been discussed above(Fig 4. (2) & Fig 2 (3)). Detailed post-operative instructions were given. Patient was happy and appreciative of the outcome (Fig 4 (4)) and intended to return for a fixed partial denture as a replacement after two months.



Figure 1. Case 1- Pre-operative view; Missing 31

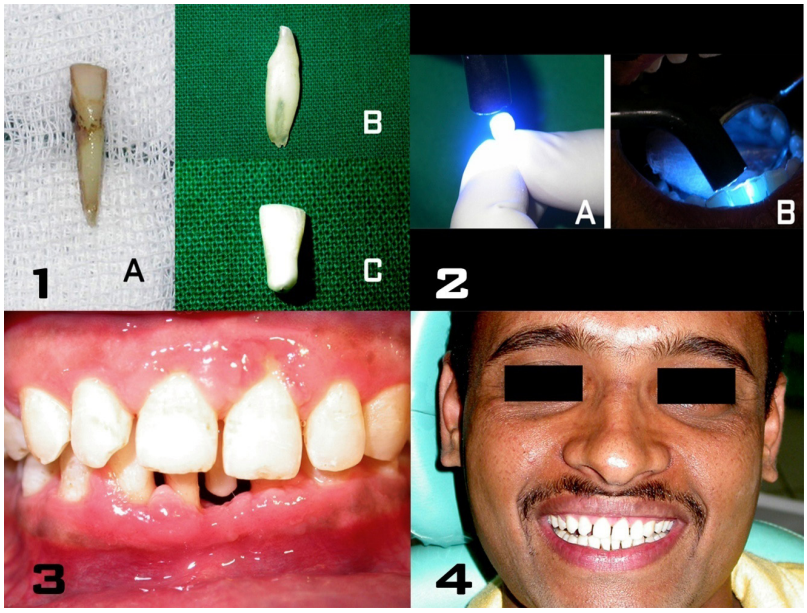


Figure 2. Case 1 (1) Processing of natural tooth (2) A. Root-end sealing B. Curing of the resin re-reinforced splint (3) Post-operative intra-oral view (4) Post-operative smiling view



Figure 3. Case 2- Pre- operative view; Mobile and extruded 21

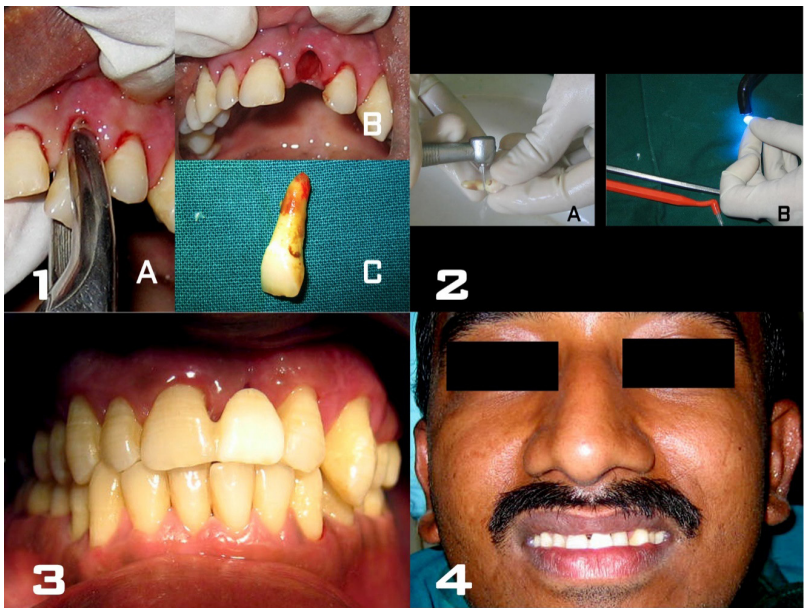


Figure 4. Case 2 (1) Extraction of 21 (2) Processing of natural teeth (3) Post-operative intra- oral view (4) Post- operative smiling view

Discussion

Patients with loss of teeth in the anterior region require an immediate attention owing to their social and psychological concerns[7]. Among the various options available for rehabilitation, utilization of patient's own tooth as a pontic offers an immediate rescue to the patient's malady.

Natural tooth pontic were designed on similar principle of a Maryland bridge, replacing the acrylic tooth with the natural one[8]. NTP is highly appreciated by patients since it can be done in the same visit. Not only does it save them embarrassment, it works as a temporary arrangement prior to a more definitive treatment.

NTP relies on adhesive dentistry for its success, with the availability of periodontally stable adjacent teeth which act as abutments. It is technique sensitive and requires a sufficient level of clinical skill to achieve satisfactory result. Several adhesive composite resins have been used to bond the natural tooth. The tooth is splinted with an additional reinforcement using wires, nylon, fibre splints, resin-reinforced etc[9].

Clinical failures often stem from the inability of these materials to be chemically incorporated in the composite resin when the loading stresses are applied to NTP. Also, low fracture strength of the composite resin may lead to de-bonding leading to unpleasant social scenarios.

We used good quality composite resin in our cases. Resin-reinforced splinting strips as used by us are quite translucent. It is pretreated with resin, adaptable and thus saves time.Strassler et al [10] however, suggested against the use of composites owing to its varying esthetics, susceptibility to wear and nidus for plaque accumulation. Chafaie et al[11] and Pankratz et al[12] reported an improved clinical performance of fibre-reinforced composite bonded prosthesis over five years.

In both the cases, a sanitary pontic was adopted which has no contact with the underlying mucosa which is beneficial in maintaining a plaque free area and allowing uneventful healing of the extraction socket. Prevention of formation of microbial plaque is essential for long term stability of periodontal health[13, 14]. Preservation of a part of root in the pontic gives an illusion of tooth emerging like a natural tooth [15, 16].

Natural tooth pontic comes along with its share of limitations such as technique sensitivity, reliance on patient's motivation for oral hygiene maintenance, irritation from tongue, minimal functional efficiency and above-all possibility of de-bonding. Notwithstanding these short-comings, successful natural tooth pontics have been reported[17-19] with Nakamura et al reporting a case treated with natural tooth pontic stable after eleven year [20].

Conclusions

Both the patients were satisfied with the outcomes of our treatment modality. This endorsesit's utility as a regular viable option wherever indicated. However, patient selection, plaque control and skill of the operator are crucial for its success.

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Halitosis-Bad Breath: Etiology, Diagnosis, Treatment

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Abstract

Bad breath is also known as Halitosis, it is the most common amongst the general population. Halitosis has been the 3rd highest reason for opting dental care, which follows tooth caries and periodontal issues. Technology and communications have witnessed enormous growth in this field recently, particularly because growing in for halitosis remedies on television ads, internet promotions and in weekly magazines. The level of guidance and misinformation on bad breath among the people, person to person, as a resultant thing. None of the human life can have complete resistance against the halitosis in their life time. Halitosis may be a sign of major or minor issues with your digestive processes, gingival diseases, allergic point of any infections, an acid system of the bod, low immune or most common cause than anything else – bad oral maintenance or contaminating bacterial growth. Unawareness of the proper maintenance and preventive measure to keep themselves hygienic for a better life in a quality manner and so as the oral health. The negative interference of bad breath needs to be taken into consideration as the relationships in today's society, as that in one of the pillars for having a quality life and proper life concept. This short review provides a comprehensive idea of the etiological factors of breath breath/ foul oral smell/halitosis, the prevalence, the diagnostic procedure and treatment aids for such conditions.

Keywords: *Oral malodor; Volatile Sulphur compounds; Breath malodor; Chlorhexidine mouthwashes.*

Introduction

Bad breath or oral malodor or halitosis is most common of us elementally have some transient unpleasant oral odor in our whole day to day life. When it becomes severe or chronic, that might cause the decrease in self-confidence and interactions socially. Halitosis have been a concern of millions of people, as it receives most of the attention in public, humorous literature than by the scientific, one of the examples phrases such as "Never settle or breathe until or before you reach the desert." The phenomenon which gets often oversimplified by the commercial industry of dental sciences, misconception in the normal society and not much understood by any scientific communities. of late,the awareness about halitosis and oral health problem is increasing enormously and need to be recognized and addressed to Dentist or dental profession,Many adults suffer from halitosis, on regular basis and causes the mind to set and may lead towards the social disagreement and personal discomfort.[1] There on, some authors estimated approx. 50 percent of the middle-aged and the elder individuals produces unaccepted social breath, upon raise in the morning they attribute from physiological causes.[2] The authorized incidence ratio is almost the same in male patients and female patients with oral halitosis or bad breath; In regard to prevalence and severity of bad breath there are no differences based on gender. However, more often women seek preventive or curative procedures than in men. Thus, this could be the sign of women are generally more concerned about the self-appearance and status of health in themselves.[3,4.] No matter whether the odorous substance emit from oral or non-oral places. 'Bad breath' is the term generally used to mentioned or indicated for any foul odour in air expired. Other names used are halitosis, fetor ex ore, bad or foul smell, breath malodour, fetor oris, and oral cavity malodour is foul or offensive odor exhaled through the person's mouth.[5] There only few patients who regularly visit dental clinics seeking for treatments, despite the reports of high prevalence in breath malodorous."Bad breath paradox", the term is given to this fact, due to the complete unawareness of this fact by people suffering from halitosis or bad odours. Whereas, few others may remain convinced by the fact that they are suffering oral malodorous, although few cases, no basic objective can be seen (pseudohalitosis or halitophobia)[6]

History: Odours play an important role in giving the evidence in creation and social bond conservation, as they are loaded high octane values for culture. This problem of bad breath has been reporting for ages and ages. Reference from the Papyrus manuscripts of date Back to 1550BC.[7] Sulphur is the devil's supreme malignant odour smelled. During Christianity, and more or less foul smell that was produced by sins. In Islamic literature a treaty in year during 850 mentioned about dentists and dental procedures for treating patients suffering from fetid breath and suggested them to use the siwak whenever the smell orally had changed or at anywhere while getting up from bed. Mouth is considered as the body's opening door, in Hindu culture and therefore need to be kept clean and mainly before offering prayers in the morning or while waking up. This practice is not only limited to brushing the teeth alone but also scraping the tongue by using an instrument specifically designed for cleaning tongues and use of mouth washes. Before the initial prayers are offered the teeth brushing and tongue scraping is practiced in Japan by Buddhist Monks.[8]

Etiological factors: Oral bad breath immediately after awakening is most common and it is not considered as the bad breath or halitosis. Chronic and persistent oral malodorous is mostly caused by oral or at times nasopharyngeal diseases. Generally, the decomposition of food and beverages or particles, body cells, blood smear and few chemical components of saliva results in Halitosis.[9] Hence almost 90 percent of causes of halitosis are seen orally in the mouth itself. The gram-negative bacteria of the oral microbes are most commonly cause the bad breath or halitosis, which includes *Prevotella melaninogenica (Bacteroides), Tannerella forsythensis (Bacteroides forsythus), Fusobacterium nucleatum nucleatum, Porphyromonas endodontalis, Enterobacteriaceae, Eikenella corrodens, Fusobacterium nucleatum vincentii, Treponema denticola, Porphyromonas gingivalis, Prevotella intermedia, Centipeda periodontii, Fusobacterium periodonticum, Bacteroides loescheii* and *Fusobacterium nucleatum polymorphum.*[10]

Primarily the volatile sulfur compounds cause the Halitosis or bad breath, particularly, hydrogen sulfide and methyl mercaptan, these are the proteins containing sulfur amino acids results in halitosis by bacterial putrefaction.[11] The products or by products mentioned would be involved in the transition from healthy gums to gingivitis followed by periodontitis or any other periodontal diseases. Local causes of bad breath are mainly the Tongue and Sulcus of the gingiva and includes remnants of odoriferous particles of food and beverages on and interdentally, between the two teeth, necrotizing ulcerative gingivitis (NUG) coated tongue, Smoker's Breath, artificial dentures,healing surgical wounds or extraction wounds, dehydration conditions and caries. Easy identifying factor of NUG is the fetid Odour as that is one of the confined characteristic features of NUG. [12,13] The increase in rate of Saliva putrefaction, accumulation of any debris in the pockets of chronic periodontitis conditions cause the unpleasant or foul odour from the mouth.

Diagnosis: Earlier the diagnosis for measuring halitosis were decided through human's judgement, by sensing the own smell and asks the patients to blow air from mouth to sense the odour of patient's saliva or breath, this procedure was followed for years and centuries. For detecting the Halitosis by which particular compound, they create a hypo additive, nonlinear bonding between the number of oral malodorous substances available.[9] As the human sensory system also have the limited places to judge and isolate the ability processing orally. By comparing the two odours (organoleptic assessment) of exhaled sir of the oral cavity and exhaled air of the nasal cavity, generally the clinical assessment of bad breath or any oral malodorous is subjective for individuals.[10] In Organoleptic measurements, based on perception of examiner on a patient's oral malodorous the subjective test score is measured. Earlier there are different quantitative and semi- quantitative scales had been used, however, at the most recently organized International Workshop on Oral Halitosis year 1999, there was a consensus for using the scaling ranges from 0 to 5, measurements of breath odours is objective in rare situations when talked about clinical practices, as it is costlier and consumes time.In case of volatile sulphur substances, a pitta le sulphide monitor can be used for measuring, but this provides an inaccurate assessment by sources and intensities of oral malodorous, as oral malodours comprises of agents other than volatile sulphur compounds.[14] Though it is not used in clinical practices or clinic works, the potential method for determining oral malodorous and its components are by Gas Chromatography of Oral Breath.Same way, there are many other assessments to determine or detect the oral breath and its components are by Detection of bacterial activities in trypsin, Benzoylargin-Naphthylamide test,dark field microscopy and Real time Polymerase

Chain Reactiondetection for causative oral microbes. As mentioned, all these falls outside the routine practice for obvious reasons.[15] Other tests are: Saliva odour test, Flossing odour test, Spoon test.

Treatment: Identifying the cause of malodour is important, before rendering any treatment. Through which the proper treatment could be given to the corresponding source can be employed.[16] Any systemic sources causing malodour, must be specially treated by the physician or appropriate specialists. Primary treatment is to bring the awareness in the patient which can be directed them to prevention to the source and lessening the bacterial accumulation orally, time to time. Proper and regular teeth cleansing, which includes teeth brushing and use of dental floss interdentally, can significantly bring down the oral halitosis, patients with poor oral health and its related gingivitis or periodontal diseases are more prone to use on regular basis. In cases where the oral health condition is already good, or improved and yet the oral halitosis persists, the tongue might be the causing factor of oral halitosis and thereby cleaning or tongue, should be followed every time after the teeth brushed. It is observed that there can be only transient reduction in oral malodour by using the chewing gum. The suggestible range of mouthwashes for treating the oral halitosis act by reducing either by the bacterial loading or by the odoriferous compounds associated to Triclosan, have direct action opposing or resisting the sulphur compounds and an antibacterial effect. Used in toothpaste, mouthwashes, fluoride applicants, it may reduce the oral halitosis or bad breath. However the action of triclosan On oral halitosis against the compounds of sulphur seems to have dependence on the solubilizing agent with which it gets delivered.[14] Chlorhexidine Gluconate gives the down fall in Bactria which produced volatile compounds of sulphur and mouthwashes or spray which can be effective at reducing oral halitosis or bad breath, for several hours to keep the oral hygiene intact and to reduce the bacterial growth than by improving oral health. Chlorhexidine/ Cetylpyridinium Chloride and zinc lactic acid can also reduce the oral halitosis, these are supplied and available in mouthwashes. The major disadvantage of chlorhexidine usage of long term is that it has an unpleasant taste, causes stains over the tooth surface, if used frequently it may give burning sensation of mucosa and tongue orally, hence the patients have high reluctance to use the chlorhexidine mouthwashes.[15, 16]

Conclusion

Social aspects and oral malodorous has the major relation which always been a source of concern among the society which, in an attempt of hiding them, usage of different components and different method to reduce the oral malodor. Oral halitosis has been an obstacle for experiencing full conjugal life every time. To have the breath smelling mint-fresh, one has to remember the routine rinsing of mouth after each meal, either with mouthwashes or normal water, habit of practicing teeth brushing followed by tongue cleaning daily, and incorporating more of digestive herbs and spices in their daily intake of food. And one should remember it's not wise to ignore bad oral smells, and shrug it off by annoying, embarrassment, or simple insignificantly. Educating about the oral health and general body health should be accomplished with views to a dynamic balance, these can be done by involving humans - physically and psychological aspects, as well as to have their social interactions, so that the individual person do not become puzzled of any sick parts in them.

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Newer Advances in Non-Surgical Periodontal Therapy: An Update

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Abstract

Periodontal disease is an inflammatory condition which involves the interaction between periodontal pathogen, acquired and environmental factors and the host. Along with the gold standard of scaling and root planning the recent technologies play a crucial role in recognizing the disease in early stage, eradicating the periodontal pathogens and causative factors which were previously inaccessible, delivering medication without systemic complications and improved home care techniques. The present review is focused on prevailing treatment modalities of periodontitis patient, chemico-mechanical approaches of treating patients and the use of home care treatment installations to reduce the needless dental visits. The review also attempts to throw lights on the current trends and future developments in some of these treatment choices.

Keywords: *Nonsurgical periodontal therapy, scaling and root planning, laser, probiotics, local drug delivery.*

Introduction

Periodontitis is a multifactorial disease that involves the association between the pathogenic microorganisms and the host which acts as a most common cause of tooth mobility and tooth loss.[1] The current etiopathogenesis suggests that the site specific pathogens accumulate in the periodontal pockets which causes interaction between the microbes and host leading to the generation of inflammatory mediators and ultimately destruction of the periodontium.[2, 3]

The overall aim of NSPT is to elicit an oral hygiene status that is compatible with the healing of periodontal tissues. The success of NSPT solely depends on compliance of the patient, daily home care and effective plaque control.[4] Formerly the treatment of periodontitis was focused mainly on eliminating the biofilm and environmental factors.[5] The current treatment modalities are giving importance to the host mediated immune responses which are responsible for periodontal destruction.

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Rationale

- To promote tissue healing and to evaluate tissue
- Arrest the progression of periodontal disease
- Induce positive change in the sub-gingival bacterial flora
- To evaluate the patient's attitude towards periodontal treatment
- Long term success of periodontal treatment depends predominantly on maintaining the results achieved with phase I therapy

Advantages: NSPT in spite of it being the mandatory phase 1 therapy is beneficial in patients with systemic conditions in which surgical periodontal treatment is contraindicated. Also, gingivitis and mild chronic periodontitis may be controlled with NSPT alone.

Laser therapy: Dental LASERS can be used as an adjunct to the scaling and root planning procedures. FDA has approved the Er: YAG laser for using it

in debridement. The application of LASER along with conventional SRP also provides a new locus for attachment of connective tissue after the removal of microbiota.[6] According to Choi et al the process of fibroblastic activity begins after 24-48 hours of the laser treatment and increases after 72 hours.[7] The fibroblastic activity alleviates in restoring the periodontium after destruction by inflammatory diseases and also improves the clinical attachment level. There is also a significant decrease in the spirochete like *Treponema denticola* and other motile rods and an increase in the number of coccoid cells.[8]

Nevertheless, mechanical debridement still functions as the gold standard for scaling and root planing procedures but the compilation of laser with SRP shows more effective decontamination of the pocket and a slow re-colonization rate of the treated site.

Perioscan scaler: It is an ultrasonic dental scaler that notifies the clinician the location of calculus optically via an acoustic signal during the treatment. The perioscan the software has the ability to detect the type of surfaces (whether it is bone, cementum or calculus) with which the ultrasonic scaler tip is making contact using a different oscillation pattern for different surfaces. The acoustic signal shows a green light when there is cleaned root surfaces and blue light when there are chunks of calculus left. Painless periodontal therapy can be achieved to a great extent by using Perioscan and lessens the chance of hypersensitivity and recession due to over instrumentation.[9]

Photodynamic therapy [PDT]: The principle of PDT is that at a certain wavelength (red light of 630-700nm) and in the composure of oxygen a photoactive substance (tricyclic dyes, tetrapyrroles) attach to the bacterial cells and highly excited oxygen molecules are created which eventually destroys the cellular structure of microorganisms. PDT is minimally invasive and has a broad spectrum of action against microbes. Study showed that photodynamic therapy along with SRP reduces the gingival inflammation.[10]

Perioprotect: They are patented customised trays which deliver medication in the deep periodontal pocket, furcation areas and other inaccessible areas of mouth. These are clear, mouth-guard like devices which allow the medication to reach below the gingival margin. The tray prevents the medication from seeping into the saliva by sitting close to the gingival margin.

The Perioprotect carry peroxide and an antioxidant to the patient mouth. A study done by Mark S. Putt in 2012,showed that the of use of 1.7% hydrogen peroxide gel delivered by Perioprotect (customized trays) after SRP in periodontitis patients results in decreasing the pocket depth.[11]

Local drug delivery systems: Local drug delivery system helps to slowly release the drug over a certain time period which helps the overall oral health and systemic status by increasing the drug concentration on the desired location and also by reducing the side effects of systemic antibiotic therapy. The list of local drug delivery systems currently available in the market.[12]

Table 1. Commercially available products for Local Drug delivery

Product	Antimicrobial agent	Dosage form	Manufacturer
Arestin	Minocycline	Biodegradable powder in syringe	Oropharma corp Warminster
Atridox	Doxycycline	Biodegradable mix in syringe	Attic labs,Ft, Collins,co.
Elyzol	Metronidazole	Biodegradable mix in syringe	Dumex corp. Co Denmark
Periochip	Chlorhexidine	Biodegradable device	Dexcel Pharma Inc. Jerusalem
Elyzol	Minocycline	Gel	Dumex pharma
Actinide	Tetracycline	Non-resorbable fibre	Alzacorp

Also, FDA has approved doxycycline hyclate carried in an absorbable polymer gel which is used after SRP to reduce the probing depth of the pocket. The drug delivery system is evolving into Micro particular and Nano particular, biodegradable technology. The Microparticular systems (size 1-1000 μm) and nanoparticle (size less ≤ 100 nm)which allows sustained release of drug, improve bioavailability and reduces any unpleasant taste of the drug. This ultimately results in a superior treatment method.[13]

Probiotics: The use of probiotics in the maintenance and improvement of periodontal health has been markedly increased over the decade. These signs of inflammation can be diminished by either decreasing the periodontal pathogens or by host modulation.

The bacteria evolve into multi resistant strains and due to the frequent use of antibiotics, the patient also

develops antibiotic resistance with time. Here comes the role of probiotics. It helps to facilitate the activity of certain bacteria which are beneficial for periodontal health and act as a selective inhibitor to harmful pathogens. They mainly act by three mechanisms.[14] Immune system modulation, production of antimicrobial substances and competitive exclusion.

The probiotic bacteria are lactobacillus and bifidobacterium, a non-pathogenic strain of *E. coli*, *clostridium butyricum, S. salivarius* etc. They can be delivered in the form of lozenges, tablets and toothpaste for example Periobalance chewing gum (containing strains of *L. reutari*) and Periobiotic toothpaste (contains *lactobacilli paracasei* strain).

Any serious complications regarding probiotics have not been cited yet but there are chances of systemic interactions. Hence probiotics must be used with caution in persons having major risk factors like immunosuppression or minor risk factors like dysfunction of barrier membrane of the intestinal epithelium, valvular diseases etc.[15]

Periodontal vaccine: Periodontal vaccine deals with specific bacterial strains which causes *periodontitis like P. gingivalis, T. denticola, T. forsythia* and *A. comitans*. The vaccinations can be achieved by active immunization (heat shock protein, hemagglutinin, synthetic peptides) passive immunization or by using DNA vaccines. With the help of gene therapy, we are gaining a future perspective in the development of the periodontal vaccine. DNA encoding of *P. gingivalis* gene produces a specific salivary IgA, IgG and serum IgG antibodies to neutralize *P. gingivalis.* The development of a multispecies vaccine that could target all four bacterial species is still in progress.

Nanotechnology: Recently nanoparticle systems have been introduced and because of their nano size so that they can reach all the inaccessible areas of the mouth. The nanoparticles were produced by the process of micellar polymerization which in turn results in a white powder like material of particle size 50-180 NM. Biocompatible nanoparticles are mostly made up of 2-hydroxyethyl methacrylate (HEMA) and polyethylene glycol dimethacrylate (PEGDMA). Triclosan and tetracycline are usually incorporated in this nanoparticle. These help in distributing the drug uniformly over a controlled period of time. Nano-diagnostics which uses nanotechnological advancements (Quantum dots, Nanoscale cantilever, Gold particles etc.) for detection of periodontal and other diseases at early stages.

This system can be easily incorporated in any other chemical plaque control devices like dentifrices, mouthwash, chewing gum etc. Henceforth the nanoparticles have the property of slow release and biodegradability and it has shown significantly good results after the scaling and root planning therapy. They are also inexpensive and easily available. Recent developments are giving us promising insight into the application of nanomaterials in periodontal diseases.

Host modulation therapy (HMT): Long term management of periodontitis requires a treatment strategy that would address both periodontal pathogen and host response. Chemotherapeutic treatment targets MMPs, cytokines and other mediators in the pathogenesis of the periodontal disease. HMT is an emerging treatment concept in the field of periodontics. Anti-proteinase, anti-inflammatory drugs and bisphosphonates are frequently used as host modulation agents. Sub antimicrobial-dose of doxycycline is used in adjunct to SRP in chronic periodontitis patients. NSAIDs are also used as they inhibit the formation of prostaglandins. Chemically modified tetracycline is used to reduce inflammation by inhibiting IL-12 and TNF alpha in chronic periodontitis patients.[16] Future HMT agents include nitric oxide synthase inhibitors, recombinant human interleukin 11 etc. Intensive periodontal therapy alongside HMT may have a profound positive effect on the overall health status of patients.

Ozone therapy: Ozone is unstable and produce nascent oxygen which results in destroying periodontal pathogens. It has an antimicrobial effect and is very effective against antibiotic resistant bacterial strains. It possesses immunostimulatory effects and stimulates the synthesis of immunoglobulins and enhances the sensitivity of microbes towards phagocytosis.[17] It has shown antihypoxic effects too as it increases the oxygen concentration in the blood which results in activation of aerobic processes like glycolysis, Krebs cycle etc. Currently, HealOzone by KaVo and Prozone by Wand H are some of the ozone producing appliances available in the market.[18] Ozone therapy is contraindicated in cases of pregnancy, severe anaemia, haemorrhage, a recent history myocardial infarction, hyperthyroidism.[19]

Home Care Techniques

Ara toothbrush: It is the first artificial intelligence toothbrush. Manufactured by Kolibre, a technological firm which specialises in dental products marketed this toothbrush in the year 2017. The brush uses Bluetooth to

connect to an app, which records and displays brushing data including frequency, duration and areas which are brushed thoroughly. It uses the property of sonic vibration for plaque removal. The weight is 70 GM's and has a two-week battery life. It is also able to see weekly emails presenting a review of brushing data and analysis over a seven days period.

Water irrigation system: An oral irrigator or water irrigating device is a dental home care product. It uses a stream of pulsating water (pulsation ranges from 1200-1400/min) to remove food debris and plaque. There is also a soft, site-specific, subgingival tip used for subgingival irrigation.

Other solutions that can be used in place of water-Chlorhexidine diluted, Povidone iodine (1:9), Stannous fluoride (1:1) solutions. It is just a point and shoot device which doesn't require high amount of dexterity. It helps patients to clean around braces, crown and bridges, implant surfaces and deep sub gingival pockets. Study cited that waterpik along with manual toothbrushes removes 29%-39% more plaque than regular waxed string floss.[20] Waterpik system is more effective in reducing bleeding and gingival inflammation than other water irritation device.[21]

Oil pulling: Oil pulling is an ancient, Indian practice which is believed to improve the oral health as well as systemic health. This involves swishing the oil inside the mouth for around 15-20 mins. The concept of oil pulling is simple – when we swish oil inside the mouth the bacteria gets dissolved in the oil. It can be done with various types of oil (coconut oil, olive oil, sesame oil) but most frequently used oil is coconut oil because of its pleasant taste. It contains fatty acids and high amounts of lauric acid, which harbour antimicrobial properties. Coconut Oil pulling has shown to reduce the amount of *Streptococcus mutans*.[22]

A study done by Kaliamoorthy et al on 60 adult patients with oil pulling for 10 minutes showed a significant decrease in the number of *S. mutans* in saliva within a span of two weeks. It is proven as an effective routine oral hygiene measure to reduce gingivitis. [23]

Conclusion

The treatment modalities in the field of non surgical periodontal therapy is radically changing and expanding horizons for a better understanding and treatment of periodontal diseases. Newer treatment method are increasing our inquisitiveness to venture deeper into the potentialities of the future of non-surgical periodontal therapy.

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Musculoskeletal Disorders in Dentists

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Abstract

Injuries or pain in the human musculoskeletal system, ligaments, muscles and nerves are called musculoskeletal disorders or MSDs. With the ever-increasing sophistication involved in treatment and the need of affluent precision in the field of dentistry, both patient expectations and simultaneously the time involved in procedures are increasing. This leads to prolonged muscle imbalances in the dental professionals due to awkward postures, repetitive motions, stresses, forceful exertions and various psychological factors also, resulting in stressed shortened muscle becoming ischemic and painful. This proliferative and infiltrative process can affect the tissue badly. Reviews and articles around the world have given us a vast spectrum of ideas about how MSDs effect dental practitioners. The objective of this study is to determine the prevalence, causes and simultaneously the prevention of Musculoskeletal disorders in dentistry.

Keywords: *Musculoskeletal disorders (MSDs), Prolonged Static Postures (PSPs), prevalence of MSDs, prevention of MSDs, Conclusion.*

Introduction

Dental profession prevents, diagnosis and treats diseases of oral cavity and related structures. Dentistry is a visually dependant occupation, where to better their visual demands, they are required and bound to work in affix posture for extended periods of time. This exposes them to many harmful factors. The awkward postures cause discomfort and disorders of the musculoskeletal systems and the peripheral nervous systems.[1]

Nearly a million people each year report taking time away from work to recover from loss of function due to overexertion in the lower back or upper extremities. Thus, making it a significant and costly workplace problem. MSDs can be defined as discomfort or chronic pain in the muscles, tendons and joints caused by repeated movements and uncomfortable body postures. Dentists come under high risk of MSDs as dentistry is one of the most demanding and stressful occupation in the world. Most dental workers provide care in a relatively small dental workplace while treating patients. During the whole treatment the dentists must stretch, reach, twist their bodies in order to reach for an equipment, dental materials or paperwork.[2]

Musculoskeletal system or MSS is composed of bones, muscles, tendons, ligaments, cartilage, nerves and blood vessels. This well organised system distributes loads and supports the body the action of skeletal muscles and joints produce obvious movements such as walking and running. In addition to movement, muscle contraction also fulfils some other important functions as joint stability and heat production. Hence this article sheds a light on what are the causes of growing number of musculoskeletal disorders in dentists and how we can prevent this by following easy yet crucial steps.[3,4]

Mechanisms of MSDs: According to WHO (2007), MSD can be defined as a disorder of the muscles, tendons, peripheral nerves not directly resulting from an instant event. These disorders are mostly created by work related environments. According to Centres for Disease control and prevention (2016), "work related musculoskeletal disorders are conditions in which the

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work environment and performance of work contribute significantly to the condition and/or the condition is made worse due to work conditions."As per international statistical classification (ICD-10), in occupational health MSDs classified as:

- Diseases caused by mechanical vibration, affecting the hands and arms
- Neuropathies: Carpal tunnel syndrome, Other lesions of median nerve, Lesion of ulnar nerve, Lesion of radial nerve
- Diseases of musculoskeletal system and connective tissue: Synovitis and tenosynovitis Oral enteropathies.[5]

Musculoskeletal pain especially back pain is often the main occupation related hazard among dentists and dental students. Many of them ignore the early signs of symptoms of MSDs which then lead to chronic back pain, muscle ischemia etc. The early symptoms are excessive pain in arms, shoulders, burning sensation in neck and arms. So only if we know the causes that lead to early symptoms; then we can easily prevent MSDs.[6] When dentists are working in the same postures for hours then it initiates pain or injury to the muscle. In some major instances it may cause an end of their career.[7]

PSPs: PSPs stands for Prolonged Static postures. When a human body undergoes PSPs again and again; then it causes muscles Ischemia/ necrosis and imbalances. Dentists always find themselves in awkward and uncomfortable positions during treating patients. This position causes stress in muscles which can become very painful. These positions exert asymmetrical focus that can cause misalignment of the spiral column. PSPs also cause hypermobile Joints. During PSPs, due to muscle contraction the joints are restricted and the production of synovial fluid is restricted which causes the hyper mobility of joints. Neck MSDs are also caused by repetition movements of neck. Low back discomfort is associated with dentists in various researches.[8]

Prevalence of MSDs in dentists: According to International Journal of Applied Dental Sciences, the prevalence of MSDs among dentists is about 49-92%. Women reports higher frequency of pain and discomfort than men. Among the body parts neck was the most affected in 26% to 83.8%. Back pain was reported in 22.2% to 91% of dentists, in which upper back is 20% to 61.8% and lower back is 34% to 69.8%.[9]

Risk factors: The work in dentistry can be characterised bysome body postures with different degrees of distortion. There are many types of factors responsible for MSDs; occupational factors, medical factors and lifestyle factors. Usually two or more factors trigger MSD. A study of the working postures of dentists found that they spent 86% of their working time with neck flexion of at least 30% and 53% of their worktime with a trunk flexion of at least 30%.[10]

Prevention: By taking some steps in our day to day dental practice, we can prevent the risk of MSDs. Among many preventive measures the notable and important measures are as follows:

- We have to focus on adequate machinery, tool designs, modification of equipment and process, correct operations and maintenance of process.
- By creating a low-stress work atmosphere, by maintaining a good routine work practice we can also prevent MSDs.
- As primary measures we need to teach dentists and undergraduates about the risk factors and proper working postures.
- Secondly, proper diagnosis of the affected dentists with early signs and symptoms of MSDs and work forward to change their working setting and work environment.
- Thirdly, we need to help the people suffering from chronic MSDs by redesigning their work station as per their convenience.

Specific stretching and exercises for neck and shoulders to improve their health of the spiral column, maintains good working postures, optimises the function of the arms and neck. There are many stress relieving techniques which decreases stress related muscular pain. They include breathing techniques, progressive relaxation, visualisations, massage and aerobics.[10] Aerobics exercise when performed 3-4 times a week for at least 20 minutes, it increases blood flow to all of the tissues in the body and improves their ability to use oxygen.[11, 12]

Conclusion

Preventing pain and discomfort caused by MSDs is going to be a bigger task than assumptions in general. It is going to need tremendous change in the dental undergraduate's curriculum to teach and educate the

dental students about proper work postures and regular exercise to counter musculoskeletal disorders. Dentistry is a highly demanding field of occupation both physically and mentally, therefore we need to take care of our body so that we can treat and work for the betterment of society.

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Early Orthodontic Treatment of Class II Malocclusion with Functional Appliances

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Abstract

The aim of this article is to figure out the studies that explain how the functional appliances affect the dentofacial structures in Class II malocclusions treated cases. Previous literature question about the proper timing &importance of initial stage orthopedic treatment. In the treatment of class II malocclusion, orthopedic appliances are effective,however such treatment have been questioned by Randomized clinical trials suggesting failure of treatment that were brought about in the initial stage of treatment reducing long-term benefits. Despite these questions modern orthodontics still revolve around the concept of growth modification.

Keywords: *Functional appliance, Growth modification, class II malocclusion.*

Introduction

"A functional appliance harnesses natural forces which it transmits to the teeth and alveolar bone in a pre-determined direction".They are fabricated to modify the patient pattern of function, the jaw relationships, and reprogram the neuromusculature, thus altering the functional matrix of the face. A famous design for treatment of skeletal class II malocclusion is early phase of functional therapy for growth modification proceeding with final fixed appliance treatment. The early phase deals with skeletal correction and the final phase with dental corrections. Occasionally early phase combines with the final phase. But ideally the final phase is simpler which primarily corrects dental malocclusion without extraction. The early phase may be associated with dental and dentoalveolar effectsalong with growth modification effects.

Numerous randomized clinical trials of initial class II treatment claim that initial treatment had fewer effects on the treatment sequel which includes skeletal modification, alignment of teeth, duration of treatment.[1] The main aim of this reviewis to focus on the early phase functional therapy in consideration with their treatment outcomes. However, obstacles are encountered while analyzing results from existing literature as successful outcomes are not steady for which it becomes problematic to correlate.

Outcomes of orthopedics appliances: Possible primary factors for the transformation of Class II malocclusion into Class I malocclusion are patient compliance, stimulatory effect on mandibular growth, restraining effect on maxillary skeletal base, mesial movement of tooth in the mandible, distal movement of tooth in the maxilla. The major goal of orthodontic treatment is to correct the esthetic appearance of the dentition and thus improving the psychology of patients.[2]

Pancherz[3] expressed that treating the patients ofclass II malocclusion with Herbst appliancefor around 6-8 months resulted in Class I dental arch relationships. Improvement was found in sagittal direction which includes molar and incisor relationships along with few skeletal and dental changes. Molar correction comprisesaugmenting the mandibular length, distalizing the maxillary molars, moving the mandibular molarsmesially. Correction of the overjet was seen due toadvancement in the length of the mandible

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with mesial movement of mandibular incisors.[4] The authors concluded that maximum improvement in the malocclusion was seen because of dentoalveolar change with minimal skeletal change that was statistically significant.[5]

According to Woodside,[6] confinement of the growth of midface, stimulation of mandibular growth beyond its normal growth potential, posterior displacement of the condylar growth, transformation of ramal form, change in the direction of the growth of mandible more towards anterior/horizontal direction, remodeling of bone tempted by neuromuscular changes, and adaptive changes in glenoid fossa to a more anterior-superior position includes the orthopedic effects of dentoalveolar and skeletal changes.

Pancherz and Hagg,[7] observed when the functional appliance treatment was advised during the period of the peak height velocity usually between 10.5 and 14 years in girls, and 12.5 and 16 years in boys there was an increased condylar growth response. Andresen and Haupl, promoted concept of activator, found that with the new closing pattern of the mandiblenewer musculoskeletal adaptation was encouraged allowing the redirection of the orofacial musculature. When themuscles try to return the mandible to its original position, a bio-mechanical force is generated by the advancement of the mandible through the appliance.[11] According to few Studies, once the mandibular genetic growth potential has reached its maximum limit or the calculated termination of craniofacial skeleton growth has occurred most of the changes result from dentoalveolar correction[8] rather than from the continuous force to the condylar cartilage due to protraction of mandible. Ruf and Pancherz[9] stated Herbst appliance treatment in adults can be used in place of orthognathic surgery and also the resultant occlusal correction from Herbst treatment was observed due to dental movements. Keeling and coworkers,[9] have mentionedmaxillary forward growth can be inhibited byactivators and headgears, but activators are mostly less efficientin comparison to headgears. Keeling et al, Wheeler TT et al,[9,10] also mentioned mandibular re-positioning can correct class II malocclusion with the help of headgears or functional appliances. Tulloch and Ghafarifound that there is a higherlimiting effect on forward growth of maxilla with the headgears and functional appliances show a higher effect on anterior positioning of mandible.[11,12]

Wheeler and coworkers[11] have reported, the achievement of early therapy is dependent on complexity of malocclusion. Kevin O'Brien did a study and concluded that early orthodontic treatment in cases of Class II Division I malocclusion with Twin-block appliance increased the patient's self confidence level with a few negative social experiences. Even though marked changes were seen in these studies, there were prominent changes in the growth pattern of individuals, irrespective of the timing of the treatment, with favorable growth also it was possible in untreated control populations.[10,11] Tulloch and coworkers in their phase 2 trials of their study cited no characteristic differences were seen in patients with early treatment and patients without early treatment, relative to anterior-posterior or vertical skeletal or dental measures, PAR scores, length of fixed appliance treatment, or need for extractions or orthognathic surgery. The advantages of early treatment were no more visible. The study suggested that one-phase treatment was more clinically effective which was started during the early permanent dentition than in two-phase treatment started during mixed dentition. Clinical trials when compared with children of various dental ages for Class II correction with headgear and Frankel appliance suggested time period for eruption of second premolars or molars have no influence, suggesting that the initial treatment timing corresponds to late childhood just close to loss of the primary maxillary second molars, so as to prevent mesial movement of the permanent molar which mayassist in correction of the distocclusion.[12]

Kevin O'Brien et al in his study concluded, complete span of treatment with Herbst and Twin block appliance is same but Phase I treatment with the Herbst appliance is faster. Patient cooperation with the Herbst appliance is better than that with the Twin-block. Also no alteration in skeletal and dental effects of treatment with both the appliances, however a marked difference was found in different sex where girls reciprocate to therapy better than boys.[14] In UK a multicenter set up found substantial reduction in the overjet during early orthodontic therapy with the Twin-block appliance in Class II malocclusion children which was primarily because of dentoalveolar correction, with a slight amount of skeletal correction. The degree of the patient's original discrepancy was linked to the end result of treatment.[15] Ashok Kumar Jena, Ritu Duggal, and Hari Prakash summarized that correction of molar relationship and reduction of overjet in class II Division malocclusion cases were effective with both bionator and twin block appliances, wherein twin block was more effective than bionator in the therapy.[16]

Elements that affect the functional appliance treatment outcome

A. The Vertical Relationship: According to a study by Charron[17] for patient with class II skeletal malocclusion upward and forward pattern of growth may be supportive in. Pancherz[18] and Tulley[19] corelated maxillary-mandibular planes angle (MMPA) to treatment outcome which showed treatment of cases with activator for class II Division I malocclusion associated with open bite was unsuccessful. They found the direction of growth was more downward than forward, which further showed worsening of the open bite rather than a reduction in the overjet.

B. The Sagittal Relationship: In previous literature[20], data related to sagittal relationship changes with functional therapy suggested changes in SNB values in cases groups as well as in control groups supporting the point that sagittal skeletal relationship can be improved automatically with normal mandibular growth in most cases and which ones will be those, it is not possible to anticipate.

C. Timing of treatment: Functional appliances should be coordinated with period of active growth. Many studies previously agreed to initiate the treatment during middle to late mixed dentition. This isfrequently seen between ages 12.5 to 16 years in boys and 10.5 to 14 years in girls. Bjork, found the efficacy of functional appliances diminished as patients got older.

D. Patient Compliance: Patient compliance is generally not confined with the orthodontist with any treatment strategy. Bishara,[21] emphasized that benefits of functional appliance are absolutelyrely on patient's cooperation. Ahlgren,[22] reported for failure of treatment one of the major reasons was poor cooperation.

Possible mechanisms for the correction:

A. Maxillary growth in the mesial and vertical direction can be retarded or redirected.

B. The anterior dislocation of the mandible from the articular fossa and growth of the mandible (including growth of condyle) act as a secondary response.

C. Medially and vertically directed maxillary dentoalveolar growth can be retarded.

D. Combination of maxillary and mandibular orthopedic effect with maxillary incisor lingual tipping and mandibular incisor labial tipping overjet correction can be done.

Constraints of functional appliances:

A. Maxillary and mandibular molar extrusion are associated with functional therapy. However, this is advantageousto overcome the deep overbite but at the same time it can increase the lower anterior facial height.Therefore, in backward rotated mandible with decreased overbite cases, functional appliances are not advisable.

B. To attain bodily and rotational tooth movements with maximum functional occlusion a final phase of fixed appliance therapy is advised as individual tooth movements are challenging with functional appliances.

C. The treatment results are completely dependent on patient cooperation.

D. In nongrowing patients' functional appliances are rarely used in sagittal correction.

Conclusions

Generally,in growing and cooperative patients the functional appliances can be used to treat Class II malocclusions successfully. However,controversy still exists regarding the use of functional appliances. The ideal types of cases for treatment with functional appliances are non-extraction Class II, Division 1 malocclusions, with proclined maxillary incisors, lingually tipped mandibular incisors, deep overbite, flat to average mandibular plane inclination, and mandibular skeletal retrusion.The outcome of functional therapy entirely dependsupon the cooperation of the patient and treatment durationat the time ofgrowth. A second stage of treatment with a fixed appliance is required for achieving complete alignment and proper interdigitation of the dentition.

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Vesiculobullous Lesions: A Comprehensive Overview

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Abstract

Vesiculobullous lesions are defined as a form of muco-cutaneous diseases in which both vescicles and bullae are evident. 'Vesiculobullous' sometimes termed as 'Immunobullous'as decreased immune system of the body causes these diseases. These are either result of range of infections, decreased immunity, drug-induced, hereditary or caused by mechanical injury. In all cases ulcerations occur due to rupture of lesions which will further make the diagnosis of lesions difficult to make. This overview will provide a knowledge about the vesiculobullous lesions along with the characteristic's features affecting the mouth, complete etiopathogenesis, site of occurrence of lesions along with their recent advances in the identification of these lesions. This will also aid in differentially diagnosing the lesions which exhibit similar sign asvesiculobullous lesions but the histopathological examination and immunofluorescence lead to the definitive diagnosis of the lesions.

Keywords: *Steven-Johnsons Syndrome, Toxic Epidermal Necrolysis, Oral Lichen Planus, Erythema Multiforme, Mucous Membrane Pemphigoid, Pemphigus Vulgaris.*

Introduction

As put forward by William Osler, "Oral mucosa acts as a mirror which reflects the general health of a patient". Oral mucosa can be defined as a specialized stratified squamous epithelium which comprises of the keratinized and the non- keratinized components. Out of which keratinized part include attached gingiva, hardpalate, vermillion border of lip (masticatory mucosa), and the non-keratinized include junctional and sulcular epithelium, lining mucosa such as lips, alveolar mucosa, floor of mouth and soft palate, GI tract and specialized mucosa such as dorsum of tongue and taste buds.[1]

Layers of oral mucosa: Subdivided into Epithelium, Lamina propria and Submucosa. Epithelium is again divided into Stratum basale, Stratum spinosum, Stratum granulosum, Stratum lucidum and Stratum corneum.[1]

Desmosomes are proteins having adhesion quality which allow solidarity of epidermis and link the intermediate filaments within cells to the plasma membrane and adjacent cells acting both as adhesive complex and as a cell surface attachment site.[2]

Desmosomal proteins, namely desmoglein-3 is at higher level than desmoglein-1because it is necessary for the manifestations of disease and detection of antibodies for the diagnosis of diseases. When there is a deregulation or any disturbance of these proteins there is manifestations of various vesiculobullous diseases. The disease shows the signs of bullae/ vesicles owing to the layer of mucosa which affected and amount of deregulation of harmful proteins.[2] These vesicles and bullae are filled with fluid which can be identified from other by size, i.e. vesicles measuring less than 0.5 -10 mm and bullae measuring greater than 1.0 mm.[3]

Lichen Planus: Prevelant mucocutaneous disorder of oral mucosa that affects the oral and genital mucous membranes,skin, nails and scalp of idiopathic etiology. Mainly affects the middle-aged women and shows definite white striations at the periphery of the lesion. Sometimes papules, plaques, erythema, blisters can also be seen.[3] Primary cause isstress or any immune change but sometimes can be associated with dental materials or may be medication induced. Different forms of lichen planus are reticular, atrophic, erosive,hypertrophic and bullous amongst which reticular form is most common and bullous form is the rarest one.[4] Occurs mainly in buccal mucosa with highest percentage followed by gingiva, tongue and soft palate with a less common

frequency.[4] Histologically lichen planus is seen as saw tooth or civette patterns of epithelium .In severe cases direct immunofluorescence can be done to exclude other diseases like pemphigus and pemphigoid.[3] Treatment of OLP includes abolition of factors which are linked with lichenoid reactions, elimination of local irritants and the effective use of therapeutic agents.[3] Nikolsky's sign is positive in patients with OLP.[5] OLP can have malignant transformation into oral squamous cell carcinomas if it is retained for longer duration than skin lesions although rare as 0.13%.[6] Specific management therapies includes corticosteroids (topical, intralesional or systemic), retinoids, cyclosporine, psoralen plus ultraviolet A light, griseofulvin, and dapsone.[7]



Figure 1. Forms of lichen planus on tongue and buccal mucosa

Pemphigus Vulgaris: "Group of autoimmune mucocutaneous blistering diseases defined histologically by blisters in skin immunologically by circulating antibodies directed against the cell surface of keratinocytes". Pemphigus imitative of greek word 'pemphix' meaning bubble/blister.[3] Different types of pemphigus include PV,Pemphigus Foliaceous, para-neoplastic pemphigus, amongst which most commonly occurring variant is PV.[3] PV is associated with antigens such(human leukocyte antigens) A10, A26, Bw28 and DR4.[4] Usually expresses between the fourth and fifth decades of life, and affects both males and females. There is production of IgG and IgM antibodies in between the cells, embattled against desmosomal cell adhesion molecules such as desmoglein 3 and (in 50% of all cases) desmoglein-1.[8] Approximately, 10% of patients have upper tract obstruction by PV and results in supraglottic laryngeal edema.[9] In classical diseases of PV, Nikolsky's sign is evident.[5] "When the tangential pressure is applied on apparently normal skin/mucosa, with the thumb or finger pad result is a shearing force that dislodges the upper layers of epidermis from the lower epidermis resulting in formation of blisters", a phenomenon is known as Nikolsky's sign. Acantholysis is distinctive histological feature in which there is cell to cell contact loss in epithelial cell layers. There is fluid collection in between cells,dissolution of intercellular bridges along with increase in width of intercellular spaces leading to separation between cells and formation of blisters just above the basal layer there by leading to formation of suprabasilar split and resultant tombstone pattern of cells.[3] Tzanck cells are representative of pemphigus consisting of freely suspended, circular acantholytic epithelial cells within the vesicle. Discrete pattern of IgG2 & C3, are observed within the intercellular spaces of the epithelium by using direct immunofluorescence.[4] Moderate to high potency topical corticosteroids is suggested for non-progressing oral lesions, for e.g fluocinolone acetonide 0.05%, clobesatol propionate 0.05% applied 2-3 times daily. At a dose of 1-3 mg/kg/day, corticosteroids are the drug of choice in severe oral and skin lesions.[8]



Figure 2. Pemphigus showing positive Nikolsky's sign

Erythema Multiforme: Can be defined as a hypersensitivity reaction with either both skin or any other mucosal (stratum corneum) involvement. According to the amount of involvement of mucosa and the nature and pattern of distribution in skin it can be classified into major and minor types.[3] EM can have many contributing factors, amongst which the best documented is the infections and medications. Other factors are malignancy,vaccination, autoimmune disease and radiotherapy. Infections mainly the HSV 1 & 2, Tuberculosis, histoplasmosis etc. Drugs precipitating EM are Barbiturates, Sulfonamides, Carbamazepine, Antibiotics (fluoroquinolones).[3]

Described as a self-limited eruption that commonly carry mild or no prodromal symptoms. At the site of the eruption of lesion the person might feel burning and itching sensation. Primarily discrete lesions beginas a number of sharply delineated red or pink macules. Gradually Papules enlarges into plaques which are several centimeters in diameter.[10] Papules become darker red in the center which are defined as characteristic "target" or "iris" lesions. Cutaneous lesions in this case appear symmetrically on the distal part of extremities (Palmer &

Plantar surfaces) and progress proximally.[10] Treatment involves identifying the etiological factors as soon as possible. For symptomatic relief oral antihistamines and topical application of steroids are necessary.[10]

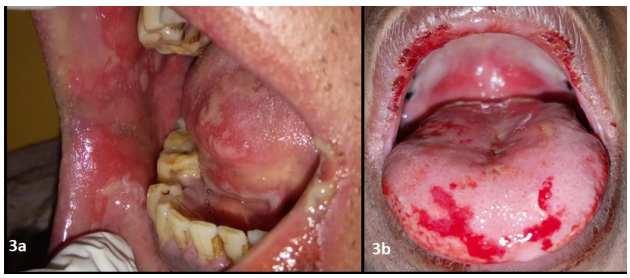


Figure 3. Erythema Multiforme

Steven Johnsons Syndrome & Toxic Epidermal Necrolysis: Stevens-Johnson syndrome is a "severe, episodic mucocutaneous intolerance reaction put forward by Hebra in 1866 and 'Albert Mason Stevens and Frank Chambliss Johnson in 1922".[15] Severe adverse drug reactions in which skin and mucous membranes are primarily affected are SJS and TEN.[3] SJS is said to occur when less than 10% of body surface area is involved.[16] TEN described as widely spread necrosed epidermis mostly caused due to drugs and their metabolites in which greater than 30% of body surface area involved.[17] Primary lesions in TEN can be seen as purpuric macules on the face and upper limbs as the disease gradually progresses into vesicles or fluid blisters these macules gradually increase in size and coalesce. In case of TEN is that airways are compromised due to disruption of mucosal surfaces[17] Suddenly during the prodromalphase, the mucocutaneous lesions tends to develop, and these new lesions continue to erupt for about 4 weeks after which they again re-epithelialize.

TEN/SJS are caused due to the following: "Allopurinol, Trimethoprim-sulfamethoxazole and other sulfonamide-antibiotics, aminopenicillins, cephalosporins, quinolones, carbamazepine, phenytoin, phenobarbital" etc.[3] As SJS and TEN are both life –threatening diseases, treatment of which includes systemic corticosteroids, intravenous immunoglobulin, cyclosporine, TNF-alpha antagonists, G-CSF which can prolong the lifespan of the patient.[17,16]

Mucous Membrane Pemphigoid: Also known as cicatricial pemphigoid, benign MMP. Chronic blistering diseases which less commonly affects skin but more commonly affects oral and ocular counterpart.[2] Laminin 5 and BP 180 are the basement membrane proteins responsible for the autoimmunereaction.[2] Characteristic of MMP is deposition of immunoglobulins and complement components along the basement zone.

Inside the oral cavity MMP can be seen in 2 forms: Bullous lesions are most common form occurring in the conjunctiva,nose, larynx, pharynx, esophagus, genitals and anus in which there is ulceration involving mostly the non-keratinized and less commonly the keratinized mucosa. Without scarring lesions befalling in the oral cavity usually heal, but ocular lesions are suggested for an ophthalmological consultation. In least cases nasal and genital involvement occurs. Nasal involvement seen as bleeding or crusting whereas genital involvement as painful ulcerations and erosions. Hoarseness of voice and dysphagia may be seen.[2] The second variant is desquamative gingivitis and involves only gingiva encircling the tooth which are highly erythematous and hyperemic.[2] In histopathogicalslide, subepithelial bullae along with absence of acantholytic cells are found. Immunofluorescence and biopsy are two positive method for diagnosis of disease.[2]

Initially topical corticosteroids are adequate for controlling of oral lesions. If lesions extend toextraoral sites,systemic corticosteroids are needed. Lesions occurring in extraoral regions are in the sequence following oral mucosa are the conjunctiva, skin, larynx.[12] Sometimes immunosuppressants such as dapsone,azathioprine may be used to reduce the toxic effects of systemic corticosteroids.(2)

Herpes simplex: Commonly manifests in young children as oral vescicles by either direct contact or contact with affected saliva. The lesions took almost 1-week time to occur after exposure and frequently identified in junctional epithelium in the corner of mouth followed by gingiva,tongue and hard palate.[11] Herpes infections are common vesicles like outbreaks of the skin and mucosa. Systemic or primary are the 2 common forms in which they manifest.[3]

Approximately 30% of young adults experience recurrent herpes infections due to the predisposing factors like sunlight,mechanical trauma, traumatic dental treatment (contact with chemical composition of materialused) which are followed by symptoms of pain, paresthesia, burning or tingling sensation.[11] The prevention of recurrence is treated by acyclovir. For treating acyclovir-resistant herpes simplex virusin immunosuppressed individual foscarnet is the drug of choice.[11]

Varicella-Zoster Virus: Chickenpox is the primary disease that results from Varicella ZosterVirus is usuallya mild disease of childhood, developing mainly on the face and trunk and less commonly intraorally as small vesicles,which appear initially clear and later on white as neutrophils try to accumulate.[11] Spreads by droplets of respiratory secretion.[11] Throughout the disease the Varicella-Zostervirus may headway along sensory nerves to reach dorsal sensory ganglia, where it can stay in dormant, unnoticeable position.[3] Details along the course of facial nerve,skin lesions appear as vescicles that become pustules which later on ulcerates further healing with a scar. Lesions are painful and results in itchiness and dryness of skin, eyes and odontalgia.

Investigations include viral culture, cytology and biopsy. Acyclovir is the drug of choice,800 mg orally five times daily for 7 days or 500 mg orally famciclovir, three times daily for 7 days. Post herpetic neuralgia is the ultimate suffering of the disease which lasts for several weeks to months to resolve.[11]

Paraneoplastic Pemphigus: Called as neoplasia induced by pemphigus[3]. Type of vesiculobullous disease described in 1990, with a distinctive profile of autoantibodies. Stomatitis that involving the vermilion border, lichenoid or bullous dermatosis along with ocular involvement develops.[11] Most prominent cutaneouslesions in skin are seen in upper chest andback. The mucocutaneous lesions shows similar characteristics with OLP, bullous pemphigoid, or EM in which Nikolsky's sign along with target lesions may occur. [11]

Hand Foot and Mouth Disease: Type A 16, Type A 5, type A 9 are most commonly involved enterovirus as the causative agent for HFM disease.[3] Children are mainly affected having an incubation period of 1 week before manifesting. Feco-oral contact and respiratory droplets are the two ways for transmission of disease.[3] Patient exhibits with prodromal symptoms of mild fever, sore throat, malaise along with multiple erythematous macules in oral cavity which progresses to form 1-3 mm vescicles.[13] Skin lesions appears late than mucosal lesions. Painful oral lesions are most commonly present on tongue, hard palate,buccal mucosa. Lesion can be diagnosed on the basis of past medical history, through examination of lesion, viral culture of lesion, detection of circulating antibodies.[11] Polymerase chain reaction is considered as the gold standard for enterovirus infection.[3] Treatment is supportive, no specific antiviral therapy is needed.[3]

Linear IgA Disease: Described by Bowen in 1901.[4] Mucous membranes, including gingivais generally affected by longstanding autoimmune disease of the skin.[11] In diseases occurring in adults and children such as linear IgA disease, cicatricial pemphigoid, presence of Ig Adeposition is seen at the basement membrane with the help of direct immunofluorescence.[4]

Infiltration of PMNL is manifested in adults which appear as a subepithelialbullae smaller in size. Lesions in oral and conjunctiva are more common. Lesions in nasal and genital areas are less common.[4] Pattern of distribution of lesion is termed as "cluster of jewels" as the peripheral old lesions are surrounded by tense vesicles.[14] Desquamative gingivitis is the only clinical symptom visible orally.[4]

Epidermolysis Bullosa: Group of hereditary diseases spread as dominant or recessive traits, and defined as presence of bullae mainly at places of trauma. Different forms include simplex, junctional, and dystrophic.[11] Epidermolysis acquisita, can be defined as the form which is non-hereditary autoimmune form generally precipitated by drugs.[3] When skin fragility decreases due to minor mechanical trauma which is further followed by formation of blisters and erosions and in some cases leading to formation of milia (small papules resembling cysts), and scar formation, then it is described as hallmark for EB.[18]

Prime aim is at cure of cutaneous lesions with various ointments which increases epithelization. Surgerymay be needed to treat difficultesophageal strictures and care should be taken about the protein and calorie intake of patient which should be double as that of normal individual.[18]

Measles: Measles also called as rubeola is a viral infection caused by paramyxovirus. Individuals are affected 2 days prior to the development of symptoms.[11] Patient usually have prodromal symptoms like fever, malaise, coryza, cough, conjunctivitis after an incubation period of 10-12 days. Exanthematous rash occurs in the body at first involving the face which lasts for 4-7 days. Clinical features includemaculopapular rashes on trunk, keratoconjunctivitis in both eyes followed by cervical and submandibular lymphadenopathy.[19] Disease typically affects the children and present intraorally as definite spots called as "koplik spots" which are white vesicles on buccal mucosa.[11] Inflamed marginal gingiva along with microabcess formation and pericoronitisare present in some cases.[19]

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Artificial Intelligence: A Cognitive Advancement towards Future Dentistry

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Abstract

With technological hindrances decreasing and research turning to development, we are on the threshold of a range of Deep-Learning enabled smart tools for dentistry called Artificial Intelligence. Artificial Intelligence is machine intelligence demonstrated in contrary to the intelligence of humans/animals. Starting from smart teeth scan while brushing, to smart scheduling, to smart patient communication, it can be used in data computation, as well as cloud computing through which an algorithm can be created which will help in diagnosis and will provide probable treatment options. It will have the major role in every branch of dentistry. Therefore, getting an in-depth knowledge of the various concepts, techniques and technologies involved will help with having a clear advantage in the future when it is time to adapt to the change with redefined roles for a rewarding practice.

Keywords: *Artificial intelligence, deep neural network, smart systems, adaptive learning dentistry.*

Introduction

What is smart? It is the presentation of quick-witted intelligence. At present, every part and field of the world is striving to become smart. We are trying to develop technologies that will decrease the manpower required to carry out day to day work and dentistry is one amongst them. Imagine a day when we would switch on our smart toothbrush and the minute, we put it inside our mouth it would scan the entire oral cavity, detect caries or fractured tooth or stains, measure halitosis, detect a mucosal lesion,analyses it and uploads onto a cloud server. This information can then be communicated to the dentist and an appointment can be automatically texted to our cell phones. This is one of the several examples of how artificial intelligence can get participate in the oral health care.

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What is Artificial Intelligence?: Artificial Intelligence (AI), also known as Computational Intelligence or Machine Learning is a system's ability to correctly interpret external data, to learn from such data, and to use those learning to achieve specific goals and tasks through flexible adaptation[1]. John McCarthy, Alan Turing, Marvin Minsky, Allen Newell, and Herbert A. Simon are regarded as the founders of Artificial Intelligence. The term Artificial Intelligence was coined by McCarthy in 1955 [2].

Artificial Intelligence technologies have increased manifold in areas like expert systems, game development, theorem-proving, natural language interpretation, recognition of images and robotics in various fields like tele-communication and aerospace. The metamorphosis of technology to AI has begun in medical and dental field in the last decade[3].

Deep Neural Network: AI uses Deep Neural Network which are a complex web of interconnected computer processors influenced from human brain neural

nodes[4]. Deep learning has emerged simultaneously with the digital era, bringing an enormous quantity of data from every region of the world. However, this enormous data is unarranged and it could take decades for humans to contain it together and unravel required information from it. This data is collected from sources like social media, internet search engines, e-commerce platforms, and online cinemas, among others which can be easily acquired, analysed and shared through cloud computing. This network uses deep learning and has the ability to learn and evolve by repeated adjustments known as Back propagation Learning and from newer information[5]. It also works by projecting into Augmented Reality and Virtual Reality.

Augmented Reality (AR): It is a mechanism that augments a computer-generated virtual image on a real image for the patient to refer and have an idea about the prosthesis or restoration[6]. The patient can perform required customization before he/she actually tries it.A company named KAPANU has developed software, implementing AR in dentistry[7].

Virtual Reality (VR): It is a computer spawned mimicking of an existent surrounding or situation by using artificial intelligence[8]. It creates a real-life experience for the audience.

Significance of Artificial Intelligence in Dentistry: Presently, AI is mostly used as a Virtual Assistant with a Voice Controlled Software. In future it may perform numerous tasks more meticulously, effortlessly and with least errors, which may include: Working for 24hrs at a stretch without a break; Faster in work than human counterpart; Unbiased because they depend on the data provided and are not emotional[3]

It may be beneficial in:

- Booking, Scheduling and coordinating regular dental appointments according to the convenience of the patient as well as the dentist.
- Alerting the patients and dentists about detecting any genetic or lifestyle change in the patient and alerting them e.g. Periodontal tissue scan for diabetic patients and oral cancer screening for those who have the habit of smoking and/or tobacco chewing.
- Devising a virtual database of patients with detailed particulars and past medical as well as dental histories.
- Aiding in the differential diagnosis and treatment planning
- Regularly reminding and counselling patients with smoking or tobacco chewing habits etc.
- Rendering tele-assistance in cases of dental crisis, eliminating the immediate requirement of a dental professional on that spot.

Recent Dental Applications of Artificial Intelligence

Dental Education: AI uses augmentedreality andvirtual reality to simulate a clinical dental situation on which trainees can practice. Also, there can be an amalgamation of artificial intelligence in computer tutoring systems like in the Unified Medical Language System (UMLS)[9, 10].There is a huge improvement in student's quality of work due to feedback that the pre-clinical virtual patient/phantoms provides the students, without requiring intervention from a human teacher allowing students to be self- competent developing skill at a faster rate than with the traditional simulator units[3, 11].

DEXvoice: Hands Free Software. Itis a modified version of DEXIS imaging software[12] allowing dentists to use Amazon Alexa enabled voice activation to their dental workflow. The dentist uses its voice while operating to capture, show, compare, take and display images. No degloving, no typing, no touching is required; dentist simply speaks -Alexa, ask My Helper to show the OPG of the patient, suddenly the images of OPG appe**Digital Impressions**[13, 14]: It uses a laser optical focal scanning by voice commands to replicate each surface in different angulations projecting a 3-D image which is then sent to a dental lab. This provides an accurate fitting restoration unlike conventional impressions, decreasing chair side time as well as patient gag and discomfort. The virtual image produced can be accessed as and when needed.

Smart Toothbrush: Recent advancements in toothbrushes include Bluetooth enabled toothbrush that collect data about the individual's brushing habits, the brushing technique used, duration of brushing, areas covered etc[15, 16]. It is then connected to an app aiding in self-assessment. It can store history to keep a track on the oral hygiene routines. Examples are Ara Toothbrush by Kolibree and Oral-B Smart Series Electric Toothbrush White 6000[17].

Dental Robots: A Miami based company, Neocis, declared a FDA cleared implant robot assistant named

Yomi[18]. It relies on CT scan to analyse the bone thickness, width height, orientation of the implant plans the treatment procedure. It helps by guiding the dentist to where the implant should be placed and if the dentist goes wrong, he/she can feel the resistance[19]. It is therefore minimally invasive and can be used as an alternative to surgical guides minimizing the obstruction of operating field. A team of engineers, dentists, and biologists from the University of Pennsylvania have developed miniature robots that can work surfaces and may destroy biofilms.[20]

Dx Vision: A new innovation by Dentem, under construction, that would soon analyzeproblems within images detecting dental caries, suggesting treatment plans, and even prevents the dormant problems from occurring.

Dental Tele Assistance: Tele assistance is a persistent field in this 4G era employed by video conferencing to obscure areas where the dentist cannot be available immediately and nurses, pharmacists etc will deliver the emergency treatment[21]. Incorporation of AI with tele dentistry will help with quality diagnosis, suggesting treatments, can help elderly/handicapped who cannot visit the dentists[22]. For example, a periodontist can make use of a teleprobe that can be connected to the computer, to assess the pocket depths while videoconferencing. It may act as an antidote to physician burnout[23].

Nanorobots: Tiny robots can be impregnated into human body and will work in cellular/molecular level. It can be utilised for precise local drug delivery. A colloidal suspension of analgesic infused petite robots can be used to produce anaesthesia. It can recognise bacteria, viruses and DNA helping with the diagnosis of oral cancer and diabetes mellitus, can be programmed to penetrate neoplastic lesions, spot mutated cells and demolish them, can seal tooth with exposed dentinal tubes with desensitizing agents[24].

Smart Dental Chairs: In future the AI machines will have their own voice to communicate; present example is Alexa, Siri. The moment a patient sits, the AI transformed dental chair will scan and be able analyse data, genetic information, body functions and will provide the best treatment options.

Bio printing: Using machine learning 3D printer's technology can be advanced to a level where it can generate living tissues to assist in the surgical procedures in healthcare. For this to be successful the exact algorithm has to be found out. Here machine uses cells as ink, which are stacked, as layers between soft polymers like the hydrogels, till the tissue is constructed. Biomaterials used includes collagen, alginate, human adipose stem cells, hyaluronic acid etc[25]. Bio printing has advanced bone tissue engineering and can be used as a scaffold in periodontal regenerative procedure[26, 27]. Along with this it can be used in Root Canal Procedures to regenerate the neurovascular plexus of the pulp rather than removing the pulp.

Image Guided Implant navigation systems: GI system, Image Navigation Ltd., USA is an Imaging Automation based navigation technology. Here the operator performs implant surgery in 4-5 models to create a Learning Curve according to the surgical site. This articulates surgical gizmos of dental implants with computer generated pictures as well as assimilates optical tracking devices, which spots the required markers for implant placement, with pre procedural planning software. With the guidance of this augmented reality technology, the user drills into the target position as navigated by the pre surgical planning software. This promotes meticulous implant placement and impedes damage to the vital structures present in and around the implant placement area [28].

Limitations[29]

AI too has certain limitations:

- Data utilization: It is one of the major limitations. Companies assume that they haven't acquired enough data for deep machine learning as the required data is enormous. Secondly to be imparted in different government and private organizations, the data should have the right parameters.
- Cultural Limitation: People are resistant to innovations and change. They do not like to give up control. For example, patients trust doctors to do the treatments but if doctors are replaced by robots(non-living), the anxiety of the patient is obvious.
- Data bias: Since information to AI is through data, take into instance if the data is biased and is uncovered, AI will execute the same.
- Expensive: Research and development for AI devices needs lot of funding and currently the newer technology is expensive making it beyond the affordability of all health care units.

Conclusions and Future Directions: There is nothing much artificial in this super advanced machine intelligence. It is made by the humans for the amelioration of the human society and is absolutely humanly. AI is a continuously advancing process, creating sophisticated technologies. In the future decades we will find that these machines will perceive, learn, think and improvise through the method of cognition doing the works of a human in better ways. But at the same time, we do not want these deep learning machines should superimpose humans, and hence, it has to follow some ethical laws given by Isaac Asimov in 1950[30].

Artificial intelligence would be the ultimate version of Google. The ultimate search engine that would understand everything on the web. It would understand exactly what you wanted, and it would give you the right thing. We're nowhere near doing that now. However, we can get incrementally closer to that, and that is basically what we work on.

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Impact of Sports Drink on Oral Health

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Abstract

Due to change in lifestyle, sports drink has grown rapidly in few years. Energy drinks intensify physical stamina, stimulate metabolism, prevent exsiccation and exchange electrolytes during activity attempts. In spite of its vogue, these energy drinks have a low pH and are acidulous in nature,it can cause erosion of dentin and enamel surfaces, lead to permanent loss of tooth bulk and rise in sensitivity of dentin. In addition to this all kind of sports drinks also cause massive destruction of tooth structure as well as restorative materials used. These energy drinks restrain unnatural colours which is likely to cause discoloration composite materials and glass ionomer cements. Acidic nature of the energy drinks could lead to a deprivation, increase in wear and roughen the surface of restorative materials. Many unfavourable outcomes of sport and energy drinks can be related due to consumption among age below 18. They should be guided to have a control diet, and consumption less amount of soft and energy drinks, keep away from negative oral health end results. Over-consumption of soft drinks which contains sweetener and have the lowest pH are probable source of preventable oral health issues.

Keywords: *Soft drink, Energy drink, Oral health, Dental caries, Dental erosion.*

Introduction

Oral health is an essential part of our general health: Preventiveness of oral diseases is bare necessity in case of health and well-being of athletes. In 2012 London Summer Olympic sports compose 30% cases were of dental consultation of all medical visits (second only to musculoskeletal),[1] highlighting the overburden of oral healthcare facilities during large-scale competitions. Trend is bigger in different sports facilities in recent years. Considering age of the participants, oral health was a real concern. Amongst which dental caries, periodontal disease, dental erosion, pericoronitis and impacted third molars were most widely complaint detected. 15–75% of athletes were affected by dental caries,15% were affected by moderate-to-severe periodontitis, 36-85% affected by dental erosion, 5-39% were affected with pericoronitis and dental trauma was conveyed in 14-57% of athletes at-risk.

The negative oral health pattern seen after trauma in 33-66% and deferred quality of life in cases of 28-40% of athletes and 5-18% face difficulty in performance. A very few proportions of athletes show positive effect on their well-being, achievements those who regularly attend dental care services, others show absence of sensitivity.

Athletes do have compromised oral health: Oral health is one of the determining factors to lead a quality life. Effects of oral health, would be astonishing if physical activity is not pretentious in athletes with compromised oral health. Pain of oral diseases arise due to animpact on performance,[2] which increased systemic inflammation[3] and weekend conviction and socialisation.

Nutrition and oral health: Physical activity and performance are rein-force by carbohydrate-containing energy drinks and gels,[4] are taken routinely through activities.[6] consuming carbohydrate containing beverages or food lead to dental caries.[5] Acidic food and soft drinks causative factor for dental erosion.[2]

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pro-inflammatory effects of a high carbohydrate consumption might also have possibility risk for disease of periodontium.[7]

Sugar supplements consumption: During exercise to maintain energy, workout supplements, soft or energy Drinks, and carbohydrate gels are frequently used by athletes. Sugar present in beverages stick to the tooth surface rather than saliva and elevate acid production for the oral microbes. Thus, it may advance risk for decay.

Acidic concentration: Energy drinks and workout supplements contain citric acid and malic acid with a pH between 2.4-4.5,Where the enamel of teeth is weak and cracked down by acids of pH lower than 5.5.

Dehydration due to low salivary production: Drying of the mouth in case of dehydration during sports action by dropping salivary flow amount thus decrease the defensive mechanism of saliva might intensify the effect of carbohydrates on caries and acidic drinks on erosion.[8] Antimicrobial action protect against periodontal diseases and re-mineralising effects of saliva.[9]

Promoting oral healthandpreventing of oral diseases while mitigating of risk: Steps those have influence on oral health and diseases use of fluoride containing toothpastes or mouth-rinses, other topical fluoride ingredients, behavioural change related to diet and oral hygiene maintenance and dental plaque removal. If recurrence, identification of pericoronitis and extraction of third molars is necessary. To avoid risk of trauma athletes should use mouthguards during sports. Modification of energy drink have been reported.[10] Even so, modification of sports drink has been created over time to increase the power boost by increasing sugar and caffeine content, these are known as energy drinks.

Table 1. Types of prevention and risk intervention for various following conditions:

Condition	Interference
All situations	Health promotion, education and behavioural change: Multilevel approach including individual athlete, medical, dental and performance team and national and international level sport organisations.
Carious tooth	Dietary habit: If reasonable, carbohydrate consumption decreases in quantity. Re-mineralizing agent: Xylitol is related with a remarkable reduction in caries occurrence and increased tooth remineralization. Fluoride: No less than 1400 ppm fluoride present in toothpaste or preferably 5000 ppm.
Periodontal effects	Oral hygiene: Efficacious elimination of dental plaque by brushing and cleansing interdental area assessed by early detection and treatment. Lessening risk factor: By ceasing use of tobacco.
Tooth erosion	Dietary habit: Abbreviate rate of consuming acidic food or beverage. Re-mineralizing agent: CPP-ACP has aptness to withstand action of acids in case of erosion. Energy drinks: Where reasonable, alleviate rate, evading extended retention in oral cavity, use of straw to drink.
Pericoronitis	Oral health status: Cautious elimination of plaque around impacted third molar. After twice pericoronitis occurs, extraction of impacted third molar is needed.

Impact of sports and energy drinks on discoloration of restorative materials: Resin material causes internal discoloration. It is probable to consume water-soluble stain like soft drinks[11]. Composites staining occurs due to habit of tobacco chewing, drinking alcohol and also using of different food dyes[12]. Higher possibility of staining in tooth because of energy drinks. Hydrophilic properties of glass ionomers may cause water sorption. Ceramics having higher predisposition to stain than composites due to hydrophobic nature.

Hypersensitivity of tooth: Balancing acidic and alkaline drinks in equal quantity can help neutralize the acidity of these drinks and it can help to keep teeth healthy, example, use of desensitizing tooth paste. These tooth-paste may include an ingredient called stannous fluoride, later it is for protecting teeth against awful sensitivity. Use of a softer tooth-brush, extra-silky and gentle floss to preserve teeth and gums strong. Drinking much higher acidic drink able to damage the tooth enamel and weaken your gum line, which expose the inner layer of teeth, it will cause painful tooth sensitivity. Particularly when you drink something very cold, symptoms of sharp pain arise in the sensitive teeth.

Summary

Oral health has consistently compromise in athletes with needful treatment. Main oral health issues affecting athletes are caries, periodontal diseases, erosion. Dental trauma in 'at-risk' games is also acknowledge. In the short-term consequences, compromised oral health can lead to discomfort and anguish, problems during eating and sleeping period, compressed value of life and outcome in activities. The long-term consequences higher risk of tooth loss, improved necessity for treatment and ensuing functional and psychological damages. These problems convey dietary habits from recurrent carbohydrate consumption and soft drinks, enhancement of host responses due to desiccation, dryness of oral cavity, rigorous training, oral health instruction and absence of adequate health raise or precautionary backing.

Differentways to promote oral health:

- Use of re-mineralizing materials can reinforce and preserve the surface of tooth. stuffs like mouth rinse, lozenges, sugarless gum, and other specific dental stuffs are useful for healthy tooth.
- Having milk, yogurt, and cheese which contains calcium and phosphate can benefit in re-mineralization of the tooth area.
- Softdrinks and lollies should be avoided. Drinking water can be used to allocate acceptable hydration. Having carbohydrate containing foods like bananas and whole grains.
- Visit dentist about pre-emptive care for oral health and invent a healthy diet schedule for exercises.
- Select to consume acidic or sugary brews then drink out of a straw, it is better to be less interaction with oral cavity.
- Take concentrating acidic and soppy drinks with water to lessen side effects.
- Right after consuming soft drink don't brush your teeth immediately. It will take about to 30 to 45 minutes of salivary interaction to initiate reparation of the teeth.
- Soppy or energy drinks should be avoided earlier to sleep.
- Before you consume any kind of drinks read the ingredient labels. If you already have teeth problems, avoid high amounts of acid and sugar.

Conclusion

Compromised oral health has an impact on performance of athletes. Aim to hike attention of the issue of oral health in sports and recommended approaches for avoidance and health advancement for best performance. Dentists should give instruction to the patients on their intake of food and drinks which can cause harmful effects to oral cavity. Drinks that are probably harm tooth and restorative materials are sports and energy drinks which comprise of sugar to feed oral microbes, and drinks having a low pH that can cause erosion of tooth and rise in sensitivity. Agonize poor oral health because of ingesting soft and power drinks should be conscious about the probable sources of oral health issues. Sports starts from school life from very young age. PT teachers should guide children to improve their oral health. So awareness about sports drinks is necessary.

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Influence of Tobacco Marketing in Adolescents

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Abstract

Vulnerable adolescents are captivated by the sale-oriented advertisements into tobacco consumption. Prone to mislead and misguide they are under the deceptive marketing strategies and advertisements made by the tobacco industry. This has been reviewed for prevention of tobacco use and its eradication from the society. Electronic database was searched for the aforementioned literature using Medline, PubMed, EBSCO, Google Scholar. The aim of the study is to analyze the effects of deceptive marketing and advertisements on adolescents. Out of the 19 articles searched, 10 fulfilled the criteria and were included for research and review. In spite of the claim made by tobacco industry, the study shows it targets non-smoking youths especially teens. Proper check on deceptive indirect advertising should be taken into consideration. Banning of billboard, outlet advertisements of tobacco. Sponsorships by tobacco industry must be limited. Counter advertisements would prove to be beneficiary for the cause. Enforcement of presiding laws and policies checking on the liberty of tobacco industry is required.

Keywords: *Adolescents; Electronic Database; Tobacco Industry; Marketing; Laws & Policies.*

Introduction

Adolescent tobacco use is the most prominent cause of death and is a serious health concern. Use of tobacco is increasing day by day especially in adults & teenagers. Millions of lives are burnt in tobacco. If we see the context or tobacco use there are various such reasons why a person or an individual start using tobacco and gets addicted. Two basic types of tobacco are smoke tobacco & smokeless tobacco. If we see there is a dynamic role of marketing in increasing the use of tobacco among adolescent. Various marketing strategies such as Advertisement are used to create a positive attitude of adults towards tobacco. Promotions by celebrities & other public personalities are used as a trap to attract adults to invest in tobacco consumption. Advertisements play an important role in increasing the sale of tobacco. Advertisement with better & eye-catching visuals and with the face of top models influence folks in tobacco marketing. To create a diplomatic marketing regime in adults the campaigns use to convey the independency healthfulness & adventure along with social recognition. Tobacco company use the electronic media the more to promote their products through special ads and videos. Tobacco company sponsor various live events such as college functions, public program, cultural fest etc. to add on their marketing strategies.[1-4]

We see the advertisement in the newspaper, intermission of movies & through various TV programs. The most important place is the stores where they sell tobacco. In the place of advertisement with heavy investment, they use LCD screens & short videos & characters explaining different flavors. They also sponsor movies where actors & actress could be seen using it. Basically, an adult change behaviorally by the advertisement and start using tobacco. This advertisement increases likelihood to buy tobacco and use it among youth. Some use to start for the sake of experiment, while few uses it through peer pressure leading to addiction. Various researches show that 25-30% of the population are attracted due to advertisement. If we talk in the context of Indian market, the advertisement plays vital role in increase of tobacco market. If we see in the rural areas of India, it is basically because the youth follows elder peers and they adopt the wrong behaviour which they see around them since childhood. Beautiful designs in the tobacco packets and different colours

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are the eye-catching traps to attract people towards it. Curiosity towards the use of tobacco among adults result in experimentation & further results in addiction. Studies depict that youth are well aware of tobacco ads in stores and such impose influences youth perception regarding ease to access cigarettes' smoking.It has been seen in various case studies that a gender specific study shows that although the male/men take tobacco more but female/women have an emotional attraction for tobacco.[5-9]

In India market condition, it can be seen greatly that the market and advertisement acts as a booster for tobacco use. A simple example can be such that the shops which sale Tea & Coffee are seen to be selling cigarettes. Many posters showing cigarettes ads have been pasted in shops. Use of smokeless tobacco such as Pan is generally a practice in various rural areas and is a part of their culture & custom. Aim of this study is to know what are the prime factors involved in the increase of tobacco consumption among youths.[10-12]

Method

Various terms & inclusion criteria were taken into consideration to review the articles, inclusion criteria, attitude towards tobacco use, published studies, indian studies, conclusion, studies related to health effects, harmful effects of tobacco, search strategy, Electronics database were used to write the article using Medline, PubMed, EBSCO, google scholar, study book SobenPeter. The articles were searched in the relation to Marketise advertisement on tobacco. Total 19 were taken into consideration, out of which only 10 were included.[13]

Results

There are two tables where table 1 shows the inclusion criteria, table 2 shows relationship between tobacco ads & progression towards tobacco use among adolescents.

Table 1. Inclusion criteria

Authors name and year	Study type	Tobacco form	Results
Bansal *et al*., 2005[1]	Cross-sectional	Both	Cigarette companies have developed sophisticated campaigns targeting different socioeconomic groups. Marketing strategies have utilized the loopholes in Indian tobacco control legislation
Arora *et al*., 2012[22]	Longitudinal	Both	High receptivity toward tobacco advertising which may lead to future progression to tobacco among boys. Study reveals a strong relationship between tobacco marketing and adolescents tobacco usage
Patel *et al*., 2012[23]	Cross-sectional	Both	Study reveals advertising around the school and low economic status were strongly associated with tobacco initiation among adolescents advertisements on billboards, posters, and the receipt of a free tobacco sample around the school campus have been a significant factors in tobacco usage among adolescents
Sardana *et al*., 2015[24]	Cross-sectional	Both	Study reveals usage of smokeless and smoke form of tobacco is promoted through the promotional activities mainly through cinemas and providing free samples of tobacco product were most influential means of initiating consumption of tobacco products among youth
Arora *et al*., 2008[25]	Cross-sectional	Both	Exposure to tobacco advertisements and receptivity to tobacco marketing were significantly related to increased tobacco use among students
Stigler *et al*., 2006[26]	Cross-sectional	Both	Almost all psychosocial factors were significantly related to tobacco use, for students in both grades. Some of the strongest correlates included social susceptibility to and social norms about use. Exposure to tobacco advertising was a strong correlate of tobacco use for 6th graders, but not for 8th graders. Sixth graders scored lower than 8th graders on almost all factors, indicating a higher risk
Kotwal *et al*., 2005[27]	Cross-sectional	Both	Almost 42% of tobacco users started before the age of 12 years. Peer pressure, general stress, and media were important influencers
Imtiaz *et al*., 2015[28]	Cross-sectional	Both	Most of the subject interviewed were aware of the hazardous effects of tobacco and were also aware of statutory warning, but still dealt with tobacco usage
Basagoudar *et al*., 2017[29]			The study reveals that most of the adolescents have initiated tobacco smoking due their peer group motivation. Mean age for starting smoking was 14 years. Having smoker in the family and a student residing away from parents were strongly associated with ever smoking
Rani *et al*., 2003[30]	Cross-sectional	Both	Tobacco consumption in 15 years or older is significantly higher in less educated in with low socioeconomic status. The prevalence of tobacco usage smoking and chewing is strongly associated with individual's socio-cultural characteristics

Table 2. Relationship between tobacco ads & progression towards tobacco use among adolescents.

Studies and authors	Alluring advertising leading to tobacco initiation
Arora *et al*., 2008	Provided strong evidence that tobacco advertising and promotion are associated with tobacco use among adolescents. Advertisements and promotion develop likelihood among adolescents to experiment tobacco product
Bansal *et al*., 2005	Reveals unique strategies by tobacco manufacturers being used to draw attention of consumers and nonconsumers. Tobacco companies promote tobacco products through movies
Arora *et al*., 2012	Confirms 2.6 times higher risk of progression towards tobacco use among adolescents
Sardana *et al*., 2015	Reveals huge amount of investment of tobacco industries in advertisements thus luring the youth for tobacco intake. Free samples or coupons for promotion can be considered as incentive for early smokers to stick to specific brands or try a new brand
Patel *et al*., 2012	Reveals free availability in tobacco product promotion and advertisements trap adolescents for experimentation which may lead to addiction
Kothwal *et al*., 2005	Study shows that smoking in media is a potential problem which generate the desire of experimentation among adolescents
Strigler *et al*., 2006	Advertising and promotional activities leads to initiations of tobacco among adolescents

Table courtesy: Yashasvini, Patthi B, et al J Indian Assoc Public Health Dent 2018;16:188-92[14]

Discussion

This review shows that despite of Cigarettes & other tobacco product Act(COTPA).There is a drastic influence of the tobacco marketing in imitations & experimentation of tobacco. Tobacco companies have ruled out the rules & policies of COTPA which has certain rules & regulations for advertisement & marketing.There must be a strong enforcement to control the ads & promotion. Studies show that 2.6 times higher risk of progression towards tobacco among adolescents due to promotional activities.GYTS (2009) shows that three quarter of students are into tobacco addiction by billboards. As the female consumers are less, the tobacco companies are trying their best to attract female towards its use. It includes the female from higher economy group who can spend lot of money.[15, 16]

A large amount of capital is invested by the tobacco company in advertisement. Basically, major capital is invested in Indian market because there is a degradation in the use of tobacco in western countries & so all the tobacco companies are mainly focussing in Indian Market & its youth. Huge amount of money are invested by the company on hiring top models & celebrities for the advertisement & to promote the company's brand. Tobacco company creates a blind belief among youth & adults towards the use of tobacco. Say for example VIMAL Pan Masala has hired Ajay Devgan, the megastar of Bollywood to promote its tobacco brand. This ad comes in most of the newspapers, in movie hall during intermission & it has got proper media coverage though.Cigarette smoking by actors in cinemas & short films attracts the youth towards the experimental use of it.[17-19]

Conclusions

Tobacco usage is widely acceptable among adolescents. It's association with advertising, marketing policies, and ease of availability has flourished it's sale. Advertising strategies develop the positive aura for tobacco by sponsoring the sports events and sponsoring other social events. Marketing policies are generated to develop the normalcy toward tobacco. Cultural ethics have been broken down through effective advertising. Although youth is aware of health hazards, tobacco initiation is adopted due to curiosity generated through advertising and other promotional activities. Tobacco intake is prevalent among adolescents due to the positive impression created by the media promoters. Such promotional activities develop curiosity which leads to addiction of tobacco. Youth is aware of health hazards, but they require strong motivation to quit. Strong policies should be implemented at school level to demolish the strong predictors. Control strategies and understanding epidemiology of tobacco-related health hazards should be strictly implemented in schools. Educational efforts should be focused on dispelling the misconceptions created in the young minds by media. Strong policies should be implemented to bar tobacco usage among adolescents. Adolescents should be motivated with role models such as media persons and doctors. Tobacco cessation advertisements should be flourished on radio, television, magazines and newspapers. Cessation program should be targeted on adolescents so that they may not switch to tobacco consumption due to any reason.

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Electronic Nicotine Delivery System

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Abstract

Electronic Nicotine Delivery System are commonly used substitute for cigarettes to deliver nicotine & have been recently considered to be a very popular& effective mode of tobacco dead diction. The primary aim of this paper is to have a comprehensive idea about the design, the parts, effects and if any safety protocols to be followed along with the potential for cessation.

Keywords: *Electronic cigarettes, smoking cessation, product safety.*

Introduction

Electronic Nicotine Delivery System most commonly known as Electronic cigarettes, e - cigarettes or vaping. Personal vaporizers, advanced personal vaporizers. These are often packaged to appear and feel like conventional cigarettes which provides it a feeling of a cigar or cigarettes. It was invented by Lik Hon in Hong Kong in 2003.[1] This is a new product & very less is known about it in Electronic Nicotine Delivery System, E- Cigarettes or electronic cigarettes are non-combustible cigarettes which deliver nicotine without combustion and are thought to be less toxic and reduce craving and relapse symptom, aid in smoking cessation and in relapse. It aids individuals to quit combustible cigarette smoking and prevent relapse and are said to be less expensive than traditional cigarettes.[2,3] Another important aspect is that it can be smoked without interfering with passive smoking which is a major concern amongst the non-smokers. They also address the psychological social and behavioral aspects of smoking.[4]

These cigarettes are packaged to mimic the features of traditional cigarettes and similar oral sensory experiences of cigarettes. The electronic cigarettes are said to provide more nicotine to the users but the amount of nicotine they deliver is comparatively less than combustible cigarettes.[4,5] Though they were introduced for deaddiction it may attract individuals to smoking. They are sold as single use disposable devices or as reusable devices. The major concern here is that both combustible and non-combustible forms of tobacco pose an adverse health effect.[6]

They are battery operated electronic devices which release aerosolized nicotine for inhalation. The design consists of A cartridge / e liquid container is available in a plastic mouth piece in which the liquid is present that could be vaporized; Atomizer or aerosol generator; Heating element / vaporization chamber in this the liquid present is vaporized to produce aerosol for inhalation; A battery / power source it provides energy for heating; A microprocessor; A LED light that produces a glow, this glow appears on inhalation.

First generation electronic cigarettes/Cig-a-Likes: Look like a combustible cigarette it contains a Cartomizer that combines the vaporing system and electronic cigarette liquid into a single unit. This when puffed the heating coil gets activated and subsequently vaporizes the liquid producing a vapour that can be inhaled with a LED light that glows at the end.

Second generation devices/Mid-size Electronic Cigarettes: Looks less of regular cigarettes and they contain a small receptacle or storage chamber that the user fills with their choice of liquid where in flavour

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and strength is decided by the users. Here nicotine concentration ranges from 0 to 24 g/ml. they mostly use large batteries where the power settings can be adjusted and contains replaceable coils and wicks. The storage chamber is also known as tank or "clearomizer" that can be replenished with e-juice.[7]

Third generation devices/ Advanced Personal Vaporizers (APVs): Include adjustable modsfor variable voltage devices. They can hold bigger batteries or multiple batteries and is often replaceable. These adjustable devices have a USB connector for recharging and is referred to as a "pass through" feature.[8]

A fourth generation / Innovative Regulated Mods:Digital e-cigarette: It Contains battery together with chamber of nicotine that is recyclable. Most prominent factor of this generation is the provision of utmost level of user accessibility as well as feasibility. Nicotine content from 0 – 36 mg/ml (max 20 mg/ml in eu from 2016).[9]

Contents

The chemical constituents of the e liquid aerosol are intricate as there are numerous brands and manufactures who use different e- liquids, battery for heating, the heating elements& nicotine concentrations along with the flavoring agents.[10]

Propylene Glycol i.e. propanediol - is an alcohol acts as a solubilizing agent which is used in food substances as a humidifier and emulsifier. A solvent in pharmaceuticals due to its affinity for water and used in aerosolized drug delivery systems in inhalers and nebulizers which is used here to prevent tobacco drying out. The mist produced dries the mucous membranes and eyes& chronic exposure is said to induce rhinitis asthma eczema and allergic symptoms.[10]

Glycerol – is the vegetableglycerin that is purified. Though its pure if overheated it can produce acrolein which acts as an irritant and oxidizing agent which is thought to affect the cardiovascular and respiratory system adversely. The concentration produced in e cigarettes is very less.

Impurities & toxicants – As nicotine is produced from tobacco, the impurities include cotinie, anabasine, anaatabine, myosmine, beta nictyrine & formaldehyde. But the nitrosamines or polycyclic hydrocarbons are absent or very minimal when compared to combustible cigarettes

Metals-Aerosols contain metal particles like:

a. Tin– It is present as an inner and outer cordwith burning of the inner cord. The presence of tin was toxic than the fluids that lacked particles.

b. Lead - present in the solder joints, Nickel, iron was the part of mouthpiece and/or metallic base, silver.

c. Silicate beads with particle like silicon, calcium, aluminum &magnesium originate in the fiberglass wick.

These metallic nano particles tend to penetrate into alveolar sacs increasing the free radicals and antioxidants and thus inflammation in the pulmonary and cardiac tissues. They travel into other organs like liver, kidney, heart, and brain. Inhalation of tin can also cause stannosis.

Fragrances & Aromas: Menthol,floral, fruity, Tabanon (cigarette like), coffee, caramel etc.

Nicotine: Acute exposure to nicotine causes dizziness, nausea, or vomiting when inhaled. Dermal nicotine exposure occurs after spills of nicotine-containing liquids or occupational contact with tobacco leaves leading to toxic body reactions.[12] A concentration ranges from 6 – 36 mg/ml which can be taken in varied concentrations and are labeled as low, medium and high. 100 mg/ml refill solution vials are available online. But the permissible level of nicotine was to be maintained at 20mg/ml by the European Commission. The maximum blood nicotine conc. in electronic cigarettes is 1.3ng/ml where as in cigarettes its 13.4ng/dl.

Safety considerations: Nicotine in e liquid is toxic to infants and children when wrongly manipulated. Therefore, child safety packaging with biometrics and sensors can be used.[13] Use of illegal substances have been reported with slight alteration of the container and refilling it with any other substances like narcotics, steroids, marijuana etc. could be of major concern.[14] Old and contaminated aerosol produces nano particles like tin, iron nickel and chromium which are grouped under potential harmful products by the Food and Drug administration association. Lithium batteries have a characteristic risk of fire and explosion. Therefore, use of low-quality materials, poor design along with any manufacturing defects could attribute to thermal run increasing the temperature causing either fire or even explosion.[15]

Effect of electronic cigarettes on smokers: The food and drug Administration of United Nations or any other government organizations have approved the usage of electronic cigarettes. Although the retail sale been banned in Australia and Canada. Other countries like the United Kingdom are introducing laws for regulating laws for use of nicotine products with medicinal properties. World Health Organization has currently advocated advices so that smokers are initially encouraged to quit smoking and encourage nicotine de-addiction by advocating previously approved treatments protocols.[12]

Effect on health: The effect on health is due to the inhaled vapor which contains nicotine and possible toxicants produced by the atomization process. The respiratory system acts as the primary target for effects of e vapor. 14 In order to measure the pulmonary effects the exhaled nitric oxide is measured which acts as a marker for eosinophilic inflammation.[16] Acute effects reported were increase in both central airway resistance & carbon monoxide in the exhaled air.

Short term use doesn't or have very little adverse effect on the cardiovascular system or the lung function tests. The passive smoke emitted from electronic cigarettes is which is exhaled after inhalation and doesn't generate any additive aerosols and seem to have no effect on the pulmonary function. Patients showed improvement in asthma, bronchitis & chronic obstructive pulmonary diseases with visible decrease in the signs of coughing, throat infections, decrease in appetite and insomnia. The neurological and sensory systems also get affected which is basically due to an overdose or withdrawal of nicotine with symptoms which activates nicotinic cholinergic receptors in the brain. Other Symptoms like anxiety and depression were also either caused by decrease in delivery of nicotine or withdrawal symptoms.[15]

Effect on nicotine levels: Nicotine levels in blood are generally lower from conventional cigarettes when an 18mg/ml nicotine containing vial was used.

a. The aerosol is absorbed from the oral mucosa instead of the lungs
b. Nicotine deposited in mucosa is said to be swallowed and is metabolized in the liver thus reducing the bioavailability.
c. Propylene glycol present in electronic cigarettes also negatively interacts with nicotine absorption from lungs but the nicotine levels in electronic cigarette vials if higher improves the effectiveness & is expected to make it a better substitute when compared to other smoking substitutes.[15,16]

Acute nicotine toxicity occurs when e cig liquid is ingested, which could be accidentally or be a deliberate use as a suicidal overdose, or with dermal exposure. It commonly causes dizziness, nausea, vomiting, pallor, tachycardia, sweating, abdominal pain, salivation, lacrimation, and diarrhea. Confusion, agitation, lethargy, convulsions and possibly death occurs in severe cases due to cardiac arrest. These Symptoms are seen 15minutes of exposure and may resolve within 1 to 2 hours. [16]

Withdrawal symptoms: The possible withdrawal symptoms like feeling awake, calming down, lack of concentration, loss of pleasure & satisfying feeling along with reduction of hunger for food.[15] Along with dependence like craving to smoke, irritability, anxiousness and poor concentration was seen. These symptoms were definite & gender differences in withdrawal suppression was also identified.

Role on smoking cessation: Electronic cigarettes minimize the abuse by acting as a substitute to conventional cigarettes which is less toxic& it helps in minimizing harm. They reduce the withdrawal symptoms immediately 20 min after its use.

Potential for abuse/addiction: Addiction is directly related to the potential of the e cigarettes to cause dependency. It is due to the presence of Nicotine which is the principle component of tobacco. When compared to conventional cigarettes e cigarettes have a very low addiction potential & would depend on the persistent use, rate of absorption of these products. Studies have shown due to minimal increase in plasma nicotine from e cigarettes with a significant decrease in cravings.[17]

Regulations for use of electronic cigarettes by FDA: Marketing, restriction of youth access with labeling& quality control while manufacturing with restriction of free sampling and standards for contaminants should be strictly supervised. There should be proper warning labeling and child proof packing on refill liquids& vials FDA should approve companies who manufacture electronic cigarettes and claim its useful for tobacco cessation.

Regulating taxing by increasing tax on combustible products would prevent its use & may create interest

in switching on to e cig. A tax too high one cig would prevent switching of low-income group users from combustible to e cig.[18]

Regulating marketing & Advertising: Marketing by using celebrities to promote about the flavors etc. tend to glamorize and might be misinterpreted amongst the youth for fun socially acceptable & desirable. Regulations should be implemented on marketing which would prevent its accesses to minors. Researches should be carried out to recognize constructive communication techniques for health information, hazards/ benefits and regulatory issues.[19]

Conclusion

E cigarettes are less harmful in comparison to the combustible cigarettes. The government should enforce efforts to differentiate the potentially harmful or beneficial effects and evaluate its effects on smoker's nonsmokers& persons seriously interested to QUIT. Additional researches & surveys should be enforced for better understanding of the design, functioning as a number of different products have been introduced by different companies with specialized testing protocols. Clinicians should be made to obligate to promote smoking cessation using e cigarettes. But very less is known in India and negligible usage or researches have been advocated here. India being one of the leading nations for Oral Cancer deaths elimination or replacement of the combustible tobacco products could significantly reduce the number of deaths.

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Xerostomia: A Comprehensive Review

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Abstract

The motto of this article is to investigate the manifestation and complications caused by dry mouth and what measures should we take to give respite to the patients. The two different facets of dry mouth are Xerostomia and Hyposalivation. Xerostomia is subjective sensation of dry mouth whereas, hyposalivation is an objective estimation of diminished salivary flow rate. This ailment is found to be more prevalent in the age group of 65 years and older i.e., around 30%. Significant increase in manifestation of having dry lips, mouth, throat, eyes, skin and nose epitomize Xerostomia. For these patients swallowing food becomes an arduous task so they drank water three times more than normal person to make it possible. In comparison to medication-free patients this disorder is found be more established in patients who are consuming drugs that affect the nervous system. Independent risk factors like gender, age and medications pose serious threat in the development of xerostomia. Dentists should be well acquainted with situation and take an active role in diagnosing and managing this situation on time should be taken forward positively by the dentists because any dereliction in this might impair the condition.

Keywords: *Xerostomia, Hyposalivation, Quality of lifestyle, Etiology, Diagnosis, Management.*

Introduction

We as human beings do not get the importance of a thing, unless and until it goes missing as a result of which there is hindrance in our daily livelihood. Now, speaking of lifestyle; chiefly deals with social interactions and relationships with people coming from all walks of life.[1] And thus, having a healthy, comfortable mouth plays a crucial role in building one's quality of life. Saliva is essential to oral health by performing various functions which are, perception/judgement of taste, digestive process, vocal expressions, food bolus formation, and facilitating in mobility of food by lubricating and bathing it.

The fundamental constituents of saliva are water and mucin which function as, disinfecting solvent and lubricating fluid reciprocally. Factors like lysozyme, lactoperoxidase, secretory IgA that are anti-microbial in nature are prevalent in saliva.[2] So the absence of saliva creates a perilous position by inducing dental problems such as; caries, gingival issues, facing hardship during chewing, wearing dentures and speech botheration. Chief salivary glands which are, parotid gland, submandibular gland and sublingual gland plays a crucial part by secreting recurrently in relation to autonomic stimulation, that is on a peak in course of a meal but low else ways. In other respects, numerous minor glands harbour mucus ceaselessly throughout the time in the lips and cheeks arena. Thus, as a consequence, oral function becomes flawed when this activity is diminished. Now, the saliva is basically of two types;

- Stimulated (resting) saliva which has been reported to be between 1-2ml/min, that aids in mastication and digestion.

- Unstimulated saliva emulates the basal flow rate which aims at safeguarding the oral mucosa. It ranges from about 0.29ml/min to 0.41ml/min.

A major cutback of 50% in the flow of saliva implies to the sensitivity of a dry mouth (Xerostomia). An objective estimation of shortened salivary flow rate elucidates the condition of hyposalivation on the contrary, a subjective accusation of dry oral habitat whether its related to malfunctioning of the salivary glands[3] or not clearly indicates a case of xerostomia. Xerostomia if neglected and not taken care of properly in due time cripples a person's social interactions and networks. Patients with xerostomia may be embarrassed by bad breath and difficulty in speech which makes them feel withdrawn, isolated and socially out-casted. A sore, dry mouth affects taste and food enjoyment. Common gestures like smiling, laughing, kissing become a difficult issue for the patients because of cracking in dry

lips. Xerostomia and salivary de-function can debilitate an individual's aspect of life by generating various oral derangements. Through various retrospective studies done before, it is found that women are the once who get affected more than men and its prevalence is highest in the sixth decade of age. Now there are various causes of xerostomia, amongst which the most common etiologic factors are;

- Drug-induced xerostomia-This is the most frequent cause of dry mouth, specifically those that block the central and peripheral nervous system[4] i.e, drugs with anticholenergic properties. Some common drugs causing this ailment are, Narcotic analgesics i.e, opoids; Antiemetics drugs- cyclizine, stemetil; Antihistamines; Antidepressants-amitriptyline; Antimuscarinis for Parkinsonism; Antiepileptic drugs-phenytoin; Antipsychotics drugs–chlorpromazine; Antihypertensive drugs-lisinopril; Antineoplastic; Bronchodilators; steroids.[5]
- Sjogren's syndrome-It is a long-term autoimmune rheumatological disorder characterised by inflammation of exocrine glands particularly of mouth, eyes that result in causing extreme dryness.[6] It affects women more often than men which is in a ratio (9:1), principally in their forties and fifties. A dry, erythematous & sticky oral mucosa alongwith atrophy of the filiform papillae on the dorsum of the tongue is noticed during physical examination. In recent times, Sialometry and newer imaging techniques, including ultrasound and Magnetic resonance sialography of the principal salivary glands are various diagnostic evaluations that have proven to be quite advantageous. Patients with Sjogren's syndrome associated with rheumatoid arthritis and systemic lupus erythematosus have an increased cardiovascular risk.
- Radiotherapy–From many a recollective studies done, it is deduced that radiotherapy for head and neck results in the most severe type of xerostomia. In the radiotherapy procedure, the major salivary glands intermittently receive a high radiation dose[7] and xerostomia arises owing to irradiation of acutely sensitive salivary tissue lying in close proximity to the radiation target. Surgical excision is the most opted treatment procedure for a wide variation of benign salivary gland tumours, but the patients with invasive salivary gland tumors are dealt with surgery followed by radiation therapy.
- Now, keeping in mind the above mentioned causes, there still remains some which are liable for this disorder; Burning mouth syndrome, Alzheimer's disease, Parkinson's disease, Rheumatoid arthritis, Cystic fibrosis, Oral infections, Chronic anxiety, Stress, Diabetes, Renal failure, Diarrhoea, Dehydration, Liver disease, HIV infection, Congenital abnormalities, Sarcoidosis, Chronic parotitis, Salivary duct obstruction, Hepatitis C infection with a long-term inflammation of salivary glands can be conducive to hyposalivation; Rare causes:Amyloidosis, Hemochromatosis, Wegener's disease, Salivary gland agenesis(with/without ectodermal dysplasia), Triple A syndrome.

In order to approach a xerostomia patient, a thorough history of symptoms and examination is crucial, so we need to lookout for painful dry, burning and atrophic tongue and mucosal tissues, cotton wool sensation in the mouth, cracked lips and soreness of mouth, candida infections; difficulty in wearing prosthesis, difficulty in chewing and swallowing dry foods, difficulty in speech, diminished or altered sense of taste, increased thirst, disturbed sleep, Presence of halitosis, deterioration of vocal function, dental caries.[8, 9]

Now in order to check this from making the patient's condition worse certain treatment procedures need to be followed stringently; local treatments like, frequent sips of water, ice-cubes, ice-lollipops, mouthwashes, sugar-free sweets are instructed to the patient. Dry lips need to be moisturised with Vaseline, partly frozen melon or artificial saliva substitutes.

Table 1. Saliva substitutes

Products available	Formulation	pH	Fluoride containing
AS Saliva Orthana (AS Pharma)	Oral spray 50ml	Neutral	Yes
Biotene oral balance (GSK)	Lozenges (30)	Neutral	No
	Moisturising liquid 45ml	Neutral	No
		Neutral	No
BioXtra (RIS products)	Moisturising gel 40ml	Neutral	No
	Gel mouth spray 50ml	Neutral	Yes
	Chewing gum pieces(20)	Neutral	No
		Neutral	No
	Sucking tablets(60)	Neutral	Yes
	Toothpaste 50ml	Neutral	Yes
	Mouth rinse 250ml		
Salinum (Crawford)	Liquid 300ml	Neutral	No
Salivix (Galen)	Pastilles(50)	Acidic	No
Saliva natura (Medac)	Oral spray 50ml	Acidic	No

Bile secretion-stimulating drug: Under the usual dosage of 25mg of Anethole trithione (thrice-a-day),[10] this drug sufficiently vitalizes the salivation and improves xerostomia.

Night guards: Sleep-related xerostomia is a condition where the patient undergoes disturbed sleep due to anomalous movement of the masticatory muscles. The use of night guards can help the patients enhance their sleeping patterns. Factors like; an increment of salivary flow, conservation of saliva amount in oral cavity, or a reduction of saliva vaporisation[11] got influenced with this advancement.

Saliva stimulants: Nonetheless, specifically dentate patients should shun the use of the above portrayed saliva substitutes with an acidic pH, because it may demineralise their tooth enamel and thus make it susceptible to dental decay. Naturally available products like pineapple contains an enzyme named Ananase which promotes the cleaning of mouth [12] making it highly beneficiary for the patients. Drugs like Pilocarpine or Cevimeline have parasympathetic effects which have shown to increase secretions of salivary glands. As a matter of fact, Pilocarpine is more potent than artificial saliva yet it has some side-effects too such as sweating, dizziness, cognitive or psychiatric disturbances, rhinitis, urinary frequency and blurred vision. So, keeping in mind, these drugs should not be prescribed to patients with asthma or chronic obstructive pulmonary disease, patients with cardiovascular diseases, peptic ulcer, renal or hepatic impairment, bowel obstruction or glaucoma.[13] The recommended dose for patients is 30mg (thrice-a-day) for Cevimeline or 5-10mg thrice daily for Pilocarpine to be taken orally.

Patients with low salivary output become susceptible to oral infections which needs attention at the first hand. Fluoride application is the most effective tactic of retaliating the unchecked hyposalivation-induced caries[14] is by using routinely NaF in neutral pH.Decrement in saliva flow results in overgrowth of fungus like Candida albicans which can be treated by antifungal rinses i.e, Nystatin oral suspension (rinse it four times a day) or Clotrimazole lozenges. Denture antifungal treatment is done by soaking the denture for 30mins daily in benzoic acid, 0.12%chlorhexidine.[15]In current years, Intensity Modulated Radiotherapy (IMRT) has explained that the repercussion of radiation on the salivary glands can be diminised by (partly) sparing the glands.[16]

Conclusion

In conjunction with the physical dilemmas of pain, infections and difficulties in eating and speaking, xerostomia undeniably has profound negative psychological and social effects, which detiorate the patient's aspect of life. These patients feel embarrassed in social gatherings. A lifetime of multi-disciplinary care is essential to monitor and treat the distressing effects of salivary de-function. Oral health care practitioners possess this unique opportunity to detect xerostomia and present an appropriate treatment towards an improved well-being.

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Fluoride: Double Edged Sword

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Abstract

Fluorine is a common element that does not occur in the elemental state in nature because of its high reactivity. It is of vital importance for humans as it maintains and solidifies the bones and also inhibits dental caries. It is abundant in the atmosphere and hence drinking water is the chief source of fluoride for individuals. It has been proved to be advantageous and at the same time it is toxic at higher concentrations has also been well recognized. Prevention can be done by supplying fluoride safe water by using defluoridation techniques. The purpose of the article is to review the various aspects of fluoride and its significance in human life.

Keywords: *Fluoride, Dental fluorosis, Fluoride therapy, Optimum doses.*

Introduction

The term "fluorine" is derivative of the Latin word "Fluore" implicates "to flow". It is the most electronegative element which never exists in free-state in nature, rarely available in its elemental state because of its high reactivity. At room temperature, fluorine is a pale, yellow-green gas. It is commonly described as a 'double-edged sword' as an inadequate ingestion leads to dental caries and too much ingestion leads to dental and skeletal fluorosis which has no treatment.

Sources of Fluorides: The existing sources of fluoride in the environment are schematically presented in Figure 1. The major fluoride reserve is considered from rocks and minerals. Other common sources of fluoride are in soil and ground water. In food high fluoride levels are found in fish products like canned fish such as salmon and sardines, cereals like jowar, vegetables like cabbages, potato and lettuce, fruits like banana, plants like taro, yam, cassava, dried tea leaves, mineral water.[1,2]

The various sources that contributes to fluoride intake and exposure can be categorized as follows:

(a) systemic/planned—water, fluoridated milk, salt, fluoride supplements

(b) systemic/incidental— ingestion of dentifrice, Teflon coatings on pans, fluoride rinse, exposure to food/ pesticides/soil, smoking, prescription drugs and environmental pollution,

(c) topical/planned— toothpaste, home use rinses and gel or professionally applied varnishes and gels

(d) topical/incidental—alginate impression materials

Drugs like fluoride containing benzothiadiazines used as fluoristeroids, diuretics, fluorobutyrophenones and phenothiazines used as methoxyflurane, tranquilizers; halothane and enflurane used as an anesthetic also consists of fluoride.

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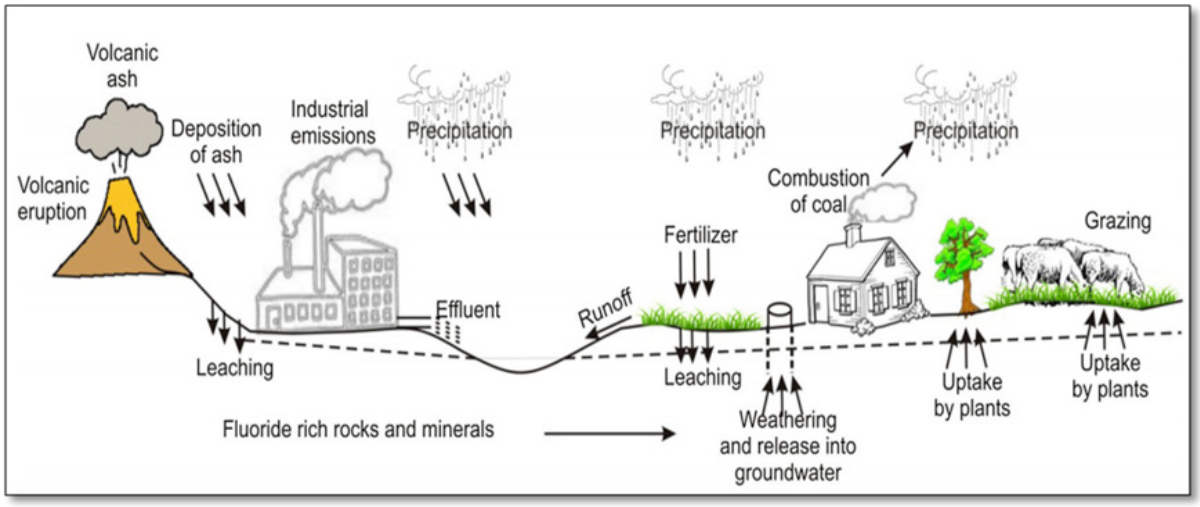


Figure 1. A schematic diagram showing the fluoride-existing sources in the environment

Metabolism: Fluoride containing compounds are very diverse. Hence it is impossible to generalize their metabolism, as it depends on their solubility, reactivity and structure and ability to discharge fluoride ions Figure 2.[3]

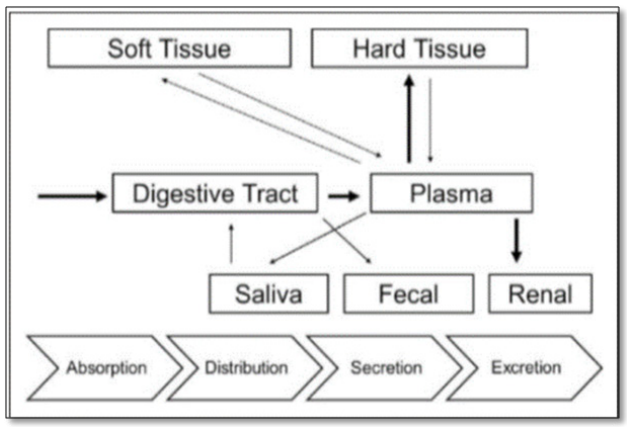


Figure 2. Flowchart of fluoride metabolism

Pharmacokinetics: Fluoride is mainlyabsorbed through the respiratory and gastrointestinal tracts but dermal absorption is insignificant except in cases of hydrofluoric acid burns. Fluoride readily crosses placenta and is absorbed by the fetus. Soluble fluoride compounds are rapidly and almost entirely absorbed to a level of 90 to 95% across the gastrointestinal tract with peak serum levels achieved after 30 min of consumption on a fasting stomach. Large volume of extracellular body fluids dilutes the absorbed fluoride concentration; thereby avoiding elevation in plasma fluoride concentration. Fluoride diffuses from the plasma to the surrounding tissues of the body. Approximately 50% of daily fluoride intake is deposited in calcified tissue like teeth and bone.[4]

- Fluoride in outer enamel is 2200 – 3200 ppm
- Fluoride in dentin is 200-300 ppm
- Fluoride in cementum is 4,500 ppm

The maximum fluoride is concentrated in the skeleton and kidney, which reflects the major pathways to dispose fluoride. It is mainlyexcreted by the kidneys with 40 to 60% of the daily fluoride dose evacuated in urine showing an elimination half-life of about 5 h. Fluoride is also excreted in sweat, saliva, and breast milk.

Estimation of Fluoride Concentration

Collection of samples: Both stimulated and unstimulated saliva should be collected for analysis. The stimulus used may be mechanical (E.g. chewing inert wax) or use of citric acid. If the concentration of fluoride in saliva derived only from the systemic source is to be estimated, then the salivary secretions must be collected directly from the gland ducts. This is done using Carlsson - Crittend or Lashy device or by direct cannulation. If the concentration of fluoride in saliva after enhancement from locally dissolved dietary or therapeutic sources is to be estimated, then whole saliva must be collected. Microorganisms and desquamated epithelial cells contaminate whole saliva. Separation by centrifugation of these cellular components is customary before analysis.

Fluoride analysis

Ionic Fluoride: commonly used method for estimation is the fluoride-specific ion electrode. Ionic fluoride has been measured by isotachophoresis and ion chromatography at about the same level of sensitivity as the micro method, the ion selective electrode.

Bound Fluoride: the bound fluoride should be made free to ionic state before final measurement. Various analytical procedures, including distillation, wet and dry ashing and acid extraction have been used.

Mechanism of Action: The mechanisms through which fluorides increases caries resistance can be categorized as follows:[5]

1. Increase enamel resistance
2. Increased rate of post-eruptive maturation
3. Interference with plaque microorganisms
4. Remineralization of incipient lesions
5. Modification in tooth morphology

Fluoride Delivery System: Anti-caries effect of fluoride started to be exploited by the beginning of the 20th century itself. However, it became more extensive by the middle of the century. Fluoride can be professionally applied and self-applied.

Professionally applied fluorides:

- **Systemic:** Water fluoridation, Milk fluoridation, Salt fluoridation, Fluoride supplements, Diet/ Tablets/ Lozenges
- **Topical:** Fluoride solutions, Stannous fluoride, Neutral Sodium fluoride, Acidulated phosphate fluoride, Amine fluorides, Fluoride prophylactic paste, Fluoride varnishes

Self-applied fluorides: Tooth brushing with dentifrices, solutions or gels, prophylaxis paste, Applying gels in trays, Mouth rinsing with solutions

Table 1. Recommended doses of dietary fluoride supplements[6]

Age	<0.3 ppm F (in mg)	0.3-0.6 ppm F (in mg)	>0.6 ppm F (in mg)
Birth-6 months	0	0	0
6months-3years	0.25	0	0
3-6 years	0.50	0.25	0
6 -16 years	1.00	0.50	0

Table 2. Mode of administration of fluorides in different age group.

Age	Fluoride (mg)	Mode of Administration
0-2	0.25	Drops dissolved in water
2-3	0.50	Chewable tabs /drops
>3	1	Chewable tabs

Table 3. Fluoride solutions[5]

Characteristics	NaF	SnF_2	APF
Percent	2%	8%	1.23%
Ppm F	9,200	19,500	12,300
Frequency of application	4 at weekly intervals at ages 3,7,10 & 13	1 or 2/ year	1 or 2/ year
Taste	Bland	Disagreeable	Acidic
Stability	Stable	Unstable	Stable in plastic container
Tooth pigmentation	No	Yes	No
Gingival irritation	No	Occasional, transient	No
Average effectiveness	29%	32%	28%

Miscellaneous Modes of Fluoride Application: Fluoride impregnated floss; Fluoride Chewing Gum; Intraoral Controlled Release Devices for Fluorides; Iontophoresis

Fluoride Toxicity: Fluoride often called as double-edged sword because ingestion of inadequate fluoride results in dental caries and ingestion of excessive fluoride leads to skeletal and dental fluorosis.

Table 4. Fluoride status in India

States	Fluoride level in India (mg/L)
Andhra Pradesh	0.4 - 29
Assam	1.6 - 23.4
Uttar Pradesh	0.2 - 25
Chhattisgarh	Information Awaited
Delhi	0.2 - 32
Orissa	0.6 - 9.2
Haryana	0.2 - 48.32
Jammu & Kashmir	0.5 -4.21
Jharkhand	0.5 - 14.32
Kerala	0.2 - 5.4
Karnataka	0.2 - 7.79
Gujarat	1.5 – 18

States	Fluoride level in India (mg/L)
Madhya Pradesh	1.5 - 4.2
Maharashtra	0.11 – 10
Bihar	0.2 - 8.32
Punjab	0.4 - 42
Rajasthan	0.10 -0.10
Tamil Nadu	0.1- 7
Uttaranchal	Information Awaited
West Bengal	1.1- 14.47

Fluoride Toxicity: It is divided into: Acute toxicity, Chronic toxicity (Dental fluorosis, Skeletal fluorosis, Non-skeletal fluorosis/ soft tissue fluorosis)

Acute Toxicity of Fluorides: Acute fluoride toxicity occurs due to rapid ingestion of excessive fluoride at one time.

Certainly, lethal dose (CLD): Children: 16-32mg/ kg bodyweight; Adults: 32-64mgof fluoride/kg body weight

Safely tolerated dose: Children: 8-16mg of fluoride/ kg bodyweight; Adults: 16-32 mg of fluoride/ kg bodyweight

Management of acute fluoride toxicity[7]

Less than 5mg/kg:

1. Oral administration of calcium
2. Vomiting is induced (not necessary)

More than 5mg/kg but less than 15 mg/ kg body wt.

1. Stomach is emptied by inducing vomiting with emetic
2. Oral administration of calcium
3. Admitted to hospital & kept under observation for few hours

15mg/kg or more:

1. Immediate admission to hospital
2. Patient is forced to vomit
3. Cardiac monitoring is initiated
4. Slow administration 10 ml of 10% calcium gluconate iv
5. Urine output should be adequately maintained using diuretics if necessary
6. General supportive measures

Chronic Toxicity of Fluorides[7]: Chronic toxicity is caused due to ingestion of lesser amount of fluoride for a long term which usually affects the kidney and hard tissue.

Dental fluorosis: Dosage: Two times optimal; Duration: Till 5 yrs (excluding 3rd molar)

Skeletal fluorosis: Dosage: 10 -25mg/per day; Duration: 10 -20 yrs

Kidney damage: Dosage: 5 -10mg/per day; Duration: 6-12 months

Dental Fluorosis: It is caused due to excessive fluoride intake during tooth development.

Clinical features: Opaque, Lusterless, enamel white patches which may be mottled, pitted or striated; Mottled areas may appear yellow stained or brown; In severe cases, hypoplastic areas is lost; Symmetric occurrence of fluorosis in dental arches

Table 5. Characteristic of mild fluorosis and non-fluoride enamel opacities.

Characteristic	Mild fluorosis	Non fluoride enamel opacities
Affected area	Cuspal tips / incisal edge	Centered in smooth surfaces; affects whole crown
Shape of lesion	Pencil shading; follow incremental lines in enamel	Round and oval
Criteria for demarcation	Shades off imperceptibly into surrounding normal enamel	Opaque appearance easily differentiated from adjacent normal enamel
Colour	“Paper white”; no stain at the time of eruption	“Creamy-yellow”- “dark orange”; Pigmented at time of eruption
Affected teeth	Calcify slowly; rarely seen in lower incisors; rare deciduous teeth involvement; usually bilateral	Any tooth; deciduous tooth may be involved; may affect single tooth
Gross hypoplasia	None; enamel has glazed appearance, feels smooth to explorer tip	Absent in severe cases; enamel surface can be etched, feels rough to explorer
Detecting criteria	On application of high intensity light- line of sight tangential to the crown	On application of high intensity light - line of sight is perpendicular to the tooth surface

Skeletal Fluorosis

Manifestation:

- Severe pain in back bone, joints, hips; stiffness in joints and spine
- Outward bending of legs and hands in advanced stage and these parts lose their shape and contour
- Rise in x-ray density of trabecular bone in lumbar spine, pelvis and elsewhere
- Endosteal/periosteal apposition leads to increase in thickness
- Calcification of ligaments take place

Indices Used for Dental Fluorosis

Fluorosis specific index: Dean's fluorosis index, Tooth Surface Index for Fluorosis, Thylstrup and Fejerskov index, Fluorosis Risk Index

Descriptive index: Developmental effects of Enamel Index, Murray Shaw Index, Jackson Al- Alousi Index

Defluoridation of Water

An excess of fluoride in drinking water is a severe problem. The only way to prevent fluorosis is supply of drinking water with recommended levels of fluoride concentration which can be achieved by **de-fluoridation** of fluoride contaminated water. Defluoridation is "the adjustment of level of fluoride in drinking water to the optimal level".

Defluoridation techniques and the materials used[8]

Defluoridation is done by:

Adsorption: Carbon materials, Calcite, Activated Alumina, Hydroxyapatite, Magnesia, Wood, Tea waste, Tricalcium phosphate, Jute waste, Coir pitch, Bauxite, Fly ash, Serpentine, Lignite, activated charcoal, Fish bone char, Nut shells, Processed bone, Paddy husk, Coffee husk, Avaram bark

Ion-exchange: *Anion-exchange resins*: NCL poly anion resin, Lewatit-MIH-59, Deacedodite FF-IP, Amberlite IRA-400, Waso resin-14 Polystyrene, Tulsion A27

Cation exchange resins: Carbion, Defluoron-1, Defluoron-2

Precipitation: Lime, Lime and alum (Nalgonda technique), Alum, Poly Aluminum Hydroxy Sulphate (PAHS), Alum flock blanket method, Poly Aluminum Chloride (PAC), Brushite

Others: Electrochemical method (Aluminum electrode), Reverse Osmosis, Electro dialysis, Electrolysis

Defluoridationimplementedin India[9] : Prasanti Technology using Activated Alumina, UNICEF in India using Household based defluoridation, KRASS Defluoridation Process, Delfuoridation based on ion exchange Mechanisms, Nalgonda Technique

Recent Advances[10]

New fluoride products available in the markets:

Fluoride foams: Topex neutral fluoride foam; KOLORZ neutral fluoride; Denti-Foam topical fluoride

Fluoride gels: Neutra Gard Home Care Gel; NeutraGard Advanced Gel; Zap Fluoride Gel[11]

Fluoride varnishes: Enamel Pro® Varnish, Profluoride Varnish, Fluoro Dose®, Flor-Opal varnish White, Fluor Protector, Fluoridex Lasting Defense, Waterpik Ultrathin Varnish, Varnish America™, Zooby® Fluoride Varnish.[12]

Fluoridated rinses: Stan-Gard Perio Rinse; ACT Total Care, ACT Anticavity Fluoride Rinse, Cari Free Maintenance Rinse, Orthowash™ Daily Rinse, Listerine Total Care, Previ Dent, Rinse, Gel-Kam Oral Care Rinse, Crest Pro-Health Rinse.[13]

Prophylaxis pastes: Clinpro™ Prophy Paste, Next Prophy Paste, Oral-B Prophy Paste, Waterpik® Prophy Paste, Glitter™, BreathRx Prophy Paste, Glitz Premium Prophy Paste, Enamel Pro®, Ziroxide.[14]

Fluoridated rinses: GC Fuji Triage White and Pink, Riva Protect, Helioseal F, Delton FS Plus Pit and Fissure Sealant, Seal-Rite, Ultra Seal XT plus Pit and Fissure Sealant, Adhe SE One F, Ecu Seal Pit and Fissure Sealant, Versa Flo Light-activated Flowable Composite Resin, Seal and Protect.[15]

Conclusion

Fluoride is the most electronegative element which never exists in free-state in nature. It is most beneficial micro nutrients for our body. Fluoride is a safe and

effective agent to prevent and control dental caries, when used appropriately. But it can be toxic in extremely high concentrations. If government would monitor fluoride concentration in diverse sources of drinking water and ground water and make fluoride map available to the public, it would be much beneficial. Government must include the International/WHO guidelines in circular form to safeguard citizens in case they are in need of fluoride supplements and this would help in preventing health related problems due to deficient/ excess fluoride exposure. For many decades, studies have been conducted to check the function of fluoride in oral health and evidences obtainedsupports topical benefits of fluoride, but not systemic. However, emphasis must be given that dental caries is not caused due to fluoride deficiency. Therefore, fluoride supplements do not reverse carious lesions. Hence for peoples having high caries risk, proper patient counselling with guidance regarding oral hygiene and selection of food is to be done combining itwith the fluoride delivery in order to reduce dental decay.

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Invasive Dental Treatment and Associated Risk of First Myocardial Infarction Episode

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Abstract

Invasive dental treatment has been linked to transient increase in the risk for intravascular inflammation and endothelial dysfunction leading to increased cardiovascular risk i.e., Myocardial Infarction. It is known that invasive dental treatment may provide long term reduction in cardiovascular risk but a study has suggested a short termed transient increase in cardiovascular risk during the first four weeks after invasive dental treatment. The study was a self-controlled case series which used U.S Medicaid data to evaluate cardiovascular risk in 1152 patients (who acted as controls for themselves) within 24 weeks post invasive dental treatment. In another study there was increase in levels if inflammatory mediators during the first 24 hours of inflammatory mediators during the first 24 hours of intensive dental therapy with a transient decrease in their levels during the following one week. Certain other studies also support the above-mentioned finding. A randomised case control study conducted within nationwide health care and population registries in Sweden including 1,880 individuals (5 controls each) with first episode of Myocardial Infarction within the course of the study. The study concluded the lack of association of invasive dental treatment and Myocardial Infarction. Hence, the hypothesis that invasive dental treatment associated with development of risks of cardiovascular events is still inconclusive. But the long-term benefits of invasive dental procedures certainly overweigh the short-term transient cardiovascular risk.

Keywords: *Invasive dental treatment; associated risk; Myocardial Infarction.*

Introduction

Invasive dental treatment includes those involving perforation and manipulation of gingival tissues. Those include extraction, scaling and root planning, periodontal surgery and dental implant therapy. According to recent studies, locally invasive periodontal therapy causes a short-term acute inflammation in the body leading to transient endothelial dysfunction. It is proved that systemic inflammation has a major role in the development and pathogenesis of atheroma i.e., atherosclerotic plaque. Myocardial infarction is caused by occlusion of blood vessels by thrombus formation due to atherosclerosis. Hence, it is still a matter of debate if the inflammatory response generated by invasive dental treatment are potent enough to impair endothelial function and contribute to the pathogenesis of atherosclerosis lesion. Cardiovascular diseases are one of the causes of increased mortality in developing countries. On proving the role and contribution of dental treatment in the pathogenesis of atherosclerosis, prophylactic drugs (like anti-inflammatory drugs) can be administered prophylactically to prevent Myocardial Infarction.[1, 2]

The Hypothesis: Various studies have been conducted to test the hypothesis that there is a transient increase in cardiovascular risk due to the acute inflammatory response generated post invasive dental treatment. The objective of the article is to review these studies and draw a conclusion.

Evidence in favour of hypothesis: Inflammation has a role in the pathogenesis of atherosclerosis and not just metabolic disorders like hypercholesterolemia leading to lipid accumulation. The recognition of this fact has an immense impact on the understanding of arterial thrombus formation.[2] Intravascular inflammation results in generation of inflammatory markers which increase the risk for various vascular events.[3,4] A study was conducted using U.S Medicaid database from January 2002 – December 2006. The study was a self-controlled case series i.e., the study relied on within sample comparison to obtain conclusion

within the sample itself. The initial sample population included individuals with a record of first episode of myocardial infarction 24 weeks after the period of enrolment for the study to begin. Individuals below 20 years of age at the time of first episode, individuals with myocardial infarction outside continuous enrolment phase and those not exposed to invasive dental treatment during enrolment phase were excluded from the initial sample population. The final sample included 1152 individuals with first recorded cardiovascular diseases and with invasive dental treatment during the course of enrolment. The period of observation began one day after invasive dental treatment and extended to 24 weeks later. Individuals undergoing at least one invasive dental procedure were observed and those who underwent more than one procedure were observed for 24 weeks after each procedure. Incidence ratios and 95% coincidence interval for events occurring within exposed period were calculated. The study concluded that there is an increase in the rate of vascular events up to 4 weeks after invasive dental treatment (incidence ratio= 1.50 and 95% coincidence interval= 1.09-2.06) with commencement to normal within 6 months. The results remained unchanged even after eliminating individuals with predisposed cardiovascular risk factors.[5,6]

In another study, 120 severe generalized periodontitis patients were randomly assigned to either receive control based periodontal care (n=59) or intensive periodontal care (n=61) in order to analyse the association between systemic inflammation after invasive dental treatment and endothelial dysfunction. Patients with presence of systemic diseases (diabetes, cardiovascular diseases),with chronic or acute infections, receiving antibiotics or any other medications within 3 months prior to study were excluded. The inflammatory biomarkers, flow mediated vascular dilation and endothelial dysfunction were measured from 1day after invasive dental treatment to 6 months. Results indicated a surge in level of C-reactive protein, Interleukin-6 and a reduction in flow mediated dilation in intensive treatment groups within 24 hours. However, at the end of 6 months the levels of the pro inflammatory cytokines reduced drastically with the increase in flow-mediated dilation to the baseline. Neither of the groups had any cardiovascular events.[7] Bacteraemia caused due bacterial dissemination into the blood post invasive dental treatments, causes acute inflammation which is transient. This acute inflammatory response further causes vascular events which may result in the progression of atherosclerosis thus increasing cardiovascular risk.[8,9]

Evidence not in favour of hypothesis: A randomized case-control study conducted on date obtained from Swedish health care and population registries included 51,880 individuals with first episode of Myocardial infarction between 2011 and 2013. Every sample had 5 controls matched on the basis of age, gender and area of residence (n=246,978). Controls were free of any previous episode of Myocardial infarction.[10-12] The Dental Health register provided information regarding invasive dental treatments among sample population. Results showed increased association of case samples with diabetes and previously detected cardiovascular diseases than the control group. Control patients had higher socioeconomic status and educational qualifications. But there was no association detected between invasive dental treatments 4 weeks prior to the date of first episode of Myocardial infarction. Although, the study found an association between socioeconomic status and poor oral health. Patients with lower socioeconomic status opted for less dental treatments and hence poor oral conditions Poor oral health resulted in poor overall health and increased cardiovascular risk.[10, 13]

Discussion

Atherosclerosis is caused due to interaction between immune mechanisms and metabolic risk factors with an inflammatory driving force that results in not only induction and dissemination of lesions in the arterial tree but also as a triggering force. Atheromatas are irregular localised thickening of the subendothelial spaces (intima) of the arteries which are essentially lipid driven. It has grossly two parts – the core and the fibrous cap. The cap is rich in lipid and foam cells (modified LDL engulfed by macrophages) and the surrounding fibrous cap consists of smooth muscles and a collagen matrix. The atheromatas grows in the shoulder region where it is surrounded by an inflammatory infiltration (T-cells, macrophages, mast cells).[14] Various inflammatory molecules, microbes and autoantigens can cause the activation of these inflammatory cells, resulting in production of various pro-inflammatory cytokines like Interferon γ, tumour necrosis factor which reduces the stability of the plaque. Further, these inflammatory infiltration by generating matrix metalloproteinases and cysteine protease attacks collagen in the fibrous cap thus initiating thrombus formation. As an acute phase response to the proinflammatory cytokinesis, the liver produces C-reactive proteins, Interleukin-6, serum amyloid A, fibrinogen and various other molecules as

acute phase reactants. These inflammatory markers are elevated in the serum of individuals undergoing peripheral vascular changes. They may not cause the disease, but they contribute to statistical risk of cardiovascular dysfunction.[15]

Invasive dental treatment may cause dissemination of microbes into the blood. Studies have indicated bacteraemia in blood samples of the patients after lasting up to 15 minutes extraction and oral prophylaxis. Administration of an antibiotic prophylactically may have an impact on bacteria, but it will not eliminate the bacteria. This acute bacteraemia may induce an inflammatory stimulus that aggravates atherogenesis. Recent studies also indicate that invasive periodontal treatment produces transient dysfunction of the endothelium for a duration of one week due to the generation of an acute systemic inflammatory response. Although, this phenomenon is followed by restoration of this inflammatory response to the baseline.[16] It is accompanied with release of acute phase reactants like C-reactive protein, Interleukin-6 and others in the peripheral blood of the patients. C-reactive protein is considered apotent biomarker in the clinical diagnosis of ongoing cardiovascular changes in a patient. A study shows the phenomenon of flow mediated vasodilation concomitant with vascular changes after invasive dental treatments. Flow mediated vasodilation shows nitric oxide induced vasomotor function which provides an insight into the effect of nitric oxide on cell multiplication, adhesion and the coagulation cascade thus causing endothelial dysfunction.[17]

One cannot exclude the possibility of alternate pathways involved in the causation of vascular changes like post invasive dental therapy related pain induced stress, consumption of analgesics post treatment or disruption in salicylate or antiplatelet therapy prior treatment. All these mechanisms tend to support the phenomenon of inflammation induced vascular dysfunction. But is this acute inflammatory response strange enough to cause impairment of the fibrous cap causing plaque rupture and thus myocardial infarction? Although studies have indicated that the inflammatory response is short-lived such as not to result in Myocardial infarction. Studies supporting the hypothesis may have certain amount of bias. Patients with episodes of first Myocardial infarction 2 days after invasive dental treatment may be because the symptoms related to upcoming Myocardial infarction prevented the patient from attending dental appointments (protopathic bias). Also, patients already receiving treatments to decrease cardiovascular risk factors like consuming anti-inflammatory(mostly over the counter), antithrombotic or antihypertensive drugs may have a cardio-protective effect around and after invasive dental treatments. This may act as a source of error.[18-20]

Many therapeutic opportunities can arise from the hypothesis. The administration of immunosuppressants, anti-inflammatory, lipid lowering statins or vaccination with oxidized LDL prophylactically can pave a pathway towards decreased vascular changes and thus reduce cardiovascular risk after invasive dental treatments.[21-23]

Conclusion

There are findings both supporting as well as contradicting the hypothesis. We can infer a conclusion that invasive dental treatments results in acute inflammation and endothelial dysfunction which is transient in nature. But the long-term benefits from such treatment enhances the overall endothelial function. There is very little knowledge about systemic response concomitant with invasive dental treatments. Hence, it is still inconclusive if the acute, short-termed inflammation is potent enough to increase cardiovascular risk and thus causing Myocardial infarction. Further research needs to be conducted in support of the hypothesis. The administration of prophylactic drugs could then be introduced in order to decrease mortality due to fatal cardiovascular diseases like Myocardial infarction.

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Lymphagioma of the Tongue: A Case Report

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Abstract

Lymphangiomas are congenital benign focal malformations of the lymphatic system diagnosed after birth & early childhood & predominantly seen in the head and neck region. These are uncommon when oral cavity, subcutaneous tissues and skin in involved. They are associated with a number of syndromes and is one of the causes of macroglossia. Usually the anterior one third and dorsal aspect of tongue is involved & is the common site when there is an intra oral involvement. Treatment consists of sclerotherapy and local excision of the lesion. Here we report a case of a 12-year-old male patient.

Keywords: *Lymphangioma, Benign malformations, Lymphatics.*

Introduction

Lymphangioma is an atypical, benign, congenital disorder of unspecified etiology with the genesis from lymphatic system.[1] This was first reported by Virchow in 1854. It's a tumor like deformation of an embryonic origin occurring in individuals less than twenty years. It is the defect of vascular system instead of a real tumor. It develops as a consequence of sequestrations of elementary embryonic lymphatic as a result of failure of anastomoses with the larger lymphatic channels, thus present as areas of lymphatic blockade. Syndromes associated with lymphangioma are Trisomy, Turners Syndrome, Noonan's syndrome etc.[2]

Case Report: A 12 years old male patient reported to the Oral Medicine & Radiology Department with chief complaint swelling in anterior region of the tongue in the last 9 years. According to the past history there was a slight increase in size of the tongue which causes difficulty in having food. But there was no difficulty while talking and it was not associated with any other symptom like pain or burning sensation. He was average built with moderate nourishment & vital signs within normal limits.

Extra oral examination revealed no abnormality. Intraoral examination revealed tissue tags in the upper and lower labial mucosa with healthy gingival findings. The patients had a Class 1 molar relation with ellis class I fracture wrt 11& decayed 46. Local Examination of the tongue revealed a swelling in the left dorsal surface which was slightly more pink in colour than the surrounding mucosa, measuring about 4x2 cms in size, extending from the tip to post 1/3rd of oral part & left lateral border to 1cm crossing the midline. It was oval in shape with a rough pebbly surface with red nodular - projections. The posterior part was covered with yellow psedomembrane and the surrounding mucosa being normal. On palpation shape and size reduced to 2x3 cms (Figure 1). It was non tender, soft, spongy, compressible and doesn't cross the midline. Rest of the tongue was apparently normal. On the basis of history and clinical features a provisional diagnosis of lymphangioma. MRI of tongue was advised as an investigatory procedure and an excisional biopsy under general anesthesia was planned (Figure-2). On histopathological examination it was confirmed to be a lymphangioma of cavernous origin (Figure 3). There was no evidence of recurrence of the lesion on follow-up of 3 years.

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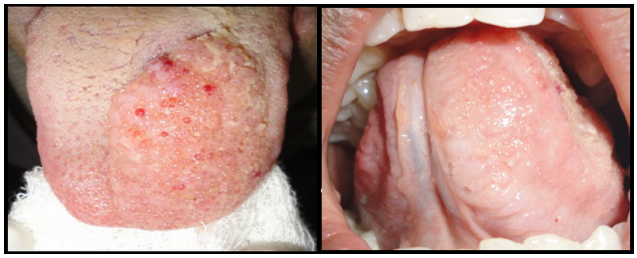


Figure 1. Swelling of dorsal surface of tongue & non involvement of the ventral surfaces

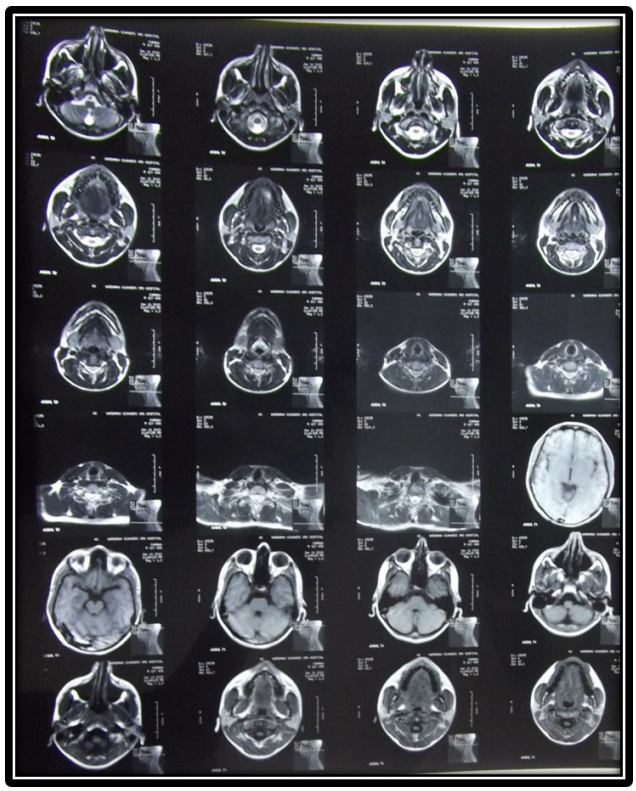


Figure 2: MRI shows Increased signal intensity (24 X 13X 14 mm) in the left lateral border of the tongue & anteriorly near the tip

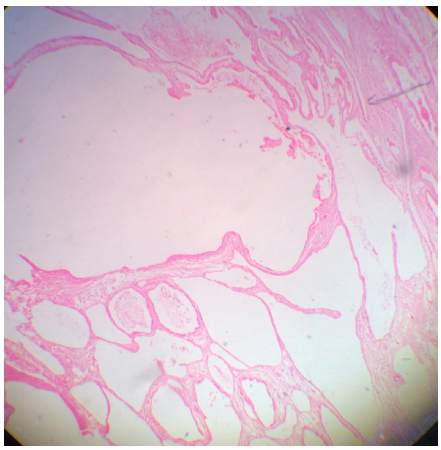


Figure 3: The H & E x 40 reveals cavernous hemangioma

Discussion

Lymphangioma is the unusual functioning of the lymphatics caused due to somatic mutations and obstruction of the drainage of the lymph.

It can be classified into four types depending upon the histological features.

1. Capillary Angioma consists of lymphatics that is small, thin walled & endothelium lined .
2. Cavernous angioma consists of comprised of dilated lymphatic vessels with surrounding adventitia
3. Cystic angioma or hygroma which presents with large lymphatic spaces surrounded by fibrovascular tissues and smooth muscles.
4. Benign lymphangioendothelioma also known as acquired progressive lymphangiona where the lymphatic channels appear to dissect through collagen bundle.[3]

Cavernous variant is rare when compared to cystic hygroma which is the most common variant of lymphangiomas in the head and neck region.

Lingual involvement on the dorsal surface and the tip of tongue is one of the rare locations. Lymphangioma clinically represents as multiple blister like nodular mass with a pebbly rough surface that is present in the dorsal surface of the tongue which appear as translucent vesicles leading to macroglossia in infancy leading to dysphagia, halitosis, airway obstruction and cosmetic deformities when big. Differential diagnosis for lymphangiomas are vascular malformations, hemangiomas, teratomas, neurofibroma, lingual thyroid, dermoid cyst, thyroglossal duct cyst etc. depending upon the involvement of the tongue.[4]

Histologically the lymphatic malformations can be macrocytic or microcystic depending upon the size larger than or less than 2 cms.

Treatment primarily is done to repair and restore breathing and swallowing of food. It is also done to establish normal speech, taste alterations, swallowing and to achieve esthetic corrections. It includes micro surgeries and use of sclerotherapy and in either case spontaneous regression cannot be attained. Non-surgical treatment primarily includes cryotherapy, diathermy, sclerosing agents like sodium morruate, Picibanil (OK-432), boiling water, saline hypertonic, ethanol etc. Intra lesional sclerosing agents are widely used although

there is no consensus regarding which is more effecting and the type of agent to be used.

Amongst the newer treatment modalities Bleomycin is used which is an anti-cancer agent but has various antiseptic, antiangiolytic & antineoplastic properties. It also has sclerosing properties and acts on the endothelial cells producing inflammatory effect & is injected intralesionally along with local anesthesia. Due to the proximity of the vessels and functional importance surgical procedures or excision is difficult and conservative procedures are preferred.[5,6]

Conclusion

Cavernous lymphangioma of tongue are rare and conventional treatment is preferred when compared to surgeries. Early recognition prevents functional deformities. Sclerosing agents and bleomycin are preferred and conservative mode of treatment for lymphangiomas.

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Blood Biomarkers for Oral Cancer

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Abstract

In the current scenario, even if there is much advances in treatment modalities, the survival of patients with cancer has not improved significantly owning to late detection and failures. The purpose of this article is to explore the role of blood biomarkers such as Antioxidants, Trace elements, proteins, antibodies etc to detect oral squamous cell carcinoma (OSCC) and premalignant lesions (PML). Key biological molecules or markers that can be linked to cancer development, risk assessment, screening, repetition probability, indicating prognosis, indicating invasion and monitoring therapeutic responses of cancer which are identified with Molecular biology and oncology research studies on oral cancer biomarkers.

Keywords: *Blood Biomarkers, oral cancer, oral squamous cell carcinoma, premalignant lesions.*

Introduction

Oral cancer is one of the major causes of morbidity and mortality all over the world which may vary according to different geographical locations and population. In order to improve diagnostic method, there is advancement in molecular biology and cancer research. Oral cancer is the sixth most common malignancy worldwide. Most of the cancers of the oral cavity are oral squamous cell carcinoma (OSCC).[1] Lesions which are clinically seen helps in easy detection of the cancer, but deep located tumours are not recognised until they have increased in size and reached an advanced stage. Floor of the mouth is second most common location. Oral cancer has various stages of invasion according to which one can determine the prognosis as well as treatment modalities using markers. Oral cancers have a greater rate of metastasis and recurrence which decreases the survival rate in comparison to other cancers.[2]

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Indicators for health and physiology-related assessments, such as pathogenic processes, environmental exposure, disease diagnosis and prognosis or pharmacologic responses to a therapeutic intervention can be served by quantifiable biological parameters such as Biomarkers. They can be categorized into genomic, proteomic, or metabolomic. The Serum biomarkers investigation helps finding therapeutic targets and prognosis in different kind of tumours. As shown in literature the increase in levels of some proteins, p53 antibody and VEGF in blood act as an indicator of oral cancer. The biomarkers differ according to race, lifestyle, and carcinogen exposure. It is crucial to keep the knowledge of all the types of biomarkers which would lead to the improvement of diagnostic and prognosis method of tumour recurrence and metastasis in order to assess changes in oral lesions.[2]

Serum biomarkers: Serum biomarkers are defined as substances changing quantitatively in the serum during tumour development. Classically, the tumour synthesizes the marker and release into circulation or expressed at the cell surface in large quantity by malignant cells.[2] Generally, tumour forms a marker and release that into circulation or malignant cells help in expressing them at the cell surface. The malignant tumour formation changes the marker's levels in blood, so they can be used to check metastasis and recurrence.

Types of Biomarkers:

A Imaging biomarkers (CT, PET, MRI):

A1 Molecular biomarkers: These are non-imaging biomarkers with biophysical properties, in order to know their levels in body fluids(e.g., plasma, serum, cerebrospinal fluid) which includes nucleic acids-based biomarkers such as gene mutations or polymorphisms and quantitative gene expression analysis, peptides, proteins, lipids metabolites, and other molecules.[3]

B Tumour marker/substance: These are of two types which are tumour specific and tumour associated. Tumour specific substance are from direct result of oncogenesis, while tumour associated substances are proteins, enzymes, hormones and immunoglobulins found in the blood and are directed by the tumour or by the influence of the involved tissues.[4]

C Disease related and Drug related Biomarkers:

C1 Disease **related Biomarkers:** Disease-related biomarkers shows effect of treatment on patients if disease present already which can be called as diagnostic biomarker, the other one is in which a disease is initiated in an individual despite of the type of treatment is called as prognostic biomarker.[5]

C2 Drugs related Biomarkers specify if a drug will be effective in a specific patient and how the patient's body will link with it.[5]

Advantages of using Biomarkers: In case of chronic diseases, the patients will be consuming medicines for a long period, in that case a proper diagnosis is required, specially where complications are expected. These Biomarkers act as protagonists as they can confirm difficult diagnose.[6] Diseases like Alzheimer's or rheumatoid arthritis, start without any symptom in the beginning. In previous cases the initial stage may or may not progress into symptoms. In these cases, biomarkers identify the high-risk individuals accurately and at different stages so that the treatment can be before onset of the disease or after that.[6]

It is better to obtain the sample material in easiest possible way in order to use the biomarker. This can be a simple blood sample taken through Intra Venous method, a urine or saliva sample, or a drop of blood from the fingertips. The results may not differ from each other for unlike laboratories and the biomarker must have proven its effectiveness for the diagnosis, prognosis, and risk assessment of the affected diseases in independent studies without any intervention. A biomarker for clinical use needs good sensitivity e.g. ≥0.9, and good specificity e.g. ≥0.9[7]. The population should always be kept in mind while choosing the biomarker for the precision of positive predictive value and negative predictive value.

Disadvantages of Biomarkers[8]

(1) Level of Accuracy: Transporting the specimen to laboratory and collection of equipment's can cause a problem in the calculation of biomarker level. Biomarkers measurement can be disturbed by improper storage and change in environment of samples which includes timing so that reliability; validity can be established. Storage determines the longevity of samples. Homogeneity of risk or disease gets difficult to understand if diseases are studied in normal range. Responsibility of Ethical committee and training the handlers of specimens is essential.

(2) Affordability: According to the financial resources and objective the biomarkers should be chosen but mostly important in a small clinical trial. But in case of an epidemiologic study the population increases along with the cost. This excludes the laboratory procedure which is comparatively simple. Even if the sample size is high and if the biomarker is readily available and its inclusion in the study is feasible then the cost decreases.

(3) Acceptability: Human tissues or body fluids origin biomarkers are better for selection, can be a good choice. There is certain degree of risk but it is of less concern in clinical trials as it is done to know the new treatment modalities for the patients.

Blood biomarkers which are most commonly used now a days for detection of premalignant lesions are:

Trace elements[9]:

Copper: Enzymatic actions in the body including cytochrome-c oxidase, superoxide dismutase, metallothene and lysyl oxidase are carried out by copper. In vitro, there is increase proliferation of fibroblasts due to raised copper concentrations. Higher copper levels were observed in patients with pre-malignant and malignant oral lesions. Areca nut shows a high copper content (302 nmol/g), the substantial amount of which is released into saliva 1 after 15-30 minutes of chewing areca nut.[10]

Iron: Iron deficiency for long period leads to increase risk of mucosal exposure to irritants. The reasons could be multifactorial in OSMF patients in Iron deficiency. In collagen formation there is hydroxylation of proline and lysine where Iron is used, also altered epithelial cell turnover rate or depletion of nutrients due to pronounced difficulty in mastication.[9]

Zinc: Zinc (Zn) is an important part of bio-membranes because it is used in managing membrane stability and lipid per oxidation-related injury. Zinc deficiency also contributes to cancer initiation by activation of NF-kB expression and the consequent induction of tumorigenic signaling.[11]

Selenium: It is responsible for immune modulation and cells growth inhibitory properties that effects immune response by making immune cells more resistant to oxidative stress. Selenium is considered as a protective agent and its dietary intake is of great benefit against cancer according to the various epidemiological studies.[9]

Cadmium: In Oral cancer and Oral leucoplakia the cadmium values were decreased. Cadmium accumulates in the body hence cadmium burden increases with age. OSMF patients with low iron status there is increased internal absorption of Cadmium. Cadmium may be one of the causes for malignant transformation of OSMF and its estimation may be a helpful tool in differential diagnosis of premalignant and malignant lesions of the oral mucosa.[9]

Antioxidants[12]: The Carcinogenesis process is highly promoted by Reactive Oxygen species (ROS) whose generation initiates lipid peroxidation (LPO) Antioxidants especially enzymatic antioxidant like Superoxide Dismutase (SOD), beta carotene and Vitamin A, Vitamin E, Vitamin C and Vitamin E play an important role in this process Malignancies results by reaction of hydrogen peroxide with Reactive Oxygen species to form hydroxyl radicals that causes destruction of RNA, DNA and protein resulting in the malignancy. Thus, it can prove an efficient marker of early diagnosis of malignant transformation.[12] Epidemiologic studies have established the role of diets rich in vegetables and fruits in oral carcinogenesis, with important contribution of vitamins and iron in maintenance of oral mucosa.

Superoxide Dismutase[13]: Betel quid generates free radicals in the oral cavity. There is initiation of lipid peroxidation while enzymatic antioxidant superoxide dismutase detoxifies the effect of these harmfulradicals (hydrogen peroxide and hydroxyl). In order to prevent oxidative stress these radicals transfer their unpaired electron to oxygen to form superoxide. Plants and animals are rich in Beta carotene and Vitamin A Beta carotene (red-orange coloured pigment). It is the inactive precursor of Vitamin A. Helper T lymphocytes level rises after ingestion of Beta carotene. It plays an important rolein OSMF and its level decreases with disease progression. An irreversibly oxidised form of Vitamin A is Retinoicacid which is the principal hormone-like growth factor for maintenance of epithelial and other cells So it act as as a great radical trap forhydroxyl and peroxyl radicals, therefore it should be maintained in adequate levels in the blood due to its immune regulatory properties.

Vitamin C (Ascorbic acid)[14]: Vitamin C has several roles such as an antioxidant scavenging free radical, reduces vitamin E degradation, inhibits nitrosamine formation, enhances detoxification via cytochrome P450 andiron absorption by reducing dietary iron from ferric form to the ferrous form. The conversion of proline into hydroxyproline is done by Vitamin C. This hydroxylation reaction requires ferrous iron and Vitamin C. The deficiency of vitamins and iron will result in abnormal repair of the lamina propria. This will result in defective healing and scar formation, which ultimately led to OSMF.[14]

Vitamin E[15]: Vitamin E is the fat-soluble antioxidant that has both tocopherols and tocotrienols. Reactive oxygen radicals (ROS) formed after the oxidation of fat are inhibited by the Vitamin E molecules. Antioxidant parameters and found decreased Vit E level in stage II and III but not instage I OSMF patients.

Immunoglobins[16]: Body protection and recognising the foreign antigen are done by the active immune response in OSMF. IgG were observed increasing among the OSMF patients by which is one of the earliest-recorded in India. IgG and IgA has been noted in OSMF patients increasing in recent studies. A progressive reduction of PTEN (Phosphatase and tensin homolog) expression which is a tumour suppressor gene was seen in OSMF and OSCC. Hence, PTEN alteration is considered as a specific molecular event in carcinogens. Initial genetic events during the malignant transformation of the disease give rise to unpredictable Genomic stages. In case of OSMF cytochrome P450 is considered as the genetic biomarker. There are genetic polymorphisms in

some specific regions of the Cytochrome P450 3A genes which is related to a genetic history, these people could be examined for OSMF as shown by some studies. It is suggested that high risk of OSMF among men if they use arecanutor smokeless tobacco in abundance are due to the polymorphins.

Literature has been showed over expression in serum of some proteins, p53 antibody (9), andVEGF as an indicator of oral cancer.[2]

Proteins

CRP-C-Reactive Protein (CRP) synthesize pro-inflammatory cytokines which is a functional counterpart to immunoglobulin G.

P53 antibody[17] p53 is a phosphoprotein that helps in cellular arrest cellular arrest and apoptosis, and in response to cellular stress helps avoid mitosis of cells with damaged DNA. Early stages of OSCC is preceeded by alteration of its expression alteration, event that precedes the continuous tumoural growth, has been related to loss of proapoptotic function.

VEGF[18, 19] Vascular endothelial growth factor is a cytokine with multiple roles has a crucial role in blood formation. Increased values of VEGF are found to be increasing with disease progression and decreases after treatment. In OSCC patients there is increase in serum VEGF accompanied with lymph node metastasis.

Public health significance[8]

The course of exposure and disease can be described by:

- Establishment of dosage regimen and response
- Early signs of disease
- Relation between exposure and disease
- Misconception about relation between exposure and disease.
- Effect of disease on various variable condition
- Increased disease assessment in individual and group.

Conclusion

Biomarker's origin should begin prior or parallel to any epidemiological studies or reports. Pilot studies are to be completed in order to form the laboratory component, and to determine accuracy, reliability, interpretability, and feasibility. Age and gender like variables should follow normal distributions and this need to be taken care by the investigator. The investigator needs to calculate the extent of intraindividual variation, tissue localization, and persistence of the biomarker Biomarkers play a critical role in improving the drug development process as well as in the larger biomedical research enterprise. For better understanding of normal physiology and for increasing our knowledge of treatments for all diseases it is crucial to know the link between quantifiable biological processes and their consequences.[20]

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Oral Submucous Fibrosis: A Warning Towards Oral Cancer

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Abstract

Oral submucous fibrosis is a chronic, insidious and highly potent precancerous condition of the oral cavity and sometimes affecting the pharynx.[2] It is characterized by generalized inflammation and fibrosis of the submucosal tissues (lamina propria and deeper connective tissues).[1] Oral Submucous fibrosis is a debilitating condition of the oral cavity with multifactorial etiology out of which areca nut chewing being the most common cause. There are various methodologies for management of this precancerous condition involving habit cessation, conservative treatment such as nutritional therapy and medical therapy, surgical interventions and oral physiotherapies, but, none of them has been able to provide permanent relief from the signs and symptoms. This review aims to focus various etiological factors behind the disease and treatment modalities available for treating this disease, mainly focusing upon the non-surgical approaches.

Keywords: *Oral submucous fibrosis; precancerous condition; etiological factors; treatment modalities; non-surgical approaches.*

Introduction

Oral submucous fibrosis is a chronic, insidious and highly potent precancerous condition of the oral cavity and sometimes affecting the pharynx. It is characterized by generalized inflammation and fibrosis of the submucosal tissues (lamina propria and deeper connective tissues). It is universally known as a disease of the Asian continent or to be more precise a disease prevalent in the Indian subcontinent. This condition was even prevalent in the ancient era, in the days of Sushruta (600BC), a great practitioner of medicine in his times, who mentioned this condition as 'Vidhari'.

Epidemiology: Oral submucous fibrosis has a prevalence rate of 0 to 1.2% in India, Myanmar and South Africa. In India,0.2 – 0.5% of the population show symptoms of Oral Submucous Fibrosis out of which 5% affected are females and 2% affected are male. Incidences of Oral Submucous Fibrosis is higher in southern parts of India as compared to other regions. Even incidences of Oral Cancerare also highest in southern states of India as compared to other states. About 7-13% chances of malignant transformation are estimated in patients showing signs and symptoms of Oral Submucous Fibrosis.

Etiology: Oral submucous fibrosis has a strong association with bettle nut chewing or quid chewing, although in rare cases non beetle nut chewing habits have also been seen. Excessive chilly consumption in diet, tobacco consumption whether as smoked tobacco such as biddi, chillum, cigarettes or hookahsor smokeless tobacco and lime are seen causing this pre-cancerous condition. Occurrence of oral submucous fibrosis has a dose dependent relationship with areca nut which denotes the unhusked whole fruit of areca palm tree. India being the largest producer of beetle nuts in the world followed by China and Myanmar, has higher reports of Oral Submucous Fibrosis as compared to other countries. Areca nut which is predominant in arecholine as well as tannins, catechins and high copper content stimulates fibroblastic concentration and collagen synthesis, mostly in bilateral buccal mucosa as well as labial mucosa, lingual mucosa and palatal mucosa.[4]

Areca nut is consumed either in 'Paan', which is the most common and ancient practice of smokeless tobacco

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consumption in India or as commercially available products such as mawa, khaini, guthka and pan masala. Origin of paan dates back to more than 2000 years and has a strong association with Hindu cultural heritage and religious believes.[6] It has a symbol of auspiciousness and is even offered to the deities in temples and in marriages. It helps in digestion, freshens the mouth, induces euphoria and also has anti-helminthic properties, but, the betel nuts in paan has an adverse effect on the oral mucosa.[7] Continuous consumption of betel nut causes irritation in buccal mucosa. Arecholine in areca nut stimulates the fibroblasts metalproteinase, increasing collagen production and decreasing collagen breakdown thus leading to increased fibrosis of the mucosa. Tannins and Catechins increase cross-linkage and stabilization of collagen fibers and decreased degradation of collagenases thus increasing fibrosis. Increase in level of copper content in saliva, stimulates fibroblastic growth, increasing fibrosis in buccal mucosa.

Signs and Symptoms

Buccal Mucosa: This precancerous condition presents itself with decreased inter-incisal distanceas there is progressive reduction in mouth opening due to formation of fibrous bands in buccal mucosa. Inter-incisal distance is calculated as the distance between the incisal surface of maxillary central incisors and incisal surface of mandibular central incisors. In a normal healthy individual the inter – incisal distance is approximately 45mm or four finger distance. But in an Oral Submucous Fibrosis affected individual the inter – incisal distance gets restricted to two finger distance or even less. Blanching of the oral mucosa is the most common and the earliest findings of oral submucous fibrosis.[3] Blanching is caused due to impairment in blood supply to the buccal mucosa. Due to decreased vascularity the mucosa appears opaque or white in colour thus giving it a marble like appearance. Blanching may take place locally or may be diffused depending upon the area exposed to the causative agents. On palpation leathery consistency of mucosa is felt with presence of circular or elliptical fibrous bands around Rimaoris. Buccal mucosa becomes rough, blanched and inelastic with leathery consistency in later stages which becomes difficult to evert them.

Tongue: Tongue becomes smooth due to loss of papilla. Gradually tongue protrusion gets limited within vermillion border of lip due to fibroblastic concentration in lingual mucosa. Burning sensation of the oral mucosa is a common symptom in the initial stages, aggravated by intake of spicy food, followed by either hypersalivation, i.e. increased saliva production or dryness of the oral cavity. Affected individual faces difficulty in speech, mastication and swallowing due to fibrosis of oral mucosa. Patient complains of trismus and aphagia as a result of fibrous band formation due to increased collagen synthesis and decreased collagen degradation in oral mucosa.

Hard Palate and Soft Palate: Clear delineation of the hard palate from the soft palate is seen due to fibrotic changes in the soft palate. Uvula becomes shrunken giving it a hockey stick appearance which indicates clear involvement of fibrotic changes in the soft palate region. The fibrotic bands radiate from pterygomandibular raphe to the anterior faucial pillars in the soft palate. Soft palate plays an important role in swallowing of food as well as in speech. Due to increased fibrosis of the soft palate, patient with Oral Submucous Fibrosis faces difficulty in swallowing.

Gingiva and Floor of Mouth: When gingiva and floor of the mouth is involved, it becomes fibrotic, inelastic and blanched.

Other Findings: As a rare finding hearing disturbances can be seen in certain individuals due to fibrosis around the Eustachian tube. In advanced stages pharyngeal involvement is also seen if the condition is left untreated. Sometimes vesicle formation, ulceration, petechiae and pigmentation is also seen in advanced stages of Oral Submucous Fibrosis.[5]

Treatment and Management: Oral Submucous Fibrosis is one of the warning signs by nature before occurrence of some carcinomas of the oral cavity. If oral submucous fibrosis is detected early and instructions from the physician is properly followed by the patient then risk of any further malignant condition can be avoided. Oral Submucous Fibrosis can be managed both conservatively as well as surgically. Its management is mostly dependent on the severity of the condition. Cases which are detected early can be managed by conservative approach and medical therapies. But advance cases require mostly surgical intervention with post-op care, long-term postoperative physiotherapy and follow ups to the surgeon.

Habit Cessation: Conservative management mostly involves patient awareness regarding life threatening effects of various habits like smoking, tobacco chewing

or betel nut chewing, motivating patients to discontinue habits involving areca nut chewing, tobacco consumption involving both smoked and smokeless form and providing nutritional support to the patients. Individuals should be made aware about the consequences of this disease through various awareness programs conducted governmentally and non-governmentally. Patients reporting with Oral Submucous Fibrosis should be explained about the outcomes of the disease as well as potent malignant transformation. Many a times improvement like increased inter-incisal distance and relief from burning sensation are seen in patients who discontinue the habit.

Nutrition and Antioxidants: Early stages of Oral Submucous Fibrosis can be treated by medical therapies like consuming diet rich in vitamins and antioxidants, local and systemic administration of steroids, placental extracts, hyaluronidase, use of gamma-interferon, chymotrypsin, collagenase and administration of vasodilators. Antioxidant rich diet intake have in a larger number shown increased inter-incisal distance, decreased fibrosis of oral mucosa and decreased trismus. Some of the antioxidant rich products that are commercially available in India are turmeric,[11] carrot, tomato, spinach,aloevera, kidney beans, barley guava, oranges, mangoes and papaya. Similarly, local administration of steroids in the affected sites or systemic administration of steroids have shown increased vascularity of the area with improvements in clinical features in early stages of the disease.[8]

Human Placental Extract: Placental extract which is rich in enzymes like alkaline and acid phosphatase, glutamic acid and pyruvic acid, nucleotides like ribonucleic acid and adenosine triphosphate, vitamins and fatty acids can also be used for treatment of this precancerous condition. Placenta can be extracted in four forms, i.e. aqueous, extract, lipid extract, immune gamma globulin and tissue coagulated. But only 'Placentix' which is the aqueous extract of the placenta acts as a biogenic stimulator, enhancing regenerative processes, wound healing and anti- inflammatory effects.[9]

Other Medical Therapies: Hyaluronic acid plays an important role in collagen formation. Hyaluronidase acts on hyaluronic acid by reducing cell formation which in turn prevents burning sensation of oral mucosa and improves health of oral mucosa. Gamma interferon is a recently discovered therapy that reduces burning sensation of oral mucosa and increases mouth opening.

Similarly, injecting the sites with vasodilators increases blood flow to the affected region which in turn helps nutrients as well as therapeutic agents to reach the affected areas. Due to increased vascularity there is reduction in blanching to some extent in the affected regions of buccal mucosa, lingual mucosa and labial mucosa.

Surgical Approach: In advanced stages where remarkable changes cannot be achieved by only nutritional therapy or medical therapy any biopsy of the affected region suggests neoplastic changes surgical intervention is used to increase the inter-incisal distance, decrease trismus and avoid asphagia. Excision of the fibrous bands is the main aim in case of surgical management. Fibrous bands that are excised are replaced with grafts which are usually tongue flaps, nasolabial flaps, skin grafts, buccal fat pads, collagen membranes, palatal flaps or free flaps (radial forearm flaps).[10] Proper Oral physiotherapy is a must after surgical excision to avoid post-operative fibrosis and relapse of the condition. Even in early stages oral exercises like ballooning of mouth and forceful mouth opening have been seen to be effective in increasing mouth opening in case of trismus due to increased fibrosis of buccal mucosa. Hot diathermy or Microwave diathermy has been found to be effective in treatment of fibrosis and trismus, and hence can be suggested to patients reporting with oral submucous fibrosis.

Cryosurgery and lasers to some extent have also been applied in treatment of Oral Submucous Fibrosis. In case of cryosurgery the affected tissues are destroyed locally by freezing them in situ. Extremely lower temperature is produced by using chemical agents like liquid nitrogen and liquid argon to destroy the tissues in affected area. The agent is exposed to the affected area by means of an instrument known as cryoprobe. Lasers such as carbon dioxide lasers have also been found to be effective in removing the fibroses tissues as compared to traditional surgical techniques.

Conclusion

Oral Submucous fibrosis is a debilitating condition of the oral cavity with multifactorial etiology out of which areca nut chewing being the most common cause. All the ways available for the management of this disease provide only short-term relief from the symptoms as the exact etiology for the disease has not been understood and this condition is also progressive

in nature. The course and management of the disease is to a larger extent dependent on the severity of the condition and clinical staging. Most the patients report during moderate to advanced staging, when the signs and symptoms associated with the disease becomes irreversible. But if the disease can be caught during the early stage, then, habit cessation can itself limit the progression of the disease. This is possible only if the masses are aware of this premalignant condition, which has a potent malignant transformation if left untreated.

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Management of Cyclosporin – A Induced Gingival Overgrowth through External and Internal Bevel Gingivectomy

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Abstract

Chronic usage of anti-hypertensive, immunosuppressants could result in unwanted effect such as gingival overgrowth. The severity and expression of this tissue specific condition could be also be influenced microbial plaque. Increase in volume of gingiva compromises the esthetics, speech and acts as a hindrance for maintenance of optimal oral hygiene. The management of such cases needs a combination of non surgical and surgical approach. This case report highlights the successful management of drug induced gingival overgrowth by a combined non-surgical and surgical approach. It also focuses on the role of supportive periodontal therapy during 1 year follow-up.

Keywords: *Cyclosporin A, gingival overgrowth, gingivectomy, immunosuppresant.*

Introduction

Common drugs associated with gingival enlargement or gingival overgrowth (GO) are anticonvulsants, calcium channel blockers and immunosuppressants[1]. The expression of this GO could be influenced by variety of factors its prevalence varies from drug to drug. A prevalence of cyclosporine A induced GO of 39. 4%[2], 6-15% for nifedipine and 50% for phenytoin has been reported among adults[3].

The interdental papilla is the most common site for the initiation of GO and involves mostly the facial surfaces of anterior teeth. Although the etiopathogenesis of GO is still unclear, it is of the assumption that certain gingival fibroblasts cells are susceptible to cyclosporine A and its metabolites the interaction of which is enhanced if accompanied by plaque induced gingival inflammation[4, 5]. Also, since the plaque control becomes difficult due to increased gingival volume, there is a vicious cycle of enlargement and inflammation leading to a compromised esthetics and discomfort[6, 7].

Different treatment options are considered that include non-surgical, surgical or a combination of both. While non-surgical approach reduces the inflammatory component in gingival tissue, the surgical approach aims to eliminate the fibrotic component that exists after nonsurgical therapy. We present a case highlighting the successful management of drug induced gingival overgrowth by non-surgical and surgical approach. It also focuses on the role of supportive periodontal therapy during 1 year follow-up.

Case report: A 29 year old male patient reported to the department with complaint of bleeding gums and enlarged gingiva which was causing him a discomfort and an esthetic concern. He was apparently alright six months back when he started noticing swelling and bleeding of gums from anterior teeth region. He revealed that he had undergone a renal transplant two years back and was taking cyclosporine for the same along with other medications. He had no other systemic illness. His family history was not significant.

On examination, the colour of gingiva in the lower and upper anterior teeth region was red and erythematous. Consistency was soft and oedematous. The size of gingiva was increased particularly on the facial aspect. There was also a nodular enlargement of interdental papillae. There was bleeding from gingiva

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on slight provocation (Figure1). There was presence of pockets without any attachment loss (pseudo-pockets) in the maxillary arch and presence of combined pockets in the mandibular arch. A clinically significant GO score of 30. 5% was calculated present case[8]. An IOPA X-ray revealed a marginal horizontal alveolar bone loss which in the lower incisors. (Figure 2). Based on the clinical presentation and drug history a diagnosis of Cyclosporin A-induced gingival overgrowth was arrived at. The drug induced gingival overgrowth (DIGO) was associated with localised class II grade B periodontitis with lower anterior.

Since his consulting nephrologist suggested to continue the present immunosuppressant the drug could not be altered. The non-surgical periodontal therapy included full-mouth scaling and root planing with polishing. Detailed oral hygiene instructions were given. An antibiotic regimen of Amoxicillin and Clavulanic acid 1 g orallytwice daily was prescribed for 8 days as suggested by the patient's nephrologist to cover the infectious risk associated with his systemic health status. Re-evaluation after 4 weeks revealed marked reduction in the gingival inflammation with minimal bleeding on probing. However, the patient expressed his esthetic concern owing to the residual gingival enlargement.

A surgical correction of the GO was thus planned for achieving esthetic gingival contour. The surgical planning included external bevel gingivectomy for the maxillary arch and internal bevel gingivectomy for the lower arch. A detailed blood investigation was carried out which revealed normal parameters. After administration of local anaesthesia in the maxillary anterior region, pockets were marked using Krane Kaplan pocket marker. An external bevel gingivectomy incision was then placed using a #15 bard Parker blade (Figure 3). Periodontal curettes were used to completely remove the excised gingiva. Periodontal pack was placed. Pack was removed after one week.

For the mandibular arch, after administration of local anaesthesia, an internal bevel incision was placed (Figure 4) and a mucoperiosteal flap was raised to access the root surfaces. The excess gingival tissue was removed with periodontal curettes after giving sulcular incisions. A thorough debridement was done and flaps were closed using continuous suturing technique (Figure 5). Periodontal pack was placed. Post-operative instructions were given. Suitable analgesics and antimicrobials were prescribed. Sutures were removed after one week.

Healing was found to be satisfactory for both arches. The patient was kept under recall for 12 months for monitoringthe oral hygiene efficiency and to note any signs of recurrence. The self-cleansable contours of the gingiva aided in maintenance ofperiodontal health and achieving satisfactory plaque control. The patient was followed up for 1 year during which good oralhygiene and no recurrence of enlargement was noted. The patientwould no longer cover his mouth and displayed an improved confidence while talking or smiling (Figure 6).



Figure 1. Pre-operative view



Figure 2. IOPA X ray



Figure 3. Surgical correction in the maxillary arch



Figure 4. Surgical correction in the mandibular arch



Figure 5. Continuous suturing



Figure 6 Post-operative view

Discussion

Gingival overgrowth is a mild enlargement involving an isolated interdental papilla to marked enlargement affecting either one or both the jaws with diverse etiopathogenesis[9]. Initially it appears as a localized nodular enlargement of the interdental papilla (horizontal growth) and progresses further towards the crown (vertical growth). Some severe cases have shown that gingival tissue may cover the clinical crown to a large extent[10]. The non-surgical periodontal therapy results in a significant reduction in the overall inflammation component of the GO with reduction in the circulating levels of inflammatory markers[11]. However, in most cases fibrotic component does not resolve completely after initial periodontal therapy. Since this does not meet the functional and esthetic demands of the patient, a surgical correction is deemed necessary. Microbial dental plaque is a strong co-factor in the etiology of Cyclosporin A-induced gingival overgrowth[12]. Risk factors that could possibly modify the prevalence and severity of Cyclosporin A-induced gingival overgrowth including age, genetic predisposition, gender, drug variables (serum concentration, drug dosage, salivary concentration) and periodontal variables such as plaque accumulation and pre-existing gingival inflammation[11, 13]. Patient education, motivation and compliance during and after dental treatment are most important factors for a long-term maintenance. Reinforcement of oral hygiene is of importance as there is tendency to revert to their original behaviour[14].

Conclusion

Gingival overgrowth is a well-documented unwanted effect associated with the systemic use of unavoidable immunosuppressive drugs such as Cyclosporin A. Patients with gingival overgrowth face challenges in oral hygiene maintenance. For apredictable outcome of treatment, motivation for oral hygiene should be started at the initial stages of treatment[15]. At least one year follow up for the patient to evaluate the tissues and for oral hygiene maintenance should be ensured.

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The Role of Proanthocyanidins in Treatment of Periodontal Disease

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Abstract

Periodontitis is a chronic inflammatory condition caused due to multiple factors which results in destruction of connective tissue and alveolar bone that support the teeth. Bacterial plaque is one of the main factors that accelerate the process of destruction. Therefore, controlling the destructive effects of this factor by including agents that could reduce or inhibit the ongoing damage is important. Proanthocyanidins (PA) have various properties including antioxidant, antimicrobial, anti-inflammatory, anticarcinogenic thus possessing the ability to enhance gingival health and thus preventing further destruction. There are many studies that have proved these properties both through in vitro and in vivo categories. Thus, this review makes an attempt to discuss the impact of PA's on the pathogenesis of periodontitis and also to show whether PA's could be developed as a therapeutic agent for periodontitis.

Keywords: *Periodontitis, Proanthocyanidins.*

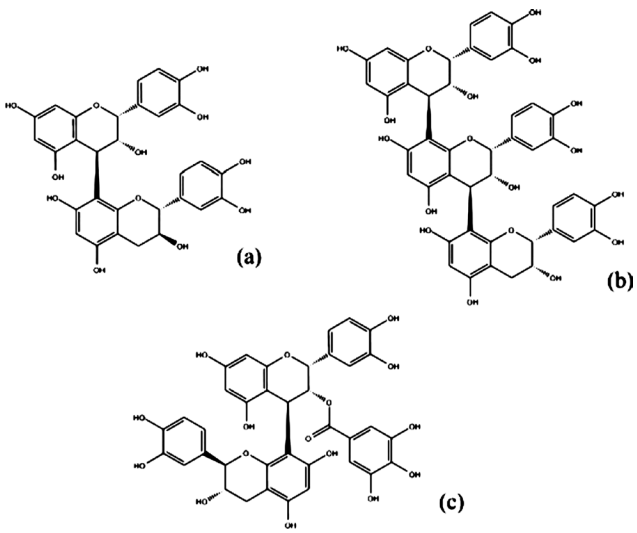
Introduction

Periodontitis is a deep-rooted inflammatory disease which is multifactorial in nature. Its occurrence depends on the local and systemic or environmental factors as well as the host immune response which if are imbalanced results in destruction of periodontium eventually leading to the loss of tooth. Intraoral dysbiosis is the major contributor in the progression of periodontitis, thus restoring the subset of species that are compatible with periodontal health is important for disease resolution. Around 15-20 species of microorganisms are discovered till now which are associated with periodontal disease. Microorganisms like *A. actinomycetemcomitans, P. gingivalis, T. forsythia* are the most virulent and have been found in increasing amounts in periodontally compromised individuals. Imbalance in the ecosystem of microorganisms in the gingival sulcus along with the host's response induced by dysbiosis causes tissue destruction. Hand and ultrasonic instrumentation are the conventional method for reducing the microbial load. The use of antimicrobial therapy like chlorhexidine and betadine solution as an adjunctive treatment to NSPT.[(1)] The use of antimicrobials might lead to development of bacterial resistance thus polyphenols, which are natural products mainly produced by higher plants as secondary metabolites with different functions have become the focus of clinical interest. Tsao and Hussain have classified polyphenols into five main groups: hydrolysable tannins, phenolic acids, polyphenolic amides, flavonoids, and other, with their corresponding subgroups based on chemical composition.[(2, 3)]Proanthocyanidins(PAs) fall under the category of flavonoids.

Proanthocyanidins: Proanthocyanidins are a group of phytochemicals that have been in use since lately since they are easily found in the extracts of certain plants, fruits, seeds, leaves of many plants thus making them easily accessible. PA are the most exuberant flavonoids in the plant kingdom. The richest sources of PA are the grape seed extract (GSE), cranberry extract, cocoa, berries and pine bark (pycnogenol) which consists of potent antioxidant, anti-inflammatory, anticarcinogenic and antimicrobialproperty.[(4)] PAs also inhibit lipid peroxidation, platelet aggregation, capillary permeability and capillary fragility.

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Biochemistry of PA



These are high-molecular weight oligomers. Proanthocyanidin are a combination of dimers, trimers, tetramers, oligomers, and polymers. The exceptional feature about proanthocyanidins is its astringency thus possess the ability to coagulate proteins. Most common proanthocyanidins found have been represented in the figure a) procyanidin dimer b) procyanidin trimer c) procyanidin dimer gallate

Mechanisms of Action

Antioxidant Property: ROS or the reactive oxygen species include oxygen radicals like superoxide, hydroxyl, peroxyl, and alkoxyl and non-radicals like HOCl, ozone, peroxynitrite, singlet oxygen, and hydrogen peroxide. PAs reduce the oxidative stress which are created by reactive oxygen species like singlet oxygen, oxygen radicals etc because of their potent antioxidant activity thus they have the ability to terminate the activity of free radicals. Animal studies demonstrate its inhibitory activity on lipid peroxidation and DNA fragmentation. Enzymes that degrade collagen are inhibited by the cyanidins and proanthocyanidins. These effects are perhaps attributable to trapping reactive oxygen species and preventing oxidative injury to vascular endothelium. In vitrostudies found that PAs increase resistance of cell membranes to injury and degradation. PAs also increase the production of nitric oxide which causes relaxation of endothelium and even helps in release of various growth factors that help in initiating wound healing. These properties of proanthocyanidins would definitely help secure the diseased periodontium to its normal healthy state. A study demonstrated the effect of proanthocyanidins on the inhibition of generation of ROS and also reduction of production of lysosomal enzymes.[5] Proanthocyanidins predominantly produces radicals that form oligomeric compounds which effectively reduces the production of oxygen species thus decreasing the oxidative stress.

Anti-Inflammatory Property: Proanthocyanidins exhibit the property of suppressing the extracellular and intracellular collagenases. They also reduce the hyaluronidase activity thus they main the propriety of the extracellular matrix. Prostaglandins and leukotrienes are one of the major contributors of inflammation which are produced by the metabolism of arachidonic acid, an essential amino acid. They are produced from the cyclooxygenase or lipoxygenase pathways respectively. Even the neutrophils containing lipoxygenase create certain chemotactic substance such as cytokines that mediate inflammation. Some of the phenolic compounds including cyanidins and PAs are known to reduce the cyclooxygenase and lipoxygenase activities but the mechanism by which they do so is not exactly stated. Another antiinflammatory feature is the ability of flavonoids to inhibit eicosanoid biosynthesis.[6] Eicosanoid, such as prostaglandins are the end products of the cyclooxygenase and lipoxygenase pathways.[7] PAs also have the ability the decrease the neutrophil degradation, thus prevent the release of mediators of inflammation from the neutrophils as well as other immune cells.

Antimutagenic / Anticarcinogenic Property: Proanthocyanidins possess anti-cancer and anti-proliferative properties which has been proved in various studies both in animal and in humans through clinical trials. Thus it is important to know the molecular mechanism involved in cell growth inhibition and modulation of cellular metabolism. Cancer being a multistage disease is distinctly divided into initiation, promotion and progression stages.[8] Proanthocyanidins induce cell cycle arrest and also induce apoptosis contributing to antimutagenic property. Inhibition of cyclooxygenase is an important mechanism in preventing tumor promotion. Thus, anti-inflammatory drugs like indomethacin, piroxicam have been used for cancer prevention but it includes various side effects which can be excluded by usage of natural proanthocyanidins as a replacement. Since COX accelerates the conversion of arachidonic acid to proinflammatory substances such as prostaglandins, leukotrienes, which stimulate tumor cell growth. Epidermal growth factor receptor (EGFR) is a type I tyrosine kinase receptor. Activation of EGFR is a key factor in tumorigenesis. Grape antioxidants like

proanthocyanidins have been shown to inhibit expression of epidermal growth factor receptor (EGFR) in head and neck squamous cell carcinoma.[9, 10] Uchino et al in 2010 through a study stated that grape seed antioxidants like cyanidins and proanthocyanidins also inhibit NF-κB's DNA binding capacity to prevent tumorigenesis. Although there are many studies that prove the efficacy of proanthocyanidins as an anti-cancer agent, they mostly focus on their in vitro mechanisms. Since proanthocyanidins show a lot of potential in anti-cancer activity, further studies are required to enhance their use in the clinical field.

Antimicrobial Properties: Periodontal diseases include established gingivitis and on persistence, ends up in periodontitis which is a multifactorial chronic inflammatory disease. Microrganisms play a major role in the development of gingivitis to periodontitis as the accumulation of more subgingival microrganisms in the gingival crevice leads to the apical migration of the junctional epithelium leading to the formation of pathogenic pockets.[11] Studies have shown the use of local drug deliveries like atridox, actisite, arestin, elyzol, chlosite etc for controlling as well as reducing the amount of microorganisms subgingivally with no systemic side effects. However, there have been reports regarding developing resistance of microorganisms against these drugs. Therefore, the use of natural antimicrobial agents like grape seed extract, cranberry extract, pine bark extract which contains proanthocyanidins that have antimicrobial properties is to be considered thereby avoiding bacterial resistance. *Porphyromonas gingivalis, Tannerella forsythia*, and *Treponema denticola* are associated with the chronic form of periodontitis, whereas *Aggregatibacter actinomycetemcomitans* is strongly associated with the aggressive form.[12] The study concluded that "PAs inhibit *P. gingivalis* adherence to human oral epithelial cells and Matrigel-coated surfaces". They inhibit biofilm formation and decrease the collagenase activity.PAs have the potential to decrease procreation of *P. gingivalis, T. forsythia,* and *T. denticola* in periodontal pockets, as amino acids and peptides are required for their multiplication. Bodet et al. demonstrated that a "cranberry fraction rich in PAs inhibits the gingipains and dipeptidyl peptidase IV activities of P. gingivalis, the trypsin-like activity of T. forsythia, and the chymotrypsin-like activity of T. denticola."[13] Thus, proanthocyanidins have the capability of reducing periodontal destruction by inhibiting the growth of periodontopathogens and also counterbalance its cytotoxic products.

Effect on Alveolar Bone: One of the major effects or signs of periodontitis is the destruction of alveolar bone which is caused due to the excess resorption of bone. Bone remodeling involves coordination of activity of osteoblasts and osteoclasts. However, the presence of gram-negative anaerobic bacteria in more than required amounts induces a host mediated inflammatory response which leads to disruption in this coordination. Proinflammatory cytokines influences the fibroblasts, lymphocytes and the macrophages to increase the production of RANKL (Receptor Activator of Nuclear factor Kappa B Ligand) causing the production of activated monocytes (osteoclasts) affecting the normal remodeling process. RANKL is expressed by osteoblasts during the normal metabolism whereas at inflammatory sites the RANKL is also expressed by the T-lymphocytes, parathyroid hormone etc. PAs present in cranberry extract is not cytotoxic to osteoclast cells but possess the capacity to inhibit formation of bone-resorbing cells. They also reduce the production of MMP's (Matrix Mettaloproteinases) and pro-inflammatory cytokines as mentioned previously.[14] PAs even prevent boosting of preosteoclasts thus decelerating the process of osteoclastogenesis. The inclusion of PAs in the diet has also proved to revamp bone constitution, confirming its positive association with bone morphology.[15] In vitro studies have shown that PAs have found to inhibit the proteolytic enzyme which causes resorption of bone.[16] Thus, it is suggested that proanthocyanidins do have a potential role in the inhibition of bone resorption and could be potentially very effective in treating periodontal bone destruction.

Safety Concerns: Proanthocyanidins present in the grape seed extract were investigated for the safety dosage. No evidence was reported at dosages of 2g/kg and 4g/kg of body weight in rodents. The US National Center for Complimentary and Alternative Medicine (NCCAM) reported that oral administration of GSE (grape seed extract) was well tolerated for over 8 weeks in a clinical trial.

Conclusion

From the present review it can be easily concluded that proanthocyanidins are a very apt replacement for antibiotics as an adjunct to conventional periodontal therapy for the treatment of periodontal disease. Various sources of proanthocyanidins available in India are grape seed extract, pine bark extract, cranberry extract etc. which is easily accessible and very cost effective.

Thus, its use for treatment of inflammatory diseases like periodontitis clinically is to be considered. As already discussed in the previous studies, its antioxidant effect, antimicrobial effect against the periodontopathogens, anti mutagenic effect, its cytoprotective effect and also its effect on the alveolar bone destruction proves that these compounds have a lot of potential in curing several inflammatory diseases apart from periodontitis. Therefore, they need to be considered in various clinical studies to prove its efficacy on human subjects and in future use it actively in the clinical practice for better result and prognosis.

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Neurogenic Switching Mechanism: Probable Link between Periodontal Disease and Systemic Diseases: A Review

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Abstract

Prevalence of systemic diseases by virtue of dental infections, has been widely recognized and accepted by the dental professionals today. In recent times spread of inflammation via neurogenic switching mechanism has found an interest among researchers and reviewers. Neurogenic switching results from the coaction of mast cells and nerves leading to the spread of inflammation from one site of the body to a distant site. *Porphyromonas gingivalis,* a principle bacterium triggering periodontal disease releases an endotoxin, lipopolysaccharide, which has been found to induce neurogenic switching mechanism, leading to an exacerbation of symptoms of various systemic diseases. Lowering in the microbial count of dental plaque, has shown to recuperate manifestation of various neurological, cardiovascular, respiratory and pregnancy induced conditions. The purpose of this review is to explore the probable link between various systemic diseases and periodontal disease through neurogenic switching mechanism.

Keywords: *Neurogenic inflammation, Immunogenic inflammation, Neuropeptides, Substance P, Neurogenic Switching Mechanism, Periodontitis.*

Introduction

Periodontal disease is an inflammatory response to bacterial infiltration through dental plaque and calculus, leading to loss of periodontium. Its interrelationship to systemic diseases, such as Diabetes Mellitus and Hypertension have been extensively researched, reviewed and well established. Certain other systemic diseases and conditions have surfaced off late, concerning the respiratory and neurological systems, pregnancy induced conditions and allergic reactions, symptoms of which have reduced or improved after scaling and root planing, hence establishing a possible association with periodontal disease[1-4].

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The process through which the interconnection has been recognized is Neurogenic Switching Mechanism (NSM). It occurs due to the crossover action of neurogenic and immunogenic response to infection, causing inflammation at a site distant from the site of stimulus. The sensory impulse is re-routed via the central nervous system from the site of activation to the second location due to the release of Substance-P (Sub-P) and other neuropeptides. The sensory fibres said to be involved are identified as C-fibres. Branches (sensory fibers) of the Cranial Nerve V (Trigeminal Nerve), supplying the periodontal tissues, might also play a pivotal role in neurogenic switching causing inflammation at other sites. This review explores and explains neurogenic switching mechanism as a probable link between periodontal disease and systemic diseases.

Neurogenic and Immunogenic Inflammation: Due to the formation of antigen-antibody complex, an inflammatory cascade is initiated leading to animmunogenic inflammation. The inflammatory response may be immediate or cell–mediated depending on prior sensitization[5]. Release of Sub-P and other inflammatory neuropeptides, when a chemical combines

with chemical irritant receptors on sensory nerves, results in neurogenic Inflammation[5]. Substance-P can degranulate mast cells and release of histamine can stimulate sensory nerves, implying the coaction between immunogenic and neurogenic inflammation[5].

Modulators of Neurogenic Inflammation:

(A) Neuropeptides: The various neuropeptides involved in neurogenic inflammation are:

(1) Substance-P

(2) Calcitonin gene related peptide

(3) Vasoactive intestinal peptide

(4) Neuropeptide Y

The various properties and location in the nervous system of the neuropeptides are summarized as an overview in Table 1.

Table 1. Overview of Neuropeptides

Neuropeptide	Source	Amino Acid Chain	Properties	Location
Substance P (SP)	Euler and Gaddum (1931)[6] Vasoactive material extracted into powder	11 amino acid peptides	Belongs to the tachykinin family Also called as Neurokinins	Peripheral nerves (enteric neurons and primary afferent neuron - capsaicin sensitive)
Calcitonin gene related peptide (CGRP)	Amara and colleagues in 1982[29] RNA process of the calcitonin gene generated mRNA encodes it	37 amino acid peptides	Strong vasodilator [Brain et al., 1985][30] Found in close proximity with SP	Central and peripheral nervous system Abundant in sensory neurons
Vasoactive intestinal peptide (VIP)	Said and Mutt, 1970[31] Isolated from pig intestinal extracts originally	28 amino acid peptides	Peptide modulating immune response [Bellinger et al 1996][32] Regulates the production of pro- and anti-inflammatory mediators [Pozo et al., 2000][33]	Central and peripheral nervous system
Neuropeptide Y (NPY)	Tatemoto 1982[34] Isolated from porcine brain	36 amino acid peptides	N- and C-terminal tyrosines derivatives Strong vasoconstrictor [Lundberg et al 1985][35]	Central and peripheral nervous system

The sensory neuropeptides are proposed to have a role in causing neurogenic switching, in addition to plasma extravasation, immune cell recruitment and dilating blood vessels thereby regulating the immune cell activity[6]. Increased neuropeptides, in an area of inflammation, results from a sprouting of peptidergic peripheral fibers. Peptidergic peripheral fibers are frequently observed to exist in close proximity to immune cells, especially macrophages[7] and mast cells[8] Also, the presence of functional neuropeptide receptors on immune cells[9, 10] indicates a role of neuropeptides in neuro-immunomodulation.

By the combined participation of N- and C-terminal, Sub-P has indirect and direct effects on histamine and smooth muscle cells respectively, leading to vasodilation. Predominant peripheral effects of tachykinins include elevated microvascular permeability, plasma protein extravasation due to formation of edema, bringing to notice their effectual pro-inflammatory properties.Sub-P is aided by NK-1 receptors, situated on post capillary venules and endothelial cells, in causing increased vascular permeability thereby causing edema[11]. NO, has shown to modulate the characteristic edema formation by Sub-P, laying basis to its interaction with other neurotransmitters[12].

Neutral endopeptidase (NEP) degrades Sub-P. The target cells of SP i.e. ones possessing its receptors, have NEP located on their surfaces. NEP levels are indirectly related to neurogenic inflammation. Neurogenic inflammation is suppressed by human recombinant. Cigarette smoke, respiratory viruses and volatile organic chemical toluene are extrinsic factors inhibiting NEP[13].

(B) Non-neuropeptides: Neurogenic inflammation is a complex process, and its initiation and sustenance depends upon the combined action of factors present neuronally and locally in the environment, which are as follows:

(1) Cytokines

(2) Nerve growth factor (NGF)

(3) Bradykinin (BK)

(4) Nitric oxide (NO)

Cytokine-neuropeptide interactions are two-way—that is, cytokines, released from immune cells. can modulate the neuronal cells and neuropeptides, released from neurons, can influence the immune response[6]. Toll-like receptors (TLRs), have associated,potent stimulation of inflammatory response to LPS through the induction of cytokine production. LPS generally activates TLR4 and there is evidence suggesting the LPS released from *P. gingivalis* can also stimulate TLR-2 [14].

NGF has been shown accountable for a surge in the levels of SP and CGRP, during chronic inflammation[15] and acts directly on B-cells, modulating release of CGRP[16]. Bradykinin (BK) are important mediators of inflammation. Besides directly activating and sensitization of nociceptors, they also are pro-inflammatory, inducing release of SP and CGRP[17]. NO, may act pre-junctionally or within peripheral neuron within the skin microvasculature causing release of neuropeptides and hence leading to neurogenic inflammation[6].

Neuropeptides in Periodontal Health and Disease: Sensory nerve fibers, which make up the great majority of periodontal innervation, originate in the trigeminal ganglion and range in size from C fibers (0.1 to 1.0 µm in diameter) to Aδ (1 to 5 µm in diameter) and Aδ fibers (6 to 10 µm in diameter)[6]. Periodontium being largely innervated by myelinated nerve fibers, during their course through the PDL, lose their myelin sheath and eventually end in multiple specialized receptors or as free non-myelinated endings.

A member of the Protease-activated receptors (PARs), has highlighted the mechanism of enzyme induced sensory nerve activation leading to release of neuropeptide. PAR-2 has an important role in chronic inflammation induced diseases[18, 19]. It may participate in nociception along with mediating neurogenic inflammation as it has been found to be expressed along with SP and CGRP on sensory nerves[20]. The basis for its active role in initiating neurogenic inflammation associated with periodontal disease stems from the fact that it is activated by tryptase, which is found locally in the environment[21]. A neutrophil enzyme, Proteinase-3, has been shown to activate PAR-2 on oral epithelial cells leading to the release of pro-inflammatory cytokine IL-8[22].

In normal human gingival tissues, perivascularly and within the confines of rete pegs, Sub-P has been localized via immunochemistry[23]. Sub-P nerve fibers extensively innervate the junctional epithelium[24] and in the confines of epithelial cells rests of Malassez. Persistence of any one of these factors - Changes in pH, temperature variations, any exposure to endotoxins or traumatic challenges in the oral cavity, may be enough stimuli to induce Neurogenic Inflammation in susceptible tissues. Levels of SP were significantly elevated in diseased sites, compared to healthy sites in periodontally compromised subjects[24]and in addition to showing appreciable correlation to indicators of host response[25].

The levels of SP in GCF noticeably reduced post periodontal treatment, suggesting their release during inflammation associated with periodontitis. SP induces the synthesis of IL-8 in monocytes in the presence of LPS, suggesting dental plaque to be an important factor in regulating the effects of SP[6].

Neurogenic Switching Mechanism via Periodontitis: Periodontitis is a chronic inflammatory disease, caused primarily by *Porphyromonas gingivalis*, a Gram-negative bacterium, containing lipopolysaccharide (LPS) in the outer membrane of its cell wall. Pro-inflammatory cytokines are released as a result of inflammation thereby activating the host immune response. Cytokines induce the release of neuropeptides (Substance-P, CGRP etc) from afferent sensory neurons. Substance P binds to mast cells through neurokinin-1 receptor, causing its activation and degranulation, resulting in the release of histamine and tryptase. This results in Immunogenic Inflammation. The histamine released binds to sensory neurons via protease activated (PAR) receptors, causing Neurogenic Inflammation.

This sends an efferent signal to Central Nervous system, leading to release of Substance P neuropeptide at a different site. Substance P binds to mast cells leading to its degranulation and release of histamine. Histamine along with Substance P have the potential to bind to mucous secreting cells, bronchial smooth muscle cells and mucous secreting cells resulting in inflammation, without local stimulation, at the second site. This is called Neurogenic Switching Mechanism.

Periodontal disease - systemic disease linked via Neurogenic Switching Mechanism: Understanding NSM and how it originates, spreads and causes inflammation at a distant site, periodontal disease can be very well linked to various systemic diseases. The presence of sensory neurons in the periodontal tissues, leading to release of neuropeptides and causing neurogenic and immunogenic inflammation clearly lays down a base for this link. Various case reports are present showing the link of asthma[26], rhinosinusitis[1], uveitis[2], migraine[27], vertigo[27]and allergic symptoms such as eczema[28] to periodontal disease. Removal of dental plaque by Scaling and root planing reduced the symptoms of the aforesaid diseases, as high levels of neuropeptides has been shown to decrease in GCF as a result of periodontal treatment[6]. The release of proinflammatory mediators as a result of scaling and root planing, due to the oozing out of blood, may result in the cutting off of NSM[2].

Conclusion

Reduction in dental plaque through scaling and root planing might relieve a patient of symptoms which otherwise could not be reduced using routine medications and treatment. Therefore, the medical and dental practitioners should keep in mind Neurogenic Switching Mechanism while treating a patient for various systemic diseases and formulate a treatment plan accordingly.

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Prosthetic Rehabilitation of a Case of Odontogenic Keratocyst in Anterior Maxilla: A Six-Year Follow-Up

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Abstract

Odontogenic Keratocyst (OKC) defined as a cystic lesion of odontogenic origin characterized by invasiveness and a high tendency for recurrence. This case report describes the treatment of patient presenting with as welling on the right side of face. Clinical and radiological examination revealed a unilocular radiolucent area in maxillary anterior region. Histopathological report confirmed the diagnosis of odontogenic keratocyst. Surgical treatment consisted of complete enucleation with curettage. Occurrence of odontogenic keratocyst in anterior maxilla is a rare clinical finding. Rehabilitation of the patient was required in order to maintain the esthetics as well as the for functional purpose. Therefore,Prosthetic Rehabilitation with fixed dental prosthesis was undertaken after a 5-year period of follow-up after surgery.

Keywords: *Odontogenic Keratocyst; Clinical & radiological examination; Histopathology; Prosthetic Rehabilitation.*

Introduction

Odontogenic keratocyst (OKC) defined as a cystic lesion of odontogenic origin, with a characteristic lining of parakeratinized stratified squamous epithelium and potential for aggressive, infiltrative behavior.[1] Odontogenic keratocysts tend to recur after treatment because of thin, friable wall which is often difficult to enucleate from the bone in one piece and/or presence of small satellite cysts within the fibrous wall. It tends to grow in the anteroposterior direction within the medullary cavity of the bone without causing obvious bone expansion. Displacement of teeth adjacent to the cyst occurs more frequently than resorption.

Posterior body of the mandible and ascending ramus related to impacted third molar are the prime location for OKC. Usually, they are associated with unerupted tooth, pain, paresthesia, purulent discharge and may resorb or displace teeth.[2,3] It shows slightly male predilection with peak incidence in patients between 10 and 40 years of age. Radiographically, OKC demonstrates a well-defined unilocular or multilocular radiolucency with smooth and often corticated margins.[4] Because of high recurrence rates, there are different treatment options for OKCs. These treatment modalities arebased upon conservative and aggressive treatment approach. Conservative treatment modalities include simple Enucleation (with or without curettage) or Marsupialization. And the Aggressive treatment modalities include Enucleation with Peripheral Ostectomy, Enucleation with Carnoy's solution application, Cryotherapy, and/or Resection.[5,6,7]

Case Report: A15-year-old male patient presented to Department of Oral Surgery with swelling on the right side of the face which persisted for the last 6 months. There was slow and gradual drifting of right anterior maxillary teeth. Upon clinical examination, extraoral swelling on right maxillary anterior region was observed which was diffuse in nature. Overlying skin was intact with elevated ala of the nose and right-side upper lip. Intraoral examination revealed swelling with obliteration of vestibule in right anterior maxillary region with deviation of regional teeth. (Figure 1a). The swelling was bony hard in nature with one or two areas

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of fluctuation depicting resorption of labial cortical plate. Palatal expansion was also evident on the right side of hard palate which was bony hard on palpation (Figure 1b).Grade-I mobility was also seen with from teeth number 11 to 14.

With these clinical findings, a provisional diagnosis of a cystic lesion was made and planned for aspiration cytology. On aspiration with 18-gauge needle, a thick dark brownish cystic fluid with lots of cholesterol crystals was aspirated. This aspirate was sent for protein estimation. The total protein content of the cystic fluid was found to be less than 4gm/100ml which is characteristically found in cystic fluid of OKC.[8] Radiological examinationrevealed a unilocular radiolucent area with well corticated margin extending from left side central incisor to right side first molar region. Maxillary sinus was pushed upward with cystic expansion. Incisors, canineand premolars of the right maxillary region were deviated. There was no evident root resorption of any of these teeth. No supernumerary tooth or any calcified mass was seen within the radiolucency. (Figure 1c).

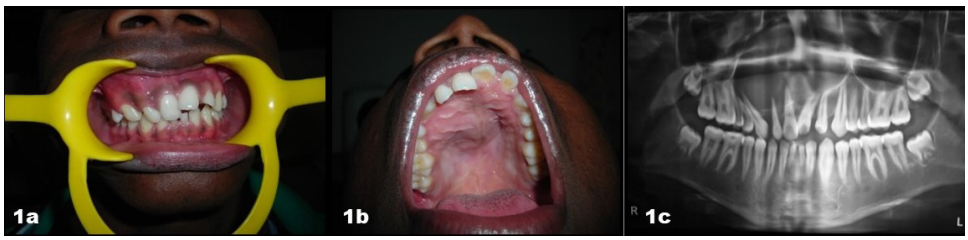


Figure 1. a) Preoperative photograph showing deviation of left central and lateral incisors; b) Preoperative photograph showing palatal enlargement; c) Preoperative orthopantomogram

A wide trapezoidal flap was designed with releasing incisions distal to left side central incisor and right side first molar. Full thickness mucoperiosteal flap was raised beyond the bony expansion on the labial aspect of right maxilla. Expanded labial cortical plate was seen with some areas of resorption. Thinned out labial cortical plate was removed and cystic lesion was enucleated from the healthy bone beneath it. Extraction of right central and lateral incisor, cuspid and first premolar was done. Sharp bony spicules were removed and primary closure of the defect was done (Figure 2a) Biopsy of the lesion was done and result of histopathological evaluation showed a parakeratotic type of Odontogenic Keratocyst. During the 5-year follow-up period, there were no signs of the recurrence of the tumor in the resected area after which the patient was advised for prosthetic rehabilitation. Edentulous span with missing 11,12,13,14 was noted with thin residual ridge with both vertical and horizontal bone loss. Due to removal of labial plate of bone along with the cyst upper lip on right side appeared collapsed. Vitality of adjacent teeth were checked and normal response was elicited (Figure 2b).

Implant supported prosthesis was ruled out because of paucity of bone on the planned site. Also, due to financial constraints, the patient did not opt for grafting. Cast removable partial denture was also suggested but patient wasn't in favor of a removable prosthesis. Therefore, treatment plan comprised of porcelain fused to metal fixed denture prosthesis using left central and lateral incisors and right second premolar and first molar as abutments. Diagnostic impressions of the maxillary and mandibular arch were made using irreversible hydrocolloid (Zelgan, Dentsply, India). Casts were poured using type -III Dental Stone (Kalrock, Kalabhai Karson, India).

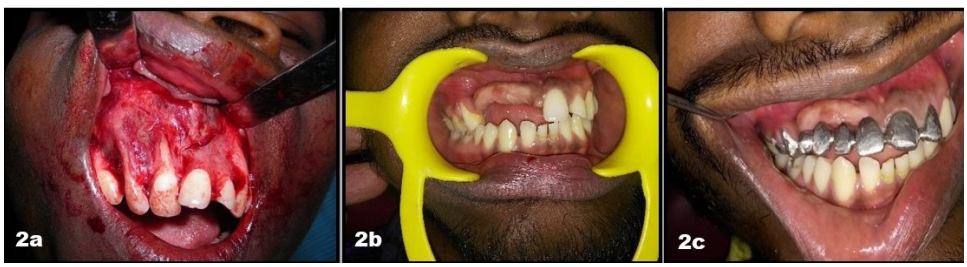


Figure 2. a) During Surgical procedure showing bluish cystic lining; b) Postoperative photograph after 5 years of surgery

A diagnostic mock-up was done for missing teeth and patient approval was obtained. Tooth preparation was done as per the diagnostic mock-up. An impression was made with polyvinyl siloxane impression material (Affinis, Coltene-Whaledent) and poured in type – IV dental stone (Ultrarock, Kalabhai Karson, India).A putty index of diagnostic wax pattern was made using polyvinyl siloxane putty material (Affinis, Coltene-Whaledent) for fabrication of provisional restoration with auto-polymersing resin (Cool Temp, Coltene). Metal copings were fabricated and its trial was doneto check for proper fit. (Figure 3) A porcelain fused to metal fixed dentureprosthesis was fabricated and cemented using type -1 Glass Ionomer Cement (GC, America). (Figure 4a, b)Patient was recalled for a follow-up after 7 days, 3 months, 6 months and 1 year. During which, an OPG revealed complete healed site with adequate bone formation. (Figure 4c)



Figure 3. Metal try in



Figure 4. a) Post-restoration photograph; b) Post-restoration photograph (palatal view); c) orthopantomogram 1 year after prosthesis fabrication

Discussion

OKCs comprise approximately 11% of all cysts of the jaw. They are usually found in mandible involving posterior body and ramus region. Although in this case the location of cyst was in the anterior maxillary region which is an unusual clinical finding. Karaca et al. in their study on 81 patients have also found that only 4 % of patient had the lesion in anterior maxilla.[5] One of the most important characteristics of odontogenic keratocystis a high rate of recurrence that ranges from 5-62%. The majority of cases of recurrence occur within the first 5 years of treatment.[9] Careful and aggressive enucleation with close follow-up has been advocated forthe OKC. Prosthetic rehabilitation in this case was planned after closely following the patient for 5 years after surgery.

Even though the restoration was of long span, the loads on the anterior teeth are comparatively less due to minimum vertical overlap (overbite) of patients existing dentition. To reduce the loads even further, a slight open bite was provided with the incisors. Modified ridge lap pontics were used to improve the appearance in anterior region. Patient was pleased with his appearance and satisfied with improved phonetics.

Conclusion

Cystic lesions of jaws can have a deleterious effect on oral form and function. Surgical treatment results in loss of bone and soft tissues which is difficult to replace with artificial prosthesis. The management becomes even more critical in anterior maxillary area due to esthetic implications. Comprehensive planning and interdisciplinary approach are key to successful rehabilitation of such patients. This case report describes the multidisciplinary management of a young male patient who presented with an unusually large odontogenic keratocyst in the anterior maxilla.

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A Rare Case of Neck Pain Elongated Styloid Process

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Abstract

Styloid process is a complex structure and ossification of this process can illicit a number of signs & symptoms aggravating the patient's condition. Elongated styloid process is also called Eagles syndrome and in majority of times are asymptomatic. But precipitation of certain procedures like tonsillectomy can make it symptomatic as in this case. Here we report a case of 26 years old female patient complaining of pain in the retropharyngeal region.

Keywords: *Styloid process; Eagles syndrome; tonsillectomy; retropharyngeal region.*

Introduction

Watt W Eagle in 1937 was first to define symptomatic elongated styloid process which was later called Eagle's syndrome.[1] It consists of unusually long styloid process, with pain on deglutition, pain on movement of neck in the jaw and throat. These symptoms can be associated with pathological condition of stylohyoid complex calcification.[2]

Anatomy and Embryology: The styloid process is attached to 3 muscles: stylopharyngeal, stylohyoid and styloglossal muscle. 2 ligaments: stylohyoid and stylomandibular ligament.[3] The Stylohyoid chain or complex consists of the styloid process, stylohyoid ligament and lesser cornu of hyoid bone. It forms a complex called the stylohyoid chain or complex which in many cases are found to be calcified that could be symptomatic.[4] The Stylohyoid complex arises from the Reichert's cartilage of 2nd brachial arch. Tympanohyal forms the base of styloid process. Stylohyal forms the shaft of styloid process. Ceratohyal forms the stylohyoid ligament and Hypohyal forms the lesser cornu of hyoid bone (Figure 1).[5,6]

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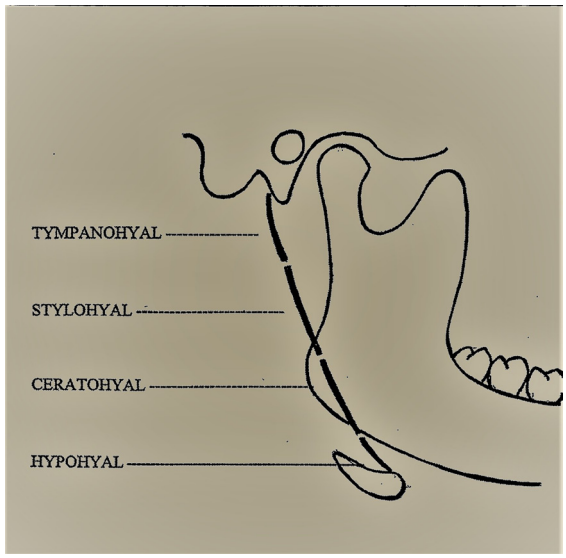


Figure 1. Panoromic radiograph with elongated styloid

Incidence: The styloid process when it is greater than 3 cm is considered elongated. It is seen in approximately 4% of the population amongst them in only 4% of the cases it was found to be symptomatic.[7] Male : Female ratio is 1 : 1 to 1 : 3 which is commonly seen in the middle age group approximately 30-40 yrs. There could be unilateral elongation as well as bilateral elongation of the styloid. [8]

Case Report: A 32 years old female patient reported to the oral medicine department with a complaint of pain the right back tooth region in the last 1 month. Patient give a history of pain that had aggravated

post tonsillectomy. Pain was dull aching type which aggravated while movement of head and while chewing and deglutition. On examination patient had dental caries with respect to 36 & 26 with mild stains and calculus & partially erupted 48. On palpation tenderness was present in the retropharyngeal region which aggravated on deglutition. Provisional diagnosis of Impacted 48, chronic generalized gingivitis and dental caries was given. Patient was advised for a panoramic radiograph & lateral skull that revealed elongation in the styloid process. Diagnosis of elongated styloid process was done in co-relating to the history of tonsillectomy and the panoramic radiograph (Figure 2, 3).



Figure 2. Panoromic radiograph with elongated styloid



Figure 3. Lateral skull radiograph

Figure 2. Lateral skull radiogr Elongated styloid process is usually asymptomatic but pain is elictated amongst the population post tonsillectomy, contracture of scar tissue stimulate 5th, 7th, 9th, and 10th cranial nerves, sensation of raw throat, refer otalgia, especially when swallowing, odynophagia or dysphagia, persistent dull-aching sore throat, pain when extending tongue or changing voice, sensation of hypersalivation.[9] The Stylocarotid syndrome is a variation where impingement of carotid artery occurs with or without tonsillectomy which stimulates perivascular sympathetic fibers causing external compression of carotid artery . It causes facial pain from brow to chin, constant neck pain, tinnitus when turning head, compression of internal carotid artery, headache from ophthalmic region to occipital region[10,11]

Pathogenesis: Styloid process can be elongated when there is congenital alteration causing a part or complete ossification of stylohyoid ligament post-traumatic reactive hyperplasia & could be associated with early onset of menopause. Even degenerative processes of ligament or osteocartilaginous element with secondary calcification could lead to elongation of the styloid process.[12] Most of the times they remain asymptomatic but could become symptomatic after Trauma causing fracture of ossified stylohyoid ligament leading to proliferation of tissue, direct nerve compression, degenerative and inflammatory changes, insertion of tendon, post-tonsillectomy fibrosis, impinging onto carotid artery and rheumatic styloiditis result from pharyngeal infection.[13] Diagnosis is primarily based on the symptoms and palpation of the tonsillar bed that could aggravate the symptoms.

Differential diagnosis

- Unerupted or impacted molar is commonly seen in teenagers or early twenties
- Glossopharyngeal or trigeminal neuralgia where there is momentary piercing or lancinating pain
- Carotidynia causes hyper pulsation and vessel dilation
- Irritation from dental prosthesis could cause prolonged pain
- Oropharyngeal or hypopharyngeal tumor
- Chronic pharyngitis and tonsillitis

Treatment: Management for Immediate relief of symptom is done by infiltrating 1 ml of 2% lidocaine, styloidectomy or non-steroidal anti-inflammatory drugs is given.[14]

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Herbal Agents for Dentinal Hypersensitivity: A Review

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Abstract

Dentinal hypersensitivity is an age-old complaint of man and a common condition of transient tooth pain related with variety of exogenous stimuli. Several herbs have been found to be suitable in the treatment of periodontal diseases as they have been reported to have no side effects. Herbal products containing spinach, cloves, cinnamon, suryakshara, eucalyptusand propolis have been used for treating dentin sensitivity. Therefore, the significance of these products in therapeutic as well as pharmaceutical technique urged us to exploreherbal agents for dentinal hypersensitivity and to get clues for future scope.

Keywords: *Dentinal Hypersentivity, Desensitizing, Herbal, Sensitivity.*

Introduction

Dentinal hypersensitivity is one of the most common dental complaints in day today life. It is a perception felt when the nerve inside the dentin is visible to the environment often described as a short sharp pain that arises from the exposed dentin in response to thermal, tactile, osmotic, chemical, or evaporative stimuli that cannot be attributed to any other form ofdental defect or pathology[1]. DH affects daily activities such as eating, drinking, speaking etc. and it is clinically challenging for the oral health practitioners to effectively manage it.

Prevalence: Prevalence of the dentinal hypersensitivity depends on people, nutrition, para-functional habits and method of examination[2]. It is approximately 5-85%[3] in patient having non-carious cervical lesions (NCCLs) 2-8% to 74% in adult populations[4]. The most commonly affected age group is around 20-50 years but the most affected age range is 30-40 years[5]. According to sex females are more affected[6]. There are two common method to determine the intensity of DH. One of them is through an interview and the other is through clinical examination. Furthermore, the incidence of DH in canines and premolars is more than other teeth. The buccal surface of mandibular incisor has been stated to be more involved [7-9]. As per dentist there is 10-25% of dentinal hypersensitivity prevalence distribution among their patients and 1% of them are serious category [9].

Indian Scenario: The prevalence of DH inIndia fluctuates from place to place on the basis of the local oral practices. Few studies in Punjab, Chandigarh, Andhra Pradesh etc., specified that the occurrence of dentinal hypersensitivity to be 25%, 47.8%and, 32%, respectively[10].

Dentinal hypersensitivity synonyms: DH is also known as Dentin Hypersensitivity or Dentin Sensitivity, Dentinal Hypersensitivity or Dentinal Sensitivity, Cervical Hypersensitivity or Cervical Sensitivity, Root Hypersensitivity or Root Sensitivity, Cemental Hypersensitivity or Cemental Sensitivity[5].

Etiology: Dentinal tubules are exposed, open with extending to vital pulp loss of enamel causes attrition tooth brush abrasion dietary erosion parafunctional habit combination of these factors expose of root surface due to loss of cementum and periodontal tissue gingival recession chronic periodontal disease following non-surgical periodontal therapy. Incorrect tooth brushing chronic trauma from habits[11].

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Diagnosis: Through Medical history[5] and clinical examination.

Differential diagnosis: Conditions that may mimic DH could be fracture of restorations or prosthesis, cracked tooth, dentalcaries or sensitivity after a tooth restoration[2, 12, 13].

Assessment: Assessment can be of tactile, thermal, osmotic, electric and evaporative[14]

Prevention: Prevention has mostly been through the use of desensitizingtoothpastes, avoiding junk food, use of soft bristledtoothbrushes, proper brushing technique. For those with para-functional habits such as clenching and bruxism, useof mouth-guard.

Pain pathway: Dental pain is dichotomous in nature, sometimes it is localized, sharp, pricking pain of rapid onset due to A-Delta sensory nerve fibres otherwise it is a generalized,dull aching sensation which persists even after the removal of the etiological factor. This pain sensation is carried by C-sensory nerve fibres. It is an established fact that the conduction of impulses is swifter in myelinated fibres than unmyelinated fibres. The A-Delta,interdental beta and Cfibres transmit the mechanical, thermal and the chemical stimulus from nociceptor to the spinal cord and hence play the role1storder neuron. The A-Deltafibres are located mainly in the pulpo-dental-dentinal and they are myelinated with low threshold to excitation. These features make it the 1st nerve fibres to propagate and conduct the pain impulses. They are principally activated during hydrodynamic stimulus causes outward fluid movement leading to hypersensitivity fibres are located deeper into the pulp and is sensitivity to thermal changes. It is slower in conduction velocity and is unmyelinated. Hence, they don't play a significant role in dentinal hypersensitivity[15].

Pain propagation theories in dentinal hypersensitivity: Manyhypotheses have been proposed to expound the pathway of dentinal hypersensitivity. Initial theories stated that dentin was directly innervated by nerves due to which they get activated by the external agents. This theory was ruled out as the electron microscopy unveiled that the nerves innervated mostly the pulpal horns and terminate shortly after entering the inner dentin. The odontoblastic transduction theory hypothesized by Rapp et al stated that odontoblastic processes function as receptor cell which propagate the impulses via the synapses located in the neurons to this terminal ending involving pain at the pulpo-dentinal junction[15, 16]. This theory was criticised and proved to be unconvincing as the odontoblasts are mesenchymal cells of neural crest origin which only play a vital role in the formation of the dentinal matrix and no synapses are seen in the pulpodentinaljunction. The hydrodynamic theory is the most convincing theory till now. It was proposed by Brannstrom that the hypersensitivity dentin experienced nociceptor excitation in pulpodental junction due to the flow of dentinal fluid was caused by physical, chemical, thermal or any other stimulus. This theory highlighted the role of dentinal fluid in the pain due to dentinal hypersensitivity[16]. This gave a new direction to the dentinal hypersensitivity pain pathway. It leads to experiments and research comparing various clinical parameters in sensitive and normal dentin such as increase in the number, radius and the density of the tubules.

Management: Change over from faulty tooth brushing and use of hard bristle tooth brush with excessive pressure to a prescribed method such as Modified Bass Technique, Softer bristles and gentle brushing. Dentifrices with more abrasive content should be avoided. Consuming acid drinks or foods at least one hour after tooth brushing should be avoided due to agonist effect of acidic erosion on tooth brush abrasion. Use of an occlusal splints may be considered for correction of occlusion[5]. Root coverage procedure should be advised in case of recession. Exogenous and endogenous acids exogenous acids include carbonated drinks, citrus fruits, alcoholic drinks, yogurt, dairy products, and occupational hazard endogenous acids include enter the mouth through reflux or gastro-esophageal regurgitation[5] thus must be restricted or avoided. Periodontal disease may cause root exposure due to poor oral hygiene.

Herbal Desensitizing Agents

Suryakshara-kshara: Suryakshara is alkaline in nature. Itis produced as aslag of variousplants, animals and minerals[17]. Main content of suryakshara is potassium nitrate which helps in reducing dentinal hypersensitivity blocking nerve depolarisation[18]. The potassium nitrate causes an increase in the concentration of extracellular potassiumaround the nerve fibres leading to their depolarization[19]. It also avoidsrepolarization of the nerve and blocks the axonic action and passage ofnerve stimulus, thus inactivating the action potential[20].

Palakya (Spinicia oleracea): Palakya or the spinach is one of the most consumed green leafy vegetable in India, possess the capacity to block the dentinal tubules due to the presence of oxalate compound, which helps in producing phyto-complexes on the teeth[18]. The oxalate compounds form a protective film on the tooth surfaces which prevents loss of tooth structure. Palakya leaves on reacting with calcium of dentin form calcium oxalate crystals [21]. These may be deposited inside the dentinal tubules and cause occlusion of orifices[22].

Lavanga (Syzygiumaromaticum): Cloves consist of eugenol (anesthetic agent) which aids in numbness of nerve and controlling pain. The clove also contains an essential oil which act as an antiseptic and eradicate the bacteria from oral cavity[23, 24]. It has commonly been used in house-holds as an obtundent for relief from toothache[25].

Triphala: It is containing of fruits of the plant species Emblica officinalis (Amalaki), Terminalia bellerica (Bibhitaki), and Terminalia chebula (Haritaki). Triphala is therefore a mixture of their dried powders in equal parts. Amla (*Emblica officinalis*) containsvitamin C and can be used either alone or in like combination with other plants to treat the common cold and fever. It also has anti-inflammatory properties. Haritaki or Harada (*Terminalia chebula)* is widely used to treat a variety of health issues including constipation, dementia and diabetes. Ittoo hasanti-inflammatory properties.

Cinnamon (Cinnamomumzeylanicum): The cinnamon has antibacterial activity against the gram positive and gram negative bacteria. Cinnamon oil contains cinnamaldehyde[24, 26] which is an antioxidant. It might have desensitizing effect but the mechanism of action is not clear.

Cineole: 1, 8-Cineole a. k. a11-eucalyptol isan achiral aromatic compound found in plants such as Salvia (*Salvia officinalis*) and Eucalyptus (*Eucalyptus globulus*) leaves. It inhibits the formation of prostaglandins and proinflammatory cytokines which might explain its desensitizing property[27].

Propolis: It is a natural, non-hazardous, resinous substance, which is yellow-brown in colour. It has a complex composition which depends on the accessible plant sources to the bees. Phenolic acids, flavonoids, terpenes, β steroids, aromatic aldehydes, alcohols, sesquiterpenes, naphthalene, stilbene derivatives of benzopyran, benzophenone, caffeic acid, cinnamic acid derivatives, and benzoic acid are the components of propolis. It acts as a sealant[14, 28, 29]. The organic structures are resin 50-60%, wax-30-40%, essential oils-5-10% with calcium and aluminium[14]. Propolis showsproperties such as anti-inflammatory, antioxidant, antimicrobial, antiviral, antiparasitic, anaesthetic, and that of a free-radical scavenger. Varnish and gel are the two available forms of propolis for the treatment of dentinal hypersensitivity. The propolis gel occludes the dentin tubules which decreases the permeability and thereby relieves dentin hypersensitivity[14].

Peppermint (Mentha piperita): It acts as an essential oil. The chemical components of peppermint oil contains menthyl acetate and menthofuran, which helps in blocking the dentinal tubules[24].

Conclusions and Future Directions

There are various treatment options which the clinician may choose for relievingdentinal hypersensitivity depending upon the severity of the condition. As use of herbal products have been associated with no adverse effects and many studies have reported their effect in the management of dentinal hypersensitivity, future research should be carried out to analyse and scrutinize desensitizing property in natural herbs.

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Oral Manifestation of HIV Virus

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Abstract

HIV is an infection that can lead to AIDS. HIV stands for Human Immunodeficiency Virus. It's a virus that breaks down certain cells in your immune system (your body's defense against diseases that helps you stay healthy). Oral lesions are common in HIV infection. There are over 30 different kinds of oral lesions related with HIV. It is essential to implicit that the oral lesions seen in HIV positive patients are a consequence of immunodeficiency triggered by the Human Immuno-deficiency Virus and not related to the direct influence of the virus on oral tissues. Dental diseases like caries and periodontal disease have greater influence on patients with HIV infection. So, it is crucial that the physician and dentist, together, detect and diminish risk factors for oral diseases associated with HIV infection.

Keywords: *Human Immunodeficiency Virus, Acquired Immune Deficiency Syndrome, Herpes Simplex.*

Introduction

Acquired immune deficiency syndrome was first seen in June 5, 1981 with around five cases in USA. Early cases were a set of injecting drug workers and queer menbut there was no sign ofdebilitated immunity that had signs & symptoms of Pneumocystis carinii pneumonia (PCP), a rare opportunistic infection that used to happen in people with compromised immunity. After that, a sudden amount of gay and queer men developed aprioruncommon skin cancer called as Kaposi's sarcoma (KS). Numerous more cases of Pneumocystis carinii pneumoniaand Kaposi's sarcomaarose later. Specialist had never seen this type of pneumonia and it progressed into chronic condition. In 1981, scientists and specialists had begun to link the dots between the new diagnosis diseases and an amount of further opportunistic infections. That year, the first case of HIV's full-scale disease state, (AIDS), was documented. HIV is a very dangerous and serious disorder of the immune system which damages the body's normal immunity and defenses to infections. So, it makesour body vulnerable to infections /conditions with malignancies that can become dangerous and can cause even death. It is seen that 20 to 50 percentages of patients with HIV will grow some oral lesions related with diseases. These lesions are key markers in disease advancement, and they can be main manifestation in a previously undiagnosed patient.[1] The oral lesions associated with AIDS can be categorized as-Infections (bacterial, viral and fungal), Neoplasm, Diseases of salivary glands, Miscellaneous lesions. Alsoincluding the side effects related to treatment of HIV with Highly Active Anti-Retroviral Therapy (HAART). So due to many of this oral manifestation dentist play an important role in recognizing early signs and symptoms of oral lesions related with human immune deficiency syndrome.

Oral Lesions: Candiadsis, Herpes simplex, Cytomegalovirus, Oral hairy leukoplakia, Kaposi sarcoma, Non- Hodgkin's lymphoma, Necrotizing gingivitis/periodontitis.

Candidiasis: Oral candiasis initiated by Candida albicans is a very and one of the most common lesions, affecting about 90 percentage of patients with HIV+ at some point of time as the progression of disease occurs. These lesions occur when Cluster of differentiation 4 cells counts fall less than 200/mm^3. It was viewed that forty to seventy percent of HIV- infected patients with Cluster of differentiation 4 counts less than 200/mL. Sixty-five

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percentages of patients with Cluster of differentiation 4 count less than 200/mL and the presence of candiasislater developed AIDS or they even died within twenty-fourmonths period of time.[1,2] According to Ranganathan and Hemelatha, and Ranganathan et al, pseudomembranous candidiasis is the most common type seen in these patients. Also presence of angular cheilitis as a recurrent fungal infection was noted.[3,4] But in accordance with Noce et al, Erythematous type of candidias was most regularly seen and noted.[5] Cell mediated immunity plays a part in the pathogenesis of candidiasis in these patients. Erythematous type of Candidiasisalong with pseudomembranous type of oral candidiasis are related with an increase in risk for the subsequent progress of opportunistic infections, thuscategorizing the patient as having Acquired Immune Deficiency Syndrome as defined by the Centre for Disease Control (CDC).

Herpes Simplex: Primary herpes infection along with recurrent intraoral and perioral herpes simplex are common viral infection, with a incidence of five to ten percentages. [6] The clinical significance and features of oral herpes viral infection are mainlyassociated to those seen in HIV (NEGATIVE) patients; but in HIV + patients with severe immunosuppression (where Cluster of differentiation 4 cell counts are less than 100 cells/mm3) extensive, dangerous, and extended lesions develop which resembles the Herpetic Gingivostomatitis. Recurrences of these lesions are tooseen. Drug of choice is usually acyclovir (800 to 1200 mg/dl). [7]

Cytomegalovirus (CMV): Oral CMV lesions may happen in patients where there is progression HIV disease. Usually these lesions are signs of underlying systemic disease related to GI tract or eye. In CMV infection the oral lesions can arise wherever on the buccal mucosa along with other parts of oral mucosa. Usually there is no specific pattern or appearances of Cytomegalovirus ulcers. Presence of white halo around the necrotic surface is common seen. Frequently they are tangled with major apthous ulcers or ulcers present inNUG, necrotizing ulcerative stomatitis and also in many lymphomas. (Eversole 1992) Ganciclovir when administered intravenously along with aciclovir in high doses are usually the drugs of choice.[8]

Oral Hairy Leukoplakia: Hairy leukoplakia of oral mucosa is initiated by Epstein-Barr virus in immuno-supressive patients. Oral hairy leukoplakia occurs in 20 percentages of peoplehaving asymptomatic HIV disease and becomes more frequent as the Cluster of differentiation 4 +T-cell count decreases. Occurrence of Oral hairy leukoplakia is a sign of HIV diseaseand also for immunodeficiency. However, in patients with HIV negative, oral hairy leukoplakiahas been cited, who hadundergone bone transplant, kidney and heart transplant. Hairy leukoplakia is an indication for evaluation and treatment of AIDS disease. HL associates with an arithmetical risk for the progression of AIDS disease very rapidly. Oral hairy leukoplakia is asymptomatic and usually requires no treatment. Antifungal treatment may treat the signs and symptoms of superimposed candidiasis but will not completely resolve the lesions. If the subject assert on removal of the lesion for whatsoever reasons, treatment for Oral hairy leucoplakia is acyclovir (high dose), antiretroviral drug (zidovudine), surgical excision [9]

Kaposi Sarcoma: Kaposi sarcoma (KS) is the single most frequent neoplasms happening in subjects with HIV+[10] but after the initiation and administration of HAART there has been a noteworthy reduction in its occurrence.[11] It happens in around fifteen to twenty percentages of the patients with HIV+Kaposi Sarcoma is caused by HHV-8 Virus. Decrease Cluster of differentiation 4 counts, homosexuality and Cytomegolovirusinfection are well-known to increase the chances of KS. Kaposi sarcoma is well known to occur among gays. In HIV it may extant as the 1st sign and symptom of AIDS. The histopathological features are flat, nodular or ulcerated mass depending on the stage of the growth of the tumour and diagnosis. Multifocal Lesions along with involvement of skin usually seen in connotation with oral Kaposi sarcoma. Kaposi Sarcoma is more common in males rather than females and children. Palate, Gingiva and tongue are the main sites where Kaposi sarcoma occurs. Three clinical stages can be illustrious: patch, plaque, nodular. Sometimesa yellowish mucosa surrounding the Kaposi sarcoma is seen histopathologically. Oral Kaposi Sarcoma lesions may increase can become ulcerated and sometimes may become infected. So, good and healthy oral hygiene is the key factor to reduce these problems. The early lesions of Kaposi Sarcoma are asymptomatic, flat and red or purple in color. As the disease progresses the advanced lesions usually exhibit nodular appearance, may become painful and can destroy the underlying bones. treatment of choice is surgical excision, radiation therapy (in case of large lesions)

Non-Hodgkin"s Lymphoma: Non-Hodgkin's

lymphoma (NHL) is the 2nd most happening intraoral neoplasm seen in patients having HIV +. Patients with AIDS are at 60 to 70 time's higher risk of developing Non-Hodgkin's lymphoma than HIV negative patients. Contrasting Kaposi Sarcoma, the incidence of Non-Hodgkin's lymphoma has not condensed with the initiation of HAART therapy, and it is predictable the frequency can in fact surge as patients' lives longer.[1,12] It can occur inany place in the oral cavity. It is more frequently seen in males rather than females. Clinical features include a presence of soft tissue swelling (painless) with or without presence of ulcerations. Hard and Soft Palate and gingiva are frequent locations where the lesion can be seen. Lesions are usually single and extremely painful. The prognosis of the disease is poor and people usually die within first year after the disease is diagnosed in their body. Treatment depends on the stage of the progression of the disease: Radiation therapy (during early stage of the disease); Systemic Chemotherapy (for extra nodal disease).

Necrotizing Ulcerative Gingivitis/Periodontitis: Necrotizing ulcerative periodontitis (NUP) is a disease affecting gums and surrounding regions and is one of the deadliest periodontal disease affecting patients with AIDS, and it occurs in immunosuppressive patients. Occurrence of Necrotizing ulcerative periodontitis is five percent or less than seven percentages. It is a fusospirochetal infection which is usually related with severe nutritional and/or immunodeficiency. Clinical significance of necrotizing ulcerative periodontitis include destruction of 1 or more interdental papillae with necrosis and presence of ulceration with sloughing which is limited to the marginal gingival tissues. The gingival tissues are burning red in color and are swollen, and are complemented by yellowish-grey necrotic tissue that can bleed easily. Bad breath is commonly seen. Regional lymph nodes may increase in size and can be enlarged and fever and sicknessare also seen. Cratered appearance of the ulcers is seen when healing takes place. Treatment comprises of ultrasonic scaling or hand scaling (for plaque and calculus removal), mechanical debridement of dead and necrotic tissue, irrigation with betadine solutions on the wounds and administration of antibiotics (metronidazole 250 mg qid, Augmentin 250 mg qid).

Conclusion

AIDS is a debilitating disease, with a plethora of oral manifestations like-oral candidiasis, herpes simplex infection, Kaposi sarcoma, Non-Hodgkin's lymphoma, necrotizing ulcerative gingivitis, oral hairy leukoplakia etc. All these oral conditions depend on CD4/CD8 ratio which can vary according to the anti-retroviral therapy given to the patients. An oral diagnostician should take into consideration the oral manifestation of HIV and must strive to give palliative treatment, psychological counseling and one should make the patient aware of these conditions in the mouth so that patient can maintain good oral hygiene with regular follow ups which can later reduce the signs and symptoms of the disease.

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Comparison of Electrical Activity of Masticatory Muscles in Clinically Diagnosed Temporomandibular Joint Dysfunction

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Abstract

Background: Surface electromyography (EMG) has been found to be an effective tool to evaluate Masticatory muscle activity in order to diagnose dysfunction of masticatory apparatus.

Aim: The current study aims to indicate the practical difference between temporomandibular joint (TMJ) disorder and muscles of the jaw on symptomatic and asymptomatic subjects by comprehensive electromyography analysis.

Method: To evaluate the significance of EMG parameters, jaw-muscles EMGs were recorded in 10 normal (Group N) subjects and 10 TMD symptomatic (group S).

Result: In TMD symptomatic (Group S), at rest position (RP) the integrated (IEMG) was larger within anterior temporalis (Ta) whereas maximal voluntary clenching (MVC) was smaller and the masseter (Ma) and temporalis (Ta) was protruded (P).

Interpretation and Conclusion: The functional efficiency is weak and may have hypertonic activities of the jaw elevators in TMD. Following a muscle twitch, the jaw muscles in TMD become less relaxed and get easily fatigued during functional effort. TMD symptoms result in alteration of functional adaptation of jaw muscle activities and occlusion.

Keywords: *Electromyography; Temporomandibular disorders; Muscle Engram; Muscle Fatigue.*

Introduction

Temporomandibular disorders (TMDs) are a collection of general and oro-facial conditions affecting the physiology of temporomandibular joint (TMJ) and/or masticatory muscles, and the contiguous tissue components. The increased or dysfunctional muscular activities leads to the aggravation of TMDs and are triggered by peripheral factors such as TMJ disease or occlusal disturbances and/or by the central factors such as psycho-emotional effects.[1]

Electromyography (EMG) (Figure 1) has been commonly used to estimate the dysfunction in situ or the orofacial muscle function. In normal subjects, the muscle activity should be laterally symmetrical, during both rest and clenching. Electromyography asymmetry would provide useful information with regard to stemmatological diagnosis and monitoring.

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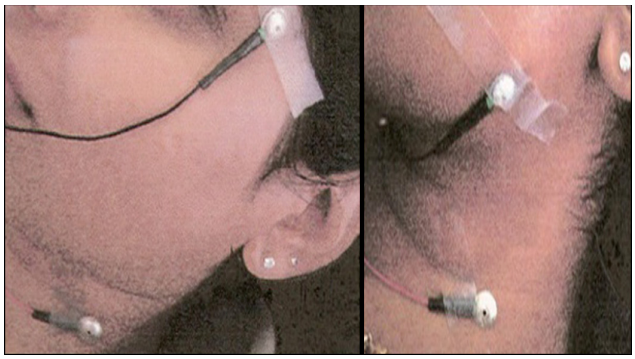


Figure 1. A) Electrode placed for recording temporalis muscle activity, B) Electrode placed for recording masseter muscle activity.

Aim: The aim of this particular studyis to denote jaw muscle's differences in their functions that is amidst asymptomatic and the symptomatic TMD subjects.[1]

Objectives: The objective of the study focus on:

1. To assess the clinical signs and symptoms of internal derangement of TMJ, and to find its effect on masticatory muscle by using Electromyography.
2. To correlate the electrical activity of masticatory muscles in a patient with temporomandibular internal derangement and masticatory muscle disorder.

Methodology

Subjects: The study was conducted at A.B Shetty Memorial Institute of Dental Sciences, Department of Prosthodontics – Crown and Bridge and Implantology, Mangalore in conjunction with Department of Neurology, Justice K.S. Hegde Charitable Hospital [A Unit of NITTE Education Trust], Mangalore. The subjects comprised of students, members of the staff and patients in the ranges of age 13 - 55 (in years). A clinical examination was done and subjects with signs/ symptoms of TMD may be one or more comprising of subjects, 10 in number and were classified under (group S) the symptomatic group.The asymptomatic group (group N) were subjects without past history concerning TMD or any TMD signs/symptoms and comprised of 10 subjects. In the age and gender ratio,there were no differences in the both groups. Prior to the experiment, full consent was obtained from the subjects.

Examination, clinically: Clinical examination and radiographic examination collected for all the subjects, were based on the following inclusion criteria:

1. Palpable TMJ pain
2. Audible TMJ sounds
3. Palpable pain in the jaw, facial, neck and back muscles
4. Muscle quality (muscle asymmetry, stiffness)
5. Limited mouth opening i.e. maximal opening less than 40mm
6. Deflection/Deviation of the mandible at the maximal mouth opening
7. Limitation of condylar translation at the maximal mouth opening
8. Variables of tooth alignment, tooth loss & attrition were the contents of static occlusion
9. Variables of occlusal interference and premature contact were the contents of functional occlusion

This study was approved by the ethical committee. The subjects were seated on a chair with the head unsupported and naturally oriented. The following conditions were recorded with 5 minutes interval between each of the EMG activities:

a. The subject was asked to keep his/her jaw at rest position(RP) is the Mandibular Physiological RP for a period greater than 30 seconds
b. The subject was asked to clench the molar teeth at the intercuspal position (ICP) as hard as possible is the maximal voluntary clenching position of mandible (MVC) for a period greater than 30 seconds
c. The Mandibular forward position of mandible (Protrusion) his/her jaw of the subject was asked to keep at maximum forward position (P) for greater than 30 seconds.

EMG Recording of Temporalis Muscle: The electrodes to temporal muscles were placed at 1-inch posterior and 1-inch superior to the outer canthus of the eye. The ground electrodes were placed over the skin of the sternocleidomastoid muscle. After the electrodes were attached, the patients were instructed to move the mandible to the above mention positions (Figure 1A).

EMG Recording of Masseter Muscle: Electrode in the masseter muscle were placed 2 cm above the lower margin of the mandible, half way between the mandibular angle and the anterior border of the muscle (the position of the anterior border of the mandible and mandibular angle were identified by palpation).

The ground electrodes were placed over the skin of the sternocleidomastoid muscle. After the electrodes were attached, the patients were instructed to move the mandible to the above mention positions (Figure 1B).

EMG data processing: The following EMG parameters were analyzed:

a. The integrated EMG activities at Physiological rest position of mandible (RP) (IEMG-RP). From the first 10-s period of the sampling, the EMG-RP was computed.

b. Of the mandible, (IEMG-MVC) is the integrated EMG activities at maximal voluntary clenching. The final 5-seconds periods of the 30-s sampling and the first seconds, IEMG-MVC was calculated. (Figure 2A & B).

c. The integrated EMG activities at Protrusion of mandible (IEMG-P). Fromboth the first (periods of the 30-s sampling) and final5-seconds, IEMG-P was calculated. (Figure 3A & B).

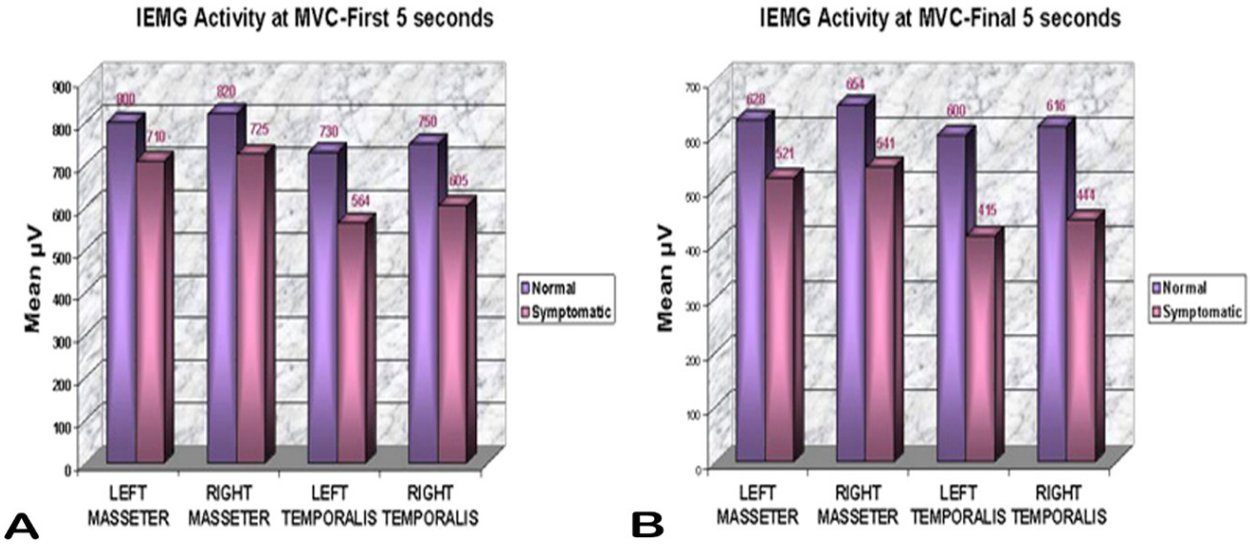


Figure 2. (A) Graph Showing the Reduction in Activity of Masseter and Temporalis in TMD Symptomatic as Compare to Asymptomatic Subjects (first 5 sec). (B) Graph Showing the Reduction in Activity of Masseter and Temporalis in TMD Symptomatic as Compare to Asymptomatic Subjects (final 5 sec).

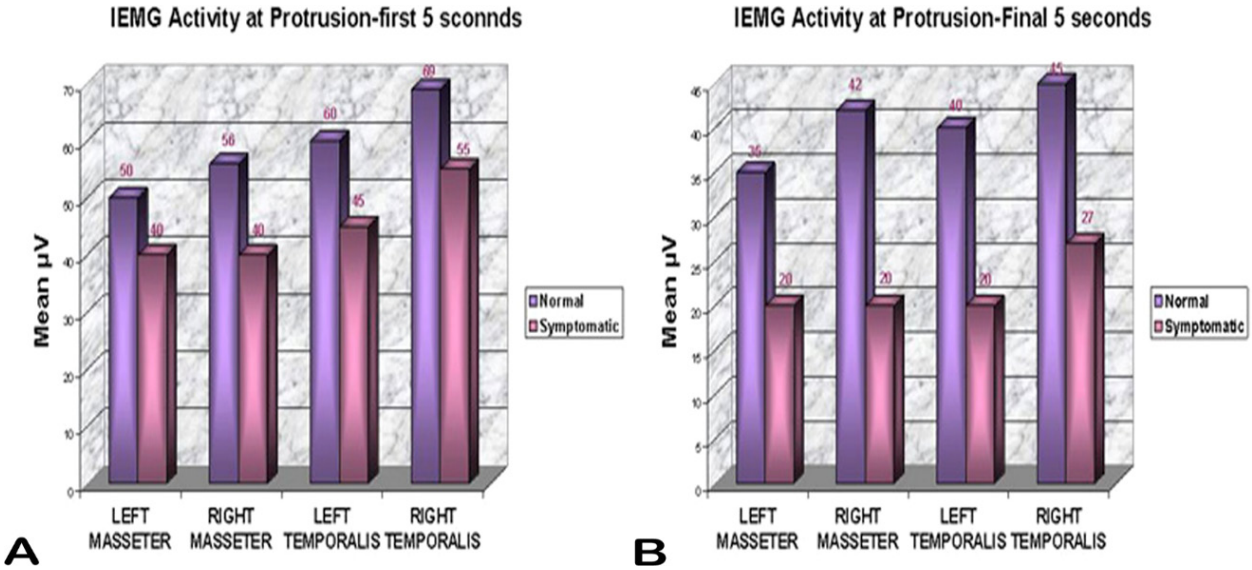


Figure 3. (A) Graph Showing the Reduction in Activity of Masseter and Temporalis in TMD Symptomatic as Compare to Asymptomatic Subjects (first 5 sec). (B) Graph Showing the Reduction in Activity of Masseter and Temporalis in TMD Symptomatic as Compare to Asymptomatic Subjects (final 5 sec).

Statistical Analysis: The readings obtained were tabulated and statistically analyzed with an independent t-test. Study data was analyzed and results are being presented in tables 1 - 5. It represents the mean vales of the electromyographic activity for the masseter and temporalis muscles in TMD symptomatic as compared to asymptomatic subjects during Rest position, maximal voluntary clenching (MVC) and protrusion (P). The electromyographic activity is recorded in micro volts (μV).

Results

Result – 1: Statistical analysis of the fore mentioned data reveals a very highly significant increase in the activity of masseter and temporalis in TMD symptomatic group than in asymptomatic subjects at physiological rest position of mandible (RP). A significant difference ($p<0.05$) in overall contractile activity was seen between normal (23.85μv) and symptomatic (28.675μv) groups (Figure 1B).

Result – 2: Statistical analysis of the fore mentioned data reveals a very highly significant lower in the activity of masseter and temporalis in TMD symptomatic group than in asymptomatic subjects at maximal voluntary clenching position of mandible (MVC) (Figure 3A).

Result – 3: Statistical analysis of the fore mentioned data reveals a very highly significant lower the activity of masseter and temporalis in TMD symptomatic group than in asymptomatic subjects at maximal voluntary clenching position of mandible (MVC) (Figure 3B).

Result – 4: Statistical analysis of the fore mentioned data reveals a significant lower the activity of masseter and temporalis in TMD symptomatic group than in asymptomatic subjects at protrusion (P).

Result – 5: Statistical analysis of the fore mentioned data reveals a highly significant lower the activity of masseter and temporalis in TMD symptomatic group than in asymptomatic subjects at protrusion (P).

Discussion

The etiology of craniomandibular disorder is not always fully understood and has been investigated from both the structural and functional point of view. The studies have concluded that the etiology is multifactorial with muscle hyperactivity being one of the main factors. Electromyography (EMG) has been often used[2], to comprehend the underlying neurologic process of muscle hyperactivity. Currently focus has been to use Electromyographic recordings in the diagnosis and treatment planning of TMDs. Electromyography (EMG) provides excellent information on muscle function. Studies have also inferred isometric muscle tension, changes and relation between a reliable reproducible and in the changes in the EMG amplitude. The conjunction with relaxation and biofeedback therapy along with that are used as a treatment tool for EMG.[2]

Periodontal receptors are important for the reflex control of masticatory muscles. The mesencephalic nucleus is activated by the stretch of jaw elevator muscles and pressure stimulation of the teeth.[3]In jaw opening and jaw closing muscles, the central sensitization process induced in the trigeminal brainstem complex by deep nociceptive afferent inputs. A type of 'splinting' effect is represented by these neuromuscular changes which protects the articular or muscular tissues from further damage and counteracts excessive movements.[5]

In TMD subjects the EMG evidences:

Jaw muscles, activity levels: The TMJ signs/ symptoms existed when hypertonic activity of the jaw muscles is also observed. To discriminate the hyperactivity of muscles of the jaw, an useful tool is the integrated electromyography (IEMG).

At Physiological Rest Position of Mandible (RP): By this study the levels of the activity of muscle on physiological rest position of mandible in groups is elevated, temporalis being specifically. It may reflect compensation for an abnormal mandibular position.[6]Due to functional over-shortening of muscles as seen in TMDs subjects, such spontaneous hyperactivity in rest position is likely seen.

Within the perimeters of its normal physiologic length when it is called upon to contract, the muscles work most efficiently. The tension recorded in muscle and tendon proprioceptors is altered if this perimeter of muscle length is changed.The excessive muscle shortening is brought by these alterations in tension, which by reflex sets up the pattern of spontaneous hyperactivity and are then imposed on the neurocentral system.[7]

At Maximum Voluntary Clenching Position of Mandible (MVC): EMG readings in the muscles of masseter, in this study and temporalis in TMDs declined in comparison with normal individuals. In TMD subjects

the jaw elevators activity are lower at maximum voluntary clenching position of mandible as it has been reported.[1]

In TMD patients, the reduction in muscle activity during clenching indicates the reduction of compressive force transmitted on the temporomandibular joint. This may reflect an involuntary pain-avoidance response. In TMD patients, the muscle is already in a contracted position due to presence of any pathological condition, such as occlusal interference, which interferes with the normal closure of the mandible. Hence, the muscles, which regulate the mandibular movements, try to close the mandible in a least damaging pattern, thus acquiring ENGRAMS according to that condition. This is the body's protective mechanism. The normal physiologic length cannot be attained during this condition the muscles are in a contracted position.[8] The tension recorded in muscles and tendon proprioceptors is altered if this perimeter of muscle length is changed. The reduced contractile activity of the muscles is in question is reflected due to these alterations in tension. This may reflect an involuntary pain-avoidance response.

At Protrusive Position of Mandible (P): The EMG readings in the muscles of masseter,in this study and temporalis in TMDs declined in comparison with normal individuals. In TMD subjects the activity of the jaw elevators are lower at protrusion as it has been reported.

Protrusion, i.e. forward movement of mandible, is mainly governed by Lateral Pterygoid muscle. This is the muscle which is most frequently involved in TMDs. Temporalis is the antagonistic muscle for lateral Pterygoid. Therefore, this muscle is also active in protrusion. This phenomenon is known as PROTECTIVE CO-CONTRACTION. This response has also been called '*protective muscle splinting'*.

During a movement pain may result in agonist muscles becoming less active whereby this has led to the concept of 'Pain Adaptation' thatis Lateral Pterygoid and its antagonist muscle (Temporalis) there by limiting jaw mobility and possibly aiding healing and becoming more active in this movement.[5]

Conclusions

At physiological rest position of mandible (RP), the muscles activity was higher and highly significant in TMD symptomatic group than in asymptomatic subjects at physiological rest position of mandible (RP). At maximal voluntary clenching position of mandible (MVC), the muscles activity was significantly lower in TMD symptomatic group than in asymptomatic subjects at maximal voluntary clenching position of mandible (MVC). During protrusive position of mandible (P), the muscles activity was significantly lower in TMD symptomatic group than in asymptomatic subjects at protrusion (P). The IEMG readings for TMD patients (at MVC and P), less activity was seen in the left side muscles than in the right-side muscles. These findings reflect higher incidence (75%) of TMDs seen on left side.Analysis of fatigue shown by the muscles symptomatic of TMDs showed greater values than the fatigue seen by normal muscles on both maximum voluntary clenching position of mandible and protrusive position of mandible. The IEMG-P readings showed higher activity in the temporalis (50 μV) as compared to masseter (40 μV). Jaw elevators in TMD showed hypertonic activities, weak functional efficiency and less relaxed following a muscle twitch and following a functional effort becomes easily fatigued. In EMG activities the severity of the pain could not be reflected and it showed increased tonic activity with functional effort due to impaired jaw movement. The functional adaptation of jaw-muscle activities and occlusion may alter due to TMD symptoms.

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Ethical Approval: None

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Carcinogenesis: A Comprehensive Overview

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Abstract

Carcinogenesis is the process of tumor induction which occurs by the oncogenes which signal the molecules at various stages of growth. Apoptosis also leads to membrane dissolution of nucleus and cytosolic skeleton, chromosome degradation and fragmentation of nucleus. Even presence of various chemical, viral, radiation carcinogens that enhance carcinogenesis. In this article we have elaborated factors & process leading to carcinogenesis.

Keywords: *Oncogenes, Host Defense, Pathogenesis.*

Introduction

Is a multi-stage process that involves induction of tumors by carcinogens. Carcinogens are agents that cause changes in the interactions between cells and their environment causing invasion and metastases. Genetic bases of cancer involve phenotypic mutation or alteration by genes.[1,2]

(a) Proto-onco genes: These importantly involved in normal growth, regulation and cell differentiation.

(b) Oncogenes: There are mutated and / or dysregulated protooncogenes[3,4].

This oncogene activation can occur by

1. Genetic over expression due to acquisition of novel transcriptional promoter
2. Chromosome dislocation e.g. Philadelphia chromosome
3. Amplification of genes due to increased gene copy number
4. Point mutation that results in altered protein

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(c) Tumor suppressor genes: expression of these genes inhibits malignant transformation of cells.

Hallmarks of Cancer

Acquisition of autonomous proliferation signaling: These depend on growth factors which are signaling molecules. Various stages in transmission of growth signal include (Growth factor and Growth factor receptor) -Transduction – transfer of Second messengers - RNA and protein synthesis - DNA synthesis **.**A number of growth factors have been studied but epidermal growth factors (EGF) and transforming growth (TGF). Growth factors may act on adjacent cells (paracrine effect) or on the same cell (autocrine effect). Some of the receptors contain G proteins and they may act in various ways[5]. E.g. activation of phospholipase C, these act themselves as tyrosine kinases, other e.g. include phosphorylation of various cell enzymes. In any event arrival of growth signal at nucleus, phosphoproteins which can bind with DNA appear to be involved in regulation of transcription.

Role of oncogenes: Oncogenes play an important part to produce abnormal products so that central mechanisms have altered to allow gene over expression and normal constraints are lost. The products oncoproteins are closely relate to normal cell growth receptors.

- **Inhibition of growth inhibitory signals:** The phase of cell cycle, G_1, S and G_2 and M is tightly

controlled. These are controlled by group of molecules called cyclin dependent kinase (CDKs) and cyclin-dependent kinase inhibitors (CDK Is). Any molecule which affects these CDKs or CDKIs has profound effect in cell growth[6].

Retinoblastoma gene (RB): RB and its protein product pRB are referred as gateway to cell cycle. Active form, pRB prevents progression through the cell cycle by binding to and inactivating factors (E2F) necessary for DNA synthesis.

Hypophosphorylated RB complexed to E2F transcription factors bind to DNA and inhibits transcription of genes. RB is phosphorylated by cyclins, E2F released → causing transcription. Thus, phosphorylated of RB is inhibited by CDK inhibitors[7].

TP53: Guardian of genome: It is located on short arm of chromosome 17. It acts by regulating gene transcription, by arresting cell cycle causing DNA repair by inducing programmed cell death. The rise in Tp53 is crucial defense mechanism, preventing division of cells with mutation .Other inhibitory factors include transforming growth factor β (TGFβ), interferons, interleukins etc.

- **Evasion of programmed cell death or apoptosis:** Apoptosis is a critical step in cell homeostasis, which leads to membrane dissolution of nucleus and cytosolic skeleton, chromosome degradation and fragmentation of nucleus. Any mutation of TP53 has an inverse correlation to extent of apoptosis in oral Carcinoma. Apoptosis is carried out by cathepsins especially initiator and effector cathepsins. Another mechanism of apoptosis include release of cytochrome (from mitochondria which controlled by BCZ family). Some antiapoptic members like BCL2 overexpression cause inhibition of apoptosis and is over expressed in HNSqCC[8].
- **Immortalization:** Tumor cells replicate infinite indefinite times. And this is necessary for progression of tumors. It is found in the activity of telomerase; prevent the destruction of telomeres which act as protective caps and hence the cell survives the replicative cycle.
- **Acquisition of nutrient blood supply:** Growth of tumors also requires nutrient supply. This occurs by mutating endothelial proliferation of cells causing formation of new blood vessels. It is regulated by various positive (Vascular endothelial cell growth factor) and negative angiogenesis regulators (Interferons)[9].
- **Tissue invasion and metastasis:** Steps critical for this process include:

  (A) Attachment and basement membrane e.g. Integrins are cell adhesion molecules released from Ca cells Proteolysis and migration is the next important step e.g. of molecules include matrix metalloproteinase area which help in invasion and metastasis in various kinds of tumors.

Etiology of cancer and mechanisms of carcinogenesis[10]: Carcinogenic agents can be divided into 3 categories:

Chemical carcinogenesis: Sir Percival Pott in 1775 gave the first evidence of any cause of neoplasia through its observation that prolonged exposure to chemicals could cause cancer. Of which oral cancers are mainly a result of these chemicals.

Initiation of carcinogenesis: The change is produced by a single dose of these agents for a short time, though larger dose for longer duration more effective. The change so induced is sudden, irreversible and permanent.

Two types:

(I) Direct acting: they don't undergo any metabolic activation

They are

a. Alkylating agents – Especially anticancer drugs. E.g. cyclophosphamide, epoxides, p propiolactones

b. Acylating agents: e.g. acetyl imidazole

(II) Indirect acting: require metabolic conversion within the body to become ultimate carcinogens. They are also called as procarcinogens.

Various steps involved:

(a) Metabolic activation: Majority of chemical carcinogens are procarcinogen and mostly activating by cytochrome R450 system located in ER or in nucleus.

(b) Following activation procarcinogens as well as directly acting carcinogens become electron deficient and bind to electron rich electrophiles of other molecules of DNA, RNA and other proteins.

(c) Changes lead to initiated cell → changes in DNA are seen, repair may occur in absence of which further progression

(d) E.g. of procarcinogen

Benz (a) anthracenes → polycyclins, aromatic hydrocarbon Benzo (a) pyrenes in tobacco, smoke, tar etc.

Aromatic amino and nitrogen compounds: Naphthylamine & Acetylamino fluorenes

(2) Promotion of carcinogenesis

Next step

- They do not produce sudden changes
- Require application or administration, for insufficient time and dose
- Change induced may be reversible
- Don't damage DNA per se but instead enhances effect of direct act of carcinogens with or pro-carcinogens.

e.g. Phorbol esters especially TPA

Phenols, hormones (estrogen) drugs (phenoparbital), artificial sweetness e.g. Sauhorn

Radiation carcinogenesis: UV light and ionizing radiation are two main forms of radiation carcinogens. Usually the appearance of carcinogenic effects occurs long after exposure 10 – 20 years or even later. The process occurs in 2 steps: **Initiation**: occurs by mutagenic carcinogenesis & **Spontaneous mutation**

Ultraviolet carcinogenesis:

Various effects of UV rays on cells include

- Inhibiting cell division
- Inactivation of enzyme
- Induction of mutation
- Insufficient damage – killing of cells

The UV light also activate T suppressor cell and so inhibit cell mediated immunity

Viral oncogenesis:

RNA oncogenic viruses: T cell leukemia in humans is caused by type 1 virus i.e human retrovirus associated with cancer.

DNA oncogenic viruses: DNA oncogenic viruses are classified into 5 subgroups each of which is capable of producing neoplasms in different hosts.

Papova viruses, Herpes viruses, Adeno viruses,Pox viruses &Hepadena viruses

Papova viruses: 3 members which have role in various of benign and malignant neoplasm

Human papilloma virus

- HPV – HPV 1,2,4, and 7 cause Benign neoplasm & papillomas (Warts)
- HPV 16 & 18 → associated with Ca of cervix, oncogenic
- Other animals: Polyoma virus, SV – 4 virus
- Herpes viruses: Important members involved in tumors and cancers.

EBV – Burkitt's lymphoms, Nasopharyngeal Ca, immuno suppressed individuals

Herpes simplex 1 – cervical carcinomas

HHV 8 – Kaposis sarcoma

- Hepadna virus: Hepatitis B virus is a member of this family. The oncogenesis effect is multifactorial
- Pox virus – molluscum contagiosum

3. **Host defense against tumors – Tumor immunity:** Human defense system is also known as "Immune Surveillance "i.e survey of the body from emerging malignant cells and its destruction. .

Tumor antigens: These are classified broadly into two categories

Tumor specific antigens that is produced by oncogenic viruses & Altered cell surface with glycolipids and glycoproteins.

Antitumor effector mechanisms: Both cell mediated and humoral immunity have been demonstrated principal mechanism of tumor immunity is killing of tumor cells by CD8 + T cells. Various cells involved are – Cytotoxic T lymphocytes, Natural Killer cells, Macrophages and Antibodies.

Immune surveillance: where selective outgrowth of antigen negative variant, Loss of reduced expression of MHC molecules & Immuno suppression etc occurs

Various other host related factors[5]:

(a) Heredity:	Though not yet found for oral cancer, there are known hereditary dominant autosomal as well as hereditary recessive autosomal disorders predisposing for certain cancers
(b) Racial constitution:	e.g. Immunity of dark skin races to carcinogenesis action of sunlight
(c) Developmental factors:	Inherent forces of growth and differentiation responsible for the proper development of a tissue or organ. These forces may be disturbed during development of tissue so those cells lose their ability to continue differentiation
(d) Age:	Higher incidence in individuals over 40 years of age. Certain tumors are common in children below15 years. E.g. Wilm's tumor
(e) Social class:	Besides specific occupational factors, there is statistical evidence that cancer of skin, mouth, and esophagus is common lower social groups
(f) Diet:	dietary deficiencies or exams can lead to biochemical malfunction which may in turn initiate or promote neoplastic process.

Theories of tumor biology: With considerable progress in genetic basis of cancer development, various theories and concepts related to tumor biology have been put.

Clonal evolution theory: Proposed by Nowell in 1976. Repeated carcinogenic results or "events" occur. With in a cell, at genetic or epigenetic level, when enough events occur, a selective growth advantage is conferred on affected cells. Though most of progeny do not survive, a dominant clonal population of cells is produced that flourishes as evolution occurs in this clonal population, new clones are produced with additional features.

Molecular progression model: Nowell's model is well accepted and usually 6 – 10 events are required for development of most tumors including Head and Neck.

Field carcinogenesis: Based on Slaughter's hypothesis – constant carcinogenic pressure, the entire upper aerodigestive tract is at increased risk of development multiple primary tumors. According to here multiple genetic events occurred throughout the involved mucosa, allowing development of molecularly multiple clonal progression. Recently however this theory is modified and it is thought that single lesion is involved in multiple aero-digestive tract lesions through the process of intra–epithelial migration.

Though both the mechanism evidence exists and it is hypothesized that both mechanisms explain the concept of field carcinogenesis.

Biology Of Metastasis: A common Denominator to all malignancies is their ability to metastasize. It varies and some tumors have greater tendency for local invasion without metastasis, whereas others produce organ-specific metastasis early on the development.

Approx, 4 million Tumor cells/gm of Tumor are released into the blood streams on a daily basis and yet only less than *1% of malignant cells* entering the Blood stream go on to survive. (Butler and Gullino, 1975), due to the efficient lymphatic system.

The filtration efficiency of a single lymph node has been shown to be better than 95%.

If so, then why does metastasis occur?

Exact Reasons are not fully understood. However, an influence of factors related to tumor and the environment may play a role in metastasis[2].

I. Tumor Factors:

(a) Cytologic Features: Phenotypic Mutations: Tumor cells generated are not inhibited by the host which eventually become Dominant and resistant allowing successful metastasis. These metastatic cells by their very nature are super selected clones which are more likely to survive

(b) Histologic Features: The phenotypic cells penetrate the Basal lamina of the epithelium into C.T. spaces and are forced into lymphatic capillaries by the high interstial pressure created by the tumor. These cells then enter the lymphatics and spread to the regional lymph nodes. However, the lymph nodes are a much less efficient barrier to the lymph borne cancer cells (Phenotypically Mutated). These may accumulate in nodes and ultimately find their way into the efferent lymph to be carried to other sites in the body. These successful metastatic cells adhere to the microvasculature of the organ, extravasate, establish a micro environment and proliferate. These factors also dictate other histologic features such as depth of Invasion, perineural Invasion, infiltrating as opposed to pushing, pattern of Invasion.

(c) Molecular Features: The successful invasion and metastasis by a tumor is almost certainly related to the elaboration of certain enzymes and growth factors.

(1) Enzymes:

- Type IV Collagenase - directed towards basement membrane.
- Zymogen Activation - by extracellular and membrane associated proteases and matrix metalloproteins (MMP) which lead to cascade of reactions modifying the extra cellular environment thus promoting tumor progression and degradation of tissue barriers.

(2) Growth Factors:

- Angiogenesis factors – Tumor Neovascularization
- EPGF – Epidermal Derived Growth Factor
- PDGF – Platelet Derived Growth Factor

II. Environment or Host Factors: Ability of the Tumor cells to survive at their termination site (Lymph node) depends on the internal environment and Immune Status of the host. Immune- elimination of altered cells after tumor activation of active and passive immunity occurs These work in a coordinated manner to protect as well as helps in progression.

Conclusion

Oral cancer is a multifactorial disease here alterations activate or oncogenes and inactivates tumor suppression genes. These altered genes are inherited but are also acquired form the environment through chemical carcinogen, radiation & viruses.

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A Rare Site for Oral Cavity Schwannoma: A Case Report

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Abstract

Schwannomas are benign tumororiginating from peripheral Schwann cells of the neural sheaths. These tumors present as solitary and encapsulated lesions. Intra oralschawannoma is not commonly seen in the palate and extremely rare at junction between soft and hard palate. These benign lesions are slowly expanding tumors with less risk for malignant transformation and need complete excision of the mass. As it has rare and non-specific presentations, the diagnosis is usually established by histopathological examination and immunohistochemical evaluation. Here we report a case of a large schawannoma at the area where hard and soft palate unite, which is an extremely rare location of this tumor.

Keywords: *Oral cavity, palate, Schawannoma, Benign tumor.*

Introduction

Schwannomas are uncommon benign tumor arising from peripheral or autonomic or cranial nerves which possess Schwann cells.[1] This neoplasm is slow-growing, solitary and encapsulated. The prognosis of schawannoma is usually very good as they do not recur and rarely transfer to malignancy.[2] Around 25 - 45% of the schwannoma seen in head and neck region whereas only 1% have an intra-oral origin.[2] The involvement of the palate by schawannoma is very rare. The rare location of this tumor in palate has similarityto other diagnosis likeminor salivary gland tumors and pyogenic granuloma as differential diagnosis. As it is a benign lesion, require complete excision. Although there are very few cases of palatal schwannomas are reported in literature, clinician should think of this rare clinical entity in of the mass located in the palate. Here, we report a rare location for schawannoma at the meeting point of soft andhard palate.

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Case Report: A 48-year-old man presented with a gradually increasing swelling over the palatefor 3 years. He had pain over the swelling since last 4 months. On examination the mass was at the meeting point of softand hard palate with 7cm × 5cm in size (Fig. 1). The mucosa over the palatal mass was normal except a whitish patch over the mass. The mass was firm in consistency, mildly tender and fixed. There was no cervical lymphadenopathy. He had no history of any systemic medical diseases. Clinically the mass was thought of minor salivary gland benign tumor. Fine needle aspiration cytology (FNAC) showed benign squamous cells and a single bunch of spindle cells with bland nuclear pictures. Contrast enhanced computed tomography (CT) showed irregular mass at the point hard and soft palate junction (Fig. 2). There was no bone erosion. Wide excision of the palatal mass was done along with healthy margin (Fig. 3). Gross examination of the excised mass revealed, the resected tumor was encapsulated. On cut section of the mass, there was

whitish tumor showed focal hemorrhage. Histopathology picture showed an encapsulated neoplasmconsists of bundle of spindle cells exhibiting alternate cellular and hypocellular fascicles of spindle cells showing alternatecellular and hypocellular (Antoni-A and Antoni-B) (Fig. 4). Immunohistochemistry (IHC) test shows, S-100 is positive where as negative for smooth muscle cell of tumor. The post-operative period was uneventful. After six months, and one year there was no evidence of recurrence. At the follow up visit, the surgical site of the palate is completely healed without any evidence of recurrence.



Fig. 1: Schwannoma at meeting of soft palate and hard palate.

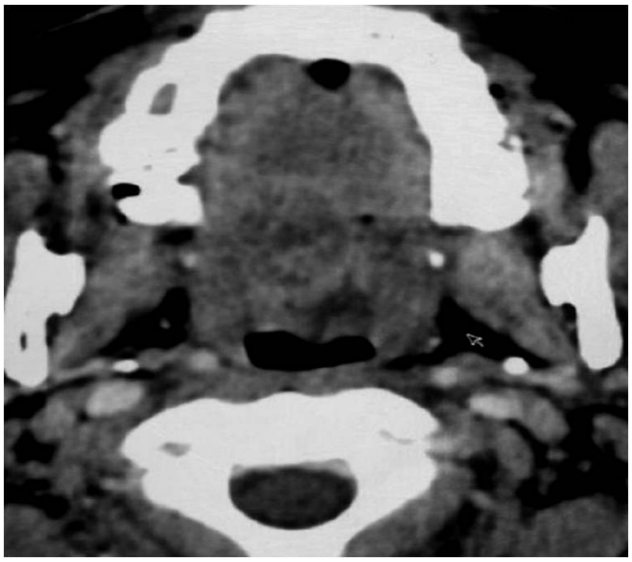


Fig. 2: CT scan axial view through the palate showing a well defined hypo-dense mass at the area between soft and hard palate.



Fig. 3: Picture of the palate after excision of the tumor mass.

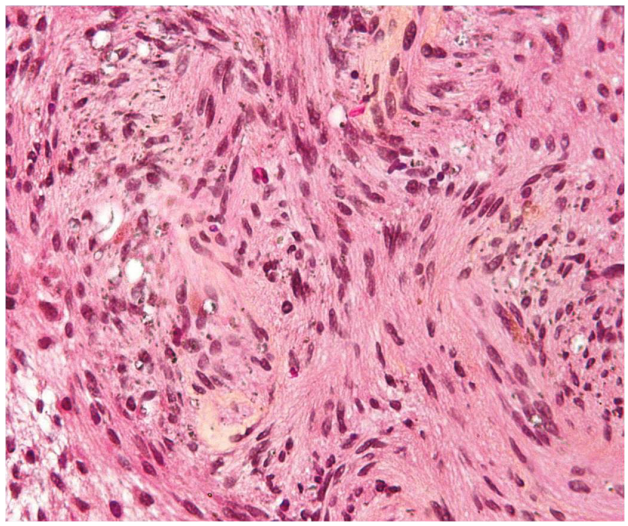


Fig. 4: Photomicrograph of tumor showing cellular (Antoni-A) and hypocellular (Antoni-B) patterns and a palisading layout of the tumor cells (Verocay body) (H&E 200X).

Discussion

Schawannoma is a slow growing benign, encapsulated neoplasm, solitary in nature and originating from Schwann cells of the peripheral nerve sheath. It is usually seen in head & neck region and surface flexors of the lower and upper limbs.[3] Most schwannomas in the head and neck region are solitary, slowly growing, non-tender and encapsulated mass. Schwann cells are derived from neural crest derived glial cells which form myelin insulation of the peripheral nervous system axons. There are notable 2 locations of the head and neck which lack Schwann cells which are optic nerve and olfactory nerves. The most common locations of the schawannoma in the oral cavity are tongue then palate,

floor of oral cavity, gingival, lips, buccal and vestibular mucosa.[4] Schwannomas of head and neck area may be seen at any age group but usually prevalent during 2nd and 3rd decades of life. Few cases of Schwannomas are reported as malignant schwannomas which accounts for five percent among all sarcomas of soft tissues. Out of these, 9-14% areseen in the head & neck area.[5] Approximately 1% of schwannomas are seen in oral cavity and commonly found in tongue, palate, floor of the mouth, oral mucosa and jaw. [6]The area between soft and hard palate is an extremely rare location for schwannoma. Extra-cranial head & necklesions (Schwannoma) are commonly solitary and properly delineatedtumor. Schwannomas are often seen in 4th and 5th decades of life and show 1. 6:1 female predilection. [6]

The clinical presentations depend on the site of the lesion and its mass effect or involvement of the nerve. Patients of head and neck schwannomas may presentclinical symptoms such as pain, voice change, difficult to swallow, cranial nerve involvement and also Horner's syndrome. [7] Schwannomas on the palate often mimic to the minor salivary gland pleomorphic adenoma in their clinical and radiographical presentations. Here, we present this case to highlight the rarity and particularlyat the junction of hard & soft palate of the oral cavity. Patient's clinical presentation of a submucosal mass and his clinical features provide thinkingfor minor salivary gland tumor which is considered in the differential diagnosis. Other possible differential diagnosis are benign lesions such as granular cell tumor, leimoyoma, malignant lesion such as squamous cell carcinoma and sarcoma.[8]

The preoperative diagnosis of schwannomas is often difficult only by routine clinical examination. For diagnosing schwannomas, radiographs have little role as they do not have any characteristics which differentiate schwannoma from other lesions. CT scan may help to rule out extension of the tumor and bony erosion. MRI provide important information for pre-operative diagnosis and planning for the treatment.[9] In MRI imaging, schwannomas have a low-signal intensity on T1-weighted imageand signal hyper intensity on T2 weighted image, revealing either heterogeneouslyor homogeneously high intensity.[10] FNAC is inadequate for diagnosis of neural tumors. The accuracy of preoperative diagnosis of schawannoma by FNAC is approximately 25%.[10] In this case, the tumor was initially thought as minor salivary gland pleomorphic adenoma on its clinical presentations.

Immunohistochemistry techniques are important method used for the diagnosis of suspected schwannomas which typically show positivity to S-100 protein. Schwannomas often shows a strongly positive to S-100 protein in all tumor cells in comparison to other neural tumors like neurofibromas or peripheral nerve sheath tumors.[11] The tumor cells of this case were strongly positive forvimentin, S-100, CD56 and negative for cytokeratin which support towards the diagnosis of schawannoma. Most of the tumor cells of the tumor mass shows Antoni type-B tissues with focal areas of Antoni type-A pattern.

Treatment at the palatal schwannomas includes surgical resection. Soft palate defect greater than 1 cm need surgical reconstruction as simple closure is not sufficient. In the present case, tumor was completely excised as it was pedunculated arising from the junction of the hard and soft palate. Complete excision of tumor is required along with emphasis is given for preserving the nerve (tumor originating) if seen during surgery. Completeexcision of this tumor of the oral cavity, its recurrence has not been documented.[12] During surgical excision of the schawannoma over the palate, importance should be given to consider function of palatal muscles such as tensor veli palatine and levator veli palatini. Closure of the wound after excision and proper epithelialization have risk for scar contracture which may lead to velopharyngeal insufficiency.[13] Defect of the soft palate more than 1 cm need surgical reconstruction as simple closure of the wound would be insufficient. There are different types of flaps according to the size and site of the defect at soft palate. In case of malignant lesions at the soft palate, it needs free flapsdue to large area of reconstruction. The free flap reconstruction lead to static reconstruction, which often results in velopharyngeal insufficiency.[14] In present case wound was small in size and closed easily without any tension and followed by no scar formation.

Conclusion

Schwannomas at the junction of meeting point of soft and hard palate of the oral cavity are extremely rare and should be included as differential diagnosis among benign lesions of the palate including minor salivary gland pleomorphic adenoma. It is imperative that the clinician must aware of this tumor with its clinical manifestations. Due to its rarity, multicenter reporting of the head and neck schwannomas should be used to identify their pattern of incidence and required surgical treatment.

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Unicystic Ameloblastoma of Maxilla: A Case Report

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Abstract

Unicysticameloblastomasare those cystic lesions that exhibitcharacteristics clinically and radiologically of a cyst from odontogenic originhistologically depictsan ameloblastomatous epithelium which lines part of the cyst cavity, with or without proliferation of luminal & mural tumor. These grow inside the jaw and cause displacement of the bone, teeth and their roots. Sometimes they infiltrate the bone and spread into the soft tissue. Mostly seen in posterior mandible, but it may also arise in the maxilla and the jaws anteriorly. This is one of the rarevariants of the ameloblastoma. We report a case of unicystic ameloblastoma of maxillary region in a male patient of 35 years.

Keywords: *Unicystic Ameloblastoma; Maxilla; cystic lesions.*

Introduction

It has been reported that ameloblastoma is the second most common odontogenic neoplasm. Robinson has illustrated it being a tumor that is 'usually unicentric', 'nonfunctional', 'intermittent in growth', 'anatomically benign' and 'clinically persistent'. It is believed to be originated from residual epithelium of the tooth-forming apparatus, such as the epithelial cell rests of Malassez; epithelium of odontogenic cysts; basal cells of the surface epithelium; epithelium of the enamel organ; and heterotopic epithelium from extraoral sites, such as the pituitary gland. These are aggressive and destructive in nature, and have the potential to reach greater dimension, infiltrate bone and breach surrounding structures. Based on the World Health Organization (WHO) classification of head and neck tumours, there are four forms of ameloblastomas: 'multicystic', 'peripheral', 'desmoplastic' and 'unicysticameloblastomas'. Robinson and Martinez in 1977 described unicystic ameloblastoma as a distinct entity. These are clinically and radiographically related to jaw cyst but histologically the unicystic ameloblastoma depicts an ameloblastomatous epithelium which lines part of the cystic cavity. Normally these are less aggressive in nature, affects patients of younger age group, and responds very well to enucleation or curettage. Unicystic ameloblastoma normally occurs in posterior part of ramus region of mandible, and hardly in posterior part of maxillary region.[1,2]

Case Report: A male patient of 35 years reported to the outpatient department of Institute of Dental Sciences, Bhubaneswar, and had a complaint of swelling in the left side of face adjacent to the nose since 2 months (Figure 1).



Figure 1. Frontal view photograph showing left maxillary swelling obliterating the nasolabial fold and displacing the ala of nose.

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The patient was apparently asymptomatic 2 months ago. Then he observed swelling over the left side of face which was asymptomatic and at the beginning was of a smaller dimension that gently progressed in dimension up to the present dimension with no discharge and mild tenderness. He had no other physical abnormality.

On extraoral examination: Well circumscribed, non-fluctuantswelling of hard consistency present adjacent to the left ala of nose extending superiorly from infraorbital region till commissure of lip, anteriorly from ala of nose till 4cm ahead of the TMJ obliterating naso labial sulcus region measuring 3*4cm in size approximately. Skin over the swelling is of normal skin colour with no secondary changes and tender on palpation.

On intraoral examination: Bicortical expansion noted in the alveolobuccal sulcus area extending from 12 region till 27 region measuring 3*3 cm in size obliterating the vestibule and palatally extending from the left maxillary canine region to the greater palatine foramen.

On palpation the lesion is nontender, having areas of depression. Egg shell cracking and Crepitus was felt buccally. Vitality test revealed 11, 12 to be vital and 21, 22, 23, 24, 25, 26 to be non vital. Needle aspiration revealed yellow straw-colored fluid.

Radiographic examination revealed unilocular lesion starting from right maxillary lateral incisor to left maxillary first molar. There was complete involvement of left maxillary sinus and lateral wall of piriform aperture. Displacement of left central incisor of maxilla to the first molar with significant root resorption was noted [Figure 2].



Figure 2. Orthopantomograph (OPG) showing unilocular radiolucency in the left maxilla displacing and causing resorption of the involved teeth.

The patient was operated under general anaesthesiausing intraoral approach. The lesion was exposed using crevicular incision and was enucleated [Figure 3]. Extraction of left maxillary lateral incisor to first molar was done. Peripheral ostectomy was done. Soframycin gauze pack was placed and the surgical site was closed with 3-0 vicryl suture. Excised specimen was sent for histopathological examination.

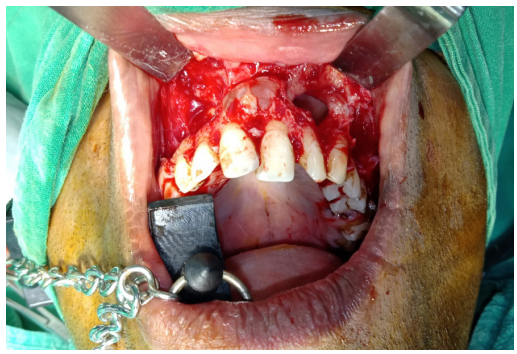


Figure 3. Intraoperative photograph showing the extent of the lesion.

Histologic analysis of the surgical specimen revealedunicystic ameloblastoma, mural form. The lesion was fully encircled by a capsule of fibrous nature and has a lining of ameloblastic epithelium, with basal layer of columnar cells, subnuclear vacuoles, reverse polarity of nucleus, and stellate cells in centre.

There was no sign of recurrence during follow-up and the patient's condition improved significantly.

Discussion

Radiographically unicysticameloblastomas are typically unilocular with a round area of radiolucency. It is mostly misinterpreted as an odontogenic keratocyst or a dentigerous cyst. It accounts for 10–15% of all extraosseous ameloblastomas.[3] Mostly the lesions are asymptomatic and occur in the posterior mandibular region. The chances of recurrence are 3.6% and 30.5% for resection and enucleation respective, 16% and 18% for enucleation followed by Carnoy's solution application and marsupialization followed by enucleation respectively. The ageof the patient is an important component which determines the treatment to be followed.[4] Prognosis depends on the method of surgical treatment and not on the tumor's histology. Recurrence of this tumor depicts the insufficiency of the primary surgical procedure. A recent systematic review demonstrated that enucleation resulted in a highest recurrence rate and the lowest was observed with resection of tumor. Therefore, thorough preoperative diagnosis o and long-term follow-up should be done in these kinds of lesions.[5,6]

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An Unusual Cause of Throat Pain: A Case Report

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Abstract

A 42-year man complained with unilateral throat pain and foreign body sensation in throat since last two years. Patient had tenderness over the left tonsillar fossa when palpated. Computed tomography (CT) imaging of the neck showed bilateral enlarged styloid process, measuring 6.8 mm on right side and 5.1 cm on left side. The salivary and thyroid glands, as well as pharyngeal and laryngeal findings, were normal. The patient was taken up for surgery after complete diagnosis. The pain and discomfort were relieved after Styloidectomy.

Keywords: *Throat pain, Eagle's syndrome, Elongated styloid process, Styloidectomy.*

Introduction

Eagle's syndrome is an uncommon clinical entity related to the prolongation of either styloid process or calcified stylohyoid tendon which is clinically portrayed by throat pain or odynophagia, emanating towards the ear. It is known to happen when either the absolute styloid process length is bigger than 2.5 cm or hardening of the stylohyoid or stylomandibular tendons. The agony brought about by Eagle's disorder is a kind of nerve torment, which means it is brought about by irregular nerve signals, not harm to the excruciating area.[1] The torment is commonly depicted by the patient as a dull and throbbing hurt that may incorporate an inclination that something is stuck in the throat. A few people may likewise encounter tinnitus.[2] Since the side effects are variable and vague, patients look for treatment in a few unique facilities, for example, otolaryngology, nervous system science, neurosurgery, psychiatry, and dentistry. We depict the instance of a 52-year-old male patient who gave left neuralgic torment, going on for around 2 years, confined in the throat and neck and some of the time transmitting into the ear.

Case report: A 42-year man displayed to us with a background marked by unilateral throat pain with foreign body sensation in throat. He was able to pin point the area of pain. He went to several institutions before coming to us but the correct diagnosis could not be made and his pain was not relieved even after taking the prescribed medications. We performed a laryngeal endoscopy under local anesthesia which came out to be normal. Then the tonsillar fossa of both sides was palpated and the patient had severe tenderness in the left side. Suspecting it to be an elongated styloid process, we advised the patient to go for a CT scan neck with 3D reconstruction. The report uncovered two-sided lengthened Styloid process, estimating 6.8 mm on right side and 5.1 cm on left side with typical salivary and thyroid organs, just as expected pharyngeal and laryngeal discoveries. The surgery was performed only on left side as the right side was asymptomatic. Tonsillectomy done by coblation method followed by styloidectomy, which is the excision of the excessive length of styloid process was done on the left side 6.8 cm of the styloid process was excised. Pain and

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foreign body sensation disappeared immediately after the surgery. Diagnostic workup: The various potential reasons for pain like odontogenic, oral sore, dental, neuralgic, solid, and temporomandibular infections were discounted. The differential diagnosis included were neuralgic pain arising from glossopharyngeal nerve, neuralgic pain originating from superior laryngeal nerve, neuralgic pain originating from occipital nerve, neuralgic pain arising from sphenopalatine nerve, intermedius nervous neuralgia, cephalic headache, neck related cerebral pain, mandibular abnormalities, TM (temporomandibular) joint issue, mutilated or Unerupted 3rd molar, Defective dental prostheses, salivary gland infections, tonsillar infections, mastoiditis, oncologic procedures in the oropharynx and oesophagus and in some cases of psychosomatic illnesses. Palpation of the oral cavity and oropharynx were finished utilizing forefinger under neighbourhood anaesthesia utilizing 15 % lignocaine splash. Palpation at the lateral wall of the oropharynx uncovered a hard and pointed feeling beneath the pharyngeal delicate wall. The delicacy on palpation uncovered extended styloid forms which was missing on opposite side and subsequently finding of longer styloid process was detected. Analysis was upheld on CT scan of neck with 3D reconstruction which was showing elongated styloid process on left side (5.1 cm) (Figure 1).

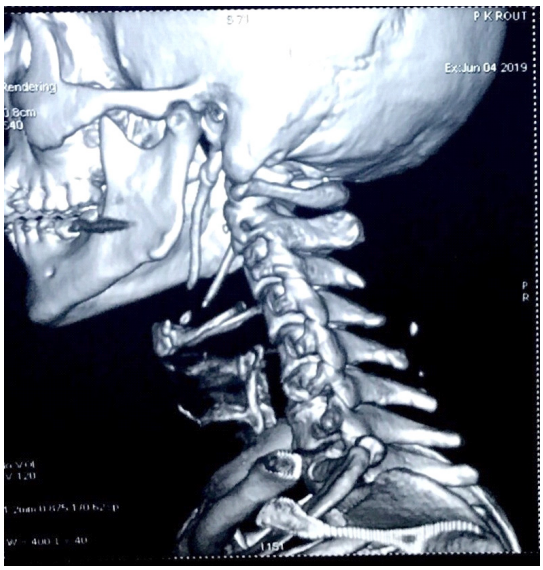


Figure 1. CT scan picture showing elongated left styloid process.

To remove the elongated styloid process, intraoral approach was used. After through examinations, understanding was planned for medical procedure under general anaesthesia. The piece of the styloid procedure was extracted trans orally (Figure 2).Preoperative prophylactic anti-infection agents were given as Amoxicillin with dose of 500 mg by oral route, one hour before medical procedure which was then proceeded as two times each day for five days. Firstly, tonsillectomy (grade 3) of left side was done using coblation method followed by dissection of the tonsillar bed. Then the styloid process was mobilized from the underlying muscle attachments and bared off the attachments using the dissector. Then the process was cut off using the Kerison's punch. Haemostasis was achieved and wound closed. Postoperative Care and Follow Up: Patient was given postoperative analgesics and antibiotics and was discharged after 24 hours with appropriate postoperative instructions and regular follow ups were done. Patient was relieved with pain in follow up visit after one month.



Figure 2. Excised styloid process via trans oral approach.

Discussion

Eagle's syndrome disorder is identified with the nearness of a strangely extended styloid process with or without variant bearing as well as solidified styloid tendon. Cranio-facial torment may take after neuralgia originating from glossopharyngeal nerve and it is auxiliary to the bothering of the encompassing neuro-vascular and strong anatomical entities (muscles, carotid course and cranial nerves) [3]. Anatomically, the styloid procedure emerges from the worldly bone and afterward passes downwards, advances, and medially. The styloid procedure is a meagre, prolonged, barrel shaped hard projection, arranged anteromedially to the mastoid procedure. The length of this procedure shifts from two to three centimetre. Back to this is facial nerve, which rises up out of the stylomastoid foramen though average to it (moving back to front) are the IJV (internal jugular vein (with 9th, 10th, 11th and 12th cranial nerves) and ICA (Internal carotid artery). Tip of the styloid

processes is attached to the predominant constrictor muscle and pharyngobasilar belt lying neighbouring the tonsillar fossa. Sidelong to tip, is outer carotid supply route that bifurcates into shallow transient and maxillary conduits. The stylohyoid tendon stretches out from the styloid to lesser cornu of hyoid. Embryologically, it is gotten from Reichert's cartilaginous part of 2nd branchial curve. Solidification of the styloid procedure and the stylohyoid tendon prompts an expansion in the thickness and length of the styloid procedure, which at that point pushes on the neighbouring structures like the carotid supply route, inside jugular vein, vagal nerve, facial nerve, hypoglossal nerve, and glossopharyngeal nerve, which results in different weight side effects. The pathophysiological cause behind ES are: neural compression of the 9th cranial nerve, 5th cranialnerve, or potentially the corda dueto the extended styloid process. Crack of the hardened stylohyoid tendon, trailed by multiplication of granulation tissue that causes weight on encompassing structures and results in agony. Compression on the carotid artery by the elongated styloid bone, creating disturbance of neural elements in the blood vessel sheath. Degenerative and fiery changes in the tendinous segment of the stylohyoid addition, a condition called inclusion tendinosis. Bothering of the pharyngeal mucosa by direct pressure by the styloid procedure. Extending and fibrosis including the 5th, 7th, 9th, and 10th cranial nerves in the post-tonsillectomy period. The analysis of this clinical substance regularly made first by radiologically then affirmed by palpation at the tonsillar fossa as it ordinarily not palpable[4]. Palpation of the tip of styloid process for the most part exasperates the symptoms.[5] Computedtomography (CT) examine give detail data of styloid procedure including its length thus supportive before careful arrangement and extraction of the styloid procedure through extra-oral or intraoral approach. CT output ought to be finished with slender thickness in sub-millimetre with hub, coronal and sagittal plane. There is a few imaging accessible for analysis of Eagle's disorder like anteroposterior head radiography, Towne or all-encompassing radiography and parallel angled perspective on head and neck.[6] These have numerous disservices like superimposition and frequently hard to gauge the length of the styloid procedure. The treatment of decision for Eagle's disorder is to abbreviate the styloid procedure, called as styloidectomy. Advantages of extra-oral approach include better visualization whereas disadvantages are scar mark and damage to facial nerve. Advantages of trans-oral approach are less time consuming, simple and no scar formation. The disadvantages of trans-oral approach include poor visualization, iatrogenic damage to deep structures and neck space infections.[7] In our case, trans-oral approach was adopted without any intra-operative and post-operative complications. The medical treatment includes use of medications to relieve pain and inflammations and/or steroids.

Conclusion

Eagle's syndrome is a rare clinical entity and often presented with diversity of symptoms. It often poses a diagnostic and therapeutic challenges to clinicians. It usually presents with chronic throat pain and refractory to traditional treatment. It should be properly evaluated and confirmed by imaging followed by excision of the styloid process.

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Central Giant Cell Granuloma: Contradicting the Usual Picture

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Abstract

Jaffe in 1953 differentiated Central Giant Cell Granuloma (CGCG) from Giant Cell Tumor of bone. This intra-osseous lesion has been described by various authors' as a reactive lesion or as a developmental anomaly or as a non neo-plastic lesion. Though inflammation, haemorrhage, local trauma has been suggested as some of the aetiological factors but actual aetiology is still unclear. Genetic aetiology has also been hypothesized. Mandible is the common site of occurrence, frequently crossing the midline. Incidences in females are more and less than 30 is the age of occurrence. The clinical behaviour of CGCG ranges from a slow-growing asymptomatic swelling to an aggressive lesion with pain, local osteolysis, root resorption and tooth displacement. Most widely accepted treatment is surgery. Nonsurgical treatments with alpha-interferon, calcitonin and corticosteroids have been described and their benefits may be worthy of consideration. Contrary to the age, gender and site here we present a case of CGCG in a 52-year-old male patient presenting with a swelling in the right anterior maxilla.

Keywords: *Central giant cell granuloma, swelling, maxilla.*

Introduction

Central giant cell granuloma (CGCG) is an infrequent benign intra-osseous lesion affecting both the jaws. CGCG is also termed as reparative giant cell granuloma. The lesion consists of substantial fibro-histiocytic proliferation and multinucleated giant cells with excessive amount of hemosiderin.[1, 2] It has been defined by World Health Organization as "an intra-osseous lesion consisting of cellular fibrous tissue with multiple hemorrhagic foci, aggregations of multinucleated giant cells, and occasionally trabeculae of woven bone".[3, 4]

Incidence of CGCG is <7% of all benign pathologies of the upper and lower jaws.[5] Clinically, have a greater predilection for females and mostly seen in patients less than 30 years of age.[6] Common site of occurrence is in the anterior mandible involving incisor, canine, and premolar regions, often crossing the midline. Moreover, CGCG has variable clinical features ranging from slow growing asymptomatic swelling to a painful aggressive lesion with destruction of bone, perforation of cortical plates, resorption of root and repetition. The most common indication isa painless swelling leading to facial asymmetry.[7] There is no definitive etiopathogenesis, but some authors believe it as a reparative response rather than neo-plastic while others regard it to have a neo-plastic potential.[5, 6, 8.]

Depending on clinical and radiographic examination the case in this report was misdiagnosed and root canal treatment was initiated but later on was histopathologically established as CGCG. Hence, we are describing this case of CGCG in the anterior maxilla to draw attention of the general dental practitioner and to raise awareness about the significance of histopathology in the identification of this enigmatic lesion.

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Case Report: A 52-year-old male patient reported with the chief complaint of pain and swelling in the right side maxillary anterior teeth region since 3 to 4 months. Initially the patient noticed a small swelling which gradually increased to the present size. There was sporadic pain which was relieved on taking medication. Past dental history showed root canal treatment was in progress in teeth 12, 13, 14 and 15 as they were diagnosed to be non-vital. But there was no significant relief. There was no relevant medical history of the patient or any systemic disease or any allergy to drugs.

On extra-oral examination, facial asymmetry was noticed with swelling on the right side of maxilla which may have caused nasal deviation also (Figure 1a). Skin overlying the swelling appeared normal. The swelling was non tender on palpation and firm in consistency.



Figure 1a. Extraoral view showing the swelling over the zygomatic bone causing nasal deviation.



Figure 1b. Intraoral view showing the palatal swelling extending from midline till the second pre-molar.

On intraoral examination, there was bucco-palatal swelling more prominent palatally,measuring approximately 3 cm × 2.5 cm extending from the midline till the mesial aspect of the 1st molar of the right side with normal appearing overlying mucosa (Figure 1b). The swelling was firm in consistency. On radiological examination, orthopantomogram exhibited multiple and diffuse radiolucency in relation to canine and second pre-molar extending from the distal aspect of right lateral incisor till the mesial aspect of the right first molar (Figure 2a). Contrast Enhanced Computed Tomography (CECT) suggested there is a large well defined soft tissue leison of size 47 x 32 x 34 mm with adjacent bony remodelling and sclerotic rim is noted. There is widening of the right osteomeatal unit. Mild soft tissue swelling seen in the right maxillary region. Bony Deviated Nasal Septum towards right (Figure 2b).

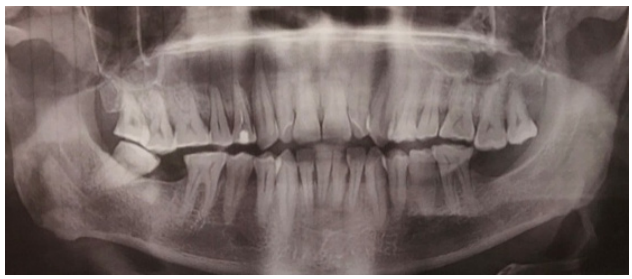


Figure 2a. Panoramic view showing the radiolucency in relation to 12,13,14,15



Figure 2b. CECT correlation suggesting a mild soft tissue swelling seen in the right maxillary region

On the basis of clinical and radiological features differential diagnosis of the radicular cyst, keratocystic odontogenic tumor, central giant cell granuloma and ameloblastoma were given. All the blood investigations of the patient were within the normal range. Incisional biopsy was done from the intra-oral site under local

anaesthesia. Buccal mucoperiosteal flap was raised, bony window created (bone was paper thin) and underlying tissue was found to be solid in nature like that of granulation tissue. Tissue was taken in multiple chunks and sent for histopathological examination (Figure 3).

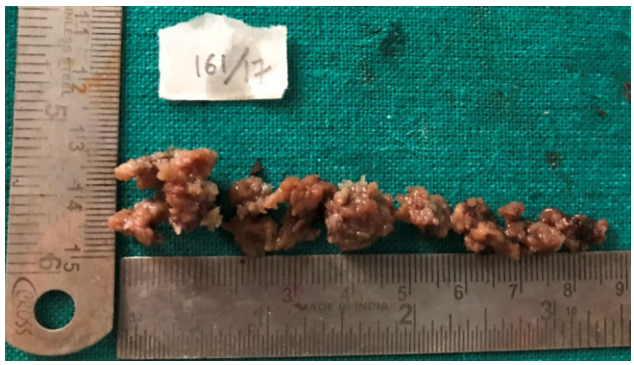


Figure 3. Macroscopic evaluation: multiple bits of formalin fixed tissue, brown in colour, irregular shaped, with irregular surface, firm in consistency and gritty on palpation and measuring about 1.5x8.5 cm (aggregate size)

H and E stained section showed numerous diffusely distributed multinucleated giant cells in a background of highly cellular connective tissue stroma. Minimal amount of chronic inflammatory cells but diffusely arranged along with numerous extravasated red blood cells were seen in the stroma. Multiple bony trabeculae were seen in the periphery as well as inside the lesion (Figure 4).

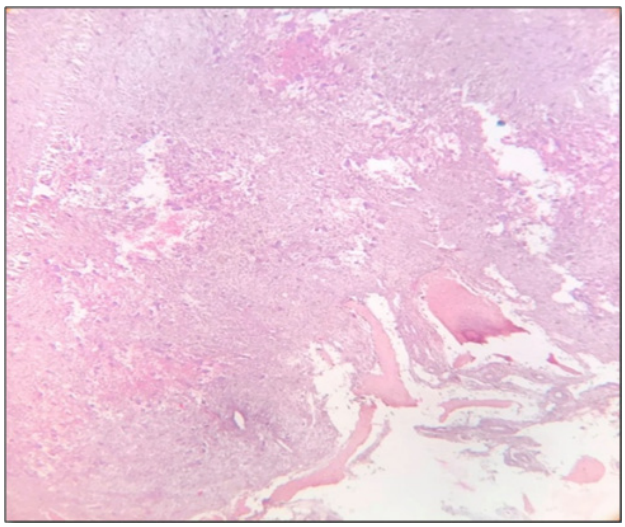


Figure 4. Photomicrograph 4x: Numerous diffusely distributed multinucleated giant cells in a background of highly cellular connective tissue stroma. Multiple bony trabeculae are seen in the periphery and extrvasated RBCs.

All the above findings were compatible with diagnosis of CGCG. Histologically CGCG is difficult to differentiate from Brown tumor of hyperparathyroidism. Hence the patient was advised to check for serum levels of calcium, phosphorus and alkaline phosphatise. All the parameters were found to be in normal limits hence Brown tumor of hyperparathyroidism was excluded,thus central giant cell granuloma of the anterior maxilla was established. Complete surgical excision of the lesion was done.

Discussion

Central giant cell granuloma is a non-neoplastic proliferative lesion of unknown etiology. This entity has more predilections for lower jaw than the upper jaw. Most common site for the mandibular lesion isin the area anterior to 1st molar and often crossing the midline. Right mandible is more affected than the left.[9] Certain clinical features are contradicting which makes this case unusual. The lesion is in the right maxilla, anterior to the 1st molar but not crossing the midline. CGCG also occurs in other areas of head and neck bones like facial skeleton and cranial vault. The lesion although very rare also has been documented in the short tubular bones of feet and hands.[10]

Giant cell granulomas of the jaw bones are of two types peripheral and central. Central lesions are endosteal while peripheral lesions are pedunculated or sessile lesions on the gingiva. Incidences in female are more than in male and found in the ratio of 2:1. Children and young adults are most commonly affected. The patient in our case is a male aged 52 years which also contradicts the above.[11-13]

Trauma is asignificant etiological factor in the instigation of this lesion. Here patient doesn't give a history of traumabut all the teeth involved in the pathology are non vital. The lesion enlarges by build up of tissue, produced by sluggish, minuscule, constant haemorrhages of multicentric nature because of trauma and some fault in the smaller blood vessels[11]. There has been reports of association of t (X; 4) (q22; q31.3) in the etiology of giant cell granulomas.[14]

CGCG has variable clinical behaviour, which ranges from slow enlarging painless swelling to a destructive pathology associated with pain. The most significant indication of CGCG is a slow growing swelling in the face causing an obvious facial asymmetry, not associated with pain. The lesion may be incidentally disclosed

during routine radiographic examination of the jaws made for a discrete cause. The lesion is accompanied by pain in about 25% cases. Bone area may elicit tenderness on palpation. The lesions are not associated with paresthesia. There may be mobility of the involved teeth but remain vital.

Central giant cell granuloma has varied radiological appearance. The radiolucency may be unilocular or multilocular, well-circumscribed or diffuse. Varied degree of expansion and destruction of cortical plates can also be seen. The radiological appearance of the lesion is a lot similar with many other jaw bone pathologies hence cannot be pathognomonic. Since the clinical and radiological features are not very precise hence the final diagnosis ultimately rests on histopathology.

Central giant cell granuloma of the jaws commonly present as a lone, radiolucent expansion but without pain. A few lesions are more caustic with a marked inclination to reappear. Hence for this type of destructive lesion further radical approach is advocated.There is marked evidence of treatment failure within the first two years of therapy indicating that the rate of recurrence to be 13-22%.[15]Management of CGCG is all based on its clinical and radiological findings. The rate of recurrence is less in well circumscribed, localized curetted lesions. In widespread lesions with radiographic substantiation of perforation of cortex, a more radical excision should be the line of treatment even partial maxillectomy is advocated. Steroids or calcitonin is used as an adjunct to surgery in the medical management of CGCG because of their anti-osteoclastic property.[16] The anti-angiogenic property of Interferon-alpha makes it useful in the management of aggressive CGCG.[17] Intravenous administration of Bisphosphonates has also shown promising results in CGCG.[18]

Conclusion CGCG has an unpredictable and inconsistent clinical behaviour. Though CGCG has a striking predilection for anterior mandibular region, for any swelling in the anterior maxillary region, the dental surgeon should also contemplate to consider Central Giant Cell Granuloma in the differential diagnosis.

Conflict of Interest: None

Funding: None

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Crouzon Syndrome in a Female Patient with Classic Craniofacial Features

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Abstract

When there is premature fusion of sutures in the cranial bone, it is called Craniosynostosis. There are many syndromes arising from craniosynostosis, among them Crouzon syndrome is the most common. It is inherited as an autosomal dominant trait but has variable features, characterized by mid-face hypoplasia, exophthalmos, and small maxilla with a prognathic mandible. Fibroblast growth factor receptor-2 gene (FGFR-2) mutation is the cause of this condition and the affected individuals with abnormally shaped heads are a therapeutic challenge for the dentist.

Keywords: *Craniosynostosis, Crouzon Syndrome, Exophthalmos, Prognathic Mandible.*

Introduction

Craniosynostosis affects brain growth and the growth is restricted perpendicular to the synostosis but increased growth is seen in the areas where the sutures are open. Hence the brain growth is asymmetric causing alteration in the shape of the base of the skull and the craniumresulting in typical deformities.[1] There are numerous syndromes associated with craniosynostosis and the common ones are Crouzon syndrome, Carpenter syndrome, Apert syndrome, Treacher Collins syndrome and Marie Sainton syndrome.[2] We are reporting a case of Crouzon syndrome who reported with a gingival growth and was incidentally diagnosed due to the characteristic facial features.

Case Report: A 28 years female patient reported to the dental hospital with the complaint of growth in the mandibular anterior gingiva and unaesthetic appearance.

History revealed that the deformity was present from birth and the growth on the gingiva first appeared when she was pregnant about 2 years back which was excised 6 months after the delivery but it again reappeared 1 month later.

On physical examination, characteristic eye changes along with nose and jaw changes were seen. Mid face hypoplasia with relative prognathism of the mandible, short upper lip and drooping lower lip along with bilateral exophthalmos, hypertelorism, slanting of the outer canthi of the lower eyelids and strabismus were observed. [Figure 1] The bridge of the nose was depressed giving a parrot beak appearance. Intraorally anterior crossbite, diastema in mandibular anterior teeth, malocclusion and high arched 'U' shaped palate was seen. [Figure 2,3]



Figure 1: Clinical pictures showing mid face hypoplasia with relative prognathism of the mandible, short upper lip and drooping lower lip along with bilateral exophthalmos, hypertelorism, slanting of the outer canthi of the lower eyelids and strabismus.

Intra-orally, a single localized irregularly shaped gingival growth in relation to 41, 42, and 43 was seen. The growth was sessile, erythematous, having an ulcerated surface, firm in consistency and slightly tender on palpation. [Figure 2, 3].



Figure 2: A single localized irregularly shaped gingival growth in relation to 41, 42, and 43 which is sessile, erythematous, having an ulcerated surface and anterior crossbite.

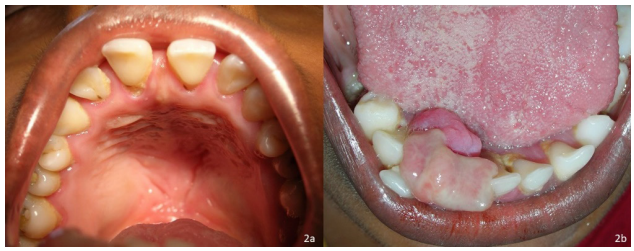


Figure 3: U shaped high arched palate and single localized irregularly shaped gingival growth in relation to 41, 42, and 43 which was sessile, erythematous, having an ulcerated surface.

In view of the facial deformity present right from the birth, it is a congenital defect. Since the facial deformity is a syndrome of maxillary hypoplasia, relative mandibular prognathism, malocclusion, exophthalmos, hypertelorism and parrot beaked nose, this syndrome can be provisionally diagnosed as Crouzon syndrome.

Radiologic investigations revealed mid face hypoplasia with depressed nasal bridge, underdeveloped maxilla, relative mandibular prognathism and class III malocclusion. Numerous markingswere seen on the skull giving an appearance of 'beaten metal'. [Figure 4a, b]. Panoramic radiograph showed relatively large mandible in compared to the maxilla, maxillary sinus is small. [Figure 4c]





Figure 4: Mid face hypoplasia with depressed nasal bridge, underdeveloped maxilla, relative mandibular prognathism and class III malocclusion. Numerous markings were seen on the skull giving an appearance of 'beaten metal'. (4a, b) Panoramic radiograph showed relatively large mandible in compared to the maxilla and a small maxillary antrum. (4c)

The gingival growth was excised under local anesthesia and evaluated histologically. A lobular pattern of vascular proliferation with inflammation and oedema were seen resembling granulation tissue. [Figure 5]. Correlating the history, clinical and radiological findings the diagnosis of Crouzon syndrome was made with pyogenic granuloma in lower gingiva.

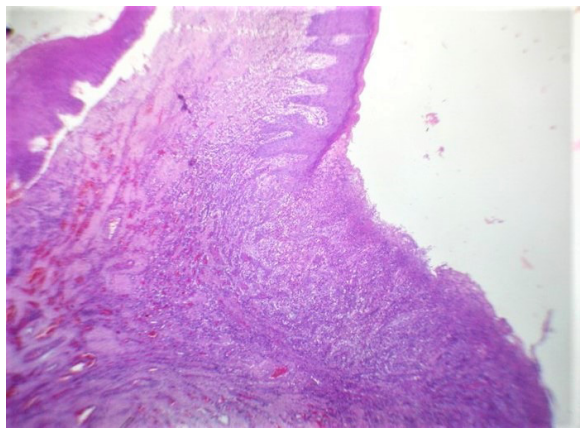


Figure 5: H&E section showing lobular pattern of vascular proliferation with inflammation and oedema were seen resembling granulation tissue.

Discussion

This syndrome was first described by Octave Crouzon in 1912. Since then it has been discovered through gene mapping that a genetic mutation in FGFR-2 gene is the cause. About 4 in every 100,000 patients suffer from this syndrome.[3] If detected in foetal ultra-sonograms, premature termination of pregnancy or

proper planning for therapeutic management after birth can be done. There is premature fusion of the parietal and frontal sutures leading to the characteristic appearance.

The patient's appearance varies with the severity of the disease and ranges from mild midface hypoplasia to multiple fused sutures resulting in severe facial and ocular problems. In some patient'sairway obstruction can cause respiratory distress.[4] Though mentally normal but these patients could be blind as a result of optic atrophy secondary to increased intracranial pressure. Ocular proptosis, hypertelorism, skeletal class III malocclusion, anterior cross-bite, shallow orbits, frontal bossing, maxillary hypoplasia, high arched palate and dental malocclusion are common findings which were also seen in the present case.[5]

The patients must undergo orthodontic check-up and orthodontic treatment at an early age can prevent anterior cross-bite and the development of skeletal class III malocclusion and associated functional problems. [5] While in adulthood the management of this disease is mostly surgical, non-surgical approaches like orthodontic and orthopaedic therapy can be considered. Rapid maxillary expansion (RME) with facemask could be used to enhance proliferation of cells in the inter-maxillary sutures and maxillary tubercles thereby facilitating forward movement of maxillary arch in growing children.[6] The surgical approaches can be used to advance the midfacial region to correct the discrepancies in the sagittal plane as well as lessen the intra-ocular pressure serving dual function: improvement of aesthetics as well as function.[7,8]

Radiographic appearance is classic with obliteration of cranial sutures, small rudimentary para nasal sinuses, shallow orbits with maxillary hypoplasia, short cranial fossa, large hypophyseal area and typical surface markings of the cranial vault called as beaten metal appearance.[9] Therapy for patients with craniofacial abnormalities requires a multi-disciplinary team-based approach. It starts with the early diagnosis of the condition so that orthopedic referral is fast and growth modifying procedures are performed.[10] Early interventions can avoid major surgeries and also help in the over-all psychologic well-being of the patients.

Ethical Permission: Approved

Conflict of Interest: None

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Role of Azithromycin in Periodontal Diseases

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Abstract

Azithromycin,a macrolide drug has been used for the cure of variety of microbial infections since a significant amount of time. It has been found to possess a far more enhanced performance in discouraging the development of the bacteria than its predecessor drugs like Erythromycin and Clarithromycin. It hasbetter structuraland pharmacokinetic properties which makes it a better version of a azalide drug in terms of itshalf-life,acid-stability,durability, intracellular penetrations and anti inflammatoryfunctioning. Having the accessible route of administration it has got a good amount of patient approval. In many cases the recurrence of the infection is common where the antibiotics are not able to reduce the symptoms associated with the disease for a longer period of time. Unlike those medications, Azithromycin focuses solely on the cure and acts as an apt option which puts a brake on the biofilm to mature.In the periodontal context, Azithromycin has especially shown that it prevails at the areas invlolving the pathology. Research has proven that Azithromycin,being the non-essential therapeutic agent for the periodontal wear and tear,has been effortlessly used as a supplement to the non-surgical method for the cure,as it has been challenging to get rid of the debris present in the inaccessible areas. It is also being involved as a mode of therapy in addition to the surgeries involved, it has been able to validate itself in reversing the periodontal conditions for the better. Being administered both in the local and systemic manner,it has been found to be fairly effective in reducing the bleeding on probing,inflammation and tenderness in the gingiva,periodontal pocket depth and the plaque build up.

Keywords: *Azithromycin, Periodontics; Diseases, non-essential therapeutic age.*

Introduction

Azithromycin was searched-out by a group of clinicians at Yugoslavia in 1980.It got it's acclaimation by the Food and Drug Administration (FDI) in 1991.[1] Azalides which are a sub-class of a group of drugs called macrolides constitutes Azithromycin (Azith) as the chief functioning component. This drug which has been proven to be effective against a good amount of gram negative bacterias,is used to treat variety of bacterial infections such as bronchitis,pneumonia, infections of the ear,non-definite urethritis,genital ulcers mainly in the men and many more.[2] It is also effective against simplified dermal and tonsillar infections. Following its metabolism in the liver, Azithromycin exhibits superior properties of pharmacokinetics than the congener-erythromycin. It has the least interference with the gastric acids,with rapid oral absorption and deep penetration inside the cells including the periodontium.[3] It shows potential actions against the pathogenic organisms which are resistant to it's analogue drugs like erythromycin and tetracycline. Azithromycin has been successfully able to show exceptionally better sustainability and drug synergies as it shows its centralization in the white blood cells(WBC's) constituting mainly of macrophages and fibroblasts,and actively gets transported to the site of infection.[3]

Recent studies have shown that gram negative bacterias such as Prophyromonas Gingivalis and Treponema Denticola which dwell in a complex microbial community within the oral cavity have been responsible for variety of chronic periodontal disease.[3] Apart from being capable of inhibiting the growth of these disease causing pathogens, Azithromycin also

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releases protein molecules from the immune system against a wide variety of microflora.[4]

Morphology: (9-deoxo-9a-aza-9a-methyl-9a-homoerythromycin) the 15-membered ring azalide Azithromycin differentiates itself from the 14-membered ring Erythromycin in its structure by the extension of a new nitrogen atom which is infused into the macrocyclic lactone ring. This nitrogen atom makes Azithromycin far more potent against the bacteriasthan drugs like Erythromycin. It has been revealed that the chemical properties in the Azithromycin lead to an increment in the balance of the acids than in the Erythromycin and therefore the former has better absorption,metabolism and longlastingness in the tissues in adequate and deep concentrations. Microbiologically it shows in-vitro actions against those micro-organisms which resist against Erythromycin and other complimentary drugs.[5]

Application: Azithromycin usually follows the oral route of administration through capsules,tablets or suspension. Opthalmic solution can be given in some patients depending on the condition.Intravenous approaches are also exercised on those who find oral route difficult to endure. Extent of therapy can fluctuate with the intensity of the disease.[6] Since Azithromycin possesses a long half life,it can easily be dosed once a day for 3-5 days keeping the age,systemic conditions and allergic reactions to the drugs in mind.[5]

Reported cases have shown a marked minimization in the prevalence of micro-organisms when Azithromycin was being given orally,once a day for 3 days before the oral prophylaxis was being performed than when conventional treatments were offered without the usage of Azithromycin. Apart from having its potential in combating with the pathogenic microflora, Azithromycin also acts as an immunomodulator. This property of Azithromycin has an anti-inflammatory response at the site of the pathosis. This feature of Azithromycin comes into action particularly in those cases which do not relate to the microbes. COPD (Chronic Obstructive Pulmonary Disease), Cystic Fibrosis, Diffuse Pan-Broncholitis are some of such examples. Azith excels as an immunomodulator when compared to other antibiotics as it revealed large scale integral circulation through oral route of administration and adequate diffusion to the tissues with minimal negative reactions to the body.[1]

The process of phagocytosis was seen to be improved in quite a few instances with the application of Azithromycin. It also inhibited the growth of inflammatory cells which persisted and curtailed the formulation of Interlukin (IL-8)in the oral epithelial cells. Efficient durability and persistence of the drug in the gingival and periodontal soft tissues and alveolar bone was appreciated.[1]

Mechanism of Action: The pathogens find their ways to combat with the drug. Either they strive to alter their purpose of action or they cut-back their intrabacterialaggregation. Azithromycin gets abundantly high in the WBC's during the process,especially at the site of the inflammation,perhaps due to the rise in the vascular properties.[7] Azithromycin rules out the bacterias from developing by attaching with the bacterial ribosome in alterable manner,thus inhibiting their process of protein synthesis and hampering the translation of m-RNA keeping the nucleic acid synthesis stable. Henceforth there is no origination of the mucus. Azithromycin has been found to be actively working immediately after the very first dose of 500mg given orally.[6] Azithromycin has been found in much abundance in the periodontal cells than in the plasma. The drug's measure outspaces the MIC(Minimal Inhibitory Concentration)and that supposedly aids the scaling down of the infection.[6] Pharmakokinetically it is safe with the acids. Absorption follows an easy and immediate pathway when devoid of food.It increases it's mass when it is involved in the process of ingestion of bacteria. The time after the drug is givenwhen the maximum plasma concentration is reached is about 2.1-3.2 hours for the oral mode of usage. The mechanism of action of Azithromycin constitutes the amalgamation of its functions (anti-microbial and anti-inflammatory) taking place in action in sync incorporated with the stability in its accretion in the inflamed tissue[7] .It undertakes the pathway of biliary excretion .

Contraindications and Adverse Effects: In general, the drug has a good rate of acceptance,but gastric disturbances and mild to moderate inconveniences related to loss of balance have been acknowledged in occasional cases.[6]Some patients had shown mild levels of altering responses which gradually increased it's severity when the application of the drug was intervened. In any circumstances if the patients have a history of allergic reactions towards erythromycin or any such complimentary drug, Azithromycin should be avoided. People who develop rapid muscle fragility and fatigue should take proper consent of the clinician prior to the usage of the drug. The state of lactation and pregnancy

are safe with Azithromycin. It is also advisable to contraindicate the drug if there had been any disorders related to the liver which had been associated with the use of Azithromycin in the past.[8]

As an adjunct to non-surgical periodontal therapy: It is being seen that chronic periodontal conditions can be healed with therapeutics which require no surgical remedies. The extent of the pocket may be the determining factor in the level of the improvement. The application of the systemic medication along with the non surgical therapies have been found out to boost up the prognosis of the treatment. Experiments had been carried out regarding the treatment protocol involving the antibiotics and its effects on the outcome. Lately Azithromycin was being advocated as a favourable supplementation to the Non-Surgical Periodontal Therapy (NSPT). Its superior properties have been able to make sure that it enhances the conclusion of the analysis.[8] On various cases examined significantly it had come to notice that Azithromycin was strongly capable enough to lower the intensity of the pocketinvolved, inflammation and bleeding associatedwith the soft tissues and thereby reduced the loss of attachment level (CAL-Clinical Attachment Loss). It was seen particularly in the cases of severe periodontal destruction which initially revealed pocket depths greater than 6-7 mm,after the action of Azithromycin presented a convincing rate of minimization in the degree of the damage involved. On the microbiological aspect,when Azithromycin was being exercised to cases where non-surgical attempts had been made,it resulted in a lower rate of presumed oral micro-organisms.[9]

Regenerative functions on the periodontium: Evidence states that application of this drug has led to reformation of the alveolar bone,irrespective of the presence or the absence of the deep calculus and debris. Investigations justified the usage of Azithromycin for the soft tissue regeneration in addition to the procedure of basic oral prophylaxis being performed. When prescribed at a dose of 500mg/day for a duration of 3 successive days before the periodontal surgery being performed,had a markdown in the amount of the infection present in the area when compared to the state before the conventional therapy. Better results have shown in a lot of chronic cases with systemic conditions in the presence of Azithromycin where the therapy follows a phase-wise plan in required intervals. Significantly the prognosis was indicative of limited grade of furcation involvement, pusdischarge, supra and sub-gingival plaque accumulation with greater patient compliance and least discomfort.[8] The metabolism and ossification of the bone has shown to increase and provide better support to the tooth and hence it leads to the reduction of the grade of the tooth mobility,if involved.[10]

Azithromycin acts as a promising drug of choice in cases where individuals have been found suspected to Diabetes and positive family history of Periodontitis havebeen detected. When the patient's co-operation would suffice during the extent of the regimen,it would result in the resolution of the minimal scoring of the periodontal index in due course of time.[10] Evidently when intoxicating habits like severe smoking had been seen it implicated to chronic condition of periodontal destruction and suppuration which had a tendency to reappear again and again. Having Azithromycin as the first line of the medicational therapy in such cases has have been manifested to show improvement in a gradual manner. Here the etiotrophic phase should be taken care of with proper counselling and Nicotine Replacement Therapy(NRT) to be followed with complete oral prophylaxis and deep curettage to be performed at regular intervals. Azithromycin has shown thriving results in the reduction of the loss of attachment by following a proper treatment plan considering the age,systemic health conditions and oral habits involved.[4]

Conclusion

It would be justified enough to conclude it as a fact that Azithromycin has revealed impressive outcomes as an ancillary drug therapy in periodontally involved sites.It plays a major role as an asset in providing advantageous consequences to patients who undergo chronic cases of Periodontitis.It works by eliminating the root causative organisms involved behind the disease and significantly lessening the degree of abnormal increase in the deepening of the gingival sulcus and regenerating the lost bond between the tooth,periodontal ligament and alveolar bone. It thereby minimizes the associated gingival inflammation, colour changes and bleeding,recurrence of supra and subgingival plaque and hard calculus and the configuration of the loss of support of tooth from the bone.

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Pemphigus Vulgaris in the Oral Cavity: A Diagnostic Challenge for the Dentist

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Abstract

Pemphigus represents a group of auto-immune muco-cutaneous, potentially fatal vesiculo-bullous-ulcerative characterized by intraepithelial acantholysis. Pemphigus vulgaris is the most frequently occurring subtype and is often diagnosed by the oral physician from the oral mucosal ulceration which are often the only manifestation in this disease. The pathogenesis involves, production of immunoglobulin G auto-antibodies against the desmoglein 1 glycoproteins present on the desmosomes. Since this disease can be life threatening if it is progresses, early diagnosis and prompt treatment is a priority. Immunosuppressants remain the mainstay of the therapeutic interventions and many patients recover to lead a normal life.

Keywords: *Auto-Immune Disease, Desmoglein 3, Vesiculo-Bullous Lesions, Immunosuppressants.*

Introduction

Pemphigus is a group of chronic muco-cutaneous, inflammatory auto-immune vesiculo-bullous-ulcerative disorders. It is a relatively rare disease seen in the elderly population with a definite female gender predilection. There are many variants of this disorder, pemphigus vulgaris (PV), pemphigus vegetans, pemphigus foliaceus, pemphigus erythematosus, paraneoplastic pemphigus (PNP) and drug related pemphigus are the ones frequently reported.[1] However, the bulk is the vulgaris subtype of Pemphigus which accounts for about four fifths of all cases.[2] Since the oral mucosa is affected in PV, which may sometimes be the only lesions in the patients, they sometimes pose a diagnostic challenge as there are no pathognomonic features. It is of paramount importance that the disease is diagnosed early before there is morbidity or mortality as it progresses over time.

Oral lesions are seen almost anywhere in the mucosa especially the buccal, palatal, labial and lingual mucosa. Though the gingiva may not be frequently affected but gingival desquamation occurs with gingival involvement. The clinical manifestation of the disease differs as in some patients the oral lesions are the only lesions, in others the oral lesions are preceded by the cutaneous ones and in some the oral lesions occur after the development of cutaneous lesions.[3] Hence initiation of immunosuppressive intervention prior to the development of cutaneous lesions delays the progression of the disease. The present case describes a middle-aged female patient with oral and skin lesions who was diagnosed by the oral physician and treated in conjunction with dermatologists by glucocorticoids and cyclophosphamide regimen with success.

Case Report: A 41-year-old female patient reported to the dental hospital with the complaint of multiple painful ulcers in the mouth and difficulty in eating food since the past 1 ½ years.

History revealed that patient developed multiple oral ulcers 1½ years back. She initially had blisters in the mouth which spontaneously ruptured to forming ulcers. These ulcers were present in many parts of the mouth and were associated with pain and burning sensation causing difficulty in eating. She has taken medications from a dentist but the lesions did not subside. In the past 10 days she developed blisters and ulcers on the face, hands and arms.

On physical examination, extra-orally a freshly ruptured bulla was seen on the right side of the face about 2cm below the medial canthus of the right eye. [Figure 1a] Tissue tags were seen and the base of the ruptured bulla was erythematous and with a shallow ulcer. There was a watery discharge from it and tenderness on palpation.She had bullae and ulcers present on her upper arms, the ulcers were covered with crustation, bled on provocation and were extremely painful. [Figure 1b, c]

A single ulcer was present on the lower lip on the right side about 2 × 1 cm in size; with irregular margins and covered with a black crustation. [Figure 2] The superior margin of the ulcer was erythematous and tender.

Intra-orally, multiple shallow ulcerations were seen in the buccal mucosa, palate and labial mucosa. [Figure 3] Each ulcer was surrounded by erythema and had irregular margins, and the surface covered with slough which could be peeled off by probing revealing a bleeding surface. The ulcers were tender and there was blood tinged exudation on palpation.

In view of the oral ulcers being present for the past 1½ years, this is a chronic condition. Since the ulcers were preceded by vesicle formation, had irregular margins, surrounded by erythema, covered with slough which can be peeled off, were painful with sanguineous exudates, this could be chronic vesiculobullous disorder. Pemphigus vulgaris and bullous pemphigoid were considered in the differential diagnosis as similar cutaneous lesions were present with positive Nikolskysign.

An incisional biopsy was performed from the peri-lesional tissue which revealed para-keratinized surface epithelium, acanthosis and acantholysis, the cells of the spinous layer in some areas appear to fall apart and arrange themselves loosely assuming a round shape. (Tzanck cells) Down below the basal cell layer shows a split from superficial layer. The basal cells are arranged parallel resembling a row of tombstones and the split area shows some acantholytic cells and extravasated RBCs. The underlying connective tissue is made up of moderately dense collagen fibres with spindle shaped fibroblasts, dense chronic inflammatory infilltrate, predominantly lymphocytes. [Figure 4] Histopathology was suggestive of Pemphigus vulgaris.

The patient was hospitalized and started with dexamethasone cyclophosphamide pulse (DCP) therapy. The treatment was done in 3 phases. Initially 100 mg of dexamethasone was mixed in half liter of 5% dextrose and administered as a slow infusion along with 50mg of cyclophosphamide given orally for 3 days. This therapy was continued for 9 months and the patient was on remission. Though all the lesions healed completely, 50mg of cyclophosphamide was given orally for 9 more months to prevent recurrence. [Figure 5,6]



Figure 1:



Figure 2: Ulcer was present on the lower lip on the right side about 2x1 cm in size; with irregular margins and covered with a erythematous, black crustation.



Figure 3: Multiple shallow ulcerations were seen in the buccal mucosa, palate and labial mucosa.

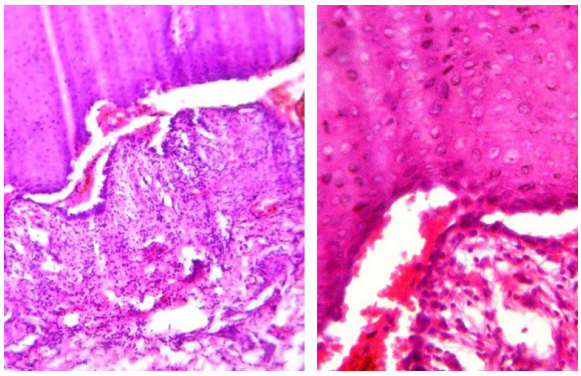


Figure 4: H&E stained sections showing para-keratinized surface epithelium, acanthosis and acantholysis, the cells of the spinous layer in some areas appear to fall apart and arrange themselves loosely assuming a round shape. (Tzanck cells) Down below the basal cell layer shows a split from superficial layer. The basal cells are arranged parallel resembling a row of tombstones and the split area shows some acantholytic cells and extravasated RBCs. The underlying connective tissue is made up of moderately dense collagen fibres with spindle shaped fibroblasts, dense chronic inflammatory infilltrate, predominantly lymphocytes.



Figure 5: Extra-oral pictures showing complete healing of facial and lip lesions following immunosuppressive treatment.



Figure 6: Ixtra-oral pictures showing complete healing of oral lesions following immunosuppressive treatment.

Discussion

Pemphigus vulgaris (PV) is a B-lymphocyte mediated auto-immune disease. In this disease auto-antibodies are produced against the antigens present in the junction of tonofilament-desmosome in the epithelial layers.[4] Vesiculo-bullous lesions are the presenting features in both oral and cutaneous lesions, which are thin walled and flaccid lesions which subsequently ulcerate.

The mechanism behind thesesub-epithelial lesions in PV is due to conjugation of immunogloblin G auto-antibodies to desmoglein 3, which is a trans-membrane glyco-protein adhesion molecule, present on the intercellular cementing substance, desmosomes.[5] When the antibodies bind to the desmosomes, protease enzyme is activated and block the adhesion of desmoglein. This leads to acantholysis i.e. Separation of the cells in the stratum spinosum leading to the formation of an intraepithelial bulla. Since this bulla spreads in the under the skin/mucosa it leads to separation of large areas of the skin/oral mucosa.[6, 7]

Clinically, thin walled flaccid bullae are seen un PV on otherwise normally appearing oral mucosa/skin. Intact bullae are rarely seen in the oral mucosa due to relative humidity of the oral cavity and trauma while mastication. Hence intact bullae are more commonly seen on the skinand typically these bullae increase in size, spreading on applying pressure onto adjoining normal area. This phenomenon is known as Asboe-Hansen sign.[8] Another sign is the development of new lesions, on applying pressure to apparently normal skin/mucosal surface, called Nikolysky sign.[9] But the Nikolsky sign is also seen in a few other mucocutaneous diseases like cicatricial pemphigoid and Lyell's disease.

For confirmation of the diagnosis, biopsy is performed, mostly on the intact vesicle or bulla that is less than a day old. And the incision is made on the apparently normal border or the perilesional mucosa, so that the pathognomonic supra-basilar split is observed in the histologic specimen. The histo-pathologic demonstration of a sub-epithelial split excludes the sub-epithelial bullous diseases like, cicatricial pemphigoid, bullous oral lichen planus and erythema multiforme.[10] An important step for confirming the diagnosis of PV is to detect the circulating intercellular antibodies. Although Western blot of recombinant and cell derived forms of the target antigens, enzyme-linked immunosorbent assay

(ELISA) and immunoprecipitation can be performed the gold standard is indirect–immunofluorescence (IIF).

Early diagnosis is of paramount importance in the management of patients with PV because lower doses of immunosuppressive agents can be curative even when given for short duration. Hence oral physicians/dentists ought to be aware of the oral features of the disease so that the disease is diagnosed and treated early thereby reducing the morbidity and mortality associated with it. PV is treated with glucocorticoids withor without other immunosuppressive agents.[11] This can be performed in 2 phases, a loading phase to heal the lesions, causing remission and a maintenance phase which prevents exacerbation or relapse. Glucocorticoids used vary from prednisolone to dexamethasone depending on the patients' needs and compliance.[12] If the lesions are widespread then systemic therapy is initiated. Prednisolone 0.5-2mg per kg body weight is started and the dose is increased as per response.[13]Since the disease is chronic so long term therapy involves addition of adjuvants like Azathioprine or Cyclophosphamide. Newer drugs like mycophenolate mofetil or targeted therapies using monoclonal antibodies are now being tried with less side effects and better results, though the cost of the therapy increases manifold.[14]

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Nasopalatine Duct Cyst: A Diagnostic Dilemma

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Abstract

Nasopalatine duct cyst is the most commonly encountered epithelial non odontogenic cyst of the maxilla. Epithelial remnants of the nasopalatine duct triggered due to some sort of irritation in the form of infection or spontaneously may give rise to Nasopalatine duct cyst. The final diagnosis can only be made based upon the clinical, radiological and most importantly histopathological findings. Treatment strategies mainly incorporate enucleation of the lesion followed by marsupialization as indicated in some cases. We present here a case of Nasopalatine duct cyst in a 45-year-old male which was diagnosed clinically as dentigerous cyst in association with an impacted tooth but a conclusive diagnosis of nasopalatine duct cyst was finally made based upon the histopathological findings.

Keywords: *Nasopalatine Duct Cyst; Marsupialization; Histopathology; Radiology.*

Introduction

First explained by Meyer in the year 1914, nasopalatine duct cyst (NPDC) or incisive canal cyst originates from the epithelial remnants of the nasopalatine duct which may be triggered spontaneously or due to some type of irritation in the form of infection. They are usually located in the midline of maxilla in the anterior part in close proximity to the incisive foramen. [(1)] It is quite common of all the non-odontogenic cyst of the oral cavity with a prevalence rate of 1%.[(2)]

The age predilection for NPDCs is wide but it is most common during the 4th-6th decades of life. Males are more commonly affected as compared to females with a ratio of 2.5 : 1.[(3,4)] More commonly such lesions are accidentally discovered during routine radiography as they are often symptomless but some patients may also present with few symptoms. Most common complaints include that of an infection in association with a previously symptomless cyst with problems such as swelling, pus drainage or pain.[(5,6)] Sometimes endodontically treated teeth may also be noticed on radiographs in association with NPDC as they are often misdiagnosed and treated as periapical cyst or granuloma.

The case presented in this paper had a typical presentation and was misdiagnosed clinically as a dentigerous cyst but was finally diagnosed as nasopalatine duct cyst after the histopathological evaluation.

Case Report: A 45-year-old male patient presented with swelling in left maxillary anterior palate since 2 months which had gradually increased to the present size. Upon intraoral examination, a well-defined, firm and tender swelling was present in left anterior palate region of size 2 cm in greatest diameter.



Figure 1: A well-defined swelling present in relation to left maxillary anterior palate region.

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Radiological Findings: Radiographs revealed a radiolucent lesion present in the left anterior palate region along with an impacted supernumerary tooth. (Figure 2& 3).

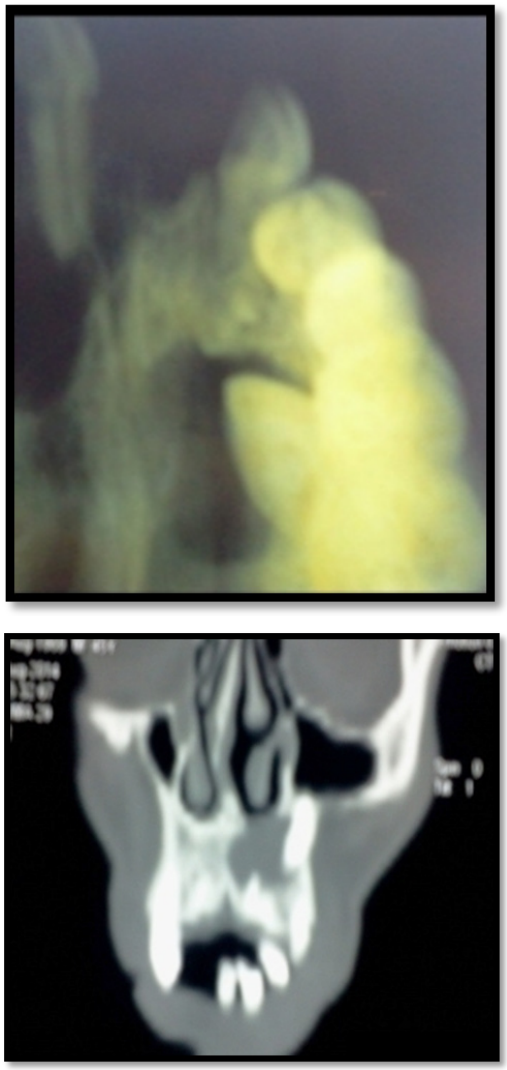


Figure 2 & 3: A radiolucent lesion present in the left anterior palate region along with an impacted supernumerary tooth.

Based upon these clinical and radiological findings a provisional diagnosis of Dentigerous cyst in association with an impacted supernumerary tooth was given. Complete surgical enucleation was done and the biopsy was then sent for processing.

Histopathological Findings: The hematoxylin and eosin stained section of the specimen showed a pseudostratified ciliated columnar epithelium supported by a connective tissue capsule. Few nerve bundles, mucous acini and ductal cells were also evident in the cystic capsule.

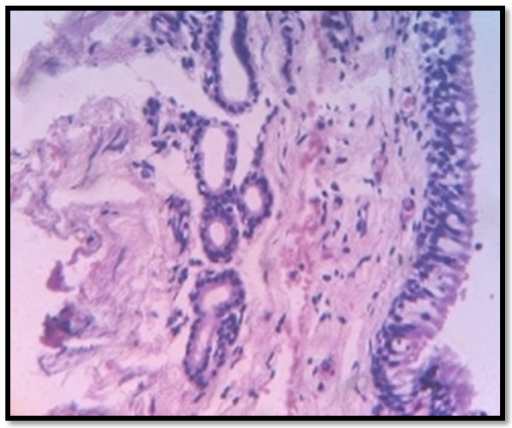


Figure 4 (4x view): The photomicrograph of H & E stained section showing a pseudostratified ciliated columnar epithelium supported by a connective tissue capsule.

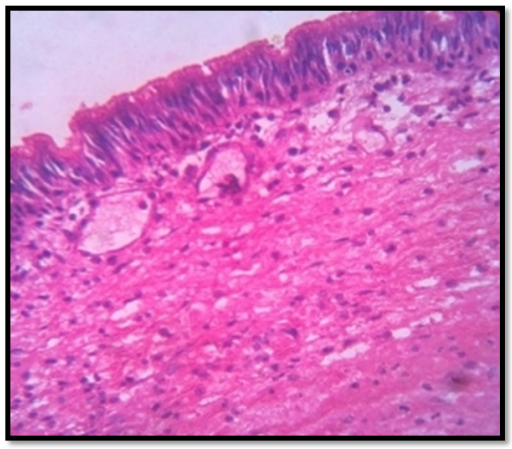


Figure 5 (10x view): The photomicrograph of H & E stained section showing a magnified view of the pseudostratified ciliated columnar epithelium of nasopalatine duct cyst.

Based upon these findings a final diagnosis of Nasopalatine Duct cyst was given.

Discussion

Nasopalatine duct cyst may occur unilaterally or centrally with no particular side prevalence. Upon radiographic examination, a well-defined round or oval radiolucency is seen in the midline while some lesions may also appear heart-shaped[7]. This heart shaped appearance is due to the notching of the cyst by the nasal septum during its expansion or due to superimposition of the nasal spine in the radiograph. NPDC is often misdiagnosed as a periapical lesion because of the same signs and symptoms and thus many authors have a belief that its incidence is much higher than actually

reported in the literature[8]. Out of the total 71.8% NPDCs reported, the type of epithelium may vary from squamous, columnar, cuboidal or as a combination of all these types. However in 9.8% cases, respiratory epithelium has also been noticed [6,9,10].

The case presented in this paper had typical clinical, radiographic, and histopathological features of a nasopalatine duct cyst. This caseenlightens us about the proper diagnosis of such lesions that are easily misdiagnosed as any other lesion followed by an in appropriate treatment plan. The treatment of nasopalatine duct cyst is complete surgical enucleation with or without marsupialization as indicated in some cases. It usually has a good prognosis with recurrence ranging from 0-11% [1].

Conclusion

NPDCs are one of the most common non odontogenic cysts and should not be confused with any other radiolucent lesions of the anterior maxilla. Clinically a vitality testing of the involved or adjoining teeth may help to rule out the differential diagnosis. A confirmatory final diagnosis is however only possible after proper histopathological examination. This case highlights the importance of the role of an oral pathologist in the final diagnosis of such lesions and hence the inevitable part of histopathology.

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Idiopathic Thrombocytopaenic Purpura in a 30-Year-Old Male: The Dentist's Nightmare

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Abstract

Hemorrhagic bullae, petechiae, hematoma, ecchymoses in the oral mucosa with unprovoked uncontrolled gingival bleeding is often a cause of concern for the dentist as it indicates an impaired bleeding or clotting mechanism. Such patients are seeking dental treatment are a therapeutic challenge and the dentists are not especially trained to handle the complications that could arise due to hematologic disorders. More so, investigations for the diagnosis of these disorders are not readily available in a dental set up as well. Idiopathic thrombocytopenic purpura (ITP) is a relatively common bleeding disorder, which occurs due to impaired production or pronounced destruction of platelets. Though the cause is uncertain, immune related mechanisms, drugs and infections may be implicated. The disease is often diagnosed based on the history and clinical examination, backed by complete blood counts and a peripheral blood smear examination.

Keywords: *Bleeding disorder, hemorrhage, platelet defects.*

Introduction

Idiopathic thrombocytopenic purpura (ITP) is a bleeding disorder in which there is a significant decrease in the number of thrombocytes in the peripheral blood, resulting in haemorrhage in capillaries and smaller blood vessels which especially seen in the mucosa of the gastro-intestinal tract as well as the genito-urinary tract.[1] The individuals typically have bleeding from the body cavities, including the oral cavity as well as nasal cavity, blood in stool, urine. Rarely there can be intra-cranial haemorrhage and death due to bleeding.[2] The oral manifestations of ITP depend on the severity of the disease, and manifest as petechiae or haemorrhages in the buccal mucosae and the palate.[3] Sometimes haemorrhagic vesicles or bullae are seen with gingival bleeding. [3,4]

Case Report: A 30-year-old male patient reported to the dental hospital with the complaint of bleeding from gums for the past 2 weeks.

History revealed that the bleeding started spontaneously and was continuous in nature and he also had bad smell in the mouth. There was no associated toothache or tooth mobility. This condition was not recurrent and there was no history of bleeding anywhere else in the body.

On physical examination, conjunctival pallor and subconjunctival ecchymosis in the left eye were seen. [Figure 1a] Gingiva appeared oedematous, with loss of stippling and the presence of purpuric spots. Areas of clotted blood were present in the anterior gingiva. [Figure 1b, c&e] Gingiva was soft and bleeding on probing in the absence of any local factors like plaque or calculus. Bleeding was aggravated on pressure. A hematoma was present on the right buccal mucosa and as well as a palatal ecchymosis. [Figure 1d]



Figure 1. Patient with Conjunctival pallor and subconjunctival ecchymosis in the left eye (a) oedematous gingiva with loss of stippling and the presence of purpuric spots (b, c) and areas of clotted blood were present in the anterior gingiva. (e) Presence of a hematoma on the right buccal mucosa (d) and as well as a palatal ecchymosis.

In view of continuous and spontaneous gingival bleeding for a short period of time without any local pathology, fever, weight loss or lymphadenopathy, these may be the oral manifestations of any bleeding disorder, and hence may be provisionally diagnosed as a Haematological disorder.

Haematological investigations were advised:

Table 1: Complete blood count

	Results	Range
White blood cell count	6,800/dl	4000 to 11000/dl
Red blood cell count	2 x 10^6 /dl	4-5 x10^6/dl
Haemoglobin	6gm%	11-16gm%
Haematocrit	24.5	34-48
Mean corpuscular haemoglobin MCH	26.1 pg	26-33 pg
Mean corpuscular volume MCV	91.2fl	78-98 fl
Mean corpuscular haemoglobin concentration MCHC	28.7 g/dl	32-34 g/dl
Red cell distribution width RDW	27.4 %	12-17%
Platelet count	9600/dl	1.5x 10^6-4.5x10^6
Mean platelet volume MPV	8.6fl	7-11fl

Peripheral blood smear revealed normocytic normochromic anaemia. The platelets were scanty and the white blood cells appeared normal in distribution. The bleeding time was prolonged at 8minutes while the clotting time was normal.

Correlating the history, clinical finding and haematological investigations and peripheral smear examination, the gingival bleeding is diagnosed to be the oral manifestation of Thrombocytopaenia.

Discussion

The exact cause of ITP is unknown but the destruction of thrombocytes occurs by different immune mediated mechanisms and there is decreased production of platelets.[4] Depending upon the duration ITP can be classified as acute or chronic and on the basis of age as juvenile or adult types.[5] It has been characterized into 3 types: newly diagnosed, persistent and chronic based on the duration in 2009 by an international working group, from 3 months, 3 months to 1 year and more than 1-year duration.[6] The present case will therefore come in the newly diagnosed category. While ITP in children is self-healing occurring after a viral infection or immunization with the child recovering with 6 months, the adult onset ITP is truly idiopathic and follows a long chronic course and does not show signs of spontaneous resolution.

To diagnose ITP all other secondary causes of thrombocytopaenia have to be excluded, including drugs, leukemia, acquired immune deficiency syndrome, hepatitis, etc.[7] For a confirmatory diagnosis of ITP as per the American society of haematology, patient's history, clinical examination, blood counts and peripheral blood smear examination.[8] The sign and symptoms depend on the severity of the disease, from being asymptomatic to severe bleeding. Easy bruising and bleeding from the mucosae of the oral cavity and gastro-intestinal tract are common, though spontaneous bleeding from multiple sites have been reported. Gingival bleeding, haematuria, epistaxis, malena, menorrhagia and severe haemorrhages in the skin have been seen in patients with a platelet count of below 10,000/µl. [9]

The therapy for ITP patients is aimed at controlling the bleeding as well as increasing the number of platelets in the circulation. When the platelet count is between 20x 10^3 and 50x 10^3 without any haemorrhagic complications, then no treatment is needed. However, if the patients are hypertensive, have cardiac disease and are on anticoagulants or need to undergo surgery, then the platelet count has to be elevated by transfusion. [10] The therapy comprises of targeting the immune

mechanisms behind the disease with glucocorticoids, intravenous immunoglobulins and anti-D antibodies. [11] Some patients may not respond to steroids or immunoglobulins and may need specific thrombopoietin receptor agonists like Eltrombopag and Romiplostim.[12]

Conclusion

In conclusion, it may be emphasized that often intra-oral haemorrhagic manifestations are the sole manifestations of ITP and are diagnosed by the oral physicians. Hence unusual gingival bleeding, haemorrhagic vesicles, haematomas in the oral mucosa warrant immediate haematologic evaluation for diagnosis and haematologist referrals.

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Customized Ocular Prosthesis: A Case Report

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Abstract

Loss of eye might be acquired or congenital. Congenital anomaly or pathology may require surgical intervention and removal of eyeball. Stock ocular prosthesis are readily available in market, stock prosthesis has some disadvantages such as ill-fit, improper shade matching, etc. whereas the custom-made ocular prosthesis has better adaptability, better movement of the eyeball and iris position can be matched with the adjacent eye. This article describes a case report of replacing left eye with ocular prosthesis of a lady patient and improving her well-being. Distribution of force of the tissue bed and co-ordinated movement of the prosthetic eye makes the prosthesis much more acceptable and real like.

Keywords: *Congenital anomaly; Rehabilitation; Ocular prosthesis; Prosthetic eye.*

Introduction

One of the finest senses of human being are the pair of eyes. Beauty of a face lies in the eyes of an individual. Loss of eye might be acquired or congenital. Congenital anomaly or pathology may require surgical intervention and removal of eyeball. (1) The surgical removal of an eye are classified by Peyman, Saunders and Goldberg (1987) into three types: Evisceration (where the contents of the eyeball are removed leaving the sclera intact), Enucleation (most common, where the entire eyeball is removed after severing the muscles and the optic nerve) and Exenteration (where the entire contents of the orbit including the eyelids and the surrounding tissues are removed).(4) The loss of an eye can cause social, physical, psychological impact on the affected patients.(2) Maxillofacial Prosthetics is that branch of prosthodontics that deals with rehabilitation of lost orofacial structures, building confidence and well-being of the patient.(2) Social acceptance, physical and psychological acceptance can only be promoted by immediate replacement of the lost eye.(4) Anophthalmia socket can lead to growth retardation and disfigurement of the face(4). Ocularprosthesis is a maxillofacial prosthesis that artificially replaces an eye missing as a result of trauma, surgery, or congenital absence; the prosthesis does not replace missing eyelids or adjacent skin, mucosa or muscle(7). Ocular prosthesis can be either stock or custom made. Stock ocular prosthesis are readily available in market, stock prosthesis have some disadvantages such as ill-fit, improper shade matching, etc. whereas the custom made ocular prosthesis has better adaptability, better movement of the eyeball and iris position can be matched with the adjacent eye.(1) Nobel metals andprecious stone were used as ocular prosthesis back in Egyptian and roman civilisation. Stock glass eyes were very popular in Germany and European Nation. But during second World War there was extreme scarcity of eye glasses, then dental acrylic took its position replacing the glass eye in United States Naval School.(3) This case report describes about custom made ocular prosthesis fabricated for a young female patient to restore her well-being.

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Case Report: A lady aged 22 years came to Department of Prosthodontics, Crown and Bridge, Institute of Dental Science, SOA University, Bhubaneswar had been referred from the Department of Ophthalmology, IMS & SUM Hospital, SOA University, Bhubaneswar, after evisceration surgery of the left eye

[Fig No. 1]. On history taking patient informed that she had undergone an injury to the left eye from pressure cooker burst. The patient was carefully examined before deciding the treatment option, whether the operated area had healed or not. After examining the entire procedure of treatment for the prosthesis was described to the patient. On approval of the treatment by the patient, customised tray is fabricated by visible light cured denture base resin which is attached to a syringe needle cap [Fig No 2]. Holes were made on the custom tray to provide retention to the light body impression material. The cured custom tray was polished with sand paper and pumice stone and was tried in the patient eye. When the tray was found to proper and comfortable to the patient, light body impression material (3m) was injected in to a syringe from the auto mixing tip, the syringe was placed on the needle cap attached to the custom impression tray and the impression material was introduced inside the custom tray [Fig No 3]. The patient was asked to move the eyes in all possible directions, adequate time was given for the light body to set. [Fig. No. 4].The impression then carefully removed from the eye. A rubber bowl was taken and reversible hydrocolloid material (plastagin; septodont) was mixed in that bowl. The impression removed from the eye was dipped in the alginate material mixed in the bowl and waited till set. The set reversible hydrocolloid was cut carefully and the impression was removed. The area achieved in the reversible hydrocolloid was filled with white coloured inlay wax and was allowed to set. The wax thus achieved will acts as a future sclera, is tried in the patient's eye and was checked whether the patient's eye lid approximating or not. After manipulation of the wax sclera and through examination, iris was placed in the wax sclera guided with marked leucoplast on the fore head [Fig. No5]. The syringe needle cap was glued to the iris and was flasked with plaster of paris. Then dewaxing procedure followed, after dewaxing the mould was packed with heat cured white coloured Poly-methyl methacrylate DPI Tooth Moulding Powder; Dental Products of India LTD. After bench curing, curing was done, and polished. Disinfection of the prosthesis was done with 70% isopropyl alcohol and 0.5% chlorhexidine solution, after disinfection the prosthesis is cleaned with and rinsed thoroughly with saline water to prevent irritation to the underlying tissue. After insertion of the prosthesis movement and fit of the prosthesis was checked [Fig. No. 6]. equally on the tissue bed but also mimic the movements of the eyeball.



Fig. No. 1: Patient before prosthesis

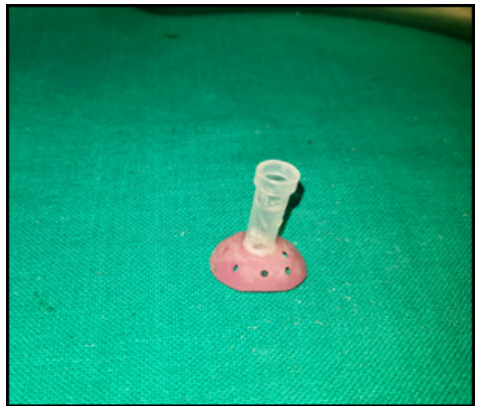


Fig. No. 2: Customized tray with needle cap attached



Fig. No. 3: Impression material was introduced inside the custom tray



Fig. No. 4: Movement of the eyeball was recorded



Fig. No.: 5: Sclera fit checked with marked leukoplast



Fig. No. 6: Prosthesis Placed

Discussion

Custom made ocular prosthesis fits accurately with the defect and reproduce the movement of the eyeball. Replication of ocular prosthesis with the adjacent eye can be very well matched with the custom made procedure whereas stock eye shells lacks the fit and movement replication.[1] According to Beumer*et al*., intimate contact between the ocular prosthesis and the tissue bed is needed to distribute even pressure, so a prefabricated prosthesis should be avoided.(6)custom made ocular prosthesis helps to add characterisation and stating which make it look life-like and due to functional recording of the defect movements of the prosthesis very smooth.Custom ocular prosthesis provides more eyelid competency than stock prosthesis. (3)

Conclusion

Rehabilitation to normal of a patient who has undergone evisceration surgery of eyecan be achieved by restoring the function andesthetics. Custom made prosthesis having natural appearance and excellent adaptability increases the confidence of the patient and aids in adding the well-being of the patient. Custom made ocular prosthesis not only distribute the force

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A Versatile Material for Dental Applications: PEEK

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Abstract

The need of good dental materials makes the material scientists to continuously experiment and innovate new materials. There are three basic requirements of a material i.e. they should have good mechanical properties, esthetic properties and should be bio-compatible. Polyether Ether Ketone (PEEK) is very close to satisfy all these properties for which it has been used in numerous clinical situations. This article is a review of properties, utility in conventional situations and additive manufacturing and about the limitations of PEEK, as a dental material.

Keywords: *PEEK, Polymer, Polyether Ether Ketone, Dental Application, Dental Implant.*

Introduction

Polyetheretherketone (PEEK) was developed by a team of English scientists in 1978 and was applied for industrial use. It was used as a material of the interbody fusion cage in vertebral surgery during the late 1990s.[1] This material has been widely used in automotive, chemical and electronics works. PEEK exhibits good biocompatibility and mechanical properties, resistant to high temperature, resistant to chemical wear. All these properties are available in PEEK material, thus making it suitable for use in dentistry.[2]

PEEK is a thermoplastic,semi crystalline material with a linear structure (-C6H4-OC6H4-O-C6H4-CO-) n. It is polycyclic and aromatic in nature. The binding of ketone and ether functional groups in between aryl rings produces PEEK. It is white in color, unlike the tan color in pure-form.[3] Etheretherketone is the monomer unit. Step-growth dialkylation reaction of bis-phenolates occur to form the polymer polyetherether-ketone. 4,40 difluorobenzophenone reacts with disodium salt of hydroquinone in a polar solvent such as diphenyl sulphone at 300 degrees C to synthesize PEEK. Addition of functionalized monomers before polymerization or sulphonation, amination and nitration after polymerization modify the material.[4]

Properties: PEEK is a sulfonated thermoplastic, used by injection molding. Its Young's modulus is 3.6 GPa which is close to that of human bone, enamel and dentin.[5] Tensile is Strength is 90-100 MPa.[6] Thermal conductivity 0.25 W/m K. Thermal stability up to 335.8°C.[7,8] Flexural modulus is 140-170 MPa and density – 1300 kg/m^3 i.e. it is a very light material. PEEK exhibits stability at high temperatures (like sterilization processes); resistance to most substances apart from deconcentrated sulfuric acid and resistance to wear. It is non-toxic, non-allergic and exhibits low plaque affinity, thus making it one of the best bio-compatible dental materials. It has least solubility and has least water absorption values compared to poly methyl methacrylate PMMA and composite resin.[9] PEEK Young's modulus can be increased with the addition of carbon fibers.[10,11]

Clinical Applications:

A. **Removable Partial Denture Frameworks:** PEEK is a good esthetic alternative to cobalt-chromium clasps due to its white color even though it has less retentive strength. It also does not produce any metallic taste, allergic reactions and also is light weight. It can be used an alternative to artificial teeth, when used in combination with polymer. The property of low plaque affinity makes it a hygienic option. Torque and the stress on abutment are reduced in distal extension cases as the material is elastic in nature.[3,7,12]

B. **Indirect Restorations:** PEEK bonds to composites with very less surface abrasions. This property is utilized in resin-bonded bridges produced from PEEK material.[13] Surface roughening can be done with acetone, phosphate-based methacrylate linings or tribochemicals. Only Sulfuric acid or a mixture of sulfuric acid and hydrogen peroxide roughen

the PEEK surface and sand-blasting increases the wettability.[14,15] PEEK can be also used in fabrication of CAD-CAM framework.[16]

C. **Fixed Partial Denture Frameworks:** PEEK restorations were able to bear masticatory forces 300 N in the anterior region and 500-600N in the posterior regions.[17] It is a suitable option for patients with metal allergy and sensitivity to metallic taste.[12,13] PEEK is also more bio-compatible than Porcelain-Fixed to Metal restorations and is less reactive with other materials.It is highly resistant to wear also .[3]

D. **Implants and Implant Abutments:** The first dental application of PEEK was its use as an esthetic abutment in 1992. Later, it was used as an implant material.[2] The elastic moduli of bone are nearly the same as that of PEEK. This property would reduce the stresses occurring on the bone i.e. would have stress shielding effects which in turn would result in bone remodeling and also would protect the bone. Numerous cases have been reported with use of PEEK in implantology like gingival formers,abutments, implant-supported prostheses due to the properties exhibited by PEEK. The surfaces can be easily modified to improve osteo-conductive activities. Nano-modifications can be done in different techniques to achieve better osseo-integration. There is homogenous distribution of stress in the bone- implant interface due to its iso-elasticity property. They have shown good strength, fracture resistance and satisfactory bio inertness.[2,3,7]

E. **Orthodontic Wires:** PEEK is used as orthodontic wire due to higher strength compared to polyethylene sulfone (PES) and polyvinyl difluoride (PVDF). The orthodontic forces generated are similar to that of titanium-molybdenum (Ti-Mo) and nickel-titanium (Ni-Ti) wires.[3]

F. **Peek as Maxillofacial Prosthesis:** There have been very limited reported maxillo-facial cases, using PEEK,But the properties of PEEK can be utilized for successful esthetic, functional outcome for patients.[2,18]

Peek in Additive Manufacturing: Additive manufacturing is an industrial method utilized in dentistry to create customized 3D printed models,implants, prostheses, guides, etc. with the assistance of 3D printing technologies, scanners and software. PEEK is a compatible material for 3-D printing.[19]

Conclusion

PEEK has mechanical properties close to that of dentin and bone. The color of this material makes it esthetically acceptable. It is light-weight and has less plaque adherence. It can be easily modified. This material is compatible with CAD-CAM technology and most importantly, 3-D printing. The use of this material can be an economic solution for the clinician and the patient. These altogether make PEEK a potential replacement for conventional materials. With the support of further research, this material can be utilized in fields like maxillo-facial prosthodontics, endodontics and other branches of dentistry.

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Oral Health Challenges During Pregnancy

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Abstract

Pregnancy is a vehement phase that leads to physiologic transitory changes in various systems of the body which also includes the oral cavity. Any dental treatment must not be withheld for maintaining good oral health. Special considerations are involved in dental supervision for pregnant women. The following review article explains some general dental issues that a pregnant lady has to face alongside the danger of several medications for both the mother and the fetus and; all the treatment implications that are suitable for the pregnant patients. In addition, supervision and execution of the associated dental issues in pregnant women and a proper time management of the surgical dental conduct during the period of pregnancy has been discussed.

Keywords: *Pregnant woman, Dental problems, Oral care.*

Introduction

Pregnancy is phase of physiological predicament which carries out several alterations in the oral cavity with other physiologic reversals that take place throughout the body of a lady.[1] Generally, it is known of a phase when women strive to be precisely knowledgeable about the urgency for what should be done in order to accomplish topmost extent of the well-being for herself and her developing child. In addition, most of the women are not very much known about the existing relation present between their general and oral health. Role of the steep levels of flowing estrogen hormones is well established which is correlated with high predominance of gingival hyperplasia and gingivitis.[2] In the serum, progesterone is also found to associate with melasma, demonstrating brown patches or pigmentation present bilaterally in middle region of face.[2] A common view of the physiological changes in the various systems of the body during pregnancy is described in Figure1.

Despite of all these goals, neglecting oral health is very common during pregnancy. Several studies have found evidence that links together the pregnancy outcomes, low maternal oral well-being with dental well-being of the child.[3] These may extend from low birth weight and preterm delivery to greater risks such as early childhood caries in case of infants. Disease prevention, oral health promotion, timely intervention and early detection are important features for both maternal and oral health of the offspring.[4] Plenty, if not all preventive and routine dental treatments can be performed securely with certain precautions throughout the period of pregnancy is widely established.

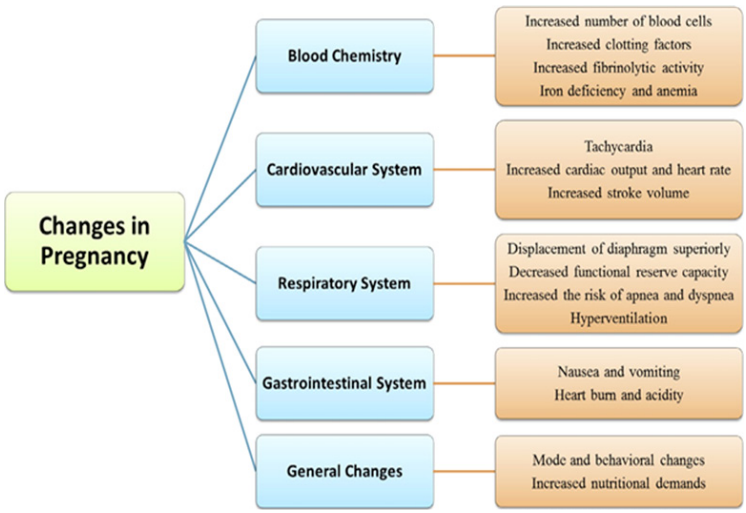


Figure 1. Key physiological changes observed in various body systems during pregnancy[5]

Management of Dental problems during Pregnancy: During pregnancy, the oral cavity also exhibits a number of changes like any other system (Figure 2), therefore, special care and action is required by the dentists. Some generalized dental problems and their management are mentioned below that the pregnant women face.

(a) Dental Caries: Pregnant patients are most likely to have dental caries because of acidic environment upsurge in their oral cavity, increased sugary diet consumption and negligence towards their oral health.[6] The acidic environment in the oral cavity is enhanced by the recurrent vomiting that is common in pregnancy which leads to progression of carious microorganisms and increased demineralization that makes teeth more likely to have caries.[7] The untreated dental caries lead to an increased occurrence of cellulitis and abscess.

Thus, it is advised by the dentists to limit the sugary diet for pregnant women, brush with toothpaste containing fluoride regularly and to use over the counter mouthwash that are fluoridated in order to counteract the demineralization of teeth caused due to vomiting. The purpose of topical fluoride applications for the prevention of dental caries is widely accepted.[8] Some restorative materials that release fluoride for example glass ionomer can prevent the growth of secondary caries.[8] Also, drugs eg. methamphetamine should be avoided which may aid to exasperation of dental caries.

(b) Gingivitis: Tender bleeding gums or gingivitis is one of the general dental problems which adds to around 60-70% of pregnant patients. These conditions are more common due to the fluctuations of progesterone and estrogen hormones, decrease in the immune response and changes in the natural oral flora.[9]

The commendations for improving the condition comprises of professional oral prophylaxis i.e. scaling, root planning and polishing, brushing twice daily with fluoridated toothpastes and flossing, saline mouth rinses in order to help in easing the irritant. For an added benefit, chlorhexidine mouth rinses may also be advised.[10]

(c) Periodontal Disease: About 30% of the pregnant patients experience some or the other periodontal disease.[11] While appearance of the increased levels of estrogen in larger predominance of gingival hyperplasia and gingivitis is well established at the time of pregnancy, the correalation between oral infections such as periodontitis and pregnancy need further investigation.[2] The act of the higher levels of the inflammatory markers such as interleukin 8, interleukin 6 and prostaglandin 2 are formed in amniotic fluid of the pregnant patients having periodontal infections, which can be considerably correlated with low birth weight and premature labor.[12]

Current data demonstrates evidently that scaling and root planning can be regarded secured at the time of pregnancy which enhances both the maternal health and health of the neonate.[12] The execution method in order to conquer the periodontal infections in pregnant women enfolds accurate diagnosis by the dentists, deep scaling/root planning and daily prescription of 0.12% chlorhexidine mouthwashes so as to restrict the progression of diseases. Chlorhexidine is classified to be FDA Class B and considered secured to be practiced in pregnant patients.[13]

(d) Tooth Erosion: This is one more undesirable dental issue that is regarded to occur due to pregnancy persuaded vomiting. The fact is accepted that the dental erosion may effectively be restrained with application of a compound that contains sodium bicarbonate which neutralizes acid and forbids kind of dental damages.[14]

It is advisable to discuss with the patient's specialist and gastroenterologist in order to manage all the relevant medical circumstances.

(e) Tooth mobility: Mineral alteration takes place in the lamina dura because of the hormonal rush and the disruption in attachment of periodontal ligament influence mobility of teeth which further leads to the periodontal diseases.[15]

This condition of the gingiva can be made reversible by the removal of local gingival irritants along with prescription of therapeutic doses of vitamin C.[16]

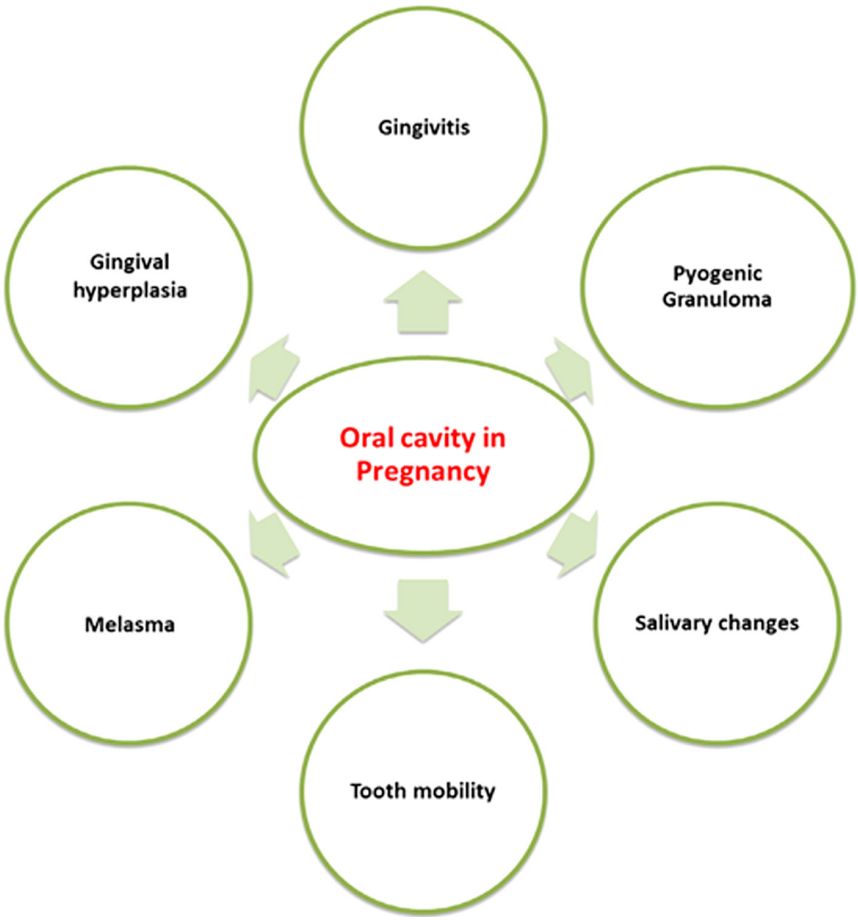


Figure 2. Key oral cavity changes and conditions in pregnancy[5]

Guidelines for oral health management in Pregnancy: Dental and oral health management is treated as one of the very important aspect in pregnant patients. To estimate the patient's present dental situation is recommended and then the patient is required to be educated about all the familiar changes at the time of her pregnancy and the measures to avoid any kind of pain and distress that can be helpful. During the second and third trimester, no harm is caused due to the dental examination and treatment in contrast to being left untreated, for example, infant caries can be caused due to dental decay at a subsequent stage.[17] Other such procedures as restorations and extractions, periodontal therapy and diagnosis do not cause any harm and are suggested to be executed during second trimester as organogenesis is expected to be completed by then.

(a) First trimester: The first trimester is considerably not the appropriate time for performing all the dental procedures. During this period, organogenesis takes place and the fetus is more likely to face danger of teratogens. Also, there is increased danger of instinctive abortions. The following guidelines are to be followed:

- Patient must be informed about all the changes that take place.
- The directions given to retain the oral hygiene should be followed.
- The therapy performed should be confined to emergency treatment and oral prophylaxis.
- Periodic radiographs should be avoided.

(b) Second trimester: The organogenesis phase gets completed in this trimester and procedures for example developing dento-alveolar and any other elective procedures are unharmed to be performed. The following are the recommendations during this phase:

- The oral hygiene should be maintained along with plaque control.
- If necessary; scaling, polishing and curettage is safe to be performed.

- The active oral diseases need to be restrained.
- Elective procedures such as restorations, root canal and extractions are also safe to be performed.

(c) Third trimester: During the third trimester, short dental procedures are appropriate to be performed as the fetus is not at a significant risk. However, there is an increase in danger of uneasiness to the pregnant woman which can be reduced by proper positioning to a larger extent (Fig.4). The middle third of the trimester is the recommended time for the procedures to be performed. The following are the measures suggested during the third trimester:

- The oral hygiene should be maintained along with plaque control.
- If necessary; scaling, polishing and curettage is safe to be performed.
- The active oral diseases need to be restrained.
- The use of radiographs should be reduced.
- After the mid time of third trimester any procedure should not be performed.

Suitable timings for treatment and dental management: At any stage of pregnancy; scaling, root planning and polishing are recommended in order to conserve and improve oral health.[18] However, to execute the common dental measures is strictly advised such as elective extractions, endodontic treatment and routine restorations after organogenesis of the fetus has taken place. Lengthy and extensive dental treatments must be delayed till delivery.[2] The treatment procedures should particularly target on prohibition of the oral infections with periodic care and follow up of the current infection (Fig.3).



Figure 3. Key oral health care measures that are adopted during pregnancy[5]

Dental Chair Positioning in Pregnancy: It is very important while performing chair side procedures that pregnant women are in a secured and appropriate seated space (Fig. 4) which aids to avoid complications for example supine hypotensive syndrome on the dental chair. If a pregnant woman, for example, is seated in a supine position, chances are high for an abnormal arterial oxygen gradient and progression to medium hypoxemia. Similarly, there is a danger of compression of aorta and vena cava due to gestating uterus which leads to postural hypotension. Thus, it is necessary for the dealing dental health care professional to get her seated in the correct

setting i.e. by placing a tilt of 5-15% on the left side of the patient or make her seated with an elevation of 10-12cm of her right hip so that the pressure is reduced on the vena cava. The pregnant woman could be advised to be seated in a full left lateral position if hypotension is not reconciled. However, these alterations are suggested during the third trimester.[7]

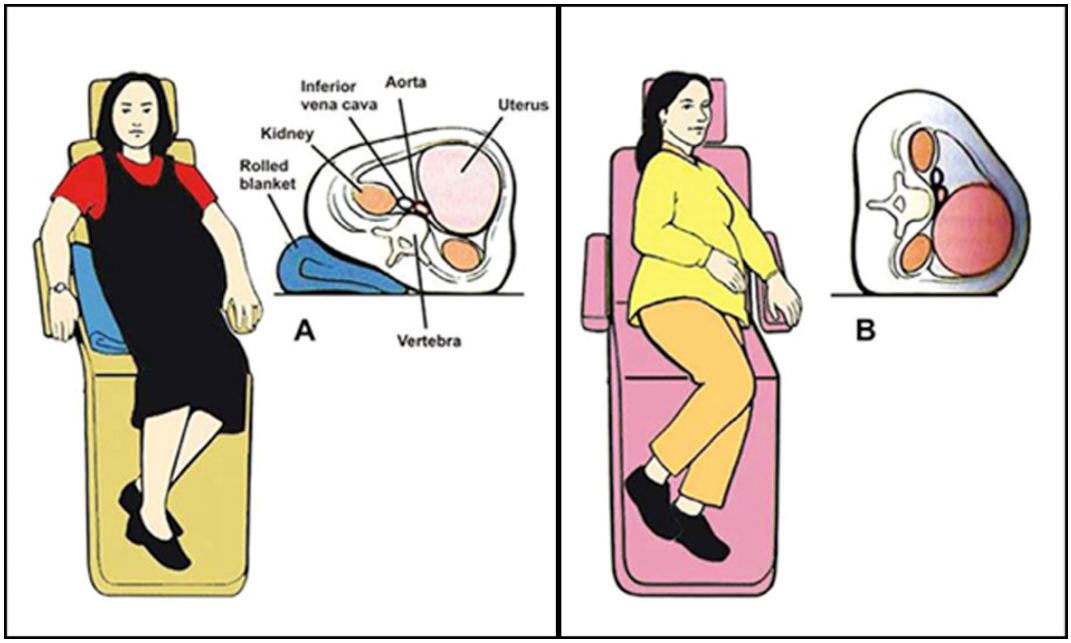


Figure 4. Schematic representation of correct chair positioning of pregnant patients[5]

Table 1 FDA risk categories of drug used during pregnancy and their potential risk factors.

Category	Risk factors	Antibiotics	Analgesics	Sedative hypnotics	Local anesthetics
A	Satisfactory well controlled studies on humans showing no hazard to the fetus				
B	Studies on animals demonstrating no fetal risk whereas no well controlled and adequate studies done on pregnant women	Amoxicillin Cephalexin Chlorhexidine Clindamycin Erythromycin Metronidazole Penicillin	Acetaminophen Ibuprofen		Lidocaine Prilocaine Prednisolone
C	Studies on animals establishing fetal hazards no controlled studies on human beings	Ciprofloxacin	Codeine with acetaminophen Hydrocodone – acetaminophen Propoxyphene		Mepivacaine
D	Evidence of risk to the fetus, can be used in exceptional cases or circumstances	Doxycycline Tetracycline (D)	Ibuprofen	Barbiturates Benzodiazepines	
X	The hazards of using the drug in pregnant women far more than the benefits				
		Nitrous oxide (avoided in the first trimester as it may result in neonatal depression and spontaneous abortion)			

Pharmacodynamics in Pregnancy: Pregnancy is a phase which has a decline in maximum plasma concentration, high volume of drug distribution, reduced plasma half-life, acceleration in rate of clearance and lipid solubility.[15] Such dynamics compromise the health of the fetus by contributing a quick entry of several drugs through placenta. These drugs, in addition, can lead to teratogenicity, low birth weight and further adverse effects may lead to abortion. The usage of drugs during this phase is therefore not advised, especially in the first trimester i.e. first 13 weeks. For a safer approach because of the potential adverse effects, drugs have

been classified on the basis of hazards and risks to the developing child.[4] "Food and Drug Administration (FDA), USA has categorized drugs on the basis of their potential risk factors during pregnancy" (Table.1).[5]

(a) Analgesics: Analgesics are practised for a limited span or short term period to minimize, heal and treat the commotion of pain. The acetaminophen is the safest and most general analgesic advised in pregnancy which is classified in Group B in FDA categorization.[19] Hepatotoxicity is the most recorded acetaminophen reaction. Due to their different formulations availability, to exceed more than a 4 grams per day is not advisable for a pregnant woman.[19] Other analgesics for example ibuprofen categorized in the category B categorization in first and second trimesters while in the third trimester, it changes to category D as this drug is correlated with immature heart valve termination, lower amniotic fluid and restricts vaginal opening at the time of labor.[13] Acetaminophen with codeine or oxycodone should be recommended by the dentist but is not suggestive of prolonged use as this may lead to neonatal abjection. This is probably not a thing to get concerned since the dose administration is approved customarily in association with dental therapy.[19]

(b) Antibiotics: Most of the authorized antibiotics fit to category B in FDA categorization with exception of doxycycline and gentamicin both of which fit into category D (Table.1). Fetal ototoxicity has been reported to cause by gentamicin whereas tetracycline stains in teeth and the adverse outcomes on developing bones is caused by doxycycline and its derivatives. A broad-spectrum antibiotic, ciprofloxacin is generally recommended for periodontal infections. Recent advancing evince is suggestive of the drug being convoluted in arthropathy and having serious consequences on developing cartilages thus should not be prescribed to pregnant patients.[20] Metronidazole categorized in group B has teratogenic effects which is also prohibited to use.[21]

(c) Local and General anesthetics: The localized practice of anesthesia, when administered accurately and with specific dose is considered safe. The anesthetic solutions like, prilocaine and lidocaine are classified under class B while epinephrine, bupivacaine and mepivacaine fit into class C in FDA categorization.[13] Epinephrine when administered with local anesthetsia through an intravenous pathway, theoretically, it may be correlated to a deficiency of utero-placental blood movement but the recorded cases in healthy pregnant ladies are 1:1,00,000.[21] The epinephrine concentration in local anesthetics administered in dental procedures is to be declared secured after there is an evaluation of pregnancy and the probable risk elements.

Conclusion

Pregnancy should not be acknowledged as the sheer inference in order to postpone the requisite dental treatment. Oral health care at the time of pregnancy is really crucial which comprises of input of patient herself, physicians and the dentists. The pregnant women must be properly educated about the expected changes in oral cavity, importance of good oral hygiene and regular dental check-ups. The dentists should be knowledgeable of the modernized updates about circumstances associated with pregnancy and appropriate execution without causing any inconvenience to the mother or the fetus. Consultation and referral to the patient's gynecologist or a specialist must be done considering top zone of the patient's requirement. Drug regimen must be accomplished presisely and should be limited. It is the best to abstain from any kind of radiography and electotal surgery. Expecting females or female women of parturiency age must be quarantined for oral diseases and caries for appropriate management.

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Life Threatening Effects of Oral Habits

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Abstract

An oral habit is a practice which may be constant or may be occasional, that has been acquired by frequent repetition. Life threatening oral habits can be either tobacco involving habits or non-tobacco involving habits. Most of the life-threatening diseases occurring due to oral habits have aetiology of tobacco usage with few instances of non-tobacco induced. Tobacco whether consumed as smoked form or smokeless form, affects the human body in one way or the other. These habits developed by the body can be peer pressure induced, stress induced, can be due to social stigma or can even be a habit that once started as an adventure has now converted into a compulsion. Favourably there are various therapies available for managing tobacco abuse that can ultimately curb the deadly situation arising after tobacco use, hence decreasing the rate of occurrence of various preventable diseases as well as increasing the life expectancy of the masses. This review article focuses on the various tobacco and non-tobacco induced oral habits that can be life threatening for the human body, consequences of these habits, their treatment and management.

Keywords: *Habits, Tobacco, Smoking, Oral cancer.*

Introduction

An oral habit is a practice which may be constant or may be occasional, that has been acquired by frequent repetition.[1] An individual develops oral habits either due to mental stress, peer pressure, social stigma or as a custom that once started as a thrill or an adventure and gradually got converted into a compulsion. Some habits such as nasal breathing can be helpful for an individual, but on the other hand thumb sucking and tongue thrusting are considered to be harmful, whereas, lip biting and cheek biting can be life threatening.

Life threatening oral habits can be either tobacco involving habits or non-tobacco involving habits. Tobacco involving habits can involve consumption either as smoked form or in smokeless form. Smoked form of tobacco consumption includes bidi, chillum, chutta, cigarettes, dhumti, hookah and hookli. Smokeless tobacco consumption forms are khaini, Manipuri tobacco, mawa, mishri, paan, snuff, zarda, gutka, pan masala and gudakhu.[2] In India smokeless tobacco consumption is more amongst the mass than smoked form of tobacco. Uses of smokeless tobacco is more in the eastern and central zone than other places. North-eastern states have equal consumption rates of both smoked and smokeless forms. The rate of tobacco consumption habit is seen more in males than females in the Indian sub-continent. Various studies indicated that tobacco consumption rate is more in males, poor, uneducated masses and the backward sections of the society. They even lack the resourses required for treatement of detoriating health issues which are seen further after.[12] Non-tobacco induced habits like cheek biting and lip biting can be life threatening for the human body.These habits mostly have a history of psychological issues, but help of a physician can be useful for an individual who is willing to give up the practice.

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Tobacco Habits

Preparation and Components of Tobacco: Tobacco is prepared from the cured leaves of several plants in the Nicotiana genus and the Solanaceae family. Tobacco is the reason behind maximum number of preventable deaths that occurs across the world. It is

estimated that tobacco contains around 4000 compounds which are proven toxic, mutagenic and carcinogenic. Out of the various known carcinogens, forty-three itself are found to be in tobacco smoke only. In India, tobacco was 1st brought by Portugese traders in the late 16th and early 17th century. With the Introduction of hookah during the Mughal rule, tobacco smoking became a symbol of aristocracy. Use of tobacco is associated with many harmful diseases like cancer, cardiopulmonary diseases and many health problems.

Nicotine, tar, carbon monoxide, nitrogen oxides and hydrogen cyanide are some of the components found in tobacco that have deadly effects on the body.

Nicotene is the most toxic component in tobacco. It is the reason behind the tobacco smoke, for which the smokers get addicted to it. Nicotene releases Dopamine from the human brain which is also known as pleasure hormone, which is the reason why the consumer has a feeling of euphoria after intake of tobacco. The particulate matter inhaled by the smoker is known as tar which consists of nitrogen, oxygen, hydrogen, carbon dioxide, carbon monoxide and volatile and semi volatile organic chemicals. Hydrogen cyanide in tobacco has a deleterious effect on cilia which forms the inner lining of the respiratory system. Metals like Nickel, Cadmium which are carcinogenic are also found in tobacco along with the clear presence of radioactive compounds such as polonium-210, potassium-40, radium-226, radium-228 and thorium-228.

Smoked Tobacco and its Consequences: Tobacco which is consumed in smoked form consists of two types of smoke, which are 'side stream smoke' and 'main stream smoke'. Side stream smoke is produced from the burning tip of the cigarette, whereas main stream smoke is formed from the filter present in mouth end of cigarette. Bidi is one of the traditional practices of smoking tobacco in India, which was introduced in the 19th century. About 34% of tobacco produced in India goes for manufacturing of bidi. Cigarette smoking is more common in the urban belt whereas bidi is found to be more prevalent in the rural areas and amongst the backward classes of the society.

Hindu monks also known as 'Sadhus' are seen snuffing tobacco smoke from a 10-14cm long, straight, conical clay pipe known as chillum which dates back its origin to the 18th century. Another common form of smoking tobacco are cigarettes in which 1gm of sun dried or artificially heated tobacco is wrapped with a paper. Along with tobacco, sugars, aromatic agents and flavouring are added, but, the harmful effects of tobacco remaining the same. Smoking increases gingival inflammation, periodontal damage, with increased pocket dept, bone loss and attachment loss. Severity of periodontal disease is directly proportional to the rate of smoking.[7] Aggressive periodontal damage is seen in case of smokers as the host-bacterial interactions get aggravated in smokers as compared to non-smokers. There is marked alteration in neutrophil count, rate of phagocytosis with increased chemotaxis and respiratory burst. Increased production of PGE_2 and increased level of TNF-alpha is seen in Gingival Cervicular Fluid (GCF).[4] Initially smoking causes a nicotine related transient increase in gingival fluid flow rate and decreased vascularity of gingival due to prolonged vasoconstriction. As a result, there is difficulty for the physician to find out gingivitis in early stages. Women who are addicted to smoking have a higher risk of developing miscarriage, sudden unexpected death of infants, premature birth, ectopic pregnancies or complications during childbirth. Newer studies have suggested that smoking is one of the major risk factors behind tuberculosis in India. It is seen that chances of occurrences of tuberculosis is three times more potent in smokers than non-smokers.[5]

Now day's youngsters are seen trending use of e-cigarettes or electronic cigarettes popularly known amongst them as ENDS and hookahs which can be easily purchased from markets and internet. Smoking is stimulated by handheld battery powered vaporizer in e-cigarettes that provides the same aspects as smoking but without burning tobacco. It produces an aerosol-based component known as 'Vapor' instead of the smoke as produced by traditional cigarettes.[11]Studies have revealed that youngsters using e-cigarettes are more prone to opening the gateway towards developing the habit of using regular cigarettes later in their life. ENDS or e-cigarettes have been announced causing DNA damage, cellular, molecular and immunological toxicity along with being carcinogenic with cardiovascular, respiratory and neurological disturbances with known foetal damages during pregnancy.

Smoking tobacco not only has an adverse effect on smokers, but can also affect the health of passive smokers.[3] People who smoke tobacco with the 'mouth end' of the pipe attached to their mouth are known as active smokers, whereas the other individuals present in the same environment in which the smoke spreads

are known as passive smokers. Passive smokers also have a greater chance of showing health risks like increased chances of occurrence of lung cancer and heart diseases like stroke and respiratory illness like asthma, bronchitis and pneumonia. Compounds like ammonia, formaldehyde and sulphur causes irritation in the eyes, throat, nose and lungs.

Smokeless Tobacco and its Consequences: Smokeless tobacco is consumed in two different forms-chewable form and snuffed of tobacco. In India the various forms of chewable tobacco are khaini, Manipuri tobacco, mawa, paan, zarda, gutka and pan masala out of which Paan chewing being the commonest form. Paan also known as betel leaf is derived from the Sanskrit word 'Parna' meaning leaf. The presence of paan is not only seen in Indian Mythological texts but also in Ayurveda due to its medicinal values. These leaves are a rich source of vitamins like, Vitamin-C, niacin, thiamine, riboflavin and carotene with a considerable part of calcium too. Paan leaves are not harmful for the body, but additional consumption of ingredients like areca nut, tobacco and lime makes its after effects worse.

When tobacco leaves are sundried or heat dried and inhaled through the nasal cavity it is known as snuff that shows remarkable morphological and functional changes in the constituency of nasal mucosa. Another form of smokeless tobacco commonly seen in eastern India is gudakhu. It is a paste of powdered tobacco mixed with molasses, red kharia, jiggery and other ingredients primarily used for cleaning the tooth.

These varieties of tobacco are greatly associated with an increased risk causing oral carcinomas. It slows down wound healing after dental surgery, induces periodontal diseases,bad breath and other forms of oral infections. Smokeless tobacco not only causes oral cancers like squamous cell carcinomas, verrucous carcinomas, salivary gland carcinomas, lymphoma, leukoplakia, erythroplakia, or lip cancer but also enhances the chances of pharyngeal cancer and oesophageal cancer.

Non-Tobacco Habits and Consequences: Some of the non-tobacco habits that can be injurious for the health are lip biting habits and cheek biting habits. Lip biting or lip sucking habits can be due to malocclusion or emotional stress. Anatomy of the normal lip carries out many important functions like speaking,eating and maintaining a balanced occlusion but these deleterious habits can lead to protrusion of upper incisiors, retrusion of lower incisors,lip trap,muscular imbalance,redness of the lip and in severe cases ulceration,bleedings and blisters formation.[6] Morsicatiobuccarum commonly known as cheek biting or cheek chewing is considered to be a body-focused repetitive behaviour (BFRB) which is an anxiety related problem. BFRBs is an anxiety related behaviour that is repeatedly reduced by the body even after the individual tries to stop it. It mostly starts in childhood and continued through adulthood. Cheek bite can cause damage to the buccal mucosa leading to mouth soreness and formation of ulcers. Studies have shown that continuous mechanical irritation to the buccal mucosa from the teeth can promote oral carcinoma induced from other agents.

Therapies for Habit Cessation: An individual can develop a habit either due to stress, peer pressure or social stigma. This developed habit can be curbed by behavioural therapies as well as medical therapies. People should be made awareness of these deleterious habits which can be harmful for the body later in their life in some way or the other. Initiatives should be taken by government agencies and non-government organisations to spread awareness across world wide area. Habit cessation in a larger extent can reduce risk of occurrences of preventable life-threatening diseases. Dental physicians play a crucial role in helping patients for quitting tobacco induced habits. They can council the patients, influence them to live a tobacco free healthy lifestyle by showing them the actual effects and dangers of tobacco in the oral cavity.[8] Various guidelines are also available for counselling the patients which can also be helpful in providing guidance. In case of tobacco induced habits various medical aids are available to prevent them. Nicotine present in tobacco is the main reason behind tobacco addiction. This can be prevented by using nicotine replacement therapies like nicotine gums,nicotine inhalers,[10] nicotine patches,nicotine nasal sprays and nicotine lozenges. In case of stress induced tobacco habits, anti-depressants can be helpful in patients who have tried a several times to quit the habit but have been unsuccessful.

Lip biting and cheek biting is usually stress induced. In order to avoid it authorised physician help is beneficial. Psychological counselling, stress management through conservative or medical therapy and behaviour management can be essential. Dental physician also plays a crucial role in managing this non-tobacco induced habit. Removable crib and vestibular screen can be used to avoid cheek biting habit as well as

lip biting. If lip biting is seen due to malocclusion then help of an Orthodontist and dento-facial orthopaedic can be beneficial.[9]

Conclusion

Deleterious oral habits as a whole or as a part has a considerable effect on oral health. Even if a life-threatening condition does not persist in the oral cavity, a dental physician can easily recognise the presence of these deleterious habits from the physiological and anatomical changes that occurs in the mouth due to the occasional or persistent practice of these habits. In such case the individual should be made aware of the consequences that may arise in the future.

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Ethical Permission: Approved

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Smoking Cessation: The Aromatherapy Way

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Abstract

Smoking is one of the major risk factors for cancer affecting the respiratory tract, oesophagus, stomach, pancreas, uterine cervix, kidney and bladder. Smoking tobacco is responsible for approximately 30% of cancer deaths world over. Nicotine dependence is now considered a disease by WHO (World health organization). The widespread use of tobacco in different forms leading to its addiction is among the biggest preventable cause of death today.

Smoking cessation can not only easily result in the decline of premature deaths but also improve the quality of life. Smoking cessation comprises an integral component of various national and international tobacco control policies. Tobacco quitting programs focussing on diagnosis, treatment and prevention of Nicotine dependence should form a major part of primary health care. Smoking cessation can reduce the chance of carcinomas, strokes,and several cardiovascular and respiratory diseases. The habit of smoking is very difficult to quit and requires a very strong will power, motivation and assistance. Several method like Nicotine replacement therapy (NRT), other pharmacological intervention, psychotherapy and counselling are employed to help the tobacco users to quit smoking. In recent years there is a lot of interest in the use of complementary and alternative medicine (CAM) techniques, like essential oils and acupuncture as therapeutic alternatives for cessation of smoking. Essential oils and aromatherapy,play a very important role in smoking cessation and their role in smoking cessation should not be ignored even though very little information is available regarding their use. This review shall help in understanding the different essential oils available and their uses which can prove beneficial in smoking cessation.

Keywords: *Smoking cessation, nicotine dependence, essential oils, aromatherapy.*

Introduction

Tobacco is produced by two plant species– Nicotiana tabacum and Nicotiana rustica, comes from the Equatorial and the Peruvian Andes. These plants have been in existence over 18,000 years, since the migration of the Asiatic populations to America.[1] By the time Christopher Columbus discovered the Indian sub-continent the cultivation and use of tobacco was already rampant over the continent. Tobacco was not only smoked in pipes, it was inhaled, chewed, eaten, and also drunk as tea.

In 1850, England became the first country to manufacture and sell cigarettes, the consumption of which increased during World War I. Today, around the globe there are more than a billion tobacco users out of which 90% have started the habit in their adolescence. (2) The rise in incidence of lung cancer was observed in 1920 sand documented in several studies.[1] Presently, the WHO reports nearly more than six million victims affected by smoking every year caused by cigarette.[2] Smoking is attributed to nearly 30%of the preventable deaths worldwide caused due to cancer. It is now one of the major risk factors for oral, pharynx,lungs, larynx, oesophagus, stomach,and many other carcinomas affecting different organs of the body.[3] In 1988, it was found that Nicotine found in cigarettes and in other tobacco products is a drug that causes dependence.

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Nicotine dependency today, is one of the mostcommon ailments affecting the world population.[4]

Nicotine affects both the body and brain of the smokers. Nicotine in a cigarette, gets absorbed through the lining of the nose, mouth, and lungs and then enters the bloodstream. When nicotine reaches the brain, it activates the pleasure centres of the brain by boosting the levels of the neurotransmitter dopamine. Changes in the balance of chemical brain neurotransmitters occurs when people use nicotine for an extended period. Therefore, when a person suddenly stops using nicotine, there is a disruption of this chemical balance which results in physical and psychological side effects, such as cravings and low mood. This disruption of brain chemicals is termed as nicotine addiction, and is a major reason why people find it so difficult to reduce or quit smoking. About 25% of the adult world population show Nicotine dependence.[5]

It hence becomes imperative to diagnose properly and effectively treat this Nicotine dependence in these patients, by promoting smoking cessation. A huge marketand industry areout there to helpsmokers dedicatedly to quit smoking, starting from nicotine replacement therapies (nicotine gum, the nicotine patch, etc.) to pills, e-cigarettes and several different products and treatment options to pick and choose.

Recently Complementary and Alternative Medicine (CAM) method like cognitive behavioural therapy, acupuncture,etc are garnering a lot of attention in many countries as parallel therapeutic interventions for smoking cessation.[5] Among the various CAM method, one of the promising ways is using aromatherapy and essential oils for cessation of smoking habit. This review shall discuss the various essential oils used for smoking cessation, their effectiveness and their mode of action.

Aromatherapy: The practice of using essential oils obtained from different parts of plants like petals,leaves, stems, and roots, to treat several physiological, physical and psychological maladies. People who practice aromatherapy are known as Aromatherapists. The toughest part for most people, while trying to quit smoking is to control the withdrawal symptoms and the cravings for tobacco.

Aromatherapy treatments are carried out in the following ways:

- By diffusion in the air
- By direct inhalation from vaporizers
- By directly applying on the skin

The various essential oils used in smoking cessation are,

Black Pepper Oil (Piper nigrum) is believed to effectively help quit smoking because its inhalation stimulates the respiratory system in a way quite similar to cigarette smoke, thereby reducing anxiety and tackling the cravings. Black pepper provides the airway sensation of smoking resulting in short-term satisfaction and also reduce craving for cigarette smoking.[7, 8]

Angelica Oil (angelica archangelica)is known as the "oil of angels", which when inhaled,curbs down the cravings and helps better in stopping the habit than without inhalation of the vapour.[9]

Lavender, Chamomile and b\Bergamot oils when mixed together and appliedtopically, directly on the skin lower the cravings and alleviate the anxiousness associated with smoking.

Citrus Oils (Lemon, Grapefruit, Orange) on inhaling cause positive feelings,which helps in alleviating the irritability and nervousness caused due to nicotine withdrawal. Lime being easily accessible it can be used as an alternative to help in smoking cessation. A randomized controlled trial was conducted by Researchers from Thailand's Srinakharinwirot University to determine the efficacy of fresh lime in smoking cessationas compared to nicotine gum. This study shows that lime can be effectively used as asmoking cessation agent. Lime has an antibacterial activity against several *E. coli* strains and smokers usually have compromised immunity. [10,11,12] However, further studies are recommended to find out the effectiveness of lime in smoking cessation.

Ylang-Ylang oil is preferably used to induce sleep. Adding a few drops of the oil on a tissue or the pillow and placed near the head while sleeping reduces stress and restlessness. It can also be used during the day when the cravings are increased.

St John wort: St John wort is an herb containing pharmacologically active ingredients like phloroglucinols derivatives, naphthodianthrones, and flavonoids. Besides its role as anantidepressant, it is also effective in smoking cessation.[13] St John's wort extract basically works by inhibiting the re-uptake of

norepinephrine and serotonin (5-HT) intopresynaptic axons.[14] Studies also confirmed that it is well tolerated in smokers. However, there are other studies which have not found it to be effective in tobacco cessation.[15]

Calamus: Calamus is well known for its medicinal properties and it has many traditional applications since ancient times. Several essential oils have been isolated and identified in calamus. It plays an effective role as an antibacterial, antidepressant, and antioxidant. According to some studies, calamus also has an effective role in smoking cessation. The exact mechanism of action of calamus in smoking cessation has however not been found due to paucity of clinical trials. Therefore, more clinical trials should be conducted to find the mode of action of calamus in smoking cessation.[16]

Other essential oils for relieving the different withdrawal symptoms include:

Withdrawal effects like, anger, irritability, and anxiety.

Bergamot: lowers anxiety, uplifts mood

Immortelle: controls anger and destructive tendencies

Lavender: calming effect, soothens anxious behaviour

Turmeric: calms down strong stressful emotions

Rose: controls and calms anger, reduces frustration

Ylang Ylang: Lowers anxiety

Withdrawal effects: Difficulty on focussing or clarity

Lavendin – Dispels mental fog

Lemon – brings clarity to the mind, regulates swinging moods

Lemongrass – clears mental fog

Rosemary – enhances mental clarity

Tea Tree – regulates thought process

Withdrawal effects: Tobacco cravings

Angelica – strong and spicy aroma, purifying

Black Pepper – stimulates respiration

Ylang Ylang –reduces daytime cravings due to the strong aroma

Clove – Hot, spicy, purifying, rebuilds inner strength

Clary Sage – improves respiration and circulation, rejuvenates

Withdrawal effects: Hunger pangs

Cinnamon –controls indigestion

Lemon – improves mood and helps digestion

Peppermint – helps in digestion

Ginger – better digestion

All the oils discussed above can be used inpure form or can be blended together and dispensed in the following ways -by diffusing, by inhalation, in aromatic bath, mixed in a massage blend, direct application on skin

Does Aromatherapy actually help?: It cannot unless the tobacco user actually wants to. There are innumerable programs and pharmacotherapeutics that can help, but the main factor for success in quitting is one's willpower. This is where aromatherapy can step in to actually make a difference. The biggest benefit essential oils can offer someone trying to quit, is by relieving some of the withdrawal symptoms like cigarette cravings, irritability, anger, anxiousness, unusual hunger pangs,lack of focus and clarity etc. Essential oils thus help reduce or easecravings and withdrawal symptoms, even though it cannot eliminate them altogether.

Aromatherapeutic oils are a part of complementary therapy, which workhand in hand with the routine standard tobacco quitting therapy like NRTs, e-cigarettes, smoking cessation tablets etc.

- convenience in use and relativelycheap.
- nomajor sideeffects.
- useful adjunct to other smoking cessation treatments.

Essential Oil Vaping: Vaping is the act of inhaling and exhaling the vapor from a vape pen or e-cigarette. Though the popularity of e-cigarettes and vaping has increased over the last few years, there is also a lot of controversy regarding their safety. Hence essential oil vaping provides a lot natural, organic,healthier and refreshing alternative.

Diffuser sticks, also called personal diffusers, are aromatherapy vapepens,which use a combination of essential oils, water, and vegetableglycerine that, when heated, creates a cloud of aromatherapy vapor.Essential

oil vape pens don't contain nicotine, but contain Volatile Organic Compounds (VOC) which when heated over 150 to 180°Fahrenheit can convert to abnormal compounds and damage the lungs, mouth, teeth, and nose on contact with the burning compound.

Essential oil vape pens are very new, and there isn't much researchavailable on vaping essential oils.The side effects of vaping essential oils depend on the oil used, and may include,coughing, bronchospasm, aggravation of asthma, itching and swelling of the throat.The long-term effects of vaping with or without essential oils is however still not clearly understood.

Aromatherapy Vaporiser

Anti-Cig Aromatherapy is an on-the-go atomising diffusing aromatherapy

vaporiser that self-activates when inhaled through the mouth, producingpure, inhalable vapours of wellness.Itcontains the highest grade & specially blended inhalable Moroccan essential oils, enriched with naturally occurring wellness herbs & plantextracts. It can be used in conjunction with other smoking cessation products or by itself.

Discussion

Five centuries,since its discovery, tobaccohas ironically gone from being a medicinal plant used even to prevent cancer to one of the worst health hazards globally causing nearly 6 million deaths each year due to tobacco use. Nicotine dependence has been identified as a disease, and according to the International Classification of Diseases 10th revision,smoking behaviour falls under the category of 'mental andbehavioural disorders due to psychoactive substance use'.[17,18] Smoking being a habitual behaviour, a very strong will power and patience is required for cessation of the habit. Therefore, for better and consistent results to achieve complete cessation, apart from the effectiveness of the intervention used, the satisfaction of the tobacco user is also very crucial. There are several smoking cessationmethod presently used,like cutting down firstbefore quitting, nicotine replacement therapy (NRT),behavioural counselling therapy etc.[18] CAM technics like Aromatherapy using essential oils too,can provide not only an effective method for smoking cessation but can also improve the emotional and mental wellbeing of the participant.[18] Essential oils are easily available, less expensive, have minimal side effects or dependence and quite beneficial to smokers who wish to quit smoking and are unwilling for any pharmacotherapeutic intervention. An appropriate combination of pharmacotherapy like NRT, psychotherapy and CAM techniques can ensure a more reliable and long-term success of quitting tobacco,than NRT or psychotherapy alone. WHO has predicted a rise in tobacco related deaths to 8 million by 2030 if adequate and effective smoking cessation policies are not implemented?[19].

Conclusion

Natural substances like essential oils and aromatherapy can therefore play a more important role in aiding tobacco cessation. However, more studies using aromatherapy alone or along with the conventional cessation techniques are needed in future to make the essentialoils an irreplaceable component in tobacco cessation measures all over the world.

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Field Cancerization: Perception, Clinical Implications and Future Prospective in HNSCC

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Abstract

Head and neck squamous cell carcinoma are usually associated with multiple premalignant lesions. This is derived from the idea of field effect in cancer. The concept of "FIELD CANCERIZATION" was introduced by Slaughter et al in 1953 while studying the presence of histologically altered tissue adjacent to oral squamous cell carcinoma (OSCC) cases. It explains the initiation of several primary tumours and locally recurrent cancer. Advance technology and cautious study design using suitable control is helpful in detection of important molecular biomarkers in genetically transmuted but histologically normal cells. These tumor specific biomarkers should improve clinical implications and effectiveness in early diagnosis and treatment modalities. In this review we discuss the perception, clinical implications and effectiveness of field cancerization in head and neck squamous cell carcinoma.

Keyword: *Field cancerization, Head and neck squamous cell carcinoma.*

Introduction

In the global scenario head and neck squamous cell carcinoma (HNSCC) are found within the top 10 cancers and in developing countries of Southeast Asia HNSCC are the most common cancers.[1] In India, prevalence of HNSCC is one fourth of male cancers and one tenth of female cancer.[2] The 5-year average survival rate has not significantly improved during the last two decades.[3] The term field cancerization was first put forward by Slaughter et al.in 1953 to define the histologically abnormal tissues surrounding the primary cancer.[4] Slaughter et al.studied 783 HNSCC patients to understand the histological alteration outside the margins of the primary tumor, in which 11% of the patients had more than one primary lesion. They believed that cancer does not originate as an isolated cellular phenomenon. Cancer has an anaplastic affinity comprising of many cells at one stage and develops at many satellite lesional centres. This results in repeated carcinogenic attack and develops at various rates in the entire field. The multiple patches of premalignant lesions, describe a higher than expected occurrence of multiple local second primary tumors in the same field and influence the presence of distant tumors.[4] Tobacco, alcohol and environmental carcinogens influence large areas of the mucous membrane leading to damage of a large proportion of epithelial cells. Effect of this causes premalignant states within the entire exposed surface.[4] Use of carcinogenic agent like tobacco and alcohol have an independent risk factor while the combination have a synergistic consequence.[5] Advanced molecular techniques have described the genetic changes developed in mucosa exposed to carcinogens.[6] In this review, we have discussed about the perceptions,the clinical implications and effectiveness of field cancerization.

Oral Field Cancerization: Braakhuiset al gave the genetic explanation of Slaughter's Concept of Field Cancerization[7] and stated that head and neck cancer develops in multiple areas as a pre-cancerous change, these are histologically abnormal cells adjacent to the primary tumor, a single primary tumor may occur due to assimilation of many autonomous lesions, if abnormal tissue persists even after surgery it may lead to a second primary tumor and recurrences.

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Warren and Gates described the criteria for diagnosis of multiple primary carcinomas, which was later revised by Hong et al.[8,9] These criteria are that every cancerous lesion must be structurally separate and multi-centric primary cancer reveals dysplasia in its superseding mucosa. The probability of the second primary carcinoma must be ruled out from metastasis or a local relapse. The second primary lesion might be away from the main tumor by minimum 2 cm of normal mucosa or might arise at least 3 years later to the primary diagnosis.

The concept of field cancerization can be understood in the ways that explain the phenomenon of secondary primary tumors.[10] In classic opinion, oral tissue are mostly affected by long-term exposure to carcinogens. In this preconditioned epithelium, multi-centric carcinomas can developas a result of independent genetic modifications. Monique GCT van Oijen et al proposed clonal theory in which, a single cell is transmuted and gives rise to one pre-malignant area by clonal expansion and regular replacement of normal mucosa.[11] It was described on the basis of two types of migration polyclonality and monoclonality

Polyclonality: The presence of multiple primary tumors (MPTs) could be due to self-regulating molecular events affecting various cells in the complete field that has been exposed to carcinogens (Figure 1).[11]

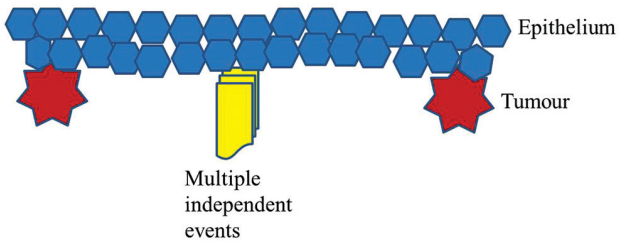


Figure 1. Schematic representation of polyclonality theory.

Monoclonality: Intra epithelial migration of genetically altered cell where the molecular events occurred in a single precursor cell with common expansion across the mucosa. There are two types of migration: these are migration of tumor cells via saliva-micro-metastasis (Figure 2a) and intra-epithelial migration of the progeny of the initially transformed cells (Figure 2b). There are three theories to describe the common clonal origin in MPTs based on similar genetic changes that are malignant cells transfer through submucosa in small islands, cells that are rests in the lumen of an organ at one place can regrow at another place and genetically altered cellsshed in the epithelium from which multiple related cancerous lesions develop which help in lateral clonal spread of cancer and subsequent occurrence of new primaries.

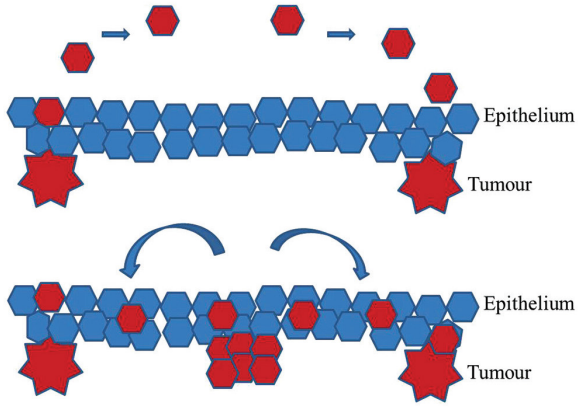


Figure 2a. Migration of tumour cells via saliva-micro-metastasis.

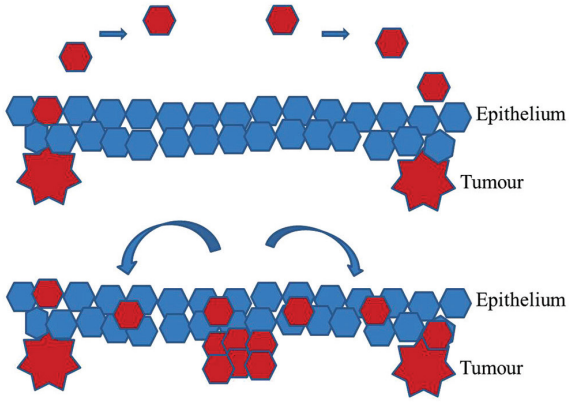


Figure 2b. Intra-epithelial migration.

Figures Courtesy: Ashwini, et al.: Oral field cancerization; Journal of Dr. NTR University of Health Sciences 2015; 141-144

Clinical Implication: The genetically altered cells of field cancerization is a threat for cancer. The huge number of pre-neoplastic cells in the proliferating area is likely to increase the malignancy risk.[12] The possibility of second primary tumor development in a patient who once had HNSCC is nearly 20%. The initial genetic changes may help in clonal expansion of premalignant cells in a specific field cancerization. Histologically, these transformed cells are diagnosed as cancer.[13] Thus, a bunch of newly formed cells with early genetic alteration without histological changes,which remains in the surrounding represents the concept of Field cancerization. However it is important to

identify the molecular biomarker for those genetically transformed but histologically normal cells to counter the transformation of premalignant lesions into invasive cancer.[14] Loss of chromosomal material at 3p and 9qin oral dysplasia is associated with cancer risk.[15–17] Further losses at 17p increases the cancer risk.[18]

Surgically treated HNSCC cases might have been at a high risk for SPT (second primary tumor)that has to be ruled out by examining the risk outline of a genetically transformed field. Additional, information of the geneticallyaltered cells can provide a basis for a rational therapy for pre-cancerous lesions.

Recently many biomarkers are studied for specific cancer field diagnosis. These biomarkers are used to recognise if multiple cancers developed due to immigration of malignant cells from a primary tumor, whenthe cell sex press the similar genetic expressions or when they express different genetic expressions from independent origin.[19] Various biomarker for detection of field cancerization are listed (Table-1).

Table 1. Biomarker for detection of Field cancerisation

Category	Biomarker
Specific genomic markers	Tumor suppressor/oncogenes or cell cycle control genes p5, p16, p21 Cyclin D1 Retinoblastoma gene C-Jun 3p (unidentified) Proto-oncogene alterations Ras (H, K, N ras) ErbB1
Growth factors / receptors	EGF/EGFR VEGF CD34 TGF-α
Vascular markers	VF CD31 αVβ3 α-SMA
Genomic markers	Genetic studies chromosomal anomalies/ aberrations Loss of heterozygosity DNA sequence analysis Gene profiling Mitochondrial genome changes Nuclear aberrations Micronuclei

Future prospective: Though the concept of field cancerization is widely accepted, further research is required to understand the knowledge. In the last decades studies reveal significant relationships between cancer and inflammation, the discovery of epigenetic and new theoretical models of cancer stem cells biology or tumour heterogenecity have disclosed new potential mechanisms and pathways of carcinogenesis.

Mignogna et al., studied 45 OLP (oral lichen planus) caseswithin a thorough follow up programme for diagnosis and effectiveness of the treatment given to the patients at an early intra-epithelial stage and micro-invasive stage, lead to long-term survival and suggested that in the theory of field cancerization, chronic inflammation should be taken into account as carcinogenic-conditioning agent.[20] Therefore, the triggered pro-inflammatory cells and cytokine complex may act as carcinogenesis promoters, and thus influence the clonal spreading. Thus field cancerization process is sustained.

Field cancerization as a new area of research interest should discover many answers including the importance to study the surrounding affected mucosa in relation to primary tumor to overcome the hazard of cancer burden. In due course monoclonal and polyclonal tumors produce different biology. More research is required to study the specific spreading of genetically altered cancer cells in environment adjacent to the macroscopic and microscopic border with respect to the site of tumor, surgical margin, and remaining cells in situ. Carcinogenic habits like smoking, smokeless tobacco and alcohol consumption or cessation has a significant effect in disease progression. The assessment of histopathological staging and molecular grading of the surgical borders are important for the suggestion of added treatment modality. Furthermore, the research for an appropriate molecular biomarker to detectlesioned cells in the tumor micro-environment should be evaluated to rule out field cancerization. More significantly, a protocol to manage the severe consequences are essential to develop and verify by conducting multi-centric longitudinal studies with large scale patient groups affected by both single and multiple HNSCC.

Conclusion

Field cancerization poses a greater challenge, as it influences the morbidity and mortality of HNSCC patient. The genetically altered cells present adjacent to

the primary tumor in a field is encumbrance for cancer treatment. The probability of developing a second primary tumor in a patient who once had HNSCC is around 20%. Early identification and management of field change is a vital determinant for prevention of cancer mortality and morbidity. Understanding the pathophysiological changes occurring in the cells within a cancerous field is the key to successful identification and treatment of the disease.

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Decoding the Link between Chronic Kidney Disease and Periodontitis

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Abstract

An increased rate of morbidity and mortality due to chronic kidney disease is a commonly witnessed issue these days. Hypertension, diabetes and other heart-related issues are some of the many factors that induce and at times, can worsen the cases of chronic kidney disease. Periodontal diseases, usually getting originated by gram negative bacteria and associated with systemic inflammatory response, cause degeneration and loss of attachment of the supporting tooth structure, which gradually makes up low grade to severe inflammation of the periodontium.

Not only during the various phases of the disease,but also during various treatment modalities like hemodialysis, renaltransplant, the supplement of various elements and intake of certain drugs also worsen the status of periodontal diseases. Stress and other psychosomatic disorders associated with chronic kidney disease also play a vital role in neglecting one's regular oral hygiene measures. Uremia, one of the most highlighting features associated with later stages of chronic kidney disease causes a great disruption in the fluid and electrolyte balance. Not merely the bacterial biofilm cause senormous loss to the periodontium; but also, the host inflammatory response adds on to the deprivation and contributes highly to the severe attachment loss of the supporting structures of the tooth. This review aims at understanding the mechanisms which interconnect these two chronic diseases and the role of dentists in managing a patient with chronic kidney disease.

Keywords: *Chronic Kidney Disease; Periodontitis; Psychosomatic Disorders; Interlink; Disease Management.*

Introduction

In our body,the volume and composition of the body fluids alter within narrow physiological limits. The kidneys hold a major responsibility in maintaining this state, by retention of substances that are vital to the body economy, by excretion of waste metabolic products and by various hormonal and metabolic functions.[1] Chronic kidney disease is a progressive and irreversible deterioration in the renal function, characterized by hydroelectrolytic, metabolic and immune disorders which proves to be a global problem affecting about 5-10% of the world population, sparing no geographical, cultural or racial groups.[1,2] Periodontal disease is an infection caused by gram-negative bacteria leading to a chronic inflammatory state, thereby causing the destruction of the alveolar bone and loss of tissue attachment.[3, 4] Studies have revealed that chronic kidney disease imparts a negative impact on the oral health of the patient by affecting the teeth, oral mucosa, periodontium, salivary glands and tongue.[5] On the contrary, periodontitis increases the systemic inflammatory burden leading to worsening of chronic kidney disease which in succession has been found to negatively affect the chronic kidney disease patients on hemodialysis therapy by reorienting their serum albumin and C-reactive protein levels.[6]

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It has been noted from various studies that, patients having chronic kidney disease who are not yet on dialysis or any other treatment modalities respond poorly to the surgical periodontal therapies due to poor immune function. Whereas, chronic kidney disease patients with predialysis, responded well to non-surgical periodontal therapies, exactly in a similar way as that of non-chronic kidney disease patients.[3]

Stages of Chronic Kidney Disease: Chronic kidney disease has five different stages, which are deliberated based on Estimated Glomerular Filtration Rate (eGFR), which is a calculation based on a serum creatinine test. This test measures the level of creatinine in the blood and uses the result in a formula to calculate a number that reflects how well the kidneys are functioning. In the earlier stages of chronic kidney disease, abnormal urine test, diminished blood cell count, feeling of lethargy and tingling sensation are most common. But as the disease progresses, even mental disability is witnessed associated with abnormal thyroid level and disturbances in body's fluid and electrolyte balance which ultimately leads to complete kidney failure. The summarized way of various stages of the disease is as follows:

Table 1. 5 stages of chronic kidney disease[5]

Stage	Description	Possible signs and symptoms	Egfr
Stage 1	Normal kidney function with minor kidney damage acknowledged.	Abnormal urine test associated with hypertension; urinary tract infection is seen.	90 or higher
Stage 2	Kidney function is minimally deteriorated.		89 to 60
Stage 3	3(a) mild to moderate loss of kidney function. 3(b) moderates to severe loss of kidney function.	Diminished blood cell count associated with feeling of numbness and tingling sensation. Also sometimes associated with diminished mental ability.	3(a) 59 to 45 3(b) 44 to 30
Stage 4	Kidney functioning gets extremely deterioted.	Abnormal levels of blood calcium, phosphorus and vitamin D. Anemia associated with bone mineral disease and loss of appetite is also seen.	29 to 15
Stage 5 End stage kidney disease	Renal failure with immediate need for kidney transplant or dialysis is obligatory.	Uremia is one of the characteristic finding. Fatique, nausea, vomiting, severe body ache; swellings of various parts of the body with abnormal thyroid levels are also associated.	Less than 15

Pathophysiology of Periodontal Diseases: In case of periodontium, a majority of the tissue breakdown occurs mainly due to host's inflammatory responses. The subgingival biofilm establishes and augments the inflammatory responses in the gingival and periodontal tissues. These subgingivally hidden pathogens release various noxious substances to their surroundings which gradually causes tissue destruction. Certain periodontal pathogens like *P. gingivalis* and *Aggregatibacteractinomycetemcomitans* keep the abilities of invading the connective tissue even whereas certain bacterial fimbriae like *P. gingivalis* play their role by initiating immune responses, such as IL-6 secretion, ultimately leading to long-term inflammation of the periodontal tissues. The various inflammatory mediators that mobilize and carry on the host responses are divided into cytokines, prostanoids and the matrix metalloproteinases.[6]

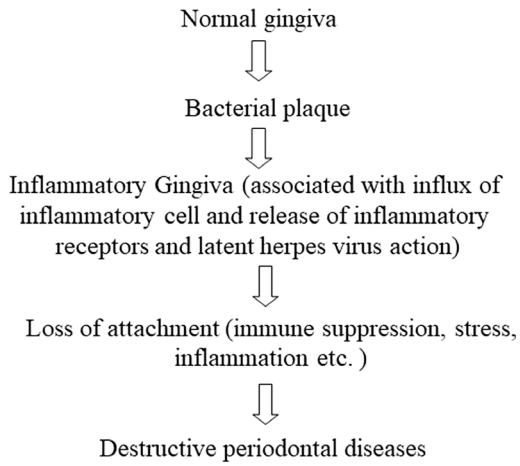


Figure 1. Pathophysiology of periodontal diseases

Periodontal Changes in Chronic Kidney Disease Patients: No specific oral signs and symptoms are observed in CKD patients however secondary oral manifestations are quite prevalent to the disease. Poor health condition resulting from chronic kidney disease may aggravate more infection and maintenance of

systemic inflammation.[2] Varying oral manifestations related to chronic kidney disease include fast formation of dentalcalculus, dysgeusia, xerostomia, hyposalivation and pH salivary alteration.[2] Based on various controversies, these alterations that occur during chronic kidney disease evolution may be related to immunosupression, fluid consumption restriction, various drug interaction measures, renal osteodystrophy and bone loss.[2] The concomitant symptoms and systemic diseases associated with chronic kidney disease causes some crucial changes in the periodontum resulting in exacerbation in gingival crevicular fluid (GCF) leading to degeneration of the gingival tissue and prolonged inflammatory response. Moving forward,it is an utmost important point to note that uremia is a condition that emanates in the later stages of chronic kidney disease. Uremia is an apparent clinical syndrome which is characterized by an elevated urea concentration in the blood associated with hormone, fluid and electrolyte imbalances and various metabolic abnormalities.[2]

Besides that,uremia also induces lymphocyte reaction suppression,granulocyte dysfunction and cell-mediated immunity suppression. Higher concentration of urea in saliva is related to Dysgeusia. Qualitative and quantitative changes in the saliva are also witnessed.

Very fast built-up of dental calculus is the most common finding in chronic kidney disease patients due to various interruptions in the renal mineral proportion. Calculus built-up mostly results due to the precipitation of various minerals present in the saliva and gingival crevicular fluid (GCF).Both organic (cellular and extracellular matrix) and inorganic (minerals) make up the constitution of calculus. Decreased magnesium level and increase in the level of urea and phosphorus can lead to calcium-phosphorus precipitation and calcium oxalate which keep their pace in calculus formation.

Dry mouth sensation is another common finding reported among chronic kidney disease patients mostly accompanied with bicarbonate decrease and calcium increase in saliva.[2] Another striking concern in chronic kidney disease patients is the alteration of the pH value in their saliva. This increase in pH value of the saliva is due to presence of urea in it. This urea containing saliva swiftly gets dispersed into the dental plaque, gets metabolized there by bacterial urease enzymes released from the bacteria adherent to the dental plaque and ultimately release ammonia and carbonic gas apparently causing an elevation in the pH value of the saliva. This ammonia which happens to be the end product of the entire process finally proves to be cytotoxic to the periodontal tissues, causing tissue breakdown and attachment loss which again causes apical shift of the gingival margin leading to gingival recession[4.]

The salivary fluid happens to be a major diagnostic medium in measuring several biological alterations in the human body.[3] Various biochemical markers and enzymes in the saliva keep pace for all these findings. Various studies reveal that due to disturbances in bone mineral content in chronic kidney disease, the serum alkaline phosphatase level gets aggravated in CKD patients. Serumalkaline phosphatase is one of the phenomenal salivary biomarker for chronic periodontitis. This serum alkaline phosphatase is a membrane-bound glycoprotein manufactured by cells like polymorphonuclear leucocytes, osteoblasts, macrophages and fibroblasts. This production process in the oral cavity occurs within the periodontium and gets diffused into the saliva which is highly indicative of inflammation of degeneration of the tissues of the periodontium. The measure of alkaline phosphatase directly corresponds to the intensity of the periodontal tissue destruction.

Othernotsomajorsymptomslikexerostomia,halitosis etc are also reported by many chronic kidney disease patients.[2] End stage renal failure is the terminal stage of chronic kidney disease,which usually results in a general state of dysfunction creating massive ill oral hygiene practices that results in alveolar bone destruction due to renal osteodystrophy. Patients in end stage renal disease do not usually respond to invasive periodontal procedures due to impaired immunity and diminished wound healing.

Periodontal Changes Seen During the Treatment Procedures of Chronic Kidney Disease: To elongate the longevity of the affected kidneys, various renal replacement procedures can be moderated. Hemodialysis is a trademark artificial method of removing nitrogenous wastes and other lethal products of metabolism from the blood. Another standby management is the Renal transplant Method. Regular oral hygiene is neglected by the patients undergoing hemodialysis which in turn create an adverse environment for the biological flora of the oral cavity leading to progression of the bacterial dental plaque which ultimately gets precipitated and calcified when left untreated to form hard dental calculus. This also occurs due to ingestion of high amount of calcium-based phosphate chelator and decreased

salivary clerancer in chronic kidney disease patients undergoing hemodialysis. Emotional disturbances like stress and anxiety during the prolong therapy session of hemodialysis, is considered another important factor for the prevailing poor oral habits.[2]

Various medications allocated to renal transplant patients like immunosuppressant drugs (cyclosporine and tacrolimus) and other hypertensive drugs that are responsible in causing extensive gingival enlargement which is considered another obstacle to the periodontium. Various supplements endowed on patients like erythropoietin and cholecalciferol cause high grade periodontal destruction.

Conclusion

Immediate diagnosis of the periodontal disease followed by appropriate periodontal therapy is enforced to diminished the risk factors associated to the periodontium in chronic kidney disease patients. When a patient suffering from chronic kidney disease walks into a dental clinic, it is an utmost important role of the dentist to take into consideration the various underlying periodontal diseases that get aggravated because of chronic kidney disease. The CKD patients should also be informed about the possible complications and consequences of the poor oral health status. They should be thoroughly educated that, in addition to their whole bodily health, it's also their oral health they should take care of Maintaining proper oral hygiene initiates the oral cavity to keep itself free from various noxious substances both directly and indirectly which ultimately throws a positive outcome for the treatment procedures undertaken in chronic kidney disease patients.

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Microbial Analysis in Dry Socket

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Abstract

Dry socket is known as the most common and painful complication in the healing of extraction wounds. It is a focal osteomyelitis. And in this the blood clot has been disintegrated or lost in the socket. It produces foul odour, throbbing type of pain and subsequent infection of the exposed bone. There is no suppuration. The reported occurrence of dry socket's frequency is 1% to 3.2% of all extraction. It was first described by CRAWFORD in 1876. It is one of the common complicationsin Paget's disease& those who are undergoing radiotherapy and patients who are taking oral contraceptives as the estrogen component increases fibrinolytic activity. It is commonly observed in 40-45 yr patient. Mandible is affected more commonly than maxilla. Dry socket starts by the 2nd& 3rd post operative day till 7-10 day and is having throbbing type pain. Dry socket is a result of physiological,mechanical, chemical and factors. Mainly it is caused by certain bacteria. Certain previously present bacteria in the oral cavity can cause the break down of the blood clot in the dry socket.

Keyword: *Microflora; Dry socket, Streptococcusmutans, Fusiform.*

Introduction

The main symptom of dry socket is having throbbing type of pain and patient mainly complains of bad breath and foul taste in the mouth. Because of having pain, we get to know that proper healing of the socket is not done. In this condition inflammation of alveolar bone has been seen after the extraction of tooth. Basically, it is known as "focal osteomyelitis" and in this the clot has been lost or disintegrated with foul odour and throbbing type of severe pain. Most importantly there is no pus formation. Here the blood clot is lost. That is giving a dry appearance. Becauseofthe fact that the bone is exposed. In women or tobacco users this is most common and most importantly associated with the extraction that has been undergoing lots of trauma and difficulty. Sometimes it is also a sequence of normal exodontia, that is a result of disintegration of a dislodgement of the blood clot. And the subsequent infection of the bone that is exposed. In the first few days after extraction, this complication arises but it has been known occurring Ben a week or longer after tooth extraction. It has been also reported that the teeth removed in toto has a less chance of having dry socket than a toothwhich got fracture during extraction. [1-4]

Occurrence of Microorganisms in dry socket and mechanism of infection: There is no significant relationship between the presence of dry socket and the general health of an individual. But it is the most common complication in Paget's disease and in radiography undergoing patient. And there is loss of oxygen supply to the bone caused byendarteritis. Patients who are taking oral contraceptives, dry socket is common in them because the estrogen component of oral contraceptives induces the fibrinolytic activity.[5] On the occurrence of proteolytic enzymes, whichare produced by the bacteria, the clot has been destructed. And this fibrinolytic activity in current scenario has thought to be the cause of loss of the clot prematurely and sharp throbbing type of pain. Lysis of clot occurs by two mechanisms-(1) plasminogen dependent pathway (2) plasminogen independent pathway. Plasminogen is synthesized in liver and released in to the circulation. It transfers in to plasmin, which acts upon the fibrinogen and fibrin and that causes dissolution of the clot. And here come the anaerobic microorganisms that those are playing the most important role in the occurrence of the condition.[6-9] Some previously present infection that is there in the mouth before tooth extraction for example some periodontal disease can also destroy the blood clot. Some bacteria that is present in the oral cavity can prevent clot formation also. Not only bacteria but some chemical, mechanical and physiological factors are also responsible for clot dissolution. Nicotine used by smokers can cause

less presence of blood in the oral cavity. So, from this, the clot can not be formed at the site of recent minor surgery.[10] Dense jaw bones, hormones or lessvascular supplyare some causes that isagainst the formation of clot. Dragging on a cigarette, aggressive rinsing, sucking through a straw can also cause dislodgement of clot. BIRN's articlegave a good Interpretation about this mechanism. Heinterprets that, cause for the dry socket is increase the quantityof fibrinolysis that is making a path for dissolution of bloodclot. This process of fibrinolysis results in outcome of making plasminogen cycle, which is achieved via physiologic or non-physiologic activator. Indirect or non-physiologic activators are elaborated by bacteria whereas direct or physiologic activators are coming after traumatized alveolarbone. It hasbeen seen that active plasmin gotinactive in the physiologiccirculation. It is caused due to the presence of antiplasmin in the physiologic circulations. Birn again analyzethe dissimilarity in the fibrinolytic pathway with uterine tissues & bone from the skeletal muscle, spleen, lung, liver, thyroid tissue.[11-14] In 1960s and after 1970s oral contraceptives became famous by showing more onset of alveolarosteitis in females who are taking oral contraceptives. Sweet and butler interpret,increase taking of contraceptives related to the dry socket. Catellaniet al again given a conclusionas increasing expectation of dry socket is more with higher estrogen level in the antipregnancy drugs. Some scientist told if we want to decrease the occurrence of dry socket endocrinal cycle must be maintained when appointing the patient for extraction. Mac Gregonsuggested that in women dry socket is seen 50% more than men, while Colby reported there is no difference seen in the onset of dry socket according to gender. Many studies support that bacterial infections are main and important cause for the incidence of dry socket. It is shown that the occurrence or frequencies of alveolar osteitis increases in patients having poor oral hygiene. Local infection that is present before such as periodontitis, pericoronitis are some of them. Many attempts have been made to detect the exact causative organisms. Rozantis et al, studied a possible mutual association of Streptococcus mutant and Activities viscous in dry socket. They were studying this on animal models. This study shows late healing of exodontiaplace after immunization of these bacteria in the models. Nitzanand others studied more plasmin like fibrinolytic actions of Treponema denticola. Another scientist Catenalli observed bacterial pyrogens and shown that these pyrogens are indirectly activating the fibrinolysis process. Wald in 1932 discovered that the bacteria are the reason of dry socket. Here antiseptic and aseptic conditions have been considered upon the assumption.[14-17]

Microbial Analysis: The nature of bacteria has been shown by few observations. Belding and Belding (1934), Schroff and Bartel(1929) developed Fuso-spirochaetalorganisms. Archer in 1961 assumed,*Streptococci* was the main organism. Grandstaff in 1935 experimentingon both normal and diseased healing socket and got *Fusiforms, bacilli, spirochaetal* and *streptothrix*. But these microorganisms didn't have such a distribution as to indicate any abnormal effect upon healing of the socket. From another study of microbial analysis in dry socket we got to know that a specific microbial pattern, which included *Peptostreptococcus, Parvimonas*, *Fusobacterium, Prevotella, Oribacterium, Slackia* and *Solobacterium* species abundantly appeared in the patients having dry socket. Here also *Peptostreptococcus, Parvimonas, Prevotella, and Fusobacterium* had much more important roles in distinguishing dry socket patient and other normally treated patient. From another study data was collected that among 10199 intra-alveolar extractions in 6182 number of patients, 4047 patients had only single tooth extraction and in 2135 patient s more than one tooth was extracted. From these patients the dry socket occurrence in multiple extraction is 2.1% and in single tooth extraction is 5%.Similarly,the dry socket occurrence is showing that it is increased from 2.7% at 15 to 19 yr to maximum value of 8.6% at 30 to 34 yr. Therefore, they concluded that occurrence of dry socket seems to be age dependent with a value in the age range 30-34 yr. [18,19]

Antibiotic treatment: Certain sulphonamides and antibiotics are used for prevention and cure. Davis and his colleagues found that by using sulphanilamide and sulphathiazole, frequency of complicated healing reduced by 38%. Olech also studied the effect of penicillin insertion in to the socket but ended at same conclusion that it was not significantly decrease the post operative complication. MYOSPHERULOSIS, known as a diseased condition of an exodontia. In this an antibiotic ointment with petrolatum base is placed. It concludes in making of hollow space in the healing site and the presence of altered erythrocytes which assumes the appearance of clusters of spherules. The ideal treatment of choice of dry socket is to irrigate with lesshotantiseptic. That should be covered with obtundent. The generally placed socket dressing is

zinc oxide-eugenol and iodoform gauze. Then dressing should be change everyday.[20]

Conclusion

Dry socket is a result of physiological, mechanical, chemical and factors. Mainly it is caused by certain bacteria. Certain previously present bacteria in the oral cavity can cause the breakdown of the blood clot in the dry socket. antibiotics are the major drugs used for prevention and cure.

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Arthroscopy of TMJ

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Abstract

Temporo-mandibular joint disorder is painful, reduced mouth opening production of sound from it. Although the open surgery of this treatment is good but for healing it takes long time and presence of scar is uncomfortable for patient. In some cases of TMJ disorder we can use arthroscopy technique for treatment. Therefore, the surgery can be done within few times. This technique is useful for surgeon to do their surgery under direct vision. As a result, the complication rate decreased accordingly. For this technique the proper instrumentation and knowledge of the anatomy is more important by which we can also use tracing paper for measurement of condylar position. With few numbers of surgeons this technique can be treated. The article reviews the manner in which the technique of treatment of temporo-mandibular joint surgery in endoscopic approaches and we can evaluate the long-term effects of this technique.

Keyword: *Temporo-mandibular joint, arthroscopy, temporo-mandibular joint disorders.*

Introduction

In an open surgery of temporomandibular joint (TMJ) disorders shows many complication and poor prognosis. The arthroscopic treatment is simple, minimally invasive, inexpensive, and highly effective. It takes less time to reduce pain then open surgery. It is relatively low complication rate and leaves fewer scars on face. Indication of endoscopic approaches is restricted to the patients which recommends for surgery like; tumors, ankylosis, and congenital growth disturbances of TMJ may require for open surgical treatment. Arthroscopy is a procedure which helps in direct vision through the interarticular joint structures, during the biopsy and other surgical procedures the arthroscopy helps in visualization also. Arthroscopy was 1st described by TAKAGI in 1939. Ohnishi in 1975 published 1st report on TMJ Arthroscopy. He used no. 24 watanabe 1.7mm telescope 5. This technique indicated in internal derangements, osteoarthritis, pseudotumors, to perform biopsy etc. In 1982, Murakami and Hoshino urbanized the nomenclature of TMJ arthroscopic anatomy 5. Arthroscopic lysis and Lavage (ALL) were good technique for the treatment of TMJ ID. In 1991, Nitzan and Colleagues proposed a customized method, which was based on the inclusion of 2 needles in the superior joint space for lavage devoid of direct visualization of the joint5.

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Anatomy of TMJ for arthroscopy: TMJ is otherwise known as synovial joint and present in; i) superior spaces(the temporal bone) & the inferior spaces (the mandibular condyle). The superior joint space (SJS) is cranially restricted by an articular surface joint which covers the articular prominence& the mandibular fossa[2] inside the SJS, 7 areas can be marked; 1. Medial synovial drape, 2. Retrodiscal synovium : Zone 1 : oblique protuberance, Zone 2: retrodiscal synovial tissue attached to posterior glenoid process, Zone 3: lateral recess of retrodiscal synovial tissue shadow, 3. pterygoid shadow 4. Articular disk, 5. Intermediate zone, 6. Posterior slope of articular eminence & glenoid fossa,7. Anterior recess (Disk synovial crease, Midportion, Medial-anterior corner, Lateral-anterior corner)[3].

There are seven areas to be observed are;"1) The medial synovial drape is the first area, which looks like gray-white has a translucent lining and a tense form with distinct higher to lower striae. 2) The pterygoid shadow

is the second area, which looks purple. It is positioned anterior to the medial synovial drape. 3) The retrodiscal synovium is the third area, where the synovium membrane covers the lateral inclusion of the disk and is reflected superiorly to the temporal fossa. The posterior insertion covered by synovial lining appears as a crest or crease is found during the mouth is open and this is known as oblique protuberance. 4)The upper joint is the lateralgradient of the articular prominence is the fourth area to. The fibrocartilage is white in color and reflection is high and the back slope of the eminence is thick[5]. 5) The articular disk is milky white, highly reflective, and without striae which is the 5th area. The disk glides fluently present beside the articular prominence therefore roofing is known as the cover on condyle is articular disk. The roofing can be marked by arthroscopoic technique with the help of posterior band of articular disk and its position according to articular prominence. 6) The sixth area is the intermediate zone and in normal condition, the intermediate zone has a white form. 7) The frontal recess starts with the condyleseated & at thatpart, the anterior disk synovial fold, which has 4th classic anatomic landmark, is known as 7th area. The proper place for placing of second cannula at the anterolateral site, this is the junction of: i) tangential synovial capsule & ii) the frontal disk synovial crease".

The requirements for diagnostic arthroscopy: Skin marker, for drawing straight line the ruler is needed, the scalpel, two instruments are used to create the working space or access point the at are; i) Arthroscopic sheath, ii) trocar with sharp obturator and Prepared irrigation liquid.

TMJ Puncture technique for diagnostic arthroscopy: After palpation and inspection of TMJ region & the position of the condylar head has been determined by passive movement of the TMJ, the trocar sites are marked by Blaustain & Heffez (1990) & Reich (1995):Locate & mark the center of tragus. Locate & mark the lateral canthus of eye. Draw a straight line between the centre of the tragus & the lateral canthus. Measure & mark a point on the line i.e. 10mm from the centre of the tragus & mark a point (A) locate 2mm below it. The trocar with obturator will be inserted at that point & the obturator will be removed for insertion of the arthroscope. Measures & mark a point on the original line i.e. 20mm from the centre of tragus. Drop a perpendicular at that point, measure 10mm down from the site where the trocar with sharp obturator will be introduced. Palpate the TMJ region before inserting the trocars, & moved the joint to confirm that the points have been marked correctly, since some distortions may occur due to shifting of the skin.

Inspect & palpate TMJ, determine position of condylar head by passive movements of TMJ.

Arthroscopy of Temporomandibular Joint:

Single puncture technique; this technique is appropriate for both diagnostic and operative needs. Usually for arthroscopic procedure general anaesthia is used for sedation of patient. To reduce contamination and swelling,the antibiotics and corticosteroids are given before treatment starts. The patient position should be in supine and for nutrition use the nasogastric tube, for artificial respiration use endotracheal tube. After the isolation of the surgical field than the anatomical landmarks are identified to avoid possible complications. Then firstly the cannula puncture point is done at tragocanthal line (i.e. the point 10mm anterior and 2mm inferior along the tragal canthus line). Before puncturing, 2ml of local anesthesia is administered into the superior joint capsule by using a 22-gauge needle for increase the size of the structures. For backpressure can be felt, use a 3ml syringe when the needle entered into the interarticular space. Administration of epinephrine into interarticular space may affect the visual accuracy. The rate of inflammation can be marked by the pattern and character of synovial vessel so any administration of local anesthesia as vasoconstrictor should be after the allergy test. Use inferiolateral technique for insertion of cannula into the superior joint space; use a sharp trocar for puncture to a 25mm depth. Withdraw the trocar after insertion of cannula then insert a blunt obturator for incision of soft tissue from the TMJ. Put the Arthroscope into the middle connector is inserted through the middle connection of the three- way female Luer lock[7].

Double puncture technique: After the diagnostic examination is completed, arthroscopic results are interrelated with clinical and imagine studies,then the necessity of double puncture technique can be determined. After determination of double puncture technique and the type of cannula is required for this technique. Then insert the second cannula at the site of surgery. Through a second cannula operative maneuvers are performed with the operative site frequently in vision. The position of the second entrance is decided by the operational site, using a scheme of vectors[1]. The anterior incline of the articular distinction and the anterior disk-synovial joint

and medical synovial joint can be seenby stirring the arthroscope to the most onward and tangentialsegment of the joint. The extent of the deepness of arthroscope is measured. From the fossa puncture a point is marked on the skin represents a distance in millimeters equal to the screening cannula deepness. Secondly cannula is insertedat right angles to this site. At this puncture site a ridge of bone can be felt at the anterior incline of the articular eminence. The bone should be touch with a trocar slant but periosteal dissection is discouraged because of articular friction and potential injuring 7th cranial nerve. Then the next cannula is conceded into the joint beneaththrough arthroscopic illustration. At this point it is not essential to modify the obturator, since triangulation will let the cannula system to be seen as it enters the anterior joint space, thus sinking offriction.

Triple puncture technique: sometimes a triple puncture is needed after double puncture because[8]; a) if the two cannulas are not in proper angulations than it is difficult to recognize the anatomy of joint, b) for different angulation of instrumentation more place is required, c) the second working instrument- helps to separate the tissue within TMJ easily and to avoid wasting materials. For the third puncture the two portals are required; a) the transmetal area and b) crest of the articular eminence. For the insertion of articular eminence, the position is "20mm anterior to the mid portion of the tragus-canthus line and 10mm inferior to tragus-canthus line".The crest of the articular eminence is a round protuberance and holds it with the index finer or the thumb,downward from tangential to medial on palpation of the lower surface. Cannula position method are formerly used to increase access to this area. However, this location impinges on the teemingtransitional zone, where there is extensivefirm tissue and tiny open space to tricklackingfriction or disc deflateconsequently this deflate is not used normally[8]. The different site for a third deflates is transmeatal portal; it allows admittance of either the higher or lowers joint space.

Complications: Hematosis, Broken instruments, iatrogenic articular injuries,Bleeding may be found within the superior TMJ space, Paresia of facial nerve may present(i.e. neurologic injuries to 5th cranial nerve &7th cranial nerve),revision of illustrationprecision of the ipsilateral eye may present immediately after the surgery, Otologic complicationl, damage of tympanic membrane, with slit of external auditory canal,temporary hearing loss,plugged of ear,Vertigo.

Results

According to gonazalez garcia R," Complicationss were observed[3] in whole series 1.34% complications rate was found, but blood clots were not found within external auditory canal. Other complications were: paresia of the facial nerve was found in 4 patients(0.6%), ipsilateral eye was found immediately after surgery in a patient". According to Tsuyama M; "Complications were observed in 31(10.3%) of 301 cases of arthroscopic lysis and lavage,26 cases(8.6%)of Otologic complications, 9 cases of blood clots in the external auditory canal, 5 cases of partial hearing loss, 2 cases of ear fullness were found, one case of perforation of tympanic membrane with laceration of external auditory canal, 7 cases of laceration of external auditory canal, one case of vertigo, 5 cases (1.7%) of the Neurologic injuries were i.e. 3 cases of 5th cranial nerve injuries and 2 cases of 7th cranial nerve injuries were found".

Indications of arthroscopy: Patients with pain and jaw dysfunction not responsive to non-surgical dental and medical management,Frequent mandibular dislocation, Disc displacements, Resistant preauricular atypical facial pain, Osteoarthritis, Post-traumatic complaints,Pseudo tumors,Chronic form of arthritis,Degenerative arthritis,To perform biopsy.

Contraindication: Bony and advanced fibrous ankylosis, ankylosing osteoarthritis, Need a open surgery,Overlying skin infection puncturing through an infected skin can cause aseptic joint postoperatively,Malignant tumors,Advanced resorption of glenoid fossa, Increased risk for hemorrhage may cause hemarthrosis.

Advantages: There will no remarkable scar on face; injury percentages of 7th cranial nerve will be reduced; results of diagnosis are good.

Disadvantages: Chances of bending of instrument, price of apparatus

Conclusion

During arthroscopic procedure and by paying attention to essential points of the arthroscopic technique at the time of instrumentation, the complication rate will decrease consequently and it is necessary to have a brief idea about TMJ[2]. The liberation of fibrillations and adherences improves the joint mobility and reduces pain. Arthroscopic surgery is less invasive, needs less time and associated with lower mobility.

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Focal Cemento-Osseous Dysplasia: An Unusual Case Report

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Abstract

Focal cemento-osseous dysplasia (FCOD) is a fibro-osseous lesion that is a nonneoplastic reactive lesion. Fibro-osseous lesions are disturbances in bone metabolism in which normal bone is replaced by a connective tissue matrix that then gradually develops into cemento-osseous tissue. Typically, the lesion is asymptomatic and is detected on routine radiographic examination. Radiologically, this lesion has three stages of maturation: pure radiolucent, radiopaque/mixed radiolucent, and radiopaque appearance. During these stages the lesion can be misdiagnosed. In this case report a 57-year- old patient complaint of painless swelling of the right mandibular front tooth region which is presented along with a review of the differential diagnosis considered in order to reach a final diagnosis of focal cemento-osseous dysplasia.

Keywords: *Cemento-osseous dysplasia, fi bro-osseous lesion, focal cemento-osseous dysplasia, periapical cemento-osseous dysplasia.*

Introduction

Focal cemento-osseous dysplasias (FCOD) are benign fibro-osseous lesions of the jaw. The term focal cemento-osseous dysplasia was coined by Summerlin and Tomich.[1] Formerly Waldron reported the case and named it as localized fibro-osseous cemental lesion observing its localized nature.[2] The etiology is unknown but is thought to be reactive in nature secondary to injury like former tooth extractions. Mostly FCOD is asymptomatic and is discovered only on radiographic examination.[3] When FCOD is present in close approximation or attached to the tooth root, the diagnosis can be bewildering with periapical pathology or other lesions thus necessitating a histological examination. In this article, the case of a 57-year-old patient with FCOD is presented with a review of the literature.

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Case Report: A 57 Year male presented to the department of oral surgery with painless swelling in the right lower anterior teeth region since 5 years. There was no other relevant medical history. On Extra oral examination findings there is presence of bony hard swelling in in relation to mandibular angle on the right side. Intraoral examination revealed a bony hard swelling in the edentulous alveolus in relation to mandibular canine region (Figure 1).A single well circumscribed ovoid swelling in the alveolar ridge of mandibular right canine region, measuring about 1×1.5 cm in size. Generalized attrition, chronic localized periodontitis and root stump of 31, 32, 36, 41, 42 were present. Intra-oral periapical radiograph shows a mixed radiopaque and radiolucent lesion seen mesial to 45 measuring about 1x1.5 cm in diameter (Figure 2). On the basis of the patient's clinical and radiographic findings ossifying fibroma, osteoma, cementoblastoma, osteoblastoma, odontoma were considered. Surgical intervention and contouring of the swelling were performed under local anaesthesia. The lesion was totally excised & was sent for histopathological examination. The microscopic examinations revealed bony trabeculae and cementum like calcifications in a fibrocollagenous stroma (Figure 3).



Figure 1-A single well circumscribed ovoid growth present in the alveolar ridge with respect to 43 region, measuring about 1x1.5 cm with surface ulceration, bony hard in consistency, non tender on palpation. missing teeth 31, 32, 36, 41, 42.

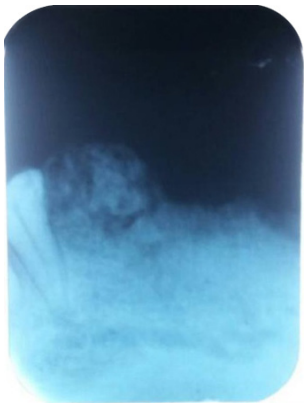


Figure 2 - Intra-oral periapical radiograph shows a mixed radiopaque and radiolucent lesion seen mesial to 45 measuring about 1x1.5 cm in diameter

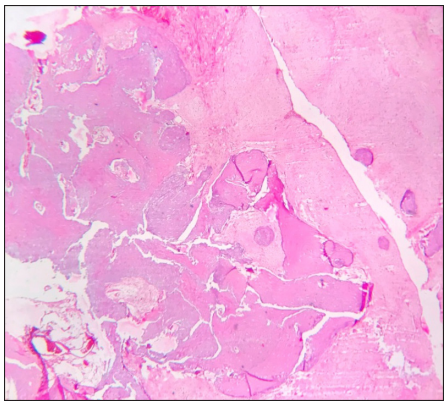


Figure 3 - Photomicrograph of hematoxylin eosin stained tissue showing foci of cementum and bone like calcification (4x)

Discussion

Recent classification of bone-related lesions, released in 2005 by the WHO preferred the use of 'osseous dysplasia' rather than the 'Cemento Osseous Dysplasia'[4]. This classification includes focal cementoosseous dysplasia under benign fibroosseous lesions[4]. FCOD is considered to be a reactive or dysplastic process with unknown pathogenesis[5]. The association of FCOD with teeth does not mandate the odontogenic nature of the lesion but suggests the possibility of influence of odontogenesis on its development[4]. Above the mandibular canal is the usual location of FCOD confining the lesion in the alveolar process. FCOD is usually unifocal and can occur in any tooth-bearing area. Generallyit occurs in the posterior mandible (86%)[6] and shows a greater frequency in women than in men (~10:1)[7,8] with a mean age in the mid-30s and a slightly higher incidence (64%) among African Americans[5]. Usually FCOD is free of symptoms (62%)[9] and is diagnosed incidentally during routine radiography. Radiolucency followed by mixed radiolucency and radiopacity followed by only radiopacity are three stages of development of FCOD observed radiologically. The third stage shows an ill-defined border with thick curvilinear bony trabeculae described as gingerroot pattern[8,9]. Our case was showing a mixed radiolucency and radiopacity. This case is consistent with the usual histopathological features consisting of bony trabeculae and cementum like calcifications in a vascular stroma. Waldron and colleagues[10] reported that most of their symptomatic cases occurred in edentulous areas, consistent with the finding of Ohkura[11] that FCOD was discovered more frequently in these areas. In our case, FCOD was also seen in an edentulous area.

FCOD has been reportedly associated with Adenomatoid Odontogenic[14], Aneurysmal bone cyst[15], benign cementoblastoma[16] and residual cyst[17]. It is very important to understand the rare occurrence of FCOD which makes exclusion from periapical granuloma, periapical cemental dysplasia, simple bone cyst etc.

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Plaque Disclosing Agent

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Abstract

Dental caries and periodontal diseases,also known as plaque mediated diseases leads to poor oral hygiene. Plaque is a highly specific variable structural entity formed by the colonization of microorganisms on the tooth surface. So plaque is not easily visible through naked eye which is difficult to remove, therefore disclosing agent is used for removing dental plaque and maintaining oral hygiene. Preparations containing dyes or other disclosing agents for identification of bacterial plaque help in maintaining good oral health.

Keywords: *Dental Caries, Plaque Disclosing Agent; Oral Health.*

Introduction

It is important for maintaining oral health for removal of dental plaque, as deposits of dental plaque brings about the inflammatory changes which leads to the destruction of tissues and also cause dental caries in long term[1]. It is usually transparent and resilient and cannot be seen through naked eye. It helps in evaluating the knownledge, attitude and practice among dental students regarding disclosing agents. Plaque is clinically defined as a structured, resilient, yellow grayish substance that adheres tenaciously to the intra oral hard surfaces, including removable and fixed restoration.

Plaque control is defined as removal of microbial plaque and prevention of its accumulation on the teeth and adjacent gingival tissues. It also deals with the anticipation of calculus formation. It includes usage of mechanical procedures as well as chemical agents which retards plaque formation. The mechanical plaque control seems to be the most dependable form of plaque control method and chemical plaque control have been used only as an adjunct to mechanical means and not as a substitute. Plaque disclosing solution is a liquid, lozenge or tablet like substance from which contains a dye or other disclosing agent, which is used for the identification of bacterial plaque.[2]

Why to Use the Plaque Disclosing Agent?

1. To aid in plaque identification.
2. It has capable to penetrate the hard plaque deposits and wipe them easily to keep the tooth clean and healthy.
3. It serves as preventive and disclosing agents to tooth infectious materials.

Types of Disclosing Agents-[2]: There are different types of disclosing agents which are available in day to day life. They aid in removing the unwanted stains on our teeth and gums. They are as follows:-

A. Iodine preparations

- Skinners iodine solution
- Diluted tincture of iodine

B. Mercurochrome preparations

- Mercurochrome solution 5%
- Mercurochrome disclosing solution

C. Bismarck brown

D. Merbromin

E. Erythrosine

FD&C (Federal Food Drug and Cosmetic Act).red no3/no 28

F. Fast green

FD&C green no.3

G. Flourescien

FD&C yellow no.8 (Used with Special Ultraviolet Source to Make the Agent Clearly Visible).

H. Two tone solutions

FD&C blue no.1 (thicker)

FD&C red no.3 (thinner)

I. Basic fuschin.

Composition:

1. FD&C green no.5
2. FD&C blue no. and D&C yellow no.5
3. FD&C red NO.3 & Hercules green shade 3
4. Fd&C red no.3(erythrosine) & FD&C blue no.1
5. FD&C blue no.2
6. FD&C red no.40
7. D&C yellow no.8(flourescein)
8. FD&C red no.22(eocine)
9. FD&C red no.3 & FD&C green no.3

Ideal Aspects [2]:

1. Duration of intensity-This colour should not rinse off with ordinary rinsing method or it can be removable by the saliva for the period of time to complete the examination and instructions procedures.
2. Irritation to the mucous membrane-The agent should not cause irritation of the oral mucosa.
3. Diffusibility-The solution should be thin enough so that it can be easily applied readily to the exposed surfaces of the teeth and yet it is thick enough to impart an intensive colour to bacterial plaque.
4. Astringent and antiseptic properties-It is quite frequently recommended that an antiseptic be applied prior to scaling. If an antiseptic disclosing agent is used, one solution serves as a dual purposes.
5. Intensity of color-A distinct staining of deposits should be evident. The colour should contrast with normal colors of the oral cavity.
6. Taste-The patients should not be made uncomfortable by an unpleasant on highly flavoured substance. The use of the agent should be pleasant and encourage cooperation.
8. Good flavour
9. Water soluble and biocompatible.
10. Non allergic to oral mucosa.

Method of Application: Disclosing solutions can be applied by the following method:

1. Direct application for solutions-The patient is asked to rinse his mouth properly to remove all the food debris and heavy saliva. Then the water based lubricant is applied cautiously so that the lips don't get stained. After that the teeth are made air dried properly. Now the agent is carried to the teeth with the help of cotton swab or small cotton pellet or it may be rinsed after the proper dilution. The solution is applied to all the crowns of the teeth. Then the patient is instruct to spread the agent over all the surfaces of his tooth with his tongue. Finally, the distribution of the solution over the tooth surfaces is examined properly and the patient is advised to rinse his mouth properly.[1]
2. Rinsing agents-A few drops of concentrated preparation are placed in a paper cup and water is added for the appropriate dilution. Instruct the patient to swish and rinse with the solution so that it is applied on all tooth surfaces.[1]
3. Tablets and wafers-The tablets or wafers may be chewed or swished around the mouth for 30 to 60 seconds and rinsed.[1]
4. Dentrifrices-Plaque disclosing agents can be incorporated in dentifrices and thus they can help in dental plaque observation.[7]

Technical Hints for Plaque Disclosing Agents: The following things should be checked before applying disclosing agent:

- On the teeth having tooth coloured restoration this agent cannot be used, as this material can stain the restoration.
- The solution containing alcohol should not be kept longer than 3 months, as the alcohol may evaporate by making the solution highly concentrated to use.
- Before applying the sealant disclosing agent not to be used.
- By dipping the cotton pliers with pellet directly into the container may contaminate the solution, so its better to transfer the required amount of the solution to a dappen dish during application.[1]

Mechanism of Action: It is worked by changing the colors of dental plaque so that it contrasts with the white tooth surface. It has the ability to retain a large number of dye substances which can be used for disclosing in various purposes. This property is related to relationship,because of the polarity difference between the components of the dental plaque and dyes. These particles are bound to the surfaces by electrostatic interactions (proteins)and hydrogen bonds (polysaccharides). [1]

Uses of Disclosing Agents:

1. It is useful for preparation of plaque indices.[3]
2. In recent studies, there are effectiveness of the plaque control devices like toothbrushes, dentifrices, dental floss etc.[4]
3. Useful for self evaluation of the patient.
4. Useful for the effectiveness for oral hygiene maintenance.[5]
5. Useful in patient instructions and motivation.
6. It is faster more efficient and minimally invasive.

Recent Advancements for Plaque Disclosing Agent:

1. Caries risk assessment: The new advances is found by three tone plaque disclosing agent which is effective in identifying pathological plaque. It can be used in identifying cariogenic microorganisms in caries risk assessment. It is based on the principle of PH selective response of three different dyes, i.e-Rose Bengal and brilliant blue and FCF. It is used to detect the age of the plaque and production of acid.[6]
2. Photodynamic therapy-It is the established treatment for localized tumours, involving the application and retention of an applied photosensitizing agent in malignant tissues.[7]
3. A plaque disclosing solution comprises dispensing toothbrush:

A. It comprises head portion and a grasping portion, an upper surface and lower surface and a hollow interior defining a reservoir.

B. A variety of bristles positioned on and attached to the upper surface of head portion of the handle.

4. The handle is partially transparent.[4]

Conclusion

Identification of dental plaque with the help of disclosing solution is one of accurate, easiest and fastest ways to examine dental plaque. It favours subsequent removal of the plaque. There is no more evidence of disclosure of dental plaque in office which aids in patient's motivation by improving the plaque control. The quality of professional supervision of oral hygiene plays a relevant role in the efficacy of dental plaque removal as a disclosing factor. The motivational effects results in study participation and anticipation of oral examinations. Self checking with plaque disclosing agents may plays a important role in improving the proper oral hygiene of school children at home. In case of periodontal diseases,it accounts for a majority of missing teeth in adults and results in tremendous social and economic burdens both to the society and to the indivisuals.

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Peripheral Osteoma: A Case Report with Review of Literature

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Abstract

Osteoma is a benign osteogenic lesion manifesting from compact or cancellous bone. These can be classified into three types according to their origin. Slow growing osteomas are benign tumours. The recurrence rate is very rare. A very rare neoplastic lesion in the maxillofacial region like Peripheral osteoma is more frequently found in mandible. This is an unusual case of peripheral osteoma present in the buccal aspect of premolar region of mandible corresponding to apical 2/3rd of root. The radiograph provides sufficient information for diagnosis but CT scan is the choice for planning surgery. Completely removing the tumour surgically is the most preferred treatment.

Keywords: *Peripheral Osteoma, mandible, benign bony neoplasm, mandible.*

Introduction

Osteoma is a benign osteogenic lesion manifesting from compact or cancellous bone. These can be classified into three types according to their origin. a) Central osteoma originates from endosteum b) peripheral from periosteum c)extra skeletal osteoma develops from the soft tissue. Peripheral osteoma is an unusualtumoroccurs usually in young age and both the genders are equally affected. This lesion mostly occurs in the frontal bone, mandible and maxillary sinuses in orofacial region. Among the above-mentioned sites the incidence ofOsteoma in mandible is higher involving the angle, condyle followed by body of mandible and ascending ramus. Intraorally Osteomas presentunilaterally as pedunculated masses, mostly in the lingual aspect of premolar and molar region. Facial asymmetry and occlusal dysfunction are often associated with condylar osteoma. These osteomas present as dense peripheral type in mandible rather than cancellous type.

Multiple osteoma in jaw bones are characteristic feature in gardener syndrome[1.] Diagnosis of these lesions are extremely importantfor the confirmation of Gardener syndrome due to its tendency to develop colorectal adenocarcinoma. As these maxillofacial features in Gardener syndrome can appear very early before the patient develops intestinal polyposis. The Diagnostic value of these lesions is very important in early diagnosis of Gardener syndrome which is a precancerous condition[6]

In mandible dense peripheral osteoma is very common rather than cancellous osteoma.[6] The pathogenesis of osteoma is still to be confirmed as they are considered to be of developmental anomalies, true neoplasm or reactive lesions caused due to trauma, muscular spasm or any infectious disease.[7] Various etiopathogenic hypothesis have been proposed for osteoma formation which includes that lesion is caused by congenital anomalies or by neoplastic proliferation caused by chronic inflammation.[8]

The osteomas grow slowly and progressively to attain a definite shape and size although it is still unclear if the osteomas are benign hamartomous lesion. In radiograph they appear as well circumscribed radiopaque circular or ovoid shape masses depending on constitution and shape of lesion.[9] Usually osteomas are asymptomatic in nature until they interfere with aesthetics if the individual.So often it is a coincidental finding in radiographic investigations.[10] Osteomas are bony hard in consistency and are covered with normal

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mucosa with no surface ulcerations until and unless they are associated with secondary trauma.

We report here an unusual case of peripheral osteoma present in the buccal aspect of premolar region of mandible corresponding to apical 2/3rd of root.

Case Report: A male patient, aged 60 years reported to department of oral medicine and radiology of Institute of Dental Sciences with the chief complaint of a hard swelling in the left lower facial region. The history revealed that the patient noticed a slow growing mass on left lower jawfor 5 years with no history of trauma, toothache, pain or discharge from the swelling. The past medical, surgical, dental, personal and family history did not reveal any abnormality.

On extra oral examination a single unilateral diffuse swelling was present in the left lower 1/3rd of face measuring approximately 1cm x 1cm in size, spherical in shape & smooth surface without any change in overlying skin(**Figure 1a**). The swelling extended 1cm below the corner of lip till 4cm below the midline of lower eyelid anteriorly and 1mm above the inferior border of mandible posteriorly. There were no secondary changes, no discharge, no pigmentation no vascular change or other changes associated with it. The inspectoryfindings of site, size, shape and borders were confirmed. It was a non-tender, hard and afebrile swelling with smooth diffuse edges which did not yield to pressure and the overlying skin was pinchable. Swelling was attached to the bone with a pedunculated base, which is notfluctuant, compressible and reducible.

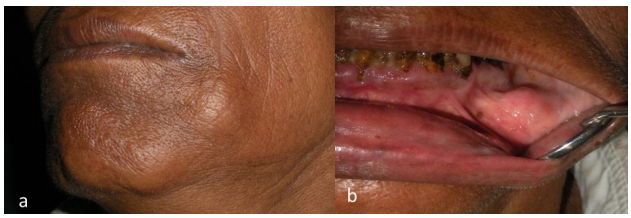


Figure 1a. Extra oral manifestation of osteoma; 1b. Intra oral picture of the lesion with normal overlying mucosa

On intraoral examination a single diffuse growth was present in left buccal sulcus measuring 1cmx1cm in approx in diameter. Shape of the swelling was roughly oval with no change in mucosal colour extending anteriorly in the buccogingival sulcus in relation to 35 till 36 posteriorly causing obliteration of the vestibule (**Figure1b**). On palpation the swelling was non tender bony hard in consistency & non fluctuant. Co-relating all the history and clinical features a provisional diagnosis of benign bony neoplasm was given & differential diagnosis of central haemangioma, bony exostosis, osteoid osteoma, osteoblastoma and osteoma was considered.

Intra oral periapical radiograph revealed a single well defined radiopacity in the periapical region of 36 which appears more opaque resembling the opacity of enamel of corresponding teeth (Figure2a). Multiple irregular radiopacities are seen with varying intensity in the periapical region of 46, 47 (Figure2b). Lateral occlusal view of left side revealed a well-defined outgrowth of a pedunculated radiopaque area,round in shape,measuring approximately 1cm x1cm in the buccal aspect of mandible (Figure2c). The Panoramic radiograph revealed multiple irregular radiopacities with varying intensity was present in periapical region irt 36 37 46 47. Periapical radiopacity in relation to 36 appears more opaque resembling radiopacity of enamel of corresponding teeth. A lateral oblique radiograph was advised which revealed a well defined radiopacity in the periapical region in relation to 36 which was more radiopaque than irregular radiolucency present in the periapical region of 37. Right lateral oblique radiograph shows radiopaque lesions in the periapical region of 36 37.



Figure 2a. Occlusal radiograph showing the extension of the lesion; 2b. OPG showed a radio-opaque mass in the left side of the jaw; 2c.Right lateral oblique radiograph shows radiopaque lesions in the periapical region of 36 37



Figure 3a. Axial CT scan view of the lesion showing hyperdense mass protruding to the buccal side; 3b. 3D reconstruction image of the lesion; 3c. 3D reconstruction image of the lesion showing the extension and shape "pedanculated" mass

Computed Tomography Axial CT scan view of the lesion showing hyperdense mass protruding to the

buccal side(Figure 3a)of the lesion was done along with 3D reconstruction(Figure 3b). It revealed a well-defined radio dense outgrowth from left hemi mandiblemeasuring 1.5cm x 1cm**.** Thus, on basis of radiographic findings a final diagnosis of osteomas was given (Figure 3c).

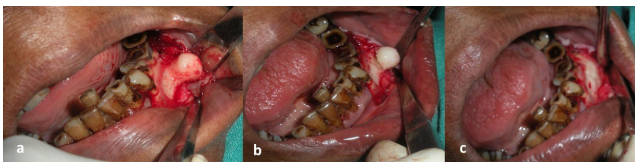


Figure 4a. Intraoral full thickness buccal mucoperiosteal flap was reflected irt 35 till 37; 4b. During excision the lesion appeared hard and homogenous; 4c.The residual bed was debrided, smoothened and flaps were sutured

Surgical excision of the growth was planned under local anaesthesia. Intraoral full thickness buccal mucoperiosteal flap was reflected irt 35 till 37 (Figure 4a). During excision the lesion appeared hard and homogenous(Figure 4b).The residual bed of the growth was debrided, smoothened and flaps were sutured(Figure 4c). After surgical excision, the specimen was sent for histological diagnosis(Figure 5a, b).

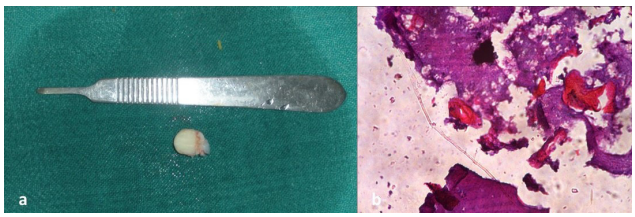


Figure 5a. The excised mass; 5b. Photomicrograph showing dense compact bone with no haversian system

The report revealed normal appearing dense compact bone with features suggestive of osteoma with missing haversian systems. And the patient was scheduled for regular follow-ups.

Discussion

The peripheral osteomas are very uncommon neoplasms. Schneider et al, Kaplan et al, Woldenberg et al (2005), Jonan et al (2005), Cincik et al(2005) and Larrea/ Oyarbide et al described as the region affected frequently is body of mandible. However in the maxillofacial region peripheral osteoma is most commonly reported in frontal bone followed by mandible and maxilla as reported by Sayan et al. According to Bodner et al peripheral osteoma mostly occurs in paranasal sinus. They are observed that they are very uncommon to be found in mandible. On analysing the reported cases of osteomas of mandible in literature it is widely agreed that the most affected region is the body of mandible followed by condylar process,angle of mandible, ramus, coronoid process and mandibular notch.[11]

The lingual side in the body of mandibular and the inferior border of mandibular angle are the frequently affected sites in the mandible but in this case the osteoma is present in the buccal aspectof 36 which is very unusual site for development of such lesions as the density of cortical bone is less in these areas.

It also cannot be ruled out few lesions described to be osteomas may also be preffered to be classified as bony exostosis. Correlating the theories responsible for growth of such lesions and the site affected in this case,the theory of trauma including such lesions can be justified [2]. Whereas infiltration of interdental bone and disturbance of the bone structure might help the neoplastic nature of this lesion. As seen in the present case the origin of osteoma could be peripheral as it appeared as a lobulated mass at the buccal cortex of mandible.[3]

According to developmental and embryological theory,osteomas probablydevelop from sutures between bones of different embryological derivation,but usually they develop in adults and not during younger age. The inflammatory theory derives that long-standing inflammatory lesions of paranasal sinuses could arouse proliferation of periosteum related osteogenic cells,it is infrequently impossible to define whether it is the infection or osteoma that developed first. However, this doesnot enumerate pathogenesis of osteomas in other structures.Few investigators also explained osteoma as a reactive lesion caused by trauma. As peripheral osteomas are generally located on lower border or buccal aspect of mandible,which is often an area vulnerable to trauma[2]

Radiographically, osteomas show a well circumscribed densely sclerotic radiopaque mass. Peripheral osteomas should be classified from several pathologic entities such as bony exostosis, osteoblastoma, osteoid osteoma and complex odontoma.The most important clinical feature differentiating bony exostosis and osteoma is that bony excrescences that usually stops growing after the individual crosses the puberty period. Osteoblastomas and osteoid osteomas are painful and fast growing than peripheral osteomas. Recurrence of peripheral osteoma after surgical excision is rare. The

goal of followup is to search for new growths or other signs suggestive of Gardner syndrome,which was not ruled out in our case,as the OPG revealed many mixed radiopaque and radiolucent areas which were present on both sides of mandible. Malignant transformation of peripheral osteomas has not been reported in literature.[3]

Histologically, osteomas consist of dense compact bone with no haversian system.

Conclusion

Slow growing osteomas are benign tumours. The recurrence rate is very rare. A veryrare neoplastic lesion in the maxillofacial region like Peripheral osteoma is more frequently found in mandible. The radiographprovides sufficient information for diagnosis but CT scan is the choice for planning surgery. Completely removing the tumour surgically is the most preferred treatment.

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Dentinogenic Ghost Cell Tumour in a 13-Year-Old Child, a Rare Presentation

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Abstract

Dentinogenic ghost cell tumor DGCT) is a rare, locally invasive and aggressive, benign odontogenic neoplasm which is considered to be a solid variant of calcifying odontogenic cyst COC) with locally aggressive behavior.These resemble other epithelial odontogenic tumors having proliferation of odontogenic epithelium, an abnormal keratinization in the form of ghost cells and dysplastic dentine. There are no characteristic clinical or radiologic pathognomonic features of this rare neoplasm and is confirmed by histopathological evaluation. The present report describes an extremely rare presentation of a DGCT in the posterior body-ramus of the mandible of a 13-year-old male child, which is an unusual age of occurrence.

Keywords: *Calcifying odontogenic cyst, dentine, ghost cells, aggressive tumor.*

Introduction

The jaw bones are affected by a perplexing variety of odontogenic cysts and tumours, and some of them are heterogeneous lesions which can present as central and peripheral or cystic and benign neoplastic or malignant variants. Dentinogenic ghost cell tumor DGCT), is a rare odontogenic neoplasm which is a benign neoplastic variant of calcifying odontogenic cyst COC). Gorlin et al described COC as a distinct entity in 1962 and it was eponymously referred to as Gorlin cyst.[1] In 1971 it was included in the WHO classification of odontogenic cysts and tumours. Later in 1981, COC was classified by Praetorious *et al*. into cystic and solid neoplastic variants and because of dentinoid production in the tumour it was called DGCT.[2] The WHO classification of odontogenic tumours and cysts also recognizes DGCT as a mixed epithelial-mesenchymal) odontogenic tumour.[3] DGCT is considered as a locally aggressive and infiltrative odontogenic having a high recurrence rate after resection. We report a case of DGCT in a 13-year-oldboy.

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Case report: A 13 years old male patient reported to the department with chief complaint of swelling in the lower jaw in the last 1 month. History revealed that swelling was slow-growing in nature, gradually increasing to the present size. There was no pain, tenderness or discharge associated with the swelling.

On examination, there was facial asymmetry with asingle diffuse swelling was present on the right side of the mandible which was ovoid in shape, measuring 4x3cm in size, having smooth surface, bony hard in consistency and no tenderness was elicited on palpation. **Figure 1a)**The same swelling was seen intra-orally, obliterating the buccal sulcus in relation to 44 to the right retro-molar region. **Figure 1b & c).** There was bi-cortical expansion, with grade I mobility of the involved teeth. The swelling was bony hard in consistency with few areas yielding to pressure and soft in consistency.

Bony irregularity/discontinuity in the cortex were palpable both buccally and lingually in some areas, with mild tenderness. 47 was missing.

Correlating the history of a slow growing swelling and clinical findings of a bony hard swelling having bi-cortical expansion and possible cortical perforation in the tooth bearing region with a missing mandibular second molar, a provisional diagnosis of benign bony odontogenic neoplasm was made. A clinical differential diagnosis of Unicystic ameloblastoma, Ameloblastic fibroodontoma, Complex composite odontome were considered.

The patient was subjected to conventional radiography. Intra-oral periapical radiographof the 44 to 47 regions revealed well circumscribed radiolucency periapicaly with the presence of bony septae within the radiolucency, the border was corticated. Peri-coronally irregular calcified flecks were seen distally in relation to 46. Root resorption was evident in 46 with loss of lamina dura in 45 and 46.**Figure 2a)**

Right mandibular lateral occlusal radiograph revealed bi-cortical expansion with evidence of irregular cortical perforation both lingually and buccally distally in relation to 46. The borders were well-defined, internal structure radiolucent with patchy calcifications. Lingually expansion of cortex also evident in relation to 43-46 region. **Figure 2b).**

Panoramic radiograph revealed an extensive, well localized radiolucent lesion in the right body and ramus of the mandible extending up to the coronoid process, measuring 3x7cm in size, with well-defined corticated margins. Internal structure was radiolucent with presence of large radiopaque septa and irregular calcified flecks of calcification distal to 46. There is loss of lamina dura in 45 and 46, root resorption in 46 and distally displaced 47 at the angle of the mandible on the right side with expansion of the inferior border of the mandible. The tooth bud of 48 was also absent [Figure 2c]. The radiologic differential diagnosis consisted of calcifying epithelial odontogenic tumour, calcifying epithelial odontogenic cyst, unicystic ameloblastoma and ameloblastic fibrodontoma. Fine needle aspiration cytology was done but did not yield any aspirate. Since the lesion was extensive and the patient was only 13 years old, a conservative approach was adopted for treatment. Marsupialization of the lesion was done under local anaesthsia, preserving the mandible. The entire lesion was curetted and disorganized irregular calcific masses were seen. **[Figure 3a & b]**The impacted tooth, 47 was not extracted avoiding a fracture at the angle of the mandible.

The curetted mass was sent for histopathologic evaluation. Hematoxylin and eosin stained section showed a lesion composed of cystic epithelial lining supporting the underlying vascular connective tissue. This gave an impression of calcifying odontogenic cyst. Evaluation of further sections demonstrated multiple foci of odontogenic epithelial cells with calcifications, ghost cells and dentinoid in the connective tissue wall. **[Figure 4a & b].** These findings suggested the diagnosis of DGCT. Immunohistochemical evaluation using Van Gieson's stain **[Figure 4c]** further confirmed the presence of ghost cells and dentinoid favouring the diagnosis of DGCT.The patient was kept under follow up and evaluated after every week and after 3 months a panoramic radiograph was taken revealed bone formation in the cavity. **[Figure 5]**

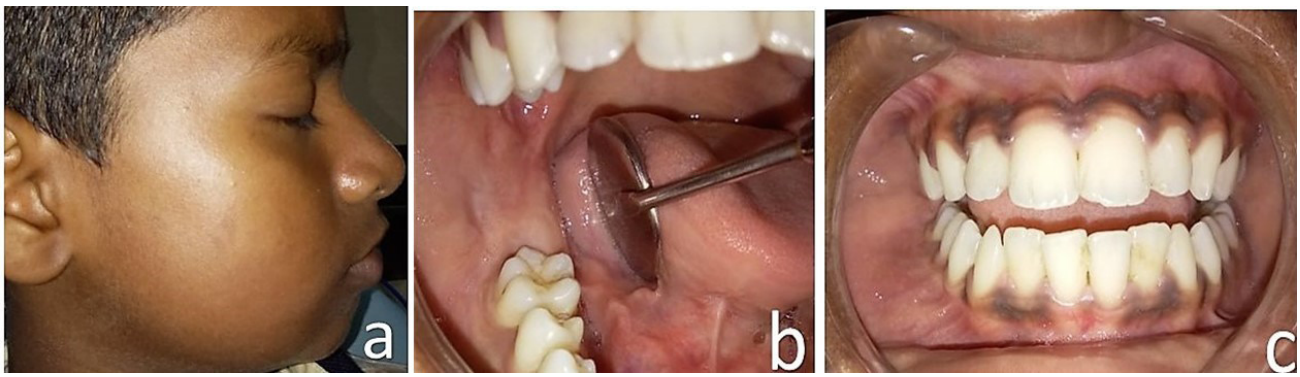


Figure 1: a. Facial asymmetry with diffuse swelling was present on the right side of the mandible. b. Missing 47 with intra-oral swelling. b. Intra-oral swelling obliterating the buccal sulcus.

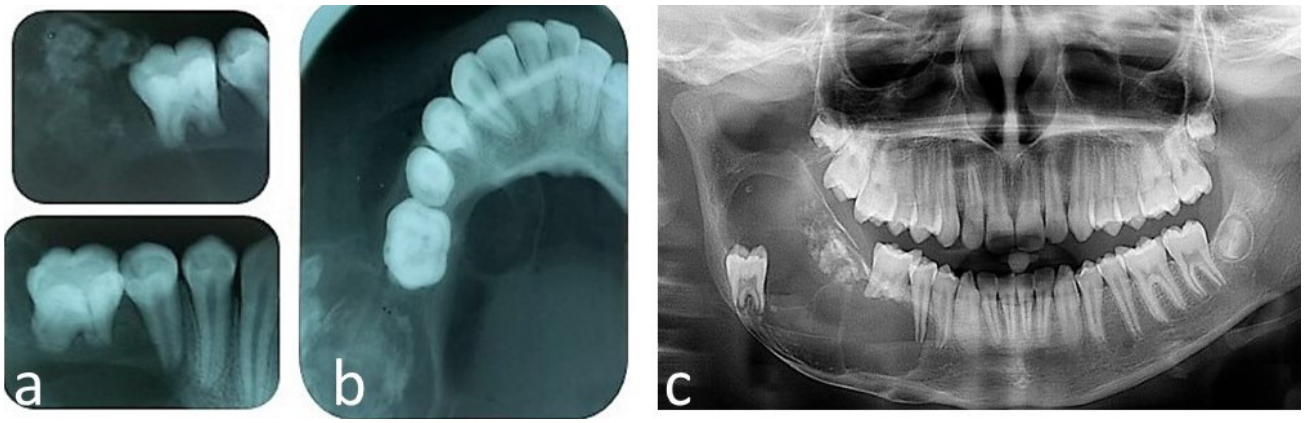


Figure 2 a. Intra-oral periapical radiograph showing well circumscribed radiolucency periapicaly with the presence of bony septae within the radiolucency, and irregular calcified flecks seen distally in relation to 46. b. Right mandibular lateral occlusal radiograph revealed bi-cortical expansion with evidence of irregular cortical perforation both lingually and bucally distally in relation to 46. The borders were well-defined, internal structure radiolucent with patchy calcifications. c. Panoramic radiograph revealed an extensive, well localized radiolucent lesion in the right body and ramus of the mandible extending up to the coronoid process, measuring 3x7cm in size, with well-defined corticated margins.

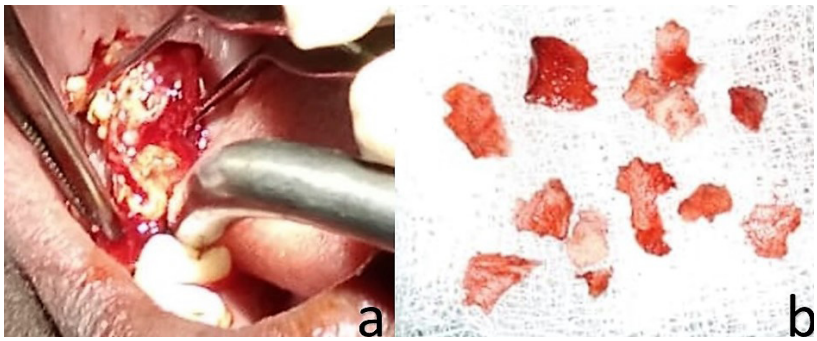


Figure 3 a. The entire lesion was curetted, and disorganized irregular calcific masses were seen. b. Calcified masses obtained after curettage.

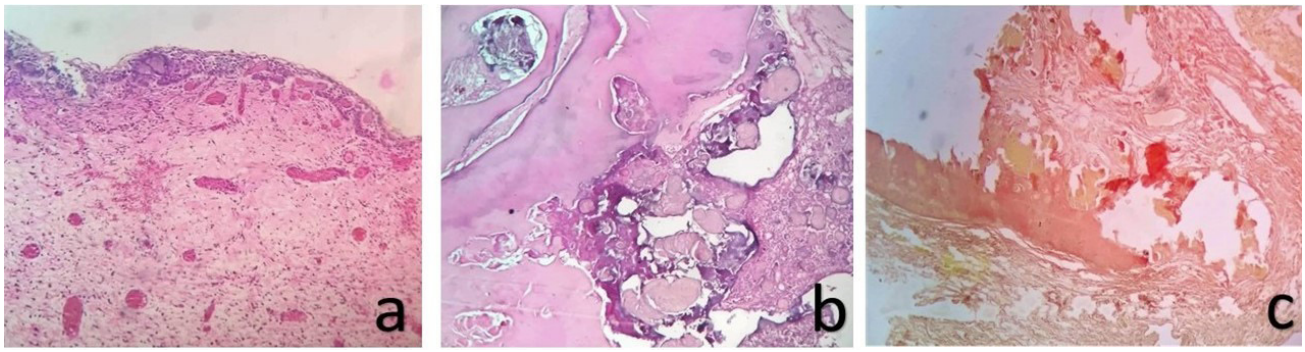


Figure 4 a. Hematoxylin and eosin stained section showed a lesion composed of cystic epithelial lining supporting the underlying vascular connective tissue. [original magnification 10x], b. Multiple foci of odontogenic epithelial cells with calcifications, ghost cells and dentinoid in the connective tissue wall suggestive of DGCT. [original magnification 40x] c. Immunohistochemical evaluation using Van Gieson's stain stained positive confirming the diagnosis of DGCT. [original magnification 40x]

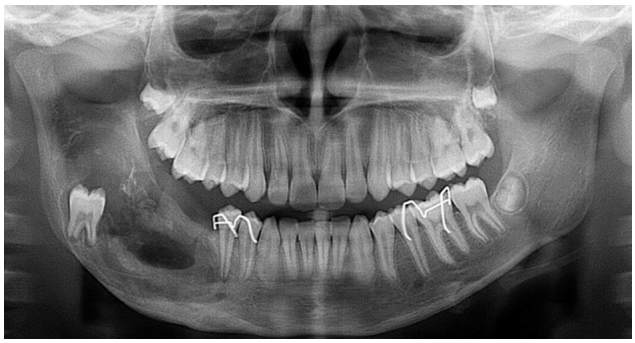


Figure 5. Panoramic radiograph at 3 months post-operative follow up showing bone formation in the cavity.

Discussion

Dentinogenic ghost cell tumor is an uncommon benign odontogenic neoplasm, and was recognized by Praetorius et al. In 1981 for the neoplastic variety of COC and then Colmenero et al proposed the term odontogenic ghost cell tumour.[4] It is also recognized as an intra-osseous neoplastic variant of the calcifying odontongenic cyst COC) by some authors, comprising of only 2-14% of COC as solid neoplasms.[5]

DGCT is a tumour which is usually seen in middle aged individuals with a slight male gender predilection. While both jaw bones are equally affected, the common site is between the canine and the first molar. [6] The intra-oesseous variety of DGCT is commonly seen, though a peripheral mucosal/gingival tumour has been reported in few cases. The clinical presentation is generally in the form of an asymptomatic swelling, rarely pain and tenderness has been reported.[7] The present case is indeed a rarity, as the age of occurrence is in the teens, the site being posterior mandible with pain a presenting complaint.

Asymptomatic DGCT may be incidentally be diagnosed on routine radiography for dental treatment. It does not have a pathognomonic radiographic appearance and is generally localized with well-defined margins. [9] It may be entirely radiolucent or radiopaque or even mixed radiopaque-radiolucent lesion with uni or multi-locularity. Resorption of roots, adjacent teeth displacement or association with impacted teeth have been reported. Bicortical expansion and scattered calcified masses are observed in the lesion. [10,11]

Histologically DGCT has sheets and rounded islands of odontogenic epithelium in a mature connective tissue. The tumour island epithelia resemble ameloblastoma and may have mior cyst formation. Some epithelial cells swell up, become ellipsoidal and lose their nuclei, form foreign body granuloma and dystrophic calcifications as a result of apoptosis. Such cells are called ghost cells. [12] However ghost cells are not characteristic of DGCT but can be seen in Odontomes, Ameloblastoma and ameloblastic fibro-odontome. Many scattered homogenously basophilic granules are seen which represent the osteoid or dentinoid material which stain with connective tissue stains like Van Gieson, Heidenhain and Goldner stains.[13]

Treatment of DGCT is surgical resection, either en-block or segmental resection with long term follow-up due to reports of recurrences after resection. Intra-osseous DGCTs are locally aggressive lesions which are invasive with a high recurrence rate of about 70%. [14] Owing to the fact that the child was in the growing age, marsupialization with curettage was performed to save the mandible and the patient was kept for regular follow-up every 3 months.

Ethical Permission: Not Required

Conflict of Interest: None

Funding: None.

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Orofacial Changes Due to Metals, Chemicals and Osteodystrophies

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Abstract

The maxilla and mandible are unique compared to other bones in the body in more ways than one. They develop from migration of cells from the neuroectoderm in the embryo making them embryologically unique. The anatomy of the maxilla and mandible is also unusual as they bear tooth buds which eventually form teeth. Diseases arising in other bones also affect the jaw bones, in addition to those osteogenic diseases, they also get afflicted by various odontogenic lesions which has bizarre manifestations. Not only that metabolic diseases can manifest in the jaw bones, metals and chemicals also affect the jaw bones and the oral cavity. In this paper, a brief description of the metals, chemicals and osteodystrophies on the orofacial region is discussed to increase awareness among dentists about the said diseases.

Keywords: *Bone disease, Metabolic defects, Oral manifestations, Osteodystrophy.*

Introduction

This overview ofthe orofacial lesions illustrates the variable manifestations that can possibly occur in the maxilla and mandible. The dentist who diagnoses and treats the patients with swelling in the jaw bones must be fully aware that these lesions may mimic one another, not only clinically, radiologically but also histologically confounding the diagnostician.[1] Mistakes in diagnosis can lead to inappropriate treatment which can complicate the pre-existing scenario. What is even more confusing about these lesions is that they may initially manifest as dental or periodontal problems, and an unsuspecting inexperienced dentist may not be aware of the more serious afflictions of the jaw bones. Hence this article aims to clear the diagnostic confusion and bring clarity in the acumen.

Lead: In clinical examination of mouth, sometimes we will find a bluish line along the margin of the gingiva. This bluish line is called "Burtonian Line" and suggests that the patient is suffering from lead poisoning'. [2] Lead poisoning is an occupational disease in which individuals who works in lead factory, painting and other occupations involving lead, are exposed to lead. The lead fumes enter the mouth and combine with hydrogen sulfide which develops from fermentation of accumulated food in gingival margin and form as lead sulfide. Thus, the patient who is suffering from lead poisoning will have recurrent attacks of diarrhea and constipation. Thus, the Burtonian line will help to diagnose, lead poisoning.

Bismuth: In the gingiva sometimes blue – black line appears. It is called "Bismuth line". This bismuth line is due to the action of Bismuth with hydrogen sulfide. Bismuth reaches the mouth from occupations like Bismuth factory. Hydrogen sulfide comes from the fermentation of food particles. The blue-black bismuth line is well demarcated in the gingiva.[3] The Bismuth line is diffusely distributed compared to lead line. Sometimes it occurs only in interdental gingiva or lingual gingiva. In lead poisoning, there will be burning sensation of the mouth.

Mercury: Sometimes the patient will have burning sensation in the mouth, in the form of hot mouth associated with itching sensation. There will be profuse salivation with metallic taste, swollen lips with superficial cracks, grayish pigmentation of gingiva. Diffuse oral mucosal ulceration with areas of necrosis will be there. The tongue will be enlarged and the covering mucosa will be ulcerated.[4] This lesion is due to mercury poisoning with systemic involvement. Mercurialism is an occupational disease in which the patient is dealing with mercuric compounds. Exposures to mercurial compounds and industrial mercury hazards, use of mercurial diuretics, exposure to dental amalgam are the factors that are

concerned in mercury ingestion. The patient will have intestinal colic, diarrhea, headache, tremor of fingers. Thus, mouth lesion will help to diagnose mercury poisoning.[5]

Fluoride: Some patients may have brownish discoloration of teeth. The discoloration may vary from white opaque flecks to pitting and corroded appearance resulting in mottled teeth and enamel hypoplasia. The brown staining is evident on exposure to sunlight after tooth eruption. This is the oral manifestation of Fluorosis which is caused due to excess consumption of fluoride, more than 1 ppm in drinking water during the time of formative stage of tooth development. This higher level of fluoride interferes with the calcification of the enamel matrix. This is called as dental fluorosis which is an endemic disease and it may be associated with skeletal fluorosis affecting bones and joints and non-skeletal fluorosis affecting soft tissues and organs. These patients may also complain of severe bone pain, stiffness in back bones with outward bending of legs, hands with loss of shape and contour resulting in knock–knee syndrome. Restriction of spine movements, calcification of soft tissues like tendons and ligaments are characteristics findings of fluorosis.[6]All dental fluorosis is not associated with skeletal fluorosis. Only those individuals who are exposed to fluoride toxicity throughout life in childhood, adulthood and adolescences, are associated with skeletal fluorosis. [7] If patients are exposed to fluoride in childhood, and not exposed to fluoride in adulthood, they only develop dental fluorosis and not skeletal fluorosis.Thus, gingival enlargement helps to diagnose systemic diseases like epilepsy and hypertension.

Tetracycline: Some children may present with grayish – brown discoloration of both deciduous and permanent teeth, which is more pronounced at the time of eruption. Positive history of tetracycline therapy taken by the child's mother during pregnancy is suggestive of tetracycline hypoplasia. Dimethyl chlortetracycline has been reported to produce severe staining while oxytetracycline and doxycycline produce less staining. The reason for staining is mainly due to chelating property of tetracycline, which binds with bivalent metal ions such as calcium and phosphorus in hydroxyapatite crystals of enamel, producing enamel hypoplasia with absence of pitting or mottling as seen in fluorosis, but an increased incidence of dental caries is noticed.[8] The severity of staining depends on the duration, and dosage and the time of initiation of therapy. Observable tooth discoloration is present during the period of crown calcification. Total dosage exceeding 3 gm with duration of treatment longer than 10 days produces staining of the teeth. Tetracycline itself fluoresces under ultra violet light and the affected teeth also fluoresces a bright yellow colour which gradually diminishes in time.

Osteogenesis imperfecta: In certain patients, the teeth will appear as yellowish or yellowish gray in colour with opalescent hue. All teeth are affected and the teeth will appear as bulbous crown, stunted root with pulp obliteration. On clinical and radiological observation, incisal attrition and hypersensitivity will be present. This is called dentinogenesis imperfecta and is associated with mandibular prognathism, high arched palate and macroglossia.[9] This dentinogenesis imperfecta is the oral sign of osteogenesis imperfecta, an osteodystropy of bone. Osteogenesis imperfecta is a generalized bone disease in which bone collagen is affected due to genetic disturbances. The bone will become brittle, fragile deformed and tends to fracture and on healing defective bone is formed. As this disease is a mesodermal involvement of genetic disturbance, other mesodermal structures are also affected resulting blue sclerae, deafness and dentinogenesis imperfecta as dentin is a mesodermal origin.

Osteopetrosis: Sometimes the patient will have retarded teeth eruption, hypoplastic crowns with arrested root growth. There will be a marked predilection for osteomyelitis following tooth extraction. If these oral signs occurs associated with other manifestations such as stunted growth with marble bones, thickened skull with frontal bossing, depressed nasal bridge with hypertelorism, nerve compression with hepatospelnomegaly and genu valgum and slow walk, it is suggestive, that the patient is suffering from osteopetrosis.[10] In osteopetrosis or the marble bone disease there is normal appositional bone growth, but failure of physiological bone resorption. The osteoclasts are defective in function due to deficiency of RNA.

Cleidocranial dysostosis: If the patient has underdeveloped maxilla, narrow arched palate unerupted buried teeth, absence or paucity of cellular cementum and retained deciduous teeth and these signs occurs along with large cranium absence of clavicles or rudimentary clavicles, moving shoulders to the midline and frontal bossing of the skull, then these signs are indicative hat the patient is suffering from cleidocranial dysostosis.[11] It is a genetic disease.

Crouzon syndrome: In some patients, maxilla appears hypoplastic with 'v' shaped maxillary arch, cleft and high arched palate with mandibular teeth completely overlapping the maxillary teeth resulting in cross bite, crowding of maxillary teeth causing skeletal class iii malocclusion. Partial anodontia, unerupted teeth, macrodontia are associated oral findings.[11] They may appear with bilateral exophthalmos, parrot beaked nose, hypertelorism, divergent strabismus with frontal bossing suggestive of Crouzon syndrome. Craniofacial dysostosis without syndactyly is called crouzon syndrome is caused by genetic disturbance characterized by premature closure of cranial sutures.

Achondroplasia: In some patients, retruded maxilla, relative prognathism of mandible, congenital missing teeth disturbance in shape of existing teeth are present and these features of mouth are suggestive of achondroplasia. Achondroplasia is a condition of absence of cartilaginous growth, in which bones are developed abnormally due to genetic disturbance.[12] Patient appear with stunted growth, bowed legs, brachycephalic skull, stubby fingers, lumbar lordosis, prominent buttocks, protruding abdomen, laxity of ligaments with limited mobility of joint. These patients cannot straighten their elbows and hang their arms freely at the sides.

Rickets: Sometimes the patient may present with open mouth, hypoplastic teeth. If these signs occur associated with manifestations like skull of a scholar, chest of a pigeon, tummy of a drum, knock knee genu valgum and if the child walks slowly, then it is suggestive of rickets. Rickets is a disease caused by deficiency of vitamin – D which is essential for calcium absorption in the intestine. During the development of tooth, if calcium is deficient in a particular period, the enamel developing at that time is affected with improper calcification resulting in hypoplastic teeth.[10]

Cherubism: Patients may present with chubby face due to painless progressive bilateral symmetric swelling of posterior mandible manifested in early childhood by the age of three years. Oral findings include enlarged palate, widening and distortion of alveolar ridge with premature exfoliation of deciduous teeth, and displacement of existing teeth.[12] Radiographic examination reveals multilocular cystic spaces with floating teeth in cystic spaces. Patient on examination reveals cherubic appearance with eyes upturned to heaven due to wide rim of exposed sclera below the iris which are characteristic findings of cherubism. It is considered to be a familial fibrous dysplasia of jaws.

Fibrous dysplasia: In some patients, unilateral painless expansion and deformity of jaws, mainly maxilla, not crossing the midline with displacement of teeth, delayed eruption of teeth due to loss of normal support of developing teeth are present. In some cases, maxillary sinus is obliterated and facial deformity is present due to prominence of zygomatic process, with expansion extending backwards to the base of skull, involving the floor of orbit.[13] Intra oral pigmentation of lips buccal mucosa associated with skin lesions unilateral in distribution involving the affected side are characterized by pigmented brown melanotic spots (café-au-lait) spots and endocrine disturbances such as precocious puberty, hyperthyroidism and diabetes mellitus are present.

In these patients bowing or thickening of long bones with hockey stick deformity, recurrent bone pain and fracture are commonly seen. These features are suggestive of albrights syndrome which consists of polyostotic fibrous dysplasia, café au- lait pigmentation and endocrine disturbances.[14] In some cases mono ostotic fibrous dysplasia, in which only single bone is involved with jaws more frequently affected and painless swelling of maxilla resulting in leonie appearance of face is present. Radiographic examination of fibrous dysplasia reveals buccal plate expansion more than lingual plate with ground glass or peau–d orange appearance. Fibrous dysplasia is a fibro–osseous lesion of developmental in origin in which bone forming mesenchyme in jaw fails to form bone and calcification occurs in the fibrous tissue present.[15]

Paget's disease of bone: The patient has enlarged maxilla, widened alveolar ridge, flattened palate. The teeth are loose with spacing, open mouth, exposing the teeth. If these oral manifestations occurs along with signs like short square figure, long arm sunken chest, curved back, bent shoulder large head hanging forward, waddling gait, bowed legs, outturned toe and the patient walks with an aid of stick, then it is indicative that the patient is suffering from Paget's disease, which is a chronic disease of bone with unknown etiology.[15]

Conclusion

The oral cavity and the face are affected by diseases which are neither inflammatory nor neoplastic but are reactive or genetic or idiopathic. A brief discussion on the effects of metals and chemicals is shared for

documentation. In this era of new age diagnostics, the importance of a proper history taking and a meticulous clinical examination cannot be undermined, and we as dentists play a vital role in the detection of systemic diseases from tell-tale oral signs.

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Wegener's Granulomatosis Presenting as a Diffuse Palatal Swelling, a Rare Presentation: Case Report

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Abstract

Wegener's granulomatosis (WG) is an uncommon idiopathic, systemic inflammatory disease which is characterized by necrotizing granulomatous inflammation and pauci-immune small vessel vasculitis of the kidneys and respiratory tract resulting in significant tissue destruction. The clinical features are generally non-specific thereby posing a diagnostic challenge. Oralmanifestations of the disease are rare and again non-specific. Oral ulceration and gingivalenlargement is often seen. Though some authors suggest a 'strawberry' like gingivitis to be acharacteristic sign of WG, it is not consistently seen in all cases. Histopathological evaluation of the lesion showing granulomatous inflammation may not be pathognomonic but helps inexclusion of other diseases but in conjunction with a positive anti-neutrophil cytoplasmic antibodies (ANCA) test confirms the diagnosis. The disease is not curable and hencetreatment is aimed at inducing and sustaining remission. Glucocorticoids with other immunosuppressants are the most accepted form of therapy.

Keywords: *Anti-neutrophil cytoplasmic antibodies, immunosuppressants, strawberry gingivitis, vasculitis.*

Introduction

Wegener's granulomatosis (WG) is a rare disease and affects multiple organs although often it may be limited to few organs. Characteristically a typical presentation is involvement of the upper respiratory tract, lungs and kidneys. Oral involvement is uncommon and may present as a non-specific mucosal ulceration. Gingival manifestations of the disease, especially the maxillary anterior region is seen in cases of oral involvement of WG. It may manifest as telangiectatic hyperplastic gingivitis considered being a diagnostic feature of WG.[1] WG is a rare systemic auto-immune disease which is a primary systemic vasculitis (PSV). Necrotizing vasculitis and purulent inflammation of tissues with granuloma formation occurs in blood vessels which results in ischaemia in vital organs and extensive tissue destruction which can be life threatening.[2] It is currently known as Granulomatosis with polyangiitis (GPA), an ANCA-associated necrotizing vasculitides.[3] The aetiology is unknown but a number of microbial exogenous factors like *Staphylococcus aureus*, *Mycobacterium avium-intracellulare* or parvovirus B19 have been considered.[4] Clinically it was considered to be of 2 types: localized and generalized, though varioussubtypes have been described.[5] The annual incidence of WG is estimated at 1:100,000 and about 90% of the patients are Caucasians.[3] There is no gender predilection and the average age of incidence is 50 years. There are few common prodromal constitutional symptoms like fever, weight loss, night sweats, and stiffness in joints.[5] Nasal stuffiness or epistaxis may also be present. Such prodromal symptoms can last for months before the disease progression occurs. All organ systems can be involved with different signs and symptoms of the disease which are however nonspecific.

Case Report: A 42-year-old female patient reported to the dental hospital with growth in the palate for 6 months. History revealed the patient underwent excision of the growth 2 months back however there was recurrence. There was mild pain and pus discharge associated with the growth. The patient had several episodes of fever and cough within the past one year. There was no known drug allergy or no other significant medical, personal or family history

On clinical examination extensive palatal swelling

was seen bilaterally restricted to the hard palate only, (Figure 1a) with gingival swelling both buccally and palatally/lingually in both the jaws. (Figure 1b) The palatal swelling measured 4x5cm bilaterally, was smooth surfaced, firm in consistency and slightly tender on palpation. The gingival enlargement involved both the free and attached gingiva with purulent discharge from the gingival sulcus on probing. The maxillary anterior gingiva was enlarged; erythematous and appearing somewhat like strawberry. (Figure 1c) The maxillary teeth were demonstrated excessive mobility while the mandibular teeth were within physiological limits.



Figure 1a. Diffuse, extensive, bilateral swelling of the hard palate; Figure1b. Generalized gingival enlargement of the maxilla and mandible with pus discharge from the gingival sulcus; Figure 1c. Anterior maxillary labial gingiva showing minute, white punctate granular 'strawberry' like appearance.

Correlating the history and clinical findings the following lesions were included in the differential diagnosis:

- Deep fungal infections like: Mucormycosis, Histoplasmosis, Aspergillosis
- Tuberculosis
- Kaposi's sarcoma
- Plasma cell gingivostomatitis
- Sarcoidosis
- Wegener's granulomatosis
- Crohn's disease
- Leukemia
- Non-hodgkin's lymphoma
- Carcinoma maxillary antrum

The following investigations were performed to reach a definitive diagnosis:

- Complete blood count (CBC) was performed and was within normal limits.
- Maxillary occlusal cross-sectional radiograph revealed alveolar bone loss anteriorly with haziness in the maxillary antra. (Figure 2a)
- Panoramic radiograph revealed generalized extensive alveolar bone loss. (Figure 2b) Water's view of skull showed antral cloudiness bilaterally. (Figure 2c)
- Chest radiograph did not reveal any abnormality.
- Computed Tomography scan of the maxilla, coronal view revealed homogenous soft tissue density involving right antrum completely and left antrum partially with thickening of the soft tissue lining of the nasal cavity and turbinates. (Figure 2d) Destruction of maxillary alveolar bone was evident in axial view. (Figure 2e)
- An incisional biopsy was taken from the palatal growth under local anaesthesia and histopathologic evaluation exhibited orthokeratinized stratified squamous epithelium pseudoepitheliomatous hyperplasia. (Figure 3a) The underlying fibrous connective tissue showed numerous vascular spaces with dense chronic inflammatory cell infiltrate presenting as perivascular infiltrate (Figure 3b, c) associated with foreign body giant cells. (Figure 9d) The histopathologic features were suggestive of Vasculitis.
- Cytoplasmic pattern of antineutrophil cytoplasmic

antibodies (c-ANCA) test was performed and was positive. (A titre of 15 units was obtained where greater than 5 units is considered positive)

- Liver function tests and renal function tests were all within normal limits.
- Urine analysis yielded normal results.

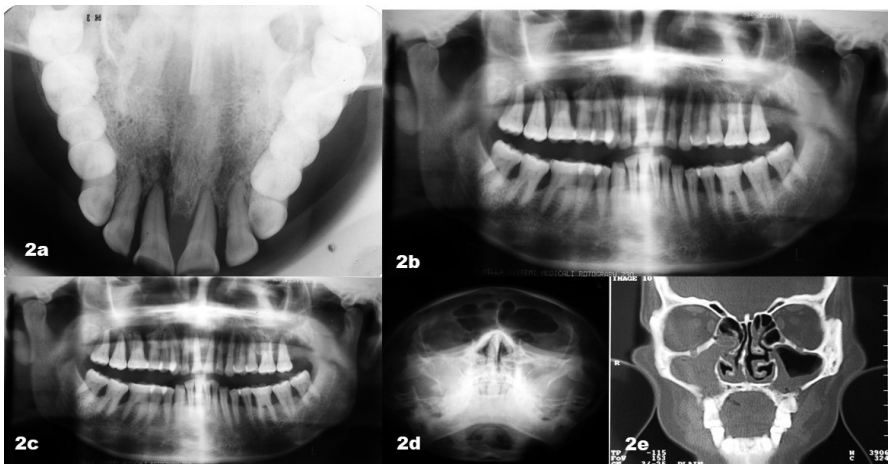


Figure 2a. Maxillary cross-sectional occlusal radiograph showing alveolar bone loss anteriorly. 2b. Panoramic radiograph showing extensive generalized alveolar bone loss. 2c Water's view of skull showing antral cloudiness bilaterally. 2d. CT scan of the maxilla, coronal view showing homogenous soft tissue density involving right antrum completely and left antrum partially with thickening of the soft tissue lining of the nasal cavity and turbinate. 2e. CT scan of maxilla showing destruction of maxillary alveolar bone in axial view.

Correlating the clinical, histopathologic and serologic findings a final diagnosis of Wegener'sgranulomatosis was made. The patient was referred to a rheumatologist for treatment. She was treated with oral prednisolone 60mg/day in divided doses with Cyclophosphamide 100mg/day for 3 months. The patient had remission of the disease and the drugs were tapered but the patient did not turn up for follow-up.

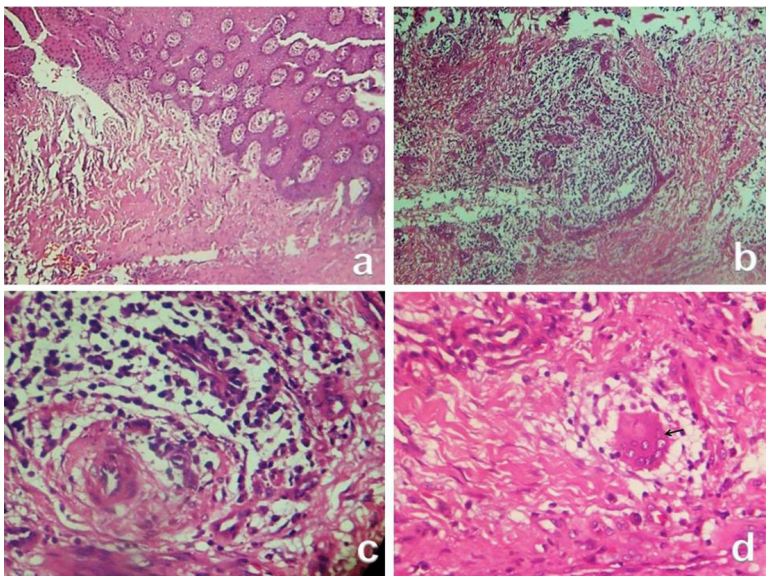


Figure 3: H & E stained section showing orthokeratinized stratified squamous epithelium with pseudoepitheliomatous hyperplasia. (Original magnification 10X, 9a) The underlying fibrous connective tissue showed numerous vascular spaces with dense chronic inflammatory cell infiltrate presenting as perivascular infiltrate (Original magnification 10X, 9b and 40X, 9c) associated with foreign body giant cells. (Original magnification 40X, 9d)

Discussion

Oral manifestations occur in approximately 6-13% of patients with WG with about 5-6% patients having oral lesions as the sole manifestations of the disease.[6] Oral mucosal ulceration, delayed healing of extraction wounds, lingual necrosis, osteonecrosis of the palate, oral-antral fistulae, swelling and desquamation of the lips and salivary gland enlargement have been reported.[7] Gingival involvement is common, especially the maxillary anterior gingiva manifests as enlarged, erythematous free gingiva, attached gingiva and the interdental papillae with gingival pain and bleeding.[8] The colour may vary from red to purple and have a petechiae or a granular appearance with white punctate lesions resembling an over ripe strawberry.[9] Later ulceration, osteomyelitis and necrosis of the underlying bone may occur with mobility and tooth loss.[10]

Palatal ulceration, growth and inflammatory destruction are uncommon, but it can occur as an extension of the disease from the nasal cavity.[11] Non-tender, nodular masses or diffuse swelling of the lip also has been reported.[7] Along with the airway involvement the salivary glands may be affected rarely presenting as unilateral or bilateral parotid gland enlargement.[12,13]

Histopathologic features of WG include necrosis, granulomatous inflammation and vasculitis.[5] The granulomatous inflammation is characterized by collections of macrophages, multinucleated giant cells and chronic inflammatory cells. Typically, the vasculitis of WG shows fibrinoid necrosis affecting the walls of small to medium sized arteries and veins.

The diagnosis of WG is based on the recommendation of the American College of Rheumatology, which has 4 criteria.[14] Fulfilment of any 2 criteria gives a positive diagnosis of WG. The criteria are: 1) oral ulcers or epistaxis/nasal inflammation, 2) nodules,fixed infiltrates or cavities in chest radiograph, 3) abnormal urinary sediment and 4) granulomatous inflammation on biopsy. In the absence of granulomatous inflammation onbiopsy a positive-ANCA test can fulfil the diagnosis of WG.

There are a group of antineutrophil cytoplasmic antibodies- (ANCA-) which cause the inflammation in WG. Therefore serum ANCA determination aids in the diagnosis of WG, but ANCA positivity does not always lead to a definitive diagnosis and ANCA negativity does not always exclude WG.[15]

Different immunosuppressive treatment protocols have been devised for the management of WG of which glucocorticoids in combination with cytotoxic agents (cyclophosphamide, methotrexate, or azathioprine) are used commonly with 95% survival at 5 years but with serious systemic side effects which include life threatening opportunistic infections.[16]

Recently Rituximab anti-CD20 therapy, mycophenolate mofetil–leflunomide, antithymocyteglobulin, and 15-deoxyspergualin, have shown promising results as alternative treatment modalities for WG with less side effects.[17,18]

Conclusion

The present case of a middle-aged female with palatal swelling and generalized maxillary gingivalenlargement in the absence of other significant medical problems shows oral manifestations could be the sole presenting features of this multisystem autoimmune disease. Hence a dentalsurgeon/oral physician may play a vital role in early diagnosis of this otherwise fatal diseaseensuring prompt treatment thereby decreasing the morbidity and mortality associated with Wegener's granulomatosis.

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Digital Model in Orthodontics

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Abstract

The purpose of 'digital imaging' in orthodontics is to display *anatomical structure of a patient for proper diagnosis and treatment planning*. Until now, imaging technology was limited to two dimensions. Some 3-dimensional (3D) imaging techniques have been developed but they are limited by the amount of information they can display and by their static nature. The development of an interactive 3-Dimensional digital model of a patient's anatomy would greatly improve our ability to determine different treatment options, to monitor changes over time, to predict and display final treatment results, and to measure treatment outcome more accurately. But the main disadvantage is that it cannot be articulated. Digital orthodontic models are as reliable as traditional stone models and probably will become the standard for orthodontic clinical use. Now a days Study model, Digital radiograph and digital photography plays vital role in diagnosis and treatment planning of orthodonticpatient. This article describes about indication,advantages, disadvantage and the procedure of digital model.

Keywords: *Digital model, 3-dimensional Imaging, Orthodontic treatment planning.*

Introduction

The digital cast models have very important role in digitization of everyday life of orthodontics. Now a days Studymodel, Digital radiographs and digital photography plays vital role in diagnosis and to decide treatment planning of orthodonticpatient. Electronic study casts are recent advances. Traditional method include dental and medical history, photography, radiograph, patientrecords in digital format. So, in this scenario digital study model has become moredesirable.[1] Plaster study models are true 3D information that is routinelyused today, and these models can't be properly intermixed or measured with the other diagnostic parameters. After 3 years of testing, in 1999 the American board of orthodontics (ABO) suggested a grading system for posttreatment orthodontic study cast and extra oral radiographs, for making the phase III Examination more accurate. According to ABO'S, seven occlusal parameters have been suggested whichincludes teeth Alignment, vertical position of marginal ridges, buccolingual angulations of molars and premolars, occlusal relation, occlusal contacts, overjet, andmesio distal contacts; measurement on plaster study castand this assessment considered as an important parameter to establish patient's final occlusion.[2]

A plaster dental study cast is a patient's record in all dimensions(3-Dimensional). Study models gives vital information about the inter proximal dimensions of tooth, arch length discrepancy, dental asymmetry, and arch length relationships in all dimension. A study model can also give a 3D evaluation of a treatment planning known as dental ''setup. Other techniques are also available that simulate digital study cast in all plane which can be seen on adigital screen. Digital ortho cad™ is software which was considered as the most precise system for doing measurements on study models. Ortho CAD was the 1st company which proposed a digital study castfacility to market of orthodontics in 1999 followed by electronic-models of Geo Digm Corp in 2001. Later, different digital modelsystems: such as E-model™, Suresmile™, Orthoproof™ and Ortholab™ came to the market from worldwide (Figure 1).[3]

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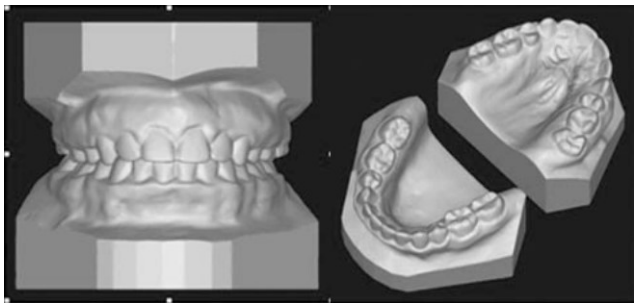


Figure 1. Emodel by Geodigm Y Corporation (Anterior view of digital model 3-D view)

Study model either plaster or digital have 2 important function:

✓ Providing information for proper diagnosis and treatment plan.

✓ Providing 3Dparameters of the actual malocclusion at any stage

But these manual models (plaster/stone) have a many **drawback** such as:

✓ More space is required forstorage and retrieval.

✓ Provides 2D information only

✓ Difficult to transfer

Table 1. Advantages of Digital and Plaster Model

Plaster Model	Digital Model
i. Easy to produce ii. Inexpensive iii. Measurementcan do Easily on plaster casts andcan be mountedon the articulator for study in 3-dimensional evaluation.	i. Easyto store and retrieve. ii. Quickevaluation of 3-dimensional information. No need of retrieval and storage of models in storage area. iii. Ease of interoffice transferability, iv. Possibly equal or better diagnostic capabilities.

Disadvantages: Only disadvantage of 'digitalmodels' is that it cannot be mounted and articulate on articulatoraccording to patient's TMJ function, while it can be partially assessed with jaw alignment assessment software.[4]

Indication: With the software in the computer, the digital cast can be useful to measure:

1. Vital treatment parameters such as overbite, overjet, and arch length.
2. Reliable measurements for: Tooth size, Arch length, Space analysis, Overjet, Overbite, Bolton ratio.

Procedure: Ortho CAD technology makes 3D digital study cast. The designing of this technologyisin such a way so that it canovercome the drawback of traditional study models. 'Digital study cast may allow the use of a proper digital patient record for the orthodontic treatment. Ortho CAD™ software has been designed by Cadent, Ind (Computer-aided Dentistry, Fairview, NJ, USA).[5]

Ortho CAD, gives orthodontista Digital 3-dimensional sets of study cast, that can be altered three dimensionally;can view sectionally in all plane of space and measurement can be done in all desirable plane with accuracy. Ortho CAD uses art and science of computer aided design i.e. CAD to optically scan the '3D cast' duplicated from a 'plaster model'. These are then described to orthodontist by the original Ortho CAD software user line which allows both construction and free alteration of the 'study cast' in 3-Dplane and collection of data by a variety of parameter for diagnosis.[6]

Production and use of digital Study cast

High quality impression: Good quality impressions and registration of bite are essential. The impression should be taken in a good quality alginate, polyvinyl silicone or polyether impression material. The aim is to produce a set of impressions that will be accurate and dimensionally stable as much as possible, considering that they have to be sent to the USA. After taking high quality alginate,such as Orthoprint (Zhermack, Rovigo, Italy) taken inrigid plastic impression trays. The alginate impressions are disinfected, packed in damp paper towel and then sealed with plastic bags to keep it moist. It will ensure that the impression will remain workable and stable at least 5 days.[7] If impression will not reach up to 5 days, then we will use polyether like Impregum (ESPE Dental AG, Seefeld, Germany).

Scanning of Impression by Cadent: After receiving of impression, plastermodel is produced from that impression and scanned optically, any distortion of the 'plaster equivalent', should not incorporated in the Ortho CAD digital system.

Approximately after 10 days of dispatch to the USA, the patient's 3D digital model can be downloaded on to your computer (Figure 2).[8]

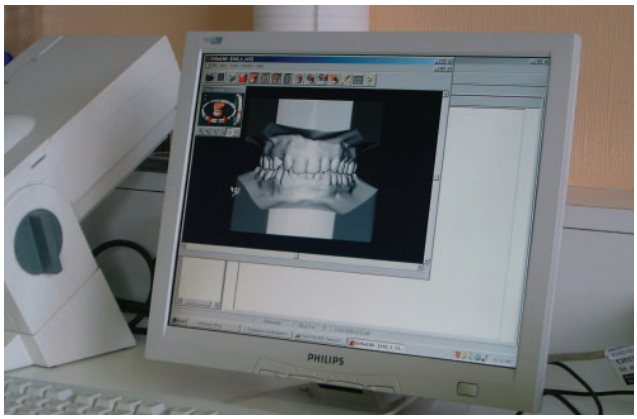


Figure 2: Visual image of 'Digital study models by Ortho CAD on Computer screen

Alteration of the Digital models: Alterationcan be done by Ortho CAD software,which facilitates'Grab and Drag' function so that alterations can be done in all planes of space. The models can be viewed statically from any perspective. Sectioning can be done in anydesired plane. Occlusal surfaces will have better visibility with highlighting the occlusal contacts. Diagnostic procedures like measurement of tooth widths, space assessment, Moyer and Tanaka-Johnston prediction, Bolton analyses, arch width measurement,and, overbite and overjet measurements can be done (Figure 3).

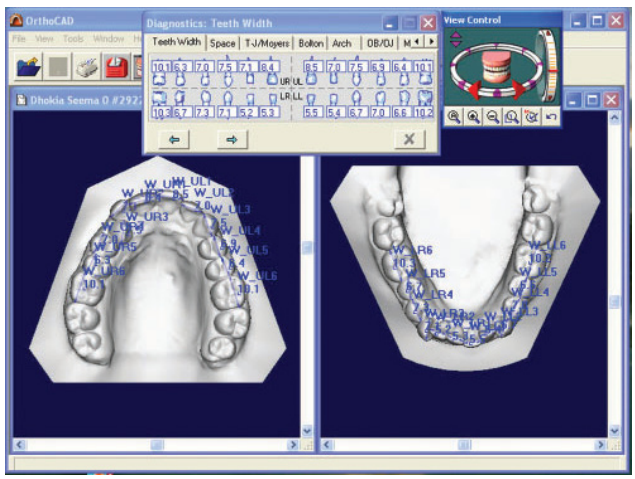


Figure 3. Visualization on digital screen of a measurement function on OrthoCAD

Measurement is made by a digitalcalliper and can be stored automatically. Then arch form and arch size are calculated for evaluation of spaced is crepancies to do all the necessary analysis as per requirement.[9] Post treatment American Board of Orthodontist assessment: Jaw alignment assessment can be sent to the patient in the form of images with all measurements in the printed or it can be mailed to the patient or orthodontist as well. All tasks are properly explained in the division of the software known as help section.

Method of involvement with Ortho CAD™: After Registration on Ortho CAD www.OrthoCAD.com, initiate the delivery of the Ortho CAD software CD with all instructions. This software is simple to load, and provided computer is designated for 'model' download, software for storage and manipulation can be used on many work offices who ever want. The hardware system requirement is properly explained on website. To download on computer, our server, require a good internet and will be 'on line' to act as gateway to download automatically that usually takes overnight. The time taken for transfer depends on the speed of internet connection, but if this takes overnight also, usuallyit's not an issue. Folder which contains the downloaded 'Digital model' files is created on the designated work office or server and each of these files usually take approximately 500 Kb of space. There is no requirement of space storage, while a separate hard drive for all digital model file that are not in active use could be use.[10] At the time of writing the cost of Ortho CAD digital model is $36.00 each set of models about £20.00. plus,shipping charge of approximately £30.00 (the author typically shipped 3 or 4 set of impression per box) and after addition it bring a total cost for a set of models to around £28.00–£30.00. 346 L. Joffe Features Section JO December 2004. The software for the digital studymodel is provided without anyprice.[11]

Conclusion

Byusing digital models, clinician can move, rotate, or zoom in any plane or orientation. Various model analysis, arch length discrepancy and curve length measurement can easily be done by pointing and clicking mouse. Many orthodontic and surgical prediction can be done on the digital models which will increase the accuracy of the prediction of treatment outcome.

Ethical Permission: Not Required

Conflict of Interest: None

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An Insight into Oral Verruciform Xanthoma: A Report of Two Cases

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Abstract

Oral Verruciform xanthoma (OVX) is a benign mucocutaneous, rare, asymptomatic lesion of unknown etiology and ambiguous nature involving the oral mucous membrane of the middle-aged during the fifth to seventh decadeof life. Clinically it may be presented as a verrucous, polyploid or sessile mass mostly solitary and slow growing in the hard palate,gingival, tongue or buccal mucosa. Colour of the lesion may vary from white, pink or red and there is a slight male predilection. The histopathological features of OVX are however pathognomonic, characterized by the presence of lipid- laden foam cells confined to the papillary areas of connective tissue. The final diagnosis is always histopathological as its clinical features are not distinct and OVX must always be considered in the differential diagnosis of other verrucous and papillary lesions. Treatment of OVX is complete surgical excision with follow up to avoid its recurrence. We present2 cases of oral verruciform Xanthoma, which were provisionally misdiagnosed as pyogenic granuloma and traumatic fibroma respectively based upon their clinical presentation and after a thorough histopathological examination revealed an entirely different diagnosis in both the cases.

Keywords: *Oral verruciform xanthoma, OVX, mucocutaneous lesion, foam cells.*

Introduction

Oral Verruciform Xanthoma (OVX) being a quite rare, benign mucocutaneous lesion is often difficult to diagnose clinically as it may have a varied presentation. It was first described by Shafer in the oral cavity in 1971 but same lesions have also been reported to occur in penis, vulva and the scrotum or in chronic inflammatory skin diseases such as Epidermolysis bullosa, epidermal nevi, discoid lupus erythematosus and graft versus host disease When there is involvement of the oral cavity, the lesion is usually symptomless and solitary, well demarcated from the surrounding mucosamainly involving the gingiva or hard palate, however, cases involving tongue and buccal mucosa have also been reported. It may have a papillary, verrucous, polyploid or plaque like appearance with colour of the lesion varying from whitish to red or pink. Most cases have been reported to occur during the fifth to seventh decades of life, more so in male.[1-6]

The histopathogical picture of OVX is pathognomonic with collection of lipid-laden foamy cells or "xanthoma cells" within the papillary areas of connective tissue. The overlying stratified squamous epithelium is hyperkeratotic with extended rete pegs and displays papillary or verrucous proliferations into the underlying connective tissue stroma. Within the projections of surface epithelium there may be presence of keratin clefts occasionally. Neutrophilic exocytosis within the parakeratin layer along with lymphocytic and plasma cell infiltration in the stroma may also be evident.[6-8]

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This paper throws light upon 2 cases of Oral Verruciform Xanthoma in a 35-year-old female which was diagnosed clinically as Pyogenic granuloma and in a 25-year-old female which was diagnosed as traumatic fibroma based upon its clinical presentation. Both the lesions were surgically excised and sent for histopathological examination and finally diagnosed as Oral Verruciform Xanthoma.[9]

Case Reports

Case 1: A 35-year-old female presented with the chief complaint of growth in mandibular anterior teeth region in the last 3 months. On intraoral examination a gingival overgrowth was present in relation to the lingual aspect of 41 and 42. The growth was erythematous and soft in consistency, fluctuant, and oval in shape measuring about 1.1cm x 0.5cm in the greatest diameter. The associated teeth were mobile and radiographical findings revealed interdental bone loss in relation to 41 and 42. A provisional diagnosis of Pyogenic granuloma was made based upon these findings. The growth was surgically excised completely and the biopsy specimen was sent for processing and histopathological evaluation.

Histopathological Findings: The hematoxylin and eosin stained section of the specimen revealed a hyperplastic acanthotic parakeratinized stratified squamous epithelium overlying a moderately vascular fibro-collagenous connective tissue stroma. Large foamy macrophages resembling xanthoma cells were noticed in the connective tissue papilla and sub epithelial connective tissue. Ossifications intermingled with spindle shaped fibroblasts along with moderate amount of chronic inflammatory cells chiefly plasma cells were evident in the stroma.

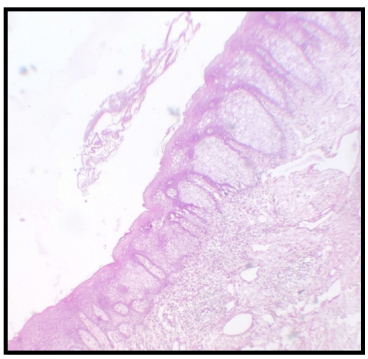


Figure 1: (4x view): The photomicrograph of H & E stained section showing hyperplastic acanthotic parakeratinized stratified squamous epithelium with underlying moderately vascular fibrocollagenous stroma.

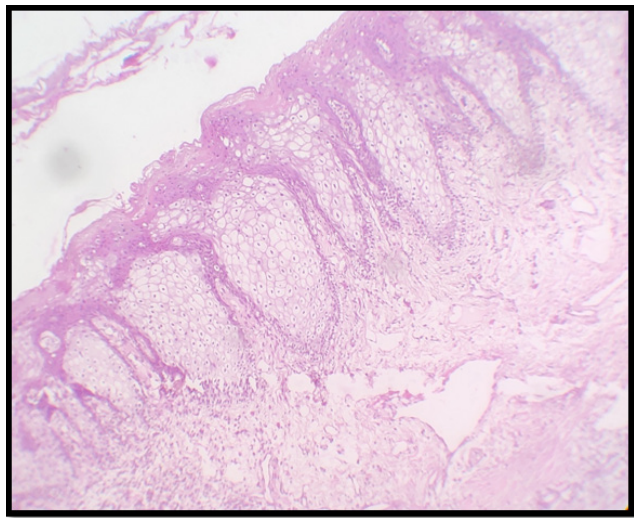


Figure 2 (10x view): The photomicrograph of H & E stained section showing large foamy macrophages resembling xanthoma cells in the connective tissue papilla and sub epithelial connective tissue.

Based upon these findings a final diagnosis of Oral Verruciform Xanthoma was made.

Case 2: A 25-year-old female presented with a painless growth in relation to mandibular anterior teeth region for 4 months. Patient was suffering from polycystic ovarian syndrome and had underwent a surgery for breast fibroid. Upon clinical examination, a pale pink pedunculated gingival growth was present in the labial aspect of 31 and 41 involving the marginal and attached gingival. The growth was soft in consistency, measuring about 0.8cm x 0.8 cm in the greatest dimension. There was no bleeding or tenderness present. A provisional diagnosis of traumatic fibroma was given based upon these clinical findings. The entire growth was surgically excised and the biopsy specimen was sent for processing and histopathological evaluation.

Histopathological Findings: The Hematoxylin and eosin stained section of the specimen revealed a parakeratinized stratified squamous epithelium proliferating into the underlying delicately collagenous connective tissue stroma. Diffusely arranged vacuolated cells resembling xanthoma cells were noticed in the connective tissue papillae as well as deep inside the stroma. Minimal amount of lymphocytes arranged diffusely were also evident in the minimally vascular stroma.

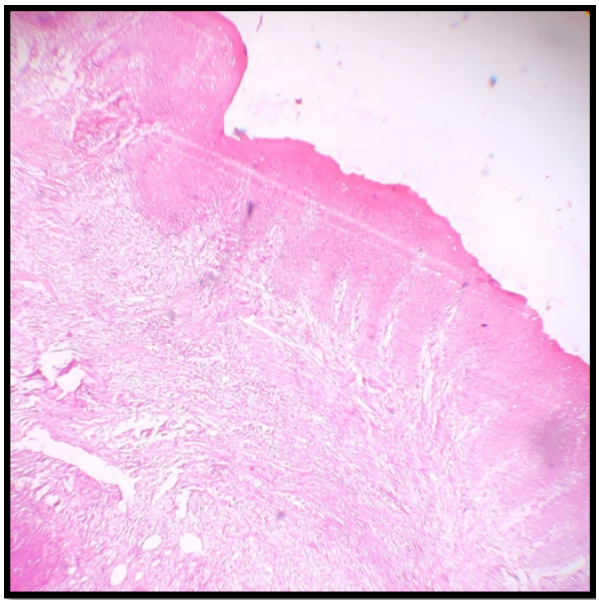


Figure 3 (4x view): The photomicrograph of H & E stained section showinga parakeratinized stratified squamous epithelium proliferating into the underlying delicately collagenous connective tissue stroma.

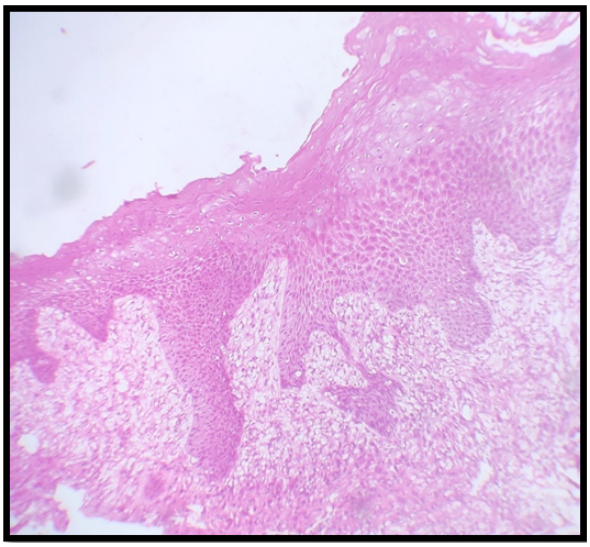


Figure 4 (10x view): Thephotomicrograph of H & E stained section showingdiffuse arrangement of xanthoma cells in the connective tissue papillae and deep inside the stroma.

Based upon these findings, a final diagnosis of Oral Verruciform Xanthoma was made.

Discussion

OVX is an extremely rare lesion with the frequency of occurrence ranging from 0.025-0.5% (9)during the 5^{th}-7^{th} decades of life and mostly diagnosed clinically as Papilloma. The extraoral lesion are even rarer and mostly involve the anogenital areas or and skin in correlation with other chronic skin diseases like epidermal nevi, discoid lupus erythmatosus, epidermolysis bullosa and Congenital Hemidysplasia with Ichthyosiform erythroderma and Limb Defects (CHILD) syndrome.[10]

The exact pathogenesis of verruciform xanthoma still remains unknown. According to one theory it is believed that a local irritant in the form of trauma or inflammation may give rise to degeneration in the epithelium which further leads to formation of lipids in turn scavenged by macrophages. Viral or fungal infections may also act as a local irritant and play a role in its etiology. However, this does not explain the prevalence of OVX in other parts of oral cavity excrept the masticatory mucosa. According to some authors the changes in epithelium occur secondary because of the presence of foamy cells or it is just an illusion because of the pushing effect of the macrophages upwards. Hence, the exact etiopathogenesis still remains questionable.[11-13]

The varied clinical presentation of verruciform xanthoma and its extremely rare occurrence in the oral cavity makes it very difficult to be diagnosed clinically. It presents as a symptomless and painless solitary mass which is usually well demarcated and can display a plaque like, verrucous, sessile or polyploid appearance. The colour of the lesion may also vary from white, pink or red. The most common site of involvement is gingiva and there is a higher predilection in males. Verrucous lesions like verrucous leukoplakia, verrucous carcinoma, squamous papilloma, verruca vulgaris, condyloma acuminatum and squamous cell carcinoma should be considered and ruled out in the differential diagnosis of Verruciform xanthoma.[14,15]

Histopathologically, the hallmark of verruciform xanthoma is the presence of foamy cells or xanthoma cells filling up the connective tissue papillae in between the epithelial rete pegs. The overlying epithelium is mostly hyperkeratotic and proliferates into the underlying stroma in the form of verrucous or papillary projections. The histopathology of OVX is pathognomonic and the final diagnosis relies upon it and it should never be avoided.

The treatment of choice for such lesions is complete surgical excision and follow up. No malignant transformation has been reported till date and the recurrence rate is extremely low.[12]

Conclusion

OVX is an extremely rare disease with an unknown cause and nature and its pathogenesis still remains questionable. The cases presented in this paper signify the importance of histopathology in such rare cases which are and can often be misdiagnosed based solely upon their clinical presentation. A thorough clinical and histopathological examination becomes mandatory and inevitable for the proper diagnosis and treatment of such cases.

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Conflict of Interest: None

Ethical Permission: Approved

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3D Printing, Innovative Approach in Dentistry

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Abstract

In dentistry use of latest technology and smart devices have made the life of a dental practitioner easier. Researchers are innovating new technologies in dentistry every other day. One of the latest innovations is three-dimensional (3D) printing which makes the treatment planning and execution faster and with precision. Three-dimensional printing is used along with a wide array of various materials. 3D printing is used in Periodontal research as well and 3D printed guides are used for esthetic correction of gingiva. This review highlights on the various 3D printing techniques available for use in dentistry.

Keywords: *Three-dimensional (3D) printing; esthetic correction; Periodontal research.*

Introduction

Over the years there is an increased development of3D printing for dental application. Be it planning of proper treatment or the treatment itself, it has simplified the procedures. Digital OPG (orthopantomogram), RVG, CBCT, Digital impression machine and CAD/CAM.3D printing is mainly applied in Oral surgery, Periodontics and Endodontics. This techniqueis an approach that builds object on a layer at a time, and then simultaneous addition of multiple layers to form an object. Powder or a liquid resin is used that slowly builds an image on layer by layer basis. A thin layer of liquid resin is dispensed by 3D machine and then a computer-controlled UV laser is used toharden each layer in cross sectional pattern. The soft resin that is left is then cleaned properly by a chemical bath at the end.

3D printing in Regenerative Dentistry in Periodontics: Abranch of regenerative medicine that focuses on regeneration of tissues i.e. oral and dental is known as Regenerative dentistry.[1] This branch uses tissue engineering concepts where a triad consisting of signalling molecule, cells and scaffold along with sufficient blood supply helps in forming new bone, cementum and PDL.[2] Guided tissue regeneration procedure remains unpredictable in a periodontal defect due to the open nature of wound, exposure to bacterial biofilm and close proximity to a avascular tooth surface.[3] To solve the dilemma,three dimensional(3D) multiphasic scaffolds and bioactive molecules are combined along with drugs. Besides gene and cell delivery is also used that enables a spatio-material control of periodontal wound healing.[4]

A computer aided design and computer-aided manufacturing (CAD/CAM) software uses a jet binder that is projected at a powder bed.[5] The solvent and powder bind together,forming a silica type solid. This process is repeated by adding a new layer of powder that can build the layer wise scaffold. Multiphasic scaffolds are used in tissue engineering because of the complex structure of soft and hard tissue interfaces of periodontal complex.[6]

Different Technologies of 3D printers

These are various principles on which 3D printers work. The technologies are as follows:

Direct light processing (DLP) technique: DLP work with photopolymers that solidifies and cures the

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resin. Each volex dataset is made up of voxels with dimensions as small as 16×16×15µmm in the X,Y and Z direction.[7] This process offers quick photo-typing capabilities with exceptional quality,good accuracy and nice surface finish.

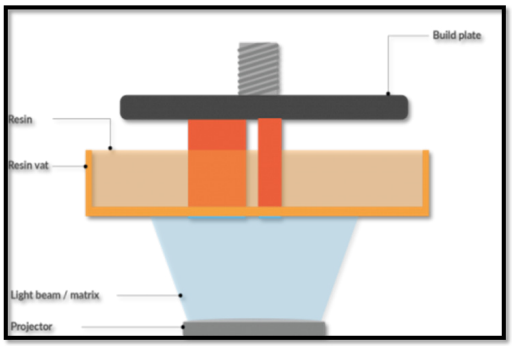


Figure 1. Direct Light Processing (DLP)

Fused deposition modelling (FDM)Technique:S. Scott Crump introduced it in 1980s and then it was in commercial use in 1990 by **Stratasys**. Most of the existing FDM machine use thermoplastic materials. Two materials are used that includesa) Modelling material, which constitutes the finished piece, b)Gel like support material acting as a scaffold.

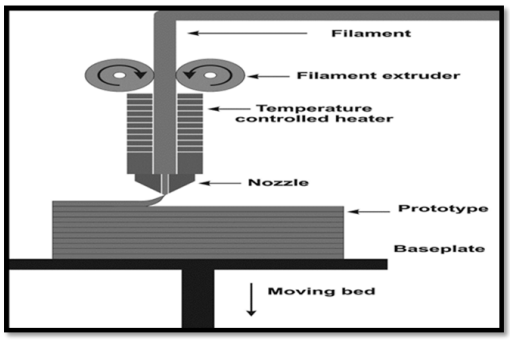


Figure 2. FDM technique

Stereolithography (SLA): This is a manufacturing process which use additive method and where ultraviolet (UV)laser helps focuson to a photopolymer resin vat. A laser light beam is used for tracing the first silica of an object on the liquid surface,causing hardening of a very thin layer. Silica is then traced and hardenedpreceded by lowering of platform. The process is repeated till the complete object is printed.

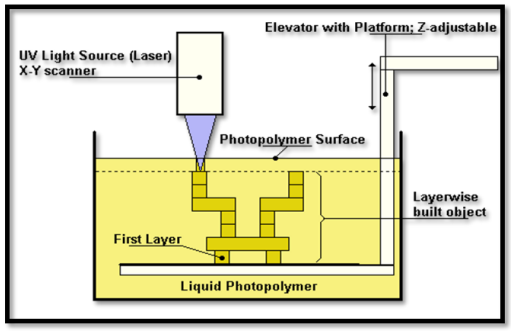


Figure 3. Stereolithography

Inkjet powder printing: Otherwise known as 'binder jetting' and "drop- on- powder". This techniqueselectively bonds powdered material together in different layers and in succession. Gypsum plaster and starch fill the powder bed and the liquid "blinder" activates the plaster. Dyes (for color printing)are also used as binders. Additives are used to adjust surface tension, viscosity and boiling point for matching printhead specification.



Figure 4. Inkjet 3d printer

Selective Laser Sintering (SLS): Heat is used for bonding powdered materials together.A powder is laid down and thereby many objects are produced. Laser is used selectively to fuse some fines particles together. Non bonded powder granules are used in the process of printing which support the object while it is being constructed. "Direct metal laser sintering"is the technique where SLS directly produces a metal object.[8]



Figure 5. SLS 3D Printer

Material used in 3D printers

Materials used in periodontal regeneration are:

(a) Polymers and Hydrogels: Synthetic polymers are materials that are commonly used in biomedical application. Pre-epolymerized cell-laden methacrylated gelatine hydrogels are nowadays used for bioprinting successfully.

(b) Ceramic: Calcium phosphate mineral, such as hydroxyapatite are used these days to make "Ceramic scaffolds".Cells canpopulate the scaffold surface very fast, thereby helping in promotionof cell proliferation and differentiation and establishment of cell tocell interactions.

(c) Composite materials: Polymer-polymer mixture,copolymer, or polymer-ceramic mixtures are printable composite materials.

(d) Polycaprolactone: The choice of material in multi-phasic scaffolds for periodontal regeneration are polycaprolactone. This being a hydrolytically biodegradable polyster can be manufactured in various porosities and requisite shapes.

Future Application: Three-dimensional printing is use in manufacturing of implants. Specifically tailored to patient's jaw maximizes the success of implants. This technique has the advantage that allowssafe and secured placement of implants in areas where a normal dental implant cannot be placed securely.

Conclusion

Considered a promising technological innovation for regenerative Periodontology in dentistry, 3D printers have received commercial awareness and but more trials should be done using this technology to have a widespread application in dentistry. More recently 4D printing has also been introduced where the printed part can change its function as well as shape with time in response to changes in light,water, temperature and electricity.

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Teeth in the Line of Mandibular Fracture

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Abstract

Facial fractures are very common fractures now in these days. Both maxilla and mandible are affected in this case. Male are more affected than female. This may happen due to road accident, fall, fights or during any sport events. Mandible is the most common site of accident although it is the heaviest and strongest facial bone. Injury to the teeth present in the line of fracture may involve many factors like avulsion, mobility, non-vitality,root fracture etc. involving periodontium. It has always been a disputed among the surgeons; whether to extract the tooth or not present in the line of fracture. Some advice to extract the tooth to avoid complication, where some advice to retain the tooth believing in benefit of the patient. This article aims to give an idea about whether the teeth in line of fracture should be retain or remove.

Keywords: *Angle of mandible, fracture line, complication, infection of teeth.*

Introduction

Mandible is the strongest bone in maxillofacial region and is more prone to trauma or accident. It is very common to locate teeth in the line of fracture. The shape and dislocation of fracture depend on the volume of force, soft tissue connection, bone thickness, route of muscle tug and susceptible zones that signify feeble anatomic structures.[1] Such type of fractures are present with pain, hematoma, irrationality of occlusion., edema, dislocation and mobility of fractured particles, facial irregularity and trouble in phonation.[1] About 56-69% of fractures of the mandible involve areas with teeth and there is about 27-30% of chances of fracture in angle of mandible.[2] The management of an angle of fracture is frequently difficult when the mandibular third molar is present in the site. The management of teeth present in line of fracture had changed in past few years. There are no any exact plans or procedures for the management of the teeth present in the line of fracture. Some clinicians' advice to remove the teeth present in line of fracture whereas some advice to keep the non-infected tooth in the site. In past it was believed that; teeth that are present in the line of fracture should be remove immediately to avoid any further complications. They suggested that the affected teeth should be extract immediately to reduce further complications like osteomyelitis. Even vital or non-affected teeth was also removed to avoid get fractured or to get infected. And after that many other studies suggested that the teeth present in the line of fracture can be protected by giving medications properly.[2] But now in recent studies it has resulted that the non-infected teeth that are present in the line of fracture can be conserved.[3]

Proper management of the noninfected teeth in the site of fracture may favor the treatment in some cases. Various authors have given different reviews on this study. According to Halazonetics (1968) revealed double as several fractures occurring at angle of mandible in dentate patients as in those that were edentulous. Oikarinen and Malmstrom (1969) revealed that the area of angle of mandible is included in 17.4% of 1284 cases of maxilla-facial trauma in their research. But none of them; neither Halazonetics or Oikarinen and Malmstorm made detailed orientation to the presence or absence of mandibular third molar teeth in the line of fracture. According to Rowe and Killley (1970) revealed that maximum fractured mandible cases are happen due to

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sports injury and road accident. Young adults are more likely to be injured in this case. According to Weiss (1965) revealed that the condylar, angle and mental areas were more prone to fracture. Another author Reitzelet al. (1978) did an experiment on the mandible of monkeys and related the forces required to fracture the angle area when the third molar was not erupted with those that create fracture when the teeth was erupted. So, they demonstrated that the presence of an unerupted teeth weakens the region of angle of mandible.[4-8]

Injury to the teeth in fracture line may complicate the fracture even more if it involves the periodontium. In such cases many complications may occur like avulsion, root fracture, non-vitality, mobility etc. These all may create complications during the time of healing or may create delay in healing. The purpose of this study was to evaluate the recent opinions on the treatment of teeth present in the line of mandibular fracture.[9]

Discussion

According to anatomy & location of fractured tooth; It is divided in to 4 types "Anatomic location of fracture, Degree of dislocation of fracture(Hairline; without dislocation, minimal; dislocation within 1-2mm; gross; dislocation within more than 2mm), location of apical foramen and lateral periodontium of fractured tooth the fractured line divided into(including oblique and apical fibers entirely, including three-quarters of the oblique fibers, involving apical fibers entirely, including apical 1/3rd of oblique fibers in both side)".[1]Mandible is the common and major site of fracture area. It is very common to observe teeth in fracture site. Some authors revealed that the presence of teeth can be one of the determinant features of fracture area. Constant extraction of teeth in the fracture line of mandible has no scientific basis and has different drawbacks.[10]

All patients should be observed and radiographs should be taken within 12 hours of the fracture and dislocation. After studying the radiographs in antero-posterior and oblique-lateral assessments of jaw then mark the fracture line of tooth then decide whether the tooth should be extracted or retained. According to line of angle of fracture in mandible, the fracture is "symphysis, para-symphysis, body, and angle and excepted fracture of condyle. In the angle fracture line if the teeth are associated with periodontitis and caries then it should be removed and the remaining teeth should be retained.[3]Sometimes these retained teeth get infected then those teeth should be extracted otherwise it may cause osteomyelitis and non-union. The treatment of angle fracture without presence of teeth is stable internal fixation.While operating maxillofacial trauma patients, there are some important rules to follow for the treatment of bone particles.[11] These rules are accurate structural discount, of bone particles, saving the occlusal plane, and by using the right fixation technique which will clutch the bone properly in useful position while maintaining occlusion until the end of operation and also stoppage of infection. Because the teeth present in fracture line also put effect on that area. So, the surgeon should carefully observe the patient and plan the treatment planning accordingly. In mandible, the angle of mandible area is thin so it may reduce the surface area between bone particles and may confound the mobility of bone particles. So, there are some rules and regulations whether the teeth should be extracted or not depending upon patient condition.[12] Suggestions for extraction of teeth are: teeth having vertical root fracture, teeth having highly mobile condition, teeth associated with periapical pathological condition, carious or fractured teeth that can't be saved by restoration, teeth having chances of acute pericoronitis, teeth having fracture near toCemento-enamel junction, wisdom teeth, roots having oblique/horizontal fracture. Reasons of not extraction of teeth are: teeth that are necessary for structural discount, teeth that role as occlusal stopper, patient having cardiac diseases, blood dyscrasias, patient who are diabetic, having renal diseases, females during lactation period and during pregnancy, teeth involving acute gingival/ peri coronal inflammation, teeth involving maxillary sinus, teeth that are related to maxillary sinus, teeth involving malignant tumours.[4, 13-15]

Fractures in mandible are more common in males than female. It may often occur 96% in male and only 4% in female.[1] According to Mariana Schaffer, "dependingupon anatomical site in mandible for fracture area are; about 10% in symphysis area, 27% in angle region,11% in body, 52% in Para symphysis area. Depending upon age and gender, the fracture line are; in age group of 15-20yrs affected male are 33%, while female are only 6%, in age group of 21-30yrs, affected male are 25% and female are 7%, in the age group of 31-40yrs, affected male are 13% and female are 5%, in 41-50yrs of age, affected male are 7% and female are only 4%. Depending upon fracture location affected area in mandible area are; in condyle 34%, in angle of mandible 17%, in Para symphysis 16%, in body of mandible 13%,

in symphysis 10%, in alveolar process 5%, in ramus of mandible 1%, in coronoid process its 0.6%, and at the end, in base of mandible its 0.3%.''[4, 16,17]

Complications

There are also many complications present in the line of fracture of mandible. It may be linked to the trauma of mandible or associated to interruption in joining the fractured mandible that rise the possibility of complications, but neural complications or any other complications like airway cooperation may make it predictable. If there is bilateral fracture of body of mandible, Para symphyseal or condylar fractures, there may be chances of airway obstructions. Other complications like infection, non-union or malunion, ankylosis are the main complications which may create problems in opening of mouth. Psychological consequences of facial trauma are such that the chances of post-traumatic anxiety condition areat rise in this situation. Other complications like inflammation, edema, ecchymoses and hematomas, emphysema, bleeding from mouth, flap dehiscence, sensory disorders are seen in early-stage of complications. In late-stage perforation of the mucoperiosteum, maxillary sinusitis, mandibular fractures, failed osseointegration, bony defects, periapical implant lesion, mental fatigue, fracture of plate, necrosis of bone, osteoporotic changes, nerve damage, displaced teeth & foreign bodies, gingival and periodontal problems, facial widening and sequestration of bone can happen.[17]

Conclusion

This study states that the proper rigid fixation system and the use of proper antibiotics have decreased the chances of inflammation in the site of mandibular fracture. The involved teeth may be frequently of great worth in relocation of fractured sections and can be used as support for prosthetic settlement. Hence, extraction of those teeth may create supplementary trauma and complicate the fracture and might prevent the chances of rigid fixation. Therefore a 1-yr of revisit in addition clinical and radiological assessment of the teeth present in the line of fracture is recommended. Unnecessary endodontic treatment can be avoided. Tooth buds present in the line of fracture should not be removed or substituted in exact place regardless of the grade of dislocation. Also, the tooth buds in initial stage of calcification and those included in broadly evacuated fracture sites sustained progress and erupted. In case of inflammation, its elimination can be measured, subsequently the existence of contamination is a prognostic factor of irregularity or impaction. Completely erupted teeth related to mandibular fracture should not be removed on a prevention basis to decrease the chances of inflammation on fracture area. Undamaged teeth in fracture line should not be extracted if they don't show any occurrence of excessive mobility or any infection. The decision of extraction of teeth must be decided on the basis of clinical condition. Though proper use of medications, extraction of non-symptomatic teeth is not required. Regular check-up and 1 year of radiological and clinical observation are recommended.

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Juvenile Periodontitis: An Overview

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Abstract

In this article, Juvenile Periodontis, which is known as an uncommon condition that is characterized by severe loss of attachment and destruction of the alveolar bone that becomes clinically significant during adolescence. It is also known as Aggressive Periodontitis. Juvenile Periodontitis is ramified as Localized juvenile or aggressive Periodontitis (LAP) and Generalized juvenile or aggressive Periodontitis (GAP). It is currently accepted that a combination of immunologic, bacteriologic factors and also hereditary factors which plays a significant role in the etiology of this disease. Hence it can be controlled by maintaining a good oral hygiene, in early stages.

Keywords: *Periodontitis, Localized aggressive Periodontitis, Generalized aggressive Periodontitis.*

Introduction

Generally, periodontitis is known as a severe gum infection that gives damage to the soft tissues and destroys the supporting bone of the teeth. It can lead to loosening of the tooth or loss of tooth. There are numerous types of Periodontitis, among them, the most common are, chronic periodontitis, aggressive periodontitis, necrotizing periodontal disease. Juvenile periodontitis is also known as early onset periodontitis or aggressive periodontitis as it progresses rapidly while ordinary Periodontitis has a slower rate of progression. It is defined as the destruction of supporting tissues of the teeth which becomes clinically significant during the adolescence or early adulthood.[1-3] This disease is classified in localized and generalized form as localized aggressive periodontitis (LAP) and generalized aggressive periodontitis (GAP). As the disease aggravates, the affected teeth increasingly becomes mobile with labial movement leading to spacings of the incisors. Bleeding of the periodontal pocket is also evident. It is evident that the diagnostic features of this disease are characteristic, but some variations are seen in clinical presentation and patterns of destruction in patients. A regular dental check-up along with comprehensive management can improve the treatment process leading to reduced chance of progression of the disease. Generally, there is some differentiation found to have a typical racial and sex predilection; where the blacks and Male teenagers have a higher risk of occurrence rather than the whites and females.[4,5]

Localized Aggressive Periodontitis (LAP): According to Gottlieb, Localized juvenile Periodontitis is defined as a chronic, degenerative, non-inflammatory disease of periodontal tissues, which he referred to as "diffuse atrophy of alveolar bone". It tends to occur among the members of same family. It affects both the sexes.It affects mainly the mesial and distal surface of first permanent molars and Incisors.. Actinobacillus actinomyecetemcomitans bacteria plays a dominant role in progression of this disease.[6] Other microorganisms like *P.gingivalis, E.corrodens, Capnocytophaga, Spirochetes, Bacillus*, etc are also found on the diseased site. Increased level of A.a are found in active sites and lower in healthy sites. These assembles leuko-aggressive properties, bone resorbing factors, collagenase and other immunosuppressive factors that helps in host tissue invasion and evasion defences gives rise to destruction of periodontal tissues.[7] Incidence of A.a found more in younger persons rather than the older one. But as per seen, younger patients experienced more damage in tissues during a short span of time. As per many cultural studies it is found that A. actinomycetecomitans permeates and grows vigorously within the periodontal soft tissues. So the therapy should be done by the total elimination of A. actinomycetecomitans from the supragingival and subgingival plaque, supragingival microflora and periodontal soft tissues. [8-10]

Generalized Aggressive Periodontitis (GAP): Anciently, it is known as Generalized Juvenile Periodontitis and Rapidly progressive Periodontitis. It is

characterized by generalized interproximal attachment loss involving at least three permanent teeth other than first molars and Incisors.[11] Delineated by a more widespread pattern of periodontal destruction. It is associated with a variety of diseases of other systems. Generalized Aggressive Periodontitis is classified into Destructive stage and Non-destructive stage. Bacterias responsible for this disease are Porphyromonas gingivalis, A.a, Bacteroides forsythis. In this case it shows poor serum antibody responses to infecting agents. Subgingival tissues evidents presence of gram negative rods and exhibits suppressed neutrophil chemotaxis. GAP usually affects the individual below 30 years of age.[12] The destruction often appears episodically and it shows severely inflamed and ulcerated tissues leading to a fiery red appearance. Suppuration, attachment or bone loss usually occurs. Some patients may exhibit mental depression, weight loss, general malaise in this disease.[13] GAP patients having a smoking habit are more likely to experience more destruction of tissues in comparison to those who do not smoke or maintaining a good oral hygiene.[14-16]

Treatment: Early detection is enormously important for prevention of attachment loss and bone loss. Depending on severity of the tissue loss extraction of the involved tooth is recommended. Antibiotics can be prescribed like; Tetracycline is a drug of choice (one gram a day) as it produces a crevicular fluid concentration which is 20-10 times that of blood.[8] Other drugs like Tetracycline with Metronidazole, Doxycycline can also be administered systemically. Periodontal therapy; closed curettage and surgical curettage involving scaling and root planning, plaque control protocols, debridement with or without flap using Iodine and hydrogen peroxide solution can be preformed by the clinician. Some chemical plaque control agents like chlorhexidine (0.12%), and povidone iodine(1%) can be prescribed by the clinician for further plaque control as an adjunct to patient's mechanical plaque control majors.[14] Amine fluoride and stannous fluoride mouth rinses and toothpastes as an adjunct mechanical oral hygiene procedures in GAP affected patients are found to be more effective in controlling supragingival plaque accumulation.[15] Bone grafts and root resecting process or hemi sectioning are also done if necessary.

Discussion

Periodontitis is common but fairly preventable. The cause is usually poor maintenance of oral hygiene. It's a risk factor for heart and lung diseases. If the disease is left untreated it progresses to Periodontitis. However in Juvenile Periodontitis, gingiva appears to be normal in early stages. Gingival inflammation is seen in those patients having poor or bad oral hygiene with obvious plaque and calculus. In some major cases it is seen that juvenile periodontitis, however one is left with major clinical impression, that the amount of destruction of periodontal tissues do not commensurate with the local irritants, which can be found.[16,17] The bone loss pattern in this disease is generally designated as an arch shaped pattern of bone loss that extending from the distal surface of the second bicuspid to the mesial surface of the second molar. In the posterior region the bone loss occurs bilaterally and the left and right sides are generally mirror images of each other.[18, 19]

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Emergence Profile in Esthetic Implant Restorations: Surgical and Prosthetic Perspective

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Abstract

The main objective in esthetic implant restoration from surgical perspective are maintenance of harmonious gingival architecture and preserving the alveolar crest contour. This review article discusses the importance of various phases of successful implant treatment. Starting fromaccurate diagnosis, assessment of risk factors, assessment of soft and hard tissues for attaining an emergence profile which provides natural appearance to implant prostheses.

Keywords: *Emergence profile, esthetics, implant prosthesis.*

Introduction

Fulfilling the esthetic demands of a patient in implant dentistry is the most difficult task to achieve. While accurate diagnosis, assessment of risk factors, surrounding soft and hard tissue are essential for obtaining the esthetic goals, the emergence profile of the definitive prosthesis plays the key role in providing a natural looking crown.(1)Excellent emergence profile provides a smooth transition from the circular form of implant platform to the natural appearance of the prosthesis at the gingival level. The main objective in esthetic implant restoration from surgical perspective are maintenance of harmonious gingival architecture and preserving the alveolar crest contour. (2)The underlying bone, the soft tissue and the superstructure all affect the esthetic outcome. Therefore, it is recommended that clinician move from one level to the next. Before or at implant placement the bone contour is altered according to the existing requirements related to function and esthetic. Soft tissue management is done with grafting comprising of various techniques and of reshaping of gingival tissues with appropriate gingival former (healing cap) and provisional restorations.(3) Lastly, the prosthesis is fabricated meeting the esthetic demands of the patient.

The factors on which the development of perfect emergence profile depends can be broadly sub- divided into different phases-

1. **Presurgical phase:** Height of Lip line on smiling, Gingival biotype, Shape of the missing and adjacent teeth, Alveolar bone height in relation to adjacent tooth, Height and thickness of hard and soft tissues in edentulous space,
2. **Surgical phase:** Deficient Soft tissue and hard tissue, Implant position in three dimensions
3. **Prosthetic phase:** Gingival former of proper size and length, Provisional restoration, Selection of abutment

Presurgical Phase:

(a) Height of lip line on smiling

- **Low lip line** – It displays only the incisal half of maxillary teeth. Esthetic risk is reduced as lips hide the suboptimal esthetic outcomes.
- **Medium lip line-**It displays most of the anterior maxillary teeth and very little gingival

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structures. In these cases, esthetic risk is increased and is associated with shape of teeth and appearance of gingival embrasures.

- **High lip line:** It displays total maxillary anterior teeth along with substantial part of gingival tissues. Esthetic risk is significantly increased due to gingival show. Any short comings will be easily noticed.

(b) Gingival biotype

- **Thick gingival biotype:** Low-risk when replacing single missing teeth. Gingival tissue comprises of thick broad band of attached gingivaty pically resistant to recession. Thickened gingiva brilliantly masks the metallic show of implants. This biotype favors the long-term stability of esthetic peri-implant soft tissue.
- **Thin gingival biotype:** Associated with excellent esthetic single tooth restorations if adjacent tooth has sufficient bone crest heights. Thin and friable nature of soft tissue is conducive to formation of interproximal papillae but increased risk of gingival recession.[4,5]

(c) Shape of the missing and adjacent teeth: Esthetic outcome is strongly influenced by the final architecture of gingiva.The shape of missing and adjacent teeth can profoundly influence the generation of interdental papilla. The risk can be reduced by presence of square teethshape. Triangular tooth shapes present greaterrisk for developing the interdental papilla and risk of developing black triangles areanticipated.

(d) Alveolar bone height in relation to adjacent tooth: For single missing teeth, the support for interproximal dental papilla is related to the height of bone crestson adjacent teeth. Where local infections have resulted in vertical bone loss around adjacent teeth, the risk of compromised esthetic outcome is greatly increased.

(e) Height and thickness of hard and soft tissues in edentulous space: The risk of compromised esthetic outcome increases with the deficiency in the height andthickness of soft and hard tissue in edentulous space. In clinical scenario, patients present with missing bone wall orreduced height and thickness of bone due to various reasons of tooth loss e.g. congenitally missing tooth or avulsed tooth with facial bone wall fracture. In such cases, deeper implant placementis undertaken to harness increased ridge width. Deeper implant placement is detrimentalto esthetics as proportion of restorations (long crown) and emergence profile arenegatively influenced. In such situations, site enhancement through horizontal boneaugmentation or soft tissue grafting is recommended.

Surgical Phase:

Deficient soft tissue and hard tissue: Thin soft tissue graft can be used for improving the width and contour of the soft tissues. These grafts are harvested in the premolar area of the palate and can be sutured to the periosteum of the mucoperiosteal flap to avoid displacement of the graft during wound closure. Guided Bone Regeneration (GBR) procedureuses barrier membranes with or without bone grafts and/or bone substitutes. Osseous regeneration by GBR depends on the migration of pluripotential and osteogenic cells. It could be done through Simultaneous approach i.e. GBR at the time of implant placement e.g. minor ridge defect. Staged approach-GBR before the placement of implant to increase ridge thickness and improve the ridge morphology.

Advances in manufacturing bone substitutes and increases in knowledge about guided tissue regeneration procedures have made bone-grafting techniques more predictable

I. Grafting Materials

- ***Autogenous bonegraft*** is a piece of tissue harvested from same person from one area to another. Commonintraoral sitesinclude mandibular symphysis, maxillary tuberosity, ramus, torior exostoses. In case of larger defects, iliac crest or tibial plateau can be used for harvesting the bone.
- ***Allografts*** tissue obtained from a person of similar species. Advantages of allograft bone are preventing another donor site and lessened surgicaltime e.g. mineralized or demineralized freeze-dried bone allograft.
- ***Xenografts*** are acquired from a genetically different species. Commonly used xenografts are natural hydroxyapatite (HA) and deorganified bovine bone. These are inert osteoconductive filler material, which provide a scaffold for new bone formation.

- ***Alloplasts*** are synthetically obtained graft material which includes calcium carbonate, bioactive glass polymers, including synthetic hydroxyapatite and tricalcium phosphate (TCP). They enhance bone tissue repair and increase bone growth. (6)

II. Barrier Membranes: Barrier membrane provide some advantage in grafting technique like they provide adhesion oftissue without mobility, block in-growth of soft tissue, easy to manipulate and help in maintaining space. They could be Non-Resorbable Membranes and Resorbable Membranes.(6,7)

Non-Resorbable Membranes:

- Disadvantages with usage of non-resorbable membranes include wound dehiscence due to incomplete coverage of the defect, wound infection subsequent to exposure of e-PTFE membranes and need for a second stage surgical procedure to remove the membrane. Thisinvolves increased costs and discomfort for the patient

- Expanded Polytetrafluoroethylene- The e-PTFE membrane acts as a mechanical barrier. Fibroblasts and other connective-tissue cells are prohibited from entering the defect site so that the apparently slower migrating cells with osteogenic potential grow in abundance in the defect.

- High-Density Polytetrafluoroethylene- a common problem with highly porous e-PTFE membrane is migration of microorganisms. To resolve this problem, a high-density PTFE membrane (d-PTFE) with a pore size of less than 0.3 micron was introduced.

- Titanium Mesh- The space to be regenerated is preserved without collapsing with the use of titanium mesh. It can be bent to desired shape as it is highly flexible.

- Titanium-reinforced PTFE-It provides stability in large, non-space maintaining osseous defects as the inserted titanium framework allows the membrane to be molded to fit a variety of defects without rebounding.

Resorbable Membrane: The advantages of resorbable membranes includeno need for membrane removal and decreased patient discomfort.

1. Polymeric Membranes- Polymeric membranes are valuable as they prevent loss of alveolar bone in extraction sockets thus avoid alveolar ridge defect.
2. Collagen Membranes

Several advantages of collagen materials to be usedas a barrier membrane are hemostasis, chemotaxis for periodontal ligament fibroblasts and gingival fibroblasts, weak immunogenicity, easy manipulation and adaption, a direct effect on bone formation and ability for augmenting tissue thickness. This makes collagen material an ideal choice for a bioresorbable GTR or GBR barrier. Disadvantage collagen and synthetic polyester membranes lack space-maintaining ability. These membranes are often used with tenting or supporting materials (different bone grafts or bone fillers) to prevent space collapse.(6,7)

Correct implant position in 3 dimensions: The correct positioning of implant in 3 dimensions critically influences the emergence profile of anterior esthetic restoration.

- **Mesiodistal position:** Improper mesiodistal positioning of implants results inreduction in height of thealveolar crest which in turn reduces the height of interproximal papilla.This will lead toformationoflonger contact area in the final restoration resulting in poor emergence profile.

- **Faciolingual position:** Placement of an implant in too facially results in soft tissue recession asmalpositionedimplant reduces the thickness of the facial bone wall. Another prosthetic implicationcouldbe implant angulation error making the rehabilitation procedure difficult.

- **Apicocoronally position:** Placement of implant in a much apical direction leads to bone saucerization resulting in significant bone loss and gradual soft tissue recession.(2)

Prosthetic Phase: Following the placement of implant,several parametersdetermine theprosthetic phase, starting with the gingival former and the temporary restoration, which form the initial gingival collar,followed by the abutment selection and finally, the shape and color of the crown.

(a) Gingival Former: The circular profile of most gingival former is different from nearly triangular profile of the cervical portion of the tooth to be

reconstructed. Therefore, some shape adjustments need to be done to create a natural esthetic emergence profile. The gingival former is anatomically shaped for esthetic soft tissue healing.

(b) Provisional restorations: Provisional restorations are required to shape, prepare, and stabilize the peri-implant tissues before the definitive restoration. They also aid in providing an esthetic evaluation before the finalization of the treatment. The shape and contour of provisional restoration can be easily adjusted chairside to establish the desired emergence profile.[8] This can be done by adding or subtracting temporary material in one to three conditioning steps.[9,10,11]

The peri -implant soft tissuesaround a provisional restoration matures and stabilizes in initial three to twelve months after insertion [12,13].Therefore, it is recommended that the provisional restoration remains in situ for a period of three months.

When the desired shape and emergence profile are achieved, the position of the peri-implant tissue must be accurately transferred to the master cast for fabrication of final restoration.

Customized impression coping: It matches the emergence profile obtained from the provisional restoration. An extraoral impression of the provisional crown is used to transfer the desired emergence profile to the impression coping. The customized impression coping supports the mucosa during impression taking and enables the dental technician to fabricate the optimal shape of the final crown.[14]

The shape of the definitive abutments and the definitive restoration will be identical tothat of the provisional restoration, thereby maintaining the exact soft-tissue architecture, optimizing esthetics, and minimizing gingival discrepancies

(c) Selection of abutment: The selection of an abutment in a particular case depends on several factors, most important is the angulation and spatial position of implant.[15]

I. Straight Abutment: The straight abutment is the most frequently used abutment. It can be used for Single,multipleor full arch restorations It can be used for both cementor screw retained restorations.

In cases where large amount of modification is necessary this abutment is contraindicated.

II. Angulated Abutment: These are the abutments used when the implants are placed in different angulation as compared to adjacent tooth. In order to compensate the angulation desired for the prosthesis, these angled abutments are used It allows for correction of angulation and positional discrepancy. This abutment is available in 15 to 35° angulations.

III. Custom Abutment: Patient specific contours of custom abutment sculpt the peri implant tissue during the healing phase. Final restorations that adhere precisely to patient's gingival contour provide ideal emergence profile. Customized abutments are fabricated in the dental laboratory after an implant level impression is made. The size, shape and material depend on the clinical application. These custom abutments help in smooth and atraumatic transition during delivery of definitive prosthesis.

Conclusion

Esthetics plays a significant role in implant placement but is critical for implants placed in the anterior esthetic zone. An anterior implant restoration must show high esthetic quality because they are most visible while smiling and talking. To provide natural effect to anterior crown emergence profile plays the most crucial role. [16]

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Oral Manifestations of Hematologic Disorders

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Abstract

It is well known that oral mucosal symptoms and signs are seen in the beginning of haematologic disorders and therefore the patient reports to the dentist first before visiting any general physician or haematologist. Hence it is imperative that the general dentist or the oral physician must be aware of these oral changes so that there is prompt referral to the specialist ensuring a fast diagnosis and early intervention thereby reducing the morbidity and mortality which may be associated with such diseases, especially leukaemia. In this overview of common oral changes encountered in the haematologic disorders is discussed in brief, including all the important facts about the disease.

Keywords: *Anaemia, leukemia, haemostatic defects, oral manifestations.*

Introduction

Haematologic disorders include a number of diseases, disorders with haemoglobin, erythrocytes, leukocytes, thrombocytes, coagulation factors, etc. All kinds of anaemia be it for deficiency of iron or vitamins or due to defects in erythropoiesis or blood loss, can lead to typical oro-facial manifestations in patients regularly visiting the dental clinic.[1]Patients having a bleeding tendency or a coagulopathy also comes with tell-tale oral signs which arouse suspicion regarding their medical status. Leukocytic diseases range from infections to haemotologic malignancy like leukemia, hence a proper diagnosis from the oral manifestations can help save lives. This paper describes the multitude of oral features in few of the important haematologic diseases.

Plummer – Vinson syndrome: Some patients may complain of burning sensation of tongue and oral mucosa. Tongue appears smooth or bald due to atrophy of papillae on the dorsum associated with erythema and fissuring is some cases. Angular cheilitis, thinning of vermilion border of lips, thin atropic oral mucosa with leukoplakia are present. Patient may also complain of dysphagia and on physical examination, spoon shaped nails (koilonychia), Esophageal stricture seen on barium swallow are suggestive features of Plummer–Vinson syndrome which consists of iron deficiency anemia, dysphagia, glossitis and koilonychia.[2] Since PlummerVinson syndrome produce dysphagia, caused by fibrosis of esophagus in post cricoid region and glossitis due to atrophy of epithelium, carcinoma may develop from dorsum of tongue and post cricoid region of esophagus, so it is a premalignant condition.

Pernicious anemia

Some patients may present with complains, of glossodynia, glossopyrosis and on examination of tongue, it appears beefy red in colour either generalized or in patches scattered over the dorsum and lateral borders. Atropy of papillae of the tongue result in smooth or bald tongue called as Hunter's glossitis or Moeller's glossitis. [3]Small, shallow ulcers resembling aphthous ulcers are present on tongue and buccal mucosa with persistent or recurring stomatitis, intolerance to dentures associated with pallor, fatigue, numbness or tingling sensation of extremities, incoordination and loss of vibratory sensation, shortness of breath, loss of weight, yellow tinged skin and sclerae in severe cases are suggestive features of pernicious anemia. It is a macrocytic anemic caused due to intrinsic factor deficiency leading to impaired absorption of vitamin B12. Achlorhydria associated with atrophy of gastric mucosa with a reduction in parietal cells is the pathognomonic feature of pernicious anemia.

Sickle cell anemia: In some patient, delayed eruption and hypoplasia of dentition associated with pallor oral mucosa and increased incidence of osteomyelitis due to hypovascularity of bone marrow are present. Intra-oral radiographs reveal large irregular marrow spaces

with coarse and reduced trabeculation seen as horizontal rows creating a ladder like effect between the roots of teeth, with normal lamina dura and periodontal ligament space. Radiopaque areas are seen representing past thrombi or infarcts. [4] Sickle cell crisis due to decreased oxygenation on exertion, infection or pregnancy is a common finding. They may have pain in joints and limbs, fatigue, cardiomegaly with an additional feature of packing of erythrocytes in peripheral vessels resulting in tissue anoxia. These features are suggestive of sickle cell anemia which is a hereditary type of chronic hemolytic anemia caused due to valine substitution for glutamic acid in sixth position of beta chain of hemoglobin.

Thalassemia: Some patients may present with unusual prominence of premaxilla, flaring of maxillary anterior, retracted upper lip, anterior open bite with painless enlargement of maxilla and mandible due to bone marrow hyperplasia as a result of extramedullary hematopoiesis referred to as "chip munk facies".[5] In some cases teeth discoloration due to excess iron deposition as an indicator of hemochromatosis associated with delayed pneumatization of maxillary sinus are present. Prominent malar bone, mongoloid face, slanting eyes, saddle nose deformity, protruding zygoma, prominent frontal and parietal bones are suggestive features of thalassemia. Intra – oral radiographs reveal salt and pepper appearance due to enlarged marrow spaces, coarse trabeculation, rarefaction of alveolar bone, thinning of lamina dura, shortened root are characteristic features of thalassemia which is a genetic disease caused by diminished synthesis of alpha or beta globin chain of hemoglobin.

PorphyriaSome patients may have red discolouration of teeth on exposure to ultra violet light and red coloured urine associated with atrophic cheilitis, advanced localized periodontal diseases with photo sensitization. Red or brown discoloration of both deciduous and permanent teeth is referred to as erythrodontia due to deposition of porphyrins which has an affinity for calcium phosphate, hence deposited in dentin during tooth development. [1] This is suggestive of Porphyria which is an in born metabolic disorder of pyrrole metabolism characterized by excessive formation of porphyrins in serum and in urine. If the disorder is localized to bone marrow, it is called erythropoietic porphyria and if liver is the site of excessive porphyrin production, hepatic porphyria develops.

Polycythemia: The patient will have an enlarged tongue with reddish color and slightest provocation causes bleeding. This sign of red tongue associated with bleeding in the form of petechiae, ecchymosis, hematoma is a clinical sign of polycythemia.Polycythemia is a condition in which there is abnormal increase in the number of red blood cells.[2,6]

Agranulocytosis: The patient has got multiple localized necrotizing ulcers in the tip of the tongue. Similar ulcers can be seen in buccal mucosa, gingiva and tonsils. The lesions appear as boggy, necrotic ulcers covered by gray or grayish black membrane. This clinical sign suggests that the patient is having agranulocytosis.[6] Agranulocytosis is a condition in which there is absence of granulocytes in WBC. Since the granulocytes are absent, local infection predominates and cause necrotic ulcer.

Leukemia: The patient has rapid gingival enlargement with bleeding. The tip of the gingiva will be purple in colour and mild ulcerations will be seen. This will be associated with petchiae, ecchymosis of skin. This clinical sign is suggestive that the patient is suffering from Leukemia.[7] Leukemia is a neoplastic proliferation of leucoplastic tissue characterized by increased number of immature erythrocytes in the circulating blood and tissues.Leukemic cell infiltration in gingiva is responsible for gingival enlargement. The rupture of minute blood vessels because of Leukemic cell circulation is responsible for bleeding.

Purpura: Patient will have bluish red dots in the oral mucosa, purpuric spots, small red patches, petechiae and ecchymosis in the oral mucosa. This will be associated with skin changes in the form of purpuric spot, petechiae and ecchymosis. The oral sign is suggestive that the patient is having purpura.Purpura is a clinical sign in which extravasation of blood occurs and manifests in the form of purpuric spots, petechial ecchymosis and is associated with bleeding from various orifices of the body.[6,8] This may be due to platelet disorders or vascular disorders. Thrombocytopathy, Thrombocytopenic, Thrombocythemia purpuras are varieties.

Hemophilia: Prolonged bleeding from oral tissue, due to injury or surgical procedures is a sign of Hemophilia. Even if there is prolonged bleeding after extraction of tooth, it will be due to hemophilia. As we know that Hemophilia is a blood disease, hereditary in nature, the defect is being carried by X-Chromosome and is transmitted as sex – linked mendelian recessive trait.

[8]Hemophilia occurs only in males, but it is transmitted from females. This is a coagulation defect in which there is deficiency of clotting factor VIII anti hemophilic globulin.

Conclusion

Many patients having anaemia or with bleeding/ clotting disorders who report to the general dentist or the oral physician have oral manifestations and even facial features pertaining to that disease. The features may be non-specific but they serve as an indicator of an underlying disease which could cause bleeding or issues in healing and could lead to cumbersome complications. Hence treating such patients requires a thorough investigative work up and referral to a haematologist before any dental treatment is initiated.

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Stem Cells in Maxillofacial Surgery

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Abstract

Cells with one-off self-renewal and potency are called stem cells. Stem cells can be converted into suitable cells with sufficient biochemical signals. Tissue regeneration involves delivery to wounded organs of different types of cells or cell products for tissue and organ reconstruction. Stem cells have strategies for the recovery and treatment of damaged tissues. In this article we are reviewing use of stem cells in maxillofacial surgery.

Keywords: *Stem Cell, Tissue, Engineering, Organs, Bone Marrow, Regeneration, Scaffolds.*

Introduction

Stem cells are cells that can differentiate into other cell types and can also split through self-renewal in order to produce more of the same stem cell types. For stem cells with medical significance in dentistry. Oral facial tissues have been identified as an origin and therapeutic target.[1,2] The stem cells are of following types:

1. **Embryonic Stem Cells:** Multipotential differentiation is possible, but clinical viability is limited due to medical problems. Embryonic cell lines are formed by the inner cell mass of embryo. The germ layers namely ectoderm, endoderm, and mesoderm are formed but the differentiation of the embryonic stem cells.
2. **Adult Stem Cells:** These stem cells are multipotent. They are obtained from different tissues such as umbilical cord, brain tissue, liver, bone marrow, amniotic fluid, pancreas, dental pulp, cornea, adipose tissue.
3. **Pluripotent Stem Cells:** It is a recent concept that uses suitable vectors to transfer 3-4genes found in stem cells to donor cells. They have the same characteristics as embryonic stem cells.

Stem cells origins are: Bone marrow, adipose tissue, oral and maxillofacial stem cells. Oral tissues are a stem cell origin. Tissue structuring in dentistry has shown promising results of oral tissue or organs being regenerated. The properties of stem cells are self-renewal and potency in regenerative dental usage many organs can be used. For tissue engineering dead cells are not used only alive cells are used as the materials. Tissue engineering contains the use of scaffold for the production of new productive tissue for a clinicaluse. [3,4]

Parameters in tissue engineering includes: - cell source, scaffold, bioreactor. It also leads to engineered tissues, that could allow us to research in vitro human physiology. The 3D extra-cellular matrix cells in the body grow by other cells surrounding to it. Scaffolds are things that are used tocause good cellular communication, in order to convey to the development of new functional tissues for medical purposes. They mimic the native tissue's extracellular matrix.[5]

It includes the possibility of creating and implanting tissues and organs in the laboratory when the body is able to repair itself. This uses cells, biomaterials, and molecules to repair structures in the body that due to disease and trauma do not function properly. In addition to regenerative medicine, tissue engineering can be to construct scaffolds in the human body. These scaffolds are used to sustain organs or organ systems that may have been damaged after injury or illness. Bone regeneration

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is the most relevant and demanding approach to tissue engineering in regenerative medicine.[6]

Dental Stem Cells and Transfer Factors: During the in vivo implantation of endodontically treated real-size, the injection of appropriate fibroblast growth factor and/or vascular endothelial growth factor (bFGF and/or VEGF) resulted in the Introduction of recellularized and revascularized connective tissue into the root canals native dentinal walls. Newly shaped dental tissue appeared thick with the extra-cellular matrix of the body surrounded by disconnected cells. Blood vessels filled with Erythrocyte were present with cell lining of endothelial tissue. In endodontically treated in vivo root canals, though in an ectopic fashion, the current chemotaxis-based approach has effective re-cellularization and re-vascularization effects. Cell homing dental pulp regeneration, can speed up medical translation rather than cell delivery.[7]

Sources of stem cells

Bone marrow stem cells (BMSCS): Sternum or iliac crest production. Hematopoietic stem cells and mesenchymal stem cells have both properties. The mesenchymal cells form as many of oral oro-maxillofacial structures as possible. The benefit of bone marrow is that there is plenty of stem cells and is possible to distinguish a wide variety of cells. Isolation done under general anaesthesia.

Adipose derived stem cells (ADSCs): It is obtained from the lipectomy or aspirate liposuction. A group of pluripotent mesenchymal stem cells with differentiation of multilineage. Useful and accessible to people.[8]

Oro-maxillofacialregion stem cells:

1. **Dentalpulpstemcells (DPSC):** represent a form of adult cell colony with the powerful ability to distinguish between self-renewal and multilineage differentiation.
2. **Dentalpulpofhumanexfoliateddeciduousteeth (SHED):** contains multipotent stem cells from human exfoliated deciduous teeth.
3. **Stemcellsofapicalpapilla (SCAP):** at the edge tips of tooth roots of the tooth.
4. **Dentalfollicleprogenitorcells (DFPC):** A loose ectomesenchyme based connective tissue sac covering the enamel organ and the dental papilla.
5. **Bonemarrow-derivedstemcells (BMDC):** They have the ability to found after trauma in several tissues.

Advantges of Dental Stem Cells:

1. Have high plasticity.
2. For longer period it can be cryopreserved.
3. It showed good interactions with factors of scaffolding and development.
4. Transplantations induce pathogen and immunosuppression, so the best alternative is autologous stem cell.

Stemcelltherapyuses:

- **Repair of dental tissue:** Dental stem cells are known to have opportunities for regeneration of tissue. These include the cell uses for dentin, periodontal ligament and dental pulp to repair damaged tooth tissues. Use of dental stem cells as cell sources to help restore non-dentinal tissues including bone and nerves.
- **Periodontalregeneration:** After implantation into the periodontal defect, BMSCs may develop the alveolar bone, periodontal ligament, and *in vivo* cementum.
- **Dentalpulpregeneration inimmaturetooth:** In the process of immunocompromised mice tubular dentin formation, human pulp stem cells with scaffold (hydroxyapatite/tricalcium) are found.

Toothregeneration: Latest development of this field. Regenerative treatments would be better suited instead of dental implants can be used as an alternative method. Epithelial mesenchymal interactions are important in the production of the tooth. Inductive morphogenesis, stem cells, scaffolds are three key elements that include tooth regeneration.

- **Craniofacial defect regeneration:** Regeneration of craniofacial defects due to cyst enucleation, wound resection and injury. Autologous stem cells and iliac crest bone graft are collected from gluteal area. Autologous fibrin keeps cells in place by cryoprecipitation. It is possible to develop articular condyles mesenchymal stem cells and biomimetic scaffold bioreactor condyles. Salivary gland regeneration is done through two approaches [3] Collagen gel-borne myoblast/progenitor cells are implanted to ensure muscle regeneration into the hemi glossectomized tongue.

- **Soft tissue reconstruction:** Reconstruction of soft tissue is performed in the oromaxillofacial region. Graft and flap transfer are repair techniques. Also used for reconstruction are adipose cells derived from human MSCs.
- **Cancer Treatment (stem cell transplantation):** Bone marrow cells are totally damaged or destroyed by killing cancer cells while undergoing high dose chemotherapy and radiation. Body can no longer produce the blood cells. Stem cells are replaced by transplants of stem cells by encouraging bone marrow to produce healthy cells that are killed by high dose cancer treatment.[9-11]

Conclusion

Traditionally it will be focus more on healing on recipients being able to use their own cells for disease treatment. The first role in dentistry is therapy for stem cell. With regenerative medicine, regenerative dentistry will have to be together. On the other hand, firstly they can be used medically, if not it could cause dangerous response. Maximum time follow up of the patient is needed to read the regenerated Cells for life. Finally, most treatments seek to improve tissue regeneration, and stem cell technology has opened a new road to regenerative medicine. A huge variety of defects are now being treated by the help of regenerative medicine. The future innovation should be able to "mimic nature" or "work with nature" to improve things and innovations such as nanotechnology in order to improve this area.

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Oral Manifestations of Cardiac, Respiratory and Renal Diseases

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Abstract

Many systemic diseases have their manifestations in the oral cavity which sometimes aids in the diagnosis of the systemic disease. It is imperative that, dentists or oral physicians ought to be aware of the different systemic diseases, the drugs that are given for their treatment and also the drug interactions in the patients with the said disease. Cardiac, respiratory and cardiac diseases are very common and many patients with such diseases report to the dentist with dental ailments. This overview aims at increasing the awareness regarding the cardiac, respiratory and renal diseases which have known oral manifestations.

Keywords: *Cardiac disease,oral manifestations, systemic disease.*

Introduction

Using the oral changes as diagnostic indicators for the detecting different cardiac, respiratory and renal diseases is uncommon as they have few and non-specific oral lesions which may not be pathognomonic.[1] However, few specific signs and symptoms specifically indicate the organ system which is diseased and ensue further investigations, leading to the eventual diagnosis of the disease.[2] An overview of the oral mucosal features seen in the cardiac, respiratory and renal diseases is discussed highlighting the not so common features of these important diseases, to educate the budding dentists and oral physicians regarding the same.

Cardiovascular diseases

Congenital heart disease: Cyanosis is bluish discoloration of the mucosa or skin due to increased amount of carboxyhemoglobin in the circulating blood. Patients will have bluish discoloration of gingiva and in other parts of oral mucosa. This discoloration is generalized, persistent and is called as cyanosis and people who are having this discoloration may have 'Congenital Heart Disease–**Fallot's Tetraology'**. In Fallot's Tetralogy, these is congenital defect in which pure blood with oxy hemoglobin and impure blood with carboxy hemoglobin are mixed. Thus, oral mucosal cyanosis is a sign of congenital heart disease.[3]

Sturge weber syndrome: Angiomatous lesion, reddish in colour, persistent, strictly unilateral, involving the area supplied by trigeminal nerve, is a sign of 'Sturge Weber Syndrome'. This will be associated with calcification of meanings and this result in fits.In general practice, complaint of fits is a common complaint and if the patient show Sturge - Weber syndrome, the general practitioner, in the absence of other disease, can diagnose, that fits are due to congenital vascular lesion, Sturge - Weber syndrome. Thus Sturge - Weber syndrome aids to diagnose the cause of fits in general practice. [4]

Hypertension: Bleeding gums is a sign that indicates certain local and systemic diseases. But if a patient has sudden bleeding from the oral tissue, associated with headache and giddiness, that bleeding suggests that it will be due to hypertension. If an abnormal sudden bleeding occurs, it indicates that the patient has got severe increase of blood pressure.

Myocardial infarction: Heart attack is dangerous and in early stage, sometimes it is difficult to diagnose. It a patent suddenly develops acute pain in the left lower jaw, in the region of premolar and molar, the severe pain is referred to the upper part of the neck, shoulder and left side of the chest, this originated pain on the left side of the chest and left lower jaw pain is suggestive of 'Myocardial Infarction', due to coronary thrombosis.[5]

During Coronary thrombosis, pain develops from the heart and transmitted through the Vagus nerve to

brachial plexus and from brachial plexus to cervical plexus and from cervical plexus to the left lower jaw, through greater auricular nerve or through a nerve called cutaneous coli. Thus, even the most dangerous disease of coronary thrombosis can be diagnosed by observing the oral manifestation of left lower jaw pain in molar & premolar region.[6]Similarly, pain from angina pectoris is also referred to left lower jaw. In angina pectoris, the patient will have pain only on exertion.

Hereditary Hemorrhagic Telengectasia: Some patients may present with numerous angiomatous or spider like telangiectatic, blood filled channels on the oral mucous membrane, lips, tongue, gingiva, buccal mucosa and palate. The early sign of the disease is bleeding from oral cavity and epistaxis. Skin lesions are common in face, neck, chest and in the nail beds. The presence of bleeding from oral cavity, epistaxis and telangiectatic lesions in both oral mucous membrane and skin are suggestive features of hereditary hemorrhagic telangiectasia.[7]

Diseases of the respiratory system

Lung abscess: Halitosis is bad breath from the oral cavity and it can occur in many diseases. It can also occur in respiratory diseases like lung abscess and chronic pulmonary tuberculosis. Thus, halitosis will help to diagnose lung abscess and pulmonary tuberculosis of respiratory system. The most serve halitosis occurs in maxillary sinusitis.[7,8]

Tuberculosis: Oral ulcer with elliptical or irregular shape associated with severe pain, with undermined margin is 'Tuberculous Ulcer'. Sometimes ulceration in the gingiva with desquamation and erythema with pain may be 'Tuberculosis Gingivitis'.Tuberculous gingivitis and tuberculous ulcer in the oral cavity may suggest that the patient will have pulmonary tuberculosis. [8] These lesions help to diagnose pulmonary tuberculosis of respiratory system, in many occasions, the pulmonary tuberculosis may not be associated with oral lesions and oral lesions may be independent in its genesis.

Renal diseases

Renal failure: Sudden appearance of diffused superficial ulceration of lip and mucosa covering white membranous patch associated with burning sensation and pain and if the patient gives history of kidney disease this ulceration is uremic stomatitis and suggests that the patient is suffering from Uremia due to chronic renal failure. The lesion in the mouth is called 'Uremic Stomatitis'.

In uremia, the end products of protein, amino acids and urea, when circulate in the blood stream, it reaches the mouth and acts as an allergen and allergic reaction sets. As a result, uremic stomatitis develops. Thus, uremic stomatitis in oral cavity helps to diagnose uremia of kidney disease.[9]

Brown colored soft growth arises from the bone and appears in oral cavity with radiographic findings of loss of lamina dura and alveolar bone as we find in primary hyperparathyrodisim, helps to diagnose secondary hyperparathyroidism due to kidney disease. In chronic renal disease, the kidney is damaged and more calcium is eliminated through urine because of failure of reabsorption of calcium and as calcium is eliminated in the urine, there is hypocalcemia in blood, which stimulates parathyroid to become hyperplastic and produce more parathormone to remove calcium and maintain calcium level. This is secondary hyperparathyroidism.[10]

Conclusion

An overview of the frequent as well as the unusual oro-facial features of the cardiovascular, respiratory as well as renal diseases is presented with a pragmatic outlook regarding the importance of history taking and clinical examination in patients visiting the dental clinic.

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Current Trends in Enamel Regeneration: A Review

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Abstract

Dental Enamel forms the outermost covering of teeth. Being the hardest mineralized tissue of human body, it is subjected to many challenges such as demineralization and remineralization to maintain an integrity within the oral environment. It is also prone to wear, decay and damage. However, it cannot regenerate as its origin is from the cells lost after a tooth is erupted. Restoration of lost enamel is possible by use of conventional treatment that uses synthetics, however it is impossible to mimic the natural prototype. Clear understanding and recent advances in material science has paved a way in formation of synthetic enamel. Isolation of post natal stem cells and understanding the interactions of proteins and their genetic products has led to development of materials that are smart that can be useful in cell and growth factor delivery. This article highlights the recent trends in bio-mimetic synthesis and strategies that's are cell based and make enamel regeneration possible and the various obstacles that needs to be overcome before it is available to dental practitioners.

Keywords: *Regeneration, Enamel, Tissue Engineering.*

Introduction

The mature enamel has no proteinand it is the hardest, can tolerate cracks as well as resistant to abrasion.[1,2] During the process of enamel biomineralization, mineral replacement usually precedes the assembly of the protein matrix. Amelogenin, a hydrophobic and dominant protein has the ability to form nanospheres which can influence the crystal habit and crystallite packing.[3] Enamel has no collagen and therefore do notremodel. This is in contrast to the mesenchyme-controlled biomineralization of bone where collagen and remodels are used. Dentin is flexible and softer. It can absorb energy, and has ability to resist fracture. It is less mineralized than enamel.

Dentinal matrix is mainly composed of type I collagen and non-collagenous matrix proteins. Dentin gets deposited throughout the life span of a teeth. Globules appear in the immature dentin which fuse during the maturation of the tissue.[4] Similarly, in response to stimulation by recombinant BMPs, dental pulp cells can differentiate into dentin-forming odontoblasts.[5]

Fabrication of Synthetic Enamel: Studies by Cao Y et.al 2014 proposed methodologies for regeneration of enamel that included hydroxyapatite micro structures. Similarly, Fletcher J et al.[6] suggested a hydrothermal method that uses the control release of calcium from Ca-EDTA, transformation of octa-calcium phosphate rod to hydroxyapatite nanorod hydrothermally. They also used hydrogen paste that contained hydrogen peroxide. The conditions required to carry out this technique were not suitable i.e. high temperature, very low acidity and high pressure. So recent research aims to use supersaturated solution and enamel derived protein amelogenin in a condition which is more comfortable for clinical application. Chen et al. fabricated fluorapatite nanorod resembling enamel prism like structure by use of a super saturated chemical solution. The advances of nano technology produced a nano rod which have similar characteristics as natural enamel like structure. It consists of hydroxyapatite that is produced by a solid-state conversion process using organic phosphate surfactant and gelatine.[7]

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Enamel tissue engineering: Enamel organ epithelial cells manipulation is an advancement that attempts to replace the enamel using tissue engineering. The enamel forming capacity of subcultures Enamel organ epithelial cells was examined by Hondaet al.[8] They transplanted cell on to a biodegradable scaffold in vivo. They further isolated fresh dental pulp cells from pigs during the bud stage of crown formation and plated it on the top of the scaffold. The subcultured EOE cell present was then seeded directly on the pulp cell. They could observe various phenomenon related to amelogenesis process after 4 weeks of transplantation. They also detected amelogenin immune reactivity in tall columnar epithelial cells found on surface of enamel or dentin which suggested that the newly engineered enamel has well developed ameloblast. However, disadvantages in this technique was that the EOE cells disappear after tooth eruption. So, there was a need to find an alternative source for ameloblast.

Cells from Bone Marrow: Hu B et al. at 2006 carried out a study where they could generate a tooth crown by culturing bone marrow cells with single cells suspension of dental epithelium.[9]

Oral Keratinocytes: These keratinocytes can be derived from buccalmucosa, grown in culture and sub-cultivated as well. Masaki J.et al. at 2010, proposed that non dental epithelial cells can be a new source of cells in the process of enamel tissue engineering.[8]

ERM: ERM is a direct lineage from Hertwig´s epithelial root sheath. The epithelial cells derived from Hertwig´s epithelial root sheath has the potential to differentiate into ameloblast and produced enamel dentin complex in combination with non cultured dental pulp cells which are found in core of dental pulp.[10]

Epithelial cells from the skin: Liu Y et al.reported that skin epithelial cells are substitute for ameloblasts and has the potential to convert ameloblasts under effective induction. However further studies are needed to prove that older post natal skin epithelial cells have the capacity to proliferate and differentiate unlike one day old post natal cells which can regenerate tooth germ like structure.[11]

Human embryonic stem cells: Li-Wei et al.observed that human embryonic stem cells have the potential to regenerate ameloblasts like the human ameloblast lineage cells.[12]

Conclusion

Complexities are involved to get a part of tooth regenerated. It is further challenging to treat a tooth with pulp inflammation. The challenge is to induce mineralization along with use of advanced biological systems and therapeutic agents thereby controlling the inflammation. Suitable carriers are necessary for treatment of diseased tooth parts. These carriers should be biocompatible, and have mechanical properties compatible for application in dentistry.Synthetic or natural 3D scaffolds composites along with bioactive materials seeded with specific dental tissue stem cells could be aninnovative approach that fulfil the requirements.

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Bioactive Restorative Materials

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Abstract

Bioactive restorative materials are the latest and the newest subjects of extensive studies and research in dentistry. It is not synonymous with biocompatible restorative materials. In the older times, research on biocompatibility was very much on the high, but in the recent times, research on bioactivity of restorative materials is on the rise. The interaction between dental pulp and these materials, its regeneration and healing are the major areas of interest.

Keywords: *Bioactive, Dentine, Interface, Restorative.*

Introduction

Bioactive material is the one that carries any property of interacting with the tissues in the surrounding areas and has some effects on them.[1] Unlike the biocompatible materials, which were inert towards the tissues, the bioactive materials interact with the dental tissues.[2] They usually stimulate certain biochemical and biophysical reactions, thereby instigating certain biological responses, leading to the production of the apatite layer, which allows the integration of the material to the surrounding tissues.[2] According to Hench, in 1969, "a bioactive material is the one that elicits specific biological response at the interface of the material which results in the formation of the bond between the tissues and the material."[3] These materials are also being successfully used as direct pulp capping agents.[4]

Classification of bioactive materials: According to the classification given in 1944, they are divided into 2 classes:[5]

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1. Osteoproductive materials: These materials exhibit both intracellular and extracellular activities. Here, the bioactive surface is colonized by osteogenic stem cells. E.g. 45S5 Bioglass.[2]
2. Osteoconductive materials: These materials only exhibit extracellular activities. They only render the interface biocompatible, so that the bone cells could migrate through it. E.g. synthetic Hydroxyapatite (HA).[2]

Bioactive materials and their antibacterial functions: For the bioactive material to also function as an antibacterial agent, the metal-based bioactive materials are superior to non-metal-based ones. The metal-based antibacterial, like silver or zinc, are an excellent option as an antibiotic. This is mostly because of the fact that the chemical properties of the metal ion interfere with bacterial growth. The development of resistance is also reduced with these materials because of their properties of unique binding, coordination and redox potentials. They have been noted to be active and effective against *Streptococcus mutans* and against biofilm formation too. The only hindrances for their development in full swing is the systemic toxicity they could pose and the less therapeutic indices.[6]

Bioactive materials in dental practice

Mineral trioxide aggregate: It was first developed by Torabinejad in 1993, as an option for surgical

root repair. But, because of its biocompatibility and potential bioactivity, more extensive studies are being conducted on it.[2] it is a mixture of 3 powders – Portland cement (75%), bismuth oxide (20%) and gypsum (5%).[7] It also contains trace quantities of SiO_2, CaO, MgO, K_2SO_4, Na_2SO_4. Portland cement, which is the main ingredient, contains a mixture of dicalcium silicate, tricalcium silicate, tricalcium aluminate, and tetracalcium aluminoferrite. It is used in a slurry form by mixing the powder with water and it subsequently sets and hardens at the concerned site. The bioactive properties of this material is seen as minimal toxicity to the tissues, minimal pulpal irritation, minimal periapical inflammation, non-mutagenic property, adherence to the tissues, and growth, increased production of alkaline phosphatase, osteocalcin, interleukin-6 and 8, its attachment to the periodontal ligament, cementum growth and formation of dentinal bridge.[8-20]Sarkar et al, in a study significant in regards to MTA, showed that, when the MTA is placed in a root canals and it gradually dissolute, hydroxyapatite crystals nucleate and grow. Hence, the microscopic space is filled up between MTA and the dentinal wall.[21]Jessie et al, in their study showed a proinflammatory and pro-wound healing environment is stimulated by MTA, which runs concurrently with the response of acute inflammation. The cellular and the tissue reactions at the interface leads to a chemical bond with the dentine and due to a diffusion-controlled reaction at the interface. These reactions of MTA offer excellent seal at the interface, and renders the material biocompatible and bioactive.[2]

Bioaggregate: It is the result of the recent developments in the field of nanotechnology of biocompatible ceramics. It is the first material of its kind. It is an aqua-based cement, containing biocompatible nano-ceramic particles.[22] It has shown better results than MTA in terms of sealing at the interface[23]and biocompatibility[24,25]It is composed of calcium silicate, calcium hydroxide and calcium phosphate.[26]its antimicrobial action is also very significant along with significant osteogenic induction and regenerationof periodontal tissues.[24,27-29.] it also shows better adhesion to the dental tissues,and stimulates migration and attachment of pulpal tissue.[30]

Bioactive pulp-capping agents: Bio Aggregate also acts as an excellent direct pulp capping agent as it stimulates the differentiation of odontoblasts and the mineralization, even better than MTA.[31]

Biodentine: It is quick-setting cement, introduced by Septodont in 2011. It was first introduced as a dentine replacement material, which was expected to be used as a coronal restorative material.[2] It contains synthetic tricalcium silicate, dicalcium silicate, calcium carbonate and zirconium dioxide (for radio-opacity).[32]It can easily be used as a restorative material owing to its setting time, which is approximately 12 minutes. This is the disadvantage with MTA (setting time is 3-4 hrs), because of which it cannot be used as a restorative material.[32, 33]

Endosequence root repair material: It was first developed by Brasseler USA along with Endosequence Root Repair Putty. This too uses the technology involving biocompatible ceramics.[2]the properties of this material, i.e., being hydrophilic, insoluble, not containing aluminium and an alkaline pH (12.8)[34] makes it an easier option to operate with. Its setting and hardening are enhanced by the presence of moisture.

Bioactive root canal sealers: They provide a complete seal at the interface between the material (sealer) and the tooth (i.e., dentine). These materials are highly biocompatible. Their high alkalinity (high pH) renders the material antibacterial.[35] Hence, this material gives a chance for successful obturation.

Bioactive Liners: Over the years, many studies have been conducted on the capabilities of the pulp capping agents in formation of a dentinal bridge and inducing pulpal inflammation.[1] MTA acts as a better pulp capping agent than calcium hydroxide, as described by Hilton in a review in 2009.[36] But, because of its long setting time of MTA (3-4 hrs), it poses a difficulty in it being used as a pulp capping agent. So, along with it, a fast setting material (like resin modified glass ionomer liner, a temporary restoration, or Biodentine which has a setting time of 12 minutes)[32,33]has to be used over it.[1] A light-cure calcium silicate liner could be placed, which is to be covered with a permanent restoration. These materials exhibit release of calcium ions and formation of a dentinal bridge.[37,38,39]

Bioactive restorative materials: These materials allow the formation of a precipitate of calcium phosphate at the interface of the restoration and the dentine. These mechanisms provide is a better seal at the interface.[40] They are also claimed to show Biointeractivity, i.e., stimulate the release of calcium phosphate and fluoride ions, thereby preventing demineralization of the tooth. [41] Some examples are Cention N, Activa BioActive.

Bioactive luting agents: The latest in the trend is the Xera Cem. It is in fact the combination of calcium aluminate and glass ionomer cements. The glass ionomer portion contributes the properties of chemical adhesion to the tooth structure, early acidic pH for a short period, flowability and its faster setting time. The other portion of the cement (calcium aluminate) contributes towards good strength, stability, the seal at the interface long retention, biocompatibility and its bioactivity, no dissolution and attaining an alkaline pH.[2]

Summary

The potential of the dental pulp for healing and regeneration allows the researchers for expanding their studies and search for materials which could be used with an advantage of interacting with the dental tissues. The biocompatibility, bioactivity and the biointeractivity of the materials allow them to induce cell proliferation and differentiation, migration of bone cells and creation of a proper seal at the interface of the material and the dentine. These newer approaches provide better understanding and implementation of the bioactive materials.

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Impact of Forensic Science in Dentistry

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Abstract

Forensic antilogy or forensic dentistry is the proper handling, interpretation and examination of dental evidence, which has to be offered before the court. Age and description of the person to whom the teeth belong can be accessed using dental history records including radiographs, antemortem and after death photographs and DNA. Person identification is the stronghold of civilization and the identification of unknown individual always been supreme importance to the society. Dental records consist of documents related to the history of present illness, clinical examination, diagnosis, treatment done and the prognosis.

Keywords: *Forensic Odontology; Dental records; Forensics; Medico legal; Antemortem.*

Introduction

Forensic odontology can be defined as a branch of dentistry which deals with the examinationand proper handling of dental evidence and with proper analysis and portrayingof dental findings in the interest of dentist. Forensic odontology is application of the art and science of dentistry to resolve cases pertaining to the law.[1]The word forensic is derived from the Latinword, forensic means public. The word science can be defined as systematized knowledge involving the acknowledgment and formulation of a problem, the collection of data through inspection and testing, and the formulation and testing of hypotheses. Forensic science refers to areas of endeavour that can be used in anadministrative setting and accepted by the court and the general methodical association to analyse the results.[2]

Role of dentists: The forensic dentistry team is headed by a chief with few members. The team which is involved in the process of recognition can be divided into on- site team and away team.

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On-site Team (antemortem subsection): The collection of antemortem data is done by on – site team, usually this team is housed in the site of the happening. Informing the investigation team are first to be done. A prepared hand out should be given to the members of the team. Communication systems with telephones, fax machines, etc. should be established. All dental records which includescharts, radiographs, models and photographs of the affected should be collected from dentists, hospital and other means of sources. The format of the antemortem should be recorded as it is. These two teams should be involved about their collected information. All the records should be filed alphabetically.[3, 4]

Away team (post-mortem dental examination subsection): Members belonging to this team should be prepared to leave to distant places on getting information. They should be immunized against various diseases such as hepatitis B and typhoid. The data collected by two teams should be collected and examined and at least two or three teams should be involved in this operation and properly examined. Extra – and intraoral radiographs, photographs should be taken. Dental charts must be filled accurately. While taking radiographs obligatoryprotection should be taken to avoid revealing the people working in the area. The post-mortem forms are divided into various categories according to sex, age and types of dental treatments. When some parts of body are recovered, the forms can be kept under "unsexed" category. A first copy is organized with all post-mortem records by numbers.[3, 4]

Comparison ways: Comparison of ante- and post mortem records may be done byphysical method or by using computers. Use of computers reduces tiresome and time-consuminglabour-intensive sorting of records.

Commonly used computer programs: The FBI-NCIC program developed by US army institute of dental research. Tooth pictures – match pictures, developed by class – I Inc: Indent exe developed by McGivney J; MUPIS system developed by Dr Bell; Win ID developed by McGivney J.[6]

Computers greatly help to show records with greatest probability of containing a positive evidence, after checking all ante- and post-mortem records. When utilizing computers, it, is necessary to transcribe the data from dental records to the computer code form.The identification from dental data is the result of human thought process and computers can only aid to certain extent. Whenever possible dental identification should be matched with data from radiographs, fingerprints or physical features to provide a "positive identification".[7]

Because of reasons listed below some of the remains can't be identified through dental evidence.[8,9]

Inadequate or absence of antemortem data: This problem is due to failure to maintain dental records by dentists, inadequate records provided by the dentists or failure to obtain name, address of the dentist who has treated the patient and patients who have not undergone any dental treatment.

Missing persons are foreign nationals: Either embassy of the foreign victims or forensic dentists in their country may be contacted through international organisation for forensic odontostomatology.

Poor or inadequate post-mortem data: This may be due to incomplete recovery of the remains or damage to the remains beyond recognition.

Incorrect data in the records: Incorrect data may be entered in ante or post-mortem data. This should be reduced by repeated cross- checking of records by various members of the team and taking precautions to avoid possible mistakes during data entry into the computer.

Bite marks in flesh: The term bite mark is used to describe a mark made by the teeth or teeth in amalgamation to other body parts. Bite marks can be found in food particles or parts of the body. The bite marks in flesh with which the dentist who is trained in forensic dentistry should be concerned which is more frequently found on the victim's body. A bite mark could be self-inflicted, either intentionally or involuntarily, for example by hand hard-pressed on victim's mouth to strangle a cry.Bite mark of the accused person can be achieved by details of the individual tooth features seen in the mark and those which is observed on the accused. Useful features like tooth displacement, adjacent tooth deformities, tooth rotation in a certain angle can be examined to get to the results. Dental replicas as models can be made and seen if it accurately gets compared to the site of action or scaled paper prints of the bites. Finally, it could be demonstrated in the court showing these replicas on the photos superimposing as the bite marks. These superimposed pictures could be in various prints, it could be black and white, and if it needs proper details as of in complex cases then it could be colour prints.[10-12]

Examination and interpretation

Definite bite mark: Tooth pressure mark by biting edges of the tooth. Redness, slight inflammation and tongue pressure.

Amorous bite mark: Made by gradually increasing pressure. Involves tongue pressure on the site against palatal rugae.

Moderately aggressive bite mark: quick and moderate force.

Aggressive bite mark: Tissues are hampered and slight bleeding. exact tooth could not be revealed as the site has tissues distorted.

Very aggressive bite mark: Tissues being has been torn. The sites involved could be ears, nose and nipples.

Role of saliva: Saliva is often found in the sites of crime together with bite marks and lip prints where the mouth may be involved. Serologicaland cellular results is of enormous use in identifying of the accused. Use of saliva in exposure of drug abuse and drunk drivers is commonly found.Saliva is usually deposited in bite marks found in many homicides, attack and other criminal cases. Since many struggles are faced in bite marks analysis, due toflexible and distortable nature ofskin and lack of good inklingmedium, an important focus in this examination is the saliva deposited during the biting.

Method of detection and analysis of dried saliva stains: Enzymes like alkaline phosphatase, starch and amylase are commonly used. for the recognitionof the age of saliva and quality of deposit,salts like nitrate and thiocyanate have also been usedquartz arch tube, ultraviolet light, lasers, and argon ion laser

Fluorescent spectroscopy: The classical technique used is known as double swab technique is done where a wet cotton is laid on the saliva stain to collect the saliva and then a dry cotton is used.

Sex fortitude can be done by two ways:

- F bodies in males and Barr bodies in females arethe recognition of sex chromatin.
- Sex hormones level determination based on noticeable quantities and ratios of testosterone and 17B – oestradiol by RIA.[13]

Conclusion

Abig amount of data in the field of BBI provided by teeth and jaws, age estimation of solitary minors, sexual abuse, child abuse, sexual abuse,domestic violence,sexual abuse, and. missing and unknown person. Oral health professionals and forensic odontologist can encourage forensic odontology for the purpose of hampering human rights violation through the function of best practice in human recognition.

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Tunnelling: A Stable Approach to Manage Mandibular Molars with Advanced Furcation Involvement

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Abstract

One of the challenging problems faced by general dental practitioner is treatment and management of teeth with furcation involvement. In advanced furcation involvement cases when other treatment options are precluded for financial or other reasons, tunnel preparation procedure remains the preferable option to extraction. Specially in the posterior teeth gaining access for oral hygiene procedures is difficult and thereby this technique could be considered as an alternate and successful treatment modality. This case report presents the management of a grade IV furcation with a tunnelling approach.

Keywords: *Tunnel preparation, Grade IV furcation, Mandibular molar, Inter-radiclular brush, Ostectomy.*

Introduction

Management of Deep furcation defect remains a common clinical dilemma for dental practitioners. A variety of treatment modalities have been suggested for the same. Meticulous plaque control and combined periodontal treatment can tackle this challenge optimistically rather than the routine choice of extractions[1,2].

Deep furcation defects can be treated by simple procedures such as scaling and root planning, occlusal adjustments, and gingivoplasty procedures[3,4]. And by more radical approaches such as root amputation or tooth hemisection[1]. Tooth hemisection and root amputation provide good access for plaque control, however these procedures also require endodontic treatment and prosthetic restoration. These additional treatments might be potential risks for future complications[5].

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For through and through defects, tunnel preparation is another technique (1) the widening of bi-furcation and trifurcation areas of roots specially the mandibular molars which has a short root trunk, a wide separation angle and long divergence between mesial and distal root can be sometimes be associated with root caries thereby leading to poor prognosis. However this procedure gives access to radicular cleaning post surgically. In a maxillary molar, also tunnel can be prepared in mesio-buccal and disto-buccal roots[6]. We present a case of management of a grade IV furcation with a tunnelling approach.

Case Report: A 40-year-old male patient reported the outpatient department of Institute of Dental Sciences with a complaint of food lodgement and pain in right mandibular first molar region along with intermittent sensitivity. On clinical examination there was moderate tenderness to lateral percussion in relation to tooth #46 with periodontal pocket around furcation area (Figure 1). OPG radiograph revealed severe bone loss in the furcation area in relation to 46 (Figure 2A).The bone support in distal and mesial aspect was relatively intact with no peri-apical radiolucency. Exploration with a Naber's probe revealed a through-and-through furcation involvement (Figure 2B).

Scaling and root planing were completed and patient was recalled for re-evaluation after 4 weeks. A surgical

approach to convert the furcation communication to a tunnel was envisaged. Routine haematological investigations were found to be normal and surgery was scheduled. Periodontalsurgery was performed under local anaesthesia. On intra-operative examination,severe bone loss and through-and-through furcation communication was seen with tooth #46.

Buccal and lingual flaps were raised and the granulation tissue in the defect was removed (Figure 2C). Root surfaces were scaled and planed, the furcationarea was widened by round burs (Figure 2D) at the entrance and then by bone files to create space for postsurgical inter-radicular plaque control (Figure 3A). The mucoperiosteal flaps were then apically positioned and sutured (Figure 3 B, C). After the removal of the dressing, the patient was instructed to maintain the tunnel area plaque-free with interdentalbrushes (Figure 3D).

Patient was asked to follow a postsurgical schedule included rinsing with a 0.12% chlorhexidine digluconate solution for 4–6 weeks[7]. Dailyrinses with 0.025% sodium fluoride solution and the use of a fluoride dentifrice applied directly by the “interradicular”brushes was also recommended, as such treated areas aremore prone for caries. Patient followed regular 3–6 monthsmaintenance visits for a period of 3 year[8].



Figure 1. Pre-operative view

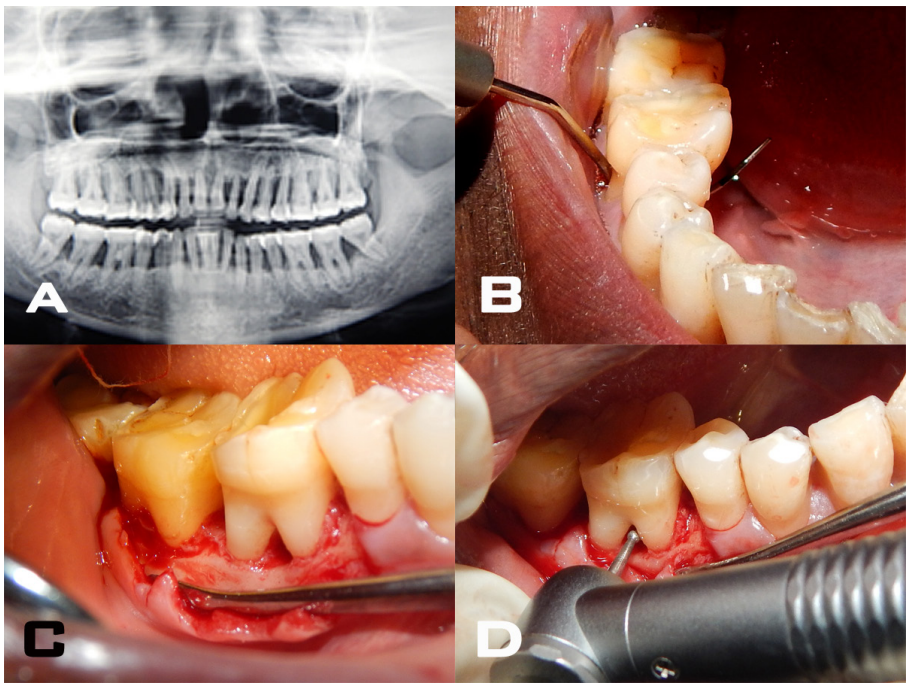


Figure 2. A. Panoramic radiograph B. Furcation Grade IV C Surgical exposure D. Furcation widening

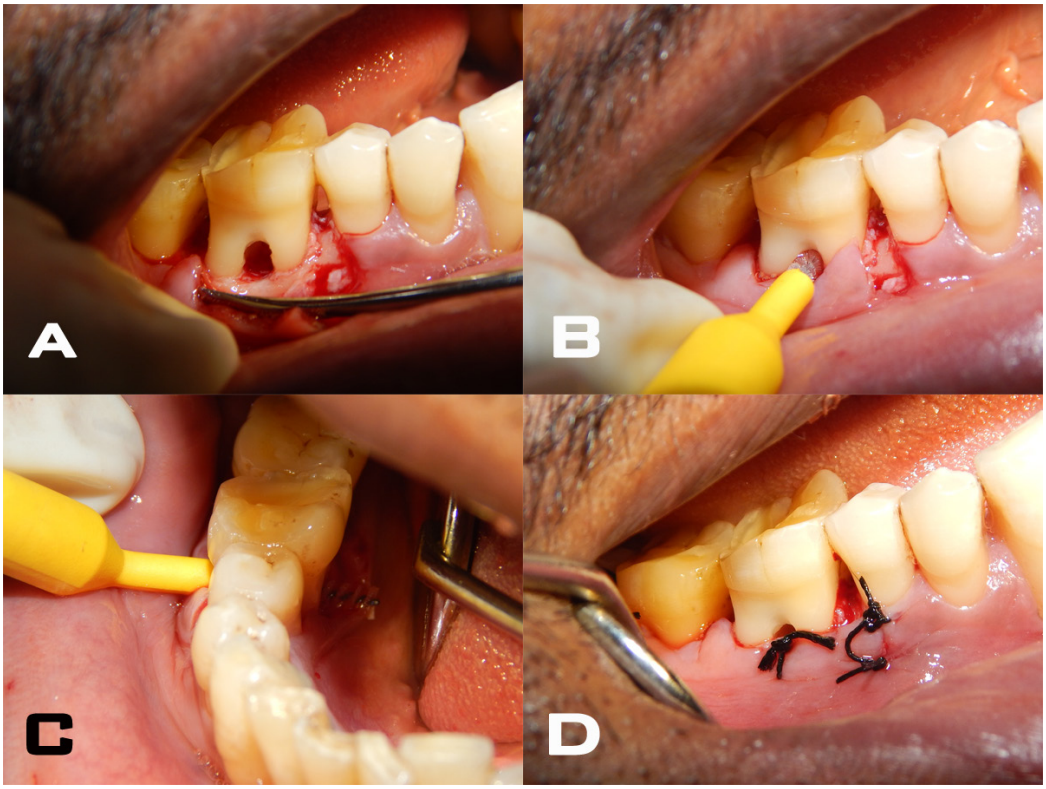


Figure 3. A. Tunnel preparation B & C Interradicular brush check D Flap closure

Discussion

Although regeneration is the best expected treatment outcome for teeth with involved furcations, sometimes alternative method such as obliteration and resections are needed. In any case, elimination of the furcation is the goal of treatment for teeth with advancedfurcation involvement so that the plaque retentive areas are converted to areas that can be cleaned by the patient easily.

Advanced grade III andgrade IV furcation involvement of especially a mandibularmolar can be treated alternately by "tunnel preparation"[9]. However few important factors need to be considered before attempting such procedures such as bone level around roots, angulation of the tooth in the arch[10]. Tilted molars should not be taken into consideration, divergence of the roots. Fused roots are poor candidates while short, conical roots are less favourable.

A major advantage of tunnel preparation is thatit does not require a subsequent endodontic intervention or a fixed prosthetics[11]. Also, on teeth with reduced bone support, this treatment will not lead to significantly increased mobility such as is commonly observed after resection of one or more roots whereas root resections and tooth hemisections are usually associated with time consuming and expensive endodontic and prosthodontic treatment[12]. However, a tunnel preparation procedure does not exclude the possibility of hemisection or root resectionat a later date if indicated.

Sometimes access difficulties arise and those can be managed by widening of the furcation and interradicular surgical dressing placement during initial healing and early introduction of inter-radicular brush.Hamp et al[1] reported a good prognosis with tunnel treatment of class III furcations. Hellden et al[13] further reported that teeth also remained caries free after treatment.

Conclusion

Conversion of a narrow Grade IV furcation communication via a tunneling approach to a self-maintainable area is a stable and preferred treatment option.

Conflict of Interest: None

Funding: None

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Social Networking in Dentistry: A Review

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Abstract

With the expanding rage for internet-based life, medicinal services are likewise not abandoned. Now a days web-based life has turned into a most common marketing strategy for dental specialists particularly for sharing data and drawing in new patients. So, internet-based life has turned into a route for business, including health professionals to communicate with patients. In the way of blogs, tweets, wikis, and social networks, communication has shifted from one-to-one to one-to-many. Be that as it may, there are a few difficulties in deciding the suitable content for web-based social networking. This article will investigate the utilization of web advances for dental education and discuss about the potential limitations of their usage.

Keywords: *Social media, Dentistry, Technology, Web2.0.*

Introduction

In today's era of computers and internet, anybody can find information through internet, however can likewise make data accessible in it. Social media can be defined as a new way of communication that uses the internet to link people from all over the world whether by using computers or smartphones that allow people to share opinions, experiences, and perspectives with each other.[1-3] Social media incorporates social networking sites, for example, Facebook, LinkedIn and Twitter. Additionally, including YouTube, blogs, customer reviews and wikis.[4] With the simplicity of internet access, the quantity of social media clients in India stood at 326.1 million in 2018. Facebook is the largest social network in India, with around 281 million users in 2018, LinkedIn has around 42 million clients and Twitter has 23.2 million active users being the second greatest base in Asia-Pacific after Japan.[5]

Social media or web2.0 has brought a revolution in spreading dental education by providing not only a means for socialization but also progressively used for learning purposes. Students can gain access to data through sources like DVDs containing many reading material and sites with intelligent video instructional exercises. There are four key points of interest in the web-based communities for learning: 1) it empowers joint effort amidst various clients, 2) it enables clients in creating personalized content through various sources of media, 3) allows users in publishing their individual works, and 4) it creates ways for approaching new areas of research.[6]

In relation to health, social media is used in the form of blogging, social networking sites and participation in online care groups. Today, technology has gained so much popularity that the term 'Health 2.0' has been cited in numerous articles and is related to "patient empowerment" which makes interaction between patients and patients and health care providers possible.[7] Regarding dentistry, web-based social networking can be utilized to share arrangements and advancements, share news and updates. Besides that, it is also used in organizing, sharing information through a blog, and providing customer service or monitoring reviews. An efficient method to publicize a dental practice is definitely, social networking. Professional contacts can be maintained which will help to acquire guidance and research support. Dental professionals are using social media as a marketing strategy for their dental office and are gaining attention and appreciation. Social media

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has emerged as a medium for promoting oral health and education but one should be cautious in whatever they choose to put on such media such that it builds up people's confidence and influence them on the call for visiting the dentists consistently but not promoting self-medication and becoming dentists themselves. Indeed, even after all these advantages, social media is a challenging task and it has got its issue as well. This article will reflect on the utilization of social media in dentistry while emphasizing on several prospects and hurdles that exist.

WEB 2.0 Technology: With the invention of world wide web in 1989, access to information changed significantly. Web 1.0 was the first stage of the internet which was static and denoted the "read only era". Web 2.0 is characterized as the internet applications which enable sharing and collaboration opportunities to individuals and conveys what needs to be the web. It is a user-generated content that incorporates social media such as Twitter and Facebook, YouTube for video sharing and blogs and wikis, as interactive websites. By using simulated experiences and role playing via avatars, Second Life creates a virtual environment which enhances learning and communication (Figure 1).[8]

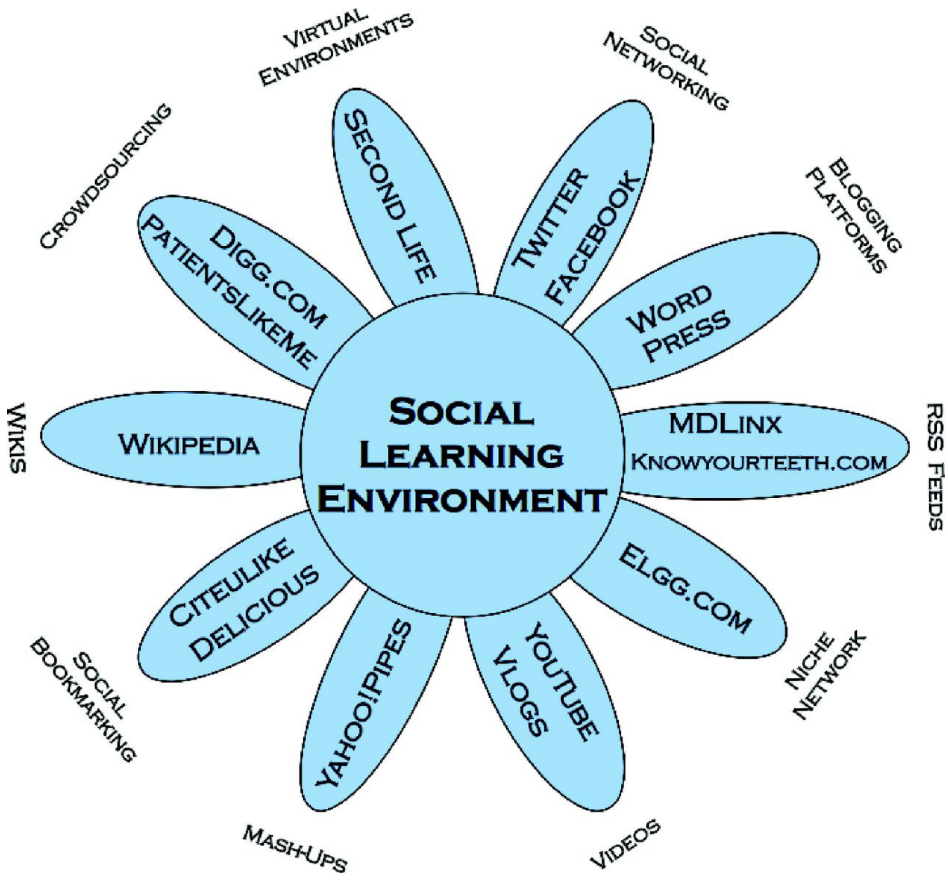


Figure 1. Social Learning Environment

Unlike web1.0, Web 2.0 websites empower clients to create, share, collaborate and communicate their work with others, without the need of any web design or publishing skills.

Facebook: As a social networking website, Facebook has become a platform where more than 750 million people share photographs, videos, remarks and communicate with one another. It offers sending private messages. Additionally, it encourages subscribers to create groups and invite others. Dentists can post their individual works and create a platform for discussion by other experts. They can also create a page to showcase their dental clinic, the treatments available, post pictures of before and after treatment of a patient and also do live video treatments including a tooth cleaning or whitening procedure. This ability of facebook has transferred

it into a consistent network for use in different fields including educational purposes as well as a good marketing strategy. As indicated by study, utilization of social media routinely for sites like facebook and twitter is 85%.[9] Facebook applications are utilized by dental students for preparing objective structured clinical examinations (OSCEs).[9]

Twitter: In 2006, Twitter was established as a social networking site, where subscribers send "tweets," short messages of close to 140 characters, to their followers. Twitter has emerged as a microblogging site which enables health communication between the public and health professionals by the means of tweets. Twitter has recently been used for research and Public Health Surveillance on the basis of tweets regarding dental pain.[10] The inclusion of Twitter led to briefer yet substantive communications for medical students who can have discussion with patients, peers, and other health care professionals.[11] Twitter is used by dental and medical professionals to boost their presentations by posting real-time comments from the audience during a medical conference.

Wiki: A wiki is a knowledge-based website on which users collaboratively modify content and structure legitimately from the web browser. Wikipedia or the free online encyclopedia, is an example of a wiki. The accuracy of Wikipedia has always been a stress over many years, which thwarts the utilization of this website as a reference for, say, a peer-reviewed publication.[8] It was found in an investigation that Wikipedia had generally indistinguishable number of errors as Britannica, which is a conventional encyclopedia.[12] Wikis provide a platform for students to collaboratively create, discuss, edit articles on explicit subjects. Wikis help in spreading dental education by encouraging group and consistent review and also initiates the probability of occasionally expanding the content and activities, significant in a learning procedure. Curricular change in medical and dental education looks for more noteworthy fuse of the essential and clinical sciences. A Media Wiki was incorporated into a medical school by Philips et al. Based on a given diagnosis, students were approached to work in little gatherings to create a patient case. Based on their wiki contributions weekly inputs were given. This collective way to deal with learning helped them during their preclinical years by correlating anatomy to clinical diagnosis.[8]

Blogs: Blogs have become an informational website or web journal, available on the World Wide Web which comprises of discrete, often informal diary-style text entries (posts). Posts (perceptions, opinions, photographs, videos, and so forth., often with links to other sites) are usually displayed in reverse chronological order, so that the latest post shows up first, at the highest point of the web page. Dental blogs have been quite popular these days and they focus in creating awareness about various oral health issues and new treatment procedures. New dentists blog, Mouth healthy, Oral health foundation are some of them. Here, viewers can discuss the topic in depth and learn from each other.

Vlogs: These are video blogs or video recordings which have the comparable detriment of credibility and validity. Being an informative and interesting platform, it can also be used for educational purposes. Inevitably it impacts discussion among peers and helps them in learning from each other.

Youtube: Established in 1997, Youtube is a media where individuals upload and share videos. Dental professionals can post videos and tutorials regarding dental treatments, spread oral health awareness and campaign against tobacco use and its evil impacts. For instance, a channel on YouTube was operated by a Dental college student, Linh Phan, where she posted vlogs which provide viewers with her viewpoint on dental school life. [8,13] She likewise posted tutorials on creating interim restorations. Her channel also has posts on commentaries about the questions posted from the dental students around the world, the offered possible alternatives, or their appreciation of her efforts.[8,13]

Second Life: Second life is a virtual world created by a 3D environment utilized for social, creative, business and educational purposes. It acts as a means of distant education. Scenarios are created by dental educators by allowing students to interact with apprehensive, angry, or special needs "virtual" patients in an attractive, pretended environment.[8] Eventually, it gives students multiple scopes for diagnosis, treatment plan, caries risk assessment, conducting counselling for tobacco cessation, and so forth which will help to overcome their nervousness and improve their certainty before treating genuine patients.

RSS Feed: RSS signifies "rich site summary" or "really simple syndication". RSS channel is a list of notifications or up-to-date information that a website delivers to its users. It helps in accessing information

from favoured websites in in an advantageous and efficient way. The Dental section of MDLinx and, for patients, knowyourteeth.com from the Academy of General Dentistry are some examples of RSS feeds for dental professionals.[14,15]

Elgg: Being an open source social networking platform, Elgg is intended to associate learners and enable them to share resources. Structured essentially for educational applications which consolidates: blogs, social networking, wikis, filesharing, and so on. Subscribers can create and join the dental groups, have full access control, can import content and publish it to blog. In addition to this, they can also add various oral health presentations, documents or webpages and tag these pages. Elgg has turned into a fundamental stage for learning and joint efforts.

Mashups: Mashup is a combination of two or more data sources integrated into one source. It utilizes the RSS technology to allow students in creating "mashups" by merging and remixing information sources, like content, web applications and mixed media, at times for purposes, usually not planned by the original creators.[8,16] One such social networking platform which depends on RSS abilities is Yahoo! Pipes. Medical data sources and visual aids can be combined creatively by employing Mashup to enhance learning.[17]

Social Bookmarking: Social bookmarking can be used to store, sort out, search, and manage "bookmarks" of web pages. Users use a social bookmarking site, where they can save links to web pages that they like or want to share.[18] Scholastic papers in social bookmaking sites are enjoyable. For instance, suppose a dental professor or student finds a website to bookmark, he or she can right-click the site to add it to his or her account and then can "tag" it with a few relevant keywords (teeth whitening, cosmetic dental clinic, best cosmetic dentist). Graphics can also be used to make it more interesting. The list can be viewed by the public, so the individual can direct other peers to it. These sites additionally demonstrate who else bookmarked the site. Another tap demonstrates the bookmark accumulations of others interested in the similar site.[19] Through Social bookmarking academic collaboration is fostered by rearranging the distribution and sharing of reference lists, bibliographies, and different resources among educators and students.[8]

Crowdsourcing and Apomediation: Howe in 2006 gave the term Crowdsourcing, from the words "crowd" and "outsourcing", in which a large group collaborate to find a solution to a problem.[20] Yahoo Answers and Digg are websites which enables individuals to post their inquiries and get the appropriate responses namelessly. By crowdsourcing, problems are presented to public and open call for solutions is then made. The individual who contributes the solution is remunerated with a prize, money, or acknowledgement.[21] In case of Apomediation, the information is "apomediated" by peers is compared with that which is "intermediated" by specialists for the sake of layman. The site PatientsLikeMe is an example, in which patient's share their health information and opinions.[8]

Challenges in using Social Media: With all the rewards of social media, there are as yet numerous issues which should be dealt with. Medical research has analysed the potential challenges of social media in use of dental education. Considerations regarding management of legal and ethical issues is very essential. The HIPAA (Health Insurance Portability and Accountability Act) first used in the United States, is a security law which guarantees personal protection of health-related information about a person. Posting of patients' photos or some other recognizable data is an infringement of protection as indicated by this law. Other than this, another territory of concern is "content related". Posting of amateurish substance can be troublesome towards dental practice. There might be absence of value and unwavering quality and reliability of health information whenever posted by obscure sources. There are some glances where patient starts their own self-medication regime.

Different inquiries come into mind when we examine about the utilization of social media in health industry. Inquiries to consider: Are the dental students realizing how to actively set their privacy settings while using social media? Do they know about the possible disclosure of information they post? Do they know about the probable privacy status changes of the social media platform they use?

Conclusion

With the innovation of social media, the world has turned into a global village. This review article highlights on how social media has made dental health education reach a widespread audience as well as has made a way for dentists to boost their professional influence. Further research should be done regarding the lawful and moral

issues of using social media in dental practices. Dental educators should consider the rapid growth of social media usage and explore it as a platform for oral health education and promotion.

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Immediate vs Delayed Implant Placement: A Review

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Abstract

In the era of new world dental implants replaces the removable partial dental and fixed partial denture. Dental implant can replace the single tooth to multiple tooth, after implant placement successful osseointegration is one of the important factors. Osseointegration is the process binding of bone with the implant surface. In this review article we discuss the two-implant placement technique and they are depending on time duration after the extraction of implant. Immediate implants are placed immediately after the tooth extraction with and without use bone graft. Delayed implants are placed after 3-4 months after the extraction of tooth. So, the main aim of the review paper was the predictability of success of immediate implant over delayed implant.

Keywords: *Dental Implants; Osseointegration; Bone graft; Immediate; Delayed.*

Introduction

In the year 1965, the first dental implant was placed by Sir Branemark the implant is composed of endosteal metal placed inpatient. The main benefit of immediate implant placement after extraction of tooth was to prevent second surgery, prevent bone loss due to extraction. The main benefit of the immediate implant was patient needn't wait for 4-6 months for wound heal and after that delayed implant placement. The various clinical trials found that after the implant placement in extraction socket with and without the use of bone graft have less bone loss after 6 months as compare to delayed implant placement. [1,2]

Other important advantage was chances of bone damage was less because of initial site preparation was not required, only the apical preparation was done with all the drill bit to extend the length to achieve the primary stability. In delayed implant, the flap was raised the bone is exposed and after that initial pilot drill was used followed by till the last drill till the site was ready for the implant placement, then after 6 months second stage surgery was performed. Bone remodeling around the implant was quicker because they are periodontic cells are present in the extraction socket, so they help in the faster new bone formation around the implant. [2-5]

Table 1. Classification based on time of implant placement as mature, recent, delayed or immediate

Author / Year	Classification	Implant placement
Hämmerle et al. (2004)	Type I	In fresh extraction sockets
	Type II	After soft tissue coverage (4- 8 weeks)
	Type III	Radiographic bone fill (12-16 weeks)
	Type IV	Healed socket (>16 weeks)
Esposito et al. (2006)	Immediate	In fresh extraction sockets
	Immediate-delayed	< 8 weeks post extraction
	Delayed	> 8 weeks post extraction

Healing after implant placement: Healing after the extraction undergoes both hard and soft tissues changes; they are dependent on each other. Loss of gingival contour and architecture of bone immediately after the extraction socket, subsequent changes include the maturation of the wound which induces the formation and calcification of the bony material.[6,7]

During the first stage clot formation, which consist of red coagulum, fibrin, inflammatory cells after 4-5 days coagulum is replaced by granulation tissue over a in

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second stage. After 2-week period, the granulation tissue contracts and is replaced by connective tissue in third stage. Calcification ofosteoid at the base and periphery of the socket commences in fourth stage.[8-10]

This formation of bony trabeculae continues for about 6 weeks and is followed by the fifth stage, in which there is complete epithelial closure of the socket.[11]

Once the tooth has been extracted the alveolar bone underwent coupling mechanism leads to new bone formation with loss of vertical height and reduced gingival tissue especially if it is of a thin biotype. [12-16]

Macroscopically level, the healing pattern will change both hard and soft tissue. In various study bone loss was seen in buccolingual dimension, it led to 3-4 mm of bone loss over period of 6-12 month though most of the reduction takes place in the first 4 months. In area of molar more resorption was seen as compare to single rooted tooth.[17,18]

Other factors can cause further bone resorption areinjury to the alveolus, pathology caused by any infective process, such as periodontal and endodontic abscesses, cysts, and tumors, Systemic conditions which may induce further bone loss include genetic factor, diabetes, smoking, and medication use.[19]

Classical protocol for implant placement: After 8-12 months of extraction the edentulous site was healed and this was the waiting period was thought to be essential for socket ossification and bone maturation. After all radiographic examination implant was placed in the desired site in bone and cover with soft tissue, after 4-6 months patient recalled for second stage surgery. 4-6 months are needed to osteointegration of implant with bone.If the surgeon follows all the guide lines the time total time period from initial implant to loading of implant was one year. [20-22]

Discussion

Several studies have been undertaken to prove the reliability and success of immediate implant placement. Healing in post extraction sites is characterized by bone regeneration within the socket and external dimensional changes due to bone resorption and bone modelling. The extraction socket wound heals by the following stages namely osteophyllic, osteoconductive and osteoadaptive phases. Indication for immediate implant areminimal bone loss around the dental, loss of tooth due to periapical infection, The tooth which cannot be saved by the endodontic therapy, pts with chronic periodontal problems. Contraindications are pus exudates at the time of exodotia, Periapical presence of granulation tissue, no adequate bone at apical to the extraction socket.[23-26]

In study done by Becker et al done immediate implant case in 24 patients and they found that 93.3% of 5-year success rate and non-significant amount of crestal bone loss when they were augmented with barrier membranes. [27]

Misch and Judy, 2000 done a study on delayed implant placements they found out that after extraction in some case there are chance of buccal or facial cortical plate is lost during extraction it leads to reduced bone height and thickness for implant placement after the socket heals thereby bone height and width are reduced forcing the operator to compromise with the size and width of the delayed implant to be placement. Studies have revealed that crestal bone loss is evident in both delayed and immediate implant placements. But in case of immediate implant placement the crestal bone loss was found to be less.[28-30]

Conclusion

Immediate implant placement following tooth extraction has been found to be viable and predictable solution to tooth loss. Patients can now avail the immediate implant placement after extraction of the teeth in the socket immediately without any need to wait for few months for the socket to heal and the bone to be formed. This leads to quicker loading of the implants and restoring the lost teeth. One more advantage of immediate implant over delayed is the crestal bone loss was found to be minimal. Hence immediate placement of implant is better when compared to the delayed implant placement.

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Oral Manifestations of Gastro-Intestinal Diseases and Nutritional Deficiency

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Abstract

It is an established fact that the oral cavity is the diagnostic indicator to many gastro-intestinal diseases and nutritional deficiencies. Among the most frequently encountered gastro-intestinal diseases are inflammatory diseases like Crohns disease and chronic ulcerative colitis, gastro-intestinal reflux disease and dental erosion. Nutritional diseases manifest as pale, depapillated bald tongue, diffuse erythema in the oral mucosa and oral bleeding. This paper presents an overview to the different manifestations of nutritional deficiencies and gastro-intestinal diseases.

Keywords: *Stomatitis, Glossitis, Perimolysis, Ulcerative Colitis.*

Introduction

When a patient report to a physician for any disease, irrespective of the systemic disease, the oral cavity and tongue is examined first and serves as a diagnostic aid for detection of nutritional deficiency and gastro-intestinal diseases. Starting from stomatitis, dental erosion from hyperacidity, melanosis, ulcers and polyps to hyperkeratosis in the oral mucosa, a plethora of clinical manifestations are observed. [1] The present paper describes these conditions briefly on the basis of their oral features.

Gastric disturbances: Patient may have white coating, which is easily scrapable in the dorsum of the tongue. If it occurs suddenly, associated with bad taste, it is due to acute temperature of the body. The fever may be due to several causes. The white coating suggests that the patient has gastric and gastro intestinal problems.[2]

Hyperacidity in the stomach: The patient will have destruction of tooth in the cervical one third of labial and buccal surfaces. This is called 'erosion". The erosion may be due to acidity in the gingival fluid or regurgitation of acids due to hyperacidity of stomach. Thus, the presence of erosion in the teeth suggests that the patient is having hyperacidity in the stomach. [3,4]

Jaundice: The patient may have green discoloration of teeth either in deciduous or permanent teeth. This suggests that the patient had jaundice or liver disease, bilirubin and biliverdin are formed and they circulate in the blood. These are coloring agents and are pigments. When they circulate in the blood, they reach in the pulp & deposit in the pulp of the tooth from there it enters into dentinal tubules.[4] Thus green colour of tooth is suggestive of liver disease or jaundice.

Peutz–Jegher's syndrome: The patient will have small, spotted, brown or brownish black pigments in the circum oral region. This is melanin pigment. This suggests that it is related to 'Intestinal Polyposis', in a disease called "Peutz–Jeger's" Syndrome. In this syndrome, there is intestinal polyposis, colic pain, and bleeding from rectum. The exact mechanism, why pigmentation occurs in polyposis is not known, but the clinical sign of circumoral pigmentation suggests diagnosing the intestinal disease called Peutz–Jeger's syndrome.[3]

Crohn's disease: The patient may develop, inside the mouth, small granulomatous growth or nodules with fissuring which appear as mucosal indurated polypoid tags in the shape of cobblestone. [5]Sometimes ulceration may also be associated. This clinical sign is suggestive that the patient is having 'crohn's disease. Linear apthous ulceration with hyperplastic borders, indurated fissures on the midline of lower lip, angular cheilitis and glossitis due to malabsorption and symptoms of nutritional deficiency are present. Granulomatous changes of minor salivary gland duct with increased incidence of mucocele.

[6] Oral lesions vary in duration and severity with periods of quiescence or exacerbations. In crohn's disease, the patient will have abdominal pain due to inflammation of intestinal mucosa and colon. This will be associated with rectal bleeding. These symptoms will occur in a number of intestinal diseases, but if it is associated with characteristic mucosal growth, it is due to Crohn's disease. Thus, granulomatous growth of mucosal tags in the oral cavity is a diagnostic point to diagnose Crohn's disease, which is a chronic granulomatous inflammatory disease of bowel affecting ileocaecal region.[7]

Ulcerative colitis: Patient may develop ulceration in the lip commonly or in other parts of the mucosa. The ulceration is diffuse, chronic with broad based papillary projection are red or pink in color and associated with purulent material and the ulcer will have some superficial necrosis. This is called 'Pyostomatitis Vegetans' and this suggests that the patient is having 'ulcerative colitis. [8]Hemorrhagic ulcers of oral mucosa and skin which starts as bullae in one to three days and ruptures to form ulcers, which are discrete and irregular shaped. Gingival bleeding due to malabsorption of vitamin k, vitamin B12 and folic acid. Minute miliary abscess and pustules on an erythematous base which rupture leading to erosions. In ulcerative colitis the patient will have ulcers of colon and bleeding from the rectum. It is an autoimmune disease.[9]

The reason why ulcerative colitis causes pyostomatitis vegetans not known but the pyostomatitis vegetans will heal only when ulcerative colitis is treated.

Coeliac disease: In some patients, recurrent apthous ulceration of oral mucosa, dental hypoplasia associated with sore tongue are present and if these oral findings are associated with steatorrhoea, abdominal discomfort, weight loss and symptoms of nutritional deficiency, then the condition may be diagnosed as Coeliac disease. Coeliac disease is a malabsorptive disorder of small intestine due to immunological reaction to gluten resulting in mucosal damage.[10,11]

Liver disorders: Bleeding tendency following minor injury, gingival bleeding andpost extraction haemorrhage are seen in some cases. In these patients there may be deficiency of coagulation factors II (Prothrombin), V, VII, IX, X which requires normal hepatic function and adequate supply of vitamin K for its synthesis and maturation. Increased bleeding tendency associated with elevation of prothrombin time are suggestive features of liver disorders in which normal lobular architecture is destroyed due to cirrhosis or hepatotoxic drugs.[8,9] Sialdenosis in liver cirrhosis due to alcohol or malnutrition is the common oral finding and is a reversible condition which regresses and disappears during recovery. [11]

Nutritional deficiency disorders

Vitamin A: Non-scrapable whitish Grey patch, which is not attributable to any other diagnosable condition particularly in elderly people, is a clinical sign of vitamin A deficiency. White patch can occur in oral cavity in many conditions like leukoplakia, lichen planus etc. but if the lesion is not specific to any disease, this white patch is to be thought as Vitamin A deficiency.[12] Vitamin A is necessary to maintain the integrity of epithelium and it helps for normal proliferation and exfoliation of epithelial cells. If there is reduction, the epithelial cells fail to exfoliate and the epithelial cells are retained and form keratin. This keratin in the oral mucosa, with logging of water molecules, is responsible for white patch of keratinisation, in the absence of any other specific diseases responsible for white lesion.[13]

Vitamin B complex: Atrophic glossitis and angular cheilitis is a clinical sign of vitamin-B complex deficiency.Vitamin B complex consists of thiamine, riboflavin, niacin, pyridoxine, pantothenic acid, biotin, folic and vitamin B12. Though different Vitamins have different manifestations, the common changes for vitamin B-complex are Atrophic glossitis and Angular stomatitis.

Vitamin C: The gingiva is enlarged, bright red in colour, smooth and shiny surface, boggy in nature with mild ulceration and bleeding. The colour changes to violaceous red. The enlarged gingiva may cover the clinical crown. This condition is called as "Scorbutic Gingivitis". This clinical sign of oral cavity is suggestive of Vitamin C deficiency. Vitamin C is essential for many metabolic activities, but the one important thing is that it is necessary for maintenance of the intercellular ground substance. Since the intercellular ground substance of blood vessels are damaged, there will be bleeding.[13]

Vitamin D: Clinically a localized area with deficient enamel with destruction and brown color discoloration, is a clinical sign that the patient has "Rickets".Vitamin D deficiency produces Rickets in young age. Vitamin D is essential for calcium and if it is not absorbed fully because of Vitamin D deficiency, calcification of tooth and bone is affected. When tooth

is developing, the enamel is laid down layer by layer. During the development of tooth, if calcium is deficient in a particular period, the enamel developing at that time is affected with improper calcification. Hence the defect occurs, change in the tooth could be a marker to diagnose Rickets.[9-12]

Vitamin K: Bleeding gums is one of the clinical signs that indicates many diseases, and one such diseases is vitamin K deficiency.Vitamin k plays an important role in synthesis of prothrombin in liver. Prothrombin plays an important role in coagulation. Vitamin k is responsible for prothrombin synthesis when vitamin K is deficient prothrombin is deficient in the liver and even if there is a mild injury, it causes bleeding which takes long time for coagulation.[12]

Protein deficiency: If the child has a bright reddened tongue with loss of papillae, bilateral angular cheilosis, fissuring of the lips, loss of circumoral pigmentation and the mouth is dry, dental caries free and easily traumatized with the epithelium readily becoming detached from the underlying tissue, leaving a raw bleeding surface, then these oral signs are indicative that the patient is suffering from "Kwashiorkor', a combined protein–energy deficiency in children.

Proteins contribute to cell and intercellular materials and are important in the formation of hormones, enzymes, plasma proteins antibodies and numerous other physiologically active substances.The presence of macroglossia in a patient may be suggestive of 'Amyloidosis'. The tongue is enlarged due to deposition of amyloid. It may also be deposited in gingival tissues.[13]

Conclusion

An alert oral physician/ dentist with adequate knowledge regarding the different systemic diseases can diagnose gastro-intestinal diseases and nutritional deficiencies.

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Submandibular Osteoma-Bony growth in the Lower Border of Body of Mandible: A Case Report

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Abstract

Osteoma is a benign slow growing tumour which commonly occurs in craniofacial bones. These tumoursoccur mainly due to proliferation of cancellous bone. It can be of peripheral, central or extra-skeletal type. In peripheral type which is described in this case report arises from the periosteom and is a very rare occurrence in the mandible. Osteomas are usually asymptomatic and can interfere with the aesthetics if they continue to grow to a larger size. These lesions are mostly discovered during routine clinical or in radiographs. Here we discuss a single large peripheral osteoma which arise from the right lower border of the mandibular body in a 50 yr old woman. This lesion caused a deformity of the facial region. Radiographic examination including IOPA, OPG and lateral oblique revealed a solitary radiopaque bony neoplasm. Incisional biopsy of the lesion confirmed the diagnosis to be an osteoma.

Keywords: *Peripheral Osteoma, Mandible, Benign Bony Neoplasm.*

Introduction

Osteoma is a benign osteogenic lesion manifesting from compact or cancellous bone. These can be classified into three types according to their origin. a) Central osteoma originates from endosteum b) peripheral from periosteum c) extra skeletal osteoma develops from the soft tissue. Peripheral osteoma is a rare lesion seen mostly in younger age group and both the genders are equally affected. This lesion mostly affects the frontal bone, mandible and maxillary sinuses are affected in orofacial region.[1]

In mandible dense peripheral osteoma is very common rather than cancellous osteoma.[6] The pathogenesis of osteoma is still to be confirmed but they are often referred to as developmental anomaly, tumor or reactive lesions triggered by trauma, muscular origin or infection.[7] Various etiopathogenic hypothesis have been proposed for osteoma formation which includes that lesion is caused by congenital anomalies or by neoplastic proliferation caused by chronic inflammation.[8]

We report here an unusual case of peripheral osteoma present in the lower border of the body of mandible with extra oral growth

Case report: A female patient,50 year,gave chief complaint of swelling in the right lower jaw. The history revealed that the patient discovered a slow growing swelling on right lower side of face since 5 years with no history of trauma, toothache, pain or discharge from the swelling. The past medical, surgical, dental, personal and family history was non-contributory

On extra oral examination a single unilateral swelling was present in the right side of the lower border of the body of mandible. The swelling measured 2cm x 1cm in diameter. The shape of the swelling was roughly ovoid with smooth surface and no changes in the overlying skin. The swelling extended 2cm from the lower border of the mandible. There were no secondary changes associated with the growth. (Figure 1)

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The inspector findings of site, size and shape were confirmed. On palpation the swelling bony hard in consistency with smooth diffused edges. The swelling did not yield to pressure. The swelling was not attached to the overlying skin. The swelling was not movable below the skin suggesting that it is attached to the underlying mandibular bone.

On intra oral examination there was no evidence of any bony growth or swelling in the buccal or lingual aspect of right side of mandible. Root stumps are present in relation to 45 46 47 48. No other mucosal changes were associated on the buccal or lingual aspect in corresponding to the extra oral growth. (Figure 2)

Co-relating all the history and clinical features a provisional diagnosis of benign bony neoplasm was given & differential diagnosis of central haemangioma, bony exostosis, osteoid osteoma, osteoblastoma and osteoma was considered.

Intra oral periapical radiograph taken with increased vertical angulation revealed a single well defined radiopacity present in the lower border of mandible in relation to 36 37 regions (FIGURE 3). Lateral oblique mandible revealed a radiopaque lesion present in the lower margin of the body of mandible. The lesion was attached to the cortical bone ofinferior border of the body of mandible (FIGURE 4). The panoramic radiograph revealed a single well circumscribed radiopaque mass present below the lower margin of the mandibular canal (Figure 5).

Incisional biopsy of the lesion was to be done under local anaesthesia and the specimen collected was sent for histopathological review and diagnosis. The report presented normal appearing dense compact bone with features suggestive of osteoma with missing haversian systems (Figure 6).

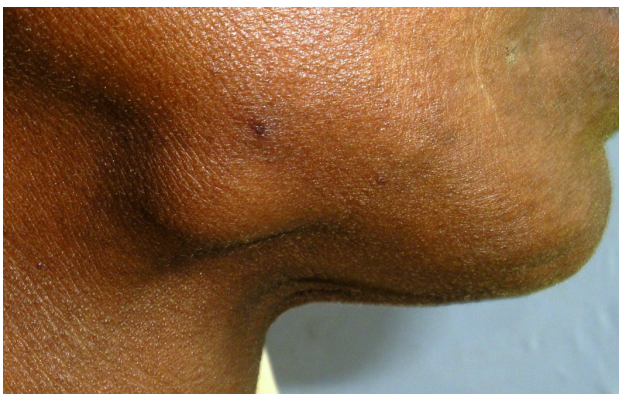


Figure 1: Extra oral manifestation of osteoma



Figure 2: Intra oral picture showing normal overlying mucosa.

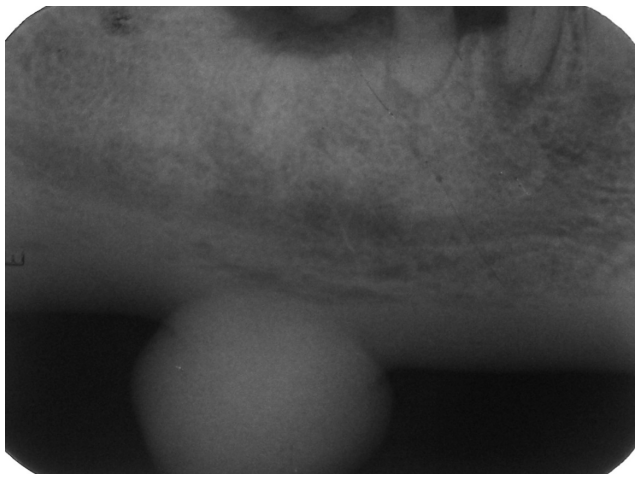


Figure 3: Intra Oral Periapical Radiograph revealing radiopaque lesion in the lower border of mandible.

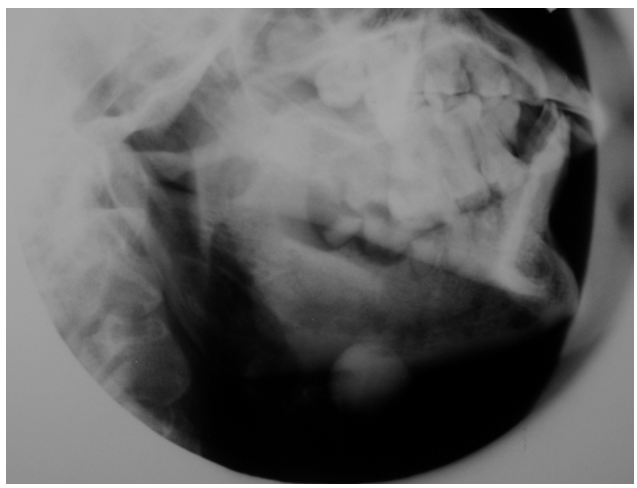


Figure 4. Lateral Oblique shows the lesion being present in the lower border of body of mandible.

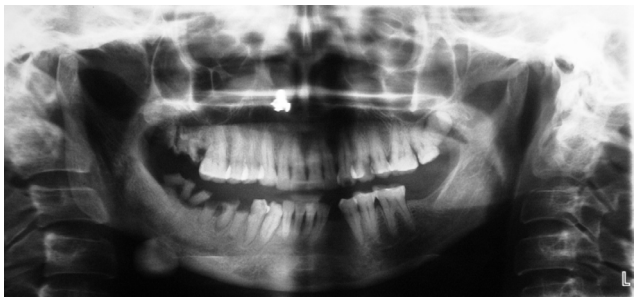


Figure 5. Oral Panoramic Radiograph showing the radiopaque lesion in the right-side body of mandible.

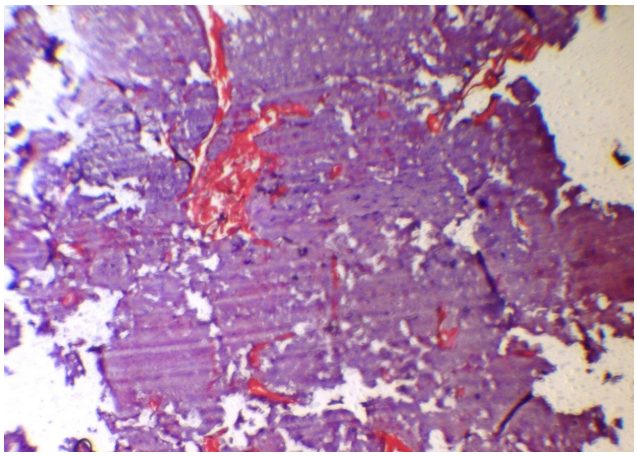


Figure 6. Photomicrograph shows normal appearing dense compact bone with features suggestive of osteoma with missing haversian systems. Mass of irregular osteoid tissues that lie in a highly vascular stroma of connective tissue containing osteoblastic cells. It consists of irregular lacelike osteoid and calcified matrix lined by plump osteoblasts and osteoclasts with a well-vascularized but bland stroma. Densely packed atypical bony trabeculae with decreased vascularity and stroma.

Discussion

The peripheral osteomas are very rareumors. According to Schneider et al, Kaplan et al, Woldenberg et al(2005), Jonan et al(2005), Cincik et al(2005) and Larrea / Oyarbide et al the region affected frequently is mandible. But in the maxillofacial region peripheral osteoma is most commonly reported in frontal bone followed by mandible and maxilla as reported by Sayan et al.According to Bodner et al peripheral osteoma mostly occurs in paranasal sinus. They are observed that they are very uncommon to be found in mandible. On analysing the reported cases of osteomas of mandible in literature it is widely agreed that the most affected region is the body of mandible.

Radiographically, osteomas show a well circumscribed densely sclerotic radiopaque mass. Peripheral osteomas should be separated from several pathologic conditions such as bony exostosis, osteoblastoma, osteoid osteoma and complex odontoma. The most important clinical feature differentiating bony exostosis and osteoma is that bony excrescences that usually stops growing after the individual crosses the puberty period. Osteoblastomas and osteoid osteomas are painful and fast growingtumors as compared to peripheral osteomas. Reappearance of peripheral osteoma after surgical removal is very rare and the diagnosticians should look for new osteomas or other signs of Gardner syndrome, which was also considered in this case, as the OPG revealed many mixed radiopaque and radiolucent areas which were present on both sides of mandible. Histologically, osteomas consists of dense compact bone with no haversian system.

Conclusion

Osteomas are the type of tumors that grows very slow. Once completely removed there is no evidence of recurrence. In the Orofacial region tumors like osteoma frequently occurs in the mandible. Conventional radiographic analysis provides adequate information for diagnosis. Recently due to availability of CT scan it has become the choice for accurate diagnostic evaluation. This has truly enhanced the surgical planning for tumor resection. The choice of treatment of the lesion is complete surgical removal.

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Oral Health Promotion Through Schools

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Abstract

A combined education, promotion, and preventive program in the school would enormously diminish the predominance of prevalent oral diseases like dental caries and gingivitis seen in children and young adolescents. Comprehensive school programs also would preclude the loss of study time due to pain and apprehension before and after treatment. Need of the hour is to develop the best projects for promoting oral wellbeing in schools with emphasis on school-based facilities. The essential objective of school oral health promotion programs centers around the 3 M's-manpower, money, material, in addition to the amount of classroom time it will take from conventional classroom education.

Keywords: *Health education, oral hygiene, oral health, school children, school health programs.*

Introduction

Healthy teeth, gums, soft tissues inside mouth cavity, muscles mastication, tongue, lips, associated glands of oral cavity will be a necessary part of oral health.[1]A healthy mouth is indispensable for an overall development of an individual,so that they can eat, communicate, and socialize without experiencing diseases, discomfort, or embarrassment.

Dental caries is found to be predominant early childhood oral health issues along with gingivitis, trauma, malocclusion, asthma, diabetes, and obesity. Early diagnosis always prevents oral health issues at the earliest. In India, the prevalence of dental caries was 32.6% and 42.2% at 12 and 15 respectively, gingivitis was 84.37%, and malocclusion was 60%.[2] In Odisha, the prevalence of dental caries was 64.3% for school children.[3]The prevalence of other oral diseases such as dental erosion and enamel defects is increasing. As per the data in Odisha, there is a very little knowledge regarding the causes and prevention of oral diseases in children, their parents, and teachers.[4]

According to the accessible information it is significant for us to concentrate on oral health problems from the early age. The Ottawa Charter for Health Promotion[1] outlined five health promotion action are as build healthy public policy, create supportive environments, strengthen community action, develop personal skills and reorient health services.

Oral Health Promotion needs in Schools: Mouth diseases will cause discomfort and tooth loss, this has a negative effect on appearance, personal satisfaction, food intake and, eventually the growth and complete development of children. Tooth caries and gingiva diseases are among the most common diseases conditions in current scenario, predominantly influencing school children. Many children have encountered mouth trauma, a considerable part who are younger than 5 years.[4] Tobacco containing stuffs are advertised directly at children and adolescents, which leads to augmented risk of oral cancers in later life.[5]Oral disease is perhaps the costliest diets and lifestyle related illnesses, and the expense of neglect is additionally high in terms of its financial, social and personal impacts.[6] Many risk behaviors start from the school age years that have heavy influence on children's development and wellbeing.

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Dental Caries Prevention: Dental caries is the most prevalent chronic disease condition, which leads to suffering of a child with severe pain, and if left untreated, the diseases may prompt further exaggerated conditions including sepsis. Dental caries can be prevented through fluorides, pit and fissure sealants, diet and nutrition.

Fluoride: Fluoride is the foundation of preventing dental caries. School water fluoridation program positively influenced oral health of children and adolescents. However, it has some major drawbacks that it will not be beneficial for the children until they begin school, school ought to have independent water supply, installation and maintenance cost of equipment is high, training should be given to the workers who will operate, monitor, and maintain the fluoridation unit.

The school-based fluoride mouth rinse program is an important tool to reduce dental caries among children. In 1970, the North Carolina Dental Society conducted an examination for school and community fluoridation, the outcomes were 34% reduction in decayed, missing, and filled permanent teeth among children who had 8 years' experience for taking fluoridated water at school for drinking purpose, and furthermore 86% decrease in dental cavities following 4 years of sealant use on permanent teeth.[7] Fluoride mouth rinse prevents dental caries when used consistently in a school based program and are recommended for children >6 years of age. Weekly mouth rinsing (0.2% sodium fluoride (900 ppm F) for weekly use or 0.05% sodium fluoride (225 ppm F) for daily use) under the supervision of school teachers is accomplished for good outcomes. Dietary fluoride intake in the form of tablets should be administered in school settings. Dietary fluoride supplements when administered from birth to age 13 or 16 years provides caries reductions of 60% to 65%.[7] Fluoride tablet program can also be implemented in which one tablet is given to each student, that they chew and swishes the tablet in the mouth for a minute and then swallow.

Pit and Fissure Sealants: The Pit and Fissure sealants are efficient and safe means of preventing dental caries in newly erupted permanent teeth. For children at high risk for tooth decay, those with ailments related with high rates of cavities, in those who have experienced nursing bottle caries, and who already have initial caries in a permanent molar tooth, this treatment is useful. School based sealant programs will help in reaching to all strata of youngsters and in a mass. Long term assessment studies on school health program have reported reduced decayed, missing and filled surfaces (DMFS), which demonstrated that dental sealants, when used in combination with fluoride mouth rinse, were especially effective in lowering the prevalence of dental caries.[8]The surgeons general's report on oral health indicates that sealants can reduce decay in school children by more than 70%.[9]

Nutrition: Healthy food habits are significant lifestyle habits that should be inculcated at the earliest age and in health promoting schools program it should be included.[10] Ministry of Education takes care of school nourishment services by taking the help of public or private sectors, which is important for schools, teachers, and student.[11],[12] Parents of children should consistently attempt to give them a balanced diet. Sugar consumption in food should be tallied. The nutritional survey (1995)of British preschool children demonstrated that the consumption of non-milk extrinsic sugars (NMES) was essentially higher (19%) than the recommended 10% level. The main sources of NMES in British children are the soft drinks and confectionery. [13] Mid-Day meal Program of Government of India, it provides hot cooked meal to students of Government schools in 7 north eastern districts.

Prevention of Periodontal Disease: Gingivitis is the most widely recognized oral disease. While the disease is to a great extent reversible in nature, it can develop in vulnerable hosts into periodontitis, which is characterized by irreversible loss of periodontal attachment.[14]

Toothbrushing: For students to pick up brushing technique appropriately it is smarter to execute a classroom brushing program. This program will develop a standard toothbrushing habit, which will eventually provide topical application of fluoride through toothpaste to the teeth to decrease the chance of tooth cavities in children. 'The Bright Smiles, the Bright Future' is an awareness program started by IDA and Colgate in partnership in July 2003, focusing on 45lakhs school children across India. It has been routine to distribute "Colgate paste and brush" free to teachers and school children, shown as an activity of state or local IDA branch for teachers training and advancement of oral health.[13]

Plaque control: The formation of plaque is the major cause of all dental problems. Dental plaque is a biofilm or mass of bacteria that develops on the

tooth surface inside the mouth. 'Learning about your oral health' is an extensive program developed by 'American Dental Association' (ADA) and their experts in coordination with the 1971 ADA House of Delegates and is presently accessible to schools' frameworks all through the United States of America. This program is created with a fundamental aim of developing adequate dexterity and knowledge about dental plaque among school children. [13].

Health Education: Health education empowers students to acquire knowledge regarding healthy lifestyle with the goal that they can be advantageous for themselves and the general public on larger scale. Redmond and colleagues examined a school dental health education program among 12-year-old English children in 1999, which included three exercises and discussion in each half yearly period by dental assistants with the support of parents/guardians. The knowledge of dental disease and in oral hygiene improved after this interventions, as well as an increase in the reported duration of tooth brushing.[15] The definitive aim of health education is to enable them to acquire knowledge and to develop critical skills, and thereby to adopt behaviors that will support their future health, by improving their levels of autonomy and responsibility. 'Blanket' referral is a program that can be implemented in India, where they are provided with a referral card that they take to their parents and then to the dentist, who sign the cards upon completion of examination, treatment, or both.

Malocclusion: When there is a discrepancy in the jaw and tooth size (the jaw is too small or the teeth are too large for the jaw to accommodate them in proper alignment) Kumar et al, found in his study that an incredible and dire requirement for orthodontic treatment, oral hygiene aspects must be contemplated. Preventive programs and early treatment of caries are as yet the best method of reducing high prevalence of malocclusion traits, particularly crowding.[16]

Preventive Dentistry in sports: These days, there is an increase in the death due to accidental injuries or sports injuries. The head, neck and mouth region are prone to get affected in sports injuries, playground injuries and road traffic accidents, injuries like avulsion, fracture also occur. As this may affect a child psychology in the growing period it is essential to make them aware regarding the prevention and treatment of such cases. As schools are the major public institution where these mishaps happen, making teachers and students aware, helps society as a whole.

Masochistic Habits: Any repetitive action being done automatically is called habit.[17] Stimulation of mouth with tongue, finger or nails is a source of relief in passion and anxiety in children.[18] Mostly the oral habits found in children are digit sucking, cheek/nails/lip/pencil biting, mouth breathing, tongue thrusting, bruxism. The resulting impact of an oral habit is dependent on the onset, duration, and nature of the habit.[19]

Tobacco avoidance and cessation: Disuse of tobacco is the number one preventable cause of disease and death. Schools that effectively advance tobacco free living make a strong statement that tobacco use is not acceptable. Tobacco free school area support the message students receive in the classrooms, creating no conflict between what is educated and what is experienced in the rest of the school environment. Dental specialist should be appointed through government for school health programs to give lectures regarding oral health, oral hygiene, plaque control, oral and dental diseases,topical fluoride application,oral cancer or smoke and smokeless tobacco habits and hazards counseling. For class promotion both physical and oral health fitness should be made compulsory. In 1980s WHO began a program,"Health Promoting Schools"wherein oral health education are included in primary schools curriculum.[16,17] In 2010-2011, Archdiocesan Board of Education in a rural and coastal areas of Goa implemented a revised school health promotion program in four schools, while another, nine rural schools were also brought under its wing through the Manthan project.[22]

Conclusion

For maintaining a healthy lifestyle, it is important to have knowledge regarding oral health and habits from childhood, for this purpose school dental health programs are one part of total dental public health programs and should be associated to different projects of prevention and education beyond what many would consider possible. Programs main objective is to take care of oral health of school children as they are the most significant casualties of dental diseases, thus promoting oral health of the community. WHO and UNESCO are launching new activity "Making Every School a Health Promoting School" in collaboration with their UN entities and civil society association through the development and promotion of Global standards for

Health Promoting Schools. The program will serve over 2.3 billion school age children, and will contribute to the WHO's 13th General Programme of Work target of achieving "1 billion lives made healthier" by 2023.

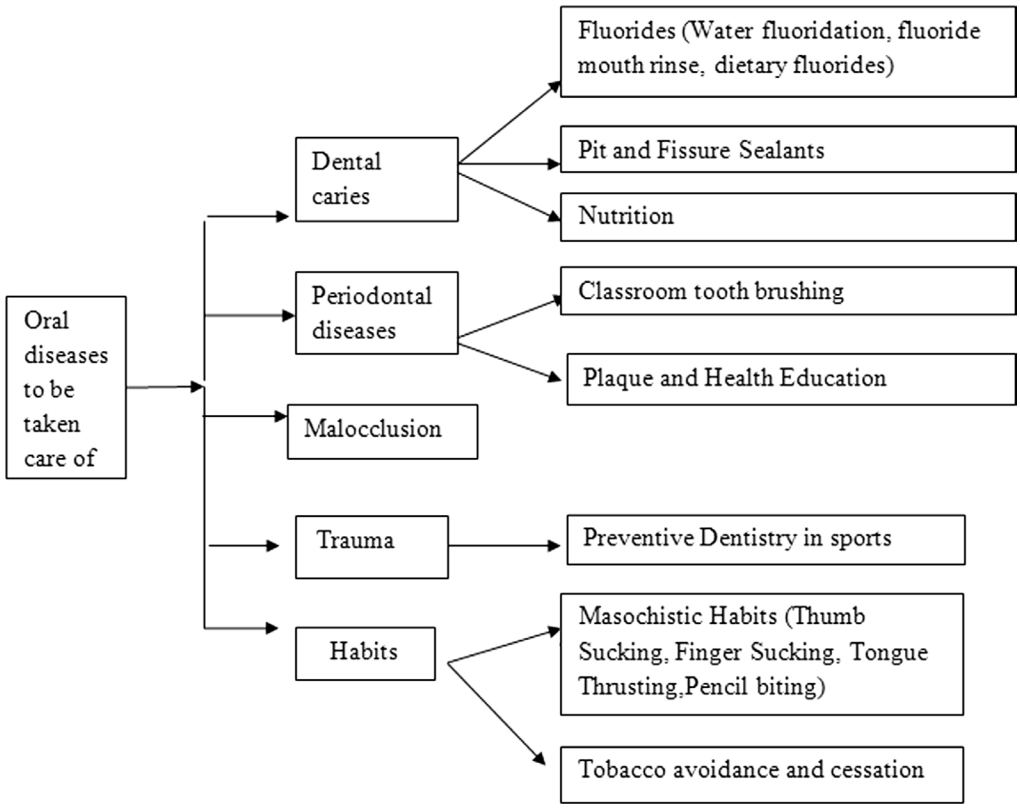


Figure 1. Summary of oral health promotion through schools

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Central Odontogenic Fibroma Coexisting with Inflammatory Odontogenic Cyst: The Second Case Report

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Abstract

This report has described a case of central odontogenic fibroma coexisting with inflammatory odontogenic cyst for the second time in the literature. The case describes a 48-year-old female presented with swelling and intermittent pain in the upper left posterior teeth region. Mobile maxillary left second premolarwas found to be associated with a well-defined unilocular radiolucency and root resorption. Histopathology showed collagenous connective tissue and odontogenic epithelial cells arranged in the form of nests and cords. Along with the conventional features of central odontogenic fibroma an inflammatory cyst was also found. Therefore, the case of central odontogenic fibroma coexisting with inflammatory odontogenic cyst shall be discussed in this report highlighting the possible aetiopathogenesis and prognosis of such lesions.

Keywords: *Odontogenic fibroma, Central Odontogenic fibroma.*

Introduction

Central odontogenic fibroma is a benign fibroblastic neoplasm characterised by nests and islands of odontogenic epithelial cells interspersed in highly cellular fibrocollagenous connective tissue.[1] The odontogenic epithelial cells are usually inactive. Odontogenic cyst may be divided into inflammatory and developmental odontogenic cyst. Presence of inflammatory cells and source of the cysts make any odontogenic cyst as inflammatory. Although central odontogenic fibroma and inflammatory odontogenic cyst individually have been reported several times in the literature coexistence of these two entities has been reported by.[2] This case shall be the second such case to report.

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Case Report: A 48-year-old woman visited us with a chief complain of intermittent pain and loose tooth in the upper left side of the jaw. IOPA revealed presence of a unilocular radiolucency measuring 3x2 cm extending from the root zone of left maxillary first premolar to left maxillary second premolar approximating the maxillary sinus (Figure 1). Root resorption in relation to 25 was seen (Figure 2). Both 24 and 25 were extracted under local anesthesia and the lesion was excised. Upon macroscopic evaluations the two formalin fixed tissues, white in colour and rubbery in consistency were received.

The haematoxylin and eosin stained sections showed two bits. One bit showed stratified squamous epithelial lining proliferating as arcading pattern into the connective tissue wall (Figure 3). Connective tissue wall is diffusely infiltrated with dense collection of chronic inflammatory cells.

Another bit showed (Figure 4) an unencapsulated lesion comprising of bundles of collagenous connective tissue many of which were arranged in parallel bundles. Rests of odontogenic epithelial cells were arranged in the form of nests and cords and are seen throughout the lesional tissue. Focal dense collection of chronic inflammatory cells was seen in the tissue.



Fig 1: Radiographic Findings–Unilocular radiolucency in relation to the root apex of 24 and 25. Root resorption in relation to 25 seen.

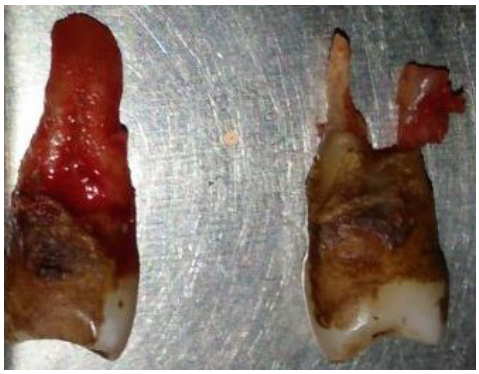


Fig 2: Extracted teeth with resorbed roots

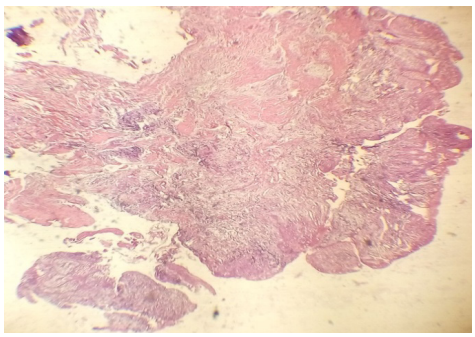


Fig 3: Hematoxylin eosin stain section of tissue is showing arcading pattern of epithelial lining supported by inflamed connective tissue wall (4X view)

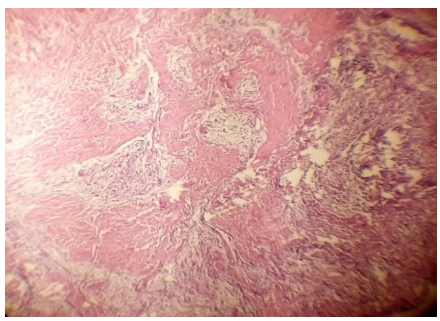


Fig 4: Haematoxylin eosin stain section of tissue is showing nests of odontogenic epithelial cells (10x view)

Discussion

Central odontogenic fibroma is an unusual odontogenic neoplasm simulating endodontic lesions and other odontogenic neoplasms.[3,4]. Wisley has suggested a group of clinical, radiological and histopathological criteria to diagnose odontogenic firbroma.[5] Clinical criteria include a gnathic location, persistent growth which results in painless cortical expansion. Radiological features include large multilocular radiolucent lesions occasionally associated with impacted/unerupted teeth. Histopathological features include presence of nests of inactive odontogenic epithelial cells in a mature cellular fibrocollagenous tissue. Wisley's criteria also includes that the lesion responds to surgical enucleation and having no tendency for malignant transformation. Further Gardener has classified COF into three groups. First being the hyperplastic dental follicle second is the Simple type COF having nests of odontogenic epithelium in collagenous connective tissue stroma.[6] Third variant is WHO type having nests of odontogenic epithelium along with dysplastic dentine or cementum like calcifications. The observation of extremely dense collagen stroma with variable amount of odontogenic epithelial nests, numerous dystrophic calcifications and central location has confirmed the WHO type of COF. The presence of diffusely arranged dense chronic inflammatory cells in the connective tissue wall supported by a cystic epithelium in another bit has suggested the cystic nature of the tissue. Consistent with the previous report the diagnosis of COF coexisting with inflammatory odontogenic cyst was given. COF is considered to be an aggressive neoplasm.[2]

The primary hypothesis to explain this coexistence may explain the possibility of a collision tumour. However, cyst and tumour occurring synchronously is an ill-explained concept. Therefore, the second hypothesis may suggest that the cyst must have been the primary lesion that stimulated COF development. The presence of an inflammatory infiltrate in the cyst may provide growth factors which induce the proliferation of odontogenic epithelial cells and consequently form COF. This suggests the presence of a cyst prior to COF. The third hypothesis may assume that COF growing excessively may undergo cystic degeneration at few areas leading to occurrence of inflamed odontogenic cyst. However, the small size of the lesion may preclude this possibility.

The five cases of tumour recurrences described in the literature appear to have no common features that

would allow the definition of an aggressive pattern of the predilection of recurrence. However preoperative histological diagnostic error and inadequate surgical technique have been the two most common factors for the possible cause of recurrence. Prognosis of all such coexisting lesions needs to be explored through follow up of such patients.

Variable number of mast cells, myofibroblasts and Langerhans's cells are found in histopathology of COF.[7] Numerous stellate plump pleomorphic fibroblasts are also reported by Gunhan.[8]. Several times COF has been also reported to coexist with central giant cell granuloma like component.[9,10] The coexistence of COF with inflamed odontogenic cyst is reported for the second time. The unilocular radiolucency and root resorption of present case contradicts the previously reported case by Ibarguren et al.[2]

Immunohistochemistry with vimentin, S100, smooth muscle actin and c kit may be done to evaluate connective tissue. Similarly, immunohistochemistry with antibodies like AE1/AE2 can be done to see odontogenic epithelium.

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Ethical Permission: Approved

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Management of Anterior Ridge Defect: A Case Report

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Abstract

Loss of teeth is the most devastating situation of patient in dentistry. Loss of teeth leads to resorption of alveolar bone which is an inevitable outcome. This resorption is further magnified in case of trauma. Anterior ridge defects present in a patient is a challenging task to treat, particularly from an aesthetic point of view. Following case report shows replacement of missing maxillary incisors with modified technique. Esthetics, function, phonetics and oral hygiene maintenance are all considered during prosthesis planning.

Keywords: *Siebert classification, Anterior ridge defect.*

Introduction

Anterior tooth loss leads to resorption of alveolar bone. In trauma and congenital defect, the resorption is more. For this type of case requires rehabilitation of tooth loss as well as closure of the soft tissue defect in order to achieveesthetics requirement of patient. The ridge defect with anterior tooth loss often deals with reduction of height and width of alveolar bone[1]. Residual ridge deficiency has been reported in 91% of the cases after extraction.[2]

Seibert in 1983 gave a classification for ridge defects: Class I–Buccolingual loss of tissues with normal ridge height; Class II–apicocoronal loss of tissue with normal ridge width. Class III–combination of bone loss in terms of height and width.[3] These defects may be restored in principle by two method–surgically during the preprosthetic phase or nonsurgical procedure using fixed and/or removable prosthesis[4]. There are different treatment modalities for nonsurgical proceduresare removable partial denture (RPD), cast partial denture (CPD), fixed partial denture (FPD) with gingival ceramics, or an Andrew's bridge. Surgical correction of these defects followed by fixed prosthesis seems to be most tempting treatment choice. However, local and systemic conditions of patient don't always allow surgical correction. Removable partial denture cannot be used when adjacent abutments are periodontally compromised. Fixed removable prosthesis i.e Andrews Bridge is not followed in this case because of cost factors and technique sensitive process. So, a modified conventional fixed prosthesis was planned in consideration with patients demands.

Case Report: A 35-years-male patient reported to the hospital complaining of missing upper right central incisor. A complete medical and dental history was obtained. History revealed that he had met with a road traffic accident 10 years back. On intraoral examination there was loss residual ridge both horizontally as well as vertically in upper right central incisor. It was a Class III type anterior ridge defect according to Seibert [3].

Treatment Option: There are different treatment modalities for anterior ridge defect Siebert class III.

1. Cast partial denture / Removable partial denture.
2. Conventional fixed partial denture.
3. Implant supported FPD.
4. Fixed-removable partial denture.

The patient was not comfortable with removable partial denture as he had to remove and replace the denture. He was also not willing for surgical procedure

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like bone grafting and implant placement. Since it was a three-sided defect, aconventional fixed partial denture designedwas modified as per patient's needs.

Treatment Course:

I. Maxillary left central incisor and maxillary right lateral incisors was chosen in this case as abutments to support the fixed prosthesis after radiological evaluation. Diagnostic impression made with alginate (Zelgan Plus DENSPLY) cast poured using Dental stone Type III (Zermack Elite Rock Dye Stone Type 4). A diagnostic wax up was doneand tried in the patient's mouth for aesthetics and phonetics. (Figure 1)

II. Teeth preparation done in relation to 22 and 12 to receive full metal crowns. (Fig 2) Master impression made using putty wash technique with polyvinylsiloxane (EXPRESS XT LIGHT BODY QUICK RFL) and casts were poured in die stone (Zermack Elite Rock Dye Stone Type 4). Temporary restorationwas fabricated using tooth coloured self-cure acrylic resin (DPI Cold cure) by indirect technique and luted with temporary cement (FREEGENOL TEMPORARY PACK; GC Corp., Tokyo, Japan).

III. Die sectioning done and Wax pattern was made with inlay wax (GC INLAY WAX MEDIUM) for both the abutment teeth with extending into the soft tissue defects. The entire wax pattern assembly was casted with induction casting machine (BEGO FORNAX T CENTRIFUGAL CASTING MACHINE).

IV. Metal try in was done considering with mechanical structural biological and esthetic factors. Fig 2

V. Shade selection was done (VITA CLASSIC SHADE GUIDE) followed by ceramic firing on the copings and gingival ceramics on metal plate extensions. The fixed partial denture with metal plate extension was finished and polished. Figure 3

VI. The provisional restoration was removed and modified fixed partial denture was cemented with resin modified glass ionomer cement (Fuji CEM; GC America, Alsip, USA) on the prepared teeth.

VII. Postoperative instruction was given and review done to assess the prognosis of the treatment. Figure 4



Figure 1. Preoperative



Figure 2. Metal Try in



Figure 3. Finished and polished denture



Figure 4. Post-operative image

Discussion

According to the literatures, usually anterior tooth loss is accompanied by ridge defects and only 9% of the patients did not have ridge defects[5]. The most common defects i.e Class III defects (56% of cases) followed by horizontal ridge defects Class I (33% of the cases).

The famous dictum by Devan is, "Our objective was the perpetual preservation of what remains, than meticulous reconstruction of what was lost." Devan MM. Basic principles of impression making.[7]. In our case, the patient desired a fixed prosthesis for rehabilitation. A conventional CPD and Andrews Bridge was not acceptable to the patient since it was removable prosthesis. Implant placement procedure would have required block graft placement for which the patient was unwilling. Hence, within the constrain option, a modified fixed prosthesis designing was planned in advantageous with completely fixed prosthesis.

Conclusion

The success of prosthetic rehabilitation depends upon various factors like, careful selection ofcases, accurate treatment plan, and careful implementation of a treatment procedure. But the of choice of treatment will be compromised according to patient's needs and financial consideration. In the present case report, modified technique was planned, which successfully replaces the missing teeth along with complete closure of the defect.

Conflict of Interest: None

Funding: None

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Oral Manifestations of Endocrine and Metabolic Diseases

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Abstract

The human body functions with commands from the brain via the central nervous system and the endocrine system. The endocrine glands secrete the metabolically active hormones which have their effects on the body, bringing about growth, immunity, health and coping with stress are to name a few. As with other diseases, any dysfunction with endocrine system or metabolism affects the oral cavity with a myriad of manifestations, some of which are non-specific while others are pathognomonic. An overview of the common oral manifestations of endocrine and metabolic disorders is presented to enlighten the dentist regarding the various endocrine and metabolic diseases which can bring about oral changes.

Keywords: *Endocrine disorders, metabolic disturbances, oral manifestations.*

Introduction

Amongst the most organ systems of the human body, the endocrine system is considered the most important, as it controls the entire body through its various ductless glands secreting hormones for normal functions. The brain exerts its control on the different systems through the hormones which are secreted in minute quantities from these endocrine glands, yet are so effective that the entire body gets affected. Amongst the most common endocrine disorders is Diabetes mellitus which has classic oral manifestations. Other endocrine diseases, though devoid of any specific oral mucosal changes can pose a challenge during stressful dental treatment and lead to complications, like in hyperthyroidism.[1]. Apart from awareness among the general dental practitioners regarding the oral changes, this article aims at cautioning them regarding the adverse effects during dental treatment.

Hyperpituitarism: What a patient shows macrodontia and macroglossia with increased height with enlargement of facial structures, this suggest that patient is suffering from gigantism, due to hyperpituitarism. If hyperpituitarism occurs in young age, during development of bone and teeth, the over activity of pituitary hormones causes 'gigantism' and in oral cavity, macrodontia, macrognathia and macroglossia occurs. When a patient has got macroglossia, macrognathia, macrochelia and large nose with large face in adult life after epiphyseal end is closed, this suggests that the patient is having 'Acromegaly'. Overactivity of pituitary gland after the epiphyseal end is closed causes acromegaly in which the organs are all enlarged.[2,3]

Hypopituitarism: When the patient shows small sized teeth with delayed eruption and small sized tongue, associated with stunted growth and affected facial height, these oral changes suggest that the patient is suffering from hypopituitarism.[4]

Hyperthyroidism: Usually in children and young adults there will be early eruption of teeth and tremors of tongue. If these changes are found, these are diagnostic points to suggest that the patient is having hyperthyroidism. In hyperthyoidism, or the grave's disease, over activity of thyroid hormone causes early eruption of teeth and tremors of tongue in the mouth.[5]

Hypothyroidism: When a patient shows macroglossia and slightly thick skin and has dull, lethargic look with slow speech as an idiotic nature, these findings suggests that the patient is suffering from myxoedema and this is due to under activity of thyroid gland. Myxomatous tissue is laid down in the tongue causing macroglossia.

Hyperparathyroidism: Brownish colored growth, soft in consistency originating from the bone and extending to the oral cavity associated with multiple cystic cavities of the jaw due to osteoclastic activity, bone pain and pathologic fracture with loss of lamina dura in

radiograph are suggestive of hyperparathyroidism. I n hyperparathyroidism caused by hyperplasia or neoplasia of parathyroid there is more secretion of parathormone which acts on bone, remove the calcium and raise the blood calcium level. Removal of calcium causes cavitation's of bone containing fibrous and vascular tissues which perforates the bone and appears in the oral cavity as 'Brown Tumor'.[6] Loss of calcium in the bone causes bone pain and pathological fracture. Lamina dura is a radiographic term used to describe radiopacity of alveolar bone proper.Removal of calcium from the alveolar bone proper is responsible for loss of lamina dura.

Hypoparathyroidism: Sometimes patients will have teeth with enamel hypoplasia which are affected with horizontal pitting, deficient enamel and this is due to calcium deficiency at the time of calcification of that particular period and this may suggest that the patient has Tetany. [6]

Pseudohypoparathyroidism: Some patients may exhibit small tooth crown covered by thin layer of enamel with hypoplastic pitting. Radiographic examination reveals short roots with blunted apices, large pulp chamber occluded by calcific deposits associated with partial anodontia, delayed eruption. Tetany, convulsions, muscle cramps, laryngeal spasm, small stature with premature closure of epiphysis, ectopic ossification and calcification of soft tissues are suggestive features of pseudohypoparathyroidism, which is a hereditable metabolic disease characterized by excessive production of endogenous parathormone, but a lack of response by target tissues namely bone and kidney. [7] Tetany is a condition caused by hypocalcemia and this occurs due to 'hypoparathyroidism'. When parathyroid secretion, mainly paratharmone is low, calcium level is decreased causing hypocalcemia and hypocalcification of enamel and dentin.[8]

Addison's disease: Pigmentation of oral mucosa in the form of bluish black color in gingiva, palate, tongue, lips develop within short duration in certain patients suffering from "Addison's disease" due to hypoadrenalism. Melanocyte stimulating hormone produced in anterior part of the pituitary gland is responsible for melanin production in the body. Melanin stimulating hormone is controlled by cortisol, secreted by adrenal gland. When adrenal gland is diseased due to autoimmune destruction, tuberculosis, amyloidoisis and neoplasia, cortisol level is decreased. When cortisol level is decreased, Melanocyte stimulating hormone increases and is responsible for overproduction of melanin which deposits as pigmentation in mouth.[9]

Puberty, pregnancy and menopause: Estrogen and androgen are the two sex hormones in females and they play an important role in development and growth of sexual organs and also play an important role in target tissues in the cellular metabolism. Gingival tissue is a target organ for estrogen and any alteration of estrogen and androgen levels, the functions of cellular growth is altered.[2]In females, these hormonal disturbances occur during puberty, pregnancy and menopausal period. During puberty, the hormonal imbalance affects the gingival and the gingiva gets inflamed and bleeding will develop. So, bleeding gums in the absence of any others condition in a girl of puberty period is a diagnostic point of attaining puberty.During pregnancy these hormonal imbalance causes inflammation of gingiva. Gingiva will be enlarged, reddish and there will be bleeding gums. Sometimes due to overactivity of estrogens, there will be proliferation of cells, forming a growth. This growth is called pregnancy gingivitis. During menopause, hormonal disturbances cause inflammation of gingiva and bleeding gums, but most characteristic finding is desquamation of epithelial cells.

Erythematous gingiva with desquamation of epithelium associated with bleeding gums is the diagnostic sign of menopause period of a lady.

Diabetes Mellitus: Generalized gingival inflammation and enlargement with alveolar resorption, mobility of tooth associated with multiple abscess in gingiva which are recurrent in nature are the oral signs suggestive of diabetes mellitus. In diabetes mellitus, there is a failure of peripheral utilization of sugar in cells resulting in hyperglycemia, glycosuria, polyurea, polydypsia and polyphagia. When the sugar content is more in gingival and periodontal tissues, the oral bacteria acts and produces sepsis and destruction resulting in mobility of tooth and multiple abscess.[10]

Mucopolysaccharidosis: Sometimes the patient appears with open mouth, enlarged tongue, protuberant thick lips with long upper lip and on examining the oral cavity, gingival and alveolar process hypertrophy with wide and flattened palate are present. Dental findings include peg shaped or small sized teeth with widely spaced dentition and delayed eruption of teeth. These patients physically appear with short stature, scaphocephalic

skull, short broad neck, narrow shoulders, bilateral corneal clouding, puffy eyelids, depressed nasal bridge, protuberant abdomen, lumbar kyphosis, claw hand with knock–knee. Radiographic examination reveals broadened and narrow mandible, prominent gonion, increased distance between the rami and hyperplastic dental follicles due to mucopolysaccharide accumulation causing localized bone destruction. General examination reveals hepato splenomegaly and death due to cardiac failure and pneumonia results.[2,8] These features are suggestive of Hurler's syndrome which is a genetically determined metabolic disorder of mucopolysaccharides or glycosaminoglycans due to alpha–L iduronidase enzyme deficiency, resulting in excess accumulation of mucopolysaccharides in tissues and urine.

Hypophosphatasia: In some patients, premature exfoliation of teeth occurs and on radiographic examination large pulp chambers, due to deficient odontogenesis and deficient cementum production is noticed. On biochemical evaluation alkaline phosphatase enzyme level in bone is reduced. This enzyme is present in bone, liver and intestine and is necessary for conversion of organic to inorganic phosphate which is essential for normal bone mineralization. Increased phosphoethanolamine secretion in urine which is substrate of alkaline phosphatase is the characteristic finding in hypophosphatasia which is a genetically determined metabolic bone disease caused by deficiency of alkaline phosphatase enzyme.[2]

Conclusion

Although all endocrine and metabolic disorders are not commonly encountered in the general dental practice, except probably diabetes mellitus, awareness about these conditions can avoid many unnecessary complications.

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Article on Healing of Wounds in the Oral Cavity

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Abstract

Wound healing mechanism is a primary healing process which has relatively little interaction and has no classification about the healing process of the oral cavity. The mechanism of healing includes sequence of biological processes, where the tissues show identical pattern with reduced scar. Saliva in the mouth forms a warm humid suitable and favourable condition for the healing process in a normal healthy person and an immunocompromised person adding the factors affecting wound healing process. Better understanding about the healing would provide information for identifying the issues which will end up in impoverished wound healing in the oral cavity.

Keywords: *Wound Healing, Inflammation, Granulation Tissue, Immunocompromised, Maw.*

Introduction

Oral wound occurring fortuitously or may be infected by the dentist for certain processes like extraction,different biopsy method, major and minor surgery and oral ulcers like diseases. A living tissue replaces the damaged and destroyed tissue in a healing process to restore normal healthy function. Within the tissues there occur a complex, dynamic biological processes that lead to their renewal and repair. This process is described by four phases that overlapand synchronize with one other resulting in tissue repair and closure. The four phases of oral wound repairinclude haemostasis,inflammation, proliferation and remodelling.[1]

Classification of healing of wounds in the oral cavity include local and systematic factors. An immuno compromised individual follows a high risk of delayed and complicated wound healing process. Besides these there lies some method that can enhance the process of wound repair in the oral cavity.

The following discussion of wound healing involves the normal healing of wound and healing in immuno compromised patient. A complex process where the tissue sunder the skin undergo self-healing after the injury is the wound healing process. Normal healing process includes four phases such as haemostasis, inflammation, proliferation and remodelling. The above mentioned four phases must occur in a specific manner maintaining their required function, duration with optimal density.[2]

Haemostasis phase: In this phase, after the injuryimmediately the platelets come in contact with the collagen which results in activation, aggregation and thrombin produces the fibrin mesh which provides strength to the platelet clump and forms a stable mesh. The growth factors and pro-inflammatory cytokines are released by the clot and surrounding the affected area. Chemotaxis occurs when the bleeding gets controlled that enhances the inflammatory phase.[3]

Inflammatory phase: Sequential infiltration of neutrophils, macrophages and lymphocytes is the characteristics of this phase. Proteases and reactive oxygen species (ROS) are synthesized by the neutrophil that kill the bacteria andthe debris are removed. Macrophages clean the apoptotic cells that include the neutrophils are cleaned by the macrophages and tissue regeneration is stimulated by a phenotypic changeover.[4] This phase takes place for 4-6 days along with edema, erythema, heat and pain.

Proliferative phase: In this phase, the main attention is given on filling and covering of the wound by inducing epithelial proliferation and migration over the provisional matrix within the wound. The fibroblasts and endothelial cells are the most prominent cells in the reparative dermis that support the capillary growth, collagen formation and granulation tissue.

The fibroblasts also produce glycosaminoglycan and proteoglycan in the wound bed which are the major components of extracellular matrix. Wound contraction is facilitated by myofibroblasts that are present at wound site. This phase lasts for 4-24 days.[3]

Remodelling phase: After robust proliferation and extracellular matrix synthesis, wound healing enters the final phase of remodelling. In this phase, regression of many newly formed capillaries takes place, as a result the vascular density of the wound returns to the normal state. The newly formed tissue gains strength and flexibility slowly. The collagen fibers undergo reorganization, tissue remodelling and mature leading to an overall increase in tensile strength. This phase varies greatly from wound to wound.

Oral cavity wound healing process with specific characteristics

Healing of palate: This takes place in the presence of the healthy bonesunderlying it and formation of the scarring tissues[5]. Decreased specifications about the immunity mediators,lesser blood vessels,cell multiplication from the bone marrow increases, re-epithelisation takes place rapidly and rapid proliferation of the fibroblast occurs due to early onset of this phase. Inflammatory phase is absent in the fatal wound healing.[6,7]

Periodontal healing: Extracted tooth socket healing follows the pattern similar to the healingprocessbut this depends on the location of the wound and the variation in the of bone loss, adjacent teeth location, protocol of the treatment followed, smoking behaviour and membranesand bone alternatives used.[8, 9]

A huge number of polymorphonuclear leucocytes are found between the residual epithelial cells and crevicular surface in approximately 2hrs after a scaling and root planning. Enlargement of the blood vessels, oedema and necrosis is seen in the lateral wall of the periodontal pocket. Keratinocytes migration and inflammatory cell infiltration is seen after 24hrs. entire pocket epithelization in 2 days. New epithelial attachment in next 4-5 days is seen and completes epithelial healing in 1-2 weeks.[10]In case of curettage a blood clot is formed in the pocket wall, large number of PML and rapid proliferation of granulation tissue takes place. Complete epithelisation occurs in next 2-7 days.[11]

In case of surgery clot is formed as an initial response which is replaced by granulation tissue followed by new connective tissue cell in 24hrs. capillaries migrate to the granulation tissue and connect the gingival tissue. complete epithelisation takes place within 1 month.[12]Interdental papilla degradation forming of back triangle are noticed after periodontal surgeries. Inflammation can be avoided by maintaining a good oral hygiene and minimizing the retraction.[8]

Healing of Dental pulp: Apical blood supply preservation and survival of the damaged odontoblast layer are the factors on which dental pulp healing relay.[11] Pulp healing is the initial step after which regeneration occurs. The process is linked with the adverse effects of inflammation.

The four steps in the healing of dental pulpby direct pulp capping using calcium hydroxide or bio active extra cellular matrix molecules include: a moderate inflammation, the commitment of adult reserve stem cells, their proliferation and terminal differentiation.[13] Prerequisite for tissue healing is inflammation, after which regeneration is followed. This is also called the pulp repair.

Bone healing: Bone healing takes places by primary or secondary intention. Healing by primary intention occurs in the presence of a healthy blood supply without callus formationand a firm fixation without the bone fragments mobility.[14] The major form of bone healing in maxillo-facial surgerythat takes place by callus formationis the bone healing by secondary intention.[15]

Healing of burns: A compromised healing with marked scarring is exhibited duringburns in the mouth.[1, 5]For the next 48-72 hrs it continues the damage leading to the destruction of the deeper tissuesensuing the initial result due to inflammatory and vascular reactions.[3]

Healing of tongue: Because of generous blood supply lacerations do not become infected and heal well. Primary wound healing occurs rapidly, only if deep lacerations more than 2cm, haemostasis becomes difficult to achieve. For effective function after proper repair early motion is advisable.Saliva plays an important role in the wound healing in the oral cavity. Its intakes a peptide called histadine-1that fight against bacteria and aids in wound healing.[16]

Table 1. Factors affecting wound healing[1]

Factors Affecting Wound Healing	
Local Factors	**Systemic Factors**
• Oxygenation	• Age and gender
• Infection	• Sex hormones
• Foreign body	• Stress
• Venous sufficiency	• Ischemia
	• Diseases: diabetes, keloids, fibrosis, hereditary healing disorders, jaundice, uremia
	• Obesity
	• Medications: glucocorticoid steroids, non-steroidal anti-inflammatory drugs, chemotherapy
	• Alcoholism and smoking
	• Immunocompromised conditions: cancer, radiation therapy, AIDS
	• Nutrition

Wound healing in immunocompromised patients: Immunocompromised patients have an impaired or weakened immune system for which normal response to the infection is affected. This inability to respond normally can be caused by number of illness, drugs and diseases which include diabetes, HIV, malnutrition. An immunosuppressed individual is at considerable risk for a delayed and sometimes complicated cause of wound healing.

Such medical condition can become disadvantageous for the response to the wound healing process. Along with the high blood sugar,occlusion of the peripheral blood circulation is often.Restriction of the cells such as platelets and monocytes from entering the wound which are the major cells responsible for healing are because of the reduced blood flow.Such patients are seen with the persisting wounds and a greater risk of infection for which post-operative care becomes more important.[17]

Enhancing wound healing process: Wound healing process can be promoted by following general measures and some medications.

General method: Wound healing is enhanced by increasing blood flow by applying heat in the affected area. In case of oral wounds habits such as proper and regular brushing and mouth rinse can be helpful where as habits such as smoking, chewing tobacco can be injurious and should be avoided. Salt water rinse can be beneficial in reducing inflammation.

Medications: Certain antibiotics and analgesics are prescribed depending upon the type and severity of the wound to give relieve and avoid infection along with a routine mouthwash. Some oral gels can be applied topically depending on the wound to get relief from swelling, discomfort and pain.

Conclusion

Wound healing in the mouth is anextraordinarily compound biological process that is vulnerable to interruption of a variety of components where a processed healing is followed by a high bacterial and viral liability. The body works in a marvellous way leading to repair and replacement of the destroyed tissue when a conducive healing condition is established.

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Minimal Invasive Dentistry

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Abstract

MID (Minimal invasive dentistry) can be best cited as preventive and biologic approach of dental treatment for the conservation and rejuvenation of healthy dental tissue and structure. The treatment aspect includes earliest and accurate possible diagnosis of dental caries along with sighting out the possible cause and its progress and accordingly planning out the treatment procedure by stopping its restriction and by recuperation of the affected tooth structure and function by alleviating maximum healing of the tooth[1]. This article highlights on the chemo-mechanical and ART procedure of minimally invasive dental treatment as these procedures benefit and focus on treatment of greater mass hence has greater public health significance because it is preferred for school based and community based dental treatment as it's a procedure evolved from fathoming out the cause and type of dental caries and restricting its progress by advanced diagnosis based on which treatment plan is advocated comprising of minimal arbitration of natural tooth structure by elimination of rotary and conservative instruments, syringes and Local anesthesia[2] and leading to usage of desirable, economic and patient comforting materials and environment for dental treatment.

Keyword: *Minimally invasive techniques, Atraumatic restoration, Chemomechanical treatment, Public health, Chemomechanical gels.*

Introduction

MID can be defined as philosophy of professional care, concerned with occurrence, early detection and earliest possible cure of the diseases on a micro level followed by minimally invasive treatment in order to repair irreversible damage caused by such diseases[1]."

MID can be categorized into 4 main categories[2,3] such as: Early identification and diagnosis of caries, Reduction-to stop the progression of the caries the causative factors need to be identified and eliminated it can be done be recapitulating individuals lifestyle by reduction of intake of snacking pattern, sweet beverages and stoppage of smoking. Remineralization which includes cultivation and restoration of strength and function of tooth structure by using materials such as fluorides, calcium sucrose phosphate, sugar substitute hydroxyapetite etc. Repair is done by conservative method without disrupting the natural tooth structure for removal of caries and promoting life span of the affected tooth.

There are various Minimally Invasive techniques such as[4]

- Mechanical-Atraumatic restorative treatment
- Rotary comprises of high and low speed burs
- Sonic oscillations
- Chemo mechanical-Carisolv, Caridex, Papicari, Carie Care
- Kinetic-Air Abrasion
- Hydrokinetic-Laser
- Ozone Technique–O_3

ATRAUMATIC RESTORATION

It's also called interim therapeutic extraction. The term itself suggests that the procedure is atraumatic and painless resulting in increased patient comfort and acceptance and reduced patient anxiety. This technique was developed in TANZANIA in mid 1980 at university of Dares Salaam[4].

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This technique comprises of eradication of soft, demineralised carious tooth structure without interference with the sound tooth structure by using hand instrument only and eliminating the use of Anesthesia and Electrical and Rotary instruments.

Instruments used in this techniques are:

- Mouth mirror
- Explorers
- Tweezers
- Spoon Excavators
- Hatchet
- Carver

ART is advisable for small occlusal cavity where the clinician has good accessibility and visibility of the cavity for restorations. Restorative material like GIC and Resin bonded composites, GIC is mostly used as it has the properties to prevent[5]-

- Micro leakage
- Secondary caries
- Pulp Irritation

Procedure: Pre organization of work scenario outside the patient mouth is that the correct position and posture of the operator should be checked, the required assistance should be available, the patient position should be checked, the operating light is to be examined, inoperating environment inside patient mouth it is essential to check the Hegemony of saliva. Hygiene and hegemony of cross infection should be maintained and examined.It is mandatory to use gloves and masks and have clean working environment and sterilized instruments forRemoval of caries the soft carious tooth structure is removed by using spoon excavator. The cavity can be expanded by placement of dental hatchet if the cavity is narrow and ultimately cleaned by wet cotton or water syringe[6].

Conditioning and preparation of cavity-Prepared surface is cleaned with dental conditioner-10% polyacrylic acid/ GIC liquid.As per the manufacturer's instructions the material is to be mixed within 20–30 seconds. Material should be smooth, glossy, putty type. By using the filling instrument the restorative material is inserted into cavity. To cover up the pits and fissures sealant is spread over. Excessive material is to be removed with a carver and cavity varnish should be applied uniformly[7].

Chemomechanical Method: The method of removal of caries opened new doors in the field of dental sciences. Various new products like gels, and other working instruments and armaterium were introduced in the field of dental sciences which made treatment procedures more easier, comfortable, less time consuming, painless and eliminated the usage of complex instrument like rotary and conservative instrument as only hand instruments were used. More over this method of treatment could focus on public health aspect rather than restricting it to fewer individuals[8].

Mechanism of Action: In this method the penetrates the demineralised dentine. Dentine has two layers the inner layer and the outer layer, the inner layer is partially demineralised and has capability of Remineralization. While the outer layer is incapable of Remineralization so the gel results in breakdown of degraded collagen and softening of carious dentine[9].

Chemomechanical Gels

- Sodium Hypochlorite based (NaOCL)-cariesolv Cariedex
- Enzyme based-Papacarie

Biosolv

Carie-care gel

Carie Care Gel: Is a gel based formulation. It is basically an enzyme designed for non intervening, non invasive, and non traumatic removal of carious dentine. On application of the gel there is selective softening of carious dentine and expedite removal by gentle excavation. The main component of carie care is endoprotien[10,11].

- This gel has-bactericidal and disinfectant properties.
- Food grade dye for localization, water and salts.
- Eradicates the use of rotary instruments and local anesthesia.
- It has maximum patient comfort.
- It is efficient and easy to use.
- It takes only 2-3 minutes to dissolve and act.
- It has a good consistency so the spillover is avoided.
- It has mild anesthetic effect.

- It has a pleasant aroma.

Cariedex: In 1984 after FDA approved cariedex was marked and was ready to use it consisted of 2 solution. Solution 1-sodium hypochlorite. Solution 2-glycine, amino butyric acid, sodium chloride and sodium hypochlorite.

Cariesolve: The gel Carisolv made it to surface on January 1998. It consisted of 2 syringes. 1st syringe-sodium hypochlorite. 2nd syringe-amino acid like lysine, leucine, glutamic acid, amino butyric acid, sodium chloride, sodium hydroxide with carboxymethyl cellulose.

Table Chart

	Cariedex	Carisolv
Solution-1	1% Naocl	0.5% Naocl
Solution-2	0.1m glutamic acid/ leucine/lycine, 0.1% NaOH	0.1m glyutamic acid/leusine/lysine, NaOH
DYE	-----	Erythrosine
Ph	10.99	10.99
Physical property	Liquid	gel
Volume needed	101-501ml	0.2-1.0ml
Time required	5-16min	5-16min
Stability	1hr	20min

V-Carie Solve: It is a caprice papaya extract gel with vitamin A and vitamin C for chemomechanical removal of dental caries. It has painless carious dentine removal procedure. The use of drilling and rotary instrument is eradicated. It is composed of payaya extract, chloramines and clove oil.

Papacarie: This gel has conservative and biologic approach of caries removal. Working time of papacarieis much lesser as compared to other chemechanical gels. It aids in reduction in bacteria, has antibacterial property following easy and painless excavation. It is composed of papacarie, chloramines and toludine blue. It was developed on 2003 in Brazil[12].

Biosolv: It is composed of pepsine enzyme in phosphoric acid. Phosphoric acts as a dissolvent for the inorganic component. Pepsin breaks down the dentured collagen fibers hence the carious dentine cam be effortlessly removed by specially designed plastic instruments. Biosolv has higher acidic Ph which makes it a aggressive material for removal of carious dentine henceforth more studies are required to know the mechanism of action of biosolv and more experiments are required for its stabilization[13].

Conclusion

Once affected a tooth cannot be brought back to its original state, hence MID is one of the best technique to preserve and perpetuate the remaining natural tooth till the possible extent. MID enhances patient comfort and acceptance reduces patients dental anxiety and eliminates the use of complex conservative instruments thereby making this procedure acceptable and assessable to wider public mass like school dental health resulting in coverage and benefiting to larger mass. This field of dental treatment has come up with lots of advancements and materials for patient care, but still many materials need more examinations and studies to understand the mechanism of its action and make it more assessable and establish its optimum effect.This treatment aspect promotes 'remineralization' which makes it a favorable treatment procedure as complex procedure are avoided especially for small occlusal cavities. The future of tooth remineraliaztion lies in the field of MID, as this procedure focuses on preservation of natural tooth.

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A Review Article of Oral Manifestations of Systemic Diseases

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Abstract

At present, multiple diseases have an impact on oral health. Oral manifestation in many systemic diseases may be turned out to be the evidence or sign of such diseases. In some systemic diseases, the oral lesions are concurrently accompanied by other medical symptoms; henceforth it is necessary to evaluate these oral lesions by physicians and dentists**.** Identification of such symptoms may help early diagnosis and treatment. This review article based on the oral manifestation of systemic diseases focuses on blood disorders, autoimmune diseases, and deficiency of essential micronutrients.

Keywords: *Oral Manifestations; Blood Disorders; Autoimmune diseases; Endocrine Disorders; Essential Micronutrients.*

Introduction

It is a clear fact that manifestation of the oral cavity is the 1st pathological conditions of the systemic diseases. It has been observed that many types of oral pathological conditions are associated with different types of systemic diseases like Endocrine disorder, an autoimmune disorder, Blood-related disorder, Neurological disorder, Viral and Bacterial infections. As we know oral mucosa consists of heterogeneous tissue which may be disturbed by the changes in blood cell count, change in neurological and endocrine secretions. The occurrence of these diseases may cause many manifestations in the oral cavity in different forms such as ulcerations, lichen planes, leucoplakia, xerostomia, swelling of the salivary gland, etc. So, in these conditions, it is very difficult to evaluate such pathological conditions only by the dentist. So early diagnosis can be done by both dentists as well as physicians. As a result, these diseases can be diagnosed and treated early[1].

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Oral Manifestation of systemic disease: Manifestations associated with specific diseases have been described as follows:

Diabetes: Diabetes mellitus is an endocrine disease in which the blood glucose level increases that are called Hyperglycaemia, which is due to the lack of insulin secretion or insulin resistant. It is of two types: Type I (Insulin-dependent), Type II (non-insulin-dependent). The most common type is type II. Type I is more common in children and type II is more common in adult 9. In such diseases, the patient's oral hygiene maintenance is very poor due to a random change in blood glucose level and as a result causes periodontal diseases, bleeding gum, etc[1,2]. An oral manifestation of diabetes Mellitus is xerostomia, root caries, oral candidiasis, periodontal diseases, and prolonged wound healing and an increase in the frequency of infections following surgery. The xerostomia increases the chances of fungal and bacterial oral infections along with loss of taste sensation. Long term manifestation included some mucosal lesions such as candidiasis, oral ulcer, and stomatitis[3].

Treatment: The manifestations should be controlled only by controlling the blood glucose level, take medication as prescribed by the physicians, eat low sugar food, use alcohol-free mouthwash. To prevent root caries and periodontal disease maintain oral hygiene with twice brushing daily and regular visit to the dentist[4,5].

Crohn's Disease: Crohn's disease is a disorder in which infection of the intestine occurs (most common site is colon) and the etiology factor is unknown. It causes inflammation of the intestine, which can lead to **severe diarrhoea**, tiredness, weight loss, and starvation. Inflammation caused by **Crohn's disease** can affect different areas of the digestive tract in different people. The most common sites of oral lesions in Crohn's diseases are lip, gingiva, vestibular sulci, oral and intestinal mucosal lining. It may cause minor aphthous ulcer, impairment of oral functions, psychological stress, angular cheilitis, persistent submandibular lymphadenopathy, gingivitis, and periodontal diseases. The inflammations spread all over the body mucosa lining which is a severe condition[2,6].

Treatment: For angular cheilitis-topical steroids (1% hydrocortisone), for deep ulcerations-topical analgesic or intra-lesional steroids, for lip fissured-intra-lesional steroid and topical tacrolimus and regular visit to the dentist for check up[7].

HIV Infections: Human immunodeficiency virus is a virus that harms the immune system of the subject's body. HIV destroys more CD4 cells; the body is more prone to get various types of infections. Oral manifestations are the most basic orofacial manifestations of HIV infections. The foremost etiological factor of oral candidiasis is the fungus, Candida Albicans;also additional species of Candida may be involved. Different orofacial lesions associated with HIV infections are Kaposi's sarcoma, candidiasis erythematous, pseudo membranous candidiasis, melatoninhyper pigmentations necrotizing stomatitis and angular cheilitis, leukoplakia, and aphthous ulcer[8,9].

Treatment: There is no such permanent treatment for HIV Patients only for the symptomatic relief some medications are prescribed and regular visit to the dentist. For mild candidiasis chlorhexidine 0.12%, Topical amphotericin B for resistant candidiasis, Clotrimazole 1% cream or Ketoconazole 2%cream are for angular cheilitis. Imidazole and triazole are the medication for anti-fungal[12].

Rheumatoid Arthritis:-Rheumatoidarthritis is an autoimmune disease. It is a systemic disorder, which affects the entire body Joints. It befalls when a person's immune system misinterprets the body's healthy tissues for foreign invaders. As the immune system responds, swelling occurs in the target tissue or organ. Oral findings like ulcerations, gingivitis and salivary gland swelling, symptoms like oral dryness and TMJ disorders[4,10].

Treatment: For Dental caries can be prevented by regular maintains of oral hygiene, topical fluoride applications, use of fluoride contain identifies or toothpaste. The dryness of the mouth can be prevented by xylitol chewing gum (sugar-free) and regular visit to the dentist for check up [11].

Anemia: Anemia is a disorder in that conditions healthy red blood cell count decreases to carry adequate oxygen to the body's tissues. Having **anemia** can make the subjects tired and weak. Mucosal pallor is the most common manifestations of anemia. The other manifestations of anemia are glossitis, gingivitis, disturbed taste sensation, Candida infections, atrophy of filiform papillae[12].

Treatment: For blood loss anemiai.e. iron deficiency anemia $FeSO_4$ 200mg 3*/d is prescribed, for hemolyticanemia avoid oxidative drugs, for sickle cell anemia blood transfusion in crisis. For thalassemia alpha and beta major blood transfusion is required and regular visit to the dentist[13,14].

Leukemia: Leukaemia is a carcinoma of the blood cells. In these conditions, the WBCs count increases up to 50lakhs above. **Leukaemia** can occur due to a problem with blood cell production. It usually attacks the leukocytes or WBCs. The foremost oral complications in leukemia are gingival enlargement, ulceration, a tendency to bleeding, taste alterations, xerostomia, Trismus[6,15].

Treatment: Regular visit to the dentist for check up & For

Gingivitis	Maintain oral hygiene by use soft bristles
Ulcerations	Topical steroids 4times/day Biopsy
Gingival bleeding	Antifibrinolytic mouth wash, use soft bristles
Trismus	Physiatrics
Periodontal infections	Antibiotics, antifungal, antiviral

Deficiency of micronutrients: Micronutrients are essential components needed by the body in small quantities. They include microminerals and Vitamins. Micromineral include at least iron, cobalt, chromium, copper, iodine, manganese, selenium, zinc, fluoride, and molybdenum. The Vitamins include vitamin-A, vitamin-B complex, vitamin-C, vitamin-D. Micronutrient deficiency may cause several orofacial lesions and different diseases. It is widespread among

2 billion people in developing and developed the country. It affects all age groups. The deficiency of these micronutrients causes increased dental caries, affects bone health, decreased bone mineralization. Deficiency of Fluoride causes dental decay and affects the bone health[7]. The most common disorder is malnutrition germination[8].

Treatment-Took all form of green vegetables,fru its,citricfruits,milk,yogurt,cheese,seafood,wheat,meat, low consume sugar food,rice,bean,egg,peanut,fishetc. Taking proper calories of food may maintain the macro and micronutrients of the body. And Drink 3-4litters of water per day also help for maintaining micronutrients percentage and Regular visit to the dentist for check up[16,17].

Conclusion

It is very often that manifestations of oral cavity are associated with the specific systemic diseases. A proper diagnosis of the pathological conditions of the oral cavity through a full review of the patient's past medical history should help to diagnosis the cause early. Hence the dentist has the major role to find out the pathological conditions of the oral cavity and can be treated the same.

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Impact of Glycemic Level in Type 2 Diabeties

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Abstract

Diabetes mellitus is a group of disorders characterized by an increased in plasma blood glucose (hyperglycaemia). Globally, the incidence of diabetes is rising approximately 3 new cases in every 10 sec and by 2030 it is expected to affect the population of 552 million people, therefore it is now considered as a new epidemic. Various type of diabetes mellitus affecting different group of people has been seen, most commonly are type 1 and type 2 diabetes. diabetes mellitus has greatly elevated the rate of morbidity and mortality which has become a major burden to the health care system of all over the world. Diabetes mellitus almost affect every system of the body; therefore, a thorough history and physical examination must be done in these patients. It also has many oral manifestations which are often neglected by the patients, clinical practitioners and many health care providers. So, in this article we are going to summarize various oral manifestations due to impaired glycaemic level.

Keywords: *Diabetes mellitus, Mucous, Blood Glucose, Fasting blood sugar, Insulin.*

Introduction

Diabetes mellitus is a non-communicable disease and chronic disease of carbohydrate metabolism which has increasing trend in past two decades all over the world and India has been declare as diabetic capital of the world. Diabetes mellitus is the groups of common metabolic disorder that containsthevariousphenotype of hyperglycaemia. Hyperglycaemia can cause both acute and long-term diseases, but most of the complications are due to chronic hyperglycaemic state as it causes microvascular changes[1]. Three important microvascular complication of diabetes are retinopathy (eye), nephropathy (kidney) and neuropathy (nerves of limbs). Various etiologicalfactor leading to hyperglycaemia are decrease insulin secretion, decrease glucose utilization and increase glucose production[2].

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It is seen in various studies, there are certain risk factors which have strong association with diabetes are genetic association, obesity, sedentary life style, certain ethnicities, increase urbanisation and economic development, therefore its incidence is more in developed country than in developing country[3].

Type 1 diabetes (also known as juvenile diabetes) is a chronic T cell-mediated autoimmune disease-causingbeta cells (insulin producing cells) destruction in pancreas leading to complete or near-total insulin deficiency. But typical symptoms of diabetes appear only when beta cell function is lost by 80-90%. It can develop at any age most commonly before 20 years of age and has strong genetic predisposition. many genes are involved but HLA complex polymorphism have 40-50% genetic risk and HLA halotypes DR3 and/ or DR4 are found in most of the individual with type1 diabetes. It contributes 5-10% of all diabetes cases. Risk of developing type 1 diabetes is 40-60% if his/her identical twin has the disease, and 20% in non-identicaltwin.It is generally more common in Caucasians and in countries which are in close proximity to polar regions like Finland. Genetic susceptibility cause immune dysfunction leading to inflammatory infiltration of islets cells-insulitis, hence

beta cell destruction decreasing insulin secretion and certain high levels of glucose may be toxic to remaining beta cell, causing profound insulin deficiency and metabolic sequalae of hyperglycaemialike glycosuria, dehydration, lipolysis, proteolysis(weight loss) and other symptoms of diabetes even resulting in ketoacidosis and death if insulin is not replaced[4].

Type 2 Diabetes mellitus (85-90% of all the diabetes cases) most common chronic diseases characterised by insulin resistance, impaired insulin secretion and increase glucose production and is one of the leading causes of death and disability in the world.Prevalence of type 2 diabetes increase with age, approximately 10% in people >65years, 70% of all diabetes seen after the age >50years. it has strong association with family history of diabetes especially first-degree relatives, overeating andobesityi.e., BMI>30kg/m^2, physical inactivity especially in office going people which always works in front of computer, hypertension, history of gestational diabetes, deranged lipid profile i.e., high LDL, cholesterol and triglycerides, polycystic ovarian syndrome and certain ethnicities (African-American, Latino, native American, Asian American, pacific islander) therefore good assessment mandates good medical history including family history, races, drug history, occupation, etc. obesity particularly intra-abdominal fat / central adipose tissue is now considered as major cause of insulin resistance but primary cause is still remain unclear likely multiple defects in insulin signalling[5]. In early stage insulin resistance cause increase insulin production to maintain normal blood glucose, then ultimately beta cells are unable to meet increased insulin demand and gradually progressing to insulin deficiency therefore, it is called relative insulin deficiency[6].

Gestational diabetes is glucose intolerance develop during pregnancy. In this there is an increase in insulin requirement due to insulin resistance is related to metabolic change of late pregnancy. Other type of diabetesmellitusincludes specific genetic effect, metabolic abnormalities, mitochondrial abnormalities and other host specific impaired glucose tolerance.

Diabetes mellitus has various oral manifestation that impact the oral health for which clinician should be well aware of it, so that early diagnosis and timely referral to oral health providers can be made and this article will be give review of association between the diabetes mellitus and oral health.

Sign and Symptoms: Symptoms of hyperglycaemia are polyuria, polydipsia(thirst),change in weight usually weight loss, fatigue, lethargy, weakness, blurry vision, nausea, headache, hyperphagia (craving for sweet foods), mood change, irritability, difficulty in concentrating, apathy, frequent superficial infection (mucosal, skin infection and slow healing of skin lesion after minor trauma).

Criteria for diagnosis of diabetes mellitus:

- Symptoms of diabetes plus random blood glucose concentration >= 200 mg / dl or
- fasting plasma glucose >= 126mg/dl or
- 2hr plasma glucose >= 200mg/dl during an oral glucose tolerance test or
- HbA1C>= 6.5%. fasting plasma glucose or HbA1C is recommended as screening test for type 2 diabetes mellitus[7]

Oral Manifestations: Oral manifestation of diabetes mellitus is firstly due to polyol pathway that converts glucose into sorbitol byaldosereductase and secondly due to formation of advanced glycosylation end products (AGE) which gets deposited in specific organ and causes various complications. it includes xerostomia, burning sensation of mouth, impaired wound healing, increase chances of infection, secondary infection with candidiasis, parotid salivary gland enlargement, gingivitis and /or periodontitis[8].

1. **Periodontal Disease:** Diabetes and periodontal disease show various synergism therefore, Periodontal complication is now considered as sixth complication of diabetes mellitus. In hyperglycaemic patients there is depleted immune functioning, decrease in white blood cells (decrease in neutrophil activity) which weakens the immune system which leads to various infections including periodontitis. Periodontitis is chronic inflammatory disorder which cause destruction of gingivae and periodontal tissue started with bacterial infection. It is slowly progressing and irreversible tissue destruction. Formation of periodontal Pockets resulting from tissue destruction due to breakdown of collagen fibres of periodontal ligament. As it is painless and asymptomatic during early stages of disease, so early diagnosis is difficult and remain undiagnosed and untreated, leads to further progression of disease, more deepening of pockets,

resorption of alveolar bone resulting in loosening of tooth. Gingival erythema, bleeding, oedema, recession, tooth mobility, tooth drifting, suppuration from pockets and tooth loss are seen in advanced disease and patient usually presented in clinics in this stage. Incidence of periodontitis increases three times in diabetic patients than in normal population, therefore glycaemic control is more important is diabetic people, it will reduce the incidence of periodontal disease and also reduce the disease progression[9].Other risk factors of periodontitis are smoking, immunocompromised condition, malnutrition, osteoporosis, medications that causes drug induced gingival overgrowth example-calcium channel blockers, phenytoin, ciclosporin and local factors like anatomical deficiencies,these risk factors have to be rule out for proper treatment of periodontal disease.therapy includes surgery, antibiotics or both . most common antibiotics used is amoxicillin.amoxicillin 250mg three times a day for 7 days or clindamycin 300mg four times a day for 7 days(for patients who are allergic to penicillin group)[10]

2. **Salivary Gland Dysfunction and Taste Dysfunction:** There are three major salivary glands namely parotid gland, submandibular gland and sublingual gland and many minor glands in oral cavity. Reduced salivary flow rate i.e., hyposalivation and dry mouth i.e., xerostomia is main salivary gland dysfunction seen in diabetes. Damage in salivary gland due to diabetes affect both quality and quantity of saliva, thus altering saliva flow rate, pH, salivary protein concentration leading to glandular deterioration. Prevalence of these dysfunction has seen more in diabetic patient with neurological complication. Because of dry mouth patient has symptoms of polydipsia and polyuria. Xerostomia is also risk factor of periodontal infection and tooth decay. Sialosis is a swelling of parotid gland is also seen in diabetic patient.treatment includes saliva substitute and stimulants, drugs can also prescribed in severe cases as pilocarpine and cevimeline Altered taste sensation in diabetic patient has been reported due to salivary gland dysfunction. There may be elevated threshold for taste sensation. these conditions show poorly controlled glycaemic level in known case of diabetes[11].

3. **Oral Fungal Infections:** In diabetes immune system is weakened which give rise to opportunistic infection like Oral candidiasis caused by a yeast *candida albicans.* High levels of blood sugar also favour growth of these organism. these infections can also occur as aside effect of antibiotics abuse, antihistamines or chemotherapy drugs. It is classified as acute and chronic infection. Acute infection are erythematous and pseudomembranous, also called oral thrush. Symptoms of oral candidiasis are white or yellow patches of bumps on inner cheeks, tongue, tonsils, gums or lips, slight bleeding if bumps are scrapped off, soreness or burning of mouth, dry and cracked skin at the corner of your mouth, difficulty swallowing, a bad taste or loss of taste. Candida infection is more seen in diabetic patients with smokers, dentures, oral steroidsand have poor glycaemic control. Chronic infection i.e., hyperplastic candidiasis also known as candida leucoplakia, seen in immunocompromised patients. Manifestations of candida occur in various forms like median rhomboid glossitis, atrophic glossitis, denture stomatitis and angular cheilitis. Salivary gland dysfunction, immune deficiency and hyper glycemia are contributing factors to this infection. local antifungals can be used as treatment, common antifungals are nystatin, clotrimazole and fluconazole. Use of pastilles, lozenges or troches to provide a local and systemic effects[12].

3. **Bacterial Infections:** Diabetes have impaired immune system and poor metabolism make it more prone to recurrent bacterial infection. Higher glycaemic level also gives it good environment for bacterial growth and favours spread of infection to submandibular space and neck. More commonly seen is streptococcal organism. Treatment includes broad spectrum antibiotics.

4. **Poor Oral Wound Healing:** Delayed wound healing makes treatment in this patient more difficult. It shows poor tissue regeneration, delayed osseous healing, delayed vascularisation, reduced blood flow, reduced in innate immunity, decreased growth factor production and psychological stress.

5. **Oral Mucosal Disease:** It includes lichen planus and recurrent aphthous stomatitis. Oral lichen planus has autoimmunity as a underlying cause, therefore it is mostly seen in type 1 diabetes. Atrophic erosive lesions are more common.treatment plan is to reduce pain erythema, ulceration and sensitivity by topical or systemic steroids and glycaemic control

6. **Neuro-sensory oral disorder:** Oral dysesthesia or burning mouth syndrome is another manifestation of diabetes. It is a chronic painful condition associated with burning sensation of tongue, lips and mucosal regions of mouth. factors affecting are uncontrolled diabetes, hormonal therapy, psychological, neuropathy, dry mouth, candida infection. management are usually symptomatic treatment, medication which are often used are benzodiazepams, tricyclic antidepressants and anticonvulsants has shown effective.

Complication of Diabetes

1. **Hypoglycaemia:** Hypoglycaemia is a condition where glucose level abruptly drop below normal i.e., <70mg/dl. It is especially seen in patients with insulin therapy, also referred as "insulin shock" or "insulin reaction", symptoms will appear within minutes. But patient with oral hypoglycaemic agents, symptoms have slower onset. If left untreated can lead to unconsciousness, coma or death, so it's a emergency condition. Condition decreases the requirement of insulin are-weight loss, disruption of food intake, drinking too much of alcohol increased physical activity, termination of pregnancy, recovery from infection and fever.

Symptoms of hypoglycaemia are shakiness, sweating, increased heart rate, dizziness or light-headedness, hunger, nervousness, change in behaviour or personality, tingling or numbness of lips and tongue, sleepiness, blurred vision, loss of coordination, headache, weakness, trouble concentrating, confusion, paleness, irritability. In severe cases, unable to eat or drink, seizures or convulsions, unconsciousness.

Management-unconscious patient

- Termination of the dental procedure
- Patient should placed into supine position with leg elevated slightly
- The steps of BLS quickly (check airways, breathing, pulse)
- Summoning of medical assistance
- Iv infusion
- Administration of oxygen

Management-conscious patient

- Recognized hypoglycaemia
- Terminate dental procedure
- Position patient comfortably
- Assess and perform BLS, as needed
- Definitive care: administer oral carbohydrates
- Successful: unsuccessful
- Permit patient to recover summon medical assistance
- Discharge patient administer parenteral carbohydrates
- Monitor patient
- Discharge patient
- Unconscious patient
- Terminate dental procedure
- Position patient supine with legs elevated slightly
- Assess and perform BLS, as needed
- Definitive care:
- Summon emergency medical assistance
- Administer carbohydrates
- IV 50% dextrose solution, 1mg glucagon, transmucosal sugar, rectal honey or syrup
- Allow patient to recover and discharge per medical recommendation

2. **Hyperglycaemia:** Hyperglycaemia is not a life-threatening emergency but if left untreated can lead to diabetic ketoacidosis and diabetic coma which are life threatening. It can occur in anytime, abnormally high glucose level due to insufficiency of insulin. Other than diabetes, condition which can lead to hyperglycaemia are pancreatitis, Cushing syndrome, pancreatic carcinoma, adrenal insufficiency. Symptoms of hyperglycaemia include glycosuria (high levels of sugar in the urine), frequent urination, increased thirst, fatigue,blurred vision

Treatment-lifestyle modification can markedly decrease the incidence of hyperglycaemia, like daily exercises and eating healthy and well proportionate diet at right time. People who have random glucose level> 240mg/dl should always check for ketone bodies as they are always prone for diabetic ketoacidosis.there are many oral administered anti hyperglycaemicagents (OHA) and insulin therapy to reduce blood sugar level[13].

3. **Diabetic Ketoacidosis:** It occurs due to imbalance between insulin and blood glucose. When insulin level is too low, large amount of cells undergo breakdown which leads to formation of acidic ketone bodies.these ketone bodies are toxic to body, If left undiagnosed and untreated it can lead to coma and death.

Symptoms-fruity odour breath,dry mouth, high blood glucose levels, high levels of ketones in the urine, frequent urination, shortness of breath, tired feeling, dry andflushed skin, nausea, vomiting and abdominal pain, confusion

Treatment-if is suspected, immediate hospitalization is needed, with immediate glycaemic control with insulin therapy[14].

Conclusion

There is huge impact of altered glycaemic level in every system of the body including oral health. A healthy oral cavity is definitely directly proportional to the good prognosis and various treatment measures associated with diabetic mellitus. It is the major role of the dentist to know the underlying causes of the periodontal diseases, resulting from disturbed glycaemic level in patients. Various surgical and non-surgical therapies, depending upon the grade of infection of the periodontist should be performed to ease the other complication arising from diabetes so early diagnosis and early control of glycaemic level prevents serenity of these manifestation.

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Applications of Botulinum Toxin in Dentistry

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Abstract

The prospect of treatment options in dentistry are broadening rapidly. Application of conservative, minimally invasive and affordable treatment options like use of botulinum toxin are gaining popularity. The toxin is produced by anaerobic bacterium Clostridium botulinum. It can be used as a treatment option for muscle generated dental diseases and used to treat esthetic dental conditions.

Keywords: *Botox, botulinum toxin, BTA.*

Introduction

Botulism term was derived from the Latin word botulus, meaning black sausage. Initially found in rotten sausage, that induced food poisoning. This toxin was discovered by Justinus kerner in 1817. It was the first toxin to be adopted in medicine, approved by the US Food and Drug Administration. Subsequently, while treating a patient with blepharospasm using BTA, Carruthers serendipitously discovered that it reduced the appearance of wrinkles in the glabellar region. Then they found that it was also effective on wrinkles around the eyes and the nasolabial folds[1]. The toxin is used in dentistry for treatment of diseases like parafunctional clenching, extra capsular myogenic temporomandibular disorder, trismus, and the associated headaches.

Structure and Types of Toxin: There are eight serologic types (A, B, C1, D, E, F, And G).Molar mass: 149kg/mol. The serotypes that are harmful to the human system are A, B, E, F, and G. Among which BTA is highly toxic. BTA and BTB are clinically used and their active regions are specific with a desirable effect that can be obtained by controlling the concentration[1].The most commercially available and used BTA products marketed worldwide are BOTOX®; ALLERGAN, Dysport® and for BTB,MYOBLOC®. BOTOX® is more effective than dysport® and MYOBLOC®, thus the doses used during treatment should be chosen cautiously.

Mechanism of Action: BT shows an action of dose dependent weakening of muscle activity, as it is injected into the required muscle. It causes a short term degeneration of nerve supply to the facial muscle by attaching itself with glycoprotein complex and suppresses the discharge of acetylcholine leading with neuromuscular blocking effect. However, it can be re-developed by germination of new proteins. Therefore, blockade is temporary. Thus, treatment with botulinum is actually a palliative approach rather than a curative option[2].

Preparation: Botulinum toxin is reconstituted with preservative-free 0.9% sodium chloride. Therefore, it should be stored in a refrigerator with a temperature of 2-4 degree Celsius and discarded if more than four hours elapse after reconstitution. The preferred syringe is a tuberculin syringe with a 26-30g needle[3]. It is recommended that the reconstitution should be gentle a*s* froth arising out of vigorous shaking can lead to surface denaturation of the toxin[2]. The toxin is dispensed in small vials containing 100 U or 500 U.

Injection Method: The patient position should be perpendicular to the floor; the site of injection must be properly inspected while the patient is forming different face expressions which will help in determining the

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exact area. The areas to be injected should be sterilized with betadine. Before injecting, application of ice is preferable to stop bleeding along with pain. The toxin is infused and some pressure is applied if bleeding is seen at the site. After completing the procedure, patient lies in straight position for some minutes. then the patient is given postoperative instructions which are; avoid lying down for 4h, no strenuous activity to be performed for 24hrs. Pain killers shall be prescribed if pain is present, ice packs can be applied to lessen bleeding and swelling if present. Dosage differs in both females and males which is determined by volume of muscle as the latter has more muscle volume they require more doses to achieve a desirable results. The results are visible within 4-14 days and lasts up to 4-6 months[4].

Clinical Application of Botulinum Toxin in Dentistry: BT is best known for its cosmetic uses. It is acquiring more popularity in the field of dentistry, where it is used for improving dental esthetics of patients as well as used for therapeutic purposes. Botox® has received maximum approvals and is used worldwide.

Cosmetic Uses:

1. **Facial Wrinkles:** The most common treatment done by BT is for wrinkle therapy. Facial wrinkles become more prominent with aging due to pull in the skin by lower facial muscles. It has been also used in the treatment of horizontal forehead lines perioral lines, platysmal bands and crow's feet. The potency of BTA in diminishing of facial wrinkles has been proven in randomized controlled trials. BTA is injected at least 1 centimeters above the orbital rim avoid injecting frontalis to reduce the chances of the brow ptosis. The injection site and the pattern of injections vary depending on the desired brow position. It is preferred to inject lower doses away from the brow so as to avoid the frozen look[2].

1. **Massetar Muscle Hypertrophy:** Masseteric hypertrophy is caused due to parafunctional use of the jaws or clenching. The conventional treatment is partial resection surgery of massetar under general anesthesia which has various complications whereas BT used in such cases has seen to be safer and efficient. Injection sites identified by palpation during clenching receive 12 U of BTA percutaneuosly in the thickest part of the muscle[2].

2. **Gummy Smile:** Excessive visibility of gingival tissues in the maxilla while smiling caused by hyper-functional muscles of the upper lip. The etiological factors can be altered passive eruption of teeth, hyperactive upper lip muscles, dentoalveolar extrusion, and vertical maxillary excess. Several surgical techniques are used for the treatment; however BT injections have gained popularity for the treatment of gummy smile because of less invasive, cost effective and require less time. Muscle are injected close to the nasalis or orbicularis oculi, with some fibers intermeshing the elevator labii superioris, levator labii superioris alaeque nasi, levatorangulioris, and zygomaticus major and minor[5].

3. **Drooping of Corners of Mouth:** It is caused due to hyperactivity of depressor angulioris. The site of infusion is the trajectory of nasolabial fold to the jaw line.

4. **Asymetric Smile:** Facial asymmetries may happen due to over activity of one of the depressor labii inferioris[6]. The muscles responsible for upper asymmetric smile are the lip elevator muscles while the muscles responsible for lower asymmetric smile are depressor labii inferioris and depressor angulioris. The injection site is the muscle fibers of the depressor labii inferioris.

5. **Perioral Rhytidis:** They are also called as smoker lines .the vertical. It is induced by continuous constriction of orbicularis oris which is elevated with certain factors like age. Botox injections or derma fillers are choice of treatment for them.

6. **Sad/Reverse Smile:** This is caused due to ageing as the skin loses its firmness due to decrease in the consistency of collagen and elastic fibers. BT injections have proved its efficacy in the treatment of this condition.

Therapeutic Uses

1. **Temporomandibular Joint Disorders:** Temporomandibular joint disorder is a term used to describe disharmony in the TMJ, masticatory muscles, and its associated structures due to orthopedic and myofacial disorders. These disorders can be treated by application of BTA. BTA is the treatment of choice because surgery is an expensive and invasive treatment option.

2. **Trigeminal Neuralgia:** Also called tic doulourex, is a chronic pain condition that affects the trigeminal

or 5th cranial nerve, one of the most widely distributed nerves in the head. Its management is based on prophylactic pharmacological treatment with anti-epileptics and neurosurgical treatments are recommended which may cause damage to nerve therefore, BT has been found to be efficient treatment for this condition.

3. **Facial Nerve Palsy:** It is neurological condition in which facial nerve (cranial nerve 7) is partially or completely lost. BT has been found to be efficient treatment for this condition.
4. **Bruxism:** Severe clenching and grinding of teeth is termed as bruxism. Commonly, oral appliances are used in this condition. BT has been found to be efficient treatment for this condition whose effect lasts for at least a month.
5. **Chronic Migraine:** Chronic migraine is a disorder which is highly discomforting. BT can be used to treat this condition.

Contraindications: Allergic to any botulinum toxin preparation[8], septicity at injection site[8], Pregnancy and lactation[3] are the various contraindications to Botox therapy.

Adverse Effects: In general, adverse are uncommon and localized. Side effects include neck pain, muscle stiffness, rash, itching, and headache. This can also accompanied by nausea, diarrhea, stomach pain, loss of appetite. The two most common medication related side effects from BT orofacial injections are alterations in salivary consistency and inadvertent weakness of the swallowing, speech, and facial muscles[2]. Some effects may be seen beyond the site of injection "spread of toxin effect". Generalized muscle weakness, diplopia, dysphagia, and breathing difficulties[3].

Conclusion

The innovation of BT in the field of medical science has widened the horizon of dentistry. A dentist can deal and treat various conditions with botulinum as dentists' have a vast knowledge about the head and neck. They can treat problems related to facial and oral cavity using BT injections with proper training. BT has been seen to be more efficient and successful in treatment of many facial and oral musculature dysfunctions. It provides with quick, conservative and painless approach. As it is a minimally invasive technique patients do not undergo through complicated surgeries. BT though, has good safety profile but should be used at recommended doses to avoid the risk of toxicity of toxin. The site of administration also plays an important role in its efficacy. Therefore, BT is a great asset in the field of dentistry.

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Current Scenario in Management of Condylar Fracture: Review Literature

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Abstract

The treatment of mandibular fractures has created a large number of conversation and dispute in maxillofacial accidental cases and there are a lot of techniques to treat them. Condylar fracture can be extracapsular or intracapsular, displaced, deviated, displaced or dislocated. The management of condylar fracture can be done by conventional management using closed treatment or surgical management with open approach. Most surgeons look for closed treatment. Yet open reduction of condylar fracture with RIF has become increasingly popular in recent years. The management of mandibular condylar fracture can be considered by the patient's age, the presence of upper and lower jaw fracture, if the condylar fracture is unilateral or bilateral, the stage and movement of the fracture, the dentition status and occlusion of tooth.

Keywords: *Mandibular Condyle, Temporomandibular Joint, Fractures.*

Introduction

Mandibular condylar fractures are commonly found in 20-62% of all the mandibular fractures[1]. The cause for the increase rate of condyle fracture is due to the joining the ramus of mandible with high strength and firmness with condylar head along with low stiffness[2]. Road traffic accidents, falls and interpersonal violenceare the main reasons for condylar fractures[1]. Pain, restricted movement of mandible, muscle contraction, deviated mandible, malocclusion, extreme modifications in the temporomandibular joint, osteonecrosis, facial irregularity and ankylosis, irrespective if the treatment was done or not are the main difficulties in mandibular fractures[3]. Condylar fractures can be treated through one of two method with conservative (closed reduction + immobilization) and /or surgical (open reduction + internal fixation) method[1]. Many surgeons suggested closed reduction due to arising complications of surgical method, like infection, nerve injury, injury to blood vessel, and scar. Currently open treatment has been more commonly used by reducing difficulties such as pain in TMJ, arthritis and restricted mouth opening through precise reduction of fractured fragments with the development of novel surgical tools and various surgical method[4].

Closed Reduction and Functional Therapy: For closed treatment, IMF is completed using arch bar and wire, followed by retaining the fixation of both the jaws for 2-4 weeks. After getting constant union of the fractured area, a wire for IMF is detached. Then standard occlusion is made after fixation using rubber, and after that 2 weeks of soft diet is continued. Physiotherapy that contains exercise of the mandibular movement and exercise of mouth opening is directed[2].

Advantage: It is a comparatively safe. During the treatment no nerves and blood vessels injury happen and also there is no difficulties such as scar and infection in postoperative period.

Disadvantage: Long duration in IMF has drawbacks like periodontal tissue injury and buccal mucosa, poor

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oral hygiene, speech disorder, improper nutrition, mouth opening complaint and breathing disorder[4].

Open reduction and internal fixation: Severalmethod of open reduction are there depending on damaged area and degree of fractured bone displacement. Generallythe various method to visualise the fracture are preauricular, postauricular, submandibular, Risdon, combinedand retromandibular approaches[2].

Advantage: In direct approach to the fracture site, the reduction of the fractured fragment has a best anatomical result. It can avoid difficulties like breathing disorder, speech disorder, and dietary difference by shortening IMF period through rigid fixation.

Disadvantage: It is an invasive management, which may cause nerve or vessels damage perioperatively and postoperative problems can be seen including infection[4.]

Literature Review: Ellis and Throckmorton related the vertical measurement of mandibular and facial morphology after open or closed reduction for mandibular fractures of condylar process, in 146 patients. Eighty one cured by closed and sixty five by open techniques. The patients cured by closed approaches established irregularities, categorized by shortening of the facial aspect of injury[5].

In the study of the Santler et al. two hundred thirty four patients with mandibular condylar fractures are treated with open or closed method. Patients treated with surgery were greatly complained of pain at peak opening of the mouth. In patients with severely dislocated condylar fractures, open reduction is only indicated[6].

Marker et al. planned study to record the effects of closed condylar fractures management which showed that closed condylar fractures management is atraumatic, safe, and reliable and in only a few cases can cause malocclusion and distorted function[7]. Rutges et al. conduct a study with closed reduction that comprised of MMF with wires in case of severe occlusal disorders. Elastic MMF has been used to treat mild occlusal disturbanes[8].

Villarreal et al. conduct a retrospective analysis of one hundred four condylar fractures. The functional development achieved through open method was greater than that achieved through closed method. Open reduction improved the occurrence of condylar postoperative defects and mandibular irregularity[9].

Hyde et al., observed 42mm of incisal opening in surgical group while in conservative management group with elastic traction, it was 32mm. According to this, the result of this study was signified the importance of surgical over conservative management[10]. According to Eckelt et al. significant differences were found for the parameters of lateral excursions in the surgical (up to 16mm) against the closed (up to 13mm) groups[11]. Carneiro et al. decided that there were no differences in the protrusive and lateral excursive movement whether condylar fracture was treated by surgical or nonsurgical method[12]. Ellis et al. determined that the patients cured by closed method had larger proportion of malocclusion related to the patients cured by open treatment method in spite of the detail, the early movement of the fractures was more in patients cured by open reduction[13].

Indications for open reduction of mandibular condyle fractures and rigid internal fixation[14-16]

Absolute indication:

1. When there is no synchronization between absolute or relative contraindications then only the patient is given the option of surgery
2. It can also be indicated in patients where the pre-traumatic occlusion cannot be restored by manipulation and closed reduction
3. If RIF is used to deal with other fracture of the face that causes the malocclusion
4. In certain cases for e.g. skeletal flaws, an entirety of periodontal diseases, less than 3 teeth per quadrant indicates that the firmness of occlusion is constrained
5. Shifting into the middle cranial fossa
6. Extracapsular lateral aberration
7. When there is a potentiality for fibrosis in an open fracture
8. Foreign body intrusion

Relative indication:

1. When oral orifice is completely edentulous
2. Periodontal predicaments
3. Condylar fractures which is mutually present in an edentulous patients without the use of splint
4. Unilateral or bilateral fractures in condylar region which splinting is not necessary for medical condition and functional therapy is unlikely

5. Reciprocally present fractures in condylar region with pulverised midfacial fragmentation, prognathy or retrognathy
6. Fracture of one side condylar with unpredictable base
7. Dereliction
8. Seizure irregularities which are unrestrained
9. Patient enduring from state of asthma
10. Psychological understanding
11. Paralysed neurological situation with early documentation of apprehended improvement in the patient
12. Substance misconduct

Contraindications for open reduction of mandibular condyle fractures and rigid internal fixation[14-16]

Absolute contraindications

1. Head of the condylar fracture csn be seen at the ligametous attachment which can of 3 types single fragment, communited or medial pole
2. If a health condition or chronic trauma increases the risk of a prolonged general anaesthetic
3. Perfect occlusion
4. Reduce pain
5. Suitable movement of mandible

Relative contraindications

1. If a simpler approach is just as efficient
2. Neck of the condylar fractures are perceptibility thin and are limited to the region below the condylar head

The determination of this review was to conclude if the literature indicates advantage of open vs closed management for condyle fractures in adult. Another study shows that ORIF improves most method of condylar and/or mandibular mobility (MIO, aerotrain, protrusion, and lack of chin deviation). In addition, it was better to improve reduction of postoperative pain and occlusion to open care patients[17].

In subcondylarregion, two main endoscopic approaches have been established. The procedure first defined by Jacobovicz in 1998 and the one favoured by the senior authors (Y.D., R.S.) includes the use of an endoscope by means of an intraoral incision with or without the use of Transcutaneous screw incision and trocar.[18,19,20] Troulis and Kabanlaterdefined an endoscopic-assisted extraoral approach to fractures in subcondylar region by a mini-Risdon approach through submandibular incision of 1.5cm. They reported an easierorientation with"en face" operating field visualization[21, 22].Schon et al studied the treatment of 17 intraoral or extraoral endoscopic-assistedpatients with mandibular fractures. They decided that the intraoral endoscopic approach was reliable for condylar fractures such as lateral override andthat the extraoral endoscopic approach was dislocated fractures such as medial override fractures was indicated[23]. Meulleret al. distinguished that outdated management of fractures in subcondylar regionwith MMF leads tomalreduction and significant functional and aesthetic sequalae, including facial irregularity, reduced mouth opening, and potential for late temporomandibular joint disturbances. The writers therefore encouraged endoscopic healing of adult condylar neck and subcondylar fractures that reveal dislodgment or dislocation and have adequate proximal bone stock to accept miniplate fixation[24]. Buschang's research in 1999, the highest of growth spurt among teenagers occurs in females (12.2 and 14.3) and correspondingly in males. The rate of growth then decreases incrementally in 1-2 years. [25].

In endoscopic approach, patient should be positioned on the operating field in flat position. Anaesthesia equipment should be away from the patient. The table should be $180^0$for the specialist and assistants to have access to the head.The settlement of camera monitors will allow both the surgeon and assistant to view the operation (Figure 1 & 2) [26].

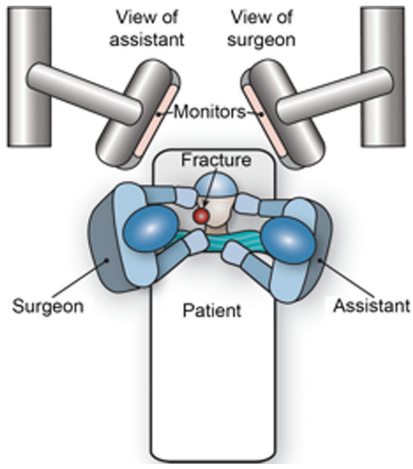


Fig 1: In this view, the camera should be positioned behind the surgeon and the assistant in order to allow both to see comfortably

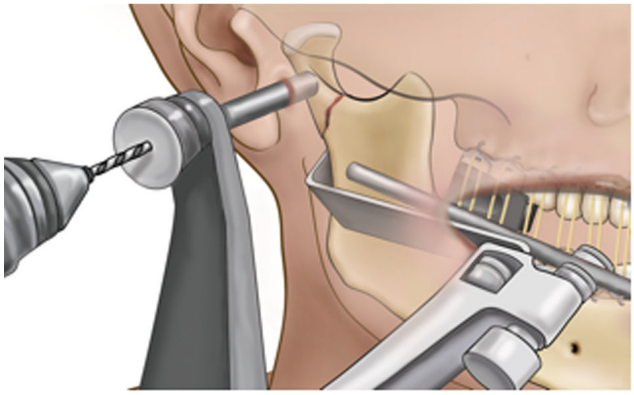


Fig 2: Endoscopic view of a percutaneous incision for direct observation with camera

Discussion

Controversy has historically plagued the management of subcondylarfractures. Years of study resulted in a better understanding of the biomechanics of tempero-mandibular joint and the profit of ORIF in cases of displaced and foreshortened subcondylar fractures. Open reduction problems have resulted in the development of modern surgical method and the implementation of new technologies, which increased the scope of subcondylar fracture for the craniofacial surgeon. [27].

The most common injuries in condyle fractures are seen in mandible and it is around 20%-62%. Surgical versus nonsurgical treatment of fracture remains contentious[28]. Recently, due to the progress, self-assurance and greater involvement of health care professionals with internal rigid fixation techniques, open method in children was widely accepted.

In adults with mandibular fracture, 3 therapy is recommended:

1. MMFphase is followed by physiotherapy
2. Physiotherapy with no Maxillomandibular Fixation time
3. Open Reduction with or without Internal Fixation[3]

It should also be noted that people who research condylar fracture management usually have extensive knowledge of whatever care they receive. Even though the findings of the studies in the literature may support ORIF over closed treatment for many variables of outcomes, specific experts may not have such advantages if their surgical procedures are not good. One must be able to carefullymake ORIF with least complications,if one is to understandthe improved outcomes. For those with little experience, it may be best to use CT and in case of malocclusion, orthognathic surgery can be used in the future

Different technology to improve transoral ORIF has ensured that some of the adverse ORIF related sequelaewere avoided by atransfacialmethod, such as facial damage of nerve. For example, using an endoscope to aid visualisation and right-angle drills and screw drivers has made transoral surgical approaches a reality, reduces the risk of facial nerve injury andeliminates the risk of facial injury.This method has been used in the management of mandibular condyle fracturesbut after a period of progress, the method has not been usuallyestablished[17].

The endoscopic-assited method in transoral are a safe and common methodforcondylar and subcondylar fractures. Patients cured with this approach indicateda higher effect in the mandibular area while it takes time and wants exclusive instruments. So, authors have therefore recommended the use of this procedure for adult subcondylar fractures in specific cases where acceptance and protection is a major concern for patients.[29]. After going through the major literatures on the controversy and our own institutional experience on treatment protocol for condylar fractures, we advocate for the open reduction technique in majority of cases. As we compare between the direct open surgeries with endoscopic technique, the later stays way advanced to the former in patient comfort and residual deformities. But till now very few centres are equipped and experienced in this novel technique and we are not so fortunate on that note. In future, surgeons should go for this endoscopic approach to the fractured condyle and refine the technique and instrumentation for the betterment of the entire fraternity and ultimately the patients.

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Role of Medicinal Herbs in Periodontal Therapy

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Abstract

Gingival and periodontal diseases are among the common problems in oral health globally and is seen to be rising more in developing countries. Most of these diseases are caused due to the microbial aggregates in dental plaque. The conventional chemotherapeutic agents have limited success in the complete elimination and prevention of periodontal disease. Rise of incidence in periodontal diseases,increased resistance by pathogenic bacteria and the threat of opportunistic infections, has renewed the search for alternative and complementary treatment strategies over the years. Ayurveda the ancient system of healthcare mentions a large number of herbal plants beneficial in the management of periodontal infections. The nature derivedphyto-chemicals that are isolated from plants are considered to be better alternatives to synthetic chemotherapeutic agents. The herbs and medicinal plants in the medica (Ayurvedic material) have been proven not only to be safe and useful but with very minimal side effects. This paper attempts to study the various herbal medicinal plants that possess antimicrobial, anti-inflammatory, astringent, antiseptic and analgesic properties which can be used efficaciously for the prevention and management of the gingival and periodontal diseases with minimal adverse reactions. Hence an integration of modern oral hygiene practices with the ancient traditional ayurvedic herbs in the various gingival and periodontal diseases can provide safe, affordable and economic treatment options to patients in general and to the low socio-economic group.

Keywords: *Herbs, Ayurveda, Oral Hygiene, Gingival disease, Periodontal disease.*

Introduction

Oral diseases like Dental caries and Periodontal diseases in particular have become a major oral health concern worldwide. The connection between oral diseases and the action of the various microbial species existing in the oral cavity is well established[1]. A rise in the incidence of oral diseases (particularly in developing and underdeveloped countries), increased resistance to commercially available chemotherapeutic agents, opportunistic infections and financial constraints in certain strata of patients has led to the global need for finding alternative treatment and preventive options in the management of dental diseases, that are safer and economical[2,3].

Āyurvedaor the science of life is a 3000-5000-year-old system of Hindu traditional medicine native to the Indian subcontinent which stresses on the use of medicines derived from plantsand treatments. Herbal medicines are drugs of plant origin which are nowadays used to treat several systemic diseases as well as oral diseases to attain or maintain improved overall well being[4]. More than one thousand Indian medicinal plants are used informulations according to Ayurveda or other ethnicity[5].

In the recent years there has been a growing interest in the use of these herbal medicines in the management of periodontal diseases as welldue to their Anti-inflammatory,Antimicrobial, Antioxidant properties[6]. This review is an attempt to gain information and knowledge of the several herbal products that can beused in management and prevention ofperiodontal diseases.

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Medicinal Herbs Used in Management of Periodontal Infections: Periodontal diseases have affected mankind since the beginning of mankind, are universal in nature and presently a major health concern all over the world. Dental plaque has been implicated as the primary etiological agent responsible for both gingival and periodontal diseases[7]. Untreated gingival and periodontal diseases cause inflammatory changes of the periodontium with formation of periodontal pockets and loss of attachment which eventually leads to tooth loss. In recent years, periodontal diseases have also been linked to a number of systemic diseases like Cardiovascular diseases, Respiratory diseases, Stroke, Diabetes, Preterm low birth weight babies,Arthritis, Alzheimer disease etc[8].

It is therefore very important to maintain the health of the periodontal tissues by using proper oral hygiene measures to reduce the inflammatory and bacterial load caused by dental plaque. Conventional oral hygiene maintenance procedure includes a combination of Mechanical Plaque Control (Toothbrushing, Interdental cleaning aids, Flossing etc) and/or Chemical Plaque Control (Chemotherapeutic agents in the form of mouth rinses). Ayurveda, the ancient system of medicine defines health as "the equilibrium of the three biological humours (doshas), the seven body tissues (dhatus),proper digestion and a state of pleasure or happiness of the soul, senses and the mind[9]. Various Ayurvedic herbal plants with their immensepotential in the management of dental health have been reviewed in the past. Various procedures in Ayurveda have been mentioned for maintaining the oral hygiene. These include *Dant Dhavani* (Brushing), *Gandoosha* (gargling) or oil pulling, *JivhaLekhana* (Tongue scrapping) and various tissue regeneration therapies.

Brushing or *Dant Dhavani* is chewing of herbal brushes in the form of sticks (called as dantakashta) in the morning and after every meal for prevention of oral diseases. These herb sticks are either "*katu*" (acrid), "*kashaya*" (astringent) or "*tikta*" (bitter) in taste. The method of use is to crush one end,chew it and eat it slowly[10]. Neem stick (*margosa*or *Azadirachtaindica*), fresh stems of *liquorice* (*Glycyrrhiza glabra*), *black catechu* or the *cutch tree*(*Acacia Catechu* Linn.), *Arjuna* tree (*Termmalia arjuna*), *fever nut* (*Caesalipiniabouduc*) and *milkweed plant* (*Calotropis procera*)[11] have proved beneficial in reducing dental plaque when used for brushing. *Gandusha* (gargling) or oil pulling: The swishing of oil in the mouth for oral and systemic health benefits is ancient Ayurveda. As a traditional Indian folk remedy, oil pulling has been used since years to prevent oral malodour, bleeding gums, decay, dryness of throat, cracked lips and for strengthening teeth, gums and the jaws[12,13]. Various oils have been used for oil pulling therapy such as coconut oil,sunflower oil, sesameoil or olive oil[14]. Clinical and microbiological studies have shownoil pulling therapy to be quite effective against plaque induced gingivitis[15,16].

Tissue regeneration therapies: *Amla* (*Phyllanthus emblica*) or the Indian gooseberry is considered as oral health rebuilder. *Amla*in the decoction form is quite effective as a mouth rinse. Healing of connective tissue is seen when one-gramamla is taken internally[17]. Regular use of *Bilberry* and *hawthorn berry* fruits stabilize collagen and strengthens the gum tissue[18].Besides *Liquorice* root has role in cavity prevention, plaque reduction and potent anti-bacterial effect[17].Along with the medicinal herbs mentioned above, there are several other herbal plants and their products which can be used to treat and manage gingival and periodontal diseases.

Traditional medicinal herbs used in Periodontal therapy and their Properties:

Amala (Emblica officinalis): It has well known astringent and antioxidant property to fight tooth decay, and is also effective in thetreatment of a toothache, gingival inflammation[19], apthous stomatitis[20] and mouth ulcers of many types.

Anar/Dalima (Punicagranatum): Pomegranate derivatives when applied topically has been found to be useful inreducing gingival inflammation as well as counts of bacterial and fungal units. Theantibacterial activity could be due to ingredients like ellagitannin,punicalagin found in pomegranates[21,22].

Launga/Clove (Syzygiumaromaticum): The primary component of clove's volatile oils being Eugenol works as an anti-inflammatory agent. Eugenol[23] also contains a variety of flavonoids and is used widely inroot canal treatment, as temporary fillings, dental abscesses, for gum pain, and other gum diseases[24].

Datiwan (Alucitabidentata): Stem is used as a toothbrush and is considered to be good in the treatment of pyorrhoea[25]. Its root juice can be used for the treatment of a toothache also. Leaves are also used.

Gotu kola (Centellaasiatica): Can be used to treat mouth ulcers and heal wounds with promotion of

connective tissue growth. Sastravaha et al[26] in a study impregnatedbiodegradable chips with *Centellaasiatica* and *P. granatum* and established its effecton periodontal disease. They found statistically significant improvements in reduction probing depth, plaque, and clinical attachment level gainat the end of 3 months in the test group when compared to the placebo.

Amra/Mango (Magniferaindica): Mango leaf contains ascorbic and phenolic acids which have knownanti-bacterial properties. They have the potential to fight periodontal pathogens like *Prevotella intermedia* and *Porphyromonas gingivalis*[27].

Neem (Azadirachtaindica): Several studies have documented the anti-bacterial, anti-inflammatory, analgesic, antioxidant, antifungal, antiviral, immunostimulant properties of neem.Chatterjee A et al.[28] have found out the anti-gingival and anti-plaque efficacy of Neem mouth rinse when used as an adjunct to routine periodontal therapy.

Nilgiri (Eucalyptus globulus): Eucalyptus extract shows both anti-cariogenic and anti-plaque property.

Tila/Sesame (Sesamum indicum): It is a rich source of vitamin E, phenolic compounds, and antioxidants. Sesame oilpulling reducedplaque index, gingival index and totalbacterial count of aerobic microbes in chronic gingivitis patients[14].

Triphala: It contains extracts of *Terminaliachebula*, *Terminalia belerica*and *Phyllanthus embelica*. Triphala shows inhibitory action against PMN, MMP-9 and some other collagenases[10]. Itpossesses *anti*-plaque properties and also usedas a gum astringent.

Harita/Turmeric (Curcuma longa linn.): Due to its excellent anti-inflammatory properties, turmericin the form of gel or mouthwash, can be very effective in reducing plaque and gingival inflammation when used as an adjunct to mechanical plaque control[29].

Curry leaf tree (Murrayakoenigiispreng): This green leafy plant known for its aromatic leaves. It forms an important ingredient of the Indian cuisine. It has been reported that 2.65 volatile essential oils such as sesquiterpenes and monoterpenesare found in fresh curry leaves which has broad antimicrobial effects on *S. mutans*, *Streptococcus sanguinis* and also helps to reduce halitosis.

Tea tree oil (melaleuca oil): It has antibiotic properties which is useful in management of chronic gingivitis, bleeding gums and halitosis. It also has the ability to penetrate the gingival tissues thereby making it beneficial for local applicationin inflamed gingival tissues.

Arjuna (Terminalia arjuna): Its active ingredients Arjunolic acid, ethyl gallate, flavone, ellagic acid and gallic acid have antimicrobial properties thus making it suitable in the treatment of multimicrobialperiodontal infections.

Rumi mastagi/mastic gum (Pistacialentiscus): It has antioxidant, anti-inflammatory as well asbactericidal effect. It is highly effective in the elimination of potential periodontal pathogens (*S. oralis*, *P. gingivalis*, *F. nucleatum*, *A. actinomycetemcomitans*, and *P. intermedia respectively*) that are commonly associated with periodontal disease.

Wheat grass: Burgeoning shoots of the *Triticum aestivum*plant, have antioxidant, antibacterial and anti-inflammatory propertiesdue to the presence of antioxidants, Vit-C and zinc. Wheatgrass juice or wheatgrasssupplement prevents gingival and periodontal inflammationby reducing or eliminating the potential periodontopathogens.

Goldenseal: Bererinewhich is an important component in goldenseal is known for its anti-bacterial, anti-viral and anti-fungal property. Goldenseal strengthens the immune system, prevents gingivitis and tightens the gums due to its astringent properties.

Licorice root: It is certified by the ADA as an herb that inhibits plaque accumulation and gum diseases. It has both anti-bacterial and anti-viral properties.

Meswak (Salvadorapersica): Meswak, is derived from Arak tree (*Salvadorapersica*) that grows mostly in Saudi Arabia and several other parts of the Middle East. It is mainly used as a chewing stick instead of the traditional toothbrush to maintain oral hygiene by different cultures in several underdeveloped countries. The Meswak extract has also been incorporated in dentifrices in the recent years because of its antiplaque and antigingiviticeffects.

Berberis vulgaris: It contains Berberine, an alkaloid agent which has highantiplaque and anti-gingivitis properties. Most active alkaloid (isoquinolines group) is extracted from the root and stem of the barberry plant.

Lippiasidoid: The major components of *Lippiasidoides* essential oil possesses potent antimicrobialproperties and is effective against oral pathogens to reduce the accumulation of dental plaqueand severityof gingivitis by reducing the inflammatory load.

Tulsi (Ocimum sanctum): Tulsi has antimicrobial property against a varietyof microbes like *C. albicans*, *Staphylococcus aureus*, *Escherichia coli* due to its phytoconstituents which include eugenol, palmitric acid,vallinin, galic acid, Vitamin A, Vitamin C etc which prevent plaque and calculus and reduce halitosis.It also has astringent and mouth freshening properties.

Myrrh: This ancient herb is known since ages and has a lot of medicinal properties. Hence using myrrh oil as a mouthrinse by adding to warm water is a very effective way to alleviate bacteria and maintain good oral hygiene.

Sage: The herb Sage has antibacterial properties which helps prevent plaque formation, prevents tooth decay and alsohelps to cure oral sores.

Green tea: Epigallo catechin 3 gallate and Epicatechin 3 Gallate are the most predominant catechins found in green tea.

The anticollagenase, antimicrobial, antioxidant, antimutagenic and hemostatic properties of the catechins are found to be of great use in periodontal disease treatment. The green tea catechins affect the red complex periododontopathogens. Sanjeevini et al. (30)in a short term studycould assess the effect of greentea catechins on the red complex organisms using PCR analysis and found Green teato be very effective in reducing the periodontal pathogens when used as a local delivery system as an adjunct to scaling and root planing.

Shiitake mushrooms lentinan: Shiitake mushrooms have a role against bacterial, fungal, viral pathogens. Shiitake is aherb which is very useful and forms the base of several plant extracts like lentinan. Extremely rich in Polysaccharides (beta-glucan) and lentinan, these mushroomshelpin stimulating the immune systemand promotes the innate immunity to combat certain illnesses.

Conclusion

Plaque induced gingivitis and periodontitis are among the most important diseases affecting the oral cavity. Ayurvedic classic literature has given a list of all the naturally available herbs and medicinal plants but it is very important to select the herbs carefully and have a thorough knowledgeof the properties of the herbbefore using it for treatment purpose.

Herbal extracts are being used in periodontal therapyto reduce gingival inflammation,as anti-plaque agents, as antiseptics, antioxidants,antimicrobials, antifungals, antibacterial, antivirals andanalgesics. They are also effective as gum astringents and as mouth freshening agents. The traditional knowledge of Ayurveda and the modern oral hygiene method should be integrated and encouraged to provide safer and more affordable treatment options especially to the lower socioeconomic strata of the society. Further studies and greater research are however required to assess the long-term anti-plaque efficacy, toxicity and interactions of these herbal medications when used for maintenance of oral hygiene.

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Osteodystrophy of Jaw: A Review

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Abstract

Pathologies particularly for jawbones and do not occurs in any bones are linked to odontogenic tissue or dentition. Jaws may anchorage non-odontogenic bony pathologies are not visible in any region of body. From the other bones are different in many wider aspects. It is special due to its progress from chambers moving from embryonal neuroectoderm embryologically. Tooth associated jaw bony lesions are classified in odontogenic tumors and cystic lesions. It includes various lesions such as fibro-osseous lesions, giant cell pathologies, bone tumors may be neoplastic or non-neoplastic and reactive bone disease, some disease are related connective tissue,nutritional deficiency, craniostenosis syndrome.

Keywords: *Classification of Jaws, Connective Tissue Disorders, Craniosynostosis Syndrome.*

Introduction

From the other bones are different in many wider aspects. It is special due to its progress fromchambers moving from embryonal neuroectoderm embryologically. Tooth associated jaw bony lesions are classified in odontogenic tumors and cystic lesions. It includes various lesions such as fibro-osseous lesions, giant cell pathologies, bonetumors may be neoplastic or non-neoplastic and reactive bone disease, some disease are related connective tissue,nutritional deficiency,craniostenosis syndrome.[1]

1. **Connective tissue disorders:** Osteochondrodysplasia and craniosynostosis syndrome:

   Osteogenesis imperfecta, Apert syndrome, Crouzon syndrome, Ehlerdanlos syndrome, Cleidocranial dysplasia, Achondroplasia, Chondroectodermal dysplasia, Marfan syndrome

2. **Metabolic bone disease due to nutritional deficiency/calcium metabolism disorders:** Osteomalacia, Rickets, Scurvy, Renal osteodystrophy, Vitamin d resistant rickets, Hypophosphatasia, Langer cell histiocytes.

3. **Endocrine disorders**: Hyperthyroidism, Hypothyroidism, Hyperparathyroidism, Hypoparathyroidism, Hyper-adrenal Cushing syndrome, Hyper pitutarism-gigantism/acromegaly, Hypopituitarism-dwarfism/Simmonds disease.

4. **Fibroosseous lesion:** Fibrous dysplasia: Mono ostotic Fibrous dysplasia, Polyostotic Fibrous dysplasia, Craniofacial Fibrous dysplasia

   Osseous dysplasia: Periapical osseous dysplasia, Focal osseous dysplasia, Florid osseous dysplasia, Familial gigantiformcementoma

   Ossifying fibroma: Conventional ossifying fibroma, Juvenile trabecular ossifying fibroma, Juvenile psammomatoid ossifying fibroma

   Others: Paget's disease, Cherubism, Massive osteolysis, Infantile cortical hyperostosis, Hyperostosis corticalisgeneralisata, Tricho-dento-osseous syndrome. [2]

Osteogenesis imperfecta: It is also known as brittle bone disease or lobsteindisease. Many infants depict with this disease are still born or die shortly after birth, patient shows bone deformity hyper extensibility and hyper elasticity and joint deformity of joints, extreme fragility and porosity of bones which are prone to fracture, formation of hyperplasticcallus, which resembles osteosarcoma. There is presence of faint blue sclera which is slim,pigmented choroids depicting and producing blue hue. Dentinogenesis imperfecta is the manifestation of osteogenesis imperfecta, there is occurrence of enamel hypoplasia, class 1

malocclusionalong with impacted 1st and 2nd molar is associated, ectopic dentition is also there, appearance of poorly calcified and semi translucent deciduous teeth. It also shows pale dirty pink, half normal size, with globular crowns with short roots along with maxillary hypoplasia.[3]

Marfan syndrome: It is also termed as marfanachard syndrome or arachnodactyly, because of defective gene FBN1 gene, it is also autosomal dominant disorder. Clinical features of this disease are patient depicts tall stature, lateralcurvature of spine (scoliosis), webby finger (arachnodactyly), pigeon chest deformity, funnel chest appearance, Steinburg thumb sign, dolichostenomelia,joint hyper mobility, ocular disturbance like catact retinal detachment,flat cornea, cardiac issues like aortic root expansion. Steinberg thumb sign which highlights after closing the thumb in close fistis considered to be positive if thumb extension is from palm of hand. Patients will be having enlarged frontal sinus with frontal bossing, temporomandibular disorders with enlarged skull height. Oral clinical presentation is bifid uvula, high arched palatal vault, malocclusion, variousodontogenicinfections of maxilla and mandible.[4]

Osteopetrosis: It is coined as marble bone disease or also known as stone bone disease or Alberg Schonberg disease which is an extremely rare inherited abnormality where the bone becomes hard and dense which can lead to osteosclerosis.It has two types of clinical representation fist one is non neoplastic autosomal dominant type and another is neoplastic autosomal recessive type. Non neoplastic form is associated with adult group and neoplastic form is associated with infantile group.[5]Oral manifestation of this disease is delayed tooth eruption,partial absence of teeth,enamel hypoplasia, abnormal dentinogenesis,proneonatal dental caries, mandibular proclination,multiple odontomes,widened lamina dura,abnormalities of periodontal membrane,in case of osteopetrosis, the number of osteoclasts may be decreased,normal or elevated .mostly osteoclast dysfunction enhance the pathogenesis of this disease,lacuna of carbonic anhydrase in the osteoclast is noticeable.[6]Mild osteopetrosis leads to no symptoms and presence of no problems but in case of serious forms it can lead to stunted growth, deformity and elevated risk of fractures. Patients suffer from anaemia, hepatosplenomegaly, recurrent infections, extra medullary haematopoiesis. It can lead to blindness,facial palsy, deafness and due to escalated pressure given on the nerves from the excessive bone formation encircling on the cranial nerve foramina. Differential diagnosis of this disease are hypervitaminosis D, hypoparathyroidism, Paget's disease,diffuse bone metastasis of breast or prostate carcinoma,intoxication with fluoride, lead or beryllium and haematological disorders such as myelofibrosis, leukaemia, sickle cell disease. Corticosteroids are given to treat anaemia and revitalizing bone resorption as well as fractures and osteomyelitis can be treated.[7]

Crouzon syndrome: It is also as craniofacial dysostosis or craniostenosis or Crouzon craniofacial dysostosis. It is a sporadicinheritedcondition which is a mode of craniosynostosis, where there is a previouscombination of fibrous junctions between certain frames of cranium. In case of this disease there is fusion of sutures in a premature case distressing the appropriateprogression of cranium and head and potentially altering the shape and development of skull.Crouzon syndrome is initiated due to alterations of FGFR2 gene usually FGFR2 which is inherited autosomal dominant. It is principally categorised by previous closure of fibrous junctions between certain bones in cranium and distinctive facial anomalies. It shows brachycephaly,eyeballs appear to protrude or bulge forward proptosis, hypertelorism,strabism us,frontal bossing,midface hypoplasia, short upper lipohyperplasia maxilla along with mandibular prognathism, exceedingly arched palate with congested teeth and malocclusion. Crouzon syndrome with (acanthosis nigricans) is a rare genetic abnormality which represents abnormal velvety thickening and hyperpigmentation of dermis,advanced hydrocephalus and thinning or jam of back of adenoidalroute is seen.[8, 9]

Apert syndrome: Apert syndrome is a type of acrocephalosyndactyly. It is characterised by craniosynostosis which affects the proper growth of skull and head. It is categorised by craniosynostosis, prematuretermination of fibrous junctionsamongst certain bones in the skull. It may have widely spaced eyes (hypertelorism), bulging eyes, down slanting palpebral fissures, maxillary hypoplasia and cleft palate .Bilaterally faces are not symmetrical, patients representing flattened nose with low bridge,delayed tooth eruption, malocclusion, open bite, having moderate to severe acne,malformation of tracheal cartilage, upper respiratory tract infections,sleep apnoea and malnutrition. It is triggered by a transmutation in the "fibroblast growth factor receptor 2 gene" which plays a

critical role in skeletal development.[10,11]

Pierre–robin syndrome: "Pierre robin "a French stomatologist,invented this condition in 1923,Pierre robin arrangement was actually elaborated as combination of "micrognathia" which is designated as mandibular hypertrophy and an atypical posterior establishment of the tongue (glossoptosis) which leads to airway obstruction and feeding difficulties .The tiny mandible is known to be due to an essentialinherentanomalies or a deformity problematic where intra uterine development is obstructed or mandibular arranging is altered. In PRS the micrognathia progresses to glossoptosis, which leads to airway obstruction and unable to feed. Mostly, family members of PRS infants have greater chances of cleft lip and palate. Cleft palate is linked with deletions on (2qand 4pand 3p,3q,7q,78q,10p,14q,16p,22q) deletions. Micrognathia is linked with "4p,4q,6qand 11q deletions and 10q and 18q" duplications. Mainly it is clinically diagnosed with"PRS "by using (fluorescence in situ hybridisation) (FISH) and (array comparative genomic hybridisation) (ACGH).Conclusion of this study is 40 percent of (PRS was secluded and 60 percent) were linked up with another syndrome they were "Stickler and Velocardiofacial syndromes". "Stickler syndrome" is linked with mutation in (COL2A1,COL9A1,COL11 A1,COL11A2), whereas "velocardiofacial syndrome"is caused from a microdeletion of chromosomes (22q11.2)." Jakobsen et all"highlights that non syndromic PRS is associated with (SOX9 and KCNJ2)dysfunction, both on chromosomes 17,related to a series of unrelated PRS patients,those who had a balanced translocations between chromosomes 2 and 17.It is associated with stickler syndrome which is an autosomal dominant condition which signifies short mandibular ramus, antegonial notching of mandibular body, myopia and joint problems. Velocardiofacial depicts retrognathic mandible, hypotonia, palatal abnormalities impaired thymus growth and cardiac malformation. Non-surgical management like nasopharyngealtube is used to avoid the site of upper airway obstruction. Tongue Lip Adhesion is used to resolve the problem of gloosoptosis by pulling the base of tongue forward and suturing the lower lip. It can be completed on infants who do not have any lower teeth, as they could connect taste through the reparation.[12,13]

Ehlers danlos syndrome: "Ehlers danlos syndrome "is coined for a group of consisting heritable soft connective abnormalities which depicts generalised joint hypermobility, skin texture disorders and visceral and vascular dysregulations. Type 5 collagen disorders is the cause of a classical variety EDS. Joint hypermobility is relatively maximum found in upto one third of children. It has a clinical presentation such as musculoskeletal and neuropathic pain,joint instability,fatigue, anxiety and cardiovascular disorders.[14]

Cleidocranial dysplasia: It is a very uncommon congenital abnormalities which is of autosomal dominant inherited disorder that progresses the disturbance in the development of the bones of cranium, clavicle and facial skeleton. The most vital representation is clavicular hypoplasia which progresses the ability to approximate the shoulders anteriorly. It also depicts the frontal, parietal, occipital bossing, open fontanelles, pubic symphysis is wide,stature is short, mental retardation, hypertelorism, delayed skeletal maturation,acute gonial angle is short .Dental abnormalities shows multiple supernumerary dentition,retained deciduous teeth, class 3 malocclusion, delayed eruption, high arched palate .This disorder is associated with mutation in (RUNX2 gene)called as CBAFA 1 gene which is present on the tiny arm of chromosome 6p21,responsible for proper functioning of osteoblasts .Also depicts naso-orbiti maxillary hypoplasia depressed nasal bridge,short tapered fingers, seldomly brachial plexus irritation occurs.[15,16]

Achondroplasia: Achondroplasia is the supreme general form of dwarfism in human population. It happens with anoccurrence of 1 in 15-25000 and in 80 percent cases. It is an autosomal dominant genetic disease, shortstature in achondroplasia mainly leads from restriction of limbs with adjacent piece sex aggerated disproportionately, a phenotype called as (Rhizomelia). Large cranium with frontal bossing and hypoplastic mid face is due to growth of cartilage defects at cranium base. Foramen magnum narrowing and spinal stenosis are more common and needs neurosurgical corrections. The dimension of the trunk is comparatively normal but is often deformed by excess lumbar lordosis. Genetic relationship studies placed in the achondroplasia gene on tiny arm of chromosome 4 and mutation analysis identified an arginine to glycine substitution at residue 380 in "fibroblast growth factor receptor 3 "(FGFR3). A severe complication narrowing of the spinal canal due to degenerative deviations of the spinal canal can cause to nerve root compression and requires surgical decompression.[1-3,17]

Chondro-ectodermal-dysplasia: "Ellis van creveld

syndrome " also known as chondroectodermal dysplasia, mesoectodermal dysplasia or chondrodystrophy, which is a rare autosomal recessive congenital disorder .It is characterised by chondrodystrophy, polydactyly, ectodermal dysplasia and congenital cardiac abnormalities .Patients depicts growth failure of the proximal tibial epiphysis and the tibial segment can be disproportionately smaller than femoral segment,or fibula may be smaller than tibia. EVC is happened by a mutation in a non-homologousgene, EVC2, which is positioned close to EVC gene in a head to head configuration. Oral manifestation shows hyperplastic frenula, absence of mucobuccal fold, gingival hypertrophy, hypodontia, dystrophic philtrum and cleft palate. The differential diagnosis of EVC includes Weyers syndrome, Mckusick Kaufman syndrome Jeure syndrome. Treatment should be initiate as early as possible which requires gingivectomy, frenectomy, amputation of extra digits beneath sedation or general anaesthesia.[1-3]

Downs syndrome: Downs syndrome is the furthermost commonly occurring chromosomal disorder in human population. It is the genetic cause of intellectualdisabilities worldwide. This syndrome is caused due to trisomy of the whole or part of chromosomes 21 un all or some cells of body and gradual elevation in expression due to gene dosage of "trisomic genes". It shows mental retardation, short stature, congenital cardiac disorders, gastro-intestinal defects, weak neuro muscular tone, morphologically abnormal features of head, neck and airways, visual and audio-vestibular impairment, hematopoietic abnormalities.[1,18]

Osteoporosis: Osteoporosis is characterised by less bone mass, structuraldegradation and porous bone which are linked with greater risk of rupture, and porous bone are linked with high prone to risk. Loss of bone is related to minimising oestrogen levels escalation. Fracture risk in post-menopausalfemales. Screening and diagnosis use a bone strength. patients having less body mass are more prone to fracture.[12] Use of glucocorticoids and patients suffering from rheumatoid arthritis are more chances of having osteoporosis. Diagnosis is done by the measurement of bone mineral density or by occurrence of a fragile fracture of hip or vertebra or absence of any kind of trauma. It is measured through dual x ray absorptiometry, which depicts a real expression of the bone in exact terms of grams of mineral as g/cm 2 of calcium per square cm of the detected bone.[5-7]

Infantile cortical hyperostosis: Infantile cortical hyperostosis is also termed as" Caffey disease" or" CaffeySilverman disease" is categorised by frequent sequences of subperiosteal development of new bone along 1 or more bones initiating within the initial five months of life. A genome–wider canopy for genetic association in a wide family along with an autosomal dominant type of Caffey disease which depicts a locus on chromosome 17q 21 .Patients having this mutationhad noticed frequent cortical hyper osteosis,joint hyper elasticity, hyperextensibility of dermis,hernia specially in inguinal region also mimics some features of(Ehlerdanlos syndrome) TYPE 3.These results elaborates the spectrum of (COL1A1) related pathologies to add on hyperostoticdisorder. It is a process of inflammation of soft tissue, as well as there is facial asymmetry, severe malocclusion occurs, mandible is predominant site specially angle and ramus region. There is escalation of serum alkaline phosphatase level.[14-18]

Rickets: Rickets is caused due to deficiency of vitamin D and calcium. In rickets patients there is less mineralization at the growing salver, where as osteomalacia there is impairment of mineralization of bone matrix. Child depicts asymptomatic or may having pain, irritability, poorgrowth, pot belly appearance, hypoplastic enamel and dentin, mainly lower extremities deformities and dental abscess, pigeon chest appearance, chances of pathological fracture is there. Serum alkaline phosphatase is escalated in case of hypophosphatemia and hypercalcaemicrickets."25(OH) D "is the best marker of vitamin D.[15-18]

Langerhans cell histiocytes: Langerhans cell histiocytes is a very sporadic clonal pathology categorised by the proliferation of (CD1)a positive unripe dendritic cell, also a disease of monocyte macrophage system. It can occur at any age, but mainly it occurs in between 1 to 4 years of age. It includes tender bony lesions and rashes.fever, loss of appetite, loss of weight, exhaustion, irritability, loosening of gums and teeth (loose teeth syndrome), swelling of jaws. Typical radiographic findings are a self-contained lesion of the skull and a (vertebra plana) Cervical lymph nodes are soft or hard matted groups with lymphoedema, gingival hypertrophy, ulceration in soft palate, hard palate and buccal mucosa. Early development of dentition occurs with LCH infiltration of mandible and maxilla.Treatment depends on the variety of LCH,two drugs regimen are given with "vinblastine"and "prednisolone for an initial rigorous phase for 6 to 12 weeks, followed by conservation

therapy for at least 12 months duration.[16-18]

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To Study the Turnaround Time of Cashless Discharge Process

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Abstract

The objective of the project is to study and assess the Medclaim Process mapping and discharge process Turnaround Time and look into the problems that arise during the whole discharge process. For Discharge process Analysis real time data was collected from the wards, Pharmacy, Billing Department for intimation, reception of papers at billing, clearance time from pharmacy, intimation time received at billing, bill ready time, final clearance time and physical vacation time.

This study is an explorative, descriptive and explanatory research which was done in a 500 bedded hospital in Pune and sample size was 100. The collection of data was done in data capturing format.

Keyword: *Mediclaim, Discharge Process, Turnaround Time.*

Introduction

The Indian healthcare industry was estimated at USD 40 billion in 2010 is expected to reach USD 280 billion by 2020. Large investments by private sector players are likely to contribute significantly to the development of India's hospital industry, which comprises around 80% of the total market, according to the report 'Indian Hospital Services Market Outlook' by consultancy RNCOS. As per estimates by ratings agency Fitch, the sector is poised to grow to USD 100 billion by the year 2015 and further to USD 275.6 billion by 2020.

Health is a human right. It's accessibility and affordability has to be ensured. The escalating cost of medical treatment is beyond the reach of common man. While well to do segment of the population both in Rural and Urban areas have accessibility and affordability towards medical care, the same cannot be said about the people who belong to the poor segment of the society.

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Mogli defines "discharge as the release of a hospitalized patient from the hospital by the admitting physician after providing necessary medical care for a period deemed necessary"[1] Dr.Sakarkar defines "discharge as the release of an admitted patient from the hospital" [2].

Health care has always been a problem area for India, a nation with a large population and larger percentage of this population living in urban slums and in rural area, below the poverty line. The government and people have started exploring various health care financing options to manage problem arising out of increasing cost of care and changing epidemiological pattern of diseases.

The control of government expenditure to manage fiscal deficits in early 1990s has led to severe resource constraints in the health sector. Under this situation, one of the ways for the government to reduce funding and augment the resources in the health sector was to encourage the development of health insurance.[3]

In the light of escalating health care costs, coupled with demand for health care services, lack of easy access of people from low income group to quality health care, health insurance is emerging as an alternative mechanism for financing health care.

Indian health financing scene raises number of challenges, which are:[4]

- Increase in health carecosts.
- High financial burden on poor, eroding theirincomes.
- Need for long term and nursing care for senior citizens, because of increasing nuclear familysystem.
- Increasing burden of new diseases and healthrisks.
- Due to underfunding of government health care, preventive, primary care and public health functions, have beenneglected

In simple terms, health insurance can be defined as a contract where an individual or group purchases in advance, the health coverage by paying a fee called "premium". Health insurance refers to a wide variety of policies. These range from policies that cover the cost of doctors and hospitals, to those that meet a specific need, such as paying for long term care. Even disability insurance, which replaces lost income if you cannot work, because of illness or accident, is considered health insurance, even though it is not specifically for medical expenses.[5]

Health insurance is very well established in many countries, but in India it still remains an untapped market. Less than 15% of India's 1.1 billion people are covered through health insurance. And most of it covers only government employees. At any given point of time, 40 to 50 million people are on medication for major sickness and share of public financing in total health care is just about 1% of GDP[6]. Over 80% of health financing is private financing, much of which is out of pocket payments and not by any pre-payment schemes. Given the health financing and demand scenario, health insurance has a wider scope, in present day situation in India. However, it requires careful and significant efforts to tap Indian health insurance market with proper understanding and training[7].

Over the last 50 years, India has achieved a lot in terms of health insurance. Before independence, the health structure was in dismal condition i.e. high morbidity and high mortality and prevalence of infectious diseases. Since independence, emphasis has been put on primary health care and we made considerable progress in improving the health status of the country. But still, India is way behind many fast developing countries such as China, Vietnam and Sri Lanka in health indicators.

The new economic policy and liberalization process followed by Government of India since 1991 paved the way for privatization of insurance sector in the country. The Insurance Regulatory and Development Authority (IRDA) bill, passed in Indian parliament, is the important beginning of changes having significant implications for the health sector.

In the present competitive world, quality of health care is playing an important role in the modern society. Among various factors affecting the health care system, discharge process is one of the important factors related to patient satisfaction. As the final step in the hospital experience, the discharge process is likely to be well remembered by the patient. Even if everything else went satisfactorily, a slow, frustrating discharge process can result in low patient satisfaction. It is an important area which touches the patients' emotion; influence the image of the hospital and patient satisfaction. Therefore, the demand for effective health services is ever increasing.

Discharge process is defined as the process of activities that involves the patient and the team of individuals from various discipline working together to facilitate the transfer of patient from one environment to another .Soon after completion of treatment, the patient as well as his or her escorts expects to be relieved off immediately. The delay in discharge process leads to dissatisfaction and affects the image of the hospital.

Discharge planning is essential to the concurrent patient care review system conducted as part of the hospital's utilization management effort. If discharge planning is delayed, patient's stay can be unnecessarily extended. Discharge planning is centralized, coordinated effort, to ensure that each patient has a planned program for needed continuing care and follow ups. When it comes to the discharge subject, it's the moment where the patient pays for the services enjoyed in the hospital and the management receives for the same. This we call Billing, which plays a vital role in the discharge process, which involves much of clerical work to be done in the billing office and demands time. But for the satisfaction of the patient, minimizing the time consumption in billing is again an importantfactor.

Therefore this time management study on discharge is undertaken with the aim of giving better services for the patient satisfaction within the minimum time. This can be done only with the help of thorough study of time taken for the whole discharge process beginning from Discharge order time till the patient leaves the Hospital.

Discharge Process: According to Erwin (2001), "Discharge planning–a centralized, coordinated,

multidisciplinary process that ensures the client has a plan for continuing care after leaving the hospital. It prepares the patient and family for transition from the health care setting to another which includes assessing patient needs at discharge, making arrangements and referrals for follow up care and coordinating the various professional and volunteer services. It needs to be initiated on admission to the hospital and then continues as an ongoing process throughout the hospital stay." Good discharge planning involves the patient from the beginning, using his strengths, providing resources to meet his limitations, and is focused in improving outcomes on the patient's life. Driscoll (2000) stated that discharge planning is a process where patients' needs are identified and a plan formed for a smooth transfer from one environment to another. Most modern definitions of discharge planning include the notion of helping patients through transitions from one level of care to another. It is not focused on moving the patients out of the hospital, rather on helping them progress through a number of levels ofcare.

The discharge planning process facilitates successful transitions, such as: from intensive care to intermediate care; a surgical unit to a rehabilitation program or from home care to a hospice unit.

Discharge planning is a process that:

- Begins with early assessment of anticipated patient careneeds
- Includes concern for the patient's total wellbeing.
- Involves patient, family and caregivers in dynamic, interactive communication as planningprocesses.
- Prioritizes collaboration and coordination among all involved health care professionals.
- Results in mutually agreed upon decisions about the most economic and appropriate options for continuingcare
- Is based on thorough, update knowledge of available continuing careresources.

Although the process is complex, the basic concept is a straight forward discharge planning helps patients progress towards optimal health. Unsuccessful discharge can be defined as unplanned readmission within six weeks of discharge.

Factors associated with delayed discharge: Recent researches have tended to highlight contributing factors towards delaying of discharge process. According to Black and Pearson (2002), the three important factors those are likely to cause delay in dischargeprocess:

(i) Individualfactors
(ii) Medicalfactors
(iii) Organizationalfactors.

Individual factors: Individual factors associated with a delay in discharge process are diverse including; personal choice, age, emotional disposition and personal support from family and friends. Recent Australian research (Laughlin & Colwell, 2002) showed that the average length of stay was four times greater for people aged 65 years old and over with dementia compared to all other people. Black and Pearson (2002) conducted a study in Scotland that suggested that 1.3% of patients aged 65 to 69 experienced delays compared with 9.5% of those aged 90 years old andover.

Medical factors: Along with long with individual factors, medical factor also contribute toward delays in the discharge process. In Sweden (Black & Pearson, 2002) a study of people aged 64 years old and over suggested that this group of population was more likely to experience new medical problems requiring treatment after they had already been slated for discharge, thus further exacerbating and complicating their discharge from hospital. The rate of delayed discharge was strongly associated with diagnosis. In terms of broad groups of diagnosis, the rate was highest among those diagnosed with nervous system disorders and circulatory disorders and mental disorders. A Canadian prospective observational cohort study of 130 patients who had undergone an elective thoracic surgical procedure found that the three most frequent medical complications that prevented discharge were persistent air leaks, pulmonary infections and atrial fibrillation. (Anthony & Barr, 2004)

Organizational Factors: Often the patient's clinical condition is not the cause of discharge delays: but rather, organizational management of health care services play a greater role. The literature highlights a small number of studies that suggest, for example, that how a patient is registered influences discharge planning. Whether people are labeled as an emergency or elective admission or if they are a planned short stay admission or a long stay admission, may influence whether or not people are likely to have a delayed discharge. It has been found that people who were admitted to hospital as an emergency admission experienced greater delays than those with elective admissions.

Delayed Discharge: A 'delayed discharge' is a hospital inpatient who has been judged clinically ready for discharge by the responsible clinician in consultation with all agencies involved in planning the patient's discharge and who continues to occupy a bed beyond the ready for discharge date. It is very important that, while the clinician in charge has ultimate responsibility for the decision to discharge, the decision must be made as part of a multi-disciplinary process and focuses on the needs of the individual patient. These patients are clinically ready to move on to a more appropriate care setting either within or out with patient's home.

In this study also it was observed that sometimes patients would wait for the consultant to confirm from them that they were fit to be discharged.

Delayed discharges are defined as delays in discharge from acute hospital of patients whose treatment episode in hospital is finished and who have been assessed as medically fit to leave. This will be after any period of rehabilitation required in hospital has been concluded. Delays related to patient choice are one of the factors affecting delays in discharge from acute hospital care.

Delays related to patient choice occur when the patient or their family or relatives has identified a preferred post-hospital placement that is not immediately available, and the patient remains in hospital awaiting a place in the preferred option.

Intermediate care: The DH published initial guidance on intermediate care in 2001. The guidance set out definitions of intermediate care, service models, responsibilities for provision and charges and planning. The British Geriatric Society defined intermediate care in 2006 as services that met the followingcriteria:

- They are targeted at people who would otherwise face unnecessarily prolonged hospital stays or inappropriate admission to acute inpatient care, long-term residential care or continuing NHS in-patientcare.
- They are provided on the basis of a comprehensive assessment, resulting in a structured individual care plan that involves active therapy, treatment or opportunity forrecovery.
- They have a planned outcome of maximizing independence and typically enabling patients and service users to resume living athome.
- They are time limited, normally no longer than 6 weeks and frequently as little as one to 2 weeks orless.
- They involve cross-professional working, with a single assessment framework, single professional records and sharedprotocols.
- Inclusion of adults of all ages, such as young disabled people managing their transition toadulthood;
- Renewed emphasis on those at risk of admission to residentialcare;
- Inclusion of people with dementia or mental healthneeds;
- Flexibility over the length of the time-limitedperiod;
- Integration with mainstream health and socialcare;
- Timely access to specialist support asneeded;
- Joint commissioning of a wide range of integrated services to fulfill the intermediate care function, including social carere-habilitation;
- Governance of the quality and performance of services.

The guidance is primarily aimed at commissioners but is also of interest to practitioners, providers, service users and their relatives. Further resources for commissioners were published in 2010 as part of a preventative package for older people, which includes intermediate care (DH 2010).

Method

The study was conducted in the wards (surgical, medical, and economic) in a 500 bedded hospital in Pune from 7th May to 7th August 2015.

The research approaches adopted in this study were exploratory, descriptive and explanatory method.

Data collection was done through observation, data capturing format and by interacting with staffs in various departments.

Data collection was done through convenient sampling method and was primary data. The sample size for the study was 100.

Results and Summary

In this study, it was observed that there was a significant delay in the discharge process. The main

reason for the delay is insufficient staff and overload of work on staffs and stacking of files in various departments. Therefore, the hospital could notadhere to the NABH standards of time for dischargeprocess.

Table1: Discharge Process Time in comparison with the NABH standard for discharge Process

Sl No	Steps in discharge procedure	Average observed time taken	NABH Standards	Difference
1	Preparation of discharge summary	108	30	78
2	Pharmacy clearance	69	30	39
3	Preparation of bills	263	30	233
4	Bill Settlement	35	30	5
Total		**475**	**120**	**355**

Conclusion

Time management study will give the managers an idea about the current time taken for the process and can compare it with the NABH standards to implement various steps towards reducing the unnecessary delay in the process. If all the sub processes of the discharge process comply with the time limit specified by the hospital and if the recommendations are implemented, the current discharge time can reduce to 1.5hrs.

Conflict of Interest: None

Ethical Permission: No Ethical issues are involved, as the study was undertaken as a part of Summer Internship of MBA (HHM) student, and there were no human or animal experimentation.

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Extinction of the Elixir of Life: Depletion of Groundwater Level In Chennai

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Abstract

Orientation: There has been a growing unease in depletion of ground water in Chennai due to the increase industrial population, creating difficulties in day to day operation of hotels.

Research purpose: To list out the problems with regard to water scarcity faced hotels in and around the areas of Chennai. Exhibit the practices and procedures followed by the hotels in overcome these problems.

Motivation for the study: Currently the city is facing a major water scarcity problem which is due to climatic changes, over consumption of ground water supply, lack of water saving activities etc. Hotel industries being a prime user of groundwater exerts a principal role in depleting the groundwater hereby has the responsibility in rescheduling the water conserve practices.

Research design, approach and method: A qualitative and quantitative study has been done in twenty three hotels located in and around Chennai with a well designed questionnaire as the research tool.

Findings: Presently no well planed practices or policies exist in water management at hotel industries. Still many hotels have not implemented water conservation initiatives to save groundwater. Awareness has to be created among the managements, employees and guest to minimise the water crisis. .

Keywords: *Conservation; Elixir; Hotel Industry; Water.*

Introduction

The elixir, magical or medicinal potionis a clear liquid which is sweet flavoured and can cure all illness of human kind. Of all liquids water is considered the elixir of the earth[1]. Saint poet Tiruvalluvar in his epical work Thirukkural expressed that the world evolves due to the blessing of water, the eternal liquid which makes the earth to live.[2]

Water is essential for living beings without water human being can survive only for a few days. It is essential for cellular homeostasis and life[3]. Our planet earth and the life form on it are inseparable from this simple inorganic compound[4]. The three quarter of this beautiful blue planet is covered with water in which approximately only 1% is fresh-water in rivers, lakes and in ground water.[5]

Ground water is the prime source for drinking, 85% of the rural and 50% of urban water requirements are being satisfied by the ground water. According to United Nations Educational, Scientific and Cultural Organization (2012) India stands first in copious user of ground water[6] and the usage rate is relatively high than their recharge rate. By 2020 water availability per person may even reduce to 48 litres per person per day that is comparatively lesser than the world's standard scale[7].

A survey held during the month of March 2017 in 15 areas of Chennai shows the fall in level of ground water ranges from 0.70 metres to 2.88 metres compared to the previous year.[9] The ground water in Chennai is over exploited if 100 litres seeps into the ground 90-100 litres of water is pumped out.[8]

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Beside the domestic users, industrial sectors are the major exploiters of the ground water. Among these industries hotel industry uses a major part of the ground water creating scarcity for water in their location. On an average the hotels at Chennai accommodates around 12000 to 14000 guest per day. The guest in a hotel consumes at least 750 to 900 litres of water for their daily activities, [10] beside the provision of water for the guest daily activities the hotel also consumes water for kitchen, laundry, landscaping etc for an aesthetic service for their guest or consumers.[11].

For the smooth running the hotels uses around 41% of water for the restroom and bathroom uses, 7% for kitchen activities and heating cooling facilities respectively 8% for housekeeping activities and 13% for landscape irrigations[12] The usage proportion of water depends upon the facilities provided or categorization of the property.[13]

The study gives attention to usage proportion of water at departments in hotels and the opinions of employees about the conservation measures followed by the hotel sectors to conserve water followed in the hotel which in turn reduces the ground water depletion.

Material and Method

Hotel industry has been always considered a boon in development of a nation's economy with no great collision on natural environment; beside there exist a grumble of consumption of vast amount of goods and energies especially local water reserves.[14]

A qualitative and quantitative study[15] was conducted to estimate the extent of ground water usage, practice and measures in water conservation at hotel industry. The study is qualitative as it depends more upon the conceptual knowledge of the population selected also quantitative to comprise a required number of population across the selected area.

Pilot Study: A face to face interview was conducted with officials of various hotels at Chennai, A set of questions that includes questions about the usage of water at various departments, preventive water management measures followed at hotel to reduce water usages, social responsibilities in conserving water at hotel industry.

Population and Sampling: The study population covers supervisors, executives and higher authorities from hotel sector. A purposive sampling[16], a method of selection a study population upon specific criteria for the study is adopted to target the selective people including executives and managers of departments, chief engineers, and others well versed in the practices and procedures of water measures in the selected hotels at Chennai.

The study was carried out more ethically with co-operation of the participant and confidential[17, 18] as disclosure of details may create an adverse effect to participants and their employer.

Data Collection: The primary data gathered using the pilot study from the officials at hotel industry are well organized and evaluated, additionally secondary data from internet sources and journals are evaluated together and a well structured questionnaire was prepared as the tool for data collection.[19] A well organized questionnaire with three sections was framed constituting open, closed, dichotomous, multiple choice and scaled question[20] to bring out the water usage proportion in departments of hotel industry, precautionary measures in water conservation the degree of acceptance of the employee and employers attitude towards water management programs.

250 Questionnaires were distributed to the respondents at major departments like Food and Beverage Production, Food and Beverage Service, Accommodation Operation, Front Office, Engineering departments the chief users of water. Questionnaire was also sent by mail to 68 respondents for their convenience. The filled in questionnaire were collected were checked whether completely filled in and validated for transcription. Among the response 239 were considered as valid responds from respondents.

Data Analysis: Validated data from the respondents are coded, entered and analysed with the statistical tool SPSS (21.0). Descriptive, one-way anova test, t-test, correlations analysis was used for the analysis of data.

Results and Discussion

The study was conducted during the month of January to April 2018 in star categorized hotels located in and around the city of Chennai, Tamil Nadu. The targeted population were hoteliers at management levels. Questionnaire were used as a tool for collection of data Table.1 shows the statistic breakup of the valid

and invalid questionnaires used for further studies. It illustrated that survey carried out by sending the questionnaire by mail is easier and the response is also comparatively accurate.

Table. 1 Validation of surveyed questionnaire

Particulars	Total		Invalid for the study		Valid for the study	
	Frequency (N)	Percentage (%)	Frequency (N)	Percentage (%)	Frequency (N)	Percentage (%)
Questionnaire Circulated Personally	250	79	64	25.6	186	74.4
Questionnaire Circulated By mail	68	21	15	22	53	78
Total	318		79		239	

Reliability test: Data from valid questionnaires for the study are coded and uploaded in SPSS statistical tool (20.0) version, and checked for their reliability. The analysis result proves the data are more reliable with Cronbach's Alpha value as 0.794.

Demographic statistics of respondents: The demographic statistic, Table. 2 exhibits a picture about the respondents participated in the study. The sampling was done under purposive selection method as the study needs the respondent to be in or above supervisory level of management, works at least a year in the particular star categorized property.

Table 2. Demographic statistics of respondents

Demographic Statistics			
Demographic Factors		Frequency (N)	Percentage (%)
Gender	Male	163	69
	Female	76	31
Age	Less than 25 Years	84	36
	26-35Years	77	32
	36-45 Years	49	20
	Above 45 Years	29	12
Designation Level in Management	Supervisory Level	71	29
	Middle Level	128	54
	Top Level	40	17
Years of Experience in Surveyed Hotel	1 to 2 years	81	34
	2 Years 1 Month-5 Years	106	45
	Above 5 years	52	21
Hotel's Star Categorization	Three Star	113	48
	Four Star	87	36
	Five Star	39	16

Source of water for hotels in Chennai: The primary data from officials at hotel and secondary data from sources of internet and magazines reveals that only 40% of water requirement of a hotel has been provided by the government bodies of the city the rest has been bought from the private agencies. A hotel need 80 to 147 kilolitres of water for a day's operation, they spend nearly Rs. 800 to Rs. 2400 for 24,000 litres of water buying from these agencies.

Kendall's W test: Water is more essential for daily operations for all activities from cleaning to cooking employees been asked to rank the end use of water at various departments. The data has been analysed for their degree of agreement using Kendall's W test which ranges between 0(disagreement) to 1 (agreement) [21]. The analysis shows the agreement is strong as the Kendall's W coefficient value is (0.767) and significant at (0.00) level.

Table 3 illustrates the ranking position of opinions about water usage in hotel departments. Usage of water at guest rooms has been ranked first among other usages. Beside these usages, water is also wasted while used in cooling or heating systems, R. O plants, leakages due to poor maintenances has been ranked last.

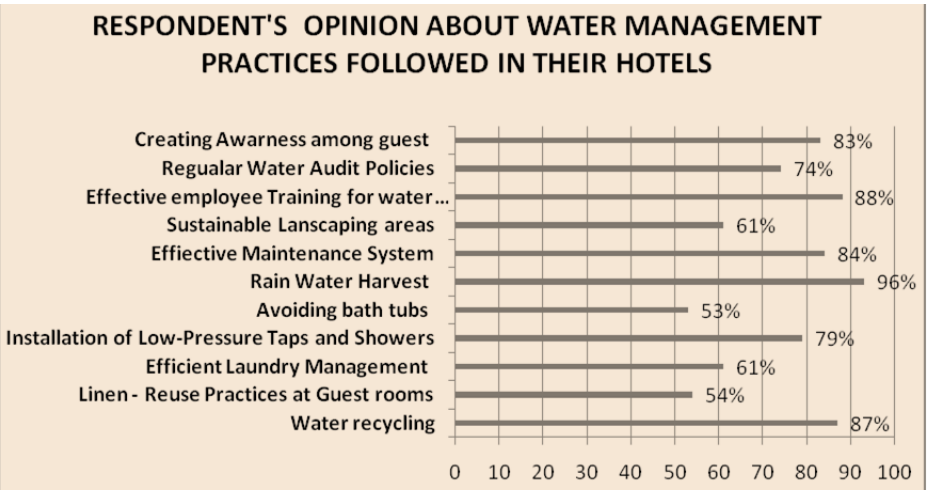
Table 3: Ranks

Particulars	Mean Rank
Landscape	3.35
Public area toilets/ lockers	2.94
Laundry	3.71
Guest rooms	1.98
F & B Production & Service Activities	2.05
Swimming Pool	4.11
Wastage	4.84

Test Statistics: Kendall's Coefficient of Concordance = 0.767 significant at (0.00) level.

Respondent's Opinion about Water Management Practices followed in their Hotels: The questionnaire constitutes a section of questions covering all technical facts and personal responsibilities of employees to observe the opinion about water management and conservation practices in their hotels[22,23]. Figure. 1 illustrates the opinions of employees employed in the surveyed hotels about the practices and procedures in water management and conservation. According to the study (96%) of the respondents feel confident that their hotels have been equipped with rain water harvesting. Around 83–88% of employees are aware that their hotels are creating awareness among the guest with regard to water conservation, hotel posses a well planned maintenance system, Effective water recycling plants and provides effective training for the employees.

Figure 1: Respondent's opinion about water management



Anova-test: Anova is an ideal method of statistical analysis to analyze the significance relation of variances.[24] One-way anova analysis is done among the variables effective water management, star categorization and employee training. The analysis (Table. 4) shows that there exist a significant relationship between the variables Effective water management and Training provided for employees (F = 24.268) and between the variables Effective Water Management and Hotel's Star Categorization (F = 16.784) at a significant value (< 0.5) level.

The analysis concludes that the effectiveness in water management depends upon the grade or

categorization of the hotel and also the efficiency of well trained employees.

Table. 4 One-way Anova test

Variables	Training for employees		Hotel's Star Categorization	
	F-Value	Significance	F-Value	Significance
Effective Water Management	24.268	(<0.5) Level	16.784	(<0.05) Level

One sample *T*-test: Factors that obliterate and deplete the ground water level are analysed using t-test Table.5 shows that these factors are significant and main causers for the ground water pollution and depletion.

Table 5. One Sample T-test

S.No.	Ground Water Depleting Factors	T-Value	Significance Level
1	Employee unawareness and irresponsibility	77.11	(0.00) level
2	Nonexistence of appropriate recycling plants	53.09	(0.03) level
3	Usage of eco-friendly cleaning equipments and agent.	83.71	(0.021) level
4	Effective drainage facilities and garbage clearance	78.03	(0.033) level

Conclusion

The study analyzes the qualitative and quantitative information from the employees of hotel industry elaborates that hotel itself faces more crucial crisis with regard to water needs. Practice and procedures by reduce the wastages of water; enhancement of conservation certainties and personal responsibilities has to be adopted to overcome the groundwater depletion. Possible steps have to be taken by the hoteliers to enhance the ground water level.

Suggestions: Chennai city faces a high water crisis at all seasons; ethically recuperation of ground water has to be considered a prime role by the hoteliers. The study proposes few suggestions by consolidating respondent's opinions for employees and employers at hotel sector. Employees have to be well trained in water management, an effective recycling plant to be installed, Enhance self responsibility among employees, refuse usage of toxic chemical and agents, organized an effective maintenance team, display signs and boards to create awareness among employees and guests, reduce the usage of linens, planning appropriate drought plants and landscape areas, reduce concreting the floors around

Limitation of the Study: The core of the study depends upon the response of the employees at hotels; the busy schedules of the employees, unawareness about the water management practices, employee's loyalty and disclosure of policies are main limitations for the study.

Conflict of Interest: Nil

Source of Funding: Nil

Ethical Clearance: Nil

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Perception of Hotel Management Students towards Entrepreneurial Motivation Factors

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Abstract

Perception of Entrepreneurial prospect from hotel management curriculum, made a vibrant raise in selection of these course as career among the students. The study covers the final year degree and diploma students undergoing hotel management course as the participants. A well administered questionnaire was set and distributed among 193 students from final year in a random. Data collected were analysed using the statistical tool SPSS (21.0). The result concludes that the students undergoing hotel management course are enthusiastic and passionate to turn out to be an entrepreneur. New aspects and training modules are been expected from the students with regard to entrepreneurship in their curriculum.

Keywords: *Entrepreneur, Hotel Management, Perception, Student.*

Introduction

Entrepreneurs are economic boosters; a nation's growth is more dependent upon the entrepreneurship quality among the citizen. According to Business Dictionary an entrepreneur is initiative and risk taker using the opportunities to develop an organisation to accomplish achievements and records[1]. Regardless of international qualms and issues, the hospitality industry maintains its growth in a constructive rate. According to the United Nations World Tourism Organization report (2015) the industry contributes around 10% of world's GDP and more than 6% exports globally.[2] Hospitality industry covers up small to large scale business providing the leisure services or products to national or international consumers. The hospitality product is composition of spare from multiple entrepreneurs. The industry provides manifold opportunities for the young entrepreneurs to develop their own businesses[3].

Changing trends and developing technologies, economically have a close collision and impact on hospitality industry. These changes bring into a positive augmentation in their micro and macro environments providing unlimited openings for the progression of budding entrepreneurs.[4] Hospitality sectors directly or indirectly provides a wide opportunities like bakery, facility planning, multi or speciality restaurants, coffee shops, ticketing and travel operations etc.

An entrepreneurship in hospitality industry is sourced and enhanced by the creative and innovative thinking, as the entrepreneurial way of thinking is more essential to find out new innovative business or to revitalize the active or ongoing business .[5] The businesses in hospitality sector is more dependent on the human work force[6] than other resources, hereby the financial investments for the business may range from zero investment to even million crores.[7]

The entrepreneurial education has become more fundamental and prevalent[8], it benefits the students educating entrepreneurial skills building up confidence and develops self-belief and maturity.[9] Hospitality management courses are entrepreneurial programmes always have a vibrant popularity among the young aspirants[10]. Many intrinsic and extrinsic motivational factors like the curriculum of programme, family supports, faculties, institutions etc. develops a positive and constructive perception among students to turn out himself an entrepreneur.[11]

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Among the students the entrepreneurial quality is more based on the interest, intention[12] and the behavioural approach[13] towards entrepreneurship the entrepreneurial qualities of a hospitality management student depend upon the institutions, curriculum, infrastructural facilities, family supports, etc. Educational institution, play a vital to orient and train their students becoming a successful entrepreneur.[14]

Curriculum of hotel management graduation is composite; it invokes and develops boundless perception and entrepreneurial ideas among their graduates. The industrial exposure training formulates a good impact about the industry making them understand the actual industrial scenarios. The syllable for the course is structured in a manner constituting a set of program to develop the basic knowledge and skills of their students and enhance them to succeed in present dynamic and business environment[15]. The lively learning prospect constructs an entrepreneur quality in the student throughout their studies.

Family background and parent's occupation influences and motivates the entrepreneurial perception of the student providing financial and moral supports.[16] Governmental bodies and banking sectors promotes the young emerging entrepreneurs helping out in provision of investment, conduction of training programmes that builds up their entrepreneurial perception.[17]

The present study was to exhibit the perception of hospitality management students towards entrepreneurship also discusses the motivational factors that enhance the actual entrepreneurial perception among the students.

Materials and Method

The study was both the qualitative and quantitative; a well structured questionnaire was framed and used as the research tool. The questionnaire consist of three section first section was designed to collect demographic parameters of students including family and education backgrounds. Second part records the students view becoming an entrepreneur and third section comprises the viewpoint about the motivational factors that enhances the entrepreneurial quality among the students. The entrepreneurial qualities are ranked and the perception about motivational factors enhancing perception were rated with likerts five point scale ranging from 1 as Strongly Disagree to 5 as Strongly Agree.

The sample population were the final year hotel management students at universities in Chennai and Kancheepuram. Printout copies of the questionnaire were distributed in person to the students and in few cases the softcopy was uploaded online (google forms) distributed to more than 250 students. Among the responses 193 were considered qualitative for the study.

Statistical Analysis of Data: Analysis of the data are done with the Statistical software SPSS (21.0). Data were treated or analysed with tests like t–test to find whether there exist significance in student's responses in selection of their business areas relationships between gender, age, and attitude with entrepreneurial perception. Chi-square test to check their business is more oriented to hospitality industry or other businesses after their graduation. Friedman's test was conducted to check the ranking position of the qualities for being a successful entrepreneur. Beside these test percentile calculations were done to find the maximum responses for a perception preferences.

Result and Discussions

The data collected from the students with regard to their entrepreneurial perception were analysed using SPSS–Version 21, data are checked for their reliability thecronbach's Alpha value is (0.726) and significant at (0.00) level. It is understood that the data are around 73% a reliable indication that the questionnaire and the response from the students are good and reliable for the research work.

The demographic factors constituting the gender, age, course, and departmental preferences are listed out in Table 1. From the table it is observed among the respondents (90.1%) are male and (9.9%) are female students. It shows the hotel management courses are more open and preferred by the male students compared to the female students. With regard to age students below 20 years is (54.4%), between 20 to 25years is (41.9%) and there exist no students above 25 years in degree whereas in diploma there exist (3.7%)of total respondents. (56.9%) students were undergoing their diploma and (43.1%) their bachelor degree in catering and hotel management. Finally the student's parental background into hospitality industry shows the majority of the students (89.2%) are not into hospitality sector only a few (10.8%) students are favoured having their parents with their background into hospitality industry.

Table 1: Demographic summary of responses from students

S. No	Demographic Factor		Frequency (N=193)	Percentage
1	Gender	Male	174	90.1%
		Female	19	9.9%
2	Age	Below 20	105	54.4%
		20–25 years	81	41.9%
		Above 25 Years	7	3.7%
3	Course	Bachelor Degree	83	43.1%
		Diploma	110	56.9%
4	Parental Background in Hospitality Industry	Yes	21	10.8%
		No	172	89.2%

Student's Preferences on their Business: The students were questioned about their preferences in sources of their investment for business, form of business, and their preference in selection of business area. Table 2 exhibits the following.

Source of Investment: Students are more aware of procedures and practices with regard to start their department specialized businesses leading percentage of them are interested to work in the hospitality firms of their business interest and learn the basic business strategies. They want to start their business after a few years of experience from their area of interest. With regard to their investments (46.1%) of the students prefer to avail a bank loan, (26.9%) of the students seeks financial help from their parent savings, (19.7%) are interested in applying for government sources and very few students (7.3%) prefer in debts and pledging properties for their investments.

Preference on Business Type: Upon the preference on the types of business, majority of the students (65.8%) are interested in starting their own business and (34.2%) are interested in partnership. With regard to selection of partners for their business students preferred their friend (83.9%) when compared to their relatives or family members.

Preference on Business Area: The hospitality industry had many prime choices of areas for the students to develop their own businesses, whereas the development of business more depends upon their innovative and creative perceptions or ideas. Among the choices restaurants (40.9%) was most preferred and facility agency (4.6%) was least preferred by the students.

Orientation of the students entrepreneurship is more towards the hospitality industry, this is proved by the analysis of data using chi-square test that results with chi–square value 134.306 being significant at (0.00) level.

Preferences in selection of Business area is analysed with one sample t–test resulting as the t–value 24.537 with mean difference 2.275 and significant at (0.00) level. This illustrates that there exist a significant difference in preferences on areas of business between the students.

Table 2. Students Preferences on their Business.

S. No	Particulars		Frequency (N=193)	Percentage
1	Source of Investment	Governmental Sources	38	19.7%
		Bank Loan	89	46.1%
		Pledging (or) Debt	14	7.3%
		Parent's Savings	52	26.9%
2	Preference on Business Type	Sole Proprietorship	127	65.8%
		Partnership	66	34.2%
3	Preference on Business Area	Restaurant	79	40.9%
		Coffee Shop	26	13.5%
		Catering Outlets	29	15.2%
		Bakeries	37	19.1%
		Facility Agency	9	4.6%
		Quick Service Restaurant	13	6.7%

Friedman's Test: Friedman's test was done to analyse the data exhibiting the qualities for being a successful entrepreneur. According to the student's perception the test results are made known in table 3, it shows the ranking position of the entrepreneurial qualities in the view of students. In the mean rank from Friedman's Test it is inferred, among the qualities framing an entrepreneur, students feel that the hardworking quality in an entrepreneur makes him achieves his business goal. Nextly the motivation and innovative thinking.

It is understood the test is more significant at (0.00)

level with the greater chi square value 257.875.

Table 3 Ranking Position of Entrepreneurial qualities

	Mean Rank
Risk taker	3.35
Motivated	2.94
Ambitious	3.71
Innovative thinker	2.98
Resourceful	4.11
Hardworking	2.05

Test Statistics of Friedman's Test

Chi-Square value is 257.875 significant at (0.00) level

Motivation features enhancing Student's Entrepreneurial Quality: The entrepreneurial quality among the students can be enhanced by features like the family support, course curriculum, institution studying, faculties, etc. these motivational factors will always brings into a moral support for the students to develop their creativity and entrepreneurial skills.

The independent t test results with f-value (13.784) significant at (0.00) level shows that the demographic factor gender does not have any influence in the entrepreneurial perception of the students

Table 4 point up self motivation of the students to become a successful entrepreneur. Being known that entrepreneurship is more risky they feel being an entrepreneur is more prestigious and attractive. Students are confident with their future business plan and want to prove themselves as a good entrepreneur than oriented only for profit or money.

Table 4: Student's Self motivation to become an entrepreneur

S.No.	Particulars	Disagree		Neutral		Agree	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1	Being an entrepreneur is more prestigious	4	2.0%	19	9.8%	170	88.2%
2	The career as an entrepreneur is very attractive	6	4.6%	32	16.5%	155	78.9%
3	My business ideas makes me more confident to become an entrepreneur	7	3.6%	65	33.6%	121	62.8%
4	I understand entrepreneurship is riskier than being salaried	23	11.9%	18	9.3%	152	78.8%
5	Earning money is not the mission of an entrepreneur	45	23.3%	12	6.2	136	70.5%
6	Becoming an entrepreneur gives me the utmost satisfaction	13	6.7%	28	15.5%	152	78.8%

The following table 5 interprets the perception of student's with regard to motivation to enhance and develop their entrepreneurial dream.

Today the younger generation are more vibrant and bold to express their confidence among their family members. They feel more confident that the family will support and stand by them during the inception of new business in all aspects.

The hotel management syllable and curriculum is more practical and training oriented that brings in and develops the entrepreneurial qualities among the students. The students about their support from the curriculum, institution and faculties are more positive anyhow they expect still more positive measure from the institution to motivate their entrepreneurial skills.

Table 5. Perception on family's support, curriculum and institution

S.No	Particulars	Disagree		Neutral		Agree	
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1	My Family allows me to start my own business	17	8.8%	31	16.1%	145	75.1%
2	Family members improves my business ideas	27	13.9%	41	21.2%	125	64.9%
3	Family is ready to support financially	39	20.2%	21	10.8%	133	69.0%
4	Entrepreneurship is a part of my curriculum	21	10.8%	33	17.1%	139	72.1%
5	Success stories of entrepreneurship are discussed in regular academic sessions	54	27.9%	19	9.8%	120	62.3%
6	The curriculum enhances entrepreneurship dream	28	14.5%	31	16.1%	134	69.4%
7	The institution's infrastructure is apt to develop our entrepreneurship skill	42	21.7%	10	5.1%	141	73.2%
8	Institution arranges periodic training/seminar/workshops with entrepreneurial achievers	59	30.5%	21	10.8%	113	58.7%
9	Faculties improves the positive attitude to become an entrepreneur	32	16.5%	29	15.1%	132	68.4%
10	Faculties supports innovative thinking beside curriculum	27	13.9%	41	21.2%	125	64.9%

Pearson's Correlation: The variables motivation strength in student and the factors family support and Institutional supports were correlated using Pearson's correlation analysis, thus Table 6, shows that there exist a significant relation among the motivational strength in student and supports from their family and institution.

Table 6. Pearson's correlation

Particulars		Family	Institutions
Motivation Strength	Pearson Correlation	.339**	.544**
	Sig. (2-tailed)	.000	.000
	N	193	193

**. Correlation is significant at the 0.01 level (2-tailed).

Conclusion

Education instigates an entrepreneurial ability and initiative among the students, Hospitality management studies are considered prime among other entrepreneurial courses. Student's entrepreneurial perception is more positive, being provided with a variety of opportunities to raise their business despite financial investments. The study concludes as the hospitality management students are more positively motivated becoming an entrepreneur. Beside the students also expects more entrepreneurial oriented prospects into their curriculum.

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A Study on the Effectiveness of Working Environment in Hyundai Motor India Limited, Chennai

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Abstract

Work environment in general comprises of the physical location, equipment used organisational climate and the activities of an employee while engaged in the performance of his work. Effectiveness of work environment contributes towards organisational productivity, employee satisfaction and ultimately towards organisational effectiveness. work is an integral part in everyone life. working environment plays a crucial role in enhancing the performances of an individual and the organisation as a whole.

This study titled "Effectiveness of working environment" analyses the impact of positive working environment towards organisation effectiveness. The information needed for the research is gathered from both primary and secondary sources of data. The chapter consists of company profile, Need, Scope, Objectives and Limitation of the study, Research Methodology, Finding, and suggestion. The Research design adopted in this study is Descriptive research. The sample size was based on the application of the formula. The various statistical tools used for the study were Percentage Analysis, interval estimation, chisquare test,weighted average,correlation,Two way Anova. Chart are also used to give pictorial representation of data collected. The interpretation are summarized and suggestion are provided.

Keyword: *(i) Work environment, (ii) Workplace., (iii) Labour scenario, (iv) Work circumstances, (v) Labour Situations, (vi) Employee situation in work.*

Introduction

A positive working environment for employees is the common goal of all good owners and managers. Such an environment encompasses favourable working conditions, good air quality, timely management feedback and an understanding of job goals and priorities.

Work life was conceptualized in terms of need satisfaction from an interaction of workers' need. It was hypothesized that need satisfaction is positively related to organizational identification, job satisfaction, job involvement, job effort, job performance. Job satisfaction is not the same as motivation, although it is clearly linked. Job design aims to enhance job satisfaction and performance, method include job rotation, job enlargement and job enrichment. Other influences on satisfaction include the management style and culture, employee involvement, empowerment and autonomous work groups.

Industry Profile

1. The automotive industry's main tasks during the 10th Five-Year period

(1) China will promote strategic reorganization of the automotive industry and provide support and direction to cooperations between influencial corporations. Powerful corporations will be encouraged and supported to develop further and become bigger and stronger. Distribution of resources will be optimized and a pattern of large automobile corporation groups will be established. A supplementary system of auto parts manufacturing will also be developed to improve competitive ability.

(2) Step by step, China will enhance the independent ability to develop and spread new products,techniques, materials and energy sources actively to encourage the advancement of techniques, accelerate development of the

automotive industry and upgrade automobile products.

(3) High and new technologies will be employed to develop key automobile spare parts, which will gain either a comparative advantages or larger developmental potential. Efforts will be made to enhance the country's ability to develop new products and strengthen the competitive ability to realize the simultaneous development of spare parts with whole vehicles and take part in the international division of labor.

Company Profile: Hyundai Motor India Limited is a wholly owned subsidiary of Hyundai Motor Company, South Korea and is the largest passenger car exporter and the second largest car manufacturer of India. Hyundai Motor India presently markets 54 variants of passenger cars across segments. Hyundai Motor India Ltd, continuing its tradition of being the fastest growing passenger car manufacturer, registered total sales of 559,880 vehicles in the calendar year (CY) 2009, an increase of 14.4 percent over CY 2008. In the domestic market it clocked a growth of 18.1 percent as compared to 2008 with 289,863 units, while overseas sales grew by 10.7 percent, with export of 270,017 units. Hyundai Motor India currently exports cars to more than 110 countries across EU, Africa, Middle East, Latin America and Asia. It has been the number one exporter of passenger car of the country for the sixth year in a row

Hyundai Motor India's fully integrated state-of-the-art manufacturing plant near Chennai boasts of the most advanced production, quality and testing capabilities in the country. In continuation of its commitment to provide the Indian customer with global technology, Hyundai Motor India commissioned its second plant in February 2008 which produces an additional 300,000 units per annum, raising Hyundai Motor India 's total production capacity to 600,000 units per annum

Need for the Study

- Working environment is needed for an organisation in order to find out the area where improvement can be made in the work.
- It helps individual growth as well as fosters the growth of organisation and would be of great help to sustain in a competitive economy.
- The study focuses on the employee relationships at various levels and it also concentrates on the various factors that contributes towards increased motivation.
- It is required in order to remove psychological and social work environment problem which hinders the growth of the employees.

Objectives of the Study

Primary Objective: To study the effectiveness of working environment in "Hyundai Motor India Limited."

Secondary Objective:

- To know the various factors that influence job satisfaction among employees in the organisation.
- To study the attitude of the employees towards training and development program.
- To identify the employee's perception towards the grievance handling procedure adopted in the organisation.
- To study the satisfaction level of employees towards health,welfare and safety measures.

Scope of the Study: Help the organisation to identify growth opportunities of workers to enhance their performance. It provides safe work environment for employee to enjoy working. It enables organisation to easily adopt to change in technology. It shows the satisfaction of the employee with respect to the pay package.

It helps the management to find out the opinion of the employee regarding their work environment. The work potential of the employee which will ultimately lead to necessary training program.

Limitations of the Study:

- Since the time given to the researcher was very limited, it was not possible to meet sufficient number of employee.
- Access to record and files to know about the employee was not possible all the time.
- The respondent may be biased in their respondents.
- Interaction with higher level official was limited since they were highly engaged in their work .
- The data collected from respondents are qualitative in nature.

Review of Literature: An attractive and supportive work environment can be described as an environment that attracts individuals into the health professions,

encourages them to remain in the health workforce and enables them to perform effectively. The purpose of providing attractive work environments is to create incentives for entering the health professions (recruitment) and for remaining in the health workforce (retention). In addition, supportive work environments provide conditions that enable health workers to perform effectively, making best use of their knowledge, skills and competences and the available resources in order to provide high-quality health services. This is the interface of the work environment and quality of care. Working environment can be divided into two components namely physical and behavioral components. The physical environment consists of elements that relate to the office occupiers‟ ability to physically connect with their office environment. The behavioral environment consists of components that relate to how well the office occupiers connect with each other, and the impact the office environment can have on the behavior of the individual. According to Haynes2 (2008), the physical environment with the productivity of its occupants falls into two main categories office layout (openplan verses cellular offices) and office comfort (matching the office environment to the work processes), and the behavioral environment represents the two main components namely interaction and distraction. These components can further be divided in major attributes and operationalised in the form of different independent variables. These variables will be used for analysis of their impact on dependant variable. It is generally understood that the physical design of offices and the environmental conditions at work places are important factors 10 in organizational performance. The empirical research by Stall has also shown that when human needs are considered in office design, employees work more efficiently. One survey conducted by Brill in particular has suggested that improvements in the physical design of office buildings may result in a 5-10 percent increase in productivity and eventually increase performance. Other studies have examined the effect of physical work environment on workers‟ job satisfaction, performance, and health. For example Scott, (2000) reported that working conditions associates with employees‟ job involvement and job satisfaction. Strong et al (1999) in a study observed that social, organizational and physical context serve as the impetus for tasks and activities, and considerably influence workers‟ performance5. Researches on quality of work life have also established the importance of safe and healthy working conditions in determining employees‟ job performance. The influence of working environment, which is mostly composed of physical, social and psychological factors, has been extensively examined in past two decades. In a number of studies, employees‟ motivation, job satisfaction, job involvement, job performance, and health have been found to be markedly influenced by psycho-social environment of work organization. According to Franco performance relies on internal motivation but presence of internal factors such as necessary skills, intellectual capacity and resources to do the job clearly have an impact. As a consequence employers are supposed to provide appropriate working conditions in order to make sure the performance of employees meet the required standards.

Research Methodology

Research: The research is an attempt to study a problem or a situation at any given circumstances and identify various causes or consequences of that particular problem. It tries to solve a complex and complicated problem through use of various tools and techniques.

These tools and techniques try to bring out a logical, accurate and scientific solution to given problem.

Research Design: A research is the arrangement of condition for collection and analysis of date in a manner that aims to combine relevance to the research purpose with economy in procedure. In fact the research design is the conceptual structure within which research is conducted; it constitutes the blue print for the collection, measurement and analysis of date. The research design adopted in the study was descriptive study.

Descriptive Research: Descriptive Research includes survey and fact finding enquiries of different kinds. The major purpose of Descriptive Research is description of the state of affairs, as it exists at present. The main characteristics of this method are that the researcher has no control over the variables, researcher can only repeat what has happened or what is happening.

Size of the Sample: 120

Analysis and Interpretation

Table 1: Table Showing the Age of Respondents

Age	No. of Respondents	Percentage
<25 Years	39	32.5
26-30 Years	47	39.16
31-35 Years	23	19.16
36-40 Years	4	3.33
>40 Years	7	5.85
	120	100

Findings: The above table shows that 32.5% of respondents are in the age group of less than 25 Years, 39.16% of respondents are in the age group of 26-30 Years, 19.16% of respondents are in the age group of 31-35 Years,3.33% of respondents are in the age group of 36-40 Years, and 5.85% of respondents are in the age group of greater than 40 Years.

Inference: It is inferred that majority of respondents are in the age group of 26-30 Years.

Table No. 2: Table Indicating the Gender of Respondents

Gender	No.of Respondents	Percentage
Male	83	69.17
Female	37	30.83
	120	100

Findings: The above table shows that 69.17% respondents are Male, 30.83% of respondents are Female in the organization.

Inference: It is inferred that majority of respondents are Male in the organization.

Table No.3: Table Indicating the Working Period of Respondents

Experiences	No. of Respondents	Percentage
<6 Months	10	8.33
1-4 Years	45	37.5
5-10 Years	32	26.67
10-15 Years	21	17.5
>15 Years	12	10
	120	100

Findings: The above table shows that 8.33% of respondents have got an experience of less than 6 Months, 37.5% of respondents have got an experience of 1-4 Years, 26.67% of respondents have got an experience of 5-10 Years, 17.5% of respondents have got an experience of 10-15 Years, and 10% of respondents have got an experience of greater than 15 Years.

Inference: It is inferred that majority of respondents have got an experience of 1-4 Years working period of employees.

Findings

- It is found that 32.5% of respondents are in the >25 Years, 39.16% of respondents are in the 26-30 Years, 19.16% of respondent are in the 31-35 Years,3.33% of respondent are in the 36-40 Years, and 5.85% of respondent are in the >40 Years.
- It is found that 69.17% of respondents are Male Worker in the organization, 30.83% of respondents are Female Worker in the organization
- It is found that 31.67% of respondents are in the Salary Package, 37.5% of respondents are in the Career Growth, 18.33% of respondent are in the Promotion, 12.5% of respondent are in the Motivation.
- It is found that 84.17% of respondents are Satisified with working hour, 15.83% of respondents are not satisfied with working hour.
- The first preference goes to salary package, second preference goes to Health,Welfare,safety measure, third preference goes to carrier growth, fourth preference goes to Team wok, fifth preference goes to Support from Management, sixth preference goes to Training and development, seventh preference goes to Skill utilization.
- It is found that 44.17% of respondents are Expert Within the organisation, 32.5% of respondents are External consulants, 23.33% of respondent are Immediate superior.
- The first preference goes to Quality in Work to improve upon, second preference goes to Confidence, third preference goes to Morale, fourth preference goes to Knowledge, fifth preference goes to SkillSet.

Suggestion:

- To increases the co-ordination between the departments, by conducting the other activities.
- To provide promotion on the basis of performance and target attained by the employees in their work.

- To get suggestion from the employees during the formation of goal and strategies.
- It is suggested to consider the entire employee in the grievance handling procedure.
- The monetary reward can be provided to the efficient employees in order to increase the level of motivation.
- Periodical group discussion and group interaction between departments must be held to enhance the healthy working environment.
- The management can identify the various flexible work options like constructing intranet and website.
- Promotion of time interval need to be reduced by implementing and creating awareness in performances appraisal system for the employees to improve work efficiency.

Conclusion

- In order to build up organisation strategies and improve the work environment, a well co-ordinated and integrated approach is necessary for designing and implementing the quality of work life program is necessary for development for Human resources.
- The study is conducted to analyse the effectiveness of working environment in Hyundai Motor India Limited.
- This study helps to find that the working environment is effective to some extent and there is no significant change in the environment.
- Working environment is to increases the production and to maintain a healthy relationship between the employer and employee in the organisation.
- After studying the interrelationship among working environment the following conclusion can be made. It includes some factors such as intrinsic motivation, job involvement, job attractive are all responsible for potentially enhancing work life.
- Thus the study reveals that companies should take enough initiatives to improve work environment. Accurate and consistent scales should be developed to measure the above factor and regular monitoring need to be done.

Ethical Clearance: This is to certify that the article entitled" A Study On The Effectiveness Of Working Environment In Hyundai Motor India Limited, Chennai is original research work done by Me.

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Conflict of Interest: NIL

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Evaluation of Factors Responsible for Failure of Root Canal Treatment in an Adult Indian Population: A Cross Sectional Study

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Abstract

The root canal treatment failure is a frequentproblem occurring in dentistry. Inadequate chemo mechanicalpreparation, poor obturation, over obturation, persistence of bacteria, instrument separation, missing canal,coronal microleakage are some of the causes responsible for the failure of the root canal treatment. 400 root canal treated teeth with failure were included in this study and were recorded using digital radiography. Under obturation was the predominant factor for the failure of root canal treatment. The larger number of the endodontic failures was found in the timeperiod of within 4-5 years. The maximum average time period causing failure was seen to be 3.85 yearsfor over obturation..

Keywords: *Over obturation, microleakage, persistent periapical infection.*

Introduction

- The main criteria behind the successful outcome of the pulp space therapy is based on the entire removal of the infected pulp tissue and irritants present within the root canal system followed by a hermetic seal.[1]
- The majority of the pulp space therapy failure arises because of the failure of the practitioner to locate all the canals which is mainly due to the presence of extra root or canals indicating variations in root canal morphology.[2]
- The quality of coronal restoration holds a pivotal role in governing theperi-apical condition of the root filled teeth .A perfectly sealed coronal restoration with a poorly filled root canal system may remain successful for a longer period of time, whereas poorly sealed coronal restoration with properly obturated root canal may show failure in a short time.[3]

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- Preoperative periapical radiolucent lesion also determines the success rate of pulp space therapy. Study done by Gulabivala etal, stated that presence of a lesion in the preoperative radiograph could adversely affect the prognosis in comparison with a tooth without a lesion.[4]
- According to European Association of Endodontists, an ideal root canal treatment should be short of the radiographic apical foramina by 0-2 mm with a tapered canal from coronal to apical area without any gap between obturating material and dentinal wall.[5]
- Hence, the purpose of the study was to enumerate the most common factors causing failure of pulp space therapy in the Indian population as the findings of the previous studies varied in the different locations it was done in.

Materials and Method

Source of the Data:

- The present study was conducted in the Department of Conservative Dentistry and Endodontics, A.B. Shetty Memorial Institute of Dental Sciences, Mangalore.

- 400 patients with root canal treatment failure were recorded using digital radiography.

Inclusion Criteria Involved: Pain after root canal treatment, swelling, pain on percussion, parulis.

Exclusion Criteria Involved: Vertical root fracture**,** badly broken down unrestorable teeth.

Procedure: The patients were evaluated under the following experimental groups

- Under obturation (Fig. 1)
- Over obturation (Fig. 2)
- Missed canal (Fig. 3)
- Instrument separation (Fig. 4)
- Perforation (Fig. 5)
- Persistent periapical infection (Fig. 6)
- Absence of full coverage restoration (Fig. 7)

Statistical interpretation of Data: Statistical analysis was performed with SPSS 22.0 software. Descriptive statistics were presented in the form of frequency and percentage. Time period and reasons for failure were compared using chi-square test. p value <0.05 was considered statistically significant.

Study Design: An excel sheet was prepared using the following data:

Following numbers were assigned for each parameter

- Gender : 1= male, 2=female
- Age : 1 = 10-20years, 2 = 20-30 years, 3 = 30-40 years, 4 = 40-50 years

  5 = 50-60 years
- Time period : 1 = 0-1 years, 2 = 1-2 years, 3 = 2-3 years, 4= 3-4 years,

  5 = 4-5years
- Under obturation, over obturation, missing canal, instrument separation, perforation, persistent periapical infection, no crown follow up : 0 = No, 1 = Yes

Endodontically treated teeth with failure

Gender

Age

Tooth type

Anteriors

Premolars

Molars

Under obturation

Over obturation

Missed canal

Instrument separation

Persistent periapical infection

Tooth Receiving Crown During Follow up

Perforation

Time period after Root canal treatment

Findings:

Table 1: Factors responsible for endodontic failure in terms of frequency and percentage

Factors for endodontic failures	No. of patients	Percentage of procedural errors
Under obturation	198	49.5%
Over obturation	27	6.75%
Missed canal	35	8.75%
Instrument separation	69	17.25%
Perforation	6	1.5%
Persistent periapical Infection	13	3.25%
Without full coverage Restoration	147	36.75%

The most contributing factors responsible for endodontic failures were under obturation (49.5%), absence of full coverage restoration (36.75%) whereas the least contributing factors responsible were perforation (1.5%) and persistent periapical infection(3.25%).

Table 2: The association of endodontic failures in different time periods

	Frequency	Percentage
<1yr	41	10.25%
1-2yr	58	14.5%
2-3yr	72	18%
3-4yr	107	26.75%
4-5yr	122	30.5%
Total	400	100.0

The larger number of the root canal treatment failures was found in the time period of 4-5 years (30.75%) and least number of pulp space therapy failures was found in 1year. (10.25 %) of treatment.

Table 3 : The association between the factors of pulp space therapy failure and endodontically treated maxillary teeth .

Maxillary teeth	Under obturation	Over obturation	Missing canal	Instrument separation	Perforation	Persistent periapical infection	Without full coverage restoration
Anterior	22	12	2	4	0	6	11
Premolar	30	4	2	2	0	0	21
Molar	35	8	10	17	2	0	25

Under obturation was the predominant cause behind the failure of pulp space therapy in maxillary anterior, premolar and molar teeth.

Table 4 : The association between the factors of pulp space therapy failure and endodontically treated mandibular teeth.

Mandibular teeth	Under obturation	Over obturation	Missing canal	Instrument separation	Perforation	Persistent periapical infection	Without full coverage restoration
Anterior	12	0	0	2	0	0	7
Premolar	8	1	0	6	0	0	16
Molar	91	2	21	38	4	7	67

Under obturation was the predominant cause behind the failure of pulp space therapy in mandibular anteriors and molars, whereas absence of full coverage restoration was predominantly responsible for failure in mandibular premolars.

Time period and reasons for failure were compared using chi-square test. Significance was only found in cases of under obturation and instrument separation [Table 5 and Table 6].

Table 5: The time lapse between time period and under obturation

			Under obturation		Total
			No	Yes	
Time Period	<1yr	Count	20	21	41
		%	48.8%	51.2%	100.0%
	1-2yr	Count	34	24	58
		%	58.6%	41.4%	100.0%
	2-3yr	Count	34	38	72
		%	47.2%	52.8%	100.0%
	3-4yr	Count	66	41	107
		%	61.7%	38.3%	100.0%
	4-5yr	Count	48	74	122
		%	39.3%	60.7%	100.0%
Total		Count	202	198	400
		%	50.5%	49.5%	100.0%

*p<0.05 Statistically significant

Highest number of failures due to under obturation was seen in time period of 4-5 years.

Table 6 : The time lapse between time period and instrument separation

			Instrument Separation		Total
			No	Yes	
Time Period	<1yr	Count	35	6	41
		%	85.4%	14.6%	100.0%
	1-2yr	Count	46	12	58
		%	79.3%	20.7%	100.0%
	2-3yr	Count	65	7	72
		%	90.3%	9.7%	100.0%
	3-4yr	Count	69	38	107
		%	64.5%	35.5%	100.0%
	4-5yr	Count	116	6	122
		%	95.1%	4.9%	100.0%
Total		Count	331	69	400
		%	82.8%	17.3%	100.0%

*p<0.05 Statistically significant

Highest number of failure due to instrument separation was seen in time period of 3-4 years.

Discussion

Under obturation was the most common factor causing endodontic failure which accounts for 49.5% of the cases. This condition could arise as a result of

incorrect measurement of the working length as well as incomplete debridement of the pulp space.[6] This is in accordance with the study done by Akbar et al.[6] The average time period for under obturation which lead to failure was seen to be 3.6years in the present study.

In this present study endodontic failure occurring due to absence of full coverage restoration (36.75%) was considered to be the second most common factor. This could be because of the following reasons i.e. potential microleakage, or due to excessive occlusal load on the root canal treated teeth or due to the presence of unsealed accessory canals on the floor of the coronal pulp.[7]This finding is in accordance with the study done by Saunders et al.[7]

In the present study absence of full coverage restoration was predominantly responsible for failure in mandibular premolars [Table 4]. This could be due to insufficient crown structure due to which it may have not been able to withstand the occlusal load. This is in support with the study conducted by Sorensen et al.[8] In the present study absence of full coverage restoration lead to failure on an average time period of 3.55years.

In the present study, failure due to instrument separation contributed 17.25% .Instrument separation might have caused treatment failure by getting stuck inside the radicular pulp space thereby, obstructing the adequate chemo mechanical preparation and hence, causing failure .[9] This is in contrast with the results of a clinical investigation done by Crump MC et al on association of separated rotary files to the outcome of pulp space therapy which stated that the separated instrument would most likely not affect the prognosis in the absence of any preoperative infection and peri radicular changes.[10]The average time period for Instrument separation which lead to failure was seen to be 3.37years.

In the present study, missing canals contributed (8.75%) of failures. This could be caused by the practitioner's inefficiency to find these canals because of the complex pulp space morphology.[11] This finding in our study supports the study done by Arnaldo et al,[2]The average time period for missed canal which lead to failure was seen to be 3.54 years**.**

The present study showed majority of the failure in the mandibular molars (42.75%) in comparison to maxillary molars (20%)which could occur due to more intricacies in pulp space anatomy of mandibular molars.[12] This study is in agreement with the study done by Wasti et al, which showed type VI morphology in a minute percentage, as well as the occurrence of three canals with distinct foramina in the mesial roots and the presence of two canals in the distal roots of the mandibular first permanent molar whereas comparatively increased number of type V morphology was observed in distal and palatal roots of the maxillary first molar teeth.[12]

Over obturation was found to be the least contributing factor for endodontic treatment failure (6.75%) which may be due to inadequate length determination, over instrumentation or extrusion of sealer .[13] This findings further confirms study done by Yousuf et al, which reported that molars have the shortest roots as compared to other tooth groups, making them more susceptible to this type of error.[12] In the present study the average time period for over obturation which lead to failure was seen to be 3.85years.

Perforation is an iatrogenic error which could lead to endodontic treatment failure.[18] In the present study, failure due to perforation contributed 1.5 %, most of which were seen mostly in the furcal region mainly during access cavity preparation. Failure could have occurred due to failure of perforation repair material to provide an adequate seal hence forming a pathway for communication between this tissue and microorganisms.[14-16]This is in support with the previous study conducted by Akbar et al.[6]The average time period for perforation which lead to failure was seen to be 3.66years in the present study.

According to the present study,persistent periapical infection contributed to 3.25% of the procedural errors. This could be because of different microorganisms that are self-reliant and unsusceptible to antibacterial treatment which include prevotella, campylobacter, actinomyces, and eubacterium.[17]This is in support with the previous study performed by Gulabivala et al. who found a decrease in the success rate of pulp space therapy between 9–13% with preoperative periapical lesion.[4]In the present study the average time period for persistent peri apical infection which lead to failure was seen to be 2.61years.

Conclusion

From this study we could infer that:

1. Under obturation was the predominant factor seen to be responsible for the failure of root canal treatment.

2. Highest failure was seen in maxillary and mandibular molars
3. The larger number of the endodontic failures was found in the time period of within 4-5 years.
4. The maximum average time period causing failure was seen to be 3.85 years for over obturation

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance:

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Can Menstrual Cups become an Alternative to Sanitary Napkins? A Critical Analysis among Women in Bangalore City

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Abstract

The topic of menstrual hygiene is always considered as a taboo to speak out in the public and even women hesitate to discuss their feelings or experiences about the same. With the help of revolutionary product called 'Sanitary Napkins', many women were able to understand their menstrual pattern and maintain their personal hygiene effectively. However, there has been number of new products flooding the market that is eco-friendly as well as economical. One such product is 'Menstrual cups' and this research paper primarily tries to understand the consumer awareness and the usage of menstrual cups as an alternative to sanitary napkins among women in Bangalore city. Since sanitary napkins result in generation of ample amount of wastes and possess the risk of health hazards like TSS,UTI and yeast infections; this research focuses on understanding how women are ready for adopting eco-friendly method like menstrual cups. To understand the same, a sample of 138 women respondents were taken for the study from different age groups, educational qualification and income groups and were asked to fill a questionnaire. Their perception on menstrual hygiene, menstrual cup awareness and its usage are recorded, analysed and interpreted with the help of SPSS.

Keywords: *Environmental hazards, Menstruation, Menstrual cup, Personal hygiene, Sanitary napkin.*

Introduction

Menstrual cup is a next generation reusable female hygiene product that has been designed after receiving feedbacks regarding sanitary napkins and tampons from women all across the world. It is a good option for upgradation from sanitary napkins and tampons as it provides ease of traveling,hygiene, safe, cost-effective and fully compatible with one's life style. It allows a normal female to perform duties hassle free during menstruation. It is small in size and funnel shaped which is usually made up of rubber or silicon that is inserted inside a women's vagina to catch and collect the blood fluid during menstruation. It reduces the risk of diseases relating to TSS, UTI,Yeast infections etc. However, menstrual cups have been available for decades, but their use is limited by bulky design and the need for multiple sizes[1].

This research is primarily being undertaken with an objective to understand the consumer awareness and usage of menstrual cups as an alternative to sanitary napkins among women in Bangalore city. From the macro level perspective, it shall help gain an understanding on how women of the modern era of 21st century are open to such kind of method as a replacement to the conventional method of sanitary napkins. Some of the reasons why women choose menstrual cups as an alternative to sanitary napkins in comparison to other method are: its holding capacity; eco-friendly in comparison to tampons;generally recyclable; can be worn for more than twelve hours and no frequent changes are required, which have to be taken care of incase of the other conventional method; less expensive and requires less decomposition time.

This action and reaction attitude study is very much focussed on the women belonging to the Bangalore city in India ranging from school and college going girls to working women class, homemakers and others in the city. At the micro level, it will provide insights about do women still feel period shame in this era, are they still hesitant to talk about sensitive topic like this? Is the menstrual hygiene improving with the usage of unconventional method? Is the risk of TSS and other related diseases reducing with the help of usage of such kind of cost effectiveand eco-friendly method?

The growth of the menstrual cups market is fuelled by factors such as need of eco-friendly, safe, comfortable, clean and cost effective products as an alternative to sanitary napkins or tampons. The global market of menstrual cups was valued around USD 995 million in 2016 and by the end of 2023, it is expected to reach 1.4 billion growing at a CAGR of around 4.6% during the forecast period ranging from 2017-2023. Menstrual cups as of today have become one of the most affordable solutions for feminine hygiene protection. They are reusable and have a lifecycle of more than 2-3 years. Comparing the initial investment in menstrual cups ($15-$75) to the cost of disposable sanitary napkins and tampons, it can actually help in saving hundreds of dollars.Table 1 shows the global and national level players in the market.

Table 1: Global and India level players

International players	National players
Diva International Inc.	She Cup
Lunette	Rustic Art Menstrual Cup
The Keeper	Everteen Menstrual Cup
Inc	iCare soft Menstrual Cup
Vcup	Intimus Menstrual Cup
Mooncup Ltd	
Lady Cup	

There is so much of concern about the environment and health concerns relating to the disposal of tampons and sanitary napkins. Tampons, sanitary napkins or be it a baby's diapers are made of synthetic materials which take years to decompose. The city of Bangalore is already thriving hard to manage it landfills and non-degradable wastes such as sanitary napkins create a menace for the city corporation A women's menstrual life cycle lasts for about 40 years and in their lifetime, this ends up generating ample amount of waste that gets accumulated in landfills and at times washes up the shores of local beaches or sewages in the Indian context. Even in the process of preparation, during the manufacture and bleaching process, there is a possibility of dioxin to be created which has health as well as environmental hazards associated with it[2]. It reveals that most of the women are concerned with price of the product and the environmental impact. The definition of what exactly "green" is debatable. Since women might want to consider the reusable options when using for the 2nd or the 3rd time as completely clean or laundered. It even provides an introspection of whether women will become more open to the idea of green alternatives provided they are aware of the risks associated with conventional menstrual products[3].

The perception about menstruation among young girls in India are always a shameful secret. Majority of the young girls in rural villages are too shy to use sanitary napkins and avoid it because of the cost factor[4]. Girls in the rural India sit separately during menses and majority of them do not even know why menstruation occurs. Few girls got the knowledge about menstruation after its occurrence[5] and also think it as a mechanism to excrete dirty blood from the body[6]

There were also instances found during the previous researches that menstruation negatively affected the girls' experience at school and in the classroom and caused an array of negative emotions. Girls reported leaving school often to change or bathe due to menstrual leaks and as a result missing class lessons. Poor concentration in class attributed to menstrual pain and worry over potential leaks was also mentioned[7].

Research conducted among 158 participants aged between 20 to 50 years with regular menstrual cycle in Gujarat Medical Education and Research Society showed that menstrual cup was preferred for comfort, dryness, and less odour. Further, the results demonstrate that this reusable vaginal device has no significant health risks and is acceptable to many women without the need for fitting or other medical services[8].

The need for menstrual education is the need of the hour. The mothers and teachers agree on the importance of menstrual education for girls yet mothers do not reveal all the necessary facts to their daughters, this may be because of the mother's own lack of knowledge[9]. Young girls should be sensitized about this topic and proper communication has to be given via movies or street plays.

Materials and Method

The objectives of the study include:

1. To study the consumer awareness of menstrual cups among women in India, particularly belonging to the city of Bangalore.
2. To find out how open women are to using alternatives like menstrual cups are which serves as eco-friendly method in comparison to other traditional menstrual products.

This study has been conducted with the help of a structured questionnaire as the primary source of data and secondary sources include the journal and publications on menstrual cups. The predicted sample size is 135 and positively 138 responses were recorded. The sample under study consists of only women ranged from young girls to women till the time they attain their menopause stage (Maximum 45-50 age). Stratified sampling technique has been adopted where girls and women have been stratified as per their age and occupation respectively. The tabular and graphical representation of the data has been done and further analysed with the help of SPSS software.

Results and Discussions

Table 2 shows the demographic factors of the respondents. About 64 per cent of college students in the age group of 18-21 year old girls are the major respondents of this study. They are aware of their menstrual cycle pattern and more than 50 per cent of them maintain their menstrual hygiene really well.The hesitation to talk about periods and related issues is still prevalent among many women (77.50 per cent),no matter how much we as a society touch the age of modernity.Most of the women (72 per cent) have stain related issues with sanitary napkins and are aware of the diseases like UTI, TSS and yeast infection which are related to it (63.80 per cent). About (73.90 per cent) of respondents do show positive signs towards other economical and eco-friendly products like menstrual cups apart from cloth, and sanitary napkin.

Table 2: Demographic factors and awareness of menstrual cups among women

Particulars	Percentage of Responses
Age	
11-17yrs	3.60%
18-21yrs	63.80%
22-30yrs	8%
30yrs and above	24.60%
Occupation	
School Student	2.00%
College Student	65.20%
Working Class Women	15%
Home Maker	14.50%
Others	3.00%
Menstrual cycle awareness	
Yes	90.60%
No	2%
Maybe	7.40%
Period shame feeling	
Yes	77.50%
No	16.70%
Maybe	5.80%
Awareness of diseases related to sanitary pads	
Yes	63.80%
No	21.00%
Maybe	15.20%

Maximum number of women (83.80 per cent) are aware of menstrual cups in Bangalore and are using it on a daily basis.It has been said that the first source of knowing about menstrual cups emerged from social media (50 per cent) and the respondents feel that the social media platform should be usedfor spreading awareness about the same.Easy to use, Eco-friendliness, washable and reusable feature, durability, economical option are considered to be the benefits of using menstrual cups (31.90 per cent). Figure 1 shows the pie chart of women feeling period shame.

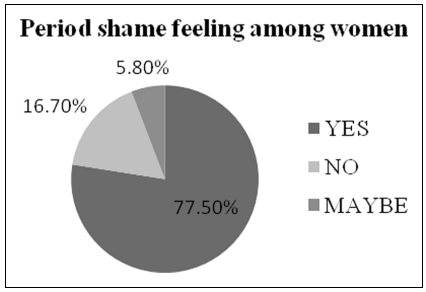


Figure 1: Pie chart showing period shame feeling among women

Women who are new to menstrual cups wants to try the same on trial and error basis and would use it on a daily basis provided they are comfortable with it (48.60 per cent). Since, skin protection is an important factor when one uses personal care products, the respondents feel that consultation with gynaecologist for the usage of menstrual cups is mandatory (57.20%). About (32.30 per cent) women who use menstrual cups regularly are moderately satisfied with it and worry about the insertion pain it causes (50 per cent). This fear of pain also serves as a barrier for using such kind of a product in the long run (25.60 per cent).

Figure 2 shows the bar graph showing barriers to menstrual cups. Table 3 shows the summary of hypotheses test result.Surprisingly good amount of responses was received from women above 30 years and above. This shows that even the elderly do have substantial knowledge about the emergence of new alternatives like menstrual cups. Most of them are concerned with the menstrual hygiene and are open to using alternatives like menstrual cups. Menstrual cups acts as a satisfactory alternative to other menstrual management method and also is a sustainable solution for the city, with moderate cost-savings and much-reduced environmental effects compared to tampons[11].

T-test, correlation and chi-square analysis were the tools used for this study. There is a significant difference between age and awareness of menstrual cups; occupation and awareness of menstrual cups; age and satisfaction level of menstrual cups. There is no significant difference between age and period shame feeling; age and awareness of diseases related to menstruation; and between menstrual hygiene and awareness of menstrual cups.Women in different age groups have different levels of awareness of menstrual cups; out of which women in younger age have more awareness of the same through social media and women online forums. Similarly women with different occupation have different levels of awareness. Homemakers have little knowledge about this product when compared to office-goers. College students have better awareness about the product when compared to rest of the occupations. Irrespective of the age group, women are hesitant to talk about their menstrual cycle and are unaware of the awareness of diseases related to menstruation. This implies the feeling of hesitation, embarrassment and shame that women experience when they talk or are asked about menstruation.In usage and satisfaction level of menstrual cups, women in the age group of above 30 years are satisfied. Even though young girls are aware of the product, they are reluctant to use the same because of the fear of insertion pain.

Table 3 Summary of Hypotheses test results

Hypotheses	Relationship	Empirical Support
H_1	There is a significant difference between age, occupation and awareness of menstrual cups	Supported
H_2	There is a significant difference between age and period shame feeling	Not Supported
H_3	There is a significant difference between age and awareness of diseases related to menstruation	Not Supported
H_4	There is a significant difference between age and Satisfaction level of menstrual cups	Supported
H_5	There is a significant difference between menstrual hygiene and awareness of menstrual cups	Not Supported

The future status as per the opinion of the women undertaken for the study predicts that about 60% of the women in future i.e., 2025 will be completely open to the idea of using menstrual cups as their personal care product and they opt Social media to be the right platform to advertise the product. Hence marketers and women communities have to take steps to spread the awareness and usage of an Eco-friendly product among women.

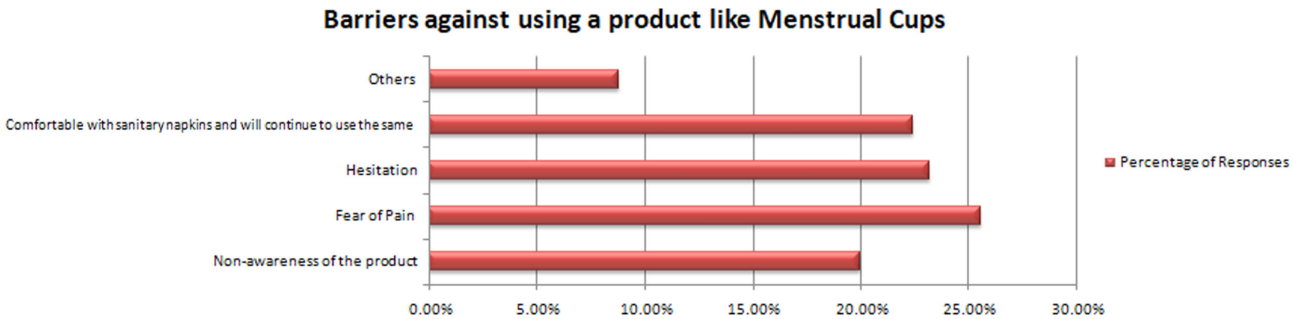


Figure 2: Bar graph showing barriers against using a product like menstrual cups

A woman based research into menstrual cups, its related hygiene and the marketing perspective of a product like menstrual cups and acceptance of the same has been studied in depth. The scope of this research should have further been expanded to include the male opinion and how open they are to addressing a sensitive issue like this.Although, the research has explored most of its objectives, other cities and countries can be

explored for a deeper understanding of a product.Since the scope and document of research is the usage and awareness of menstrual cups, it has not addressed other alternatives like tampons in detail.

Conclusion

Awareness and usage of menstrual cups as an alternative to sanitary napkins has been quiet an extensive research. Long after the emergence of sanitary pads, it did help women in maintaining menstrual hygiene. But it was realised that this accounts for about good percentage of expenditure every month and can get heavy over the pocket of a middle or lower level households. Considering this, even after the removal of GST, it is still not completely the most viable option. It takes years for sanitary napkins to decompose and therefore, it becomes important for the government to introduce other alternatives for women. The focus of the government should be mostly on educating and spreading awareness on eco-friendly menstrual products among the school girls who are the future generation. Separate courses related to menstruation, menstrual hygiene and products; environmental hazards caused by sanitary napkins and its prevention method should be taught well in schools and colleges. The research study initiated a great deal of awareness about menstrual cups as a product to regular users and young girls in the city of Bangalore.

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Plasma Cell Gingivitis: An Uncommon Clinical Entity–A Recent Update

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Abstract

Plasma cell gingivitis is a rare, benign inflammatory condition of uncertain etiology. The exact etiology is not known, although, it is considered as a hypersensitivity reaction to a number of allergens. The lesions appear as well demarcation on the gingival with erythema and edema extendsto the muco-gingival junction. Early and accurate diagnosis entails thorough history taking, hematological and histopathologic examination. The condition is treated according to the underlying allergic component; removal of the cause will cure the lesion.

Keywords: *Allergen, hypersensitivity reaction, Plasma cell gingivitis, Treatment.*

Introduction

Plasma cell gingivitis is very uncommon, benign in natureandinflammatory condition of unknown etiology. It has been referred to as plasmacytosis of the gingiva, idiopathic gingivostomatitis, plasma cell gingivostomatitis, atypical gingivostomatitis and allergic gingivostomatitis.[1] This benign condition was first described in 1952 when Zoon referred to the lesion as "plasma-cell infiltrate" condition involving the glans penis.[2] These conditions have also been reported on the lips, tongue, vulva, conjunctiva, nasal aperture, larynx, and epiglottis.[3]Kerr et al in 1971 reported a case of plasmacytosis of gingiva and found that the most etiological factor responsible for the allergy to be the chewing gum. The tissue became normal upon discontinuation of the use of chewing gum.[4,5]

Review of Literature: Plasma cell gingivitis (PCG) is basically a gingival hypersensitivity reaction with predominant plasma cells in the connectivetissues.[6] There is no known etiology of plasma cell gingivitis. However, it may be considered as lesions of idiopathic etiology due to allergen, and the origin is neoplastic in nature.[7]The immune reaction to some allergic antigen forms the basis of the condition.

Based on causative mechanism, plasma cell gingivitis is categorized as three types: (a) idiopathic lesions, (b) allergen causing (c) neoplastic.[4] This entity is thought to be a B-cell mediated disorder with T-cells augmenting the response.[8]a different form of PCG, known as plasma cell granuloma can occur, manifesting as an enlargement of a specific intra oral region.The term "plasma cell granuloma" specifically by infiltrates of polyclonal plasma cytes on a particular focal region.[9]

Mintin present in the toothpaste and chewing gum,[10] cinnamonaldehyde,[11,12] strong spices (pepper, cardamom)/chilies, chewing of khat,[13,14] and some ingredients of the herbal toothpastes constitutes the possible reported allergens.[15] Clinically, these cases occur almost exclusively in the oral cavity. Angular cheilitis, erythematous gingivitis, and glossitis are the major symptoms, although laryngeal manifestation has also been reported in one case.[16] PCG is characterized by macular lesions that are bright red, velvety, sharply circumscribed, and flat to slightly elevated. Pruritus, burning sensation, or pain occur infrequently and the

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lesions are generally asymptomatic.[17,18] Gingiva shows bleeding on the slightest manipulation with loss of stippling. However, there is no loss of attachment.[6,7] Gingival ulceration is rare in plasma cell gingivitis. PCG is a very atypical type of enlargement which presents as painless, diffuse, erythematous, and edematous lesion of the gingiva with a clearly demarcatingand extending up to the mucogingival junction (Figure 1).[19]



Figure 1. Plasma cell gingivitis. Patient reports a change in the tooth paste.

Discussion

The gold standard for finaldiagnosis in the cases of PCG is histopathology which aids in differentiating it from other lesions that clinically resemble localized PCG. Thorough serologic and hematologic testing is mandatory as Plasma Cell Gingivitisresemblesgingival changes in other conditions like leukemia, lichen planus and cicatricial pemphigoid.[20]Histological features of this lesion includes spongiform pustules in the epithelium and a dense infiltrate of normal polyclonal plasma cells in the underlying lamina propria(Figure 2).

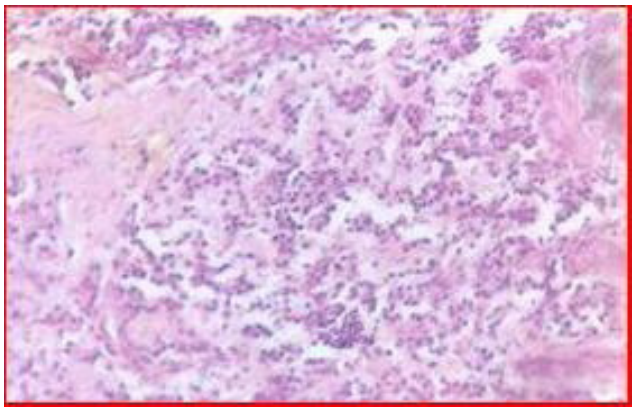


Figure 2. Histopathology showing plasma cells in the connective tissue.

The management of a patient with plasma cell gingivitis should be symptom-based; plaque control and conventional therapies alone will not cure the disease. Identification and elimination of the allergens in an effort to discover the underlying cause. In a patient with an unknown underlying cause allergy testing can be undertaken.[21]

The condition is best managed by identification of the possible allergic agent. This entails a thorough clinical history (patch testing is usually negative). Elimination of the causative agent results in resolution of symptoms.[22-25]

Conclusion

Plasma cell gingivitis is an uncommon entity of obscure etiology. Early diagnosis is necessary as PCG has very much identical pathologic changes often found clinically as in leukemia, HIV infection, discoid lupus erythematosus, atrophic lichen planus, desquamative gingivitis, or cicatricial pemphigoid that must be identified through hematologic and serologic testing.

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Effects of Vitamin Deficiencies on Oral Health

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Abstract

The health and functions of skin and mucous membrane epithelia are regulated by vitamins which are organic substances soluble either in fat or water. In economically disadvantaged communities' due to inadequate dietary consumption there is reduced intake or impaired absorption of vitamin and minerals that causes nutritional deficiency diseases. Often the oral cavity shows the early signs and symptoms of systemic diseases, nutritional deficiencies due to rapid epithelial cell turnover in oral mucous membrane. Water-soluble vitamins such as vitamin B2 (riboflavin), B3 (niacin), B6 (pyridoxine), B9 (folic acid), B12 (cobalamin), and C are obtained through dietary or supplement sources as they are not stored in the body in large amount. Fat-soluble vitamins that affect the oral mucosa include vitamins A, D, and K.

Keywords: *Vitamin deficiency, Glossitis, Anaemia, Oral manifestations, Malabsorption, Malnutrition, Leukoplakia, Alcoholism.*

Introduction

Water-Soluble Vitamins

Vitamin B1 (thiamine): In tissues thiamine is found as thiamin pyrophosphate (cocarboxylase) which converts carbohydrates to glucose and takes part in intracellular fat and protein metabolism. Vitamin B1 is absorbed from small and large intestines.

Sources: It is found in cereals, grains, beans, nuts, pork and duck.

Deficiency: There is no confirmation that vitamin B1 insufficiency causes any oral manifestation.

Risk Factors: Polished rice, chronic alcoholic patients who do not take food at all, gastrointestinal disease, diabetes mellitus and renal dialysis.

Vitamin B2 (riboflavin): Riboflavin is a component of coenzymes FMN (flavin mononucleotide) and FAD (flavin adenine dinucleotide). These coenzymes exert an important role in regulation of intracellular metabolic oxidation/reduction reactions.It is essential for carbohydrate, fat and protein metabolism. It is absorbed from the intestinal tract**.**

Sources: It is found in dairy products.

Deficiency: Patients with vitamin B2 deficiency have oculo-oro-genital syndromes like conjunctivitis, photophobia, erythematous, scaling patches in genitalia and perianal skin and superficial ulceration. Riboflavin deficiency results in atrophic glossitis in which the filiform papillae become atrophic and the fungiform papillae become mushroom shaped giving a reddened tongue. In severe cases complete atrophy of all the papillae results in glazed, smooth, magenta colored tongue. Other oral manifestations are glossodynia, cheilosis, and angular cheilitis. Riboflavin insufficiency causes ariboflavinosis.The symptoms are cracked lips, swelling of the tongue and burning sensation of the oral cavity, dry mouth.

Risk Factors: Alcoholism, gastrointestinal diseases, malabsorption, diarrhea, deficiency of vitamin B3 zinc.

Vitamin B3 (niacin, nicotinic acid): Nicotinamide adenine dinucleotide and nicotinamide adenine dinucleotide phosphate are the amide derivatives of vitamin B3. They are mainly required to maintain the cell function and metabolism.[1] The main role of niacin is to synthesis cytosine, thymidine which are

thepyridoxine nucleotide. In the other hand oxidation/ reduction reactions are regulated by Niacin. Thus, it helps in metabolism ofamino acid, fattyacid, carbohydrate. Adenine triphosphate (ATP) production is also maintained by vitamin B3.[2]

Sources: Vitamin B3 is found in yeast, red meats, liver, potatoes, pasta, lean pork, salmon, poultry, fish in large amount and milk, eggs contain small amount of Vitamin B3.

Deficiency: Pellagra is a widespread problem resulting from vitamin B3 deficiency.The symptoms pellagra includes mainly diarrhea, inflamed skinand dementia.[3] If the patient remains untreated death may occur. Vitamin B3 deficiency causes malaise, apathy, and weakness, nausea, abdominal pain, and bloody mucoid and watery diarrhea with malabsorption. Initially there is presence of erythema and edema that may cause burning sensation and presence of blisters like acute sunburn. Oral manifestations are bright red glossitis, cheilosis, angular cheilitis, sores in mouth that causes burning sensations in the mouth, erythematous gingiva, mucosal edema and angular cheilosis, mucositis that causes painful ulceration of the mucous membrane, stomatitis, oral pain,appearance of ulcers in the gingiva, the tongue becomes denuded, glossodynia that causes burning sensation in the mouth, inflamed swollen red smooth tongue, dorsum of the tongue becomes dry & smooth, dental caries.[4]

Risk Factors: Chronic alcoholism, gastrointestinal disease, consumption of isoniazid, 5-fluorouracil, sulfapyridine**.**

Patient presents with congenital defects in which tryptophan transport systemis affected in the intestine,kidneys. It results in Hartnup disease in which non polar amino acid absorption is affected**.**

Vitamin B5 (Pantothenic acid): Vitamin B5 plays instrumental role in metabolism of fatty acid, synthesis of cholesterol, and degradation of amino acid. It is a component of coenzyme A.

Sources: Vitamin B5 is found mainly in meats like chicken, beef, liver and also found in corn, broccoli, peanuts, egg, soybeans, cauliflower,tomatoes,lobster,sa lmon and whole grains.

Deficiency: There is no specific evidence that vitamin B5 deficiency causes any specific oral manifestations.

Vitamin B6 (pyridoxine): It is a complex of pyridoxine,pyridoxal and pyridoxamine.Vitamin B6 takes part in decarboxylation of amino acid,protein and fatty acid metabolism.

Sources: Vitamin B6 is found in sunflower seeds, chickpea, salmon,shiitake, organmeats, beef liver, whole grains, fruits other than citrus and starchy vegetables.

Deficiency: It's deficiency results in fatigue, weakness, dizziness associated with anemia, burning paresthesia, depression, confusion, and generalized seizures. Oral manifestations include atrophic glossitis, angular cheilosis, xerostomia–dryness of the mouth, pellagrous stomatitis, and erythematous gingiva.

Risk Factors: Chronic alcoholism, malabsorption, malnutrition, renal failure, renal dialysis, liver disease, advanced age.

Vitamin B7 (biotin, vitamin H): Vitamin B7 helps in synthesis of fatty acid, amino acid catabolism, and gluconeogenesis.

Sources: It is mostly found in soybeans, cooked oats, egg yolks, unpolished rice, almonds, peanuts, walnuts, whole grains.

Deficiency: Vitamin B7 deficiency causes some neurologic diseases such as depression, hallucination, ataxia, and peripheral paresthesia. There is no specific oral manifestation of vitamin B7 deficiency.

Risk Factors: Consumption of raw egg for prolonged period, patients who are dependent on intravenous nutritionlacking biotin supplementation, diabetic patientas well aspatients with biotinidaseinsufficiency**.**

Vitamin B9 (folic acid, folate): Tetrahydrofolate is the active form of vitamin B9 that plays an important role in purines, thymidine, and amino acid synthesis. It helps in DNA repairing, RBC production.

Sources: The significant sources of Folate are green vegetables,beans, citrus fruits, spinach, broccoli, yeast, legumes, lima, kidneybeans, grapes, strawberries, peanuts, walnuts, juices, organ meats, beef liver. There is of deficiency 60% to 90% of folate in cooked food items.

Deficiency: Therefore,mostly affected tissues by folic acid deficiency are those which show cell turnover with high rates. Glossitis, sore tongue, aphthae, atrophy of lingual papillae,

Risk Factors: Under developed socioeconomic status, advanced age, alcoholism, starvation, malabsorption, pregnancy, chronic hemolytic anemia, certain medications like phenytoin, sulfasalazine, metformin, tobacco smoking, bleeding.

Vitamin B12 (cobalamin, cyanocobalamin): Cobalamins consist of a planar group with a central cobalt atom (corrin ring) and right-angles. Vitamin B_{12} was first crystallized ascyanocobalamin, but the main natural cobalamins have deoxyadenosyl-, methyl- and hydroxocobalamin groups attached to the cobalt atom. It is an important cofactor for DNA synthesis.

Source: It is found in milk, cobalamin-fortified cereals, eggs, and meat.

Deficiency: Angular cheilosis, burning mouth, inflamed gingiva, bleeding gum, halitosis, epithelium of the oral mucosa becomes dysplastic, oral paraesthesia, periodontal fibresbecome lose and get detach from the tooth structure, taste sensations become distorted followed by loss of taste sensations, ulceration, ulcerative gingivitis, denuded tongue,glossitis,glossodynia, tongue is "beefy"red, smooth & glossy, delayed wound healing, xerostomia, bone loss, aphthous ulcers.[5]**Causes**: Starvation, insufficient dietary intake, impaired absorption of stomach, vegans.

Risk Factors: person with low dietary intake, Vegans, malabsorption.Pernicious anemia, Gastrectomy, Congenital transcobalamin II deficiency, Nitrous oxide (inactivates B12)

Vitamin C (ascorbic acid, L-ascorbic acid and ascorbate): Vitamin C plays a significant role insynthesis of nor epinephrine, amination of such hormones like peptide hormones, biosynthesis of carnitine, and tyrosine metabolism and collagen formation. It repairs healthy tissue with its antioxidant properties.[6]

Sources: It is present in citrus fruits like lemons, oranges, tomatoes, broccoli, green peppers, and cabbage.

Deficiency: Insufficiency of vitamin C causes various oral symptoms that include scurvy- swollen and bluish or reddish inflamed gingiva, periodontal destruction, increased risk in candidiasis, mucosal petechiae, gingival bleeding, sore burning mouth, soft tissue ulceration, gingival bleedingand malformed teeth, gums become swollen and spongy that bleeds on slide provocation. Presence of superadded infection, loss of connective tissue and alveolar bone that causes loosening of teeth. Severe vitamin C deficiency causes scorbutic gingivitis. Untreated scurvy leads to intracranial hemorrhage followed by death.[7]

Risk Factors: Mainly seen in malegender, person with low dietary intake and tobacco smoking that causes reduction of absorption of vitamin C and increased degradation of vitamin C.

Fat Soluble Vitamins:

Vitamin A (retinol): It plays a significantpart to maintain the integrity of epithelium, vision sensation, immunity, reproductive system. Vitamin A mediates bone modeling and growth and modeling of teeth. It combined with long-chain fatty acids and present as esters in the food and the body.

Absorption mainly takes place in the intestine. It is stored in the liver, kidneys, and adipose tissue. Then it is transported to the plasma and there it bounds to α-globulin, retinol-binding protein (RBP)**.**Vitamin A acts as avitalconstituentthat is required to sustain the maintenance of oral mucous membrane, salivary glands, and teeth.[8]

Source: It present in cod liver oil, sweetpotato, carrot, eggs, whole milk, broccoli, squash,green leafy vegetables fortified cereals, capsicum, mango.

Deficiency: Vitamin A deficiency causes ocular, cutaneous, and mucosal changes. Oral manifestations are keratosis of labial mucosa, xerostomia, hyperkeratosis of oral epithelium, periodontal disease, increased rates of intraoral infection, desquamated oral mucosa, candidiasis, inflamed reddish gingiva, leukoplakia,altered taste sensation, arrested enamel development, enamel developmentbecomes messed up, tooth becomes brittle, degenerating salivary glandand increased risk of dental caries,impaired tooth development in children.

Prolonged deficiency of vitamin A loss of specificity of epithelial basal cell layer leads to formation of stratified squamous epithelium with keratin production followed by keratinizing metaplasia of epithelial cells. Deficiency of retinol causes salivary gland atrophy followed by impaired defense mechanism of the oral cavity against infection.[9]

Risk Factor: Malnutrition, malabsorption, alcoholism, impaired biliary secretion, vegan diet.

Vitamin D (calciferol, cholecalciferol, ergocalciferol): Vitamin D has an important role in calcium and phosphorus homeostasis. In human there is photo activation of 7-dehydrocholesterol to cholecalciferol that produces Vitamin D, then it is converted to 25-hydroxycholecalciferol and further converted to active metabolite by renal 1α-hydroxylase. Absorption of Vitamin D occurs in small intestine.

Source: Sunlight, reference nutrient intake (RNI). It is present in fish liver oils, fatty fish, egg yolks, and fortified milk in limited quantity.

Deficiency: Oral manifestation included loss of periodontal ligament attachment, enamel hypoplasia. During tooth developmental period insufficient supply of vitamin D can cause delayed tooth eruption, loss of lamina dura and cementum. Histologic evidence shows hypocalcified globular dentin with clefts and tubular defects occurring in the region of pulp horn. There is periapical involvement of deciduous or permanent teeth followed by formation of gingival fistula.[4]

Risk Factors: Insufficient sunlight exposure, malnutrition, malabsorption, advancedage, hepatic disease, renal disease.

Vitamin E (tocopherol): Vitamin E is divided into two parts; Tocopherols-commonest is α-tocopherol and Tocotrienoles. It acts as an antioxidant and affects cell proliferation and growth.

Sources: It is present in a wide variety in dietary source.[10]Vegetables and seed oils, soya bean, saffron, sunflower, cereals and nuts.

Deficiency: There is no significant oral manifestation of lack Vitamin E.

Risk Factors: Genetic abnormalities, impaired biliary secretion.

Vitamin K (phylloquinone): Vitamin K has an important role in regulation of the factors II, VII, IX, and X which are the procoagulant factors and the anticoagulant proteins, protein C and protein S. Vitamin K_1-phylloquinone

Vitamin K_2- menaquinone.

Major absorption occurs in the terminal ileum.

Sources: It is found in green leafy vegetables, cauliflower, Brussels sprouts, collard greens, spinach, mustard greens,broccoli,parsley, soybean, canolaand olive.

Deficiency: Increased risk of gingival bleeding, sub mucosal hemorrhage is seen in oral manifestations. In untreated patients' death may occur due to uncontrolled systemic hemorrhage.

Risk Factors: Certain anti-bacterial drugs, cholestaticjaundice**,** Vitamin K antagonists, Oral anticoagulants.

Table 1: Oral Manifestations[11]

Deficient Vitamins	Effect on oral structure
Vitamin A	Decreased epithelial tissue growth, Impaired tooth formation, Enamel hypoplasia.
Vitamin D/ Calcium phosphorus	Lowered plasma calcium, Hypo mineralization Compromised tooth integrity, Delayed eruption pattern Absence of lamina dura, Abnormal alveolar bone patterns.
Vitamin C	Irregular dentin formation, Dental pulpal alterations Bleeding gums, Delayed wound healing, Defective collagen formation.
Vitamin B1 (Thiamine)	Cracked lips, Angular cheilosis
Vitamin B2 & Vitamin B3	Inflammation of the tongue, Angular cheilosis Ulcerative gingivitis
Vitamin B6	Periodontal disease, Anemia Sore tongue Burning sensation in the oral cavity.
Vitamin B12	Angular cheilosis, Halitosis, Bone loss, Hemorrhagic gingivitis Detachment of periodontal fibers Painful ulcers in the mouth

Conclusion

Due to inadequate diet and mal nutrition there is malabsorption and disturbance in utilization of certain important factors that are present in daily food. People who stay in undeveloped poor countries mostly present with vitamin deficiency syndromes. Malnutrition affects the oral mucosa through an altered tissue homeostasisin different ways and advancedoral diseases.

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Modifications of Local Anesthesia in Medically Compromised Patients: A Review

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Abstract

The association of local anesthesia, the vasoconstrictor used in it and the medical condition of the patient concerned has long been studied, analyzed and modified. With the advancement in medical and dental practices, the number of complications relating the above stated parameters has also increased. This article gives a review of how the conditions of medically compromised patients effect the use of local anesthetic agent and the vasoconstrictors used with them in dental practice.

Keywords: *Local Anesthesia, Complications, Medically-Compromised.*

Introduction

The use of a vasoconstrictor in local anesthesia brings about vasoconstriction of peripheral vasculature locally, which leads to creation of a bloodless operating field and reduced absorption of the local anesthetic agent to the blood stream. This increases the depth and duration of anesthesia, and decreases the systemic and/or harmful effects of anesthetic agent.[1] The most commonly used vasoconstrictors in dental office are Epinephrine and Levonordefrin. Epinephrine is preferred over Nor-Epinephrine because of the fact that, it causes severe and paradoxical bradycardia because of its action on the cardiac β1 receptors, thereby increasing the heart rate.[1] 2% Lignocaine with 1:80,000 Epinephrine is the most commonly used vasoconstrictor in the dental office.[1] by using 1:200,000 or 1:100,000 solution, duration of anesthetic action is maintained sufficiently for most of the minor surgicalprocedures in dentistry.[2] A slow injection of the anesthetic solution, containing vasoconstrictor or not, must be carried out (1ml/minute).[2]

The effects of Epinephrine are vasoconstrictionof peripheral vasculature, increased sinus node conduction rate, increased contractility and irritability of the myocardium, increased conduction rate of AV nodes, bronchodilation, vasodilatation of skeletal muscle. It stimulates the α1 receptors of the smooth muscles of the peripheral vessels, thereby leading to peripheral vasoconstriction, decreased absorption of the local anesthetic agent, local ischemia of the tissues.[2] This ischemia also occurs in the blood vessels (called vasa nervorum) which supply the axons of sensitive nerve fibers of the site anesthetized. The metabolic activities of the nerve cells are reduced, thereby reducing the nerve impulse transmission, leading to increased depth and duration of local anesthesia.[1]

Review of Literature

Cerebrovascular system: The cerebrovascular system is usually depressed by the use of higher doses of local anesthetic agent. This depression is manifested as bradycardia, hypotension, and collapse of cerebrovascular system and might lead to cardiac arrest.[3] The early manifestations of this depression is commonly caused by vasovagal reactions like, giddiness and syncope, mainly when the patient sits in an upright position in the dental chair.

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Hypertension: In 1964, American Heart Association and the American Dental association jointly provided a concluding statement that "the typical concentrations of vasoconstrictors contained in local anesthetics are not contraindicated with cardiovascular disease so long as preliminary aspiration is practiced, the agent is injected slowly, and the smallest effective dose is administered".[4] After many studies including different categories of subjects, it has been found that, when the subjects are injected with local anesthesia without vasoconstrictor, their Blood Pressure is noticeably uncontrolled when pain and anxiety are kept under control, than in the patients who are injected local anesthesia with vasoconstrictors prior to dental extraction.[2] The recommended total dosage of Adrenaline should be limited to 0.04mg in patients with cardiac risk.[5,6] This is approximately equal to local anesthetic containing 1:100,000 Adrenaline. Levonordefrin, as a vasoconstrictor shows one-fifth effectiveness as Adrenaline. So, it is used in a concentration of 1:20,000, which has the same clinical risk as 1:100,000 concentration of Adrenaline.

Unstable Angina: Unstable angina is referred to deterioration of symptoms in recent times and decreased response to medical management protocols. Angina de novo is the total number of anginas in 4 weeks' duration or less. Crescendo angina mainly refers to an increase in frequency of angina, duration of the attacks, severity of symptoms, and a decreased response to medical care.[1] Even injecting a quantity of local anesthesia with vasoconstrictor just higher than a safe minimal dose can cause a noticeable increase in cardiac stroke volume and oxygen consumption in healthy individuals who are normotensive. In such patients, preliminary aspiration should be carried out and minimal effective should be administered.[2] And in case of emergency dental treatment, medical consultation is necessary and eliminating pain should be the major concern. Epinephrine dosage should be limited to 1 or 2 cartridges of 1:100,000 (0.018mg-0.036mg) solution.[7]

Stable Angina: Dental anesthesia poses a significantly lesser threat to stable angina patients having a history of myocardial infarction or not than to unstable angina patients or having a history of recent myocardial infarction (within 6 months). The clinical factors in management of such patients are stress and anxiety control and absolute pain control throughout the procedure. For proper stress management, local anesthetic with vasoconstrictor is necessary and the dosage of Epinephrine-containing local anesthesia should be limited to one or two 1.8 ml cartridges.[1] Elective dental procedures are postponed and only emergency dental procedures should be carried out in such patients, i.e., patients suffering from unstable angina, myocardial infarction (within 6 months), or coronary artery bypass graft surgery (within 3 months).[8] In case of after 6 months duration of myocardial infarction, doses of Epinephrine should be stuck to less than 0.036 mg. [9]

Recent coronary artery bypass surgery: Both, local anesthesia administration with vasoconstrictor and routine dental treatment should be post-ponded to 3 months duration after surgery, which is the delicate period for healing, during which notable ischemic changes occur.[3]

Cardiac Dysrhythmia: A physician consultation is required to assess the current status of such patients. Stress management is of utmost significance for patients especially with coronary atherosclerotic heart disease, ischemic heart disease or congestive heart failure.[3] So, local anesthesia containing vasoconstrictor should be administered for pain and anxiety control, but, the safety limit of total dose should not be exceeding two 1.8 ml cartridges per appointment. Periodontal ligament or intraosseous injections should be avoided with local anesthesia containing vasoconstrictor.[10] Elective procedures should be postponed until the disease is well under control.

Refractory arrhythmias: This carries a high risk for immediate cardiac arrest, leading to death and is one of the major reasons for contraindication for use of vasoconstrictor with local anesthesia in dentistry.[1]

Heart failure: Uncontrolled and untreated congestive heart failure has a poor prognosis and a risk of sudden cardiac arrest (leading to death) because of ventricular arrhythmias.[3] But, well-controlled and treated congestive cardiac failure can be treated with arelative safety and limited vasoconstrictor quantity of two 1.8 ml cartridges of Epinephrine-containing local anesthesia. Patients under treatment of Digitalis glycosides, such as Digoxin must be treated with utmost care as interaction of the drug with vasoconstrictor might precipitate dysrhythmias.[3] Patients, who are under the management with long-acting nitrate drugs, such as nitroglycerin, Isordil, or Isorbid, or under a vasodilator such as Minipres may exhibit a reduced efficacy of vasoconstrictor in local anesthesia, thereby reducing the duration of anesthesia.[11]

Cerebrovascular Accident: Dental treatment should be postponed to 6 months after the stroke because a patient with a history of stroke has a higher risk of having another stoke within 6 months from the first stroke. 3 After 6 months, dental procedure can be carried out by using vasoconstrictor-containing local anesthesia when pain control is required. The dosage of vasoconstrictor must be minimized for patients who have a history of stroke associated with cerebrovascular problems. [3]

Pulmonary diseases: The most frequently encountered pulmonary diseases in patients in the dental offices are asthma, tuberculosis and chronic obstructive pulmonary disease (chronic bronchitis and emphysema).

Asthma: In asthmatic patients, stress reduction protocols should be strictly followed, and hence, judicial addition of vasoconstrictor in local anesthesia is also important.[3] But, according to Food And Drug Association warnings, drugs containing sulphites cause allergy in susceptible individuals.[12,13] Usually the severe steroid-dependent asthmatics are allergic to sulphites, which are used in local anesthesia solutions containing vasoconstrictors to prevent the breakdown of the vasoconstrictors. Hence, in these patients' vasoconstrictors should be avoided, which would thus prevent the usage of sulphites.[14,15]

Chronic Obstructive Pulmonary Disease: This is characterized by chronic obstruction of ventilating system of lungs. The two most common forms are bronchitis and emphysema, where patients have decreased respiratory functions. So, the precautions to be carried out in a dental office require the prevention of respiratory depression. If these patients have coronary heart disease/or hypertension, vasoconstrictor in local anesthesia should be regulated according to these associated diseases.[3]

Renal diseases: As the local anesthetics used in dentistry are excreted by kidney, so the dosage should be reduced to safe minimal dose and interval between subsequent injections should be increased. 16 In case of a tumor in the adrenal medulla, called pheochromocytoma, administration of vasoconstrictors should be strictly contraindicated.[15]

Hepatic diseases: Amide local anesthetic agents are metabolized in the liver. So, dosage of these solutions should be avoided or atleast reduced. This might mostly be the case in patients with chronic active hepatitis or in patients carrying the hepatitis antigen. Minimum dosage local anesthesia has to be administered. But, with patients with complete recovery, routine local anesthesia administration can be carried out. The same stands true for more advanced cirrhotic diseases too. Hence, for such patients, local anesthetic doses should be decreased and the interval between following injections should be increased. In such a case, injection of a rapid-onset local anesthetic such as Lidocaine or Mepivacaine, and subsequently an injection with a long-acting local anesthetic like Etidocaine or Bupivacaine would stand as the most preferred option of maintaining the safe dosage, and achieving the desired effects in pain control in patients.[3]

Pancreatic diseases

Diabetes Mellitus: Patients with either Type I or Type II diabetes mellitus, if well-controlled and are well under treatment, can be routinely treated. But, stress management protocols should be strictly followed. Type I diabetes mellitus patients, who are under the treatment of large doses of Insulin show unpredictable shifts between hyperglycemia and hypoglycemia. Hence, the dosage of vasoconstrictor should be minimized to avoid the chance of vasoconstrictor-enhanced hypoglycemia.[17] Because the action of Adrenaline is the exact opposite to the action of Insulin(Adrenaline stimulates neoglucogenesis and hepatic glycogenolysis), which leads to hypoglycemia.[1] For patients with unstable diabetes mellitus, Epinephrine amount maintained in one to three cartridges of local anesthesia (0.018mg to 0.054mg) would be sufficient to rise the chances of ketoacidosis and hyperglycemia.[1]1:100,000 Adrenaline-containing solution should be kept at a minimal dosage.[1]

Thyroid diseases

Hyperthyroidism: Epinephrine use must be refrained from or decreased to one to two cartridges in patients without treatment or with uncontrolled levels of thyroid hormones. Unjudicial use of vasoconstrictor might precipitate hypertension and cardiac dysrhythmias.[3]

Hypothyroidism: Mild to severe hypothyroid patients have central nervous system depression, which might be the cause of exaggerated responses of these patients to local anesthetic agents. For the patients with severe hypotension, dental treatment should be postponed till the condition is under control.

Blood dyscrasias

Sickle cell anemia: Vasoconstrictor-containing anesthesia can be used safely in these patients, if the dose is limited to one to two cartridges, but stress reduction protocols should be strictly maintained.[18]

Methehemoglobinemia: Prilocaine (specifically, among other local anesthetics) might lead to an increase in methemoglobin levels, if specially associated with other drugs having the similar effect[19,20] (interactions like Dapsone, Isordil, Nardil, Septra, Nitroglycerine, etc.)[21]

Conclusion

A critical understanding of the medical condition of the patients is required to avoid any untoward situation. Stress reduction protocols, preliminary aspiration, slow injection and a safe minimal dose can help achieve a smooth running of the dental procedures. A reduced concentration like 1:200,000 exhibits similar effects of vasoconstriction and is recommended for medically compromised patients.[15]

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The Periodontium: A Comprehensive Overview

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Abstract

The periodontium is the foundation for their dentition. The components of periodontium are–The alveolar mucosa, gingival, cementum, the periodontal ligament and the alveolar bone which serves as the supporting apparatus for teeth in function and in occlusal relationship. The knowledge of the details of the tissue compartments,the cells which are involved and how the cellular products acellinteract will provide a greater understanding of the function of periodontium. Thus, it is important to know about the anatomy and physiology of the healthy periodontium and its relationship to the natural dentition, jaws and oral environment.

Keywords: *Periodontium; Dentition; Oral Environment.*

Introduction

The **primary dentition** is composed of 20 teeth with 10 in each arch. There are five teeth in each quadrant composed of two incisors(central and lateral),one canine, and two molars. These teeth are referred to as letters A, B, C, D, E. The primary tooth begin to erupt at six months of age. The **permanent dentition** is composed of 32 teeth which is sixteen in each arch. These are eight teeth in each quadrant, composed of two incisors (central and lateral), onecanine, two premolars and three molars. These teeth are referred to as 1(central incisor) to 8 (3rd molar wisdom tooth).The permanent teeth begin to erupt and replace the primary teeth at 6 years of age. The permanent teeth complete eruption by approximately 13 years of age with the exception of 3rd molar.[1]

Periodontium of the primary dentition: The word periodontium comes from Greek term peri which means around and odons which means tooth. Literal meaning is that which is around tooth. It has been found that periodontium of primary dentition differs from that of permanent dentition in several aspects. The gingiva in primary dentition appears to be more reddish vascular and flabby and lacks stippling as compared to permanent dentition. The periodontal ligament in primary dentition are wider and have less dense fibers. The alveolar bone in primary dentition has less trabeculae and calcification, more marrow spaces and greater blood supply and lymphatic drainage. The periodontium of primary dentition resorbs more easily because it contains more sialoprotein and osteoprotein which facilitates the binding of osteoclast.[2]

Oral mucosa contains following three zones:

- The gingiva and covering of hard palate termed as masticatory mucosa
- The orsum of the tongue,covered by specialized mucosa
- The oral mucous membrane lining the remainder of oral mucosa.

Gingiva: Gingiva is the part of oral mucosa that covers the alveolar process of the jaws and surrounds neck of the teeth.Anatomically, gingiva is divided into: marginal gingiva

- Attached gingiva
- Interdental gingival

How is the child's gingiva different from that of an adult?

- Marginal-also known as–unattached gingival, it is the terminal edge or border of gingival that surrounds the teeth in collar like fashion.
- marginal gingival of child has rolled edges in primary dentition
- In children, it is flaccid and retractable due to immature connective tissue and gingival fibers and increased vascularization.

- Attached-it is continuous with the marginal gingiva. It is firm,resilient,an tightly bound to underlying periosteum of alveolar bone.
- Width-Primary Dentition-Greatest in incisor region, decreases in cuspids and increases again in primary molar region.
- Permanent dentition-Greatest in incisor region and less posteriorly with least in premolar region.
- Interdental-It occupies the gingival embrasure which is the interproximal space beneath the area of the tooth contact.
- It is pyramidal or col shaped
- Because the contact point isbroad, flat and low the papillae are shorter and rounder than those in permanent teeth.
- HISTOLOGIC FEATURE-In child connective tissue of gingiva contains less abundant collagen fibers than adult.
- COLOUR-The gingival colour of the young child may be more reddish due to increased vascularity and thinner epithelium.

Physiologic changes in gingiva associated with tooth epithelium: Pre eruption bulge-It is present over the crown of the tooth which is about to erupt. It may be slightly blanched. Formation of gingival margin-As the crown penetrates oral mucosa, marginal gingival a sulcus develops. Usuallyedematous, rounded and slightly reddened. Normal prominence of gingival margin-prominence of gingival margin especially over maxillary anterior is normal till the teeth is fully erupted.[3]

Periodontal ligament: It is specialized fibrous connective tissue that surrounds and attaches roots of teeth to alveolar bone. It is also known as periodontal membrane.it is continuous with connective tissue of gingival and it communicates with marrow spaces through vascular channels in the bone.

Principle fibers of PDL: The most important element of periodontal ligament are principle fibers which are collagenous and are arranged in bundles which follows a wavy course when viewed in longitudinal section. The principle fibers are arranged in 6 groups that develops sequentially in developing root: Transseptal fibers; alveolar crest fibers; horizontal fibres; oblique fibers; apical fibers; interradicularfibers.[2, 4]

Cementum: Cementum is calcified avascular mesenchymal tissue that forms the outer covering of the anatomical root. It is of 2 types: cellular and acellular.

- **Acellular:** It is the first cementum formed which covers approximately the cervical third and half of the root and it does not contain cells. It is formed before the tooth reaches occlusal plane.
- **Cellular:** It is formed after the tooth reaches the occlusal plane and is more irregular and contains cells in individual spaces that communicates with each other. Cellular cementum is less calcified than acellular cementum and are separated by other fibres that are arrange either parallel to root surface or at random.5 -7

Alveolar bone: It is portion of maxilla and mandible that forms and supports the tooth socket. It forms when the tooth erupts to provide the osseous attachment to the forming periodontal ligament, it disappears gradually after the tooth is lost.

It contains 2/3 inorganic matter and 1/3 organic matrix.

Inorganic Matter: It is principally composed of minerals, calcium and phosphate along with hydroxyl,carbonate,citrate and trace amounts of other ions such as sodium, magnesium, and fluoride.

Oraganic Matter: It mainly consists of collagen type I (90%) with small amount of non-collagenous protein such as osteocalcin, osteonectin bone morphogenic protein, phosphoprotein and proteoglycans.[4]

Table 1. Differences between primary and permanent periodontium

Primary	Permanent
Gingiva is generally absent in a healthy child, similarly,recession is in frequent.	Gingivitis is common in adults
Alveolar atrophy is rare	Alveolar atrophy occurs
Cementum is very thin and of primary type. Secondary cementum is characteristically absent.	Secondary cementum is present.
Roots have enlarged apical foramen. Thus, the abundant blood supply demonstrates a more typical inflammatory response.	Foramens are restricted. Thus, reduced blood supply favors a calcific scarring.
Incidence of reparativedentin formation beneath carious lesion is more extensive and irregular	Reparative dentin formation is less.

Primary	Permanent
Localization of infection and inflammation is poorer in pulp.	Infection and inflammation in pulp is localized.
Pulp nerve fibers pass to the odontoblastic area.	Pulp nerve fibers terminate mainly among the odontoblasts.

Conclusion

The periodontium of primary dentition differs a lot from that of the permanent dentition. The periodontium of primary dentition play a more significant role for doing the dental treatments. Periodontium of primary dentition should be preserved while doing the clinical treatments However, dental education should do more to reinforce altruistic motive in students to develop commitment to improve future of the oral health environment.

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Obstructive Sleep Apnoea: An Overview

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Abstract

Obstructive sleep apnoea is a frequent disarray define by constant chapter of nocturnal respiratory arrest due to failure of upper airway. OSA element syndrome, being extreme daytime vacation is combined among symbolic cardiovascular dysphoria & fatality. Contrasting analysis benefits are today applicable as a practical administration of this disorder. "Subsequently more than three decades from its first purpose Continuous positive airway pressure (CPAP) do still perceive as the gold accepted therapy".Nasal CPAP is deeply compelling that developing quality of life & contracting the clinical importance of sleep apnoea.

Keywords: *Continuous positive airway pressure, Obstructive sleep apnoea, Oral Appliances, Uvulopalatopharyngoplasty, Polysomnography, Upper airway.*

Introduction

Obstructive sleep apnoea is a sleep disorder. It causes breathing to stop and start frequently while breathing the muscles in the pharynx keep the airway open. Commonly these muscles relax slightly during sleep. However, if they relax in excess it may cause airway to get blocked & the individual wakes up due to shortage of oxygen in the lungs. The patient tries to breathein consciously to re-saturate the blood with oxygen so that he will fall back into sleep. In a worldwide study It is estimated at 3% to 7% in men and 2% to 5% in women. Its symptoms such as too much of day time somnolence and is associated with a significant cardiovascular morbidity and mortality. It is defined as repeated episodes of obstructive apnoea and hypopnea during sleep, together with daytime sleepiness or altered cardiopulmonary function.[1] Particular segment of the people has been diagnosed because of lack of cognizance of sleep apnoea diagnosis with the physician.[1,2]

Definitions: Sleep apnoea upper & lower airway obstructive patients mainly complains of lethargy and fatigue in daylight and also during sleep. Upper-airway resistance syndrome is marked due to rise in response to increased upper-airway resistance with no sign of an elevated apnoea or hypopnea index. Heavy snoring is founded in Patients with the upper-airway resistance syndrome.[3,4]

Pathogenesis: Restriction or obstruction may occur in upper airway that includes velopharynx, oropharynx, or hypopharynx. This kind of situation are triggered by the crucial neuromuscular tone,upper airway muscle syndrome & the pattern of sleep. These episodes are generally most flashy during rapid eye movement(REM) sleep because of the hypotonia of the muscles present in the upper airway which is a peculiar of stage 1 sleep.[4] The Upper-airway patency during sleep is decided by the soft-tissue and the skeletal muscles surrounding the upper airway. The upper airway narrowing is triggered in obese patients who have significant amount of adipose tissue in the neck, which causes the narrowing of airway. It has been reported that MRI has shown fatty

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infiltration inside the pharyngeal tissue of patients with sleep apnoea.Patients with tonsillar hypertrophy skeletal deformities plays a major role in upper airway closure at the time of sleep.[6]

Pathophysiologic consequences: The major possibility hazards of Sleep apnoea are cardiovascular disorders (E.g. Pulmonary hypertension,myocardial infection,congestive cardiac failure & sudden stroke. Various author suggest that there is a significant combination of sleep apnoea with morbidity & modality. Drowsiness, dullness, irritabilityand personality distortion have been associating to nocturnal desaturation and chronic sleep deprivation caused by sleep fragmentation. Sleep fragmentation may be the most important predictor of daytime sleepiness.[7]

Diagnosis: Several other condition can cause daytime sleepiness but can usually be excluded by a careful history given below.

Lack of Sleep: Deficient time in bed, Extraneous sleep disruption (like Babies & children), Shift work, excessive caffeine intake, Physical illness (like different types of pain), Sleep disruption, sleep apnoea/hypopnoea syndrome, periodic limb movement disorder(recurrent limb movements during non-REM sleep,frequent, nocturnal awakenings).[8]

Sleepiness with relatively normal sleep: Narcolepsy, Idiopathic hypersomnolence, Neurological lesions(like hypothalamic or upper brain stem infarcts or tumours), Drugs, Psychological/psychiatric, Bleakness.[9]

Narcolepsy is a rare cause of sleepiness,occurring in 0.05% of the population. Idiopathic hypersomnolence occurs in younger individuals & is signalize by long nocturnal sleeps.

Sleep studies: A full night of polysomnography, organized by a technologist in a sleep laboratory, has usually been noticedas the gold standard for analysing sleep apnoea. Thepolysomnogram is a comprising study used to scroll many physiologic variables in order to diagnose a wide spectrum of pulmonary and non-pulmonary disorders of sleep. Portable, unattended monitoring systems that can be used outside the hospital promise a more cost-effective alternative to the standard diagnostic nocturnal polysomnography. [10]

Treatment: The highly effective treatment for sleep apnoea is CPAP. It is a device which is consist of a mask and the patient has to keep that mask in the mouth and the nose region and the device slowly push the air into the upper airway to keep it patterned during the hours of sleep. Alternate self-management for sleep apnoea is describe below. Self-care like Aerobic Exercises 1 hour for 7 days improves the cardiovascular health and the patency of upper airway. Supportive care like CPAP & airway management (clearing a blocked airway of food,foreign objects,fluid & other obstructions.[11]

Oral appliances: Specific studies have exposed that oral appliances are suitable for positive airway pressure for some sleep apnoea patients. An ample variation of appliances are available, differing both in construction and in the manner in which they alter the oral cavity. The appliances are worn only during sleep and are generally well tolerated. Not all patients have a clinically meaningful response to oral appliances, which are currently regarded as second-line therapy. Patients with mild sleep apnoea who do not tolerate therapy with positive airway pressure are good candidates for a trial of an oral appliance. Close collaboration between the physician and the dental consultant is necessary to ensure optimal patient selection and to avoid any mutation of dental occlusion or temporomandibular-joint discomfort.[2, 4]

Surgical treatment

Tracheostomy: Tracheostomy bypass the UA & is the most adequate surgical procedure for treatment of OSA. It is basically 100% effective. Unfortunately,tracheostomy is a deform method & decreases the patient's quality of life.[9]

Palatal Surgery: In 50 percentile of patient uvulopalatopharyngoplasty, is remedial. Preoperative radiographic studies are not adequatelypredicted success of a surgery.[9]

Maxillofacial Surgery: A diversity treatment modalities has been implemented to intensify and to improve the sleeping pattern of the patient. The method are palatopharyngoplasty. Example: Pierre robin syndrome patient where the patient has lack of growth of genioglossal muscle and also the mandible. In these patients palatopharyngoplasty may not be a good option, distract osteogenesis is the ideal treatment option in these patients.[9]

Long-Term Management: All patients with OSA should have ongoing, long-term administration for

their chronic ataxia. Those on chronic therapy (PAP, OA, positional therapy) should have regular, ongoing follow-up to monitor attachment to healing, side effects, progress of medical difficulty linked to OSA, and advance resolution of symptoms. Those with destruction of OSA (weight loss, surgery) should be monitored for continued risk factor modification and to look for return of symptoms.[12]

Various treatment modalities are available for smooth management of obstructive sleep apnoea. CAPA is a gold standard device in-controlling symptoms & increasing the quality of life of the patient suffering from apnoea & reducing clinical complications in these patients. Surgical treatment of sleep apnoea is controversial. According to authors mandibular or maxillary advancement with the help of distraction osteogenesis is giving better results in sleep apnoea patients. All the patient with obesity should be encouragedto change their lifestyle in order to lose weight & bariatric surgery can be examined BMI over 40. Maxillomandibular surgery is excessively applicable & can be recommended to patient with craniofacial abnormalities. Tonsillectomy and adenoidectomy are effective in children and in adults with enlarged tonsils. Uvulopalatopharyngoplasty is a well-entrenched procedure to be considered as a second-line option when PAP has failed.[12]

Conclusion

Sleep disordered breathing is progressively presence accepted in the surgical population. This morbidity modifies the anesthetic care of afflicted patients. It is accordingly essential for the anesthesiologist to demonstrate a firm forgiving of the patients at risk and the pathogenesis of this disorder. This will enable the anesthesiologist to maintain specific care in the perioperative period.

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Unilobed Lipoma in the Floor of Mouth: A Rare Case Report

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Abstract

Lipomas are comparatively uncommon mesenchymaltumours which are benign and originates from adipose cells. Oral lipoma can occur anywhere in the body but commonly develop intraorally in lip,tongue, palate,buccal mucosa, vestibule, and below the tongue and salivary glands. Their progressive growth cause hindrance with speech and mastication due to the tumour's dimension. Here in thispublication we discuss a case of lipoma in a 28-year-old female patient underneath the anterior one–third of tongue with no pain but interfering with speech and phonation for 2 years.The patient was completely asymptomatic with a large swelling in floor of the mouth and complained of difficulty in speech and eating.

Keywords: *Soft Tissue Tumour, Sublingual, Mandible.*

Introduction

Case report: A female patient of 29 years reported of large swelling in the right side below the tongue, measuring approximately 3x3.5 cm in size. The swellinggradually started as a small one and within two years it increased to achieve the present dimension with no signs of inflammation, pain and of mucosa colour. The chief complaint was difficulty in eating and phonation. The intraoral swelling is soft in consistency, even surface, mobile, and fluctuant, which could not be compressed and non-reducible, non-tender on palpation.

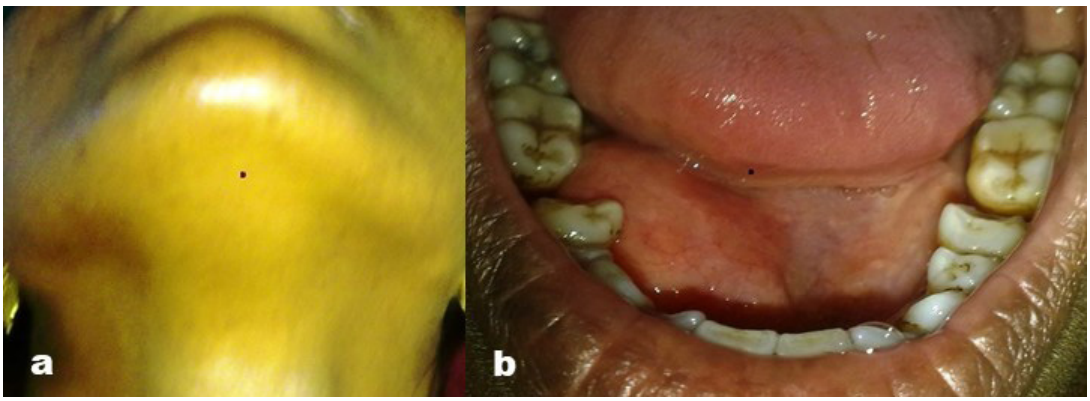


Figure 1a. Extraoral view showing a diffused swelling in the right submandibular region. 1bIntraoral view shows a diffused swelling present in the right side of the Floor of the mouth

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Occlusal radiograph revealed radiopaque structures present resemblingsalivary stones or any calcified mass. USG of the lymph nodes and gland revealed presence of echogenic mass approximately measuring 2cm × 3cm in diameter. MRI revealed a characteristic radiographic form; it shows a hyperintense mass rangingfrom 83 to 143 Hounsfield units with well-definedmargins MRI of

the right paramedian floor of the mouth showed well encapsulated lesion in (26x23x16mm) with T1W/T2W hyperintense lesion with total attenuation in fat saturated image.

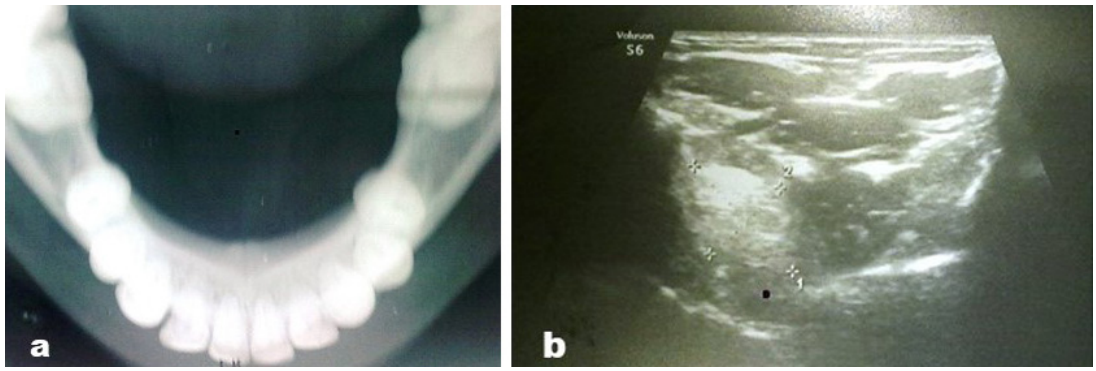


Figure 2a. Occlusal Radiograph; 1b. USG shows an echogenic mass present in the right submandibular region

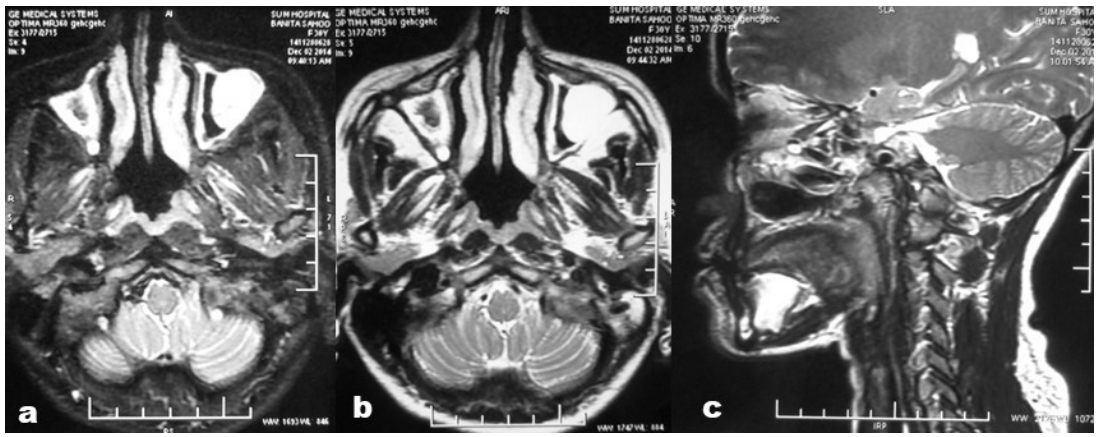
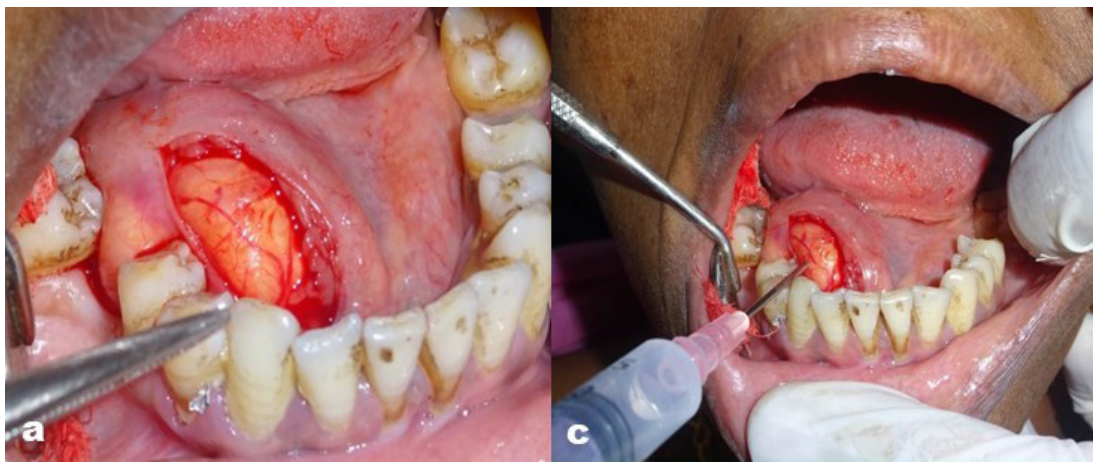


Figure 3a.T1 Axial view in MRI shows an hyper intense mass in the right submandibular region; 3b. T2 Axial view in MRI shows an hyper intense mass in the right submandibular region; 3c. T2 saggital view in MRI shows an hyper intense mass in the right submandibular region

Local anaesthesia is used to excise the lesion surgically. A longitudinal cut was made in the floor of the mouth in the mucosa overlying the tumor,on giving a blunt dissection the lesion popped out from surrounding tissues. The resected mass was yellowish in colour and soft in consistency. Mucosal layers were closed using absorbable sutures.



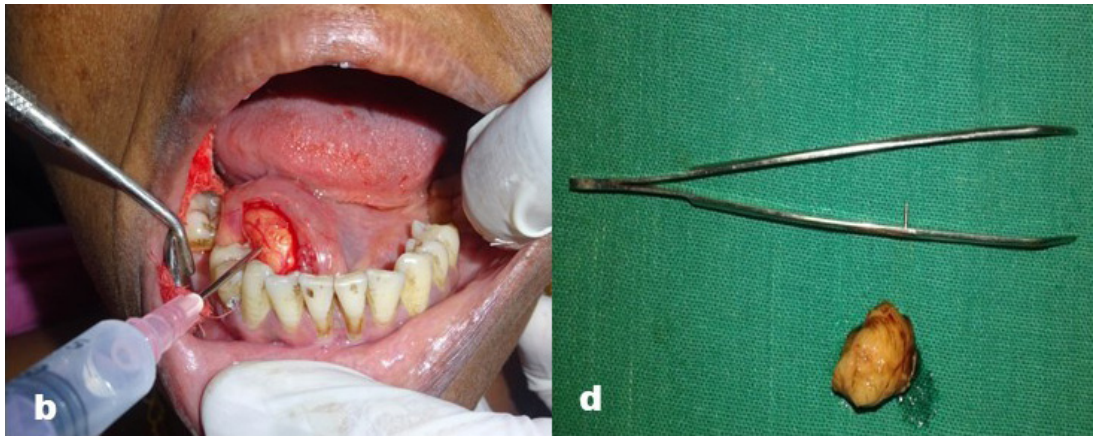


Figure 4a Intra operative picture shows the mass beneath the mucosa after the incision; 4b. FNAC of the lesion shows negative, 4c. The intraoperative picture shows that the mass is attached to the underlying structure; 4d, shows the tumour mass after excision

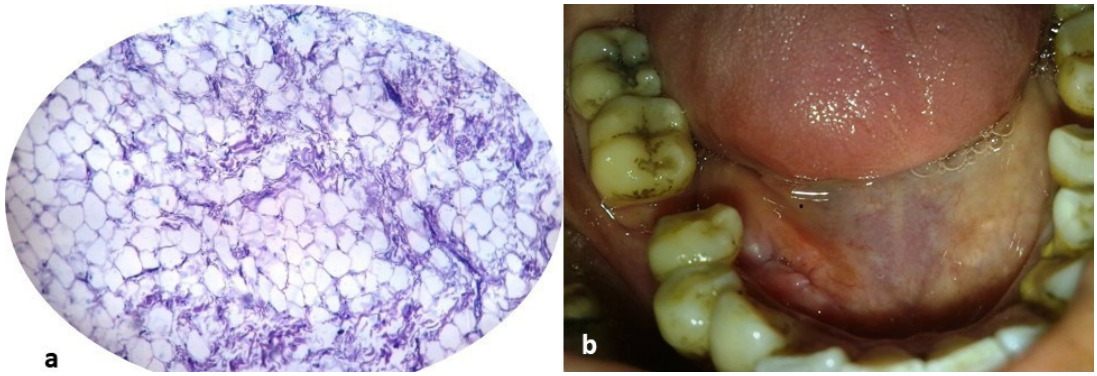


Figure 5a H & E x 100 Photomicrograph of the excised lesion showing mature adipocytes separated by fibrous septae; 5b. (FOLLOW UP) healed lesion after one month.

Histopathological inspection disclosed the occurrence of keratinized stratified squamous epithelium with mature lipocytes and demonstrating a thinstroma, sectioning of the excised tissue revealed mature adiposities and of fat tissue lobules,not connectedto the surface epithelium by fibrous connective tissue stroma. Lobular arrangement of tumour cells was seen. These lobules were detached from each other by fibro vascular connective tissue septa.

Discussion

Lipomas are neoplasms of mature adipose tissue which is benign in nature, seen in head and neck region(1 to 4%)[1]. Thepeak incidence is fifth or sixth decade of life, anduncommonin children[2]. The tumors may be encapsulated. Most lipomas develop in the subcutaneous tissues,uncommon in oral cavity [3]. Some studies showed a female preponderance [4]. Although benign in nature, their continuousexpansioninterfereswith speech and mastication[5].Lipomas are slow growing, well-circumscribed, painless soft tissuetumors, sometimes located superficially or deeply, with a malignant counterpart called liposarcoma. most frequentlyseen in buccal mucosa, labial structure, tongue, palate, buccalsulcus and floor of the mouth.According to Furlong et al over a period of 20 years showedonly 125 cases of oral lipomas, which shows the infrequency of these oral tumours[6]. ROUX first described it in 1848 as "yellow epulis"[7].

There are two pathogenic mechanisms describing the pathophysiology of lipoma i.e. HYERTROPHY and METAPLASIA theory. According to the former theory etiological factors are obesity and indefinite growth of adipose tissue that contributes for the development of lipoma but the major drawback being that the lipoma developing in non-existant adipose tissue location, couldn't be satisfactorily explained with hypertrophy theory. These lipomatous cells are not used up in periods of starvation unlike other fat cells.[8]

According to "metaplasiatheory" as fat cells can also be derived from mutant connective tissue cells anywhere in the body, so their development occurs due to differentiation of in situ mesenchymal cells into lipoblast.In fewcases, trauma and long-standing irritation may also be a factor in the development of lipoma[9]. Lipomas arise from multipotential cells which stay dormant until adolescence when they differentiate into adipose cells under the influence of hormones. [10]. As in the present case, patient gave no history of trauma and may be presenting as neoplasm. Chromosomal disturbance viz. translocation of t (3; 12) (q 127; q 13) and I (3; 12) (q28; q14), diabetes mellitus,increase in cholesterol level are the etiological factors. [11]

Rare cases of intraosseous lipomas in body of mandible and ramus have been elaborated by Oringer and Johnson respectively.[12]

Lipomas develop as slow developing,sessile, round to ovoid sub mucosal nodules. The size varies from 0.2- 1.5 cm in diameter, tumors as huge as 50 mm have been reported in buccal mucosa.[13] Histopathologically the tomor can be divided asclassic lipoma, fibro lipoma, angiolipomas, spindle cell lipoma and pleomorphic, myxoid, sialolipoma, and intramuscular lipomas [14]. Intramuscular or infiltrating lipoma originatewithin skeletalmuscle bundles and infiltratesalong the intramuscular septa. They may mimic liposarcoma but due to the absence of cellular pleomorphism, nuclear hyperchromatism and low mitotic activity, they are differentiated.[15]

Surgical excision or lipectomy and liposuction are the two treatment modalities. Recurrence is brought down by wide surgical excision simultaneously by conservation of adjoining structures. Lipomas that are well encapsulated, come out easily with no recurrence or damage to the surrounding structures. It is advisable to remove them with a little extension of the adjacentan atomical structure to avoid recurrence and conserving surrounding structures[16].

Conclusion

This above case of lipoma presented at a very unusual site, that is, on the floor of the mouth and demonstrates the heterogeneity in presentation. Intraoral lipomas are seen only during routine dental examination which causes pain very rarely, resulting in late treatment. The patient usually worried about theaesthetics or discomfort. It is mandatory for a clinician to diagnose intraoral lipomas. latest diagnostic method should be used to rule out any other tumor and treatment should be done accordingly.

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Herbal Toothpaste: A Comprehensive Overview

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Abstract

Dental caries is the microbial infectious disease. In recent years it is the most comment health problem in the world. Toothpaste is a paste or gel dentifrices used with a tooth brush to promote oral hygiene. Tooth paste cleans the teeth protects them against tooth decay and keeps them looking healthy and attractive to look at also ensuring fresh breath. Brushing the teeth is only effective if using toothpaste as well.

Keywords: *Toothpaste, Gel Dentrifices, Oral Hygiene, Brushing, Plaque, Calculus.*

Introduction

Dental caries is the microbial infectious disease. In recent years it is the most comment health problem in the world.[1,2] It is a chronic disease which destroy the tooth tissue and affect chewing and aesthetic appearance plaque, calculate and fermentable carbohydrate are the source of caries development plaque forms continuously on tooth surface.[3] In in all age groups and it will be removed by brushing with a tooth brush with tooth paste. There are many herbal available in market and herbal toothpaste is also one of the products. Toothpaste is the common product in our family and we hardly care to know about the product which we are using. Herbal toothpaste is having advantages over commercial products. This study also contains about the advantages and disadvantages of herbal toothpaste.[4]

Importance of toothpaste: Brushing with toothpaste is important for several reasons. First and fore most a tooth paste and a correct brushing action to work to remove plaque, a sticky harmful film of bacteria that grows on the teeth that causes cavities, gum disease and eventual tooth loss if not controlled second tooth paste contains fluoride which makes entire tooth structure more resistant to decay and promotes remineralisation, aids in repairing early decay before the damage can even be seen. Third special ingredients in tooth paste help to remove stains overtimes fourth, toothpaste help freshen breath and leave the mouth with a clear feeling.[5]

Composition of toothpaste:

Detergent:

- Amount weight 1 to 2%
- Material: Sodium laurylsulfate, sodium mono glychride sulphate.
- It decreases the surface tension and acts as a surface-active substance and removes the debris with its foaming action.

Binder:

- Amount weight =3%
- Material- carrageenan
- Binding agents are hydrophilic colloids which are used to stabilize dentifrice formulations by preventing the separation of the solid and liquid phases.

Colorants:

- Amount weight = 1 to 2%
- Material-Food colorants
- It provides dentifrice with pleasing colours.

Flavouring agent:

- Amount weight = 1 to 2%

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- Material-peppermint, spearmint and winter green and sweeteners such as saccharine.
- It gives flavour.

Fluoride:

- Amount weight = 0 to 2%
- Material-Sodium fluoride, Sodium mono fluorite phosphate.
- Fluoride presents dental carries.

Tartar control agent:

- Amount weight = 0 to 1%
- Material-Tetra sodium pyro phosphate.
- Tartar control agent stabilizes the amount of calcium in saliva and interferes with the crystalline structure of calculus.

Desensitizing agents:

- Amount weight = 0 to 5%
- Material-Potassium nitrate, potassium chloride
- Desensitizing agents promotes occlusion of dental tubules.

Abrasive:

- Amount weight = 20 to 55%
- Material-calcium carbonate, brushite, silica.
- Abrasives are added to clean the teeth and to remove stains and polish the surface.

Humectant:

- Amount weight = 20 to 35%
- Material-Glycerine, sorbitol, paraffin oil
- Humectants act as a moisturizing agent and provide a smooth creamy texture to the dentifrice

Water:

- Amount weight = 15 to 25%
- Material-Deionized water
- Water acts as a solvent and dissolves ingredients allowing them to be mixed.

Types of toothpaste: There are variety types of toothpaste: toothpaste for children, herbal toothpaste, whitening toothpaste, fresh breath toothpaste, anti-plaque toothpaste

Toothpaste for children: These kinds of toothpaste are specially created for children. They have pleasant flavours and come in attractive colours. These toothpastes contain no sugar and have low concentration of fluoride to prevent causes fluorosis.

Herbal toothpaste: Herbal toothpastes are made from natural ingredients and some are certified as organic. Now a day many consumers have started using natural toothpaste in order to avoid synthetic and artificial flavours which are commonly found in natural toothpaste. They don't contain any artificial flavours or chemicals. It is good choice for people who allergic to mint or to sodium lauryl sulphate, a foaming agent that is included in most commercial toothpaste brands.

Whitening toothpaste: These toothpastes contain special ingredient such as hydrogen peroxide for teeth bleaching and whitening. The peroxides deliver oxygen radicals to enamel. According to American Dental Association (ADA) because it acts as a bleaching agent, hydrogen peroxide actually changes the colour of the enamel on the surface of the teeth by cleaning the extrinsic stains that discolour the outside of the tooth. Tooth whitening toothpaste have higher abrasive value than normal toothpaste to remove food and other stains.

Fresh breath toothpaste: These are most popular toothpaste in the market. They contain enhanced flavouring agent with antibacterial agent to help fight against halitosis.

Anti-plaque toothpaste: Anti-plaque agent reduces plaque growth. This can have a positive effect in reducing plaque growth on teeth, reducing gingivitis and potentially reducing caries.

Composition of herbal toothpaste

Herbs used in herbal toothpaste

Turmeric: A daily intake of turmeric about half a teaspoon reduces the growth of false DNA patter.

Aloe Vera: Aloe Vera may be effective in the treatment of gum wounds.

Peppermint: Pepper-mint is used in flavouring agent.

Mint leaf: Mint is used for dental care because of its genocidal and freshening properties.

Small cardamom: It helps to produce smoky flavour. It disinfects the oral cavity the germs and drives away bad breath.

Clove: Cloves are also said to be a natural anthelmintic. The essential oil is used in aroma therapy.

Lemon peel: Contains high amount of vitamin C

Orange peel: Contains high amount of vitamin C

Banana peel: Vitamin A and B rich in banana has anti-oxidant

Pumpkin peel: Pumpkin is found having zinc content that is really good for skin.

Mango peel: It has been recommended as a drug in preventing dental plaques.

Papaya peel: Papaya has antibiotic, antifungal, anti-microbial, anti-inflammatory.

Jack fruit seed: Jack fruit seed contains vitamin A, C, B. The seeds contain minerals like calcium, zinc and phosphorus that strengthen the teeth.

One herbal toothpaste brand and it's advantage and disadvantage. Vicco is must trusted and original herbal product. It has all the ingredients which help us in avoiding tooth disease. It refreshes the breath, cleans the teeth and prevents the gum disease. It made from herbal stem and flower not the artificial ingredient. It also contains vajradanti which actual means diamond teeth. It also does not use any sugar

Advantage: No bodies wants that their body of full of chemicals. So, we must go for natural alternatives available in the market. At least it saves our tooth from decay. There are many advantages of herbal toothpaste Commercial toothpaste contains sodium Lauryl toothpaste which can cause irritation and inflammation while doing the brush. But in case of herbal toothpaste there is no chemical ingredient. Natural oral care products are effective in removing bacteria and keep the mouth healthy. Peppermint and spearmint oils are present in herbal toothpaste which helps in destroying the bacteria

Disadvantages: Safest products of herbal toothpaste that which is certified as organic otherwise they may also endanger our tooth. It should not contain cinnamon and any artificial chemicals.

Discussion

A study carried out by Ozgu Ilkcan Karadagluoglu at al in February 2019 showed that herbal toothpastes exhibit statistically significant antibacterial activity against s.mutans than their initial form after the addition of essential oil.[6] Another study carried out by Mullaly BH, James JA. Culter W A, in 1995 showed that herbal based toothpaste was effective as the conventionally formulated toothpaste in the control of plaque and gingivitis.[7] A study carried out by Fabiana Ozaki showed that both herbal and commercial toothpaste were effective in reducing plaque and gingivitis in subjects with established gingivitis.[8] A study carried out by Sudhir Rama Verma, Husam Sherif, Ahemed Serafi, Salim Abu Fanas, Vijay Desai, Eiyas Abuhijleh in February 2018 showed that Brushing with Meswak-based toothpaste gave a significant drop in plaque score when compared with TTO-based paste.[9] A study carried out by Mohan Kumar KP, Priya NK, Madhushankari G S showed that herbal toothpastes have similar antibacterial effect as conventional toothpaste. Toothpaste with multiple herbal ingredient is more efficient than the toothpastes with fewer herbal ingredients in an anticariogenic property.[10] A study done by Banani R et al showed that herbal toothpaste successfully whitens the teeth, kill germs, imparts freshness feel inside mouth.[11]

Conclusion

As brushing is a very basic phenomenon of our life and at least we should take care of such a small phenomenon. We can do it by not using any chemical toothpaste but to go for herbal toothpastes which are certified and free from artificial dyes and all. By keeping small things in our mind, we can change our life and keep ourselves and our family healthy.

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Ethical Permission: Approved

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Application of CAD-CAM in Oral and Maxillofacial Surgery: A Literature Review

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Abstract

CAD/CAM means computer aided design and computer aided manufacturing. It is the technology concerned with the use of digital computers to perform certain function in design and manufacturing. CAD can be defined as the use of computer system to create, modify, analyze or optimize an engineering design. CAD/CAM used for designing as well as controlling the manufacturing process. Reconstruction the craniofacial structure is difficult due to its complex anatomical structure, presence of vital structure adjacent to the affected part, chances of high infection. For any craniofacial reconstruction autograft is the gold standard. But use autografts have limitation such as large defect, chances of infection, additional surgeries, highly qualified team, donor site morbidity etc. But the CAD/CAM system focuses on 3D modeling which gives the surgeons the ability for precise preoperative planning and perform virtual resection of the defect and design the patient specific implants.

Keywords: *CAD-CAM, Craniomaxillofacial, Reconstructive Surgery, Prosthesis.*

Introduction

This technology first used in craniomaxillofacial surgery in 1980's. At that time an anatomical model with all features is prepared from the slices of CT scan. In that decade 3 to 6 mm slices of CT scan, which used to produce physical model of face and head by this technology had multiple limitation which overcame by means of Selective Laser Sintering (SLS) and Stereolithography (SLA) and 3D printing technology now a days.[1-4]

Other progresses in this field at that time were:[5,6]

1. Higher image quality with good resolution and 1 mm thick slices of CT scan.
2. Cone beam computed tomography which produce finer detail as well as it reduces the patient exposure to the radiation.
3. Use of software for analysis of radiographic images.
4. Introduction newer biomaterials for this technology.
5. Higher processor speed of the computer chip along with higher storage space, high RAM for better processing and use of graphics card. All these advancement in computer technology produces real life visualization of the problem and rapid processing.
6. Algorithms software which creates 3D images from the 2D slices of CT scan were introduced in 1990's which further enhances the visualization of the defect for the surgeons.

Applied aspect: In maxillofacial prosthesis: Till 1990s, multiplestudies took place for CAD/CAM for its application in fabrication of different prosthesis of external maxillofacial region, where CAD-CAM used for digital capturing of the anatomical detail and designing the prosthesis digitally and its manufacturing. Primarily

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laser scanning, wax milling and other computer programs are used for designing and prosthesis fabrication. Its use proved to be promising but not adopted in day to day practice completely till now.[7,8]

Planning and placement of implants: Different programming like Surgicase, Anaplastology Module, Materialize NV helps in Maxillofacial prosthesis fabrication by simulated surgery, determine the suitable place for placement of implant by detecting presence of important structures, volume of the bone, and density of the bone. Therefore proper size of the implant and suitable site for placement of implant can be planned and a customized dill guide also design as per planned. The software also helps in mirroring of anatomical situation for proper prosthesis placement.[9,8]

Capturing implant locations and surrounding surfaces: For the design of an implant-based prosthesis the implant locations, the internal tissues and the surrounding external surfaces. Data must be captured from mobile anatomy, including complex textures and incoherent surfaces (like hair), and the sharp edged detail of the abutments. CT, MRI and CBCT help to collect data of the internal and external geometries which is an important step for planning the implant position and also helps to evaluate the position of the implant post-operatively. Photogrammetry scanning has role incapturing anatomical surface and can be used easily in clinical setup. It has 'multi-camera set-up' whichhelps to record the data without moving around thepatient within second.[10-13] However, its application is limited. The prerequisite for maxillofacial prosthesis fabrication by means surface scanning technologiesare:

1. Speed with accuracy
2. Repeatability
3. Colour and surface texture capturing capability
4. Determination of the contour, surface detail and shape of an object
5. Should not be affected by environmental condition

Prosthesis 'body' design and manufacture[14,15]: CAD/CAM technology had been promoted to design and fabricate prosthesis but in clinical practice these techniques is not adopted completely. This also translated successfully into workshops focusing on the use of digital design in Maxillofacial Prosthetics. Similar techniques have been used in other patient-specific applications, such as custom implant and surgical guide design, as described earlier in the literature review. Two set of computed tomography been used. The preoperative one used for planning purpose and for evaluation of the implant placement site. And postoperative one to determine the exact location of the placed implant. This has been considered as the first attempt at considering the retention components in the digital design of a prosthesis. Incorporation of retentive mechanism on prosthesis surface is challenging also be important for retention of the prosthesis which improve the property and also improve clinical result.

In Surgery: Recently CAD-CAM used in planning for different surgical procedure ranging from trauma management to reconstructive surgery. Increased used of the CAD-CAM helps surgical team to visualize and treatment planning preoperatively.[16]

Orthognathic procedures: Modern 3D virtual planning for orthodontic surgery has critical advantages compared to conventional treatment planning.[17]

Trauma: CAD-CAM used in management of traumatic injuries of facial skeleton like comminuted mandibular fracture and fracture involving all third of the face. 3D visualization of fracture offacial skeleton helps in proper reduction of fractured bone segments. CAD/CAM used in production of occlusal splints for bettermanagement of facial asymmetry, functionality and aesthetics. Areas which are avulsed or necrosed replaced by customized prothesis. Along with this, use of CAD-CAM act as cutting guides with improvement in accuracy and reduced error during shaping and harvesting autologous graft.[18-20]

Temperomandibular Joint (TMJ) Reconstruction

Reconstruction of TMJ done in two steps:

1. First step is Gap arthroplasty and
2. In second stage implant designing and fabrication done with the help of post- operative CT scan.

But in CAD-CAM this prosthesis can fabricate pre-operatively in a single stage with the help of simulation of TMJ gap arthroplasty, 3D planning. TMJ functionality, occlusion also checked virtually before insertion which provide better functional outcome of the surgery and less post-operative complication.

Mandibular Atrophy: CAD-CAM can also beused in management of defect of atrophic mandibular alveolar crest where other procedure had failed. Different graft

also planned for virtually and executed for reconstruction of the atrophic mandible.[21]

Planning for onco-surgery: Extend of lesion along with safe margin for resection of the lesion is critical for successful management of any carcinoma. Previously it was difficult to access the proper anatomy precise margin for resection and requirement of graft size for the defect created by the resection of the lesion and they decided intra-operatively in trial and error method. Thus, these procedures require precision, surgical skill and huge intra-operative time and suboptimal reconstruction.[22]

Whereas CAD-CAM offers pre-operative planning by surgical team for reconstruction of complex facial structure, helps to determine the actual resection margin of the lesion, planning for the graft and helps in co-ordination between oncologic and reconstructive team. Overall this technology reduces the time of surgery, post-operative complication and recurrence of the lesion.[23]

Pros of CAD-CAM in this Field[24-26]:

- More accurate diagnosis which helps in planning for better treatment/surgery.
- Anatomic structures are visualized directly.
- Act as guide for surgery.
- Practice of the surgery can be done virtually which helps in later stage.
- Helps in incision design and helps to determine the margin for resection.
- Assessment for placement of graft
- Contouring of plates used in reconstruction purpose
- Fabrication of custom prostheses, distraction devices, fixation device
- Reduced surgery time, anesthesia,as well as exposure of the wound
- Result is more predictable
- Better communication between colleague
- Can be used for patient's education purpose

Discussion

This technology has potentiality in consistent aesthetical and functional outcome in advance reconstruction. This is suitable for application in cases with varying complexity because of it helps to visualize and manipulate the complex 3D structure of the maxillofacial bony structure. This helps to perform reconstructive and critical surgical work more precisely in trauma, in prosthesis fabrication, in orthognathic surgery and in oncological procedure too.Use of CAD-CAM in different steps of the reconstruction also reduce error and helps in intra-operative decision-making with expedition of the surgical phase.[3] With passing years this cad-cam procedure, which gaining acceptance in different field of medical science make diagnosis better and become an innovative solution for reconstruction of complex maxillofacial structure.[24]

Conclusion

Reconstruction the craniofacial structure is difficult due to its complex anatomical structure, presence of vital structure adjacent to the affected part, chances of high infection. For any craniofacial reconstruction autograft is the gold standard. But use autografts have limitation such as large defect, chances of infection, additional surgeries, highly qualified team, donor site morbidity etc. But the CAD/CAM system focuses on 3D modeling which gives the surgeons the ability for precise preoperative planning and perform virtual resection of the defect and design the patient specific implants.

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Complication of Dental Procedures During Pregnancy

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Abstract

Pregnancy is stated as the series of embryo and fetal escalation and progress in uterus. It is a delicate condition which creates a cycle of changes for the adaptation in fetal progression. The squall of hormones which is stimulated in pregnancy causes physical changes in a mother's body and oral cavity is no exemption. Throughout this stage some of dental treatments are prohibited due to different complications. This study is the consideration of various adaptation and adjustments during treatment of pregnant woman.

Keywords: *Pregnancy, Dental, Treatments, Complication, Contraindicated.*

Introduction

Pregnancy is related with various physiological and endocrinal changes in the body and special and common changes in the body. Special and common changes seen during this period which includes gingivitis, pyogenic granuloma, and dental caries increased susceptibility to odontogenic infections, ptyalism, enamel erosions, tooth mobility and xerostomia[1]. One of the lead changes is an increase in the level of estrogen and progesterone[2].

Dental care: The Trimester Approach: Health care providers refer to three segments of pregnancy, called trimester. The first trimester is from week 1 to week 12. In this period treatment maybe narrowed because of vomiting at the time of sunrise. Only emergency treatment should be indicated during this time. Routine preventive procedures including oral prophylaxis can be performed during this phase. Elective dental treatment must be contraindicated during first trimester due to organogenesis procedures of fetus. The fetus is particularly vulnerable during this period.

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The second trimester is from week 13 to week 28. This is the safest period to induce any essential dental treatment. Pregnant women should be advised to discuss with their prenatal care providers about the employ of sedatives and medication. The fetus further developed and pregnant woman is more comfortable. *The third trimester is from week 13 to week 28. In this period expert assessment is needed. Treatment should be avoided because of enhanced physical uncomfort.*[3]

There are two types of hypotension seen in pregnant women. In the first type of hypotension, postural hypotension is seen in pregnant woman in the period of first trimester; this normally happened when she wakes up in the early hour during sun up but doesn't reappear at day time. The exact reason of this condition is unknown. The other one is called as supine hypotensive syndrome of pregnancy, happened during third trimester if the woman continues in supine position greater than 3-7mins. Signs and symptoms of syncope become more prominent in this period of time, and after that the women faints. The inferior vena cava is compressed by the flaccid, graviduterus so that the venous return from the lower limbs reduced. When the position of the patient changes to lateral side or to standing position, then the inferior vena cava is not compressed by the weight of gravid uterus, therefore the probability of syncope eliminated.[4]

Gingivitis is the most common obstacle seen in a pregnant woman, which is supposed to be seen in the time period of second trimester. Localized gingival hyperplasia, which is also called as pregnancy tumor, is

also occurred in pregnant woman. It must be postponed after delivery, if surgical procedure is advisable. Dental procedures and treatment in any form is hazardous to both doctor and the pregnant patient. For example, while prescribing medications and during medicinal interactionin the period of pregnancy results in various complications which includes symptoms such as pain, fear, anxiety because of the physical and psychological stature of the pregnant patient. The treatment and management of odontogenic infection must be carried out urgently because, this odontogenic infection leads to fever which plays the active role in miscarriage.[2]

It is advisable to do necessary supra gingival scaling and root planning. The prevention of plaques formation during pregnancy especially in the 1st trimesters is indicated for mother and fetus. Other than dental plaque management, no definite dental treatment should be carried out during the period of 1st trimester in pregnancy as it can be perilous to the fetus.[2] Even though pregnant patients are not immunologically compromised, but sometimes immune system of a pregnant woman becomes concealed, hence forth there is a reduction in cell mediated immunity and natural killer cell activity. Odontogenic infections must be treated and managed with at most care during any time of pregnancy because odontogenic infection has the ability to convert into deep space infection assertively which results in cancelation of oro-pharyngeal airway. There should be drainage of abscess and pulp offensive of extracted tooth should be removed to reduce the infection. Patient status and treatment procedure should be informed to the obstetrician. Patient with severe dental pain should be treated and managed as the same method. Use of Analgesics for a long time except the precised treatment is prohibited. It is not essential for the patient to wait for the entire treatment procedures till the delivery[1]

Maternal periodontal disease is a risk factor of preeclampsia hypothesized. Women with severe periodontal disease are at high risk of preeclampsia in the period of pregnancy. Preeclampsia is a hypertensive pregnancy disorder that causes severe maternal and fetal morbidity and death. 5% pregnant women are affected by it.[1]

General Consideration: Treatment ought to be meant for controlling of disease while keeping a healthy and good oral hygiene and inhibit the possible problems which could be seen during pregnancy or in post partum time period. Patients who have been marked for any pregnancy related complications and problems by the obstetrician must be consulted before any dental treatment. For example: hypertension induced by pregnancy, gestational diabetes, risk of repeated abortion or past history of premature delivery. If blood pressure is greater than 140/90 mmHG simultaneously, which is usually induced by fear and pain, patient must notify the obstetrician.[1]

Pregnant patients with diabetes suffer numerous problems due to sever periodontal diseases compared to pregnant patients not having diabetes. The two chief enhancing factors for periodontal disease are diabetes and endocrinal changes, so that it changes and affects the maternal and fetal outcomes.[3] A supple,remote, hyperplastic growth is seen which induced by pregnancy is also called as pregnancy epulis or pregnancy granuloma. 5% pregnant patients are affected by this disease. Clinically most affected area is the anterior region of upper jaw. It is normally seen in second trimester and it develops vastly. It is normally reduced in size after labor and diminished completely. Surgical produres may be indicated often, which is usually postponed after labor.[3]

Positioning of patient on dental chair: The dental chair positioning of pregnant woman is necessarily considered, specially in the period of 3rd trimester because the uterus comes directly over to the inferior vena cava, femoral vessels and aorta due to the expansion with growing fetus and placenta. If the patient remains in supine position for long during a procedure, the weight of the gravid uterus might implicates sufficient pressure which decreases the blood circulation by these three main vessels. After that the blood pressure decreases which leads to syncope or almost syncopal situations. This condition is called as supine hypotension. This situation can prevented by adequate dental chair positioning of pregnant patient on her left side and elevating the head rest of dental chair, so that the main vessels would not be compressed.

Radiography: Embryos and fetuses are more sensitive to radiographs compared to adults due to most embryonic cells are not comparatively differentiating and faster. Prenatal radiation exposure can cause fatal condition or certain developmental anomalies, based on the phase of development and growth of the fetus during the radiation exposure. The most susceptible period of organ formation of a fetus is between the 18th and 45th days of gestation period. The threat to the developing

fetus is directly proportioned and attached to the increasing in irradiation. The irradiation exposure rate of a fetus should be less than 10 rads. If it goes above 10 rads, it will be considered as dangerous and risky, which leads to mutation, mental illness and retardation and anomalies of eye, although radiation exposure to the uterus is minimum during any routine dental checkups and diagnostic radiographs, dentists and obstetrician often suggests to avoid radiographs in the period of pregnancy. In case of the diseases, which needs to be diagnosed and treated immediately, then radiographs are only indicated seeing the status of the and condition of that disease.

Table 1. Medications

Drugs that are indicated and drugs that are prohibited during the period of pregnancy	
Drugs, those are indicated during pregnancy	Drugs, those are prohibited during the period of pregnancy
ANTIBIOTICS Penicillin, cephalosporins, tetracyclins, doxycyclines, Amoxicillin, clindamycin, erythromycin (estolate form)	
Erythromycin (except Estolate form)	
ANALGESICS acetaminophen, aspirin, diflunisal, etodolac	
Acetaminophen with codeine	
In small doses	

The major concern during prescribing medicines to a pregnant patient is based on the affecting possibilities on the fetus. Aspirin and ibuprofen are prohibited to use in the period of pregnancy.

Antibiotics: The penicillins, together with amoxicillin and the cephalosporin, are usually harmless for use in the period of pregnancy. For those patients who are allergic to penicillin, in that case erythromycin can be the substitute but the estolate form is prohibited because of its potential to cause cholestatic hepatitis in the time of pregnancy. Another two drugs are prohibited for causing discoloration of fetal dentition are tetracycline and doxycycline, as well as the threat of reducing or slowing the bone growth. Metronidazole should not be given to the pregnant woman because of its mutagenic properties towards bacteria and micro-organisms.

Analgesics: Most widely used analgesic drugs are acetaminophen, measured safe in the period of pregnancy. In case of severe pain, acetaminophen along with oxycodone is advisable as compared to acetaminophen with codein as codein leads to various birth defects and anomalies. Aspirin and ibuprofen are prohibited in the period of pregnancy. Aspirin in higher dose in the period of pregnancy leads to certain raise in duration of pregnancy and labor as well as hampers with associated function and increasing the bleeding time, it should be taken towards the end period of pregnancy. It is risky to the mother for antetartum and postpartum hemorrhage. Aspirin is also responsible for cleft lip and palate. Ibuprofen uses stem cells from enhancing the drugs in the development of al anomalies, deleterious changes and neonatal circulation. Aspirin and ibuoprofen prohibiting the prostaglandin synthesis and can lead to limitation of fetus ductus anterious which causes pulmonary hypertension and rising in fetal death therefore they are prohibited to use during 3rd trimester.

Sedative Agents: Barbiturates, prescribed to pregnant women, happen to cross the placenta and can affect the fetus. Developmental disorders have been seen during pregnancy or infants going to be born to, in cases of chronic barbiturate users. Dizapam has been responsible for birth disorders including cleft lip and palate, which is also referred as category D drugs and prohibited to use in the period of pregnancy. It is not yet been decided to use nitrous oxide as sedative agent during the period of pregnancy. It is prohibited during the 1st critical trimester and less used in 2nd and 3rd trimester because nitrous oxide leads to deactivation of vitamin B12 synthesis, which causes birth disorders. Therefore, it is prohibited in the period of pregnancy because 1st trimester is the most sensible period and the brain is progressively developing till 2nd and 3rd trimester even into the period of childhood.

Table 2. Drug teratogens

Drug Teratogens	
Alcohol	Cranio-facial abnormalities, fetal alcoholic syndrome
Tobacco	Brain damage, cleft lip and palate
Cocaine	Placental abruption, conginitive delay
Thalidomide	Malformation of extremities of new born
Methyl mercury	Brain damage, micro cephaly
ACE inhibitors	Cranio-facial abnormalities
Tetracycline	Maternal toxicity and discoloration of tooth
Phenytoin	Hypoplastic nails, typical facies
Warfarin	Facial chondro dysplasia and dismorphism
Barbiturates	Facial cleft lip and palate deformity

Table 3. Categories of drugs

Category	Evidence
A	Controlled human studies indicate no apparent risk to the fetus. The possibility of risk to the fetus is remote.
B	Animal studies do not indicate fetal risk. Fetal controlled human studies have failed to demonstrate at risk.
C	Animal studies show an adverse effect on the fetus but there are no controlled studies in humans. The benefits from the use of such drugs may be acceptable.
D	Evidence of human risk, but in certain circumstances, the use of such a drug may be acceptable in pregnant woman despite potential risk.
X	Risk of use in pregnant woman clearly outweighs possible benefits.

Conclusion

Dental health which is also called as oral health is the health of gums and teeth. Despite medical advances in diagnosing and treating perform labor, complications are arising. Adverse pregnancy outcomes such as neurogenic diseases have an impact on the family and economical impacts on the society causing financial troubles during checkups and treatment. Dentists and dental hygienist should take part an active role for motivating all women of child bearing age for oral health consultation, inspections and management if it is indicated. There ought to be a good communication in between dental care providers and pre-natal care providers. At last, emergencies should deal with carefully.

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Child Abuse and Neglect in Pediatric Dentistry

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Abstract

Abuse is something, which indicates disrespect and dishonest way of dealing. It is defined as any action that intentionally harms or injuries another person. Child abuse is disturbingly common findings in our civilization. It is not only the physical violence which directly hurts a child but also any form of maltreatment by a person, which puts negative impact on the psychological state of a child. The dental practitioner has a unique opportunity to notice these problems, as he/she deals with oral cavity. To prevent a child from child abuse, we should understand the child, scolding and strict punishment method can leave an emotional scar to the child, so the parent should approach the child an interactive manner, so that he/she feels comfortable and reciprocate well in that manner. By doing all these we can save children live from hindrances.

Keywords: *Abuse, Child, Neglect, Pediatric dentistry.*

Introduction

"Non accidental physical injury, minimal or fatal, inflicted upon children by persons caring for them" (Defined by Gill in 1968)[1]. CAN (Child Abuse and neglect) previously called as battered child syndrome have recently described as Non-Accidental Injury (NAI)[1]. The term battery is defined as unprivileged touching of another person's body and unusually associated with abuse. Children under ENGLISH COMMON LAW were considered property of their father, as women were considered as property of their husbands, until late 1800s. American colonists carried the tradition of children being property of their fathers to the early years of the United States. Children are abused by other persons on whom they are dependent, such as teachers, sport coach, caretakers etc. Sometimes children are subjected to abuse and ill-treatment by the offenders but not always. It is admitted that non intentional abuse to the children is also harmful which hinders their growth and development. This is a violation of the basic child rights. In order to ensure that basic right of every child is not violated in any manner by anybody or any organisation, Commission for protection of child rights have been formed in every state of our country like OSCPCR (Odisha State Commission for Protection of Child Rights) in our state and at the national level which is called as NCPCR (National Commission for Protection of Child Rights). Child abuse is something, which we all never want to see[2]. It should be noted that injuries found in children are not essential because of child abuse. Therefore the dentist should be serious and alert to these kind of injuries and if such instances come to their notice, they should follow local safeguarding policies. Child abuse includes the factors like physical and sexual abuse, evidence of bite marks and dental neglect. Bullying of children is also one type of child abuse which has serious long term effects on child. These issues maycreate problems if notified, during his/her physical examination.

A child exhibiting the following features should be included under these syndromes[1]. **Evidence of bone fracture, Subdural hematoma, Failure to thrive, Soft tissue swelling, Skin bruising.**

There are different types of child abuse such as,[1] Physical abuse, Sexual abuse, Failure to thrive, International drugging or poisoning, Munchausen syndrome by proxy, Health (medical) care neglect, Dental neglect, Safety neglect, Emotional abuse and neglect, Physical neglect[3].

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Physical Abuse: Any non-accidental injury to the body of a child by someone who has responsibility for child, like Parent, caretaker, or a stranger which resulting in severe injury(trauma) or even death of the child[1,4]. It is the physical violence against a child consequence from physical aggression. Physical abuse resulting in certain injuries which are: Learning disabilities, Physical,visual,speech and hearing disabilities, Cerebral palsy, Seizures, Behaviour disorders, Congestive impairments, Even death immediately/delayed.

Is Physical Punishmenmt the Same as Physical Abuse?: Physical aggression resulting an injury which is called as physical abuse. But physical punishment is defined as Physical force is use in such a way that causesbodypain, but not injury, for the purpose of improvement of the child. But physical punishment can easily get out of control and become physical abuse[4]. Oral injuries may be caused by using instruments such as kitchen tools, utensils or a bottle during forced feedings, hands, fingers etc. The abuse may result in injuries like burns, laceration of the tongue,lip, buccal mucosa, palate(soft and hard), gingivae,alveolar mucosa or fraenumfracture, avulsed teeth; or facial bone and jaw fractures[5,6]. Most common site for inflicted oral injuries(54%) is lip followed by oral mucosa, teeth, gingivae and tongue. Discoloured teeth are the indication of pulpal necrosis which may be result in bruises,scarring at the corners of the mouth.

Many oral cavity injuries like posterior pharyngeal injuries and retropharyngeal abscesses or any accidental injuries to the mouth are commonly seen and should be judged if it is abuse or not by taking a detailed history and also the timing and mechanism of injury. Hence the dentist could be of help to the children in protecting them from abuse. The dentist is the type of person, who can help in protecting children from injuries. If a child is detected with multiple injuries, injuries in different stages of healing or inconsistent history, strong suspicion should come to the mind of a person who deals compassionately with him/her. The role of a dentist dealing with such cases plays a vital role to ascertain its cause and suggest remedial measures.

Types of Physical Abuse[4]:

- Shaken Baby Syndrome (SBS)
- Battered Child Syndrome
- Munchausen syndrome by proxy
- Sudden Infant Death Syndrome (SIDS):

Shaken Baby Syndrome (SBS): Also known as abusive head trauma. Shaking a baby to try to stop inconsolable crying. Babie's skulls are very soft; even if they are hit by any soft object it can be harmful for them. Their heads and brains are heavier than their body and they have weak neck muscle which can't give support to hold their head straight. So haemorrhage is caused when shaking the baby. There are various sign and symptoms of shaken baby syndrome[4,7].

Common symptoms are: The muscle tone of the baby is decreased. Baby is showing extreme irritability. Poor feeding or vomiting for no apparent reason. Bruises on arm or chest are rare. The baby is not smiling. She/he has problem in sucking or swallowing. Facing difficulty in breathing. Baby's forehead appears larger than normal. He/she is not able to lift his/her head, also not able to focus. Slow heartbeat. Have problem in hearing. Retinal bleeding occurs. The skin of the baby may turn to bluish[7]. This syndrome can be diagnosed by imaging tests like MRI,CT scan.

Battered Child Syndrome: This is reported by HENRY KEMPE in 1960[4]. Multiple asymmetrical fractures at different stages of healing. Evidence of fracture at tip of the long bone. Fracture of ribs especially in the back. Battered child syndrome is diagnosed by an emergency room physician or by teachers or social workers. Investigations: Radiographs**,** MRI**,** CT scan

Treatment: Medical treatment varies depending upon the injuries affecting the child for battered child syndrome. Counselling of child's parent or guardian is necessary for an intervention plan. Both the physical and psychological therapy are often recommended as treatment for the abused child[8].

Munchausen Syndrome by Proxy: Also known as factitious disorder by proxy or paediatric condition falsification. MSP is relatively rare behavioural disorder. It affects primarily caretaker,often the mother. It is a condition in which a care giver usually the mother induces an illness in another person, usually her child to gain attention and sympathy as the "worried" parent. It was coined by Sir Roy Meadow in 1977. Munchausen syndrome was first described by Dr. Richard Asher in 1951 for adults who fabricated symptoms about themselves and produced sign of illness. The most clinically useful definition is provided by Bools et al(1992).

"Illness in a child which is fabricated by a parent or someone in loco parentis. The child is presented for medical assessment and care, usuallypersistently, often resulting in multiple medical procedures. The perpetrator denies knowledge of the etiology of the child's illness. Acute symptoms and signs of the illness decreases when the child is separated from the perpetrator".

Signs: A child with a parent having knowledge in the medical field who has unexplained medical problems, Laboratory findings that do notcorrelate with clinical features and is not responding to the usual treatments and has similar family history of illness or death[9].

Sudden Infant Death Syndrome (SIDS): Also known as cot death or crib death.The term cot death is often used in United Kingdom, and crib death in North America.SIDS may be due to any reason but child abuse can be a reason.It is the sudden unexplained death of a child of less than one year of age.

Sexual Abuse: It is also known as child molestation. Sexual abuse of a child is usually occurring below the age of 18 years by a person of any age. Generally, that person is a close relative or well known to the victim's family[1]. Generally, the oral cavity is a common site of sexual abuse in children, oral injuries or oral infections are rare to see.[6] Child sexual abuse can occur in a variety of settings, including home, school or work. UNICEF has stated that "child marriage represents perhaps the most prevalent form of sexual abuse and exploitation of girls". The effects of child sexual abuse can include depression, post-traumatic stress disorder (PTSD), anxiety, complex post-traumatic stress disorder and physical injury to the child. The global prevalence of child sexual abuse has been estimated at 19.7% for female and 7.9% for males[10].

Types of sexual assault according to the protection of children from sexual offence act: **Penetrative sexual assault:** penetration of an organ or any other objects into vagina, urethra, anus or mouth or makes the child to do vice versa.

Aggravated penetrative sexual assault: it is considered when the same is done by public or government servant, staff of any private hospital or staff of an education institution if a child is a part of it. Sexual assault is if a person touches the private part of a child without penetrating but with sexual intention or makes the child do vice versa.

Aggravated sexual assault: It is considered when the same is done by police officer, public or government servant, or staff of an education institution if a child is a part of it.

Sexual harassment: when a person with sexual intent uses inappropriate words, pornographic video or pictures.

Child sexual abuse can be characterized by a syndrome of secrecy and dependence. Suspect of an abuse(sexual) when the child has difficulty in walking or sitting.Reluctant to expose his/her body over-clothe to hide scars, full-length sleeves in hot weather. Reports of bed wetting. Behaviour not appropriate for his/her age. The girl becomes pregnant particularly if under age 14 years[11].

Failure to Thrive: It can be defined as underweight, malnourished condition. Child usually has a height and head circumference that are above the third percentile and weight that is below the third percentile on the growth curves. The clinical features of these children include gaunt faces, prominent ribs, and wasted buttocks. It is usually seen in the fast 2 years of life since this is the time when the rapid growth occurs and there is dependency of adults for feeding. The underweight infant who gains rapidly and easily in the hospital is a victim of under feeding at home.

Intentional Drugging or Poisoning: Drugging or poisoning to a child with intention is an uncommon type of abuse by parents or caretaker involving the administration of a non-prescribed or prescribeddrugthatis harmful or not intended for children. Most commonly sedatives are used. The dentist may be assigned for treating tooth injuries that has occurred when a child was not coordinated due to drugs.

Emotional Abuse: Emotional abusemeans to neglect a child continuously by parents. Verbal abuse also can be the part of emotional abuse. Abuse is a type of action which is intended to control another person byusingfear, humiliation and verbal assault. Among all the abuse, emotional abuse has more long lasting psychiatric effects. Emotional abuse includes changing of the psychological state of a child. Emotional abuse can range from simple verbal insult to an extreme form of punishment like;Ignoring,withdrawal of attention, rejection**,** Lack of physical affection**,** Lack of positive reinforcement**.** Habitual blaming, Degradation

Child Neglect: It is one of the most common form of child abuse. WHO defined neglect as "inattention or omission on the part of caregiver to provide for the development of child in all spheres-health,education,nutrition, emotional, development, shelter and safe conditions[2]." National child abuse and neglect data system (NCANDS) defines neglect as "maltreatment that refers to failure of care given by the caretaker to provide needed, age appropriate care although financially be able to do so. People in close contact are frequently the ones to know and report it."The causes of child abuse are like unwanted child especially female child, over-aspirational parents, inadequate parental skilling, economic status is poor, blaming the child because of loss of family members etc.

Types of child neglect:

Physical neglect: physical neglect is the failure to provide a child with basic life requirements such as cloth, food, shelter foe their growth and development.

Emotional neglect: the child is deprived of love, affection, care, emotional supports.

Educational neglect: it can be called as developmental neglect. The child is deprived of learning. Children are forced to do household work instead of acquiring education. Normal psychological growth and development can be impacted due to lack of confidence of the child.

Nutritional neglect: The child is depriving of nutrients which are necessary for the growth and development.

Medical neglect: Basic medical services are not reach to the child health care is a form of medical neglect.

Dental neglect: According to American Academy of Paediatric Dentistry, Dentalneglect is the "wilful failure of parent or guardian to seek and follow through with treatment necessary to ensure a level of oral health essential for adequate function and freedom from pain and infection". Dental neglect includes so many dental diseases like dental caries, periodontaldiseases, poor oral health etc. it can lead to pain infections if not treated[12].

Conclusion

From the analytical description of child abuse cited supra, it can be summed up that, it is an on-going social trauma observed in our day to day life, which retards the overall growth and development of a child. In a civilized society like ours, everybody should be aware and conscious about such type of evils and try his level best to carry on massive awareness programme in order to sensitize the wrongdoers against stringent legal action and ensure a child abuse free environment in our society. As such, everybody is required to be very careful to this aspect and ensure that a child enjoys his rights without any hindrance. A dentist plays a predominant role in this regard, while dealing with the cases of child abuse and is required to eradicate such nuisance from the society.

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Stress and Oral Health: A Literature Review

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Abstract

The mind and body are interconnected with each other. If one is ill it affects the other and the vice versa also holds true. Stress manifests itself into lot of varieties of disorders. A dental practitioner witnesses a wide variation of stress induced oral conditions. Even the most common oral conditions aggravate when the patient is psychologically compromised.

Keywords: *Stress, psychosomatic, emotional, MPDS, BMS.*

Introduction

In this fast-paced society, stress has become an integral part of our lifestyle. Stress is defined as "psychological strain resulting from demanding circumstances."Stress helps in release of various powerful neurochemicals and hormones that prepares us for the fight or flight response. If necessary, actions are not taken, this stress response can have detrimental effects on our health leading to **psychosomatic disorder.** Psychosomatic disorders are defined as "disorders characterized by physicalchanges that originate from underlying emotional factors." These diseases can be due to several biochemical disorders involving the brain neurotransmitters, incomplete connections between the oral regions and undefined complaints due to the cognitive process in the higher centers of the brain. While different individuals manifest prolonged stress in different organs; a good lot of them have oral manifestations.[1]

Classifications of psychosomatic disorders[2]: According to International classification of diseases (ICD-10; WHO-1993) (based on tissue damage)

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Psychological malfunction arising from mental factors: This describes a variety of physical symptoms or types of psychological malfunctioning of mental origin, not involving tissue damages, and usually autonomic nervous system (ANS) mediated.For example: Respiratory distress like hyperventilation and psychogenic cough, Cardiovascular distress like cardiac neurosis, Skin disorders like pruritis. Mental disturbances or psychic factors of any type that may have played a major role in the etiology of certain physical changes usually involving tissue damage.For example: Psychogenic conditions like asthma, dermatitis, eczema, urticaria, mucouscolitilits, ulcerative colitis and gastric ulcer.

According to Zegarelli *et al.* Psychotic disorder, Personality disorder, Psycho-physiologic disorder, Psychoneurotic disorder

Classifications of psychosomatic disorders concerning the oral cavity[2][3]

According to McCarthy and Shkalar (1980)

Oral psychosomatic disease: Aphthous stomatitis; Lichen planus; Glossitis and benign migratory glossitis

Psychological factors as etiology: Erythema multiforme; Chronic periodontal diseases; Mucous membrane pemphigoid

Emotional stress as predisposing factor of oral infections: Necrotizing ulcerative gingivitis; Recurrent herpes labialis;

Neurotic habits induced oral disease: Leukoplakia; Dental and periodontal diseases produced by bruxism; Self-mutilation of oral mucosa; Physical and mechanical irritation

Neurotic oral symptoms: Glossodynia (glossopyrosis); Mucosal pain; Dysgeusia

According to Bailoor and Nagesh (2001)

Pain related disorders: Myofascial pain dysfunction syndrome (MPDS); Atypical facial pain

Disorders related to altered oral sensation: Idiopathic xerostomia; Idiopathic dysgeusia; Burning mouth syndrome

Miscellaneous: Bruxism; Psoriasis; Oral lichen planus; Recurrent aphthous ulcers; Acute necrotizing ulcerative gingivitis (ANUG); Erythema multiforme; Cancerphobia; Anorexia nervosa

Revised simple working type classification proposed for psychosomatic disorders pertaining to dental practice by Thorakkal Shamim (2014)

Disorders related to pain: Myofascial pain dysfunction syndrome (MPDS); Atypical facial pain; Phantom pain; Atypical odontogenic pain

Disorders related to altered oral sensation: Burning mouth syndrome (BMS); Idiopathic dysgeusia; Idiopathic xerostomia; Glossodynia; Glossopyrosis

Neurotic habits induced disorders: Biting of oral mucosa (self-mutilation); Dental and periodontal diseases caused by bruxism;

Autoimmune disorders: Recurrent aphthous stomatitis; Psoriasis; Oral lichen planus; Mucous membrane pemphigoid; Erythema multiforme

Miscellaneous disorders: Necrotizing ulcerative gingivostomatitis; Recurrent herpes labialis; Chronic periodontal diseases; Cancerophobia

Pain related disorders: The international association for the study of pain (IASP) defines pain as an unpleasant emotional and sensory experience accompanying with actual or potential tissue damage or described in terms of such damage. Pain is an outcome of various components that leads to the perception of pain, which said to be a psychophysiological experience that happens when a subject is hurt physically or emotionally.[4]

Myofascial pain dysfunction syndrome (MPDS)[2-8]: MPDS is the most common form of temporomandibular joint (TMJ) disorders characterized by any abnormality in various parts of masticatory system particularly in the TMJ, muscles and its related structures which can lead to pain and dysfunction in TMJ.

Clinical features: Female predilection between age of 20-40 years, TMJ sounds, Impaired mandibular movement, Limited mouth opening, Preauricular pain, Fascial pain, Jaw tenderness on movement, Unilateral pain

Available Treatment modalities:

Non-surgical treatment

1. **Initial therapy**
   a. **Reassurance and explanation** of the nature and prognosis of the treatment
   b. Elimination of hard and chewy food from the **diet** to reduce forces and rest the TMJ.
   c. **Resting** of the jaw by making the patient aware of their unconscious postural clenching or swallowing habits
   d. **Thermotherapy** is done by applying hot moist towel or heating pad on affected areas for 10-15 minutes
2. **Supportive therapy:**

   It is of two types

   a. Pain relief
      i. Pharmacological method
         - **Analgesics** like morphine, paracetamol
         - **Anti-inflammatory agents** like aspirin, ibuprofen
         - **Anxiolytic agents** like diazepam and lorazepam
         - **Muscle relaxants** like methacarbamol and cyclobenzaprine
         - **Local anaesthesia** eliminates immediate pain to allow full stretching of muscle painlessly

ii. Physical method

There are several method of physiotherapy such as

- Spray and stretch
- Ischemic pressure
- Continuous suppleness exercises
- Electro galvanic stimulations
- Transcutaneous stimulations
- Acupuncture
- Ultrasound
- Ionotophoresis
- Cold or soft lasers

b. Dysfunction therapy:

i. **Restriction** of movement to prevent damage

ii. These **exercises** are divided into three types:

- **Active exercises** 'asking the patient to open the mouth.'
- **Passive exercises** assisted mouth opening
- **Isometric exercises**

Alternative treatment therapy

a. Relaxation therapy

b. Trigger point pressure release

c. Spray and stretch

d. Occlusal appliances like:

- Nightgaurds
- Hawley's bite plane
- Splint therapy

Atypical facial pain[9]: The diagnosis of AFP is characterized by constant chronic pain in the absence of any apparent causes in the face or brain. It is diagnosed by exclusion of previously considered conditions.

Clinical features: AFP is characterized by an intense, constant and deep pain which is burning or aching type and is poorly localized. Feeling of numbness, tenderness, tingling or warmth sensation, are common additional complaints.

Treatment modalities

1. Pharmacological treatments:
   a. **Tricyclic amines** like amitriptyline, nortriptyline is often the core drug treatment.
   b. **Analgesics and NSAIDs** for temporary relief.
   c. **Contineous use of Gabapentin combined with tricyclic anti-depressant** can make extreme pain bearable.
2. Psychological treatments
3. Physical treatments like acupuncture and TENS.

Atypical odontogenic pain / atypical odontologia[10,11]: Atypical odontologia (AO) has been defined by Merskey as "severe throbbing pain without any major pathology." Pain is fluctuating in intensity, frequently persistent and continuous with no pathology present. Primary sign is pain, located in a tooth or tooth site that may spread with time involving the entire jaw.

Clinical features: Characterized by continuous dull, burning or aching pain of moderate intensity in apparently normal or endodontically treated tooth and sometimes at extraction site which is generally not affected by cold, heat or electric stimuli on testing. Most common site affected is the molars and premolars of maxilla

Treatment: Administration of the following medications has been reported to achieve pain control in AO patients: Gabapentin, Aspirin, Clonazepam baclofen, Phentolamine infusion, Cocaine, Doxepin Opioids, Monoamine oxidase inhibitors, Injections of local anesthetics and corticosteroids Topical capsaicin

Phantom pain: Phantom pain is defined as the pain sensation in a body part which has been removed and is most commonly associated with limb amputation.[12].

The phenomenology and theory of orofacial pain in the oral cavity is graded into:

- **Phantom tooth pain** is usually associated with tooth extraction
- **Phantom bite syndrome** is defined as a patient's perception of an irregular bite although there is no abnormality on examination.
- **Intraoral stump pain**

Disorders related to altered taste sensations

Burning mouth syndrome (BMS): BMS is a multifactorial disease with psychological components manifested as burning and stinging sensation with a normal mucosa in absence of local or systemic disease[13].

Clinical features:

- Commonly seen in postmenopausal women
- Unexplained persistent burning pain or sensation oral soft tissues.
- Glossodynia and glossopyrosis
- Bitter and metallic taste.
- Normal oral mucosa
- Xerostomia
- Fissured and geographic tongue
- Painful jaw, TMJ and teeth
- Increased parafunctional activity
- Loss of comfortable jaw positions.
- Difficulty in speaking, dysphagia, nausea and gagging
- Usually bilateral in nature

Treatment and management

1. **Primary BMS (unknownetiology)**
   a. Pharmacological: Clonazepam, Chlordiazepoxide, Capsaicin, Amitriptyline, Gabapentin, Alpha lipoic acid, Oral lidocaine
   b. Behavioral interventions: Acupuncture, Low level laser therapy
2. **Secondary BMS (known etiology)**
   i. Topical and oral antifungal are used for **oral thrush**.
   ii. Oral supplements for **nutritional deficiency**.
   iii. High fluid intake and sialagogues for **xerostomia**.
   iv. Hormone replacement therapy for menopausal women.
   v. Change of medications for drug allergy management
   vi. Central nerve pain control with benzodiazepines, tricyclic anti-depressants, gabapentin, topical casaicin.
   vii. Oral lignocaine and topical steroids
   viii. Oral rinses and mouth washes

Idiopathic dysgeusia: Dysgeusia is defined as 'a persistent gustatory sensation or gustatory perception in the absence of any gustatory stimulants'. These are often perceived as abnormal bitter, sour or metallic taste[12,14].

Idiopathic xerostomia: The subjective report of oral dryness is termed as xerostomia which is the most common presentation of salivary gland disease[15].

Clinical features: The lips are cracked, peeling and atrophic; buccal mucosa maybe corrugated and pale in appearance, tongue is smooth and reddened with loss papillation. Marked increase in dental caries and erosion.

Glossodynia: The type of psychosomatic disorder in which the patient experiences chronic pain on the tongue surface is called glossodynia. It is generally associated with BMS, candida associated lesions (CAL) or a combination of both[12].

Glossopyrosis: It is the burning sensation experienced on the tongue surface preceded by long period of depression. It is generally associated with immunologic, gastrointestinal, psychiatric, dermatological and neurologic disorders; and BMS[12].

Neurotic habits induced disorders: These are the disorders induced by parafunctional habits of hard and soft tissues of the oral cavity.

Biting of oral mucosa (self-mutilation)[12,14]: Self-mutilation of the oral cavity is caused due tobiting of the oral mucosa originating as a result of chronic lip, tongue or cheek biting, most commonly observed on the lateral surface of the tongue and on the buccal and labial mucosa. These kinds of lesions are often seen in people with psychogenic background.

Treatment: Along with dental management; relaxation techniques, psychiatric treatment are helpful to the patient.

Dental and periodontal diseases caused by bruxism[12,14]: Bruxism is defined as 'the parafunctional clenching and grinding action between the upper and lower teeth.' These forces are stronger than masticatory forces if applied for longer periods of time; creates dental abnormalities like abfraction, hypersensitivity, periodontal distraction and temporomandibular dysfunction. Two most striking risk factors for bruxism include stress and anxiety.

Treatment:

- Use of splints as occlusal intervention
- Both by exacerbating the condition and innerting the effects anti-depressant drugs have great effects on bruxism like amitriptyline and nortriptylin.

Autoimmune disorders

Oral lichen planus (OLP)[16]: Lichen planus is 'a chronic mucocutaneous disorder of the stratified squamous epithelium affecting the skin, nails, scalp and oral and genital mucous membrane. It is immunologically mediated.

Clinical features: Literature describes 6 OLP classical presentation as Reticular, Erosive, Atrophic, Plaque-like, Papular, Bullous. Female predilection with age group of 30- 60 years. The characteristics of this lesion include radiating velvety greyish thread- like papules in a linear, retiform and annular arrangement. Tiny white elevated dot is seen at the junction of white lines called as **striae of Wickham**as compared to lacy, reticular white lines seen in the skin **Wickham striae of the skin. Koebner phenomenon:** the lesion appears in a linear manner following the traumatic line. Most commonly seen in the oral mucous membrane prior to the appearance of cutaneous lesions. **The 6 P's of lichen planus** are Planar**,** Purple**,** Polygonal**,** Pruritic**,** Papules**,** Plaques

Recurrent aphthous stomatitis (RAS)[17,18]: Recurrent aphthous stomatitis (RAS) is a disorder characaterized by 'recurring ulcers confined to the oral with no sign of any other disease.'

RAS is classified based on its clinical features. Those are:

1. Minor ulcers (less than 1 cm in diameter without any scars)
2. Major ulcers (more than 1 cm in diameter leaves scars on healing)
3. Herpetiform ulcers manifests as recurrent groups of small ulcers throughout the oral mucosa

Treatment modalities:

1. Cauterizing drugs like phenol, chromic acids
2. Vitamin B12
3. Milk of magnesia
4. Mucous membrane adhering compounds like orabase
5. Vaccination with cowpox vaccine
6. NSAIDs and anti-histamines
7. Topical corticosteroids
8. Systemic corticosteroid therapy if topical corticosteroids are ineffective

Erythema multiforme (EM)[19,20,21]: Erythema multiforme is a self-limiting, inflammatory, acute mucocutaneous disorder that is manifested on the oral mucosa and on skin.EM is most commonly induced by drugs such as barbiturates, phenytoin, penicillins and sulfonamides; or infection caused by HSV.EM without mucosal involvement is called EM minor whereas EM with mucosal involvement is called and EM major.

Clinical features: EM is a self-limiting eruption which resolves spontaneously in 3-5 weeks without sequelae. EM has a highlighting feature called as target lesion. It has a regular round shape. There are three concentric zones of EM; A central dusky or darker red zone, A paler pink or edematous zone, A peripheral red ring. Crusting or blistering sometimes occurs in the lesion's center

Treatment modalities: EM is generally self-limiting and will resolve in few days. If drug induced the offending drug is advised to discontinue.

HSV induced- EM the first line of therapy is anti-viral prophylaxsis: Acyclovir-400mg BID, Valacyclovir-500mg BID, Famicyclovir-250mg BID

Miscellaneous disorders

Recurrent herpes labialis[19]: It is caused by the infection of herpes simplex virus 1 (HSV1), called

herpes simplex labialis (HSL). The most common form of infection is gingivostomatitis.

Clinical features: Predominantly seen in young children. The condition is self-limiting over7-14 days. Characteristics of symptomatic cases are prodromal period of fever, malaise, dysphagia, lymphadenopathy, widespread oral ulceration and generalized gingivitis.

Treatment modalities: Treatment is done by anti-viral drug therapy-Acyclovir-400mg BID, Famicyclovir-500mg TID

Acute Necrotizing ulcerative gingivitis (ANUG) is an infection of fusospirochetes. Although there are local and systemic predisposing factors; emotional stress appears to be the most common causative element for the disease[22].

Chronic periodontal disease (CPD): emotional stress plays a major role in its etiology due to which the gingiva and periodontal structure doesn't respond to the locally irritating plaque and calculus[22].

Conclusion

Dental practitioner on a daily basis comes across so many stress induced disorders. Hence recognizing and managing it effectively has become need of the hour. Careful elimination of other etiological factors should be done before naming the source of the disorder as stress. The dentist has to work in unison with psychiatrist to provide the best treatment care to the patient; thus, closing the gap between the two specialties.

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A Cross Sectional Study to Assess the Level of Patient Satisfaction in OPD Services of a Govt. Hospital

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Abstract

Aim: Surveys are required to know the patients' necessity and their suggestions about the services getting in the hospital. It is an important factor in evaluating the healthcare delivery service in hospital.

Methods: It is a cross-sectional study to assess the level of patient satisfaction in Medicine OPD of a Govt. Hospital (CHC Berhampur, Cuttack). 200 respondents aged above 18yrs were selected by systemic sampling technique. A pre-structured questionnaire was used to conduct the research. Patients' experience with the outdoor services, facilities of hospital and patient satisfaction level were evaluated.

Results: Most of the respondents were satisfied with the services & facilities provided in the hospital. They were also highly satisfied with the services offered by physicians, nurses, and pharmacists but were little unsatisfied with the registration services and the amount of drug availability.

Conclusion: It is evident from the study that patient's satisfaction level should be conducted periodically to regulate, improve and proper management of hospital services.

Keywords: *Patients' satisfaction, Survey, Cross Sectional Study.*

Introduction

According to Hall et al, "Patients' satisfaction was defined as the result of matching one's expectation of healthcare services with actual experiences whether it is pleasant or unpleasant."[1] If the services are not as much as the patient have expected there will be a definite low level of satisfaction. And similarly, vice versa, if the patient's expectations are addressed properly there will be an extremely high level of satisfaction. Thereafter if the patients' needs are met with additional service that what initially they have expected there will be group of highly obliged and delightful patients. According to Swan, he suggested "that patients' positive opinion about service they have received is the process of matching between a set of generally accepted quality with their personal past involvement.[2,3] India is a developing country having large no. of villages in it. Thus, most of the population live in rural areas. In rural areas the only healthcare service provider is by the govt. hospitals. Although some private hospitals have come up in recent times still the govt. hospitals are the major source of healthcare service provider in rural areas. In the daily newspapers always, there are so many issues are raised by the public about the poor healthcare delivery services in govt. hospitals. So, the government has been constantly trying to improve its healthcare services as per the patient demands with the due course of time. There are several method that are being used to keep a check and evaluate the effectiveness and credibility of the various organisations and the working employers under them. In a system of healthcare service one of the main indicators of its improvement is the Patient satisfaction. Therefore, in a hospital to monitor the health care services a survey of patient satisfaction in relation to its services and cost plays a vital role. Mostly in health care consultation services the first department that comes in contact is out patient department (otherwise known to be the first line in the consultation).

This study is to assess the patients' satisfaction level in a Medicine Outpatient Department (OPD) of a govt. hospital at CHC level located in Odisha, India.

Methods

By receiving permission from the Medical Officer, I/C of the Community Health Centre Berhampur, the research process was started with collection of data.

Study Design: A cross-sectional study had been designed to find out the patients' satisfaction level and its relationships with different socio-demographic parameters of the studied population. A pre-structured questionnaire was selected from an earlier researcher and thoroughly examined, justified and then applied accordingly.

Study Population: The Medicine OPD of the Community Health Centre, Berhampur was selected as the site of study as the no. of patient visiting is more in comparison to another department. This hospital is chosen as the study site because it is situated in the rural area but very nearer to the city of Cuttack where all types of modern treatment are easily available. So, we can know whether peoples are satisfied here or they are preferred to move to the nearest city for the common medical problems. Samples were obtained from the patients who had been visiting the OPD of the Health Centre at the moment of collecting data.

Sample Size and Sampling Technique: 200 patients were interviewed for the study who were willing to give their response without any pressure or force from the researcher.

So as to find out statistically noteworthy representatives of the population, a systematic random sampling was used to draw the interval sampling number of patients that should be skipped for every sample selection. Every fourth patient from the samples available at the time of data collection are selected to be interviewed in all shifts to ensure the proper distribution of patients who represented the total population.

Research Instruments: Adopted from a previous study, a pre-structured questionnaire was used to collect the data.[4] There were 60 questions and 1 descriptive question, divided into 3 different segments:

1. Socio-demographic description,
2. Responses on OPD
   i. Facilities available,
   ii. Doctor-patient relation,
   iii. Nurse-patient relation,
   iv. Drug dispensary system,
   v. Opd registration.
3. Accessibility to OPD
   i. Waiting period,
   ii. Schedule of working,
   iii. Procedure of the service.
4. Suggestion and comments.

The pre-structured questionnaire was tested for the reliability by systematically randomly selecting 30 patients from the medicine OPD as the samples. Then the result was analysed statistically for the reliability coefficients. The data was collected by face to face interviews. The scoring method was adopted from a previous research article. [4] Table 1 shows scores for labelling the level of experiences, accessibility and patient satisfaction.

Table 1: Scoring table

Variables	Poor/Low (First Range)	Good/High (Second Range)
Experience:		
Physical facilities	5-7	8-10
Doctor–patient relation	7-10	11-14
Nurses–patient relation	4-6	7-8
Drug delivery system	4-6	7-8
Registration services	3-4	5-6
Accessibility:		
Waiting period	3-4	5-6
Working shifts	2	3-4
Service procedure	2	3-4
Patient satisfaction:		
Convenience	7-10	11-14
Courtesy	6-9	10-12
Quality of care	9-13	14-18

Part 1. Socio-Demographic profile of the respondents: In this segment there is patient's general information that is of what is the age, gender, marital status, occupation, educational status, number of visits and their monthly income. The questions comprise of 9 multiple choice as well as fill in the blank questions.

Part 2. Responses towards medicine opd: Responses of the respondents were divided into 3 sub categories like doctor-patient relation, nurse-patient relation, experiences with drug delivery and opd registration system. 17 MCQ were asked and the answers were recorded either as yes or no accordingly.

According to the scores obtained experience levels were categorized as good and poor.

Part 3. Accessibility to opd: Accessibility to opd comprises waiting periods for getting services, working times and service processes. 12 MCQ were asked and the answers were recorded either as yes or no accordingly. The experience levels were described as good and poor according to the scores obtained.

Part 4. Patients' Satisfaction with Medicine OPD: Satisfaction level were described in terms of convenience, courtesy, and quality of care provided by the clinical staff. Each segment is composed of 22 questions. Each question was answered as eithersatisfactoryor unsatisfactory.

Part 5. Suggestion or Comments: Patient give their comments or suggestions for the improvement of opd services in the Health Centre.

Data Collection Procedure: Patients of age 18 years & above and visited the OPD during data collection were selected. The OPD registration by taking general information of the patients was done by a nurse which makes easier for the researcher to select the sample with four patient intervals. Before visiting the doctor, patients were informed about the research process and asked for consent. Then data collected once they finish their consultation. Data was collected form all shifts like morning, afternoon and evening.

Statistical analysis: The data collected was analysed statistically by using SPSS software.

In SPSS, the following tests were used to obtain the desirable results:

1. Descriptive statistics: frequency, mean, median, mode, standard deviation, chi-squared test, and fisher's exact test.
2. Correlation analyses.
3. Computing variable and recoding into different variables.

Observation & Results

Table 2: Responses towards health services

Health services	Frequency				Level of satisfaction
	Yes		No		
	#	%	#	%	
Physical Facilities:					
Ease of finding opd	195	97.5	5	2.5	High
Cleanliness of opd.	190	95	10	5	High
Enough seats in waiting room.	178	89	22	11	High
Cleanliness of toilets in waiting room.	70	35	130	65	Low
The waiting room is spacious and well ventilated.	190	95	10	5	High
Doctor–patient relation					
Doctor told the detail of treatment procedure.	135	67.5	65	32.5	High
Doctor asked your health problem in depth.	178	89	22	11	High
Doctor understood your problem.	193	96.5	7	3.5	High
You got enough chance to discuss in detail.	158	78.5	42	21.5	High
Doctor gave sufficient time for you.	88	44	112	56	Low
There are enough doctors.	170	85	30	15	High
Nurses–patient relation:					
Nurses understood and answered your complain.	147	73.5	53	26.5	High
Nurses clarified you the consultation process.	186	93	14	7	High
There are enough nurses.	176	88	24	12	High
Drug delivery system:					
Pharmacist listened to you.	138	69	62	31	High
Pharmacist explained about the use of medicines.	156	78	44	22	High

Health services	Frequency				Level of satisfaction
	Yes		No		
	#	%	#	%	
There were enough drugs.	89	44.5	111	55.5	Low
There were enough of staffs.	192	96	8	4	High
Registration process:					
Registration staff listened to you.	138	69	62	31	High
Registration staff described you detail where to go.	158	79	42	21	High
There were enough staff	180	90	20	10	High

As per the **table 2** majority of the respondents were highly satisfied with the health services available except the cleanliness of the toilets present in the waiting room, the time spent by the doctor for the respondent and the number of drugs available.

In taken as a whole, most of the patients had high-quality experience with physical facilities, and the services provided by the nurses', doctors', pharmacy's, and registration, in that order. However, there were little concern regarding the time doctor used up for consultation, amount of the prescribed drugs, and registration services.

Table 3: b. Accessibility to Health Services:

Access to Health Service	Frequency				Level of satisfaction
	Yes		No		
	#	%	#	%	
Waiting Time:					
- Time taken for registration was correct.	95	47.5	105	52.5	Low
- Time taken for consultation is acceptable.	176	88	24	12	High
- Time taken for drug delivery is acceptable.	187	93.5	13	6.5	High
Working Schedule:					
- OPD timing is suitable to you.	190	95	10	5	High
- Do sufficient staff present in all shifts.	90	45	110	55	Low
Service Procedure:					
- Registration process was done timely.	90	45	110	55	Low
- Coordination between registration, OPD, and Pharmacy section is good	180	90	20	10	High

Based on the results from the **table 3**, it seems that most of the respondents were satisfied with the time taken to receive consultation and medicines from Pharmacy. Majority of them also reported that the OPD timing was suitable and there was good coordination between different departments. However, only 45% of the respondents satisfied with the time taken for registration, available of sufficient staff in all shifts.

Discussion

This study was about the patients' experiences towards the hospital; therefore, it was conducted during working hours. So, some patients were not comfortable in giving their experiences and opinions about the hospital services. A detail introduction of the researcher, the purpose, and the use of the data collected was provided to each participant.

Most of the patients have high level of satisfaction with health services provided in Medicine OPD of the Community Health Centre. Very few numbers (47) of respondents gave their comments or suggestions even after explaining the importance of the study and its use as indicator for the improvement of the quality of care. This shows a lack of interest of the respondents in sharing their personal experiences which may be due to:

- Inability to communicate their experiences
- feeling uncomfortable in a new environment
- the busyness of life,
- the nature of the respondent

Surveys are obligatory to make out the patient's necessitate and their judgment of the service that they have received as it is used in evaluating the quality of healthcare delivery service in any particular hospital.

According to Amin Khan Mandokhail's study in 2007, Thailand, "the level of satisfaction among 225 Medicine OPD patients was high for doctor-patient and nurse-patient behavior as well as Physical facilities and pharmacy services whereas the drugs were expensive and access to the services was poor. The level of Satisfaction was also influenced by marital status and occupation."[4]

Lower the satisfaction level poorer will be the compliance to treatment and poorer will be the health outcome. In the study conducted by Asma Ibrahim in 2008, "only 10.4% of 251 patients were highly satisfied. It showed that the patients' perceptions of the services were not good in term of convenience, courtesy, quality of care, hospital fee, and physical facilities. Particularly, the patients' opinion was mainly affected by the staff's attitude."[5]

Patient satisfaction is an important parameter in judging the quality of the healthcare services provided in the hospital. According to Anjum Javed in 2005, Satisfaction level was said to have significant relationship with the distance from patients' living areas to the hospital and opd timing.[6]

It is thought that the high levels of positive opinions of patients might have some relation tothe standards of living, gender, age groups, and even status of the patients whether they are single, married, or widowed, etc. But according to **Doborah L,** "there is little relationship between socio-demographic characteristics with satisfaction level."[7] Some study shows that people who are from the same ethnic groups tend to pay more attention or to help the people who are from the same sources. This idea is also said to apply in the performance done by physicians who are from the same groups as their patients.[8] Hall J.A. & Dornan M.C in their study described, "that some social advantages such as educational backgrounds, employments, revenues, a warranty are the keys for clients to decide which services to use."[8]

In order to improve the condition of the hospital, periodic assessment of patients' satisfaction level should be done. From the obtained study in the medicine outpatient department of CHC Berhampur, Cuttack, it is seen that preponderance of the patients were satisfied with the facilities that the hospital is providing and service of doctor's, nurse's and pharmacists. The majority of the respondents were relatively less satisfied with registration service, quantity of drugs that have been and the responsiveness of the staff who is registering. So, these area needs to be enhanced.[9]

Conclusion

A satisfied patient will always convey a good representation of the treating hospital which is the important factor for the management point of view. In this study, it was found that the service receiverwas satisfied with logistic array, nursing care, doctor's services, staffing pattern etc. Education was found to have significant relationships with patient satisfaction level. Hence the OPD services is an important element to provide a good image of the hospital and the patients' opinion are essential in quality improvement.Therefore, the author recommends that"Conduction of periodical survey emphasising on patients' contentment in the hospital should be done to keep up with the amend of the technology."

Conflict of Interest: None

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Ethical Permission: Approved

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Infant Mortality in India and its Contributing Risk Factors: A Systematic Analysis

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Abstract

Infant mortality rate (IMR) data can be used as a statistical measure to identify the changing dynamics of children health, which can be an indicator of the welfare and progress of a society. However, these data are usually collected by authorized bodies or Government organizations on a large scale, with very little local stratification. For implementing correct policies for medical intervention, the knowledge about patterns of the cause-specific mortality is necessary. Studies included in this article were identified through a systematic analysis search of the scientific literature published between 2018 & 2019. Secondary data was extracted from vital records, sample Registration system 2019, database from "UN inter-agency" group of infant mortality estimates. The data between 2009-2019 (on or before June 2019) were collected. The infant mortality rate was calculated based for every death per 1000 live birth in the year. The data for each year was evaluated based on the information collected from secondary records. Further, the IMR data from the "Indian Sample Registration System (ISRS)". Estimated NMR for 2019 was based on assumption and data collected on or before May 2019. For the purpose analysis all publicly available data on infant mortality was used.

Keywords: *Infant mortality; Cause-specific mortality; Systematic analysis, Microbial infections.*

Introduction

Infant mortality rates (IMR) is the measure to calculate number of deaths among children the deaths of 0 to 5 years of age per 1000 live births, including the neonatal mortality rates (NMR; i.e. within 28 days from birth)."Reducing neonatal mortality"was an essential part of the third "Sustainable Development Goal (SDG)" where SDG was adopted from Millennium Development Goals (MDG) and many more goals were incorporated in it in the years 2015, which will be relatable and beneficial to end preventable child deaths.[1,2] The SDGs also specifies that every country should focus to reduce the NMR down to 12 deaths per 1000 livebirths or fewer and under-5 mortality to 25 deaths per 1000 livebirths or fewer by the year 2030. The major issue is unavailable or limited data in low-income settings, where they are most needed and estimations are necessary.[3] India is a country with a significantly high infant mortality of 32 per 1000 live births(as on May 2019), neonatal mortality 28 per 1000 live births (as on September 2017) and increasing population of 1,368,973,535 (as on 8th September 2019) with 51 live births every minute. Further, the total death rate of 7.3 per 1000 population, lower maternal literacy rate 65%, below poverty population 276 million of total population (as on 2012)and other associated factors like presence of under-five sibling in the same family, lower birth weight, inadequate breast-feeding, malnutrition, poor sanitation, geographical factors and improper hygiene and environmental factors are responsible for increasing the incidence of infectious diseases and other cause–specific deaths among infants.[3] The new born being immunologically more suppressed are prone to acquire diseases and even death.[4]

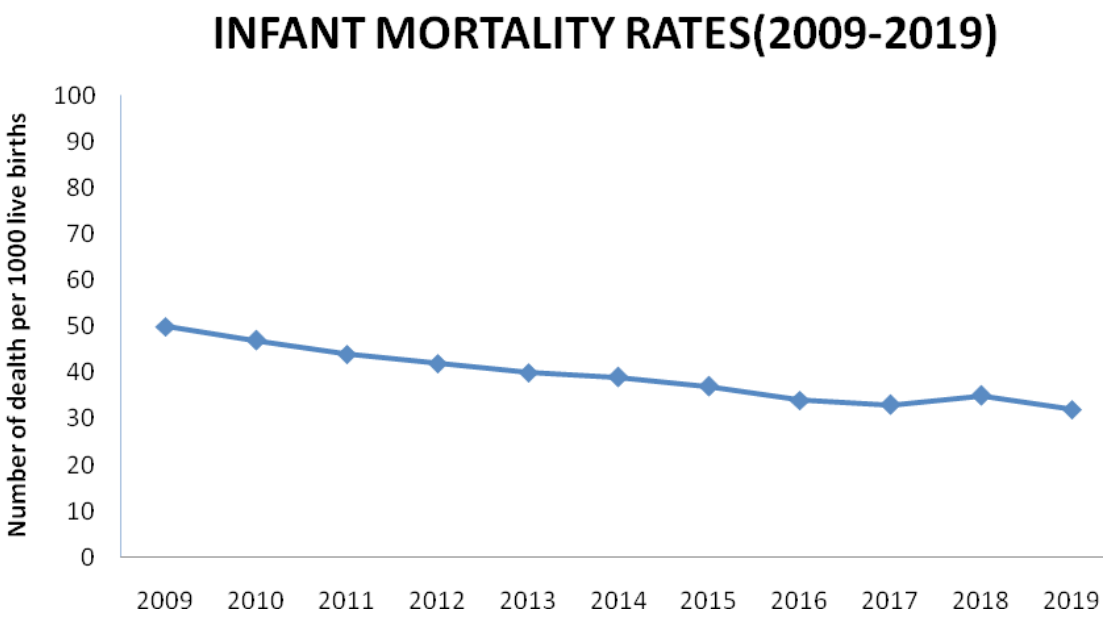
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The Child Health Epidemiology Reference Group (CHERG) is working in response to international demands and to meet the need of data in magnified form of evidence-based cause-specific mortality with group of experts jointly coordinate by WHO and UNICEF together. There has been a considerable progress in the estimation of data for under 5 mortality by Interagency Group for Child mortality Estimation (IGME). Neonatal deaths worldwide are estimated to be caused due to diarrheal infections, pneumonia and malaria which accounts for huge number of deaths.[5]

Method

A complete Study which included systematic analysis search of the scientific literature published between 2018 & 2019. Secondary data for infant mortality rates was extracted from vital records, Sample Registration System 2019, database from "UN inter-agency group" of child mortality estimates. The data between 2009-2019 (on or before June 2019) were collected. The IMR was calculated based for every death per 1000 live birth in the year. The data for each year was evaluated based on the information collected from secondary records. Further, the infant mortality data from the "Indian Sample Registration System (ISRS)", whose annual estimates are consistent with those of the NFHS were also collected. Estimated NMR for 2019 was based on assumption and data collected on or before May 2019. For the purpose analysis all publicly available data on infant mortality was used.[6]

Results



Source: http://www.geoba.se/country.php?cc=IN, https://childmortality.org/data.[7]

Figure 1. Infant mortality rates from 2009-2019 per 1000 live births (10 years study). The data for 2019 is collected on or before May 2019. The decreasing rates of Infant mortality in India shows it is expected tosignificantly decrease 5% by the end of 2019.

The result obtains by analyzing 10 years IMR shows significant decrease in IMR for a period of 10 years. The IMR which was 50 per 1000 live births in 2009 decreased slowly to 47 per 1000 live births in 2010, 44 per 1000 live births in 20011, 42 & 40 per 1000 live births in 2012 & 2013 non-significantly and slowly it reached 32 per 1000 live births as on or before May 2019.This decrease in mortality rates among infants in India over the past years consequent to improving socioeconomic conditions. Factors including the improving social, cultural and health, status of women, improved health services during pregnancy and post pregnancy period and women empowerment and many other policies for and facilities for women in India are responsible for decrease IMR.

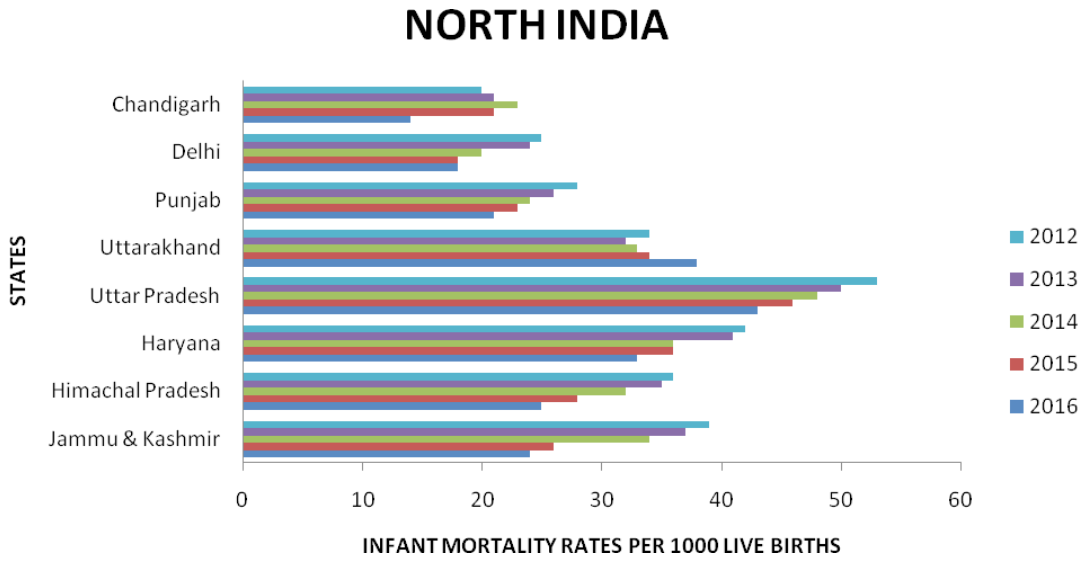


Figure 2. Infant mortality rates in North India (2012-2016)

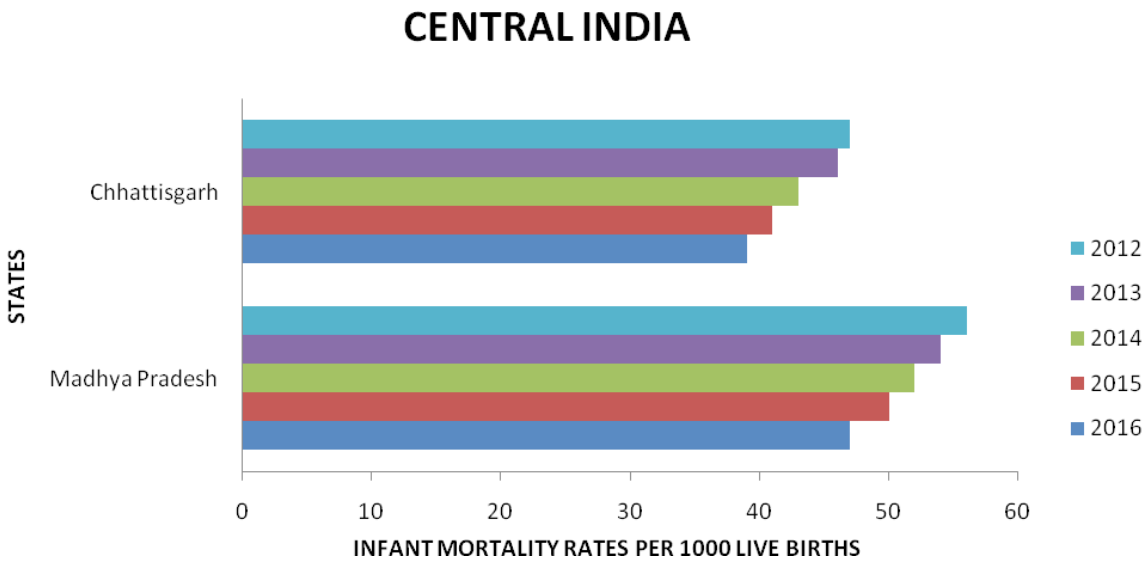


Figure 3. Infant mortality rates in Central India (2012-2016)

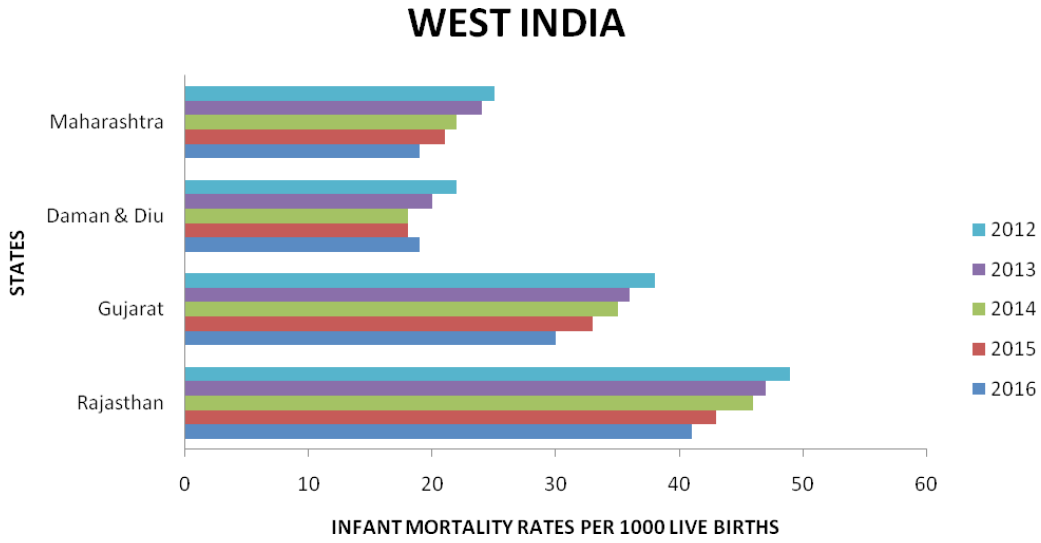


Figure 4. Infant mortality rates in West India (2012-2016)

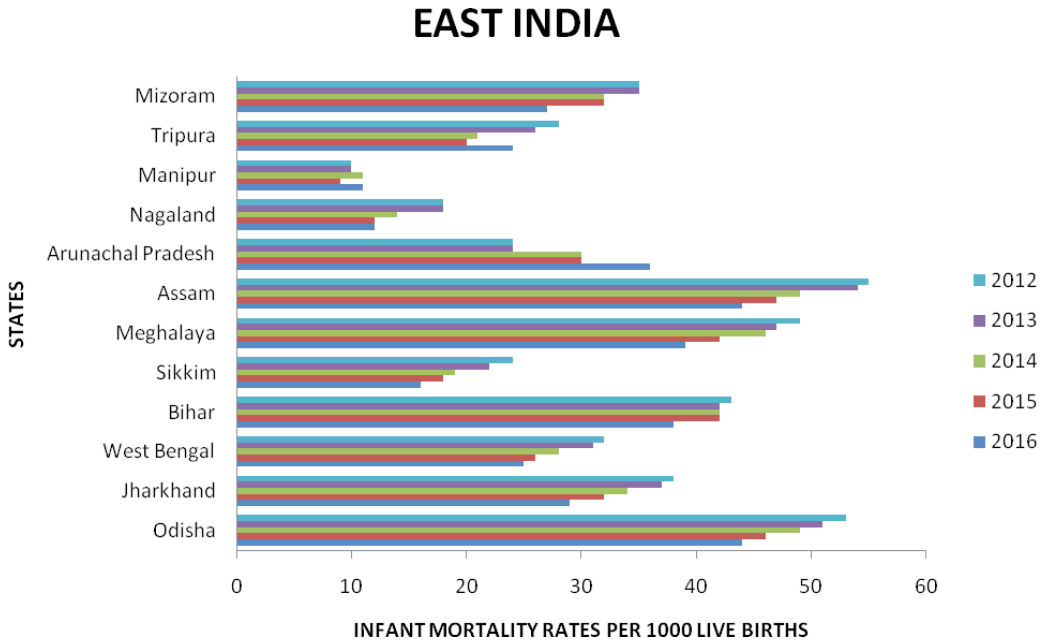


Figure 5. Infant mortality rates in East India (2012-2016)

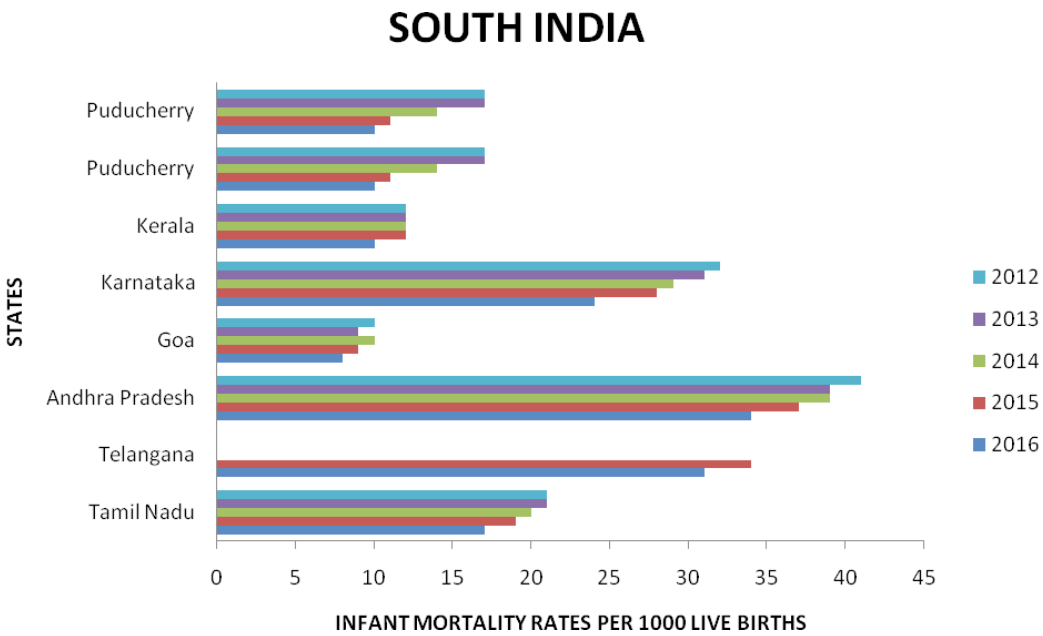


Figure 6. Infant mortality rates in South India (2012-2016)

From these above graphs it can be interpreted that the IMR has shown a significant reduction with time in different zones of India till 2016 (as of 2017 SRS data). However, in Uttarakhand, Northern zone with 38 infant deaths per 1000 live births, Tripura 24 infant deaths per 1000 live births and Andhra Pradesh 34 infant deaths per 1000 live births in the Eastern zone of India. The sudden differences of IMR in the year 2016 observed could be due to change in demographic pattern of these states, malnutrition, low-birth weight and pre-term birth. Further, epidemic, between 2008 and 2014, there were deaths cases of encephalitis in regions of Bihar and Uttar Pradesh which can be one the reason for sustainable high rates of IMR in these two regions. Moreover, dengue outbreak was recognized as one of the largest outbreak of the period, (v) most importantly climate change or natural disasters such as flood, landslides which are common in Northern regions of India, especially in Uttarakhand, (vi) other disease-specific/cause-specific reasons also might have been responsible for increased Infant mortality rates.

Discussion

The "Sample Registration System (SRS)" is a large-scale demographic survey which provides consistent yearly estimates of IMR, birth rate, death rate and other fertility & mortality indicators at the various national and state levels.[8] Initially on pilot basis by the Office of the Registrar General, India in between 1964-65 in few selected states had started and during 1969-70 it had become fully operational with about 3700 sample units. Although there has been a substantial decrease in IMR since 1990, there is still a need of increased effort to improve progress in order to achieve the SDG target by 2030.[8] Individual state government in India must be advised to consider the current mortality rates and the level of progress of IMR decreasing policies in their respective states. Among the States/Union Territories, the IMR ranges from 12 in Nagaland to 47 in Madhya Pradesh for 2017.[9,10]

Cause-Specific Mortality: Infant mortality can be due to the following infectious and systemic disorders: pneumonia, diarrhea, neonatal sepsis, malnutrition and/or anemia, fever, measles, malaria, typhoid, dengue, stillbirth, preterm birth, Low birth weight, tetanus, asphyxia, chronic diseases and miscellaneous. The miscellaneous category included mostly infective and a few systemic disorders which may cause child death.[11-14] The major causes include:

Pneumonia: Acute respiratory illnesses are major cause of deaths among children under 5 which includes pneumonia & bronchiolitis most commonly. Pneumonia is the largest killer of children causing about 20% worldwide.

Diarrhea: The most common gastrointestinal infection among infants is diarrhea and it is the leading cause of preventable deaths not only in India but also in most developing countries. It was estimated in a review that 2.2 (approximately) infants die annually from diarrhea worldwide. Water and food are some of the major source of contamination and propagation of disease, thereby causing large number of morbidity and mortality among infants.

Neonatal sepsis: Sepsis and meningitis are major cause of morbidity and mortality among infants, especially among children with low-birth weight & preterm. It is acquired by nosocomial or community source. Meningitis is a fatal infection which includes bacteria, viruses, parasites and fungi.

Malnutrition: Malnourished children and are always at an increased risk of acquiring infection and even death. The presence of characters such as stunting, wasting/underweight were determined malnourished using WHO child growth standards or the NCHS growth reference. Low birth weight is another major cause of infant death, the principal cause of death over two third of deaths occur in low birth weight (less than 2.500 Kg).

Preterm Birth: Preterm infants may suffer from asphyxia. Under developmental conditions may lead to morbidity and ultimate death within few days.

Malaria: Placental malaria is one of the major reasons for infant death. Since, there are no other understandable causes of asphyxia, malaria is considered to be most probable cause of infant death.

Conclusion

The data extracted from successful records lacks cause-specific year wise data of infant mortality. Though there is a decline in rates of infant mortality in last 10 years, for a period of 2–3 years of slower declines in the IMR which was later followed by years of very rapid decline. Future child health policies should be built based previous study outcomes and from the results of child health programs implemented in India. There should be continuous effort to sustain the achievements that have already been made and there is also need to enhance quality and efficiency of the ongoing programs. Fresh and innovative planned policies should be implemented for reducing childhood illness and developing health care system in rural and urban areas. The Government must reassess the current policies for decreasing IMR in country & must implement more holistic measures. Socioeconomic, environmental, behavioral, educational health and nutritional determinants also influence infant mortality and should be equally taken care of and maternal education, pre and post pregnancies training session should be conducted so as to reduce the incidence of preventable deaths.

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Conflict of Interest: None

Ethical Permission: Approved

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Diagnosis and Management of Endodontic-Periodontal Lesions

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Abstract

Relationship between periodontal and pulpal disease was first described by Simmering and Goldberg (1964). After that Endo-Perio lesion is being used as the terminology for describing the lesions due to inflammation and its products found in the tissues of both periodontium and pulp. Studies regarding the relationship between endodontium and periodontium has been done extensively and the queries related to the correct diagnosis,treatment plan and prognosis has been always a raise.A tooth which is symptomatic,may have pain of either pulpal or periodontal origin. In determining the etiology of such problem, the nature of that pain is important. The main purpose of this article is to present the anatomical considerations of pupal and periodontal relationships, the factors initiating the pulpal and periodontal lesions, Biologic effect of pulpal infection on periodontal tissues and periodontal infection on the dental pulp, diagnostic considerations and successful management of tooth with endodontic-periodontal lesions.

Keywords: *Endo-Perio Lesions, Anatomic Considerations, Diagnosis; Treatment Strategies, Prognosis.*

Introduction

As the endodontium and periodontium are closely related to each other, the diseases of endodontiummay lead to involvement of periodontium or vice versa. In this case,correct diagnosis is very important so that appropriate treatment can be provided.From embryonic stage[1,2];Pulpal tissues and periodontal tissues are interlinked to each other.Thedental papilla which,is a precursor of dental pulp and dental sac, which is aprecursor of periodontal ligament;are of a common mesodermal origin.Inlate bell stage; epithelial root sheath separates dental papilla & dental follicle; Except at the base of the future apical foramina.So, naturally periodontium gets affected by pulpal inflammation and vice versa.[3]

Anatomic considerations: Apical foramina are the main & obvious route of communication between pulp and periodontal ligament. Advanced pulpitis will lead to pulp necrosis, which often is accompanied by inflammatory bone resorption at the root apex, as found in cases of apical periodontitis or an apical abscess[4]. This is also known as retrograde periodontitis as it presents the breakdown of the periodontium from an apical to a cervical direction. This is typically identified as a periapical radiolucency.[5]

Alternatively lateral or accessory canals may also be the routes of periodontal and pulpal communications. Prevalence of accessory root canals in various human teeth and their contribution to root canal system complexity has been well established.[6]Third root of communication between the periodontium and the pulp is through the dentinal tubules. Dentin is a permeable structure and the permeability changes at different locations along the root surface according to the size and density of the dentinal tubules. Colonisation of bacteria in dentinal tubules from infected root canals and invasion of bacteria into the dentinal tubules from the periodontal pocket proves that dentinal tubules may allow pulpal irritation which arise from periodontitis.[7,8]

In addition to the above routes there are chances of communication between pulp and periodontium by iatrogenic defects, such as vertical root fractures and tooth perforations. These are non-anatomic communication and result in spread of infection from one to another.[9]

Factors Initiating Pulpal and Periapical diseases[10]

- Microorganisms
- Trauma
- Excessive heat

- Restorative procedures
- Restorative agents
- Malocclusion

These lead to inflammatory changes in the pulp, starting from a reversible or irreversible pulpitis and ultimately progressing to pulpal necrosis and breakdown of the periodontium. Dental caries is the cause of pulpal disease and bacterial infection is the form of microbial insult to the pulp.[11]Thermal changes caused by dental procedures such as tooth preparation leads to alteration of pulpal circulation and induce pulp tissue damage. Pulpal necrosis will lead to apical periodontitis. Chemical irritants also impose measurable changes in the pulp status. Etching the dentin with high phosphoric acid content has deleterious effects on dental pulp.[12] Bonding Agents also lead to acute pulpitis and varying degrees of necrosis in teeth. Root canals overfills with gutta-percha and sealers also cause inflammatory reactions in the apical tissues but the patient might be completely asymptomatic.[13]So to make a proper diagnosis, a clinician must evaluate the symptoms, radiographic and clinical findings and the presence absence and location of any swelling or drainage.[14]

Classification of endodontic-periodontal lesions[15-17]

SIMON ET AL (1972)

1. "Primary endodontic lesions"
2. "Primary endodontic lesions with secondary periodontal involvement"
3. "Primary periodontal lesions"
4. "Primary periodontal lesions with secondary endodontic involvement"
5. "True combined lesions"

GROSSMAN (1991)

Based on the treatment strategy-

1. "Teeth that require endodontic treatment alone"
2. "Teeth that require periodontal therapy alone"
3. "Teeth that require endodontic as well as periodontal treatment"

TORABINEJAD AND TROPE(1996):

1. "Endodontic origin"
2. "Periodontal origin"
3. "Combined endo-perio lesion"
4. "Separate endodontic and periodontal lesions"
5. "Lesions with communication"
6. "Lesions with no communication"

World Workshop for Classification of Periodontal Diseases (1999):

Periodontitis associated with endodontic disease:

1. "Endodontic-Periodontal lesions"
2. "Periodontal-Endodontic lesions"
3. "Combined lesions"

VON ARX AND COCHRAN (2001)

Class 1: lesion with bone defect in the apex which may invade the buccal and lingual apex"

Class 2: Apical lesion with the concomitant marginal involvement also referred as a combined periodontal endodontic lesion, with great periodontal pocket depends around the affected tooth.

Class 3: Furcation lesion coming from the accessory canals or from iatrogenic perforation and the marginal lesion may or may not occur."

KIMANDKRATCHMAN:

A. Absence of periradicular lesion, no mobility, normal pocket depth, but unresolved symptoms after non-surgical therapies have been exhausted.

B. Presence of a small periradicular lesion in the apical quarter, clinical symptoms such as discomfort or sensitivity on percussion as sinus tract, normal periodontal probing depths and mobility."

C. Large periradicular lesions progressing coronally but without periodontal pockets or mobility

D. Clinically similar to those in Class C but with periodontal pockets more than 4mm and no communication of the pocket and the endodontic lesion.

E. Deep periradicular lesion with endodontic periodontal communication to the apex but no obvious fracture.

F. Apical lesion and complete denudement of the buccal plate but no mobility.

ROTHSTEIN AND SIMON (2006):

1. Retrograde periodontal disease: It could be of two types
   A. "Primary endodontic lesion with drainage through the PDL"
   B. "Primary endodontic lesion with secondary periodontal involvement"
2. "Primary periodontal lesion"
3. "primary periodontal lesion with secondary endodontic involvement"
4. "combined endodontic periodontal lesion"
5. "Iatrogenic endodontic periodontal lesions"
   A. "Root perforations"
   B. "Coronal leakage"
   C. "Dental injuries or trauma"
   D. "Chemicals used in dentistry"
   E. "vertical root fractures"

Etiological factors:

1. Live pathogens: Bacteria, fungi, viruses
2. Nonliving etiologic agents-Extrinsic agents, Intrinsic agents

Contributing factors[18]

1. poor endodontic treatment
2. poor restorations
3. trauma-crown fracture without pulp involvement, crown fracture with pulp involvement, crown root fractures, root fractures, concussion, subluxation,Extrusive luxation, intrusive luxation and avulsion.
4. Resorptions: external, replacement and internal.
5. perforations
6. developmental malformations

Clinical diagnostic procedures[19,20]

Visual examination: Cheeks,lips,oral mucosa, tongue, palate and muscles is examined visually. Alveolar mucosa,attached gingiva are examined visuallyto detect; inflammation, ulcerations,sinus tracts,teeth are examined to detectdental caries; faultytooth restoration; fractures; erosions; abrasions.

Palpation: Done byapplying firm pressure with the index finger on the mucosa covering roots; which detects presence of hot zones that produces a response which is painful. Positive response indicates active periradicular inflammatory process.

Percussion: Percussion is performed by the clinician by tapping on the incisal or occlusal surface of the tooth with the back end of mirror handle. The tooth is tapped horizontally & vertically.Positive response indicates that apical periodontium is inflamed.The origin may be pulpal or periodontal.

Mobility: On each side of crown;two mirror handles are used and mobility is checked. Pressure is applied on faciolingual & vertical direction. Extremely mobileteeth have poor periodontal support which indicates periodontal disease may be the primary cause. Tooth which are recently traumatised and which have fractured roots are also mobile.

Radiographs: These are important tools for detection of carious lesions,extensive or defective restorations, pulp cappings, previously endodontically treated tooth,canal obliterations, root resorption, root fractures, peri radicular radiolucency,thickened periodontal ligament and alveolar bone loss. But the clinical signs and symptoms and other clinical tests are also essential during radiographic evaluation.

Pulp Vitality Testing:

Cold test: Done usually by applying a cold substance on tooth surface. The tooth surface must be first isolated. Cold method are- "ice sticks", "ethyl chloride", "CO_2" (dry ice), "dichlorodifluoromethane". Prolonged & intense response indicates"irreversible pulpitis" & absence of response indicates "pulp necrosis"

Electric test: Done with the help of a"special pulp tester device". Tooth is cleaned; isolated; dried. On the electrode of the pulp tester; small amount of toothpaste is placed and then it is l put into contact with the particular tooth surface. Till patient reports sensation; electric current is applied gradually. False negative responses may occur if there are obliterated root canals;poor electrode tooth contact; traumatised tooth,immature apices, drugs that elevate pain threshold.

Pockets probing: It is important for differentiating endodontic and periodontal lesions. Williams's probe is used; probing depth & CAL (clinical attachment level)

is determined. Used to track a sinus resulting from an inflammatory periapical lesion that extends cervically through the PDL space. If a deep pocket is present without any periodontal disease, it indicates the infection might be endodontically or it might be a vertical root fracture.

Fistula tracking: Usually,opening of the sinus track is visible on the attached gingiva or the vestibule. The fistula is tracked by inserting a radiopaque material;into the sinus track. Gutta percha cones or silver cones are commonly used.Post insertion Radiograph will show the course of sinus track & the origin of inflammatory process.

Treatment decision making and prognosis: There is no difficulty in diagnosis of primary endodontic & primary periodontaldisease. Usually pulp gets infected,non-vital in primary endodontic disease.In case of primary periodontal disease; pulp vitality is normalso responds to pulp vitality testing. primary endodontic disease with secondary periodontal involvement,Primary periodontal disease with secondary endodontic involvement & true combined lesionsare clinically and radiographically similar. If there is no evidence of plaque induced periodontitis; lesion is treated endodontically first;then clinical probing shows soft tissue healing;recall radiograph shows bony healing;then the lesion can be diagnosed retrospectively. Degree of healing afterRCT will determine the retrospective classification. If adequate healing does not happen, thisisindicative of periodontal treatment.

Prognosis and treatment plan varies according to type of endodontic periodontal disease. There is good prognosis in primary endodontic lesionas the endodontic treatment is the only treatment of choice. In Primary periodontal disease"; prognosis depends on the extent of the periodontal disease and how the patient responses to the particular treatment Primary endodontic disease with secondary periodontal involvement" should be treated endodontically first. Results are evaluated in two-three months and after that periodontal treatment is considered. This gives adequate time for initial tissue healing and the periodontal condition is assessed in a better way[21].

Primary periodontal disease with secondary endodontic involvement and true combined diseases need endodontic and periodontal therapy. Intrapulpal infection leads to an epithelial down growth along surface of dentin. Experimentally induced periodontal defects was associated with twenty percent more epithelium.Teeth which were not infected;showed ten percent more connective tissue coverage[22].

Treatment of endodontic periodontal lesions: Primary endodontic disease: In endodontic treatment; lesiongets healed. As affected pulp is removed during RCT; sinus tract disappears in early stages of the treatment; the nit is cleaned, shaped, obturated. In chronic lesions; periodontal abscess occurs so evaluating carefully is needful for proper treatment.

Primary periodontal diseases: In Primary periodontal disease, first classical line of treatment includes scaling and root planning. Then; restorations which are poorly contoured are removed, developmental grooves are removed so that the tooth can be accessible for better maintenance and the treatment can be successful. Then the periodontal therapy begins. How much extensive is the lesion and how much efficient the periodontal treatment determines the success of the treatment.

True combined diseases: True combined lesion might be the result of faulty RCT or faulty posts or coronal restoration. In this case RCT is the first treatment of choice but one can not expect a good prognosis if the periodontal lesion is extensive. In such cases,periodontal regenerative procedure is first performed so the that prognosis depends on periodontaltreatment.

Treatingiatrogenic lesions: Thing which is to do first is to close the iatrogenic communication. Root perforations are treated according to their etiology,but Palatal perforations can't be managed surgically so that the tooth frequently leads to extraction. Root perforations can be treated successfully if early detection is made. In case of vertical root fractures,the prognosis is very poor;so it is indicated for extraction.

Conclusion

Diagnosis of endodontic periodontal lesion is most important. After that a correct treatment can be planned. The chief goal of the periodontal therapy in this scenariois the preservation of the periodontium. The aim of RCT is cleaning the root canals and shaping them followed by obturation so as to maintain the apical periodontium. The success in the treatment of endo periolesions depends on all contributing lesions are treated or not.Both endodontic as well as periodontal therapy is required for true combined lesions. Whether first the endodontic therapy is completedor the periodontal therapy should be accompanied with the endodontic treatment;the decision

making completely depends on accurate diagnosis. The dentist should be highly experienced clinically so that he is able to choose the treatment planwhich is appropriate for the condition.

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Dental Administration of Patients Acquiring Anticoagulant and/or Antiplatelet Treatment

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Abstract

The main objective of the study is to determine,the management of patient who is under anticoagulant therapy in cardiac patients with periodontal disease and to follow up the effects of dental procedures associated with low-doses of antibiotics in relation with coronary atherosclerotic disease. Patients living with cardiovascular disease are susceptible to physical and emotional stress. This is further magnified if the patient needs dental treatment, as dental surgery itself is stress provoking. Cardiac patient may collapse and die in the dental chair, because of cardiogenic emergencies and multiple drug interactions. Cardiac patients are a great risk for dental surgeons that are why a multidisciplinary approach while managing these medically compromised dental patients is of paramount importance to achieve the desired outcome. Adequate haemostasis is a decisive factor for dental treatment.

Keywords: *Anticoagulants, Coumarin, Fibrin, Heparin, Thrombosis.*

Introduction

Haemostasis is the physiological course that blocks bleeding at the site of an injury while sustaining normal blood flow elsewhere in the body. Loss of blood is interrupted by construction of a haemostatic plug. The presence of endothelium in the blood vessel uphold an anticoagulant surface that assist to sustain blood in its fluid state, if there is injury to the blood vessel contaminated components of the soft endothelial matrix are opened to the blood. At this stage two important mechanism of haemostasis is initiated, that is formation of blood clot and aggregation of platelets and fibrin.[1]The fibrinolysis pathway also plays a major role in thrombosis. If there is thrombosis or pathological bleeding can happen whenever this course is disturbed. Appropriate equivalence between pro-coagulant systems and anticoagulant systems plays a major role in legitimate haemostasis and prevent a formation of thrombus.[2,3]

Review of Literature: The anticoagulants are mostly used to prevent all kind of cardiac diseases; aspirin is the most commonly used drugs in these patients. Extractions in these patients who are undergone replacement of valves are mostly under anticoagulant oral therapy, as these patients may complains or at a risk of post-operative bleeding complications, in recent studies most of the authors they have come to a conclusion that anticoagulant medication should not be stopped before any kind of minor surgical procedure to prevent severe thromboembolic complications.[4] To prevent bleeding probabilities in patient under anticoagulant therapy, several measures has been described by various authors. Some authors have used antifibrinolytic agent such as local haemostatic materials for blockage of post-operative bleeding. Some authors have also used fibrin glue in the dental extraction sockets.[5,6]

Many authors have suggested use of platelet-rich plasma (PRP) in the dental socket without stopping the anticoagulant drugs. The goal of PRP is to improve healing through release of platelet growth factors. Many authors also suggest to do the INR (International normalize ratio) before doing extraction any kind of

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minor oral surgical procedure. If INR is increased then patients are advised to stop the anticoagulant drugs minimum of 3 days, then INR is again checked and if it is normal then the patient can be taken for dental surgery.[7,8]

If there is increase in the value of international normalize ratio the amount of bleeding during the dental procedure will be more. In literature there are cases has been reported where the cardiac patient under anticoagulant therapy, if the anticoagulant drugs are stopped prior to minor dental procedure without checking the values of PT/INR the patients had suffered from cardiac problem (coronary artery blockage). Few authors had also explained the dental procedure which has minimal invasive in nature there is no need to stop any anticoagulant drugs prior to the procedure.[9]

In major surgeries in cardiac patient under anticoagulant therapy, where there is a chance of bleeding can be managed with small doses of fractionated heparin and local haemostatic agent should be incorporated at the site of the surgery to prevent bleeding on the operated site. These patients usually be in the bed for a longer time so the chances of deep vein thrombosis (DVT) is higher. So low molecular heparin use should be implemented during the course of surgical treatment to prevent DVT.[10]

Dental Aspect: The patient with anticoagulant therapy has a tendency to bleed so these patients' surgical extractions should be avoided and patient has to be convinced for non-invasive procedure such as root canal treatment and other rehabilitation procedures. Cardiology consultation has to obtain from the patient before taking up any procedure, a high-risk consent form has to be signed from the patient before examination of the patient, to avoid any medico legal complications.[11]

INR should be used as a gold standard test in patient who are under warfarin therapy, if warfarin is stopped before or during the procedure the prevalence and incidence of hyper-coagulability. In the day of surgery, the values of INR should be preferably analysed, if the INR value is more than 3 then any minor dental surgical procedure has to be treated in hospital under the supervision of haematologist where the warfarin medication has to be altered and patient has to be shift to heparin instead of warfarin.[12-15]

The patient is under oral aspirin therapy the recent studies are stated that there is no need to stop aspirin during or prior to the extraction, in practise aspirin hardly hampers or cause any kind of complication during dental procedures, but other authors also stated that before stopping oral aspirin prior to or during surgery INR/PT value should be obtained or checked.[13-18]

Conclusion

The management of cardiac patient under anticoagulant therapy who comes to the dental hospital for dental treatment, requires the surgeon to create a harmony between the risk of haemorrhagic complication and the fatal risk of serious thromboembolic episode. The older guidelines where to stop oral anticoagulant therapy prior to the dental procedure to avoid the risk of bleeding during procedure or after the procedure. However, in recent studies maximum author has stated that none of the cases have fatal bleeding complication during oral surgery patient who is under therapeutic levels of warfarin sodium where as a high number of cases of embolic complication has been reported where the anticoagulant has been stopped. So, concluding before stopping any anticoagulants whether on the form of warfarin, heparin, oral aspirin do not stop it immediately before taking INR. If INR values are normal in their patient then no need stop anticoagulant therapy during dental procedure.

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Epidemiology of Oro-facial Clefts

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Abstract

Cleft defects are very common deformations in the head and neck region. This requires immediate intervention by specialists from birth. Counseling patient and family members from the initial period is vital. Treatment is done phase by phase. There have been various factors affecting prevalence of this defect. This article is a review of the epidemiology of cleft defects, observed in different regions and in India.

Keywords: *Cleft Lip and Palate, Prevalence, Incidence.*

Introduction

Oral and Facial clefts are one of the commonest congenital deformations which may involve lip, palate to other craniofacial structures. Oro-facial clefts have a psychological, social, behavioral impact on the patient[1]. There have been wide variations in ethnicity and race regarding prevalence of oro-facial clefts. Environmental factors, genetics and morphogenesis of palate formation play a major role in cleft and palate defects[2].

Review of Literature:

The global set-up: A study of data was retrieved between 1978-1987 in the Rhône-Alpes/Auvergne birth defects registry. It confirmed 903 cases with incidence of 0.67/1,000 for cleft lips with or without palate involvement and 0.44/1,000 for cleft palatescases. Cleft lip and palate are more frequent in males, and cleft palate are found to be more frequent in females.[3] In a study conducted in Kumasi were reported Ghana, Africa, 1.31/1000 congenital cleft defects[4]. In a study conducted among Brazilian oro-facial clefts patients, prevalence was 1 out of 1010 live births. 21.2%, 23.8%, 55% cases were identified with cleft palate, cleft lip and cleft lip and palate, respectively. 15.3% patients were syndromic, 10.4% patients had cleft lips with or without cleft palate, and 33.9% patients had Cleft Palate. There is 18.52% decrease in prevalence of non-syndromic cleft patients following fortification with folic acid in Brazil[5]. Prevalence of 0.5 per 1000 was found from data collected from 7 Smile Train centers from 6 geo-political zones in Nigeria in between September 2006 to June 2011. Prevalence was found to be 0.5 per 1000. A significant gender difference for cleft palate patients was observed with more females than males[6]. 389 surgeons from Africa filled questionnaires regarding 36,384 patients out of which 34.44% were lip clefts, 58.87% clefts of lip and palate, and 6.69% clefts of the palate only. There is male predominance with male to female ratio as 1.46:1[7]. In another study, data regarding prevalence of cleft lip and palate patients between 1990 and 2014 were collected. From 28 studies meeting the first inclusion criteria, the pooled live births were 31,475,278. The prevalence of undifferentiated cleft lip and palate was 1.38 per 1000 births. But, during secondary analysis, where 4 studies met the inclusion criteria, 75,627 births were observed with a prevalence of 0.75 cleft lip and palate cases per 1000 births. There was prevalence of approximately 1 in every 730[8].

In the literature search conducted through PubMed from 1950 and June 2015, 45193 Oro-facial Clefts patients from 30,665,615 live births were counted. In Asia 1.54-1.60, North America 1.53-1.59, Europe 1.52-1.58, Oceania 1.30-1.36, South America 0.96-1.02, and Africa 0.54-0.60 oro-facial cleft patients per 1,000 live

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births were reported. American Indians had the highest prevalence rates and the Blacks had the lowest rate of 2.62 per 1,000 live births and 0.58 per 1,000 live births, respectively. Differences based on ethnic origin, genetic, environmental factors and method of ascertainment, were observed[9]. A total of 202 Cleft Lip and Palate case records, registered in Kuwait from January 2009 to December 2014 were collected. Prevalence was 0.57 per 1000 live births. Males had slightly higher prevalence females. Babies to Kuwaitis parents were at a greater risk than those to Non-Kuwaiti parents. The prevalence difference across gender and nationality were statistically insignificant[10].

Indian set-up: A pilot project with a motive to establish basic standards of cleft patient care in India was started by Indian Society for Cleft Lip and Palate and Craniofacial Anomalies Meeting, 2006, at Guwahati, Assam. This also helped craniofacial treatment centers in India to participate in clinical research conducted by WHO. The generated data would be useful for comparison with that of other countries and would be used to improve quality of life of cleft patients[11].

A study conducted on the basis of GBD 2016 presents a relatively lower prevalence and incidence rate of OFC as compared previous results which was done in 1990 with increase in quality of life of patients[12]. Consanguinity of parents were searched among 18,242 patients in Hyderabad. 3653 cases i.e. 20.2% of total cases with consanguinity were identified. 57.8% parents had first degree of consanguinity whereas 3.5% had a positive family history[13]. A study of 926 patient records was done over a 10 year period (2007–2016) and Male to female ratio was 1.2:1[14]. Among 126 patient data accumulated from three centers by Kharbanda and et. al, a wide variation in age at primary lip i.e. range 2-60 months and palatal surgery i.e. 4-78 months was seen. 29% required lip surgeries, 35% required nose surgeries. A high proportion of them had hearing defects, tympanic membrane afflictions, relevant speech i.e. 60%, 56.3% and 40%, respectively[15,16].

Discussion

The major approach to diseases is evidence-based interventions to improve quality of life by treating and majorly by preventing the diseases[18,19]. Due to varied ranges of ethnic groups, factors associated, lack of access to healthcare and awareness a state-wise registry to maintain congenital defects is necessary for National record maintenance which should begin at grass-root levels[20].

Conclusion

Besides,Smile Train and Operation Smile, Deutsche Cleft, Mission Smile, and Lifeline Express have extended service for cleft patients in India and other countries. Systematic categorization of centers should be done to improve quality of service. Healthcare facilities have grown, but these are not adequate and even in terms of distribution and service. Though there is penetration of NGOs and other service providers, masses in the periphery still are deprived. Quackery and lack of awareness is adding up to improper treatment and outcome. Further research and surveys would definitely give solutions towards better service, patient care, management and awareness leading towards improved quality of life of cleft and palate patients.

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Clinico-pathological Correlation of three Cases of Squamous Odontogenic Tumor, a Rare Entity in the Odontogenic Tumor's Arena!

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Abstract

The squamous odontogenic tumour (sOT) is a rare, benign epithelial neoplasm of odontogenic apparatus that appears to originate from the rests of Malassez, remnants of the dental lamina or gingival epithelium. From its first documentation in 1975, Since then there is limited number of reported cases, especially in the Indian subcontinent. We report three cases of SOT with varied clinicopathological presentation and management. The first two cases presented as asymptomatic swellings in maxilla whereas the third one was in body of mandible. Variable radiographic picture ranging from well-defined radiolucency to mixed radiolucent-radiopacity was noticed among the three cases. All cases responded well to the conventional treatment therapy.

Keywords: *Squamous odontogenic tumor; Benign neoplasm; Radiolucency; Histopathology, Conventional treatment.*

Introduction

Squamous odontogenic tumor (SOT) is a rare benign neoplasm, was first described in 1975 and been classified as an independent entity in recent times.[1] Though the etiopathogenesis of this locally-invasive odontogenic epithelial neoplasm still remains a dilemma, it's been reported to be considered as a hamartoma, pertaining to its multiple site involvement and particularly due to its familial multicentric variety.[2] It occurs mostly in the third decade of life with equal propensity to both jaws. Radiographic features of SOT are non-specific and been described to be either well-circumscribed semicircular radiolucency or triangular-shaped radiolucent lesion adjacent to the roots of teeth. The lesion is usually central, but sometimes it may be peripheral.[1] The typical microscopic appearance includes islands of squamous cells in a mature connective tissue stroma. The most important aspect of this lesion is its mistaken histologic identification as an acanthomatous ameloblastoma or a well differentiated squamous cell carcinoma.[3] The most amenable treatment protocol is conservative surgical removal in the form of local excision or thorough curettage in cases of SOT. Slightly more aggressive intervention may be indicated for lesions of the maxilla and recurrence has been rarely.[4]

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Case 1: A 38-year-old male patient reported with an asymptomatic enlargement of the right maxilla with obliteration of nasolabial furrow and discomfort of the regional teeth for 5-6 years (Figure 1 A, B). Though the regional teeth were found to be vital the patient gave a history of root canal treatment for right upper central incisor, lateral incisor, & canine teeth 2 years back at outside centre but the swelling did not subside.

Radiographic examination revealed the presence of a poorly defined radiolucent lesion that extended from mesial surface of right central incisor to mesial surface of second molar of same side with root resorption of right central incisor & displaced lateral incisor and canine (Figure 1 C, D, E).Subsequently during apicoectomy a solid mass was noted at the site of surgery which was fragile in nature and sent for histopathological evaluation (Figure 1 F,G). Histopathological examination revealed a well-circumscribed tumor that consisted of small islands of squamous epithelial cells. These epithelial islands were rimmed by a peripheral layer of cuboidal cells or flattened cells lacking a well-polarized palisading columnar epithelium characteristic of ameloblastoma (Figure 1 H, I). Histopathological diagnosis of SOT was confirmed. The patient was followed up for 12 months but no recurrence is reported.

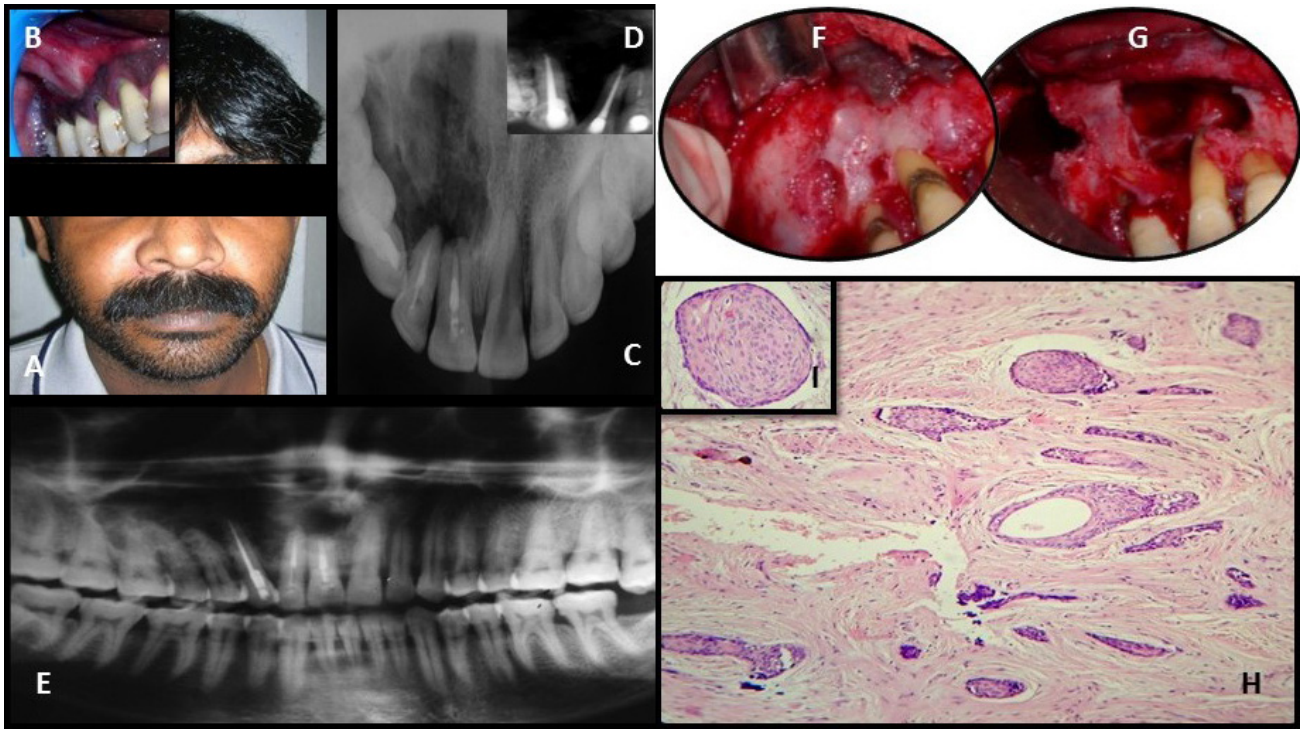


Figure 1. A: Extra oral examination showing swelling in right side of face; B: Intra oral examination revealed swelling in mucobuccal fold; C: Occlusal X-ray showing radiolucent lesion with irregular margins; D: IOPA X- ray showing displaced roots of two teeth; E: OPG X-ray of jaws showing a large radiolucent area extending from mesial surface of central incisors to mesial surface of 17 & root resorption of central incisor; H: Photomicrograph showing odontogenic epithelial islands & few areas of microcystic degeneration; I: Photomicrograph showing epithelial island surrounded by flattened epithelial cells & without any ameloblast like appearance

Case 2: A 45-year-old male patient reported with a complaint of painless swelling in the left maxillary anterior region for past 1 year. The lesion was well circumscribed with expansion of both buccal and lingual cortical plates (Figure 2 A, B). Left maxillary central and lateral incisors were extracted 4 years back. OPG showed the presence of a well-defined radiolucency without sclerotic margin causing root resorption of left maxillary canine, first and second premolar (Figure 2 C). Based on clinical and radiological findings a provisional diagnosis of cystic lesion was given. Excision of the lesion was done and tissue was sent for histopathological examination. Histological features were suggestive of the presence of islands of stratified squamous epithelium with peripheral cuboidal cells in dense fibrous connective tissue stroma. Micro cyst formation was noted in some epithelial islands and the diagnosis of SOT was established (Figure D, E, F).

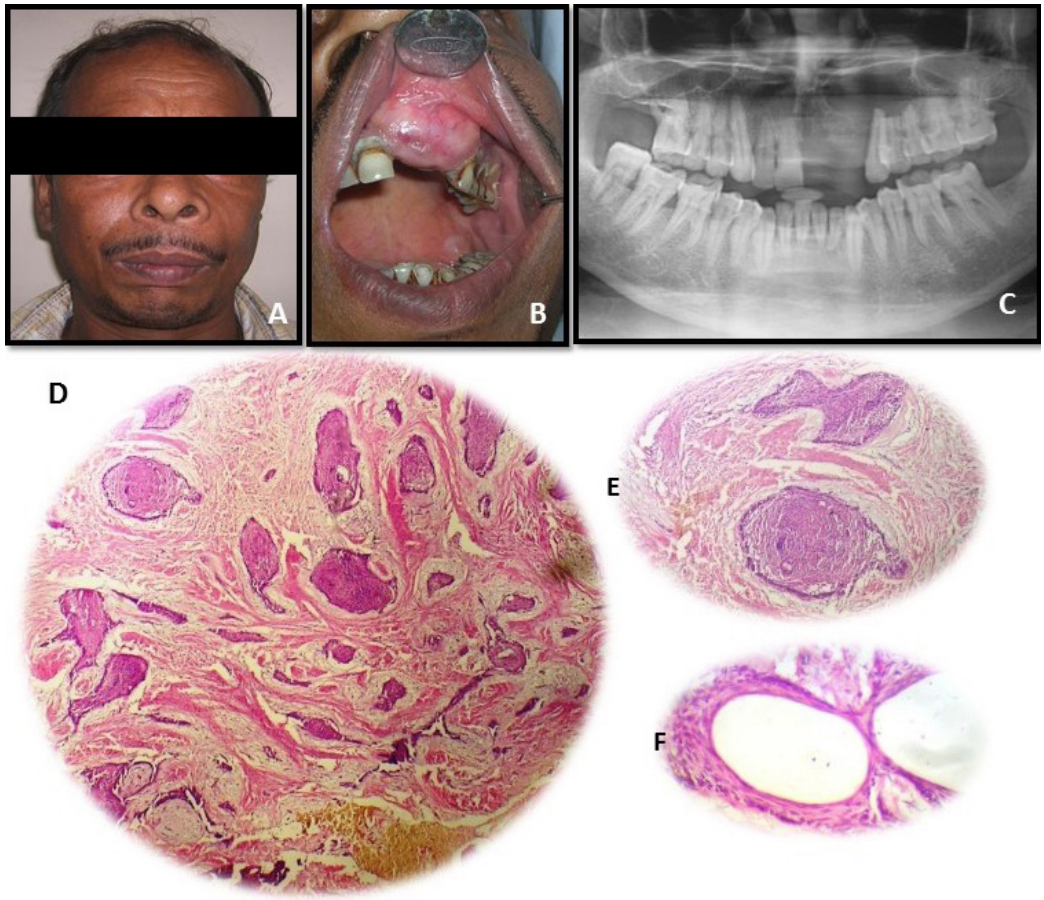


Figure 2 A: Extraoral view revealed swelling in the left upper region; B: Intraoral examination showed a well-defined swelling; C: OPG X-ray shows a well-defined radiolucency involving the anterior left maxillary region; D: Photomicrograph showing multiple islands with squamous epithelium in fibrous stroma; E: Photomicrograph showing high power view of islands with flattened peripheral cell; F: Photomicrograph showing high power view of microcysts formation within the islands

Case 3: A 20-year-old male came with a chief complaint of swelling on the right lower jaw for one year. The patient had undergone extraction of right lower molar by a local doctor due to swelling & pus discharge one & half years back. After 6 months he noticed a small swelling in the particular region which has gradually increased in size for which he was again treated by local doctor without any appreciable result. There was no relevant past medical or family history. On Extra-oral examination a bony hard, nontender swelling is noticed on the right body of the mandible. Intra- Oral examination revealed a bony hard swelling involving region of missing second molar & accompanied by bucco-lingual expansion (Figure 3 A, B). OPG of the jaws reveal relatively large radiolucent area extending distally from 43 to mesial root of 48 with multiple small radio - opaque foci of varying radiodensity & missing right second molar. Standard occlusal view shows bucco-lingual expansion of the cortical plates & missing second molar of the right side. After thorough examination of all findings, the provisional diagnosis is made out to be calcifying epithelial odontogenic tumor (CEOT). The patient was then subjected to radiographic examination. Incisional biopsy was done and the section stained with H & E revealed the presence of interlacing collagen fibers, proliferating fibroblasts, blood capillaries with R.B.C's & minimal inflammatory changes with the presence of multiple islands of squamous odontogenic epithelium & the cells at the periphery of the squamous islands are flattened(Figure 3 C,D).The overall histopathological features were confirmative of SOT. The patient was then referred to the Department of Oral Surgery for treatment & management. Conservative surgical procedure was done and regular follow ups did not reveal any recurrence.

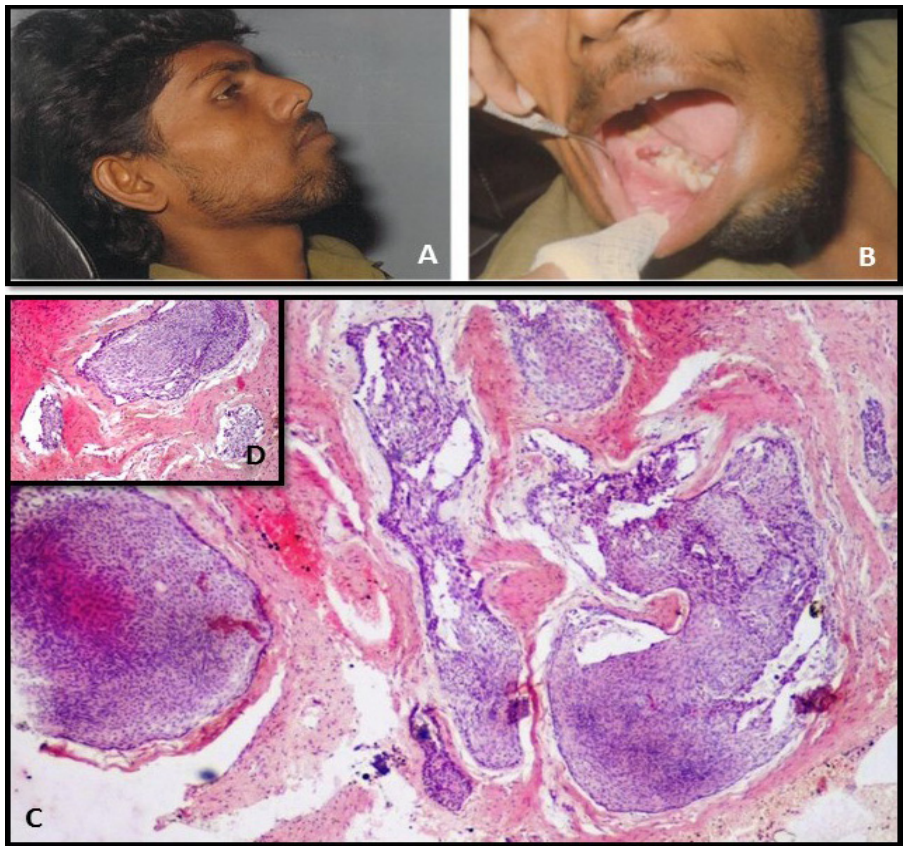


Figure 3A: Swelling on the right body of the mandible; B: Intra-swelling involving region of missing second molar with buccolingual expansion; C: H & E revealed the presence of multiple islands of squamous odontogenic epithelium; D: Higher magnification showed the cells at the periphery of the squamous islands are flattened

Investigations, Treatment & Follow Up:

Clinical differential diagnosis: Most commonly misdiagnosed with squamous cell carcinoma and ameloblastoma.

Radiologic differential diagnosis: Radiographically, the most common presentation of SOT is often semicircular or triangular, radiolucent defect between or along the roots of adjacent teeth. This is not pathognomonic and can mimic severe periodontal bone loss. Circumscription is characteristic, but the margin may or may not be corticated. Rarely multiple radiolucencies are observed in SOT.Along with periodontal bone loss other differential diagnosis can include Langerhans's cell histiocytosis, lateral periodontal cyst, odontogenic keratocyst (keratocystic odontogenic tumor) and central odontogenic fibroma.

Histopathologic differential diagnosis: The histologic differential diagnostic considerations for SOT are acanthomatous and desmoplastic variants of ameloblastoma. They can be ruled out as ameloblastic differentiation is not a characteristic feature in the SOT. Gingival squamous cell carcinomas when considered will display characteristic malignant features in contradiction to SOT. Similarly, bland islands of squamous epithelium are not featuring of primary intraosseous/odontogenic carcinomas either

Treatment: Surgical intervention was carried out

Outcome and follow-up: The patients were kept under observation and followed up for 12 months; without any signs of recurrence.

Discussion

SOT is a rare, benign epithelial odontogenic neoplasm, defined as a locally infiltrative neoplasm consisting of islands of well-differentiated squamous epithelium in a fibrous stroma with less than 50 cases

reported till date.[5]The first published case of SOT is to the credit of Pullon et al in 1975. They reported six cases and established diagnostic criteria and surgical approaches that are still followed today.[6] By screening the reported cases it is found that SOT occurs over a wide age range between 8-74 years with a mean of 38.7 years with a slight male predilection (M: F=1.8:1). However, due to paucity of documented cases relative frequency among odontogenic tumors cannot be determined.[7] It occurs in both jaws with equal propensity.[8] In maxilla lesions centre around incisor-cuspid area whereas in mandible lesions tend to occur in bicuspid molar area.[3]However, SOTs occurring in maxilla are found to be more aggressive than their mandibular counterpart because of the anatomy, porous and medullary natue of maxilla9. Multifocal variant and familial cases have also been reported.[10]

They are often asymptomatic but may present as a slow growing lesion with tooth displacement and mobility, ulceration of soft tissue, and usually without pain1. Most cases develop in the periodontium of permanent dentition. One case was associated with deciduous dentition and four cases were found in edentulous area.[7] Clinicopathologically three types are identified: intraosseous, mural (mural SOT-like proliferation in cyst), extraosseous form.[11] Radiologically the central variant shows a unilocular, triangular or semicircular radiolucent area with or without sclerotic border between the roots of adjacent teeth. Large SOTs, however, may show multilocular pattern. Root resorption is reported in some cases too as noticed in our first two cases. Surprisingly, variation in classical radiographic presentation of SOT in the present cases was observed. The first case presented poorly defined radiolucency whereas the mixed radiolucent radiopaque lesion was noticed in third case.The peripheral variant may show saucerization of underlying bone which is likely to be a pressure phenomenon rather than the result of true tumor infiltration.[6] Once such a lesion is detected thorough radiographic examination is required to exclude multiple tumours.[2]

Histologically, the tumour is composed of round to oval islands of squamous epithelium with a flattened or cuboidal peripheral cell layer in a mature, fibrous connective tissue stroma. These squamous cells have distinct intercellular bridges, individual cell keratinization but lack nuclear pleomorphism, stellate reticulum, mitotic activity or keratin pearl formation. Microcyst formation, laminar calcification, globular eosinophilic hyaline structure which is not amyloid may be found in the islands.[3] Circular areas of fibroblasts and fibrous condensation or hyalinization can be seen around some of the epithelial islands which suggest a connective tissue reaction to epithelial proliferation.[7] In our cases microcyst formation is seen but calcification and hyaline structures are not found.

SOT may pose diagnostic difficulties as it may be confused with acanthomatous ameloblastoma, desmoplastic ameloblastoma and well differentiated squamous cell carcinoma and this is a major reason for the paucity of documented cases. The fact that the peripheral cells are not ameloblastoma like and the absence of stellate reticulum should differentiate it from various types of ameloblastomas. Unlike well differentiated squamous cell carcinoma SOT does not show nuclear or cellular pleomorphisms and mitotic figures.[3]

The pathogenesis of SOT still remains unclear. SOT is histologically related to remnants of odontogenic epithelium, which includes cell rests of Serre (dental lamina rests), enamel organ and cell rests of Malassez (rests in Hertwig root sheath). Due to the widespread presence of odontogenic epithelium for a considerable time after birth some tumours may arise from residues of these cells in bone or in the soft tissue such as in gingiva (peripheral SOT). For the central variant, origin from periodontal ligament (rest of Malassez) is postulated due to its occurrence between the adjacent teeth, the pattern of bone destruction. However, in our second case the fact that the tumor was present in the edentulous area does not take away the possibility that it originated from rest of Malassez of teeth formerly present there.[7]The origin of peripheral SOTs is putatively from gingival rests of Serres or from gingival surface stratified squamous epithelium.[3]The nonperiodontal lesions can be attributed to genetic etiologies like mutation in ameloblastin gene which has an important role in epithelial-mesenchymal signaling during odontogenesis.[7]

SOT like proliferations have been reported in few cases arising from the wall of odontogenic cyst but they neither transform into a neoplasm nor alter the prognosis or the behavior of the cyst. Hence, they are considered as a reactive process only.[3,7]Biologically, SOTs are less aggressive than ameloblastomas but are more aggressive than SOT like proliferation in the cysts, except for those arising from the walls of odontogenic keratocysts.[7] Multicentric lesions are less aggressive

almost hamartomatous. However, care must be taken to differentiate such proliferation from the tumour itself.[2]

Immunohistochemical studies of SOT have confirmed the proliferative activity of odontogenic epithelial cells indicated by heavy staining for keratin 13\16, and the squamous differentiating cells in the centre of islands have shown a strong positive reaction for involucrin staining.[7]The treatment of SOT is conservative surgical removal in the form of local excision, enucleation, or thorough curettage. However, tumors located in the maxilla have to undergo a more radical treatment because of the aggressive potential of SOT in this location.[5]According to Hopper et al., the type of radiographic border may help define the type of treatment to be adopted since a more aggressive lesion has poorly defined radiographic border.[12]Recurrences seem to be extremely rare and are reported in only one case by Pullon et al and are most likely due to insufficient removal.[6]

Conclusion

SOT is a rare odontogenic neoplasm. The tumor is often asymptomatic, as a number of cases are accidental finding in routine dental radiographs, although it can present with symptoms of pain and tooth mobility. Clinical and radiologic appearances of such tumours may be similar to the other odontogenic neoplasms encountered in the jaw bones.As characteristic histopathological features of SOT are sufficient to elucidate the diagnosis from other mimicking aggressive lesions i.e. ameloblastoma and epidermoid carcinoma, evaluation of the entire clinicopathologic picture is necessary to forbid the over or under treatment of the same.

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Malocclusions and Orthodontic Management of Syndromic Patients: A Review

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Abstract

A good oral health is important for one and all, and especially in patients with syndromes. A syndrome is defined as "a set of signs or a series of events occurring together that often point to a single disease or condition as a cause". Early diagnosis is important for having an effective treatment in these patients. The oral findings are generally the basis for diagnosis in early adolescence and is usually the time when a comprehensive orthodontic treatment is sought. Thus, orthodontists should be thoroughly aware of the patients syndrome and the clinical features with which they relate. The treatment intervention would likely require–aligning of teeth, management of cleft, management of functional shift such as–deviation, habitual posturing, arch coordination, and dis-impaction of teeth.

This review article aims to compile various clinical features of syndromes that are encountered in the dental office and the orthodontic aspects to be considered while treating such cases.

Keywords: *Oral health, syndrome, early diagnosis, orthodontic treatment, impaction.*

Introduction

The humans have diverse facial patterns and a wide variety of craniofacial morphologies are possible due to a combination of environmental and genetic factors.[1] The environmental factors often include–hormonal imbalances, trauma, poor nutrition, muscle dysfunction, mandibular posture habits, diseases of the pituitary gland, caries, premature loss of deciduous tooth, prolonged habits, enlarged tonsils and a low socioeconomic status.[2] The genetic factors could be–a disproportionate size of the teeth and the jaws; or a disproportionately positioned, sized or shaped mandible and maxilla.[3] Both of these factors interact to manifest as a malocclusion.

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Malocclusion can be defined as "a significant deviation from an ideal or normal occlusion".[4] Lauweryns reported that genetic factors contribute to about 40% of the malocclusion.[5] Sometimes, these malocclusions associated with severe skeletal discrepancies are a result of a genetic syndrome. A Syndrome is defined as "a set of signs or a series of events occurring together that often point to a single disease or condition as a cause". Chromosomal aberrations, transpositions, deletions or breakage leads to a malformation of the first branchial arch. This further results in orofacial clefts, micrognathia, oligodontia, facial asymmetry and malocclusions. Cohen, Proffit, Bell and White classified syndromes which are commonly associated with malocclusions.[6] **(Figure 1)**

Various syndromes and their associated malocclusions

Pierre Robin syndrome: This was first described in 1923 by the French surgeon Pierre Robin. The genetic cause is usually a mutation in the SOX9 gene which causes formation of the Meckel's cartilage. It may also occur due to a deficiency in the Transforming growth factor–TGFB.3 and extreme flexion of the fetal neck.[7]

The characteristic feature is a bird face due to micrognathia. Butow et al in 2009 reported the presence of cleft palate in 75-100% of the cases. The tongue is abnormally dorsally positioned (glossptosis) resulting in respiratory difficulty, vagal syncope and problem with feeding. Tooth agenesis is prevalent in the permanent dentition between 30-50%, mostly affecting the mandibular 2nd premolars.[8]

Treacher Collins syndrome (also known as**Mandibulofacial dysostosis, Franceschetti syndrome):** It is an Autosomal dominant condition affecting 1:50,000 live births. It mostly occurs due to a mutation in the gene TCOF1 located on 5q32-q33.1 chromosome. This results in a failure in the differentiation of the maxillary mesoderm in the developing embryo.[9]

The Craniofacial features include–downward slanting palpebral fissures, coloboma of the lower eyelids, conductive deafness, atresia of the external ear, malar and mandibular hypoplasia, facial symmetry, hypoplasia of the soft tissues of the face, narrow arched palate and cleft palate (about 30%). Abnormalities in the Temporomandibular joint may also lead to a limited mouth opening and an anterior open bite. Obstructive sleep apnea syndrome (OSAS) have also been reportedly associated with this disease. The dental findings include–tooth agenesis in the mandibular 2nd premolars, followed by maxillary 2nd premolars, lateral incisors and maxillary canines. Malpositioned maxillary central incisors, ectopic eruption of the maxillary 1st molars and impacted maxillary supernumerary teeth have also been reported.[10]

Marfan syndrome: It is an autosomal dominant connective tissue disorder which is caused by a defect in the FBN1 gene encoding the connective protein Fibrillin-1.

The clinical features include–disproportionately increased height with long limbs and digits, moderate joint laxity, aortic aneurysm, mitral valve prolapse, GERD, degenerative disk disease, deviated septum, early cataracts, glaucoma, dislocated lenses, coloboma of iris, emphysema, flat feet, osteopenia, scoliosis and obstructive lung disease. The dental features include–high arched palate, retrognathia, temporomandibular joint disorders, dental crowding with an increased overjet and dentinogenesis imperfect.[11]

Beckwith Weidemann syndrome: This syndrome occurs due to a defect in the short arm of chromosome 11. The clinical features include–Congenital hernia, gigantism, midline abdominal wall defects such as–omphalocele, umbilical hernia, ear pits, and neonatal hypoglycaemia. The orofacial features include–macroglossia, macrosomia, and an increased facial height.[12]

Goldenhar syndrome (also known as **Hemifacial Microsomia, Oculo-Auriculo-Vertebral (OAV) spectrum, Facio-Auriculo-Vertebral (FAV) sequence):** This syndrome occurs due to a duplication in the OTX2 gene, resulting in an anomalous development of the first and second branchial arches. Environmental causes may include a fetal exposure to drugs like–Thalidomide, retinoic acid, and primidone.

The clinical features include–an incomplete development of the ear, nose, lip, soft palate and mandible on one side of the body. There will be associated hearing loss, coloboma of the upper eyelid, hypoplasia of the zygomatic bone and facial muscles usually on one side, obstructive sleep apnea and cleft palate (10% of cases). It may also involve internal organs like–heart, kidneys and lungs.

Cephalometrically, the patients demonstrate an upward cant of the occlusal plane, smaller body and ramus of mandible on the involved side, steep gonial angle and convex facial profile. The dental features include–shorter mesiodistal dimension of mandibular 1st permanent molar on the affected side, and tooth agenesis most notably in the mandibular 2nd premolar and 2nd molar.[13]

Neurofibromatosis (also known as **Von Recklinghausens disease):** This is classified as a Gingivodental syndrome having both gingival hyperplasia and dental manifestations. The cause is a mutation in the NF1 gene on chromosome 17q11 and shows an incidence of 1 in 2000-3000 live births.

The characteristic Neurofibromas are benign tumors that appear along nerves and in proximity to the spinal cord. Other hallmark features include–café-au-lait spots and iris Lisch nodules. These will be variably accompanied by Hypertension, scoliosis and facial paralysis. The craniofacial features include–macrocephaly, short maxilla, mandible and cranial base, low facial height, marked antegonial notch, increased length of the coronoid process, hypoplastic condyles and zygomatic processes. Intraorally, unilateral hyperplasia of the gingiva is evident. Alongside, impacted, missing,

displaced or supernumerary teeth and spacing may be present.[14]

Crouzon's syndrome: This syndrome is characterized by premature craniosynostosis and follows an autosomal dominant trait. The clinical features include–brachycephaly with a large frontal bony swelling, hypertelorism, exophthalmos, hypoplasia of maxilla, mental retardation, resemblance of nose with parrot's beak. The oral features are–crowding of teeth, V-shaped arch, high arched palate, complete cleft palate, bifid uvula, cross bite or open bite and partial anodontia.[15]

Aperts syndrome: This is an autosomal dominant disorder resulting from mutation in the FGFR2 gene on chromosome 10. The syndrome is characterized by malformations of the skull, face, hands and feet. The clinical features include–craniosynostosis, brachycephaly, prominent forehead with a flat posterior skull, maxillary hypoplasia, mandibular prognathism and syndactyly. The oral features are usually–high arched palate and crowded teeth.[16]

Downs syndrome: Downs syndrome is caused due to the presence of an extra 21st chromosome (trisomy 21). The clinical features include–mental retardation, epicanthal folds, brushfield spots in iris, dysplastic ears, congenital heart disease, simian crease, clinodactyly, brachycephaly, flat facial profile, and flat nasal bridge. The oral findings demonstrate–large protruding tongue, ANUG, open bite, anterior or posterior crossbite and smaller sized teeth.[17]

Cleidocranial dysostosis (also known as **Cleidocranial dysplasia** and **mutational dysostosis**)**:** This is an autosomal dominant disorder caused due to a mutation in the RUNX2 gene located in the short arm of chromosome 6 and affects osteoblastic differentiation. The clinical features include–underdeveloped or missing clavicle, marked frontal, parietal and occipital bossing, delayed closure of fontanelles and sutures, hypertelorism, brachycephaly and reduced lower anterior facial height. The oral features involve–high arched palate, complete palatal cleft, supernumerary teeth, underdeveloped maxilla, delayed eruption of both deciduous and permanent teeth.[18]

Orthodontic management of syndromic patients[19]**:** Several obstacles are encountered during the therapeutic access of these patients, such as–reduced understanding and apprehension, limited cooperation, uncontrolled movements, exaggerated gag reflex, and drooling. Thus, even routine dental procedures like–impression taking and radiography becomes quite difficult.

Tooth brushing is not properly practiced by such patients which is manifested by presence of food debris, plaque and gingival inflammation. This makes the patient more prone to caries. Restorations and root canal treatment should be carried out prior to the start of orthodontic treatment.

The orthodontic treatment plan should be redirected towards more limited goals and provided on a modular basis. The following adaptive modifications can be made during treatment -

1. Removable appliances should be preferred over fixed appliances wherever possible. If fixed appliances are to be used, then straight wire appliance or tip-edge appliance with simple mechanics should be prescribed. Arch expansion can be carried out in shorter modules separately.
2. The material of choice for impression taking should be Elastomeric impression material as it is patient friendly, do not induce gag reflex like alginates might do, and multiple casts can be retrieved from a single impression.
3. Syndromic patients may have problems with excessive salivation. Thus, antisialogogue drugs should be prescribed before procedures, an newer generation of etchants with moisture controlled primers should be used.
4. Indirect bonding of brackets should be preferred to reduce the chairside time.
5. Self-ligating brackets should be promoted as it reduces the chairside time and allows less frequent visits, while also avoiding lacerations and a better oral hygiene can be achieved too.
6. The orthodontic intervention would likely require–aligning of teeth, dis-impaction of teeth, management of cleft, and management of functional shift such as–deviations, habitual posturing and arch coordination.
7. Both removable retainers and bonded lingual splints can be used for an extended period of retention with a little cooperation from the patient. Sedation sessions can help for bonding procedures.

For patients with Hemifacial microsomia, use of hybrid functional orthodontic appliances and distraction osteogenesis can be helpful to treat moderate asymmetries. Staged orthognathic surgery would be an appropriate treatment for severe craniofacial asymmetries.[20]

In patients with Treacher Collins syndrome, a detailed evaluation from an Otorhinolaryngologist should be done as reduced nasal airway volume and subsequent impaired phonation and Obstructive sleep apnea are likely.[21]

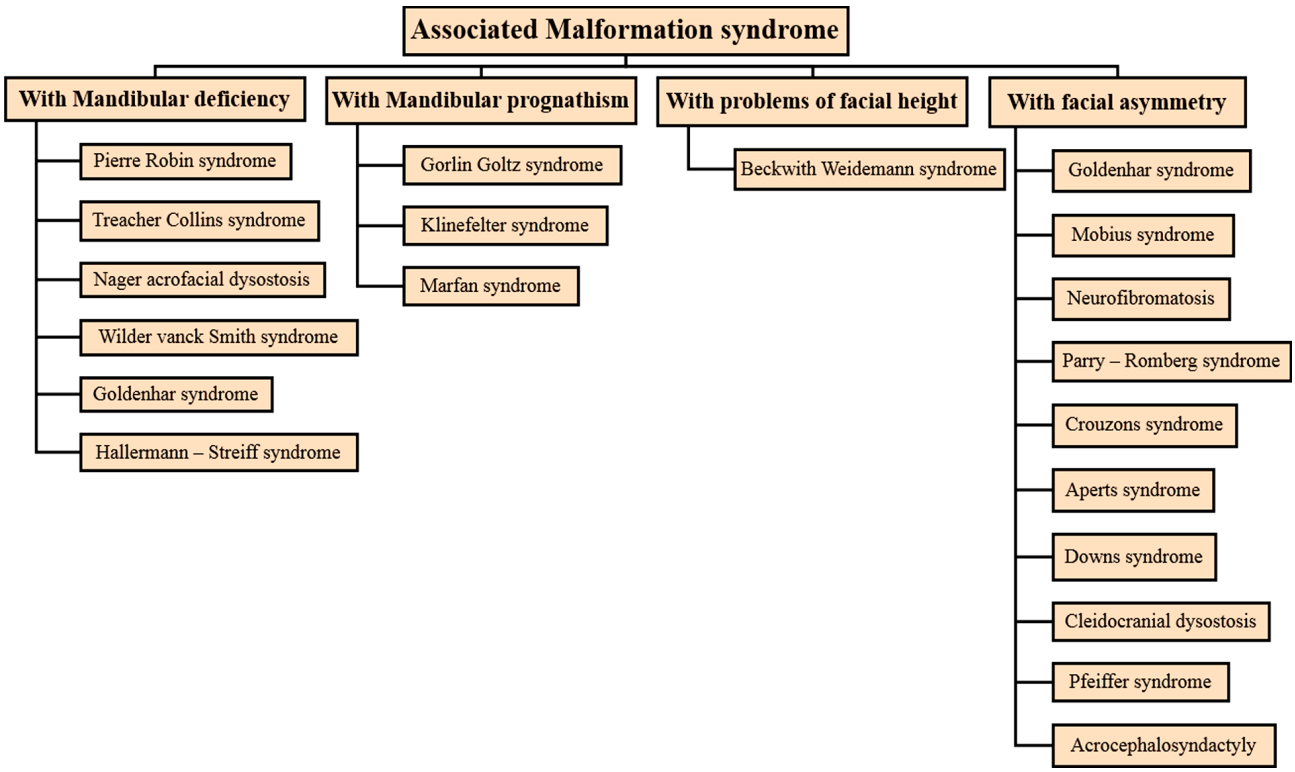


Figure 1: Cohen, Proffit, Bell and White's classification of syndromes which are commonly associated with malocclusion

Conclusion

The dental development and facial growth only completes at around 14 and 18 years respectively. Thus, early detection of syndromes and interventions concerning the timing of orthodontic and surgical treatment becomes difficult.

The orthodontists should be thoroughly aware of the patient's syndromes and the clinical features with which they relate. The treatment plan should be designed keeping in mind factors such as–increased root resorption, hypomaturation of bone and teeth, delayed healing, supernumerary teeth, missing teeth and presence of any cysts. Thus, treatment should be aimed at removing the hurdles in performing routine activity rather than keeping high expectations on outcome.

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A Clinical Study on Evaluation of Vertical Accuracy of Interocclusal Registration Materials in Centric Relation

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Abstract

Purpose: The purpose of this study is to evaluate the ability to accurately record, maintain and reproduce vertical interocclusal relationship of four bite registration materials i.e. (Aluwax, zinc oxide eugenol, polyvinylsiloxane, bisacrylic resin bite registration materials).

Statement of problem: It is necessary to evaluate recording materials for their accuracy to record, maintain and reproduce these maxillo-mandibular relationships as they are transferred from the mouth to the articulators.

Materials and method: Maxillary & mandibular cast were articulated in maximum intercuspation in split cast technique on the Whipmix articulator. This position was adopted as reference position for displacement measurement of the four materials. Two arbitrary points are selected on the right and left side of the cast to avoid operator tendency of repetition of the value. The measurements were calculated as the difference between the readings of the two points. The interocclusal records were placed and the measurements were taken. The difference in the two reading gave the vertical discrepancy with each material.

Results: ANOVA and Tukey test were used. The result was statistically significant. Wax plus zinc oxide eugenol and wax plus aluwax showed significant difference statistically & clinically in recording the relationship.

Conclusion: The bisacrylic resin and polyvinylsiloxane bite registration materials can record the interocclusal relationship accurately. Wax plus zinc oxide eugenol paste and wax plus aluwax produced significant discrepancies in recording the relationship.

Keywords: *Aluwax, bisacrylic resin, interocclusal records, Lucia Jig, polyvinylsiloxane.*

Introduction

An accurately recorded maxillo-mandibular relationship is important for success of any prosthesis and it should be accurately transferred to the articulator. These relationships are dynamic and change during life. Recording of jaw relations in prosthodontics treatment aims at facilitating the adaptation of prosthesis to optimum level of comfort and function to the patient. To achieve this goal, the recording must include various jaw relations, in order to develop occlusion that will function in harmony with existing masticatory apparatus.

The centric relation record is the most important and most difficult maxillo-mandibular relation record to make. In centric relation, stable occlusal contact can be developed. Registration of correct centric jaw

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relation is the primary objective of any prosthodontist to establish harmony within stomatognathic system, improve functional ability and masticatory efficiency. A recording material is necessary to register the patient's inter-arch relationship. Inter-occlusal recording material records the centric and eccentric relationship and aid in replicating them on mounted casts on articulators.

A satisfactory inter-occlusal registration, the materials must have the following characteristics: low viscosity, low resistance to mandibular closing, no adherence to the teeth, plasticity, appropriate working time, rigidity after setting, precision of details, dimensional stability, easy handling, acceptability to the patient, and low cost[2,3,4,5,6].

In the present study, four interocclusal registration materials in centric relation in two techniques were compared, materials were used alone or combinations of materials were utilized which are as follows:

- baseplate wax with aluwax,
- baseplate wax plus zinc oxide-eugenol paste,
- Luxabite bis-acrylic resin, and
- Jetbite bite registration polyvinylsiloxane material

The aims of the study were t*o evaluate the vertical distance using Aluwax bite registration material*, wax plus Neogenate Zinc oxide–eugenol paste, Luxabite, bisacrylic based bite registration material and Jetbite polyvinylsiloxane bite registration materials and to compare the various materials used for the study for its accuracy in recording the maxillo-mandibular relationship in right and left side of the patient, individually and on the whole.

Materials and Methods

This present in-vivo study was conducted in the Department of Prosthodontics, during 2007-2010. Comparison of the vertical distance of four different materials against the vertical distance at maximum intercuspation in the right and left side of the patient was done. The vertical distance is assessed by travelling microscope with a precision of 0.001cm and magnification of 10X.

Five male patients in the age group of 20 -35 years were selected for the study and they met the following inclusion criteria : Complete dentition up to the second molar, Normal systemic and physiologic histories, Angle's class I, Absence of signs and symptoms of temporo-mandibular disorder, Diagnostic cast showing stability in centric occlusion position.

Impression of maxillary and mandibular arches were obtained using dual mix, dual impression method with polyvinylsiloxane impression material and poured with Type IV die stone. Base-former was used to pour the base. The graph paper was cut and glued to the base in the right and left region of both maxillary and mandibular casts.

The method utilized in this study **for obtaining the centric relation for fabrication of baseplate wax record[7,8]** is a combination of bimanual manipulation and anterior stop technique given by H. Shillinburg[8]. The bimanual manipulation programs the muscle from centric occlusion position to the trained centric relation position and the jig helps to retrude the condyle where it is influenced by the posterior slope of the fossa.[48] An anterior programming device or jig is made to establish the predetermined stop to vertical closure with the condyles in optimum position and was given by Lucia. A small piece of aluminum foil 0.2µm was burnished to the lingual surface and incisal edge of the maxillary incisor. Then 2ml of auto-polymerizing monomer and 4ml of acrylic polymer were mixed in a dapen dish and at a dough stage it was applied to the foil on the cast and gently molded to a sloping ramp. Before the acrylic set it was transferred to patient mouth and using the thumb and index finger the resin was adapted in the lingual side and the patient was made to close in the previously trained centric relation position. The mandibular incisor indentation in the jig was checked and it was trimmed till there was a separation of posterior teeth by 1mm. With the jig in place the baseplate wax record was re-softened and placed in position using the canine flaps as index.

For registration of record using aluwax[8,9]: 10 registrations of double thickness baseplate wax records were obtained using the jig in centric relation. The areas of indentation of the teeth in the record were removed and the aluwax was flowed over the area. The record was again placed in the mouth with the jig in place and the registrations were recorded. The registrations were removed after the wax was cooled, disinfected and kept in container with water until analysis was done.

For **Registration of record with wax plus zinc oxide - eugenol impression paste[8,9]:** 10 registrations of

double thickness base plate wax records were obtained using the jig in centric relation. Zinc oxide- eugenol bite registration paste were taken out in small quantity i.e 6mm in length of base and accelerator along with a small amount of petrolatum and mixed thoroughly on a clean glass slab with cement spatula. The teeth are first coated by petrolatum then a small amount of the paste is then placed in the indentation area of both the maxillary and mandibular teeth on the wax record and replaced in the mouth with the patient instructed to close until the mandibular incisor firmly contacts the programming device. After the material has set the excess registration paste is removed i.e 1.5mm from the cusp tip in all direction[4]. The registration's were then disinfected and kept in moist environment for further analysis.

For Registration with luxabite bisacrylic resin: Adequate amount of luxabite registration material were applied on the left and right side of the occlusal surface of the molars. Luxabite were composed of bisacrylic resin and were supplied in a double cartridge in 4:1 ratio form and are dispensed with an automix–dispenser supplied by manufacturer. With the jig in place, the mandible was placed in centric relation position. The material was allowed to set for 40-60 seconds and the patient was instructed to slightly separate the teeth and reclose to ensure that the bite registration is not locked on. An additional 2 minutes was allowed for the materials to final set and then it was removed. 10 such registrations were made and finished with acrylic trimmers. The deep grooves and occlusal embrasures are removed that may not be well registered in the model.

For Registration with Polyvinylsiloxane (Jetbite registration paste)[9]: 10 registrations were made by placing the bite registration material on the occlusal surface of the right and left side molars and premolar and with the jig in position the mandible was closed in centric relation position. The Jetbite polyvinylsiloxane are supplied in auto- mixing cartridges with a spiral mixing tip and spreader tip as provided by the manufacturer. The cartridge was loaded in the auto-mixing gun and the two tips are attached as instructed by the manufacturer. Registrations were removed from the mouth, disinfected and stored in plastic packets (humidor) in absence of humidity for further analysis.

For measuring the vertical distance: The maxillary cast was seated in the indentation on the Quickmount facebow and was attached to the Whipmix articulator. The cast was attached to mounting ring with low–expansion, fast-setting plaster. The mandibular cast was manually articulated in maximum intercuspation to the maxillary cast in a split cast technique with the articulator in an inverted position. It was then maintained in the same position by stabilization with plastic tongue blade & sticky wax. And this position was adopted as reference position for displacement measurement in four different studied materials & technique. Two arbitrary points are selected on the right and left side of the cast to avoid operator tendency of repetition of the value and the measurements were calculated as the difference between the readings of the two points. Mandibular cast was then disarticulated and to relate the mandibular cast properly to the maxillary cast, the incisal pin should be lowered sufficiently to compensate for the thickness of the centric relation record. On the occlusal surface of the maxillary cast the interocclusal records are placed, and the mandibular cast was seated on the record with the Lucia jig in place. The cast was stabilized with plastic tongue blade & sticky wax and articulated in a split cast technique for each record. Then the readings of the vertical distance are taken from the two arbitrary points with a travelling microscope. Difference in reading of the vertical distance with the material and at maximum intercuspation is calculated individually for each record in the left and right side. And the data was then statistically analysed.

All the interocclusal records were evaluated under the same procedure. Only one investigator made all the measurement in the study. To minimize the polymerization shrinkage polyvinylsiloxane were stored in plastic packet & distortion the materials were prevented by storing in humid environment. And the records were taken to the laboratory for measurement as soon as possible. To minimize error the average vertical discrepancy was calculated on both the right and left side of the cast.

The mean and standard deviation were calculated for the vertical discrepancies associated with different materials for the right and left side under which the study was performed. Because the distribution of the sample was normal, the analysis of variance (ANOVA), and Tukey test were used.

Results

The measurements were taken taking the difference of individual records in vertical distance from maximum intercuspation vertical distance. Analyses of variance

(ANOVA) were done comparing the 4 materials. Since the P value is less than 0.01 there is significant difference in the 4 materials. There is no significant difference in between wax plus Aluwax and wax plus zinc oxide eugenol records. The polyvinylsiloxane & bisacrylic shows significant difference when compared individually with the other materials. And also bisacrylic is the best among all of them as it showed the least mean in the right side.

The measurements were taken taking the difference of individual records in vertical distance from maximum intercuspation vertical distance. Analyses of variance (ANOVA) were done comparing the 4 materials. Since the P value is less than 0.01 there is significant difference in the 4 materials. On the left side no significant difference was found in the polyvinylsiloxane and bisacrylic material. But the wax plus aluwax and wax plus zinc oxide eugenol showed a significant difference when compared with other materials. And also as the mean value of bisacrylic is least it's the best among the four materials on the left side.

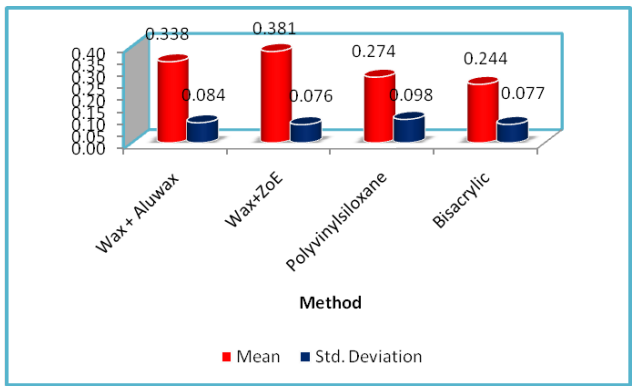


Figure 1: Graph I - Mean and standard deviation of four materials for the 5 patients on the right side.

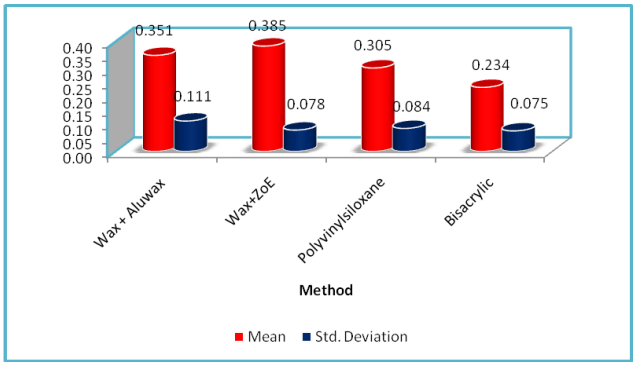


Figure 2: Graph II - Mean and standard deviation of four materials for the five patients on the left side.

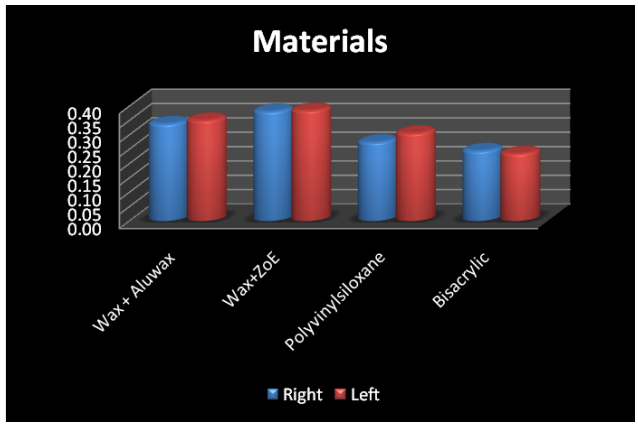


Figure 3: Graph III - Comparison of mean and standard deviation of four materials for the five patients on the left and right side.

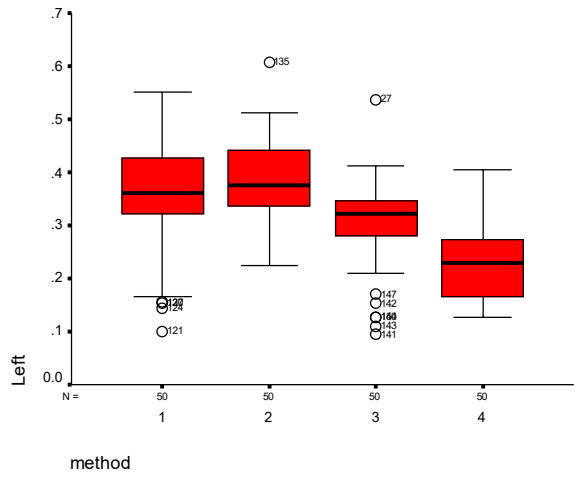


Figure 4: Graph IV- Averages, range of variation, and standard deviation on the left side.

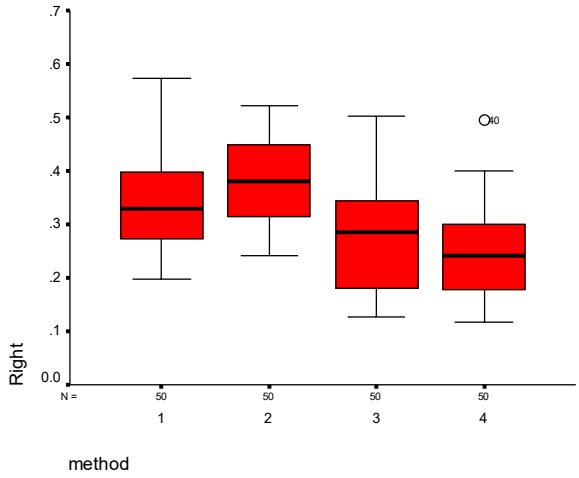


Figure 5: Graph V - Averages, range of variation, and standard deviation on the right side

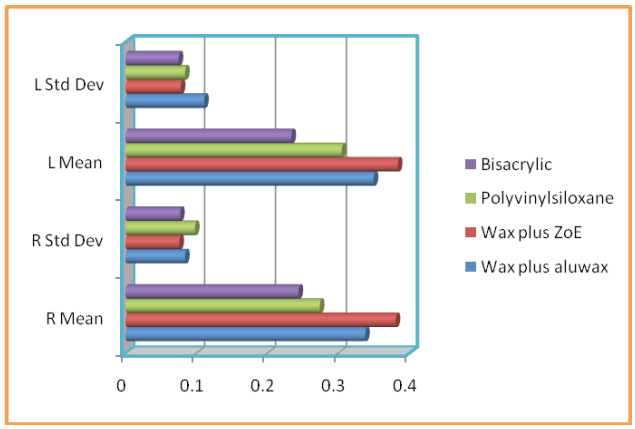


Figure 6: Graph VI - Comparison of mean and standard deviation of right and left side.

Discussion

The four main method of recording centric relation are as follows; 1) unguided method, 2) chin point guidance with anterior jig by Anderson & Tanner, 3) P. Dawson's bimanual manipulation and 4) tongue to palate technique. Kantor[10] compared all these method and found that bilateral manipulation gave the greatest replicability in patients.

The materials most frequently used for making centric inter-occlusal records can be broadly classified as physical, thermal and chemically setting e.g zinc oxide-eugenol pastes and non eugenol pastes, impression plaster, waxes, acrylic resin, polyvinylsiloxane and polyether materials. Waxes have been used in the shape of quadrant strips, wafers and complete or partial arch wafers since long time[11].

Dawson[12] stated that, criteria for accuracy in making inter-occlusal records include

- Recording material must not cause any movement of teeth or displacement of soft tissues.
- Recording material must fit casts as accurately as it fits the teeth intra-oraly.
- Accuracy of the jaw relation that has been made should correlate in the mouth and on the casts.

Freilich and Wahle[13] stated that apart from dimensional stability and accuracy, relative elasticity and rigidity are also relevant to duplication of intra oral inter-occlusal relationship on articulator. When the study was analyzed it was evident that bisacrylic resin Luxabite and polyvinylsiloxane Jetbite gave constantly accurate interocclusal registrations. So these materials can be advocated in routine recording of interocclusal registration instead of waxes which are most popular among the clinicians.

In Figure 1, the graph shows that the mean and standard deviation of each material were compared for five patients on the right side. The standard deviation and mean was found to be least for bisacrylic records and highest for wax plus zinc oxide eugenol records. Figure. 2 shows the mean and standard deviation of each material compared for the five patients on the left side. The standard deviation and mean was found to be least for bisacrylic records and highest for wax plus zinc oxide eugenol records. Figure. 3 shows the comparison of mean of the right and left side of four materials in the five studied patients. The mean is least for bisacrylic on the left side and most for the wax plus zinc oxide eugenol on the left side. Figure 4 shows a comparison of the mean, range of variation and standard deviation in centric relation of each four materials for the five patients in left side. Figure. 5 shows the averages, range of variation and standard deviation of centric relation position with each material in the right side. In Figure. 6, when comparison was made of mean and standard deviation of right and left side it was found to be without any significant difference. On the right & left side the aluwax and polyvinylsiloxane were the materials with highest standard deviations and range of variance. The mean was highest for wax plus zinc oxide eugenol and least for bisacrylic resin in both left and right side.

Conclusion

Bisacrylic resin Luxabite was a material of choice for interocclusal registration. It has the advantage of ease of handling, and rigidity, dimensional stability after setting. Polyvinylsiloxane Jetbite was found to be second best materials statistically and clinically in the study. The wax plus aluwax, and wax plus zinc oxide eugenol material were found to be comparatively inaccurate bite registration material in the present study. In place of dentate patient, partial edentulous patient with prepared tooth can be taken for further studies. Some research should be done to reduce the dimensional change that is observed in aluwax and polyvinylsiloxane bite registration materials. The bisacrylic resin which becomes very hard when it set, and had to trimmed to articulate properly, so some modification can be done on this material to reduce this.

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Pleomorphic Adenoma: An Overview

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Abstract

The salivary glands are exocrine glands which that produces saliva through ducts. Two types of salivary gland MAJOR and MINOR salivary glands. Salivary glands can be as serous, mucous or seromucous (mixed). The secretion is mediated by parasympathetic stimulation, acetylcholine in the active neurotransmitter and binds to muscarinic receptors in the gland, leading to increase salivation. The salivary glands consist of major and minor glands. The salivary gland tumors are divided into benign and malignant tumors. Pleomorphic adenoma is the most common benign tumor affecting salivary gland. It majorly affects the parotid gland and palate most commonly the hard palate. It develops in both major and minor salivary gland. This article represents a case of pleomorphic adenoma in the minor salivary gland of hard palate.

Keywords: *Pleomorphic Adenoma, Salivary Glands, Minor Myoepithelioma, Submandibular Gland, Salivary Gland Neoplasms.*

Introduction

Pleomorphic adenoma constitutes more than 50% of all tumors and 90% of all the benign tumors of salivary glands. It can affect both the major and minor salivary gland but mostly affects the parotid gland and also affect the rest submandibular glands. It arises from the myoepithelial cell of salivary glands. Both epithelial and connective tissue elements are seen in the tumor so it is named as MIXED TUMOR. It mostly affects the palate and may as affect the lips, buccal mucosa and retromolar region[1]. It mostly affects women more than men in the 4th, 5th, 6th, decade of life. Pleomorphic adenoma affects the palate most commonly (42.63%), followed by the lip (10%), buccal mucosa (5.5%), retromolar area (0.7%) and the floor of the mouth.

These are readily movable without fixity to the deeper tissues or to the overlying skin. The size of the tumor can increase but will not ulcerate[2]. Tissue destruction, pain or facial paralysisis not seen. Tumors in the oral cavity like Pleomorphic adenoma usually starts as painless small nodules which gradually grows. The tumor is the hard palate is seen early because f difficulty in chewing, swallowing or talking. It shows fixity in the palate due to underlying done but doesnot invade the bone. It is usually asymptomatic due to painless intermittent growth[3].

The diagnosis is usually based on physical, radiographic, histopathologic examination.

Differential diagnosis

Lipoma

Hyperplastic lymph nodes

Neurilrmmona of the facial nerve

Wartin's tumor

Squamous cell carcinoma–Both may contain squamous epithelium with keratinization and may be difficult to differentiate in small biopsy or cytology material. Myoepithelioma and myoepithelial carcinoma–contain exclusively myoepithelial cell. Epithelial components is less Radiology increases the risk of developing pleomorphic adenoma[4,5].

Histology: The tumor consists of epithelial and connective tissue components arranged in complxed manner. Myoepithelial cells are the particular features of pleomorphic adenoma. A rare type immune cell known as plasmacytoid myoepithelial cell are special feature

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of minor salivary gland tumor. Spindle cells, clear cells and oxyphilic cells may also be present. The tumor is surrounded by pseudocapsules or false capsules[6]. Area of scale like metaplasia and epithelial pearls may be present. The histology may differ in appearance which varies in every individual tumor. The tumor extends through normal glandular parenchyma in the form of finger like pseudopodia,which is not a sign of malignant transformation[7].

The intraoral pleomorphic adenomas which affects the minor salivary gland palate are noticed early because of difficulties in mastication speech etc. They grow slowly in a painless manner without any ulceration with intermittent growth in size.

The diagnosis of this mixed salivary gland tumor is based on basic history,physical examination, histopatology. On physical examination we can see a non tender,fixed,consistent growth. CT scan and MRI are done to provide size location and extension of tumor. The CT scan may reveal no perforation but cupped out resorption of the pallet. There may not be any major changes in hematology investigations but by performing biopsy we can see several histologic changes[8,9].

Treatment: The treatment of pleomorphic adenomas are mainly surgical excision. Needle biopsy can also be performed before the surgery to confirm the diagnosis. More specific surgical treatment or supportive radiotherapy can be performed on the basis of the development of the tumor into benign or malignant the parotid gland tumors are removed with adequate margins where as the intra oral regions can be removed by performing conservative surgery. The benign parotid gland tumors are treated with superficial or total paroitdectomy. The facial nerves should always be conserved when possible[10,11]. Submandibular tumors in case of that, excision of the gland with the tumor is performed. The removal of the tumor shoud be removed by careful dissection[12]. Wide excision with negative margins is the optimal strategies for the management of pleamorphic adenoma.Irradation is contraindicated as the tumors is radioresistant. The tumor does not reoccurs if the excision is done properly[13].

Complications: Infection, salivary fisula, hemorrhage, hematoma, numbness, asthetic irregularities are the common complications of parotidectomy. If the excision is left incomplete it may lead to recurrence[14]. If the adenoma is left untreated for long time it may lead to malignancy. The tumor which has ulcerations and causes facial paralysis have the potency to get malignant[15].

Conclusion

Pleomorphic adenoma is a uncommon salivary gland tumor which can be removed by local excision if diagnosed early or else we have to undergo the removal of whole tumor. Reconstruction is only necessary if there is full thickness defect in the bone otherwise excellent results is seen when the wound is allowed to heal itself. The recurrencs unknown but the long followed process is required.

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Betel Nut Chewing: A Brief Review

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Abstract

The use of tobacco is not new to the society, similarly the extreme consequences of the abuse of the same is not hidden. The product is best known for killing its most loyal customers. The use of tobacco is global it kill almost half of the people who consumes it. Geographically covering the Indian subcontinent, Southeast Asia and some areas covering the locations of western Pacific. With furthermore migration to inner city areas of many countries, this habit is known to be present in its practitioners. This habit has been having on communities a major cultural and social role. The effect of usage of is still a mystery to many dentists due to lack of knowledge and awareness about the prevalence of the diseases caused in the oral cavity. The acknowledgement of the role of these products in the development of pre malignant lesions in oral cavity and oral carcinomas is very vital for a dental practitioner to know. This emphasizes on the importance of acquiring knowledge about the encouragement to habit cessation as it is directly affecting the improvement in mucosal lesions clinical symptoms.

Keywords: *Tobacco, Prevalence, Mouth Neoplasms, Dentists, Habits, Southeastern Asia.*

Introduction

The habit of betel quid or areca (BQ) chewing is not new, it has an ancient background in whole. The imprints of this is not just limited to our country or any specific age group, the spread is global and often includes every section of the society even involving women as well as children[1]. Social acceptability, perceived health benefits, religious beliefs and constant addiction are the four main factors that influence a chewer of betel nut and maintain its popularity. In the positioning of most commonly consumed psychoactive materials in the globe after caffeine, alcohol, nicotine is followed by betel nut, hence ranking the fourth most used product. Betel nut is obtained from Areca catechu palm tree, is present in number of products including paan masala, mawa, paan, gutkha, khaini etc[2].

The term "quid" may be defined as "a substance or mixture of substances (in any mass-produced or treated form), placed in the mouth or chewed and remains in contact with the mucosa, usually containing one or both of the two basic ingredients, tobacco, or betel nut, in raw or any manufactured or processed form". Thus, BQ is to be considered as a specific variety of quid; it indicates any type of mixture or quid that includes betel leaf.

Various categories of BQ include:

1. Quid with betel nut but without tobacco products (betel nut quid) which may involve chewing only the betel nut or betel nut quid wrapped in betel leaf (paan)
2. Quid with tobacco products but without betel nut(tobacco quid) including chewing tobacco, chewing tobacco plus lime, mishri (burned tobacco applied to the teeth and gums), moist snuff, dry snuff, niswar (a different kind of tobacco snuff), and naas (a stronger form of niswar)

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3. Quid with betel nut as well as tobacco products (tobacco and betel nut quid).

It is believed the use of this product results in attaining euphoria, increasing salivation, achieving satiation, reducing fatigue and even believed to reduce toothache[3]. The use of Betel nut is harmful to health. Even after knowing about the deleterious effect on human health it still continues to prevail as the highest consumed product in the South and Southeastern Asia, covering up to (10–20) % of the world population[4]. Betel Quid (BQ) has been ranked as Group 1 human carcinogens by the International Agency for Research on Cancer and the World Health Organization[5]. In the past few years several researches and large scale studies have proven even just using quid in the absence of slaked lime and tobacco it may result in potentially malignant lesions in the oral cavity followed by malignancies. The effect of these can be broadly divided into 2 sections. Firstly, its effect on dental Hard tissues (includes tooth, which is supported by the periodontium and the TMJ i.e. Temporomandibular Joint) and the second is the Soft tissues (comprising of the mucosa which lines the oral cavity)[6].

Effects on Hard Tissues:

Attrition, Abrasion and Fracture of tooth: The most common problem that is seen in the users are loss of occlusal tooth surface also knows as attrition, loss of cervical tooth structure also known as abrasion and chipping off of tooth fragments mainly incisors and cuspal loss i.e. fracture of tooth, is because of the hard fibrous texture of the betel nut. The above mentioned problems result in hyper sensitivity and often resulting in pain in advance stages. The degree of damage is directly dependent on the hardness of the betel, duration it is kept in the oral cavity and the frequency of its consumption[7].

Staining: The chewing results in a copious red saliva. With the chronic use of BQ this stains embed in the teeth and the soft tissues around the tooth. And with the increase duration and frequency the staining ranges from red to slowing transforming into black. Polymers of orthoquinones have been proven to be the reason of blackening of the tooth.

Dental Caries: The prevalence of dental caries have been lower in BQ users than in non-chewers[8]. The possible hypothesis to this statement are several. Some of them are as follows:

a. The coating formed by the use of BQ often forms a physical barrier of the tooth in turn helping in preventing demineralization.

b. Tannin in BQ is believed to have antimicrobial activity which in turn result in the cariostatic activity

c. The loss of occlusal tooth structure releases the pits and fissures hence resulting in no food accumulation in those complex areas which is more prone to caries.

d. The use of BQ is seen to increase salivation and often in addition of slake lime the overall pH of the oral cavity is noted.

e. The attrition resulting in sclerosed dentine may deliberate the protection from the invasion of microbes causing caries.

However the above mentioned hypothesis are yet to be proven. Many researchers have been working on this field and some have shown that there is no such significant decrease in the caries index of the BQ users than compared to non-users in the Asian population[9].

Temporomandibular Joint (TMJ) Disorders: The masticatory forces that are being used in BQ users could result in Temporomandibular dysfunctions. It is often confusing the exact cause of TMJ deterioration as the pathologic conditions associated with the BQ chewing results in secondary changes in TMJ for example in Oral sub mucous fibrosis that is the stiffness in fibrotic bands often results in trismus.

Effect on Soft Tissues:

Diseases of the periodontium: The cytotoxic nature of BQ towards the periodontal fibroblasts often accelerated the already present periodontal problems and ultimately resulting in the detachment of periodontal ligament and subsequent increase in calculus deposits. [10] The establishment of the statement cannot be done firmly as there are several other factors that is associated with the declining periodontal health including dietary factors, oral hygiene habits, dental health status etc.

Oral Mucosal Lesions: These are mainly comprising of 2 categories:

a. Lesions and conditions that are outlined diffusedly and are involving not just only one site but several site causing a field alteration, for example the lesions resulting from mechanical trauma or chemical reaction.

b. Various intraoral lesions and conditions fall into this category, the exclusions include staining's caused by quid[11]. These are often the site of lesion are restricted to the site of placement of the BQ.

Chewers Mucosa: The peeling up of the oral mucosa or its desquamation due to the traumatic action and condition results in detached tags of mucosa can be often found in these users. The areas of desquamation often appear wrinkled and pseudomembranous. The locality might also show imprints of reddish or brownish stains in the mucosa. This can be easily found and seen in the chronic users[12]. These lesions clinical appearance as well as histologic appearance is somewhat similar as of cheek biting, lip biting, morsicatiobuccarum and/or labiorum. Hence it is very important to differentiate the same by thorough examination and proper history taking as well as correlating with age related habits. The exact pathogenesis of the chewer mucosa is unknown but it is somewhat established that the physical and chemical factors plays a significant factor. BQ consumption results in a ROS (reactive oxygen species) production and has a direct relation in the commencement processes in tumor, followed by mutation, genotoxicity and/ or making the oral mucosa vulnerable to the elements present in BQ and the toxicants that are present in the environment. This ultimately changes the structure of the oral mucosa. At the moment BQ chewers mucosa doesn't come under pre malignant lesions, although this is anyhow related to other mucosal lesions like OSMF (Oral submucous fibrosis), tobacco induced lichenoid reactions, leukoplakia etc. which comes under the classification potentially malignant lesions.

Quid-Induced Lesion: These lesions often occur in the site of regular placement of the BQ, hence it is often localized lesion. The most important characteristics of these lesions are as follows:

- Alteration in the color of the mucosa
- Appearance is mostly wrinkled
- Mucosa is often thickened
- Epithelial surface may or may not be scrapable
- Incidence of ulceration

Betel nut related lesion: Lesions resulting from tobacco and lime, sniff induced and BQ induced. Often it is noted that there may not be any significant changes in the oral mucosa of a user unilaterally or bilaterally, however present of greyish white patch often unscrapble is present. The consistency can be described as rough linen like texture and if seen histologically the slide shows epithelium that is ortho-keratinized or/and para-keratinized[13].

Lichenoid reaction: There has been widely reporting of quid induced lichenoid reaction. The lesion is somewhat similar to lichen planus but with some noticeable minor differences. The clinical features include whitish, fine wavy lines, which do not intersct with each other often in zig zag pattern, often smooth and in many lesions radiating from an erythematous areas center. These are often seen at the site of quid abuse. Earlier this lesion was termed to be Lichen Planus like lesion, but with time this has got a new name that is 'betel quid lichenoid lesion'. This lesion reduces with many factors including the number of time it is consumed, the duration of time kept in mouth and the different site change during the chewing process. On complete cessation of habit there have been cases reported about total reversion of the lesion[11].

The pathogenesis of these BQ related lesion are under Type IV contact hypersensitivity reactions.

Oral Leukoplakia: It can be defined as "predominantly white patch or plaque on the oral mucosa that cannot be characterized clinically or pathologically as any other disease and is not associated with any other physical or chemical agent except tobacco."

Leukoplakia has been classified into several types. One of which is based on its appearance clinically:

- Homogeneous Leukoplakia (often white in color)
- Speckled Leukoplakia (both red and/or white in color)
- Verrucous Leukoplakia
- Nodular Leukoplakia[14]

Several epidemiological data shared proves the correlation between BQ use and leukoplakia[15,16].

Oral submucous fibrosis (OSMF): OSMF was coined in the year 1966 by Sirsat and Pindborg, was defined as "as an insidious, precancerous, chronic disease that may affect the entire oral cavity and that sometimes extends to the pharynx[17,18]."

The lesion is often associated with blanching or marble like appearance often marked by restricted mouth opening and fibrous bands present in the buccal mucosa,

restricted tongue protrusion and shrunken uvula because of the inflammatory reaction in the sub epithelial layer which is then followed by changes in the lamina propria (fibro elastic changes) and then followed by atrophy of the epithelium. Often results in burning while eating normal to spicy food.

There are basically 3 stages clinically to evaluate:

- Somatitis phase (oral mucosa is erythematous and appearance of vesicles is see)
- Fibrosis (the vesicles in the previous stage then eventually rupture to form ulcers which then in the process of healing get fibrosed.)
- Sequelae (then finally the fibroses lesion extends and disrupts various mouth functions)[17]

Trismus is often a resultant of fibrosis.

Oral Squamous cell carcinoma: BQ use has been proven and establish to cause oral carcinoma[19, 20].

Conclusion

Clearly it is proven that BQ has adverse effect not only in hard tissues of oral cavity but also the soft tissues of the oral cavity. Awareness among the users as well as the practitioners is much needed in this scenario. Working hand in hand and understanding this subject will play a vital role in eliminating the ailments associated with BQ consumption.

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Role of Mass Media in Dentistry

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Abstract

Mass media plays a key role in our day to day life, its impact can be negative or positive depending upon the way its used. Mass media has a very broad range of audience, who can be made aware by repeated broad casting or advertising oral care messages using TV, radio, internet, newspaper etc. Majority of public who does not have access to dental treatments and are unaware of the consequence of poor oral hygiene live in rural areas. Some are illiterate some not well to do but everyone is connected to mass media in some form or other. The awareness messages then compete with commercial promotion of products, addiction and habits.

Keywords: *Dental Health Education, Mass Media, Radio Communications, Television.*

Introduction

India is a developing country with a bulk of its population living in rural areas.India's overall dentist to population ratio- 2.7 lakh registered dentists for a population of 134 crore- is about one dentist for 5000 people, well above the WHO recommended ratio of one for 7500. But the problem is extensive in rural areas because the dentists are clustered in urban areas[1]. Also the dental infrastructure is very lacking in rural areas and many people still consider oral health and dental hygiene are of secondary priority[2].

According to NOHP (National Oral Health Program)'s survey conducted in 2007, dental diseases affecting the majority of Indians are periodontal diseases, dental caries, cleft lip & cleft palate, malocclusion, and oral cancer. Periodontal diseases are most common with a prevalence of >90% (advanced disease in 40%), then dental caries with a prevalence of 40-45%, oral cancer per lakh population and so on. Since past few decades disorders related to oral health are the most prevalent disease groups in India, particularly oral cancer due the extensive consumption of tobacco in India. India is considered the world capital of oral cancer. This is why it's very crucial to provide dental health education on a large scale as prevention is better than cure.

Mass media refers to mass communication through different technologies. Mass media can be divided into print media, outdoor media and electronic media. Print media can include books, newspapers, magazines, etc. Electronic media consists of television, movies, internet, social media, radio, etc and outdoor media consists of posters, billboards, etc. Individuals who are not conscious about dangers of poor oral health and does not have regular dental check up, can gain considerable amount of information from news media, which includes both newspapers(print media) and television(electronic media). Societal accountability of mass media to provide accurate and evidence based information to the community can not be ignored[3].

Role of Social Media: Internet and social media now has become the most important portal from which we can glean knowledge regarding oral health and related information. Some of the most popular social media platforms are facebook, youtube and twitter.

Benefits:

- All the informationis open and easily accessible for the users.
- Dental education- Teaching staff and professors use social media to engage with students and get feedback from them, which they can use to modify or improve their traditional teaching style. It also

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helps the students to improve their knowledge, peer teaching etc. the students can use sites such as 'Junior Dentist Blog' or 'Student Dental Network Forum' to further their knowledge[4].

- Social media can be used by Dental schools and Universities to attract students.
- It can also be used by various dental hospitals and clinics to attract patients through direct communication by the dentist, informing them, answering their queries, blogging, posting videos of various procedures alleviates their fear and anxiety.
- Patients can also be recruited for online surveys, online studies and various clinical trials.
- Consumers and patients can give feedback (consumer ratings) on dental product or services which then influences other consumers in their decision.
- In the past, there was an intermediary approach towards the health care service but now it has changed to apomediary approach which refers to cutting out the middle man that is the health care professionals and getting the information directly with the help of apomediaries which guide them to relevant information[5].
- Social media also works as free marketing when patients post their experiences, its works as modern day word of mouth for dentists and dental clinics. But on the other hand if the posts are about bad experiences, it can affect their reputation.
- Online presence of dentists helps to advertise their practice and facebook is the most popular platform for it.
- 'Dental Buzz', 'Dental Town', 'Dental Lab Network' are some of the popular sites where dentists can communicate, discuss other dentist's approach to a certain case and debate with each other. Using these sites they can remain up-to-date with latest dental news and recent advances or technology in the field of dentistry.
- Social media can give access to specialists in other fields who can give suggestions related to clinical cases and procedures.
- Learning from each other by sharing and discussing cases. But special care should be taken so as to not betray any doctor patient confidentiality during posting of the cases. Social media should not be used as way of raising concern.
- Various online support groups are there and can be helpful for patients having rare diseases and disorders.
- Social media facilitates communication between patients-doctor and patient-patient discourse.
- Online consultations are getting popular nowadays.
- Easy to refer a patient and remain in contact when the patient is shifting.
- Health information can be accessed from the internet any where at any point of time from various sites[6].

Limitations:

- There is a lot of information online and self diagnosis by the patients can be harmful.
- Lack of interest in visiting dental clinics and hospitals if the service is available online at home.
- Various diseases are diagnosed by inspection, palpation and percussion, which are not possible during online consultation and can lead to misdiagnosis.
- It happens to be expensive at times and cannot be afforded and accessed by everybody.
- Sometimes people access sites that are unauthorized and unscientific and end up with some sort of vague and misleading information.

Role of Print Media and Outdoor Media in Dentistry: Print media is defined as "The means of mass communication, which uses printed publications, such as newspapers, tabloids, magazines, books, journals, pamphlets, etc. to disseminate information to the general public"[7]. After the advent of social media and television people were disguised of the misconception that print media will become irrelevant. Far from it, magazines and newspaper reading is a popular and widespread tradition in India even after the arrival of television and internet[8].

Newspaper caters to a very wide range of people and of various age groups, especially in rural India its still very much a part of their life."Print media offers a more physical, tangible medium to consumers." Print media can also have a localized presence that is harder to achieve with digital media. Newspapers can be local, regional or national published in daily, evening, weekly or Sunday editions[9].

Benefits: Advertising on billboard and posters gives the opportunity to reach patients that are on the move. Outdoor advertising when done properly with research and is informative, it will be beneficial for both the practitioner and the patients as it simultaneously attracts patients and makes them aware about oral health[10].

In case of social media we reach out for information which is selective and need-based on the other hand print media covers a wide range of topics. When boards and posters (on oral health) are displayed on various landmarks it is hard to ignore and stays in our mind for a long time.

One of the most ordinary and common form of mass communication is through posters, which are very effective even in low awareness and literacy areas. The main advantage of posters is that the messages displayed are simple, to the point, artistic and very eye catchy. Their placement should be in places where large masses of people gather regularly like bus stands, hospital, etc and to maintain their effect they should be changed regularly[11].

Newspapers and magazines are very effective, popular and affordable visual aid for educating as well as communicating oral health information.

Role of Electronic Media in Dentistry: Very efficient and effective as oral health care practices like tooth brushing techniques can be demonstrated through audio visual aids like television and computer. They are the most effective form of communication of oral health education among children[12].

In case of print and social media people need to be educated to be able to read the information provided but one does not need education to understand the information provided audio visually. Display of oral cancer ads before the start of the movie and during interval time in movie theatres. Dentists can advertise their practice. Commercial dental product advertisement who uses real dentists and not only promotes their product but also informative for example sensodyne[13].

Promoting Oral Health through Mass Media:

Schools: If the children are educated about oral health in their formative years and its practice incorporated into their daily routine, oral care will become a habit for them.

Some of the programs are:

- Colgate's "young India" bright smiles, bright futures school dental health education program
- (Chacha Neheru Sehat Yojna) school health scheme, New Delhi
- Pit and fissure sealant pilot project- National oral health program (NOHP), AIIMS, New Delhi
- Trinity care foundation–Bangalore

Role of mass media: Regular organisation of oral screening/treatment camps, slogan/essay writing, poster, glass painting competitions are effective among students. Teachers and parents should be involved actively. The laws pertaining to banning of tobacco products within 100 yards of educational institutes and selling of tobacco products to individuals less than 18 years of age should be strictly practiced. Teachers and parents should encourage healthy eating habits among the students and teach them healthy oral care practices such as brushing twice daily, flossing after eating, etc[14].

Tobacco and Oral Cancer: India ranks second in producing and consuming tobacco. Mortality due to tobacco in India is 8-9 lakh (approx.) individuals per year. Over 80% of oral cancers are due to the use of tobacco. Use of tobacco (smoke/smokeless) can cause aggressive periodontitis;loss of tooth, delayed wound healing, pre-cancerous and cancerous lesions, etc. One of the most popular, extensive and influential mass media campaign in India is oral cancer and tobacco cessation which caused many positive changes.

National Tobacco Control Programme

- COTPA (cigarette and other tobacco product act) in 2003
- Govt. of India ratified WHO's FCTC (framework convention on tobacco control) in 2004
- NTCP (National Tobacco Control Program) launched by MOH & FW

Role of mass media: As directed by Ministry of Broadcasting (MoIB) and Central Board of Film Certification (CBFC) directs that movies and TV programs that show tobacco use should display hazards of tobacco use 30 sec at the beginning and 20 sec at the middle of the program. There should not be any advertising and promotion of the use or sale of tobacco and related products as directed by M/O I & B and

Advertising Standard Council of India (ASCI). Over the years many NGOs, advertising companies and publishing houses have helped the cause[7]. CPAA (cancer patient's aid association) is one such NGO which organises awareness programs at factories, hotels, schools, offices, etc. and distributes information brochures. Various infomercials, short films, posters, etc helps to raise awareness. Organisation of lectures, mass pledges, posters and slogan writing competitions on the subject piques the interest of students. Free screening camps, creation of support groups helps to persist because the chances of faltering are greater in an individual[8].

Fluorosis: Fluoride constitutes as an important caries preventive but in excess may affect bones, teeth, kidney, thyroid, etc adversely. According to WHO, acceptable level of fluoride intake should remain between 0.5-1.0mg/L. In case of dental flourosis, affected individual becomes aesthetically compromised and show stained chalky white teeth with pitting on it. In 2008-2009 govt. of India started National Program for Prevention and Control of Flourosis (NPPCF) to manage flourosis[5].

Some of the programs by govt. of India to tackle flourosis issue through safe drinking water are-

- Flourosis mitigation in Nuapada District, Odisha (2005)
- National rural drinking water program (NRDWP) IN 2009, etc.

Role of mass media: People should be made aware about the impact; exposure to flourosiscan have on health. Talks, lectures, demonstration of deflouridation techniques should be done in areas with high fluoride content. Creating awareness about drinking water and diet through group discussions, posters, boards, etc. The priority should be in setting up of diagnostic facilities, surveillance and encouraging community participation.

Recently AIIMS along with Union Health Ministry launched, 'e-Dant SEVA' which contains list of all dental collages and services and a distinctive feature called the 'symptom checker'. Some of the programs launched by IDA or in association with IDA are 'Swachh Mukh Abhiyaan', 'healthy Mouth healthy Body', and 'Healthy Smile Happy Smile' which is targeted for school children.

Conclusion

India constitutes of very huge and diverse group of people with varying awareness about oral health. It requires enormous amount of resources and commitment to provide necessary oral care knowledge to each one of them. Mass media to some extent alleviates that problem. Oral health awareness camps, roadside rallies and street plays are also a part of mass media. Where technology is unable to help, that extra effort through plays and rallies could be of help. Mass media should be used as a tool through which to spread knowledge and understanding among public. There is no warranty that they will put them into practice but without knowledge there is no choice. Wide-spread media campaigns facilitate dialogue amongst the masses which may further lead to policy change.

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Orthodontic Considerations in Diabetic Patients: A Review

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Abstract

Orthodontic patients traditionally had comprised of only the young and healthy people. With its gaining awareness, elder patients with systemic disorders have also been seeking treatment. This means, an increased number of diabetic patients also report to the orthodontic office. Diabetes mellitus is defined as "a chronic, progressive metabolic disease characterized by hyperglycaemia resulting from defects in insulin secretion, action or both". Thus, it becomes necessary for the orthodontist to have knowledge pertaining to the types, cardinal signs, and oral manifestations of diabetes mellitus and keep them in mind while planning for orthodontic treatment. This article reviews in detail Diabetes mellitus from its historical perspective, prevalence, classification, cardinal signs, pathogenesis, oral manifestations, and the management options to be considered in terms of–before and during treatment along with the emergencies that might pop up in case such a patient is undergoing treatment in an orthodontic set-up.

Keywords: *Diabetes mellitus, metabolic disorder, hyperglycemia, prevalence, emergencies.*

Introduction

Orthodontic treatment has traditionally been considered a treatment choice for the young and the healthy. An increase in the esthetic awareness among the masses has, however, resulted in adults seeking orthodontic treatment. Many of these adults suffer from various chronic diseases and one among them is definitely Diabetes mellitus. Diabetes mellitus is defined as "a chronic, progressive metabolic disease characterized by hyperglycaemia resulting from defects in insulin secretion, action or both".[1]

Historical perspectives: Aretaeus of Cappadocia, an ancient Greek physician coined the term 'Diabetes' meaning Siphon. He noticed that the ants were enticed by the wonderfully sweet urine. Cullen added the word 'mellitus' to the name 'Diabetes', which means 'honey', considering the sweetness that a diabetic urine has. Celsus described the cardinal signs–polyuria, polyphagia, polydipsia and a loss of weight.[2]

Incidence and prevalence: Diabetes is the most common amongst all endocrinological disorders, which is characterized by pancreatic β-cell destruction and a resultant dysfunction in glucose metabolism, insulin resistance, inadequate insulin and glucagon secretions. Data from 2010 reports suggest that an estimated 221 million people worldwide are suffering from Diabetes.[3] Its peak incidence is usually in the 5th decade of life, however, below the age of 20, approximately 0.24% was found to have diabetes. Among these, 3-10% have Type 1 diabetes. There is no gender predilection for type 1 diabetes. Type 2 diabetes is more common globally. Almost 5% of all children and adolescents are estimated to have Type 2 diabetes due to a high caloric diet, mental stress and a decrease in physical activity.[4]

Classification

I. Type 1 diabetes (β-cell destruction, usually leading to absolute insulin deficiency)–
   - A. Immune mediated
   - B. Idiopathic

II. Type 2 diabetes (may range from predominantly insulin resistance with relative insulin deficiency

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to a predominantly secretory defect with insulin resistance)

III. Other specific types–

A. Genetic defects of β-cell function–Chromosome I2, Chromosome 7, Chromosome 20, Chromosome I3, Chromosome I7, Chromosome 2, Mitochondrial DNA

B. Genetic defects in insulin action–Type A insulin resistance, Leprechaunism, Rabson-Mendenhall syndrome, Lipoatrophic diabetes

C. Diseases of the exocrine pancreas–Pancreatitis, Trauma/Pancreatectomy, Neoplasia, cystic fibrosis, hemochromatosis, Fibrocalculouspancreatopathy

D. Endocrinopathies–Acromegaly, cushing's syndrome, glucagonoma, phaeochromocytoma, hyperthyroidism, somatostatinoma, aldosteronoma

E. Drugs- or chemical- induced–Vacor, pentamidine, nicotinic acid, glucocorticoids, thyroid hormone, diazoxide, β-adrenergic agonists, thiaxides, dilantin, γ-interferon

F. Infections–congenital rubella, cytomegalovirus

G. Uncommon forms of immune-mediated diabetes–"Stiff-man" syndrome, anti-insulin receptor antibodies

H. Other genetic syndromes sometimes associated with diabetes–Down syndrome, Klinefelter syndrome, Turner syndrome, Wolfram syndrome, Friedreich ataxia, Huntington chorea, Laurence-Moon-Biedl syndrome, Myotonic dystrophy, Porphyria, Prader-Willi syndrome

IV. Gestational diabetes mellitus

Diagnosis of Diabetes: The general clinical symptoms of diabetes are–polyuria, polydipsia, polyphagia, fatigue and weight loss. For young type 1 diabetic patients, the first presentation is of Diabteic ketoacidosis and recurrent infections in the skin and mucous membrane. The diagnostic criteria established by the American Diabetes Association (ADA) includes[5]–

i. Fasting plasma glucose level > 126 mg/dL

ii. 2-h plasma glucose level >200 mg/dL with 75 g glucose and Oral Glucose Tolerance Test (OGTT)

iii. Random plasma glucose > 200 mg/dL in clinically suspected patients

The criteria for gestational diabetes mellitus is a little different, allowing a 2-h level of upto 140 mg/dL, above which is considered diabetic.[6]

Pathogenesis: The processes that lead to the development of diabetes are–

i. Genetic defects

ii. Destruction of the islet cells by inflammation, cancer or trauma

iii. Endocrine disorders such as anterior pituitary hyperfunction, Cushing's disease and phaeochromocytoma,

iv. Administration of corticosteroids

The type 1 diabetes develops due to–environmental, immunologic and genetic factors and causes destruction of the pancreatic β cells.

Type 2 diabetes, on the other hand, develops due to–resistance to insulin secretion, and an inadequate insulin secretor response. Type 2 has a stronger genetic component and has almost a 60–90% chance of being present in monozygotic twins.[7]

Diabetes mellitus also manifests with–microvascular, macrovascular and neuropathic complications. The disease also shows dental complications. The following theories have been put forward to explain these complications–

i. Diabetic related microangiopathy theory: The small and medium sized blood vessels are affected, resulting in a reduced blood flow to the organs and tissues. This further leads to–ischaemic toothache, tenderness of gums, bone erosions and tooth loss.[8]

ii. Polymorphic dysfunction theory: This theory explains the recurrent oral infections and ulcers.

iii. Protein metabolism impairment theory: The presence of hyperglycemia impairs protein metabolism, resulting in collagen disruption and a delay in wound healing.

Oral manifestations of Diabetes in patients seeking orthodontic treatment: Orthodontic treatment was more common initially among adolescents and young adults. Nowadays, even elders seek orthodontic treatment and hence patients with diabetes are also encountered.

The oral symptoms associated with diabetes include–Xerostomia, glossopyrosis, acetone smell from mouth of poorly controlled patients, brittle teeth, dental caries, recurrent candida infections, ulcerations from mouth, altered taste sensation, delay in the healing of injured mucous membrane. They also bring about teeth disposition and misalignment, periodontitis and gingivitis.[9]

Gingival inflammation is evident even in patients with well-controlled diabetes mellitus.

Orthodontic treatment considerations:

Considerations before deciding orthodontic treatment: Diabetes often causes erosion of gum bones and hence teeth get misaligned and undesirable changes in position occur. Thus, an increasing number of patients report to an orthodontist's clinic seeking treatment.

Orthodontic treatment should not be performed if a patient is having uncontrolled diabetes. If HbA1C > 9%, then an improvement in the Blood glucose control has to be considered. Also, it is necessary to perform a full-mouth periodontal examination and render therapy before beginning orthodontic treatment.

Considerations during the process of orthodontic intervention: Both fixed and removable appliance therapy can be practiced, giving importance to oral hygiene when fixed appliances are used. Plaque retention, leading to tooth decay and periodontal breakdown can be prevented by using fluoride–rich mouth rinse. Microangiopathy can occur resulting in odontalgia, percussion, sensitivity, pulpitis or even a loss of vitality of tooth.

It is advised to apply light physiologic forces to the tooth to prevent further damage.[10] They should also be prescribed antibiotic prophylaxis during procedures such as–Band placement, separator placement, and miniscrew insertion to prevent oral infection as they may already have a compromised immune system.[11]

Diabetic emergencies during orthodontic treatment: The most serious emergency that pops up during orthodontic treatment is Hypoglycemia, when the serum blood glucose level drops below 50 mg/dL. There are 2 distinct stages that should not be missed by the orthodontist.

Neurogenic (or adrenergic) stage: During this stage, there is an activation of the sympatho-adrenal system resulting in–shivering, tremors, tachycardia and cold sweating.

Neuroglycopenic stage: The symptoms would include–dizziness, confusion, generalized weakness, blurred vision, leading to coma and death.

When hypoglycemic symptoms are recognized early, oral glucose of 50 g can be administered. If the symptoms are recognized when the patient is already conscious, then 1 mg intramuscular glucagon or intravenous dextrose should be given immediately.[12]It is advisable to ensure that the patient consumes a morning meal on the day of the orthodontic procedure.

Conclusion

In today's world, due to a high prevalence of diabetes mellitus, the practicing orthodontist is likely to encounter patients in his clinic with the disease. Thus, a responsible orthodontist is expected to have a basic knowledge of the signs and symptoms of the disease. A well–controlled diabetic patient can undergo orthodontic treatment whereas it is contraindicated in patients with uncontrolled diabetes. The patients should be advised to maintain a good oral hygiene, periodontal health should be checked regularly along with the vitality of the teeth. During treatment light physiologic forces should be applied and antibiotic prophylaxis should be prescribed as deemed necessary.

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Types of Mandibular Distraction & its Implementation: A Review of Literature

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Abstract

Distraction osteogenesis is a widely accepted modern technique in the field of orthopaedic surgery. Ever since the first application of Ilizarov principles of distraction osteogenesis for mandibular bone reconstruction, several case reports, research findings, systematic reviews and subject reviews have been published. These published data focoused on the sequential development of the distraction osteogenesis technique, its practice, success rate and comfort to the congenital and acquired patients of mandibular deficiency and disorder as well. As on date the craniofacial surgeons, across the globe, prefer the distraction osetgenesis technique over conventional reconstructive surgery by bone graft. This paper attempts to review the scientific principles, protocols, indications, advantages, limitation and future scope of the mandibular distraction osteogenesis and the latest developments in the field.

Keywords: *Mandibular Reconstruction, Bone Nails, Mandibular Distractor, Surgeons, Esthetics.*

Inroduction

The mechanical appliance of distraction is commonly known as a distractor or DD. Device creates tension and gives vector to the osteomized bone fragments. In the MDO process mainly two types of distractors viz. extra-oral and intraoral are used. Extra oral one is the external device which is fixed to the osteotomised segment by percutaneous pins and attached to externally placed fixation clamps with distraction beam[1,2]. The distractor when activated stretches the bone fraction apart[3]. The external devises are in the use since last few decades due to its mechanical advantages of multidirectional vectors. This device is easy to operate and remove too. As the major disadvantages, it has a risk for inferior alveolar nerve and leaves scar on external pins zone. The intra-oral devices are placed internally along the mandible spanning the osteotomised segments at subcutaneous position or within the oral cavity. The internal devises are relatively new, innovative and of more aesthetic over the external devises. The major drawback of the system is pointed as unidirectional linear vector movement.

The DD if attached to bone or teeth are named as bone-borne or tooth borne respectively. Hence based on types of anchoring system distractors are placed under bone-borne or tooth borne group. Third category distractors are available which is fixed both to bone and teeth called hybrid type of distractor[4,5].

On the basis of vectors distractors can be categorised to unidirectional, bidirectional and multidirectional. The unidirectional device leads the bone fragment to move in one direction whereas bidirectional and multidirectional distraction devises have the scope for distraction in two or multiple directions respectively. The vectors of distraction for mandible reconstruction may be vertical, horizontal and oblique. The case specific vector selection of mandibular distractor and its placement is of surgeons' choice[6,7].

Indication of MDO[8-12]: Some of the major correction and reconstruction indications are outlined below.

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i. Correction of hemifacial microsomia to restore the facial symmetry and oral function through distraction of ramus, angle, or posterior body of the ipsilateral/contralateral mandible.

ii. Improvement over sever micrognathia condition with bilateral mandibular advancement to alleviate the airways obstruction and facial height in infants and children.

iii. Vertical alveolar distraction to regenerate the bony base for dental implantation and correction of malocclusion.

iv. Midline horizontal distraction for correction of arch deformity and cross bite as well.

v. Transport distraction for neo-condyle generate to restore the temporomandibular joint function after surgical reduction ankylosis

vi. Posttraumatic rectification or reconstruction of bone and soft tissue

vii. Reconstruction following oncogenic or cystic jaw excision.

Types of mandibular distraction: The MDO is a biomechanical tool for reconstruction of congenital deficiency of the bone and soft tissue or acquired loos of the same. Based on the aetiology and requirement one of the following types of distraction process are adopted to meet the target. So far, the osteotomy is concerned it may be classified as the unifocal, bifocal or t multifocal to create required number of osteotomised segments. In monofocal osteotomy a single fracture forms a single distraction gap which is gradually filled by tension and stress principle resulting in simultaneous expansion of soft tissue and bone formation. In bifocal or multifocal osteotomy two or more bone segments are created along the mandibular axis[13-17].

Transport distraction osteogenesis is one of the bifocal osteotomy techniques where the movement of osteomized healthy bone segment leads to reconstruct the defective mandibular bone. The defect may be due to trauma, oncogenic resection or congenital anomaly. In this technique transport disk (the osteomized healthy bone segment) of host moves gradually across the area of defect under the biomechanical influence of an appropriate distraction device and the new bony regenerate bridges the gap. When the transport disk completes its movement the fibro- cartilage tissue of the leading edge must be removed for complete union of transport and host bone segment by compression[18,19].

In cases like microsomia where both mandibular and maxillary hypoplasia are the aetiology, a simultaneous distraction procedure can be adopted for reconstruction which can increase the bone stock of both maxilla and mandible. As an example, Le Fort osteotomy on maxilla and the mandibular osteotomy on ramus can be done simultaneously with suitable DD. Similarly, in case of the TMJ ankylosis, surgical reduction of ankylose tissue, gap arthroplasty and ramal height improvement can be done simultaneously which is named as simultaneous distraction technique[20]. One of the common problems in the dental implantation in mandible is lack of adequate alveolar height and width. The alveolar deficiency may appear due to periodontal pathological diseases, trauma or congenital diseases, recently alveolar distraction osteogenesis (ADO) has been proved as a promising technique for alveolar ridge augmentation to the mandible alveolar deficiency before planning any implant placement. The appropriate distractor creates an environment to gain a natural formation of bone between the distracted alveolar segments[21--25].

Timeline landmarks on DO: The attempts to rectify the broken bone with traction force were described by Hippocrates during 460 B.C. Over the year's science has been added to this practice of bone reconstruction and management. Ever since Barton, 1826 osteotomy was performed for orthopaedic surgery. Significant research achievements have been recorded in this sector during 20th Century. Codvilla (1905) reported limited success of limb bone lengthening by distraction principle[1]. Kazanjian (1937) approached the same with a device of elastic bands. Gavril Ilizarov, a Russian orthopaedic surgeon established the DO and popularise the same by practice and publications[2,3,4]. The first success of mandibular distraction osteogenesis with Ilizarov's principle was recorded by Synder **et al.**[5] during 1973. First ever mandibular bidirectional osteodistraction and transport distraction osteogenesis were reported by Molina and Ortiza-Monasteio and Constantino **et al.** respectively.[6,7]. Fixation of extra-oral devices and mandibular distraction was successfully credited to McCatrhy during 1989 and subsequently he designed and applied the multiplanar distractor in mandible satisfactorily [8,9]. Guerrero **et al.** [10] for the first time initiated the application of intra oral tooth-borne device on mandible during 1987 and massive success was reported during 1990. Further Wangeriin *et al.* (1996), Diner and Vasquez (1997) design improvised and simplified intraoral devices which could be used in

mandibular distraction[11,12]. Distraction osteogenesis is also applied to resolve the alveolar anomalies. The first alveolar reconstruction was achieved and reported by Chin and Tooth[13] during 1996. Another land mark in the mandibular distraction osteogenesis is the simultaneous distraction, performed by Molina and Ortz Monasterio[14] during 1995. However, the patient friendly intra-oral and extra oral devices and their application in mandibular distraction osteogenesis reconstruction are reviewed time and again [15-17]

Discussion

Hegab and Shuman[18] in their review have out lined the common indications of mandibular distraction as : a) Unilateral distraction of ramus, angle or posterior body b) Bilateral distraction and advancement ramus body c) Alveolar height correction through vertical distraction d) Cross bite correction through horizontal distraction at midline; and e) Transport distraction for neo-condylar regenerate. Horacio *et al*.[19] suggested mandibular distraction osteogenesis as an appropriate treatment for obstructive hypoventilation syndrome of neonatal and infants. However, the success in distraction osteogenesis is quite dependent upon biomechanical factor as well as biological mechanism. Several biomechanical factors such as selection of befitting distractors, their placement for recommended vector and force, suitable operational protocol and standardised operational period for different phases of the distraction osteogenesis also plays vital role for creation of a DO environment. Broadly the distraction devises are of extra oral, subcutaneous and intra oral. The intra oral devises may further put under two categories viz. sub mucosal and extra mucosal[20]. Suitable extra oral and intra oral distractors and their chronological improvement are recorded and reviewed currently by Sharma et al. and Mahajan *et al.*[21,22]. Review of several clinical records describe the potentiality of placement of devices in vertical, horizontal and oblique orientation to the mandible[23, 24,25]. Vertical placement generally increases the ramus height. Whereas the sagittal projection of mandibular body and symphysis is achieved by horizontal placement. Similarly, oblique placement promotes the osteogenesis in both horizontal and vertical dimensions [26]. In dentoalveolar distraction procedure the distractors are fixed on the lateral side of the alveolar bone attached to the transport and host segment as well [22]. Separation of bone as the first step of distraction osteogenesis of mandible was initiated ascorticotomy preserving osteogenic tissue with periosteal and endosteal blood supply[6]. Latter on many maxillofacial surgeons preferred complete osteotomy of the bone and claimed better reconstruction over the corticotomy protocol due to easy movement of the bony segment as per the planned vector [27]. Diversified opinions are in place for duration of the latency period in mandibular osteogenesis. Being the highly vascularised bone it takes relatively shorter latency period over limb bone[28]. In a review of clinical studies of distraction osteogenesis among 3278 patients Mofid *et al.*[29] could not find any significant difference between a defined and non-defined latency period. During growing period, children experience a high rate of bone metabolism which could shorter the latency period. As described by Chin[13] some craniofacial surgeons give 0-day latency to reduce the treatment period without any adverse effect on reconstruction. Snyder *et al.* reported seven days while Costantino *et al.* opined for ten days period respectively[5,7]. Despite several different opinions, case specific latency duration four to seven days is recommended imperially. In a prospective case study of several micro gnathic treatment Baskaran *et al.*[30] described the pick latency period ranged between 5-7 days. Effect of magnitude and frequency of distraction force determine the quality of reconstruction under distraction osteogenesis. Ilizarov law of "Tension-stress" postulated the distraction rate of one mm per day for limb bone [3,4] lengthening. It was suggested that distraction rate at 0.5 mm or 0.25 mm twice or four times a day respectively was more conducive to osteogenesis. Further he added that increasing the rate of distraction per day may lead to poor bone formation and soft tissue contracture. Whereas minimisation of distraction rate may result in early consolidation. The above finding of earlier worker has also been recommended for mandibular distraction with mere modification to achieve the target with distraction period of 2- 4 weeks and consolidation period of 4-8 weeks[18]. Moreover in a few cases of micrograthic rectification (10-20 years age group) the mandibular distraction at 1.5 mm rate per day gave very promising result[30].

Conclusion

We conclude that distraction osteogenesis is a welcome alternative to conservative orthognathic surgical procedure especially for correction of severe craniofacial deformities which necessitate large movements, where relapse is commonly encountered in the postoperative period. The osteoinductive potential seen in distraction osteogenesis along with the associated histogenesis is desirable to correct most of

the craniofacial deformities.It is seen in our study that the improvement of mandibular length, chin position and velopharyngeal space is remarkable following distraction, though a larger sample size and a longer follow-up period would help us to assess the stability of the regenerate post distraction and the behaviour of the newly created Temporomandibular joint and its effect on growth of the distracted skeleton.

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Rehabilitation of Mutilated Dentitions with Precision Attachments: A Conservative Approach!

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Abstract

Rehabilitation of mutilated dentitions, especially the distal extension cases are intimidating, when dental implants are ruled out. This case report presents a conservative approach to treat distal extension cases, with a combination of extra coronal precision attachment (RHEIN 83 OT CAP attachments system) and cast partial denture.

Keywords: *Rehabilitation, Mutilated dentitions, conservative, Extra coronal Precision Attachment, Cast Partial Denture.*

Introduction

Rehabilitation of distal extension and long-span partial edentulous arches has always been taxing. It can be ascribed to an unfavorable number and position of abutment teeth required for fixed dental prosthesis. A viable treatment alternative is implant prostheses, provided, there are no medical, anatomical and financial limitations.[1] Routinely these cases are treated with removable partial dentures.[2] Of particular anguish is the detrimental effect of these unstable prostheses have on the supportive tissue and abutment teeth, during functional and parafunctional activity.[3] Attachment retained removable prosthesis can be a savior in such a situation.[4] They are not only retentive but also aesthetically pleasing with good patient acceptance.[5] Literature shows a survival rate of attachment retained prostheses to be 83.3% up to 5years, 67.3% up to 15years and 50% up to 20years.[6] So they can be considered as a definitive treatment option for distal extension cases.

Precision attachment types of prostheses have two components.[7] The male part or Patrice is attached to fixed restoration and the female part or matrix in the intaglio surface of the denture. A precise and separable joint is formed when they are joined together. They are available in a variety of rigid and semi-rigid attachments forms.[8]

This case report describes in detail, the rehabilitation of a patient with distal extension maxillary and mandibular arches, using a combination of precision attachment and cast partial denture prostheses.

Case Presentation: A 65 years old male patient reported to the Department of Prosthodontics with chief complaints of looseness of the denture, inability to chew tough food and speak properly. He was not having any relevant medical history. On extraoral examination, characteristic features of reduced vertical dimensions like drooping of commisure, deepened nasolabial fold and poor tonicity of the facial muscles was present (Figure 1a). Intraoral examination revealed Turner's I situation, with lost occlusal vertical dimension, missing posterior occlusal stop and altered occlusal plane

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(Figure 1b).[9] The maxillary arch was of Kennedy class I modification 2 type whereas mandible was of Kennedy class II modification 1 type (Figure 1 c, d).[10] Teeth number 16, 13, 12, 11, 21, 22, 24, 25, 28, 37, 43, 44, 45 and 48 were present whereas 23 and 28 were root stumps (Figure 2). The examination of old prosthesis showed non-retentive maxillary and mandibular acrylic partial dentures. Different treatment options comprising cast partial denture and implant-supported prosthesis were discussed with the patient. Implant therapy was ruled out as the patient was apprehensive of surgery and have a financial constraint. Cast partial denture prostheses were also excluded to avoid the objectionable display of metal clasp. After a comprehensive discussion with the patient, it was planned to restore the remaining teeth with porcelain fused metal crowns and replace the missing teeth using cast partial dentures (CPD) retained with precision attachments for both maxillary and mandibular arch.



Figure 1a:Preoperative extraoral view; Figure 1b: Preoperative intraoral (frontal) view; Figure 1c: Maxillary occlusal view; Figure 1d: Mandibular occlusal view



Figure 2: Preoperative panoramic view

Pre prosthetic phase: After obtaining consent from the patient, clinical procedures were initiated. The tooth has a poor prognosis (13, 16, 48) and root stumps (23, 28) were extracted (Figure 2). Root canal treatments were performed in teeth number 12, 22,24,25,37,43,44,45 followed by post and core restoration of 43.

Fabrication procedure: Teeth of both maxillary and mandibular arch were prepared to receive porcelain fused to metal crowns. Impressions of prepared abutments were made with putty reline technique (Imprint II, 3M ESPE) and were poured in type IV die stone (Kalrock, Kalabhai Karson Pvt Ltd., Mumbai, India). The working models were then mounted on the articulator using the face bow and jaw relation record.

Wax patterns of abutment teeth were prepared for PFM crown and milled for the most guiding plane surface. The patrices of precision attachments (OT Caps, Rhein83 Inc., USA) were then added to axial surfaces of the wax patterns of abutment using a dental surveyor. Precautions were taken to attach the patrices lingual to the center of the proximal contour of the abutment. This ensured that the bulk of matrice did not interfere with the aesthetics of buccal cusp of replacing denture teeth. The copings along with the attached patrices were then invested and casting was carried out by lost wax technique.

Try-in of metal copings with patrice was then done to evaluate the fit of the casting. This was followed by shade selection and bisque try-in of PFM crowns (Figures 3a, b). PFM crowns were provisionally cemented and a pickup impression was made using putty and light body (Imprint II, 3M ESPE) (Figures 3c, d). Working casts were obtained from these pick-up impressions using type IV die stone (Kalrock, Kalabhai Karson Pvt Ltd., Mumbai, India).After block out of undercuts, they were duplicated in refractory material (Wirovest, Bego, Germany) using agar hydrocolloid (Wirogel M, Bego, Germany). Wax patterns (Bego, Germany) of cast partial denture framework were fabricated over the refractory casts to which the female components were attached. This was followed by the casting procedure to obtain the metal framework.

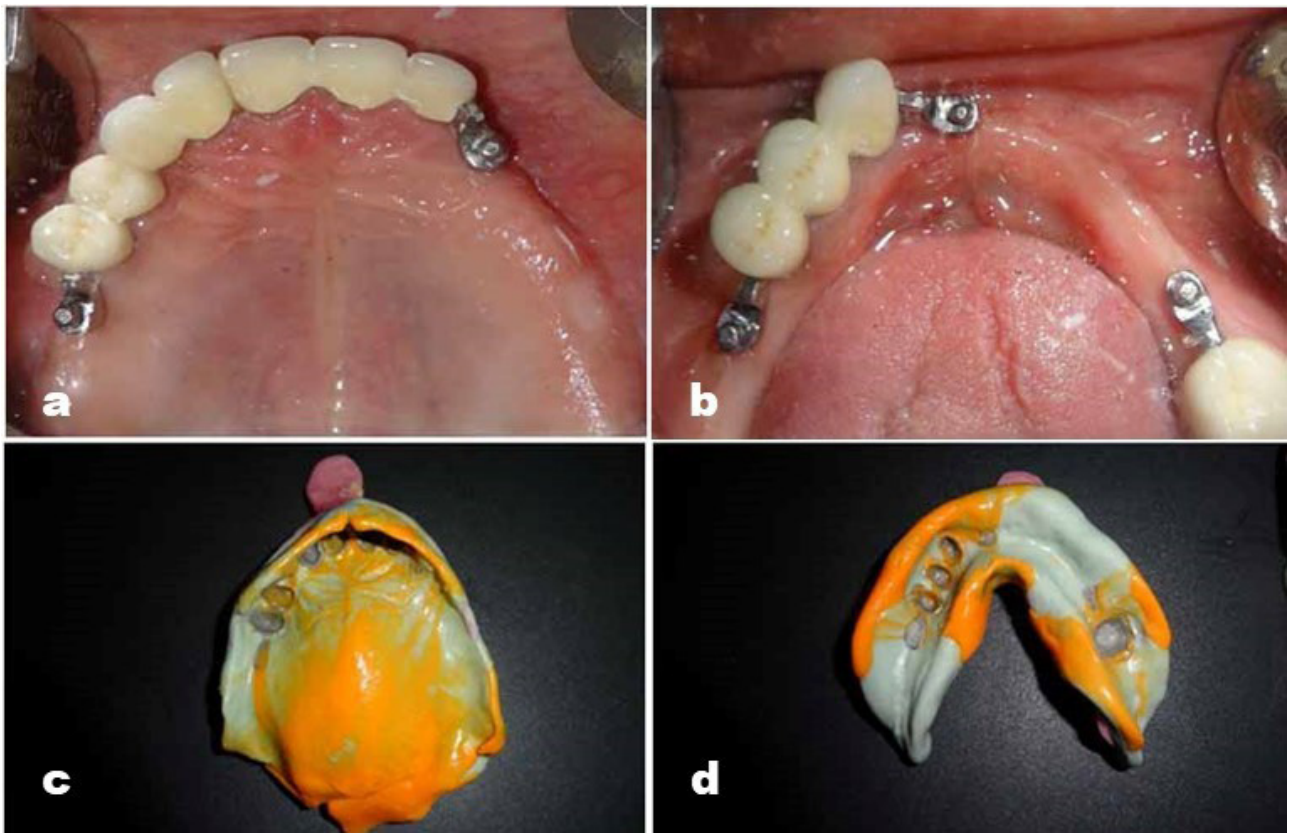


Figure 3a: Maxillary bisque try-in of PFM crowns with attached patrices; Figure 3b: Mandibular bisque try-in of PFM crowns with attached patrices; Figure 3c: Maxillary pick up impression; Figure 3d: Mandibular pickup impression



Figure 4. Try-in

The metal framework was then evaluated in the patient's mouth for passive fit, followed by a jaw relation record. Try in of dentures were done after the posterior teeth arrangement (Figure 4). A group function was given as the lower anterior teeth were missing.[11,12] This was followed by glazing of PFM crowns and acrylization of attachment retained partial denture (Figure 5a, b).As standard retention was required, a pink color elastic cap (OT Caps, Rhein83 Inc., USA) was chosen for the matrix. They were placed in the female counter slots of CPD using the insertion tool (Figure 5 c, d). These elastic caps not only act as stress breakers but also make the prosthesis retentive and stable. Cementation (Gc Fuji 1) of PFM crowns was done with the CPD attached to avoid any change in the path of insertion of CPD (Figure 6a, b, c). The patient was recalled at an interval of 24 hours, 1 week, 2 weeks, 1 month and every 3 months for one year for routine check-up and maintenance of hygiene. He was highly satisfied, as the stable prosthesis resulted in improved retention, mastication, speech and better aesthetics (Figure 6d). Moreover, it was a non-invasive and cost-effective palliative procedure.

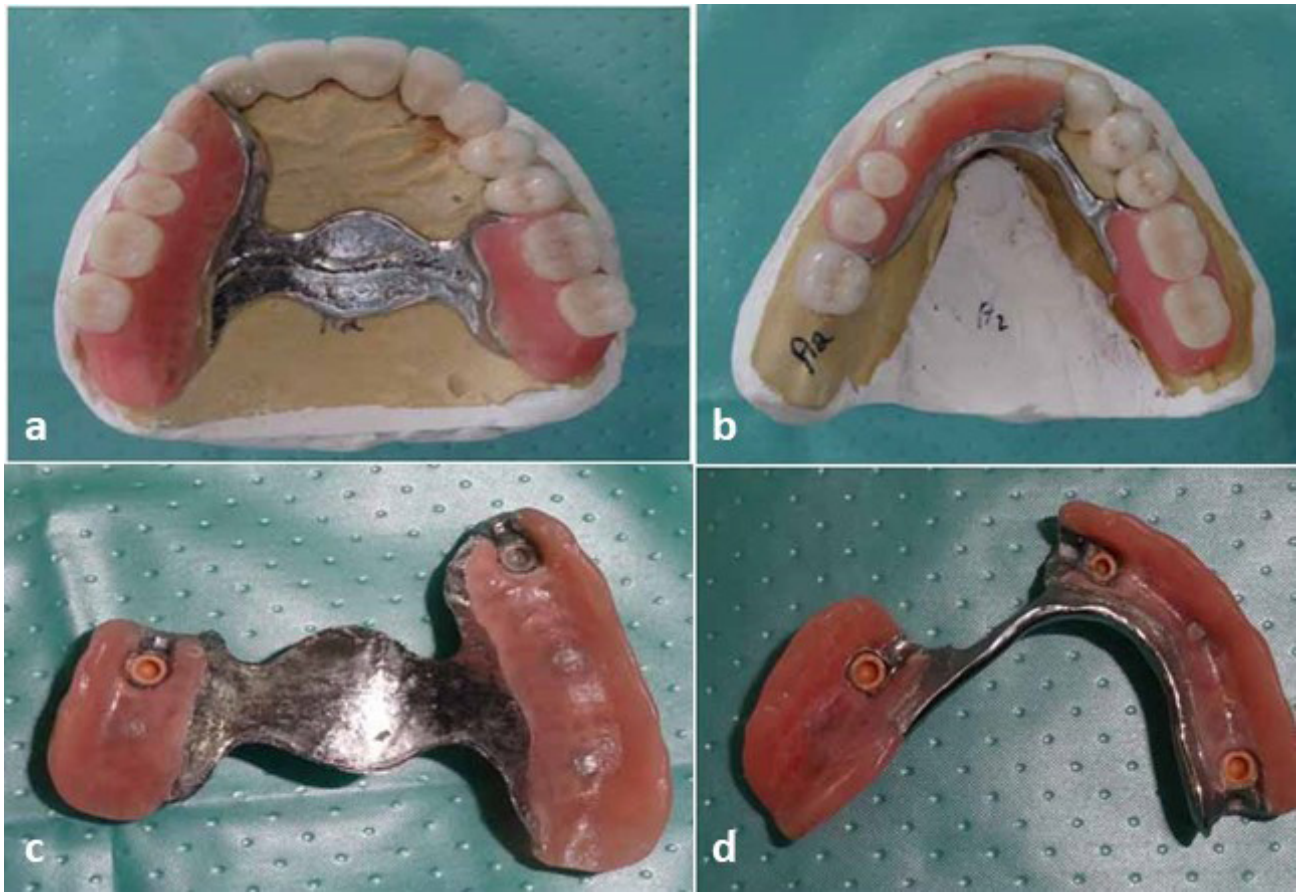


Figure 5a: Glazed PFM crowns with a maxillary partial denture; Figure 5b: Glazed PFM crowns with a mandibular partial denture; Figure 5c: Maxillary final prosthesis with a pink female retentive cap; Figure 5d: Mandibular final prosthesis with pink female retentive cap



Figure 6a: Maxillary occlusal view with the final prosthesis; Figure 6b: Mandibular occlusal view with the final prosthesis; Figure 6c: Intraoral postoperative view; Figure 6d: Extraoral postoperative view

Discussion

Rehabilitation of the present distal extension case required restoration of the lost vertical dimension, function and aesthetics of the patient. The patient was neither satisfied with the existing acrylic prosthesis nor convinced for the implant prostheses. Further, the position of remaining teeth precluded the use of a fixed partial denture. A simple CPD could have transferred excess stress to the remaining abutment teeth along with an objectionable metal display of clasp. So, the case was rehabilitated with cast partial denture and made retentive by use of precision attachment (RHEIN 83 OT CAP attachments system).

The height of the abutment teeth, in this case, was adequate (>3mm), which made the situation favorable for precision attachment.[13] These attachments not only made the CPD more retentive but also aesthetically pleasant, as it eliminated the objectionable metal display of clasp. Further, the resiliency of precision attachments redirected the forces to the residual ridge whereas, the CPD helped in cross arch load transfer during functional and parafunctional activities.[14] Together they stabilized the prostheses without the use of implants. Stress was further reduced by broad coverage, stable denture base and splinting of dentition.[15]

An extra coronal type of attachment, Rhein 83 system was chosen for this case based on the remaining teeth, their location in the arch, intra and inter arch relationship, aesthetic and financial aspect.[16] It is simple and offers spherical retention. This along with elastic retentive caps of precision attachment improved the retention of the prosthesis.[17]These types of retainers offer vertical resiliency, universal stress relief and easy replacement of worn attachments.[18] Favorable long term retention and less wear of ball are also seen when a combination of a precious gold alloy matrix and a titanium ball is used.[19]

However, the main deterrent for use of such prosthesis is cost because of complex laboratory, clinical procedure and the wearing of attachment components. They are also contraindicated in short clinical crowns as they cannot house the attachment

components and effectively offset the leverage forces exerted on the crown.[13] Adequate inter arch space is also another prerequisite for the corresponding attachment components to be housed within the RPD framework and optimal artificial tooth replacement.[6]

Conclusion

Precision attachment retained CPD was found to be superior to the conventional acrylic RPD used by the patient in terms of improved retention, aesthetic and hygiene maintenance. Again, they can be used as long term definitive kind of prosthesis, where the use of implant-supported prosthesis is either contraindicated or not affordable. As it is a non-invasive procedure, it can also be used by the general practitioner, with adequate knowledge and proper treatment.

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The Role of "Melatonin" in Dentistry

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Abstract

Melatonin, an endogenous hormone, is a wonderful tool in the field of dentistry. It has got myriad qualities which can be used in every branch of dentistry. It is basically a night hormone, playing a component in the circadian sequence of the body. But it has been observed that it has got true potential when incorporated in dentistry. Apart from the treatment part, it can also be used to neutralize the toxicity part from the restorative materials used in dentistry. Right from the oral ulcer to the treatment of oral cancer, melatonin can be of utmost importance in the implant dentistry, extensively. The aim of this review is to decisively analyze and review by focusing on the capability of melatonin in the field of dentistry.

Keywords: *Melatonin, anti-oxidant, melatonin as a hormone.*

Introduction

Periodontal disease is a globally challenged infectious disease which resulted from the disturbance between the pathogenic agent and host immunity. Targeting the root cause of periodontitis by non-surgical therapy has been always the gold standard. Hence, the pharmaco-therapeutic agents have become very significant in the management of periodontal disease which has given rise to the popularity of the usage of the sleeping Hormone "Melatonin".[1]

Melatonin was revealed in extracts of the bovine pineal gland and synthesis in this organ was determined in 1958. It ranges from 1 to 5 pg/ml in the day and upto 50pg/ml at night. Melatonin is an endogenous molecule that controls basically the circadian rhythm. The circadian secretion protocol of Melatonin goes similar in serum and saliva. But salivary melatonin level do not always imitate absolute melatonin concentration of serum. As in the blood stream, melatonin can beleap to 70% of albumin and the rest is present in the free fraction which becomes able to diffuse passively from the submandibular glands to the saliva which is only 24 to 33%. Hence, in the oral cavity, particularly the anti-oxidant function of the Melatonin involves in the pathogenic process of periodontal diseases. However, it also regulates and modulates a wide variety of pathophysiological processes together with the modulation of immune response, anti-inflammatory, anti-oxidant, anti-tumoral, anti-parasitic and neuroprotective processes. Melatonin is a significant biomarker in the diagnosis and also plays a significant role in the treatment of periodontal disease. It also possesses a potent antimicrobial activity on multidrug resistant, gram positive as well as gram negative bacteria also.[2] It is available in the topical form, spray, Gel, and also can be taken systematically. Ramelton, a melatonin derivative was the first melatonin receptor agonist accepted for human use. It has much of therapeutic values then the Melatonin and it has a higher lipophilicity and can be more easily taken up and retained by tissues.[3,4]

Effects of Melatonin: Melatonin and periodontal health: Melatonin has been much beneficial on useful mechanisms regulating the fibroblasts migration and proliferation throughout gingival healing on periodontal repair.

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They function by 3 following mechanisms:

1. By dropping the making of cytokines, chemokines and pro-inflammatory proteins produced by leukocytes melatonin prevents the devastation of cells and other structures.
2. By neutralizing ROS, melatonindefends the fibroblasts from noxious substances that brelease Ros and helps in reversing the effects of oxidative damage.
3. By enhancing the mechanism of wound healing.[5]

ROS formed by keratinocytes, fibroblasts and a variety of other inflammatory cells mightconsequence in disequilibrium among the pro-oxidants and antioxidants. Reactive oxygen metabolites lead to devastation and damage to cell membranes by lipid peroxidation. Commercially available melatonin gel can be functional in the oral cavity is effective in reducing mucosal lesions.[5]

Melatonin against inflammation/periodontal disease: As periodontitis is an inflammatory disease, caused mainly by the bacterial infection. During the infection, the bacterial LPS produces nitric oxide, IL-6, lipid peroxidation which is the main concern in the development and initiation of chronic periodontitis. Melatonin exerts alpha protective role against periodontal inflammatory process by its anti-oxidant and anti-inflammatory action. Also the free scavenging potential of melatonin aids in lowering the massive reactive species (ROS) confined by bacteria. Antioxidant capability of melatonin helps up in the treatment of the local inflammatory conditions and there by fastens up the healing process. Melatonin exerts its inflammatory actions by inhibiting the prostaglandin synthesis, production of adhesion molecules and NF-kB binding to DNA. Apart from this, it also reduces the leukocyte-endothelial adhesion and leukocyte transendothelial cell migration. Not only this, it also decreases the PMNL to the inflammatory sites. It also inhibits inflammatory enzymes COX-2 by binding to the active sites of COX-1 and COX-2 and hence inhibits the activity of the enzymes and aids in inflammation. It is an anti-bacterial agent which has been a strong antimicrobial agent on various bacteria and viruses.[6] The straight action of melatonin as an antimicrobial, synergistically by its immunomodulatory and anti-oxidant properties may prove to be a potent weapon against numerous oral infections. It rescues the injured oral epithelial cells from apoptosis process.It enhances phagocytic activity by its immunomodulatory function.[4] Melatonin also influence fibroblast activity and bone regeneration.[6] Melatonin mediates the effect of immunomodulatory action through receptors on localized preosteoblasts which leads to the production of the bone sialoproteins, alkaline phosphatase, osteopontin, osteocalcinin in their cells, hence significantly shortening the tissue needed for their differentiation into mature osteoblast from 21-12 days. RANKL is an important protein in osteoblastic differentiation and proliferation. Osteoprotegrin(OPG) interferes with its biological potential. Hence RANKL plus OPG plays a critical role in the development of periodontal disease resulting in periodontal destruction from the up regulation of RANKL. SO the triad is (RANKL, OPG, RANK) responsible for destruction, which is altered by the modulating effects of melatonin. Treatment of Melatonin generatesthe abundance, segregation, action of osteoblasts. It acts at the level of osteoclast lacunae because of antioxidant and free scavengers, hence neutralizes reactive species and inhibits bone resorption.

Salivary melatonin level may improve the organism's defensive response to the periodontal inflammatory process. Melatonin strongly suppresses the nitric oxide (NO) and IL-6 production induced by LPS from P. intermedia. Studies showed that as the degree of the periodontal disease is increased, salivary and GCF melatonin level gets decreased indicating Melatonin is taking care of the disease.[7]

Melatonin and Porphymonasgingivalis associated Periodontal Disease: Melatonin has shown a significant role on "keystone" periodontal pathogens like *P.intermedia, P.gingivalis*. It acts on the virulence factors of *P.gingivalis*, such as proteinases, gingipains, fimbriae, LPS, cytotoxic and haemolytic molecules like KgP. It suppresses the production of nitric oxide and IL-6 produced by the LPS of *P.intermedia*. And this virulence factor was a necessity for growth and survival of *P.gingivalis*, as nutrients as well as adherence to lots of host cells surface playing a vital role in the breakdown of host defencemechanism, the penetration and progressive damage of the host connective tissue. Also melatonin breaks down the virulence factors like LPS which would have stimulated the production of inflammatory mediators like interleukin carrying inflammation.

Melatonin level is seen significantly reduced in patient with periodontal disease. Hence it can be applied as a potential treatment of periodontal disease. It has a

tremendous anti-inflammatory effect on *P.gingivalis* virulence and *P.gingivalis* induced inflammation by affecting the gingipains and haemolytic activities of them. Melatonin also inhibits biofilm formation and thus decrease the biofilm viability of *P.gingivalis*. Not less, melatonin also has a potential to inhibit *P.gingivalis*LPS induced IL_6 and IL-8 secretion.[6]

The level of salivary and GCF melatonin level decreases in case of periodontitis then the healthy individuals, which may be a risk indicator for the development of severe kind of periodontitis in future. Melatonin level gets depleted here because of response to an oxidative stress which is increased by a shortage of antioxidant to balance the same and the bacterial attack present in periodontitis.[1]

Melatonin can alter the development of the periodontal disease as it can act on PGE2 thereby inhibiting the differentiation of the osteoclasts induced by cell to cell contact between osteoclasts and osteoblasts. Melatonin can also modulate all the proteins that regulate the resorption process in the periodontal diseaseand interact with other biological agents such as calcitonin, parathromone, IL-2, IL-8, IL-6, osteoprotegrin. And hence diminishes bone resorption and promotes the bone marrow cell differentiation.[2]

Melatonin downregulates the expression of pro-inflammatory factors such as c reactive protein, IL-6, TNF alpha but also downregulates the receptor activators of nuclear factor kappa Beta ligand/osteoprotegrin ratios to reduce periodontal inflammation.[5] Topical application of melatonin can be used as an adjunct with non-surgical therapy and also during the surgical debridement to improve the outcomes of periodontal therapy.

Melatonin and diabetic induced periodontal disease: Melatonin significantly inhibited hyperglycaemia induced oxidative stress and alveolar bone loss through its anti-oxidant effect. Melatonin reduces the magnitude of inflammation in the periodontal tissues by its anti-inflammatory and antioxidant properties. It also scavenges the ROS produced by diabetes and hence reduces the inflammatory effects of diabetes in periodontium.[5] Melatonin not only benefit local oral environment but also can contribute to ameliorate glucose levels, helping to prevent chronic diabetes complications. Periodontitis known as a sixth complication of diabetes can also be improved by the therapeutic effects of melatonin.[3]

Melatonin and stress induced periodontal disease: Stress causing depression also plays a contributory role in periodontitis. Oral hygiene is impaired because of low maintenance and results in periodontitis. Melatonin can be of tremendous help here as an anti-oxidant and an antidepressant.[3]

Melatonin and oral cancer: Melatonin is a promising anti cancer agent.Reactive oxygen species and free radicals are the main factors for oral cancer. In the precancerous cases of bothleucoplakia and lichen planus, Melatonin plays a preventive role as well as a therapeutic role against oral cancer.It may impede the metastasis of oral cancer by suppressing metalloproteinase -9 activator. It is a strong anti-oxidant having immense anti-proliferative action on the cancer cells, anti-tumor activity, antiapoptotic effect, immune stimulator, anti-inflammatory and antiangiogenic agent which makes melatonin to exert oncostatic action on cancer by all the biological mechanisms.[6]Also, Melatonin has been used as the palliative therapy for cancer because of anti-cachectic, antiasthenic, thrombopoietic properties. It is used as preventive tool to neutralize the side effects of chemotherapy. Melatonin is successfully administered in medical oncology in the supportive concentration of untreatable advanced care. Hence, oral melatonin gels, oral melatonin rinses and melatonin tooth pastes are helpful to impede and prevent oral cancer.[4]

Melatonin in xerostomia: Melatonin has the therapeutic potential to regulate and balance the activity of the salivary glands and their rate of the salivary flow as well. It acts directly on the secretory unit of the salivary level.[6]

Melatonin andOral mucositis/oral ulcers: By suppressing the inflammatory enzyme Cox-2 as a potent anti-inflammatory agent as well as by its antioxidant capacity, Melatonin helps in treating the local inflammatory condition like oral mucosities. Also, it protects DNA damage against the ionizing radiation. In case of radiation mucositis, oxidative damage and toxic cytokines is very painful and is relieved by the usage of melatonin gel. It also prevents the damage of the environmental dangers like lead, arsenic, and fluoride into the body by neutralizing the toxicity. Melatonin by its free radical scavenging capacity regulates the apoptotic process otherwise there would have been massive cell death by the ROS. It is also a potent antiapoptotic agent.[6]

Melatonin and bone formation: By stimulative synthesis of Type 1 collagen fibers and by its free radical scavenging capacity, Melatonin prevents ROS which may otherwise resulted in promoting the osteoclastic activity. And thereby, it protects organisms from bone resorption by its anti-oxidant and free radical scavenging properties.[6]

Melatonin and viral infection: Acyclovir and melatonin beneficial effects are compared and was found that Melatonin seems to be better than the former. The antiviral potential of melatonin on herpes is enhanced by stimulation of products like IL-1B, cytokines, IL-2 and INF–gamma leading to the increased activity of NK cells and CD4 cells. Immunomodulator formulations is 2.5 mg of melatonin and 100mg SB-73(a mixture of Magnesium, phosphate, fatty acids, protein extracted from *Aspergillus oryzae*. SB-73 when given either before and after viral infection amplified the number of bonemarrow granulocyte macrophage progenitor cells. Hence, aid in immunity.[6] Melatonin prevents the untoward effect of the drug acyclovir and hence decreases the toxicity. [7]

Melatonin and candidiasis: Melatonin as an immunomodulator agent has got the shielding effects in severe sepsis/shock induced by bacterial LPS in animal models. Itsuppresses IL-6 level and becomes a therapeutic agent in animals with candida sepsis. The level of TNF-alpha and adhesion molecules seems to be in a suppressed level in the animals treated with melatonin as compared to the animals not treated with melatonin hence, used as an antimycotic agent for the oral candidiasis. It can be used either as a topical agent or can be taken systemically. Also, some studies have shown phagocytic functions of melatonin and at the same time reduces oxidative stress originating during candidiasis.[6]

Melatonin and dental materials: It are observed that the restorative and the esthetic dental materials comprises of methacrylates polymers with some additives. Often, there is incompleteness in polymerization or material in situ because of masticatory shearing, salivary enzymes, enzymatic degradation, which doesn't allow the whole monomer to undergo polymerization. Hence, there is leech of methacrylate monomers from the restoration into the pulp and the oral cavity by which they get accumulated in the distant organs through blood. And there they produce toxicity like cytotoxicity and genotoxicity with the help of the oxidative actions of the monomers in both the vivo as well as in vitro.[8] Freely available monomers induce DNA double-stand breakdown and irreparable damage to the fibroblasts because of the oxygen and nitrogen-based reactants of the monomers, Melatonin also helps in the reparative action of DNA in the same way and also prevent it from apoptosis. Melatonin sublingual tablet can be added on tooth paste, gels and mouth washes. Also, it is seen that the traditionally amalgam fillings have been replaced by the composite material because of the high toxicity of the mercury in amalgam.[9] And composite materials are nothing but a combination of organic polymers with inorganic fillers belonging to the methacrylate group. Hence, Melatonin here is a boon acting as a powerful antioxidant in neutralizing the toxicity.[6,10]

Conclusion

Dietary melatonin supplements can be taken asa supplement to enhance the periodontalparameters. Hence to analyze its possibility as a long termbeneficial agent for the management of periodontitis, melatonin should be accepted in routine dental practise. More research is still needed to see the effect. Antioxidants have anoutstanding role in the maintenance of periodontal health and melatonin is one of them which have emerged as anoutstanding adjunct that can develop the outcome of conservative periodontal therapy. Melatonin can be a prominentdistinction by a remarkable stabilityamong health and disease.

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The Night Hormone "Melatonin" in Implant Dentistry

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Abstract

Melatonin (N-acetyl-5-methoxy tryptamine) is a substance secreted by different organs in vertebrates. Adding up to in performance a part in the circadian cycle of the body, melatonin also plays a significant role as an anti-oxidant, anti-inflammatory, immune-modulatoryspecial effects on human tissues. Melatonin has been playing a very significant role in the dentistry in various roles. Apart from this melatonin also plays a very powerful and a significant role in Oral implant dentistry.Furthermore,melatonin has been observed to improve osseointegration and bone regeneration. Topical management of melatonin has a helpful effect on periodontal health and osseointegration and also promotes the curing of tooth extractionsockets by impeding the progression of resorption of bone. It also helps in suppressing the peri-implant microflora too. Melatonin positive regulation of bone formation and homeostasis, in combinationwith the inhibitory effects on bone resorption, highlights the potential use of melatonin as a marker of periodontal and periimplant bone-related diseases. Hence this review is to critically evaluateand summarize the effects of melatonin in the bone metabolism, bone repair and healing till the osseointegration in the field of Implant dentistry.

Keywords: *Melatonin, osseointegration, Hormone in implant.*

Introduction

Melatonin is a very powerful biomimetic agent and it mimics many biochemical processes which becomes a blessing for dentistry especially in the implant dentistry. For the remarkable success outcome of Implant, the quality and the quantity of the bone plays an important role. At the low concentration, Melatonin (indole group of melatonin) can stimulate, synthesis and can produce Type 1 collagen fibres in osteoblasts of human being. Melatonin has got myriad properties which is very much benefitted for the implant dentistry.[1] Melatonin has the powerful potential of osteogenesis, anti-inflammatory, immune-modulatory,antioxidant, free scavenging of ROS and many more. Together with all these wonderful potentials of Melatonin, it makes a powerful entry to the implant dentistry. It is available in the form of powder, gel, and tablets. It can be nicely merged with any type of bone grafts or growth hormones at the time of implant placement which gives a remarkable outcome in the follow up period after 3 months.[2]

Because both the bone graft and melatonin together act here as bone stimulators and thereby enhance the synthesis and differentiation as well as proliferation with early matrix production and mineral deposition. So, one should go without a single doubt in mind about placing combination of bone graft along with the melatonin for good osteogenesis and osseointegration especially for the immediate implant.[1,3]

Melatonin has a great scavenging potential for the free radical species generated by the inflammatory cells. It detoxifies and scavenge the free oxygen radicals and then prevent them from acting on the osteoblasts in resorbing the extracellular matrix. Otherwise, it would have led to a greater degree of resorption. Melatonin because of the antioxidant properties and capacity to counteract the active species, it retards the resorption of

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bone, by downregulating the RANKl, as the RANKL is the main source of formation and regulation of osteoclast lacunae.The anti-inflammatory and the antioxidant properties have a reinforce action on the microorganisms by squeezing to the minimum production of reactive species and hence prevents bone resorption.

As melatonin is dosedependent, application of Indolamin at the micromotor concentration of 5 to 500 micrometres, is able to help in the expression of mRNA and osteoprotegerinin the proosteoblast cell which helps in increasing in the bone mass due to the constriction of osteoclast activation.Also, melatonin has got potential of anxiolytic and analgesic. Melatonin suppresses the pain from inflammation by blocking the pathways of nitric oxide production.As melatonin is an immunomodulator and a neuro endocrine hormone, it helps in influencing angiogenesis and healing of wound by the proliferation of fibroblasts. Hence, it helps at the time of immediate implant placement if there is peripaical pathology, lack of complete tissue closure or absence of keratinized tissue.[4]

Melatonin being a pleiotropic multitasking molecule, topixc application of melatonin has got a tremendous suppressing effect on IL-6, IL-B which are the inflammatory mediators, causing soft tissue destruction by stimulating the production of PGE and collagenase synthesis.[5]Melatonin has an antioxidant, immunoenhancing promotes the fibroblast activity and bone regeneration. Melatonin with Vitamin c has a synergetic antioxidant effect. Melatonin has the ability to maintain the bone health by forming good quality as well as sufficient amount of bone formation around the implant, by being a biomimetic agent, leads to good osseointegration.[6]

1. By acting on the osteoclasts directly as an antioxidant and a free scavenger it prevents resorption of the extracellular matrix by producing free radicals. This helps in prevention of the bone resorption.
2. Melatonin can induce osteoblastogenesis by regularly RANKL and osteoprotegrin synthesis. And this in turn helps in development of the bone sialoprotein and the other important protein bone markers. Once this bone marker is developed in the osteoblast, they in turn helps in differentiation of osteoblasts by reducing the time from 21 normal days to 12 days.
3. Melatonin gel or powder can be used as a bone graft material added with any type of growth factor, at the site of extraction before placing the implant.
4. Studies after 1 month shows the group used melatonin as a gel during immediate implant placement showed good perimeter of bone, increase in the bone density, new bone formation and increase in the bone at the inter thread area and hence increases the stability of the implant. Because of the stability of the implant is directly correlated with the significance increase in the inter thread new bone formation. Even, melatonin can act incase of aggressive placed implant where there is bone compromised and there is too much necessity of remodelling with repair and regeneration of bone at the quickest.

Biological effects of melatonin and its principal actions[7]

1. Firstly, melatonin increases pre-osteoblast/ osteoblast/osteoblast–like cell proliferation, improves the expression of type 1 collagen and bone marker protein (e.g. alkaline phosphatase, osteopontin, bone sialoprotein, and osteocalcinin and stimulates the mineralized matrix in these cells. Melatonin also prevents the differentiation of osteoclasts by reducing the expression of RNA and increase in both the mRNA and protein levels of osteoprotegrin.
2. Melatonin can in some way regularize bone metabolism via the exchanges and systemic hormones (e.g. PTH, calcitonin, oestrogen)or other molecules. Oestradiol treatment has got the potential toextend the properties of melatonin to boost bone remodelling.
3. Osteoclasts generateelevated levels of superoxide anions through bone resorption that is correlated to the degradative process. Melatonin can eliminate these free radicals and defendthe cells of the bone from oxidative attacks.

Melatonin can also be benefitted for the post-menopausal women undergoing HRT and is a case for immediate implant placement.Surface modification of dental implant is a pre-requisitive factor to increase the bioactivity before the implant placement. Once again, melatonin has shown a remarkable viable alternative tool to stable the coating of the implant. And this is carried out by the balance of the bioactive coating ion leakage and residue particle. And by doing this, there is a remarkable

significant increase in the inter thread bone formation and bone mineralization. Melatonin can prevent the drawbacks of the modified implant by preventing delamination of the bioactive coating, ion leakage and particle residues. Melatonin a viable alternative to stable the implant coating powdered melatonin on the implant site leads to increase significantly in the inter thread bone formation and bone mineralization.[7]

Melatonin can indirectly give a bonus strength to the osteogenic potential of xenografts in the case of a calcium coated titanium implant. However, still the synergistic effect is seen in adding up the growth hormone on the melatonin dust over the implant site.

Even the studies have shown a remarkable significant profound one implant contact on the administration of intra peritoneal melatonin injection added with growth factors like FGF to the titanium and zirconium implant. A fantastic osseointegration is been observed after 3 months because of the fantastic osteoconductive potential of the implant.

1. Melatonin in bone remodelling: As we know, hormones are mainly responsible for the bone remodelling processes and melatonin is one of them. Melatonin helps in bone remodelling in 3 phases and act on the action of
2. It enhances the pattern of a mineralized matrix in these cells.
3. At all the level of the pre-osteoblast/osteoblast/ osteoblast like cell proliferation which in turns promotes the expression of type 1 collagen and bone marker proteins which helps in remodelling of the bone.
4. It stops the differentiation of osteoclasts via the decline in the expression of RANK and mRNA and increase in both the protein level and mRNA of osteoprotegrin which in turns helps in remodelling of the bone.
5. Melatonin interact with the systemic hormones indirectly and thus regulate the bone metabolism like PTH. Many literatureshave stated that the oestrogen in the body or if the body is under oestradiol treatment plan. Post-menopausal women or under HRT, oestradiol can prolong the effect of melatonin and helps in bone augmentation. So, here good quality of oestradiol is necessary to make the melatonin properly act on the bone.
6. During bone resorption, much elevated levels of superoxide anions are liberated bythe osteoclasts which enhance the degradative process. As melatonin is an excellent free radical scavenger and antioxidant, melatonin empties the free radical given up by the osteoclasts at the time of bone resorption, and hence prevents the bone cells from the oxidative attacks.[5]

Melatonin and bone repair: As we know repair of bone is always a continuous process and also a complex one. And this bone repair requires 3 biological stages: Inflammatory phase, proliferative phase and the Remodelling phase. And the sequence in the bone repair starts from the infiltration of the inflammatory cells, vascularisation, angiogenesis, followed by the cell differentiation and cell proliferation and then the deposition of the collagen, formation of the granulation tissue and finallyby the deposition of the mineral matrix. As melatonin is a strong antioxidant, it helps in the healing process of the bone by regenerating the bone cells and also promotes the action of angiogenesis. And also, melatonin it promotes the action of angiogenesis. As melatonin is a free scavenger of free radicals, it also scavenges the free radicals generated bythe inflammatory cells and hence prevent from the impaired healing of bone.Or else it may lead to cell damage via the lipid peroxidation. Here melatonin is a significant pineal hormone at both the physiological and pharmacological concentration. Melatonin promotes neo vasularization and thus helps in healing. As osteogenesis is formed after the angiogenesis process, hence the repair of the new bone was dependent upon the blood vessels for the supply of mineral elements and the migration of angiogenesis and osteogenic cells takes place into the scheduled places. Hence, melatonin promotes the remodelling process.[5]

Melatonin and osseointegration of the dental implant: Melatonin may be a powerful biomimetic mediator in the placement of endoosseous dental implant. Studies have shown that the application of melatonin has significantly increased the bone perimeter which is in straight contact withthe treated implant, bone density and new bone formation and inter-thread bone in contrast with the control implants.It was found that the increase in osteoblast proliferation withthe peri-implant zone is bythe help of melatonin.[5] These actions brought by melatonin on osseointegration are of significant beneficial as it can be used to apply melatonin in different forms of dental implant surgery where melatonin acts

as a biomimetic agent during the traumatic extraction of tooth, when melatonin is placed at the site and that followed by the immediate implant placement, melatonin is normalized the level of reactive oxygen species, lipid peroxide, nitrates and nitrites production at reaction to tooth extraction.[11, 12] If bone growth factor plus PRF and melatonin is given, it is remarkable.

Melatonin promotes utterly positively the peri-implant bone response. In many of the studies done on vitro, it shows that melatonin as akeymoderator in bone configuration and stimulation, enhancing osteoblast differentiation. Here, melatonin acts on the bone as a confined growth factorwith paracrine effect on nearby cells. Melatonin also has shown a positive effect on the precursors of bone cells in various animal studies. Indolmane is proved to be a major modulator of calcium metabolism and interacting with other bone regulating factors such as PTH, Calcitonin, and PGE, it prevents osteoporosis and hypocalcaemia. It is shownthat bone-to-implant contact (BIC) and total peri-implant bone area at 4-12 weeks are higher in melatonin treated implant then in controls. The larger amount of bone tissue in direct contact withthe implant that received melatonin mayreproduce greater synthesis of bone matrix in the peri implant area. The reason may contribute to either the quantity of osteoblasts enhanced, may be due to the active osteoblastic activity or may be due to the constraints of the osteoclast activity. Melatonin seems to help in the formation of the bone cells. Also it has been keenly observed lots of cells which are newly formed with clear bone trabeculae in direct contact withthe implant surface is observed after the administration of melatonin with growth factors like FGF-2 by promoting new preosteoblasts which are carried from the bone marrow to the alveolar bed via the vascular system.[8]An additional action of melatonin, is at the pre osteoblast level, boost new bone formation by prompting of gene expression of assured proteins in the bone matrix. Melatonin constrains the production of ROS by peri-implant blood vessels.

Melatonin improves results for cell adhesion, proliferation, differentiation, on different titanium surface modification, by the additional usage of topical melatonin. Here melatonin acts as a biomimetic agent.[10] Melatonin has dual effects on both osteoblast and osteoclast. Bone remodelling is accountable for bone mass maintenance, regulation of bone potency and or mineral homeostasis all along human lifetime.[2] Melatonin is dose dependent and is maximum at the concentration of 50 micrometer. At concentration ranging from 5 to 500 micrometre, melatonin minimizes the expression of mRNA from the RANK and increases the level of both osteoprotegrin as well as mRNA from thepreosteoblast cell lines. This positive potential of melatonin on bone makes it to act as a biomimetic agent during endosseous implant surgery.[9-11]

Conclusion

Therefore, melatonin may inhibit bone resorption or promote bone-marrow cell differentiation. It is important to note that the stimulation of osteoblastic differentiation by melatonin may influence bone formation through the induction of bone sialoprotein and alkaline phosphatase and osteocalcin that are essential proteins for bone maturation. Hence, melatonin may play a major role in the regulation of the bone resorption as well as formation but always ends up in favouring of the bone formation. Hence Melatonin can be considered as a therapeutic agent, either alone or combined with both grafts and growth factors in the implant cases. It is a promising tool for implant dentistry having multiple beneficial properties under one name of melatonin.

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Outcome Assessment of Operative Treatment of Humeral Shaft Fractures by Antegrade Unreamed Humeral Nailing (UHN)

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Abstract

The motive behind this inquiry was to study the out-and-out cracks in the Humeral shaft handled with Unreamed Humeral Nailing System (UHN). Infatuation of the glenoid shaft cracks in this evaluation was performed by an insubstantial UHN structure entry point, without the use of its proximal locking features. Thirty-five patients have been handled along these lines. Useful status for the shoulder and elbow Surgery (SASES) scoring system. 1 example of deep was monitored during the follow-up period. The average association period was 16.8 weeks. SASES shoulder and elbow capacity were brilliant or large in 94.28 per cent of patients. Difficulties included non-union in 1 (2.38 percent) and spiral nerve paralysis in 1 (2.86 percent). Antegradunreamed humeral Nailing is a worthy, safe and reliable therapy for humeral shaft breaks.

Keywords: *Humeral shaft, Fractures, Treatment, Antegrade, Humeral nailing, Unreamed.*

Introduction

Humeral shaft breaks are amongst the most excellently-known orthodontic issues, responsible for about 3% of all cracks[1]. Treatment techniques for this form of wound continue to advance in both usable and non-usable approaches[9 10]. It is often acknowledged that most splits in the humeral shaft are best controlled extra-operatively., While a few signs of essential or optional usable techniques include poly-injury with important neck or potentially head damage, ipsilateral splitting of the two lower arm bones [1112](drifting knees), wide-neighbor related injury, such as joint, brachial plexus, muscle or ligament, absence of decrease of the humeral shaft fracture by closing, and obsessive humeral shaft. Cracking[13 14].

Despite the big connection since-effects in non-employable administration, there are still a few issues, such as long-term therapy and patient prejudice, especially between young and dynamic patients regularly speak about usable administration to experts and professionals. The empowering outcomes that have been accounted for by the late developments in inward obsession. Systems and instruments have led to the growth of cautious indications of such breaks[4]. Obsession of plate techniques was regarded to be the normal method. Issues linked to this method include injury inconveniences, e.g. illness, raised likelihood of deferred blend (particularly when the trial of plaque fixation have not been actually directed Non-affiliation and fixation on disappointment[5,6]. Intra-medullar pinning is additional proper careful methodology that could be actualized over both wager evaluation and retrograde approachs. There are unmistakable outcomes in the composition of unreamed humeral nailing (UHN) and a few preliminary studies have revealed distinct rates of non-association[7, 8]. In the light of the shoulder, we recognize that joint's A broad range of motion of UHN with a bet assessment strategy without distal locking, apart from a tiny increase in The danger of pre-association will not cause significant uncertainty, but may decrease the time of procedure and decrease the opportunity of extensive nerve damage[15,16,17]. The objective of this evaluation is to assess the results of the

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UHN through a risk assessment strategy in patients with breaks in the humeral shaft.

Materials and Method

The point is to tentatively investigation the "practical result of antegrade intramedullary interlocking nailing in crack shaft of humerus" at the Department of Orthopedics in Sree Balaji Medical College and Hospital chrompet Chennai. The enrollment time of this examination will be from March 2017 to February 2018 (a year). The subsequent period will be for a base time of 7 months (extend: 7 to 19 months). Radiological association, practical result and intricacies were evaluated.35 patients with shut intense humeral shaft cracks requiring employable administration They were handled with UHN. The criteria for account were: (1) humeral shaft cracks which indicated usable therapy and were monitored by intersecting and (2) patients with a duration of more than 18 years. Rejection criteria were: (1) patients under 18 years of age, (2) segmental cracks, (3) breaks within 4 cm of anterior or distal humerus finish..All patients had a fair clinical and radiological evaluation before they decided to make a cautious decision. intercession. All breaks were characterized by the Muller AO arrangement. Subsequent to utilizing the consideration and prohibition Criteria, we included 41 UHN patients. For the proximal enactment, an entry point of 1–2 cm was intentionally placed on the anterolateral tad of the shoulder in order to limit harm to the deltoid muscle, and an intramedullar nail (Russell-Taylor type) was applied to the rotator sleeve bet analysis. (Fig. 1). The significant speculation in this examination is that as per the shoulder's wide scope of movement regardless of whether not locking the distal segment causes some degree of non-association, it would not cause any revolution limit. Failure to lock the distal portion would significantly reduce the interaction span and reduce the risk of overspread nerve damage. Dynamic and detached movements of the elbow and pendulum activities of the shoulder were begun on POD-3 and following two weeks, dynamic and latent flexion and snatching of the shoulder were begun. Failure to lock the distal portion would significantly reduce the interaction span and reduce the risk of overspread nerve damage.Association status was researched utilizing control radiographies. Reactions were noted for every patient. The utilitarian status of the shoulder and elbow was assessed utilizing the Society of the American Shoulder and Elbow Surgery (SASES) scoring framework (see Appendix 1). Scores (98 to 100) were viewed as magnificent, (95 to 98) great and under 95 were unsuitable. As characterized by the standard, span for ordinary association is 8 to 12 weeks, postponed association is 3 to a half year and for non-association it is over a half year. The particular time it takes for each patient to come back to the day by day exercises has been registered. Factual investigation was completed by method for Programming SPSS 18.0 for Windows. Results are reported as techniques ± SD and understudy t of the experiment was conducted for their correlation. Estimates of probability under.05 were considered to be critical.

Findings: Findings of our study (2017-2018) can be summarized as follows:

(a) Our male to female ratio, in the sampled age group of 31 to 55 years, was 5:2. Hence there was a clear male dominance in the sampled total of n=35 patients. On critical analysis of this, while the male preponderance dropped when we move up the age scale, many female recruits had joined the study beyond age 46 to 55 years. Thus this bimodal model is as distinctly reflected in our study too.

(b) Right sided injuries predominated at 77.14% (n=27) in our study.

(c) In the younger age group of 31 to 45 RTA was the predominant mode of injury. As we move up the age scale from 46 to 55 years, trivial fall constituted the majority of recruits, who also happened to be females.

(d) As per the 2018 AO-OTA adult diaphyseal classification system adopted in our study, type 12 B 3 constituted 40% (n=14) cases, followed closely by type 12 B 2 at 31.42 % (n=11).

(e) Our average injury to surgery time lapse was at 5.9 days (range : 0 to 11 days). From surgery to discharge our time of hospitalization was at 14.7 days (range : 8 to 19 days)

(f) 34.29 % (n=12) cases in our series of 35 cases, had an associated skeletal injury.

(g) Our average time for bone union in 97.14% (n=34) cases was 16.8 weeks (range : 12 to 21 weeks). We encountered 2.86% (n = 1) cases of non-union in a 55 year old female, who had hysterectomy done at age of 38 years for DUB at 6 months and was appropriately subjected to LCP with bone grafting which united in 5.3 months. This particular case type 12 B 3 AO-OTA grade at index fixation.

(h) Of the total complications that we encountered, 8.58 % (n=3) were minor complications like; superficial wound infection, shoulder impingement and radial nerve palsy. All resolved without affecting the final clinical or functional outcome. We did encounter a 2.86% (n = 1) of major complications of non-union, as described earlier and resolved with resurgery.

(j) Our functional outcomes as assessed by the ASES criteria was at 94.28% (n = 33) for good to excellent, at 2.86% (n = 1) of fair and 2.86 % (n = 1) of poor result.

(k) The poor outcome (n = 1) as already detailed underwent plate osteo-synthesis with bone grafting and achieved union at 5.3 months post resurgery and had a good outcome as assessed by the ASES criteria.

Discussion

This research was conducted with two primary hypotheses:

1. The failure to lock the distal bit will not cause a major problem for patients due to the broad range of motion of the shoulder, and may assist the association process by Placing your weight on the site.

2. The loss of the rotator cap would be minimal if the infinitesimally obstructive approach in the distal enactment with an strategy of 1–2 cm were used in the anterior section of the chest.

3. Pretell et al.[15] performed humeral pathological shaft breaks by intramedullary nailing techniques and average operating time was 48 minutes (extended 35–160 min). Koike et al.[16] evaluated the clinical and radiographic effects of intramedullary nailing reflexively and the mean duration of operation was 84 min (go 54–114 min). In the context of the mentioned inquiries, our scheme can significantly reduce the operating time of the complement of nails in patients with humeral shaft breaks (P<0.05). McCormack et al.[17] believes that the out-happening of the humeral shaft breaks through the intra-medullary nailing and the dynamic pressure plate and the speed of the shaft, The non-association in the collection of nails was 9.5 percent. In addition, Singisetti and Ambedkar[4] considered the clinical after-effects of nailing and plating in the planned report, and the rate of non-associated nailing was 5%. As far as the above studies are concerned, our scheme induces a marginally increased non-association rate.McCormack et al. [17] detailed 1 instances of post-usable outspread nerve paralysis among 35 patients who experienced intra-medullary nailing (2.86 %). In our patients, just one instance of post-usable spiral nerve paralysis was recognized, and the patient recouped after around about a month and a half of activity.

In our examination, the pace of connection was perfectly sufficient, and the components of the shoulder and elbow were fantastic, or if nothing else, in the vast number of the patients ; two suppositions ended up being correct.The important point is that each of the patients who had spread nervous paralysis had delayed their connection. What's more, the primary example of non-association was a patient with extensive nerve paralysis.

Conclusion

Overall, it appears that the use of infinitesimally obtrusive bet grade UHN without distal lock method is protected, easy and suitable for cracks in the femur shaft, and reduces the risk of spiral nerve damage and connection.

Ethical Clearance: No ethical clearance was necessary for this research work

Source of Funding: Self funded project

Conflict of Interest: Nil

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To Study Prevelance of Insulin Resistance in Acne Vulgaris

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Abstract

To study prevelance of insulin resistance in acne vulagaris. 30 patients were included in the study. Informed consent was obtained from all patients. we were looking insulin resistance in these patients. Among 30 patients 8 patients had insulin resistance. We found a positive correlation between insulin resistance and acne vulgaris. These findings suggest that treatments prescribed for insulin resistance are worth investigating as treatment for severe acne vulgaris.

Keywords: *Vulgaris, Insulin, acne, insulin resistance.*

Introduction

Acne is commonly a disorder of late childhood and adolescence, despite the fact that it may persist into, recur, or begin during adulthood.[1] [2] [3]Although acne has been reported in otherwise healthy children as young as 8 years, and even earlier in those with abnormal virilization or precocious puberty, most cases occur between the ages of 14 and 19 years[4-9].Skin manifestations of insulin resistance have been described to be reliable and consistent with the euglycemic insulin clamp test results. As mentioned previously, insulin resistance is defined as the reduced responsiveness of a target cell or an organ to the concentration of insulin to which it isexposed: inpractice,[10-13]it refers to the state in which insulin secretion associated with an abnormal glucose response (e.g., impaired glucose tolerance or diabetes)

Materials and Method

Study Design: Cross sectional study.

Study Area: Skin Outpatient Department, Sree Balaji Medical College and Hospital

Study Population: All male patients age above 18 attending skin OPD, who are clinically diagnosed with acne vulgaris.

Study Method: Investigational study.

Sample size: 30

Inclusion criteria:

1. Males aged above 18 years with acne 2. Consenting for the study.
3. Good general health
4. No usual intake of drugs (except acne therapy) 5. consenting for investigation

Exclusion criteria:

1. Known case of Diabetes Mellitus Type 1 or Type 2 Patients affected by other dermatological diseases or performing treatment for other endocrinopathies
2. Not consenting for the study
3. Patient not willing for the investigations 5. Patients receiving psychotropic drugs

Materials Used for Data Collection: A pre-structured and pre-tested proforma was used to collect data. Baseline data including age and sex and the recruited patients were subjected to the following

1. Full History Taking

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2. Thorough General Dermatological Examination. 3. Clinical pictures

Biochemical Analysis Done for the Following

i. FASTING BLOOD SUGAR (70-110mg/dl)

ii. FASTING INSULIN LEVEL (<25mIU/L)

iii. INSULIN RESISTANCE BY–HOMA-IRSCORE

Category	HOMA-IR Score
1. Normalinsulinresistance	<3
2. Moderateinsulinresistance	Between 3 and 5
3. Severeinsulinresistance	>5

The index of insulin resistance by homeostasis model assessment (HOMA-IR) is also based on a mathematical model that allows quantifying the extent of insulin resistance. For calculating HOMA-IR was used the formula published by Matthews: HOMA-IR = [fasting insulin (μU/mL) x fasting glucose (mg/dL)]/405. This study was undertaken after obtaining clearance from the ethical committee of SBMCH. The consent form, proforma and the master chart are enclosed.

Findings: Among 30 patients 8 patients had insulin resistance, whose HOMA-IR level are more than 3.

Discussion

Acne vulgaris is a disease of pilosebaceous gland that usually affects people from puberty to young adulthood. It is seen commonly on the face, neck, trunk, and arms. Its severity differs and its pathogenesis is multifactorial. The main pathogenic factors of acne are increased sebaceous gland secretion, follicular hyper proliferation,, Propionibacterium. Four major factors play an important role in the pathogenesis of acne vulgaris: (1). Hyperplasia of sebaceous glands, (2). Increased sebum production, (3). Hyperkeratinization of (4). Propionibacterium acnes colonization and periglandular dermal inflammation. Acne is a widespread skin disease affecting individuals of all ages, particularly between the ages of 15 to 17 years. In Western populations, 79–95% of the adolescents are affected [61].Acne is also seen in adulthood although seborrhea, follicular hyperkeratinization, Propionibacterium acnes colonization, and inflammation are found to be responsible for the pathogenesis, the mechanism of acne is not known clearly. Relationship between diet and acne has been uncertain in recent years. Several studies have been conducted over the years to support this hypothesis, but they have yielded contradictory results. Therefore, in this study, we aim at investigating the relationship between severe acne vulgaris and insulin resistance.

Conclusion

We found a positive correlation between insulin resistance and acne vulgaris. These findings suggest that treatments prescribed for insulin resistance are worth investigating as treatment for severe acne vulgaris.

Ethical Clearance: No ethical clearance was necessary for this research work

Source of Funding: Self funded project

Conflict of Interest: Nil

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A Study on Age Incidence of Thyroid Nodule in Our Institution

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Abstract

Thyroid swellings or nodule can present as both mutlinodular and solitary nodular goitre. A discrete swelling in an otherwise impalpable gland is termed as solitary nodule of thyroid. Prevalence ranges from 4% to 10% in general adult and 0.2 to 1.5% in children. The study was done Sree Balaji Medical College & Hospital from June 2017 to October 2018 in the department of General surgery. Incidence of thyroid nodule in different age groups It is concluded from the present series that peak incidence of thyroid nodule is from 50-60 years of age.

Keywords: *Thyroid nodule, MNG, SNG.*

Introduction

Thyroid nodule is a palpable clinically or radio logically over the gland[1-10]. There is a high risk of malignancy in STN than in multiple nodules. So for this, Solitary thyroid nodules have to be treated with high suspicion. Solitary thyroid nodules (STN) occur in 4-7% of the population who presented with thyroid swellings[11-20]. They are more common in females (6.4%) than males (1.5%). A preoperative through workup of thyroid nodules to differentiate benign from malignant nodules is important to avoid unnecessary surgery and related problems[21]

Material and Method

A study was carried out on 60 patients who were admitted and operated for thyroid nodule Sree Balaji Medical College. During the period ofmarch 2017 to October 2018 in the department of General surgery. All the patients were assessed for age at which they presents with thyroid nodule All the patients underwent both FNAC & post-operative Histopathology for the final diagnosis. It is prospective study.

Findings: In our study out of 60 patients were 7 were male and 53 were female patients. Solitary thyroid Nodule observed in 15 cases (Male 1-Female 14) Multinodular goitre observed in 45 cases (Male-6, Female-39). The incidence of SNG & MNG in male & female have been shown in table-1. The age incidence of SNG & MNG has been shown in table 2. & figure 1

Table 1: Sex Incidence

Sex	Solitary Nodular Goiter	Multinodular Goitre
Female	14	39
Male	1	6

Table 2: Age Incidence

Age Limit	Solitary Nodular Goitre	Multinodular Goitre
21-30	0	2
31-40	6	9
41-50	4	11
51-60	4	20
61-70	1	3

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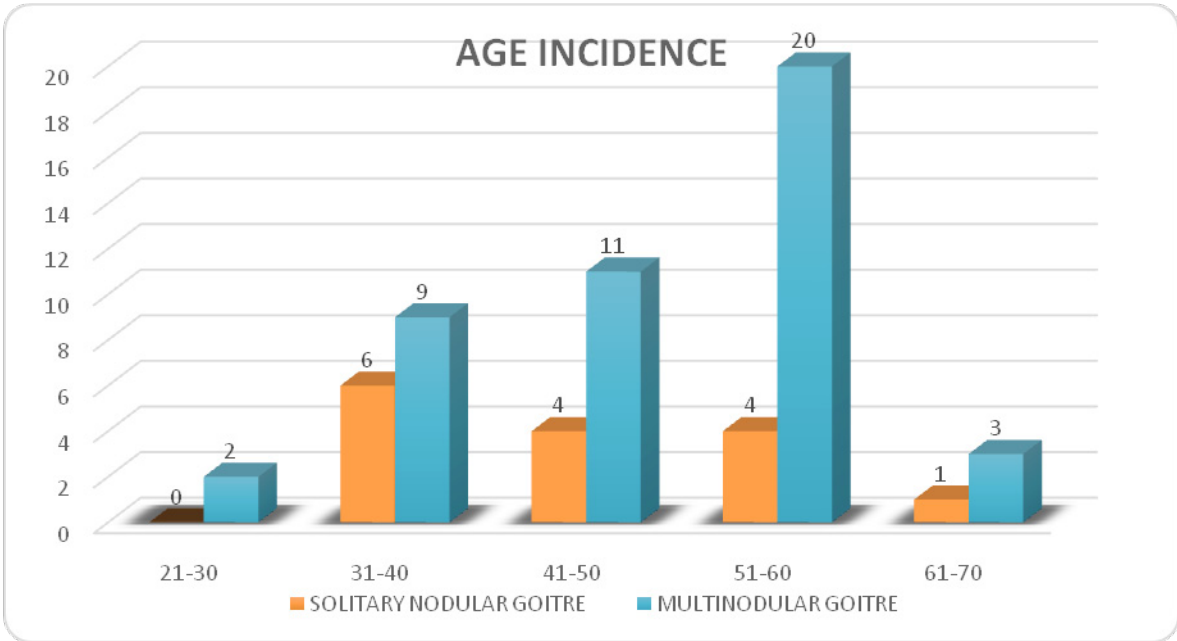


Figure 1 : age incidence of thyroid nodule as MNG & SNG

Discussion

FNAC is easy to perform and safe with minimum complication rate. Care must be taken to obtain an adequate specimen-most authors recommend between 3 to 6 aspirations is needed. Satisfactory specimen contains at least 6 groups of 10 to 15 well preserved cells. They are categorized by their appearance to benign, indeterminate or suspicious and malignant. The diagnosis of papillary thyroid carcinoma by FNAC on the basis of characteristic nuclear changes is reliable and accurate with sensitivity and specificity both approaching 100%.

Oliver H beechars *et al* stated that goitres were frequently seen in women however, the incidence of carcinoma in man is greater than in women. In our study among 60 cases, the incidence of carcinoma in Male (1.6%) is greater than in female (15%). This is in accordance with various published reports. Fenn A.S *et al*1976 found that there was no great sex predominance in the incidence of malignancy. [20]According to Dr. C. Suryaprakash Rao et al,–Andhra Pradhesh–Adenoma thyroid was the commonest benign lesion and papillary carcinoma was the commonest malignant lesion. Prof. R.L Gupta Delhi analyses 370 cases of solitary nodule. In his study, about 38.7%. OF HPE report was different from FNAC. His study showed the fact that FNAC is not full proof and surgery with HPE report remain the only method of confirmation. [21]

As Per Hossein gharib and papini*et al.* [8] nodule size is not predictive of malignancy. They have reported the following features are associated with increased risk of malignancy in thyroid nodule.

H/o of childhood head and neck radiation

Family H/o of PTC, MTC, or MEN 2 (multiple endocrine neoplasia)

Age 20 or >70 yrs

Male sex

Abnormal cervical adenopathy

Fixed nodule

Vocal cord paralysis.

They concluded that risk of cancer is not significantly higher for solitary nodular than for glands with multiple nodules. But in our study the incidence of carcinoma in solitary nodular goitre (6.66%) is more than multinodular goitre (20%). Raghuveerpedamullu, et al, conducted a retrospective study of 98 cases of MNG who underwent total thyroidectomy at Guntur government general hospital (India) from 2001 to 2004 he found the prevalence of MNG in female 88% in males 12% and incidence of female 88%. He concluded that inspite of negative FNAC the patients can still

harbor a malignant focus due to high sampling error with MNG [12]. In our study FNAC showed 50 cases of nodular colloid goitre but histopathology showed only 42 nodular colloid goitre cases, the 8 cases turned out to be, papillary carcinoma in 3 cases, follicular adenoma in 4 cases, hashimoto's thyroiditis in one case.

Conclusion

Results were compared with available literature reported previously. The patients admitted with thyroid nodules were seen in the age group of 50-60 years of age were more There are no cases below 10 years of age. Papillary carcinoma is the commonest malignancy observed constituting to 80% of the malignancies.

Ethical Clearance: No ethical clearance was necessary for this research work

Source of Funding: Self funded project

Conflict of Interest: Nil

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A Study on Cutaneous Hyperandrogenism in Adult Male with ACNE

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Abstract

To study cutaneous hyperandrogenism in adult male with acne. 30 patients were included in the study. Informed consent was obtained from all patients. we were looking for cutaneous hyperandrogenism in male above 18 years of age. Among 30 patients 21 patients had acanthosis nigricans, 20 had alopecia, 22 had seborrhea, 8 had insulin resistance. To conculde, Male acne Patients with clinically diagnosed cutaneous hyperandrogenism need not have elevated hormonal levels, however there was an association with insulin resistance was found.

Keywords: *Cutaneous hyperandrogenism, Male, ACNE.*

Introduction

Acne is frequently a disease of late childhood and adolescence, despite the reality that it may persist, recur or start in adulthood. Although acne has been recorded in otherwise healthy children as young as 8 years of age and even sooner in those with unusual virilization or precocious puberty, most instances happen between 14 and 19 years of age.[1-5]

Commonness expanded with age more quickly among more youthful than more established young people, from 39% at age 12 years to 86.4% at age 17 years, and the expansion in pervasiveness with age was more fast and predictable among young men than young ladies[6-9]. Progressively extreme facial skin inflammation (characterized in the overview as at any rate comedones, little pustules, and an inclination toward aroused sores more profound than the follicular opening) was available in an a lot littler extent of adolescents.[10-12]

It is observed that hyperandrogenism occurs in men. The manifestations are usually in the form of patterned alopecia, Acanthosis nigricans, and acne. The name APAAN (acne, patterned alopecia, acanthosis nigricans) syndrome is suggested for this presentation in men.

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Materials and Method

Study Design: Cross sectional study.

Study Area: Skin Outpatient Department, Sree Balaji Medical College and Hospital.

Study Population: All male patients age above 18 attending skin OPD, who are clinically diagnosed with acne vulgaris.

Study Method: Investigational study.

Sample Size: 30

Inclusion criteria:

1. Males aged above 18 years with acne
2. 2. Consenting for the study.
3. Good general health
4. No usual intake of drugs (except acne therapy)
5. 5. consenting for investigation

Exclusion criteria:

1. Known case of Diabetes Mellitus Type 1 or Type 2
2. Patients affected by other dermatological diseases or

performing treatment for other endocrinopathies

3. Not consenting for the study
4. Patient not willing for the investigations 5. Patients receiving psychotropic drugs

Materials Used for Data Collection:

1. A pre-organized and pre-tried proforma was utilized to gather information. Benchmark information including age and sex and the enlisted patients were exposed to the accompanying
2. Occupied History Taking
3. Detailed General Dermatological Examination.
4. Clinicalpictures

Biochemical Analysis Done for the Following

1. DHEAS. (35–430 µg/dl),
2. TOTAL TESTOSTERONE. (2.4-12ng/ml),
3. FASTING BLOOD SUGAR.(70-110mg/dl)
4. FASTING INSULIN LEVEL (<25mIU/L)
5. INSULIN RESISTANCE BY–HOMA-IRSCORE

Category	HOMA-IR Score
1. Normalinsulinresistance	<3
2. Moderateinsulinresistance	Between 3 and 5
3. Severeinsulinresistance	>5

The record of insulin obstruction by homeostasis model appraisal (HOMA-IR) is likewise founded on a scientific model that permits measuring the degree of insulin resistance.For computing HOMA-IR was utilized the equation distributed by Matthews:HOMA-IR = [fasting insulin (µU/mL) x fasting glucose (mg/dL)]/405. This investigation was embraced in the wake of acquiring freedom from the moral advisory group of SBMCH. The assent structure, proforma and the ace graph are encased.

Result

Correlation of apaan syndrome with fasting insulin, fasting glucose, insulin resistance, dheas, and total testosterone.

Independent Samples Test							
APAAN_syndrome		**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**	**t value**	**p value**
Fasting insulin	No	14	9.445	5.657	1.512	2.006	0.055
	Yes	16	13.966	6.564	1.641		
Fasting glucose	No	14	84.857	6.024	1.610	3.053**	0.005
	Yes	16	93.063	8.322	2.081		
HOMAIR	No	14	2.011	1.329	0.355	2.175*	0.038
	Yes	16	3.279	1.789	0.447		
DHEAS	No	14	280.791	97.313	26.008	0.427	0.673
	Yes	16	264.311	112.145	28.036		
Total testosterone	No	14	7.286	1.465	0.391	0.688	0.497
	Yes	16	6.919	1.457	0.364		

*p<0.05 **p<0.001

Fasting glucose level: among 30 cases 16 were with APAAN syndrome and 14 were without APAAN syndrome. Fasting blood glucose was statistically high (93.063) with APAAN syndrome patient when compared to patients without APAAN syndrome patients (84.857). off p-value 0.005* which is more significant. Insulin resistance level: it was calculated by standardized HOMA IR formula. Insulin resistance was high with APAAN syndrome (3.279) when compared with the absence of APAAN syndrome patients (2.011) off pvalue 0.673 ** which is found to be statistically more significant. Fasting insulin level was high in APAAN syndrome patients (13.9660) when compared to patients with absence of APAAN syndrome patients which was (9.4445) which is statistically more significant of p-value 0.055. DHEAS was less in presence in APAAN

syndrome (264.311) when compared with the absence of APAAN syndrome (280.791) which is found to be statistically less significant of p-value 0.673. Total testosterone level was found to be less in APAAN syndrome present patient (0.364) when compared with the absence of APAAN syndrome (0.391) of p-value (0.497) which is found to be statistically less significant.

Findings and Discussion

Acne is mostly a disease of late childhood and adolescence, despite the reality that it may persist, recur or start in adulthood. Although acne has been recorded in otherwise healthy children as young as 8 years of age and even sooner in those with unusual virilization or precocious puberty, most instances happen between 14 and 19 years of age.

Four central point assume a significant job in the pathogenesis of skin inflammation vulgaris: (1). Hyperplasia of sebaceous organs, (2). Expanded sebum generation, (3). Hyperkeratinization of pilosebaceous pipes and (4). Propionibacterium acnes colonization and periglandular dermal aggravation. Androgens animate the generation of sebum, the development of the sebaceous organs and hyperkeratinization. Clinical manifestations of hyperandrogenism are acanthosis nigricans, alopecia, seborrhea.

It is observed that hyperandrogenism occurs in men. The manifestations are usually in the form of patterned alopecia, Acanthosis nigricans, and acne. The name APAAN (acne, patterned alopecia, acanthosis nigricans) syndrome is suggested for this presentation in men

The pathogenetic procedure of skin break out seems to initiate with androgenic hormonal incitement of pilosebaceous units, the thickness of pilosebaceous units is most noteworthy on the face and scalp (400–800 organs/cm2) and least on the furthest points (50 organs/cm2). Before the degrees of coursing androgens increments, pilosebaceous units comprise of delicate, fine, unpigmented vellus hair and little sebaceous organs. Circling androgens tie to androgen receptors that are limited to the basal layer of the external root–sheath keratinocytes of the hair follicle and to sebaceous organs. “In sexual areas, such as the axilla, pilosebaceous units begin to differentiate into large terminal hair follicles. In sebaceous areas, such as the face, pilosebaceous units become sebaceous follicles while the hair remains vellus. Without circulating androgens, the sebaceous glands remain small. The gonads and adrenals produce the majority of circulating androgens. During the period of prepubertal, adrenal androgens appear to be the major determinant of sebaceous gland activity.” In the two young men and young ladies, plasma centralizations of the adrenal androgens dihydroepiandrosterone (DHEA) and dihydroepiandrosterone sulfate (DHEAS)’’ ordinarily start to increment at adrenarche, or adrenal pubescence, which commonly happens at about age 8 years, and keep on ascending through adolescence. Conditions like adrenal hyperplasia or polycystic ovary sickness are related with hyperandrogenism. Skin manifestations of insulin opposition have been depicted to be dependable and steady with the euglycemic insulin brace test outcomes. As referenced already, insulin obstruction is characterized as the decreased responsiveness of an objective cell or an organ to the convergence of insulin to which it is uncovered: by and by, it alludes to the state where insulin emission related with an unusual glucose reaction (e.g., hindered glucose resilience or diabetes).

Conclusion

To conculde, Male acne Patients with clinically diagnosed cutaneous hyperandrogenism need not have elevated hormonal levels, however there was an association with insulin resistance was found.

Ethical Clearance: No ethical clearance was necessary for this research work

Source of Funding: Self funded project

Conflict of Interest: Nil

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Platelet-Rich Plasma Injections for Chronic Plantar Fasciitis

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Abstract

The purpose of this study was to assess the safety and preliminary clinical results of platelet-rich plasma (PRP) injections for treating chronic plantar fasciitis. The present sample size of 40 patients were analysed prospectively by injecting platelet rich plasma in plantar fasciitis. The study was conducted in sreebalaji medical college and hospital from March 2017 to March 2018 with a follow up period of 3 months duration. The visual analogue scales (VAS) for pain were used to evaluate the clinical results. The mean difference between in VAS scoring system at the time of presentation was 8.4%, and there was gradual and significant improvement in VAS scoring system in plantar fasciitis. Which showed as 4.925% at 1st month, 3.375% at 2nd month, and 1.925% at 3rd month respectively. In this single-centre, uncontrolled, prospective, preliminary study, results indicate that treating chronic plantar fasciitis with PRP injections is safe and has the potential to reduce pain.

Keywords: *Platelet rich plasma, and plantar fasciitis.*

Introduction

Platelet rich plasma (PRP) injections are widely studied for treating various musculoskeletal disorders due to its increased healing properties.[1] The contains growth factors such as Platelet-Derived Growth Factor, Insulin-Like Growth Factor, Transforming Growth Factor, Epidermal Growth Factor (EGF), Vascular Endothelial Growth Factor (VEGF), Fibroblast growth factor. Interaction of this growth with differentiation factors, and the adhesive protein factors such as fibronectin and vitronectin are responsible for the healing response promoting the regenerative process of chemotaxis, self proliferation, tissues debries, angiogenesis, extra cellular matrix formation, osteoid production and collagen synthesis, which enhance the healing rate in chronic tendinopathies.[2]This methodology of treating chronic tendinopathies has general importance as this form a connecting approach between conservative management as well as surgical management.[3]The common cause of heel pain is plantar fasciitis which affect 10% of the general population. The age group of 40-70 years most commonly occurs.[4] It tends to occur more often in women, middle aged, military recruits, athletes and the obese persons.[5] The inflammation is due to repeated trauma from overuse or injury. The degeneration occurs at origin of the plantar fascia at the medial tuberosity of the calcaneum.[6]Various method have been advocated for treating this condition like rest, non-steroidal anti inflammatory drugs, night splints, keeping appropriate wedge on shoe, soft heel pad, plantar stretching exercises, ultrasound massage to heel, extracorporeal shock wave therapy (ESWT), local corticosteroid injections, and operative treatments.[7]The purpose of this study was to assess the safety of PRP injections for treating chronic plantar fasciitis and provide initial clinical assessment of its effectiveness.

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Materials and Method

The present sample size of 40 patients were analysed prospectively by injecting platelet rich plasma in plantar fasciitis. The study was conducted in sreebalaji medical college and hospital from March 2017 to March 2018 with a follow up period of 3 months duration.

Inclusion criteria:

1. Plantar fasciitis diagnosed patients.
2. Patients should have minimum three months duration of symptoms.
3. Patients should undergo conservative treatment for a minimum period of three months.
4. Pain scores more than seven at the time of injection.
5. Local steroid injection in the last 2 months.
6. Both male and female
7. Age group above 20 years.

Exclusion criteria:

1. Plantar fasciitis of less than three months duration.
2. Pain scores less than seven.
3. Patients without any trial of conservative treatment.
4. Recent local steroid injection.
5. Patients suffering from other causes like rheumatoid arthritis, Sero negative spondylo arthritis.
6. Infection or ulcer at the injection site.
7. Patients less than 20 years.
8. Cancer.
9. Women in lactation and pregnancy

Pain assessment:

Visual Analogue Scale (VAS):

No pain ***Worst Possible Pain***

Method of preparation of platelet rich plasma: Initially a venous puncture is done and specific volume of autologous blood is collected from the patient (10ml of venous blood sample) into a tube containing an anticoagulant (sterile sodium citrated tubes) At 1800 rotations/minute (rpm) for 15 mins centrifugation takes place separating plasma from packed red blood cells. The top layer consists of plasma and bottom layer consists of red blood cell. The plasma is shifted to a sterile tube following which the packed cell layer is discarded. The second centrifugation takes place at 3500 rpm for 10 min which yields concentrated platelet layer after extraction of platelet poor plasma.



Injection technique: Patient in supine position and palpate most tenderness point and marked using skin marker. The area was prepared and draped for injection. Initially,a local block of lignocaine is infiltrated subcutaneously. Under proper aseptic precaution a 21-g needle is used to inject, 1ml platelet rich plasma is injected over the maximum tenderness while the remaining platelet rich plasma is injected into the surrounding tissue. (figure 1).

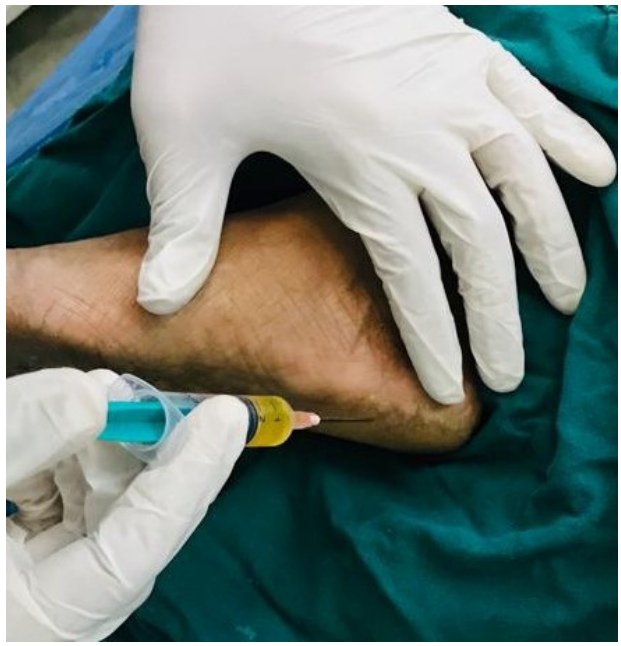


Figure 2: Injecting platelet rich plasma in plantar fasciitis patient.

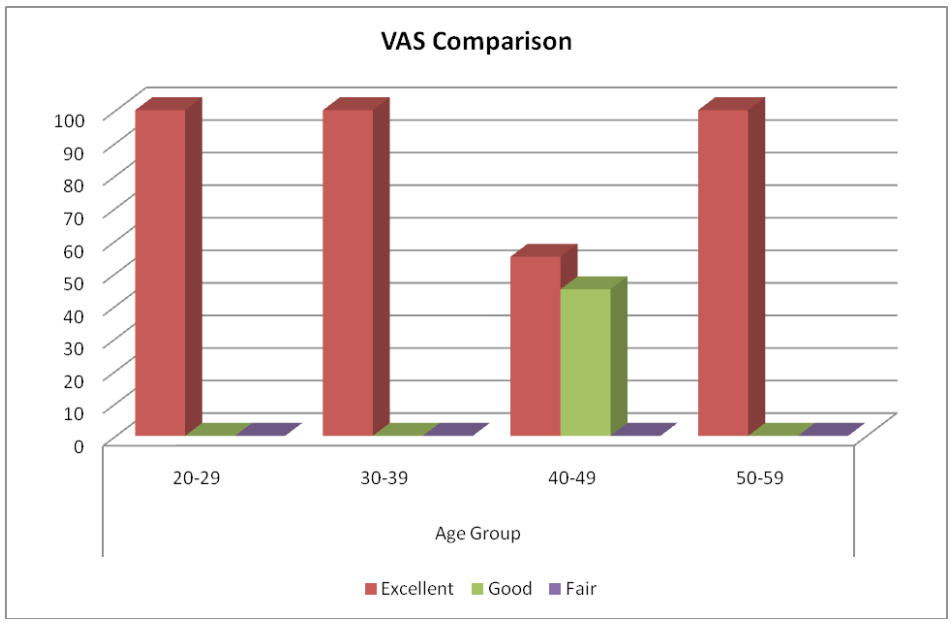
Follow Up: Patients were followed up for 3 months. Follow ups was done at 1st, 2nd and 3rd month. Patients were assessed subjectively using the visual analogue score.

Findings: SPS software system was used to do statistical analysis by comparing the results. Patients were analysed for pain relief subjectively at 1st 2nd and 3rd month post injection therapy and there pain is tabulated using visual analogue score (VAS) (pain score).

Table 1: Comparison of VAS score with age in Plantar Fascitis:

VAS Score	Age Group				Total
	20-29	30-39	40-49	50-59	
Excellent	2 (100)	8 (100)	11 (55)	10 (100)	31 (77.5)
Good	0	0	9 (45)	0	9 (22.5)
Fair	0	0	0	0	0
Total	2 (100)	8 (100)	20 (100)	10 (100)	40 (100)
Chi sq	11.613		P value	0.009*	

*-Significant ($p<0.05$)



Mean Pain Score: Pain score was assessed at the time of injection. The mean pain score of all the patients was 8.4%. The mean pain score at 1,2,3 months was 4.925%, 3.375%, and 1.925% respectively.

Table 2: Mean pain score:

Patient	Mean pain score at the time of injection	Mean pain score at 1st month	Mean pain score at 2nd month	Mean pain score at 3rd month
Plantar fasciitis (40)	8.45%	4.925%	3.375%	1.925%

Result

The mean difference between in VAS scoring system at the time of presentation was 8.4%, and there was gradual and significant improvement in VAS scoring system in plantar fasciitis. Which showed as 4.925% at 1st month, 3.375% at 2nd month, and 1.925% at 3rd month respectively.

Discussion

The growing trend in using platelet rich plasma injection for condition like plantar fasciitis had significantly improved in last decade. The steep rise in use of platelet rich plasma is because of good functional outcome of this modality.

We have taken up this study to evaluate the efficacy of platelet rich plasma in plantar fasciitis. We selected a sample size of 40 patients who were suffering from plantar fasciitis. Comparison of VAS score at each group for plantar fasciitis had a significant difference at the end of mean follow up period of 3 months. The P value was 0.009. Which was found to be significant.

The comparison of these groups for plantar fasciitis at different age groups had shown significant difference in their outcome at the end of 3 months. Therefore usage of platelet rich plasma injection in plantar fasciitis has show significant outcome due to its healing properties.

The mean VAS score system shows significant difference in pain varying from time of injections till the end of 3rd month. Initial VAS score was (8.4%), at the end of one month (4.925%), two months (3.375%) and three months were (1.925%) respectively. This shows significant outcome of improvement in plantar fasciitisIn our study, there were certain limitations such as multiple scoring technique, volume of patient, and long term follow up study needs to be done for knowing the better outcome of platelet rich plasma injection.

Conclusion

In conclusion, we consider that platelet rich plasma injection in plantar fasciitis has served as an effective tool in management of these conditions. The significant difference in P value in different age groups had shown a proportionate improvement due to platelet rich plasma injection in varying age groups. Hence this type of management decreases the progressiveness for surgical management of plantar fasciitis.

Ethical Clearance: No ethical clearance was necessary for this research work.

Source of Funding: Self funded project

Conflict of Interest: Nil

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The Functional Outcome of Antegrade Unreamed Humeral Interlocking Nailing in Adults

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Abstract

Fractures of the humerus shaft account for roughly 1% of all fractures handled. The method of interconnecting nails reflects a newer approach to the therapy of humeral broken bones. The aim is to prospectively study the "functional outcome of antegrade intramedullary interlocking nailing in fracture shaft of humerus" at the Department of Orthopaedics in Sree Balaji Medical College and Hospital chrompet Chennai. The recruitment period of this study shall be from March 2017 to February 2018 (12 months). The follow-up period shall be for a minimum period of 7 months (range: 7 to 19 months). Radiological union, practical outcome and problems have been evaluated. By the end of 6 months, the Union rate was 97.14 per cent. According to Rodriguez-Merchan EC, of the 35 patients evaluated, 16 patients had outstanding functional ratings, 12 had good ratings, 4 had reasonable ratings and 3 had bad ratings. There was 1 case of non-union, 1 case of superficial infection, 1 case of profound infection and 1 case of shoulder stiffness. Unreamed humeral interlocking nail is an efficient means of fixing severe humeral fractures.

Keywords: *Interlocking, Nailing, Adults.*

Introduction

Fractures of the humerus shaft account for roughly 1% of all fractures treated [1]. Historically, injuries in the humeral shaft have been categorized by fracture place, injury pattern, connected soft tissue injury and tissue quality. This fracture was handled by closed decrease & cast application with/without cast compression and by open decrease & inner fixation using dynamic compression. Many authors have recorded the general good result following the fixation of the compression plate [2 3 4],which is still regarded to be the gold standard for the intelligence analyst treatment of acute humeral shaft fractures. Although plate fixation has resulted in elevated levels of bonding, it includes comprehensive soft tissue stripping, potential injury to the radial nerve, and bad bone fixation. Later flexible nails of many types have been used [56]. The benefits of intramedullary nailing are minimal surgical awareness, better biomechanical obsession, minimal soft tissue disruption and early mobilization of adjacent joints.

The method of interlocking nails reflects a newer approach to the therapy of humeral fractures. Intertwining nailing also prevents problems such as absence of rotational control, migration of nails and the need for additional bracing [7 8]. The Seidel nail was the first to be medically tested. Ultimately several nail systems developed [3 7 9 10 11]

The published surveys of Cox MA and Crates Junion rates were 87.9% and 94.5% respectively for antegrade interlocking nailing. Antegrade overlapping nailing has a greater rate of rigidity of the shoulder. The unheard intramedullary nail has its own separate theoretical benefits, such as removing the risk of idiopathic fractures, saving cortical blood supply and reducing harm.[12-16]

The objective of this research was to assess the functional result after an antegrade previously unheard interlocking of the humeral fracture shaft, the rate of association and the triggers of bad outcome.

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Materials and Method

The aim is to prospectively study the "functional outcome of antegrade intramedullary interlocking nailing in fracture shaft of humerus" at the Department of Orthopaedics in Sree Balaji Medical College and Hospital chrompet Chennai. The recruitment period of this study shall be from March 2017 to February 2018 (12 months). The follow-up period shall be for a minimum period of 7 months (range: 7 to 19 months). Radiological union, functional outcome and complications were assessed. All the nails have been placed through an entry point, only medial to greater tuberosity. Reaming was not performed to prevent harm to the radial nerve and to decrease harm to the rotator cuff. All of these fractures were resolved by means of a universal humeral nail with a diameter of 6.7 mm and a suitable length calculated intraoperatively. Distal locking was performed by freehand method using escalation of the picture. The next lock was performed using the jig. In all cases, the rotator cuff was repaired. In 35 patients, the operated limb was restrained for 2 days and the active facilitated shoulder insurrection began on the 3rd preoperative day. We followed up 35 patients for at least 7 months postoperatively.

The radiological union was described as the existence of bridging calluses of their cortices in two orthogonal positions(7). Delayed union was described as a 4-month fracture failure. Non-union was characterized as a six-month fracture failure or proof of a fixing failure.(3) The operational result was evaluated using the Rodriguez-Merchan EC criteria(10). The range of movements was measuredby a single observer using a goniometer.

GRADING	ELBOW ROM	SHOULDER ROM	PAIN	DISABILITY
EXCELLENT	EXTENTION 5 FLEXION 130	FULL ROM	NONE	NONE
GOOD	EXTENTION 15 FLEXION 120	<10% LOSS OF TOTAL ROM	OCCASIONAL	MINIMUM
FAIR	EXTENSION 30 FLEXION 110	10-30% LOSS	WITH ACTIVITY	MODERATE
POOR	EXTENSION 40 FLEXION 90	>30% LOSS	VARIABLE	SEVERE

Shoulder stiffness was defined as per Benjamin Shaffer(12) and Douglas(13) criteria.

1) History of injury or repeated trauma or operation with a rigidity start that structurally limits the use of the severity.
2) Assessment with restricted shoulder movement in a particular direction, multi-directional or worldwide.
3) Radiograph with a standard cartilage joint area.
4) The range of movement of the shoulder, which was less than 90% of the spectrum when the distal shoulder was not affected.

Findings: In this cross sectional study, an analytical approach was adopted to assess Functional result of the antegradeintramedullar intertwining nailing in the bone shaft of the femur at the Department of Orthopaedics in Sree Balaji Medical College and Hospital chrompet Chennai. Functional outcome was assessed with rodriguez-merchan criteria.

Study Groups Based on Outcomes	Poor	Percentage
Poor	3	8.57
Fair	4	11.43
Good	12	34.29
Excellent	16	45.71
Total	35	100.00

It is evident from the age distribution table that majority of poor outcome subjects belonged to 51-60 years age category (66.67%) with a mean age of 48.67 years, majority of fair outcome subjects belonged to 51-60 years age category (100%) with a mean age of 44.00 years, majority of good outcome subjects belonged to 41-50 years age category (58.33%) with a mean age of 43.83 years and majority of excellent outcome subjects belonged to 31-40 years age category (45.71%) with a mean age of 40.48 years. The data subjected to one way ANOVA test reveals the existence of statistically significant association between the age distribution and study groups ($p < 0.05$).

It is evident from the gender status table that majority of poor outcome subjects are males (66.67%), majority of fair outcome subjects are females (75.00%), majority of good outcome subjects are males (91.67%) and majority of excellent outcome are males too (68.75%). The data subjected to chi squared test reveals the existence of statistically non-significant association between the gender status and study groups ($p > 0.05$).

It is evident from the side involved status table that majority of poor outcome subjects had right side involvement (66.67%), majority of fair outcome subjects had right side involvement (75.00%), majority of good outcome subjects had right side involvement (66.67%) and majority of excellent outcome had right side involvement too (87.50%). The data subjected to chi squared test reveals the existence of statistically non-significant association between the side involved status and study groups ($p > 0.05$).

It is evident from the mode of Injury table that majority of poor outcome subjects had trivial fall (66.67%), majority of fair outcome subjects right had trivial fall (75.00%), majority of good outcome subjects had RTA (58.33%) and majority of excellent outcome had RTA too (50.00%). The data subjected to chi squared test reveals the existence of statistically significant association between the mode of injury and study groups ($p < 0.05$).

It is evident from the fracture pattern status table that majority of poor outcome subjects had B2 fracture pattern (66.67%), majority of fair outcome subjects had B2 fracture pattern (50.00%), majority of good outcome subjects had A1 fracture pattern (41.67%) and majority of excellent outcome had A1 fracture pattern too (56.25%). The data subjected to chi squared test reveals the existence of statistically non-significant association between the fracture pattern status and study groups ($p > 0.05$).It is evident from the associated injuries status table that majority of poor outcome subjects had no associated injuries (100%), majority of fair outcome subjects had no associated injuries (100.00%), majority of good outcome subjects had no associated injuries (66.67%) and majority of excellent outcome had associated injuries (50.00%). The data subjected to chi squared test reveals the existence of statistically non-significant association between the associated injuries status and study groups ($p > 0.05$).It is evident from the injury to surgery interval table that majority of poor outcome subjects had injury to surgery interval 12-15 days (66.67%), majority of fair outcome subjects right had injury to surgery interval 12-15 days (75.00%), majority of good outcome subjects had injury to surgery interval 0-3 days (42.86%) and majority of excellent outcome had injury to surgery interval 0-3 days too (50.00%). The data subjected to chi squared test reveals the existence of statistically significant association between the injury to surgery interval and study groups ($p < 0.05$).It is evident from the complication status table that majority of poor outcome subjects had complications (100%), majority of fair outcome subjects had no complications (100%), majority of good outcome subjects had no complications (91,67%) and majority of excellent outcome had no complications too (100%). The data subjected to chi squared test reveals the existence of statistically significant association between the complication status and study groups ($p < 0.05$).It is evident from the time for union distribution table that majority of poor outcome subjects had time for union of 13 weeks (50.00%) with a mean time for union of 12.50 weeks, majority of fair outcome subjects had time for union of 13 weeks (50.00%) with a mean time for union of 12.50 weeks, majority of good outcome subjects had time for union of 12 weeks (41.67%) with a mean time for union of 13.00 week.

Discussion

In our study the age distribution between poor, fair, good and excellent outcome groups were meaningfully significant. This is evident by the increased mean age in poor outcome group compared to fair outcome group (mean increased difference of 4.67 years, 10% higher), increased mean age in poor outcome group compared to good outcome group (mean increased difference of 4.83 years, 11% higher) and increased mean age in poor outcome group compared to excellent outcome (mean increased difference of 8.29 years, 17% higher). A negative correlation is observed between age and the functional outcome. in Ante grade intramedullary interlocking nailing in fracture shaft of humerus surgeries as age of patients increases poorer outcome occurs more commonly.

In our study the mode of injury status between poor, fair, good and excellent outcome groups were meaningfully significant. This is evident by the increased incidence of trivial fall as mode of injury in poor and fair outcome groups compared to good and excellent outcome groups (percentage increased difference of 66.67 points, 94% higher) and the increased incidence

of RTA as mode of injury in good and excellent outcome groups compared to poor and fair outcome groups (percentage increased difference of 25.00 points, 46% higher). An associative pattern is observed between mode of injury and the functional outcome. Ante grade intramedullary interlocking nailing in fracture shaft of humerus surgeries due to RTA is associated with better outcomes and due to trivial injuries is associated with poorer outcomes commonly as RTA is usually associated with younger patients who have a better outcome due to age factor compared to older patients who suffered fractures due to trivial falls.

In our study the mode of injury status between poor, fair, good and excellent outcome groups were meaningfully significant. This is evident by the increased incidence of injury to surgery interval of 12-15 days in poor and fair outcome groups compared to good and excellent outcome groups (percentage increased difference of 33.33points, 89% higher) and the increased incidence of injury to surgery interval of 0-3 days in good and excellent outcome groups compared to poor and fair outcome groups (percentage increased difference of 51.04 points, 100% higher). An associative pattern is observed between mode of injury and the functional outcome. Ante grade intramedullary interlocking nailing in fracture shaft of humerus surgeries with shorter injury to surgery interval is associated with better outcomes and loner injury to surgery interval is associated with poorer outcomes commonly.

In our study the complications status between poor, fair, good and excellent outcome groups were meaningfully significant. This is evident by the increased incidence of complications in poor outcome groups compared to fair, good and excellent outcome groups (percentage increased difference of 97.2 2points, 97% higher). An associative pattern is observed between complication status and the functional outcome. Ante grade intramedullary interlocking nailing in fracture shaft of humerus surgeries with arising complications is associated with poorer outcomes commonly.

Conclusion

In our research, while evaluating the functional result of the antegradeintramedullar intersecting nailing in the fracture structure of the femur at the Department of Orthopaedics in Sree Balaji Medical College and Hospital chrompet Chennai, on internal comparison the following significant conclusions were observed:

Gender, side involved, fracture pattern, associated injuries, nail size, follow up interval and time for union have no significant association with functional outcomes

- Increasing age is a factor associated with poorer outcomes (> 50 years)
- Excellent surgical outcomes are commonly seen in cases as result of road traffic accidents
- Poor surgical outcomes are commonly seen in cases as result of trivial falls
- Longer injury to surgery interval is a factor associated with poorer outcomes (> 12 days)
- Poor surgical outcomes are commonly seen in cases with arising complications
- Ideal candidate to predict excellent outcome
- Patient aged < 50 years with fracture shaft of humerus as a result of road traffic accidents with injury to surgery interval < 8 days with no complications
- This study is a hypothesis proving study.

Ethical Clearance: No ethical clearance was necessary for this research work.

Source of Funding: Self funded project

Conflict of Interest: Nil

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Distribution of Age and Sex in Patients with Facial Trauma Referred for Computed Tomography Scan

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Abstract

Young kids are generally under parental supervision in safe settings and are therefore less probable to be subjected to significant accidents, occupational trauma, or interpersonal violence typical of adult facial fractures. Understanding the causes, seriousness and particular features of paediatric fractures is vital to avoid esthetic and functional deficits and will enhance our capacity to avoid accidents.

Keywords: *Facial trauma, Tomography.*

Introduction

The skull is made up of eight cranial bones and 14 bones of the face. There are few of these bones in pairs. Maxilla, palatine bones, zygomatic bones, lacrimal bones, nasal bones, and lower nasal conchae are the combined bones of the body. The vomer and mandible are the single bones.

There are many sutures that hold the facial bones together and keep them aligned, some of the sutures are frontozygomatic suture, frontomaxillary suture, frontolacrimal suture, frontonasal suture, temporozygomatic suture, zygomaticomaxillary suture, lacrimomaxillary suture, nasomaxillary suture and internasal suture.Facial bone and soft tissue injuries are a prevalent disease. Their prevalence varies from 20% to over 50% of traumatic emergency space admitted instances. The most common causes of these pathologies include traffic injuries (up to 80% of instances), immediate force, mostly during an attack (up to 60% of instances), falling (up to 25% of instances), and sports incidents (up to 10% of instances) [1–5].

In the pediatric age bracket, facial skeleton injuries are uncommon relative to adolescents. Retrospective surveys of maxillofacial injury involving both males and kids showed that less than 15% of such injuries occur in kids under the era of 16 and less than 1% of all facial injuries occur in kids under the era of [6,7].

Pediatric facial bones are shielded by the small face-to-head volume ratio of children, which enables the cranium to absorb most of the violent effect, rather than the head. In addition, the facial bones of children are more susceptible to fractures owing to their greater elasticity, absence of sinus pneumatization, heavier osseous walls encircled by adipose tissue, and stability of the mandible and maxilla by unraveled teeth[8].

Young kids are generally under parental supervision in safe settings and are therefore less probable to be subjected to significant accidents, occupational trauma, or interpersonal violence typical of adult facial fractures[9,10].

Understanding the causes, seriousness and particular features of pediatric fractures is vital to avoid esthetic and functional deficits and will enhance our capacity to avoid such accidents[11].

Materials and Method

- The research population consisted of 150 clients who had CT facial skull injury assessments to the emergency department in Sree Balaji Medical College and Hospital, Chennai attached to the Bharath University.

  Study Design: Descriptive study.

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Study Period: March 2017 to October 2018.

Inclusion Criteria: All individuals with clinical proof of facial bone injury who are subjected to multi-slice CT testing and are found to be favorable for fractures.

Exclusion Criteria: Patients with injury to facial skeleton in whom a CT examination is contraindicated. Eg. Pregnancy.

Findings:

Data Analysis:

Age distribution of patients in the study: In this research team consisting of a total of 150 participants, the majority of participants belonged to the age communities of 21-30 and 31-40.

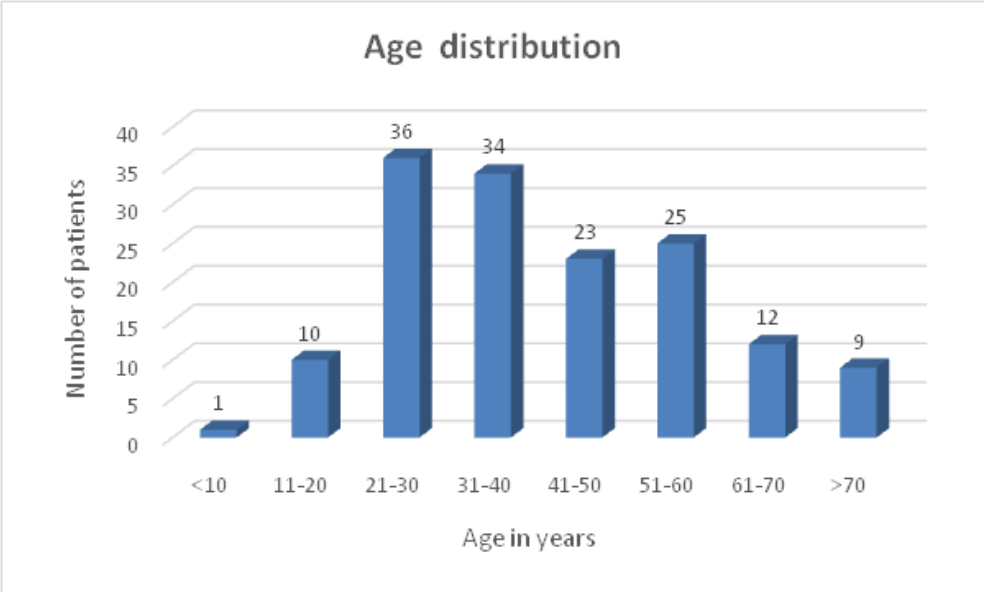


Chart 1: Age distribution of patients presenting with facial fractures.

Sex distribution of patients in the study: Among 150 patients included in this study. 63% were males and 37% were females having facial bone fractures.

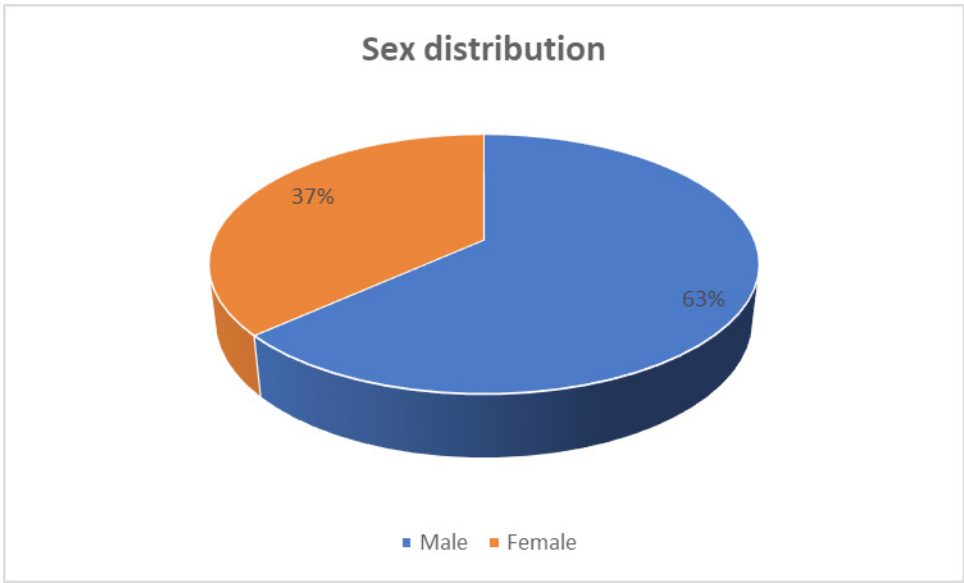


Chart 2: Pie chart showing the comparative percentages in the research set of men and women.

This study shows that there is male preponderance in facial trauma with suspected facial fractures and young age group of 21-40 years is most commonly involved.

Discussion

Facial trauma is an isolated injury or portion of polytrauma and is clinically essential because the disturbance of smooth tissues and facial bones creates facial asymmetry and disfiguration that creates mental and cosmetic problems. [12].

More adult-like lifestyles had evolved in patients aged > 13 years. This shift in behavior outcomes from increased involvement in socializing or contact sports, a considerably greater incidence of attacks, and a overall decline in oversight [13]. In our research, the masculine predominance also agrees with that of several latest[14-16] research. Due to involvement in more physical operations than women, men are more probable to maintain trauma and violence compared to women. Our research also discovered that because of violence, kids were more probable to suffer fractures.

In Japan, Iida and Matsuya 16 showed that facial fractures were more prevalent in men and that violence was more prevalent cause in adolescents over the era of 13, while bicycle crashes were the most prevalent cause in all age groups, which might have been connected with Japan's culture based on bicycles. They also stated that the incidence of bicycle crashes is likely to decline considerably owing to the latest advent of television and computer games, leading to kids spending more time indoors than before.

Conclusion

In comparison, in a research with 1,251 fractures in Portugal, Ferreira et al. 10 discovered that pediatric face fractures were more frequent in men and in the winter, that traffic accidents were a major source, and that the most prevalent form of mandible fractures.In a research of pediatric patients with facial fractures, Munante-Cardenas et al. [17] indicated that facial fractures happened more frequently in children, bicycle crashes were the most prevalent source of fractures, and mandible fractures were the most prevalent among all facial fractures. In summary, this research offers an analysis of facial bone fractures between different sex and age groups, helping to demonstrate fracture patterns and features.

Ethical Clearance: No ethical clearance was necessary for this research work

Source of Funding: Self funded project

Conflict of Interest: Nil

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Prevalence of Hypertension among Rural Adult Population of Kancheepuram, Tamil Nadu

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Abstract

Cardiovascular diseases (CVDs) are a cluster of heart and blood vessel illnesses that include heart disease, stroke, peripheral arterial disease, rheumatic heart illness, congenital heart illness, profound vein thrombosis, and lung embolism. Cardio-vascular disease (CVD) is the leading cause of suicide worldwide and an approximately 17.7 million individuals died from CVD in 2015, comprising 31% of all fatalities worldwide. CVD is the leading source of morbidity and mortality in India and accounts for 25% of all fatalities and is expected to improve to 50%. The cross-sectional study was carried out to assess the prevalence of hypertension among the Kancheepuram District rural age population, Tamil Nadu.

Keywords: *Cardiovascular diseases, hypertension.*

Introduction

Worldwide, the epidemiological transition has resulted in a tremendous rise in the older population in emerging nations with a simultaneous rise in life expectancy. The bulk of the world's older population is projected to be living in emerging nations by the year 2025. Therefore, developing nations are probable to experience a huge strain of acute non-communicable diseases (NCDs) in the close future compared to communicable diseases that were once a significant issue.[1-4] In terms of disability-adjusted life-year (DALY) declines, the worldwide allocation of illness burden suggests that communicable illnesses account for 41% DALY losses, non-communicable illnesses account for 43%, and accidents account for 16%. Comparison between high, small, and middle-income nations shows that low-and middle-income nations bear the strain of communicable diseases more than 6 times (43.8 percent) relative to high-income countries (7.2 percent). As far as India is concerned, the DALY losses owing to communicable illnesses account for 50%, compared with 33% for non-communicable illnesses, and 17% for accidents.[5]

Non-communicable diseases (NCDs) are a cluster of non-communicable chronic diseases. They are described as long-term illnesses and slow development. Globally, NCDs are the major source of adult mortality and morbidity.[6] Cardiovascular diseases, tuberculosis, acute respiratory diseases, and diabetes are the four primary kinds of non-communicable diseases.[7] Globally, early mortality from these four major NCDs decreased by 15 percent between 2000 and 2012 This decrease level is inadequate to fulfill the one-third growth aim of 2030.[8]Nearly 38 million individuals die from non-communicable diseases worldwide each year.[9] Based on present patterns, by 2020, these NCDs are anticipated to account for 73% of worldwide fatalities and 60% of the worldwide disease burden.[10] According to the 2015 World Health Organization (WHO) survey, every fourth Indian dies from an NCD before the era of 70. Globally, India is the first nation to create particular objectives and indices in this sector to reduce the toll of NCD fatalities worldwide by 25 percent by 2025.[11]

The risk factors for non-communicable disease are grouped into 3 categories they are behavioural, metabolic and biochemical risk factors. Behavioural risk factors include tobacco use, alcohol use, unhealthy diet and

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lack of physical activity. Metabolic risk factors include overweight, obesity, diabetes and hypertension (HTN). Biochemical risk factors include hypercholestremia and hypertriglyceridemia. The National Program on Diabetes Prevention and Control, Cardiovascular Diseases and Stroke (NPDCS) has been introduced to address the growing strain of Non-Communicable Diseases, Ministry of Health and Family Welfare, Government of India.[7]

Cardiovascular diseases (CVDs) are a cluster of heart and blood vessel illnesses that include heart disease, stroke, peripheral arterial disease, rheumatic heart illness, congenital heart illness, profound vein thrombosis, and lung embolism. Cardio-vascular disease (CVD) is the leading cause of suicide worldwide and an approximately 17.7 million individuals died from CVD in 2015, comprising 31% of all fatalities worldwide. CVD is the leading source of morbidity and mortality in India and accounts for 25% of all fatalities and is expected to improve to 50%.[12]

Objectives:

- To evaluate hypertension incidence among the survey group
- To determine the connection between hypertension and socio-demographic variables.

Materials and Method

This cross-sectional study was carried out to assess the prevalence of hypertension among the Kancheepuram District rural age population, Tamil Nadu. It is a community-based cross-sectional survey undertaken in the Sree Balaji Medical College and Kancheepuram District Hospital's rural field practice region. The training region of the sector includes 5 villages.

The calculated sample size was 1250 using Formula 4 PQ/L2. The selection of research respondents was based on a systemic random sampling technique. To gather information from the survey population, a pre-tested organized questionnaire was used. Information was acquired on socio-demographic features, risk variables, hypertension, and the research population's physical measurements. In MS Excel, the information was reached and analyzed using SPSS software (version 22). Descriptive and analytical statistics were used to describe the study variables[13-18].

Results

Socio-demographic characteristics of the study population: The research population's socio-demographic features are shown in Table 1. Among the respondents in the research, 44.2% belonged to the era of 51-60, 24.2% belonged to the era of 20-30 and 20.8% belonged to the era of 31-40. About 57.4% of the study participants were females and 42.6% were males. Nearly 82.4% are married and 5.44% were unmarried. Almost 18.7% of the study samples had no formal education,30.2% had middle school education and 21.3% had high school education. Among the participants around 43.7% were unemployed, 32.2% are engaged in unskilled occupation and 17.8% are involved in semiskilled occupation. According to the modified BG Prasad socio economic classification 49.6% belonged to lower middle socio economic category and 21.8% belonged to upper lower socio economic group. In this study 56.8% of them belong to nuclear family and about 30% belonged to joint family and the rest were belonging to three generation family.

Table 1: Socio demographic characteristics of the study population

Sl No	Socio-Demographic Variable	Frequency (N=1250)	Percentage (%)
1.	**Age**		
	20-30 Years	136	10.9
	31-40 Years	302	24.2
	41-50 Years	260	20.8
	51-60 Years	552	44.2
2.	**Sex**		
	Male	532	42.6
	Female	718	57.4
3.	**Marital Status**		
	Unmarried	68	5.4
	Married	1030	82.4
	Widower	142	11.4
	Divorcee	10	0.8
4.	**Education**		
	Illiterate	234	18.7
	Primary School	282	22.6
	Middle School	378	30.2
	High School	266	21.3
	Post High School Diploma	12	1.0
	Ug/Pg	72	5.8
	Professional	6	.5
5.	Occupation		

Sl No	Socio-Demographic Variable	Frequency (N=1250)	Percentage (%)
	Unemployed	546	43.7
	Unskilled	402	32.2
	Semiskilled	222	17.8
	Skilled	46	3.7
	Farmers/Clerks/Shop Owners	10	.8
	Semi professional	14	1.1
	Professional	10	.8
6.	Socio Economic Status		
	Upper	90	7.2
	Upper Middle	234	18.7
	Lower Middle	620	49.6
	Upper Lower	272	21.8
	Lower	34	2.7
7.	Type of Family		
	Nuclear Family	710	56.8
	Joint Family	438	35.0
	Three Generation Family	102	8.2

Occurrence of hypertension: The incidence of hypertension is shown in Figure 1.as we can see that the incidence of hypertension in this research is 23.6% (298) and pre-hypertension incidence is 22.4%. Only54% of the study participants were normotensive individuals. Among them 73.2% (218) were known hypertensive and 26.8% (80) were newly diagnosed hypertensive's.

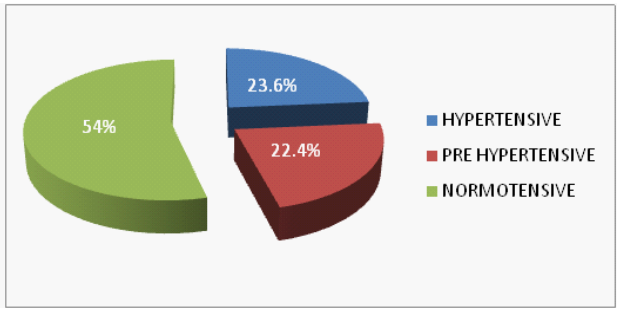


Figure 1: Occurrence of hypertension in the study population

In this study, the variables that are significantly associated with hypertension are age (p value-<0.0001), marital status (p value-<0.0001), education (p value-0.015), occupation (p value-0.003), socio economic status (p value-<0.015),family type (p value-<0.0001),positive family history (p value-0.009),co morbidity (p value-<0.0001),knowledge about hypertension (p value-<0.0001) and BMI (p value-<0.0001).There was no association found between other variables and hypertension.

Table 3: Association between sociodemographic variables and hypertension among the study population

S.No	Variable	Total Frequency (N-1250)	Hypertension			
			Frequencyv (N-298)	Chi-square value	P value	Odds Ratio (95%CI)
1.	Age> 40 Years< 40 Years	438812	26434	124.387	<0.0001*	5.724(3.916-8.366)
2.	SexFemaleMale	532718	168130	0.181	0.670	0.949(0.730-1.234)
3.	Marital StatusMarriedUnmarried/ Divorce/Widower	1030120	22672	23.943	<0.0001*	17.051(12.407-23.434)
4.	Education≥ High School Education< High School Education	356894	91207	15.828	0.015*	1.139(0.857-1.514)
5.	Occupation≥ Skilled< Skilled	801120	22276	19.501	0.003*	1.225(0.736-2.039)
6.	Socioeconomic StatusUpper/Middle ClassLower Class	944306	22771	12.295	0.015*	1.047(0.772-1.420)
7.	Family TypeJoined/Three Generation FamilyNuclear Family	540710	158140	22.244	<0.0001*	1.684(1.296-2.188)
8.	Positive Family HistoryYesNo	268982	80218	6.788	0.009*	1.491(1.102-2.016)
9.	Co-MorbidityYesNo	310940	129169	71.718	<0.0001*	3.251(2.456-4.304)

* P value <0.05 is significant at 95% CI

Discussion

Occurrence of hypertension: The prevalence of hypertension in this study is 23.6% (298) and 76.4% of them were non hypertensive. Among them 73.2% (218) were known hypertensive's and 26.8% (80) were newly diagnosed hypertensive's. Pre-hypertension incidence in this research is 22.4 percent. The incidence level of hypertension in a research undertaken by Agarwal is 15.7 per 1000 of the overall rural population.13 The incidence of hypertension in the Beegom survey undertaken in southern India is 18.9 percent [19-22]. The results of the present research are similar to research undertaken by Chaturvedi S, Ibrahim MM, Shanthirani CS, Anand MP, Kaur,in which the overall prevalence of hypertension is 27.5%,26.3%,21.1%,26.8% and 21.4% respectively.[15-19] Results of the study were varied from studies conducted by Hazarika NC, Malhotra P, Ganesh SK, Joshi SV and Sathish Kumar in these studies the prevalence of hypertension was 60.8%, 4.5%, 44.3%, 7.8% and 34% respectively.[20,21,22]This broad variability in hypertension incidence in these research is due to variability in the research population's sociodemographic features.

Conclusion

The study reveals that, Among the study participants, 44.2% belonged to 51-60 years of age and About 57.4% of the study participants were females. As far as marital is concerned nearly 82.4% are married. According to the modified BG Prasad socio economic classification, 49.6% belonged to lower middle socio economic category.

Among the study population 23.6% were hypertensive and 22.4% were pre hypertensive. 73.2% were known hypertensive's and 26.8% were newly diagnosed among the hypertensive's. in this study.

It can be stated from the research results that the incidence of hypertension and prehypertension in the research region is large. There is also quite a heavy burden of undiagnosed situation. There is no gender difference in hypertension incidence. This study also shows that there is still gaps in the diagnosis and treatment of hypertension in the study area. Among those treated also adherence, incidence of complications and co morbidities are worrisome. The level of awareness among the study participants about this disease is lower than expected which is quite alarming. Though there is an existing program to address this disease there is few lacunae identified in this study which prevents the program from reaching the needful. All these lacunae must be bridged by effective interventions.

Ethical Clearance: No ethical clearance was necessary for this research work

Source of Funding: Self funded project

Conflict of Interest: Nil

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Risk Factors for Ocular Morbidity among School Going Children in Kancheepuram District, Tamil Nadu

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Abstract

India is a country in transition and needs to simultaneously address preventable and treatable causes of childhood morbidities. Children require support in recognising eye problems and hence screening becomes essential. Moreover their issues need to be tackled at the earliest for treatment to be effective. The selected risk factors for ocular morbidity among school going children and the nutritional factors affecting ocular morbidity among school going children were studied.

Keywords: *Risk factors, Morbidity, Nutritional factors, Treatment.*

Introduction

Globally, the prevalence of blindness among children is estimated to be approximately one tenth of that in adults, at around 0.7 per 1000. However, blindness in childhood has far reaching implications for the affected child and family, and throughout life profoundly influences educational, employment, personal, and social prospects. Thus, the control of childhood blindness has been identified as a priority of the World Health Organisation's (WHO) global initiative for the elimination of avoidable blindness by the year 2020.[1,2]

India is a country in transition and needs to simultaneously address preventable and treatable causes of childhood morbidities. Children require support in recognising eye problems and hence screening becomes essential. Moreover their issues need to be tackled at the earliest for treatment to be effective[3].

Ocular health is a fundamental part of early child development and of overall health and wellbeing. Early childhood is a sensitive period for the development of the visual system and any ocular disorders that occur during this period, if untreated can lead to visual impairment or blindness[4, 5].

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Materials and Method

Study Design: This study is a community based cross-sectional study conducted in urban area of Kancheepuram district, Tamil Nadu.

Study Area: This study was conducted in **Anakaputhur** which is the urban field practice area of the Urban Health and Training Centre (UHTC) attached to our Institution (Sree Balaji Medical College and hospital.

Anakaputhur is a municipality city in the district of Kancheepuram, Tamilnadu. It is divided into 18 wards for which elections are held every 5 years. The study was conducted in Anakaputhur which is located at a distance of 7 kilometres from the institution with an area covering approximately 16 sq. kilometres. (Annexure)

Study Population: According to the 2011 census, Anakaputhur urban field practice area had a total population of 48,050 of which 24,158 were Males, 23,892 were Females and 9850 were Children (6-16 years of age). Among the children 5045 were Males and 4805 were Females. Total number of houses in Anakaputhur is 12,146 The study was done among Children (6-16 years of age) residing in the study area permanently at the time of the study.

Study Period: The study was carried out from. December 1st2017–May 31st 2018

Sample Size: Sample size was calculated from a previous study conducted by Deshpande Jayant D in a rural area of North Maharashtra in the year 2011.The study recorded a prevalence of 27.6% This was taken as the reference value for calculating sample size. The sample size was calculated using the formula:

$N = Z\acute{a}^2pq/[L]\ 2$

Where, Z = 1.96 at 95% confidence interval

p = Prevalence of disease/event (referred value)

q = 100–P

L =Relative precision, which is assigned as 13% of p (15% of 27.6-3.588 for this study

Substituting it in the formula,

[Z = 1.96, p = 27.6%, q =72.4 (100-27.6), L = 3.588]

N = 1.96 x 1.96 x 27.6 x 72.4/3.588x3.588 = 599

Accounting 10% for non-response, the final sample size was calculated as 658 (rounded off to 672). [N = 672]

Inclusion Criteria: The inclusion criteria for the study were children of age group (6-16 years) residing in the study area, who gave consent to participate in the study.

Exclusion Criteria: The exclusion criteria for the study were Children who were mentally retarded, who are severely ill and those who didn't give consent to participate in the study were excluded.

Sampling Method: Anakaputhur had a total population of 48,050 as per 2011 census. As per the data available in the UHTC register there were 9850 children (6-16 years) residing in the study area. The sampling technique followed for this study was Systematic random sampling.

Total number of children belonging to 6-16 years of age, N=9850; which was divided by the total sample size, n = 672, to obtain the k value.

K value = N/n = 9850/672 = every 14th participant.

Every 14th participant from the records was chosen and the name and address of the person was noted and was visited for the data collection. if the person corresponding to the number did not give informed consent or was absent, the next number within the respective ward was chosen and the 14th person from that particular person was selected and interviewed. Likewise, 672 children who gave informed consent and willingly participated in the study were identified.

Study Tool: A pretested structured questionnaire was used as study tool for data collection, by interviewing the study participants. The questionnaire was prepared in English and translated to Tamil. The interview was conducted by the investigator herself and their responses were recorded in the questionnaire. The questionnaire consisted of the following sections:

Section I: Socio-Demographic Factors: Family background characteristics, including socio-demographic factors (age, sex, standard, family income, religion family type, and socio-economic status).

Section II: History Regarding Refraction: History regarding refraction like whether wearing spectacles, duration, refractive power, family history of refractive error.

Section III: Eye Complaints: History of eye complaints like redness, watering, itching, difficulty in night vision, difficulty in reading books etc.

Section IV: Nutritional Status: History of fruit and vegetable intake and history of Vit A supplementation.

Section V: Physical Measurements: Physical measurement such as, Height, weight, BMI were taken from the study participants.

Section VI: Ophthalmic Measurements: Ophthalmic measurements like visual acuity, corrected visual acuity and colour vision were taken using Snellen chart and ishihara chart respectively.

Informed Consent: Informed Consent was obtained from each participant prior to the administration of the interview schedule. The Informed Consent was prepared in the local language and is based on ICMR guidelines [Annexure]

Ethical Approval: The study proposal was presented and approval from Institutional Ethics Committee was obtained prior to the pretesting. The approval letter is enclosed in Annexure.

Pilot Study: A pilot study was carried out among 70 participants in the Anakaputhur area, which is a in Kancheepuram District. The questionnaire consisted of socio-demographic characteristics, details regarding the risk factors for ophthalmic morbidity, history regarding refraction, nutritional status and physical measurements. Based on the results of the Pilot study, the necessary changes were incorporated in the questionnaire and the study was conducted. The samples included in the pilot study were not included in the present study.

Data Collection Period: Data was collected from the study participants for a period of 6 months from December 2017 to May 2018.

Data Collection Method: Using Multi stage Sampling technique samples were selected. The data was collected by visiting the designated place of residence as per the sampling frame. On obtaining the informed consent, the interview was conducted by the investigator herself. Each participant was interviewed for 10 to 15 minutes.

Findings:

Table 1: Frequency Distribution of Family Related Factors

Variable	Frequency	Percentage
WHETHER FAMILY MEMBERS WEARING SPECS (N=672)		
YES	237	35.3
NO	435	64.7
FAMILY MEMBER WEARING SPECS(n=237)		
MOTHER	90	37.9
FATHER	112	47.2
SIBLING	35	14.7

As in table 1, regarding the family related factors of the study subjects, 64.7% of them had no family history of wearing spectacles. Out of the subjects with positive family history, 47.2% of the subjects had a father who wore spectacles, wheareas 37.9% and 14.7% of the subjecta had a mother and a sibling who wore spectacles respectively.

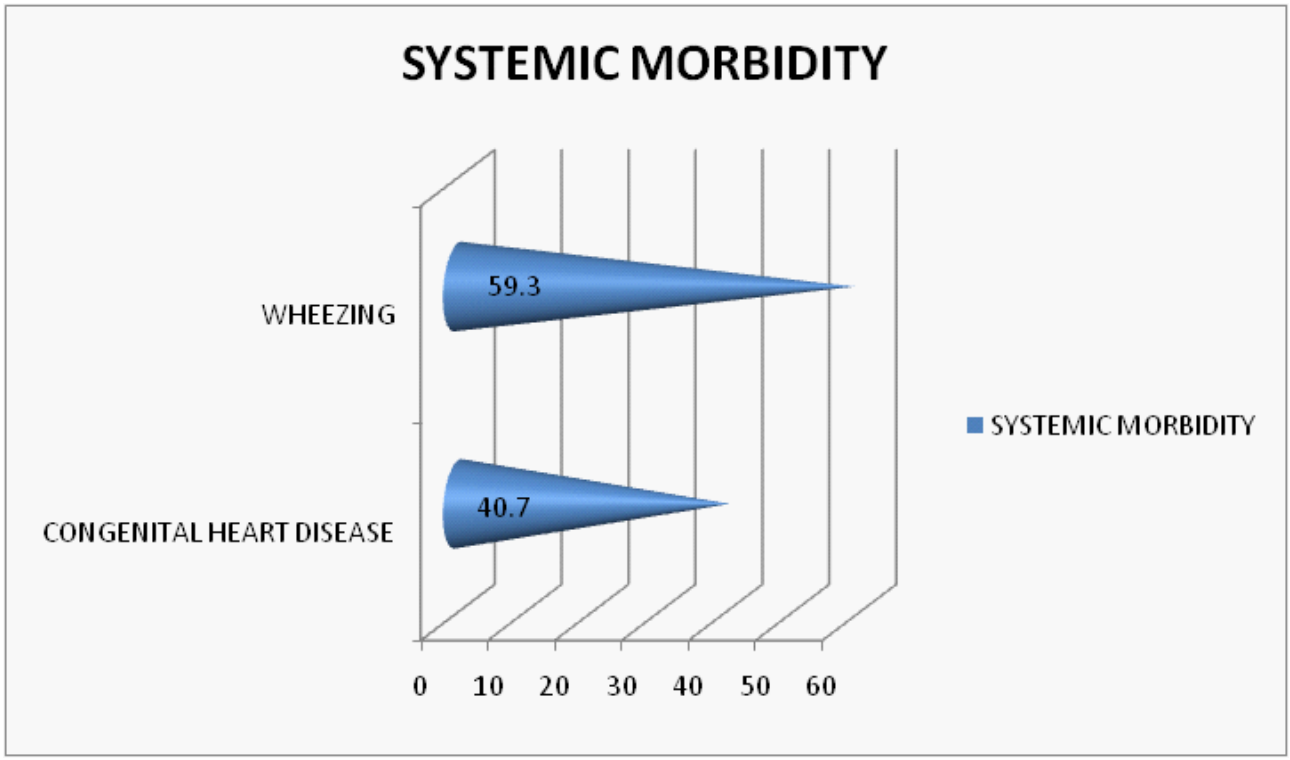


Figure 1: Percentage Distribution of Systemic Morbidity Among The Students With Systemic Morbidity (N=27).

Among the students presenting with systemic co-morbidities,wheezing (59.3%) was more prevalent than congenital heart disease(40.7%) as in figure 1.

Table 2: Frequency Distribution of Risk Behaviour Concerning Ophthalmic Morbidity Among The Study Population.

Variable		Frequency	Percentage
WATCHES TV FROM NEAR	YES	262	48
	NO	410	52
BENCH SEATED IN CLASSROOM	FIRST	310	46.1
	MIDDLE	283	42.1
	LAST	79	11.7

The distribution of risk behaviour among the subjects as tabulated in table 2,is as follows.48% of the study population succumbed to watching television from nearby.And 46.1% were seated in the first benches and had a possibility of having difficulty reading the black boards from a distance.

Discussion

In our study, the most common systemic co morbidities were asthma and congenital heart disease. In a study done by Gui king Wang,the most common disease found in the past medical history of participants related closely to the eye diseases was hypertension (*n*=273, 24.5%), and its prevalence increased with age. Hypertension can lead to multiple ocular diseases, leading to visual impairment and blindness. Diabetes mellitus, a major cause of health problems in developed countries, can also lead to visual impairment and blindness.

In our study, the distribution of risk behaviour among the subjects as tabulated in table 5,is as follows.48% of the study population succumbed to watching television from nearby.And 46.1% were seated in the first benches and had a possibility of having difficulty reading the black boards from a distance.According to a study done by A J Lee[6], the risk behaviours associated with occurrence of ocular morbidities was found to be pterygium ($p<0.001$, multivariate odds ratio (OR) 1.8; 95% CI 1.4 to 2.5) and history of current cigarette smoking ($p=0.05$, multivariate OR 1.5; 95% CI 1.0 to 2.2).

Conclusion

- Majority of the ocular diseases observed were either preventable or treatable.
- If these morbidities are not attended at the right time they may progress to severe disabilities or blindness and may also affect the child's performance in the school.

Ethical Clearance: The study proposal was presented and approved from Institutional Ethics Committee prior to the pretesting.

Source of Funding: Self funded project

Conflict of Interest: Nil

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Comparison of CT Multiplanar Reconstruction with Axial Sections in Diagnosing Facial Bone Fractures

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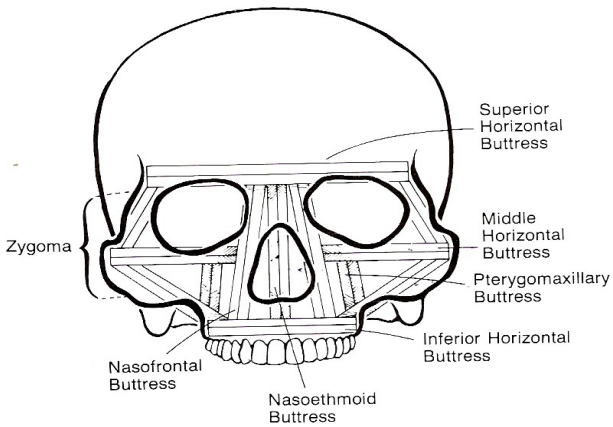
Abstract

MPR is generally helpful when it is not possible to correctly evaluate pathology on axial pictures alone. Most situations involve pathological interfaces parallel to the axial plane or structures that cannot be fully exhibited as they pass through a amount of slices. In these instances, MPR can be used to generate problem-oriented imaging aircraft. The performance of these pictures relies heavily on overlapping image reconstruction and thin slice collimation. The diagnostic accuracy of Multiplanar reconstruction protocol in comparison with axial section in traumatic patients with facial bone fractures were evaluated.

Keywords: *Axial Facial bone.*

Introduction

The face skeleton is not just a set of single bones, but a scheme of horizontal and vertical reinforcements that support each other (and therefore have a much greater mechanical strength than other bone components), transferring forces and pressures. Each bone has many attachments to the neighbouring bones which hold them together firmly.



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It outlined an amount of facial buttresses 1. There are four main groups of facial skeletons with vertical buttresses: three are bilateral and peripheral and one is centrally situated. Furthermore, it describes three horizontal buttresses: superior, centre and lower.

Figure 1: Schematic facial buttresses image. The human midface's multiple vertical and horizontal buttresses are shown schematically.

Horizontal Buttresses[1]: Superior horizontal buttress consists of facial bone orbital sheets, ethmoid air cell structures, and ethmoid cribriform plate. The center horizontal consists of the temporal bone's zygomatic process, zygoma's body and temporal system, zygoma's infraorbital process, maxilla's orbital surface, and maxilla's facial process. The lower horizontal buttress consists of the alveolar ridge and tough palate and functions as a significant bridge that stabilizes the two maxillary bodies.

Developed in the early 1900s, basic tomography overcame some of the limitations in radiographs. In this method, the X-ray emitter moves through a body area of concern during radiation exposure, while the transferred picture is recorded by a portable movie recorder behind the patient.

Since spatial resolution along the z-axis used to be bad and ground step artifacts were prevalent, MPR was not used much in standard CT. With the introduction of

Spiral-CT with overlapping image reconstruction, it is possible to nearly eliminate stair step artifacts, but image quality still relies on procurement parameters (efficient part width). Excellent outcomes are achieved by using slender collimation.[3-7]

MPR is generally helpful when it is not possible to correctly evaluate pathology on axial pictures alone. Most situations involve pathological interfaces parallel to the axial plane or structures that cannot be fully exhibited as they pass through a amount of slices. In these instances, MPR can be used to generate problem-oriented imaging aircraft. The performance of these pictures relies heavily on overlapping image reconstruction and thin slice collimation[2].

Therefore, the complex anatomy and fractures of the facial bones are shown extremely well by CT, and also helps in determining soft tissue complications. In the past few years radiographic facial series has been almost replaced by CT, and is now used only in specific situations, such as very focal facial trauma like nasal bone fracture, or when CT is unavailable.

CT gives better spatial resolution and allows reconstruction of images in multiplanar reconstruction (MPR) and volume rendering (VR) which enhances the ability to identify and report facial fractures.

Aim and Objectives: To evaluate the diagnostic accuracy of Multiplanar reconstructionprotocol in comparison with axial section in traumatic patients with facial bone fractures.

Materials and Method

Source of data: The study was conducted in patients with facial trauma referred for computed tomography (CT) to the Department of Radio Diagnosis at Sree Balaji Medical College and Hospital, Chennai-600044.

Method of collection of data:

- The research population included 150 individuals facing facial bone injury with CT assessment to the emergency department in Sree Balaji Medical College and Hospital, Chennai attached to the Bharath University.
- The CT was done on the advice of the referring physician and for the sole purpose of this study no patient was made to undergo CT.

  All the CT scan patients gave consent
- The scans were acquired with the use of spiral data acquisition technique in the transverse plane.
- The Multiplanarreconstructions (MPR) were obtained for each patient.
- Two reviewers evaluated the axial-sections and MPR individually.

Study Design: Descriptive study.

Study Period: March 2017 to October 2018.

Inclusion criteria: All individuals with clinical proof of facial bone injury who are subjected to multi-slice CT testing and are found to be favorable for fractures.

Exclusion criteria: Patients with facial bone injury who are contraindicated by a CT examination. Eg.Pregnancy.

Data acquisition

CT protocol used for this study:

Slice thickness: 1.25 mm.

Voltage: 120 kV.

Current: 300 mA.

Table speed: 27.5 mm/sec.

Pitch: 1.375:1

Rotation: 0.6 sec.

Post traumatic fractures were classified on the origin of anatomical location of fractures:

1. Frontal bone fractures
2. Orbits, with classification into the orbital walls
3. Nasal bones
4. Maxillary bones with inclusion of maxillary sinus walls
5. Zygomatic arches and bones
6. Body, ramus, and condylar process of mandibular bones

Findings: The sensitivity of each reconstruction formats was calculated by using the standard formula.

Frontal bone fractures: In assessment of frontal bone fractures, axial section shows maximum number

of fractures.

Considering sensitivity of axial section as the gold standard, MPR lacks by 11% in detection of fractures.

Chart 1: Number of frontal bone fractures detected in various formats.

Orbital bone fractures: In assessment of orbital bone fractures, axial section and MPR shows maximum and equal number of fractures. Considering sensitivity of axial section as the gold standard, MPR shows the equal sensitivity in detection of fractures.

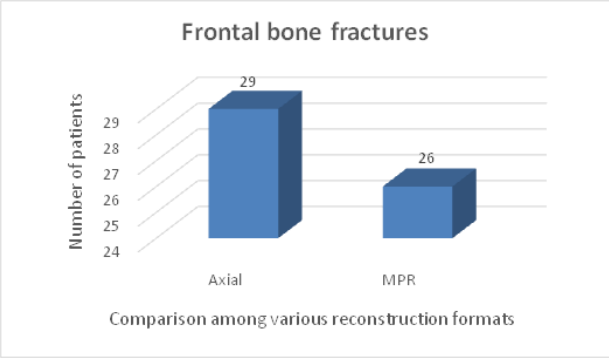


Chart 2: Number of orbital bone fractures detected in various formats.

Nasal bone fractures: In assessment of nasal bone fractures, axial section shows maximum number of fractures.

Considering sensitivity of axial section as the gold standard, MPR lacks by 43% in detection of fractures.

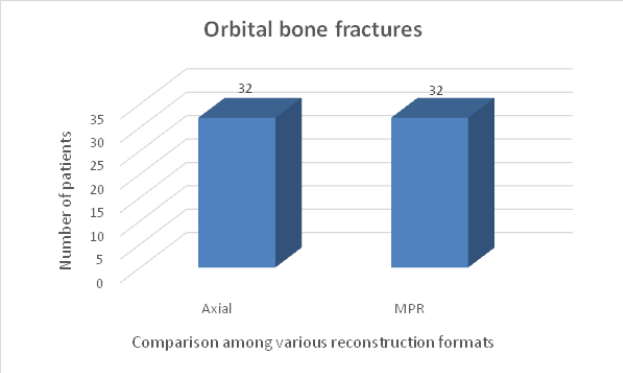


Chart 3: Number of nasal bone fractures detected in various formats.

Maxillary bone fractures: In assessment of maxillary bone fractures, axial section shows maximum number of fractures.Considering sensitivity of axial section as the gold standard, MPR lacks by 14%in detection of fractures.

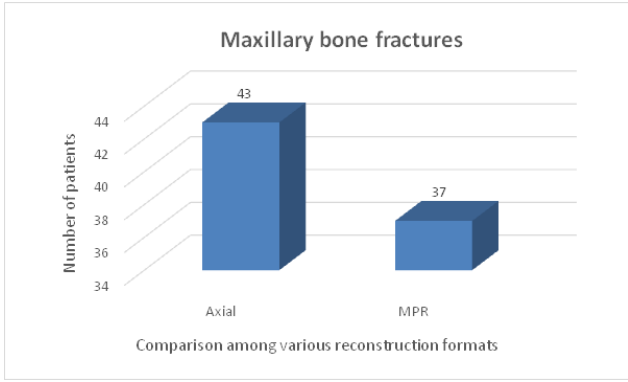


Chart 4: Number of maxillary bone fractures detected in various formats.

Zygomatic bone fractures: In assessment of zygomatic bone fractures, axial section and MPR shows maximum and equal number of fractures.

Considering sensitivity of axial section as the gold standard, MPR shows the equal sensitivity in detection of fractures.

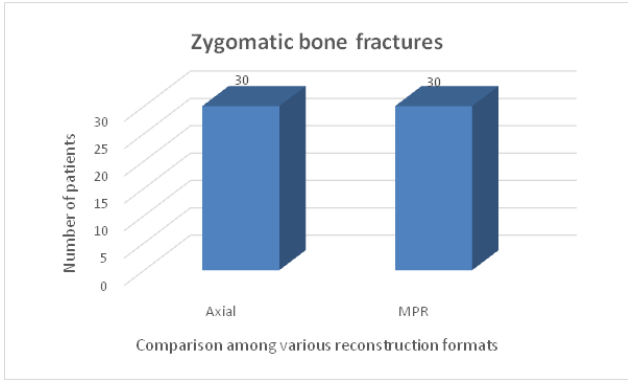


Chart 5: Number of zygomatic bone fractures detected in various formats.

Mandibular bone fractures: In assessment of mandibular bone fractures, axial section shows maximum number of fractures.

Considering sensitivity of axial section as the gold standard, MPR section lacks by 18% in detection of fractures.

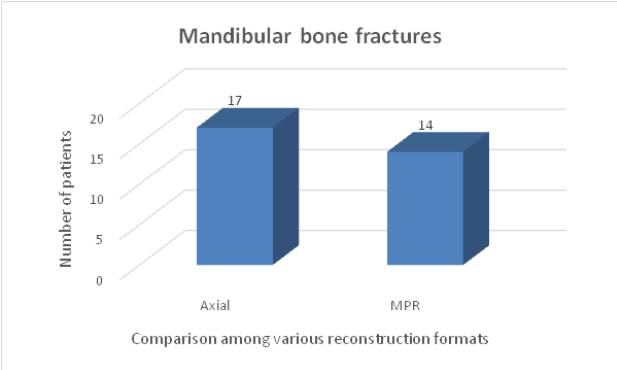


Chart 6: Number of mandibular bone fractures detected in various formats.

Table 1: Shows the sensitivity of detection of fractures by various sections in different bones.

Sensitivity Table (% age)		
	Axial	**MPR**
Frontal bone	100	89
Orbital bone	100	100
Nasal bone	100	57
Maxillary bone	100	86
Zygomatic bone	100	100
Mandibular bone	100	82

Axial section is considered as the gold standard as it identifies the maximum number of fractures. MPR sections are found to be equally sensitive as axial sections in fractures of orbital bone and zygomatic bone. MPR is nearly sensitive to axial sections in fractures of frontal bone, maxillary bone and mandibular bone.

In this study none of the reconstruction format shows the false positive results. So, considering the false positive as zero, if we calculate the specificity it comes to 100% for all the formats.

Discussion

Facial trauma is an isolated injury or portion of polytrauma and is clinically essential because the disturbance of smooth tissues and facial bones creates facial asymmetry and disfiguration that creates mental and cosmetic problems.[3] Plain radiographs were the initial modality of choice for imaging in these patients, but they can be inadequate due to superimposition of bony structures [4].

CT is the imaging method of selection opposed to conventional radiography to show the multiplicity of pieces, the degree of rotation and displacement or any participation of the nucleus of the skull. [5]Tanvikula R, Erol B [6]study shows the comparison and superiority of CT over plain radiography and classification of all facial fractures.

In a study done by Fox et al [7] showed that in the zygomatic region, they were able to recognize the presence of injury better on VR (88%) than axial sections (64%), and both of these modalities were superior to MPR(0%). Whereas in the orbit and maxilla, axial sections (62%,50%) showed better sensitivity in detecting fractures over VR (50%,44%) and MPR (33%,11%). In fractures involving nasal region, axial (50%) and VR (50%) are more sensitive than MPR (16%). Overall, axial images had higher average sensitivity values than the other two modalities.In our study, axial sections were considered as the gold standard as it identified the maximum number of fractures.MPR sections is found to be equally sensitive as axial sections in fractures of orbital bone and zygomatic bone.

Conclusion

MPR is nearly sensitive to axial sections in fractures of frontal bone, maxillary bone and mandibular bone. According to Tanvikula R, Erol B [6], Axial and coronal CT pictures are suitable for the diagnosis of medial orbital wall fractures and confirm the supremacy of coronal CT in the diagnosis of orbital floor fractures and blow-out fractures, particularly in individuals who may experience diplopia or enophthalmos.

Ethical Clearance: No ethical clearance was necessary for this research work

Source of Funding: Self funded project

Conflict of Interest: Nil

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A Study on Risk Factors for Hypertension among Rural Adult Population of Kancheepuram, Tamil Nadu

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Abstract

Non-transmittable ailments (NCDs) are gathering of interminable ailments that are not transferable. They are characterized as sicknesses of long term and moderate movement. NCDs are the real reason for grown-up mortality and dismalness globally. The 4 primary sorts of non transferable sicknesses are cardiovascular infections, malignant growths, constant respiratory illnesses and diabetes. The determinants of hypertension among the study population and the association between various risk factors and hypertension were determined.

Keywords: *Hypertension Children.*

Introduction

Epidemiological transition worldwide has lead to a tremendous increase in the elderly population in the developing countries with concomitant increase in the life expectancy. It is estimated that by the year 2025 the majority of the elderly population worldwide will be residing in developing countries. Developing countries are thus likely to face an enormous burden of chronic non-communicable diseases (NCDs) in the near future in comparison to communicable disease which were once a major problem.[1-4]In terms of disability-adjusted life-year (DALY) declines, the worldwide allocation of illness burden shows that communicable illnesses account for 41% DALY losses, non-communicable illnesses account for 43%, and accidents account for 16%. With regard to India, the DALY losses due to communicable diseases account for 50%, compared to 33% for non-communicable diseases, and 17% of injuries.[5]

Non-transmittable ailments (NCDs) are gathering of interminable ailments that are not transferable. They are characterized as sicknesses of long term and moderate movement. NCDs are the real reason for grown-up mortality and dismalness globally.[6] The 4 primary sorts of non transferable sicknesses are cardiovascular infections, malignant growths, constant respiratory illnesses and diabetes.[7] Globally, untimely mortality from these four fundamental NCDs declined by 15% between 2000 and2012this pace of decrease is deficient to meet the 2030 objective of a 33% decrease.[8] Nearly 38 million people die each year globally from Non communicable diseases.[9] Based on current trends, by the year 2020 these NCDs are expected to account for 73% of global deaths and 60% of the global burden of disease.[10] As per the World Health Organisation (WHO) 2015 report, every 4th Indian die from an NCD before the age of 70 years. Globally India is the first country to develop specific targets and indicators in this field, which are aimed at reducing the burden of deaths from NCDs globally by the year 2025 by 25 per cent.[11]

The risk factors for non-communicable disease are grouped into 3 categories they are behavioural, metabolic and biochemical risk factors. Behavioural risk factors include tobacco use, alcohol use, unhealthy diet and lack of physical activity. Metabolic risk factors include overweight, obesity, diabetes and hypertension (HTN). Biochemical risk factors include hypercholestremia and hypertriglyceridemia.[7]

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Cardio Vascular Disease (CVD) is the number 1 cause of death globally and an estimated 17.7 million people died from CVD in 2015, representing 31% of all global deaths. CVD are the major cause of morbidity and mortality in India and accounting for 25% of all deaths and projected to increase to 50%.[12]

Objectives:

- To identify the determinants of hypertension among the study population.
- To determine the association between various risk factors and hypertension.

Materials and Method

This cross sectional study was conducted to estimate the prevalence,of hypertension among the rural adult population of Kancheepuram District, Tamil Nadu. It is a community based cross sectional study, conducted in the rural field practise area of Sree Balaji Medical College and Hospital of Kancheepuram District. The field practice area covers 5 villages.

Information regarding socio demographic characteristics, risk factors, regarding hypertension and physical measurements of the study population were obtained. The data was entered in MS Excel and analysis was done using SPSS software (version 22). Descriptive and analytical statistics were used to describe the study variables.

Findings:

Lifestyle characteristics of the study population: Lifestyle characteristics of the study population is shown in Table 1.60.2% of them are involved in sedentary work and 35.5% were engaged in moderate type of work. Only 21.4% has the habit of doing regular physical exercise. Among them 39.6% do exercise for duration of 1-2 hours per week and 27.7% do exercise for duration of 2-5 hours a week.

Table 1: Lifestyle characteristics of the study population

Sl No	Lifestyle Characteristics	Frequency	Percentage (%)
1.	Job Type (N-1250)		
	Sedentary Work	752	60.2
	Moderate Work	444	35.5
	Heavy Work	54	4.3
2.	Exercise (N-1250)		
	Yes	268	21.4
	No	982	78.6
3.	Duration of Exercise (N-268)		
	< 1 Hour/Week	20	7.4
	1-2 Hours/Week	106	39.6
	2--5 Hours/Week	74	27.7
	> 5 Hours/Week	68	25.3

Table 2: Prevalence of behavioural risk factors among the study population

Sl No	Risk Factor	Frequency (N-1250)	Percentage (%)
1.	Tobacco Use		
	Yes	160	12.8
	No	1090	87.2
2.	Alcohol Use		
	Yes	232	18.6
	No	1018	81.4
3.	Physical Inactivity		
	Yes	828	66.2
	No	422	33.8
4.	Unhealthy Diet		
	Yes	906	72.5
	No	344	27.5

Prevalence of risk factors among the study population: Prevalence of risk factors for hypertension is depicted in Table 2 and 3.in this study 12.8% use tobacco in any form, 18.6% use alcohol, 66.2% of the participants are physically inactive and 72.5% are consuming unhealthy diet. Among the study participants 21.4 % had a positive family history of hypertension,3% of them are under oral contraceptive pills and 24.8% are suffering from various co morbidities.

Table 3: Associated risk factors among the study population

Sl No	Risk Factors	Frequency (N-1250)	Percentage (%)
1.	Family History of Hypertension (N-1250)		
	Yes	268	21.4
	No	982	78.6
2.	Oral contraceptive Pill Intake Among Females (N-718)		
	Yes	38	3.0
	No	680	97.0

3.	Co-Morbidity (N-1250)		
	Yes	310	24.8
	No	940	75.2

Prevalence of obesity among the study population: As per the Asian Adults BMI criteria (Figure 1), 26.2% were overweight,22.% were pre obese and 12.6% belonged to obese category. Central obesity was assessed based on the waist hip ratio. About 83.4% of the study participants have central obesity.

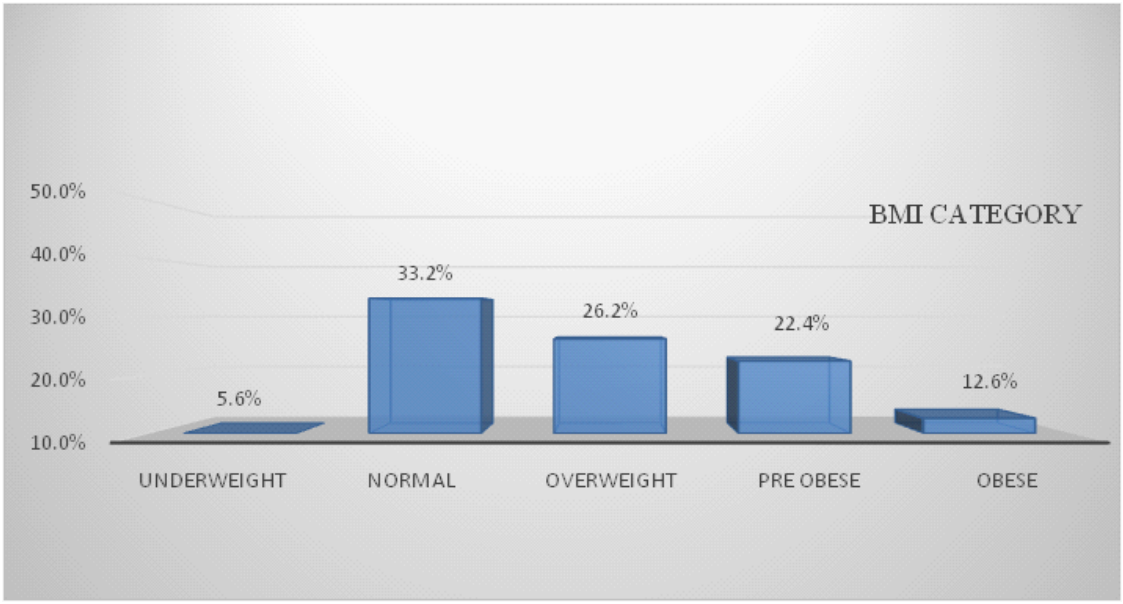


Figure 1: BMI classification of the study population

Among the males 86.5% have central obesity and 80.3% of females have central obesity in this study (Figure 2).

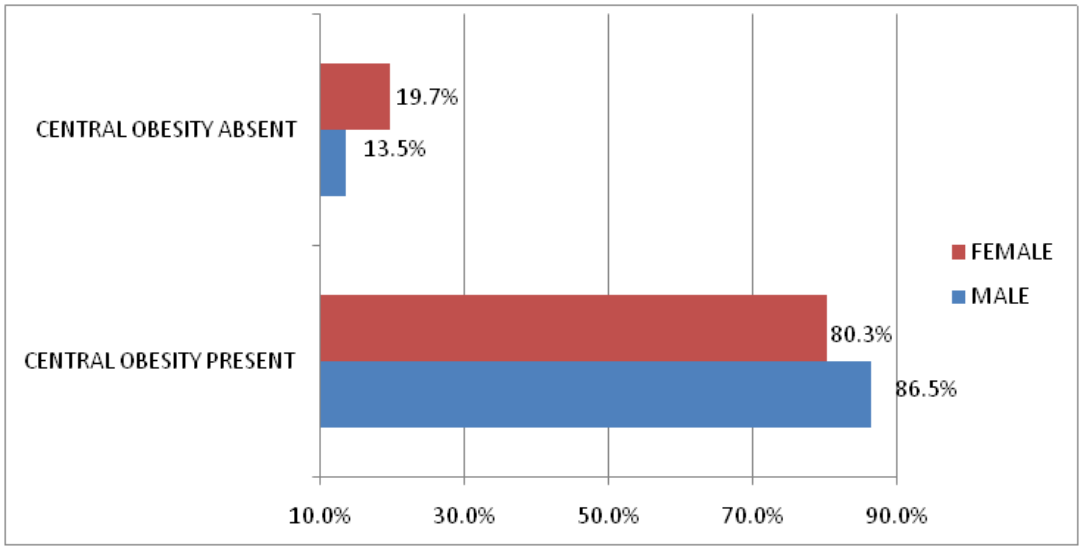


Figure 2: Prevalence of central obesity among the study population

Blood pressure category among the study population: Blood pressure was classified based on JNC 8 criteria. Table 4 depicts the blood pressure category. Nearly 64% of the study participants belonged to normal BP category, 22.4% were pre hypertension,9.3% belonged to stage 1 hypertension category and 4.3% belonged to stage 2 hypertension category.

Table 4: Blood pressure category among the study population

S. No	BP Category	Frequency (N-1250)	Percentage (%)
1.	Normal	800	64.0
2.	Prehypertension	280	22.4
3.	Stage 1 Hypertension	116	9.3
4.	Stage 2 Hypertension	54	4.3

Discussion

Risk factors for hypertension

Tobacco use: In this study among the study participants 12.8% use tobacco and of which 3.5% use smokeless tobacco. In a study by Chataut J 40.2% of the study population has the smoking habit.[13] 25.5% of the ever used tobacco in a study by Maroof KA In Uttar Pradesh.[14] In Peter Lloyd-Sherlock study 64.6% had never smoked and 24.1% are smoking daily.[15] 15.9 % are smoking daily and 73.2% are using smokeless tobacco in a study by AroorBhagyalaxmi which was conducted in a rural area of Gujarat, India.[16]

Alcohol use: In this study 18.6% are current alcohol users and 1.1% was past users of alcohol.40.9% are consuming alcohol in a study by Chataut J.[13]In a study by K. A. Maroof 35.5% had ever used alcohol and the remaining 64.5% had never used alcohol.[14] 76.8% had never consumed alcohol in their lifetime in a study conducted by Peter Lloyd-Sherlock.[15]

Physical activity: In this study 66.2% were physically inactive and only 33.8% were physically active as per the operational definition and this showed that majority of the study participants are following an unhealthy lifestyle habits. In Chataut J study 51.8% are involved in moderate physical activity and 8% are engaged in sedentary activities.[13] 28.5% are physically inactive in a study done by Peter Lloyd-Sherlock.[15]AroorBhagyalaxmi study showed that 14.1% of the study samples were physically inactive.[16]

Unhealthy diet: 72.5% of the respondents in this study were following unhealthy diet. In a study conducted by AroorBhagyalaxmi most of the study participants i.e. 96.4% were following unhealthy diet.[16] 94.5% were taking low fruit and vegetables in a study by Garg A.[17] Bhattacherjee S conducted a study in west Bengal in which 60.4% were consuming unhealthy diet.[18]

Overweight and obesity: In this study, as per the Asian Adults BMI criteria, 26.2% were overweight, 22 % were pre obese and 12.6% belonged to obese category.12% of the study population were overweight in a study by Aroor Bhagyalaxmi.[16] In a study done by Prabhakaran D 35% of them were overweight and 3.3% of the study participants belonged to obese category.[19] 20.5% were overweight and 4.2% were obese in Midha T.[20]

Central obesity: In this study central obesity was assessed based on the waist hip ratio. About 83.4% of the study participants have central obesity. AroorBhagyalaxmi showed that central obesity was present in 38% of the samples.[16]In a study by K. A. Maroof 30.5% were centrally obese.

Association between sociodemographic variables, risk factors and hypertension: In this study the variables that are significantly associated with hypertension are age, marital status, education,occupation, socio economic status,family type,positive family history,co morbidity, knowledge about hypertension and BMI.[21]Jonas JB conducted a study in which prevalence of hypertension was associated with higher age, higher body mass index, body height, Higher blood hemoglobin levels and elevated blood urea concentration.[22]

Conclusion

In this study 12.8% use tobacco in any form, 18.6% use alcohol, 66.2% of the participants is physically inactive and 72.5% are consuming unhealthy diet. Among the study participants, 26.2% were overweight,22.% were pre obese and 12.6% belonged to obese category.21.4 % had a positive family history of hypertension,3% of them are under oral contraceptive pills and 24.8% are suffering from various co morbidities.

From the findings of the study, it can be concluded that the prevalence of hypertension and prehypertension are high in the study area. The burden of undiagnosed case is also quite high. There is no sex difference in the prevalence of hypertension. This study also shows that there are still gaps in the diagnosis and treatment of hypertension in the study area. Among those treated also adherence, incidence of complications and co morbidities are worrisome. The level of awareness among the study participants about this disease is lower than expected which is quite alarming. Though there

is an existing program to address this disease there is few lacunae identified in this study which prevents the prevents the program from reaching the needful. All these lacunae must be bridged by effective interventions.

Ethical Clearance: No ethical clearance was necessary for this research work

Source of Funding: Self funded project

Conflict of Interest: Nil

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Association of Selected Variables with Ocular Morbidity among School Going Children in Kancheepuram District, Tamil Nadu

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Abstract

Refractive errors are the leading cause of ocular morbidity in school-aged children of India.Children do not complain of defective vision and may not even be aware of their problem.Children in the school-going age group (6-16 years) represent 25% of the population in the developing countries. They offer significantly representative material for these studies as they fall best in the preventable blindness age group.

Keywords: *Variables,children,Morbidity.*

Introduction

The scenario of paediatric ocular diseases varies worldwide. The pattern of ocular diseases in children is very important because some eye conditions cause ocular morbidity while others invariably lead to blindness. The majority of blindness is either potentially curable or preventable.[1] Childhood ocular abnormalities are more debilitating and disabling than the senile onset, because the child has to live their whole life ahead with that morbidity.[2]

During a child's first 12 years of life 80% of all learning comes through vision, and yet most children have not had a comprehensive eye examination prior to entering primary school.[3]The school eye health program is one through which children can be screened for diseases, such as refractory error, strabismus, amblyopia and trachoma[6] In most of the countries school screening programs are done routinely to detect the prevalence rate and causes of ocular morbidity.[4]Refractive errors are the leading cause of ocular morbidity in school-aged children of India.Children do not complain of defective vision and may not even be aware of their problem. They adjust to the poor eyesight by sitting near the blackboard, holding the books closer to their eyes, squeezing the eyes and even avoiding work requiring visual concentration. This warrants early detection and treatment to prevent permanent disability.[5]

Children in the school-going age group (6-16 years) represent 25% of the population in the developing countries. They offer significantly representative material for these studies as they fall best in the preventable blindness age group, are a controlled population i.e. they belong to a certain age group and are easily accessible and schools are the best forum for imparting health education to the children. Schools are also one of the best centres for effectively implementing the comprehensive eye healthcare programme.[5]

Materials and Method

Study Design: This study is a community based cross-sectional study conducted in urban area of Kancheepuram district, Tamil Nadu.

Study Area: This study was conducted in **Anakaputhur** which is the urban field practice area of the Urban Health and Training Centre (UHTC) attached to our Institution (Sree Balaji Medical College and hospital.

Anakaputhur is a municipality city in the district of

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Kancheepuram, Tamil Nadu. It is divided into 18 wards for which elections are held every 5 years. The study was conducted in Anakaputhur which is located at a distance of 7 kilometres from the institution with an area covering approximately 16 sq. kilometres. (Annexure)

Study Population: According to the 2011 census, Anakaputhur urban field practice area had a total population of 48,050 of which 24,158 were Males, 23,892 were Females and 9850 were Children (6-16 years of age). Among the children 5045 were Males and 4805 were Females. Total number of houses in Anakaputhur is 12,146 The study was done among Children (6-16 years of age) residing in the study area permanently at the time of the study.

Study Period: The study was carried out from. December 1st2017–May 31st 2018

Sample Size: Sample size was calculated from a previous study conducted by Deshpande Jayant D in a rural area of North Maharashtra in the year 2011.The study recorded a prevalence of 27.6% This was taken as the reference value for calculating sample size. The sample size was calculated using the formula:

$N = Z\acute{a}^2pq/[L]\ 2$

Where, Z = 1.96 at 95% confidence interval

p = Prevalence of disease/event (referred value)

q = 100–P

L =Relative precision, which is assigned as 13% of p (15% of 27.6-3.588 for this study

Substituting it in the formula,

[Z = 1.96, p = 27.6%, q =72.4 (100-27.6), L = 3.588]

N = 1.96 x 1.96 x 27.6 x 72.4/3.588x3.588 = 599

Accounting 10% for non-response, the final sample size was calculated as 658 (rounded off to 672). [N = 672]

Inclusion Criteria: The inclusion criteria for the study were children of age group (6-16 years) residing in the study area, who gave consent to participate in the study.

Exclusion Criteria: The exclusion criteria for the study were Children who were mentally retarded, who are severely ill and those who didn't give consent to participate in the study were excluded.

Sampling Method: Anakaputhur had a total population of 48,050 as per 2011 census. As per the data available in the UHTC register there were 9850 children (6-16 years) residing in the study area. The sampling technique followed for this study was Systematic random sampling.

Total number of children belonging to 6-16 years of age, N=9850; which was divided by the total sample size, n = 672, to obtain the k value.

K value = N/n = 9850/672 = every 14th participant.

Every 14th participant from the records was chosen and the name and address of the person was noted and was visited for the data collection. if the person corresponding to the number did not give informed consent or was absent, the next number within the respective ward was chosen and the 14th person from that particular person was selected and interviewed. Likewise, 672 children who gave informed consent and willingly participated in the study were identified.

Study Tool: A pretested structured questionnaire was used as study tool for data collection, by interviewing the study participants. The questionnaire was prepared in English and translated to Tamil. The interview was conducted by the investigator herself and their responses were recorded in the questionnaire.

Informed Consent: Informed Consent was obtained from each participant prior to the administration of the interview schedule. The Informed Consent was prepared in the local language and is based on ICMR guidelines [Annexure]

Ethical Approval: The study proposal was presented and approval from Institutional Ethics Committee was obtained prior to the pretesting. The approval letter is enclosed in Annexure.

Pilot Study: A pilot study was carried out among 70 participants in the Anakaputhur area, which is a in Kancheepuram District. The questionnaire consisted of socio-demographic characteristics, details regarding the risk factors for ophthalmic morbidity, history regarding refraction, nutritional status and physical measurements. Based on the results of the Pilot study, the necessary changes were incorporated in the questionnaire and the

study was conducted. The samples included in the pilot study were not included in the present study.

Data Collection Period: Data was collected from the study participants for a period of 6 months from December 2017 to May 2018.

Data Collection Method: Using Multi stage Sampling technique samples were selected. The data was collected by visiting the designated place of residence as per the sampling frame. On obtaining the informed consent, the interview was conducted by the investigator herself. Each participant was interviewed for 10 to 15 minutes.

Findings:

Table 1: Age And Standard Characteristics of the Population

Variable	Minimum value	Maximum value	Mean		Standard deviation
			Value	Standard Error	
Age	6	16	11.25	0.105	2.734
Standard	1	12	6.20	0.108	2.792

Table 2: Association of Sociodemographic Variables with Ophthalmic Morbidity

Sociodemographic characteristics	Variable	Total frequency	Ophthalmic morbidity			
			Frequency	Chi square value	P value	Odds ratio (95%CI)
Sex	Male	311	57	5.431	0.020*	1.66 (1.08-2.56)
	Female	361	43			
Age	< 10 yrs	206	38	38.57	0.000*	1.473(0.947-2.293
	≥ 10 yrs	466	62			
Socio-economic status	Upper	479	55	35.238	0.000*	0.420(0.272-0.651)
	Lower	191	45			
Religion	Hindu	571	81	2.041	0.564	0.704(0.405-1.224)
	Others	101	19			

The mean age of the study population was found to be 11 years wherein the subjects varied from 6 to 16 years of age. The mean standard of the study subjects was found to be 6th standard wherein the study subjects were distributed between 1st and 12th standard.

As in table 2,the variables that are significantly associated with ophthalmic morbidity are sex (p value <0.020-OR value-1.66), age (p value<0.000-OR value-), socio-economic status (pvalue<0.000-OR value-) and school type(p value<0.043-OR value-).Other factors are not significantly associated with ophthalmic morbidity.

Discussion

The sociodemographic variables that are significantly associated with ophthalmic morbidity are sex (p value <0.020-OR value-1.66), age (p value<0.000-OR value-), socio-economic status (pvalue<0.000-OR value-) and school type(p value<0.043-OR value-).Other factors are not significantly associated with ophthalmic morbidity.

In a study done by Deshpande,[46] the variables that were significantly associated with ophthalmic morbidity are religion, socio-economic status, literacy of head of family, BMI. Factors that were not significantly associated with ophthalmic morbidity are sex and family type. In a study done by V Kalikivayi,[50] the sociodemographic factors that were significantly associated with ophthalmic morbidities were age, literacy, family type. Other factors were insignificant.

Conclusion

- The socio-demographic variables that are significantly associated with ophthalmic morbidity by univariate analysis are age, sex, socioeconomic status and family type.
- Majority of the ocular diseases observed were either preventable or treatable.
- If these morbidities are not attended at the right time they may progress to severe disabilities or blindness

and may also affect the child's performance in the school.

- As the burden of blindness is already high in our country we have to have a blindness prevention approach, beginning right from the childhood and school eye-screening programme should be an integral part of it.

Ethical Clearance: No ethical clearance was necessary for this research work

Source of Funding: Self funded project

Conflict of Interest: Nil

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Comparison of CT Volume Rendring Images with Axial Sections in Diagnosing Facial Bone Fractures

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Abstract

Wounds of facial bones and delicate tissues are an extremely normal pathology. Their rate ranges from 20% to over half of cases admitted to horrendous crisis. The idea of three-dimensional display of CT-data is not much older than CT itself. For three-dimensional presentation purposes the components of these voxel ought to be as little as could be expected under the circumstances. The diagnostic accuracy of volume rendering image protocol in comparison with axial section in traumatic patients with facial bone fractures were evaluated.

Keywords: *Normal pathology, Ct Data, Diagnostic Accuracy, Facial bone fractures.*

Introduction

The skull comprises of 8 cranial bones and 14 facial bones. Maybe a couple of these bones exist two by two. The matched bones of the face are the maxilla, palatine bones, zygomatic bones, lacrimal bones, nasal bones, and second rate nasal conchae. The single bones are the vomer and mandible [1].

Wounds of facial bones and delicate tissues are an extremely normal pathology. Their rate ranges from 20% to over half of cases admitted to horrendous crisis. The most regular reasons for these pathologies incorporate are transportation wounds (up to 80% of cases), direct power, for the most part during an ambush (up to 60% of cases), falls (up to 25% of cases), and mishaps during games (up to 10% of cases) [2–5].

Cracks including the facial skeleton might be disconnected or complex.

Detached breaks include single life systems structures and are typically a consequence of alow energy blow[6]. The three most common isolated facial fractures are:

- Nasal fractures.
- Zygomatic fractures.
- Orbital floor fractures.

Complex fractures are due to high energy impact injuries to the mid face and involve several structures, examples of these are:

- Le-fort fractures.
- Nasoethmoid mid-facial fractures.

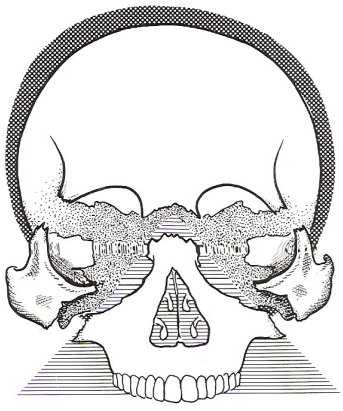


Figure 1: The human skull composed of an ovoid-shaped cranium, a pyramid shaped mid face consisting of the maxilla and the triangle shaped zygomas

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The idea of three-dimensional display of CT-data is not much older than CT itself. Basic work on this topic was performed by Gabor Herman and published in several articles [7]. Further fundamental research and development was done by Marc Levoy and Robert Drebin[8,9].The littlest component of volumetric pictures is called voxel (for example volume component) and contains the properties (for example forces) of the checked volume, comparable to the two-dimensional pixel (for example picture component). As a volume can be envisioned as a three-dimensional network, the subsequent estimation of one single voxel is the normal incentive over the framework[10-15]. For three-dimensional presentation purposes the components of these voxel ought to be as little as could be expected under the circumstances. One single voxel, being of limited size, may contain various tissue types. With rate grouping this physical reality can be portrayed precisely [16, 17].

Aim and Objectives: To evaluate the diagnostic accuracy of volume rendring image protocol in comparison with axial section in traumatic patients with facial bone fractures.

Materials and Method

Source of data: The study was conducted in patients with facial trauma referred for computed tomography (CT) to the Department of Radio Diagnosis at Sree Balaji Medical College and Hospital, Chennai-600044.

Method of collection of data:

- The study population included 150 patients who underwent CT evaluation of face when they presented with injury to facial skeleton to the emergency department in Sree Balaji Medical College and Hospital, Chennai attached to the Bharath University.
- The CT was done on the advice of the referring doctor and no patient was made to undergo CT for the sole purpose of this study.
- All the CT scan patients gave consent
- The scans were acquired with the use of spiral data acquisition technique in the transverse plane.
- The Volume rendring (VR) images were obtained for each patient.
- Two reviewers evaluated the axial-sections and VR individually.

Study Design: Descriptive study.

Study Period: March 2017 to October 2018.

Inclusion criteria: All patients with clinical evidence of injury to facial skeleton who undergo Multi-slice CT examination and are shown to be positive for fractures.

Exclusion criteria: atients with injury to facial skeleton in whom a CT examination is contraindicated. Eg. Pregnancy.

Data acquisition: All the CT scans in this study were performed using Hitachi 16-slice CT scanner.

CT Protocol used for this study: Slice thickness: 1.25 mm.

Voltage: 120 kV.

Current: 300 mA.

Table speed: 27.5 mm/sec.

Pitch: 1.375:1

Rotation: 0.6 sec.

Post traumatic fractures were classified on the basis of anatomical location of fractures:

1. Frontal bone fractures
2. Orbits, with classification into the orbital walls
3. Nasal bones
4. Maxillary bones with inclusion of maxillary sinus walls
5. Zygomatic arches and bones
6. Body, ramus, and condylar process of mandibular bones

Findings: The sensitivity of each reconstruction formats was calculated by using the standard formula.

Frontal bone fractures: In assessment of frontal bone fractures, axial section shows maximum number of fractures.

Considering sensitivity of axial section as the gold standard, VR lacks by 35% in detection of fractures.

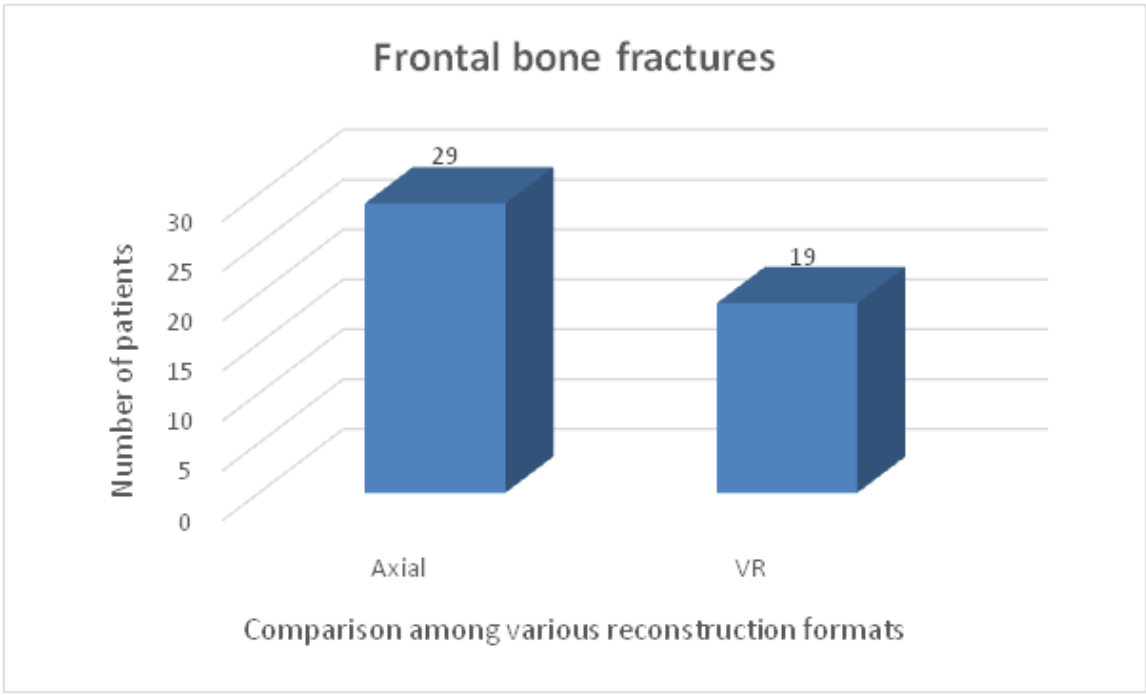


Chart 1: Number of frontal bone fractures detected in various formats.

Orbital bone fractures: In assessment of orbital bone fractures, axial section shows maximum number of fractures.

Considering sensitivity of axial section as the gold standard, VR lacks by 44% in detection of fractures.

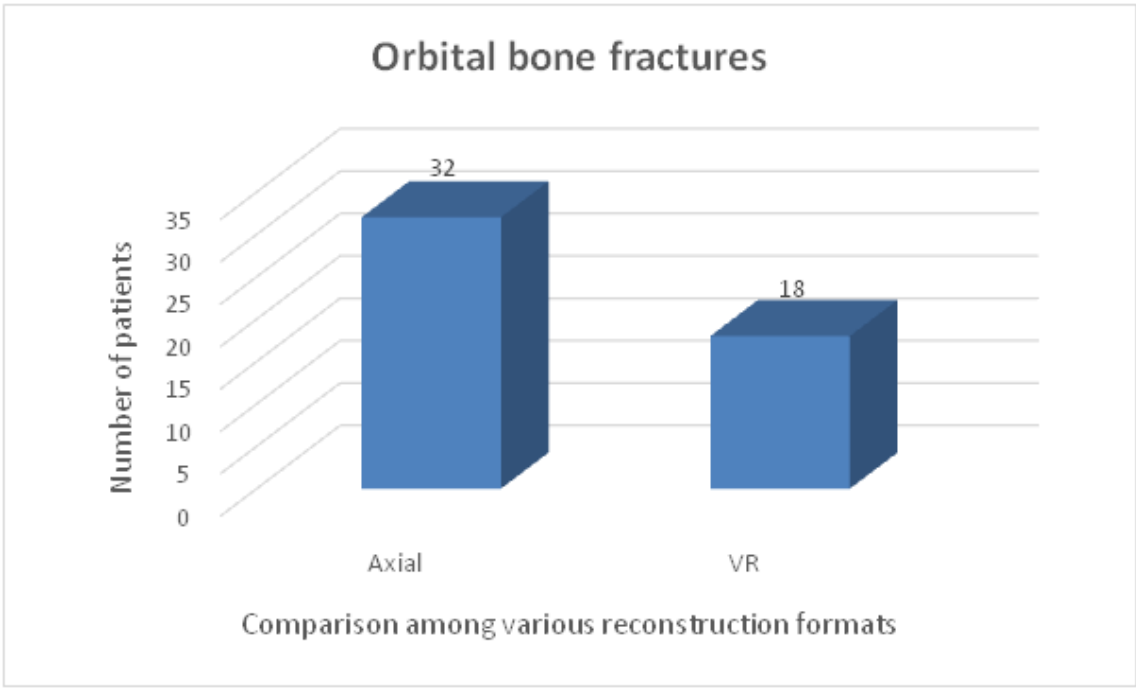


Chart 2: Number of orbital bone fractures detected in various formats.

Nasal bone fractures: In assessment of nasal bone fractures, axial section shows maximum number of fractures.

Considering sensitivity of axial section as the gold standard, VR lacks by 49% in detection of fractures

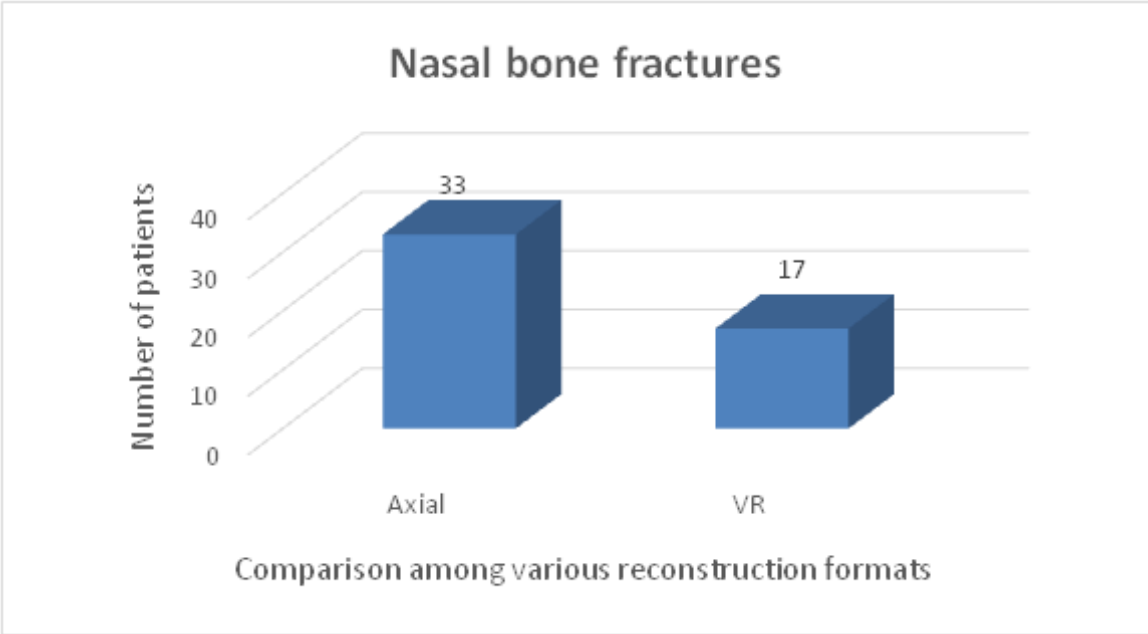


Chart 3: Number of nasal bone fractures detected in various formats.

Maxillary bone fractures: In assessment of maxillary bone fractures, axial section shows maximum number of fractures.

Considering sensitivity of axial section as the gold standard, VR lacks by 51% in detection of fractures.

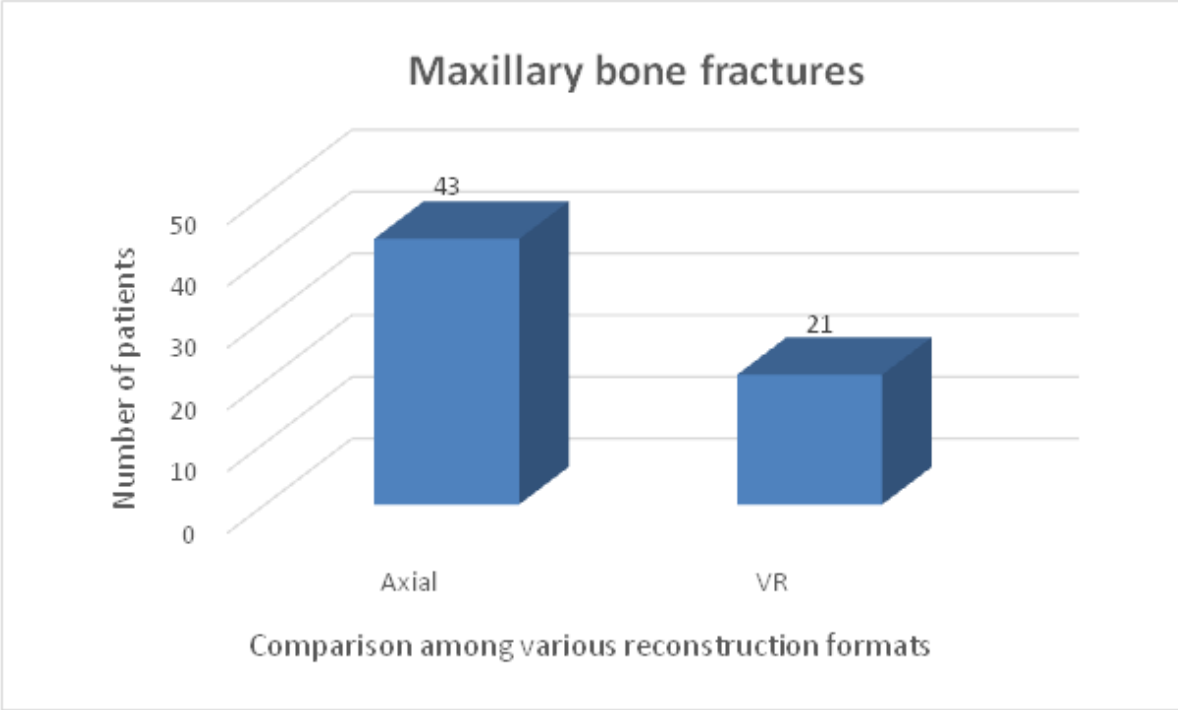


Chart 4: Number of maxillary bone fractures detected in various formats.

Zygomatic bone fractures: In assessment of zygomatic bone fractures, axial section maximum number of fractures.

Considering sensitivity of axial section as the gold standard, VR lacks by 10% in detection of fractures.

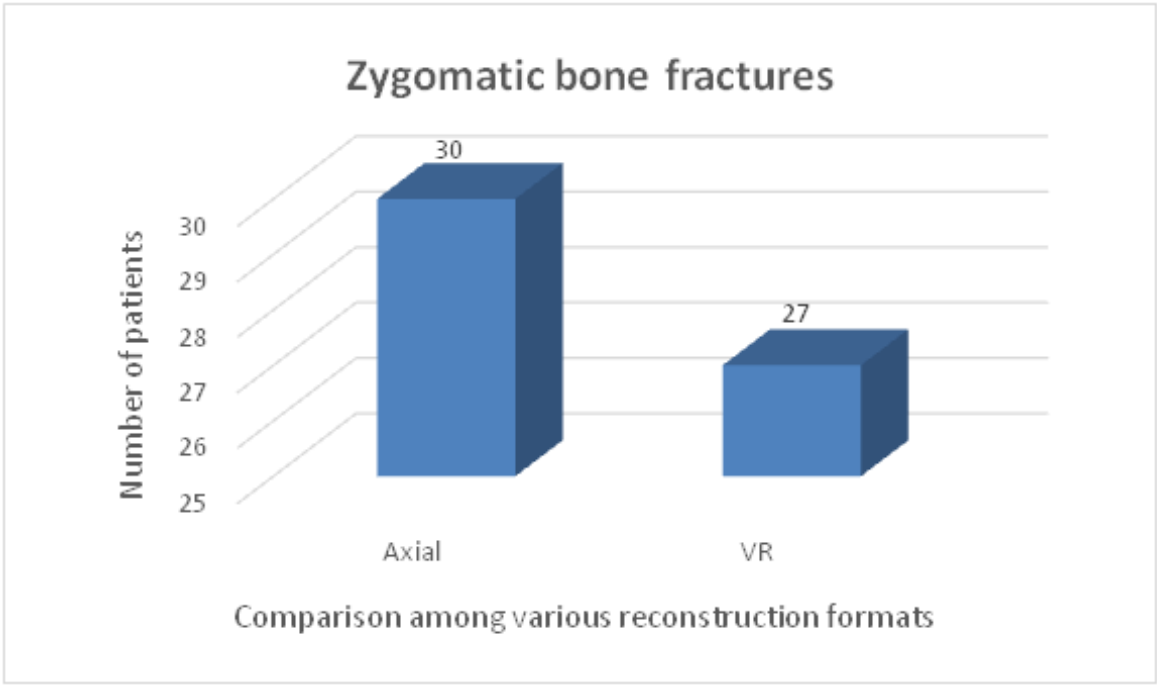


Chart 5: Number of zygomatic bone fractures detected in various formats.

Mandibular bone fractures: In assessment of mandibular bone fractures, axial section shows maximum number of fractures.

Considering sensitivity of axial section as the gold standard, VR sections lacks by 18% in detection of fractures.

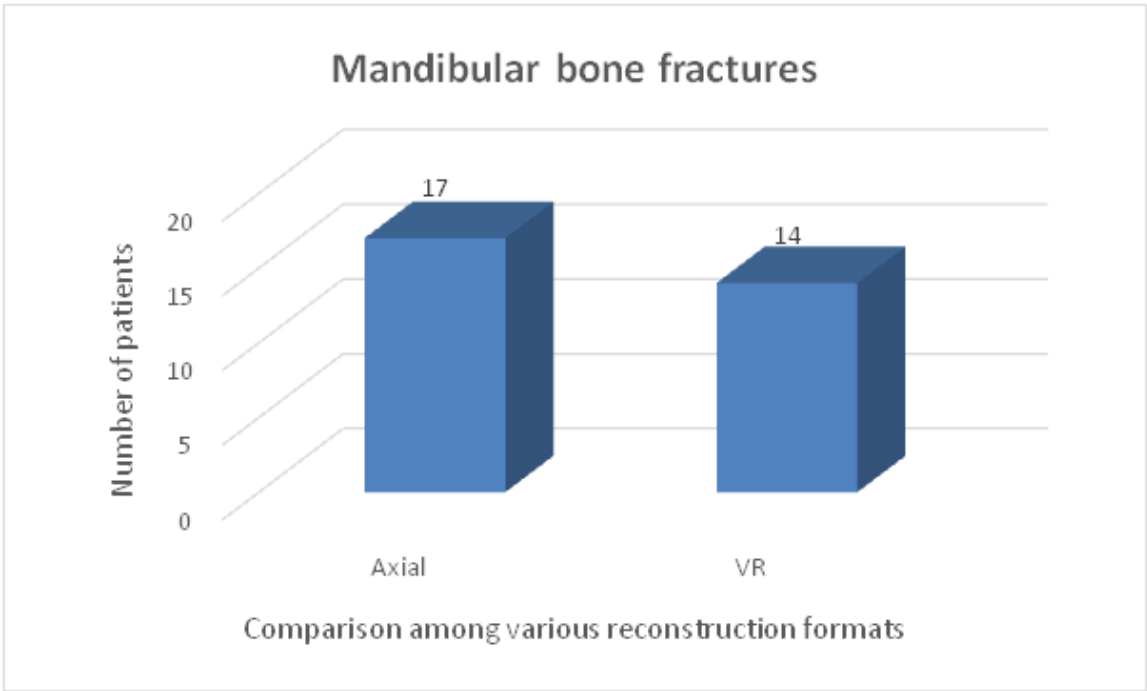


Chart 6: Number of mandibular bone fractures detected in various formats.

Table 1: Shows the sensitivity of detection of fractures by various sections in different bones.

Sensitivity Table (% age)		
	Axial	VR
Frontal bone	100	65
Orbital bone	100	56
Nasal bone	100	51
Maxillary bone	100	49
Zygomatic bone	100	90
Mandibular bone	100	82

Axial section is considered as the gold standard as it identifies the maximum number of fractures. VR images didn't show significant sensitivity over axial sections in any of the facial bone regions but was nearly sensitive in zygomatic and mandibular bone.

In this study none of the reconstruction format shows the false positive results. So, considering the false positive as zero, if we calculate the specificity it comes to 100% for all the formats.

Discussion

Plain radiographs were the initial modality of choice for imaging in these patients, but they can be inadequate due to superimposition of bony structures [18,19].

In a study done by Fox et al [20] showed that in the zygomatic region, they were able to recognize the presence of injury better on VR (88%) than axial sections (64%), and both of these modalities were superior to MPR(0%). Whereas in the orbit and maxilla, axial sections (62%,50%) showed better sensitivity in detecting fractures over VR (50%,44%) and MPR (33%,11%). In fractures involving nasal region, axial (50%) and VR (50%) are more sensitive than MPR (16%). Overall, axial images had higher average sensitivity values than the other two modalities.

In a study done for comparison of facial bone fractures by VR and axial images done by Gillespie et al [21], VR showed poor detection rates than axial images in all the orbit fractures; showed 50% poor detection rate and 50% similar in zygomaticomaxillary fractures.

In a study done by Remmler et al [22], VR was superior than axial images when fractures involving the naso-orbito-ethmoid region are considered (mainly in the inferior orbital rim, piriform aperture and nasomaxillary buttress) but axial was better than VR at lateral nose and medial orbital wall. Diagnostic accuracy of axial images ranged from minimum of 25.9% at the piriform aperture to a maximum of 88.9% at the medial orbital wall, whereas VR varied from 63.0% at the medial orbital wall to 88.9% at the piriform aperture.

Conclusion.

In our study, axial sections were considered as the gold standard as it identified the maximum number of fractures.VR images didn't show significant sensitivity over axial sections in any of the facial bone regions but was nearly sensitive in zygomatic and mandibular bone. Fox et al [20] found that 3D recreated CT sweeps were deciphered all the more quickly and all the more precisely and that 3D CT was increasingly exact at surveying zygomatic cracks yet was substandard compared to hub pictures for assessing orbital breaks.Many studies have noted that 3D reconstructed images are helpful in the evaluation of fracture comminution, displacement components, and complex fractures involving multiple planes [23].

The degree of communitive breaks is better exhibited on the 3D-CT, where the size, shape, and uprooting of individual sections are unmistakably uncovered. The blend of multislice CT and 3D volume rendering procedure permitted a few enhancements in imaging translation.

3D imaging isn't shown, in any case, for little cracks of the orbital floor or confined breaks of the maxillary divider, in which the break is constrained to one plane. Here, inspecting 3D examines alone can give false-negative outcomes.

Ethical Clearance: No ethical clearance was necessary for this research work.

Source of Funding: Self funded project

Conflict of Interest: Nil

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A Study on Awareness Treatment and Control of Hypertension among Rural Adult Population of Kancheepuram, Tamil Nadu

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Abstract

Developing countries are thus likely to face an enormous burden of chronic non-communicable diseases (NCDs) in the near future in comparison to communicable disease which were once a major problem. Cardio Vascular Disease (CVD) is the number 1 cause of death globally and an estimated 17.7 million people died from CVD in 2015, representing 31% of all global deaths. CVD are the major cause of morbidity and mortality in India and accounting for 25% of all deaths and projected to increase to 50%. The association between various risk factors and hypertension were determined in this study.

Keywords: *Hypertension, Epidemiological transition.*

Introduction

Epidemiological transition worldwide has lead to a tremendous increase in the elderly population in the developing countries with concomitant increase in the life expectancy. It is estimated that by the year 2025 the majority of the elderly population worldwide will be residing in developing countries. Developing countries are thus likely to face an enormous burden of chronic non-communicable diseases (NCDs) in the near future in comparison to communicable disease which were once a major problem.[1-4] The global distribution of disease burden in terms of disability-adjusted life years (DALY) losses indicates that communicable diseases account for 41% DALY losses, non-communicable diseases account for 43%, and injuries account for 16%. Comparison between high-, low-, and middle-income countries reveal that low-and middle-income countries shoulder more than 6 times (43.8%) the burden of communicable diseases, as compared to high-income (7.2%) countries. With regard to India, the DALY losses due to communicable diseases account for 50%, compared to 33% for non-communicable diseases, and 17% of injuries.[5]

Non-communicable diseases (NCDs) are group of chronic diseases that are not communicable. They are defined as diseases of long duration and slow progression. NCDs are the major cause of adult mortality and morbidity globally.[6] The 4 main types of non communicable diseases are cardiovascular diseases, cancers, chronic respiratory diseases and diabetes.[7] Globally, premature mortality from these four main NCDs declined by 15% between 2000 and2012this rate of decline is insufficient to meet the 2030 target of a one third reduction.[8] Nearly 38 million people die each year globally from Non communicable diseases.[9] Based on current trends, by the year 2020 these NCDs are expected to account for 73% of global deaths and 60% of the global burden of disease.[10] As per the World Health Organisation (WHO) 2015 report, every 4th Indian die from an NCD before the age of 70 years. Globally India is the first country to develop specific targets and indicators in this field, which are aimed at reducing the burden of deaths from NCDs globally by the year 2025 by 25 per cent.[11]

The risk factors for non-communicable disease are grouped into 3 categories they are behavioural, metabolic and biochemical risk factors. Behavioural risk factors include tobacco use, alcohol use, unhealthy diet and

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lack of physical activity. Metabolic risk factors include overweight, obesity, diabetes and hypertension (HTN). Biochemical risk factors include hypercholestremia and hypertriglyceridemia. To contain the increasing burden of Non-Communicable Diseases, Ministry of Health and Family welfare, Government of India, has launched the National Programme on Prevention and Control of Diabetes, Cardiovascular diseases and Stroke (NPDCS).[7]

Cardiovascular diseases (CVDs) are a group of disorders of the heart and blood vessels and they include coronary heart disease, cerebrovascular disease, peripheral arterial disease, rheumatic heart disease, congenital heart disease, deep vein thrombosis and pulmonary embolism. Cardio Vascular Disease (CVD) is the number 1 cause of death globally and an estimated 17.7 million people died from CVD in 2015, representing 31% of all global deaths.CVD are the major cause of morbidity and mortality in India and accounting for 25% of all deaths and projected to increase to 50%.[12]

Objectives

- To identify the determinants of hypertension among the study population.
- To determine the association between various risk factors and hypertension

Materials and Method

This cross sectional study was conducted to estimate the prevalence,of hypertension among the rural adult population of Kancheepuram District, Tamil Nadu. It is a community based cross sectional study, conducted in the rural field practise area of Sree Balaji Medical College and Hospital of Kancheepuram District. The field practice area covers 5 villages.

The sample size calculated was 1250 using the formula 4 PQ/L2.Systematic random sampling method was used to select the study participants. A pre tested structured questionnaire was used to collect data from the study population. Information regarding socio demographic characteristics, risk factors, regarding hypertension and physical measurements of the study population were obtained. The data was entered in MS Excel and analysis was done using SPSS software (version 22). Descriptive and analytical statistics were used to describe the study variables.

Findings.

Knowledge regarding hypertension among the study population: In this study 47.5% of the participants have adequate knowledge about hypertension as shown in Figure 1. As seen from Table 1 about 89.1% of them have measured their BP. Among them 20.1% measured their BP in the last month and 61.6% measured their BP in the last 6 months.

Table 1: Measured BP among the study participants

Sl No	Measured BP	Frequency	Percentage (%)
1.	Measured BP in their Lifetime (N-1250)		
	Yes	1114	89.1
	No	136	10.9
2.	When Was the last time you measured BP(N-1114)		
	< 1 Month	224	20.1
	1-6 Months	686	61.6
	6 Months--1 Year	130	11.7
	1---2 Years	30	2.6
	> 2 Years	26	2.3
	Don't Remember	18	1.7

Knowledge about normal BP value among the study participants: Among the study participants when asked whether they know the normal blood pressure value, 24.8% said they know the normal blood pressure value and among them only 60% said the correct blood pressure value and 40% said incorrect value.

Table 2: Diagnosis characteristics of hypertension among the study population

Sl No	Diagnosis Characteristics	Frequency (N=218)	Percentage (%)
1.	Mode of Diagnosis		
	Symptomatic	84	38.6
	Incidental	112	51.4
	Master Health Check up	22	10
2.	Duration since Diagnosis		
	< 1 Year	60	27.5
	1--5 Years	96	44
	5-10 Years	24	11
	> 10 Years	38	17.5

Diagnosis and treatment characteristics of the study population: Among the known hypertensive

51.4% were diagnosed incidentally and 38.6% presented with symptoms at the time of diagnosis (Table 3). Around 44% were hypertensive for the past 5 years and 17.5% are hypertensive for more than 10 years. Among the hypertensive's 98.1% are under treatment. Nearly 51.4% of them are getting treatment from private facility and 47.7% are getting treatment from government facility.

Table 3: Treatment characteristics of hypertension among the study population:

Sl No	Treatment Characteristics	Frequency	Percentage (%)
1.	Under Treatment (N-218)		
	Yes	214	98.1
	No	4	1.9
2.	Treatment Duration (N-214)		
	< 1 Year	60	27.6
	1--5 Years	96	44.6
	5-10 Years	22	11.2
	> 10 Years	36	16.6
3.	Treatment facility(N-214)		
	Government	102	47.7
	Private	110	51.4
	Others	2	0.9

Table 4: Drug characteristics among study population

Sl No	Drug Details	Frequency	Percentage (%)
1.	Claim to Know DrugName (N-214)		
	Yes	136	63.6
	No	78	36.4
2.	Group of Drug (N-214)		
	ACE Inhibitors	54	39.7
	Beta Blockers	32	23.5
	Calcium Channel Blockers	32	23.5
	Others	18	13.3
3.	How many Drugs (N-214)		
	Single Drug	180	84.1
	Multiple Drugs	34	15.9

Drug characteristics among study population: Among the participant 63.6% know the name of the drug they are taking. About 39.7% are treated with ACE inhibitors and 23.5% are under beta blockers and calcium channel blockers. About 84.1% are under single drug treatment and 15.9% of them are under multiple drug combinations.

Table 5: Side effects to treatment among the study population

Sl No	Side Effects	Frequency	Percentage (%)
1.	Side Effects to Drugs (N-214)		
	Yes	18	8.4
	No	196	91.6
2.	What Type of Side Effects (N-18)		
	Gastritis	12	66.7
	Low Back Ache	2	11.1
	Giddiness	4	22.2

Side effects and adherence to treatment among study population: Among those under treatment 8.4% suffer from any form of side effect and among them 66.7% suffer from gastritis and 22.2% suffer from giddiness. Adherence to treatment was assessed using Morisky 4 item questionnaire. Only 44% of them were adherent to treatment and 66% were non adherent to treatment.

Expenses for hypertension among the study population: Among the hypertensive's 69.1% are spending 100-500/month for hypertension, 16.3% are spending < 100/month and 10.1% are spending more than 1000/month for hypertension. The expenses include expense for treatment, travel and investigations.

Table 6: Expenses for hypertension among the study population:

Expense for Hypertension		Frequency (N-214)	Percentage (%)
Expense	< 100/Month	18	16.3
	100--500/Month	76	69.1
	500--1000/Month	4	3.6
	> 1000/Month	12	10.1

Discussion

This study was done to assess the awareness, treatment and control of hypertension among rural adults in the study area. The study was conducted in the Rural field practice area covered by our institution and included 1250 samples selected from the study area. Many interesting results were obtained from this study and were explained already. Findings of the study is discussed in comparison with similar studies done elsewhere.

Knowledge, Treatment and control of hypertension: In this study 47.5% of the participants

had knowledge about hypertension. Among the hypertensive's 98.1% were under treatment. Nearly 51.4% of them are getting treatment from private facility and 47.7% were getting treatment from government facility. Among the hypertensive under treatment, 68.8% have their blood pressure under control and 31.2% have uncontrolled hypertension. In a study by Deepa R 50% of the hypertensive's were on treatment and among them only 40% of them had their BP under control.[13] 16.8% of hypertensive patients were aware of their disease,31.8% are under treatment and only 11.4% had normal BP in a study done by Avadaiammal Vimala.[14] Sathish Kumar conducted a study in which only 31.0% of the hypertensive's were aware of their hypertensive status, 23.2% of the hypertensive's are on treatment and only 11.2% of them are under control.[15] In II Meshram study among hypertensive about 10% were aware about the condition and about 8% were on treatment. The level of awareness and treatment seeking behaviour was more among women and among educated subjects.[16]

Conclusion

Among the hypertensive's 98.1% are under treatment and in that under treatment, 68.8% have their blood pressure under control.From the findings of the study, it can be concluded that the prevalence of hypertension and prehypertension are high in the study area. The burden of undiagnosed case is also quite high. There is no sex difference in the prevalence of hypertension. This study also shows that there are still gaps in the diagnosis and treatment of hypertension in the study area. Among those treated also adherence, incidence of complications and co morbidities are worrisome. The level of awareness among the study participants about this disease is lower than expected which is quite alarming. Though there is an existing program to address this disease there is few lacunae identified in this study which prevents the program from reaching the needful. All these lacunae must be bridged by effective interventions.

Ethical Clearance: No ethical clearance was necessary for this research work

Source of Funding: Self funded project

Conflict of Interest: Nil

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Mechanism of Unstable Inter-Trochanteric Fractures in the Elderly

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Abstract

There is an increased incidence of hip fractures with aging due to decrease in muscle mass around the hip and osteoporosis. This is becoming more common as the proportion of elderly people in the population has been steadily increasing. Our study shall aim to evaluate the clinical, functional and radiological outcomes of bipolar hemi-arthroplasty and compare them to those treated by dynamic hip screw fixation, for communized, osteoporotic, displaced trochanteric fractures in the elderly population.

Keywords: *Hip Fractures, osteoporosis, Hemi Arthroplasty.*

Introduction

Proximal femoral fractures in the elderly individuals have a tremendous impact on both the health care system and society. It occurs with both mild and moderate trauma[1,2]. During an impact, the large amount of energy that is released is absorbed by the skin, fat, and muscles which surround the hip. There is an increased incidence of hip fractures with aging due to decrease in muscle mass around the hip[2] and osteoporosis. This is becoming more common as the proportion of elderly people in the population has been steadily increasing[3].

Upon treatment of inter-trochanteric factures with conservative management, itusually unites with a mal-union and with shortening, but the problem of trochanteric fractures has never been union but because of complications associated with prolonged recumbency and its associated morbidities. Trochanteric hip fractures in the elderly patients have benefited from advances in internal fixation.In the last 2 decades these newer implants have been helping in early mobilization and thereby preventing complications of recumbency. Early failure of internal fixation occurs however in a number of cases[4]. The failure after internal fixation has been due to the initial fracture pattern, communition, sub-optimal fracture fixation and poor bone quality[5]. The problems associated with fixation of these fractures area loss of fixation, avaruscollapse and implant cut-out of the lagscrew[6]. As a result there is profound functional disability and pain[7]. In these patients treatment with primary bipolar hemi-arthroplasty decreases the post-operative complications due to prolonged immobilization or implant failure and also quickly returns the patients to their pre-injury activity level[6,8].

Our study shall aim to evaluate the clinical, functional and radiological outcomes of bipolar hemi-arthroplasty and compare them to those treated by dynamic hip screw fixation, for communited, osteoporotic, displaced trochanteric fractures in the elderly population.

Materials and Method

This study was conducted at Sree Balaji Medical College and Hospital, Chrompet, Chennai from March 2017 to October 2018 on 40 elderly osteoporotic patients with unstable inter-trochanteric fractures who were divided into two groups with Group A-bipolar prosthesis (20 cases approximately) and Group B–DHS (20 cases approximately). The recruitment of patients was from March 2017 to February 2018 [12 months], so that there would be a minimum follow-up of 8 months [range: 8 to 20 months].

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Findings:

Table 1: Age and Sex Distribution

AGE (in years)	GROUP A (BPHA group) Sex and 'n'		GROUP B (DHS group) Sex and 'n'		SAMPLE SIZE 'n' Group A + Group B	% Age of patients in the total sample.
	Male 'n'	Female 'n'	Male 'n'	Female 'n'		
56-60	3	5	5	3	16	40
61-65	3	3	1	4	11	27.5
66-70	1	2	1	1	5	12.5
71-75	1	2	2	3	8	20
Total	8	12	9	11	40	100
% age in total	20	30	22.5	27.5	Net total	100%
% age within group	8/20 (40%)	12/20 (60)	9/20 (45%)	11/20 (55%)		

In our study, of the total 40 patients recruited, most of them were in the age group of 56 to 60 (40%). Females out-numbered males in both the groups,60% in group A and 55% in group B. Together in both groups put together the females were 57.5%.

- Eight patients were in the age group of 56 to 60, of these 3 were male and 5 were female patients.
- Six patients were in the age group of 61 to 65, of these 3 were male and 3 were female patients.
- Three patients in the age group of 66 to 70,of these 1 was male and 2 were female patients.
- There was one male and 2 female patients in the age group of 71 to 75 years

Group B: Sex Distribution In Group B (DHS Group):

Among the 20 patients, there were 9 male (45 %) and 11 female (55 %) patients as far as group B (DHS group) was concerned.

Age Distribution in Group B (DHS Group):

- Eight patients were in the age group of 56 to 60, of these 5 were male and 3 were female patients.
- Five patients were in age group of 61 to 65, of these 1 was male and 4 were female patients.
- Two patients were in the age group of 66 to 70,of these 1 was a male and 1 was a female patient.
- Five patients were in the age group 71 to 75, of these 2 were males and 3 were female patients.

Table 2: Type of Fracture (Classification of Ao-OTA)

Classification	AO Type			Total
Types	A2.1	A2.2	A2.3	
Group A (BPHA Group)	03	11	06	20
Group B (DHS Group)	05	10	05	20

In group A (BPHA group), according to AO classification type A2.2 was more common in11 patients (55%), type A2.3 in 6 patients (30%) and type A 2.1 in 3 patients (15%).

In group B (DHS group), according to AO classification type A2.2 again was more common in 10 patients (50%), type A2.3 in 5 patients (25%) and type A2.1 in 5 patients (25%).

Table 3: Mechanism of Injury Distribution Table

Mode of Injury	Male		Female		Net Total 'n' % age
	Group A (BPHA) 'n'% age	Group B (DHS) 'n'% age	Group A (BPHA) 'n'% age	Group B (DHS) 'n'% age	
RTA	03	02	02	03	10(25%)
Trivial trauma	01	01	04	03	9(22.5%)
Accidental fall and others	04	06	06	05	21(52.5%)
Total	8(40%)	9(45%)	12(60%)	11(55%)	40(100%)

- 10 patients had accidental fall of which there were four male and six female patients.
- 5 patients had road traffic accident of which there were three male and two female patients.
- 5 patients had trivial trauma of which there were one male and four female patients.

In group B (DHS group):

- 11 patients had accidental fall of which there were six male and five female patients.
- 5 patients had road traffic accident of which there were two male and three female patients.
- 4 patients had trivial trauma of which there were one male and three female patients.

Osteoporosis Evaluation: In both the groups, grade 3 was more common in 13 patients. Six patients had grade 2 in group A and seven patients in group B. Grade 1 osteoporosis was seen in one patient in group A.

Surgical Approach:

Group A (BPHA group):

- Lateral–14.
- Posterior-06.

Group B (DHS group):

- Lateral–20.

Table 4: Time Elapsed From Injury To Surgery

Time Interval from Injury to Surgery (In Days)	No. of Patients 'n'	
	Group A (BPHA group) 'n' (% age)	Group B (DHS group) 'n' (% age)
0-4	6(30%)	7(35%)
5-9	8(40%)	9(45%)
10-14	6(30%)	4(20%)
Total	20(100%)	20(100%)

The mean time elapsed from injury to surgery was 7 days in the group A (BPHA) and 6.25 days in the group B (DHS)

Table 5 .Operative Time Distribution Chart

Operative Time (mins)	Group A (BPHA) 'n' (no. of patients)	Group B (DHS) 'n' (no. of patients)
61-90	6	4
91-120	12	15
121-150	2	1
Total	20	20

Average surgical time in Group A (BPHA) = 99.5 minutes., Average surgical time in Group B (DHS) = 101 minutes., P value: 0.0004.

Table 6. Blood Loss Evaluation Chart

Blood Loss (in ml)	Group A (BPHA) 'n' (no. of patients)	Group B (DHS) 'n' (no. of patients)
81-100	07	00
101-120	04	03
121-140	06	12
141-160	03	05
Total	**20**	**20**

P value: 0.0310., Mean blood loss for Group A(BPHA group): 111 ml., Mean blood loss for Group B(DHS group): 148 ml.

This prospective study was conducted at Sree Balaji Medical College and Hosital, Chrompet, Chennai from March 2017 to October 2018. The recruitment period was till February 2018 (12 months). The minimum follow-up period was 8 months (range: 8 to 20 months). 40 cases of unstable inter-trochanteric hip fractureswere recruited, in this12 months, which satisfied our inclusion criteria. They were sub-divided into two groups of 20 cases each. The first group A set [BPHA], were surgically treated with bipolar hemi-arthroplasty and the second group B set [DHS], were surgically treated with dynamic hip screw fixation

The following observations were made out in this study:

Discussion

Inter-trochanteric fractures in elderly patients are associated with notable morbidity and mortality. Internal fixation in these patients has reduced the mortality associated with these fractures[20], however failure rate in certain literature are as high as 56%[21,22] and early mobilization is avoided in these cases because of osteoporosis, poor screw fixation and comminution.

The weak and porotic bone in these patients do not provide for a firm purchase of screw which leads to early bio-mechanical failure[23]. As aresultthefemoral head collapses and migrates into varus and retroversion. This leads to limping gait due to shortening and decreased abductor muscle lever arm[24].

Another cause for functional disability and pain in these patients is cutting out of the screw from the femoral head. Although the mortality rate is somewhat decreased with internal fixation, the complication rate still ranges from 4 to 50 percent[25].

In study by Broos et al[26];BipolarVandeputte prosthesis was implanted in ninety four elderly patients.

Results were better with bipolar hemi-arthroplasty group with respect to shorter average operating time, lower mortality rate and better functional results.

In study by Rodop et al[27];BipolarLeinbach hemi-prosthesis was implanted in fifty four elderly patients. There were no cases of stem loosening or dislocations. Harris Hip Scoring showed good to excellent result in eighty percent of thesepatients.

In our study, there was female preponderance in both the groups accounting for 60% in group A (BPHA) and 55% in group B (DHS). This is due to post-menopausal osteoporosis and lower peak bone mass.

The results in group A (BPHA) were better than group B (DHS) with respect to blood loss, operative time, peri-operative blood transfusion this compares favourably with the study alone bySinno K et al[18]; where one hundred and two patients participated in the study. Bipolar hemi-arthroplasty was done in 48 patients and 54 patients were treated with dynamic hip screw fixation.The mean operative time was just less in group A (BPHA) (99.5 minutes) than that in group B (DHS) (101 minutes),which coincides with study by Sinno K et al[18] where it is 112 minutes.The amount of blood loss (mean) was lower in group A (BPHA) (111 ml) than in group B (DHS) (148ml) with a P value of 0.03,which is similar to the study by Sinno K et al[18]; where it was reported 129 ml in the hemiarthroplasty group with a P value of 0.005.

The mean blood transfusions (units)was higher in group B (DHS) (1.9 units) than in group A (BPHA) (1.4 units) with a P value of 0.02.This compares well with the study by MdEmami et al[37]; where the mean blood transfusions was greater in internal fixation group (1.9 units) than in Bipolar hemiarthroplasty group (1.37 units),withaP value of0.01.Early mobilization with full weight bearing in group A (BPHA) compared to non-weight bearing or partial in group B (DHS) shows reduction in pulmonary complications (5%). This is in concurrence with the study done by Grimsurdet al[15]; where they studied 39 patients treated with bipolar arthroplasty. It allowed for early weight bearing and had low rate of pulmonary complications and bed sores.

Conclusion

From our clinical observation we would suggest that unstable intertrochanteric fractures in elderly result most frequently from accidental fall(52.5%), being the most common described mechanism of injury.

Ethical Clearance: No ethical clearance was necessary for this research work

Source of Funding: Self funded project

Conflict of Interest: Nil

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Assessment and Evaluation of Etiological Factors in Cases of Female Primary Infertility

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Abstract

Objectives: The aim of the study is to assessment and evaluation of etiological factors in case of female primary infertility.

Place of Study: Gynaecologyopd, Sree Balaji Medical College and Hospital, Chennai.

Period of Study: August 2016 to February 2018 (18 months).

Study Design: Prospective study.

Materials and Method: All the reproductive age group women coming to Gynaecologyopd out patient clinic with history of anxious to conceive.

Those patients who satisfy the above criteria are to be selected for the study.

The test has to be carried out in hospitalized patients.

1. A detailed history was taken.
2. General physical and systemic examination was done.
3. Ovarian factors and uterine factors ruled out
4. Fortubal cannulation

The data collection technique adopted in this technique is structured questionnaire on the evaluation of infertility in couple of less than 35 years of age in a period of infertility less than 5 years from infertility OPD for one and half years of Sree Balaji Medical College and Hospital. Detailed history obtained from the couple and evaluate, inform at ion with the help of various investigation in evaluating an infertile couple.

Results: The prevalence of infertility in the age group 21–29 years were about 76% in women. This showed that maximum number of female attain menarche at the age group of 12 to 14 years. In our study, it is observed that there is a strong relation of infertility with BMI, the prevalence of infertility increases as BMI Increases in population. 22% of thew omen has BMI above 30 (obese). In our study, 8% of the women has hydrosalpinx, 4%of the women had fibroids and 6% of the women haspolyps. We observed that 4% of the women had unilateral fallopian tubal block and 2% had bilateral fallopian tubal block**.**

Conclusion: In modern era of economically growing world we have concluded that the prevalence of infertility is about 76% in women age group of 21-29, 40% of the women have attained menarche at 12-14 years, observed hydrosalpinx in 8%, polyps in 6% and fibroids in 4%.

Keywords: *Etiological factors, infertility.*

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Introduction

According to WHO, positive reproductive health of awoman is a state of complete physical, mental and socialwell-being and not merely absence of disease

related toreproductive system and functions. Infertility implies apparent failure of a couple toconceive, while sterility indicates absolute inability toconceive, for one or more reasons[1-4]. If a couple fails to achieve pregnancy after 1 yea r of 'u nprotected' and r egular intercourse, it is an indication to investigate the couple. This is based on the observation that 80% of normal couples achieve conception within a year. It is observed that 50% conceive within 3 months of regular, unprotectedintercourse, 75% in 6 months and 80–85% conceive withina year. (1) Primary infertility if conception has never occurred[5-7].

Materials and Method

A prospective study was planned on women with primary infertility. All the reproductive age group women coming to Gynaecologyopdout patient clinic with history of anxious to conceive.Those patients who satisfy the below criteria are to be selected for the study.

Inclusion Criteria:

- Primary infertility who are less than 35 years of age.
- Couples practicing regular timed intercourse without using contraception.
- Couples aware of fertile period

Exclusion Criteria:

- Patients who are on hormones, anti-psychotic drugs.
- History of pelvic inflammatory disease, endometriosis
- History of tuberculosis

The test has to be carried out in hospitalized patients.

1. A detailed history was taken.
2. General physical and systemic examination was done.
3. Ovarian factors and uterine factors ruled out
4. For tubal cannulation.

The data collection technique adopted in this technique is structured questionnaire on the evaluation of infertility in couple of less than 35 years of age in a period of infertility less than 5 years from infertility OPD for one and half years of Sree Balaji Medical College and Hospital. Detailed history obtained from the couple and evaluate, informat ion with the help of various investigation in evaluating an infertile couple. Obtaining the history would be as followed

Day 1; Detailed history collection from the couple, including menstrual history, coital history, husband history with any significant past history

DAY 2; Baseline scan for the female to evaluate any uterine structural abnormalities and to look for pre-antral follicles and hormonal study.

DAY 8; To do hysterosalpingography to rule out any pathological tubal factor association with fallopian tube or D-lap.

If any abnormalities to be found at this factor, refer the patient to higher center for tubal reconstruction surgery

DAY 9; To look for any spontaneous ovulation in a woman through follicular tracking, starting from the day of the cycle and main factor found to be normal.

If patient is not conceiving with 3 cycle of ovulation, indication to assess cervical factors to plan for intra uterine insemination and follow the patient. History of evidence of any hormonal irregularities to be corrected.

Findings: In this study maximum female 38 was found in age group of 21-29 years followed by 12 cases in the age group of 31-34 years

Table No. 1: Age Group of Respondents

S. No	Age group	Female	Percentage
1	21-29 years	38	76%
2	31-34 years	12	24%
3	Above 35 years	00	0%
Total		50	

In this study female attend menarche at the age of 11 was found to be 8 followed by 40 cases in the age group of 12-14 years followed by 02 cases in age group of 15-17 years.

Table No. 2: Female Patients Age at Menarche in Years

Age at Menarche	Patients	Percentage
11	08	16%
12-14	40	80%
15-17	02	04%
>18	0	0%

In this study maximum 22 women had regular cycle 28 had irregular cycle

Table No. 3: Female Patients Menstrual Cycle

Menstrual Cycle	Patients	Percentage
Regular	22	44%
Irregular	28	56%

In this study 27 cases married in the duration of 1-3years followed by 36 cases married in the duration of 4-6 years followed by 22 cases in the duration of 7-9years followed by 15 cases above 10 years…..

Table No. 4: Female Body Mass Index (BMI)

Duration of Married Life	Patients	Percentage
1-3	27	27%
4-6	36	36%
7-9	22	22%
Above 10	15	15%

In this study 3 women are less than 18.5 BMI (underweight) followed by 9 women 18.5 to 24.9 BMI (healthy) followed by 27 women BMI 25 to 29.9 (over weight) followed by 11 women BMI above 30 (obesity)

Table No. 5: Female Body Mass Index (BMI)

BMI Chart	Normal Values	Female	Percentage
Underweight	Less than 18.5	03	06%
Healthy	18.5 to 24.9	09	18%
Over Weight	25 to 29.9	27	54%
Obesity	Above 30	11	22%
Total		50	100%

In this study 34 men had normal sperm followed by 7 had mild oligospermia (10-15million sperm/ml) followed by 4 had moderate oligospermia(5-10 million sperm/ml)followed by 3 had severe oligospermia(0-5 million sperm/ml)followed by 2 had Azoospermia.

In this study 34 men had normal sperm followed by 7 had mild oligospermia (10-15million sperm/ml) followed by 4 had moderate oligospermia(5-10 million sperm/ml)followed by 3 had severe oligospermia(0-5 million sperm/ml)followed by 2 had Azoospermia.

Table No. 6: Semen Analysis

Semen	Cases	Percentage
Normal Sperm	34	68%
Mild Oligospermia	07	14%
Moderate Oligospermia	04	08%
Seveve Oligospermia	03	06%
Azospermia	02	04%
Total	50	100%

In this study 1 case had varicocele followed by 16 had others (mild moderate severe oligospermia) followed by 2 had cryptorchidism.

Discussion

A descriptive approach is used to ASSESS AND EVALUATE ETIOLOGICAL FACTORS IN CASES OF FEMALE PRIMARY INFERTILITY. The study was conducted at Sree Balaji Medical College and Hospital in Chrompet. After taking informed consent, a structured questionnaire is prepared to find out the etiological factors

The sample size for this study is 50 couples

Age: The prevalence of infertility in the age group 21–29 years were about 76% in women The prevalence was observed 24% of the women from age group 31 to 34 years . This showed that increase in age is an important risk factor for infertility

Menarche: In our study, the mean age of attaining menarche is12.5 years. The 40% age group of females at tainedmenarche at age group of (12-14 years) and 16% attained atthe age of 11 years and the remaining 4% attained at the age group of (15-17 years). This showed that maximum numberof female attain menarche at the age group of 12 to 14years.

Menstrual Cycle: In the present study, 44% of the women has history of irregular menstrual cycle, 56% had regular cycle.

Duration of Infertility: In our study, duration of infertility is 1 to 3 years in 27% of the couples, 4 to 6 years in 36% couples, 7 to 9 years in 22% of couples and above 10 years in 15% couples.

BMI: In our study, it is observed that there is a strong relation of infertility with BMI, the prevalence of infertility increases as BMI Increases in population. 22% of the women has BMI above 30 (obese). 54% of the women are with BMI 25–29.9 (over weight), 18% are with 18.5–24.9 (normal) and 6% are with BMI <18.5 (underweight)

Female Structural Abnormalities: In our study, 8% of the women hashydrosalpinx, 4% of the women had fibroids and 6% of the women has polyps.

Base Line Scan: In the present study, base line scan showed 5 to 15 antral follicles in 46% of the women of age group (20-29) and in 14% of the women of age

group (30-35). Base line scan showed less than 5 antral follicles in 34% of the women (20-29) age group and in 6% of thewomen (30-35) age group.

Hysterosalpingogram: In our study, we observed that 4% of the women had unilateral fallopian tubal block and 2% had bilateral fallopian tubal block.

Conclusion

The present study assessed and evaluated etiological factors of primary infertility in couple at Sree Balaji Medical College and Hospital and we have concluded that the prevalence of infertility is about 76% in women of age group 21-29 year. We have observed the age of attaining menarche in all the women who has included in the present study. 40%of the women has attained menarche at 12-14 years. We have observed the relation of infertility with menstrual cycle irregularities we have observed that44% of the women has regular menstrual cycle and56% of the women has irregular menstrual history. We have observed the relation of BMI to infertility and concluded that 54% of the women has 25-29.9 (over weight) and 22% of the women has BMI above 30 (obesity). We have evaluated all the women who were included in the study for structural abnormalities and we have observed hydrosalpinx in 8%, polyps in 6% and fibroids in 4%. We have taken base line scan for all the women who were included in the study on day 2 of the menstrual cycle and observed 34% has less than 5 antral follicles in the age group (20-29 year). We have done hysterosalpingogram for all the women and observed unilateral tubal block in 2 women and bilateral tubal block in 1 women in age group 20-34years.

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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To Study the Mobidity and Mortality of Primary Cesarean Section in Multigravida

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Abstract

Aim: To study the mobidity and mortality of primary cesarean section in multigravida.

Method: In this study 58 cases of primary caesarean in multigravida over a period of two Years i.e. from August 2016 to April 2018 at the obstetric department of Sree Balaji Medical College And hospital, Chennai-44 were taken. Before surgery, indications for the cesarean section were observed. All problems have been observed and noted until the patient's release. For primigravida and multigravida, calculations were produced individually and the outcomes were contrasted. Statistical analysis was performed by meaningful chi square test.

Results: During this era, the main cesarean segment supplied 58 multigravida. The most prevalent signs in multigravida were fetal distress and misrepresentation. Primary PPH was commonest intraoperative complication (17.34%) followed by extension of uterine incision (3.44%) in multigravida women. In multigravida women Maternal morbidity was seen in 20 cases and Perinatal morbidity seen in 45 babies. Major causes for perinatal morbidity are birthasphyxia 22 cases(38%), Prematurity 6 cases(10.34%). Perinatal Mortality seen in 2 cases with incidence of 3.44%.There were no maternal deaths in the present study.

Conclusion: Women's first labour requires to be handled well to decrease the prices of cesarean section. Good antenatal check-ups can reduce the incidence of APE. Multigravida carries a greater danger of morbidity that highlights the need to improve women's health status in the reproductive age category and to better implement family planning facilities.

Keywords: *Cephalopelvic disproportion (CPD), Antepartum eclampsia (APE).*

Introduction

The rate of cesarean area has multiplied or significantly increased everywhere throughout the world over the most recent 15 years [(1).] In spite of the fact that cutting edge innovation and offices have made this activity amazingly sheltered, yet cesarean segment is related with expanded danger of maternal horribleness and mortality when contrasted with vaginal conveyance just as it additionally confuses the administration of consequent pregnancies. Additionally this expansion in cesarean rate has not contributed essentially to the synchronous watched decrease in perinatal mortality [(2).] Henceforth the essential cesarean segment performed on a lady is of much obstetric essentialness and requirements a top to bottom examination. The reason for this examination is to assess the inconvenience of essential cesarean segment in multigravida with the goal that the perspectives which need due consideration could be separated and better obstetric administration could be given to them.[3-8]

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Materials and Method

In this study 58 cases of primary caesarean in multigravida and primigravida done over a period of two Years i.e. from August 2016 to April 2018 at the obstetric department of Sree Balaji Medical College And hospital, Chennai-44 were taken.

Inclusion Criteria:

1. Multigravida with pregnancy of >28 weeks gestation (gravida 2 and above), with previous one or more vaginal deliveries.
2. Multiple pregnancy
3. Pregnancy with medical disorders.
4. Previous instrumental, assisted breech deliveries, still births and IUD.

Exclusion Criteria:

1. Previous one or more caesarean.
2. Previous h/o hysterotomy

Findings: Around 1857 caesarean sections were made 5161 shipments during this era, representing 36 percent of all shipments. The incidence of main caesarean section in females with multigravida is 1.12 percent of all shipments and accounted for 3.10 of all segments.

Table 1: Booking Status

	No of Cases Inmultigravida
NO OF BOOKED CASES	22(38%)
NO OF UNBOOKED CASES	25(43%)
NO OF REFERRED CASES	11(19%)

Table 2: Indications of Caesarean Section in Multigravida and Primigravida

Sl. No.	Indication	No of Cases in Multigravida	Percentage
1	Fetal Indications		
	a) Fetal distress	16	27.6
	b) Malpresentation	10	17.2
	c) Cord prolapse	-	-
	d) Macrosomia	-	-
2	Obstetric Indications		
	a) Antepartum haemorrage	7	12.1
	i) Placenta previa	4	7
	ii) Abruptio placenta	3	5.1
	b) CPD	9	15.6
	c) Labour disorders	5	8.6
3	**Maternal Indications**		
	a) Medical Disorders	7	12.1
	i) Hypertensive disorders	5	8.6
	ii) Heart disease	1	1.7
	iii) renal causes	-	-
	iv) Infections to the mother (HIV,HPV,HSV)	1	1.7
	b) Maternal request	-	-
	c) Previous VVF Repair/iv degree perineal laceration	-	-
	d) Neoplasm	2	3.4
	e) Previous uterine surgery	2	3.4

The Indications of caesarean section in multigravida the most common are fetal distress accounting for 27.6% cases and second common was malpresentation with 17.2%, CPD accounting for 15.6%, Antepartum haemorrage accounting for 12.1% amond this Placenta previa was 7% and abruption placenta was 5.1%.Labour disorders accounting for 8.6% and in medical disorders, hypertensive disorders accounting for 8.6%.

Table 3: Showing Various Intraoperative Complications.

Intraoperative Complications	No: of Cases in Emergency CS	Percentage	No: of Cases In Elective CS	Percentage
PPH (Atonic)	6	10.34	4	7
Extension of uterine incision	2	3.44	-	-
INJURY(bowel, bladder, ureteric injury, broad ligament haematoma	1	1.72	-	

Around 9 patients had intra operative complications with incidence of 22.5%. The incidence of complications is more with emergency section(15.5%) than with elective section(7%). The most common complication is PPH with incidence of 17.34%. In 2 cases extension of uterine incision and was sutured. In 1 case broad ligament haematoma and it was resolved after a course of antibiotics.

Table 4: Post-Operative Complications

Postoperative Complications	Incidence	Percentage
Wound infections	6	10.34
Pyrexia	5	8.62
Sub involution of uterus	2	3.44
Secondary suturing	2	3.44
Urinary tract infections	2	3.44
Respiratory tract infections	1	1.72
Endometritis	1	1.72
Paralytic ileus	1	1.72

In present study, 20 patients had morbidity after caesarean with incidence of 24%.Wound infection with gaping was the most commonest with incidence of 10.34% followed by febrilemorbidity in 8.62% followed by sub involution of uterus, secondary Suturing, UTI, endometritis, paralytic ileus shows incidence of 1.72%.

Table 5: NICU ADMISSION RATES

NICU admission	No of cases in multigravida	Percentage in multigravida
Admitted	45	77.58
Not admitted	13	22.41

NICU admission rates are significant in multigravida accounting for 77.58% and in primigravida 17.8% with p value <0.0001.

Table 6: Perinatal Morbidity

	No of Cases	Percentage
Birth asphyxia	22	38
TTNB	5	8.62
Hypoglycaemia	3	5.17
Prematurity	6	10.34
Sepsis	4	6.89
RDS (HMD, Pneumonia, MAS, Pneumothorax)	4	6.89
Anomalies	1	1.72

45 babies had perinatal morbidity and requiring NICU admission. Birth asphyxia

Accounting for 22 cases and prematurity 6 cases are the leading cause.

Transient tachpnoea of newborn 5 cases, sepsis 4 cases, respiratory distress

Syndrome4 cases, hypoglycaemia 3 cases, anomalies 1 case.

Neonatal Mortality: In our study there were two still births accounting for 3.44% due to abruptio placenta and transverse lie with hand prolapse.

Intrapartum monitoring with CTG, availability of USG and NST have been also took part in reducing neonatal morbidity. Recent improvement of neonatal care,neonatal setup, preterm Care and availability of medications may be contributing factor for absent neonatal deaths.

Discussion

This research highlights the need for labor leadership through antenatal care and vigilance. Negligence in which operational measures are needed most of the moment for both mom and baby's healthy issues. Above all, there is a huge need for multigravida councils to report to the hospital as soon as feasible as many of them travel to the hospital during the active labor stage.

The most prevalent signs for caesarean segments were fetal distress (27.6%), misrepresentation (17.2%), CPD (15.6), APH (12%), medical illnesses (12%) and labor diseases (8.6%). Cases obtained immediately rather than referenced were higher in figures (48.84%) and also unbooked patients were higher (43%) than booked instances (38%) implying that even multigravida patients do not go to antenatal visits.

Due to excellent antepartum and intrapartum care, mortality rates in tertiary care hospitals are lower. Unrecognized cephalopelvic disproportion (in mentioned instances) resulting to obstructed labor is a contributing factor in growing maternal morbidity. A multigravida female in labor therefore needs the same attention as the primigravida female. Good intrapartum and antenatal care and premature referral can decrease multigravida mortality and parental and perinatal morbidity.

There is no Maternal Mortality in the Present Study.

Neonatal Mortality Following Caesarean Section in Different Series

- In our study number of still births which is accounting for 3.44% and it is correlating with all the other studies where there is more percentage of still born as in Rao Jyothi[7] H (2013) it is 7%, Sethi Pruthwiraj[6] (2014) it is 3% and in Sharmila[8] (2016) it is 1.5%.
- There were two still births in the present study due to abruptio placenta and transverse lie with hand prolapse.

Perinatal Mortality	Rao, Jyothi	Sethi Pruthwiraj	Sharmila	Present Study
STILL BIRTH	7%	3%	3(1.5%)	2(3.44%)
EARLY NEONATAL DEATH	-	-	-	-

Conclusion

In this manner, to close, the pace of essential cesarean area in primigravida is expanding as somewhere else and is higher than multigravida. So to decrease the pace of cesarean segment, first work of lady is to be very much overseen.

Most normal signs for cesarean area are fetal trouble and CPD. Electronic fetal observing, fetal scalp blood inspecting and intrapartum fetal heartbeat oximetry for fetal reconnaissance would diminish some superfluous activities. An all around applied arrangement on dynamic administration of work and careful utilization of partograph will lessen the occurrence of dystocia. Wellbeing mindfulness will build the antenatal visits and diminish the rate of inconveniences like APE.

Essential cesarean segments in multigravida comprise just a little level of all out conveyances however run a more serious hazard during pregnancy and work. This hazard can be adequately decreased by giving great antenatal consideration, compelling family arranging measures and wellbeing instruction to patient and intensive consideration and cautiousness in the administration of work. Likewise terrific multigravida is a condition to be averted. Further, measures ought to be taken to lessen youth unhealthiness and to energize instruction of the young lady kid. This will eventually improve the degree of use of wellbeing offices by ladies during their regenerative age and therefore would improve the obstetric result. There is requirement for solid and speedy systems administration with fringe medical clinics and empowering brief referral of high hazard and troublesome cases so obstetric crises arrive at a specific organization prior and an appropriate administration should be possible before the results turned out to be grave.

Summary: This study was conducted at Sree Balaji Medical College and Hospital, Chennai.

Over a period of 2 years i.e., from August 2016 to April 2018. There were 5161 deliveries during this period, which included 1853 deliveries by caesarean section. Among them 58 were primary caesarean sections in multigravida, an incidence of 1.12% of all deliveries.

The common indications for caesarean section in multigravida women are fetal distress(27.6%),M alpresentation(17.2%),CPD(15.6%), APH(12.1%), Hypertensive disorders and Labour disorders (8.6%).In Primigravida the common indications are CPD(36%), Labour disorders(18%), fetal distress(17%).

Primary PPH was commonest intraoperative complication (17.34%) followed by extension of uterine incision (3.44%) in multigravida women. In multigravida women Maternal morbidity was seen in 20 cases and Perinatal morbidity seen in 45 babies. Major causes for perinatal morbidityarebirthasphyxia 22 cases(38%), Prematurity 6 cases(10.34%).Perinatal Mortality seen in 2 cases with incidence of 3.44%.There were no maternal deaths in the present study.

Ethical Clearance: No ethical clearance was necessary for this research work

Source of Funding: Self funded project

Conflict of Interest: Nil

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To Evaluate the Anti Inflammatory Effect of Metformin on C Reactive Protein in Newly Diagnosed Type 2 Diabetes Mellitus Patients: A Open Label Prospective Study Conducted in a Tertiary Care Hospital for 6 Months Period

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Abstract

Aim: To evalaute the pleiotropic effects of metfromin by measuring the Hs-CRP in newly diagnosed type 2 diabetes mellitus patients.

Materials and Method: A total of 70 patients were enrolled in the study, and out of that 50 patients who fulfilled the eligibility criteria were included in the study. And after randomization and obtaining the informed consent,50 patients were subjected to the trial drug-tablet Metformin 500mg twice daily for a period of 6 months and the patients were advised to follow at 3 and 6 months and hs-crp levels were measured at baseline and followup and patients were monitored for adverse drug events.

Results: hs-CRP baseline value expressed as Mean±SD was 3.4±1.16 mg/L . After 3 months of metformin therapy, hs-CRP reduced to 2.93±0.9 mg/L. After 6 months of metformin therapy, hs-CRP effectively reduced to 1.7±0.81 mg/L. hs-CRP levels were lowered after 6 months of treatment. Treatment with Metformin showed effective reduction in hs-CRP values comparatively between hs-CRP baseline values and hs-CRP values at sixth month were significant ($P<0.05$).

Conclusion: To conclude with the above findings shows that there was significant reduction in hs-CRP after six of therapy with metformin and hence proving its pleiotropic effects and hence apart from it's a antidiabetic agent it proves its beneficial cardioprotective role in patients with newly diagnosed type 2 diabetes mellitus patients.

Keywords: *Metformin, diabetes mellitus, anti diabetic, pleiotropic.*

Introduction

Diabetes mellitus (DM), speak to a huge worldwide wellbeing problem[1]. Type 2 DM (once in the past known as non-insulin subordinate DM) is the most widely recognized type of DM described by Insulin inadequacy, Insulin obstruction and expanded hepatic glucose creation (HGP) prompting glucotoxicity, beta cell fatigue lastly beta cell failure[2]. The objective of treatment for DM is to avoid mortality and complexities by normalizing blood glucose level. Recent proof proposes that poor glycemic control is altogether connected with the improvement of Microvascular Complications like diabetic nephropathy, neuropathy and retinopathy by means of a few systems, for example, the generation of cutting edge glycation final results (AGEs), the production of a proinflammatory microenvironment, and the acceptance of oxidative pressure and along these lines to macrovascular intricacies. [3]

Poor quality constant aggravation, reflected in raised degrees of serum C-responsive protein (CRP), has as of

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late been connected to corpulence, insulin obstruction disorders, for example, polycystic ovary disorder (PCOS), and an expanded danger of cardiovascular infection. Studies have shown that C-receptive protein (CRP) a marker of fundamental aggravation is rising as a significant autonomous hazard factor for cardiovascular complications[3,4].High CRP levels have been connected to an expanded danger of thrombotic occasions like myocardial infarction[4]. Raised CRP levels have likewise been connected to an expanded danger of later advancement of diabetes[5]. Moreover, CRP levels are higher in individuals with diabetes contrasted and non diabetics[6,7].Insulin resistance therapies can profit people by decreasing inflammation, atherogenesis, and thus problems of the macrovascular system.

To achieve glycemic control in diabetes, oral hypoglycemic agents (OHAs) stay a key factor. Studies indicate that OHAs in Type-2 DM patients decrease some amount of CRP. Given the above-mentioned connection between oral hypoglycemic agents and the amount of CRP, it is complicated[8].

Poor quality constant aggravation, reflected in raised degrees of serum C-responsive protein (CRP), has as of late been connected to corpulence, insulin obstruction disorders, for example, polycystic ovary disorder (PCOS), and an expanded danger of cardiovascular infection. Studies have shown that C-receptive protein (CRP) a marker of fundamental aggravation is rising as a significant autonomous hazard factor for cardiovascular complications[3,4]. High CRP levels have been connected to an expanded danger of thrombotic occasions like myocardial infarction[4]. Raised CRP levels have likewise been connected to an expanded danger of later advancement of diabetes[5]. Moreover, CRP levels are higher in individuals with diabetes contrasted and non diabetics

Materials and Method

Study Design: This is an Open Label, Prospective Study, of 6 months duration evaluating the effect of Metformin on C reactive protein in patients of newly diagnosed Type 2 Diabetes mellitus.

This study was conducted in Sree Balaji Medical College and Hospital, Chennai during the period from November 2017 to April 2018 in accordance with the declaration of the Helsinki and ICH GCP guidelines. The study protocol was reviewed and approved by the Committee on Institutional Ethics and all participants in the trial were informed of the study procedures and received written informed consent.

Withdrawal Criteria:

- Adverse event which warrants withdrawal of subject.
- Non-compliance with procedures.
- Withdrawal of consent for participation in the study by the subject.
- Failure of the study drug to produce the desired effect

Study Procedure: The study " Effect of Metformin On C-Reactive Protein in Type 2 Diabetes Mellitus Patients" Open Label, Prospective Study was started after obtaining approval from the Institutional Ethics Committee of Sree Balaji Medical College and Hospital. Voluntary written informed consent was taken from all the study participants after explaining the clinical study protocol in detail about the risk and benefit. They were given adequate time to decide for their participation. Confidentiality was maintained and patient's identity was not revealed in the source document. The informed consent was available in English as well as local language (Tamil).

All the 50 patients who fulfilled the Eligibility criteria was advised to take the study drug Tablet Metformin 500mg twice daily one in the morning and one in night. The study Drug was given free of cost to the patients and they were given assurance that any withdrawal from the study would not affect their future treatment in the same hospital.

Baseline laboratory investigations were done before study and repeated after 3 months and 6 months of treatment.The baseline features like demographic data, general, systemic and local examination were carefully noted in the case report form. Contact numbers of the investigators and emergency physician were provided to all the study participants for any queries during the study period and for reporting of any adverse events.There were three scheduled visits during the study-baseline visit, 3rd month and 6th month (end of the study visit).

Study Population: A total of 50 patients with newly diagnosed type 2 DM were included in the study. Both sexes were included in study . Study data was documented and patients were assessed periodically.

Drug Dosage: Tablet Metformin 500 mg twice daily, one in the morning and one in the night were advised to the study participants**.**

Adverse Event Reporting: All the adverse events observed/complained by the study participants were reported in the case report form along with the other information about the severity such as mild, moderate or severe and any relation to the study medication.

Laboratory Investigations: A baseline investigation protocol was followed before starting the study, the following investigations were performed at the beginning of the study:

Blood Biochemistry: High-sensitivity (hs) C-Reactive protein (CRP) level were done at baseline and repeated at 3 and 6 months of follow up.

Findings:

Primary endpoints: To evaluate the effect of metformin on C-reactive protein levels in patients with newly diagnosed type 2 diabetes mellitus.

Secondary endpoints: To evaluate the tolerability of metformin in type 2 diabetes mellitus.

Statistical analysis: All values are expressed as mean ± standard deviation. Comparison hs-CRP, values before and after the study was performed by paired t-test using SPSS software 16.0 version. Comparsion of blood parameters at baseline, 3month and 6month were found to be statistically significant. And also comparsion of blood parameters at 3 month and 6 month were found to be statistically significant ($p<0.05$ value).

Discussion

Effect of Metformin on hs-CRP: hs-CRP baseline value expressed as Mean±SD was 3.4±1.16 mg/L . After 3 months of metformin therapy, hs-CRP reduced to 2.93±0.9 mg/L. After 6 months of metformin therapy, hs-CRP effectively reduced to 1.7±0.81 mg/L. hs-CRP levels were lowered after 6 months of treatment. Treatment with Metformin showed effective reduction in hs-CRP values comparatively between hs-CRP baseline values and hs-CRP values at sixth month were significant ($P<0.05$).

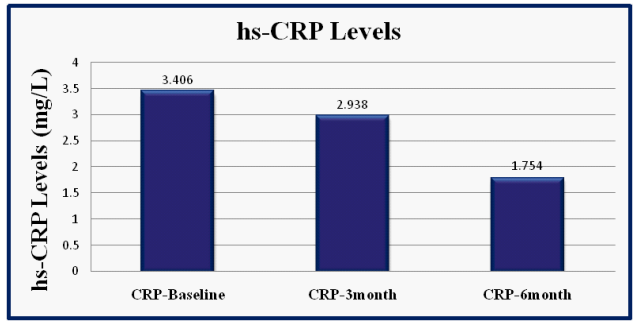


Figure 1: Comparison of hs-CRP levels between Baseline and at the end of the study

Table 1: Comparison of hs-CRP levels between Baseline and at the end of the study

S.No	Parameter	N	Metformin (n=50)	
			Baseline (1month)	End of the Study(6month)
	CRP	50	3.406 ± 1.16	1.754 ± 0.81 *

Values Expressed in Mean ± STD. Deviation, * Represents P < 0.05.

Conclusion

The results of the present study proves that metormin in newly diagnosed type 2 diabetes mellitus patients significantly improves CRP level (inflammatory marker) after six months of treatment. So this study emphasizes the intitaion of metformin as monotherpay in diabetic patients that apart from its effective gylcemic control it also reduces CRP level which prove its additional pleotropic effect (anti inflammatory effect), and hence thereby in diabetes patients by decreasing the long term macrovascular complications.

Ethical Clearance: No ethical clearance was necessary for this research work.

Source of Funding: Self funded project

Conflict of Interest: Nil

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To Evalaute the Efficacy of Metformin Monotherapy in Newly Diagnosed Type 2 Diabetes Mellitus Patients by Assesing the HBA1C Percentage Reduction as a Single Diagnostic Tool for Glycemic Control and its Incidence in Preventing Macrovascular Complications: A Prospective Open Label Study for a Period of 6 Months Duration

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Abstract

Aim: To evaluate the efficacy of metformin monotherapy in newly diagnosed type 2 mellitus patients by assessing the hba1c reduction percentage and thereby preventing the incidence of macrovascular complications.

Materials and Method: A total of 50 type 2 diabetes mellitus patients were included in the study.and after obtaining the informed consent the patients were advised to take Tablet metformin 500mg twice daily and hba1c were done at baseline, 3 and 6 months of the study period and the patients were assessed periodically and if any adverse events were reported it was recorded and manged promptly.

Results: HBA1C baseline value expressed as Mean±SD was 7.966±0.85 %. After 3 months of metformin therapy, HBA1C mean obtained was 7.53±0.83 %. After 6 months of metformin therapy, HBA1C improved to 6.8±0.93. Treatment with Metformin showed effective reduction in HBA1C values comparatively between HBA1C baseline values and HBA1C values at sixth month were statistically significant($P<0.05$).

Conclusion: From the above results the current study shows significant reduction in hba1c values after six months of metformin therapy and this proves that metformin is a sole antidiabetic agent started as monotherapy in newly diagnosed diabetic patients the incidence of macrovascular complications can be prevented at the intial stage of the disease.

Keywords: *Metformin, macrovascular, type 2 diabetes mellitus.*

Introduction

Diabetes mellitus is a complex endocrinology disease which requires a meticulous understanding of its pathogenesis and its complications to subdue it. It has been riddled with extensive micro and macrovascular complications which by itself has its own set of pathogenesis. There is a near connection between DM and cardiac illness (CVD), which in diabetic patients is the most common source of morbidity and mortality. In people with DM, cardiovascular (CV) risk variables such as obesity, hypertension, and dyslipidemia are prevalent, putting them at enhanced danger for heart incidents.

The goal of prescribing medication to decrease glucose among individuals with type 2 diabetes is to decrease hyperglycaemia signs and the possibility of

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microvascular and macrovascular problems. A variety of therapies have been efficient since old times to alleviate the polydipsia and polyuria involved with increased concentrations of blood glucose. Twenty years earlier, trial proof lastly appeared that reducing blood glucose lowered the risk of microvascular problems among individuals with type 2 diabetes.

The glycated hemoglobin (HbA1c) and fructosamine is additionally still valuable for deciding glucose authority after some time. In July 2009, the International Expert Committee (IEC) suggested the extra analytic criteria of a HbA1c result ≥6.5% for DM. This board of trustees recommended that the utilization of the term pre-diabetes might be eliminated yet recognized the scope of HbA1c levels ≥6.0% and <6.5% to distinguish those at high danger of creating DM [1,2]. Similarly as with the glucose-based tests, there is no positive limit of HbA1c at which typicality finishes and DM begins[3, 4]. The IEC has chosen to suggest a cut-off point for DM analysis that underlines explicitness, remarking this reasonable the shame and cost of erroneously distinguishing people as diabetic against the insignificant clinical results of deferring the finding in a patient with a HbA1c level <6.5%.

Metformin, other than hypoglycemic movement, has been taken with eating routine and exercise changes to avoid diabetes in individuals who are at high hazard for getting to be diabetic. Metformin (a biguanide subsidiary), by controlling blood glucose level abatements these entanglements. Metformin works by reestablishing the body's reaction to insulin. It diminishes hepatic glucose creation (HGP) and intestinal glucose assimilation [5,6]

Recent proof indicates that bad glycemic regulation is substantially correlated with the growth of microvascular problems such as diabetic nephropathy, neuropathy and retinopathy through several processes such as the manufacturing of sophisticated glycation end goods (AGEs), the creation of a proinflammatory microenvironment, and oxidative stress induction and consequently macrovascular[7].

Materials and Method

To evalaute the efficacy of metformin monotherapy in newly diagnosed type 2 diabetes mellitus patients by assesing the hba1c percentage reduction as a single diagnostic tool for glycemic control and its incidence in preventing macrovascular complications-a prospective open label study for a period of 6 months duration.

This study was conducted in Sree Balaji Medical College and Hospital, Chennai during the period from November 2017 to April 2018 in accordance with declaration of Helsinki and ICH GCP guidelines. The study protocol was reviewed and approved by the Institutional Ethics Committee and all trial participants have been informed about the study procedures and written informed consent was obtained.

Inclusion Criteria:

a. Newly diagnosed Type-2 DM

b. Patients started on metformin monotherapy.

Exclusion Criteria:

a. Patients on insulin/other oral hypoglycemic agents

b. Any infective, inflammatory, allergic disorders, cardiovascular disorders, malignancy

c. Patients with trauma due to surgery, burns, fractures

d. History of alcohol and/or smoking

e. Pregnant/lactating women

Withdrawal Criteria:

- Adverse event which warrants withdrawal of subject.
- Non-compliance with procedures.
- Withdrawal of consent for participation in the study by the subject.
- Failure of the study drug to produce the desired effect.

Study Procedure: The study " Effect of Metformin On C-Reactive Protein in Type 2 Diabetes Mellitus Patients" Open Label, Prospective Study was started after obtaining approval from the Institutional Ethics Committee of Sree Balaji Medical College and Hospital. Voluntary written informed consent was taken from all the study participants after explaining the clinical study protocol in detail about the risk and benefit. They were given adequate time to decide for their participation. Confidentiality was maintained and patient's identity was not revealed in the source document. The informed consent was available in English as well as local language (Tamil).

All the 50 patients who fulfilled the Eligibility criteria was advised to take the study drug Tablet Metformin 500mg twice daily one in the morning and

one in night. The study Drug was given free of cost to the patients and they were given assurance that any withdrawal from the study would not affect their future treatment in the same hospital.

Baseline laboratory investigations were done before study and repeated after 3 months and 6 months of treatment. The baseline features like demographic data, general, systemic and local examination were carefully noted in the case report form. Contact numbers of the investigators and emergency physician were provided to all the study participants for any queries during the study period and for reporting of any adverse events. There were three scheduled visits during the study-baseline visit, 3rd month and 6th month (end of the study visit).

Study population: A total of 50 patients with newly diagnosed type 2 DM were included in the study. Both sexes were included in study . Study data was documented and patients were assessed periodically.

Drug dosage: Tablet Metformin 500 mg twice daily, one in the morning and one in the night were advised to the study participants.

Laboratory Investigations: A baseline investigation protocol was followed before starting the study, the following investigations were performed at the beginning of the study:

Blood Biochemistry: Hemoglobin A1c (hbA1c) were assed at baseline, 3 months and 6 months of study period

End points

Primary endpoints: To evaluate the efficacy of metformin montherapy in patients with newly diagnosed type 2 diabetes mellitusby assessing the hba1c percentage reduction as a single diagnostic tool

Secondary endpoints: To evaluate the tolerability of metformin in type 2 diabetes mellitus.

Findings:

Effect of Metformin on HBA1C: HBA1C baseline value expressed as Mean±SD was 7.966±0.85 %. After 3 months of metformin therapy, HBA1C mean obtained was 7.53±0.83 %. After 6 months of metformin therapy, HBA1C improved to 6.8±0.93. Treatment with Metformin showed effective reduction in HBA1C values comparatively between HBA1C baseline values and HBA1C values at sixth month were statistically significant (P<0.05).

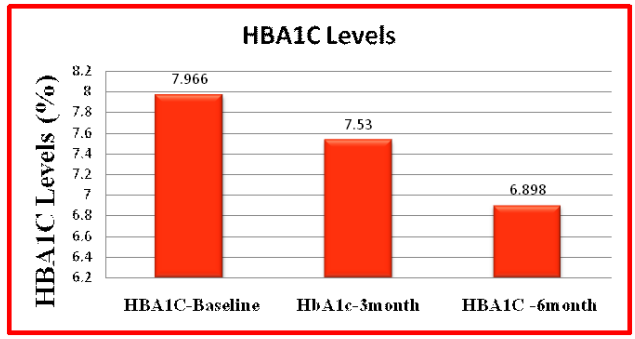


Figure 1: Comparison of HBA1C levels during study period

S.No	Parameter	N	Metformin (n=50)	
			Baseline (1month)	End of the Study(6month)
1	HBA1C	50	7.966 ± 0.85	6.898 ± 0.94 *

Values Expressed in Mean ± STD. Deviation, * Represents P<0.05.

Discussion

Metformin brings down glucose and, subsequently, lessens indications of hyperglycaemia. It has a decent security profile, even among patients with disabled renal capacity, is generally very much endured. While recognizing that metformin has pleiotropic impacts, in the event that it was demonstrated to be viable in numerous preliminaries, the close direct connection between HbA1c decrease rate and danger of cardiovascular ailment and demise, and the to some degree self-assertive analytic limit for diabetes, may likewise fortify the notoriety of metformin for treating diabetes.

Conclusion

Fresher operators that could possibly be utilized right off the bat throughout the infection are presently accessible, and are sponsored by information from later thorough cardiovascular endpoint preliminaries. Maybe regardless of, as opposed to in light of, the proof, metformin monotherapy is probably going to remain the primary line treatment for the hyperglycaemia related with sort 2 diabetes for a long time to come and subsequently our present examination infers that metformin monotherapy is profoundly helpful in averting the frequency of macrovascular intricacies by accomplishing the glycemic control by following the hba1c inside objective control.

Ethical Clearance: No ethical clearance was necessary for this research work

Source of Funding: Self funded project

Conflict of Interest: Nil

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Prevalence of ESBL Producing Escherichia Coli in Urine Samples in a Tertiary Care Hospital

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Abstract

The assessment was driven at Sree Balaji Medical College and Hospital, Chrompet, Chennai, Central Laboratory Department of Microbiology for a period of one year from August 2017 to August 2018. An entirety of 3580 pee tests were obtained in the Central Lab during the examination timespan and tests were read for the pace of Escherichia coli and its antimicrobial inadequacy structure. Of the 3580 urine samples obtained, the bulk of the samples were taken. from inpatient departments (2800) while 780 samples were from outpatient. 150 random Escherichia coli samples isolated from urine were tested further for ESBL and antibiotic sensitivity pattern.

Keywords: *E.coli,Male Female.*

Table 1: Male: Female ratio among E.coli (n=150)

S.No	Male/Female	Number of isolates (%)
01	Female	106 (70%)
02	Male	44 (30%)

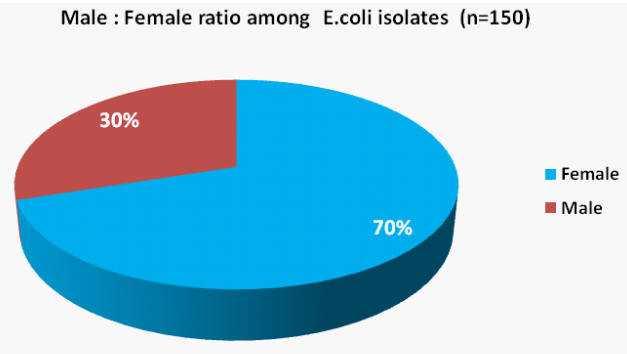
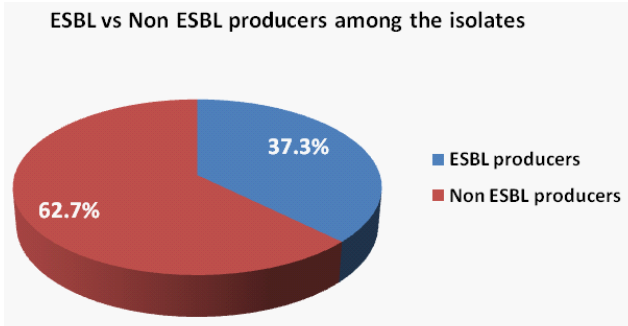


Table 2: Age wise distribution of E.coli (n=150)

S.No	Age Group (Years)	Number of Isolates (n=150)	Percentage (%)
01	0-20 years	18	12%
02	21-40 years	53	35%
03	41-60 years	44	29%
04	More than 60 years	35	24%
		150	**100 %**

Table 3: ESBL vs Non ESBL producers among the isolates (n-150)

	ESBL producers	56
02.	Non ESBL producers	94
	Total	150



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Table 4: Antibiotic Susceptiblity plan among ESBL creators and Non ESBL producers

Antibiotic	Disc Concentration (µcg)	ESBL + (n=56)			ESBL-(n=94)		
		R	I	S	R	I	S
Ampicillin	10 mcg	50	0	6	84	4	6
Amoxicillin clavulanic acid	20/10 mcg	48	2	6	76	3	15
Cefazolin	30 mcg	40	8	8	57	7	30
Ceftazidime	30 mcg	50	3	3	45	14	35
Ceftriaxone	30 mcg	52	0	4	55	15	24
Gentamycin	10 mcg	29	7	20	40	15	39
Ciprofloxacin	05 mcg	39	7	10	54	10	30
Cotrimoxazole	1.25/23.75 mcg	16	2	38	30	5	59
Amikacin	30 mcg	30	9	15	40	25	29
Meropenem	10 mcg	5	0	51	6	3	85
Imipenem	10 mcg	8	4	44	5	3	86
Piperacillin tazobactam	100/10 mcg	14	6	36	10	6	78
Nitrofurantoin	300 mcg	32	4	20	28	21	45

Table 5: Antibiotic resistance percentage of ESBL producing Uropathogenic E.coli

Antibiotic	ESBL Producer (%)	Non ESBL producer (%)
Ampicillin	89%	90%
Amox-Clav	85%	63%
Cefazolin	74%	60%
Ceftazidime	89%	47%
Ceftriaxone	92%	58%
Gentamycin	51%	42%
Ciprofloxacin	69%	57%
Cotrimoxazole	28%	31%
Amikacin	53%	42%
Meropenem	8%	6%
Imipenam	14%	5%
PipercillinTazobactam	7%	10%
Nitrofurantoin	57%	29%

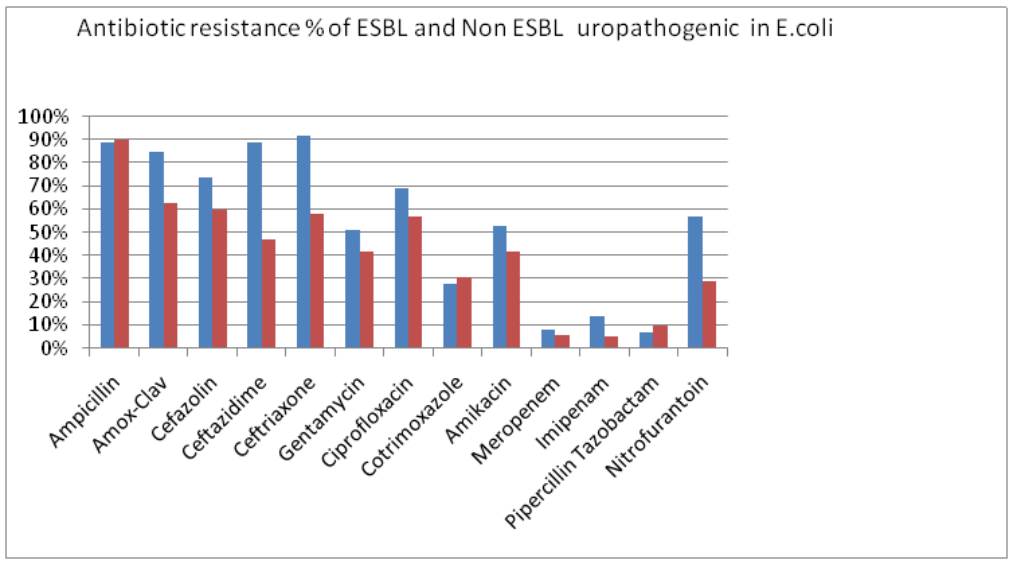


Table 6: Comparison of counteractive action events of Uropathogenic E.coli in various assessments from India and various bits of the world

Author	Country	Year	Ampicillin	Ciprofloxacin	Cotrimoxazole	Nitrofurantoin
Colodner et al[1]	Israel	2001	66	6	26	1
Gupta et al[2]	India	2002	74	38	70	12
Farrell et al[3]	UK	2003	48.7	2.3	-	3.7
Andrade et al[4]	Latin America	2006	53.6	21.6	40.4	6.6
Biswas et al[5]	India	2006	63.6	35.1	40.3	9.3
Garcia at al[6]	Spain	2007	58.7	22.7	33.8	5.7
Akram at al[7]	India	2007	-	69	76	80
Kothari & Sagar[8]	India	2008	85.4	75	64.2	17.9
Niranjan & Malini[9]	India	2014	88.4	75	64.2	17.9
Presentstudy	India	2018	89	69	28	29

Prevalence of ESBL production

In India, event of ESBLs has been recorded since the 1990s[1-8]. The Phenotypic substantiating test and the E test revealed that 56 detaches (37.3 percent) of 150 breaking points from E. coli were viewed as ESBL creators and 94 pulls back were non-ESBL producers (62.7 percent). A latest research in Chennai revealed that ESBL age among E. coli was 47% in tertiary thought workplaces[20]. Various nations, in assessment with India, have exhibited a lessened pace of ESBL creators. Studies have shown that the pace of E. coli-generation ESBL is 13.3 percent in Lebanon, 9.2 percent in Korea, 10.3 percent in Saudi Arabia and 17 percent in Turkey[21]. Notwithstanding, there is a steady rising in the measure of occupants in strain-generation ESBL in the social requesting of various nations [22-25]

The move in strains made by ESBL could be ascribed to the usage of cures with no past control or affectability tests, got together with misery and mass nonappearance of planning. This has achieved askew dosing, a nonattendance of completing of the proposed course and the utilization of additional cures [26]. An evaluation attempted in Mangalore by [27] exhibited a rehash of 70% ESBL among E. coli pulls back.

S.No	Country/State	E.coli ESBL (%)	Reference
1.	USA	2.2%	Sumeeta et al 2002 [28]
2.	Canada	2.7%	Sumeeta et al 2002[28]
3.	Norway	60%	Sumeeta et al 2002 [28]
4.	Europe	5.3%	Calbo et al 2006 [29]
5.	Pakistan	51%	Mumtaz, 2006 [30]
6.	India	70%	Singhal et al [31]
7.	Manipal	35%	Shoba et al,2007 [32]
8.	Mangalore	70%	Beena Antony etal,2010 [27]
9.	Nagpur	34%	Tankiwale et al, 2004 [33]
10.	Kerala	62.3%	Sashikala et al,2010 [34]
11.	Tamil Nadu	41%	Baby Padmini and Appalaraju, 2004[35]
12.	Present Study	37.3%	

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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Affectability of USG Guided FNAC of Axillary LYMPH Nodes in Breast Cancer Patients with Clinically Node Negative Axilla

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Abstract

This is a prospective study undertaken at Sree Balaji Medical College and Hospital between August 2016 and August 2018 to evaluate the sensitivity of USG-guided axillary node FNAC in breast cancer females. 40 patients with biopsy have been shown to have breast cancer but clinically adverse axilla. Sensitivity and specificity were calculated by comparing the FNAC report to the postoperative histopathological report.

In this study US-FNAC showed the accuracy of 90.9% .USG of axilla in correlation with US-FNAC showed the sensitivity, specificity, PPV and NPV of 97.77%, 25%, 92.01%, and 50% respectively.

Keywords: *Lymph Nodes, Axilla.*

Introduction

Chest infirmity is the most overpowering explanation for dangerous improvement related going among females. As the size of essential chest sullying rises, explicit danger cells are discharged into the cell spaces and experienced the lymphatic structure. These perilous cells may then extension through the instance of the lymph center point and join to the depicting structures of the axilla, including the chest divider. Axillary lymph center point get-togethers are routinely progressively associated with from the most unassuming (level I) to the basic (level II) to the apical (level III) lymph center point parties[1-3]. Around 95 percent of all females who pass on from chest clever have remote metastatic malady and is commonly the most key sullying free acknowledgment factor and all around affirmation was the axillary lymph center status. The females with negative nodal ailment had less a 30% danger of rehash, separated and as high as a 75% threat for women with positive nodal sullying[4]. The status of the axillary lymph center metastasis, regardless of being the most principal prognostic gadget in this social event of patients, has a key spot in the relationship of this undermining progress.

Sree Balaji Medical college is located in Chrompet, one of the socioeconomically backward areas of Chennai, Tamil Nadu. Breast malignancies are considered a major problem in Western countries, and are the leading cancer in the female population. In India, this has been our major problem,as it has overtaken even cancer of the cervix. All breast malignancies with clinically negative axilla,seen during the period from August 2016 to August 2018, were taken up for study. The study was taken up to assess the sensitivity of ultrasound guided FNAC of axillary nodes in detecting metastasis, the presence or absence of which dramatically changes the prognosis of the patient.

Materials and Method

This study (prospective type) was performed in 40 female patients who had a clinically node-negative axilla tested breast cancer biopsy submitted to the OPD or IPD of our General Surgery Department during the period from August 2016 to August 2018. All these patients underwent surgery (altered radical mastectomy). The establishment's ethics driving get-together of trustees was comprehended and patients went into the evaluation show up after their informed consent structure had been

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settled upon. The patients encountered a blue clinical evaluation and standard hematological appraisals. A proforma was made,and all the participants were asked to fill the proforma. Ultrasound guided FNAC was performed by the pathologists, and this report was compared to the post operative histopathological report[5,6].

Inclusion Criteria:

- All females above the age of 40 years diagnosed with breast carcinoma
- Any T stage of malignancy, with N 0 and M 0

Exclusion Criteria:

- Males
- Females below the age of 40 years
- Patients with palpable axillary nodes

Ultrasound Guided FNA procedure: In the Supine position, fine needle aspiration guided ultrasound was performed with a 22G needle which was attached to a 10 ml syringe. Smears were then prepared from the aspirated material and air-dried.

Cytology findings were reported to be satisfactory for assessment, categorized as: adverse for metastases; positive for metastases; or inadequate for definitive reporting. In the wake of looking check center centers, axilla evaluation was done close to medicinal viewpoint for the focal tumor. The nodes dissected from the axilla were then subjected to pathological and histological examination of the metastatic deposits. Following the correlation of sonological and pathological results, the precision of this operation was calculated.

Findings:

Number of true positive =35 (87.5%)

No of False Positive =3 (7.5%)

Number of true negative =1 (2.5%)

No of False Negative =1 (2.5%)

Statistics: In solid end, “affectability” is the most far away motivation driving the test to suitably watch those with the torment (real flawless rate), while “expressness” is the cutoff of the test to sensibly watch those without the dirtying (veritable negative rate).

Positive and negative sensible characteristics (PPV and NPV) are the degrees of positive and negative results in bits of data and unequivocal tests, which are real positive and veritable negative results, self-governingly[7]. PPV and NPV delineate the credibility of an obvious test or other genuine estimation.

Using statistical equations and the final diagnoses from histopathological examination, the following statistics were generated for the study:

Sensitivity of the study = 35/(35+1) x 100 = 97.77%

Specificity of the study = 1/(1+3)x100= 25%

Positive predictive value (PPV) of the study = 35/(35+3)x100=92.01%

Negative predictive value (NPV) of the study = 1/(1+1)x100=50%

Diagnostic accuracy of the study = (35+1)/(35+1+3+1)x100=90%

Discussion

The closeness structures of the lymphatic methodology of the mammary organ has been looked into for a few different years. The head wide delineation was given by Haagensen1. At the fulfillment of the eighteenth century, Cruikshank and Mascagni depicted two principal lymphatic courses: the nternal and inside plan. In 1830, Sappey found that all chest tissue had a centripetal discharge into the subareolar plexus2. Assessment of the twentieth century by then solidified extra ways. Camper was the first to delineate lymphatic spillage to lymph centers along the internal mammary vessels in 1770. Autoradiographic system with isotopes in twentieth century included helpful information. One outlined by Grossman and Rotter called the interpectoral center obsessions and the unmistakable center individual and paramedian centers wereseen by Cruikshank3. Gerota and Turner-Warwick passed on that the ipsilateralinternal mammary nodes receive more than 75% of lymph drainage from the breast[4].Mornard first described the occasional direct drainage from breast parenchyma tosupraclavicular nodes[5]. Retro-sternal lymphatic drainage to contra lateral internal mammary chain of lymph nodes occurs sporadically.

There are 5 sets of axillary nodes draining the breast:

1. Anterior group (Pectoral group): these are situated along the lateral thoracic vein under the anterior axillary fold mainly in the 3rd rib. From here the lymph drains primarily into the central group.

2. Posterior group (Subscapular group): these lie along the posterior axillary fold in relation to the subscapular vessels. Lymph drains from here mainly into central and supraclavicular nodes.
3. Lateral group (Axillary vein group): they lie along the upper part of humerous in relation to axillary vein.
4. Central group: These are situated in the fat of the upper part of the axilla. Lymph drains from here into the supraclavicular nodes. This nodal group is often palpable in metastatic disease.
5. Apical group (Subclavicular group): They are constant in position bounded below by 1st intercostal space, behind by the axillary vein and in front by the costocorocoid membrane.

These sets of lymph nodes and the area of breast from where they receive the lymph is of paramount importance, since it is now proved that the first lymph node to get involved in breast cancers are these nodes and this is known as sentinel node, it being the most important factor deciding the stage, likelihood of recurrence and response to treatment.

Sentinel Lymph Node Biopsy: Current research is directed towards the sentinel node. Forward and in turn around progress research is stimulated towards the sentinel center. A cognizance get-together at work of sentinel center point biopsy in chest carcinoma was held in 2001 at Philadelphia, Pennsylvania from April nineteenth to 22nd. Current isotope structures using radiopharmaceutical, technetium sulfur colloid or then again egg whites and isosulfane blue stowing endlessly or patent blue veiling, are prompt being reliably used to see the sentinel centers. These can be managed by systems for various courses checking peritumoral, intratumoral and subcutaneous, intradermal and subareolar implantations. Most clear experience has been with peritumoral mix to discover

Lymphatics: Axillary center spotlights are in like manner dispensed subject to their relationship with level and customary edges of pectoralis minor muscle. There are three remarkable levels:

Level I: Nodes parallel to level edge of pectoralis minor

Level II: Nodes among ordinary and parallel edges of pectoralis minor, checking interpectoral centers.

Level III: Nodes customary to average edge of pectoralis minor, including apical moreover, supraclavicular centers.

Lymphatics of overlying skin: Lymphatics of overlying skin: They go an expansive course and in checking centers. Those from outside side go to the axillary center obsessions and those structure upper part channel into the supraclavicular center focus interests. Auchincloss changed radical mastectomy is the helpful method all things considered got all through the world. This has begun to be emptied by Breast Conservation Therapy (BCT) containing wide neighborhood extraction of tumors (segmental mastectomy), axillary lymph center dismantling, trailed by post usable radiation to the remainder of the tissue in the included chest. The National Attentive Adjuvant Breast Project (NSABP) B 06 starter began in 1976 found no separate in the consistency results between patients who experienced BCT and MRM6. Less observable systems to the affiliation and organizing of axilla are in like manner grabbing more thought.

The ability of ultrasonogram to detect more suspicious lymph nodes increased with increasing tumour size. In conclusion, only those patients who showed benign or indeterminate features of lymph nodes on ultrasound and had negative US-FNAC of suspicious lymph node will require SLNB as the staging procedure.

Rest of the patients who show definite features of lymph node involvement on ultrasound and positive US-FNAC may undergo ALND directly as a part of primary breast surgery, thus saving time and expense and also avoiding the morbidities associated with SLNB[7].

Ultrasound guided axillary center point throbbing has a high pace of trademark exactness and could change into an obliging mechanical social gathering for the evaluation of axillary metastasis in early chest torment in low resource settings. Unequivocally when center centers are not seen using all frameworks, by then the chances of metastasis are irrelevant. Higher getting together with the structure may help ruin the pace of dissatisfaction. Openness of Intra-employable ultrasound for assessment of lymph centers may show to be a valuable gadget for testing of suspicious center focus interests.

Conclusion

Convincingly, using axillary ultrasound and express US-FNAC is a splendid, non-terrible structure for planning the axilla in beginning late inquired about chest ghastly improvement patients and may particularly change into a standard bit of patient thought as it can spare various patients a purposeless procedure, particularly the people who are encountering axillary evaluational.

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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Assessment of the Complication and Radiological Outcome of Proximal Femoral Nailing in Unstable Trochanteric Fractures

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Abstract

The demographics of world population are changing. More of the elderly people are living in the developing countries. Presently about three-fifths of the hip fracture occur in Asia which, it is predicted that will become almost one-half by the year 2050. Inter-trochanteric fractures are one of the most common fractures of the hip occurring both in the young adults, as a result of high energy trauma and in the elderly, as a result of low energy trauma due to osteoporosis. Problems with these fractures are: (a) they are associated with significant morbidity and mortality; (b) malunion is prevalent; (c) implant failure such as head cuts and hip penetration is a complication; (d) they are a major economic burden on the family; and (e) they are most frequently linked with medical comorbidities such as diabetes and hypertension. The objective of this research is to evaluate the complications and radiological outcome of proximal femoral nailing in patients who have sustained an unstable trochanteric fracture.

Keywords: *Proximal, Femoral, Nailing, Orthopaedics, Fractures, Trochanteric failure.*

Introduction

Both male and female patients aged 46 to 65 years with an unstable trochanteric fracture (AO-OTA 2.2, 2.3, 3.1, 3.2 and 3.3) were included in the studies. Patients with displaced trochanteric fractures, open and pathological fractures, have been excluded. Patients have been tracked for a minimum period of 7 months (mean 12.6; range 7 to 19 months). Cases were investigated on the basis of injury mechanism, classification and treatment with Proximal femoral nail and assessed using Harris Hip Score for their functional outcomes. In our study which included 42 patients, intra-operatively, we experienced difficulty in achieving anatomical reduction of the fracture (n=1) in 2.38%, difficulty in passing de-rotation screw (n=2) in 4.76%, distraction at the fracture site occurred during nail insertion (n=2) in 4.76%, breakage of the guide wire (n=1) in 2.38% and a varus angulation (n=2) in 4.76%. Post-operative complications included superficial infection (n=1) in 2.38%, deep infection (n=1) in 2.38%, limb shortening (n=2) in 4.76%. Complete radiological union was observed in 90.4%. Lateral slide of the proximal screws occurred (n=1) in 2.38% and varuscollapse (n=1) in 2.38%, 'Z' effect was seen (n=1) in 2.38% and failure of the implant (n=1) in 2.38% .[1-4]

It is essential to differentiate between unstable and stable versions of these fractures in the treatment of trochanteric fractures. With cortical instability on one side of the fracture due to cortical overlap or destruction, the fracture would tend to collapse in the direction of instability. Thus, by definition, a truly stable inter-trochanteric fracture is one that, when lowered, has a cortical contact without a gap in the back and in the middle.

The proximal femoral nail (PFN) launched by the AO/ASIF group in 1998 has become common in the treatment of trochanteric fractures in latest years [7,8.]

Materials and Method

The present study has been a prospective study, involving patients who had sustained unstable inter-trochanteric fractures. The study began in March 2017

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and went on till February 2018 (a total recruitment period of 12 months). The study concluded in September 2018, so that there was a minimum follow-up of 7 months (mean 12.6; range 7 to 19 months).[9-12]

Inclusion Criteria:

- Only unstable trochanteric fractures were included (AO-OTA 2.2, 2.3, 3.1, 3.2 and 3.3).
- Only fractures seen within 15 days of injury were included.
- Both male and female patients, in the age group of 46 to 65 years were included in the study.

Exclusion Criteria:

- Patients with displaced trochanteric fracture not conforming to the above parameters were excluded.
- Open and pathological fractures were excluded.
- Inability to walk independently, prior to fracture due to pre-existing stroke or CVA were excluded.

Follow Up Period: Minimum period of 7 months (mean 12.6; range 7 to 19 months).Cases were investigated on the basis of injury mechanism, classification and treatment with Proximal femoral nail along with complications and radiological outcome.[13-16]

Pre-Operative Protocol: All the routine investigations were done as follows,

- CBC.
- Blood sugar and urine routine with sugar and acetone check.
- Serum urea, creatinine.
- Bleeding time and clotting time.
- Serum electrolytes.
- Blood grouping and Rh typing.
- HIV ELISA and HbsAg.
- Chest X-ray PA view and ECG in all leads in deep inspiration.
- Echo-cardiogram and cardiologist opinion in warranted cases was sought.

Surgical Technique:

Positioning: The patient is positioned supine on the traction table. The ipsi-lateral arm was placed in an arm sling. The trunk was angled 15 degrees towards the unaffected side. The unaffected limb was flexed, abducted and externally rotated for providing enough space for positioning of the image intensifier. The affected lower limb was held in traction and adduction in the foot piece. Reduction was achieved by traction (disengaging the fracture fragments) and internally rotating the limb while maintaining traction and confirming with the image-intensifier view.[17-19]

Approach: A 3 cm incision is made proximal to the tip of greater trochanter slightly bent dorsally. Skin with subcutaneous tissue and deep fascia are incised. Gluteus maximus was split by blunt dissection. The tip of trochanter is then felt with finger

Entry Point: Reduction of the fracture was essential before making the entry point. After confirming the anatomical reduction, entry point is made with a bone awl over the tip of greater trochanter. If the reduction is not anatomical, we manipulated the fragments by percutaneously passing the Steinmann pin in the proximal fragment and temporarily holding the reduction with 'k' wires driven along the anterior cortex such a way that it shall not interfere with the path of nail. After confirming the position in AP and lateral views, the awl was driven just proximal to the level of lesser trochanter.[20-23]

Guide Wire Insertion and Reaming: A 3.2mm guide wire was inserted and driven into the distal fragment. Proximal reaming was done with a 15 mm cannulated awl upto 7 cm distally in order to accommodate the proximal portion of the nail. Distal reaming was done with an increment of 1 mm more than the predicted diameter of the nail planned to be used.[24-26]

Post-Operative Protocol:

- Parenteral third generation cephalosporin and aminoglycosides were given for 72 hours. Oral antibiotics started from POD 4 (Linezolid with Dalacin C) and continued till suture removal.
- Parenteral NSAIDS given for the first two days and changed to oral there-after.
- Drain was removed on POD 2.
- Static and dynamic quadriceps exercises from POD 2 were initiated.

Follow-Up:

- Patients were evaluated clinically and radiologically bi-weekly for the first 2 months and then, once monthly there-after until signs of radiological and clinical union appear.

- Clinical union was assessed as being absence of pain and tenderness upon full weight-bearing.[27-28]

Clinical Assessment Included the Folowing Parameters: 1. Gait, 2. Pain, 3. Deformity, 4. Shortening, 5. Range of movements,6. Ability to sit cross-legged, 7. Ability to squat, 8. Be able to return to pre-injury occupational status.

Radiological Assessment Included: 1. Signs of union, 2. Varus collapse, 3. Amount of lateral slide, 4. Screw cut-out, 5. 'Z' effect, 6. Implant failure and loss of fixation.

Table 1: Sex Distribution

Sex	No. of Patients 'n'	% age
Male	16	38.10
Female	26	61.90
Total	42	100

Table 2: Fracture Pattern Distribution

AO Classification	No. of Patients 'n'	% age
Type A2.2	7	16.66
Type A2.3	14	33.33
Type A3.1	16	38.01
Type A3.2	-	-
Type A3.3	5	12.00
TOTAL	42	100

Table 3: Intra-Operating Time: (Incision to Closure)

Operating Time (in min)	No. of Patients 'n'	% age
< 45	16	33.33
45–60	7	16.66
61–75	9	21.42
76–90	10	23.80
Total	42	100

Table 4: Intra-Operative Complications

Nature of complication	No. of Patients 'n'	% age
Fracture displacement upon nail insertion	2	4.76
Failure to get anatomical reduction	1	2.38
Difficulty to engage a de-rotation screw	2	4.76
Breakage of guide wire	1	2.38
Breakage of drill bit	0	0.00
Varus angulation	2	4.76
Total	**8**	**19.04**

Table 5: Post-Operative Complications & Radiological Outcome

S. No.	Nature of complication	No of Patients 'n'	% age
1.	Shortening	2	4.76
2.	Superficial infection	1	2.38
3.	Deep infection	1	2.38
4.	Varus collapse	1	2.38
5.	Lateral slide of proximal screws	1	2.38
6.	Non-union	0	0.00
7.	'Z' effect	1	2.38
8.	Implant failure	1	2.38
9.	Mortality	0	0.00
	Total	8	19.04

As per our inclusion criteria, 42 patients were recruited for surgical fixation of unstable trochanteric fractures. Of these 42 patients, approximately 28% of the patients were of the age group of 46 to 50 years, 26% of the patients were between 51 to 55 years, 26% were between 56 to 60 years and 19% were between the age of 61 to 65 years. We had a total of 38.10% (n=16) male and 61.90% (n=26)female patients, with a male to female ratio of 2 : 3.2, thus indicating a female preponderance.[23-25]

Among the 42 cases treated surgically, 49.99 % were of A2 type and 50.01 % were of the A3 type. Thus in our series, the fracture pattern distribution was found to be equal. The average operating time was 58 minutes (range 45 to 90 minutes).Intraoperatively, we experienced difficulty in achieving anatomical reduction of the fracture in one patient, difficulty in passing de-rotation screw in two patients, distraction at the fracture site occurred during nail insertion in two patients, breakage of the guide wire in one patient and a varus angulation in two patients.

Discussion

Successful treatment of inter-trochanteric fractures relies on many factors10; the age of the patient, the overall health of the patient, the time elapsed from trauma to therapy, the concomitant medical procedure and the stability of fixation11. The suitable technique and perfect implant used for these fractures are still being discussed with the advocates of the different method, each claiming their benefits over the others. Many inner fixing systems, including extra-medullar and intra-medullar implants, have been suggested for the therapy of these fractures.[33]

The dynamic hip screw stayed the preferred implant for more than four centuries due to its favourable outcomes and a comparatively small rate of non-union and failure. It ensures controlled compression at the fracture site. The use of DHS was backed by their biomechanical characteristics, which were assumed to enhance the healing of fractures12. However, DHS needs comparatively higher exposure, more tissue handling and near anatomical decrease, all of which increase morbidity, the likelihood of infection and a substantial loss of blood. The chance of a varus collapsing and the failure of the implant to survive until the fracture union was its primary drawbacks.[26-29]

The side-plate and the screws mechanically weaken the bone. The prevalent causes of this fixing failure were unstable trochanteric fractures, osteoporosis, absence of anatomical decrease, failure of the fixing device and inaccurate positioning of the lag screw in the femoral head [13,14].

Conclusion

With the demographics of the world population changing, more and more elderly persons are sustaining osteoporotic fractures. Among them, displaced and unstable trochanteric fractures are in significant numbers. The development of implant designs to address these unstable fractures of the proximal femur, have got refined. This has significantly improved the surgical outcomes in managing these problematic fractures. The proximal femoral nail, which was the implant used in this study, has established its distinct superiority in the instances of surgically managing displaced and unstable trochanteric fractures. Its unique advantages are that it is amenable to closed reduction which preserves the fracture hematoma. There's less of a surgical insult. It allows early rehabilitation and early return to pre-injury activity status. We hereby conclude that PFN osteosynthesis used in unstable trochanteric fractures provides outstanding stability, fewer mechanical problems and satisfactory functional outcomes. It is therefore an optimal implant for the surgical management of unstable inter-trochanteric fractures.[30-32]

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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Recent Trend in Rise of Caesarean Section in Multigravida and Primigravida

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Abstract

There is a trend towards an rise in the rate of the Caesarian section globally. With enhanced safety following the advent of contemporary anaesthesia, blood transfusion equipment and greater antibiotics, the signs for the cesarean section are liberalized to include dystocia, placenta previa, fetal distress, BOH, and others.

Keywords: *Multigravida, Primigravida.*

Introduction

Caesarian section is regarded a safer alternative to extended and hard vaginal surgery to decrease maternal and perinatal morbidity and mortality[1-8]. With the advent of contemporary technology in the workplace, such as cardiotopography, color doppler, biophysical profile, the rate of cesarean section has increased further with countless other medical societies.

Other accountable considerations for the increase in the frequency of cesarean section in the multipara are the identification of high-risk pregnancies with enhanced antennatal care and antipartum fetal surveillance method[9-13], enhanced rates of elective induction of labor, decreased operative vaginal delivery and vaginal delivery, enhanced number of pregnant females after 30 years with related medical com.[6]

Materials and Method

In this study 58 cases of primary caesarean inmultigravida done over a period of two Years i.e. from August 2016 to April 2018 at the obstetric department of Sree Balaji Medical College and Hospital, Chennai-44 were taken.

Inclusion Criteria:

1. Multigravida with pregnancy of >28 weeks gestation (gravida 2 and above), with previous one or more vaginal deliveries.
2. Multiple pregnancy
3. Pregnancy with medical disorders.
4. Previous instrumental, assisted breech deliveries, still births and IUD.

Exclusion Criteria:

1. Previous one or more caesarean.
2. Previous h/o hysterotomy

Observation and Results:

Table 1: Incidence of Caesarean Section

	No of Cases	Percentage
Total Number of Primary C.S in Multigravida	58	3.10
Total Number of C.S. in Primi	995	53.56
Total No of Repeat C.S.	805	43.34

During this era, 5,161 shipments were made to approximately 1,857 Caesarean segments, representing 36% of all deliveries. The incidence of main caesarean in parous females is 1.12 per cent of all deliveries and 3.10 of all segments.

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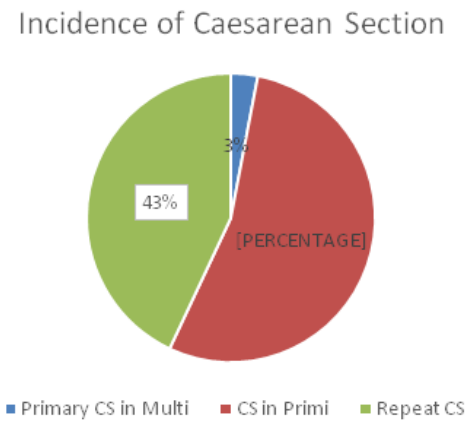


Figure 1: Incidence of caesarean section

Table: 2 Distribution of Cases According to Age in Multigravida and Primigravida

Age Interval	No of Cases in Multigravida	Percentage	No of Cases in Primipara	Percentage
<20 Yrs	5	8.2	139	13.97
21-25 Yrs	15	25.87	348	34.98
26-30 Yrs	21	36.21	294	29.55
31-35 Yrs	12	20.68	179	17.98
36-40 Yrs	5	8.62	35	3.52

Findings: Maximum number of women undergoing primary caesarean section in multigravida were in the group of 26-30 yrs with incidence of 36.21% and lowest were in the group of <20 yrs and 36 to 40 yrs and in primigravida it is 21 to 25 yrs age group with incidence of 34.98%.

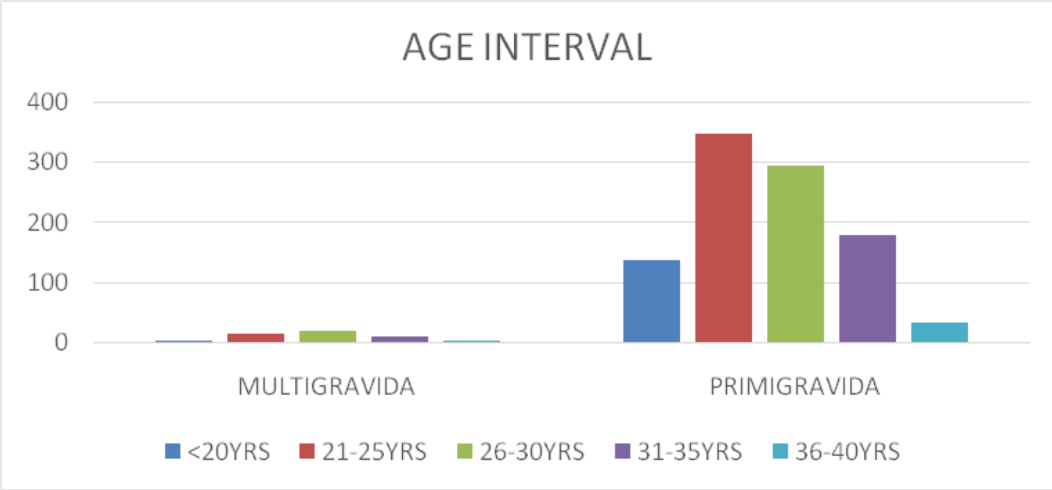


Figure 2: Distribution of cases according to age in multigravida and primigravida

Table 3: Gravida And Frequency of Caesarean Section

Gravida	No of Cases	Percentage
I.	24	41.3
II.	20	34.2
III.	9	16.5
IV.	3	5
V.	2	3

In this study majority of patients belonged to gravida-2 with incidence of 34.2%. There were 2 grand multigravida in the present study, incidence is 3%.

TABLE 4: Indications of Caesarean Section In Multigravida And Primigravida

SL.NO	Indication	No of Cases In Multigravida	Percentage	No of Cases In Primi	Percentage	P Valve (One Side Test)
1	Fetal Indications					
	a. Fetal distress	16	27.6	170	17	<0.05
	b. Malpresentation	10	17.2	92	9.2	<0.05
	c. Cord prolapse	-	-	-	-	
	d. Macrosomia	-	-	40	4	
2	Obstetric Indications					
	a. Antepartum haemorrage	7	12.1	79	8	>0.05
	i. Placenta previa	4	7	19	2	<0.05
	ii. Abruptio placenta	3	5.1	60	6	>0.05
	b. CPD	9	15.6	358	36	>0.05
	c. Labour disorders	5	8.6	178	18	>0.05
3	Maternal Indications					
	a. Medical Disorders	7	12.1	55	5.5	<0.05
	i. Hypertensive disorders	5	8.6	35	3.5	<0.05
	ii. Heart disease	1	1.7	6	0.6	>0.05
	iii. renal causes	-	-	-	-	
	iv. Infections to the mother (HIV, HPV, HSV.	1	1.7	14	1.4	>0.05
	b. Maternal request	-	-	12	1.2	
	c. Previous VVF repair/iv degree perineal laceration	-	-	-	-	
	d. Neoplasm	2	3.4	8	0.8	<0.05
	e. Previous uterine surgery	2	3.4	3	0.3	<0.001

On comparing the indications of caesarean section in multi and primigravida table), the most common was fetal distress accounting for 27.6% cases in multi, 17% in primi (p value <0.05) and second common was malpresentation with 17.2% in multi and 9.2% in primi (p value<0.05). CPD in patients in 15.6% multi and 36% in primi(p value>0.05). Antepartum haemorrage accounting for 12.1% in multi and 8% in primi (p value>0.05) although not significant. Placenta previa was 7% in multi and 2% in primi with significant p value <0.05. labour disorders accounting for 8.6% in multi with no significant difference between multi and primi. In multi medical disorders are common than primi leading to hypertensive disorders as a significant indication for primary caesarean section 8.6% in multi and 3.5% in primi.

Discussion

The changing trends in caesarean deliveries There has been a steady increase in the rates of CS in both developed and developing countries. The reasons for the increased caesarean are multifaceted.Commonly cited causes are Increased institutional deliveries • Avoiding difficult manipulative or instrumental vaginal deliveries. • Foetal distress detected especially with the use continuous electronic foetal monitoring • Liberal use of caesarean in high risk cases like Breech presentation, previous caesarean delivery, growth retarded foetus, multiple pregnancy, preterm baby. • Improved safety of C-section with better surgical techniques, anaesthesia, better availability of blood and its products, advanced antibiotics. • Fear of the patient for labour pain. • Busy schedule of the obstetrician specially those working in private sector and also an apprehension of the obstetrician

regarding the fear of poor neonatal outcome. • Increased incidence of IVF and other high risk pregnancies.

Table 5: Incidence of Total Caesarean Section

Authour	Totalcaesarean Section Percentage
Present study	36
Shanti sri (2013)	38.5
Sherinsams(2014)	33.5
Sharmila (2015)	29.3
Himabindu (2015)	40.55

The incidence of total caesarean section is 36% and it is proportional compared to the rise in other studies.

Table 6: Incidence of Primary Caesarean in Multigravida

Author	Percentage (%)	P Value
Present study (n=58)	1.12	
Rao,Jyothi (n=200)	10.28	0.0253
Sherinsams(n=211)	2.59	0.5059
J.K.Saluja (n=50)	3.82	0.4268
P.Himabindu (n=186)	2.80	0.3577
Sharmila (n=196)	3.00	0.4655
G.Parthasarathy (n=436)	1.73	0.7325

Incidence of total caesarean section in this present study is 1.12 among all deliveries. The incidence is correlating with other studies except Rao, Jyothi the incidence is higher 10.28 and is significant.

More over increase in incidence of primary caesarean in primigravida in the recent years can be attributed to greater incidence of repeat caesarean. In a uterus with previous scar there is always a risk to the mother and fetus and also risk of uterine scar rupture, which will increase maternal and fetal morbidity.

Conclusion

The greatest emphasis on fetal welfare in today's tiny family norm has altered shipping method in favor of the C-Section. There is no empirical evidence of an optimum proportion. What is most important is that all females in need of caesarean sections receive them (WHO Statement 2010). A safe decrease in the frequency of main caesarean deliveries will involve distinct method for each indication. Customization of the indication and thorough assessment, following standardized rules, the practice of evidence-based obstetrics and audits at the organization, can assist us reduce CSR.

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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Suicidal Behavior in Adolescents: A Tertiary Hospital Based Study

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Abstract

In adolescent it is the second most common mode of death after accident. Suicide is now the second most cause of death in young adults ranging 15-35 year world over. There has been a dramatic rise in suicide in last 40 years. Every 2 hours a youth commit suicide. (1)However, in spite of the dramatic rise, suicide is still unrecognized & under reported due to stigma attached to it. There has been a dramatic rise in adolescent suicide & it not only affects individuals but also has devastating effect on family friends & community as a whole. Suicide attempts occur 30-100 times more frequently than completed suicide.

Keywords: *Suicide, adolescents, Dramatic rise.*

Introduction

Suicidal behavior in adolescent is dissimilar to that of adult population. Girls attempt three times more than boys.

Causes of adolescent can be :

Biological

Psychosocial

Emotional

Intellectual

Substance abuse.

Biology: In biological causes depression, physical illness and psychological changes due to puberty.

Psychosocial: Psychosocial changes includes-Isolation, Withdrawn behavior, Lack of social skills,Lack of social integration, Peer problems, Unpopularity.

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Emotional: Emotional causes includes-Sadness of mood, Lack of self esteem, Feeling helplessness/ hopelessness/worthlessness. Impulsivity, Anger, Identity crisis, Loneliness, Anxiety.

Intellectual Causes: Intellectual causes are those who are shy, who has pressure to achieve, self criticism, inability to communicate feelings and those who see a lot of fault in themselves and in others.

Substance Abuse: The most important cause to contribute to impulsivity in adolescent is substance use. Adolescent tend to use substance of abuse when they are neglected, when there is a loss and when the family is not supportive [(2).]

One has to look out for the danger in adolescent suicide. It includes-

Depression, Abuse of substance, Negativity, Giving away positions, Estrangement[(3,4)], Rebellious nature.

Four personality characteristics among adolescent suiciders:

- Irritable and over sensitive to criticism.
- Impulsive and volatile,
- Withdrawn and Uncommunicative and perfectionist and
- Self-critical

Aims: To find out the suicidal behavior in adolescent

Methodology:

- The study was conducted at the outpatient department of Psychiatry at Sree Balaji Medical College and Hospital, Chennai-44.
- Includes 30 adolescent (13-18 years)
- Patient who comes to SBMCH psychiatry opd
- Scales used-GHQ, HAM-D, Beck's suicidal intent scale.

Findings: Out of the 30 adolescents, 1 had history of deliberate self harm in the past. The frequency of deliberate self harm in present is more. 11 out of 30 patients who reports to psychiatry opd.

Deliberate self harm past:

1 (3.3%)

Deliberate self harm present:

11 (36.7%)

Prevalence of depression:

Mild depression	16 (53.3%)
Moderate depression	13 (43.3%)
Severe depression	1 (3.3%)

General health Questionnaire:

15 (50%)	Normal
14 (46.7%)	Evidence of distress
1 (3.3%)	Severe Psychological distress

Conclusion

Deliberate self harm in adolescents as per the study suggest more of an impulsive act rather than a well planned out activity. Mild depression is noted in 53.3% of the study population. With the GHQ of majority normal followed by evidence of distress accounting for 50% and 46.7% respectively.

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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Breast Carcinoma: A Review

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Abstract

Breast malignancy has fast overtaken ovarian malignancy as the leading cause of death in women. A number of factors attribute to the rise in breast cancer,including obesity, food habits and carcinogen exposure.

This article is a review of breast malignancy, and its pathological nature,and highlights the significance of axillary staging as a prognostic factor,and hence the importance of axillary investigation.

Keywords: *Malignancy, prognostic.*

Introduction

Breast cancer is the most common cause of cancer-related deaths among women. As size of primary breast cancer increases, a number of cancer cells are shed into the cellular spaces and these are transported through the lymphatic network. These malignant cells may then proliferate through the lymph node capsule and fix to contiguous structures in the axilla, including the chest wall. Around 95% of all women who die of breast malignancy[1] have distant metastatic disease and traditionally the most important prognostic coefficient of disease-free and overall survival was the axillary lymph node status.

History: Female breast carcinoma was the first tumor reported as far back in historyas the time of the Egyptian civilization. In ancient Greece, Hippocrates, who was one of the fathers of modern medicine[2], advocated surgery as the only treatment option in these patients.

During the time of Celsus, the prototype of radical mastectomy was performed. The metastatic nature of the disease was recognized by LeDran (1685-1790),[3] who advocated the removal of primary and axillary lymph nodes in continuity. Breast cancer is a major issue of all women, regardless of race,socioeconomic status or country of origin. It is one of the top ten killers of adult population in our country. However, this incidence is not the same in all populations. Thus in 1982, the incidence in Madras was 15.8% while at Manipurwas only 7.2%. The same is true in western countries as well. It is not only the occurrence that varies,but also the prognosis. For example though the incidence ofbreast cancer in African-American women is lower than in Caucasian women[4] is, they have a higher mortality from breast cancer, and are less likely to survive 5 years after diagnosis.

A number of factors are attributed to this-like the younger age atdiagnosis, later stage of detection, different incidence of negative tumor receptors and lesser degree of response to treatment in African-American women. The endogenous hormones play a complex role in this respect as well. Surgery has been the main treatment modality for the last 75 years. All patientsare subjected to surgery unless they are unfit due to other reasons. The detailed description of radical mastectomy by Halstead of Baltimore was given in 1894[5]. Varioussurgical procedures have evolved during the ensuing years. Modifications and improvisations have been made by extensive research on various method. Now Auchincloss's Modified Radical Mastectomy and Breast Conservation Surgery have become the mainstay of modern surgical treatment[6]. Hence greatest importance is to be given towards its prevention and early detection.

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Role of Axillary Metastasis and Required Investigations:

Findings: Breast cancer is the most common cause of cancer-related deaths among women. As size of primary breast cancer increases, a number of cancer cells are shed into the cellular spaces and these are transported through the lymphatic network. These malignant cells may then proliferate through the lymph node capsule and fix to contiguous structures in the axilla, including the chest wall. Usually, the axillary lymph node groups are involved sequentially from the lowest (the level I) to the central (the level II) to the apical (the level III)groups of the lymph nodes.

Around 95% of all women who die of breast malignancy have distant metastatic disease and traditionally the most important prognostic coefficient of disease-free and overall survival was the axillary lymph node status. The females with negative nodal disease had less than a 30% risk of recurrence, compared with as high as a 75% risk for women with positive nodal disease[7]. The status of the axillary lymph node metastasis, in addition to being the most important prognostic tool in this group of patients, has a critical place in the management of this cancer. For many many years,the axillary lymph node dissection (ALND) was amethod of choice for the axillary nodal evaluation to stage and treat effectively the metastatic lymph node involvement. However, for the cases that had no node involvement, axillary dissection gave no advantages and it was also sometimes associated with certain significant complications such as lymphoedema, infection of wound, stiffening, weakness of shoulder, numbness and pain of the affected arm. Later, the method of biopsy of sentinel lymph node (SLNB) was developed.

This method has proven to be a valuable tool in determining whether the malignancy has spread from its site of origin and for the staging of the axilla. It has been proven to be a very effective alternative to ALND[9]. Those patients whose SLNB is disease-free require no more treatment and are thus spared from unnecessary surgery for the axilla.

Discussion

Despite the general acceptance of this method in practice, sentinel node biopsy has certain drawbacks; it is a meticulous and slow procedure for surgeons in the theatre, needs the administering of radioisotopes to patients, and requires many microscopic sections for the final pathological examination. Also this method is not freely available in all centres and it is quite expensive. A sonological examination is recommended by the previously done studies in order to find suspicious involved lymph nodes in the axilla. High resolution sonology, which can help to establish the structural features of the axillary lymph nodes and the structural changes which may suggest metastasis, is now being accepted as an important non-invasive method increasingly.

Conclusion

Breast cancer is on the rise,and claims more victims every minute. Axillary metastasis indicates advancement of the disease, and indicates a poorer prognosis than non metastatic disease. Hence,investigations like sonology of the axilla,and sentinel lymph node biopsy play significant roles in predicting the prognosis of the patient as well as guiding surgeons in the appropriate treatment.

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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Risk Factors for Depression among Adolescents in Urban Kancheepuram District Area, Tamil Nadu Objectives

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Abstract

A Community based cross sectional descriptive study done in Anakaputhur, an Urban area of Kancheepuram district, Tamil Nadu. Depression among adolescent age groups has an effect on teen socialization, academic achievement, family relationships. They are at danger of gambling addiction, social media, electronic gadgets, smoking, alcohol, antisocial behaviour, and also psychosocial impairment. Suicide, the third major cause of death among elderly adolescents (Centre for Diseases Control, Atlanta), is the most disastrous result of adolescent depression. In India, more than six kids commit suicide every day due to failure of examinations in 2011.10 Thus, it can be seen that today's adolescents are confronted with multiple types of physical, psychological and social issues.

Keywords: *Depression, Adolescents, electronic gadgets, Depression.*

Introduction

Major depressive disorder is estimated to be the second most vulnerable human disease in 2020.1,2 Globally, most of them are shielded under the Convention on the Rights of the Child. However, their demands and vulnerabilities often stay unnoticed. They lack fundamental facilities on the basis of their particular requirements. National programs concentrate primarily on newborns, under-five, adults but adolescents are not covered by any programs. 3,4 According to the World Health Organization, depressive disorders are the primary mental health disorders of adolescents owing to their elevated incidence and associated complications and other health-related consequences.[5] The incidence of depression among adolescents varies from 15 to 20 per cent with a recurrence rate of approximately 60 to 70 per cent.[6,7] This often results in suicide, college dropout, substance abuse, adolescent pregnancy, overeating and obesity, and in the long run leads to adult depression.[8,9] Mental health problems create socio-economic burdens by contributing to the growth of more disabled people.

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Materials and Method

Study Design: A Community based cross sectional descriptive study done in Anakaputhur, an Urban area of Kancheepuram district, Tamil Nadu.

Study Area: The study was conducted in the Urban Field Practice Region of the Urban Health Training and Center linked to our organization located in Anakaputhur, Kancheepuram, Tamil Nadu District. Kancheepuram is one of the 32 districts of Tamil Nadu. According to the 2011 Indian census, the Kanchipuram county covers an area of 4433 sq.km with a population of 39.98 lakhs, comprising 20.12 male lakhs and 19.8 female lakhs. Kancheepuram, the town of the temple is the headquarters of the district for administrative purposes, the district has been divided into 4 revenue divisions composed of 11 taluks with 1137 revenue villages.

Anakaputhur is a town in the Kancheepuram district of Tamil Nadu. It's split into 18 rooms. The research was performed in Anakaputhur, an urban field practice region of the Department of Community Medicine of

Sree Balaji Medical College and Hospital (SBMCH), situated at a distance of 7 kilometers from the institution with an region of roughly 16 square metres. It's miles.

Study Period: The study was conducted between June 2017 to July 2018.

Study Participants: According to the 2011 census, Anakaputhur urban field practice area had a total population of 48,050 of which 24,158 were males, 23,892 were females with 8890 adolescent (Individuals aged 10-19 years) . Total number of houses in Anakaputhur is 12,146. The study was done among adolescent who are residing in the study area permanently at the time of the study.

Inclusion Criteria: The inclusion criteria for the study were adolescent people of both the genders of age group (13-18) residing in the study area, who were willing to participate in the study were included.

Exclusion Criteria: The exclusion criteria for the study were adolescents who have any physical illness, severely ill and those who were not willing to participate in the study were excluded.

Sample size: Sample size was calculated from the earlier research undertaken by Kunal Kishore et al among school-going adolescents in the urban area of Bihar in 2016, the incidence of depression reported in this research was 49.2 percent. This was taken as the reference value for the calculation of sample size. The size of the sample was calculated using the formula. $N=Z\ a^2pq/[L]^2$

Where, Z = 1.96 at 95% confidence interval

p= Expected prevalence rate,

q=100-p,

L =Relative precision, which is assigned as 10% of p (10% of 49.2% = 4.92) for this study.

Substituting in the formula,

Z = 1.96, p =49.2 %, Q=50.8% [100–49.2], precision=10 % of prevalence

= 1.96* 1.96 *49.2*50.8/24.20

= 396

= 396 which was rounded off to 400. [N = 400]

Sampling method: Anakaputhur had a total population of 48,050 as per 2011 census. As per census data, the adolescent age group (10–19) were identified and there were 8890 adolescent residing in the study area . The sampling technique followed for this study was Systematic randomsampling technique. Sampling interval K= (N/n) is calculated as follows, where K is the sampling interval

K = Total adolescent in Anakaputhur/sample size

K = N/n = 8890/400 = 22^{nd}. Every 22^{nd} adolescent were selected.

The name and address of the person was noted and was visited for the data collection. If the person corresponding to the number did not give informed consent or absent,the next number was chosen and the next person was selected and interviewed. Likewise, 400 adolescents who gave informed consent and willingly participated in the study were identified.[10-13]

Study tools: A pretested structured questionnaire was used as a study tool to interview the study participants. The questionnaire was drawn up in English and translated into Tamil. It was conducted by face to face interview by the investigator herself and the responses were recorded in the questionnaire.

Ethical approval: The research was endorsed by the Institutional Ethical Review Committee of the Sree Balaji Medical College and the Chennai Hospital. **Ref No : 002/SBMC/IHEC/2017/954 (ANNEXURE I)**

Informed consent: The details and purpose of the research and the confidentiality of their identity have been clarified to each participant, and those ready to engage in the research have been required to sign informed permission, after which they have been included in the research. The informed consent was given in Tamil, the local language of the research respondents.

Pilot study: A pilot study was conducted among 40 adolescent residing in urban area of Pammal which is the adjacent area to the study area and also located in Kancheepuram district. It was done for a period of one month during the month of July 2017. Based on the results of the pilot study, the necessary changes were incorporated in the questionnaire and the study was conducted. The samples included in the pilot study were not included in the present study.

Data collection period: Data was collected from the study participants for a period of one year from June 2017 to July 2018.

Data collection Method: Using systematic random sampling study subjects were identified. The adolescents of both the genders were identified after obtaining their written consent in the informed consent form. The interview was conducted by the investigator herself. The pilot study questionnaire was used to interview each participant by one to one individual method on socio-demographic details, family history, questions regarding depression etc.PHQ–9 depression scale, questionnaire was used for ascertaining the prevalence of depression. Anthropometric measurements such as height, weight were measured among the study participants.

Data Analysis: The information was entered in Microsoft Excel 2007 and analyzed using the Windows Social Sciences Statistical Package (SPSS) version 20.0. Prevalence information was provided in the form of numbers, percentages, tables and figures. The analytical statistics used were chi-square, odds ratio and confidence intervals. Binary logistic regression has been used to calculate the adjusted odds ratio. $P < 0.05$ was regarded to be a statistically significant value.

Findings: Distribution of family history of mental disorder research respondents

Table 1 demonstrates the allocation of research respondents by family history of mental disorders. Of the 400 survey population, most of them had no family history of mental disorder 365 (98.8 per cent), only 5 (1.3 per cent) had a family history of mental disorder.

Table 1: Distribution of family history of mental illness (N=400) research participants

Family history of mental disorder	Frequency (N)	Percent (%)
Yes	5	1.3
No	395	98.8
Total	**400**	**100.0**

Distribution of study respondents based on the smoking/alcohol status of the father Figure 1 demonstrates the allocation of study respondents on the basis of the smoking/alcohol status of the dad. Among the study participants, 69.80 % did not had the habit of alcohol intake and smoking,13.30% had habit of intake of alcohol and smoking, 9.30% had habit of smoking alone and 7.80% had the habit of smoking alone.

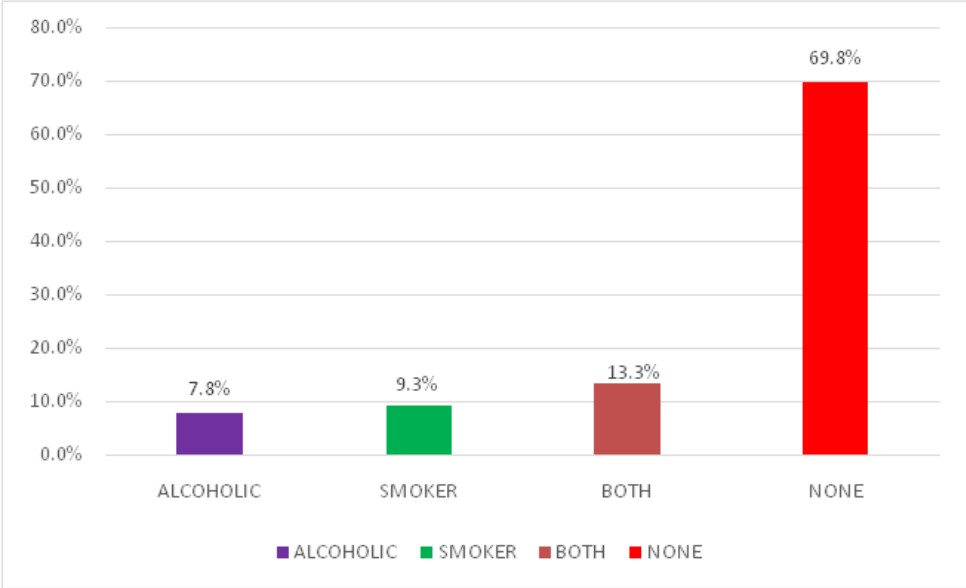


Figure 1: Distribution of research respondents on the basis of father's smoking/alcohol status (N = 400)

Distribution of research respondents on the basis of whether the research becomes burdensome: Table 2 Shows the allocation of study respondents based on whether the research has become burden some. Out of the 400 study population, only 101 (25.3%) told study became burden but most of them 299 (74.8%) told that study not became a burden.

Table 2: Distribution of research respondents on the basis of whether the research becomes burdensome (N = 400)

Study becoming burden	Frequency (N)	Percent (%)
Yes	101	25.3
No	299	74.8
Total	400	100.0

Distribution of study members on the basis of study burden: Table 3 demonstrates the distribution of study respondents on the basis of study burden, out of the 400 study inhabitants, 98 (24.5%) of the study population reported. problems related to parents, 94(23.5%) of them told problems related to teachers,45(11.3%) of them told problems related to friends, 29(11.3) of them told due to physical ill-health and 124(31%) of them told other reasons.

Table 3: Distribution of study respondents on the basis of the study burden (N=400)

Reason for study burden	Frequency (N)	Percent (%)
Not interested in study	10	2.5
Physical ill-health	29	7.3
Problems related to classmate/friends	45	11.3
Problems related to teachers	94	23.5
Problems related to parents	98	24.5

Discussion

Academic Performance: The connection between academic performance and depression was discovered to be statistically important (p<0.005) in this research. This may be due to the experience of school-related stress, such as bad academic performance, negative feedback from parents and educators about school work, daily problems in the school setting, stressful life activities, and adverse effects during school work. 11

Similarly, a research undertaken by Jayanthi p et al among teenagers discovered that the study population with academic pressure was 2.4 times (95% CI-0.9-2.4) (p<0.001) greater risk of depression than teenagers without academic pressure. 12 Similarly, a study by Man Mohan Singh et al discovered that there was a statistically significant connection between academic performance and depression. 13 Another research by Bit Na Kim et al on the impacts of academic stress on depression discovered that both boys and girls had higher rates of academic stress than depression. This could be due to poor academic degrees, which usually predict elevated psychology.

Alcoholic/Smoking Status of Father: Alcohol and smoking status of the dad and depression were discovered to be statistically important with depression p(<0.005). In a multivariate assessment, depression was substantially correlated with the alcoholic/smoking status of the dad (P value–0.016) OR–1.540; CI–(1.083–2.191).

Similarly, a research by Jacob t et al on psychosocial functioning in children of alcoholic father found that the association between parental alcohol intake and depression was higher and it was statistically significant (p <0.005).

Conclusion

Teachers should be made aware of the issue at an previous point so that the risk of advancement to other severe issues, such as substance abuse, etc., can be minimized. Health education for parents as well as for the society as a whole should be encouraged in order to eliminate the stigma connected to these illnesses.

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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To Compare the Efficacy of Azithromycin Pulse Therapy with Doxycycline in Acne Vulgaris Treatment: An Open Labelled, Randomised, Parallel Group, Hospital Based Study

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Abstract

Skin break out vulgaris is a typical dermatological issue with multifactorial etiology . There exists both topical and fundamental treatment for skin break out This investigation was led to think about the viability of oral azithromycin beat treatment with oral doxycycline in the treatment of skin break out vulgaris . Strategies: This randomized controlled preliminary was directed in the Dermatology branch of Sreebalaji therapeutic school and medical clinic from March 2016 to March 2017. Patients of age (15–40 years) having any evaluation of skin inflammation vulgaris were incorporated into the study.200 patients were arbitrarily isolated into two gatherings. Patients in first gathering were given azithromycin 500 mg day by day before feast for 3 back to back days in seven days for 3 months while patients in second gathering were given doxycycline 100 mg every day after dinners for 2 months. Patients were followed up in the wake of taking treatment for 2 months to see the adequacy of each medication. Results: Both the medications are effective in lessening skin break out. Anyway, towards the finish of the examination less number of evaluation III and grade IV cases in the doxycycline bunch than azithromycin gathering involves doxycycline is better then azithromycin .Conclusion: Doxycycline is a superior choice for treatment of skin inflammation vulgaris when contrasted with azithromycin as far as symptoms.

Keywords: *Acne vulgaris,acne therapy***,** *Doxycycline, Azithromycin.*

Introduction

Acne vulgaris is defined as a chronic, inflammatory disease of pilosebaceous unit, manifesting generally in adolescents with pleomorphic lesions like comedones, papules, nodules and cysts and these may lead to scaring[1]. It is a multifactorial disease influenzed by hormonal, genetic, microbiological and immunological factors. Though, it is highly prevalent among adolescent age group, it can affect all age groups [2]

Acne normally affects people during the onset of puberty[1]. It's severity generally increases with age and time. The inflammatory changes of acne may be quite chronic and may lead to severe residual scarring. It is more common and severe in males than in females. The age of incidence is between 14 to 17 years in women and 16 to 19 years in men [1][2].

Genetic factors influence the susceptibility to acne[1]. The role of diet as a cause is unclear. Hormonal activity such as menstrual cycles and puberty, may contribute to the formation of acne. Increase in sex hormone called androgen causes follicular gland to grow larger and make more sebum[3]. Similar condition is seen in pregnancy, leading to increased sebum production. Cigarette smoking does increase the risk of developing acne and worsens its severity[1][4].Acne mostly affects skin with a greater number of oil glands including the face, upper part of the chest and back .

If not treated properly, acne might lead to complications such as inflammatory lesions and nodules,

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cystic lesions, post inflammatory hyperpigmentation (PIH), nodular hypertrophic scars, exudative or hemorrhagic nodules and rarely sinus tract formation between the nodules . Lesions in severe acne vulgaris might be very painful, chronic and refractory to treatment and even cause psychological complications.(1-2)

Successful management of acne needs careful selection of anti-acne agents according to clinical presentation and individual patient needs. . Systemic antibiotics, hormonal therapy or retinoids are used in moderate to severe acne [6]. Antibiotic selection may be driven by its efficacy, side effect profiles and patterns of Propionibacterium acnes resistance.

From the mid-1950s through the early 1970s, the predominant oral antibiotics that were utilized in acne were tetracycline and erythromycin . Over time, as the sensitivity of many strains of *P.acnes* to erythromycin and tetracycline decreased, the therapeutic utility of these two agents also diminished, leading to increased use of " newer generation " tetracyclines-doxycycline, released in 1967. However tetracyclines may be associated with a fairly large number of adverse effects . Azithromycin is a macrolide and a methyl derivative of erythromycin that has been recently prescribed for the treatment of acne. It is as effective as doxycycline [7]. Its extensive distribution in the tissue allow pulse dose regimen recommendation for increased compliance[8]. Due to its improved pharmacokinetic properties, high tolerability profile and efficacy against P.acnes, its rationale use in acne has been examined and it has been found to be effective in a few clinical studies [7][9][10]Various doses and regimens of azithromycin have been studied for acne treatment but still data about the optimum dose of azithromycin is lacking . On this basis, the present study is specifically undertaken to compare the efficacy of azithromycin pulse therapy-5oo mg once daily for three consecutive days in a week with doxycycline 200 mg daily for 2 months.

Material and Method

This is an open label, prospective, single centred, randomized, comparative study conducted to evaluate the efficacy of oral Azithromycin Pulse Therapy-5oo mg once daily for three consecutive days in a week with oral doxycycline 100mg once daily for 8 weeks in patients with acne vulgaris. This study enrolled 200 patients. Patients who visited the Department of Dermatology, at Sree Balaji Medical College and Hospital, Chennai Tamil Nadu, with the complaints of pimples (acne), were the source of samples in the present study. The study duration was for 2 months and study period was from March 2016 to March 2017. The study protocol was reviewed and approved by the Institutional Ethics Committee and all trial participants have been informed about the study procedures and written informed consent was obtained.(3-5)

Subjects:

Inclusion criteria:

- Both male and female patients
- Age between 15 to 40 years
- Patient with all grades of acne (Grade I to IV according to Indian author acne classification)

Exclusion criteria:

- Patients age less than 15 and age above 40 years of age
- Patients with history of drug sensitivity
- Patients with history of taking any topical and systemic treatment for acne during the past two and four weeks respectively
- Patients received oral isotretinoin for the past 6 months
- Patients with other dermatological disorders
- Presence of any other skin disorder that would interfere with diagnosis or assessment of acne
- Presence of hepatic or renal derangement
- Patients with history of psychiatric disorders
- Pregnant and lactating women
- Patients with any medical diseases including endocrine or gastrointestinal, and hyperandrogenism manifestations in girls

With Drawal Criteria:

- Adverse events which warrant withdrawal of subject
- Non-compliance with procedures
- Withdrawal of consent, for participation in the study by the subject
- Failure of the study drug to produce the desired effect

Sample size for this study was calculated using power and sample size calculation program software (version 2.1.31). The calculated requisite total sample size was 200.

Methodology: All 200 study subjects, who fulfilled the study criteria were selected from 248 patients . They were then randomized into two groups in 1:1 ratio with the help of a statistical software SPSS version 23 . Each study group consists of 100 participants.

Initial assessment of acne vulgaris was carried out based on the simple grading system followed by Indian dermatologists in their routine clinical practice[1]

Drug Dosage: Group I (100 patients): Drug–Azithromycin-500 mg Azithromycin is given orally once daily for three consecutive days in a week for 2 monthsGroup II (100 patients) :Drug-Doxycycline-100 mg Doxycycline is given orally once daily for 2 months

Study subjects were also instructed not to apply any topical medicaments or to undergo any beauty procedures such as chemical peels, facials, bleaches etc during the study period. Parallel assignment of drug was used in both groups. Three scheduled visits were carried out during the study period–Baseline visit, visit at the end 4th week and visit at the end of 8th week (end of study). The response to treatment was evaluated during each follow up visit . (15)

Laboratory Investigations: The following laboratory investigations were done during screening i.e. baseline visit ('0'weeks), at 4th week and at 8th week. Blood Biochemistry :Complete blood count,Random blood sugar,Renal function test,Liver function test.

Primary outcome measure : To compare the safety and side effect profile of oral azithromycin and oral doxycycline by marking the adverse effects during the treatment phase.

Statistical Analysis: Data analysis was done using Statistical Package for the Social Sciences (SPSS) version 23 .

- All continuous variables were compared using t-test.
- Qualitative variables were compared using chi-2 test. (12)

Findings: A total of 248 patients were screened for this study, out of which 48 patients were excluded . Among the 48 patients, 10 patients refused to participate and 38 patients didn't meet the inclusion criteria of our study. The selected 200 patients were randomised into two groups and the treatment was started as and when they reported to the hospital. All of them continued the study, and there was no discontinuation or withdrawl due to adverse events. All statistical analysis was done in SPSS version 23 and intent to treat principle is employed for analysis . Results were distributed in age, sex, treatment comparison and adverse event profile. The overall results of this study is shown below :p value (Probability that the result is true) of < 0.05 was considered as statistically significant after assuming all the rules of statistical tests. Regarding demographic characteristics there is no significant difference between the two treatment groups.

Table 1: Distribution of participants based on age

Characteristics	Group 1 Azithromycin (n=100) Mean ± SD	Group 2 Doxycycline (n=100) Mean ± SD	p value
Age	26.5 ± 5.6 yrs	26.9 ± 6.8 yrs	0.557

The mean age of the study subjects is 26.7 ± 6.2 yrs.

Figure 1: Distribution of age groups in Azithromycin and Doxycyclin treatment groups

Treatment efficacy

Table 2: Comparison clinical grade of patient at baseline, first and second month

	Azithromycin			Doxycycline		
	Baseline	4th week	8th week	Baseline	4th week	8th week
Grade 1	20	23	10(10%)	20	37	17(17%)
Grade 2	26	47	49(49%)	24	50	71(71%)
Grade 3	27	20	34(34%)	33	9	10(10%)
Grade 4	27	10	7(7%)	23	4	2(2%)

Distribution of different grades of disease at baseline and at the end of first and second month for both Azithromycin and doxycycline is documented in Table-2. At the follow up visits the acne grades were significantly reduced in both the groups compared to the baseline indicating that both drugs could able to reduce acne vulgaris . Towards the end of the study, presence of more grade III and grade IV patients in Azithromycin group compared to the doxycycline group indicates that doxycycline is more efficient in reducing the severity of the acne compared to azithromycin.[10,11]

Table 3: Comparison of Azithromycin and Doxycycline treatment response

Response	Azithromycin (100 patients)	Doxycycline (100 patients)	p value
No response	12	6	0.004*
Mild response	21	10	
Moderate response	29	19	
Good response	28	52	
Excellent response	10	13	

*p value-clinically significant

Further comparison of response in both Azithromycin and doxycycline groups also showed that the doxycycline more efficient in achieving good improvement (Table-5 & Figure-9). The difference in the response of these treatments is statistically significant (p value = 0.004).

Discussion

Acne vulgaris is a common dermatological problem. The choice of proper treatment is determined by the severity and extent of acne . Systemic antibiotics have been the mainstay of treatment for moderate to severe acne vulgaris. The anti propionibacterium property found in antibiotics are able to inhibit the bacterial colonisation of pilosebaceous glands and prevent further inflammation. The efficacy and possible side effects of various oral antibiotics has been the subject of numerous studies for atleast the last twenty years in an effort to understand, which products are likely to produce better efficacy with least possible side effects. The new emerging problem is antibiotics resistance to propionibacterium . There has been a constant increase in search of safe medications to overcome the side effects and resistance of existing formulations for the treatment of acne vulgaris. [6,7]

The tetracycline class of antibiotics should be considered first-line therapy in moderate to severe acne, except when contraindicated. Macrolides like azithromycin are effective alternatives for the treatment of acne. Its extensive distribution in the tissues allows pulse–dose regimen recommendation for increased compliance.Various dose regimens of azithromycin has been compared with doxycycline with variable results. Therefore, this study was being conducted to assess the efficacy of oral azithromycin pulse therapy for three consecutive days in a week with doxycycline therapy in the treatment of acne vulgaris.

Doxycycline is a long acting tetracycline derivative. In contrast to tetracycline, the absorption of doxycycline is less affected by food and it has better efficacy. Doxycycline is effective in reducing both inflammatory and non–inflammatory lesions. 50 to 100 mg doxycycline daily for three months treatment could able to reduce 14% and 50% for non-inflammatory lesions, and between 30% and 75% for inflammatory lesions. Its drawbacks are adverse effects and its prolonged use is associated with the resistance. Therefore comparison of the results of efficacy between these two drugs may help in optimizing the dosage of the drugs .Azithromycin is a macrolide antibiotic. It has a long half-life of 68 hours and therefore can be given three times a week to have better patient compliance. Various oral azithromycin regimens were found to be effective in reducing both inflammatory and non-inflammatory lesions in patients with moderate to severe acne . The results of previous studies indicated that both drugs has good therapeutic efficacy.[1-3]

Conclusion

Our study shows that both azithromycin and doxycycline are efficient in reducing acne . However towards the end of the study, presence of less grade III and grade IV patients treated with doxycycline compared to the azithromycin clearly indicates that doxycycline is more efficient in reducing the severity of the acne compared to azithromycin. Percentage of good and excellent responses are also higher with doxycycline. Hence for the treatment of acne vulgaris, doxycycline 100 mg daily for 2 months is better than azithromycin pulse therapy-500 mg daily for three consecutive days in a week for 2 month in terms of efficacy.

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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Prevalence of Hypertension and its Correlation with Diet in School Going Adolescent Girls in an Urban Setting

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Abstract

Background: Hypertension in children is a frequently overlooked problem and an important cardiovascular risk factor of adulthood. This study was conducted to determine the prevalence of hypertension among school aged urban children and find out the association of diet with hypertension.

Method: The study included 100 children aged 15–17 years. The weight, height, and BP were measured using standardized instruments following standard guidelines.(7) Details regarding food habits were obtained. Blood pressure measurements were taken by an electronic BP monitor–Omron. Hypertension was considered when blood pressure was more than the 95th percentile for age and sex as per the NHLBI, NIH (National heart lung blood institute) standards. In children having hypertension a repeat measurement was done to confirm hypertension.

Results: In this study the prevalence of hypertension was found to be 9%.

Conclusion: High Blood pressure in children and adolescents is on the rise. These new findings have implications for the cardiovascular disease public health burden. They reinforce the urgent call for early prevention of obesity and High blood pressure in adolescents

Keywords: *Hypertension, Adolescents, Urban, school, diet.*

Introduction

Risk factors for cardiovascular disease such as hypertension have been increasingly prevalent among adolescents[1]. The causes for increase in blood pressure are attributed to obesity(2) change in dietary habits, decreased physical activity and increasing stress. Data is lacking from India regarding the prevalence of hypertension in adolescent children and its association with diet. So this study was conducted to determine the prevalence of hypertension among school aged urban children(3) and find out the association of diet with hypertension(1)

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Method

The study included 100 children aged 15–17 years. The weight, height, and BP(5) were measured using standardized instruments following standard guidelines. Details regarding food habits were obtained. Blood pressure measurements were taken by an electronic BP monitor–Omron. Hypertension was considered when blood pressure was more than the 95th percentile for age and sex as per the NHLBI, NIH(National heart lung blood institute) standards. In children having hypertension a repeat measurement was done to confirm hypertension(2).Overweight is defined as a BMI at or above the 85 th percentile and belowthe 95th percentile for children and adolescents of the same age and sex(9). Obesity is defined as a BMI at or above the 95th percentile for children and adolescents of the same age and sex(6-8). Weight was measured using anelectronic weighing machine Omron and height was measured with astadiometer. The children were questioned about their food habits whether they took vegetarian or non vegetarian food.(3)

Results

A cross sectional study on hypertension among adolescent girls wasdone in an affluent school in Chennai.[9] A total of 100 adolescent girlswere included in the study. The mean age of the children was 16.4 years. The mean weight of the children was found to be 56.8 Kg (SD 11.3 Kg).The mean height of the children was found to be 159.8 cm (SD 6 cm).80 children were non vegetarian while 20 children took vegetarian food.12 children were found to be obese while 88 children had a normal weight. 9 children were found to be hypertensive while 91 children had normal blood pressure[4].

In this study, the prevalence of obesity was found to be 12%[10]. The chance of an adolescent girl to have hypertension was 11.7 times higher for those adolescents who were obese comparedto those with normal weight. It was found that 5 of theadolescent girls who were obese and 4 of the adolescent girlswho had normal weight had hypertension and this was found to bestatistically significant (p=0.000).[5]

Discussion

India is undergoing an epidemiological transition where non-communicable diseases (NCDs) are on rise. According to World Health Report 2002,cardiovascular diseases (CVDs) will be the largest cause of death and disability by 2020 in India.[6]The growing burden of CVDs is being contributed largely due to multitude of risk factors with hypertension being one of them

Hypertension is one of the diseases which is diagnosed and treated in 25%of the cases only making it largely an under-diagnosed problem. There isplenty of evidence to suggest that hypertension begins in childhood andadolescence. The asymptomatic nature of hypertension in early phases ofits onset during adolescence increases the chances of developingcomplications during adulthood.[4] Therefore, detection of hypertensionduring childhood is of potential value in identifying those, who are atincreased risk of primary hypertension as adults, and who might benefitfrom earlier intervention and follow-up[8].

Several studies in India have reported the prevalence of hypertension to be ranging between 0.46% and 11.7% amongst children and adolescents. Further, a number of environmental factors have been found to be associated with hypertension in children and adolescents. Thus, early detection of hypertension and its aggravating factors becomes imperative. The data on blood pressure (BP) profile of school adolescents is scanty in India. Considering the detection of hypertension in adolescence as the best possible preventive intervention to avoid complication later in life, the present study was undertaken to determine the prevalence of hypertension amongst urban school adolescents and its correlation with diet.

High Blood pressure in children and adolescents is on the rise. These new findings have implications for the cardiovascular disease public health burden. They reinforce the urgent call for early prevention of obesity and High blood pressure. Cardiovascular diseases are a leading cause of death. Systematically assessing and quantifying modifiable CVD risk factors is therefore crucial. Better understanding and awareness of CVD risk factors may help clinicians and public health professionals develop culturally sensitive interventions, prevention programs, and services specifically targeted toward risk burdens in each of these populations.

Conclusion

Hypertension is increasing in adolescent urban children[10]. Our present study estimated the prevalence of hypertension in adolescent school going children as 9%. Non vegetarian diet is more associated with hypertension. Sedentary habits, lack of exersice, intake of junk food and increasing screen time is associated with increasing hypertension in adolescent children. More data on the prevalence of hypertension in adolescent urban children is required to form public health preventive policies.

Limitations of the study: A large sample size is needed to study the association between weight, food habit, and hypertension in adolescents.

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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Epidemiology of Breast Cancer: A Case Series

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Abstract

Background: Breast cancer is the most frequent cancer in women and represents the second leading cause of cancer death among women (after lung cancer).The proportion of breast cancer is rising in India. Incidence rates are high in more developed countries, whereas rates are lower in less developed countries but increasing.

Aim: This is a retrospective study of 90 breast cancer patients less than 70 years of age treated in a single center from April 2018 to April 2019. The aim is to assess the known risk factors that modulate the development of breast cancer.

Materials and Method: Data were collected from medical records. Variables such as age, parity, breast feeding, body mass index (BMI), family history and usage of oral contraceptive pills (OCP) were analyzed in relation to outcome. All data were recorded in MS Excel sheet.

Results: Maximum number of cases (58.8.4%) belonged to age group of ≥50 yrs. Maximum number of cases falls under lower parity/nulliparity. There was no data in the records on duration of breast feeding, to determine its association with breast cancer. Postmenopausal women (37 cases) with increased BMI is evident to show its risk. Most of the cases (80%) didn't have positive family history. 93.3% of cases not associated with intake of OCP.

Conclusion: Increase in age contributes to maximum number of cases. Parity & Breast feeding is inversely proportional to breast cancer. In postmenopausal age group, BMI is increased. Positive family history is present in few cases, which shown familial breast cancer accounts less than of all breast cancer cases. Intake of OCP shows no association with breast cancer. This study has several limitations of being a descriptive study & it described only the collected data.

Keywords: *Breast cancer; epidemiology; risk factors.*

Introduction

Breast cancer is the leading cause of death among cancer patients worldwide. More than 100,000 patients are estimated to be newly diagnosed in India which depicts the disease burden. This neoplasm is probably the most feared by women, especially by the negative stigma brought by its diagnosis and due to its psychological effects, which affect the perception of sexuality and their own personal image(1).

As compared to the western countries breast cancer in Indian women presents at a younger age, almost a decade earlier. Hence, a significant breast cancer burden in India occurs in younger women(2).

This study was conducted to determine and explore the association of breast cancer with age, socio-demographic details, body mass index, duration of breast feeding and the usage of oral contraceptive pills in a tertiary care center in India.

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AIMS and Objectives: To determine the association of breast carcinoma with age, socio-demographic details, body mass index, duration of breast feeding and the usage of external hormones pathologic among women.

Materials and Method

This study has been done retrospective, descriptive study on ninety proven patients of carcinoma breast with regard to histopathology in the Department of Pathology, Sree Balaji Medical College and Hospital, Chennai. Data was collected from the hospital medical records department.

The study included a convenience sample of 90 women in the period between April 2018 and April 2019, diagnosed with breast cancer at any stage of disease.

Patients with incomplete data were excluded from the study. All data were recorded in MS Excel sheet.

Discussion

Age: The proportion of breast cancer is increasing in urban India. It presents approximately a decade earlier than the West. It is yet to be proved whether this reflects the younger population in India, or a true biological difference. At present, breast cancer in women below 40 years occurs in approximately 5-7.5% of the total number of cases diagnosed every year in Western Europe and US[3] In Asian studies, the incidence is two-folds higher[2]

As there is no effective screening strategy for this age group, the presentation is almost always with a palpable lump. McAree *et al*., have reported a symptomatic presentation in 98.2%,[4] while Foxcroft *et al*., have reported a symptomatic presentation in 93%[5] of all breast cancer patients less than 40 years of age.

Current literature supports the hypothesis that breast cancer is generally more aggressive in younger women than older women due to larger tumor size, higher grade, higher lymph node positivity, hormone receptor negativity with associated lymphovascular emboli[6].

The incidence of breast cancer increases rapidly with age during the reproductive years and then increases at a slower rate[7].

Our study showed that most of the cases i.e 39 cases(43%) falls between 50-59yrs of age, followed by 24 cases(26.6%), 15 cases(16.6%) and 12 cases(13%) falls between age group of 40-49yrs, 30-39yrs and 60-69 yrs respectively Fig. 1.

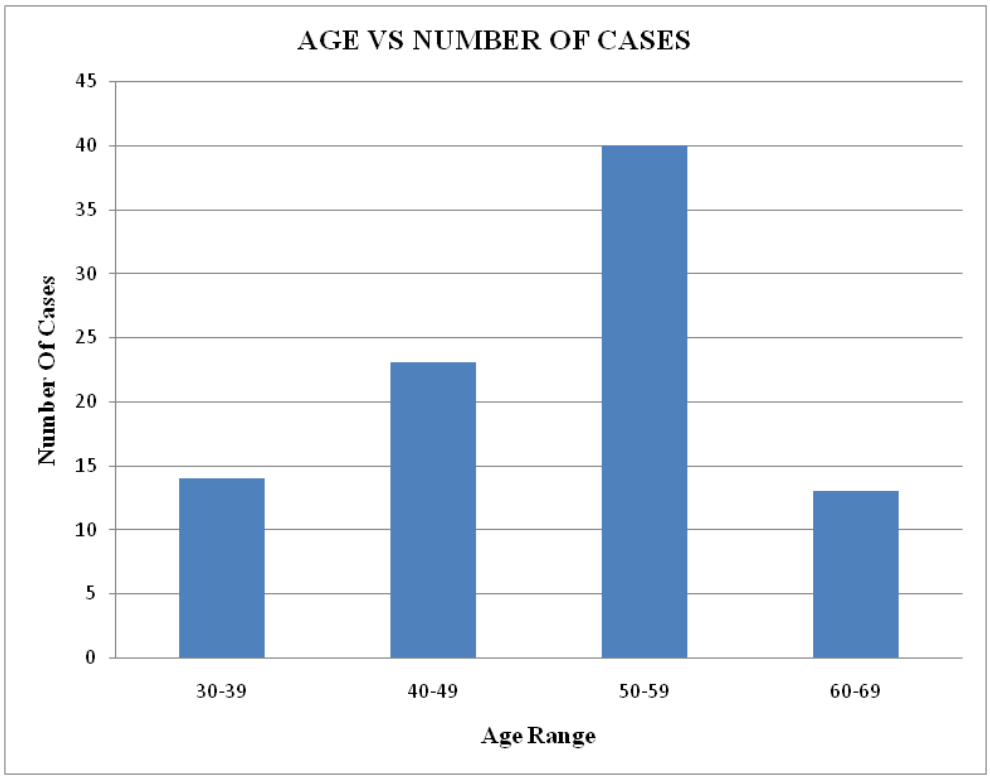


Fig. 1: Distribution of cases based on age.

In conclusion, this study has shown most of the cases presented at older age group and significant proportion of young females (those less than 40 years) with breast cancer. Breast cancer education, free breast cancer detection camps can help in creating awareness on this disease. Proper awareness and screening programs can promote early access to the treatment.

Findings: The high incidence of triple negative breast cancer may be partly explained by the fact that the risk factors for triple negativity are commonly seen in Indian population, like-high parity, young age at the time of first birth[8,9] younger age at diagnosis, i.e., <50 years[10,11] and lower socio-economic status[12].

Higher parity decrease breast cancer risk to half of the risk of nulliparous women. Early age at second pregnancy further reduces the risk of breast cancer [13]. In contrast, nulliparity and late age at first birth contribute towards an increased risk of developing breast cancer. Interestingly, women with their first birth after age of 35 are even at higher risk than nulliparous women [13,14,15].

Our study shown less number of cases in higher parity compared to lower parity Fig. 2.

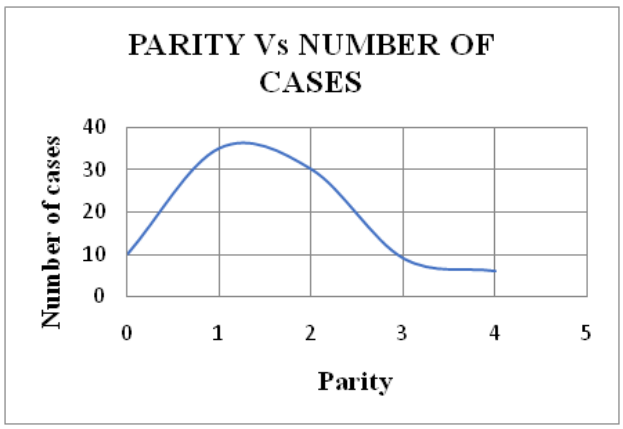


Fig. 2: Distribution of cases based on parity.

Breast Feeding: Prolonged lactation has been demonstrated to be protective, as well [16]. There is a 4.3% decrease in the relative risk of breast cancer for every 12 months of breast feeding. The decrease of breast cancer risk due to prolonged lactation may be explained in part by the reduction of total number of ovulatory menstrual cycles and consequently reduced cumulative ovarian hormone exposure [15].

Studies in less developed countries, where the total duration of breast feeding can be very long, have reported substantial protective effects[16]. Protection has also been seen in some, but not all, studies in more developed countries. For example, the US Cancer and Steroid Hormone Study examined the relation between breastfeeding and breast cancer in over 4500 women with the disease and found that women who had breastfed for a total of 25 months or more had a 33% lower risk of breast cancer than those who had never breastfed [17].

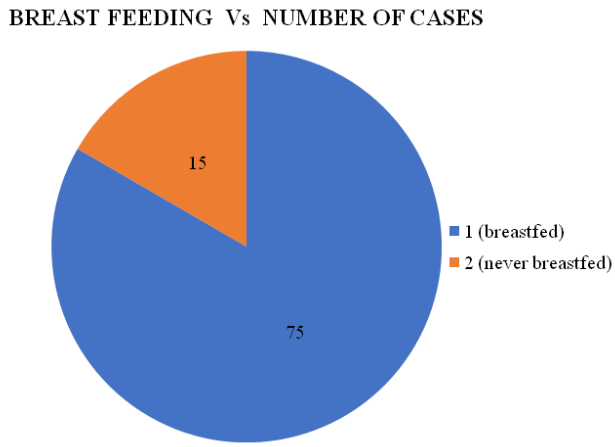


Fig. 3: Distribution of cases based on breast feeding

In our study, there is no data on duration of breast feeding so the study of this association is incomplete.

Obesity: Higher adiposity has opposing effects on breast cancer risk, depending on a woman's menopausal status. Among premenopausal women, higher adiposity, in childhood or during adult life, is associated with decreased risk of breast cancer, while among postmenopausal women obesity increases risk.

Interestingly, greater adiposity during childhood and adolescence is inversely associated with both hormone receptor-positive disease (i.e., tumors expressing estrogen (ER) and progesterone (PR) receptors) and receptor-negative disease. In contrast, obesity in adulthood has been found to be associated predominantly with ER+/PR+ breast cancer, and, in the case of postmenopausal obesity, with increased risk of ER+/PR+ disease only among women not using HRT.

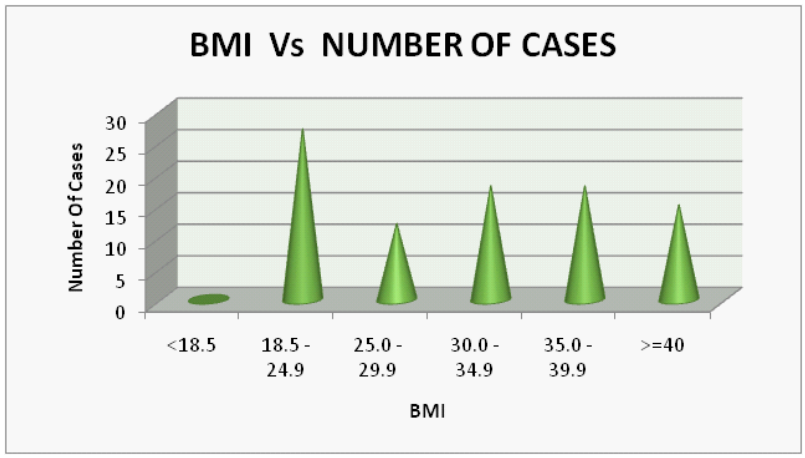


Fig. 4: Distribution of cases based on BMI.

Of note, while the relationship between body size in pre-and postmenopausal women and subsequent breast cancer risk has been extensively investigated, it still remains somewhat uncertain until what point in the premenopausal period obesity is protective, and, similarly, from what point in the postmenopausal period obesity begins to show a deleterious effect[18].

Our study shown 51 cases has BMI of ≥30.0 Table. 2, which indicates most of them are obese according to WHO classification of BMI. Particularly in postmenopausal age group women ≥45yrs, 37 caseshas increased BMI ≥30.0. Fig. 5.

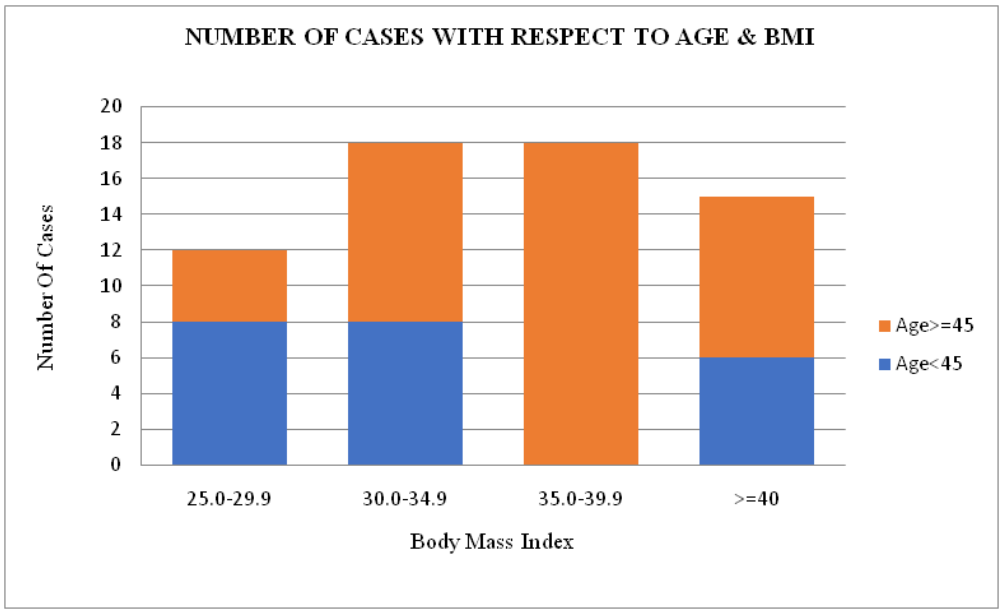


Fig. 5: Distribution of BMI in age groups.

Family History:

Discussion

Family history of breast cancer increases a woman's risk of developing the disease. A meta-analysis of 52 individual epidemiological studies showed that 12% of women with breast cancer have one affected family member and 1% have one or more relatives affected [19]. Women with one, two, and there or more first-degree affected relatives have an increased breast cancer

risk when compared with women who do not have an affected relative.

Most studies on familial risk of breast cancer have found about two-fold relative risks for first-degree relatives (mothers, sisters, daughters) of affected patients[28]. With affected second-degree relatives (grandmothers, aunts, grand-daughters), there is a lesser increase in risk.

Two genes, *BRCA1* and *BRCA2,* have been implicated in familial breast cancer but account for less than 10% of all breast cancer cases[20]. In our study, there is no data on genes associated with breast cancer. Most womeni.e 72 cases(80%) Fig.6 with the disease do not have a family history of it. Environmental and lifestyle factors rather than inherited genetic factors account for most cases of breast cancer.

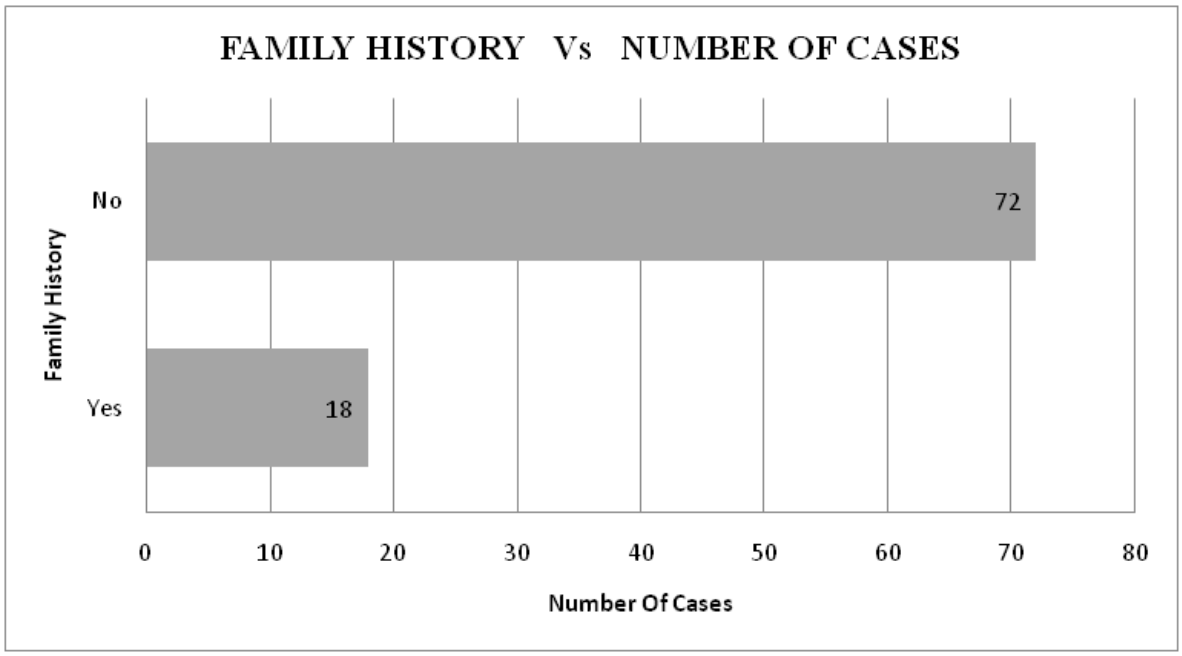


Fig. 6: Distribution of cases based on family history.

OCP: A meta-analysis study by Kahlenborn et al.[21] on 34 case/control studies showed that Odds Ratio (OR) of breast cancer increased by 1.19 times in the women who used contraceptive pills. In addition, results of the present study indicated that using contraceptive pills for more than 4 years increased OR of breast cancer by 1.52 times. Consistently, Nelson et al.[22] conducted a meta-analysis study on 61 studies and examined 8 factors. The 12 studies showed that using the pills increased the risk of breast cancer by 30% times (relative risk = 1.30, CI = 1.13–1.49).

Some studies show that there is no relationship between the use of oral contraceptives and breast cancer. Marchbanks et al.[23] carried out a meta-analysis in 2002 and reviewed 54 studies that represented 4,574 and 4,682 case and control subjects among women from 35 to 64 years of age, including white and black races. They concluded that current or former oral-contraceptive use was not associated with a significantly increased risk of breast cancer.

Conclusion

Increase in age contributes to maximum number of cases. Parity & Breast feeding is inversely proportional to breast cancer. In postmenopausal age group, increase in BMI has a significant association. Positive family history is present in few cases, which shown familial breast cancer accounts less than of all breast cancer cases. Intake of OCP shows no association with breast cancer.

Manyof the established risk factors are linked to oestrogens. Risk is increased by obesity in postmenopausal women. Childbearing reduces risk, with greater protection for early first birth and a larger number of births; breast feeding probably has a protective effect.

Oral contraceptives are not associated with the risk of developing breast cancer. Mutations in certain genes greatly increase breast cancer risk, but these account for a minority of cases.

Breast cancer is a complex disease and a variety of risk factors are involved in the etiology and development of breast cancer. The decline in breast cancer mortality has been attributed to both improvements in breast cancer treatment and early detection. However, not all segments of the population have benefited equally from these advances. This mortality difference reflects a combination of factors, including differences in stage at diagnosis, obesity and comorbidities, and tumor characteristics, as well as access, adherence, and response to treatment.

Feasible changes in risk factors, such as obesity, breastfeeding, and physicalactivity, could yield important reductions in breast cancer risk. Further progress may come fromthe identification of new, modifiable lifestyle (especially dietary) risk factors.

This study has several limitations of being a retrospective descriptive study with a small sample size from a single center. However, it does give an idea about the disease profile of breast cancer in the relatively lesser studied population in India. It described only the collected data and its characteristics.

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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Mobile Phone Use and Possible Cancer Risk: A Review

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Abstract

Versatile correspondence is presently basically controlling our every day survives better availability and shrewd cell phone administrations. This survey discussions talks about colossal development in Indian correspondence industry alongside developing concerns with respect to wellbeing impacts of portable radiation introduction. Concerns presented are particularly with respect to carcinogenesis and other health related impacts of portable radiation presentation. In the push to set up or invalidate any such concerns, numerous examinations have been embraced in the previous three decades, for the most part casecontrol structures or cross-sectional reviews. In any case, the vast majority of them significantly neglected to set up causal affiliation principally inferable from potential inclinations and blunders in their lead and examination. Past accomplice studies have given conflicting outcomes prompting proceeded with vulnerability in regards to tumorigenic capability of portable radiation presentation. In India, there remains a tremendous information hole relating to this specific subject and just couples of studies are by and by in progress, for example, the Indian Council of Medical Research (ICMR) mobile phones consider in the National capital area (NCR). Global Agency for Research on Cancer (IARC) has arranged radio frequency electromagnetic fields related with remote telephone use as potentially cancer-causing to people (Group 2B), causing significant concerns worldwide among versatile organizations and supporters ambiguously. The World Health Organization (WHO) is by and by conveying formal hazard evaluation of all considered wellbeing results from radio recurrence field's exposures.

Keywords: *Radio Waves, Carcinogen, Non ionizing radiation.*

Introduction

"Make tracks in an opposite direction from you."That's something everybody's parents says simply regarding each time they see their kids with a cell phone squeezed against their ear. They are voicing something numerous cell phone clients, or guardians of cell phone clients, naturally feel: that these gadgets are by one way or another creation them wiped out. Though they have never been especially worried about cell phone radiation and malignant growth, there telephone makes them uneasy. It directions a lot of their consideration. It takes up a lot of their time. Also, it isn't shrewd to have its warmth so near there cerebrum.

Cell phones are a necessary piece of current media transmission frameworks and are generally utilized around the world. In numerous nations, over a large portion of the populace utilizes cell phones. The expense of cell phone innovation has fallen, prompting expanded number of endorsers in the nation (725 million). There is a developing open concern with respect to conceivable antagonistic wellbeing impact because of versatile radiation exposures, which, keeping in view colossal number of portable supporters appears justified[1]. Therefore, today is essential to deliberately research, comprehend, and screen any potential general wellbeing effect of expanding cell phone use in India. Cell phones impart by transmitting radio recurrence waves through a system of fixed reception apparatuses. Such radiations are delivered by cell phones and other family unit gadgets, for example, Wi-Fi, (TV), and

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radio transmitters and so forth. Radio frequency waves are electromagnetic fields, and not at all like ionizing radiation, for example, X-beams or gamma beams, can neither break synthetic bonds nor are incredible enough to harm our deoxyribonucleic corrosive (DNA). Be that as it may, they are probably going to be consumed by tissues nearest to gadget presentation site and produce mellow nearby warm impact. Among studies directed to evaluate exposures to cell phone radiations, an investigation close schools and medical clinics in Chandigarh, Punjab found the most noteworthy thickness of 11.48mW/mm, which is 1,148% of as far as possible. The examination reasoned that presentation level in the city were much about the organic wellbeing limit above which the natural arrangement of people and creatures begins getting affected[2]. The measure of radio recurrence vitality introduction relies upon portable set innovation, the degree kind of utilization, telephones reception apparatus, and phone towers remove from the client. Physicists have examined each other possible connection between versatile radiation and natural procedures, for e.g., physical misshapenness of proteins, initiation of flagging pathways, and docking with receptors on cell films. For each situation, the determined quality of portable radiation has been immaterial to influence any neurotic transformation[3].

What is radio recurrence radiation?

Materials and Method

Radio frequency radiation is a type of electromagnetic radiation. Electromagnetic radiation can be classified into two sorts: ionizing (e.g., x-beams, radon, and grandiose beams) and non-ionizing (e.g., radio frequency and very low recurrence, or power recurrence). Electromagnetic radiation is characterized by its wavelength and recurrence, which is the quantity of cycles of a wave that pass a reference point for each second. Electromagnetic frequencies are depicted in units called hertz (Hz).The vitality of electromagnetic radiation is dictated by its recurrence; ionizing radiation is high recurrence, and in this way high vitality, while non-ionizing radiation is low recurrence, and along these lines low vitality. The recurrence of radiofrequency electromagnetic radiation ranges from 30 kilohertz (30 kHz, or 30,000 Hz) to 300 gigahertz (300 GHz, or 300 billion Hz). Electromagnetic fields in the radiofrequency range are utilized for media communications applications, including PDAs, TVs, and radio transmissions.

Momentary Effects: Various examinations have explored the impacts of radiofrequency fields on mind electrical movement, intellectual capacity, rest, pulse, and circulatory strain and so on. In an examination directed on male understudies of National Institute of Technology (NIT), Kerala, India. Migraine, discombobulating, deadness in the thigh, and largeness in the chest were accounted for among successive cell phone clients. The examination revealed an expansion in pulse changeability when the cell phone is held near the chest and a decline when held near the head. Nonetheless, these perceptions were not discovered any progressively noteworthy in contrast with conditions without versatile phone[6]. To date looks into haven't proposed any steady proof of unfriendly wellbeing impacts from introduction to radiofrequency fields aside from the tissue warming impact. Further, looks into haven't had the option to offer help for a circumstances and logical results connection between presentation to electromagnetic fields and any self reported symptoms such as electromagnetic touchiness among versatile users[7].

Long Haul Effects: Epidemiological inquires about analyzing potential long term risks from radiofrequency introduction have for the most part searched for an association between cerebrum tumors and cell phone use. In any case, the same number of malignancies stays imperceptible until numerous years after the communications that prompted the tumor, and in light of the fact that cell phones were not broadly utilized until the mid 1990s; epidemiological investigations were confined distinctly to those diseases that become clear inside shorter time spans. Consequences of creature studies have reliably demonstrated no critical increment in the disease chance because of long haul presentation to radiofrequency fields[8]. Few examinations have attempted to search for any other possiblelong term wellbeing impacts of introduction to portable radiation. In an investigation led in Amritsar, Punjab, India, a relationship between's cell phone use (introduction to radio recurrence radiations) and DNA and chromosomal harm in lymphocytes of cell phones clients was watched. Such harms can have long term results regarding expanded danger of neoplasia or other age related changes. Indian test creature studies directed on rodents have furthermore demonstrated that cell phone radiations may influence cerebrum work and can make a few neurological issue and unending introduction no ionizing microwave (MW) radiation can prompt fruitlessness by means of free radical/oxidative species mediated pathway[9,10].

In an investigation led on occupants living close cell phone towers, higher hazard for creating neuropsychiatric issues and a few changes in neurobehavioral capacities was watched, hence, upholding alert in such regard[11].

Findings:

Malignancy in Humans: Since mobile phones typically are held close to the head when being utilized, the fundamental concern has been whether they may cause or add to tumors around there, including[12].

- Malignant (malignant) mind tumors, for example, gliomas
- Non-malignant tumors of the mind, for example, meningiomas
- Non-malignant tumors of the nerve interfacing the mind to the ear (vestibular schwannomas, otherwise called acoustic neuronal)
- Non-malignant tumors of the salivary organs.

The Interphone Study is the greatest of all the investigation discoveries into mobile phone radiation and the wellbeing of cell phones for people. At an expense of 25 million dollars, this is the biggest investigation of PDA use and tumor hazard led to date. It found that "standard utilization of a wireless by grown-ups can altogether expand the danger of gliomas by 40% with 1640 hours or a greater amount of utilization"[13.]

Broad proof audits have been directed to comprehend conceivable cancer-causing dangers presented by versatile radiation in the previous decade. In a metaanalysis of concentrates on intracranial tumors and cell phone use which was distributed before the finish of 2012, high heterogeneity was recognized acrosson individuals withestimation of glioma and acoustic neuronal hazard in long term utilization of cell phone because of methodological contrasts installed in the variable investigation gatherings. By and large, the outcomes from the speculation are that cell phone use influences the event of intracranial tumors[14].

The largest review case control ponder INTERPHONE, directed by a consortium of scientists from 14 nations and composed by the International Agency for Research on Cancer (IARC), demonstrated no measurably critical increment in mind or focal sensory system malignant growths identified with higher measures of cell phone use[15]. However, the workgroup didn't disregard the restricted proof in people for the cancer-causing nature of radiofrequency radiation as constructive affiliations. The investigation gathering watched an association between introduction to radiofrequency radiation from remote telephones and glioma and acoustic neuroma[16].

The Handel group directed two case controls contemplates on mind tumors during 1997–2003 with cases being accounted for from the Swedish Cancer Registries. Steady example of the expanded danger of glioma and acoustic neuroma related was seen with utilization of cell phones and cordless telephones. Steady proof originated from anatomical limitation of the tumor to the most uncovered territory of the mind, amount of introduction, and inactivity time that all add to the organic pertinence of an expanded hazard. In light of on information which suggests expanded hazard for glioma, a threatening sort of mind cancer. The IARC in May 2011 ordered radiofrequency electromagnetic fields as conceivably cancer-causing to humans[17].

Notwithstanding cerebrum malignant growth, these examinations connect mobile phone radiation presentation to numerous different sorts of disease, including[18, 19] .

- Cancer of the Pituitary Gland
- Thyroid Cancer
- Melanoma Risk
- Stem Cell Cancer
- Parotid Malignant Tumors
- Leukemia
- Lymph Node Cancer
- Multifocal Breast Cancer
- Eye Cancer

Discussion

Suggestions by Expert Agencies: WHO expresses that "countless investigations have been performed in the course of the most recent two decades to survey whether cell phones represent a potential wellbeing hazard. Until this point in time, no unfriendly wellbeing impacts have been built up as being brought about by cell phone use. WHO will lead a formal hazard appraisal of all considered wellbeing results from radiofrequency field's introduction by 2016" [22].

Indian Council of Medical Research (ICMR) states

that "In various investigations it has been accounted for that introduction to radiation from cell phones can cause unfavorable wellbeing impacts. Yet, there is no decisive information accessible so far on this issue, in any case, the developing group of logical confirmations demonstrates some bioeffects and conceivable antagonistic wellbeing impacts of Radio Frequency Radiation (RFR) which require further investigations"[23].

The American Cancer Society (ACS) expresses that "The IARC order implies that there could be some hazard related with malignant growth, yet the proof isn't sufficiently able to be viewed as causal and should be researched further. People who are worried about radiofrequency introduction can restrict their presentation, including utilizing an ear piece and constraining cell phone use, especially among children"[24, 25].

Proposals on Mobile Use: In the current circumstance, we can't be totally certain about the long term impacts of versatile radiation introduction. Moreover, there have not been sufficient investigations to take a gander at how the utilization cell phones could influence the wellbeing of kids. In the present situation, preventive methodology remains the best alternative to cell phones clients, who could be prescribed to limit their presentation by keeping their calls short. Individuals ought to guarantee that their cell phone has low explicit ingestion rate (SAR) of radio recurrence and kids, immature, and pregnant ladies playing it safe. Cell phones ought to be avoided the body (head) by utilizing content informing, or utilizing a "hands free" gadgets bringing presentation down to radiofrequency fields and, consequently, better protection[26].

Conclusion

Generally speaking assessments demonstrate that the present proof for a causal relationship among malignancy and presentation to portable radiation is weak and not totally persuading. A portion of the examinations building up affiliation had constraints and shortcomings and, stay inconsistent. Studies have featured that utilizing these telephones for around 10 years isn't probably going to cause malignant growth. Yet, as cell phones are as yet another innovation and there is a little proof about impacts of longer term use. Anticipation is the best methodology. Individuals are exceedingly concerned with respect to conceivable wellbeing impacts of cell phones, particularly on the grounds that they are broadly utilized and conveyed for longer lengths by the clients. There is a pressing need of advancing further research and better innovative mediations in field of portable innovation for guaranteeing wellbeing and security of endorsers around the world.

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Ethical Clearance: Nil

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Prevalence of Gastroesophageal Reflux Disease and Gastritis in Chennai and Kanchipuram District

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Abstract

Background: To think about the commonness GERD and Gastritis among Kanchipuram and Tamil Nadu locale and to bring mindfulness among the populace the causes and forestall the sickness.

Point and Objectives: To explore the pervasiveness of gastritis and GERD among fiery sustenance and caffeine consumption people and to bring mindfulness among people about the way of life changes in GERD and gastritis.

Materials and Method: This graphic arbitrary examining strategy was completed among 100 people among Chennai and Kanchipuram locale between age gatherings of 15-45 years. The information was gathered utilizing a semi organized questionnaire was gathered through online in web.

Conclusion: The commonness of GERD and gastritis of the examination populace was observed to be low. Awareness of the malady and the avoidance must be made to diminish the frequency of the ailment.

Keywords: *Gastroesophageal Reflux, GERD, Gastritis, Esophagus.*

Introduction

GERD and gastritis is the regular gastrointestinal issues in western nations and Asia and now it is getting to be normal issue in eastern nations too. This is because of expanding current way of life with expanded fast-food admission, smoking and liquor consumption and so on. This causes antagonistic impacts like spewing forth of nourishment and acid reflux and henceforth this examination is imperative to know the predominance among people and bring mindfulness among them. Reflux infection is considered as a typical reason for alluding patients to restorative care[1]. Risk factors for reflux esophagi is incorporate the nearness of hiatal hernia, transient unwinding of the lower esophageal sphincter, and debilitated freedom of disgorged gastric substance in the esophagus[2]. Despite these actualities, the basic component of reflux illness has not been totally defined[3,4]. It was proposed that Helicobacter pylori (H. pylori) could be a causative factor for some gastrointestinal illnesses, for example, gastritis. In any case, the connection between H. pylori contamination and gastro esophageal reflux illness (GERD) is as yet disputable.

During the most recent decades H. pylori treatment was generally controlled to patients with dyspepsia. In this specific situation, examines on patients with non-ulcer dyspepsia demonstrated that H. pylori destruction probably won't have a useful job for patients with reflux disease[5-7]. Even a few analysts recommended that nearness of H. pylori disease may have a defensive job against GERD[8]. Although it isn't affirmed in all studies[9]. Thus the relationship between H. pylori, gastritis, and GERD is considered as a point of enthusiasm for studies. In view of past investigations ceaseless dynamic H. pylori gastritis is related with milder types of reflux illness and annihilation of H. pylori expanded the danger of creating GERD[5, 9]. Moreover there is little data about the example of gastritis in dyspeptic patients with creating GERD. The point of this examination was to decide the

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relationship between the nearness of GERD and gastritis designs in patients with H. pylori contamination.

Materials and Method

Kind of study: This is a Descriptive cross sectional examination

Study populace: All subjects were between the age group of 15 to 40 years .

Study Area: Urban region of Kancheepuram locale.

Study test: An example of 100 people were taken

Study strategy: Convenient examining technique. Study period: During the long stretch of April 2019.

Incorporation criteria: Individuals between 15 to 40 years and taking an interest willfully in the examination

Avoidance criteria: people beneath 15 or more 40 years and the individuals who did not give educated assent.

Information accumulation: An organized poll was utilized for information accumulation which incorporate all information of zesty sustenance intake, caffeine consumption, information identified with tobacco use and liquor admission and information is gathered with their willful educated assent

Measurable examination: Information section was done in Microsoft exceed expectations and dissected by SPSS adaptation 22.

Findings:

Table 1: Sociodemographic details of the study population

Demographic Variables	Groups	Percentage
Age in years	<20	52%
	20-30	46%
	30-40	2%
	>40	0%
Sex	Male	30%
	Female	70%
Do you consume alcohol	Yes	10%
	No	90%
Do you consume tobacco in any form	Yes	5%
	No	95%

Among the study participants, most of them (52%) were below the age group of 20 years and 70% were males. Most of them did not consume tobacco and alcohol. [Table 1].

Table 2: Dietary habits of study population

Dietary Habits	Groups	Percentage
Do you drink coffee	Yes	75%
	No	25%
If yes,how many glasses per day	1-2	70%
	>2	5%
How many times do you eat per day	<3	20%
	3	75%
	>3	5%
Do you skip meals	Yes	45%
	No	55%
If yes, which one do you skip (n = 45)	Breakfast	35%
	Lunch	8%
	dinner	2%
Do you eat spicy food very often?	Yes	60%
	No	40%
Do you eat in fast food restaurants?	Yes	80%
	No	20%
If yes,how often do you eat fastfood? (n = 80)	Daily	5%
	Weekly	45%
	Monthly	15%
	Very rarely	15%
Some interested food you prefer	Fast food	38%
	Packeted chips	15%
	Carbonated drinks	12%
	Chat items	35%

Table 2 shows the dietary habits followed by the study participants. Around 75% of them drank coffee, 45% of them had a practice of skipping meals, 35% skipped breakfast. Regarding consumption of spicy food, 60% consumed those and 80% had a habit of eating in fast food establishments with 45% of them having a weekly habit of going too fast food restaurants. Most of the study participants preferred to eat in fast food and consume chat items.

Table 3: Symptoms related to gastritis and GERD among population

Symptoms	Groups	Percentage
When do you go to bed after eating	Immediately After few minutes After few hours	0% 30% 70%
Do you get regurgitation of food	Yes No	13% 87%
Do you have pain in epigastrium	Yes No	15% 85%%
If yes,is it relieved or aggravated after eating	Relieved Aggravated	9% 6%
Any change/hoarseness in voice	Yes No	10% 90%
Do you get blood in stools?	Yes No	2% 98%
Are you a diabetic	Yes No	2% 98%
Do you take pain killers too often?	Yes No	5% 95%

Table 3 shows the symptoms experienced by the study participants related to gastritis and GERD. Around 30% of the study participants had a habit of going to bed after few minutes of having food, 13% had symptoms of regurgitation, 15% had pain in epigastrium occasionally and 9% of them had relief of pain after eating. Among the participants, 10% had a change in voice, 2% passed blood in stools and 5% take painkillers often.

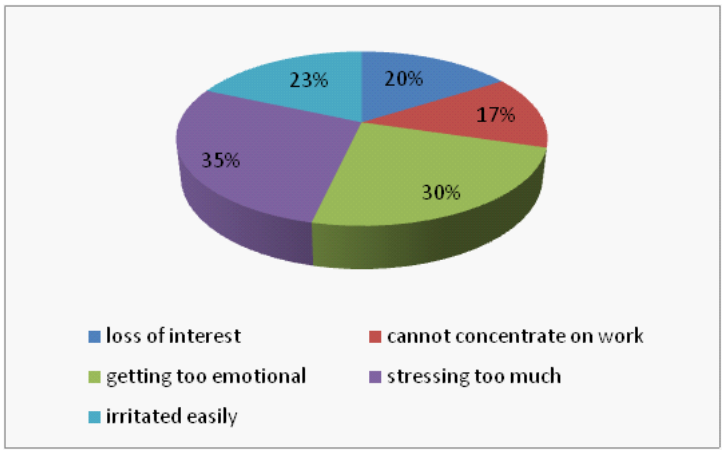


Figure 1: Psychosocial problems among study population

Among the study participants 35% suffered from stress, 30% got emotional too often on petty things, 23% got irritated too easily and 17% had difficulty in concentrating on their work.

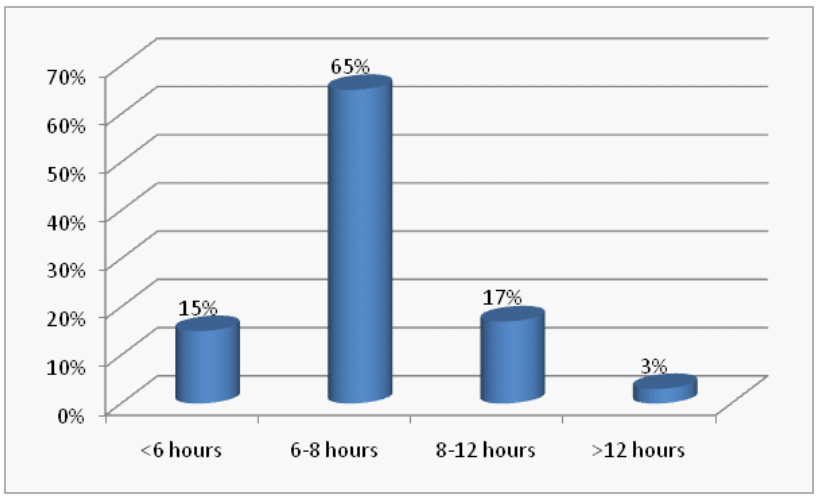


Figure 2: Sleeping pattern of the study population

Among the study participants, 65% of them had night sleep duration of 6-8 hours, 17% slept for 8-12 hours and 15% of them slept for less than 6 hours.

Discussion

In the present investigation, we found that the commonness of H. pylori among patients with reflux infection and GERD were 74.4% and 75.3%, individually. Additionally we demonstrated that the seriousness of antral gastritis was related with reflux disease. H. pylori could add to numerous gastrointestinal infections including GERD. The job of H. pylori in creating GERD still remains a disputable issue[9, 10]. Based on past reports, the rate of H. pyloriinfectionin patients with GERD, fiercely fluctuates from 30-90% and it appears that about 40% of patients with GERD are tainted by this bacterium[5, 11]. Furthermore, most preliminaries on the relationship between's H. pylori infection and GERD have demonstrated no causal relationship Acid contact to throat mucosa is considered as the fundamental driver of esophagitis[2, 5, 12]. H. pylori itself produces corrosive inhibitory proteins, while the disease instigates restraint of corrosive emission.

In certain patients H. pylori is basically colonized in the antrum, bringing about an antral transcendent gastritis, which thusly incites gastrin and corrosive discharge. In the remainder of patients H. pylori disease spreads from the antrum towards different pieces of the stomach[5, 13]. When the corpus (as the fundamental corrosive creating area) is tainted, the emission of corrosive is influenced by aggravation procedure and diminishes. In this perspective on point the annihilation of H. pylori may build corrosive emission and thusly actuate esophagitis as uncovered by past reports.

Conclusion

The predominance of GERD and gastritis of the examination populace was observed to be low. Awareness of the infection and the counteractive action must be made to diminish the rate of the illness. As indicated by the investigation we have discovered that in excess of 50 percent of populace eat fiery sustenance and inexpensive food and henceforth mindfulness must be spread about the irritating elements and avert the infection.

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Occupational and Environmental Exposure to Lead and Reproductive Health Impairment

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Abstract

Lead is a substantial metal. It is utilized in lead-corrosive battery, as a shading specialist, paints, and metal alloyed as protecting materials, smelters, printing press, etc. It is a lethal metal influencing different organs, and creating hatchling and youthful youngsters are progressively helpless against harmfulness of lead. This outline depends on the data of poisonous capability of lead to human multiplication and conceptive result. Introduction to lead may influence drive, semen quality by declining sperm tally, motility, feasibility, honesty, height in morphological variations from the norm, and sperm DNA respectability. These adjustments prompted decreasing fruitfulness potential and odds of unsuccessful labors, preterm birth, etc in an accomplice. Lead introduction impedes hormonal combination and guidelines in both genders. Lead introduction additionally influences female proliferation by impeding monthly cycles, decreasing ripeness potential, deferring origination time, modifying the hormonal generation, dissemination, influencing pregnancy and its result, etc.

Keywords: *Follicle-animating hormone, lead, moxie, luteinizing hormone, pregnancy result, semen quality, sperm DNA honesty, testosterone.*

Introduction

Lead is a normally happening component found in earth peak and is generally joined with different components. Lead is a substantial metal and dangerous to human and creature wellbeing. Lead harming happens in people when they are presented to higher dosages of lead or its ceaseless introduction which once in a while winds up lethal when lead develops in the body step by step through nonstop constant exposures to little amounts of lead through various sources. It influences practically every one of the organs of the human body and furthermore causes physical and mental hindrances. Youngsters are progressively helpless against introduction to lead when contrasted and same greatness of dosages of lead presentation in grown-up as their sensory systems are as yet creating. Lead still remains a critical ecological, word related, and general medical issue internationally. As of late, the World Health Organization (WHO) (2017) cited the information of Institute for Health Metrics and Evaluation that lead presentation represented 494,550 passing's and loss of 9.3 million inabilities balanced life years because of long haul impacts on wellbeing. They additionally evaluated that lead presentation represented 12.4% of the worldwide weight of idiopathic formative scholarly handicap, 2.5% ischemic coronary illness, and 2.4% of stroke[1]. Adequate quantities of distributed reports are accessible on lead and human generation alongside controlled test examines regarding lead conceptive lethality. Agarwal detailed that overwhelming metals, for example, lead, mercury, cadmium, arsenic, and chromium may cause birth abandons. Despite the fact that the mother might be unaffected or unconscious to such low-level introduction, their off springs may be influenced unfavorably with presentation to such specialists in utero[2]. Winder referenced that from the view purpose of human propagation, lead is known to cause various unfriendly conceptive results in

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the two people. Revealed impacts of lead in men incorporate decreased charisma, consequences for spermatogenesis (diminished motility and numbers, expanded irregular morphology), chromosomal harm, barrenness, anomalous prostatic capacity, changes in serum testosterone, and impacts in ladies which include fruitlessness, unnatural birth cycle, early layer break, preeclampsia, pregnancy hypertension, and furthermore preterm birth[3].

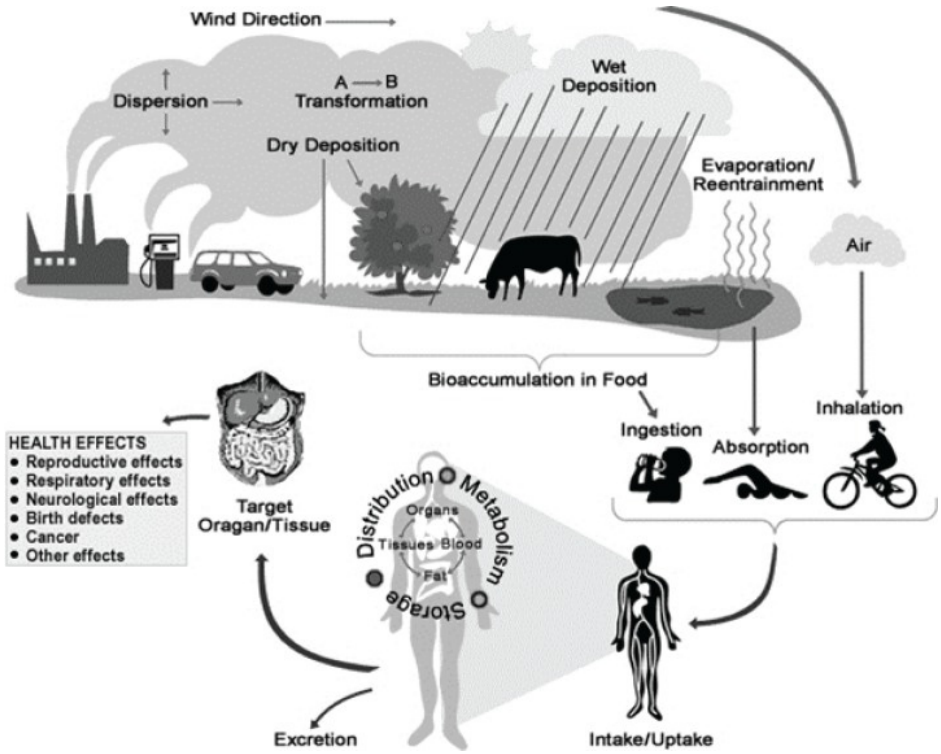


Figure 1: Illustration how people are exposed to chemicals in the environment and the effect of such chemicals on human health

Occupational Expose: Word related presentation is a noteworthy hotspot for lead harming in grown-ups. As per evaluations made by the National Institute of Occupational Safety and Health (NIOSH), in excess of 3 million laborers in the United States are possibly presented to lead in the work environment (Staudinger and Roth, 1998). Word related presentation as the significant concern and furthermore the primary driver of lead harming was accounted for by Needleman (2004). The basic working offices that include lead containing items are radiation shields, ammo, and certain careful gear, creating dental X-beam films before computerized X-beams, fetal screens, plumbing, circuit sheets, stream motors, and fired coatings. All these expansion the odds of danger with expanding presentation. Moreover, numerous other word related laborers like lead excavators and smelters, handymen and fitters, vehicle mechanicals, glass makers, development specialists, battery producers and recyclers, terminating range teachers, and plastic makers are in danger for lead presentation.

Lead is a typical natural contamination. Presentation to lead happens for the most part at word related destinations, creation of lead-corrosive batteries or funnels, metal reusing and foundries. Kids living close such places are additionally in danger of raised blood lead levels. In August of 2009, 2000 kids living close zinc and manganese smelters were observed to be harmed with lead, an occurrence which brought about uproars. Other basic things which cause lead introduction are lead noticeable all around, family unit dust, soil, water, and business items.

Signs and manifestations: Lead harming causes an assortment of manifestations, including unusual conduct which changes from individual to individual, while time of presentation assumes a significant job. There

are additionally thinks about which demonstrate no side effects of lead harming even with raised degrees of lead in the body. The inquiry what makes such contrasts in the human body is an issue of real concern. For what reason are there such contrasts in achieving harmfulness of lead or other lethal substance? Why for one gathering of individuals any expansion in the fixation gives poisonous quality and for another a similar level has no impact. As of now there is no proof from the writing about such contrasts, anyway it is trusted that future research could investigate this region and make sense of the potential reasons.

Materials and Method

The writing on introduction to lead and human male and female propagation just as on pregnancy, fetal advancement, and its result were gathered through looking through different sites, for example, Google, Pub Med, and TOXNET and furthermore counseling different books and diaries identified with word related, natural, and regenerative wellbeing. The article is isolated into various areas dependent on male and female concerning word related and natural introduction to lead. Information are condensed and delineated in [Table 1], [Table 2].

Table 1: Word related and natural introduction to lead and human male multiplication

Exposure to lead	Observed effects	References
Exposure to inorganic lead >40 µg/dL of blood	Reduced sperm count, volume, density, changing sperm motility, and morphology	Apostoli *et al.* (1998)
Reproductive endocrine function in healthy male industrial workers	Moderate exposure to Pb (BPb <400 µg/L) and Cd (BCd <10 µg/L) reduces semen quality without conclusive evidence of impairment of male reproductive endocrine function	Telisman *et al.* (2000)
Reproductive effects were observed at low-level Pb environmental exposure (BPb median 49 µg/L, range 11-149 µg/L)	A significant association of BPb, delta-aminolevulinic acid dehydratase, and/or erythrocyte protoporphyrin with reproductive parameters indicated a lead-related elevation in immature, pathologic, wide, round, and short sperm, serum testosterone and estradiol level, and a decline in seminal plasma zinc and serum prolactin	Telisman *et al.* (2007)
BLL ≥20 µg/dL and subjects with BLL <20 µg/dL	A nonsignificant reduction in count, motility, higher impaired sperm morphology with BLL ≥20 µg/dL compared with <20 µg/dL subjects; chromatin condensation negatively correlated with BLL	Awadalla *et al.* (2011)
Semen quality and endocrinal function in infertile painter	A significant negative correlation between BPb and sperm count, motility, whereas no significant correlation between BPb and endocrinal parameters PbB ≥20 µg/dL showed a significant decrease in sperm motility, increase in testosterone level	Hosni *et al.* (2013)
Seminal Pb and Cd at environmental level and semen quality	A negative association between seminal Pb or Cd and sperm concentration, motility, and % abnormal morphology; exposure to Pb (5.29-7.25 µg/dL) and Cd (4.07-5.92 µg/dL) might affect semen quality	Pant *et al.* (2015)
Accumulation of lead	Affects hypothalamic-pituitary axis causing blunted TSH, GH, and FSH/LH responses to TRH, GHRH, and GnRH stimulation, respectively; higher levels of PRL in Pb intoxication In short-term Pb exposure, higher LH and FSH associated with normal testosterone, whereas long-term exposure low testosterone levels do not induce high LH and FSH	Doumoucht-sis *et al.* (2009)
Lead-exposed male workers and serum sex hormone	Testosterone lower, whereas inhibin B significantly higher; Pb exposure alters male sexual hormone, which might harm endocrine function and Sertoli cells	Yu *et al.* (2010)
Role of Pb and Cd on sex hormones and molecules of steroid biosynthesis pathway	After adjustment for age, race, BMI, smoking, diabetes, and alcohol, BPb was positively associated with testosterone and SHBG, whereas BCd positively associated with SHBG	Kresovich *et al.* (2015)

BLL: Blood lead level; TSH: Thyroid-stimulating hormone; GH: Growth hormone; FSH: Follicle-stimulating hormone; LH: Luteinizing hormone; TRH: Thyrotropin-releasing hormone; GnRH: Gonadotropin-releasing hormone; BMI: Body mass index; SHBG: Sex-hormone binding globulin; PRL: Prolactin

Table 2: Occupational and environmental exposure to lead and human female reproduction

Exposure to lead	Observed effects	References
Low-level cumulative lead exposure	An association found between low-level cumulative Pb exposure and an earlier age at menopause may contribute to menopause-related health outcomes in older women	Eum *et al.* (2014)
Female workers of lead battery plants	Incidence of poly-menorrhea, prolonged and abnormal menstruations, hypermenorrhea; spontaneous abortion noticed in few workers; poor working conditions and workload may also be additional factors	Tang and Zhu (2003)
Geometric mean of Cd, Pb, and Hg levels was 0.29 (0.19-0.43) µg/L, 0.93 (0.68-1.20) µg/dL, and 1.03 (0.58-2.10) µg/L, respectively	Decreases in FSH with increasing Cd and elevation in progesterone with increasing Pb level; environmentally relevant levels of metals are associated with modest changes in reproductive hormone levels in premenopausal women	Pollack *et al.* (2011)
BPb levels and serum FSH and LH in 35- to 60-year-old women; BPb levels of women ranged from 0.2 to 17.0 µg/dL	As BPb increased, the concentration of serum FSH increased in postmenopausal women, women with both ovaries removed, and premenopausal women; LH increased as BPb level increased in postmenopausal women and women with both ovaries removed; lowest concentrations of BPb at which a relationship detected were 0.9 µg/dL for FSH and 3.2 µg/dL for LH	Krieg Jr and Feng (2011)
Low level of Pb	BPb in infertile women was significantly higher than controls (3.55 vs. 2.78 µg/dL); compared with women with BLL ≤2.5 µg/dL, and BLL >2.5 µg/dL associated with a threefold increased risk for infertility	Chang *et al.* (2006)
Effect of Pb and Cd on hormone production throughout sensitive developmental period	High Pb (≥5 µg/dL) inversely associated with inhibin B >35 pg/mL (odds ratio=0.26 compared with Pb <1 µg/dL); at 10 and 11 years, girls with low Pb (<1 µg/dL) had significantly higher inhibin B than girls with moderate (1-4.99 µg/dL) or high Pb (≥5 µg/dL); inhibin B levels lower among girls with both high Pb and high Cd than with high Pb, relative to girls with low Pb and low Cd	Gollenberg *et al.* (2010)

BLL: Blood lead level; FSH: Follicle-stimulating hormone; LH: Luteinizing hormone

Findings: There are a few reports on introduction to lead and disintegration of human conceptive wellbeing, and unfavorable impact on pregnancy and its result are accessible since long and endeavors are in progress to decrease/confine/stop human presentation to lead by different partners everywhere throughout the world. These reports showed that lead can instigate barrenness and hormonal awkwardness in the genders, decrease moxie, influence spermatogenesis and interruption in ovarian cycle in ladies, influence fertility and unfavorable pregnancy result, etc. Be that as it may, people are presented to lead as well as presented to a few different toxicants during their everyday exercises. In this manner, it is hard to pinpoint a solitary operator/ factor in charge of unfriendly regenerative impacts. These variables at some point may act synergistically to deliver such unfavorable impacts or even a few factors, for example, diet may likewise effect on unfriendly impacts. Be that as it may, the positive finding of these toxicants supports taking up preventive measures to stop introduction to such conceptive toxicants.

Male Propagation and Lead Presentation: People are presented to various toxicants including overwhelming metal lead during their occupations and through condition. Toxic substances in work environment may likewise add to barrenness among specialists. There are a few reports which demonstrated that lead effectsly affects human male propagation by declining charisma, spermatogenesis, semen quality, hormonal generation and guideline, etc. A mix of hereditary, have, natural, word related, and way of life elements adds to unfavorable consequences for the conceptive strength of men. A large portion of the examinations have commonly affirmed that even moderate-to low-level introduction to lead influences certain regenerative parameters[8]. Various prior reports proposed that word related presentation to lead influences the semen quality at a degree of >40 µg/dL in blood of uncovered individual. As ahead of schedule as 1975, Lancranjan et al. announced that raised degrees of Pb were related with diminished moxie and an expansion in semen variations from the norm in laborers presented to lead in workplace[9]. Earlier, Apostolic et al. revealed that introduction to inorganic lead >40 µg/dL in blood disabled male conceptive capacity by decreasing sperm tally, volume, and thickness, or changing sperm motility and morphology[10]. Alexander et al. additionally found a decrease in absolute sperm tally with expanding blood lead level (BLL), and semen Pb fixation was conversely connected with complete sperm check, discharge volume, and serum testosterone, yet not to sperm concentration[11]. Later, Telisman et al. researched blood lead (BPb), action of delta-aminolevulinic corrosive dehydratase (ALAD), erythrocyte protoporphyrin (EP), blood cadmium (BCd), serum zinc (SZn), fundamental liquid zinc (SfZn), serum copper (SCu), and semen quality and regenerative endocrine capacity in solid mechanical specialists. They found that moderate exposures to Pb (BPb <400 µg/L) and Cd (BCd <10 µg/L) can essentially lessen semen quality without convincing proof of disability of male conceptive endocrine function[12].

Discussion

Various pathways may be associated with lead-initiated weaknesses of male regenerative wellbeing. Vigeh et al. detailed that regenerative impacts of lead are intricate. In spite of the fact that lead can conceivably lessen male ripeness by diminishing sperm quality and influencing useful parameters, not the sum total of what concentrates have had the option to exhibit such discoveries. They additionally referenced that blood-testis obstruction can shield testicular cells from direct introduction to high BLLs. For these and thinking about the wide range of lead lethality on regenerative hormones, they recommended that lead's principle impact on male propagation perhaps happens by changing the conceptive hormonal pivot and hormonal control on spermatogenesis[28]. Furthermore, as of late Gandhi et al. referenced that natural and word related presentation of lead may unfavorably influence hypothalamic–pituitary–testicular hub, debilitating spermatogenesis. Brokenness at the regenerative pivot, specifically testosterone concealment, is most defenseless and irreversible during pubertal improvement.

Female Multiplication and Lead Introduction: Various examinations are likewise accessible on female multiplication and on pregnancy and its result as for lead introduction. Tang and Zhu announced that the occurrence of poly-menorrhea, drawn out and anomalous monthly cycles, and hyper menorrhea was essentially higher in female laborers of lead battery plants than control. The rate of unconstrained premature birth was likewise seen in couple of laborers when contrasted and none in charge. They presumed that word related Pb introduction could prompt impedance of the capacity of conceptive frameworks; in any case, poor working conditions and remaining task at hand may likewise be extra explanations behind such effects[30]. Eum et al. likewise found a relationship between low-level total lead introduction and a previous age at menopause. These information propose that low-level lead introduction may add to menopause-related wellbeing outcomes in more established women[31].

Ethical Clearance: No ethical clearance was required for this work.

Source of Funding: Self funded work.

Conflict of Interest: Nil

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Usage and Perceptions of Anabolic-androgenic Steroids among Male Fitness Centre Attendees in Urban Area of Kancheepuram District in Tamil Nadu

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Abstract

Background: Thinking about the ongoing ubiquity of weight training and the clear spread of anabolic androgenic steroid (AAS) use among working out devotees in Kancheepuram locale, there is an overall absence of logical examination concerning the utilization, learning and frames of mind towards AAS among the populace in danger of manhandling it. In this manner, this examination intends to explore the recurrence, learning, dispositions and routine with regards to AAS use among male wellness focus participants in Kancheepuram region in Tamil Nadu.

Strategies: A cross sectional review using a self-directed poll was utilized. Data on socioeconomics just as information and mentality about and towards the utilization of AAS was incorporated into the survey. Ten wellness focuses in Kancheepuram area were arbitrarily chosen and surveys were disseminated to all people leaving each inside on haphazardly chosen days and time frames for each middle. Generally n = 100 surveys were circulated.

Results: An aggregate of n = 80 polls were returned finished. Of the responders, 28.7 % utilized AAS. About 48.8% of responders accept that ideally solid body must be accomplished by utilizing AAS, and greater part of non-AAS clients (67.9%) accept that AAS use would have huge damages to wellbeing. There is blended reaction with respect to the information of symptoms of AAS.

Conclusion: The utilization of AAS is high among male exercise center clients in Kuwait and is probably going to introduce an extra weight to the wellbeing administration. A powerful activity to limit the weight of AAS misuse should concentrate on changing the demeanours towards AAS as opposed to spreading consciousness of their symptoms.

Keywords: *Sports medication, androgenic anabolic steroids, general wellbeing.*

Introduction

Anabolic androgenic steroids (AAS) are engineered subsidiaries of testosterone having articulated anabolic properties and generally powerless androgenic properties. They are utilized clinically for the treatment of conditions portrayed by strangely low generation of testosterone, or muscle squandering. In any case, since the 1950s, AAS have been utilized by expert muscle heads and progressively by youthful grown-ups to improve physical appearance. These non-medicinal employments of AAS are related with noteworthy wellbeing dangers, for example, cardiovascular, hepatic, endocrine, psychosocial and mental issue just as death[1-3].

In the course of the most recent decade various examinations have analyzed the commonness of exercise center clients' utilization of execution upgrading medications, for example, anabolic steroids, clenbuterol

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and development hormones just as why teenagers utilize these medications. AAS are utilized to improve athletic execution, physical engaging quality, increment body weight, sans fat mass, muscle size, and quality when joined with quality preparing. Various investigations have distinguished hazard factors for AAS use, including negative self-perception, more youthful age, knowing different AAS clients, more noteworthy time spent on weight lifting, more prominent familiarity with the impacts of AAS use, and other illegal medication use.

The most widely recognized discussions against AAS use start with the contentions on symptoms of AAS that dangers young people. A considerable lot of the substances utilized by competitors and youths to upgrade execution convey noteworthy basic dangers, including a danger of death. Also; AAS use has been related with a wide scope of physical and mental inconveniences including atrial fibrillation, skin sores, for example, extreme skin break out and canker at site of infusion, edema, heart palpitations, diminished richness, and sexual brokenness, changes in lipoprotein part, expanded triglyceride levels, expanded convergences of a few thickening variables, changes in the myocardium, for example, expanded left ventricular mass and enlarged cardiomyopathy and hyperinsulinism and reduced glucose resistance . Mental symptoms, for example, hypomania, craziness, or real gloom have likewise been related with AASs. Notwithstanding expanded forcefulness, there have additionally been reports of fierce conduct and there are confirmations recommending an upgraded danger of unnatural demise by ending it all or being the casualty of crime. Moreover, AAS have likewise been connected to the maltreatment of liquor, morphine, and other addictive substances[4, 5].

Avocation of Study: This examination intends to research the recurrence, information, frames of mind and routine with regards to AAS use among male wellness focus participants in urban zone of Kancheepuram area in Tamil Nadu. Also in regards to the learning about the solid nourishment propensity. It likewise centers on the information of symptoms of AAS[6].

Members: This was a cross-sectional study of guys going to wellness focuses in Kancheepuram region. These wellness focuses were haphazardly chosen from the national phone registry. Self-managed polls were then circulated to all people leaving each inside on an arbitrarily chosen day and timeframe which was distinctive for each middle. Generally speaking n = 100 polls were disseminated. A sum of n = 80 were returned finished.

Examining type: cross sectional overview.

Testing size: Reactions from 80 subjects have been gathered.

Testing outline: Testing edge incorporates male wellness focus participants.

Consideration criteria: The individuals who were available and complete noting the survey.

Rejection criteria: The individuals who neither were absent nor did not finish noting the poll[7,8].

Findings:

Utilization and socioeconomics: The age conveyance of the example incorporate 53.7% were matured between 19-25, 18.8% were between 26-34 years, 23.8% were between 14-18 years and 3.7% were over 34 years. People from a wide range of occupation were considered for the examination.

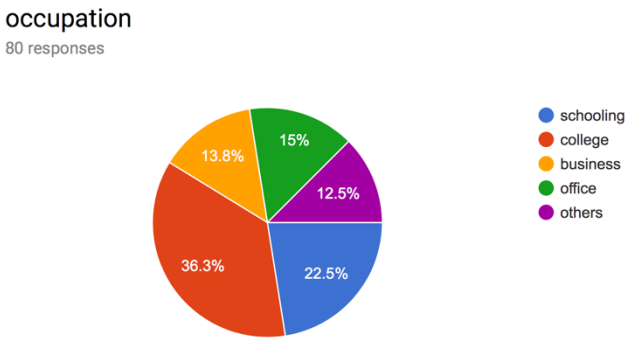


Figure 1: Occupation

The questionnaire dealt with 5 main areas of interest which includes:

i. Demographic

ii. AAS usage

iii. Knowledge and attitude toward AAS

iv. AAS practise habits

v. Healthy lifestyle

The percentage of people who've used AAS in our sample was 28.7% of the responders, 31.3 % with intentions to use, 41.3 % with no intentions to use, and 27.5 % with undetermined intentions.

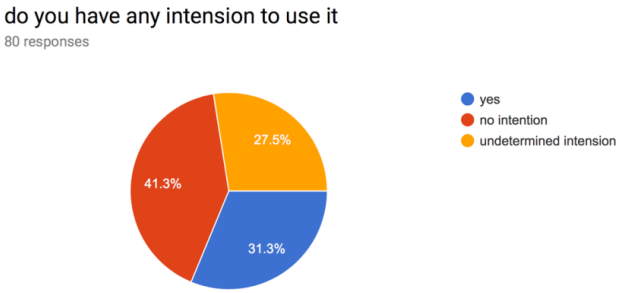


Figure 2: Intention of Users

Attitude to AAS: A high percentage of users and non-users with intentions to use agreed with the statement that having an optimally muscular body can only be achieved by using AAS.

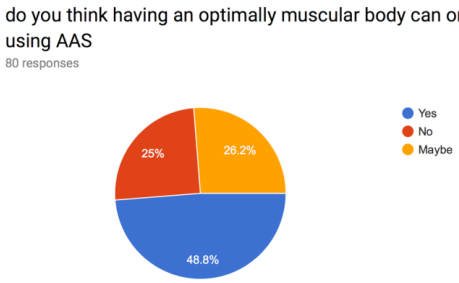


Figure 3: Attitude to AAS

Several reasons for not using AAS were reported. When analysed, being harmful to health was the most important single reason for not using AAS and having not felt the need to use AAS was the second. Amongst non-users only 67.9 % reported that being harmful to health was their primary reason for not using AAS, and 32.1 % reported that it was not their reason at all

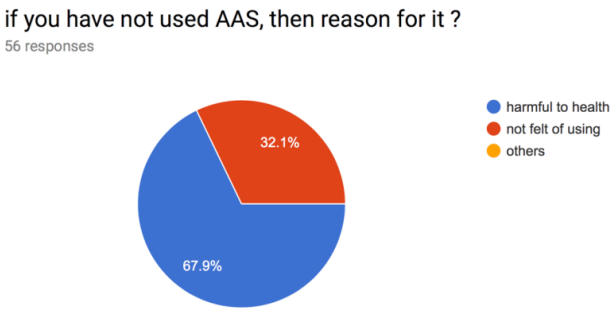


Figure 4: Reason for not using AAS

Practise of AAS use: Injectable forms of AAS were used in high frequency at about 75%, and a combination of oral and injectable AAS was the least common practice whereas oral form of AAS were at about 25%.

The frequency of intake of many (≥3) other ergogenic aids and supplements (e.g. growth hormone, Nitric Oxide-containing supplements, creatine-containing supplements, etc.) was highest amongst AAS users 55% whereas the response for not required is 45%.

Source of AAS: Users obtained AAS from a variety of sources as follows: gym coach (56.6 %), individual supplier (30.4%), (pharmacy or physician (13%).

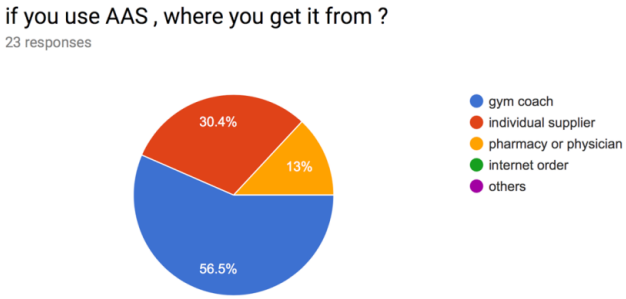


Figure 5: Source of AAS

Healthy lifestyle: About 57.5% responders consume 3 meals a day whereas 42.5%of responders consume more than 3 meals a day. When asked regarding the diet the following responses is been obtained.

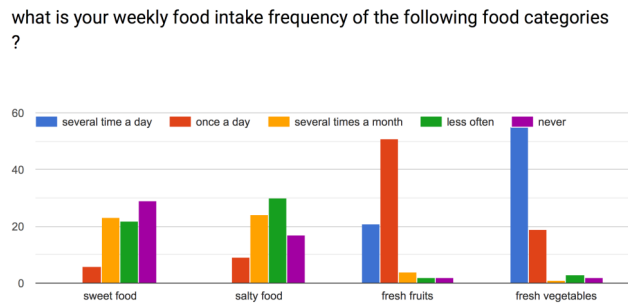


Figure 6: Healthy lifestyle

Discussion

This examination explored the recurrence, information, frames of mind and routine with regards to AAS use in Kancheepuram locale among male wellness focus participants. The recurrence of AAS clients was 23%considering that AAS clients were as taught as non-clients, it doesn't create the impression that the degree of training was a factor in the choice to utilize AAS in this examination. Both the conviction that AAS are critical to ideal solid bulk.AAS clients and non-clients with goals to utilize accepted all the more unequivocally in the advantages of AAS and were less stressed over the dangers related with their utilization. In general, clients saw that the advantages to muscle mass exceeded the dangers of negative symptoms.

It is fascinating that lone 67.9% of non-clients announced that being hurtful to wellbeing was their essential explanation behind not utilizing AAS. The vast majority of non-clients without any aims to utilize AAS have joined the exercise center for reasons other than lifting weights, and the greater part of them detailed they have not wanted to utilize AAS to accomplish their ideal objective in the rec center. This demonstrate the primary reason exercise center individuals did not utilize AAS was that they didn't think or feel they required them, and not as a result of their symptoms. This snippet of data could be pivotal for any exertion toward controlling the spread of AAS misuse. The utilization of AAS was connected with the utilization of other substances; AAS use was obviously connected with an a lot higher recurrence of admission of many (≥3) ergogenic helps and different substances (for example development hormone, Nitric Oxide-containing supplements, creatine-containing supplements, and so on.)[9].

Lacking information about entanglements of AAS was likewise detailed in past investigations. Curiously, non-clients were as much clueless as clients about the reactions of AAS, despite the fact that a fundamentally bigger level of them thought they are hurtful to wellbeing. Supporting the end that spreading mindfulness about the symptoms of AAS may not be the best system for restricting their maltreatment. These outcomes demonstrate that the dispositions towards AAS don't relate with information about their damages, and the demeanors towards AAS are more firmly connected with their utilization than is learning of the potential damages[10].

Conclusion

Anabolic androgenic steroids (AAS) are engineered subsidiaries of testosterone having articulated anabolic properties and generally frail androgenic properties. They are utilized clinically for the treatment of conditions described by unusually low creation of testosterone, or muscle squandering. In any case, since the 1950s, AAS have been utilized by expert muscle heads and progressively by youthful grown-ups to improve physical appearance. These non-therapeutic employments of AAS are related with noteworthy wellbeing dangers, for example, cardiovascular, hepatic, endocrine, psychosocial and mental issue just as death.

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Conflict of Interest: None declared.

Ethical approval: Study was approved by the institutional ethics committee, Sree Balaji Medical College and Hospital.

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The Incidence and Health Burden of Earaches Attributable to Recreational Swimming in Natural Waters: A Prospective Cohort Study (Swimmer's Ear)

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Abstract

Otitis externa is thought to influence 10% of individuals at some stage, and can display in intense, unending, or necrotizing frames. Otitis externa might be related with skin inflammation of the ear waterway, and is increasingly normal in swimmers, in moist situations, in individuals with tight ear trenches, in portable amplifier clients, and after mechanical injury. Intense Otitis externa (AOE) is the irritation of external ear and ear channel. Four classifications of otitis externa that incorporate intense limited otitis externa, diffuse otitis externa, chronic otitis externa, and harmful otitis externa.

Incidence of otitis externa is high in Europe and most likely higher in the creating nations. Inclining factors for AOE is swimming and swimming in the dirtied water. Bacterial development and impedance of the skin of the ear trench that allows the advancement of infection. Chronic skin conditions atopic dermatitis, psoriasis or variations from the norm of keratin generation may cause contamination and outside otitis. Frequently related pathogens include, Pseudomonas Aeruginosa, Staphylococcusepidermidis, Staphylococcus Aureus, fungi, and yeast. Treatment of decision utilized are anti-toxin ear drops with or without corticosteroid Fungal or otomycosis require debridement and nearby treatment.

Keywords: *Otitis Externa, outer soundrelated trench, Pathophysiology, Clinical presentation,Treatment.*

Introduction

Otitis externa, outside otitis or swimmer's ear is an irritation of the external ear and ear trench. Alongside otitis media, outer otitis is one of the two human conditions usually called "earache"[1].Infection of the outside sound-related canal(EAC),[1](otitis externa) is like contamination of skin and delicate tissue somewhere else. Disease of the outside ear channel might be sub divided into four categories:(a)acute confined otitis externa (b)diffuse otitis externa(c) interminable otitis externa, and (d) dangerous otitis externa[2-4]. The occurrence of otitis externa is high. In the Netherlands,it has been assessed at 12-14 for every 1000 populace for each year, and has been appeared to influence over 1% of the example populace in the United Kingdom over an a year term[5]. Of the inclining factors for intense otitis externa,only swimming has been appeared to expand the risk[6]. Swimming in contaminated water is a typical method to get swimmer's ear, yet it is additionally conceivable to get swimmer's ear from water caught in the ear waterway after shower, particularly in a muggy climate[7]. Constriction of the ear channel from bone growth(surfer's ear) can trap flotsam and jetsam prompting infection[8] Saturation jumpers have announced otitis externa during word related exposure[9]. Even without presentation to water, the utilization of articles, for example, cotton swabs or other little items to clear the ear trench is sufficient to cause breaks in the skin, and enable the condition to develop[10]. Once the skin of the ear channel is aroused, outer otitis can be definitely improved by either scratching the ear channel with an item, or by enabling water to stay for any delayed length of time[10]. Two factors that are required for outside otitis

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to create are (1) the nearness of microorganisms that can taint the ear and (2) hindrances in the respectability of the skin of the ear waterway that enables disease to happen. On the off chance that the skin is sound and unharmed, just presentation to high centralizations of pathogens, for example, submersion in a lake tainted by sewage, is probably going to set off a scene. Be that as it may, if there are ceaseless skin conditions that influence the ear trench skin, for example, atopic dermatitis seborrheic dermatitis, psoriasis or anomalies of keratin creation, or if there has been a break in the skin from injury, even the typical microbes found in the ear channel may cause disease and out and out manifestations of outer otitis[11]. Prophylactic measures, for example, drying the ears with a hair dryer and staying away from control of the outside waterway may help recurrence[12]. Pathogens generally connected with intense otitis externa are Pseudomonas aeruginosa, Staphylococcus epidermidis, Staphyococcusaureus,,and Streptococcus Pyogenes[13]. Organisms and yeast are normally found in patients with unending otitis externa or those are immunocompromised[14]. Current the executives incorporates debridement pursued by dressing and topical treatment with acidifying or antibacterial specialists, with or without corticosteroids[15]. Frequently utilized are anti-infection ear drops with or without steroids. The paper surveys the present writing, pathophysiology, diagnosis, and treatment of otitis externa

Pathophysiology:

Sound-related Canal: The one of a kind structure of sound-related channel adds to the advancement of otitis externa. It is the main skin-lined circular drive in the human body. The outer sound-related channel is warm, dull and inclined to end up sodden, making it a magnificent situation for bacterial and parasitic growth. The skin is dainty and the sidelong third overlies ligament, while the rest has a base of bone. The waterway is effectively traumatized. The exit of trash, emissions and outside bodies is actuated by a bend at the intersection of the ligament and bone. The nearness of hair, particularly the thicker hair basic in more seasoned men, can be a further impediment. The outer sound-related has some unique protections. Cerumen makes an acidic coat containing lysozymes and different substances that likely hinder bacterial and parasitic development. The lipid-rich cerumen is hydrophobic and keeps water from infiltrating to the skin and causing maceration too little cerumen can incline the ear to contamination, yet cerumen that is over the top or too gooey can prompt obstacle, maintenance of water and flotsam and jetsam, and infection Additionally, the trench is guarded by one of a kind epithelial movement that happens from the tympanic layer outward, conveying and garbage[16,17]. When these protections come up short or when the epithelium of the outer sound-related channel is harmed, otitis externa results. There are numerous precipitants of this contamination however the most widely recognized is unnecessary dampness that raises the pH and expels the cerumen. Once the defensive cerumen is evacuated, keratin garbage assimilates the water, which creates a nourishing medium for bacterial growth[12]. The outside sound-related channel is roughly 2.5 cm long from the concha of the auricle to the Tympanic layer. The horizontal portion of the trench is cartilaginous; the average; half passages through the transient bone. Choking, theism thus, present at the intersection of the rigid and cartilaginous bits, restrains the passage of wax and remote bodies to the tympanic layer. The skin of the channel is thicker in the cartilaginous segment and incorporates a well-created dermis and subcutaneous layer. The skin coating of the rigid part is more slender and solidly joined to the periosteum and does not have a subcutaneous layer. Hair follicles are various in the external third space in the inward 66% of waterway[18]. The microbial vegetation of the outside trench are like the greenery of skin somewhere else. There is transcendence of Staphylococcus epidermidis, Staphylococcus Aureus, Corynebacterium and, to lesser degree anaerobic microbes, for example, Propina Bacterium Acnes. Pathogens in charge of contamination of the center ear (Streptococcus pneumonia, Haemophilus Influenzaeand Moraxella catarrhalis) are extraordinarily found in the way of life of the outside sound-related channel when the tympanic film is intact[19, 20].

Clinical Presentation and Management: Intense limited otitis media externa may happen as pustule or furuncle related with hair follicles; the outer ear channel is erythematous, edematous and might be loaded up with discharge and chips of skin trash. Staphylococcus Aureus is the most incessant pathogen. Erysipelas caused a gathering A Streptococcus may include the concha and the canal. Pain might be severe. Bluish-red hemorrhagic bullae might be available on the rigid trench dividers and furthermore on the tympanic layer. Adenopathy in the lymphatic waste zones is frequently present. Neighborhood and fundamental are normally healing. Entry point might be important to ease serious agony[18]. Intense diffuse otitis externa (swimmer's ear) happens for the most part in sweltering muggy climate. The ear tingles and turns out to be progressively painful.

The skin of waterway edematous and red. Gram-negative bacilli, basically P. pseudomonas may assume a critical job. A serious discharge outer otitis brought about by P.pseudomonas was related with portable redwood hot tub frameworks[26]. Gentle purifying to expel flotsam and jetsam, incorporating water system with hypertonic saline (3%) and purging with blend of liquor (70% to 95%) and acidic corrosive ought to be utilized initially. Hydrophilic arrangements, for example, half Burow's answer might be utilized for 1 to 2 days to diminish irritation .A cotton wick might be of an incentive in upgrading dispersion of the ototopical operator when trench is swollen. A ten-day routine of fluoroquinolone otic arrangement, for example, ofloxacin or ciprofloxacine-dexamethasone otic or ear drops of neomycin alone or with polymyxin joined with hydrocortisone are successful in decreasing neighborhood irritation and infection[27, 28].

Incessant otitis externa is brought about by aggravation from waste through a punctured tympanic film. The fundamental reason is endless suppurative otitis media. Tingling might be extreme. The board is coordinated to center ear issue. Uncommon reasons for interminable otitis externa incorporate tuberculosis, syphilis, yaws, uncleanliness, and sarcoidosis[18]. Intrusive threatening otitis externa is an extreme necrotizing contamination that spreads from the squamous epithelium of the ear channel to nearby regions of delicate tissue, veins, ligament and bone[4,29].

Treatment: Powerful answers for ear waterway incorporate acidifying and drying specialists, utilized either separately or in blend. At the point when the ear trench skin is aroused from the intense otitis externa, the utilization of weaken acidic corrosive might be difficult. Burow's answer is an extremely viable cure against both bacterial and parasitic outer otitis. This is a cushioned blend of aluminum sulfate and acidic corrosive, and is accessible without medicine in the United States .Topical arrangements or suspensions as ear drops are the backbones of treatment for outside otitis. Some contains anti-infection agents, either antibacterial or antifungal, and others are basically intended to gently ferment the ear channel condition to dishearten bacterial development. Some solution drops additionally contain mitigating steroids, which help to determine swelling and itching. Although there is proof that steroids are powerful at diminishing the length of treatment time required, fungal otitis externa (likewise called otomycosis) might be caused or disturbed by excessively delayed utilization of steroid containing drops .Oral anti-microbials ought not be utilized to treat uncomplicated intense otitis externa .Oral anti-infection agents are not an adequate reaction to microscopic organisms which cause this condition and have a huge symptoms including expanded danger of artful infection. In differentiate; topical items can treat this condition.

In contagious or otomycosis otitis externa, purging of the ear channel by suctioning is head treatment. Acidifying drops, offered three to multiple times day by day for five to seven days are typically sufficient to finish treatment[12]. Because the contamination can endure asymptomatically, the patient ought to be assessed toward the finish of the course of the treatment. As of now any further purging can be executed as required. On the off chance that the contamination isn't settling over-the counter clotrimazole 1 percent arrangement (Lotrimin), which likewise has some antibacterial movement can be utilized. In vitro examinations demonstrate that topical arrangements of thimerosal (Merthiolate) and M-cresyl acetate(Cresylate) are increasingly powerful specialists yet are messier. If the tympanic film is punctured, tolnaftate 1 percent solution(Tinactin) ought to be utilized so as to counteract ototoxicity. All of these topical operators topically utilized at a dose of three or four drops day by day for seven days. Aspergillus contaminations might be impervious to clotrimazole and may require the utilization of oral itraconazole (Sporanox).

Prevention: Counteractive action of repeat of otitis externa essentially comprises of staying away from the numerous precipitants and dermatologic issue. This especially significant for patients with surprisingly gooey cerumen, a limited outside sound-related channel or fundamental allergies[17].After washing or swimming, the outer sound-related waterway ought to be dried utilizing a hair dryer on the most minimal warmth setting. Acidifying drops would then be able to be ingrained .Some creators prescribe consolidating acidifying specialist with liquor drops (Swim Ear) to go about as an astringent, yet numerous doctors feel this excessively bothering and favor utilizing Burow's answer as the astringent (Star-0tic).0bviously and control of the skin of the outer sound-related canal(such as scratching or enthusiastic purging) ought to be kept away from. Whenever the outside sound-related waterway is cleaned and cerumen is evacuated, the trench turns out to be progressively powerless against disease. In this manner, if there has been any injury and syringing has left the outer sound-related channel wet, utilization of

an acidifying operator with hydrocortisone is a decent prophylactic measure .If the cerumen is hard to expel, ceruminolytic specialist such as Cerumenex or even a straightforward 4 percent heating soft drink arrangement ought to be utilized in the workplace to mellow the cerumen first to abstain from damaging the outside sound-related canal. Persons who swim every now and again should utilize an obstruction to shield their ears from water. In any case, impermeable ear attachments go about as a neighborhood aggravation and have been appeared to incline the ear channel to otitis externa. A tight-fitting top offers better protection[17]. Patients with intense otitis externa ought to ideally refrain from water sports for in any event seven to 10 days, although a few creators would enable focused swimmers to return following three days of treatment as long as all agony has resolved. Other would permit come back with the utilization of well-fitting ear plugs[17].

Conclusion

Otitis externa is an aggravation of the external ear and ear canal. Frequently utilized treatment is anti-toxin ear drops, with or without corticosteroid. In parasitic or otomycosis otitis externa purging by suctioning, and with acidifying drops given a few times every day is the treatment of decision .Malignant otitis externa (MOE) may result in genuine confusions

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Study on Immunization Knowledge, Attitude and Practice among the Parents having Children Less than 16 Years of Age

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Abstract

Background: A standout amongst the most financially savvy wellbeing intercessions is vaccination. The principle goal of the investigation is to create and approve a poll to watch the learning, frame of mind, routine with regards to immunization among guardians having youngsters under 16 years old. This examination likewise assesses the familiarity with guardians towards more up to date antibodies present today.

Strategies: A Cross-sectional investigation was done among 100 guardians utilizing helpful inspecting procedure and a survey was made to gather the Parents information and the information accumulation is made in MS-EXCEL. Educated assent and moral board of trustees endorsement is acquired.

Result: 84% of the guardians inoculate their youngster routinely 16% don't immunize normally. Among 100, 68% of guardians don't know about the more up to date antibody. Specialists were the primary wellspring of data. 65% of the guardians accept that immunization that doesn't anticipate the illness.

Conclusion: There is a restricted information among guardians with respect to more current immunization. Inoculation mindfulness by specialists and wellbeing training by the open are significant for the network acknowledgment of the new antibody and furthermore for keeping up their trust in the current immunization. Mindfulness in regards to NATIONAL Immunization SCHEDULE ought to be actualized all over India.

Keywords: *Awareness program, Health instruction, Parental training.*

Introduction

Childs wellbeing incorporates physical, mental and social prosperity. After the presentation of extended program on vaccination by world wellbeing association (WHO) in 1974, Global inclusion with routine antibodies has expanded from <5% to >=84%, inclusion of the third portion of diphtheria, lockjaw, pertussis immunization (DTP) before 12 months' over of age is a noteworthy pointer of inoculation program performance[1]. One of the significant hindrance for less inoculation inclusion in India are gigantic populace and poor mindfulness among general society. Infections can be forestalled somewhat by the usage of National Immunization timetable as per the truism "Avoidance is superior to fix". In 2016, almost 1 out of 10 youngsters did not get any immunization. WHO says an extra 1.5 million passing's could be stayed away from if worldwide inoculation normal improves? In 2017, no of kids inoculated are 116.2 million and it was the most astounding record ever. Since 2010,113 nations have presented new immunizations in excess of 20 million extra youngsters have been inoculated. Polio has been totally destroyed from India, where as measles, rubella, maternal and monatal lock jaw are behind the timetable. The greater part of the youngsters passing up a great opportunity is those living in the least fortunate, underestimated networks. Inoculation counteracts sickness, handicap and demise from immunization preventable infections including cervical malignant growth, diphtheria, hepatitis-B, measles, mumps, pertusis, pneumonia, polio, rotavirus, rubella

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and lockjaw. 169 million youngsters passed up a major opportunity first portion of measles immunization somewhere in the range of 2010 and 2017, UNICEF said.

Materials and Method

The survey was created based on Parents learning and practice towards the inoculation. An example space of 100 Parents were taken by arbitrary testing strategy. Guardians who came to visit the medical clinic for inoculation and guardians of in patient in Chennai are chosen. Cross sectional examination is done. It is the easiest type of an observational investigation. It depends on single examination of a cross area of populace. It is otherwise called pervasiveness ponder. Cross sectional investigations are more helpful for unending than fleeting diseases[2]. The deliberate assent is acquired from the guardians in the wake of advising in insight concerning the system and insights about the examination. Moral advisory group endorsement is gotten. Created survey was restricted to sixteen inquiries that was viewed as plausible and concentrated on learning, mentality and routine with regards to guardians about the antibody in the national vaccination plan.

Findings: Aggregate of 100 guardians were incorporated into the investigation of inoculation information, frame of mind and practice. Out of 100, 84% of the guardians inoculate their tyke normally, though, 16% doesn't immunize

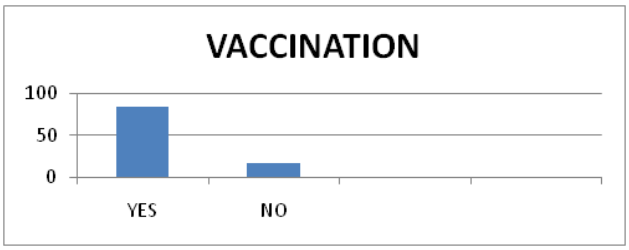


Figure 1: Awareness about vaccination

Yes-Regular

No-Irregular

Immunization knowledge of the parents are mostly acquired from the doctors and rest from relatives, mass media, and Internet.

Table 1: Sources of knowledge regarding immunization from various sources

Choices	%	Count
Doctor	65%	65
Relatives	27%	27
Internet	5%	5
Mass Media	3%	3

As a result of decreased awareness among the public regarding vaccination many aren't aware of the newer vaccines.

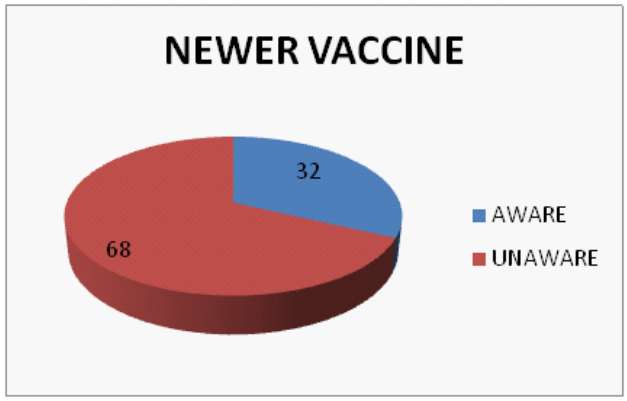


Figure 2: Awareness about latest trend in vaccination

Parents knowledge regarding maximu.m age vaccine can be administered is described

Under the following bar diagram

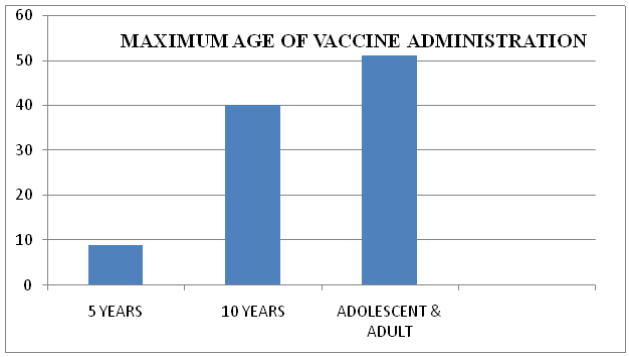


Figure 3: Maximum Age of Vaccine Administration

People have a false belief that autism can be caused due to vaccine administration. Among the 100 parents, certain think vaccination is harmful.

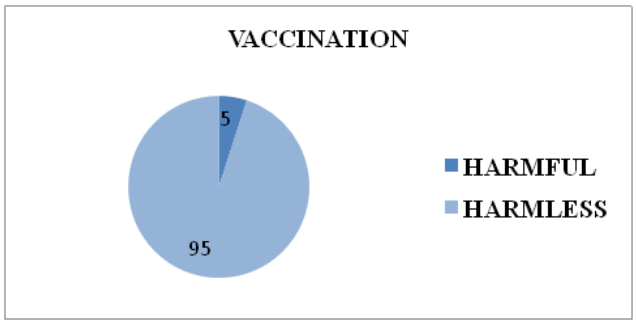


Figure 4: Distribution of people thinking vaccine as harmful

Discussion

80% of the parents are unaware that not all vaccines are administered under the national program and there are few vaccines which are in the recommended immunization schedule and need to be taken in addition to routine vaccines[3]. Another finding in the study was limited knowledge of the mothers regarding immunization through, a vast majority of respondents agreed on the fact that immunization was important to protect their children from diseases and most of them could not even name one disease that immunization provided protection against.

2019 campaign objectives: The main goal of campaign is to raise awareness about the critical importance of full immunization throughout the life[4].

As part of 2019 campaign WHO aims to:

1. Demonstrate the value of vaccine for the health of children, community and the world.
2. Highlight the need to be built on immunization progress while addressing gaps, including through increased investment.
3. Show how routine immunization is the foundation for strong, resilient health systems and universal health coverage.

Table 2: Knowledge about vaccination for different dieseases

Knowledge Assessment Questions	Yes (%)	No (%)	Don't Know (%)
Child with common cold be vaccinated	5%	82%	13%
Child with fever be vaccinated	4%	87%	9%
Child with diarrhea be vaccinated	5%	76%	19%
Vaccination available after 20 years of Age	33%	67%	-

Conclusion

Among the sample space collected, only 45% of the parents have the knowledge that, 3 vaccines are administered at birth, whereas 51% say as 2 vaccines, 4% say 4 vaccines respectively."Compliance to immunization is important", "Child immunization is important", and it is important for children to get all doctor-recommended vaccines.

World immunization week celebrated in the last week of April aims to promote use of vaccines to protect people of all ages against various diseases. Immunization saves millions of lives every year and it is recognized as one of the worlds successful and cost effective health intervention.

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Conflict of Interest: none declared.

Ethical Approval: study was approved by the institutional ethics committee, Sree Balaji Medical College and Hospital.

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A Study of the Knowledge and Attitude towards Pulsepolio in Urban areas of South India

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Abstract

Polio infection transmission has been hindered in many pieces of the world with the exception of couple of foci in ten nations situated in South Asia and Central/Western Africa[2]. The Government of India propelled the beat polio inoculation (PPI) program on a nationwide premise in 1995. The expression "beat" portrays the concurrent, mass organization of oral polio antibody (OPV) on a solitary day to all kids matured underneath 5 years[3]. PPI comprises of inoculation of kids at fixed stalls on two national vaccination days (NID), isolated by about a month and a half, throughout the winter season. The primary point of PPI is to intrude on the transmission of wild polio infection by presenting kids to the antibody virus[3]. However, 5–6% of kids were being missed in the PPI. In this manner, during 1999–2000, notwithstanding stall inoculation, a house-to-house search of missed youngsters was embraced to immunize them over the 2–3 days following each NID.

Keywords: *Pulsepolio, beat polio inoculation (PPI), oral polio antibody (OPV).*

Introduction

Poliomyelitis is a dreaded ailment in certain nations of the world because of its lamentable inheritance of loss of motion and disfigurement. In 1988, the World Health Assembly and its individuals focused on the objective of annihilation of poliomyelitis continuously 2000[1]. This worldwide activity to kill polio was the biggest global illness control exertion ever. Polio infection transmission has been hindered in many pieces of the world with the exception of couple of foci in ten nations situated in South Asia and Central/Western Africa[2].

The Government of India propelled the beat polio inoculation (PPI) program on a nationwide premise in 1995. The expression "beat" portrays the concurrent, mass organization of oral polio antibody (OPV) on a solitary day to all kids matured underneath 5 years[3]. PPI comprises of inoculation of kids at fixed stalls on two national vaccination days (NID), isolated by about a month and a half, throughout the winter season. The primary point of PPI is to intrude on the transmission of wild polio infection by presenting kids to the antibody virus[3]. However, 5–6% of kids were being missed in the PPI. In this manner, during 1999–2000, notwithstanding stall inoculation, a house-to-house search of missed youngsters was embraced to immunize them over the 2–3 days following each NID.

Despite the broad PPI presented by the legislature, the point of making India a 'polio free state' still stays fantastical with 733 youngsters with polio detailed in 2009[4]. This makes India the biggest polio endemic nation in the world[2]. Resistance by the all inclusive community seems to anticipate acknowledgment of this program. Confusions and legends with respect to the immunization worry about its evil impacts and absence of mindfulness about poliomyelitis and PPI are the major obstacles[5]. Our examination means to distinguish these misinterpretations to all the more likely illuminate future usage regarding this program. This investigation was accordingly directed to evaluate the consciousness of the objective populace about polio and PPI, and to

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survey their frame of mind and practice towards PPI.

Materials and Method

This cross-sectional examination was attempted in june 2019 in urban regions, in Kancheepuram area in Tamil Nadu territory of South India. The moral endorsement for directing this investigation was acquired from the institutional moral freedom board of trustees. The example size was determined utilizing 95% certainty breaking points and 90% power. Accepting a mindfulness level of poliomyelitis and PPI among individuals as being about 56% from a past study,[6] the example size was determined as roughly 100 individuals. An aggregate of 100 such were secured by comfort examining during the investigation time frame. Information was gathered by talking any part inside age gathering of 50 years utilizing a pretested, semi-organized survey subsequent to taking their educated assent.

Members were gotten some information about signs and manifestations of poliomyelitis, the age bunches most vulnerable to this infection, the method of sickness transmission, the wellsprings of data about PPI, the quantity of and seasons in which the PPI rounds are held, the advantages of PPI and purposes behind non-inoculation during PPI rounds. Each answer given to the poll was allocated focuses which empowered the estimation of total scores and resulting classification of the degree of familiarity with members into well, modestly and ineffectively. Every one of the information gathered were dissected utilizing rendition 11.5 of the Statistical Package for Social Sciences programming bundle was utilized for testing measurable centrality and P esteem <0.05 was considered as noteworthy.

Findings: The reaction rate was 100 % as all the 100 members consented to be met by our group. Of the absolute 100 members, 69% were guys. Proficiency rate among members was close aggregate at 100% with77% taught up to secondary school

Table 1: Socioeconomic distribution of study participants. (n = 100)

Educational status	No.	Percentage
Illiterate	0	0
Primary school (1–5 std)	0	0
Secondary school (6–10)	8	8
Pre University (11–12)	15	15
Graduation & above	77	77

Awareness about The Disease: All of the participants had heard about poliomyelitis. Although 90 (90%) knew that poliomyelitis is a preventable disease, 48(48%) were under the misconception that it is curable. (See Table 2).

Table 2: Awareness of participants about poliomyelitis (n = 100)

Characteristics	No. (%)
Heard about poliomyelitis	
Yes	100
No	0
High risk groups	
Children	96
Adults	4
Don't know	0
Preventable disease	
Yes	71
No	0
Don't know	29
Curable disease	
Yes	48
No	52
Don't know	0

Awareness about the PPI Program: All the participants said that they had heard about PPI. Television was found to be the primary source of information about PPI among 60% participants.

None of the participants knew what the term "pulse" in PPI meant. The target age group of 0-5 years for PPI was correctly answered by 96% participants. The purpose of PPI being to eradicate polio was known by 90% participants. 15% participants had the misconception that repeated vaccination under PPI leads to over dosage and is thus harmful to children. Interestingly, 19% participants had the misconception that the oral polio vaccine can prevent other diseases as well. (Table 3)

Table 3: Awareness of participants about PPI (n = 100)

Characteristics	No. (%)
Heard about PPI	
Yes	100
No	0
Primary source of information about PPI	
Television	35
Newspapers	16

Radio	5
Health workers	19
No. of annual rounds	
One	11
Two	73
>2	16
Repeated vaccination causes over dosage	
Yes	15
No	48
Participations in both annual rounds	
Is a must	85
One of them is sufficient	12
Don't know	3
OPV can prevent other diseases	
Yes	19
No	16
Don't know	65

Performance scores of participants showed that 51% were well aware, 34% were moderately and 15% were poorly aware of poliomyelitis and PPI and this was significantly associated with the level of education. (See Table 4).

Table 4: Association between the educational status of the participants and their level of awareness about PPI

Educational status	Poorly aware	Moderately aware	Well aware	Total
Illiterate	0	0	0	0
Primary (1–5 std)	0	0	0	0
Secondary (6–10)	6	2	0	8
PUC (11–12)	3	9	3	15
Graduation and above	6	23	48	77
Total	**15**	**34**	**51**	**100**

Discussion

PPI has been intended to annihilate polio. In the event that this can be accomplished it will likewise establish tone for the annihilation of different ailments, for example, measles. Such a noteworthy activity requires participation from all areas, especially individuals from the all inclusive community. In this manner their discernment and acknowledgment of PPI turns out to be exceptionally fundamental for its prosperity.

This examination uncovered that every one of the members had caught wind of polio and PPI. As to of the illness, most of members realized that youngsters are most defenseless to polio, that loss of motion is a significant continuation and that the malady is preventable. These discoveries were like an examination done by Singh et al where 70.3% of the members realized that polio prompts loss of motion of legs and 86.2% realized that polio is preventable by vaccination[7]. However, an investigation done by Chincholikar et al demonstrated that regardless of a decent education status just 60% of the respondents thought about polio[8]. Similar discoveries were accounted for by Misra et al where just 56% thought about polio and just 63% realized that it is preventable[6]. The contrasts between studies might be on the grounds that the last two examinations were embraced in a provincial and ghetto region individually while the previous investigation and our own were done in urban territories. This could show that degree of learning about polio contrasts relying on the territory of home.

Disregarding decent information with respect to most parts of the ailment, more than quarter of members in our examination had the misguided judgment that polio is treatable and 89% did not know the correct method of sickness transmission. Indeed, even in the investigation done by Singh et al 30.7% of respondents believed polio to be a treatable disease[7]. The essential wellspring of data about PPI in this examination was for the most part from the TV. In a few different examinations too TV was observed to be the commonest wellspring of data for participants[7-10]. This demonstrates TV is a distinct advantage to utilize when wishing to spread data of general wellbeing significance.

The job of wellbeing laborers as suppliers of essential data about PPI was constrained (19%) in our examination. This was as opposed to consequences of concentrates done in West Bengal and Agra where wellbeing specialists were the principle wellspring of data in about 70% participants.[11-13] Wellbeing laborers are evidently the best way to improve the accomplishment of the program. This is on the grounds that they are browsed the network and are known to impact the learning of neighborhood individuals by relational methodology during entryway to-entryway battle as likewise saw in an investigation done by Manjunath et al[14].

Sixty five to 75% members in our examination knew the objective populace, number of rounds of PPI and the season during which PPI is held. This was like perception of Bhasin et al where 75% respondents

realized the objective gathering correctly[15]. Whereas in an investigation done among Delhi ghetto populace, 82% of respondents realized the right target bunch for PPI which was more than our examination results[6]. This could be on the grounds that the fundamental wellspring of data on PPI among members in their investigation was wellbeing specialists (67.2%). As examined before between close to home correspondence is the most effective method for data spread. In another investigation done in Delhi just 18.1% of respondents knew the PPI day's correctly[7].

In our investigation, practically 19% members had a misinterpretation that OPV can anticipate different illnesses too. This conviction could prompt poor take-up of vaccinations for sicknesses. A further misinterpretation was recognized in 15% members in our investigation, as they accepted that rehashed immunization under PPI results in over dose. This was equivalent to the finding of Dobe et al where 2.2 to 6.3% respondents in different locale did not inoculate their kids because of the dread of over dosage[12, 16].

Instructive status was observed to be essentially connected with level of mindfulness about the PPI program in our investigation; this is like the discoveries of Chincholikar et al and Rasania et al where likewise noteworthy affiliation was seen[8, 12]. These discoveries uncover that disregarding a high proficiency rate and moderately great learning about the illness and the program, misguided judgments still exist in the brains of the general population. These issues should be routed to improve the achievement of this program.

Conclusion

The instructive degree of the considerable number of members in the examination regions was great however their mindfulness level as for the ailment and the program was inadmissible in the greater part of them. Not many members realized that polio is transmitted by debased nourishment and water.

Confusion that it is a treatable infection was found in excess of a fourth of them. Likewise as for the program various misguided judgments were featured. A fourth of our members did not know the recipients of PPI or said it wrongly. A couple of members felt that rehashed inoculation in PPI causes over measurements and is in this way destructive for youngsters. Confusions like routine inoculation under national inoculation program can substitute for immunization under PPI program are not many different reasons which can decrease the inclusion of PPI. Hazardous misguided judgments like OPV can counteract different illnesses notwithstanding poliomyelitis can decrease the inclusion of inoculation against different sicknesses. TV which was the most mainstream essential wellspring of data needs be used to create mindfulness about the significance of PPI. Notwithstanding this a system of wellbeing laborers ought to be successfully prepared and activated to evacuate the misguided judgments and falsehood about poliomyelitis and PPI through guiding of guardians and parental figures just before vaccination rounds. The best methodology would be relational correspondence by house to house visits in family units having under-fives. For hesitant families center gathering talk can be masterminded including Medical Officer, nearby pioneers and agents from ladies self improvement gatherings. This will further improve the acknowledgment of PPI in the network.

Funding: No funding sources.

Conflict of Interest: none declared.

Ethical approval: study was approved by the institutional ethics committee, Sree Balaji Medical College and Hospital.

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A Study to Assess Depression among Patients with Non-Communicable Diseases Attending a Tertiary Care Hospital

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Abstract

Background: Misery influences individuals paying little mind to their experience and all ages too. As per the World Health Organization, 300 million individuals have melancholy around the globe. Somewhere in the range of 18 and 25 is most noteworthy among people with the predominance of significant burdensome scenes among grown-ups.

Technique: The unmistakable cross sectional investigation was done on 120 patients with non-transmittable ailment going to a tertiary consideration emergency clinic by arbitrary testing system. . Data would be assembled from patient, relative and guardian about statistic, clinical information utilizing a semi organized proforma. Melancholy will be affirmed by Patient Health Questionnaire (PHQ-2) and seriousness deciphered utilizing Patient Health Questionnaire (PHQ-9).

Results: The predominance of misery among patients with non-transferable malady is observed to be 77%. Wretchedness was for the most part because of weakening of wellbeing and their dread of compounding of disease and passing. There were likewise related elements which further declined the condition like family issues.

Conclusion: The pervasiveness of sadness has been observed to be increasingly regular in patients in extreme type of illness. Subsequently many helped directing and mental trainings should be possible to control or lessen despondency because of horribleness.

Keywords: *PHQ-9, PHQ-2, morbities, mental health, counselling.*

Introduction

Misery is one of the normal mental issues worldwide. It influences individuals of all age bunch with/without co-morbities. It most generally shows as bitterness or loss of enthusiasm for things which were once favored. The basic side effects are low disposition, loss of interests and joys, low vitality, weariness, aloofness, cynicism towards the future, irritated rest, poor craving, poor fixation, low confidence, blame or self-fault, self-destructive thoughts. The current demonstrative criteria for discouragement is to indicate that 2 out of 10 manifestations enduring at any rate 2 weeks should be resolved for conclusion[1]. Some other ailments like cerebrum tumors, vitamind eficiency, etc may take after depression, hence it is important to discount such conditions. As per American mental association, one in 15 grown-ups have discouragement in any given year, and it is more typical in females than male. It is additionally observed to be increasingly pervasive in age gathering of 18-25 years. Non-transferable interminable maladies like diabetes, hypertension, osteoarthritis, malignancy, and so on expand the danger of creating extreme burdensome illness. High rates of melancholy have been noted in patients with neurological issue, especially epilepsy (20%-55%), numerous sclerosis (40%-60%) and stroke (14%-19%) Other generally included morbities are cardiovascular ailments, pneumonic ailments, stroke, skin issue, parkinsonism[2].

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Misery is regularly treated with prescriptions or psychotherapy or both. if these medicines don't diminish symptoms, electro convulsive treatment or some other cerebrum incitement treatment can be done. commonly utilized meds are energizer. Discouragement is one of the need conditions secured by WHO's emotional well-being Gap Action Program (mhGAP). The Program intends to enable nations to expand administrations for individuals with mental, neurological and substance use issue, through consideration given by wellbeing laborers who are not masters in emotional wellness. WHO, among different offices, has created brief mental intercession manuals for melancholy that might be conveyed by lay laborers. A model is, Problem Management Plus, which portrays the utilization of conduct enactment, unwinding preparing, critical thinking treatment and reinforcing social help. Also, the manual Group Interpersonal Therapy (IPT) for Depression depicts bunch treatment of melancholy. At long last, Thinking Healthy spreads the utilization of intellectual social treatment for perinatal depression[3].

Philosophy: Setting of study-Patients of different age bunch in different offices in a tertiary consideration medical clinic.

Test measure 120 subjects. Kind of study-Cross sectional investigation.

Incorporation

- Patients with non-transferable maladies.
- Clinically steady for meeting

Avoidance

- Patients with transferable maladies and mental issues.
- Clinically temperamental or uncooperative.
- Persons with serious tactile (hearing and visual imperfections) and informative hindrances.
- Persons who is experiencing ridiculousness, schizophrenia, different psychoses or major emotional issue and mental hindrance.
- Those not satisfying the consideration criteria. Instruments utilized
- Modified BG Prasad scale (2018)
- Patient Health Questionnaire-2 (PHQ-2)
- Patient Health Questionnaire-9 (PHQ-9)

Altered BG Prasad scale (2018)-Modified BG Prasad financial scale has been being used for deciding the financial status of study subjects in network based wellbeing contemplates in India.

Persistent Health Questionnaire-2(PHQ-2)-The motivation behind the PHQ-2 is to screen for misery in an "initial step" approach. It asks about how much an individual has encountered discouraged state of mind over recent weeks.

Tolerant Health Questionnaire-9 (PHQ-9)-The PHQ-9 is the downturn module, which is utilized to screen the seriousness of gloom. Patients who screen positive for PQ-2 ought to be additionally assessed with the PHQ-9 to decide if they meet criteria for a burdensome issue or not. Information accumulation strategy

People who satisfy the incorporation and the rejection criteria subsequent to acquiring composed educated assent in various offices were incorporated into the investigation. Data was accumulated from patient, relative and guardian about statistic, clinical information utilizing a semi organized proforma. Despondency was affirmed by Patient Health Questionnaire (PHQ-2) and seriousness deciphered utilizing Patient Health Questionnaire (PHQ-9). There would be no intercession as a piece of study and normal treatment would not be changed as a feature of the investigation. The information will be assembled in Microsoft Excel and fitting factual investigation will be finished utilizing SPSS adaptation 22.

Results

By and large 120 patients finished the questionnaire. Out of this, 92 patients (77%) have been in mellow to extreme depression. Among this, 53(57%) were females and 40(43%) were guys.

Table 1: Shows the socio-demographic details and prevalence of depression among the study participants Prevalence of Depression

Variables	Yes	No
Age group		
<20	27(23%)	6(5%)
21-35	31(26%)	7(6%)
36-50	24(20%)	11(9%)
>51	10(8%)	4(3%)
Sex of the participant		

Male	39(32%)	14(12%)
Female	53(44%)	14(12%)
Profession		
Student	43(36%)	4(3%)
Working	30(25%)	15(12)
Housewife	19(16%)	9(8%)
Marital status		
Single	46(38%)	9(8%)
Married	45(37%)	18(15%)
Divorced/widow	1(1%)	1(1%)
Type of family		
Jointfamily	24(20%)	16(13%)
Nuclearfamily	68(57%)	12(10%)
Consumption of tobacco		
Yes	7(6%)	1(1%)
No	85(71%)	27(22%)
Consumption of alcohol		
Yes	12(10%)	2(2%)
No	80(67%)	26(21%)
Socioeconomic status		
I	63(53%)	13(11%)
II	17(14%)	10(8%)
III	10(8%)	3(2%)
IV	2(2%)	1(1%)
V	-	1(1%)

Depression was more common in the age group of 21-35 years. Females were more depressed. Participants who were students were found more to be suffering from depression. Those who were unmarried and those belonging to nuclear family and those belonging to upper socioeconomic status were more depressed.

Table 2: Severity of depression among the study participants.

Depression Severity (PHQ–9)	Male	Female
No depression	14(12%)	14(12%)
Minimal depression(1-4)	20(16%)	27(22%)
Mild depression(5-9)	7(6%)	7(6%)
Moderate depression(10-14)	9(7%)	13(11%)
Moderately severe depression(15-19)	1(1%)	6(5%)
Severe depression(20-27)	2(2%)	-

Minimal depression was present more in females when compared to males. Mild depression was present in 6% among male and female respectively. Moderate depression was present in 24% of study participants.

Discussion

Patients with non-transmittable maladies being one of the hazard factor for depression,It is seen to be increasingly regular among patients with differing severity. Our concentrate appeared about 77% (92 out of 120) of patients endure gloom with different ailments. Comparative examinations done by Brygidakwiatkowska among patients with rheumatoid joint pain demonstrated 91(76%) patients including 79(87%) female and 12(13%) guys have manifestations of depression[4]. It is discovered that downturn is more typical in females than guys while certain examinations appears there is no sex differences[5].

Melancholy, paying little respect to the seriousness of disease,is seen in grim people. This shows the dread of being sick or practical imapairment or perished. Studies led in different populace gatherings demonstrates that downturn is all the more regularly happening during endless ailments and could result in inability if the comorbid melancholy isn't treated[6-9]. A partner think about by American school of rheumatology on rheumatoid joint inflammation patients which connects with financial status indicated higher pervasiveness of gentle to direct wretchedness among low financial status[10].

Conclusion

Physical ailment generally went with burdensome side effects. This comorbidity has some administration problems. The first hindrance to treatment is acknowledgment of wretchedness in restoratively sick patients, and mental indications ought to likewise be organized when making the diagnosis. Several intercessions for sadness can be made and have been demonstrated to be successful in this patient gathering, including handicap of the medicinal ailment being limited, general steady measures, CBT, and stimulant prescriptions in patients with moderate to extreme symptoms. Patient's wellbeing criteria ought to be considered while endorsing antidepressants.

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Conflict of Interest: None declared.

Ethical Approval: study was approved by the institutional ethics committee, Sree Balaji Medical College and Hospital.

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Appendicular Adenocarcinoma with Pseudomyxoma: A Case Report

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Abstract

Essential adenocarcinoma of the informative supplement is an uncommon illness as contrasted and malignant growth of the colon. It is normal in patients in the middle age. Mucinous adenocarcinoma is one of the histological kinds seen. The typical introduction of patients is intense an infected appendix or peri–attached boil. Finding is generally made after the careful example has been sent for histopathological survey. It is imperative to discount synchronous and metachronous tumor during medical procedure

Harmful mucinous neoplasms of the informative supplement is an inconsistently experienced substance. Extra appendiceal spread of these tumor is one of the commonest etiology of pseudomyxoma peritonei, which requests an uplifted carefulness in their initial conclusion. Albeit second rate appendiceal mucinous neoplasms (LAMNs) to a great extent remain restricted to the index, however they can spread to the peritoneum as pseudomyxoma peritonei prompting a flighty result. Because of the uncommon event of poor quality appendiceal neoplasm constrained data is available in the medicinal writing. This investigation exhibits an instance of a 50 years of age female who was given grievances of right lower stomach torment, loss of weight and repetitive fever for a month. CECT Abdomen and colonoscopy recommended occasional ulcer optional to affixed aperture. Medical procedure was done and histological report was that of mucinous adenocarcinoma.

Keywords: *Supplement, Mucinous neoplasm, Pseudomyxoma peritonei, Adenocarcinoma*

Introduction

Essential adenocarcinoma of the supplement when contrasted and malignant growth of the colon is an uncommon illness. It establish < 0.5% of gastrointestinal neoplasm[1,2]. As at 2002, under 250 cases had been accounted for. It is regularly found in patients over the age of 50 years and exhibits as intense a ruptured appendix or peri-attached abscess[3]. The histological sorts seen incorporates mucinous adenocarcinoma, cystadenocarcinoma, adenocarcinoids, adenosquamous,seal ring type adenocarcinoma and colonic sort non mucin creating adenocarcinoma of the reference section . Mucinous adenocarcinoma is a troublesome infection to analyze preoperatively and in many patients are not recognized till the ailment is progressed . Niteck et al saw that in just 32% of cases examined were the analysis made intraoperatively . Determination is regularly made after the histopathological examination of the careful example . Once in a while, solidified areas are additionally utilized in the determination . Dangerous tumors of the index take after colonic adenocarcinoma[4]. Henceforth, there ought to be reconnaissance for synchronous or metachronous tumors of the gastro-intestinal and extra intestinal tract during medical procedure. The degree of the infection as at the season of medical procedure is a more significant indicator of survival than the histological sort. It has likewise been accounted for that mucinous adenocarcinoma and nonattendance of carcinomatosis are great prognostic elements.

Poor quality appendiceal mucinous neoplasms (LAMNs) are uncommon condition with the revealed

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predominance of less than 1% of all appendectomies[1]. Low-grade mucinproducing tumors of the index that incorporates adenomas and mucinous tumors of obscure harmful potential (MTUMP) may give pseudomyxoma peritonei because of their capability to spread to the peritoneal hole and viscera as mucinous stores. Peritoneal mucinous carcinomas with middle of the road and incongruent highlights are watched frequentlyand in this manner another divaricate grouping has been prescribed, ordering the pseudomyxoma peritonei of appendiceal starting point into mucinous carcinoma peritonei–second rate and mucinous carcinoma peritonei–high level[5, 6].

Materials and Method

A multi year old female instructor from Koyilandy,with no comorbidities exhibited to gastro-specialist with right lower stomach torment related with looseness of the bowels, spewing and reccurent fever of one month span. She additionally had protests of loss of hunger and loss of weight .she was assessed with routine blood examinations, CECT stomach area and colonoscopy which were suggestive of occasional canker auxiliary to affixed puncturing.

Findings: She at first experienced CT guided ponytail inclusion into the intra stomach collection(sub-hepatic space).since the braid catheter was depleting inadequately she was planned for medical procedure, was done on 31st walk 2018 solidified biopsy announced as adenocarcinoma with pseudomyxoma peritonii. She experienced adjuvant chemotherapy with CAPEOX based routine. She endured the treatment with no intense dismalness and was released in stable condition. Figure 1 & 2: Colonoscopy reports of the patient:

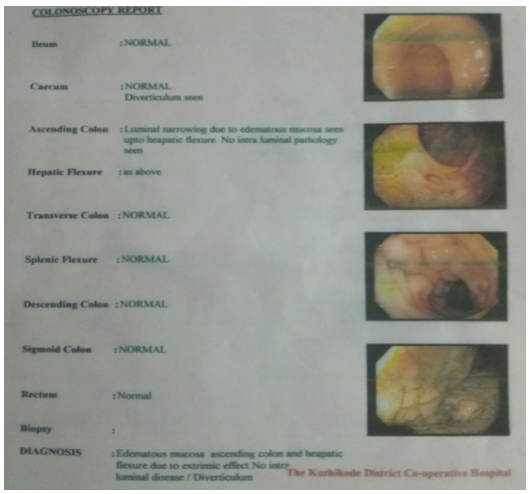


Figure: 1

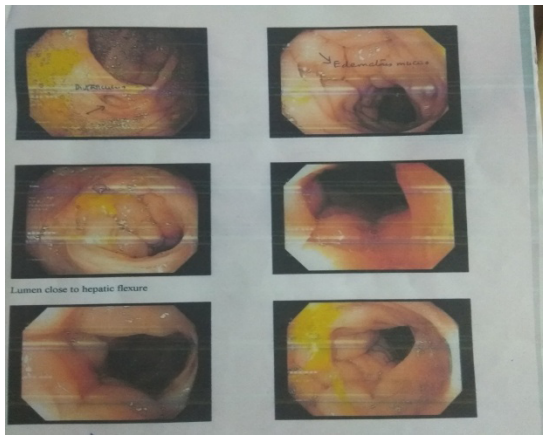


Figure: 2

Discussion

Mucinous adenocarcinoma of the index is an uncommon illness. It is a malady of the gastrointestinal tract that normally displays in patients over the center age[1]. The discoveries of a bulbous and firm informative supplement (4 cm in distance across) without inclusion of its base and caecum, nonappearance of lymphadenopathy and metastatic sores in other piece of the inside and the clinical condition of the patient educated the choice to play out an appendectomy. There is debate with regards to the predominance of right hemicolectomy over appendectomy .Some creators are of the sentiment that a privilege hemicolectomy is the suitable careful treatment in patients analyzed for mucinous adenocarcinoma of the reference section[4, 2]. The favored surgery and result are ineffectively gotten[1]. The intra employable conclusion was that of carcinoid tumor, which brace the way that mucinous adenocarcinoma isn't speculated most occasions; both previously and during activities .However, the utilization of solidified area would have enabled the finding of mucinous adenocarcinoma to be made intraoperatively[7]. Moreover, since female patients present with gynecological signs and indications it is fitting to prohibit metachronous tumors, for example, metastatic adenocarcinoma from the ovary during medical procedure [1]. This was carefully done at medical procedure.

Pseudomyxoma peritonei is a pathologic element having a variable clinical outcomes; if this condition is brought about by a high-grade appendiceal tumors, it is generally connected with a more awful prognosis[5, 6]. Pseudomyxoma peritonei is particularly characterized element portrayed by the nearness of intraperitoneal mucin, with or without related mucin-creating epithelium. Not inconsistently this condition is joined

by fibrosis and granulation tissue arrangement. It is estimated that the mucin may spread to the peritoneal cavity causing pseudomyxoma peritonei[5],either by bodily fluid following all through the expanded, diminished appendiceal divider or through the appendiceal diverticulum. Pseudomyxoma peritonei with inadequate, poor quality epithelium on microscopy has a decent visualization, while pseudomyxoma peritonei with bottomless, high-grade (carcinomatous) epithelium has been found to have an awful prognostic result.

Conclusion

Taking everything into account, mucinous adenocarcinoma of the reference section is a determination made on histopathological evaluation and is an uncommon tumor. doctors and specialists ought to engage a conclusion of the illness in moderately aged patients to such an extent that investigation of the gut ought to be performed with careful reconnaissance for synchronous and metachronous tumors. Also, intraoperative analysis can be made utilizing solidified areas. Reviewing of epithelium in psuedomyxoma is significant for the executives and visualization. Clear correspondence between the pathologist and clinicians and their collective exertion is in this manner pre imperative so as to reach to a corroborative conclusion.

Funding: No funding sources

Conflict of Interest: None declared.

Ethical Approval: Study was approved by the institutional ethics committee, Sree Balaji Medical College and Hospital.

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Dyslipidemia on Type 2 Diabetes Mellitus

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Abstract

Background: In spite of the fact that diabetes keeps on being the significant way of life condition in India, there is absence of concentrates on whether Dyslipidemia in diabetics are sufficiently controlled early recognition.

Techniques: A cross sectional examination was performed on the back to back patients of sort 2 diabetes mellitus with helpful testing strategy. Fundamental information was gathered from a gathering of individuals of 100 patients matured over 45 years with diabetes mellitus in Chennai were chosen.

Results: An aggregate of 100 patients were chosen in Chennai matured over 40 years with sort 2 diabetes mellitus with and without dyslipidemia. Out of all out populace 56% were guys and 44% were females and 68% were dyslipidemic and 32% were non-dyslipidemic. Aftereffects of serum lipid profile demonstrated that the mean qualities for absolute cholesterol levels, triglyceride levels, high thickness lipid levels, low thickness lipid levels, low thickness lipid levels were 221.82 mg/dl, 159.7 mg/dl, 39.25 mg/dl, and 142.50 mg/dl, 36.92 mg/dl. Among all patients 68 people had hypercholesterolemia.

Ends: The investigation indicated regular lipid variations from the norm during Diabetes prompted Dyslipidemia i.e., Hypercholesterolemia, Hypertriglyceridemia and raised Low thickness lipid cholesterol (LDL-C) levels. This examination demonstrates Dyslipidemia control in sort 2 Diabetes Mellitus patients is poor.

Keywords: *Catchphrases–glucose levels, hypercholesterolemia.*

Goals:

I. To think about the predominance of dyslipidemia in sort 2 diabetes mellitus in Chennai

II. To explore the subjects of diabetic dyslipidemia who are at a danger of cardiovascular illness

Introduction

Diabetes mellitus is a standout amongst the most widely recognized perpetual ailments all inclusive and keeps on expanding in numbers.[1] It is among top five reasons for mortality. It is characterized as a metabolic issue of various aetiologies, portrayed by unending Hyperglycemia with unsettling influences of sugar, fat and protein digestion.

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The recurrence of diabetes mellitus is expanding numerous folds in South Asian populace because of high level of hereditary inclination and high vulnerability to natural insulin, described by high BMI, high chest area adiposity, a high muscle versus fat ratio and an abnormal state of insulin resistence. The incessant Hyperglycemia of diabetes is related with long haul harm, brokenness, and disappointment of different organs like eyes, kidneys, nerves, heart and veins.

In this manner, present investigation was done to discover relationship between serum lipid profile and glucose, in perspective on speculation that early recognition and treatment of lipid variations from the norm can limit the danger of atherogenic cardiovascular

issue and cerebrovascular mishap in sort 2 Diabetes Mellitus patients. Consequently, the method of reasoning of this examination was to recognize Dyslipidemia in patients with sort 2 Diabetes Mellitus.[2, 3]

Materials and Method

A cross sectional investigation was performed on the continuous patients of sort 2 diabetes mellitus. This examination was embraced to survey dyslipidemia in sort 2 DM was finished. The investigation was endorsed by the Institutional Ethics Committee, SBMC & H. The investigation was directed in the year-2019. 100 subjects of sort II DM were chosen, with term of 3-15 years, matured above 45yrs. Both male and female were chosen from patients going to diabetic OP at Sree Balaji Medical College and Hospital.

Educated assent was acquired from all subjects preceding enrolment into the examination. A proforma with itemized history of the subjects were filled. Tallness, weight, BMI was estimated. The predominance study are surveyed utilizing a poll, the members of the examination are assembled into diabetes dyslipidemic and diabetic non-dyslipidemic by evaluating their Fasting Blood Sugar levels, Postprandial glucose levels, Total cholesterol levels, LDL-C levels, HDL-C levels, VLDL-C levels, Triglyceride levels. The subsequent information was broke down measurably.

Consideration Criteria: All the individuals who consent to take an interest in the investigation will be incorporated.

Rejection Criteria: Those who don't give assent will be prohibited.

Findings: An aggregate of 100 patients were chosen in Chennai matured over 40 years with sort 2 diabetes mellitus with and without dyslipidemia. Out of absolute populace 56% were guys and 44% were females and 68% were dyslipidemic and 32% were non-dyslipidemic. The mean age of the investigation populace was 53.08 years and mean weight record was 26.43.

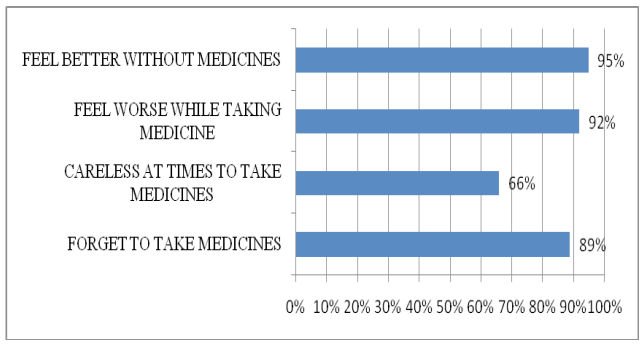
The range and mean estimation of fasting glucose levels were 110-240 mg/dl and 173.24 mg/dl, while the range and mean estimation of postprandial glucose levels were 145–400 mg/dl and 248.51 mg/dl. It was seen that a few patients have controlled fasting glucose levels however their postprandial glucose levels was uncontrolled.

Blood Sugar Parameter	Normal Range	Calculated Range	Mean Value
Fasting Blood Sugar	70–100 mg/dl	110-240 mg/dl	173.24 mg/dl
Postprandial Blood Sugar	Less than 140 mg/dl	145–400 mg/dl	248.51 mg/dl

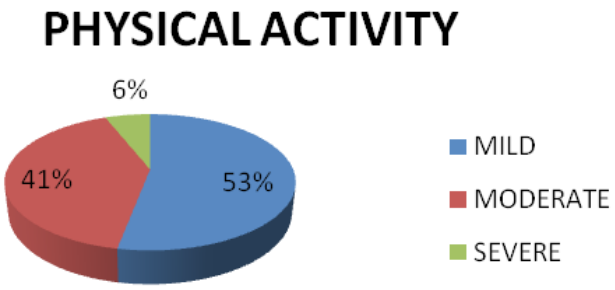
Results of serum lipid profile showed that the mean values for total cholesterol levels, triglyceride levels, high density lipid levels, low density lipid levels, very low density lipid levels were 221.82 mg/dl, 159.7 mg/dl, 39.25 mg/dl, and 142.50 mg/dl, 36.92 mg/dl. Among all patients 68 individuals had hypercholesterolemia.

Lipid Parameter	Normal Range	Mean Value
Total Cholesterol (Tc)	< 200 mg/dl	221.82 mg/dl
High Density Lipid Cholesterol (Hdl-C)	> 60 mg/dl	39.25 mg/dl
Triglycerides	50–150 mg/dl	159.70 mg/dl
Low Density Lipid Cholesterol (Ldl-C)	< 130 mg/dl	142.50 mg/dl
Very Low Density Lipid Cholesterol (Vldl-C)	15–30 mg/dl	36.92 mg/dl

Out of total subjects 56% subjects had a family history of type diabetes mellitus and 49% had dyslipidemia. And 46% of subjects were only on regular monitoring of blood sugar levels and lipid profile. And only 47% and 39% subjects were on regular medications for Diabetes Mellitus and Dyslipidemia. Rest of the subjects did not take medications due to some reasons as follows: forgetting to take medicines regularly, being careless at times to take medicines, feeling worse while medicines, feeling better without medicines.



The mean value of waist circumference for females and males were 39.5 inches and 46.5 inches. The subjects having abdominal obesity were of 58%. In the study, 44% were smokers and alcoholic and 56% were non-smokers and non-alcoholic. The levels of physical activity of the subjects are depicted below:



The patients had following symptoms of diabetes mellitus–fatigue, hunger, and intense thirst, frequent desire to urinate and trouble focusing vision.

Discussion

The connection between diabetes mellitus and serum lipid profile had been tremendously talked about during the previous decades. Both lipid profile and diabetes have been demonstrated to be significant indicators for metabolic unsettling influences including dyslipidemia, hypertension, cardiovascular infections, hyperinsulinemia, and so on.[4]

An investigation by Packard et al., reports that decreased HDL-C as an amazing indicator for untimely coronary heart sicknesses. Goldberg announced that hyperglycemia logically builds the exchange of cholesterol esters from HDL-C to VLDL-C particles, subsequently denser LDL particles gain a huge extent of these HDL esters, further lessening the HDL-C levels.

HDL is a prepared substrate for hepatic lipase which changes over it into littler particles, which are promptly cleared from the plasma. Likewise with the triglycerides, improvement in glycaemic control prompts the expansion in the degrees of HDL-C and proposes the proof for the job for poor glycemia in diminishing the degree of this lipoprotein.[5]

Conclusion

Present investigation demonstrates normal lipid anomalies during diabetes initiated dyslipidemia are hypercholesterolemia, hypertriglyceridemia and raised LDL-C. Results recommend a high pervasiveness of dyslipidemia, which may assume a noteworthy job in the advancement of cardiovascular ailments among diabetic patients

Ethical Clearance: Ethical clearance was endorsed by the institutional Ethics Committee, Sree Balaji Medical College and Hospital.

Source of Funding: No financing sources.

Conflict of Interest: Nil

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Effect of Caffeine Consumption on Mood and Alertness of Medical Students of Urban Area of Kanchipuram

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Abstract

Background: Caffeine is expended in various structures, for example, tea, espresso, soda pops and caffeinated drinks. It is a typical fixing in prescription to treat or oversee laziness, cerebral pains and headaches. Caffeine improves the state of mind by expanding the sentiment of prosperity. Some espresso contains about 90% of caffeine and it needs 20 minutes to clear from the stomach after utilization. Stimulated drinks are being devoured by medicinal understudies more when contrasted with different understudies to deal with the pressure and outstanding task at hand.

Point: This examination is intended to discover the impact of caffeine utilization on state of mind and sharpness of therapeutic understudies among medicinal understudies.

Technique: A cross sectional enlightening examination was directed at Sree Balaji Medical College and Hospital, Chromepet, Chennai. 200 understudies (100 male and 100 female) took an interest from first year to definite year based on helpful examining technique. Information has been gathered from April 2019 to June 2019 through self-tried survey and examined utilizing distinctive factual apparatuses.

Results: Caffeine more often than not as espresso (40.6%), tea (16.75%), Carbonated drinks(11.16%) and not vitality drinks(3.55%) is devoured by the vast majority of the therapeutic understudies. Understudies give numerous reasons, for example, To help vitality (33.5%), To lessen sleepiness or cerebral pain (20.3%), To remain conscious particularly before tests (18.78%) and other reasons(15.22%, for example, for taste, to extinguish thirst or for refreshment, and so on.

End: The principle reasons regarding why medicinal understudies expend a lot of caffeine is to support vitality, diminish tiredness and to remain conscious particularly before test. Despite the fact that it is sheltered, a high admission client ought to limit their utilization.

Keywords: *Carbonated Drinks, Energy Drinks, Coffee, cerebral pain.*

Introduction

When we get up in the first part of the day, a large number of us go after an espresso to kick-begin our day. As per global espresso association, roughly 1.4 billion cups of espresso are expended worldwide each day.[1] The greater part of Indians begin their day by expending caffeine in different structures particularly espresso and tea. Espresso utilization is for the most part amassed in the southern states like Tamil Nadu (60%) and Karnataka (25%). [2] It has turned into an essential part in everybody's life. Some are mentally and physically subject to caffeine to carry on their day by day exercises. As per numerous investigations moderate caffeine admission can advance an assortment of medical advantages. Caffeine is a socially adequate 'Psychoactive drug'.[3]

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Caffeine is a focal sensory system stimulant that influences human body from multiple points of view. It is expended in various structures, for example, tea, espresso, soda pops and caffeinated drinks. It is a typical fixing in medicine to treat or oversee laziness, cerebral pains and headaches. When it comes to in the cerebrum it brings sharpness and fills freshness in one's brain. Caffeine improves the disposition by expanding the sentiment of prosperity. It builds the general movement of the person.

Some espresso contains about 90% of caffeine and it needs 20 minutes to clear from the stomach after utilization. The impact begins from an hour and stays for 3-4 hours. The pinnacle plasma focus is come to following 40 to an hour. The half-existence of caffeine is around six hours in sound adult 4. Being a restorative understudy the remaining burden is more contrasted with different understudies. It incorporates Regular tests, Exam arrangement and more which incorporates intemperate pressure, significantly working without appropriate rest.

Caffeine admission is most normally credits to the utilization of espresso (± 137 mg/cup of stimulated espresso and ± 2 mg/cup of decaffeinated espresso; the volume of one cup is roughly 240 ml), tea (± 47 mg/cup), juiced soda pops (± 46 mg/340 ml can or container of cola refreshment) and caffeinated drinks (up to 80 mg/can)5. In spite of the fact that it has its reactions and withdrawal side effects, for example, Headache, Confusion, Palpitation, Depression and Anxieties, and so on.

It is currently broadly accepted that routine day by day utilization of caffeine for example 4-7 cups of espresso or 7-9 cups of tea (>500–600 mg) speaks to a critical wellbeing hazard and may consequently be viewed as 'misuse'. Supported maltreatment alludes to a disorder results in 'caffeinism', which is portrayed by a scope of antagonistic responses, for example, fretfulness, tension, crabbiness, muscle tremor, a sleeping disorder, cerebral pain, tactile unsettling influences (for example tinnitus), cardiovascular indications (for example tachycardia, arrhythmia) and gastrointestinal objections (for example sickness, heaving, diarrhea)6. To deal with their scholarly pressure jazzed drinks are being devoured by medicinal understudies. Henceforth this examination was directed to evaluate the effect of caffeine on temperament and sharpness of restorative understudies.

Materials and Method

System: A cross sectional enlightening investigation was done among the medicinal understudies in a therapeutic school of Chennai. Helpful testing technique was pursued for determination of members. Therapeutic understudies from first year to definite year have been given the pre-tried semi-organized poll and information have been gathered from April 2019 to June 2019. The investigation comprises all out number of 200 respondents.

Information Collection: Primary information was gathered through poll. Educated assent was gotten before starting the investigation. The poll contained dichotomous inquiries (yes/no), various decision questions and scaled inquiries. 5 point Likert scale type articulations were utilized in poll. The survey established inquiries in regards to their refreshment utilization propensities, amount and purpose behind utilization and so on.

Information Analysis Tool: The information have been examined utilizing distinctive measurable apparatuses, for example, Descriptive Statistics (Frequency and Percentage) to decipher the outcomes. The information was dissected by utilizing Statistical Package for Social Sciences (SPSS) 21.0. What's more, Microsoft-Excel.

The examination was endorsed by the Institutional Ethics Committee, Sree Balaji Medical College and Hospital.

Findings: An aggregate of 200 respondents (100 guys and 100 females) from first year to definite year took an interest in this investigation. Lion's share of respondents were of age bunch 18-20 years (58%) trailed by 21-23 years (38%) and 24-26 years(4%). Around 197 out of 200 respondents were caffeine customers and 3 were non purchasers.

Table 1 demonstrates the example of caffeine utilization among restorative understudies. It demonstrates that most favored refreshment is espresso (65%) and generally during morning and night. The majority of them were devouring 1-2 times each day (32%).

Figure 1 delineates the reasons of utilization of energized refreshments which demonstrates that most basic reason is to support vitality and to remain wakeful particularly during tests. Practically 15%students chose

different reasons, for example, for taste, to extinguish thirst or for refreshment, and so on.

Figure 2 portrays the reviewing given by respondents for state of mind and readiness increase after caffeine utilization. Larger part of them concurred that it causes expanded vitality, diminishes weakness and cerebral pain.

Table 1 : Pattern Of Caffeine Consumption Among Medical Students

Variable	Classification	Frequency (n=200)	Percentage (%)
Consumption of caffeine in any form	Yes	197	98.5
	No	3	1.5
	Less than once in a week	37	18.5
Frequency of consumption	Once in a week	39	19.5
	Every other day	52	26
	1-2 times a day	64	32
	More than 3times a day	5	2.5
Preferred Beverages	Tea	66	33
	Coffee	127	65
	Carbonated drinks (CD)	64	32
	Energy drinks (ED)	13	6.5
Time of consumption	Morning	88	44
	Afternoon	27	13.5
	Evening	112	56
	Night	26	13
Amount of sugar added	No sugar	20	10
	1 spoon	117	58.5
	2 spoons	46	23
	More than 2 spoons	15	7.5

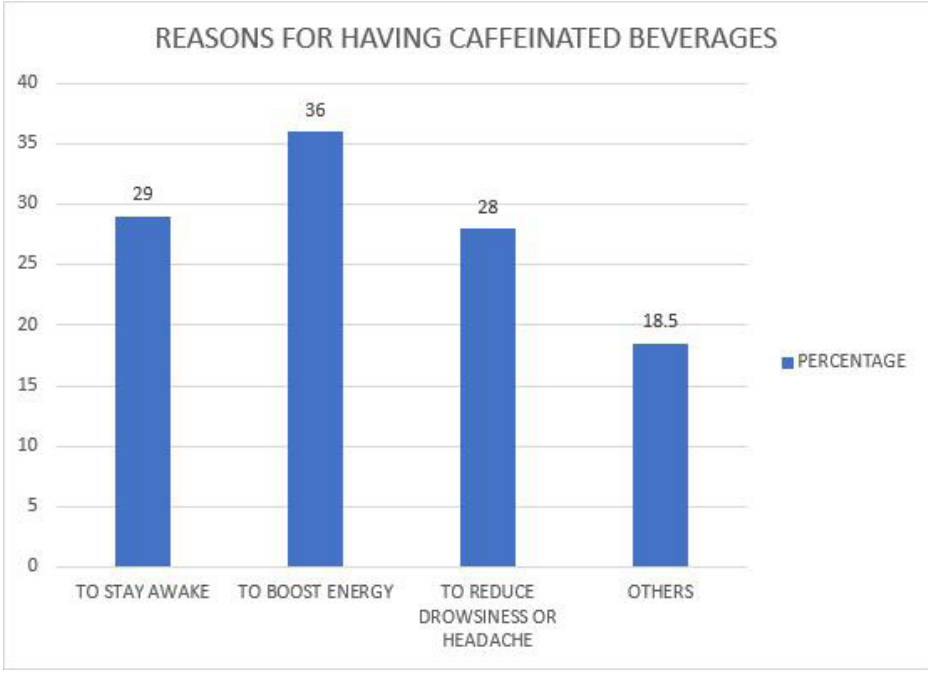


Figure 1: Reasons Of Consumption Of Caffeinated Beverages

Table 2: Other Characteristics Associated With Caffeine Consumption

Variables	Frequency	Percentage
Consumption of beverages empty stomach		
Yes	75	37.5
No	124	62
Skipping Breakfast over Coffee/Tea		
Yes	75	37.5
No	124	62
Symptoms After skipping Coffee/Tea		
Headache	23	11.5
Nausea	5	2.5
Vomiting	6	3
Stomachache	5	2.5
Confusion	15	7.5
None	161	80.5
Others	4	2
48-72 hours spent without caffeinated beverages		
Yes	161	81.72
No	36	18

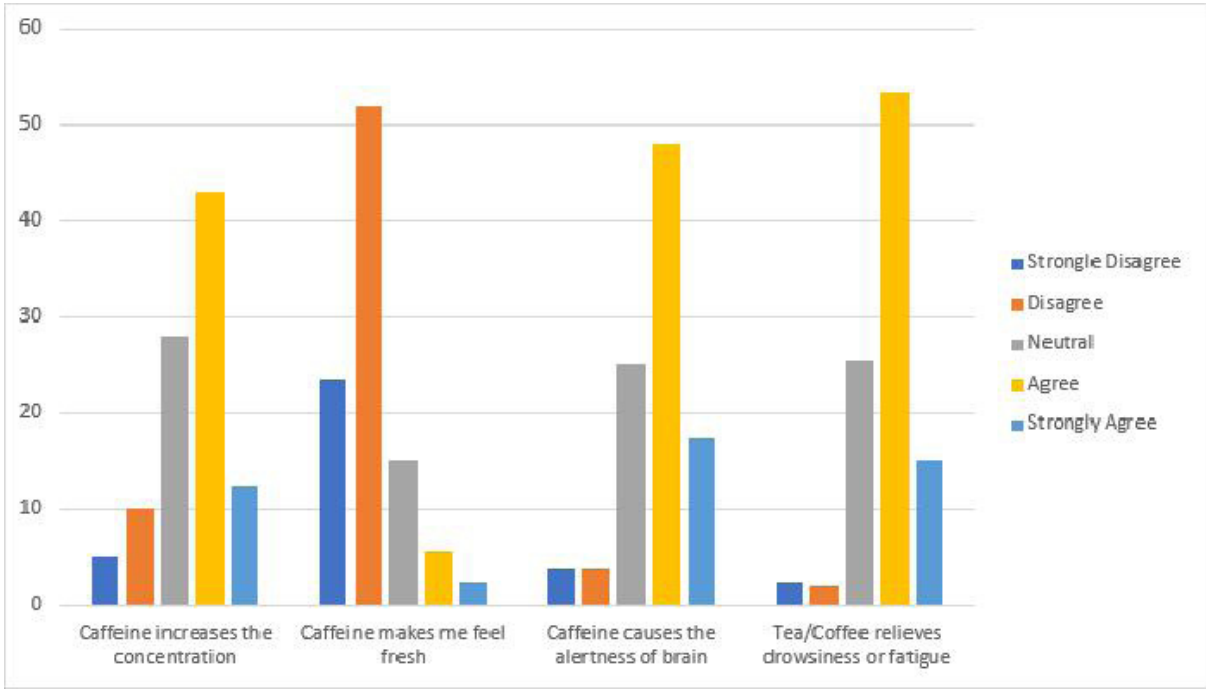


Figure 2: Reasons For Consumption Of Caffeinated Drinks

Discussion

The principle motivation behind the examination was to discover the impact of caffeine utilization on disposition and readiness of medicinal understudies of tertiary social insurance focus. The utilization of caffeine by college understudies utilizing an information from helpful examining of 200 understudies (100male and 100 female) of Sree Balaji Medical College and Hospital, Chrompet, Chennai. Out of which 98.5% of respondents devour charged beverages.

A greater part of respondents who are in age bunch 18-20 years were accounted for the utilization of

caffeine in various structures, for example, tea (16.75%), coffee(40.6%), carbonated drinks(11.16%) and vitality drinks(3.55%). Most broadly utilized refreshment among medicinal understudies are espresso trailed by tea and carbonated beverages which is devoured for 1-2 times day by day.

In our examination most basic motivation to drink charged refreshments is to help vitality and to remain wakeful particularly during tests. Dominant part of the understudies apparent that utilization of caffeine expands fixation, it is utilized for refreshment and readiness of cerebrum and to ease sleepiness and exhaustion. An examination directed by University Puerto Rico Medical Sciences Campus on first year and second year understudies demonstrated that in excess of two third of understudies expended charged refreshments and the report demonstrated that it encourages them alert during test, diminishes pressure and remaining task at hand yet none of the factor was found essentially connected with scholarly pressure or load.[4]

The blend of sugar with caffeine uncovers that Caffeine ingestion does not modify starch or fat digestion. In spite of the fact that the theme of connection between espresso utilization and glucose resilience has been disputable for a long time. In our investigation just 3.55% understudies devour caffeinated drinks which are a decent sign since restorative understudies thinks about the symptoms of caffeinated drinks. As opposed to a few different investigations which show high measure of caffeinated drink utilization. In 2018, 33.85% of respondents of age bunch 18 to 29 years expressed they drink Energy Drinks consistently in United States.[7]

An examination was finished by Datta SS et.al. On Medical understudies during planning of their examination which demonstrates that the enslavement level during test increments among understudies and utilization of tea, espresso, tobacco and smoking expanded particularly among the individuals who concentrated late night.[8] In our examination, just about 36 (18%) respondents couldn't abandon 48-72 hours which shows the reliance of caffeine on understudies. The withdrawal indications of caffeine are felt anyplace between 12 to 20 hours in the wake of stopping and can keep going for up to 1week.[9]

For the all inclusive community of sound grown-ups, moderate caffeine consumption at a portion level of 400mgday-1 isn't related with unfriendly impacts, for example, general poisonous quality, cardiovascular impacts, changes in conduct, expanded occurrence of disease and impact on male ripeness issues. Nor are moderate admissions of caffeine related with unfavorable impacts on bone status or potentially calcium balance if satisfactory admissions of calcium are being consumed.[6]

The investigation had couple of constraints, for example, the portion reaction relationship couldn't be resolved.

Conclusion

It was seen from this examination that the vast majority of the understudies devoured either types of caffeine. The purposes behind caffeine utilization are that it builds focus, it is utilized for the refreshment and readiness of cerebrum and to calm laziness and exhaustion. A few buyers announced that it improves mind-set and physical execution. The majority of the caffeine expended in type of espresso pursued by tea and starch drinks, not caffeinated drinks. It is prescribed to screen the every day admission of caffeine. In spite of the fact that couple of buyers speak to reliance on caffeine, others likewise should attempt to limit it. The container specialist of school must give caffeine free refreshments or point of confinement stimulated beverages so understudies would embrace a sound way of life.

Source of Funding: Self funded project

Conflict of Interest: Nil

Ethical Clearance: Ethical clearance was endorsed by the institutional Ethics Committee, Sree Balaji Medical College and Hospital.

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Effect of Electronic Gadget Usage on Sleep Quality among Medical Students in Chennai

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Abstract

Background**:** Electronic device gadget which was once considered as an extravagance of the prosperous has now turned into an imperative one. To begin with, it was the radio, at that point the phone, and the TV, pursued rapidly by the web. The current-day interest with the electronic contraption (e.g., cell phones) is the most recent innovation that seems, by all accounts, to be urging individuals to invest moderately more energy with innovation and less with individual people. Cell phone dependence is a quickly expanding variable that effects physical, mental and social wellbeing. Cell phone fixation may prompt less and less fortunate rest. Point: To evaluate the electronic device utilization design among the restorative understudies and furthermore to decide its impacts on nature of rest accomplished by them. Techniques: Subjects of age gathering of 18-25 years in a restorative school of Chennai were chosen. An example space of 200 youthful grown-ups is taken by helpful inspecting technique during the investigation term.. The inquiries were arranged for the most part to comprehend the connection between the cell phone utilization and rest. Results: In this examination, it was discovered that about 52% of the members dozed not exactly the required least of 6 hours out of each day. Practically 58% of the members have the propensity for utilizing an electronic contraption directly before resting. Upto 67% of the members had the propensity for utilizing an electronic device in obscurity. Conclusion: Students ought to be urged to accomplish ordinary rest and maintain a strategic distance from the utilization of any sort of electronic gadget before rest. Individuals ought to be instructed to utilize blue light channel which was demonstrated to be successful in improving rest quality as blue light incites melatonin arrangement which thus animates the cerebrum to remain conscious prompting poor rest quality.

Keywords: *Cell phones, rest aggravations, blue light channel.*

Introduction

Electronic contraption gadgets which were once considered as extravagance of the princely, have now turned into an indispensable.[1] First, it was the radio, at that point the phone, and the TV, pursued rapidly by the web. The current-day enthusiasm with the electronic device (e.g., cell phones) features that the most recent innovation has urged individuals to invest moderately more energy with innovation and lesser with individual humans.[2] Due to innovation progression, numerous improvement is found in devices like camera, web, cell phones, which has made life increasingly less difficult and imaginative, which draws in the general population to utilize the contraptions routinely and frequently.

It is discovered that young people are more dependent on cell phones than grown-ups, this is on the grounds that youngsters have a lower level of discretion, and they might be powerless against cell phone addiction. Several elements affect the quality and length of rest and one quickly developing variable might be the expanded utilization of innovation, all the more explicitly cell phone use. A few examinations demonstrate that the utilization of cell phones is related with lacking rest duration. Poor rest quality and inadequate rest span are perceived as significant wellbeing concerns internationally.

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In young people, deficient rest may cause poor scholarly execution or contrarily influence development and development. Poor rest around evening time is expands daytime dysfunction. It has likewise ensnared in a progression of weakness behavior. Proliferation of electronic gadgets, for example, PDAs has been involved in the poor rest of youngsters all day, every day association with innovation is really undesirable when you're attempting to nod off. 71 percent of individuals rest either holding their cell phone, having it in bed with them, or having it on their end table. Such huge numbers of individuals utilize their cell phones as their morning timers, it bodes well that many would need their telephones inside an arm's scope. Cell phones–like PCs, tablets, and TVs–produce something many refer to as blue light, which is a kind of light that the cerebrum translates as sunshine. The blue light really smothers melatonin (a hormone that influences circadian beat and should increment when you are getting ready for sleep time). This prompts lack of sleep because of incitement of the brain

Exorbitant utilization of cell phones is known to be related with cerebral pain, ear throb, warmth sensations and furthermore seen focus troubles. There are additionally different investigations which have demonstrated that most of portable uses experience the ill effects of lack of sleep and expanded pressure influencing their subjective and learning capacities. The cell phone subordinate understudies likewise become scholastically worried. In any case, there are not very many examinations directed among restorative understudies with respect to cell phone use and their impact on rest aggravation. Henceforth, this examination was endeavored with a goal to evaluate the impact of cell phone use on rest among restorative understudies.

Materials and Method

Subjects of age bunch over 18-25 years were chosen from a restorative school in Chennai . An example of 200 youthful grown-ups were selected to the investigation during the examination time frame from April 2019 to June 2019. The inquiries were organized and arranged basically to comprehend the connection between the cell phone utilization and rest. The overview was begun in the wake of getting endorsement from the Institutional Ethics Committee of Sree Balaji Medical College and Hospital. In the wake of acquiring educated assent the survey was self-directed. Questions in regards to the members cell phone use, the measure of time they spend in cell phones, and the recurrence of utilizing cell phones every day. They were additionally gotten some information about the time at which they would for the most part utilize their cell phones and in the event that they would utilize it directly before resting. The recurrence and the planning of the cell phone utilization directly before resting were enquired. The information gathered was entered in an exceed expectations sheet and investigated utilizing SPSS programming.

Findings: Table 1 portrays the various sorts of electronic gadgets utilized by the understudies. It was discovered that greater part (181,92%) of them utilized cell phones. Table 2 exhibits the time contrast between screen time and time of resting. It was seen that larger part (115,58%) of then had a distinction of <1 hour. Figure 1 portrays the understudies who utilized blue light channel (116) in their electronic gadget. 80 of them utilized the electronic gadget to visit via web-based networking media. (figure 2).

In this investigation, it was discovered that about 52% of the members dozed not exactly the required least of 6 hours of the day. Practically 58% of the members have the propensity for utilizing an electronic device directly before resting. Upto 67% of the members had the propensity for utilizing an electronic device in obscurity. Practically 21% of the members marathon watch atleast once every week and upto 40% of them experienced incessant cerebral pains.

Table 1: Types of Electronic Device Used

Type of device	No. of participants (197)	Percentage (%)
Mobile	181	92
PC	8	4
Console	4	2
Others	4	2

Table 2 : Duration Between Screen Time and Sleep

Time (Hour)	No. of participants (197)	Percentage (%)
<1 hour	115	58.3
1 hour	62	31.4
2 hour	12	6
3 hour	6	3
>3 hour	2	1.3

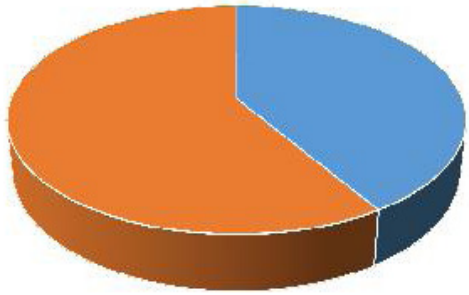


Figure 1: Utilization Of Blue Light Filter In Electronic Device

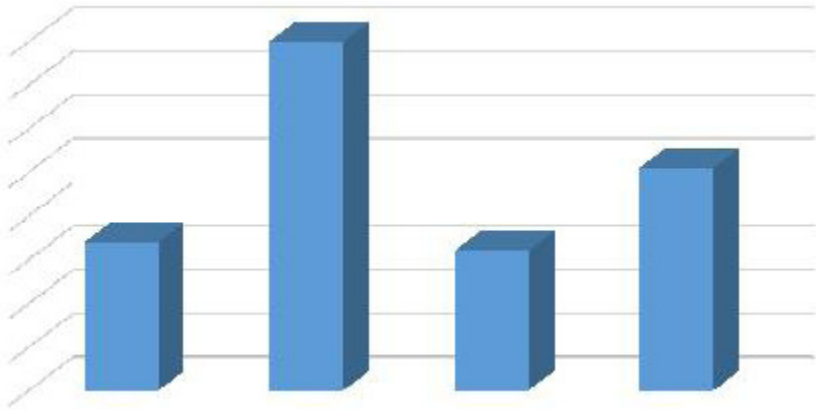


Figure 2: Purpose Of Usage Of Electronic Device

A significant amount of participants,64.5%, belonged to the age group of 16-20 while 31.5% of the participants belonged to the age group of 21-24. The rest 4% of the participants belonged to the age group above 25 years. Also in this research, 50.3% of the participants were females while 49.7% of the participants were males which showed an equal gender distribution.

Discussion

It was observed that most of them had very less time gap between screen time and time of sleep. Mobiles were the most common gadget used apart from console, laptops etc. It was found that most of the participants slept less than 6 hours per day. Almost 58% of the participants have the habit of using an electronic gadget right before going to sleep. Majority of them had the habit of using an electronic gadget in the dark. Most of them were also involved in binge watch at least once a week and upto 40% of them suffered from frequent headaches. It's been found that about 55.3% of the participants do not silence their mobile phone will going to sleep. 51.3% of the participants had morning fatigue due to poor sleep quality. 40.3% of the participants suffered from some form of ocular abnormalities. 48% of the participants used an electronic gadget for more than 5 hours per day. Also, 39% of the participants had nightmares during sleep.

Conclusion

The long standing effects of lack of sleep are well known and there is a need to insist on adequate sleep among students. The effects could be avoided by proper education about the adverse effects due to lack of sleep. People could be educated to use blue light filter which was proven to be effective in improving sleep quality in comparison to those who did not use blue light filter as blue light induces melatonin formation which in turn stimulates the brain to stay awake leading to poor sleep quality. Promotion of health by attaining quality and adequate sleep has to be encouraged among young students.

Funding: No funding source

Conflict of Interest: None declared

Ethical Approval: Study was approved by the Institutional Ethics Committee, Sree Balaji Medical College and Hospital.

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Effects of Cosmetics on the Aetiology of Acne Vulgaris

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Abstract

Background: Skin inflammation, otherwise called skin break out vulgaris, is a long haul skin sickness that happens when hair follicles are stopped up with dead skin cells and oil from the skin. The primary goal of the investigation was to examine the relationship between the incessant presentation of beautifying agents and the improvement of skin break out.

Techniques: Subjects of arbitrary age gathering and sexual orientation were chosen. An example space of 105 people was taken by irregular examining technique. An organized survey was utilized to examine the connection between the use of beautifiers and the improvement of skin inflammation which incorporated the socio statistic subtleties, history of skin break out, family ancestry of skin break out, use of beauty care products, and the fundamental treatment for the equivalent. The subsequent information was investigated measurably. Result: The investigation demonstrated that out of 105 people 27.6% of them had skin break out vulgaris and 44.8% of the all out members use beauty care products while 4.76% of the people created skin break out vulgaris due to the use of beautifying agents. Along these lines, beauty care products alone isn't in charge of the causation of skin inflammation vulgaris and skin break out can be caused because of different elements. conclusion: We found that the utilization of beautifying agents alone was not in charge of causing skin inflammation, and the improvement of skin break out is multifactorial.

Keywords: *Skin infection, obstructed skin, multifactorial.*

Introduction

Skin break out, otherwise called skin break out vulgaris, is a long haul skin ailment that happens when hair follicles are stopped up with dead skin cells and oil from the skin.[1] It fundamentally influences regions of the skin with a generally high number of oil organs, including the face, upper piece of the chest, and back.[2] The subsequent appearance can prompt nervousness, diminished confidence and in outrageous cases, discouragement or contemplations of suicide. Hereditary qualities are believed to be the essential driver of skin break out in 80% of cases. Different causative variables, including corrective introduction, have been ascribed towards acne.[3] Therefore, it is imperative to dissect the connection between the utilization of beautifiers and the improvement of skin break out.

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Materials and Method

A cross-sectional investigation was led in Chennai, Tamil Nadu, India. The institutional moral panel affirmed the investigation. Subjects of age bunch 13-60 years were chosen. An example space of 105 people was chosen. All the included members were talked with utilizing a self-controlled survey to evaluate the examples of restorative use and the improvement of skin inflammation. It comprised of inquiries on socio-statistic subtleties, history of skin break out, utilization of beauty care products and the vital treatment for the equivalent. The information gathered was organized in Microsoft exceed expectations worksheet and PC based investigation was performed utilizing the measurable item and administration arrangements (SPSS) 16.0 programming. The clear cut factors were outlined as extents and rates.

Findings: A cross-sectional investigation was led. 105 people finished the poll. There were 65(61.9%) females and 40 (38.1%) guys. The age scope of the people was from 13-60 years. Table 1 and 2 delineates the socio-statistic qualities of the members. Table 3 demonstrates the different causes and worsening variables of skin break out vulgaris among the examination populace. Table 4 demonstrates the level of people utilizing makeup and experiencing skin break out. We saw that beautifiers don't really cause skin inflammation, and people in whom skin break out is brought about by the utilization of beauty care products demonstrated that long haul utilization of beautifying agents might be a potential disturbing element for their facial skin break out.

Table 1: Socio-demographic characteristics of the participants

Total Responses (105)	Gender (%)
Females	61.90%
Males	38.10%

Table 2: Age

Total	
Responses	105
Age	**%**
13 ~ 20	21%
21 ~ 30	26%
31 ~ 40	29%
41 ~ 50	18%
51 ~ 60	6%
61 ~ 70	1%

Table 3: Causes and exacerbating factors among the participants (n=105)

Causes	Yes	No
Family history	19	86
(Genetics)	(18.1%)	(81.9%)
Stress or tension	69	36
	(65.7%)	(34.3%)
Use of cosmetics	47	58
	(44.8%)	(55.2%)

Table 4: Individuals having acne using cosmetics

	Yes	No
Acne	29	76
	(27.6%)	(72.4%)
Using	9	20
cosmetics	(31%)	(69%)

Discussion

The present examination was led to discover the connection between the use of beauty care products and skin break out and to investigate the relationship between the continuous presentation of makeup and the advancement of skin break out. Skin break out is a standout amongst the most widely recognized issue treated by dermatologists and other human services suppliers. In excess of 90 percent of total populace is influenced by skin break out sooner or later in their life. In spite of the fact that skin break out is a skin malady, it can prompt noticeable enthusiastic and mental issues.[2] In 2010, skin break out positioned eighth in the rundown of most predominant infections on the planet, with a worldwide pervasiveness of 645 million. Around 80 percent of individuals are influenced by skin break out between the beginning of pubescence and 30 years old.

Skin break out cosmetica is currently a consuming issue looked by a large portion of the populace. It is a skin express that most adolescents experience from most fragile occasions of their regular lives.[4] They will in general put most spotlight on their appearance and look and when they experience the ill effects of skin inflammation flare-ups, they pick it rather difficult to manage the issue. It is along these lines pivotal to work at treating skin inflammation assaults. On the off chance that it is left untreated, it just prompts burdensome issues, instructive drops, material maltreatment, and social detachment. Skin inflammation isn't a perilous issue, and the mental impacts principally comprise scarring which may keep going forever. The seriousness of Acne is fundamentally estimated by the skin inflammation sufferer's passionate and public activity. Corrective actuated pimples influence huge gathering of populace independent of their age gatherings. Unmethodical utilization of beautifying agents ought to be dodged. Severe individual cleanliness ought to be kept up to avoid the repeat of the pimples.[5]

Skin inflammation vulgaris is an almost all inclusive skin illness distressing 79-95% of the juvenile populace in westernized societies.[1] This anticipates approval and acknowledgment by the dermatological network. Skin break out influences 80% of people among pubescence and 30 years of age.[6] It was likewise recorded in 54% of ladies and 40% of men more than 25 years old.[3] Other examinations have detailed skin inflammation in 28-61% of younger students in the age bunch 10-12 years; 79-95% in the age bunch 16-18 years; and

even in kids in the age bunch 4-7 years.[4,5, 7] In India, commonness information from a dermatology center in a showing emergency clinic in Varanasi detailed skin break out in 50.6% of young men and 38.13% of young ladies in the age bunch 12-17 years.[6] There are accepted to be no sexual orientation contrasts in skin break out predominance, albeit such distinction is frequently revealed and, all around likely, speak to social predispositions. In centers in the urban regions, there is a reasonable prevalence of young ladies looking for treatment.[8]there is additionally an observation that skin inflammation is less predominant in rustic populace.

The general pervasiveness of skin inflammation in our investigation populace was 27.6% with 31% of the skin break out populace use beauty care products. This empowers us to realize that there is no critical relationship between's corrective utilization and improvement of skin break out vulgaris.

Conclusion

Skin break out is a standout amongst the most irksome and regular healthy skin issues for individuals around the globe, and sincerely a standout amongst the most thinking and humiliating skin issue to involvement. Albeit frequently connected with adolescents and the beginning of adolescence, in all actuality you can get skin break out at any age, which makes it all the more disappointing. Comprehending what causes Acne, is the initial phase in figuring out how to control it. Corrective initiated Acne is a present consuming issue. Skin inflammation cosmetica will create a gathering of manifestations like, pimples, redness, comedones, tingling, and staining. Basically eight of every ten individual's experience the ill effects of skin break out, every one of them must fight with Acne and its negative impacts. This investigation reasons that beauty care products isn't the main source for the improvement of skin break out and that skin break out has multifactorial causation.

Funding: No funding source

Conflict of Interest: None declared

Ethical Approval: Study was approved by the Institutional Ethics Committee, Sree Balaji Medical College and Hospital

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Gallstone Ileus: A Rare Presentation of Cholecystoduodenal Fistula in a Female

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Abstract

Gallstone ileus is an uncommon type of little gut hindrance brought about by an impaction of gallstone inside the lumen of small digestive system. The regular side effects are sickness, regurgitating, clogging, stomach agony and distension. Starting administration includes liquid revival and conceivably nasogastric suctioning. Since gallstone ileus is a mechanical little entrail deterrent, it tends to be a careful crisis and requires open or laproscopic medical procedure to evacuate an affected stone. We present an instance of Gallstone ileus in a 75-year-old female who had a 2-day history of intense spewing which bothered after sustenance consumption. Patient was determined to have intestinal hindrance. Enterotomy was finished. The stone was found and recovered. The post-usable stage was uneventful.

Keywords: *Enterotomy, little inside check, jejunal gallstones, Rigler's set of three.*

Introduction

The gallbladder is a little, pear-molded organ that is a piece of the stomach related framework. It is situated on the correct side of the stomach area beneath your liver. The gallbladder stores and secretes bile, which is made by the liver, into the small digestive tract during absorption. Bile, a yellow-caramel liquid, helps condensation fats in nourishment. Gallstone ileus is an uncommon type of little inside impediment brought about by an impaction of gallstone inside the lumen of small digestive tract. It represents 1-4% of intestinal checks only in the more seasoned female population.[2] A jejunal area of gallstone ileus has been once in a while depicted in the writing. Gallstone ileus is a mechanical intestinal check because of gallstone impaction inside the gastrointestinal tract. Under 1% of instances of intestinal deterrent are gotten from this etiology. The name "gallstone ileus" is a misnomer in light of the fact that an ileus is, by definition, a non-mechanical inside motility disappointment.

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Materials and Method

A multi year elderly person was admitted to the emergency clinic with a multi day history of intense spewing which exasperated after nourishment consumption and was bilious in nature. She had a background marked by stomach torment that was colicky in nature. Anyway there was no history of stomach distension or fever or then again some other explicit protests. Before, there were no comorbidities, no past careful history yet the lady had a propensity for tobacco biting for as far back as 25 years. On clinical examination the patient seemed, by all accounts, to be got dried out, paleness (anicteric) and had low pee yield. Follow up of which CT ABDOMEN was done and uncovered proximal jejunum expanded and fallen ileum. Patient was additionally screened under USG uncovering intense intestinal obstacle. Examinations uncovered that, Hb-8.3 g%, S.Creatinine-2.0 mg%, Blood urea–65mg/dl, LFT ordinary, S.potassium–3.0 mEq/L. X-beam erect guts demonstrated numerous air liquid level, indications of intestinal hindrance.

Laparotomy discoveries uncovered a gallstone 3.5 cm X 2 cm blocking the jejunum 100 cm from the DJ flexure, Proximal dilatated inside circles, Multiple 1.5 cm calculi found in the digestive tract proximal to the deterrent, Gallbladder thickly disciple to duodenum and

containing stones. A 3 cm longitudinal entry point made only proximal to the deterrent drained out the stone. The various stones in the proximal small digestive tract were drained out. The entry point shut transversely in two layers. DT put and twisted shut in layers. Considering the age, drying out, ARF and poor general state of the patient, separation of cholecystoduodenal fistula and subtotal cholecystectomy was arranged later as an elective medical procedure. The patient was doing admirably post task.

Findings: Patient was determined to have intense little inside impediment and in this way crisis laparotomy was arranged and the surgical technique pursued with restorative administration. Following which Enterotomy was done in the ileum for 4cm, proximal to affected site. Stone was found and recovered. Around five littler stones additionally recovered proximally. Enterotomy shut in opposite way to stay away from hindrance in two layers. The post-usable stage was uneventful.

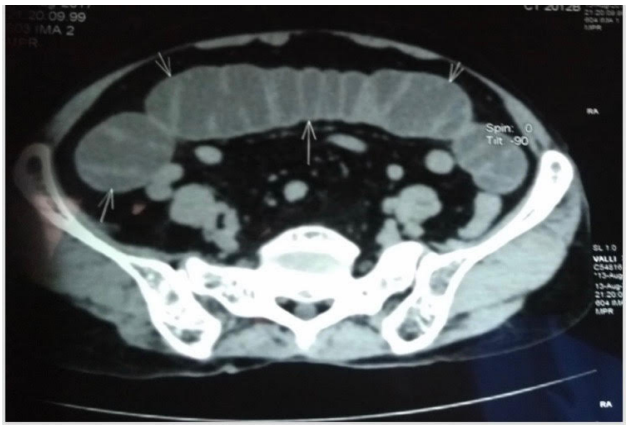


Figure 1: abdominal radiograph shows dilated jejunum & abdominal radiograph shows collapsed ileum.



Figure 2: Shows stone of size 3.5x2cms and multiple 1.5cm calculi.

Discussion

Gallstone ileus is a mechanical intestinal obstacle because of gallstone impaction inside the gastrointestinal tract. Under 1% of instances of intestinal block are gotten from this etiology. The name "gallstone ileus" is a misnomer in light of the fact that an ileus is, by definition, a non-mechanical gut motility failure.[1] Gallstone ileus is an unprecedented difficulty of cholelithiasis with a high grimness and mortality rate.[2] Gallstone ileus is an uncommon ailment and records for around 1-3% of specialist ileus of the little inside, however for 25% of all little entrail blocks in patients more seasoned than 65 years. Associative cardiorespiratory maladies or diabetes are visit in more established patients and in charge of the high death rate.

The traditional X-beam portrayal of gallstone ileus is RIGLER'S TRIAD (ectopic gallstone, halfway or complete entrail deterrent and gas in the gallbladder or biliary tree) Riglers Traid is a mix of discoveries on a stomach radiograph of individuals with gallstone ileus.[3] Pneumobilia is seen in just 33% of cases likely because of impediment of the cystic pipe from the inflammed gallbladder. Radiological highlights of little inside deterrents might be missing when in the sub intense stage, as found for this situation. One investigation has exhibited 96% affectability in analysis when stomach X-beam is joined with a stomach ultra sound scan.[4]

Conclusion

Gallstone ileusis an uncommon reason for little gut impediment (1-4%). Jejunum as a site of check is seen uniquely in 15% of gallstone ileus(70% in ileum).10% have extra stones in small digestive tract like our case.[4] Jejunum gallstones represent a specific indicative test and request a high file of doubt. The administration of the stone seems to fluctuate contingent upon the method of introduction. A high record of doubt is required on deciphering plane x-beam films. Stomach ultra sound, differentiate considers and a stomach CT output are on the whole complimentary and may help in achieving a pre usable finding. The perfect treatment for jejunum gallstones is a solitary stage laparotomy, cholecystectomy and fistula repair.[5]

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Metabolic Syndrome: A Short Review

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Abstract

Critical intrigue exists in understanding the common metabolic dysregulation prompting heftiness, diabetes, and cardiovascular sickness (CVD). Henceforth came the idea of the "metabolic disorder" (MetS). Reaven first depicted MetS in his 1988 Banting address as "Disorder X". Reaven recommended that the disorder depended on the presence of insulin opposition and brought about glucose narrow mindedness, hypertension and dyslipidemia. The World Health Organization (WHO) created the main formalized meaning of the MetS in 1998. From that point forward numerous meanings of the disorder have been proposed, the latest being the Harmonized Definition where 3 of the 5 hazard variables are available: amplified abdomen outline with populace explicit and nation explicit criteria; triglycerides ≥ 150 mg/dL, HDL-C < 40 mg/dL in men and < 50 mg/dL in ladies, systolic circulatory strain ≥ 130 mm Hg or diastolic pulse ≥ 85 mm Hg and fasting glucose > 100 mg/dL, with the consideration of patients taking drug to oversee hypertriglyceridemia, low HDL-C, hypertension, and hyperglycemia. The National Health and Nutrition Examination Survey (NHANES) assessed the general predominance of MetS in grown-ups (matured ≥ 20 years) in the United States as 33% from 2003 to 2012. The high commonness is especially disturbing given that MetS likewise inclines to various genuine conditions past diabetes and CVD including non-alcoholic greasy liver illness (NAFLD), non-alcoholic steatohepatitis (NASH), polycystic ovarian disorder (PCOS), obstructive rest apnea (OSA), malignancy, and numerous different genuine ailment states.A study directed in urban zones of Karachi and Pakistan,showed high predominance of MetS-34.8 and 49% as per International Diabetes Federation (IDF) definition and altered National Cholesterol Education Program,Adult Treatment Panel III (NCEP ATPIII) criteria,respectively.Hence, early distinguishing proof and intercession are justified. Way of life change is the central intercession in treatment of MetS.

Keywords: *Metabolic Syndrome, CVD, non-alcoholic greasy liver illness (NAFLD), polycystic ovarian disorder (PCOS).*

Introduction

The metabolic disorder (MetS) is depicted by the bunching of a few hazard factors for cardiovascular infection (CVD, for example, hypertension, dyslipidaemia, weight (especially focal stoutness), insulin opposition and high fasting plasma glucose.[1] In 2001, The Third Report of National Cholesterol Education Program Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) (ATP III) underlined the significance of the metabolic disorder and gave a working meaning of this disorder for the first time.[2] Contrasts in hereditary foundation, diet, levels of physical movement, age and sex structure all impact the pervasiveness of both metabolic disorder and its components.[3] Cardiovascular sickness is one of the fundamental reasons of death among ladies on the planet.[4]

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Meaning of Metabolic Syndrome: There are a few meanings of Metabolic Syndrome in the World. World Health Organization's (WHO) settled on a choice in 1988 to institutionalize the criteria. The WHO was characterized as one of the accompanying: Type 2

diabetes debilitated fasting glucose, hindered glucose resilience and for those with typical fasting glucose (< 110 mg/dL). The hazard components incorporate antihypertensive prescription or potentially hypertension (≥ 140 mmHg systolic or ≥ 90 mmHg diastolic), plasma triglycerides ≥ 150 mg/dL, HDL cholesterol < 35 mg/dL in men or < 39 mg/dL in ladies, BMI > 30 kg/m2 and additionally midriff: hip proportion > 0.9 in men and > 0.85 in ladies.[5]

Met S is characterized by a group of stars of an interconnected physiological, biochemical, clinical, and metabolic elements that straightforwardly builds the danger of atherosclerotic cardiovascular illness (ASCVD), (T2DM), and all reason mortality.[6]

The three most broadly perceived ongoing endeavors to characterize the metabolic disorder incorporate the WHO report from 1999[7], the European Group for the Study of Insulin Resistance (EGIR), additionally in 1999[8], and the meaning of the National Cholesterol Education Program Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults–also called the Adult Treatment Panel III (ATPIII)–in 2001.[9] The first 352 A.J. Cameron et al/Endocrinol Metab Clin N Am 33 (2004) 351–375 WHO proposals were not intended to be an accurate definition; rather, they were planned as a working rule, to be enhanced later on, that would empower likeness between studies. Following the distribution of the WHO meaning of the metabolic disorder in 1999, the EGIR proposed an adjusted form to be utilized in nondiabetic subjects just, that would be more straightforward to use in epidemiologic examinations since it didn't require an euglycemic clip to quantify insulin opposition, and with marginally changed cut-focuses for hypertension, triglycerides, high-thickness lipoprotein (HDL) cholesterol, and modified measures and cut-focuses for obesity. [8]

Epidemology: Overall commonness of MetS ranges from <10% to as much as 84%, contingent upon the area, urban or provincial condition, piece (sex, age, race, and ethnicity) of the populace considered, and the meaning of the disorder used. [10,11]

The predominance of MetS shifts the world over and regularly relates with the pervasiveness of weight. There is a wide variety in predominance dependent on age, sexual orientation, race/ethnicity, and the criteria utilized for determination. MetS influences a fifth or a greater amount of the number of inhabitants in the USA and about a fourth of the number of inhabitants in Europe. South-east Asia has a lower pervasiveness of MetS yet is quickly moving towards rates like the western world. Beltrán-Sánchez and partners announced a lessening in the age-balanced commonness of MetS in the USA, from 25% in 2000 to 22.9% between 1999/2000 and 2009/2010 dependent on National Health and Nutrition Examination Survey (NHANES) data.[12]

Higher financial status, inactive way of life, and high weight file (BMI) were altogether connected with MetS. Cameron et al. have inferred that the distinctions in hereditary foundation, diet, levels of physical action, smoking, family ancestry of diabetes, and instruction all impact the commonness of the MetS and its components.[13] The watched pervasiveness of the MetS in National Health and Nutrition Examination Survey (NHANES) was 5% among the subjects of ordinary weight, 22% among the overweight, and 60% among the obese.[14] It further increments with age (10% in people matured 20–29, 20% in people matured 40–49, and 45% in people matured 60–69)15. The predominance of MetS (in view of NCEP-ATP III criteria, 2001) fluctuated from 8% to 43% in men and from 7% to 56% in ladies around the world. Park et all seen that there is an expansion in the pervasiveness of MetS from 20 years of age through the 6th and seventh decade of life for guys and females, individually. Ponholzer et al. detailed that there is high predominance of MetS among postmenopausal ladies, which changes from 32.6% to 41.5%16.

Pathogenesis of MetS: job of irritation: The pathogenic instruments of MetS are intricate and stay to be completely explained. Regardless of whether the individual segments of MetS speak to unmistakable pathologies or signs of a typical pathogenic component is still discussed. The wide variety in geographic dispersion of MetS and the ongoing ‘make up for lost time’ in the creating scene underscore the significance of ecological and way of life factors, for example, the utilization of abundance calories and absence of physical action as being real supporters. Instinctive adiposity has been shown to be an essential trigger for the greater part of the pathways associated with MetS, in this manner focusing on the significance of a high caloric admission as a noteworthy causative factor.[17] Of all the proposed components, insulin obstruction, neurohormonal enactment, and interminable aggravation have all the earmarks of being the principle players in the inception, movement, and change of MetS to CVD (Figure1).

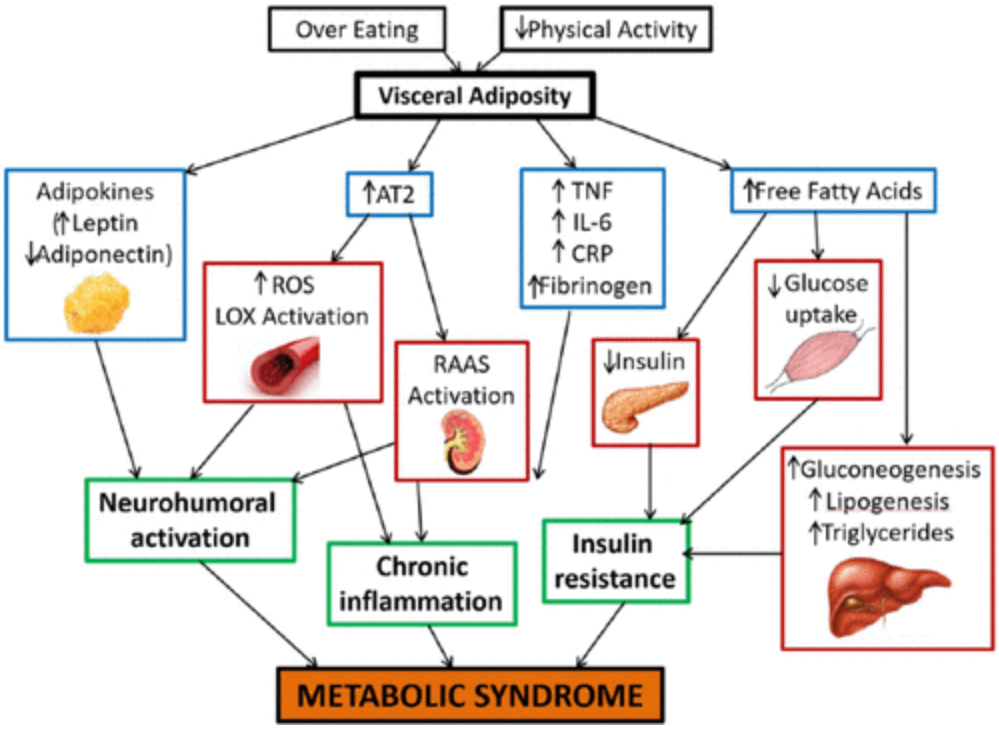


Figure 1. Pathophysiological systems in metabolic disorder. AT2, angiotensin II type 2 receptor; CRP, C-responsive protein; IL-6, interleukin 6; LOX, lectin-like oxidized low-thickness lipoprotein; RAAS, renin-angiotensin-aldosterone framework; ROS, receptive oxygen species; TNF, tumor rot factor. Metabolic disorder: pathophysiology, the board, and balance by normal mixes. The board of MetS.

MetS is related with an expanded danger of both atherosclerotic and nonatherosclerotic CVD. Regardless of whether the hazard is a whole of its individual parts or the bunching of these segments instigates a synergistic hazard is still under discussion. Results from an ongoing meta-investigation by Motillo and partners showed that MetS copies the danger of CVD results and expands all-cause mortality by 1.5 occasions. The executives of MetS includes a double methodology that joins way of life changes and pharmacological intercessions with an end goal to diminish CVD.[18]

Way of life change: As depicted before, MetS results from expanded calorie utilization lopsided to metabolic necessities. Way of life adjustment is basic in the administration of basic hazard factors. Weight decrease and support of perfect body weight are fundamental preventive and the board techniques. The objective of weight decrease is lost 7–10% in gauge body weight over a time of 6 a year just as a decrease of caloric admission by 500–1000 calories/day. Dietary change can likewise control different MetS segments: low admission of soaked fats, trans fats, cholesterol, sodium, and basic sugars is known to help with dyslipidemia, hyperglycemia and hypertension, for instance. Diets high or low in fat substance fuel atherogenic dyslipidemia, all things considered, 25–35% of every day caloric admission as fat is typically suggested. Reasonable utilization of bariatric medical procedure has indicated advantage in the butterball shaped. Weight decrease assists with progress in all segments of activity. Exercise builds calorie utilization, helping weight reduction and diminishing generally speaking CVD hazard: around 30–60 min of moderate power practice and cognizant endeavors to adjust a stationary way of life can be useful for the administration of MetS.[18]

Pharmacotherapy: Alongside altering the hidden hazard factors, pharmacotherapy is another alternative for the counteractive action of CVD. Major pharmacological intercessions incorporate administration of dyslipidemia with statins, diminishing prothrombotic hazard with antiplatelet drugs, and the utilization of insulin sensitizers to diminish the danger of diabetes. There is no single medication treatment for MetS and as of now accessible pharmacotherapy and related comorbidities require delayed utilization of different drugs, which is trying for patients because of

polypharmacy and diminished consistence. Therefore, there is developing enthusiasm for the utilization of normally happening mixes in bringing down the hazard and movement of MetS however their impact on long haul cardiovascular results and long haul consistence is unknown.[18]

Treatment: MetS is a condition of endless second rate irritation with the significant fundamental impacts (Table1). Clinical recognizable proof and the board of patients with the MetS are essential to start endeavors to satisfactorily actualize the medications to lessen their danger of resulting diseases.[19] Successful preventive methodologies incorporate way of life changes, basically weight reduction, diet, and work out, and the treatment contains the suitable utilization of pharmacological operators to decrease the particular hazard factors. Pharmacological treatment ought to be considered for those whose hazard elements are not sufficiently decreased with the preventive measures and way of life changes.[20] The clinical administration of MetS is troublesome in light of the fact that there is no perceived technique to counteract or improve the entire disorder, the foundation of which is basically insulin resistance.[21] In this manner, most doctors treat every segment of MetS independently, laying a specific accentuation on those parts that are effectively agreeable to the medication treatment. Truth be told, it is simpler to endorse a medication to lower circulatory strain, blood glucose, or triglycerides instead of starting a long haul system to change individuals' way of life (practice more and eat better) with the expectation that they will eventually shed pounds and will in general have a lower pulse, blood glucose, and triglycerides. For the treatment of hazard components of MetS, the doctor ought to pursue the present treatment rules of the National Cholesterol Education Program (NCEP)[22], the American Heart Association (AHA) 23.

Table 1: Fundamental impacts of MetS.

Renal	Microalbuminuria, hypofiltration, hyperfiltration, glomerulomegaly, central segmental glomerulosclerosis, and endless kidney disease.[24]
Hepatic	Increased serum transaminase, nonalcoholic steatohepatitis (NASH), nonalcoholic greasy liver sickness (NAFLD), hepatic fibrosis, and cirrhosis.[25]
Skin	Acanthosis nigricans, lichen planus, fundamental lupus erythematosus, consume instigated insulin obstruction, psoriasis, androgenetic alopecia, skin labels, skin malignancy, and skin inflammation inversa.[26]
Ocular	Nondiabetic retinopathy, age related waterfall atomic, cortical, back subcapsular; focal retinal supply route impediment, essential open point glaucoma, oculomotor nerve paralysis, and lower cover Entropion.[27]
Sleep	Obstructive rest apnea (OSA)[28]
Regenerative system	Hypogonadism, polycystic ovarian disorder (PCOS), and erectile dysfunction[29]
Cardiovascular system	Coronary coronary illness (CHD), myocardial localized necrosis (MI), and stroke[30]
Cancers	Breast, pancreas, and prostrate[31]

Hazard Assessment: The objectives of treatment are to decrease both a present moment and lifetime chance. The nearness of the MetS per seindicates a higher lifetime chance. A commonsense way to deal with gauge supreme, present moment CHD/CVD hazard in patients with the MetS without ASCVD or diabetes is to utilize the standard Framingham calculation to appraise a 10-year danger of the coronary illness (CHD).[22]

Conclusion

MetS is a worldwide pandemic and built up hazard factor for atherosclerotic and non atherosclerotic CVD.Insulin resistance, visceraladiposity, atherogenic dyslipidemia, endothelial dysfunction, geneticsusceptibility, elevated blood pressure, hypercoagulable state,chronic stress are a few elements of MetS. Lifestyle alteration stays as the underlying intercession of choice. Existing treatments to handle different parts of MetS are constrained by different elements. Right off the bat, the presence of just a bunch of prescriptions that have been appeared to convincingly affect long haul results settles on the decision of treatment testing. Also, the ceaseless idea of the segments of MetS warrant delayed and regularly uncertain utilization

of different meds, for example, statins, prompting an expanded weight of medication related antagonistic impacts and patient rebelliousness. In this specific circumstance, the improvement of nutraceuticals that are promptly accessible and with negligible reactions may speak to a region of guarantee in the advancement of novel treatments.

Ethical Clearance: No ethical clearance was required for this work.

Source of Funding: Self funded work

Conflict of Interest: Nil

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Parenteral Breastfeeding Practices in Rural Population of Kancheepuram District

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Abstract

Breast sustaining assumes a significant job in the advancement of the child. The greater parts of the moms in our general public are uninformed of its significance. Thus, this examination is being led to know the commonness of breastfeeding rehearses in the urban zone of kancheepuram local. Materials and Method: The unmistakable cross sectional examination was completed among 100 ladies having kids between the age gathering of 0 months to 1 year going to urban Health preparing focal point of a private restorative school. Helpful examining strategy was pursued, and a semi-organized poll was utilized to gather socio statistic subtleties and breastfeeding rehearses. Result: The commonness of parenteral breastfeeding practices is observed to be 67%. There found to a misguided judgment among the moms that the other weaning items give a superior wellbeing and advancement to their infants. End: The predominance of parenteral bosom nourishing practices in our examination is has been observed to be low. Consequently, instructive projects and mindfulness camps must be made and taken to the mother and other relatives.

Keywords: *Parenteral Breastfeeding, semi-organized poll, parenteral bosom.*

Introduction

Breastfeeding has been definitively exhibited as a standout amongst the most significant determinants for development and survival of newborn children, youngster and lactating moms. For any neonate, 'Bosom is ideal' is currently an all inclusive idea. It contains abnormal amounts of counter acting agent rich proteins, particularly secretory immunoglobulin an and lactoferrin, which offers security to the new conceived from disease. The antibodies found in human bosom milk secure the infant against respiratory contaminations. Increment in breastfeeding practice has decreased the occurrence of intrusive bosom malignant growth by 4.3 percent while 30 rate decreases in ovarian disease can be seen related with longer times of breastfeeding.

World Health Organization (WHO) suggests early commencement of breastfeeding solely for a half year. And furthermore included that breastfeeding till 1 year is progressively effective to build the invulnerability of the tyke. It is can be noticed that youngsters breastfed for under 1 year are at extraordinary danger of being underweight and squandering as the bosom milk supplements Vitamin A. In any case, an all-inclusive breastfeeding without the presentation of suitable reciprocal nourishments following a half year can prompt hunger. All around, just 40 percent of newborn children under a half year of age are only breastfed.[1] About 67% of newborn children in India are only breastfed.

The breastfeeding project endeavors to rejuvenates the endeavors towards advancement, security and backing of breastfeeding rehearses through wellbeing frameworks to improve breastfeeding rates.[2] Under any conditions bosom milk is the perfect nourishment for the newborn child. No other sustenance is required by the child until a half year after birth. Under typical conditions, Indian mother emit 450-600ml of milk day by day with 1.1gm protein per 100ml. The vitality estimation of human milk is 70 Kcals per 100ml.[3] Bosom milk is the characteristic first nourishment for children, it gives all the vitality and supplements that the baby

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requirements for the main long stretches of life, and it keeps on giving up to half or even more a kid's dietary needs during the second 50% of the primary year, and up to 33% during the second year of life.[4]

The Government of India just because had included explicit objectives to improve newborn child bolstering rehearses for decreasing the Infant Mortality Rate (IMR), hunger and advancing coordinated early tyke advancement in the 10 th Five-Year Plan. It likewise intended to build the rate of commencement of breastfeeding inside 1 h to half from the present degree of 15.8%, and to expand the selective breastfeeding rate to 80% during the initial a half year from the present level. Despite the fact that there have been worldwide developments towards ensuring, advancing and supporting bosom milk as a piece of ideal bolstering rehearses among infants, there exist numerous disparities between what has been prescribed and what is being polished in actuality. "Poor newborn child bolstering rehearses and their results are one of the world's serious issues and a genuine obstruction to social and financial improvement. It isn't just an issue of the creating scene, it happens in numerous pieces of the created world also". As indicated by National Family Health Survey–4, which were discharged in 2016, the predominance of select breastfeeding in India was 55% and in Tamil Nadu, it was 48.3 %. Youngsters under 3 years old, breastfed inside one hour of birth was observed to be 41.6% in India and 54.7% in Tamil Nadu. All inclusive (90%) inclusion of breastfeeding can forestall 13% of passings of youngsters under 5 years of age.[5]

Materials and Method

Study plan: This was network based clear cross sectional investigation did in a urban zone of Kancheepuram. Study territory and test estimate: The investigation was done among ladies having youngsters matured 0 months to 1 year going to as outpatients in a private therapeutic school. The example size is 100. Study Period: The investigation was completed in April 2019. Moral endorsement and Informed Consent: Ethical freedom was gotten from the Institutional Ethical Committee and educated assent was acquired from every single member. Study Tool: A semi-organized survey was utilized information gathering by eye to eye meet. The survey incorporated the socio-statistic subtleties, term of selective breastfeeding, inception of breastfeeding, other weaning items utilized. They were enquired and noted.

Findings: Table. 1 demonstrates the sociodemographic profile of the example individuals. It demonstrates that the example has a larger number of moms of age over 31 years and the per capita salary of them is in excess of 10,000 rupees and furthermore they all have the instructive capability of auxiliary training and the vast majority of them are non-working lastly the financial status of them is medium.

Table 1: Sociodemographic profile of the study participants

Demographic Variables	Groups	Percentage
Age in years	<19	0%
	20-25	30%
	26-30	41%
	>31	29%
Income per month	<2500	0%
	2500-5000	0%
	5000-10000	5%
	>10000	95%
Marital status	Married	100%
Formal education	None	13%
	Primary	15%
	Secondary	72%
Mothers employment	Working	56%
	Non-working	44%
Socio economic status	Low	16%
	Medium	73%
	High	11%

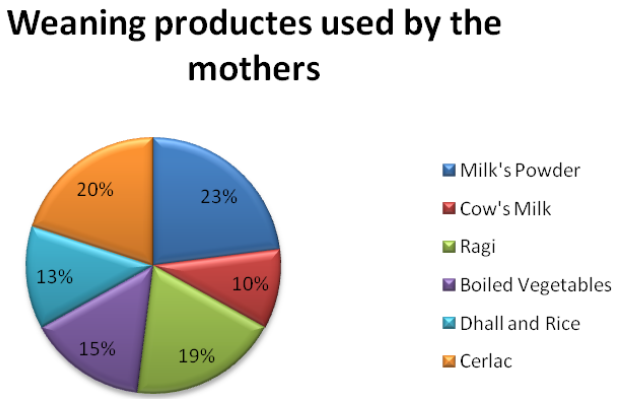


Figure 1: Weaning productes used by the mothers.

Figure.1 shows the other weaning products that has been used along with or other than the breast milk. Of all these milk powder tops the list next comes the

supplementary food cerelac and it is followed by ragi, boiled vegetables, dhal and rice and finally then cow's milk.

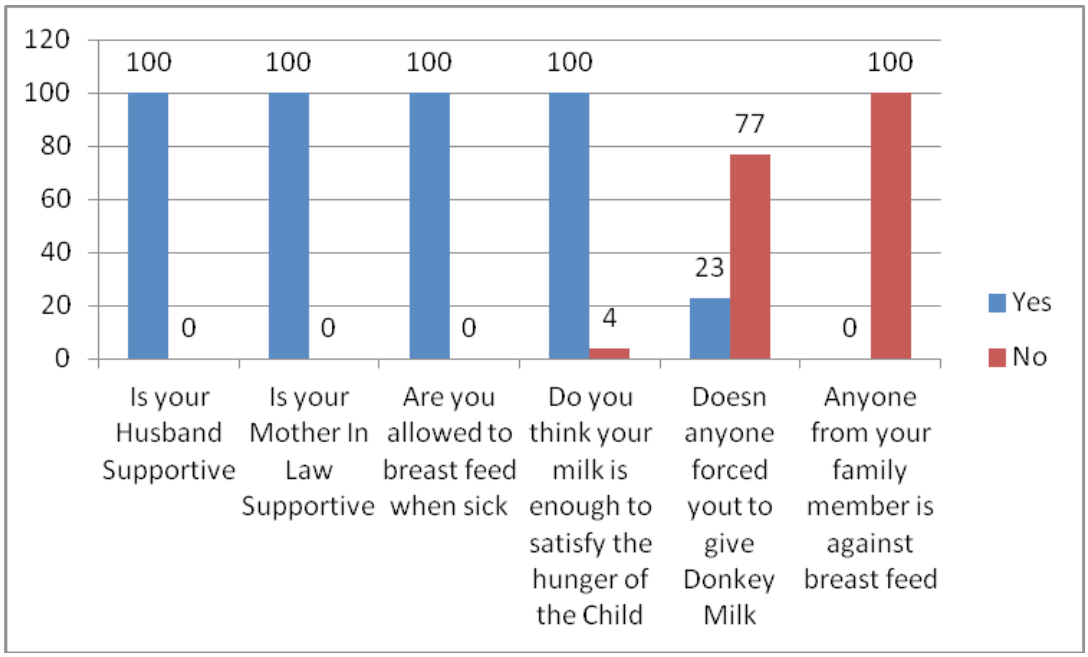


Figure 2: Breastfeeding support among family members

Figure 2 demonstrates the level of answers to the inquiries that has been posed during the review. It speaks to that every one of the spouses and mother in laws are strong in breastfeeding and none of the relatives are against the breastfeed. Also, about 77% have addressed that they were told by few of their relatives and companions to give jackass' milk as it builds the vocal limit of the infant. What's more, nearly everyone were to permitted breastfeed notwithstanding when they wiped out. What's more, 96% of the moms feel that their milk is adequate to fulfill the craving of the kid.

Discussion

Because of modernization and uncontrolled publicizing of equation sustains, the act of restrictive breastfeeding is gradually vanishing from our locale. Our investigation done in urban region of kancheepuram, demonstrated the predominance of select breastfeeding to be 67%. Comparable outcomes were found in an investigation done by S. Radhakrishnan et al in Salem (34%) and by Joshi PC et al in Bangladesh (36%).[6, 7] This demonstrates the qualities are lower than our national predominance of selective breastfeeding.

It is discovered that lone 33% of kids are breastfed inside 60 minutes. As per NFHS–4 reviews held in 2015-16, broadly 41.6% of babies were breastfed 1 hour after birth. Additionally in our examination, 21% of the youngsters were not breastfed even following 24 hours after birth. This demonstrates the absence of familiarity with breastfeeding rehearses that will be started following birth.[5]]

Numerous confusions about breastfeeding practices are rehearsed all over our nation. At the point when approached about the purpose behind not rehearsing, the most widely recognized answer was that there are other weaning items superior to anything bosom milk in giving better improvement and expanding body weight and a decent vocal limit. The other weaning items utilized by a large portion of them are ragi, jackass milk, cerelac, bovine's milk, vegetables, dhall, ect.

Conclusion

This examination demonstrates that the restrictive breastfeeding practices are being brought down in our locale. Also, there is a need to make mindfulness among the ladies' of tyke bearing age with respect to the breastfeeding practices like select breastfeeding for a half year and to begin nourishing following birth. This training ought to likewise be given to the next relatives. This would bring the change and make it a triumph.

Funding source: No financing sources

Conflict of intrigue: None announced

Ethical endorsement: The investigation was affirmed by the Institutional Ethics Committee, Sree Balaji Medical College and Hospital.

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Prevalance of Obesity among Urban Population in Thiruvallur District

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Abstract

Background: Stoutness and overweight are quickly expanding in nations like India. Weight prompts different conditions like expanded dangers of Cardiovascular infections, angina, diabetes mellitus. There is additionally a connection among obesity and atherosclerosis. Because of the utilization of unfortunate nourishment, stationary way of life, absence of social insurance administrations, and money related help, the creating nations are confronting high danger of corpulence and their unfriendly outcomes like ischemic heart ailments, diabetes mellitus, and so on.

Techniques: This is a cross sectional examination led in Thiruvallur region among urban populace. Every one of the general population having a place with either sexual orientation in the gathering of 20-50 years, who were obviously sound were incorporated into the examination.

Results: A sum of 100 individuals was incorporated into the investigation, 11 people were observed to be stout.

Conclusion: BMI is fundamentally identified with dietary propensities. Dietary propensities are of the significant determinants of stoutness and its related outcomes, and other related issues like hair fall, stomach throb, obstruction and so forth.

Keywords: *Weight, Overweight, Bmi, Cardiovascular Diseases.*

Introduction

Weight and overweight are quickly expanding in nations like India. Weight prompts different conditions like expanded dangers of Cardiovascular ailments, angina, diabetes mellitus.[1] The rising weight of corpulence is the significant risk for the creating nations. Heftiness is the way of life executioner illness. Heftiness is ordinarily characterized calm basically as abundance body weight for tallness, however this basic definition gives a false representation of an etiologically mind boggling phenotype essentially connected with adiposity, or body bloatedness, that can show metabolically[2] and not simply as far as body measure. Corpulence extraordinarily builds danger of unending ailment horribleness–specifically inability, wretchedness[3], type 2 diabetes cardiovascular infections, and mortality. Weight is influencing a large number of individuals in our country[4]. Obesity was viewed as a created world issue. Anyway these days the pervasiveness of stoutness is definitely expanding in creating nations too.[5] Different parts of neighborhood condition assume a key job in the improvement of heftiness. Weight and overweight is the fundamental driver for the improvement of non-transferable malady dreariness and mortality. BMI is the proportion of weight in kilogram isolate by stature in meters squared (kg/m2).[6] Neighborhood retailing of fatty unfortunate sustenance had been involved in influencing the commonness rate of weight and overweight. As per the world wellbeing association, heftiness is a standout

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amongst the most widely recognized, yet among the most dismissed, general medical issues in both created and the creating nation. The danger of death was most minimal when BMI was 30 kg/m2.[7] Individuals with heftiness have higher mortality than non-hefty people. Corpulence is numerous, complex, and to a great extent preventable infection, influencing more than 33% of the number of inhabitants on the planet.[8]

Materials and Method

This was a spellbinding cross sectional examination done to discover the predominance of heftiness among urban populace in Thiruvallur region between the time of April 2019-July 2019. The example size was 100.

Educated composed assent was taken from the examination members before they were incorporated into the investigation. Data was gotten utilizing a self-regulated poll. Weight file was evaluated by estimating their and weight and were arranged into whether they were hefty or not.

Findings: A sum of 100 people were engaged with the investigation. Around 45% of them were between the age gathering of 20-30 years. 59% of them were of them were females. With respect to, 25% were overweight and 11% were hefty.

Category	Criteria	Percentage
Age group	20-30	45%
	30-40	20%
	40-50	35%
Sex	Male	41%
	Female	59%
Occupation	House wife	29%
	Teacher	3%
	Student	22%
	Business	31%
	Tailor	2%
	Government staff	13%
BMI	Under weight (<18.5)	2%
	Ideal weight (18.5-24.9)	62%
	Over weight (25-29.9)	25%
	Obese (>29.9)	11%
Consumption of tobacco in some form	Yes	14%
	No	81%
	Occationally	5%
Drinking	Yes	8.2%
	No	81.6%
	Occationally	10.2%
Ever tried to quit smoking & drinking	Yes	9.1%
	No	30.3%
	Not applicable	60.6%
Hypothyroidism	Yes	4%
	No	96%
Sleep duration	>6-8 hours	34%
	<6-8 hours	49%
	>12 hours	27%
Stress	Yes	63%
	No	37%
Anxiety	Not anxiety	72.7%
	Moderate anxiety	23.2%
	Extreme anxiety	4.1%
Depression	Not depressed	72.7%
	Moderately depressed	25.3%
	Extremely depressed	2%
Pain while exercising	Yes	23%
	No	76%
	Mild	1%
Problems in performing usual activity	No problem	86%
	Mild problem	12%
	Unable to do	2%
Problems related to self-care	No problem	97%
	Some problem	3%
Mobility	No problem	84%
	Some problem	16%
	Confined to bed	0%
Medical problems preventing you from doing exercises	Yes	15%
	No	81%
	Don't know	4%
Have you ever tried to lose weight	Many times	15%
	Occationally	24%
	Never	61%

Discussion

The ICMR-INDIAB study is the principal think about from India to appraise the predominance of corpulence (summed up and stomach) among urban and rustic inhabitants of States of India. This investigation demonstrated the accompanying outcomes: the most astounding commonness of the two kinds of heftiness (GO and AO) was found in Chandigarh pursued by Tamil Nadu, Maharashtra and Jharkhand. This isn't amazing as Chandigarh has the most elevated per capita pay among all the four areas considered and is profoundly urbanized, comprising essentially of the city of Chandigarh and a couple of peri-urban clusters.[9]

In the present examination pervasiveness of summed up, stomach and joined stoutness was observed to be 56%, 71.2% and 51.3% separately. Andhra Pradesh, 44.4 percent urban men experienced stoutness, while the rate in provincial parts was 28 percent. Correspondingly, 45.6 percent of the urban ladies in the state were stout against the 27.6 percent ladies in rustic Andhra Pradesh. In an investigation led in urban north India (New Delhi), the general commonness of summed up weight was 50.1 percent, while that of stomach corpulence was 68.9 per cent.[10]

In nations like India, the ascent in heftiness predominance could be ascribed to the expanding urbanization, utilization of automated vehicle, expanding accessibility of handled and quick nourishments, expanded TV seeing, reception of less physically dynamic ways of life and utilization of more "vitality thick, supplement poor" diet. Higher predominance of obesiety in young ladies is likewise troubling in light of the fact that it might build the prevalanvce of gestational diabetes, type 2 diabetes, hypertension and cardiovascular maladies in later life. They may experience the ill effects of significant outcomes like polycystic ovary disorder, barrenness, etc..with further urbanization, changing way of life and conduct we may expect further increment in the occurrence and the predominance of obesiety in india.

Conclusion

BMI is essentially identified with stationary way of life and dietary propensities. Dietary propensities and absence of activity and inactive way of life are the real determinants of weight and other wellbeing related issues like heart ailments, diabetes, and so on heftiness can likewise be brought about by the propensity for skirting breakfast being particular about sustenance. Different propensities like taking desserts routinely and so forth turns into a significant reason for creating corpulence. So measures should take at school levels, kids, ought to be instructed about the outcomes of weight and its preventive measures. And furthermore they ought to be guided for ordinary little exercise which can keep them from weight. Legitimate sound eating regimen ought to be prompted. An activity of around 30 min is exhorted.

Funding: No funding source

Conflict of Interest: None declared

Moral Endorsement: The examination was affirmed by the Institutional Ethical Committee, Sree Balaji Medical College and Hospital.

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Prevalence of Gaming and its Psychological Effects among Young Adults in an Urban Area of Chennai

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Abstract

Background: Video gaming has turned into a most well known relaxation action in numerous pieces of the world, which seems to create issues because of unreasonable gaming, most ordinarily among understudies. The gaming standard of conduct is of adequate seriousness to result in huge disability in close to home, family, social, instructive, word related or other significant regions of working. In this setting present examination was directed to survey the predominance of dependence on online computer games among young people. Techniques: This is a cross-sectional investigation led among 100 youthful grown-ups (18-25 years) chose from a urban territory of Chennai by advantageous examining. The greater part of them were chosen from the schools arranged close to the urban zone. The parts of gaming and its belongings were evaluated utilizing a pre-tried organized poll. Results: In our examination, the normal length of gaming was 2 hours. The members conceded about irregular rest practices like dozing late around evening time, awakening amidst night for scoring higher levels in the game. Because of expanded preoccupancy with gaming, they conceded to having lesser focus during classes in this way indicated terrible showing in their examinations. As 26% of understudies were making diversions in the class hours with their companions their examinations and scholastic execution was influenced the most. In this investigation, understudies who were having high scores grumbled of state of mind issue like uneasiness, discouragement, impulsivity and compulsivity. Conclusion: Gaming issue are on an ascent, which has lead understudies to psychosocial unsettling influences, tension, wretchedness, state of mind issue, rest aggravations, cerebral pain, absence of social exercises, and debilitation in instruction. In this way, the time has come to manage the utilization of Electronic gadgets, Internet and computer games.

Keywords: *Video gaming, rest, scholastic execution.*

Introduction

Gaming issue is portrayed by longing for of the individual to play computer games. This may influence every day schedule exercises of the individual, alongside horrible showing in studies, not ready to satisfy the needs in occupation, different regions of significant working and aggravations in family connections. As indicated by world Health association, gaming issue is analyzed after time of at any rate a year, however from the get-go in instances of seriousness of signs and symptoms.[1] It has perceived as serious issue and has included under International Classification of Diseases 11, for example scatters because of substance utilize or addictive practices.

An examination led by Caplan et al, uncovered that there was psychological debilitation among computer game addicts.[2] Physical ailments like repetitive incessant cerebral pains, queasiness, cervical spondylitis because of inappropriate adjusting of neck, obscuring of vision, dry eyes, early advancement of waterfalls, torment in wrist and bury phalangeal joints were credited to gaming addicts.[3] Psychiatric diseases like mind-set issue, tension, longings for gaming, propensity for stealing, loss of intrigue and so on were additionally

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noted in numerous studies.[4,5] The American Psychiatric Association (APA), while expressing there is lacking proof for the consideration of web gaming issue in the Diagnostic and Statistical Manual of Mental Disorders in 2013, thought of it as a condition for further study.[6] Some scholars center around assumed inherent reward frameworks of the recreations to clarify their possibly addictive nature.[7,8] Many computer games, especially greatly multiplayer online job playinggames and informal organization and versatile games,[9] depend on an "impulse circle" or "center circle"-a cycle of exercises that include remunerating the player and driving them to proceed through another cycle, holding them in the game. The expectation of such rewards can make a neurological response that discharges dopamine into the body, so that once the reward is acquired, the individual will recall it as a pleasurable inclination.

A few understudies make web based amusements utilizing cell phone, and some favor PC and x box as well. People who have gaming entrances at their home will play for longer term of hours. People playing over cell phones are for the most part playing web recreations, they will play with this present reality and will contend to win and accomplish greatest rewards in the game. This is conceivable just when additional time is apportioned for playing. Also, with cell phones which are convenient this turns out to be progressively simpler. Henceforth cell phone gamers are influenced in a progressively extreme manner when contrasted and different gamers. The gaming issue may introduce itself as impulse, social separation, forceful conduct, temperament swings, decreased creative mind, and hyper center around in-game accomplishments, at the expense of other significant occasions in life.[2, 3] Gaming issue can be analyzed when an individual takes part in gaming exercises at the expense of satisfying day by day obligations and without respect for the negative consequences.[10,11]

As of late, understudies are dependent on live gushing recreations like "Conflict of Clans" "Conflict Royale" "Smaller than expected Militia" and "Players obscure Battle ground [PUBG]", while certain Computer games like "Blue Whale", "Pokémon" and "MomoChallenge" and so forth have guaranteed lives of individuals who were playing them. Along these lines, in this unique circumstance, this investigation was led to know the pervasiveness of gaming and its belongings among youthful grown-ups.

Materials and Method

This is a cross-sectional clear investigation. Youthful grown-ups of age bunch 18 to 25 years were chosen from a urban territory of Chennai. This investigation was led between April to July 2019. An example of 100 youthful grown-ups was chosen from an urban region of Chennai by advantageous examining. The vast majority of them were chosen from the schools arranged close to the urban region. The parts of gaming and its belongings were surveyed utilizing a pre-tried organized poll.

The information gathering was started in the wake of getting freedom from Institutional Ethical board of trustees and in the wake of acquiring educated assent from the members . An organized poll was self-managed. Gathered information was gone into Microsoft Excel sheet and after that examined utilizing SPSS programming

Findings: The mean time of understudies took an interest in the investigation is22±4 and the normal time of Play was 3 hours. Be that as it may, the majority of the understudies were gaming for over 2 hours. Male members were 73% and female members were 27%.

Table 1 delineates the qualities of the gaming among the members. Larger part were playing disconnected gushing recreations (60%). In spite of the fact that the greater part (61%) of members gaming span was under 1 hour yet at the same time 39% had higher gaming length.

Table 2 delineates the impacts of gaming. Albeit every one of the outcomes demonstrate that lion's share of them were not influenced by gaming but rather still a noteworthy number were observed to be influenced with eagerness, crabbiness, playing during class hours and restless.

Figure 1 shows the assortment of gaming entries utilized. Versatile was the most much of the time utilized entrance. What's more, Figure 2 portrays the commonest kind of game played was Pubg.

Table 1 : Characteristics of the Games Played By The Participants

Sl No	Characteristics of gaming	Frequency (Percentage)
1	Game Streaming	
	Online gaming	40 (40%)
	Offline gaming	60 (60%)
2	Duration of gaming	

Sl No	Characteristics of gaming	Frequency (Percentage)
	<1 hour	61 (61%)
	1-3 hours	28 (28%)
	>3 hours	11 (11%)
3	Preoccupied with gaming	
	Yes	24 (24%)
	No	76 (76%)

Table 2: Effects of Gaming among Participants

Sl No	Effects of gaming	Frequency (Percentage)
1	Game has replaced hobby	
	Yes	32 (32%)
	No	68 (68%)
2	Playing during class hours	
	Yes	26 (26%)
	No	74 (74%)
3	Sleep Deprivation due to gaming	
	Yes	43 (43%)
	No	57 (57%)
4	Restlessness/irritability due to gaming	
	Present	27 (27%)
	Absent	73 (73%)

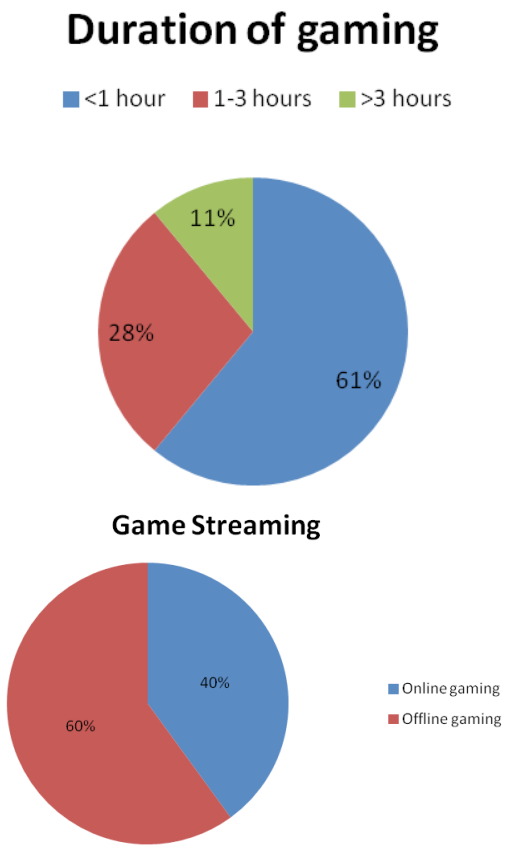


Figure 1: Characteristics of gaming

Discussion

This investigation was embraced to examine the gaming patters and its persuasions throughout the everyday existence of members. The members conceded about unusual rest practices like dozing late around evening time, awakening amidst night for scoring higher levels in the game. Because of expanded preoccupancy with gaming, they conceded to having lesser fixation during classes along these lines indicated terrible showing in their investigations. As 26% of understudies were making recreations in the class hours with their companions their examinations and scholarly execution was influenced the most .It was found in the reactions that 53% conceded that they were visit gamers and 47% as non-visit gamers. Due to expanded preoccupancy of understudies with gaming, they whined of having lesser fixation during classes in this manner indicated lackluster showing in their examinations.

Comparable discoveries were found in concentrates done by Hawi et al, Rehbein et al and KO et al.[7,12,13] Hawi et al, Bartel et al and Satghare et al, which was because generally dozing, awakening amidst night for scoring higher levels.[7,14,15] In this examination, understudies who were having high scores grumbled of state of mind issue like tension, sorrow, impulsivity and compulsivity, which was like the examination directed by Savvidou et al and Zhou et al.[16,17]

Contrasting and the examination done by pradeep yarsani 18, the individual gaming normal of 7 hours were making them game issue like eye issue and different issues like eagerness. 23 % have incidental rest unsettling influences and 6 % had extreme rest aggravation and anomalous rest design, In our investigation 43%of them free their ordinary rest example and 11% of understudies play over three hours and with lion's share having a normal of 2 hours gaming span. In the majority of the investigations guys were prevalently engaged with playing computer games which was likewise found in our examination.

Conclusion

Gaming issue are on an ascent, which had lead understudies to psychosocial aggravations, nervousness, discouragement, state of mind issue, rest unsettling influences, cerebral pain, absence of social exercises, and debilitation in instruction. These understudies felt trouble in adapting up in their investigations, since they invested more energy in gaming and less time on studies,

rest and different exercises. The understudies who are dependent on online video gaming conceded that, they are investing less energy with their families and are neglecting to control feelings with other relatives. Just as, these understudies may create conditions like dry eyes, early waterfalls and weakening of cerebrum. In this way, the time has come to control the use of electronic gadgets, web and computer games.

Funding: No funding sources.

Conflict of Interest: None declared.

Ethical approval: Study was approved by the institutional ethics committee, Sree Balaji Medical College and Hospital.

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Evaluation of Urinary Iodine and Thyroid Hormone in Hypothyroidism of South Indian Population

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Abstract

Aim and objective: The present study was conducted to assess the Urinary iodine excretion levels among hypothyroid patients based on Thyroid profile and to correlate the Urinary iodine excretion with various disorders associated with hypothyroidism.

Method: The study group includes 50 control subjects and 100 clinically proven hypothyroidism patients. Histopathological investigations and thyroid scan were taken for all the patients. They were analyzed for Thyroid hormone profile and the Urinary iodine excretion level was determined by Ammonium persulfate method in spot urine sample.

Results: Free T_4, TSH and Urinary iodine concentration (UIC) were measured for both the control and study group (P = 0.00).The mean Free T4, TSH & UIC for control group was 1.71 ng/dl, 1.41µIU/ml & 150.28µg/L and the mean Free T4, TSH & UIC for test group was 0.85ng/dl, 48.38µIU/ml & 233.74µg/L respectively. A significant positive correlation between Free T_4, TSH and UIC was found. Increased Urinary iodine excretion (UIE) was observed in patients with Papillary Carcinoma, Thyroiditis and Multinodular goiter.

Conclusion: The findings of the present study reveals that increased excretion of urinary iodine reflects under utilization or impaired iodination by the thyroid gland.

Keywords: *Hypothyroidism, Urinary iodine, Iodine deficiency disorders, Goitre.*

Introduction

Iodine deficiency damages human health in several ways, most importantly by interfering with normal development of the brain. Iodine deficiency is a major health problem in India. Surveys conducted in 275 districts of 25 states and 4 union territories in India had identified that 235 districts are endemic for Iodine deficiency disorders (IDDs) [1].

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Out of 29 districts in Tamil Nadu, 24 have been surveyed and all have been found to be endemic to IDD. Iodine Deficiency Disorders (IDD) is the most common cause of preventable brain damage and mental retardation affecting 118 countries worldwide.[1] Government of India in 1997 imposed ban on the storage and sale of the non-iodized salt[2,3]. Monitoring Urinary Iodine excretion(UIE) level is an essential part of measuring a country's thyroid health[4].

Clinical and subclinical manifestations of Iodine deficiency is collectively denoted by the term Iodine deficiency disorders (IDD), affects all stages of human life and encompass a variety of conditions including Goitre, Cretinism, Dwarfism, Mental retardation, Muscular disorders, Spontaneous abortions and

Stillbirths[5,6]. India is one of the major endemic areas of IDD where 167 million people are at risk, 54 million people have Goitre, 6.6 million have mild neurological defects and 2.2 million are cretins[2,7].

Disorders associated with altered thyroid hormone secretion are common and affect about 5% women and 0.5% men[7]. Normal levels of thyroid hormones are required for Neuronal migration and Myelination of fetal brain and lack of Iodine irreversibly impairs brain development. Severe Iodine deficiency during pregnancy increases risk for Stillbirths, Abortion and Congenital abnormalities[8].

Hypothyroidism is a condition characterized by abnormally low thyroid hormone production. There are many disorders that result in hypothyroidism. These disorders may directly or indirectly involve the thyroid gland, because thyroid hormone affects growth, development, and many cellular processes, inadequate thyroid hormone has widespread consequences for the body[9].

The hypothyroid patients were classified into five sub groups according to their disorders. They were as follows 1. Thyroiditis 2. Dishormonogenetic goiter (DHGG) 3. Multinodular goiter (MNG) 4. Papillary carcinoma(pap ca) 5. Ectopic thyroid.

The main objective of the present study is

1. To evaluate the Iodine status in patients with proven Hypothyroidism.
2. To identify the various factors that leads to hypothyroidism by studying the thyroid profile and by measuring the Urinary Iodine excretion level.

Normal requirement of Iodine in the diet: In 2000, the Institute of Medicine at the National Academy of Sciences developed new Dietary Reference intakes for iodine. Adequate intakes were established for children up to one year old, and RDA was determined for all people over one year. These recommendations appear as follows: 0-6 months-110 µg; 7-12 months-130 µg; 1-8 years-90 µg; 9-13 years-120 µg, 14-18 years-150 µg, Women 19 years and older-150 µg; Pregnant women-220 µg; Lactating women 14 years and older-290µg.

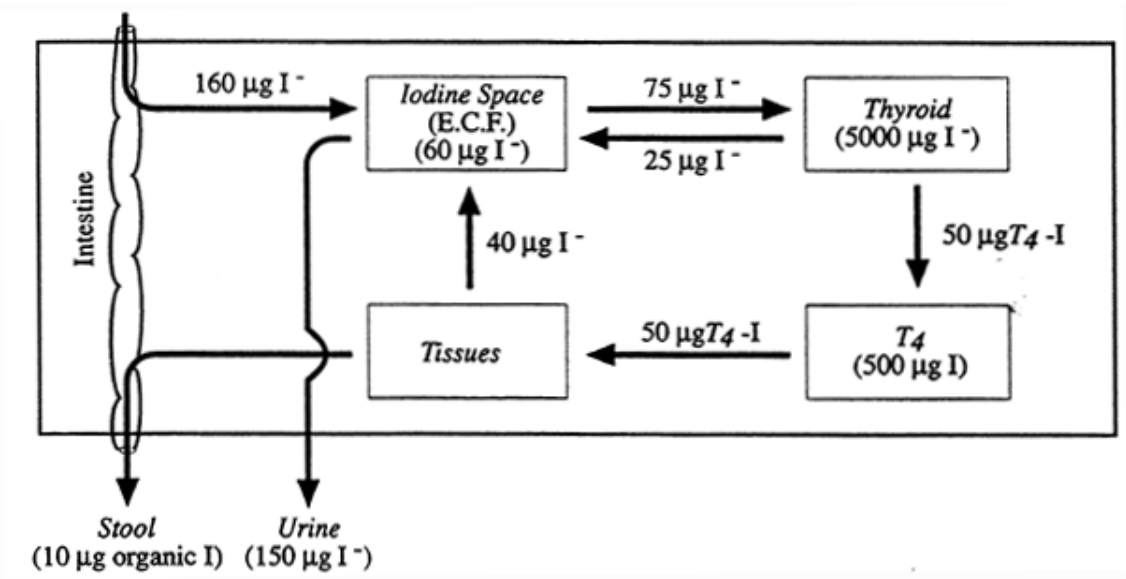
Foetal Thyroid Hormones: Thyrotropin Releasing Hormone (TRH) and Thyroid Stimulating Hormone (TSH) start being secreted from the fetal hypothalamus and pituitary at 18-20 weeks of gestation, and fetal production of Thyroxine (T4) reach a clinically significant level at 18–20 weeks. Fetal Triiodothyronine (T3) remains low (less than 15 ng/dl) until 30 weeks of gestation, and increases to 50 ng/dl at term. Fetal selfsufficiency of thyroid hormones protects the fetus against brain development abnormalities caused by maternal hypothyroidism. However, Preterm births can suffer from neuro developmental disorders due to lack of maternal thyroid hormones, due to their own thyroid being insufficiently developed to meet their postnatal needs[10, 11].

Toxicity of Iodide Ion: Excess iodine has symptoms similar to those of iodine deficiency. Commonly encountered symptoms are abnormal growth of the thyroid gland and disorders in functioning and growth of the organism as a whole. Iodides are similar in toxicity to bromides. Excess iodine can be more Cytotoxic in the presence of selenium deficiency[12, 13].

Iodide Leak: Iodide has several actions on the synthesis and secretion of the thyroid hormones. Administration of small amounts of iodide results in the increased synthesis without increased secretion. Acute administration of large amount iodide causes a progressive decrease in iodination of TG. This phenomenon is called the Wolff-Chaikoff effect. It is dependent on the concentration of iodide in the thyroid cells. The effect is transient and is overcome by an adjustment of the iodide transport system, which lowers intracellular iodide concentration. Chronic administration of large amounts of iodide results in an increase in iodide uptake and binding to TG while secretion of T4 remains normal. This is accompanied by release of non hormonal iodide from the gland, termed as **Iodide leak.** Failure of this adaptive mechanism may be the cause of goiter and hypothyroidism, which are occasionally observed in patients who have a chronically excessive iodide intake. Large amounts of iodide also inhibit release of thyroid hormones, probably by a direct effect on proteolytic enzymes[14].

Fate of Ingested Iodides: Iodides ingested orally are absorbed from the gastrointestinal tract into the blood in about the same manner as chlorides. In the small intestine, facilitated diffusion enables organic iodine absorption to occur across the intestinal cells. The more common inorganic iodide form requires a specific transport protein called the Sodium-Iodide Symporter (NIS). Once iodine absorption is complete and the iodine is in the blood stream both forms are concentrated into

various tissues including the thyroid, mammary glands, the eyes, salivary glands, cervix, thymus, choroid plexus, kidneys, arteries, and bones. These tissues also contain the sodium-iodide symporter, so they can absorb the inorganic form. Normally, most of the iodides are rapidly excreted by the kidneys, but only after about one fifth are selectively removed from the circulating blood by the cells of the thyroid gland and used for the thyroid hormones. Iodine is an indispensable component of the thyroid hormones, comprising 65% of T4's weight, and 58% of T3's weight. Tyrosine is also consumed through diet and is absorbed from the GIT. For the synthesis of normal quantities of thyroid hormones, approximately 1 mg of Iodine is required per week or about 50 mg per year. To prevent Iodine deficiency common table salt is iodized with one part of Sodium Iodide to every 1,00,000 parts of Sodium Chloride[15].



Courtesy: Iodine metabolism and balance in humans. Dr. Noel sturm 2010

Goitre: Iodine deficiency is the major health problem in India. Worldwide, the most common cause for goitre is iodine deficiency. A **goitre** or **goiter** (Latin *gutteria*, *struma*), is a swelling in the thyroid gland, which can lead to a swelling of the neck or larynx (voice box).[10-14]. In countries that use iodized salt, Hashimoto's thyroiditis is the most common cause. Other causes are:overproduction or underproduction of hormones. They are classified in different ways:

"Diffuse goitre" is a goitre that has spread through all of the thyroid (and can be a "simple goitre", or a "multinodular goitre"). **"Toxic goitre"** refers to goitre with hyperthyroidism. These are most commonly due to Graves' disease, but can be caused by inflammation or a multinodular. **"Nontoxic goitre"** (associated with normal or low thyroid levels) refers to all other types (such as that caused by lithium or certain other autoimmune diseases).

Other type of classification is by grading: GRADE 0,GRADE I, GRADE II & GRADE III[16,17]

Materials and Method

The patients were selected from the Endocrinology outpatient clinics of Madras Medical college and Rajiv Gandhi government hospital, Chennai,Tamil Nadu, India. Informed consent was obtained from all the participants. The clinical and pathological stages were obtained from the medical records of the patients.

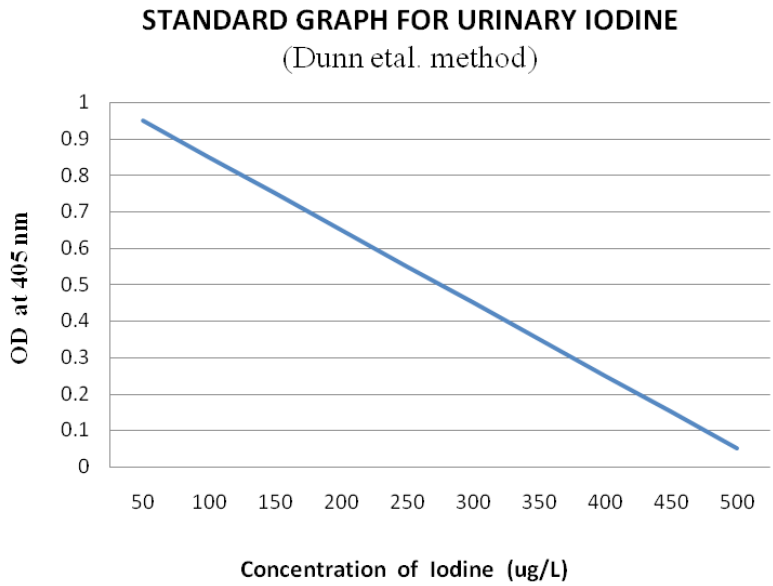
Control Group: The control group consisted of 50 healthy volunteers (Male-20 & Female-30) with a mean age of 34.22. They showed no signs of any Thyroid disorders and no thyroid enlargement by physical and clinical examination. They were are all non diabetic, non smokers, non-alcoholics and with normal renal function. They were all tested for TFT and UIE level. Control subjects with abnormal TFT were excluded from the study.

Study Group: The study sample comprised of 100 clinically proven Hypothyroid patients of mean age 35.52 (Male-26 & female-74). Histopathological investigations and thyroid scan were taken for all the patients. Grading of goiter was determined according to the criteria recommended by the joint WHO/UNICEF/ ICCIDD[6].

Sample Collection: Blood samples were collected in two plain red-top veni puncture tubes. The tubes were centrifuged at 2000 rpm for 15 minutes for TFT estimation and for other investigations too. Along with blood samples spot urine samples was also collected in sterile plastic containers. Urine samples were analyzed on the same day even though they could be stored at 2-8° C for 5 days or at-20 °C up to 20 days.

- TFT was measured by ELISA method with an open system automated ELISA analyzer (Triturus analyzer).
- UI Excretion was measured manually by Sandell–Kolthoff reaction by Dunn et al or ammonium persulfate method) [18-20].

Findings: A standard curve was constructed on graph paper by plotting iodine concentration of each standard on the abscissa against its optical density at 405 µg/l (OD 405 nm) on the ordinate.[18,19,20] (graph 1) from which urinary iodine value was calculated.



We used SPSS version 16 for data processing. Quantitative data were presented as mean and SD. For comparison of means, the independent t-test was used.

Table 1 depicts the comparison of mean values of free T_4, TSH and Urinary iodine between control subjects and the patients group by Independent t-test. A Significant difference was noted between the two groups. Since all confounding factors were matched.

Table 1: Comparison of mean values between control and Test subjects

Variables	Control n = 50	Test n = 100	P Value	Significance
FT4	1.71	0.85	0.000	Significant
TSH	1.41	48.38	0.000	Significant
UI	150.28	233.74	0.000	Significant

Table 2 depicts the classification of test subjects into 3 groups based on urinary iodine excretion. Group 1 (UI < 100), Group 2 (UI 101-200), Group 3 (UI >200). The mean values of all the parameters between the 3 groups were compared using independent t test (t-test for equality of means). Out of 100 patients 48% had increased UI excretion level.

Table 2: Classification of Test subjects (n=100) into 3 groups based on UI excretion level

Variables	Group 1 (n=16) UI < 100	Goup 2 (n=36) UI 101-200	Group 3 (n=48) UI > 200
FT4	0.706	0.735	0.987
TSH	52.58	39.42	53.71
UI	76.625	149.94	348.95

Figure 1 shows the five different sub groups of hypothyroid and the Maximal excretion of UI was seen in Thyroiditis 71%,when compared to other sub groups. It is represented by a pie chart.

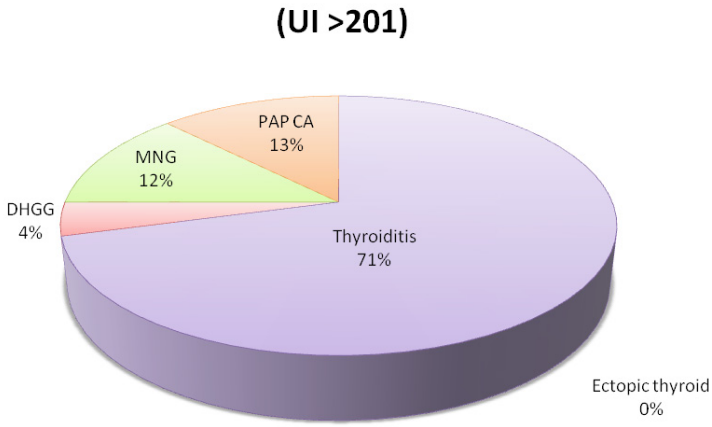


Figure 1: Five different sub groups of hypothyroid and the Maximal excretion of UI

Table 3: Classification of Hypothyroid patients based on various thyroid disorders

Variables	Control n = 50	Thyroiditis n = 70	DHGG n = 8	PAP CA n = 8	Ectopic thyroid n = 4	MNG n = 10
FT4	1.71	0.84	0.88	1.02	0.98	0.73
TSH	1.41	49.22	87.60	23.65	8.95	46.64
UI	150.28	222.65	190.5	385.5	152.5	257.00

Table 3 and Fig 2 shows The Hypothyroid patients were grouped based on the disorders and compared with control groups by bar diagram. The mean Free T4, TSH & UI values of control subjects with that of various thyroid disorders associated with hypothyroidism was compared. Out of 100 clinically proven hypothyroid nearly 70% had Thyroiditis and 10% multi nodular goiter.

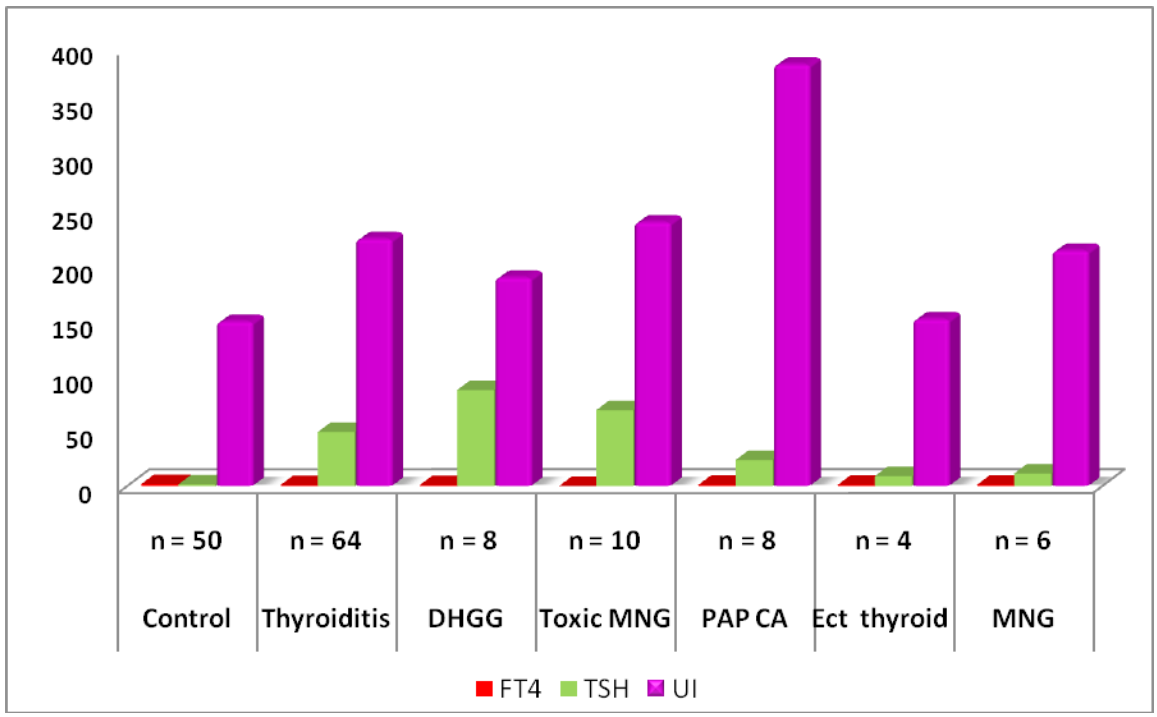


Figure. 2: Hypothyroid patients based on various thyroid disorders

Discussion

The most common problems of the thyroid gland is an Over-active thyroid gland, referred to as ' Hyperthyroidism', and an Under-active thyroid gland, referred to as 'Hypothyroidism'[17]. Seawater is the most important reservoir for terrestrial iodine (mean concentration 58 (µgl–1I).Soil iodine content is also strongly influenced with coastal soils being much enriched and central continental soils being depleted due to heavy rainfall. A type of seaweed, kelp, tends to be high in iodine as well,with from 0.03–0.45 dry weight percent. About 19,000 tons are produced annually from natural sources[18-22].

Naturally occuring Goitrogens like thiocyanate, thiooxazolidone, isothiocyanates are known to exhibit antithyroidal activity and inhibitors of iodine uptake may have contributed to the pathogenesis of Hypothyroidism. Besides eating iodine-rich foods, it is important to slow down or stop eating goitrogens (iodine blockers) like peanuts and soybeans in our diet. Percholate is actively transported by NIS (sodium iodide symporter) and has 30 fold affinity towards perchlorate than iodide. Percholates both inhibit iodide uptake by NIS and also stimulates iodide efflux from thyroid follicular cell[23].

Excess iodine has symptoms similar to those of iodine deficiency. For the synthesis of normal quantities of thyroid hormones, approximately 1 mg of Iodine is required per week or about 50 mg Per year. Excess iodine can be more Cytotoxic in the presence of selenium deficiency. Universal salt iodisation was successful in the country and consumption of iodised salt by the households should also be monitored regularly. So Further studies on Excess consumption of iodine through diet, Iodine toxicity, role of goitrogens and perchlorate metabolism in thyroid function are required for better understanding of Iodine Deficiency Disorders[24, 25].

Conclusion

The present study suggest and recommends the implementation and success of universal salt iodization programme (USI) need continuous monitoring of the quality of salt provided to the population. In order to achieve the goal of Iodine deficiency disorders elimination. Intake of required iodine uptake may prevent the pathogenesis of hypothyroidism. Further increased consumption of iodine also should be avoided to prevent toxicity.

Ethical Clearance: No ethical clearance was required for this work.

Source of Funding: Self funded work

Conflict of Interest: Nil

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A Study on Awareness and Perception Regarding Eye Donation among Students of a Medical College in Kanchipuram District

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Abstract

Corneal infections establish a huge reason for visual weakness and visual deficiency in the creating scene. The quantity of corneal transplants done is far not exactly the genuine prerequisite in India. This is generally because of the insufficient number of corneas gathered.

It is seen that 12% of the world's visually impaired populace is influenced by corneal visual impairment, a visual debilitation that is amiable to treatment. The disturbing figures rise each year, keeping India in the number one spot. Corneal transplantation remains the pillar of treatment for reestablishing vision in such patients. Writing survey in India uncovers that the mindfulness about eye gift in broad daylight, particularly among the adolescent is exceptionally low. Subsequently formation of mindfulness conveys foremost significance. A semi-organized poll on eye gift was self-regulated for gathering the important data in the wake of acquiring educated assent. The lion's share (86%) of understudies realized that eyes can be given simply after death and (81%) realized that the perfect time of gift was inside six hours of death. Most members (80%) were eager to give eyes. The saw purposes behind not giving eyes should be considered while making mindfulness about eye gift in the community. The therapeutic understudies could be effectively included as volunteers in eye gift crusades and they can go about as advisors for eye contributors. They can likewise contribute by taking part in making mindfulness and spurring individuals to progress toward becoming eye benefactors.

Keywords: *Blindness, corneal transplantation, eye donations, medical understudies.*

Introduction

Corneal ailments are a noteworthy reason for visual weakness and visual deficiency in the creating scene. The significant reasons for corneal visual impairment incorporate trachoma, corneal ulceration following xerophthalmia because of nutrient A lack, ophthalmia neonatorum, and the utilization of destructive customary medications, onchocerciasis, uncleanliness, and visual trauma[1-3]. The visual debilitation contemplate (2010) assessed that 285 million individuals are outwardly weakened, out of which 39 million individuals are blind. Corneal visual deficiency represents 12% of the world's visually impaired and India represents the dominant part, in this way making it a worldwide priority[2,3]. The quantity of patients anticipating corneal transplantation is extensively developing in India. The Andhra Pradesh Eye malady think about (APEDS) revealed the predominance of corneal visual deficiency at 0.13% (95% CI: 0.06-0.24), establishing 9% of all visual impairment. APEDS likewise proposed a huge weight of corneal visual deficiency in the country populace of Andhra Pradesh, of which 95% was avoidable. Despite the fact that systems to counteract corneal visual deficiency are probably going to be more expense effective,visual restoration by corneal transplantation remains a noteworthy treatment choice for reestablishing sight in the individuals who as of now have corneal blindness[4]. Approximately 18.7 million individuals are visually impaired in India and 190,000 are visually impaired from reciprocal corneal disease[5]. Consistently, another 20,000 join the rundown[6].

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The late Dr. Muthiah began the absolute first eye bank in India and he effectively played out the primary corneal transplant in 1948. Even after over 50 years, patients hanging tight for corneal transplants establish a significant accumulation, which keeps on developing. The need, subsequently, is to instruct the majority about eye gift with an end goal to build the obtainment of corneas. Therefore, there is a requirement for attention to eye gift with an end goal to expand the acquirement of corneas. According to the Eye Bank Association of India, the cornea acquisition rate in India is 22,000 for every year. It is assessed that a huge extent of giver corneas are unacceptable for corneal transplantation. Based upon our present proportion of accessible safe benefactor eyes, we would require 277,000 contributor eyes to perform 100,000 corneal transplants in a year in India. There is roughly a 20-overlay increment from the contributor eyes accessible at this point. A lack of transplantable corneas is normal and has been the subject of much consideration. To build acquisition of corneas, raising the degree of state funded training on eye gift is a significant initial step. Requesting for real eye gift at the season of death is a vital and acknowledged practice. Though the components influencing obtainment of corneas and the open mentality towards eye gift have as of late gotten consideration in the created world, very little has been distributed from the creating world. With this foundation, an investigation was attempted in a restorative school in kanchipuram locale to survey the mindfulness about eye gift among the medicinal understudies

Objectives

Point: To make a mindfulness towards eye gift among the restorative understudies

Objectives:

(i) To survey the information with respect to eye gift among therapeutic Students.

(ii) To bring mindfulness among the understudies about eye gift and shortage of giver eyes in India.

Materials and Method

Study Type: Cross sectional investigation

Study Area and Population: Students of a Medical College in Kanchipuram locale.

Sample Size: 100

Sampling Method: Convenient examining technique

Study Tool: Semi-organized Questionnaire

Study Period: April to June 2019

A test size of 100 therapeutic understudies of a medicinal school in Kanchipuram locale was taken by helpful examining strategy. The Students of second and third year were chosen for the study. A semi-organized survey, self-managed for gathering the essential data in the wake of getting educated assent. The survey contains inquiries on statistic subtleties, mindfulness with respect to eye gift, explanations behind giving and not giving eyes, expectation to give eyes, and wellsprings of data. The subsequent information was gathered and entered in Microsoft Excel Software and examined utilizing SPSS v22. Descriptive measurements like recurrence, mean, standard deviation were determined.

Consideration Criteria: Medical understudies who were available upon the arrival of study and who gave assent are incorporated

Avoidance Criteria: Medical understudies who were absent upon the arrival of study and understudies who didn't give assent for the investigation are rejected

Measurable Examination: After noting the appropriate response sheets were gathered for assessment.

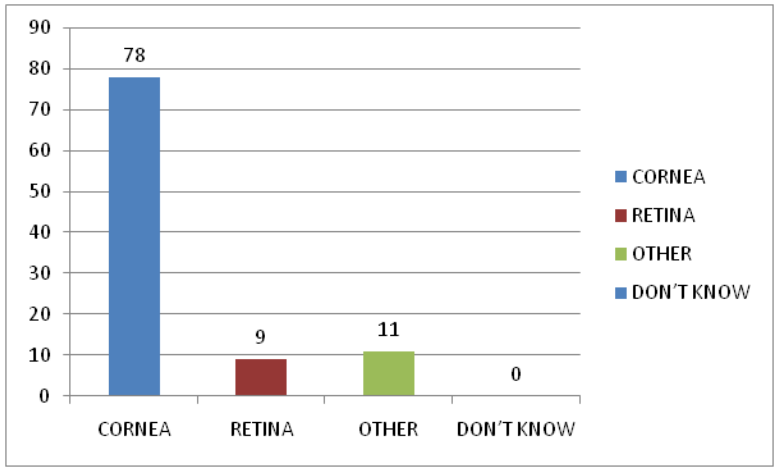
The gathered information was gone into Microsoft Excel Sheets. The information were dissected utilizing SPSS (Statistical bundle for the Social Sciences) Software form 22 (IBM SPSS Statistics,Chennai,Tamil Nadu, India) and the distinct insights, for example, number and rate were determined for the gathered information.

Findings: Out of 100 understudies, 83 (83%) were guys and 17 (17%) were females. Age fluctuated from 19 to 23 years of age with 15 (15%) understudies who were 19 years old, 37 (37%) understudies who were 20 years of age, and 28(28%) understudies who were 21 years old, 15(15%)students were 22 years old, 5(5%) understudies were 23 years of age. Of the 100 understudies, it was seen that 86 students (86%) realized that eyes can be given simply after death; that they ought to preferably be given inside 6 hours of death was known to 81 (81%) of the 100 understudies. The contact place for eye gift in Chennai was known to just 43 (43%) of 100 understudies. The vast majority of the understudies

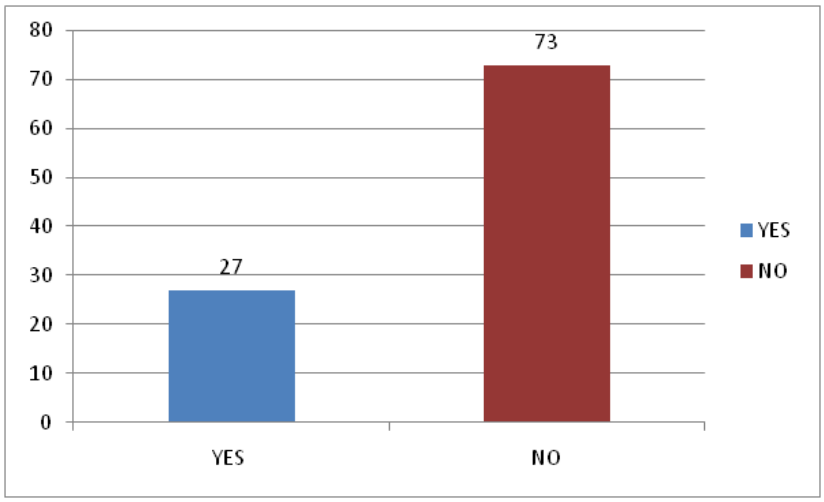
(73%) knew that people with transmittable sicknesses can't give their eyes just 25% understudies accept eye gift is against their religious conviction. Most members never knew people who has donated (69%) eyes and who has received (77%) benefactor eyes. Most of the members, 80 (80%) of 100 understudies, were either ready to give eyes or had effectively promised to give their eyes

Responses to the Questionnaire on Eye Donation:

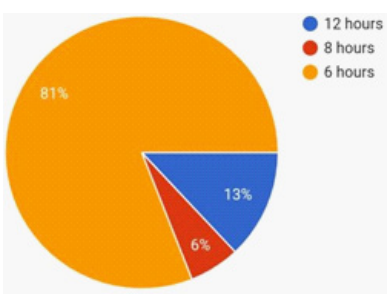
The most important part of the eye which is transplanted_____



A Person with communicable diseases can donate his/her eyes?



Ideal time for Donating eyes is within _____ hours after death?



Are you willing to donate your eyes in future?

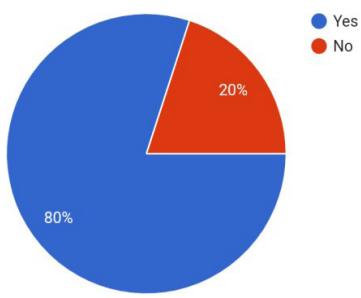


Table 1: Percentage of Response given by total of 100 students (n=100)

Questions	% of Students Aware	% of Students Not Aware.
Eyes can be donated only after death	86%	14%
Ideal time for donating eyes is within 6hours after death	81%	19%
Knows the contact place for eye donation in Chennai.	43 %	57%
The most important part of the eye which is transplanted.....Cornea	78%	22%
Knows a person who has donated eyes?	31%	69%
Knows someone who has received a donated eye	23%	77%
Corneal diseases are the major cause of visual impairment and blindness	85%	15%
Donor's eyes can be preserved in the eye bank	87%	13%
Donated eyes can be used for corneal grafting	96%	4%
Knows there is shortage of eye donors in India	92%	8%
Eye Donation can be performed only after the written consent of the family/relations of the deceased	92%	8%
The identities of both donor and recipient are kept confidential	90%	10%

Discussion

Corneal visual impairment is the real reason for visual impairment. This is because of the expansion in the deficiency of the giver eyes in India. Therefore, there comes need to make mindfulness about eye gift and to teach the general population in regards to the significance of it. This concentrate done in kanchipuram region accompanied intriguing outcomes, examined underneath.

In this investigation, 86% of the understudies knew that eyes could be given simply after death. In an investigation among the south Indian populace, 50.7% of members knew about eye gift. In another examination among medical clinic staff, 97% of them had great to amazing learning about transplantation of different human organs. Information by broad communications could be identified with the abnormal state of mindfulness in our examination participants. A enormous number of understudies, 96 (96%) out of 100 realized that they gave eye is utilized for corneal uniting and 81% realized that the perfect time for

Gift is inside 6 hours of death. An examination on restorative and nonmedical understudies additionally seen that 79.6% of therapeutic understudies realized that eyes can be given after death and 63.3% realized that it ought to be done inside 6 hours. Another investigation in the overall public demonstrated the mindfulness level on eye gift to be 73.8%. In this investigation, just 43(43%) out of 100 understudies thought about the suitable spot for an eye donation. Our study demonstrated that 92 (92%) of 100 members concurred that there is a deficiency of eye givers and 80 (80%) of 100 were either eager or had effectively swore to give their eyes. In an examination among restorative understudies, 87.8% of the respondents were happy to be eye givers. Another investigation in the urban populace saw that 73.8% knew about eye gifts and just 44.9% were eager to vow their eyes. Willingness to give eyes was less (41.5%) even among relatives of after death cases who knew about eye gift. Other purposes behind not giving eyes included complaint by relatives, aversion of distorting the body, postponing of religious customs, and religious confinements.

Comparative reasons were additionally announced in different examinations. Mandatory assent for gift communicated before the passing of the giver ought to in a perfect world structure the reason for eye gift. Nonetheless, on account of inaccessibility of such assent, assent from grown-up relatives of the expired benefactor ought to be gotten for eye gift. In an examination done on the reactions of relatives of posthumous cases, it was uncovered that out of the potential after death benefactors, just 44.3% of relatives of such cases gave assent for gift after serious advising. Mass media as TV, papers, magazines, and notices were significant wellsprings of data on eye gift. Different examinations likewise discovered attention crusades and the media to be the significant wellsprings of data on this issue.

Conclusion

The present examination uncovered that therapeutic understudies were very much aware of eye gift and the vast majority of them were slanted to vow for eye gift. The apparent purposes behind not giving eyes should be considered while making mindfulness about eye gift

in the network. The medicinal understudies could be effectively included as volunteers in eye gift crusades, wherein after appropriate preparing in advising method, they can go about as advocates for eye givers. They can likewise contribute by taking part in making mindfulness and propelling the general population for eye gift during their postings in network prescription.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: The study was endorsed by the Institutional Ethics Committee, Sree Balaji Medical College and Hospital.

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A Case Study on Pierre Robinson Syndrome

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Abstract

Pierre Robin arrangement (PRS) is traditionally portrayed as a set of three of micrognathia, glossoptosis, and aviation route impediment. Babies every now and again present during childbirth with a hypoplastic mandible and trouble relaxing. The littler mandible uproots the tongue posteriorly, bringing about hindrance of the aviation route. Normally, a wide U-formed congenital fissure is additionally connected with this wonder. PRS isn't a disorder in itself, yet rather a succession of disarranges, with one anomaly bringing about the following. Notwithstanding, it is identified with a few other craniofacial abnormalities and may show up related to a syndromic conclusion, for example, velocardiofacial and Stickler disorders.

Newborn children with PRS ought to be assessed by a multidisciplinary group to survey the anatomic discoveries, outline the wellspring of aviation route impediment, and address aviation route and nourishing issues. Situating will settle the aviation route block in ~70% of cases. In the right position, most youngsters will likewise have the option to encourage typically. In the event that the baby keeps on demonstrating proof of desaturation, at that point arrangement of a nasopharyngeal cylinder is shown. Early sustaining by means of a nasogastric cylinder may likewise decrease the measure of vitality required and take into account early weight gain. An extent of PRS newborn children don't react to traditionalist measures and will require further mediation. Preceding thinking about any surgery, the clinician should initially discount any wellsprings of hindrance beneath the base of the tongue that would require a tracheostomy. The two most basic techniques for treatment, tongue–lip bond and diversion osteogenesis of the mandible, are talked about.

Keywords: *Pierre Robin arrangement, Micrognathia, Glossoptosis, aviation route block, diversion osteogenesis.*

Introduction



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PRS is portrayed by a great set of three of Micrognathia, Glossoptosis, and aviation route obstacle. Micrognathia is quickly distinguished during childbirth and is a characterizing highlight of the determination. Hypoplastic mandibles are little in both the vertical and flat measurements[1]. This thusly represents the decline in the anteroposterior projection of the jaw and its resulting great retrognathic appearance. Aside from the Micrognathia, Randall portrayed the striking finding of Retrogenia, or back relocation of the jaw, to describe the starting oddity in this succession[2].

Introduction

In 1923, Pierre Robin, a French stomatologist, reported a turmoil which presently bears his namesake. Pierre Robin grouping (PRS) was initially portrayed as comprising of Micrognathia (which he named

"Mandibular Hypotrophy") and Glossoptosis (an irregular back position of the tongue), which result in aviation route obstacle and encouraging troubles. The little mandible is believed to be because of an innate hereditary issue or a deformational issue where intrauterine development is limited or mandibular situating is modified. As opposed to a[1] syndrome, which is characterized as different peculiarities emerging from a solitary basic pathogenesis, note that PRS is, where numerous oddities result from a consecutive chain of deformities–one involving the following. In PRS, the micrognathia prompts glossoptosis, which thusly results in aviation route deterrent and failure to nourish.

Materials and Method

Case History: We report the instance of a kid name Shruti, Age: 8 years, Sex: F

Antinatal History: No antinatal sickness in mother

Nataland Postnatal History: Normal full term vaginal deleivery. She weighed 2.6kg. No noteworthy antenatal history. No birth asphyxia, Developed breathing trouble not long after birth. Required oxygen support for a few days. She went through 15 days in the neonatal unit and was in every case extremely hard to bolster orally, with huge regurgitating from the begin. She was prevalently nourished through NG tube in spite of the fact that she retched hugely. Guardians were informed that the child has some inherent anomalies including a congenital fissure. There was likewise history of repetitive respiratory disease and rehash ear contaminations. The congenital fissure was revised at 11/2 years old

At the Time of Examination: Weight: 17kg; moderately fabricated, small lower jaw (Micrognathia), Displacement of the tongue towards back of the oral depression (Glossoptosis).Cleft sense of taste which is precisely rectified. Different frameworks are typical

Analysis: Pierre Robin Syndrome

Findings: Following conveyance the infant was conceded in NICU. Since there was desaturation the infant was given 100% oxygen 2-4 liters/minute through nasal prongs. As a result of diligent regurgitating was given IV liquids, at first 10% dextrose pursued by 10% isolyte P. Enteral bolstering began through a nasogastric tube. Communicated breatmilk and recipe feeds were given. When the child began enduring enteral feeds the NG cylinder was expelled and bosom bolstering began. The infant was breast fed in inclined and parallel position to evade desire. A Nasopharyngeal cylinder was acquainted for quite a while with assuage aviation route block. Hearing test and eye examination was typical. Intermittent respiratory diseases in early stages required anti-infection agents and nebulisations. The mother was encouraged to sustain the infant in an upstanding, sitting position to keep the equation from streaming once more into the nose zone. Careful fix of congenital fissure was done at one and a half years old. Since there was no noteworthy aviation route block Tongue Lip Adhesion was not done.

Discussion

Pierre Robin disorder likewise named as Pierre Robin succession, or Robin anomalad, is described by a few degrees of micrognathia seriousness, glossoptosis and palatal contortion. In this distortion, the tongue size is typical yet buccolingual lopsidedness due to micrognathia, expanding the glossoptosis is habitually watched[2]. The word "succession" recommends that one peculiarity prompts resulting oddities, and micrognathia is viewed as the actuating abnormality in patients with PRS. Aviation route obstacle and nourishing challenges emerge and the seriousness of the issues fluctuates. PRS may happen alone or in relationship with different disorders, for example, stickler disorder, velocardiofacial disorder thus geneticist ought to be counseled to know the likelihood in future kids. In about 30% of cases PRS might be a disengaged event, while, in the accompanying 30%, it is identified with different inconsistencies and in the last third of cases it is a piece of a progressively perplexing disorder (most habitually Stickler Syndrome). This assortment of articulations is the aftereffect of a blended hereditary starting point: in 40% of cases PRS is hereditarily confined, else it is a latent or predominant autosomal condition[3]. For our situation no relationship with different inconsistencies were watched. Notwithstanding the reason, neonates and babies with Pierre Robin arrangement may experience fluctuating degrees of aviation route obstacle and bolstering challenges[4]. PRS can be perilous during the neonatal period with the beginning of aviation route obstacle, which can happen whenever directly after birth. Whenever left untreated, delayed aviation route block can prompt intense or interminable hypoxia, cyanosis, apnea scenes, goal, respiratory tract disease, nourishing troubles, lack of healthy sustenance, and inability to flourish. Resulting entanglements of unending hypoxia

are incessant carbon dioxide maintenance, raised pneumonic vascular obstruction, cor pulmonale, right heart disappointment, and cerebral hypoxia. Most of the patients with PRS gets eased by traditionalist measures anyway patients with articulated micrognathia, inability to flourish, delayed utilization of nasopharyngeal aviation route or delayed endotracheal intubation needs careful rectification. As for our situation moderate measures were adequate to deal with the indications of neonate.



Fig. 1-U-Shaped Cleft Palate



Fig.2-Showing Micrognathia



Fig.3-Showing Glossoptosis

Conclusion

Every one of the instances of PRS ought to be altogether examined to determine relationship to have other disorder and to figure the further line of the board. Every single instance of PRS is remarkable and should be evaluated exclusively. It is our duty as doctors to perceive this issue opportune, to give close development and suitable treatment and guiding.

Ethical Clearance: No ethical clearance was necessary for this research work

Source of Funding: Self funded project

Conflict of Interest: Nil

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A Case Report on Prostate Ductal Adenocarcinoma Presenting with Hematuria

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Abstract

Prostatic ductal adenocarcinoma is a rare neoplasm arising from the urethra of the prostate. We present in the prostatic cavity an 85-year-old man with an exophytic lesion that was diagnosed after the prostate's transurethral resection. Histopathologically, the tumor was diagnosed with endometrioid symptoms and a Gleason score of 6 as a ductal adenocarcinoma.

Keywords: *Prostate Ductal Adenocarcinoma, Hematuria, Degarelix and Lupron.*

Introduction

Prostate malignant growth is the most widely recognized kind of disease in guys. The World Health Organization 2016 partitioned epithelial tumors of the prostate into numerous subcategories including acinar and ductal adenocarcinoma. Practically all prostate malignant growths are acinar adenocarcinomas and create from the organs themselves. Unadulterated ductal adenocarcinoma starts from the pipes and it speaks to 0.2–0.4% of every single prostate malignancy. It is generally blended with acinar subtype[1]. The frequency of the ductal adenocarcinoma has been expanding over every decade, and around like the rate of increment of acinar carcinoma[2]. However, it isn't accounted for in prostate specimens[1]. Many examinations report increasingly forceful highlights of acinar prostate malignant growth, including their higher phase of the ailment and metastases and furthermore higher mortality rate[1,3]. This is a case report of an individual who was determined to have blended ductal and acinar prostate adenocarcinoma.

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Materials and Method

A 85-year-elderly person gave two months of irregular effortless perceptible hematuria. His medicinal history demonstrates considerate prostatic hypertrophy (evaluated prostate volume 50 cc) and Grave's illness status post I-131 removal; he was fit and healthy barring the ailment. His lab discoveries exhibited gentle sickliness and a pretreatment PSA of 5.63 ng/ml, which had remained moderately stable in the 4–6 ng/ml go for in any event the previous 5 years.

Findings: During cystoscopy, a papillary injury in the prostate with related discharge was watched (Fig.1). Transurethral resection of this example indicates prostatic adenocarcinoma with blended acinar and ductal types, Gleason 4 + 5 = 9 (Fig. 2). Advanced rectal examination affirms prostatic hypertrophy with the tumor reaching out from original vesicles to prostatic pinnacle.

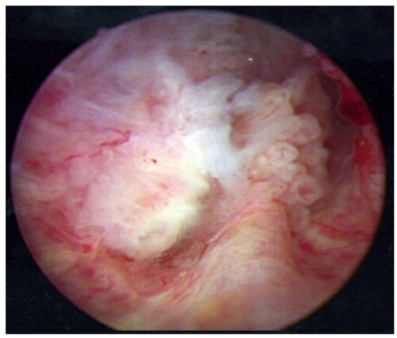


Fig 1: Cytoscopic Image. This is the papillary lesion of prostate ductal adenocarcinoma with hemorrhage seen during cystoscopy

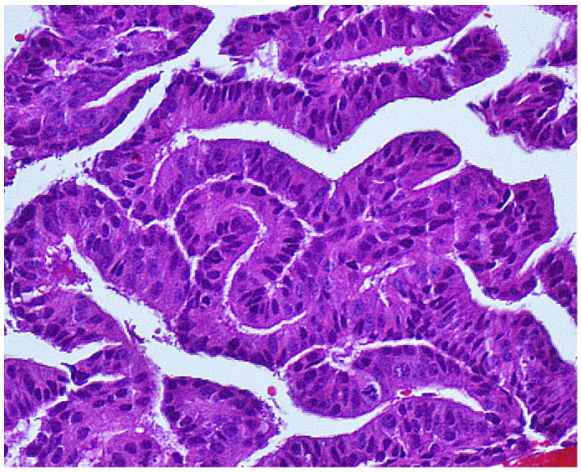


Fig 2: Microscopic Image of Bladder Lesion. This bladder lesion was diagnosed as prostatic ductal adenocarcinoma, Gleason 4 + 5.

A MRI showed a 3.1 cm multifocal infiltrative tumor which stretched out to the bladder with pelvic adenopathy. Every single other output, for example, bone sweep and CT chest, belly, pelvis were negative for far off infection. In this way, he was arranged with cT4N1M0 illness. He is with privately propelled ailment, the patient was not a careful hopeful, and thus he was treated with conclusive radiation treatment, force balanced radiation treatment (IMRT) to 5040 cGy to pelvic lymphatics, prostate, and fundamental vesicles, trailed by the lift to 7920 cGy absolutely to the prostate and original vesicles. He additionally gotten simultaneous and adjuvant androgen hardship treatment with Degarelix and Lupron about for 10 months

The patient has all around reacted to treatment. He stopped to have hematuria, his PSA was imperceptible, and MRI was rehashed. It exhibit goals of pelvic adenopathy and relapse of the prostate tumor. 2 years after his underlying finding, he again gave discontinuous easy plainly visible hematuria, which was treated as hemorrhagic radiation cystitis at first. Nonetheless, rehash cystoscopy and biopsy affirmed intermittent illness at the privilege ureteric hole.

Restaging outputs got 2 years 6months after his underlying conclusion included bone sweep and CT chest, guts, and pelvis, which were negative for far off illness with the special case being that there was an expanded take-up on bone sweep at the distal right tibia and fibula. This area was modestly agonizing as was additionally encouraged to take a MRI, which demonstrated broad bony metastatic illness in the distal lower limit. This was treated with palliative radiation.

The patient was approached to restart on Lupron and started Zometa for hard metastases. His PSA had expanded to 0.23 ng/ml before the season of beginning androgen-hardship treatment. He at first declined chemotherapy and created dynamic sickness throughout the following a half year with across the board rigid scleroticmetastases, dural metastasis along the falx, multitudinous aspiratory knobs, and lymphangitic carcinomatosis. Despite the fact that he endeavored one cycle of Docetaxel 60 mg/m2, he was not ready to endure it and ceased it. He passed away around 3 years 2 months after his underlying determination.

Discussion

Ductal adenocarcinoma of the prostate, with or without a blended acinar part, speaks to fewer than 5% of every single prostate malignant growth. Tumors are described by tall, columnar, pseudostratified epithelium with papillary design. Perceptibly, ductal adenocarcinoma will in general show up exophytic with villous development, and can include the prostatic urethra, original vesicles, or periprostatic delicate tissue, including the bladder. Men with PDA are bound to give privately propelled illness, in spite of the fact that lymph hub metastases appear to be practically identical among ductal and acinar pathology[2].

Studies have demonstrated that men with PDA experience comparative rates of radical medical procedure as their acinar partners. Notwithstanding, PDA will in general have a high momentary disappointment rate after radical prostatectomy[4]. PDA can likewise be treated with conclusive radiotherapy, similarly as with our patient. PDA reaction to hormone treatment is far from being obviously true. A few investigations have discovered a phenomenal long haul reaction to endocrine control dependent on PSA level. In any case, while PDA tumor cells do deliver PSA, this lab worth isn't raised in all patients[3]. In our patient, PSA was conflicting with infection movement and hormone treatment did not control his illness. His PSA pattern during hormonal treatment may propose the nearness of emasculate safe malignancy as a transformative break strategy for the tumor.

PDA will in general metastasize to uncommon areas. For instance, our patients at first created singular distal limit rigid metastases. This was trailed by dural metastases to the falx and lymphangitic carcinomatosis. Instinctive metastases are likewise moderately regular

with PDA. This might be because of the affinity of PDA to disperse by means of hematogenous as opposed to lymphatic routes[5].

Conclusion

This case is a case of how PDA is an increasingly forceful type of prostate malignant growth. PSA may not be an adequate tumor marker for neighborhood repeat of sickness movement. The area of inaccessible metastases in PDA will in general be less unsurprising. More endeavors are required to contribute learning of this tumor science and to evaluate its reaction to treatment.

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Conflict of Interest: None declared.

Ethical Approval: Not applicable

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A Study on Symptoms of Stress and Stress Management Strategies among pre-final and Final Year Medical Students in Kanchipuram District, Tamil Nadu

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Abstract

Foundation: In a medicinal or organic context stress is a physical, mental or passionate factor that causes real or mental pressure. This examination is to survey the manifestations of worry among the pre-last and last year medicinal understudies and the procedures they use to deal with the pressure they face.

The primary targets are (i) to research the relationship between conduct changes, physical troubles and enthusiastic status of the classification of understudies chose for the study, during stress times. (ii) To explore the systems they use to deal with the pressure they face. (iii) To realize a mindfulness about the hurtful impacts of worry in our body.

Method: This cross-sectional examination was led from among pre-last and last year therapeutic students from the urban zone of Kanchipuram area, Tamil Nadu, India, utilizing an advantageous inspecting system. The determined all out example size was 100. A pretested self-controlled survey was utilized for the information gathering. The subsequent information was examined.

Result: This study has yielded intriguing outcomes about the pressure side effects and stresses the executives techniques among pre-last and last year medicinal students, which are portrayed underneath. The relationship between social symptoms, emotional manifestations and physical side effects on the body at the season of pressure and the systems used to oversee worry by pre-last and last year understudies.

Keywords: *Behavioural symptoms, Emotional indications, physical side effects of pressure.*

Introduction

Everybody is presented to worry sooner or later in their lives, that awkward circumstance that influences our feeling of prosperity and nature of life[1]. As indicated by the intellectual value-based model of pressure, stress is the dynamic connection between an individual and the earth wherein a boost (whatever it is) exasperates a person's homeostasis, causing him/her to react to the circumstance with all accessible resources[2]. When this happens, we assess the interest in respect to our accessible assets, and the measure of pressure we experience is represented by the accompanying standard: the more assets we have, the less pressure we will involvement.

The pressure may prompt poor basic leadership and cut down the presentation of the person in their field of work. The general attributes of an individual in trouble are: being over-stirred; tense or incapable to unwind; unstable, effectively resentful or bad tempered; effectively surprised or restless, and exhibiting narrow mindedness of any intrusion or delay[3]. Over the top pressure results in an expanded predominance of mental issues like sorrow, tension, substance misuse and suicide ideation[4].

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Materials and Method

A cross-sectional investigation was led in a urban

area, Kanchipuram region of Tamil Nadu, India. The institutional moral advisory group endorsed the investigation.

The present investigation was attempted so as to evaluate the commonness of worry among understudies of restorative college, especially among the pre-last and last year understudies and the relationship of worry with different behavioural, emotional and physical manifestations and the procedures they pursue.

Subjects of age bunch 19 to 25 years in pre-last and last year of medicinal school in Kanchipuram locale is chosen. An example size of 100 is taken by advantageous inspecting technique. The psychosocial aspects, behavioural changes, passionate status and physical manifestations of them during the season of pressure were surveyed dependent on a pre-tried, self-controlled questionnaire. The poll was isolated into six areas. The primary segment secured as age, the subsequent segment secured the year if think about,the third area conduct indications, the fourth segment secured the enthusiastic side effects,the fifth segment secured the physical side effects and the 6th segment involved the systems the understudies due to deal with the stress. Stress Scale (DASS-21), which has been validated. Then the members of the examination are then assembled and are contrasted and the feelings of anxiety of the members utilizing Depression, nervousness, and stress scale (DASS) information are investigated statistically[5]. Then the methodologies of stress the executives are additionally analyzed.

Findings: In this investigation around 100 pre-tried poll were appropriated and gathered and were utilized for last analysis. They chose test bunch populace had a place with age bunch between 19-25. Overall there were hundred pre-last and last year medicinal understudies[6]. Out of these hundred students, 31% was last year understudy and 69% were pre-last year understudies.

Out of the all out respondents for conduct side effects of stress, 65% experienced irritability, 55% experienced fatigue, 66% experienced anxiety and 73% experienced incapacity to focus.

Out of the all out respondents reacted for passionate indications of stress, 41% regularly and 49% here and there stress a lot over things, 26% frequently and 60% here and there experienced episodes of anger, 33% frequently and half in some cases feel apprehensive that things may turn out badly dependably and 21% regularly and 43% some of the time had meddling contemplations.

Out of the complete respondents reacted for physical side effects of stress, 53% of them encountered cerebral pain sometimes, 47% experienced spinal pain sometime, 48% experienced indigestion, about 2% experienced constipation, 54% have encountered changes in eating pattern (either eating excessively/very less), 32% regularly and 51% once in a while experienced change in dozing pattern (either a sleeping disorder/over rest).

Out of the complete respondents reacted for pressure the board methodologies practically 95% tune in to music at times when they feel stressed,88% select web based life utilization to ease stress,12% picked rest to oversee stress,87% picked investing energy with relatives and companions and around 40 percent selected doing exercise, yoga and perusing books to oversee pressure.

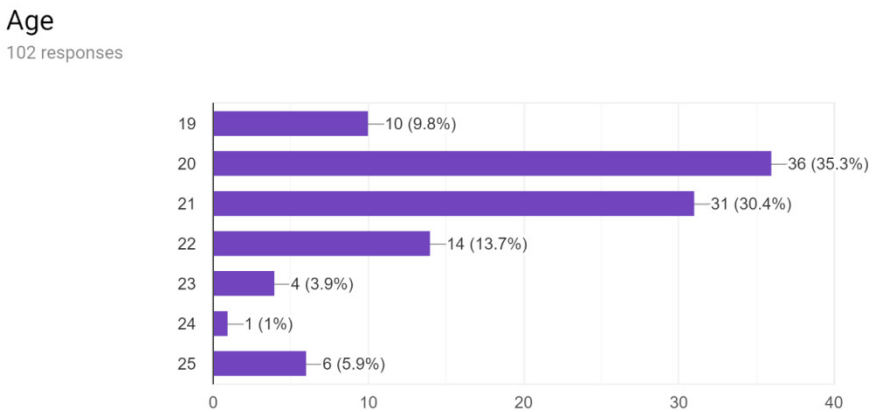




Table 1:

Behavioral symptoms	Often %	Sometimes %	Never %
Irritability	25	65	10
Fatigue	20	55	22
Restlessness	23	56	15
Disability to concentrate	21	76	9

Table 2:

Emotional symptoms	Often%	Sometimes%	Never%
worry too much	41	49	12
bouts of anger	26	60	15
feel afraid	33	50	31
panic attack	8	38	58
intrusive thoughts	21	43	37

Table 3:

Physical symptoms	Often %	Sometimes %	Never %
headache	25	53	24
backache	16	47	41
indigestion	13	48	41
constipation	2	41	61
change in eating habit	19	54	29
change in sleep pattern	13	51	20

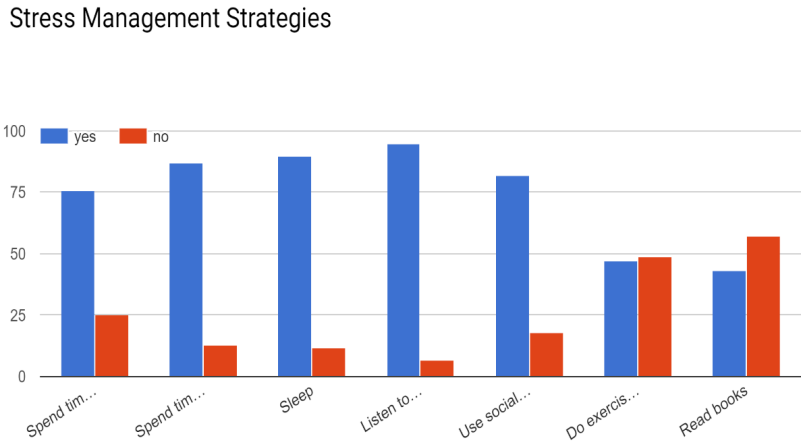


Table 4:

Stress management strategies	Yes %	No %
spend time with family	76	25
spemd time with friends	87	13
listening to music	95	12
sleep	90	7
use social media	82	18
do exercise or yoga	47	49
read books	43	57

Discussion

Medicinal training is innately distressing and requesting. A high pervasiveness of worry among restorative understudies to be sure required consideration as it might debilitate the learning capacity that may at last influence the nature of patient consideration they give after graduation.

Restorative understudies are over-burden with a gigantic measure of data, particularly during preclinical experiences[7]. They have restricted time to disguise all the data examined. The over-burden data makes a sentiment of misery and dissatisfactions, since they don't deal with all themes secured and, in this manner, are not fruitful during the examination time frame. The intemperate measure of worry in medicinal preparing inclines understudies to experience issues in taking care of issues and diminished fixation lastly create wretchedness. Moreover, worry among medicinal understudies can break the psychological solidness, debilitated decisions, and non-attendance from class exercise. In actuality, each one of those things bargains scholastic accomplishment of understudies.

This could be clarified that over the top pressure results in unreasonable emission of a pressure hormone cortisol that causes decrement in memory recovery elements of hippocampus and amygdala because of complete blockage of glucocorticoid receptors. This examination has yield a fascinating outcome that has been talked about below.

A Study of Stress among Students of Professional Colleges from a Urban territory in India Vivek B. Waghachavare,* Girish B. Dhumale, Yugantara R. Kadam, and Alka D. Gore,conducted in Maharashtra demonstrated comparable outcomes as this undertaking, though Abu-Ghazaleh et al. in Jordan, stress was seen in 70% of the respondents. Much lower feelings of anxiety were seen in the present examination, a discovering which could be credited to geological and social varieties. Moreover, it is essential to take note of that Supe considered apparent worry in the investigation subjects,6 though Abdulghani et al. connected the Kessler Psychological Distress Scale (K10) stock, which measures non-explicit mental distress and Abu-Ghazaleh et al. connected the 12-thing general wellbeing poll (GHQ-12), which is planned to screen for general mental morbidity. In the present investigation, the scale utilized was the DASS-21, which estimates worry in a manner which is very like the DSM-IV conclusion of GAD. These distinctive screening strategies used to decide pressure may have added to the distinctions in the watched predominance of stress[8,9].

This present venture has likewise yield comparative outcomes as Journal of Cognitive Behavioral Therapy in the three head reactions to stress were 1) tuning in to music, 2) conversing with a companion about the issue, and 3) working out.

Restrictions: Absence of speculation of our outcomes to other therapeutic schools in India is a significant constraint of this investigation. Cross-sectional plan of our examination is one more confinement since scores exhibited need fleetingness. Despite the fact that reaction rates out of complete understudies (95% for example who was available on that day) were genuinely great there could be some determination (nonresponse) inclination. The primary reasons that surfaced were the touchy and individual nature of the examination. Different reasons were nonappearance from school because of affliction or travel upon the arrival of the overview.

Conclusion

From the discoveries, the outcomes plainly demonstrate that adolescent is worried toward abnormal state. The side effects recognized are being eating, sorrow and migraines are more among understudies

It is seen that because of the expansion us of web-based social networking the youthful age become conceited and just interface with the innovation. It lessens the physical development of the body and investing energy with relatives and companions. All these make pressure which builds the instance of despondency and suicide. It is vital and proposals to the youngsters that make target arranged methodically use innovation inside point of confinement and offer your feelings with your friends and family.

Conflict of Interest: None declared

Funding: No funding sources

Ethical Approval: The Study was approved by the Institutional Ethical Committee, Sree Balaji Medical College and Hospital

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Study on Alopecia and its Impact in Everyday Life among Alopecia Patients Visiting Tertiary Health Centre in Thiruvalluvar District of Chennai

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Abstract

Background: Alopecia is an endless dermatological fiery issue in which individuals lose a few or the majority of the hair on their head. Once in a while on their body too. It is neither dangerous nor difficult there can be disturbance of skin, also physical issues coming about because of loss of eye lashes and eye foreheads. Etiology and ensuing improvement of alopecia isn't completely comprehended. Be that as it may, it is an immune system issue emerges from blend of hereditary and natural influence. Its physical results are for the most part considered and treated .But its mental outcomes are not considered in treatment much of the time.

Method: This is a graphic crosssectional study led among 100 patients experiencing Alopecia in a tertiary wellbeing place for skin and hair n Thiruvalluvar area of hennai Tamil Nadu.

Results: we have attempted to evaluate the effect of Alopecia in consistently life among the patients. Most of the age gathering influenced by alopecia is age bunches over 35. Alopecia areata is commonest sort of alopecia pursued by androgenic alopecia.

Conclusion: With globalization and absence of touch with nature, and huge heaps of stress, both physical, passionate nature, over-burdening of free radicals in our body, it causes areal toll on our worries .there is a critical need to advance further research in the zone of brain science and mental mediations for the administration of this disorder. Flushing out poisons from our body, utilization of sulfate and paraben free items, great sustenance, less unpleasant personality, moderate exercise when rehearsed consistently and stringently alopecia can be controlled. For the most part it tends to be imagined that instance of alopecia on the off chance that gathering is higher than the control gathering, subsequently appropriate mindfulness and awareness about mental and expert back grounds is fundamental for desireable administration of the sickness.

Keywords: *Alopecia,Dermatologists, Alopecia Areata*

Introduction

There numerous a man has more hair than mind, was expressed by William Shakespeare in the parody of Errors. Be that as it may, in this day and age, individuals are so grieved by male pattern baldness they may step more hair than mind; Alopecia is characterized as loss of have from zones where hair ordinarily develops. It very well may be fractional/complete loss of hair. There are various kinds of alopecia the primary sorts are Alopecia Areata(AA) Alopecia Totalis (AT) Alopecia Universalis (AU) Alopecia Barbae, Androgenic alopecia (AGA), Scarring alopecia: telogen exhaust (diminishing of hair) less normal courses of male pattern baldness without[1]. Scarring incorporates hauling out hair (footing alopecia) chemotherapy, ailing health, Fe, microbial infusion, Radiation treatment, endocrine issue. Treatment of this

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includes tolerating the condition hair transplantation, wig, minoxidil, finastride, dutastreide, pulsed electro attractive treatment, for FPHL, about 2% of individuals create alopecia some point in time. It very well may be because of trichotillomania known as hair pulling. Is a psychological issue wherein there is Long term hauling out ones hair, places basic incorporates around eyes and head. The deggree of hair pulling results in trouble all the more regularly watch habitual issue treat by subjective social treatment .Alopecia can be mental. Can have genuine psychosocial results coursing exceptional enthusiastic enduring individual, social business related issues. The distressing life occasions can lead toevents of activating alopecia[1]. Contrasted and all inclusive community, expanded commonness rates of hallucinogenic issue are related with alopecia. Being a higher SSR for advancement of real burdensome issue nervousness issue, social fear and neurotic issue. Be that as it may, essentially an uncovered man is socially satisfactory, a bare lady isn't. The mindfulness among alopecia can prompt change in their ways of life adjustments. Sound and the self control to battle back against it.hence the intend to examine are the results looked by Alopecia influenced patients influencing physical and psychological well-being and their disposition towards alopecia in todays world[1].

Materials and Method

The investigation includes alopecia influenced individuals visiting tertiary wellbeing place for skin and hair in Thiruvalluvar area Chennai Tamil Nadu. An example size of 100 individuals is gotten by assignment of patients by the head of tertiary wellbeing focus from her emergency clinic for alopecia and testing strategy pursued was helpful examining technique. Age gathering includes individuals from 1year to 80 years. The causes, various pieces of the body influenced by alopecia, its restorative camouflage, recommended treatments, challenges they face in regular day to day existence languishing over the patients partaking in this exploration are surveyed utilizing a page poll simply subsequent to getting assent from them by marking in the assent structure .Data was gathered and MS Excel and broke down utilizing SPSS form 22.

Findings: Our results included 100 individuals influenced by alopecia which includes 62%male and 38%female .the age gatherings required for male and female are spoken to as a table outline. Higher pervasiveness (41%) was found in those over 35 years old. (Table 1).

Table 1: Socio demographic details of the study participants

Age group	Percentage/Frequency the same
<less than 18 years	27%
18-35 years	32%
>greater than 35	41%
Sex	Percentage/frequency the same
Female	38%
Male	62%

The table 2 represents the type of alopecia people are most commonly affected with Alopecia Areata [70%] is the most common type of alopecia affected cases followed by Androgenic Alopecia [45%], Telogen effluvium [40%], alopecia totalis [20%], trichotillomania[10%], alopecia barbarae[5%].

Table 2: Types of alopecia-among the study participants

Types of alopecia	Percentage	Frequency
Alopecia areata	45	45
Telogen effluvium	15	15
Alopecia barbarae	2	2
Alopecia totalis	5	5
Alopecia universalis	2	2
Androgenic alopecia	20	20
Cicatrical alopecia	2	2
Trichotillomania	9	9

Figure 1 shows the cosmetic concealment options used by the study participants for alopecia. Around 43% of them use wig, 28% use hair extensions, 14% use resatinfibers.

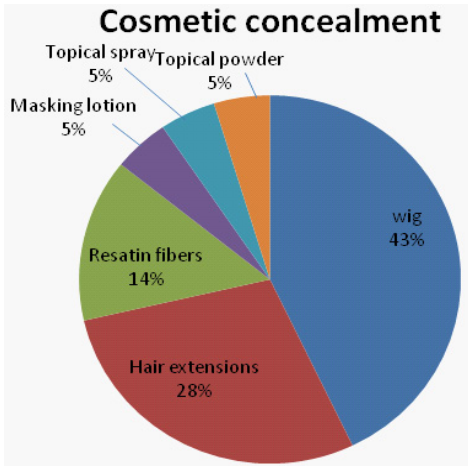


Figure 1: Details regarding Cosmetic concealment among study participants

Stress is being the major killer triggering alopecia .findings from the above pie chart shows stress people take in their studies, job, personal and family problems being the reasons for hair loss around 9% of people marriage especially for men being rejected inspite of their god profession and monthly income 10% move into depression and are under pscychatric guidance .23 % people have felt to attempt suicide because of the mockery they face in the society due to alopecia (Figure 2).

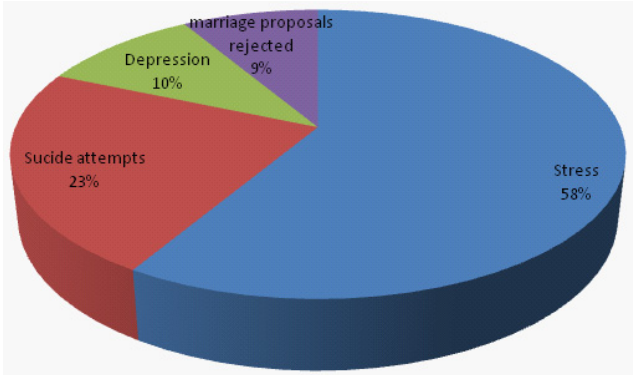


Figure 2: Psychosocial problems faced by the study participants due to alopecia.

Most of the study participants had a alopecia pattern of scalp being affected followed by eyebrows and eyelashes. (Figure 3).

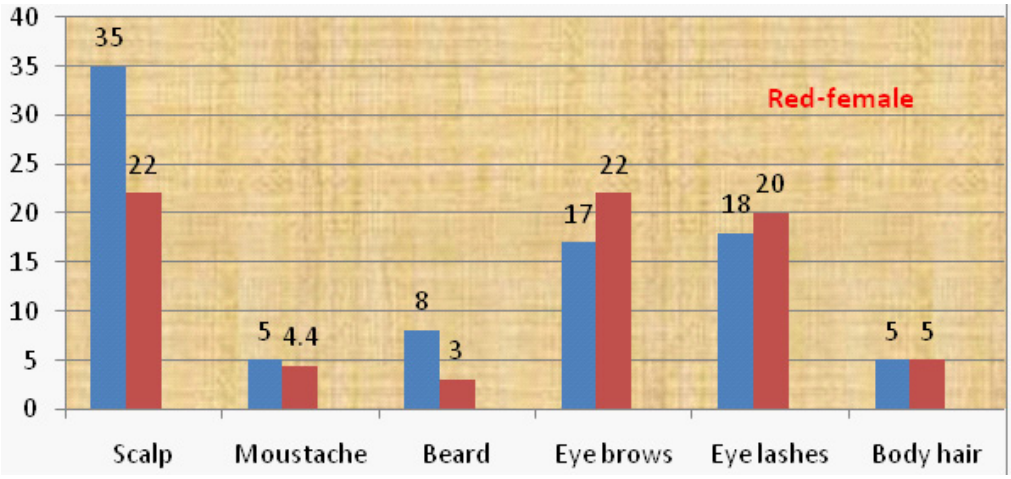


Figure 3: Alopecia affected parts of the body among study participants

Discussion

The examination depends on the effect of alopecia in regular day to day existence. for example, nervousness, stress, despondency, character profile, neurobiological bits of knowledge, nature of life. This study center upon the reasons and cause for alopecia in today world. This study manages the outcomes gotten by investigating the point of view of alopecia among the 100 individuals of various age bunches in today world how they adapt up, manage it,discoveries of kinds of hairloss pattern, different regions of body influenced by alopecia by clear chronicles from the information acquired after discussion with the alopecia affected people is acquired dependent on these discoveries about the effect of alopecia in regular day to day existence individuals of different social back grounds are break down.

Research thinks about by Gupta MK have revealed following the issue to antagonistic youth encounters and formative points of view have been elusive[2]. Alopecia influenced understudies express that mental trouble because of alopecia was not endless supply of patient or phase of baldness study[1] done by Priktt J recommends that ladies who have recuperated from chemotherapy face worry for failure to style their hair[3]. Study by Petkhova L with respect to the evaluating of alopecia have indicated varying outcomes in the clinical example of male and female example hair male pattern baldness propose that they 2 separate entities[4].

Stress is a wide build and specialists have differing meanings of what comprises pressure. Analysts likewise fluctuate in what are flitting or long haul suffered pressure. This makes hard to translate discoveries from research papers regarding the matter and most examinations take on insight of intrapsychic and different individual directions that might be influencing everything in the individual patient[5]. Uneasiness and melancholy have been accounted for generally crosswise over different examinations in patients with alopecia areata. The scopes of patients influenced by the clutters are 30-80% crosswise over examinations. Sentiments of instability and inferiority alongside inactivity in light of feelings has been accounted for in this patient population Personality profiles in alopecia Areata: alopecia areata patients have a trademark character profile with low oddity looking for, low reward reliance and low self-amazing quality, youngsters with alopecia areata are progressively pulled back, discouraged and forceful demonstrating sorrow in almost 40-half cases[6]. There are very few examinations on character qualities of these patients and neither has the frequency of character issue in this gathering thinks about. There is one research that reports raised sorrow, social self preoccupation sub scale on appraisal on the Minnesota multiphasic character stock (MMP) in this group[7]. Neurobiological bits of knowledge into alopecia areata: the impact of mental factor in alopecia areata however entrenched has discussed. Late examinations have attempted to clarify a neurobiology fothesame[8]. Intense enthusiastic pressure might be hasten alopecia by enactment of over communicated type 2b corticotropin discharging hormonal receptors around the hair prompting neighbourhood information[9].

Personal satisfaction in alopecia areata: personal satisfaction is an expansive idea and is gone for whether confusion restrains a patient's capacity to satisfy an ordinary job and furthermore surveys weight and results of medicines advertised. It is characterized as the emotional impression of the effect and social working and prosperity of patients[10]. This is significant pointer in scatters like alopecia areata in light of the fact that the turmoil has solid effect on social connections, consistent schedule actives and psychosocial status. Life occasions and alopecia areata: life occasions assume a significant job in causation of alopecia areata. Life occasions alone are not adequate independent from anyone else to achieve etiological significance[11]. Female patients with alopecia areata: female patient with alopecia areata have progressively enthusiastic hints and adding to the stress might be a trivialization of the issues by unpracticed physician Communication and consistence alopecia areata: relational abilities are an unquestionable requirement when managing a patient of alopecia as great correspondence is imperative in the recuperation procedure. Correspondence needs to incorporate tuning in to the patient, understanding the patient, advising about different tests and symptomatic methodology just as helpful onsiderations and prognosis,it includes onvincing the patient while giving expectation and joinly cheering over restorative advancement. Understanding instruction and advising alongside psycoeducation of relatives in helping patients adapt is another region which is significant[12]. Data of utilization psychotropic medications just as antidepressants this populationas well as on relative examinations on preliminaries on this respect was unavailable clinical experience recommends that choice will be on case to casebias[13].

Job of mental mediations in alopecia areata: there is a requirement for dermatologists to work in contact with emotional wellness experts when it comes the effective administration of alopecia areata a disorders[14].

Conclusion

With globalization and absence of touch with nature, and monstrous heaps of stress, both physical, passionate nature, over-burdening of free radicals in our body, it causes areal toll on our worries .there is an earnest need to advance further research in the zone of brain research and mental intercessions for the administration of this issue.

Flushing out poisons from our body, utilization of sulfate and paraben free items, great nourishment, less unpleasant personality, moderate exercise when polished routinely and stringently alopecia can be controlled. By and large it very well may be imagined that instance of alopecia in the event that gathering is higher than the control gathering, thus legitimate mindfulness and cognizance about mental and expert back grounds is fundamental for desireable administration of the ailment.

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Conflicts of Interests: No

Ethical Approval: The study was approved by Institutional Ethical Committee Sree Balaji Medical College.

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Are Pets Stress Busters or Cause of Allergy

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Abstract

Background: In brain science, stress is a sentiment of strain and pressure. Stress is a kind of mental torment. Sensitivity to pets are for the most part because of their hide which is truly unimportant .coming up next is the exploration done on the advantages of pets on undergrads and their conceivable unfriendly consequences for them.

Method: Philosophy Cross Sectional examination done by convenience testing strategy. Information was gathered with the assistance of a poll. The subjects utilized for this investigation were College understudies from Kanchipuram area.

Result: Out of the 150 respondents it was discovered that 66% had pressure and just 20% had hypersensitivity because of different causes. Among the pet proprietors there is a noteworthy decrease in worry after the entry of the pet.

Conclusion: There are numerous advantages of pets. One such advantage is the decrease of pressure. The prevalence of sensitivity because of pets is truly immaterial .Thus the advantage of having a pet exceeds its hazard. The significant levels of pets give help and are regular pressure buster.

Keywords: *Man's buddy, Hypersensitivity response, allergens, Cortisol.*

Introduction

An ongoing statics uncovered that a normal of 600000 pets is being embraced every year. China has the most astounding populace of canine proprietors of 27.4 million proprietors. India positions fifth with 10.2 million proprietors behind Philippines. An ongoing overview uncovered that Chennai participation issues licenses for around 160 pooches every month[1]. One of the greatest false impressions with respect to pet hypersensitivities is that they are brought about by creature hide. Specialists state this isn't valid and that even two pets from a similar breed may cause altogether different degrees of hypersensitivity. The pets hide isn't the most serious issue with regards to allergens rather it is the feline or canine dander which causes the genuine problems[2].

Stress is a sentiment of strain and weight. Stress is a sort of mental torment. Studies have additionally demonstrated that association with treatment creatures can diminish worry in people. Playing with or petting a creature can diminish levels of the stress. The human body reacts to occasions that incite worry by actuating the sensory system and explicit hormones These hormones accelerate pulse, breathing rate, circulatory strain, and digestion. The physical changes set you up to respond rapidly to deal with the weight existing apart from everything else. This regular response is known as the pressure reaction. This reaction improves your capacity to perform well under strain. Stress influences everyone in an alternate manner. What makes one individual become over-focused might not have a similar impact on another person. The primary driver if stress are as per the following Exams,Problems at school or work, New duties, Moving to another spot, Traumatic occasion–, for example, the passing of a friend or family member,

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New or endless disease or incapacity, Peer weight, being harassed and Unrealistic desires put on you without anyone else, companion, family or culture[3].

The most hazardous thing about pressure is the manner by which effectively it can crawl up on you. You become accustomed to it. It begins to feel recognizable, even ordinary. You don't see how much it's influencing you, even as it causes significant damage. That is the reason it's imperative to know about the regular cautioning signs and side effects of pressure overload[4].

At the point when stress comes your direction, your body goes into battle or-flight mode, discharging hormones like cortisol to wrench out more vitality boosting glucose and epinephrine to get your heart and blood siphoning. When we live in a steady condition of battle or-departure from progressing worry at work and the frantic pace of current life, these physical changes negatively affect our bodies, including raising our danger of coronary illness and different hazardous conditions. Contact with pets appears to balance this pressure reaction by bringing down pressure hormones and pulse. They likewise lower nervousness and dread levels (mental reactions to stretch) and raise sentiments of smoothness. Studies have discovered that mutts can help simplicity stress and forlornness for seniors, just as assistance quiet pre-test worry for school students[5]. Animals can fill in as a wellspring of solace and backing. Treatment pooches are particularly great at this. They are here and there brought into clinics or nursing homes to help lessen patients' pressure and anxiety[6].

Materials and Method

Coming up next was a cross sectional investigation done by convenience inspecting technique. The investigation is done on understudies from Sree Balaji Medical School in Chrompet. The information was gathered with the assistance of a poll .An assent structure was issued alongside the poll expressing that the subtleties of the review were disclosed to the subject and the cooperation is simply deliberate. The survey was set up so that it helps to recognize whether the subject experiances stress and if being a pet proprietor lessens this pressure. Additionally the reasons for hypersensitivity amoung the subjects were gotten to.

Test measure: 150.

Study area: Sree Balaji medicinal school and clinic

Study populace: Students from Sree Balaji medicinal school and Hospital who have a place with first, second and third year.

Study technique: Cross sectional engaging investigation

Study period: April 2019-June 2019

Consideration criteria: All those will be available upon the arrival of study

Avoidance criteria: All the individuals will's identity missing upon the arrival of study

Findings: The graph shows that 60% of the students were girls and the remaining 40% were boys.

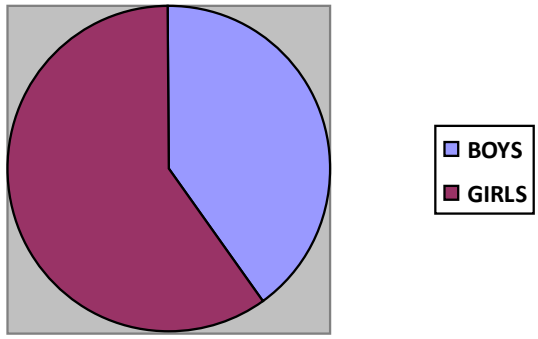


Figure 1: Percentage of Boys and girls

The bar graph indicates that 16 individuals had dust allergy, 8 individuals had allergy to food, 4 individuals had allergy to certain drugs and only 3 individuals had allergy towards a pet animal .Out of the three individuals who had an allergy towards an animal only one person had a pet at home.

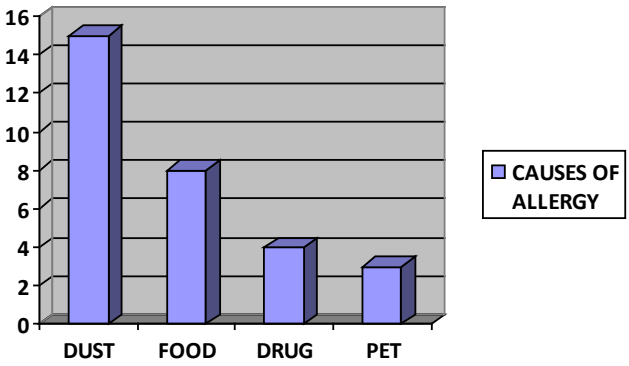


Figure 2: Causes of Allergy

Table 1: Factors Related To Pets

S. No	Variable	Frequency	Percentage
1	Do you experience stress?		
	Yes	99	66%
	No	51	34%
2	Do you have a pet at home?		
	Yes	90	60%
	No	60	40%
3	Is there a reduction of stress after the arrival of the pet?		
	Yes	72	80%
	No	18	20%
4	Do you have allergy?		
	Yes	30	20%
	NO	120	80%

The above table demonstrates the elements identified with pets. The principle elements contemplated here is the central advantage of pets on pressure and the unfavorable impact is an outcome of hypersensitive sign on the respondents.

The investigation uncovered that 66% of the people had pressure. 60% of the subjects had a pet and there was 80% decrease of pressure amoung the pet proprietors. 20% of the people had hypersensitivity.

Discussion

In the present period marvel of pressure isn't limited to grown-ups yet additionally influences understudies. In this examination an endeavor has been made to distinguish whether pets are pressure busters or reason for hypersensitivity.

From this investigation it is discovered that 66% of the understudies had stress. Similiar considers amoung restorative understudies in Chennai has demonstrated that around 78% of the subjects were worried because of different causes like tests and companion weight. 60% of the subjects were found to have pets. The subjects were solicited whether there was a decrease from worry after the entry of the pet. 72% addressed that there is a resulting decline in worry because of their pets. Comparative examinations in Israel revieled that brief time of petting a creature brought about decreased state-uneasiness amoung non clinical people in a distressing condition[7].

Another examination in the US found that 74% of pet proprietors announced psychological wellness enhancements from pet possession, and 75% of pet proprietors detailed a companions or relative's emotional well-being has improved from pet ownership[8, 9]. This investigation additionally uncovered that 20% of the subjects had hypersensitivity out of which just 7% had sensitivity to pets. An article in the ABC news uncovered that 15% of the populace is adversely affected by pets and 30% if the general population with asthma are sensitive to pets.

In this way from this investigation it was discovered that in urban zones where huge numbers of them were worried because of friend and parental weight the nearness of pets impressively decreased pressure. There is sufficient proof to help a case that we are 95% sure that a great many people accept they have decreased worry from time gone through with their pets.

Conclusion

In this chaotic existence where it would seem that everybody is out to get us. A pooch is the one thing on earth that cherishes you more than you yourself. People lie to one another, they double-cross, why they are even prepared to murder one another, yet our pet creatures realize just to adore us. They stay steadfast till the final gasp of our lives. It is just an irrelevant level of pets which cause sensitivities, the significant level of pets give help and are common pressure busters. On the off chance that you purchase a toy for a tyke he will be cheerful for some time; however in the event that you blessing a pet to your kid he will be glad forever. Pets are unquestionably our best mates for they will neither judge nor reprimand simply totals love. You have to deal with your pet and keep it in clean conditions. The pet must be consistently inoculated and all medical problems took care of improvised.

Funding: No funding sources.

Conflict of Interest: None declared.

Ethical Approval: The study was approved by International ethics committee Sree Balaji Medical College and Hospital.

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Atrophoderma of Pasini and Pierini in an Adolescent Male: A Case Report

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Abstract

Atrophoderma of Pasini and Pierini (APP) is an uncommon and unmistakable type of dermal decay of dubious etiology. It displays as one or a few, pointedly discouraged patches, with no encompassing erythema, sclerosis and indurations. Normally happens in youthful grown-ups, for the most part in the storage compartment. For this situation consider we present a multiyear old kid giving grievances of a dull shading asymptomatic skin sore over the lower back

Keywords: *Pasini, Pierini, erythema.*

Introduction

In 1923, Pasini portrayed an atrophic injury on the storage compartment which he revealed as dynamic idiopathic Atrophoderma. In 1958, Canizares et al renamed this condition as 'Idiopathic atrophoderma of Pasini and Pierini'[1]. It is typically a kind issue which exhibits as asymptomatic, hyper pigmented, somewhat discouraged patches with sharp "bluff drop" fringes[2] or impression in snow appearance[3] with symmetrical and respective dissemination. These plaques are commonly round or ovoid fit as a fiddle with their long hub parallel to the lines of cleavage[1].

Findings: A multi year old BOY exhibited to a private skin center with a dim hued asymptomatic skin injury over the back of the storage compartment for as long as a half year, with No history of other comparative skin injuries in the body related with or without agony. Dermatological examination uncovered 7cm x 4cm single, unbalanced, very much outlined, pigmented, atrophic, discouraged plaque with trademark bluff drop fringes. No delicacy was available.

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Foundational examination was ordinary. Routine lab examinations, for example, CBC, pee investigation, liver capacity tests, renal capacity tests and serum electrolytes were accomplished for incase of any differential determination and basic infection and observed to be ordinary.

A skin biopsy of 0.2cm was taken from the injury for histological examination, demonstrated dispersed epidermis and dermis indicating somewhat thickened collagen packs and gentle lymphocytic invade. Atrophoderma of pasini and pierini was made dependent on clinical and histopathalogical discoveries.



Figure 1: gross lesion on the lower back

Discussion

There are different choices with respect to whether Atrophoderma of pasini and pierini speaks to isolate element or is a principally shallow and atrophic variation of morphea. They are symmetrically circulated

truncal sores generally yet single sores and zoster form conveyances[4] are likewise observed. The sores are non-indurate; blue-dark to darker, hyper pigmented and forcefully differentiated discouraged patches, with bluff drop fringe or impression in snow appearance[3].

Etiology: It is an uncommon condition with obscure etiology that speaks to 0.1% of youth morphea. This issue is more every now and again experiencing in ladies than in men in the proportion 6:1[2]. It as a rule begins treacherously in the second or the third decade of life and has likewise been accounted for in youngsters more youthful than 13 years old. The sores happen more often than not on the storage compartment, particularly on the back and the lumbosacral region[5]. Two kin with phenylketonuria demonstrated morphea in one and atrophoderma of pasini and pierini in another, inspire of this familial inclination, a hereditary factor has not been dependably incriminated[6]. Job of borrelia burgdorferi has likewise been suggested[7].

Pathology: Histopathological appearances are variable: show typical to mellow lymphocytic invasion along decreased dermal thickness and ordinary or sclerotic and hyalinized edematous collagen. Flexible stains may likewise demonstrate a range of changes[2] (atrophoderma indicates a greater number of changes in versatile tissue than morphea) extending from typical to insufficient fracture of bunched flexible fiber network[5, 2]. Immunofluorescence studies may demonstrate igM and C3 in the dermal blood vessels[8]. A couple of most recent examinations have said that histopathological studies have no demonstrative worth.

Clinical highlights: The injuries are single or various and for the most part round or ovoid, all around surrounded delicate plaques with a discouraged focal point of 1 to 8 mm top to bottom and an old style bluff drop appearance going in size from a couple of centimeters to patches covering enormous territories of the storage compartment, the shading fluctuates from somewhat blue dark colored to violet[3]. They are normally asymptomatic and need irritation. at the point when various injuries combine, they give huge, sporadic, dark colored fixes generally numerous sores can have Swiss cheddar appearance[3]. The skin encompassing the patches is typical in appearance and there is no erythema or lilac ring as in morphea[1].

Differential determination: The most plausible differential finding is Morphea and Atrophoderma of moulin[5]. Morphea is described with a lilac ring and cobblestone[9]. Appearance of the sore with erythema and induration[10]. Thus discounted here. Where atrophoderma of moulin are has no histological changes and is altogether different from atrophoderma of pasini and pierini. In this manner Atrophoderma of pasini and pierini was made dependent on clinical and histopathalogical findings[5, 1].

Treatment: No treatment as been demonstrated successful. in any case, PUVA(psoralen and bright A), hydroxychloroquine and Q-exchanged Alexandrite laser has been tried[8] it was just powerful in decreasing the hyperpigmentation by half after 3 medicines in just barely one case[9]. In perspective on the likelihood of a basic Borrelia disease, penicillin and antibiotic medication has additionally been utilized for treatment[7] when the finding is built up; follow up of the patient for improvement of new regions is to be done where ultrasonography is utilized. Careful treatment has commonly not been useful in improving the presence of decayed skin[9].

Conclusion

Atrophoderma of pasini and Pierini is a sort dermal atrophy with obscure etiology, regardless of whether it's a different infection substance or essential variation of morphea is still discussed and to be additionally contemplated. Patients assent was acquired. There are no irreconcilable circumstances.

Conflict of Interest: Nil

Source of Funding: Nil

Ethical Clearance: Not needed as this is a case report.

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Case Report Respiratory Failure Presenting H1N1 Influenza with Legionnaires Disease

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Abstract

This is a case report of patient who displayed in 2018 with coinciding H1N1 infection and Legionella diseases in a 69-year-old male. For this situation every one of the signs and side effects, including regurgitating, dynamic respiratory sickness prompting respiratory disappointment, headstrong hypoxemia, leukopenia, lymphopenia, thrombocytopenia, and raised degrees of creatine kinase and hepatic aminotransferases, were steady with basic disease because of 2018 H1N1 infection contamination. Different irresistible issue may mirror H1N1 viral contamination particularly Legionnaires' ailment. I do feel that my doubt of Legionella contamination dependent on clinical history and X-beam variations from the norm was major for a fruitful goals.

Keywords: *Respiratory Failure, H1n1 Influenza, Legionnaires Disease, Legionella.*

Introduction

Flu is an intense self-constrained febrile disease brought about by contamination with flu type An or B infection. While respiratory side effects are most normal, myositis, rhabdomyositis, myoglobinuria, myocarditis, pericarditis, and focal sensory system contribution have all been portrayed with flu infection disease. Media emotionalism on the H1N1 episode may have affected decisional forms and clinical finding.

Materials and Method

This case report proposes that patients with H1N1 ought to be screened for Legionella, which isn't right now regular practice. This is especially significant since the signs and manifestations of the two diseases are comparable.

Catchphrases:

- Respiratory disappointment
- Viral contamination
- Legionella
- Swine influenza

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Findings: Flu is an intense self-restricted febrile sickness brought about by contamination with flu type A or B infection. While respiratory side effects are most normal, myositis, rhabdomyositis, myoglobinuria, myocarditis, pericarditis, and focal sensory system association have all been depicted with flu infection disease. Media sentimentality regarding the swine influenza flare-up may have affected decisional forms and clinical determination. This is a report two instances of patients who present during 2009 in whom H1N1 and Legionella contamination existed together. Optional bacterial pneumonia is perceived as a standout amongst the most widely recognized reasons for death in flu cases. Coinfection has been found in 30% of all flu cases in people with occasional flu. The pathogens regularly included are Streptococcus pneumoniae, Staphylococcus aureus, and Hemophilus flu. From July 2009 through February 2010 there was a pandemic. In the year 2010 there had been 2850 cases detailed and 1833 passings from H1N1 swine flu in kerala.

Case: This case is a 69-year-elderly person with a past restorative history of coronary vein ailment, interminable renal deficiency, hypertension and type 1 diabetes. Two weeks sooner, he had been presented to

a youngster with an upper respiratory contamination. He lived in a rustic territory. He had no history of bug nibbles, however was presented to cultivate creatures and lake water.

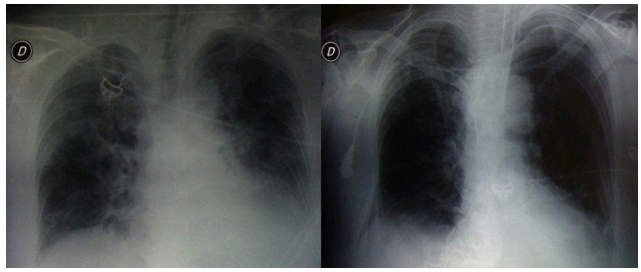
He had been well until nine days sooner, when profitable hack, myalgias, fever (39.4°C), disquietude, sore throat and nasal blockage displayed. On physical examination in the Emergency Room (ER), the patient had a temperature of 39.2°C, a pulse of 50 beats for every moment and a respiratory rate of 35 breaths for each moment. A buccal swab was negative for flu An and B antigens, and no parasites were seen on a fringe blood smear. Acetaminophen, ketorolac, levofloxacin and typical saline were regulated.

Following 24 hours he gave tireless fever (39.0°C), profitable hack and respiratory disappointment and was admitted to the emergency unit). Imperative signs were as per the following: circulatory strain 135/70 mm Hg; pulse 50 beats for every moment; respiratory rate 34 breaths for each moment; oxygen immersion 88%, on half propelled oxygen. On physical examination bronchi were recognized in the lower lung fields.

Rehashed trial of nasopharyngeal emissions for flu infections, parainfluenza infection, respiratory syncytial infection, and adenovirus were negative. Testing for antibodies to toxoplasma was suggestive of past contamination. Societies of examples of blood, pee, and sputum were sterile. Polymerase chain response assurance of buccal swab for H1N1 flu A infection was sure. Urinary tests for Legionella antigens were certain.

On affirmation principle research center examinations were as per the following: white platelet check (WBC) was 9.8 K/mL (87% neutrophils, 4% lymphocytes); C-responsive protein 205 mg/L; serum sodium 132 mEq/L; serum phosphorus 2.3 mg/dL; serum glutamate pyruvate transaminase (SGPT) 175 IU/L; serum oxaloacetate transaminase (SGOT) 184 IU/L; serum ferritin 4100 ng/mL; creatinine phosphokinase (CPK) 241 IU/L. Winthrop scale score was > 15.

Chest radiograph demonstrated low lung volumes, with inconsistent air-space malady predictable with multifocal pneumonia (Figure 1). Intravenous azithromycin (500 mg twice day by day), levofloxacin (500 mg twice every day) and oral oseltamivir (150 mg twice day by day) were controlled. Inside 18 hours after entry, tachypnea and hypoxemia (PaO2: 58 mm Hg, while breathing half oxygen) expanded further requiring intubation and mechanical ventilation. Hypotension and renal disappointment created; methylprednisolone and vasopressors were controlled.



Right board: antero-back chest x-beam of patient 1. Left board: antero-back chest x-beam of patient 2.

On the third day turn around transcriptase polymerase chain response (RT-PCR) on a bronchoalveolar lavage example was as yet positive for H1N1 flu disease. Legionella antigens were likewise affirmed positive. On the fifth day he was extubated and non-obtrusive ventilation was begun. He was released from the ICU on day 21.

Discussion

The pandemic was painstakingly trailed by the media however with a dash of sentimentality that caused an across the board a feeling of dread in the populace. Human services frameworks and doctors were abruptly in the spotlight. For this situation every one of the signs and manifestations (counting respiratory disappointment, recalcitrant hypoxemia, leukopenia, lymphopenia, thrombocytopenia, and raised degrees of creatine kinase and hepatic aminotransferases) were steady with basic sickness because of contamination with the 2018 H1N1 infection.

Different irresistible issue may impersonate H1N1 viral contamination particularly Legionnaires' illness. Starting endeavors to analyze H1N1 disease utilizing immunochromatography depended on test units created for regular flu An and B infections, a large number of which demonstrated fundamentally less delicate to H1N1. Subsequently, tests with monoclonal antibodies that respond with H1N1 yet not regular flu A (H1N1 and H3N2) or B infections were created.

Perceiving viral hemagglutinin and nucleoprotein, explicitly permits the location of H1N1 infection in nasal wash liquid or nasopharyngeal liquid from patients with flu like sicknesses. Early and fast conclusion of H1N1-related respiratory deficiency needs quick screening

during a pandemic however clinicians can't depend just on the buccal swab test and need to preclude false positive and negative cases by RT-PCR on oral/nasal liquids or bronchoalveolar lavage examples.

In the event that one the visit by a tyke with an upper respiratory contamination five days before the beginning of disease in the patient speaks to likewise a conceivable presentation to the 2018 H1N1 infection; . The quick doubt of Legionella disease dependent on clinical history, X-beam anomaly was principal for effective goals.

Practically all patients influenced by pandemic H1N1 diseases admitted to an ICU due to lung association get empiric anti-infection treatment. Be that as it may, fundamental clinical information have neglected to show a steady job of bacterial co-disease proposing that extreme aspiratory harm happens because of viral pneumonia[1, 2]. An ongoing post-mortem examination study uncovered proof of simultaneous bacterial contamination in 29% of cases[3]. In 45% of these the pathogen was S. pneumoniae. These discoveries affirm the aftereffect of past investigations of dissection examples demonstrating that most passings credited to flu A infection happened simultaneously with bacterial pneumonia. Then again, they feature the significance of treating flu patients with both empiric antibacterial treatment and antiviral meds. It is significant that zoonotic contaminations must be precluded. The absence of known contact with creatures in an immunocompetent host seems to preclude zoonotic diseases, for example, Coxiella burnetii. One of the patients had worked close water lakes, which could have been polluted by creature pee, yet he didn't have aspiratory drain so leptospirosis appears to be impossible. Without introduction to feathered creatures, Chlamydia psittaci is impossible. Network procured pneumonia (Streptococcus pneumoniae, Hemophilus influenzae, S. pyogenes, or Staphylococcus aureus) can cause serious pneumonic infection, particularly in patients with precursor flu. These pathogens ought to have reacted to the wide range antimicrobial treatment; in this way, they are probably not going to have been the sole reason for ailment. Atypical bacterial pathogens, for example, Legionella pneumophilacause multifocal pneumonia yet as a rule don't cause upper respiratory tract indications

Anaplasmosis could result in a lower respiratory tract malady yet fulminant sickness is uncommon and clinical improvement ought to have happened with levofloxacin treatment. Radiographic variations from the norm additionally should have been precluded. Numerous fundamentally sick patients have radiographic discoveries of viral pneumonitis, with two-sided interstitial and alveolar invades. Multifocal and inconsistent variation from the norm as found in this patient has been accounted for in instances of 2018 H1N1 flu A infection contamination however don't totally preclude obtrusive bacterial disease[4]. Ground glass mistiness and cavitary lobar murkiness should concentrate consideration on Legionnaire's sickness[2].

Another potential contributory factor that should have been discounted was viral disease of the respiratory tract. Disease with adenovirus or flu infection must be considered. Adenovirus type 14 is the undoubtedly reason for serious viral pneumonia in grown-ups. Radiographic discoveries may incorporate lobar invades, despite the fact that these are increasingly normal for bacterial pneumonia. The way that bacterial contaminations ought to have reacted to levofloxacin contends against the way that an optional bacterial pneumonia superimposed with flu A or B causing extreme aspiratory illness. The absence of late travel in H5N1 (winged creature influenza) endemic territories or presentation to wiped out or dead poultry contend against H5N1 flu (fledgling influenza)

Conclusion

This case report proposes that the patient with H1N1 ought to be screened for Legionella, which isn't at present regular practice. Specialists ought to never be stunned by possibility and media drama in basic leadership. With brief distinguishing proof of the bacterial etiology of pneumonia, proper treatment can be begun with both antibacterial treatment and antiviral meds. The length of emergency clinic remains and the mortality of both pandemic and occasional flu can be decreased.

Ethical Clearance: No ethical clearance was required for this work.

Source of Funding: Self funded work

Conflict of Interest: Nil

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Depression in Primary Healthcare

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Abstract

Despondency causes huge affliction and is regularly found in essential consideration. Since essential consideration suppliers once in a while neglect to distinguish patients as discouraged, methodical screening programs in essential consideration might be useful in improving results in discouraged patients. Discouragement screening is predicated on the idea that recognizable proof will enable powerful medications to be conveyed and that the advantages of treatment will exceed the damages.

Keywords: *Antidepressants, essential consideration, specific serotonin reuptake inhibitors, Adverse responses, psychotherapy, social changes.*

Introduction

Real sorrow is a temperament issue that presents with either a tenacious sentiment of trouble or loss of delight, or both. Despondency causes huge affliction and is regularly found in essential consideration. Since essential consideration suppliers once in a while neglect to distinguish patients as discouraged, methodical screening programs in essential consideration might be useful in improving results in discouraged patients. Discouragement screening is predicated on the idea that recognizable proof will enable powerful medications to be conveyed and that the advantages of treatment will exceed the damages.

Materials and Method

One thousand patients chose haphazardly and by accommodation from 4 essential consideration centers were surveyed by PRIME-MD and finished a poll estimating the accompanying approval factors: useful status and prosperity, handicap days, substantial manifestations, misery seriousness, self-destructive musings, medicinal services use, and the doctor persistent relationship.

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Side effects: Various manifestation spaces–passionate, physical, and conduct–structure the heavenly body of gloom. Not all patients experience all indications. The impact of sadness on certain spaces can be either an expansion or a reduction. For instance, craving (and regularly body weight) might be raised or decreased, and either a sleeping disorder (of a few distinct examples) or hypersomnia can occur[1]. The extent of side effects additionally can fluctuate from patient to understanding and after some time inside a given case. Enduring and handicap generally connect with the seriousness of manifestations.

Determination: It is regularly hard to recognize sorrow as an essential state of mind issue in a patient with a general ailment since it might be seen as auxiliary to the medicinal disease itself[2].

Accurate finding can likewise be a test as a result of the cover of side effects, for example, weight reduction and weariness, which happen in despondency just as in numerous medicinal ailments, for example, diabetes, malignant growth, and thyroid illness. The regular mental, conduct, and physical side effects related with sorrow incorporate, however are not restricted to, uneasiness, low confidence, diminished fixation, absence of intrigue or delight, decreased profitability, social withdrawal, cerebral pains, gastrointestinal issues, and heart palpitations.

Findings:

Pharmacotherapy: Pharmacotherapy for sadness should comprise of intense treatment up until the best clinical reaction or abatement is accomplished (typically 6-12 weeks) and continuation treatment for a further a half year to avoid backslides. Some of the time, upkeep treatment will proceed for quite a long time or years if there should be an occurrence of intermittent or persevering issue[3]. Rates of backslide are about twice as high when energizer drug is stopped before the finish of the continuation stage so adherence is significant.

In picking a stimulant, the essential consideration doctor ought to consider the symptom profile of the prescription, cost, the patient's age, the nearness of comorbid ailments, inclination, previous history or reaction/non-reaction to the upper, current meds and potential medication sedate collaborations, and the danger of lethality in overdose.

Medications: Particular serotonin reuptake inhibitors or SSRIs are the most broadly utilized class of antidepressants. They work by expanding the degree of serotonin in the cerebrum[4]. Unlike MAOIs and TCAs, SSRIs don't essentially influence norepinephrine levels in the mind. SSRIs likewise have less and milder symptoms.

First-line antidepressants incorporate particular serotonin reuptake inhibitors (SSRIs), serotonin-norepinephrine reuptake inhibitors, mirtazapine, bupropion, agomelatine and vortioxetine. Different antidepressants, for example, tricyclic antidepressants (TCAs) and monoamine oxidase inhibitors (MAOIs) are viewed as second-line and third-line, individually, because of their fairness and wellbeing profile.

Symptoms:

- Weight addition or misfortune
- Headache
- Insomnia
- Agitation
- Restlessness
- Sexual brokenness[5].

SNRIs may expand circulatory strain, particularly at high portions. Hypertension brought about by SNRIs might be overseen by lessening the portion of the SNRI.

TCAs are related with various cardiovascular (heart and veins) impacts, for example, orthostatic hypotension and anomalous pulses and rhythms. Orthostatic hypotension may prompt dazedness, falls, and breaks. Orthostatic hypotension might be overseen by diminishing or suspending the TCA portion, expanding salt admission, or treatment with steroids.

Psychotherapy:

Psychological Therapy: Cognitive treatment is the possibility that our musings can influence our feelings. Subjective treatment encourages patients to figure out how to distinguish regular examples of negative reasoning, called psychological bends and to transform those negative idea designs into progressively positive ones, subsequently improving the patient's state of mind[6].

Social Therapy: Behavioral treatment is a kind of psychotherapy that spotlights on changing undesired practices. It utilizes the standards of traditional and operant molding.

Intellectual Behavioral Therapy: Because psychological treatment and social treatment function admirably together to support melancholy and uneasiness issue, the two are regularly consolidated in a methodology called subjective conduct treatment (CBT)[7].

Persuasive Behavior Therapy: Dialectical conduct treatment is a sort of CBT. Its primary objective is to show the patient aptitudes to adapt to pressure, direct feelings, and improve associations with others. This sort of psychotherapy additionally consolidates care rehearses from Buddhist customs.

Psychodynamic Therapy: Psychodynamic treatment depends on the suspicion that downturn can happen on account of uncertain–generally oblivious–clashes, regularly starting from youth. The objectives of this sort of treatment are for the patient to turn out to be progressively mindful of their full scope of feelings[8].

Relational Therapy: Interpersonal treatment is a sort of treatment that spotlights on over a wide span of time social jobs and relational connections. During treatment, the advisor by and large picks a couple of issue regions in the patient's present life to concentrate on.

Discussion

Wretchedness is the second most regular interminable condition (after hypertension) treated when all is said in done restorative practice. Significant sadness is basic in the essential consideration setting. In the last article of this arrangement, we delineate the way to deal with the administration of gloom in essential consideration. Psychotherapy has been demonstrated to be as successful as antidepressants for gentle to direct significant gloom. Antidepressants ought to be begun at a sub remedial portion to evaluate averageness, at that point bit by bit expanded until an insignificantly powerful portion is accomplished. Aside from pharmacotherapy and psychotherapy, the executives of melancholy ought to incorporate overseeing stressors, connecting with social and network support, managing disgrace and segregation, and overseeing accompanying comorbidities.

Conclusion

The best types of psychotherapy are those with organized and brief methodologies, for example, subjective social treatment, relational treatment, and certain critical thinking treatments. Notwithstanding the psychotherapy started, "mental administration" must be coordinated in the meantime. Drugs, for example, antidepressants ought to be recommended with psychotherapy. Patients, who live with sadness, and their family and companions, have huge difficulties to survive. Essential consideration doctors can give humane consideration, significant instruction, mental checking, social help, consolation, and support for these patients and their friends and family.

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Conflict of Interest: None declared.

Ethical Approval: Not applicable

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Emergence of ADHD among Young People: A Review Article

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Abstract

Consideration deficiency hyperactivity issue (ADHD) is an unending conduct issue described by industrious hyperactivity, impulsivity, and carelessness that debilitates instructive accomplishment as well as social working. Its conclusion is made by finding out whether the youngster's particular practices meet the demonstrative and factual manual of mental issue IV-updated criteria. Its etiology is as yet vague yet late examinations propose that hereditary qualities assume a noteworthy job in presenting helplessness. Comorbidity with mental issue, for example, tension issue, gloom, oppositional resistant issue and lead issue; and with explicit learning inability isn't extraordinary. In spite of the fact that drug functions admirably much of the time of ADHD, ideal treatment requires coordinated therapeutic and conduct treatment. Mental instructive intercessions in school can help increment the effective working of influenced youngsters and improve their scholastic execution. Practically 50% of influenced kids keep on demonstrating huge indications of the confusion into pre-adulthood and youthful adulthood[1].

Keywords: *ADHD, etiology, mental issue.*

Introduction

For more than 100 years it has been recorded that a few kids can have over the top and hindering hyperactivity, impulsivity, and mindlessness. In 1902, the English pediatrician George Still displayed a progression of three addresses to the Royal Society of Medicine portraying 43 youngsters from his clinical practice that were regularly impervious to train, who indicated minimal inhibitory volition, had difficult issues with continued consideration and couldn't gain from the outcomes of their activities. He recommended that these critical social issues were because of a hidden neurological shortfall and not brought about by nature. in any case, it was not till 1968 that the demonstrative and measurable manual of mental issue (DSM) of the American Psychiatric Association initially named this clinical issue as hyperkinetic motivation issue (DSM-II). As more up to date clinical research rose, the name changed to a lack of ability to concentrate consistently issue (DSM-III) in 1980, and inevitably to consideration shortage hyperactivity issue (ADHD) (DSM IV) in 1994[1].

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Materials and Method

Family doctors should start an assessment for ADHD when a youngster presents with indications that incorporate scholastic underachievement and disappointment, troublesome homeroom conduct, absentmindedness, poor confidence, or issues with setting up or keeping up social relationships. The conclusion of ADHD depends on clinical discoveries and is made by learning whether the tyke's particular practices meet the DSM IV-R criteria. These criteria characterize three subtypes of ADHD:

1. ADHD fundamentally of the scatterbrained kind (ADHD/I)
2. ADHD fundamentally of the hyperactive-indiscreet sort (ADHD/HI)
3. ADHD, joined sort (ADHD/C).

A youngster meets the demonstrative criteria for ADHD by documentation of:

1. Nearness of at any rate six of the nine practices portrayed in the distracted area (ADHD/I), or, in any event six of the nine practices depicted in the hyperactive/indiscreet space (ADHD/HI), or six of the nine practices depicted in the two areas (ADHD/C), and these practices ought to happen ''frequently'' and to a degree that is maladaptive and conflicting with the kid's formative level.
2. Nearness of these practices in at least two settings (for instance, at home and at school) for at any rate recent months;
3. Nearness of certain manifestations of ADHD before 7 years old (history from guardians);
4. Clear proof of clinically critical impedance in scholastic or social working, or in both;
5. These manifestations not happening solely over the span of an unavoidable formative issue, schizophrenia, or another insane issue, and worse represented by another psychological issue (for instance, a disposition issue or a nervousness issue)[1].

What causes ADHD?: There is nobody single brought together hypothesis that clarifies the etiology of ADHD. Later utilitarian MRI cerebrum studies show that the turmoil might be brought about by atypical working in the frontal projections, basal ganglia, corpus callosum, and cerebellar vermis. Pharmacological investigations have additionally involved days guidelines of frontal sub cortical cerebellar catecholaminergic circuits (dopamine and norepinephrine synapse frameworks) in the pathophysiology of the turmoil (Table 1 and Table 2). Family studies have given solid proof that hereditary qualities assume a noteworthy job in presenting powerlessness to ADHD. Studies have shown that low-birth weight and psychosocial difficulty (for instance, extreme parental strife, low-social class, encourage arrangement) are inclining danger factors for ADHD. Also, babies destined to moms who devour liquor or smoke during pregnancy are in danger for ADHD[1].

Table 1: Environmental risks that have been most commonly studied in relation to ADHD[2].

Pre- and perinatal factors	Environmental toxins	Dietary factors	Psychosocial adversity
Maternal smoking, alcohol and substance misuse *Risk but not proven causal risk factor*	Organophosphate *pesticides* *Risk but not proven causal risk factor*	Nutritional deficiencies eg zinc, magnesium, polyunsaturated fatty acids *Correlate not yet proven risk factor*	Family adversity & low income *Correlate not yet proven risk factor*
Maternal stress *Risk but not proven causal risk factor*	Polychlorinated biphenyls *Risk but not proven causal risk factor*	Nutritional surpluses eg sugar, artificial food colourings *Correlate not yet proven risk factor*	Conflict/parent–child hostility *Correlate not yet proven risk factor*
Low birth weight and prematurity *Risk but not proven causal risk factor*	Lead *Risk but not proven causal risk factor*	Low/high IgG foods *Correlate not yet proven risk factor*	Severe early deprivation *Risk, likely causal risk factor*

Findings: The three medicines that have been approved as being fundamentally powerful for ADHD seem to be: (1) prescription administration, (2) social treatment, and (3) a mix of the two methodologies

1. Medication the executives of ADHD: To accomplish enhancement of the center ADHD side effects, prescription administration is better than social treatment. MPH and atomoxetine are the two medications which are as a rule as of now recommended and their adequacy in diminishing the manifestations of ADHD is very much reported. Meds are not prescribed for use in youngsters who are beneath 6 years old.
2. Behavioral treatment: Parents are instructed by therapists or social specialists to accomplish reliable and positive connections with their influenced kid. They are instructed how to fortify positive practices by recognition or by utilizing every day possibility

outlines (star or 'glad face' graphs), how to quench negative practices by dynamic disregarding, and how to successfully rebuff for unbearable practices.

Parent preparing is the sole treatment for youngsters with ADHD who are beneath 6 years old.

Table 2: Candidate genes with the most consistent meta-analytic evidence for association with ADHD[2].

Gene name	Codes for	Variant	Risk allele	Pooled odds ratio
Dopaminergic genes				
DRD4	Dopamine D4 receptor	VNTR in exon 3	7-repeat	1.33 (Smith, 2010)
		Polymorphism in promoter region	5-repeat	1.68 (Li et al., 2006)
			T allele	1.21 (Gizer et al., 2009)
DRD5	Dopamine D5 receptor	Dinucleotide repeat in 5′ flank	148-bp allele	1.23 (Gizer et al., 2009)
DAT1	Carrier protein involved in dopamine reuptake	VNTR in intron 8	3 repeat	1.25 (Gizer et al., 2009)
		Polymorphism in 3′UTR	G allele	1.20 (Gizer et al., 2009)
		VNTR in 3′UTR	10 repeat	1.17 (Yang et al., 2007)
Serotonergic genes				
5HTT	Carrier protein involved in serotonin reuptake	5HTTLPR polymorphism in promoter region	Long allele	1.31 (Faraone et al., 2005)
HTR1B	Serotonin 1B receptor	Polymorphism in exon 1	G allele	1.11 (Gizer et al., 2009)
Other				
SNAP-25	Protein involved in neurotransmitter release, synaptic plasticity and axonal growth	Polymorphism in 3′UTR	Not known	1.19 (Faraone et al., 2005)

VNTR, variable number tandem repeat; UTR, untranslated region.

3. Combined treatment: Optimal treatment of ADHD requires incorporated medicinal and social (joined) treatment. Although consolidated treatment does not yield essentially more prominent advantages than prescription administration for center ADHD side effects, it lessens the all out day by day required drug portion and the related non-ADHD side effects viz. indications of tension and despondency, and oppositional/forceful practices; and accomplishes positive working results for friend collaborations, parent–tyke relations, and perusing accomplishment. Ongoing exploration proposes that joined treatment may help forestall the advancement of future mental issue[1].

Age group mainly affected: In age bunch over 19 years we see that there are all the more Predominantly unmindful sort pursued by transcendently hyperactive-imprudent than joined. Comparative pattern is found in age bunch 13-18, where overwhelmingly scatterbrained sort is most extreme, while joined and prevalently hyperactive-incautious have proportionate number of cases.

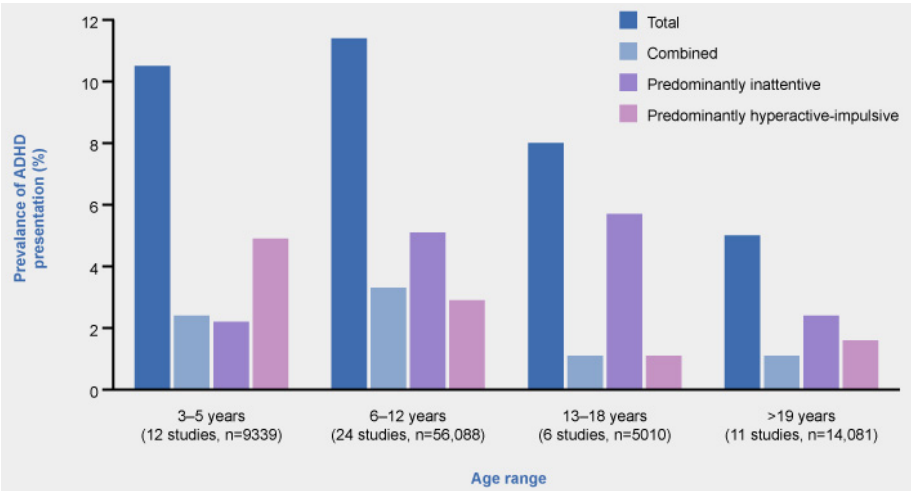


Fig. 1: Prevalence of ADHD in different age groups[3]

Discussion

Immaturity may realize a decrease in the over activity that is regularly so striking in more youthful kids, yet distractedness, indiscretion, and internal eagerness stay real challenges. A twisted feeling of self and an interruption of the ordinary improvement of self has been accounted for by youths with ADHD. Moreover, unnecessarily forceful and standoffish conduct may create, including further issues (fig 4). An investigation by Edwards et al inspected youngsters with ADHD and oppositional insubordinate issue (ODD), which is characterized by the nearness of notably resistant, rebellious, provocative conduct and by the nonattendance of increasingly serious dissocial or forceful acts that abuse the law or the privileges of others. These adolescents appraised themselves as having more parent-high scholar struggle than did network controls. Expanded parent-adolescent clash was additionally revealed when guardians of young people with ADHD did the rating exercise. Also, a study of 11–multi year olds demonstrated that those with hyper kinesis were twice as likely as the general populace to have ‘’a serious absence of friendship’’. Young individuals with ADHD are at expanded danger of scholastic disappointment; dropping out of school or school, high school pregnancy, and criminal conduct Driving represents an extra hazard. People with ADHD are effectively occupied from focusing on driving when going gradually, however while driving quick may likewise be risky. It has been demonstrated that, contrasted and age coordinated controls, drivers with ADHD are at expanded danger of criminal traffic offenses, particularly speeding, and are viewed as to blame in more car crashes, including lethal ones. The danger of such occasions was expanded further by the nearness of attending ODD. In any case, it has been proposed that treatment may positively affect driving aptitudes[4].

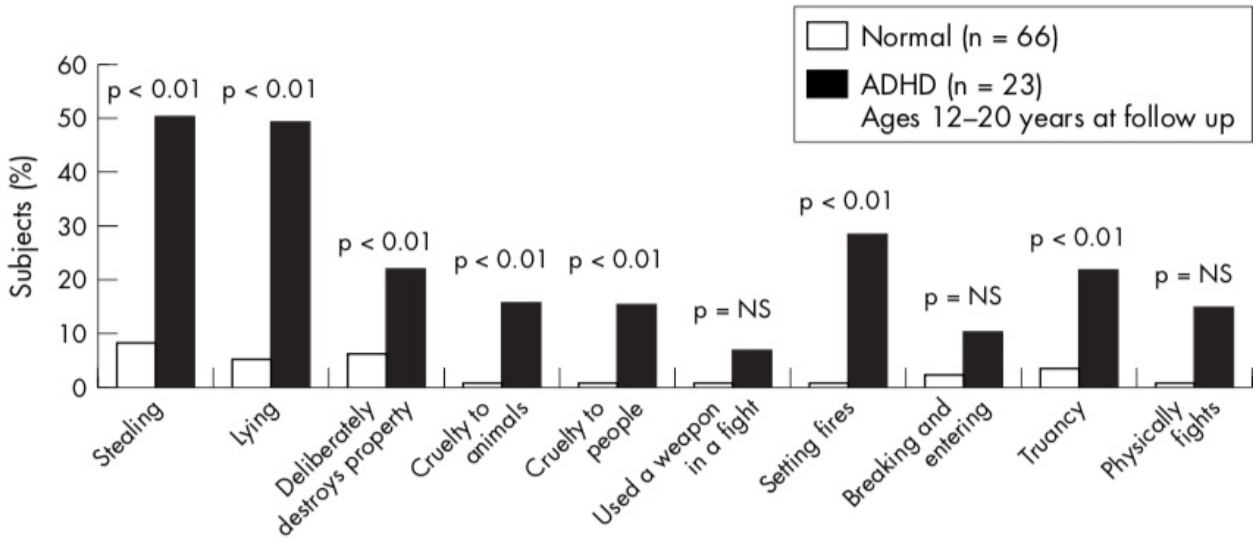


Fig 2: Antisocial behaviour in adolescents with ADHD. Data primarily represents outcomes in those with conduct disorder[4].

Conclusion

In synopsis, there is solid proof of an acquired commitment to ADHD, in spite of the fact that non-acquired elements that reasonable incorporate natural dangers and chance occasions (counting again hereditary changes) are likewise significant. There is no single reason for ADHD and the hazard factors that have been recognized so far have all the earmarks of being non-explicit. That is, dangers, for example, chromosomal micro deletions (e.g., VCFS), enormous, uncommon CNVs, extraordinary low birth weight and rashness seem to influence a scope of various neurodevelopment and mental phenotypes. Hereditary dangers likely likewise incorporate different regular quality variations of little impact measure that presently can’t seem to

be recognized, with the conceivable special case of a couple dopaminergic qualities. With the expenses of DNA sequencing dropping, there is probably going to be an expanding center around distinguishing uncommon hereditary variations, including basic variations, for example, CNVs and other uncommon changes with bigger hazard impacts. In spite of the fast advances in hereditary qualities, there is as yet a requirement for further investigation into ecological dangers. Albeit numerous variables are related with ADHD, various structures are expected to test which are causal.

The most grounded proof identifies with the connections between ADHD/ADHD-like practices and generally uncommon extraordinary afflictions, explicitly outrageous rashness, exceptionally low birth weight, fetal liquor disorder and an example of practices related with institutional hardship in the early years. Less is thought about hazard factors that alter ADHD results. One exemption is the relationship among COMT and reserved conduct in ADHD that is all around duplicated now and features that social issues in those with ADHD may have various birthplaces to social issues when all is said in done. In total, the accessible proof goes some path towards featuring bunches who are at higher hazard; explicitly the individuals who have a family ancestry of ADHD and additionally neurodevelopment or learning issues, and the individuals who have been presented to the natural difficulties depicted before. Nonetheless, none of these dangers, including the hereditary ones, give tests or biomarkers of ADHD. It is trusted that, later on, improved ID of ADHD hazard variables and pathways will expand our comprehension of the so far obscure pathogenesis of ADHD and make ready for improving analysis and treatment[5].

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Anthropological Concepts in the Development of Masticatory System

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Abstract

Teeth play a fantastic role in the line of mammalian evolution. Apart from being covered in one of nature's hardest substances so that it can take anything a million years of geology can throw at it, a tooth's 3D shape is a phenomenally subtle food processing surface. Much like Charles Darwin found out about the beaks of finches, different types of teeth have an evolutionary history as well. Darwin found that the birds' beaks were specially shaped depending on the type of food they ate. Short, sturdy beaks belonged to finches that needed to crack nuts to get nutrition, while long and pointy beaks were used to poke into the cracks of trees to find juicy insects to eat.

Some of the most noticeable changes in the evolution of the genus have been in the dentition and the jaws which support them. In general, living people have smaller teeth and less robust jaws than people living 25,000 years ago. Neanderthals, from perhaps 120,000 and becoming extinct in Europe after 30,000 years ago, had unusually large incisor and canine teeth, together with several other unique dental features. The oldest British hominin fossil teeth, at about 500,000 years ago, from the Boxgrove site in Sussex, were more significant still. In order to understand such differences, it is essential to see the teeth in the context of their use during life.

Keywords: *Anthropology, Evolution, Dentition, Masticatory System.*

Introduction

In a typical non primates: dog, sheep or hedgehog, the facial skeleton projects in front of cranial region of skull. During primate evolution facial skeleton bent gradually more downwards until in man it lies below overhanging frontal region of cranium. Erect posture in humans. The arms and hands have become freed. The manipulation of food and other objects and defense, offense, and so forth, utilize primarily the hands, rather than the shortened jaws[1].

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The large size of the human brain also relates to a rotation of the orbits toward the midline. This results in a binocular arrangement of the orbits, a feature that complements finger-controlled manipulation of food, tools, weapons, and so forth. The absence of a long, protrusive muzzle does not block the close-up vision of hand-held objects[2].

Complete orbital rotation into a forward-pointing direction,however, has also caused a marked reduction in the interorbital part of the face. This is significant, because the area involved is the root of the nasal region, and the result of man's close-set eyes is a narrow nose. Reduction in nasal protrusion is accompanied by a more or less equivalent reduction of the jaw. The downward rotation of the olfactory bulbs and the whole anterior cranial floor by the enlarged frontal lobes of the cerebrum has caused a corresponding downward rotation of the nasomaxillary complex. Facial rotation has led to the development of the humanmaxillary

sinus beneath the orbital floor and above the shortened maxillary arch. Because of its adaptation to facial rotation, the humanmaxilla is uniquely rectangular, rather than triangular like that of most other mammals. It is a distinctively shaped upper jaw.An orbital floor has also been added to the humanmaxilla because the middle and lower parts of the face have been rotated to a position beneath the eyes[3].

Evolution of Jaws and Joints: The first vertebrates did not have jaws. These are collectively referred to as the "Agnatha" (a=without, gnath=jaws), or jawless fish. There is a general trend to reduce the number of pharyngeal arches over evolutionary time.

Placoderms, an extinct group of early fishes, had 7 arches. The first arch was lost. Their new 'first' arch became the mandibular arch that formed jaws. The upper half of the mandibular arch became the palatoquadrate cartilage, the lower half became the mandibular or Meckel's cartilage. At about the same time in the fossil record there appears several major groups of fishes, in these groups, the jaws were formed by components of arch #1 and #2. Arch #2 is called the hyoid arch (upper half = hyomandibular cartilage, lower half = hyoid cartilage)[4].

Amphibians: Some arches are lost in adult amphibians while others are modified. In amphibians, the hyomandibular cartilage became the stapes in the middle ear. The hyoid apparatus supports the tongue and larynx. With the loss of gills, associated dermal bones that connected the head to pectoral girdle was lost creating an independent neck region[5].

Reptiles and the evolution of the secondary palate and middle ear ossicles: Reptiles invented the secondary palate that allows us to eat and breathe at the same time. The reptile line that led to mammals substantially increased bite force by ultimately redesigning the articulation of the jaw joint. This in turn led to the development of the malleus (hammer) and incus (anvil) ossicles in the middle ear[6].

The secondary palate: Fish have good noses. They smell by passing water through a loop located on their snout. The loop does not connect to the mouth cavity. The lobe finned fishes (Sarcopterygii) breathed atmospheric oxygen. One of the consequences of air breathing is that the olfactory loop became redirected. Instead of exiting back to the outside environment, the loop turned and entered the anterior margin of the mouth cavity, forming the internal nares. Thus, these fish could breathe by bringing the tip of their snout to the surface. This saved energy and allowed air breathing to be less conspicuous to predators[7].

Amphibians inherited this anatomy. Because the internal nares are at the anterior margin of the mouth, amphibians have to hold their breath while they eat. Amphibians can use cutaneous gas exchange until the prey is swallowed. Reptiles, with their hardened, dry skin do not have that luxury. Any reptile that did a better job of eating while breathing would be favored by natural selection.

Over evolutionary time, the fossil record shows a second shelf of bone forming across the roof of the mouth. Over evolutionary time, first the premaxilla bone, then later, the maxilla bone, then finally the palatine bone all extended a shelf from each side of the jaw and met in the middle. This shelf formed a separate passage for air from the external nares. Over time, the internal nares entered the mouth further and further toward the throat. This shelf is the secondary palate. We know it in humans as the hard palate[8,9].

Evolution of TMJ: In reptiles generally, including the now extinct early synapsid reptiles that gave rise to mammals, the jaw joint is formed by the articular (lower) and quadrate (upper) bones. The joint was a simple hinge at the posterior of the jaw. The jaw closed putting even pressure along its margin therefore, the force exerted on the joint was in proportion to the bite pressure. In mid to late synapsid reptiles, the dentary bone (lower jaw) increased in size as muscle and bite force increased, but force on the joint decreased[10]. This was because muscle insertion points shifted to allow greater jaw mobility. The looser the joint became, the more control synapsids had over specialized processing of food along regions of the jaw margin. The articular and quadrate bones at the jaw joint became smaller and more loosely associated with the dentary. The coronoid process of the dentary bone formed to accommodate these changing forces. Ultimately, the jaw joint shifted from aarticular-quadrate joint to a dentary-squamosal joint. The condyloid process formed to create a new articulating surface[11].

Freed from jaw mechanics, selection pressure favoring perception of sound took the evolutionary opportunity of the articular and quadrate bones adrift at the margin of the jaw joint and incorporated them into the middle ear. The articular became the malleus

(hammer) and the quadrate became the incus (anvil). Humans, and all mammals, have these bones to this day.

Evolution of Socket or Attachment of Teeth[12]: Four method of attachment of teeth in animal world:

1. Fibrous
2. Hinged
3. Ankylosis
4. Gomphosis

Fibrous attachment: Seen in sharks and rays. The teeth are fixed by the means of fibrous bands to the submucosa of the fibrous membrane which covers the jaws.

Hinged Attachment: The hinged teeth occur in the centre and front of the mouth and those around the periphery of jaws being attached by anchylosis. Three main fishes have to be discussed as they have different types of hinge attachments.

1. Angler
2. Hake
3. Pike

1. **Angler:** This fish has 2 rows of teeth an outer anchylosed and inner hinged row. A hinged tooth is supplied posteriorly by fibrous elastic ligament, while its anterior free edge rests upon a buttress of bone. The teeth bent towards the throat, the hinge compresses and teeth return to their original positions upon the force being removed.
2. **The hake:** Hake teeth is composed of vasodentine, which requires a rich blood supply and the vessels pass from the tooth in a backward direction and enter the bone attachment about the rotating axis in the posterior hinge which has 2 parts.
   - A. **Calcified elastic part** of hinge which prolong downwardsto the bone of attachment of the lingual surface of dentine (outer area of dentine-no blood supply)
   - B. **Uncalcified fibrous part** of hinge which lies in front of the calcified, elastic portion. Between two part of hinge is a triangular area containing interlacing fibres - elastic in nature. The labial edge of base of teeth - thickened and rounded-adapted for resisting shock. This edge is at higher level - than the lingual edge and fits upon a buttress of bone. So that tooth cannot be bent outward without injury to lingual hinge.
3. **Pike:** The hinged teeth of pike sit anteriorly on a small pedestal of bone - but posterior hinge does not possess elasticity. In pike teeth (osteodentine) , the central trabeculae do not calcify but remain soft and elastic-responsible for returning the teeth to their erect posture when backward pressure isreleased[13].

Anchylosis Attachment: When a tooth is fixed to the jaw by calcified tissue it is said to be anchylosed. There is no intervention of fibrous or uncalcified tissue.

Eel fish: The teeth of the Eel rest upon little cylinder or cups of bone of attachment and is described as "Acrodontanchylosis".Here dentinal tubules do not fuse with bone of attachment, but little fibrous "annular ligament" surrounds the base of tooth and allows a slight movement.

Mackerel: Teeth are slung up between the plates of the jaws by means of osseous trabeculae which pass between the inner sides of the alveolus and outer sides of teeth, the bases of latter resting upon nothing hard, the attachment is pleurodont.

Gomphosis (attachment in sockets): Seen in man, mammalia, reptiles and in some fish eg: saw fish, pristis. In man, mammals and crocodile, a membrane (alveolar dental membrane) exists between the tooth and the socket of bone in which the tooth is situated. Our field exists today due to excellent remodeling capacity of the PDL and alveolar bone in gomphosis type of attachment

Anthropologists and dentists: Future Presprctive: Following 10000 years, dental anthropologists, will have a field day with our fossilized teeth. In the event that they break down our finish science, they'll have the option to figure out which of us grew up as vegetarian and which didn't. Maybe they will be shocked to see that people from a similar population had such contrasts in diet. It is almost certain, they'll interpret these contrasts in habits as a characteristic expansion of our evolution– our brain permits us social adaptability, including the versatile capacity to eat assorted nourishments. Future anthropologists will likewise be astonished by the degree of our dental issues. A couple of instances of dental disorders exist in the human fossil record, yet today we are regularlyaffected by malocclusions (when teeth don't meet up effectively), third molar impactions, caries, periodontitis and other dental diseases that will leave their imprints in our remaining parts[14].

Research findings may also draw upon the possibility of "developmental anomalies"–that the chasing and assembling diets of our predecessors didn't set us up for the quick convergence of delicate and sugary foods that we eat today. Basically, we are not adjusted to the cutting edge Western eating routine. The nourishments our tracker gatherer precursors ate were hard to bite and did exclude refined sugar. Delicate nourishments don't animate jaw development during youth, prompting malocclusions, and sugary food sources give situations to caries-making microscopic organisms flourish[15,16].

Truth be told, by removing bacterial DNA from calcified plaque in antiquated teeth, one gathering of anthropologists found that caries-causing strains of microbes turned out to be progressively regular with the approach of horticulture. These strains particularly thrived in human mouths during the Industrial Revolution, with the primary large scale manufacturing of prepared sugar. Despite everything we're enduring these impacts today[17].

At long last, what will future anthropologists think about the bunch ways individuals change their teeth? In Western societies, individuals make careful arrangements to misleadingly brighten their teeth. As indicated by one examination, directed in the U.K., subjects found more white teeth progressively appealing, particularly in ladies. The specialists recommend that white teeth may fill in as an age marker in human mate decision, with guys inclining toward white teeth as a sign of youth.

Conclusion

The evolution of the human masticatory system is not only related to diet and food processing techniques but also brain size, bipedalism, and speech (language). Appearance of spoken complex language is believed to be the result of the critical change in the human evolution that occurred 40.000 years ago, named "the great leap forward" which resulted in the formation development of human civilization. It has been claimed that the formation of the anatomic basis for the complex speech was the cause of this leap. Variation in size, shape, number, arrangement, and wear pattern of the teeth of man has long been an area of great interest to physical anthropologists. It is important that orthodontist cultivates an anthropologists eye for tooth variation. Since the orthodontist ponders many of these same variables in his daily battle with malocclusion, many aspects of dental anthropology can prove helpful in understanding orthodontic problems and in formulating their successful treatment.

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Oral Submucous Fibrosis: Interdependance on Pernicious Habit

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Abstarct

Arecanut, a main integrant in betel leaves is usually a great contributing factor for change in the biology of oral mucosa. This change leads to degradation of collagen fibre and increase in hyalination of mucosa. Oral submucosais commonly affected. So, its named as oral submucous fibrosis. Furthermore, its a long-term inflammation of abutting epithileum of oral mucosa which can lead to a precancerous condition. Oral submucous fibrosis results in change in structure as well as function of oral cavity. Decrease in interincisal distance associated with trismus which directly affects over all health. However, it not only targets oral cavity but also the associated areas of it. Increasing consumption of Arecanut can be fatal also. Youths are the prey of such condition. This article basically aims in describing cause ,method of invasion and consequences of oral submucos fibrosis. Various signs and symptoms are shown by the patient and grading it into severity is required. Early detection can give a good prognosis but late detection can be fatal. Morbidity and mortality is totally dependent on a person's pernicious habit.

Keywords: *Oral submucous fibrosis, Arecanut, Abutting epithelium, alkaloids, flavonoids, blanching.*

Introduction

Oral submucous fibrosis (osmf) is a long-term enervative and lame condition of Rima oris. Such a state is always analogue with abutting epithelial reaction which abide by change in the collagen consistencies with degradation of membranous tissue commencing to stiffness of buccal mucosa and neighbouring structures followed by trismus[1]. According to Pindborg, it is also accompanied with vesicle formation in mucosa. WHO involved in and coined oral submucosa fibrosis as 'a slow progressive disease in which fibrous bands in oral mucosa, ultimately leading to severe restriction in mouth movement including tongue'[2]. Chronic use of Arecanut causeoral submucous fibrosis, which is a premalignant condition[3]. Such habit is prevalent in South Asia[4]. Pernicious habit like chewing of tobacco with combination of Arecanut lead to peak rise in malignant condition of oral mucosa[3].

Aetiology: Packet gutkha, pan masala, mawa etc. has a warning on wrapper ' injurious to heath' but it is preferred most as it provides a sense of being well, it increases body temperature, a sense of quivering, vigilance, acceptance to hunger, reaches peak of vigour and determination to work[4].

Exact a etiology is unknown. The suggested factors are[5,6]:

1. Chronic irritation from Betel nut and tobacco chewing, Slaked lime, Chillies
2. Nutritional deficiency
3. Defective iron metabolism

Mechanism: Arecanut contains alkaloids and flavonoids as main ingredient. Alkaloids consists of arecoline, on hydrolysis produce arecaidine. Along with it, alkaloids have guvacine and guvacoline. Both arecaidine and guvacine, guvacoline increases the proliferation of fibroblast with rapid collagen synthesis. On the other hand, flavonoids includes tannin and catechin inhibits the Collagenases leading to reduced breakdown of collagen[7]. Alkaloids and flavonoids have a major impact on oral mucosa progressing to oral submucous fibrosis. Pronounced hyalination of abutting epithelium, there is obliteration in blood supply causing muscle fatigue and degeneration with limitation of mouth opening.

Clinical Features: The initial signs and symptoms of oral submucous fibrosis is redness along with gradual limitation of mouth opening which shows blanching of

buccal mucosa. Moreover, due to advanced state of oral submucous fibrosis, vesicle formation starts with rupture of it burning sensation is felt in oral mucosa. Increase in fibroblastic activity, vascular supply reduces causing white patches in the affected area. Deposition of fibrous band causes difficulty in check retraction. It looses its elasticity and patient finds difficulty while blowing whistle or inflating balloon. Stiff buccal mucosa with firm Rimaoris, patient is unable to maintain oral hygiene progressing to future dental problems. Sometimes it affects tongue and uvula. Patient finds difficulty in protruding tongue. Hockey stick appearance of uvula is often observed in oral submucous fibrosis. If it affects gingiva, stippling may be absent.

Classification was given based on clinical feature and severity[9].

According to pindborg JJ (1989):

- **Stage I:** Inflammation of oral cavity includes erythematous mucosa, vesicle, mucosal ulcers, melanotic mucosal pigmentation.
- **Stage II:** vesicles and ulcers heals leading to its fibrosis which is the hallmark of this stage. Blanching of oral mucosa is primarily detected. More the older lesion, more is fibrosis and blanching seen with palpable circular and vertical fibrotic band in buccal mucosa and around the lips. Marble like appearance of the mucosa because of thickening of mucosa. Reduction in mouth opening, stiff and small tongue.
- **Stage III:** It is the advanced stage. There is decrease in speech efficacy and sometimes it affects hearing ability.

Preventive Measures: Patient is advised to quit habit as soon as possible. Counselling of patient is done properly. Further patient is asked to avoid Arecanut. Progression of the lesion can be stopped by public awareness. Selling of gutkha and paan should be banned. Social awareness programs should be conducted.

Management: Various treatment modality has been put forward.

Nutritional Support: Micronutrients and vitamins are the main support system for management of such condition. Sometimes high protein and calories is also required[10].

Immunomodulatory Drugs: Glucocorticoids can be administered locally in the lesion or systemic route can be chosen. The glucocorticoids have ability to prevent or suppress inflammatory reaction by decreasing fibroblastic proliferation and decreasing fibrosis[10].

Physiotherapy: The most common method to overcome fibrosis is forceful opening of mouth with blowing action and heat therapy can also be done.

Local Drug Delivery: Hyalurodinase, Collagenases, antifibrotic drug can be injected locally which breakdown the intercellular cement substances and also decreases collagen formation[11].

Surgical Management: Submucosa resection of the fibrotic bands and replacement with partial thickness skin or mucosal graft can be done.

Conclusion

'An ounce of prevention is worth a pound of cure'[12]. Oral submucosa fibrosis is a fast and widespread premalignant condition of our society. Arecanut with slaked lime is a deadly combination which targets malignancy by altering the healthy tissue. Public awareness and proper diagnosis should be carried out with a strict follow up so that we can manage such situation.

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Ethical Permission: Approved

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Hemisected Mandibular Molar a Strategic Abutment: A Case Report

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Abstract

Every patient wants to maintained his dentition remain in oral cavity. Most commonly mandibular first molar is affected by dental caries and periodontal disease. These teeth are regarded as key of occlusion in prosthodontics because of wider periodontal surface areas. So, these teeth have to preserve in dentition to prevent shortened dental arches. It is better to extract the diseased part of teeth and remaining part of teeth should restored with proper treatment plan. A multidisciplinary approach was planned to fabricated the prosthesis.

Keywords: *Hemisected Mandibular Molar; dental caries and periodontal disease; prosthetic treatment.*

Introduction

Loss of Posterior tooth often leads to mesial drift of molars, lack of centric stops, loss of masticatory function leads to shorten dental arch. This requires prevention and maintenance measures.[1,2] Inrecent advancement of dentistry, there are multidisciplinary approach to save the decayed and periodontally compromised tooth rather than extraction. Management of periodontally involved molars with extensive decay is challenging cases for the dentist toretainsuch tooth.[3] A multidisciplinary approach like periodontal, prosthodontic and endodontic was made to retain such teeth.[1,4] Resection means excision and removal of any segment of the tooth or a root, with or without its accompanying crown portion. Various resection procedures described are: root amputation, hemi section and bisection.[5] Hemi sectionis a conservative procedure in which as much as healthy original tooth structure should retained[6,7]. Compiled results of several studies have shown that the average failure rate of hemisected tooth supported prosthesis is close to 13.1% which is comparable to the failure rate of implants. According to Buhler et al, hemisection should be considered an option prior to molar extraction, as this procedure can ensure cost savings with good long-term.[8,9] Following the several factors enlisted by Weine for hemisectioning case like. Weine[5,10] listed the following indications for tooth resection.[10]

Periodontal indications:

1. vertical bone loss involving only one root of multi-rooted teeth.
2. furcationinvolvement.
3. proximity of roots of adjacent teeth, which preventing adequate hygiene maintenance in proximal areas.
4. Severe root exposure due to dehiscence.

Endodontic and restorative indications:

1. Perforation of the pulp chamberor pulp canal of one of the roots of an endodontically involved tooth which cannot be instrumented.
2. Vertical fracture of one root
3. Furcation involvement due to sub-gingival caries, traumatic injury etc.

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Contraindications:

1. Teeth available for idealbridge abutments as alternatives to hemisection.
2. Inoperable canals in root to be retained.
3. fused root.

The success of treatment depends upon the above factors.

Case Report: A female patient age of 52 years reported to department for management of endodontically treated tooth in relation to 36(Figure 1a). On clinical examination tooth was endodontically treated with grade 1 mobility. There was a probing depth of 9 mm on distal root of the tooth. On radiographic examination, severe angular defect was evident in relation to distal root and tooth was root canal treated (Figure 1b). So, the distal root should be hemisected. The treatment plan was explained to the patient and consent obtained.

Periodontal Phase: Under local anaesthesia, a gingival crevicular incision was given and full thickness muco-periosteal flap was reflected to provide for easy visualisation and instrumentation. There was angular bony defect along the distal root which was curetted and debrided (Figure 2a. A tapered fissure diamond bur was used to split the mesial and distal half of the tooth and distal root was extracted. Patient was called for prosthesis after one month (Figure 2b). A conventional fixed partialdenture was planned in which retained mesial half of tooth nos. 36 and 37 were the abutment with sanitary pontic.

Prosthodontic Phase: Diagnostic impression made with alginate. Zelgan Plus DENSPLY. A all metal crown tooth preparation was done in relation to 37 and distal root of 36.Putty wash impression made with putty and light body (AquasilLv Ultra, Smart Wetting Impression Material, Dentsply; Figure 3). Temporization done in indirect technique(FREEGENOL TEMPORARY PACK; GC Corp., Tokyo, Japan, Figure 4). A master cast was obtained and die sectioning was done and wax pattern was fabricated using inlay wax. (GC INLAY WAX MEDIUM). The entire wax pattern assembly was casted with induction casting machine (BEGO FORNAX T CENTRIFUGAL CASTING MACHINE). The temporary restoration was removed and the fixed component were cemented with resin modified glass ionomer cement (FujiCEM; GC America, Alsip, USA) over the prepared teeth(Figure 5, 6). Postoperative instruction was given and reviewed periodically to assess the prognosis of the treatment.

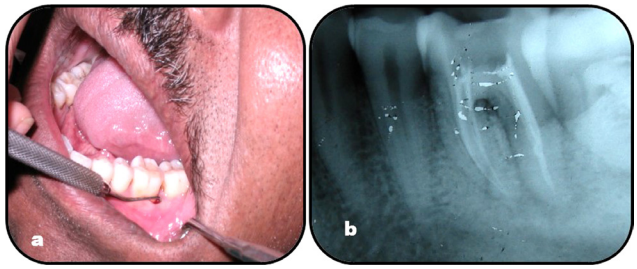


Figure 1a, b. Preoperative images

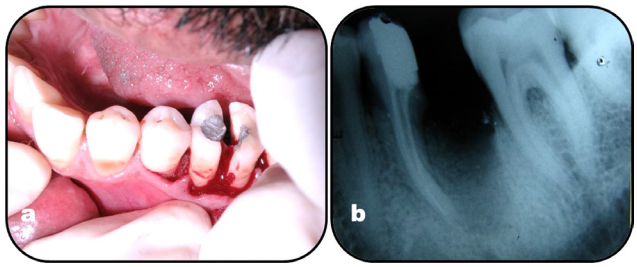


Figure 2a. Hemisection; 2b. Post-Surgical Radiograph



Figure 3. Hemisected Molar



Figure 4. Tooth Preparation



Figure 5. Temporization



Figure 6. Final Prosthesis

Discussion

According to the literature the effective treatment options for molars with furcation involvement is root resectivetherapy.[11] There are many studies about survival rate and success of root resected teeth. Some of them stated that over 10 years, 30% of molars subjected to root resection failed.[12] Others suggested that survival rate of such teeth is more than 90 Carnevale et al. found that survival rate of both root resected tooth and nonresected tooth in 10 years of observation were 93% and 99%, respectively.[13] Zafiropoulos et al. found that majority of both dental implants and root resected teeth had not any complication within at least 4 years maintenance care. However, complication of root resected mandibular molars was more than dental implants.[14]

Choosing a molar for root resective therapy is influenced by several factors including root morphology, attachment of the remaining root, the divergence of root and location of the furcation.[15] Mesial root is more difficult to prepare because its concavity is toward the distal. Biomechanical, endodontic, and periodontal factors are the main reasons of failure in restorations of root resected teeth. In a study of Langer et [16]failure reasons of the root resected molars were as follows: root fracture (75%), endodontic treatment failure (18.4%), dissolution of the cement (7.9%), and periodontal problems (26.3%).Patients motivation is highly required for careful planning and execution of treatment in hemisection procedure. If all these criteria are met, hemisection surgery is an alternative for tooth extraction and its replacement with either a dental implant or aconventional fixed/removable prosthesis.

Conclusion

A conservative approach has been the main stay of dentistry and medicine for the preservation of natural body structures. Hemisection is considered to be a viable and conservative alternative to tooth extraction and implants. It conserves bone and also serves as a natural abutment and prevents the necessity of preparing and cutting adjacent teeth for use as abutments. However, proper case selection and preoperative evaluation are the cornerstones for a successful procedure.

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Ethical Permission: Approved

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Adenoid Cystic Carcinoma of Sub-mandibular Gland: A Case Report

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Abstract

Adenoid cystic carcinoma is an uncommon salivary gland tumor with high rate of recurrence and metastasis. The unpredicted clinical course is countered-back by regular clinical follow-up for at least >15 years. The traditional treatment protocol is surgery with postoperative radiotherapy to optimize local metastasis. Research has been carried out to understand the molecular biological process of the tumor that can cure the patients at high risk of recurrence. This article presents a case of sub-mandibular gland malignant neoplasm of a 34 years male patient.

Keywords: *Adenoid cystic carcinoma (ACC), Salivary gland neoplasm.*

Introduction

Adenoid cystic carcinoma (ACC) is a slow growing but aggressive tumor with a remarkable capacity of recurrence. It was first reported by three French scientists (Robin, Lorain, and Laboulbene) in two different articles published in 1853 and 1854.[1]Billroth in 1859 termed this lesion as "cylindroma". Spies in 1930, coined the term adenoid cystic carcinoma, in a discussion of tumors of the basal cell variety.[2] It is characterized by proliferation of ductal or luminal epithelium and myoepithelial cells in cribriform, tubular, solid and cystic patterns.[3] According to recent AFIP (Armed Forces Institute of Pathology; 4th ed.; 2008) grading ACC is the fifth most common malignant epithelial tumor of the salivary gland after mucoepidermoid carcinoma, adenocarcinoma, acinic cell carcinoma and polymorphous low-grade adenocarcinoma.[4] The uniqueness for ACC is because of two reasons, first is its prolonged duration for clinical presentation even after local or distant metastasis; and secondly, its tendency to spread along peri-neural root.[5,6] ACC have been known for its high survival rate for 10 to 15 years,even with pulmonary metastases.[7]

ACC is biologically aggressive and impulsive tumors of the head and neck that has tendency to recurred even after radical excision has been performed.[8] Radical or supra-radical surgery were previously practiced treatment method, but gradually it was observed that only surgery may not improve survival rate nor it may reduce local recurrence rates, as compared with conservative surgical approach followed by postoperative radiotherapy.[9]

Incidence of ACC accounts for approximately 10% of all salivary glands neoplasms. Parotid gland is the most common site of origin followed by submaxillary and the accessory glands in the palate and tongue. ACCs occur mostly in fifth and sixth decades of life but rarely occurs during third decade of life with more female predilection than male.[10]

Case Report: A 34 years male patient reported to our Institute of Dental Sciences, Bhubaneswar with pain and swelling on his right submandibular gland region since one and half year. On examination the patient was moderately built and normal gate. Patient had an average oral hygiene not associated with habit.

Extra oral examination showedbilaterally asymmetric face with a single well-defined growth

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present on the superior border of right side of the mandible, size measuring of 2cm x 2cm in its greatest dimension, oval in shape,slightly tender on palpation and firm in consistency. [Figure-1] There was no colour change of the overlying skin. Bimanual palpation reveals the swelling is inside the submandibular salivary gland. The associated submandibular lymph nodes are slightly tender on palpation, mobile and firm in consistency. There were no relevant intraoral findings recorded. [Figure-2] On the basis of clinical findings we suspected the growth to be any benign tumor of the oral cavity, and further investigation were carried out.



Figure 1: Extra oral view



Figure 2: Intra oral view

The routine blood profile had no relevant result and all the parameters were in normal range. The aspiration cytology showed numerous cohesive cell cluster & few dislocated cells bordered by rim of hyaline basement membrane material. Cells were round to oval, with sparse cytoplasm & bland nuclear chromatin. Variable amount of stromal basement material was seen in clumps. These findings were in accordance with monomorphic adenoma of tubular variant.

The submandibular gland was surgically removed with a conservative approach to maintain aesthetics of the patient. Histopathological findings showed the tumor mass arranged in the connective tissue in a Swiss cheese pattern. Numerous cystic spaces were present with some of them filled with eosinophilic coagulum like material. High power magnification showed individual tumor cells which were monotonous in appearance with nuclear hyperchromatism. Few areas of solid pattern of tumor cells were also evident. Areas of basophilic stained glycosaminoglycan within the lumen was also seen. Intervening connective tissue fibrous septa at places were separating tumor masses. Occasional areas of hyalinisation were seen. The tumor cells were seen invading into the lymph vessels. Hence a final diagnosis of adenoid cystic carcinoma of cribriform pattern was given. [Figure-3].

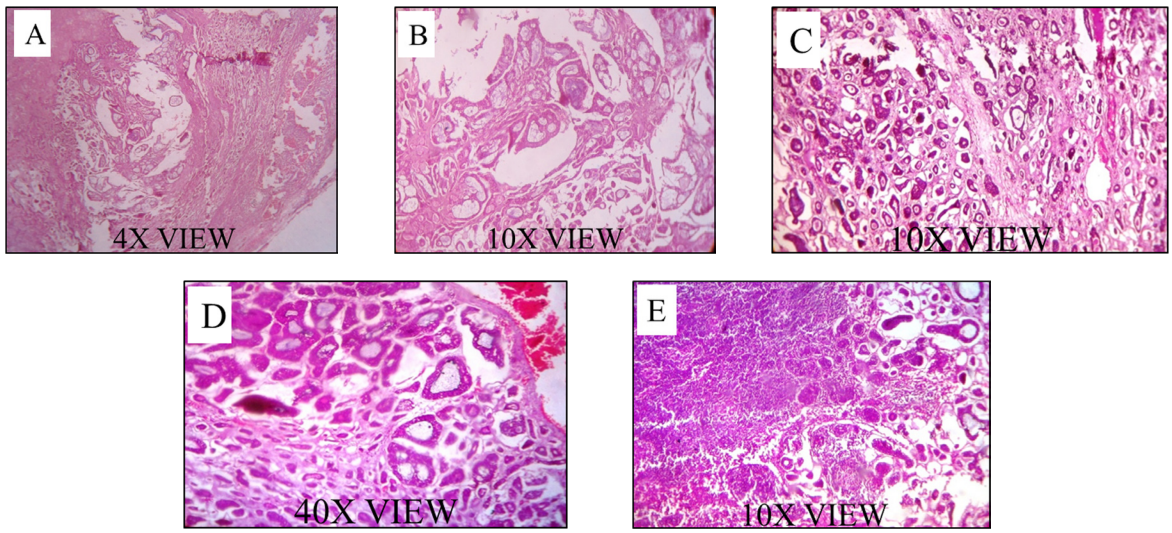


Figure 3: Photomicrograph A–Cribriform pattern in scanner view, B–Cribriform pattern with cystic degeneration, C/D–Classic Cribriform pattern, E–Cribriform pattern infiltrating into Lymph nodes.

Discussion

Ten to fifteen percent of salivary gland neoplasms are malignantthat occurs with a higher frequency in the submandibular gland.[8] Patients are 54 years old on average, when first diagnosed with salivary gland ACC.[5]The minor salivary glands and the sub mandibular gland are common site for ACC where the sublingual and parotid glands are less frequently affected. Nevertheless ACC may be found inthe aero-digestive tract, lachrymal glands and sebaceous glands.[11]Sometimes it may appearas a primary intraosseous tumors of the maxilla and mandible.[12]

ACC originates from the intercalated ducts of the mucous secreting salivary glands. The electron microscopy imaging shows that it arises from the cells that have potency to differentiate into epithelial and myoepithelial cells.[13] ACC affecting major salivary gland were reported clinically at 2- 4cm at its greatest dimensionand intraoral lesion arerarely larger than 3 cm at its greatest dimension.[14,15] The lesion is non-capsulated and infiltrative which invadesinto underlying bone. There is less incidence of cervical metastasis.[16]Maxillary lesion mayinvade to the base of the skull which leads to death.[17]

There are three ACC morphologic patterns, often mixed: tubular, cribriform, and solid, with the last one having a more aggressive clinical course. The cribriform pattern is most commonly found.[16] The similar layer of the myoepithelial cells of salivary ducts form the tubular pattern to the lesion. The solid variantconsists of solid epithelial cell islands with central areas of necrosis. This solid type has a poor prognosis than the cribriform type. Wide surgical excision with margins is choice of treatment. Post-surgical radiotherapy is advised to avoid chance of metastasis.[9] Histopathologically the small tumor cells are basophilic, hyperchromatic with a densely granulated nucleus and occasionally shows mitotic figures.[19] Available treatment possibilities for ACC include surgical therapy, radiotherapy, chemotherapy and combined therapy (surgery and radiotherapy, radiotherapy and chemotherapy). Only surgical excision or radiotherapy isolation may be unsuccessful to eliminate the possibility of recurrence and metastasis in surgical margins, as well as the to the cervical lymph nodes, bones, lungs and brain.[20] Considering the aggressiveness of the tumor the combination therapy has mostly been recomended.[21,22] Long-term follow up of patients with adenoid cystic carcinoma is mandatory to reduce any chance of loco-regional recurrence and metastasis.

Conclusion

Adenoid cystic carcinoma should be considered as an aggressive lesion in maxilla and mandible and especially when it is involving palate. It should be considered in the differential diagnosis of minor salivary gland tumors. The early detection of the lesion is mandatory, in order to ensure a more favourable prognosis and better quality of life.

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Ethical Permission: Approved

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Dental Implants: Contemporary and Ancient Facts

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Abstract

The antiquity of the advancement of dental implants is an amusing and mesmerizing travel talk through time, Since the establishment of human life, man have been using dental implants in some way or the other form to compensate the missing tooth. The first known to be used dental implants is certified to Mayan inhabitants somewhere around 600 Ads. In those times they outclassed the substitute of mandibular teeth by making use of pieces of shells as implants. Evidence of radiographs that were taken in the 1970's of mandible of Mayan reveals formation of compact bone around the foreign implants placed- these bones astonishingly appears so much like that is visible around implant blade. In early Honduran culture around 800 A.D. an implant made up of stone was first constructed and used.

Keywords: *Dental Implants; Contemporary Facts; Ancient Facts; History.*

Introduction

The basic value implant treatment has focused on since the very beginning of its existence is patient presented. The primary and ultimate aim of a modern dental setup is to preserve the patient to normal contour function, speech, aesthetic, comfort and health, in case of a carious affected tooth or any missing tooth. Due to the lack of advancements in earlier times such as adding abutments traditional dentistry could not achieve this and the design for restoration is always directly related to the present oral health. Implant dentistry is considered unique in a way as it has the ability to achieve this milestone irrespective of atrophy, injury or disease of the stomatognathic system. The uniqueness of implant dentistry is that it can provide a range of supplementary abutments.[1]

The modification of the prevailing edentulous space and ultimate prosthetic design is further modified by augmentation of the bone. As an outcome of several continuous research investigative tools, planning of the treatment, designs of implants, techniques and the materials to be used, the success rate has now been increased for rehabilitation of many complex and complicated situations. Ultimately this has resulted in several treatment options for partially edentulous patients as well as the completely edentulous patients. Each and every creation even simply an art, building, or teeth it needs the ultimate result to viewed and carefully planned for an optimal outcome. To get an ideal design of the prosthesis, the preexisting structural anatomy is thoroughly evaluated to find out if a removable or fixed prosthesis is needed. An axiom of treatment of implant is to meet the basic patients' needs which includes easy, most predictable and most cost-effective treatment which will meet the patient esthetic needs as well as personal desires.[2]

In the beginning days implant dentistry was thought of to be the treatment alternative to treat the edentulous jaw. On the other hand,today, it is clinically and scientifically proven standard of care for replacing edentulous area. The requirement for the long-term success of the implant reinforced treatment concept is the development and re-evaluation of standard treatment protocols based on the patient's request. New criteria for "evidence-based implant dentistry" is evaluated in order to confirm expected accomplishment.[3]

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Each and every treatment rule can be looked upon as the result of nonstop learning process where to avoid failures rules are setup. The earlier implant protocol is based on pragmatic data that were introduced 25 years ago with the initial of this continuing learning curve. Earlier in those time no clinically or scientifically based results were accessible, or if any they were not very satisfying. The firstly suggested healing period of three months in the mandible, and six months in maxilla have confirmed to assurance uninterrupted osseointegration clinically. Nevertheless, there is no proof that safe osseointegration may not have been achieved after a decreased healing time.[4]

According to Branemark set al the historical protocol for implant was constructed on the basis of serial preconditions which today is thought to be restrictive. Earlier during those times, the primary implications for placing a dental implant was to restore the edentulous area, mandible that is atrophied with attaching segments for removable over dentures. A single tooth replacement was never under consideration as an option for treatment. The information on critical risk assessment and perfect suggestions were not existing.[5]

Biomechanical and biological constraints capable of quickening hard and soft tissue incorporation were abandoned. Over several years,the site of implant preparation was mainly focused from a surgical point of view in a treatment protocol, with the healing of implants guaranteed. As the process of osseointegration process is restricted to some weeks, the reactions occurring in the cellular level during the functional loading phase was now taken as more significantly important viewing a long-term victory.[6]

Historic background of the dental implants: Way back over 1350 years prior when Branemark started to work with the titanium, the Mayan civilizations have shown to have used the almost first known endosseous implants. In 1931 archeologist while excavating a Mayan burial site in Honduras discovered a mandible originating from Mayan, back dating about 600 A.D. The discovered mandible was believed to be ageing in her early twenties of a women, had shells pieces of tooth shaped placed in her sockets of lower incisor teeth which as missing. Earlier it was believed that the shell implants were placed after the death, but later on in 1970 a Dental academic of Brazil Professor Amadeo Bobbio inspected the mandibular specimen and subjected it to multiple radiographs. He discovered compact bone formation around the two shell implants, from which he concluded that they were placed when she was alive.[7]



Figure 1. Site of Mayan Burial the First ever implant made up of Implant

In 1950 investigation was being held in Cambridge University, England to study the in vivo blood flow. These workers developed a technique of fabricating a titanium compartment which was then implanted into the rabbit's ear. A Swedish orthopedic surgeon, in 1952, PI Branemark was fascinated in learning bone healing and regeneration and embraced a Cambridge designed 'rabbit ear chamber' for use in rabbit femur. After several months of study, he tried to retrieve this exclusive chamber from rabbits and found that he could not remove them. Branemark detected that bone had deposited in so near with titanium that it effectively glued to the metals. Branemark further went on many studies with animal and human subjects which all established this uniqueness of titanium.[8]

Although he had originally considered that first work should center on knee and hip surgery, Branemark finally decided that mouth was more accessible for continued clinical observation and high rate of edentulous space in broad population offered more subjects for widespread study. He termed clinically observed adherence of bone with titanium as 'osseointegration'. In 1965 Branemark, who was by then professor of anatomy at Gothenburg University in Sweden, placed the first titanium dental implant into a human volunteer named Gosta Larsson. This patient had a cleft palate defect and required implants to support a Palatal obturator. Gosta Larsson died in 2005, with the original implants still in place after 40 years of function.[9]

Synchronous autonomous studies in the United States by Stevens and Alexander have led to in the year

1969 United Stated patent filling for dental implants of titanium.Branemark published several studies for over next 14 years on the effective use of implants are of titanium in dental implantology till he joined hands for commercial partnership in the year 1978 with the Swedish defense company before AB for the expansion and advertising of dental implants made by him. With Before (later to become Nobel industries) as the parent company, Nobel pharma AB (later to be renamed Nobel Biocare) was founded in 1981 to focus on dental implantology. To the present day 7 million Branemark systems have been placed and hundreds of other companies produce dental implants. The majority of dental implants now available are shaped like small screws with either tapered or parallel sides. They can be placed at the same time as the tooth is removed by engaging with the bone of the socket wall and sometimes also with the bone beyond the tip of the socket. Current evidences suggest that implants placed straight into an extraction socket have comparable success rates to those placed in the healed bone. The success rates and radiographic results of immediate restorations of dental implants placed in fresh extraction sockets (the temporary crowns placed at the same time) have been shown to be comparable to those obtained with delayed loading (the crowns placed weeks or months later) in carefully selected cases. The Osseointegration concept evolved closely coupled with the design of a cylindrical titanium screw with a specific surface treatment to enhance its bio acceptance.[10]

The first of the parameters on what is thought of a successful implant treatment among the strict guidance of the scientific community was held in the year 1982 at the conference that was held in Toronto in Osseo integration in Clinical Dentistry. Only after this conference the initiation of acceptance started and in North America the use of Dental Implants started. From then many local as well as exotic system of implant system have been emerging. Many of these design are similar to that of "Branemark Titanium Screw". Still many companies have improvised and the research has still been continuing to place an impact in the designs and concept of the upcoming implants.[11]

Branemark external hex was the first amongst the abutment system that is anti-rotational. It was reformed to prevent the abutment rotations those are present on the body of implants, but initially it was designed only for allowing the engagement of a driver in seating the implant. The small stature of the hex, and the dearth of an abutment with correct tolerances, for the rotation of single tooth made it a poor option in stabilization. To add, the abutment with flat to flat connection resulted in the entry of bacterial components as well as various fluids into the implant connection. This thrusting act for the duration of repeated loading eventually leads to stress in the retaining screw. The loosening of the screw was widespread in the design with letting down of the components of the prosthesis and the volume of soft issue. Screw loosening became endemic in this design with failure of the prosthetic components and soft tissue volume. The move from external to internal attachments initiated as a means to diminish the abutments loosening as they were being exposed to clinical and functional forces. Reduction of Crystal bone remodeling, was marked radiographically, was a clinical outcome of this kind of change.

Percolation of liquids occurs in the abutment implant surface during the regular micro-mobility that it results in bacterial penetration. Matrix metalloproteinase (such as elastase, collagenase, gelatinase) is result of chronic inflammation which lead to the breakdown of soft tissues and the osteoclastic activity potentiation. The reduction of micro leakage at the interface of an abutment/implant was the main challenge.[12]

Recent researches in the field of dental implantology is emphasizing on the use of materials made up of ceramics like Zirconia (ZrO2) in the processing of the dental implants. Zirconia is a metal that is close to titanium mentioned in the periodic table, it is the dioxide form of the element Zirconium with somewhat similar properties of biocompatibility. Even though usually the similar shape as titanium implants, ZrO2 which has been used effectively in surgery of orthopedics since several years, has the benefit of being more cosmetically appealing owing to its bright tooth like color. Nevertheless, clinically long-term follow-up data is needed prior single piece Zirconia implants, then can be suggested in day to day practice.[11,12]

Conclusion

To conclude, the history of the growth and progression of the implants related to dental is a glorious and captivating journey through the course of time. NO one can stop man's inventiveness as followed with years of new research and scholarship. There is a wide range of materials have been used as dental implants starting

from ligature wire made up of gold, ivory to chromium, cobalt to iridium and platinum. Changes involving from modifications in the implants physical structure to changes in coating of surface and treatment of surface of the implants. In the recent scenario coating of Laminan is being used. With days passing by in the studies of dental implant, the materials, forms and the coating in the surfaces is expected to be more precise so as to provide the patient with edentulous arches or area the best possible treatment in future.

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Contour to Conserve: A Justified Way to Practice Dentistry

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Abstract

For the long-term survival rate of dental restoration, the adjacent periodontium must also remain healthy and vice versa. In today world as patients are keen about getting a comfortable, durable and most importantly as esthetic filling, we as dentist are encroaching the gingival crevice are a while giving subgingival margins. In this article we will get a clean idea to give a restorative therapy to the patient while maintaining physiological periodontal health.

Keywords: *Contour; Dentistry; Long-Term Survival; Dental Restoration.*

Introduction

The restorations whether composite class II or V or metal or PFM or all ceramic crown, all should be such that it should prevent caries progression, maintain proper periodontal health and allow the patients to clean the tooth surface properly to avoid plaque accumulation. The relation between the periodontal health and restoration of teeth is intimate and inseparable. In healthy oral condition both epithelial as well as connective tissue attachment contribute to a protection mechanism is a most challenging area where natural tooth penetrates the ectodermal integrity of the body.[1] This junctional area on tooth is called "Dento-gingival Junction" the term as coined by Sicher. The vertical dimension of the dento-gingival junction comprises sulcus depth (SD), junctional epithelium (JE) and connective tissue attachment (CTA). It is physiologically formed at a level dependent on the location of the alveolar bone.[1,2]

Evaluation of Biological width: Firstly, the clinicians should assess the biologic width at the area where the restoration be it simple filling, inlay or onlay or crown. It can be done by two method.

1. By Radiography
2. By using periodontal probes.

Periodontal probe method is also called Bone sounding. Here the topography of the alveolar process is done by penetrating periodontal probe into the anaesthetized soft tissue.[3]

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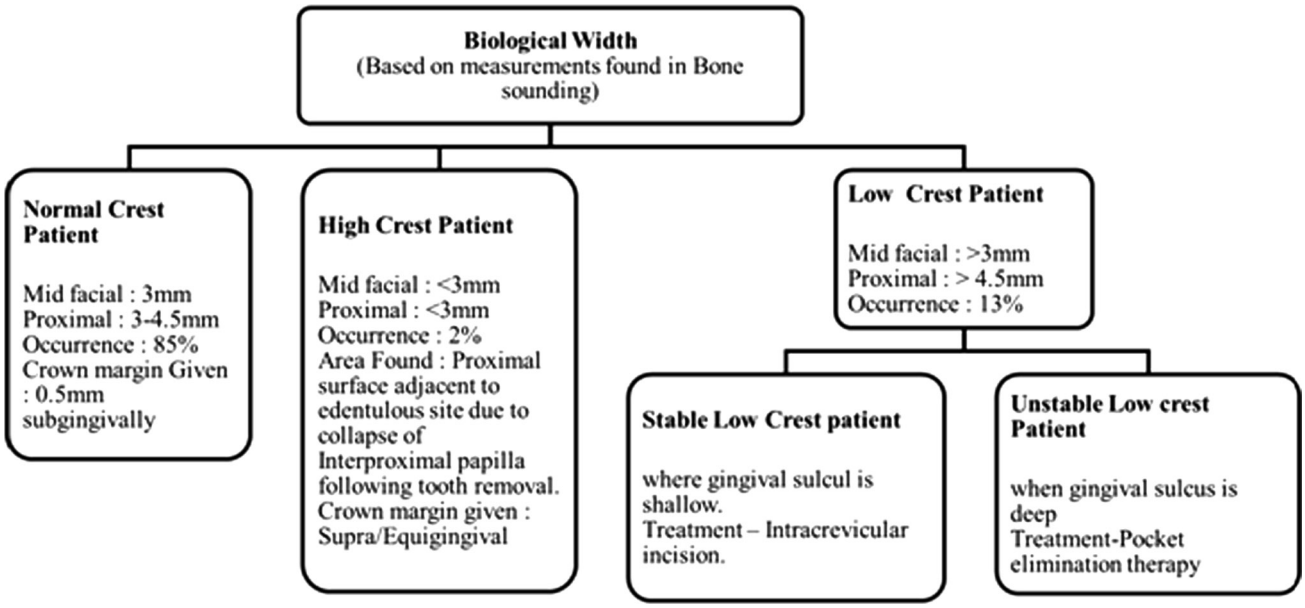


Figure 1. Evaluation of Biological width

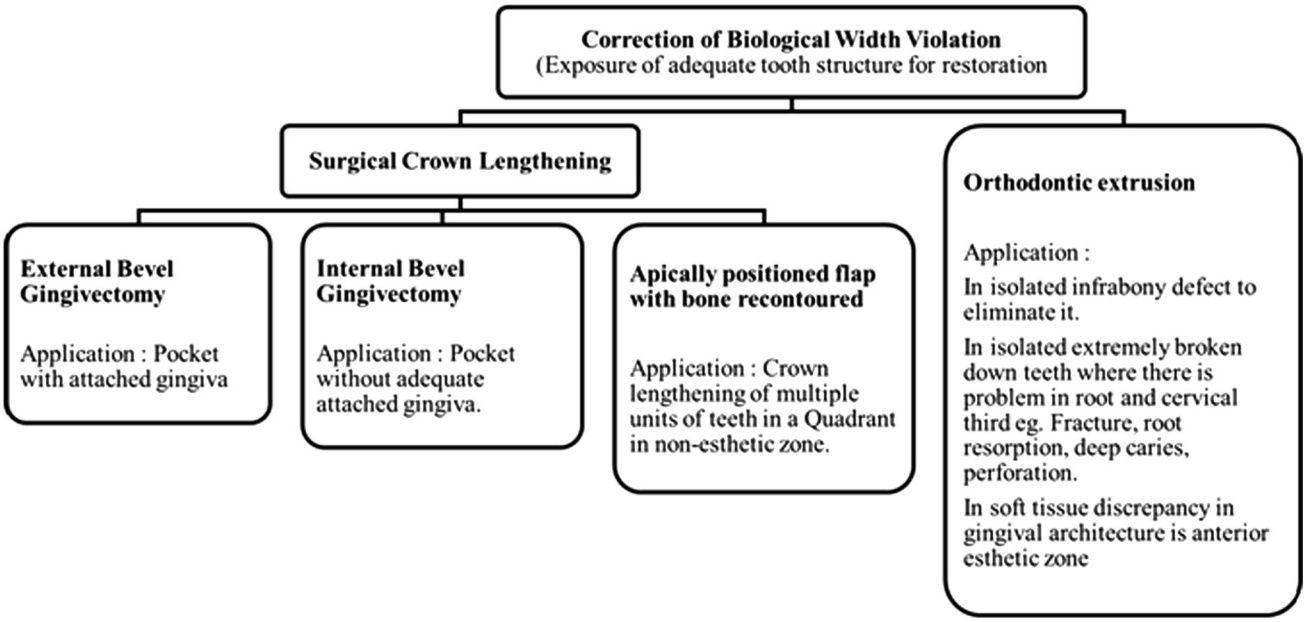


Figure 2. Correction of Biological width

Periodontal restorative interrelationship[4]: 6 Characteristics that are important of restoration from a periodontal point of view:

I. Margin of restoration

II. Contours of restoration/crown

III. Occlusion of restoration/crown

IV. Material of restoration/crown

V. Bridge design of restoration/crown

VI. Procedure involved in restoration/prosthetic dentistry.

I. Margin of Restoration:

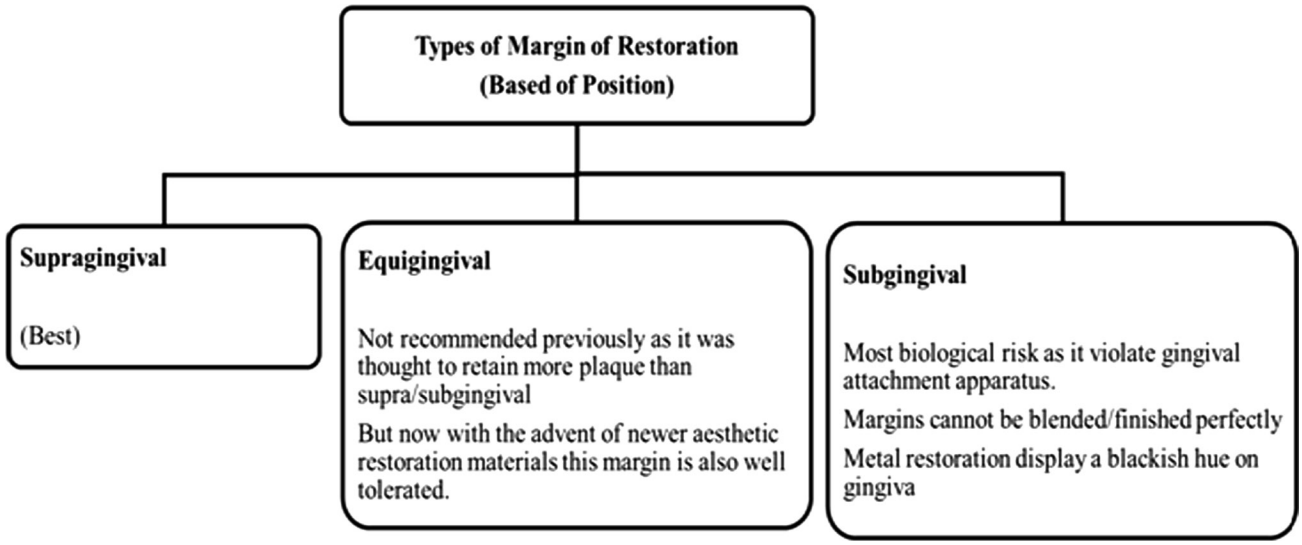


Figure 3. Margin of Restoration

3 Rules for application of subgingival margins:

a. If sulcus probes 1.5mm or less the restoration margin should be 0.5mm below gingival margin specially in esthetic zone

b. If the sulcus probes more than 1.5mm the restoration margin should be placed one half of the gingival sulcus depth. If margin is given below there is change of tissue recession.

c. If the sulcus probes more than 2mm gingivectomy should be performed to lengthen the teeth and create 1.5mm sulcus[5]

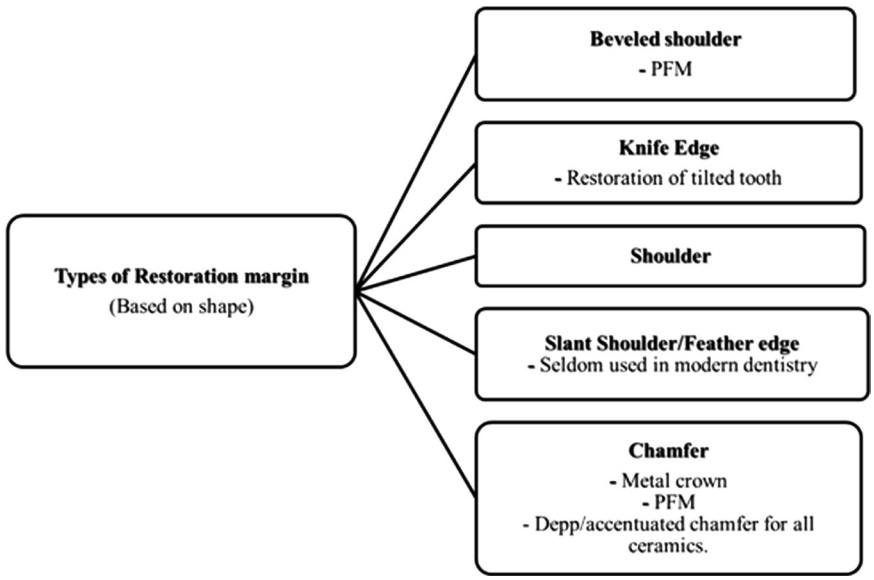


Figure 4. Types of Restoration margin

Beside the position and shape of the restoration margin the factor which plays a critical role in case of inlay, onlay and crowns is the luting material or cement. The dissolution and disintegration of cement causes cluster formation between preparation and restoration leading to plaque accumulation and inflammation.[6]

II. Contour of restoration/crown:

- With the advent of advanced light cured composite materials the proximal contour build-up is done by proper wedging, ultra thin metal matrix band placement and centripetal build-up technique. In this technique the 1st small increment of posterior composite is condensed towards the matrix band → light cured → 2nd small increment for occlusion margin → light cured → 3rd increment for building cusp slopes → light cured. After completion of curing metal matrix is removed and wooden wedge is left in place.
- The buccal and lingual surface of the crown should not be over contoured as it results in creating area where oral hygiene procedure cannot reach to remove plaque. Apparently under contouring is not nearly as damaging to gingiva as over contouring.
- Crown should be given self-cleansing contours. In case of giving crown to bifurcation involved tooth furcation should be "bevelled" from the margin of restoration to occlusal surface. The crown should be "barreled out" to eliminate plaque traps and facilitate plaque control.
- The greatest buccolingual dimension of the crown should not be more than 1mm than the buccolingual dimension of that tooth at cement-enamel junction. Except lower molars and premolars which have larger lingual curvatures.
- The convexity given to the restoration should be gradual and in the cervical third of the tooth. These feathers allow less food entrapment and allow the patient to access to the sulcus and tooth surface for cleansing.
- Contact area of the restoration should be high (directed incissally) and buccal in relation to the central fossa except maxillary 1st and 2nd molar. This created a large lingual embrasure for optimum health of lingual papilla.[7,8]

III. Occlusion: Restoration or prosthetic replacement which does not conform to the occlusal pattern creates excessive forces on the abutment leading to periodontal injury of the opposing tooth, abutment tooth itself and some of the other teeth in the arch also. Reshaping of plunger cusp should be done. Occlusal contour should be developed such that it allows escape of food embrasures.

IV. Materials: Glass ceramics and porcelain veneers offer a clear advantage over other types of restorative materials in maintenance of gingival health.

V. Bridge design: The bridge design with least effect on periodontium is sanitary or hygienic pontic. The ovate bridge is the most hygienic type with best patient acceptance. It is extremely important to remove all excess cement from the sulcus after cementation.

VI. Restorative Dentistry Procedure: Improper placement and use of the retraction cord can result in tissue tearing and inflammation. So, the retraction cord is handled meticulously. Interim restoration should be made such that it does not cause periodontal inflammation and gingival recession. The use of rubber dams, matrix band and polishing discs should be such that it does not injure the tissues. Injudicious tooth separation or orthodontic extraction should be avoided.[9,10]

Conclusion:

The health of the periodontal tissues is dependent on the properly designed restoration and healthy periodontium leads to longevity of the restoration. This accepted truth will help the dentist to deliver a more promising prognosis to the patients.

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Intrusion Arches in Orthodontics

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Abstract

Not all patients with deep overbite should be treated with the same mechanics. Some patients require intrusion of the anterior teeth, while others require primarily extrusion. This article has discussed the principles of incisor and canine intrusion and has demonstrated the use of intrusion springs that are capable of intruding incisors with minimal side effects on the posterior teeth. Six principles must be considered in incisor or canine intrusion: the use of optimal magnitudes of force and the delivery of this force constantly with low-load-deflection springs; the use of a single point contact in the anterior region; the careful selection of the point of force application with respect to the center of resistance of the teeth to be intruded; selective intrusion based on anterior tooth geometry; control over the reactive units by formation of a posterior anchorage unit; and inhibition of eruption of the posterior teeth and avoidance of undesirable eruptive mechanics.

Keywords: *Deepbite, Intrusion. Orthodontics, Segmented arch technique*

Introduction

Most orthodontist come across cases with excessive incisor exposure and increased overbite in their clinical practice. These patients require a comprehensive treatment plan, which establishes how the incisor exposure should be reduced and deep overbite, corrected depending on the cause. Correction of the deep overbite can be accomplished in a number of ways depending on the initial diagnosis and treatment objectives. Deep bite can be corrected by various tooth movements.[1]

Extrusion of the posterior teeth, will result in increased lower facial height, steepening of the occlusal plane, downward and backward rotation of the mandible, resulting in worsening of the class II skeletal relationship. The long term stability of the correction is questionable unless suitable growth occurs. Deep overbite correction by intrusion of anterior teeth offers a number of advantages including, simplifying control of vertical dimension and allowing forward rotation of the mandible. Intrusion of anterior teeth to correct deep overbite may be indicated in patients with unaesthetic excessive maxillary incisor showing at rest position of the lip, and deep mandibular curve associated with long lower facial height. Numerous method have been described for incisor intrusion, and all of the employ the same principle, a tipback bend at the molars, or a V bend in the posterior region of the arch to provide an intrusive force at he incisors.[2]

Utility Arch: Utility arch designed by Robert M. Ricketts in the early 1950's and has been popularized as an integral part of bioprogressive therapy. One of the most versatile auxiliary arch wires that can be used in either mixed or permanent dentition treatment is the utility arch. Utility arch is a continuous wire that extends across both buccal segments, but engages only the 1st permanent molars and four incisors It was developed originally to provide a method for leveling the curve of spee in the mandible but through the incorporation of loops, has been adapted to perform additional functions in addition to incisor intrusion in both arches.[3]

Basic components: Regardless of the presence or absence of loops, all utility arches have a common design, which consist of Molar segments, Posterior vertical segment, Vestibular segment, Anterior vertical segment, Incisal segment.[4]

Molar Segments extends into a tube on the 1st molar. This segment may be cut flush with the end of the tube or may be bend gingival if the utility arch is to be tied back. When utility arches are used in combination with full arch appliances, it is necessary to have auxiliary tubes located in the gingival portion of the 1st molar bands.

Posterior Vertical Segment is formed by making a 90° bend with 142 arch forming pliers. Posterior step typically is 3-4mm in length in the mandible and 4-5mm in maxilla. It is often necessary to place a 3rd order bend at the function of molar segments and posterior vertical segment to avoid impingement of utility arch on adjacent gingiva.[5]

Vestibular segment is formed by placing a right angle bend at the inferior portion of posterior vertical segment. The wire then passes antero-inferiorly along gingival margin.

Anterior vertical segments should be about 4.5mm in length when the utility arch is used in the mandible and about 5-8mm in length, when used in the maxilla. Depth of the maxillary and mandibular vestibules of the individual patients, along with the design of the fixed appliances used during treatment, determine specific length of both vertical segments.

Incisal Segment: Final 90° bend creates the incisal segment that should lie passively in the brackets of anterior teeth.[6]

Wire selection: As advocated by Ricketts, utility arches are fabricated from chrome–cobalt wires. With regard to selection of appropriate size of wire for 0.018" slot appliance, recommended wire for mandibular utility arch is either 0.016" x 0.022" or 0.016" x 0.016" wire. For maxillary arches 0.016" x 0.022" wire is recommended, with 0.022" slot, 0.019" x 0.019" wire can be used in either arch. Generally rectangular wire is preferable to round wire to control torque and prevent unwanted tipping of incisors. [7]

Intrusion Utility Arch: Intrusion utility arch is similar in design to passive utility arch, except that the posterior vertical segments do not lie against auxiliary tube on the 1st molar bracket. Arch is activated to intrude the anterior teeth. Utility arch should produce 60–100 grams of force on the mandibular incisors, force level considered ideal for mandibular incisor intrusion. As with the passive arch, intrusion arch is stepped gingival at the molars, passes through the buccal vestibule, and then is stepped occlusal at the incisors to avoid distortion from occlusal forces. In contrast to the passive utility arch, posterior vertical segment is at least 5mm, anterior to the auxiliary tube of molar.[8]

Intrusion of anterior teeth can be produced in one of the two ways:

1. First the utility arch can be bent passively to fit the existing occlusion. After ligating the utility arch into the anterior brackets, an intrusive force can be produced by placing an occlusal directed gable bend in the posterior portion of the vestibular segment of the arch wire.
2. Bench has advocated an alternative method of activation of utility arch to produce intrusion. This type of activation involves placing a tip–back bend in the molar segment. Tip-back bend causes the molar segments of the arch wire to lie in the vestibular sulcus. Intrusive force is created by placing the incisal segment of the utility arch into the bracket of the incisors; however, placing a tip back bend can occasionally lead to unintentional posterior tipping of 1st molars which in the maxillary arch can be minimized by concurrent use of trans–palatal arch.[9]

Connecticut Intrusion Arch: Connecticut intrusion arch introduced by Ravindra Nanda is fabricated from Nickel–Titanium alloys as it is the material of choice for delivering continuous forces under large activation. These alloys have high memory and low load deflection rate producing small increments of deactivation over time and thus reducing the number of reactivation appointment. [6-8]

Appliance Design: Connecticut intrusion arch incorporates the characteristics of utility arch as well as those of conventional intrusion arch. C.T.A on preformed with appropriate bends necessary for easy insertion and use. Two wire sizes are available 0.016" x 0.22" and 0.017" x 0.025" Maxillary and mandibular versions have anterior dimensions of 34 mm and 28mm respectively. The by pass, located distal to lateral incisors is available in two different length to accommodate for extraction, non-extraction and mixed dentition.[7,9]

Mechanics: C.T.A's basic mechanism of force delivery is a V bend calibrated to deliver approximately 40–60 g of force. Upon insertion the V bend lies just anterior to the molar brackets. Incisor intrusion requires about 50g of force directed apically along the center of resistance. Although the C.T.A is calibrated for this purpose, slight difference in placement may alter the force system during activation. Moment created at the molar will also vary, according to the amount of force at the incisors multiplied by the distance to the molars. These

minor changes can be measured with a spring gauge when the arch is inserted and necessary adjustments can be made to ensure proper force delivery.[10]

Burstone Intrusion Arch: In the 1950's Burstone developed the segmented arch technique, which had different crossection of the wire within the same arch and wires that did not run continuously from one bracket to the adjacent bracket. Burstone concluded that one of the limitations of the continuous arch therapy is its inability to produce genuine intrusion. Basic mechanism of Burstone intrusion arch consist of Posterior anchorage unit, Anterior segment, Intrusive arch spring. To increase the stability of the posterior segment, wires that are .018" x .025" or .021" x 0.25" Stainless steel can be placed following initial alignment and maintained in placed through out treatment. When alignment is completed in the posterior segment, right and left buccal segments are joined together across the arch by means of trans-palatal arch in maxilla and low lingual arch in mandible.[11]

Intrusive Spring: Intrusive arch consist of an 0.018" x 0.022" or 0.018" x .025" wire with a 3mm helix wound 2½ times placed mesial to the auxiliary tube. Curvature in placed in the intrusive arch, so that the incisal portion lies gingival to the central incisors. When the arch is tied to the level of the incisors, an intrusive force is developed. In order that the arch does not increase its length during the activation, a gentle curvature should be placed with the amount of curvature increasing as one approaches the helix. In this way the activated arch wire will appear relatively straight, and as it works out during intrusion arch length will decrease and no anterior flaring is produced.[12]

Anterior Segment: Intrusive spring as not tied directly into the incisor bracket. Anterior alignment arch or anterior segment is placed in the central incisor or four incisors and intrusive arch is either tied labially, incisally or gingivally to the wire.

Tip Back Springs (Intrusion Springs): Originally proposed by Burstone, these springs are made of 0.017" x 0.025" inch. T.M.A wire, upper and lower arches have to be leveled and aligned and rigid stainless steel wire, preferably of 0.017 x 0.025 inch dimension.

Anchor molars should be re–inforced with a T.P.A in the upper and lingual holding arch in the lower arch. The intrusion springs are made from 0.017" x 0.025" TMA wire without a helix or 0.017" x 0.025" stainless steel wire with a helix so that forces can be made optimal for intrusion. Wire is bend gingivally mesial to the molar tube and then a helix is formed. The mesial end of the spring is bend into a hook and is engaged distal to lateral incisor, which according to Burstone is the approximate center of resistance of the four incisors.

Mesial end of the spring lies passively at the height of mesio–buccal fold and spring is activated by pulling the hook down and engaging it on to the arch wire.[7-9]

Three Piece Intrusion Arch: The Three piece Intrusion arch consist of the following parts

Posterior Anchorage Unit: After satisfactory alignment of the pre-molars and molars, passive segmented wire (.017 x .025" stainless steel) are placed in the right and left posterior teeth for stabilization. A precision stainless steel trans-palatal arch (.032 x .032) placed passively between the first maxillary molars consolidates the posterior unit now consisting of right and left posterior units. Canines may be retracted separately and incorporated into the buccal segment.[9]

Anterior Segment: The anterior segment is bent gingivally distal to the laterals and then bent horizontally creating a step of approximately 3mm. The distal part extends posteriorly to the distal end of the canine bracket where it is formed into a hook. The anterior segment should be made of (.018 x .025 or larger) to prevent side effects created by bending of wire during force application.[10]

Intrusion Cantilever: The intrusion cantilever is fabricated from .017 x .025 inch T.M.A. the wire is bent gingivally mesial to the molar tube and a helix is formed. The mesial end of the cantilever is bend into a hook. The cantilever is then activated by making a bend mesial to the helix at the molar tube, such that the anterior end with the hook lies passively in the vestibule. This is then brought down and engaged onto the horizontal portion of the anterior segment. This allows further distal placement of the intrusive forces, that is , lateral to the lateral incisor, so that the resultant forces are made to pass through the center of resistance of anterior teeth. An elastic chain can be attached to the hook to facilitate simultaneous intrusion and retraction or to redirect the forces more parallel to the long axis of incisors.

However to achieve true intrusion of anterior teeth it is always necessary to balance the effective force of intrusion. [11]

Kalra Simultaneous Inrusion Retraction: The K- SIR archwire is a modification of segmented loop mechanics of Nanda and Burstone. It is a continuous .019" x .025" TMA arch wire with closed 7mm x 2mm U loop at the extraction site. To obtain bodily movement and prevent tipping of teeth into the extraction space a 90° V bend is placed in the arch wire at the level of U-loop. This V-bend, when centered between the Ist molar and the canine during space closure, produces two equal and opposite moments to counter the moments caused by activation force of closing loop. An off centered 60° V bend located posterior to the interbracket distance produces an increased posterior clockwise moment on the Ist molar which augments molar anchorage as well as intrusion of anterior teeth. To prevent the buccal segment from rolling mesiolingually due to force produced by loop activation, a 20° anterotation bend is placed in the archwire just distal to each U-loop.[12]

Activation: A trial activation of the arch wire is performed outside the mouth. Trial activation releases the stress built up in bending the wire and thus reduces severity of the V bend. After the trial activation, the neutral position of each loop is determined with the legs extended horizontally. In the neutral positon, the U-loop is about 3.5mm wide and the archwire is inserted into the auxiliary tube of the Ist molar and engaged in the six anterior brackets. It is activated about 3mm so that the mesial and distal legs of the loop are barely apart. IInd premolars are bypassed to increase the interbracket distance between the two ends of the attachment, which increases the efficacy of the off enter V bend.[6-9]

When the loops are first activated, the tipping moments generated by the retracting force will be greater than the opposing moments generated by the V bend in the arch wire. This will initially cause controlled tipping of the teeth into the extraction space. As the loops deactivate and force decreases; the moment to force ratio will increase to first cause bodily and then root movement of teeth. The archwire should therefore be not reactivated at short intervals, but only every 6-8 weeks until all the space have closed.[10-12]

Conclusion

Intrusion of the tooth involves resorption of the bone, particularly around the apex of the tooth. In this movement, the whole of supporting structures are under pressure with virtually no areas of tension. Unlike extruded teeth, intruded teeth in young patients undergo only minor positional changes after treatment. Relapse usually does not occur, partly because the free gingival fiber bundles become slightly relaxed. Stretch is exerted primarily on the principal fibers. A light contentious force, such as that obtained in the light wire technique, has proved favorable for intrusion in young patients.

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Latex Allergy in Clinical Practice: An Overview

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Abstract

The use of latex has been increased in this few years. The medical staff and students appear to be at high risk for latex sensitization. The increased use of latex has led to many mucosal and cutaneous reactions. Allergic to latex is the main allergic occupational for health workers. The prevalence of latex allergy in the general population is only 1%. Latex exposure can be via skin or mucous membrane. Some of the allergens may also be associated with the gloves lubricant powder and can become aerosolized causing respiratory, ocular or nasal symptoms.

Keywords: *Allergic reactions, Latex allergy, gloves.*

Introduction

Latex Allergy is an allergic reaction to certain proteins found In natural rubber latex[1]. Latex protein contains less than 1% of protein. Latex get thoroughly washed during the manufacturing. When they are not washed properly,free latex present on the surface and this free latex are responsible for allergies[2]. When an individual is allergic to Latex, his immune system recognizes latex as a harmful substance and triggers histamine and other chemicals in bloodstream and produce signs and symptoms. Latex can cause type I and type or type IV allergic reactions**.** Contacted with natural rubber latex in dental equipment products must be avoided with patients diagnosed with type I NRL allergy and NRL free products should be used.[1]

Product containing Latex: Latex Gloves, Rubber dam, Rubber file stops, Orthodontic elastics, Rubber mixing cup, Prophylaxis polishing cups, Needle guards, Dappens pot. The most effective way of latex allergy in dental and medical environment is via aerosolized latex protein from powdered latex gloves, which is commonly used as dry lubricant in latex gloves. Persons who have undergone multiple dental surgery have high risk for latex allergy[5]. Persons having direct mucosal contact with NRL devices have a very important route for sensitization to latex in the body. Atopic patients, Dentists and other health care individuals, children with spina bifidia, Rubber industry workers, Florists may develop Latex allergy.[2]

Signs and symptoms of latex allergy: In most of the cases, latex allergy develops after many previous exposures to latex. Symptoms begin within minutes after the exposure to latex containing products. The most severe latex allergy can result in anaphylaxis, a serious allergic reaction including severe breathing difficulties and fall in blood pressure. Allergic skin problems or signs can occur while direct contact with allergic latex proteins in latex gloves products. Direct physical contact with latex product is not needed to have an allergic reaction. Severe asthmatic reactions have been caused by inhaling latex proteins in the air from the powder latex gloves.[3]

Signs and symptoms of Latex Allergy: Coughing, Sneezing, Shortness of breath, Nasal congestion, Runny nose, Nasal or palatal it itching, watery eyes, Dizziness, Hypotension, confusion, Nausea, Vomiting, Hives, Swelling and rashes, Rapid or weak pulse.[4]

Other allergic reactions while using latexare:

1. **Irritant contact Dermatitis:** This is a skin reaction not an allergic reaction. This occurs when a person is exposed to latex powder while wearing latex gloves.
2. **Allergic contact Dermatitis:** This reaction occurs when chemical additives used during manufacturing. Signs of blisters seen in next 24 to 48 hours.

Diagnosis: It requires a thorough history of patient then few tests to Confirm it.[4]

Skin prick testing: The easiest and very low cost. A drop of latex extract is diluted with the saline and is pricked gently in skin by a needle. A wheel and flare reaction will develop in 20 minutes if a person is sensitized. The reaction is graded according to the redness and swelling at that site. The test should have performed by an expert. Also there should be emergency equipment and drugs to treat any emergency allergic reactions. This test can be interfered if a person is taking some specific medicines or having severe dermatitis.[5]

Intradermal skin test: Performed only if skin test is negative. It is more sensitive than skin prick test. It can induce systemic reactions.

Patch test: This test is helpful for differentiating between irritant contact dermatitis and allergic contact dermatitis. This takes for 2 to 3 days. Because this reaction is at peak in 48 to 72 hours. They can be differentiated by onset of action.

Use Test: Test using allergic substances. This test is very difficult to standardize.

In vitro Immunoassay: It is not easily available as skin prick test. This a high cost and Safe test. In this test the patient is not exposed to latex protein.

Treatment: Medicines are available for latex allergy but patient need to have education to avoid latex. If he or she needs a treatment, then they need to use non latex products. But still an individual can come in contact with the latex. An individual need to carry an injectable epinephrine for a severe allergic. If an anaphylactic reaction appears then he needs to attend the emergency room. Doctorsmainly prescribe anti-histamine or corticosteroids for a less severe reaction.[6]

Education: The doctor needs to educate the person about the sensitivity of latex, mechanisms,risk factors and management. Doctor has to say about the alternatives of latex products and should know how to manage the severity of allergic reaction.

Latex and alternative items: Latex items: Surgical gloves, Surgical for examination, Adhesives, Adhesive bandages, Medications vials with use ampules

Non-latex items: Neoprene triblock co polymer, Nitrile gloves, vinyl or nitrile gloves, Non latex adhesives, sterile dressing with tape, Rubber stoppers

Protocol to how to attend latex allergy patient[7]:

1. Take a thorough history for the known latex allergy patient and ask questions like–has the patient ever experienced any adverse effects to balloons, condoms, household gloves or any dentaltreatment. Does the patient have an allergy to foods cross-reacting with NRL like bananas, kiwi, chestnuts, avocados. Has the patient experienced hives, asthma, or hay fever chestnuts as a result of their work, where the latex gloves are used?
2. Verify with the latex allergy tests
3. Label the patient chart or any slip with LATEX ALLERGY.
4. Discard all the latex containing products from the patient's area. Direct or indirect contact can give rise to a severe allergy
5. Strictly the doctor or the physician has to use some latex free products.
6. Educate the patient's family about all the risks and management of latex allergy.

Gloves selection guides:

1. Use non-latex gloves for activities that are not likely to involve contact with infectious material.
2. Appropriate barrier protection is necessary when handling infectious materials. Skin care protocols-Ensure that gloves comply with national and international standard of performance. In market there are gloves for the allergic people like low-protein gloves. Powder-free gloves, Non-latex gloves. But studies show that low-proteins gloves are not appropriate for the latex-free environment.

Conclusion

Natural rubber is manufactured from the sap of and is allergenic to some of the chemicals which are added to during the production. Latex products are found in both the home and workplace such as in form of balloons, carpets, condoms, textiles and medical gloves. Immediate allergic reactions to latex range from pruritusto urticarial, rarely anaphylaxis. Contact dermatitis is usually eczematous and only appears after 24 to 48 hours. Testing of latex is kind of problematic. Interdermal injection can induce anaphylactic shock. Treatment at the beginning is preferred as the environmental levels of allergens rise, as activities in

the surgery continues. A proper education should have given to the patient and to their families. Patient in high-risk group must be diagnosed properly so that proper protocols can be taken. So encourage the patient to use proper skin care to avoid unnecessary irritations.

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Sports Dentistry: An Overview

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Abstract

'Sports Dentistry' is the branch of dentistry that involves treatment of dental athletic injuries and prevention of oral sports injuries. It also involves the compilation and distribution of information on dental athletic injuries and encourages research in the prevention of such injuries. In children, sports activities were found to be responsible for 13% of overall oral trauma. It is emphasized that there is a great need for "Team Dentist" from high schools to specialized teams. In this review, we discuss the relationship between sports and dentistry, and the importance of educating parents, teachers, and children in prevention of injuries related to the sports. Dental trauma in sports is the main connecting waterway between the dentistry and sports.

Keywords: *Sports Dentistry; injuries related to the sports; treatment & management.*

Introduction

A game is derivedfrom old combinations of words that literally mean, "to carry away from work". A sports consists of a normal physical activity or skill carried out under a publicly agreed set of rules, and with a recreational purpose, for competition, for self-enjoyment, to attain excellence, for the development of skill, or some combination of these.[1]

The combined effect of traffic accidents, fighting, along with sportactions have givenconcern of shocking dental injury as a problem of community dental wellbeing.[2] "Sports dentistry" can be defined as the prevention and treatment of orofacial muscular injuries and related oral diseases, as well as the collection and distribution of information on dental athletic injuries and the encouragement of research in the prevention of such injuries. The dentist has avested interest and a professional responsibility to contribute their unique skills in serving special needs of the patient who participate in sport safety measures and therefore it becomes necessary for them to have a thorough information of this upcoming branch of dentistry.[2].

How Dentistry is Related to Sports: For all age groups a physically active lifestyle is important. Reasons to participate in sports and physical activity are many, such as relaxation, pleasure, competition, preservation, socialization, and improvement of fitness and health. Sports participation may carry a risk for injuries, which leads to enduring dysfunction.[3]

Teeth and facial damage are very popular sports education injuries. It has been extensively concluded from several reports, that contribution in sports carries the jeopardy of supporting dental damage,the maxillary central incisor are the most commonly damaged tooth and males are troubled more as compared to females.

With amplified occurrence of orofacial injury in sports, there is a better apprehension for the crisis and long-term worry of orofacial injury and practice of defensive measures like helmet, mouth guards in these sports education.[4]

Incidence and Location: Face is the most vulnerable area of the body and is typically the slightest confined. Of all facial soft tissue injuries, sports-related facial injuries account for about 8%. Approximately 11-40% of all sports injuries involve the look[6]. Some sports injuries result from accidents; others are due to, improper

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tackle, poor training practices and or insufficient warm up or lack of conditioning, and stretching.[5,6]

Prevention of Sports Related Traumatic Orofacial Injuries: Physical fitness, stress reduction, skill development, and team building are among the many positive aspects linked with contribution in energetic and planned sports. Despite these benefits, many a risks exist to those who engage in these endeavor. Face is the most exposed part of the body in athletic competition[1]. Besides, as the prognostic threat factors linked with these injuries are more visibly recognized plus clear, the plan in addition to growth of new defensive devices may add to prospect sporty intersubstitutable

Oral Diseases in Sports Community: Tooth wear or tooth substance loss is becoming an increasingly common problem in athletic group of people. It has been recognized that dental problems are arising from the using up of acidic food and drinks among several spotting groups.

Dental erosion is a non-carious pathologic loss of tooth substance by chemical process. Dehydration reduces in turn its buffering capacity to clear acids from mouth and the salivary flow rate.[8]

Risk Factors for Sport Injuries: For any such unknown and unexpected events, it is firstly important to know, understand and appreciate the various predictive considerations. In this way we can be capable enough to prevent any sort of injury and other loss related to it. Theserisk factors can be collaborate classified as extrinsic and inherent factors.[9]

External factors: External factors are usually derived from any sort of outer source while performing activities like running, jogging etc. They are usually independent of the individual.

These usually results in any sort of stress injury, that usually results from any contact sports[8.]

Intrinsic factors: Intrinsic factors are biologic and psychosocial and depend on the individual. They are the characteristics which are inbuilt within an individual sport participant. The various factors, on which the intrinsic risk factors depend are:

Age: The complex realm of intrinsic factors is strength of body, coordination, physical maturity, healing ability and growth and development are all part of it and mainly are the contributing factors. In another study done we get to know that the danger of wound decrease with rising age and the majority occurs in adolescent and young children.[10]

Sex: The role of sexual category as a possible hazard factor may be an indication of an evident tendency for boys plus men to select additional“contact” otherwise assertively energetic games.[10]

Body size: An increased body size of the participant may enhance the chance of injury in sports in various ways. These include an, increased influence due to greater length of limbs, higher center of gravity and strain on joint unpaid to extra weight. Number of studies done predispose that excessive tallness and heaviness individuals are prone to wound.[10]

Broad mind aptitude: Study recognized an associations tuck between inferior scores on aptitude tests and sports injuries, suggestive of that injury proneness might be due to intelligence.[11]

Protective Equipment for the Prevention of Sports Related Craniofacial Injuries:

Organized sports at the amateur level that mandate the use of helmets, facemasks, and mouth guards during practice and in competition include boxing, football and ice hockey.[12]

Helmets: These are the equipment’s well delineated for the protection of the sensitive areas of the head including the skin of scalp, skull, brain, central nervous system and ears of the athlete from contusions, abrasions, fracture, lacerations, concussions, sleep, cerebral hemorrhage, paralysis, brain damage,and death[9].

Facemaks: These are intended to guardnose, eye, zygomatic arches, pyramid of nose, and jaws from armed forces directed towards the face. One of the major disadvantages of facemask is that it presents a protruding object within the ready grip of adiffering player.

Mouthguards: Prevention of sports related dental injuries is enhanced further when a properly fitted athletic mouth guard is included as an essential protective device.

Types of Mouthguards:

Classification of mouth guards: The ASTM(American society of testing and materials) in Designation: F697-80 established the classification system for athletic mouth guards:[1]

Type I: Stock mouth guards

Type II: Mouth-formed mouth guards

Type III: Custom fabricated mouth guards

Custom-made mouth guards are effective for junior players in reducing the injuries. A significant reduction regarding these injuries can be reduced with the use of mouth guards. Asatisfactory custom made mouth guard may be capable of preparing for allyoung person; therefore, they preserve and should be used in contact sport. An ideal situation is, wherever nearby is a possibility of dental damage is the requirement of a team dentist.[8]

Role of Various Specialities In Prevention:

(A) Role of a pediatric dentist: Identification of injury-prone groups: Very young children whose motor development is not complete, therefore susceptibility to trauma is also increased. Special children with those like cerebral palsy are also susceptible to falling and trauma. Children with a curved profile are more prone to injuries.

Counseling of parents: They should be well-versed of their child's risk of dental trauma, and the relatively simple and comparatively inexpensive means of preventing such injury. Children should not be compelled to play a certain sport. If that is done the child will not play with full concentration, and may sustain injuries more often.

Counseling about basic post dental trauma management: The parents should be informed that the child should be immediately taken to a doctor. If broken tooth piece is there, it should be kept to be reattached, and if a tooth comes out completely, the child should be brought to a dentist within half an hour of the injury. The parents should also be counseled regarding the diet and nutrition of their child as it is essential to provide a balanced diet for proper fitness.

Counseling of school teachers: Teachers, specially the sports in-charges should also be counseled about the basic preventive plan and also the post injury management[1].

(B) Role of orthodontist: Malocclusions have long been recognized a contributing to the risk of dental trauma. Patients with Class II Division I malocclusion demonstrate excessive overjet that places the maxillary incisors in a vulnerable position. The procumbent incisors, often without benefit of lip coverage, are more likely to be traumatized in frontal blow to the face. If concern about esthetics and function have not already prompted the patients or parents to pursue orthodontic treatment, the dentist should also explain the benefits of trauma risk reduction.[1]

(C) Role of oral surgeon: Impacted third molars create areas in the mandible which are highly susceptible to crack in a traumatic event. Thus in older adolescents and adult athletes, unerupted or impacted third molar should be removed. A mandibular fracture in the area of third molar may confine the athlete for 3 to 4 months as bony healing occurs. By contrast, the osseous regeneration after removal of impacted third molar does not result in n total interruption of athletic activity.[1]

Indian Perspective of Sports Dentistry: It is advisable for sporting community to have the sports dentistry centers identified for a quick approach when needed. Millions of rupees are spent every year in treating dental trauma injuries caused due to sporting accidents. However, in India only a very few athletes wear mouth guards to prevent these injuries. It was observed that 82% injuries were related to nonuse of protective devices.

For 58% coaches in the study, boxing was more likely to produce orofacial injuries. The coaches observed more injuries in hockey followed by cricket and boxing. In other studies, 63-75% of such injuries occurred when mouth guard was not used. Team of doctors including a pediatric dentist, Orthodontist, Oral Surgeon, Physician, Orthopedic Surgeon, and Laboratory technician skilled in making mouth guards is required to start sports dentistry clinic setup. In India dental procedures should be performed at cheaper costs, with best of quality in different cities at various dental clinics.[6]

Conclusion

The pediatric dental surgeon should hold a sound medical working information about sports-related injuries in adolescent along with children. When a patient with oral/facial athletic injuries enters the dental clinic, it's the utmost important role of a dentist to deal to the related oral diseases associated with the injuries, with varying manifestations, complications and consequences. The dentist should possess a sound clinical working knowledge on various methodologies of prevention procedure and treatment modalities. The available facilities are dependent on the situation of the

nation, sports practiced most commonly and the level of community education in this regard.

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Criterion for Selecting a Study Design

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Abstract

A research question may be answered by more than one research design. The next logical step after designing a research question is to select an appropriate study design. A research question may be answered by more than one research design. All types of research design have a place, and all have advantages and disadvantages. But not all types of design are always possible for a study.

Keywords: *Epidemiology, Study designs, causality.*

Introduction

Epidemiology is the only scientific discipline that directly addresses phenomena of disease occurrence in the human population with the aim of explaining and clarifying them as well as advising public health agencies regarding preventive measures.[1] Epidemiology studies are conducted using human populations to evaluate whether there is a correlation or causal relationship between exposure to a substance and adverse health effects. These studies are quite different from clinical investigations which evaluate the effect of any drug or therapy on a given population while epidemiological studies measure the risk of illness or death in an exposed population compared to that risk in an identical, unexposed population (for example, a population the same age, sex, race and social status as the exposed population).Epidemiological research helps us to understand how many people have a disease or a disorder and how this disorder affects the society and its long-term impact on the economy as well as health statistics. Hence, selecting an appropriate study design an important factor in biomedical and public health research quality, execution and interpretation.[2,3]

Study Designs[4,5,6]: The most critical elements of the design of the epidemiology study include: a control group, enough time span and statistical detection of an effect. More specifically, the control population used as a comparison group shall be as like, for instance, age, sex, race, social condition, geographical area and environmental and lifestyle influences as possible to the test group. The study design determines the statistical ability to detect an effect or the power of the study and in order to gain precision, the study and control populations should be as large as possible.

The designs of research can be primarily categorized in experimental and observational studies. A non-analytical or descriptive research does not seek to measure the relationship but attempts to give us an image of, for example, prevalence, effect or group experience, what is happening within a population. In description studies, case studies, qualitative studies and intersectional surveys are included that measures the frequencies and the extent of the problem and measure the frequency of several factors.

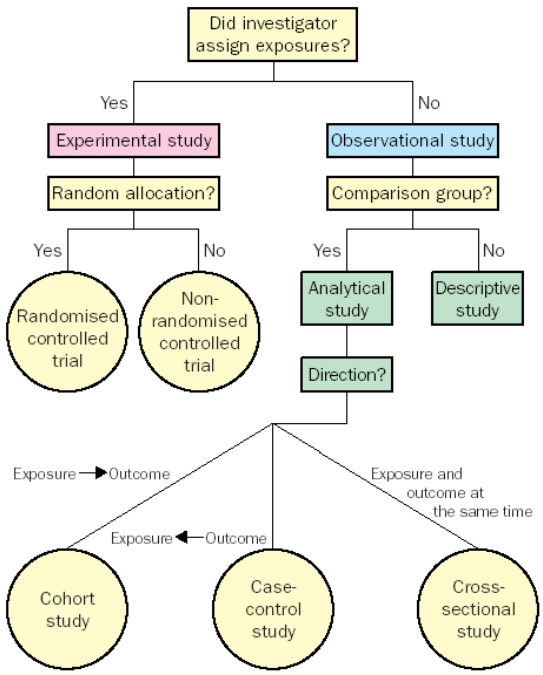


Fig 1: Framework of selecting a study design[7]

Observational studies investigate and record exposures (such as interventions or risk factors) and observe outcomes (such as disease) as they occur. Such studies may be purely descriptive or more analytical.

In analytic observational studies, the researcher simply measures the exposure or treatments of the groups. Analytical observational studies include case control studies, cohort studies and some population (cross-sectional) studies. These studies all include matched groups of subjects and assess of associations between exposures and outcomes.

An analytic study attempts to quantify the relationship between two factors, that is, the effect of an intervention (I) or exposure (E) on an outcome (O). To quantify the effect, we will need to know the rate of outcomes in a comparison (C) group as well as the intervention or exposed group. Whether the researcher actively changes a factor or imposes uses an intervention determines whether the study is observational (passive involvement of researcher), or experimental (active involvement of researcher).

The aim of an experimental study is to provide "scientific proof" of etiological factors which may permit the modification or control of those diseases. In experimental studies, the researcher manipulates the exposure, that is he or she allocates subjects to the intervention or exposure group. Experimental studies involve some actions, intervention or handling such as intentional application or removal of the suspected cause or the modification of one variable within the causative chain within the experimental group, with no changes in the control group, and observation and comparison of the results in both groups of the experiment. Such studies-controlled trials, particularly if randomised and blinded, have the potential to control for most of the biases that can occur in scientific studies but whether this occurs depends on the quality of the study design and implementation.

Spotting the Study Design[8,9,10,11]: A study design is a specific plan or protocol for conducting the study, which allows the investigator to translate the conceptual hypothesis into an operational one.

Study designs can be classified based on their aim or purpose i.e. to simply describe a population (PO questions) implies descriptive or to quantify the relationship between factors (PICO questions) implies analytic. For observational study the main types will then depend on the timing of the measurement of outcome, so our third question is: what is the time frame we are looking at?

In observational studies, scientists observe and gather data on some phenomenon that's already happening patterns of olive oil consumption, who tends to take vitamin D supplements, how much people exercise, and so on. But they don't intervene at all to change anything in people's lives; they merely gather descriptive information on habits, beliefs, or events.

With experimental research, on the other hand, scientists do intervene, or at least use statistical method to mimic intervention: they give some people a drug, they perform an operation on others. In the best-designed experiments, study participants are randomly divided into at least two groups: those who get the intervention (i.e., treatment) and those who don't (i.e., placebo). Random allocation ensures that the groups are statistically comparable with potential "confounding factors" equally distributed among them. The only difference between the groups is the intervention, which allows researchers to tease out what effect that intervention causes. Therefore, conclusions from experiments are generally considered to be more reliable and trustworthy.

Observational studies[7,12,13,14]: There are many different types of observational studies, but here are the four most common that you need to know about: cross-sectional surveys, cohort studies, case-control studies, and case reports.

"Cross-sectional surveys" take a random sample of people and record information about them at one point in time. This study describes a given population in terms of time, place, person and disease. The data collected from these surveys help in formulating a hypothesis

"Cohort studies" are just like surveys but they track the same groups of people over an extended period. Data are obtained from groups who have been exposed, or not exposed, to the new technology or factor of interest (e.g. from databases). No allocation of exposure is made by the researcher. Best for study the effect of predictive risk factors on an outcome. Cohort design is ethically safe; can be standardised in terms of time, direction and eligibility criteria. It is much cheaper than a RCT. But establishing controls can be difficult to identify and the disease can be linked to a confounding factor too. Blinding is not feasible in this study hence, ruling out bias is difficult.

The cases under study need to be uncommon and must be followed up for a long time. This can be a hassle as following large no. of patients for a long time is difficult.

"Case-control studies" are often called "retrospective studies." That's because researchers start with an end point and work backward, figuring out what might have caused that outcome. The study goes from "effect" to "cause". This study design is preferred for investigating very rare disorders or diseases with long lag between exposure and outcome. The study design is very economical and doesn't require a large sample size. A major drawback of this study is that it must depend on the records to determine exposure status, hence, selection of control groups is difficult and confounders and potential bias cannot be ruled out successfully

"Case reports" are basically detailed presentation of a patient's medical history. If a doctor writes up case reports about a cluster of patients with the same condition or disease, this is a "case series." Though these are considered the weakest kind of observational studies, they can still be very helpful for rare diseases and powerful for advocacy. This type of studies is helpful in hypothesis generation and can be informative for very rare disease with few established risk factors. Case reports cannot be used to study cause and effect relationships and can assess disease frequency.

From a single observational study, researchers will only be able to suggest whether there's an association between a risk like fat consumption and an outcome like heart diseaseand not that one caused the other. That's because the research participants were already eating fat or already had heart disease (or not) when the study began. What if people who eat lots of fat happen to be less health conscious? What if they are poorer and therefore more stressed? What if this group of fat-eaters just happened to be chubbier than those who stick to a low-fat diet? These things are called "confounding factors," or the difficult-to-predict variables that are associated with both the cause (e.g., saturated fat) and potential effect (e.g., heart disease) under study.

Experimental studies[15,16,17]: There are two basic types of experimental research. There are two basic types: randomized controlled trials and quasi-experimental designs. The gold standard of medical evidence is "randomized controlled trials" but it is not necessarily the best design for every research question. The reason they are so strong is because they are designed to disincline relationships between cause and effect; randomizations means treatment groups can be equated, and the only difference between them is the intervention (i.e. if the drug has been received or not). They are even stronger if these experiments are blinded. Blinding means either the students or the doctors or the two (double-blinded) do not know whether they are receiving the actual therapy or a placebo.

Lastly, there's a type of study design that lies somewhere between experimental and observational research: that's the "quasi-experiment." The prefix quasi means "resembling." Thus, quasi-experimental research is research that resembles experimental research but is not true experimental research. Although the independent variable is manipulated, participants are not randomly assigned to conditions or orders of conditions Because the independent variable is manipulated before the dependent variable is measured, quasi-experimental research eliminates the problem of directionality. However, as participants are not randomly assigned–probably, other conditions differ–quasi-experimental research doesn't remove the problem of confusion. So quasi-experiments are usually somewhere between correlational studies and real experiments in terms of internal validity. Quasi-experiments are most likely to be conducted in field settings in which random assignment is difficult or impossible. They are often conducted to evaluate the effectiveness of a treatment–perhaps a type of psychotherapy or an educational intervention.

Systematic reviews[18]: A systematic review summarizes the findings of carefully designed research (controlled trials) available and offers a high level of evidence on the efficacy of health care treatments. Judgments on the facts can be taken and medical decisions can be told.

These reviews address that problem of the single study puzzle piece. Rather than relying on just one person's experience or even just one randomized controlled trial, synthesized evidence draws on multiple sources and weighs their contributions to arrive at a more fully supported conclusion according to each study's rigor and relevance. This kind of research is regarded as the highest form of evidence and the best science to inform decision-making.

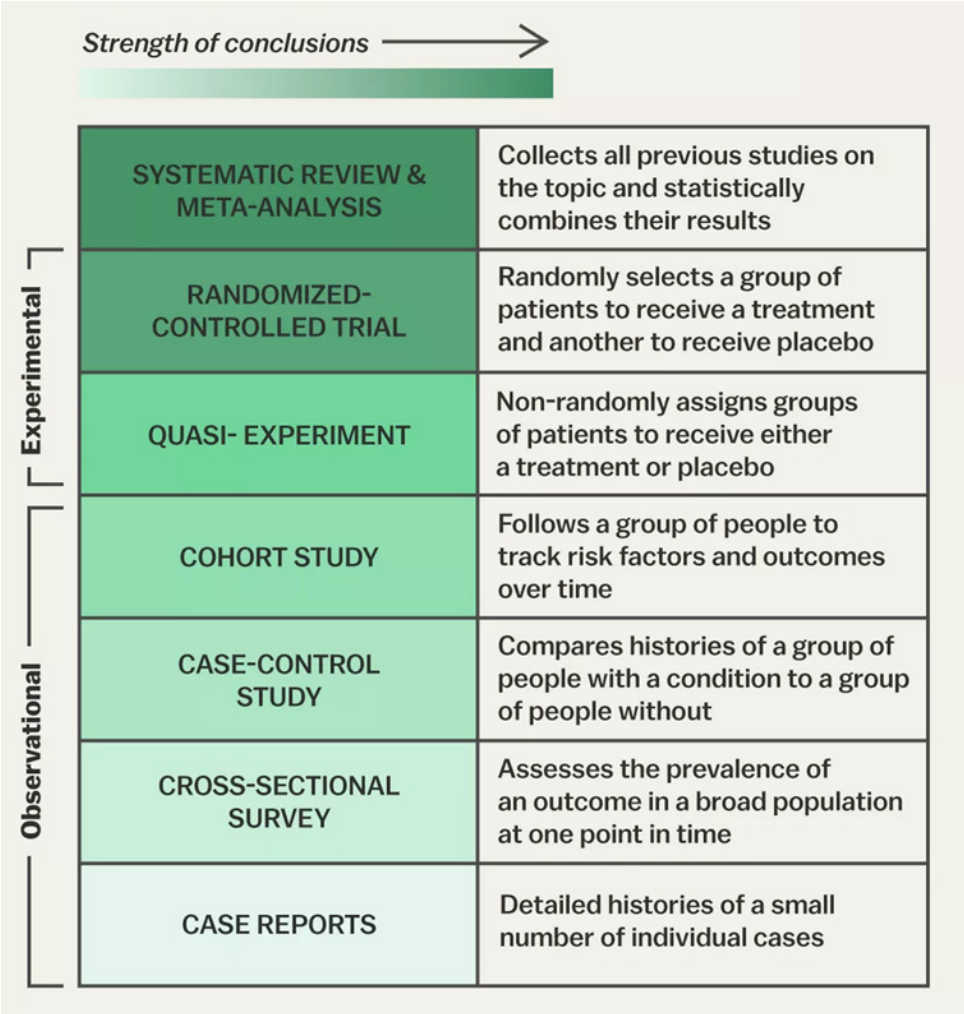


Fig 2: Hierarchy of evidence[19]

Advantage of selecting a good study design[20]:

Benefits of Study Design in Producing a Valid Result: A good study design strongly contributes to increasing different aspects of validity while adhering to the research question and previous literature. The main advantage of the study design in providing a valid result (the greatest validity in answering a given question) is avoiding systematic error. Further advantages may include the ability to rapidly conduct a study in a relevant environment and address issues of the effectiveness, as opposed to efficacy, of an intervention or diagnostic test. A fitting study design strengthens the internal validity while increasing the chances of a good generalisable result.

Resource Use, Size, and Duration: Available resources are never practically enough for conducting an elaborate research. Hence, a study designs helps one determine the needs of the population as well the research and allocate the available resources accordingly. Resources are not only expressed as finances but also as manpower, material/equipment required and the time of the investigators as well as the time allotted for the study. Randomized controlled trials (RCTs) can be very expensive, but large, simple trials have also been conducted for relatively modest costs; trials requiring only a short duration (communicable disease trials) are less expensive than non-communicable disease trials, which may need to be observe subjects for years. The size of a study depends on a variety of factors, including the expected number of outcome events occurring. The duration of a study depends on the anticipated accrual of recruited subjects, the incidence of outcome events, and the natural history of the condition studied.

Availability of Data and Ability to Recruit: This dimension assesses the likelihood that the study design

will be able to achieve the basic inputs (data or patients) required for launch. Data and recruitment are partially dependent on study design and partially dependent on the content area. For example, subjects are generally much easier to recruit into observational studies than intervention trials. FRN researchers may know of already existing secondary databases that might address an identified evidence gap.

Ethical, Legal, and Social Issues: This dimension deals with the external issues that could affect the feasibility or desirability of different study designs. Potential problems with ethical conduct of research are likely to vary depending on the content of the proposed measurement and intervention and the current standard of care and may not be a consistent feature of a study design.

These guidelines should be applied with flexibility to considerations of study designs for FRNs. The advantages and disadvantages of a study design may change depending on the study question or the setting. The resources required for a study design depend on the intervention proposed. The features of a specific FRN may make some study designs better suited under those circumstances. Considerations should include an understanding of the context of the research, including the condition or health policy being investigated, the existing body of evidence, and potential utility and quality of the data gained through different study designs. The urgency with which an answer to the research question is needed may be an additional ethical consideration in prioritization of research needs.

Conclusion

Appropriate selection of the design of the study is only one element of successful research. The selection of the design of the study should include consideration of costs, access to cases, identification of exposure, the epidemiological measures required, and the level of evidence currently published on the specific exposure-outcome relationship to be assessed. The review of appropriate published standards in the design of the study can significantly enhance the execution and interpretation of the results of the study.

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A Guide for Selection of a Research Topic

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Abstract

The initial step in the research process is to select a research topic. A researcher needs to be aware that it is perhaps not easy to choose a good topic, as the topic selected must be restricted and steady enough to be interesting, and at the same time sufficiently broad for enough information. This article aims to shed light on the basics guidelines of choosing a good research topic.

Keywords: *Health Research, Medical Literature, Cochrane Reviews.*

Introduction

Research is a systematic investigation and study of materials and sources in order to establish facts and reach a new conclusion. 'Creative work is endeavoured on a systematic basis with a goal of increasing the knowledge base in every sphere including knowledge of man, culture and society, and utilizing this knowledge to develop new applications.' Research validates evidence to asserten the findings of previous work, to solve new or existing problems, to endorse theorems or to develop new theories.

A research project may also be based on past work or on existing literature in the field. Research may be conducted in order to test the viability of instruments, experiments or procedures, the research may reproduce the elements of previous projects or the project. Research should always aim to contribute something new to existing literature. Until diving into research, it is essential to know how to pick and develop a good research protocol.[1,2] The purpose of this article is to shed light on the basics guidelines of choosing a good research topic.

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Factors affecting research[2,3,4,5]: Selection of a research subject may be motivated by incentive, need based or profit driven. The opportunity arises from the availability of funding, the prospect of engaging in joint international research and collaborating with the pharmaceutical industry. Work is often motivated by the accessibility of resources that may or may not meet local priority needs or the interest of scientists. Quality and quantitative work is becoming increasingly expensive, and additional funding is required to perform good research.

Health research funding can be given either from public sectors, as well as central/state governments and United Nations inter-governmental bodies, or from private sectors, counting in for-profit pharmaceuticals and non-profits, such as philanthropic foundations and non-governmental organizations. Public sector and the pharmaceutical industry are expected to be among the topprone to disease burdens in developed countries. The path for research and development in industry is underpinned by latest technological advances, which provide new guides for the development of novel drugs. Nevertheless, the market has an impact on the technological drive and thus on the prospects for study. Only a very small part of the industry's massive investment in research is related to the health problems of developing countries. Expenditure for industrial research is driven by market forces.

Health policy makers at national and international level would like to see work dictated by health needs, with a return on investment that can reduce the implications of

disease on their population. The importance of the health problem is measured by its prevalence and severity. A health problem may be widespread but not serious and vice versa. The fact that the health problem is prevelant does not necessarily mean that it should be a indicated for research. The solution for the health problem may already be present, but it is not implemented or made available.

A health problem may also be of great severity, and there may be a need for studies to fix it. Nonetheless, other questions need to be asked before it can be prioritized for analysis. E.g.: Is the question understood enough to consider looking into potential interventions? Is the development of new technologies needed to go forward? How economic are these approaches to be? Can they be produced early and at a ninimal expense? This may not always be the case.

Sources for research ideas come:

1. **Searching the medical literature:** In the first progress towards research development, medical literature should be read, including reviews that outline research gaps, take part in scientific meetings, and be active in teaching. Ideas are often conceived from talks and conversations and therefore discussions should be held with colleagues or advisors in the same or separate disciplines. A research scholar would have to know about the needs of research organizations, develop specific scientific fields, get new ideas, be a good observer and creative. Research should be selected by understanding that "science should not be admired but questioned."[6]
2. **Scientific literature:**

Open access: At the World Summit on the Information Society in Geneva in December 2003, open access to scientific information was prioritised. The Declaration of Printing has been adopted by delegates from 176 nations who pledged themselves to "having universal access to research, to developing and sharing scientific and technical knowledge with equal opportunities for everyone, including open access data publishing initiatives"[6]

Health Inter-Network Access to research Initiative (HINARI)[7]: Hinari's "Access to Science for Health Programs" offers local non-profit institutions in developing countries free or very minimal charge online to major newspapers for biomedical and social sciences. Hinari was started in January 2002, with approximately 1500 journals from 6 major publisher: Blackwell, Wolters Kluwer International Health & Science, the Harcourt Worldwide STM group, Elsevier Science, Springer Verlag and John Wiley. Since then, there has been steady increase in the number of participating publishers and journals and other complete articles. In Hinari, up to 160 publishers ' contents are available, and many other publishers join the program. The publishers are financing WHO for training librarians in using HINARI. Improved functionality has provided a connection to the HINARI journals from PubMed (the database for the United States National Library of Medicine).

Eastern Mediterranean Region Virtual Health Sciences Library[8]: The Eastern Mediterranean WHO Regional Office has initiated to link libraries in the region to a virtual network. The Network's aim is to make the fullest scope of health and biomedical literature available and/or open to potential users throughout the area in an economical manner. The internet, which is now in most Member States in the region, enables the network to operate as a virtual network.At present, most of these journals are not internationally indexed or abstract. Local health and biomedical literature were mapped in order to increase coverage at national, regional and global scales. The Medicus Index is a powerful resource to index, review, track, preserve and share information on local health.

PubMed central[9]: This initiativetaken up by the United States National Library of Medicine (NLM), gives free online access to the full text of articles on Medical research. PMC acts as an electronic complement to the vast print journal archive of the NLM, in compliance with NLM's statutory obligation to preserve and conserve the biomedical literature. The NLM National Centre for Biotechnological Information (NCBI) was established and is managed by the PMC. It offers free access to peer-reviewed primary life science research reports and gives the international scientific community and users in general the freedom to search the literature of life sciences and to findentire reports of research free of charge n not merely the titles and abstracts.

CochraneCollaboration[10]: CochraneCollaboration is an international organization that focuses on helping people to make sound healthcare decisions and health policy through the preparation and retention of systemic reviews of high quality. It's a "non-profit organization that relies heavily on volunteer work."One cannot pay

for Cochrane membership; they have to earn it through participating in our work. Contribution to the work of The Cochrane Collaboration may include:

- Systematic review as the part of a team
- Provide editorial support for a Cochrane Review Group acting as a support group in advocate of evidence health care and the work of the Cochrane Collaboration
- Provide training for review authors or editors, or users or other researchers; Cochrane Fields include health care such as child health, complementary medicine, vaccines or primary care. People associated with Fields help to ensure that priorities and outlook in their area of interest are reflected in the work of CRGs.

Index Copernicus[11]: It is an online database of information provided by users including profiles of scientists, scientific institutions, publications, and projects established in Poland in 1999. The database includes several tools for productivity assessment that allow the impact of scientific works and publications, researchers or research institutions to be tracked. The Copernicus Index also offers the traditional abstraction and indication of scientific publications in addition to the productivity aspects. The Copernicus International Index operates the database.

Criteria for a good research topic[12,13,14,15]:

Feasibility: The study population required to answer the research question should be able to be recruited within the scheduled research framework. Equipment supplies and other research requirements should be available for the research establishment of investigators. Researchers need the expertise they need. Research costs must be cost-effective, and resources should be available. There should not be too many or too ambitious research goals. The development of the study program should always be focused on a single primary objective. This can be complemented by secondary targets that can also generate rational findings.

Significance to the discipline: A problem selected by the researcher should be of importance to the profession or discipline. When a discipline develops or perfects the professional knowledge body, a research problem is important. Some of the criteria to evaluate the importance of a profession are as follows: The research findings benefit the consumers/interested parties. This will enhance current practices. Encourages theory or testing. Facilitates solutions to current needs in practice. Generate information for the profession to have practical implications.

Originality: Every investigation should be new and unique. It is therefore up to the scientist to use innovative knowledge to select a research issue in order to increase the growth of existing knowledge within a profession.

Peer support: Many research ideas have failed because the researcher did not receive any peer support. A climate of shared interest among the professional members promote research activities smoothly.

Availability of subjects: In some cases, potential subjects may not meet the study criteria or may not be willing to participate in the study or may already be a part of other studies. The availability of subjects should therefore be well ensured in advance.

Researcher's competence: A research problem can only be workable if it is in accordance with the competence of the researcher. A researcher should be able to deal with a specific research issue. A new research scholar should not attempt taking up topics which require substantial experience as well as knowledge. A person needs to get acquainted to the idea of the research first and then dive into the vast field of research.

Current: A good research problem must be based on the current challenges and needs of the profession. The result generated will therefore be of more use. In addition, more professionals will be interested in the research carried out on the current issues of their profession.

Interesting: The research problem must be the motivation of the researcher, and it should be fascinating for the researcher. Research will therefore be conducted with full enthusiasm, and not just for its achievement. The investigators should be personally interested and must be able to allure colleagues towards the subject or else the project may not be worth doing.

Clear & unambiguous: The research issue selected should be clear in its ability to reflect or provide guidance on the various aspects of the methodology. The research problem chosen to be investigated should be subject to a scientific inquiry. Research should be verifiable by means of scientific calculations.

Relevant: The research problem chosen to be investigated should be relevant to the profession, time, need and competence of the researcher.

Systematic: The research problem should be systematic- in the sense the researcher should have arrived at the problem statement following relevant selection parameters or criteria. To do so, write the research theme as a declaration of the purpose of the study. The statement will usually be one or two sentences that states precisely what is to be answered or proven, in relation to the research theme.

Ethics: Some ethical issues must be addressed at the early stage of selecting the research topic while other need to be addressed during planning the research and some ethical problems may indicate that the research should not be considered from the beginning.

Conclusion

A thorough understanding of what research is and following the steps of selecting a good research topic methodically is essential to lay down a strong foundation for research. A researcher needs to remember that if the selection of a research topic is not good then it will lead to failure of the entire protocol, no matter how strong the study design is.

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Ethical Permission: Approved

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Retreatment of Root Canal Failure, Possible? A Review

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Abstract

The main aim of endodontic treatment was to eliminate the bacterial load from the canal by mechanical, chemical preparations and three dimensional obturation of the canal. There are various factors which are responsible for endodontic failure, different root canal system, presences of addition canal or lateral canal, over obturation. The aim of this review article was to how to manage these retreatment cases and prevent root canal failure cases.

Keywords: *Retreatment, Bacterial infection, Root canal treatment.*

Introduction

Retreatment procedure is performed on that tooth that received an earlier attempt of root canal treatment but fails due to bacterial, iatrogenic factor that resulted in a condition requiring additional new endodontic treatment to achieve a successful outcome.[1] The Rass et al., hypothesized that the main cause of treatment failure depends on insufficient cleaning and inadequate obturation.[2] Lack of biological-technical-scientific base is one of the commonest cause of Endodontic failure. Many general practitioners venture in the area and the rate of failure within this group is quite high about 98.0% according to Leonardo. For successful endodontic retreatment there should be proper cleaning of root canals, so clinicians should pay special attention to the technique used for removal of theobturation material, the most used being cements, pastes and guttapercha points.[1,3] In retreatment we have to reach the actual working length and completely remove the obturation material, thereafter cleaning the root canal and proceed with the final obturation. Several techniques are used for the removal of gutta-percha including rotary instruments, manuals, solvents and their associations.[3] The aim of the present review article was to evaluate, through a literature review, the endodontic retreatments with rotary and mechanical files, which is the best efficacy.[4]

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Factors Responsible for Endodontic Failure: Endodontic procedures are high chances of success as compare to the other disciplines if done with proper protocol. For successful endodontic procedure you know the mechanisms of root canal failure, these have been classified in three phases.[5]

Pre-operative factors responsible for endodontic treatment failure

1. Poor diagnosis
2. Tooth fracture cases
3. Medically compromised patients
4. Pt was not willing to sign consent from

Factors that involves in during the endodontic procedure

1. Missed lateral canal
2. Formation of ledge at the middle third of the root
3. Peri-apical infection
4. Periapical extrusion of chemical irrigations causes swelling and sever pain.
5. Over obturation or incomplete obturation
6. Apical extrusion derris's

7. Breakage of endodontic file

Diagnosis of Endodontic Failure:

Clinical Examination: For clinical examination, we look for periapical area of redness or pain by pressing the apical end of the tooth, other signs that indicate retreatment procedure are swelling, Spontaneous pain, pain on biting.[6]

Radiographic Findings: In failure cases we seen widening of lamina dura, radiolucent area associated with respected root. Intraoral periapical radiographs play an important role to detect any endodontic failure. [7]

Rationale for Retreatment: Proper knowledge of root canal anatomy of every tooth plays a significant role in endodontic success or failure. There are chances of 2 to 4 accessory canal present in the tooth that communicate with the surrounding periodontal fibers, and an important source of infection if left untreated. One of the most important factors responsible for root canal failure improper coronal sealafter completion of root canal treatment other important factor is leakage of sealer and bacterial contamination. In most of the case retreatment correct the pain and other symptoms if it re-occurs frequently extraction will last choice of every dentist.[8.9]

Endodontic Mishaps and their Prevention:

1. **Access cavity perforations:** During the access opening perforation in the furcation area was irreversible complication

Diagnosis: Continuous bleeding, leakage of saliva and other chemical.

Treatment: After completion of root canal obturation perforation repair was done with any of the following material like GIC, gutta- percha, calcium hydroxide paste, MTA gives best results as compare to other perforation repair materials.[10]

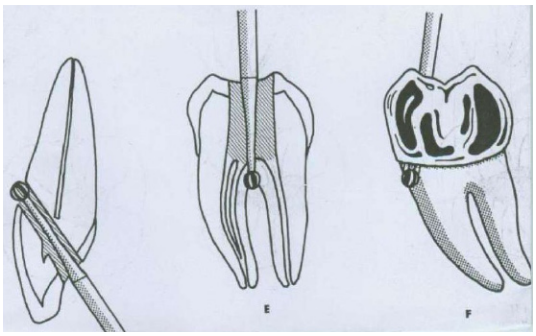


Figure 1. Perforation

2. **Missed Canal:** In most of the case of maxillary first molar MB2 canal was not find, and missed by undergraduate students because not easily accessible or readily apparent from the chamber.It can be found in different x-ray position or by the endodontic probe. The treatment of missed was endodontic retreatment.[11]



Figure 2. Missed Canal with Post

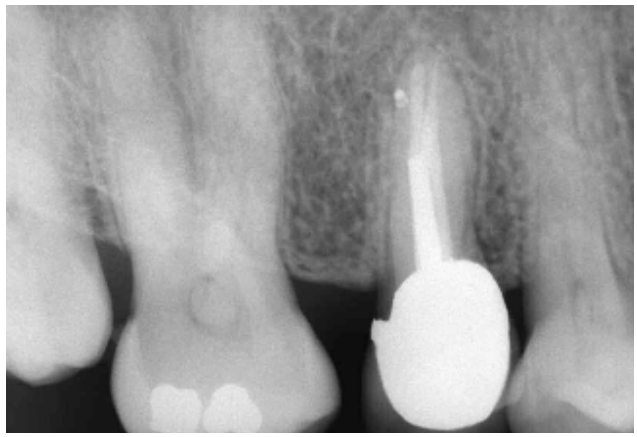


Figure 3. Retreatment

3. **Separated Instruments:** Long term use of same files may cause losing in the flutes of file in the canal we apply the extra forces it may lead to breakage in the canal. It can be seen in radiograph, small size blunt tip. Treatment protocol will be different in each case if the file will break on access opening area, we try to remove with the ultrasonic tips and enlarge the size of the canal. If file break in the middle third we have by pass with the smaller file after by passing the file we will obturation done. If file brake outside the canal, endodontic surgery will be done.[12-15]



Figure 4: Separated Instrument

Conclusion

This article has identified a variety of techniques to successfully retreat endodontically failing teeth. It should be recognized certain endodontically failing teeth are notamenable to successful retreatment. In these instances,the various interdisciplinary treatment options can bethought fully considered to ensure each patient is best served. However, as the potential for health associated with endodontically treated teeth becomes fully appreciated,the naturally retained root will be recognized as the ultimate dental implant.

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Special Child Management in Dentistry: An Overview

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Abstract

Dental treatment of the special children is mostly given at least priority by parents or dentists which is a real pity for society. The term disabled child is often added to their innocent identity only because they are impaired daily activities in some fashion. Thereby these handicapped children can be divided into medically compromised & developmentally disabled children. These children seek our help, so they can establish them self in front of the society well. They are even unaware what is importance of basic oral health care. Despite opening new windows for them may dentists are unwilling to treat them as patients. This may be due to many reasons like lack of knowledge about their symptoms, unfamiliarity with the measures to treat these kinds of children, who took an initiative in the year of 1981 for special children.

Keywords: *Dental treatment; special children; compromised & developmentally disabled children.*

Introduction

World Health Organization (1980) defined a handicapped person as one who ever an appreciable period is prevented by Physical or mental condition from full participation in the normal activities of their age groups including those of a social, recreational, educational & vocational nature. Primarily, these patients should be evaluated by the dentist, what are their dental needs & his/her ability & willingness to accept any sort of procedure. Management techniques must be TLC (Tender, Lavin, Care). empathy; the ability to understand & sense the fears of another w/o differencing one's from others. With the handicapped patient it may be a four way or 5-way professional relationship i.e., head of the residential special school. Brief clinically first requirement in their comprehensive treatment. The according person role is to take decision about the treatment plan required. The dentist's attitude should always be positive, but most it is Negative because lack of equipment. [1,2]

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- Lack of patient to treat such type of patients.
- Substandard fees.
- Fear of law and order.

Management of Developmentally disabled child: Mental retardation Is known as the low intellectual development than that of normal people & least fit to the environment. It is calculated be well known formula.[3]

Mental age/Chronical Age x 100:

- The IQ guide gives as gradation of children from very superior to mentally retarded having IX above 140& 69 respectively.
- Mental retardation never be ignored than any fatal disease.
- The special children may present with anomalies of fungal structure delayed eruption,anodontia, enamel hypoplasia, malocclusion, multiple carious feet.

T/t:

- Comfort the mentally retorted child to the clinic atmosphere, very low & simple with the patient.
- ISD&TLC measures helps in mild cases & anesthesia in moderate cases.
- Only day appointments are preformed & it should be kept as short as possible.

- Permanent restriction should be done in multiple appointments.

Down's Syndrome (Trisomy 21): Late pregnancies, uterine & placental disturbances & chromosomal aberration can cause this disease.[4]

Features:

- Round skull resulting in a flattened just interior to posterior fontanelle.
- Oblique palpebral fissures with permanent epithelial fold.
- Scanty eyelashes.
- Dysplastic ears with abnormal pinna.
- Neck- short & broad with excess skin posteriorly
- Short little finger, IQ level within 25 to 50

Oral Manifestations:

- Small dropping month, fissured tongue, Macroglossia.
- Dry & fissured lips, Class-II tendency, short maxilla.
- Bifid uvula, cleft lip & palate.
- Nitrous Oxide analgesia or TSD in mildly apprehensive patients can be used chlorhexidine can be prescribes.
- Pulp treatment in milk tooth is restricted in patient with involved in understanding or using spoken or written language.
- Minimal brain injury damage to CNS can be a cause.[5]

Cerebral Palsy: It is a non-progressive lesion which occurs is any stage of child birth. Number of neuromuscular defects can occur in the child paralysis improper co-ordination & balance, unregulated gait, involuntary muscle control.[6]

Cause: Decrease in oxygen supply during child birth to the brain.

- Complicated pregnancy, Heavy metal & drugs poisoning nearly birth than normal IUL.
- Spastic cerebral palsy is the condition in which child has motor tone increased & restricted limb moments, Short maxilla & mandible, mouth breathing etc.

Athetosis:

- Study says it occurs in 15% children.
- Bull neck is a characteristic feature. Tongue protruding, peri-oral muscles hypotonic with mouth breathe.
- Aburt closing of jaw or bruxism in high rate.

Ataxia:

- Less common variant.
- Slow movement is characteristic features.
- Eyes are chance of risk.

Epilepsy: Any abnormality in the electrical activities of brain can cause chronic, recurrent changes in cerebral functioning known as epilepsy. The single episode of incidence is called seizure.

Causes:

- Idiopathic or symptomatic
- Brain malformation or injury during pregnancy.
- Genetic factor is also responsible.

Classification:

Scrums are broadly classified as:-

i. Partial seines: simple partial slimness

   Complex partial

ii. Primary generalized seicums:

   Grandmal epilepsy

   Petitmal epilepsy

   myoclonic seizures

iii. Status epileptics:

   Most commonly children suffer from primary generalized seizures.

   Characteristic: Characteristic of absence seizures.

- Patient stops continuing work suddenly & loss postural control.
- Urgent integrals of consciousness. Which lasts only for sometimes.

6-14 years are mostly affected eyelids roll upward &distortion of face occurs when seizures comeuninformingly.

- After 10 to 30 seconds the toxic phase is followed by a clinic phase of several minutes. Where in severe muscle contraction occurs with increased rate of sweating.

When the seizures symptoms cease child goes to deep sleep.

Precautions: Phenothiazenes promote seizures so should drugs are restricted.

- Dental chair light should be turn off while treating such patients.
- diazepam is the drugs of choice for sedation if necessary.
- Vegabartin, lamotrigine, gabapentin & topiramate are drugs available for treatment.
- Dilantin sodium used in treatment of seizure before caused gingival hyperplasia.
- Dentist should make the chair position supine if it occurs during appointment Tongue blade should be Placed to avoid injury of tongue & scalpel like sharp objects are kept away from the patient.
- Proper airway should be maintained. O_2 supply should be maintained. Take the patient to nearby hospital if situation gone out of control.[7]

Deafness & Blindness:

Causes: Viruses like rubella & influenza, ototoxic drugs, elemental syphilis.

Injury to features during pregnancy, toxemia in late pregnancy in appropriate Oxygen supply to features.

Treatment: Sign languages can help to communicate with the patients.

Tell show do techniques applied to create better communication with children.

Management of Medically Compromised Patients:

Heart disease: 2 types of diseases can be there i.e. 1) Congenital 2) Acquired.

Cyanotic & cyanotic congenital heart disease are two types of congenital variant depending upon .

Cyanosis: A trial, septal & ventricular defects in which shunting of blood from left to right in heart.

- Cyanosis just vice versa i.e. right to left shunting of blood within heart.

Causes: Viral infections, metabolisms errors, Genetic feature.

Acquired Heart disease: Eg- Rheumatic fever, infective bacterial endocarditis

Infective bacterial endocarditis:

- Microbial colonization of endocardium.
- Acute phase responsible for species like streptococcus, staphylococcus, Pneumonia.

T/t:

- Consultation with cardiologist is must prior to any surgical procedures.
- Preventive treatments are preferred
- Antibiotic therapy has major role in treatment.
- Detailed clinical history is required.

Diabetic Meaitus:

- Children it is considered to be most common endocrinal disorders.
- 2 forms
  i. Insulin dependent diabetes mellitus.
  ii. Non insulin–dependent diabetes mellitus (NIDDM)

T/t:

- Early morning appointments are preferred for these patient & patient is asked to do prior screening tests.
- In type I. insulin can be administered.
- If the patient shows following symptoms like excessive sweating, Irritation, Nausea, Tremors, Sudden decrease in body temperature then stop all the procedure.
- Insulin overdose can lead to insulin shock. [8]

Management:

- Oral carbohydrates orange juice & candy are given .
- Dextrose IV (50ml in 5% concentration).
- Glucagon in (1 MG) followed by in epinephrine 10.5 mg of 1: 1000 concentration).
- If the patient does not respond after 5 minutes emergency procedures should be initiated.

Astha:

- Persons airway narrower, inflamed & produce extra mucous causing difficulty in breathing.
- Dyspnea, cough & wheeling are common clinical feature.

Causes:

- Allergy to dust or any other substances can lead to this condition, even atmospheric condition has a significant role.

T/t:

- Brief clinical history.
- Patient is allowed to sit in upright posture.
- Drugs like aspirin, NSAIDs are contra indicated.
- Procedures can be done under general anesthesia if necessary.
- Nitrous–oxide sedation is mostly preferred.
- 0.3 ml of epinephrine can be administrated in sudden attack of Asthma.

Autism: Mental& emotional balance is disturbed in such kind of patients, causing difficulties in social activities of life.

Discussion

India has 12 million children living with disabilities, and only 1% of them have access to school. About 80% of children with disabilities do not survive past age 40. Many conditions such as mental retardation, developmental disabilities, cerebral palsy, craniofacial abnormalities, and seizure disorders can impact a child's oral health. Children with SHCN generally have increased prevalence of poor oral hygiene, compromised gingival and periodontal health, and increased prevalence of dental caries than the general population. Dental diseases and its treatment present several problems in this group of patients. These children may not understand or assume responsibility for preventive oral health practices. Many caregivers do not practice appropriate oral hygiene or choose a proper diet. Their parents also have the burden of medical treatment. They usually do not seek dental treatment. Moreover, the importance of dental care for these children has often been overlooked by the health planners.

Conclusion

In recent years, the dental profession has shown increased concern in providing complete oral health care to the mentally- or physically-challenged children. The specialty of pediatric dentistry provides both primary and comprehensive, preventive and therapeutic oral health care to children with SHCN. These special children are entitled to the opportunity to achieve appropriate rehabilitation, to enable them to realize their maximal level of functioning, and to assist them in not only "normalizing" their lives but also lengthening their life span.

Ethical Permission: Approved

Conflict of Interest: None

Funding: None

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Rampant Caries in Adolescents: A Review

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Abstract

Rampant caries is a common destructive and intense progressing nature of carious infection. The supervision of these problems assists one of the most challenging activities under several dental offices because of the weight and huge chance of recurrence. Some initial investigation concerning this infirmity and testimony of the hazard agents permits specific key of the condition including avoiding constant, careless and offensive operative method. Besides these common protective plans, the application like some dental unit should think upon securing the victim knowledgeable regarding the unique chance factors moreover adapt his performance and view towards systemic moreover oral health. Here continues some performance of the status concerning an adolescent outpatient among rampant caries, which explains the particular complexity of the pathogeny also the aggregation of determinants associated under the etiology of the condition.

Keywords: *Rampant Caries, Tuberculosis, Economic State.*

Introduction

None particular patterns of examination, "rampant caries" holds a state that nearly every practitioner becomes faced throughout the modern ages.[1] Toward adults the session normally assigns a dynamic and quickly proceeding kind of caries epidemic including various teeth moreover including teeth and surfaces such denote habitually on a reasonable prospect of caries. There are various movements following the encounter and succession regarding rampant caries in youngsters and adolescent. In most states some variations in psycho-social development yield dietary remodelling's and seldom degeneration of sanitation.[2] Most of certain young adults cannot yield a precise strategy and specific health policy-related toward dental approach is negative supportive for those victims following the period of eighteen. Within the recent age, some of certain patients force to be pretended via systemic sicknesses that people denote not conscious about our attempt to protect because they hit scared to be discarded because of that. The rising amount regarding such events and some importance of significant injuries demand that any dental practitioner should understand how to evaluatea comprehensive investigation and recognize the prospect parts of the form under succession to establish the defensive and healing approaches ready to regulate the illness. The analysis of these patients should rely on completely including precise selection and relationship of each accessible report given by patient records, hazard estimation, clinical review, x-rays, and adjunctive examinations.[3]

Review of Literature: Our victim owned particular chance factors that could remain correlated including caries. These alterations during familiar world existed like to generation (adolescence) and the immigrant situation, both states producing toward tremendous anxiety, improper nutrition, inadequate cleanliness, absence of interest during personal well-being, and reduced path toward dental and therapeutic applications. Each predominance regarding rampant caries in evolved nations is 1.12% while in emerging nations including disadvantaged communities within devolved nations, special currency may approach 70% of preschool adolescents.[3] Indeed, externally leading toward attention to the socio-economical situation

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which strength do a questionable effect,[3-5] immigrants are supposed to remain a long chance collection. Meanwhile adolescents and young adults, occasional exchanges of psycho-social agents can regularly happen compared among qualifications of intake or oral fitness routine exercises. Certain variations may appear during an imperfect nutrition, usually relying upon toward food that means accessible, simple and quick to arrange. Special dietary alteration may enhance further exceptional to remineralization agents to equalize these demineralisations difficulties. Periodic loss of extremely sweetened carbonated refreshment significantly boosted this venture of helping dental caries.[6] In that state the loss of carbohydrate liquids including sugar also caffeine mixture continued added chance factor for rampant caries because of addictive potential associated with sugar including use as stimulating moreover refreshing food. During the inadequacy of severe systemic condition,rampant caries remains a symptom of severe flaws of nutrition. Some salivary bacterial analyses established the principle that intake remained the main hazard part. While some numbers of salivary mutants streptococci show significant levels of bacterial immigration on teeth, preparing relevant predictors of caries prospect, lactobacilli numbers last un fit during caries foresight, however, they continue notice regarding cavitation, of sugar consumption, plus oral health standing, implying essential during the estimation of victims including rampant caries. Sufferers among tuberculosis may encounter xerostomia and/or salivary gland inflammation, including granuloma or cyst form in the altered glands.[7] Temperature, vital falls of weight also vomiting added on salivary debt and reduction of the oral pH. Certain meaningful changes in the oral conditions could appear under active choice of acidogenic bacteria and diminished capacity of protection, buffering furthermore remineralization mechanisms.[8]

Treatment: The removal of rampant caries remains fulfilled within restorative treatments that comprise the elimination of the infected part of the tooth-supported with the induction of cement to restore the tooth. If too much regarding tooth continues lost into rampant decay, the dentist may prefer to set a crown on the tooth to preserve the tooth.[9] The rehabilitation selection is conditional upon how much of the sound tooth persists including where the tooth exists. Despite the time, the special diagnosis for patients who possess rampant caries is subordinate in their readiness to alter their practices. Nutrition differences, enhancing oral hygiene plus accepting to your dentist's guidance are helpful in producing sure their mouth endures healthful post-treatment.[10]

Conclusion

In adolescents and young adults, the development of psycho-social parts can be united including poor nutrition and unwanted oral health. Still in adolescent cases, report regarding pharmaceutical records and existing status maybe really necessary toward identifying systemic hazard circumstances to rampant caries. Migration influences now un unique in adults but additionally youngsters plus adolescences and well-being management should think these inmates in sessions of estimation including restriction of dental medicine. During this arrives to rampant caries, the purpose concerning the dental unit should concentrate not only on negotiating specific lesions yet including the initial analysis of the situation and description regarding these jeopardies.

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Effect of Informational Support on Quality of Life among Pregnant Women with Antiphospholipid Syndrome

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Abstract

Antiphospholipid syndrome is a disorder of the immune system that is characterized by excessive clotting of blood and adverse pregnancy outcome which affects negatively on women's quality of life.

Aim: Evaluate the effect of informational support on quality of life among pregnant women having antiphospholipid syndrome.

Design: Quasi- experimental design (One group only pretest – post test design) was adopted purposive sample of 43 pregnant women with antiphospholipid syndrome.

Setting: The high-risk pregnancy department at obstetrics and gynecology Cairo University Hospitals. Two tools of data collection were used: an interviewing questionnaire, the Arabic version of World Health Organization Quality of Life Questionnaire.

Results: There was improvement and a highly statistically significant difference between the perception of pregnant women as regard to rating their quality of life and health satisfaction before and after informational support; the social relationships domain, presented the highest mean score (13.64±3.32) was assessed as the domain with the best perception of QOL and the environment domain was associated with the lowest score (8.56±2.56) considered the worst perception of QOL there was a better perception of quality of life physical and environmental domains after informational support.

Conclusion: Before the implementation of informational support, the worst QOL domains were environmental then psychological domain, while after informational support there was an obvious improvement related to environmental and physical domains.

Recommendation: Implement informational support as a part of nursing care protocol in high risk pregnancy department.

Keywords: *Antiphospholipid syndrome, quality of life, informational support.*

Introduction

Antiphospholipid Syndrome (APS) is a systemic autoimmune disease which is characterized by recurrent arterial, venous thrombosis and pregnancy morbidity such as recurrent abortions, fetal losses[1]. It is classified into primary and secondary APS[2.] Worldwide statistics have shown that the prevalence of APS in the general population ranges between 1% and 5%. While in Egypt no accurate incidence represented, but according to Rawhya, et al, 2016, the rate of fetal loss in Egypt among pregnant women with APS may exceed 90% in untreated women[3].

The cause of APS is unknown although there is evidence that genetic, environmental influences and a variety of infections have been implicated as potential

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inducers of APS[4]. APS affects young women, in the most productive years of their life, and the consequences of tissue damage involve disability, limitation in activities of daily living, cognitive dysfunction, and fatigue. In the case of pregnancy complications, emotional and psychological distress reflected as to impair the mental domain in quality of life (QOL)[5].

Significant of the study: Improving QOL can be in term of knowledge of the disease which involves information about the causes, exacerbating factors, symptoms, and available method of treatments and consequences about the disease; all these have been shown to facilitate adaptation to a chronic disease and improve physical, psychological, and social functioning. Even though previous studies already been conducted in the field of QOL of APS, the knowledge gained in this field in the Egyptian context is still very limited, so this study conducted to evaluate the effect of informational support onQOL among pregnant women having APS.

Hypothesis: Providing informational support to the pregnant women with antiphospholipid syndrome may improve QOL

Materials and Method

A purposive sample of 43 women with APS was recruited for this study. The sample was calculated using power analysis (G power version 3.1.1) with a power of. 95 (β = 1-.95 =. 05) at alpha. 05 (two-sided) was used as the significance level, and large effect size= (.05)

Inclusion criteria: Criteria for inclusion were any pregnant woman who had one or more pregnancy losses associated with APS either primary or secondary; at any reproductive age

Tools for Data Collection

Two tools were used:

A. **An Interviewing Questionnaire:** It included data related to (a) socio-demographic data (b) past and present obstetric history; (c) medical history, (d) menstrual history.

B. **(WHOQOL-BREF):** It is a short version of the world health organization quality of life 100- scale instrument, it contains 26 questions; two general and the other 24 questions in the domains of physical health, psychological health, social relations and environment domain. It is a likert scale of 5 degree. The Arabic version of WHOQOL-BREF translated by Awadalla, & Jude, 2009 has been shown to display good discriminant validity, content validity, and test-retest reliability[6]

Procedures

Interview Phase: Each woman was interviewed to collect data related to socio-demography, obstetric, medical, and menstrual history; also an assessment of pregnant women quality of life using The WHOQOL-BREF questionnaire. The interview lasted for about 25-35 minutes for each pregnant woman.

Second phase: Included providing informational support to pregnant women having APS; the researcher met the woman four times per month (once weekly). Session duration ranged from 15-25 minutes. The first session contained the definition, classification, and the effect of APS on health; the second session contained diagnosis of APS, screenings and risk factors; the third session contained early reporting for danger signs, utilization of medical treatments; information about heparin, the fourth session contained promoting healthy behavior through better adherence to appropriate diet, physical activity recommendations

Third phase: Each pregnant woman was interviewed to assess QOL. The duration of the interview ranged from 15-25 minutes.

Results

I. **Description of the Pregnant Women according to their Sociodemographic Data:** Results indicated that, the pregnant women age ranged from 20 to less than 45 years old, with a mean of 31 years old. The highest percentage (34.9%) was in the age group 30 < 35 years while the lowest percentage (7%) was in the age group 40 < 45 years. moreover, 51% of them lived in rural areas. As for occupation, 83% were housewives. In addition, 88% of them reported that they had not enough family income (**Table 1).** As regards the level of education, less than half of the pregnant women completed their technical/ secondary education, more than one-quarter of them 18.6% can read and write, and 14 % completed their university education (Figure, 1)

II. **WHOQOL-BREF before and after informational support:**

   A. **Description of the overall QOL and the perception of their health before and after informational support:** Results revealed that

20.9% of the pregnant women rated that their overall QOL were good compared to 32.6% after informational support. In relation to how pregnant women were satisfied with their health, 20.9% perceived that their health was good compared to 32.6% after informational support. There was improvement between the perception of pregnant women as regard to rating their QOL and their health satisfaction before and after informational support. Also, there was a highly statistically significant difference between the items of rating QOL and the items of health satisfaction before and after informational support (Table 2).

B. **The relationship between the four domains of QOL mean scores (physical, psychological, social, and environmental)before and after informational support**

The results indicated that the social relationships domain, which presented the highest mean score (13.64) was assessed as the domain with the best perception of QOL and, the environment domain, which was associated with the lowest score (8.56), was considered the worst perception of QOL. After informational support a significant difference (P < 0. 05) was identified in the Physical, and environment domains which leads us to conclude that there is a better QOL perception in these domains (table 3).

Table (1): Distribution of pregnant women according to their socio- demographic characteristics

Socio-demographic data	N = 43	%
Age		
(20-<25)	5	11.6
(25-<30)	13	30.2
(30-<35)	15	34.9
(35-<40)	7	16.3
(40-<45)	3	7.0
Mean ±SD=	31.04 ± 5.09	
Residence		
Rural	22	51.2
Urban	21	48.8
Occupation		
Housewife	36	83.7
Worker	7	16.3
Family income		
Not enough	38	88.4
Enough	5	11.6

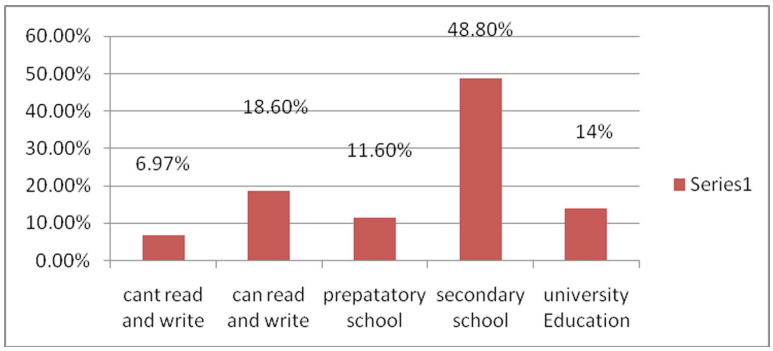


Figure (1): Distribution of pregnant women according to their level of education

Table (2): Comparison between the overall QOL perceptions for pregnant women having APS and the perception of their health before and after informational support (n= 43).

Rating quality of life	Very poor	Poor	Neither poor nor good	Good	Very good
Before No (%)	8(18.6)	10(23.3)	16(37.2)	9(20.9)	0
After No (%)	1(2.3)	8(18.6)	19(44.2)	14(32.6)	1(2.3)
$X^{2=}$ 33.121 P=. 001					
Health satisfaction	**Very dissatisfied**	**Dissatisfied**	**Neither satisfied nor dissatisfied**	**Satisfied**	**Very satisfied**
Before No (%)	12(27.9)	12(27.9)	7(16.3)	9(20.9)	3(7)
After No (%)	3(7)	6(14)	16(37.2)	14(32.6)	4(9.3)
$X^{2=}$ 57.966[a] P=. 000					

* Statistically significant difference at p≤0.05

Table (3): Mean scores of QOL for the four domains among pregnant women having APS before and after informational support

Domain	Informational support		Wilcoxon test	
	Before	After		
	M±SD	M±SD	Z value	p- value
Physical health	11.77±2.32	12.03±2.18		.022
Psychological	11.64±2.32	12.03±2.25	-1.516	.129
Social relationships	±3.32	13.45±3.26	-.715	.475
Environment	±2.56	10.36±2.12	-5.247	.000

Discussion

The current study results revealed that there was an improvement between the perception of pregnant women having APS as regard to rating their QOL and their health satisfaction before and after informational support. Also, there was a highly statistically difference between the items of rating quality of life and the items of health satisfaction before and after informational support (p-value < 0. 05). This result may be the information provided to women which consequently changed their attitude which become positive toward better pregnancy outcome.

Also in Egypt the health care providers have no time to give the women any information about the disease specially when the mother follow in the governmental hospital due to the flow rate of the women; Also lack of nurse's knowledge regarding the APS. So, providing information for pregnant women with APS about illness and its treatment, caring, being present, communicate all kind of this support provides the patient with the sense of normality in their life, support also affect the mental balance, sense of relief, decrease fears, anxiety, stress, increase in women satisfaction through increasing their knowledge and their ability to cope all this might affect health-related quality of life

This result similar to the study finding's of Georgopoulou et al, (2018) who studied The relationship between social support and health-related quality of life in patients with APS, and concluded that social support in the form of emotional, instrumental and informational support was linked to improving health-related QoL, and perceived informational support through provision of disease-specific education was highly statistically difference with physical, social functioning and vitality domain of QOL (p = .05, p=.02, p=.01 respectively)[7]

In the current study findings, The highest mean scores were for the social relationship 13.64 ± 3.32 and the physical 11.77±2.32 then psychological domain 11.64 ± 2.32 and mean scores were lower for the environment domains 8.56 ± 2.56 which contains questions about (safety life, physical environment, financial state, information, living place, health services, transport). The lowest mean score was for the psychological domain and environmental. This may due to, the economic burden that the women suffering from the expensive treatment and the low level of the information that the women had, also the low score of the psychological domain, This may due to the threats and the pregnancy complications that the women faced due to this disease. the highest score for the social relationship may be due to the social context of the Egyptian culture in which people enjoy strong social relationships and family connection.

The previous findings also supported by Georgopoulou1 et al (2018)[7] who described the health-related quality of life (HRQoL) for people with APS, and concluded that QOL in better in physical domains, but poorer in psychological domains. While Alba et al, (2016) who assessed organ damage and quality of life in antiphospholipid syndrome, clarified the presence of low scores in the physical and mental health domains [5]

The current result revealed that, there was a better QOL perception in the physical and the environmental domains after providing informational support for the women having APS, as there was a statistically significant difference (p < 0.05) before and after informational support regarding those domains. This result is similar to the study of Reis, and Costa (2010) who evaluated the quality of life (QOL) of women with systemic lupus erythematosus (SLE) and the association between QOL domains; and detected a significant difference (P < 0.05) in the physical, psychological, and

environment domains, when confronting QOL domains with education about SLE[8].

Conclusion

Before the implementation of informational support, the worst QOL domains were environmental then psychological domain, while after informational support there was an obvious improvement related to environmental and physical domains. So the research hypotheses were accepted

Recommendations:

1. Implement informational support as a part of nursing care protocol in high risk pregnancy department.
2. Studying the lived experience of women with APS using qualitative approach

Ethical Clearance: A primary approval was granted from the Ethical Research Committee at faculty of nursing, Cairo University to carry out the current research in November 2017. Informed written consent was taken from each pregnant woman who was willing to participate in the research and the researcher emphasized that, their participation in the research is entirely voluntary, and that they have the right to withdraw at any time without giving any reason and without affecting their care. At the same time, pregnant women were informed that, the research posed no risks or hazards on their health. Measures were taken to assure confidentiality as coding of data and participants were ensured that the collected data will be used only for the purpose of the research.

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Conflict of Interest: The authors declare that there is no conflict of interest.

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Nutritional Content and Quality Analysis of Palm Sugar in Pledokan Village, Sumowono

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Abstract

Palm sugar is a natural sweetener containing nutrients and antioxidants. The aim of this research is to measure nutrient content (reducing sugar, sucrose, water and ash content), number of bacteria, and antioxidant level of palm sugar. The sample in this study was palm sugar randomly taken from ten different production sites. Nutrient content determination used luff schoorl method and antioxidant measurement used DPPH method. Based on the analysis of reducing sugar content, all samples met SNI 01-3743-1995 criteria, with an average of 7.16% (5.14% up to 8.73%). The average of sucrose was 76.6% (62.50% up to 88.58%). There was 40% of the palm sugar samples having sucrose content that meets the criteria. The average of water content was 10.34% (7.79% up to 11.86%). The water content of palm sugar suitable with the criteria was 30%. While the total ash content of palm sugar suitable with the criteria was 50%. The ash content average was 3.1% (1.1% up to 6.3%). The number of lactic acid bacteria found was still within normal limits. The average number of bacteria was 6.4 x 10^4 (CFU/ml), (0 x10^4 (CFU/ml) up to 27 x 10^4 (CFU/ml). The average antioxidant content was 84.60%, with the lowest strength of 89.71% and the highest strength of 74.73%. In conclusion, The nutritional content of the sample has not met the SNI 01-3743-1995 criteria as a whole. The palm sugar produced in Pledokan Village, Sumowono are still safe to eat (based on the number of bacteria). The antioxidant activity of palm sugar in Sumowono Village is strong (50% - 100%).

Keywords: *Nutrients; antioxidants, bacterial count, palm sugar antioxidant.*

Introduction

The increasing of community needs and dependency on sugar consumption every year on a national scale is not appropriate with domestic production capacity so the fulfillment of sugar is more fulfilled through imports. One effort that can be taken to help this condition is the diversification program, especially the source of non-cane sugar. Sugar palm is a product produced from palm trees that can be used as one source of raw materials in terms of quality and attractive appearance.

Palm sugar is one of the natural sweetener derived from *nira*, a sweet liquid of palm tree, as the main ingredient. *Nira* or palm juice is a sweet liquid obtained from the stems or sap bunch plant flowers such as sugar cane, beetroot, sorghum, maple, *siwalan*, dahlia flowers or palm family such as palm, coconut, *nipa* palm, sago and date palm.[1] Sugar trees in Sumowono are still growing wildly and widely used by the community. This is because the palm tree has economic value from the processing of the physical parts of the tree. The processing of palm juice into sugar is still in traditional way. The palm juice used is including commodities that rapidly change into acid because of the fermentation process that began when the palm juice out of palm tree bunches. It is also supported by the condition of the reservoir that is not clean and the presence of microbes that cause the fermentation process more quickly. The degree of palm juice acidity (pH) of the sap when it first comes out of the bunch is about 7 but it can decrease as the fermentation process occurs.[2, 3]

One of the processed product that quite popular in the community from raw materials of palm sugar / palm

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juice is made as brown sugar. Palm sugar has several advantages and uniqueness in terms of taste, nutrition, micronutrient level and distinctive flavor that become the main attraction for consumers.[1, 4] There are some things that serve as the quality parameters of brown sugar such as ash level stating the metal solids contained in the sugar which in brown sugar has ash level exceeding the applicable standards it could be bad for the body because of the metal will accumulate in the body consumers. For the parameters determining the quality of others can also be known from their ability to prevent the free radical and maintain the body's immune through the antioxidant activity it has.[5, 6]

The purpose of this study is to provide information on the nutritional content and quality of brown sugar products produced in Sumuwono village so it can be used as reference to know the quality of brown sugar production in Sumuwono village.

Method

The research were made on brown sugar, where the variables observed in brown sugar included sensory (color) and chemical parameters (reducing sugar, sucrose sugar, moisture level, ash level, antioxidant activity, and total bacterial).

Sugar palm samples were taken from 10 different production sites in Sumuwono village and color sensory tests were performed. Other substances used as reactants in the test of reducing and sucrose sugar are luff school solvent, water level test, BAL test, reducing sugar, sucrose, and ash (analytic balance, porcelain cup, furnace, oven and desiccator).

The stages done include sampling and tested the water level, ash level, reducing sugar, sugar level of sucrose, BAL and color organoleptic examination conducted in the laboratory. The determination of reducing sugar content and sucrose analysis was done by luff school method in Nutrition Chemistry laboratory of Diponegoro University. The determination of ash level and water level used gravimetric method involving furnace. The principle of this method is the difference of sample weight before and after through the oven in 105°C for two hours, while on the test of combustion ash level with furnace in 521°C for 4 hours.[3] The antioxidant antivity of palm sugar was analyzed using DPPH (1, 1-defenyl-2-picrihidazil) method by duplicating *spetometrophotometry* to know the sample of absorbance wavelength.[7, 8] The examination of total bacterial on palm sugar using BAL test method (lactic acid bacteria) conducted in integrated laboratory of Diponegoro University.

Results and Discussions

The analysis of reducing sugar level, sucrose sugar level, moisture level, ash level, antioxidant activity, and total bacterial in palm sugar sample can be found in following table:

Tabel 1. The Level of Reducing Sugar, Sucrose Sugar Level, Moisture Level, Ash Level, Antioxidant Activity, and Total Bacterial in palm sugar sample (n = 10)

Sample Name	Reducing Sugar Level (%)	Sucrose Sugar Level (%)	Moisture Level (%)	Ash Level (%)	Antioxidant Activity (%)	Total Bacterial (CFU/ml) × 10^4
A	5.14	88.58	11.78	4, 3	74.73	1.11
B	5.85	83.18	11.07	2, 4	83.94	27.00
C	8.73	83.18	**10.63**	1, 3	82.31	4.00
D	8.29	**70.63**	7.79	1, 1	83.94	1.00
E	8.16	**75.00**	9.44	**6, 3**	86.10	5.00
F	6.48	**72.90**	**10.39**	2, 0	82.13	4.00
G	7.48	**62.50**	**11.57**	1, 3	89.17	20.00
H	8.48	82.50	**11.86**	1, 7	89.71	0.00
I	6.10	**72.90**	8.13	3, 9	89.17	2.00
J	7.04	**75.00**	10.75	6, 2	84.84	0.00
The Average of	7.16	**76.60**	10.34	3.1	84.60	6.40
SNI 01-3743-1995	Max 10	Min 77	Max 10	Max 2		Max 500

Sucrose is a disaccharide group with a single glucose molecule attached to a single fructose molecule. Sucrose is not included in the reducing sugar group because it has no free carbonyl group. The reducing sugar group

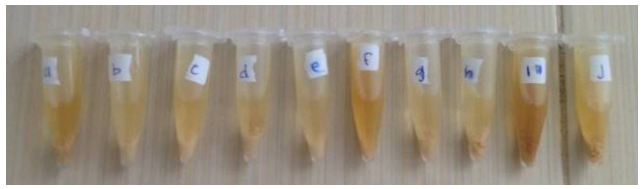
includes glucose and fructose monosaccharides. The inversion process that occurs shortly after the palm juice is tapped until become sugar can affect the reducing sugar and sucrose. The presence of acids during the boiling process of sucrose solvent will cause the hydrolysis process to produce reducing sugar where the inversion velocity is affected by temperature, heating time, and pH of the solvent.

A good palm sugar has characteristics in accordance with the National Standardization Agency (BSN) which is safe to consume if in accordance with SNI 01-3743-1995.2 The normal limit of sugar reducing of sugar level should be no more than 10% wet weight and a minimum sucrose level of 77% wet weight of the product. The palm sugar samples from Sumowono village have fulfilled the requirement of reducing sugar but for sucrose sugar parameter, not all samples meet the standard criteria.

The water content in a substance can affect the durability of the product during the storage process. Microorganisms will grow at a fairly high water level because it will make the conditions of water activity suitable as the medium for life. Based on SNI 01-3743-1995 the water level of palm sugar should be no more than 10% by weight of the product. As the samples tested only three samples that meet the criteria, they are D, E, and I. The high sugar levels indicate that the product has water vapor absorption from the environment. It is suitable with the nature of palm sugar, hygroscopic that is easy to absorb water from the environment.

The analysis of ash level on a material is needed to see the mineral content of the product. In food, the mineral content is determined by spying method. According to the government regulations in SNI 01-3743-1995 regarding the requirement of the quality of brown sugar, a good palm sugar has ash level no more than 2% bb, otherwise if the level of ash exceeds the standard then brown sugar is classified as low quality.

From the research results, it can be seen from 10 samples tested, 5 of them have levels above the specified standard, while the other 5 have good quality. Based on the research conducted by Maharani (2014) mentioned that one of the causes of high ash level in palm sugar is high temperature during the production process, the presence of insoluble solids derived from non-sugar materials such as impurities entering during the production process or from additional ingredients such as preservatives used like Na-Metabisulfate.[9]



There are two classifications of antioxidants based on the source, they are synthetic antioxidant and natural antioxidants. The antioxidants found in plants belong to natural antioxidants. The antioxidant testing method involves DPPH as an indicator because DPPH is a stable free-release compound. DPPH absorbance values ranged is between 515 to 520 nm but in this study the absorbance value is 517 nm.[10, 11] During the test process, DPPH will be incubated with the samples that have reacted with methanol so that the color of DPPH solvent will fade into yellow color derived from the *pikril* group. A compound that has potent antioxidant will have the IC50 value ranges from 50% - 100%.[12] Based on the analysis of antioxidant activity that has been done shows that the sample has a strong antioxidant levels.

Picture 1. The color of sample solvent

The lactic acid bacteria can produce physiologically lactic acid.[13, 14] These bacteria can be found in foodstuffs as well as gastrointestinal and urogenital tracts of humans and animals. During its growth, lactic acid bacteria can produce metabolite components including *bacteriocin*. *Bacteriocin* in sufficient quantities can kill or inhibit other bacteria that also competent in the same ecology.[15] The contamination and growth of microorganisms was also analyzed in samples where based on the Thai ministry of industry that total microorganisms should no more than 500 CFU / ml.[6, 16] As all samples are still below the limit so that palm sugar products are safe.

Conclusions

The palm sugar produced in Pledokan Village, Sumowono are still safe to eat (based on the number of bacteria). The antioxidant activity of palm sugar in Sumowono Village is strong category (50% - 100%) and all samples are still below the limit so that palm sugar products are safe.

Conflict of Interest: The author said that there was no conflict of interest in this study.

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Ethical Clearence: Research has obtained approval from Public Health Diponegoro University Ethics Commission with Number.080/EC/FKM/ 2018.

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Determinants of Unmet Need for Family Planning in Tegal and Klaten Regency

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Abstract

Tegal Regency has the highest unmet need for family planning at 14.54%, Klaten Regency's unmet need is still high at 14.40%. The aim of this research is to analyse the factors causing the unmet need in Tegal and Klaten Regencies. The research population includes all the women of reproductive age in couples, with total number of 483,144 and the samples set, selected by simple random sampling of 268 respondents. The result show that is a significant correlation between the number of live children unmet need (p = 0.001), correlation between attitude and unmet need (p = 0.007), correlation between attitude and knowledge (p = 0.001), correlation between age groups and unmet need (p = 0.035), correlation between opinion on contraceptives as a sin and unmet need (p = 0.002), correlation between the respondent's beliefs that contraceptives are against their religion and the unmet need (p = 0.028), and correlation between social media exposure and unmet need (p = 0.001). The family planning field counselors experience a harder work load as the work areas are getting wider. The paper concludes that perception and knowledge about the definition of unmet need by the family planning field counselors is very limited. The roles of religious and community leaders in providing counseling on contraceptives and unmet need are limited. Based on this study it is suggested that communication, information and education should be developed using interactive dialog method, coordination by and roles of the family planning field counselors should be improved, and family income and wealth should be increased through a family welfare income increasing program.

Keywords: *Family planning field counselors, community leaders, women of reproductive age, contraceptives, unmet need.*

Introduction

The family planning program in Central Java has not shown the maximum results. This can be seen from the result of the Demography and Health survey of Indonesia in 2007, which showed the number of Total Fertility Rate of Central Java, as 2.3, and it became 2.5 in 2012. The result of family census in 2015 showed the percentage of women of reproductive age who were married and using contraceptives was about 74%, who were not using any contraceptives was 26%. These figures indicate that the dropout and unmet need is still high.[1]

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Unmet need refers to women who do not want to become pregnant or want to or space out their pregnancies but are not using contraceptives to prevent their pregnancy. The term unmet need does not include unmarried women, women using contraceptives, women failing to use contraceptives, pregnant women considered infecund, or fecund women willing to have the next child in less than 2 years.[2]

Based on the data of the field control report until December 2015, the unmet need in the province in December 2015 was 10.48%. This indicates that optimal efforts are needed to lower the unmet need. The range of the unmet need in the regency/city was from 14,54% in Tegal Regency (the highest) to 6.75% in Demak Regency (the lowest)

Tegal Regency, which has the highest unmet need represents the north coastal areas, and Klaten Regency which has high unmet need with 14.40% represents the mid-south areas and mountainous areas.

Method

The type of research is Explanatory Research. This study utilizes quantitative and qualitative research approaches. The quantitative approach is employed to explain the factors related to the occurrence of unmet need in a society where the research population is women couples of reproductive ages aged 10-49 years. The research population is all women of couples of reproductive age (aged 10-49 years) in Tegal Regency and Klaten Regency with the total 483,144. The sample selection is done by determining the clusters/villages which has high unmet need rate. The samples in those clusters are chosen randomly, with the number of samples based on the Issac and Michael formulas. The number of the samples chosen is 268.

Results and Discussion

Based on the study the average age of women of reproductive age in Klaten and Tegal Regency was 36.4627 in April 2016 with a deviation standard of 7.40954, and a median 37. The percentage of respondent's knowledge between the respondents with the good knowledge and attitude about family planning and those with less knowledge and attitude about family planning was almost the same.

A study done by Waqas Hameed, et all in Pakistan indicates that the higher the age, the higher the chance of unmet need.[3] This happens because unmet need in older age happens more for limiting the number of children. Based on the study done by Susiana Sariyati, Sundari Mulyaningsih, and Sri Sugiharti in Yogyakarta, the respondents assume that at that age they are not in the reproductive age anymore, think that they are already old so there is a little possibility for them to be pregnant, and ages >35 years are the period of the end of reproductive are not true. Instead women at those ages still have possibility to be pregnant.[4] A mother with a lower education or higher education may experience unmet need due to the health problems that they have when using any contraceptives. It differs from the result of study conducted by Ali, in Sudan which shows that the education of a husband and a wife relates to the occurence of unmet need. [5,6] The research by Susiana Sariyati, et all, it shows that the higher of one's education, the higher the occurrence of the unmet need. This happens because they have known how to prevent pregnancies in natural way so they do not want to use modern contraceptives.[4] This study is also in line with the research conducted by Sherin Raj T., V.K. Tiwari and J.V. Singh, which states that education status has no relationship to the unmet need of family planning in Rajahstan. For women with education of 10 years or more, 32 % more experience the unmet need for limiting, whereas 19% of illiterate women have the possibility to experience the unmet need.[7]

Table 1. The characteristics of women of reproductive age (n=268)

Category	f	%
Age		
<20	0	0.0
20-35	**137**	**51.1**
>35	131	48.9
Age first getting married		
15 years	1	0.4
15-19 years	57	21.3
20-24 years	**146**	**54.5**
25-29 years	57	21.3
30-34 years	6	2.2
35-39 years	1	0.4
Education		
No education background	11	4.1
Elementary School	72	26.9
Junior High School	75	28.0
Senior High School	**92**	**34.3**
University	18	6.7
Number of children born alive		
≤ 2	**183**	**68.3**
> 2	85	31.7
Knowledge		
good	131	48.9
less	**137**	**51.1**
Attitude		
good	151	56.3
less	117	43.7

More children cause the chance of higher unmet need than less children.[4] The number of children has a role in the occurrence of unmet need.[2] Based on the 2007 Demographic and Health Survey report of Indonesia, women's intention to stop births increases after they have two children or more.[8] If it relates with the demand of contraceptives for spacing the births, the demand of contraceptives appears when a woman has already had a child. Based on research done in Uganda, women who have 3 or 4 live children have twice the possibility of experiencing unmet need than women who have between zero or two children, and the couples of reproductive age who have 5 children or more are three times more likely to experience the risks of unmet need.[9,10] According to

Ahmadi and Iranmahboob (2005), the less knowledge of the respondents, which is found out from the answers they give suggests that there are still respondents who do not know about the family planning program or its goals or about contraceptives and their purposes.[11] The factors, which have roles in forming the behaviour can be divided into two, the internal and external factors. This study also aligns with the one conducted by Kurnia Wulandari Fitri (in 2015), it shows that there is no relationship between knowledge and the case of unmet need because the case of unmet need is affected by another factor namely side effects. Even though the knowledge is good, someone could stop or not use contraceptives when they experience side effects that affect their health.[12] Respondents identified various side effects including physical weakness, change in body weight, menstruation problems, infertility, malformation in the new born babies and death. The increasing complaints about the side effects causes negative attitudes by reproductive age couple toward using any contraceptives.[13] The reason is it does not follow the sunnah of the apostles which says that children are God's sustenance, so inserting any things into the body is considered haram, it changes the God's destiny, and therefore contraceptives are haram.[7] Woman who have not discussed contraceptives with their husbands in the last year have a higher percentage of unmet need than those who have discuss them with their husband, even if only once or twice.[14]

In carrying out the family planning program, the program management of family planning in Klaten Regency is required. The management of the family planning program aims to giving effective services, which suit the need of society, so the unmet need should not happen. The problems existing in the management of family planning program in Klaten and Tegal Regency are the same. They are the limited contraceptive management fund and family planning promotion, and no promotion segments from the Board of Woman Empowerment and Family Planning. The problems faced by the Board of Woman Empowerment and Family Planning in Klaten Regency in collecting unmet need data that are not valid is because of the limited budget and less coordination between family planning field counselors and cadre and midwives. There is no monitoring from the leaders or The National Family Planning Coordinating Board in family planning data collection which includes the data from village district to sub district until Regency. The work performance of the family planning field counselors affects the occurrence of unmet need.[15,16]

The study results also show that there are problems related to the role of midwives in Klaten and Tegal. The midwives do not fully comprehend the unmet need and target set by the National Family Planning Coordinating Board, which expects them to function as educators to provide understanding to the cadres concerning the unmet need of contraceptives. The facilities provided are only family planning forms and aids for decision-making. Considering those matters, there is a need to provide budget, reward, and punishment for the implementation of the program to reduce the unmet need. The evaluation on contraceptive mounting by midwives in Klaten is intended for IUD contraceptives and Implant contraceptives. The supervision of IUD contraceptives is held every one week, two weeks, 1 month, six months, and a year after mounting, whereas the supervision of implant contraceptives is done 3 days after mounting. This is different from what happen in Tegal Regency where midwives do not do any evaluation since the women there do not have medical records for their family planning program. The midwives in Tegal Regency should have the medical records data so that they can be used for evaluating the program and supervising the society concerning the use of contraceptives.

The midwives in Klaten have another problem that relates to the complaints and complications that happened to one implant contraceptive and IUD acceptor which causes the acceptor become traumatic in using implant and IUD contraceptives. It is worried that the complaints will spread to other societies and create a bad perception about those contraceptives.[12,17]

The role of health workers is very important to provide understanding for society so that they can strive to use contraceptives to reduce the number of cases of unmet need. The roles of husband and spouse will maximize the contraceptive use.[18] Based on the related research on the roles of family planning field counselors in Tegal Regency, they directly throw themselves into society to reduce birth rates and provide counseling by motivating society to use contraceptives. On the other side, the roles of family planning field counselors in Klaten Regency has more organised work-plans. They give routine counselling which is aimed at the acceptors who have 2 children and evaluate the program based on the data results. The other existing problems are there are no additional fees related to their roles, there are no rewards if the program runs successfully and there are no sanctions from the government if their job cannot be performed well.

The religious leaders should be trained by the Board of Women Empowerment and Family Planning in Tegal in relation to their roles as the information giver and the motivator for the couple of reproductive age to participate in the family planning, cause the religious leaders are usually people who are trusted and close to the society and their behaviour is embraced by the community.

Conclusion

Based on the research on unmet need in Klaten and Tegal, it can be concluded that there are some problems related to the role of the Chief of the Board of women Empowerment and Family Planning, midwives, family planning field counsellors, cadres, community leaders and Religious leaders cased of unmet need. The vacuum of contraceptives will cause the increase of the case of unmet need. The access providing the contraceptives have been evenly in various health services. The family planning field counsellors feel the heavy workload since their work areas are getting wider. Monitoring and evaluating on the work of family planning field counsellors are not optimal, they do not give any sanctions if the set work performance targets are not met.

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Duta Safety Riding: The Actors of Traffic Accidents Prevention in Samarinda, East Kalimantan, Indonesia

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Abstract

Traffic Accident is the main cause of death for adolescents. The adolescents' thought that they've matured enough to ride motorcycles on roadway, although the knowledge about safety riding they had was low, and it made they usually on dangerous situation which riding which leads to fatal accident, which could cause disabilities or death. Therefore, safety ambassador group as peer group in act on safety as prevention step to decrease the number of accidents on roadway. Training was given to increase knowledge and attitude about safety riding as the priority on preventing traffic accidents. Since safety riding ambassador could be a role model for other teenagers to act on safety riding. The aims of this research was giving training about safety riding to safety riding ambassadors in order to increase the knowledge and behavior on safety riding. This research was a pre-experimental using one group pre-posttest design. There were 25 high school students as the samples using purposive sampling. The results have shown that the average score about knowledge was 18.12 before training, while after training it was 18.32. The average of safety riding behavior before training was 140.6, while after that, it was 141.6. The statistic test had shown that there is no difference on safety riding behavior before and after training (p=0.06), however there was the difference on knowledge before and after training (p=0.05). This research can be concluded that training could increase the safety riding ambassadors' knowledge about safety riding.

Keywords: *Adolescent, Peer, Safety Riding, Traffic Accident.*

Introduction

Each year, traffic accident related death takes 1.25 million people, most of which are teenagers aged 15–29 years old, and 90% of the misfortune occurs in developing countries.[1] Fifty percent of death on the road are walker, bicycle riders, and motorcycle riders.[2] Indonesia, as one of the developing countries, has 120 deaths each day due to traffic accident. The newest data from the Directorate General of Land Transportation showed that the average growth of traffic accidents in Indonesia was 16.59 %.[3]

The mortality among teenagers both in America and Developing countries caused by traffic accident[4, 5] grounded on the fact that most teenagers consider themselves matured enough to ride motorcycles[6] The risk of accidents for young riders (18-24 years old) is as twice as higher than that of adult riders.[7 8]

Department of Transportation of Samarinda reported that traffic accidents took place in East Kalimantan was 1.767 in 2010 and decreased into 1.347 events in 2011. From 2.115 victims-related traffic accident, 463 lost their live, 517 had severe injuries, and 1.135 had minor injuries.[3] Traffic Police Station of Samarinda reported the number of deaths cause traffic accident increased in 2013, 83 people died, while in 2012, within 249 events of the traffic accidents, 67 people died.[9]

Setyowati[10] observed that 50.8% respondents have unsafe behavior, 49.2% respondents have poor knowledge about safety riding, and 57.8% have negative perception about danger on a roadway, the reasons of students riding motorcycle themselves are that no one can take them to school (39.4%) and the schools are too far from their homes (11.7%).

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The intervention explored in this paper covers giving education about safety riding to Safety Riding Ambassadors as peer group education, it is expected that participants' knowledge, skills, and awareness about safety riding increase; so that, the number of traffic accidents would decrease.

Given this situation, this paper analyzes the impact of giving training to increase knowledge, attitude, and skill rates of students chosen as Safety Riding Ambassadors among students of Senior High School who act as the peer group educators in Samarinda.

According to Soehodho,[11] the factors, human errors are the most taken place in Indonesia causing death or injuries involving students who has lack of knowledge about safety riding. In dealing with this situation, providing education and training to the students in the right way is expected to decrease the cases of traffic accidents.

The aim of this study was to analyze the impact of training about safety riding on their knowledge, attitude, and skills as the Safety Riding Ambassadors. This research was conducted while giving the training about Safety Riding and analyzes the impact of training to the knowledge, attitude, and skills of 25 Senior High School Students chosen as Safety Riding Ambassadors in Samarinda.

Method

This quantitative study using pre-experimental design on one group was conducted using pre-posttest approach; before and after the experiment. Purposive sampling technique was used to choose 25 Senior High School Students from 315 students who have participated in Safety Riding Research in 2017. The chosen ones were quantified based on the scores in answering questionnaire about safety riding, and they were asked to sign a written permission and an informed consent to participate in the study.

The materials given were including traffic regulation, safety riding, and riding test. The respondents were asked to complete the three sections questionnaires before and after the training. Section A was about The characteristic of Respondent; B: The Attitude about Safety Riding; and C: The Knowledge about Safety Riding. The questionnaire was designed using strict questions of Likert scale; for the attitude about Safety Riding, the answers were 1= Never, 2= Sometimes, 3=Often or 4= Always; meanwhile, the knowledge was measured using Gutman Scale, Correct – Incorrect.

The analyses was conducted using SPSS v 24.0 with Wilcoxon test for 2 related samples, for all results the statistical significance were reported using p value, and the significance level was set at $\alpha = 0.05$.

Results and Discussions

Socio-demographic characteristics

Table. 1 Respondents Frequency Distribution Based on Respondent Characteristics

No	Characteristics	(n)	(%)
1.	**Sex**		
	Men	6	24.0
	Women	19	76.0
2.	**Ownership of SIM C**		
	Yes	4	16.0
	No	21	84.0
3.	**Have Experience Traffic Accident**		
	Yes	15	60.0
	No	10	40.0
4.	**Age (Year)**		
	16	6	24.0
	17	19	76.0
	Total	25	100

Table 1 shows that 76.0% of the respondents are 17 years old female, 84.0% has no driving license (C level), and 60.0% has experiences of traffic accidents.

The results showed that 17 years old female with no driving license and had dealt with traffic accidents dominated the characteristics of the respondents. The law number 22, 2009 About Traffic and Vehicles permitted 17 years old citizens to have driver license. Driving license is the evidence of registration and identification given by the Police of Republic of Indonesia to its citizens who meets all the administrative requirements, such as physically and psychologically healthy, understand the traffic signs, and skill full in riding vehicles.[12] Therefore, as 84.0% of respondents had no driving license, the respondents had no sufficient knowledge and skills in riding vehicles.

This fact suggested that the risk to have a number of traffic accidents could increase for the students did not have sufficient skills on safety riding; while, 60.0% of the respondents had experienced to be the victims of traffic accidents. Unskilled riders have risk of death 0.263 times than skilled riders,[13] and in Indonesia, traffic accident related death is also influenced by the number of population and vehicles, eligibility to have driving

licenses, and distance of a journey.[14]

Traffic police task force of Samarinda and Transportation Department of Samarinda delivered the training about safety riding observed in this study. The training materials were subjects related to traffic and vehicles regulation, traffic signs, vehicles equipment, traffic instructions, safety riding simulations, and riding practice test. The training was conducted in two days at SMA Negeri 3 Samarinda (State High School 3 of Samarinda), and the safety riding simulations and riding practice test were conducted at police station in Samarinda.

All of the materials, simulations, and riding practices test were given to safety riding ambassadors who would act as the peer group educators. This training was given to the safety riding ambassadors since they are still teenagers, and teenagers in the same ages can communicate more openly and easily rather than parents and teachers.[15] Most adults who have regular contact with adolescents understand the value and importance that these young people attribute to their friends and peers. Many people would concede that such groups serve as the primary means by which teenagers share and validate each other's struggles to develop new identities and to assume new, more mature roles. Many would also concede that peers usually provide emotional support and intimate counsel when adults are unavailable or appear indifferent. On the other hand, many adults regard peer groups as the instigators of all the problems we commonly associate with adolescence: defiance of adult norms, the use and abuse of alcohol and drugs, delinquency, sexual experimentation, experimentation with guns, and even suicide.[16] So utilizing peer friends to deliver positive information related to teenagers' safety can be considered as a health promotion strategy.

Table. 2 The Distribution of Knowledge Rate and Attitude Rate of the Respondents Before and After The Training

No	Characteristic	Before		After	
		(n)	(%)	(n)	(%)
1.	**Knowledge**				
	Poor	13	52.0	16	64.0
	Good	12	48.0	9	36.0
2.	**Attitude**				
	Poor	12	48.0	11	44.0
	Good	13	52.0	14	56.0
	Total	25	100	25	100

Table 2 shows the percentage of safety riding knowledge and attitude among Duta Safety Ridings before and after training. Most of them (48.0%) have poor basic attitude regarding safety riding and turn into 44.0% after getting the training. Meanwhile, 48.0% respondents have poor knowledge about safety riding, but turn into 36.0% after getting the training.

Table. 3 The Results of Wilcoxon Test

Variable	n	Median (Min-Max)	Mean	p
Knowledge				
Before	25	17 (13-27)	18.12	0.05
After	25	18 (13-27)	18.32	
Attitude				
Before	25	142 (106-190)	140.6	0.06
After	25	144 (112-171)	141.6	

Table 3 shows the average score (mean) of respondents' knowledge about safety riding, increasing from 18.21 in pre-test to 18.32 in post-test. The average (mean) of respondents' attitude about safety riding increases, from 140.6 in pre-test to 141.6 in post-test. The statistic result using Wilcoxon Test for the variables of knowledge about safety riding has p= 0.05, meaning that there was a significance difference to the level of knowledge before and after training. Meanwhile, the statistic result using Wilcoxon Test for the variables of attitude about safety riding has p=0.06, meaning that there was no significance difference to the level of attitude before and after the training.

In conducting the program, peer educators (Safety Riding Ambassadors) delivered the information related to safety riding to their peer friends, since in peer education continuous interactions between peer educators and their peer friends is possible to happen. Peer education is important, and considered as an effective way to alter people behavior; consequently, peer educators had to have a better level of knowledge, attitude, and skills to be good examples and role models for their peer friends. Meanwhile, the result related to knowledge variables of safety riding was p = 0.05, meaning that the training program influenced the respondents' knowledge level. This result of this research was in line with the one of Erawan[17] that the average score improvement on students' knowledge and attitude related to traffic accident prevention is p= 0.000. In this research, the average score of knowledge before and after training was 18.12 and 18.32 respectively, which meant that there was an improvement of knowledge about safety

riding; although, it was not significant (0.2) since the level of the respondents' knowledge about safety riding was already good (48%).

Furthermore, the score of the respondents' attitude about safety riding before training was poor (48%) and it decreased to 44% after the training, meaning that there was an improvement as the average score of the respondents' attitude before and after the training was 140.6 and 141.6 respectively. The improvement could also be identified from respondents' positive attitude to the statements proposed. For example, the sample statement states: not using helmets even if it is only for short-distance journey. In the pretest, 72% stated that it was wrong attitude, and in the posttest, the numbers of respondents provided similar positively answer improved to 80%. At the statement, "checking the vehicle before using it decreases the risk of traffic accident", 80% of the respondents answered it correctly in pre-test, and it changed to 84% in post-test.

Similarly, almost all of the statements proposed, such as there is no-smoking regulation, listening to the music while riding is not dangerous, obey to traffic light when there is a police and disobey it when it is not crowded, and the riding skill is not important were responded positively. However, since the statistic test was $p = 0.06$, the differences were not significant, so it could be interpreted that there was no difference of respondents' attitude about safety riding before and after the training or the training did not influence the respondents' attitude. This result was not in line with the one of Erawan,[17]who stated that peer education influences knowledge and attitude about traffic accident prevention in Senior High School students.

Dangerous condition, which is also a serious threat for riders, is the distraction while riding.[18] However, this research's finding showed that most of the respondents stated that no smoking prohibition and listening to the music while riding were not dangerous; in fact, smoking and listening to the music through cell phone were unsafe behavior. Smoking can increase the risk, bigger than using cell phones along the way, so that it is needed to promote to the public the information about those risks among people.[19] Using cell phone can decrease the rider's concentration, and teenagers usually use their cell phones while riding.[20 21] Moreover, teenagers usually get serious injuries while using cell phones when riding.[22] The using of cell phones while riding reflects the relationship level between cognitive and behavior.[23] The safety-riding ambassadors as peer educators were expected to deliver the information to their peer friends to decrease unsafe behavior such as smoking and listening to the music while riding.

Conclusions

The training would increase the knowledge about safety riding to the Safety Riding Ambassadors.

Conflict of Interest: There is no conflict of interest.

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Electrolyte Supplementation on Workers Under Heat Stress: A Preliminary Study on Workers' Hydration and Performance

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Abstract

Background: Heat exposure could harmed employees on many aspects. Prolonged activity under extreme heat often results in fatigue, poor concentration and dehydration. Lack of water consumption would make impact either in electrolyte balance or urinary tract system. This study examined electrolyte water supplementation and its impactin urine osmolality and employee's performance under extreme heat condition.

Method: Indoor temperature, workers' performance and indoor air humidity were measured. Seventy people were participated and divided evently into group A (isotonic) and group B (hypotonic). In a single blind experimental study, 3000 ml of isotonic and hypotonic solution were administered into group A and B, respectively, within 8 hours. Urine sample were taken at 10 am and 15 pm and reaction time test was done to measure performance at the end of working time.

Result: Low consuming water (400–1100 ml) in the first 4 hours was found in both group. Most of participants were stated as moderately hypohydrated state (average of urine specific gravity 1.026) in the beginning of working hours. There was no differences of urine specific gravity between two groups (U= 608.00, p=0.954). Workers' performance was found elongated (moderately fatigue) and there was no differences in both groups (U=706.05 and p= 0. 657).

Conclusions: Electrolyte supplementation in this study is not appropriately enough to maintain electrolyte balance among workers under heat stress environment. Heat stress and lack of water replacement will caused moderate fatigue

Keywords: *Heat stress; electrolyte supplementation; hydration status; work performance.*

Introduction

According to the Indonesian Minister of Labour Regulation No. 5/2018 on Occupational safety and Health Standards, it has been assigned that Indoor Temperature Threshold Limit Value (TLV) was at arnge between. TLV is determined with a view to giving limits in occupational safety and health through physical and chemical hazards[1].vv Heat exposures can triggered fatigue and work performances. Research conducted in Central Java on steel billet factory workers find a correlation of ambient temperature and body core temperature rise [2].

Although the liquid adequacy rate has been set in the RDA (Required Daily Allowance/Nutrition Adequacy Score) for Indonesian people, but specifically not obtained figures for the adequacy of minerals (Na, K, Cl) in drinking water either for people working under high temperature. Adequacy of water and electrolytes were also needed by employees who worked with exposure of high temperature [3]. Regulations determine the safe working limits in order to avoid illness and accidents. The objectives of the study were to measure hydration status of employees and examine the role of urine specific gravity test in fluid replacement decision

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of workers under heat stress condition. The present investigation was designed to assess the effect of high temperature for employees health, and hydration status.

Heat stress is common for workers in a laundry processing with dry cleaning method. Work processes and tools / machines used have great potential of heat injuries / illnesses. These extreme conditions were sourced from workplace lay out with less functioning of air conditioned. This will increase the temperature of the room. Approximately 10 persons work under hot temperature in 10-12 work hours everyday. Workplace measurements at baseline condition was conducted in February 2018. From baseline survey, we have workplace temperature in production area was 30°C-33°C (WBGT).

Further issue for this study was to observed fatigue level which tecnically correlated with hydration status. People who are involved in hot conditions job, without access to shade or sufficient fluid replacement, are at especially elevated risk in heat related injuries. Heat related injuries can cause discomfort, fatigue, exhaustion, heat cramps, and heat stroke in employees[4,5]. During four hours of work, we observed that employees drank as much as 2-3 cups (400-600 ml) of water and taken outside during lunchtime. Based on observation, employees must cope with, high temperature, humid and less fresh air ventilation. They also have less frequent of water and electrolyte replacement. The employer had never done urine specific gravity test before.

Method

This is an experimental studies with Randomized Controlled Trial (RCT) in a double-blind design. In this study subjects were treated with electrolyte solution for eight hours work. The research observed differences in urine osmolality and specific gravity between treatment group and the comparison through fluid-electrolyte supplementation for 8 hours of work. Affordable population is laundry workers in Semarang District, Indonesia as many as 90 people. Eligible participants were examined before the data was collected. The enumerators reached the workplaces 1/2 hour before work began, after which baseline assessment was carried out. Samples selected by purposive sampling using the inclusion criteria, as follows:

a. Age 20-40 years

b. Working in a place with heat exposure WBGT> 30^{o} C

c. Willing to become respondents (informed consent)

d. NaCl consumption of 2400-2500 mg / day

e. No history of urinary tract disease (infections, *calculi*)

f. No history of hypertension or cardiovasculair disease

Workplace temperature was measured by using a digital Questtemp Heat Area Monitor. NaCl intake measured using a questionnaire of 3 x 24 hour recall and analyzed with open source software for nutritional analysis. The nutritional status was measured by using the Body Mass Index (BMI) refers to the classification from Indonesia Ministry of Health. Urine Specific Gravity was measured by using Urinometer. Electrolyte supplementation given were:

1. Isotonic electrolyte solution, containing 0.9 g of sodium chloride and potassium chloride 0.6 g per 1 L

2. Hipotonic electrolyte solution as a placebo containing 0.52 g of sodium chloride and potassium chloride 0.30 g per 1 L

The solution was preserved and validated by Department of Pharmacy Faculty of Medicine, Diponegoro University. Statistical analysis conducted in non-parametric test (Mann-Whitney) for urine specific gravity and osmolality of the treatment group and control. Workplace temperature was measured in a 3-point measurement of Questtemp. It measured twice daily : at 10:00 and 15:00.

Hydration status based on USG samples in this study are cathegorized in:

1. ≤ 1.015 – optimal level of hydration (euhydrated).

2. 1.016–1.020 – marginally adequate hydration.

3. 1.021–1.025 – hypohydrated.

4. 1.026–1.030 – severely hypohydrated, at increased risk of heat illness and impaired performance. Should not work in hot conditions.

5. > 1.030 – a clinically dehydrated state, based on the criterion used by the Australian Pathology Association (APA)[6]. Flicker fusion test was conducted to identify general fatigue. The test done 15 minutes before lunch break. Subjects were not allowed to drink, eat or going out before the test.

Results and Discussions

Ambient Temperature: The ambient parameters required for calculating the TLV indicator were measured twice a day at the middle, and end of the working hours in the working place of both group (1000 am and 1500 pm).

Table 1. Ambient Indoor Temperature

No	Location	WBGT		Rate Humidity (%)	
		1000	1500	1000	1500
1	1	30,3	31,1	74,4	74, 8
2	2	30,5	33,3	73,8	74,3
3	3	30,1	32,2	74,5	74,6

According to Indonesia Ministry of Labour Regulation No. 5/2018, the observed workplace indoor temperature has exceeded the Threshold Limit Value (TLV) in the amount of 26,7°C. The result was still lower when compared with mining workers with the working environment temperature was higher from 30,7°C to 35,2°C. Studies in Australia on mining workers showed results 29,5°C dry temperature (dry bulb). Both studies demonstrate the need to control the temperature in the workplace so as not to exceed the Threshold Limit Value (TLV). Heat induced injuries are related by a combination of ambient temperature, employees' health status, dehydration, drugs and/or alkohol abuse[7] Many studies reported that working activities in an extreme hot environment (>40°C) could improve peripheral nerve mechanisms and could result in the sweating response[8,1,9]

Participants' age: Respondents who participated in this study were between the ages of 20-40 years. Selection of this age range based on the hypothesis that people under 40 still have good adaptability for extremely high temperature [1].

Table 2. Participant's Age

No	Age group (yrs)	Freq	%
1.	20-25	18	25,7
2.	26-30	2	31,4
3.	31-35	20	28,5
4.	36-40	10	14,2
Total		**70**	**100**

Age plays a role in an individual's health status, especially under continuous hazardous heat exposure. Although not specific, studies have shown a correlation of age with episodes of heat exhaustion in miners. Workers with over 40 years of age were relatively more vulnerable to be attacked by heat exhaustion [10] Physiologically, the age factor relates to the ability of the kidneys to excrete the rest of biochemical metabolites to maintain the acid-base balance of the blood. Increasing age of a person or a disturbance in the kidney will reduce glomerular and tubular function in the formation of urine. A number of studies have examined age-related differences in thermoregulatory function under extreme hot conditions[11,12]. Unhealthy lifestyle such as lack of physical activity, consumption of drugs in the long term as well as the lack of drinking habits can also be a trigger factor [8]

Body Mass Index (BMI): Body Mass Index measurements conducted to determine the anthropometric nutritional status. It could identify possible malnutrition from food intake and/or workplace exposure.

Table 3. Body Mass Index

No	BMI	Freq	Percentage
1	Normal	65	92,84%
2	Overweight	5	7,16 %
Total		**70**	**100 %**

BMI measurements were applied to estimate the individual adaptability to high temperature. Body weight monitoring is beneficial to determine the participant's weight loss due to dehydration. Studies in 51 workers in California in mid-summer earned weight loss of 2.3 kg per day [13]. Excess weight loss, followed by the build up of fatty tissue caused body to produce more heat. Dehydration predisposes the participants to healt exhaustion, heat stroke and heat cramps. This is disadvantageous for employees who worked in a high/ extreme temperature. Adaptability of extreme heat will be low so workers will quickly feel tired compared to individuals with normal BMI [9,3]

Work period:

Table 4. Work Period

No	Work Period (yrs)	Freq	Percentage
1	1-3	30	42,85 %
2	4-6	30	42,85 %
3	7-9	10	14,2 %
Total		**70**	**100 %**

Respondent has been working for - 6 years of average.

3.5. Urine specific gravity (USG) and osmolality

Table 5. Frequency Distribution of Urine Density and Osmolality (Average per group for each sample)

USG I		Osmol I		USG II		Osmol II	
A	B	A	B	A	B	A	B
1,021	1,026	1050	1050	1,0264	1,0264	1050	1050

USG = Urine Specific Gravity, Osmol = Osmolality

Mean of urine sampling in two group were 1.0258 (SD 0.0057). Osmolality mean 893.50 (SD 212.48). Mann-Whitney test for urine specific gravity of the two groups of workers showed U 608.00, and the p value 0.954 which means that Ho is accepted (ρ> 0.05) ie no urine specific gravity differences between two groups. Median value of urine osmolality test results showed UD = 611.00, and the p value was 0.984 which mean that Ho is accepted (ρ> 0.05). There was no difference in mean urinary osmolality of two groups.

Research showed differences in the ability of sweating sensitivity based on tenure. Workers with tenure of more than five years tend to have lower sweating rate compared to the group with a newer ones. This condition is caused by adaptation functions that have been run better. Although there have been adaptations, but does not mean the system is not impaired renal excretion [1].

Urinary density and osmolality was depend on fluid and amount of solute produced by the kidney tubules. Urine osmolality was defined as number of moles of solute per kg of solvent (water)[6]. Examination of urine specific gravity is a method to assess renal function or hydration status, especially in conditions of high ambient temperature [1]. For practical purposes, urine specific gravity were able to assess hydration status either euhydrated (UD = 1.015) as well as voluntary hypohydrated (UD> 1.025) based on the classification of Australian Pathology Association (APA) [9]. Fluid loss due to physical workload or environmental temperature as much as 1.5% of body weight can have an effect on the physical performance of individuals [3].

From laboratory examination result of urine specific gravity,70 respondents earned an average of 1.0258, while the osmolality was 893.5 mOsm / Kg. USG value was related with the "voluntary hypohydrated" cathegory according to APA classification. This condition can be caused by lack of water replacement during work hours. Many studies examined influence of hydration level on body fluids and exercise performance in the heat environment. They addressed the issues of hypohydration and the effects on performance/fatigue[7,1]. From the preliminary data obtained 16 workers (47%) had urinary SG 1,030 which should be monitored physical condition andalso need a rapid fluid and electrolyter replacement. Compared to the USG indicators, urine osmolality levels more believed to evaluate renal concentrating ability because relatively few factors that influence [1]. Results of the examination with the conversion of urine specific gravity showed the average value of osmolality remained at physiological range (normal value 50-1400 mOsm / Kg) This physiological range indicates that the body is capable of adapting to the formation of urine in a state of high temperature[14]. Majority of the respondents (80%) drank less water during work hours and experienced excessive sweating.

It was no difference in mean results of these two groups, could be sourced from the amount of fluid which had drunk and did not meet body metabolic needs and fluid balance. The addition of electrolytes (Na, K) in the fluid being offset by a sufficient volume will not be able to fix the value of urine SG and osmolality, due to a smaller volume than the concentration of solute to produce concentrated urine. Provision of electrolytic more expected shortly on improving the body's electrolyte balance. Giving proper electrolyte is expected to prevent heat cramps or heat exhaustion [15]. Urine density improvement can be achieved when consumption reaches 1.4 to 1.8 liters of fluid per hour in extreme conditions such as underground miners and the military personnel in desert[13]. Consuming water without any electrolytes may be problematic for physical activity under hot environment exceeding several hours that produce high sweat rates[16, 17]

Work Performance (Fatigue Level)

Table 6 Level of Fatigue

Fatigue Level	n	%
Mild	10	14,28
Moderate	50	71,43
Severe	10	14,28
Total	**70**	**100**

Concerning employee's fatigue, table 6 showed that most of participants were in moderate fatigue state. The participants reported that they felt more tired in the hotter weather and experienced sweating and headaches that slowed their job. Participants from both groups

reported that it required a longer time to finish their tasks in extreme high ambient temperature. On average, respondents worked 10 hours a day in their routine job. Most of participants reported that they took breaks to rest every 20 minutes or less. This finding was in the same line with prior research which stated that the highest percent of chronic fatigue was shown in moderate level[18]. There was no differences in both groups (U=706.05 and p= 0. 657) in level of fatigue.

Conclusions

The result showed that urine specific gravity (USG) was high and cathegorized in moderately/voluntary hypohydrated. This condition was caused due to the volume of electrolyte replacement drink had has not reached the required needs. Osmolality value was stated in "normal" cathegory. There was proved that anyn acclimatization and adapttation to high temperatures amongst participants. Due to USG result, it also proved that kidney still be able to compensate urine concentration. Even though,"voluntary dehydration" is the primary issue for this study[1,19]. The company can educate workers to increase consumption of drinking water with electrolytes until it reaches 1.5-2 liters for 4 hours. Urine Specific Gravity could also be examined to check the osmolality every 3 months periodically. Drinking water was expected to be placed closer to the workspace.

Employees should do little exercise on the workplace. It benefits is reducing stress and fatigue at work. They should done every 2 hours. The research showed that heat management based on ambient monitoring but without addressing the hydration status cannot protect workers from the effects of heat stress injuries [7,20]

Conflict of Interest: The author hereby disclose all of our conflict of interest and other potentially conflicting interests,including specific financial interests and relationships and affiliations relevant to International Journal of Public Health Research and Development. This applies to the past 5 years and the foreseeable future.

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Effect of Training to Knowledge and Practices of Dasa Wisma Activists as Pregnant Women Assistants in Preventing Low Birth Weight

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Abstract

The number of Low Birth Weight (LBW) in Indonesia is still high because of, among others, the lack of mothers' knowledge to prevent LBW case. The solution proposed is to encourage *Dasa Wisma (Dawis)* activists to assist pregnant women as one of the strategic actions. The aim of the research was to analyze the effect of assistance training towards the knowledge and practices of *Dawis* activists related to the prevention of LBW case in pregnant women. Method of this research was pretest and posttest without control group design of Quasi-experimental were applied. The population sampled using purposive random sampling was 37 *Dawis* activists in Tlogosari Wetan District, Semarang. The distance between pretest and posttest was approximately one month. Test result of Wilcoxon Match Paired test revealed that there were significant differences in the knowledge ($p < 0.05$) and practices ($p < 0.05$) of *Dawis* Activists before and after the intervention of assistance training. In the end of this research, the knowledge of *Dawis* Activists increased 5.97 points, while their practices increased 3.97 points. The recommendation from this research is that assistance training for *Dawis* Activists is necessary, even if it is only for a day, in order to increase the competence of *Dawis* Activists in assisting pregnant women to prevent Low Birth Weight case in one month.

Keywords: *Training, Knowledge, Dasa Wiswa Assistance, Pregnant Woman, Birth Weight.*

Introduction

The number of Low Birth Weight (LBW) case in Indonesia is still high. LBW has been considered the primary factors in the increasing number of mortality and morbidity of neonatal, infants, and children, which may lead to long-term effects in the future[1]. In Indonesia, the high rate of malnutrition cases in pregnant women contributed to that of LBW case, which was estimated to be more than 350.000 infants per annum, and it has been predicted that 17 million LBW babies per annum might also be exposed to. Meanwhile, in Central Java, the percentage of LBW tended to be increasing since 2012 to 2015, and it decreased in 2016[2]. According to the report of the Health Office of Semarang City in 2016, there were 506 infants (1.9%) of LBW infants in 2016, consisted of 260 male infants and 249 female infants[3]. One of the districts identified to be low nutrition infants and toddlers was Tlogosari Wetan District. Realizing the possible danger of LBW, several strategies have been implemented to reduce LBW cases, yet, the results have not been maximum. Meanwhile, the government has not prioritized community empowerment programs.

Cadres, the closest persons to the community and pregnant women, have been empowered to be able to assist pregnant women for the last few years. In addition to the cadres, some people may voluntarily assist pregnant women, such as the *Dasa Wisma* (*Dawis*) activists. Until recently, *Dawis* activists have not joined such training regarding their function to assist pregnant women within their area. The assistance of *Dawis* activists to pregnant

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women is one of the strategic moves that significantly leverage in solving LBW problems. The general purpose of this research was to analyze the changing paradigm from PLC to CLC with evidence-based proof that the *Dawis* activists could be educated with the prevention of LBW through assistance training, in order to raise their confidence and possess sufficient knowledge as pregnant women assistant.

Method

This was quasi-experimental research, with pre and posttest without control group design. The population of this research was the *Dawis* Activists in the working area of PHC Tlogosari Wetan, Semarang City, especially in Kecamatan Tlogosari Wetan. The sampling method has been done through purposive random sampling to 37 *Dawis* Activists.

Intervention in this research was through a training for a whole day, led by an expert in Mothers and Child Health from the Faculty of Public Health Diponegoro University, as a provision for the *Dawis* Activists to assist pregnant women related to LBW prevention. Data about the knowledge and practices was obtained from a structured interview by trained enumerators. Data analysis used Wilcoxon Match Paired test (data obtained distributed abnormally) to analyze the difference or alteration in the result in the knowledge and practices of the *Dawis* Activists before and after intervention.

Results and Discussions

According to distribution table from the *Dawis* Activists, all 37 participants in this research were females (100%) with following composition: 75% of participants were above 35 year old including four 50 year old participants. Most of them has been joining *Dawis* for 10 years or less (84%), which the biggest population were 5 years and 10 years' experience as *Dawis* members (5 people in each population). The latest education was mostly Senior High School or equal (56%) with following professions: 54% housewives, 54% private sector workers as tailors, entrepreneurs, and company workers.

The Knowledge of *Dawis* Activists: The table 1 showed the increase and decrease number of participants who understand the knowledge related to maternal and child health.

Table. 1 The difference of participants' knowledge before and after intervention

No.	Statement	Before intervention				After intervention			
		Understand		Unversed		Understand		Unversed	
		n	%	n	%	n	%	n	%
1	Pregnancy development	26	70.3	11	29.7	37	100	0	0.0
2	Signs of pregnancy	34	91.4	3	8.1	36	97.3	1	2.7
3	Blood pressure check during pregnancy	32	86.5	5	135	34	91.9	3	8.1
4	TT immunization during pregnancy	22	59.5	15	40.5	32	86.5	5	13.5
5	Iron tablets for pregnant women	29	78.4	8	21.6	33	89.2	4	10.8
6	Pregnant women and fetus health	23	62.2	14	37.8	32	86.5	5	13.5
7	Pregnancy gymnastics	27	73.0	10	27.0	37	100.0	0	0.0
8	Pregnant women nutrition	37	100.0	0	0.0	37	100.0	0	0.0
9	Alarming signs during pregnancy	8	21.6	29	78.4	14	37.8	23	62.2
10	Contact health provider when the alarming signs appear during pregnancy	36	97.3	1	2.7	34	91.9	3	8.1
11	Regular Pregnancy check	9	24.3	28	75.7	29	78.4	8	21.6
12	Carbonated drinks	25	67.7	12	32.4	37	100.0	0	0.0
13	Counselling during pregnancy	23	62.2	14	37.8	35	94.6	2	5.4
14	Resting period for pregnant women	26	70.3	11	29.7	36	97.3	1	2.7
15	Pregnant women medicines	36	97.3	1	2.7	37	100.0	0	0.0

Table. 2 The score difference of participants' knowledge

Participants knowledge related to LBW prevention	Before intervention		After intervention	
	N	%	N	%
Give 75% or less right answers	27	73.0	1	2.7
Give more than 75% right answers	10	27.0	36	97.3
Total score	37	100.0	37	100.0
Mean	10.62		13.51	
Wilcoxon test	p= 0.001 (p < 0.05)			

This study showed that intervention through the *Dawis* Activists as an action to prevent obstetric outcomes of LWB, then after the *Dawis* Activists implemented pregnant women assistance, it showed a significant result. Difference test used Wilcoxon test showed significant difference of knowledge during before and after intervention (p=0.001). The result of normality test showed irregular distribution pretest variables (p=0.020) and irregular distribution posttest variables (p=0.002), thus Wilcoxon test was selected. From the results of difference test using Wilcoxon test, it showed a significant difference of knowledge in before and after intervention (p=0.001).

This result was in accordance with the previous study in Australia, which shows that 70% - 97% participants achieve an increasing rate of confidence through training and 83% - 91% participants achieve an increasing rate of knowledge in mothers and children health topic from pre-training score 11 to post-training score 15[4]. Another literature shows that output targets from the training in health program counselor communication techniques, it increases the confidence of participants who have limitations in delivering health information[5,6]. The keys of success in health training are delivering health education with confidence, good communication techniques, giving positive stigma, and educate people naturally for counselors[7].

These results corresponded with the result of a research in rural India, which shows that anemia maternal incident during 3 – 5 months of gestation period significantly related to the high LBW tendency (OR: 0.34, 95% Cl: 0.13-0.92, p=0.03). Approximately 30% of participants experience unplanned pregnancy, thus, it raises the risk of LBW. Therefore, pregnant women need to be provided with nutrition plan education and healthy lifestyle during their pregnancy[8].

Another important subject that should be informed by the *Dawis* Activists to pregnant women was the restriction on consuming medicines. Bocca, et al, stated on the research that Extremely LBW with < 1500 grams birth weight happened because of drugs exposure, which then caused element deficiency or toxicity that affected fetus development, obstructed the absorption of uteroplacental nutrition circulation, and increased oxidative stress[9].

The Practice of *Dawis* Activists in PHC Tlogosari Wetan Working Area: The following table showed the increasing and decreasing number of participants who implemented pregnant women assistance practices.

Table. 3 Practice Differences of the Participants before and after intervention

No	Statement	Before intervention				After intervention			
		Do		Don't		Do		Don't	
		n	%	N	%	n	%	n	%
1	Pregnancy Test	36	97.3	1	2.7	33	89.2	4	10.8
2	Pregnancy Signs	29	78.4	8	21.6	31	83.8	6	16.2
3	Pregnancy check in health facility	22	59.5	15	40.5	35	94.6	2	5.4
4	Pregnant women carry heavy load	23	62.2	14	37.8	36	97.3	1	2.7
5	Resting and small activities for pregnant women	23	62.2	14	37.8	33	89.2	4	10.8
6	No dietary food during pregnancy	24	64.9	13	37.1	30	81.1	7	18.9
7	Pregnancy gymnastic	25	67.6	12	32.4	32	86.5	5	33.5
8	Nutrition for pregnant women	15	40.5	22	59.5	27	73.0	10	27.0
9	Alarming signs during pregnancy	26	70.3	11	29.7	31	83.8	6	16.2
10	Avoidable LBW	29	78.4	8	21.6	32	86.5	5	13.5
11	Pregnant women must avoid cigarette smokes	22	59.5	15	40.5	32	86.5	5	13.5
12	Fruits and vegetables are important for pregnant women	26	70.3	11	29.7	30	81.1	7	18.9

No	Statement	Before intervention				After intervention			
		Do		Don't		Do		Don't	
		n	%	N	%	n	%	n	%
13	Pregnant women should not do heavy works	24	64.9	13	35.1	35	94.6	2	5.4
14	Pregnant women drink water or milk	30	81.1	7	18.9	33	89.2	4	10.8
15	Sports for pregnant women	26	70.3	11	29.7	32	86.5	5	13.5

Table.4 The score difference of participants' practices

Participants practices related to LBW prevention	Before intervention		After intervention	
	N	%	N	%
Give 75% or less right answers	30	81.1	9	24.3
Give more than 75% right answer	7	18.9	28	75.7
Total score	37	100.0	37	100.0
Mean	9.70		13.02	
Wilcoxon test	p= 0.001 (p < 0.05)			

The result of normality test showed irregular distribution pretest variables (p=0.001) and irregular distribution posttest variables (p=0.001), thus Wilcoxon test was selected. From the results of difference test using Wilcoxon test, it showed a significant difference of practice in before and after intervention (p=0.001). This study showed that there was a significant practices change in before and after intervention as the result of comparative test used Wilcoxon test (p=0.001).

The material conveyed by the *Dawis* Activists stated that pregnant women must avoid cigarette smokes is in line with the literature which stated that smoking causes toxicity trace element that could disrupt uteroplacental circulation and increase oxidative stress[9]. In another literature, it shows that cigarette smokes exposure during pregnancy would increase the risk of LBW and premature birth[10–13], and inducing labor in 37 – 38 weeks gestation[14].

This research also in accordance with following literatures, that LBW case prevention could be implemented through prenatal care program evaluation, pregnant women mapping, assistance, education, and elevate the knowledge about mother and children health[15]. Implementation of the *Dawis* Activists assistance to pregnant women through education and motivation is flexibly conducted based on the activities of the *Dawis* Activists and pregnant women, including home visit. This could be optimized according to the research from Krans, et al. in the United States, which states that optimum prenatal check for LBW prevention through education and home visit which is the fittest model for pregnant women because of its flexibility[16].

Home visitation in New York according to Lee, et al. is conducted as pregnant women service strategy, including in the case of teenage pregnancy which has limited social and family support[17–19]. Furthermore, home visit program becomes the core program that has a significant impact to decrease the risk of pregnancy complication, including LBW[20].

Conclusions

The result of this study shows that there are differences in the knowledge of the *Dawis* Activists before and after intervention regarding the training on LBW prevention in pregnancy with p=0.001 and the average increasing point is 3.11 point. There are also differences in the practices of the *Dawis* Activists before and after intervention regarding the training on LBW prevention in pregnancy with p=0.001 and the average increasing point is 3.32 point.

The role of the *Dawis* Activists is also crucial to convey information and to monitor public health level by monitoring pregnant women health. Also, PHC needs to assign more active programs and activities to the *Dawis* Activists under its working area to provide monitoring and information regarding health issues, especially for pregnant women.

Conflict of Interest: The authors declare that they have no conflict of interest within this research.

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Risk Factors of Pregnancy Incidence before 20 Years Old in Indonesia in 2016

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Abstract

Young age pregnancy is an important public health problem, due to its high association with mortality and morbidity for both mother and the child and also reflect the country's welfare. Teenage mother often have problems related to labor or postpartum period. Lack of knowledge can be caused by low education, which create barrier upon receiving message. Highly educated people tend to have more information, from other people as well as press, and they're also more open to new value compared to less educated people. Marriage below 20 years increase the odd of pregnancy before 20 years. Knowledge about contraceptives is crucial and related to Maturing Age of Marriage programe. Problems in Maturing Age of Marriageprograme will increase pregnancy below 20 years rate. Descriptive analysis related to pregnancy risk factors below 20 years old is needed throughout Indonesia.

Keywords: *Marriage age <20 years; contraceptives knowledge; pregnancy <20 years.*

Introduction

Children quality reflect country's welfare. Maternal and child mortality reflect people health status and welfare.[1] Based on the Indonesian Demographic and Health Survey 2012, maternal mortality rate associated with pregnancy and childbirth accounted for 259 per 100,000 live births. Maternal factor that affects the health status of children and mothers is age during pregnancy and childbirth.[2,3]

Maternal age at the time of pregnancy affects the mother's pregnancy because it is related to the maturity of reproductive organs and mother's psychological condition to receive pregnancy. Young age pregnancy (less than 20 years) is one of 4T criteria of high risk pregnancy.[4,5]

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Based on riskesdas (Basic National health research) 2013 on women aged 10-54 years, 2.6 percent first marriage occurs at age less than 15 years and 23.9 percent married at age 15-19 years.[6] The result of Indonesia Demographic and Health Survey in 2012, median age of first marriage of Indonesian women was 20,1 years; while the Indonesian Demographic and Health Survey 2007 showed the median age of first marriage was at the age of 19.8 years and the results of the 2002-2003 Indonesian Demographic and Health Survey showed 19.2 years. This shows increasing trend of the median age of first marriage within the last 10 years although not yet in accordance with the expected target of 21 years.[2]

Early marriage that causes young pregnancy often occurs due to parents factor. They often think that girls is an economic burden and marriage is one of the attempt to maintain family life.[7] The younger the marriage age, the lower the level of education achieved by the child because of the responsibilities of being a wife and expectant mother.[8] Teenagers in rural areas are more likely to be mothers compared to urban area.[2]

Age Specific Fertility Rate (ASFR) for the age 15-19 years describes the number of pregnancies in adolescents aged 15-19 years. Results of the Indonesian Demographic

and Health Survey 2012, ASFR for 15-19 year olds were 48 per 1,000 women aged 15-19 years while the target expected in 2015 was 30 per 1,000 women aged 15-19 years.[2] Younger the marriage age means longer time span of reproduction.[2] Riskesdas 2013 showed the pregnancy rate at age less than 15 years old was 0,02 percent, while pregnancy rate in adolescence (15-19 years old) was 1,97 percent. Pregnancy regulation is crucial because it affects the fertility rate in Indonesia.[2]

Pregnancy below 20 years of age is influenced by education, contraceptive knowledge, contraceptive behaviour, culture, adolescent/dating behavior, health care, providers and income. Teenage women, at age of 15-19 years, responsible for 15 million birth each year. According to the data from Central Bureau of Statistics, teenage marriage rate in Indonesia was 8.8%. In developing country, 1 to 4.4 million teenagers have a miscarriage; and most procedures are performed under unsafe conditions. Complications of pregnancy and childbirth are the leading causes of death between the ages of 15-19. Limited knowledge or limited access to health care systems was the leading factors for pregnancy complications.[9]

Lack of knowlegde can be caused by low education, which will create barrier upon receiving message or information.[10] In the other hand, higher education means it easier to receive the information.[11]

Data from Central Java showed that women who married before 21 years are 54.67%. The highest percentage of marriage before 21 years are in Rembang (72.17%). In the other hand, there are 13.82% men who married under 25 years, with highest percentage in Banjarnegara (23.59%). Underage marriage will lead to pregnancy under <21 years of age. This also happened in several provinces throughout Indonesia.

From data above, we decided to create a descriptive study to find risk factors related to high number of parity before 20 years old throughout Indonesia.

Method

A descriptive, cross sectional study was conducted to describe several factors related to teenage pregnancy: maternal education, marriage age, contraceptive knowledge and the age of first childbirth.

Target population were Indonesian woman who pregnant before 20 years old. The sample of this study were 456,686 Indonesian woman who were pregnant before 20 years 2016. Univariate and bivariate data analysis were provided in this

Results and Discussions

Characteristics of subject are shown in Table 1.

Table 1.Univariate analysis of education level, married age, contraceptive knowledge, first birth and pregnancy <20 years

Variable	f	%
Education Level		
No formal education	954	2.09
Elementary, not graduate	0	0
Elementary, graduate	17.377	38,13
Junior High, not graduate	0	0
Junior High, graduate	13.929	30,57
Senior High, not graduate	0	0
Senior High, graduate	8.682	19,05
University / academy	4627	10,16
Marriage age		
20-35 years	26,907	59,05
< 20 years	18,662	40,95
Contraceptive Knowledge		
No	116	0,25
Yes	45,453	99,75
First Birth		
20-35 years	33,429	73,36
< 20 years	12,140	26,64
Pregnancy < 20 years		
No	33,429	73,36
Yes	12,140	26,64

Based on table 1.1, the highest education of Indonesian fertile women is elementary school (33.18%) and graduated from junior high school (30.57%). As many as 59.05% of sample married at 20-35 years, and 99.75% of them know about contraception. There are 73.36% women who not pregnant before 20 years

In our study, majority of childbearing age women have low education level, which consisted of primary school education and junior high school, 38.13% and 30.57% respectively. Unicef (2008) mentioned that factors contributing to teenage pregnancy are lack of education and information about sexual health especially from parents.

Table 2. Frequency distribution of level education on teenage pregnancy in Indonesia 2016

Pregnancy < 20 years	Education Level										Total	
	No Formal School		Elementary, Graduated		Junior High, Graduated		Senior High, Graduated		University / Academy			
	f	%	f	%	f	%	f	%	f	%	f	%
No	500	1,50	10.307	30,83	10,669	31,92	7.529	22,52	4.424	13,23	33.429	100,00
Yes	454	3,74	7.070	58,24	3.260	26,85	1.153	9,59	203	1,67	12.140	100,00

The results also showed that the teenage pregnancies were more prevalent among childbearing age women who did not go to school and graduated from elementary school, 3.74% and 58.24% respectively. Childbearing age women with higher education have lower teenage preganancy incidence (graduated from junior high school, graduated from senior high school, and PT / academy; 31,92%, 22.52% and 13.25% respectively). Childbearing age women with low education have difficulty to digest messages or information conveyed and hamper their development and attitudes toward newly introduced values.

As for childbearing age women with junior high school, senior high school and PT / academy education are known to have a smaller percentage of teenage pregnancy; this result showed that highly educated women tend to get more information either from other people or from press.

Tabel 3. Frequency distribution of marriage age on teenage pregnancy in Indonesia 2016

Pregnancy < 20 years	Marriage Age				Total	
	20 – 35 years		<20 years			
	f	%	f	%	f	%
No	26.546	79,41	6.883	20,59	33.429	100,00
Yes	361	2,97	11.779	97,03	12.140	100,00

The results showed more than half of reproductive age women married at age 20 - 35 years with a percentage of 59.05%. From the study, it is known that women who married at the age of 20-35 years did not experience teenage pregnancy (79.41%). In the other hand, almost all women who married before 20 years old have pregnancy under the age of 20 years with a percentage of 97.03%. Unicef (2008) mentions that the factors contribute to teenage pregnancy are traditions that lead to early marriage (developing countries) and lack of access to tools that prevent pregnancy. The statement is in accordance with our results in which women who married at the age of less than 20 years tend to have a pregnancy under the age of 20 years. In the reproductive period, under 20 years of age is the recommended age for delaying marriage and pregnancy.[12] Pregnancy under the age of 20 is said to be risky, with mortality rate 2-4 times higher than healthy reproduction.

Table 4. Frequency distribution of contraceptive knowledge on teenage pregnancy in Indonesia 2016

Pregnancy < 20 years	Contraceptive knowledge				Total	
	No		Yes			
	f	%	f	%	f	%
No	80	0.24	33,349	99.76	33.429	100,00
Yes	36	0.30	12,104	99.70	12.140	100,00

Majority of Indonesian childbearing age women already known about the contraception type with a percentage of 99.75%. Knowledge is obtained after the person senses a particular object. Sensing occurs through the five senses of the human senses: sight, hearing, smell, taste and touch. Most of the knowledge is obtained through the eyes and ears. Knowledge is a very important factor for a person's behavior.

In our study, the number of childbearing age women

who have and do not have knowledge about contraception were almost the same percentage to have a teenage pregnancy, where tenage pregnancy in women without contraceptive knowledge is slightly higher (0.30%) and women have contraception knowledge have a slightly greater percentage (99.76%) in terms of pregnancy after 20 years. Changing a person's health behavior can be done by providing health education.[13,14] Lack of knowledge about high-risk pregnancies is influenced by education. Women of childbearing age who have low education will find it difficult to digest messages or information conveyed and hamper their development and attitudes towards newly introduced values.[13,15]

Table 5. Frequency distribution of age of first time give birth of <20 years old reproductive age women in Indonesia 2016

Pregnan-cy< 20 years	First Birth				Total	
	20 – 35 years		<20 years			
	f	%	F	%	f	%
No	33,429	100,0	0	0.0	33,429	100.0
Yes	0	0.0	12,140	100.0	12,140	100.0

From our study, it is known that childbearing age women who first gave birth in the age range 20-35 years was 73.36%. Teenage pregnancy has a higher pregnancy, delivery and post partum complication compared to healthy reproductive individual (age 20-35 years). It is caused by immature reproductive organs to conceive, which can harm the mother's health, development and growth of the fetus. In addition, teenage pregnancy can cause other problems due to imperfect body growth, socioeconomically disadvantages, difficulty in childbirth, or not ready to perform the mother role.

Conclusions

Indonesian childbearing age women in 2016 have a low level of education, which is elementary and junior high by 38.13% and 30.57% respectively. Childbearing age women who do not receive formal education and have primary school education have a greater percentage of pregnancies under the age of 20 with a percentage of 3.74% and 58.24% respectively.

Indonesian childbearing age women in 2016 are known to have contraceptive knowledge with percentage of 99.75%. Women who unaware of this knowlegde (0.3%) have pregnancy under the age of 20.

Most of Indonesian women married at the age 20-35 years with percentage of 59.05%. Most of Indonesian women have their first child at the age 20-35 years with a percentage of 73.36%.

From the results above, active counseling and interpersonal communication from midwifery is required for all maried couple, so that unexpected circumstances and adverse events in teenage pregnancy can be anticipated as early as possible.

Counseling and interpersonal communication for couple below 20 years is required to prevent teenage pregnancy and risk related to it can be anticipated as early as possible.

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Evaluation of Mass Drug Administration (A Cross Sectional Study in Sanggu Village, South Barito, Central Kalimantan, Indonesia)

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Abstract

Barito Selatan was one of the endemic areas of filariasis with Mf rate of 1.34% in 2004. MDA filariasis has been carried out in 2005-2013 gradually. Transmission assessment survey in 2014 obtained Mf rate of 1.7% with most cases in the village Sanggu. As a result, South Barito must add MDA Filariasis for 2 years. MDA filariasis 2015 was done. The purpose of this study was to evaluate the filariasis mass treatment, indicated with Mf rate and type of microfilariae,in the village Sanggu South Barito regency in Central Kalimantan. This research was a descriptive with *cross sectional* design. The sample was part of filariasis MDA target in 2015 aged> 2 years in the village of Sanggu. The sampling technique using *a simple random sampling*. The minimum sample size as many as 102 people. The inclusion criteriawere willing to become subject and age <15 years accompanied by a parent. We excluded subjects who moved from Sanggu village,pregnant, and children aged <5 years of marasmus.The results showed that the rate Mf Sanggu Village at 2.9% with type *B. malayi* microfilariae. Characteristics of subjectswere average age of 36.24 years, 52.9% were female, 25.5% were students, 35.3% had finished high school, 67.1% had poor knowledge, 55.9% were taking the medication from MDA program and 59.8% did not received support from implementer elimination (TPE). Suggested to do follow up study for variables that may be associated with filariasis mass treatment such as the degree of endemicity, gender, education, knowledge, practice taking medication, the support of implementer elimination, selective treatment of old patients and monitoring the implementation of filariasis mass treatment.

Keywords: *Evaluation, filariasis, mass drug administration.*

Introduction

Filariasis is a tropical disease caused by infection of filarial worm *Wuchereria bancrofti*, *Brugia malayi* and *B. timori* which are transmitted through mosquito bites.[1,2] Filariasis rarely causes death, but it may cause permanent disability.[3] The data from WHO in 2016 show that there are 1.103 million populations at risk of filariasis in 73 countries and 632 million (57%) of countries in Southeast Asia, including Indonesia, as the endemic countries.[4] Based on the data from the Directorate General of Disease Control and Environmental Health, Ministry of Health of the Republic of Indonesia, the number of filariasis clinical cases from 2000 to 2014 have increased from 6,233 cases to 14,932 cases, with more than 102 million people (43%) of Indonesian's population at risk of filariasis.[5,6]

South Barito is an endemic district in Central Kalimantan. Finger blood surveys were first conducted in 2004 with MF rate of 1.34%.[7] According to the policy from the Ministry of Health of the Republic of Indonesia, if an area has Mf rate of > 1%, it belongs to the category of filariasis endemic area. To eliminate the filariasis, Mass Drug Administration (MDA) for Filariasis is conducted. There are two mass treatment

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strategies that are carried out doing MDA once a year for 5 consecutive years in endemic areas and clinical management for chronic filariasis patients. [8]In South Barito regency, MDA for Filariasis was implemented from 2005-2013 gradually. Mass treatment was not done simultaneously due to limited budget. However, until 2014 Mf rate of 1.7% was still obtained with the type of microfilaria *B. malayi*.[9] Consequently, South Barito should implement MDA for Filariasis again for 2 consecutive years. The sixth round of MDA for filariasis were conducted simultaneously in all sub-districts in South Barito in October 2015.

Research in Papua New Guinea showed that there was a decrease of Mf rate after mass treatment was conducted.[10]. Research in Egypt showed similar result in the decrease of Mf rate which ranged between 0.2%-2.7% after mass treatment was conducted.[11]

In the implementation of mass treatment, the Health Office is assisted by the Elimination Executors (TPE) of Filariasis due to the wide area of treatment target.[6] Each elimination executor is responsible for 20-30 families. The elimination executor is in charge of distributing drugs, administering medical cards, reporting side effects and assisting in counseling.[12]

Based on the explanation above, the research on Evaluation of Mass Treatment Admission for Filariasis in Sanggu village South Barito regency, Central Kalimantan is conducted.

Method

This research is descriptive research using cross sectional design by observing the independent variables and dependent variable. The independent variables in this study are age, sex, occupation, education, knowledge, practice of medicine intake, Elimination Executor's support, endemicity level and microfilaria species. While the dependent variable is evaluation of mass treatment admission for filariasis.

The research was conducted in Sanggu village, South Barito regency, Central Kalimantan on April 4 to April 29, 2016. The population of the research is all the target of filariasis mass treatment in 2015 aged > 2 years in Sanggu village. While the study sample is part of the entire target of filariasis mass treatment in 2015 aged > 2 years in Sanggu village. The inclusion criteria consist of willingness to be respondent and aged <15 years accompanied by parents while the exclusion criteria consist of moved out respondents, pregnant and children aged <5 years with marasmus. The sample was taken using simple random sampling technique. The sample size is determined through the calculation using the proportion estimation formula of 102 respondents.

The research uses primary data taken by conducting direct interviews to the respondents' house with structured questionnaires and finger blood examination which then continued by conducting in-depth interviews. The study uses univariate analysis which aims to get the idea of frequency distribution result on each variable.

Results and Discussions

Finger blood test from 102 respondents in Sanggu village resulted in 3 positive blood preparations containing microfilariae. It resulted in Mf rate in Sanggu village to be 2.9% with *Brugia malayi* microfilaria type and infection from another microfilaria type is found to be none.

The previous study conducted in Ghana, found that the microfilaria rate was 4.6%. [13]. While in study conducted by Upadhayula et al in Karimnagar district, India found the mf rate range from 0,0%-10,5%, and in Chittoor district ranged from 0,0%-7,0%.[14]

Table.1 Characteristic of the respondents based on sex, education and jobs (n=102)

No.	Characteristics (n=102)	f	%
1.	Sex		
	• Male	48	47.1
	• Female	54	52.9
2.	Educations		
	• Do not attend school	2	2
	• Kindergarten	2	2
	• Elementary School	17	16.7
	• Do not graduate Elementary School	6	5.9
	• Elementary School graduates	19	18.6
	• Junior High School graduate	11	10.8
	• Senior High School graduates	36	35.3
	• College graduates	5	4.9
	• University graduates	4	3.9
3.	**Jobs**		
	• Unemployed	4	3.9
	• Housewives	18	17.6
	• Students	26	25.5
	• Farmers	15	14.7
	• Rubber Tappers	7	6.9
	• Wood Collectors	2	2.0
	• Merchants	3	2.9
	• Private Employees	10	9.8
	• Civil Servants/Armies/Polices	11	10.8
	• Others	6	5.9

From the table 1 we know the average respondent aged 36.24 years old with the youngest aged 5 years old and the oldest aged 90 years old. Table 1. shows that more than half of the respondents are female (52.9%). A quarter of the respondents are students (25.5%) and one third of the respondents are high school graduates (35.3%).While study in Tanzania reported the median age of the respondents was 16.6 years, and more than half of them were female (51,0%).[15]. Another study in Kuwait also reported that respondents aged 29,2 range between 14-61 years old, more than half of them were male (57,4%), working as migrant workers.[16]. The result of this study revealed that more than thirty of the respondents have poor knowledge about filariasis (32.9%). The previous study Ghana, Malaysia and Indonesia also reported that the knowledge of the community toward filariasis still poor. [17–19]. Most respondents are wrong about the arguments of filariasis cannot be healed (78.4%), what causes it (95,1%), each patients drink 2 kinds of medicines (85,3%), the drug is meant only for filariasis patient 64.7%), medicines are taken by all aged > 15 years (67.6%), 2 year-old patients may take the medicine (85.3%) and side effects arise as a result of the death of microfilariae (75.5%). This results were in line with the study conducted by Amaechi et al who found that most of the respondents (82,1%) had not heard about filariasis, and several of the said filariasis caused by charms (77,9%), nearly a quarter of them don't know what the symptom of filariasis (24,2).[20]. Another study also reported that most of the community don't know the cause of filaraisis and the disease transmission.[21]

Table 2. The knowledge level of filariasis (n=82)

Knowledge	f	%
Good	55	67.1
Poor	27	32.9

Table 3 revealed that more than half of the respondents do not take medication (55.9%) during mass drug administration for filariasis in 2015. For the previous years, from 2010-2014, there were no respondents who took filariasis drugs. We know that the compliance of the respondents in taking medication were still low in this study. The previous study also reported the compliance of the community still low in India.[12,22] In contrary with the study conducted by Elaziz et al in Egypt who found the compliance of the respondents in Giza village was 85,7%, and in the Delta village was (84,8%).[23].

The results found that most of the reasons the respondents do not take the medication are due to the fear of side effects (45.6%) and the parents do not give the children a chance to take filariasis medication (35.1%). (Table 5) The previous study conducted by Hussain et al also foun that 77,0% of the non-compliance of MDA because fear the side effect.[12]

Table 3. The medication practices (n=102)

Medication practice	f	%
Do not take drugs	57	55.9
Take drugs	45	44.1

Table 4. The knowledge of filariasis prevention (n=57)

Reason of not taking drugs	f	%
Scared of side effects	26	45.6
Do not have filariaris	1	1.8
Parents do not give the children a chance to take filariasis drug	20	35.1
Do not receive filariasis drug	2	3.5
Lazy	7	12.3
Too old	1	1.8

Table 5. Distribution of Respondents Based on Examination Executors' Support (n=82)

Examination Executors' Support	f	%
Supporting	33	40.2
Not Supporting	49	59.8

More than half of the respondents do not get support from Elimination Executors (59.8%). The role of Elimination Executors were not optimal, they do not inform anyone about who should take the medication (59.8%), the benefit of mass drug administration (54.9%), the side effects (68.3%), do not monitor drug intake directly (86.6 %), and do not ask for possible treatment reactions (92.7%). The study conducted by Ginandjar et al in Pekalongan District reported that obtained socialization about MDA and obtain information from elimination officer was associated with the knowledge level of the community about MDA. Knowledge was predisposing factor for the MDA compliance, so the adequate information about MDA may increase the compliance of the community in taking filariasis medication during MDA.[19] The study conducted by Babu et al reported the reason why most of the respondents do not take the medication because they fear the side effect of the drugs. And results of qualitative

study participants said that the elimination officer just gave the drugs without giving any further information.[24]. The role elimination officers have an important role to play in the community's compliance with the MDA in terms of providing additional information such as informing the public of the side effects of drugs and what they should do if that happens. So that will reduce people's fear of the side effects of drugs, and perhaps it would increase the community compliance of taking filariasis medication during MDA.

Conclusions

The rate of microfilaria in Sanggu village after the 6th round of mass drug administration for filariasis has been done in 2016 is 2.9%. It means that mass drug administration for filariasis in Sanggu village has not reached WHO target. Factors that may be associated with the drug administration for filariasis are the level of endemicity, sex, education, knowledge, medication practice, Examination Executors' support and long-term selective treatment and monitoring of the implementation of mass drug administration for filariasis.

Conflict of Interest: The author reports no conflicts of interest in this work.

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The Effectiveness of Gymnastics of the Elderly to Decrease the Blood Pressure of the Elderly in the Elderly Health Care Werda Tama (PLWT) Wayut, Jiwan, Madiun

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Abstract

Introduction: one of the indicators of success in development is the increasing life expectancy age. Some studies of the elderly are actively moving and exercising more is healthy and has a lower risk for chronic diseases. Elderly exercise be one way for the elderly to move the body so that blood pressure is always controlled.

Objective: to know the effect of gymnastics on blood pressure in elderly in the Elderly health care Werda Tama (PLWT) Wayut, Jiwan, Madiun.

Method: this research is Quasi Experiment with design one group pretest-posttest. The sample in this study, 21 people were taken by random.

Results: The test Results of the Paired T Test to compare blood pressure before and after treatment (gymnastics seniors) obtained a value of 0,018 means that elderly exercise is effective for lowering blood pressure elderly.

Conclusion: Elderly exercise can lower blood pressure. For further research using a sample of more with research method case control.

Keyword: Elderly, gymnastics, one group pretest-posttest.

Introduction

One of the indicators of success in development is the increasing life expectancy age. Burean of the census USA issued a report the demographic data of the population international, that Indonesia is no year 1990-2025 will have a rise in the number of elderly by 414%[1]. Elderly bring the consequences of the rising variety of cardiovascular diseases. A disease that is often experienced by the elderly is blood pressure[2].

Handling health problems regarding blood pressure can be classified into the handling of nonpharmacologic and pharmacologic. Administration of antihypertensive drugs in a long period of time will cause side effects. Because the onset of side effects such handling of non farmakologis highly recommended way of weight loss restrictions on tobacco and alcohol, physical exercise and relaxation[3].

Physical exercise for seniors one of which is the gymnastics of the elderly which is the handling of non-pharmacological recommended. [4], in his research if the elderly exercise done regularly can prevent loss of functional diakbatkan olehpenakit cardiovascular. Other benefits of elderly exercise that lower blood pressure, lose weight and strengthen the muscles of the heart[5].

This research can provide benefits in the field of nursing to improve and maintain the health of the cardiovascular in the elderly with use handling of non-pharmacological that does not harm the environment health.

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Method

This type of research is quantitative using the method of experimental design with one group pretest-posttest. The population of research are the elderly in the Elderly health care Werda of All the Village Wayut Kecamatan Jiwan, Madiun Regency. The sample in this study as many as 21 people.

Elderly every morning at 09.00 PM for 7 days taken blood pressure data, then given treatment gymnastics for 15 minutes and wait 30 minutes then (09.45 WIB) rechecked blood pressure after treatment gymnastics.

Results

Elderly health care Werda Tama (PLWT) one of the elderly health care under the auspices of the health center Klagenserut Jiwan Madiun. PLWT is the integrated service post for the elderly in the Village Wayut, which is driven by the community (cadres).

Table 1: Characteristics of study respondents in PLWT Wayut, Jiwan, Madiun February 2019

No	Characteristic	Frequency	Percentage
1	Age		
	60-64	13	61,9
	65-69	7	33,3
	70-75+	1	4,8
Total		**21**	**100**
2	Gender		
	Men	3	14,3
	Women	18	85,7
Total		**21**	**100**
3	Body Mass Index		
	Less (<18,5)	3	14,3
	Normal (18,5-25)	12	57,1
	Excess (>25)	6	28,6
Total		**21**	**100**

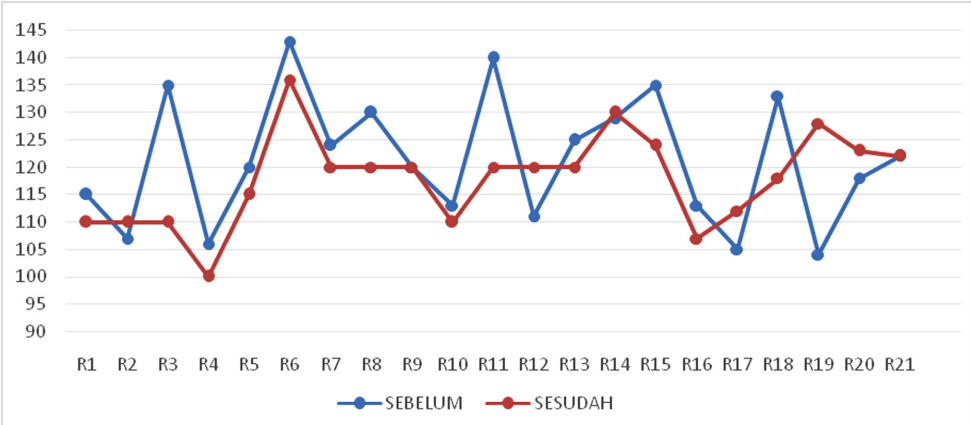
Normality test Shapiro-wilk with α=0,05. Distribution of Data is normal if p-value >α and the data is not normally distributed if p-value <α. The results of the normality distribution of data is normal that data blood pressure pre-test value p-value 0,503 and blood pressure post-test value p-value 0,651.

Table 2 Analysis of the Blood Pressure Systole before and after a given treatment elderly exercise on the respondents in the PLWT Wayut Jiwan, Madiun Februari 2019.

Variable		Mean	Min-Max	*p-value*	α
Pre-test	Sistole	121,33 mmHg	104-143 mmHg	0,018	5%
Post-test	Sistole	117,85 mmHg	100-136 mmHg		

Table 2 above shows the results of paired t test with p–value 0,018 these results suggest treatment elderly exercise is effective for lowering blood pressure systole respondents. As illustrated in the following chart :

Picture 1 the results of the blood pressure systole of the elderly before and after the gymnastics of the elderly on the respondents in the PLWT Wayut Jiwan, Madiun February 2019



Discussion

The results of the analysis in table 2 shows that the average blood pressure systole of the respondents before treatment (pre-test) 121,33 mmHg. To get blood pressure stable handling that is done to the respondents in the tudy this is the gymnastics of the elderly[3]. And the results of

the average blood pressure systole of respondents after treatment (post-test) 117,85 mmHg.

This study consisted of 18 female respondents and 3 male respondents and it turns out that gender did not influence the treatment given to the response of the body, in accordance with research [6] in Australia which states that gender affects the risk of incidence of hypertension but not with response to treatment in lowering blood pressure.

This study describes elderly exercise can lower blood pressure, koesterol,weight and maximize oxygen intake, muscle mass, total body potassium er fat-free soft tissue, and body fat [7]. And also the results of the research [8]in Korea which provide aerobic exercise there are elderly women, that aerobic axercise does not give the changes in left ventricular function but showed a positive influence on the body, namely the absorption of oxygen and fat to the maximum. [9]Prove excercise affect parasypatic cardiac control by means of the affect insulin sensitivity and glucose metabolism secondary, so that can reduce arterial stiffness and arterioskerosis that will facilitate blood flow and lower blood pressure.

CONCLUSION

Elderly exercise is effective in lowering the blood pressure with the difference in blood pressure systole before and after a given treatment (p-value 0,018) with α=0,05. Changes in blood pressure systole what happens is the average before treatment elderly exercise 121,33 mmHg decreased to 117,85 mmHg.

Other researchers are advised to develop gymnastics for the elderly and other method to lower blood pressure which is optimal.

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Determinant Factors Affecting the Nutritional Status of Children in Regional Health Center of Gresik

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Abstract

Preschool children are at risk developing PEM as they are not breastfed and the food consumed may not fuilfill the nutrients need for their progressive growth. Nutritional status of preschool children is indirectly associated to the socioeconomic and hygiene status and directly associated to the level of consumptions and infections. The aims of this research is to analyze the associations between socioeconomic factors, hygiene, level of consumptions, and infections with the nutritional status of preschool children in Gresik District. The result of statistical analysis using the Multiple Linear Regression Test showed that maternal education, knowledge, environmental hygienity and protein energy intake have a significant influence on nutritional status of children,while maternal parenting, URI incident and diarrhea and family income variables have no significant influence on nutritional status. Early detection through intensification monitoring of toddler growth at posyandu, followed by determination of nutritional status by village midwife or other health worker. It is a striving for a dynamic food and environment where monitoring of critical indicators of resources, availability and access to food and nutrition at all levels of society required.

Keywords: *Nutritional status, maternal education, knowledge, hygienity, protein energy,children aged 24-60 months.*

Background

Underweight or poor nutrition in infancy and children, especially at the age of less than 5 years can lead to disruption of physical growth and child intelligence.[1] Growth of brain cells takes place very quickly and will stop or reach the perfect stage at the age of 4-5 years.[2] Rapid brain development can only be achieved if the child has good nutritional status.[3] Growth monitoring of infant development is very important to know the existence of early infant growth disorder, by way of weight measurement as the best way to assess the nutritional status of children every month so that child growth will be monitored.How to assess nutritional status can be done with anthropometric, clinical, biochemical, and biophysical measurements. Anthropometric measurements can be performed with several measurements: weight measurement, height, upper arm circumference, and so on. One indicator of health in children under five years old (toddlers) can be seen from the nutritional status. Nutritional status of children can be measured by age, weight (BW), height (BH). Monitoring the nutritional status of children under five can be seen from three indicators of anthropometry, namely: weight by age (BW/A), body height by age (BH/A) and weight by body (BW/BH). Based on the indicator of BW/BH, nutritional status is divided into 4 namely malnutrition, underweight, good nutrition, and fat.Based on the results of Basic Health Research in 2013, it is known that the percentage of underweighted BW/A status by province in Indonesia is 33 percent higher, the prevalence of malnutrition in infants (BW/BH) by province in Indonesia is 18,7 percent in 2013. Meanwhile,the percentage of underweight and underweight nutrition (BW/A) according to regencies and municipalities in East Java Province in 2013 was 4.9% and nutritional status less 14.2%.[4]

Based on the data of PSG data from the Health Office of Gresik Regency in 2016, it shows that percentage of nutritional status under fives index BC/U in 2014 until 2015 for under-five children with malnutrition decreased significantly from 5.43% to 0.7% but in year 2016 increased slightly to 0.98%, while under-fives

with underweight nutrition continued to increase from year to year, ie in 2014 by 0.26% (203 under-fives), by 2015 soaring. equal to 4, 9% (3907 under-fives), and in 2016 increased to 5.93% (4547 children under five). Malnutrition events need to be detected early on through intensification of infant growth monitoring at posyandu, followed by determination of nutritional status by village midwives or other health workers. Malnutrition data in East Java is based on 2 categories ie by indicator comparing BW/A and second category is compare BW/BH.

Research Methodology: This research is a quantitative research using analytical survey with cross sectional design or design. Cross-sectional survey is a study to study the correlation dynamics between risk factors and effects by approach, observation or point time approach meaning that each subject is observed only once and the measurement is done on the character or variable status subject at the time of examination. The population of this study is all mothers who have children under five in the working area of Puskesmas Kabupaten Gresik. Respondent in this research is mother toddler, while sample unit is toddler age 24-60 month amount 1315 balita. The minimum sample size in this study was 90 mothers and children aged 24-60 months, taken by proportional random sampling. Respondents were mothers of the sample. The statistical test used is Multiple Linear Regression. The independent variables in this research are education, mother's knowledge, environmental higines level, protein energy intake, family income, mother care pattern, and incidence of URI and diarrhea with nutritional status of children. Dependent variable in this study is nutritional status of children aged 24-60 months.

Research Results: Table 1 shows that of 90 respondents most of the mothers have high school education background and normal nutritional status of children (64.4%). Result of data analysis using t test got t count equal to 2,526 and p = 0.013, so p <0.05. This means that there is significant influence between mother education with nutritional status. The level of maternal education determine their attitudes and actions in dealing with various problems and has an important role in the health and growth of the child. This can be demonstrated by the fact that children from mothers with higher educational backgrounds will have a better chance to live and grow better and more readily accept broader insight into nutrition.[5,6]

Table 1. Cross-tabulation of maternal education and nutritional status of children

		Nutritional status				Total (person) Percentage (%)
		Bad	Insufficient	Normal	Fat	
Education	SD	3	0	0	0	3
		3.3%	0.0%	0.0%	0.0%	3.3%
	SMP	0	8	4	0	12
		0.0%	8.9%	4.4%	0.0%	13.3%
	SMA	0	1	58	10	69
		0.0%	1.1%	64.4%	11.1%	76.7%
	PT	0	1	3	2	6
		0.0%	1.1%	3.3%	2.2%	6.7%
Total		3	10	65	12	90
		3.3%	11.1%	72.2%	13.3%	100.0%

Table 2 shows that of 90 respondents most mothers have high income is>Rp. 1,200,000 and her children have normal nutritional status (67.8%). The result of data analysis using t test got t count equal to 0.561 and p = 0.567, so p> 0.05. This means that there is no significant influence between family income with nutritional status of children.Some studies highlighted the relations of family income and nutritional status.[7,8]Thus the incidence of nutritional disorders is not only found in families who earn less but also in high-income families. This situation indicates that ignorance of the benefits of food for the health of the body causes the poor nutritional quality of family food, especially toddlers.

Table 2. Cross-tabulation of income family and nutritional status

			Nutritional status				Total
			Bad	Insufficient	Normal	Fat	
Family income	Low (<IDR 1.200.000)	Count	136.928	0.000	4	2	11
		% of Total	1.1%	4.4%	4.4%	2.2%	12.2%
	High (>IDR 1.200.000)	Count	2	6	61	10	79
		% of Total	2.2%	6.7%	67.8%	11.1%	87.8%
Total		Count	3	10	65	12	90
		% of Total	3.3%	11.1%	72.2%	13.3%	100.0%

t_{count}= 0.561, p =0.567

Table 3 shows that of 90 respondents most mothers have enough knowledge and normal nutritional status (60%). The result of data analysis using t test obtained t count equal to 5,729 and p = 0.000, so p <0.05. This means that there is significant influence between mother's knowledge about nutrition with nutritional status of children. Nutrition knowledge of parents is one of the factors that affect child nutrition.[9] Mother's knowledge determines the behavior of food consumption, one of them through nutrition education so that will improve the habit of food consumption.[10] Lack of knowledge about nutrition or the ability to apply in everyday life is an important cause of nutritional disorders.

Table 3. Cross-tabulation of mother's knowledge about nutrition with nutritional status.

			Nutritional status				Total
			Bad	Insufficient	Normal	Over	
Knowledge	Less	Count	0	4	0	0	4
		% of Total	0.0%	4.4%	0.0%	0.0%	4.4%
	Enough	Count	2	5	54	0	61
		% of Total	2.2%	5.6%	60.0%	0.0%	67.8%
	Good	Count	1	1	11	12	25
		% of Total	1.1%	1.1%	12.2%	13.3%	27.8%
Total		Count	3	10	65	12	90
		% of Total	3.3%	11.1%	72.2%	13.3%	100.0%

t_{count}= 5.729, p=0.000

Table 4 shows that of 90 respondents almost half of the mother's parenting pattern is enough and normal nutritional status (42.2%). The result of data analysis using t test got t count equal to 0.553 and p = 0.582, so p> 0.05. This means that there is no significant influence between mother care pattern with nutritional status of children. Patterns of parenting also contribute to the nutritional status of children, one of the patterns of care related to the nutritional status of children is the pattern of feeding.[11] In addition to eating patterns, mother's health patterns also affect the health status of children and will ultimately affect the child's nutritional status indirectly.

Table 4. Cross tabulation of mother's parenting with nutritional status

			Nutritional status				Total
			Bad	Insufficient	Normal	Fat	
Mother's parenting	Less	Count	0	2	19	2	23
		% of Total	0.0%	2.2%	21.1%	2.2%	25.6%
	Enough	Count	1	5	38	2	46
		% of Total	1.1%	5.6%	42.2%	2.2%	51.1%
	Good	Count	2	3	8	8	21
		% of Total	2.2%	3.3%	8.9%	8.9%	23.3%
Total		Count	3	10	65	12	90
		% of Total	3.3%	11.1%	72.2%	13.3%	100.0%

t_{count}= 0.553, p=0.582

Table 5 shows that of 90 respondents most of the good environmental hygienitas and toddlers normal nutritional status (67.8%). Result of data analysis using t test got t count equal to 3,753 and p = 0.000, so p <0.05. This reveal a significant influence between hygienitas environment with nutritional status of children.Some studies found the link between environmental hygiene and nutritional conditions.[12,13] Health status can be improved by maintaining health and physical and social environment. From an epidemiological point of view the nutritional problems are strongly influenced by the host, the agency, the environment. The imbalance between these three factors, such as the occurrence of nutrient insufficiency. Poor environmental sanitation will make children more susceptible to infectious diseases that may ultimately affect nutritional status.

Table 5. Cross-linking of environmental hygienity with nutritional status

			Nutritional status				Total
			Bad	Insufficient	Normal	Fat	
Hygienity level	Less	Count	3	0	0	0	3
		% of Total	3.3%	0.0%	0.0%	0.0%	3.3%
	Enough	Count	0	8	4	2	14
		% of Total	0.0%	8.9%	4.4%	2.2%	15.6%
	Good	Count	0	2	61	10	73
		% of Total	0.0%	2.2%	67.8%	11.1%	81.1%
Total		Count	3	10	65	12	90
		% of Total	3.3%	11.1%	72.2%	13.3%	100.0%

t_{count}= 3.753, p=0.000

Table 6 shows that of 90 respondents most of the incidence of URI and diarrhea is absent and children under normal nutritional status (72.2%). Result of data analysis using t test got t count equal to-1,313 and p = 0,193, so p> 0.05. Thus, there is no significant influence between incidence of URI and diarrhea with nutritional status of children. Malnutrition due to dietary intake can be affected by childhood illness, such as URI and diarrhea. This will be important enough to get serious attention in childhood because it can enter a variety of disorders of growth and development of nutritional status. Similarly, diarrhea can cause nutritional disorders due to reduced food intake.[14]Less nutritional status leads to decreased body resistance and stronger viral pathogens, resulting in a balance of disorders and infection.

Table 6. Cross tabulation of incidence of URI and diarrhea with nutritional status

			Nutritional status				Total
			Bad	Insufficient	Normal	Fat	
URI and diarrhea	Exist	Count	1	2	0	5	8
		% of Total	1.1%	2.2%	0.0%	5.6%	8.9%
	No	Count	2	8	65	7	82
		% of Total	2.2%	8.9%	72.2%	7.8%	91.1%
Total		Count	3	10	65	12	90
		% of Total	3.3%	11.1%	72.2%	13.3%	100.0%

t_{count}=-1.313, p=0.193

Lastly, the testing results of the effect of energy and protein consumption levels on nutritional statusshow that out of 90 respondents, most of the level of energy and protein consumption is normal and toddlers normal nutritional status (52.2%). The result of data analysis using t test got t count equal to 4,751 and p = 0.000, so p <0.05, mean H0 rejected and H1 accepted so there is significant influence between nutrient intake with nutritional status of children aged 24-60 months. Nutrition is a substance or chemical element contained in the food needed for metabolism in the body normally. Nutrition needed by the body consists of carbohydrates, fats, proteins, vitamins, minerals and water. In an effort to achieve adequate consumption, the two most important factors that can affect the daily consumption of nutrients of availability of food and nutritional knowledge.[15]A person will be able to provide adequate consumption when they are able to provide nutritional food.

Conclusion

The findings reveal that there is a significant influence between maternal education variables on nutritional status of children aged 24-60 months in 3 Puskesmas Kab. Gresik. The variables of knowledge, environmental hygienity and protein energy intake have a significant influence on nutritional status of children. Moreover, there is no significant influencesof parenting, URI incident and diarrhea and family income variable on nutritional status of children.Of the factors above, the most dominant influence the nutritional status of children aged 24-60 months is the knowledge and protein energy intake. This encourages the community, especially the nanny, or the mother of the child 2-5 years to increase knowledge about child nutrition, and for healthcare workers to routinely hold program both in mother and children related to child nutrition.

Ethical Clearance: Taken from Puskesmas Kabupaten Gresikcommittee

Source of Funding: This study is self-funded

Conflict of Interest: There are no conflict of interests.

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Determinant of the Puskesmas Utilization in Madura Island

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Abstract

Madurese communities often have a low public health status. These could be seen from the health development achievements four regencieson the island. This research was intended to analyze the determinant ofthe Puskesmas utilization in Madura Island. The Data derived from the 2013 Riskesdas. The analysis usingbinary logistic regression to examine the determinant of the Puskesmas utilization. The results of the study showed the Madurese in Bangkalan likelihood 2,120 times more utilize the Puskesmas than in Sumenep (OR 2.120; 95% CI 1.448–3.105). Madurese in Pamekasan 1.410 times more likely to utilize the Puskesmas than in Sumenep (OR 1.410; 95% CI 1.025–1.940). Age affects the Puskesmas utilization, while rurality did not show a significant influence. Those who pass the primary school were likelihood 0.225 times to utilize of Puskesmas than the graduates of the college (OR 0.225; 95% CI 0.054–0.946). The Madurese in quintile 4 seen has no difference from those in quintile 5. While the Madurese who insured likelihood 0.650 times to utilize the Puskesmas than who not insured (OR 0.650; 95% CI 0.517–0.818). The Madurese that has a shorter time to the Puskesmas likelihood 0.616 times more utilize than that have a long time (OR 0.616; 95% CI 0.479–0.791). The research concluded that from 9 factors related to the Puskesmas utilization in Madura Island, there are 7 factors that are determinants, namely the regency, age, education, work status, socioeconomic, insurance, and travel time.

Keywords: *Utilization determinant, healthcare, health services, Madura, Riskesdas.*

Background

Madura is one of the islands which is in the working area of the province of East Java, Indonesia. Madura Island very special because it is dominated by the community in one tribe, Madura[1]. Health development in Madura has its own notes. This is because often the health development in four regencies in Madura Island (Bangkalan Sampang, Pamekasan and Sumenep) left behind than others regency in East Java Province. The Indonesian Public Health Development Index (PHDI), an index rating, is processed based on the data of 2007 Indonesian Basic Health Research (Riskesdas). PHDI put 4 regencies in Madura Island in the bottom five ranking from 38 regencies in East Java Province[2]. Indonesian PHDI released back in the year 2014. This time the index rating is done based on the results of 2013 Riskesdas. The result 3 regencies remain in the bottom five ranking, and 1 regency (Sampang) successfully slightly rose to the position of the bottom ten ranking[3].

Community Health Center in Indonesia called Puskesmas is a technical executive unit regency health office which is responsible for holding the health development in a regency's working area. The existence of a Puskesmas in the community is vital because the Puskesmas is a primary health service as the spearhead health services[4,5]. The Puskesmas in its implementation serve outpatient and emergency, but also inpatient for some specific regions, especially that far from the hospital[6].

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The Puskesmas utilization as the spearhead in Madura was considered very important. Because the Puskesmas is the first entrance for the community to get health services[7]. The determinants of Puskesmas utilization must be really understood by the policymakers in Madura to policy decisions made can really give impact to the health status of the Madurese communities[8]. Based on the background then this article was written to analyze the determinant of the Puskesmas utilization in Madura Island.

Method

The source of the data used in the analysis of this study was the 2013 Riskesdas. The Puskesmas utilization was a community visit to Puskesmas, both outpatients and inpatient. Outpatient was a community visit that done the last month, and inpatient was a community visit that done the last year. There were eleven factors analyzed in relation to the Puskesmas utilization. The eleven factors were a regency, rurality, age, gender, marital status, education, work status, socioeconomic, insurance, time traveled, and transportation cost to the Puskesmas.

The analysis unit in this research was the inhabitants of Madura Island 15 years old and above. At the age was assumed respondents have been able to take his own decision to do utilize the Puskesmas or not. Samples size were analyzed some 7.135 respondents.

The Chi-Square used to test dichotomous variables and T-tests for a continuous variable. This test was used to assess whether there were differences in the utilization of the Puskesmas. The estimation used binary logistic regression tests to analyze the factors that influence (determinant) on the Puskesmas utilization.

Findings: Table 1 is a statistical representation of the characteristics of the community respondents Madura Island which becomes the object of analysis in this research. Table 1 shows that there is a significant difference between Madurese people who utilize the Puskesmas based on the Regency. The average of Madurese that utilized of the Puskesmas a little older than that does not utilized. Table 1 also shows that the Madurese that utilizes the Puskesmas more women than men. However, based on the statistics test shown that gender and marital status were not different in statistics.

Table 1: Descriptive Statistics

Characteristic	The Puskesmas Utilization		All	P
	Utilized	Not Utilized		
Regency				0.000*
● Bangkalan	40 (11.6%)	1,658 (24.4%)	1,698 (23.8%)	
● Sampang	110 (31,9%)	1,617 (23.8%)	1,727 (24,2%)	
● Pamekasan	68 (19.7%)	1,657 (24.4%)	1,725 (24,2%)	
● Sumenep (Ref.)	127 (36.8%)	1,858 (27.4%)	1,985 (27.8%)	
Age (mean)	345 (45.49)	6,790 (42.95)	7,135 (43.08)	0.006*
The Area				0.002*
● Urban	90 (26.1%)	2,317 (34,1%)	2,407 (33.7%)	
● Rural (Ref.)	255 (73.9%)	4,473 (65.9%)	4,728 (66.3%)	
Gender				0.151
● Male	140 (40.6%)	3,023 (44.5%)	3,163 (44.3%)	
● Female (Ref.)	205 (59.4%)	3,767 (55.5%)	3,972 (55.7%)	
Marital Status				0.717
● Single	46 (13.3%)	1,097 (16.2%)	1,143 (16,0%)	
● Married	256 (74.2%)	4,854 (71.5%)	5,110 (71.6%)	
● Live together without married	0 (0.0%)	6 (0.1%)	6 (0.1%)	
● Divorce	5 (1.4%)	117 (1.7%)	122 (1.7%)	
● Separate	1 (0.3%)	10 (0.1%)	11 (0.2%)	
● Dead divorce (Ref.)	37 (10.7%)	706 (10.4%)	743 (10.4%)	
Education				0.000*
● Under primary school	186 (53.9%)	3,081 (45.4%)	3,267 (45.8%)	

Characteristic	The Puskesmas Utilization		All	P
	Utilized	Not Utilized		
● Primary school	95 (27.5%)	1,843 (27.1%)	1,938 (27.2%)	
● Junior high school	37 (10.7%)	775 (11.4%)	812 (11.4%)	
● Senior high school	25 (7.2%)	797 (11.7%)	822 (11.5%)	
● College (Ref.)	2 (0.6%)	294 (4.3%)	296 (4.1%)	
Work Status				0.030*
● No worked	127 (36.8%)	1,987 (29.3%)	2,114 (29.6%)	
● Worked	199 (57.7%)	4,389 (64.6%)	4,588 (64.4%)	
● Looking for work	2 (0.6%)	43 (0.6%)	45 (0.6%)	
● Schooling (Ref.)	17 (4.9%)	371 (5.5%)	388 (5.4%)	
Socioeconomic Status				0.000*
● Quintile 1	136 (39.4%)	2.109 (31,1%)	2,245 (31.5%)	
● Quintile 2	112 (32.5%)	1,950 (28,7%)	2,062 (28.9%)	
● Quintile 3	59 (17.1%)	1,169 (17.2%)	1,228 (17.2%)	
● Quintile 4	23 (6.7%)	2,284 (13.8%)	960 (13.5%)	
● Quintile 5 (of Ref.)	15 (4.3%)	625 (9.2%)	640 (9.0%)	
Insurance				0.000*
● Insured	175 (50.7%)	2,554 (37.6%)	2,729 (38.2%)	
● No insured (Ref.)	170 (49.3%)	4,236 (62.4%)	4,406 (61.8%)	
The travel time				0.000*
● ≤ 15 minutes	199 (57.7%)	3,171 (46.7%)	3,370 (47.2%)	
● > 15 minutes (of Ref.)	146 (42.3%)	3,619 (53.3%)	3,765 (52.8%)	
Transportation cost				0.000*
● ≤ IDR 10,000	305 (88.4%)	5,475 (80.6%)	5,780 (81.0%)	
● >IDR 10,000 (of Ref.)	40 (11.6%)	1,315 (19.4%)	1,355 (19.0%)	

Note: Chi-Square used for a dichotomous variable, and T-test for a continuous variable; *significant at 95% levels.

Table 1 shows that there is a difference between the Puskesmas utilization in Madura Island based on education level. Seen them that make use of the services is dominated by which has education status under the primary school. This results in line with differences in the utilization based on socioeconomic level. Madurese people who utilize Puskesmas was dominated by who was in the quintile 1 (very poor). Based on the work status of those who have the work dominate the Puskesmas utilization.

Three other variables also have a significant difference in the Puskesmasutilization. Among the insured and not, among that takes time quickly (≤ 15 minutes) and takes a long time, and among the cheaper transportation cost (≤ IDR 10,000) and the more expensive transportation costs.

Table 2: Logistic Binary Regression of the Puskesmas Utilization in Madura Island

Predictor	The Puskesmas Utilization			
	Sig.	OR	The lower bound	The upper bound
Regency: Bangkalan	0.000*	2.120	1.448	3.105
Regency: Sampang	0.629	0.933	0.705	1.235
Regency: Pamekasan	0.035	1.410	1.025	1.940
Age	0.009*	0.990	0.982	0.997
Area: Urban	0.119	1.248	0.945	1.649
Education: Under primary school	0.065	0.258	0.061	1.086
Education: Primary school	0.042*	0.225	0.054	0.946
Education: Junior high school	0.048*	0.229	0.053	0.984

Predictor	The Puskesmas Utilization			
	Sig.	OR	The lower bound	The upper bound
Education: senior high school	0.084	0.277	0.064	1.191
Work status: No worked	0.574	0.851	0.484	1.495
Work status: Worked	0.347	1.305	0.749	2.274
Work status: looking for work	0.929	0.933	0.204	4.274
Socioeconomic: Quintile 1	0.002*	0.391	0.215	0.712
Socioeconomic: Quintile 2	0.003*	0.405	0.224	0.732
Socioeconomic: Quintile 3	0.025*	0.501	0.274	0.917
Socioeconomic: Quintile 4	0.880	0.949	0.485	1.857
Insurance: Insured	0.000*	0.650	0.517	0.818
The travel time: ≤ 15 minutes	0.000*	0.616	0.479	0.791
Transportation cost: ≤ IDR 10,000	0.057	0.693	0.475	1.010

Note: Category reference is "No utilized"; OR Confidence Interval 95%; *Significant at 95% levels.

Table 2 displays the results of the binary logistic regression tests to illustrate the factors that affect the Puskesmas utilization in Madura Island. Selected category reference was "No utilized". Table 2 shows that the Madurese living in Bangkalan likelihood 2.120 times more utilize the Puskesmas than the Madurese in Sumenep (OR 2.120; 95% CI 1.448–3.105). The Madurese living in Pamekasan likelihood 1.410 times more utilize the Puskesmas than those living in Sumenep (OR 1.410; 95% CI 1.025–1.940). While there is no significant difference between Madurese living in Sampang and Sumenep in Puskesmas utilization.

Table 2 shows that the age effect significantly against the Puskesmas utilization. While rurality did not show a significant impact. Based on education level, partially influencing against the Puskesmas utilization. The Madurese are graduated primary school likelihood 0,225 times utilize the Puskesmas than the college graduates (OR 0.225; 95% CI 0.054–0.946). The graduates of junior high schools' likelihood 0,229 times than those which college graduates in the Puskesmas utilization. Based on the work status, there is not a significant impact on the Puskesmas utilization.

There is a partially influence the Puskesmas utilization based on socioeconomic level. The Madurese in quintile 4 seen has no difference from those in quintile 5. While those who have insurance was likelihood 0.650 times utilize the Puskesmas more than those who have no insurance (OR 0.650; 95% CI 0.517–0.818). Different from the results of other studies that reveal the positive impact of insurance in relation to the straight path towards the utilization of health services[9,10,11,12,13], Madurese people who utilized the Puskesmas dominant who do not have insurance. This asserts that the tariff services of Puskesmas in Indonesia are classified as cheap. The possibility of these conditions creates Madurese loyal to utilize the Puskesmas[14,15,16]. This makes the role of the replacement of the risk through insurance mechanisms less so necessary in the Puskesmas utilization.

Based on time traveled, Madurese that have shorter time likelihood 0.616 times more utilize than those who have time traveled longer (OR 0.616; 95% CI 0.479–0.791). The results of this study strengthen the results of other research that shows the relationship between the travel time with the health services utilization[17,18,19,20].

Based on the table 2 can be known that there are 7 factors that proved statistically significant as a determinant of Puskesmas utilization in 4 regencies in Madura Island. Examining the determinants are seen that the societies of the Madurese are most many utilize the Puskesmas was that those in marginal groups. This condition can be seen from their domination of the low educated and poor (quintile 1 and quintile 2), and do not have insurance to have the possibility of higher utilize the Puskesmas services. This description in accordance with some research results on the image of the previous Puskesmas utilization[21,22,23,24]. Based on the results of this can be stated that the Puskesmas in Madura Island was the main choice when marginal communities who need the health services.

The choice of society marginal Madura against the Puskesmas very reasonable. The Puskesmas is the nearest health service facilities and has the cost of the services cheap and even free. Access to Puskesmas that is physically close is a guarantee of cheaper transportation costs[25,26]. A rational choice for the marginal group.

Conclusion

Based on the research results it can be concluded there are 9 factors that are related to the Puskesmas utilization in Madura Island. From 9 factors, 7 selected

factors that are statistically significant. The seven factors are a regency, age, education, work status, socioeconomic, insurance, and time traveled to the Puskesmas.

Ethic and Consent: The 2013 Riskesdas survey had an ethical clearance that was approved by the national ethical committee in the NIHRD (ethic number: 01.1206.207). Informed consent was used during data collection, which considered aspects of the data collection procedure, voluntary, and confidentiality.

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Conflict of Interest: Nil.

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A Comparative Study in Healthy Psychological Burning among Football Referees and Football Referees of First Class Halls in Southern Zone

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Abstract

Term of (Burnout) is being repeated in last years within sources of sports psychology which means (Burning) and it is a case of psychological & physical exhausting which may infects the athletic due to accumulating of emption and entertainment and as a source for worry and fear to fail instead of desire to success, win and rising, Process of refereeing in football is a difficult mission the referee bears heavy loads and many troubles but he became delighted to practice it because the foundation of his practice of it is a pure hobby so he always seeks to a success in it through continuous work despite physical, technical and social obligations, The research aimed to know about differences in the phenomenon of psychological burning among football referees and football referees of first class halls in southern zone.

The researchers assumed that there are differences with moral guidance in the phenomenon of psychological burning among football referees and football referees of first class halls in southern zone.

The researchers had mentioned to the theoretical studies that contained of multiple researches related to the topic of the research. The researchers used the describing method by principle of comparative studies due to is suitable for the problem of the research, The research sample was contained from (28) referees divided onto (14) football referees and (14) referees of first class halls after implementing measure of psychological burning on a sample of research the researchers did to find differences between the two groups by using the law of (T) for the independent samples, After that theses results has been previewed and analysis and discussed so the researchers reached to conclusions the most important of the is that there are no any moral differences between the groups of football referees and football referees of first class halls in southern zone.

As for the most important recommendations that there is a necessity to insert referees whether football referees and football referees of first-class halls in southern zone. And would be supervised by psychological consultant for sake to instruct them about the psychological burning phenomenon and causing reasons so to insure their acknowledgment of this phenomenon in future.

Keywords: *Psychological Burning, society, Referees.*

Introduction

Preface and importance of the research: Psychology is to be considered of important sciences that needs study and big deepening due to is has big biological effecting on individuals, So it is a science which is so needful in last years especially in the sport field due to it has active effecting whether in training or competing some gave it priority in classification because it effects on the physiological sides of different body organs that do an active role in performance so it has been repeated in last years the term of (Burnout) within the terms of sport psychology which means (burning) where it is the status of physical and psychological exhausting that may infects the athletic due to accumulating of loads of ambition and entertainment and a source for worry and fear instead of desire in superiority, win and highness.

Refereeing process is to be considered a difficult mission the referee bears heavy loads and many troubles but he feels delighted to practice it because the basis of practicing is a pure hobby so he seeks always to

success through continuous work despite it has physical, technical and social obligations and this the top of the evolution and success to reach top levels and big degrees.

So the occupation of referee is most occupations that being subjected to psychological stresses and these stresses by its turn causes psychological burning and the psychological burning leads to creating negative situations against others which would leads to a case of restless and self conflict and down fall of personal relations where it effects on the personality in all ad this effect would be more clear in the psychological and physical health and performance in work which will causes that the referee will not be able to do his role in complete that participate in his feeling to be disable and gloominess with exhausting effort leads to a case of exhausting and psychological exhausting the thing that will enforce him to performs with low than its required from him.

The football game and football for halls are most popular games in the world and the role of the referee would be considered very important in managing the wheel of the match and to lead it to the safe lands and this requires high physical and psychological effort where the nature of psychological stresses that are being faced by the referee whether they where from the audience or press or media means, competing teams or referee committee that he works with them gives and big importance to be studied, Due to its role in rising the level of referee occupation and developing it and to rise it to the required level which will make practice of this occupation clear of problems and to get rid of its negatives that which will maintain giving his value and respected status for the sport referee in the society[1].

Through what has been mentioned and in view of available scientific resources about this important psychological phenomenon so the importance of the current research shows clearly in dealing with one of the sport jobs that impacts on sport field and joins with others in showing level of matches by shining & honoring vision for any sports activity being practiced, from here the importance of the research come out to know the phenomenon of psychological burning of football referees and football referees of fist class halls in order to know the referees of any of these two games are more subjecting to the psychological burning other than others. For sake to reduce the severity of psychological burning in them through knowing the reasons that causes that caused their burning.

Problem of the study: Few of people knows the size of big work that has been assigned on the shoulders of the referee whether before or after or during the match so he works under big stresses despite multi global and Arabic studies that took the phenomenon of psychological burning in the sport field but most of them (according to the acknowledgment limits of the two researchers) has not mentioned to the psychological burning of the sport referee especially foot bal referees and football referees of halls which may play an important role in leading the match and give it big beauty, through observation and private meeting for some of the referees and following by the researchers of the periodic and referees the problem of the research appeared that there are a number of referees does not continues in work due to being subjected for some psychological stresses or they may continue in their work with no acceptance about this work and then falling of their level of achievements, These stresses that are causing psychological burning varies by the difference of the game and its requirements which has pushed us to try to explore about these differences in the phenomenon of psychological burning of them.

Aims of the research: Identification on differences in the phenomenon of psychological burning among football referees and football referees of first class halls in southern zone.

Supposition of the research: There are differences with moral guidance in the phenomenon of psychological burning among football referees and football referees of first class halls in southern zone.

Scope of the research:

1. 5.1 Human field:-football referees and football referees of first class halls in southern zone–republic of Iraq
1. 5.2. Time field 15/5/2018-1/2/2019
1. 5.3. Location field, Stadiums and halls of football in southern zone

2. Method of research and its field procedures:

2.1. Research method the two researchers used the describing method by principle of comparing due to its suitable for the research problem.

2.2. Society of the research and its sample:

The society of the research has been formed from football referees and football referees of first class halls in southern zone (Basra–THI-QAR–Maisaan, Mothanna

governorates) and those who had been really recorded in the union of the football federation who are (39) referees of football and (28) referees for halls football, but the sample of the research has been chosen by random method where (28) referees had been chosen with reality of (14) referees for football and (14) referees for first class halls and the table (1) represents some of the information about society and sample of the research.

Table (1): Indicates number of society and research sample

Number Province	Number of football referees		Number of referees of halls	
	Total number	Sample	Total number	Sample
Basra	11	4	9	3
THI-QAR	15	6	6	5
Maisaan	7	2	6	3
Muthanna	6	2	7	3
Total	39	14	28	14

Research Method

2-3-1 Psychological burning measurement of the sport referee: The measurement has been designed by[3] to measure the feeling of the sport referee in burning under title of burning in refereeing and it is a measurement being abstracted from list of (Masilas) of burning and has been translated to Arabic[4], The measurement includes (15) phrases the referee answers on the item of the measurement according to seven substitutes (never implemented on me, implements on me very little, implements on me little,implements of me middle, implements on me with large size, implements on me with very large size, totally implements on me) the degrees from (1–7) is being given respectively except items (11.7.5) where their degrees is to be counted reversely. As much the total referee degree comes close from (105) it means he reached the degree of burning appendix (1)

2-3-2 Scientific specifications of the measurement

2-3-2-1 Credibility of the measurement: The two researchers had depended on measurement outward credibility and that a group of specialists to evaluate the validity of the measurement to measure the mark that it has been made for it, so the researchers did showed the measurement on a group of specialists appendix (2) in the field of sport psychology and football to go over the items of the measurement and to indicate how far is the validity and after collecting the forms from the specialists those forms has been emptied by the two researchers where the ratio of the agreement (100%)

2-3-2-2-measurement stability: The tool would be considered stable if it gives same results if measures the phenomenon for several times where the method of measurement stability through retesting is most used method in finding stability factors and most common and for sake to get of measurement stability the researchers has divided the measurement on a sample consisted of (8) referees from those who do periodic first class football teams and football for the halls and not from oral test sample then the same test repeated after two weeks from the first test on same sample after collecting the data they had been treated statistically by using the factors of simple connecting and the value of (R) 0.91 and this proofs that there is high connection and then excitant of stable factor of the measurement .

2-4 Statistical means: The following statistical treatments had been used:-

1. Accountant media
2. standard deviation
3. difference factors
4. simple connection factors
5. T Test for independent samples

3-preview results analysis & discussing them:

3-1preview and analysis the results of psychological burning measurement: 3-1-1 among football referees and football referees of halls

Table (2) Shows the differences in psychological burning among football referees and football referees of first class halls in southern zone

Treatments Changes	Football Referees		Football Referees of halls		Value of T		Statistical guidance
	S	+/-A	S	+/-A	Accounted	Table	
Psychological burning	45.21	11.15	49.66	7.41	1.199	2.06	Non moral

Value of (T) table at degree freedom (26) and the level of guidance (0.05) is (2.06)

Table (2) indicates the accountant middle and standard deviations and value of (T) accounted in the measurement of psychological burning of football referees and football referees of halls in the southern zone, results showed that then accountant middle of the group of football referees where (45.21) with standard deviation (11.15) but the accountant middle of the group of referees of halls where (49.66) with standard deviation (7.41) but the value of (T) accounted where (1.199) which is less than (T) table value of (2.06) with freedom degree (26) and below level guidance of (0.05) and this proofs that there are no any moral differences among football referees and football referees of halls in the psychological burning.

Discussion

It is clear from the table (4) that there are no any moral differences in the results of the measurement of psychological burning among football referees and football referees of halls in the southern zone the researchers justifies that it belongs to the good preparation and programmed training by the referees whether football referees or football referees of halls to reach by their selves to high level of physical fullness that enables them to good performance along the time of match as well as big desire by referees for this job and their love to it also the personal experience of those referees and their understanding of the items of the international law in managing the match and how to deal with the players in good manner as well as the exchanged cooperation between the referee and his associates in leading the match has caused not excitant of phenomenon of psychological burning for them … and this is what has been mentioned by [5] that the control on the burning requires from the athletics that they are aware of resisting against the burning where it is possible that they will analysis with constructive form and conveys their feelings to the others and by that they are reducing the burning . defined steps that leads to reduce the burning, The athletic or the referee can learn principles of psychological stress and get benefits by close examination, relaxing and others also knowing stresses is the side that enable the athletic to reduce traces of burning also that the best technique for the athletic is to identify on the problem and bearing it as much as he can then reducing it and then removing it.

Recommendations and Conclusions

Conclusions and recommendations

Conclusions

No existent of moral differences between the two research groups of referees of football and football referees of halls of first class in southern zone.

Recommendations: Basing on the results of the research the two researchers recommends by the following:

1. Participating referees whether football referees or football referees of halls in courses related to psychological sides and under supervision of psychological specialist for sake to let them know about the phenomenon of psychological burning and causes so that to ensure their acknowledgment of the phenomenon in future.
2. Raising the level of the physical fitness of the referees to stop phenomenon of physical psychological exhausting which impacts on his performance during the matches.
3. Providing financial and moral support for the referees who suffers from psychological burning symptoms.
4. Making researches and implementing similar studies treats the phenomenon of psychological burning or any other psychological variable.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Not required

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The Relationship between Nutrient Intake and Blood Glucose Levels of Male High School Students in Madiun City

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Abstract

Introduction: Macro nutrients consisting of carbohydrates, proteins, fats and micronutrients are instrumental in the incidence of obesity and diabetes. Micro nutrient substances that play a role in this situation include vitamin A, vitamin C, vitamin D, and zinc which are important elements for synthesis, storage and secretion of insulin.

Aim: The aim of the study was to analyze the relationship between nutrient intake and blood glucose levels in male high school students.

Method: The study used a cross sectional design. A total of 103 male high school students with overweight (BMI ≥ 25) and underweight condition (BMI<18) were recruited as the respondents. Data collection on nutrient intake was carried out by conducting interviews three times using food models. The amount of food intake was calculated using the Nutri Survey SEAMEO-TROPMED RCCN Indonesia University application. Blood glucose levels were determined by measuring fasting blood glucose levels. Statistical analysis was performed with Pearson correlation test on normally distributed data and with Spearman rank test on abnormally distributed data.

Findings: The findings showed the relationship of energy intake (r = 0.344, p = 0.000), protein (r = 0.202, p = 0.041), fats (r = 0.297, p = 0.002), carbohydrates (r = 0.292, p = 0.048), vitamin A (r = -0.097, p = 0.331), vitamin C (r = -0.140, p = 0.158), vitamin D (r = 0.287, p = 0.046), vitamin E (r = 0.015, p = 0.880), zinc (r = -0.003, p = 0.976) with blood glucose levels. The average blood glucose level was 94.45 ± 18.09 g / dl, energy intake 1984.38 ± 289.32 Cal, protein 74.69 ± 14.42 gr, fat 82.03 ± 19.17 gr, carbohydrates 238.49 ± 44.47 gr, vitamin A 671.76 ± 785.65 ug, vitamin C 21.64 ± 34.18 mg, vitamin D 1.66 ± 2.13 ug, vitamin E 4.96 ± 1, 89 mg, zinc 7.34 ± 1.73 mg.

Conclusions: In conclusion, the findings highlight that there is a significant relationship between energy intake, protein, fats, carbohydrates, and vitamin D with blood glucose levels in male high school students. While vitamin A, vitamin C, and zinc have no significant relationship.

Keywords: *Nutrient intake, blood glucose levels.*

Introduction

Adolescence is a period of physical and social change, and a period of development that affect choices in maintaining health and eating behavior. Behavior in food selection during adolescence is very important because the behavior patterns obtained during adolescence tend to last until adulthood(1).

Problems in nutrition are not only the problem of malnutrition but also the problem of over nutrition. At present, nutrition problems with high prevalence are overweight and obesity. Obesity is a world nutrition problem which the impact is starting to shift from adult to childhood(2).

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Obesity has a risk for type 2 diabetes[3]. Overweight can occur due to an imbalance between energy consumption and needs. Excess energy consumption is stored in subcutaneous tissue and intestinal tissue [4].

Macro nutrients consisting of carbohydrates, proteins and fats play a role in the incidence of obesity and diabetes. Excessive consumption can affect glucose metabolism by changing cell membrane function, enzyme activity, insulin releases and gene expression [5].

Moreover, micronutrients are also significant in the incidence of diabetes. Zinc is one of the micronutrients that is beneficial in the synthesis, storage and secretion of insulin. Zinc is also useful for the synthesis, storage and secretion of insulin. The function of zinc in the body metabolism is based on the enzymatic affinity of the enzyme or metalloenzyme complex [6].

Other micronutrients that engage in the incidence of diabetes are vitamins A, C, D and E. Lack of vitamins A, C and E can cause obesity. Vitamins A, C and E have been shown to reduce or inhibit the formation of leptin in both humans and animals so that it can increase appetite [7] ([8]. Children and adolescents who are obese have lower concentrations of vitamins A, C and E than those who have normal weight [9]. Consuming vitamins C and E for three months can reduce hypertension and blood glucose by increasing superoxide levels of dismutase and glutathione [10].

Another vitamin that involved in overweight and insulin resistance is vitamin D. Vitamin D is essential in increasing the activation of transcription from insulin receptor genes and in increasing the total number of insulin receptors without changing its affinity. 1,25 (OH) 2D increases insulin sensitivity by activating the delta receptor active peroxisome prolifator that regulates fatty acid metabolism in skeletal muscle and adipose tissue[5].

Method

This research was an observational analytic study with a cross-sectional design. This study was conducted at public high school 5 and 6, Madiun City. The data was taken from March to May 2019.

The respondents were a total of 130 male high school students who were overweight (BMI ≥ 25) and underweight (BMI <18). The variables in this study were the independent variables and the dependent variable. The independent variable was the nutrient intake (carbohydrates, protein, fats, vitamin A, vitamin C, vitamin D, vitamin E and zinc). The dependent variable was blood glucose level.

The data was taken by conducting three-time structured interviews using food recall tables. Blood glucose level was measured by using fasting blood glucose. Nutrient intake data was calculated by using the 2007 SEAMEO-TROPMED RCCN Nutri Survey Indonesia University application program.

Statistical analysis was performed with Pearson correlation test on normally distributed data and with Spearman rank test on abnormally distributed data. This study was stated ethically feasible by the Health Research Ethics Committee in Faculty of Medicine, Sebelas Maret University with number series 441/ UN27.06/KEPK/2019 date 20 March 2019.

Findings:

Table 1: Respondents Distribution Based on Blood Glucose Levels and Nutrient Intake

No	Variable	Mean	Median	SD
1	Blood glucose level (g/dl)	94,45	92	19,09
2	Energy (Cal)	1984.37	2021.9	289.32
3	Protein (g)	74.69	72.5	14.42
4	Fats (g)	82.03	82.5	19.17
5	Carbohydrates (g)	238.49	239.8	44.47
6	Vitamin A (ug)	671.76	493.3	785.65
7	Vitamin C (mg)	21.64	15.3	34.18
8	Vitamin D (ug)	1.66	0.8	2.13
9	Vitamin E (mg)	4.96	4.7	1.89
10	Zinc (mg)	7.34	7	1.73

Table 1 showed that the average of blood glucose level was equal to 94.45 ± 18.09 g / dl, energy intake = 1984.38 ± 289.32 Cal, protein = 74.69 ± 14.42 g, fats = 82.03 ± 19, 17 g, carbohydrates = 238.49 ± 44.47 g, vitamin A = 671.76 ± 785.65 ug, vitamin C = 21.64 ± 34.18 mg, vitamin D = 1.66 ± 2.13 ug, vitamin E = 4, 96 ± 1.89 mg, zinc = 7.34 ± 1.73 mg.

Table 2: Pearson Test of the Relationship between Energy, Protein, Fats, Carbohydrates and Vitamin E with Blood Glucose Levels in Male High School Students

No	Variable	Pearson Correlation	Sig. 2-tailled
1	Energy	0,344	0,000
2	Protein	0,202	0,041
3	Fats	0,297	0,002
4	Carbohydrates	0,292	0,048
5	Vitamin E	0,015	0,880

Table 2 showed if energy had the most significant relationship with blood glucose levels with r = 0.344 and p = 0,000.

Table 3: Spearman Test of the Relationship between Vitamin A, Vitamin C, Vitamin D and Zinc with Blood Glucose Levels in Male High School Students

No	Variable	Correlation Coefficient	Sig. 2-tailled
1	Vitamin A	-0,097	0,331
2	Vitamin C	-0,140	0,158
3	Vitamin D	0,287	0,046
4	Zinc	-0,003	0,976

Based on the results above, there was a significant relationship between blood glucose levels and the energy intake in male high school students (r = 0.344, p = 0,000). Blood glucose levels are associated with the intake of energy-dense food, especially food with high fats and carbohydrates. Blood glucose levels, obesity, and insulin resistance are influenced by high-energy food [11].

There was a significant relationship between blood glucose levels and protein intake (r =-0.202 p = 0.041). Animal protein and plant protein intake are associated with the risk of type 2 diabetes [12]. A high-protein diet can reduce overweight and obesity so that diabetes can be prevented [13]. Low protein diet can change the positive energy balance through the adaptation of thermogenesis, whereas high protein diets are useful for preventing that condition [14].

There was a noticeable relationship between blood glucose levels and fats intake (r = 0.297, p = 0.002). Consumption of fatty acids is associated with several diseases. These effects influence glucose metabolism by changing cell membrane function, enzyme activity, insulin signaling, and gene expression. The imbalance of omega-6 or omega-3 fat ratio strongly supports the existence of pro-inflammation which gives results in the incidence of atherosclerosis, obesity and diabetes. Consumption of MUFA (Monounsaturated Fatty Acids) is also associated with impaired glucose tolerance and fasting serum insulin. High intake of n-3 PUFA (Polyunsaturated Fatty Acids) can increase blood glucose levels and decrease insulin sensitivity, especially in obese persons [15].

There was a noticeable relationship between blood glucose levels and carbohydrates intake (r = 0.292, p = 0.048). Carbohydrates are the biggest source of energy. Carbohydrates needs to maintain health are about 55%-75%, most of which are complex carbohydrates and 10% are simple carbohydrates. These compositions can reduce the risk of type 2 diabetes [16].

There was no significant relationship between blood glucose levels and vitamin E (r = 0.015, p = 0.880). In this study, the respondents' vitamin E intake had an average of 4.96 mg. That average is still below the recommendation number which is 15 mg. Vitamin E is a cofactor in enzymatic and antioxidant reactions. Vitamin E acts as a peroxyl scavenger, it can prevent lipid membrane oxidation which has a relationship with diabetes mellitus [17].

There was no noticeable relationship between blood glucose levels and vitamin A (r =-0.097, p = 0.33). Vitamin A deficiency can cause an accumulation of fats in body tissues. But in this study, the average intake of vitamin A was 671.76 ug so it was still below the recommendation number, 1100 ug. Vitamin A coordinates lipid metabolism through the retinaldehyde dehydrogenase 1 enzyme [7]. High or moderate intake of vitamin A and high fruit intake are associated with metabolic syndrome problems. Health strategies must focus on increasing consumption of vitamin A to prevent metabolic syndrome [18].

There was no significant relationship between blood glucose levels and vitamin C (r =-0.140, p = 0.158). This study showed the average vitamin C intake was 21.64 mg so it was still below the recommendation number which is 100 mg. That is different with previous study which showed that there was a relationship between vitamin C intake and the incidence of diabetes [19]. Vitamin C as an antioxidants can reduce insulin resistance, oxidative stress, hypertension, blood glucose and increase superoxide dismutase and glutathione [10]. In this study, there was no relationship of vitamin C with blood glucose levels due to low fruit and vegetable intake.

There was a particular relationship between blood glucose levels with vitamin D (p = 0.046, r = 0.287). There are several ways in which vitamin D can affect insulin sensitivity. One of them are through 1.25 (OH) 2D which enters responsive insulin cells and interacts with VDR as a consequence, it can activate VDR retinoic acid X receptors and then binds to vitamin D in human insulin receptors. The process can increase the activation of transcription from insulin receptor genes and increase the total number of insulin receptors without changing its affinity. Moreover, 1.25 (OH) 2D increases insulin sensitivity by activating the delta receptor active peroxisome proliferator which is a transcription that regulates the metabolism of fatty acids in skeletal muscle and adipose tissue [20]. Vitamin D

indirectly affects insulin resistance through the renin-angiotensin aldosterone system (RAAS). Vitamin D deficiency is associated with increased fat infiltration in skeletal muscle and gives impact on decreasing insulin action [21].

There was no significant relationship between blood glucose levels and zinc intake (r =-0.003, p = 0.976). In this study, the average intake of zinc was 7.34 mg so it was still below the recommendation number which is 10 mg. Zinc is a micronutrient that plays a role in metabolic processes, regulation of endocrine hormones, immune responses, as well as human growth and development. Low zinc intake is associated with decreased insulin sensitivity and impaired glucose use in the body, whereas higher zinc intake can provide protection against type 2 diabetes mellitus [22]. Zinc also plays a role in insulin synthesis and action. Thus, low zinc levels will cause a decrease in insulin sensitivity, impaired glucose utilization and type 2 diabetes mellitus [23].

Conclusions

In conclusion, there is a significant relationship between energy, protein, fats and vitamin D intake with blood glucose levels in male high school students. However, there is no significant relationship between vitamin A, vitamin C, vitamin E and zinc intake with blood glucose levels in male high school students. Therefore to reduce the risk of diabetes mellitus in male high school students, energy intake should be limited yet fruit and vegetable consumption must be increased in order to fulfill vitamin intake.

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Parents Determination Factors Influencing Incomplete Basic Immunization for Infantsin Sorong City, West Papua Province

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Abstract

Background: The implementation of complete Indonesian basic immunization has decreased in the period of 2012-2015. West Papua is one of the provinces with the lowest immunization coverage, which is 57.1% and the city of Sorong is only 21.9%.

Objective: to investigate the determinant factors of parents in complete basic immunization of infants months in Sorong City, West Papua Province

Method : This study was cross-sectional in design. The subjects consisted of apurposive samplingof 134 parents of children aged 1-5 years old,have incomplete basic immunization from immunization records and who visit 10 health center in Sorong City. Data were collected from parents using questionaires and immunization records. Logistic regression were used for data analysis.

Results: Simultaneously, mother's age, education level, occupational status, number of children, experience of having children, distance to the place of immunization, knowledge, family support, immunization officers and attitudes did not affect the incompleteness basic immunization (f count 1.768).Only the number of children (t = 0.017) and immunization staff support (t = 0.044) which affected the incomplete immunization. sequentially, number of children (β = 0.003), immunization support staff (β = 0.004), distance to immunization site (β = 0.035) and attitudes (β = 0.027) which most contribute to incomplete immunization.

Conclusion: Number of children, immunization officers support, distance to immunization site and attitudes which contribute to incomplete immunization.

Keywords: *Vaccine, parental attitude, infants.*

Introduction

Reduction of serious infections which are indicators of global public health success can be done by immunization. However, the implementation still found many obstacles which until now have not been found a solution because the scope of its implementation has not been comprehensive to all recipient subjects. The World Health Organization in 2017 estimates that around 19.4 million infants, children and toddlers throughout the world have not received complete basic immunization. About 60% of them live in low and middle income countries such as Asia, Africa and Ukraine including Indonesia[1].

According to the Indonesian Ministry of Health's Center for Data and Information, the implementation of complete basic immunization for the 2012-2015 period did not reach the target and even decreased by 75% of the 80% target of the National Medium Term Development Plan. West Papua is the province with the lowest immunization coverage (57.1%) and Sorong City only 21.9[2].

The priority of immunization programs in each country varies, including Indonesia. Indonesia requires 3 doses of DPT-HB-Hib, 1 dose of Hepatitis B, BCG,

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measles and 4 doses of polio[2]. Indonesia managed to carry out basic immunizations in all city districts such as measles and BCG which almost 95%. But it did not occur in Hepatitis B, DPT, Polio and Tetanus immunizations in Papua and West Papua which were only under 80% [2].

Although immunization is the biggest success in the health sector, there are still various obstacles to implementation[3]. These problems include lack of access to health facilities due to poverty and ignorance and controversial ethics such as regulation, development, religion and beliefs, research and testing, informed consent and access gaps.

These obstacles cause 2-3 million infant deaths in Indonesia each year[4].Even though the implementation of immunization in Indonesia is protected by law and the government is very active in carrying out it, but still encounters obstacles when implemented. Therefore, looking for causes for planning solutions must be done immediately.

This epidemiological study can help provide advice on selecting vaccines to be included in public health programs, identify target pathogens and disease-causing transmission pathways, disease burden, design disease control, determine appropriate strategies, monitor performance indicators, eradicate, monitor strategies, measure progress and the impact of the vaccination strategy.

Method

Study design: This was a correlational research with cross sectional design to analyze the factorinfluencing incomplete basic immunization for infants in Sorong City, West Papua Province.

Setting: This study was conducted in 10 health centers in the city of Sorong is Malawei, Remu, Klasaman, Cape cassowary, doom, Malanu, Sorong West, East Sorong, Malaisimsa, Sorong City from October to November 2018.

Sample: The subjects consisted of a purposive sampling of 134 parents of children aged 1-5 years old, have incomplete basic immunization from immunization records and who visit 10 health center in Sorong Cityand willing to be respondents.

Instrument: A questionnaire was used to measure the demographic of the participants consisting mother's age, education level, occupational status, number of children, experience of having children, distance to the place of immunization, knowledge, family support, immunization officers and attitudes. Instrument for measuring complete basic immunization for infants was immunizationrecord in health centre. immunization record is record of infants condition that showed history of immunization contains 3 doses of DPT-HB-Hib, 1 dose of Hepatitis B, BCG, measles and 4 doses of polio. Validity and reliability by Winarni.

Data analysis: Univarate analysis was used to describe the findings. Bivariate and multivariate logistic regression analyses were conducted to analyze the associations that existed among constructs and identify the factors that most influence the incompleteness of basic immunization status for infants.

Results

There was a 100% response rate, of which, the large majority of them 128 (95.5%) were in the less 35 years age group. A total of 127 (94.8%) the study participants have high education. Half of the study participants were unemployed 75 (54.03%). Total 78 (58,2%) the study participants have had only had children. Most of them have less than 2 children in their home 128 (95.5%). Most participants have male children 80 (59,7%). Most of them havehigh level of knowledge about immunization92 (68.7%) and are supported by families 75 (56%) but were not supported by immunization officers to immunize their children 69 (51.5%) even though access to the immunization site is very close 100 (74.6%). Therefore, respondents have a negative attitude towards immunization 100 (74.6%) (Table 1)

Table 1: Socio-demographics and economic Characteristics of participants for the behavioral determinants survey, 2018, Sorong

Variabel	Number (n-134)	%
Mother's Age (years)		
< 35	128	95.5
>35	6	4.5
Education levels		
Primary	7	5.2
High	127	94.8
Occupational status		
Unemployed	75	54.03
Employed	63	45.07
Experience of having children		
First	78	58.2
More	56	41.2

Variabel	Number (n-134)	%
Number of children		
<2	128	95.5
>2	6	4.5
Infants gender		
Male	80	59.7
Female	54	40.3
distance to the place of immunization		
Close	100	74.6
Far	34	25.4
Level of knowledge		
Low	42	31.3
High	92	68.7
Family support		
unsupport	59	44.0
Support	75	56.0
immunization officers support		
unsupport	69	51.5
Support	65	48.5
attitudes		
Negative	100	74.6
Positive	34	25.4

The factors that most influence the incompleteness of basic immunization status for infants in Sorong City during 2018 are presented in table 2. In the multivariate analysis, simultaneously mother's age, education level, occupational status, number of children, experience of having children, distance to the place of immunization, knowledge, family support, immunization officers and attitudes did not affect the incompleteness basic immunization (f count 1.768). Only the number of children (t = 0.017) and immunization staff support (t = 0.044) which affected the incomplete immunization. sequentially, number of children (β = 0.003), immunization support staff (β = 0.004), distance to immunization site (β = 0.035) and attitudes (β = 0.027) which contribute to incomplete immunization.

Table 2: Multivariable logistic regression analysis of factors involved in the incomplete immunization.

Variabel	F	t	Beta	p-value
Mother's Age (Years)	1.768	1.458	0.127	0.147
Education levels		1.028	0.090	0.306
Occupational status		1.337	0.114	0.184
Number of children		0.017	0.003	0.986
Experience of having children		0.824	0.295	0.412
Distance to the place of immunization		0.264	0.027	0.793
Level of knowledge		1.352	0.129	0.179
Family support		2.085	0.208	0.039
Immunization officers support		0.044	0.004	0.965
Attitudes		0.364	0.035	0.717

Discussion

According to the Indonesian Ministry of Health's Center for Data and Information, the implementation of complete basic immunization for the 2012-2015 period did not reach the target and even decreased by 75% of the 80% target of the National Medium Term Development Plan. West Papua is the province with the lowest immunization coverage (57.1%) and Sorong City only 21.9%[2]. The main reason for vaccine uptake among HCWs, as supported by other studies, is that vaccination protects family members, friends and patients from being infected[5,6,7].

We found that,the variable that greatly influences the incompleteness immunization status of infants is number of children, immunization support staff, distance to immunization site and attitudes which most contribute to incomplete immunization.

Doubts and anti-immunization movements are always present in every immunization exercise[8,9]. besides religious and lifestyle reasons[10,11,12] Concerns that too many infants are immunized simultaneously[13,14]. concerns from parents who oppose or only some who accept immunization become one of the concerns about the safety and consequences of vaccines long-term unknowns to date[15,16,17,18].. because it is related to vaccine safety perhaps because parents are concerned by parents about their child's development.

Many parents worry about vaccine safety because the controversy regarding the use of mercury in vaccines has been around since 1999. But after that, the American Academy of Pediatrics and US Public Health Services recommended that children's immunization vaccines be made without preservatives[3]. In addition, it was strengthened by immunization officers providing counseling to parents about vaccine safety.

Research shows that rarely accessing health services may make parents vulnerable to conflicting information from neighbors in their environment or media (online) [19,20]. Searching for immunizations on the Internet, especially through search engines and on social media, can cause confusion and hesitation among parents. Another explanation that might underlie parents who refuse vaccination is insufficient knowledge, and distrust of immunization officers. More research is needed to find out what information parents need and want to make decisions about vaccinating children.

Planning behavior theory is one theory that has been successfully applied to improve immunization implementation decisions because it includes the process of consideration by decision makers; information processing available by thinking of the consequences of decisions and weighing pros and cons[21,22,23]. Vaccination decisions are included in health decisions that require consideration by parents. Deliberations between husband and wife can increase positive attitudes in the implementation of immunization. More research is needed on the reasons for consideration of parents who receive vaccinations because this will result in a more stable attitude towards child immunization.

Availability and access to immunization services tend to be worse in suburbs or sub-areas that are less densely populated or mountainous areas, where people are rarely West Papua. Although perceptions of the distance between parents and others in accessing immunization facilities in shingles are not clear, this problem seems to be related to immunization status. This finding was also seen in other studies. For example, a study in Bangladesh found that women who reported having the nearest health facility (<1 km) were more likely to fully immunize their children[24].

Another study, in India, found a positive relationship between the existence of a health center within 2 km of the village. urban slums and immunization status of children[26]. Further studies are needed to understand the perceptions of parents in the city of Sorong about the distance to immunization and other health services.

Seasonal migration in homes anchored to and from urban shocks is quite common and affects immunization coverage. Families sailing to become fishermen for better economic opportunities directly affect the use of health services and immunization. the problem encountered was that they lost time to immunize, children were left by caregivers, or parents forgot immunization records.

An integrated tracking and reporting system must be implemented so that the baby gets complete basic immunization from sites other than the designated site. This system can track these children for the next vaccination. This study has important implications in the development of policies and programs for the implementation of complete basic immunization in infants. Vaccination coverage can be increased in remote areas by increasing access and reducing travel time to health facilities. hospitals and health centers that assist in the delivery process can have integrated data with health facilities in the patient's domicile. so, health workers can carry out immunizations to the patient's home.

Additional immunization activities can also contribute to increasing measles immunization coverage in infancy and reducing inequality. If necessary, outreach programs and additional immunization activities should be considered to increase coverage in remote areas. In addition, a new vaccine strategy is needed for the most difficult to reach children in West Papua and other parts of West Papua

Conclusion

Affordability to immunization facilities and support from immunization officers greatly influences the attitudes of parents in carrying out immunizations. motivation in carrying out immunization is very dependent on the right information and the comfort of the subjects receiving immunization services. in addition, integrated information between health facilities from the birth process to the age of 12 months is very helpful in meeting the targets of complete basic immunization.

Ethical consideration: This research had been approved by the Committee ethics of the Health Polytechnic of health ministry Sorong, with number: DM.03.05/6/101/2018. Before the conduct of the field work, the researchers sought permission from each administrator at all levels. Each study participant was

asked to participate in the study after explaining the aim of the study and after assuring confidentiality of personal information using code numbers instead of names.

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Effect of Zirconium Oxide and Yttrium oxide Nanoparticles on Plant Germination of Cucumis Sativus

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Abstract

Nanoparticals of earth metal oxides were widely used and applied in agriculture, precisely in germination. In this study Yttrium oxide and Zirconium oxide were used in the germination of *Cucumis* seeds. The seeds were immersed in sterile water or metal oxide nanoparticles (NPs) suspensions for 2 hrs, fourteen treatments were done, then every ten seeds were transferred into a Petri dish with a filter paper on the each Petri dish. The germination was conducted in dark at 25 °C for 5 days. After that, the germination rate, the root length and shoot length were measured and it was found that Zirconium + Gibbriline gave the best parameters in comparison with the other treatment. The mechanism of metal oxide NP phytotoxicity is related to the NP species, test plants, concentration, chemical composition, surface modification and particle size of the nanoparticles itself.

Keywords: *Cucumis sativus, germination, Yttrium oxide, Zirconium oxide.*

Introduction

The effect of Manufactured Nanomaterials MNMs on diverse plants types can differ significantly, and there are reports of both positive and negative effects. Among positive effects, it can speed up the germination and growth was promoted by a mixture of nano-sized materials oxides due to its ability silicon to absorb water and fertilizer, and stimulated the antioxidant system [1-3].

Yttrium oxide (Y_2O_3), and Zirconium oxide (ZrO_2) are important oxides along with rare earth compounds, it has been actively studied in the recent years, and were considered as the most promising elements for commercial products, cosmetics, medicine, as well as agriculture. In addition to that, it is widely used as a host material for various rare earth dopant and is of interest for potential applications in biological imaging as well as photodynamic therapy[4,5]. Nanoparticles of ZrO_2 uses in the manufacture of dentures and cosmetic fillings. Therefore, it is necessary to produce new antibiotics without side effects such as particles of ZrO_2 nanoparticles that can inhibit a wide range of microorganisms [6.7].

Cucumber fruit is composed generally of water; more than 96% as well as other constituents such as vitamins, minerals, amino acids, phytosterols, phenolic acids, fatty acids, taces of essential oil, pectins, vitamin C, and other useful compounds which enable it for a wide pharmaceutical applications [8].

In this study the researchers used manufactured Nanomaterials (MMNs) tto enhance the germination of cucumber seeds and minimize the toxic effect of soil on the seeds to ensure a smooth and healthy growth.

Material and Method

Chemiclas: Nanoparticle (Zirconium and Yttrium) bught form the local market, Naphthol Acetic Acid (NAA), Indol acetic acid (IAA) and Gibberellin.

Seed Germination: For germination, the seeds *Cucumis* were surface sterilized by soaking in 70% ethanol for 2 min. Then the seeds were rinsed with sterile water several times to remove any remaining ethanol.

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Subsequently, the seeds were immersed in sterile water or metal oxide NPs suspensions for 2 hrs. This had been done for fourteen treatments with different solution component every time, as shown in table (1). After that, every ten seeds were transferred into a Petri dish (100 mm, for 15 mm) with a filter paper on each Petri dish. Finally, the Petri dishes were covered and sealed with tape. The germination was conducted in dark at 25 °C. After 5 days, the germination rate was evaluated via measuring the root length and shoot length [9].



Figure 1: Germination of Cucumis seeds on Petri dishes

Table 1: Type of Treatment

No.	Treatment
1	Control
2	Yttrium 100 µg
3	Yttrium 300 µg
4	Zirconium 100 µg
5	Zirconium 300 µg
6	Gibbrilne 300 µg
7	IAA
8	NAA
9	(6+2)
10	(7+2)
11	(8+2)
12	(6+4)
13	(7+4)
14	(8+4)

IAA = Indol Acetic Acid (Plant Hormone), NAA = NaphthaleneAcetic Acid

Data Analysis: Each treatment was conducted with three replicates and all of the experiment groups were conducted in triplicates, the dates were showed as mean p< 0.05) SD (standard deviation). Difference analysis was conducted with ANOVA (analysis of variance, LSD). Statistical significance was based on probabilities of p< 0.05).

Result and Discussion

The germination rate was calculated based on the equation listed below. The results of an experiment compared the effect of plant hormones and nanomaterials on germination and growth of seeds.

$$Germination\ Percent\ (GP\%) = \frac{GN}{SN}\ X\ 100$$

Where: GN is the total number of germinated seed;SN is the total number of seeds tested.

The results of an experiment compared the effect of plant hormones and nanomaterials on germination and growth of seeds.Significantly Yttrium 100µg and Zirconium and Gibberellin had the highest seed Germination 100% followed by Zirconium 100µg, Ytterium+ Gibberellin and Ytterium+Indol Acetic Acid 93.3% in compare with acetic acid in compare with other treatment.Seed Vigor Index : SVI=Germination% (GP)× (root length + shoot length) Vigor index I= Germination % × Seedling length (cm).We found that significantly Ytterium +Gibbrillen and Zirconium +Gibbrilline gave the highest vigor Index 5280 & 5133 followed by the other treatments. The result of Vigor index II, calculate by equation = Germination % × Seedling weight (g)

We found that Zirconium with Indol Acetic Acid significantly gave the highest value 177.4 in compare with all treatments. While in column E, the result showed non-significant differences between all treatments. In column F (Number of root), also the results indicate no significant differences.Ytterbium +Gibbriline and Indol Acetic Acid significantly gave the highest value 34.3, 34.1, while ytterbium +Naphthalene acetic acid significantly gave the lowest value 5.8.as shown in column G. Significantly Zirconium +Indol Acetic Acid had the highest length of shoot in compare with other treatment. Zirconium and Gibbriline gave the highest value in wet weight and dry weightin compare with the other treatment, columns I and J in table 2.

From experimental results and the collected data, it was found that Zirconium +Gibbriline gave the best parameters in compare with the other treatment. The mechanism of metal oxide NP phytotoxicity could be related to the NP species, test plants, concentration, chemical composition, surface modification andparticle size [10].The addition of different material on seed treatment in comparison with control, the initial growth stages showed a positive effect on *Cucumis* seed plants. There were increases of over 100% in seedling height

with all the evaluated concentrations of material under study. These findings are in full agreement with those reported by Xing and his coworkers[8] who observed that treatment participate in the formation of adventitious roots, cell differentiation, and root morphogenesis. Increases in root length from the effect of these elements have also been observed in other species. Table indicates the comparison between different treatments while figure 2 shows different germination treatment (root + shoot).

Table 2: Calculated data

No.	Treatment	A	B	C	D	E	F	G	H	I	J
1	Control	86.6	0.40	3140	76.540	2.60	6.6	17.5	18.6	0.81	0.089
2	Yttrium 100 µg	100	0.50	4933	88.760	3	7.3	3.2	17.5	1.28	0.103
3	Yttrium 300 µg	86.6	0.46	4073	53.960	2	6.6	25.3	19.2	0.86	0.094
4	Zirconium 100 µg	93.3	0.46	4620	101.846	3	7	30.6	19.5	1.1	0.105
5	Zirconium 300 µg	86.6	0.43	3346	64.496	3	6.6	32.8	20.5	0.57	0.098
6	Gibbrilne 300 µg	80	0.40	3710	58.470	2.3	6	2.7	18.6	0.90	0.105
7	IAA	86.6	0.43	4846	146.016	3	7.6	34.1	21.6	1.20	0.110
8	NAA	86.6	0.36	3193	92.272	2.3	6	2.3	14	1.21	0.100
9	(6+2)	93.3	0.46	5286	97.872	2.6	7	34.3	22.6	1.20	0.110
10	(7+2)	93.3	0.46	3653	122.520	2.3	9	34.1	18.5	1.13	0.109
11	(8+2)	86.6	0.43	1840	67.730	2.6	9	5.8	15.6	1.10	0.111
12	(6+4)	100	0.50	5133	177.230	3	9.6	28.5	22.8	1.31	0.132
13	(7+4)	86.6	0.43	3906	125.144	3	7.3	33.6	23.3	1.28	0.120
14	(8+4)	80	0.40	626	71.624	2.3	11	7.6	12.6	1.11	0.090

A= Cucurbita Seed Germination (Germination percentage of Cucurbita Seed), B = Germination Rate ($Germination\ Rate\ (GR) = \sum \frac{S_i}{t}$), C= Seed Vigor Index (SVI-I= Seedling length X Germination), D= Vigor Index II (SVI-II= Seedling Dry Wt. X Germination), E = Number of Shoot leaves (The results indicates no significant differences), F = Number of root (The results indicates no significant differences), G = Length of Root for germinated treatment seed, H = Length of Shoot (length of growth), I = Weight Wet, J = Weight Dry

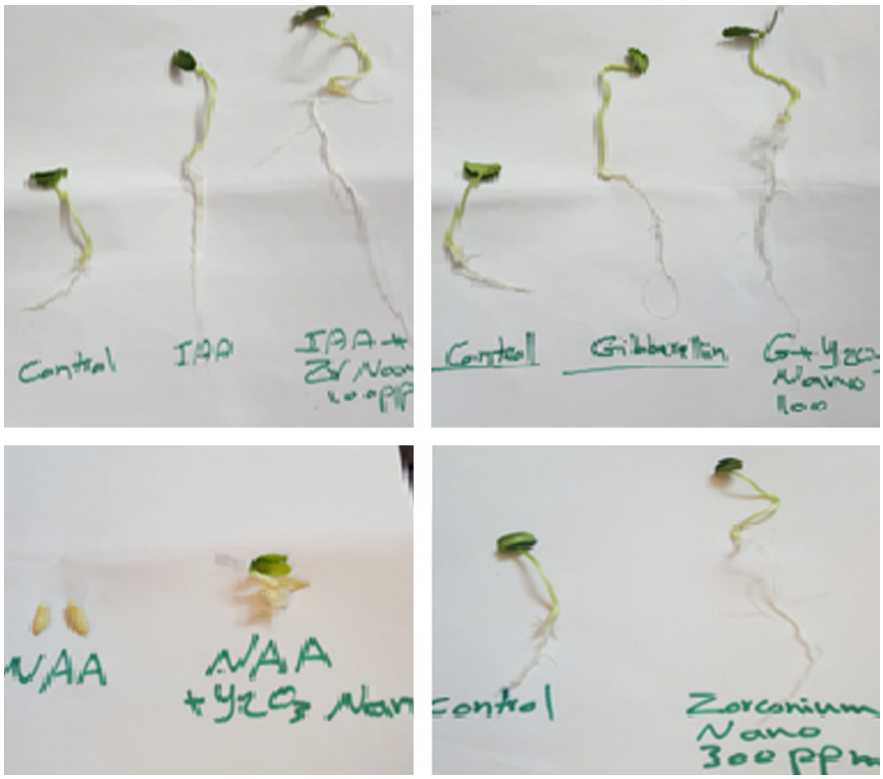


Figure 2: Seed treatment germination in different treatment (Root +Shoot).

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Mapping National Health Insurance Health Services Based on Preference and Community Needs in South Sulawesi

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Abstract

The increase in the population of South Sulawesi is in line with the increasing needs of the population related to national health referral guarantee information. The problem is the unavailability of a clear geographical picture and complete information about the state and distribution of public health services. The research aims to map national health insurance health services based on the tastes and needs of the people in South Sulawesi. This research uses a qualitative approach. Data were analyzed using content analysis based on method triangulation, source triangulation, and data triangulation. The results of the study found that the mapping of health services in South Sulawesi has not run as expected so that increasing access and at the same time can be an accelerated step to achieve equity in the health referral system performance. The achievement of equity in health services and access to health services must be determined by the preference and actual needs of health services rather than merely the ability to pay or geographical location.

Keywords: *Mapping, National Health Insurance, Health Service, Preference, Needs.*

Introduction

The quality of health services, including National Health Insurance participants, is still an issue that has not been resolved until today [1-5].The Health Social Security Provider has not met the equity principle in accordance with the National Social Security System Act. The mandate of the Act is the mapping of health service areas adjusted to the referral area[6]. Health development in the 2015-2019 period is a Healthy Indonesia Program that is implemented with 3 main pillars, namely the healthy paradigm, strengthening health services, and the National Health Insurance. The strengthening of health services is carried out with strategies to improve access to health services, optimize the referral system and improve the quality of health services, using a continuum of care approach and health risk-based interventions[7]. The health care referral system in Indonesia is still a problem. This problem is a consequence of Indonesia's geographical condition as an archipelago and topographic conditions that can be very extreme between regions[8].

With the increase in the population of South Sulawesi, the population needs related to the national health referral guarantee information on public health services will also increase[9]. This is because people are increasingly aware and believe that health is a major asset in everyday life. But it is unfortunate, until now the type of health service information available is only limited to non-spatial data and is limited. The unavailability of a clear geographical picture and complete information about the state and distribution of public health services in South Sulawesi is a major problem in the service referral system. The mapping of public health services is expected to be able to provide solutions to the problems faced by making it easy for anyone to access health service information.

Based on this information, a mapping of the level of accessibility of health services in South Sulawesi is

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needed. This mapping is important to be carried out as an equal distribution effort that has been carried out, as well as determining development priorities for improving the accessibility of health services in South Sulawesi.

Materials and Method

This study uses a qualitative method[10-12]. Data were analyzed using content analysis based on method triangulation, source triangulation, and data triangulation. This research was conducted at Daya Hospital and Waihidin Hospital, South Sulawesi Province.

Results and Discussion

a. Mapping Health Service based on the Community Preference

The public preference in the health service system must be based on the needs of the health service. The meaning is that the community is given the opportunity to choose health facilities, choose the doctor to be referred to either referred or own initiative in conducting health services. The preference is still based on the need for indication and diagnosis of the disease they are suffering from as well as the type of BPJS membership class.If something is forcing to move up or down grade due to lack of facilities and infrastructure when they want to do treatment for the disease. This is for people in the border area between two regions both in one region and another region, even different provinces so that they are still given the opportunity to choose the closest health facility to provide health services and can still be served as a BPJS participant.

For example, patients ask to go to Bantaeng because it is near the Jeneponto border, it must go to BPJS Bantaeng asking for access to services. Likewise, the people of Bangkala Sub-District, Jeneponto Regency and Takalar Regency Hospital and all inter-regional boundaries in South Sulawesi need to be mapped. Wing-wing solution in this case is that the government must immediately adopt a short-term policy between two neighboring regions, namely conducting an MOU on access to health services together, as complained by informants R17, R1 and four other informants as follows:

In general, all patients can be referred according to the wishes of patients, but BPJS rules do not allow that, especially outpatients. Their references must be tiered unless they approach the BPJS (R17).

Many patients in Barru Regency Hospital asked to be referred to Parepare Hospital because the principle is faster, more precise and more quality, even though for orderly, they have to go to Daya Makassar Hospital far enough (R1 59 years),

The community is very difficult to regulate in relation to these references. Therefore, as a doctor, we must have a lot of patience in dealing with patients with such diverse problems. The results showed that many health workers confirmed that the referral system was problematic. Many references are given to the community based on the request of the patient or the patient's family.

In general, patients are referred at their own request, so the doctor gives a lot of policy with the doctor's reasoning and analysis that the referral place can carry out an extension of the mandate, (R16).

Why is the regionalization not running, actually it is still running but many people ask to be referred to a particular hospital / doctor, they should go to Labuang Baji Hospital but ask to Hajj Hospital or UIT Hospital (R19)

b. Mapping Health Service based on the Community Needs

BPJS Health is a legal entity formed to organize a national health insurance program. There are still issues that need to be addressed. These problems are related to systems, procedures, human resources (medical personnel), as well as infrastructure and the application of the principle of responsiveness to the needs of the community in order to improve the quality of public services in the health sector. Health services do not meet good public service standards, community access to benefit services is very limited, people cannot yet get services in all health facilities[13].

Developing a public sector service model of customer loyalty in consumer theory by incorporating customer perceptions of equity and customer brand values and preferences into an integrated loyalty analysis, illustrating the extent of customer loyalty. There are seven factors which influence service quality, equity and value, customer satisfaction, customer loyalty, expected switching costs and clinical recommendations[14]. The general model is implemented for JKN customers in a comprehensive and retired service. This analysis found that although perceived quality does not directly affect

customer satisfaction, it is done indirectly through customer equity and perceived value. The study also found that customer loyalty in the past was not directly related to customer satisfaction or current service recommendations and that brand preference was an intervening factor between customer satisfaction and returning customer intentions. The main factors affecting brand preference are perceived value with customer satisfaction and switching costs that are expected to have less effect[15].

Regionalization is still expected to run based on community interests. Some informants' views, for example:

Regionalization continues but the community wants it to be of interest to a particular hospital/doctor (R19).

The regulation has been running, for example, from Type C Hospital to Wahidin Hospital immediately rejected, but from the Puskesmas to Type B Hospital it has not been strict, for example from the Puskesmas to Daya Hospital here (R11)

Community interest in treatment is low so that if there is a health facility close by, they choose it rather than being far away (R7)

In my opinion (doctor) BPJS is strange, there are patients from Jeneponto being referred, seeking treatment to Takalar or to Bantaeng, complete documents but cannot be served as BPJS patients (R18)

Patients can ask to be referred to certain health facilities with a reasonable reason but in terms of rules they cannot ask for their own referral goals, there is already a frame work (R16).

Regionalization contradicts regional autonomy because regionalization limits the rights of citizens to obtain health services according to the desired standard.

Conclusion

Health services in South Sulawesi did not go as expected. Increasing access and at the same time can be an accelerated step to achieve equity (fairness) in the performance of the health referral system. The achievement of equitable health service equity has a number of dimensions. Access to health services must be determined by actual preference and needs for health services rather than merely the ability to pay or geographic location.

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Dental Caries Experience and Salivary Total Protein among 5 Years Passive Smokers in Tikrit City, Iraq

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Abstract

Passive smoking is perhaps one of the most important toxic exposures in childhood. The evidence for a causal association between smoking and premature tooth loss is rapidly growing .Dental caries occurs predominantly in younger children, and various factors may influence development of dental caries including passive smoking. This study was designed to assess dental caries experience and salivary total protein among 5 years old passive smokers in Tikrit city. This study included 60 kindergarten children (32 boys, 28 girls) aged 5 years old,Passive smokers group included thirty children was compared with control group consist of thirty children matching in number, age and gender,but they were not passive smokers. Caries-experience was diagnosed and recorded according to criteria of decayed, missing and filling Surface index (dmfs index for primary teeth) described by WHO 2013. Stimulated salivary samples were collected for the estimation of total protein concentration. All data were analyzed using statistical package for social science (SPSS) version 21.The percentage of dental caries occurrence was found higher in study group than control group. Concerning dental caries experience represented by dmfs, results showed that mean values of dmfs and its component (ds,ms and fs) were higher among passive smoker group. Regarding mean values of dmfs and ds, the difference was statistically highly significant (P>0.01), while it was not significant for ms and fs (P< 0.05).The data of study also revealed that salivary total protein concentration was higher among control group with statistically non-significant difference. In addition there was a negative correlation of dmfs with salivary total protein among control group, while it was positive for study group. It can be concluded that higher caries experience and lower salivary total protein concentration among passive smoker group compared to control group was found in the current study indicating influential harmful effect of passive smoking on oral health including caries experience and salivary composition.

Keywords: *Dental Caries, Salivary Total Protein, Passive Smokers.*

Introduction

Tobacco smoking is a global major problem of public health. The continued popularity of tobacco smoking appears to defy rational explanation. Smokers mostly acknowledge the harm they are doing to themselves and many report that they do not enjoy it, yet they continue to smoke [(1)] .The reason is that nicotine from cigarettes generates strong urges to smoke that undermine and overwhelm concerns about the negative consequences of smoking, and the resolve not to smoke in those trying to stop [(2)] .

Passive smoking can negatively influence the health of non-smokers of all ages [(3)]. Passive smoking (environmental tobacco smoke), on the one hand, is the result of spontaneous cigarette burning, and on the other hand, is the result of side stream of cigarette as well as the smoke exhaled by active smokers." Unwilling to smoke" also means passive smoking because the individuals who inhales it often has no choice to matter [(4,5)] .

Study at (2015) recorded that a similar increase in the risk of certain diseases for passive smoking and active smoking[(6)]. An important report introduced by World Health Organization (WHO) has indicated that passive smoking, especially among young children, may cause serious health hazards[(7)]. The most frequent oral problems are dental caries and periodontal disease. They can start early and progress to tooth loss unless they are treated[(8)] . It has been observed that caries experience was higher in passive smokers than non-smokers[(9,10)].

All human saliva usually contains approximately l mg / dl of total proteins, which are secreted from parotids, sublingual and some small glands. These polypeptides play an important role as a biomarker for the survey of the status of human disease[11].

The identification of salivary proteins as biomarkers for dental caries would allow a subject to be classified as a caries susceptible individual when a salivary biomarker was present. Based on this, the individual could take part in an oral health program in order to control diet and hygienic habits to prevent dental caries development[12] A non-significant difference was recorded between smokers and non-smokers groups regarding salivary total protein concentration[13] a study conducted among healthy students found that higher levels but statistically non-significant differences of total protein in the caries active group compared to caries-free groups[14], in controversy with a study in Iraq among pre-school children that found that total protein levels increase in caries-free children compared to caries active with statistically non-significant difference [15] .

As far as,there is no available Iraqi study about effect of passive smoking on dental caries experience and salivary total protein among kindergarten children and because passive smokers represent a large percent in our population, for all of the above reasons this study was designed to investigate about the harmful effect of passive smoking on oral health of children and give awareness about its danger.

Materials and Method

The study group included 60 kindergarten children (32 boys, 28 girls) aged 5 years old, Passive smokers group include thirty children was compared with control group consist of thirty children matching in number, age and gender,but they were not passive smokers, the criteria of passive smoker selection was: [9,16,17]

1. One of the parents of the children is smoker.
2. The number of cigarettes smoked per day are at least 20.
3. The smoking is indoors (inside the house(.
4. The exposure of subject to environmental smoking was at least for 5 years

Caries-experience was diagnosed and recorded according to decayed, missing and filling Surface index (dmfs index for primary teeth) .described by WHO 2013. Stimulated salivary samples were collected for the estimation of total protein concentration chemical analyses. The samples were immediately stored at-20C for biochemical analysis determination[18]. Then centrifuging have been done at 3000 rpm for 10 min, and the clear supernatant saliva was collected by micropipette into tubes and biochemical analysis determination of total protein have been done. All data were analyzed using statistical package for social science (SPSS) version 21.

Result

The sample of this study include 60 kindergarten children (32 boys and 28 girls) aged 5 years old. Distribution of children according to gender is shown in table (1).

The sample was divided equally into passive smokers group and control group. For both groups the percentage of males was (53.33 %) higher than females (46.66 %).

The occurrence of dental caries is illustrated in table (2). Dental caries was found to be 100 % of passive smokers group, while it was 86.67 % for control group.

Caries experience in primary dentition represented by (dmfs) and its component (ds,ms,fs) has been shown in Table (3) .The mean values of (dmfs) and (ds) in study group were higher than among control group, statistically these difference were highly significant($p<0.01$) . The mean values of (ms) and (fs) among study group were higher than among control group, statistically these difference were not significant .

The salivary total proteinconcentration (TP) among study and control groups has been shown in Table (4). Mean value of total protein was higher among control group than study group with statistically not significant difference ($p>0.05$).

Correlation coefficient between caries experience dmfs and salivary total protein has been illustrated in the Table (5) . The caries experience represented by dmfs was weak and positive correlated with total protein among study group, but weak and negative correlated among control group, however both correlated were not significant ($p>0.05$).

Table (1): Distribution of the sample as study and control groups by genders

Smoking				
Groups	Male		Female	
	No.	%	No.	%
Study group	16	53.33	14	46.66
Control group	16	53.33	14	46.66

Table (2) : Occurrence of dental caries .

	Study group		Control group	
	No .	%	No.	%
With caries	30	100.00	26	86.67

Table (3) : Dental Caries Experience (dmfs) and its Components (ds,ms,fs) (Mean± SE) among Study and Control Group .

Variable	Smoking				t	df	P-value
	Study		Control				
	n	Mean ± SE	n	Mean ± SE			
ds	30	17.63 ± 1.411	30	8.33± 1.242	4.948	57.089	0.000**
ms	30	0.50 ± 0.279	30	0.17± 0.167	1.027	47.406	0.310
fs	30	0.53± 0.409	30	0.07± 0.067	1.126	30.541	0.269
dmfs	30	18.67± 1.427	30	8.57± 1.291	5.250	57.428	0.000**

** highly significant p<0.01

Table (4) : Salivary Total protein Concentration (Mean ±SE) among Study and Control Groups .

Variables	Smoking		t	df	P-value
	Study group	Control group			
	Mean ± SE	Mean ± SE			
TP	1.619±.040	1.637±.046	0.307	56.957	0.760

Table (5) : Correlation Coefficient between Caries Experience, dmfs with Salivary Total protein among Study and Control Group .

Variable	Study group		Control group	
	R	P	r	P
ds	.99	.601	-.201	.288
ms	-.329	.076	-.013	.945
fs	.116	.541	.258	.168
dmfs	0.068	0.723	-0.181	0.337

Discussion

Dental caries is the most prevalent infectious chronic disease affecting all age in both genders and both races [19] . In the present study, the index used for recording dental caries was dmfs, which is the most sensitive index used because it is measure caries in the term of surfaces rather than teeth .However because radiographic examination was not applied, so there may be underestimation of dental caries record as interproximal caries may need X ray for better diagnosis.

Data of present study revealed that study group had 100% dental caries, while control group had 86.67 % dental caries .

Result of the present study revealed the caries experience was higher among study group compared to control group . The same result reported by others studies concerning tobacco in cigarette [20,21].This result may be attributed to lower pH and lower buffering capacity among smoker group [22]. Another reason, may be due to lower salivary flow rate among smokers [23] .

Nicotine content of cigarette enhances the proliferation of cariogenic bacteria such as mutans streptococcus in the smoking mother oral cavity that transport these cariogenic bacteria to their infants. Additionally, nicotine reduces vitamin C level, which is associated with S. mutans proliferation and results in subsequently increased caries risk [24].They have been suggested that parents who smoke might have children with poorer oral health and health behaviors with high S. mutans counts that can be transmitted to their children [25(.In present study passive smoking is positively associated with dental caries and this result is in agreement with other studies [10,26], however it disagree with some studies which revealed that there is no association between passive smoking and dental caries [9,20,27].The mean value of decay component od dmfs was higher among passive smokers children with statistically highly significant difference, this will lead to increasing in need for dental treatment.

The differences in the result among different studies may be attributed to differences in, characteristicthe life style of population, smoking habits and the design of the study used.The data of the present study revealed that the total protein concentration among control group was higher than passive smokers group, the same result reported by [9,28], while it disagree with Avşar (2009) [29]. This finding may explain the anticaries protective role of total protein. Salivary proteins adsorbs on the tooth surfaces and may decrease risk of dental caries[30]**.** Finding of present study showed that therewas no significant difference in total protein concentration between study and control groups and thisresult agree with Rezaei and Sariri[31].Salivary total protein have both detrimental and protective properties. Salivary proteins function may depend on the molecule's location or site of action. Some proteins such as antimicrobial and pH modulating proteins play a protective role in the oral cavity, while adhesions and agglutinins play a detrimental role by increasing the colonization of microorganisms[32].

Conclusions

Higher experience among passive smokers group compared to control group was found in current study, with no significant between dental caries experience and total protein concentration among study group.

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KAOMBO: Preservation of Coastal Environment Based on Local Wisdom in Siompu Island, South Buton Regency

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Abstract

Kaombo is a knowledge system of the Buton community which is believed to create harmonization of relations between humans and their environment. Kaombo as a social institution functions as an instrumentfor environmental management and preservation while preventing the adverse effects of environmental ecosystem damage. This study describes Kaombo in environmental management, the dynamics of community symbolic interpretation of Kaombo, and Kaombo's conservation efforts in managing the coastal environment on Siompu Island. This study shows that Kaombo as a form of harmonization of community relations with its environment is manifested in the system of values, ideas, and knowledge of the people of Buton. Kaombo forms a code of conduct that binds every society to act wisely and wisely to protect the ecosystem of the environment. Although Kaombo is interpreted differently by the community, both as a system of values, norms and symbolism that contains mystical elements, kaombo is still understood as a system of knowledge that can guide behavior in living and interacting with the environment. On Siompu Island, the community maintains and preserves kaombo through strengthening traditional institutions in the form of traditional party rituals and thanksgiving.

Keywords: *Local knowledge, built environment, marine, traditional institutions.*

Introduction

The Buton area is a region that has a strong tradition in terms of trust in human relations, nature and the environment, as well as in terms of medicine[1,2]. Kaombo is one of the local wisdom in the Buton Islands region of Southeast Sulawesi Province[3]. Kaombo is instrument because it contains normative elements. The normative value of the Kaombo contained in the Seven Butonese Dignity Act, outlines the legal provisions of community behavior in relation to efforts to manage and preserve the biological environment ecosystem. By the people of Buton, the Kaombo is a set of values that are binding and compelling and are believed to contain magical elements whose purpose is to prevent humans from irresponsible actions[4].

As a manifestation of a group of ideas and knowledge of the Buton community, Kaombo is believed to be able to create a harmonious relationship between humans and the environment physically. The achievement of the Kaombo role is essentially a preventive effort in preventing possible adverse effects from damage to the environmental ecosystem. Therefore, the existence of Kaombo is quite potential as an instrument in efforts to manage and preserve the environment[5].Forest protection is even included in efforts to create a healthy environment and city[6-9].

Siompu Island is one of a group of islands in Buton Islands. Siompu Island consists of two sub-districts and there are eighteen villages, which are included in the administrative area of South Buton Regency. The daily life of the people of Siompu Island is closely related to the customs and religion of Islam. The rules that apply in Siompu indigenous people are the rules regarding

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Kaombo. The Kaombo is determined by a customary institution through a meeting headed by Parabella in Baruga[10]. Parabella in its history is a leader and symbol of the continuity of adat in a traditional region under the Buton Sultanate.

Kaombo is a prohibited area to take something in an area to be used both in land and sea areas, the rules about managing marine resources in Buton are known as marinekaombo. One of them is regulating the time of closing the area and the opening and retrieval of marine resources. Basically the Kaombo system works by providing a time limit for the community (fishermen) in carrying out certain resource exploitation activities.

This study aims to describe the existence of Kaombo as a local wisdom that applies to the people of Siompu Island in an effort to preserve the coastal environment and the efforts made to maintain it.

Materials and Method

The study was conducted from October 2018 to January 2019 which is located on Siompu Island, South Buton Regency. The method used is qualitative [11]. The research subjects were residents living in the coastal area of Siompu Island. The main informants were determined through purposive and snowball techniques with the aim of digging information on Kaombo local wisdom related to the activities of local fishermen. To support the main information, key information was also determined from local government officials, community leaders, religious leaders, educator figures and the fishing community in general.

A qualitative approach is intended to explore various information about Kaombo as a local wisdom of the Buton people on Siompu Island. Primary data comes from key informants and secondary data sourced from various documentation studies. Data were analyzed descriptively through four stages: data collection, data reduction, data display, and drawing or verifying conclusions[12].

Results and Discussion

Kaombo and Customary Institutions on Siompu Island: Siompu District is one of the coastal areas in South Buton Regency, Southeast Sulawesi Province. Marine Kaombo (nambo) is a local wisdom in the management of traditional natural / marine resources that is still valid until now in Siompu. The management of natural resources practiced by people in the area is by regulating the area of exploitation of natural resources and the types of resources. In the management of marine resources, community members cannot freely exploit marine resources in all regions and all types of marine resources that exist. But there are certain regions and certain resources that can be exploited, or in other words there is a prohibition on exploiting certain marine resources or certain regions at certain times.

The customary communal area in Siompu is divided into 5 institutions. These traditional institutions include the Biwinapada Customary Institution, the Kaimbulawa Customary Institution, the Lontoi Customary Institution, the Molona Customary Institution, and the Lalole Customary Institution. The five customary institutions each have customary territories in the sea or have a marine Kaombo (nambo). Of the five customary institutions there are eight Kaombo, both marine Kaombo (nambo) and kaombo terrestrial (pangholo) and five of them are Marine Protected Areas (DPL).

Kaombo, which is a DPL area, in addition to being supervised by all members in the customary institutions linked, also receives close supervision by DPL officers. Kaombo which is included in the DPL area has never been opened for its marine products. In the Kaombo region that is included in the DPL area, we can be sure to be safe from illegal activities both from an indigenous perspective and from state law. Because there is a DPL device that has a special duty to protect the Kaombo area. This device gets a salary from the state so that Kaombo's security is maintained. While Kaombo is purely custom supervised by all members of the customary institution concerned.

Dynamics of Kaombo and its Utilization: The implementation of marine Kaombo (closure of the sea area) is determined through deliberation. Deliberations are held to discuss the boundaries of the regions to be combated, marine resources that are prohibited from being exploited, the deadline for the application of Kaombo (starting from the prohibition / closure of the territory and opening) and sanctions against violators.

In addition to announcements to residents, there were also signs of closing waters boundaries that were closed, carried out by wati (members of the religious council / sara in charge of general regulations), and moji (member of the religious council in charge of religious regulations). The boundary mark can be in the form

of a pillar that is given mushrooms which are fixed on the seafront. At the time of the installation of boundary markers, spells or batata were read out which essentially contained statements of sanctions that would be imposed on violators of the traditonal rules.

At the time of deliberation, both when the Kaombo will be implemented (sea area closure or prohibition of extracting resources) and bongkanokaombo (opening of the Kaombo), community leaders in traditional institutions (Parabella, Wati, Pangara and others) use Buton traditional clothing according to their respective positions-one.

Marine Kaombo usually lasts for 6 months to a year. Actually, the length of the application of the Kaombo also depends on the community's need to hold a traditional party. At the time the sea was closed, first when the sea area was also combined, community members should not enter the sea at all, let alone take their resources. However, after a change in regulation, the community may enter a region that is being combated, but may only capture certain resources such as fish but may not take resources such as lola, sea cucumber and japing-japing. The opening of the sea area to be utilized by the community is called bongkaanokaombo. Similar to Kaombo, the implementation of Bongkaanokaombo was also begun with community leaders' meetings led by Parabella.

If there are residents of Siompu community who violate the Kaombo, then the sanction will be felt by the residents. Trusted by the Siompu community, residents who commit violations will feel the sanctions given by nature. For example by entering the Kaombo region and taking prohibited resources, the person will get sick or even die. In addition, the imposition of sanctions that have been set out in the same time will be imposed on residents who violate the rules. If there are people who violate the Kaombo rules that have been delivered by Parabella at a traditional party in Baruga (traditional house), sanctions are imposed.

Perspective of Symbolic Interactionism on the Kaombo: Aside from being a set of concepts and ideas, Kaombo is also a symbolic communication in the continuation of the process of social interaction. How not, kaombo is also imaged in a particular container or the installation of boundary signs of waters which are closed in the form of a pillar that is given mushrooms which are planted on the seafront, which is carried out by Wati (a member of the religious council in charge of general regulations), and Moji (member of the religious council in charge of religious regulations).

Based on the description above, it is not surprising that the increasingly heteregon general public in Buton knows Kaombo more as something that has magical power / mystical power even though in essence it also functions as a set of concepts, ideas and knowledge about the management and preservation of land, sea, forest and environment, as stated in the Buton Sultanate State Law. Therefore, the image of Kaombo as something that is truly magical or sacred is nothing more than a transformation of Kaombo to a more micro-scale, so it forms as a set of symbols from a vast and open sea area for anyone to become a marine area which is prohibited and even sacred.

Kaombo as one of the important elements of the cultural values of the Buton community is functionally binding on every member of the community to carry out their roles and functions in accordance with the rules and values of culture (Buton locality) in realizing harmonious human life with the environment, especially to nature. The Kaombo region and its contents should not be used in any way without the legality of the Buton Sultanate Government for its exploration activities, moreover exploiting the potential of its natural resources as is the case in various regions in Indonesia.

Kaombo is a limited sea area unit, under the supervision of the value system by the Buton Sultanate at that time, and since the integration of the Buton Sultanate into the lap of the Unitary Republic of Indonesia, the responsibility for governance and supervision of Kaombo was carried out entirely by the Local Government (Regent / Mayor) and related government agencies. In this biological conservation effort, Kaombo is not only a protected area of marine territory, but also the highest value system that is understood by the Government of the Buton Sultanate and its people in managing, and using the sea in an effective, sustainable manner and does not cause destruction to the environment.

Mangunjaya, Heriyanto, and Gholami (2007) in his book on forest conservation efforts entitled "Planting Before Doomsday: Islam, Ecology and the Movement of the Environment" explained that: "The Kaombo is a reflective effort of the Buton community towards their respect for nature. and the resources in it. In other words, Kaombo is a reflection of the system of ideas, concepts,

ideas and views of the Buton community towards efforts to conserve nature.

Apart from the magical/mystical elements contained in the "Kaombo", the Marine Kaombo (nambo) is actually from the term of conservation marine area or Marine Protected Area (DPL) and sea by the Government of the Buton Sultanate culturally is a norm that wants to regulate and direct morality (ethics) of society in a more human direction that comes from conscience, as well as the realization of normative values that bind the collectivity of social behavior of the community. In line with the description, Herimanto and Winarno (2010)[13] put forward meaningful theoretical relations, that moral is related to the value of good and bad human actions. Moral actions are human actions that are carried out consciously, willingly, and knowingly and those actions are related to moral values.

Efforts to Maintain the Kaombo: The ritual implementation in the form of traditional parties and thanksgiving rituals is the best means of strengthening traditional institutions on Siompu Island. The ritual involves all elements of society in the area of customary institutions. They participate according to their respective social positions. Community members will participate as providers of energy or support in the form of rice or other ingredients needed by a ritual. Likewise, community leaders or stakeholders of government institutions will have a role in the ritual.

In traditional rituals, a declaration will be issued regarding the life of the community. Parabella through yaro will convey views and norms relating to their lives. Parabella will convey matters relating to the natural environment in the form of weather in the year that will run until the moral behavior of the community. This natural environment influences the results of fishing by the fishermen and the results of farming; while behavior concerning the norms of society must be done and that must be avoided. Because the presence or absence of violations of the norm will bring goodness and ugliness to live in a society in general in the indigenous region. This view will be heard and obeyed by the community.

The implementation of traditional rituals greatly influenced the existence of Kaombo in Siompu. Rituals in the form of traditional parties and thanksgiving rituals are the most important elements in maintaining the continuity of traditional institutions and their norms. Because ritual is a concrete form that a custom still takes place in the traditional institution concerned. When traditional parties are still ongoing, the structure of the adat institution is still in existence and is still ongoing. Because customary institutions that hold traditional parties and in traditional parties have announcements regarding the structure of traditional institutions.

Conclusion

Kaombo as a form of harmonization of Buton society with the environment is manifested in the system of values, ideas and ideas of the Butonese community. The Kaombo is intended as a form of behavior that is binding on every Buton community to always be wise and wise in protecting the environmental ecosystem. The achievement of the role of the Kaombo in its essence is a preventive effort in preventing possible adverse effects that can be caused from damage to the environmental ecosystem. Even though Kaombo can be interpreted differently by the community, whether it is a system of values and norms of local culture or materialism symbolism of material and special meanings containing elements of mysticism, kaombo is still understood as a group of ideas, knowledge, and advancement of local human mindset in guarding behavior life of its citizens in relation to the existence and existence of physical interactions with the environment.

Conflict of Interest: Nil

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Analysis of Risk Factors Related to the Events of Early Marriage tn the Wetland

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Abstract

According to Law No. 1 1974, article 7, paragraph (1) "Marriage is allowed only when the man has reached the age of 19 (nineteen) years and the woman has reached the age of 16 (sixteen) years". A marriage of under-age marriage is said to be the case when the age of one or both families are under the age specified. Banjar district ranks the second highest cases of early marriage in South Kalimantan in 2017. Figures for the early marriage Banjar district from 2016 as many as 15 cases and an increase in 2017 as many as 74 cases, 67 cases of which are in Sub-Aluh Aluh. This study aims to explain the risk factors associated with the incidence of early marriage in the wetlands. This study is a quantitative research, with case control design with a ratio of 1: 2 and using purposive sampling technique. The number of respondents in this research were 105 people consisting of 35 respondents 70 cases and the control group respondents. Based on the research results attitudinal variables and the environment girls associated with the incidence of early marriage (p value = 0.001 and p value = 0.001), while the variables of education and culture (p value = 1.000 and p value = 0.011), not associated with the incidence of early marriage. The conclusion of this research is no relationship between environmental attitudes and girls with the incidence of early marriage, whereas no correlation between education and culture with the incidence of early marriage.

Keywords: *The incidence of early marriage, attitude, environment.*

Introduction

Early marriage is inner and outer bond between men and women who are young. Early marriage is a marriage on girls under the age of 16 years should not yet ready to perform marriages [1].This is contrary to Law No. 1 1974, article 7, paragraph (1) which states that "marriage is allowed only when the man has reached the age of 19 (nineteen) years and the woman has reached the age of 16 (sixteen) years". A marriage of under-age marriage is said to be the case when the age of one or both families are under the age specified [2,3].

Indonesia is among countries with a high percentage of young age marriage in the world (rank 37). This position is the second highest in ASEAN after Cambodia. Based Health Research (Riskesdas) in 2013, South Kalimantan Province was ranked second after West Java in the case of early marriage at the youngest age between 10-14 years. Based on data from the BKKBN, the number of teenagers in South Kalimantan families are 2483 people with a number of early marriages reached 18% of the total number of adolescents aged 14-16 years[4,5].

Data Based Population and Family Planning Agency (BKKBN) in 2012 about early marriage, shows the percentage of early marriages in the province of South Kalimantan at 4.84% exceeds the national average by 40 early marriages per 1,000 population. Whereas in 2014 the percentage of early marriages in South Kalimantan rose to 5.85%[6].

According to the Ministry of Religious Affairs, South Kalimantan 3 cases of early marriage with the highest ranking in South Kalimantan in 2017 respectively Hulu Sungai Tengah Regency as many as 101 cases, as many as 74 cases of Banjar Regency and Tanah Laut as many as 32 cases. The Ministry of Religious Affairs According to the Banjar district early marriage figures for Banjar of 2016 as many as 15 cases and an increase

in 2017 as many as 74 cases. Figures early marriage in Banjar district in 2017 was 74 cases, consisting of the District Aluh-Aluh with the highest number of as many as 67 cases[7,8].

The high incidence of early marriage will lead to a high risk of the incidence of pregnancy at a young age. Among them are miscarriage, premature delivery, low birth weight (LBW), congenital abnormalities, easy to infection, anemia in pregnancy, pregnancy poisoning and death [9,10]. Pregnancy at a very young age correlated with maternal mortality and morbidity. Girls aged 10-14 years 5 times the risk of dying during pregnancy or childbirth compared to 20-24 years age group. This risk is increased 2-fold in the age group 15-19 years[11]. Based on the background mentioned above, the research on "The relationship between education,

Materials and Method

This study is a quantitative research, this study used a case control study design with a ratio of 1: 2 and using purposive sampling technique. The number of respondents in this research were 105 people consisting of 35 respondents 70 cases and the control group respondents.

The research instrument is a checklist sheet, the sheet. The bivariate analysis using chi square test. The variables in this study are education, attitudes, culture and the environment and the dependent variable was the incidence of early marriage.

Results and Discussion

A. Univariate Analysis

Table 1. Frequency Distribution

Variables	Respondents	
	N	%
Education		
Low education (primary and junior)	104	99.0
Higher education (SLTA)	1	1.0
Attitude		
Support	38	36.2
Does not support	67	63.8
Culture		
Support	34	34.4
Does not support	71	67.6
Environment		
Support	39	37.1
Does not support	66	62.9

Table 1 shows that the frequency distribution of education levels reveals that a number of teenage girls who berpindidikan larger lower than girls who are highly educated (99.0% versus (1.0%). On the attitude of the frequency distribution shows that the number of teenage girls that does not support early marriage is greater than the girls who support early marriage (63.8 versus 36.2%). In the culture of the frequency distribution shows that the number of teenage girls who do not support early marriage is greater than the girls who support early marriage (67.6 versus 34.4%).In the neighborhood frequency distribution indicate that the number of teenage girls who are in an environment that does not support early marriage which is greater than the number of girls who are in an environment that supports early marriage (62.9% versus 37.1%).

B. Analysis Bivariat

Table 2. Analysis of Risk Factors Related to Early Marriage Event In Area Wetland

Variables	Genesis Early Marriage				Total		p-value	OR
	Early married		Not Married Early					
	n	%	n	%	N	%		
Education								
Low education (primary and junior)	35	100	69	98.6	104	100	1,000	-
Higher education (SLTA)	0	0	1	1.4	1	100		
Attitude								
Support	32	91.4	6	8.6	38	100	0,001	
Does not support	3	8.6	64	91.4	67	100		113

Variables	Genesis Early Marriage				Total		p-value	OR
	Early married		Not Married Early					
	n	%	n	%	N	%		
Culture								
Support	8	22.9	26	37.1	34	100	0,011	-
Does not support	27	77.1	44	62.9	71	100		
Environment								
Support	33	94.3	6	8.6	39	100	0,001	176
Does not support	2	5.7	64	91.4	66	100		

Discussion

Based on table 2, the results showed that the attitude and environment variables girls is associated with the incidence of early marriage, while education and culture are not associated with the incidence of early marriage.

Based on the results of the chi square test showed that there is no relationship between education girls with the incidence of early marriage with a p-value = 1.000. This is caused by the age range of married respondents in this study is from <16 years, so it only consists of two categories of educational level. The results are consistent with research conducted by Priyanti (2013) which shows the p-value = 0.195, which indicates there is no correlation between education girls with the incidence of early marriage. These results indicate that the higher education does not determine a person to perform early marriage [12].

Based on the results of the chi square test showed that there is a relationship between the attitude of girls with the incidence of early marriage with a p-value = 0.001. This is because the girls are still in a culture that supports early marriage, early marriage so that he believes it is a natural thing for him and their willingness to channel the emotional needs through marriage considering they view marriage is better than dating.

This is in line with research conducted by Kartika (2013) which shows the perception of girls about early marriage will affect early marriages by 30.8% and is based on research Rafidah (2009) which stated that the respondents who have a perception of a less risky marriage 4.6 times more likely to marry at age <20 years compared to respondents who have a perception of a good marriage[13,14].

Based on the results of the chi square test showed that there was no relationship between culture and girls with the incidence of early marriage with a p-value = 0.011. At respondents who did not favor early marriage, but still get married early, there is an important role by parent respondents. Parents marry off their children is dominated by a strong belief of religion to avoid their children from fornication. According Dahro (2009), parents who still hold on to the old culture is to match and marry off their children at an early age because parents fear that their children are considered a spinster. This is in line with the results of in-depth interviews conducted by Haryono (2008) which states that according to the religion of parents are obliged to marry his daughter was of age (puberty) not committing fornication[15,16].

This is in line with research Pandaleke (2017), which shows the value of p = value p = 0.272> 0.05), then H0 is accepted or not there is a relationship between culture with early marriage. The results of this study are also consistent with research Rahma (2014), which examined the factors that influence the incidence of early marriage among women with results of bivariate analysis showed there was no correlation (p-value = 0.321) between the culture of early marriage[10].

Based on the results of the chi square test showed that there is a relationship between the environment and girls with the incidence of early marriage with a p-value = 0.001 it is because parents have a greater role than environment.

Conclusions

Based on the research results, conclusions obtained as follows:

a. Girls education was not associated with early marriage in Sub-Aluh Aluh Banjar district (p-value = 0.48).

b. The attitude of girls associated with early marriage in Sub-Aluh Aluh Banjar district

(p-value = 0.001 and OR = 113.7).

c. Culture girls are not associated with early marriage in Sub-Aluh Aluh Banjar district

(p-value = 0.011).

d. Environment girls associated with early marriage in Sub-Aluh Aluh Banjar district

(p-value = 0.001 and OR = 176).

Suggestion:

1. Given this research are expected for people, especially parents to be wise in making a decision to marry her after knowing the impact of early marriage
2. For adolesscent girl, it is better before deciding to get married, they must first consider the maturity of age in marriage

Ethical Clearance: The study was approved and received ethical clearance from the Research Ethics Committee of Public Health, Faculty of Medicine, University of Mangkurat, Indonesia. In this study we followed the guidelines of the Committee on Public Health Public Health Committee on Research Ethics, Faculty of Medicine, University of Mangkurat, Indonesia for permission etchical and informed consent. informed consent, including the study title, objectives, participants correctly, confidentiality and signature.

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Analysis of Factors Related to Mother Behavior on the Utilization of Integrated Service Post (POSYANDU) in Kotabaru District

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Abstract

The main strategy to reduce the prevalence of nutritional problems is through improving monitoring the children growth in Posyandu. The percentage of children under five years old was weighed in the last 6 months of 2016 in South Kalimantan Province was 68.7% and the district with the lowest coverage was Kotabaru District (43.60%). The Local Area Monitoring Report (PWS) nutritional development program in 2016, showed that D/S coverage at Dirgahayu Health Center based on the toddler age group were 44.79%, 24.57% and 19.72% and if the percentage compared with the district, provincial and national targets, it is still very low (less than 80%). This study aims to analyze the factors related to mother behavior in the utilization of posyandu in Kotabaru district. This research is a quantitative study with case control research design and in a study consisting of 95 cases and 95 controls with simple random sampling technique. There is a correlation between knowledge (p=0,0001), level of education (p=0,0001), community leaders support (p=0,005), and health worker support (p=0,005) with posyandu utilization behavior while dominant factors related to Posyandu utilization behavior is knowledge (p=0.0001).

Keywords: *Behavior, Utilization, Posyandu, Mother, Toddler.*

Introduction

One of the targets of the 2015-2019 National Medium Term Development Plan (RPJMN) is the decrease in the prevalence of malnutrition problems in children under five years old.[1] Posyandu is a form of Community Resource Health Efforts (UKBM) that are managed and organized from, by, for and with the community in the implementation of health development.[2]

Community visits to posyandu in Indonesia are still relatively low. Based on data from the Basic Health Research (Riskesdas) in 2010 62.5% of households did not utilize posyandu because they stated didn't need it.[3] Riskesdas (2013) data showed the frequency of weighing of children under five years old during the span of 6 months of observation in South Kalimantan Province is 29.5%. [4] Community participation in growth monitoring in posyandu (D/S) in South Kalimantan at 2016 was 68.7%. Of the 13 districts/cities, as many as 12 districts/cities did not reach the target (80%) with districts with the lowest coverage were Kotabaru District (43.60%).[5,6]

Based on the Local Area Monitoring Report (PWS) of Kotabaru District Health Office in 2016, out of 28 community health centers in Kotabaru the lowest percentage of family use posyandu (bringing toddlers to posyandu aged 0-11 months, 12-23 months and 24-59 month) in the Dirgahayu Community Health Center. Dirgahayu Community Health Center was ranked as the 4th (fourth) lowest percentage the three age groups of toddler which was 44.79%, 24.57% and 19.72%. When compared with the district, provincial and national targets, it is still very low (less than 80%).

Dirgahayu Community Health Center is one of the Posyandu that has 3,212 mothers who have children with the highest level of education is elementary school as many as 1,179 people (36.7%) .[7] Dirgahayu community health center is supported by 59 community leaders and 11 religious leaders and is not separated from the assistance of cadres, both health cadres as many as 934 people and cadres of Family Empowerment and Welfare (PKK) as many as 546 people. The Dirgahayu Health Center in 2016 had 13 midwives and 2 nutritional

workers. With the support of resources in the working area, Dirgahayu Community Health Center should be able to support in increasing maternal interest in utilizing Posyandu.

Community use of health services, especially posyandu, is influenced by many factors. The results of Sakbaniyah's research (2013) showed the factors that cause low interest of mothers to bring their babies to the posyandu are education, distance, cadre, knowledge, attitude, family, health workers, support of community leaders, and husband's support. In addition, it was also motivated by the support of cadres, religious leaders and stakeholders.[9] Based on the background above, the authors aimed to do research about factors related to maternal behavior in the use of posyandu in Kotabaru District.

Materials and Method

This research is an analytic observational study with case control design. The location that became the place of research was one of community health center in Kotabaru District, that is Dirgahayu Health Center which was held in March-September 2018.

The population in the study were mothers who had toddlers in the work area of the Dirgahayu Community Health Center as many as 3,212 people. Case samples were 95 mothers of toddlers who did not routinely carry their children every month to the Posyandu, while 95 control samples were mothers of toddlers who came regularly carry their children every month to the Posyandu. The sampling technique is simple random sampling.

The independent variables include knowledge level, level of education, support of community leaders, cadre support, PKK support, house distance, and support of health workers. while the dependent variable is mother's behavior in utilization of Posyandu. Research instruments are questionnaires that have been tested for validity and reliability. The analysis was carried out in univariate, bivariate (chi square, with 95% confidence interval (α=0,05) and multivariate with multiple logistic regression test.

Result And Discussion

1. Univariate Analysis

Table 1. Frequency and Distribution The Level of Knowledge, Level of Education, Community Leader Support, Cadre Support, PKK Support, Health Worker Support, Posyandu Distance, and Posyandu Utilization Behavior

Variable	n=190	%
Level of Knowledge		
Less	37	80,5
Good	137	19,5
Level of Education		
Elementary-Junior High School	102	53,6
Senior High School	88	47,4
Community Leader Support		
Less	109	57,4
Good	81	43,6
Cadre Support		
Less	75	39,5
Good	115	60,5
PKK Support		
Less	109	57,4
Good	81	43,6
Health Workers Support		
Less	25	14,2
Good	165	86,8
Posyandu Distance		
>10 minute	52	27,4
≤10 minute	138	72,6
Posyandu Utilization Behavior		
Less	95	50
Good	95	50

Source: Primary Data 2018

Based on table 1 it is known that mothers knowledge about posyandu mostly in the good category (80.5%). The mother's education level is mostly on elementary or junior high school (53.6%). Most community leaders did not support community to make use of posyandu (57.4%) because respondents felt that there was no consultation activity to plan activities related to posyandu and they did not provide motivation and suggestions to routinely bring the children to posyandu.

Based on table 1 it is known that most of the cadre support in good category (60.5%). Most of PKK support is still lacking (57.4%). Based on the findings in the field it was found that PKK support was felt to be lacking due to the mother feeling the PKK was not motivated to be independent in the use of posyandu, not mobilizing resources to support posyandu activities, not routinely coming to the posyandu and not helping the posyandu activities.

Most of the health workers' support is in the good category (86.8%). The results of the study show that most of the distance from the posyandu to mother's house in the category <10 minutes if taken by foot. The results showed that there were 95 respondents (50%) mothers who routinely used Posyandu and 95 respondents (50%) who did not routinely used Posyandu.

2. Bivariate Analysis

Table 2: Correlation Analysis Between Independent Variable and Dependent Variable

Variabel	Posyandu Utilization Behavior				p-value	Odd Ratio (OR)	95% CI
	Less		Good				
	n	%	n	%			
Level of Knowledge	31	32.6	6	6.3			
Less	64	67.4	89	93.7	0,0001*	7,18	2,831-18,234
Good	95	100	95	100			
Total	**31**	**32,6**	**6**	**6.3**			
Tingkat Pendidikan							
Elementary-Junior High School	63	66,3	39	41,1	0,0001*	2,827	1,567-5,100
Senior High School	32	33,7	56	58,9			
Total	**95**	**100**	**95**	**100**			
Community Leader Support							
Less	64	67,4	45	47,4			
Good	31	32,6	50	52,6	0,005*	2,294	1,274-4,131
Total	**95**	**100**	**95**	**100**			
Cadre Support							
Less	43	45,3	32	33,7			
Good	52	54,7	63	66,3	0,103	-	0,905-2,927
Total	**95**	**100**	**95**	**100**			
PKK Support							
Less	56	58,9	53	55,8			
Good	39	41,1	42	44,2	0,660	-	0,640-2,023
Total	**95**	**100**	**95**	**100**			
Health Worker Support							
Less	19	20,0	6	6,3			
Good	76	80,0	89	93,7	0,005*	3,708	1,40-9,758
Total	**95**	**100**	**95**	**100**			
Posyandu Distance							
>10 Minutes	25	26,3	27	28,4			
≤10 Minutes	70	73,7	68	71,6	0,745	-	0,475-1,703
Total	**95**	**100**	**95**	**100**			

*significant

Based on table 2 it is known that there is a significant correlation between the level of knowledge with posyandu utilization behavior in mothers who have children under five years old (p=0.0001) with an OR is 7.18 which means that mothers who have less knowledge have 7,18 times more likely not routinely take their children to the posyandu. This is in line with research conducted by Hutami and Ardianto (2014) which states that there is a relationship between the level of knowledge of mothers and toddler visits at posyandu. The knowledge of mothers is the basics for the realization of the importance activities in Posyandu.[10] Changes in knowledge are not always be the cause of behavior changes, but knowledge closely related to the initial determination for someone to behave.[11]

Based on statistical tests, it was found that there was correlation between level of education and posyandu utilization behavior (p=0.0001) with OR 2.827 which means mothers who have low education 2.827 more likely not routinely bring their children to posyandu. According to Hidayat (2005) with good education, mothers can obtained basic knowledge about posyandu activities.[12] This is in line with research conducted by Halimah N (2012) which states that there is a significant relationship between the level of mothers education and the level of attendance of children under five years old at posyandu. Good education will support mothers to be able to receive all information from outside and will have an impact on changes in health behavior so that awareness to visit the posyandu.[13]

Statistical test results showed that there was correlation community leader support and posyandu utilization behavior (p=0.005) with an OR value= 2.168, which means that mothers who lack support from community 2,168 more likely to behave badly in utilizing posyandu services. This is in line with the research of Yuryanti (2010) which states that the active role of health workers and community leaders is needed to increase participation in Posyandu implementation because community leaders are the drivers of the community to be present and play an active role in the utilization of posyandu.[14]

Statistical test results showed that there was no relationship between cadre support (p=0,103) and PKK support (p=0,660) with posyandu utilization behavior (p=0.103). Factors that caused there was no correlation between cadre support and PKK support with posyandu utilization were inadequate PKK support in this study. This is in line with the research by Hasanah (2011) which states that there is no relationship between PKK support and the behavior of mothers of toddlers in considering their children to the posyandu. The study stated that mothers visits to posyandu were more influenced by the activeness of mothers.[15]

There was a relationship between health workers support with posyandu utilization behavior (p=0.005) with OR= 3.708, which means that mothers who do not get the support of health workers 3,708 more like have less posyandu utilization behavior. The results of this study are in line with the research conducted by Putri (2015) which states that there is a relationship between health workers supports and mother visits to posyandu.[16] Based on research conducted by Reihana et al. (2014), there was a relationship between the presence of health workers and mother participation in weighing their children to the Posyandu. Every program with the target community, especially the posyandu program, will not succeed if the community does not understand the importance of posyandu. Therefore, there is a need for participation and support from health.[17]

Based on the results of statistical tests, it was found that there was no correlation between posyandu distance and posyandu utilization behavior (p=0.745). This is because the number of mothers who have close house distance (<10 minutes) from posyandu have more bad behavior in the utilization of health services (73.7%). Another factor is because some of the respondents' education level is still low. The results of this study are in line with research conducted by Fitriah et al (2013) which states that there is no relationship between distance of residence and mother visits to posyandu, this is because if knowledge, education, support from community leaders, cadres, and health workers are well, even though the distance is quite far, a mother will still come to the posyandu because they are aware of the importance of coming to the posyandu for toddler health and growth.[18]

3. Multivariate Analysis

Multivariate analysis was performed using multiple logistic regression tests using the backward method. Variables that include to multivariate model candidates are independent variables with bivariate results with p-value <0.25. For independent variables whose bivariate results showed p-value> 0.25 but are important in substance, these variables can be included in the multivariate model. The variables included in the multivariate model can be seen in the table below:

Tabel 3: Variable Selection

No	Variabel	P-value
1	Level of Knowledge	0,0001*
2	Level of Educatiom	0,0001*
3	Community Leader Support	0,005*
4	Cadre Support	0,103*
5	PKK Support	0,660**
6	Health Worker Support	0,005*
7	Posyandu Distance	0,745**

Explanation: p-value = Correlation Value, * = Continue to Statistic Analysis, ** = Discontinue to Statistic Analysis

Tabel 4: Last Results of Multivariate Analysis

No	Variable	Sig.	Exp (B)
1	Level of Knowledge	0,0001	5,625
2	Level of Education	0,004	2,609
3	Community Leader Support	0,018	2,197
4	Health Worker Support	0,025	3,347

The results of the multivariate analysis showed the knowledge variable was the most dominant variable related to posyandu utilization behavior by mothers who had children with p-value=0.0001 and Odd Ratio=5.625, which means that mothers with less knowledge 5,635 more likely to not routinely take their children to the posyandu. Notoatmodjo (2003) stated that knowledge or cognitive is a very important domain in shaping one's actions. Insufficient knowledge makes mothers not aware of the importance of the benefits of bringing toddlers to the posyandu so that mothers lack awareness and positive attitudes to participate in activities at the posyandu. If knowledge comes from personal experience, the mother who follows the posyandu repeatedly, even regularly, will certainly know the benefits of posyandu.[19]

Conclusions

There was a relationship between knowledge, education, community leaders support, and health workers support with posyandu utilization behavior, while the cadres support, PKK support, and posyandu distance doesnt have a significant relationship with posyandu utilization behavior. It is expected that the Health Service and Community Health Centers to conduct health promotion activities for mothers who have children under five years old to increase the knowledge of mothers about the importance of bring children to posyandu, and for the local government needs to strengthen the performance of PKK and posyandu cadres in Kotabaru District to support improved mothers behavior in the utilization of posyandu.

Ethical Clearance: This study approved and received ethical clearance from the Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia. In this study we followed the guidelines from the Committee of Public Health Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia for etchical clearance and informed consent. The informed consent included the research tittle, purpose, participants's right, confidentiality and signature.

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Conflict of Interest: The authors declare that they have no conflict interest.

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A Comparative Study of Early Response Rate between Patient Given Standard Chemotherapy with Patient Given Combination Targeted Therapy in Non-Hodgkin Lymphoma Patients

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Abstract

Background: Treatment for non-Hodgin Lymphoma (NHL) with cyclophosphamide, doxorubicin, vincristine, and prednisone (CHOP) has been standard chemotherapy regimens for treatment of patients with diffuse large B cell lymphoma and follicular lymphoma. Rituximab, a chimeric monoclonal antibody against the CD20 B-cell antigen. Rituximab in combination with CHOP (RCHOP) increases better response rate without any significant increase in toxicity. The standard definition of treatment responseis based on changes in lesion dimensions with time. We conducted a comparative study to compare early response rate between CHOP andCHOP in NHL patients.

Method: This study was using cohort prospective analysis and conducted at Wahidin Sudirohusodo Hospital from September 2018 until June 2019. The response rate was measured with the longest diameter of tumor and compared after 2 observational cycle periods of chemotherapy. Analysis to compare responserate was carried out using Independent T-test analysis.

Results: Seventy patients enroll this study consisting of 38 subjects in CHOP group and 32 subjects in RCHOP group. Analysis to compare early responserate between CHOP and RCHOP was significant with p-value 0.001 (46.6% vs 67.0%;).

Conclusions: Early response rate in patient given combination targeted therapy have better response rate than patient given standard regiment chemotherapy.

Keywords: *Early ResponseRate, RCHOP, CHOP, non-Hodgkin Lymphoma.*

Background

Malignant lymphoma is divided into 2 large groups of neoplasms namely Hodgin Lymphoma (HL) which characterized by presence of reed sternberg cells and non-Hodgin Lymphoma (NHL) which characterized by a collection of abnormal lymphocytes.[1,2] Non-Hodgin's lymphoma represent 80-90% of all malignant lymphoma.[3,4,5]. The most frequent type of NHL isdiffuse large B cell lymphoma (DLBCL), accounts for approximately 40% of lymphoma new cases.[6, 7] In Indonesia, NHL along with Hodgkin disease and leukemia ranks as the sixth most frequent diseases.[3, 8]

The management of NHL depends on several things including histophatological type, stage, differentiation, progression, age and patient's general condition.[3,9]

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Combination chemotherapy of cyclophospamide, doxorubicin, vincristin, prednison (CHOP) has emerged as the standard therapy for agrresive type of NHL for more than two decades.[7] Randomized studies had shown that CHOP is a chemotherapy that has same effectiveness with other regimens but has minimal toxicity.[7] Rituximab, a monoclonal antibody that binds specifically to CD20 antigen, which is expressed on the B lymphocytes surfaces.[7] Rituximab is given to NHL patients with positive CD20.[10] Various multicenter studies showed that rituximab combination with CHOP (RCHOP) increased survival rate and completed remission in first-line chemotherapy of DLBCL patients compared to CHOP alone.[6,11]

The first widely-used standard response categories for malignant lymphoma in the CT imaging erawere usingthe Cotswolds criteria.[12] Moreover, the most commonly used nowadays is NHL International Workshop Response criteria.[13] These standard definitions of treatment response are based on changes in lesion dimensions with time.[14] CT assessment of lymphoma after one or two cycles of chemotherapy may show some tumor shrinkage but the response was usually incomplete at that stage, especially tumors in larger size.[13,14] The studies on responserate comparing RCHOP with CHOP in NHL patientsand factors that influenced the responseratewere limited. Based on these findings, it is tempting to conduct the study especially in Makassar, Indonesia.

Method

This study used a prospective cohort design for patients with NHL who underwent chemotheraphy at Wahidin Sudirohusodo Hospital in Makassar from September 2018 to June 2019. Research subjects is population that meets research inclusion criteria. Patients were eligible if they wereabove eightteen years of age and histopathological examination showed non-Hodgin Lymphoma.All subjects provided written informed consent. Subjects were excluded if they wereusing other chemotherapy regimens besides CHOP and RCHOP or had obtaining radiotherapy during observation period.Subjects were drop out if have not completed 2 chemotherapy cyclesduring observation period.

We divided the subjects into 2 groups. The CHOP group weresubjects who received cyclophospamide, doxorubicin, vincristin, prednisoneand andthe RCHOP group were subjects who received rituximab addition to CHOP with a positive CD 20. Age was divided into groups by age <60 years and ≥60 years. Performance status was grouped into ECOG 0, I, II, III, IV. Subjects were grouped into without or with presenceof B symptoms if there was weight loss, excessive sweating and fever without other causes. Serum LDH was grouped into less than upper limit normal (ULN) (<220 U/L) and greater than ULNor equal to ULN (LDH ≥ 220 U/L). Ann Arbor stage consisting of stages I, II, III, IV. Subjects were grouped bulky disease (maximal tumordiametergreater than 7 cmor greater than one-third of internal transverse diameter of posterior-anteriorchest radiograph) or without bulky disease. Prognostic risk based on IPI Score is grouped into ; low risk: score 0-1, moderate risk: score 2, moderate-high risk: score 3 and high risk: score 4-5.

Earlyresponse rate was assessed based on changes in size of tumor before and after 2 chemotherapy cycles. If tumors more than one, we used the Sum of Longest Diameters (SLD) comparison. Tumors that can be assessed on body surface were assessed using a caliper while tumors located in internal organs of the body and involving extra nodules are assessed with radiology (chest X-ray or CT Scan).

Findings: Descriptive data analysis was performed on 70 subjects, CHOP group were 38 subjects (54.3%) and RCHOP group were 32 subjects (45.7%). This study consisted of male (61.4%) and female (38.4%). The age range of subjects was between 19-79 years with an average 50 ± 14 years, based on age was divided into <60 years (74.3%) and ≥60 years (25.7%). Serum LDH were grouped into less than ULN (24.3%) and greater than ULN or equal to ULN (75.7%).Immunohistochemical examination in this study subjects were 46 subjects with positive CD 20 (65.7%) and with negative CD 20 were 24 subjects (34.3%). B symptomspresenced in 32 subjects (45.7%) and absensed in 38 subjects (54.3%). Based on Ann Arbor stage, stage 1 (45.7%), stage 2 (17.1%), stage 3 (22.9%) and stage 4 (14.3%). Bulky disease presentedin study were 16 subjects (22.9%) and absense of bulky disease were 54 subjects (77.1%). Performance status with ECOG 1 (68.9%) and ECOG 2 (31.4%). Prognosisrisk which had low risk (50%), moderate risk (31.1%), and moderate risk (12.9%). (Table 1).

Table 1. Basic Characteristics

Variable	Characteristic	n	%
Chemotherapy	CHOP	38	54.3
	RCHOP	32	45.7
Gender	Male	43	61.4
	Female	27	38.6
Age	<60 years old	52	74.3
	≥60 years old	18	25.7
Serum LDH	Less than ULN	17	24.3
	Greater than ULN or equal to ULN	53	75.7
CD20	Positive	46	65.7
	Negative	24	34.3
B Symptoms	Presense	32	45.7
	Absense	38	54.3
Ann Arbor Stage	1	32	45.7
	2	12	17.1
	3	16	22.9
	4	10	14.3
Bulky Disease	Yes	16	22.9
	Not	54	77.1
Performance Status (ECOG)	1	48	68.6
	2	22	31.4
Prognosis Risk (IPI score)	Low	35	50.0
	Intermediate	26	37.1
	High-Intemediate	9	12.9

Histopathological features of anatomic pathology examination showed that Diffuse Large B Cell Lymphoma was the highest percentage with 26 subjects (37.1%), non-specific Hodgkin Lymphoma with 25 subjects (35.7%), Small Lymphocytic Lymphoma with15 subjects (21.4%), Follicular Lymphoma with 2 subjects (2.9%), Malignant Lymphoma Intermediate Cell with 1 subject (1.4%), and MALT Lymphoma with1 subject respectively (1.4%). (Table 2)

Table 2. Histopathological Features

Histopathological features	n	%
Diffuse Large B Cell Lymphoma	26	37.1
non-specific Hodgkin's lymphoma	25	35.7
Small Lymphocytic Lymphoma	15	21.4
Follicular Lymphoma	2	2,9
Malignant lymphoma Intermediate Cell	1	1,4
MALT Lymphoma	1	1,4
Total	**70**	**100.0**

The RCHOP group showed a better earlyresponse rate based on tumor size shrinkage percentage compared to CHOP group(67.0% vs 46.6%) significantly with p value 0.001. (Table 3).

Table 3. Comparison ofearlyresponserate of standard chemotherapy therapy with combination targeted therapy

Chemotherapy	n	Mean of early response	Standard devation	p-value
CHOP	38	46.6	26.2	0.001
RCHOP	32	67.0	21.8	

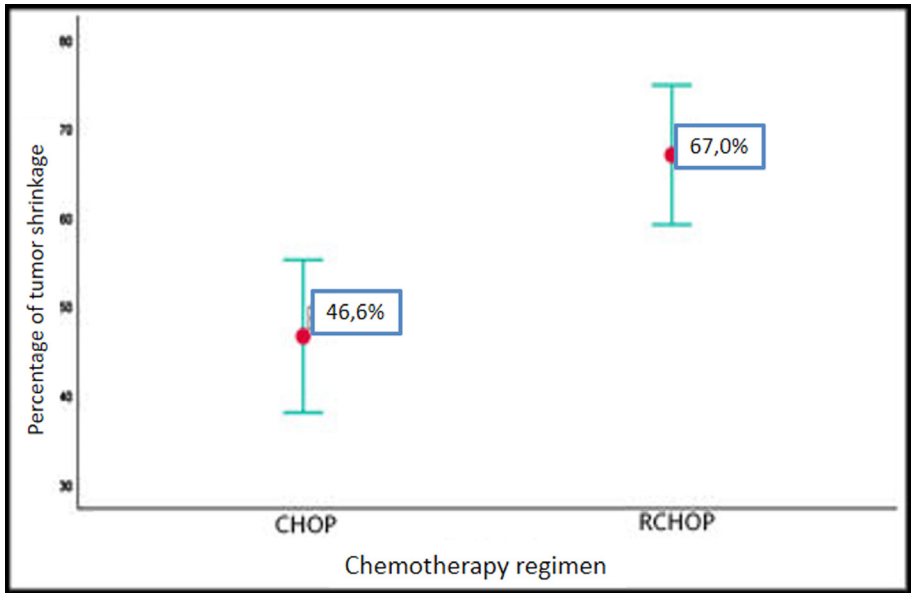


Figure 1. The comparison of early response rate between CHOP and RCHOP

Discussion

In this study, numbers of male subjects more than female subjects with a ratio of 1.6: 1, this is in line with the Intragumtornchai et al study, in 4056 patients with ratio of men than women 1.3: 1 and according to WHO data, in the United States ratio of male to female patients was 1.5: 1.[15,16] The age range of subjects in this study was 19-79 years with an average 50 ± 14 years. This is in accordance with subjects in study by Itragumtornchai et al with range of 16-99 years with an average age of 56 years.[15] Based on histopathological features in this study found that the highest prevalence was DLBCL, this is consistent with the data from WHO that among the malignancies of NHL, DLBCL was the highest prevalence of subtype.[17] Most aggressive lymphoma is DLBCL and its prevalence continue to increase by 3-4% every year.[18] We found that more patients had LDH serum greater than ULN. These result in accordance with study of Kasir et al that found all of the subjects hadLDH serumgreater than ULN.[19] LDH serum is prognostic factor and can be monitored to assess response rate.[20] Analysis in B limphocytes showed thatmost NHL have a positive CD20, but some of previous studied found that to 1-2% patients had negative CD20.[21] Based on B symptom, in this study 54.3% of subjects showed anabsense of B symptoms, according to previous NHL study that B symptoms were more common in aggressive lymphoma (41%) than in indolent lymphoma (19%).[22]

The RCHOP group showed better early response rate when compared to CHOP group (67.0% vs 46.6%; p=0.001). This study results were in line with studies by Delgado et al found that combination Rituximab with CHOP improvedcomplete response (CR) and delayed disease progression in folicular lymphoma patients.[23] In the same study, in DLBCL group the combination Rituximab showed no significant difference in long-term outcome.[23] Coifier et al study, found that patients who received 8 RCHOP chemotherapy cyclesgroup showed better CR number than CHOP group (76% vs 63%, P <0.05).[6] In addition to Nishimori et al study in Japan,patients who received 3-4 cycle of standard chemotheraphy regimen showed a greater CR difference in RCHOP group compared CHOP group (77.7% vs 69.4%, p<0.01).[7] Rituximab has an important role in calcium channels for B cell survival.[24] Complement-dependent cytotoxicity and human FC receptors are activated which trigger cellular antibody toxicity of cellular when rituximab which binds to CD20 receptor.[24] Rituximab mediates immune system and induces apoptosis.[24]

Conclusion

Early responserate in patients given combination targeted therapies showed better responserate than patients given standard regiments of Chemotherapy.

Conflict of Interest: No Potential conflict of interest relevant to be declared.

Source of Funding: This study was conducted with self funding, no external funding sources for this study

Ethical Clearance: The study has been permitted and acknowledged by Hasanuddin University Ethic Medical Committee. Before each interview, each participant was given written information on the study. Each participant was also informed that his or her participant was voluntary. Before each interview, we emphasized the importance of maintaining confidentiality in relation to patient cases. All participants provided written consent to participate in this study.

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Relationship between Exposure of Cement Dust Emission on Blood Level of Chromium and Nickel as Acarcinogenic Factor of Retinoblastoma

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Abstract

Background: Retinoblastoma is the most commonprimary intraocular malignant tumor in children with genetic etiology. Cement dust is genotoxic and can cause changes in the genetic structure of somatic and germ cells. Cement dust contains metal compounds that are harmful to human health such as chromium and nickel that can enter the human body. Chromium is mutagenic while nickel is a toxic and carcinogenic metal.

Method: This study is analytic cross sectional study in three population groups that are exposed and not exposed to PT. Semen Padang and the group of fathers of children with retinoblastoma. The total sample size is 304 people. Each sample is grouped by sex, occupation, and chromium and nickel levels in the blood.

Results: There were no significant differences in chromium levels of the male and female sample groups (p value 0,598) and no significant differences in the nickel level of the male and female sample groups exposed to cement dust (p value 0.401) . There were no significant differences in chromium levels of the male and female sample groups (p value 0.753) and no significant differences were found in the nickel level of the male and female sample groups not exposed to cement dust, (p value 0.234).

Conclusions: This study showed no statistically significant association between chromium and nickel levels in the blood as carcinogenic substances in retinoblastoma patients to exposure to dust mortar and its

Conclusions: This study showed no statistically significant association between chromium and nickel levels in the blood as carcinogenic substances in retinoblastoma patients to exposure to cement dust and its effects as carcinogenic substances in retinoblastoma disease.

Keywords: *Retinoblastoma, cement dust, chromium, nickel.*

Introduction

Retinoblastoma is the most frequent primary intraocular malignant tumor in children. Genetically, this tumor develops due to a long-arm mutation of the chromosome at the locus 13q14. Mutations in both Rb1 gene alleles are a prerequisite for this tumor to develop. These tumors can be hereditary or sporadic derived, and may be unilateral (70-75% of cases), or bilaterally (25-30% of cases). There is no predilection of sex and race with age that is often subjected to an average age of 18 months and 90% of patients diagnosed before the age of 5 years.[1,2,3,4]

The occupation of the father before and after the conception of the child requires an investigation to explore the etiological factors in both forms of retinoblstoma. From some studies of parental work and cancer in children, the work of the father in the form

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of television or radio repairmen related specifically to retinoblastoma. Another significant finding is the association of preconceptional work on work relating to metals and nonhereditic retinoblastoma. The biological explanations are caused by the carcinogenes of 2 metal compounds namely nickel and chromium. Cement dust contains metal compounds that are harmful to human health such as chromium and nickel that can enter the human body through respiratory system due to polluted air as well as digestive system due to drinking water pollution from the precipitated metal compound. In this study we wanted to know the relationship between levels of chromium and nickel in blood to exposure to cement dust emissions and their effects as carcinogenic substances in retinoblastoma disease. [5,6,7,8]

Method

This study has obtained ethical clearance from the ethical committee of Faculty of Medicine Andalas University. The design of this study is analytic cross sectional study in three population groups that are exposed and not exposed to PT. Semen Padang and the group of fathersof children with retinoblastoma. This study was conducted at Eye Health Clinic of Dr.M.Djamil Padang and also around Semen Padang with distance from location based on radius ≤ 10 km (exposed location) and ≥ 30 km (unexposed location). The location taken is an area corresponding to the wind direction for the city of Padang which averages toward the west, northwest, and southwest. The study was conducted from June 2015 to September 2016. For each group exposed and not exposed to cement plant dust emissions 189 samples were obtained for groups of people living in the vicinity of semen padang and 102 samples for unexposed groups while the number of samples for groups of people old people with retinoblastoma that is 13 people. The total sample size is 304 people. Each sample is grouped by age, sex, occupation, cromium and nickel levels in the blood.

Inclusion criteria are the parents of patients who have been diagnosed with retinoblastoma by a doctor at the Eye Health clinic of Dr. M. Djamil and has agreed in writing to participate in the study. For the exposed group of residents who live around the cement plant and have been living for at least 2 years and are willing and agree to participate in the study and undertake to meet the rules of the inspection conducted. The exclusion criteria in this study were the elderly people with retinoblastoma who had died or moved the address of the residence. Residents who disagree and do not undertake are included in the study.

The study was conducted on the inhabitants of cement factory and residents outside the cement factory and the fathers whose children suffered from retinoblastoma. The three sample groups were informed consent, then interviewed with questionnaires, slit lamp examination, fundoscopic examination, and blood sampling for examination of chromium and nickel levels in blood serum using spectrophotometer method. A group of low grade chromium and nickel and groups with high grade chromium and nickel were obtained.

Results

The data were collected at the Ophthalmology Department of Dr. M. Djamil Hospital Padang and people living around Semen Padang area with distance from the location of ≤ 10 km (exposed location) and ≥ 30 km (unexposed location). The location taken is an area corresponding to the wind direction for the city of Padang with averages toward the west, northwest, and southwest. The total sample size is 304 people (table 1). Each sample is grouped by sex, occupation, chromium and nickel levels in the blood. Table 1 shows the mean ratio of chromium and nickel levels in the blood of fathers of children withretinoblastoma, people exposed and not exposed to cement dust.

Table 1: Comparison of chromium and nickel level in all three groups of samples

Sample	Amount	Chromium(mg/dl)	P value	Nickel (mg/dl)	P value
The father ofretinoblastoma	13	4,282	0,741	28,730	0,459
Exposed	189	3,957		23,732	
Not exposed	102	3,857		23,888	

Based on Table 1, there was no significant difference between mean chromium levels in fathers of children with retinoblastoma, people exposed and not exposed to cement dust (p 0.741). In addition, nickel level in the group offathers of children withretinoblastoma, people exposed and not exposed to cement dust also did not

differ significantly (p 0.459). In general, however, mean chromium and nickel levels in the blood of fathers of children with retinoblastoma were higher than those exposed and not exposed to cement dust. By sex, the relationship between blood level of chromium and nickel in the exposed group and not exposed group to cement semen dust is shown in Table 2.

Table 2. Chromium and nickel level based on sex in the exposed group and not exposed to cement dust

Gender	Amount	Chromium (mg/dl)	Standard Deviation	P value	Nikel (mg/dl)	Standard Deviation	P value
Exposed							
Man	47	11,587	6,4312	0,598	100,81	14400,67	0,224
Women	142	10,940	7,5416		93,08	48,905	
Not Exposed							
Man	33	50,17	2,9569	0,753	46,45	20,8411	0,234
Women	69	52,14	3,6482		53,91	24,6599	

In table 2, the number of male samples in the are exposed to cement dust were 47 people and the number of female samples were 142 people, whereas in the environment not exposed to cement dust we obtained 33 men and 69 women. Based on statistical results, there was no significant difference in mean chromium level (p value 0,598) and nickel (p value 0.224) in the men and women exposed to cement dust. In addition, chromium and nickel levels in the male and female samples in areas not exposed to cement dust also showed no significant difference (p value 0.753 and 0.234). However, chromium and nickel levels were higher in men than women in areas exposed to cement dust, whereas in areas not exposed to cement dust the chromium and nickel levels were found to be higher in the female sample group. Chromium and nickel level by type of occupation of the three sample groups are shown in Table 3.

Table 3. Chromium and nickel blood level based on type of occupation.

Type of Work	Amount	Chromium (mg/dl)	Standard Deviation	P value	Nikel (mg/dl)	Standard Deviation	P Value
Fathers of children with retinoblasroma							
Indoor	9	6,06	4,7010	0,459	7,11	37,8832	0,309
Outdoor	3	7,83	3,0184		4,67	1,2061	
Exposed							
Indoor	158	11,052	7,0851	0,741	87,275	7,9440	0,224
Outdoor	31	8,812	5,5438		100,822	7,0725	
Not exposed							
Indoor	85	50,188	2,7888	0,058	48,675	2,1437	0,052
outdoor	17	73,935	5,9574		72,9	2,9998	

In table 3, most types of occupations of retinoblastoma patient's father were outdoor workers. While exposed and not exposed to cement dust samples were mostly in door worker. Based on statistical results, there was no significant difference in mean chromium (p value 0.459) and nickel level (p value 0.309) in father of children with retinoblastoma who worked indoor or outdoor. In the group exposed to cement dust, there was no significant difference in mean chromium and nickel level for both indoor and outdoor worker groups (p value 0.741 and 0.224). Likewise in the groups not exposed to cement dust, there was no significant difference in mean chromium and nickel level for both indoor and outdoor worker groups (p value 0.058 and 0.052).

Discussion

The chemical composition of cement dust shows a toxic constituent and requires the evaluation of occupational populations exposed to the genotoxic effect in order to assess the mutagenic potential of cement dust. Semen doses are genotoxic and can cause changes in the genetic structure of somatic and germ cells of exposed

workers. Toxic substances entering the human body cause disruption to the normal condition and behavior of chromosomes which ultimately lead to a change in the arrangement of hereditary materials that cause chromosomal aberration and gene mutations in somatic and germ cells. The chromosomal aberration illustrates the presence of damage to DNA. [11,12,13]

In this study we obtained 189 samples for groups of people living in the vicinity of semen padang and 102 samples for unexposed groups while the number of samples for fathers of children with retinoblastoma was 13. Of the 189 samples for the group living around the cement padang, there were 47 men and 142 women, while from 102 samples for unexposed groups there were 33 men and 69 women. Epidemiologically, exposure to the elderly before the conception of the child can affect the development of inherited sporadic retinoblastoma.

Chromium is a hard, shiny, gray metal that has a high melting point. Chromium is also odorless, tasteless and altered. The trivalent chromium compound is a stable form and is therefore found in the extracted material and most often in the remaining kilns of kilns and cement. The hexavalent chromium compounds are strong and unstable oxidizers and have high solubility in water. The hexavalent chromium compounds are more toxic than trivalent chromium. Respiratory tract is the main target organ of hexavalent chromium compound, in acute (short-term) and chronic (long-term) inhalation exposure.

Study by the International Agency for Study on Cancer in animal experiments supports the assumption that the most potent chromium compounds are carcinogenic compounds of hexavalent chromium, especially calcium chromate. The exact mechanisms of carcinogenicity of hexavalent chromium compounds have not been fully understood. It is thought that hexavalent chromium compounds govern the majority of cytotoxic and genotoxic effects by causing oxidative stress, forming stable DNA-chromium adducts, DNA-DNA crosslinks, and solving single-stranded and double-stranded DNA. DNA damage triggered by hexavalent chromium compounds may affect the replication, transcription, and translation of DNA in altered gene expression. Changes in gene expression mediated by DNA damage are considered as the key mechanisms underlying the genotoxic and carcinogenic activity of hexavalent chromium compounds. [14,15,16,17]

Nickel is a nonessential metal widely used in the production of coins, jewelry, batteries, medical equipment, carbon particles as well as in coating and welding processes. Nickel particles are the most dangerous in humans, especially in the lungs where the crystalline nickel becomes settled in the mucosa before it is phagocytosed by epithelial cells and macrophages. When inside the cell, the nickel compound is gradually destroyed and releases reactive nickel ions. The phagocytic properties of nickel intake mean significant amounts of nickel can accumulate over time, harm the lung tissue and often cause latent effects in individuals exposed to nickel for many years before. [14,18]

In this study, we found nosignificant difference between mean chromium levels in fathers of children withretinoblastoma, people exposed and not exposed to cement dust (p 0.741). In addition, nickel level in the group of fathers of children withretinoblastoma, people exposed and not exposed to cement dust also did not differ significantly (p 0.459). In general, however, mean chromium and nickel levels in the blood of fathers of children with retinoblastoma were higher than those exposed and not exposed to cement dust.

There was no significant difference in mean chromium level (p value 0,598) and nickel (p value 0.224) in the men and women exposed to cement dust. In addition, chromium and nickel levels in the male and female samples in areas not exposed to cement dust also showed no significant difference (p value 0.753 and 0.234). However, chromium and nickel levels were higher in men than women in areas exposed to cement dust, whereas in areas not exposed to cement dust the chromium and nickel levels were found to be higher in the female sample group.

From some studies of parental occupation and cancer in children, the work of the father in the form of television or radio repairmen related specifically to retinoblastoma. Bunin et al in his study, observed five significant associations between occupation and retinoblastoma. In the form of inherited diseases, more cases than controls have fathers working in welder groups and machine interpreters and grandparents of the mother's side working as farmers. Another significant finding is the linkage of preconceptional work to work relating to metals and nonhereditic. [4,5,8]

In this study, most fathers of children suffering from retinoblastoma were outdoor workers. While

exposed and not exposed to cement dust samples were mostly worker indoor. However, we found no significant difference in blood level of chromiumand nickel in father of children with retinoblastoma who worked indoor or outdoor. Likewise, in the groups exposed and not exposed to cement dust, the blood level of chromium and nickel in both indoor and outdoor workers were also not statistically different.

Conclusion

This study showed no statistically significant relationship between chromium and nickel levels in fathers of children with retinoblastoma, exposed group, and unexposed group to cement dust emissions and their effects as carcinogenic substances in retinoblastoma disease. There is no association between increased levels of chromium and nickel in blood to exposure to cement dust, thus further studyon toxic metals and other pollutants suspected to be associated with the pathogenesis of retinoblastoma is needed.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Ethical committee of Faculty of Medicine Andalas University.

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Palmitic and Palmitoleic Acids Levels in Milk of Cows on a Diet with a Complete Feed

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Abstract

The aim of this study was to examine the effect of feeding using complete feed added with various formula toward the level of milk's palmitic and palmitoleic acids in Holstein-Friesian cross cow. In this study, we used ten female Holstein-Friesian cross cows between four and seven years with two to six lactation periods. The substances were control feed P0 and complete feed with different formula P1, P2, P3, P4. The study was completely randomized design with five treatments and two replications. The data were analyzed using analysis of variance and the differences means between of the treatments were tested by Duncan's multiple range tests. The software that was used to analyze the data was windows Statistical Program of Social Science 22 (SPSS 22). Interestingly, the result of the study showed that P3 complete feed containing the lowest crude fiber among the treatments could increase the levels of palmitic and palmitoleic acids in the milk of cow. In conclusion, fed dairy cows using complete feed with a different formula affect the levels of palmitic and palmitoleic acids in cow's milk significantly.

Keywords: *Palmitic acid, palmitoleic acid, complete feed, milk, Holstein-Friesian.*

Introduction

The livestock revolution is primarily driven by demand. Poor people everywhere are eating more animal products as their incomes rise above poverty level and as they become urbanized. By 2020, the share of developing countries in total world meat consumption will expand from 52% currently to 63%. By 2020, developing countries will consume 107 million metric tons (mmt) more meat and 177 mmt more milk than they did in 1996/1998, dwarfing developed-country increases of 19 mmt for meat and 32 mmt for milk[1]. Milk is a considerable resource of products whose composition varies[2]. Fat serves as an efficient source of energy for the body directly and potentially, when stored in adipose tissue[1]. Fatty acid is a constituent part of the lipid. Fatty acid play a number of key roles in metabolism [3].

A variety of fatty acids exists in the diet of humans, in the bloodstream of humans, and in cells and tissues of humans. Fatty acids are energy sources and membrane constituents. They have biological activities that act to influence cell and tissue metabolism, function, and responsiveness to hormonal and other signals. The biological activities may be grouped as regulation of membrane structure and function; regulation of intracellular signaling pathways, transcription factor activity, and gene expression; and regulation of the production of bioactive lipid mediators[4].

Palmitic and palmitoleic acids are two of the various fatty acids in the cow's milk. Palmitic acid itself has a high substance in milk fat in the appeal of other fatty acids as a shaper of milk fat. Palmitoleic acid has a low substance than palmitic acid, however palmitoleic acid also play a role as a forming of milk fat. According to Sulistyowati[5], palmitic acid contained in human and cow fat milk is 22.6%. A comparison between the effects of foods containing lauric, myristic, and palmitic acids, that palmitic acid can lower serum cholesterol level. Besides the replacement of foods that contain lauric-myristic to palmitic-oleic in human have beneficial effect on thromboxane index (one transmitter protein that play a role in blood clotting process and includes class arachidonic acid) to prostacyclin in plasma. While palmitoleic acid has its own function, according to Mozaffarian *et al*.[6], circulating trans-palmitoleic acid is associated with lower insulin resistance, presence of atherogenic dyslipidemia, and diabetes incidence.

The fat content in cow's milk in Indonesia is still not qualified in the standard of SNI 01-3141-1998 in the amount of 3%. Based on research in Bogor, the fat content of cow's milk from farmers is only about 2.5%[7], even lower results obtained in Riau province in which the results of a study states that the fat content in cow's milk is only 1.6%, in the range of 1.21-2.05%[8].

Quantity and quality of milk in farm where located in the tropical area are influenced by the nutrient substance of feed. Poor feed quality causes nutrients from a feed material that is absorbed in the digestive tract for milk production is decreasing. This condition affects the quantity and quality of milk produced[9]. One of the efforts to improve the quality of milk is improving the quality of feed[10]. The aim of the present study was to examine the portion of contribution of the dairy cows digestive system in absorbing nutrients for the formation of palmitic and palmitoleic acids in milk.

Materials and Method

This study used completely randomized design (CRD), which consists of five kinds of treatments and two replications using the different replications. This study was conducted at Teaching Farm (owned by Faculty of Veterinary Medicine, Universitas Airlangga), Gresik, Indonesia. Experimental animals used in this study were 10 dairy cows. Dairy cows used in this study were female productive cross dairy cows of Holstein-Friesian, at 4 to 7 years old, and were in second to the sixth month lactation with an average production of 10 liters/head/day.

The study was conducted by providing a complete feed with a variety of formulas to experimental animals. Experimental animals were randomly assigned using a simple random system. In this study, each treatment has two replications. P0 was a control treatment using forage and soy pulp, whereas P1, P2, P3, and P4 itself were a complete feed consisting of concentrates and forages that have been measured in different compositions for each treatment.

This study used several phases, including: the adaptation phase of feed, feed treatment phase, sampling phase, the phase of milk fatty acid analysis, feed fatty acid analysis, and data analysis phase. During the adaptation phase, P0 conventional feed, complete feed P1, P2, P3, and P4 were fed for a week. Adaptation of the feed was intended to have the experimental animals to consume the feed in accordance with the provisions of regular and stable feed.

Feed treatment phase was to provide a complete feed for each animal according to type of treatment. P0 as a control treatment used a forage and soy food pulp, while the P1, P2, P3, and P4 used a complete feed with a different composition for each treatment. Control feed given to the animal was 15 kg of forage and 10 kg of soy pulp per day, whereas the complete feed was given to each animal in the morning for 7.5 kg and 7.5 kg in the afternoon, so the feed given was 15 kg/head/day in each treatment group. This stage was conducted for a week.

The research lasted two weeks, with details of a week for the process of adaptation, and a week for treatment. Samples of feed derived from complete feed formed. In this phase, the milk was taken twice a day, in the morning and afternoon, for a liter each time. After that, the sample milk was coded and grouped according to the treatment and then stored at 15 °C, so that the composition of milk was not changed or damaged. At the end of this study, all samples of milk from the Teaching Farm, Gresik, Indonesia collected at the Faculty of Veterinary Medicine, Universitas Airlangga, Surabaya, Indonesia has been stored at 15°C. Milk was thawed, homogenized and labeled according to the treatment. All the samples were analysis of palmitic and palmitoleic acids with feed and milk as samples. Fatty acid analysis performed by the method of HPLC (High Performance Liquid Chromatography).

The data were analyzed by the method of ANOVA (one-way analysis) with Statistical Program for Social Science 22 (SPSS 22) and for average differences between treatments were tested with a range of Duncan's multiple range test, with standard real for $\alpha = 0.05$.

Results

The results of palmitic and palmitoleic acids analysis in feed were as follow (Table 1). In accordance with the data below (Table 1) P4 and P3 complete feeds contain high level of palmitic acid, while the high level of palmitoleic acid among the treatment found in P1, P2, P3, P4 complete feeds. The lowest level of palmitoleic acid found in P0 control feed.

The results in regard to using P0 as a control feed and P1, P2, P3, as well as P4 as complete feed for dairy cows toward the level of palmitic and palmitoleic acids were as follow (Table 2). Feeding dairy cow with complete feed brought significant effect ($p<0.05$) toward the level of palmitic and palmitoleic acids contained in milk.

The result showed that there was significant difference ($p<0.05$) in the palmitic and palmitoleic acids levels in the dairy cow's milk due to different treatments. The level of palmitic acid among different treatments was on the different level; that was 35.76% (P0), 17.07% (P1), 6.31% (P2), 43.48% (P3), and 12.61% (P4). Likewise, the level of palmitoleic acid among different treatments in this study was on the different level; that was 1.76% (P0), 0.59% (P1), 0.34% (P2), 2.57% (P3), and 0.76% (P4).

The high level of palmitic acid in milk found in P3 treatment (43.48%), in this group the cow consuming P3 complete feed which contain the lowest crude fiber (22.00%), highest protein (21.35%), and high level of palmitic acid (56.92%) in the feed composition among the treatment. The level of palmitic acid in the milk of cow in P0 and P1 treatments did not differ from P3 treatment, but P0 and P1 treatments also did not differ from P2 and P4 treatments. So, the cow consuming complete feed P3 could increase the level of palmitic acid in cow milk with the highest mean 43.48%. The high level of palmitoleic acid in milk was found in P3 treatment (2.57%). The level of palmitoleic acid in the milk of cow in P0, P1, P4 treatments did not differ from P3 treatment, but P0, P1, P4 treatments also did not differ from P2 treatment.

Table 1: Analysis of the Level of Palmitic and Palmitoleic Acids in Feed

Feed Treatment	Palmitic acid (%)	Palmitoleic acid (%)
P0	3.315	0
P1	18.611	13.792
P2	25.593	6.635
P3	56.922	8.682
P4	69.569	8.778

Table 2: Analysis of the Level of Palmitic and Palmitoleic Acids in Milk

Feed Treatment	Palmitic acid (%)	Palmitoleic acid (%)
P0	$35.76^{ab} \pm 23.55$	$1.76^{ab} \pm 1.09$
P1	$17.07^{ab} \pm 4.63$	$0.59^{ab} \pm 0.62$
P2	$6.31^{b} \pm 2.95$	$0.34^{b} \pm 0.41$
P3	$43.48^{a} \pm 36,69$	$2.57^{a} \pm 2.49$
P4	$12.61^{b} \pm 6.83$	$0.76^{ab} \pm 0.75$

Different superscript on same column showed a significantly different average level of palmitic acid and palmitoleic acid in milk ($p<0.05$).

Discussion

The study result showed that complete feed gave significant effect toward the palmitic and palmitoleic acids level in the milk of cow. Some factors could influence the level of palimitic and palmitoleic acids in milk of cow. According to Allison [11], the ruminant ability to consume feed could be influenced by many factors: (1) cow factor, for example, body weight, physiology condition, genetic, production level and the cow health. (2) feed factor, for example, nutrient composition, anti-nutrient substance, feed forming. (3) and environmental factor, for example temperature, humidity, air, rainfall, farm condition, and feed storage.

The high level of palmitic and palmitoleic acids found in P3 treatment is caused by the content of crude fiber in feed on the lowest level (22.00%) among treatments. According to Hatmaya[12], there was negative correlation betwen the crude fiber digestibility and organic matter digestibility. The high level of crude fiber in the feed was limiting factor for the digestion length time so it would affect the rate of digestion and decrease feed intake. Increased consumption of feed for cattle equaled by increasing the quality and digestibility of feed given, while digestibility of feed depends on the fiber content that could not be used by cow.

Fat content in feed for ruminant, usually was low because ruminant animals a partly of their feed derived from plant which contain fat around 1-4%, so the level of fat that is high in ruminant feed would cause an increase in the sensitivity of rumen fermentation[13]. According to Ressang and Nasution (1992)[14], the fat content consumed would affect acidity level in rumen that could cause: (1) plant cell wall decomposition in rumen be slow, consequently feed that had high crude fiber like grass and the other forage could not be digested and left behind in rumen so feed number consumed will decrease; (2) utilization of the other feed substances contained in forage cells would be inhibited because the cell wall could not be digested; (3) nutrients will be more widely used to increase body weight than for their milk production.

Milk fat is formed from about 12.5% glycerol and 85.5% fatty acids, it had a density 0.93. Milk fatty acids derived from microbiological activity in the rumen or from synthetic process in secretory cells. Fatty acids are composed by the hydrocarbon chains and carboxyl groups[15]. According to Ressang and Nasution[14], fatty acids are formed from medium to long-chain fatty acids

that joined with the glycerol compound. In the rumen, crude fat is separated into organic acids and fatty acids. After that fatty acid is converted into free fatty acid that would be absorbed in the small intestine.

Organic acid and glycerol would be converted into acetic, propionic and butyrate acids in the rumen. Acetic acid is the main ingredient for the formation of milk fat. Acetic and propionic acids entering the liver through the the rumen wall, as well as butyric acid that would be converted into hydroxy butyrate before penetrate the wall of the rumen. The next process in the liver is to distribute acetic acid and beta hydroxy butyrate to around the body through the circulatory system. Propionic acid entering the liver would be broken down into glucose. On the other hand, acetic acid entering the mammary gland would be used as precursor of milk fat formation. According to Rosalin[15], absorption of short chain fatty acids (e.g. acetic acid, propionic, or butyric acids) in the intestine and glucose in small amounts could influence milk fat synthesis. If the production of propionic acid or unsaturated fatty acids increases, the reduction of milk fat secretion would be occurred. Increased in absorption of acetate or butyrate improve *de novo* synthesis and secretion of several C4-C16 fatty acids, so that increased absorption of propionate or glucose decrease the secretion of several major long-chain fatty acids. According to Romziah *et al.*[16], the other factor that could influence the quality of milk is rumen microorganisms. Rumen microorganisms could change feed substance to saturated condition so that saturated fatty acid level in fat circulation is high.

The level of palmitic and palmitoleic acids in milk among treatment gave significant effect. P3 complete feed could increase the level of palmitic and also palmitoleic acids in the milk of cow. P3 complete feed could become an alternative feed to fulfil the cow's nutrition need, since it is more economic and efficient feed for farmer in village. Not only fulfil the cow nutrition need but also the cow could produce high quality of milk.

Conclusion

In conclusion, feeding using complete feed with a different formula affect the level of palmitic and palmitoleic acids in cow's milk significantly.

Conflict of Interest: The authors declare that they have no conflict of interest.

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Ethical Approval: Ethical approval for this study was obtained from the Committee of Animal Care and Use, Faculty of Veterinary Medicine, Universitas Airlangga.

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Caesar Labor without Medical Indication Problem: The Midwives Challenge of Midwifery Care

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Abstract

Quality midwives are neededto reduce maternal and infant mortality. Not only medical skills but also interpersonal and soft skills that are culturally and indigenous responsiveness essential in midwifery services, especially in childbirth assistance. A competent midwife will make a woman comfortable so that she entrusts her health and baby to the midwife, especially in childbirth assistance. This review aims to find facts about the delivery care needed by the community. The literature review was used to explore more information from several studies. This literature study is sourced from a systematic search of the computerizeddatabase (CINAHL, ProQuest, PubMed, EBSCOhost, Google Scholar) as well as research journals and literature studies.

Keywords: *Caesar section, No medical indication problem, Midwife.*

Introduction

Childbirth is a natural process that will naturally take place when labor arrives. The mother will feel the symptoms of childbirth, and through the birth process, the baby will be born alone through the birth canal[(1)]. This natural labor can be difficult and requires the help of tools or even surgery due to power problems, passenger, passage, pass way(4P)[(2)]. In addition to the 4P, the psychological condition of the mother also influences the union process[(3)].

Natural childbirth has its advantages compared to delivery with the help of tools and surgery. Childbirth goes naturally, without the preparation of various types of equipment, without anesthesia, without an operating room, besides the recovery process after childbirth is faster than labor by cesarean section[(4)]. But nowadays, cesarean section is often the primary choice for labor when a mother is going to give birth.

Cesarean delivery must be done when there are indications of complications in power, passenger, passage and pass way (4P)[(3)]. Caesar section of delivering baby has a high risk, not only for the mother but also for the fetus they contain[(5)]. Nevertheless, in reality, the incidence of cesarean section continues to increase in many countries including Indonesia. But currently, there are not a few mothers who want labor by surgery (cesarean section on request) even though there is no indication. Some of them are afraid of going through the natural process of childbirth, worrying about delivery, so they feel that the labor process is an excruciating process and cannot be done alone. Wanting their baby to be born on a certain date is also the reason for cesarean delivery [(6)].

WHO survey results in 2004-2008 on three continents namely Latin America, Africa,and Asia found the lowest incidence of cesarean section in Angola, which was 2.3% and the highest in China was 46.2%. Labor with cesarean section in Asia also increased sharply. The results of the study in Thailand showed an increase in the rate of cesarean section delivery from 15.2% in 1990 to 22.4% in 1996. While in China, the rate of cesarean section delivery reached 36.3% in 2011 from 19.2% in the year 2003[(7)].

In Indonesia, the rate of Caesarean section delivery in major cities has increased. Based on the 2013 Health research basic program, the highest Caesarean section delivery rate occurred in Jakarta at 19.9% and the lowest SC delivery in Southeast Sulawesi was 3.3% of the total incidence of SC in Indonesia at 9.8%. In general, the pattern of delivery through cesarean section according to the characteristics shows the highest proportion in the top ownership index quartile (18.9%), living in urban areas (13.8%), employment as employees (20.9%) and education D1-D3 / PT (25.1%).

Midwives as female friends throughout the life cycle of women from preconception to menopause. Midwives have an important role in pursuing natural and safe delivery assistance. Midwives will accompany women from before pregnancy, up to 9 months of pregnancy, seek and help with safe delivery, postpartum booting, support to the baby, until the mother does family planning[8].

The midwife helps not a few mothers who are worried about giving birth. Families with middle and upper socioeconomic status prefer to give birth in hospitals, families with lower socioeconomic status are still seeking help from shaman even though the State has aided deliver labor by health workers.

A good midwife character is needed to build public trust in midwives as health workers at the primary service level[9]. Continuity of care is fundamental in the midwifery practice model to provide holistic care, build sustainable partnerships to provide support and foster mutual trust between midwives and clients[10]. Thus clients from all walks of life will entrust their reproductive health to Midwives, especially in childbirth assistance. It will reduce Cesarean section event events without indication.

Material and Method

The literature review was used to explore more information from several studies. This literature study originated from a systematic search of the computerizeddatabase (CINAHL, Pro Quest, Pub Med, EBSCO host, Google Scholar) in the form of research journals as well as literature studies.

Finding and Discussion

This review literature found various problems related to the selection of cesarean section community in Indonesia. Four topics related to the challenges of midwives in normal delivery care in the community, including 1. Reasons for choosing a cesarean section; 2. Place of delivery; 3. Childbirth Helper; 4. The character of Midwife as Childbirth Helper.

Reasons for choosing cesarean section delivery: There are four highest reasons for choosing CESAREAN SECTION delivery, among others: 1. There are complications of labor; 2. Higher levels of maternal and family education; 3. Middle and upper economic status; 4. Mother gave birth for the first time[11–13]. There was an increase in demand for cesarean section delivery without indications of complications of 21, 24 times in 2015[13,14]. Childbirth cesarean delivery is not always caused by indications,but from obstetric socio-demographic and medico factors must be considered[15]. Previous experience of giving birth to Cesarean section also determined the choice of delivery with CESAREAN SECTION (16,17)

Place of delivery: Maternity aid places that are the choice of mothers in childbirth include public hospitals[18]. Private hospitals are also an option for birth[19].

Childbirth Helper: The increasing demand for delivery of cesarean section without medical indications is not only influenced by the socioeconomic status of society, but also by the condition of Education. Both of these things are related to the level of community trust in midwives as birth attendants in primary care. Communities with middle and upper socioeconomic status feel calmer if their delivery is done in a hospital with a doctor or an origin specialist as a delivery helper. Communities with higher levels of education tend to have deliveries to doctors who are considered to have better knowledge and skills in childbirth assistance than midwives.

Midwives as primary service providers in the community, should not only be an option for middle-class people. Midwives should be able to improve their quality so that they can be chosen by all levels of society, both upper and lower layers. In childbirth assistance, this is expected to reduce cesarean section delivery without medical indications that should be born spontaneously without surgery[20].

The character of midwives as birth attendants: The midwife's character performance shows the quality of midwives in providing midwifery services during the service. Characteristics are taught not only in appearance, but also in clinical skills, and no less important are soft skills and interpersonal skills by the needs of the community who are culturally responsive and supported by evidently based on current research[21].

The quality of these ideal midwives in developing countries is hard to find causing barriers to the provision of quality midwifery services. It can be caused by three things, social; economy; and professionalism [22].Social factors can be interpreted as a lack of social welfare. The economic factor in question is the low salary that is not

proportional to the burden and responsibility of the job. While professionalism can be interpreted as registration, legislation, state accreditation that protects midwifery services by applicable laws.

The quality of delivery services is not only determined by the mid wife itself, but also must receive facilities and infrastructure support from service providers[23]. Availability of vehicles, affordability, completeness of service facilities is a part that supports service providers in addition to medical skills for midwives, soft skills and interpersonal skills.

Conclusion

The character of midwives as childbirth assistants in primary care should prioritize not only performance and medical skills but also more critical interpersonal skills that are culturally and indigenous responsiveness. The character is related to the trust and comfort of the community; it is hoped that with this character the midwife will get a separate place in all levels of society in the care of the midwife. Thus, cesarean delivery without medical indications is expected to decrease.

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Conflict of Interest: Nil

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Medical Students' Syndrome–A Myth or Reality?: A Cross Sectional Study among Medical Students of Jouf University, Saudi Arabia

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Abstract

Background: Prevalence of stress, anxiety and depression among medical students are high all over the world. It has been attributed by huge amount of psychological stress due to the constant work required, frequent examinations. Medical student syndrome (MSS) is a condition commonly reported among medical students, that they repeatedly develop anxiety and symptoms of ill health of diseases of what they are studying.

Objectives: To assess the prevalence and risk factors of medical students' syndrome among Jouf university medical students.

Materials and Method: An analytical cross sectional study done among the medical students of Jouf University in Saudi Arabia by using standard and validated student health questionnaire. Statistical Package for Social Sciences (SPSS) software version 20 was used to enter and analyze data. Descriptive statistics were presented as number and percentage. Chi square test was used to identify the risk factors and p value less than 0.05 is considered as statistically significant.

Results: Medical students' syndrome found among 58 (16.11%) students of the 360 participants and was statistically significant ($p<.05$) among the students with less than 22 years of age, who studied basic sciences and smokers (daily and rarely).

Conclusion: Health education programs in medical schools should be implemented to improve their mental health status. This has to be implemented from the first year of their Hence, they can work effectively for the health of the people in the community.

Keywords: *Medical student syndrome, Help seeking, Hypochondriasis, Anxiety and Stress.*

Introduction

Medical students' syndrome (MSS) is a condition commonly reported among medical students, that they repeatedly develop anxiety and symptoms of ill health of diseases of what they are studying[1,2]. This phenomenon is reportedly common among medical students than non medical students[3]. In fact, it has been even included in the medical psychology courses of several medical colleges[3].

Prevalence of stress, anxiety and depression among medical students are high all over the world[4-7]. It has been attributed by huge amount of psychological stress due to the constant work required, frequent examinations[8,9]. Studying in medical school is a stressful process in which students may undergo mental and physical health consequences[10]. This psychological anxiety and stress

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leads to detection of hypochondria symptoms, a main element of medical students' syndrome. This is usually manifested by augmented physical sensations and appearance of hypochondria symptoms[9].

As a part of medical school curriculum, students undergo extensive clinical training and obtain new clinical knowledge. The anxiety and stress and newly obtained clinical knowledge makes students to diagnose themselves with a disease with even simple body dysfunction[1].

"Medical Student Syndrome" is consisting of two elements as cognitive and distress. Firstly, cognitive element includes the thoughts of a student that he has the disease being studied and the secondly, a distress element that includes development of anxiety due to cognitive element. The cognitive element is present among all students and it progresses from the beginning of their medical education to till graduation. In contrast to cognitive element, distress element is common among initial period of medical school and is insignificant among senior students because with the year progress students acquire more knowledge and development of maturity among students (6-8). The clinical examination on students on several occasions may not reveal conditions that fully responsible for the person's worrying about the disease or symptoms, that makes it is a diagnosis of exclusion. Unfortunately, the fears frequently persist among medical students despite medical reassurance, affecting their concentration during their training[9].

Numerous attempts[4,7,9,11] have been made in the past by several authors on the assessment of depression, anxiety and stress among medical students in the world as well as in the Kingdom of Saudi Arabia. Despite high prevalence of stress, anxiety and depression among the medical students in the Kingdom of Saudi Arabia, there are very few studies on assessment of prevalence of medical students' and its risk factors.

It is essential to improve the mental health status of medical students as they are tomorrow's backbone of health care system. Assessment of prevalence medical student syndrome and its risk factors will help to identify mental health of medical students and will help us to improve their mental health so that they can be involved effectively in health care delivery. Hence, this study is planned.

Objectives: To assess the prevalence of medical student syndrome among the medical students' of Jouf university and to identify the factors influencing for the development medical students' syndrome among them.

Materials and Method

It is an analytical cross sectional study designs done among the medical students of college of medicine, Jouf University. All the students of college medicine were requested to participate in this study. This study was done between November 2018 to March 2019.

The data was collected through the "student health questionnaire" (Adopted from Waterman LZ et al, 2014)[3]. It is a standard and validated questionnaire. Our data collection profroma had two parts. First part enquire about socio–demographic details of the of the students (age, gender, year of education, resident status etc). The second part was aimed to assess 'Hypochondriacal and Help-Seeking Behaviour (HHSB) " of the students through student health questionnaire as HHSB is the core component of medical students' syndrome. Our study data were entered and analyzed by using the Statistical Package for Social Sciences (SPSS) software version 20. Descriptive statistics were presented as number and percentage. Chi square test was used to identify the risk factors and p value less than 0.05 is considered as statistically significant.

Results

Table 1: Socio-demographic details (n = 360)

Variable	No (%)
Age (years)	
Less than 22	201 (55.83)
22 and above	159 (44.17)
Gender	
Male	220 (61.11)
Female	140 (38.89)
Year of education	
1st year	88 (24.44)
2nd year	77 (21.39)
3rd year	71 (19.72)
4th Year	65 (18.06)
5th Year	59 (16.39)
Smoking status	
Daily	39 (10.83)
Rarely	25 (6.94)
Non smoker	296 (82.22)
Residence status	
Hostler	58 (16.11)
Living with family	302 (83.89)
Marital status	
Married	35 (9.72)
Unmarried	325 (90.28)

Table 1 shows, among the 360 participants studied, majority of the participants were males (61.11%), living with their families (83.89%) and unmarried (90.28%)

Table 2: Prevalence of MSS (n= 58)

Variable	No (%)
Age (years)	
Less than 22	41 (20.39)
22 and above	17 (10.69)
Gender	
Male	37 (16.82)
Female	21 (15)
Year of education	
1st year	17 (19.32)
2nd year	15 (19.48)
3rd year	14 (19.71)
4th Year	7 (10.77)
5th Year	5 (8.47)
Smoking status	
Daily	10 (25.64)
Rarely	6(24)
Non smoker	42 (14.19)
Residence status	
Hostler	14 (24.14)
Living with family	44 (14.57)
Marital status	
Married	5 (14.29)
Unmarried	53 (16.31)

Our study found 58 (16.11%) students were affected with medical students' syndrome. Table 2 presents the variation of prevalence in each category. The prevalence is high among male gender, age group less than 22 years, daily smokers, hostlers and unmarried participants.

Table 3: Factors influencing MSS (n = 58)

Variable	No (%)	P value
Age (years)		
Less than 22	41 (20.39)	0.013
22 and above	17 (10.69)	
Gender		
Male	37 (16.82)	0.647
Female	21 (15)	
Year of education		
Basic sciences	46 (18.64)	0.016
Clinical sciences	12 (11.29)	
Smoking status		
Smokers (daily and rarely)	16 (17.98)	0.032
Non smoker	42 (14.19)	
Residence status		
Hostler	14 (24.14)	.069
Living with family	44 (14.57)	
Marital status		
Married	5 (14.29)	0.757
Unmarried	53 (16.31)	

Chi square test was done to find the statistical difference between each variables. Variables with more than two categories are clubbed to make two categories. In year of education category, up to year 3 was considered as basic sciences and year 4 and 5 was considered as clinical sciences.

Medical students' syndrome was statistically significant ($p<.05$) among the students with less than 22 years of age, who studied basic sciences and smokers (daily and rarely).

Discussion

Medical students' syndrome is widely known phenomenon and common among medical students[12,13]. Hypochondriasis, a core component of medical students' syndrome cause stress and anxiety; students may hesitate to seek help and care under several circumstances. This will not be good for the profession, as medical doctors are already known to be shy or unwilling to show themselves as patients[14,15].

The present study found 16.11% of medical students are affected with MSS. This study finding is similar to several studies[4,6] done in the Kingdom of Saudi Arabia with the slight variation in prevalence. But in contrast to our findings, some studies[13,15] found very high prevalence of hypchondrial symptoms among medical students. This is most likely due to study settings in which study is done, as these studies are done in either Asian or European settings. Also, cultural factors might have played a role as female participants are less in our study in comparing to the other studies as females may not describe their symptoms completely.

Our study found the MSS prevalence is statistically significant among basic sciences and age group less than 22 years of age. This almost similar to studies done by Saggab (2013) and Sara S et al (2018). In their study they found initial years of medical school hypochondrial symptoms are very high. This is most probably explained as initial years students are not completely aware about symptoms and clinical correlations and as they enter

clinical sciences program they may correlate well with these hypochondrial symptoms, which is a core symptom of MSS.

The present study identified MSS is statistically high among the smokers than the non smokers. This findings also similar to previous studies done in different settings all over the world[2,4,6,13&15] This can be explained by the relationship between smoking and stress, anxiety as published in previous studies.[3,5,7&10]

Conclusion

There is high prevalence of hypochondrial symptoms among the medical students. These symptoms may lead to further anxiety and stress among them. Hence, health education programs in medical schools should be implemented to improve their mental health status. This has to be implemented from the first year. Hence, they can work effectively for the health of the people in the community. Further, unnecessary overload in course to be avoided by decreasing number of lectures as continuous lecture may not be help in retention of information delivered[16]. Finally smoking cessations program to be encouraged regularly as it is one of the major risk factor for medical students' syndrome

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The Function of Pepsin and pH Levels in the Nasal Secretions Due to Extraesophageal Reflux in Causing Chronic Rhinosinusitis

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Abstract

Background: The relationship between extraesophageal reflux and chronic rhinosinusitis remains a controversial feature in the literature. Recently some research has been done to prove this relationship and it found that there was relationship between gastroesophageal reflux disease with the occurrence of chronic rhinosinusitis. This research aimed to determine and analyze the presence and levels of pepsin and pH in nasal secretions due to extraesophageal reflux amongpatients with chronic rhinosinusitis concerning to complaints of laryngopharyngeal Reflux.

Method: The research was an analytical research with cross-sectional design. The research involved 27 patients with chronic rhinosinusitis, who were divided into two groups. Group 1 consisting of 8 patients with chronic rhinosinusitis accompanied with complaints of laryngopharyngeal reflux, and group 2 consisting of 19 patients with chronic rhinosinusitis without complaints of laryngopharyngeal reflux. The laryngopharyngeal reflux was determined from the questionnaires value of *Reflux Symptom Index*>13 and *Reflux Finding Score* determined by a flexible nasolaryngoendos copy examination with score >7. The level of pepsin and pH of both groups of patients were examined from the nasal secretion. The examination of pepsin using ELISA method and pH level measurement was using by pHmetri.

Result: Characteristic of respondence, 82.0% of respondence were their ages over 25 years old and 59.3% of them were females. 29.6% of chronic rhinosinusitis patients were accompanied by pharyngeal larynx reflux. Pepsin was found in all nasal secretions of chronic rhinosinusitis patients. Pepsin level of nasal secretions among Chronic Rhinosinusitis patients was 19.00 to 75.80 pg/ml with median 52.20 pg/ml. The pH level of nasal secretions among chronic rhinosinusitis patients were ranged from 6.00 to 6.80 with median of 6,39. Analysis by Mann-Whitney U-test revealed a significant change difference ($p<0,05$) between the two group. The level of pepsin was higher in the group chronic rhinosinusitis patients than complaints of laryngopharyngeal Reflux patients. The pH levels not statistically significant difference ($p> 0.05$) although it was found that the degree of acidity was higher (pH <6.5) in chronic rhinosinusitis patients than complaints of laryngopharyngeal reflux.

Conclusion: Extraesophageal reflux may be one of the factors that can cause chronic rhinosinusitis or aggravate chronic rhinosinusitis caused by infection or allergies. The presence of pepsin with high acidity (pH <6.5) can cause irritation of thelarynx mucosa, pharynx and sinonasal.So, the assessment of RSI, RFS, and pepsin and antirefluks therapy (PPI) is recommended to people with chronic rhinosinusitis who do not respond well or recurrent with standard chronic rhinosinusitis treatment.

Keywords: *Chronic Rhinosinusitis, laryngopharyngeal Reflux, Pepsin, pH, RSI, RFS.*

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Introduction

Chronic rhinosinusitis (CRS) according to EPOS (European Position Paper on Rhinosinusitis and Nasal Polyposis) criteria is nasal and paranasal sinuses inflammation lasting more than 12 weeks.Its symptoms are nasal congestion/obstruction/congestion or colds

anterior/posterior nasal secretions, with or without facial pain/suppression on the face, with or without interruption of inhalation.Nasoendoscopic also shown polyps or mucopurulent secretions from the meatus medius and mucosal obstruction/mucosa in the Meatus Medius.A picture of computer tomography shown mucosal changes in the osteomata andor sinus complexes.[1]Chronic rhinosinusitis has a high prevalence in the community. three hospitals In Makassar reported 45% of all cases were chronic rhinosinusitis handled by Sub Division Rhinology of ENT departmentin the period 2003-2007.[2]

The relationship between chronic rhinosinusitis and extraesophageal reflux is still a controversial issue in the literature.Chronic rhinosinusitis and gastroesophageal reflux are two common conditions that occur together more often than expected.[3]Therefore, it has been suggested that gastroesophageal reflux disease may have an etiological role in the occurrence of chronic rhinosinusitis. There is a relative prevalence of reflux with controlled CRS. There is still little controlled research with a large number of patients to confirm this hypothesis.[4]

Gastroesophagealreflux (GER) is a backflow of gastric contents into the esophagus. The esophagus and laryngopharynx are separated by the upper esophageal sphincter (SEA) which is the last barrier to prevent reflux from entering the laryngopharynx. Reflux increase SEA tone leads to esophageal distention resulting in relaxation of SEA leading to exposure to esophageal fluid called extraesophageal reflux (EER). It can reach the larynx, pharynx, nasal cavity and middle ear.Cause of laryngitis and pharyngitis in the form of laryngopharyngeal reflux (LPR), and may cause chronic rhinosinusitis. Gastric fluid may contain pepsin, stomach acid (HCl), mucin and renin.

Pepsin plays many major roles in the development of reflux-related disorders. Pepsin is considered an important etiologic factor of reflux disease in aerodigestive channels and biomarkers for reflux, whose level and acidity may be related to the severity of the damage.[5,6] The research was obtained 29 of 33 patients with reflux suffering cause of chronic rhinosinusitis. The results of pepsin fluorometric examination correlated with 24hour dual probe monitoring results for laryngopharyngeal reflux diagnosis with 100% sensitivity and 92.5% specificity. It can be asserted that there is a relationship between CSR and LPR.Detection of pepsin in nasal fluids can be performed as a non-invasive and feasible method for LPR skrining.[7]another research reported that radiologic and endoscopic values of rhinosinusitis patients were worse in patients who also suffered from laryngopharyngeal reflux.[8]

During the last month how did the following problems affect you:						
1. Hoarseness or a problem with your voice.	0	1	2	3	4	5
2. Clearing your throat.	0	1	2	3	4	5
3. Excess throat mucus or postnasal drip.	0	1	2	3	4	5
4. Difficulty swallowing food, liquids, or pills	0	1	2	3	4	5
5. Coughing after you ate or after lying down.	0	1	2	3	4	5
6. Breathing difficulties or choking episodes	0	1	2	3	4	5
7. Troublesome or annoying cough.	0	1	2	3	4	5
8. Sensations of something sticking in your throat or a lump in your throat.	0	1	2	3	4	5
9. Heartburn, chest pain, indigestion or stomach acid coming up	0	1	2	3	4	5

0= no problem, 5= severe problem/ very troublesome. Adapted from Belafsky PC, Postma GN, Koufman JA. Validity and reliability of the reflux symptom index (RSI). J Voice 2002; 16: 274-77.

Findings	Score
Subglottic Edema	0= absent, 2= present
Ventricular	0= none, 2= partial, 3= complete
Erythema/Hyperemia	0= none, 2= arytenoids, 3= diffuse
Vocal Fold Edema	0= none, 2= mild, 3= severe, 4= polypoid
Diffuse Laryngeal Edema	0= none, 2= mild, 3= severe, 4= obstructive
Posterior Commissure Hypertrophy	0= none, 2= mild, 3= severe, 4= obstructive
Granuloma/Granulation of Tissue	0= absent, 2= present
Thick Endolaryngeal Mucus	0= absent, 2= present

Adapted from Belafsky PC, Postma GN, Koufman JA. The validity and reliability of the reflux finding score (RFS). Laryngoscope. 2001;111:1313–1317.

LPR assessment based of RSI and RFS score[9,10]

Method

Research Site: This research was conducted in the outpatient unit of ENT department Dr. Wahidin Sudirohusodo Hospital Makassar starting from October-December 2017. Processing of research result was at laboratory of Education Hospital of Hasanuddin University Makassar.

Design: The design of this study was an analytical research with cross-sectional design. The independent variable in this study was extraesophageal reflux, while the dependent variable was pepsin and pH.

Samples: The sampling technique was performed randomly. In this study patients that positive (27) with chronic rhinosinusitis were divided into two groups. Group 1 consisting of 8 patients with chronic rhinosinusitis accompanied with complaints of laryngopharyngeal reflux, and group 2 consisting of 19 patients with chronic rhinosinusitis without complaints of laryngopharyngeal reflux. The laryngopharyngeal reflux was determined from the questionnaires value of *Reflux Symptom Index*>13 and *Reflux Finding Score* determined by a flexible nasolaryloendoscopy Examination with score >7. The level of pepsin and pH of both groups of patients were examined from the nasal secretion.

Exclusion Criteria: Patients who are contraindicated performed a flexible nasolaringoendoskopi examination, patients who received on treatment of PPI therapy, anti-histamine 2, antacids in the past 4 weeks.

Statistical Analysis: Data were analyzed using Statistical Package for Social Sciences (SPSS) software (version 23.0 for Windows; SPSS Inc, Chicago, IL).

Results

Table 1: Characteristics of Population Research

Characteristics		n	%
Age	16-24 y.o	5	18 %
	25-55 y.o	22	82 %
Gender	Male	11	40,7 %
	Female	16	59,3 %
LPR	Yes	8	29,6 %
	No	19	70,4 %

From Characteristics of the study population were shown in Table 1. The results showed of the subject demography of the research is all of chronic rhinosinusitis patients 82.0% were over 25 years old and more in females than males (59.3% vs 40.7%) and from 27 chronic rhinosinusitis patients were also accompanied by Laryngopharyngeal Reflux /LPR (29.6%).

Table 2. Levels of Pepsin and pH in nasal secretions of chronic rhinosinusitis (CRS)

Variabel	PEPSIN		Pepsin Level (pg/ml)		pH Level	
	Yes	No	Min/Max	Median	Min/Max	Median
CRS (n=27)	27	-	19,0 / 75,8	52,20	6,00/6,80	6,395
Total	**100%**	**0%**				

From table 2 it can be seen that pepsin was found in all nasal secretions of chronic rhinosinusitis patients which pepsin level of nasal secretions in Chronic Rhinosinusitis ranged from 19.00 to 75.80 pg/ml with median 52.20 pg/ml and the pH level of nasal secretions of chronic rhinosinusitis patients ranged from 6.00 to 6.80 with median of 6,395.

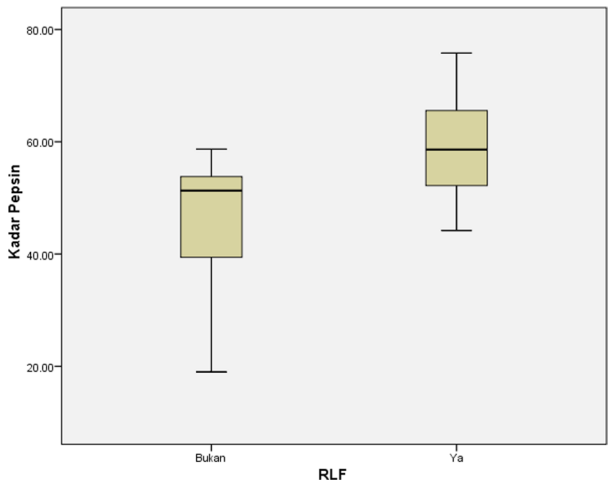
Table 3: Pepsin levels and pH nasal secretions of chronic rhinosinusitis patients based on presence complaints of laryngopharyngeal reflux (LPR)

Variabel	Yes LPR (n=19)		No LPR (n=8)		Total (n=27)		p*
	Median	Min/Max	Median	Min/Max	Median	Min/Max	
Pepsin (pg/ml)	58,60	44,2/ 75,8	51,30	19,0/ 58,5	52,20	19,0 / 75,8	0,035
pH	6,22	6,00/6,35	6,450	6,00/6,70	6,395	6,00/6,80	0,095

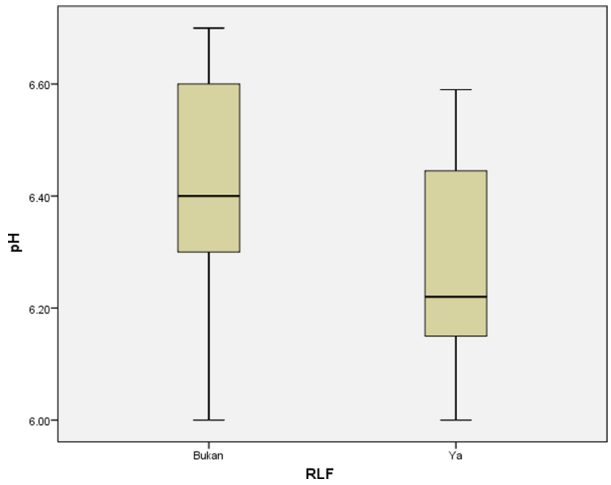
*Mann-Whitney U test

The results of the Mann-Whitney U test shown significantly different pepsin nasal secretions ($p < 0.05$) between chronic rhinosinusitis patients with LPR complaints and chronic rhinosinusitis without LPR complaints.The pepsin content of chronic rhinosinusitis patients with LPR complaints was higher than which

has no LPR complaint (median 58.60 vs 51.30 pg/ml). The pH level in nasal secretions of patients with chronic rhinosinusitis with LPR was lower than chronic Rhinosinusitis without LPR (6.22 vs 6.45) but not statistically significant (p> 0.05)



Graph 1: Box Plot of Pepsin levels nasal secretions in both groups



Graph 2: Box Plot of pH level nasal secretions in both groups

Graph 1 can be seen the average pepsin levels of nasal secretions of people with chronic rhinosinusitis accompanied by LPR complaints higher than patients with chronic rhinosinusitis without complaints LPR. Graph 2 shown the average pH level of nasal secretions among patients with chronic rhinosinusitis accompanied by LPR complaints is lower (acid) than patients with chronic rhinosinusitis without complaints LPR.

Discussion

Pepsin was found in all sample's nasal secretions with varying levels. 8 of respondents also gave LPR complaints assessed based on RSI and RFS scores, although there was pepsin in all nasal secretions. 19 respondents did not give LPR complaints. 21 of respondence gave a RSI score >13 where this led to LPR only 8 samples also provided an RFS score supporting LPR with score > 7. This could be due to improved RSI and RFS scores.Some respondence say had previous LPR complaints that were felt to have diminished in recent months, 11 of 19 respondents suffering from CRS without LPR complaints have changed their eating habits even without taking drugs. More regular eating patterns have also been undertaken i.e eating often with a small portion and large portions of food may increase the pressure and reflux of the stomach.

Diet and behavior were very influential in the occurrence of reflux. In people who often eat chocolate for long periods of time it can be a risk factor for reflux where it is known that chocolate contains methylxanthine, which has been shown to reduce the pressure of Lower esophageal sphincter by causing smooth muscle relaxation. However, the presence of pepsin in nasal secretions is clearly a sign that there has been a reflux of gastric fluid that reaches the sinonasal region because pepsin in the body only in the production of the stomach.

The results of this study obtained pH level nasal secretion chronic rhinosinusitis patients are an average of 6.39. The pH level of nasal secretions of chronic rhinosinusitis accompanied by LPR complaints is lower than chronic rhinosinusitis without LPR complaints Although statistically these two groups do not give significant difference. Its shown that pepsin can respond in an acidic atmosphere. Pepsin is active at pH 2-6.5 and inactive at pH> 6.5 and remains stable at pH 8 and pH variation affects the motility and morphology of cilia in the respiratory mucosa.[5]Sinonasal mucosa is not designed to withstand damage caused by pepsin and acids.

The pepsin presence and the acidic atmosphere of nasal secretions causes active pepsin and pathologic of the paranasal sinus mucosa. Its causes of an inflammatory reaction in the sinonasalmucus ostium and eventually creates a favorable condition for the development of a rhinosinusitis. A rhinosinusitis becomes the ideal condition for the development of colonization bacteria.[11] It has been proved by numerous studies that extraesophageal reflux can cause laryngitis and pharyngitis in the form of laryngopharyngeal Reflux.

So, it can also lead to chronic rhinosinusitis. The nasal mucosal, larynx and pharyngeal layers are not the same as the esophageal mucosa where the esophagus has a layer better mucosal and cilia as barrier to the effects of pepsin and stomach acid than the pharyngeal, larynx and Sinonasal.

Therefore chronic rhinosinusitis accompanied by LPR complaints in this study is undetermined as a cause of irritant factors caused by pepsin and acids.A higher level of pepsin and a lower acid level can activate pepsin (pH <6.5) and it was found in patients with chronic rhinosinusitis with LPR complaint than without LPR complaint.Although pepsin examination is not done on the secretions in the larynx and pharynx, but the presence of pepsin in the nasal cavity must pass through the larynx and pharynx first. Thus, gastroesophageal reflux may be a risk factor for chronic rhinosinusitis.

High levels of pepsin and acidic conditions over time cause irritation of the sinonasal mucosa which is a risk factor for chronic rhinosinusitis.Others factors of chronic rhinosinusitis are infection (bacteria, virus, fungi), allergies and others. Other study reported that pepsin was detected in sinus fluid in 4 of 6 chronic rhinosinusitis patients with an invitro examination and they concluded that pepsin can cause damage to mitochondria in nose epithelial cells.[12]The CRSs caused by infection or allergies have been treated with standard treatment management for CRS. One of which needs to be suspected is the presence of mucosal inflammation due to the direct irritant effects of pepsin and high acid derived from extra esophageal reflux.

Therefore, CRS patients who have been given standard treatment but still have not responded well or often recurrent, pepsin examination of nasal secretions and antireflux therapy (PPI) is recommended, especially if the CRS sufferers also have symptoms or signs of RLF obtained from the score RSI >13 and RFS >7. This is consistent with previous study regarding the provision of PPI therapy shows at least some improvement in CRS symptoms, some experiencing complete or near-complete resolution of symptoms. Improvement of sinus symptoms is associated with improved LPR symptoms.[13] This suggests that antireflux therapy may play a role in the treatment of CRS disease. It suggests that management of CRS, especially those with RLF symptoms should consider the LPR therapy.This treatmentreduces or change the administration of drugs for CRS.

Conclusions

Excessesophageal reflux is one of the risk factors of chronic rhinosinusitis, with evidence that the discovery of pepsin and acidic atmosphere (ph<6.5) in nasal secretions of chronic rhinosinusitis patients, Higher levels of pepsin and acidity are found in nasal secretions of CRS patients accompanied by LPR complaints. In the management of chronic rhinosinusitis, screening of RSI scores should be screened. It is better if the determination of the score of RFS or pepsin examination on nasal secretions in adequate facilities and infrastructure, and anti-reflux therapy (PPI) additional should be considered.

Conflict of Interest: There is no any conflict of interest within this study and publication

Ethical Clearance: The study permit was obtained from Biomedical Research Ethics Committee on Human Faculty of Medicine Hasanuddin University (Register No. 922/H4.8.4.5.31/PP36-KOMETIK/2017).

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Parental Knowledge on the Perpetrators and the Impacts of Child Sexual Abuse towards Parental Protection Efforts to Prevent Children from Being the Victims of Sexual Abuse

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Abstract

Cases of sexual harassment and sexual abuse are believed to occur since children interact with other people or strangers who are not known before. In fact, the perpetrators of sexual abuse are the closest people who actually are in the environment around the children(1) Sexual abuse has a very large impact on early childhood, such as sexual trauma, stigmatization, rejection (neglect), and helplessness(2). Cases of early child sexual abuse in Jember are caused by the low role of parents in providing protection to children. Thus, new parents find out about cases of sexual abuse experienced by children after the case is repeatedly experienced by children. This research aimed to analyze parental understanding of the perpetrators and the effects of sexual abuse on the role of parents in providing protection from the risk of child sexual abuse. It was carried out in Jemberby involving 170 parents as the research respondents. The results of the study showed that parental understanding of perpetrators of sexual abuse has significant effects on parental protection efforts that are applied in daily care. Comprehensive knowledge of perpetrators of sexual abuse, both from internal and external families, will increase the sensitivity of parents to prevent and protect against the risk of sexual abuse in early childhood.

Keywords: *Parental knowledge, child sexual abuse, sexual abuse impacts.*

Background

Early childhood becomes a category that is vulnerable to sexual abuse. The victims of child sexual abuse reached more than 73% compared to victims of adult age. The Indonesian Child Protection Commission (KPAI) stated that Indonesia was in the status of "Emergency of Sexual Abuse in Children" because the trend of cases of sexual abuse against children continued to increase. Also, there is a trend of sexual abusein East Java Province that is not much different from the picture of cases of sexual abuse at the national level. There were reports of sexual abuse in children in 2014 of 27 cases increasing to 263 cases in 2015. Jember is a district that has a high level of sexual abuse in East Java and continues to increase from year to year. In 2014 there were 127 reports of cases of sexual abuse in children, and in mid-2015 cases of sexual abuse against children reached 111 cases.

Most opinions believe that the safety of early childhood is more threatened by strangers, than people who are known to children. At home and at school, parents and teachers emphasize to children that they cannot talk to strangers or receive candy or toys from them. However, the reality is that children are sexually abused by someone they know and trust, including parents, siblings, teachers, child care operators, pastors, or trainers. Sexual offenders come from all walks of life, all races, and all socioeconomic levels. Furthermore, adults are not the only perpetrators of abuse. Teenagers and teenagers, including brothers and sisters, are also able to become perpetrators of sexual abuse in early childhood(3).

Faller shows another model, in which several factors that cause sexual abuse - such as perpetrators feel sexually aroused by children and the tendency to act on the basis of sexual desire - are prerequisites for sexual harassment. Contributing factors can come from the family system, culture, and life situation, personality, or previous experience of perpetrators of sexual abuse(3).

Sexual abuse in children has long-term sequelae including early onset of sexual activity at risk of sexually transmitted infections (STIs) and pelvic inflammatory disease[3]. Finkelhor divides the impact of child sexual abuse into four main categories: sexual trauma, stigmatization, rejection (neglect), and helplessness[4]. This impact can extend until adulthood and the victims have worse physical health including obesity and somatization. They have mental health problems including drugs and alcohol abuse, intentional self-harm, post-traumatic stress disorder (PTSD), depression and problems in interacting with others[5].

Parents are the first child educators and perhaps the most influential for their children, and important parenting assignments are preparing children to be sexually healthy, not only as adults but from the start[6]. The role of parents as protectors and child educators, in this case related to the prevention of sexual abuse in early childhood[7]. A study shows that children suspected of experiencing sexual abuse are in a problem of parenting. The care situation encountered is: uncertainty about the occurrence of abuse or abuse; protection dilemma; changes in parent-child relationships; changes in personal support networks; dependence on professional competence and severe emotional tension[8]. This research aimed to analyze parental understanding of perpetrators and the impact of sexual abuse on safeguards undertaken to prevent children from being victims of sexual abuse.

Material and Method

This research aimed to find outthe causality among several sub variables of research through hypothesis testing.

This research analyzed parental understanding of perpetrators and the impact of sexual abuse on safeguards undertaken to prevent children from being victims of sexual abuse.

The subjects are parents of children aged 3-6 years who live in urban areas in Jember. The samples were 170 pairs of parents (170 fathers and 170 mothers) taken by simple random sampling from 10 kindergartens in the urban area of Jember.

Linear regression analysis was carried out to analyze the influence of parental understanding of the perpetrators and the effects of sexual abuse on protection measures taken to prevent sexual abuse in early childhood.

Findings

Respondents' Characteristics: Most of the maternal respondents in the study were aged 26-35 years (66%). The education level of most mothers is high school graduation (38.2%), and most mothers work as housewives (45.9%).

While the respondents' father, most aged 31-35 years (34.1%). Similar to maternal respondents, most fathers have senior high school graduates (42.4%) with employment as self-employed or private sector employees (75.3%).

Most of these parents have 5-year-olds (40%) with male sex (51.8%).

Knowledge on the Perpetrators of Sexual Abuse: Most parents have a high level of knowledge (49.41%) about perpetrators of sexual abuse in children. Most parents with high knowledge about perpetrators of sexual abuse are parents who have children aged 5 years (58.82%) and female (57.32%).

Parent's knowledge of perpetrators of sexual abuse includes: (1) Perpetrators from internal families and (2) Perpetrators from external families (External family). Most parents have low knowledge about sexual abuse perpetrators who come from the family's internal environment (mean = 15.5). Most of the parents as respondents felt that the perpetrators of sexual abuse came from the family's external environment not from the family's internal environment.

Table 1: Frequency Distribution of the Perpetrators of Early child sexual abuse (n=170)

Parental Knowledge on Sexual Abuse Perpetrators	Mean	Med.	Modus	Std.Dev	Min	Max	Sum
Internal Family	15.53	16.0	18.00	4.25	6.00	24.00	2639.50
External Family	18.39	19.0	18.00	3.76	6.00	24.00	3125.50

Knowledge on the Impacts of Sexual Abuse: Most parents as research respondents have a low level of knowledge (94.71%) about the impact that can be experienced by children who are victims of sexual abuse. Most parents who have a low level of knowledge have children aged 5 years (91.18%) and male (95.45%).

Assessment of the knowledge of the impacts of sexual abuse on early childhood consists of: (1) physical impact, (2) psychological impact and (3) social impact). Most parents as respondents have high knowledge about the impact of victims of psychological sexual abuse (mean = 6.15), while knowledge that tends to be less on physical impact (mean = 3.08) resulting from sexual abuse in early childhood.

Table 2: Frequency Distribution of the Impacts of Early child sexual abuse (n=170)

Parental Knowledge on Sexual Abuse Impacts	Mean	Med.	Modus	Std.Dev	Min	Max	Sum
Physical Impacts	3.08	3.0	3.00	0.45	1.67	4.00	523.17
Psychological Impacts	6.15	6.0	6.00	0.92	3.50	8.00	1046.00
Social Impacts	3.20	3.2	3.00	0.46	1.17	4.00	544.32

Prevention from the Risk of Sexual Abuse: Most parents make self-protection efforts to children against sexual abuse in children in good category (75.88%). Most parents have taken protective measures to prevent their children from becoming victims of sexual abuse optimally. most parents feel more able to provide protection in the home than providing protection to early childhood outside the home. This is indicated by the mean score of child protection in the home (mean = 10.89) greater than the protection of children outside the home (mean = 8.21). The obstacle faced by most parents in providing protection outside the home is the obstacle of parents' activities, one of which works. Therefore, most parents feel less optimal in providing protection outside the home.

Table 3. Frequency Distribution of the Aspects on Parental Prevention Indicators in Parental Control Skill Variables of Early childhood

	Mean	Med.	Modus	Std.Dev	Min	Max	Sum
Protection inside the home	10.89	11	12.00	1.15	7.00	12.00	1851.0
Protection outside the home	8.21	8	8.00	1.41	4.00	12.00	1395.5

Effects of Parental Knowledge with Parental Protection Efforts: Based on the results of the cross tabulation it is known that most parents who have a high understanding have high protection efforts against children from the risk of sexual abuse (51.9%). As with the understanding of the impact of sexual abuse, most parents who have an understanding of the effects of low sexual abuse still have high protection efforts against the risk of sexual abuse in early childhood (93.8%).

Statistical analysis using linear regression test was carried out to analyze the influence of parental understanding of the perpetrators and the impact of sexual abuse on children on the protection efforts of parents. The results show that there is a significant influence between parents 'understanding of who is the perpetrator of sexual abuse in children against the parents' protection efforts (sig = 0.032). There is no significant influence on the variable of parents' understanding of the impact of sexual abuse (sig = 0.309).

Table 4. Cross tabulation of parental knowledge on the perpetrators and the impacts of sexual abuse with parental protection efforts

Parental Protection		Low		Medium		High		Amount	%
		f	%	f	%	f	%		
Knowledge on Perpetrators	Low	0	0	8	19.5	7	5.4	15	100.0
	Medium	0	0	16	39.0	55	4.6	71	100.0
	High	0	0	17	41.5	67	51.9	84	100.0
	Total	0	0	41	100.0	129	100.0	170	100.0
Knowledge on Impacts	Low	0	0	40	97.6	121	93.8	161	100.0
	Medium	0	0	1	2.4	8	6.2	9	100.0
	High	0	0	0	0	0	0	0	0
	Total	0	0	41	100.0	129	100.0	170	100.0

Discussion

Regardless of the form of early child sexual abuse, once sexual abuse occurs, the child will feel trapped and continue to keep his secret or decide to reveal it to other parents or other trusted adults. If the disclosure is untrusted or causes a lot of pressure to be handled by the child, the child can withdraw the disclosure [(3)].

Mothers (female parents) often believe that most perpetrators of sexual abuse are men, not women[(9)]. In addition, the occurrence of sexual abuse in early childhood is still considered because children have sexual attraction in the eyes of adults, making them vulnerable to becoming victims of sexual abuse. In fact, sexual attraction in children, although common, is not the only motivating factor that influences the behavior of perpetrators of sexual abuse in children. The perpetrator chooses to act sexually with a child as a means to satisfy his needs. The principal motivation of the offender is the desire for personal affirmation, seeking power and control over others, or a mixture of more than one factor[(10)]. The results show that the more parents understand who at risk as a perpetratorof sexual abuse, the greater the efforts made by parents to protect children from the risk of sexual abuse.

On the other hand, most respondents better understand the impact of psychological sexual abuse compared to the physical and social impacts experienced by victims of sexual abuse in the future. The experience of sexual abuse in boys by perpetrators who are also male (homosexual) will contribute greatly to the formation of similar behavior in children who are victims, namely to become homosexual[(11)]. The impacts of sexual abuse is important, not only on the mental aspects but also to be observed about the future impact on children as victims in terms of sexual behavior and children's social life [(12)].

Parents basically have a large role and contribution in improving control of their children primarily as an effort to protect against sexual abuse in children. One study explained that parents try to modify children's behavior in situations they perceive as risky (for example, after learning that his sister-in-law is photographing his daughter under a table and in bed, instructing his daughter to be careful in the way she sits in a dress). Parents must understand well that they have the power to intervene in alleged sexual harassment. Can use direct and indirect verbal and nonverbal communication by increasing the protection of temporary children in the presence of potential perpetrators and reducing social contact with people who fear parents will or have crossed sexual boundaries with their children[(13)].

Conclusion

Some efforts to protect early childhood from the risks of sexual abuse around them need to be applied by parents in daily care practices. Parents, as the primary environment of children, have an important role in preventing sexual abuse and protecting children from being the victims of sexual abuse. Implementing comprehensive understanding of sexual abuse, especially about one(s) who can be at risk of becoming a perpetrator of sexual abuse, is an important factor to increase the initiation of efforts to protect early childhoodfrom the risk of sexual abuse.

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Estimation of Osteocalcin and Insulin in Men with Type 2 Diabetes in Misan Province Iraq

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Abstract

The present study aimed to evaluation of osteocalcin and insulin in the serum of men with T2D Mat Misan province during the period from December of 2018 to May of 2019. The study include of 110 men (66 type 2 diabetic and 44 health men) with average aged 35-49 years,the sample of study divided by age into three groups, the first (35-39) years, second (40-44) years and third (45-49), also divided by the body mass index to four groups,the normal weight (18.5-24.9),overweight (25-29.9), obesity class l (30-34.9) and obesity class ll (35- 39.9) groups. The result showed the following; According to age, the mean value of FBG, HbA1 cincrease significantly in diabetic subjects when compared with the control. The mean values of insulin of T2DM significantly increase in the first group of age. OC increase significantly in second and third group in compare with control. According to BMI mean value of FBG, HbA1c increase significantly in diabetic subjects when compared with the control. The mean value of insulin in T2DM according to BMI was increase significantly in each of obesity class l and overweight groups compare control groups**.** OC value of T2DM significantly increases in the group obesity class ll and overweight.

Keywords: *Osteocalcin, Insulin, T2DM, Men, Misan.*

Introduction

Diabetes is a metabolic disorder with an growing prevalence worldwide, the number of influenced people may reach to 300 million in 2025[1], of whom 85% will have Type 2 diabetes mellitus (T2DM)[2]. D.M. is a clinical syndrome characterized by hyperglycemia due to absolute or relative deficiency of insulin producing from pancreatic β- cell[3].

One more complication has been associated with DM, an augmented risk of fragility fractures which seems to be rather independent of bone mineral density (BMD) [4,5]. T2DM patients have, normal BMD,implicating abnormalities in bone material strength and/or bone micro architecture[6].In general,the processes involved in the decreased bone formation in T2DM include a decrease in bone quality, alterations of the mesenchymal cell differentiation and bone microcirculation, as well as changes in osteoblasts and osteoclasts[7]. Bone can secret hormone named osteocalcin (OC)[8], OC is the most abundant noncollagenous protein in bone matrix[9]. It is a product of differentiated osteoblasts, made of 46 to 50 amino acids related to species[10].

In humans, it is a 49 amino acid with three glutamic acid residues which stimulates proliferation of pancreatic cells, insulin secretion, and insulin sensitivity[11,12]. OC receptor is expressed in different tissues including the liver, skeletal muscle, brain, testis, bone,and pancreatic β-Cells.Insulin signaling in osteoblasts enhances OC action, which, in turn, favors insulin secretion[13,14]. T2DM has been associated with poor bone quality by several mechanisms include, insulin resistance and hyperglycemia on the bone and bone marrow microenvironment, advanced glycation end products of bone matrix proteins[15,16,17].

Materials and Method

Study Population: This study was carried out at the AL-sadder Teaching Hospital and center for Endocrinology and diabetes specialist in Misan province as showed in (Figure,1) and BMI was estimated according to formula: BMI =W/H2 kg/m^2[18].

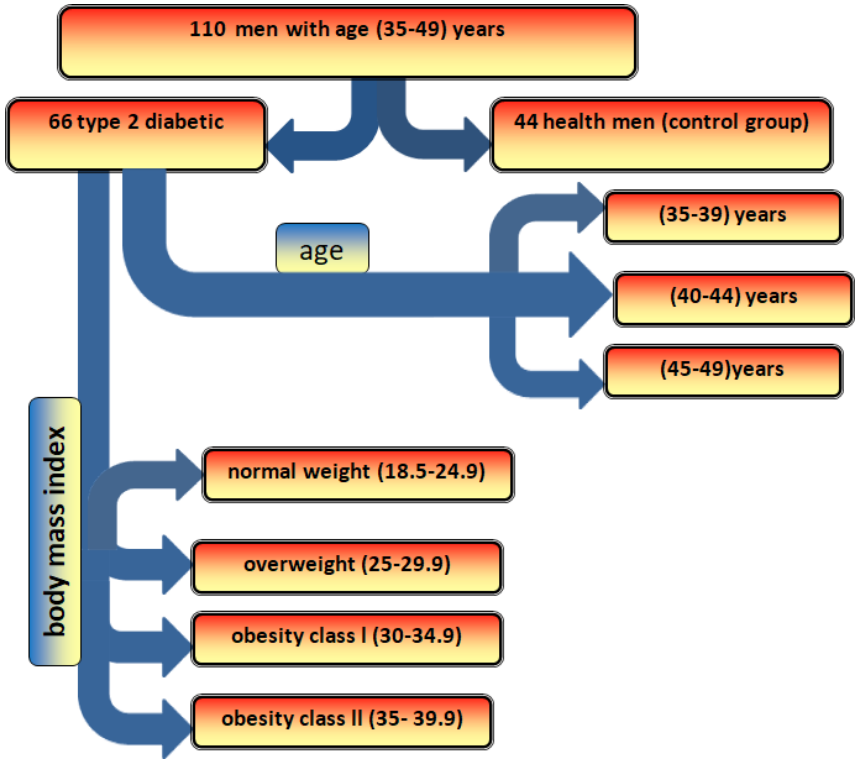


Figure (1): Study Population

Blood sampling and Preparation of serumfor Measurement HbA1c, FBG, Osteocalcin and Insulin: Venous blood (6 ml) pull draw from all fasting study population at (8-10 A.M). Blood sample was divided into two portions:2.5 ml was transferred into EDTA tube for HbA1c determination by Bio-Rad Variant Hemoglobin A1C program according to[19], and (3.5 ml) for serum preparation according to[20], to measure Fasting blood glucose (FBG) according to (Accu-Chek, Roch diagnostic GmbH, Mannheim,Germany)[21], and evaluation of OC by kit supply from Shanghai company (China) according to[22], while insulin determined by kit supply from Demediteccompany (Germany) according to[23].

Statistical Analysis: The data was analyzed statistically to determine the significance of the different parameters by student's t-test and one way ANOVA, the values present as means ± SE[24].

Result

Biochemical analysis (According to age)

Fasting Blood Glucose (F.B.G.) and HbA1c level: The results of F.B.G and HbA1c values for the study populations as showed in Table (1) the results elucidated no significant differences in F.B.G and HbA1c values among patients of T2DM in first, second and third groups.

Table (1): The values of F.B.G and HbA1c in control and patient with T2DM (According to age)

Groups	Parameter	Control	Patient	P-value
Group First (35-39)year	FBG (mg/dl)	94.67±2.37	210.61±14.96*	0.00
	HbA1c %	5.09±0.08	9.27±0.47*	0.00
Second group (40-44)year	FBG (mg/dl)	93.05±2.42	207.09±15.44*	0.00
	HbA1c%	5.35±0.05	9.55±0.45*	0.00
Third group(45-49)year	FBG (mg/dl)	93.90±3.31	205.03±15.29*	0.00
	HbA1c%	5.39±0.04	9.45±0.54*	0.00

*Significant between control and patient at the ($p<0.05$), Values represent mean±S.E.

Osteocalcin (OC) and Insulin level: The results for OC showed that the level among patients with T2DM increased significantly (P<0.05)in second group comparison with first group, while there are no significant difference between second and third groups. Also there are no significant difference between third and first groups of T2DM (Table,2).

The results showed no significant difference of insulin levels in patients of second and third groups comparison to the control of second groups and third groups. There are no significant difference in insulin level among patients of T2DM in first, second and third groups.

Table (2): The values of OC and insulin in control and patient with T2DM (According to age)

Groups	Parameter	Control	Patient	P-value
First group (35-39) year	OC ng/ml	1.08±0.15	1.03±0.21 [b]	0.84
	INμIU/mL	10.90±1.03	22.45±4.40*	0.01
Second group (40-44) year	OC ng/ml	0.97±0.22	2.01±0.31*[a]	0.01
	INμIU/mL	15.38±1.79	18.98±2.74	0.28
Third group (45-49) year	OC ng/ml	0.55±0.18	1.83±0.31*[ab]	0.01
	INμIU/mL	15.79±3.40	19.23±2.90	0.26
LSD of OC= 0.98				

*Significant at the (p<0.05), Values represent mean± S.E.

Different letters refer to significant differences while similar letters refer to non- significant differences among patient groups.

According to body mass index

Fasting Blood Glucose level: The results of F.B.G and HbA1c values for the study populations as showed in Table 3 the results elucidated F.B.G No significant difference in F.B.G and HbA1c values among patients of T2DM in different BMI.

Table (3): The values of F.B.G and HbA1c in control and patient with T2DM (According to BMI)

Groups	Parameter	Control	Patient	P-value
Normal weight (18.5-24.9)	FBG (mg/dI)	103.48±3.31	205.40±26.34*	0.04
	HbA1c %	5.32±0.03	9.05±0.71*	0.01
Overweight (25-29.9)	FBG (mg/dI)	87.71±2.26	219.63±11.34*	0.00
	HbA1c %	5.33±0.05	9.78±0.39*	0.00
Obesity class I (30-34.9)	FBG (mg/dI)	98.52±2.09	185.15±17.79*	0.00
	HbA1c %	5.18±0.10	8.98±0.52*	0.00
Obesity class II (35-39.9)	FBG (mg/dI)	89.77±3.23	190.24±28.44*	0.01
	HbA1c %	5.22±0.13	8.66±0.86*	0.00

Values represent mean±S.E., *Significant at the (p<0.05)

Osteocalcin and insulin level: The results of OC and Insulin values for the study populations as showed in Table (4).

Table (4): The values of OC and insulin in control and patient with T2DM (According to BMI)

Groups	Parameter	Control	Patient	P-value
Normal weight(18.5-24.9)	OC(ng/ml)	0.89±0.19	1.07±0.25	0.57
	IN µIU/mL	8.14±0.29	14.24±1.99*b	0.01
Overweight(25-29.9)	OC ng/ml	1.00±0.23	1.77±0.24*	0.02
	IN µIU/mL	17.73±1.39	17.64±1.97 b	0.96
Obesity class I(30-34.9)	OCng/ml	1.00±0.19	1.35±0.29	0.34
	IN µIU/mL	12.21±0.80	29.81±7.05*a	0.02
Obesity class II(35-39.9)	OCng/ml	0.29±0.14	1.27±0.35*	0.03
	IN µIU/mL	14.44±1.50	22.77±6.48 ab	0.25
LSD (IN)=12.17				

Values represent mean± S.E., *significant at the p<0.05)

Different letters refer to significant differences while similar letters refer to non- significant differences among patient groups.

Discussion

According to age: The present study showed the FBG, HbA1C and insulin level in patient of T2DM which increased significantly (P<0.05),the patient with T2DM has high serum glucose, either due to the insulin that is produced by body does not enough, or because body cell do not respond to the insulin that is produced[25,26].The increasing in the level of FBG was in agreement with many researchers[27,28];which define diabetes is a group of metabolic diseases characterized by high level serum glucose. Hyperglycemia is the main characteristic of DM and its increase may associated with the increase of glucagonlevel that characterized by hepatic glucose production,the main factor that partake in fasting and postprandialhyperglycemia[29].

In this study the OC level which increased significantly (P<0.05) in patient with T2DM in both second and third age groups compare to the control groups.This result agreement with[30] that reported OC increase with age,while disagreement with[31] that reported OC levels are drop in diabetic than in healthy subjects.The result show no significant different between patient and control in first age group,also showed OC level of patient in second and third group increase significantly compare with patient of first group,this result may be because balance in bone formation and absorption in this stage of age.

In current study the insulin level in patient of first group increase significantly compare with control, this may be because insulin level increase in patient with T2DM due to insulin resistance,agreement with[32]that mention patients with T2DM have hyperinsulinemia,due to weakened cellular sensitivity to insulin, and hyperglycemia, due to insulin resistance.The insulin in most people of diabetic patients who are unable to use its glucose for energy and because of a problem with the cell body's insulin receptors and to problems with the chemical that makeup insulin itself; and this condition is called insulin resistance[33,34].

According to BMI: The result of the present study showed that the diabetic patients had significantly high concentration of FBG and HbA1C (P<0.05) than control group agreement with that reported by[35]that diabeticpatients FBG level ≥ 126 mg/dl. Increasing ofHbA1c levels in our study indicates poor control of FBGlevels or poor glycemic index agreement with[36]. Blood glucose is controlled by two main processes: insulin secretion by β-cells in response to a nutrient challenge and insulin action on major target organs, i.e., skeletal muscle, liver and adipose tissue, T2DM is often associated with obesity and results from insufficient insulin production and/or secretion and IR[37].

In this study OC level increased significantly in overweight, and obesity class II, this result agreement with[38]may be because insulin has an anabolic effect on osteoblasts [39]., may be suggest insulin resistance cause decrease in bone formation, increase bone absorption and increase OC released in to blood.Our result disagreement

with [40]. which reported that serum OC concentration in metabolic syndrome patients was significantly decreased than in control group. On the other hand, the OC level was significantly and negatively correlated with weight, BMI and fat mass[31].

The current study showed increase insulin level significantly (P<0.05) in patient with T2DM which suffer from obesity,Obesity may result in hyperinsulinism and insulin resistance, with a close relationship between the increased amassing of visceral fat and the degree of insulin resistance as well as hyperinsulinism this result agreement with study by[41].

Cubbon, *et al.*,[42] reported that T2DM is most commonly associated with obesity in middle-aged individuals, it is because of defects in insulin receptors on the plasma membrane of cells in target tissues, or an abnormal binding of insulin to receptors.

In the present study there was significant increased serum insulin in T2DM obese group in comparison to control group; this is in agreement with[40] which reported that subjects with metabolic syndrome had significantly higher serum insulin. Also, Goran, *et al*.[43] reported that occurrence of obesity was higher in adolescence leading to development of insulin resistance and the duration of obesity was independent risk factor for the development of T2DM. Furthermore,[44] reported that obesity main causes of develop insulin resistance in individuals having higher levels of insulin, obesity associated insulin resistance was the major risk factor for development of multiple diseases including cardiovascular diseases and T2DM. Finally, Margoni,*et al*[45] suggested that insulin sensitivity in obese has an important role in the advance of pathogenesis of obesity related insulin resistance.

Conclusion

This study revealed no relationship between OC level and T2DM and BMI

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Conflict of Interest: There are no conflicts of interest.

Ethical Clearance: Permission to conduct this study was issued by the Health institutional; AL-sadder Teaching Hospital and center for Endocrinology and diabetes specialist in Misan province, and the blood sampling from patients was carried out by a public health technician.

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Evaluation of Prolactin, Total Testosterone and Anti Mullarian Hormones in Women with Hypothyroidism at Misan City Iraq

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Abstract

Hypothyroidism is a common endocrine disorder,resulting from insufficient production of thyroid hormones. It is affect metabolism of sex steroids and ovarian function in women. This study included 88 women atage (20-35) years. 5 to 7 ml of blood was drawn and serum obtained. Thyroid and reproductive hormones tests performed to all women. The results showed: the values of TSH increased significantly (P<0.05) in the C (hypothyroidism women) and D (hypothyroidism and infertility women) groups, while T3 and T4 results show decreased significantly (P<0.05) in the C (hypothyroidism women) and D (hypothyroidism and infertility women) groups. The values of AMH and TT decreased significantly (P<0.05) in the C (hypothyroidism women) and D (hypothyroidism and infertility women) groups, while the values of PRL did not differences significantly among all groups. The present study demonstrates low level of AMH and TT in hypothyroidism women, while PRL show normal levels in all groups.

Keywords: *Hypothyroidism,prolactin, testosterone, AMH, women.*

Introduction

The thyroid is one of the largest endocrine glands found in the body[1]. Thyroid hormones (THs) are released by thyroid gland follicular cells whose true structure is Thyroxine (T4) and Triiodothyronine (T3) [2]. Disorders of the thyroid are usually acquired and can occur at any time in life. Thyroid autoimmunity is the most prevalent cause of disorder in the reproductive age of females[3,4]. Thyroid disorders increase with age, following exposure to radiation, and females are ten times more probable than males. The most prevalent endocrine defects in both Saudi Arabia and Middle East are thyroid disorders[5,6&7]. According to the American Association of Clinical Endocrinologists about 4.78% of the United State population have undiagnosed thyroid dysfunction and according to the American Thyroid Association, one in eight women will develop thyroid problems during her life time[8]. Hypothyroidism is connected with a wide range of reproductive illnesses ranging from abnormal sexual growth to infertility through menstrual irregularities, modified ovarian function, menstrual irregularities, subfertility[9,10]. In women have a greater incidence of anovulatory cycles leading to infertility and have a greater rate of fetal loss in the first trimester of pregnancy occurs[11,12].

The interior pituitary gland secrets hormones play roles in physiological mechanisms, including metabolism, growth, development and reproduction[13]. Gonadotropin-releasing hormone (GnRH) regulates the release of FSH from anterior pituitary. FSH causes follicle maturation and aromatase androgen-converting enzyme synthesis. LH and FSH foster ovulation and boost ovarian sex hormone secretion of estradiol and progesterone. The receptors of thyroid hormones are found in human oocytes, cumulus and granulose cells,some of hormones are impacted by hypothyroidism, such as prolactin, LH, and FSH[14,15].

Method

This study was conducting on 88 women in reproductive age (20-35) years who reviewed Al-Sadder Teaching Hospital and the Diabetes and Endocrine Center in Misan city, from the period December 2018 to June 2019. Women divided in to four groups as the following: group A (Control group), group B(Infertility women), group C (Women with hypothyroidism) and group D (Women with hypothyroidism and infertility).

Blood sample: 5 to 7 ml of blood was obtained by syringe at 8-10 a.m. Blood sample was poured in a plane container and then centrifuged. Serum was kept

as – 20 °C till used for the thyroid hormones,PRL, TT and AMHmeasure.

Measurement of hormones: Measurements weredone by the Chemiluminescent Automates Immunoassay System (Cobas e 411,Roche diagnostic, Germany). While; AMH hormone measured by used the ELISA system, according to the[16,17,18,19&20].

Statistical analysis: The data obtained during the current study were analyzed statistically to determine the significance of the different parameters by ANOVA. The comparisons between means were made using least significant differences, the data are presented as mean ± S.D.

Results

As shown in Table (1),the value of TSH in the D group increased significantly (P<0.05) in comparison with A,B and C groupsrespectively. C group differ significantly in comparison with A and B groups. No differences significantly between A and B groups. The values of T3 and T4increased significantly (P<0.05) in the A group in comparison with C and D groups. But A group did not differ significantly in comparison with B group. No significant differences between C and D groups.

The values of PRL don't differ significantly (P<0.05) in the A, B, C and D groups (Figure 1).The values of TT in the B group increased significantly (P<0.05) in comparison with A, C and D groups. No differences significantly among A,C, and D groups (Figure 2).The values of AMH in the A group increased significantly (P<0.05) in comparison with C and D groups. A group did not differ significantly in comparison with Bgroup, No differences significantly between C and D groups (Figure 3).

Table (1): Thyroid hormones concentrations at fertility, infertility and hypothyroidism women.

T4 nmoL/L	T3 nmoL/L	TSH ulU/mL	Groups
102.23±25.85 [a]	2.009±0.50 [a]	1.85±0.50 [c]	Group-A
109.29±16.46 [a]	1.95±0.33 [a]	1.86±1.03 [c]	Group-B
94.75±21.62 [b]	1.67±0.41 [b]	3.31±1.06 [b]	Group-C
87.81±22.81 [b]	1.67±0.45 [b]	13.61±2.37 [a]	Group-D
7.48	0.28	1.45	LSD

Values represent mean ± SD.

Different letters refer to significant differences while similar refer to non-significant among groups at level (P<0.05).

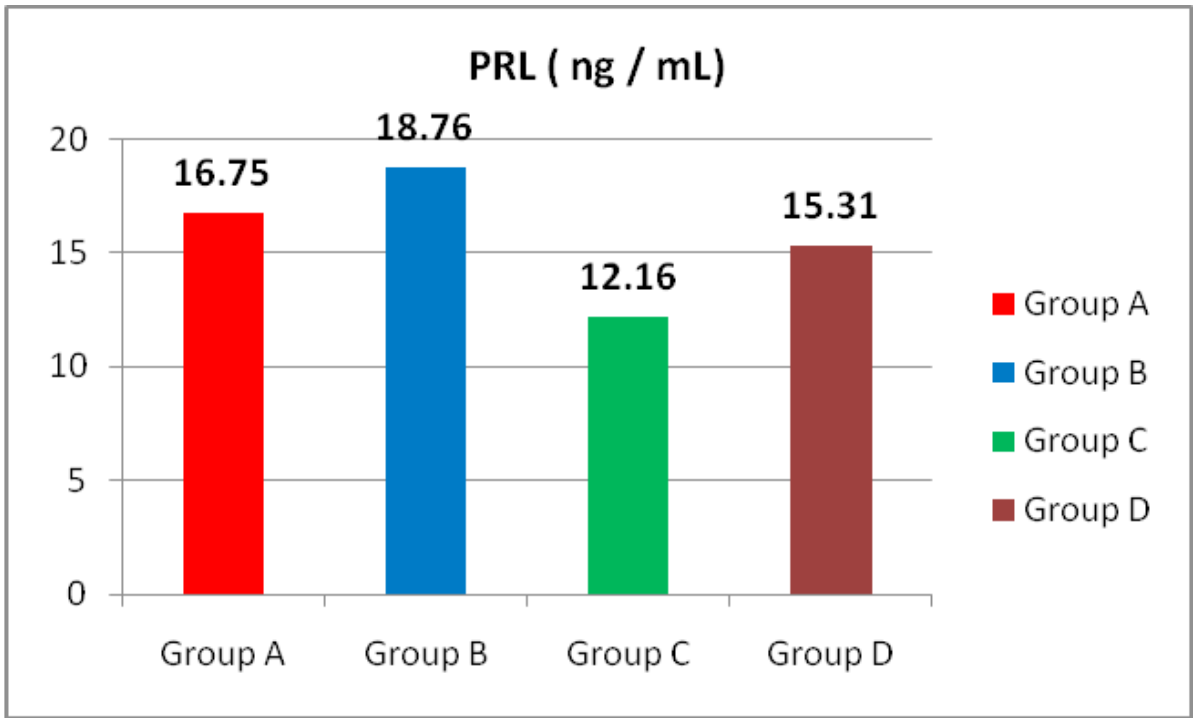


Figure (1): PRL values of control, infertility and hypothyroidism women.

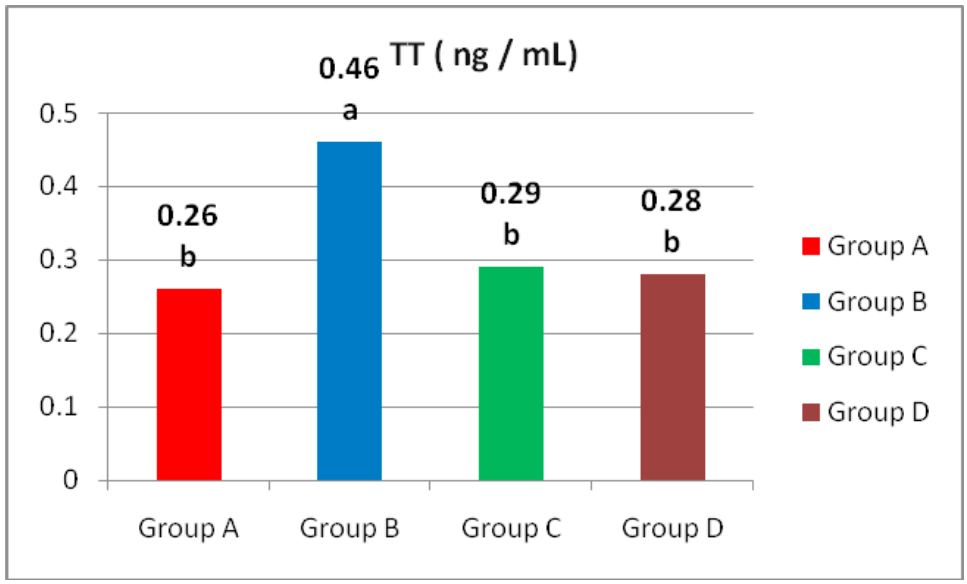


Figure (2): TT values in control, infertility and hypothyroidism women.

· Different letters refer to significant differences whilesimilar refer to non-significant among groupsat level (P<0.05).

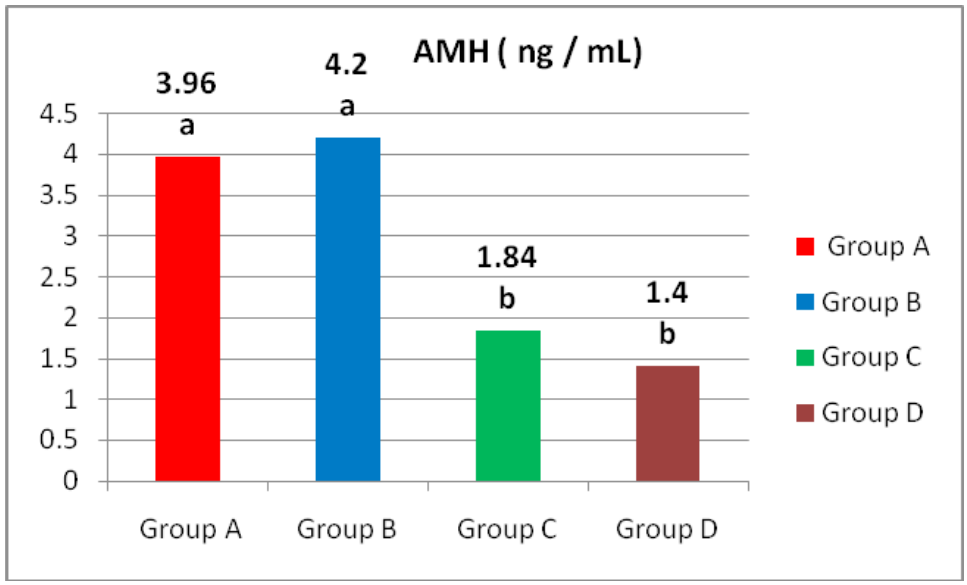


Figure (3): AMH values in control, infertility and hypothyroidism women.

Different letters refer to significant differences whilesimilar refer to non-significant among groupsat level (P<0.05).

Discussion

This study agreement with[21]which found T3 and T4 levels are significantly decreased and TSH levels were significantly increased in clinical hypothyroid females compared to controls. These Biochemical decreases in T4 and T3 lead to hyper-secretion of TSH from pituitary gland and amplified rises of its concentrations in serum[22]. TSH concentration highly significant increased in primary hypothyroidism group as compared to the control group[23], another study carry out by[24] which found higher significant rise in TSH levels in the infertility women group compared to the control group. TSH level was found higher in infertile women than fertile[25]. Generally, serum TSH measurement in infertile females is used for hypothyroidism detection[26].

Hypothyroidism was diagnosed on the basis of history,physical examination findings and thyroid function tests showing high levels of TSH and low T3

and T4[27]. Women with elevated TSH concentrations above 2.5 mIU/L had more menstrual disturbances and an ovulatory cycles, reduced oocyte fertilization and pregnancy rates, increased risk of in-vitro fertilization failure and greater recurrent miscarriage rates[28,29]. TSH was found to be rises in 4% and overt hypothyroidism was identified in 3.3%, ovulatory dysfunction was dominant compared to other cases of infertilityaccording to study by[30].

The prevalence of hypothyroidism differ, in the infertile females, was revealed to range from 0.7% to 43%, this broad prevalence range was attribute to the variations in TSH measurement sensitivity[28,31,32,33]. 0.9% of infertile women had overt hypothyroidism but none had subclinical hypothyroidism according to study by[34].

The results of hormones in current study agree with the study done by[35] which found decreased significantly in the levels of testosterone and progesterone in hypothyroidism females, and agreement with the study done by[36] that found hypothyroidism is associated with decreases levels of Testosterone,but the current study did not agreement with study by[37] that found 40.7% of infertile women with hypothyroidism exhibiting hyperprolactinemia. About 66% of testosterone is bound to SHBG and 33% is bound to albumin, leaving only 1-2% of testosterone unbound, this unbound can enters target tissues[38]. Hypothyroid women demonstrate a reduced androgen metabolite proportion of 5 α/β and an increase in the excretion of 2-oxygenated estrogens[39].

The result observed by[40] which found PRL elevation in 36% of patients with overt hypothyroidism and 22% with subclinical hypothyroidism, PRL level decreased to normal after thyroid functions were normalized by L-thyroxine treatment and E2 levels increased significantly,treatment also reverses menstrual abnormalities and increases spontaneous fertility[41].

Other study showed increase in PRL levels in hypothyroidism women, these increase may be due to TRH stimulation, as lactotropic which resemble thyrotropic cells, express membrane receptors to releasing hormone. In addition, the increase in PRL may be due to an increase in pituitary vasoactive intestinal peptide, which acting as a paracrine or autocrine to affects PRL secretion regulator according to study by[42].

Current study agreementwith study done by[43] which found the concentration of AMH was inversely correlated with concentration of TSH in women at reproductive age suffering from infertility. The study done by[44] which investigated the association ofAMH values and ovarian reserve in women with autoimmune thyroid disease, which demonstrated low serum AMH concentration in women with AITD, but don't reach to significant level,women with hypothyroidismare at increased risk for development ofovarian insufficiency.In infertile patients with elevated serum TSH concentrations also revealed high prevalence clinical information of decreased ovarian reserve [43,45].TSH concentrations were an important predictor of IVF failure, as TSH concentrations were considerably greater among females who manufactured non-fertilized oocytes[46]. The TSH in patients with hypothyroidism could directly suppress the growth of follicles. Also, depleted thyroid hormones secretion may have an additional adverse effect on follicle recruitment[47].

Conclusion: The present study demonstrates low level of AMH and TT in hypothyroidism women, while PRL show normal levels in all groups.

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Conflict of Interest: There are no conflicts of interest.

Ethical clearance: Permission to conduct this study was issued by the Health institutional; AL-sadder Teaching Hospital the Diabetes and Endocrine Center in Misan Province, and the blood sampling from patients was carried out by a public health technician.

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Synthesis, Antioxidant, Antimicrobial and Docking Study of Novel 2-Pyrazoline Derivatives Bearing Imine Moiety

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Abstract

In our attempt to exploring new class of antimicrobial and antioxidant agents, novel pyrazoline derivatives (3-11) were synthesized and characterized by some spectroscopic method such as FTIR[1] HNMR and GCMass. The antimicrobial study of the synthesized compounds against various bacterial species. Escherichia coli klebsiella sp (gram negative), Staphylococcus epidermidis, Staphylococcus aureus (gram positive) and one fungi (candida albicans). The scavenging properties of all the synthesized derivatives were evaluated against DPPH radical by using *TLC* autographic assay and the scavenging activity was determined by using spectroscopic method.

Keywords: *Chalcone, Pyrazoline, Schiff bases, antimicrobial, antioxidant, docking study.*

Introduction

Pyrazoline and its derivatives were member of nitrogen containing heterocycles [1] in their structure, two nitrogen atoms were present in five-membered ring. This nucleus contains a C=N double bond[2] Pyrazoline derivatives have been found in natural products in the form of vitamins, alkaloids and pigments[3]. In the last decade, great attention has been paid on the pyrazoline derivatives due to their unique molecular structure with simplicity of preparation and wide application in pharmaceutical field. They have shown interesting pharmacological activities such as anticancer[4] anti-inflammatory [5,] antimicrobial[6] antioxidant [7] and antidepressant[8].Therefore, our attempts to find novel antimicrobial and antioxidant agents focus on the pyrazoline derivatives. Pyrazoline derivatives (3-11) were in vitro screened against various bacterial species. Escherichia coli klebsiella sp (gram negative), Staphylococcus epidermidis, Staphylococcus aureus (gram positive) and one fungi (candida albicans). and found to exhibit mild to potent activity. Docking study of the most active discovered hit **6** was achieved to evaluate the binding affinity tawred the active site of glucosamine-6-phosphate synthase, the specific enzyme for the antimicrobial agents.

Methodology

Material: All chemicals and materials were used without purification**.** Melting points were determined on electrothermal capillary apparatus and are uncorrected. UV light, FTIR-8400S measurements were recorded on a Shimadzu GCMS-QP2010 Ultra apparatus. ^{1}HNMR spectra were gained with a Bruker spectrophotometer model ultra-shield at 300 MHz in DMSO-d6 solution with the TMS an internal standard.

Synthesis

Synthesis of (E)-1-(4-aminophenyl)-3-(thiophen-2-yl) prop-2-en-1-one (1): This compound was synthesized according to the method qualified in the published work[9]. To a solution of 4-aminoacetophenone (1 mmol) in ethanol absolute (10 mL), sodium hydroxide (40%, 1mL) was added and the mixture was shaking for (30) minutes. Then the aromatic aldehyde (1 mmol), was added and the reaction mixture was shaking overnight. The mixture was allowed to remained at room temperature. The product was dried and recrystallized from ethanol.

Yellow powder, yield 92%, m.p 110-111˚C; IR ($\bar{\upsilon}$cm^{-1}): 3317, 3219 (NH_2), 3101(aromaticC-H), 1633 (C=O), 1600 (CH=CH), 1577 (aromatic C=C). ^{1}H-NMR (300MHz, DMSO-d_6) δ (ppm): 6.10 (s, 2H,NH_2)**,** 6.61 (d, 2H, *Ar-H*, j=8.56 Hz), 7.15-7.86 (m, 7H, 5*Ar-H*, -*CH=CH*). Mass (EI) m/e: 229 M^+ For $C_{13}H_{11}NOS$,Rf = 0.42 (5:5), Hexane:Ethyl acetate.

Synthesis of 4-(5-(thiophen-2-yl)-4,5-dihydro-1H-pyrazol-3-yl) aniline (2): This compound was prepared depending to the modified method in reported reference[10]. Chalcone compound (1) (1 mmol) in ethanol (10 ml) and excess of hydrazine hydrate 80% (1 ml) was refluxed for 6 hrs. The precipitate product was recrystallized from ethanol.white powder, yield 80%, m.p 120-122°C, IR (cm^{-1}): 3327, 3286 (NH_2), 3205 (NH-pyrazoline), 3107 (aromaticC-H), 2933(aliphatic C-H),1622 (C=N), 1600 (C=C). ^{1}HNMR (300MHz, DMSO-d_6) δ (ppm): 3.00 (dd,1H, CH_a-pyrazoline, j= 11, 4 Hz), 3.30 (m, 1H,CH_b-pyrazoline), 4.94-5.01 (t,1H, CH_x-pyrazoline, *j = 11 Hz*), 6.45-7.40 (m,9H, 5 Ar-H, NH_2). Mass (EI) m/e: 243 M^+ for $C_{13}H_{13}N_3S$, R.*f* = 0.42 (7:3, Hexane: Ethyl acetate).

Synthesis of Schiff bases (3-11): These compounds were synthesized depending to a modified method described in the reported reference[11]. Substituted aldehyde (1 mmol) was dissolved in methanol with few drops of glacial acetic acid and then was added (1 mmol) of pyrazoline derivatives. The blend was refluxed for (10 h) and the reaction process was observed by *TLC* using ethyl acetate: hexane system (1:1 and 3:7). The precipitate was filtered and washed with methanol dried, dried and recrystallized from ethanol.

1-(4-chlorophenyl)-N-(4-(5-(thiophen-2-yl)-4,5-dihydro-1H-pyrazol-3-yl)phenyl)methanimine(3)

yellow powder, yield 50 %, m.p80-82◦C; IR (cm^{-1}): 3375(NH-pyrazoline), 3070 (C-H aromatic),3000(aliphatic C-H),2885 (HC=N), 1620 (C=N), 1595 (C=N pyrazoline), 1512 (C=C aromatic). ^{1}HNMR (300MHz, DMSO-*d6*) δ (ppm): 2.70-2.90 (m, 1H, *CH_a*pyrazoline), 3.40-3.50 (m, 1H, *CH_b-pyrazoline),* 5.30-5.40 (m, 1H, *CH_x-pyrazoline),* 7.00-8.00 (m,11H, 11 ArH*)*, 8.70 (s, 1H, *CH=N*).

1-(4-nitrophenyl)-N-(4-(5-(thiophen-2-yl)-4,5-dihydro-1H-pyrazol-3-yl)phenyl)methanimine(4): Yellow powder, yield 60 %, m.p118-120◦C; IR (cm^{-1}): 3383 (NH-pyrazoline)**,** 3010 (C-H aromatic),2974(aliphatic *C*-H), 2899 (HC=N), 1620 (C=N), 1597 (C=Npyrazoline), 1516 -1342 (NO_2).[1] HNMR (300MHz, DMSO-*d6*) δ (ppm): 2.60-2.70 (m, 1H, *CH_a*pyrazoline), 3.55-4.10 (m, 1H, *CH_b-pyrazoline),* 5.20-5.40 (m, 1H, *CH_x-pyrazoline),* 6.50-8.40 (m,11H, 11 ArH*),* 8.80 (s, 1H, *CH=N*). Mass (EI) m/e: 376 M^+ for $C_{20}H_{16}N_4O_2S$: R.*f* = 0.65 (3:7, Hexane: Ethyl acetate).

1-(thiophen-2-yl)-N-(4-(5-(thiophen-2-yl)-4,5-dihydro-1H-pyrazol-3-yl)phenyl) methanimine(5): Orange powder, yield 55%, m.p 125-127°C; IR (cm^{-1}): 3300 (NH- pyrazoline), 3100 (C-H aromatic),2974(aliphatic C-H), 2899 (HC=N), 1612 (C=N), 1589 (C=Npyrazoline).[1] HNMR (300MHz, DMSO-*d6*) δ (ppm): 3.20-3.40 (m, 1H, *CH_a*pyrazoline), 3.20-3.40 (m, 1H, *CH_b-pyrazoline),* 5.05-5.15 (m, 1H, *CH_x-pyrazoline),* 7.00-8.10 (m,10H, 10 ArH*),* 8.90 (s, 1H, *CH=N*), R.*f* = 0.50 (3:7, Hexane: Ethyl acetate).

1-(1H-pyrrol-2-yl)-N-(4-(5-(thiophen-2-yl)-4,5-dihydro-1H-pyrazol-3-yl)phenyl)methanimine(6): red powder, yield 55 %, m.p130-131°C; IR (cm^{-1}): 3362 (NH-pyrazoline), 3113 (C-H aromatic),2964(aliphatic *C-H*),2885 (HC=N), 1618 (C=N), 1589 (C=N pyrazoline).[1] HNMR (300MHz, DMSO-*d6*) δ (ppm): 3.00-3.20 (m, 1H, *CH_a*pyrazoline), 3.20-3.40 (m, 1H, *CH_b-pyrazoline),* 5.05-5.15 (m, 1H, *CH_x-pyrazoline),* 6.50-8.10 (m, 10H, 10 ArH*),* 8.50 (s, 1H, *CH=N*).11.00 (NH-pyrrole) R.*f* = 0.50 (3:7, Hexane: Ethyl acetate).

1-phenyl-N-(4-(5-(thiophen-2-yl)-4,5-dihydro-1H-pyrazol-3-yl)phenyl) methanimine (7): Brown powder, yield 55 %, m.p130-131◦C; IR (cm^{-1}): 3352 (NH- pyrazoline), 3103 (C-H aromatic), 2972 (aliphatic C-H),2889 (HC=N), 1624 (C=N), 1593 (C=N pyrazoline).[1] HNMR (300MHz, DMSO-*d6*) δ (ppm): 2.60-2.75 (m, 1H, *CH_a*pyrazoline), 3.20-3.40 (m, 1H, *CH_b-pyrazoline),* 5.10-5.25 (m, 1H, *CH_x-pyrazoline),* 6.50-8.40 (m,11H, 11 ArH*),* 8.60 (s, 1H, *CH=N*). R.*f* = 0.60 (3:7, Hexane: Ethyl acetate).

N,N-dimethyl-4-(((4-(5-(thiophen-2-yl)-4,5-dihydro-1H-pyrazol-3-yl)phenyl)imino)methyl) aniline(8): Red powder, yield 55%, m.p150-131°C; IR (cm^{-1}): 3338 (NH-pyrazoline), 3066 (C-H aromatic), 2895 (aliphatic C-H), 2850 (HC=N), 1653 (C=N), 1581 (C=Npyrazoline).[1] HNMR (300MHz, DMSO-*d6*) δ (ppm): 2.70-2.80 (m, 1H, *CH_a*pyrazoline), 3.00 (s, 6H,$N(CH_3)_2$, 3.20-3.40 (m, 1H, *CH_b-pyrazoline),* 5.25-5.45 (m, 1H, *CH_x-pyrazoline),* 6.50-7.90 (m, 11H, 11 ArH*),* 8.50 (s, 1H,*CH=N*):R.*f*=0.60 (3:7,Hexane:Ethyl acetate).

1-(4-methoxyphenyl)-N-(4-(5-(thiophen-2-yl)-4,5-dihydro-1H-pyrazol-3-yl)phenyl) methanimine(9): Brown powder, yield 55 %, m.p150-151◦C; IR (cm^{-1}) : 3360 (NH- pyrazoline), 3107 (C-H aromatic), 2999 (aliphatic C-H),2895 (HC=N), 1620 (C=N), 1593 (C=N ***pyrazoline***).[1] HNMR (300MHz, DMSO-*d6*) δ (ppm): 2.60-2.70 (m, 1H, *CH_a*pyrazoline), 3.20-3.90 (m, 4H, 1 *OCH_3*, *CH_b-pyrazoline),* 5.30-5.40

(m, 1H, *CH_x-pyrazoline),* 7.00-8.00 (m,11H, 11 ArH*),* 8.60 (s, 1H, *CH=N*), R.*f* = 0.60 (3:7, Hexane: Ethyl acetate).

2-(((4-(5-(thiophen-2-yl)-4,5-dihydro-1H-pyrazol-3-yl)phenyl)imino)methyl)phenol(10): Orange powder, yield 60 %, m.p95-97◦C; IR (cm^{-1}): 3398 (NH-pyrazoline), 3107 (C-H aromatic),2987(aliphatic C-H), 2895 (HC=N), 1616 (C=N), 1595 (C=N pyrazoline).[1] HNMR (300MHz, DMSO-*d6*) δ (ppm): 2.75-3.00 (m, 1H, *CH_a*pyrazoline), 4.5-4.70 (m, 1H, *CH_b*pyrazoline) 5.10-5.40 (m, 1H, *CH_x-pyrazoline),* 6.50-9.10 (m, 13H, 11 Ar-H, NH pyrazoline, CH=N), 12.00 (s, 1H, OH). R.*f* = 0.5 (3:7, Hexane: Ethyl acetate).

1-(4-bromophenyl)-N-(4-(5-(thiophen-2-yl)-4,5-dihydro-1H-pyrazol-3-yl)phenyl)methanimine(11): Brown powder, yield 60 %, m.p111-112◦C; IR (cm^{-1}): 3336 (NH-pyrazoline), 3064 (C-H aromatic), 2987 (aliphatic C-H), 2881 (HC=N), 1624 (C=N), 1585 (C=N pyrazoline).[1] HNMR (300MHz, DMSO-*d6*) δ (ppm): 2.75-2.90 (m, 1H, *CH_a*pyrazoline), 3.60-3.90 (m, 1H, *CH_b-pyrazoline),* 5.10-5.20 (m, 1H, *CH_x-pyrazoline),* 7.00-8.00 (m,11H, 11 ArH*)*, 8.40 (s, 1H, *CH=N*). Mass (EI) m/e: 410 M^+ for $C_{20}H_{16}N_3SBr$: R.*f* = 0.60 (3:7, Hexane: Ethyl acetate).

Determination of scavenging activity:

Qualitative method using Thin layer chromatography: Few milligrams of synthnthesized compounds (1-11) dissolved in methanol were added to the TLC plate by small capillary. Then after drying TLC plates were sprayed with methanolic solution of 0.2 % DPPH, the plates were examined 30 minute after spraying. Potent derivatives appears as blue or yellow spots against a purple background[12].

Quantitative determination using spectroscopic method: (1.0 mL) of the synthesized compounds (1-11) atconcentration (5,25,50,100,200) µg/ml were added to 0.5 mL DPPH solution (2mL of 0.013g/L DPPH) in methanol. The reduction of DPPH was measured at 517 nm versus a blank assay at 30 min. The percentage of residual radical in medium is calculated as the absorbance of the sample split by that of DPPH control at the same time multiplied by 100. The capability to scavenge the DPPH radical was calculated using the following equation: DPPH scavenging effect (%) = (A0 – A1/A0)×100, where A0 is the absorbance of the control reaction and A1 is the absorbance in the presence of the samples or standards. The results of DPPH scavenging effect (%) were plotted against scavenger concentration to calculate IC50.[13]

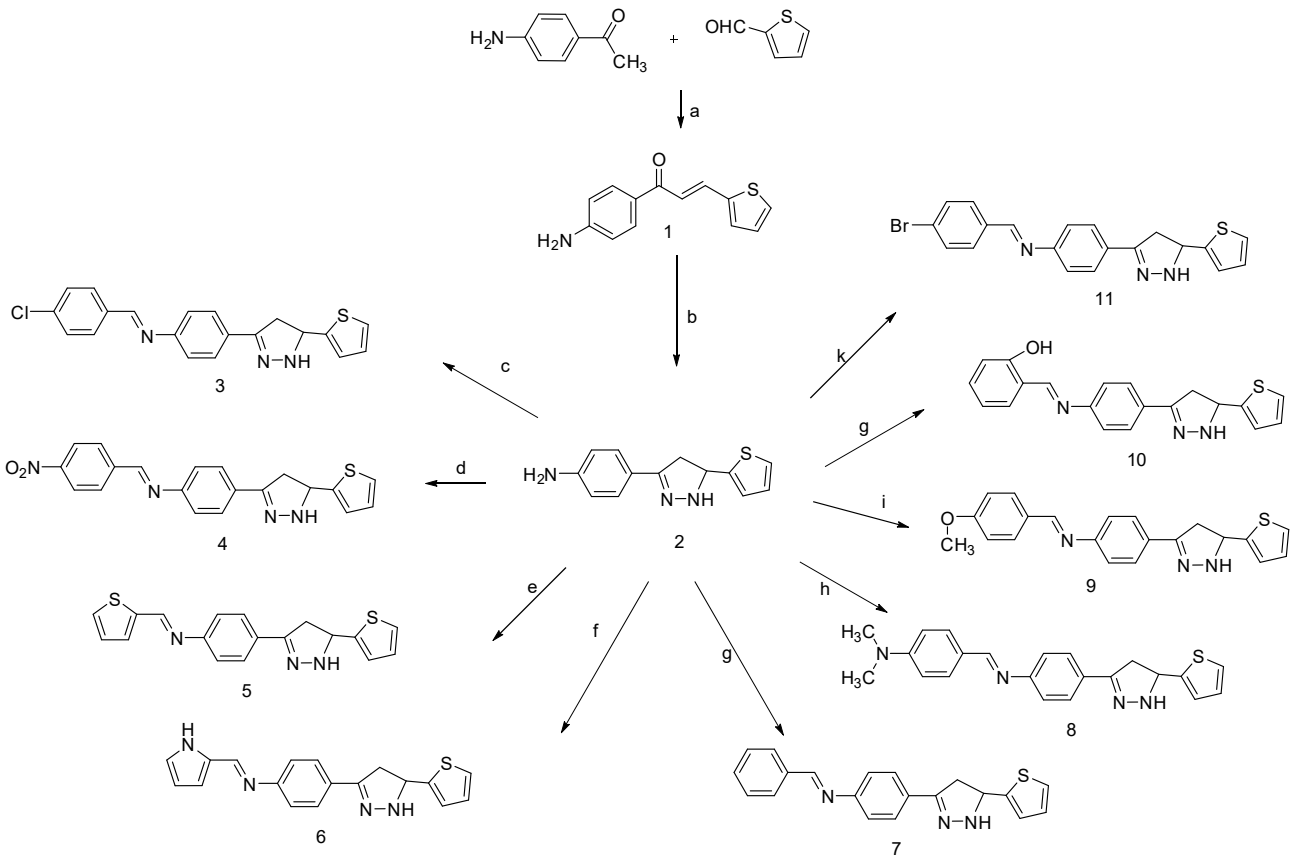
Antimicrobial studiy using well diffution method:

Well diffusion method: Agar well diffusion method for bactericidal susceptibility was carried out according to standard method to assess the presence of antibacterial activity for compounds using *Escherichia coli, klebsiellasp, Staphylococcus epidermidis* and*, Staphylococcus aureus*. The studied compounds were dissolved in 5% DMSO to prepare solution with 1 mg\ ml concentration,. The medium was sterilized at 120°C in autoclave. Then the medium was transported into sterilized Petri plates and kept at 37°C for solidification. The bacterial strains were diffused on the Petri plates using loop. On each plate, a single well of 4mm diameter was made using a gel pierce. From each compound (5µl) was added into the wells. The plates were incubated at 37°Cfor 24 hrs. The experiments were accomplished in triplicates and the zone of inhibition was measured[14]. The Dimethyl sulfoxide was used as control.

Docking study: Auto Dock 4.2 package software was selected to explore the binding of compound **6**into the active site of GlcN-6-P synthase as described by the reported reference[15-16]. The pdb file format (PDB code 1 MOQ) of receptor was obtained from the Protein Data Bank (RCSB) and applied as a rigid molecule. All the water molecules were eliminated then the hydrogen atoms were added to the amino acid residues. Chem Draw ultra 7.0 tool was used to constructed the mol file of the docked compound, while the open Babel 2.3.1 software was used to build the pdb file. In order to achieve the docking study, grid dimensions of 30.5, 17.5 and -2.2, were applied. On the other hand, Lamarckian Genetic algorithm was employed with 10 runs, 150 population size, 2,500,000 maximum number of energy evaluations and 27,000 maximum number of generations.

Results and Discussion

Organic Synthesis: Chalcone derivative (1) and the pyrazoline compound (2) were prepared and characterized as described by previous work[9]. Schiff bases (3-11) were obtained from the reaction of 2-pyrazoline derivative (2) with different aromatic aldehydes in ethanoic solution, using glacial acetic acid as a catalyst (Scheme 1).



Scheme (1) : Schematic representation for the synthesized derivatives: (a) NaOH, EtOH, (b) Hydrazine hydrate, EtOH, (c) p-chlorobenzaldehyde, AcOH (d) p-nitrobenzaldehyde, AcOH (e) 2-thiophenecarboxaldehyde, AcOH (f) pyrrole-2-carboxaldehyde, AcOH (g) benzaldehyde, AcOH (h) N, N-dimethylaminobenzaldehyde, AcOH (i) p-methoxybenzaldehyde, AcOH (j) o-salicyaldehyde, AcOH (k) p-bromobenzaldehyde, AcOH

The synthesized derivatives were characterized by spectral analysis. The FT- *IR* spectra of compounds (3-11) showed absorption bands at 2850-2899 cm^{-1} and 1612-1653 cm^{-1} regions due to the stretching vibrations of the *CH=N* and *C=N*, respectively. The disappearance of the NH_2 stretching frequencies strongly enhances the elucidation of synthesized compounds. The *HNMR* spectra of the synthesized compounds (3-11) showed singlet at the 8.40-8.90 ppm regions due to *CH=N* protons with the absent of the singlet signal at 6.18 related to NH_2 group in compound **2**. Mass analysis for the synthesized derivatives strongly confirming the structure elucidation.

Antioxidant scavenging activity: Thin layerautographic assay (***TLC***) were used to evaluate the scavenging properties of all the synthesized derivatives **S_2(1), $1S_2$(2), $2S_2$(3), $4S_2$(4), $3S_2$(5), $6S_2$(6), $10S_2$(7), $8S_2$(8), $12S_2$(9), $11S_2$(10), $5S_2$(11)**against DPPH radical. The synthesized compounds dissolved in methanol were distributed on *TLC* plate using spotting capillary. After drying and spraying the DPPH solution, the most active compounds **S_2(1), $1S_2$(2), $2S_2$(3), $4S_2$(4), $3S_2$(5), $6S_2$(6), $10S_2$(7), $8S_2$(8), $12S_2$(9), $11S_2$(10), $5S_2$(11)**appeared as yellow or blue spots with purple background. The scavenging activity of the lead derivatives **S_2(1), $1S_2$(2), $2S_2$(3), $4S_2$(4), $3S_2$(5), $6S_2$(6), $10S_2$(7), $8S_2$(8), $12S_2$(9), $11S_2$(10), $5S_2$(11)**was determined using spectroscopic method as described in the experimental section. The IC_{50} was calculated from the plotting of DPPH scavenging activity against different concentrations of each tested compound (5, 25, 50, 100 and 200 µg/ml) as shown in Figure **1** and depicted in **Table 1**.

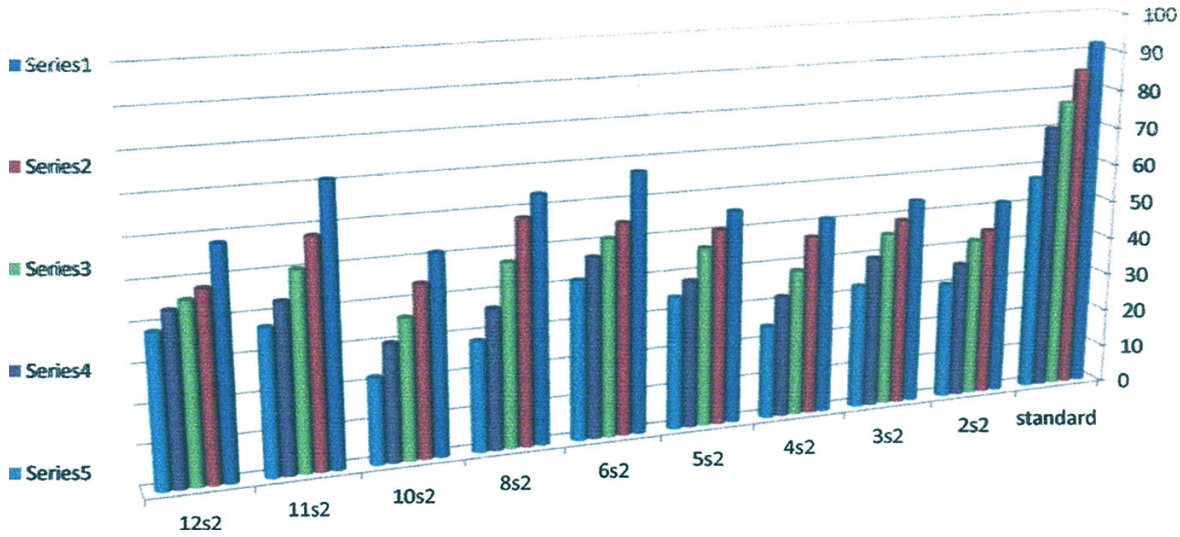


Figure 1: Comparison of DPPH scavenging assay of potent compounds S_2(1), $1S_2$(2), $2S_2$(3), $4S_2$(4), $3S_2$(5), $6S_2$(6), $10S_2$(7), $8S_2$(8), $12S_2$(9), $11S_2$(10), $5S_2$(11)against Gallic acid

Table 1: IC_{50} of the synthesized derivatives

Compounds	IC50 µg/ml
Gallic Acid	43
1	-
2	-
3	180
4	163
5	137
6	60
7	172
8	98
9	116
10	66
11	122

Antimicrobial activity: The *in vitro* assay of the synthesized compounds (**1-11**) which exhibited the potent antioxidant activities, against different pathogenic bacteria and yeast were achieved using 1000 µg/ml concentration as illustrated by Table 2. The activity of compounds was evaluated against Staphylococcus Epidermidis, Staphylococcus aureus (gram positive bacteria), ***Escherichia coli***, ***Klebsiella species*** (gram negative bacteria), and *Candida albicans* (yeast). Compound **6** revealed promising activity against the different species at applied concentration.

Table 2: In Vitro antimicrobial inhibition zone (mm) of the synthesized compounds

	Staphylococcus epidermidis	Staphylococcus aureus	Escherichia coli	Klebsiella species	Candida albicans
1	13	-	-	-	-
2	15	23	14	-	-
3	-	11	-	-	-
4	10	11	-	11	-
5	-	18	-	-	-
6	13	17	12	-	-
7	-	11	-	-	-
8	-	-	-	-	-
9	-	-	-	-	11
10	11	-	12	-	-
11	-	13	-	-	-
Amoxicillin (Control)	33	21	20	15	-

Docking study: The docking approach of the potent active 2-pyrazoline derivative 6 into the binding pocket of glucosamine-6-phosphate synthase, the potential target forantifungal & antibacterial agents was achieved. The grid box was constructed to include all the binding residues of enzyme (Cys 300, Gly 301, Thr 302, Ser 303, Ser 347, Gln 348, Ser 349, Thr 352, Val 399, Ser 401, Ala 602 and Lys 603) as indicated by the X-ray study (**Figure 2**)[17].

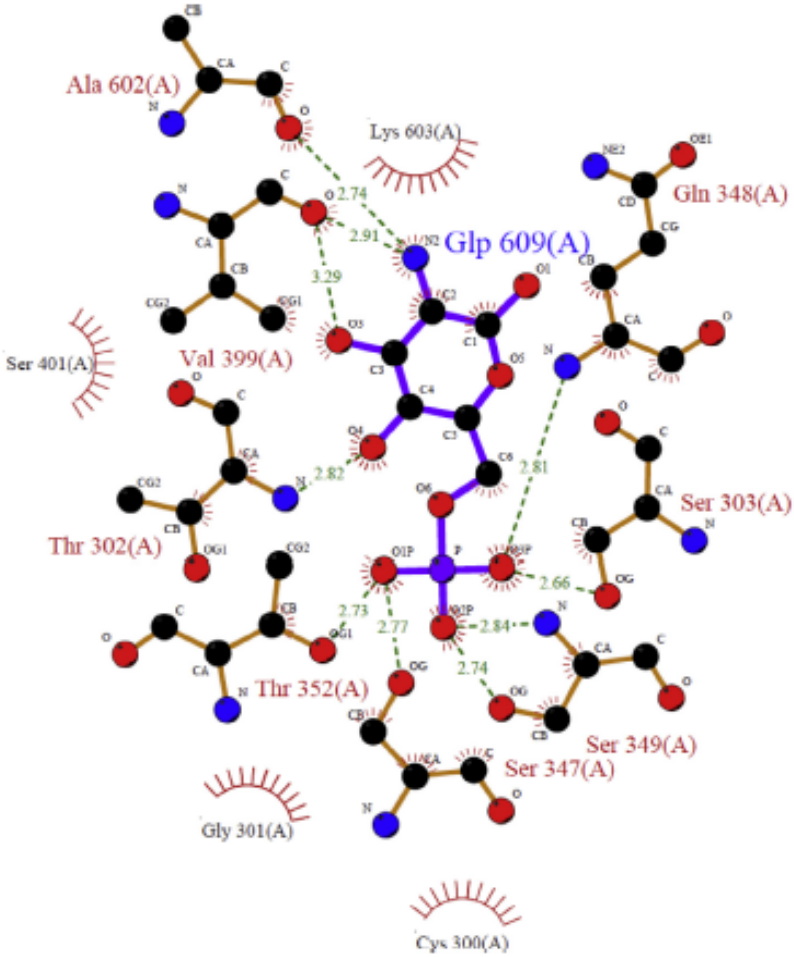


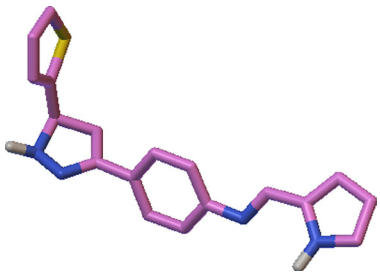
Figure 2: Ligplot of GlcN-6-P showing the binding of glucosamine-6-phosphate in an active site of enzyme

The docking parameters for the ten generated conformers by the Autodock 4.2 are illustrated in **Table 3**. The binding energy of the best generated conformer is -7.56 Kcal mol^{-1} with -8.75 Kcal mol^{-1} intermolecular energy. The calculated inhibition constant (Ki) was 2.88 µM as determined by the docking approach. The best conformer bonds the enzyme pocket with two hydrogen bonding, the first one with ALA602 while the second with the LIG residue as shown in **Figure 3**.

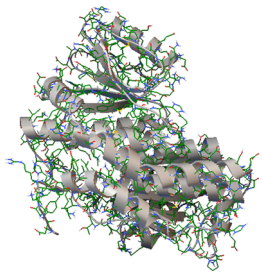
Table 3: Docking parameters of 2-pyrazoline derivative 6

Bonding	H-bonds	Intermolecular energy (kcalmol^{-1})	Inhibition constant (µM)	Binding Energy (Kcal mol^{-1})	Compound 6
ALA602:HN:LIG:N	1	-8.75	2.88	-7.56	1
ALA602:HN:LIG:N	1	-8.73	3.01	-7.53	2
LIG:H: ASN600:O ALA602:HN:LIG:N	2	-8.67	3.32	-7.47	3
-	0	-8.39	5.27	-7.20	4

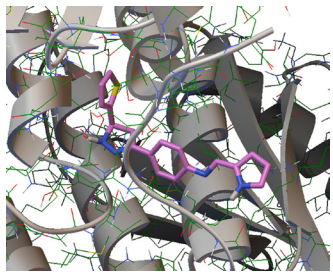
Bonding	H-bonds	Intermolecular energy (kcalmol^{-1})	Inhibition constant (µM)	Binding Energy (Kcal mol^{-1})	Compound 6
-	0	-8.39	5.33	-7.19	5
-	0	-8.31	6.05	-7.12	6
VAL605:HN:LIG:N	1	-8.05	9.38	-6.86	7
ALA602:HN:LIG:N	1	-8.06	9.31	-6.86	8
LIG:H: ASN600:O ALA602:HN:LIG:N	2	-8.06	9.30	-6.86	9
VAL605:HN:LIG:N	1	-7.97	10.81	-6.78	10



Structure of compound 6



3D structure of GlcN-6-P



Best generated conformer inside the binding site of GlcN-6-P

Figure 3: The docking of the best generated conformer of compound 6 inside the binding pocket of L-Glutamine: D-fructose-6-phosphate amidotransferase (GlcN-6-P)

The docking results of generated conformers within the binding pocket strongly related to the antibacterial activities and enhancing the discovered hit (compound 6) as promising antimicrobial agents at lower concentration.

Conclusion

The present research summarized the synthesis of novel 3,5-disubstituted-4,5-dihydro-1 *H*-pyrazoles derivatives containing imine moiety. The antioxidant activity for all the derivatives were determined by using DPPH radical. The discovered hits which exhibited promising antioxidant results were screened against various bacterial species and Candida Albicans to explore the antimicrobial activity of the novel derivatives. On the other hand, docking approach using Autodock 4.2 was achieved to illustrate the binding state of the potent hit inside the glucosamine-6-phosphate synthase.

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Influence of Autologous Platelet Concentrates on the Dynamics of Regenerative Processes in Treatment of Trophic Ulcers of Lower Extremities

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Abstract

The effectiveness of the use of Autologous platelet concentrates was studied to improve the regenerative processes of trophic ulcers. The study involved 41 patients of the surgical department of "Simferopol Central Clinical Hospital" with trophic ulcers (TU) of the lower extremities of various sizes and shapes from 4 to 26 cm^2. In addition to the complex treatment of trophic ulcers, patients of the 1st group received topical treatment with stimulants of the regenerative process - Autologous Platelet Concentrates (APC), followed by repeated applications if necessary. According to standard approaches, 20 patients with TU were treated (group 2). The use of APC therapy in the complex treatment of TU was clinically effective. The applied method in the 1st group helped to accelerate the processes of wound repair, reduce the healing time of trophic ulcers and statistically significant decrease in the area of the wound defect compared with patients of the 2nd group were found. The use of APC therapy in the treatment of TU is clinically effective. The applied method contributed to the acceleration of wound recovery processes.

Keywords: *Trophic ulcer, Autologous platelet concentrate, Surgery.*

Introduction

Wound healing is one of the oldest surgical problems, which has still not lost its relevance [2]. When treating wounds, surgeons often deal with soft tissue defects, which are characterized by signs of chronic inflammation, high bacterial contamination, and the predominance of degenerative processes over regenerative ones [1]. Such conditions include wounds, non healing for a long time, fistulas, bedsores [3]. Despite the wide range of drugs and various method for treating skin wounds, trophic ulcers (TU) remain a significant problem [4].

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The use of autologous platelet concentrates (APC) is a specialized local therapy for the treatment of TU [8]. APC is a part of the blood obtained from the patient's autologous blood (Fig. 1&2), which initiate wound healing by releasing local growth factors released during degranulation of α-granules. The α-granules contain secretory proteins: platelet growth factor (PDGF), AA-, BB and AB-isomers, transforming growth factor p (TGF-p), platelet factor 4 (PF4), interleukin-1 (IL-1), platelet angiogenesis factor (PDAF), vascular endothelial factor (VEGF), epidermal growth factor (EGF), platelet endothelial growth factor (PDEGF), epithelial cell growth factor (ECGF), insulin-like growth factor (IGF), osteocalcin (Oc), osteonectin (O), fibrinogen (Fg), vitronectin (Vn), fibronectin (Fn), thrombospondin-1 (TSP-1) [6]. All of them contribute to the involvement of undifferentiated cells in the newly formed matrix and the launch of cell division. APC also inhibits the release of cytokines and limits the inflammation process, thereby improving healing [5,7].

Published experimental and clinical data[9] indicate a positive effect of APC on the stimulation of tissue angiogenesis and wound healing (Fig. 5), which in turn suggests that the use of APC in patients with TU is effective and promising [10].

Purpose of the study: Improving the regenerative processes of TU through the use of APC therapy in the complex of therapeutic measures.

Materials and Method

Since 2014 to 2019 on the basis of the surgical department of "Simferopol Central Clinical Hospital" a comprehensive examination and treatment was carried out according to the proposed methodology of 21 patients with TU (group 1). In addition to the complex treatment of TU, patients of this group received topical treatment with stimulants of the regenerative process - APC, followed by repeated applications if necessary. And 2nd group contains 20 patients who were treated with standard approaches of TU.

Patients of the 1st group had a wound process that was heterogeneous in etiology. Therefore, in the 1st group, two subgroups were distinguished: 1A - 10 (45.4%) patients with trophic ulcers and chronic arterial insufficiency (CAI); 1B - 11 (54.6%) patients with trophic ulcers and chronic venous insufficiency (CVI).

To analyze the results obtained, similarly with the 2nd group, two subgroups 2A were identified - 10 (50%) patients with trophic ulcers and CAI; 2 B - 10 (50%) patients with trophic ulcers and CVI.

Both groups are comparable in age, gender, severity of general condition, the nature of the concomitant pathology. The duration of the wound process in patients of the 1st group correlated with the duration of the wound process in patients of the 2nd group and ranged from 5 weeks up to 4 months. All patients of the studied groups at the prehospital stage were consulted by an angiosurgeon, received outpatient treatment from the surgeon at the place of medical care, and in case of a long term wound history - treatment was carried out in a general surgical hospital. All patients with trophic ulcers and CVI were treated with elastic compression, phlebotonics, and systemic phleboprotectors were prescribed. Treatment of patients with subgroups 1A and 2A with diabetes included functional relief, correction of hyperglycemia, as well as existing neuro and angiopathic disorders in accordance with existing recommendations.

All patients of both groups underwent local treatment of TU with the standard method, including surgical treatment of the purulent foci, in which dead tissue was removed (Fig. 4), and if possible, the existing scab and fibrin layers, which often covered granulation tissue, were radically removed. Subsequently, various antiseptics were used locally to clean the wound surface, including chlorhexidine solutions, 3% of hydrogen peroxide solution, 10% of povidone-iodine solution, they irrigated the wound surface during surgery or daily dressings. Then an aseptic gauze dressing was applied with a 0.5% solution of dioxidine or ointment agents on a water-soluble basis (levosin, levomekol). All patients were prescribed antibiotic therapy from the 1st day of hospitalization in accordance with generally accepted schemes.

Patients of the 1st group used APC in the form of daily applications, which was obtained by centrifugation of autologous blood [5]. The resulting Autologous platelet concentrates in the form of an application were applied to the wound defect (Fig. 3) and covered with a dry cloth and a hydrophilic film coating for 24 hours.

To study and objectify the healing processes of TU in patients of both groups, the area of wound defects was determined using the LesionMeter program from OS Android. To measure the surface area of TU using this program, a limb segment with a wound defect was photographed, where the scaling standard was placed in the form of a standard plastic card, after that the wound defect was circled around the perimeter with the cursor and automatically received its area in cm^2. The result obtained was recorded in the program archive.

The area of the initial wound defect was determined upon admission to the hospital before treatment and during the treatment period to determine the dynamics of wound healing on days 4, 8, 12, 16, and 20, as well as at the end of treatment.

Depending on the size of the wound defect, TUs were divided into small ones - up to 9 cm^2 in area, medium - 10 - 18 cm^2, large - 19 - 26 cm^2. The structure of patients of both groups depending on the area of the wound defect was compared (Table 1). The distribution of patients of both groups over the area of TB was uniform.

Table 1. The structure of the studied groups of patients depending on the area of the wound defect

Area of wound defect	Groups							
	1st Group				2nd Group			
	subgroups				subgroups			
	1A		1B		2A		2B	
	No. of patients	%	No. of patients	%	No. of patients	%	No. of patients	%
Less than 9 cm^2	3	30.0	4	36.4	3	30.0	4	40.0
10-18 cm^2	4	40.0	4	36.4	3	30.0	3	30.0
19 - 26 cm^2	3	30.0	3	27.2	4	40.0	3	30.0
Total	**10**	**100.0**	**11**	**100.0**	**10**	**100.0**	**10**	**100.0**

Results

Before starting treatment in all subgroups of the 1st and 2nd groups, the average values of the area of the wound defect were compared (Table 2).

In subgroup 1A and subgroup 2A, the area of the wound defect average were (15.5 ± 1.2) and (15.7 ± 1.1) cm^2 respectively, which did not have a statistically significant difference (p> 0.05). In subgroup 1B, the area of the trophic ulcer averaged was (15.9 ± 1.4) cm^2, and in subgroup 2B - (15.8 ± 1.7) cm^2, which also did not have a statistically significant difference (p> 0.05).

Table 2. The area of the wound defect in patients of the 1st and 2nd groups before starting of treatment (x ± t)

Area of wound defect	Groups			
	1st Group		2nd Group	
	subgroups		subgroups	
	1A	1B	2A	2B
Less than 9 cm^2	7.2 ± 0.6	6.8 ± 0.8	6.9 ± 0.7	7.1 ± 0.8
10-18 cm^2	16.8 ± 0.9	17.1 ± 0.8	16.3 ± 0.6	15.9 ± 0.9
19 - 26 cm^2	22.5 ± 1.1	23.9 ± 1.4	24.1 ± 1.9	24.8 ± 1.7

The overall dynamics of reduction in the area of the wound defect (Table 3) in patients with TU and CAI of subgroup 1A did not have statistically significant difference in the first 8 days of treatment compared with patients of subgroup 2A (p> 0.05). However, after the 12th day of complex treatment, patients of subgroup 1A showed a clear statistically significant difference (p <0.05) in the healing rate of TU compared with subgroup 2A, and this significant of difference continued until the end of treatment.

Table 3. The dynamics of healing of TU in patients of the 1st and 2nd groups (x ± t).

Stages of observation	Groups			
	1st Group		2nd Group	
	subgroups		subgroups	
	1A (cm^2)	1B (cm^2)	2A (cm^2)	2B (cm^2)
Day of Hospitalization	18.4 ± 4.2	19.6 ± 5.4	18.3 ± 5.1	19.5 ± 4.7
Treatment period, day				
4th	17.7 ± 4.1	18.2 ± 4.7	17.9 ± 4.8	19.3 ± 4.6
8th	14.6 ± 4.4	16.5 ± 4.2	17.5 ± 5.3	18.9 ± 4.2
12th	12.2 ± 3.8 *	15.3 ± 3.7	16.8 ± 4.3	17.5 ± 4.3
16th	10.8 ± 3.2 *	14.5 ± 3.6	16.1 ± 4.4	16.7 ± 3.9
20th	7.5 ± 3.4 *	13.5 ± 3.9	15.8 ± 3.8	15.9 ± 4.2
24th	4.2 ± 3.5 *	12.7 ± 3.7	15.2 ± 3.4	15.3 ± 3.9

Note. * Statistically significant differences compared with the corresponding subgroups of the 2nd group.

Patients of subgroup 1B with trophic ulcers and CVI also showed a more rapid decrease in the area of the wound defect compared to patients of subgroup 2B, however, no statistically significant differences were observed during the entire period of inpatient treatment ($p > 0.05$).

The main criterion for evaluating the results of treatment was the degree of reduction in the area of the wound defect: “a” - complete wound healing; “b” - reduction of the area of the wound by 70% and more than its original area; “c” - reduction of the area of the wound by 50 - 69%; “d” - reduction of the area of the wound by 30 - 49%; “e” - the absence of signs of regeneration or a decrease in trophic ulcers by less than 30%.

Criteria “a” and “b” were considered as a good result of treatment, satisfactory - criterion “c”, unsatisfactory - criteria “d” and “e”.



Fig. 1. The separation of the cellular elements of the patient’s venous autologous blood after centrifugation.

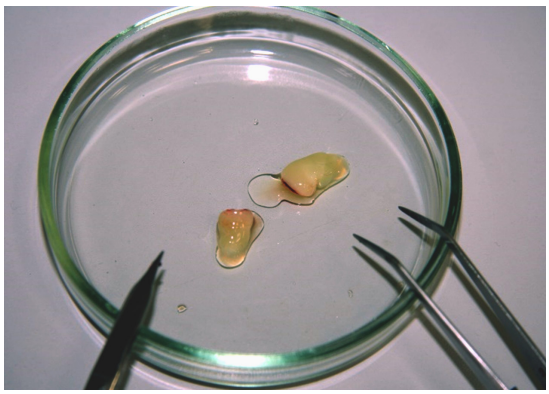


Fig. 2. Concentrates of autologous platelets from autologous blood in a Petri dish.



Fig. 3. Patient H. - application of autogenous platelet concentrates on the surface of the trophic ulcer.



Fig. 4. Patient H. - trophic ulcers of the right foot before treatment.



Fig. 5. Patient H. - healing of trophic ulcers of the right foot for 25 days.

Discussion

Table 4 shows subgroup 1A of 1st group, a good treatment result was obtained in 9 (90.0%) patients, in subgroup 2A - only in 5 (50.0%) patients. A decrease in the area of a wound defect by 50 - 69.0% in subgroup 1A was observed only in 1 (10.0%) patients, in a subgroup 2A - in 30 (30.0%), a decrease in the area of a wound defect by 49% or less in a subgroup 2A was only in 2 (20.0%) patients. A good treatment result was observed in 4 (36.4%) patients of subgroup 1B and in 3 (30.0%) patients of subgroup 2B; unsatisfactory results were found in 3 (27.3%) and 4 (40.0%) patients, respectively.

Table 4. Evaluation of the effectiveness of treatment of patients of the studied groups.

Criteria for evaluation	Groups							
	1st Group				2nd Group			
	subgroups				subgroups			
	1A		1B		2A		2B	
	No. of patients	%	No. of patients	%	No. of patients	%	No. of patients	%
«a»	6	60.0	2	18.2	2	20.0	1	10.0
«в»	3	30.0	2	18.2	3	30.0	2	20.0
«c»	1	10.0	4	36.3	3	30.0	3	30.0
«d»	-	-	3	27.3	1	10.0	3	30.0
«e»	-	-	-	-	1	10.0	1	10.0

Conclusion

A study of the planimetric indicators of the healing of TU in patients of the 1st group, to whom conventional therapeutic measures were supplemented with topical application of APC, showed that the area of wound defects in subgroup 1A was statistically significantly reduced on the 8th and 12th days respectively, compared with subgroup 2A. However, in patients of subgroup 1B, such a significant difference with subgroup 2B in the processes of repair of TU was not established.

As a result of evaluating the effectiveness of treatment, the best indicators were also obtained in patients of subgroup 1A: complete healing of the wound or reduction of its area by 70% or more was found in 60.0% of patients. In the 2nd group, complete or significant healing of TU was achieved only in 20% of patients of subgroup 2A. In turn, in patients with TU and CVI, the treatment efficiency remained low and amounted to 36.4% in subgroup 1B and 30.0% in subgroup 2B.

The use of APC therapy in the complex treatment of TU is clinically effective. The applied method contributed to the acceleration of wound repair processes, a decrease in the healing time of TU, and a statistically significant decrease in the area of the wound defect.

Conflict of Interest: None declared.

Source of Funding: Self funding by authors

Ethical Clearance: In our study involving all human participants were in accordance with ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1964 and later amendments.

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Anemia in Children Due to Airborne Lead Exposure of Used Lead-Acid Battery Recycling Area in Jabodetabek, Indonesia

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Abstract

This study aims to determine the relationship between the concentration of airborne lead exposure to anemia in children aged 7 to 13 living near the informal used lead-acid battery recycling area in Jabodetabek. A cross-sectional study was conducted at four locations in Jabodetabek (Tangerang, Bogor, Bekasi and Depok), in which there were informal battery recycling. The study population was children aged 7 to 13 living in the area of informal used lead-acid battery recycling units. The number of children who were willing to participate was 418 children. The respondents were interviewed by using structured questionnaires. Environmental samples measured the airborne lead concentration using High Volume Air Sampler (HVAS) and analyzed using atomic absorption spectrometry (AAS). To identify anemia, blood Hb measurements were taken using HemoCue® Hb 201+ System. The Logistic Regression risk factor model was used to determine the correlation of airborne lead with anemia in children. The results showed an average concentration of airborne lead (n = 52) was 2.96 μg/m^3. The average blood Hb level of children (n = 418) was 11.89 g/dL, with prevalence of anemia of 51.2%. High airborne lead concentration is strongly associated with an increased anemia incidence in children (OR: 3.96; 95% CI: 1.83-8.56) after behavioral factors of calcium intake was controlled (OR: 0.68; 95% CI: 0.46-1.01). This study reveals the correlation between airborne lead exposures and anemia as well as underlines the needs to strengthen the policies, supervision, and development of strategies to reduce airborne lead exposure.

Keywords: *Airborne Lead; Anemia; Battery Recycling; Environment.*

Introduction

Lead is used in many industrial products such as batteries, ammunition, metal products, instruments to shield X-ray radiation and others. [1,2]. The high level of lead pollutants in Guiyu China comes from the burning of used lead-acid batteries and electronic waste containing lead. This affects the high level of lead in blood in children, workers, and breast milk[3]. The high level of airborne lead is associated with the high level of lead in human blood[4].

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Lead toxicity affects almost every organ system in the body [5,6]. From a research in Dakar, Senegal on November 2007 to March 2008, there were 18 children who died of progressive (chronic) central nervous system disease which could not be explained in a community involved in a battery recycling in the suburbs[7]. Intoxication of high levels of lead exposure also causes death in children. Children are more vulnerable to lead exposure since they are still in growth stage [8,9].

Airborne lead interacting with population enters human body through oral and inhalation routes [10,11]. Lead in blood will change the hematological system by inhibiting the activity of several enzymes involved in heme biosynthesis that function as red blood cell formation, then disruption of the hematopoietic system will cause a decrease in hemoglobin levels in the body, shorten the life of erythrocytes, and will cause anemia[11,12].

In Indonesia, it is estimated that more than 200 smelters of used lead-acid battery, around 71 smelters are in Jabodetabek [9,13]. Health impacts of illegal smelting of used lead-acid battery for children including difficulties in achieving high grades in school and having stunting or other problems of physical development [13]. Anemia is one of the symptoms caused by the toxic effect of high levels of lead in the blood [14,15]. Until now, the correlation between airborne lead exposure and anemia in children aged 7 to 13 in the area of informal used lead-acid battery recycling in Jabodetabek Indonesia, is still unknown. The purpose of this study is to analyze the relationship between airborne lead exposure concentration and anemia in children aged 7 to 13 years old in the area of informal used lead-acid battery recycling in Jabodetabek, Indonesia.

Method

In 2014, the Joint Committee for Leaded Gasoline Phase-Out (KPBB) conducted a mapping of the location of used lead-acid batteries recycling units in Jakarta and its surroundings [16]. Based on the results of the study, the research location was selected with inclusion criteria: there are locations of used lead-acid battery recycling in residential areas, there is population of children aged 6-13, the children are in good health or have recovered from illness at least 7 days before blood sampling is performed, female children are not menstruating. Thus, the areas that fulfill the inclusion criteria were; Tangerang Regency (Pasar Kemis Village and West Kedaung Village), Bekasi Regency (Satriajaya Village), Depok City (Pancoran Mas Village and Beji Village), and Bogor Regency (Cinangka Village). This study used a cross-sectional data set from a specific research on used lead-acid battery recycling in 2014 to examine the correlation between airborne lead concentration and anemia incidence.

The sample was calculated using Lemeshow formula to test the hypothesis, resulting in the minimum number of samples of 238 children. While from the data collection results of Specific Research on Used Lead-Acid Battery Recycling in 2014, it was found 418 children. Therefore, the number of samples needed in this study was sufficient to meet the minimum requirements. During the data collection, the sample was determined using population list of children aged 7-13 years old in the integrated health service post (Posyandu cadre), and then a random sampling was conducted. The number of samples in each region was determined proportionally, with the inclusion criteria of living <700 m from used lead-acid battery recycling units. So, the sample distribution according to regency/city were Tangerang Regency of 95 respondents, Bekasi Regency of 110 respondents, Depok City 109 of respondents, and Bogor Regency of 104 respondents. Lead sampling in ambient air had a ratio of 1: 10, meaning that 1 sample of air measurement could represent 10 respondents. The total air measurements amounted to 52 locations, with 20 locations in Tangerang Regency, 7 locations in Bekasi Regency, 15 locations in Depok City, and 10 locations in Bogor Regency.

The types of data collected included: 1). Pb levels in the air, measured by collecting airborne lead particles (aerosol) in the filter using High Volume Air Sampler (HVAS), then dissolving each lead in the filter and analyzing sample solutions with Atomic Absorption Spectrometry (AAS) [17]; 2). Anemia was determined by measuring blood Hb with HemoCue® Hb 201+ System, by taking a blood sample of 50 µl from the fingertips (peripheral blood) using microcuvettes and the diagnosis of anemia could be seen from blood Hb less than 12 g/dl [18,19]; 3). Height (BH) was measured using anthropometry; 4) Body weight (BW) was measured using standardized weight scales; 5) Data on individual characteristics, behavior, and education of parents were obtained using a structured questionnaire through an in-depth interview with each respondent. The analysis used descriptive statistics, chi-squared test, and Multivariate Logistic Risk Factor Regression.

Results

Respondent aged 7 to 10 years was 272 respondents (65.1%), Almost all of the respondents had the behavior of washing hands before eating amounted to 336 respondents (87.6%). Most of the respondents' parents had a low educational background (equivalent to junior high or ≤ 9 years) amounted to 303 respondents (72.5%). Respondents exposed to airborne lead ≥ 2 µg/m^3 were 41 respondents (9.8%) and those with anemia were 214 respondents (51.2%).

Table 1. Category Distribution of Child Characteristics, Hb levels, and lead exposure in informal used lead-acid batteries recycling areas (n = 418)

Variable	Total	Percentage
Age		
7 – 10 Years old (Children)	272	65.1
11 – 13 Years old (Teenager)	146	34.9
Nutritional status		
Obesity (≥ 25.0 Kg/m^2)	30	7.2
Non-obese (< 25.0 Kg/m^2)	388	92.8
Sex		
Female	230	55.0
Male	188	45.0
Washing Hands Before Eating		
No	52	12.4
Yes	366	87.6
High Calcium Food Consumption		
No	226	54.1
Yes	192	45.9
Parents' Education		
≤ 9 years old	303	72.5
> 9 years old	115	27.5
Airborne lead		
Not Eligible (≥ 2 µg/m^3)	41	9.8
Eligible (<2 µg/m^3)	377	90.2
Anemia Incidence		
Anemia (Hb <12 g/dL)	214	51.2
No anemia (Hb≥12 g/dL)	204	48.8

Measurement of airborne lead was performed on sunny days. The tool was installed at 1.25 m height from ground level or as high as upper respiratory tract in children. The farthest distance of air measurement location from the used lead-acid batteries recycling was 750 m. From the analysis results, it was found that the average lead level in ambient air in the residential area near the used lead-acid batteries recycling was 2.9 µg/m^3. This value has exceeded the standard value determined by Government Regulation Republic of Indonesia number 41 of 1999 of 2 µg/m^3. According to WHO, anemia in children aged 7-13 years old is known when there is a decrease in blood Hb levels from normal of 12 g/dL. In Table 5.11, the average Hb level of children is 11.89 g/dL, showing that the average respondent is affected by mild anemia or normal. However, there are respondents with very low blood Hb values of 7.7 g/dL, it is assumed that these respondents had acute anemia.

Table 2. Distribution of Airborne Lead Exposure Concentration (n = 52) and Hemoglobin Levels in Blood (n = 418) in the informal recycling areas of used lead-acid battery

Variable	Mean	Median	SD	Minimum-Maximum	95% CI	Quality standards
Airborne lead (µg/m^3)	2.96	0,273	13.23	0.01 -78.05	0.725 – 6.64	2.0
Blood Hb (g/dL)	11.89	11.9	1.36	7.70 – 16.10	11.7 – 12.03	12

In Table 3, the analysis results show that there is a statistically significant correlation between airborne Pb and anemia (p = 0.001). Children who live in areas with high lead exposure concentrations (≥ 2 µg/m3) in ambient air are 3.8 times (95% CI: 1.77-8.20) to suffer from anemia than children living in areas with low lead exposure concentrations (<2 µg/m^3) in ambient air.

Table 3. Analysis Results of Correlation between Airborne Lead Exposure and Other Variables to Anemia in Children Aged 7-13

Variable	Anemia n (%)	P Value	OR	95% CI
Airborne Lead				
≥ 2 µg/m^3	32(78)	0.001	3.81	1.77-8.20
2 µg/m^3	182(48.3)			
Age				
7 – 10 Years old	107 (54.3)	0.269	1.26	0.86-1.86
11 – 13 Years old	107(48.4)			

Variable	Anemia n (%)	P Value	OR	95% CI
Sex				
Female	116 (50.4)	0.806	0.93	0.63-1.37
Male	98 (52.1)			
Nutritional Status				
Obesity	18 (60)	0.417	1.46	0.68-3.13
Non-Obese	196 (50.5)			
Parents' Education				
Low (≤ 9 years)	165 (54.5)	0.04	1.61	1.04-2.48
High (> 9 years)	49 (42.6)			
Hand washing behavior				
Not	22 (42.3)	0.222	0.66	0.37-1.19
Yes	192 (52.5)			
Calcium Behavior				
Not	107 (47.3)	0.107	0.7	0.48-1.05
Yes	107 (55.7)			

From the final modeling above, it can be explained that children living in areas with high lead exposure concentrations (≥ 2 μg/m^3) in ambient air are 3.96 times more likely to develop anemia than children who live in areas with low lead exposure concentrations (<2 μg/m^3) in ambient air after being controlled with the variable of high calcium food consumption.

Table 4. Final Modeling Results of Multivariate Logistic Regression Analysis between Independent Variables and the Anemia in Children Aged 7-13 Years old

Variable	P value	OR	95% CI
Airborne Pb	0.0001	3.963	1.83-8.56
Calcium Consumption	0.057	0.683	0.46-1.01
Constant	0.008	0.120	

Discussion

The analysis results show there is a significant correlation between airborne Pb with anemia statistically. The significant correlation between airborne Pb levels with anemia in children aged 7-13 years old in the area of used lead-acid batteries recycling has answered the research hypothesis. This finding is consistent with the findings of other studies, which revealed that there was a correlation between airborne Pb exposure and anemia [20,21].

The average lead concentration in ambient air in a residential area where there is a used battery recycling activity is 2.9 μg/m^3. This value exceeds the standard value set by Government Regulation Republic of Indonesia No. 41/1999, which is equal to 2 μg/m^3, even though this threshold value is still above the quality standards set by the EPA of 0.15 μg/m^3 [14,22]. If children are exposed to lead for a long period of time, the most dangerous effect for children is a decrease in intelligence and nervous system disorders. Anemia is not one of the dangerous diseases, but if there is a prolonged exposure with a dose exceeding the quality standard, it may cause chronic anemia leading to death [22,23]. Another impact caused by the condition of anemic people will certainly reduce work productivity in the region [24].

Air pollution in the used lead-acid battery recycling has been proven by the high levels of airborne lead. Lead pollution from used lead-acid battery recycling into the surrounding environment occurs at each stage of the process, starting from sorting, evaporation, and combustion. Generally, air pollution in the environment around the informal recycling areas of used lead-acid battery is sourced from the combustion of lead plates producing dust particles containing lead. The dust particles from combustion that is carried by the wind will fall directly onto the residential areas. This happens because the process of informal used lead-acid batteries recycling does not use chimney with filters. Therefore, the local Environment Agency should audit the used lead-acid battery smelting process as well as conduct an airborne lead monitoring around the surrounding area of the recycling operation. Meanwhile, the Community Health Center and the local Health Office should monitor the blood lead level of the local community.

Conclusions

High airborne lead concentrations are strongly associated with an increase of anemia in children (OR: 3,96; 95% CI: 1,83-8,56) after controlled by calcium consumption behavior factor (OR: 0,68; 95% CI: 0,46-1,01). This study shows the correlation between airborne lead exposure and anemia as well as highlights the needs to strengthen policies, supervision, and development of strategies to reduce lead exposure. The local Environment Agency should audit the process of used lead-acid batteries smelting industry as well as conduct airborne lead monitoring in the surrounding area of the recycling operation.

Ethical Clearance: The ethical clearance of this research taken from ethics committee of faculty of public health, universitas indonesia by number 458/UN2.F10/ppm.00.02/2019 Valid thru June 2020.

Conflict of Interest: The authors declare no conflict of interest.

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Prototyping Personal Health Records for Type 2 Diabetes Mellitus Prevention

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Abstract

Background: Diabetes mellitus is one of the four most prioritized non-communicable diseases (NCD) in the world. The global diabetes prevalence increases every year, with type 2 diabetes as the highest contributor. Based on Indonesian Basic Health Research, the type 2 diabetes prevalence for the age group >15 years was 5.7% in 2007, increased to 6.9% in 2013, and reached 8.5% in 2018. Around 70% of people with type 2 diabetes are often unaware of their illness, and 25% of them only realize their condition once they experience complications of diabetes. The purpose of this study is to design a prototype personal health record (PHR), which could help prevent and control the risk factors of type 2 diabetes mellitus.

Method: The method followed the systems development life cycle (SDLC), using the rapid application development (RAD) approach with prototyping techniques.

Results: This prototype provides information regarding diabetes, a main menu for users, medical history data collection, scoring of risk factors for type 2 diabetes mellitus, and health recommendations in the form of text and videos.

Conclusions: This Android-based PHR could be developed further as tool for the prevention of and control of risk factors for type 2 diabetes mellitus. This tool aims to give a dependable prediction of type 2 diabetes mellitus occurrence in the community. This user-friendly application, with its simple design and interface, could encourage users to improve their behavior toward a healthier lifestyle.

Keywords: *Type 2 diabetes mellitus; prevention; personal health record; healthy behaviors.*

Background

The global prevalence of diabetes is increasing, particularly cases of type 2 diabetes. Many people with type 2 diabetes remain unaware of their illness for a long time because symptoms may take years to appear[1]. Around 2/3 of diabetics do not realize that they have diabetes, and various factors may delay their access to health services, so complications often occur[2]. Diabetes is the main cause of blindness, kidney failure, cardiovascular disease, and lower limb amputations. Diabetes is dangerous for mothers during pregnancy: If a diabetic mother's glucose levels are not well controlled this can have an impact on both mother and baby[3]. One solution for the prevention and control of diabetes risk could involve utilizing technological advances—specifically, the use of a Personal Health Record (PHR), which is an Android-based application that is managed individually.

Based on data from the International Diabetes Federation (IDF), the number of diabetes cases world wide is increasing; there were 381.8 million cases in 2013, 415 million in 2015, and 425 million in 2017 (of diabetics in the age range of 20 to 79 years). It is estimated that by 2045 the number of diabetes cases will increase to 629 million people globally. About 80% of diabetics are in low- and middle-income countries[3].

Cases of diabetes are also increasing in Indonesia. Based on Indonesian Basic Health Research, the

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national prevalence of people with type 2 diabetes >15 years old, increased from 5.7% in 2007 to 6.9% in 2013 and reached 8.5% in 2018. Furthermore, diabetes is a disease that is not fully diagnosed: Around 70% of people with type 2 diabetes are unaware of their illness, and 25% of them only realize their condition once they experience complications from diabetes[4]. If this situation is not immediately managed, it ispredicted that by 2045 Indonesia will be among the top 10 countries with diabetic cases(the others are India, China, the United States, Mexico, Brazil, Egypt, Indonesia, Pakistan, Bangladesh, and Turkey)[3].

An increase in prevalence will also increase the health financing burden. Based on data from the Center for Health Financing and Assurance in Indonesia, the cost of type 2 diabetes in outpatient data up to June 2014 amounted to 485 million from 1,415 cases handled, and the 70,584 cases of hospitalization cost 313 billion IDR[4].

Personal Health Record (PHR) is one of the tools of m Health, which is a user-centered health information system[5]. PHR is an internet-based individual health record; with it, a patient can access and coordinate their lifetime health information with their health service providers[6,7]. This suggests there is an opportunity to design a Personal Health Record prototype to prevent and control risk factors for type 2 diabetes. The application could help a person control their health, and the health recommendations made by the app would motivate changes in health behavior of the users.

Because of advancements in technology, prevention of disease and control of personal health can be done individually through an application on cellular phones. Based on the Central Bureau of Statistics, in Indonesia data cellular telephone users reached 59.59% in 2017. This growth was followed by internet access in as many as 57.33% of households[8]. This advancement in technology and information is accepted by people of various ages and socio-economic status, and represents an opportunity for self-management in the prevention and control of type 2 diabetes mellitus, by facilitating self-monitoring habits[9].

Method

The prototype design used for the PHR was the systems development life cycle (SDLC). SDLC is a method describing the route that directs developers from problems to solutions. The particular SDLC method used was rapid application development (RAD) with prototyping techniques. RAD was selected as it has a short and fast system development cycle a technique that fit within the time constraints of the study[10].

Identification of system requirements was done through data collection by in-depth interviews, observations, and systematic studies at the Health Office and Beji Public Health Center, Depok City, in February–May 2019. Five informants were used in this study: one member of the non-communicable disease (NCD) prevention program in Depok City Health Office, one diabetes mellitus (DM) program holder at Beji Public Health Center, and three general practitioners at Beji Public Health Center. The design of the prototype in this study was carried out to meet level 4 of the Technology Readiness Level scale (TRL). Tests were carried out to validate components against application prototypes that had been built on a laboratory scale.

Results

The research was carried out by (1) needs analysis and (2) feasibility analysis, to assess whether this application can be built and will provide benefits. Next, (3) RAD was used to make Android-based applications, and (4) Diagram of using PHR steps.

1. **Needs Analysis:** Needs analysis is done through in-depth interviews and observations in the field. This analysis revealed several obstacles that have prevented diabetes prevention programs from running optimally. The existing problems identified were the following:
    1. Cases of diabetes continue to increase, and the costs of diabetes and its complications are high.
    2. Existing applications related to prevention and control of risk factors for type 2 diabetes mellitus (NCD surveillance) have not been able to detect whether an individual has been screened individually before.
    3. There is a lack of public interest in visiting the Integrated Development Post NCD (Posbindu) program.
    4. There is no individual-based application for the prevention and control of type 2 diabetes mellitus risk factors.
    5. Increasing awareness and changing public health behavior are needed to carry out preventive activities.
2. **Feasibility Analysis:** The TELOS criteria (technics, economics, law, operations, schedule) were used to determine whether this application is feasible[11].

1. Technical Feasibility: The development of a system is based on the reasons why the system must be built and its expected value[10]. If the desired application is user friendly, easy to access, and inexpensive, then technically the proposed system requirements can be declared feasible. The proposed PHR application can be developed and implemented using Android.
2. Economic Feasibility: The main consideration in terms of economics is to calculate the profits and loss from designing the application. Based on the results of a World Economic Forum publication in April 2015[12], the potential loss due to NCDs in Indonesia in the 2012–2030 period is predicted to reach US$ 4.47 trillion, or 5.1 times Indonesia's 2012 gross domestic product (GDP). This shows that there is a high expenditure in cases of NCDs, one of which is diabetes mellitus. Furthermore, the appearance of NCDs in the 2030 Sustainable Development Goals suggest that NCDs should be made a national priority[12].
3. Legal Feasibility: The Minister of Health Regulation of the Republic of Indonesia has shown that e-healthcare applications area solution to support the care and handling of health services by utilizing technological advances. PHRs can be developed in Indonesia as a solution to healthcare issues[13].
4. Operational Feasibility: An assessment of operational feasibility is conducted by looking at how the application operates. This application processes automatically, so after inputting data according to the existing variables, users will receive health recommendations[14].
5. Schedule Feasibility: Data were collected until the prototype was made in February to May 2019.

3. **Rapid Application Development: Making Android-Based Applications:** Figure 1 outlines the process of making an Android-based application using the RAD method and the Android studio tool.

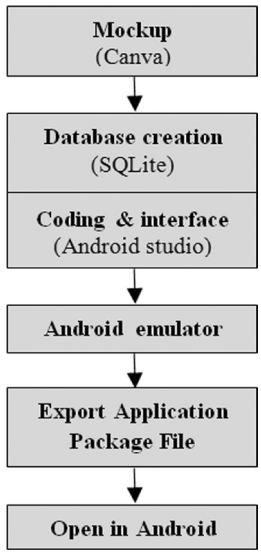


Figure 1. Steps for making Android-based applications

4. Diagram of Using PHR Steps

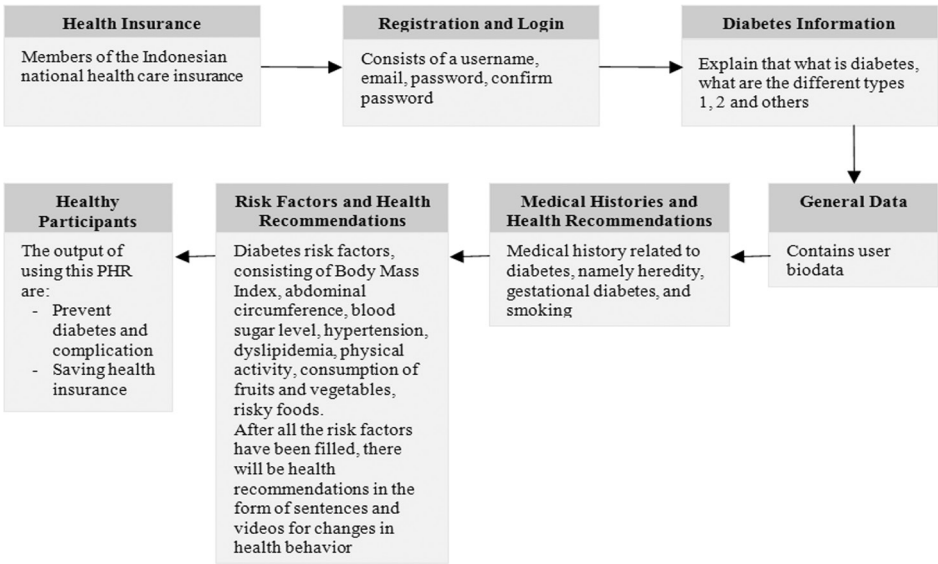


Figure 2. Steps of using PHR Android-based application.

Discussion

1. **Application Design Implementation:** Based on the guidelines, the prevention and control of type 2 diabetes mellitus is a promotive and preventive program from a public health center. The program is conducted in the Posbindus in the villages. However, only a few people visited their local Posbindu[15].

The type 2 diabetes mellitus (DM2) PHR application is an application designed to make it easier for health service providers, cadres, and the public to prevent and control risk factors for type 2 diabetes mellitus. The general data available in this application are similar to the general data provided by the NCD surveillance by the Ministry of Health. But this application is designed specifically for diabetes mellitus. PHR can be a form of primary care development[16].

This study produced an application prototype which can later be developed and integrated with the applications in public health centers. This application can be used anywhere and anytime and it could help public health center in collecting data. Thus, prevention and control of risk factors for type 2 diabetes mellitus can be managed, and data collection can also be implemented properly.

2. **Advantages and Development to the Next Level:** This application has several advantages. First, it can be used as a tool for type 2 diabetes mellitus prevention and the control of associated risk factors. Second, the application is easily accessible because it is based on Android. Third, it will educate people about managing risk factors for diabetes, via its diabetes mellitus information menu. Fourth, it will help motivate changes in health behavior, because it includes a menu of information on diabetes, general data, medical histories, risk factors and health recommendations. Fifth, users can learn more about the potential risks of type 2 diabetes mellitus.

Despite these advantages, this Android application requires improvement to reach the next level of implementation in accordance with the TRL. First, this application can only be used on Android-based smart phones. Second, it requires internet use, so it depends on users having an internet connection. Third, it cannot yet be integrated with applications in public health centers. Fourth, it cannot store data continuously.

3. **Technology Readiness Level (TRL):** The prototype follows the level 4TRL standards (see Table 1).

Table 1. Technology Readiness Level (TRL)[4]

Level 4 TRL Standards	Prototype Level
1. Separate laboratory tests of components have been carried out	Design and coding are carried outand databases are created and tested in Android emulator, after which they are extracted as files in the form of anApplication Package (APK).Trials are carried out on Android, with a minimum specification of 2 GB RAM, 1080 x 1920: 420dpi resolution, and API 15: Android 4.0.3 (Ice Cream Sandwich).
2. System requirements for applications according to the user are known	Analysis and identification of needs have been carried out through in-depth interviews, observations, and document studies at the Depok City Health Office and BejiPublic Health Center.
3. The results of laboratory experiments on components indicate that it can operate	The trials carried out indicate that the application can operate in Android.
4. The main functions of technology in the relevant environment have been experimented with	A menu has been created in the Personal Health Record (PHR) application, resulting in a resume and health recommendations for changes in health behavior.
5. Laboratory-scale technology prototypes have been made	The application is designed at a laboratory scale based on risk factor guidelines for type 2 diabetes mellitus and general data (identical to the data in non-communicable disease surveillance).
6. Component integration research has begun	Component integration starts from the needs analysis in the field; then components are designed in the Android application.
7. The key process has been identified and reviewed in the laboratory	The application includes a menu with the available DM2 information, general data, medical history data, and risk factor data. After data input is carried out, a resume and health recommendations will be provided.
8. Integration of technology systems and laboratory-scale design has been completed[17].	The design was tested on members of the Faculty of Public Health in Universitas Indonesia, using Android, the Java programming language, and the SQLite database[18].

Conclusions

Based on the results obtained during the design of the Personal Health Record prototype to prevent and control the risk factors for type 2 diabetes mellitus, the following conclusions are drawn:

1. PHRcan be a usefulAndroid-based tool for developing a complete health record for the prevention and control of risk factors for type 2 diabetes mellitus.
2. The feasibility study conducted allows this application to provide valuable benefits and shows it can be developed to the next levelof technological readiness.
3. Users can discover their potential risk for type 2 diabetes mellitus.
4. The application can provide health information and recommendations to encourage behavioral change in users.

Ethical Considerations: This study was approved by the Ethical Committee of the Faculty of Public Health, Universitas Indonesia (No.43/UN2.F10/PPM.00.02/2019).

Conflict of Interest: The authors declare that there are no conflicts of interest.

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Correlation Between Zinc Level of Mothers and Case of Babies with Non-Syndromic Cleft Lip and Palate

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Abstract

Non-syndromic cleft lip and palate is a common face malformation of all ethnic in population and one of factors caused it was nutritional deficiency. Micronutrient deficiency which mostly occurred in developing countries were Zinc (Zn) and folate acid deficiency. The deficiency of Zn serum in pregnant women was suspected in increasing the complication risk during pregnancy and the deformity risk of non-syndromic cleft lip and cleft palate. This study aimed to analyze the correlation between mother's zinc level and their babies which suffered with non-syndromic cleft lip and palate, also to determine the median of zinc level among mothers and babies between group of cleft lip, cleft palate, and cleft lip & palate. This was observational and analytical study with cross-sectional design. The participants were 35 babies with Non-syndromic cleft lip and palate and their mother attended the unit of perinatology, Dr. Hasan Sadikin Hospital, Bandung and network hospitals during September 2016-June 2017. The study used consecutive sampling to measured zinc level with ICP-AES (Inductively Coupled Plasma-Atomic Emission Spectrometer) method. The result showed the mean of zinc level among mothers was higher than the babies. The test showed significant correlation ($p=0.04$ or $p<0.05$) with the correlation coefficient $r=0.35$ with term of moderate correlation. There was no difference in median of zinc level among mothers and babies between group of cleft lip, cleft palate, and cleft lip & palate. It concluded that there was moderate correlation between zinc level between mothers and babies with non-syndromic cleft lip and palate.

Keywords: *Baby, non-syndromic cleft lip and palate, zinc level, mother, deficiency.*

Introduction

Non-syndromic cleft lip and palate defined as a common face malformation occurred in the community and ethnic group. The cases reported were about 65% from all anomalies on the head and neck[1–3]. Approximately 70% of orofacial clefts were isolated and non-syndromic deformity; classified into two groups which were cleft lip with or without cleft palate and cleft palate only[4–12]. This might be occurred in unilateral or bilateral involved tissue on lips, alveolus bone, nasal base, and cartilage bone both part and complete[8,12]. The Prevalence of cleft lip and palate are varied depending on race and ethnic, geographical location, and social-economy[1,3,13]. Prevalence from several races were high in Asian and American-Indian with ratio of 1 per 500

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births followed by European with 1 per 1000 births, and Caucasian & African that had lowest prevalence rate of 1 per 2500 births. The prevalence of cleft lip and palate in Indonesia has remained unknown. Kembaren[14] reported that the people with cleft lip and palate in Indonesia increased with average of 7,500 persons per year.

One of the factors influenced to the prevalence of cleft lip and palate was nutritional deficiency. Since the beginning of twentieth century, many studies found that malnutrition related to cleft lip and palate. The nutritional intake of the low social-economy and low educated mother correlated with the increased prevalence of cleft lip and palate[15,16]. The women in modern era could obtain lots of food but their malnutrition status particularly because of zincdeficiency[16]. High substance of dietary zinc and iron commonly found in food source such as oyster, beef, turkey, chicken, cereal, and processed beans[17]. The severe stage of Zn deficiency among mothers could be the risk factor of cleft lip and palate[12]. This study aimed to analyze the correlation of Zinc level between mothers and babies with the occurrence of non-syndromic cleft lip and palate.

Method

This study was analytical and observational research with cross-sectional design. The research was conducted at Dr. Hasan Sadikin Hospital and network hospitals in Bandung such as Ujung Berung Hospital, Cibabat Hospital, Mother and Children Hospital, and Indonesian Cleft Center during September 2016 until June 2017. The participants were 35 babies with cleft lip and palate, and mothers who attended the hospital mentioned above. The sample technique used consecutive sampling that eligible with the inclusion and exclusion criteria, and limited time.

The method to assess Zinc level was ICP-AES (Inductively Coupled Plasma – Atomic Emission Spectrometer). Statistical analysis used spearman test to analyze the correlation Zinc level between the mothers and their babies, and chi-square Kruskal-Wallis test to analyze the difference Zinc level in mothers and babies among phenotype types of cleft lip, cleft palate, and cleft lip & palate.

Results

Table 1 depicted the characteristic of participants in this study. Most of mothers were 25 – 29 years old (34%) and the other were distributed into 6 age groups. The characteristic of babies was divided into sex and type of cleft lip and palate. Most of babies were female (60%) and suffered unilateral cleft lip and palate (66%).

Table 1. The Characteristic of Participants (n=35)

No	Participant	Characteristic	Frequency	
			n	%
1.	Mothers	Age group (years old)		
		15 – 19	3	8.57
		20 – 24	4	11.43
		25 – 29	12	34
		30 – 34	10	28
		35 – 40	4	11.43
		≥40	2	5.71
2.	Babies	Sex		
		Female	14	40
		Male	21	60
		Deformity type		
		Cleft lip	5	14
		Unilateral Cleft Lip & Palate	23	66
		Bilateral Cleft Lip & Palate	2	6
		Cleft Palate	5	14

Table 2. The Correlation Spearman Test of Zinc Level between Mothers and Babies with Non-Syndromic Cleft Lip & Palate

Variable	Mothers				Babies				p	R
	N	Mean	SD	Median	N	Mean	SD	Median		
Zinc level	35	5.05	3.30	4.75	35	3.39	2.14	2.99	0.04	0.35

Table 2 showed there was a correlation of zinc level between mothers and babies with non-syndromic cleft lip and palate ($p < \alpha$=?). The correlation coefficient that showed by r between both variables was moderate. The mean and median of Zinc level in mothers were higher than the babies.

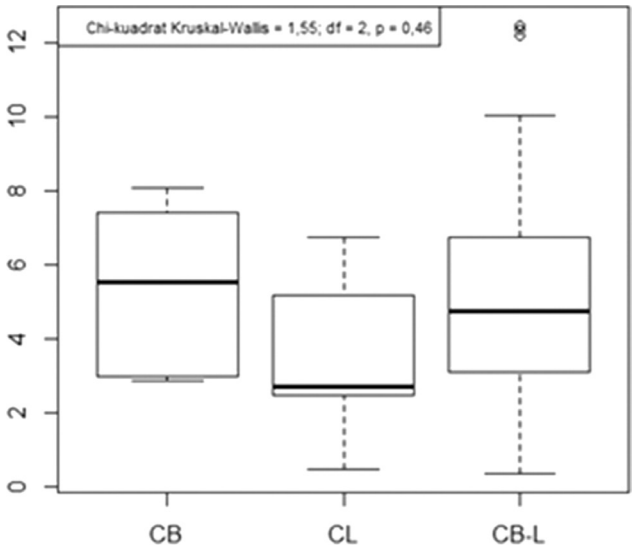


Figure 1. Zinc Level in Babies with Phenotype of Cleft Lip, Cleft Palate, and Cleft Lip & Palate

The median of Zinc level in babies with phenotype of cleft lip & palate was the lowest (2.93 µg/dL) from other phenotypes of cleft palate (3.53 µg/dL) and cleft lip (2.99 µg/dL). The figure 1 depicted the result of Chi-Square Kruskal-Wallis that there was no difference (p=0.99) Zinc level in babies among phenotype types.

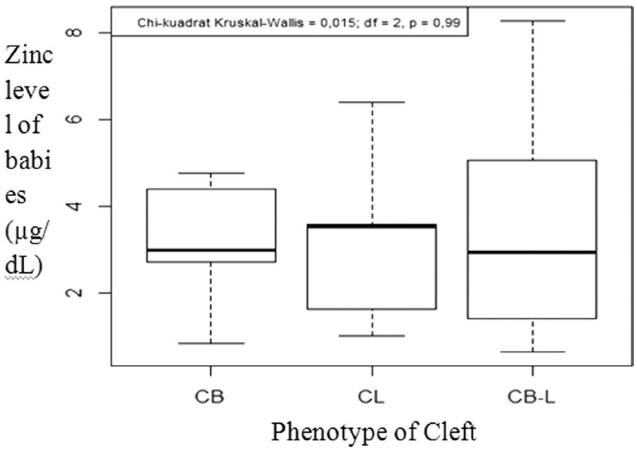


Figure 2. Zinc Level of Mothers who had Babies with Cleft Lip, Cleft Palate, or Cleft Lip & Palate

The median of zinc levels of mothers with cleft lip baby was the highest (5.54 µg/dL) among other phenotype of cleft palate (2.68 µg/dL) and cleft lip & palate (4.75 µg/dL). There was no difference in mothers with baby suffered cleft lip, cleft palate, and cleft lip & palate based on result of Chi-square Kruskal-Wallis (p=0,46). Most of the babies with cleft palate (75%) were under the median of zinc level, otherwise the majority babies with cleft lip was above the median value.

Discussion

Heredity and environment factor such as mother's nutritional status was known to be an influence variable in etiology towards orofacial cleft including cleft lip, cleft palate, and cleft lip & palate[18,19]. The sex ratio in babies suffered cleft lip & palate according a prior research was 3:2 for male and female[12]. Some studies indicated that nutritional deficiency from folate, cholesterol, multivitamin, and micronutrients like Zinc of the mothers might increase the risk of orofacial cleft in babies[18-20]. Otherwise, food fortification by adding the folate for pregnant women was proven in some studies to reduce the risk of orofacial cleft in babies[18,21]. However, the function of Zinc level as the risk factor of orofacial cleft in babies has been controversy. Study by Munger et al.[20] in 2005 showed Zinc deficiency in Philippine mothers had been associated in increasing the risk of orofacial cleft in babies, but the result could not be replicated in the Utah population, US.

The pregnant women according the literature should need Zinc with amount 11.5-11.75 mg/dL to meet the normative requirement during pregnancy. As stated by Caulfield et al., about 82% pregnant women in the world had less intake of Zinc[22]. However, the study did not apply for the developed countries because the pregnant women had higher weight and Zinc intake than the women in the developing countries[23].

Deficiency of zinc serum in pregnant women was suspected to be a factor that might increase the complication risk during pregnancy and risk of congenital deformity of lip and palate. The research conducted in East Nusa Tenggara showed average of 71% of pregnant women suffered deficiency of Zn serum (<7µg/dl). Another study conducted in Central Java stated the prevalence of deficiency of Zn serum was about 70%-90%[24]. The data and reports of epidemiology, and experimental research showed severe Zn deficiency might cause deformity fetus[23,25], and cleft lip and palate, malformation of brain and eyes, various heart abnormal, lungs and urogenital system[25].

Zn is an important element for enzyme function and growth hormone during pregnancy, so it played important role in growth. For the example, during pregnancy, placental alkaline phosphates required Zn to induct DNA synthesis and cell proliferation[26]. The lowest Zn in plasma correlated with complication of pregnancy like hypertension, postpartum bleeding, spontaneous abortion, and congenital malformation[27].

It was important for pregnant women to haveadequate nutritional intake before and during pregnancy to achieve its optimum. However, many reproductive women in sub-Sahara Africa particularly who lived in the poor village experienced deficiency because they had less intake of essential nutrition. Severe nutritional deficiency could lead the risk factor for both mother and her baby. As deficiency of iron and zinc frequently happened, about 56% of sub-Sahara African women were estimated with anemia and about 80% of sub-Sahara African women were risked of Zinc deficiency because inadequate food intake. Nutritional deficiency in women was related to bad pregnant result including low birth weight, young maternal age, and prematurity[28].

The status of maternal nutrition was influenced the nutritional element in placenta and fetus. The fetus during pregnancy was depended on nutritional transport to placenta. The nutrition was carried via special transporter located at placenta and basal microvillus membrane. The result from animal experiment showed a low micronutrient intake in mothers caused high signal from the fetus to regulate expression and activity of microscopic transporter in placenta. When the nutritional intake was adequate for the mother, the expression and transporter activity was lower than the inadequate intake. Thus, the response of nutritional placenta transporter to status of maternal nutrition was a key to assess the growth of fetus nutritionduring pregnancy[29].

Nutritional factor had an important role for growth and embryo differentiation including Zinc. As eloquently stated by the past research that low zinc level in mothers might increase risk of orofacial cleft, it was not clear whether low zinc level factor in mothers and babies could be associated with all of orofacial cleft phenotypes or only one of phenotypes considering Zinc was needed in palatogenesis process during the beginning of embryogenesis.

According to this study, zinc level which was under the median mostly occurred to babies with cleft palate. The trend of low zinc level was more associated with cleft palate phenotype than other two orofacial cleft phenotypes. This study coincided with the reference that mentioned Zinc was needed in palatogenesis process during the beginning of embryo growth. Zinc deficiency might interrupt the process of palate fusion; suspectedto be the cause of cleft lip in babies.

Conclusion

There was correlation of Zinc level between mothers and their babies suffered non-syndromic cleft lip and palate. The correlation coefficient was categorized in moderate correlation. In addition, there was no difference of median in zinc level of mothers and babies among phenotype types of cleft lip, cleft palate, and cleft lip & palate.

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Ethical Clearance: This research has been proved by Health Research Ethics Committee, Faculty of Medicine, Universitas Padjadjaran Bandung Indonesia Number 837/UN6.C1.3.2/KEPK/PN/2016 approved in 26thAugust 2016.

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Effect of Psychoeducation-Modification on the Improvement of Spiritual Response, Perception Stigma, Anxiety Level and Cortisol Levels among Lepers

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Abstract

Objective: This study aims analyze the effect of psychoeducation-modification (MP) intervention on the improvement of spiritual response, perception stigma, anxiety level, and cortisol levels among lepers.

Method and Materials: This study was a mixed method design. The first stage used qualitative method to develop a psychoeducation-modification module and the second stage was a quantitative method with quasi-experiment using pre-test post-test with control group design. The population was patients who received MDT (Multi Drugs Therapy) treatment, with a total sample of 35 respondents. Statistical tests used the T test, ANOVA test, and pathway analysis. Interventions for psychoeducation-modification were provided in 5 sessions and each session 60-90 minutes

Results: There were significant differences in mean scores of spiritual response, perception stigma and anxiety levels scores between intervention group and control group (p-value <0.05) and there was no difference in mean scores of cortisol levels intervention group and control group (p-value> 0.05). The psychoeducation modification effect was more targeted at improving emotional and spiritual intelligence which had an impact on the improvement of spiritual response, Perception Stigma, anxiety level and stability in cortisol levels decrease.

Conclusion: Psychoeducation-modification was effective in improving spiritual response, perception stigma, anxiety level, and cortisol levels among lepers compared to intervention using psychoeducation only. It is recommended to integrate psychoeducation modification intervention into the leprosy prevention service program as a holistic service that includes spiritual bio-psycho-social aspects.

Keywords: *Intelligence, spiritual response, Perception Stigma, anxiety level, cortisol levels.*

Introduction

The psychological effects of leprosy stigma are changes in emotions such as fear, anxiety, depression, loss of self-esteem, withdrawal, despair, and stress[(1),(2)] Studies among blacks in South Africa reported that one third of them thought of suicide when they were diagnosed with leprosy[(3)]. In Indonesia the discovery of a new case of NCDR (New Case Detection Rate) leprosy still continue, it is static and tends to increase in prevalence[(4)]. In 2011-2013 there were 14 provinces including West Java in the category of high leprosy burden.[(5)]Based on the health profile of the Cirebon District Health Office, it was found NCDR in 2017 of 10.2% per 100,000 population and in 2018 of 10.15% per 100,000 population[(6)]. A study in Bangladesh among 189 lepers found 50% perception stigma. A study among

77 lepers showed that 90.9% experienced anxiety and 58.4% lost self-esteem[7].

Anxiety due to stigma can cause distress. Stress activates two systems in the body, the first system is the autonomic nervous system and the second system is the hypothalamus pituitary axis and the adrenal gland. Activation of the hypothalamus will trigger the anterior pituitary gland to secrete adrenocorticotropic hormone (ACTH). The ACTH hormone will stimulate the adrenal cortex to secrete cortisol[8]. Psychological problems affect physical, emotional, intellectual, social and spiritual conditions[9]. The awareness of the patient that he has leprosy will make him able to cope with the disease well. The ability to accept illness is based on intelligence, spiritual, emotional, intellectual, and adversity of the patient.

Some programs that have been carried out and developed by the Government have not been optimal, including there are no efforts to reduce the problem of stigma and even the spiritual aspects of lepers so that patients are more distressed, the patients' condition worsen, which causes their quality of life to decline[10]. The cause of leprosy stigma is an error in the perception of the cause of leprosy. Misperception of the cause and all conditions due to leprosy is a cognitive process error. Then the intervention can be done through psychoeducation[11]. Various studies proved that one's level of faith was closely related to immunity. For example some verses in a religion (Islam) can be practiced as a prayer for those who are suffering from stress, anxiety, depression or other physical illness[12].

There was a previous study related to stigma, namely group counseling (psychoeducation therapy) but there was no session to improve emotional aspects in the topic of the intervention given. There had been no efforts on the spiritual impact due to the stigma of leprosy. This study aims to prove and explain the effect of psychoeducation modification intervention on the improvement of spiritual response, Perception Stigma, anxiety level, and cortisol levels among lepers.

Method and Materials

Study Design: This study was a combined study which used mixed method, wherein the first stage used qualitative method to develop a psychoeducation modification module and the second stage was a quantitative method with quasi-experiment using pre-test post-test with control group design.[13] The study population was patients who received MDT. The total sample in 3 groups was 35 lepers. The sampling technique used cluster sampling and simple random sampling techniques.[14]This study was conducted in Cirebon District. Statistical tests used One-way ANOVA, Kruskal-Wallis test and PLS (Partial Least Square) path analysis.

Description of Treatment Model: The treatment group consisted of three groups, the first treatment-group was psychoeducation modification (MP) that was given psychoeducation modification intervention and standard therapy for leprosy prevention program namely Multi Drugs Therapy (MDT), the second treatment group was psychoeducation (P) that was give psychoeducation intervention and MDT, and the control group (control group) K) was only given standard therapy of MDT. Psychoeducation modification intervention was provided in 5 sessions and consisted of 3 intervention topics namely knowledge management, anxiety management and prayer. Each psychoeducation modification intervention session lasted for 60-90 minutes

Results

The mean age of the study subjects in group MP was 31.42 years, in group P was 33.91 years and in group K was 45.50 years. The mean duration of treatment in group MP was 6.08 months, in group P was 6.91 months, and in group K was 10.25 months.

Table 1: Differences in Spiritual Response and Perception Stigma Scores among the 3 Groups of Lepers

Time of Assessment	MP=12	P=11	K=12	P value
	Mean±SD	Mean±SD	Mean±SD	
Spiritual Response				
Pre-test	35,33±5,74	34,82±3,12	33,75±4,15	0,794*
Post-test 1	41,42±3,476	38,09±3,177	29,67±3,025	0,0005*
Delta 1	6,08±6,529	3,27±2,970	-4,08±3,988	0,004*
Post-test 2	43,42±3,942	38,82±3,401	31,42±2,968	0,0005*
Delta 2	8,08±5,071	4±3,16	-2,33±3,962	0,002*

Time of Assessment	MP=12	P=11	K=12	P value
	Mean±SD	Mean±SD	Mean±SD	
Perception Stigma				
Pre-test	18,25±8,604	22,45±9,459	14,67±8,261	0,162*
Post-test 1	13,67±2,348	19,73±3,069	16,92±6,708	0,002*
Delta 1	-4,58±7,657	-2,73±11,53	2,25±4,864	0,146*
Post-test 2	9,33±1,497	16,09±4,549	18,58±5,664	0,0005*
Delta 2	-8,92±7,669	-6,36±6,562	3,92±6,288	0,001*

* Kruskal Wallis Test

Psychoeducation modification increased the score of spiritual response among lepers, from the mean score difference and statitiscal test showed significant difference in mean of spiritual response before and after the intervention of the three groups (p-value of<0.05).

Psychoeducation modification decreased the perception stigma among lepers, seen from the mean score difference and the statistical test showed significant difference in mean of Perception Stigma before and after the intervention of the three groups which obtained (p-value of<0.05)..

Table 2: Differences in Anxiety Level and Cortisol Levels Scores among the 3 Groups of Lepers

Time of Assessment	MP=12	P=11	K=12	P value
	Mean±SD	Mean±SD	Mean±SD	
Anxiety Level				
Pre-test	20.58±3.288	17.27±5.236	22.42±4.209	0.024*
Post-test 1	12.83±1.528	14.55±2.115	26.67±5.614	0.0005*
Delta 1	-7.75±3.388	-2.73±6.278	4.25±4.751	0.001*
Post-test 2	11.67±3.916	12.64±3.472	24.17±5.167	0.0005*
Delta 2	-8.92±5.452	-4.64±6.652	1.75±3.194	0.008*
Cortisol Levels				
Pre-test (µg/dL)	9.42±4,750	10.42±5.797	10.68±3.914	0.801*
Post-test 2 (µg/dL)	8.14±4.071	7.01±4.188	9.13±3.278	0.431*
Delta	-1.28±4.800	-3.41±7.725	-1.56±3.033	0.606*

* Anova test, ** Post Hoc Test

Psychoeducation modification reduce anxiety level score among lepers (p-value of<0.05). Psychoeducation modification reduce in the mean score of cortisol (p-value of > 0.05). The path in the study showed that psychoeducation modification effect was more targeted at improving emotional and spiritual intelligence which had an impact on the spiritual response improvement, Perception Stigma, anxiety level and stability in cortisol levels decrease.

Discussion

Psychoeducation modification increase the spiritual response score among lepers. Positive emotional reactions could improve a person's immune system[15]. Previous study stated that participation in spiritual therapy programs could improve spiritual condition, quality of life, including physical, emotional, and social functions among breast cancer sufferers[16] through counseling with a spiritual approach among pregnant women[17]. Prayer during illness produced physical benefits such as reducing blood pressure, psychological benefits such as decreased depression, anxiety, and spiritual benefits. Patients stated that prayer could give them comfort and had a positive effect on the recovery of their pain[18].

Psychoeducation modification decreased the perceived stigma score among leprosy patients.

Psychoeducation is a therapy to provide information to sufferers who experience distress and can improve skills and coping due to health problems[19]. To change attitudes, it is very important that a patient is consistently exposed to new information that can be integrated into his view. Psychoeducation provides a cognitive framework that help accept their illness and improve adherence, reduce psychological which in turn provided hope about opportunities for a productive life[20]. Previous studies stated that psychoeducation significantly reduced the Perception Stigma and provided greater coping after treatment among patients with chronic mental illness[20]. The concepts developed from previous studies are related to the Perception Stigma by involving a spiritual approach[21],[22]. People with skin disorders often experienced stigma and even discrimination, the countermeasures by spiritual method had brought healing to the stigma they felt[23].

This study proved that psychoeducation modification could reduce the anxiety level score among lepers. Psychotherapy could influence psychobiological responses to stress including cognitive assessment and coping style[24]. Regarding physiological aspect, relaxation can reduce anxiety through the mechanism of increasing parasympathetic nerves by inhibiting the work of sympathetic nerves. The relaxation response caused by the parasympathetic nerve works by stimulating the adrenal medulla to decrease epinephrine, norepinephrine, cortisol release and increase nitric oxide. This situation will cause changes in the body's responses such as a decrease in pulse rate, blood pressure, oxygen consumption, metabolism, and a person will feel comfortable[25].

These results are consistent with previous studies, which stated that psychoeducation interventions could reduce anxiety and depression in heart disease[26]. Education could reduce anxiety, depression, and stress among pulmonary TB patients[27]. Spiritual interventions could reduce anxiety levels among preoperative patients. [28]Post-prayer evaluation showed decreased anxiety and depression, and a greater spiritual state compared to baseline size among patients with depression and anxiety[29]. Prayer therapy was effective with a significant difference in anxiety levels between the intervention group and the control group among cancer patients[30].

This study proved that psychoeducation modification could reduce cortisol levels among leprosy patients. When the body meets with stressors, the body will activate the nerve and hormone responses to carry out defense measures in order to cope with emergencies. General adaptation syndrome is controlled by the hypothalamus. The hypothalamus will directly respond by activating the sympathetic nervous system. It also releases CRH to stimulate ACTH and cortisol secretion. Sympathetic stimulation will cause epinephrine secretion, both of which have secretion effects on insulin and glucagon by the pancreas. A balanced body system affects the hormonal balance in a physiological state. When the remembrance focus phrase is combined with the relaxation response it can inhibit the work of the sympathetic nervous system which regulates the speed of the heart rate, pulse, respiration and metabolism[31]. Previous study showed an effect on the decrease in cortisol hormone production among HIV/AIDS sufferers, but overall there was no significant difference between the treatment and control groups[32],[33].

Emotional intelligence is very necessary to cause patience which will further show the important role of spiritual intelligence. The path showed that psychoeducation modification effect was more targeted at improving emotional and spiritual intelligence which had an impact on the improvement of spiritual response, perception stigma, anxiety level and stability in cortisol levels decrease.. The mechanism of the relationship between emotional and spiritual states on the cortisol levels can be performed through human cognitive proces which may cause changes in cortisol levels as a marker of emotional and spiritual situations[34),(35].

Conclusion

It can be concluded that psychoeducation modification was effective in improving spiritual response, Perception Stigma, anxiety level, and cortisol levels among lepers. The path showed that psychoeducation modification effect was more targeted at improving emotional and spiritual intelligence which had an impact on the improvement of spiritual response, perception stigma, anxiety level and stability in cortisol levels decrease. It is recommended to integrate psychoeducation modification intervention into the leprosy prevention service program as a holistic service that includes spiritual biopsychosocial aspects. It is necessary to improve emotional and spiritual intelligence so that it can improve the immunity of lepers which in turn have an impact on the healing process of the illness.

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EEBE-HOTS: Developing Environmental Enrichment Book Eco-label Based on Higher Order Thinking Skills for 21st Century Learning

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Abstract

Environmental learning about eco-label in schools has not been done too much. The purpose of this study was to develop an Environmental Enrichment Book Eco-label based on HOTS (EEBE-HOTS). The research method used is research and development by Borg and Gall model (2003). The research was conduct in April-June 2019 at the State University of Jakarta (Jakarta State University). The results of the study showed that EEBE-HOTS is very valid and suitable for used in learning with average score percentage from learning material expert (92.65%), learning media expert (89.71%), user 1 (98.53%), user 2 (89.71%), user 3 (88.24%), and user 4 (94.12%). EEBE-HOTS is an innovation in 21st-century learning because it is very contextual with current environmental problems. Besides that, EEBE-HOTS can be applied online. The conclusion is that EEBE-HOTS products can be used in learning.

Keywords: *Eco-label, enrichment book, environment, HOTS.*

Introduction

Environmental problems are a problem that must be solved. One of the environmental problems that we are facing is using environmentally friendly products. Environmentally friendly products have several characteristics, for example, made from environmentally friendly materials, environmentally processes, and product packaging also adheres to environmentally friendly principles. The problem is that most people do not understands the production process of a product. This is one of the reasons of an eco-label problem study[1–3].

Eco-label is a label contained in a product that indicates product is environmentally friendly or not. A product that has an eco-label means that the production process has gone through stages that are environmentally friendly[4,5]. The next problem is that many people do not understand the various types of eco-labels. Especially for students at the secondary school level, Junior High School and Senior High School, they are a group of consumers who must know eco-labels. The problem that arises is that there has not been much learning about eco-labels in schools. Teachers in school usually convey information about the general environment and do not follow the current issues including eco-labels [6–8].

Students need Higher Order Thinking Skills (HOTS) in solving environmental problems specially related to the eco-labels. Student need to analyze, evaluate the product according to the eco-label or not. They should also be able to create innovations about environmentally friendly products, for example making eco-friendly shopping bags[5,9,10].

This problem can be overcome by developing a book specifically discussing eco-label topicsthrough HOTS. Based on research in the world that has been carried out relating to eco-labels is about people's perceptions of eco-labels[1,11,12]. Studies are still lack in developing about eco-labels books and are still thinking about implementation in schools. Also, in other studies related to HOTS, many studies only discussed the HOTS profile of students[13–16]. Not many have done eco-label

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development related to HOTS. Based on this, the novelty of this research is a development topic on Eco-label and HOTS-based topics. The purpose of this research was to develop Environmental Enrichment Book Eco-label based on HOTS (EEBE-HOTS).

Method

This research was conducted in April-June 2019. This study used research and development method by following the steps of Borg and Gall. There are 6 steps from development research, namely (1) Conduct analysis of various references/needs assessment (2) Conduct development planning (3) Develop Products (4) Conduct limited trials (5) Revise products (6) Conduct trials with larger scale [17].As for this study only carried out only until the third stage until product development.

In the first stage, a needs analysis was carried out, referring to previous research that found that the enrichment eco-label was a product that was rarely developed before at the school and university level[6]. In the second stage, EEBE-HOTS product development planning was carried out at the State University of Jakarta (Universitas Negeri Jakarta), Indonesia. Then the third step is to develop EEBE-HOTS products.

Products developed are in the form of electronic books (e-books) with the contents of the book (1) definition of eco-label (2) type of eco-label (3) how to assess a product based on eco-labels (4) student activity sheets. The HOTS aspect used is analyze, evaluate, and create [18]. The HOTS aspect is inserted in the contents of the book and activity sheet. Then after development, material and media validation tests were carried out. The experts appointed as material and media experts are lectures on the Biology education program, and four Biology teachers as users. The validation criteria used refer to Ratumanan & Laurens [19]. Also, the data is also presented as a percentage. The percentage category refers to the category validation, according to Akbar[20]. More details can be seen in tables 1 and 2.

Table 1. Category validation based on score interval

Score Interval	Category
$3.25 < x \leq 4.00$	Very Valid
$2.50 \leq x \leq 3.25$	Valid
$1.75 < x < 2.50$	Less Valid
$1.00 < x < 1.75$	Not Valid

Source: Ratumanan& Laurens[19]

Table 2. Validation categories based on percentage scores

Percentage Score	Category	Note
81 % - 100%	Very Valid	Can be used without repair
61 % - 80%	Valid	Can be used with a little improvement
41 % - 60%	Less Valid	Can be used with many improvements
21 % - 40%	Invalid	Cannot be used
0% - 20%	Invalid	Cannot be used

Source: Akbar[20]

Findings And Discussion

The results of development products are made in full color and use Indonesian language. In the cover section, there is a book title, author's name, and also an illustration of eco-label. While in the contents of the book there is an explanation of eco-labels and various types of eco-labels such as the Forest Stewardship Council (FSC) logo, the Program for Endorsement of Forest Certification (PEFC), the Marine Stewardship Council (MSC), etc. More details can be seen in Figure 1

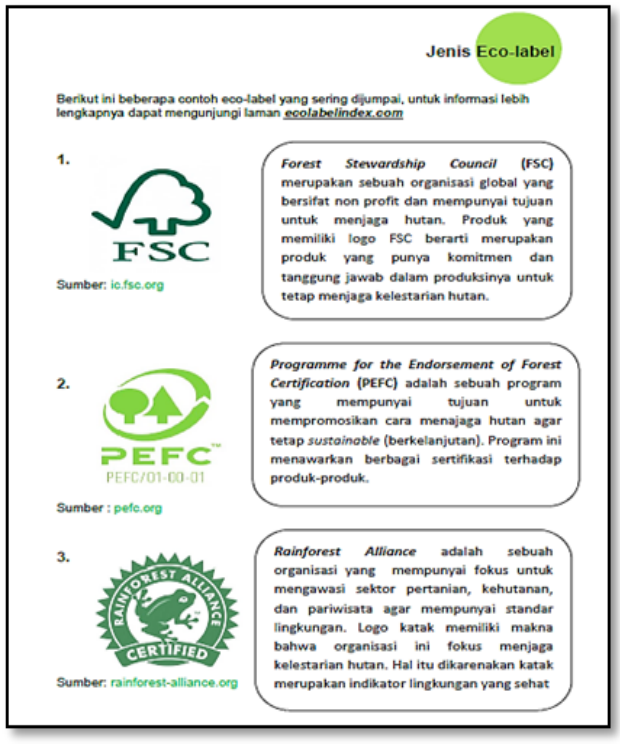




Figure 1. Cover and content of EEBE-HOTS

Then another part besides the explanation about eco-labels also explained about how to evaluate an eco-label based product. Finally, students were asked to work on an activity sheet containing tasks based on Higher Order Thinking Skills (HOTS). For example, in the first worksheet, students are asked to make an analysis and evaluate a product. Of course, the products requested to be analyzed everyday products that they often use such as soap, shampoo, paper, cooking oil etc. Then on the second worksheet, students are asked to design a product that meets eco-label based criteria.

Validation results are presented in the form of tables from expert learning materials, Learning media experts, and users. The overall results showed that EEBE-HOTS has a very valid category, so EEBE-HOTS is suitable for use in learning in schools for Junior High School and Senior High School levels. More details can be seen in tables 3,4,5 and 6.

Table 3. Results of Learning Material and Media expert validation

No	Indicator	Average	Percentage
Learning Material Expert			
1	Material Accuracy	4.00	100.0
2	Depth of Material	3.50	87.50
3	Language Clarity	3.75	93.75
4	Use of sentences, words and punctuation	3.50	87.50
Learning Media Expert			
1	Suitability of images and colors	3.60	90.00
2	Compatibility of letter and writing formats	3.75	93.75
3	Language clarity	3.50	87.50
4	Use of sentences, words and punctuation	3.50	87.50

Table 4. Results of user validation for each indicator

No	Indicator	User 1	User 2	User 3	User 4	Average
1	Suitability of images and colors	4.00	3.40	3.60	3.60	3.65
2	Conformity of Material with syllabus	4.00	3.50	3.50	3.75	3.68
3	Language clarity	3.75	3.75	3.75	4.00	3.81
4	Use of sentences, words and punctuation	4.00	3.75	3.25	3.75	3.68

Table 5. The results of the all validators with category

Validators	Average Score	percentage	Category
Learning Material Expert	3.70	92.65	Very Valid
Learning Media Expert	3.58	89.71	Very Valid
User 1	3.94	98.53	Very Valid
User 2	3.59	89.71	Very Valid
User 3	3.53	88.24	Very Valid
User 4	3.76	94.12	Very Valid

Based on table 3, it can be seen that the score given by learning material expert was greater than that of the learning media expert. This makes EEBE-HOTS able to present accurate information because it comes from valid information[21–24]. In the table, the highest 6 points are found in the indicators of letter format and writing conformity. This is because the EEBE-HOTS is presented with standard information. Based on user validation, this book is also according to the syllabus and basic competencies in the school, so that it can be used in the classroom[25,26].

After obtaining the results of validation, the next discussion is about the function of EEBE-HOTS. EEBE-HOTS is an enrichment book which has the function of deepening the material for students. Based on its function, this EEBE-HOTS does have a function to deepen students' knowledge about eco-labels. This is necessary because in school, learning does not discuss in detail about eco-labels [5,21]. Even though in daily life, students are very concerned with eco-labels.

Students who do not understand the eco-label will easily buy the items they need without considering the quality of the product and do not care about environmentally friendly aspects. This underlying the EEBE-HOTS book developed has a section specifically discussing "how to assess an eco-label based item". This makes students know what steps are needed to choose an eco-label based item. This component becomes important in an enrichment book because this will make students' knowledge deeper and wider [23,27].

In the menu "how to assess an eco-label based item" this is also by one aspect of HOTS, namely evaluate. Students are taught how to assess the quality of an item based on eco-label aspects. The other HOTS aspects of the EEBE-HOTS book can be found in the "student activity sheets part 1" menu section. In this menu, the students further after learning how to assess an item, students are now asked to assess and analyze the various products around them in terms of eco-labels. This activity is very suitable with HOTS, where students are trained to analyze and evaluate. The benefit that can be obtained by students with this activity is to become accustomed to buying an eco-label based item[4,28,29].

The create aspect which is the highest level in HOTS is in the "student activity sheets part 2" menu. Students are asked to design a product using the eco-label principle. This activity can take place, for example, by making handicrafts from used materials. Students can make a bag from unused cloth. This activity in addition to relating to HOTS also relates to students' skills in working together and practicing student creativity [30–33]. The last discussion is EEBE-HOTS as an innovation in 21st-century learning. As innovation in environmental learning in schools, the development of EEBE-HOTS is considered appropriate because it is based on more contextual or current environmental issues [34–36]

Conclusion

Based on the results of the study, it can be concluded that EEBE-HOTS has a very valid and appropriate category of learning. EEBE-HOTS content that contains HOTS aspects is located on the "how to assess an eco-label based item" menu and the "student activity sheets"menu. EEBE-HOTS is a learning media innovation and teaching material in 21st-century environmental learning.

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The Association of Triglycerides Glucose Index with Diabetic Retinopathy in Patients with Type 2 Diabetes Mellitus

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Abstract

Aim: The aim of this study is to evaluate the association of the Triglycerides glucose index, (TyG index), a marker of insulin resistance, with diabetic retinopathy in patients with type 2 diabetes mellitus.

Method: This is a cross sectional study, carried out during the period from April 2016 to November 2017. 416 patients with type 2 diabetes mellitus were enrolled in this study (194 male and 222 female). Fasting blood sample was obtained to measure the blood glucose, glycated hemoglobin, and lipid profile. Patients were referred to ophthalmological assessment for the diagnosis of diabetic retinopathy. Body mass index and waist circumference were measured by standardized procedure. TyG index was calculated according to a published formula. Statistical analysis was performed by using SPSS

Results: Seventy patients had diabetic retinopathy (28 male and 42 female).TyG index was higher in patients with diabetic retinopathy, the prevalence of diabetic retinopathy increased across TyG index quartiles (p=0.000). The correlation between TyG index and the presence of retinopathy was significant (r = 0.247, P=0.000) after adjusting for the confounders. Area under the curve showed that TyG index has a good discriminating power to predict the presence of diabetic retinopathy.

Conclusion: TyG index could be used as an indicator of the presence of diabetic retinopathy. It shows a good association with diabetic retinopathy

Keywords: *Triglycerides glucose index; diabetic retinopathy; type 2 diabetes mellitus; insulin resistance.*

Introduction

Diabetic retinopathy (DR) is the leading cause of vision impairment and blindness globally [1, 2]. DR prevalence in patients with diabetes is about one-third and expected to increase in the coming years [3].

Many well known risk factors are involved in the pathogenesis of retinopathy as hyperglycemia hypertention, dyslipidemia and diabetic duration [4]. Hyperglycemia remains the key risk factor [3,] however, in the UK Prospective Diabetes Study (UKPDS), a 10 year follow up of participants was newly diagnosed with type 2 diabetes,it has been found that even with intensive glycemic control the overall micro-vascular complications rate are reduced only by 25% [5]. So, this leads us to the hypothesis that there are other risk factors that are involved in the pathogenesis of DR.

A few studies have investigated the relation between insulin resistance and the development of DR, Insulin resistance is a feature of type 2 diabetes mellitus, diabetic cardiovascular and renal complications [6, 7]. Therefore it is hypothesized that insulin resistance may play a role in the development of DR.

The gold standard method for assessing insulin resistance is the hyperinsulinemic-euglycemic clamp. However, the need for an accessible, reliable marker has proposed the use of Triglycerides glucose index (TyG) as a novel marker for insulin resistance with a high specificity and sensitivity[8,9]. Previous researches

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have demonstrated the role of TyG as a predicator of metabolically obese normal weight subjects, non alcoholic fatty liver and metabolic syndrome [9].

The aim of this study is to determine the association of TyG index, as a non invasive, simple, inexpensive marker of insulin resistance, with the presence of DR in patients with type 2 diabetes mellitus

Subjects and Method

Study design: This is a cross sectional study conducted during the period from April 2016 to November 2017 in Diabetic centers in Baghdad. The data **were** collected from both patients visiting the diabetic centers,in addition some cases **were** collected from the saved records and files which **were** retrospectively viewed and collected to get complete information of each diabetic patient.

The records of 500 T2DM subjects aged (18-70 years) were initially assessed for eligibility. Among these, 34 patients were excluded due to missing data or certain diseases or medication as insulin therapy that affect the tested parameters. Patients with type 2 diabetes mellitus meeting any of the following exclusion criteria were not included in this study eg., less than 18 years old, gestational diabetes, previous ocular surgery or contact lens wear; eye trauma; ocular inflammatory diseases;corneal and conjunctival diseases; glaucoma; vascular or degenerative retinal. Finally, 416 type 2 diabetic subjects (154 men and 129 women) were enrolled

The participants provided written informed consent for use of their health screening data in this research. The study was approved by the ethical and scientific committee in AL-Kindly College of Medicine-University of Baghdad. The study was carried out in accordance with the Helsinki Declaration of 1975.

Biochemical measurement: After 12h fasting, venous blood samples were collected from all the participants. Serum was collected in EDTA tube, centrifuged at 5000 rpm for 15min. The clear supernatant was then separated and analyzed.

Fasting glucose (FPG), triglycerides (TG), total cholesterol (TC), and high density lipoprotein (HDL-C) were measured by using chemistry auto analyzer (Roche Modular P-800, Germany).

The level of LDL cholesterol was determined using the Friedewald formula:

HbA1c was measured by high performance liquid chromatography (HPLC supplied by Variant company, USA)

Definitions: According to the American Diabetes Association (ADA) criteria; diabetes was defined as levels of fasting glucose ≥ 126 mg/dL or HbA1c ≥ 6.5% and/or the current use of antihyperglycemic drugs[10].

LDL-C (mg/dL)=TC (mg/dL)-HDL-C (mg/dL)-TG (mg/dL)/5[11].

TyG index was calculated according to the formula [12,13]:

TyG index = ln (fasting TG [mg/dL]/fasting glucose [mg/dL]/2)

Ophthalmological assessment: As part of routine follow up for patients with diabetes, they underwent opthalamoscopic assessment. Standard equipments and techniques were used for clinical examination; and the retinal assessment was done using a direct/indirect ophthalmoscope or 90D lens on slit lamp. The presence of macular edema and the grading of the retinopathy were kept outside the scope of this study,any type of DR was included.

Anthropometric measurements: The body weight, height and waist circumference (WC) were measured according to a standardized protocol. Measurements were done while the participants wore light clothes with bare feet. WC **was** measured midway between the costal margin and the iliac crest at the end of expiration. Weight and height **were** measured to the nearest 0.1 kg and 0.1 cm respectively. The BMI had been calculated as the weight in (kg) divided by the height in (m) squared.

Statistical analysis: Statistical software SPSS version 23.0 software (Chicago, IL, USA) was used for statistical analysis. A value of $p < 0.05$ was considered statistically significant.

Participants were grouped into patients with and without diabetic retinopathy. and their baseline characteristics were compared using the Independent samples t-test (2-tailed) and the results were expressed as mean ± standard deviation or standard error of mean as appropriate. The TyG index **was** calculated as quartiles and the measured parameters were compared

by (ANOVA) test as appropriate. the Chi square tests was used to compare the categorical variables with percentages.

Correlation test was used to assess correlations between the TyG index and DR adjusted for other factors. Receiver Operating Characteristic (ROC) curve was used to compare the strength of TYG indices in discriminating the presence of diabetic retinopathy depending on the area under the curve (AUC) with the 95% confidence interval (CI) was calculated.

Result

Four hundred sixteen patients with type 2 diabetes **were** enrolled in this study (194 male and 222 female). 70 patients had diabetic retinopathy (28 male and 42 female). The baseline parameters of the patients with and without diabetic retinopathy are illustrated in table 1. TyG index was higher in patients with diabetic retinopathy, in addition, most of the tested parameters were higher in the DR group but,only diabetes duration, patients age, SBP and LDL-C reach a statistically significant higher level in the DR group.

Table 2 shows the characteristics of the patients according to the TyG index quartiles,the metabolic profile and the anthropometric measures worsen with the increase in the TyG index.

The correlation between TyG index and the presence of retinopathy was significant (r = 0.247 P=0.000) after controlling (age, duration of diabetes, FBG, HbA1C, SBP,DBP, TC, TG,HDL,WC and BMI) as shown in table 3

In table 4 we assess the potential power of TyG index to predict the presence of DR **which** illustrated a good discriminating power

Table 1: Characteristics of patients with type 2 diabetes mellitus by the presence or absence of retinopathy

	Patients without Diabetic retinopathy	Patients with Diabetic retinopathy	P value
Number	346	70	
Gender (male:female)	166:180	28:42	0.194
Age (years)	54.56±9.31	58.98 ±7.63	0.001**
Duration of diabetes(years)	7.07± 0.33	13.02± 1.28	0.000**
TyG	9.30 ±70	9.87 ±.85	0.000**
FBG(mg/dl)	184.63±3.89	200.36 ±12.88	0.248
HbA1C (%)	8.73 ±2.17	8.92 ± 1.60	0.502
SBP(mmHg)	135.34±19.24	148.37 ± 26.26	0.003*
DBP(mmHg)	86.03±10.16	86.65±12.74	0.759
TC(mg/dl)	177.2 ±43.34	164.34 ± 42.85	0.076
TG(mg/dl)	135.34±19.24	148.37 ± 26.26	0.321
HDL(mg/dl)	44.70±3.06	45.0 ± 2.65	0.533
LDL(mg/dl)	103.46±30.6	86.41±38.7	0.04*
Body Mass Index(kg/m^2)	29.62 ±5.20	30.51 ±5.10	0.294
Waist Circumference (cm)	100.21±10.5	101.10 ±11.49	0.634

Results are expressed as mean± SD or SEM as appropriate, *P value less than 0.05 is statistically significant

Table 2: Characteristic of patients according to the TyG index quartile including baseline characteristics and prevalence of diabetic retinopathy

	Q1 TyG Less than 8.9	Q2 TyG 9-9.3	Q3 TyG 9.4-9.7	Q4 TyG More than 9.8	P value
Number	104	104	104	104	
Age	55.89±9.603	55.72±10.06	55.36±9.73	55.28±8.09	0.958
Duration of diabetes (years)	6.92±0.703	7.50± 0.594	8.15±0.670	9.28± 0.76	0.090
FBG(mg/dl)	130.89 ±5.16	169.07±4.41	204.40±5.48	243.77±8.07	0.000
HbA1C (%)	7.63±1.81	8.54 ±2.04	9.12±2.00	9.75±1.96	0.000

	Q1 TyG Less than 8.9	Q2 TyG 9-9.3	Q3 TyG 9.4-9.7	Q4 TyG More than 9.8	P value
SBP(mmHg)	137.30±19.1	137.17±19.9	138.63±20.03	139.50±25.9	0.835
DBP(mmHg)	85.61±9.41	84.48±9.11	86.22±8.65	87.27±12.38	0.233
TC(mg/dl)	163.23±3.70	173.95±3.933	177.78±3.963	190.69±5.15	0.000
TG(mg/dl)	102.02±2.64	124.70±4.83	147.09±4.85	209.44±8.69	0.000
HDL(mg/dl)	46.15±2.20	45.42±2.74	44.84±2.52	42.79±3.42	0.000
LDL(mg/dl)	94.1 ± 4.73	104.28±4.78	104.75±4.65	102.52±7.34	0.441
Body Mass Index (kg/m^2)	29.4 ±5.7	29.57 ± 4.43	29.62 ±4.42	30.81 ±6.14	0.188
Waist Circumference (cm)	98.99 ±11.1	100.3 ±9.7	101.1±10.39	102.3 ±12.08	0.153
DR number (%)	7(6.73 %)	11(10.57%)	20(19.2%)	32(30.7 %)	0.000
Gender(male: female)	3:4	4:7	9:11	12:20	0.407

Results are expressed as mean± SD or SEM as appropriate, Chi square test used for the difference in the frequency. *P value less than 0.05 is statistically significant

Table 3: Correlation analysis of TyG Index and the presence of DR

	r	p-value
TyG Index and DR	0.247**	0.000

*P value less than 0.05 is statistically significant, Corrected for (age, duration of diabetes, FBG, HbA1C, SBP, DBP, TC, TG, HDL, WC and BMI)

Table 4: Area under Receiver Operating Characteristic curve (ROC) for TyG in predicating diabetic retinopathy

Test result	Area under the curve	Asymptomatic 95% confidence interval		P value
		Lower bound	Upper bound	
TyG	0.704	0.613	0.795	0.000

P value less than 0.05 is statistically significant.

Discussion

The TyG index has been proposed as a surrogate marker of IR [14]. Hence in the present study, we have explored the association of TyG index with DR. we found that TyG index was significantly associated with the presence of DR. TyG index was higher in patients who had diabetic retinopathy. In addition, the number of patients with DR increases across the TyG quartiles. The area under the curve showed that TyG index had a good discriminating power to identify the presence of DR.

Currently, the studies that link TyG Index and DR are scarce. Our results agree with a study done by Parvanova et al[15] which reported the association of retinopathy with insulin resistance using a hyperinsulinemic-euglycemic clamp in 115 patients with type 2 diabetes mellitus. He found that insulin resistance was the only considered biomarker to maintain a significant association with the severity of retinopathy. However, the use of hyperinsulinemic-euglycemic clamp to assess insulin resistance is impractical as it is expensive, invasive and not available in every clinical setting.In contrast, the TyG Index is practical,available and inexpensive. TyG index only requires the measurement of glucose and triglycerides level, hence, both are routinely measured in patients with diabetes to assess the metabolic profile, In addition, using TyG index may better interpret their joint effect in Diabetic retinopathy risk prediction. Our results confirm and broaden previous studies [16-18], including the report by Maneschi *et al*.[19] illustrating that patients with Diabetic retinopathy tended to be more insulin resistant than those without retinopathy.

How insulin resistance enhances the development of diabetic retinopathy remains a subject of debate. Many proposed mechanisms are involved. First of all, abnormal fibrinolysis caused by excessive activity of plasminogen activator inhibitor-1 with the inhibition of the antiatherogenic action of insulin may lead to the occlusion of retinal capillaries resulting in ischemia-

induced neovascularization[20]. The other proposed mechanism is the ischemic damage **which** can be further increased by insulin resistance due to a lower ability of insulin to induce vasodilatation through defective endothelial nitric oxide production or excessive inactivation[21].

There were several limitations in the present study. Firstly, the cross sectional design of the study, Secondly,the sample size might not be large enough, third, the measurements of TG and glucose had unavoidable intra-individual biological variation, Hence, larger sample and long-term studies are needed to confirm our findings

In conclusion, the TyG index represents a useful and accessible tool, more severe insulin resistance is associated with DR in patients type 2 diabetes mellitus. Early screening for insulin resistance by a simple measure as the TyG index can spot high risk patients who may benefit most from preventive and curative measures so that interventions that improve insulin resistance may also decrease the risk of diabetic retinopathy.

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No Ethical Concern

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Analysis of Risk Factors Related to the Events of Early Marriage in the Wetland

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Abstract

According to Law No. 1 1974, article 7, paragraph (1) "Marriage is allowed only when the man has reached the age of 19 (nineteen) years and the woman has reached the age of 16 (sixteen) years". A marriage of under-age marriage is said to be the case when the age of one or both families are under the age specified. Banjar district ranks the second highest cases of early marriage in South Kalimantan in 2017. Figures for the early marriage Banjar district from 2016 as many as 15 cases and an increase in 2017 as many as 74 cases, 67 cases of which are in Sub-Aluh Aluh. This study aims to explain the risk factors associated with the incidence of early marriage in the wetlands. This study is a quantitative research, with case control design with a ratio of 1: 2 and using purposive sampling technique. The number of respondents in this research were 105 people consisting of 35 respondents 70 cases and the control group respondents. Based on the research results attitudinal variables and the environment girls associated with the incidence of early marriage (p value = 0.001 and p value = 0.001), while the variables of education and culture (p value = 1.000 and p value = 0.011), not associated with the incidence of early marriage. The conclusion of this research is no relationship between environmental attitudes and girls with the incidence of early marriage, whereas no correlation between education and culture with the incidence of early marriage.

Keywords: *The incidence of early marriage, attitude, environment.*

Introduction

Early marriage is inner and outer bond between men and women who are young. Early marriage is a marriage on girls under the age of 16 years should not yet ready to perform marriages [1]. This is contrary to Law No. 1 1974, article 7, paragraph (1) which states that "marriage is allowed only when the man has reached the age of 19 (nineteen) years and the woman has reached the age of 16 (sixteen) years". A marriage of under-age marriage is said to be the case when the age of one or both families are under the age specified [2,3].

Indonesia is among countries with a high percentage of young age marriage in the world (rank 37). This position is the second highest in ASEAN after Cambodia. Based Health Research (Riskesdas) in 2013, South Kalimantan Province was ranked second after West Java in the case of early marriage at the youngest age between 10-14 years. Based on data from the BKKBN, the number of teenagers in South Kalimantan families are 2483 people with a number of early marriages reached 18% of the total number of adolescents aged 14-16 years[4,5].

Data Based Population and Family Planning Agency (BKKBN) in 2012 about early marriage, shows the percentage of early marriages in the province of South Kalimantan at 4.84% exceeds the national average by 40 early marriages per 1,000 population. Whereas in 2014 the percentage of early marriages in South Kalimantan rose to 5.85%[6].

According to the Ministry of Religious Affairs, South Kalimantan 3 cases of early marriage with the highest ranking in South Kalimantan in 2017 respectively Hulu Sungai Tengah Regency as many as 101 cases, as many as 74 cases of Banjar Regency and Tanah Laut as many as 32 cases. The Ministry of Religious Affairs According to the Banjar district early marriage figures for Banjar of 2016 as many as 15 cases and an increase in 2017 as many as 74 cases. Figures early marriage in Banjar district in 2017 was 74 cases, consisting of the

District Aluh-Aluh with the highest number of as many as 67 cases[7,8].

The high incidence of early marriage will lead to a high risk of the incidence of pregnancy at a young age. Among them are miscarriage, premature delivery, low birth weight (LBW), congenital abnormalities, easy to infection, anemia in pregnancy, pregnancy poisoning and death [9,10]. Pregnancy at a very young age correlated with maternal mortality and morbidity. Girls aged 10-14 years 5 times the risk of dying during pregnancy or childbirth compared to 20-24 years age group. This risk is increased 2-fold in the age group 15-19 years[11]. Based on the background mentioned above, the research on "The relationship between education,

Materials and Method

This study is a quantitative research, this study used a case control study design with a ratio of 1: 2 and using purposive sampling technique. The number of respondents in this research were 105 people consisting of 35 respondents 70 cases and the control group respondents.

The research instrument is a checklist sheet, the sheet. The bivariate analysis using chi square test. The variables in this study are education, attitudes, culture and the environment and the dependent variable was the incidence of early marriage.

Results and Discussion

A. Univariate Analysis

Table 1: Frequency Distribution

Variables	Respondents	
	N	%
Education		
Low education (primary and junior)	104	99.0
Higher education (SLTA)	1	1.0
Attitude		
Support	38	36.2
Does not support	67	63.8
Culture		
Support	34	34.4
Does not support	71	67.6
Environment		
Support	39	37.1
Does not support	66	62.9

Table 1 shows that the frequency distribution of education levels reveals that a number of teenage girls who berpindidikan larger lower than girls who are highly educated (99.0% versus (1.0%). On the attitude of the frequency distribution shows that the number of teenage girls that does not support early marriage is greater than the girls who support early marriage (63.8 versus 36.2%). In the culture of the frequency distribution shows that the number of teenage girls who do not support early marriage is greater than the girls who support early marriage (67.6 versus 34.4%).In the neighborhood frequency distribution indicate that the number of teenage girls who are in an environment that does not support early marriage which is greater than the number of girls who are in an environment that supports early marriage (62.9% versus 37.1%).

B. Analysis Bivariat

Table 2. Analysis of Risk Factors Related to Early Marriage Event In Area Wetland

Variables	Genesis Early Marriage				Total		p-value	OR
	Early married		Not Married Early					
	n	%	n	%	N	%		
Education								
Low education (primary and junior)	35	100	69	98.6	104	100	1,000	-
Higher education (SLTA)	0	0	1	1.4	1	100		
Attitude								
Support	32	91.4	6	8.6	38	100	0,001	
Does not support	3	8.6	64	91.4	67	100		113

Variables	Genesis Early Marriage				Total		p-value	OR
	Early married		Not Married Early					
	n	%	n	%	N	%		
Culture								
Support	8	22.9	26	37.1	34	100	0,011	-
Does not support	27	77.1	44	62.9	71	100		
Environment								
Support	33	94.3	6	8.6	39	100	0,001	176
Does not support	2	5.7	64	91.4	66	100		

Discussion

Based on table 2, the results showed that the attitude and environment variables girls is associated with the incidence of early marriage, while education and culture are not associated with the incidence of early marriage.

Based on the results of the chi square test showed that there is no relationship between education girls with the incidence of early marriage with a p-value = 1.000. This is caused by the age range of married respondents in this study is from <16 years, so it only consists of two categories of educational level. The results are consistent with research conducted by Priyanti (2013) which shows the p-value = 0.195, which indicates there is no correlation between education girls with the incidence of early marriage. These results indicate that the higher education does not determine a person to perform early marriage [12].

Based on the results of the chi square test showed that there is a relationship between the attitude of girls with the incidence of early marriage with a p-value = 0.001. This is because the girls are still in a culture that supports early marriage, early marriage so that he believes it is a natural thing for him and their willingness to channel the emotional needs through marriage considering they view marriage is better than dating.

This is in line with research conducted by Kartika (2013) which shows the perception of girls about early marriage will affect early marriages by 30.8% and is based on research Rafidah (2009) which stated that the respondents who have a perception of a less risky marriage 4.6 times more likely to marry at age <20 years compared to respondents who have a perception of a good marriage[13,14].

Based on the results of the chi square test showed that there was no relationship between culture and girls with the incidence of early marriage with a p-value = 0.011. At respondents who did not favor early marriage, but still get married early, there is an important role by parent respondents. Parents marry off their children is dominated by a strong belief of religion to avoid their children from fornication. According Dahro (2009), parents who still hold on to the old culture is to match and marry off their children at an early age because parents fear that their children are considered a spinster. This is in line with the results of in-depth interviews conducted by Haryono (2008) which states that according to the religion of parents are obliged to marry his daughter was of age (puberty) not committing fornication[15,16].

This is in line with research Pandaleke (2017), which shows the value of p = value p = 0.272> 0.05), then H0 is accepted or not there is a relationship between culture with early marriage. The results of this study are also consistent with research Rahma (2014), which examined the factors that influence the incidence of early marriage among women with results of bivariate analysis showed there was no correlation (p-value = 0.321) between the culture of early marriage[10].

Based on the results of the chi square test showed that there is a relationship between the environment and girls with the incidence of early marriage with a p-value = 0.001 it is because parents have a greater role than environment.

Conclusions

Based on the research results, conclusions obtained as follows:

a. Girls education was not associated with early marriage in Sub-Aluh Aluh Banjar district (p-value = 0.48).

b. The attitude of girls associated with early marriage in Sub-Aluh Aluh Banjar district (p-value = 0.001 and OR = 113.7).

c. Culture girls are not associated with early marriage in Sub-Aluh Aluh Banjar district (p-value = 0.011).

d. Environment girls associated with early marriage in Sub-Aluh Aluh Banjar district (p-value = 0.001 and OR = 176).

Suggestion:

1. Given this research are expected for people, especially parents to be wise in making a decision to marry her after knowing the impact of early marriage
2. For adolesscent girl, it is better before deciding to get married, they must first consider the maturity of age in marriage

Ethical Clearance: The study was approved and received ethical clearance from the Research Ethics Committee of Public Health, Faculty of Medicine, University of Mangkurat, Indonesia. In this study we followed the guidelines of the Committee on Public Health Public Health Committee on Research Ethics, Faculty of Medicine, University of Mangkurat, Indonesia for permission etchical and informed consent. informed consent, including the study title, objectives, participants correctly, confidentiality and signature.

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Conflict of Interest: The authors declare that they are not interested in confict.

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Analysis of Homology and Phylogenetic Genes Encoding Fusion (F) Protein of Newcastle Disease Virus (NDV) Isolated Swan (Cygnus Olor)

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Abstract

This study were conducted to analyze the homology and the relation of nucleotidesencoding partial genomic sequence of Fusion (F) protein Newcastle Disease Virus (NDV) isolated from swanusing phylogenetic tree. Samples were collected from cloacal swabs of seventy one waterfowls. Consisting of twenty four Domestic swan, thirty three Muscovy ducks, and fourteen Domestic ducks form waterfowl in East Java Province, and also positive LaSota isolate (ATCC). Samples were isolated in embryonated chicken eggs(ECEs) with specific pathogen free (SPF)and identified by HA test and confirmed as NDV by HI test. Positive samples were performed by RT-PCR using a forward and reverse primer with a target of 699 bp.The nucleotide sequences from field isolates were compared with the gene of vaccine viruses isolates encoded F protein NDV that used in Indonesia and vaccine viruses encoded F protein NDV that spread across the globe obtained at GenBank data and had very close phylogenetic relation with those vaccine viruses LaSota.Analysis of homology and phylogenetic from isolates in this study relate to isolate of vaccine viruses.

Keywords: *Newcastle disease virus, F protein, Homology, Phylogenetic Tree, RT-PCR.*

Introduction

Newcastle disease virus (NDV) is avian paramyxovirus (APMV) type 1 belong to genus *Avulavirus* in the family *Paramyxoviridae*. NDV has a single-stranded, negative sense RNA genome of 15.186 to 15.198 nt in length.[1] It has six genes that encode for a nucleoprotein (N), a phosphoprotein (P), a matrix protein (M), a fusion protein (F), an attachment protein called hemagglutinin-neuraminidase (HN), and a large polymerase protein (L).[2] Theoretically, F protein requires cooperation with HN protein to perform a membrane fusion during the fusion process so that the virus may penetrate a host cell's surface. [3,4]This virus has the ability to infect almost all bird species, both wild and domesticated birds.[5] Outbreaks of Newcastle disease (ND) occuring in Indonesia are usually caused by Asian-type velogenic strains which means including acute, highly lethal, and highly pathogenic virus. Cross protection that accurs between the *Newcastledisease* virus (NDV) can counter the challenges of other NDV, the underlying nature of vaccine production is the low virulence (lentogenic and mesogenic) ND strains.[6] Wild bird, especially waterfowl can be reservoirs of lentogenic strain, so they can be developed for vaccine production.[7]

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Newcastle Disease Virus (NDV) cases in Indonesia could occur despite intensive vaccination programs on farms.[8] Vaccination failures due to genetic changes of viruses is being put into consideration when using an existing vaccines commercial and encouraging the preparation of the newer vaccines.[9,10]Conducting research and developing the ND vaccine by utilizing local isolates is one of the strategies undertaken to develop the ND vaccine in Indonesia according to Bahri *et al*.[11] Thus, it is necessary to study the viruses isolated waterfowl to better understand the molecular characterization to control the NDV and ND Vaccines formulated with closer phylogenetically with field viruses can provide a better control by reducing transmission of ND virus from infected poultry.[12]

Materials and Method

Sample collection and virus isolation: Seventy one samples were collected from water fowls consisting of twenty four Domestic swan, thirty three Muscovy ducks, and fourteen Domestic ducks from waterfowl in East Java Province. Cloacal swab were placed in 1,m ml centifuge tubes containing 1,0 ml of transport medium phosphate buffer saline pH 7.0-7.4 with antibiotics (penicillin, 1000 U/mL); streptomycin (2 mg/mL) and fungison (1000 U/mL). All samples were inoculated in 9-to-11-day-old specific pathogen free embryonated chicken eggs (SPF-ECE) and incubated for 4-7 days with the temperature of 37°C.[7]

Haemagglutination (HA) and Haemagglutination inhibition (HI) test: HA and HI were used for virus identification follows standart procedure.[7] The 0,5% washed chicken RBC was used for spot HA testing individual alantoic fluid from the dead embryos prior to harvesting. Four HAU were used in HI test using reference anti-NDV (PUSVETMA, INDO).

Viral RNA extraction: RNAs of the viruses were extracted from allantoic fluids using Trizol LS reagen (Invitrogen, Carlsbad, CA) following the manufacture's instructions. Sample suspension was used for extraction, and RNA product store at -20°C.

Reverse Transcription Polymerase Chain Reaction (RT-PCR) and gene sequensing: RT-PCR was used for detection of partial F-gene of NDV using following primers Forward: (5'-GAC CGC TGA CCA CGA GGT TA-3', nucleotide position 4306-4326) and Reverse: (5'-AGT CGG AGG ATG TTG GCA GC-3',nucleotide position 4981-5005) oligonucleotide primer sets were used for amplification of 699 bp. Reverse transcription and PCR amplification followed QIAamp one step RT-PCR procedure (QIAGEN). A 25 µL total reaction mix was prepared using 12.5 µL 2x RT Mix component, 1 µL primary forward, 1 µL reverse primer, 1 µL superscript III, 8.5 µL NFW and 1 µL RNA. Conditions for amplification RT-PCR of complate F genes was follow 95°C lid on setting, 94°C predenaturation for 10 minutes; 94°C denaturationfor 1 minute; 57°C annealing for 1 minute; extention 72°C, for 10 minutes; and keep it at 4°C.RT-PCR products were analyzed by 1.5% agarose gel electrophoresis and visualized by ultraviolet transillumination.The target band was purified using the QuickClean DNA Gel Extraction Kit (QIAGEN) and purified products were sequenced using an automatic Applied Biosystem 3130xl Genetic Analyzer (HITACHI).

Molecular analysis: For homology analysis, the nucleotide sequences from field isolates were compared with the gene of vaccine viruses isolates encoded F protein NDV that used in Indonesia and vaccine viruses encoded F protein NDV that spread across the world obtained at GenBank data. The obtained sequence was edited using BioEdit Software Version 8 to create consensus sequence. Other isolate samples from GenBank were input into BioEdit for alignment using the ClustalW menu. The homology analysis of the F genes was performed using BLAST program of NCBI online on the Global Align tool (Needleman-Wunsch) which comprises two different sequences for the determination of similarity relationships.Phylogenetic trees were drawn using the maximum likelihood method found in MEGA6 software. [13]

Results and Discussion

Virus Isolation and Identification: All samples were inoculated in specific-pathogen-free (chicken embryos) allantoic fluid aged 9-10 days for 5 days and were observed every 24 hours. Cloacal swabs had been done because NDV known to be transmitted through digestive and respiratory systems.[7] Foursamples showing positive results of HA, ND/SW1/2018, ND/SW2/2018,ND/SW3/2018 and ND/SW4/2018. Samples with positive HA were confirmed by HI (haemagglutinin inhibition) using ND antiserum obtained from PUSVETMA. Growth of NDV in allantoic fluid is known by HA test to see the ability of haemagglutination of erythrocytes in viral envelope capable of agglutating erythrocytes of chickens. [14]. HI test is based on

principle that the hemagglutin on the viral envelope can agglutinate the chicken erythtocytes and this can be inhibited by specific antibodies. Agglutination inhibition occurs perfectly against 4 HA Unit antigen. Haemagglutinin of NDV can bind specifically to sialic acid on sensitive cell surface receptors and facilitate the infection process. This delicate receptor is also owned by red blood cells (erythrocytes) of chickens. [15]

RT-PCR: Samples ND/SW1/2018, ND/SW2/2018, ND/SW3/2018, ND/SW4/2018, and LaSota positive isolate continued to RT-PCR. RT-PCR has been established to identify of NDV.[16,17,18] The electrophoresis results showed good results with proven detection of DNA fragments in the sample with length of 699bp.

Homology analysis: Homology analysis carried out in this study used sixteen isolates comparison consisting of circulating virus vaccine and *Newcastle disease virus* (NDV) isolates in Indonesia. Vaccine virus isolates used were strains F, LaSota, V4, B1, Beaudatte C and Komarov and Newcastle disease virus (NDV) isolates were circulating is isolates with F protein sequence found in GenBank. Isolates ND/SW1/2018, ND/SW2/2018, ND/SW3/2018 in this research have the highest homology with LaSota vaccine about 97-98% and isolate ND/SW4/2018 have highest homology with LaSota vaccine about 94%.Homology analysis conducted on this studi using 17 comparative isolates consisting vaccine viruses and NDV isolates circulating in Indonesia (Table-2). Homology analysis revealed that the isolates in this research had high homology with some vaccine isolates.

Phylogenetic Tree: Phylogenetic analysis showed that samples from Lumajang and Kenjeran were placed in class II. We found that samples had a close genetic relationship with vaccine virus as LaSota, V4, B1, Beaudette C strains were used as in Indonesia Phylogeny tree were shown in Figure-1. Phylogenetic analysis revealed that the isolates in this study were closely related to isolatesfrom LaSota vaccine. However, Dirmitry *et al*[19] have reported vaccines that were phylogenetically close to outbreak-causing NDVs to provide better protection against ND. This indicates that the possibility of lentogenic and mesogenic virus vacine circulating in the Surabaya and Lumajang areas, and possibly due to virus shedding from release or contamination of viruses from vaccinated chicken on farms to sorrounding environment. Although the live vaccives could effectively protect against clinical signs and mortality caused by virulent isolates, they can be shed from vaccinated domestic poultry into the environment. [20] Therefore our results revealed that the samples and vaccine virus in Indonesia present a close phylogenetic relationship.

Table 1: HA and HI test result

Sample	MDT	Identification test	
		HA	HI
ND/SW1/2018	96 h	2^8	2^6
ND/SW2/2018	96 h	2^9	2^6
ND/SW3/2018	96 h	2^7	2^6
ND/SW4/2018	120 h	2^8	2^6

Table 2: Area from observed samples, previously-recorded isolates from Indonesia in GenBank, and vaccine viruses

Virus	Genkbank accession number	Origin
Samples		
ND/SW1/2018	-	Lumajang
ND/SW2/2018	-	Lumajang
ND/SW3/2018	-	Kenjeran
ND/SW4/2018	-	Kenjeran
Previous Isolates From Indonesia		
NDV/Bali/2007	AB605247.1	Bali, Karangsem
NDV/Gianjar/2010	HQ697257.1	Gianjar
NDV/Kudus/2010	HQ697259.1	Kudus
NDV/Sragen/2010	HQ697258.1	Sragen
NDV/Banjarmasin/2010	HQ697254.1	Banjarmasin
NDV/Cockatoo/1990	AY562985.1	Indonesia
NDV/Sukorejo/2010	HQ697255.1	Sukorejo
NDV/Makasar/2009	HQ697256.1	Makasar
Vaccine		
LaSota	JF950510.1	
LaSota	AY845400.2	
LaSota	KJ563940.1	
V4	AY225110.1	
V4	JX524203.1	
Beaudatte C	JN872154	
Komarov	KT445901	
B1	AF309418.1	

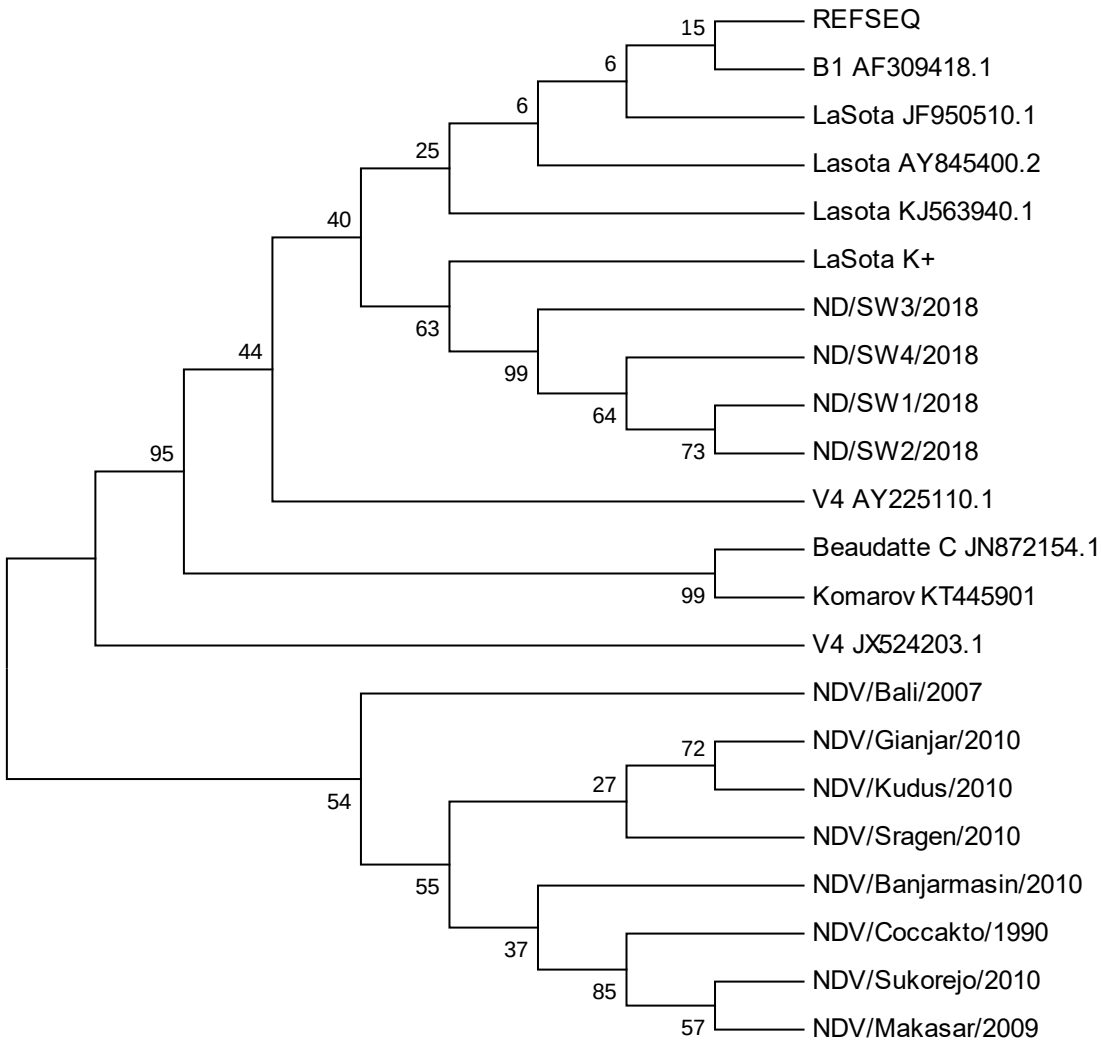


Fig 1: The phylogeny tree based on the nuclotide structure of the NDV field isolates encoding F protein gene compared with vaccine viruses isolates used in Indonesia and which spread in the world from GenBank data.

Conclusion

Therefore, it can be concluded that the isolates in this research had high homology and closely related with some vaccine isolates.

Conflict of Interest: The authors declare that they have no competing interests.

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Ethical Approval: The research does not need ethical approval. However, samples were collected as per standart collection method without any harm and stress to the animals.

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Early Detection of Risk Factors and Severity of Airway Obstruction Through Measurement of Critical Values of FVC and FEV_1 on Bus Terminalofficers

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Abstract

Purpose: The purpose of this study was to explain the extent to which critical values of FVC and FEV1 were able to predict risk factors for severity of airway obstruction in bus terminal Officers in Solo Raya Indonesia.

Method: This study used a descriptive survey design with a cross-sectional approach. The sample of this study was the bus terminal Officers in Solo Raya Indonesia who work in the field of traffic, vehicle inspection, and parking. The sample consisted of 139 random respondents. The severity of airway obstruction was measured through critical values of FVC and FEV1 using Spirometry. The research data analysis technique used the Logistic Regression Test with a significance level of 95%.

Result: The results of this study showed that the prevalence of sex for the majority of men was 64.7%, the age group 43-50 years was 30.9%, the years of service of 21-30 years was 38.8%, and the severity of obstruction of the airway was mostly in the light category of 52.5 %. The measurement model for critical values of FVC and FEV1 was able to predict the significant severity of obstruction of airway by 80.7% and the traffic officers were at higher risk of obstructing airway significantly by 3.88 times compared to those working in parking, or vehicle inspection as indicated by $\rho = 0.008 < 0.05$; at least, the traffic officers had 1,420 to 10,637 times higher to get airway obstruction.

Conclusion: Officers who serve in the field of traffic work have a tendency to be exposed to exhaust emissions of motorized vehicles on the highway, so there is a risk of an increase in the severity of road obstruction compared to those in other occupations. For this reason, the need for early detection through routine inspection and increasing the capacity of traffic Officers and road transport in an effort to prevent the severity of airway obstruction through the movement of work safety discipline using masks. This is important because of the risk of exposure to exhaust gas emission air pollution on the highway.

Keywords: *Severity, respiratory tract obstruction, FVC, FEV_1, Officer.*

Introduction

The growth of the automotive industry, ease of loans, and increased public purchasing power has increased the number of motorized vehicles. This triggers air pollution which can reduce air quality which can endanger human health. World Health Organization (2017) reports globally that in 2015 there were more than 3.17 million people in the world died by exposure to indoor and outdoor air pollution, as well as dust and smoke. Jeems (2015) explains that the level of air pollution in Indonesia is currently ranked the 8th most deadly, with an average mortality rate of 50,000 people per year. This is lower than China, with an average of 1.3 million people dying every year.

From the perspective of nursing, the impact of air pollution can cause disruption to the airway, both obstruction, and electricity. Chronic Obstructive

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Pulmonary Disease (COPD) is a term often used in groups of lung diseases that last a long time and are characterized by increased resistance to air flow. The disease currently has become a serious health problem in Indonesia, along with increasing life expectancy and the increased exposure to risk factors, such as smokers, and air pollution. Global Obstruction Lung Disease/GOLD (2015) explains that there are around 3 million people dying of COPD in 2005, it means 5% of all deaths globally. In 2002 COPD was the fifth leading cause of death in the world and is estimated to be the third leading cause of death worldwide in 2030[1].

Basic Health Research (2013) explained that in 2007 the mortality rate from COPD was ranked 6th out of 10 causes of death in Indonesia and the average prevalence of COPD was 3.7%. The survey results in five provincial hospitals in Indonesia (West Java, Central Java, East Java, Lampung and South Sumatra) in 2004 showed COPD ranked first in the number of patients at 35%, followed by bronchial asthma by 33%, lung cancer by 30% and the other 2%[2].

The purpose of this study is to explain the extent to which critical values of FVC and FEV1 are able to predict risk factors for airway obstruction severity in bus terminal Officers in Solo Raya Indonesia.

Research Method

Research design: This study uses a descriptive survey design with a cross-sectional approach. The severity of obstruction of the airway in this study was assessed based on the results of measurements of critical values of FVC and FEV1 using Spirometry. The data analysis technique of this study uses the Logistic Regression Test with a significant level of 95%.

Sampleand Setting: The sample in this study was randomly selected from bus terminal officers who worked in the field of vehicle inspection, traffic, and parking in the area of Solo Raya, Indonesia. The FVC and FEV1 critical values of all bus terminal officers were examined using Spirometry. Inclusion criteria were officers who still work in the bus terminal who work in vehicle inspection, traffic, and parking, and do not have a smoking history.

Research instrument: The research data was collected through FVC and FEV1 measurements using calibrated spirometry.

Results

Demographic Characteristic: Of the 155 FVC and FEV_1 study subjects measured using Spirometry, 139 respondents (89.7%) met the sample criteria and 16 respondents (10.3%) did not meet the sample criteria. Based on the characteristics of 139 respondents, the picture is as follows:

Table 1. Demographic Characteristic (n=139)

Characteristic	n	%
Sex		
a. Men	90	64.7
b. Women	49	35.3
Age		
a. 19-26 years	24	17.3
b. 27-34 years	30	21.6
c. 35-42 years	29	20.9
d. 43-50 years	43	30.9
e. 51-58 years	13	9.4
Education		
a. Elementary school	3	2.2
b. Junior high school	10	7.2
c. Senior high school	79	58.8
d. Bachelor	47	33.8
Years of service		
a. <10 years	36	25.9
b. 10-20 years	49	35.3
c. 20-30 years	54	38.8
Field of work		
a. Traffic	71	51.1
b. Parking	32	23.0
c. Vehicle inspection	36	25.9
Airway Obstruction		
a. Airway obstruction negative	44	31.7
b. Airway obstruction positive	95	68.3
NasalSeverity		
a. Normal	43	30.9
b. Mild	73	52.5
c. Moderate	23	16.5
d. Severe	0	0

Based on table 1, out of 139 subjects conducted the study found that 64.7% men and 35.3% women, 30.9% were 43-50 years old, 58.8% were high school graduates, years of service were 20-30 years (38.8%), and 51.1% of respondents work in the traffic sector.

Based on the results of the Chi-Square Test shown in table 2, it can be explained that the characteristics of age, years of service, and fields of work have a significant correlation with the level of obstruction of the airway. While sex and education do not show a correlation with the level of obstruction of airway.

Table 2. Correlation between the severity of airway obstruction and sex, years of service, fields of work, and education (n=139).

Variable	Chi-Square	Sig.
Sex * Obstruction level	0.612	0.736
Age*Obstruction level	15.615	0.048
Years of service* Obstruction level	10.119	0.038
Fields of work*Obstruction level	111.490	0.000
Education*Obstruction level	2.770	0.837

Table 3. Critical value of FVC and FEV_1

FVC-1			FVC-2			FVC-3			FVC Acceptable			FEV_1	FEV1/ FVC	%
Value	f	%	Value	f	%	Value	f	%	Value	f	%			
1.22	3	2.2	1.59	3	2.2	1.59	3	2.2	1.59	3	2.2	1.34	0.84	84
1.35	4	2.9	1.81	4	2.9	1.81	4	2.9	1.81	4	2.9	1.41	0.78	78
1.42	4	2.9	1.91	4	2.9	1.91	4	2.9	1.91	4	2.9	1.34	0.70	70
1.49	8	5.8	2.17	4	2.9	2.17	4	2.9	2.17	4	2.9	2.13	0.98	98
1.84	4	2.9	2.46	8	5.8	2.46	8	5.8	2.46	8	5.8	2.11	0.86	86
2.06	4	2.9	2.49	4	2.9	2.49	4	2.9	2.49	4	2.9	1.43	0.57	57
2.29	4	2.9	2.5	3	2.2	2.5	3	2.2	2.5	3	2.2	2.04	0.82	82
2.37	4	2.9	2.51	1	0.7	2.51	1	0.7	2.51	1	0.7	2.06	0.82	82
2.46	4	2.9	2.53	4	2.9	2.53	4	2.9	2.53	4	2.9	2.46	0.97	97
2.5	1	0.7	2.62	3	2.2	2.62	3	2.2	2.62	3	2.2	2.08	0.79	79
2.51	4	2.9	2.82	3	2.2	2.82	3	2.2	2.82	3	2.2	2.44	0.87	87
2.52	4	2.9	2.94	8	5.8	2.94	8	5.8	2.94	8	5.8	2.9	0.99	99
2.54	3	2.2	2.98	4	2.9	2.98	4	2.9	2.98	4	2.9	2.06	0.69	69
2.57	8	5.8	3.08	2	1.4	3.08	2	1.4	3.08	2	1.4	2.29	0.74	74
2.85	8	5.8	3.23	8	5.8	3.23	8	5.8	3.23	8	5.8	2.46	0.76	76
2.96	4	2.9	3.26	4	2.9	3.26	4	2.9	3.26	4	2.9	2.45	0.75	75
2.98	7	5	3.4	5	3.6	3.4	5	3.6	3.4	5	3.6	2.6	0.76	76
3.05	4	2.9	3.42	2	1.4	3.42	2	1.4	3.42	2	1.4	2.57	0.75	75
3.08	8	5.8	3.52	1	0.7	3.52	1	0.7	3.52	1	0.7	3.41	0.97	97
3.14	4	2.9	3.53	4	2.9	3.53	4	2.9	3.53	4	2.9	2.46	0.70	70
3.2	3	2.2	3.55	4	2.9	3.55	4	2.9	3.55	4	2.9	2.72	0.77	77
3.32	5	3.6	3.56	4	2.9	3.56	4	2.9	3.56	4	2.9	2.82	0.79	79
3.33	2	1.4	3.57	8	5.8	3.57	8	5.8	3.57	8	5.8	2.56	0.72	72
3.45	4	2.9	3.58	7	5	3.58	7	5	3.58	7	5	3.4	0.95	95
3.49	7	5	3.59	4	2.9	3.59	4	2.9	3.59	4	2.9	1.41	0.39	39
3.52	4	2.9	3.74	4	2.9	3.74	4	2.9	3.74	4	2.9	2.83	0.76	76
3.53	2	1.4	3.78	4	2.9	3.78	4	2.9	3.78	4	2.9	2.9	0.77	77
3.71	4	2.9	3.83	4	2.9	3.83	4	2.9	3.83	4	2.9	2.76	0.72	72
3.78	4	2.9	3.86	8	5.8	3.86	8	5.8	3.86	8	5.8	2.52	0.65	65
4.43	3	2.2	4.52	3	2.2	4.52	3	2.2	4.52	3	2.2	3.41	0.75	75
4.53	3	2.2	4.68	3	2.2	4.68	3	2.2	4.68	3	2.2	2.67	0.57	57
4.57	4	2.9	4.78	4	2.9	4.78	4	2.9	4.78	4	2.9	2.64	0.55	55
			4.82	3	2.2	4.82	3	2.2	4.8	3	2.2	3.4	0.71	71
Total	**139**	**100**	**Total**	**139**	**100**	**Total**	**139**	**100**	**Total**	**139**	**100**	**Total**	**139**	**100**

This study used three-times Spirometry to measure the critical values of FVC and FEV1. Table 3 showed that 90 respondents (68.3%) experienced airway obstruction and 44 (31.7%) of the remaining respondents did not experience airway obstruction. For the airway obstruction level, 52.5% of respondents experienced mild airway obstruction, a moderate level of 16.5%, and a normal level of 30.9%.

Obstruction Severity Prediction: The results of the logistic regression statistics showed that the predictive value of the logistic regression model was shown in overall percentage which is equal to 80.7%, the Exp (B) value is 3.88, $\rho = 0.008$. It means that the measurement model for the critical value of FVC and FEV1 was able to correctly predict the severity of airway obstruction by 80.7%. While the odds ratio value shown in the Exp (B) value is 3.88, which means that the traffic officers have an airway obstruction risk of 3.88 times higher than those who work in vehicle inspection and parking.

Table 4. Logistic Regression Statistics Test Results

Logistic Regression Test	Results	ρ	CI Exp (B) 95%	
			Lower	Upper
Exp (B) Predicted	3.88 80.7%	0.008	1.420	10.637

Discussion

The results of this study indicated that out of 139 respondents in the bus terminal were male (64.7%) with the prevalence of age groups between 43-50 years. Men are more adaptable and more quickly to make decisions in solving problems at the bus terminal. These characteristics are consistent with a retrospective study conducted by Sun et al. (2015) which explained that patients in Korea who were examined using spirometry and diagnosed with Chronic obstructive pulmonary disease (COPD) were mostly men (404 samples) and the rest were women[3]. In addition, the literature review conducted by Rycroft, Heyes, Lanza, & Becker (2012) explains that out of 2838 articles, more men experience airway obstruction than women[4].

The results of this study differed from the cross-sectional study conducted by Schneider et al. (2009) which explains that 57.7% of the 219 subjects affected by this disease were women[5]. However, the characteristics of the sex ratio must be considered because even though men are more likely to be exposed to airway obstruction, this does not mean that men are more likely to be affected by the disease; differences in sex ratios in the population or sample studied affect the results of a study.

The prevalence of most age groups in this study was 43-50 years (64.7%). This research was carried out in the bus terminal management environment in Solo Raya Indonesia so that the age group was more productive, but the work did not determine and became a factor that influenced lung function.This is consistent with the research conducted by Mokoagow, Uyainah, Subardi, Rumende, & Amin (2014) which explains that the percentage of age <60 years is more than other groups[6]. The age group characteristic in this study was differed the retrospective study conducted by Damiputraet al. (2016), which explained that the age category of 56-65 years was higher than other age groups.

Most of the years of service characteristic in this study were 20-30 years (38.8%). Furthermore, the characteristics of years of service in this study have a correlation with airway obstruction. Years of service are risk factors that are directly related to the length of exposure to automotive air pollution in bus terminals which increases the risk of respiratory disorders. The results of this study are consistent with the research conducted by Guo et al. (2018) which explained that long-term exposure to air pollution (particulate matter) is associated with a decrease in lung function[7]. Long-term exposure to air pollution (particulate matter) is also associated with an increased risk of COPD events.

This showed that the traffic officers in the bus terminal have a risk of having airway obstruction 3.88 times higher than those in other fields. This means that traffic officers have a higher risk to be exposed to automotive emissions. Thus, people who live or do their activities around the highway are more often exposed to pollutants whose levels depend on the conditions of each road. This is in accordance with research conducted by Dement et al. (2015) on construction workers that explained that construction workers were solid predictors of the risk of COPD[8]. The results of this study were also in accordance with the research conducted by Rice et al., (2015) which explained that those who live less than 100 m from the highway experienced a decrease in FEV1 value of 5.0 ml/year[3].

Conclusion

Officers who serve in the field of traffic work have a tendency to be exposed to exhaust emissions of motorized vehicles on the highway, so there is a risk of an

increase in the severity of road obstruction compared to those in other occupations. For this reason, the need for early detection through routine inspection and increasing the capacity of traffic managers and road transport in an effort to prevent the severity of airway obstruction through the movement of work safety discipline using masks. This is important because of the risk of exposure to exhaust gas emission air pollution on the highway.

Ethical Clearance: This study obtained the Certificate of Ethical Clearance from the Research Ethics Committee of Dr Moewardi General Hospital number 405/V/HREC/2017.

Source of Funding: This study was a self-funded research project.

Conflict of Interest: None.

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Preceptorship Method Development Based on Experiential Learning to Improve Preceptor Clinic Competency

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Abstract

Introduction: Preceptorship is an intense partner of people who are more skilled or experienced with fewer skills or experience, with goals agreed upon by people who have less experience to add and develop specific competencies, with increasing numbers of new nurses in the Lavalette hospital then increasing also the problems that exist in the Lavalette hospital. The most common problem experienced by preceptors is the schedule of guidance with new nurses is not the same as the preceptor schedule when serving, preceptors undergo expert level education and most of the reasons are due to lack of information on preceptorship training, unbalanced preceptor ratios with new nurses, so that preceptors do not know the task in detail. The purpose of this study was to develop a preceptorship method based on experiential learning to improve the competence of preceptor clinics.

Method: This type of research a Research and Development research (R & D). The sampling method used was purposive sampling with 112 people divided into two groups (control group and treatment group). The intervention of the control group was applied every day for 4 meetings, and the treatment group was applied 4 times.

Result and Analysis: The independent t-test results in the control group were $p < 0.05$ in the experiential learning variable.

Discusion and Conclusions: In this study is the development of the preceptorship method based on experiential learning simultaneously will affect the increase in the competence of preceptor clinics.

Keywords: *Preceptor, Preceptorship, Experiential Learning, Clinical Competence.*

Introduction

Preceptorship is an intense partner of people who are more skilled or experienced with fewer skills or experience, with goals agreed upon by people who have less experience to add and develop specific competencies[1]. Preceptorship is a teaching method commonly used in many professions, including the nursing profession[2]. Experiential learning-based learning theory suggests that learning becomes more effective if based on experience[3]

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Preceptorship activities involve someone who is wiser, more experienced in conveying their knowledge to someone who is less experienced. A preceptors become models/role models in preceptorship activities while simultaneously providing expert advice to the preceptee. This is a relationship that is given free of charge and in which there is a push, guidance, support, and advice neutrally to help preceptors in organizational development and personal development.

The form of preceptorship is in the form of advice that relates to practice in the workplace including role models in one-to-one groups and organizations. [4]said that increasing nurse retention was described as an advantage of the preceptorship program.

Preceptors are role models of nurses who are

good and worthy of being exemplified because of their attitudes, behavior, professional abilities above average. Preceptors are clinical abilities, professional skills, critical thinking and professional behavior[2]

One of the efforts to optimize the preceptorship program is to organize and streamline guidance to new nurses, namely the preceptorship program based on experiential learning.

This study aims to provide an overview of the implementation of preceptors based on experiential learning in hospitals.

Method

This type of research a Research and Development research (R & D)

Design: The design of this study uses a descriptive design.

Respondents: The sample in this study was a preceptor with a total of 112 people in the November period 2018 to April 2019. The sampling technique used was purposive sampling technique using inclusion and exclusion criteria.

Data collection: Research and Development research (R & D) shapes knowledge based on specific events and takes the form of practical contexts. The research sampling technique uses the Purposive Sampling technique. The inclusion and exclusion criteria in this study are as follows:

Inclusion criteria: Nurses who work in the regional hospital PTPN XI in East Java, Nurses who have worked for at least 5 years, Nurses who are permanent employees, Minimum education in D3 Nursing. Exclusion criteria: Nurses who are on maternity leave, Nurses who are training, Nurses who are licensed or study assignments, Has played a role in testing the reliability of the instrument

Instrument: The instrument of this research uses a questionnaire sheet.

Analysis: Descriptive analysis was carried out through frequency distribution based on the categories of each variable and descriptive category with a column row analysis approach. Data analysis for the results of Focus Group Discussion (FGD) was obtained from audiovisual recordings and field notes during the discussion. The results of the Focus Group Discussion (FGD) will be copied and analyzed according to the results found. The researcher will also increase the persistence of observation by repeating audiovisual recordings to analyze the context.

Results

The study was conducted from February 28 to April 28, 2019, at the Lavalette hospital. During the data collection, 112 preceptors were obtained with the following results:

1. Orientation Ability: Activity capabilities in this preceptorship program not yet referring at Standard Hospital Accreditation (SNARS)
2. Learning in class: The preceptor is not yet capable do effective communication in giving care
3. Professional Transition Session: Not able to provide an experience of ability: Other in nursing care, it has not been able to provide its experience in nursing attitudes and ethics
4. Learning Exchange Clinic: The preceptor has not been able to carry out the transfer at work
5. Evaluation: Not yet able to provide an evaluation in nursing care
6. Clinic guidance: Not yet able to do guidance with a different work schedule

Discussion

The preceptorship is measured using the module preceptorship based on the[5]. The standards for implementing preceptors consist of preceptorship management, learning method, preceptorship method, and evaluation. Timing, meeting schedule, competency list, and evaluation results are part of standard preceptorship management, learning method, preceptorship method, and evaluation. However, the management strategy, learning method, preceptorship method, and evaluation of time, in particular, are not following the standard Preceptorship Guide to Professional Education Students[5]. This includes the absence of a preceptorship program based on experiential learning, the absence of implementation time, the absence of a meeting schedule, the absence of a list of competencies, and the absence of evaluation results since its enactment in April 2018.

At the location of the study, researchers found that the independence of precepts was very lacking in implementing programs in hospitals. This is due

to a lack of involvement of preceptors in conducting guidance processes with precepts. Preceptee views that those who are more entitled and competent to carry out hospital programs are preceptors. Whereas preceptors are also lacking in involving themselves during the hospital. Preceptee is only involved in daily activities in the hospital because of routines, without knowing the standards in the hospital.

Experiential learning is a process of change that uses the experience as a medium of learning or learning[3]. [6]showed the success of 78% of students using experiential learning method. Experiential learning styles intend to accommodate individual tendencies in how to receive and process information in learning. The experiential learning style is an indicator of stable learning about how students are taught to see, interact and demonstrate learning outcomes. The experiential learning model is developed based on Kolb's theory, which emphasizes the central role of experience in the learning process[6]. Based on perceptive epistemology, experiential learning is a model of learning with constructivism learning theory, which directs students to build learning from their learning experiences[6]. In the preceptorship, the preceptor conducts clinical guidance to pay attention to aspects of orientation, classroom learning, professional transition sessions, exchange of clinical learning, evaluation, and clinical guidance. The implementation of each aspect of the assessment is followed by four stages in experiential learning. The stages in experiential learning consist of concrete experience, reflective observation, abstract conceptualization, and active experimentation.

The first stage of the Concrete Experience is to involve nurses in real activities during preceptorship. At this stage, the preceptor only performs the task. The task in question is an act of clinical competence. The head of the room observes the actions taken by the preceptor, adjusted to the standard set. The second stage is Reflective Observation. At this stage, the preceptor evaluates actions that are not by the standard, then exemplifies the precepts in real action that should be done according to the standard. Preceptor provides an opportunity for supervised precepts to pay attention to examples of technical competency actions carried out by preceptors and reflect them with actions that have been carried out previously. The next step is the abstract conceptualization. This stage is the thinking phase meaning that the preceptor can understand and explain what is obtained from the results of observation and reflection. The preceptor allows the precepts to convey the concept obtained from the observations. The last step is Active Experimentation which is to provide preceptor motivation to carry out clinical competence actions in daily activities.

Conclusions

The Development of preceptors based on experiential learning includes: there are times of training and development, implementation schedules, knowledge of competency lists, and evaluation results so module preceptorship based on experiential learning is needed to improve the competency of preceptor clinics developed to improve service quality in nursing.

Ethical Clearance: Ethics is done at the Nursing Faculty No: 1483-KEPK.

Conflict of Interest: None

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High Risk Obstetrics in Developing Countries: Root Cause Analysis and Viable Mitigation Strategies

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Abstract

Obstetric complications are among the deadliest plagues that devour most developing countries. Due to the substantial obstetrical issues seen in developing countries, research analysis demonstrates that countries such as Nigeria, India, and Bangladesh have seen the death of more than a third of pregnant women. India serves as the most vulnerable country in terms of maternal health due to its large population and for the fact that it is a developing country. This paper outlines a health education, using a mnemonic "VIBGYOR" and using a research review mapping to support and illustrate the various interventions to address the maternal and childbirth issue.

Keywords: *VIBGYOR, Risk Factor, Obstetric Complication, Health Education, High Risk, Millennium Development Goals, Sustainable Development goals.*

Introduction

Millions of women and girls perish annually due to obstetric and childbirth issues. Even though a handful of women have a high risk of enduring maternal problems in developed countries, a large number of women are at high risk of developing maternal complications in developing countries. Tragedies associated with women mortality over obstetric complications traumatize not only their lives, but also their children, their families, and the entire community.[1,2].

In 2010, developing countries recorded that approximately 15% of pregnant women, developed obstetrical complications. The United Nation's report of 2010 unveiled that Nigeria and India saw the death of more than a third of pregnant women[1]. More than 15 research articles were utilized to develop a literature review on maternal health issues between 2001 and 2010. The review focused on three countries; India, Nepal, and Bangladesh. The results revealed that about 12% to 75% of pregnant women report difficulties in at least one of their pregnancies.[2] Sustainable Development Goals which came after the end of MDGs demands the end of newborn deaths by 2020 where all countries aim at decreasing the neonatal deaths to less than 12 in every 1000 live births.[3]

Even though the Indian government has launched several health care programs that consistently functions to deliver safe mother-hood process, they fail to ensure that they satisfy the needs of citizens[4]. Some of those healthcare programs include; Safe Motherhood program, National Rural Health Mission, National Population Policy, Child and Health Programme, and Child Survival program. India experienced a high maternal mortality rate, leading to only 570 live births per every 100,000 in the 90s. The phenomenon has since decreased by about 4.9% recording 63,000 maternal deaths in 2012 due to their undying efforts to attain the MDG of reducing MMR by 75%. The most recent trends in MMR, India accounts for 15% of mortality rate.[5]

Root Cause Analysis of Pregnancy-related complication.

Biological Risk Factors: Women enduring teenage

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pregnancy or elderly primigravida serve as the most adversely affected group. A significant number of the group suffers from risks such as malnutrition, Null parity, and stillbirth history, which in turn leads to obstetric complications as well as maternal deaths. The difficulties usually vary between those who regularly visit the clinic during pregnancy, as well as those booked and unbooked.[6]

Table 1. Childbirth/Obstetric Complications as well as their prevalence levels

Complications During Pregnancy	Prevalence Level
Hypertensive Disorder	6-8%
Premature Pre-term Membrane Rupture	3%
Placenta Previa	0.64%
Restriction of Intra Uterine Growth	7%
Oligohydramnios	4.45%
Anemia	14% (1st World nations), 51% (3rd World nations), and 65%- 75% complication rates in India.

Social Economic Risk Factors: According to South Asian Research findings, obstetric complications are associated with low socio-economic status, illiteracy, poverty, as well as inadequate knowledge on risks and mitigation measures of illnesses in both postpartum and pregnancy periods[7]. Other studies on District Household and Facility Survey (DLHS-2) conducted in Odisha[8], have since contradicted the above findings, pinpointing that urban lifestyle, younger age, and enhanced educations are the critical reasons for high morbidity rates associated with pregnancy. The Empowered Action Group EAG in Indiaconducted a research study in economically challenged regions andfound that more than 50% of women either report pregnancy and or post-pregnancy complications. [9]

Psychosocial Factors: Psychosocial factors may impact complications during pregnancy. According to a field research finding by Shegufta et al. in Bangladesh, more than 43% of women endured difficulties due to social psychological factors within their vicinity. The study compared obstetric complication to couples' pregnancy wantedness. It was evident that 20.1% of the women had pregnancy and childbirth complications and 36.7% nearly missed the difficulties if the couples wanted the pregnancy, as 61.9% received complication if couples never planned to have the pregnancy.[10]

Sociocultural Risk Factors: The third world nations have geographical regions which are divided into rural, urban, and semi-urban. In this case, the most adversely affected by the administration of Emergency Obstetric Care naturally becomes the population within the rural setup, especially those living within hilly terrains. Particular traditional values and rituals which some groups tend to abide by, yet lacks scientific backgrounds can easily affect maternal health. Some of the traditions include; preventing pregnant women from consuming a large sum of food, which is believed to enhance the size of the fetus, resulting in difficulties in giving birth.[11]Certain regions such as Jharkhand, women often take locally brewed alcohol, which acts as pain relievers. Such communities also prefer traditional untrained midwives during delivery.[12]

Crucial period to act: Determent of the obstetric problems is a key requirement.

Sustainable Development Goals

A slow transition was made from the MDGs to Sustainable Development Goals was developed to gain and carry on the momentum of the previous MDGs.[13,14] In order for India to attain Sustainable Development Goals as at 2030, India needs to prioritize Goal's development agenda. Even though SDG has made tremendous progress in decreasing the child and maternal mortality, the country is still among the world countries registering pregnancy complications and deaths. The phenomenon is despite the halving of child and maternal mortality rates from 1990 to 2015. This report suggests 57% of the death occur during neonatal time. The countdown report states that the MMR in India was 180 per 1000 live births as at 2013. The SDGs targets to reduce the MMR to less than 2 per every 1000 live births as at 2030.[15]

The government has scheduled all relevant mitigations through launching essential countrywide programs concerned with maternal well-being to ascertain secure motherhood and consequently ensure that active health institutions attain the objective group. This resolution are crucial tasks vested on all citizens who require to commit themselves to advance and achieve the MDG-5 missions currently through the SDGs.[16] The most pressing issues towards achieving quality maternal care through the sustainable developmental goals are outlined in an article as the need for prioritizing maternity services, universal coverage by promoting gender equality, strengthening the available health

systems, accelerate progress through evidence based practices.[17]

Methodology: Inflicting knowledge toward the available obstetric issues the threatening symptoms will prompt access to effective obstetric care as well as aid in efficient innervations to decrease maternal death mortality and morbidity.[18] This paper is concerned on a few essential factors that are critical to improving the well-being of overall population by echoing on the importance of initial diagnosis of high-risk situations coupled with consistent antenatal care.[19] Thus the primary elements are articulated on the mnemonic "VIBGYOR" to develop the course of gestation an attractive event by using a research review mapping approach with studies supporting each element of the mnemonic.

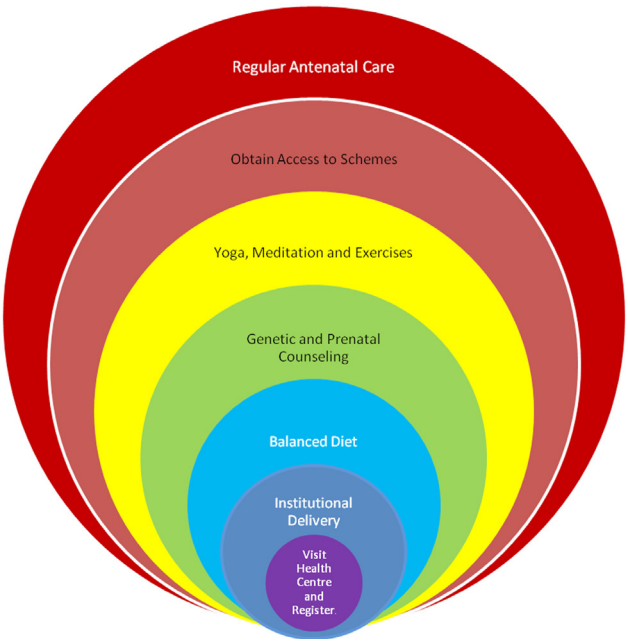


Figure 1. Representation of "VIBGYOR"– MNEMONIC essential for teaching women on hedging obstetric complications

Research Literature Review on the Viable Mitigations Strategies.

Visit and Record at the nearest medical institution immediately gestation is confirmed: Gestation is a natural situation which is often indicated as normal not until complications accrues. Health professions recommend that once an expectant is diagnosed with complications, it is essential to make early registration and a consistent visit to the primary health institution concerned with initial detection and referral of adverse patients. Initial registration alongside diagnosis is promoting eradication of maternal morbidity and mortality burden.[20]

Institutional parturition aimed at deterring complications: A study conducted in India shows substantial data evidence to prove that accessing health institutions for parturition is averagely 5km. The long-distance of hospitals is the primary reason resulting in high home deliveries. Despite Indian's government 2010 objective of attaining 80% rural deliveries conducted in health facilities being achievable, the result unfolded negatively. Moreover, the same study unraveled no acceleration in the diagnosis of health complications.[21]

Achieving Millennium Development Goal 5 required improvement of attendance's skills towards delivering a quality service to expectant women to reduce child mortality which is still a mandatory concern while continuing the achievement of the SDG.[22] Besides the scheduled delivery improved in the hospital, it is essential for expectant women to deliver in vicinities fully furnished with life-saving equipment alongside good hygiene to eradicate bacterial and viral infections.[23]

Balanced Diet is mandatory particularly calcium and Iron-rich foods: A study unravels that the malnourished women are vulnerable to contracting parturition complications, not excluding premature birth.[24] According to the WHO's medical report, almost 55 percent of expectant mothers in developing countries suffer from Anemia that primarily results from an inappropriate diet regimen[25]. Insufficient Iron concentration is attributing to 1/10 of maternal mortality, especially in developing nations. The factors predisposing women towards contracting Anemia includes nutritional related elements such as deficient folic acid, iron, and Vitamin B12. Besides the nutritional concerns, other health factors such as excessive blood loss during parturition and metabolic malfunction also contribute immensely to anemic condition. In a study Atrashin Bangladesh, social factors such as the nutritional stereotype that restrict expectant women from accessing nutritional diet contributes to parturition complications in sub-Saharan Countries.[26]

Generic alongside Prenatal Counselling aids to the diagnosis of hereditary infections: The CDC organization, from its headquarters in New York, the *Preconception Care Work* strategy recommends the necessity of prenatal therapeutic session for new couples before working out pregnancy issues helps deter parturition complications.[27] The Center for Disease control also initiated a Preconception Counselling policies in 2006 that recommended an improvement of

attitude, behaviors, and knowledge of couple concerned preconception well-being.[28]

Yoga and Meditation promote a healthy as well as stress-free gestation: Yoga has a positive effect on hedging obstetric complications. The randomized controlled test conducted on 78 vulnerable expectant women sorted into Yoga alongside Control groups. The group which accessed Yoga were exposed to at least hourly sessions three times in a week on the third trimester, a fewer PIH, IUGR, Preeclampsia, and PIH manifested. Another controlled study conducted among 59 individuals unraveled an improvement in fetus placenta circulation and intrauterine growth. Performing Yoga in expectant thus proved to curb stress[21], anxiety, depression, and low back pain in expectant women. Therefore, expectant women ought to follow prescribed yoga instructions depending on their body features.[29]

Obtain the correct knowledge about the programs initiated for maternity services and the threatening symptoms during gestation from healthcare practitioners: The antenatal insights and therapeutic sessions ought to consider essential topics especially threatening symptoms of gestation complication. The gestation education to expectant women aims at delivering adequate information through straightforward antenatal programs. The risky symptoms include elements such as headache, blurred vision, vaginal bleeding, abdominal pain, reduced fatal movement, and inflamed pyrexia.[30] Several authors emphasize the necessity of dispensing expectant women with appropriate information essential for the gestation period.[2,31,32]

Routine Antenatal Care is mandatory for early detection of High Risk Pregnancy: A minimum of three visits is recommended as mandatory for a pregnant woman. Research studies conducted to observe the impact of Janani Suraksha Yojana, a cash transfer scheme reported the increase in antenatal visits and consultations and improved rates of hospital delivery among at risk pregnant women.[33]

Conclusion

The healthcare policymakers and the industry is in a unique position to get involved in taking the neglected health aspects to the most vulnerable group–pregnant women. Creativity in delivering health education is essential to capture the attention of the target group influencing their health seeking behaviors and practices.[34] The paper has outlined health education which illustrate several resolutions to curb maternal mortality.

Ethical Clearance: Not Applicable

Conflicts of Interest: Nil

Source of Funding: Nil

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Effect of Chemomechanical Caries Removal with Papacarie Gel on Bond Strength of Composite Resin Restoration

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Abstract

Aim: The aim of the current study was to evaluate the effect of chemomechanical caries removal with papacarie gel on bond strength of composite resin restoration.

Method: Caries in twenty extracted primary molars with large carious cavities was removed using papacarie gel. Samples were divided into two basic groups (10/each). Group (1) was treated with Adper™ Scotchbond™ SE Self-Etch Adhesive and group (2) was treated with iBond® Total Etch. Both groups were restored with Harvard Restore Composite. Teeth were sectioned vertically with diamond disc, then embedded in self-cure acrylic resin and polished. Teeth were immersed in sodium hypochlorite, followed by hydrochloric acid then rinsed and dehydrated with alcohol. Specimens were dried, mounted on aluminum stab and scanned with electron microscope to evaluate the resin tags qualitatively and quantitatively.

Results: in self-etch group micro-tags were longer, dense and with numerous lateral branches than the total etch group with no significant difference.

Conclusion: Self-etch adhesive system showed longer, dense and numerous lateral branches of resin tags than the total etch after usage of papacarie gel as caries removal.

Keywords: *(Papacarie gel), (Chemomechanical caries removal), (Bond strength), (Self etch), (Total etch).*

Introduction

Chemomechanical caries removal (CMCR) is a noninvasive technique eliminating infected dentine via a chemical agent. This process not only removes infected tissues, it also preserves healthy dental structure, avoiding pulp irritation and patient discomfort. This method of caries removal based on dissolution of infected tissues instead of drilling, this method uses a chemical agent assisted by an atraumatic mechanical force to remove soft carious structure **(Jain et al., 2015)**[1].

This method of caries removal is characterized by the use of a material that acts on the pre-degraded collagen of the lesion, promotes its softening, doesn't affect the adjacent healthy tissues, and avoids pain stimuli (chemical action), then the softened carious tissue is removed with gentle excavation, which makes this technique an effective alternative method to treat carious lesions since it allies no traumatic characteristics with bactericide and bacteriostatic action **(Maragakis et al., 2001)**[2].

A research project in Brazil in 2003 led to the development of a new formula to universalize the use of chemomechanical method for caries removal commercially known as Papacarie®. Papacarie® is basically comprised of papain, chloramines, toluidine blue, salts, thickening vehicle, which together are responsible for the bactericide, bacteriostatic and anti-inflammatory characteristics **(Bussadori et al., 2005)**[3].

Papain acts only in infected tissue because infected tissue lack a plasmatic anti protease called Anti-trypsin. Antitrypsin is present only in sound tissue and it inhibits protein digestion. The absence of anti-trypsin in infected tissue allows papain to break the partially degraded collagen molecules, contributing to the degradation and elimination of the fibrin "mantle" formed by carious process **(Piva et al., 2008)**[4].

Papacarie causes cleavage of the polypeptide chains and hydrolyses the crosslinks of collagen fibrils. After the degradation, oxygen is freed, and this explains the appearance of bubbles on the surface and blearing of the gel during the clinical procedure. These signs demonstrated that the removal process has been started **(Bittencourt et al., 2010)**[5].

Therefore the current study was conducted to evaluate the effect of chemomechanical caries removal with papacarie gel on bond strength of composite resin.

Materials and Method

1. **Collection of samples:** Twenty extracted human permanent molars, with large and visible carious cavities involving the occlusal surface and extending into dentine, were used as samples in the study. All the teeth were cleaned, disinfected and stored in distilled water until use **(Dominiciet al., 2001)**[6]**.**

2. **Caries removing procedures:**

- The Papacarie™ gel (1) was applied to the caries lesion for 30 to 40 seconds, and then softened carious tissue was removed with the blunt end of an excavator.
- The gel was reapplied, if necessary, until the complete removal of the carious tissue was achieved.
- The texture of the remaining dentine was inspected with the use of an exploratory probe to determine successful removal of all caries.

3. **Grouping the samples:**

Selected molars were divided randomly into two main groups:

- **Group1:** Consisted of 10 samples treated with Adper™ Scotchbond™ SE Self-Etch Adhesive (2) and Harvard Restore Composite (3).
- **Group 2:** Consisted of 10 samples prepared for evaluating the bonding characteristics using iBond®(4) Total Etch and Harvard Restore Composite.

(1) Papacarie gel: Gabrie Garcia Ceballos. Mexico.

(2) Adper™ Scotchbond™ SE Self-Etch Adhesive: 3M ESPE. USA.

(3) Harvard Restore Composite: Harvard Dental International GmbH. Germany

(4) iBond®: Kulzer GmbH. Germany

4. **Bonding and restoration:** Each type of etching system was applied according to manufacture instructions. Then Harvard Restore Composite was applied in increments of 2 mm. layers and polymerized for 40 seconds till the whole cavity was restored.

5. **Preparation of samples for scanning:**

- Teeth were sectioned vertically through the resin fillings and dentin with the help of a diamond disc under running water to expose the resin-dentine interface.
- Teeth were embedded in self-cure acrylic resin and polished with 600, 1000, 2000 grit polishing paper and soflex finishing and polishing system. Then they were immersed in 4 % sodium hypochlorite for 20 minutes, followed by 20 % hydrochloric acid for 30 seconds.
- Specimens of both groups were rinsed with distilled water and sequentially dehydrated in 60%, 70%, 80%, 90% alcohol for 20 minutes each and in 100% alcohol for 1 hour.
- Surface morphology and dentin resin interface were dried, mounted on aluminum stubs, placed in a vacuum chamber, sputter coated with gold and observed under a scanning electron microscope.

They were then embedded in self-cure acrylic resin and pol-ished with 600, 1000, 2000 grit polishing paper and Sof lex nishing and polishing systems

They were then embedded in self-cure acrylic resin (figure 9) and polished with 600, 1000, 2000 grit polishing paper and Soflex finishing and polishing systems. Then they were immersed in 4% sodium hypochlorite for 20 mins, followed by 20% hydrochloric acid for 30 sec. The specimens of both groups were rinsed with distilled water and sequentially dehydrated in 60%,70%, 80%, 90% alcohol for 20 minutes each and in 100% alcohol for 1 hour. Surface morphology and dentine-resin interface were dried, mounted on aluminum stubs, placed in a vacuum chamber, sputter coated with gold and observed under a scanning electron microscope.

- A series of photomicrographs were taken at a magnification of 2000x and 5000x for viewing the surface morphology and 1000x for viewing the resin-dentine interface.
- Resin tags were evaluated qualitatively and quantitatively.

- ❖ Qualitative evaluation was carried out by measuring the length of the resin tags according to the scale given on the photographs.
- ❖ Quantitative evaluation of the tags, a four- step (0-3) scale method was used for evaluation of resin-dentine interfaces **[Ferrari et al., 2002]**[7] as follows:
  - Score 0 – no resin tag formation.
  - Score 1- few and short resin tags.
  - Score 2- when long resin tags were visible.
  - Score 3- dense resin tags with numerous lateral branches.

6. **Statistical analysis:** All data were collected, tabulated and statistical analyzed using (SPSS) software version 15 to identify the difference between resin tags formed at the resin-dentine interface using Adper™ Scotchbond™ SE Self-Etch Adhesive and iBond® Total Etch after use of papacarie gel. The significance level was set at $p< 0.05$.

Results

The results revealed that 20% of samples in group (I), showed few and short resin tags with length ≈ 15-20 µm (score 1), 60% of them had long resin tags (score 2) reach to length 80 µm, and the remaining 20% showed dense resin tags with numerous lateral branches (score 3). While in group (2) the percentages were 20%, 70% and 10% for scores 1, 2, 3 respectively (figure 1-6). However no statistical significant differences were detected between groups ($P > 0.05$).

(Table 1) Comparison between the studied groups regarding Resin tags

Resin tags scores	Group 1 N %	Group 2 N %	p^2
Score 1: Few and short resin tags	2(20%)	2(20%)	0.8
Score 2: When long resin tags were Visible	6(60%)	7(70%)	
Score 3: Dense resin tags with numerous lateral branches	2(20%)	1(10%)	

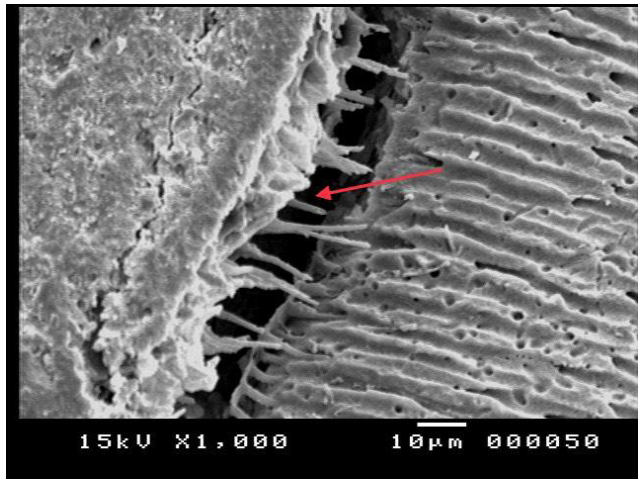


Figure (1): Photomicrograph of scanning electron microscopy (SEM) for samples treated with self – etch (group 1), showed few and short resin tags.

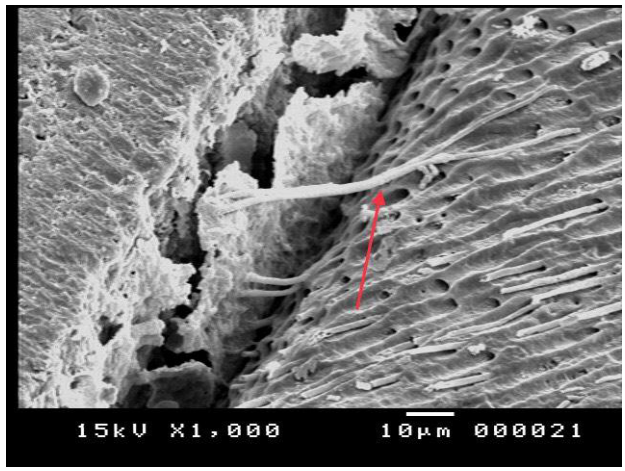


Figure (2): Photomicrograph of scanning electron microscopy (SEM) for samples treated with self – etch, showed long resin tags with lateral branches.

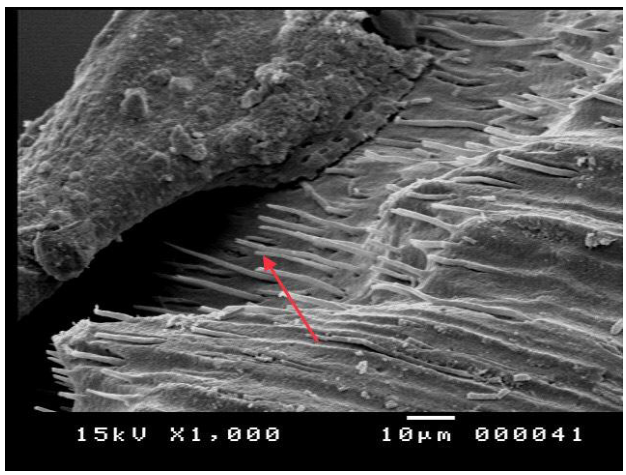


Figure (3): Photomicrograph of scanning electron microscopy (SEM) for samples treated with self – etch, showed dense resin tags.

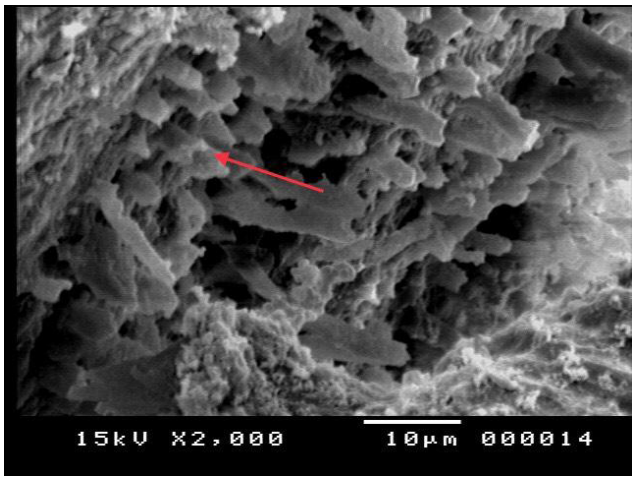


Figure (4): Photomicrograph of scanning electron microscopy (SEM) for samples treated with total-etch (group 2), showed few and short resin tags.

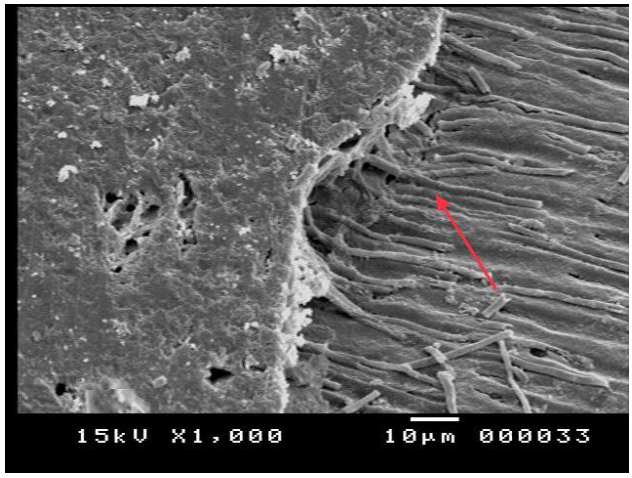


Figure (5): Photomicrograph of scanning electron microscopy (SEM) for samples treated with total-etch, showed long resin tags.

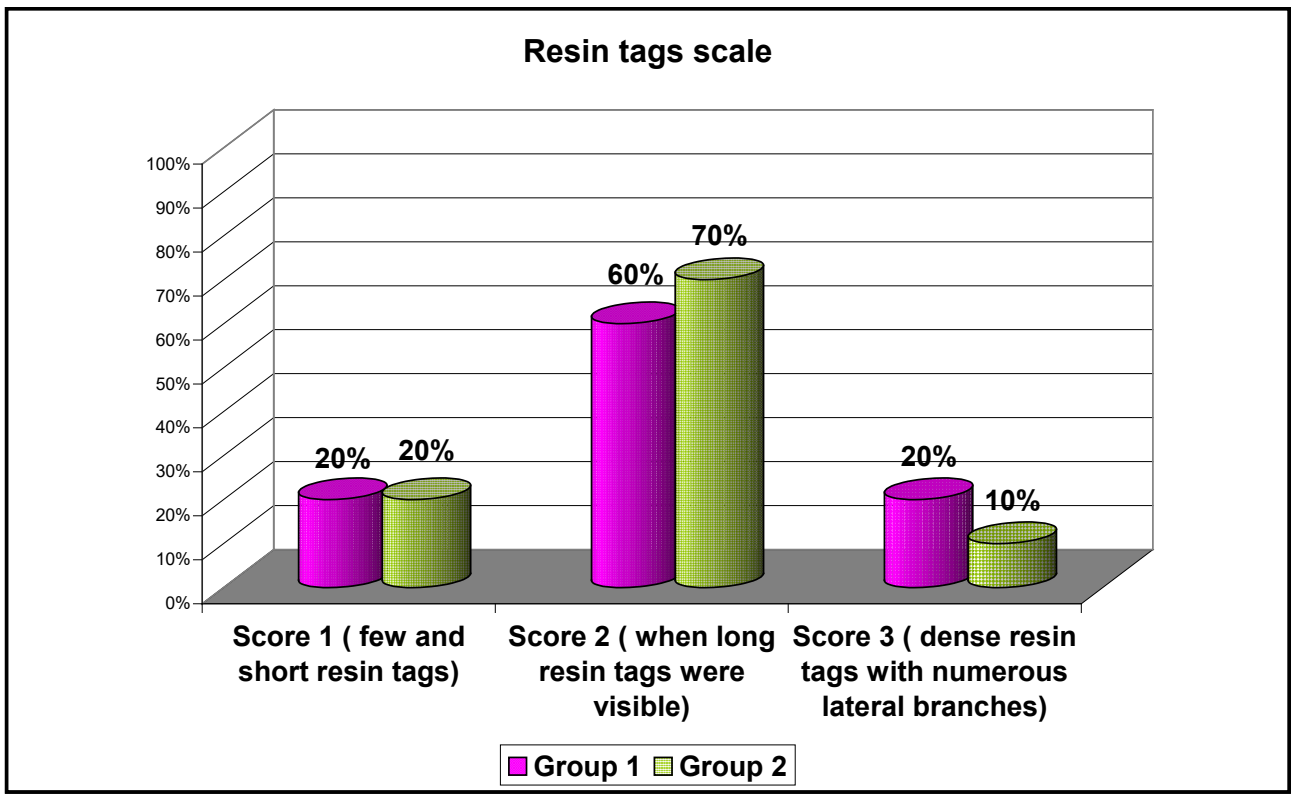


Figure (6): Comparison between the studied groups regarding Resin tags.

Discussion

Caries removal by minimally invasive method followed by achieving perfect coronal seal is the most needed procedures in pediatric dentistry. Mechanical method for caries removal like air rotor and carbide bur remove carious dentin aggressively and large amount of affected dentin is also removed. All latest inventions support minimal removal of caries to prevent any harm to underlying young pulp. One of recent method of minimally invasive caries removal is chemomechanical caries removal.

Papacarie is a formula of chemomechanical caries removal, allows the maximum preservation of healthy dental structures, with antibacterial and anti-inflammatory effects. The advantage of Papacarie is its easy application which does not need special instruments **(Sulianti et al., 2019)**[8].

This study evaluated the influence of a papain based gel (Papacarié) as a chemo-mechanical caries removal agent on the bond strength of micro hybrid photopolymerised composite after bonding with two different adhesive techniques, are self-adhesive and total etch adhesive techniques. These materials are selected for the investigation since they are the most commonly used ones in restorative Pediatric Dentistry.

Resin tags were evaluated qualitatively by measuring the length of the resin tags and quantitatively by determining the density and length of resin tags, these evaluations were done using electron microscope (SEM). **(Atwan and Sullivan)**[9]. SEM was employed in this study because it is simple, inexpensive and does not need sophisticated equipment.

Bond strength and sealing between tooth structure and composite restoration could be affected by three main factors. The first is the composite polymerization shrinkage that induces stress at the bonding interface. Second factor is the substrate, a biological tissue, which makes adhesion difficult. Third factor is chemical composition of adhesive itself **(Guéders et. al., 2006)**[10].

According to these factors that affect the bond strength, the current study evaluated the effect of papacarie gel on bond strength of one type of composite which was universal hybrid photopolymerized composite (Harvard Restore Composite) but the adhesive system was changed, which were Adper Scotchbond SE Self-Etch Adhesive in one group and iBond Total Etch in the second group.

Based on the results of the present study, the bond strength of self-etch adhesive system is better than etch and rinse adhesive system but with no significant difference between two groups after use of a papain based chemomechanical method for caries removal. these findings goes in accordance with the study conducted by **(Anjali, 2017)**[11] who compared the extent of microleakage between tooth and restoration interface in class V composite resin restorations after using Total Etch (Adper single bond) in first group and using Self Etch (Adper ™ SE Plus, Adper ™ Easy One) in second group, results showed that one step self-etch agents had less microleakage than total etches.

In Self Etch adhesives the acidic characteristics of the active monomers are responsible for dissolving the smear layer and demineralizing the underlying dentin. This demineralization is self-limiting because the acidity of the monomers is gradually buffered by the mineral content of the dentin. This implies that the resultant morphological aspect of the bonded interface is largely dependent on the characteristics of the dentin to which the adhesive is being applied and on the aggressiveness of the acidic monomers (**Carvalho et. al., 2012)**[12]**.**

Strong self-etch systems dissolve the smear layer completely similar to etch and rinse while ultra mild leaves the tubules intact with smear plug. the partial demineralization resulting from mild and and ultra mild Self Etch systems has reported to be an advantage because of the possibility of chemical interaction between some functional monomers (such as MDP and 4-META)and the remaining hydroxyapatite crystals along the collagen fibrils. It has been claimed that this chemical bonding resulting in the improved bond durability reported for these systems **(Carvalho et al. 2012)**.

On the other hand **(Ceballos 2003)**[13] observed that an etch and rinse adhesive system exhibit higher bond strength to caries affected dentin than the self-etch system, he suggested that the caries affected dentin contains dentin tubules that are filled with acid resistant minerals than can be solubilized with the application of phosphoric acid on the dentin, therapy contributing to better resin retention.

Conclusion

It was concluded that the self-etching adhesive system achieves better bonding for composite resin restoration than of total etching adhesives to caries-affected dentin after caries removal with papacarie gel.

Ethical Clearance: No need for ethical committee because research was on extracted teeth.

Source of Funds: Self-funds.

Conflict of Interest: Nil.

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Establishing Nursing Diagnoses Profile for Patients with Multiple Sclerosis: Maslow's Model Application

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Abstract

Multiple Sclerosis (MS) is a chronic inflammatory and autoimmune disease, estimates about 2.5 million people around the world had MS. Furthermore, scanty studies were carried out to document nursing diagnoses among Egyptian patients suffering from MS. The aim of the current study was to establish the actual nursing diagnoses profile for patients with MS applying Maslow's model as assessed by (I) personal information and medical background tool, (II) physical examination tool based on Maslow's model, and (III) Multiple Sclerosis Nursing Diagnoses Profile (MSNDP) that developed by the investigators. Non experimental design was utilized in this study. A convenient sample of 100 adult male and female patients with MS was involved. The current study findings revealed that 29 actual nursing diagnoses for patients with MS based on Maslow's hierarchy were established. The most common actual nursing diagnoses were imbalanced nutrition, activity intolerance and anxiety. Therefore, it is recommended to replicate the study using large sample from different geographical areas in Egypt to obtain more generalized data.

Keywords: *Multiple sclerosis, Nursing diagnosis, Maslow's hierarchy.*

Introduction

Multiple sclerosis (MS) is an autoimmune disease, a chronic inflammatory, demyelinating and neurodegenerative disorder through inflammatory process of unknown etiology and complex factors[1-2] such as immunologic, genetic, viral and environmental factors that may affect on the disease's progression, so it causes neurological disability by decreasing nerve conduction[3,4]. It is estimated that about 2.5 million people around the world had MS[5]. The last annual statistics for inpatient with MS among Egyptian attending El Kasr Al Ainy MS research unit at Cairo University in the last three years 2016, 2017 and 2018 was 1439, 1957 and 1402 respectively[6].

There's no cure for MS to date although early pharmacological treatments can delay the progression of the disease[7]. Management of multiple sclerosis requires integration of multiple disciplines of health professionals who should have the basic knowledge and skills necessary to provide optimal care for the dynamic demands of the patient and the family. The nurse is a key member of health care team because the nurse is more contacted with patient and family. Nursing intervention is individualized for each patient through continuous assessment for patient progression. Appropriate care focuses on safety, prevention of complications, assistance with physical therapy and emotional support during diagnostic and therapy stages[8].

Applying care through nursing process provide nurses with an organized frame of reference regarding patients' problems and skills. The nurse gather all relevant information depend on the clinical situation, patient status, time available and purpose of data collection[9]. Accurate assessment information is essential for the provision of high quality nursing care [10-11]. All humans are born with instinctive needs, these needs grouped into five categories which arranged from physical survival to develop a person's fullest potential according to Maslow's hierarchy of human needs. People are motivated to achieve lower level needs; once

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that level is fulfilled the next level up motivates people, and so on[12].

Based on literature review, the investigators found wide variety of nursing diagnoses related to patients with MS as fatigue, self-care deficit, self-esteem disturbance, sleep disturbance, social isolation and potential for ineffective family coping as reported by[3]. Ineffective activity planning and ineffective airway clearance were reported by[9]. Costa et al., [13] found that the most frequent nursing diagnoses in patients with MS were: impaired physical mobility and activity intolerance; while the least frequent was a risk of disuse syndrome. Furthermore, scanty research studies were carried out to document nursing diagnoses among Egyptian patients suffering from MS based on Maslow's model; therefore, the aim of this study is to establish nursing diagnoses profile for patients with multiple sclerosis using Maslow's model as a frame.

Significance of the study: Nursing diagnoses profile will help nurses, researches, patients and their family in determining properly patients' needs and make appropriate decision in caring and consequently improving quality of care. Nurses can monitor patient condition through identifying defining characteristics and contributing factors, so they can prevent or reduce complications which faced patients during disease process. They will provide scientific evidence for nurses to give proper instructions for patients or/and family members to cope with expected problems.

Nursing diagnoses profile will increase patient satisfaction by knowing health problems and how to cope with it; consequently patient hospital stay or readmission will be reduced and psychological status of patient and family will be maintained and enhanced. Moreover, it will decrease the level of stress for patient's family through enhancing patient's outcome. It will guide researchers to explore about proper management in caring of patients with MS to improve their quality of life.

Method

Aim of the Study: This study aimed to establish actual nursing diagnoses profile for patients with multiple sclerosis applying Maslow's model.

Research question: To fulfill the aim of the study, the following research question was postulated:

What is actual nursing diagnosis profile of patient with multiple sclerosis: Maslow's model application?

Research Design: Non experimental, descriptive - explorative design was utilized in the current study

Sample: A convenient sample of 100 adult male and female patients with a confirmed diagnosis of MS and able to communicate constituted the study sample through a consecutive six months duration at multiple sclerosis research unit (KAMSU) affiliated to Cairo University.

Data Collection Tools:

Data was collected using three developed tools:

(I) Personal information and medical background tool; which included demographic and medical background.

(II) Physical examination tool based on Maslow's model; it designed according to the levels of Maslow's hierarchy of needs. Every level gathered through physical examination and patient's verbalization.

(III) Multiple Sclerosis Nursing Diagnoses Profile (MSNDP): This tool included defining characteristics and contributing factors of nursing diagnoses.

Validity & Reliability: Tools were validated by a panel of five experts in the field of Medical-Surgical Nursing and modifications were carried out. Reliability was tested using Cronbach's alpha with value of 0.98.

Procedure: Relevant data was collected after individualized interview with patients, it took one - two hours to fill the tools and record patients' responses.

Statistical analysis: Descriptive statistics were utilized to analyze collected data by using SPSS version 20.

Results

Section I: Demographic characteristics and background: More than three quarters of the study sample were female; age ranged from 30 - 40 years for more than one quarter with a mean of 32.27 ± 8.02; around two thirds were married and more than two thirds were unemployed.

Figure (1) shows that 78% of studied sample was diagnosed with relapsing remitting MS

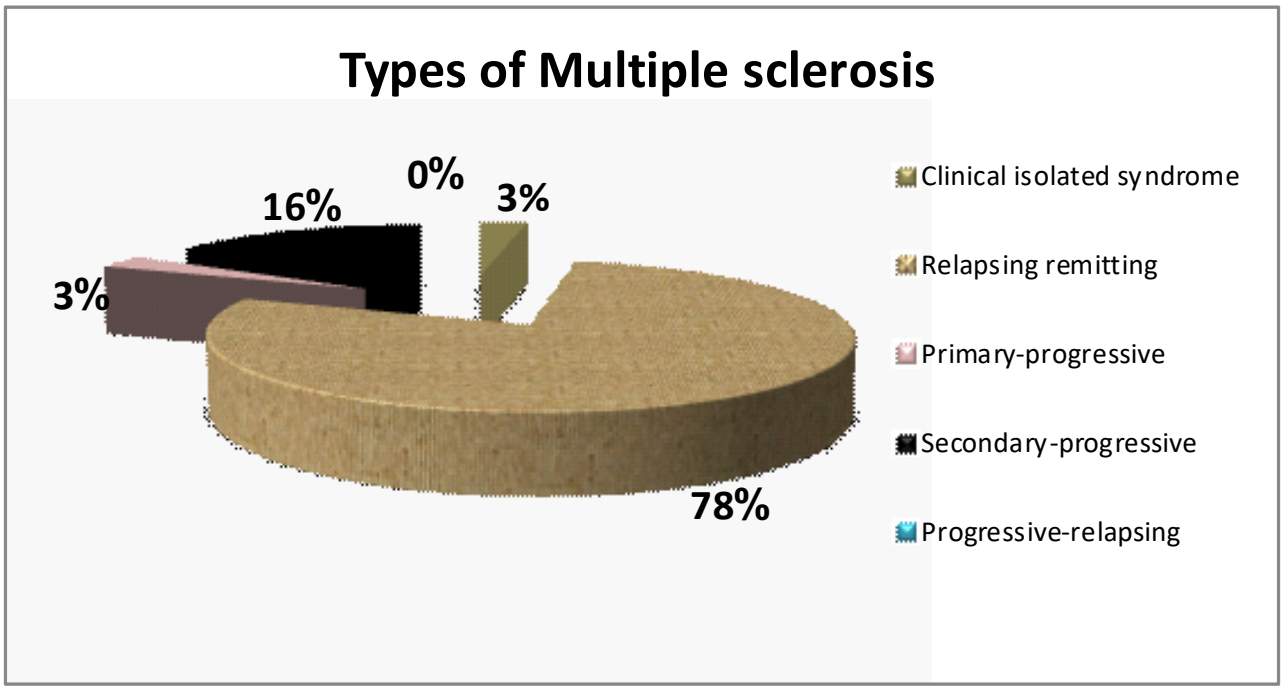


Figure (1): Percentage distribution of sample according to types of MS (N=100).

Section II: Actual nursing diagnoses profile for patients had Multiple Sclerosis according to Maslow's hierarchy.

Table 1: Percentage distribution of actual nursing diagnoses profile according to physiological needs of Maslow's hierarchy (N=100).

Levels of needs	Actual nursing diagnoses	Defining characteristics	Contributing factor/s	%
Physiological needs	Imbalanced nutrition: less than body requirements	Recent change of body weight	Alternation in GIT function (nausea-vomiting-anorexia)	85
	Decreased cardiac output	Edema	Alteration in tissue perfusion	83
	Ineffective peripheral tissue perfusion	Edema	Limitation of vascular functioning	83
	Impaired skin integrity	Edema	Ineffective peripheral tissue perfusion	83
	Alteration in comfort	Increase severity of pain	Alteration in motor &sensory functions	64
	Disturbed sleep pattern	Feeling unrested	Alteration in comfort	64
	Impaired urinary elimination	Incontinence	Loss of motor & sensory function	54
	Sexual dysfunction	Alteration (activity/ satisfaction/desire)	Psychological problems	39
	Impaired bowel elimination	Change in bowel pattern	Alteration in nutrition oral habit	32
	Disturbed in health management of disease	Express doesn't continuous in management	Long time administration	24
	Ineffective breathing pattern	Tachypnea	Using accessory muscles	19

Table (1) clarifies that the highest percentage of actual nursing diagnoses was imbalanced nutrition 85%; while the ineffective breathing pattern constituted 19%.

Table 2: Percentage distribution of actual nursing diagnoses profile according to safety and security needs; love and belonging of Maslow's hierarchy (N=100).

Levels of needs	Actual nursing diagnoses	Defining characteristics	Contributing factor/s	%
Safety and security needs	Activity intolerance	Fatigue	Generalized weakness	84
	Disturbed Sensory Perception	Alteration in vision	Alteration in motor &sensory	79
	Impaired physical mobility	Slowed movement	Loss or limitation in motor & sensory	79
	Self-care deficit	Toileting: partial dependent	Alteration in physical ability	79
	Deficient Knowledge	Statement of misconception	Unfamiliarity with the disease and management	42
	Impaired memory	Forgetfulness	Alteration in neurological function	32
		Inability to recall events or rain new information		
Love and belonging needs	Anxiety	Express about anxiety	Management of disease	86
	Chronic sorrow/Grieving	Psychological distress	Change of role performance	80
	Self –neglect	Change of body image	Alteration in physical ability	79
	Interrupted family processes	Assigned tasks change	Inability to fulfill expected roles	78
	Social isolation	Desire to be alone	Change communication	70
	Powerlessness	Alienation	Illness-related regimen	69
	Spiritual distress	Impaired spiritual activity	Alteration of physical ability	24

Table (2) illustrates the highest percentage of actual nursing diagnoses according to safety and security needs was activity intolerance 84%; while the lowest percentage was impaired memory 32% and regarding to love and belonging needs the highest percentage was anxiety 86%; while the lowest percentage was spiritual distress 24%.

Table 3: Percentage distribution of actual nursing diagnoses profile according to self-esteem and self-actualization needs of Maslow's hierarchy (N=100).

Levels of needs	Actual nursing diagnoses	Defining characteristics	Contributing factor/s	%
Self-esteem needs	Low self-esteem	Rosenberg scale (low score)	Ineffective coping with loss	70
	Ineffective coping	Reporting coping disability	Change in physical & Psychological	70
Self-actualization needs	Deficit diversional activity engagement	Reduced participation in recreational	Disease process	52
	Decisional conflict	Delay in decision-making	Insufficient support system	42
	Ineffective activity planning	Inability to prepare for a set of action (un ambition)	Alteration of psychological status	41

Table (3) clarifies that the highest percentage of actual nursing diagnoses regarding to self-esteem needs were low self-esteem and ineffective coping 70% and regarding to self-actualization needs the highest percentage was deficit diversional activity engagement 52% and the lowest percentage was ineffective activity planning 41%.

Discussion

Actual nursing diagnoses profile regarding physiological needs of Maslow's hierarchy: Imbalanced nutrition was documented by more than two thirds of patients. It might be due to alternation in GIT functions (nausea, vomiting, loss of appetite) and side effect of medications that lead to loss or change of body

weight. This result was contradicted with study done by Huizen[4] who found that 10% of patients with MS had nausea and vomiting.

Ineffective breathing pattern and use accessory muscles were observed for less than one quarter of sample because of chest muscles weakness. On the same line, a study done by Health line[1] and a study done by Ackley, Ladwing, Makic[9] reported the same findings.

Actual nursing diagnoses profile regarding safety and security; love and belonging needs of Maslow's hierarchy: Activity intolerance expressed by fatigue was reported by more than three quarters of sample as MS affects the muscles' functions that result in improper physical mobility, disturbance in sleep, incontinence of bladder function, pain, psychological distress, and self-care deficit. This result agreed with Huizen[4] who reported fatigue from 80% of patients. However, this result contradicted with Costa et al[13] where less than half of sample reported fatigue.

Impaired memory was reported by more than one quarter of sample. It might be a result of disease process on the cognitive status and neurological functions. This finding partially agreed with Pittsburgh Institute[14] which reported that approximately half of patient with MS had cognitive dysfunction. It was congruent with Huizen[4] and Costa et al[13] in symptoms of cognitive change (remembering recent information, organize and solve problem or recall events).

Anxiety was found in the majority of the sample. It might be related to the nature of the disease and its distressing sequences as a chronic inflammatory and neurodegenerative disorder. This finding was partially supported by Pittsburgh Institute[14] who reported that 35% of patients with MS had anxiety and by Costa et al[13] who reported that less than half of sample had anxiety.

Spiritual distress was expressed by approximately one quarter of sample. It might be related to improper physical mobility and psychological distress. Rest of sample had healthy spiritual status especially after getting diseased with MS that it might be related to the culture beliefs to attach with spiritual activities in confronting any disaster. The result of the current study was in the same line with Niyazmand, Abbasszadeh, Borhani & Sefidkar[15] who found spiritual health and hope could have positive improvement of psychological status in patient with MS.

Actual nursing diagnoses profile for patients with MS regarding self-esteem and self-actualization needs of Maslow's hierarchy: Low self-esteem was found in around two thirds of sample. It might be resulted from reported coping disability, increased incidence of female gender, unemployment status or related to type of MS. This result consistent with study done by American Association of Neurosurgical Nurses[16] and Zitnik, Mills, Tennant and Young[17] who reported that low self-esteem in MS related to fatigue, level of disability and employment status. The result partially agreed with N Ifantopoulou et al[18] who reported that perceived stress had significant effect on low self-esteem and depression was around fifty percentages. This result contradicted with Costa et al[13] who reported that more than one third of sample had low self-esteem.

Deficit diversional activity engagement was reported by more than half of sample. It might be related to the effect of disease on physical mobility, psychological disturbance, insufficient encouragement of family members, ineffective coping with disease or delay in decision making and formulating planning for activity. The same finding was reported by studies done by Huizen[4] and Costa et al [13].

Ineffective activity planning was found in more than one third of sample. It might be related to the effect of disease on body systems, un acceptance of MS as chronic uncured disease and awareness of patient about the progressive nature of the disease that lead to development of chronic sorrow, change of role performance and feeling of powerlessness. The findings were supported by Huizen[4] who reported that MS had an improper effect on physical and psychological status of patients that result in un ambition to perform any activity.

Conclusion and implications: Finally, the most common actual nursing diagnoses for MS patients were anxiety, imbalanced nutrition, activity intolerance, decreased cardiac output, ineffective peripheral tissue perfusion and impaired skin integrity. This result will guide nurses about nursing diagnoses which might face MS patients and their family members, so direct them regarding accurate instructions to cope with problems; consequently decrease level of stress for patients or/and family members, hence, enhance patient's outcomes. Nurses can improve quality of care through formulating appropriate comprehensive nursing care plan for patient's needs based on Maslow's hierarchy of needs.

The study recommended the following:

- Replication of the study on a larger probability sample selected from different geographical areas in Egypt to obtain more generalized results.
- Organize workshop for students, nurses, patients and family members to increase awareness about problems for patients had multiple sclerosis.

Ethical Clearance: A research approval was obtained from the Research and Ethical committee at Faculty of Nursing - Cairo University and official permission was obtained from the administrators at study setting. Written informed consent was obtained from each patient.

Conflict of Interest: The authors declare that there is no conflict of interest.

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Socioeconomic Determinants of Complete Immunization Status in Under-Five Children in Slum Inner Capital City

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Abstract

Identifying socioeconomic factors affecting immunization status may provide the insight to facilitate the development of effective strategies and policies to reduce the number of incomplete immunizations among children, therefore decreasing child mortality and morbidity. This study, conducted from October to November 2018, aimed to identify socioeconomic factors influencing immunization status in under-five children in Tanah Tinggi, Johar Baru, Central Jakarta. A total of 237 subjects were recruited to participate in this study. The prevalence of complete immunization status was 84.8%. Most cases of incomplete immunization were found among children aged 12–23 months. Significant socioeconomic determinants for complete immunization status were age group, families of one to two children (odds ratio [OR]= 2.85; 95% confidence interval[CI]: 1.29 to 6.33), and highly educated mothers (OR = 2.72; 95% CI: 1.24 to 5.96). Multidisciplinary approach to intervene these risk factors could be effective for decreasing the number of incomplete immunizations.

Keywords: *Children; determinants; immunization; slum; socioeconomic; urban.*

Introduction

Children are an important asset for the future of a country. Since 1978, the World Health Organization (WHO)/UNICEF Expanded Program on Immunization has successfully decreased child mortality rates for vaccine-preventable diseases in both developed and developing countries but apparently has not decreased the number of unvaccinated children[1,2]. In 2013, more than six million children five years of age and above died during the neonatal period due to infectious diseases, such as pneumonia, diarrhea, malaria, meningitis, and measles[3]; some of which can be prevented by vaccination. During the same year, 21.8 million children one year of age and above had not been fully immunized with diphtheria, tetanus, pertussis, and measles vaccines[2]. Meanwhile, recent data from Indonesia in 2018 showed the rate of children with complete, incomplete, and without primary immunization was 57.9%, 32.9%, and 9.2%, respectively[4].

Socioeconomic status plays an important role in determining both life and health standards. It also has an impact on social security in terms of accessibility, affordability, acceptability, and utility of health facilities. Evidence has shown that children with a well-educated parent, high family income, or those living in an urban area have more complete immunization status[5] which showed that immunization practice favored children with relatively higher socioeconomic status[6]. Identifying socioeconomic factors which may influence immunization status may provide much-needed insight to develop effective strategies and policies to reduce the number of incomplete immunizations among children.

Given this background, our study aimed to determine the socioeconomic factors influencing immunization

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status in under-five children in Tanah Tinggi, Johar Baru, Central Jakarta.

Material and Method

This was a cross-sectional study in which a questionnaire was applied and filled by health workers while they were conducting community service in Tanah Tinggi, Johar Baru District, Central Jakarta from October to November 2018. This is a densely populated slum in urban area. Children aged 0–60 months were included in this study by stratified random sampling. We examined 294 children, of which 56 were dropped out because of incomplete data and one was excluded (aged 61 months old). Participants' parent or caregiver signed a written informed consent form prior to study participation.

The interview with the mother or caregiver was done individually using a questionnaire. Independent variables in this study were: age, sex, birth order, total number of children in the family, primary caregiver, mother's education, working mother, and family income. Age grouping was done according to the immunization schedule: 0–11 months (primary immunization); 12–23 months (secondary immunization); and 24–60 months (catch-up immunization). Birth order was categorized into 1–2 (first and second child) and more than two (third child or more). The total number of children in the family was classified one to two and more than two. The primary caregiver was classified into mother and other than the mother. The mother's education was categorized as less educated (below senior high school) and highly educated (senior high school and above). The mother's occupation was classified as working and not working. Classification of family income was made according to regional minimum wages in DKI Jakarta province in 2018 for low (below 3,600,000 IDR) and high income (3,600,000 IDR and above). The dependent variable was the immunization status. Complete immunization included full primary immunization provided by the national program until nine months of age (hepatitis B, BCG, polio, DTP-HB-Hib, measles/MR) and booster (DTP-HB-Hib, measles/MR) immunization according to age[7]. Incomplete immunization referred to children who missed one or more immunization doses or who had never been vaccinated.

Statistical analysis was done using Statistical Package for Social Sciences version 20.0. Bivariate analysis for proportional differences was done using Chi-square and Fisher test as appropriate. Variables with p value<.25 were included in multivariate logistic regression analysis and considered significant if p value<.05.

Findings: This study included 237 subjects aged 0–60 months old. Most subjects were male (54.4%) and aged between 24 and 60 months (60.8%). The prevalence of low and highly educated mothers in our study population was comparable (43.9% vs. 56.1%). Most mothers did not work (86.5%) and acted as primary caregivers (85.2%). About two thirds of the subjects came from low-income families.

The prevalence of complete immunization status in under-five children in Tanah Tinggi was 84.8% (201/237 subjects). Table 1 provides an analysis of the socioeconomic factors affecting immunization status. We found a significant difference between complete and incomplete immunization status for the following variables: age group, birth order, total number of children, and mother's education. Three variables were found to have significant association with immunization status in the final model (Table 2): age 24–60 months, 1–2 children in a family, and highly educated mother.

Discussion

The prevalence of complete immunization in under-five children in this study was 84.8%; higher than that reported in a basic health research study conducted in 2018 (57.9% in children aged 12–23 months old)[4] and similar to the WHO and UNICEF's Global Immunization Vision and Strategy target (80%)[8]. Results from a study in a densely populated area, such as ours, may describe a socioeconomic condition that can be extrapolated to the general population in Indonesia as well as other developing countries.

We found no significant differences between sexes in immunization status, which is similar to previous studies[9,10]. This finding denoted no discrimination toward Indonesian children of any sex. In contrast, other studies showed more complete immunization status in male children[1,11,12]. Women in low-income countries are more dependent on men socially, economically, and culturally. This resulted in disadvantages for women, one of which was a lack of preventive health care such as vaccinations[5,12]. Previous study reported higher prevalence of unimmunized females than males; however, immune response after vaccination was better in females. Adverse events following immunization such as fever, pain, and inflammation were more serious in females, leading to more vaccination refusals.[13]

Most incomplete immunization cases were found among children aged 12–23 months (44.4%), while the least cases were found among children aged 0–11 months (19.4%). According to previous study, child's increasing age was negatively associated with complete immunization coverage of five traditional vaccines (DTP/DTaP, IPV/OPV, Hib, MMR, and HBV). Except for hepatitis B, coverage for age-appropriate immunization of those vaccines was satisfactory at the age of 12 months but gradually decreased thereafter at the ages of 24 and 60 months[14]. This finding was supported by a study conducted in Gambia[15], which reported high vaccination coverage in the first year of life. Lower booster coverage was probably because parents were less likely to bring the children back for later doses of vaccines as they gave more attention to younger siblings as well as limited knowledge and unawareness about booster doses[16].

Similar to previous studies[1,11], our study showed a significant difference between birth order and immunization status. This is probably a result of the differences in parenting method in terms of birth order as parents give more attention to their first or second child. This was supported by our finding in which families with one or two children were two times more likely to have complete immunization status compared to those with more than two children. Parents in a larger family are unable to focus on one child only and have other priorities over the timely immunizations[17]. Families with ≥3 children aged under 18 were more likely to have incomplete immunization status because parents tend to forget or miss the immunization schedule and have difficulty in remembering or coordinating the immunization schedule among the children[17–19].

A higher level of maternal education was related to the child's health and had an impact on the understanding of the benefits of immunization[5,6,12,17,20]. Mothers with higher education tend to know more about the importance of immunization and have modern thinking and confidence in making the best decision for family health and toward receiving health information. Furthermore, preventive health services were more acceptable among highly educated people[17].

The mother's occupation was not associated with immunization status. In contrast, previous study by Ueda et al.[20] showed a strong association between working mothers and incomplete immunization status mainly because working mothers did not have spare time to take the children for immunization. Moreover, missing a day of work would result in decreased pay. The difference in the findings are probably attributable to the cultural differences between the Japanese and Indonesian populations. Working mothers in Indonesia may still strive to get her children immunized by taking them to health care facilities during the weekend or even asking for permission during weekdays. Another caregiver may also bring the children for immunization as more relatives live nearby.

Previous studies have showed that an increase in family income may increase the complete immunization status[17,18,21,22]. Reportedly, incomplete immunization status in a low-income family is because they spend more time at work rather than getting immunizations and have lower awareness for health-seeking behavior[18]. However, we found no significant difference between family income and immunization status. This finding could be explained by the presence of free government vaccination programs which are routinely applied by community-based health services, such as *Pos Pelayanan Terpadu (Posyandu)* and Primary Healthcare Center. Community-based health services are more acceptable in low socioeconomic population as the travel time to health facilities is shorter, the transportation costs are lower,[10] and the immunizations are free of charge. Unavailability of health services nearby may cause vaccination hesitancy which is not explored in this study because there was a primary health center 15 minutes away on foot from the subjects' residences.

The main limitation of our study was a possible risk of recall bias. Several subjects who forgot to bring or lost their maternal and child health handbook gave information about immunization status based solely on recall. To avoid such bias, we suggest further research to include a check of all subjects' immunization statuses from the medical records or maternal and child health handbooks.

Table 1. Bivariate analysis for determinant socioeconomic factors of immunization status

Socioeconomic factors	Description	Immunization status		OR (95% CI)	p value
		Complete (n=201)	Incomplete (n=36)		
Sex					
	Male	107	22	0.72 (0.35–1.50)	.382
	Female	94	14		
Age					
	0–11 months	21	7	-	.004*
	12–23 months	49	16		
	24–60 months	131	13		
Birth order					
	1–2	150	19	2.63 (1.27–5.45)	.008*
	>2	51	17		
Total number of children					
	1–2	142	18	2.41 (1.17–4.95)	.015*
	>2	59	18		
Primary caregiver					
	Mother	169	33	0.48 (0.14–1.66)	.237
	Other than mother	32	3		
Mother's education					
	High	121	12	3.03 (1.43–6.39)	.003*
	Low	80	24		
Working mother					
	No	173	32	0.77 (0.25–2.35)	.795
	Yes	28	4		
Family income					
	High	69	11	1.19 (0.55–2.56)	.659
	Low	132	25		

*p value < .05

Table 2. Multivariate logistic regression analysis for socioeconomic factors of immunization status

Variables	B	OR (95%CI)	p value
Age group			**.002***
12–23 months	0.088	1.09 (0.37–3.23)	.874
24–60 months	1.497	4.47 (1.49–13.42)	.008*
Total number of children (1–2)	1.048	2.85 (1.29–6.33)	.010*
Mother's education (≥ senior high school)	0.999	2.72 (1.24–5.96)	.013*
Constant	-0.171	0.84	.758

*p value < .05

Conclusion

In conclusion, identifying contributing socioeconomic factors of complete immunization status will provide a much-needed insight to implement effective immunization programs. The prevalence of complete immunization status in our study was 84.8%. Most cases of incomplete immunization were found among children aged 12–23 months, a period during which these children are supposed to receive booster doses. Birth order (>2) and total number of children in the family (>2) contributed significantly to incomplete immunization status. Family planning would probably indirectly increase the immunization status if done

properly. The mother's education was one of the main contributing factors for complete immunization status. Therefore, parents should encourage their children, especially daughters, to complete the 12-year compulsory education.

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Effects of Serum Ferritin and White Blood Cell on Overweight and Obesity in South Korean Adults

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Abstract

The purpose of this study was to determine the difference between WBC and ferrit in according to obesity level in Korean adults. This study was performed the 5,281 subjects older than 19 years. Data were analyzed using descriptive statistics, ANOVA, χ^2-test, Scheffe's test, Pearson correlation coefficient and logistic regression analysis. The ferrit in showed higher in the obesity, overweight than the normal weight. The WBC was highest in obesity, followed by overweight, and the lowest in the normal weight. Second, BMI was positively correlated with ferrit in and WBC. Third, The ferritin was greater than normal weight in overweight 1.01 times and obesity 1.03 times. WBC was greater than normal weight in overweight 1.07 times and obesity 1.19 times. Obesity and overweight were associated with ferritin and WBC. Thus, intervention for ferritin and WBC should be included in the obesity management and prevention program for Korean adult.

Keywords: *Adult, Body mass index, Ferritins, White Blood Cells.*

Introduction

Obesity is a global health problem,600 million adults are obese in 2014.[1] Raised BMI is a major risk factor for non-communicable diseases, which were the leading cause of death.[2] The obesity was classified as a "disease" in 2013 by the American Medical Association.[3] Obesity is risk factors for ischemic heart disease, diabetes, metabolic syndrome et al.[4] In addition, the increase in the occurrence of iron deficiency (ID) and iron deficiency anemia (IDA), obesity also increases the social and economic burden.[5] Obesity people persisted in subclinical inflammation, leading to ID, malignancy, and so forth.[6-8]

Serum ferritin is used as a marker of iron deficiency.[9] Serum ferritin levels are present in abnormal conditions because they are acute phase reactants, serum ferritin levels are high in obesity, which are generalized inflammatory conditions.[10] For this reason, the use of serum ferritin as a marker of ID or IDA in obese is controversial.[11] The inflammation caused by the increase of the adiposity will be suggested as a link between iron status and obesity.[12] Among the many metabolic activities of obesity, high BMI is associated with incompatibility of iron parameters.[13,14]. Obesity of chronic inflammation showed low iron status.[15] Physical activity may be another factor associated with body iron reduction in obesity.[16]

The WBC is needed to protect against invading organisms and the immune system.[17,18] There is strong evidence for a link between obesity and increased WBC count.[19,20] Obesity is also associated with increased leptin levels.[21] WBC has a positive correlation with percentage body fat and leptin concentrations.[22]

The relationship between serum ferritin and WBC has been extensively studied as a subject of foreign obesity,[15,16,19-22], but there are few studies of obesity in Korea. In particular, studies investigating the difference in serum ferritin and WBC in overweight and obese are rare.

In this study, we suggested a fundamental data of adult obesity prevention and management program by identifying the relationship between BMI, serum ferritin and WBC.

Materials and Method

Research Design: This study is a descriptive survey study which attends a secondary analysis of the

Fifth Korea National Health and Nutrition Examination Survey's raw data to check the differences of serum ferritin and WBC depends on Korean adults' obesity degree.

Samples and setting: Subject of this study is adult(over 19 years) and data is based on 'The Fifth Korea National Health and Nutrition Examination Survey (KNHANES V-3), 2015' which Ministry of Health and Welfare and Korea Centers for Disease control and prevention conducted.

According to classification standard of BMI groups were divided in normal weight 2303 subject, overweight 1282 subject and obesity 1696 subject. The final 5281 subjects were analyzed as the data of this study.

Measuring method: BMI: The representative method to measure obesity is BMI, and the way to change BMI into clinical obesity category has slight difference following weight distribution of west and east.[23,24] Based on this, the BMI categories are normal weight (BMI<23 kg/m²), overweigh (23≤BMI<25 kg/m²) and obesity (BMI≥25 kg/m²).[25]

Blood measurement: The serum ferritin measurements, immunoradiometric as say was used for inspection method, IRMA-mat Ferritin (Dia Sorin/ U.S.A) for reagent. It is analyzed, with 1470 WIZARD gamma-Counter (Perkin Elmer/Finland). WBC measurements was performed with, laserflow cytometry as inspection method, Detergent, Cellclean (Sysmex/ Japan) for reagent. Ii is analyzed, with XE-2100D (Sysmex/Japan).

Data analysis: The difference of serum ferritin, WBC depends on subject's obesity degree was analyzed by ANOVA, χ^2-test, Scheffe's test. The relation between subject's BMI, serum ferritin, WBC was analyzed by Pearson correlation coefficient. The factors influencing overweight and obesity were analyzed by logistic regression (SPSS 24.0).

Findings

General characteristics of subject: The average BMI is 23.76, specifically, normal weight was 43.6%, overweigh was 24.3%, and obesity was 32.1%. The mean serum ferritin was 81.88 and WBC was 5.87 (Table 1).

Table 1. General characteristics of subject (N=5.281)

Variables	Category	Mean±SD N(%)	Acquired score range
Age (years)		50.80±16.39	19~88
Gender	Male	2219(42.0)	
	Female	3062(58.0)	
Education level	Under elementary school	1314(24.9)	
	Middle School	565(10.7)	
	High school	1787(33.9)	
	Above college	1607(30.5)	
Weight change over the past year	No change (within 0-3Kg)	3568(67.6)	
	Weight loss	747(14.1)	
	Weight gain	966(18.3)	
BMI		**23.76±3.40**	**14.42~53.54**
	Normal weight(BMI<23)	2303(43.6)	
	Overweigh(23≤BMI<25)	1282(24.3)	
	Obese(BMI≥25)	1696(32.1)	
Serum ferritin		**81.88±24.23**	**12.00~450.40**
WBC		**5.87±1.65**	**2.00~24.00**

Differences in serum ferritin, WBC according to subject's BMI: The age of subjects was higher in overweight and obese than in normal group (F=58.953, p<0.001). According to obesity, there was a difference in gender (χ^2 = 55.937, p<0.001),education level (χ^2 = 111.371, p<0.001) and weight change over the past year (χ^2 = 150.469, p<0.001).According to obesity, there was a difference in BMI (F = 7012.793, p<0.001), serum ferritin (F=59.122, p<0.001) and WBC (F=57.490, p<0.001) (Table 2).

Table 2. Differences in serum ferritin, WBC according to subject's BMI (N=5,281)

Variables	Category	Normal weigh G[1] N=2303 Mean±SD N(%)	Overweigh G[2] N=1282 Mean±SD N(%)	Obesity G[3] N=1696 Mean±SD N(%)	F/χ^2 (p value)
Age (Years)		48.12±17.43	53.72±15.20	52.24±15.21	58.953(<0.001) 2,3>1
Gender	Male	835(36.3)	603(47.0)	781(46.0)	55.937(<0.001)
	Female	1468(63.7)	679(53.0)	915(54.0)	
Education level	Under elementary school	475(20.7)	370(28.9)	469(27.7)	111.371(<0.001)
	Middle School	180(7.8)	182(14.2)	203(12.0)	
	High school	824(35.8)	379(29.6)	584(34.5)	
	Above college	820(35.7)	349(27.3)	438(25.9)	
Weight change over the past year	No change (within 0-3Kg)	1656(71.9)	892(69.6)	1020(60.1)	150.469(<0.001)
	Weight loss	369(16.0)	160(12.5)	218(12.9)	
	Weight gain	278(12.1)	230(17.9)	458(27.0)	
BMI		20.83±1.60	23.98±0.56	27.56±2.47	7012.793(<0.001) 3>2>1
Serum ferritin		68.40±15.35	88.06±22.35	95.50±24.53	59.122(<0.001) 3>2>1
WBC		5.63±1.65	5.89±1.54	6.19±1.67	57.490(<0.001) 3>2>1

Correlation between subject's BMI, Serum ferritin and WBC: The subject's BMI was positively correlated with serum ferritin (r=0.152, p<0.001) and WBC (r=0.157, p<0.001) (Table 3).

Table 3. Correlation between subject's BMI, Serum ferritin and WBC (N=5,281)

Variables	BMI	Serum ferritin	WBC
	r (p value)		
BMI	1		
Serum ferritin	0.152(<0.001)	1	
WBC	0.157(<0.001)	0.120(<0.001)	1

Factors Affecting Overweight and Obesity: As the age goes up, the overweight 1.02 time sand obesity 1.01 times increased. In gender, female were higher overweight 1.38 times and obesity 1.22 times than male. At the educational level, overweight was lower in the middle school 0.71 times and high school 0.74 times compared to the under elementary school. On the other hand, above college 1.40 times increased. Obesity was lower in the middle school 0.58 times and high school 0.75 times compared to the under elementary school. At the weight change over the past year, overweight was reduced in weight loss 0.73 times compared to no change, and overweight was increased in weight gain 2.29 times compared to no change. Obesity was increased in weight gain 3.58 times compared to no change.

The overweight (as compared to those being of normal weight) had 1.01 times greater odds of serum ferritin. In addition, obesity(as compared to those being of normal weight had 1.03 times greater odds of serum ferritin. The overweight group had 1.07 times greater odds of WBC, In addition, obesity group had 1.19 times greater odds of WBC (p<0.001) (Table 4).

Table 4. Factors Affecting Overweight and Obesity (N=5,281)

Variable	Category	Normal weight vs Overweight		Normal weight vs Obesity	
		OR[a] (95% CI[b])	p value	OR[a] (95% CI[b])	p value
Age		1.02(1.01~1.02)	<0.001	1.01(1.00~1.02)	<0.001
Gender	Male	referent		referent	
	Female	1.38(1.17~1.63)	<0.001	1.22(1.04~1.43)	0.012
Education level	Under elementary school	referent		referent	
	Middle School	0.71(0.56~0.91)	0.007	0.58(0.46~0.73)	<0.001
	High school	0.74(0.59~0.93)	0.012	0.75(0.60~0.93)	0.010
	Above college	1.40(1.08~1.82)	0.010	1.12(0.87~1.45)	0.354
Weight change over the past year	No change	Referent		Referent	
	Weight loss	0.73(0.59~0.90)	0.004	0.91(0.75~1.11)	0.366
	Weight gain	2.29(1.86~2.83)	<0.001	3.58(2.98~4.30)	<0.001
Serum ferritin		1.01(1.00~1.01)	<0.001	1.03(1.02~1.04)	<0.001
WBC		1.07(1.02~1.11)	0.003	1.19(1.14~1.24)	<0.001
Constant			<0.001		<0.001

a. OR=Odds ratio, b. CI=confidence interval

Discussion

In this study, overweight and obesity showed more female than male. This is more common for female and obesity is considered a serious health threat.[26] In this study, BMI and serum ferritin were positive correlation, and serum ferritin was the highest in obesity and the lowest in normal weight. In addition, serum ferritin was greater than normal weight in overweight 1.01 times and obesity 1.03 times. The study second, third and fourth quartiles of serum ferritin levels were 1.08 times, 1.14 times, and 1.24 times as compared with the first quartile, There was also a consistent association with severe obesity (BMI ≥ 30 kg/m²),[27] Our data showed similar conclusion with above study.

Serum ferritin is a marker of inflammation in overweight and obese subjects, and There was a high BMI is to have a high level of serum ferritin, which can be caused because of the dominant inflammatory conditions, in the presence of an increased adipose tissue.[8]

Increased body fat tissue appears to be associated with an increased risk of iron deficiency that can be masked by elevated serum ferritin levels.[28] Serum ferritin is a prime indicator for estimating iron status.[29] Ferritin expression is stimulated by a number of factors, including cytokines released during inflammation and liver disease, Inflammation in turn leads to liver synthesis of acute phase proteins.[30]

ID is found in obesepeople and low iron levels in overweight and obese patients are most likely due to inflammatory mechanisms.[31] IDA occurs most often due to malnutrition. Obesity, on the other hand, is often caused by excessive nutrition. Therefore, the coexistence of IDA and obesity in the same person indicates malnutrition and hypernutrition. Among the factors responsible for mutual co-existence, such as diluted hypoferremia, lack of dietary iron intake, increased iron demand, and/or iron absorption disorder, hepcidin has recently been identified as a major cause of obesity ID or IDA.[32]

Chronic inflammation caused by excessive fat tissue, rather than diet, provides an explanation for obesity's ID/IDA, but the presence of acute and chronic infections should also be considered and inflammatory diseases should be considered.[33] As a result, higher ferritin levels secondary to asymptomatic inflammation of overweight and obese people can conceal iron deficiency because they are acute-phase responders,[32] supporting the results of this study.

In this study, BMI and WBC were positive correlation. The WBC was not only the highest in obesity but also the lowest in normal weight. In addition, WBC was greater than normal weight in overweight 1.07 times and obesity 1.19 times. The study found a positive correlation between BMI and WBC in the obese group, The number of WBC in overweight and obesity was 1.06 times and 1.11 times, respectively.[34] A previous study

showed some factors that cause continuous increase in WBC in obese patients.[35] Obesity was the only identified cause in patients with leukopenia. Obesity has also been demonstrated to be associated with low-grade subclinical and smoldering inflammation,[36] supporting the results of this study.

In this study, it is meaningful to confirm the difference between serum ferritin and WBC according to BMI of South Korean adult. The results of this study are intended to provide basic data for prevention and management of obesity in adult.

Conclusions

In this research, BMI of Korean adults was significantly correlated with serum ferritin and WBC. Serum ferritin and WBC were the highest in the obese, followed by the overweight and the normal weight. Serum ferritin and WBC were found to affect overweight and obesity. In conclusion, adult obesity prevention and management programs should include serum ferritin and WBC intervention.

Conflict of Interest: The authors declare that there is no conflict of interests.

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Ethical Approval: The Korea National Health and Nutrition Examination Survey which is used in this study was reviewed from Korea Centers for Disease Control and Prevention Institutional Review Boards (IRB)(2012-01EXP-01-2C), and subject's anonymity and confidentiality were guaranteed by collecting their private information in serial number which is unable to distinguish. So, Institutional ethics approval was not sought. More details can be found in the web site (http://cdc.go.kr/CDC).

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Comparative Study of Antimicrobial Activity of Seven Ficus Species Cultivated in Egypt

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Abstract

Ficus species are rich sources of compounds that treat various diseases with limited reports examining those cultivated in Egypt. We compared the antibacterial, antifungal, anti-leishmanial, anti-malarial and anti-trypanosomal activities of the total methanolic extracts of seven Egyptian *Ficus* species leaves andone bark of *F.bengalensis*. The extracts were tested against two fungal strains;namely *Candida albicans* (*C.albicans*), and *Aspergillus niger* (*A.niger*), and against four bacterial species, namely *Staphylococcus aureus* (*S.aureus*), *Bacillus subtilus* (*B.subtilus*), *Klebsiella pneumoniae* (*K.pneumoniae*), and *Escherichia coli*(*E. coli*) using disc diffusion method. Also, the extracts were tested for their anti-leishmanial, anti-malarial and anti-trypanosomal activities. All the extracts of *Ficus* showed moderate to high antibacterial activity against Gram positive and Gram-negative bacteria. *F.retusa* showed the highest activity against *E.coli* (inhibition zone=24mm), followed by *F.elastica and F.cycomorous* (inhibition zone=22mm). The highest inhibition zones against *K. pneumoniae*were for *F.platyphylla* and *F.retusa* (inhibition zone=24 and 22mm, respectively). All the extractsshowed no antifungal activity against *A.niger*. Also, no anti-leishmanial, oranti-malarial or anti-trypanosomal activities against the microorganismstested. In conclusion, methanolic extracts of different *Ficus* species had promising antibacterial activity and could be used as a cure for some bacterial diseases.

Keywords: *Antimicrobials; Anti-leishmanial; Anti-malarial; anti-trypanosomal; Ficus.*

Introduction

Natural products are considered renewable natural resourcesof diverse bioactive compounds[(1)].The use of natural remedies in medicineis usually to find novel antimicrobial drugs from natural sources to avoid microbial resistance[(2)].

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Leishmaniasis is a major public health problem in Africa, Asia and Latin America[(3)] while malaria is a global health problem. Concomitantly, human African trypanosomiasis (HAT) is caused by trypanosoma[(4)]. Tillnow, there is no drug of plant origin for treatment of trypanosomiasis, although, some plants exhibited considerable anti-trypanosomal activity[(5)].

Family Moraceae (Mulberry) is one of the largest among angiosperms, comprising 73 genera and 1100 worldwide species. Several members of the genus *Ficus*;a member of Moraceae Family;are used traditionally in a wide variety of ethnomedical remedies. *Ficus* sp. were reported as a rich source of compounds, which have multidimensional curative properties[(6)]. However,

there are limited reports examining the activities of *Ficus* species cultivated in Egypt. Accordingly, seven *Ficus* species cultivated in Egypt were selected for this study to investigate their antifungal, antibacterial, anti-leishmanial, anti-malarial and anti-trypanosomal activities aiming to discover new antimicrobial agents from natural sources.

Materials and Method

Plant materials: Fresh leaves of seven *Ficus species (F.bengalensis, F.platyphylla, F.hawaii, F.elastica, F.sycomorus, F.infectoria, and F.retusa)* and the bark of *F.bengalensis,* were collected from the Experimental Station of Ornamental Plants, Faculty of Agriculture, Minia University and were kindly identified and authenticated by Prof. Dr. Mahmoud Abd El-Hady, Professor of Horticulture, Faculty of Agriculture, Minia University, Egypt. All the plants were kept and dried in shade. The dried leaves and bark were pulverized into powdered form and weighed to give 250g of each.

Preparation of crude extracts: The air-dried powders of the leaves and bark of *Ficus* species were separately extracted by maceration with 90% methanol at room temperature (3×1L) till exhaustion. Each methanolic extract was concentrated by a vacuum rotary evaporator and left to dry as described[7]. Each crude dry extract (0.5g) was used to explore the antimicrobial activities and the rest was preserved at 4°C in air-tight bottles until used.

Antimicrobial assay strains: *In-vitro* antimicrobial screening was carried out using cultures of two fungal strains namely *Candida albicans* (*C.albicans;* ATCC10231), and *Aspergillus niger* (*A.niger*; ATCC16404), as well as four bacteria species namely, Gram positive bacteria, *Staphylococcus aureus* (*S.aureus*; ATCC29213), and *Bacillus subtilus* (*B.subtilus*; ATCC6051), Gram negative bacteria, *Klebsiella pneumoniae* (*K.pneumonia*; ATCC700603), and *Escherichia coli* (*E.coli*; ATCC25922).

Antileishmanial assay: The *in-vitro* anti-leishmanial activity was carried out on the total methanolic extractsof *Ficus* species, on cultures of *Leishmania donovani promastigotes, L.donovani Amastigote,* and *L.donovani Amastigote/*on *THP* human monocytic cell lineas described previously[8].

Antimalarial assay: *In-vitro* screeningof antimalarial activity was performed against Chloroquine-sensitive strain (D2, Sierra Leone) of *P.falciparum*by measuring plasmodial lactate dehydrogenase activity (LDH) as described[9].

Antitrypanosomal assay: Anti-trypanosomal activity was tested against *Trypanosoma brucei brucei* strain TC221 (10^4 trypanosomes per ml) as described[10].

Antimicrobial activity testing:: Antimicrobial activity was determined using the agar disc diffusion method as described[2]. The tested organisms were sub-cultured on Trypticase soya agar medium (Oxoid Laboratories, UK) and Sabouraud dextrose agar (Oxoid Laboratories, UK) for bacteria andfungi, respectively. Chloramphenicol (30µg) and Sulphamethoxazole/ Trimethoprim (23.75/1.25µg; SEDICO, Egypt)were used as positive control antibacterial agents and dimethylsulfoxide (DMSO) was used as a negative control to evaluate the potency of the tested extracts under the same conditions. Also, fluconazole (Pfizer, Egypt) was used as a positive control antifungal agent. The dried methanolic extracts were dissolved in DMSO with a stock concentration of 1mg/ml. The tests were performedin triplicate cultures and average zone of inhibition was calculated. Inhibition zones <10mm were considered as no/weak activity, 10-20mm were considered as moderate activity, while >20mm was considered as high activity.

Antileishmanial activity testing: The *in-vitro* anti-leishmanial activity was carried out on the total methanolic extractsof *Ficus* species on cultures of *Leishmania donovani* promastigotes*, L.donovani* Amastigote*, L.donovani* Amastigote on *THP* cell lineas described[8]. Pentamidine and Amphotericin B were used as standard anti-leishmanial agents. IC_{50} values for each extract were computed from the growth inhibition curve.

Antimalarial activity testing:: The total methanolic extracts were *in-vitro* screened for their antimalarial activity against a chloroquine-sensitive strain(D2, Sierra Leone) of *P.falciparum*by measuring plasmodial LDH activity as described [9]. Chloroquine was included as a positive control. DMSO (0.25%) was used as a negative control vehicle.

Antitrypanosomal activity testing: Anti-trypanosomal activity was tested following a publishedprotocol[10]. *Trypanosoma brucei brucei* strain TC221 (10^4 trypanosomes/ml) was cultivated in Complete Baltz medium(Sigma-Aldrich, Germany).

For controls, 1% DMSO as well as, parasites without any test extracts or fractions was used simultaneously in each plate to secure absence of activity of 1% DMSO The IC_{50} values of the tested extracts were quantified by linear interpolation of three independent measurements.

Findings:

Antifungal activity: *In-vitro* examination of antifungal activity of the seven *Ficus* species was performed against two fungal strains (*C.albicans,*and *A.niger*) as described in the Materials and Methodsection and the results are shown in Table 1. The datashowedthat the most effective extract against *C.albicans* was *F.infectoria* (inhibition zone=15mm), followed by *F.elastica and F.cycamorous* (inhibition zone=14mm each) and finally *F.hawaii* and *F.bengalensis* leaves (inhibition zone=12, 11 mm, respectively). All these results are considered as moderate activity. Leaf extracts of *F.retusa, F.platyphylla, F.bengalensis* bark showed no activity against *C.albicans.*As shown in Table1, all extracts showed weak or no activity against *A.niger*. Fluconazole; the positive antifungal control; had inhibition zones of 38 and 26mm against *C.albicans*and *A.niger*, respectively.

Antibacterial activity of the totalFicus extracts: Data in Table 1 showed that *F.elastica* had the highest activity against ***S.aureus*** when compared with other extracts (inhibition zone=19mm), followed by *F.platyphylla*and *F.bengalensis* bark (inhibition zone=18 mm), then *F.retusa*and *F.hawaii* (inhibition zone=14, and 13mm, respectively).The obtained results indicated their higher potency compared to that of Sulphamethoxazole/Trimethoprim (13mm) but were still considered of moderate activity. However, the data revealed that all the extracts showed lower activity compared to that of chloramphenicol(inhibition zone=25mm). *F.cycomorous*and *F.bengalensis*leaf showed inhibition zonesof 11 mm (moderate activity) while *F.infectoria* did not show any activity against *S.aureus.*

*F.elastic, F.bengalensis*leaves, *F.platyphylla, F.retusa, F.bengalensis*bark and *F.hawaii*showed moderate activity against ***B.subtilus*** with inhibition zones of 17, 15, 12, 12, 11, and 11mm, respectively. *F.cycomorous* and *F.infectoria* showed weak/ noantibacterial activityagainst Gram-positive bacteria (Table1).

F.retusa showed strong activity against ***K.pneumoniae*** (inhibition zone=22mm)while *F.platyphylla* hadthe same activity as that of chloramphenicol (inhibition zone=24mm) and is comparable to that of Sulphamethoxazole/Trimethoprim (23mm). *F.cycamorous*and *F.bengalensis*bark showed moderate activity (inhibition zone=18mm each), followed by *F.elastica* and *F.hawaii* (inhibition zone=17, and 16mm, respectively). Both *F. bengalensis* and *F.infectoria* leaf extracts showed moderate activity with inhibition zones equal 12, and 10mm, respectively (Table1).

F.retusa was highly active against ***E. coli*** (inhibition zone=24mm), which is like that of chloramphenicol and double the activity of Sulphamethoxazole/Trimethoprim (inhibition zone=12mm). Also, *F.cycamorous* and *F.elastica* exhibited strong activity (inhibition zone=22mm). Although the antimicrobial activity of *F.platyphylla, F.bengalensis* leaf and *F.bengalensis* bark (inhibition zone=20, 18 and 14mm, respectively) are of moderate activity, they were higher than that of Sulphamethoxazole/Trimethoprim.*F.infectoria* and *F.hawaii* showed inhibition zones equal to 12, and 11mm, respectively (Table1).

Antileishmanial activity: The *in-vitro* anti-leishmanial activity were initially tested in a primary phase assay at 20µg/ml in duplicates. All the extracts showed no activity against *Leishmania donovani* promastigotes*, L.donovani* Amastigote*, L.donovani* Amastigote on *THP* human monocytic cell line at concentrations upto20µg/ml while pentamidine showed IC_{50} of 2.4µg/ml (Table2).

Antimalarial activity: As shown in the Table 3, the extract of *F.elastica* showed weak antimalarial activity (17%), followed by *F.infectoria* (14%). The rest of extracts didn't show any antimalarial activity, higher doses may be needed for noticeableeffects.

Antitrypanosomal activity: The *in-vitro* anti-trypanosomal activity was carried out against *Trypanosoma brucei* and THP1 cell line and the $\mathbf{IC_{50}}$ and $\mathbf{IC_{90}}$ were determined in comparison with the positive control (Alpha-diflouromethylornithine) which showed $\mathbf{IC_{50}}$ and $\mathbf{IC_{90}}$ of 6.35 and 12.4µg/ml, respectively. As shown in Table 4, all the extracts didn'tshow any effect against *Trypanosoma brucei brucei* strain TC221 at concentrationsup to 20µg/ml.

Table 1: Antimicrobial activity of different extracts of Ficusspecies expressed as inhibition zone (mm)

Plant species	Fungi		Gram positive bacteria		Gram negative bacteria	
	CA*	AN	SA	BS	KP	EC
F.cycomorous	14	9	11	9	18	22
F.hawaii	12	8	13	11	16	11
F.retusa	N.A†	N.A	14	12	22	24
F.platyphylla	N.A	N.A	18	12	24	20
F.infectoria	15	8	N.A	8	10	12
F.elastica	14	N.A	19	17	17	22
F.bengalensis leaf	11	8	11	15	12	18
F.bengalensis bark	N.A	N.A	18	11	18	14
Chloramphenicol			25	30	24	24
Sulphamethoxazole/Trimethoprim			13	10	23	12
Fluconazole	38	26				
DMSO	N.A	N.A	N.A	N.A	N.A	N.A

*CA=*Candida albicans*, AN=*Aspergillus niger*, SA=*Staphylococcus aureus*, BS=*Bacillus subtilus*, KP=*Klebsiella pneumonia*, EC=*Escherichiacoli,* Inhibition zones <10mm considered as weak activity, 10-20mm considered as moderate activity, >20mm considered as high activity, †N.A=No activity

Table 2: Anti-leishmanial activity of different extracts of different Ficus species

Strains	L.donovani Promastigote		L.donovani Amastigote		L.donovani Amastigote/THP	
Extract	IC_{50}	IC_{90}	IC_{50}	IC_{90}	IC_{50}	IC_{90}
F.bengalensis (leaf)	>20	>20	>20	>20	>20	>20
F.bengalensis (bark)	>20	>20	>20	>20	>20	>20
F.cycomorous	>20	>20	>20	>20	>20	>20
F.elastica	>20	>20	>20	>20	>20	>20
F.hawaii	>20	>20	>20	>20	>20	>20
F.infectoria	>20	>20	>20	>20	>20	>20
F.platyphylla	>20	>20	>20	>20	>20	>20
F.retusa	>20	>20	>20	>20	>20	>20
Pentamidine	2.42	2.42				

Table 3: Antimalarial activity of different extracts of different Ficus species

Extract	Test concentration ng/ml	Percentage of inhibition Plasmodium falciparum D6
F.bengalensis(leaf)	15866.7	0
F.bengalensis(bark)	15866.7	0
F.cyomorous	15866.7	0
F.elastica	15866.7	17
F.hawaii	15866.7	0
F.infectoria	15866.7	14
F.platyphylla	15866.7	0
F.retusa	15866.7	2
Chloroquine	79ng/ml	100

Table 4: Antitrypanosomal activity of different extracts of different Ficus species

	T.brucei IC_{50}	T.brucei IC_{90}	THP1 IC_{50}	THP1 IC_{90}
F.bengalensis (leaf)	>20	>20	>20	>20
F.bengalensis (bark)	>20	>20	>20	>20
F.cycomorous	>20	>20	>20	>20
F.elastica	>20	>20	>20	>20
F.hawaii	>20	>20	>20	>20
F.infectoria	>20	>20	>20	>20
F.platyphylla	>20	>20	>20	>20
F.retusa	>20	>20	>20	>20
Alpha-diflouromethylornithine	6.35	12. 4	--	--

Discussion

In thisstudy, all the extracts showed high to moderate antibacterial activity except *F.infectoria.* They showed moderate activity against *C.albicans*andno antifungal activity against *A.niger.* The antibacterial activity of *F.bengalensis* leaf and bark against *B.subtilus*, *E.coli* and *S.aureus* were previously reported[11] but with smaller inhibition zones than ours. By contrast, the reported inhibition zone of *F.retusa*[11] was identical to ours (14mm). Others[12], reported that *F.bengalesis* and *F.elastica* didn't give any action against *E.coli,* while*F. infectoria* gave an inhibition zone of 1 mm at 5mg/ml concentrations.

The inhibition zone of *F.cycomorous* against *S.aureus*was higher than that (7.8mm) reported by others[13]. Leaf extracts of *F.platyphylla* and *F.cycomorous* showed inhibition zones of 17.5 and 21.3mm, respectively against *S.aureus*at concentration of 100mg/ml. These data are relatively higher than ours but we used only 1mg/ml of the extracts[14]. The results of *F.retusa* against *E.coli*and *S.aureus* were higher than those reported byothers[15].One study[16], reported inhibition zones of *F.elastica* against *E.coli*, *K.pneumoniae* and *S.aureus*, which were relatively lower than ours for *E.coli* and *K.pneumoniae*, and no activity against *S.aureus*. Ethanolic extract of *F.platyphylla* leaves showed no activity against *B.subtilus* and *S.aureus*, and the inhibition zone was 10.6mm against *E.coli*[17], which is much lower than ours.

One study[18], reported that hydroalcholic extract of leaves and twigs of *F.bengalensis* cultivated in Iran showed anti-leishmanial activity against *L.major*at concentration of 5-500µg/ml.*F.platyphylla* bark showed antitrypanosomal activity at 25µg/ml and exhibited no activity against *L.donovani*at 100µg/ml[19]. Also, the stem bark of *F.sycomorus* ceased *T.brucei brucei* motility *in-vitro* with IC_{50} of 4mg/ml[20]. In addition, the wood of aerial roots of *F.elastica* reported anti-trypanosomal effect with IC_{50} value 0.9µg/mL and antimalarial activity with IC_{50} of 9.5µg/ml[21]. Egyptian *Ficus* species tested did not have any antileismanial, antimalarial or antitrypanosomal activity. In conclusion, methanolic extracts of different Egyptian *Ficus* species could be considered promising antimicrobial agents that could be used for curing some human bacterial diseases.

Conflict of Interest: None

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Ethical Clearance: Not applicable

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Life Skill Improvement of the Hydrokura Method on the Community at Astambul Subdistrict of Banjar District

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Abstract

In 2020 the volume of waste in Indonesia will increase fivefold. Approximately 91.83% of the people in the Astambul village was still throwing garbage in the river. Also, the organic waste produced by fruit trees reaches 500 kg/day even though almost all household did not have garbage disposal outside the house, which is 74 households (87.06%). Wrong littering behavior is due to the lack of management specifically that handle the garbage problem in Astambul and Kelampayan Ilir Village. This study aims to create a sustainable integrated management program for the community, namely the hydrokura method which is the development of organic compost as a local potential by utilizing waste to be effective and developing the life skills of the Astambul's people by performing organic compost as fertilizer for hydoponic plants such as vegetables and fruit. The results that have been achieved are already carried out counselling in the Astambul village with the theme of making organic compost and manufacture of bio-activator and activities of composting with takakura and planting hydroponic techniques from simple composting activity results. The output of this activity is increased knowledge by 78% and self-management commitment and formation of cadre organizational structures to increase life skills of the hydrokura method.

Keywords*: Life Skill, hydroponics, takakura.*

Introduction

Health is one of the most important elements of the quality of life in national development.[1] According to Blum theory, one of the factors that affect a person's health is the environment and health services.[2] The Ministry of Environment data in 2010 stated that the average volume of waste in Indonesia reached 200 thousand tons per day. If the waste problem is not immediately addressed, by 2020 the volume of waste in Indonesia will increase five-fold. It means 1 million tons of garbage in a day.[3] Therefore, the management of waste is needed.

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Law Number 18 of 2008 concerning Waste Management has regulated the way of managing household waste. The management method in question is to apply the 3R principles, namely reduce, reuse, and recycle.[4] The purpose of this management is to be able to be reused so that it can reduce the pile of garbage and obtain economic value from waste.[5] One program that utilizes the economic value of waste is by using the hydrokura method.

Based on priority issues from the results of Field Learning students of the Public Health Study Program of Lambung Mangkurat University, it was found that around 91.83% of the people in Astambul Subdistrict were still throwing garbage in the river. This arbitrary trash behavior is due to the absence of specific management that handles garbage problems in Astambul Kota Village. In addition, according to the head of Astambul Kota Village, it is estimated that organic waste produced by the fruit market reaches 500 kg/day.

According to Tien Aminatun research, the amount of organic waste produced per household per day averaged

2.67 kg.[6.] Meanwhile, 1 kg of organic waste can produce 0.6 kg of compost.[7] Thus, it is known that in a day a household can produce around 1.6 kg of compost and produce around 48 kg in 1 month. If 1 kg of compost is sold at Rp. 2,500/kg, then organic waste is produced home stairs per month worth 120,000 IDR, whereas village got income around 22,500 IDR/month of organic waste derived from the fruit market.

Potency value economical that is potency non-acceptance could be ruled out in effort create sustainability of management programs integrated garbage in a community.[8] Based on the dedication activities carried out in 2016, there is potential economy on garbage, which is increasing income and fulfilment community needs both economic value, knowledge and skill value, and improving health value.[9] The value of health and economy is obtained from the reduction of the amount of generation as much as 38 kg/day resulting from 2 kg/day from 19 cadres with economic value to those that have been obtained for 950,000 IDR with the sale of 1 package 30,000 IDR - 50,000 IDR. Therefore, a program is needed to develop organic compost as a local potential by utilizing waste to be effective and developing the life skills of the people of Astambul by performing organic compost as fertilizer for hydoponic plants such as vegetables and fruits.

The hydrokura method is expected that the people of Astambul village can get these benefits. Hydrokura method is one of the strategies in reducing the volume of waste by combining hydroponic method for farming and takakura method for composting. This method intends to empower the community so that the community can manage household waste, not throw garbage into the river, reduce the volume of waste in the environment, and increase public income. Judging from the successful implementation of community service that has been implemented previously regarding waste management self-management, there is an increase in community knowledge of 64.29% regarding waste management.

Waste management that is not handled wisely will cause environmental problems and pollution. The problem of the people in Astambul Subdistrict, especially in the Astambul City and Kelampayan Ilir Villages that are the focus of activities is the garbage problem that is still not well managed. If household waste is managed properly, household waste will produce an economic value that can increase public income.

These problems relate to practical waste management science that has not received optimal guidance and supervision for rural communities and is developed and empowered optimally so that the problems that have existed so far will become economic potential. Based on community diagnosis and question and answer with village officials it is known that the amount of generation produced is 2 kg/day from 346 households with the amount of waste generation as much as 692 kg/day. The reduction of the amount of waste that has been done is as much as 38 kg/day resulting from 2 kg/day from 19 cadres with an economic value of which has been obtained for 950,000 IDR with the sale of 1 package of 30,000 IDR - 50,000 IDR.

Therefore, a program is needed to develop organic compost as a local potential by utilizing waste to be effective and developing the life skills of Astambul's people by doing organic compost as fertilizer for hydroponic plants such as vegetables and fruits. The community wants a solid waste management program with the hydrokura method. Judging from the success of the implementation of community service that had been carried out previously regarding self-management of waste management, there was an increase in community knowledge of 64.29% regarding waste management.

Materials and Method

The program implementation in Astambul Kota Village and Kelampayan Ilir Village cannot be separated from the participation of the community. In the implementation of this program, the community acts as the implementer of the program that has been implemented. Aside from being the executor, the community also acts as the main target in the use of the program results that have been carried out. In general, the method of implementing this community service program is as follows:

Preparation: The strategy used in this program is the Advocacy, Atmosphere Development and Community Movement. First, advocacy is carried out with the health agencies and the local village government. In this case is Public Health Center whose working area is located in Astambul Kota Village and Kelampayan Ilir Village. Advocacy is then carried out to the heads of the Astambul Kota Village and Kelampayan Ilir Village to support this program so that it can run according to goals, objectives and plans. Community development is carried out with the local community with support from

community leaders and public health center to encourage the community to carry out waste management.

Implementation: Before conducting counselling and establishing a waste management post, cadres from the village community were formed as parties who would assist and supervise the running of the program.

Evaluation: Assessment of the success of this program is seen from the ability of the community to make hydroponic plants and composting, ability to process, designing, selling organic compost and hydroponic crop yields as well as the community income coming from the method.

Findings and Discussion

The results that have been achieved are already carried out counselling in the Astambul and Kelampaian Ilir Village on August 27, 2018, with extension activities hydrokura waste management method (hydroponics and takakura) consisting of organic and composting activities making bio-activators and making hydroponics and compost by takakura method. Counselling and establishment of waste management posts. Choosing cadres are managing hydrokura. The cadre of the Hydrokura post manager is from the local community in Istanbul Kota Village and Kelampayan Ilir Village. Cadres are chosen together with the local community and village officials. The chosen cadres are expected to have more time to manage hydrokura, have good communication skills with the local community, and have a commitment to carry out the tasks for the sustainability of the hydrokura program.

Based on this commitment a cadre organizational structure was made so that community empowerment activities could be implemented properly in self-management regarding the organic waste management of the hydrokura method. People in Astambul and Kelampaian Ilir Village very enthusiastic outreach activities and provision of material. This is evidenced by the fact that there is an increase in knowledge and skills related to waste processing by 78%.

Following is documentation of community partnership program activities in Astambul Kota Village:



Figure 1. Counselling and Provision of Pre-Post Test



Figure 2. Head of Astambul Kota Village and cadres




Figure 3. Composting Training with the Banjar Regency Environmental Agency

Program Sustainability: The activity of counselling and the provision of skills will still be carried out even though the activities have been completed so that the continuity of the activity program by involving the community, students and lecturers of public health study programs is upright. Monitoring through selected cadres is expected to have more time to manage hydrokura, have good communication skills with the local community, and have a commitment to carry out tasks for the sustainability of the hydrokura program. Conducting hydroponics and compost with takakura method in order to get economic additions to the community and continue to teach teaching activities, selling organic compost and hydroponic crops.

Conclusion

Counselling was conducted at the Astambul Kota Village namely counselling of organic composting and manufacture of bio-activator and activities of composting with takakura and hydroponic planting techniques from simple composting activity results. The people of Astambul Kota Village were very enthusiastic about participating in counselling and material giving activities. This is evidenced by the results of self-management commitment and the formation of cadre organizational structures to improve the life of the hydrokura method skill. In addition, there was an increase in knowledge of 78%.

Ethical Clearance: Before conducting the data retrieval, the researchers conducted a decent test of ethics conducted at the Faculty of Medicine, Lambung Mangkurat University to determine that this study has met the feasibility. Information on an ethical test that the study is eligible to continue. The feasibility of the research was conducted to protect the human rights and security of research subjects.

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Support and Self Efficacy of Tuberculosis Lung Clients: Literature Review

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Abstract

Self-efficacy and support are important to improve health status patient TB and MDR TB. The purpose of this study is to find out research articles explaining self-efficacy and support for pulmonary TB clients, so that it can be an intervention suggestion that can be used effectively with an existing proof. The strategy is comprehensive strategy. In the efficacy all the research conducted explains that the impact of self-efficacy is very positive on the patient in carrying out the treatment and treatment process. Support of TB clients this can be grouped into several categories: social support, family support, socioeconomic support, facility support, financial support, health system support, using media.

Keywords: *Tuberculosis, Lung, Support, self-efficacy, client.*

Background

Tuberculosis (TB) is an infectious disease that occurs primarily in the pulmonary parenchyma. TB spreads directly and is caused by mycobacterium tuberculosis[(2)]. Pulmonary TB sufferers are productive ages (15-50 years) ranging from 75%, which can lead to a loss of average work time of 3-4 months and income from clients with pulmonary TB is reduced annually to 20-30% [(19)].

WHO explains that TB by 2015 has 10.4 million people infected with TB and 1.8 million died from TB disease including those with HIV AIDS of 0.4 million. In cases of death due to tuberculosis there are almost 95% of countries in the middle economic level down. Indonesia has second rank among the highest TB countries in the world[(23)].

Confidence about self-efficacy will provide the basis for one's motivation, well-being and achievement. Self-efficacy will determine how a person feels, thinks, motivates himself or behaves[(1)]. One of the things that can affect self-efficacy is social persuasive that can be support. While the definition of support is the provision of encouragement, motivation, or spirit and advice to others who are in a situation to determine the decision[(5)].

Most self-efficacy is needed in chronic diseases and requires treatment over a long period of time. Self-efficacy can be established one of them through support. According to research conducted that relationship between one of them is social support that can affect the self-efficacy. Pulmonary TB is one of the diseases that require treatment in the long term so that although different from chronic illness but the treatment that is lived has a time span that is not different, that is takes a short time[(11)].

The purpose of this study is to find out research articles explaining self-efficacy and support for pulmonary TB clients, so that it can be an intervention suggestion that can be used effectively with existing evidence. A literature review describing support and self-efficacy in pulmonary tuberculosis clients still does not exist. Certainly this literature review will be very meaningful and can be developed appropriate nursing interventions to be given to clients of pulmonary TB

Method

The strategy is comprehensive strategy, looking for research articles in the online and offline database. The data has been obtained presented in the form of

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description for each article's content that obtained. This search is done by using keywords based on what you want found that is self-efficacy and support on the tuberculosis. On the online search used keywords, self-efficacy, tuberculosis, support. In the search done with the punctuation "AND" between the two of "self-efficacy and tuberculosis" and "support and tuberculosis"

Results

Based on the results of the search engine data base journal then got the total articles from the six journals conducted search then obtained amounted to 14 articles, where for self-efficacy tuberculosis amounted to 5 articles and to support tuberculosis amounted to 9 articles. In the efficacy cell all the research conducted explains that the impact of self-efficacy is very positive on the patient in carrying out the treatment and treatment process. In 5 researches that can be classified as impacts in self efficacy that is to help improve TB treatment process, the meaning of life is enhanced by self-efficacy in TB clients, and factors that can form self-efficacy in TB clients.

In a study was explained that the TB clients studied were between the TB treatment relationships that were being run with the self-efficacy of pulmonary tuberculosis patients during the course of the ongoing treatment[15].

Self-efficacy is also not fully able to directly affect the treatment and care of TB clients. This can be maximized by the conclusion of self-efficacy with other aspects of consideration such as in research articles which explains that self-efficacy done with social support can increase the meaning of life of TB clients, in this study explained that so high self-efficacy and social support then the higher meaningfulness of life. This research was conducted by using correlation study, in taking samples conducted purposive sampling with 53 respondents involved, with criteria of advanced patients with the minimum age of 15 years to 54 years with the education level taken at least elementary school[17].

Self-efficacy that can be shown good results also to restore the health of clients with TB then the factor that can realize self-efficacy is in each client self must be known, in research conducted by Handuto et al explained that 79.5% of respondents who have Good self-efficacy is not determined by age. But the factors that determine the self-efficacy of this is the level of education owned by respondents, habits of smoking behaviour in everyday life and low income also be a determinant. Research conducted by using descriptive with total sampling that the number of respondents is as much as 39 respondents[9]. Another similar study conducted by Mason et al using a correlation study using as many as 75 respondents who diagnosed TB with unexplained sampling obtained the results of factors that determine the formation of self-efficacy in TB clients is a good education or literacy that is owned by Tb clients are very influential[13].

In support of TB clients this can be grouped into several categories: social support, family support, socioeconomic support, facility support, financial support, health system support, using media. Various kinds of support gained from various research results are various results obtained and overall have a good and positive impact although there is some support is still minimal function. Social support is one of the supports that can assist in the process of treatment and care that is lived by patients with TB, the results research that using sampling with total sampling of 220 respondents with a cross-sectional study, explaining that MDR patients TB Found to have very low social support, social support sourced from the family and from the influencing environment in running the TB treatment process that lasts long enough. Patients with social or isolated activity restrictions show a lack of support from the surrounding environment, MDR TB patients need more social support in the process of performing their TB treatment again[4]. Social support as a supporter in TB treatment is also explained in other research that explained social support combined with self-efficacy of TB clients can improve meaningful life of TB clients. This study was using purposive sampling to 53 respondents with correlation study[17].

Family support is a support needed by TB patients. This family support is described in a study conducted that explains less harmonious family support also contributes to the MDR of TB in patients, family support that part of social support has a role important to be improved when MDR TB patients will start treatment again[4]. Other research is described that health behaviour can regulate and prevent the occurrence of TB, whereas in health behaviour is the most important factor that plays a role in family support, where the result is that the higher the family support the better the health behaviour Will be done by TB patients. Research with this study description with sampling by purposive sampling with number of respondents counted 126 respondents[3].

Socioeconomic support is one aspect of support that can be given to patients with TB, according to Wingfield et al with a study control study involving 312 participating households with 135 intervention groups and 147 control groups taken non-blind randomization The result is that socioeconomics can rapidly increase the spread of TB and is said to be a good TB prevention. Support through this socioeconomic cause a decrease in the incidence of TB since the year 2004 to 2015 [22].

Facility support with the implementation of a policy project in support of health facilities in controlling TB by 2016 that obtained results of 7 out of 8 built facilities indicates that the reduction in TB transmission rates occurred over a period of 10 months. The facilities built are TB assessment and control facilities, development and planning facilities, TB training and control facilities, and field visit facilities[20]. Research using 5 FGDs and 47 in-depth interviews with TB and MDR TB samples and healthcare providers, the results obtained that patients with TB require enormous costs because of their long treatment, support in the form of cost subsidies by freeing up medical and treatment costs and medical insurance is a much-needed support [8].

Support of health system according to the study by using semi-structured interviews, observing the system from 5 countries in Europe got health system is very helpful in overcoming MDR in some countries, this can be shown from several things done starting from Rapid diagnosis of MDR TB clients, convinced financial systems can be accessed overall care and treatment performed for clients with MDR TB, a patient-centered approach with the power of inter-sector collaboration aimed at emotional and social needs of the patient, motivation and dedication of the worker who provides Health services with sufficient command and which means supporting the patient and maintaining the sustainability of the management that has been running[21].

Media support is a viable support for TB patients that studies involving 5 facilities of health care providers in Mozambiq. SMS automatically as health promotions and reminders sent to patients with RCT techniques, with Total counts being 141 patients and 40 health-care workers interviewed. The results of this study are both patients and workers explained by the SMS system provided is very useful and reliable. Positive impact points are reducing the number of failures in drug taking and scheduling health service meetings. Patients are confident in the system[16].

Most feel the system improves communication between healthcare providers and patients, and this can lead to education or counselling and motivation. Patients with this system are very easy to ask and health care providers can also easily answer them. But with this system there are some disadvantages that sometimes when patients complain or tell the story then the workers forget to take a documentation patient in status patient. The use of other media is to use the application by using a sophisticated smartphone, which is currently a smartphone that is very close to every person, but based on research that using 3 applications for purchase for online, Used are applications that focus on TB and use English, Spanish and Portuguese. 11 functions are reviewed such as information, structure, history or recording. The results show that of 1332 applications identified was relevant, with 24 existing inclusion criteria. All applications can be downloaded for free but there are 7 that require login and password and are developed specifically for specific clinics, specific areas, or research needs. The identified application is found to be minimal in function; the primary target focuses only on primary care workers in TB health services. The focus of TB information is only general, guides and news or data sets of notifications based on recent data or tracking. Some applications are developed for TB patients and are not developed to support TB patients in improving and managing their self-care such as reminders of monitor side effects or improving interaction with health care providers, limited this application focusing on patient care[10].

Discussion

Self-efficacy in patients with TB and MDR TB then self-efficacy is a much needed thing to be established for every TB patient. Self-efficacy is one of the parts that can keep patients in long treatment and for patients who will repeat TB treatment is something that must be formed. Self-efficacy can make TB and MDR TB patients survive to continue to fight against the disease and undergo the treatment process. If we look at the research that has been done then self-efficacy has a supporting factor in this formation that is one of them is the level of education enough. If seen with the case of TB in Indonesia are mostly middle to low class with minimal education then this is a new challenge for health providers in Indonesia to try to establish self-efficacy TB patients in Indonesia because need a special approach in improving self-efficacy for the community with TB who have low education.

Various supports that can be done in help to treatment process and prevention and transmission. Support certainly will help to overcome this TB problem, but what needs to be attention is one of the support provided from media facilities that can be accessed by the community through smartphones, even today in Indonesia smartphones can be obtained at an affordable price, based on existing research applications information provider And others related to tuberculosis provide very minimal benefits, ranging from very general information so it will be not easily digested directly by ordinary people, in particular the website provided intend to provide support to TB patients but can lead to erroneous information when not controlled, So the need for confirmation of what is obtained by the community.

Conclusion

Self-efficacy is one of the things that are needed for TB patients and MDR TB, so it is necessary to know the factors that can support the establishment of self-efficacy, the factor obtained in the form of TB patient education background becomes an important consideration in the formation of self-efficacy. Support for TB is also variously considered effective as a bodyguard for the treatment and prevention and dissemination of TB in the form of social support, family, socio-economic, health systems, financial and media.

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Statement nothing conflict and process this article in other journal

I am Ikbal Fradianto, I was presentation this article in my university with event Biennieal International Nursing Conference, the website is http://conference.ui.ac.id/binc/BINC2017/paper/view/12046 I declare that the paper is not under review elsewhere and just only present in my university also has not conflict of interest.

Ethical Clearance: Ethical clearance taken from the ethics committee of the Faculty of Nursing, Universitas Indonesia No.08/UN2.F12.D/HKP.02.04/2017

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Comparison of Child Development between Aterm and Premature Birth at Age 2-3 Years Old in Kabupaten Probolinggo, Indonesia

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Abstract

Cases of preterm birth are still a problem in developing countries. WHO data in 2013 shows the rate of preterm birth in Indonesia at 2010 was 15.5% of total births. The prevalence of preterm birth in Kabupaten Probolinggo tends to increase from 2011 to 2013. Premature births are at risk of developing language delays, motor balance and coordination. This study aims to analyze developmental differences in children with a history of premature birth and term. The data used was primary data through filling questionnaires and interviews to subjects. This study was observational analytic with retrospective cohort design. The population was all 2-3 years old children at Kabupaten Probolinggo. Sampling was using a simple sampling formula and obtained 100 children into 2 groups. First group was 50 children who aterm at birth. Second group was 50 children who premature at birth. The result showed that there were there is significant differentat child development between aterm and premature born childen ($p<0.05$). The relativerisk (RR) analysis showed that the value is significant enough. Children development was influenced by type of born (RR=1.647x).

Keywords: *Children development, premature birth, development disorder.*

Introduction

Premature birth is defined by the estimated gestational age as a measure of maturity. Three subgroups were distinguished by the World Health Organization (WHO): premature pregnancy (<37 weeks), very premature (<32 weeks), and very premature (<28 weeks)[1].

More than 60% of premature births occur in Africa and South Asia, but preterm birth is truly a global problem. In low-income countries, on average, 12% of babies are born too early compared to 9% in high-income countries[2].

WHO data shows in 2013 there are 15.5 per 100 live births or as many as 675.700 people were born prematurely[3]. In the Probolinggo Public Health Office report in 2015 there were 992 babies (5.36%) who suffered from premature birth and Low Birth Weight (LBW), this number increased from 2014 which totaled 956 infants[4].

Progress of neonatology in recent decades has significantly reduced mortality and morbidity of high-risk infants[5]. However, premature babies have a higher risk ofdecreasing levels of physical growth, delays in language development, motor balance, coordination and developmental deficits when compared to children born with childbirth[6].

Increasing and decreasing GM (gray matter) and WM (white matter) volumes have been described in young adults with very pre-term (VPT)/very low birt weight (VLBW), especially in the internal capsule, insula, prefrontal cortex, medial gyrus/parahippocampalgyrus and putamen[7]. This volume growth is mainly due to the growth of new neurons and synapses[8].

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Significant 'wiring' occurs during the first years of a child's life and this effectively programs child development. At three, a child has around 1000 trillion brain connections or synapses, which in later development are selectively pruned.It is the experiences and relationships that infants and young children have that continuously develop their brains and build the neural circuits that will be the foundation for later development[9]. A child's experience plays a large role in determining which surplus connections are gradually eliminated during childhood and adolescence, a process sometimes called pruning[8].

In the neonatal period, the development of premature infants shows that they are distinctively different compared to infants in relation to autonomic responses, motor responses, behavioral conditions, attention/ interaction and self-regulation systems[5].Among the problems found in the neonatal period, brain damage, especially periventricular hemorrhage, is prominent, namely abnormalities that most commonly affect the central nervous system(CNS) of premature infants[10]. They may also experience respiratory complications such as chronic lung disease, which can jeopardize the functioning of the CNS, increase the occurrence of neurological sequelae and, as a result, learning difficulties during school[11].

Cheong et al. noted that the percentage of children with microcephaly increased from 2 years of age, which indicates a failure of postpartum brain growth[12]. A recent study also found that children with small heads consistently during the first 2 years of life were seven times more likely to experience neurocognitive disorders[13].

Child development is a dynamic process whereby children develop from dependence on caregivers in all areas that function during growth, towards growing independence in childhood (primary school age), adolescence and adulthood. Skills appear in a number of related domains: motor, cognitive, communication and social-emotional sensory[14].

In the neonatal period, the development of premature infants shows that they differ significantly compared to infants in relation to autonomic responses, motor responses, behavioral, attention/interaction and self-regulation systems[15]. This is influenced by a variety of biological and environmental factors, some of which protect and enhance their development while others compromise the results of their development[14].

Whereas the first years of life, especially the period from the fetus in the womb to a 2-year-old child are a very important period of child growth and development. This period is a golden opportunity as well as a period that is vulnerable to negative influences. Childhood is an important phase in growth and development because the experience during childhood can affect the outcome of one's life[14,15].

However, it has never been compared directly whether there is a significant difference between children born with a history of premature and aterm born at the age of golden age of growth (2-3 years old).

Materials and Method

This study was observational analytic with retrospective cohort design. The population was all 2-3 years old children at Kabupaten Probolinggo.

Sampling was using a simple sampling formula and obtained 100 children then divided into 2 groups. First group was 50 children who aterm at birth. Second group was 50 children who premature at birth. Inclusion criteria of this study were : The child age was ≥ 2 and <4 years old at April 2018, healthy, past gestational age 37-40 weeks and <37 weeks (for premature group).

This study used primary data through doing children development test from Indonesia Ministry of Health (KPSP) to subjects. The test tool and equipment were provided by researcher. Examiners are certified by Kabupaten Probolinggo Public Health Office.

The The independent variables were child at 2-3 years old age with aterm and premature born. The dependent variable was child developmental, wich is normal or there are developmental disorder. SPSS Statistics 22.0 was used for data analysis. Bivariate analysis were compared using cross-tabulations and Chi-Square Test with $p = 0.05$.

Findings

Table 1: Bivariate analysis between type of birth and child development

Variable	Aterm		Premature		Total		p value (Sig)	RR	95% CI
	n	%	n	%	N	%			
Child Development									
Normal	33	33	22	22	55	55	0,027	1,647	1,042-2,603
Possibility of Disorder	19	19	26	26	45	45			

*Significantly different using Chi-Square Test (p > 0.05)

Based on the **Table 1** above, it can be seen that the results of chi-square statistical tests indicate that the results of the calculation of p value is 0.027, which means the value (p< 0.05). This means that there is significant difference in the development of premature or aterm born children.

The RR results indicate that children born prematurely have a chance of 1.647x to be affected by growth disorders. RR value is, because the value of RR where the sample is taken is 1,042-2,603 (RR>1) which means the risk of developing developmental disorders inchildren born with premature is 1,042 to 2,603 times.

Discussion

On the KPSP test (Pre Development Screening Questionnaire) which is a series of tests from SDIDTK (Early Stimulation, Detection and Intervention of Child Development) can be found aspects of development, gross motor movement, fine motor, speech and language, and socialization and independence.

During the development test, there are several development points that the KPSP test results indicate failure. As many as 70% of premature children showed that they still did not fulfill 2 aspects, namely the aspects of speech and language, as well as aspects of socialization and independence.

Premature birth coincides with a higher level of problem with language function compared to children born at term[16]. In a meta-analysis by van Noort-van der Speket al. revealed that premature children received significantly lower scores compared to children born at a simple age, as well as in complex language function tests, during childhood, even without major disabilities and independent of SES (socio-economic status)[17].

Premature born or low birth weight children show lower performance in functional capacity and independence compared to children without these characteristics, but environmental and socioeconomic conditions appear to have a significant effect on the results found[18,19].

What happens before birth and within a few years of life plays an important role in health and social outcomes. While genetic factors play a role in shaping child development, evidence shows that the environment has a major influence during childhood[14].Australian Early Development Census said that key features of early brain development can be fostered by relationships with caregivers, and can be supported by optimal community environments for families and children. Brain development is also vulnerable to toxic stress (depending on length and number of stressors for the child)[9].Therefore children with a history of premature birth need special guidance and stimulation from parents and those around them during the development period so that they can experience optimal childhood.

Ministry of Health suggests that growth and development in the early stages determine the next development. The developmental stage of a child follows regular and sequential patterns. These stages cannot occur upside down, for example the child is first able to make a circle before being able to draw a box, the child is able to stand before walking and so on[15].

According to the Ministry of Health about the stages of development and stimulation aged 24-36 months, in the speech and language column, the child should be able to: talk well using 2 words. Can appoint 1 or more parts of his body when asked. See images and can correctly call the names of 2 or more objects. Help pick up their own toys or help lift plates if requested[15].

But what the researchers found in the field, children had difficulty communicating, still could not construct the word correctly and had not been able to speak by

forming 2 words well according to age level. While the other points, most of them have been able to carry out activities according to their age.

Toddler growth and development will be optimal if the environment provides positive support or vice versa[20]. Environmental factors are factors that determine whether or not an innate potential is made up of a bio-psycho-social environment[21]. We suggest that children who are still unable to communicate can be stimulated by development, for example: read storybooks before going to sleep, encourage children to want to tell stories and talk more, use good language and not slur when talking to children.

Socio-emotional functioning involves the ability to learn to successfully interact and communicate within a social context and to efficiently deal with emotions, deficits in multisensory processing may affect speech perception, subsequently resulting in difficulties in communication and social interactions[22,23].While in the socialization and independence column, the Ministry of Health also stated that children should be able to eat their own rice without spilling and removing their own clothes[15]. In the field, we have found that children cannot eat on their own, if the child can eat alone, their food tends to spill out of its place.

Most children also still cannot take off their own clothes, but some children can just take off their pants. We recommend that children be given more stimulation to stimulate socialization and independence aspect, for example: teach children to dress themselves without help, give children the opportunity to choose the clothes they will wear. Encourage children to clean their bodies when dirty and then wipe them with as little help as possibleand do light housework.

Conclusion

The development of 2-3 years old children is very important because it is the gold age for the growth and development period, especially children with a history of premature birth who have a risk of developmental disorders. Parents should give more attention in providing appropriate developmental stimulation according to the child's age.

Conflict of Interest: There was no conflict of interest in this study.

Ethical Clearance: This study was received ethical approval from the Health Research Ethics Committee, Faculty Medicine, Airlangga University.

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OCOP "One Caregiver One Pregnancy" Intervention to Increase Knowledge, Attitude and Family Facing Practices in Pregnancy Care

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Abstract

Objective: The objective of this study was to analyze the effect of OCOP "One Caregiver One Pregnancy" intervention on knowledge, attitudes, and practice of family accompaniment to pregnant women in pregnancy care.

Method: Quasi-experimental research with a non-equivalent control group design was conducted in Jepara Regency. The sample was 128 pregnant women in the first trimester pregnant, 8-12 weeks of gestational age, who met the inclusion criteria. Data were analyzed by the Mann-Whitney Test, and calculated using adjusted odds ratio (ORs) with 95% confidence interval (CI).

Results: The results showed that, after one month of OCOP intervention, there were significant differences in knowledge, attitudes, and practices of family accompaniment in pregnant women in pregnancy care between intervention group and control group ($p < 0.005$). In addition, an increase took place in the mean value of knowledge by 5.81, family attitudes of 9.27, and practice of family assistance for pregnant women in pregnancy care by 14.18.

Conclusion: OCOP intervention increases family knowledge and positive attitudes towards pregnancy care, thereby increases practice of family accompaniment to pregnant women in pregnancy care.

Keywords: *Caregiver, Pregnancy, Knowledge, Attitude, Practice.*

Introduction

One effort to reduce maternal and infant mortality is to improve the health status of pregnant women because 10-15% of pregnancies are accompanied by complications.[1,2] Pregnancy care is one of the interventions and strategies of regional, international and various government organizations to improve maternal health.[3] Behavior during pregnancy that can give a bad risk to pregnant women include keeping their daily activities the same as before pregnancy which includes strenuous activities.[4]

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Morbidity and mortality of pregnant women can be prevented by increasing the ability of families to recognize danger signs of pregnancy and try to seek health help.[5] Family empowerment means how the family enables itself by facilitating others to improve the health status of the family by increasing the ability of the family to conduct family health care.[6] Therefore, the family has an important role in assisting pregnant women in seeking health services so that the status of pregnant women who receive moral support from family members has contributed to the increased use of maternal health services.[7,8]

One of the strategies for maternal and child health including pregnancy care is family empowerment.[9] The role of parents influences the behavior of pregnant women,[10] because decision making and utilization of health services are still very dependent on the family.[11,12]

Sources of advice during pregnancy are sourced from in-laws (62.96%), and parents (53.70%),[13] family social support and family advice of pregnant women (parents, in-laws, grandmothers, etc.) related to pregnancy care.[14,15] However, family practice in assisting with pregnancy care was found to be still low, 65% of families had not provided information about pregnancy care, 57% of families had not informed about the hygiene of pregnant women, 73% of families had not accompanied pregnant women to do light exercise, 52% of families had not prepared food which is nutritious for pregnant women and 52% of families do not remind consumption of Fe tablets.[16]

Various studies on pregnancy care have shown that self-care behavior during pregnancy is not appropriate so that family accompaniment is needed in pregnancy care. Therefore, research is needed to analyze the effect of OCOP "One Caregiver One Pregnancy" interventions on the behavior of pregnant women in pregnancy care.

Material and Method

The quasi-experiment with a non-equivalent control group design was used to analyze treatment group (group 1) and non-treatment group/control (group2).[19] This study was conducted in Jepara Regency from August to September 2019 to pilot the OCOP "One Caregiver One Pregnancy" intervention on family knowledge, family attitudes, and family assistance practices for pregnant women in pregnancy care. The sample was 128 pregnant women in the first trimester pregnant, 8-12 weeks of gestational age, who met the inclusion criteria.

Family inclusion criteria are extended family type, biological mother or parents-in-law who live in the same house as pregnant women, biological mothers or in-laws who are willing to accompany pregnant women during pregnancy, biological mothers or in-laws who are able to read and write, biological mothers or in-laws able communicate well, biological mothers or in-laws aged 36 years - 50 years, and biological mothers or in-laws who are willing to be respondents. Exclusion criteria are family members who are experiencing pain who must be hospitalized and unable to perform normal activities.

The subjects of group 1 treated with OCOP intervention took a pre-test, being treated with OCOP intervention for 1 month, then took a post-test. The result of the pre-test was compared to the post-test to determine changes in family knowledge, family attitudes, and family assistance practices in pregnant women in pregnancy care before and after getting OCOP intervention. Meanwhile, the control subjects (group 2), which were not treated with the OCOP intervention took a pre-test and after one month they took a post-test. The result of the pre-test was compared to that of post-test. Further, the result of group 1 was compared to that of group 2.

All data were analyzed with SPSS software version 21.0 package. Continuous variables were compared using Mann-Whitney test and presented as mean. Adjusted odds ratio (ORs) with 95% confidence interval (CI) was calculated. A p-value < 0.05 was considered statistically significant.

Findings

Table 1. Differences between intervention groups and control groups related to family knowledge about pregnancy care

Mean Rank of Knowledge Score	Intervention Group (n = 64)	Control Group (n = 64)	Difference (Δ)	ρ value*
Before OCOP Intervention	76.29	70.71	-0.808	0.419
After OCOP intervention (1 month)	104.73	74.27	-8.976	0.000

*Mann-Whitney Test

Based on table 1. above it can be seen that significant difference in family knowledge after being given an OCOP intervention for 1 month between the intervention group and the control group (p> 0.05). This proves that OCOP intervention for one month can increase family knowledge about pregnancy care.

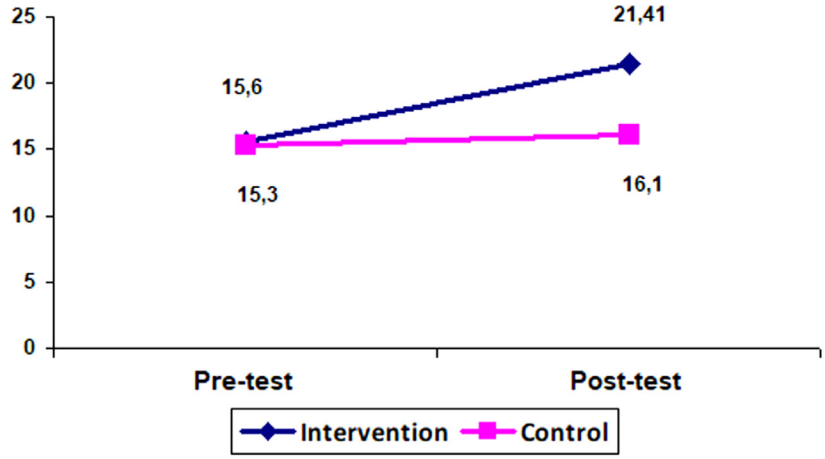


Figure 1. Change in the mean (average) of family knowledge about pregnancy care

The results of the study in Figure 1 above show that the average (mean value) of knowledge after getting the OCOP intervention for 1 month in the intervention group is higher than the control group.

The results of this study are following the results of various studies on pregnancy care obtained results most of the respondents have low knowledge about the signs of danger of pregnancy.[17–19] Efforts to realize the independence of the family in maintaining maternal and child health, one of the efforts of the health program is to improve family knowledge and skills.[20]

Table 2. Differences in scores of family attitudes towards pregnancy care in the intervention and control groups.

Mean Rank Attitude Score	Intervention Group (n = 64)	Control Group (n = 64)	Difference (Δ)	ρ *value**
Before OCOP Intervention	74,73	72,27	-0,358	0,720
After OCOP intervention (1 month)	110,00	37,00	-10,533	0,000

*Mann-Whitney Test

Based on table 2. above it can be seen that significant differences in family attitudes after being given an OCOP intervention for 1 month between the intervention group and the control group ($p > 0.05$). This proves that OCOP interventions for one month can improve family attitudes towards pregnancy care.

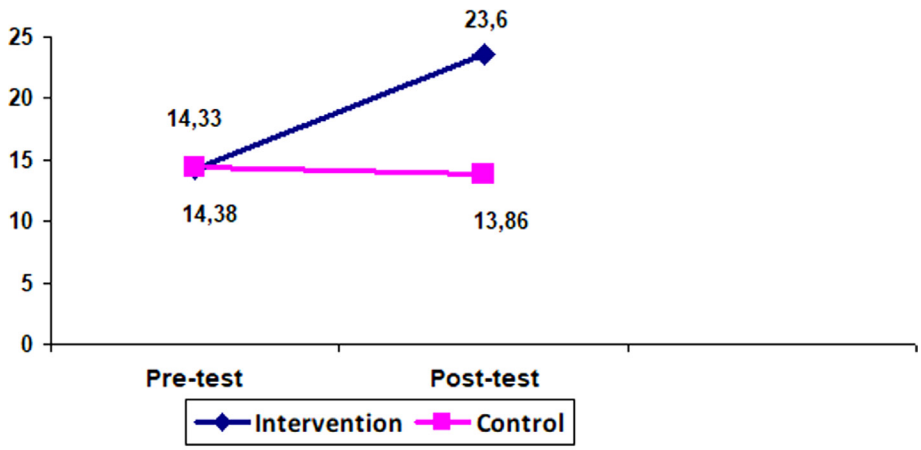


Figure 2. Changes in mean (average) family attitudes towards pregnancy care

The results of the study in Figure 2. The above shows that the average (mean value) of family attitudes in the intervention group is higher than the control group after the OCOP intervention for 1 month. In fact, in the control group after 1 month there was a decrease in the mean value of family attitudes towards pregnancy care by 0.52.

The results of this study are not following previous studies where the level of awareness and knowledge of the mother-in-law is still low so they only receive pregnancy information and do not care about the danger signs of pregnancy.[21]

Table 3. Differences in scores of family accompaniment practices in pregnant women in pregnancy care in the intervention and control groups.

Mean Rank Score practice of family accompaniment	Intervention Group (n = 64)	Control Group (n = 64)	Difference (Δ)	ρ *value**
Before OCOP Intervention	72,39	74,61	-0,319	0,750
After OCOP intervention (1 month)	110,00	37,00	-10,458	0,000

*Uji Mann-Whitney Test

Based on table 3. above it can be seen that significant differences in the practice of family assistance for pregnant women in pregnancy care after being given an OCOP intervention for 1 month between the intervention group and the control group (p> 0.05). This proves that OCOP intervention for one month can improve the practice of family assistance to pregnant women in pregnancy care.

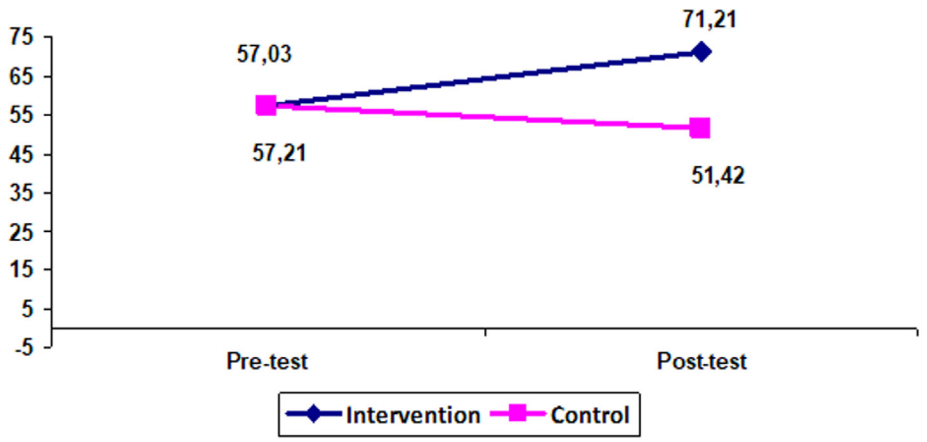


Figure 3. Changes in the mean (average) practice of family assistance to pregnant women in pregnancy care

Based on Figure 3. above shows that the average (mean value) of family assistance practices in pregnant women in pregnancy care after getting the OCOP intervention for 1 month in the intervention group was higher than the control group. However, the control group after 1 month there was a decrease in the mean value of family assistance practices for pregnant women in pregnancy care by 5.79.

The practice of family assistance in providing pregnancy care affected the health status of the pregnant women. A family being able to carry out health tasks will also be able to solve health problems.[22] Pregnant women treated in a family-centered model will experience greater satisfaction with their baby's birth experience. Pregnant women will participate in the decision making process that will increase their confidence. They will validate their learning with real-life experiences. Health care providers who work in a family-centered model will also experience greater satisfaction.[23]

The results of this study are in line with studies

that show that patients who together with families get family empowerment interventions have higher self-efficacy than the control group. In family empowerment in pregnancy care, pregnant women get interventions to improve communication and interaction between pregnant women and families through the practice of family assistance in pregnancy care in the form of simulation activities between pregnant women and families, so pregnant women will get very strong support to increase self-confidence so that pregnant women feel confident in their ability to perform pregnancy care.[24]

Supporting research results show that pregnant women are in dire need of support from family and husband during their pregnancy period. Likewise with the results of research that pregnant women need help and support from both their families and from health practitioners when they undergo their first pregnancy.[25] Other research that supports is Martin, et al. (2007) social support affects prenatal care visits and decreases in the amount of cigarette consumption by pregnant women during their pregnancy.[26]

Conclusion

The research results show that the OCOP "One Caregiver One Pregnancy" intervention increased family knowledge and positive attitudes towards pregnancy care, thereby increasing the practice of family accompaniment to pregnant women in pregnancy care. The OCOP intervention provided is a family empowerment activity through simulations between pregnant women and families related to family assistance to pregnant women in pregnancy care using the "One Caregiver, One Pregnancy" method. It is hoped that the OCOP intervention can be widely used in the community to improve the practice of family assistance to pregnant women in pregnancy care so that pregnancy care can be carried out by pregnant women appropriately.

Conflict of Interest: None declared.

Source of Funding: This research did self-funding.

Ethical Clearance: The present study was approved by the Research Ethics Committee of the Faculty of Public Health Diponegoro University No.194/EC/FKM/2018.

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TB Treatment and Multidrug-Resistant of Tuberculosis (MDR-TB) in Central Java of Indonesia: A Case-Control Study

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Abstract

Background: The burden of tuberculosis (TB) is exacerbated by anti-TB drug resistant especially multidrug-resistant TB (MDR-TB). There has been an increasing trend of Multidrug-resistant TB in Indonesia. However, there is lack of epidemiological study on risk factors of MDR-TB in Indonesia.

Objective: This study aimed to determine the influence of TB treatments as risk factors on MDR-TB in Central Java Indonesia while controlling other covariates.

Method: A case-control study was conducted between August 2017 and February 2018. The study subjects were selected using inclusion criteria. Cases were 81 MDR-TB patients in intensive phase that lived in Central Java and recorded in the Moewardi Hospital, a referral hospital. The controls were 228 patients who received first-line anti-TB treatment without drug resistance. A structured questionnaire interview was used to collect the data. Multiple logistic regression analysis was used to identify the association.

Results: The proportion of gender among the 81 cases and 228 controls were 64.2% vs. 43.0% for males, and 35.8% vs. 57.0% for females. TB treatment that were significantly associated with MDR-TB were: length of TB treatment > 6 months (aOR =14.1; 95% CI: 6.68-29.86), continued TB treatment (aOR =11.695% 95%CI: 5.36-25.48). Other significant covariates were had no formal education or primary education (aOR = 2.89; 95% CI: 1.38-6.02) and low monthly income (aOR =2.86; 95%CI: 1.18-6.92)

Conclusions: Long duration, discontinuity of TB treatment, and low socioeconomic status increase the risk of MDR-TB.

Keywords: *Multidrug resistant tuberculosis, MDR-TB, risk factors, Central Java, Indonesia.*

Introduction

Tuberculosis (TB) remained one of the top 10 causes of death worldwide[1]. 93.4% (5.7 million) or 6.1 million TB patients were newly diagnosis cases, and only 6.5% of them were previously having TB treatment[2]. Anti-TB drug resistant exacerbated burden in a country. Globally, around 3.5% (95% CI:2.2-4.7%) of all newly TB diagnosed patients and 20.5% (95% CI: 13.6-27.5%) of previously treated had MDR-TB[2]. In addition, it is a growing global health problem[3].

MDR-TB is defined as resistance to two most powerful TB drugs, isoniazid and rifampicin, with or without resistance to other first-line drugs (FLD)[5, 6].

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Two main pathways of developing active drug-resistant TB were primary and acquired (secondary) drug resistance [7].

Resistance to anti-TB drugs is an important challenge in global TB control due to going to be mutant wild-type *Mycobacterium.* Previous studies reported that factors associated with drug resistant were poor case management, overcrowding, delayed diagnosis, inadequate treatment, and poor institutional infection control [9].

Indonesia was the second highest of TB cases in the world after India [1]. Indonesia ranked 8th of 27 countries with the highest MDR-TB in the world between 2009 and 2014 [10]. A survey from Indonesia in 2006 reported that 1.9% MDR-TB was from new cases, whereas 17.1% was from previous TB treatment [11]. Central Java province is one of the highest population among provinces.

The rate of MDR TB in Central Java Province was 2% in people who had never received anti-TB treatment before, while 16% in people who had previously received anti-TB treatment [12]. The case notification rate (CNR) of new positive tuberculosis smears in 2017 was 60.91 per 100,000 populations and CNR for all TB cases in Central Java 2017 was 132.9 per 100,000 populations. The success rate was 82.36%, which means that there was still 18% failed treatment [13].

Material and Method

We conducted a population-based case-control study to estimate TB treatment as a risk factor of MDR TB while controlling for other covariates.

Inclusion criteria for cases: Indonesian citizens, aged ≥18 years old, diagnosed as MDR-TB that were confirmed with molecular test (GeneXpert) and culture examination, in the intensive phase of MDR-TB treatment, registered in the MDR unit at Dr. Moewardi Hospital (a referral hospital) in Surakarta, Indonesia.

Inclusion criteria for control: Indonesian citizens, aged ≥18 years old, a TB patient without resistance to rifampicin and isoniazid, were in the intensive phase of TB treatment and registered in 28 community health care units (PUSKESMAS) of Sukoharjo, Wonogiri, Boyolali, and Kudus districts, and Surakata city. Patients who did not speak or understand Bahasa, who were severely sick, or were not able to respond to the interview, were excluded from the study.

Sample size calculation: A total of 81 MDR-TB cases and 228 controls who met the inclusion criteria were included in the study. Data were collected by a face-to-face interview. The questionnaire was developed and validated by 5 specialists in MDR-TB and TB. A reliability test was conducted involving 30 cases and controls. The Cronbach alpha coefficient was > 0.80. This study was conducted from August 2017-February 2018.

Statistical analysis: A bivariate analysis was performed using simple logistic regression to determine the associations of TB treatment, socioeconomic status, and health status with MDR-TB, with standard statistics including crude Odds Ratio (OR), 95% confidence interval (95% CI), and p-value.

Multivariable logistic regression[15,16] was used to determine the effect of risk factors on MDR-TB, while controlling for the effects of confounder. Independent variables for the multivariable analysis were selected according to two criteria: firstly, variables in the crude analysis which were found to have a p-value of less than 0.25, and secondly, variables showed from a literature review to have an association with MDR-TB. The method of backward stepwise elimination was used as the model fitting strategy. A likelihood ratio test was performed to assess the goodness-of-fit of the final model. All analyses were performed using Stata version 10.0[17]. Adjusted Odds Ratios (aOR) and 95% CI indicated the magnitude of association of the risk factors.

Findings:

Table 1: Bivariate analysis of factors associated with MDR TB

Factors	MDR-TB				cOR (95% CI)	p
	Cases (Number=81)		Control (Number=228)			
	n	%	n	%		
Education						<0.001
Junior high school or higher	27	33.3	125	54.8	1	
Primary school or lower	54	66.7	103	45.2	2.40(1.42-4.12)	
Monthly income						0.001
Moderate-high	12	14.8	75	32.9	1	
Low	69	85.2	153	67.1	2.80(1.43-5.52)	
BMI (kg/m^2)						0.002
≥18.5	34	42.0	140	61.4	1	
<18.5	47	58.0	88	38.6	2.20(1.31-3.68)	
Co-morbidities						0.005
Absent	40	49.4	153	67.1	1	
Present	41	50.62	75	32.9	2.00(1.24-3.50)	
Length of TB treatment (month)						<0.001
≤6	27	29.6	202	64.0	1	
>6	54	70.4	26	36.0	15.5(8.38-28.7)	
TB treatment						<0.001
New	33	40.7	207	90.8	1	
Recurrent	48	59.3	21	9.2	14.3(7.62-26.94)	
Side effect						<0.001
Absent	3	3.7	66	29	1	
Present	78	96.3	162	71	10.0(3.22-34.75)	
Adherence						0.116
No	3	3.7	20	8.8	1	
Yes	78	96.3	208	91.2	2.40(0.72-8.64)	

Previous study stated that inappropriate treatment was associated with MDR-TB (OR=24.2; 95% CI=6.9-85.1; p<0.001)[23]. In addition, defaulter of TB treatment might be a risk factor of MDR-TB (OR=2.9; 95%CI=0.22-37.4; p>0.05)[24]. The duration of MDR-TB treatment was 19-24 months with an initial stage of an oral drug administration and injection for at least six months or 4 months after conversion of culture. Then the next stage was oral medication without injection[21]. Prolonged treatment with low-to-severe side effects may lead to comorbidity.

Another study reported that comorbidities had statistically significant association with MDR-TB (OR=2.0; 95% CI=1.24-3.50; p=0.005). Comorbidities were associated with poor health outcomes, more complex clinical management, and increased health care costs[25]. Some comorbid diseases including diabetes, cardiovascular, other respiratory diseases, and cancer were indicated as risk factors of primary MDR-TB (aOR= 57.1; 95% CI=8.6–424.2) due to their chronic disease nature that can damage or suppress immunity[8].

Multivariable analysis of factors affecting MDR-TB while controlling for confounding factors

Table 2 Multiple logistic regression of factors affecting MDR-TB while controlling for confounding factors

Independent variables	MDR-TB				OR (95%CI)	aOR (95%CI)	p
	Case (n=81)		Control(n=228)				
	n	%	n	%			
Length of TB treatment							<0.001
≤6 months	27	29.6	202	64.0	1	1	
>6 months	54	70.4	26	36.0	15.5(8.38-28.7)	14.1(6.68-29.86)	
TB treatment							<0.001
New	33	40.7	207	90.8	1	1	
Recurrent	48	59.3	21	9.2	14.3(7.62-26.94)	11.6(5.36-25.48)	
Education							0.005
High school or above	27	33.3	125	54.8	1	1	
No schooling/primary school	54	66.7	103	45.2	2.4(1.42-4.12)	2.89(1.38-6.02)	
Monthly income							0.020
High	12	14.8	75	32.9	1	1	
Low	69	85.2	153	67.1	2.8(1.43-5.52)	2.86(1.18-6.92)	
Adherence to treatment							0.329
No	3	3.7	20	8.8	1	1	
Yes	78	96.3	208	91.2	2.4(0.72-8.64)	3.02(0.49-18.57)	

Table 5 Multiple logistic regression of factors affecting MDR-TB while controlling for confounding factors

TB patients with drug resistance can transmit the disease to others with directly drug-resistant bacteria [20]. TB treatments in Indonesia were as follows: Intensive treatment stage for two months, and advanced stage for four months treatment duration. There was then a re-treatment stage due to relapse, failure of previous first-line anti-TB treatment, and re-treated patients after dropping out of treatment (lost to follow up) [21]. However, there are challenges associated with management of the second line drugs arise from less effectiveness, more side effects, higher toxicity, and higher cost [22].

Previous study reported that continuity of TB treatment was found significantly associated with MDR-TB (aOR =11.6; 95%CI= 5.36-25.48; p<0.001), which means that the odd to get MDR-TB for recurrent TB treatment were 11.6 times higher than the continue treatment. Previous treatment of tuberculosis has been identified as a key covariate for MDR-TB, and the association becomes stronger in the previous TB treatment groups of 6-11 months and over 12 months [26]. Likewise, another study in Pakistan reported that previous TB treatments were associated with MDR-TB (aOR= 5.88; 95%CI= 4.32-7.99; p<0.001) [27]. The patients with prior TB treatment were more likely to get MDR-TB (aOR= 4.2; 95%CI= 1.1, 15.4) and (aOR=21; 95%CI=17.8–28) [28, 29]. TB drug resistant occurred when TB did not respond to the standard six-month treatment with first-line anti-TB drugs [30], including resistance to at least rifampicin and isoniazid. Consistent with other studies, a study in South Africa indicated that previous TB treatment was a strong risk factor for MDR-TB [32], as well as in Ethiopia (OR=2.9; 95%CI= 0.22-37.4; p>0.05) [24].

Educational attainment and income were found as significant covariates of MDR-TB. Low educational attainment might limited the patient knowledge on TB severity, TB treatment and susceptible of treatment resistance. A previous study on risk factor for default TB drug stated that completed high school is a protective factor of TB resistance (HR=0.59; 95%CI=0.35-0.97; p=0.04) [33]. Similar study also indicated that the higher education level, the lower probability of getting MDR-TB [34]. Inadequate knowledge and misperceptions related to TB/MDR-TB for patients as well as health personnel could hinder the TB control programs[35]. Low level of knowledge was statistically significant association with MDR-TB (OR=1.93; 95%CI=1.61-

3.23; p =0.011). Sir John Crofton-conveyed that the burden was not only for patients himself but also for others due to infect other people with his drug-resistant organism [30]. The previous study in Henan China found that the odds of MDR-TB for having poor knowledge was OR=2.87 (95%CI=2.46–3.88; p<0.001) [36].

The severely underweight patients had two-fold odds of persistent smear positive [37]. Patients treated with the second-line drug in Estonia, Philippines, Russia, and Peru with BMI <18.5 kg/m^2 (under nutrition) had a higher risk of death, failure, and default of MDR-TB (RR=2.71; 95%CI 1.91-3.95) [38]. A previous study stated that low income was a risk factor of MDR-TB (aOR=1.1; 95%CI=0.34-0.47) [24]. A study indicated that the odd of MDR-TB for those with BMI <18.5 kg/m^2 was 1.17 times the odds of those with BMI ≥ 18.5 kg/m^2 [39]. In addition, low body weight had a longer time to initiate culture conversion among MDR-TB patients [37]. Although the 6 months long TB treatment and the 24 months long MDR-TB treatment are provided free of charge, patients have to bear other costs such as travel cost to the primary health center to get medication once a week. The patients with low income were more likely to miss the follow up for taking the drug regularly because there was no transportation and insufficient funds. Another study reported that annual low income was associated with primary MDR-TB (OR=6.33; 95%CI=1.87-21.40; p=0.003) [8].

Conclusions

The risk factors of MDR-TB were the length of TB treatment, continuity of TB treatment, educational attainment, and monthly income. TB drug treatment irregularity is closely related to TB resistance since TB medication requires adherence and continuity according to the prescribed schedule.

Conflicts of Interest: All authors declare that they have no competing interest

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The Effectiveness of Northeast Thai Local Dance (Champasri) Training for Risk group Type 2 Diabetes mellitus in Thai Rural Elderly Women

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Abstract

Type 2 diabetes is now a major problem worldwide, including in rural as well as urban Thailand. One measure for control is increasing physical exercise. In the elderly traditional style dancing is an attractive option. The quasi experimental research was conducted to assess the influence of a 16 weeks program focusing on Thai local (Champasri) dance in experimental of 27 Thai females aged 60-69 by integrate stretching, warm up, exercise and cool down 50 min by using DVD which conducted by researchers, and limited to 29 female elderly in the control group. Outcome variables were fasting glucose and BMI values. significant decrease $p<0.001$ and hemoglobinA1c no significant at the end of the program.. In addition, physical fitness parameters like chair stand test, arm curl, chair sit & reach, back scratch, 8 Ft up & go and 6 min walk testwere also improvedsignificant $p<0.001$ Conclusion, North East Thai local(Chapasri) dance trainingcan be recommended for diabetes control in elderly women.

Keywords: *The effectiveness, North East Thailand local dance, high risk to type 2 diabetes mellitus, 60-69 year old women.*

Introduction

Diabetes is the complexity of chronic diseases that require continued medical treatment with various risk reduction strategies. Adoption of a healthy lifestyle may delay progression from the precursor high risk to type 2 diabetes mellitus. Mahasarakham province, Northeast Thailand has become a new patient increasing steadily from 2014–2017, rising from 2.31-2.88%.[1] Northeast Thai local dance in Mahasarakham province is called "Champasri dance", is for recreation among adolescent and important festivals as well as no test for exercise science. This research concerns to improve Champasri dance by integrating stretching muscle training, warm up, exercise, cool down and extent to 50 minutes. It can promote physical fitness and reduction of the risk in diabetes Mellitus type 2 in women aged 60-69.

This study aims tocompare physical fitness andto assess a percent of hemoglobin A1c (HbA1c) and fasting blood sugar(FBS) changing before and after training

Method

Study Design and Sampling: The research design was quasi-experimental. Its intervention was "Champasri dance training" for women volunteer aged 60-69. The sample size calculation was compared the average between two groups[2]. Each groups has 35 female volunteers and must pass the inclusion criteria as follows. FBS from the fingertip in the previous year at 100-125 mg/dl, body mass index (BMI) 18.50-24.99 or more than 80 centimeters waist circumference have had. The researcher helped volunteers from the community leaders to clarify, persuade, and sign the consent form.

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Data Collection and Training: There are data collection (April-June 2018)and dancing places (Nadun Sub district–Municipal for experimental group and Khanthararat Sub-district, Kantharawichai district for control group). Intervention procedures for Champasri dancing were DVD conduction and demonstration. The training had started from week 1-16, 3 days a week, 50 minutes, 16 weeks totally, 04.10-05.00 pm., on Wednesday, Tuesday, and Friday. The clarification, consent, and record form were improved quality of three experts. Volunteers received supports for all facilities and transportation fees for dance trainings and tests.

Data Analysis: Data analysis was carried out using SPSS ver.26. The differences within groups used a pair t-test and wilcoxon signed-rank tests and between groups used an independent t-test and mannwhitney u tests. Analysis of covariance: ANCOVA has used to test the variables.

Results

1. Seven female volunteers have 7 days training with using of polar heart rate test compared to American Heart Association Guidelines. They had moderated intensity level at HR 50-60%.
2. There were 27 participants in the experimental group have the average ages 66.15 (SD = 1.936) and 29 participants in the control group were 65.00 (SD = 2.673).13 female volunteers have to leave the criteria.
3. The changes comparison of physical fitness before and after training.
   - 3.1 The experimental group had statistically significant ($p<0.001$). The control group, the mean values of chair sit & reach, back scratch: left,back scratch: right,8 Ft up & go and 6 min walk had p-value <0.001.
   - 3.2 The physical fitness test between groups after experiment had statistically significant ($p<0.001$). The experimental group, mean values higher or better than the control group as shown in Table 1-2.

Table 1: The comparison of the changes of physical fitness before and after training between groups by using the Independent t-test.

Physical fitness	Before				After			
	Exper G. M(SD) (n=27)	Control G. M(SD) (n=29)	t	p-value	Exper G. M(SD) (n=27)	Control G. M(SD) (n=29)	t	p-value
arm curl (right)	18.963 (4.061)	17.482 (4.005)	1.372	0.176	25.000 (3.802)	17.224 (3.437)	8.037	<0.001
back scratch (left)	-15.414 (4.832)	-16.375 (5.578)	0.687	0.495	-12.785 (5.019)	-18.586 (5.318)	4.190	<0.001
back scratch (right)	-14.785 (5.234)	-17.062 (3.863)	1.861	0.068	-11.822 (4.660)	-19.769 (3.961)	6.890	<0.001
8 Ft up & go	8.265 (1.255)	7.973 (0.968)	0.979	0.332	6.168 (1.009)	8.397 (1.389)	-6.901	<0.001
6 min walk	310.185 (32.830)	319.413 (41.789)	-0.914	0.365	371.740 (41.489)	280.482 (26.808)	9.699	<0.001
BMI	23.656 (1.248)	23.569 (1.125)	0.275	0.784	22.872 (1.471)	24.566 (1.306)	-4.563	<0.001

Table 2: The comparison of the changes of physical fitness after training between groups by using the ANCOVA-test.

Physical fitness	Exper.G. M(SD), (n=27)	Control G. M(SD), (n=29)	SS	df	MS	F	P-value
Chair stand test	18.963(4.735)	12.137(2.474)	194.413	1	194.413	26.538	<0.001
Arm curl (left)	23.074(2.510)	16.379(4.143)	258.118	1	258.118	40.898	<0.001
Chair sit & reach	-11.974(6.914)	-16.127(4.267)	700.231	1	700.231	30.490	<0.001

4. The blood sugar comparison and effects after fasting before and after training.

   4.1 The change in HbA1c and FBS within groups, HbA1c and FBS has statistically significant ($p<0.05$). The mean after experiment in the control group was higher than the experimental group.

   4.2 The change in HbA1c between groups. After training, had no statistically significant ($p>0.05$) but the experimental group's mean (SD) had a lower value than the control groups. The change test of FBS, after the experiment between groups has statistically significant ($p<0.05$) as shown in Table 3-4.

Table 3: The comparison of the changes of fasting blood sugar after training groups by using the Independent t-test

Dependent Variable	Before				After			
	Exper G. M(SD), (n=27)	Control G. M(SD), (n=29)	t	p-value	Exper G. M(SD), (n=27)	Control G. M(SD), (n=29)	t	p-value
FBS	106.518(10.860)	107.103(9.969)	-0.210	-0.834	94.444(11.981)	107.620(11.216)	-4.251	0.000

Table 4: The comparison of the changes of hemoglobin A1c after training groups by using the ANCOVA-test

Hemoglobin A1c	Expe.G. M(SD), (n=27)	Control G. M(SD), (n=29)	SS	df	MS	F	P-value
%HbA1c	5.400(0.378)	5.306(0.409)	0.072	1	0.072	0.631	0.430

Changes in exercise techniques and food consumption at home before and after the experiment are not significantly ($p>0.05$). The study believes that the experimental and control area have similar living style.

Discussion and Conclusion

Comparing and analyzing the results between groups appeared the dance cannot change the results of cardiovascular health and cardio-respiratory rate clearly as same as to the previous study[3,17,20,28]. Butit has the effect of changing muscle strength and gait ability. The results can add the benefits beyond the previous study that changes on BMI, balance, and flexibility.

Discussion

After the dance training, Chair stand test, arm curl, chair sit & reach, back scratch, 8 Ft up & go and 6 min walk in the experimental group changes better than the control group. Results of fitness test of dance trainings: Greek Traditional[4], Thai traditional[5,19], Waltz[6], Ballroom[7], Rumba swing[7], Samba[7] and Bolero[7], Creative[8], Argentinetango[9,15,27,30], Aerobic[10,17,18,31,33], Turkish[11], Caribbean[12], Salsa[13], Tango and Waltz/ Foxtrot Dance[14], Exercise Dance for Senior (EXDASE) [16], Greek dance[20,32], Agilando Dance[21], Dance Therapy (Healthy-Steps) [22], and Dance Therapy (Lebed method)[23] are line dances[35] that have a moderate intense level like the Korean dance, aerobic, and resistance exercises[,29] lower than Greek Dance[28], beneficial for obese older women or high risks of cardiovascular diseases. BMI in the experimental group has normal means close to the BMI assessment from Bollywood Dance training[36] and Bhangra Dance[24]. In 16 weeks was appropriate to change BMI values. The Creative[8], Greek[20], Korean, and Aerobic dance, and resistance exercise[25,29], Ballroom dance meetings, toning exercise[26], low-impact aerobic dance[34], had statistically significant within groups better after experiment. It associates with lower exercise tolerance as measuring by peak oxygen consumption[39]. BMI values associate with higher exercise tolerance after training. The experimental group's mean has a lower value or risk than the control group. The result of a chemistry test from the

Bollywood dance training[36], Bhangra dance training[24], percent of HbA1c result from Korean dance, aerobic and resistance exercises training[25], had statistically significant difference within group as same as the result of this study. FBS after the experiment differed statistically significantly in the experimental group has a lower mean or risk of diabetes. The control group has a slight to increase of the mean and consistent with the study of FBS in aerobic exercise[37]. In results of Tai Chi training, FBS has decreased within 6,000

minutes of exercise[38]. It can be determined the study used the aerobic exercise period by the dance for only 2,400 minutes that can affect FBS reduction. It may cause from Thai dance style is a continuous slow dance focuses on relationship between movement and music. It was more complex than Tai Chi[19]. If the frequency increasing, long duration, continuity, and moderate exercise nearby the real intensity level and consistent with the lifestyle and funny exercise. The effect of changing in% Hb A1c will be clearer.

Conclusion

Northeast Thailand local dance Training is resulting in a healthy body from the evaluation of physical fitness test. The shape has a greater proportion from results of BMI, succeeded in controlling the level of FBS, and has a tendency of decreasing% Hb A1c.

Recommendation for research applying: The older women needed to have their writing skills, to improve and pay more attention to memorize their routines, to reduce the risk of having dementia.

Recommendation for further research: The participants can have a sustainable healthy diet by themselves and have the rights to choose food and their families go along with the local culture and activities. It will help sustain healthy.

Conflict of Interest Statement: No conflict of interest to declare.

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Ethical Clearance: Taken fromthe office of the Khon Kaen University Ethics Committee in Human Research (project number HE602343).

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Health Education in Increasing Prevention Behavior of Dengue Hemorrhagic Fever in Families at Gubeng Village, Surabaya, Indonesia

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Abstract

Dengue Hemorrhagic Fever (DHF) is the fastest spread of mosquito-borne viral disease in the world–an annual health problem in Indonesia. Efforts to prevent and eradicate DHF are focused on efforts to control infectious vectors through the Mosquito Nest Eradication movement known as 3M Plus, but community participation in preventing DHF is still low due to a lack of understanding in its importance, so that the health education is needed to improve understanding and awareness of DHF. This study aims to analyze the effect of health education on the increasing prevention behavior of DHF. This research is a type of comparative analytic research using non-equivalent control group with a quasi-experimental design. The sample of this study–72 families–are the people who lived in RT 03 RW 03 Gubeng, Surabaya, which was taken using a cluster sampling technique. Data were analyzed using the Wilcoxon sign rank test and Wilcoxon Mann-Whitney test with a significance level of 0.05. The results showed that there was a significant increase in family behavior in the prevention of DHF between before and after health education was carried out in the treatment group. Also, there were significant differences in family behavior in the prevention of DHF between the treatment and control groups after health education. Considering that health education has a significant influence in improving family behavior in the prevention of dengue, it is advisable to health workers in the Puskesmas to conduct health education about DHF and its prevention regularly and continuously to reduce the incidence of DHF.

Keywords: *Health education, behavior, prevention, Dengue Hemorrhagic Fever.*

Introduction

Dengue Hemorrhagic Fever (DHF) is the fastest spread of mosquito-borne viral disease in the world. In the past 50 years, the incidence of dengue has increased 30-fold with extensive geographical expansion[1]. Dengue fever is also still a health problem in Indonesia every year, especially during the rainy season. Data taken from the Directorate of Vector and Zoonoses Infectious Diseases Control of the Ministry of Health of Indonesia said that during January 2016[2] there were 3,298 cases of dengue fever with 50 deaths or Case Fatality Rate (CFR) of 1.5%. In 9 Regencies and 2 Cities from 7 Provinces which are KLB areas, there were 492 cases, 25 of which died or CFR of 5%. In Surabaya, which is an endemic area of dengue fever, we need to watch out for the possibility of a case surge. The Surabaya City Health Office found 60 cases of dengue fever in January 2016. This number increased compared to the same month in 2015 totaling 48 cases.

Vaccines to prevent and drugs to effectively eradicate dengue virus are not yet available. Therefore, prevention and eradication of dengue fever focused on efforts to control the infectious vectors through the Mosquito Nest Eradication. However, in reality, community participation in the prevention of dengue fever is still lacking. Therefore, the behavior of eradicating mosquito nests needs to be continually grown, especially in many countries that have been proven to reduce dengue fever

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cases. Outbreaks of dengue fever in Indonesia related to a variety of risk factors, including the limited public understanding of the importance of eradicating mosquito nests[2]. To increase knowledge, understanding, and awareness of the community can be pursued through health education.

Method

This research is a type of comparative analytic research that compares the prevention behavior of DHF of the community who get the health education and who was not. The research design used was a quasi-experimental non-equivalent control group. The study population is a family who lives in the area of RW 03 Gubeng Surabaya, Indonesia. The sample of this study was the family who lived in the area by using cluster sampling. The sample divided into two groups, namely the treatment group (36 families who get health education) and the control group (36 families who did not get health education). Data collected by filling out a questionnaire and analyzed using the Wilcoxon sign rank test and the Wilcoxon Mann-Whitney test with a significance level of 0.05.

Results

The results of this study include family demographic data as well as specific data on the prevention behavior of DHF; before and after health education. Demographic data shows that all (100%) of respondents are women. One-third (33.33%) of the treatment group and half (52.78%) of the control group were middle-aged. Nearly half (41.66%) of the respondents in the treatment group and the majority (61.11%) in the control group had a high school education, and a small proportion (16.67%) had college. Most (55.56%) of the respondents in the treatment group and 52.78% of the respondents in the control group worked as private employees, entrepreneurs, and civil servants. Majority of the treatment group (80.56%) and control group (83.33%) did not have a history of dengue fever–the complete data presented in Table 1.

Table 1. Distribution of family demographic characteristics

Demographic Data	Treatment Group F (%)	Control Group F (%)
Gender:		
Male	0 (0)	0 (0)
Female	36 (100)	36 (100)
Age:		
Young (21-40 y.o)	15 (41.67)	10 (27.78)
Middle-aged (41-59)	12 (33.33)	19 (52.78)
Elderly (≥ 60 y.o)	9 (25.00)	7 (19.44)
Education:		
Elementary School	10 (27.78)	5 (13.89)
Junior High School	10 (27.78)	3 (8.33)
Senior High School	15 (41.66)	22 (61.1)
College	1 (2.78)	6 (16.67)
Occupation:		
Not working	16 (44.44)	16 (44.44)
Civil Servant	0 (0)	4 (11.11)
Private employe	7 (19.44)	5 (13.89)
Entrepreneur	13 (36.12)	11 (30.56)
History of DHF:		
There is	7 (19.44)	6 (16.67)
None	29 (80.56)	30 (83.33)

The results of this study indicate that the behavior of DHF prevention when prior to health education in the treatment group was obtained almost entirely (80.56%) in the sufficient category and only a small proportion (19.44%) behaved well, whereas in the control group obtained most (63.89%) behaved adequately and almost half (36.11%) behaved well (Table 2). Based on Table 2, it can be concluded that the behavior of DHF prevention, before health education, is better in the control group than the treatment group.

Table 2. Distribution of family behavior of DHF prevention before health education

Behavior of DHF Prevention	Treatment Group F (%)	Control Group F (%)
Good	7 (19.44)	13 (36.11)
Enough	29 (80.56)	23 (63.89)
Total	**36 (100)**	**36 (100)**

Table 3 indicates that the behavior of DHF prevention after health education in the treatment group found most (58.33%) in the sufficient category and almost half (41.67%) in the good category. The same condition was also found in the control group, where most (63.89%) families behaved adequately, and almost half (36.11%) behaved well in the prevention of DHF.

Table 3. Distribution of family behavior of DHF prevention after health education

Behavior of DHF Prevention	Treatment Group F (%)	Control Group F (%)
Good	15 (41.67)	13 (36.11)
Enough	21 (58.33)	23 (63.89)
Total	36 (100)	36 (100)

After being given health education to the treatment group, their behavior in preventing DHF showed improvement (Table 2 and Table 3), where before being given health education, it was seen that families who behaved well at 19.44% then after being given health education the number increased to 41.67%.

Descriptive statistics on the score of DHF prevention behavior in the treatment group also showed an increase after being given health education, both in the mean value and median value, as listed in Table 4.

Table 4. Differences in DHF prevention behavior between before and after health education in the treatment group

Behavior of DHF Prevention	Descriptive Statistics	
	Before HE	After HE
Mean	70.03	74.28
Median	69.50	73.50
St. deviation	7.15	5.81

p = 0,000

Based on the results of hypothesis testing using the Wilcoxon signed ranks test, it obtained a p-value of 0.000, which means that DHF prevention behavior in the treatment group after getting health education was higher or better than before getting health education.

Descriptive statistics about the difference in scores of DHF prevention behavior between before and after health education showed that the treatment group had a higher difference than the control group, as listed in Table 5.

Table 5. Differences in DHF prevention behavior between treatment and control groups after health education conducted

Behavior of DHF Prevention	Descriptive statistics	
	Treatment Group	Control Group
Mean of the difference in score	4.31	0.33
Median of the difference in score	4.00	0.00
Std deviation of the difference in score	4.88	1.24

p = 0.000

The results of hypothesis testing using the Wilcoxon-Mann Whitney test showed that the behavior of DHF prevention after health education in the treatment group was higher or better than the control group, with a p-value of 0.000.

Discussion

Before health education was carried out in the treatment group, almost all (80.56%) of DHF prevention behavior in families were in the sufficient category and only a small percentage (19.44%) behaved well, whereas in the control group, most of them (63.89%) behave adequately and almost half (36.11%) behave well. DHF prevention behavior in the community influenced by knowledge from various media. The level of education strongly influences the ability of the community to understand information. In the control group, high school and tertiary education levels are more than the treatment group, so the ability to receive information is easier so that it produces better behavior than people with low levels of education. This research is in line with the results of a study that junior high school education has a preventive behavior of low dengue hemorrhagic fever before health education[3] and it in accordance with a theory which states that education influences the learning process, the higher one's education the easier it is for the person to receive information[4]. The more information about health that comes in, the more knowledge gained about health. Communities with low education need empowerment through health education to increase their knowledge. With his awareness and knowledge, the ability of the community to behave well in the prevention of dengue arises.

Prevention of DHF behavior before health counseling can also be attributed to family experience in treating DHF patients, which in the treatment and control groups is almost the same, both have experience

having treated family members who suffer from dengue. Thus people who have experienced dengue hemorrhagic fever will participate more in preventing DHF by doing 3M Plus. Notoatmodjo said that behavior is the result of experience and the process of interaction with the environment, which manifests in the form of knowledge, attitudes, and practices so that a balanced state between the driving force and the holding strength achieved[5]. This statement is supported by a study which states that experience as a source of knowledge is a way to obtain the truth of knowledge by repeating the knowledge gained in solving problems in the past[4]. So that experience is what gives us lessons about how to avoid dengue.

After health education for the treatment group, most of them (58.33%) behaved adequately, and almost half (41.67%) were in a good category. The same condition was also found in the control group, where most families behaved adequately, and almost half behaved well in the prevention of DHF. The results of this study indicate that health education about the prevention of DHF has a positive effect on improving community behavior in preventing DHF. Following the opinion of Azwar[6] quoted by Maulana[7] in the general conception of health, health education defined as health education activities carried out by disseminating messages and instilling confidence. Thus, the community not only is aware, knows, and understands, but also wants and can make health-related recommendations. Fitriani[8] added that health education is a dynamic process of behavior change, not a process of transferring material or messages from someone to another person and not a set of procedures.

In this study health education changed family behavior to better prevent dengue hemorrhagic fever by doing 3M Plus, where it is following Mubarak[9] statement that counseling for health education, in general, is to change unhealthy behavior, to be healthy. Families after receiving health education change unhealthy behaviors into healthy behaviors because they already have the awareness that in the preventive behavior of dengue hemorrhagic fever through 3M Plus is beneficial for themselves, their families and surrounding communities. Surya[10], as cited in Maulana[7], that counseling is a relief effort given to counseling (students) so that they gain self-concept and self-confidence, to be utilized by him in improving his behavior in the future. With the concept of self-confidence, the family can improve its behavior in the prevention of dengue hemorrhagic fever. This statement reinforced by WHO[11], as cited in Mubarak[9], that the goal of health education is to change the behavior of people or society from unhealthy behavior to healthy behavior.

The results of this study indicate that there is a significant increase in DHF prevention behavior in the treatment group between before and after health education. In other words, health education has proven effective in improving family knowledge about prevention of dengue. According to Notoatmodjo[5], if there are an innovation or development programs in the community, then what often happens is that some people are swift to accept the innovation or change that is changing their behavior, and some people are prolonged to accept the innovation or change because each person has a willingness to change or readiness to change that is different. Every person in a society has a different willingness to change, even though the conditions are the same. Notoatmodjo[5] also states that health education can influence and or invite others, both individuals, groups, and communities to carry out healthy behavior. Operationally is an activity to provide knowledge, attitudes, and practices of the community in maintaining and improving their health.

The basic principle of health education is the learning process. In this process, there is a reciprocal influence of various factors, including the subject of learning, teaching, learning method and techniques, learning aids, and the material or material learned. In this study health education was carried out in groups with a total target of 36 participants housed in the Post RT room, the material was delivered using the lecture and question and answer method with the media of powerpoint slides and leaflets equipped with images relevant to the material. The participants seemed enthusiastic and focused their attention on the material discussed. Classical or group counseling also enables interaction and sharing of information and experiences between participants, thus increasing their broader horizons. This condition is following Notoatmodjo[5] states that for large groups where more than 15 counseling participants, good method include lectures. Factors that influence an educational process in addition to input are method, materials or messages, educators, or officers who do and assistive devices or educational aids. In order to achieve an optimal result, these factors must work in harmony.

DHF prevention behavior after health education in the treatment group is higher or better than the control group. According to Azwar[6], changes in one's behavior influenced by knowledge, experience, and certain

environmental situations. Therefore, families can change to behave better after getting a lot of information and knowledge while attending counseling. In conducting health counseling, the instructor must be able to convince information about the family. After hearing and seeing the educational slide shows and pictures on the leaflets, awareness of the family will arise so that their behavior will change for the better. Good behavior that occurs in the family is possible to arise because the family has gained good knowledge about dengue fever so that it will affect behavior changes from before it is not good to be good. After the family gets good knowledge about dengue fever, they can see things related to dengue fever prevention so that their behavior changes to pay more attention to their health.

Conclusions

There is a significant increase in the behavior of dengue prevention between before and after health education is carried out in the families of the treatment group.After conducting health education, behavioral prevention of DHF in the treatment group was higher or significantly better than the control group.Given that health education has a significant influence in improving family behavior in the prevention of dengue, it is advisable to health workers in the health center to conduct health education about DHF and its prevention regularly and continuously in order to reduce the incidence of DHF.

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Effectiveness of Eduche Method (Education Card Healthy) Reducing the Event of Osteopenia in Adolescent Private Vocational School, Martapura River Region

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Abstract

Martapura River has the greatest potential for fish farming compared to other regencies in South Kalimantan. With the condition of the region and the results of the cultivation, this area should have the potential as a fishery source that plays a role in the supply of animal protein such as fish that can be used by the community to improve community nutrition, such as osteopenia in girls. Osteoporosis/osteopenia is more common in women about 80% of men 20%. The study design used Pre and Post test One Group Design. The research subjects were all teenage girls in Islamic boarding schools in the Martapura River area, Banjar Regency. Sampling was done by measuring the nutritional status of female teenagers using the WHO anthropometry 2007 reference standard with the following criteria: female teenagers said to be overweight with z scores > + 1 SD, Obesity with z scores> +2 SD, normal with z scores-2 SD to +1 SD, Thin (Thinness) with z scores-3 SD to-2 SD, and Very thin (Severe Thinness) with z score <-3 SD. Research instruments are mikrotoice and stepping scales. Measuring the degree of bone density using a quantitative ultrasound bone densitometry. Protein and calcium intake using 24-hour food recall form. Eduche Method (Healthy Education Card) with CTL (Contextual Teaching Learning) approach to TGT (Team Games Tournament) settings. The results showed osteopenia respondents were 65 people (79.3%), the most dominant factors related were low protein intake (p value = 0.001. Eduche Method (Education Card Healthy) with CTL (Contextual Teaching Learning) TGT settings (Team Games Tournament) effectively increase respondents' knowledge about osteopenia (p value 0.0001).

Keywords: *Teenage girls, eduche, osteopenia, CTL, TGT.*

Introduction

The degree of bone density is to describe the state of the bone after a period of perfect development. Signs of early low degrees of bone density are osteopenia, while further osteoporosis. Osteoporosis is bone loss, especially in the spine, upper arms and pelvic bones. Symptoms of osteoporosis are difficult to detect, most are only realized when there is swelling of the spine, fractures or broken bones, pinched nerves. One of the causes of osteoporosis is the lack of daily calcium intake and protein. Women are more at risk due to less bone mass they have and faster bone loss compared to men and women experience faster loss than men due to menstruation, pregnancy, breastfeeding and menopause[1,2]. The results of Rahayu and Putri's research in 2016 in the Banjar Regency region have found that there were still quite a number of respondents who had protein and calcium intake in the unfavorable category, namely 37.8% and 42.2% [3,4]. This result is supported by the results of the Rahayu and Yulidasari 2015 research that most of the adolescents with low protein intake are due to their low level of nutritional knowledge which is 53.7% [5]. Potentials that can prevent osteoporosis can be in the form of biological wealth such as fish cultivation which provides a source of nutrients that are beneficial

to the body including helping in the formation of bone mass[6].

The method can be in the form of EDUCHE Method (Education Card Healthy) is a method that will be implemented by the counseling guidance teacher in collaboration with researchers as a form of improvement efforts in overcoming osteopenia in young women by giving counseling for teenage girls and providing nutritional knowledge of girls through an approach to CTL (Contextual Teaching Learning) approach to setting TGT (Team Games Tournament). Teenage girls will be given a health education card (Education Card Healthy) at the end of each month as a form of learning evaluation. This approach is one of the cooperative learning models that is easy to implement, involving the activities of all female adolescents with osteopenia whose learning activities with games designed in cooperative learning model of Teams Games Tournament (TGT) enable female teenagers to learn to relax more than foster responsibility, honesty, cooperation, healthy competition and learning involvement absorb knowledge provided using participatory methodologies and participatory learning and action processes, so as to increase knowledge about osteopenia.

Materials and Method

This research is an action research (Operational research). The study design used Pre and Post test One Group Design. The subject of the study were all teenage girls in Darul Islamic boarding schools in the area of the Martapura riverbank, Banjar Regency, while the determination of the sample was chosen 1 (one) school which had the largest number of female adolescents with osteopenia who were screened. Then samples will be taken with the following inclusion criteria: (1) female adolescents with osteopenia based on measurements of the degree of bone density using a quantitative ultrasound bone densitometry; (2) The female teenagers are family members who live as residents on the banks of the Martapura river. (3) When researching girls are not fasting. (4) When research girls are not experiencing pain which results in reduced appetite.

In this study the following research instruments were used: 1) quantitative ultrasound bone densitometry for degree of bone density, 2) scales for measuring body weight, 3) microtoice for measuring height, 4) 2x24 hour form recall for measuring protein and calcium intake, 5) Question sheet to identify knowledge before and after nutritional education through the CTL approach to TGT settings during the education process, 6) Evaluation sheet for EDUCHE activities (Education Card Healthy) to find out the progress of educational material that has been given at the end of the month with components: height changes/body length according to age (BMI); protein and calcium intake, 7) Fill in the characteristics of respondents and family. The independent variable (independent variable) in this study is the Effectiveness of EDUCHE Method (Education Card Healthy) with the CTL (Contextual Teaching Learning) approach of TGT (Team Games Tournament) settings, while the dependent variable (dependent variable) is the Osteopenia Occurrence in Girls. Meanwhile, the variables measured were the degree of bone density, BMI, protein and calcium intake and the level of nutritional knowledge of girls.

Primary data collected includes: (1) family characteristics using a structured questionnaire; (2) IMT data was determined using the BMI indicator according to age with the WHO 2007 standard using microtoice instruments and stepping scales with the category of Overweight (> Overweight) if> 1 SD, Obesity if> + 2 SD, Normal if-2 SD up to +1 SD, Thinness if-3 SD to-2 SD, and Very thin (Severe Thinness) if <-3 SD; (3) knowledge of adolescent nutrition was collected through evaluation forms on the CTL approach of the TGT setting (4) data on protein and calcium intake were obtained using a 24-hour recall form. Protein intake consists of 3 categories according to the recommended nutritional adequacy rate which is less if <80%, normal if 80-100% and more if> 100%. While the category of calcium intake is divided into 3 categories, namely if <800, normal if 800-1000 and more if> 1000 (5) osteopenia data obtained by measuring the degree of bone density using quantitative ultrasound bone densitometry using conversion according to Meilnikow, 2005. As for Bone density category consists of 3 categories: Normal if>-1 SD, Osteopenia if-1 SD to-2.5 SD, and Osteoporosis if <-2.5 SD (6) data on changes in protein, calcium and BMI intake are known from the method EDUCHE. Data for family characteristics were made in the form of percentages, data on EDUCHE method activities in the form of narrative, and BMI, protein and calcium intake. To find out the relationship between independent and dependent variables, che square test was used and to find out the most dominant factors associated using multiple logistic regression analysis.

Result

Univariate Analysis: Table 1 shows the distribution of variables according to categories that are likely related to the incidence of osteopenia in respondents.

Table 1: Frequency distribution of respondent and family characteristics

Osteopenia category	Frequency (person)	Percentage (%)
a. Osteopenia	65	79,3
b. Normal	17	20,7
IMT category		
a. Abnormal	51	62,2
b. Normal	31	37,8
Father's Education Level Category		
a. Not finised-SMP	62	74,6
b. SMA-PT	20	24,4
Mother's Education Level Category		
a. Not finished-SMP	61	74,4
b. SMA-PT	21	25,6
Family income level		
a. < UMK	62	75,6
b. ≥UMK	20	24,4
Number of Family Members		
a. >5 person	54	65,9
b. < 5 person	28	34,1
Adequacy of protein intake		
a. Defisit	62	75,6
b. Enough	20	24,4
Adequacy of calsium intake		
a. Defisit	52	63,4
b. Enough	30	35,6
Tingkat pengetahuan		
a. Kurang	20	24,4
b. Good	62	75,6

Table 1 shows that most of the respondents experienced osteopenia which is 65 people (79.3%). Several other potential variables have a relationship with osteopenia incidence in respondents, namely BMI, father's education level, mother's education level, family income, number of family members, protein intake and calcium intake. Table 1 shows that adolescents who have a BMI category are not more normal than adolescents with normal BMI, namely 51 people (62.2%), father and mother who do not complete the primary to junior secondary education level, amounting to 61 each. people (74.6%) and 62 people (74.4%). With the level of education of parents who fall into the low category, the income earned by the elderly/family becomes insufficient to meet the consumption needs of family food. The results of this study indicate that most of the family income is still below the UMK (Minimum Wage for Employees) that is equal to 60 people (75.6%). This UMK refers to the UMK of Banjar Regency in the amount of Rp.2,248,000. In addition, the factors that also contribute to the incidence of osteopenia are the number of family members.

The results of this study found that most respondents had a relatively large number of family members (> 5 people), namely 54 people (65.9%). The possibility with this relatively large number of family members will affect the family distribution of food. The results of this study showed that protein and calcium intake were mostly in the less categories of 62 people (75.6%) and 52 people (63.4%) and found that there were still adolescents who had less knowledge about osteopenia, risk factors, and the impact in the future for girls is 20 people (24.4%). The magnitude of the frequency distribution between each of these variables has not been able to show a relationship between the variables of the characteristics of respondents and family with the incidence of osteopenia in the respondents, so it needs a bivariate analysis so that the relationship between these two variables is known to be meaningful, in detail can be seen in Table 2.

Bivariate Analysis

Table 2. The relationship between the characteristics of respondents and families with osteopenia status in adolescents

Variables	p value*	Information
1. IMT	0,0001	Significan
2. Father's Education Level	0,110	Not Significan
3. Mother's Education Level	0,032	Significan
4. Family income level	0,24	Not Significan
5. Number of Family Members	0,644	Not Significan
6. Adequacy of protein intake	0,0001	Significan
7. Adequacy of calsium intake	0,001	Significan

**p value* (<0,05)

Table 2 shows that some variables show an association with osteopenia status in respondents. These variables are BMI (Body Mass Index) with p value = 0.0001, mother's education level with p = 0.032, adequacy of protein intake with p value = 0.0001 and adequacy of calcium intake with p value = 0.001. This analysis uses the Che Square test with a 95% confidence level. How many of these variables are still unknown is the factor most associated with osteopenia status in respondents. Therefore, in order to know the most dominant variables associated with osteopenia, further analysis is needed, namely multivatiate analysis using logistic regression. Can be seen in detail in Table 3.

Multivariate Analysis

Table 3. The most dominant factors related to osteopenia status in respondents

No	Variables	B	SE	Wald	Sig	Exp (B)
1	IMT	2,272	885	6,586	0,010	9,696
2	Father's Education Level	-168	1,466	1,164	0,281	0,206
3	Mother's Education Level	-1,582	1,716	0,010	0,922	0,845
4	Family income level	-2,256	1,717	1,727	0,189	9,549
5	Adequacy of protein intake	2,257	0,747	11,708	0,001	12,981

Table 3 shows that the variable protein adequacy is the most dominant risk factor for osteopenia in adolescent girls in Darussalam Martapura Islamic Boarding School with p = 0.001 (<0.05), with Exp (B) = 12.981 which means that girls with less protein intake Nutritional adequacy rates that are recommended to have a risk of 12,981 times greater osteopenia than adolescents with adequate protein intake.

Difference Test Analysis

Table 4. Different test of effectiveness of Educe CTL approach to TGT setting in changing the level of knowledge of respondents by using the Wilcoxon Signed Ranks Test

	pengetahuan_akhir-pengetahuan_awal
Z	-5.284[b]
Asymp. Sig. (2-tailed)	.0001

a. Test Statistics[a], b. Wilcoxon Signed Ranks Test, c. Based on negative ranks.

Table 4 shows the results of the Wilcoxon Signed Ranks Test on changes in the level of knowledge of respondents related to osteopenia with the results that there were differences before and after giving education using the Eduche method (Education Card Healthy) with the CTL (Contextual Teaching Learning) approach to setting TGT (Team Games Tournament) on respnden knowledge about osteopenia, risk factors, and their impact on future girls. This result means that the Eduche (Education Card Healthy) method with the CTL (Contextual Teaching Learning) approach to TGT (Team Games Tournament) settings effectively increases respondents' knowledge of osteopenia (p value = 0,0001).

In addition to intake, Jiga BMI acts as a cause of osteopenia in adolescents. The results of Permatasari's research (2011) have found that adolescents who have abnormal BMI (nutritional status) have a risk of 3.958 times greater osteopenia than adolescents who have a normal BMI. Similarly, the results of research conducted by Nafilah (2014) found that there was a relationship between body mass index and bone density in female adolescents (p = 0,000). This means that the higher the adolescent who has less nutritional status (BMI), the higher the rate of osteopenia in adolescent girls[9]. So, during childhood and adolescence, new bones are formed faster than old bones (which are removed), so the bones become larger, heavy and dense[10].

Conclusions

Most respondents still experienced osteopenia by 65 people (79.3%) out of 82 total respondents. The most dominant risk factor in the incidence of osteopenia in respondents in Darussalam Martapura Pesantren, with p = 0.001 (<0.05) and Exp (B) = 12.981 which means that girls with protein intake are less than the nutritional adequacy rate recommended (AKG) at risk 12,981 times greater osteopenia than adolescent girls with adequate protein intake. There is a difference in the level of knowledge before and after giving education with the Eduche method. The Eduche Method (Healthy Education Card) with the CTL (Contextual Teaching Learning) approach effectively adjusts respondents' knowledge about osteopenia.

Ethical Clearance: This study has received ethical approval from the Medical Faculty Research Ethics Committee of Lambung Mangkurat University, Banjarmasin, Indonesia. In this study we followed the

guidelines of the Ethics Committee on Public Health Research including completing the title of the study, informed consent, research objectives, the right of respondents to the confidentiality of data obtained and also completed with the signature of the researcher and respondent chairman.

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Conflict of Interest: The authors in this study did not experience conflicts of interest with anywhere and with anyone.

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Analysis of Fish Derived Protein Intake Adequacy and Cultural Factors and its Correlation with the Occurrence of Stunting among Children Under Two Years Old in Martapura Riverbanks, Banjar District Area

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Abstract

Banjar is an area of higher fish farming production compared to other districts in South Kalimantan. Taking the condition of the area and the fish farming production into account, Banjar is an area of significant potential to become the source of fish as supplies of animal protein to be utilized by people to improve their nutritional status and overcome the protein energy malnutrition problems. Correlations have been demonstrated between food consumption and nutritional status. The implication of chronic malnutrition for children under two years old is called stunting. To conduct an in-depth analysis on the cultural factors and fish-origin protein intake adequacy with the occurrence of stunting. This three month cross-sectional study recruited 36 children aged 6-24 months as samples. The study was conducted for three months in 2015 in Sungai Pinang, Banjar District. The children's nutritional status was determined according to the 2005 edition of WHO anthropometry reference standard with categories as follows: 1) stunting (very short, z score <-3.0 SD); 2) short (≥-3 SD sd <-2 SD); 3) no stunting (normal status, ≥ 2 SD). Protein intake adequacy was determined by the standards of Nutrition Adequacy Score for children For Age 0-3 Year on WNPG 2004. Data were analyzed using chi square test with 95% confidence interval. This study demonstrated a correlation between the fish derived protein intake adequacy with the occurrence of stunting among children under two years old. Children of poor protein intake adequacy had 5.5 times greater risk of stunting. This significant number of stunting was partially caused by the culture of not establishing a habit of eating fish since early age and during pregnancy. The fish-origin protein intake adequacy and cultural factors played important roles on the occurrence of stunting among children under 6-24 months in Sungai Pinang, Bajar District.

Keywords: *Children under two years old, fish-origin protein intake adequacy, stunting, cultural factors.*

Introduction

The first two years of life is a period of heightened sensitivity toward environmental influences and this period was relatively brief and could not repeat, hence the recognition of this period as the golden period/the window of opportunity/the critical period. In addition, more than half death among infants and children under five years old is caused by inadequate nutrition during the first two years of life. Chronic nutritional deficiency might lead to stunting. Children who experience stunting have a higher possibility to develop to adults of low quality. Therefore, the issue of stunting is not negligible as it carries with it life-long consequences that might be hard to overcome.[1,2] Data from the Basic Health Research (Riset Kesehatan Dasar/Riskesdas) stated that the prevalence of stunting among children under two years old in Indonesia in 2007 was 36.8% and this prevalence seemed to be gradually increasing as demonstrated by the prevalence of 35.6% and 37.2% in 2010 and 2013, respectively. These prevalences of more than 30% has made stunting a significant public health burden. The 2007 Basic Health Research data of South Kalimantan Riskesdas stated that the prevalence of stunting among children under two years old was 35.3%. The 2013 data also demonstrated an increased prevalence to 45%. This further indicated the significance of stunting as a public health burden due to its high prevalence. [3,4,5]

The 2014 data from the local Health Office stated that Banjar is the district of highest contribution to cases of stunting in south Kalimantan. Among areas in Banjar, the highest number of case load was found in the Sungai Pinang Public Health Center's working coverage area (53.46%). This prevalence slightly increased than the 213 prevalence of 53.25%. The finding was intriguing as the working coverage area of Sungai Pinang Public Health Center included areas located in the riverbank that can be utilized for fish farming. As fish farming products might provide a significant source of protein, the areas shouldn't have had a public health problem of a high prevalence of stunting. [6,7]

Banjar district with its approximately 12595.9 tons of yearly production, is an area of highest fish farming production compared to other areas in South Kalimantan. The tremendous products mostly comes from the products of pond and fresh water fish cultivation, karamba, mina padi/sawah dan jaring apung. The conducive environment of Banjar district has allowed this various types of farming to develop. However, in concordance with the research conducted by Hartati, the number of riverbank inhabitants that consume fish is still really low despite the area's potential as a significant source of animal protein from fish farming products. The riverbank area should've been utilized by the community to manage with the low nutritional status, especially with stunting. [8,9]

Three categories of factors might lead to the occurrence of stunting: basic factors (e.g. economy, social, political factors), underlying factors (e.g. family and health service), and immediate factors (e.g. diet and health status). Family factors might also include genetics and parental level of educational attainment (that might significantly correlates with knowledge), social economy condition, and the number of children under two years old within the family. Dietary factors might include food intake of the children under two years old within the family.[10] As mentioned by Atmarita and Soekirman, lower socioeconomical status and level of educational attainment might affect their nutritional status. These risk factors might lead to the inability to buy and sort the food required for a balanced diet, hence the nutritional inadequacy. [1,2]

This research was conducted to better explore the cultural factors and fish-origin protein intake adequacy and its potential correlation with the occurrence of stunting among children under two years old in the riverbank of Martapura river in Banjar district. Specifically, this research aimed to conduct in-depth analysis of the factors that might prevent fish consumption within families with children who experience stunting, identify the types of fish consumed and its protein content, determine the adequacy fish derived protein intake, and its potential correlation with the occurrence of stunting.

Materials and Method

This research employed a mixed method with cross sectional design. The quantitative part of the research aimed at analyzing the adequacy of protein intake and other risk factors that might correlate with the occurrence of stunting, while the qualitative part was conducted to analyze the cultural factors that might prevent fish consumption among children under two years old in riverbanks within the working coverage of Sungai Pinang Public Health Center. Sample was taken during the nutritional status assessment conducted on children under two years old who met the predetermined inclusion criteria. The children's nutritional status was determined according to the 2005 edition of WHO anthropometry reference standard with categories as follows: 1) stunting (very short, z score <-3.0 SD); 2) short (≥-3 SD sd <-2 SD); 3) no stunting (normal status, ≥ 2 SD). Protein intake adequacy was determined by the standards of Nutrition Adequacy Score for children For Age 0-3 Year on WNPG 2004. [2]

The research subjects were mothers with children under two years old (age 6-24 months) within the working coverage area of Sungai Pinang Public Health Center, with a number of 36 subjects recruited [7]. The sample was obtained using the purposive sampling technique with a predetermined inclusion and exclusion criteria.[11] The inclusion criteria used were as follows: 1). Inhabitants of the riverbank within the working coverage area of Sungai Pinang Public Health Center, 2). Mothers with children under two years old (age 6-24 months), 3). The indexed children under two years old (age 6-24 months) were biological children, 4). When the family had more than one children under two years old (age 6-24 months), the one recruited was the youngest child, 5). Physically and mentally healthy, 6). Willing to participate as respondents as indicated by signing the informed consent form, 7). No congenital anomalies (physical disability) found in the children, 8). The indexed children did not suffer from conditions that might alter food absorption (TBC, hepatitis, shingles, worm infestation, diarrhea), 9). Subjects were available during the time of data collection.

Research instrument used in this research were as follows: 1). Anthropometry instruments for children age 6-24 months (a baby lenghtboard with the precision of 0.1 cm), 2). Informed consent form, 3). Food recall Form to collect the food intake data during three non consecutive twent-four-hour-period. This note was used determine the level of protein intake in the indexed children, 5). Basic demography form to note the subjects' and family identity. In addition, an interview manual was used to help gathering data about factors that might affect the fish derived protein consumption. Data collected were then analyzed using *chi square* statistical test with a 95% confidence interval to to determine the subjects' protein intake adequacy status and its possible correlation with the occurrence of stunting.

Result and Discussion

A. Univariate Analysis

Table 1. Distribution of Frequency

Variabel	N	%
Level of Protein Intake Adequacy		
Poor	25	69.4
Good	11	30.6
The state of stunting		
Stunting	15	41.7
No Stunting	21	58.3

B. Bivariate Analysis

Table 2. The correlation of fish derived protein intake adequacy and the occurrence of stunting among children under two years old

Level of protein intake adequacy	The state of stunting				Total		p value	OR (95% CI)
	Stunting		No stunting					
	n	%	n	%	n	%		
Poor	12	80.9	4	19.1	16	100	0.041	5,5 (1.277-23.693)
Good	3	19.1	17	80.9	20	100		

Table 2 showed that most children under two years old with poor fish derived protein intake adequacy experienced stunting (n=12; 80.9%). In contrast, a number of 17 (80.9%) children within the good protein intake adequacy never experienced stunting. A significant correlation was demonstrated between the fish-origin protein intake adequacy and the occurrence of stunting among children under two years old ($p<0.05$). The OR value of 5.5 indicated that children under two years old with poor fish derived protein intake adequacy had 5.5 higher risk of stunting than the children with good fish derived protein intake adequacy.

One of the indirect causes of stunting might be the socioeconomy state of the family that might correlate well with the level of the family income. When limited income prevents a good access for food, stunting would be highly more likely to occur. For countries undergoing nutritional transition like Indonesia, obesity might also emerge as a public health problem in addition to conditions related to the low nutritional adequacy such as stunting. While improved welfare might lead to improvements in food adequacy, the risk of consuming higher level of calories and saturated fat instead of protein should also be of concern due to its potential health risks in the far future.[12] This is because protein plays an important role in the growth and development of children, especially during the window of opportunity period. This might be well represented by the finding of this research. A number of 15 (41.7%) children under two years old in this research experienced stunting, and 80.9% of them were from the poor protein intake adequacy group. This was further supported by Hartati who has previously demonstrated the correlation of protein adequacy and the nutritional status of children under five years old. Protein is needed by human body as substrates for replacing damaged cells that would subsequently induce growth and development especially during infancy and under five years of age. [9]

A number of 3 (19.1%) subjects, however, still experienced stunting despite being in the good fish derived protein intake adequacy. This finding might present the bias potentially induced by the short research duration and the food recall period of three non consecutive days. These methodological aspects

might lead to the data being not entirely representative for the subjects' actual eating habit. The degree of fish availability might also affect the dietary pattern of the inhabitants from time to time. The cross sectional design of this research did not allow a further analysis on such changes and its possible correlation from the occurrence of stunting. It was also impossible to analyze internal factors such as genetics that might also play role in the occurrence of stunting. Further research should therefore be conducted with improvements on those factors.

Madanijah, *et al* (2006) further stated that the fish consumption among children in fishermen family was higher than non fishermen family as the dietary pattern would understandably be determined by the availability of the immediate food source. Some families might also prevent themselves from feeding their children with fish as preparing fish dish potentially requires some additional time to clean the fish bones and scales. Limited mothers' knowledge about the importance of fulfilling the nutritional status of children under two years old could also contribute to their tendency to not provide fish. Another misled belief that might lead to this reduced fish intake in children under two years old is the belief that the children have had their protein needs covered from the breast milk. Therefore, the fish should be provided to the mother instead. [13]

Conclusions

A significant correlation was demonstrated between the fish derived protein intake adequacy and the occurrence of stunting among children under two years old ($p<0.05$). The OR value of 5.5 indicated that children under two years old with poor fish derived protein intake adequacy had 5.5 times greater risk of experiencing stunting compared to children with good fish derived protein intake adequacy. The possible immediate approach to manage with this problem would be to provide nutritional education for mothers. This might include the education about the importance of maintaining a balanced diet, the process of preserving and preparing various fish derived food, and the role of fish derived protein in the growth and development of their children. When conducted during the window of opportunity period, this might allow the children who might be at risk to catch up on growth and development.

Ethical Clearance: This study approved and received ethical clearance from the Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia. In this study we followed the guidelines from the Committee of Public Health Committee of Public Health Research Ethics of Medical Faculty, Lambung Mangkurat University, Indonesia for etchical clearance and informed consent. The informed consent included the research tittle, purpose, participants's right, confidentiality and signature.

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Conflict of Interest: The authors declare that they have no confict interest.

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Contributing Factors of Neonatal Death Frommother with Preeclampsia in Indonesia

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Abstract

Background: Preeclampsia is one of the main causes of maternal and neonatal morbidity and mortality in developing countries. The infant mortality rate in Indonesia has decreased but is still quite high. The purpose of this study was to analyze the factors that contribute to the death of infants from mothers with preeclampsia.

Method: This research is a design retrospective cross-sectional study conducted in women with a history of preeclampsia are recorded in the data Dr. Soetomo hospital over a period of one year. Total respondents were 32 4. Demographic data on preeclamptic mothers (gestational age, age, parity and mode of delivery) and infant mortality data were collected which were then analyzed descriptively and chi-square test.

Results: The results showed a significant relationship between maternal age with preeclampsia (p = 0.005), age of maternal pregnancy with preeclampsia (p = 0.000) and mode of delivery of mothers with preeclampsia (p = 0.000) with the incidence of death in infants, and none a significant relationship between maternal parity status with preeclampsia (p = 0.043) with the incidence of death in infants.

Conclusion: factors that contribute to infant mortality from mothers with preeclampsia are age, gestational age, and mode of delivery.

Keywords: *Contributing factors; preeclampsia; neonatal death.*

Introduction

Sustainable Development Goals (SDGs) Program in Indonesia one of which is to reduce the neonatal mortality rate and child mortality rate. Events of infant or child death in Indonesia. The number of infant mortality cases dropped from 33,278 in 2015 to 32,007 in 2016, and in 2017 there were 10,294 cases. Similarly, the maternal mortality rate dropped from 4,999 in 2015 to 4912 in 2016 and in 2017 there were 1712 cases[1]. Despite the decline, the figure is still high.

Data from the World Health Organization, maternal mortality in the world amounted to 289,000 in 2013, maternal deaths occurred every day about 800 women died due to complications of pregnancy and childbirth. The main trial of maternal deaths in Indonesia are bleeding, preeclampsia and infection. Preeclampsia is a hypertensive condition k late pregnancy characterized by increased blood pressure and proteinuria[2]. In developing countries, preeclampsia is one of the main causes of maternal mortality ranging from 1.5-2.5 percent and infants range from 45-50 percent[3]. Based on these data, the percentage of infant deaths due to preeclampsia is greater than that of mothers. Infant mortality occurs due to several risk factors for preeclamptic mothers, such as preeclampsia in previous pregnancies, symptoms of chronic hypertension, pregnancies of more than 40 years, and others that have been carried out in advance[4].

The impact of preeclampsia other than on the mother also affects the baby. The condition of preeclampsia can interfere with blood flow to the placenta and fetus which can cause low birth weight babies, prematurity, asphyxia, respiratory distress syndrome, apnea[5]and infant mortality[6]. Babies who survive after birth from mothers with pre-eclampsia are also at risk of developing disorders due to disturbances while still a fetus.

Some factors that cause the handling of preeclampsia in pregnant women are lacking are lack of knowledge, lack of self-awareness and poor antenatal care[7]. Pre-

eclampsia conditions will increase the risk of mother and baby experiencing cardiovascular complications [8], maternal age> 30 years, parity, history of hypertension, and no antenatal care [9,10].

Research on preeclampsia that has been done more often looks at the risk factors of the mother and the effects on the fetus. But the contributing factors, especially in Indonesia, have not been found. The purpose of this study was to analyze the factors that contribute to infant mortality in women with preeclampsia.

Method

This research is a retrospective study conducted in the public hospital area of Dr. Soetomo Surabaya. The sample of this study is medical record data of preeclampsia patients in the period of January to December 2017 as many as 324 were taken by consecutive sampling.. Patient data is collected sequentially based on medical record numbers to avoid repetition of data and confusion when filling in data. Pre-eclampsia diagnosis is established by obstetricians. Pre-eclampsia diagnosis is blood pressure> 140/90 mmHg with proteinuri> +2. The independent variables of this study were age, gestational age, parity and mode of delivery. The dependent variable in this study was infant mortality defined as death in the first 28 days of life. Data were analyzed descriptively and chi-square test.

Results

Table of factors that contribute to infant mortality in women with pre-eclampsia

Variable (Mother)	Infant					P
	Life	%	Mortality	%	Total N (%)	
Age (Years)						
<20	14	4,3	0	0,0	14 (4)	0.005
20-35	180	55,6	31	9,6	211 (65)	
>35	72	22,2	27	8,3	99 (31)	
Age of Mother's Pregnancy (Weeks)						
<28	9	2,8	21	6,5	30 (9.3)	0.000
28-34	91	28,1	30	9,2	121 (37.3)	
>34	166	51,2	7	2,2	173 (53.4)	
Paritas						
Nulipara	96	29,6	20	6,2	116 (35.8)	0.463
Primipara	81	25,0	14	4,3	95 (29.3)	
Multipara	89	27,5	24	7,4	113 (34.9)	
How to Deliver						
Spontaneous Vaginal Discharge	47	14,5	13	4,0	60 (18.5)	0.000
Vaginal Induction	16	4,9	12	3,7	28 (8.6)	
Vagina with Instruments	9	2,8	4	1,2	13 (4)	
Perabdominam	193	59,6	26	8,0	219 (67.7)	
No Data	1	0,3	3	1,0	4 (1.2)	

Most respondents are aged 20-35 years (65%). Most of the respondents' gestational age was> 34 weeks (53.4%). Most of the respondents were nullipara (35.8%) and most of them had abdominal labor (67.7%).

Most respondents with pre-eclampsia with a baby who died were aged 20-35 years as many as 31 events (9.6%). Infant mortality from preeclampsia mothers was 30 events (9.2%) from pre-eclampsia mothers with 28-34 weeks gestational age. Infant mortality in pre-eclampsia mothers was 20 events (6.2%) occurred in pre-eclampsia mothers with nulliparous parity, and infant mortality occurred as many as 26 events (8%) occurred in pre-eclampsia mothers by means of gestational birth.

Statistical test results showed a significant relationship between maternal age with preeclampsia with the incidence of infant mortality (p = 0. 005), and

there was no significant relationship between the parity status of mothers with pre-eclampsia and mortality in infants (p = 0.463). The results of statistical tests also showed a significant relationship between the age of maternal pregnancy with preeclampsia (p = 0.000) and the method of delivery of mothers with preeclampsia (0.000) with the incidence of infant mortality.

Discussion

The age of mothers with preeclampsia has a significant relationship with the incidence of infant mortality. Infant mortality occurs in preeclamptic mothers in the age group of 20-35 years and age> 35 years.

The results of this study are in line with other studies which state that maternal age with young pre-eclampsia is associated with the risk of infant mortality[11,12]. Maternal age at risk of developing pre-eclampsia occurs in the age group <20 years and> 35 years.

In this study, besides that most of the respondents in this study were preeclamptic mothers aged 20-35 years. In preeclamptic mothers aged 20-35 years are included in the productive age where they are emotionally mature, especially in the face of pregnancy. In addition, the reproductive organs have also been mature and balanced[13]. Several other factors such as early treatment of the condition of preeclampsia and maternal conditions when treatment can affect maternal conditions.

Pregnancy age of mothers with preeclampsia has a significant relationship with the incidence of infant mortality. The infant mortality from mothers with preeclampsia most common in gestational age 28-34 weeks and <28 weeks.

The results of this study are in line with previous studies showing that the gestational age of mothers with preeclampsia is related to the morbidity and mortality of infants who born[14]. Other studies have shown that the high risk of infant mortality in preeclamptic mothers in the preterm period (gestational age less than 37 weeks)[15,16] and will be more severe at a gestational age of fewer than 24 weeks[17].

Babies born in the preterm period have a high risk of experiencing low birth weight babies, respiratory disorders such as asphyxia[18]that occur due to pulmonary growth disorders[6], intrauterine growth restriction (IUGR) and hematological disorders. Epidemiological research states that babies born to mothers with preeclampsia have a high risk of developing diabetes and cardiovascular disorders. The condition of preeclampsia can aggravate the baby's condition which is probably caused by impaired placental function due to preeclampsia or maternal system response to placental inability.

The method of delivery of mothers with pre-eclampsia has a significant relationship with the incidence of infant mortality. The majority of preeclamptic mothers in this study gave birth to a method of palpation. As well as the incidence of infant mortality from preeclamptic mothers occurred in the group of preeclamptic mothers who gave birth to a method of domination.

Previous studies have suggested that abdominal method of childbirth will increase the risk of respiratory distress in infants that can cause infant death[19,20]. In addition, the method of childbirth with abdominal can increase the risk of respiratory disorders in infants compared with childbirth with vaginal delivery. Previous studies have shown that abdominal delivery[21]cannot improve maternal and perinatal outcomes or reduce mortality and morbidity[22].

Most mothers with preeclampsia do the method of labor by abdominal. The reason for the majority of method of delivery per abdominal is because abdominal labor is the definitive treatment in patients with severe pre-eclampsia. The risk of childbirth in women who experience severe pre-eclampsia is very high because it can threaten the life of the mother and baby, so it is necessary to end the pregnancy by giving birth per abdominal. The condition of preeclampsia which has a negative impact on the baby as well as ways of abdominal delivery which increase the risk of disorders in infants can increase the risk of infant mortality from mothers with preeclampsia.

The parity status of mothers with preeclampsia does not have a significant relationship with the incidence of infant mortality. The total parity status of preeclamptic mothers in the study was almost the same in the nullipara, primiparous and multiparous groups.

Previous studies have shown that the status of nulliparous parity will increase the risk of the occurrence of preeclampsia[23] that would increase the risk of death in infants. Nulliparous pregnancies experience angiogenic imbalances so they are prone to pre-eclampsia compared to multiparous pregnancies[24]. The results of this study indicate that the incidence of infant mortality from

mothers with pre-eclampsia occurs in nulliparous parity status although there is no statistically significant relationship.

This study has several limitations because it is done retrospectively such as some data relating to maternal preeclampsia conditions such as income, increased maternal weight during pregnancy, or other diseases that can worsen the condition of preeclampsia.

The results of this study have implications for policies related to health interventions and treatment of women with preeclampsia, maternal complications,and complications in infants. This study has limitations, the severity of preeclampsia is still not differentiated and several other factors such as antenatal care visits, knowledge,and accompanying complications have not been measured. So it needs further study of these factors related to the incidence of infant mortality from mothers with preeclampsia.

Conclusion

Preeclampsia can threaten the mother and baby and can increase morbidity and mortality in infants. Factors that contribute to infant mortality from mothers with preeclampsia are maternal age, maternal gestational age,and maternal delivery method. The need for early antenatal care needs to be conveyed to pregnant women in order to screen crews for risk of preeclampsia and prevent worsening of the disease.

Recommendation: Preeclampsia is a preventable medical condition. Early pregnancy screening early and appropriate antenatal care can reduce the risk of morbidity and mortality in infants of mothers who experience pre-eclampsia. Increasing public awareness and health workers on the prevention of pre-eclampsia needs to be done through health education or including pre-eclampsia screening at standard examinations in pregnant women.

Ethical Clearance: This research has received ethical approval from the ethics committee of the general hospital health research area of Dr. Soetomo Surabaya number 0171/KEPK/IV/2018.

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Mental Health Nurses and Community Leaders' Roles in Mental Health Enforcement: A Phenomenological Study

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Abstract

The concept of mental health enforcement in the community makes mental health policies which are part of the national and regional health systems seek health implementation activities that are integrated in cross-sectoral programs and involve society participation. Mental health nurses and community leaders play main roles in implementing the mental health enforcement in society started from the family. The objective was to briefly describe the phenomenology study of mental health nurses and community leaders' roles in mental health enforcement in Surabaya urban society. This study used a qualitative research design with a phenomenological study approach. There were 7 representatives of authorized community leaders and health workers related to the mental health enforcement in the community which was taken by purposive technique. Data were taken using forum group discussion (FGD). Data were analyzed using the Colaizzi Analysis Method. The research findings obtained 7 themes and 12 sub-themes related to the roles of mental health nurses and community leaders in mental health enforcement. The mental health nurses and community leaders' roles in mental health enforcement are important in handling several cases of mental disorders within a family in the society.

Keywords: *Mental Health Nurse, Community Leader, Role, Enforcement, Phenomenology Study.*

Background

Community is a part of healing process for mental health illness. Mental illness recovery is drawn as a transformational process which ongoing to contribute to life.(1) In addition to somatic factors, psychological and socio-cultural factors also play a role as a source of mental disorders where from various predisposing factors to mental disorders, 60% of factors that determine a person's health status are social, cultural and environmental conditions(2). The society where the family lives influences the burden. The stressors, however, involve many types of care burdens, negative perceptions or stigma and lack of support from those in the surrounding environment (community)(3).

The prevalence of mental disorders in Indonesia is not much different from the prevalence in the world. The incidence of mental disorders in Indonesia based on data is 4.6/1000 people(4). This figure is equal to the median prevalence rate of mental disorders in the world. In East Java, people with mental disorders experienced a drastic increase in 2016. East Java Province showed the number of 2.2 people based on all East Java population of 38,005,413 lives, it could be concluded that 83.612 lives have mental disorders in East Java. In addition, national data on the incidence of severe mental illness (schizophrenia) in East Java was 1.4% and Surabaya accounted for 0.2%. While emotional mental disorders (such as anxiety, depression, etc.) by 35% and in Surabaya recorded 18.8%.

Mental health policies that are part of the national and regional health systems seek promotive and preventive integration across multiple cross-sectoral programs and involve community participation(5). One of the efforts that can be done to support the recovery of patientswith mental disorder according to the Decree of Health Minister no 220/Menkes/SK/III/2002 is to involve community participation in supporting the recovery of patients with mental disorders.(6) Mental health nurses and community leaders play main roles in implementing the mental health enforcement in society started from the family as a small part which builds community. The implementation of nursing care in the community is related to each other, because the services provided must be comprehensive, holistic and sustainable because the

needs of each individual are different from each other, the nurse must behave according to the individual's needs at that time[7]. The phenomenological study of how mental health nurses and community leaders' roles involve in mental health enforcement in the Surabaya urban city community becomes important primarily in concerning with each family's backgrounds integrated into planning, treatment, to participation in decision-making related to mental health care in society.

Method

A qualitative design with phenomenology study approach was used in this study. There were 7 informants which was taken by purposive technique. Inclusion criteria were the representatives of community leaders and health workers who are authorized in mental health enforcement in society. Data were taken using forum group discussion (FGD) in Keputih Public Health Centre in Surabaya as the first advanced implementation of mental health program in the city stated by the Surabaya City Health Office. Data were analyzed using the Colaizzi Analysis Method and validated using triangulation techniques.[8]

The questions asked in the forum group discussion were about the roles of mental health community nurse in implementing the mental health in general. Before the study, researcher firstly completed the permission procedures from Surabaya City Health Office to the head of Keputih Public Health Centre. The researcher conducted the forum group discussion with 7 representatives of mental health enforcement authorized persons in surrounding Keputih Public Health Centre's area consisted of 1 doctor, 2 nurses, 1 psychologist, 1 citizen association, and 2 cadres.

Findings: The results of forum group discussion found 7 themes and 12 sub-themes conveying about the roles of mental health nurses and community leaders in mental health enforcement included:

1. **Fostering collaboration with families in the form of family's approach and assistance:** Listen to and respect each family member. Respecting race, ethnicity, culture, and socio-economy, family background and experience according to patients and family preferences in planning and delivering health services.[9] In accordance to this, health workers implement a family mentoring system where community mental nurses (on duty in the field) become the supervisor of this activity. In handling cases of mental disorders in the community, nurses work with families because the family is the closest person to the sufferer. If there are obstacles, the officer then collaborates with community leaders to help the approach.

"..Citizen association must be able to be active in helping their citizens. At least the family, because with no management assistance, the family will find difficulty, how can he be accepted in the community.."(D1)

"So far, I have accompanied.." (R1)

"If it's about collaboration with family, it's just assistance..." (D2)

2. **Relying information about mental disorders through mental health education and socialization:** The value of care and care for family-centered patients and information sharing, respect, and collaboration with patients and families is also important for family care.[10] Mental health education is carried out as a form of information sharing by health workers (especially nurses who are directly involved in the field) to convey information related to mental disorders. Community leaders helped facilitate the extension activities to the community. Community leaders and other health workers (particularly nurse and cadres) who are authorized can also provide socialization according to their portion.

"We bridge to be able to provide health education to families.. . We connect with family and surrounding communities." (D1)

"Information about mental disorders, after the person concerned from the family came to the officer and to the health facilities… I have a little knowledge; I can convey it to him. And can increase knowledge for the handling of the patient."(A)

"..Routine health education at community events and sometimes the health office also goes down to socialize mental health problems."(D2)

3. **Improving family communication by providing understanding of the problem solving to families and society:** Providing understanding to families and communities regarding the problems that occur is a form of efforts to improve family communication with people with mental disorders and solutions to problem solving carried out in the community.

Constraints that are often faced are not only from the family but many problems that are also presented by the community. Therefore, the communication carried out is not only specific to the family but also to the surrounding community.

"*If there is outside interference so we invite, we connect with family. We convey the good aim. Maybe there is something that can be helped, assistance for healing, or subsequent follow-up. We help.* "(D1)

"*If it is a problem like that, we did it earlier... Outright, mentoring, then gave an explanation of mental health problems to his family. The real problem is not the average family in the community, but the neighbors. So we give an explanation. We also present the district to explain that it is not that easy to citizens..''* (R2)

All family nursing interventions occur in the context of nurse family relationships and are carried out primarily with therapeutic communication which teaches the principle of effective communication and teaches problem solving strategies.[11] The philosophy of nursing is known as the relationship between patient, care, and family centered.[12]

4. **Helping to use a service system with cross-sector coordination and collaboration:** In handling mental disorders in the community, mental health nurses cannot work alone even though they are directly responsible in the field. Cross-sector collaboration is always done to maximize performance so that problems faced by families and communities related to mental disorders can be resolved immediately. Cross-sectoral cooperation is carried out, which is related to the health office, urban village, sub-district, community leaders (community and cadres), to other health workers such as specialists and psychologists. All parties will coordinate so that cases of mental disorders in the community can be handled.

"...When it comes to referral and when it is outright to do it from a health worker, that is facilitated." (D2)

"...If this happens, then we will coordinate with several related parties." (D1)

*"Finally yesterday I took the initiative to come to public health centre and took action that I also reported to the district in outright, and brought to hospital..''(*R2)

"Then we finally report to the citizen association and the person in charge of social institution then finally take to it.." (E)

"..Because for the case of our society we cannot work alone, we should work with the sub-district administration.." (A)

Centralized patient and family care has been endorsed at the highest policy level in developed countries and has the privilege in the mission statement of most health care systems that have encouraged the creation of many patient and family care institutions that provide resources and collect data about their implementation.[5]

5. **Helping family members meet their own needs by communication and counseling (psycho-education):** Patients and families can become members of family counseling or other institutions in health care facilities.[9] The form of the way the community mental health nurse helps family members meet their needs is by doing counseling. The implementation of counseling can be done at the public health centre or Hospital. Counseling is done to the family to get the choice of the right actions to meet the problem of the needs of the patient, especially in terms of treatment and care. The mental health nurse involves the family to determine the needs.[13] The way carrying out this role is to do family psychoeducation. Community leaders also play a role in efforts to fulfill the needs of patients and families including cadres who strive to help families if there are family problems, so that families can be more open.

"..so far.. I always have communication when there is a development.. the family should give good communication to the patient.." (E)

"if family has problem, it is always welcome to consult with me.." (A)

"For the consultation there is now a mental health booth with psychologist. We concern more in the field.." (D2)

6. **Resolving specific issues about patients in the form of family empowerment:** In resolving a special issue about patients, community mental health nurses said they had tried to do family empowerment. This is certainly supported by a team of other health workers and community leaders. After the community leader assists in the approach

by giving advice to the family, health workers are then included in further management. But first, in empowering the family, it must be ensured that the family accepts the presence of assistance offered. If the family refuses, the decision will wait for follow-up from the family. Community mental health nurses continue to strive to give direction to things that families can do independently with family members who experience mental disorders.

"..we empower their families. If the nurses and doctors like that, focus on these patients, we don't have enough energy, so we empower the family. For health check-up, we also make it easier for patients, so families can focus on handling the independence of their patients."(De)

"If you face a family like that, the term is that they are still able to accompany the sick or not?.." (D)

"..I also said, please help (to the family to take care of the patient). Later when there is a need to be able to call us.. we are ready to assist all the problems.. "(Ri)

Family nurses have developed various models to implement with families. For example, the Calgary Family Assessment and Intervention Model[14] identifies relational family nursing interventions that guide nurses to explore how illness has affected their lives and their awareness of suffering the illness.

7. **Resolving specific issues about families with community empowerment (cadres):** Community mental health nurses also empower the community such as community leaders (community members and especially cadres) to help resolve specific issues about the family. Not only towards mental health cadres, other cadres are also directed to be able to help problems that exist in the community. With the empowerment of the community, health workers are assisted by the existence of reports and input on cases of mental disorders that exist in the family and community so that the relevant authorities can coordinate and follow up. On the contrary, the community also received attention from a team of health workers who were bridged by community leaders, especially cadres regarding the resolution of existing mental disorders cases.

*"Then there are mental health cadres too. So when there are activities, then we help.. "(*E)

*"... that is the active role of mental health cadres and then the administrators. Because this is a shared problem, and we must actively participate to be able to help.. . "(*A)

"In theory, we have mental health cadres, but we ask for help from all cadres." (D2)

"But we focus on the community through the Community Mental Health Management Team.. we collect cadres, across sectors, to talk about mental health, but we have not yet made the decree." (R1)

Demands to cover a broad group, not just an individual approach make the intervention must be able to be absorbed by certain communities in an appropriate, integrated, and continuous manner.[15] Therefore intervention in the Mental Health field is an integrated psychosocial program, which leads to group empowerment that is directly related to these social problems.

Conclusions

In handling several cases of mental disorders within a family in the society, mental health nurses and community leaders play important roles in implementing mental health enforcement. Community mental health sectors include all levels and actions of mental health enforcement have their own parts in advance. Empowering all potentials and resources in the society is also important to realize an independent society in maintaining mental health. The enforcement of mental health in urban society needs to be developed more widely and deeply that can be applied in order to improve the high quality of individuals' mental health in their life.

Conflict of Interest: There is no conflict of interest in this study.

Ethical Permission: This research has passed the ethical clearance with the number 1127-KEPK by the Research Ethics Commission of Nursing Faculty, Airlangga University Surabaya.

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The Influence of Perceived Quality, Sacrifice and Value toward Customer Satisfaction at Inpatient Installation of Dr. Soetomo Hospital Surabaya, Indonesia

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Abstract

Introduction: One indicator to assess hospital quality service is customer satisfaction. Customers satisfaction in health services are valuable assets in health business. The aim of this study was to analyze the influence of perceived value, perceived quality and perceived sacrifice to customer satisfaction at Inpatient Installation of Dr. Soetomo Hospital Surabaya, Indonesia.

Method: A cross-sectional observational analytical research with random sampling method. This study was conducted at the Inpatient Instalation Dr. Soetomo Hospital. The sample size of this study was 353 patients determined using Sample Size Determination in Health Studies application. The eligible patients were explained about the study objectives. Approval from patient regarding the participation in the study was obtained by written informed consents. The research instrument used consisted of a valid and reliable closed questionnaire. This questionnaire is used to measure perceived quality, perceived sacrifice, perceived value, and customer satisfaction variables through questionnaire-guided interview. All data was analyzed with $p<0.01$ were considered significant.

Results: The perceived quality has a positive significant influence in customer satisfaction ($p=0.0001$), the perceived sacrifice did not affect customer satisfaction ($p=0.691$); and the Perceived value have a positive significant influence on customer satisfaction ($p=0.000$) ($p<0.01$).

Conclusion: The Perceived Quality and Perceived Value have an influence and affect Customer Satisfaction significantly in Inpatient Installation of Dr. Soetomo Hospital Surabaya, Indonesia. Further study is needed and can be done to provide empirical evidence about other factors that affect customer satisfaction.

Keywords: *Perceived Quality, Perceived Value, Perceived Sacrifice, Customer Satisfaction, Service Quality.*

Introduction

Quality, fair and equitable health services are the basic rights of all patients. Indonesia Government must continue to improve health services. Hospital plays an important role in health service to improve patient health. The increasing number of hospitals that are accompanied by increased knowledge of service users (patient). It makes patients selectively choose health facilities. The health business competition surprisingly increased. The hospitals must to improve the quality of their health services.[1]

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Service quality is defined as the comparison between expectations and reality obtained by customers.[2] The quality of health services should be improved by fulfill the demand, needs, and the customer desires to meet customer satisfaction. Customer satisfaction is customer's perception if the health service received is deemed appropriate or meets their expectations.[3] Customers satisfaction in health services are valuable assets in health business.[1]

Dr. Soetomo Surabaya is a tertiary general hospital in East Java Province since 1938 and the largest hospital in Eastern Indonesia. Dr. Soetomo Surabaya has a vision to be a trusted with high-quality health service by using the values of integrity, professionalism and innovation. Dr. Soetomo hospital should be ready to compete in health business competition. Dr Soetomo hospital must prepare many strategies to face the health business competition such as improve the health service quality. One indicator to assess hospital quality service is customer satisfaction. Customer satisfaction at Dr. Soetomo hospital Surabaya during 2012 to 2016 did not meet the standards set by the Quality Assurance Standard based on data from the 2016 Government Institution Performance Report of Dr. Soetomo hospital Surabaya. The other problems faced by Dr. RSUD Soetomo Surabaya was patient visit in 2016 decreased compared to the Inpatient Installation in 2015.

The aim of this study was to analyze the influence of perceived value, perceived quality and perceived sacrifice to customer satisfaction at Inpatient Installation of Dr. Soetomo Hospital Surabaya, Indonesia.

Material and Method

A cross-sectional observational analytical research was carried between October 2017 – December 2017 at the Inpatient Instalation Dr. Soetomo Hospital, Surabaya. The study protocol was approved by Ethics Committee of Dr. Soetomo Hospital (313/PANKE/IV/2017). Population of this study was all patients in Inpatient Instalation Dr. Soetomo Hospital, Surabaya. Determination sample size in accordance with the strata of Inpatient Installation using software or the Sample Size Determination in Health Studies application (Sample Size 2.0). Based on the calculation results obtained 353 patients for sample size. Prior to the study, the eligible patients were explained about the study objectives. Approval from patient regarding the participation in the study was obtained by written informed consents. The research instrument used consisted of a valid and reliable closed questionnaire. This questionnaire is used to measure perceived quality, perceived sacrifice, perceived value, and customer satisfaction variables through questionnaire-guided interview. All data was analyzed using Statistical Package of Social Sciences (SPSS) 17.0 for windows was used and p values <0.01 were considered significant.

Results

The hypothesis test results obtained from three hypotheses only one hypothesis rejected that can be seen in Table 1. It means that there is a variable that did not have a significant influence. The perceived quality has a positive significant influence in customer satisfaction. The variable perceived sacrifice did not affect customer satisfaction. Perceived value has a positive significant influence on customer satisfaction.

Table 1. The Influence of Perceived Quality, Sacrifice, and Value toward Customer Satisfaction Variable.

Variable	Original Sample	T-value	P Value
Perceived Quality to Customer Satisfaction	0.340	6.887	0.000*
Perceived Sacrifice to Customer Satisfaction	-0.018	-0.398	0.691
Perceived Value to Customer Satisfaction	0.317	6.381	0.000*

*Information: Significant at p<0.01

Discussion

There was significant influence of perceived quality and perceived value on customer satisfaction. Whereas for perceived sacrifice there is no positive and significant influence on customer satisfaction. Significant influence of perceived quality and perceived value on customer satisfaction can be interpreted as an increase or decrease in customer assessment of the quality and value of services provided by the Inpatient Installation of Dr. Soetomo Hospital Surabaya influences customer satisfaction with the service.

Perceived quality and customer satisfaction relationships are controversial issues in the marketing literature.[1] The results of this study indicate that the perceived quality has a significant effect on customer satisfaction at the Inpatient Installation of Dr. Soetomo Hospital. If the perceived quality is higher or better,

then customer satisfaction will increase for the services provided by the Inpatient Installation of Dr. Soetomo Hospital. The Influence of perceived quality with customer satisfaction due to both variables assess the performance of services that are directly felt by customers.

Customers feel that the service provided by the Inpatient Installation Dr. Soetomo hospital from the aspects of administrative services, doctor services, nurse services, pharmacy services and nutritional services have been good thus customers feel satisfied. These results are in accordance with the research conducted by Yang (2004) who found evidence that perceived quality variables have a positive and significant influence on customer satisfaction.[4] This statement is supported by the research of Cronin and Taylor (1994) which proves that customer satisfaction is determined by the perceived quality that has been given.[5] Fornell (1992) explained in his study that there was a perceived quality relationship with customer satisfaction.[6] Research conducted by Subagio and Saputra (2012) also shows that perceived quality affects customer satisfaction.[7] Many other studies have views that perceived quality is something that precedes or affects customer satisfaction.[2,5,8]

The test results show that the perceived sacrifice variable has a negative but not significant influence on customer satisfaction. It can be concluded that the sacrifice made by customers in the Inpatient Installation of RSUD Dr. Soetomo did not influence customer with the service. The results obtained in this study are not in line with the research conducted by Subagio and Saputra (2012) where the perceived sacrifice in the study had a significant influence on customer satisfaction.[7]

The non-influence of sacrifice on satisfaction can also be caused by customers in Dr. Soetomo Hospital mostly uses National Health Coverage or Badan Penyelenggara Jaminan Sosial (BPJS) as a source of medical expenses, so they receive any services provided by the hospital. The sacrifices that customers feel not significantly influence their satisfaction with the services they receive. In addition, the perceived sacrifice has no effect on customer satisfaction because of the type of product provided by Dr. Soetomo hospital is a health service where the most customers desperately needed health services. Customers assume that the sacrifice given is appropriate to be given, in contrast to companies engaged in other goods or services such as the research conducted by Subagio and Saputra (2012) at Garuda Indonesia Company.[7] Other studies by Krisno and Samuel (2013) also show the results of a significant influence between perceived sacrifice and customer satisfaction, but the study was conducted at Informa Pakuwon City Surabaya which is a sales company for non-health products like Dr. Soeetomo Hospital.[9]

The results show that perceived value has a significant influence on customer satisfaction. The influence of the perceived value is positive so it can be concluded that the higher the perceived value, the higher the customer satisfaction. Customer satisfaction is influenced by perceived value which is an overall evaluation of the benefits of a product or service received compared to the sacrifice made.[10] The values obtained from the perceived value, it can be concluded that the majority of customers feel the benefits of using services at the Inpatient Installation of Dr. Soetomo hospital Surabaya. The customers feel satisfied with the services provided. The results of these influences are in accordance with the research conducted by Subagio and Saputra (2012) where perceived value affects customer satisfaction.[7] Hallowell (1996) believes that perceived value is a consequence of customer satisfaction. Other studies that show the relationship between perceived value and customer satisfaction are research conducted by Krisno and Samuel (2013).[9,11] The positive influence between perceived value and customer loyalty is also shown by many studies of both products and services.[8,12,13]

Conclusion

The Perceived Quality and Perceived Value have an influence and affect Customer Satisfaction significantly in Inpatient Installation of Dr. Soetomo Hospital Surabaya, Indonesia. Further study is needed and can be done to provide empirical evidence about other factors that affect customer satisfaction.

Conflict of Interest: The authors declare no conflict of interest.

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Assessment of Health Knowledge on Pregnancy, After Delivery and Newborn Baby Danger Signs among Migrant Mothers in Tak Province at Thailand-Myanmar Border

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Abstract

Awareness of danger signs in pregnancy, after delivery and newborn baby among mothers lead to seek immediate health care and consequently reduce maternal and neonatal mortality. Thailand has accepted about 3 million blue-collar migrant workers from neighboring countries mainly from Myanmar. Understanding the level of knowledge of migrant mothers and its associated factors would be helpful for health agencies to implement suitable health promotion programs.

Myanmar migrant women who had been living in the five border districts of Tak province, Thailand and delivered in the health facilities in five districts during September 2017 to March 2018 were face to face mother interviewed after 12 weeks after delivery with structured questionnaires.

Among 723 migrant women, only 125 respondents (17.29%) could mention 8 or more danger signs and 218 participants (30.15%) knew only less than 4 danger signs out of total 16 danger signs. The level of health knowledge on danger signs were significantly associated with resident district (χ^2 = 17.52, P<0.001), mother education (χ^2 = 17.06, P=0.002), health insurance status (χ^2 = 9.52, P=0.009),household income (χ^2 = 26.92, P = <0.001), location of home in factory compounds or in villages (χ^2 = 18.94, P=0.001), watching TV regularly (χ^2 = 15.25, P<0.001).

The migrant mothers in this study showed low health knowledge on danger signs. The organizations working for migrant health in Thai-Myanmar border should focus the provision of pregnancy and newborn healthcare messages to the illiterate mothers with low family income without health insurance in living in agricultural farms and factory.

Keywords: *Knowledge on Danger Signs, Migrant women, Thailand-Myanmar Border.*

Introduction

Knowledge of danger signs in pregnancy complications and newborn are life saving health knowledge and health literacy to seek immediate health care to save lives to reduce maternal and newborn mortality. Most causes of maternal deaths were preventable and related to complications in pregnancy and childbirth [(1)]. There were evidences that knowledge of danger signs and access to Antenatal care are associated[(2)] and well documented findings of adequate ANC visits are cost-effective strategy to reduce maternal morbidity and mortality [(3)].Globally pregnancy or childbirth complications cause mother dead 830 every day (303,000 annually) in 2015 as estimated by WHO[(4)]. These situations were addressed under Millennium Development Goal 5A, reduced maternal dead 532,000 in 1990 to 303,000 in 2015. Under Sustainable Development Goal (SDG), result 3: continues commitment to reduce the global maternal mortality ratio to less than 70 per 100,000 live births and end preventable deaths of newborns and children under 5 years of age[(5)]. At 282 per 100,000 live births, Myanmar's maternal mortality ratio (MMR) is the second highest in ASEAN [(6)]. It was far higher than SDG target.

About seventy two percent of maternal death is attributed to direct causes of maternal mortality. Among those causes Hemorrhage, Hypertension, Sepsis,

Abortion, Embolism accounts 27%, 14%, 11%, 8% and 3% respectively[7]. These situations can be prevented by awareness of danger signs which could be well named by layman and identify by apparent well define signs and symptoms. Pregnant women have not enough knowledge and not understood danger signs and health related with childbearing and postpartum, would be poorly prepared to make decision on different choices and that will significantly jeopardize to their own well-being[8].

International Labor Organization reported that there are 3.25 million migrant workers in Thailand which compose 8.5% of workforce in country[9]. Most of these workers are blue collar labors and mostly working in low-skilled jobs settings; agriculture, construction, service industries like restaurants, petrol station, retail shops, domestic work, fishing, manufacturing, and other services. Studies in Thailand related with barriers of migrant health care accessibilities were illegal stay in Thailand, language barriers, lack of information hinder their accessibility and utilization of health services[10,11,12].

Mae Sot town in Thailand is one of the most famous border towns for many migrants who cross border from Myawaddy town of Myanmar to Mae Sot as entry point to Thailand. There are many unofficial crossing points along the border around Mae Sot and its surrounding districts. Many migrants especially undocumented migrants stay and work in Mae Sot and surrounding districts as easy to cross border and wait there to move into other big cities such as Bangkok and Chiang Mai etc. This situation creates nearly 50% of total Mae Sot population with 149,708 Thai citizen and estimate 30,000 are people from Myanmar. Other four Districts in Tak Province along border Tha Song Yang, Mae Ramat, Phop Phra and Umphang with total Thai population of 256,231 and 118,036 are from Myanmar. Post conflict affected areas of Kayin State in Myanmar are border areas of Tak province. However, there is lack of evidence-based information about Myanmar migrant mothers' level of knowledge on danger signs of pregnancy and new-born and factors associated in five border districts of Tak Province at the Thailand Myanmar Border where thousands of Myanmar migrants are working.

Material and Method

Study sites: The study was conducted in five districts hospitals of Tak Province which are bordering with Myanmar; Mae Sot, Tha Song Yang, Mae Ramat, Phop Phra, and Umphang District and one charity health facility Mae Tao Clinic. All six health facilities offered ANC for migrants with the same standard as citizens.

Study subjects: Between June to December 2017, total 723 participants in the study were gave birth in one of the six health facilities. Sample size from each study site was calculated proportionally according to the number of deliveries of migrant women in the previous year among the facilities.

Data collection: A structured questionnaire was used to collect data regarding migrant women's demographic and socio-economic status, previous pregnancy information, awareness about danger signs in pregnancy and health literacy concerning pregnancy and antenatal care. Face to face interviews were conducted for data collection by the trained interviewers at the health facilities. The timing and number of ANC attendances were verified with ANC record books. A pilot study was conducted in Mae Sot and Phop Pra areas to test the validity and reliability of the questionnaire.

Data analysis: The categorical data were described by using frequency and percentage. All analyses were performed using Stata version 13.0 (Stata Corp, College Station, TX). Descriptive analysis and chi square test has been done for association and p-value < 0.05 has been considered as significant. Knowledge of total 16 danger signs in pregnancy, postpartum and newborn to seek immediate health care to group as high level of knowledge (> 8 danger signs), moderate level of knowledge (4 to 7 danger signs) and poor level of knowledge (<4 danger signs).

Findings

Descriptive analysis: A total of 723 migrant women were selected in this cross-sectional study. Most of the mothers were in age under 25 years (43.6%) and 13.5% were illiterate. Majority lived in Mae Sot (74.6%) and majority (65.3%) lived independently in the communities whereas 16.2% and 18.5% lived in the in the vicinity of agricultural farms and factories where they were working, respectively. Nearly three quarters of the women (72.9%) were employed and 55.2% had no health insurance. A total of 529 women (73.2%) had sufficiently took antenatal care (i.e., they made at least four ANC visits).

Figure (1)shows knowledge items on pregnancy, after giving birth and newborn danger signs, 412 (57%) of mother mentioned spotting or bleeding per vagina

with highest score in the seven pregnancy danger signs. 461(64%) of mothers stated excessive bleeding in postpartum period with highest score among four danger signs. 366 (51%) of mothers mentioned fever as danger signs for newborn to seek immediate health care with health personals.

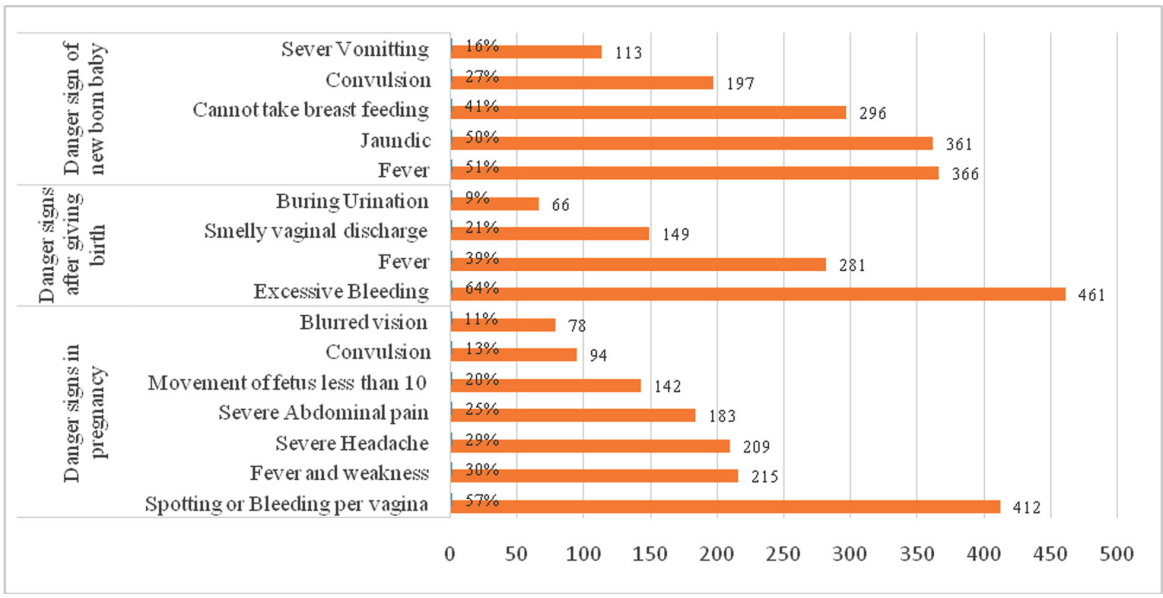


Figure (1). Health knowledge on pregnancy, after-delivery and newborn baby danger signs

Factors associated with level of knowledge of danger signs in Myanmar migrant mothers Knowledge levels of total 16 danger signs in pregnancy, post-partum and newborn to seek immediate health care were grouped as good e (> 8 danger signs), moderate(4 to 7 danger signs) and poor (<4 danger signs). Table (1) shows resident district, mothers' education, health insurance status, household income, location of home, watched TV were significantly Associated with level of health knowledge. Similar findings in Southern Ethiopia study mentioned that educational status of the respondents, monthly income were associated with mother knowledge of pregnancy danger signs[2]. Mother age, father age, fathers' education, legal stay permits, history of problems in the latest pregnancy were not associate with level of mother knowledge on danger signs in this study. However, Dessu S, et al found out that age of the respondent and history of previous pregnancy were found association with pregnancy danger signs[2].

Table (1). Factors associated with level of health knowledge on pregnancy, after-delivery and newborn baby danger signs

Knowledge on pregnancy and newborn danger signs

	Sample	Good Number (%)	Moderate Number (%)	Poor Number (%)	χ^2 value	P-value
Resident District						
Moe Sot	539	75 (13.91)	299 (55.47)	165 (30.61)	17.52	**<0.001**
Others	184	50 (27.17)	81 (44.02)	53 (28.80)		
Mother Education						
Illiterate	98	10 (10.20)	43 (43.88)	45 (45.92)	17.06	**0.002**
Primary	333	62 (18.62)	170 (51.05)	101 (30.33)		
Secondary	292	53 (18.15)	167 (57.19)	72 (24.66)		
Health Insurance						
Insured	324	63 (19.44)	182 (56.17)	79 (24.38)	9.52	**0.009**
Non-Insured	399	62 (15.54)	198 (49.62)	139 (34.84)		

	Sample	Good Number (%)	Moderate Number (%)	Poor Number (%)	χ^2 value	P-value
Household Income (Thai Bath)						
<5000	137	41 (29.93)	49 (35.77)	47 (34.31)	26.92	**<0.001**
5000-8000	299	38 (12.71)	170 (56.86)	91 (30.43)		
>8000	287	46 (16.03)	161 (56.10)	80 (27.87)		
Location of home						
Farm	117	20 (17.09)	50 (42.74)	47 (40.17)	18.94	**0.001**
Factory	134	10 (7.46)	82 (61.19)	42 (31.34)		
Ward/village	472	95 (20.13)	248 (52.54)	129 (27.33)		
Watch TV						
No	270	33 (12.22)	135 (50.00)	102 (37.78)	15.25	**<0.001**
Yes	453	92 (20.31)	245 (54.08)	116 (25.61)		

Discussion

This study showed that the commonly mentioned danger sign in pregnancy was bleeding per vagina and it was same as other studies [2,14,15].Reduce fetal movement was answered only 142 (20%) in this study with similar with Kenyatta National Hospital (10.9%)[16], however in South Africa study,reduce fetal movement was mentioned higher (50%) [17].In Gambia study there was very low awareness of danger signs. The proportion of respondents answered signs of danger were anemia (29%), hypertension (24.6%), hemorrhage (14.8%) fever (12.9%) and puerperal sepsis (5%) [8]. The low level of health knowledge could be consequence to increase in medical expenses, morbidity and mortality and side effects of the diseases [18].The possibility of low health knowledge will be health education session is often verbal and health professional used professional medical languages and words, so most mothers can not perceive these words and these trainings are unusable [19].In Thailand there are strong primary health care networks in rural areas. These networks help migrant mothers who lived in rural areas able to learn more pregnancy related knowledge in not crowded rural health centers. Watching TV regularly and having health insurance also helped mothers to learn health education messages.

Conclusion

Understanding and awareness of dangers can save mother and newborn lives, if mothers are able to identify danger signs and seek immediate health care at the health facilities. More attention should be given to migrant communities in urban districts focusing on illiterate mothers without health insurance with lower family income. Pregnancy and newborn health care messages should be broadcasted in TV regularly.

Conflict of Interest: The authors declare that there is no conflict of interest in this research.

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Ethical Clearance: Approval for this research was received from Khon Kean University Ethics Committee in Human research, (Approval number HE12068 2018-02-13 14-26) and the Research Ethic Committee of Mae Sot Hospital (Approval number MSHP 002/2561).

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A Prototype System for the Analysis of Sentiment Regarding Drug and Food Issues in Indonesia

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Abstract

Background: Drug and food policies or issues can give rise to various opinions in the community. In Indonesia, such perspectives can be quickly identified with the use of big data analytics software that can perform a sentiment analysis of Twitter content and complaints received by the country's ***National Agency of Drug and Food Control***. These tools are employed to examine positive or negative views regarding the aforementioned policies or issues. In consideration of these matters, this study was aimed at developing a prototype system for the analysis of sentiment regarding drug and food issues and integrating itwith Indonesia's information and complaints service network.

Method: To the above-mentioned ends, the research adopted a supervised machine learning classification method called a naive Bayes classifier (NBC), which was incorporated with evaluation parameters, namely, accuracy, precision, recall, and the F-measure. The systems development life cycle was used as a framework. The system was then tested using 10-fold cross-validation.

Results: The validation results showed that the highest accuracy exhibited by the system was 88%. It registered a precision of 81%, a recall of 100%, and an F-measure of 90% on 540 tweets that served as training data and 60 tweets that served as testing data. Sentiment analysis results are displayed on a dashboard.

Conclusion: An NBC exhibits reasonably good performance in the examination of sentiment toward drug and food issues in Indonesia. Sentiment data can serve as input that facilitates rapid response to these problems and subsequently clears the way for formulating appropriate education strategies for the community.

Keywords: *Drug and food; big data analytics; sentiment analysis; information and complaints service system; Twitter; naive Bayes classifier.*

Introduction

The Fourth Industrial Revolution is a period during which almost all people use digital innovations as their business vehicles. Its advent has driven online selling to emerge as one of the most effective avenues in which to address competition and current market movements, including the sale of drugs and food. This advantage, unfortunately, is also accompanied by increased cases of drug and food abuse, which directly affect the public,especially amid Industry 4.0. As reported by the World Health Organization, 50% of medicines sold online around the world are fake and that one out of 10 medical products in developing countries is substandard or counterfeit[1,2]. The Pangea Operation–an international initiative intended to combat the online trade of counterfeit and illegal drugs–found that websites through which illegal drugs and food are sold numbered 293, 214, and 370 in 2015, 2016, and 2017, respectively, and that 1,999, 1,312, and 4,796 items were sold in these sites over the same periods, respectively[3]. In the Indonesian context, the number of complaints received through the Consumer Complaints Service Unit of the country's National Agency of Drug and Food Control

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(known as BPOM in the country) and Halo BPOM 1500533 Contact Center with regard to the circulation of drugs and food over the Internet increased from 303 in 2015 to 325 in 2016[4].

The persistence of the above-mentioned concerns is expected to increase public health problems. As an institution authorized to implement drug and food control in Indonesia, the BPOM has a drug and food control system with one component that is overseen by the community through the enhancement of knowledge, attitudes, and behaviors regarding ways to rationally choose and use products. To date, however, the BPOM has no integrated database that enables the fast, precise, and accurate review of data to support the effectiveness of communication, information, and education strategies. Compounding this deficiency is the lack of an efficacious system for the early detection of drug and food abuse. At present, the BPOM acquires such data from complaints and requests for information on drugs and food, which are coursed through a drug and food information and complaints service system.

In addition to accurate data management, a necessary approach is to involve the community in advancing effective communication, information, and education initiatives, one of which is the analysis of digital data derived from social media as a space where people express opinions on drug and food policies or issues. Social media sentiments should be analyzed using a system that can be integrated with existing networks. These requirements can be satisfied through big data technologies, which can perform sentiment analysis that allows for the identification of public responses to products[5]. Sentiment analysis is the process of extracting, processing, and understanding textual data automatically to identify the views reflected in an opinion sentence, whether such perspectives are positive, neutral, or negative[6].

Social media monitoring has presented many benefits in terms of overcoming public health problems by, among other outcomes, the detection of drug side effects[7]and the assessment of vaccination programs[8]. The same holds true for Twitter,features that render the micro blogging site one of the largest and most popular social media sites in the United States and the world. Twitter is a very valuable data source for researchers of public health informatics[9]. Despite the promising potential of sentiment analysis, however, its use in the health sector of Indonesia is rare. To address this gap, this study developed a prototype system for the analysis of sentiment regarding drug and food issues in Indonesia. The system, which was integrated into the country's drug and food information and complaints service network, examines Twitter data using a machine learning-based method referred to as a naive Bayes classifier (NBC). The NBC was incorporated with evaluation parameters, namely, accuracy, precision, recall, and the F-measure.

Method

The systems development life cycle was used as the framework in creating the sentiment analysis system, with the stages involved being identifying system requirements from a user perspective, designing and prototyping the system, and testing and evaluating it. A series of steps were then carried out to design the system application through the supervised machine learning techniques starting from problem identitication, data collection, preparation and manual labeling of input data, preprocessing, algorithm training, algorithm testing, and performance evaluation using 10-fold cross-validation.

The sentiment analysis system put forward in this work uses Python, which provides libraries for data preprocessing and NBC algorithms with Natural Language Toolkit tools as well as evaluates performance. The NBC is a classification method derived from Bayes' theorem by using probability and statistical approaches, such as the prediction of opportunities on the basis of previous experience[10]. After the system was created, it was integrated with the information and complaints service application (SIMPEL LPK) already being used at the BPOM. The Web-based prototype was developed using the PHP programming language and the My SQL database. The prototype development trials for the validation of system components were performed in a laboratory. The entire research was conducted at the Community Complaints Section of the Bureau of Public Relations and Management Support at the BPOM in Jakarta.

Results

1. Identification of System Requirements

On the basis of the in-depth interviews and document analysis implemented at the research site, the system-related needs that were identified areas follows:

a. Organizations need a system that can integrate the analysis of social media sentiments with

service provision for addressing drug-and food-relatedinformation and complaints.

b. Such sentiment analysis system is expected to provide easily readable and understandable information on real-world public opinionsregarding policydevelopment and matters associated with drugs and food.

c. The system is expected to be easy to use.

The system can be developed by taking into account aspects of policy, infrastructure, and resources.

2. Development of the Sentiment Analysis System

a. Problem Identification

This study pinpointed fivetopics related to drug andfood policy or issues:

- Online drug sales
- Electronic cigarettes
- Imported cosmeticuse
- Use of antibiotics
- 2D barcode application in drug and food control

b. Data Collection

Data were collected from 22 November 2018to9 March 2019, and two sources were used for this purpose:

- Data were collected from Twitter via the Web scraping of www.search.twitter.com and the use of key words that were determined using the Python Tweepy library.
- Data were extracted from the SIMPEL LPK application database.

c. Preparation and Manual Labeling of Input Data

The filtered Twitter and SIMPEL LPK data were merged, yielding a filtered data set comprising 600 tweets, which were randomly divided into 540 tweets serving as training data and 60 tweets used as testing data. The data were also labeled as two sentiment classes, namely, positive sentiments (e.g., statements that signify agreement, liking, happiness) and negative sentiments (e.g., statements reflecting disagreement, disliking, sadness,dissatisfaction). The amount of data were balanced between the classes.

d. Preprocessing

Preprocessing was conducted to eliminate inappropriate words, homogenize terms,and reduce the volume of words to be examined. The stages carried out are described below:

- Cleansing: Tweets were cleansed of unnecessary words or elements to reduce noise in the classification process.
- **Case folding:** All letters were converted into lowercase format.
- **Tokenization:** A set of characters in a text were broken down into units of words.
- **Normalization:** Words that are expressed in abbreviated form were changed into their full forms.
- Elimination of stop words: Stop words are terms that do not affect the classification process. A list of common stop words was obtained from Tala's[11] study and added to the training data.

e. Algorithm Training/Data Modeling

Training data were needed to build a probability model.

Table 1. Examples of Training Data

Tweets	Preprocessing	Account*	Label
Bangsa ini butuh antibiotic	bangsa butuh antibiotic	angganaxxxxx27	Positive
@FANBASEBOKEP jangan asal beli di toko online obat gitu banyak yg palsu	jangan beli toko online obat banyak palsu	Lazaruxxxxx	Negative

*Note: Twitter accounts wereanonymized.

f. Algorithm Testing

Data that were not used in the training process were employed in testing. When testing data are entered into the proposed system, it initiates the determination of features, their extraction, and their classification in accordance with the established probability model.

Table 2. Examples of Testing Data

Tweets	Preprocessing	Account*	Label	Prediction
LAGI JANGAN SEMBARANGAN MAKAN ANTIBIOTIK!!!!! https://t.co/FsY9BdU5xO	jangan sembarangan makan antibiotik	ma2taxxxx,,	Negative	Negative
@danirachmat Thanks mas Dan. Sedang menuju pulih nih. Emang kalo udah ketemu dokter sama antibiotik lgs cepet recovery nya	terimakasih pulih ketemu dokter antibiotik langsung cepat recovery	NonaXxxxx222	Positive	Positive

*Note: Twitter accounts wereanonymized.

g. Performance Evaluation

The performance of the classification model was evaluated by measuring its accuracy, precision, and recall. A confusion matrix (Table 3) shows various correct and incorrect predictions based on the classification design developed in this work[12].

Table 3. Confusion Matrix

		Predictedclass	
		Positive	Negative
Actual class	Positive	True positive (TP)	False negative (FN)
	Negative	False positive (FP)	True negative (TN)

h. 10-fold Cross-Validation

The classification was iterated 10 times on the data sets as a means of cross-validation to obtain the best predictive accuracy. In the cross-validation, the data employed were the 600 tweets, with a compositional training-to-testing ratio of 90:10.

Table 4. NBC Results

Iteration	TP	FN	FP	TN	Accuracy (%)	Precision (%)	Recall (%)	F-Measure (%)
1	24	6	5	25	82	83	80	81
2	23	7	6	24	78	79	77	78
3	18	12	3	27	75	86	60	71
4	11	19	1	29	67	92	37	52
5	23	7	6	24	78	79	77	78
6	24	6	12	18	70	67	80	73
7	30	0	7	23	88	81	100	90
8	25	5	5	25	83	83	83	83
9	25	5	3	27	87	89	83	86
10	26	4	6	24	83	81	87	84
Average					79	82	76	78

Sentiment Analysis Dashboard: The dashboard menu contains keyword search columns and the data source options Twitter, SIMPEL, and Twitter + SIMPEL, which extract data in realtime. The search results are then displayed in tabular and graphical forms (Figure 2).

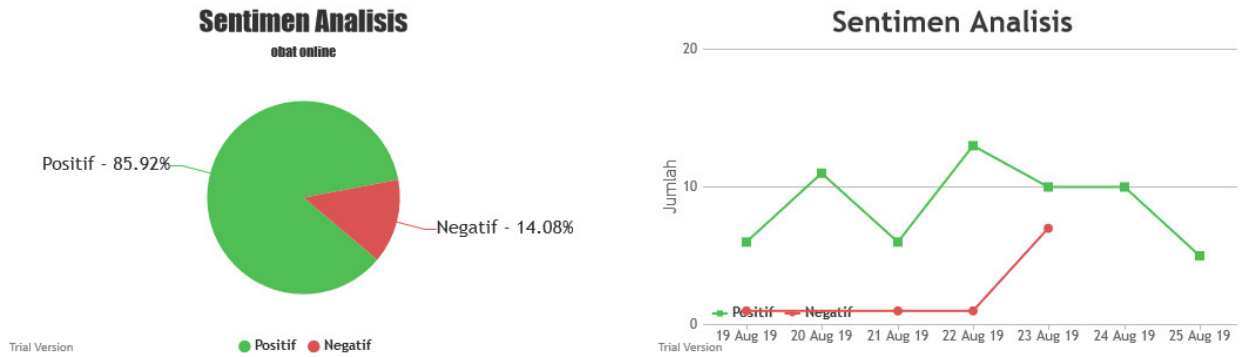


Figure 2. Graphical Forms on Sentiment Analysis Dashboard

Discussion

Social media-based data analysis is a qualitative examination of the behaviors of social media users with respect to their personal experience of an issue. Although the mining of Twitter messages cannot replace traditional survey method, the content of social media messages can be a useful, real-time, and publicly available source[13]. Social media sites also serve as forums in which to foster community awareness about health issues[13].The data derived from these platforms can be employed in the analysis of sentiment regarding drug and food policy or issues. The prototype sentiment analysis system developed in this research provides benefits to the BPOMas a decision support system for the real-time monitoring of drug-and food-related concerns, functioning as an early warning system that prompts immediate action in tracking issues in the field and as an additional source of input in the preparation of communication, information, and education strategies.

Application Performance: The prototype comes with a dashboard that displays real-time data analysis results. Table 4 shows that the system exhibited an accuracy of 88% (the highest) at the seventh testing iteration and an accuracy of 67% (the lowest) at the fourth testing iteration. After 10 iterations, the system achieved an average accuracy of 79%. In terms of precision, the highest level was 92%, achieved at the fourth iteration, whereas the lowest was 67%, realized at the sixth iteration. The average precision of the proposed system was 82%. The highest recall was 100%, registered at the seventh testing iteration, whereas the lowest was 37%, recorded at the fourth iteration. The average recall of the system was 76%. As regards the F-measure, the system put forward in this research exhibited the highest and lowest values of 90% and 52% at the seventh and fourth testing iterations, respectively. The average F-measure was 78%. These results indicate that the system implements satisfactory classification but that its machine learning performance still needs improvement. Such enhancement can be achieved with respect to four components, that is, increasing the quality of (1) data collection and reinforcing the performance of (2) algorithms, (3) tuning, and (4) ensembles[14].

Limitations: Certain constraints impeded the optimal functioning of the proposed prototype. These include the following:

1. The amount of training data was limited. Classification accuracy can be improved by increasing the volume of data used for training. The greater the amount of training data, the higher the accuracy of the system in recognizing testing data.
2. The accuracy of sentiment analysis depends on preprocessing. To ensure effective preprocessing, the following measures should be implemented:
    a. The stemming process should be strengthened to eliminate word affixes and thereby retain only basic terms. A sound stemming process can augment the accuracy of explorations into sentiments contained in text documents[15]. In this work, time constraints prevented the carrying out of stemming.
    b. A list of abbreviated words and stop words should be obtained.
3. The current system's features are insufficient as some of the required attributes have not been developed. These features include time filters and tag clouds.

Conclusions

1. The NBC exhibited reasonably good performance in the analysis of sentiment regarding drug and food issues in Indonesia. The average accuracy

of the system was 79%, and its average precision, recall, and F-measure were 82%, 76%, and 78%, respectively. At the seventh testing iteration, the system generated its highest accuracy, which was 88%, broken down into 81% precision, 100% recall, and 90% F-measure.

2. The built-indash board of the prototype system displays people's sentiments toward drug and food issues in realtime. Such information supports data and serves as input for rapid response to the aforementioned matters.

3. The system therefore functions as an early warning network that prompts immediate action in tracking issues in the field and as a source of input in the preparation of appropriate communication, information, and education strategies.

Ethical Considerations: This study was approved by the Ethical Committee of the Faculty of Public Health at Univers it as Indonesia (approval no.: 026/UN2.F10/PPM.00.02/2019).

Conflict of Interest: The authors declare no conflicts of interest.

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Reconstruction of Groin Defects Using the Extended Dissection Technique of the Gracilis Myocutaneous Flap

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Abstract

Background: Groin defect reconstruction is a problem which can present with devastating consequences. Such wounds are encountered after inguinal lymph node dissection (ILND), soft tissue sarcoma (STS) resection or radiation necrosis to the inguinal region. Gracilis myocutaneous (GMC) flap is an ideal option due to its easy accessibility and minimal donor site morbidity. Application of extended dissection technique makes the flap more reliable and improves its vascularity.

Method: This is a descriptive study with the purpose of determining the visibility of GMC flap in groin defects reconstruction at National Cancer Institute, Cairo University, Egypt.

Results: 15 patients underwent groin reconstruction using GMC flap. 10 patients had metastatic inguinal lymph nodes and 5 patients had groin STS. Skin island size ranged from 8 to 20 cm in length and from 6 to 10 cm in width. 10 cases were totally viable, 3 cases had partial skin loss and 2 cases had total skin loss. Only 1 case of donor site morbidity was reported.

Conclusion: GMC flap is a versatile flap that is harvested easily and with a minimal morbidity at the donor-site.

Keywords: *Defect, Flap, Gracilis, Groin, lymphadenectomy.*

Introduction

Groin wound management is a challenging problem which can present with dangerous consequences. Such wounds are commonly encountered after ILND, STS resection, radiation to the inguinal region and arterial revascularization[(1)]. Adequate coverage of these defects is extremely important to prevent the exposure of femoral vessels which may lead to life-threatening blow-outs and [(2)].

A variety of reconstructive options have been described for covering groin defects such as tensor fascia lata[(3)], rectus abdominis myocutaneous flap[(4)], rectus femoris [(5)], GMC flap [(6)] and anterolateral thigh (ALT) flap [(2)].

The gracilis muscle is used widely in reconstructive surgery, either as a pedicled flap or as a free microsurgical flap [(7)]. The gracilis muscle has the advantage of easily accessibility with minimum donor site morbidity. However, there are limitations when using a pedicled flap. Limited distal muscle bulk restricts its effective use for more extensive wounds. Short pedicle length limits the arc of rotation. These factors may be critical to successful reconstruction with the gracilis because the most distal portion is often the most crucial for wound closure [(8)].Application of the extended-dissection technique provides more direct access to the main pedicle, improves the arc of rotation and prevents torsion of the vascular pedicle. It also can deliver adequate muscle bulk to yield a successful reconstruction [(9)].

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Aim of the work: To assess the versatility of GMC flap in reconstruction of groin with application of extended dissection technique.

Patients and Method: This descriptive, prospective study was conducted on patients suffered of groin soft tissue defects in National Cancer Institute, Cairo University, Egypt.

Inclusion Criteria: Groin defects which measure not more than 20 cm (length) X 10 cm (width) in maximum dimensions

Exclusion Criteria: Defects more than 20 cm (length) X 10 cm (width) in maximum dimensions and patients subjected to deep resections compromising branches of profunda femoris artery.

Procedure: The patient is placed in the supine position and the donor lower limb is abducted with slight flexion of the hip and knee joints. Then we mark the pubic tubercle superiorly and the medial tibial condyle inferiorly. The origin of adductor longus muscle is palpated and just beneath it, the gracilis muscle origin could be palpated and marked. A straight line is drawn between the point of the gracilis muscle origin and the medial tibial condyle. The skin paddle is designed over proximal two-thirds of this line (Fig. 1).



Figure (1): Skin paddle design over the gracilis muscle

Make the anterior incision then dissect through the subcutaneous fat in an oblique angle away from the flap to prevent undermining of the skin paddle.

It is easiest to begin dissection distal to the skin paddle by localization of the rounded gracilis tendon. The gracilis tendon should be circumferentially dissected and then placed under tension. At this stage, the skin paddle design must be reexamined to ensure that it has been correctly centered over the longitudinal axis of the gracilis muscle.

The gracilis tendon is transected and dissection proceeds in the avascular fascioareolar plane between the adductor longus and gracilis. Minor vascular pedicles of the gracilis, which may be 2-5 in number, are encountered and cauterized. The adductor longus is retracted anteriorly, and the dominant proximal pedicle of the gracilis is seen running between the adductor longus and brevis, entering the gracilis 8-11 cm distal to the pubic tubercle (Fig. 2).

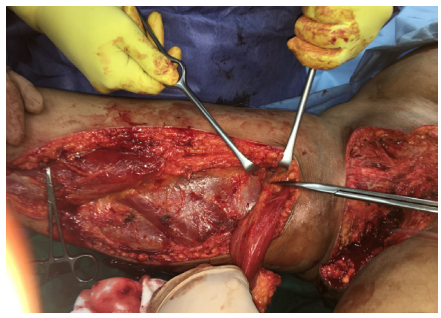


Figure (2): Isolation of the main vascular pedicle.

The main pedicle is the center of the arc of rotation of the flap, and further dissection of the muscle proximal to the major pedicle is continued. The muscle could be transected proximally above the main vascular pedicle if the arc of rotation in needed to be increased.

The adductor longus is dissected free from surrounding tissue and the gracilis flap is passed beneath it and brought out laterally to reach the recipient site. Then the flap is sutured to the surrounding skin over a suction drain. The last step is the donor site closure in anatomical layers over a suction drian.

The patient should stay supine in bed without movement of the affected limb for two days and elevated 30 degree above the body level to decrease edema and improve venous return.

Complete wound healing is expected after two weeks and full range of movement is anticipated 4 weeks postoperatively (Fig.3).

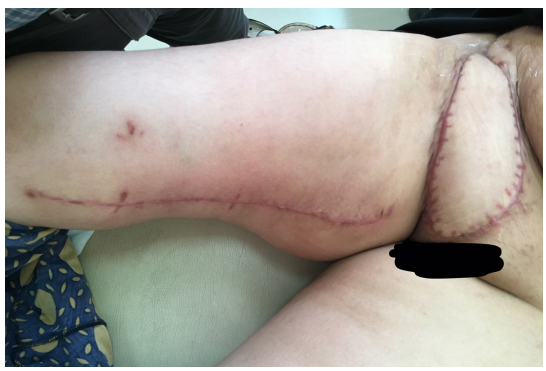


Figure (3): Complete healing 4 weeks postoperatively

Results: Fifteen patients with groin defects underwent reconstruction by GMC flap. There were 8 males (53%) and 7 females (47%) with mean age 57 years at the time of surgery (range 23-75 years).

10 patients had metastatic inguinal lymph nodes (66.5%). 5 patients had STS (33.5%). 10 patients underwent radical ILND and 5 patients underwent wide local excision of STS. The area of skin island ranged from 8 to 20 cm in length and from 6 to 10 cm in width with surface area up to 200 cm^2. Distance between pubic tubercle and main pedicle was ranged between 8 to 11 cm. The number of secondary pedicles ranged from 2 to 4 pedicles. All Donar sites were closed primarily. 10 cases were totally viable and complete healing occurred after three weeks. Partial skin necrosis occurred in 3 cases (20%). Only 2 cases (13%) had total skin loss due to venous congestion. All patients were able to adduct their affected lower limbs without limitation or pain after one month postoperatively.

Discussion:

Reconstruction of groin defects continued to pose a difficult task in surgical practice as coverage of such defects is an important issue to prevent the exposure of femoral vessels which may lead to life threatening blow-outs [10].

Flap closure of the groin has many advantages: The flap brings well-vascularized tissue from a distant area to the groin which enhances local immunity and wound healing. It covers the dead space in the femoral triangle and decreases seroma formation and postoperative radiotherapy can be safely given [11].

There are many options for reconstruction of the groin. They range from primary closure, grafting to flaps. Flaps include sartorius, gracilis, rectus abdominis, rectus femoris, tensor fascia lata muscle, anterolateral thigh flap and local skin flaps. Although, favorable results have been reported with these flaps, problems include donor-site morbidity, partial flap loss, and time-consuming procedures [12].

Tensor fascia lata is one of the most commonly used flaps for groin defects, but the donor site closure always requires a split skin graft and forms a big dog ear at the pivot point [3].

The rectus abdominis musculocutaneous flap has a reliable blood supply which is the inferior epigastric artery, a wide arc of rotation and the ipsilateral or contralateral muscle could be used [10]; however, the rectus abdominis is not a dispensable muscle, and the resulting donor-site morbidity is significant in the form of ventral hernia (19%) in addition to usage of prothetic mesh to close the donar site which lengths the operation time [13].

ALT flap is a perforator flap based can be used to cover a wide defect and can be raised as a very thin flap. However, there are few disadvantages; it is technically more demanding, the variability in position of perforators and the need for skin graft for donor site closure in some cases of large flaps [14].

The use of the rectus femoris muscle has been criticized for its potential for loss of full knee extension. Knee extension power following the use of the muscle has been reported to decrease by 24 to 28 percent on computerized dynamometer testing compared with a patient's contralateral limb [15].

The GMC flap is well known to reconstructive surgeons for its various uses as both a free and pedicled flap. It has a single major dominant pedicle in a constant location with a predictable blood supply from the profunda femoris, usually as a branch of the 'adductor artery' [16].

GMC flap also has the advantage of being mobilized easily and its speed of dissections in bloodless plane**.** Its superficial location on the medial aspect of the thigh makes it an ideal pedicled flap for coverage of groin and perineal defects. The gracilis muscle belly can help fill the defect but is small enough to avoid appearing bulky [17].

The gracilis muscle has one or more accessory pedicles ranging in number between 1-5. They originate from the superficial femoral artery or from the popliteal artery with a caliber of 2 mm [18]. In our series we found the number of secondary pedicles ranging from 2 to 4.

In this series, we found the distance between the pubic tubercle and the entry point of the primary pedicle into the gracilis muscle ranged from 8 to 11 cm. Harbans and et al reported that this distance measures 9.4 cm in males and 7.9 cm in females [19].

In our series, the length of the skin paddle ranged from 8 to 20 cm and the width ranged from 6 to 10 cm. In the series of Rasheedha and Sivakumar, the reported

the length ranged from 6 to 11 cm and the width ranged from 4 to 12 cm [17].

According to the literatures, the percentage of partial and major GMC flap necrosis varies between 6.8% and 38%.Copeland et al. reported 13% with the use of GMC flap for vaginal reconstruction [20]. Also, in Rasheedha and Sivakumar for perineal reconstruction, they reported 20% partial flap loss [17].

In our series, the percentage of partial and total flap loss were 20% and 13%, respectively. Venous congestion was the cause of flap failure.

In this series, the donar sites of all cases closed primarily after mobilization of the upper and lower skin flaps in subfascial plane and the resultant scarring can be easily concealed with clothing.

Complications of GMC flap are infrequent. Carr et al. reported a series of 104 GMC flaps in which 61 patients were adults and 43 children. According to their results, 15% of the patients reported a temporary reduction of leg strength with an average duration of 6 months. This was significantly shorter in children (3.4 months) than adults (10.8 months) [21].

Deutinger et al. reported a series of 42 patients. According to their findings, abduction strength of the ipsilateral hip joint was decreased by 11% when the gracilis was elevated, but the patients did not notice this decrease in strength [22].

We reported only one complication at the donar site in the form of partial wound dehiscence. In our study, we did not use dynamometric measurements of hip adduction strength, because the gracilis is not the only muscle responsible for hip adduction. Adduction primarily occurs via the gluteus medius as well as the gluteus minimus. But none of our patient complained of lower limb disability and all patients were able to mobilize early, with a full range of motion after maximally 4 weeks postoperatively and in our opinion the minimal donar site morbidity is considered the most important advantage of GMC flap in comparison to other flaps.

Like any other flaps, the GMC flap has few disadvantages. It causes some minimal contour deformity in the thigh. However, this was acceptable by all patients. Also, the application of extended dissection of the vascular pedicle is time consuming and requires meticulous dissection.

Conclusion

The GMC flap is a reliable reconstructive technique for immediate closure of a complex groin defects. GMC flap is a versatile flap that is easily harvested and with a low rate long-term morbidity at the donor-site. The extended dissection technique permits direct approach to and excellent observation of the proximal aspect of the dominant pedicle to the gracilis muscle.

Ethical Clearance: Taken from Egyptian National Cancer institute Ethical Committee.

Source of Funding: Self-funding

Conflict of Interest: Nil

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Comparative Evaluation of Plaque Removal Efficacy of Plaque-Indicating Dye Dentifrice Vsnon-Dye Dentifrice in Enhancing Oral Hygiene among Orthodontic Patients. A Double Blind Randomized Clinical Trial

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Abstract

Background: Good oral hygiene is always a challenge for patients undergoing orthodontic treatment because food particles get readily trapped around the braces which makes it harder to remove plaque. Hence, keeping plaque under control is one of the most effective measure of maintaining healthy gingiva. Therefore, this can be achieved by the use of toothpaste containing plaque indicating dye which will demonstrate higher plaque removal efficacy than those using conventional disclosing tablets.

Methodology: A double blind randomised controlled trial was conducted among twenty orthodontic adults. The participants were randomly allocated into two groups. Group I-(experimental group) dye containing toothpastse, Group ll-(Negative control) tooth paste without dye. Oral hygiene instructions, brushing techniques and use of standardised tooth paste was explained to all the participants. The plaque and gingival index were recorded at baseline and 15th day of follow up. Wilcoxon signed Rank test is used to compare the mean differences before and after treatment within each group for plaque and gingival indices. Mannwhitney U test to estimate differences in the mean plaque and gingival indices between the groups.

Results: In the present study, a statistically significant reduction in the mean plaque Index and gingival index scores was observed in Group I when compared to Group II.

Conclusion: To conclude Plaque indicating dye containing toothpaste together with proper use and oral hygiene instructions, significantly increases plaque removal efficacy of the Orthodontic patients.

Keywords: *Oral hygiene, plaque HD toothpaste, plaque Index, gingival index,Orthodontic Patients.*

Introduction

Good oral hygiene maintenance is a challenging task among patients undergoing fixed appliance orthodontic treatment[1]. The brackets along with the other components present a favourable situation for rapid plaque accumulation and increased acid production leading to demineralization and incipient carious lesions[2,3].

Oral cleaning becomes more difficult with the presence of the orthodontic appliances and their components. Thus, the elimination of plaque is the main target to overcome the problems[4]. Orthodontic treatment alters the oral environment, increases plaque amount, changes the composition of the flora, and complicates the cleaning for the patient[5,6,7].

Dental plaque is known to be a major factor which contributes to gingivitis and other periodontal diseases,

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and the effective daily control of plaque in orthodontic patients for optimal dental health is important[8].

It is known that because of the great possibility for the increased plaque accumulation orthodontic patients who are treated with fixed appliance, mainly generally belong to a potentially higher risk group. Orthodontic treatment may be hazardous for the subjects who have no motivation nor proper supervision or preventive programme. It is important for both patients and clinicians to prevent tooth decay, gingival as well as periodontal problems and tooth discoloration that could compromise the esthetic of smile and well being of the patients. The key for this is represented by dental plaque[9].

The importance of having a twice-daily, mechanical brushing routine as the basis for ensuring good oral health is well understood, but actually achieving effective plaque removal can still be a challenge for many individuals[10]. Beside of the use of fluoride containing toothpaste and brushing with conventional brushes, additional method could be suggested to improve oral hygiene[4]. In some cases the identification of plaque with the naked eye is difficult because it is similar to the teeth. In these cases, the accumulation of plaque and localization can be assessed by different method, thesimplest way being able to scrape the tooth surface with the use of a periodontal probe. Special disclosing tablets containing red or blue dye can be used which can disclose the plaque. One tablet is chewed thoroughly in the oral cavity, moving the mixture of saliva and dye over the teeth and gums for approximately 30 seconds. Then the mouth is rinsed with water and checking of the teeth is done to identify the stained plaque. The disadvantage of these disclosing tablets is the temporary discolouration on the lips,cheeks, mouth or tongue. Another method is using plaque fluorescence. A special fluorescent solution is swirled around the mouth and then rinsed with water gently. After that, the teeth and gums can be checked with an ultraviolet light. The plaque will show a brillant orange-yellow. This method does not leave stains on other tissues in the mouth but can cause a temporary discoloration on the tongue and the buccal mucosa. Matured and fresh plaque can be seen in different colors. More blue plaque coloration means improper oral hygiene [9]. Some dentifrices and rinses are formulated with antimicrobial agents to help with chemical plaque control. However, achieving effective plaque control can prove problematic for individuals, and the excessive regrowth of plaque can lead to oral health problems[11,12,13]. The home use of plaque disclosants has been recommended as a helpful adjunct to improve oral hygiene. Adding a visible dye to toothpaste to disclose remaining plaque after toothbrushing has the potential to enhance patients' awareness and encourage them to be more thorough when performing oral hygiene[14].

Lack of dental knowledge and poor oral hygiene have a negative impact on plaque removal efficacy and the ability to accurately evaluate oral status. Increasing education and instruction of techniques is one way to minimise the problem, but another valid option is to improve oral hygiene products to enhance plaque removal efficiency. This is especially important in populations of low socioeconomic status, and the elderly that traditionally have less access to regular professional oral care[15].The aim of this study was to compare the efficacy of plaque removal between a plaque-indicating dye dentifrice Vs non-dye dentifrice in enhancing oral hygiene among orthodontic patients as well as to explain the importance of maintaining proper oral hygiene.

Materials and Method

Study Design: It is a double-blinded, parallel group, randomized controlled clinical trial.

Study Population: Patients undergoing fixed orthodontic treatment at saveetha dental college and hospital, chennai were recruited.

Eligibility Criteria:

Inclusion criteria: Apparently Healthy patients without any known history of systemic illness above 18-25yrs of age and Patients withGood to Fair Plaque index score, mild to moderate gingivitis and those who brush their teeth twice daily were included.

Exclusion criteria: Patients with positive history of usage of anti microbial therapy and routine use of oral antiseptics in the previous 3 months and those with history of allergic and idiosyncratic reactions to product ingredients and presence of systemic diseases that could alter the production or composition of plaque

Sample Size Determination: Sample size was calculated based on study by Stevens K et al. (2016)[14] using a *priori* by G*Power 3.1.2 software. The minimum sample size of each group was calculated, following these input conditions: power of 0.95 and $P \leq 0.05$ and sample size arrived were 10 per group.

Randomization

Sequence Generation: Computer generated block randomization with a block size of five were used to generate the assignment schedule well in advance by a third person who was not related to the study. The investigator was blinded to the sequencing of the block and allocation of the groups.

Allocation Concealment: SNOSE (sequentially numbered, opaque, sealed envelopes) method was implemented for allocation concealment which conceals the sequence until interventions were assigned. Patients were assigned their study numbers as they sequentially entered the study. Based on the group assigned, respective treatment was carried out as described in the procedure.

Blinding: Although the investigator knows about the study design and products that were used in the study, investigator and patients were unaware about the treatment groups. Therefore the investigator and patients were blinded in the study. Both Group I and II dentifrices were transferred to a white opaque tubes to assist in keeping the subject blinded to the product's identity (Refer Figure 1).

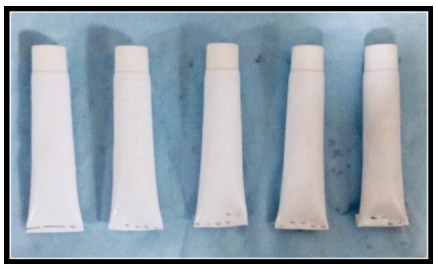


Figure 1: Blinding of the tested products



Figure 2: Study group

Study groups (Refer Figure 2**):** Group I-Plaque HD tooth paste, Group II-Colgate total advance health.

Study Procedure: Prior to the treatment, a careful medical and dental history was taken. Preoperative data for each patient was recorded in the predesigned proforma which includes age, gender and address. The study design was explained to the qualifying patients and informed consent was obtained from the voluntary patients who were willing to participate in the study.

Disclosing solution was generously applied to the surfaces of the teeth with the help of applicator brush. The study participants were instructed to rinse the mouth. Plaque index was recorded for the indexed teeth. The mean score of plaque and gingival index was recorded in the pre structured proforma. A standardized toothbrush and the toothpastes were allocated according to the group. Oral hygiene instructions with an emphasize on the appropriate brushing technique were given. The above mentioned steps were repeated at 15th day of follow up.



Figure 3: Plaque HD-plaque identifying tooth paste– (Targetol technology)

Data was entered in Microsoft excel spread sheet and analysed using SPSS software (version 17). **Wilcoxon signed Rank test** used to compare the mean differences before and after treatment within each group for Plaque and Gingival index score. **Mann whitney** U test to estimate differences in the mean Plaque and Gingival index score between the groups.

Results

Table1 shows Comparison of Mean Plaque and Gingival Index scores at Baseline, and 15th day time points of Group I and II. A statistically significant difference was observed in mean Plaque Index and Gingival Index score at Baseline and 15th day of follow up using Wilcoxon signed rank test. Table 2 depicts comparison of Mean Plaque and Gingival Index scores of Group I and II at Baseline and 15th day. There was no statistically significant difference was observed in mean

Mean Plaque and Gingival Index between the Groups using Mann-whitney U test.

Table 1: Comparison of Mean Plaque and Gingival Index scores at Baseline, and 15th day time points of Group I and II

Index	Groups	Time Points (Mean±SD)		Wilcoxon signed Rank test
		Baseline	15th day	P value
Mean Plaque Index	Group I	1.09±0.07	0.43±0.20	0.005**
	Group II	1.06±0.16	0.81±0.21	0.008**
Mean Gingival Index	Group I	0.51±0.14	0.18±0.07	0.05*
	Group II	0.54±0.15	0.35±0.13	0.07

Wilcoxon signed Rank test(P<0.05)

Table 2: Comparison of Mean Plaque and Gingival Index scores of Group I and II at Baseline and 15th day

Index	Time Points	Groups		Mann Whitney U test
		Group I	Group II	P value
Mean Plaque Index	Baseline	1.09±0.07	1.06±0.16	0.85
	15th day	0.43±0.20	0.81±0.21	0.002**
Mean Gingival Index	Baseline	0.51±0.14	0.54±0.15	0.79
	15th day	0.18±0.07	0.35±0.13	0.05*

Mann Whitney U test (P<0.05)

Discussion

Oral cavity is an important part of the body and it plays a crucial role in chewing, swallowing, and in forming facial expression as well as maintaining nutritional status, system health and self esteem[16]. Oral hygiene has been risk indicator, risk factor and risk predictor and for various oral problems and other dental problems[17].

The purpose of oral hygiene is to prevent the formation of plaques, the sticky film of bacteria[18]. Oral hygiene measures should be implemented to remove plaque, soft bacterial deposits that adhere to the teeth and cause dental caries (decay or cavities) and periodontal (gums) diseases[19]. For preserving oral health and for preventing oral diseases oral self care such as toothbrushing is important[20]. Studies conducted by Nitin Chandrakantet al and Thanish Ahamed found that majority of the participants preferred Toothpaste to be the most commonest oral hygiene measure[21,22].

Orthodontic patients have a high susceptibility to the plaque accumulation on their teeth because of the various orthodontic appliances like bands, brackets, wires which impair plaque removal by physical method like normal tooth brush resulting in poor oral hygiene and gingival health. Orthodontic appliances present a challenge to the proper removal of plaque from tooth and gingival surfaces[23]. Numerous strategies and measures have been adapted to eliminate plaque and to reduce the bacterial colony counts to preserve the oral health for life time. One among them is toothbrushing. As tooth brushing is considered to be the most common oral hygiene method, dentifrices are the most ideal vehicle for plaque removal. Hence the present study was conducted to evaluate the plaque removal efficiency using novel dye containing dentifrice in enhancing oral hygiene among orthodontic patients as well as to explain the importance of maintaining proper oral hygiene.

The results of our present study were found to be similar when compared to the study done by Stevens K et al[24]. where Mechanical plaque removal by brushing with toothpaste containing plaque-indicating dye significantly reduced plaque compared to brushing with toothpaste without dye combined with proper use instructions. Thus this dentifrice may improve oral hygiene and reduce plaque-related damages to teeth and oral tissues. Toothpaste containing plaque-disclosing dye is more likely to work for patients rather using multiple products concurrently to achieve the same result. This reinforces improved hygiene habits by guiding the patients the areas they are deficient in removing plaque.

In a thesis done by Katharine Emilia Stevens, the greater overall reduction in plaque percentage of the experimental group(using plaque tooth paste containing a green disclosing dye) vs. the control group (using placebo toothpaste which does not contain the green disclosing dye and is white in colour) indicates that the presence of green dye in the test toothpaste helped the subjects identify areas of plaque accumulation than the subjects who brushed with placebo toothpaste[24].

In the present study, patients who were using plaque HD, after being given proper oral hygiene instructions demonstrated significantly better mechanical plaque removal because they were able to visualise the plaque at critical places and remove it because of the presence of dye in it. The long term use of such products promotes better oral hygiene habits. Therefore, this study concentrated on fixed orthodontic patients as they are at

a high risk for plaque related diseases. Hence, plaque HD gave better results when compared to control toothpaste.

Conclusion

To conclude, regular use of Plaque indicating dye containing toothpaste significantly increases plaque removal efficacy, thereby prevents plaque induced dental caries and periodontal diseases.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Institutional Ethics Committee, Saveetha University.

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Prevalence of Disability in Uttar Pradesh: A District-wise Study

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Abstract

Introduction: Information on disability is essential for the government to formulate policies, allocate adequate resources and implement appropriate programmes. The objective of this study was to measure the prevalence of disability and the estimation of distribution of disabilities by gender, advancing age, districts, geographical regions,work and marital status in the Uttar Pradesh.

Method: We analyzed the 2011 Census data of Uttar Pradesh. Age-adjusted disability rates and disability rates per 100 000 population were calculated.

Results: There were 4157514 individuals with disability in Uttar Pradesh in 2011 accounting for a disability rate of 2081 per 100 000 populations. The disability in hearing, seeing, and movement was most predominant with rates of 514, 382 and 339 per 100 000 respectively of the 71 districts, age-standardized disability rates in 20 districts were above the state average of 2081 per 100 000 population. In all kinds of disability there was mostly male predominance in both rural and urban areas across all agecategories.

Conclusion: About 2 in every 100 person in Uttar Pradesh (2080 per 100 000 persons) is either physically or mentally disabled. Disability rates reflect the overall health status of the population. Identification of the underlying causes and employing effective and focused preventive strategies will help to reduce the burden of disability and maximize the quality of life in Uttar Pradesh.

Keywords: *Disability, Age-standardized, Census, Uttar Pradesh.*

Introduction

Any restriction or lack of ability to perform an activity in a manner or within the range considered normal for the human beings, resulting from impairment is termed as disability. Impairment concerns the physical aspects of health; disability is the loss of functional capacity resulting from an impairment organ; handicap is a measure of the social and cultural consequences of an impairment or disability.[1]

Article 41 of the Indian Constitution states that the State shall within the limits of its economic capacity and development;make effective provisions for securing the right to work, education and public assistance in case of unemployment,old age, sickness and disablement. People with disabilities suffer undue hardships and they continue to bemarginalized, discriminated and abused. Moreover, people with disabilities suffer undue hardships and they continue to bemarginalized, discriminated and abused.[2] In December, 2016, the Indian Parliament passed a new law on the rights of persons with disabilities to facilitate greater access to public spaces, education, employment, and healthcare, and the integration and protection of rights, particularly of persons with mental illness or disability.[3]

It is essential that access to affordable healthcare and rehabilitation be offered to persons with disability. In India, the major sources of statistics on disability are the decadal Population Censuses and the regular large scale sample surveys on disability conducted by National Sample Survey Office (NSSO).[4]Although both

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sources are used to provide representative estimates of the prevalence of various disabilities,but differ in terms of their coverage, the definition of disability they use, and the specific types of disability they track.[5] The 2011 census, which covers the entire population of India, provides reported information on disability as a medical condition (seven types of disability and one category for multiple disabilities).[6]

Census 2011 reported that, In India out of the 121 Cr population, 2.68 Cr persons are 'disabled' which is 2.21% of the total population. Among the disabled population, 56% (1.5 Cr) are males and 44% (1.18 Cr) are females. In the total population, the male and female populations are 51% and 49% respectively. Across the country, the highest number of disabled persons is from the State of Uttar Pradesh. Nearly 50% of the disabled persons belonged to one of the five States namely Uttar Pradesh (15.5%), Maharashtra (11.05%), Bihar (8.69%), Andhra Pradesh (8.45%), and West Bengal (7.52%). Moreover, The State of Uttar Pradesh is home for the highest number of disabled children (0-6 years).[7]

There is a need to quantify the burden of disability since this information is essential for the Government to formulate policies allocates adequate resources and implements appropriate intervention programmes for persons with disability.

The objective of this analysis was to measure the prevalence of disability and describe the types of disability in the Uttar Pradesh population based on the available dataon disabilities in the public domain under the Census 2011 database. We also estimated the distribution of disabilities by gender, advancing age, districts, geographical regions,work and marital status in the population.

Materials and Method

The Census in India is conducted once every 10 years following an extended de facto canvasser method.[8]The census questionnaire had three questions pertaining to disability which captured information on (i) presence of mental or physical disability (Yes 1, No 2); (ii) disability type (seeing 1, hearing 2, speech 3, movement 4, mental retardation 5, mental illness 6, any other 7, multiple 8); and (iii) the nature of disabilities (maximum of 3) in people in whom the response to the second question was 'multiple disability'.[6]

Data Analysis: Disability rates per 100 000 population were calculated. The 2011 data from C20 Table pertaining to Uttar Pradesh was used for the numerator which consisted of the number of disabled persons by type of disability, age, gender and type of residence (rural/urban).[9] The denominator was obtained from C-14 five-year age group data by residence and sex from Census 2011. This table provides information on the number of people in Uttar Pradesh as well as in districts in various age groups (5 yearly) starting from 0–4 years, up to 75–79 years and 85+ years. In addition, information on residence (rural/urban) and gender was used.[10] The following tables from Census 2011 were used to calculate disability rates related to literacy level, marital status, work status and social group: PCA-09, DDW-0900C-02-fer3-MDDS, DDW-C20-0900, DISAB03-0000, DDW-0000C-21, DDW-0000C-23, DISAB04SC-0000 and DISAB04ST-0000.[11]

Age-adjusted disability rates calculated by the direct standardization method were used for comparison and ranking of the districts with respect to each type of disability. The data were analyzed using Microsoft Excel windows 2016.

Results

There were 4157514 individuals with disability in Uttar Pradesh in 2011 accounting for a disability rate of 2081 per 100000 populations (2.08%; 2011 population of Uttar Pradesh: 199812341).

The disability in hearing, seeing, and movement was most predominant with rates of 514, 382 and 339 per 100,000 respectively. Disability rates in mental retardation, multiple disability, speech and mental illness were 91, 109, 133 and 38 respectively.

Disability in hearing, seeing and movement is 24.71%, 18.36% and 16.29% of the total disability burden. In addition, mental retardation, multiple disabilities, disability in speech and mental illness constituted 4.37%, 5.24%, 6.39% and 1.82% of the total disability, respectively. The remaining 22.78% of disability was due to other causes.

Disability rates in districts of Uttar Pradesh: of the 71 districts, age-standardized disability rates in 20 districts were above the state average of 2081 per 100 000 population. Moreover, disability rate ranged from 1447 to 3922 per 100 000 population (Fig.1). Kushinagar, Ghaziabad, Allahabad had the highest disability rates of 3922, 3102, 2992 per 100 000 population, respectively.

Jyotiba Phule Nagar, Balrampur districts had the lowest rates of 1247 and 1294 per 100 000 population, respectively.

Disability in seeing (1517 per 100 000) and hearing (1138 per 100 000) were both highest in Kushinagar district. Disability in movement and speech was highest in Auraiya (577 per 100 000) and Pratapgarh (242 per 100 000) respectively.

Disability rates by demographic variables: Disability rates increased as age advanced with the highest rate of4276 per 100 000 among people aged 60 years and above (Table 1). The disability rates were higher in males (2263 per 100000) and in urban areas (2227 per 100000) (Table 1).

The disability rate among the Scheduled Castes was higher (2279 per100 000) compared to the Scheduled Tribes and other social groups.

Higher disability rates were also observed among illiterates (2331 per 100 000), and in 'widowed, separated, divorced' taken together (4529 per 100 000) people. However, disabilities in working class (2198 per 100000) were higher than non-working class (2023 per 100000). (Table 1).

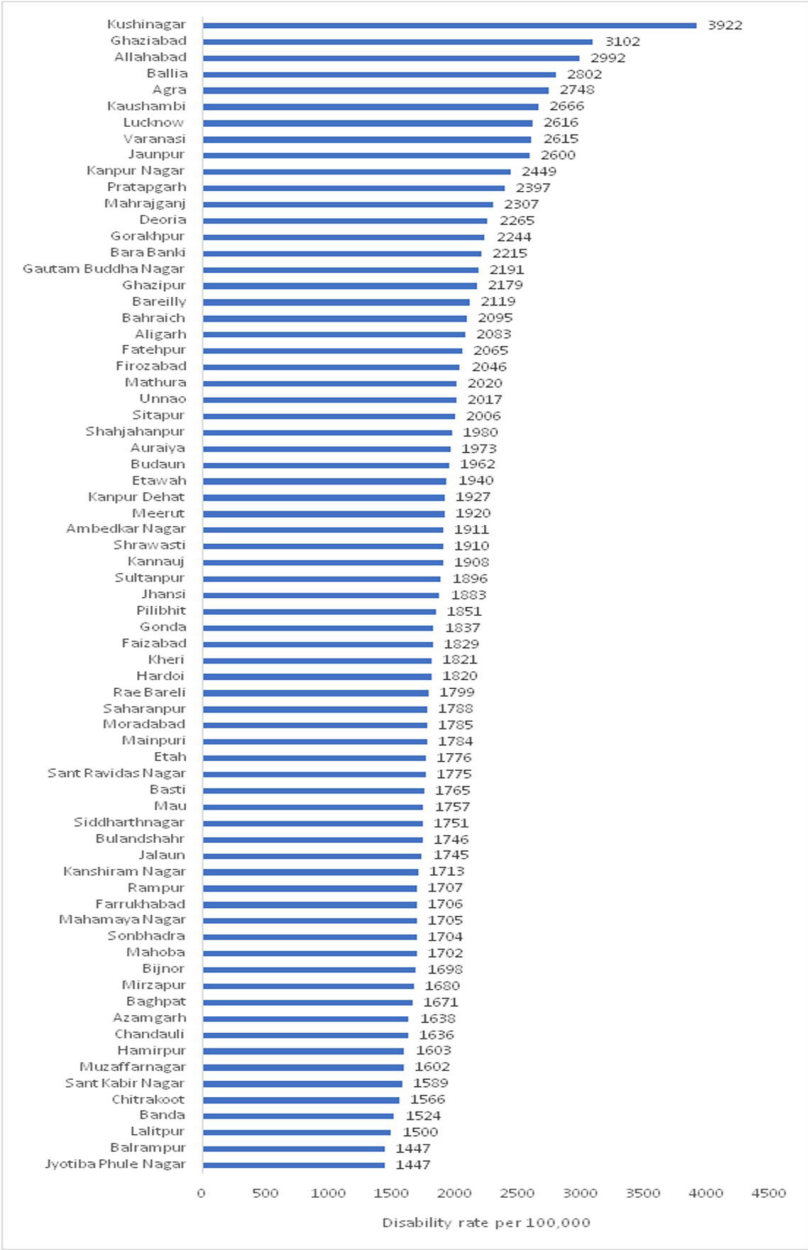


Figure 1: Age-standardized disability rates per 100,000 in the districts of Uttar Pradesh, 2011

Table 1: Disability rates by basic demographic variables in Uttar Pradesh, 2011

Demographic Characteristics		Total Population	Total Disabled	Disability Rate per 100,000
Age in Years	0-19	94348646	1551148	1644
	20-39	57669381	1193540	2070
	40-59	30732348	711070	2314
	≥60	15439904	660245	4276
	Age not stated	1622062	41511	2559
Gender	Male	104480510	2364171	2263
	Female	95331831	1793343	1881
Location of residence	Rural	155317278	3166615	2039
	Urban	44495063	990899	2227
Social groups	Scheduled Caste	41357608	942478	2279
	Scheduled Tribe	1134273	23078	2035
	Others	157320460	3191958	2029
Marital Status	Never Married	105471588	1989084	1886
	Currently Married	86450758	1811099	2095
	Others (widowed, separated, divorced)	7889995	357331	4529
Literacy level	Literate	114397555	2166693	1894
	Illiterate	85414786	1990821	2331
Work status	Working	65814715	1446393	2198
	Non-working	133997626	2711121	2023

Types of disability by age, gender and residence: Disability rates associated with seeing, hearing, speech and movement increased as the age advanced with rates of 1112, 947,163 and 878 per 100000 respectively, in the age group 60 years and above (Table 2). Mental retardation decreased with advancing age and was lowest with 70 per 100 000 in the age group 60 years and above. Mental illness was high in the age group 40–59 years with a disability rate of 54 per 100 000. Multiple disabilities were remarkably high in 60 and above age group (396 per 100000) in comparison to other age groups.

In all kinds of disability there was mostly male predominance in both rural and urban areas across all age categories (Fig. 2). In seeing, hearing, speech, mental retardation, and mental illness, and any other kind of disability the disability rate was higher in urban areas in comparison to rural areas in almost all age groups. In movement, there was more disability in rural areas than in urban areas in all age groups. In multiple kind of disability there was also rural dominance in all age group except 0-19 years.

Table 2: Differences in type of disability based on age groups in Uttar Pradesh, 2011

Type of disability	0-19 Years (n=94348646)		20-39 Years (n=57669381)		40-59 Years (n=30732348)		60 Years and above (n=15439904)	
	Total Disabled	Per 100,000	Total Disabled	Per 100,000	Total Disabled	Per 100,000	Total Disabled	Per 100,000
Seeing	267013	283	179377	311	138620	451	171630	1112
Hearing	414367	439	284437	493	171611	558	146225	947
Speech	108924	115	83232	144	46685	152	25236	163
Movement	190568	202	232250	403	115305	375	135521	878
Mental Retardation	76168	81	63353	110	29600	96	10852	70
Mental Illness	23476	25	29262	51	16563	54	6822	44
Any Other	390735	414	273282	474	166429	542	102841	666
Multiple	79897	85	48347	84	26257	85	61118	396

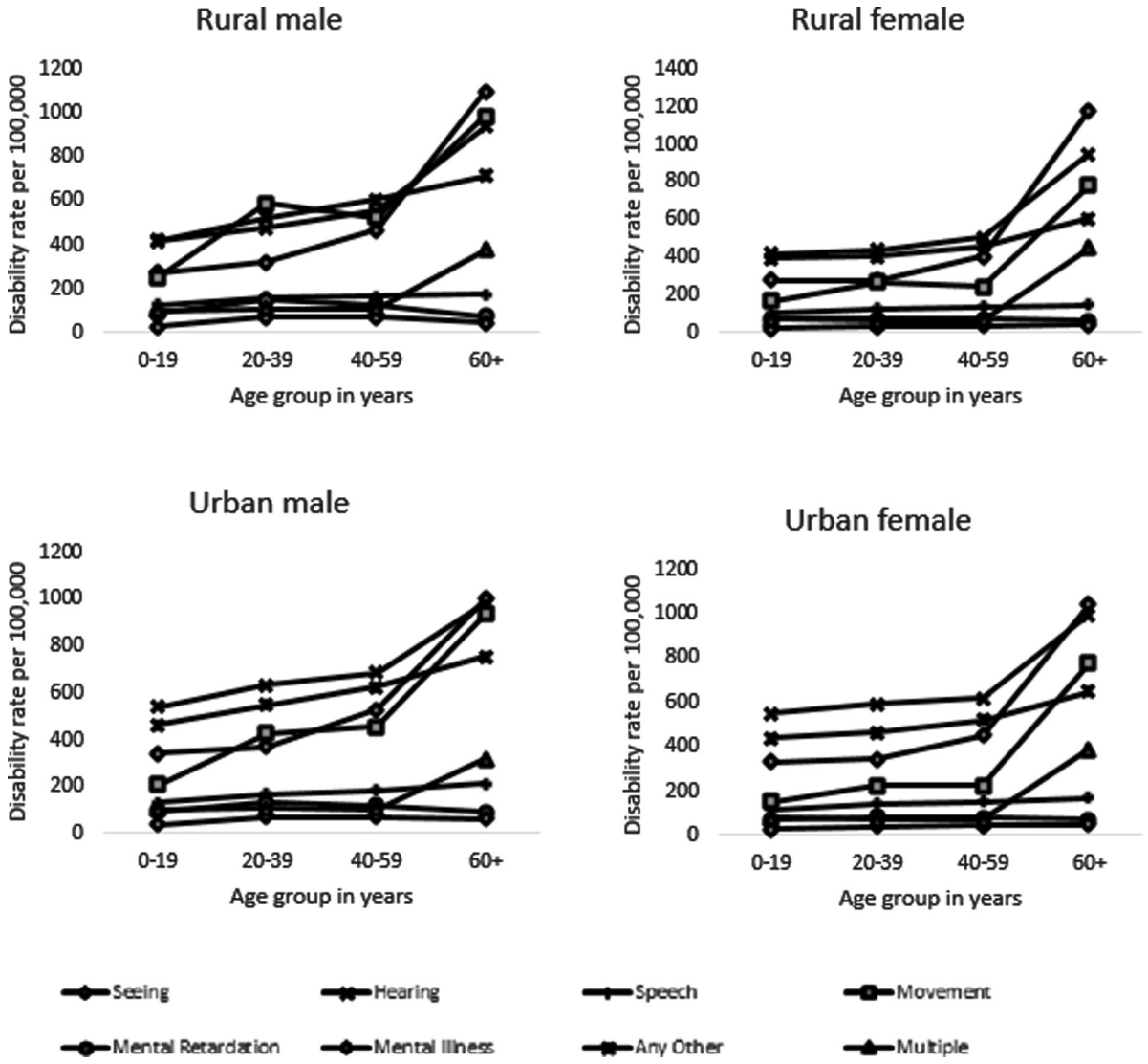


Figure 2: Disability rates by age, gender and location of residence (urban/rural) according to the type of disability in Uttar Pradesh, 2011.

Discussion and Conclusion

We observed that about 2 in every 100 person in Uttar Pradesh (2080 per 100 000 persons) is either physically or mentally disabled based on the data of Census 2011. This is similar to the analysis of 14 household surveys from 13 developing countries,which suggested that 1%–2% of the population have disabilities.[12] In the USA, overall 22.2% of adults reported any disability in 2013.[13] However, the prevalence rates for disability are not strictlycomparable owing to the differences in the definition used in different countries and different surveys.

According to census 2011, the states of Jammu and Kashmir, Sikkim and Odisha had 2.9% disabled in their population, which was more than UttarPradesh whereas some states like Assam, Meghalayaand Mizoram had lower disabled population (<1.5%).[14] The reason for suchdifferences could be because of differences in healthcare facilitiesand access to healthcare. However,this needs further exploration and research for varied disabilityrates across different states in India.

There ishigher disability rates in urbanareas compared to rural (2.22% v. 2.03%) in U.P. This is different from overall Indian scenario, which showed disability rates of (2.17% vs. 2.24%).[14] The geographical variation observed in our analysis needs to be explored further to generate evidence that would help in designing locally relevant interventions.

The observation of male predominance in disabilities with 2.3% to that of female 1.9% in this analysis is similar to that of higher disability rates in India among males which was 2.4% compared to that of females 2%.[14] This highlights the need to address the gender angle in the disability burden through appropriate strategies.

The disability in mental retardation and mental illness in Uttar Pradesh were 91 and 38 respectively. The reasons for mental retardation were serious illness or head injury during childhood, pregnancy and birth-related effects and hereditary disorders.[15] Understanding the causes of disability is important to plan appropriate preventive strategies and research is warranted in this area.

'Elderly' is defined as a person who is 60 years or more in age.[16] We observed the burden of disability to be high in the elderly in Uttar Pradesh. This would probably increase since the proportion of the elderly (>60 years) in India by 2026 is projected to be 12.17% of the overall population compared to 8.6% in 2011.[17] The absence of a strong safety net policy makes the disabled elderly vulnerable.

The observation of high burden of mental retardation, mental illness in the age group of 20-59 years and also the burden of movement, hearing related disability in these age groups (economically productive age group) in our analysis is a matter of concern.

Persons with disability could have been disadvantaged in getting educated, married and this might be reflecting high disability rates in those sections of the population observe din our analysis. Lower educational attainment among adults with disabilities has been reported from developing countries.[18] A study from the Organization for Economic Co-operation and Development (OECD) in 27 countries reported that persons with disability have significantly lower levels of education and working age persons with disabilities experience significant labour market disadvantage than working-age persons without disabilities.[19] The lives of disabled people are affected by poor health outcomes,lower educational achievements, less economic participation,high rates of poverty and increased dependency.[20] The Government of Uttar Pradesh is responsive to the needs of the disabled and offers many schemes and scholarships for rehabilitation of the disabled.[21]

Disability rates reflect the overall health status of the population.We have presented the estimates of disability prevalence, geographical and gender differentials in the disability rates in Uttar Pradesh. To understand the reasons to explain these, additional research studies will have to be planned out in regions and population groups with a higher burden of age-standardized disability. Identification of the underlying causes and employing effective and focused preventive strategies will help to reduce the burden of disability and maximize the quality of life in Uttar Pradesh in the years to come.

Source of Funding: Self

Ethical Clearance: Not required as the data is in public domain.

Conflict of Interest: None

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Lumbosacral MRI Findings in Chronic Lower Back Pain

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Abstract

Background: Low back pain (LBP) is one of the most common musculoskeletal disorders demanding hospital visits. Inter vertebral disc degeneration is a known cause of chronic low LBP back pain. The relation between changes in the lumbar spine and lower back pain is controversial.

Objectives: To assess LSS MRI findings in patients with CLBP, and to show the relation of disc degeneration with age and gender.

Material and Method: 218 adult patients with chronic lower back pain (pain more than 12 weeks) did Lumbosacral spine MRI, at Azadi Teaching Hospital/Kirkuk city, from March/2017 to April/2018, those with a positive history of spinal pathology other than osteoarthritis were excluded. The disc degenerative MRI changes at each lumbar disc were assessed and correlated according toage and gender.

Results: 146 of patients were male, and 72 of them were female, their age ranged from (16-73 years). Males and elderly patients were affected by disc degeneration more. 92.2% of patients had disc degeneration, followed by disc contour abnormality, facet joint arthrosis, high-intensity zone (HIZ), spinal canal stenosis, Modicchanges (MC), Schmorl's nodes (SN), and spondylolesthesis. L4-L5 disc was the most commonly involved level by disc degeneration, followed by L5-S1 disc, the least level was L1-L2.

Conclusions: Most patients with CLBP have DDD. Older males are the most susceptible people to develop DDD which affect most commonly L4-L5 disc level, other findings may associate with DDD are MC, SN, HIZ, facet joint arthrosis, spinal stenosis, and spondylolesthesis.

Keywords: *Chronic, lumbosacral, lower back pain, MRI.*

Introduction

Low back pain (LBP) is one of the most common musculoskeletal problems demanding hospital visits, and the main contributing cause of disability in adults. LBP occurs in most of the people during any period of life[1,2,3,4,5] Although several causes have been implicated in lowback pain, disc degeneration disease (DDD) is a known cause of this pain[6,7]. Chronic pain is defined as pain for more than 12 weeks.[8]

DDD of the lumbosacral spine (LSS) in adults can start in the third decade of life.[6]. There are several risk factors related to disc degeneration in the LSS, including age, increased physical loading, obesity, and genetic influences.[4,9,10]

Magnetic resonance imaging (MRI) is often requested and of choice in the management of patients with LBP as different abnormalities can be seen on spinal MRI[11,12,13] LSS MRI findings of DDD include decreased disc space, decreased signal intensity on T2W images which indicates disc dehydration. Disc degeneration on T2-weighted sagittal magnetic resonance images of the lumbar spine is appeared and graded as:

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Grade (0): Normal No signal changes; Grade (1): the signal intensity of the nucleus pulposus is slightly decreased; Grade (2): seen as hypointense nucleus pulposus with preserved disc height; Grade (3): seen as hypointense nucleus pulposus with narrowing of disc space.[14]

Disc degeneration may be associated with disc bulging/herniation, and high-intensity zone(HIZ).[9,15] Herniated disk is defined as a "focal displacement of nucleus, cartilage, a piece of annulartissue or fragmented apophyseal bone beyond the space of the intervertebral disc.Disc displacement most commonly is classified into fivegrades (normal, disc bulge, protrusion, extrusion, and sequestration).[16,17] (HIZ) represents tear in the annulus fibrosus of the disc, seen as very bright signal intensity on T2 weighted images at the posterior part of the disc[18] Other findings which associated with DDD include Modic changes (MC), Schmorl's Nodes (SN), facetjoint degeneration, spondylolesthesis, and spinal stenosis.[19]

This study was done to assess LSS MRI findings in patients with CLBP, and to showthe relation of DDD with age and gender.

Patients and Method

Subjects: Inclusion criteria:Two hundred eighteen (218) adult patients with chronic lower back pain (more than 12 weeks) were sent to MRI department at Azadi teaching hospital/Kirkuk city/Iraq, as a part of the management of lower back pain, over the period fromMarch/2017 to April/2018. Their ages range from 16 to73 years.

Exclusion criteria: Those who had a history of spinal surgery or back trauma, known spinal pathology, malignant diseases,and athletes were excluded from the study.Clinical information was obtained from the documentation ofphysicians.

Imaging: All lumbosacral spine MRI examinations were done using the 1.5-T unit (Philips Acheiva,

Netherland (2010) with a dedicated lumber coil, imaging protocol was as follows:

1. T1-weighted sagittal Turbo spin echo (TSE) with 8 msec echo time (TE) and 500 msec repetition time(TR).
2. T2-weighted sagittal TSE with 100 msec TE and 4000 TR.
3. T2-weighted axial TSE with 120 msec TE and 4000 TR, and
4. Myelography with 1000 msec TE and 8000 TR.

The images were interpreted by two board-certified radiologists with 7 years experience, anydifference in opinion were settled by consensus.Each lumber level of 218 patients was assessed for disc degeneration scoring, disc bulging and herniation, HIZ,presence of MC, SN, facet joint degeneration, spondylolesthesis, and spinal stenosis.

Statistical analysis: It was a cross-sectional analytic study. The study population demographic criteria including age in years, weight in kilograms (kg), and height in centimeters (cm)were expressed as means(SD). Percentage of Disc degeneration at different lumber disc levels was assessed and related to gender and age, total degeneration score was estimated for each patient as average degeneration score of all lumbar disc levelsand related to age, using Chi-square test.*P*-value level of less than 0.05 was required for significance.Percentageof disc bulge/herniation, HIZ, MC, SN, sponylolisthese, facet joint arthropathy, and spinal stenosis were also estimated. SPSS software, version 17, was used for the statistical analyses.

Results: The demographic criteria of the study sample were as seen in table 1.

Table 1. The demographic criteria of the study sample

Category	Male ([a]N=146) Mean (SD)	Female (N=72) Mean (SD)	t-value	P value
Age (years)	43.5 (12.1)	42.5 (12.7)	0.5645	0.5730
Height (cm)	174.3 ± 6	161.3 ± 5.8	15.3747	0.0001
Weight (kg)	83.31 ± 14	74 ± 8	5.2332	0.0001

[a]Number.

There were 146 males and 72 females in the study sample; male to female ratio was 2:1, 141males (96.6%) and 60 (83.4%) of females had disc degenerative changes in their LSS MRI.

Males were significantly more affected than females by disc degeneration (*P*=0.0006).

Most of the patients had abnormal MRI findings 201 (92.2%), and only 17 (7.8%) had a normal MRI study. 32 patients were less than 35 years old, 140 patients were 36-55 years old, and 46 patients were more than55

years old. 68.8% of < 35 years old group,95% of 35-55 years old group, and All patients >55 years old group had disc degeneration change. The incidence of disc degeneration was significantlyincreased with advancing age (P<0.001)as seen in table 2.

Table 2. Relation of disc degeneration with age.

Age	Disc degeneration		Total
	Male	Female	
< 35	17	5	22
35-55	98	35	133
>55	26	20	46

The total number of the affected disc was 588 levels of a total of 218 patients. The mostcommonly affect level was L4-L5 in 32%, followed by L5-S1, L2-L3, L3-L4, and L1-L2 in

21.2%, 19.1%, 18%, and 9.2% respectively as seen in figure 1.

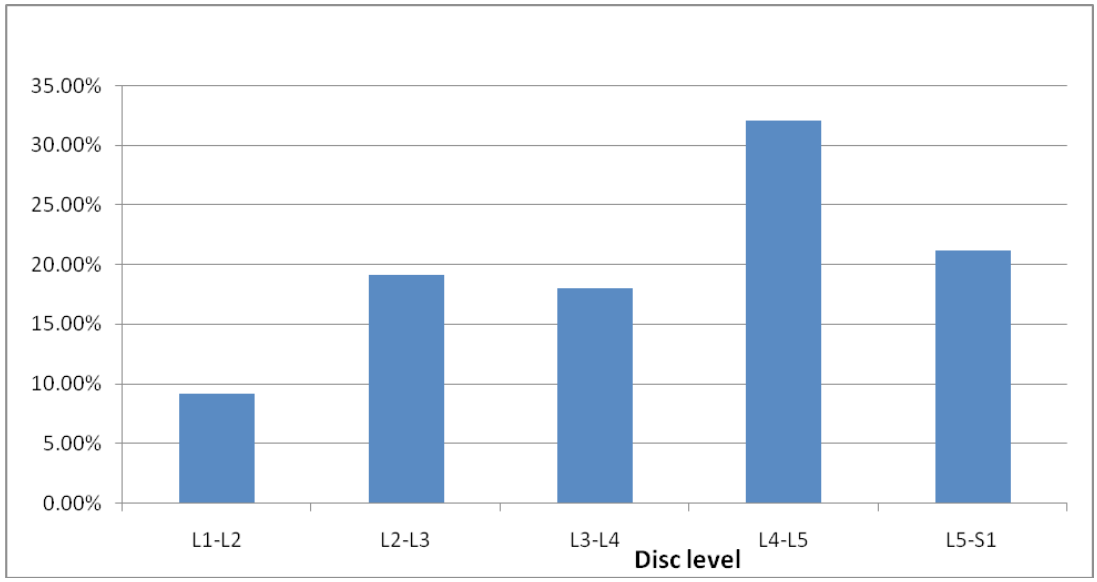


Figure 1: Distribution of disc degeneration according to disc level.

Disc degeneration was present at one level in 25%, and multilevel in 75%. The average disc degeneration score of each patient was score 0 in 7.8% (17 patients), score I in 30.1% (66 patients), score II in 37.2 (81 patients), and score III in 24.8% (54 patients) (Table 3).

Table 3-The relation between disc degeneration score and age.

Age (years)	Total degeneration score				Total
	0	I	II	III	
>35	10	18	4	0	32
36-55	7	40	61	32	140
55<	0	8	16	22	46
Total	**17**	**66**	**81**	**54**	**218**

Score 3 disc degeneration was not seen in <35 year's age group, and all patients who were <55years old group had degeneration with different scores, the score of degeneration was significantlyincreased with increasing age (*P*> 0.001).

Other LSS MRI findings were as the following: disc contourabnormality (70.7%), HIZ (27.8%), SN in (12.9%), MC (19.3%),spinal stenosis (20.4%), facet joint degeneration (45.2%), andspondylolisthesis (6.4%).

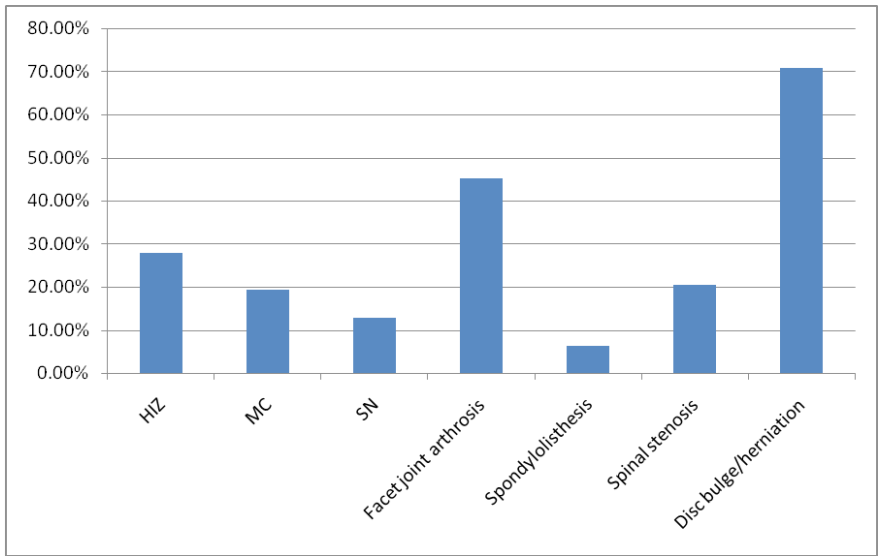


Figure 2: Percentage of MRI changes associated with disc degeneration.

Discussion

Degenerative changes were seen in the majority (92.2%) of patients with chronic lower back pain;most of these changes were observed at L4/L5 and L5/S1 levels and lowest rate of involvementwas noted at L1-L2 level. Similar outcomes had been perceived in most of the previous studies,due to the highest mechanical strain at these levels[20,21,22 and 23].

Multiple disc level involvement was common as compared to the single-disc involvement; which was also in line with past studies.[16, 24] In this study the incidence of disc degeneration significantly increased with age, due to agingprocesswhich involvesdecreased vascularization, and decreased delivery of nutrients and growth factors to the disc.[25] This result was similar to several studies.[20, 26] The fewer percentage of DDD that'sseen in younger age group also noticed in other studies like us, its exact etiology is not clearlyknown, but issues like genetic, autoimmune, and biochemical factors may play a role inthe pathogenesis of disc degeneration.[27]

Males were affected significantly more than females in our study which was comparable with other studies, [28, 29] as men engage in jobs associated with heavy workload compared with women.[30] Mechanical load that contributes to DDD might also have a role in the pathogenesis of disc contour abnormalities, HIZ, MC, and SN[31,23,33]

Conclusions

Most of patients with CLBP have DDD. Older males are the most susceptible people to develop DDD which affect most commonly L4-L5 disc level, other findings may associate with DDD including MC, SN, HIZ, facet joint arthrosis, spinal stenosis, and spondylolesthesis.

Conflict of Interest: None.

Source of Funding: None.

Ethical Approval: The permission was obtained from the Azadi Teaching Hospital Committee and informed consent was obtained from each individual before data collection was begun. Personal data was not explored.

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Spatial Association Patterns of Geographic Factors and Opisthorchis Viverrini Infection in the Northeast of Thailand

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Abstract

Background: Thailand is the world highest prevalence's of Opisthorchis Viverrini (OV) infection. This study aimed to determine the spatial association of geographic factors with OV infection in the highest prevalence region, the Northeast (NE) of Thailand.

Method: This study was conducted using four geographic factors data sets of years 2016 and 2017. A Moran's *I* and Local Indicators of Spatial Association (LISA) were used to identify the spatial autocorrelation between geographic factors and OV infection within the region.

Results: Among the total of 189,231 participants in the NE, the regional prevalence of OV infection was 10.60%. The results indicated a spatial global autocorrelation of geographical factors with OV infections, those geographical factors included water sources including dams, reservoirs, weirs, canals and lagoons; proportion of rice field areas and number of dogs and cats per village, (Moran's *I* values of 0.28, 0.34, 0.11, 0.40 and 0.17, respectively). The LISA analysis identified significant positive spatial local autocorrelation of water resource: one of high-high cluster for the numbers of dams and reservoirs, three low-low clusters for the number of weirs and two of high-high clusters for the numbers of canals and lagoons. In addition, there were two high-high clusters and three low-low clusters of the proportion of rice field areas, and one low-low cluster of dogs and cats with OV infection.

Conclusion: There were spatial associations between physical geographic factors and OV infection in the NE of Thailand which should be taken into new policy recommendations for OV infection control. Especially, in the province with more rice fields, big water resources and had more dogs and cats.

Keywords: *Geographic factors, OV infection, Spatial association patterns, Northeast of Thailand.*

Introduction

Opisthorchis *viverrini* (OV) infection is a food-borne infection caused by a liver fluke[(1)] through consumptions of inappropriately cooked metacercariae, an infective stage of OV[(2-4)]. It was estimated that about 6 million Thai people were infected with OV, of which most of them lived in the Northeast of Thailand[(3)]. The concerned on OV infection is its strongly association with cholangiocarcinoma (CCA),with a high medical care cost worth up to[4] billion baht per year[(5)]. The most common reported causes of OV infection were eating raw or inappropriately cooked fishes[(4,6,7)], sanitation factors such as inappropriate waste disposal[(3,8)],and socio-demographic factors[(7, 9)]. Some previous studies indicated environment especially geographic factors as one of the important risk factors of OV infection includinglived near water reservoirs[(10)], irrigation areas[(11,12)]. Furthermore, dogs and cats were known as a major reservoir for spread of OV infection since OV is a common infection of the civet cat and other fish-eating mammals that spread the disease into the environment through defecation[(3,4,8)].

In Thailand, there have been intensive and continuous control activities on OV infection for more than 3 decades. Most of OV infection control measures were primarily focused on consumption behaviors and sanitation. However, the OV infection prevalence in the Northeast was still higher than 10 percent with the highest prevalence of 23.6-42.49 percent in 5 provinces[(13)] because of the provincial difference in term of health policy implementation and geographical influence OV infection.

Therefore, this study aims to determine the spatial association of geographic factors with OV infection in the Northeast of Thailand to provide comprehensive information for policy recommendations related to disease control and prevention of OV infection.

Materials and Method

Study design and Population: This cross-sectional study used 4 datasets for analysis including 1) a data set on OV infection status of 189,231 participants who registered with the OV-CCA screening project[3], 2) water sources distribution data from the Department of Water Resources[14],3) data on areas of rice field retrieved from the Office of Agricultural Economics[15],and 4) data on distribution of dogs and cats in the area from the Department of Livestock Development[16].The population in this study were people who lived in the Northeast of Thailand. The samples were those who registered in the OV-CCA screening project in years 2016 and 2017 that were screened for OV infection by one of three method including a fecal examination by Kato Katz thick smear, a Parasep stool kit or a Formalin ether concentration technique (FECT). All data sets were merged using postcode of district.

Factors of dependent and independent factors: The independent factors were geographic factors consisted of proportion rice plantation area, numbers of different types of water sources in a district, and numbers of dogs and cats per a village.The dependent variable was the prevalence of OV infection per province.

Statistical analysis: This study used the Quantum GIS program to describe the spatial distribution patterns geographic factors and OVinfection. The GeoDa program was used to analyze spatial autocorrelation by specifying 3 k-Nearest neighbor province that connecting as a criterion to identify grouping which using the weight matrix to analyze spatial correlation[17,18]. Bivariate Moran's *I* analysis was used to identify global autocorrelation within the region. The global autocorrelation statistics provide a single measure of spatial correlation for an attribute in a region as a whole[17,19]. The reports of the Moran scatter plot, consisted of a plot with the spatially lagged variable on the y-axis and the original variable on the x-axis[17,20]. Both variables were standardized and the graph was divided into four quadrants: high-high and low-low indicating positive spatial autocorrelation; and high-low and low-high indicating negative spatial autocorrelation. The slope of the linear fit to the scatter plot equals Moran's *I*[19,20]. The expected value of Moran's *I* is-1/(n-1), and the interpretation is similar to that of the product-moment correlation coefficient. Informally, +1 indicates strong positive spatial autocorrelation, 0 indicates random spatial ordering, and-1 indicates strong negative spatial autocorrelation[17,19].

Then, a LISA was used to determine the local spatial autocorrelation patterns of the variables[19,21]. This computes a measure of spatial association for each individual location. The maps depict the locations with significant Local Moran statistics (LISA significance maps) and classify those locations by type of association (LISA cluster maps)[17]. Which the reports that showed the High-High is an indication of spatial clusters when having a high frequency of geographic factor with a high frequency of OV infection in the identified province with three neighboring provinces. The Low-Low location is indication of spatial clusters when a low frequency of geographic factor with a low frequency of OV infection in the identified province with three neighboring provinces. In contrast, the High-Low and Low-High are indications of spatial outliers[17,21]. The statistical significance level was 0.05. The simulation used 999 permutations to evaluate the sensitivity of the results.

Results

Spatial distribution characteristics of factors: The overall prevalence of OV infection was 10.60%. The highest prevalence was in Srisaket province (18.21%). The quantile distribution in dictated the highest quantile of 13.30-18.20 percent in 5 provinces of Chaiyaphum, Mahasarakham, Kalasin, Surin, and Srisaket provinces (Table 1).The highest quantile distribution of number of dams and reservoirs was in Khonkaen, Nakhonratchasima, Buriram, Srisaket, and Ubonratchathani provinces. The highest quantile of number of weirs were also in Khonkaen,Nakhonratchasima, Mahasarakham, Surin, and Srisaket provinces. In term of number of canals and lagoons the highest quantile of number of canals and lagoons were found in Nongkhai, Nongbualamphu, Kalasin, Roi Ed, and Srisaket provinces. Concerning, the proportion of rice field areas, the highest quantile was in Mahasarakham, Roi Et, Yasothon, Surin, and Srisaket provinces. In addition, the highest quantile distribution of numbers of dogs and cats were found in Khonkaen, Nakhonratchasima, Buriram, Srisaket, and Ubonratchathani provinces.

Table 1: Province ranking on the prevalence of OV infections in the northeast of Thailand

No.	Province	Participants	Percent of OV infection
1.	Srisaket	9,170	18.2
2.	Kalasin	10,879	17.7
3.	Surin	6,562	16.6
4.	Chaiyaphum	7,633	14.1
5.	Mahasarakham	9,698	13.6
6.	Nakhonratchasima	7,189	13.2
7.	Nakhonphanom	17,878	11.3
8.	Roi Et	13,027	11.1
9.	Mukdahan	8,393	10.7
10.	Ubonratchathani	13,155	10.6
11.	Buriram	8,136	10.4
12.	Udonthani	7,945	9.86
13.	Buengkan	8,430	9.28
14.	Sakonnakhon	12,581	8.61
15.	Loei	6,729	8.2
16.	Yasothon	4,037	7.38
17.	Nongbualamphu	6,646	6.58
18.	Khonkaen	10,273	6.19
19.	Nongkhai	10,898	5.52
20.	Amnatcharoen	9,972	2.77
	Total	**189,231**	**10.60**

Factors associated with OV infection: The results of Moran's *I* indicated spatial autocorrelation with the distribution pattern of number of dams and reservoirs in the same direction as the OV infection distribution pattern (Moran's *I*: 0.28). LISA indicated areas with a concentration of dams and reservoirs and high prevalence OV infection with also the high values of surrounding 3 provinces (High-High) was in Surin province. The number of weirs had spatial autocorrelation with the same direction as the OV infection distribution pattern with the Moran's *I* of 0.34. LISA analysis showed cluster of a province with a low concentration of weirs and OV infection with also low values of surrounding 3 provinces(Low-Low). There were 3 low-low clusters found in Loei, Nongkhai, and Amnatcharoen provinces. In addition, there was a spatial autocorrelation of number of canals and lagoons and a distribution pattern in the same direction as OV infection with Moran's *I* of 0.11. The LISA analysis indicated 2 High-High clusters of high concentration of numbers of canals and lagoons and OV infections with also high values of the surrounding 3 provinces in Nakhonratchasima and Roi Et provinces. The proportion of rice field areas in a province had spatial autocorrelation with the OV infection (Moran's *I* of 0.40). Two High-High clusters of proportion of rice field areas and OV infection were in Surin and Sisaket provinces. Two low-low clusters of low proportion of rice field areas and low prevalence OV infection with also low values in 3 surrounding provinces were in Nongkhai and Loei provinces.In addition, there was a spatial autocorrelation of number of cats and dogs per village and OV infections (Moran's $I = 0.17$). There was a low-low cluster Yasothon province indicated the correlation of low concentration of dogs and cats in the province as well as low prevalence of OV infection in the province and the 3 surrounded provinces (Table 2).

Table 2. LISA and Moran's *I* scatter plot matrix of the geographic factors on OV infections in the Northeast of Thailand

Factors	Moran's I	LISA				p
		High-High	High-Low	Low-Low	Low-High	
1. Number of dams and reservoirs	0.2768	Surin*	Nakhonphanom* Mukdahan*			0.05*
2. Number of weirs	0.3398			Loei* Nongkhai* Amnatcharoen*	Buriram**	0.05* 0.01**
3. Number of canals and lagoons	0.1086	Nakhon-ratchasima* Roi Et*			Buriram*	0.05*
4. Proportionof rice field areas	0.3999	Surin** Srisaket*		Nongkhai* Loei* Nongbualamphu*	Ubon-ratchathani*	0.05* 0.01**
5. Dogs and cats	0.1705		Nakhonphanom* Mukdahan*	Yasothon*	Buriram*	0.05*

Discussions

Explaining the findings: The Northeast of Thailand is the biggest region of the country covers about one third of the country land area. There were 20 provinces in the region. The overall prevalence of OV infection in the Northeast of Thailand was 10.6%. The province with highest prevalence were Srisaket followed by Kalasin, Surin, Chaiyaphum, and Mahasarakham province (13.60-18.20 percent).The high prevalence of OV infection were in the provinces with more water resources. Similar pattern of high proportion of rice field areas and high prevalence of OV infection and high prevalence of OV infection was found in a province with had more dogs and cats per village as well. The Moran's *I* and LISA indicated the spatial association between geographic factors and OV infection. We found that there were 6 spatial correlation clusters of water resources and OV infections. Consideringone cluster involved a center province and others 3 surrounding provinces, 18 provinces had spatial pattern of correlation. However, some clusters shared were in the same province, therefore about 16 provinces were involved in the spatial pattern. Possible explanation on water resource were that with more water resources, people could access, catch or buy raw fishes for consumption for whole years. Similar results on association in access to fishes and OV infection was found in the area of Mekong River[22] more irrigation areas with high prevalence of OV infection[11,12] and higher OV infection prevalence in the areas near reservoirs[10]. Concerning the spatial correlation of proportion of rice filed area and OV infection, the possible explanation was that people could catch fishes from rice fields and they more likely consume raw or semi-cooked fish because the fish was still fresh which was consistent with the study of environmental factors affecting the OV infection in the Northeast of Thailand which reported a high prevalence of OV infection in the cultivated area[23] and lowland areas[24]. The positive clustering correlation between numbers of dogs and cats and OV infection in the Northeast of Thailand could be explained by that dogs and cats were more likely to eat raw fish and they also were more likely to defecate in water resources. It was also found in the study on liver fluke infection in Northeast Thailand[25] and the Epidemiology of OV infection[26]. However, some provinces such as Khonkaen, Ubonratchathani provinces had rather low prevalence of OV infection with no spatial autocorrelation with surrounding provinces. The possible explanation might be the impact of immense continuously OV infection control implementations in these public health education institutional provinces.

Conclusions

There was still high prevalence of OV infection in the Northeast region of Thailand.Geographic factors especially water resources,rice field areas, and concentration of cats and dogshad significant spatial autocorrelation withOV infection of most of the Northeastern provinces such as Srisaket, Surin, Nakhonratchasima, and Roi Et provinces. Health sectors and local administration should take into consideration of the geographical factors in their plans for additional surveillance in the high-risk areas as well put more effort on improving knowledge and behaviors of the people in the high geographical risk areas.

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The Effects of Cigarette Smoke on Serum Immunoglobulin Levels of Patient with Chronic Periodontitis (Comparative Study)

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Abstract

The aim of the present study was to determine and compare the periodontal health status and the concentration of serum immunoglobulins by using clinical and immunological analysis between smokers and non-smokers with chronic periodontitis. Total sample composed of forty participants, twenty subjects smokers with chronic periodontitis (group 1) and twenty subjects non-smokers with chronic periodontitis (group 2). All periodontal parameters and serumsample for immunological analysis for (IgA, IgG, IgM) were taken in the same visit. The periodontal parameters include: Plaque index (PLI), gingival index (GI), Probing Pocket Depth (PPD) and Clinical Attachment Loss (CAL) were recorded. The result showes that there was non-significant difference for mean of PLI, G.I and PPD between group 1 and group 2, but with highly significant difference in the mean of CAL the inter group comparison of serum IgA IgG concentration showed a significant different between group 1 and group 2. But there was no-significant difference between group 1 and group 2 considering the mean of serum IgM concentration. The present study indicate that there is association between cigarette smoking and increase periodontal parameters which include PLI.GI, CAL, and PPD with the suppression of immunoglobulin production.

Keyword: *Smoking, periodontal parameters, Immunoglobulins.*

Introduction

Periodontitis is a chronic multifactorial inflammatory disease and manifested through present of periodontal pocketing, gingival bleeding, clinical attachment loss (CAL) and assessed alveolar bone lossradiographically[(1)]. Tobacco smoking is one of the most important risk factors that associated with the destruction of the alveolar bone and loss of attachment in patients with periodontitis [(2)]. In addition, smoking was found to be a good predictor for further bone loss and attachment loss in smoker patients with periodontitis when compared to non-smoker counterparts[(3,4)]. Smoking as an environmental factor has been found that it could interact with host cells and affect inflammatory responses to the microbial challenge [(2)].The effects of smoking include alterations in vascular function, monocyte/neutrophil activities, expression of the adhesion molecule, release of cytokine/ inflammatory mediators and antibody production[(5,6)]. Charu Shrestha et al. showed that the long-term effects of smoking could lead to significant decreases in serum IgG levels. Smokers were found to have lowerserum IgG levels than non-smokers with chronic periodontitis. In addition, it was shown that cigarette smoking could cause suppression in the functions of B cell and effect production of Igs. The authors suggested that alterations in the levels of antibodies can give the explanation for the aggravations found in periodontal disease[(7)]. Hersey et al found that in a group of people who quit smoking, the quantity of lymphocytes decreased and NK activity against cultured melanoma cells increased. Also their serum IgG and IgM concentrations were significantly increased. Therefore these results demonstrated an inverse correlation between smoking status and immune function[(8)].

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Material and Method

Sample population was consisted of forty individuals; systemically healthy males with an age range (35-55) years old. All participants were from subjects attended department of periodontology and department of oral diagnosis, Collage of Dentistry, University of Baghdad.

All the individuals were informed about the purposes of the investigation and consented to its protocol. Smoking and non smoking status were assessed by means of a self reported questionnaire. Questionnaire was designed to include: name, age, full medical history, clinical periodontal parameters (plaque index, gingival index, probing pocket depth and clinical attachment level). Also it included information about how many cigarettes smoked per day and number of smoking years.

The participants were grouped in to 2 categories:

Group 1 included (20) smokers patients with chronic periodontitiswith mean age 40.93±5.41years

Group2 included (20)nonsmokers patients with chronic periodontitiswith mean age 39.93±4.96years. All smoker subjects regularly smoked at least 10 cigarettes per day for at least 5 years and did not quit smoking [9]. Each chronic periodontitis patient had at least 20 teeth, and more than 30% of sites with probing pocket depth ≥ 4mm and or clinical attachment loss ≥ 1mm, as defined by world workshop consensus reports [10]. Any individuals had a history of any systemic diseases, subjects who receive medications (e.g: anti-inflammatory or antimicrobial therapy within the previous 3 months), a history of regular use of mouth washes and any previous periodontal treatment for the last three months were excluded.The following clinical indicesincluding Plaque index (PL.I)[11], Gingival index (GI)[12], Probing pocket depth (PPD) and Clinical attachment loss (CAL) were measured. Five millilitres of venous blood sample were collected. The serum samples were centrifuged at 3000 rpm for 10 min and stored in plastic vials at −20°C till being assessed [13]. Immunological analysis for IgA, IgG, IgM level was estimated by radial immunodiffusion technique of Mancini et al. [14].

Statistical analysis: The data were presented as mean and standard deviation,minimum,maximum. Student's t test (unpaired) were used to determine significant differences between the means. Values of $P < 0.05$ were regarded as statistically significant

Results

The descriptive statistics for PL.I and G.I betweengroups was illustrated in Table (1) it was clearly shown that the means of PL.I were slightly elevated in group 1 (1.660 ± 0.355) in comparison with 1.504 ± 0.457 of group 2.

The mean of G.I in group 1 (0.995 ± 0.197) was slightly lower than the mean score of group 2 which was (1.06 ± 0.147).

Table (1): Descriptive statistics of PL.I and G.I of smokers and non-smokers groups with periodontitis

	PL.I		G.I	
Statistic	**Group1**	**Group2**	**Group1**	**Group2**
Mean	1.660	1.504	0.995	1.06
SD	0.355	0.457	0.197	0.147
SE	0.091	0.118	0.051	0.038
Min	1.08	0.35	0.70	0.82
Max	2.20	2.20	1.30	1.30

Inter group comparison forPL.I andG.I showed that there was no significant difference between group1 and group 2 as declare in Table (2)

Table (2): Inter group comparison of mean of PL.I and G.I between group1 and group2

PL.I			G.I		
t-test	**p-value**	**Significant**	**t-test**	**p-value**	**Significant**
1.317	0.209	N.S	1.154	0.268	N.S

The descriptive statistics for PPD and clinical CAL for groups was shown in Table (3), it was slightly higher in group 1.

Table (3): Descriptive statistics of PPD and CAL for group 1 and group 2

	PPD		CAL	
Statistic	**Group1**	**Group2**	**Group1**	**Group2**
Mean	2.676	2.606	0.960	0.76
SD	0.676	0.688	0.164	0.127
SE	0.17	0.177	0.042	0.032
Min	1.5	1	0.7	0.50
Max	8	7.5	3	2.5

The Inter group comparison of mean of PPD and CAL of groupswas illustrated in Table(4),it was statistically non-significant for PPD, while it was statistically significant for CAL.

Table (4): Inter group comparison of mean of PPD and CAL of group 1 and group 2

CAL			PPD		
t-test	**p-value**	**Significant**	**t-test**	**p-value**	**Significant**
0.162	0.874	N.S	4.275	0.001	S

The mean of serum IgA, IgG and IgM concentration in group 1was lower than in group 2 as shown in Table (5).

Table (5): Descriptive statistics for serum IgA, IgG and IgM concentration between group 1 and group 2

	IgA		IgG		IgM	
Statistic	**Group1**	**Group 2**	**Group1**	**Group 2**	**Group1**	**Group 2**
Mean	186.1	299.9	853.9	1233.5	138.1	195.8
SD	80.95	105.4	182.05	389.7	65.5	100.07
SE	20.9	27.23	47.1	100.6	16.91	25.8
Min	85.9	129.8	699.4	883.1	66.6	71.4
Max	351.8	490.5	1166	1820.9	251.7	376.3

Inter group comparison of mean of serum IgA and IgG concentration of groups showed a significant difference, while it was statistically non significant for IgM as in table (6).

Table (6): Inter group comparison of mean of serum IgA, IgG and IgM concentration between group 1 and group 2

IgM			IgG			IgA		
Sig	**p-value**	**t-test**	**Sig**	**p-value**	**t-test**	**Sig**	**p-value**	**t-test**
N.S	0.133	1.597	S	0.007	3.171	S	0.004	3.382

Discussion

There was no significant difference in PL.I between groups. This result was in agreement with[15,16,17] who showed that there were no significant mean differences between smokers and non smoker, but disagreed with Ustun and Alptekin[18]; Sreedhar and Shobha[4], Ali et al[19] and Mokeem et al.[20].

The reason for the result of our study is that the amount of plaque on the teeth surfaces is mainly depend on personal oral hygiene and frequency of teeth brushing rather than smoking status. People who brushed their teeth more frequently had less plaque than people who brushed their teeth less frequently or occasionally [21]. The result showed that that smoker chronic periodontitis patients associated with lower gingival index than non smoker. This result was in agreement withÜstün and Alptekin[18] and Sreedevi et al [4] who found that gingival inflammation was less pronounced in smokers than non-smokers. The results disagreed with Johannsen et al[22], who found that the smokers associated with increase gingival inflammation. Other studies reported that there were no differences in the inflammatory status between smokers and nonsmokers [16, 4].Smokers with periodontal disease typically have less clinical inflammation and gingival bleeding than non-smokers. This is because of the effect of nicotine with a vasoconstriction that lead to reduce blood flow, edema, and clinical signs of inflammation, which mask periodontal disease in smokers[23]. Smoking masks clinical signs of gingival inflammation because it suppresses the inflammatory response to plaque challenge [2]. The results showed that there was slightly elevated level in the mean of PPD in smokers group when compared with non-smokers group. Statistically, there was no significant difference between the groups. The present findings was in agreement with Preshaw et al (24) who found no significant difference between them, but disagreement with the long term results of Johnson and slach[25].There was significant difference in CAL between groups. These results were in agreement with Luzzi et al [26], Nassrawin[15] andMokeem et al [20], they found that CAL mean score of smokers were higher than non-smokers. Smoking effects both the cellular and humoral immune systems. Its effects throughout the cytokine network and suppresses both chemotactic and phagocytic functions

of polymorph nuclear leukocytes in saliva and tissues [2]. It have been reported that smoking cause suppression in immune responses, impaired stromal cell function, and amplified inflammatory responses.

According to the results, there was significant difference in the serum IgG,IgA between groups.While the IgM concentration showed non-significant difference between both groups, with slightly elevated level in non-smokers in comparison with smokers.This results was in agreement with Graswinckel et al [13], Al-Gamidi and Anil [27] and Charu Shrestha et al [7] who found that there is a reduction in IgG2 concentration in smoker patient.Another study also found that healthy smokers have lower serum IgG levels than do non-smoking individuals; however, no differences were found in the levels of serum IgA and IgM [28]. Previous findings have indicated that no significant differences occur in serum IgM level between smokers and nonsmokers [29]. Prior research has provided evidence that Ig levels (particularly IgG levels) decreased with increased smoking, and these effects were reversible after smoking cession [30].

One of the mechanisms to explain this finding is that smoking decreases the proliferative capacity of T-cells and T-cell-dependent antibody responses which affects B-cell function and antibody generation. It is possible that B-cells are functionally compromised by the reduced proliferative responses to oral pathogens, which leads to decrease in production of serum antibodies. In addition, it has been found that alveolar macrophages from smokers exhibit reduced expression as antigen-presenting cells which leads to a reduction in the humoral immune response to fight organisms in periodontitis patients [31,7].Our study suggests that reduced salivary IgA and IgM levels in smokers with periodontitis could enhance increased susceptibility to periodontitis

Conclusion

The present study indicate that there is association between cigarette smoking and increase periodontal parameters. Also alteration in antibody levels further explains the potential mechanism by which smoking exacerbates periodontal disease.

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Adequacy Level of Energy and Nutrients and Nutritional Status of School-Aged Children with Working Mothers were Lower than those with Non-Working Mothers

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Abstract

The objective of this research was to analyze the relation of maternal employment status to adequacy level of energy and nutrients and nutritional status of school-aged children (SAC). This cross-sectional study conducted from March to May 2016 involved 175 fifth-grade SAC. The results showed that maternal employment status had a significant positive correlation with adequacy level of energy and carbohydrates. Mean Body Mass Index-for-Age (BAZ) of subjects with working mothers was significantly lower than those with non-working mothers. Adequacy level of energy and nutrients, and BAZ of subjects with working mothers tended to be lower than those with non-working mothers.

Keywords: *Elementary school children, maternal employment status, nutrient adequacy level, nutritional status.*

Introduction

The data of Indonesian Ministry of Health in 2010 showed that the national prevalence of underweight and overweight based on BAZ for children aged 5 to 18 years were 12.2% and 9.2%, respectively[1]. The data in 2013 indicated that the prevalence of underweight based on BAZ aged 5 to 18 years was 10.6% and the prevalence of overweight was 12.3%[2]. Underweight or overweight problems, occurring in childhood may affect growth, development, health and incidence of degenerative diseases in adulthood.

Meanwhile the increasing employment opportunities for women and the need to increase household income make more women choose to work. The economic theory states that families with working mothers must trade off the increased income with less time for home-based food production and supervision of children's activities. Such trade-off may produce a positive, negative or non-existent effect on children's nutritional condition[3]. A systematic review has indicated that negative effects of maternal employment status (i.e. overweight and obesity) on children have been proven from several studies in US, Canada and the United Kingdom[4]. However, the results outside those three countries are still inconsistent, either the absence of any influence of the presence of results indicating that maternal employment status decreases Body Mass Index (BMI) value, especially in developing countries in Africa and Asia. In Indonesia itself, there has not been many studies conducted with the main focus to identify the relation of maternal employment status to food consumption and nutritional status of school-aged children. Therefore, the present study was conducted with the aim to analyze the relation of maternal employment status to food consumption and nutritional status of elementary school children in Bogor City.

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Method

Study Subjects: This study used a cross-sectional design. It was conducted from March to May 2016 in four elementary schools. The subjects were selected based on the criterias: 1) fifth-grade elementary school children, 2) had working and non-working mothers, 3) were willing to follow the study and filling out the questionnaire. From the complete questionnaires filled

out by the subjects and their parents, we got 175 subjects to be studied.

Socioeconomic, Anthropometric and Food Consumption Data: The data collected were subjects' characteristics (age, sex, pocket money, body weight and height), family characteristics (parental education and occupation, family income and size), food consumption. The data regarding subjects' and family characteristics were obtained through questionnaires filled out by the subjects and subject's parents, who were guided by the researchers, respectively. Anthropometric data were collected by taking direct measurements of body weight and height in each class of each school. Body weight was measured by using a digital scale with a capacity of 200 kg and 0.1 kg precision, while body height was measured with a stature meter with a capacity of 200 cm and 0.1 cm accuracy. Food consumption data were collected through 24-hour recall.

Statistical Analysis: The data were analyzed using Microsoft Excel for Windows 2007 and SPSS version 16.0. Subjects' nutritional status based on BAZ obtained from anthropometric measurements was then analyzed by using WHO AnthroPlus 2007 software. The associations between variables were analyzed by using Spearman's rank correlation test. Comparative analyses were used to differentiate the variables between the subjects with working mothers and the ones with non-working mothers.

Results

Subjects and Family's Socioeconomic Characteristics: Most of the subjects (71%) were at the age of 11 and more than half of them (54%) were girls. Mean daily pocket money of the subjects with working mothers was significantly higher ($p<0.05$) than those with non-working mothers.

Paternal education level was significantly higher ($p<0.05$) among subjects with working mothers than those with non-working mothers. Education levels of working mothers were significantly higher ($p<0.05$) than non-working mothers. Most of the working mothers (63%) were university graduates, while most of the non-working mothers (41%) were senior high school graduates. Family income of the subjects with working mothers was significantly higher than the ones with non-working mothers.

Table 1. Distribution of subjects based on subjects' characteristics, family's characteristics and maternal employment status

Variable	Working mother (n=72)		Non-working mother (n=103)		Total (n=175)		p
	n	%	n	%	n	%	
Age (years)							
10	1	1.0	5	5.0	6	3.0	
11	52	72.0	73	71.0	125	71.0	0.508
12	19	26.0	25	24.0	44	25.0	
Sex							
Boys	35	49.0	45	44.0	80	46.0	0.521
Girls	37	51.0	58	56.0	95	54.0	
Pocket money (IDR/day)							
Small amount(<6,000)	26	36.0	58	56.0	84	48.0	0.009
Large amount(≥6,000)	46	64.0	45	44.0	91	52.0	
Mean ± SD	8,447±5 337		6,242±3,624		7,149±4,528		
Paternal education							
< Senior high school	11	15.0	26	26.0	37	21.0	
Senior high school	23	32.0	44	43.0	67	38.0	0.007
University	38	53.0	33	32.0	71	41.0	
Maternal education							
< Senior high school	12	17.0	39	38.0	51	30.0	
Senior high school	15	21.0	42	41.0	57	33.0	<0.0001
University	45	63.0	22	21.0	67	38.0	

Variable	Working mother (n=72)		Non-working mother (n=103)		Total (n=175)		p
	n	%	n	%	n	%	
Income (IDR/capita/month)							
Poor (< 271,970)	2	3.0	9	9.0	11	6.0	<0.0001
Not poor (≥ 271,970)	70	97.0	94	91.0	164	94.0	
Mean ± SD	1,734,775±1,211,493		1,161,567±1,491,630		1,397,401±1,408,263		
Family size (people)							
Small (≤ 4)	34	47.0	53	51.0	87	50.0	0.619
Moderate (5-7)	38	53.0	48	47.0	86	49.0	
Big (≥ 8)	0	0.0	2	2.0	2	1.0	
Mean ± SD	4.6±0.9		4.8±1.1		4.7±1		

Food Consumption: Intake of energy and carbohydrates in subjects with working mothers (1330±393 Cal/day and 188±65 g/day, respectively) were significantly lower ($p<0.05$) than the ones with non-working mothers (1534±542 Cal/day and 225±91 g/day, respectively). The adequacy level of energy (70.71±22.58%) and carbohydrates (72.81±27.75%) in subjects with working mothers were also significantly lower ($p<0.05$) than those with non-working mothers (88.03±35.06% and 93.88±41.29%, respectively). However, protein and fat intakes and adequacy levels between the subjects with working mothers and non-working mothers were not significantly different ($p>0.05$).

If categorized by the adequacy level of energy and carbohydrates, most of the subjects (75% and 76%, respectively) with working mothers belonged to deficit category. Meanwhile, most of the subjects with non-working mothers had energy and carbohydrate deficiencies; 55% and 52%, respectively. Maternal employment status had significant positive correlations with adequacy level of energy ($p=0.001$, $r=0.251$) and carbohydrates ($p=0.001$, $r=0.252$). However, there was no significant correlation between maternal employment status and adequacy level of protein and fat.

Table 2. Distribution of subjects based on maternal employment status, intake and adequacy level of energy and nutrients

Intake/adequacy level	Working mother (n=72)		Non-working mother (n=103)		*p*
	n	%	n	%	
Energy					
Deficit	54	75.0	57	55.0	
Normal	18	25.0	28	27.0	
Excessive	0	0.0	18	17.0	
Mean ± SD	70.71 ± 22.58		88.03 ± 35.06		0.001
Energy intake (Cal/day)	1 330± 393		1 534 ± 542		0.020
Protein					
Deficit	49	68.0	66	64.0	
Normal	14	19.0	19	18.0	
Excessive	9	13.0	18	17.0	
Mean ± SD	75.60 ± 34.30		81.68 ± 34.45		0.171
Protein intake (g/day)	41 ± 20		41 ± 16		0.549
Fat					
Deficit	58	81.0	69	67.0	
Normal	6	8.0	19	18.0	
Excessive	8	11.0	15	15.0	

Intake/adequacy level	Working mother (n=72)		Non-working mother (n=103)		*p*
	n	%	n	%	
Mean ± SD	68.60 ± 33.69		78.31 ± 41.08		0.103
Fat intake (g/day)	43 ± 21		45 ± 21		0.406
Carbohydrates					
Deficit	55	76.0	54	52.0	
Normal	12	17.0	24	23.0	
Excessive	5	7.0	25	24.0	
Mean ± SD	72.81 ± 27.75		93.88 ± 41.29		0.001
Carbohydrate intake (g/day)	188 ± 65		225 ± 91		0.012

Nutritional Status: Most of the subjects with working mothers (73%) and those with non-working mothers (80%) had normal nutritional status. Nutritional problems were more commonly found among subjects with working mothers (27%) than those with non-working mothers (20%). BAZ of the subjects who had working mothers (-0.49±1.58) were significantly lower ($p<0.05$) than the ones who had non-working mothers (-0.11±1.54).

Table 3. Distribution of subjects based on nutritional status and maternal employment status

Nutritional status	Working mother		Non-working mother		Total		p
	n	%	n	%	n	%	
Underweight	4	6	6	6	10	6	0.050
Normal	53	73	83	80	136	77	
Overweight	15	21	14	14	29	17	
Total	72	100	103	100	175	100	
Mean ± SD (BAZ)	-0.49±1.58		-0.11±1.54		-0.34±1.57		

Discussion

Education level of the working mothers was significantly higher ($p<0.05$) than non-working mothers. Mothers with high education will more easily receive messages and information about nutrition and child health[5], thus they are expected to be able to determine food with better quantity and quality. Income level of a person will affect the type and amount of food they consume[6]. It is reflected in the changes in the purchase of foodstuff that was originally cheap to food with more expensive price and better quality. The number of family members also contributes to types and quantity of food available in the family[7].

This study indicated that working mothers tended to give a larger amount of pocket money. Parental education, especially the father, has a reciprocal relationship with occupation[5]. Paternal education level directly or indirectly determines family's economic condition. The larger the amount of pocket money given, the greater the chances of children to buy food in canteen or outside school[8].

Adequacy level of energy and macronutrients in children with working mothers tended to be lower than those with non-working mothers. Similar result with our study was also shown by previous study, which proved that the intake of energy and nutrients of 142 preschoolers were significantly higher in children of the non-working mothers than children of the working mothers[9]. However, another study on 350 school-aged children the majority of children with non-working mothers had low energy and protein intake patterns[10].

A significant association was found between maternal employment status and adequacy of energy and protein intakes. Non-working mothers had more time to spend with their children[11]. They could manage the dietary pattern of their children, thus the children usually ate healthy and nutritious food. Food consumption in children was influenced by tradition and habits of the environment where they lived[12]. Non-working mothers were likely to prepare healthier and more nutritious

meals than the working mothers[11]. There is a negative association between maternal employment status and the quality of child's diet[3]. Children with full-time working mothers had lower healthy eating index (HEI) scores than those with non-working mothers. They also consumed less fruit and had lower iron and fiber intakes[3]. There was a significant association between maternal employment status and healthy dietary pattern among children, which was also related to mother's time[13]. Working and non-working mothers were thought to have different impacts on nutritional levels of their children. Housewives were suspected of having more time for their children, while the working mothers might depend on their families, babysitters, and housekeepers to nurture and assured that their children got the appropriate nutritious food.

There were more subjects who fell into energy and macronutrient deficit category than those who fell into normal and excessive categories. However, there were more subjects with non-working mothers that had normal adequacy level of energy and macronutrients. There was a relationship between working mother and child's body weight. Working mothers have less time to cook and prepare food. They may decide to cook less food at home, choose to buy restaurant food or ready-to-eat food. These foods are generally high in calories and not in accordance with balanced diet guidelines[14].

The effect of maternal employment status on school-aged children occurs in terms of the availability of time to prepare food at home. It is different from the preschoolers, in which the effect of maternal employment status mainly occurs through maternal nutrition knowledge[15]. Working mothers had more negative attitudes toward cooking, and they thought that cooking was an activity that they hardly wanted to do. They strongly agreed that lack of time and energy was a barrier to prepare food, and they prepared less food for dinner on weekdays over the last one week of the study[16]. Working and/or non-working mothers with longer working hours significantly allocated less time for preparing food, having meals with children, and supervising children's physical activities than the ones with shorter working hours[4].

The subjects with working mothers tended to have lower BAZ or to be heading to under nutrition. Similar results were also shown by several other researchers. Preschoolers who had working mothers showed signs of malnutrition. In addition, there were 34% of children of working mothers skipping their meal times[17]. Full-time working mothers significantly decreased the chances of children becoming obese by 5.4% and decreased age- and sex-specific BMI by more than three percentiles. However, the risk of obesity increased by 3.7% in children of the working mothers who used child care facilities[18]. Previous studies also indicated the higher prevalence of stunting, wasting and underweight among children of the working mothers, although not statistically significant[7,19].

However, our finding was different from the result of other studies. Other study concluded that maternal working hours had a positive association with child's weight and BMI[9]. There is also positive association between maternal working hours and child's body weight was stronger in sixth-grade children than younger children[20]. The extremely busy work schedules made the working mothers become less able to supervise and participate in every children's activities. Working mothers are often unable to manage the children's dietary patterns. They let their children to eat unhealthy food. Their children also often spend more time in front of the television and do less outdoor activities. Therefore, it may result in children being overweight or obese[21]. Present study showed that the prevalence of overweight and obese subjects (21%) with working mother was one and a half time compared to non-working mother (14%).

Conclusion

Subjects whose mothers worked had more nutritional problems than the ones whose mothers did not work. Adequacy level of energy and macronutrients in subjects with non-working mothers tended to be higher (closer to the adequacy level) than those with working mothers. More attention should be given to nutritional problems (under nutrition or overweight/obese) among children, especially the ones related to the consumption that has not met the nutritional adequacy level. The working mothers should pay more attention to the provision of food that is good in terms of type and amount of food, which may influence the nutritional status of children.

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Spatial Study of Malaria Events and the Effect of Plasmodium SP Density. Against Anemia, Thrombocytopnia and SGPT/ SGOT in Malaria Patientsin Southeast Minahasa District 2017

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Abstract

Malaria affects almost all blood components. One of the most common haematological disorders is thrombocytopenia. Plasmodium infection can cause abnormalities in platelet structure and function. This study aims to spatial/map the spread of malaria incidence, location and physical environmental conditions and chemical breeding places of malaria vectors and analyze the effect of the density of Plasmodium sp on Anemia, Thrombocytopenia and SGPT/SGOT on malaria patients in Minahasa District in 2017. Samples were malaria sufferers April-August came to check up at the existing Puskesmas in Southeast Minahasa Regency, then the data of the coordinates of the house of malaria patients and Anopheles sp habitat and the physical and chemical environmental conditions of the Anopheles sp habitat surveyed using Global Positioning System (GPS). To analyze the effect of plasmodium sp density on anemia, thrombocytopenia and SGPT/SGOT using Chi square test statistics. The results of the study Dissemination of malaria incidence and the distance of Anopheles sp habitat to the homes of malaria sufferers. Physical and chemical environmental conditions in Anopheles sp habitat. in residential areas of malaria sufferers are temperatures 25.1-27.9 0c, humidity 72%-86%, pH 6.2-6.7 and salinity 0 ‰. Plasmodium sp density in 37 malaria patients consisted of 18 + cases, 12 ++ cases, 5 +++ cases and 2 ++++ cases. Statistical test results showed no relationship between Plasmodium sp density and anemia, and there was a relationship between the density of Plasmodium sp to Thrombocytopenia and SGPT/SGOT.

Keywords: *Spatial, Malaria, Anemia, Thrombocytopenia, SGPT/SGOT.*

Introduction

About 96% of the population at risk of contracting malaria in the Southeast Asian region lives in Bangladesh, India, Indonesia, Myanmar and Thailand and causes 95% of malaria cases (both sick and dead) in the area[(1)]. Indonesia is one of the countries where malaria transmission still occurs (at risk of malaria or risk of malaria), where in 2014 there were 252,027 positive cases of malaria[(2)]. North Sulawesi Province is ranked ninth out of 34 provinces in Indonesia with malaria morbidity rate (API) 0.94 per 1000 at-risk population[(3)]. Southeast Minahasa Regency is one of the Regencies in North Sulawesi Province with a high level of malaria endemicity, which in 2015 ranked second highest API number from 15 Regencies or Cities in North Sulawesi Province with a positive malaria case was 447 cases in 2015[(4)].

Malaria affects almost all components of the blood, and thrombocytopenia is one of the hematological abnormalities encountered, and has received much attention in the scientific literature. Plasmodium infection can cause abnormalities in platelet structure and function. Some of the mechanisms postulated to cause thrombocytopenia include immune mediated lysis, sequestration of the spleen and disturbances in the bone marrow[(5)]. Research conducted by Jojera et al (2013)[(6)], in 135 patients who were malaria-positive in Gujarat, India, 89.62% of patients experienced a decrease in platelet count. Thrombocytopenia is a hematological

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finding that is common in malaria and is often used as an indicator of malaria in endemic areas. The liver is the first organ involved in the reproduction of malaria parasites. Transaminase enzyme increases can be observed in malaria patients. Transaminase enzymes include serum enzymes glutamate pyruvate transferase (SGPT) and serum glutamate oxaloacetate transferase (SGOT)[7].

Material and Method

This type of research is analytic with cross-sectional design. The study population was malaria sufferers in Southeast Minahasa regency in April to August 2017. Samples were determined by accidental sampling, namely malaria sufferers from April to August who came to check in at 4 Puskesmas work areas (Tambelang, Touluaan, Silian and Tombatu) number of 37 patients. The mapping of the spread of malaria cases was carried out by observing all the cases of the house made as research subjects with the coordinates of Plasmodium positive malaria cases based on examination of blood preparations. Mapping the habitat distance of Anopheles sp mosquito larvae is done by tracking using GPS on all Anopheles larvae habitat in the research location. Make buffer cases and habitats using the Arc application. GIS version 9.3. Dividing the distance between larval habitat and malaria cases into 3 (three) zones:

1. Red buffer zone, which is the distance of the malaria case house which is closest to the habitat of Anopheles sp mosquito larvae with a radius of 0-100 meters.
2. The yellow buffer zone is the distance of the house of malaria cases which is a bit far from the habitat of Anopheles sp mosquito larvae with a radius of 100-200 meters.
3. Green potential zone (green buffer zone), is the distance of the case house of malaria incidence which is relatively far from the habitat of Anopheles sp mosquito larvae with a radius of 200-300 meters.

Results

The spread of malaria cases based on Plasmodium types in Southeast Minahasa Regency can be seen in Figure 1.

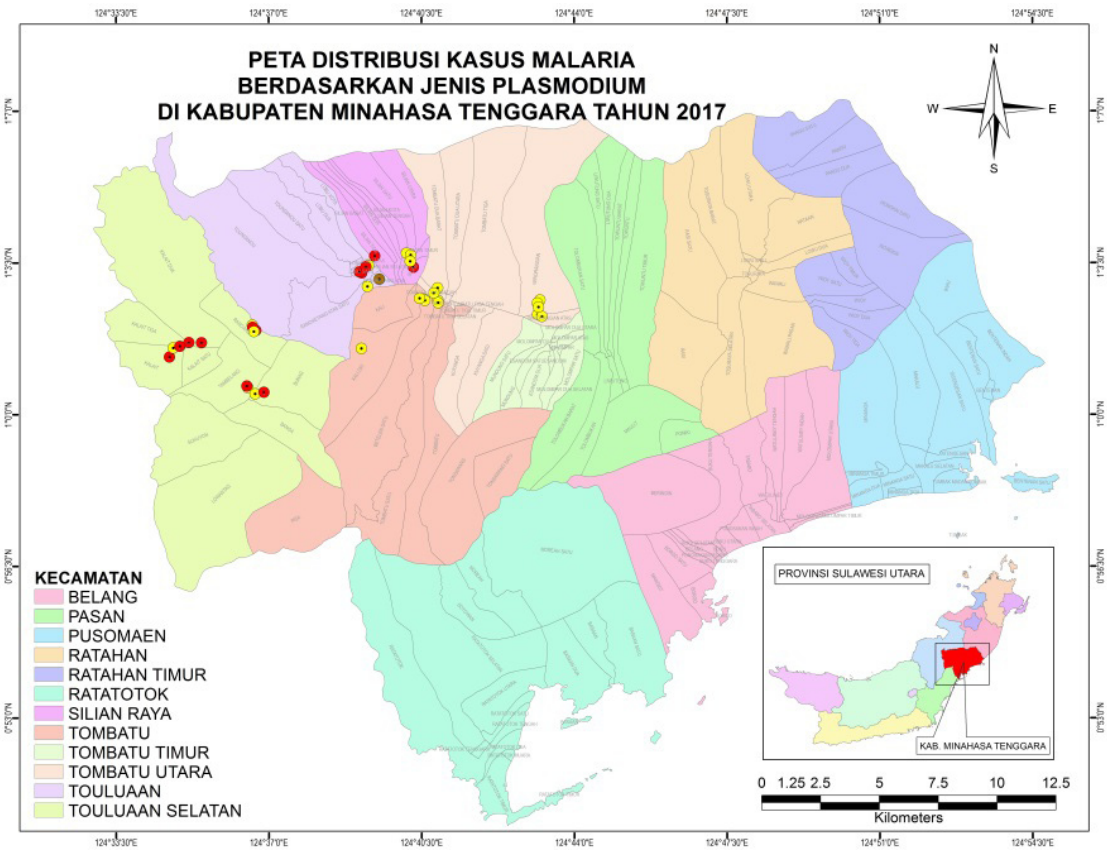


Figure 1: Map of the spread of malaria incidence based on the type of Plasmodium in the Southeast Minahasa District in 2017

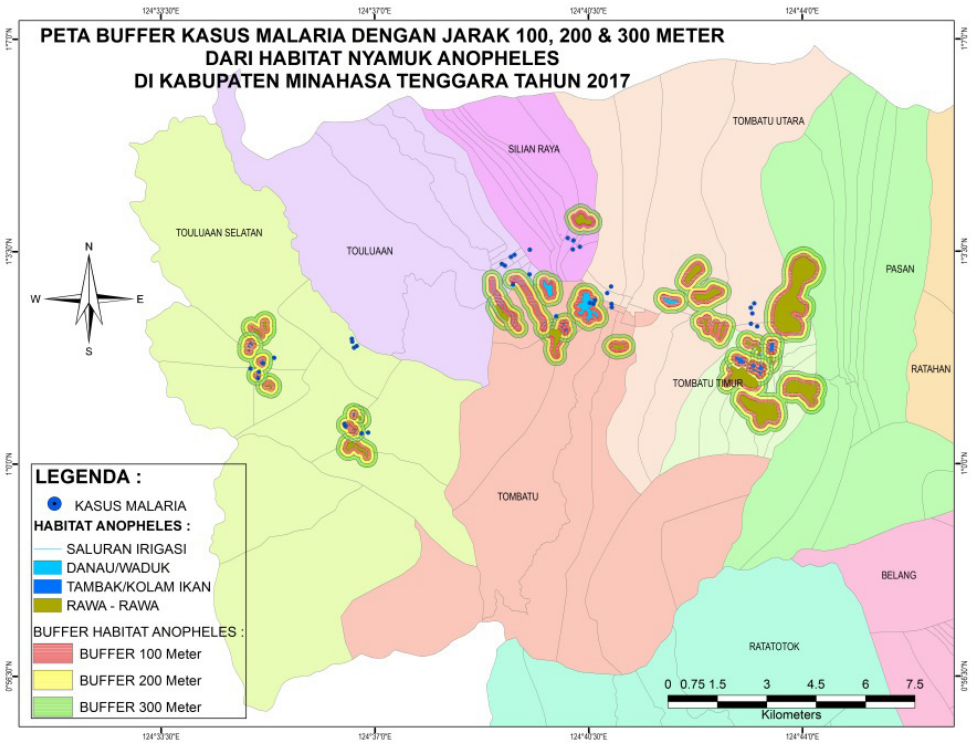


Figure 2: Distance map of Anopheles sp habitat with case houses/malaria sufferers in Minahasa District in 2017

Figure 1. Shows the spread of malaria cases in the Southeast Minahasa District in 2017 totaling 37 cases spread in 18 villages from 5 sub-districts in 4 Puskesmas areas that were the locations of the study. The most cases are in Winorangian Village, namely 5 sufferers. of the 37 patients who were sampled there were 13 patients who were Plasmodium falciparum positive, 23 patients with Plasmodium vivax positive and 1 positive patient with Plasmodium falciparum and Plasmodium vivax mixtures.

Habitat types obtained from Anopheles sp larvae located in the area of malaria cases in Minahasa Regency in 2017 consist of irrigation channels, lakes/ reservoirs, fish ponds/ponds and swamps. Figure 2, 37 malaria cases in the Southeast Minahasa Regency, 4 cases included in the green potential zone, 3 cases in the potential yellow zone, 7 cases in the potential red zone and 23 cases of malaria that were not included in the potential zone. Physical environmental conditions in the breeding places range from 25.2-27.9 (0c) and humidity 72%-86%. Whereas the results of the measurement of chemical conditions in the breeding places around the case location in Minahasa Tenggara District obtained results for the pH in the range of 6.2-6.7 and salinity of 0%.

Table 1 shows the physical environmental conditions (temperature and humidity) and the chemical environment (pH and salinity) in Anopheles sp. in the area of malaria sufferers in the Southeast Minahasa District of 2017.

Table 1: The Physical Environmental Conditionsand The Chemical Environment in Anopheles sp. in The Area of Malaria Sufferers in the Southeast Minahasa District of 2017.

Habitat Type	Physical Environment ($\bar{x}$)		Chemical Environment($\bar{x}$)	
	Temperature (°C)	Humidity (%)	pH	Salinity (Gram/kg)%
Swamps	25.2	72	6.2	0
Irrigation/Sewer Channels	26.6	81	6.3	0
Fishponds	25.1	79	6.7	0
Lake/Reservoir	27.9	86	6.3	0

a. Malaria Distribution Based on Plasmodium Types: Table 2 shows the distribution of malaria in 37 patients infected with malaria parasites in the Southeast Minahasa regency based on the type of plasmodium which found that there were two types of plasmodium with Plasmodium, the most common being Plasmodium falciparum in 23 patients (62.2,%).

Table 2: Malaria Distribution Based on Plasmodium Types in Southeast Minahasa Regency

Plasmodium	Σ	%
P. falciparum	13	35.1
P. vivax	23	62.2
P. malariae	0	0
P. ovale	0	0
Mix Plasmodium	1	2.7
Total	**37**	**100**

b. Plasmodium Density: Table 3 shows 37 samples that are positive for plasmodium and continued by calculating the density obtained with the most results is + with a number of 18 patients (48.65).

Table 3: Plasmodium density in malaria patients in Southeast Minahasa District

Density Plasmodium	Σ	%
+	18	48.65
++	12	32.43
+++	5	13.51
++++	2	5.41
Total	**37**	**100**

Hemoglobin examination results in patients infected with malaria parasites in Southeast Minahasa District. of the 37 malaria patients 23 (62.2%) had anemia because blood hemoglobin levels were below normal. More can be seen in Table 4.

Table 4: Hemoglobin Examination Results for Malaria Patients

Hb examination results	Σ	%
Normal	14	37.8
Anemia	23	62.2
Total	**37**	**100**

Statistical test results of data in table 5, the effect of Plasmodium sp density on thrombocytopenia in malaria patients in Southeast Minahasa District in 2017 using the Chi-Square test showed a relationship with p = 0.022.

Table 5: Thrombocytopenia with Malaria

Trombositopenia	Σ	%
Trombositopenia	22	59.5
Non trombositopenia	15	40.5
Σ	37	100

Statistical test results from the data in table 6, the influence of the density of Plasmodium sp on SGPT and SGOT on malaria patients in Southeast Minahasa District in 2017 using the Chi-Square test showed a relationship with each of p = 0.052 and 0.047.

Table 6: Value of SGPT/SGOT in Malaria Patients

Resultexamination	SGPT <35 u/L		SGOT <30 u/L	
Normal	21	56.8	18	48.6
Ubnormal	16	43.2	19	51.4
Σ	37	100%	37	100%

Discussion

The positive distribution of malaria cases in plasmodium at the study location was in 18 villages with different compositions. Temperature is one of the abiotic environmental factors that greatly contributes to larvae breeding in all breeding places. Based on the results of research conducted in the Southeast Minahasa Regency, the temperature of breeding places ranged from 24.2ºC-27.9ºC. the highest breeding places temperature at 27.9ºC is found in lakes/reservoirs. Temperature measurements in the range of 26 ° C-29ºC. This is a temperature that is ideal for the life of Anopheles larvae in any type of Breeding Places with varying conditions.

There is a difference in breeding places temperatures found by researchers due to differences in geographic conditions where there are breeding places that have protective plants around breeding places and there are also those that do not have protective plants that allow sun irradiation. And directly also due to differences in seasons and time of temperature measurement.

Based on the results of the study showed that the pH in breeding places ranged from 6.2-6.7. The highest pH of breeding places is 6.7 found in lakes/reservoirs. Salinity in breeding places was obtained ranging from 0-14 ‰. Examination of the density of Plasmodium amount in malaria patients from 37 respondents studied there were 18 respondents with the total density (+) (48.65%), and 12 respondents with the total density (++) (32.43%) and for (+++) amounting to 5 patients (13.51%) and 2 patients (++++) (5.41%).

The results of this study indicate that people in endemic areas have paid more attention to their health and immediately went to the health center or to the nearest hospital for the initial symptoms of the disease so that malaria cases can be detected since the initial attack. Besides that at the initial attack, the number of parasites in the peripheral blood is still low so that the parasite density is still low. Patients with ages 15-54 years are 15 people (48.65%) who are adults. This is because this age group is a productive age group where at that age it is possible to work and travel outside the house so that it is more likely to contact the malaria vector. Characteristics of malaria sufferers based on sex, showed malaria patients male as many as 18 people (63.3%) and women as many as 19 people (36.7%). The results of examination of blood smears of malaria patients showed that the most common type of Plasmodium was Plasmodium vivax, which was 23 patients (62.2%). Anemia or decrease in blood hemoglobin levels to below normal values in malaria is caused by excessive destruction of red blood cells by malaria parasites[2]. Examination of 18 patients (78.3%) with very mild anemia, 3 patients (13%) with mild anemia, 2 patients (8.7%) with moderate anemia. The malaria parasite is in the blood for most of its life cycle so it induces changes in the blood. Statistical test results showed that H0 was accepted, indicating a relationship between the type of plasmodium density and platelet count (p = 0.022). These results are supported by research conducted by Jojera et al in 2013[2] in India, where more than 80% of malaria sufferers, both pfalciparum and p.vivax infection, experienced a decrease in platelet counts and 92.48% of cases found in P. infection. falciparum. Thrombocytopenia was also found in patients with vivax malaria, in this study found 23 vivax malaria patients with complications of severe malaria.

Malaria transmission in humans is when sporozoites infect the liver. In the liver the sporozoites mature and form schizon tissue or become dormant hypnozoites. Schizonakan tissue produces a lot of merozoites and then destroys liver cells. Infection of liver cells can cause leakage of parenchymal liver enzymes (transaminases) namely SGOT and SGPT. Echo-erythrocytic cycles of malaria-causing parasitic infections invade the liver and destroy hepatocytes/liver cells thus, causing increased activity of liver enzymes as evidence of liver dysfunction and are associated with membrane integrity[8]. The results showed that there was a relationship between Plasmodium density and levels of SGPT/SGOT. This is because the amount of plasmodium density in 19 patients shows a density of more than +1, where the number of parasites that can destroy erythrocytes in the liver are many.

Damage to liver cells or hepatocytes during the schizogoni cycle results in cellular damage but that does not mean significant liver dysfunction. All types of Plasmodium experience the process of schizogoni in liver cells and then infect and destroy erythrocytes. Jaundice or jaundice can appear as a sign of severe malaria infection either due to severe hemolysis or due to liver involvement. Usually the SGPT value will increase along with SGOT, but increased SGPT indicates that liver function is happening because this enzyme is in the cytoplasm so it is easier to get out of the cell if the cell is damaged by parasites

Conclusions

Dissemination of malaria incidence and distance of Anopheles sp habitat with case houses/malaria sufferers in Southeast Minahasa District in 2017. Physical environmental conditions (temperature 25.1-27.9 0c and humidity 72%-86%) and chemical environment (pH 6.2-6.7 and Salinity 0 ‰) in Anopheles sp habitat. in the area of malaria sufferers in the Southeast Minahasa Regency in 2017. The density of Plasmodium sp consists of 18 + cases, 12 ++ cases, 5 +++ cases and 2 ++++ cases.

There was no correlation between the density of Plasmodium sp and anemia in malaria patients with p = 0.24; there is a relationship between the density of Plasmodium sp to Thrombocytopenia in malaria patients with p = 0.022 and there is a relationship between the density of Plasmodium sp to SGPT/SGOT in malaria patients with p = 0.052 and 0.047

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Silver Nanoparticles that Synthesis by Using Trichoderma Orientlae and Evalute Antifungal Activity

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Abstract

Silver nanoparticles (AgNPs) have been studied as antifungal materials. AgNPs was dependent on several materials for synthesis such as; physical, chemical, and biological ways.Biological way was very important and most eco-friendly approach. In current study, we use *Trichoderma orientale* that gives good diversity and dimensions. The synthesized AgNPs are confirmed by various techniques such as; UV.VIS spectrum, FTIR analysis, and identified the antifungal activity.The peak absorbance of AgNPs for this species used in this study was 500nm. In addition, FTIR analysis was showed the presence of proteins which may responsible for the efficient reduction of nanoparticles. Also, the antifungal activity for T.orientale was identified by using several concentrations such as; 25,50,100, and 150mg/ml, the results obtained from this study revealed that the nanoparticles that responsible for silver synthesis show a significant tolerance to the antifungal activities when isolated by the concentration method. It was observed that the maximum reduction of this fungi at 150 mg/ml of AgNPs.

Keywords: *Silver nanoparticles; Antifungal activity; Trichoderma orientale; FTIR analysis.*

Introduction

Nanotechnology is the first major worldwide research initiative of the 21st century.Nanotechnologies are general purpose technologies that act as both the basis for technology solutions across a range of industrial problems or as a nexus for the convergence of other enabling technologies like biotechnologies, computational sciences, physical sciences, communication technologies, cognitive sciences, social psychology and other social sciences[1].Accordingly, these environmentally-friendly biological systems may be considered as benign nanofactories. It must be pointed out that many such microorganisms are biologically poisonous to humans, animals and plants, and care must be taken in their choice for production of nanoparticles.Nanotechnology has maximized the applications by minimizing the size of particles. The unique size dependent properties make these materials superior and essential in many areas of human activity. Nanotechnology has numerous applications in various fields like medicine, food industries, agricultural fields etc[2]. It is demonstrated that using the dissimilatory properties of an eukaryotic organism such as fungi may be used to biosynthesize and grow nanoparticles. It is shown that certain fungi have the ability of producing extracellular metabolites that serve as agent for their own survival when exposed to such environmental stresses like toxic materials (such as metallic ions), predators and temperature variations[3].In the biosynthesis of metal nanoparticles by a fungus, the fungus mycelium is exposed to the metal salt solution. That prompts the fungus to produce enzymes and metabolites for its own survival. In this process the toxic metal ions are reduced to the none-toxic metallic solid nanoparticles through the catalytic effect of the extracellularenzyme and metabolites of the fungus. The presence of hydrogenase in fungi, such as *Fusarium oxysporum*,*Trichoderma reesei*, and *Trichoderma viride*, was demonstrated with washed cell suspensions that had been grown aerobically or anaerobically in a medium with glucose and salts amended with nitrate. The nitrate reductase was apparently essential for ferric iron reduction[4].

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"Several studies have shown that metal nanoparticles, such as gold, silver, gold-silver alloy, selenium, tellurium, platinum, palladium, silica, titanium, zirconium, quantum dots and magnetite can be biosynthesised by bacteria, actinomycetes, fungi and viruses revised by[5]". There are three main method of synthesizing metal nanoparticles: Chemical, physical andbiological method. The radiation-induced AgNPs synthesis is a simple, clean which involves radiolysis of aqueous solution that provides an efficient method to reduce metal ions[6.] "Antifungal activity of ionic or nanoparticle silver has a great potential for use in controlling sporeproducing fungal plant pathogens. Silver may be less toxic to humans and animals than synthetic fungicides". "In present study, we investigated the biosynthesis of AgNPs using *Trichoderma ortientale*, and its underlying mechanisms, the properties of obtained AgNPs were characterized by ultraviolet-visible spectrophotometer, and FTIR techniques. This work evaluate the efficacy silver compounds for suppression of pathogenic fungi."

Method

Fungal species: This isolation (*Trichoderma orientale*) was taken from the advanced fungi laboratory/ Department of Biology/Faculty of Science/University of Babylon.

Growth Media

Potato dextrose agar (PDA): This media was prepared according to the Indian company (HEMIDIA) by dissolving 39 gm of medium in 1 liter of distill water, mix thoroughly and then added a chloramphenicol that concentration 250mg/ml. It is then sterilized by autoclave at 121°C for 15 minutes, finally cooled to 45°C and poured into sterile petri dishes.

Potato dextrose broth (PDB): This media was prepared according to the Indian company (HEMIDIA) by dissolving 24 gm of medium in 1 liter of distill water, mix thoroughly and then added a chloramphenicol that concentration 250mg/ml. It is then sterilized by autoclave at 121°C for 15 minutes, finally cooled to 45°C and kept into sterile tube.

Biomass preparation: *T.orientale* isolate was grown in a flasks volume 250 ml, each flask containing 100 ml of liquid medium (BDB), this isolate incubated in orbital shaker at 28°C and agitated at 150 rpm for 3 days. After incubation period, fungal biomass harvested through Whatman No.1, later thoroughly wash with deionized waterto remove the effect of culture media from the biomass.After that, 20 gm of soft biomasswith deionizedwater (flask 250 ml) was incubated at 28°C for 3 days and agitated at 150rpm. Finally, the biomass was filtrated using Whatman No.1, fungal filtrate was used for manufacture of nanoparticles.

Extracellular synthesis of AgNPs: In order to manufacture of nanoparticle particle from the extracted fungal filterate, 50 ml of fungal filterate mixed with 50 ml of $AgNO_3$ solution.place the mixture in flask 250 ml and incubate the flasks at 28°C for 3 days. The reaction mixture without silver nitrate was used as control. All mixtures were kept in the dark to ovoid light events during the experiment. Finally, AgNPs were centrifuged at 10,000 rpm for 10 minutes and repeated twice, and collected for further characterization.

Characterization of AgNPs: The first step in the characterization of silver nanoparticles using the U.V-VIS spectrophotometer, where recorded wavelengths at range between 300 to 750 respectively. U.V spectroscopy is a type of analysis used to measure the intensity of light absorbed and disseminated by the sample used. The spectra was used from AgNPs solution showed a peak absorbtion at 500 nm which was designated for nanoparticle particle.

Fourier transform infrared spectroscopy (FTIR): "The chemical composition of the synthesized silver nanoparticles was studied by using FTIR spectrometer **(**perkin-Elmer LS-55-Luminescence spectrometer**)**. The solutions were dried at 75°C and the dried powders were characterized in the range 4000–400 cm-1 using KBr pellet method".

Characterization of antifungal activity: To characterize the effect of antifungal activity, different concentration of silver nitrate solution were used (25,50,100, and 150 mg/ml).Mix 5 ml of each concentration of silver nitrate solution with PDA medium and then pour into petri dishes.After that, incubate the plates that containing silver nitrate solution and PDA at 28°C for two days. After 2 days of incubation, agar disc (5 mm) containing fungi were inoculated simultaneously at the center of each Petri plates containing Ag NPs, followed by incubation at 28°C for 5 days. Finally, growth inhibition is measured by using the following equation:

$$\text{Growth inhibition} = \frac{G - g}{G} \times 100$$

G = radial growth of fungal mycelia for control, g = radial growth of fungal mycelia with silver nanoparticles

Results and Discussion

Extracellular biosynthesis of AgNPs: In the current study, the results were shown the possibility of synthesis AgNPs.*T.orientale*was used in the synthesis of silver nanoparticles based on their high efficiency, rapid growth, and production of large amounts of biomass. In order to distinguish nanoparticles, it was observed the color of fungal filterate that mix with silver nitrate changed from pale yellow to dark purple. This indicates the formation of AgNPs (Figure 1 & 2).A possible mechanism for the conversion of silver ions into nano form by using fungal biomass could be the extracellular reduction of silver ions in the solution followed by precipitation on to the cells. This may be the reason for the gradual change in color of the silver nitrate treated *Trichoderma* supernatant from pale to brown[7,8]. There is no color change noted in the control flask incubated in the same environment.

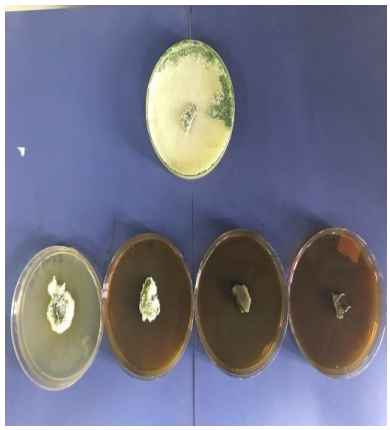


Figure 1: Agar plate of T.orientlae

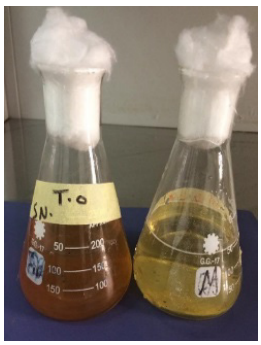


Figure 2: AgNPs biosynthesis A-control, potato dextrose broth with fingi (Negative control) B-Positive results color change AgNPs formation

Characterization by UV-visible spectroscopy: Figure 3 was shown highest absorption of *T. orientale* at 500 nm that treated with silver nitrate, Wherese no absorption of the control was observed. These results were compatible with [9]that confirmed the optimal wavelength of Trichoderma at range between 300-500 nm. According to the characteristic of nanoparticles, it was become important in many areas in recent years such as energy, health care, environment, and agriculture. Many organisms have been used to manufacture extracellular silver nanoparticles, fungi is one of the most important organism that used to synthesis silver nanoparticles by using biological method. The UV-visible spectroscopy studies could be considered as the most useful technique for structure characterization of silver nanoparticles. "[10] confirmed electrons stimulated by an interactive electromagnetic field that called surface plasmon peak.So we confirmed that these isolates have more potential to reduce Ag ions into Ag nanoparticles, which lead us for further research on synthesis of silver nanoparticles. The intensity of absorption peak increase with increasing time. The reduction of metal ions occurs on the surface by the enzymes presented in the cell wall[11] The maximum synthesis wavelength of Ag for *T.orientale*was shown at 500 nm [12].

In addition[13,14] also showed the optimal U.V absorption beak for *Trichoderma sp*at range 400-500 nm.

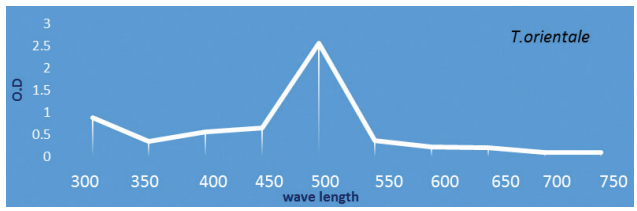


Figure-3: UV-VISSpectrumof AgNPs synthesis by T.orientale

FTIR analysis of Ag-NPs: The silver nanoparticles were analyzed by using FTIR analysis method to establish the relationship between silver and active compounds produced by fungi.These active compounds play an important role in the reduction of metal ions, stability, and AgNPs. The amide linkages between amino acid residues in proteins give a important signature in the infrared region of the electromagnetic spectrum. Therepresentative spectra of nanoparticles obtained manifest absorption peaks located at about 2360 cm^{-1} (aromatic-CH stretching) 1683.966 cm^{-1}(-NHCO of amide) and 825.16cm^{-1} (C-CI). Figure 4 showed the analysis of beaks for *T.orientale*.FTIR analysis was

used to support the presence of proteins to synthesis of silver nanoparticles. The phytochemicals may be serve as reducing agent for the conversion of Ag^+ to Ag 0 and to act as capping and stabilizing agent of AgNPs in the present study[15].

The main important potentially active functionalgroups for Ag-NPs, Ag^+ ions, andanisotropic growth are the Tyr residues from hydroxyl groups and Asp, Glu residues fromcarboxyl groups. The peaks 1384.47 may represent the residual nitrate (NO-3). Peaks at 1154.88 cm-1and 1078.10 cm^{-1}, indicates-N-H and carbonyl (C-O-) stretching vibrations respectively in amide linkages of proteins re. The peak formed at 2921.20cm^{-1} could be due to C-H stretch of methylene groups of proteins[16]. Further, it is reported to be responsible for the prevention of agglomeration of green synthesized AgNPs. Therefore, it is concluded that the phytochemicals/biomolecules present in the above plant sources played a dual role in the formation and stabilization of the green synthesized AgNPs.

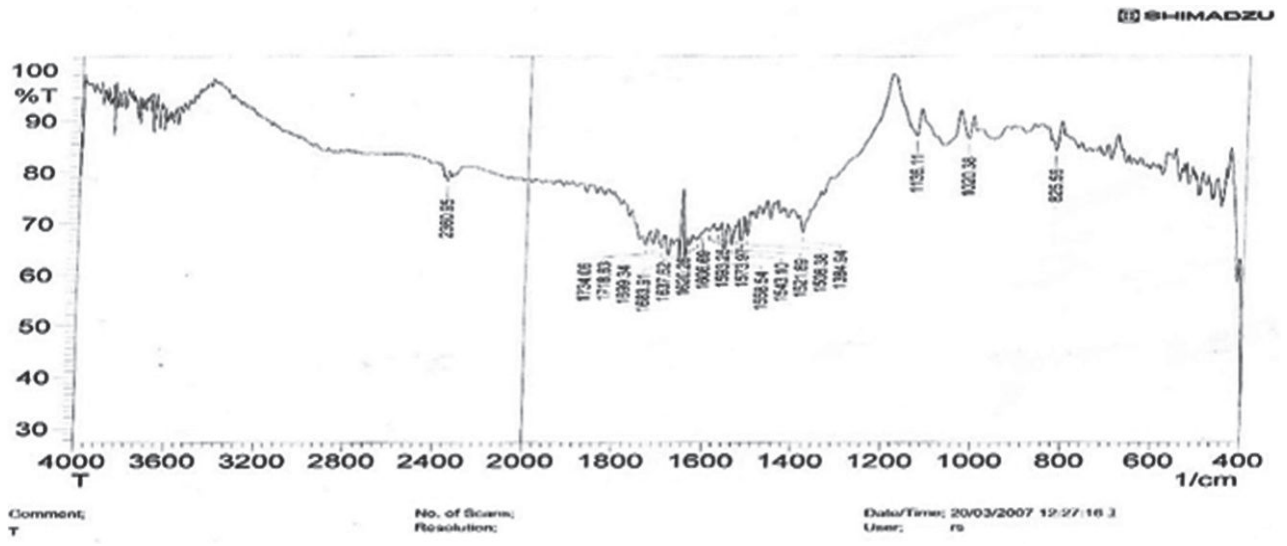


Figure 4: Detection of various functional groups by FTIR from *T.orientale*

Antifungal Activity: In the current study, the growth inhibition of *T.orientale* was tested using different concentration of silver nitrate (25,50,100, and 150 mg/ml). PDA medium was used to study the growth inhibition. After the end of incubation period, the results showed the highest inhibition of this fungus was at 150,100 mg/ml compared with other concentration which also gave inhibition but less at 81.2 and 91.2% respectively, figure 5, table 1. The current results were shown that silver nanoparticles were able to inhibit the growth of *T.orientale*, When the concentration of silver nanoparticles increases the inhibition growth also increased.. In our study, silver nanoparticles were found very effective agent against bio-control agent fungi such as *T.orientale*. There are many mechanisms of inhibitory effect of Ag on microorganisms such as DNA loses its ability to replicate[17]", "resulting in inactive expression of ribosomal subunit proteins, instead of some other enzymes and cellular proteins necessary to the adenine triphosphate production[18]". In addition, it has been supposed that silver ion primarily affects the membrane-bound enzymes functions for instance those in the respiratory chain[19]. "Similar results were previously reported by[20&21], who tested the effect of SNPs on bacteria and fungi using the same method.[21] observed SNPs antifungal activity against several fungi as *candida* spp, *Aspergillus* spp, and *Fusarium* spp, presenting the concentration that effect on fungal species are 150 mg/ml. Recently,[22] showed SNPs possess antifungal activity effects through apoptosis".In previous study, the biological synthesis of silver nanoparticles was found to be most active against the bio control isolates such as *Trichoderma*. The results proved that silver nanoparticles showed maximum activity at high concentration, which revealed silver nanoparticles as novel antifungal agent

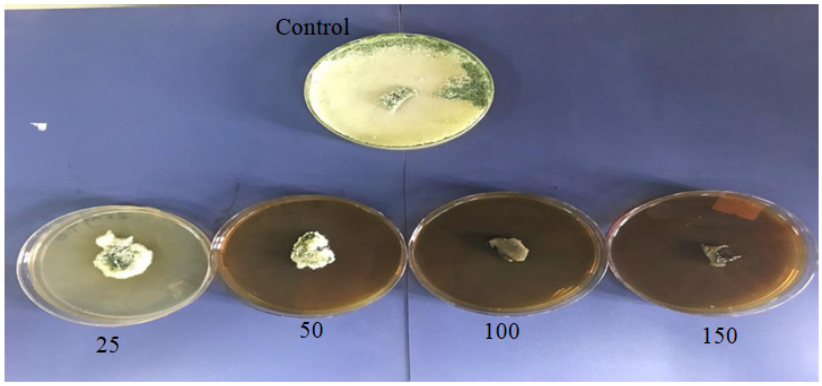


Figure 5: Growth inhibition of extracellular silver nanoparticles against plant pathogenic fungi.

Table (1): Antifungal activity of extracellular silver nanoparticles against fungi (Inhibition%)

Species	Different concentration (mg/ml)			
	25mg	50mg	100mg	150mg
T.orientale	81.2%	91.2%	100%	100%

Conclusion

In conclusion, the bio-control fungus, *T.orientale*has shown potential forextracellular synthesis Ag-NPs. Synthesis of Ag-NPs using the cell free filtrate is rapid. This indicates nanoparticle synthesis from biological process is quick suitable for larger scale production. The characterization of Ag-NPs was through UV visible spectrophotometer and FTIR analysis. Nanotechnology exhibits contemporary and revolutionary approach to formulate and to test the new approaches based on antifungal properties from the metallic nanoparticles. Ag-NPs showed remarkable antifungal activity against*T. orientale*.

Conflict of Interest: None

Funding: Self

Ethical Clearance: Not required.

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Correlation Between the Level of Milk Urea Nitrogen (MUN) when Insemination with Pregnancy Rate and IGF-1 Profile on Frisien Holstein Dairy Cow

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Abstract

MUN is high due to high protein content in feed, Thehigh level of MUN can affect hormonal systems including growth hormone IGF-1 and reduce pregnancy rates. The aim of this study is to determine MUN as an indicator of feed evaluation and see the corelation between MUN and IGF-1 levels and pregnancy rates. The cows according to the criteria were sampled to determine the levels of MUN and IGF-1 then processed with the application curve ekspert 1.4 and SPSS 20. Value r = 0.75 between MUN and IGF-1 stated that there was a strong correlation between the two. There were significant differences between MUN and pregnancy rates (P <0.05). High and low levels of MUN will affect pregnancy rates. All sample of MUN with levels of 17-28.5 mg/dl did not have pregnancy and MUN with levels of > 12 mg/dl was obtained in five out of eight pregnant.

Keywords: *Milk Urea Nitrogen (MUN), IGF-1 hormone,pregnancy rate, Blood Urea Nitrogen (BUN) and Dairy cow.*

Introduction

Protein as a feed substance needed by livestock to fulfill basic life needs.[1] The feed protein that enters the rumen will initially undergo proteolysis by protease enzymes into peptides, then hydrolyze to amino acids which then quickly deaminated to ammonia and α-keto acids.[2] Ammonia as the result of deamination will be absorbed through the rumen wall to the portal blood circulation, which then converted to urea in the liver. [3]Excessive urea will be absorbed by the blood and excreted in the form of urine.[4] The results of urea synthesis originating from blood urea will be used to be recycling through urine and also diffuse into the udder gland to become MUN. [5] The high Urea contained in the blood and milk exceeds the limit of 18 mg/dL, will disrupt the folliculogenesis and reproduction process. [6] And can experience the risk of reducing pregnancy. High MUN concentrations in cattle significantly reduce pregnancy rates only at the first lactation, increasing normal Urea can reduce fertility by 18%.[7] So the researchers wanted to know the correlation between the levels of MUN and IGF-1 levels and pregnancy rates.

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Material and Method

Sampling Technique: The population used in this study was the Frisien Holstein (FH) lactation dairy cow obtained from field and recording data that matched the criteria. The samples taken in this study are milk, blood and pregnancy taken.

Research Locations: The sampling location was carried out on the farm in the precept, Sumbersuko village, Wager sub-district, GunungKawi-Malang.

Proximate Analysis: Proximate analysis is carried out to find out the value of the concentrate and grass given.

Collections Milk Samples: Milk samples were taken when the time of insemination, taken once in the afternoon directly from the 50 ml udder which was put into sterile milk plastic and then stored on the ice box.

Collection Blood Samples: Blood samples were taken 10 ml through the coccygeal vein using venoject and needle on day 0, day 7, and day 22 after insemination and then left in a slanted condition so that the serum could be taken.

Examination of Milk Urea Nitrogen (MUN) levels: The Urea Nitrogen Milk (MUN) referred to in this study is a by product of undigested protein metabolism in dairy cows which the levels are considered the same as BUN and examined by the Barthelot method.

Examination of IGF-1 Hormone Levels: To check serum IGF-1 levels using the ELISA sandwich method.

Data Analysis: The data obtained were analyzed by correlation and regression with expert curve software 1.4 and SPSS 20 software.

Results and Discussion

The Correlation of MUN with IGF-1 Levels: The level of urea nitrogen above 8-12 mg/dl can have a negative effect on reproduction such as: increasing service per conception, decreasing pH in the uterus and disrupting the balance of reproductive hormone levels. [8] Decreased levels of progesterone in blood serum are associated with reduced concentration of IGF-1. The results of this study indicate a correlation or relationship between levels of MUN (Milk Urea Nitrogen) (Figure 1). This study was supported by.[9] stating that dairy cows with BUN levels of ≥18 mg/dl were all not pregnant with low IGF-1 levels. the dairy cows with low BUN levels and are pregnant, they have higher IGF-1 levels, and are lower in non-pregnant cows. IGF-1 hormones are high in pregnant dairy cows, but low in non-pregnant cows. The statement shows that high levels of BUN result in low IGF-1 levels. High blood urea can increase milk urea levels, because theblood urea diffused into the udder gland. Urine nitrogen can be reflected from MUN, because high urine nitrogen will be followed by high MUN levels.[5]

The Correlation of MUNWith Pregnancy Rates: Low IGF-1 levels due to high levels of MUN can interfere with folliculogenesis and reproductive processe.[6]And can caused the risk of reducing pregnancy. High MUN concentrations in cattle significantly reduce pregnancy rates only in the first lactation, MUN ≥18 mg/dl, an increase in normal Urea can reduce fertility by 18%. [10] This study also proves the existence of a correlation between MUN levels and pregnancy rates. MUN in the range of 9-12 mg/dl pregnancy was obtained five from eight samples while MUN with a range of 17-28.5 mg/dl obtained 7 samples did not experience pregnancy (Table 3). This shows that high levels of MUN in cattle can caused the rate of pregnancy decreased.

Table 1. Table of results of expert curve analysis 1.4.

Day	S	R	Interpretations
0	42.024	0.68	High
7	36.606	0.71	High
22	34.121	0.75	High

Table 2. Table of interpretations of r values (Guilford., 1956)

Correlation coefficient r	Interpretations
0,80-1,00	Very High
0,60-0,80	High
0,40-0,60	Enough
0,20-0,40	Low
0,00-0,20	Very low

Table 3. Statistics table for pregnancy rates

		Pregnancy Rates		Total
		Not pregnancy	Pregnancy	
Treatment	MUN 9-12	3	5	8
	MUN 13-16	2	1	3
	MUN 17-28,5	7	0	7
Total		**12**	**6**	**18**

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.563[a]	2	.038
Likelihood Rasio	8.510	2	.014
Linear-by-Linear Association	6.193	1	.013
N of Valid Cases	18		

a. 5 cells (83.3%) have expected count less than 5. The minimum expected count is 1.00.

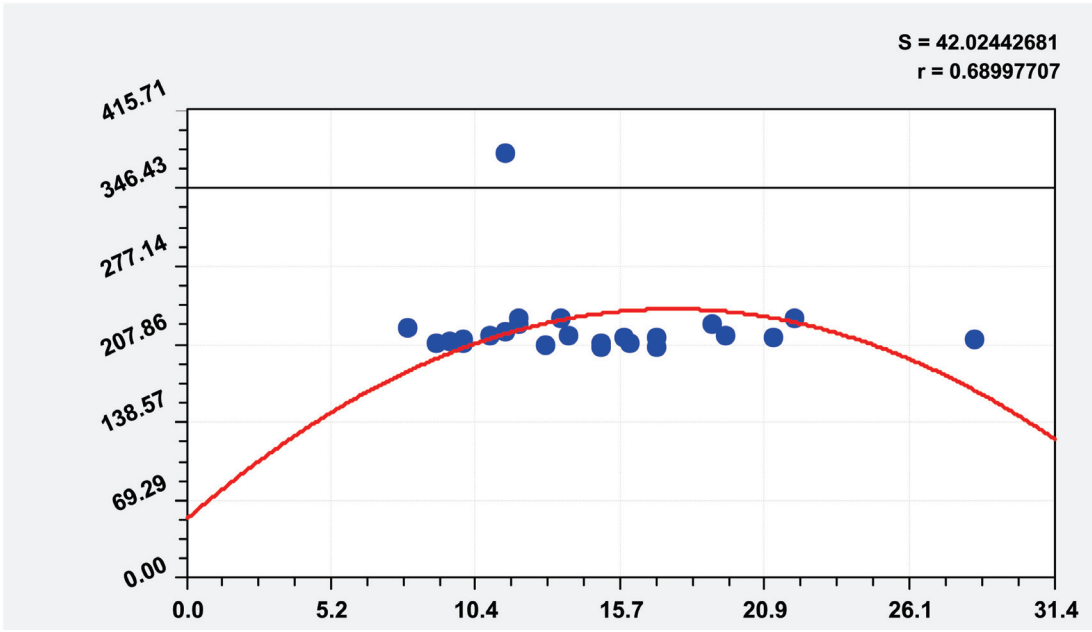


Figure 1. IGF-1 H0 correlation curve and MUN level

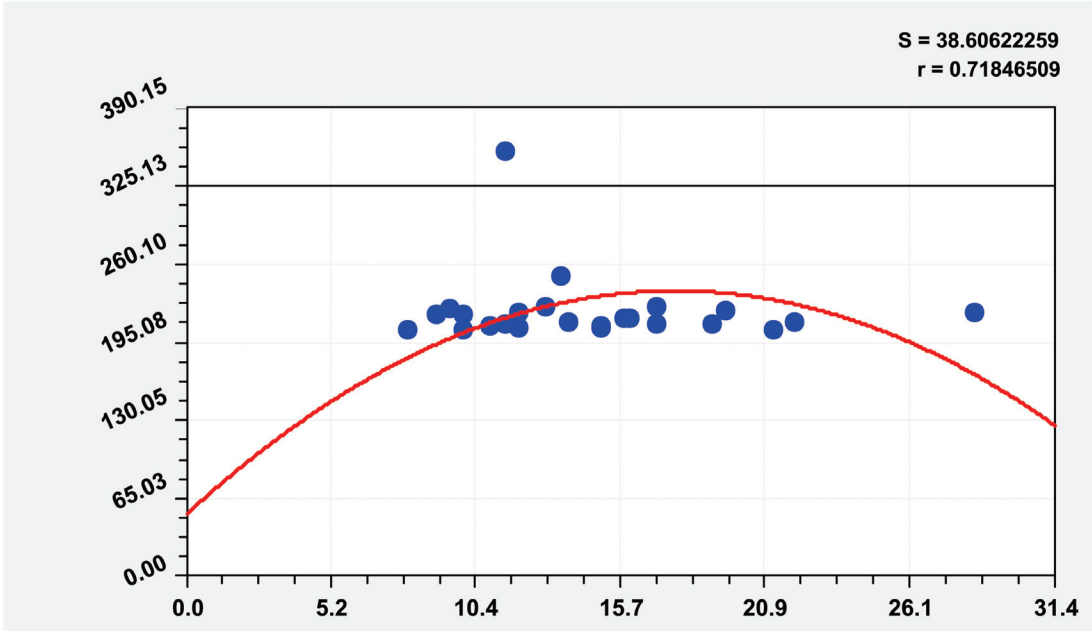


Figure 2. IGF-1 H7 correlation curve and MUN level

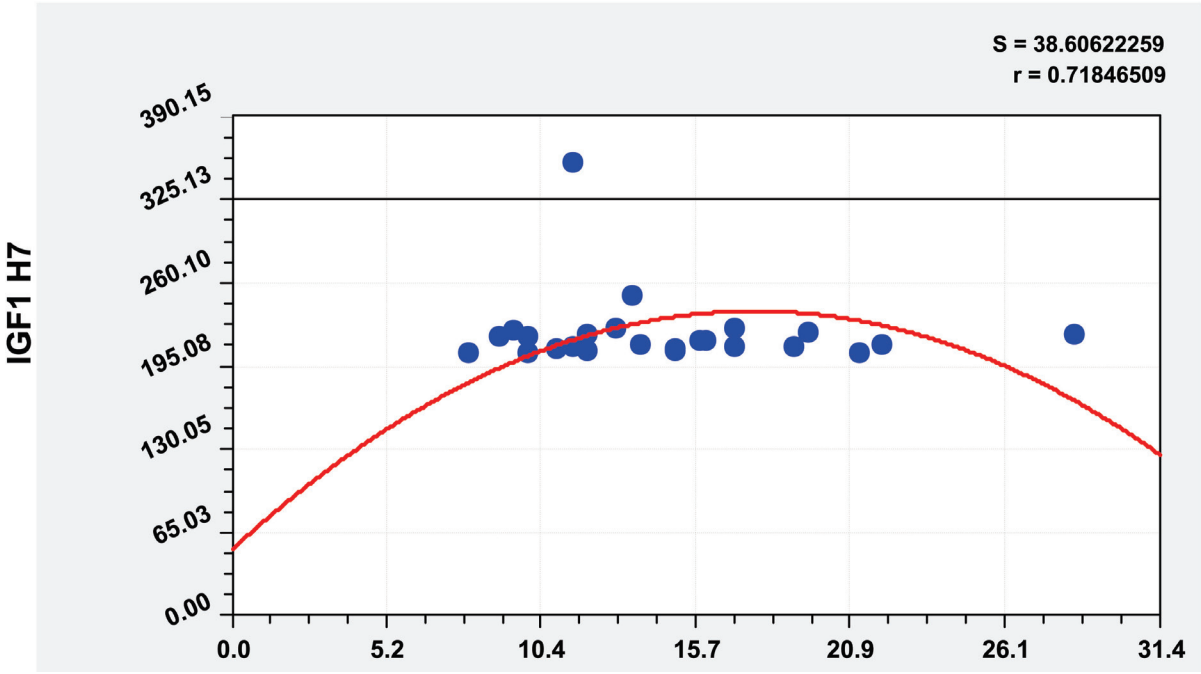


Figure 3. IGF-1 H22 correlation curve and MUN level

Conclusion

There is a high correlation between MUN levels and IGF-1 levels (r = 0.75) and there is a correlation between MUN and pregnancy rates, cows did not pregnant at MUN 17-28 mg/dl and five out of eight samples were obtained pregnant at MUN 9-12 mg/dl. Low and high level of MUN affects to the IGF-1 level and pregnancy rate.

Competing Interest: The authors declare that they have no competing interest.

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Ethical Approval: The research does not need ethical approval. However, samples were collected as per stand art collection method without any harm and stress to the animals.

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Anxiety and its Relationship of Scoring Skill on Football Young Players

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Abstract

The skill is express of the ability of the individual and mastery of the work and is influenced by the factors surrounding the individual with different degrees, the football scoring of the basic skills, which is an adjective affected negatively or positively, it has a great impact on the outcome of the match where the research aims to identify psychological anxiety and its relationship to accuracy of football shooting,The sample included (20) player from team players of Furat University East Technica and has been used descriptive approach with the sample members through one of the accuracy tests where the laboratory shooting the ball on the goal and the goal is determined by three squares for each square degree and given to the laboratory three attempts for each player. Therefore It is statistically processed and reached the conclusions were The importance of a significant correlation between anxiety and scoring skill of football,as well as the accuracy of scoring is negatively affected with the high level of anxiety and the study approved some recommendations, the most important was the need of coaches and teachers to take constant attention to the levels of anxiety which affected the players and students during the matches and direct them to the lowest level.

Keywords: *anxiety, psychologically effect,cognitive.*

Introduction

The great development in the field of scientific research is one of the most important advantages of the modern age, which spread of the different fields of life. Since the sport is one of these fields in sports it has a large share in various psychological, physical, skill and other changes, The adoption of various scientific means has become very important to achieve a high progress at the sport level[1]. The use of psychological anxiety tests is an important and complementary to the training process which enables the trainer to recognize of curriculum effectiveness to create a necessary functional adaptations and the ability of the players psychologically for skill performance also the convergence of players' levels, physical, technical and planning. Hence the focus on the psychological factor of anxiety during training, competitions and official matches where levels of anxiety are different, such as the training period and official participation which subject to the situation of the player, where the basic skills and its mastery of football has an important role in the football game. Hence, the researchers wanted to highlight on the psychological state of player through the knowledge of anxiety being a personal status and its impact on the accuracy of football scoring through the use of dimensions of anxiety as a cognitive, physical and ease of emotion of the young players of Najaf Sports Club of football.

Problem of the research: It has become a good performance of skills for some players in advanced stages, but it is no longer the only indicator of the player efficiency and the effectiveness of his performance in the stadium, because the integrated preparation depends on other psychological and physical factors in addition to the skill preparation and through the researcher experience being a young football player of Iraq and doctorate in physical education, Through the investigation of research belong the anxiety in the sports side, the researcher found that there is a lack of research in the sports field of football, which attracted the researcher to study this problem and find some correct solutions and treatment it, the physical factor one of the basic elements in training field of football which did not receive enough attention in sports training field being the anxiety one of the psychological emotions which it's responses effect on accurate of skill performance, The researcher found that there is a great attention of the technical and physical aspects without enough attention to the psychological aspect, especially the anxiety and it's

dimensions of the cognitive, physical side, ease emotion and the relationship between anxiety and scoring skill of football players being the anxiety and it's dimensions one of the foundations of the integrated preparation of the player and the team.

The concept of anxiety: Anxiety is a complex emotion of internal tension and a sense of fear. Anxiety is the most important type of emotion[2]. The anxiety relate with fear of the one of the effective functions by the individual performance in any work. As defined by [3]that the anxiety as an emotional state in the case of yellowing the face or stuttering in this case the anxiety is apparently negative [1]. He suggested that " the anxiety as "an emotional state in the case of yellowing of the face or stuttering, in this case the anxiety is apparently negative [3].

Anxiety is characterized as relativity temporality (except for the anxiety of case) or at least longer at its period effect; the severity of anxiety is often greater than the real anxiety, which is unknown. Anxiety is a state of fear that has occurred in the past or may occur in the future[4].

Types of anxiety: Psychology has established evidence of anxiety that has a positive value in addition to the negative effects. It plays an important role and it can be a positive motive force or vice versa negative motive force for this purpose the anxiety is divided into[5]

1. Neurological anxiety
2. Moral anxiety
3. Substantive anxiety
4. Anxiety case
5. Feature anxiety

Anxiety levels: It is not strange to say that anxiety is associated with human life in all its details, but the anxiety found in anywhere of life, the type of anxiety and it's levels from one stage to another stages of human, but the level of anxiety in general can be divided into three levels are[6]:

- Low level.
- Intermediate level.
- High level.

Low Level: A certain degree of anxiety is a necessity for help to prepare for life's needs, so, a low level of anxiety acts as a motivation, incentive or activator for the individual because the student's anxiety before the exam will push him to study and the player's anxiety before the race will push him to the continuous exercise in preparation for the race, will motivate him and ready to make the best effort to achieve the best achievement

Intermediate Level: Sometimes the level of anxiety increases to the extent that it partially effects on the performance, in the intermediate level the athlete in general and the player in particular lose part of his ability of control and include excessive movements through excessive effort, hesitancy and fear of the opponent.

High level: Where the individual acts inappropriate behavioral method of the situations he passed result of the speed of irritability, random behavior, the inability to focus and attention, we notice sometimes negative effects begin to clear on the player's behavior and his performance, lose his ability on focus,do more mistakes, characterized his behavior by nervous and do fast and strong movements that lack the accuracy as he exert high energy without justification leading to loss of energy and lack of focus of competition in the raceearly.

Anxiety of Sports Field: The achievements of individuals and their behavior is an expression of the tendency of personal aspects and the sports achievements of the individual depends not only on the development of physical and skills capabilities, but also affected by many psychological factors such as motivations, desires, convictions, perception, thinking, psychological readiness, fear and anxiety.

We see the player proud and happy when his efforts end with the right development in order to reach the highest stages and vice versa when he gets tired, paralyzes his movement and less motivation and determination,may appear fever start or indifference.

Sports anxiety is one of the emotions and has a significant impact on the player and his field performance before competitions and important matches, during and after this matches, when evaluating the results of the player shows his level of disappointment and does not commensurate with the level of results shown during the training, this is due to the errors occurred in the skills implementation and tactical to the emotional state of the player[7].

Anxiety in sports field is a double-edged; Anxiety may be facilitated and may be disabled. In the first

case, anxiety plays the role of catalyst, which makes the player recognize the source of anxiety and prepares himphysically and psychologically to overcome it, while in the second case, anxiety disrupts work through its negative impact on the player's psychology.

We conclude that anxiety in the sports field has a positive and negative impact, The positive effect is the effect plays an important role in the required performance of the player and control his temper reverse of the negative effect of the anxiety that works on the player psychical who feel of afraid, hesitation and tension that effectson his performance in the competition.

Football: Football is a team sport played between two teams of eleven players by round ball. Football is played by 250 million players in more than 200 countries around the world; therefore football is the most popular sport in the world. Football is played in oblong stadium with two goals on each side. The goal of the game is scoring the goals by kicking the ball into the goal.

The goalkeeper is the only player allowed to touch the ball with his hands or arms, provided that he is inside the penalty area[8]. The players' non-goalkeepers often use their legs to attack or pass the ball and can also use their head to hit the ball. The team that scores more is the winner. If the two teams score equal goals at the end of the match, the result of the game will be either equivalence or the game will enter into the system of overtime or penalty shootout depending on the Championship system. Football laws in England were established by the English Football Association in 1863. International football is presided over by FIFA,The World Cup is held every four years and is the most important Championship in the world.

Football has evolved throughout the history, as well as its own rules and regulations, till retched to the current stage of modern football, which is not focus on attacking and scoring many goals as far as became focus on tactics and skill. Football represent of the general organization which uses the coach of football team to control the team's movements on the playground to achieve the planned result.

The Research goals:

1. Identify the anxiety and deportation of young players in the Najaffootballclub.
2. Recognize the accuracy of the scoring skill of football among young players in Najaf FootballClub.
3. Identify the relationship between the scoring accuracy and anxiety among young football players.

The Research hypotheses: There is a statistically significant relationship between the anxiety and its dimensions and the accuracy of scoring football among the young players of Najaf football Club.

The Research fields:

1. Human field: players of Najaf Football Club for the year 2018-2019.
2. Timefield: from 22-11-2018 to 24-2-2019.
3. Spatial field: playground of Najaf football Club.

The Research Methodology: Researchers had to use the descriptive approach in the hypothetical relationships method to determine the relevance of two variables [6] or more, because the descriptive approach works on depict the situation and determines the relationships between phenomena and trends that are on the way to growth [7].

Population and Sample Research: The most important objectives set by the researchers and the procedures that will determine the nature of the selected sample [8].

The researchers selected the research sample from the players of Najaf Youth Club for the year (2018-2019) and the sample was selected randomly numbered of (20) players.

The Research tools and devices used: Thepurpose of obtaining the correct and accurate scientific results, the researchers needs tools and means to help complete the research and how to solve the problem [9].The researchers used:

1. Arab and foreign references and scientific sources.
2. Anxiety removal form for each player.
3. Exit pollform of experts in physical education in general and physical psychology in particular.
4. Testing and measurement.
5. Legal balls.
6. Tape measure 20 m

The Research procedures: Determination of Anxiety Measurement Instruments and its dimensions: The Anxiety Measurement Instrument and its dimensions and its design shall determine by Mohammed Jassen

Allawi and applied on the Egyptian environment and the similar of Iraqi environment, Anxiety scale of the physical match 1994 [10]. It consists of three dimensions are:

1. Physical dimension
2. The cognitive dimension
3. After the speed and ease of emotion

Correction of the measure: The multidimensional anxiety scale includes (45) phase,three-dimensional words and each dimension contains (15) phase. The player answers the phases based on the graduated scale included (ABA-sometimes-often-always), the scale of positive phases is corrected by degrees of one degree (Start), two degrees (sometimes), three degrees (often), and four degrees (always).Either negative phrasescorrected as follows (four degrees (start)-three degrees (sometimes)-two degrees (often)-one degree (always), the range of degrees for each dimension ranges from (15) degrees to reach the maximum (60). The minimum theoretical degree of the scale as a whole is (45) degrees and the theoretical value of the scale as a whole (180) degrees, the closer of the player's score to the maximum score, whenever higher the characteristic, of dimension measures as follow table:

Table (1): The phase numbers which measure the multidimensional anxiety by two ways:

Measure	Positive phrases numbers	Negative Phrase Numbers	Total
Cognitive dimension	21,18,15,12,9,3 42,39,33,30,27,24	45,36,6	15
Physical dimension	31,28,22,19,16.13,7, 4,40,37,34	43,25,10,1	15
After the speed and ease of emotion	26,23,20,11,8,5,2, 44,35,29	41,38,32,17,14	15

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Not required

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Assessment of Iron Chelation Therapy Compliance among School Age Children with Thalassemia

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Abstract

Background: Iron overload is the most important cause of mortality in children with thalassemia major,iron chelation therapy (ICT) is therefore a critical issue in the management of these children, so compliance with ICT is crucial in preventing iron overload related complications.

Aim: The study aimed to assess compliance with (ICT) among school age children with thalassemia.

Method: A descriptive exploratory research design was utilized. **Setting:** this study was carried out at outpatient hematology clinicat Al-Mounira Pediatric Cairo-University Hospital.

Sample: A purposive sample of one hundred school age children with thalassemia.

Tool: The required data was collected by using structured interview questionnaire which consists of three parts to assess;child and caregiver personal data, child's knowledge about thalassemia, blood transfusion and iron chelation therapy, compliance with iron chelation therapy and factors affecting compliance.

Results: More than three quarters of children their age ranged from 9 to 12 years old and nearly two thirds were males, one third of children received parenteral therapy Desferal, and about two thirds received oral chelators (Ferriprox and Exjade), the higher compliance rates were for children on Exjade,followed by Ferriprox, and thelowest compliance rates were for children on Desferal,the mean serum ferritin value was lowest in compliant children rather than non-compliant, also the lowest ferritin levels were in children on Exjade while the highest values were for children on Desferal.

Conclusion: More than half of children with thalassemia were compliant with ICT administration, compliance with oral chelators is better than parenteral and most of children prefer its convenience administration. The study recommended that factors affecting compliance with each iron chelation therapy must be examined to improve adherence to therapy through teaching.

Keywords: *Compliance, iron chelation therapy, school age children, thalassemia.*

Introduction

Iron chelation therapy (ICT) is necessary for the removal of excess iron among children with thalassemia, but treatment's efficacy and success are highly dependent on type and timing of the therapy as well as on patient compliance to treatment. Chelation therapy should be given regularly in order to work efficiently; this requires strong compliance to the chelation regimen. The more, the compliance to iron chelation therapy, more will be the life expectancy of the patient, with better quality of life and a lesser chance of iron related toxicity due to iron overload[1].

Poor compliance to chelation therapy and severe iron overload among children has been reported in both

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developed and developing countries including United States, Pakistan, Egypt, India, Japan, Italy and Dubai. Children with poor compliance to chelation therapy develop complications of iron overload including cardiac failure, cirrhosis, growth retardation, delay in sexual maturation, diabetes mellitus, hypothyroidism, hypoparathyroidism and osteopenia, However lifelong administration of iron chelation regimens has posed challenges to the health team and patients equally[2].

Operational definitions:

- Compliance for oral chelators measured by calculation of number of doses administered in the last 4 weeks and on the basis of achieving 90% of medication administration.
- Compliance with Desferal measured by administration of medication for at least 5 nights per week for at least 8 hours/day.

Aim of the study: The aim of the current study is to assess compliance with iron chelation therapy among school age children with thalassemia.

Research question: What is the level of compliance with iron chelation therapy among school age children with thalassemia?

Method

Research Design: A descriptive exploratory research design was utilized.

Setting: The proposed study was conducted at outpatient hematology clinic which allocated at Al-Mounira Pediatric Cairo-University hospital.

Participants: A purposive sample of 100 school age children with thalassemia, who are receiving regular blood transfusion, andiron chelation therapy. Three quarters of children (76%) aged between 9 to 12 years old with mean age =10.6±1.4 years, 62% were males, and 53% ranked as the first child. Most of children (85%) attending school, 67.1% of them had primary education, three quarters of children (75%) from rural residency, and 79%lived in families more than 5 members.

Data collection tool:

Structured Interview Questionnaire: It consisted of three parts, to assess:

Part I: Child and caregiver personal data which included:

Personal data sheet for child and caregivers: child's age, gender, rank, level of education; current school year, residence, and number of family members.

Part II: Child's knowledge about thalassemia, blood transfusion and iron chelation therapy: It was adapted from Gad Allah, (2007) [3], it included: child's knowledge about normal range of Hb., and the level required for blood transfusion, normal iron in the body,complication of iron overload, food that either contains high iron levels, helps in iron absorption, or that decrease iron absorption,and knowledge about iron chelation therapy, etc…..

Part III: Compliance and factors with oral and parenteral iron chelation therapy: include type of oral chelators; (Ferriprox or Exjade), age of starting the chelators, number of doses per day or week, reminder for administration, side effects, number of missed doses per month, causes of forgetting administration, action taken when forgot to take medication, precautions of administration, route of Desferal administration; (IV./ SC./IM.), compliance with days and hours, factors of non-compliance, such as side effects, prolonged treatment time, lack of family support, medication affect body image and appearance of the child, effect on school attendance and on daily living activities,etc…..

Validity and Reliability: Content validity of the tool was been reviewed by three experts in the field of pediatric medicine nursing and pediatric hematology medicine. The experts agreed on the content of the tools, but minor changes that would make information clearer and more precise were carried-out. Reliability of tools performed to confirm its consistency by using Alpha-Coefficient test; it was 0.7 which means high internal consistency and reliability.

Pilot study: It was carried out on 10 children of the total sample to test study tools in terms of its clarity, applicability and time required to fulfill it.

Procedure: After the ethical approval obtained from the ethics research committee, an official permission was obtained from the directors of Al-Mounira pediatric university hospital and the pediatric hematology clinics. The research investigator introduced herself to the caregiver and children with thalassemia. The researcher obtained the written consent from each caregiver after explanation the purpose and nature of the study. Also oral acceptance was obtained from children to participate in the study. The researcher met each child with his/

her caregiver at a special quite room at the outpatient clinic and before entering the outpatient clinic in order to fill out the structured interview questionnaire. The duration with each child was 20-30 minutes. After that the researcher attended the follow up visit of the child with the hematologist to detect for how extent the child was compliant to iron chelation therapy administration, this information was recorded in the study tool. Also the researcher collected the needed follow-up data from each patients file about chelation history, frequency, compliance and last Ferritin level. Every child's compliance with iron chelation therapy was assessed for only one time. The researcher was available two days/ week for data collection. Field work begins from June 2017 to January 2018.

Results

Table (1) revealed that35%, 33%, 32%, and 24% of children respectively received Exjade, Ferriprox, Desferal, and combined chelation therapy. Children who received parenteral Desferal therapy, 87.5% of them administered it via subcutaneous route and 12.5% via intravenous route. Children on oral iron chelators, 51.5% of them on Exjade and 48.5% on Ferriprox.

Table (1): Percentage distribution of children with thalassemia according to type and route of chelation therapy (n=100)

Items	No.	%
Type of chelation therapy:		
Exjade (oral)	35	35.0
Ferriprox (oral)	33	33.0
Desferal (parenteral)	32	32.0
Combined therapy (parenteral + oral)	24	24.0
Chelation therapy according to route of administration:		
Desferal therapy (n=32)		
Subcutaneous route	28	87.5
Intravenous route	4	12.5

Table (2) proved that more than half (56.3% and 53.1% respectively) compliant with Desferal either by days or hours, regarding total compliance 71.9% of children were non-compliant to Desferal and 93.8% of children had side effect from Desferal.

Table (2): Compliance among children on parenteral chelation therapy (n=32)

Items	No.	%
Compliant with days (more than 5 days/week)		
Yes	18	56.3
No	14	43.7
Compliant with hours (more than 8 hrs./day)		
Yes	17	53.1
No	15	46.9
Total compliance (by days and hours/day)		
Compliant	9	28.1
Noncompliant	23	71.9
Parenteral iron chelation therapy side effects: (n=32)		
Yes	30	93.8
No	2	6.2

Table (3) delineated that, when comparing the total compliance of Exjade to Ferriprox the ratio was 85.7% versus 54.5% respectively, Ferriprox has more side effect than Exjade (75.8% and 37.1% respectively) and the differences were statistically significant, children on Exjade were more compliant with blood transfusion and follow up than those on Ferriprox (91.4% versus 85.7%respectively), and the differences were statistically significant.

Table (3) Relationship between two oral chelation therapy regarding compliance, and side effects among children with thalassemia (n=68).

Items	Treatment Type				X^2 test	p-value
	Exjade (n=35)		Ferriprox (n=33)			
	No.	%	No.	%		
Total compliance with iron chelation therapy:						
Yes (90% and more)	30	85.7	18	54.5	7.95	0.005*
No (less than 90%)	5	14.3	15	45.5		

Items	Treatment Type				X^2 test	p-value
	Exjade (n=35)		Ferriprox (n=33)			
	No.	%	No.	%		
Have side effects:						
Yes	13	37.1	25	75.8	10.27	0.001*
No	22	62.9	8	24.2		
Compliant with blood transfusion:						
Yes	32	91.4	22	66.7	6.37	0.01*
No	3	8.6	11	33.3		
Compliant with follow up:						
Yes	30	85.7	20	60.6	5.50	0.02*
No	5	17.3	13	39.4		

Table (4) illustrated that, The compliant children among the three types of chelators have lower mean of ferritin level than non-compliant with no statistically significant differences; while in comparing the total sample mean among compliant and non-compliant the lowest ferritin level was for theExjadeand the highest forthe Desferal with statistically significant difference.

Table (4): Differences in ferritin level and compliance among three types of chelation therapy among children with thalassemia

Ferritin level by treatment type and compliance						Kruskal Wallis Test	p.value
Desferal (n=32)		Exjade (n=35)		Ferriprox (n=33)			
Mean±SD	Median	Mean±SD	Median	Mean±SD	Median		
Non-compliant							
2704.1±2145.1	2200.0	3012.2±1987.3	1789.0	2133.4±1224.7	2100.0	0.55	0.76
Compliant							
1033.3±458.3	950.00	1080.3±492.9	990.00	1432.0±1066.5	1100.00	1.91	0.39
Total sample							
2234.2±1975.4	2000.00	1356.3±1068.8	1000.00	1750.8±1177.4	1592.00	7.21	0.03*
Mann-Whitney	10.47	Mann-Whitney	8.01	Mann-Whitney	3.27		
p-value	0.001*	p-value	0.005*	p-value	0.070		

Discussion

The current study results shows that the majority of children on Exjade were compliant with its administration, these results are supported by the study done by[4]in India about "Deferasirox in Indian children with thalassemia major: 3 years' experience" who reported that, the vast majority of children recorded good compliance with administration of Exjade. Additionally, the study of[5] about "Adherence to Deferasiroxamongbeta-thalassemia major children-a cross-sectional study in a tertiary care hospital" who found that more than half of children were compliant.

The current study findings demonstrates that more than half of children who received Ferriproxreported good compliance with its administration, these results were in accordance with[6]in a study titled "Experience with combination therapy of Deferiprone and Desferoxamine in β-thalassemia major patients with iron overload at Maternity and Children Hospital, Al Madinah Al Munawarah, Saudi Arabia" who reported that half of children mentioned that they were totally compliant withFerriprox administration.

The findings of the present study clarifies that only less than one third of children on Desferal were compliant with days and hours of administration, these results are supported by[7]who reported that only about two fifth of children were compliant with Desferal administration, on the other hand, the result of the

current study is contradicted with[6]who reported that about two thirds of patient were compliant with daily administration of Desferal. Also the current study revealed that the majority of children had side effect from Desferal, these results are in accordance with[8]in a study titled "Compliance of Deferoxamine injection in beta-thalassemia major patients in Iran" who found that most of children suffered from Desferal side effects. From the researcher point of view, poor compliance with Desferal in the current study may be related to one quarter of children received combined chelation therapy (oral and parenteral) and may be dependent on oral therapy for reducing iron overload.

The results of the current study identifies that in comparing children's compliance with three treatment groups (Desferal, Exjade, and Ferriprox), the lowest compliance rates were for children on Desferal, followed by children on Ferriprox, the higher compliance rates were for children on Exjade, these results are congruent with[9]in a study titled "Compliance and satisfaction with Deferasirox compared with Deferoxamine in patients with transfusion-dependent beta-thalassemia" who found that compliance with Desferal was found only in few children while the vast majority were compliant with Exjade, These results answer the research question; what is the level of compliance with iron chelation therapy among school age children with thalassemia?

The current study findings reveals that compliance among oral chelators the Exjade is better than the Ferriprox, these results arein accordance with a study done in Egypt by[10] who found that the Exjade group had the highest compliance. From the researcher clinical observation, the difference between Ferriprox and Exjade groups may be attributed to the more frequent daily doses and side effects of Ferriprox, compared with Exjade, which was taken once daily and was devoid of these side effects.

Also the current study results stated that children's compliance with oral iron chelators is better than those who received parenteral chelation therapy, these results goes in line with[10][11]who reported that children adherence were reported to be better in those receiving oral iron-chelating agents compared with those taking subcutaneous infusions of Desferal.

The current study results reveals that the compliant children among the three types of chelators have lower mean of ferritin level than non-compliant with no statistically significant differences, these results are in agreement with [5]who reported that the mean serum ferritin level of compliant group was significantly lower than that of the non-compliant,also in relation to Desferal, there was elevation of mean ferritin level for non-compliant children rather than compliant, these results are supported by a study done in Iraq by[12] entitled "Therapeutic drug monitoring of chelating agent Desferal for β-thalassemia major patients" who reported that children who missed doses and not adhered to Desferal administration had ferritin level higher than totally compliant children.

Conclusion

More than half of children with thalassemia were compliant with ICT administration, compliance with oral chelators is better than parenteral chelators and most of children prefer its convenience administration. The study recommended that factors affecting compliance with each iron chela ti on therapy must be examined to improve adherence to therapy through teaching.

Ethical Clearance: Ethical approval was obtained from the research committee in the Faculty of Nursing, Cairo University. A written informed consent was obtained by the research investigator from the mothers of children with thalassemia after complete description of the purpose and nature of the study in order to obtain their acceptance as well as to gain their cooperation. Children under 12 years old, oral affirmative consent to participate in the study were obtained from those children. Parents were informed about their voluntary participation in the study and their right to withdraw from the study at any time without giving any reason and without any effect on the care of their children. Also parents were assured that all gathered information had been confidential and used only for the purpose of the study. The permission for adapted part from Gad Allah, (2007)[3] was attained.

Conflict of Interest: the authors declare that there is no conflict of interest.

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The Relation between Health Literacy and Cataract Screening in Elderly People, Kalasin Province, Thailand

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Abstract

Vision impairment in elderly people due to cataract commonly affect including falls, confusion and reduced quality of life. Cataract screening may help in reducing their living with sight loss. This cross-sectional study aimed to study the relation between health literacy and cataract screening inelderly. Multi-stage random sampling was used to obtain data from 438 elderly people in Kalasin province. Interviewing was used for data collection. Descriptive statistic and logistic regression analyses were performed to investigate the relation between health literacy and the attendance of the cataract screening in elderly. The results revealed that 44.06% of elderly attending a cataract screening. The percentage of cataract screening attendance was greater among female (OR=2.29, 95% CI = 1.53-3.41), aged between 70-79 (OR=1.83, 95% CI = 1.22 to 2.74), with underlying disease (OR=5.45, 95% CI = 3.61 to 8.23), having annual health checkup (OR=5.21, 95% CI = 2.83 to 9.60) and distance from home to hospital less than 1 km (OR=1.77, 95% CI = 1.08-2.92). The attendance of cataract screening had significantly associated with health literacy at a good level of each skill which were access to information and services (OR= 2.42, 95% CI = 1.49 to 3.95), communication skills with professionals (OR= 2.42, 95% CI = 1.45 to 4.03), Self-management (OR= 1.90, 95% CI =1.19 to 3.04), media and information literacy (OR= 1.74, 95% CI = 1.10 to 2.75), decision-making skill (OR= 3.15, 95% CI = 1.82 to 5.46).

Therefore, to be successful in promoting public health and interventions to increase the coverage of cataract screening and the prevention blindness in the elderly, the measures should be concerned with the sociological gap, accessibility and especially, health literacy towards cataract.

Keywords: *Health Literacy, Cataract Screening, Senile cataract, Thailand.*

Introduction

Cataract is continuing to be the leading cause of blindness in the global population. Estimated almost 18 million people who were bilaterally blind from cataract[1], adults aged 50 years and older globally blind as 35% and 45% in Southeast Asia population[2]. In Thailand, a prevalence of blindness was 0.6% in people aged 50 and up[3]. Cataract was the main cause of vision loss accounted for 69.7% of blindness[4]. Vision problems due to cataract in elderly people were increasingly associated with chance of falls[5], diminished quality of life and diminished general functional living activities[6].

Cataract screening with surgical treatment are essential to correct and prevent loss of vision. “Vision 2020 Thailand”aimed to increase the coverage of visual screening in people aged 60 years and above to 80%. In 2017, an average of 76% of Thai elderly attended cataract screening at the Health Promoting Hospital[7]. In contrast, elderly in Kalasin Province shown lower rate of cataract screening,less than 65% and less than 15% in some rural areas. Consequently, many elderly people

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have been undiagnosed for vision problems and are not received of proper treatment.

Health literacy plays a major role in promoting healthy preventive behavior[8]. The World Health Organization has defined health literacy as "the development of the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health"[9]. Low health literacy had an association with poor well-being and negative health outcomes[10], particularly elderly people who have less adequate health literacy[11]. And, low health literacy also has correlated with low utilization of health services and low accessibility to health information[12].

Despite these findings, there has been little research on elderly people concerning their health literacy and its relationship to the attendance the of cataract screening. Therefore, this study aimed to investigate the relationship between socioeconomic factors and health literacy with cataract screening in elder people. The results will serve as a basis for developing programs to promote the utilization of eye care services in Thai elderly people.

Materials and Method

Study Design and Sampling: A cross-sectional study was conducted in Kalasin province, located in the northeast region of Thailand. The sample size was calculated using Krejcie and Morgan's formula[13] at a CI of 95% and further added 10% for the missing data. Thus, 438 elderly people were recruited from 18 districts by multistage sampling technique.

Data Collection: The questionnaire was adapted from the literature review and based on research questions, especially in the areas of health literacy which adapted from "Health Literacy Scale for Thais"[14] and incorporated with the Nutbeam's concept[15]. There were two parts in the questionnaire, as follows: 1) Sociodemographic characteristics, including the attendance of cataract service and 2) Health literacy toward cataract consisting of 6 skills, namely a) Knowledge and understanding; b) Access to information and services; c) Communication skills with professionals; d) Self-management; e) Media and information literacy and f) Decision-making skills. The questionnaire was validated by 3 experts and tested for reliability. Evaluation of health literacy was analyzed and interpreted according to Bloom's cut-off point[16] of 3 levels as follows: > 80% as good level, 60%-79% as medium level and <60% as low level. Data collection was carried out from May 2018 to July 2018.

Data Analysis: Data analysis was carried out using STATA (version 13; college station, TX, USA: Stata Corp). Sociodemographic characteristics were described as frequency and percentage for categorical data; minimum, maximum, mean and standard deviation for continuous data. Logistic regression was used to investigate independent variables associated with the attendance of cataract screening. A p-value ≤0.05 was considered to represent statistical significance.

Results

The overall number of those, 44.06% of the elderly attended a cataract screening. Bivariate analysis of the association between sociodemographic characteristics and the attendance of cataract screening revealed that female was likely to attend cataract screening more than male (OR=2.29, 95% CI = 1.53-3.41).Elderly people aged between 70-79 were significantly more likely to have cataract screening than aged between 60-69 (OR=1.83, 95% CI = 1.22 to 2.74). The elderly with underlying disease, having annual health checkup and having distances from home to health promoting hospital less than 1 km were significantly more likely to attend cataract screening, respectively.

Table 1: Logistic regression analysis of sociodemographic characteristics associated with the attendance ofcataract screening

Factors		n = 438				Crude OR	95% CI	p-value
		Not screening		Screening				
		n	%	n	%			
Overall		245	55.94	193	44.06			
1. Gender								<0.001
	Male	120	67.80	57	32.20	1		
	female	125	47.89	136	52.11	2.29	1.53to 3.41	

Factors	n = 438				Crude OR	95% CI	p-value
	Not screening		Screening				
	n	%	n	%			
2. Age(years)							0.003
60-69	145	63.04	85	36.96	1		
70-79	81	48.21	87	51.79	1.83	1.22 to 2.74	
80 and up	19	47.50	21	52.50	1.89	0.95 to 3.70	
3. Underlying disease							<0.001
No	173	74.57	59	25.43	1		
Yes	72	34.95	134	65.05	5.45	3.61 to 8.23	
4. Distance from home to health promoting hospital (km)							0.028
<1	80	46.51	92	53.49	1		
1-<3	74	60.66	48	39.34	0.56	0.35 to 0.90	
3-<5	50	73.53	18	26.47	0.31	0.16 to 0.57	
≥ 5	41	53.95	35	46.05	0.74	0.43 to 1.27	
5. Annual health checkup							<0.001
No	71	83.53	14	16.47	1		
Yes	174	49.29	179	50.21	5.21	2.83 to 9.60	

The attendance of cataract screening had significantly associated with health literacy at a good level of each skill including accessibility to information and services (OR=2.42, 95% CI =1.49to 3.95), communication skills with professionals (OR=2.42, 95% CI = 1.45 to 4.03), Self-management (OR= 1.90, 95% CI =1.19 to 3.04), media and information literacy (OR=1.74, 95% CI =1.10 to 2.75), decision-making skill (OR=3.15, 95% CI = 1.82 to 5.46), respectively, but were not detected the association with knowledge and understanding.

Table 2:Logistic regression analysis of health literacy toward cataract associated with the attendance of cataract screening

Factors	n = 438				Crude OR	95% CI	p-value
	Not screening		Screening				
	N	%	n	%			
1. Knowledge and understanding							0.883
Low	128	57.66	94	42.34	1		
Medium	99	52.38	90	47.62	1.23	0.83to 1.82	
Good	18	66.67	9	33.33	0.68	0.29 to 1.58	
2. Access to information and services							<0.001
Low	92	69.17	41	30.83	1		
Medium	80	52.29	73	47.71	2.04	1.25to 3.32	
Good	73	48.03	79	51.97	2.42	1.49to 3.95	
3. Communication skills with professionals							<0.001
Low	92	68.66	42	31.34	1		
Medium	96	52.17	88	47.83	2.00	1.26 to3.19	
Good	57	47.50	63	52.50	2.42	1.45 to 4.03	
4. Self-management							0.012
Low	81	67.50	39	32.50	1		
Medium	55	50.46	54	49.54	2.03	1.19 to 3.48	
Good	109	52.15	100	47.85	1.90	1.19 to 3.04	

Factors		n = 438				Crude OR	95% CI	p-value
		Not screening		Screening				
		N	%	n	%			
5. Media and information literacy								0.016
	Low	93	63.27	54	36.73	1		
	Medium	72	55.38	58	44.62	1.38	0.85 to 2.24	
	Good	80	49.69	81	50.31	1.74	1.10 to 2.75	
6. Decision-making skill								<0.001
	Low	78	75.73	25	24.27	1		
	Medium	88	50.00	88	50.00	3.12	1.82 to 5.35	
	Good	79	49.69	80	50.31	3.15	1.82 to 5.46	

Discussion and Conclusion

The study showed that more than half of the elderly in Kalasin Province attend the cataract screening lower than cataract screening rate of Thailand[7] and much lower than the aim of"Vision 2020 Thailand" project. Females were more likely to attend the cataract screening than males likewise, the cataract screening in Sri Lanka[17], it may be due to more than 80 percent of village health volunteers were females[18]. Moreover, females were more interested in and reported much more actively seeking health information and health care than male did[19]. This finding indicates the advantage of the cataract service because of the higher incidence of visual impairment was found in females than males[4,20]. This study also suggested that the older people were more likely to uptake cataract screening than the elderly in younger age. This could be clarified that the severity of senile cataract ***increasesby aging***[17], ***resulting, ina higher screening rate.***

The findings also indicated that, the elderly living near health promotion hospital were more likely to attend cataract screening than who lives far from a hospital. This can be explained that the accessibility condition played an important role for the elderly in attending the cataract screening.Additionally, long distance is one of the major barriers in accessing health services among the elderly because it related to high transportation costs and time consuming[21,22]. On the contrary,the elderly living at a shorter distance tend to obtainhealth information and were easier to travel to health service center. Moreover, elderly with the underlying disease were more likely to attend the cataract screening because of their chronic diseases[23]which usually had a regular health check-up, especially those with diabetes who have annual health screening for retinopathy[24].

The attendance of cataract screening also associated with health literacy toward cataract in 5 skills which includeaccess to information and services, communication skills with professionals, self-management; media and information literacy, and decision-making skills. The access to information and serviceshowed an important role for the elderly in attending the cataract screening because the elderly who had the high ability to seek the information had more chance to entry into health service[25]. Moreover, the poor is a one of key barriers in the access of eye care service, and Kalasin province is a one of 5 poorest province in Thailand[26]. Communication skills with professionals also played a significant role in the attendance of cataract screening. It may because of thehearing loss which common occurs in elderly[27]. And, it may be due to or the difficulty for understanding the medical words or misinterpret of the meaning[28].In addition, this study found the association between the attendance of cataract screening and media and information literacy-ability to understand, analyze and evaluate information received. Elderly in community frequently received information from words of mouth which brought them to misunderstanding such as, the difficulty in common activities of daily life and complication or bad outcome after surgery, which similar to the study in Kenya[29]. Furthermore, the elderly who had a good level of decision-making were more likely to attend cataract screening than those who had at a lower level. Decision-making skills in choosing appropriate practice to prevent cataract related to the understanding on the advantage of screening, early detection, and treatment[30].

In conclusion, this study revealed a low rate of elderly cataract screening. Factors associated with the attendance of cataract screening were sociodemographic characteristic (sex, age, distance from home to health

promoting hospital, underlying disease, obtained annual health checkup), access to information and services, communication skills with professionals, self-management, media and information literacy and decision-making skill. Health literacy could be considered as an effective strategy for promoting the attendance of cataract screening in low coverage rate, especially, in northeastern, Thailand.

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Ethical Clearance: Taken from the office of Khon kaen University Ethics Committee in human research (project number HE 602187)**.**

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Study of Dental Enamel Ions (ca^+ & sr^+) Using XRF Device-After Bleaching

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Abstract

Background: Dental enamel Ca^+ and sr^+ ions were analyzed using x-ray fluorescence.

Objectives: We aimed in our research to study the effect of one application of high concentration of bleaching materials (CP 45%, HP 40%)-which contains sodium fluoride & potassium nitrate-on the mineral content of dental enamel (ca+, sr+ ions).

Method: 20 Sound Extracted human premolars with no caries were stored in distilled water at room temperature prior to the experiment, Distributed into two groups (10 teeth: its buccal surfaces were bleached by one application of 40 minutes of HP (pf) 40%, 10 teeth: its buccal surfaces were bleached by one application of 45 minutes of CP (pf) 45%).every studied enamel surface was grinded, the lingual surface of each tooth was the control sample for its buccal bleached surface. The powder taken from each enamel surface of each sample was analyzed using x-ray fluorescence which depends on electronical beam projection on enamel powder and reading results on XRF instrument screen.

Results: There was no statistical differences between ions average of bleached and control samples of dental enamel. There was no difference between HP and CP samples.

Conclusion: One application of HP 40% & CP45% bleaching materials doesn't affect dental enamel ca^+ & sr^+ ions.

Keywords: *Carbamide peroxide (CP), hydrogen peroxide(HP), pf (potassium nitrate & sodium fluoride), XRF.*

Introduction

Tooth enamel is the hardest and most mineralized tissue in the human body [1], mineral content is about 96-98% from its weight[2]. Dental enamel ions May be affected by teeth bleaching, which has become the most important, most cosmetic, well accepted procedures by most patients. Dental ions can be analyzed using several devices, the most important modern device is x-ray fluorescence (projection of electrons on enamel powder with a presence of selenium lithium ions mediator). Tooth bleaching refers to a technique where chemical bleaching materials are applied to brighten discolored teeth. Tooth bleaching materials usually contain a strong oxidizing agent that whiten teeth due to oxidation reactions.[3] Hydrogen peroxide (HP), carbamide peroxide or sodium perborate are popular oxidizing agent used to whiten teeth [4]. Bleaching occurs by peroxide decomposition into free oxygen radicals, which can break down the large pigmented molecules deposited in teeth to smaller and less pigmented molecules [5]. Studies results about the effect of teeth whitening materials on the mineral content of tooth enamel varied among researches [3,6,7,8]. Some of them did not find harmful effect of bleaching materials on formal & chemical properties[9]. Suliemanre search results showed no effect of high concentrations of hydrogen

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Peroxide and carbamide peroxide on the formal properties of enamel surface[8,10]. Also, low concentrations of hydrogen peroxide 6.5% did not show any changes on enamel surface[6,11,12]. 25% and 15% concentrations of carbamide peroxide also did not affect the enamel surface[13,14]. While laboratory studies have shown an effect of low pH bleaching materials on enamel surface[15,16,17]. While no noticeable changes on enamel surface with 30% hydrogen and 10% carbamide peroxide use were noticed[18]. Goo used electronical spectroscopy for chemical analysis (ESCA) technique to study chemical changes of enamel after carbamide peroxide application[19.] many researchers studied bleaching effect on enamel chemistry and structure using different techniques: PXRF (portable x-ray fluorescence), XRD (x-ray diffraction), SRXRF (synchrotron radiation x-ray diffraction), AAS: (atomic absorption spectrometry) and XRF (x-ray fluorescence) [20,21]

Aims of study: The objective of the present *in vitro* study was to Study the effect of bleaching materials with high concentrations-containing potassium nitrate & sodium fluoride (pf)-(hydrogen peroxide pf 40%) and (carbamide peroxide pf 45%) on dental enamel ca+ & sr+ ions using XRF technique(X-ray fluorescence).

Materials and Method

40 samples of dental enamel powder were collected from 20 Extracted human premolars which were stored in distilled water at room temperature prior to the experiment. Sound premolar teeth with no caries, no enamel defects were selected in this study For electron microscopic XRF. These 20 premolars were distributed into 2 groups (10 premolars in each group) according to the bleaching materials (CP 45%, HP 40%). premolars crowns were divided perpendicularly into two parts (buccal & lingual), lingual part: is the control sample, buccal part : bleached with one of the two bleaching materials.

Teeth sample preparation: Extracted teeth were rinsed with water, cleaned mechanically with a hard brush and then left in distilled water until experiment performance mesial distal section of every premolar was performed using diamond disks to obtain 2 parts: (buccal submitted to the bleaching & lingual is control to the tooth itself). The bleached halves were rinsed completely. Then dried sufficiently to collect its enamel powder using aluminum oxide disks in order to study enamel mineral elements by XRF device the same procedure of powdering was made for control samples.

Results

Research was performed using 40 samples taken from 20 premolars distributed to 2 groups

- Group 1: 20 samples (10: submitted to carbamide peroxide 45%,10 : control)
- Group 2: 20 samples (10 submitted to hydrogen peroxide 40%, 10 : control) (table 1).

Table 1: Teeth sample distribution

HP 40% group		Cp 40% group	
Bleached Samples	**Control Samples**	**Bleached Samples**	**Control Samples**
10	10	10	10

All samples ions were analyzed using XRF device, the results showed no effect of high concentration of bleaching materials on dental enamel ions. T-test showed no statistical differences between bleached half ca^+ & sr^+ ions and control half ca^+ & sr^+ ions. (Table 2).

Table 2: Statistical t test results

Studied Ion	Bleaching Material	Tooth half	Number	Mean	Std Deviation	T value	Sig
ca^+	Hp group	Bleached	10	93	1.77	0.225	0.833
		Non bleached	10	38.86	1.82		
	Cp group	Bleached	10	41.34	0.95	2.549	0.063
		Non bleached	10	44.20	2.22		
Sr^+	hp group	Bleached	10	101.68	32.51	1.031	0.361
		Non bleached	10	82.46	11.78		
	Cp group	Bleached	10	130.12	10.95	1.718	0.161
		Non bleached	10	110.46	15.44		

Discussion

There have been many studies concerning hair and teeth sample analysis. In our work the X-ray fluorescence device was used to analyze ca^{+} & sr^{+} in dental enamel after high concentration of teeth bleaching application[23]. We used one premolar to give us the control sample & bleached sample[24,25.] research results showed no effect of teeth bleaching materials on mineral contents concentration (ca^{+}, sr^{+}) in enamel tissue, because mineral content may be affected by low ph and not by hydrogen peroxide itself [26,27]. on the other hand, fluoride & potassium nitrate-existed in studied bleaching materials-may approve enamel properties and remineralizes affected enamel [28]. These results agree with Wang results which didn't find any effect of peroxide bleaching materials on dental enamel. the researcher used 3 materials opalescence xtra boost, opalescence pf 20%,sodium perborate using following method : attenuated total reflectance infrared spectroscopy (ATR IR), with scanning electron microscopy (SEM),Raman spectroscopy, x-ray diffraction (XRD), electron probe microanalysis (EPMA), flame atomic absorption spectroscopy (FAAS) and total reflection x-ray fluorescence (TXRF [25.] results also agree with Basting 2003 and Dietschi 2006 who didn't find effect of high concentration on dental enamel ions in spite of long term application[28,29], we also agree with many researchers who didn't find any effect of teeth bleaching on enamel structure[30,31,32,35.] Whereas research results disagreed with Oltu and Tezel who found decrease in dental enamel calcium concentration using XRD[33,34] theses results returns to sample and measurement method difference[28.]

Conclusion

Within the limits of this study, no effect of teeth bleaching materials with high concentration (containing fluoride sodium and nitrate potassium) on ca+ & SR+ contents in dental enamel.

Conflict of Interest: None

Funding: Self

Ethical Clearance: Not required.

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Radiographic Evaluation of Supporting Structures Around Mini Implant Retained Over Denture Utilizing Three Different Denture Base Materials

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Abstract

Background and Purpose: Recently mini-implant over denture is widely used as a substitution for the conventional two-implant over denture. This study was done to evaluate the supporting structures around mini implant retained over denture radiographically when utilizing three different denture base materials.

Subjects and Method: This is a randomized controlled trial included 24 healthy completely edentulous male patients selected from the out-patient clinic and divided randomly into three equal groups according to the used denture base material. **Group I:** the conventional acrylic denture base implants were used. **Group II:** hard thermoplastic denture base implants Polyan IC (PMMA) were used and **Group III:** semi flexible thermoplastic denture base implants (bre flex 2nd edition) were used. Crestal bone loss around each mini implant was measured radiographically at 3 different follow-up intervals, baseline-3 months, baseline-6 months and baseline-12 months'. Bone density around each mini implant was measured radiographically in relative Hounsfield unit (Hu) at baseline, 3, 6, and 12 months. The collected data were analyzed by SPSS program version 20 with considering statistical significance when P value<0.05.

Results: No implant failure was detected. The bone loss values were higher significantly in the group of semi flexible thermoplastic denture bases. There was an increased bone density values in patients with acrylic denture bases than other groups but this difference was not statistically significant.

Conclusion: Under the limitations of this study we can conclude that acrylic and hard thermoplastic resins are better than semi flexible thermoplastic resins.

Keywords: *Mini implant, acrylic, thermoplastic denture base, bone loss, bone density.*

Introduction

Mini-implant is considered one of the reliable solutions to the problem of replacing missing teeth with the conventional implants. It is technically easier and less in vasive than the conventional implants. [1] These implants are used where there is no enough bone thickness for conventional ones. It can be also used to stabilize a denture until conventional implants heal. [2,3].

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Mini implants were investigated as an aid for over denture. They revealed a high success degree and a good prosthetic outcome that increase their use in edentulous arches. Mini implant could be a good solution for those patients suffering from discomfort and less functioning dentures. [4]

Mini dental implants have numerous benefits as expanding the bone when they are placed as minimal osteotomy size is required. In addition they are characterized by immediate stabilization and loading on the day of placement and consequently fewer treatment visits. [5] Moreover, flapless placement leads to minimal surgical trauma, easier removal and good healing in case of failure. These implants are also characterized by decreased cost. [6]

Thermoplastic resins have various applications including partial dentures, complete dentures, performed partial denture clasps, fiber reinforced fixed partial dentures and sleep apnea appliances. [7]

Accurate and successful fitting of the denture bases is essential for the long term success of the mini implant retained over dentures. Different denture base materials have different physical properties during construction and different actions during function.[8]

The advantages of thermoplastic resins over the conventional acrylic resin are having predictable long-term performance, being more stable, exhibit high creep resistance and almost no porosity. [9]

The purpose of the article is to evaluate radiographically the supporting structures around mini implant retained over denture utilizing three different denture base materials.

Subjects and Method

The current study is a randomized controlled study that included twenty four healthy completely edentulous male patients selected from the outpatient clinic of the Prosthodontic department, Faculty of Dentistry, Minia University. The inclusion criteria included patients who were systemically free, arches provided a minimal bone height of 15 mm, all the patients are angel's class I skeletal relationship between mandible and maxilla and enough inter arch space suitable to accommodate over dentures and attachments.The exclusion criteria included clenching habits and bruxism, tempro-mandibular disorders and any intraoral soft or hard tissue abnormality.

Accurate medical history, dental history, extra oral examination, intra oral examination and radiographic examination were performed for all the patients.In this study patients were carefully selected and thoroughly examined in an attempt to reduce human variables and eliminate any factor or habit that might adversely affect the results. Standard clinical and laboratory techniques were followed for the construction of the dentures for all patients.

Also, the same materials were used as feasible as an attempt to eliminate any factor that might affect the results of this study.[10] Cross linked resin teeth were used as they act as shock absorber preventing applying undue stresses to the implant.[11]

All patients participated in the study were informed about the nature of the study and its purpose, agreed to take part in it and write an informed consent reviewed by the research ethics committee of the Faculty. All reasonable steps to protect the confidentiality and privacy of the personal and health information of the patients were taken and patients informed about the benefits of obtaining implant retained mandibular over denture.

Patient grouping: Patients were divided randomly into three equal groups (eight patients each) according to the denture base material:

Group I: Patients rehabilitated with four mini dental implants retained over denture with conventional acrylic denture base.

Group II: Patients rehabilitated with fourmini dental implants retained over denture with hard thermoplastic denture base Polyan IC (PMMA)

Group III: Patients rehabilitated with fourmini dental implants retained over denture with semi flexible thermoplastic denture base (bre flex 2nd edition)

Construction of conventional and thermoplastic complete dentures: For patients in group I, each patient had received a new set of upper and lower complete dentures, constructed with the compression molding technique used for polymerizing the acrylic denture bases.

Patients in group II, each patient had received dentures constructed from hard thermoplastic acrylic resin through injection molding technique including that when processing Polyan Ic (PMMA) hard rigid thermoplastic resin, For a safe bond to the acrylic teeth surface roughening for all the prefabricated teeth (sandblasted with aluminum oxide) was performed, with the use of the adhesion promoter poly.Link.

For patients in group III,each patient had received dentures constructed from semi flexible thermoplastic resin (bre flex 2nd edition) through injection molding technique including the same steps of hard thermoplastic resins and for a safe bond to the acrylic teeth a circumferential grooves needs to be milled in the cervical area and mechanical retention (undercut) needs to be included in the basal area (fig1).



Fig. (1) Breflex2nd edition and Polyan IC

Fabrication of the computer guided surgical stent: For each patient, a customized computer guided surgical stent was fabricated through the data obtained from the cone-beam CT (CBCT). Captured images from CBCT were imported into viewing software then sent for fabrication of the guide fig (2).



Fig. (2) Prefabricated clear acrylic surgical guide with four metal sleeves

Implant installation and loading: Four mandibular mini dental implants (Cowellmedi Co., Ltd.48 Hakgam-daero 221 beon-gl, Busan, Republic of Korea), with a standard diameter of 2.4 mm, and a length 13 mm, were placed in each of the 24 completely edentulous patients following immediateloading protocol. After the anaethesia effect has confirmed, the surgical stent was seated in position in the patients mouth (three holes were drilled in the mandible, through the provided lateral cylinders of the guides to receive the anchor pins for fixation of the guide). Flapless surgical technique was performed to the patients. Using the pilot drill, four marks were made in the mandible in the corresponding mini implant sites guided by the stent. The surgical stent was then removed from the patient's mouth, and using a 2.0 mm mini implant drill with copious saline irrigation, the four osteotomy sites were prepared in a vertical direction and parallel to each other. After finishing the osteotomy preparations, mini implants were removed from their sterile packaging using the implant insertion tool and then fastened directly to the osteotomy sites using finger until moderate resistance was felt. Then the mini implant torque wrench was applied until complete crestal flushing of the mini implants with the bone crest. Implant insertion was done under copious saline irrigation fig(3).



Fig. (3) Mini implants in position before direct pick-up

All patients were recalled one week after implants insertion for immediate loading, the metal housing caps were attached to the mini implants, glass ionomer cement was applied to block the undercuts beneath the metal housings, Lingual escape holes were opened to allow for escaping of excess pick up material and ensure proper seating of the denture on the tissue.

For patients in group I; pink cold cure acrylic resin (relining material), and in group II and III repair material uni-lign speed used as a pick-up material and after setting, the dentures checked for the accurate fitting of the metal housing to the ball abutments of the mini implants and excess material was trimmed then Patients were instructed for the proper way of denture removal and insertion, cleaning, and usage.After that, the radiographic evaluation was performed in the form of bone loss and bone density during one year follow up period.All the data were collected, tabulated and statistically analyzed.

Results

Data were gathered and tabulated for each group at baseline, 3, 6, and 12 month. The collected data were expressed by mean, and standard deviation (SD) for all variables to compare between the three study groups.

Numerical data were explored for normality by checking the distribution of data and using tests of normality (Kolmogorov and semirnov test) all showing normality distribution.

To compare the measures between the three groups Kruskal-Wallis test was used and Mann-Whitney test was used to compare between each two groups.

1. **Bone loss:** Table (1) shows increased bone loss mean values among semi flexible thermoplastic denture bases compared with other groups at different time intervals.

Table 1: Comparison of bone loss values at different time intervals between the three studied groups

Bone loss	Acrylic	hard flex	Semi Flex	P	P1 P2 P3
First interval					0.6
Range	0.20-0.80	0.30-0.90	0.30-1	0.2	0.1
Mean±SD	0. 47±0.23	0. 53±0.21	0.66±0.25		0.3
Second interval					0.7
Range	0.30-0.90	0.40-1	0.30-1.2	0.1	0.05
Mean±SD	0.60±0.21	0.63±0.21	0.82±0.23		0.1
Third interval					0.3
Range	0.40-1	0.50-1.2	0.70-1.4	0.04*	0.01*
Mean±SD	0.72±0.24	0.82±0.21	1.02±0.23		0.09

P1= acrylic vs. hard flex, p2= acrylic versus semi flex, p3= hard flex versus semi flex

2. **Bone density:** Table (2) shows increased mean bone density values in patients with acrylic denture bases than other groups through the follow up period but this difference was not statistically significant.

Table 2: Comparison of bone density values through the follow up period between the three studied groups

Bone density	Acrylic	Hard flex	Semi Flex	P	P1 P2 P3
At baseline					0.4
Range	120-240	113-191	78-195	0.2	0.1
Mean±SD	176.6±43.1	160.8±22.7	144.3±47.7		0.4
At 3 month					0.4
Range	122-248	117-197	84-200	0.3	0.1
Mean±SD	179.8±44.8	165.8±23.3	150.3±47.9		0.4
At 6 month					0.5
Range	125-250	125-250	88-204	0.3	0.1
Mean±SD	183.5±44.6	170.1±23.6	154±47.3		0.4
At 12 month					0.4
Range	127-255	127-255	91-206	0.3	0.1
Mean±SD	187±44.9	172±23.6	155.8±47.2		0.4

P1= acrylic vs. hard flex, p2= acrylic versus semi flex, p3= hard flex versus semi fl

Discussion

Several studies revealed that injection molding techniques result in less dimensional inaccuracy and more accurate denture base than the usual conventional processing techniques. [12].In this study, 4 mini implants were used as sufficient number of mini-implants must be placed to adequately distribute loads generated during mastication. [13]

Surgical technique without incision of the soft tissue was done as the bleeding will be less, post-operative trauma is decreased, healing time and the possibility to infection during surgical procedure are less and the loading is immediate.[14] In this study, the direct pickup was performed as it is simple, economic, quick and allow patient to retain prosthesis.[15] This is particularly important to allow prosthesisimmediate functional loading.[16]

The crestal bone area is considered an important indicator of implant health. Crestal bone is the bone that bears the stress around an implant. Blood supply to the crestal bone area is reduced around an implant compared with that of the natural tooth. This is because the blood vessels from the periodontal ligament are not present. The source of blood supply is from the periosteum covering the bone. [17]

The decreased levels of crestal bone loss in the three groups could be attributed to several factors. The first factor is the flapless placement technique of mini implants which causes minimal disruption to the periosteum, preserves peri and endosteal blood supply and retains the bone height around the implants after surgery.[18] In addition, the immediate loading protocol of mini implants leads to bone compression which may act to increase bone density in the area immediately surrounding the implant and minimize crestal bone loss. [19]

Results reflected all the success criteria regarding to all parameters; these results could be explained as a result of flapless surgery with the guidance of computer guided stent which preserve the periosteum and peri implant tissues.[20]

Analysis of the results of this study reflected no statistical significance difference regarding bone loss results around the mini implants between the first two groups while there are significant increase in mean values in the semi flexible thermoplastic denture base (bre flex 2nd edition) group than other groups andbetter bone density in the acrylic group.

The 3rd group values could be explained as a result of mechanical connectionof metal housing to the denture base that may lead to some micro mechanical movement of the metal housings that enhance over denture rotation during posterior loading, with twist load transmission to the implants and increases the chance of implant overloading by rotation of the distal cantilevered portions of mandibular over denture.

Conclusion

In the present study no implant failure was detected. The mini implants were assessed radiographically throughout the study period, the three groups showed success criteria throughout the study period regarding bone loss and bone density values which may reflect theproper selection of cases, adequate mini-implant length in proportion to the height of the residual alveolar ridge, proper oral hygiene measures, proper mini-implant surgical insertion and angulations. Although thermoplastic denture bases are alternative for conventional acrylic denture bases, only the hard ones exhibited radiographically outcomes close to the conventional baseswhile the semi flex ones require more optimizations and studies.

Source of Funding: Self funding.

Conflict of Interest: Nil

Ethical Clearance: Every patient in this study had given their informed consent for inclusion before their participation. Which is conducted in accordance with the declaration of Helsinki, it was approved by the Ethics Committee of Minya University.

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Using of Omega 3 to Reduce the Toxic Effect of Antituberculosis Therapy on Hepatorenal Function and Some of Blood Parameters of Albino Male Rats

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Abstract

Objective: Antituberculosis is anti-inflammatory drug used widely to treat tuberculosis, it is active drug but unfortunately causes harmful side effects on liver, kidney and blood. In the present study we used Omega 3 to reduce the side effects of this drug.

Method: The study was carried out on 40 males of albino rats. We divided the animals into four groups; control of healthy animals group, antituberculosis group, antituberculosis drug plus omega group and only omega group..Then after two months samples of blood were withdrawn from the animals for analyzing of some blood, liver and kidney parameters.

Results: Our study proved that *Omega-3* can significantly reduce the toxicity of "antituberculosis drug" for some hematological, liver and kidney parameters ("ALT,AST,Urea, Creatinine").

Conclusion: the results showed that "*Omega-3" have* protective characteristic to reduce the toxicity of "antituberculosis drug".

Keywords: *Antituberculosis, omega-3, toxicity, liver, kidney, blood parameters.*

Introduction:

Tuberculosis is considered a world wide which is caused by "*Mycobacterium tuberculosis",* these bacteria can infect mainly the lungs but it can cause infection to other organs and tissues of the human[1]

TB is highly resistant to treatment so that it is one of the most difficult diseases to be treated. In addition the using of this drug usually cause some dangerous side effects like liver toxicity and blood disorders [2].

To treat tuberculosis, a mixture of drugs is used to decrease drug resistance. The mixture is consist of pyrazinamide, rifampicin, and ethambutol to ensure highly effective treatment and avoid pathogen resistance [3,4]. Unfortunately this highly effective mixture can may elevate toxicity and lead undesirable side effects[5,6].

It was revealed that anti TB drugs can affect hematological parameters including WBC, RBC, Hb, HCT, MCV, MCH, MCHC, RDW and PLT[7]. Another study found that anti TB cause leukopenia especially neutropenia[8]. Number of mechanisms can mediated "drug-induced" hematological disorders like immunological effects, direct hematopoiesis inhibition and enzymatic interaction pathways. Hematological disorders include RBC aplasia, megaloblastic anemia, sideroblastic anemia, aplastic anemia and leukocytosis. Many anti-inflamatory drugs may lead to malabsorption and depression in RBC, WBC and platelet [9,10].

Aims of the study: The aim of the present study is to evaluate the "protective effect" of Omega-3 on the toxicity of anti-tuberculosis drug in albino rats.

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Method

Animals of the experiment: In the present study we used forty rats of male sex. the rats were housed in animal house and they were fed a standard laboratory chow with water. The rats were arranged into four separated groups.

1. Group 1: The control was nourished with only food and water.
2. Group 2: Administrated anti-tuberculosis drug (25mg/kg) in day for two months[11].
3. Group 3: Administrated Omega-3 (10 mg/kg) + Anti-tuberculosis drug (25/mg/kg) in day for two months.
4. Group 4: Administrated only Omega-3 (10mg/kg) in day for two months[12].

Biochemical measurements: For biochemical study "Aspartate aminotransferase, Alanine aminotransferase, urea and creatinin" were colorimetrically identified.

Hematological measurements: For hematological study the following tests were made : RBC_s count, WBC_s (granulocytes and agranulocytes), Platelets, HGB, HCT, MCV, MCH and MCHC.

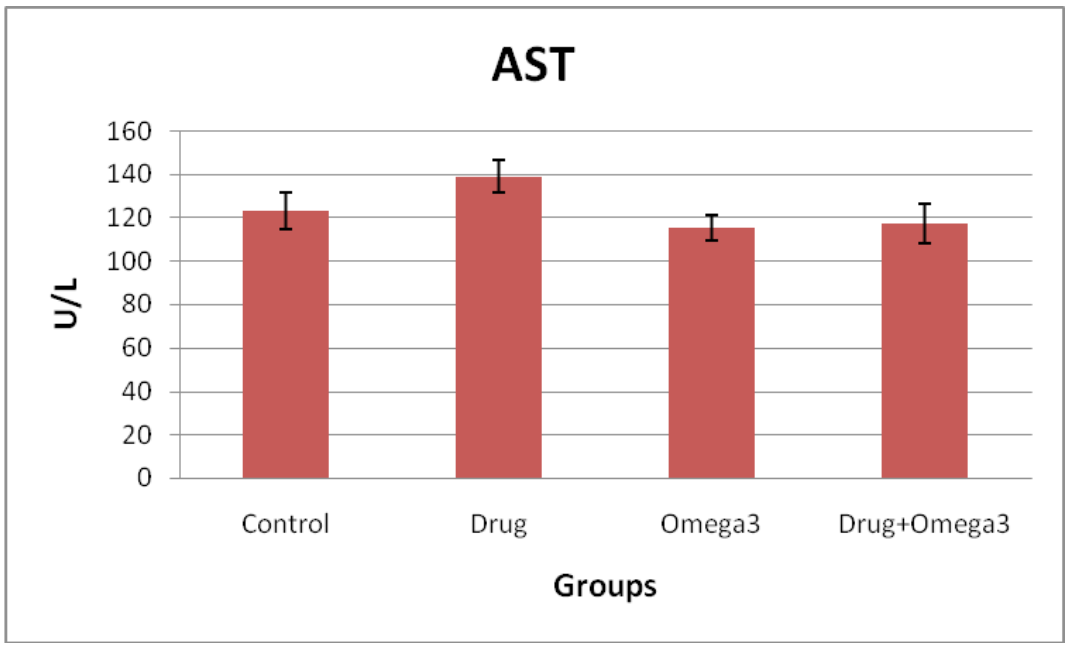
Statistical analysis: The differences between the means of the groups were analyzed by SPSS (One way ANOVA analysis) $P \leq 0.05$.

Results

Figures (1,2) show the effect of omega-3 on liver function AST and ALT respectively in rats treated with anti TB drug. The figures show significant increase at $p \leq 0.05$ in both AST and ALT in groups drenched with Anti TB drug. Both AST and ALT reduced significantly in groups treated with omega-3

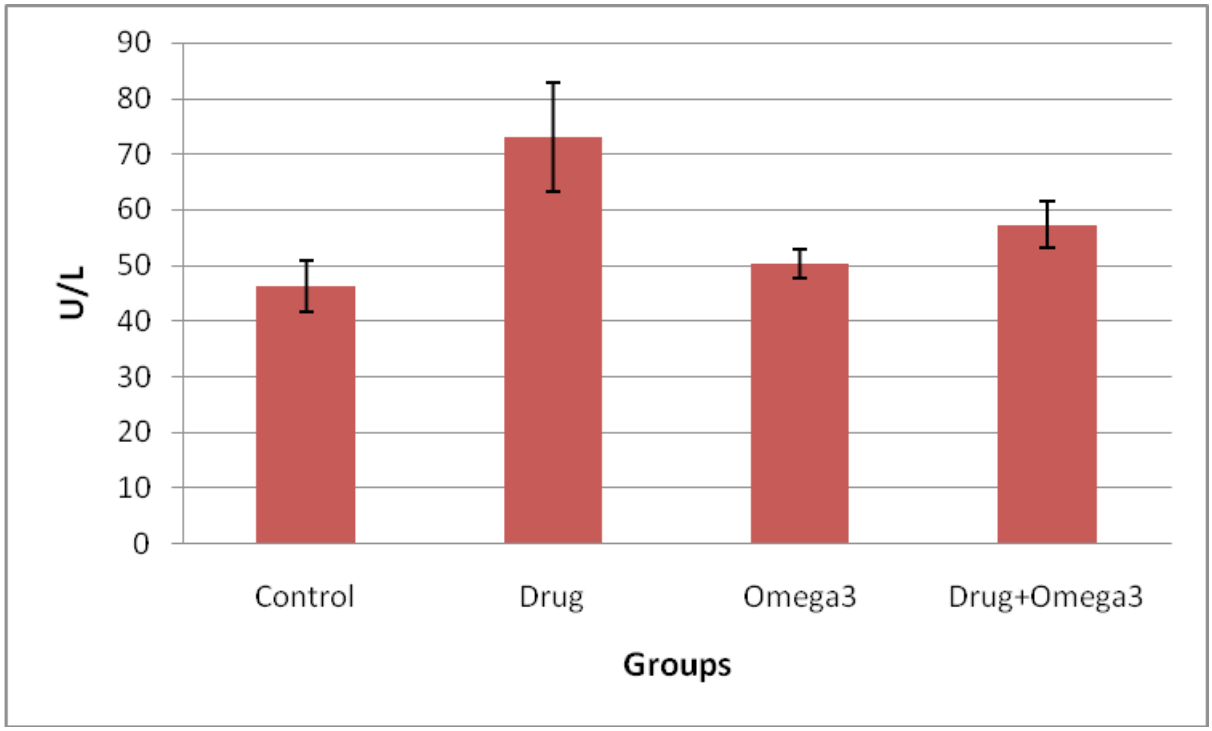
Figures (2,3) show the effect of omega-3 on kidney function urea and creatinine respectively in rats treated with anti TB drug the figures show significant increase at $p \leq 0.05$ in both urea and creatinine in groups drenched with Anti TB drug. Both urea and creatinine reduced significantly in groups treated with omega-3.

Table (1) Show the effect of Omega-3 against anti-tuberculosis drug toxicity on blood parameters. There is a significant depression at $p \leq 0.05$ in WBC count; HGB, HCT, MCH, MCHC and platelet count in groups drenched with anti TB drug. WBC count, HGB, HCT, MCH and MCHC were elevated significantly to normal in groups treated with omega-3 while the elevation in platelet count was not significant.



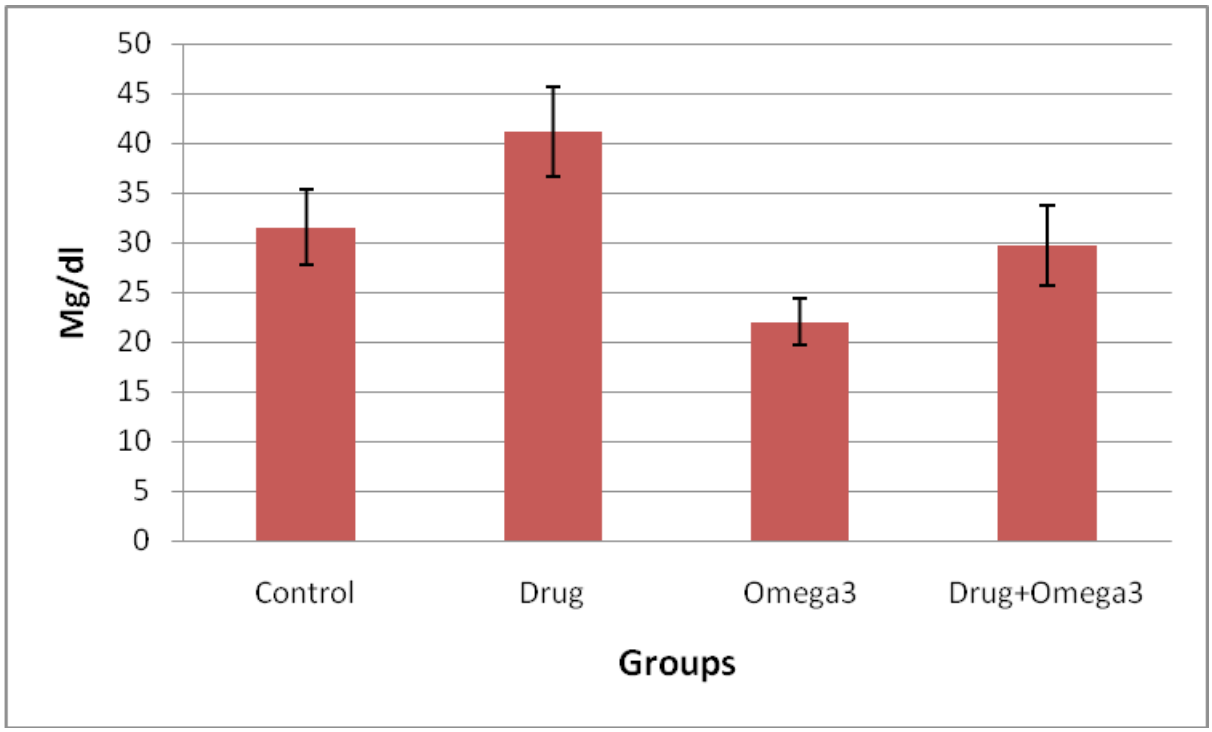
Values were represented by mean ± SEM at $p \leq 0.05$

Figure (1): Effect of omega-3 on AST of rats drenched with anti TB drug.



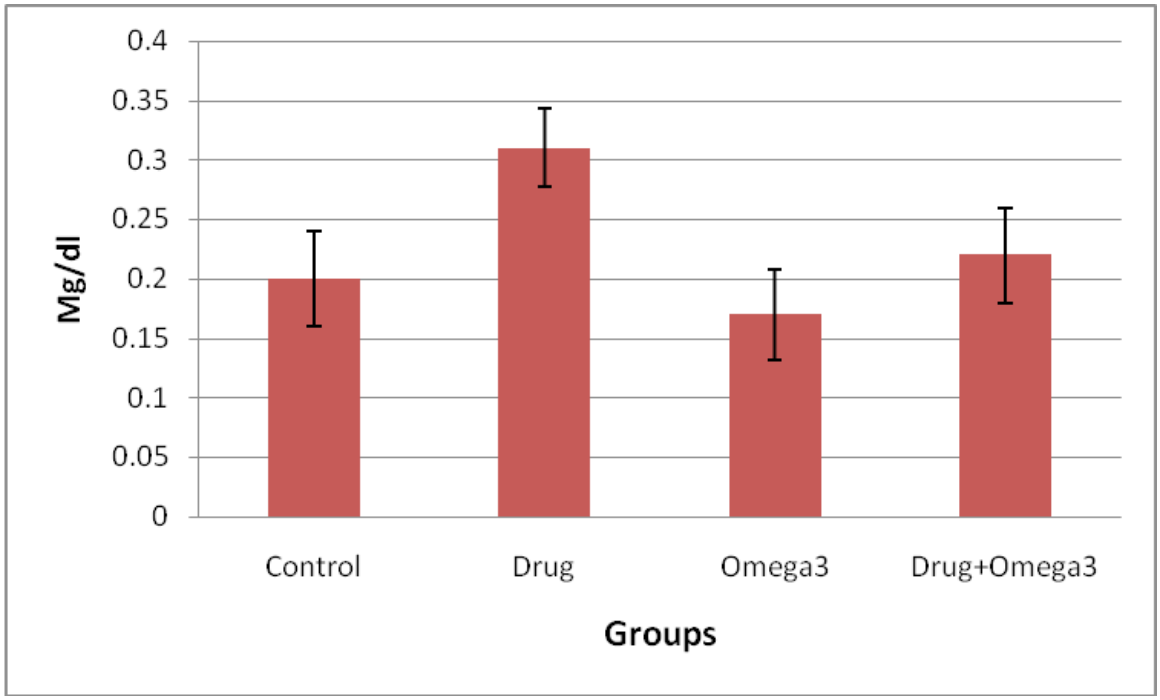
Values were represented by mean ± SEM at $p \leq 0.05$

Figure (2): Effect of omega-3 on ALT of rats drenched with anti TB drug.



Values were represented by mean ± SEM at $p \leq 0.05$

Figure (3): Effect of omega-3 on Urea of rats drenched with anti TB drug.



Values were represented by mean ± SEM at $p \leq 0.05$

Figure (4): Effect of omega-3 on creatinine of rats drenched with anti TB drug.

Table (1): Show the effect of Omega-3 against anti-tuberculosis drug toxicity on blood parameters

Groups / Parameters	Control	Drug	Drug+Omega-3	Omega-3
WBC	9.80±0.60^{a}	7.50±0.47^{b}	9.00±0.52^{a}	10.02±0.49^{a}
RBC	7.05±0.18^{a}	7.47±0.19^{a}	8.01±0.11^{a}	7.80±0.20^{a}
Hb	13.57±0.37^{a}	11.52±0.53^{b}	14.82±0.54^{a}	14.85±0.30^{a}
Hct	51.75±0.68^{a}	44.97±0.78^{b}	55.35±1.96^{ac}	56.77±1.11^{c}
MCV	67.47±0.94^{a}	64.15±0.60^{a}	73.10±2.08^{b}	71.17±1.54^{b}
MCH	18.05±0.46^{a}	15.97±0.19^{b}	18.77±0.17^{a}	18.45±0.29^{a}
MCHC	26.75±0.4^{a}	24.80±0.44^{ab}	26.27±0.97^{ab}	27.32±1.04^{c}
Platelets count	591.50±22.35^{a}	463.30±25.22^{b}	431.26±49.34^{b}	619.75±43.09^{a}

Values were represented by mean ±SEM, different small letters mean significant difference ($p \leq 0.05$)

Discussion

The study revealed a significan televation in liver enzymes “AST and ALT” with antituberculosis therapy compared to normal control group and this increase was significantly reduced by omega-3 when it was used as a mixture with drug. Previous studies revealed that antituberculosis drugs cause DILI by the oxidative stress in mitochondria, cholestasis and cell apoptosis [13].

The kidney function also affected by the drug. The study found increase in urea and creatinin levels. Previous studies referred to rifampicin as the main antibiotic that cause kidney injury[14,15]. Several studies explained the mechanism of rifampicin to affect the kidney by two mechanisms, these mechanisms are type ll and type lll hypersensitivity which are caused by antibodies against rifampicin “anti-rifampicin” that lead to form immune complexes, these complexes can be deposited in the glomerular epithelium, renal vessels and interstitial spaces[16]. The deposition of these complexes in the interstitial spaces can cause interstitial nephritis while deposition in renal vessels can cause vascular

degradation which lead to tubular necrosis [17]. Another studies carried out by renal biopsies proved that the most common problems were tubular necrosis and interstitial nephritis[14,15,18].

In the present study we evaluated the using of omega3 to reduce the toxic effects on liver and kidney. As shown in figures (1, 2) the using of omega3 significantly reduced the activity of AST and ALT in group 4 (Drug+Omega3) relative to group 2 (Drug) and in figures (3, 4) we also noticed that omega 3 reduced the urea and creatinin levels. Omega3 might boost the antioxidant system leading to handle treats caused by antituberculosis drug, which is pro-oxidative agent. Some studies reported the effect of omega3 in reducing the toxicity of some other drugs like anticancer drugs [19]. The antioxidant effect is done by lurking of the free radicals and frustrating lipid peroxidation[20].

The present study revealed also the effect of antituberculosis drugs on blood parameters "RBC, WBC,HGB, HCT, MCV, MCH, MCHC and platelet".

Also the number of WBC decreased significantly after treatment. Shishido*et al.,*(2003)[21]Found that agranulocytosis is caused by isoniazid and rifampicin whileKyoung & Min, (2015)[22] mentioned that ethambutol may be the cause.

The mechanism of effect may result from different mechanisms like enzymatic pathways interactions, inhibition of hematopoiesis and immune effects [23]. This may result from the effect of ashaptens to form antibodies against neutrophils which lead to lysis of neutrophils by the reaction of Gell Coombs type 2 hypersensitivity[8]. Hiwa & Falah, (2012)[19] Mentioned that omega 3 supply normal mitotic division in bone marrow in mice treated with anticancer drug. Omega 3 also increase the development of the myeloid progenitor cells of the bone marrow and regulate hematopoiesis[24.]

In the other hand the study revealed that TB therapy can cause anemia this result agreed with a study byJude *et al*., (2017)[25] which found that the syndromes induced by drug include RBC aplasia, megaloblastic anemia sideroblastic anemia, hemolytic anemia and leukocytosis. In fact two kinds of anemia are caused by TB therapy, hemolytic and aplastic anemia[26]. hemolytic anemia is caused by isoniazed and rifampicin while sidroblastic anemia is caused by pyranizimide. Anti-inflammatory drugs may cause interfering with iron absorption, malabsorption and hemolysis. Anti TB may lead to idiosyncratic reaction by lowering the number of RBC, WBC and platelets [27,28].

The present results revealed that Hb, HCT, MCV, MCH, MCHC were elevated in groups drenched with omega-3. This may belong to the supporting of the RBC membrane to increase its fluidity. MacPhail, (2012)[29] Mentioned that unsaturated fatty acids work to increase the fluidity of RBC membrane.

In The present study we also observed depression in platelet number this result agree with previous study carried out by Surya *et al.,*(2010)[30].Yakar et al.,(2013)[31] Reported that thrombocytopenia caused mainly by the effect of rifampicin. Rifampicin binds to the glycol proteins of platelets membrane leading to conformational changes and attaching of antibodies to platelets and causing increase destruction.

Conclusion

Our results revealed that omega-3 may have protective effect against the toxicity of antituberculosis drug.

Conflicts of Interest: "No conflicts of interest are existing".

Funding: Self

Ethical Clearance: The experiment was done with the agreement of the animal ethical committee of the Pharmacy Faculty, University of Karbala where the animal house is found.

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Evaluation of Antimicrobial Effect of Conventional Calcium Hydroxide, Calcium Hydroxide Nanoparticle and Combined Calcium Hydroxide with Silver Nanoparticle as Intracanal Medication against Enterococcus Faecalis

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Abstract

Aim: This study was performed to evaluate the effect of three intracanal edicament Conventional calcium hydroxide ($Ca(OH)_2$), $Ca(OH)_2$ nanoparticle and Combined $Ca(OH)_2$ with silver nanoparticle on E.faecalis bacterial biofilm within infected root canals. Forty five extracted human single rooted teeth were sterilized followed by mechanical preparation Microbiological culturing of E. faecalis was performed and incubated for 7 days. After incubation period, proper irrigation and premedication bacteriological sample was taken teeth were randomly divided according to the intracanal medicament used, samples were incubated in 37°C for 7 days. Second microbiological sample was taken after 7 days and culturing was done to allow bacterial count reduction. The non-parametric Kruskal-Wallis test was performed to evaluate the bacterial count reduction and percent of reduction at significance level was set to $p \leq 0.05$.

Results: The antibacterial effect of combination of calcium hydroxide with silver nanoparticle was better than calcium hydroxide nanoparticle and followed by Conventional calcium hydroxide against E. faecalis bacteria.

Conclusion: combination $Ca(OH)_2$ with silver nanoparticle can be used instead of Conventional $Ca(OH)_2$ against E. faecalis bacteria in necrotic root canals.

Keywords: *Calcium hydroxide, E. faecalis, Silver nanoparticle, calcium hydroxide nanoparticle.*

Introduction

The goal of endodontic treatment of necrotic pulp space is to clean, disinfect the entire root canal system and to eliminate bacteria and any sources of nutrient supply such as the tissue remnants. Inadequate accomplishment of these objectives risks the short-term as well as the long term outcome of endodontic therapy, where bacteria persisting within the root canal system are the major cause of endodontic treatment failures[(1)]. The use of $Ca(OH)_2$ as an intracanal antiseptic was first suggested by Hermann in 1920[(2)]. $Ca(OH)_2$ had proven to be an excellent antimicrobial intracanal dressing, but it failed in many cases to eliminate Enterococcus Faecalis bacteria from the necrotic root canal[(3)]. E. faecalis is gram positive cocci that occur singly in pairs or in short chains. It is a facultative anaerobe present in small proportion of the flora of untreated canal as a part of polymicrobial flora. It is the predominant bacteria responsible for root canal failures and persistent infections[(1)]. When a bioflm is formed, many of the microorganisms become more resistant to disinfectant agents. Thus, the researchers emphasized on the need to find new protocols for effective removal of bacteria before obturation of the canal. In order to improve antibacterial activity of these agents against poly-microbial infections or bacterial biofilms, antibacterial materials can be combined. Based on this idea, in order to increase the effectiveness of $Ca(OH)_2$ various vehicles have been added to it

Silver nanoparticles are used in many disinfectant agents used to disinfect medical devices since they

show wide range antibacterial characteristics as well as virucidal effects[3]. Silver nanoparticles attach to the cell wall of bacterium and penetrate into the cell and cause disintegration and increased permeability of bacterial cell membrane[4,5].

A recent study has shown that a combination of $Ca(OH)_2$ with silver nanoparticle as an intracanal medicament notably decrease the number of intracanal microorganisms in short-term [6].

The aim of this study was to evaluate in vitro E.faecalis bacterial biofilm count reduction after application of 3 intracanal medicament within infected root canals. Conventional $Ca(OH)_2$paste, $Ca(OH)_2$ nanoparticle and combined $Ca(OH)_2$ with silver nanoparticle.

Materials and Method

Preparation of Calcium hydroxide nanoparticle: Nanoparticles were prepared via direct thermal decomposition method using $Ca(OH)_2$ as a wet chemically synthesized precursor. Nanocrystalline particles of $Ca(OH)_2$ have been obtained by adding 2 ml NaOH aqueous solutions to 0.5 ml $CaCl_2H_2O$ aqueous solutions at 80°C and wait till evaporation occur.

Preparation of Combined calcium hydroxide with silver nanoparticle: Nanoparticles were prepared via direct thermal decomposition method using $Ca(OH)_2$ as a wet chemically synthesized precursor. Nanocrystalline particles of $Ca(OH)_2$ have been obtained by adding 2 ml NaOH aqueous solutions to 0.5 ml $CaCl_2$ H_2O aqueous solutions at 80°C[7].

Silver nanoparticles have been prepared by chemical reduction method as reported by **Pal et al. 2009[8]**. Silver nanoparticles were prepared by microwave irradiation of silver nitrate solution in ethanolic medium using PVP as a stabilizing agent. Ethanol was observed to act as a reducing agent in the presence of microwave. $Ca(OH)_2$ were added to silver solution and mixed together till evaporation of ethanol to get the final required concentration.[7].

Characterization of nanoparticles: The optical properties of the prepared nanoparticles were characterized using UV-Vis absorption spectra which were obtained on Ultraviolet–visible absorption (UV-Vis) spectroscopy (Cary 5000 UV-Vis-NIR Spectrophotometer, USA).

The particle size and shape were determined using Transmission electron microscope which was performed on JEM-2100 (JEOL,Tokyo, Japan) high resolution transmission electron microscope at an accelerating voltage of 200 kV..

Sample selection: Forty-five extracted human single rooted teeth with straight root canals, fully developed apices, free of caries or fractures and had no previous root canal treatment were selected. Extracted teeth were collected after extraction for orthodontic or periodontal reasons from outpatient clinic, Faculty of Dentistry, Minia University. Samples were divided randomly into 3 groups according to type of medication used (n=15).

Group I: Fifteen samples were medicated by conventional $Ca(OH)_2$ paste Ultracal (Ultradent. Products. inc).

Group II: Fifteen samples were medicated by $Ca(OH)_2$ nanoparticle prepared by NanoTech Egypt for Photo-Electronics.

Group III: Fifteen samples were medicated by $Ca(OH)_2$ with silver nanoparticle prepared by NanoTech Egypt for Photo-Electronics.

Sample preparation: The anatomical crowns were removed at the cement-enamel junction using tapered diamond stone mounted on low-speed hand piece under water coolant. The roots were individually placed in separate sterilizing bag. They were autoclaved at 121 ˚C for 30 minutes. The root canals were explored with a #10 K-file (Mani, Japan) until the tip of the file was visible from the apex, working length was calculated by subtracting 1mm.. The mechanical preparation was done using crown down preparation technique with the use of protaper next rotary files (Dentsply-Sirona Endodontics) in a sequence of use of X1 rotary file (0.17/0.04), then X2 rotary file (0.25/0.06) and finally X3rotary file (0.030/0.07), all files were used to full working length using endomate endodontic motor (NSK, Japan) with adjusted torque 2 Ncm and 300 rpm according to the manufacturer instructions. 1ml of distilled water was used after each file size. After instrumentation was completed, the roots were irrigated with 5 ml of distilled water. The external root surfaces were coated with two layers of nail polish, except for the coronal opening and apical foramen. The apical foramen was then sealed with light-cured nanofilled composite resin (META, Korea).

Preparation of microbial suspension: Enterococcus Faecalis suspension was prepared by adding 1 ml of a pure culture of E.faecalis (ATCC 29212) Microbiology Department, Faculty of Medicine Cairo University, which was grown in brain heart infusion (BHI) broth for 24 hour. The inoculation suspension of Enterococcus Faecalis was standardized to 2 McFarland. Preparation of microbial suspension was performed as follows: The microorganisms were cultured on blood agar plates. The colonies of the microorganism were picked up by sterile bacteriological loop and emulsified in sterile glass tube containing 1 ml of sterile BHI broth, then vortexed for 30 seconds. This preparation was repeated till the density of the microbial suspension was adjusted to match a turbidity equivalent to 2 McFarland. Each sterilized root canal was placed in Eppendorf tube and filled with the 1ml of E.faecalis standard microbial suspension by using plastic syringe in each group. The samples were submersed in the prepared bacterial suspension in coded sealed Eppendorf and incubated for 7 days at 37˚C.

After 7 days, bacterial sampling was done by using paper point #30 all root canals were irrigated with 10 ml of sterile distilled water. The medications were placed inside the canals using plastic syringe where sufficient amount was placed until the paste was seen at the canal orifice to ensure that the canals were completely filled. After application of the medication, the root canal orifices were sealed using Intermediate Restorative Materials (Densply. Switzerland).

After 7 days, all root canals in each group were irrigated with 10ml of sterile distilled water using disposable plastic syringe. A sterile paper point #30 was placed in the root canal to the working length to get sample after 7 days.

Both pre and post intracanal medication paper point samples were inserted in weatherman tubes containing 1 ml of BHI broth. The tubes were incubated at 37˚C for one day. Each sample was carefully homogenized by being vortexed for 10 seconds. Serial 10 fold dilution (1:100 and 1:1000, 1:10000) was completed in saline, then 1ml from the third and fourth dilution was inoculated on the plate media (BHI agar plates) and incubated at 37 ؚ C for 2 days. Inoculation done by using 6 ml of BHI broth from each tube was taken by sterile pipette, BHI broth was spread on BHI broth agar media using sterile glass rods. After culturing, the plates were incubated at 37˚C for 2 days.

Colonies were counted from plates and the colony forming units CFUs/ml were calculated according to following equation:

Number of colonies X dilution X amount of infected BHI broth.

The Percentage of count reduction was calculated by following formula:

$$\text{Percent Reduction} = \frac{(A-B)\times 100}{A}$$

Where:
A is the number of viable microorganisms before treatment.
B is the number of viable microorganisms after treatment.

Results

The non-parametric Kruskal-Wallis test was performed at significance level $p \leq 0.05$. The analysis of non-parametric Kruskal-Wallis test showed that there was no statistically significant difference between the three groups in comparison referring to pre intracanal medication application, where there was a statistically significant difference between the three groups in comparison referring to post medication application.

The mean log $_{10}$ value after intracanal medication application of conventional $Ca(OH)_2$ was 68.13±35.17, while 24.40±8.01 for $Ca(OH)_2$ nanoparticle group and 7.00±2.98 in $Ca(OH)_2$ with silver nanoparticle group. Table (1).

Table (1): Descriptive statistics and test of significance of E.faecalis count reduction in tested groups for pre and post intracanal medication application.

	Conventional $Ca(OH)_2$ Group		$Ca(OH)_2$ Nanoparticle Group		$Ca(OH)_2$ with silver Nanoparticle Group		P value
	Mean	SD	Mean	SD	Mean	SD	
Pre Intracanal Medication	98.07	35.05	76.27	13.04	78.47	11.34	0.077
Post Intracanal Medication	68.13	35.17	24.40	8.01	7.00	2.98	< 0.001*

*Significant at $p \leq 0.05$.

Comparing the percent of reduction between three groups using Independent-Samples Kruskal-Wallis Test, there was a statistically significant difference between groups. (P<0.001). The mean and standard deviation values of percent of reduction in conventional $Ca(OH)_2$ group were 29.93% ± 12.72%, while 51.87% ± 15.69% for $Ca(OH)_2$ nanoparticle group and 71.47% ± 10.08% in group $Ca(OH)_2$ with silver nanoparticle group. Table (2).

Table (2): Descriptive statistics and test of significance of percent of reduction in E.faecalis count in tested groups.

	Conventional $Ca(OH)_2$ Group		$Ca(OH)_2$ Nanoparticle Group		$Ca(OH)_2$ with Silver Nanoparticle Group		P value
	Mean	SD	Mean	SD	Mean	SD	
Percent of Reduction	29.93%	12.72%	51.87%	15.69%	71.47%	10.08%	< 0.001*

*Significant at $p \leq 0.05$.

Discussion

Successful endodontic treatment of necrotic root canals needs effective control of the root canal infection[9]. Chemomechanical cleaning and shaping of the infected root canal results in the reduction of microorganism counts, but cannot eliminate it completely. This is mainly because of anatomical complexity and access limitations to the root canal system by instruments and irrigants[10] [11]. In some cases where microorganisms are resistant to regular therapy and present with pain and exudation, the need for intracanal medication is increased[12].

A systematic review by **Sathorn et al. 2007**[13] on antibacterial effect of conventional calcium hydroxide as intracanal medicament showed its limited disinfection activity within the root canal system[14]. It is not equally effective against all bacteria found in the root canal. Indeed, several studies have reported the failure of conventional $Ca(OH)_2$ to eliminate Enterococci effectively, as they tolerate high pH values, varying from 9 to 11[15]. Thus, the researchers emphasized on the need to find new protocols for effective removal of bacteria before obturation of the canal.

Recently, silver nanoparticle intracanal medication has become favorable due to its effects against biofilm[16]. In a study by **Monteiro et al 2009**[17], silver nanoparticle was found to have an effect on bacterial adhesion and biofilm formation. Since, it was recommended to use silver nanoparticle in an intracanal medication rather than irrigant for effective bacterial killing[18].

Microbiological sampling was accomplished using sterile paper points to absorb the microorganisms suspended at the lumen of the root canal[19].

The injectable plastic syringe was used for application of nanoparticles intracanal medication to be sure of that the canal was fully soaked with intracanal medication, after intracanal medication application orifices were sealed with IRM to prevent leakage.

In current study results showed that combined $Ca(OH)_2$ with silver nanoparticle had higher significantly higher antibacterial effect in elimination of E. faecalis regarding to percent of reduction (71.47% ± 10.08%) followed by $Ca(OH)_2$ nanoparticle(51.87% ± 15.69%), then Conventional $Ca(OH)_2$ (29.93% ± 12.72%), which have the lowest effect as showed in. Table(2).

The results of current study may be attributed to the nanosize of the intracanal medication of $Ca(OH)_2$ with Silver nanoparticle and $Ca(OH)_2$ nanoparticle.

$Ca(OH)_2$ nanoparticle had an antibacterial effect over the traditional medicaments $Ca(OH)_2$. The mechanism of antibacterial activity of nanoparticles may be caused by an increased surface-to-volume ratio, resulting in increased surface area to contact with bacteria, increased chemical reactivity of the material, or change in the physical properties of the traditional agents, such as superior solubility, interaction, or penetration into bacteria [20].

This result came in accordance with **Javidi et al 2014** [21] who showed that $Ca(OH)_2$ with Silver nanoparticle had the better than conventional $Ca(OH)_2$ in antibacterial effect against E.faecalis.

The results of current study disagree with **Alabdulmohsen and Saad 2017** [22] who showed that the Silver nanoparticle was less effective against E. faecalis than the conventional $Ca(OH)_2$ alone or

combination of both materials this may be attributed to differences in concentration and in particle diameter as the concentration of 20 ppm with an average diameter of 2 nm in the form of colorless gel were used.

Conclusion

Combination $Ca(OH)_2$ with silver nanoparticle can be used instead of Conventional $Ca(OH)_2$ against E.faecalis bacteria in necrotic root canals.

Research Ethical Approval: This study was made with the approval of the ethical committee of the faculty of dentistry, Minia University.

Conflict of Interest: The authors declare that there is no conflict of interest.

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Expression of Amylin and Preptin in Iraqi Patients with Type 2 Diabetes Mellitus

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Abstract

This study was planned to investigate the relationship between serum amylin and preptin levelsin patients with T2DM compared to healthy controls. And to study their associations together (preptin and amylin) with serum levels of insulin and HOMA-IR.Sixty-four (64) patients were recruited from the Endocrine Outpatient clinic in Al-Imamain Al-Kadhimain city hospital from March of 2018 to May of 2018. Fasting serum samples were obtained on enrolment. (Mean age, (61.73± 8.05) years;mean duration of diabetes, (8.77±2.66) years; mean HbA1c,(8.1 ± 1.7)withT2DM and body mass index (BMI) > 25.1 kg/m^2 underwent examination. Age, sex and (BMI) matched with thirty eight(38) healthy controls were also in ruled,Serum preptin and amylin levels were measured by ELISA technique.There was statistically significant difference between patients and controls serum amylin (p=0.023) and preptin (p=0.01).Patients with T2DM had significantly higher blood glucose (p=0.0001), HbA1c (p=0.0001), insulin (p=0.0001), and homeostaticmodel assessment of insulin resistance (HOMA-IR) (p=0.001)compared to healthy control,while total cholesterolwas positively related (p=0.111)triglyceride, low-density lipoprotein cholesterol values were (p<0.001 for each), and significantly lower high-density lipoprotein cholesterol levels comparedwith the control group (p<0.0001). The preptin level demonstrated asignificant positive association with insulin and HOMA-IR compared with healthy control.For healthycontrol group: r=0.381,p=0.146, r=0.133,p=0.438respectively; for T2DM group: (r=0.411,p=0.02, r=0.332,p=0.003), The amylin level also showed a significant positive correlation with insulin and HOMA-IR compared with healthy control. (for healthy control group: r= 0.188,p=0.309, r=-0.039,p=0.911) respectively; for T2DM group: (r=0.279,p=0.002, r=0.291,p=0.003),Conclusions: There were significant differences between healthy control and patients with T2DM concerning amylin and preptin levels.Serum Amylin and preptin increase in association with insulin in diabetic conditions. The present study suggests a potential role of amyline and preptin in the pathogenesis of T2DM.

Keywords: *Amylin, preptin, diabetes.*

Introduction

The term diabetes mellitus (DM) describes a metabolic disorder of multiple etiologies characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both.The effects of DM include long-term damage, dysfunction and failure of various organs. Diabetes mellitus may present with characteristic symptoms such as thirst, polyuria, blurring of vision, and weight loss [(1)]. T2DM results from a defect in insulin action in hepatic and peripheral tissues, especially muscle tissues and adipocytes [(2)]. The specific etiologic factors are not known but genetic input is much stronger inT2DM than type 1 diabetes mellitus (T1DM) [(2)]. Human islet amyloid polypeptide (hIAPP) which named as amylin, 37 amino acid, that is co-secreted with insulin from pancreatic islet β cells. This peptide when accumulates, and aggregates forms fibrils; Amyloid deposits is associated with β cells degeneration which considered as a hallmark of non-insulin-dependent diabetes mellitus mellitus (NIDDM)[(3)]. The The prevalence of diabetes

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for all age-groups worldwide was estimated to be 2.8% in 2000 and expected to be 4.4% in 2030[4]. The total number of people with diabetes is projected to rise from 171 million in 2000 to 366 million in 2030. According to International Diabetes Federation data, there were some 425 million patients with diabetes worldwide in 2017, and this number is estimated to reach 629 million by 2045[5,6,7]. Amylin is produced via gene expression on chromosome 12. It is transcribed as an 89-aminoacid prepolypeptide, which is cleaved to form the mature peptide in the β cells of the pancreas, where it is stored along with insulin and C-peptide in the same granules [8].Amylin, which is co-secreted with insulin, regulates post-prandial glucose levels in part by inhibiting gastric emptying and suppressing the glucagon release while not affecting glucose uptake[9].Amylin Amylin has been shown to mirror insulin secretion in healthy subjects[10], obese subjects, prediabetics (subjects with impaired glucose tolerance) [11,12], and patients with T2DM(10). These findings suggest an active role for plasma amylin levels in modulating glucose metabolism [13].

As an endocrine peptide, preptin is thought to activate the insulin-like growth factor factor receptor 2 (IGF2R), and as a result, induces calcium-dependent insulin secretion in association with protein C and phospholipase C when the glucose concentration is high[14]. In addition, preptin has insulin-like effects on bone metabolism, such as boosting cellular differentiation and affecting the functions of osteoblasts and osteoclasts[15]. Preptin is a 34-amino acid peptide hormone co-secreted from the cells of the pancreas along with insulin, amylin,and pancreastatin[16,17]. Females have higher preptin levelsthan males [18]. Preptin is believed to be a pphysiological enhancerof insulin secretion induced by glucose. There is a strong correlation between obesity, hyper-insulinemia and insulin resistance, and these associations get stronger with increasing body weight[19]. Therefore, the relationship between BMI and preptin level would be a worth investigation. Hence, this study was carried out to evaluate amylin and preptin in patients with T2DM.

Subjects, Material and Method

Subjects: This study comprised sixty four consecutive patients of T2DM (26 male and 38 female) and 38 healthy controls(18 male and 20 female) were recruited from the Endocrine outpatient clinic in the Al-Imamain Al-Kadhimain city hospital from March 2018 to May 2018. All the patients were asked to provide socio-demographic data, medicalhistory, and family history.Other questions included were:theduration of disease, age of onset of the disease, anytreatment taken.

Inclusion criteria: Patients who are suffering and diagnosed as T2DM patients.

Exclusion Criteria: T1DMpatients, Pregnant women, Presence of other autoimmune diseases like Hashimoto's thyroiditis, SLE, patients with liver disease, renal disease, recent history of cardiovascular disorder, hypertension, neurological disease, or obese subjects with history of acute or chronic infections, any other chronic diseases, under cortisol treatment or suffering from any autoimmune disease, were excluded from the study.

Blood Sampling: Blood samples (7 ml) were collected from T2DMpatients diagnosed according to the WHO protocol, and control subjects in serum separatorvacutainers (BD Vacutainer Systems, Plymouth, UK).Sera was separated and immediately stored at − 20° Cuntil analysis.

Serum Amylin and preptin: The quantitative determinations of Amylinlevels and preptin were conducted by ELISA technique, using acommercial available kit, (human Amylin ELISA kit Catalog No. MBS72142 Mybiosource.com) and (human Preptin ELISA kit Catalog No. MBS764034Mybiosource.com) respectively.

Statistical analysis: All data were coded and entered using the program statistical package for social sciences (SPSS) version 25 under windows XP. Descriptive data was summarizedusing mean, standard deviation (SD), $P< 0.05$ were considered statistically significant.

Results

Serum levels of Amylin and preptinwere estimated in 64 patients with T2DM, compared with 38 healthy control, age and sex matched. As expected, the patients with T2DM had been significantly higher level of Amylin levels than the healthy controls($P=0.023$), as as shown in table (1) and Figure(1).

The concentrations of preptinlevel, are presented in Table (1) are significantly higher in T2DM patients as compared with normal subjects ($p=0.01$). As shown in figure (2), themean level of amylin and preptin in normal healthy subjects and T2DM patients was depicted in Table 1.

Table (1): the Anthropometric and biochemical variables between the studied groups.

Parameters	Healthy Control Mean± SD	Type 2 DM Mean ± SD	P-value
NO.	38	64	……..
Age (years)	58.3 ± 9.1	61.73± 8.05	0.0001
BMI	26.5 ± 3.2	29.2 ± 4.2	0.411
FPG (mg/dL)	78.8± 8.1	188.3± 38.1	0.0001
HBA1c (%)	4.1 ± 1.3	8.1 ± 1.7	0.0001
Insulin (µiU/L)	6.67 ± 4.76	4.33 ± 2.53	0.0001
HOMA-IR	1.21 ± 0.16	1.77± 0.38	0.001
Total Cholesterol (mg/dL)	165.7 ± 22.3	191.7 ± 26.3	0.111
Triglyceride (mg/dl)	96.8± 29.3	187.6 ± 63.6	0.0001
HDL-C (mg/dL)	44.3 ± 4.1	34.5 ± 2.8	0.0001
LDL-C (mg/dL)	105.4± 26.3	181.4 ± 41.8	0.293
Amylin (pg/ml)	133.46±68.47	244±73.74	0.023
Preptin (pg/ml)	383.11±18.47	546.68±19.62	0.01

Values are Mean ± SD, BMI: body mass index HOMA-IR: homeostatic model assessment-insulin resistance, FPG: fasting plasma sugar, HBA1c: hemoglobin A1C, HDL-C: high-density lipoprotein-cholesterol, LDL-C: low-density lipoprotein-cholesterol, $P < 0.05$ is considered statistically significant

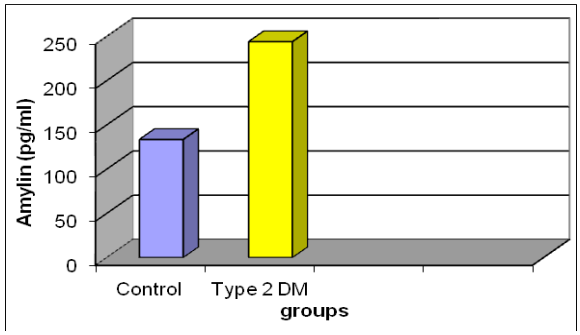


Figure (1): Mean levels of Amylin in patients with Type 2 DM compared to healthy controls.

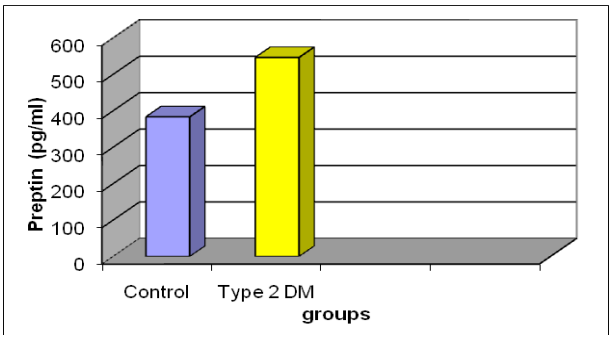


Figure (2): Mean levels of Preptin in T2DM patients compared to healthy controls

The amylin level demonstrated a significant positive correlation with insulin and HOMA-IR compared with healthy control(r=0.279,P=0.002),(r=0.291,P=0.003). Also preptin level showed a significant positive correlation with insulin and HOMA-IR compared with healthy control.(r=0.411,P= 0.02),(r=0.332,P= 0.003)

Discussion

In T2DM, the levels of amylin are raised in parallel with the increased demand for insulin, and this is thought to induce concentration-dependent amylin aggregation [20]. Islet Islet amyloid formation is associated with reduced β-cell mass [21] and human amylin 'oligomers' (small, soluble aggregates) are toxic to cultured islet cells[22] suggesting that they could contribute to progressive islet β-cell failure. Amylin oligomers can disrupt membranes [23] and inflict oxidative damage to cells [24]. In the present study amylin was measured and compared in type 2 DM and control, there was significant statistical difference between type 2 DM and control group where the p-value was 0.023. Researchers mentioned that islet amyloid deposits are found in >90% of T2DM patientsat autopsy [25], and action [26]. Amylin has been. However,the mechanisms and the precise role of amylin in the pathophysiologyof T2DM remain unclear.

In the present study the concentrations of preptin level significantly higher in T2DM patients as compared with normal subjects (p=0.01), as illustrated in Table (1).These results agree with other results done byYang et al.[27] who found higherlevels of preptin in T2DM patients compared withthe control group. Higher preptin levels have also been reported instudies of patients with gestational DM and polycystic ovarysyndrome [28,29,30]. Preptin is a physiological enhancer of insulin secretion induced by glucose. Recent studies have revealed that there is a potential association between preptin and insulin resistance in humans [31]. About diabetes mellitus, this association was also significant and this is confirmed by literature where it was shown that the concentration of preptin levels were higher in DM patients [32]. Statistical analysis revealed that Amylin significantly related to the variations seen in HOMA-IR in the present study, indicating a connection between amylin and insulin resistance in patients with T2DM.

In the present study preptin level showed a significant positive relation with insulin and HOMA-IR compared with healthy control.These results consistent with other

results that showed strong association between preptin levels and HOMA-IR in obese subjects as previously mentioned[33].

Similar to our research, thepreptin level showed a positive correlation with insulin, HOMAIR,glucose, and HbA1c levels in a study conducted by Yang etal [27]. Therefore, it is expected that a possible relation between amylin and preptin levels might exist.In the present study these two peptides(amylin and preptin) increases independently in T2DM patients; however, both indices demonstrated a positive correlation with insulin levels and HOMA-IR values.

Conclusion

Amylin and preptin may have an important role in the pathogenesis of T2DM, and ultimately in the degeneration and death of pancreatic islet cells. These findings provided a new rationale and opening up additional avenues of research into the etiology, pathogenesis and the treatment of T2DM. The findings of this investigation may provide significant data for in future research.

Conflict of Interest: None

Funding: Self

Ethical Clearance: Not required.

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Impact of Occupation and Lifestyle on Prevalence of Non-Specific Low Back Pain among Common Population: A Cross-Sectional Study

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Abstract

Introduction: Over the previous decade, musculoskeletal disorders have turned into a noteworthy ailment causing disability and expanded burden around the world. This burden will probably develop consistently, impacted by the accompanying variables, for example, age, occupation, way of life, general wellbeing, replacement, wellbeing history and so on. Earlier examinations have officially shown that age amass somewhere in the range of 34 and 51 years of age of office workers have encountered non specific low back pain in the first investigation for a year was up to 20 to 23% of office specialists.

Aim of Study: Evaluating the commonness of NSLBP among individuals of age group 18-60 years in like manner populations to contemplate the pervasiveness of NSLBP in relationship with occupational posture and way of life factors. Likewise we indent to make a self administratorquestionnaire for the examination populations utilizing computerized correspondence frameworks (Survey monkey application)

Material and Method: A cluster sample of over 480 subjects in like manner populations changing age groups between 18-60 years, where haphazardly got from office workers and drivers to be taken an interest in the examination. Overview through a survey for investigating general wellbeing, Body mass index, age, gender, occupation, rate and span of non specific LBP taken after by examination of information utilizing reasonable factual devices. We needed to reject couple of reactions from our investigation as they were either from individuals younger than 18 years old or more seasoned than 60 years old.

Conclusion: The vast majority of the members had no past history of lower back pain. Some of them could have bring down back pain because of their wellbeing conditions, some because of inactive way of life, some because of movement and so forth. Smoking and liquor addiction likewise could conceivably prompt lower back pain that is nonspecific. For this to be demonstrated, more surveys must be led taking a bigger example of around 1000 subjects.

Keywords: *Non specific, lower back pain, Prevalence, Population.*

Introduction

Non specific lower back pain is a condition that exists in numerous people from youths to grown-ups. The reason for this back pain isn't exceptionally sound. The back pain isn't caused by any conspicuous, known particular pathology. The seriousness of pain can be from mellow to extreme. Although, nonspecific lower back pain(NSLBP) has been viewed as an uncommon event

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in teenagers, recent research demonstrates that there has been a noteworthy increment among young people experiencing lower back pain[1,2]. NSLBP is frequently portrayed to as a pain experienced underneath the costal edge [3]. It is thought to be a noteworthy medical issue worldwide among grown-ups with an expected lifetime commonness of more than 60% [4]. The commonness of perpetual lower back pain is around 23% [5]. The principal scene of the NSLBP can be experienced by a person as youthful as 9 years old[6]. Lifetime predominance fluctuated from young people to grown-ups, from nation to nation. For instance in low pay nations like South Africa, Kuwait and Nigeria has been accounted for as 58%, 57.8% and 25% separately[7,8,9].

Lifetime pervasiveness has been depicted to show extent of individuals who has encountered it in any event once in lifetime[10]. Lower back pain (LBP) can result in absence of execution at work front. It might prompt segregating oneself from society as the individual experiencing LBP will most likely be unable to go to social capacities and take an interest actively[11]. It is viewed as that around 85% of individuals experiencing LBP have nonspecific low back pain as the correct reason for torment isn't known [12]. It is arrangement in light of appraisal, asymmetry, arrangement and adaptability of lumbar spine, pelvis and hip [13].

The vast majority with nonspecific lower back pain recovers rapidly, on occasion; the recovery can take longer time. It tends to be said that nonspecific lower back pain varies as per the movement did and the posture of the body.

The NSLBP that goes on for over about a couple of month and a half, it is calledchronic lower back pain. Components adding to NSLBP could be inactive way of life, no break at work, travel, driving constantly for a while. The study aims to checkinfluence of occupation and lifestyle on prevalence of Non-Specific Low Back Pain among Common populationThis examination was led with the reason to ponder population amass experiencing nonspecific lower back pain in the Southern part of India

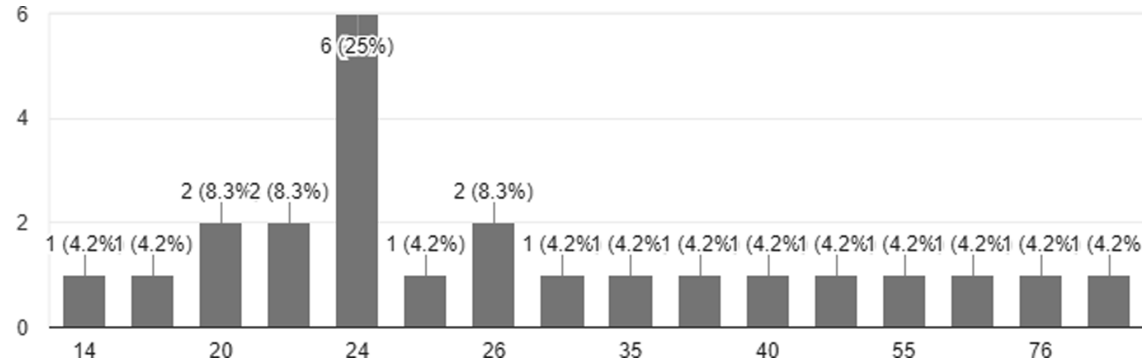
Material and Method

A cross sectional study survey was composed and offered out to around 480 individuals arbitrarily to fillquestionnaire. This was finished with a goal to comprehend the different variables that could possibly add to nonspecific lower back pain(NSLBP), with both genders, age group between 18 to 60 years and furthermore to limit underneath whose recuperation took longer than about a couple of month and a half. The examination would help in distinguishing hazard factors identified with occupation and way of life on growing LBP and its commonness among various age groups of individuals.

The inquiries were separated into five classes in particular Personal, Medical history, Physical wellness, business and travel. The classifications were picked in the wake of considering factors that may possibly add to bring down back pain like not taking break at work, voyaging ceaselessly, driving constantly for a considerable length of time, to what extent it takes to recuperate from back pain, liquor utilization, conjugal status, physical effort and so on.

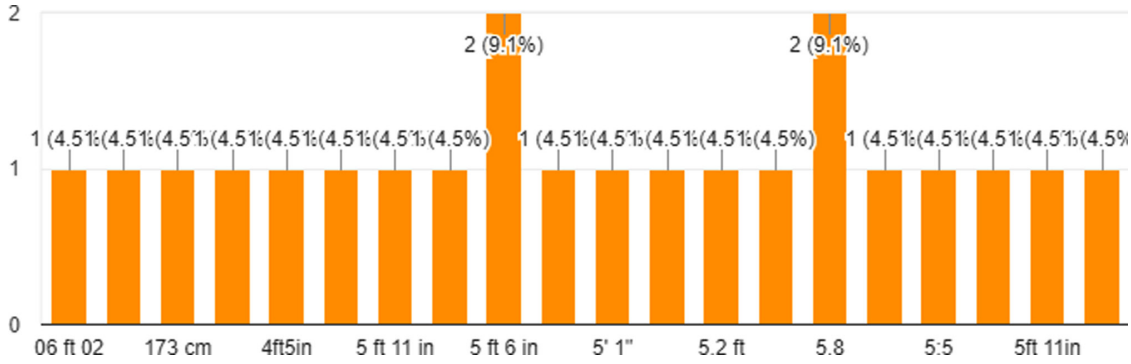
The questionnaire was outlined in such a way, it would be simple for all age'sgroups to answer the inquiries. Individuals underneath 18 years old the event may not be that clear and in the meantime, it very well may be utilized to discover bring down LBP caused by occupation.

Data Analysis



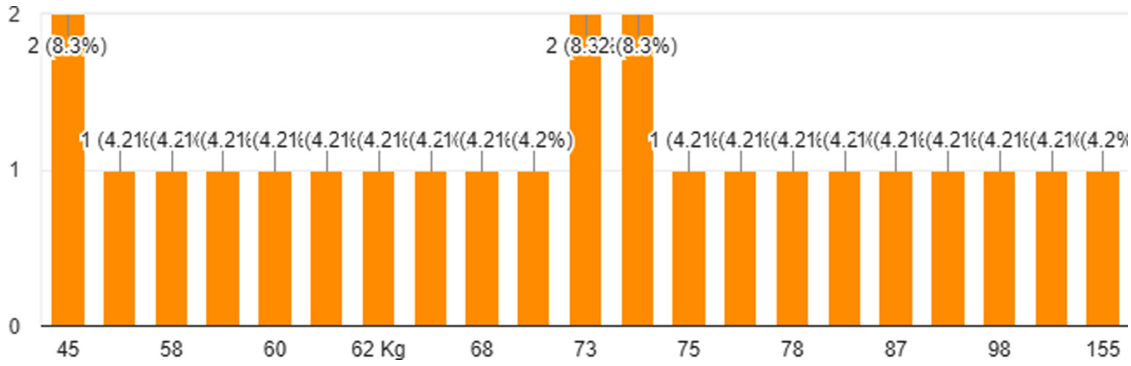
Graph 1: Age

People of age 24 years took part effectively in the survey. Around 120 individualstook part in the survey to help evaluate the occupational related dangers with NSLBP.



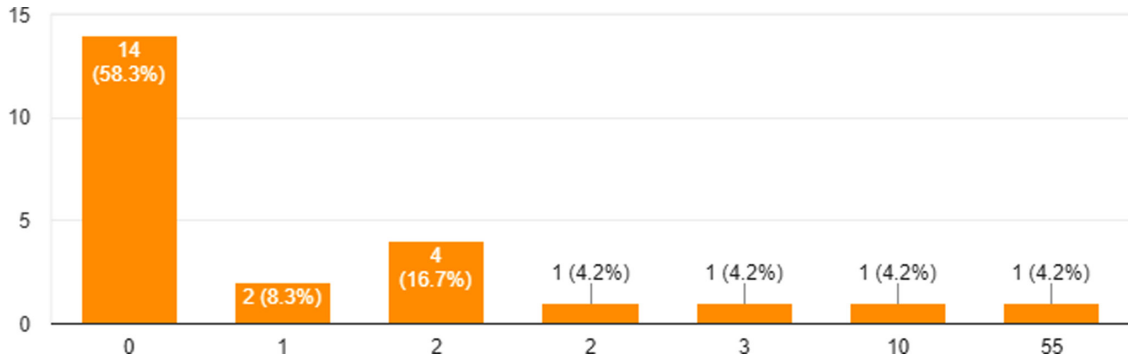
Graph 2: Height

Majority of the people was between 5 feet 6 inches to 5 feet 8 inches. The base tallness was 4 feet 5 inches and the most extreme stature was 6 feet 2 inches.



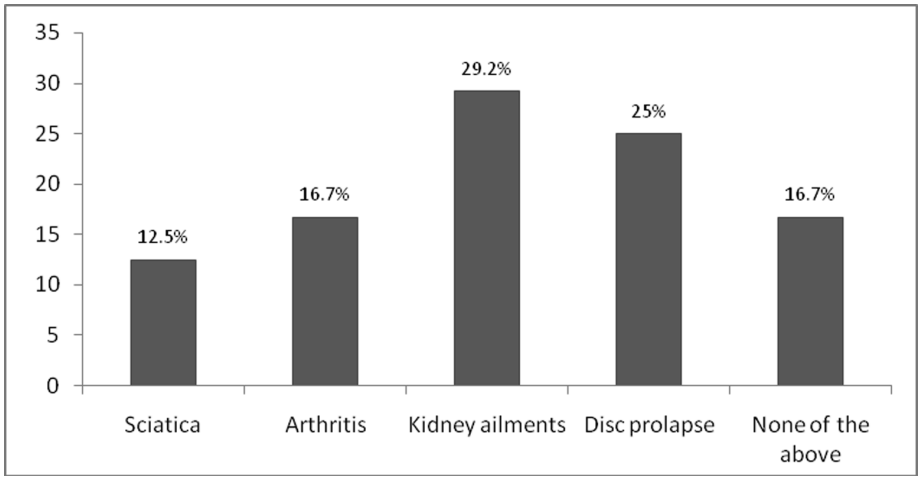
Graph 3: Weight

On a normal, individuals measured 70 kg. The most extreme weight being 155 kg and the base weight being 45kg.



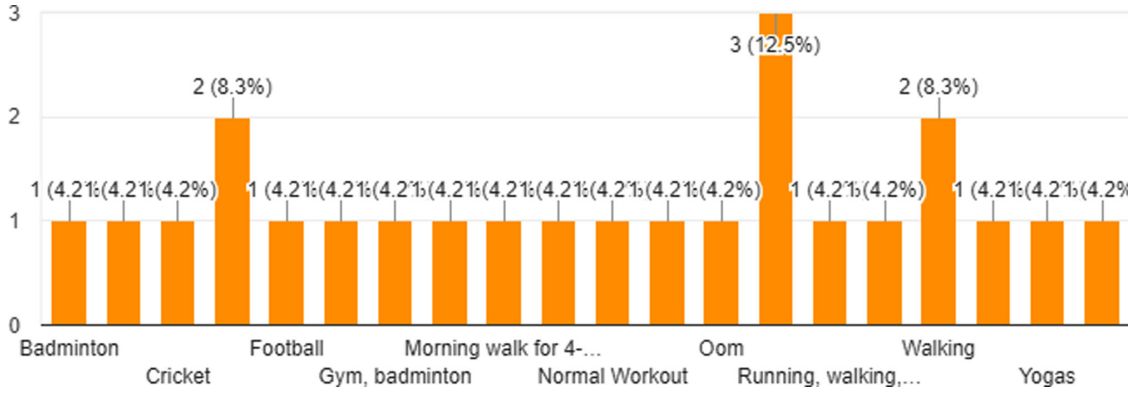
Graph 4: Frequency of Back Pain and Duration

Around 58.3% had no history of LBP,around 4.2% (20) of the members experienced LBP for more than 10 years now.



Graph 5: Have You Been Diagnosed with Sciatica/Arthritis/Kidney Ailments

Individuals having kidney illnesses represented 29.2% (140 people) of the study members. Around 12.5% (60) people having Sciatica and around 25% (120) individuals with disc prolapsed. The rest of the 16.7% (80) people were not having any of the previously mentioned. The greater part of them has not had any of the conditions, like Sciatica, Arthritis and Kidney diseases. A couple has been determined to have these conditions for nearly 4 years.



Graph 6: What Kind of Fitness or Sport You Involved

Survey members were involved in different sorts of exercises like Badminton, Cricket, Football, Yoga and so forth. Some went to fitnesscenter; some were occupied with running and strolling. A large portion of them being involved in Walking/running/Jogging.

Marital Status: of members who took part in survey, 71% (340) were not married and the rest of the 29%(140) were married. Employment: of the 480 individuals, around 280 people that are represents around 58.3% were employed and the staying 200 which represents around 41.7% were not employed. Since the target of our investigation was individuals working to comprehend whether any factor in occupation is prompting NSLBP. Drinking Habits-Alcohol: Around 380 members were observed to be the individuals who don't expend liquor potential nondrinkers. This represented around 80% of the population while around 20% consumed liquor. Drinking Coffee: Around 37.5% (180 people) of the study members did not consume espresso. However, there were many members who expended espresso in excess of two times each day and rare sorts of people who consume most likely two times each week.Food Habit: Around 220 individuals who participated in the study were vegetarians. This represented 45.8% of the survey members and the staying 54.2% were non vegetarians. Smoking: of 480 individuals, around 440 people were non-smokers that is 91.7% of the survey members and 8.3% were smokers.

History of Back Pain: Around 339 individuals who took part in the survey had no history of LBP, around 8.3% (40) had NSLBP for more than 12 weeks and 16.7% (80) had bring down LBP for under about a month and a half. Around 4.2% experienced LBP that went on for 6 to 12 weeks.History of Back Pain in a Family:Around 159 survey members (i.e. 33.3%), had somebody they would say bring down back pain later in their life. The staying 321 survey members had no history of LBP in their family. Frequency of Back Pain and Duration: Around 58.3% (279) of the study members had no history of LBP. Around 37.5% of members experienced LBP at some point. Around 4.2% which is low number of members encounter bring down LBP every now and again.

How regularly you do Exercise: Around 200 survey members performed practices every day. Around 240 members performed practices now and again. Around 8% of the members did not do any kind of activities. Physical Exertion: Around 279 members experienced physical exertion around 60 minutes. Around 140 members experienced physical exertion for around 1 to 2 hours every day. Around 60 individuals experienced it for around 2-3 hours per day.About the Shoes: Around 300 individuals that took part in the survey for NSLBP did not utilize heeled footwear. The staying 37.5% (180 people), wore heeled footwear most consistently.

Work Schedule: Around 180 of the survey peoplehad a sedentary life. Around 154 members needed to travel a considerable measure in the meantime; the way of life was sedentary. Around 60 (12.5%) people went all the time. 16.5% (79) of the members were occupied with physical exertion everyday premise.Work Experience: Around 180 people were either fresher's or had 1 to 2 years work experience. Around 159 survey participants had work experience between 2 to 5 years and around 140 individuals had work experience greater than 10 years. People with greater than 10 years of work experience would better understand occupational factors contributing to NSLBP.How often you take break at Work: A standout factors in deciding components is whether a man going to work is taking breaks Around 219 people rarely enjoyed reprieve at work. Around 180 members enjoyed reprieve often 60 members enjoyed reprieve very often and a couple around 20 nevertook break at work.

How Frequently You Travel: Around 240 individuals travelled now and again. Around 140 members travelled very frequently. Around 80 individuals travelledfrequently. Generally around 4% of the members did not go by any means. Mode of Travel: The majority of them utilized two wheeler to go from place to place. Around 159 people gone by bus and around 60 people via car. The quantity of individuals going to work or to different places by walk and train were the same.Frequently of driving: The majority of the study members did not drive for a considerable length of time. A few members drove for over 2 hours.

Findings: With the approach of science and innovation, individuals depend more on machines to their work instead of working out themselves. It influences an individual mentally on the grounds that, the individual does not entertain oneself doing exercises in the fitness center for wellness or not walking to the closest grocery store. The examination was comprehendto the work relatedcomponents also; way of life factors possibly could bring down back pain. We excluded 40 responses as 20 were younger than 18 years and 20 responses from individuals more noteworthy than 60 years old. Around 339 people took part in this survey had not experienced lower back pain by any stretch of the imagination. This could be because of connecting themselves in a few sorts of activities like running, strolling, and yoga and so on. Exercise is known to diminish the quantity of repeats of lower back pain and furthermore decrease pain in individuals experiencing lower back pain[14]. A portion of people in the survey with no analysis of kidney diseases could be experiencing lower back pain either due to the utilization of heeled shoes or because of consistent travel and stationary way of life. One of the components at work that may conceivably prompt individuals getting lower back pain isn't taking break at work. Nowadays the utilization of PC isn't just confined to programming engineers, even biotechnologists, mechanical designers, structural architects; electrical specialists need to utilize PCs at work. Evidencesuggests that effective multidisciplinary management approach involves for NSLBP[15]. Hence, it tends to be presumed that back pain can be added to a great deal of variables including sitting posture. Additionally studies must be led to get an unequivocal end to find out the variables that may add to bring down back pain.

Result

The accompanying investigation was attempted so as to survey the effect of occupation on the nonspecific lower back pain. Around 480 individuals were picked

indiscriminately from various expert gatherings and were given a survey containing around 28 questions. Around 40 (8.3%) of the responses must be prohibited from the examination as the people did not meet the age criteria. Around 40 out of 480 were well more than 60 years old. Around 24 (5%) responses were from individuals more youthful than 18 years old, hence excluded from the examination.

Conclusion

Lower back pain could be consequence of an assortment of exercises. 480 individuals from Southern part of India took part in the study. We needed to reject around 40 responses 20 responses from individuals more youthful than 20 years old and 20 responses from individuals more prominent than 60 years old as it would give a reasonable picture. Out 480, around 336 members had never experienced lower back pain. Some of them could encounter it on account of working persistently without break and driving a stationary way of life alongside visit travel. It was likewise observed numerous individuals who were performing exercise all the time might be the ones who might not have had back pain. Numerous variables, for example, sitting posture, going by bikes, driving for extended periods can prompt lower back pain. The impact of smoking and liquor addiction on bring down back pain isn't exceptionally lucid. For an authoritative end, examine must be directed considering an example of a greater example of around 1000 members and by including more factors.

Conflict of Interest: None

Source of Funding: Self funded study

Ethical Clearance: Ethical clearance was obtained from Institutional Review Board of Faculty of physiotherapy, Dr. M.G.R. Educational & Research Institute.

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Gene Analysis Polymorphisms INSR and Level SHBG, as Risk Factors in Polycystic Ovary Syndrome (PCOS) in Madurese

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Abstract

PCOS (Polycystic ovary syndrome) one of the endocrine disorders most often in women of reproductive age, marked menstrual disorders (amenorrhea/oligomenorrhea), hirsutism, acne, alopecia, biochemical examination results in increased androgen. The high incidence with the same phenotype in family members of PCOS patients shows that genetic factors play a role. The purpose of this study was to analyze the relationship between gene polymorphism INSR and levels SHBG on PCOS (Polycystic ovary syndrome) in the Madurese tribe.

This study was analytic observational with study design case-control, a sample of 30 patients (PCOS cases) and 30 healthy women (not PCOS) in the Madura Tribe Previously, screening of SGOT, SGPT, BUN, Creatinin and GDA, PCR and RFLP was examined in the INSR gene and examination of SHBG levels by ELISA kit.gene research results INSR have 16.67% TT genotype, 63.33% TC and 20.00% CC, control group has 38.24% TT genotype, TC 44.12% and CC 17.65%, whereas in the case group T 48.33%, C allele 51.67% and control group 56.67% T allele and 43.33% C allele, based onstatistical tests chi-square in the case group and control of both genotypes and alleles there was no significant difference (P> 0.05). This study was first carried out in the Madura Tribe in the INSR gene and in the examination of SHBG levels, the results showed no INSR gene differences between PCOS and healthy women.

Keyword: *PCOS (Polycystic ovary syndrome), polymorphism, INSR, SHBG.*

Introduction

PCOS (Polycystic ovary syndrome) is an endocrine disorder in women of reproductive age characterized by menstrual disorders (amenorrhea/oligomenorrhea), hirsutism, the appearance of acne, alopecia and biochemical examination androgen (testosterone) which increases by[1]. The long-term impact of PCOS infertility, insulin resistance, increased risk of diabetes and cardiovascular disease[2]

Basedon diagnostic criteria *National Institutes of Health* 1990, PCOS prevalence is 6 to 10% of women of reproductive age, but Rotterdam's prevalence is twice as high as[3]. Based on research revealing 75% of infertility with anovulation causes were caused by PCOS, and the prevalence of PCOS in Surabaya in women of reproductive age was 4.5% [3]. Based on research in Sampang and Bangkalan regencies on May 20, 2017, for 5 months; January to May 2017 in WijayaKusuma and RSIA RoudatulHikmah clinics, around 5.2% and 4.7% of women of reproductive age, and 60% of cases of infertility caused by PCOS.

Thegene In Iranian Turkish women revealed there was no relationship between thegene*INSR* and SOP[4.] polymorphism*INSR* was a genetic predisposing factor for PCOS. Based on several studies have been conducted to examine the relationship between *Single nucleotide polymorphismsINSR(SNPs)* and PCOS[5].

The results of gene research underlying the occurrence of PCOS are still contradictory, due to

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regional, ethnic and racial differences, so further research is needed to prove the gene causing PCOS. The genetic role of PCOS supports, the genes involved in the etiology of the syndrome have not been fully investigated until now[3] genetic risk factors can detect PCOS early, thus avoiding risk factors for PCOS. The gene *INSR* study in PCOS patients has the potential for tribes because it has a high carbohydrate-consuming lifestyle, and marriage tends to be non-mixed.

Material and Method

This study was an observational analytic *case control*. The number of samples of 30 samples of PCOS and healthy women of 30 samples was taken by *purposive* sampling technique according to the criteria of case and control groups. Case group criteria are native Madurese (3 generations), married women aged 20-40 years, pregnancy program, there are Rotterdam criteria of at least 2 clinical symptoms, normal kidney function and liver physiology, 3-5 days of menstruation and control group criteria are genuine Madurese (3 generations), women married and aged 20-40 years, regular menstruation at intervals of 21-35, no diabetes, kidney and liver physiological disorders, 3-5 days of menstruation, no hormonal therapy or hormonal contraception 3 previous month. Screening Initial examination of SGOT, SGPT, BUN, Creatinin, and blood sugar, if normal further Body Mass Index Measurement is continued, followed by SHBG examination using an ELISA kit. Taking 8 mL of blood using EDTA tubes for DNA extraction was then taken by plasma for examination of SHGB levels from PCOS patients and healthy women.

Findings: All PCOS patients were 30 patients and controlled 34 healthy women, both cases and controls come from the Madura tribe. Based on (Table 3) it was found that clinical and biochemical examination characteristics for age, BB, BMI there were significant differences between case and control groups (P <0.001), whereas biochemical examination *SHBG* there was no significant difference in (P> 0.05). but it was seen from the mean of the two groups that there was a difference, the level *SHBG* was lower than the PCOS group of the healthy women group.

Gene polymorphism was *INSR* analyzed using *PCR-RFLP*. The results of the frequency distribution of genotyped and alleles in the gene *INSR* can be seen in (Table 4). Analysis of the genotype statistical test andgene allele *INSR* found no significant differences (P> 0.05) between the PCOS group and the control group.

Based on (Table 5) shows that from the results of the Logistic Regression statistical relationship of thegene *INSR* and levels *SHBG* there was no significant relationship P> 0.05.

Table 1: Five pairs of PCR primers in the DENND1A and FSHR genes for application DNA

PCRRonde	Primary	Sequence (5 '→ 3')	Amplicon
INSR	F	5'-CCAAGGATGCT GTGTAGATAAG-3	317bp
	R	5'-TCAGGAAAGCC AGCCC ATGTC-3	317bp

Table 2: RFLP FSHR gene polymorphism, INSR,and LHCGR

GEN	Restriction Enzyme Endonuclease
INSR	PmlI

Table 3: Clinical characteristics of patients with PCOS and control

Characteristics	PCOS	Controls	P Value
Age (Year)	25.76±5:07	30.57±5:37	0000
BB (Kg)	63.56±13.97	54.11±6:03	0001
TB (Cm)	155.7±6.47	154.5±4.81	0.691
BMI (BB/TB^2)	26.06±4.63	22.68±2.26	0.001
SHBG (nmol/l)	68.97±195.84	82.83±261.38	0.662

Table 4: Distribution of genotypic and allele frequencies from the INSRgene

Genotype	Case (PCOS)		Control		P value
	N	%	N	%	
Gen INSR					
TT	5	16.67	10	33.33	0.299
TC	19	63.33	14	46.67	
CC	6	20.00	6	20.00	
Allele					
T	29	48.33	34	56.67	0.465
C	31	51.67	31	43.33	

Table 5: Logistic regression statistics test results, levels of SHBG

Gene polymorphism	β	Significant	Exp (β)
SHBG	0.000	0.813	1,000

Table 6: Distribution FSHR, INSR and LHCGR based on examination of levels FSH, LH and SHBG research subjects

Gene INSR	Case			P Value
	TT(n = 5)	TC (n = 19)	CC (n = 6)	
SHBG (nmol/I)	15.53±18.70	100.37±242.48	14.08±16.95	0.530

Discussion

Genetic research on ethnicity that is different from China, Caucasian but says there is no significant relationship between FSHR (Ala370Thr) gene, INSR gene,and LHCGRgene. The results of the study of the characteristics of PCOS patients and healthy women obtained age, BB, BMI there was a significant relationship, BB and BMI in PCOS patients were higher than the control group, this is in accordance with Bassiuny study, 2014 that age and BMI were significantly higher in the PCOS group[7,8]. Obesity and overweight are manifestations of PCOS, especially obesity that occurs in the abdominal area, even 50% of women who are obese or overweight will experience PCOS[9, 27, 28.]

The results of the SHBG examination in this study found no significant relationship but seen from the mean more SHBG low PCOS patients compared to the control group, the control group of SHBG levels was higher, and in the PCOS group the levels of SHBG were lower, from five studies said that SHBG levels were not significant with PCOS[10.19]. PCOS patients SHBG levels were lower than in the control group[11]. Low levels of SHBG are a risk factor for the occurrence of hyperandrogenism and insulin resistance.[12] SHBG is a glycoprotein that is in testosterone and other steroid hormones in the blood, many studies linking low SHBG levels with PCOS[13]. Research revealed that SHBG levels were also found in PCOS women compared with controls.[14]

The results of this study showed no significant differences in INSR genes between PCOS women and healthy women. Based on research on Turkish women, it was found that the INSR gene with PmIlenzyme *restriction* showed that there was no difference between the case group and control of both genotype and allele[4]. The INSR gene study had no significant differences in genotypes and alleles between case and control groups. But it was seen from the relationship of INSR gene alleles with PCOS that there was a significant relationship with the PCOS group. Research on Madurese tribes is not in line with research in Iranian women, found that there was a significant association of INSR genes with PCOS[15.20]. Research on American women shows that there is an association between the INSR gene and PCOS found in thin women, but it is also necessary to describe the environmental factors that influence the occurrence of PCOS[16.]The results of research on the Madurese tribe found no significant relationship with PCOS in the INSR gene. very significant was found in PCOS women compared to the control group. But from the relationship test, the results of the INSR gene allele were significantly associated with the incidence of PCOS in the Madura tribe.

Thegene is *INSR* located on chromosome 19 and consists of 22 exons, measuring 120 kb. INSR studies in knockout rats show extreme insulin resistance. Insulin resistance stimulatessecretion*LH* from the pituitary and testosterone production from theca cells and cytochrome p450 activity from granulosa cells thereby disrupting follicular maturation and becoming PCOS. Polymorphism of *Allele INSR* genetic predisposing factors for PCOS.

There were no significant differences in the INSR gene (Pm*I*I) between 50 sample PCOS patients and 47 control groups in Iranian women. PCOS has various etiologies including gene and environmental gene interactions. PCOS is associated with insulin resistance, type 2 diabetes mellitus, hyperinsulinemia, hyperandrogenism, inflammation, cardiovascular disease, and hypertension. PCOS women are diagnosed with hyperandrogenism, menstrual irregularities,and infertility, and are usually overweight or obese[4,21,22,24,25]. There was a significant association of the INSR gene with PCOS patients in 677 participants, the INSR gene had risk factors for PCOS and the INSR gene relationship. INSR gene has an important role for the occurrence of PCOS regulate insulin, a study in China found an increased risk of insulin resistance and PCOS is associated with the group of patients emaciated by RFLP analysis, it is also consistent with studies conducted in the United States[17].

Research shows that there is a relationship between the INSR gene and the incidence of PCOS. Obese women develop insulin resistance so hyperandrogen

affects follicular development and PCOS occurs, and PCOS pathogenesis differs between thin and obese women[8]. A Korean women's study reported that there was no significant association between the INSR gene and PCOS, the frequency of allele T was higher in PCOS patients compared to the norm group[18,23]. Different research in Madura tribe found allele C was higher in PCOS patients than in healthy women.

Conclusion

Research on the INSR gene had no differences in INSR between PCOS and healthy women, and from the SHBG level there were no differences between the case and control groups, but the results from the mean were found to be lower in PCOS compared to the control group, so further research was needed. genes that are a risk factor for PCOS with a larger number of samples.

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Accuracy of 3D Ultrasound in the Diagnosis of Uterine Pathology in Patients with Postmenopausal Bleeding

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Abstract

Objective: To evaluate the diagnostic accuracy of 3-Dimensional transvaginal sonography (3-D TVUS) in detection of myometrial and endometrial lesions compared to uterine histopathological assessment in patients with postmenopausal bleeding(PMB).To estimate the accuracy of transvaginal Power Doppler of the endometrium and subendometrial space in predicting endometrial pathology in PMB patients.

Material and Method: Prospective observational study conducted on 80 postmenopausal patients presenting with PMB.All patients were subjected to 2-dimensional (2-D) and 3-D TVUS of the uterus to detect the presenceof any cavitary or myometrial lesions.Power Doppler sonography was done to detect vascular flow to the endometrium and subendometrial space to measure RI (Resistance Index), PI (Pulsatility Index) and PSV (Peak Systolic Velocity) of remarkable vessels.Histopathological diagnoses were obtained in all cases.

Results: The corresponding sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) of 3-D TVUS as a diagnostic test for Fibroid were 94.11%, 93.6%, 80% and 98.33% respectively and for Adenomyosis, were 88.88%, 95.77%, 80% and 98.55% respectively.

The accuracy of 3-D TVUS in diagnosing myometrial lesions is of 88.46% sensitivity & 55.56% specificity with accuracy 75% however in diagnosing endometrial lesions is of 77.36% sensitivity & 90% specificity with accuracy 81.93%.

The receiver operating characteristic(ROC) curvesrevealed that the cut-off values of RI=0.76, PI=1.26 & PSV=6.25 (cm/sec) for prediction of abnormal endometrium yielded sensitivity of 98.15%, 73.6% & 75.5% respectively.

Conclusion: 3-D TVUS is an accurate tool in diagnosing the cause of bleeding in postmenopausal patients; it shows high correlation with the histopathological results.

Power Doppler examination of the endometrial and subendometrial space can be used to differentiate normal from abnormal pathology through cut-off values with high sensitivity specially when examining RI values.

Keywords: *Postmenopausal bleeding, 3-Dimensional transvaginal sonography, Power Doppler, PSV, RI, PI.*

Introduction

PMB is a common problem that affects 1 in 10 postmenopausal women older than 55 years and representing 5% of all gynecology outpatient attendances.[1]

Although PMB usually has a benign cause, the priority is to exclude malignancy. Endometrial atrophy, submucosal fibroids, endometrial polyps, endometrial hyperplasia, endometrial carcinoma and estrogen withdrawal were considered knownCauses of PMB.[2]

At present, endometrial sampling is the gold standard for the diagnosis of Uterine/Endometrial

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pathology however; endometrial sampling is an invasive procedure. Sampling may be performed via office biopsy, dilatation and curettage (D & C) or in some cases, hysteroscopically guided biopsy. Endometrial tissue sampling resulting in findings insufficient for diagnosis is common. D & C misses 2% to 6% of endometrial lesions, with even higher miss rates for office biopsy in which less tissue is sampled. Hysteroscopically guided biopsy is more expensive and requires considerable physician expertise.[3]

Consequently, guidelines were developed to consider these issues in evaluating women with PMB.[4] The guideline development group recommended endometrial sampling or transvaginal ultrasonography for initial management of spontaneous PMB. This will enable patients with endometrial thickness of 4 mm or less to be managed expectantly.[5]

The recent advent of Three-dimensional volume ultrasound (3-D US) of the female pelvis, specifically using a transvaginal approach, has been one of the most important advances.[5,6]

3-D US permits a more selective approach to endometrial biopsy in women with PMB by finding those who truly need to be sampled and directing the choice of the best sampling technique in each individual patient.[7]

Material and Method

The current prospective observational study was conducted at department of Obstetrics and Gynecology, Kasr Al-Ainy Hospital, Cairo University between March 2016to December 2018. It included 80 patients with PMB recruited from the attendees of the outpatient Gynecology clinic. The study was approved by the Kasr Al-Ainy ethical committee. All patients were counselled about the procedure and an informed consent was obtained from all cases.

The included women were menopausal (Menopause; defined as 1 year of absence of menstruation in women older than 50 and the amenorrhea was not explained by medication or disease) complaining of PMB; defined as any vaginal bleeding in a postmenopausal woman not on hormone replacement therapy. Women on hormonal therapy, with coagulation disorders, thyroid and liver diseases, neglected intra uterine device or pessary or any cervical abnormality were excluded.

All participants underwent the following: full history taking, complete physical examination (general examination including BMI & gynecological examination), laboratory investigations (complete blood count, liver function tests, kidney function tests and a coagulation profile), 2-D TVUS to measure Endometrial Thickness (ET) and presence of any endometrial and myometrial focal lesions,Power Doppler ultrasound is done to detect vascular flow to the endometrium and the sub-endometrial space to measure RI, PIand PSV of remarkable vessels, 3-D TVUS to acquire multiplanner view of the uterine cavity and detect presence or absence of any cavitary or myometrial lesions and Pathological diagnosis (after curettage or hysterectomy) for histopathological examination & assessment.

Transvaginal sonography was performed for all patients using GE Voluson E10 (GE Healthcare, Milwaukee, WI, USA) transvaginal volumetric probe transducer with frequency range of 5-8 MHz equipped with color, power and pulsed Doppler capabilities.

First, 2-D TVUS was performed to measure maximum ET and to detect the presence of any endometrial and myometrial focal lesions.

Then, 3-D TVUS to acquire multiplanner view of the uterine cavity to notice the presence of any focal endometrial or myometrial lesions.

Thereafter, the power Doppler gate was activated for blood flow mapping of the endometrium and endometrial-myometrial interface (subendometrial area).

Once the vessels have been identified, the pulsed Doppler sample volume was activated to obtain a flow velocity waveform (FVW). RI, PI and PSV were automatically calculated from three consecutive FVWs. The lowest RI and PI, and the highest PSV found were recorded.

Patients were then admitted for either endometrial sampling or for total Abdominal Hysterectomy. All removed tissues were sent for histopathological assessment. Data were statistically described in terms of mean ± standard deviation (± SD), range, or frequencies (number of cases) and percentages when appropriate. Comparison of numerical variables between the study groups was done using Student t test for independent samples. Agreement between the different diagnostic techniques was tested using kappa statistic.

Accuracy was represented using calculated values of sensitivity, specificity, PPV, NPP value, and overall accuracy.

ROC curves analysis was used to determine the optimum cut off value for the studied diagnostic markers. p values less than 0.05 was considered statistically significant. All statistical calculations were done using computer program SPSS (Statistical Package for the Social Science; SPSS Inc., Chicago, IL, USA) release 15 for Microsoft Windows 2006.

Findings: The characteristics of the patients included in this study are represented in Table 1.

Table 1: Patient characteristics

Variable	Mean ± Standard deviation		
Age (years)	54.33 ± 3.634		
Gravidity	6.33 ± 2.916		
Parity	5.19 ± 2.797		
BMI (kg/m^2)	36.93 ± 6.603		
Age at menopause (Years)	50.41 ± 2.114		
PMB Presentation	**Number**		**Percent**
	Primary	32	40
	Recurrent	48	60
Medical disorders among the study group	**Number**		**Percent**
	Hypertension	14	17.5
	Diabetes Mellitus	8	10
	Hypertension & Diabetes	10	12.5
	Others	6	7.5
	Free	42	52.5
Type of operation subjected to the study group	Hysterectomy	45	56.25
	Dilatation & Curettage	35	43.75

The 3-D TVUS and histopathological examination findings in the myometrium and the Endometrium are shown in tables 2, 3.

Table 2: Myometrial lesions as detected by 3-D TVUS and Histopathology (In patients underwent Hysterectomy):

Lesions	Number	%
By 3-D TVUS		
Fibroid	20	44.5
Adenomyosis	11	24.4
Free	14	31.1
Total	**45**	**100**
By Histopathology		
Fibroid	18	40
Adenomyosis	9	20
Free	18	40
Total	**45**	**100**

Table 3: Endometrial appearance and lesions as detected by 3-D TVUS and Histopathology:

Lesions	Number	%
By 3-D TVUS		
Endometrial Polyp	16	20
Endometrial Hyperplasia	25	31.3
Endometrial Carcinoma	3	3.8
Free	36	45
Total	**80**	**100**
By Histopathology		
Endometrial Polyp	15	18.8
Endometrial Hyperplasia	33	41.3
Endometrial Carcinoma	5	6.3
Free	27	33.8
Total	**80**	**100**

The accuracy of 3-D TVUS in diagnosing myometrial and endometrial lesions is shown in table 4.

Table 4: The accuracy of 3-D TVUS in detection of Myometrial and Endometrium lesions:

	Sensitivity	Specificity	P PV	N PV	Accuracy
Myometrium	88.46	55.56	74.19	76.92	75.00
Endometrium	77.36	90.00	93.18	69.23	81.93

Velocimetric parameters & endometrial thickness: Malignant endometrium had a much lower RI (mean =0.316±0.0196), and higher PSV (mean = 10.91 ±0.55) than other benign causes of PMB (Table 5)

Table 5: Velocimetric parameters & endometrial thickness According to pathology:

Pathology	ET (mm, mean±SD)	PI (mean±SD)	RI (mean±SD)	PSV (cm/mean±SD)
Endometrial Polyp	18.33 ± 4.11	1.1± 0.395	0.56± 0.16	6.9± 1.2
Endometrial Hyperplasia	10.97± 3.5	1.0632±0.57	0.61± 0.168	6.57± 1.9
Endometrial Carcinoma	16.6± 5.12	0.69±0.05	0.316±0.0196	10± 0.55
Free Endometrium	6.98± 2.39	1.35±0.49	0.7± 0.22	4.7± 1.4

ROC Curves revealed that the cutoff values of RI = 0.76, PI = 1.26 & PSV = 6.25 (cm/sec) (AUC ROC 0.761, 0.682 and 0.783 respectively) for discriminating between Normal and Abnormal endometriumhad sensitivity of 98.1%, 73.6% & 75.5% respectively (Fig. 1)

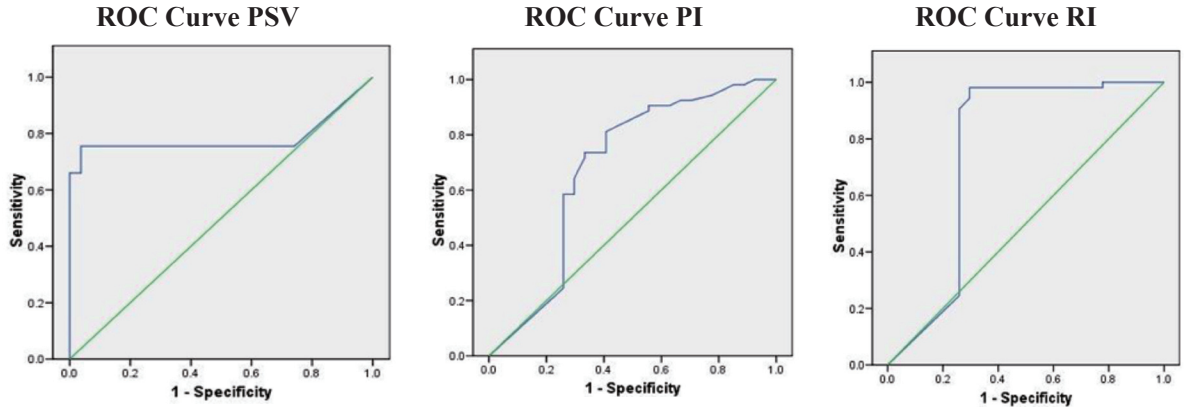


Fig. 1: ROC Curves showthe cutoff value which differentiates the normal from the abnormal endometrium according to PSV, PI and RI values

Discussion

At present, TVUS is used as a first step in the evaluation of women with PMB. In this prospective study, the corresponding sensitivity, specificity, PPVand NPV of 3-D TVUS as a diagnostic test for leiomyoma were 94.11%, 93.6%, 80% and 98.33% respectively.These results are similar to those of other previous studies that evaluated the accuracy of ultrasonography in enabling the diagnosis of leiomyoma. Hanafi, in 2013reported sensitivity and specificity of TVUS as a diagnostic test for leiomyoma of 96.38% and 96.00%,respectively with accuracy of 96.32%.[8]

Adenomyosis is a relatively frequent disease that is difficult to diagnose. Both magnetic resonance (MRI) imaging and ultrasound (US) are non-invasive tests with equivalent accuracy in diagnosing adenomyosis.[9]

Similarly,for the initial 3-D TVUS diagnosis of adenomyosis, current study findings are similar to those of other studiesthat reported sensitivity of 65% to 98% and specificity of 86% to 97%.[10]

Endometrial polyps are one of the most common etiologies of abnormal genital bleeding in both premenopausal and postmenopausal women.[11] Borges et al., 2015 observed the prevalence of endometrial polyps in 79% of postmenopausal women. In their study, ultrasonography had a sensitivity of 88.7% and specificity of 25.4%.[12] The prevalence rate of malignancy associated with endometrial polyps ranges from 0.8% to 8%, depending on the sample analyzed and the resection method used.[13]

Accordingly, in our study, it was observed that via 3-D TVUS, an endometrial Polyp was detected in 16 (20%) patients, with a mean ET of 18.33 mm.

Histopathological examinations confirmed the presence of hyperplasticendometrial polyps in15of 16 patients. Well differentiated Endometrioid endometrial adenocarcinoma with an irregular/thick endometrium of 12 mm on 3-D TVUS was evident inone patient. The mean ET in endometrial hyperplasia, endometrial carcinoma and free endometria were 10.97± 3.5, 16.6± 5.12, and 6.98± 2.39, respectively. There was

a statistically significant difference in the mean ET between women with endometrial carcinoma and women with free (normal) endometrium (P-value= 0.001).

ET of ≤ 5 mm associated with a low endometrial cancer risk had been reported.

In two large studies, using < 4 mm thickness as normal, the sensitivity was 98% with a range of specificity between 36% to 68% for the detection of endometrial cancer.[5]

Women with PMB and a thick endometrium must undergo endometrial sampling because of the high risk of endometrial cancer. [14]

In the present study, the diagnostic performance of 3-D TVUS in predicting endometrial pathology hada sensitivityof 88.46%, specificity of 90%,PPVof 93.18%,NPP of 69.23% and adiagnostic accuracy of 81.93%.

Shiva et al. (2018) reported,TVUS had a sensitivity of 50% and specificity of 98% for the diagnosis of myoma and a sensitivity of 54% and specificity of 80% for polyps.[15] Zafarani and Ahmadi (2013) reported that endometrial hyperplasia could be suspected sonographically. The principal findings are a thickness of> 15 mm or >8 mm after menopause and the presence of a non-homogenous echo pattern with microcysticchanges.[16] Meanwhile, Reported sensitivity of endometrial biopsy varies from 82% to 94%, with false negative rates as high as 15%.[17]

Regarding Velocimetric Parameters, the cut off values of RI=0.76, PI=1.26 & PSV=6.25 for discriminating between Normal & Abnormal endometrium had sensitivity of 98.1%, 73.6% & 75.5% respectively. RI and PI values of benign lesions (0.66 ± 0.19 and 0.92 ± 0.27 respectively) were significantly higher than that of carcinoma (0.33 ± 0.03 and 0.45 ± 0.15 respectively) (p value < 0.05).

In cases with endometrial polyps, a higher RI was reported (mean =0.56± 0.16) than in cases with endometrial carcinoma.

The results were in agreement with those of previously reported studies where the RI and PI values were significantly lower in malignant endometrium than in benign diseases of the endometrium in postmenopausal women[18] Bano et al, (2013), using RI = 0.81 and PI = 1.83as cutoff values for discriminating benign and malignant endometrium,sensitivity was 62.5% and 75% respectively.[19]

Conclusion

In the present study by correlating ultrasonography findings with histopathological findings, we have demonstrated that 3-D TVUS evaluation of uterine volume can enable accurate identification of uterine pathology, and should be considered for all patients with PMB. The accuracy of 3-D TVUS was 75.00% and 81.93% in diagnosing myometrial and endometrial lesions respectively.

Also Power Doppler examination of the endometrial and subendometrial space can be used to differentiate normal from abnormal pathology through cut-off values with high sensitivity specially when examining RI values.

Conflict of Interest: No.

Source of Funding: No.

Ethical Clearance: Approved by the Kasr Al-Ainy ethical committee.

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Antibacterial Activity of Zinc Oxide Nanoparticles on the Growth of Enterococcus Feacales, Candida and Total Root Canal Microbiota (in Vitro Study)

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Abstract

Severalendodontic irrigants,medication can eliminate endodontic pathogens,the possible development of resistant bacterial species, the anatomic complexity of the root canal system and limitation of cleaning and shaping protocols making the achieving of complete elimination of the pathogens is difficult. Antimicrobial nanoparticles show promising effect against pathogens The concept of using nanoparticles in endodontics as a new treatment modality was developed recently and their antibacterial efficacy against endodontic pathogens was evaluated by several researchers in many in vitro studies. The aim of this study to evaluate the antimicrobial activity of zinc oxide nanoparticles against E.feacales, candida and total root canal microbiota.30 patients diagnosed with necrotic root canal and failed endodontic treatments was selected, microorganisms were isolated from root canals andcultured, After identification and isolation of bacterial species, agar diffusion method was used to assess the antibacterial action of ZNO NPs, Zones of inhibition (no growth of bacteria) were examined around the wells containing ZNO NPs & diameters of the zones were measured in mm. The mean of inhibition zones was measured and statistically analyzed among groups using ANOVA. Znonps showed increase in diameter of the inhibition zone as the concentration increased, 2% concentration showed the larger inhibition zone, When comparing between the diameter of the inhibition zone of the ZNO NPs on the bacteria using F-test for all concentration the result was highly significant except for 0.25% concentration it was non-significant. It can be conclude that the zinc oxide nanoparticles in different concentrations have inhibition effects on *E. feacales, candida, T. aerobic* and *T. anaerobic*, the sensitivity of the bacteria to ZnO NPs increase with increasing of the concentration.

Keywords: *endodontics, zinc oxide nanoparticles, Enterococcus faecales,candida,agar diffusion test.*

Introduction

The root canal system is, in its healthy and intact state, free from microorganisms, once bacteria inter the root canal by caries lesion the consequences may vary from a simple reversible pulpitis to the necrosis of the pulpal tissue and eventually formation of a periapical lesion(1).Although fungi and most recently archaea and viruses have been found in association with endodontic infections(2)bacteria are the major microorganisms implicated in the pathogenesis of root canal infection. In advanced stages of the endodontic infectious process, bacterial organizations resembling biofilms can be observed adhered to the canal walls(3) Consequently, apical periodontitis has been included in the roll of biofilm-related oral diseases.Enterococci have been implicated in endodontic infections..its occasionally isolated from primary endodontic infections but frequently recovered from treatment failures (4). The rapid emergence of antimicrobial resistance among enterococci makes it difficult to treat the chronic infections.Enterococcus faecalis is a nonspore-forming, fermentative, facultatively anaerobic, Gram-positive coccus. Enterococcus faecalis cells are ovoid and 0.5 to 1 µm in diameter. They occur singly, in pairs, or in short chains, and are frequently elongated in the direction of the chain. Most strains are nonhemolytic and nonmotile. Surface colonies on blood agar are circular, smooth,

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and entire. The G+C content of the DNA ranges from 37 to 40mol% [4].*E. faecalis* may cause secondary infections that later become persistent[5].*E. faecalis* can survive in endodontically treated teeth, it has to resist intracanal disinfection procedures and to escape the action of chemomechanical preparation and adapt to the harsh environmental conditions caused by treatment[6]. Antibacterial nanoparticulates are found to have high antibacterial activity. because of the increase in the surface area and charge density of nanoparticulates, which give greater degree of interaction with the negatively charged surface of bacterial cells[7].Zinc oxide nanoparticles have high antibacterial effectiveness, its mechanisms similar to that of other types of nanoparticles, causing increased permeability of the cell wall membrane, a release of cytoplasmic content and cell death[8]. The objective of this study to analyze in vitro study the antibacterial activity of the ZNO NPs on *E.feacales*, candida and total root canal microbiota.

Materials and Method

Patient selection and isolation of bacteria: 30 patients aged (20-40) years with infected root canals which were diagnosed clinically and radiographically. Rubber dam used in order of isolation of the teeth before sample collecting. After access opening and all caries removed the working length confirmed radiographically and instrumentation by sterile files then sterile paper point introduced in the canals to collect microorganisms and then removed and placed in transported media (phosphate buffer saline) (PBS) to preserve microorganisms and send to microbiological lab[9].

Isolation of microorganisms: the bacterial strains were used in the study which were Enterococcus faecalis, which were isolated and cultured on Brain heart infusion agar (Oxoid.uk) and Pfizer selective enterococcus agar (Himedia.india), fungal strain Candida which was isolated and cultured on a Sabouraud agar media(T mast.uk),total bacteria isolated on brain heart infusion agar and cultured aerobically for aerobic bacteria and anaerobically for anaerobic bacteria.

Identification of bacterial species: Microorganisms were identified at microbiology department in (college of dentistry–university of Baghdad), Biochemical tests by gram stain were used to distinguish between G+ve and G-v,catalase test to distinguish between catalase negative and positive, vitek 2 compact (**Biomerieux) used to diagnosed E.*feacales*.**

Activation of the isolates: Inoculoms of bacterial strain were activated by addition of pure isolates of each type of 10 ml of sterile BHI broth which were incubated aerobically for 24 hrs at 37 C and anaerobically for an aerobic bacteria.

Determination of viable count: Viable count (CFU/ml) were done for all types of microorganisms using serial delution with (PBS) and 0,1 ml from 10^{-3}–10^{-6} were inoculated on (BHI-A) and incubated aerobically except total anaerobic incubated anaerobically for 24 hrs at 37 C

Zinc oxide nanoparticles

ZnO NPs properties used in the study: in the study the ZnO NPs used was prepared by sol gel method from the Corporation of research and industrial development, Iraqi Ministry of industry and minerals that prepared by[10].

Characteristics of ZnO-NPs: ZnO NPs solution were identified by the Scanning Electron Microscope SEM (CM 10 Philips) showed in fig.In Centre-College of medicine, University of Al-Nahrain, Iraq.

Also identified by scanning probe microscope(SPM) and (AFM) in the *College of Science*, *Department of Chemistry*, *University of Baghdad*

The average diameter 46 nm: Determination of antibacterial activity of Zinc oxide nanoparticles to microorganisms (agar diffusion method)

Procedure:

- 0.1ml of fourteen activated E,feacales $3x10^6$cfu\ml, ten candida albicanes $1,5x10^5$cfu\ml, thirty total aerobic$7x10^6$cfu\ml and thirty total anaerobic $5x10^6$cfu\ml isolate were spread on BHI agar plates was taken respectively and, left at room temperature for 10 minutes, then wells of equal size and depth made with sterile stainless steel Cork borer in the BHI agar 6mm in diameter were prepared in the agar
- Five wells in each plate. Each well was filled with ZnO NPs in different concentration (2, 1, 0.5, 0.25)% and last well for solvent (ethanol 1-3 water mixture) as negative control. Plates left in the room temperature for 10 minutes and then incubated aerobically for 24hrs. at 37°C for aerobic bacteria, and anaerobically for total anaerobic bacteria plate

placed in anaerobic jar with a gas pack for 24hrs at 37 C.

- Inhibition zones were across the diameter of each well. The diameter of inhibition around the wells containing the test materials were measured and recorded after the incubation under aseptic condition.
- The inhibitory zone was considered to be in (mm) measured by Vernier caliper.

Results

Antibacterial activity of Zinc oxide nanoparticles on bacteria(agar well diffusion method).

The mean values and standard deviation (SD) values of the inhibition zones in millimeters (mm) of the zinc oxide nanoparticles against the bacteria are presented in the table(1).

Table 1: Diameter in (mm) of inhibition zone of ZNO NPs%

Bacteria	No. strain		2%	1%	0.50%	0.25%	Control
E.feacales	14	Mean	30.07143	20.64286	14.5	9.928571	0
		SD	0.730046	1.150728	0.518875	1.491735	0
Candida	10	Mean	18.9	12.4	9.8	9.5	0
		SD	0.875595	1.173788	1.398412	1.178511	0
T.aerobic	30	Mean	26.6	20.6	15	9.6	0
		SD	1.037238	1.037238	1.43839	1.037238	0
T.anaerobic 30	30	Mean	22.8	18.6	14.6	9.8	0
		SD	1.186127	1.037238	1.037238	1.186127	0

Znonps showed increase in diameter of the inhibition zone as the concentration increased, 2% concentration showed the larger inhibition zone while the solvent (negative control)showed no inhibition zone see Figure(1) and figure (2).

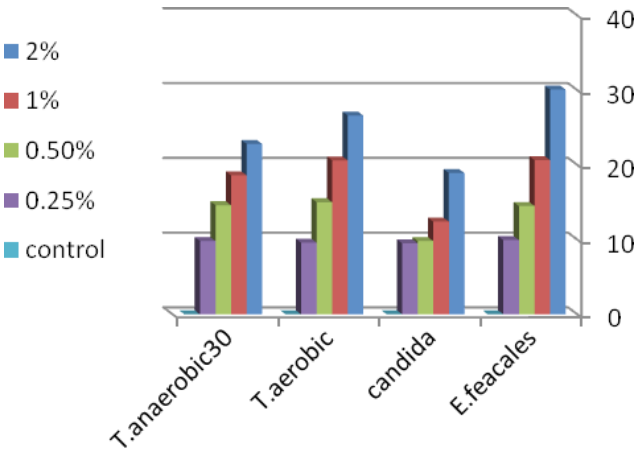


Figure (1): Bar chart showing differences between the mean of inhibition zones of ZNO NPs

When comparing between the diameter of the inhibition zone of the ZNO NPs on the bacteria using F-test for all concentration the result was highly significant except for 0.25% concentration it was non-significant see table (2).

Table (2): ANOVA between groups (bacteria) of diameter of inhibition zone of ZNO NPs%

	F-test	P-value	Sig
2%	296.221	0.000	HS
1%	160.671	0.000	HS
0.50%	51.929	0.000	HS
0.25%	0.403	0.751	NS
Control	-	-	-

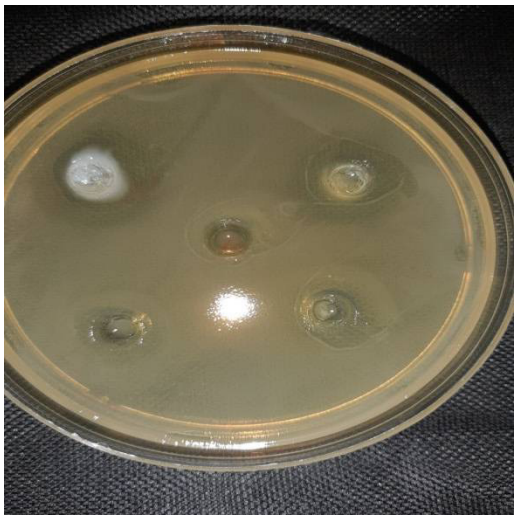
* P < 0.001 High significant



A-E.feacales



B-candida



C-T.aerobic



D–T.anaerobic

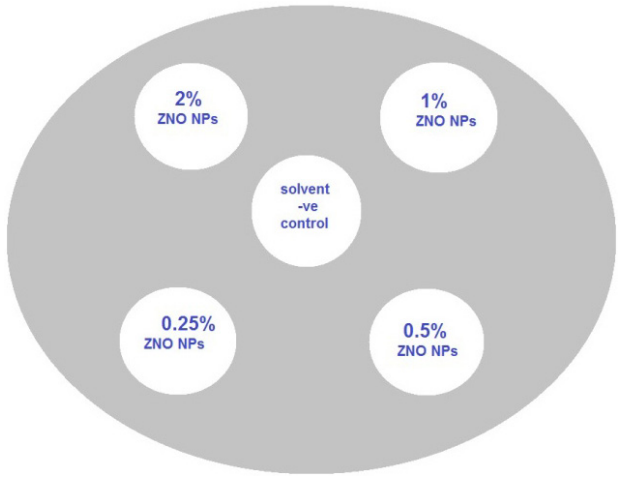


Figure (2): Antibacterial activity of ZNO NPs on each microorganisms

Discussion

The purpose of endodontic therapy is to eliminate bacteria and their by-products from the infected root canal system and prevent subsequent reinfection[11]. Chemomechanical preparation and intracanal medicaments significantly reduce microorganisms inside the infected root canal. However, it is virtually impossible to completely eliminate all microbes from root canal system in every case [12].The possible development of resistant bacterial species is one of the problems related to the efficacy of the currently available irrigants and medicaments. In addition, the complex anatomy of the root canal system allows endodontic pathogens to be hidden in areas inaccessible to the action of the irrigating preparations. Antimicrobial nanoparticles show promising effect against resistant pathogens in pharmaceutical science as a result of their unique physio-chemical properties. Unlike traditionally used antimicrobial agents, these nanoparticles destroy bacterial cells through multiple mechanisms. The concept of using nanoparticles in endodontics as a new treatment modality was developed recently and their antibacterial efficacy against endodontic pathogens was evaluated by several researchers in many in vitro studies[13].Zinc oxide nanoparticles showed high antibacterial effectiveness, destroying microbial cells in a higher pH environment[14].The antibacterial mechanism of zinc oxide nanoparticles is similar to that of other types of nanoparticles, causing increased permeability of the cell wall membrane, a release of cytoplasmic content and cell death[15].The bactericidal effect of zinc oxide nanoparticles was shown to be related to size, the smaller the size the higher the antibacterial effect and the

production of reactive oxygen species such as hydrogen peroxide when in contact with an aqueous medium[16]. Additionally, zinc oxide nanoparticles can produce zinc ions inside the bacterial cell causing disturbances in its enzymatic system and the mechanism of amino acid metabolism, resulting in further damage[17].The antibacterial effect of zinc oxide nanoparticles has been shown to depend on concentration, higher levels resulting in the maximum antibacterial effect.

The result of antibacterial assessment by disk diffusion method from which observed the antibacterial activity (the size of inhibition zone) depended strongly on the concentration of the ZNO NPs on the bacteria this agreed with Arabi et al[18]who conducted that the size of inhibition zone strongly depends on the concentration of ZNO NPs and also this agreed with study of Azam et al[19].who conducted that Zinc oxide NPs have greatest antimicrobial activity against both gram positive and negative bacteria it was also demonstrated that ZNO NPs poses excellent bactericidal activity and depend on concentration. The diameter of inhibition zone directly increased when the concentration is increased also.

Conclusion

Zinc oxide nanoparticles in different concentrations have inhibition effects on *E. feacales*, *candida, T.aerobic* and *T. anaerobic*,the sensitivity of the bacteria to ZnO NPs increase with increasing of the concentration. Zinc oxide nanoparticles are more appropriate for use as a root canal irrigant solution, intra-canal medicament, or even bioactive root canal filling material, which is still an area of further investigation. Also, the antimicrobial effects of the ZNO nanoparticles need to be tested against a large variety of persistent endodontic pathogens. Indeed, more studies are needed to evaluate the biocompatibility, safety, cost and ease of use of these innovative materials.

Conflict of Interest: None

Funding: Self

Ethical Clearance: Not required.

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Behavioral Risk Factors Associated with Intestinal Parasitic Infestations among Children in Rural Areas

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Abstract

Background: Intestinal parasitic infestations (IPIs) still remain an important public health problem among children in developing countries including Egypt. Identification of behavioral risk factors among children is important for the effective prevention and control of these infestations.

Aim: This study aimed to assess behavioral risk factors associated with intestinal parasitic infestations among children in rural areas.

Design: A descriptive exploratory design was utilized.

Sample: Convenient sample of 120 children suffering from intestinal parasitic infestations and their mothers.

Tool of data collection: A structured interview questionnaire sheet included questions about behavioral risk factors.

Results: More than half and more than two fifths of children do not wash their hands either before eating or after using toilet respectively, about three quarters and most of children suffering from IPIs for the first time and more than one time respectively were exchanging personal hygienic instruments with their family' members, more than two fifths and slightly more than three fifths of children suffering from IPIs for the first time and for more than one time respectively were buying food from street vendors.

Conclusion: Neglecting washing hands before eating and after using toilet, sharing personal hygienic instruments with family' members and eating from food handlers were the behavioral risk factors associated with IPIs among children.

Recommendation: Develop educational programs to increase public awareness regarding behavioral risk factors associated with intestinal parasitic infestations among children.

Keywords: *Intestinal parasitic infestations, behavioral, risk factors, children, rural areas.*

Introduction

Intestinal parasitic infestations (IPIs) are endemic worldwide, it is estimated that 3.5 billion people have been affected, and 450 million are ill as a result of these infections with the largest majority of them being children [1]. Behavioral factors associated with IPIs include open defecation, neglecting hand washing after defecation and prior to eating food, eating street

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food, eating unwashed food and pica, walking barefoot and handling animals that could be source of infective agents[2].

The deleterious effects of intestinal parasites on children are varied and terrifying such as growth retardation and the impairment of neuro-psychomotor development, immune function, productive ability and intellectual capacity that all will affect negatively on school performance and academic achievement. As well as, IPIs have been shown to affect nutritional status, physical development, mental function, verbal ability and cognitive behavior in children[3]. Assistance with identification of the parasites, assessment of risk factors, prevention of initial infection and treatment of current infection are considered major nursing responsibilities related to IPIs among children[4].

Aim of the Study: The aim of the present study was to assess behavioral risk factors associated with intestinal parasitic infestations among children in rural areas.

Research Question: What are the behavioral risk factors associated with intestinal parasitic infestations among children in rural areas?

Subject and Method

- **Research design:** A descriptive exploratory research design was utilized in the current study.
- **Research Setting:** The study was carried out four primary at health care units in rural areas that affiliated to Ismailia governorate, namely: Abu Atwa, Aldobaia, Nefesha and Ain Ghusein. Egypt.
- **Sample:** A convenience sample of 120 children aged 4-12 years old, suffering from intestinal parasitic infestations and their mothers.
- **Tool of data collection:**

  A structured questionnaire sheet:

  - **Part (I):** Socio-demographic data about the children and their parents.
  - **Part (II): Part (II):** Related to behavioral risk factors associated with IPIs among children including questions related to healthy and unhealthy hygienic behaviors of children.

Validity: The tool was revised by three experts in pediatric nursing and community health nursing for clarity, relevance, applicability, and comprehensiveness.

Reliability: Internal consistency reliability of the tool was done according to Cronbach's alpha coefficient and it was 0.85.

Pilot Study: A pilot study was conducted on 10 children with their mothers.

Procedure: An official letter was issued from the Dean of the Faculty of Nursing-Ismailia/Suez Canal University to the director of each study setting to seek their approval for carrying out the study. An official permission was obtained from the director of each study setting. The aim of the study and its expected outcomes had been illustrated. The actual field work was carried out over a period of 6 months, which started from 1st of October 2017 and ended in 1st of April 2018. The researcher was available 2 days per week (Saturday and Thursday) from 9.00 am to 1.00 pm in each setting of the above mentioned study settings for 6 weeks. The researcher introduced herself to the mother and the child and informed them about the purpose of the study. Oral affirmative consent was obtained from children aged 7-12 years old and written consent from mothers to participate in the study and then the researcher interviewed them in order to fill the study tool, the approximate time spent with each mother and her child dual to complete the study tool was 25 to 35 minutes across one session.

Statistical analysis: Descriptive statistics including frequency distribution, mean and standard deviation were used to describe different characteristics. Univariate analyses including: t-test was used to test the significance of results of quantitative variables and Chi-Square test was used to test the significance of results of qualitative variables. The significance of the results was at the 5% level of significance.

Results

Table (1) reveals that 58.3% of children their age ranged between 6 to less than or equal to 12 years old with mean age score mean ±SD = 6.7±2.4 years, slightly more than half of children (51.7%) were females. Less than half of children (47.5%) are ranked as the third child or more, the most of children (82.5%) are going to either school or nursery.

Table (1): Percentage distribution of children suffering from IPIs according to their personal characteristics (n=120)

Items	No.	%
Age (Years)		
• Preschool (4-<6)	50	41.7
• School age (6-≤12)	70	58.3
Mean ± SD	6.7±2.4	
Gender		
• Male	58	48.3
• Female	62	51.7
Rank of the child		
• First	35	29.2
• Second	28	23.3
• Third or more	57	47.5
The child goes to school or nursery		
• Yes	99	82.5
• No	21	17.5
Kindergarten	36	30.0
Primary school	63	52.5

Table (2) clarifies that 54.2% of children reported that they do not wash their hands before eating, 44.2% of children reported that they do not wash hands after using toilet and slightly less than half of children (48.3%) reported that they do not trim their nails weekly.

Table (2): Percentage distribution of children suffering from IPIs according to their healthy reported hygienic behaviors (n=120)

Items	No.	%
Wash hands before eating		
Yes	55	45.8
No	65	54.2
Wash hands after using toilet		
Yes	67	55.8
No	53	44.2
Used material for hand washing		
Water only	78	65.0
Water and soap	42	35.0
Wear trousers during sleep always		
Yes	117	97.5
No	3	2.5
Trim his nails weekly		
Yes	62	51.7
No	58	48.3

Table (3) reveals that 25.4% of children infected for the first time do not exchange personal hygienic instruments with their family' members, while 88.5% of children suffering from recurrent infestations reported that they exchange personal hygienic instruments with their family' members and the difference between the two groups is statistically significant, 94.9% of children suffering from IPIs for the first time do not deal with cattle in home or barn, while 27.9% of children suffering from recurrent' infestations deal with cattle in home or barn and the difference between the two groups is statistically significant, 79.7% of children suffering from IPIs for the first time do not play with cats and dogs outdoors, while 47.5% of children suffering from recurrent' infestations play with cats and dogs outdoors and the difference between the two groups is statistically significant. Also, 57.6% of children infected for the first time do not buy food from street vendors, while 60.7% of children suffering from recurrent infestations buy food from street vendors and the difference between the two groups is statistically significant.

Table (3): Relationship between the unhealthy reported hygienic behaviors of children and the recurrence of parasitic infestations (n=120)

Items	Recurrence of infestations				X^2	P
	First time (n=59)		More than one time (n=61)			
	No.	%	No.	%		
Exchange personal hygienic instruments (nail scissor, bath towel...etc) with his family' members						
• Yes	44	74.625.4	54	88.511.5	X^2=3.897	P=0.048*
• No	15		7			
Exchange under-wears with his siblings						
• Yes	9	15.384.7	10	16.483.6	X^2=0.029	P=0.864
• No	50		51			

Walk and play in the street barefoot						
• Yes • No	38 21	64.435.6	45 16	73.826.2	X^2=1.233	P=0.267
Swim in the canal water						
• Yes • No	4 55	6.8 93.2	8 53	13.186.9	X^2=1.337	P=0.247
Defecate in open places						
• Yes • No	9 50	15.384.7	5 56	8.2 91.8	X^2=1.450	P=0.229
Deal with cattle in home or barn						
• Yes • No	3 56	5.1 94.9	17 44	27.972.1	X^2=11.210	P=0.001*
Play with cats and dogs outdoors						
• Yes • No	12 47	20.379.7	29 32	47.552.5	X^2=9.866	P=0.002*
Have the habit of nail biting or thumb suckling.						
• Yes • No	27 32	45.854.2	22 39	36.163.9	X^2=1.167	P=0.280
Buy food from street vendors						
• Yes • No	25 34	42.457.6	37 24	60.739.3	X^2= 4.015	P=0.045*

*Significant at P≤0.05

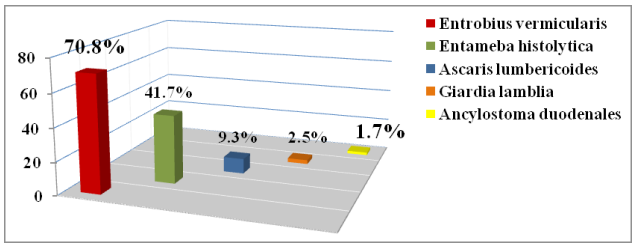


Figure (1): Types of intestinal parasites

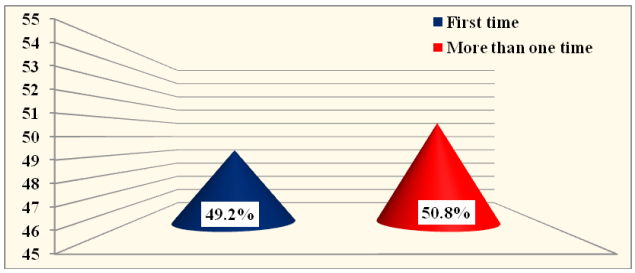


Figure (2): Recurrence of intestinal parasitic infestations

Discussion

The results of the current study revealed that more than half of children do not wash their hands before eating. This finding was in accordance with the study done by[5] titled "Prevalence of intestinal parasitic infections and risk factors among school children at the University of Gondar Community School, Northwest Ethiopia" who reported that more than two thirds of children infected with intestinal parasites do not wash their hands before eating. The present study results illustrated that more than two fifths of children do not wash their hands after using toilet. This result was supported by[6]in a study titled "A study of prevalence of intestinal parasites and associated risk factors among the school children of Itahari, Eastern Region of Nepal" who revealed that the likelihood of acquiring IPIs in children who did not wash their hands after using toilet was higher than among those who wash their hands.From the researcher point of view, neglecting washing hands either before eating or after using toilet among children in the current study may be due to lack of children awareness about the importance of hand washing in interrupting parasite transmission and low socio-economic status which play a role in the lack of resources such as soap necessary for washing hands.

The current study results revealed that slightly less than half of children reported that they do not trim their nails weekly. This finding was emphasized by[7] in a study titled"School-based prevalence of intestinal

parasitic infections and associated risk factors in rural communities of Sana›a, Yemen**"**who reported that the risk of being infected by intestinal parasites was increased among children with untrimmed and unclean finger nails as compared with children who have trimmed clean fingernails. As regards the unhealthy reported hygienic behaviors of children, the results of the current study revealed that most of children suffering from recurrent infestations reported that they exchange personal hygienic instruments with their families, while slightly more than one quarter of children infected for the first time do not exchange personal hygienic instruments with their families and the difference between the two groups is statistically significant. These results were inconsistent with the study conducted by[8] in a study titled" Life style related to parasitic infestation among primary school children in rural area" who revealed that about three quarters of families of children infected with intestinal parasites reported that they never shared in personal equipment. From the researcher point of view, exchanging personal hygienic instruments among family members may be increase the transmission of infection and the recurrence also.

The present study results revealed that less than half of children suffering from recurrent infestations play with cats and dogs outdoors, while more than three quarters of children suffering from IPIs for the first time do not play with cats and dogs outdoors and the difference between the two groups is statistically significant. These findings were consistent with[9]who found that more than two fifths of children infected by parasites were playing with cats and dogs outdoors and that it was considered the independent risk factor associated with parasitosis among children living in Damanhur city, Elbehera governorate, Egypt.

The present study results revealed that slightly more than three fifths of children suffering from recurrent infestations buy food from street vendors, while less than three fifths of children infected for the first time do not buy food from street vendors and the difference between the two groups is statistically significant. These findings were in accordance with[10]who found that slightly less than two thirds of children suffering from IPIs their mothers were dependent on street food in their homes.

Regarding the types and recurrence of IPIs among children, the present study results revealed that more than two thirds of children are infected with Entrobius vermicularis followed by more than two fifths infected with Entameba histolytica. These findings were in accordance with[11]who reported that Entrobius vermicularis was the most prevalent type of parasites among children as about two thirds of children were infected by this type of parasite. The current study results illustrated that slightly more than half of children are suffering from recurrent infestations. This finding was in accordance with[12] who noted that less than two thirds of children were suffering from recurrent IPIs. From the researcher point of view, recurrence of infestation among children may be due to their unhygienic practices and their immature immune system which put them at frequent risk of infestations.

Conclusion

Neglecting washing hands before eating and after using toilet, sharing personal hygienic instruments with family' members and eating street food were the behavioral risk factors associated with IPIs among children.

Recommendations:

1. Implementation of health education programs about behavioral risk factors and prevention of IPIs for the already diagnosed children with IPIs and their mothers at primary health care units or outpatient clinics.
2. Increase of public awareness regarding behavioral risk factors predispose to IPIs and its' control method through mass media, social media and others.
3. Regular screening and treatment of IPIs for children in rural areas.
4. Further researches are recommended to determine behavioral risk factors associated with IPIs among children in other rural areas with large sample size to generalize the results.

Ethical Clearance: Primary approval was obtained from the research ethical committee in the Faculty of Nursing, Suez Canal University. The researcher explained the aim and nature of the study to children and their mothers for gaining their cooperation. Oral affirmative consent was obtained from children aged from 7-12 years old while written consent was obtained from their mothers to participate in the study after informing them about their voluntary participation and their right to withdraw from the study at any time. The topic of this study doesn't touch religious, ethical, moral and cultural issues among participants. Mothers and

children were assured that all gathered information will be confidential and will be used only for the purpose of the study.

Conflict of Interest: The authors declare that there is no conflict of interest.

Source of Funding: There are no resources of fund.

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Legal Perspective about the Management of Fishery and Marine Investment Management in Indonesia

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Abstract

The constitutional perspective provides the basis that the earth and water and natural resources contained therein were controlled by the State and used for the greatest prosperity of the people. This means that the government policy as the elaboration of this constitution must take sides to the people, in the sense of improving their standard of living. Policy as stipulated in Regulation of the Minister of Finance of the Republic of Indonesia No. 159/PMK/011/2015 about Tax Holiday Social Economic Condition and Policy and Fishermen's Welfare in Indonesia. In the field of economy is processed into several fields, namely the field of the state that implements the scope of large (public utilities); the field of cooperatives working on a small scope starting from the bottom. For the private sector acting between two so-called national private or national private sectors by cooperating with the foreign private sector in the line specified by the Government on its application is not in favor of the people. The tendency to side with entrepreneurs with various motivations. This causes the management of fishery and marine investment in Indonesia is not correlated with efforts to improve the welfare, especially for the fishermen.

Keywords: *Management of Investment, Fisheries, Legal Aspects.*

Introduction

Indonesia is the world's largest archipelagic country with 17,504 islands and 5.8 million km^2 of marine waters (consisting of 0.3 million km^2 of territorial sea, 2.95 million km^2 of archipelagic waters and 2.55 million km^2 of Indonesian ZEE).[1] Geo-politically Indonesia has a very strategic role because it is between the Continent of Asia and Australia, as well as between the Pacific Ocean and Indian Ocean. The position places Indonesia as the world's maritime axis in the context of global trade linking the Asia-Pacific region with Australia.[2,3]

Indonesia's archipelagic waters include oceans that contain biological resources that are very important for the prosperity of the people of Indonesia.[4] Indonesia's marine area including the Exclusive Economic Zone of Indonesia is an area of 2.7 million km^2 surrounded by tropical ecosystems such as mangrove forests, coral reefs, and biological and non-biological resources contained therein.[5]

Fisheries biological resources are strategic economic resources to improve the welfare of the Indonesian people. The marine and fisheries sector can be one of the most important sources of economic growth because of its huge supply capacity, while demand continues to increases, in general output can be exported, whereas inputs from local resources can generate large upstream and downstream industries.[6] These effects can absorb a lot of manpower, generally in the area and the fishing industry, biotechnology and marine tourism can be renewable (renewable resources) so as to support sustainable development.[7]

In 2014, the Ministry of Marine Affairs and Fisheries of the Republic of Indonesia implement various development policies with the following results: Gross Domestic Product (GDP) of Fishery in 2014 grew by 6.97%. This figure is higher than the national GDP growth of 5.1% and the growth of agricultural GDP in the broad sense of 3.3%. If viewed from the magnitude of its economic value, GDP Fisheries in 2014 reached IDR. 340.3 Trillion.

Increased fisheries production each year has supported national food security, especially in the provision of animal protein for the improvement of community nutrition; The export of fishery products in 2014 reached USD 4.64 billion. The export result was dominated by the export value of shrimp commodity

which reached USD 2.09 billion and followed by Tuna, Tongkol and Cakalang fish commodity amounting to USD 0.69 billion in 2014. In line with the above, it is necessary to elaborate more on how the arrangement of marine development investment in Indonesia. Similarly, about the socio-economic aspects and the level of fishermen's welfare as a result of foreign investment in Indonesia.

Investment Management and Marine Development Investment Arrangement.

Investment Activities: Investment is an activity to invest capital now to gain profit in the future, which always depends on the consideration in terms of managerial. In the investment activity, there are two approaches, namely macro approach and micro approach.

The macro approach is an investment activity in which there is government interference, and the micro approach is the legal relationship of the parties that is brought together in a position that is faced between the investor and the beneficiary.[7] Generally, investment can be interpreted as an activity undertaken by individuals and legal entities in an effort to increase and/or maintain their capital value in the form of cash, equipment, fixed assets, intellectual property rights, or expertise.

Law investment is the legal norms concerning the possibility of investment, investment conditions, protection and most importantly directing investment to bring prosperity to the people. Government policies to increase investment will affect the number of catches and patterns of utilization of fishery and marine resources.

Investment activities either in the framework of Foreign Investment (FI) or Domestic Investment (DI) implemented with the aim of improving national economic growth. In order to further stimulate investment for development, it is deemed necessary to simplify investment system and procedures including the review of the duty of the Capital Investment Coordinating Board, the Investment Bureau of the relevant departments with the development of the investment business field, and the Investment Coordinating Board.[8]

The location can be located at (a). Certain industrial estates and/or certain bonded areas; (b). outside a certain bonded industrial zone/region Investment and Marine Development in Indonesia Based on Article 3 paragraph (1) letter (a) of the Investment Law, it is stipulated that investment activities shall be organized on the basis of legal certainty.

According to Ida Bagus Rahmadi, there are 11 factors into consideration before conducting investment activities namely (a). risk of investing; (b). bureaucratic range; (c). transparency and legal certainty; (d). transfer of technology; (e). guarantee and protection of investment; (f). employment; (g). availability of infrastructure; (h). the existence of natural resources; (i). market access; (j). tax incentives; (k). effective dispute resolution mechanisms.[7]

Basically, investors, both domestic and foreign investors who invest in Indonesia are given various facilities. The granting of easiness is intended for domestic investors or foreign investors to invest in Indonesia.

Investment in Marine Fisheries Sector: The definition of maritime development is regulated in Article 1 number (6) of the Maritime Law, namely development that provides direction in the utilization of marine resources to realize economic growth, equity of welfare, and keppeliharaan carrying capacity of coastal and marine ecosystem.

Marine economy Under Article 15 paragraph (2), marine economic policy aims to make marine as the basis of economic development. Article 15 paragraph (4) stipulates that to make marine as the basis of nation's economic development, the Government shall include the sea area as the basis for the allocation of marine development budget.

Marine Management Based on Article 14 paragraph (1) of the Maritime Law, it is stipulated that the government and regional government shall be in accordance with the authority to conduct marine management for the greatest prosperity of the people through the utilization and exploitation of marine resources using blue economic principles. Based on Article 14 paragraph (2) Marine is stipulated that the utilization of marine resources as referred to in paragraph (1) may include: (a). fishery; (b). energy and Mineral Resources; (c). coastal resources and small islands; (d). non-conventional resources.

While the exploitation of marine resources under Article 14 paragraph (3) of the Marine Law can be: (a). marine industry; (b). Marine tourism; (c). sea transportation; (d). building of the sea. Fisheries Based on Article 16 of the Maritime Law it is stipulated that

the Government regulates the management of fish resources in the territorial waters and jurisdiction areas and exercises the regulation of fish resources on the high seas based on cooperation with other countries and international law as joint vessels, fishery resources have interconnectivity, indivisibility, and subtraction.

The nature of interconnectivity is a fishery resource having interconnectedness between a component. Indivisibility is the nature of fishery resources are not easily divided into parts or areas of certain waters. Basically, the utilization of marine biological resources is done directly or indirectly. Direct utilization is intended as the utilization of resources to meet the physical needs of humans, such as food, clothing, shelter, and religious-cultural needs, as well as recreation. While indirect use is related to the function of resources concerned with the ecosystem, for example as a coastal protector, producer of organic matter, and place of care of biotic puppies. Marine information systems and data.

Based on Article 41 Paragraph (1) of the Maritime Law it is stipulated that cooperation in the maritime sector can be implemented at the national, and international level by prioritizing the national interest for national independence. Defense, Naturity, Law Enforcement, and Safety in the Seas Defense and security are very important for a nation's sovereignty, especially Indonesia with its vast sea.

In the framework of law enforcement in the territorial waters and jurisdictional areas, especially in carrying out security and safety patrols in the territorial waters and jurisdiction of Indonesia, established the Marine Security Board, hereinafter referred to as MSB. Under Article 62, MSB has a function to develop national policies in the field of security and safety in the territorial waters of Indonesia and the jurisdiction of Indonesia, and under article 63 of the Marine Law, MSB has the authority to dismiss, examine, arrest, carry, and submit ship to the relevant authorities authorized for further legal process execution.

Governance and Marine Institutions Under Article 69 of the Maritime Law, it is stipulated that: The Government establishes marine governance and institutional policies (para.1); The marine governance and institutional policies referred to in paragraph (1) include the development plans of the legal and governance system as well as effective and efficient marine planning, coordination, monitoring and evaluation systems (paragraph 2).

In preparing governance and marine institutional policies as referred to in paragraph (1), the Government shall undertake the arrangement of the law of the sea in a system of national law, both through public and civil aspects with due regard to international law (paragraph 3); Further provisions on governance and marine institutional policies as referred to in paragraph (1) shall be stipulated in a Government Regulation.

About Marine Development in the National Medium Term Development Plan 2015-2019 The Ministry of National Development Planning has drafted the targets and maritime development Regulation of the Minister of Marine Affairs and Fisheries of the Republic of Indonesia Number 25/PERMEN-KP/2015 on Strategic Plan of the Ministry of Marine and Fisheries Year 2015-2019 To follow up and implement the Strategic Plan of the Ministry of Marine Affairs and Fisheries Year 2015-2019, the Ministry of Marine Affairs and Fisheries issued Regulation of Minister of Marine and Fisheries No. 25/PERMEN-KP/2015 on Strategic Plan Ministry of Marine and Fishery Year 2015-2019.

As a national policy, the President of the Republic of Indonesia has declared that the sea is the future of national civilization. It shows that the sea can not dipunggungi, it's time the Indonesian nation to see the sea as a source of human life. Therefore, marine and fisheries development must be undertaken by all stakeholders to transform a situation into a better state by utilizing marine and fishery resources optimally, efficiently, effectively and accountably, with the ultimate goal of improving the welfare of the community in a sustainable manner.

Concerning the socio-economic aspects of the Fishermen's Welfare, when discussing the rights of coastal communities, especially traditional fishermen, traditional fishermen form the right to develop their economic, social and cultural progress. At the international level, the livelihoods of local communities are an integral part of sustainable development.[9] Traditional rights to fish are exercised on the high seas by freedom on the high seas as regulated in the law of the open sea law.

Problems of Indonesian Fishermen: Fishermen in Indonesia have quite complex problems. The main problem faced by fishermen is in the framework of the development of their business, especially the international access. Fishermen have limited business

capital support from banks and other financial institutions and access coverage. Therefore, fishermen still have difficulty accessing capital or credit due to constrained by fulfillment of banking procedural requirements.

The Ministry of Marine Affairs and Fisheries (MMAF) has a mission to promote fisheries and to make prosperous fishermen. The mission is Kedauluatan/ sovereignty that is to realize sustainable marine and fisheries development, to sustain economic independence by securing marine and fishery resources, and reflecting the personality of Indonesia as an archipelagic country; Sustainability/sustainability, ie realizing sustainable management of marine and fishery resources; Prosperity/ prosperity, which is to realize marine and fishery community prosperous, advanced, independent, and personality in culture.

Development in the marine and fisheries sector, can not be viewed only as a way to eliminate poverty and unemployment. However, more than that, the marine and fisheries sector is the basis of the national economic, it is only natural that the fisheries and marine sector developed into a leading sector in the international trade arena.[9]

Development of marine and fisheries by MMAF has been implemented in order to realize the 3 pillars of development, namely pro-poor (poverty alleviation), pro jobs (employment), pro growth (growth). The development of marine and aquaculture should be able to make the nation of Indonesia better than what is now. According to the authors, Indonesian fishermen are not prosperous, and capital difficulties. Activities in business in the fishery sector generally still use their own capital/family, and not much capital from the bank, it is the main cause.

The Minister of Fisheries and Marine Affairs of Indonesia affirmed that the Indonesian sea should belong to Indonesian fishermen completely. The new Presidential Regulation on Negative List of Investment is a good step to restore Indonesian citizenship rights over marine municipality and fishery economy of Indonesia.[10]

The Cause of Poverty of Fishermen According to the Directorate of Coastal Community Empowerment, Ministry of Fisheries and Marine Affairs of the Republic of Indonesia: The causes of the poverty of fishermen in Indonesia are: the absence of policies, strategies and implementation of coastal development programs and integrated fishermen communities among development stakeholders; The inconsistency of production quantity (catch), so that the sustainability of socio-economic activity of fisheries in fishing villages is disturbed.[11] This is due to the condition of fisheries resources that have reached the conditions of over fishing, a prolonged famine, and rising fuel prices; The problem of geographical isolation of fishing villages, making it difficult for the flow of goods, services, capital and people to flow in and out, which disrupts socio-economic mobility; There is a limitation of business capital or investment capital, making it difficult for fishermen to increase their economic activities; The existence of exploitative socio-economic relations with boat owners, brokers (middlemen), or fisheries entrepreneurs in the lives of fishermen; The low level of income of fishermen households, so that it has a negative impact on efforts to increase business scale and improve their quality.

Based on Law Number 7 Year 2016 concerning Protection and Empowerment of Fishermen, Cultivators of Fish, and Fisherman of Salt, the Government guarantees that by Law no. 7 of 2016 aims for the following:

1. Providing the necessary infrastructure and facilities for developing a business;
2. Provide a sustainable business certainty;
3. Increasing the capacity and capacity of fishermen, fish farmers, and salt farmers; strengthen institutions in managing fish resources, and marine resources and in conducting independent, productive, advanced, modern and sustainable business, and develop environmental sustainability principles;
4. Developing a system and institutional financing that serves business interests;
5. Protect from risks of natural disasters, climate change, and pollution;
6. Provides security and safety guarantees and legal assistance.

Conclusions

That the arrangement of marine development investment in Indonesia is based on the Constitution of the State of the Republic of Indonesia Year 1945. Article 33 paragraph (3) stipulates that: “The earth and water and natural resources contained therein are controlled

by the State and used for the greatest prosperity of the people. This constitutional basis is fundamental in further regulation of investment in the marine and fisheries sector.

Conflict of Interest: There is no conflict of interest exist.

Source of Funding: Self funding.

Ethical Clearance: Not required.

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Evaluating the Setup Uncertainties by Different Registration Method in 3DCRT CA Breast Patients Using Onboard Cone Beam CT

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Abstract

Aim: The aim of this study is to find out the difference in setup errors when registering cone beam conventional tomography on couch with planning CT simulator images with 2 different registration method in ca breast patient treating with 3DCRT technique

Objective: following study is to compare the patient setup uncertainties using two different registration method, one with standard clip box registration method and other with mask registration method.

Methodology: Ten patient with ca breast are taken for the study. All patients are undergone standard 3dcrt planning and pushed to xvi for further analysis. CBCT scans were taken and two types of registration were done each under by mask based and clip box based method. Shifts on all 3 axes such x,y,z is noted with rotational shift. Comparison were done on systematic error (Σ), random error (σ), mean displacement vector (R), mean setup error (M).

Result: Out of all this registration method mask based grey registration (T+R) shows some superior quality for soft tissue verification. But again One can use any of the registration method for patient setup verification depending on their institution protocol and site to be treated

Keywords: *EBRT, CBCT, 3DCRT, xvi, ca breast.*

Introduction

Ca breast is one of the common carcinoma found in women after ca cervix worldwide over. There are different modes of treatments now, for treating such type of carcinoma. Such as chemotherapy, surgery, hormone therapy, brachytherapy, external beam radiotherapy etc. EBRT is One of that kind, using radiation to kill the tumor cells and save the surrounding normal tissue. 3DCRT is one of the standard treatment method used for treating ca breast in external beam radiotherapy from long time ago. Even though today advance treatment modalities and technique are present, 3dcrt planning technique are widely accepted for treating ca breast all over the world due to its benefits compared with other technique. For the successful treatment delivery, the patient setup error needs to be minimized as low as possible before treatment execution, to save surrounding normal cells. So verification is very important steps in radiotherapy to increase the accuracy of target localization and reduce toxicity. It is done by comparing the planned CT image with the treatment image set using 2D or 3D acquisition. The nature of breast,breathing motion, supraclavicular nodes and itsregion of avoidance contours, especially for the breast conservative surgery cases makes it's a difficult process, to retain the same position on every single treatment delivery time. For that purpose, image-

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guided radiation therapy (IGRT)are commonly used to minimize patient setup errors mainly systemic and random error in the treatment session. This was achieved by using an onboard KVcone beam attached to the linac gantry or by using MV beam for imaging in our setup we have ELEKTA HD versa with x-ray volumetric imaging (XVI) verification system. With the help of onboard KV cone beam it is possible to create a three dimensional reconstructed images of patient on couch and can be used for verifying the positional shifts with the reference CT images, where treatment planning was done already. In some center MV electronic portal imaging device are also used for image registration purpose. Each verification system has their own pros and cons, but forbetter contrast and accuracy of soft tissue, kv CBCT offer better view than mv imager[1]. A study done by Hawkins et al. shows that by using 3D cbct it is possible to increase the accuracy of the treatment delivery and should be used for image guidance radiation therapy[1]. There was study done by Batumalai et al.who compared setup errors between EPI and CBCT imaging method for patients undergoing tangential breast RT. There results show both method are same in detecting the setup error[2].

Verification radiotherapy will help us to be certain that we are not missing our target, it also helps in identifies the setup error and helps in assessing the adequacy of ptv margin[5]. In our center majority of the cases are verified using XVI cone beam ct. Mainly two types of registration protocol method are available in xvi cone beam CT for verification, such as mask type and clip box type. In each protocol again four different types of registration are possible, such as manual, gray value (translational), bone (translational + rotational), gray value (translational + rotational).The selection of which registration method is used are depend on the reviewer and the specific site. In this study we are comparing four registration method such as bone (T+R), gray value (T+R) of clip box, and bone (T+R), gray value (T+R) of mask registration protocol.

Methodology

There are studies done in various department in different site using different registration method[1,6]. This study conducted at Kasturba Hospital using ELEKTA HD versa XVI cbct. Ethical approval was granted by the Institutional Ethics Committee, Kasturba Medical College, Manipal. The study is approved and registered under CTRI. Ten breast cancer patients who were treated with 42.5 Gy in 16 fractions were chosen for this study. Contours, prescription are done based on ICRU protocol[3]. Standard tangential 3dcrt beam planning was generated using 6 mv photon with wedge. Plans are evaluated by experienced radiation oncologist before sending for verification and treatment. Patients were imaged with CBCT on first consecutive three days and every third day during their course of treatment. CBCT was taken before and after during each fraction. In all, 7 CBCT image sets were acquired for each patient for 3 weeks. The total image sets of 70 are obtained. A total of 280 registrations were performed using four registration method for patient setup error. Patients were positioned supine, with both arms raised above their head and immobilized by thermoplastic mould[5]. During the mould making process, three fiducial markers were placed on the patient's body with the support of laser for isocenter reference mark. CT was taken with slice thickness of 3 mm for delineation of the targets and OAR using Monaco™ TPS V5.11.02 treatment planning system (TPS). once plan was done, all plans were approved by a radiation oncologist and transferred from TPS to CBCT system for the treatment delivery along with the corresponding planning CT datasets which will be used as the reference image data sets.The planning CT-scan was imported into the XVI database via DICOM.XVI system consisted of kilo-voltage X-ray source arm and amorphous silicon flat panel imager, is together with Elekta HD versa® (Elekta Ltd, UK) linear accelerator was used as the IGRT system to acquire onboard CBCT images. Patient's 3D-CBCT images are acquired at isocenter after applying the shift from the origin, which we got from the treatment planning station.Rotational shifts such as pitch, yaw and roll are not considered in this study. If the rotational error is more than 3°, patients are repositioned and images are taken once again

Images in cbct were acquired withinone-minute time span, 360-degree rotation with the patient immobilized in the treatment position same like during CT acquisition. M20 collimator cassette was used on all patients giving a nominal irradiated scan length at the isocentre of approximately 26 cm and reconstruction diameter of approximately 40 cm. the acquisition parameters were 120 kV, (with clinical filter F1), maintaining the lower dose to the patient's skin but improving image quality. The image acquisition parameter of xvi is given in table 1 below. Commissioningand calibration of the CBCT isocentre to the linear accelerator isocentre was performed prior to this study according to recommended guidanceAAPM TG 58[7].

Table 1: The image acquisition parameters of XVI CBCT

KV	120
MAS	140
Gantry rotation	Clockwise (360°arc)
Collimator	M20
Filter	F1
Frame	660
Reconstruction filter	wiener
XVI software	Version 5.0.3
Nominal scan dose	3.8 mGy

Image registration protocol: In Clip-box registration (CBR) method, the volume of interest is defined on the CT image in the form of a box drawn around the anatomy of interest[4]. The registration between image sets is limited only to the voxels within the clip box which contains the volume. It is a rigid registration process and does not include any margins during image matching.inMask registration (MR) Image registration is done by soft-tissue volume. The mask sets an irregular 3D region of interest around the chosen volume.in our study we created a mask on prescribed ptv contour with a default margin of in each direction. The registration is again limited only to the voxels inside this volume same like in clip box registration, which must include the target volume. In both the protocol,manual matching and automatic matching are present. In manual registration we use mouse to move the reference image with translational and rotations.Even though Manual matching is a time taking registration, it is superior than automatic one[4]. Out of automatic matching, the gray value (T + R) registration use grayscale intensity values of the voxels in the registration volume. The algorithm used here is correlation ratio procedure. The bone (T+R) mode of automatic registration use chamfer matching algorithm[11], to calculate the same as bone densities. Since the algorithm is not very sensitive to image noise, this registration can have done very quickly.

The deviation between the actual and intended position in a patient treatment is called the setup errors. Mainly two types of setup errors are present while treating a patient in external beam radiotherapy, such as systematic and random error. Systematic part of an error is one which occur systematically (same direction and magnitude) throughout the delivery[5]. This types of errors may be introduced into the treatment during immobilization preparation, planning, while transferring the data, during delivery etc.so Systematic errors are sometimes called as treatment preparation errors It can be calculated by standard deviation of the mean error of individual of that population and is represented by the symbol $\sum$. whereas random error which is represented by σ, is one which direction and magnitude of error will vary from each fraction during the treatment. This type error is usually occurring during treatment delivery phase may be due to patient's setup, tumor position, intrafraction movement and sometimes called as daily execution errors. Which can be calculated by the root mean square of the standard deviation of each patient. It is easy to reduce the random error to some extent than systematic error[5].The residual errors are calculated from data obtained from the post-treatment CBCT scans[12].

The mean setup error (M) is the average of the setup error in each direction. Whereas mean displacement vector which quantifies the distance and direction of patient setup errors can be calculated using

$$R = \sqrt{\left(d^2_{ML} + d^2_{CC} + d^2_{AP}\right)}$$

Where d_{ML},d_{CC},d_{AP} is deviation in three axis of patients respectively[5].

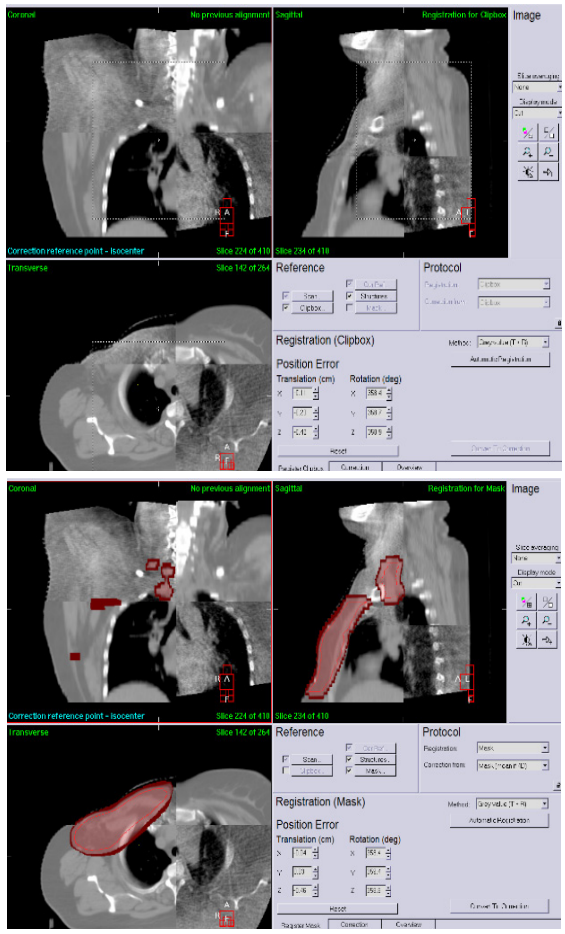


Fig 1: Clip box registration mask based registration

Results and Discussion

The result of present study is expressed in tables and chart given below.No manual match was performed in this study Furthermore no additional observers were used, as the purpose of this study was not to address inter-observer variability. It is found thatsoft tissue registration is very good in matching the tumor position and bony registration for the vertebral bodies. The systematic and random errors for each of the 'clip-boxes' and mask were calculated and showed below in table 2. It is found that in both systemic and random error most deviation occurred in (y) craniocaudal direction. It is also noted that while using mask with gray (T+R) registration the systemic and random error is less. The mean and standard deviations were calculated. The mean value expressed the systematic error and the standard deviation describes the random error. The residual systematic setup errors data's are shown in fig 2.

Table 2: Systematic (Σ) and random (σ) errors calculated for four different registration method.

	Systematic error (Σ)			Random error (σ)		
	ML	CC	AP	ML	CC	AP
Clip-box grey (R+T)	1.8	2.8	1.5	2.8	4.5	2.3
Mask grey (R+T)	1.1	1.9	1.2	2.6	3.2	2.3
Clip-box bone (R+T)	1.8	2.2	1.2	2.9	4.5	2.1
Mask Bone (R+T)	3.1	2.6	1.8	2.8	4.6	2.7

(X (ML): Medio lateral, Y (CC): Craniocaudal, Z (AP): Anteroposterior) all reading are in mm)

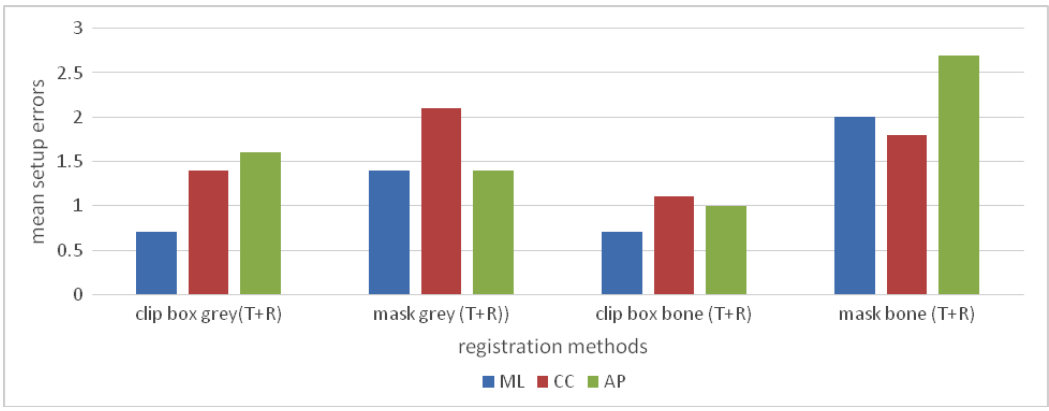


Fig 2: The residual systematic setup errors from data obtained from the post-treatment scans

The mean setup errors for clip box grey, mask grey, clip box bone and mask bone in ML direction (2.2 mm, 1.6 mm,1.8mm and 2.5 mm), in CC direction (1.3 mm, 1.9 mm, 0.3mm and 0.8 mm), and in AP directions (-0.1 mm, 0.5 mm,-1.0 mm and 1.2 mm) were observed. The mean vector displacement of four registrations are shown below in chart (fig 3). Again the vector displacement value is less in mask based grey registration when compared with other types.

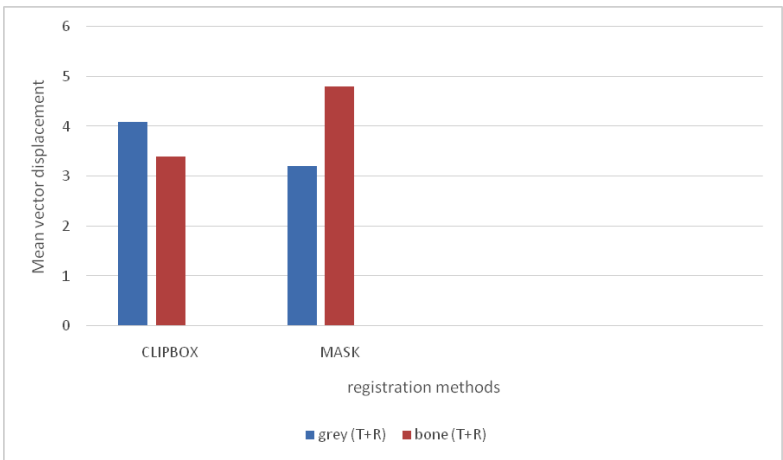


Fig 3: Comparison of Mean vector displacement of registration

A good knowledge about the patient's anatomy and well training in three dimensional registrations is also needed for an accurate image registration. Each institution has to develop their own registration clinical protocol for each site they are treating.

Conclusion

From this study, in our clinic it is found that for soft tissue such as breast, mask based grey registration shows some superior benefits than other types of registration. Appropriate clinical protocols and personnel training needs to be a developed for each clinic. Good knowledge of patient 3D anatomy is a must for a good registration

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Effect of Coordination Training on the Ability to Distribute Attention in Children with Different Types of Nervous System

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Abstract

The aim of the study: was to determine the effect of coordination training on the development of the coordination abilities of children aged 7-8 years in physical education classes and to reveal its influence on the ability to distribute attention among schoolchildren with different types of nervous system.

Method and Material: Children from 7 to 8 years old who attended the regular school participated in the pedagogical study. Distribution of attention was determined using the "Different counting" method, coordination abilities were determined by the "Running Run" test, the type of the nervous system was determined by the "Tapping-test" methodic. The method of statistical and mathematical processing of the results was the T-Student test.

Results: The duration of the study was 7 months, a total of 59 physical education classes were held. After the pedagogical experiment, some changes took place in the indicators. In KG the indicators in the "Shuttle Run" test have deteriorated from 10,3±0,6 s. to 10,4±0,6 s. ($p>0,05$). However, in the test "Different counting" their indices slightly improved from 37,9±1,8 s. to 37,2±1,9 s. ($p>0,05$). In EG-1, distribution attention indicators improved from 39,3±1,9 s. to 36,7±1,7 s. ($p>0,05$). The indicators of the level of development of coordination abilities improved by 0,2 s. ($p>0,05$). In EG-2 schoolchildren significantly improved their results. In the "Shuttle Run" test, the indices improved from 10,3±0,6 s. to 9,7±0,5 s. ($p<0,05$). In the test "Different counting" from 36,5±1,7 s. to 29,6±1,5 s. ($p<0,05$).

Conclusion: If the children of 7-8 years develop coordination abilities in each physical education class, then the coordination of the movement will improve, while such exercises will improve the ability to distribute the attention of schoolchildren. Indicators will be significant if children are differentiated into groups with a typology in mind.

Keywords: *Distribute attention, coordination abilities, differentiated approach, type of nervous system, children.*

Introduction

Coordination abilities are very important for human life and activity.[1,2] Coordination of movement means a person's ability to quickly, accurately and completely solve motor problems, especially those that arise suddenly.[3] The types and variety of coordination abilities are surprising, there are classifications of coordination abilities.[4,5] It is impossible to single out the main coordination ability, which would develop separately from others.

In order to develop special or specific coordination abilities, it is necessary to bring to a high level the general coordination abilities that are more developed in the younger school age.[6,7]

Separately, one should say about the ability to distribute attention. This is the ability to spread attention to a significant space, in parallel to perform several different actions, that is, the ability to focus on several objects simultaneously.[8,9]

The interaction of different mental processes and physical qualities is constantly being studied. At the same time, we were not able to find data that establish the effect of coordination training on the ability to distribute attention in younger schoolchildren.

In the pedagogical process, in a regular school or sports section, there is a differentiated approach. The effectiveness of such an approach is not to be doubted, it maximizes the ability to reveal the full potential of the children's body.[10,11] In this case, the differentiation of children into groups can be based on different criteria.[12,13,14] One of these criteria is the typology of the nervous system.[15,16,17]

The aim of the study was to determine the effect of coordination training on the development of the coordination abilities of children aged 7-8 years in physical education classes and to reveal its influence on the ability to distribute attention among schoolchildren with different types of nervous system.

The hypothesis of the study is the assumption that differentiated coordination training raises the level of development of the coordination abilities of children of 7-8 years, and effectively influences the indicators of distribution attention of younger schoolchildren who engage in physical culture with using typological criterion.

Material and Method

In the pedagogical experiment, junior schoolchildren of 7-8 years (1st grade) took part, who were healthy and admitted to physical education classes. A total of 60 boys and girls participated, who were differentiated into 3 identical groups of 20 people each.[18]

1. Control group (CG), children were engaged in the standard program for schoolchildren who are in grade 1.[19]
2. Experimental group-1 (EG-1), the children were engaged in the same program, but at the beginning of the lesson for 12-15 minutes they performed exercises to develop coordination abilities.[3]
3. Experimental group-2 (EG-2), the children were engaged in a standard program, but, when performing coordination exercises, they were differentiated into subgroups taking into account the strength of their nervous system.[16,17,20,21]

During the study period, only 59 sessions were conducted for 45 minutes each lesson, classes were 2 times a week. Classes in EG-2 differed in that the load during the exercise was different. For children with a strong nervous system, the load was intense, and for children with a weak nervous system–a volume. At the same time, the volume increased due to an increase in the rest time and the number of repetitions of exercises. The intensity was increased by reducing the rest time and increasing the number of exercises.

To develop coordination abilities, the simplest and most accessible physical exercises were used (running, jumping, rolling, and moving with the ball, using a rope and other gymnastic objects). New physical exercises were learned using the repeated method. Then, a variation method of performing the exercises was used. The complexity increased due to changes in the location of objects, their weight, height, the external conditions also changed, exercises were used with catching objects in motion, a combination of running with jumps and many others. Equally effective were method–game and competitive.[3]

Before and after the pedagogical experiment, all children took control tests. Distribution of attention was determined using the "Different counting" method, coordination abilities were determined by the "Running Run" test, the type of the nervous system was determined by the "Tapping-test" methodic.

"Different counting"–is a method for determining the ability to distribute attention. Especially effective is the method for children 6-10 years old.[8] The essence of the method: on the command "GO" the schoolchildren write on a sheet of paper numbers from 1 to 20 in ascending order. At the same time, the schoolboy considers in the rumor the number from 20 to 1 in descending order. It is important that if the child starts to error immediately, the distribution of attention is developed very poorly.

Result: The amount of time the schoolchildren spent on the job (accurate to 0,1 sec.).

"Shuttle run" is a test that determines the level of development of general coordination abilities.[19]

Two lines "Start" and "Finish" are shown 10 meters from each other. By the "GO" command, the schoolboy runs from the line "Start" to the line "Finish" and touches her hand, after which he returns back and touches the line "Start" and performs the last jerk toward the Finish line without touching the line. Result: amount of time the schoolchildren spent on the exercise (accurate to 0, 1 sec.)

"Tapping-test" is a test that determines the strength of the nervous system through the excitation process.[22]

Paper A4 sheet is located horizontally and is divided into 6 squares (3 below and 3 above). By command "GO", a schoolchildren places points (using a pencil) in the first square for 5 seconds, then the "transition" command goes. The schoolchildren moves to the second square and performs the same moves. Exercise ends 30 seconds after the sixth square. The sum of points in each square is calculated and a graph is drawn up. The type of the nervous system is determined according to the graph

Statistical analysis was performed using T-Student, and the result was significant at $p<0,05$. Correlation analysis was performed using the Bio-stat program 2009.[23,24]

Results

Before the start of the study, all the schoolchildren were differentiated into 3 identical groups in such a way that the average coordination abilities in the "Shuttle run" test were approximately the same ($p>0,05$). Children in EG-2 were differentiated into 2 subgroups, taking into account the type of nervous system in the excitation process. After 59 training in physical culture (7 months), new results of the study were obtained (Table 1).

Table 1: Indicators of coordination abilities and ability to distribute attention among schoolchildren 7-8 years old (M±m)

Indicators	Group	Before	After	P
Shuttle run (s)	KG	10,3±0,6	10,4±0,6	>0,05
	EG-1	10,3±0,6	10,1±0,5	>0,05
	EG-2	10,3±0,6	9,7±0,5	<0,05
Different counting (s)	KG	37,9±1,8	37,2±1,9	>0,05
	EG-1	39,3±1,9	36,7±1,7	>0,05
	EG-2	36,5±1,7	29,6±1,5	<0,05

Analysis of Table 1 shows that there has been a change in the overall study period. In the KG, in which the schoolchildren were engaged in the standard program "Physical culture for schoolchildren of the first grade", the indicators in the "Shuttle run" test deteriorated from 10,3±0,6 s. to 10,4±0,6 s. ($p>0,05$). However, in the "Different counting" test, their performance slightly improved from 37,9±1,8 s. to 37,2±1,9 s. ($p>0,05$).

In EG-1, the indices improved in both tests. The indicators of distribution attention have improved from 39,3±1,9 s. to 36,7±1,7 s. ($p>0,05$). The indicators of the level of development of coordination abilities have improved by 0,2 s. ($p>0,05$).

In EG-2, in which schoolchildren performed coordinating exercises and used a differentiated approach based on the strength of the nervous system, significantly improved their results. In the "Shuttle Run" test, the rates have improved from 10,3±0,6 s. to 9,7±0,5 s. ($p<0,05$). In the test "Different counting" from 36,5±1,7 s. to 29,6±1,5 s. ($p<0,05$).

The results of the new study indicate the effectiveness of using a differentiated approach based on the typology of schoolchildren.

Discussion

The level of development of coordination abilities of a person reflects his ability to quickly and precisely solve motor tasks, especially those that arise unexpectedly, therefore it is difficult to overestimate their significance.[1,2]

It is impossible to single out and develop one coordination ability, their uniqueness is in interaction with each other.[4,5]

Taking into account the results obtained during the study (improvement of the indicators in the groups in which coordination training was implemented), one can agree with the authors' opinion that the favorable period for the development of coordination abilities is the younger school age.[6,7]

Separately we should say about the meaning of the ability to distribute attention to a person. Distribution of attention is the dispersion of attention to several objects at one and the same time, the ability to perform several actions immediately. It depends on the individual characteristics of the person. Of course, nobody will be able to do two things at the same time if one does not know how to do each one individually.[8,9]

There is enough facts about the existence of the relationship between physical qualities and psychic processes.[25,26,27] Despite this, we have not been able to find data that reflects the influence of coordination capabilities on the distribution of the attention of schoolchildren. In the new study, we managed to install it. Indeed, the indicators of ability to distribute attention depend on the level of development of coordination abilities.

This research confirms the authors' opinion on the effectiveness of using a differentiated approach in the educational and training process.[10,11] At the same time,

the effectiveness of using a different load on physical education classes for children with different types of the nervous system has been proved. The findings are confirmed by earlier studies in this area.[15,16,17] And the data we received in our previous studies.[20,21]

The peculiarity of differentiated load considering the typology is that the intensive load will be more effective for schoolchildren with a strong nervous system. Volumetric load will be more effective for schoolchildren with weak nervous system. At the same time, a person who has a strong nervous system is not necessarily stronger than the weak, these people go to one goal in different ways.

For the first time, a study was conducted on the effect of coordination training on indicators of the ability to distribute the attention of younger schoolchildren who have different types of nervous system. The aim of the study was achieved, and the hypothesis was solved and confirmed by the results that were obtained after the pedagogical experiment.

If at the beginning of each training in physical training for 12-15 minutes to perform physical exercises to develop coordination abilities, then indicators of not only coordination of movement, but also indicators of ability to distribute attention will improve. At the same time, the result will be more effective if you differentiate the schoolchildren by type of nervous system

Conclusion

Several conclusions can be revealed on the results of the study. First, in physical education lessons, younger schoolchildren need to develop coordination abilities. Secondly, coordination training can improve indicators of not only coordination abilities, but also indicators of mental processes, such as the distribution of attention of schoolchildren. Thirdly, the effect of coordination learning will be higher if we use a differentiated approach based on the strength of the nervous system through the excitation process.

The article is relevant for trainers, teachers and educators. The results of the study are new, they are perspective for studying new interactions of physical and mental abilities of schoolchildren.

Conflicts of interest: There are no conflicts of interest.

Source of Funding: Self

Ethical Clearance: No requirement

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent was obtained from all individual participants included in the study.

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Molecular Characterisation of B-Casein Gene in Cattle Breeds of Kerala (Genetic Polymorphism and Comparative Analysis of β-Casein (Exon 7) Gene in Crossbreed and Vechur Cattle)

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Abstract

Casein and whey protein are the major proteins present in milk. Among 13 different genetic variants of casein proteins A1 and A2 β-casein are the most common. Polymorphism studies of β-casein gene became one of the most important groups of researches in recent years because of its close relation with the milk quality. Hence a study was undertaken to investigate the genetic variation of β-casein (partial exon 7) in crossbred cattle and Vechur cattle. DNA was isolated and casein gene was amplified by polymerase chain reaction (PCR) using suitable primers. PCR products were sequenced and analysed using suitable softwares. Nucleotide sequences obtained, were showing both synonymous and non-synonymous variations.

Keywords: *β-casein, Polymorphism, Vechur cattle.*

Introduction

Milk and dairy products are the richest source of proteins and minerals in our diet, forms an important role in human nutrition(1). Caseins and whey proteins are the two major groups of proteins present in milk. Caseins are family of phosphoproteins, synthesized in the mammary gland in response to lactogenic hormones and secreted as micelles. Casein contributes 80% of total bovine milk proteins(2,3). The four casein proteins present in bovine milk are casein alpha s1 (CSN1S1, 39–46% of total caseins), casein alpha s2 (CSN1S2, 8–11%), beta casein (CSN2, 25-35%), and casein kappa (CSN3, 8–15%)(4). Casein genes are located as a cluster on chromosome 6(5,6,7). Caseins have an appropriate amino acid composition that is important for growth and development of the nursing young. Characterization of milk protein variants in different species gained importance with the discovery of milk protein polymorphism and its impact on milk production(8). Single nucleotide polymorphism (SNP) analysis is a well-established tool for the identification of genes associated with traits of economic importance in livestock populations.

The present study was undertaken to investigate the genetic variation of beta-casein protein gene, which is strongly related to economically important milk quantitative and qualitative traits. Polymorphism study will promote selection programs that are depending on the use of genetic markers which will help in improving breeding strategies. This study aimed at molecular characterisation of β-casein gene in cattlebreeds of Kerala.

Materials and Method

A total of six animals were used for the study (three crossbred cattle and three Vechurcattle). Animal maintained in livestock farm, College of Veterinary and Animal Sciences, Mannuthy, Thrissur were randomly selected for the study. About 5 ml of blood samples were collected from unrelated animals aseptically from jugular vein. Genomic DNA was isolated using standard Phenol: Chloroform: Isoamylalcohol (PCI) method(9). Isolated DNA was then quantified by Nano-drop spectrophotometer at 260/280 nm.

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Polymerase chain reaction (PCR) was employed in a total volume of 25µl with 50-100 ng of genomic DNA. PCR was performed using KAPAG2G Robust Hot Start Ready Mix contains an engineered DNA polymerase. The primer pair reported by add reference[10] was used for the study to amplify 400-500bp long exon-7 region of β-casine gene. PCR was carried out in a thermal cycler machine with an annealing temperature of 52.5^0C. PCR products were then purified using PCR purification kit (Invitrogen by life technologies) and products were then sequenced. The sequences were analysed by BLAST (Basic Local Alignment Search Tool) search at NCBI site for homology using BLAST programme.

Results and Discussion

Genomic DNA was isolated from peripheral blood leukocyte by standard Phenol chloroform method. The purity and deproteinization of the obtained DNA was indicated by ratio of optical density at 260 and 280 nm ranged from 1.7 to 2. Partial exon 7 region of beta casein gene was amplified by PCR with optimum annealing temperature of 52.5 °C for 1 minute in crossbred and Vechur cattle. The amplified products were then checked on 1 per cent agarose gel. The amplified products found to have size range between 400-500bp

Amplicons were sequenced by automated dideoxychain termination method. The sequencing results revealed an amplified fragment size ranges between 400-500bp. Nucleotide sequence analysis was carried out by using NCBI Basic Local Alignment Search Tool (BLAST)–blastn. Crossbred cattle D183CB cattle showed sequence similarity to the nucleotide sequences of Bosindicus breed Sahiwal beta-caesin (Accession no. KY290551.1) with sequence similarity of 97% with query coverage of 95%. This may be due to fact that the exotic blood is comparatively less in this animal when compared with other cross breeds. It may be present to a level that is there in Sahiwal cattle[11]. All other crossbred cattles showed sequence similarity to the nucleotide sequences of *Bostaurus* EF628290.1. Nucloetide sequences of the Vechur cattle breeds indigenous to Kerala showed 99% similarity to Sahiwal breed of cattle (Bosindicus Accession no KY290551.1) with 99% query coverage.

Multiple sequence alignment of the selected nucleotide sequence data of cattle breeds studied with the sequence available in NCBI (Accession nos. EF628290.1 and KY290551.1) showed sequence variations within breeds and between breeds. Indigenous Vechur cattle breeds showed only single nucleotide variation at position 409. Nucleotide sequence variations found to be synonymous in nature as these variations did not result in amino acid variation. All these variations in crossbreed were natural variations which may occurred due to inappropriate cross breeding programme followed. Amino acid sequence analysis of both crossbred cattle and Vechur cattle under study showed that the casein is of A2 variant[12]. A1 variant could not be identified even in crossbred animal. A through screening based on allele specific PCR-RFLP is needed in this mixed population to know the presence of A1 variant which is proved to be deleterious to health [13,14]

Casein genetic polymorphisms are important and well known due to their effects on quantitative traits and technological properties of milk [15]. Polymorphism occurring within exon VII giving rise to A1 and A2 alleles was reported to increase both protein yield and content and simultaneously to decrease the content and yield of milk fat [16,17,18,19].

Polymorphic study of the milk protein gene will help to achieve a tailored genetic improvement in both quality and quantity of ruminant milk by efficient breeding and selection programme. All these variations noticed is due to single nucleotide polymorphisms in the nucleotide sequences which can be used as tool for more efficient selection of livestock breeds. Non synonymous nucleotide changes in the nucleotide sequences can bring about new beta-casein variants. All the amino acid sequence analysis of cattle breeds showed the A2 variant in our population. It is suggestive that a wide population study is needed to identify animals with A1 milk in the livestock herd of the state.

Conclusion

The present study was undertaken with the objectives of molecular characterisation of partial β casein gene in crossbred and Vechur cattleby PCR amplification and sequencing. DNA was extracted by both phenol chloroform and kit method, and all downstream processes were standardized by using DNA isolated with kit method. Single amplicon specific to exon 7 region of the β-casein was amplified by standardizing suitable PCR protocols. The cyclic parameters were similar for all breeds expect in anneling time. Amplicons were sequenced by Sanger's method and analysed by blastn suite of NCBI and clustal-W. All sequences were

showing similarity to NCBI submitted sequences of CSN2. One among the crossbred cattle studied showed nucleotide sequence similarity to the sequence of *Bosindicus* breed Sahiwal and others showed similarity to the sequence of *Bostaurus* breed. This shows the difference in the level of exotic blood in the same population of crossbred cattle. Nucleotide sequences of Vechur cattle an indigenous breed of Kerala showed 99% similarity to Sahiwal breed. All these variations noticed is due to single nucleotide polymorphisms in the nucleotide sequences which can be used as tool for more efficient selection of livestock breeds.

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Ethical Clearance: Not applicable

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Participation in Student Group with Awareness of Aids and Drugs (Kspan) Associated with Knowledge of HIV & AIDS among Junior High School Students in Denpasar, Bali, Indonesia

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Abstract

Introduction: Adolescents are very susceptible to HIV transmission. Junior high school students, in particular, should be equipped with HIV & AIDS information in order to avoid risky sexual behavior. *Kelompok Siswa Peduli AIDS dan Narkoba* (Student Group with Awareness of AIDS and Drugs)-KSPAN is one of the student organizations established in schools in Bali to help provide more comprehensive information about HIV & AIDS, including how to prevent HIV transmission. The purpose of this study was to identify the relationship of participation in KSPAN with the knowledge of HIV & AIDS among junior high school students in Denpasar, Bali.

Method: This was a cross-sectional study using secondary data from Kisara IPPA Bali Chapter. Descriptive analysis was used to present the proportion of the students' participation in KSPAN and knowledge about HIV & AIDS. Chi-square analysis was applied to identify the relationship.

Results: More than half of juniorhigh school students had sufficient knowledge of HIV & AIDS (59.8%) and most of them participated in KSPAN (81.5%). Moreover, the proportion of students with sufficient knowledge on HIV & AIDS was higher among those who participated in KSPAN compared to who did not (67.2% vs 27.0%) The result of bivariate analysis using Chi-square test showed that participating in KSPAN was associated with having sufficient knowledge of HIV & AIDS (p-value <0.001).

Conclusion: Participating in KSPAN had a positive impact on knowledge on HIV & AIDS since students were provided with comprehensive information on HIV & AIDS. Therefore, increasing the participation of students in this organization is essential to expand the HIV & AIDS information.

Keywords: *AIDS, HIV, knowledge, KSPAN, participation, student organization.*

Introduction

HIV & AIDS remains a pressing issue in many developing countries due to a lot of new infections and AIDS sufferers are well-documented. Given this problem, governments in many affected countries set targets and made commitments as outlined in the Sustainable Development Goals (SDGs). One of the targets of the SDGs related to HIV & AIDS is to decrease HIV infections every year by three quarters by 2030 and to ensure universal access to treatment by HIV & AIDS patients by 2040.[1]

New HIV cases in the Asia Pacific regions in 2017 were estimated at 2.8 million among people aged 15 years and above whilst 10 thousand new sufferers were attributable to those aged 0-14 years.[2] In Indonesia, there were 34.5 million HIV-positive adults out of a

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total of 36.7 million people living with HIV (PLHIV) from all age groups in 2016, indicating that a number of adolescents have been infected with HIV.[3] Bali as one of the provinces in Indonesia was first known to report HIV patient in 1987. The data from Provincial AIDS Commission showed that 500 people aged <19 years were infected with HIV from a total of 9,027 PLHIV from 1987 to December 2016. Meanwhile, data obtained from the Bali Health Office in 2010 showed a significant increase in HIV cases in each district in Bali. The district with the highest growth of HIV & AIDS cases was Denpasar, by 45.83% with a total of 679 AIDS cases and 920 HIV infections.[4]

Adolescents aged 10-19 years experience physical development accompanied by sexual maturation so that it leads to their vulnerability to drugs use and risky sexual behavior.[5] Therefore, they are susceptible to HIV infection since drugs use and risky sexual behavior are the mode of HIV transmission.[6] It indicates that adolescents need to have sufficient knowledge of HIV & AIDS in order to prevent HIV transmission.

Junior high school students are part of adolescents who need to have qualified knowledge since the misconceptions of HIV & AIDS-related issues are more likely to occur among them.[7] Provincial AIDS Commission of Bali initiated to establish *Kelompok Siswa Peduli AIDS dan Narkoba* (Student Group with Awareness of AIDS and Drugs)-KSPAN as one of the extracurricular activities implemented in schools in Bali. It aims to provide comprehensive information on HIV & AIDS and develop peer educators.[8,9] This present study aimed to identify the association between the participation in KSPAN with knowledge of HIV & AIDS among junior high school students in Denpasar, Bali.

Material and Method

This study was a quantitative study with a cross-sectional approach using secondary data from a project, entitled "Sexual and Reproductive Health Knowledge, Attitude, and Behavior among Adolescents in Denpasar, Bali" conducted by Kisara IPPA Bali Chapter from July to September 2016. It has successfully recruited 1,200 students out of 24 schools using multi-stage cluster random sampling. For this study, we employed all records of junior high school students, making a total sample of 400 students.

The dependent variable was knowledge of HIV & AIDS, measured using some statements or questions such as 1) HIV is a virus that attacks the immune system; 2) HIV can be transmitted through vaginal fluid and sperm, blood, breast milk, and the use of unsterile syringes; 3) HIV is the same as AIDS; 4) HIV-positive people tend to not show symptoms; 5) AIDS is a set of symptoms after being infected with AIDS; 6) HIV can be transmitted by HIV-positive people apparently look healthy (window period); and 7) HIV can be cured. Meanwhile, the independent variable is the participation in KSPAN by questioning whether the student was a member of KPSAN or not. For the analysis, Chi-square test was used to identify the relationship between the participation in KSPAN with knowledge of HIV & AIDS with the significant level (α) at 0.05. The results were presented by p-value and coefficient Cramer's V to show the magnitude of relationship.

Results

Table 1 shows that from 400 junior high school students in this study, the average age was 14 years and 56.3% of the respondents were female. For a variable of the participation in KSPAN, 81.5% of students have participated in KSPAN and the remaining of 18.5% did not participate. The total score of knowledge was grouped, and 59.8% had sufficient knowledge of HIV & AIDS.

Table 1: Characteristics, participation in KSPAN, and knowledge of HIV & AIDS among junior high school students

Variables	n = 400 (%)
Age (Mean; SD)	(14.18; 0.77)
Sex	
Male	43.7
Female	56.3
Participation in KSPAN	
Yes	81.5
No	18.5
Knowledge of HIV / AIDS	
Sufficient	59.8
Poor	40.2

Knowledge indicators of HIV & AIDS are described in detailed as presented by Figure 1. It was measured using seven questions and responses are given as "yes" and "no" by junior high school students. It shows some misconceptions among students such as more than half of them agreed that HIV can be cured (65.5%); they disagreed that HIV-positive people will not show the

symptoms and almost a half argued that at least one of these modes of HIV transmission (vaginal fluid, sperm, blood, breast milk, and the use of unsterile syringes) was incorrect (49.75%).

Other indicators showed that the majority agreed with the given definition of HIV (79%) and AIDS (61.8%). In addition, they could differentiate between HIV and AIDS (67%) and knew that HIV sufferers who apparently look healthy are able to transmit HIV (53.5%).

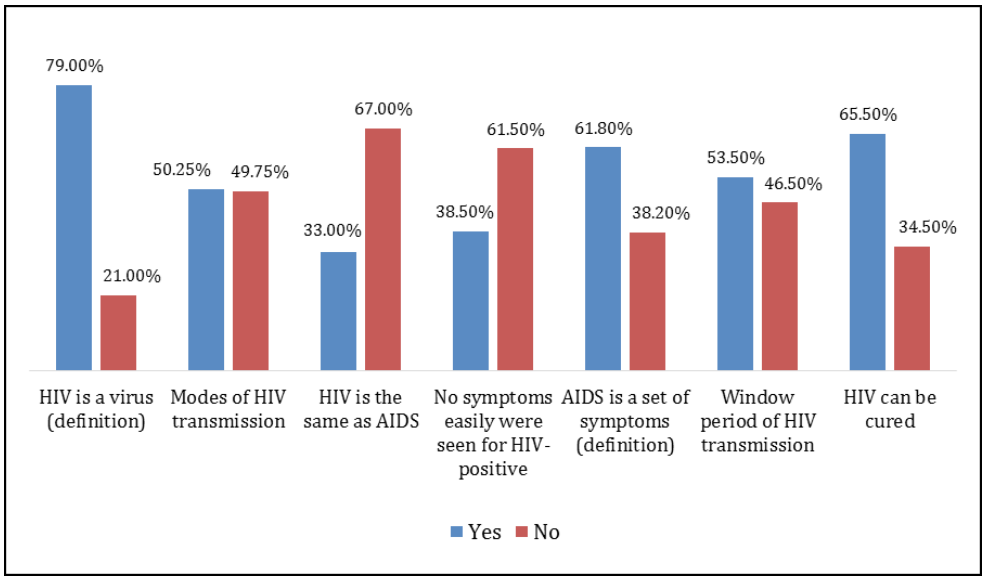


Figure 1. Knowledge of HIV & AIDS among junior high school students

Table 2 shows the result of Chi-square test between students' participation in KSPAN and their knowledge of HIV & AIDS. Based on cross-tabulation, 67.2% of students who participated in KSPAN had sufficient knowledge while only 27% who did not join KSPAN had sufficient knowledge. There was a significant association between the participation in KSPAN and sufficient knowledge of HIV & AIDS among junior high school students (p-value <0.001). According to the Cramer's V coefficient which shows 0.32 means that the relationship is quite strong.

Table 2: Association between the participation in KSPAN with knowledge of HIV & AIDS

Participation in KSPAN	Knowledge of HIV & AIDS		p-value	Coefficient of Cramer's V
	Sufficient (%)	Poor (%)		
Yes	67.2	32.8	<0.001*	0.32
No	27.0	73.0		

*significant level (α) at 0.05

Discussion

Obviously, HIV transmission is preventable, as well as, the stage of AIDS among HIV-positive people can be prevented as early as possible. Unfortunately, a lack of knowledge and incomprehensive information often results in an increase of new HIV infections and stigma and discrimination among PLHIV accelerate to AIDS. According to the Health Belief Model theory, knowledge is one of the several important modifying factors which can affect personal belief related to health, in which, can

lead to a change in one's attitudes and behavior.[10]

This study can provide information on the current situation of students' knowledge of HIV & AIDS in some aspects, such as HIV and AIDS definition, the difference between HIV and AIDS, and the window period of HIV transmission. This study found that 67% of the students argued HIV is different from AIDS. It is different from a previous study which found that 64.9% were still unable to distinguish between HIV and AIDS.[11]

However, students gave the wrong answer to some knowledge indicators, such as 65.5% of students said that HIV can be cured, but, in fact, currently no drugs available to cure HIV & AIDS. Nowadays, there is only antiretroviral virus (ARV) drug to suppress HIV and prolong the quality of life of PLHIV.[12] By contrast, a finding from a similar study showed that 69.8% reported that HIV & AIDS could not be cured.[11]

Another indicator of HIV knowledge was 61.5% of the students stated that people who are HIV-positive can be identified easily from several symptoms, although only VCT can ensure whether people have been infected with HIV or not.[13] HIV-positive people who apparently look health are also able to transmit HIV because of a window period of HIV which can last 5 to 10 years preceding the symptoms.[14]

Another important aspect of knowledge which students should have is HIV mode of transmission. Someone can be infected with HIV through vaginal fluids, sperm, blood, breast milk, and the use of unsterile needles.[15] The results of this study showed that 49.75% did not know the whole method of HIV transmission. A previous study found that most of the respondents (> 90%) knew that body fluid containing a virus, male and female sexual secretions were the main sources of infection.[16] In addition, a similar study reported that 91% and 92% of the respondents knew that HIV could be transmitted from infected mother to baby and through contaminated needles and syringes, respectively.[14] Among adolescents, the easiest HIV transmission is through risky sexual behavior or injecting drugs. Previous published literature also mentioned that sexual intercourse is a common mode of HIV transmission among adolescents.[7]

Based on the findings, providing information related HIV & AIDS that were less known by students is essential to enhance their knowledge and address their misconceptions. KSPAN is one of the extracurricular activities in schools which potentially contributes to increase the knowledge of HIV & AIDS among junior high school students. More importantly, students are also trained to be peer educators as part of KSPAN's activities. It might be underlying reasons for the moderate-to-strong relationship between the participation in KSPAN and sufficient knowledge of HIV & AIDS among junior high school students (p-value <0.001 and Cramer's V coefficient = 0.32). A similar previous study also reported that the proportion of sufficient knowledge of HIV & AIDS among KSPAN members was 68.7%, higher than students who were not members of KSPAN, at 31.3%.[9] In addition, another evidence pointed out that the existence of special programs aiming to provide health information for adolescents in schools was able to increase students' knowledge of adolescent health, including HIV & AIDS knowledge.[10] Therefore, it is essential to increase students' participation in KSPAN and teachers should support and promote this extracurricular to students to expand the HIV & AIDS information. In addition, the activities of KSPAN should be designed with a lot of interesting activities to attract students and retain members' participation.

Conclusions

Participation in KSPAN can help students to obtain trustworthy HIV & AIDS information that can increase their knowledge of HIV & AIDS. Information of HIV & AIDS must be provided in an early stage of adolescents in order to have qualified knowledge to prevent the HIV transmission. KSPAN as one of the extracurricular activities is promising to take this duty. Increasing students' participation to join this extracurricular is essential to expand HIV & AIDS information. It should be supported by a strong commitment from teachers to promote KSPAN to students.

Conflict of Interest: The authors declared that there is no conflict of interest.

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Ethical Clearness: Kisara IPPA Bali Chapter collected data after obtaining informed consent from the respondents and their participation in this study was anonymous.

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Measurement and Simulation of Noise in Manufacturing Industry in Malang City, Indonesia

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Abstract

Noise is one form of pollution that occurs in big cities. Increased noise pollution is influenced by various noise sources, for example construction activities or the number of motorized vehicles in certain areas. Continuous noise exposure with a noise level higher than 85 dB can cause effects on humans in general are physiological and psychological. In this study noise measurements and will be carried out in the manufacturing industry. It is expected that in this study, not only can produce noise simulations, but also provide scientific contributions to both engineering and social sciences. The results showed that the sound intensity generated by the factory machine at location 1 gave a maximum value of 103.5 dB on Thursday, while at location 2 the maximum value on Thursday is 82.1 dB and the minimum value is 58.3 dB on Tuesday for each total for one week. This difference is caused by the accumulation of noise levels with increasing time and outside noise activity that can affect the measurement value. Measurements made for one week gave an average value of 92.29 dB at location 1 and 67.59 dB at location 2.

Keywords: *Noise, Manufacturing Industry, Malang City*

Introduction

The production process in the manufacturing industry is required to be able to compete in order to meet demand targets and achieve the expected quality targets. This condition causes, the industry is then designed using machines to increase productivity and accuracy [1]. Machinery in the industry has a positive impact on increasing company productivity, but also has a statistical impact on the health of workers. Industrial machines that are operating will certainly cause noise or noise due to the work process between machine parts [2].

Noise is a form of potential health hazard that often occurs in the industry. The production process that runs continuously will provide continuous exposure to workers, especially the ear. Noise is a disturbing sound because it has an impact on human physical, mental and psychological health [3].

Continuous noise exposure with a noise level higher than 85 dB can cause hearing loss. Hearing loss is the most common effect of physiological effects. It is all possible to divide the effects of noise on the ear into three groups: acoustic trauma, temporary hearing loss, and permanent hearing loss. The psychological effects of noise are more common than physiological and it can all be seen from the form of resentment, stress, anger and concentration disorders due to difficulty in resting [4].

From this description, this research will identify noise levels in the industry, especially in manufacturing industries, by making direct measurements. It is expected that this research will produce recommendations to reduce noise in the manufacturing industry environment and create a more conducive industrial environment.

Method

This research was carried out by following the method flow, namely preliminary studies, data collection, noise data processing, drafting, evaluating, and drawing conclusions. The importance of this study is to provide the basis, reference or benchmark for researchers in solving the problem, so that the urgency of the problem and the objectives that have been formulated are achieved.

Data collection is done through recording information related to the object under study to support the research conducted. Researchers will conduct observations by direct observation of the object under study, namely academics, recording (documenting, and conducting interviews related to relevant information.

Calculate the noise level equivalent using the Decree standard. No. 48 / Minister of Environment RI / 11/1996. After knowing the equivalent noise level of the engine then noise mapping is made using the Surfer program. The questionnaire will be presented with descriptive statistics [5].

According to the Minister of Manpower Regulation of RI No. PER.13 / MEN / X / 2011, noise is all unwanted noise sourced from the tools of the production process and / or work tools which at a certain level can cause hearing loss [6]. According to Harun quoted by Sasongko et al. (2000) noise is an unwanted sound that is disturbing and can be dangerous [7]. According to Sataloff, noise is a very complex sound consisting of random frequencies that are related to each other [8]. From these definitions, it was concluded that noise is an unwanted sound that comes from the means of production that interfere with and can endanger health, especially hearing loss..

According to the Minister of Manpower Regulation of RI No. PER.13 / MEN / X / 2011 concerning the threshold value of physical factors and chemical factors in the workplace states that the NAV is a hazard factor standard in the workplace as a weighted average intensity of time that can be accepted by the workforce without causing illness or health problems, in daily work for a time not exceeding 8 hours a day or 40 hours a week.

The instrument used in measuring noise in the work environment is sound level meter (SLM). Sound level meter (SLM) consists of reading displays, microphones, amplifiers and electronic circuits. Microphones on sound level meters are used to detect variations in small air pressure associated with sound and turn into electrical signals that will be processed by electronic circuits from the instrument. To measure noise in the work environment can be done using a sound level meter.

Results

Noise measurement

1. **Noise level at day and night at location 1:** Noise caused by machinery measured by day and night time differences is shown in Table 1 to Table 2. Noise levels measured at locations 1 comes from the measurement of the sound intensity generated by the machine. Measurements were made at the center of the sound source, namely in the engine room for 7 days from 07.00-17.00, (Table 1) and from 17:00 to 22:00 (Table 2).

Table 1. Noise levels during the day in the engine area

Period	Noise Level						
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
07.00-08.00	81	79	80	77	80	80	80
08.00-09.00	92.3	90.5	91.5	92.5	91.3	91.3	93.3
09.00-10.00	93.2	94.2	94	95.6	94.2	94.2	94.5
10.00-11.00	100.5	101.6	96.6	103.5	100.6	100.6	102.6
11.00-12.00	88	86	89	102.3	87	87	87
12.00-13.00	96.2	96.2	96.2	97	95.2	97.5	97.8
13.00-14.00	91	92	92	95	91	91	91
14.00-15.00	88.8	86.4	88.4	96.5	88.4	88,\.4	85.4
15.00-16.00	89	92	91	94	90	90	90
16.00-17.00	87	86.8	89	85	88	88	90
Average	90.7	90.47	90.77	93.84	90.57	90.8	91.16

Table 2. Noise levels during the night in the engine area

Period	Noise Level						
	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**
17.00-18.00	78.2	78	79	79	78	79.5	81
18.00-19.00	90.5	92.5	93.5	93.5	93.7	92.1	91.5
19.00-20.00	93.3	95,2	95,6	95,8	94,6	95,2	94.7
20.00-21.00	99.5	101.4	102.5	101.4	102.4	102.4	101.4
21.00-22.00	100.3	100.6	100.3	101.6	99.6	100.5	105.6
22.00-23.00	95.2	98	99	99	96	95	93
23.00-24.00	88.6	99	98	97	100.2	97	92
24.00-01.00	91.5	95.5	96.5	96.5	95.4	98.5	96.5
01.00-02.00	89	92	95	93	92.2	93	94
02.00-03.00	83	84.2	84	85.2	84.6	84.3	83.8
Average	90.91	93.64	94.34	94.2	93.67	93.75	93.35

Table 1 and Table 2 show the relationship between sound intensity measured by the observation time interval for one week. The table shows that the highest noise intensity increase occurred on Thursday with the average noise intensity being 93.84 dB, while the lowest intensity value occurred on Friday with an average value of 90.57 dB. This proves that the tendency of the sound intensity generated by machines for Thursday is increasing, but provides almost the same characteristics for other days. In general, the sound intensity of the machine results in maximum value measured on Thursday. This maximum value is caused by the influence of activities other than machines such as trucks carrying goods that also operate on that day.

External noise activities that can affect come from truck cars carrying goods, as well as heavy equipment working around location 1. The highest noise level occurs on Thursday, thus the external factors mentioned above are more dominant on Thursday.

During one week during the daytime measurements it turned out that the sound intensity measured on the machine had a value away from the quality standard price for the industry, which was 70-85 dB, with the highest difference of 33.5 dB to 18.5 dB on Thursday.

The relationship between the value of the sound intensity generated by the factory machine at night is to show the relationship is almost the same as the measurement during the day (Table 1 and Table 2). The highest measured intensity at night occurred on Wednesday at 94.34 dB, while the lowest occurred on Monday at 90.91 dB.

This is because on Wednesday the accumulation of noise levels increases with time. On Monday the intensity value is between the value of the interval. Sound intensity does not experience much change at night during one week the difference in intensity measurement is 1.1 dB (on Thursday and Wednesday night). When compared with the afternoon it turns out the difference in night value is greater, this is because at night the atmosphere of silence is also added by the difference in the air layer so that the sound experiences curvature downward, besides because of differences in pressure and temperature, if the small temperature is large then the greater the speed of sound and vice versa the large temperature of small density, the smaller the speed of sound. So the sound you hear will feel clear and loud at night. That the sound intensity generated by the factory machine at night gives a difference with a maximum quality threshold of 32.5 dB and the lowest is 17.5 dB.

2. **Noise level at day and night at location 2:** Noise in location 2 in the office area is also caused by factory machinery and the activities of employees in the office. The noise value for this office area is measured based on day and night time differences shown in Table 3 and Table 4

Table 3. Noise levels during the day in the office area

Period	Noise Level						
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
07.00-08.00	58.3	58.3	59.2	62.5	59.4	58.7	58.8
08.00-09.00	61	61	60.7	64.7	60.6	60.6	62.6
09.00-10.00	63.4	63.4	64.4	66.4	62.1	64.1	64.1
10.00-11.00	64.6	64.6	65.7	66.6	64.5	64.5	64.5
11.00-12.00	68.5	66.5	65.8	67.5	65.1	64.1	66.1
12.00-13.00	70.2	70.2	71.2	73.2	71.3	72.3	72.3
13.00-14.00	73.1	71.1	72.1	75.1	72.4	72.4	73.4
14.00-15.00	72.6	72.6	73.6	74.6	72.6	74.6	71.6
15.00-16.00	74.9	74.9	74.9	77.9	73.7	74.7	74.7
16.00-17.00	77.1	75.1	74.3	82.1	76.2	75.7	76.3
Average	68.37	67.77	68.19	71.06	67.79	68.17	68.44

Table 4. Noise levels during the night in the office area

Period	Noise Level						
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
17.00-18.00	57.8	58.8	58.4	56.8	58.5	63.6	57.4
18.00-19.00	63.1	61.5	62.5	62.5	62.3	65.8	61.5
19.00-20.00	63.5	61.7	62.7	62.2	62.1	67.2	62.1
20.00-21.00	64.2	63.3	62.4	63.3	62.3	68.7	63.3
21.00-22.00	64.5	63.5	64.4	64.7	64.7	71.5	64.5
22.00-23.00	66.3	66.5	66.1	66.2	67.1	74.5	66.1
23.00-24.00	67.1	64.3	64.3	66.2	65.2	75.3	64.3
24.00-01.00	67.8	67.8	66.9	67.8	67.6	76.6	67.8
01.00-02.00	69.2	70.2	71.5	72.5	72.1	78.8	71.2
02.00-03.00	76.4	77.3	76.3	74.3	75.1	85.5	75.3
Average	65.99	65.49	65.55	65.65	65.7	72.75	65.35

Table 3 and Table 4 show that the pattern of noise levels at location 2 during the day and night is the same, which tends to increase with time. The pattern of noise at night is relatively more stable than the pattern of noise during the day. This is because the external noise source is not very influential at night compared to the noise source from the factory machine.

Table 3 and Table 4 show the relationship between sound intensity measured by observation time interval and for one week. The highest increase in noise intensity occurred on Thursday with an average noise intensity of 71.06 dB, while the lowest intensity value occurred on Tuesday with an average value of 67.77 dB.

This proves that the tendency of the sound intensity generated by factory machinery and employee activity for office areas on Thursday is increasing, but provides almost the same characteristics for other days. In general, the intensity of sound at location 2 from the results of factory machinery and employee activity is measured maximum on Thursday. This maximum value is caused by the possibility of the influence of activities other than plant machinery such as heavy equipment machines that are operating on Thursday, in addition to the activity of trucks carrying goods that also operate on that day whose frequency is high enough to contribute to measured intensities. While the sound intensity on Tuesday the smallest value is 58.3 dB smaller than

the intensity of sound on other days. During one week during the afternoon measurements it turned out that the sound intensity measured in the office area had a value that avoided the quality standard for the industry, namely 65 dB, with a difference of 17.1 dB on Thursday. On Monday the deviation from quality standard is 10.1 dB, while for other days other than Thursday and Tuesday the deviation from office quality standards is at both of these intervals.

The highest intensity value measured at night occurs on Sunday at 72.75 dB. While the lowest occurred on Sunday at 65.35 dBC. When compared with the afternoon it turns out the difference in night value is greater, this is because at night the atmosphere of silence is also added by the difference in the air layer so that the sound experiences curvature downward.

Discussion

Noise levels that exceed the Threshold Value are very influential with the incidence of hearing loss. In this study most of the noise measurement results are above the threshold value of 85dB [9].

Other effects of noise such as disturbed sleep, some mental tension caused by noise, will cause rapid pulse rate and hypertension, which can lead to another danger where the sufferer cannot hear shouts or warning sounds so that it can lead to accidents [10]. Constantly in the midst of workplace noise and traffic can result in loss of listening sensitivity leading to deafness [11].

In general, high-pitched noise is very disturbing, especially if it breaks up or comes suddenly. Disorders can be an increase in blood pressure (± 10 mmHg), increased pulse, constricting peripheral blood vessels, especially in the hands and feet, and can cause pale and sensory disorders. Psychological disorders can also occur, in the form of discomfort, lack of concentration, insomnia, irritability. If noise is received for a long time it can cause psychosomatic diseases such as gastritis, stress, fatigue, and others [12].

Besides that noise can cause communication disruption usually due to masking effect (clear hearing noise) or noise clarity. Communication of the conversation must be done by shouting. Disruption can cause work disruption, to the possibility of errors due to not hearing signals or alarms; This communication disruption indirectly endangers the safety of the workforce[13]. Noise in a long time can also cause the impression of walking in space or floating, which can cause physiological disorders in the form of vertigo or nausea[14].

Conclusion

Measurement of noise intensity is known that the factory machine is above the threshold value of > 85 dB or around 77 dB-103.5 dB where in this location there are machines that have high noise levels such as kernels, boilers, and the powerplant which is a source of noise and based on the noise level at each point, the length of exposure time recommended by NIOSH varies depending on the level of noise produced. The higher the noise level, the shorter the exposure time, and the lower the noise level, the longer the exposure time.

Ethical Clearance: Not required.

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Conflict of Interest: There is no conflict of interest exist.

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Evaluation of Serum Thyroid Hormones and its Effect/Complications During Pregnancy

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Abstract

Thyroid hormone viz, triiodothyronine (T3), thyroxine (T4) and thyroid-stimulating hormone (TSH) plays an important role during pregnancy to both the mother and fetus. This study included 60 pregnant women enrolled in the Al_ Batool teaching hospital in February to July 2019. The enrolled patients are between the age group between 25-35 years. The fasting blood was collected in the plain vacutainers from the vein after getting participant oral consent. Serum were used to evaluate the serum T3, T4 and TSH level. About 96.72%response rate was observed. The average respondent age was 27.37±3.52 years. About 36 (60%) and24 (40%) women were included in the age group of 25-30 and 30-35 years, respectively. About 82.32% women were under overt hypothyroidism category i.e. they showed increased levels of TSH as compared to the healthy pregnant women. The serum TSH levels were found to be 7.076±2.01mIU/ml and 4.146±0.37mIU/ml in thyroid hormone deficiency (TD) and normal groups, respectively. In the TD groups, about 80.32% women showed a caesarean delivery while about 97.45% women showed normal delivery. Normal delivery time takes about 39.22±0.34 weeks while TD groups showed a premature delivery at about 36.64±1.93 weeks. Iraqi women showed overt hypothyroidism. This abnormal levels of the thyroid hormones can be lead to miscarriage caesarean delivery with high weight infants.

Keywords: *Thyroxine, Triiodothyronine, Thyroid-stimulating hormone, Overt hypothyroidism, Caesarean delivery.*

Introduction

Pregnancy is associated with intensealterations in thyroid physiology and function to deliveradequate thyroid hormone (T3 and T4) to both the fetus and mother. During the first trimester of pregnancy, human chronic gonadotropin (hCG) stimulates the thyroid gland. These hormones play significant role in fetal development and embryogenesis as fetal thyroid start to produce thyroid hormone (TH) in the gestation (about 20 weeks old). Therefore, in early pregnancy, maternal source of TH to fetus evidenced through increased thyroxine-binding globulin concentrations[1]. As a result of this, serum free thyroxine (FT4) level increase and thyroid-stimulating hormone (TSH) level decrease. This occurs from eight weeks to throughout the first half of pregnancy, leads to the different reference intervals for FT4 and TSH as compared to the nonpregnant women. In early pregnancy, triiodothyronine (T3) and thyroxine (T4) levels are reported to be increased and attain a plateau in the second trimester and increased is about 30-100% as compared to prepregnant women[2].

Around 2%–4% prevalence rate is observed in thyroid disorders and around 0.1-0.4% prevalence is observed for hyperthyroidism in pregnant women. Out of which, around 2-3% showed hypothyroid, 0.3-0.5% have overt hypothyroidism and 2-2.5% have subclinical hypothyroidism. Thyroid antibodies are found in the at least 5-10% of womenand prone to developed thyroid insufficiency during pregnancy[3]. On the basis of serum FT4 concentration in the mother, the pregnant women is categorized into either overt hypothyroidism (OH)

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or subclinical (SCH)[4,5]. Subclinicalhypothyroidism is defined as a patient with normal serum FT4 level and TSH levels is range in 2.5 and 10 mIU/L.In case of overt hypothyroidism, women showed increased in TSH level in the trimester-specific reference interval and /or decreased in serum FT4 levels[6].

Thyroid hormone abnormality is relatedto an increased threat of various adverse maternal and child outcomes, including intrauterine growth retardation, a decreased child IQ miscarriage, preterm delivery, hypertensive disorders etc,[7]. Thus, it is very crucial to check thyroid status during pregnancy, for the assessment of suspected thyroid abnormalities and/ or status of pre-existing thyroid disease. With this background, in the present study, we evaluate the serum T3, T4 and TSH hormone levels in the Iraqi women with its associated complications.

Material and Method

This study included 60 pregnant women enrolled in the Al_ Batool teaching hospital in February to July 2019. The women with abnormal serum thyroid hormone was grouped as TD group. The age match women, which had normal thyroid hormone was considered in the healthy group.

Fasting blood (n=20) was collected by a single puncture form patients, after obtaining informed consent. The enrolled patients are between the age group between 25-35 years. The patients with the gestitional diabetes and high blood pressure were excluded from this study.

The fasting blood was collected in the plain vacutainers from the vein after getting participant oral consent. The samples were kept at room temperature for 30min. Followed by the centrifugation at 3000rpm for 15min. The serum was separated and kept at 20°C for further study. Serum sample was used to evaluate the serum T3, T4 and TSH level by commercially available kits (Sigma, USA).

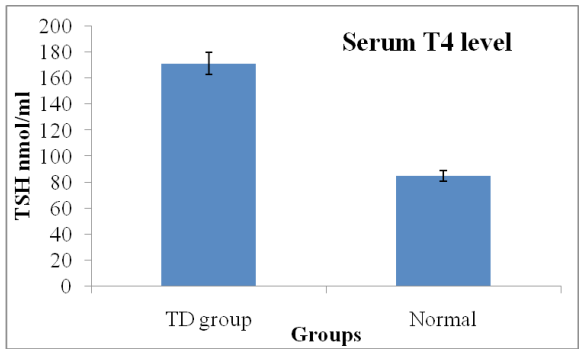
Statistical analysis: Results were denoted as Mean ± Standard Error (SE). One way Analysis of Variance (ANOVA) along with Dunnett Multiple Comparison Test was done to estimate the statistical significance.

Results

In the current study, we evaluate the serum T3, T4 and TSH levels of Iraqi pregnant women visited to Al_ Batool teaching hospital from February to July 2019. The reference range was considered as given by American Thyroid Association (ATA). About 96.72% response rate was observed. The average respondent age was 27.37±3.52 years. About 36(60%) and 24(40%) women were included in the age group of 25-30 and 30-35 years, respectively. Table 1 shows the details of socio demographic characteristics.

About 82.32% women were under overt hypothyroidismcategory i.e. they showed increased TSH levels as compared to the healthy control. The serum T4 levels were171.36±9.25 and 84.83±2.58 nmol/ml.

Figure 1: Serum T4 level in the enrolled groups



The serum TSH levels were found to be 7.076±2.01 m IU/ml and 4.146±0.37 m IU/ml in TD and normal groups, respectively. The serum TSH levels are depicted in the Figure 2.

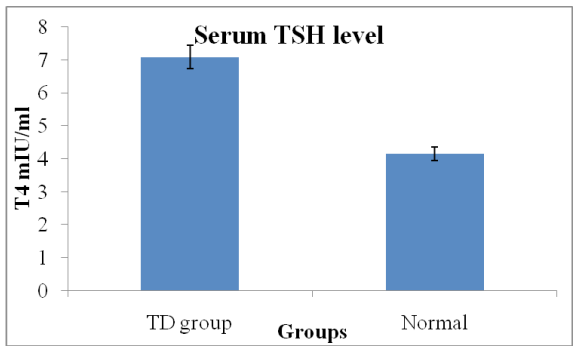


Figure 2: Serum TSH levels in he enrolled groups

In the TD groups, about 80.32% women showed a caesarean delivery while about 97.45% women showed normal delivery. Normal delivery time takes about 39.22±0.34 weeks while TD groups showed a premature delivery at about 36.64±1.93 weeks.

Discussion

During pregnancy, thyroid function is stimulated by human chronic gonadotropin (hCG). Thus, any abnormality associated with thyroid function results

in abnormality in maternal and fetal development such as miscarriages and preterm delivery[8]. However, information regarding levels of thyroid hormones T3 and T4 in pregnant women is scant and display variation depending on the ethnicity of study population. Decrease serum levels of free T3 and T4 was reported by some authors while unchages or even elevation was also reported previously. So, the thyroid hormone change during pregnancy is controversial. But many of the authors reported lowering of free-hormone concentrations as compared to nonpregnant women. Thus, it is imperative to determine levels of T3 and T4 hormones in pregnant women of a particular geographic location.

In the cohort population-based study conducted in Isfahan, Iran, in the first trimester of gestation,serum FT3, FT4 and TSH, levels were 4.50 ± 0.64 pmol/L, 1.01 ± 0.15 ng/dL, and 1.84 ± 1.32 mIU/L, respectively. While in nonpregnant women, these levels were 4.49 ± 0.57 pmol/L, 1.10 ± 0.21 ng/dL and 2.58 ± 1.77 mIU/L, respectively[8]. Mehran et al.[9]has reported that in Iranian women reference intervals of T3, T4 and TSH were first (137.8–278.3ng/dl; 8.2–18.5 g/dl; 0.2–3.9mIU/l), second (154.8–327.6ng/dl; 10.1–20.6 g/dl; 0.5–4.1mIU/l) and third (137–323.6ng/dl; 9–19.4 g/dl; 0.6–4.1mIU/l) trimestersrespectively[9]. Similar reportsare reported by Yan et al.[10] and Soldin et al.[11]. First trimester showed maximum T3 and T4 levels and it gets decreased by third trimester. Soldin et al.[11] evaluated the trimester i.e. first, second, and third specific ranges. He found that first, second, and third trimesters value of T4 ranges from 6.3–14.6, 6.4–14.8, and 6.3–16.7 g/dL and for T3 92–218, 112–278, and 111–265 ng/dL, respectively.

On the other hand, a case-control study from Dhaka, Bangladesh, reported significantly higher levels of serum TT 4 level in pregnant women during third trimester compared with non-pregnant women[12].Rajput et al.[13] determined TSH, T3 and T4 levels in pregnant women from Hrayana, India, wherein, TSH increased with simultaneous decrease in serum FT3 as gestational period progress. The significant FT4 decreased was observed from trimester 1–3rd, while nonsignificant decrease from 2nd-3rdtrimester.

Conclusion

In the present study, we found that in the TD groups, about 80.32% women showed a caesarean delivery while about 97.45% women showed normal delivery. Normal delivery time takes about 39.22±0.34 weeks while TD groups showed a premature delivery at about 36.64±1.93 weeks. Iraqi women showed overt hypothyroidism. This abnormal levels of the thyroid hormones can be lead to miscarriage caesarean delivery with high weight infants.

Ethical clearance: The blood was collected from the Al_ Batool teaching hospital after their investigation. Oral consent was taken before enrolled the patients in the study.

Source of funding: Self

Conflict of Interest: Nil

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Comparative Study between Mesh Repair Versus Mayo's Repair in Surgical Treatment of Paraumblical Hernia

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Abstract

Background: Para umbilical hernia has many causes and it is a complex process, they are most commonly found along the midline. This study aims to assess the efficacy of mesh repair in comparison toMayo'sRepair and toanalyse the complications associated with the management.

Method: The study was done in Samarra general hospital, with clinical features suggestive of Paraumbilical hernia (Minimum 30 cases each) from October 2014 to October 2016. This study not include Paediatric age group and those patients requiring emergency surgery. 30 patients underwent Mayo's repair and 30 patients underwent Mesh repair. Follow up period ranged from 2 months to 24 months.

Results: Paraumbilical hernia was found more commonly between the age of 30 years to 50 years with female: male 3:1. Most common presenting symptom was swelling with cough impulse (36 %) and reducibility present. Commonest predisposing factors were multiparty and obesity. Percentage of early postoperative complications in Mayo's repair was 18% and in Mesh repairs 6%. Percentage of recurrence following Mayo's repair was 13.3% and following mesh repair was 0%. Postoperative complications like seroma, infections were similar in both procedures (Mayo's repair and Mesh repair).

Conclusions: Prosthetic mesh repair is a technique with good post-operative outcome, low recurrent rate and Good patient satisfaction.

Keywords: *Mesh repair, Mayo's repair, surgical treatment, paraumblical hernia, Medical techniques, features suggestive.*

Introduction

Midline hernia occurring through linea Alba either superiorly or inferiorly to the umbilicus is called asparaumblical hernia.(1) Paraumbilical hernias present one of the common hernias of adulthood. Formation of Paraumbilical herniais a multifactorial and complex process they are most commonly found along the midline line a Alba. Though they are typically supra umbilical in location. Paraumbilical hernias are relatively common in adult population, more common in female with ratio of 3:1.(2) In 90%of the patient it isan acquired defect that is a direct result of increase abdominal pressure include multiparous status, obesity, older age, emphysema, asthma and other chronic lung conditions, benign prostate hypertrophy, abdominal distension, steroid use, coughing and lifting heavy weight. Para umbilical hernia is often asymptomatic or produces intermittent complaints. Discomfort or a ventral bulge is the most common initial symptom, most common content isomentum, but bowel obstruction can also be the first symptom that forces a patient to seek medical attention. Incarceration and strangulation are more common if the hernia neck defect is small. Repair of paraumbilical hernia was earlier performed bymayo's repair,but it has high recurrence rate up to 28% to 30%.(1)

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Thus it has been replaced with Mesh repair as standard procedure for paraumbilical hernia repair, it has low recurrence rate compare to Mayo's repair. Umbilical hernias are amongst the commonly occurring abdominal wall defects, not much work has been done to record the incidence. Western studies quote an incidence 4.65% among all types of hernias.(3)

The management of paraumbilical hernias remains one of the common surgical problems.(4) a number of operations are presently employed in the management of paraumbilical hernia. Hence, this study taken up to assess the efficacy of mesh repair in comparison toMayo's Repair and to analyze the morbidity associated with the management.

Method

This is a Prospective study done at Samarra General Hospital for the treatment of paraumbilical hernia from October2014toOctober2016. All the materials for this study have been taken from 60 patients who got admitted to Samarra General Hospital. Informed written consent was obtained after explaining the surgical procedure and its results.

The study criteria include, randomly selected 60 para umbilical hernia patients and excludes Patient with severe co-morbid conditions (severe cardiopulmonary disease), recurrent hernia, pediatric patients and patients undergoing emergency surgery are excluded.

Clinical history regarding duration of hernia, progression,associated complaints like pain in the swelling orabdomen, vomiting, reducibility, chronic cough, constipation, difficulty in micturition, abdominal distension-history suggestive of ascites and other causes of abdominal distension, number of pregnancies, previous surgery for same problem is collected. In local examination special attention was given to the position, size, shape, composition, cough impulse, reducibility, skin over the swelling and size of defect inlinea alba.

Pre-surgical technique Cases were prepared for surgery after preoperative correction of anemia, hypertension, diabetes and localskin conditions. All patients underwent surgical procedure after preoperative preparation. All patients received one dose of preoperative antibiotic 1 gm of 3rd generation cephalosporin during or immediately after induction of anaesthesia. The anaesthesia of choice was spinal anaesthesia with mild intravenous sedation. On operative table betadine 10%scrub given toanterior abdominal wall. Surgical procedures done were Mayo's repair and Prosthetic mesh repair. 30 patients were selected for particular procedure randomly. Patients who underwent Mayo's repair and 30 patients who underwent polypropylene mesh repair.

Surgical technique

Mayo's method

Mayo's repair

After anaesthesia patient is laid on supine position, parts painted, and drapes are applied to allow access to the umbilical area. A transverse elliptical incision is made enclosing the umbilicus and the skin covering the hernia.

It should extend laterally on each side for at least 5cm beyond the protuberance. It is deepened through subcutaneous fat until the surface of the aponeurosis is exposed. The neck of the sac is generally free from adhesions and is opened first. Before doing so, the aponeurosis is cleared centrally from all directions, until the neck of the hernia is exposed of the level where it emerges through linea Alba. A small incision is made in the fibrous coverings of the neck of any convenient point on its circumference and is carefully deepened until the sac itself has been opened. A finger is introduced and is passed round the in side of the sac to determine the presence of any adhesions. The remaining circumference of the neck of the sac is then divided with scissors, the finger being used to protect the contents from injury. The central island comprising the sac together with attached ellipse of skin and fat is now joined to the abdomen only by contents is carefully examined. If they consist of omentum, which is chaemic, it can be ligated and excised, if it is healthy, it can be reduced into peritoneal cavity. If bowel is the content, sac is opened upas far as possible. The sac is now gradually turned inside out, and contents gently peeled off its interior. Adherent omentum removed along with the sac. Adhesions between adjacent coils of intestine are released as far as possible and the hernial contents are returned to the abdominal cavity.

Mesh repair: Steps for surgery are similar to Mayo's repair till the hernial sac and its contents are managed. Polypropylene mesh is used for repair. Most commonly used size of mesh is 6" x 3".If defect is larger, larger sized mesh is used. After exposing the defect and excising excess part of hernial sac, peritoneum is closed using vicryl, mesh is placed beneath the peritoneum. It

is fixedto rectus sheath using prolene suture. Incision closed after keeping suction drain. In all patient suction drain was kept and skin closed with nylon.

Results

Paraumblical hernia is more common between 4th and 6th decade of life,more common in females (65%) than in males(35%).there is no difference in age distribution of cases between male and females age distribution in mesh is (44_70) years. Most common symptom was swelling around umbilicus,may or maynot be associated with pain. Swelling was reducible and cough impulse was present in 93% of patients. Skin changes were present in 8,5% of cases.

Table 1: Size of defect

Size of defect (cm)	Mesh	Mayo's
4	13	18
4-6 13 11	4-6 13 11	4-6 13 11
>6	04	01

Most common precipitating factor in females is multiparity 87%, next common factor is obesity is 33 %.Most common precipitating in males is smoking 62 % followed by COPD as stated in international literature paraumbilical hernia is more common in obese and corpulent women. This has been substantiated by our result. Size of defect was <4cm in 52 % of patients, between 4-6 cm in 40% of patients >6cm in 8.5% of patients.

Table 2: Complication of procedure

Complication	Mayo's repair (n=30)	Mesh repair (n=30)	Significance
Seroma	4	2	p>0.05(NS)
Wound infection	2	1	p>0.05(NS)

Diabetes mellitus (20%) the most common associated disease followed by Hypertension (16%) and Hyperthyroidism 3.33%.Most common postoperative complication were seroma-13.3% in Mayo's repair and 6.6% in mesh repair.wound infection 6.6% in mayo's repair, 3.3% in Mesh repair there is no statistical difference between mean size of defect for which mayo's repair and mesh repair was applied.

Table 3: Recurrence of the procedure.

Procedure (n=30)	Recurrence	Percentage
Mayo's	4	15%
Mesh	00	00

Size of defect for which Mesh repair was done is mean 4.88+-1.32 cm. There was one recurrence (3.33%) following 30 cases of Mayo's repair. There were no recurrence following mesh repair there is no significance in recurrence following mayo's repair and mesh repair, P value =0.2, but there is statistical trend towards the difference between procedures regarding recurrence.

Discussion

Paraumbilical hernia ismore common in patients aged between 40-60 years in this study. Youngest patient was 20 years old. It is found that paraumbilical hernia is rare after 70 years as only one patient was >70 years old in both mayo's and mesh group. Paraumbilical hernia is more common in females. Inmayo's group (n=30), 18 female 60% and 12 were male 40% and in mesh group (n=30), 21 were female 70% and 09 were male 30%. There is no significance difference in age distribution in males and females, as disease is more common between 4th and 6th decade in both sex. All 60 (100%) patients were presented with chief complaint of swelling around umbilicus, 25 (41%) patients had pain in the swelling and 8(13.3%) patients had skin excoriation along with pain and swelling.

Most of the patients had swelling for more than 6 months before they presented to hospital. Maximum duration of symptoms was 2 years and minimum duration was 1 month. Even though it was stated in literature that most of the paraumbilical hernias are irreducible or partially reducible, in this study cough impulse was present and swelling was reducible in 93% of patients. Only 4 patients had absent cough impulse and irreducible swelling. Overlying skin changes were presented in long standing cases 8 (13.3%). In females, most common precipitating factor was multiparty. Out of 40 patients 35(87.5%) were multipara. This can be attributed to stretching and weakening of anterior abdominal wall Next common precipitating factor was obesity-13 patients (33 %). Pathogenesis can be attributed to theory explained by Mayo-obesity causes downward traction on the abdominal wall bearing on a fixed point on umbilicus associated with an increase of vertical dimension of abdominal wall. [1,2] Fat penetrates muscle bundles and layers, weakens aponeurosis and favours appearance of hernia.

Other less common precipitating factors were diabetes, hypertension, chronic cough and constipation.

In males most, common precipitating factor was Smoking–13 patients (62 %) followed by COPD patients. Smoking is an important predisposing factor in development of hernia as it causes degeneration of collagen fibers. Other factors are obesity and heavy manual work. Some patients had more than one precipitating factor and some patient did not have any precipitating factor. 12 patients were diabetic, 10 patients were hypertensive, and 2 patients were hypothyroidism. These associated diseases were treated adequately before surgery; hence there was no much effect on the outcome following surgery. In this study, 30 patients underwent polypropylene meshrepair and 30 patients underwent Mayo's repair. Out of 30 patients who underwent Mesh repair, all were Inlay (preperitoneal) procedure. Although cases were randomly selected for particular surgical procedure, size of defect and age of patients has been considered. Among 30

patients who underwent mesh repair 13 patients haddefect size of <4 cm, 13 patients had defect size of 4-6cm and 4 patients had defect size of >6 cm. Mean size of defect was 4.88 cm with small defect 1.77cm. Among 30 patients who underwent Mayo's repair 18 patients had defect size of< 4 cms,11 patients had defect size of 4-6 cms and one patient had defect size of >6cm. Mean size of defect was 4.08cm with SD 1.32cm. There isno statistical difference in defect size for which Mayo's and Mesh repair has been done. In this study, most common postoperative complications were Seroma-13 % in Mayo's repair, 7 % in Mesh repair, Wound infection–6 % in Mayo's repair, 3 % in Mesh repair. No patient required removal of mesh because of infection, as infection was superficial and responded well to antibiotics. There is no significant difference in percentage of postoperative complications between Mayo's repair and Mesh repair.

In this study, out of 30 patients who underwent Mayo's repair one patient had recurrence of paraumbilical hernia (3.33%), there were no recurrence following Mesh repair.

Conclusion

Prosthetic mesh repair is a technique with good post-operative outcome, low recurrent rate and excellent patient satisfaction. It could become the gold standard in adult umbilical and paraumbilical hernia repair, in the future.

Conflict of Interest: Nil

Source of Funding: By all

Ethical Clearance: Committee members are approved to perform a study about.

"Comparative study between Mesh repair versus Mayo's repair in surgical treatment of paraumblical hernia"

After discussion of study plan with researchers:

Researchers:

- Rabah Ali Hussein
- BasimGhaib Hussein
- Jameel I. Azzawi

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The Relation between Bullying Workplace, Organizational Support, and Work Engagement as perceived by Staff Nurses

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Abstract

Aim: The present study aimed to assess the relation between bullying workplace, organizational support, and work engagement as perceived by staff nurses.

Setting: This study was conducted at Minia university hospital, and Gynecology, Obstetric, and Pediatric University Hospital.

Research Design: A descriptive correlation comparative design was utilized to achieve the objective of the present study.

Sample: All nurses who accepted to cooperate in this study at the time of data collection were included (N=300) from Minia university hospital and from gynecology, Obstetric and Pediatric University Hospital.

Tools: The following instruments were used: Bullying workplace was developed by(15) II: (8)developed organizational Support questionnaire III: Work engagement questionnaire was formed by(16).

Results & Conclusion: The conclusions of the current study showed that there signified an adverse correlation between perception of nurses' regarding bullying workplace and organizational support plus work engagement (R=.461-**), (R=.265-). Finally, work engagement and perceived corporate support positively correlated (R=.298).

Recommendations: The organization should encourage nurse supervisors to use practical communication skills and support for nurses' staff, which helps to reduce workplace bullying.

Keywords: *Bullying workplace, Perceived organizational support, Work engagement, Staff nurses.*

Introduction

Motive, assurance, and maintenance of staff nurses have developed as concerns of meaningful interest for healthcare providers.(1) Every day nursing duties are physically and emotionally requiring and depend not so much on regulated rules but situational bases.(2) The essence of the work in the healthcare organizations entails nurses to be sincerely interested in their work performances and voluntarily go beyond the call of their duty.(3) Workplace bullying (**WPB**) is perceived as a severe problem in the nursing profession. **WPB** has been designated as repeated behaviors directed at one or more workers that create embarrassment, offense, and distress, and that may interfere with job fulfillment such that the contradictory effects may lead to an unpleasant working environment.(4)

The healthcare sector may very well be a model of a set at significant risk of **WPB**, **WPB** becomes a severe negatively affects both, organizations and individuals., for an organization, this may result in the raised rate of absenteeism, which then negatively influences productivity, efficiency, and profitability. The repeated exposure to negative behavior at work may lead to a depletion of coping resources, thus preventing

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the individuals' ability to cope with daily work tasks, in addition, it may increase operator turnover affecting the health care organization financially as novice staff recruitment and retraining is a costly process.[5] **WPB** can results in various adverse consequences for individuals,, including distress, tension, irritation, marks of trauma, and diminished interpersonal functioning. Additionally, it may lead to lower levels of self-confidence and lower levels of contentment with life. Studies indicate that not only victims of **WPB** but also the individuals who observed it had raised levels of tension.[6]

Receiving support from an organization directs staff nurses to be more productive and more committed to duty.[7],[8] represented the construct of perceived organization support (POS) as workers 'global expectations concerning the degree to which the health care organization values their contributions and cares about their well-being'.[9] POS one of the core concepts that have a considerable impact on organizational, it affects all regulatory policies. Creating appropriate work conditions, Supervisor assistance, appropriate rewards, and justice in the workplace that are individual values leads to the improvement of one's self-esteem, hope, and personal growth of employees. Appearing in the existence of physical, mental, emotional, and spiritual well being.[9][10]advised that supporting from an organization is returned to worker and employer in terms of a better level of staff production, job pleasure, and condition of patients' care. Highly perceived level of organizational support may aid to revive the equilibrium between the benefits awarded by the organization plus the benefactions of the individual.[11]enlightened that organizational support considers one of the great predictors to discriminate low and high accomplishing employees.

Work engagement refers to a convinced work-related state of thought that is designated by dimensions of vigor, dedication, and absorption and trust and results in more reliable, cost-effective patient outcomes.[12]" Work engagement has been linked to numerous affirmative organizational consequences such as job satisfaction, job completion, organizational commitment.[11] Given these positive outcomes, nurturing work engagement is of famous value for health care organizations, particularly in a setting where workplace bullying might be at action. Employees who are engaged in their work can work long hours and put their hearts into their practice.[13] According to the studies by[14] which exhibited that job sources are combined with engagement in work include social support from supervisors, feedback for one's performance, autonomy and opportunity for learning.

Significance of the Study: The study is significant because workplace environments and the dynamics that exist within them affect everyone involved, especially coworkers, and to provide further evidence on the implications of **WPB**. **WPB** has been linked to many unfavorable outcomes that can be very costly to organizations. On another hand, other studies have suggested, work engagement is a vital component for a healthy work environment, and workplace bullying is a significant, unresolved problem that affects workers and neighboring bystanders. Therefore, It is, necessary to examine how **WPB** affects the work environment and how these concepts are interrelated. So from the researcher's point of view, it is essential to investigate the concept under investigation to identifies the means of retaining, engaging, and supporting ways to facilitate engagement and unusual behaviors for staff nurses. Therefore the following study will be conducted to assess the relation between bullying workplace, organizational support, and work engagement as perceived by staff nurses.

Subjects and Method

The study aim: The present study was offered to assess the relation between bullying workplace, organizational support, and work engagement as perceived by staff nurses.

Research question: What is the relation between bullying workplace, organizational support, and work engagement as perceived by staff nurses?

Research Design: A descriptive correlation comparative design was utilized to achieve the objective of the current study.

Sample: All staff nurses who agreed to cooperate in the study at the point of data collection were included. The total number was (n=300) staff nurses divided into (175) nurses from Minia Hospital and (125) staff nurses from Gynecology, Obstetric and Pediatric University Hospital

Setting: The current study was conducted at Minia university hospital and. Gynecology, Obstetrics, and Pediatrics University Hospital within these hospitals include critical care units, medical units, surgical units, and kidney dialysis units, obstetric units, and plastic surgery units.

Tools for data collection:

To reached the aim of the current study, data were collected using four tools:

a. **Personal data questionnaire:** This developed by the researchers to collect data such as marital status, age, qualification, plus years of experience.

b. **Bullying workplace questionnaire:** Developed by the[15], it composed of (22) items which operates on five possible answers (1) never, (2) occasionally, (3) monthly, (4) weekly, and (5) daily referring to contrary acts and it is based on the frequency an individual experiences negative behaviors which relate to workplace bullying. Cronbach's coefficient alpha was .95

c. **Perceived Organizational Support Scale:** Evolved by[8] It consisted of (33) items to value levels of recognized organizational support among nursing staff about their settings. Responses ranged from (1) strongly disagree to (5) strongly agree. Cronbach's alpha coefficient was.91

d. **Work engagement questionnaire:** was formed by[16] It consisted of (17) items using the 5-responses Likert scale, ranged from (1) strongly disagree to (5) strongly agree. And Cronbach's coefficient alpha was .92.

Tools validity and Reliability

Validity: Study tools content validity was established through a jury of three specialists, two professors and one assistant professor from the Faculty of Nursing Miniauniversity. Each expert on the group was asked to examine the instrument for content, coverage, clarity, wording, length, format, and overall appearance.

Reliability: The reliability test was measured utilizing Cronbach's Alpha Coefficient for the three tools which indicate that questionnaires were highly reliable. Test results for the inquiries workplace bullying, organizational support, and work engagement were (0.86, 0.79, and 0.84), respectively.

The pilot study: The pilot study was conducted on (10%) from the current sample to ensure the clarity and applicability of the items, and to estimate the time needed to complete the questionnaire. The result showed that the time spent in filling the survey was ranged between 25-30 minutes. Based on the pilot study analysis, no modifications were done in the questionnaires. So the number of the pilot study was included in the total number of the study sample.

Procedure:

- Official permission was obtained from the director of the hospitals after explaining the nature of the work.
- The researcher explained the aim, quality, and significance of the study for every nurse to get better cooperation during the implementation phase of the research
- Oral consent was obtained from each participant in the research after clarifying the scope of the study
- During data collection, the researcher handed the questionnaire sheets individually to the participant nurses in their units, then the investigator told the questionnaire sheets to them and asked them to fill it.
- The time spent to fill the questionnaires ranged between 25 to 30 minutes.
- The researcher waited until the participants completed the sheets and were ready to answer any question.
- After completion of filling the questionnaire sheet, the researcher collected them. Data were collected in a period of nearly two months from March to April 2019

Statistical design: Data entry and statistical analysis were done using computer software the statistical package for social studies (SPSS), version 21. Suitable descriptive statistics were used, such as frequencies, and percentages for qualitative variables, means, and standards deviations for quantitative variables. The correlation coefficient (r) test was used to estimate the closeness association between variables. For all the criteria used, statistical significance was considered at p-value <0.05.

The Finding:

Table (1): Distribution of staff nurses personal data characteristics (No =300)

Personal data	N= (300)				
	No	%	Personal data	No	%
Age			**Marital status**		
18-28	74	24.7	Single	57	19
29-39	121	40.3	Married	207	69
40-50	68	22.7	Divorce	18	6
·<50	37	12.3	Widowed	18	6
Sex			**Qualifications**		
Male	72	24	Diploma	128	42.7
Female	228	76	Institute	136	45.3
			Baccalaureate	36	12
Years of experience					
1-10	114	38	21-30	66	22
11-20	104	34.7	>31	16	5.3

Table (1), More than one third (40.3%) between 29-39 years, more than three quarter (76%) of them were females, more than half (69%) were married, less than half (45.3%) of them had technical degree of nursing and more than one thirds(38%) had 1-10 years of experience.

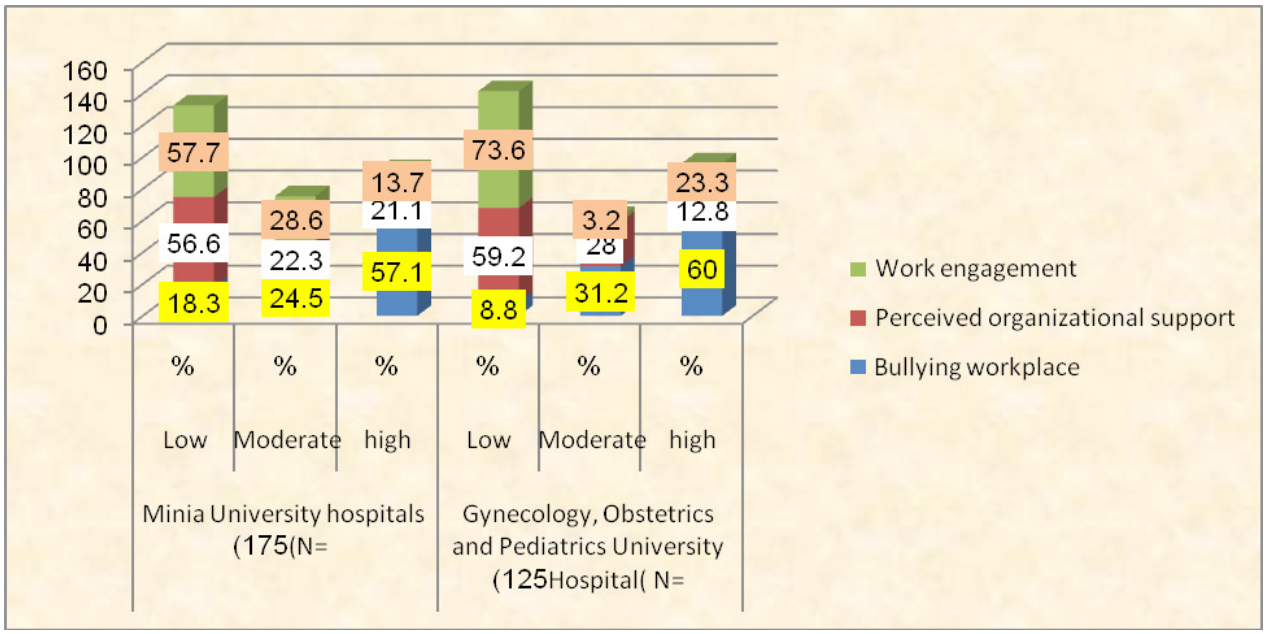


Figure (1): Percentage distribution regarding staff nurses perception of the studied variables (n = 300)

Figure (1), About sixty percent of staff nurses from the two Hospitals had the highest percent regarding perception toward bullying workplace (60%, 57.1%), in addition, the majority of staff nurses from two hospitals had low percentage regarding perceived organizational support by percent (59.2%,56.6%). Also, they have a little interest regarding perception toward work engagement by percent (73,6%),(57.7%) sequentially.

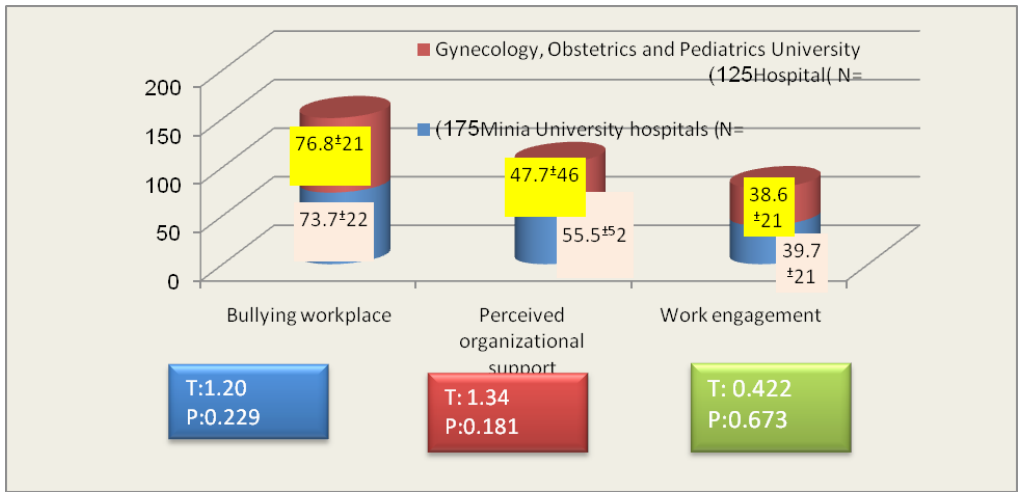


Figure (2): Analysis of variance among hospitals regarding staff nurses perception of bullying workplace, organizational support and work engagement (n = 300)

Figure (3), there was no statistically significant difference between the two hospitals in bulling workplace and organizational support, and work engagement.

Table (2): Correlation between staff nurses perception of bullying workplace,organizational support and work engagement (n = 300)

Variable	Bulling workplace	
	R	P
Organizational support	.461-**	.000
Work engagement	.265-	.000

Table (2),there was a negative correlation between staff nurses' perception of bullying workplace and organizational support (R=.461-**) besides where a negative correlation between staff nurses' knowledge of bullying workplace and work engagement (R=.265-).

Table (3): Correlation between staff nurses perception of Perceived organizational support and work engagement (n = 300)

Variable	Work engagement	
	R	P
Perceived organizational support	.298**	.008

Table (3) showed a positive correlation in work engagement and perceived organizational support(R=.298).

Discussion

The current study revealed that the majority of staff nurses from Minia University Hospital and Gynecology, Obstetric and Pediatric University Hospital had the highest percentage regarding their perception toward bullying workplace, and more than half of them from two hospitals had the lowest rate regarding their opinion toward organizational support and work engagement. From the researcher view of point, this result might be due to absence or lack of support from their organization which leads psychological problems of staff nurses such as distress, anger, anxiety, embarrassment, discouragement, feelings of inadequacy, hopelessness, depression, burnout, and lower job satisfaction all psychological problem affected negatively on work outcome which results poor performance, and staff nurses not engaged with their work.

This supported by the point of view of [17]which stated that staff nurses who are bullied in their workplace always evolve psychological side effects like stress disorder, anxiety, depression, and insomnia, all of that could result in poor work performance. Also, another author, [10]added that employees who gain organizational support would have more involvement and stronger feelings of faithfulness and allegiance towards the organization, which leads to employee engagement. Also[18] demonstrated that nurse's exposure to bullying workplace was highly related to somatization, depression, anxiety, and negative affectivity among victims of bullying, and fear among those who witnessed the bullying behavior.

Besides this current study explored that, there was no statistically significant difference between two hospitals in bulling workplace and organizational support, and

work engagement. The interpretation from the researcher view of point, this result might emphasizes that, the head nurses followed autocratic style in their leadership, and the most of the head nurses like to take the final decision-making authority within their department because they believe if they didn't do that they can be lost their control on staff nurses; and they may do not have enough experience in management, and they didn't have enough training program on leadership and how to lead staff members.

These findings were consistent with the work of the [17]which concluded that autocratic leaders have absolute power over their subordinates and the latter have little opportunity to make suggestions, Also this result confirmed by a study conducted by[19] which reported that most of the study subjects had autocratic style, and there was a connection between bureaucratic, authoritarian, and authority compliance management styles that followed an autocratic leadership style.

In addition this finding may be due to, that a result of the shortage in the nurses numbers in the hospitals and lack of training programs, and poor hospital environment in which this increase the workload for the nurses; and thus lead to reduce their ability to cope with daily challenges; and ability to deal with recent technology which reduce their job performance efficiency. This was inconsistent with[20] that there is a remarkable significant negative correlation between job stress and work overload which affect job performance efficiency; as when there are work overload and tension in the work environment; the employee affected physically and psychologically and thus consequently decrease their job performance efficiency.

The current study illustrated that there was a negative correlation between nurses' perception of bullying workplace, organizational support, and work engagement (R =.461-, R =.265-). From the researcher's view of point, this result might due to; the bullied employees are less likely to have their fundamental psychological demands (i.e., autonomy, relatedness, competence) met and therefore lost their inherent motivation to be engaged with their profession. They also may have a lack of support from their supervisors and first-line managers, which results in a negative work environment (poor performance, low quality of patient care). This agreement with[21] stated that nurse managers who have the stability of organizational support and work engagement promote a work environment conducive to an excellence culture. So, this healthy work environment fosters quality care, patient security, and staff retention. Also, this result was congruent with[22] which found that bullying workplace was negatively related to organizational support, assistance and work engagement.

Finally, the finding result of the present study indicated that there were a positive correlation among work engagement and organizational support (R=.298). This result was supported by[23] stated that there was a strong correlation between staff nurses' perceived organizational support, work engagement. Also, this was congruent with[24], detected a meaningful association between recognized organizational support and work engagement and appointment.

Also[17] added that employees who gain organizational support would have more involvement and stronger feelings of faithfulness and allegiance towards the organization. This led to employee engagement and proved that there is a meaningful and positive correlation between perceived organizational support and employee engagement.individuals will be motivated to match their obligations and kept fully engaged at work when there is recognized organization support–empirically demonstrated organizational support is an antecedent to work engagement. Moreover, work engagement is critical because recent research findings suggest that engaged employees practice: happiness, joy, and enthusiasm, good physical and psychological health, and better job performance, increased the ability to create jobs and different personal capacity and capability to transfer their engagement to others.

Conclusion

The findings of the current study affirmed that the majority of staff nurses from the two hospital had the highest percentage regarding their perception toward bullying workplace, and more than half of them from two hospitals had the lowest rate regarding the understanding of organizational support and work engagement.

Also, there were a negative correlation between the perception of staff nurses' toward bullying workplace and organizational support and work engagement. Finally, work engagement and perceived corporate support positively correlated.

Recommendations:

- Hospitals should create a supportive practice

environment within the implementation of policies, anti-bullying, and continuous training programs.

- The organization should encourage nurse supervisors to use practical communication skills and support for nurses' staff, which helps to reduce workplace bullying.

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Socioeconomic Disparities in Hospital Utilization among Elderly People in Indonesia

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Abstract

The pattern of diseases in the elderly people usually is degenerative diseases which often catastrophic and high cost. Unfortunately, a large financial intervention is often having the wrong target, precisely because of the more utilized by high socio-economic groups. This article is devoted to an analysis of hospital utilization disparity based on the socioeconomic status on the elderly in Indonesia. The data processed from the 2013 Indonesian Basic Health Survey (Riskesdas) with a sample size of 199,653 elderlies. Estimation by using multinomial logistic regression test used to explore the disparity between socioeconomic characteristics of the elderly in hospital utilization. Quintile 1 likelihood 0.355 times utilizing hospital outpatient than quintile 5 (OR 95% CI; 0.355 0.302-0.418). Quintile 1 likelihood 0.414 times utilizing hospital inpatient than quintile 5 (OR 95% CI; 0.414 0.366-0.468). Quintile 1 likelihood 0.247 times utilizing outpatient inpatient at once than quintile 5 (OR 95% CI; 0.247 0.184-0.332). The better the socioeconomic status is getting better the hospital utilization of the elderly.

Keywords: *Elderly, socioeconomic disparities, hospital utilization, Indonesia, inpatient-outpatient.*

Introduction

The elderly is one of the groups that are vulnerable according to the attention of the World Health Organization (WHO). Other vulnerable groups are children, pregnant women, people who are malnourished, and people who are ill or impaired immune[1]. The elderly is getting increase and require more attention as an impact of the development of better health. Indonesia's population dynamics also shifted towards the population elderly groups. As evidence is the life expectancy in Indonesia that is continually increasing. The year 2010 life expectancy 69.81 years. The number then rose to 70.90 years (man 69.09 years, women 72.8 years) in 2016. Life expectancy 70.90 years showed that babies born in the year 2016 can live up to 70 years of age[2].

The dynamics of population shifts to the elderly age group also promoted the shift pattern of the disease. The pattern of disease that often follows the elderly is a type of degenerative diseases that often this type of the catastrophic disease. The types of diseases that topped a catastrophic, that disease absorbs the high cost, are the heart, stroke, diabetes, kidney, cancer, hepatitis, leukemia, hemophilia, Thalassemia[3]. Unfortunately, the financial intervention of the catastrophic disease is often the wrong target, because of more utilized by high socioeconomic groups[4]. Elderly people on low incomes have more diseases, which more require medical care than their counterparts who are higher income earners[5].

The claim type of catastrophic disease seized a considerable amount of the share of the budget of the National Health Coverage (JKN). The year 2017, one-half of the costs spent on catastrophic disease has reached IDR 12.7 trillion or equivalent 24.81% of total hospital

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costs that are claimed to Social Security Administrator (BPJS)[6].

Based on the description of background then the writing of this article is devoted to the analysis of hospital utilization disparity based on the socioeconomic status on the elderly in Indonesia. The results of this research are important for consideration of equitable health care on the elderly in Indonesia.

Method

The analysis unit in this study was Indonesian citizens aged 50 years and over. The sample size in this research paper was 199,653 elderly respondents. The processed data comes from the 2013 Riskesdas. Riskesdas was a national scale survey conducted by the Ministry of Health.

The hospital utilization was public utilize to the hospital, whether it did an outpatient or inpatient. Limits on outpatient variables were hospital utilization one last month. Limits on inpatient variables were hospital utilization one last year. Assuming the use of these time restrictions due to respondents could still remember well the events of outpatient or inpatient.

Chi-Square was used for the dichotomous variable and the t-test for continuous variables. This test is used to assess whether there was a difference between the elderly's socioeconomic statistically significant. Estimation used multinomial logistic regression test used to study the influence disparity between socioeconomic characteristics of the elderly in hospital utilization and to check the level of his significance.

Findings: The chi-square test results showed that there were differences between each of the elderly's socioeconomic status at hospital utilization, which was confirmed as statistically significant. In proportion, the better socioeconomic status (getting rich), then the better hospital utilization. This condition applies to all categories of hospital utilization, both in outpatient, inpatient, and outpatient inpatient at once.

The chi-square test results also showed that the very poor elderly more living in a rural area. Contrary, the very rich elderly more living in an urban area. Based on the gender of the elderly is dominated by women. However, the difference is thin, and this was confirmed with no significant gender differences on each quintile. The education level indicated directly proportional to socioeconomic. Based on the type of work, the poor elderly (quintile 1 and 2) are dominated by those who worked as a farmer/fisherman/labor, while the rich elderly (quintile 3-5) dominate those who don't have jobs. When viewed on the category of insurance ownership, the elderly is already more than half which have insurance.

The T-test results shows that those who are on quintile 1 have an average age of older (61.82 years) compared to the elderly who have the quintile 5 (58.99 years).Overall, only gender variables that show no significant relationship with hospital utilization in the elderly in Indonesia

Table 1: Multinomial Logistic Regression of Indonesian Elderly Hospital Utilization using the 2013 Riskesdasdata

Predictor	Outpatient			Inpatient			Outpatient + Inpatient		
	OR	Upper Bound	Lower Bound	OR	Upper Bound	Lower Bound	OR	Upper Bound	Lower Bound
Age	1.017*	1.012	1.021	1.020*	1.017	1.024	1.025*	1.018	1.032
Socioeconomic: quintile 1	0.355*	0.302	0.418	0.414*	0.366	0.468	0.247*	0.184	0.332
Socioeconomic: quintile 2	0.536*	0.471	0.610	0.621*	0.560	0.688	0.497*	0.401	0.617
Socioeconomic: quintile 3	0.682*	0.611	0.762	0.777*	0.708	0.853	0.631*	0.523	0.760
Socioeconomic: quintile 4	0.904*	0.824	0.991	0.902*	0.828	0.984	0.909	0.777	1.064
Area: Urban	1.544*	1.420	1.679	1.146*	1.072	1.226	1.369*	1.189	1.576
Marital Status: single	0.823*	0.580	1.168	0.663*	0.476	0.925	0.766	0.392	1.500
Marital Status: married	1.142*	1.040	1.254	1.171*	1.084	1.266	1.400*	1.189	1.649
Education: primary school and under	0.500*	0.434	0.575	0.928	0.799	1.077	0.586*	0.460	0.747
Education: junior high school	0.774*	0.664	0.902	1.052	0.894	1.238	0.802	0.613	1.049

Predictor	Outpatient			Inpatient			Outpatient + Inpatient		
	OR	Upper Bound	Lower Bound	OR	Upper Bound	Lower Bound	OR	Upper Bound	Lower Bound
Education: senior high school	0.868*	0.761	0.991	0.980	0.844	1.138	0.887	0.701	1.124
Work: No work	1.522*	1.263	1.835	1.504*	1.273	1.777	1.455*	1.076	1.968
Work: Public servant/ army/police	1.121	0.895	1.404	1.098	0.878	1.374	0.664	0.446	0.988
Work: Employee	0.887	0.685	1.149	0.996	0.784	1.265	0.941	0.619	1.430
Work: Entrepreneur	0.963	0.783	1.184	1.067	0.888	1.282	0.766	0.542	1.082
Work: Farmer/fisherman/labor	0.795*	0.650	0.972	0.904	0.760	1.075	0.637*	0.457	0.887
Insurance: Not insured	0.301*	0.251	0.362	0.552*	0.448	0.680	0.300*	0.216	0.418
Insurance: Askes, Jamkesmas, Jamkesda, Jamsostek	0.636*	0.535	0.755	0.856	0.697	1.051	0.751	0.551	1.025

Note: The reference category was "no utilization"; 95% Confidence Interval for OR; *Significant at level 95%.

Table 1 is the multinomial logistic regression test results to detect hospital utilization disparity between elderly in Indonesia. Selected as a reference category "no utilization". Table 1 shows the significant disparity between socioeconomic at elderly that utilizes the outpatient or inpatient. Table 1 shows the better socioeconomic then the better hospital utilization of the elderly. This condition applies to all utilization. Quintile 1 likelihood 0.355 times utilize hospital outpatient than quintile 5 (OR 0.355; 95% CI 0.302-0.418). Quintile 1 likelihood 0.414 times utilize hospital inpatient than quintile 5 (OR 0.414; 95% CI 0.366-0.468). Quintile 1 likelihood 0.247 times utilizing outpatient inpatient at once than quintile 5 (OR 0.247; 95% CI 0.184-0.332). The results of this research are consistent with several studies in various countries. A study in Brazil found that the elderly who have a socioeconomic good have better access than the elderly with low socioeconomic[7]. Similar results were also obtained with research in South Africa[8], Rwanda[9], Europe[10], Bangladesh[11], and USA[12].

Based on Table 1 it can be known that the elderly in the urban has a better utilization compared to the elderly who live in rural. The elderly in urban likelihood 1.544 times more utilize than rural (OR 1.544; 95% CI 1.420-1.679). Based on the categories of marital status, the elderly with "divorce" status (as reference) has a better utilization than the single, but lower than are married. Comparing an urban area with rural in the hospital utilization are also carried out by researchers in several countries. A study in Brazil found that the elderly living in urban had better access than the elderly who live in rural[7]. The same conclusion is also produced in several studies in China[13], Ethiopia[14], Taiwan[15], USA[16], Egypt[17], and India[18]. Better transportation in urban areas is predicted to contribute to hospital utilization.

Based on the level of education, the better education level means the better in hospital utilization for the elderly. Elderly with no passed primary school is likelihood 0.500 times utilize the hospital outpatient than elderly with a college education (OR 0.500; 95% CI 0.434-0.575). A better level of education is closely related to the ability to receive better information, and end up with the utilization of better service anyway[19]. Based on the work type, the not working elderly have a better hospital utilization than elderly who worked on another's category. This condition applies to all categories of hospital utilization. The possibility is the elderly who do not work is the poor that covered by Government insurance.

Table 1 shows good consistency on ownership categories of insurance, especially in outpatient utilization. The elderly who have a Government-run insurance has better utilization than who have no insurance. The elderly who have a private-run insurance better than the elderly who have a Government-run insurance. This is in line with a research in China that aimed at studying the impact of access repair through elderly insurance that found positive results. Proven that the elderly have better access to health services[20,21]. The same study also was done in five African countries (Ghana, Nepal, Sierra Leone, Zambia, and Zimbabwe), and the results show the same impact[22]. Although there are other studies in low-and middle-income countries that have different results[23].

Conclusion

It can be concluded that the socioeconomic status of the elderly is directly proportional to the utilization of hospital services in Indonesia. This condition applies to all services provided by the hospital. The better the socioeconomic status, the better the hospital utilization of the elderly.

Ethic and Consent: The 2013 Riskesdas had an ethical clearance that was approved by the national ethical committee in the NIHRD (ethic number: 01.1206.207). Informed consent was used during data collection, which considered aspects of the data collection procedure, voluntary, and confidentiality.

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To Compare and Determine the Presence of Voids in Calcium Hydroxide, Epoxy Resin, and Tricalcium Silicate when Used as a Sealer in Single Cone Obturation Technique- An in Vitro Study

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Abstract

Aim: The purpose of this study was to evaluate and compare the area of voids in calcium hydroxide, epoxy-resin and tricalcium silicate-based sealers when employed with single cone obturation technique.

Materials and Method: Fifteen extracted single-rooted mandibular premolar teeth were cleaned and shaped and divided into three groups according to the three different sealers used. Single cone obturation was done using gutta-percha and three sealers: Sealapex, AH Plus, and Bioroot RCS sealers, respectively. These teeth were decoronated at the cementoenamel junction and the roots were sectioned at apical, middle, and coronal third, and a stereomicroscope was used to assess the area of sealer voids and digital images were taken and was analyzed by image J software. The results were statistically analyzed using SPSS software and Kruskal–Wallis and Mann–Whitney tests.

Results: All three groups showed voids in all the sections. Significant differences were found between these sealers regarding their section wise area of voids ($P < 0.05$). Similarly, there were significant differences in their overall area of voids ($P < 0.05$) with AH Plus showing significantly least area of voids followed by Sealapex.

Conclusion: Single cone obturation with AH Plus showed least mean area of voids, whereas Single cone obturation with BioRooot RCS had significantly the most mean area of voids.

Keywords: *Sealapex, AH Plus, BioRoot RCS, voids, single cone obturation, stereomicroscope.*

Introduction

The three-dimensional obturation of the root canal system is one of the foremost necessary steps in endodontic treatment which remains as a challenge in the root canal procedure and affects the long-term successful prognosis[1]. Gutta-percha itself cannot completely seal the canal. Hence,the homogeneity of root fillings must be enhanced by using root canal sealers in conjunction with gutta-percha to fill the irregularities and minor

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discrepancies between the core filling material and canal walls, thus reinforcing remaining tooth structure[2,3].

The single cone (SC) obturation technique comprises packing the canal with a single gutta-percha cone employed with sealer in which its thickness varies depending on the fit of the single cone to the walls of the canal. Since spreader is not used with SC obturation, the risk of damaging dentin is totally reduced. As a result of the quantity of sealer needed in SC obturation is larger than the quantity of sealer necessary for many compaction techniques, a spare volume of a dimensionally stable sealer ought to be placed into the canal[4].

The standard of the ultimate root canal filling directly depends on the properties of root canal sealers, where they assist to resolve the periapical pathosis by preventing microleakage, thus reducing the likelihood of residual microorganisms from apical percolation. An ideal root canal sealer should have sufficient working time and when set should provide an excellent seal with the canal walls[5].

Studies conducted by Ingle and Beveridge concluded that the bulk of endodontic failures occur principally due to microleakage which results from incomplete sealing of the root canal. Thus, the sealers which produce a fluid-tight seal between the root canal system and the periapical tissues must be promoted to use. Aside from glass ionomer cement-based sealers, none of the sealers have the flexibility to bind chemically to canal walls. The smear layer produced on the root canal walls should be eliminated from the root canal walls for the better penetration of sealers into tubular dentin, which successively reduces the microleakage[6].

It might be fascinating to use a sealer which can stimulate hard tissue formation and it is well established that calcium hydroxide stimulates the healing of periapical tissues and induces hard tissue formation. Sealapex (Kerr Sybron, Romulus, USA) is a calcium hydroxide polymeric based non-eugenol root canal sealer. It is composed of calcium hydroxide, sulfonamide, zinc oxide, zinc stearate, colloidal silica, barium sulfate, resin, isobutyl salicylate, colloidal silica, titanium dioxide, and iron oxide and sets in about 40 minutes[7].

AH Plus (Dentsply, Konstanz, Germany), a well-known epoxy-resin sealer had overcome the disadvantages of formaldehyde release and extended setting time of AH 26 sealer. It consists of two paste system, Paste A consists of Bisphenol A epoxy resin base, while Paste B consists of Dibenzydiamine as catalyst[7]. AH Plus has comparatively short setting time, low solubility, and high tissue compatibility. AH Plus demonstrated good sealing and adaptation properties[8].

Bioroot RCS, a tricalcium silicate-based hydraulic sealer has been introduced recently. It is available as powder/liquid combination, in which the powder comprises tricalcium silicate, zirconium oxide, and povidone; whereas, the liquid consists of polycarboxylate and calcium chloride. Since the tricalcium silicate phase is bioactive, it is popular today. It induces hard tissue deposition and has lower cytotoxicity than alternative standard root canal sealers and has antimicrobial activity[9]. However, the impact of Bio Root RCS sealer voids in single-cone obturation has not been evaluated much. Therefore, this *in vitro* study was conducted to determine and compare the presence of voids in Sealapex, AH Plus, and Bio Root RCS sealers when employed with single cone obturation technique.

Materials and Method

The study was done after obtaining clearance from the ethical committee. Fifteen single-rooted human mandibular premolar teeth extracted for periodontal or orthodontic reasons were used as samples in this study. Access opening was done and the working length was determined by subtracting 1 mm from the inserted no: 15 K file which was just visible through the apical foramen. Pro Taper Gold (Dentsply Maillefer, Ballaigues, Switzerland) Ni-Ti rotary files were used in the crown down technique up to size F3 to clean and shape the root canals. Sodium hypochlorite (5.25%), 17% EDTA and saline were used as irrigants.

The prepared teeth were randomly divided into three groups, with five teeth in each group (n = 5), for single cone obturation using different sealers as follows:

Group	Sealer used	Manufactured
A	Sealer sealapex	Kerr Sybron, Romulus, USA
B	Sealer AH Plus	Dentsply, Konstanz, Germany
C	Bioroot RCS	Septodont, Saint Maur Des Fosses, France

The groups were then obturated by single cone technique using the corresponding F3 sized Pro Taper Gutta-percha cone (Dentsply, Switzerland) with tug back along with their root canal sealers respectively. In order to ensure the complete set of the sealers, all the

obturated teeth were stored in 100% relative humidity at 37° for 7 days. Then, decoronation of all these samples were done at the cementoenamel junction, and the roots were marked with shallow cuts on the buccal and lingual aspects at an approximate level of 1 mm, 4 mm, 8 mm, and 12 mm from their apices using a diamond disc. A total of 15 sectioned samples were obtained in each group by sectioning of the roots through the marked cuts with a chisel. Thus, apical, middle, and coronal third sections, each with an approximate thickness of 3 ± 0.5 mm, were obtained from a single tooth.

Each sectioned sample was observed using a stereomicroscope with a magnification ×40 and digital images were taken. Image J software (National Institutes of Health, Bethesda, MD, USA) were used to analyze the images for calculation of the area of voids. The results were statistically analyzed using SPSS software (version 15, SPSS Inc, Chicago, IL, USA) and Kruskal–Wallis and Mann–Whitney tests.

Results

All sealers showed voids in all the sections, but AH Plus sealer showed least voids in apical, middle and coronal third among all the sealers and had a least overall mean area of voids. Single cone obturation with Bioroot RCS sealer also showed a lesser area of voids in the apical and middle sections and greatest overall mean area of voids when compared to those with Sealapex sealer. The differences in mean area of voids between Sealapex and AH Plus sealers in the middle and apical section were significant ($P < 0.05$).Section-wise mean area of voids in the sealer is demonstrated in table 1.

Table 1: Mean area of voids in mm^2

Section	Groups	No of samples (n)	Mean area of voids±SD (mm^2)
Coronal	Sealapex	5	.0272±.0278
	AH plus	5	.0094±.0097
	Bioroot	5	.0388±.0245
Middle	Sealapex	5	.0154±.0099
	AH plus	5	.0024±.0028
	Bioroot	5	.0068±.0044
Apical	Sealapex	5	.0080±.0050
	AH plus	5	.0016±.0020
	Bioroot	5	.0064±.0048

Table 2: Comparison of the groups using Kruskal-Wallis

	Coronal	middle	apical
Kruskal-wallis	3.624	6.006	5.188
p value	.163	.050*	.075

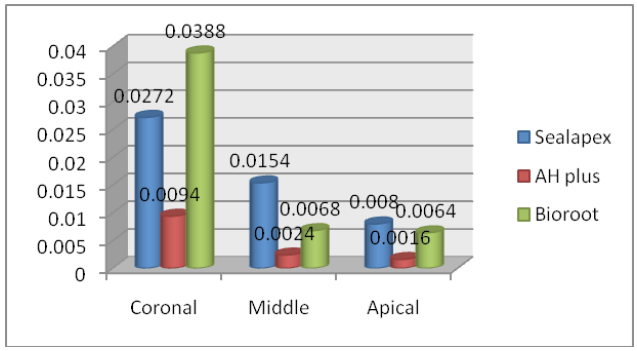
*significant

Table 3: Post-hoc test using Mann-Whitney

	Coronal	middle	apical
Sealapex v/s AH plus	0.24	0.020	0.026
Sealapex v/s Bioroot	0.53	0.20	0.67
AH plus v/s Bioroot	0.059	0.116	0.113

p value significant at 0.05/3 =0.016

Graph 1 shows the mean distribution of voids among all the groups.



Graph 1: Mean area of voids

Discussion

Single cone obturation of the straight root canals with a tapered gutta-percha master cone that matches the shape of nickel-titanium rotary instruments eliminate complete bacterial penetration effectively and reduces chairside time. Since the adaptation of a single cone to the canal walls depend on the quantity and property of sealer used, the area of voids in the sealer should be least to prevent microleakage[1].

Single cone obturation technique, the most frequently used root filling technique was selected for use in the present study, due to its simplicity and it is less operator-dependent and time consuming when compared to other root filling techniques. The ability to create a tapered circular preparation, as well as the shape of the canals, determine the quality and use of single cone gutta-percha points[10].

In this study, there have been significantly fewer sealer voids and better seal of the root canals was found

in the canals obturated using the epoxy-resin sealer, AH Plus when compared with calcium hydroxide and tricalcium silicate-based sealers. This study was in agreement with certain studies (Viapiana et al, Siboni et al)[2,9]. Adhesion to the root canal dentin of epoxy-resin based sealers are high and they penetrate deeper into the dentinal tubules. Their creep capacity and period of prolonged polymerization allow their better penetration into the micro-irregularities (Topcuoglu H S et al)[3]. Presence of resin in the sealer explains its better flow. The superior adaptation of AH Plus to the root dentin can be explained by their chemical bonding to dentin by forming covalent bonds between the collagen and the epoxy resin (Arikatla S K et al)[12]. This difference could also be related to sealer properties as BioRoot RCS has a shorter working time and less flow than AH Plus[2].

The AH plus penetrated completely in the dentinal tubules in the coronal, mid-root and apical region, whereas the sealer penetration pattern of Bio Root RCS was different to that of AH Plus. Tricalcium silicate-based sealers may enhance the seal of the root fillings due to their biological activity. Biomineralization may be potentially induced due to their interaction with dentin fluid. Thus, the mineral plugs form within the dentinal tubules enhances the biological activity within the root canal (Viapiana et al)[2].

Sealer voids on the apical third of all groups were less when compared to the middle and the coronal third, whereas it was significantly higher on the coronal third of Bioroot RCS. The hydrophilic nature of Bioroot RCS had produced greater porosity and solubility values. Since AH Plus is a hydrophobic material, they do not adsorb water; and therefore, their porosity and solubility values are significantly reduced than for the tricalcium silicate-containing materials. High Ca2+ and OH^{-} release in Bioroot RCS resulted in their high values of voids (Siboni F et al)[9].

A calcium-hydroxide based sealer, Sealapex, which is a paste-paste preparation was selected for this study, as it improves the biological properties and guarantees a proper seal to the root canal system. Voids with sealapex sealer were more when comparing with AH Plus sealer and were less comparing with Bioroot RCS sealer. Our findings are supported by Janavathi et al, who found better results with AH plus than Sealapex. Vasconcelos et al, in their study, have shown that initially, Sealapex had presented with good sealing ability, then the sealing was found very poor after being stored in water for an extended time. Initially produced satisfactory results may be related to the volumetric expansion of sealapex while setting due to water sorption caused by calcium oxide in the sealer; whereas the sealer dissolution over time explains the later sealing ability loss. The rapid, but limited release of hydroxyl ions may be related to the disintegration and solubility of the sealer and in an aqueous environment[13,14]. The alkaline environment created during the liberation of hydroxyl ion is responsible for the antimicrobial activity of the sealer[7].

Stereomicroscopic examination was chosen for this study as this was simple and at the same time, provides a three-dimensional view of the surface to be examined, it needs no pretreatment of the specimen as in the Scanning Electron Microscopic Examination and is related to an image analysis software system, which eliminates human errors while the interpretation of the parameters[11].

Even though it was a three-dimensional microscopic study, this methodology leads to the destruction of samples and structural loss while sectioning. Greater sample size associated with nano-computerized tomography would assist in the better results of this study.

Conclusion

In the present study, all the groups showed sealer voids and single cone obturation with AH Plus showed least voids in all the sections when compared to other groups and had a least overall mean area of voids and that with Bioroot RCS showed greatest overall mean area of voids when compared to those with Sealapex sealer.

Conflicts of Interest: Nil.

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Reference no: of ethical clearance certificate– NDC/698

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Impact of Fertilization Rate on ICSI Outcome and Pregnancy Rate for Unexplained Subfertile Couples

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Abstract

Fifty subfertility couples were involved in the present study during their attendance at the fertility clinic at Al-Sadder teaching hospital in Al-Najaf/Iraq throughout a period from January 2018 to January 2019 to undergo intracytoplasmic sperm injection (ICSI). Details history and physical examination were done for every subject participated in this study. Fertilization rate (FR) was calculated as percentage transformation of microinjected oocytes into two pronuclei. A categorical variable of FR defined based on 50% FR grouped couples; Group I with FR>50% and Group II with FR>50%. The objective of this study was to investigate the influence of fertilization rate on ICSI outcome and pregnancy rate for unexplained subfertile couples. Main results of this study revealed that there was a significant difference ($p<0.05$) in ICSI outcome and pregnancy rate between different study groups. With increasing fertilization rate, there was an increase in the ICSI outcome and the pregnancy rate. It was concluded that increased fertilization rate have a positive impact on the ICSI outcome and pregnancy rate for unexplained subfertile couples.

Keywords: *Intracytoplasmic sperm injection, Fertilization, Fertilization rate.*

Introduction

Infertility could be defined as the couples inability to achieve spontaneous conception after one year or more of a regular, unprotected sexual relationship[(1)]. Infertility is a growing concern affecting globally up to 15% of couples trying to conceive, and it represents a source of social and psychological suffering for both men and women and can place high pressure on the relationship within the couples[(2)]. Fortunately, progresses in the assistive reproducing technologies (ART) have assists many subfertile couples to achieve conception[(3)]. In Vitro Fertilization (IVF) is a well-established procedure as a treatment of various types of infertility, including tubal obstruction, endometriosis, idiopathic infertility and some cases of mild male infertility. However, those couples suffering from severe male factor infertility represent the leading cause of failed fertilization in IVF[(4)]. The need for a more efficient procedure to achieve normal fertilization ended with the development of ICSI, where a single viable sperm was introduced directly into the ooplasm[(5)]. The first human pregnancy and live birth using this technique were achieved in 1992. Since then, ICSI has become the common treatment of choice for couples presenting with male infertility[(6)]. Fertilization rate (FR) is the percentage of the transformation of microinjected oocytes into two pronuclei[(7)]. The implantation rate (IR); the number of pregnancies per embryo transferred, has been reported to vary from 10% to 40% in different clinics. Fertilization process involves that, the ovulated or retrieved oocyte is activated by sperm entry either by normal conception in vivo or artificially with ICSI. Events happen during fertilization include sperm-oocyte membrane fusion,

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then polar body extrusion and completion of the second meiotic division[8]. The first week of preimplantation development starts from fertilization and continue up to blastocyst hatching. This involves repeated mitotic division of zygote in the tubes and uterus before the blastocyst hatches and implants in the endometrial cavity on day 6 or 7[9].

The most important morphological criteria to evaluate cleaved embryos in vitro are blastomere size and shape, whether even or not, fragmentation and multinucleation[10]. Nuclear structure, especially of nucleoli, change after embryonic genome expression between the 4-cell and 8-cell stages, where compact nucleoli in early embryos become progressively reticulated in later embryos[11]. Failure of treatment after ICSI a to a long list of factors which vary depending on the cause of infertility. In 25% of the cases, the aetiology of infertility cannot be found. This unexplained infertility is described with normal semen counts together with optimal ovulatory functions, presence of patent tubes and a normal uterine cavity[12]. It has been observed that failure of fertilization and cleavage is more likely to occur in couples with unexplained infertility as compared to tubal factor infertility, and male sperm problems [13].

Materials and Method

Patients: A total of fifty subfertile couples who approach the clinic of fertility centre at Al-Sadder teaching hospital in Al-Najaf/Iraq for their inability to conceive and undergoing ICSI were included in this study, throughout a period from January 2018 to January 2019. Couples with unexplained infertility for more than two years with female's age ranging from 20 till 35 years were included. Details history and physical examination were done for every subject participated in this study. Subfertility due to male factor and females with polycystic ovaries, endometriosis, and endocrine abnormalities were excluded from the study. Fertilization rate (FR) was calculated as percentage transformation of microinjected oocytes into two pronuclei. A categorical variable of FR defined on the basis of 50% FR grouped couples; Group I with FR $\leq$ 50% and Group II with FR $>$ 50%.

Sperm preparation for ICSI: Semen analysis and preparing, damage to sperm must be minimized by avoiding large fluctuations in temperature and unnecessary centrifugation[14].

Intracytoplasmic sperm injection (ICSI): All-female partners were subjected to controlled ovarian hyperstimulation with different protocols, including long agonist, short agonist, and antagonist programs. Ovulation was induced by intramuscular injection of 10,000 IU of human chorionic gonadotrophin. Oocyte retrieval procedure was performed under ultrasound guidance at about 36 hr. after triggering. The oocytes were denuded by hyaluronidase enzyme and the mechanical way by repeated aspiration through a sequence of denuding pipettes. Then the oocytes were washed with the culture medium, and the maturity of oocytes was assessed.

Oocyte Culture and Evaluation of fertilization: The normal standardized routine method was used for all patients 16-18 hours after injection oocytes were inspected for fertilization (finding of two pronuclei and two polar bodies). The fertilization rate was calculated from the number of oocytes normally fertilized divided by the number of injected oocytes. Subsequent evaluation of the embryo quality depended on blastomere number, shape, equality, mononucleated and proportion of fragmentation. Embryos were incubated individually in drops and transferred daily to fresh cleavage medium. Embryos were classified as 'good quality' if they were at the four-cell stage at forty-eight hr. after injection or at the six-to the eight-cell stage, seventy-two hr. after injection with even-sized blastomeres and little or no fragmentation[15].

Pregnancy Evaluation: In this study, pregnancy was reported as positive when serum hCG (IU/mL) concentrations were more than 10 IU/mL on day 10 post-transfer, and clinical pregnancy was confirmed by the presence of cardiac activity on transvaginal ultrasound scan (TVS) two weeks afterwards[16].

Results

In this study, we evaluate the impact of fertilization rate on ICSI outcome and pregnancy rate for unexplained subfertile couples.

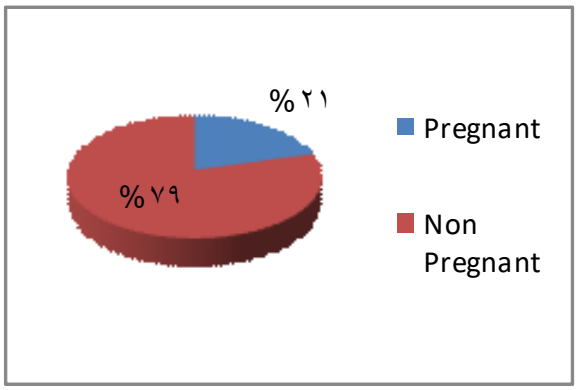


Figure 1: Distribution of patients according to the pregnancy rate (PR).

Figure 2: shows the pregnancy rate among different studied groups. The clinical PR was 15.9% in group I and 29.4% in group II. Thus, a higher rate was achieved in group II.

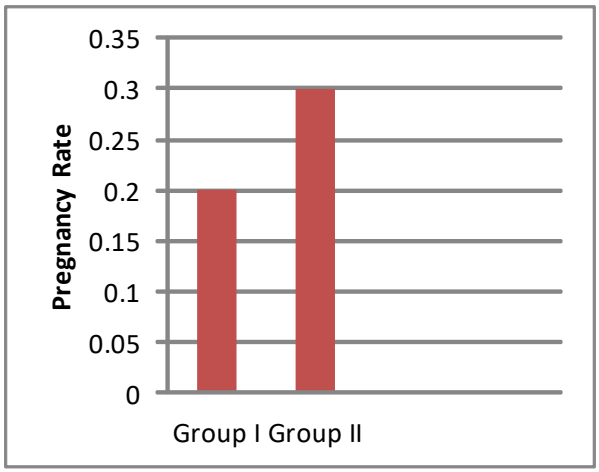


Figure 2: pregnancy rate among different studied groups.

Table-1 shows that Group II had higher basal E2, LH and FSH levels than Group I, but the results were not significant.

Table 1: Hormonal profile of the studied groups

Hormone	FR		P-value
	<50%	>50%	
Basel E2 (pg/ml)	38.41	39.57	0.783
E2 at the day of HCG injection (pg/ml)	1768.32	1693.88	0.785
Basel FSH (Miu /ml)	5.41	5.48	0.916
Basel LH (Miu /ml)	3.15	3.33	0.688

Table 2: shows that Group II had higher ICSI outcomes than Group I, there was a significant difference.

Table 2: ICSI outcomes of the studied groups.

ICSI outcome	FR		P-value
	<50%	>50%	
No. of follicles	8.35	9.73	0.304
No. of retrieved oocytes	5.85	6.77	0.438
Good injected oocyte	5.20	5.77	0.545
2PN	1.80	5.10	0.00
No. of embryos	1.75	4.83	0.00
Grade I embryo	0.8	1.5	0.67
Grade II embryo	0.65	2.4	0.002
No. of embryos transferred	1.75	3.87	0.00
Cleavage rate	83%	93%	0.289

Discussion

The introduction of intracytoplasmic sperm injection (ICSI) in 1992, a technique of in-vitro fertilization using direct insertion of a single sperm into an egg, offered the ability to bypass even some of the most severe etiologies of male subfertility[4]. ICSI procedure need a single life sperm with ability to activate oocyte and form pronuclei is necessary but morphology, motility and acrosome status not important[15]. It is documented that fertilization of oocytes involves a complex series of events requires growth, development and cytoplasmic maturation of oocytes microinjected with spermatozoa. Implantation of the human embryo is a well co-ordinated sequenced event of apposition and adhesion of the invading blastocyst in the endometrial bed during the window of implantation[17]. The sensitivity of antral follicles to gonadotropic drugs, response to stimulation, oocyte maturity, fertilization, embryo quality and endometrial thickness, all contribute to the magnitude of success rates of ART. In all procedures, failure of fertilization is the stage which stops the process and wipes the hopes and expectations of the infertile couples. The problem is intensified more in the couples to whom the reproductive endocrinologists have no true explanation of the cause of infertility. It is established that low FR results in poor IR and pregnancy outcome in comparison to patients with greater FR[18]. During ICSI, a number of oocytes estimated by TVS as preovulatory follicle count (PFC) is the strongest predictor of number of oocytes obtained during oocyte pick up. In the present study, the oocytes number and basal FSH was high in group II. E2 produced during the follicular phase of female reproductive cycle improves endometrial receptivity for implantation of the blastocyst. A good number of oocytes and high E2 measured on the day of hCG administration reflects response and pregnancy outcome that has been subjecting

of debate by several researchers[19]. In a previous study, it is reported that females with higher peak E2 had more significant number of retrieved, mature and fertilized oocytes with increased FR and IR[17]. In this study, peak E2 gives a positive predictor of FR in patients of unexplained infertility. Our results in this study show that the quality of the embryos at the time of ET has a critical effect on the outcome of ICSI, as was the case with conventional IVF.

Total oocyte retrieved, PN, grade II embryo, the total number of embryos, and the number of ET were significantly higher in pregnant women when compared with non-pregnant women. These results agreed with Van Loendersloot and his co-workers in 2014 who found a direct relationship between the increasing number of oocytes retrieved, ET, embryo quality and pregnancy rate after ART [20]. Also, he discovered that pregnancy chances had a significant association with ICSI parameters [20].

Cai and his co-workers (2011) found that the total number of grade I and II embryos was a superior predictor for ART success [21]. Also, they established that embryonic parameters, including a total number of grade I & II embryos and the total number of embryos, ordered as the first most important and second most important predictors for ART success. These results recommend that the total number of embryos give additional information to predict ART success if there was a lack in the determination of the total number of good-quality embryos. It may be a substitution marker for hormonal factors and may work through the uterine receptivity [22].

It is clear that in ICSI, different sperm indices do not affect the fertilization rate, PR, or the outcome of pregnancy as long as a morphologically well-shaped motile sperm is used for injection [23]. Although poor-quality embryos failed to demonstrate the same PR as those derived from mature oocytes, the cause was not the quality of the sperm, but the quality of the oocyte and particularly the maturity of the cytoplasm. In general, the ICSI fertilization rate is lower than expected despite the mechanical injection of one sperm into a mature oocyte, possibly because sperm that is selected may have defects in their DNA [24]. That is to say ICSI procedure bypass the natural selective process although the most normal-appearing and motile spermatozoa are selected there is always a small percentage of sperm used in in vitro fertilization (IVF)/ICSI that contains varying degrees of DNA damage and due to the high apoptotic activity during development into a blastocyst the chance of a successful ongoing pregnancy is significantly low[24].

Conclusion

It was concluded that increased fertilization rate have a positive impact on the ICSI outcome and pregnancy rate for unexplained subfertile couples.

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Conflict of interest and Source of Funding: The other authors Saad Mashkoor Waleed Al-Zaiyadi, Abdulhasan Mahdi Salih, Iqbal Ajrash Sabr, Sahib Yahia Al-Murshidi, Ali B. Roomi, Athraa Mohammed Dheyaa and Mohammed Kadhim Al-koofee declare that they have no conflict of interest. Source of funding-Self.

Ethical Approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee in the Al-Sadder teaching hospital in Al-Najaf/Iraq.

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Development of Score Computation Concept of Desirable Dietary Pattern as a New Approach for Measurement of Consumption Quality

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Abstract

The concept of calculating DDP which is use of maximum scores even though the AKE score is higher can be biased on the quality of consumption of some food groups, especially grains, oils/fats, and sugars because they are considered to be in line with the recommendations, but the fact exceeds from consumption recommendations. Development of the concept of DDP (Desirable Dietary Pattern) score using a new method that evaluates the deviation score is aimed to get a valid result of quality of food consumption. This research is a development research with quantitative multiple method used the secondary data of Calorie and Protein Consumption Report March 2017. The results showed that the quality of consumption has decreased according to the new method of DDP score. The average deviation of DDP score the difference between the old and new scores of the all areas is 7,25 and especially in food group grains and oils-fats. Excessive food consumption generally in the food group of grains, oil/fat and sugar affect decreased in consumption quality which is at risk for the emergence of degenerative diseases and also higher risk to death. The development concept of DDP score is in line with the actual quality of the population's consumption by considering health problems arising from excessive food group consumption.

Keywords: *Consumption, DDP, Development, Deviation.*

Introduction

Related to the problem of food in national scale, it can be done with changes in the system that integrated by doing food diversification [1]. The size of food consumption through food diversity of the population in an area can be seen from the Desirable Dietary Pattern (DDP) score. Desirable Dietary Pattern is a combination of type and quantity of the main food groups that are recommended to meet the needs of energy and nutrients[2]. Food Security Agency (BKP) performance report in 2017 states that the high consumption of grains and oil fats then low consumption of fruit and vegetables, animal food, beans, tubers impact on less diverse of food consumption. Excessive food consumption generally in groups of oil/fat and sugar affects a decrease in consumption quality which is become risk for the degenerative diseases and death[3,4].

The BKP concept of calculating DDP in the use of maximum scores even though the adequacy of energy intake (AKE) score is higher can be biased on the quality of consumption. Some of food groups, especially grains, oils/fats, and sugars are considered to be in accordance with the recommendations, but the fact exceeds ideal consumption recommendations. The development of the concept of calculating DDP using a method that evaluates deviations aims to obtain valid results of quality of food consumption by taking into account irregularities that occur. The development of the concept of calculating the DDP score is expected to be able to assess the quality of population food consumption according to actual consumption.

Material and Method

This study used the secondary data from the Report of Calorie and Protein Consumption of Population of Indonesia and Province March 2017 issued by Statistics Center of Indonesia (BPS RI). The data were nation-wide food consumption survey data which include data variable of food consumption of population (calorie/capita/day) with data type are quantity and type of food consumed[5]. This research is a development research with quantitative multiple method. The primary method used are content analysis of extant data based on two

measurement method and descriptive of literature for validation. This research were conducted at Bogor Agricultural University for three months in January until March 2018.

The data were processing and analysis using Microsoft Excel 2013. Food groupings and DDP score calculations were done with the guidelines from the guide book of DDP by BKP 2015 with standard of adequacy of energy intake is 2.150 kkal (table 1). Calculation of DDP score according to old concept (BKP) has the following formula[6]:

DDP Score (i)=SAKEi,if SAKEi <Ei

DDP Score (i)=Ei,if SAKEi >Ei

Description: i = type of food, SAKEi = Energy adequacy score of food type i, Ei = Standar score/maximum score DDP

Table 1: Examples of calculating a score of DDP food consumption with the concept of national

No	Food Groups	Energy (kkal)	% AKE	Weights	AKE Score	DDP Score	Max score of DDP (Ei)
1.	Grains	1083.1	50,4	0.5	25.2	25.0	25.0
2.	Tubers	35.3	1,6	0.5	0.8	0.8	2.5
3.	Animal source foods	213.6	9,9	2.0	19.9	19.9	24.0
4.	Oils and Fats	266	12,4	0.5	6.2	5.0	5.0
5.	Oily fruit/seed	64.6	3,0	0.5	1.5	1.0	1.0
6.	Pulses	35.3	1,6	2.0	3.3	3.3	10.0
7.	Sugar	104.1	4.8	0.5	2.4	2.4	2.5
8.	Vegetable and fruit	75.5	3.5	5.0	17.6	17.6	30.0
9.	Others	26	1.2	0.0	0.0	0.0	0.0
Total		**1903.6**	**100**			**75**	**100**

The old concept has a point of view that the DDP score is still ideal even though the AKE score exceeds the ideal. The principle of development a DDP score is to evaluate the deviations that occur when the score is more than the standard/maximum calculated as a standard score. The calculation equation of development PPH score becomes:

$$\text{DDP Score}\,(i) = \sum_{i=1}^{n} \text{Ei} - |\text{SAKEi} - \text{Ei}|$$

$$\text{DDP Score}\,(i) = 0, \text{if SAKEi} \geq 2\text{Ei}$$

Description: n = The number of food groups

Analysis of deviation of DDP score can be seen from:

Deviation (absolute different) = Old DDP Score – New DDP Score

Validation of the concept of calculating the DDP score by development method using theory-based validation. The analysis included in the validation is a literature study related to the estimation of health risks due to unbalanced food consumption (excess from standards).

Results

Based on the results of calculating the DDP score in all regions, the DDP score with the development concept has a lower value when compared to the DDP score calculated by the BKP (Food Security Agency of Indonesia) concept.The change in the DDP score concluded that there was a decrease in levels when calculated using the development concept. The average absolute difference between the DDP score and the BKP concept and DDP score of the development concept was 7.25 with an average standard deviation of storage in the entire region of 2.68 (table 1).

Table 2: The absolute difference in provincial DDP scores according to the old method with the development method

Results of	Desirable Dietary Pattern Score		
	Old (BKP)	New	Absolute Difference
Median	79.72	71.39	7.64
Average	78.42	71.17	7.25
Standard Deviation	4.90	5.00	2.68
Minimum	66.39	57.30	0.37
Maximum	87.94	81.86	11.57

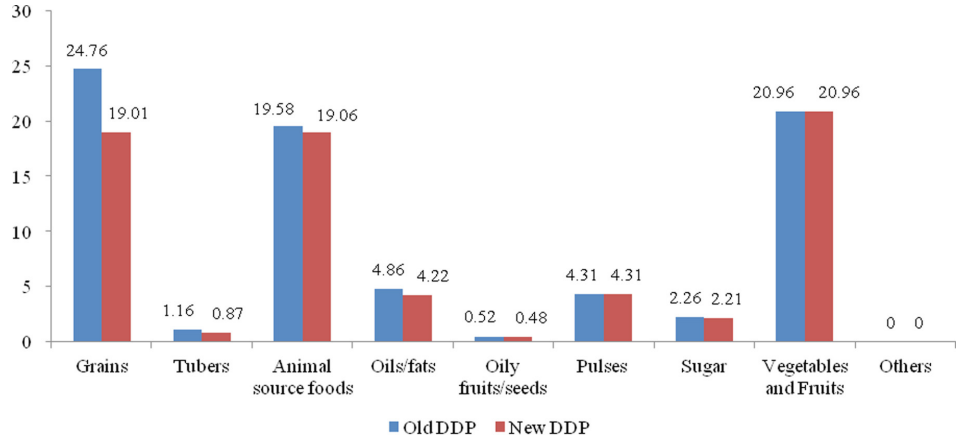


Diagram 1: Average value of deviations in each food group

The concept of calculating DDP scores according to BKP has an average of 78.42 with an average score in the grains group reaching 24.76. Whereas in the development concept, the average DDP has a lower average score of 71.17 with a DDP grade of 19.01. The food group with the highest value is owned by the grains group with an average absolute difference in the entire region of 5.74. Oil and fat in second place of biased food consumption with an absolute average value of 0.64 I then followed by animal food groups with an absolute difference of 0.52 (diagram 1).

Discussion

National concept of calculation of the DDP according to BKP guidelines will cause a deviation/bias, because of excessive scoreare considered to be in line with the recommendations. But according to the new concept (development) excessive scorefrom recommendations will be evaluated so that the more score will not be counted as the ideal DDP score. The principle of developing DDP calculations with similar concepts is also carried out in China. Study of Zhou *et al.*(2013) stated that the DDP score category that previously calculated using the traditional concept showed the "desirable dietary pattern", but showed decline in levels when using the concept of development, became a "good dietary pattern".The results of the development DDP scores by Zhou were positively correlated with the NRF9.3 index and considered more accurate and sensitive for evaluating dietary patterns for the Chinese population [7].

Almost all food groups show an absolute difference when calculated using the concept of development except the food group of pulses, vegetables and fruits and other food groups (spices). The results of the PPH scores of the three groups doesn't have biased because there were no excessive consumption from recommendations. The highest absolute difference value is found in the grains group with an average of 5.74, conclude that consume of grains reaching 5 points above the recommendation.

The low diversity of consumption is a trigger hidden hunger phenomena (micronutrient deficiency)and lead to disruption of physical growth and learning processes, limiting productivity, and ultimately perpetuating poverty in a sustainable cycle[8]. Excessive food consumption is generally in the food group sources of, grains, oil/fat and sugar affect the decline in quality of consumption at risk of emergence degenerative diseases that progress to death[9].

Grains and Tubers: Foods that are largely based on staple foods, such as corn, wheat, rice, and cassava, which provide most of the energy but with relatively low amounts of important vitamins and minerals and often result in hidden hunger[8]. Excessive consumption of rice is not enough to meet the needs of micronutrients because white rice is a low source of folate (vitamin B9), low level of β-carotene, and selenium[10,11].

The phytat acid group, pesticic acid, and dietary fiber contained in grains and tubers has a negative effect against other minerals such as calcium, zinc, iron, and magnesium [12,13]. Some tubers such as potatoes are found to contain trypsin inhibitors and chymotrypsin inhibitors which interfere with digestion, absorption, and utilization of trypsin and chymotrypsin. Potato foods are also found to contain lectins which when consumed excess can be goitrogenic [13].

Animal source food: Meat is the main source of fat in human consumption patterns, especially saturated fatty acids (SFA) which is also a significant factor of degenerative diseases in some developed countries [14]. In line with this, Sartika's research (2008) states that every 4 ons of beef or chicken meat contain 100 mg of cholesterol and saturated fatty acids. The increase levels of K-LDL (LDL cholesterol) is a predictor of coronary heart disease if being balanced by other diverse foods [15].Animal foods are also iron-rich foods, but overfilling iron stores can damage the liver, pancreas and heart[12]. High iron status in the human body combines with LDL cholesterol can be a significant factor in the incidence of atherosclerosis [13].

Fish and marine products are important natural sources of omega-3 fatty acids, selenium, iodine and vitamin D for human. Fish and marine products are also a source of dioxin, mercury, marine biotoxins and endocrine disruptors for human[16].

Oils and fats: The consumption of food groups of oil and fat is inseparable from the effect of the taste of fat from the food itself [17]. The taste of fat will encourage or trigger continuous consumption and tends to overdo it. Excessive consumption of fat in the body can allow too much calorie intake consumed by the body and has a very significant impact on obesity [18].Coconut oil and palm oil initially contain unsaturated fatty acids and will turn into saturated fatty acid content after being used for frying. It also has the ability to increase LDL cholesterol levels and a trigger for coronary heart disease (CHD) and arteriosclerosis which are the main contributors to death[14,15].

Oily fruits/seeds: Food groups of oily fruits/seeds such as chocolate have a nutritional content that has a negative impact if consumed in excess. Oxalic acid in chocolate can be like pitatic acid which has the effect of reducing absorption of calcium and some other minerals[13]. Phytate and deep polyphenols can inhibit nonheme iron absorption with absorption inhibition of 71% in chocolate [19].

Pulses: Research by Tosh and Yada (2010) stated that in raw conditions, legumes can have a dietary fiber content of 15-30% of the total food fiber needed by the body in a day [20]. Excessive food fiber content in food consumption a day when accumulated will cause interference with absorption and utilization of other minerals such as calcium, magnesium, zinc, and iron [12]. Research by Mc Crory et al. (2010) and Omaye (2004) state that pulse has antiprotein content which can inhibit the action of trypsin and chymotrypsin as evidenced in the study [13,21].

Sugar: Sugar is important as a substance that capable of releasing opioids and dopamine and allows it to have the potential like opiate. In some circumstances, intermittent access to sugar can cause behavioral and neurochemical changes that mimic the effects of substance abuse such as bingeing, withdrawal signs, craving, and cross-sensitization [22]. It is estimated that each additional can or a glass of sugary drink consumed daily increases the risk obese by 60% and higher the caries incidence in children. Some studies also show that deaths caused by obesity amount to more than 300,000 and result in related medical expenses of $ 100 billion per year [23].

Vegetables and fruits: Some nutritional content in vegetables and fruits has anti-nutrients properties, which makes some of these nutrients unable to be absorbed other nutrients maximally. Anti nutrients in this food including oxalate, phytate, tannin and dietary fiber that can interfere with absorption minerals, especially calcium[24]. Fruits and vegetables tend to contain a lot of potassium (potassium) when intake exceeds (about 18 g/day) will cause hyperkalemia and have a fatal impact due to heart attack. The risk of hyperkalemia will be very high in patients with renal failure[12].

Conclusion

The DDP score when calculated using the development concept show deviation value, especially in the grains group. The quality of consumption also decline in categories according to the developing concept of calculation of DDP score. The concept of DDP with reference to the diversity of consumption, nutritious, and balanced foods is still not achieved when viewed from the high contribution of calories from grains and oil/fat groups. When considering health problems that arise due to excessive consumption of food groups which is resulting in imbalance of nutrients contained such as a description of the theory above, then the development concept of calculation DDP score is considered appropriate for measure of the quality of food consumption.

Ethical Clearance: This research is a research with secondary data collection or publish data that does not require the implementation of ethical clearance.

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Conflict of Interest: All authors declared no conflict of interest within this study.

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Parental Style and Its Relation to Adolescents' Self-Concept and Depression

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Abstract

Background: The adolescents' growth and development can be developed by the style of parents. Parenting style has been discussed to influence on psychological status of adolescent in which it may produce depression or decrease self-concept.

The aim of the study: Was to assess parental style and its relation to adolescents' self-concept and depression

Research design: Descriptive correlation research design was used.

Research question: Is there a relation between Parental style and adolescents' self-concept and depression?

Setting: This study was carried out in Zohra preparatory and El-Fath preparatory schools at Minia City.

Sampling: A convenient sample consisted of 200 adolescent students.

Tools: Three tools were used; Parental style (MOPS), Self-Concept Clarity Scale, and Birleson depression scale.

Results: There was significant negative statistical correlation between self–concept and total parent style; **Conclusion**: the current study concluded that most of the studied adolescent pained from depression symptoms. Parents with abusive behavior their adolescent self-concept decreased and become depressed.

Recommendations: Parents training regarding parenthood had a power on self-concept of their children which as a consequently induced the depression.

Keywords: *Adolescents', Depression, Parental Style, Self-Concept.*

Introduction

The master component of each society and the smallest public unit is the family. As well, the climate of family is the most significant and initial tool that affect the growth of family individuals[(1,2)]. The basic of developing any individual is resting in the family womb; and the family environment as well its atmosphere is the basic for developing and growing the child's personality.

Parenting is sophisticated and multiplex action that encompasses numerous special behaviors as well as it is working autonomously to impact their children outcomes. Parenting contains two major and distinguishing roles as the mothering and fathering[(3)]. Loving, sympathetic, authoritative, legitimate fathering develops the child autonomous, individualistic, and emotional stability as well establishes their positive attitudes and behaviors toward the society. If mother's anticipation is true, having love, and suitable in caring, ascendancy or punishing; the development of child become more gainful, useful and fanciful. While, ideal and exemplary mother expectation, over protection and more soldiers like mother's attitude can be seen as the responsible for the modes of parenting problems [(4)].

At times, self-concept has been defined as an individuality characteristic. Modern researches about personality has been displayed that great five personality

features (extraversion, neuroticism, agreeableness, conscientiousness, and openness) are essence and root characteristics that cannot be changed. While self-concept realized as the biddable and tractable characteristics of person. These researches had seen self-concept as changeable personality characteristics because it can be affected by status, situations, events of life, and environment factors. Therefore, self-concept considered as multidimensional structure and it has been specified that the causative impact of personality on one behavior and attitude can be more probably interpose to some scope by self-concept [5, 6].

There are many studies concluded that there is a reverse relation between self-concept and depression. By another way when self-concept dwindling, the average of depression will be excessed [7]. revealed in their study that depression and self-concept had correlation; as well as they displayed a comparable correlation for another variable like ethnic/racial group, physical look, and sex in their study. Also, they revealed that adolescents with Hispanic ethic had low self-concept and high depression level than other ethnic categories.

The negative feelings about own bodies were higher between Hispanic females adolescent than White and African American and these feelings were shared in increasing the depression symptoms as well decreasing self-concept. Self-concept, depressed mood, and body image have a mutual distinction between emigrant and acculturated Hispanic girls. As the negative feelings among Hispanic females for their bodies' image may be directed to marginalization outcome[8, 9].

Therefore, depression which is the most widespread status of emotional problems is more practiced during adolescence; it can be described by feelings of anxiety, anger, fear, sadness, guilt, disrespect, grief, chagrin confused or troubled thinking [10,11]. Personality features can be explicate as the continual characteristics which can discriminate between persons, and some words that can be used to characterize personality are "passive, " "extrovert, " "outgoing, " and others. On the other hand, personality features or traits refer to how the person can reply to events that is temporary[12].

Depression is utilized as a subscale for determining the clinical and nonclinical citizens of children with the behavior disorders[13].There are many aspects of adolescent's life can be influenced by the presence of depression such as, family and social relationships, self-worth, schoolwork, and decision making. Specially, depression can affect negatively different domains of cognitive function in children and adolescents. Thus, inability to treat depression in adolescents, this can lead to a growing in suicides; as the greatestdecisive predictor for suicide is depression [14].

Significance of the study: One of most important aspect of individual is self-concept which is a key of psychological luxury that build in and of itself. Also, self-concept had been evident to have an effect on various and many of critical wellbeing results and outcomes and serve as an influential cornerstone for developing full of one's potential. Also, it was reported from various studies that many of individual who have low self-concept had negative or high psychological disorders such a fear, anxiety, stress and depression. Thus this study was done to assess parents' styles and its relation to self-concept and depression.

Aim of the study: To assess parental style and its relation to adolescents' self-concept and depression

Research question: Is there a relation between Parental style and adolescents' self-concept and depression?

Subjects and Method

Research design: Descriptive correlational research design was used in this study.

Setting of the study: This study was conducted at selected sample of Minia schools in (Zohra preparatory school and El-Fathpreparatoryschools) at Minia City.

Subjects: A convenient sample of 200 adolescent their ages ranged from 12 to16 yrs. students was recruited in the study. Data collection started from March to May 2017.

Tools of data collection: Three tools were used

Tool one: It contained two parts

First part: Personal data, which covered the following items: age, gender, address, and birth order and family income.

Second part

Measure of Parental Style (MOPS)[15]: This self-assessment tool usedto assess the perceived parenting styles by parents. This tool comprised of 15 items

divided into three styles as: Indifference style contained (6 items), Abuse style contained (5 items)and over control contained (4 items). The sum of thestyle items scores provides the total score for each style. There is no severance of score; the style total score show to which that parental style was dominated by parents.

Self-Concept Clarity Scale [16]: This scale was used by researcher to assess the self-concept of adolescent. This scale contained 12 statements measured by five points likert scale ranged from (1 strongly disagree to 5 strongly agree). The scoring system was as follow: low self-concept when adolescent is less than 20, from 21 to 40 is moderate and high self-concept is from 41 to 60. The scale statements are reversed items except statement number 6 and 11.

Birleson depression scale[17]: This scale was utilized by researchers to determine the depression level among adolescents. It encompassed from 18 statements measured by three point likert scale ranged from (0=never to usually=2). Statements are reversed in 3,5,10,14,15,17and 18.Scoring system was the adolescent who had less than 11= is not depressed; and adolescent who had 12 and more are depressed.

Pilot Study: It was applied on 10% from the study subjects (20 adolescents). Based on the pilot study analysis no modifications were done in the questionnaires. So number of the pilot study was included in the total number of the study sample.

Validity and reliability: The tools were submitted to a panel of five experts in the field of pediatric nursing and psychiatric nursing at Minia and Assuit University to confirm content validity. Reliability of the tools were done and calculated statistically. The reliability of tools was measured by Cronbach's alpha test and was for tool I (0.87), for tool II (0.90)and for tool III (0.89).

Procedure: A review of related literature was done for covering various aspects of the problem using available journals and books to be acquainted with the research problem and to select the appropriate study tools. Official permissions were granted from the director of schools to conduct the study. The researcher selects these two schools because only these schools agree to participate in the study. The researchers went to El-Fath preparatory school every Sunday from 9am to 11 am and take adolescents in lab room then explain the purpose of the study and then fill in the sheet. Regarding Zohraschoole, it's a village affiliated to Minia city, the researcher went to it by bus, the researchers went to Zohra preparatory school every Wednesday from 9am to 11 am, and the aim of the study was explained by the researcher to adolescents for getting their approval prior starting their participation in the study. The data collection was lasted for three months. Their ages were ranged between 12-16 yrs, majority of them in class 3 preparatory school, their number was 200 who agreed to participate in the study.

Statistical Analysis: Subjects' responses to each category were analyzed, categorized and coded by investigators then tabulated separately by using the statistical package for social science (SPSS) version 20. Descriptive statistics were calculated as frequency, percentage, mean, stander deviation. T-test and ANOVA test and Pearson correlation were also used among studied values. Probability (p-value) less than 0.05 is considered significant and less than 0.001 is considered highly significant.

Results

Table (1): Distribution of the studied adolescent according to socio-demographic data, shows that, more than two thirds of the study adolescents (68.5 %) aged between 14-16year, with mean age (13.73 ± 0.95). Regarding gender, about three quarter (73 %) of adolescents were females and (27 %) of them were male. 50.5% of adolescences live in urban area. 50% of adolescences have low family income. Also, it reveals that, the highest percentage of adolescent (36.5 %) was ranked as second child in their families.

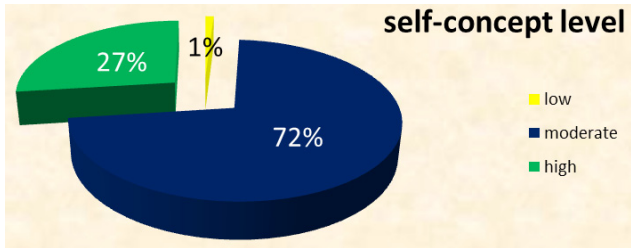


Figure 1: Distribution of Studied adolescent According their self-Concept levels (n= 200).

Figure (1) shows that most of adolescent 72 % had moderate self–concept level and more than on quarter 27% had high self-concept level.

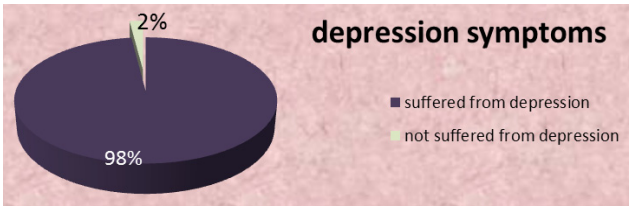


Figure 2: Distribution of Studied adolescent According to Presences of depression symptoms (n= 200)

Figure (2) clarifies that the vast majority 98 % of studied adolescent suffered from depression symptoms, but only 2% of them not suffered from depression.

As regard mean Score differences of adolescents' Parent style, Self-concept and Depression, According to gender, result shows that, there was statistically significant difference between total parent style and adolescent gender (t=0.96, P=0.03).

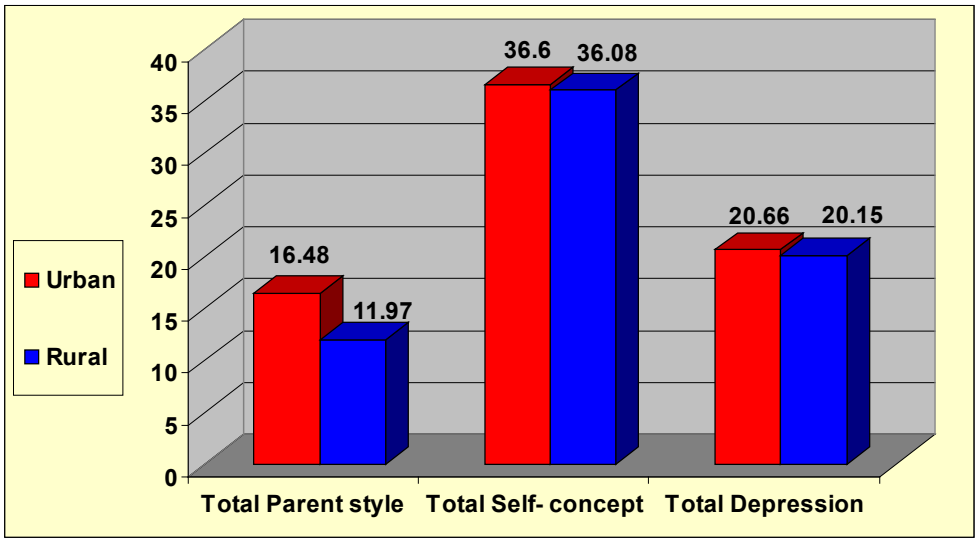


Figure 3) Mean Scores differences of adolescents' Parent style, Self-concept and Depression, According to place of residence (n=200)

Figure (3) shows that, there was statistically significant difference between total parent style as well as total self-concept with place of residence (t=5.01, p=0.00** and t=0.66, p=0.02**) respectively.

Table 1: Relation between adolescents' gender and both depression and self-concept levels (n=200).

Tested Items	Total	Male		Female		X^2 P-value
		No.	%	No.	%	
Level of depression • Nnormal non-depressed "less than 11"	5	1	0.5	3	1.5	0.96 0.00**
• Ddepressed "12-and more"	195	53	26.5	143	71.5	
Level of self-concept • Llow "≥ 20"	1	1	0.5	0	0.0	2.76 0.25
• Mmoderate "21-40"	145	38	19	107	53.5	
• Hhigh "41-60"	54	15	7.5	39	19.5	

Table 1: Clarifies that there were 71.5 % of female adolescents suffering from depression compared with 26.5% of male adolescents with statistically significant difference between the two groups (X^2 = 0.96/p-value 0.00). Additionally, 53.5 % of female adolescents had moderate level of self-concept and no one had high level; compared with 19% had moderate self-concept level and 7.5% had high level among male adolescent with not significant statistically difference between the two groups.

Also, results display that the highest mean scores "16.25 ± 8.09" of total parent style score and its'

domains; indifference parent style and over control parent style "6.00 ± 3.74" and "7.00 ± 2.58" were reported by adolescent's who don't have depression symptoms. Also, it can be noted that the highest mean score was "4.41 ± 3.21" of abuse parent style reported by adolescent's who had depression symptoms.

Table (2): Correlation between Adolescents' Perceived Parent Style and both of self-concept and depression

Variables		Total Parent Style	parent style domain 1	parent style domain 2	parent style domain 3	Total depression	Total Self concept
Total Parent Style	R P-value	1					
parent style domain 1	R P-value	0.855** 0.000	1 -				
parent style domain 2	R P-value	0.842** 0.000	0.610** 0.000	1 -	.		
parent style domain 3	R P-value	0.436** 0.00	0.098 0.166	0.121 .074	1 -		
Total depression	R P-value	-0.146-* 0.039	-0.166 0.019	-0.074 0.300	-0.069 0.332	1 -	
Total Self concept	R P-value	-0.174-* 0.014	-0.123- 0.083	-0.195- **0.006	-0.047- 0.509	0.296** 0.00	1 -

Table 2: Shows that there were statistically significant negative correlations between self–concept and total parent style and its sub scale of abuse parent style (R=-0.17, p-value 0.01) & (R=-0.19, p-value 0.00) respectively. Additionally there was a statistically significant negative correlation between depression score and total parent style & Parent Indifference style (R=-0.14, p-value 0.03) & (R=-0.16 p-value 0.00) respectively.

Discussion

The current study revealed that there was more than two thirds (68.5 %) of the adolescents aged between 14-16 year, while there was 31.5 % of them had age between 12-< 14 year, with mean age of 13.73 ± 0.95. Regarding gender, there was 73 % of adolescents were female and 27 % of them were male. Also data revealed that, the highest percentage of adolescent 36.5 % ranked the second child in their families.

The current study displayed that most of adolescent 72 % had moderate self-concept and more than a quarter 27 % had high self–concept. The vast majority 98 % of studied adolescent suffered from symptoms of depression, but there only 2% had no experiences or symptoms of depression according to Birleson depression scale. As the adolescent who has low level of self-concept, was in risk to be depressed. This can be explained as result of the strong relation between self-concept and depression.

Actually when there is a support provided from parents and peers to the adolescents, their self-concept will be enhanced and maintained. In the same respect, [18]displayed that there 56% of their studied adolescents had an average level of self-concept and about third 30.75% had good level of self-concept, 8.25% had poor self-concept, and 0.75% had very poor self-concept, while only 4.25 had very good level of self-concept. Thus, it can be consummated that low level of self-concept is linked to the high level of depression; in other words, when the level of self-concept diminished, the level of depression rates excessed. Also, [5]stated in their research study among 77 adolescents, that there was strong negative correlation founded between depression level and self-concept level.

Moreover, in the current study it was revealed that there were statistical significant differences between male and female adolescents in regarding to the perceived parent style. It was noted that the highest mean scores were for the indifference and abusive parent style "4.22 ± 3.20"and "4.60 ± 2.99" respectively in favor to female adolescent. While, the highest mean score "6.59 ± 2.53" of over control parent style was reported by male adolescent. This result was in agreement with the findings of[19] who displayed that there are two parent

styles as indifference and abusive had significant relation with level of depression among adolescents. Also, the result advocates the hypothesis about the significant relation between parent styles and level of depression in adolescents.

It also observed that there were 71.5 % of female adolescents had high level of depression compared with 26.5% of male adolescent; indeed 53.5 % of female adolescent had moderate self-concept. This result was congruent with the study result of [12]revealed that, the most commonly psychological disturbance among adolescent was depression, in which it was appear that up to one of each three girls and one out of each five boys can had minimally one episode of depression disorder when reach the age of eighteen.

In the same context [20]supposed that the adolescents with high depression level had self-concept with negative view, which can affect negatively on their cognitive capabilities and had an effect on academic ability. Also, this result was consistent with the findings of [21] found that the level of depression is higher and raised more among female (35%) than male (23.1%) adolescent. As well as it was reported that the incidence of depression symptoms is higher in women than in men[22, 23]. Also, in 2010 the annual global incidence of depression mentioned that depression was 5.5% in female and 3.2% in male[24].

The current study also revealed that the highest mean score was "4.41 ± 3.21" for the abuse parent style which was reported by adolescent's who had depression symptoms. [25]Reported that; adolescents with manifestation of depression had the higher mean score for the abuse parent style. Also, [26]mentioned that the abuse parent style was the most common style reported among adolescents who had symptoms of depression.

Moreover, it was reported from different researches that the mostly effective aspect that influence on the establishment and enhancing personality of adolescent was the parents' activities in parenting. Style of parent's parenting can determine the prosperity or dud of the adolescent. The most important issues in parenting style were; the amount of emotion, softness and smoothness that children had; also, the amount of agreement, conformity and monitoring or dominance that utilized by parents[27].

The current study also revealed that, there were statistically significant negative correlations between self–concept and total parent style & its subscale of abuse parent style. As when abusive behavior increases as a parent style, the self-concept of adolescents decreases consequently. The negative self-concept among adolescent can lead them to do not good during their life. Commonly, they not successes in their life as they often do problems and turmoil in their life; as well as they failed to manage effectively their life.

Therefore, the persons who had negative or low self-concept can absolutely be unsatisfied about them in everything as well they cannot be happy about the surrounding. Further[28] agreed that one who has self-concept in negative manner can be easily and permanently gain criticism from the parents, teachers, peers, and friends. This can help adolescent to be further unfavorable and passive, as well they don't realize how to have relations with people who live with; in which this can influenced and effect on them to be more less self-confidence and timid.

Additionally, there were statistically significant positive correlations between depression score and total parent style & parent indifference style. This result was in congruence with the finding of[29] who pointed that, there was negative relation with statistically significance between the parenting style and adolescents' self-concept in favor to indifference style.

Indeed, correlation between adolescents' self-concept and parenting style did not show any statistically significant relations with all the three dimensions. This was not congruence with[27] mentioned that, parenting styles had statistically significant correlation with depression. As there were two styles of parenting had significance correlation; and the parenting style of authoritarian was the mostone had positive correlation, while parenting style of permissive was correlated negatively with depression.

It also, found that there was a statistically significant relation between total depression and total self-concept. This finding was in accordance with the finding of[12] displayed that, there was a strong relation with significance between self-concept and depression.

Conclusion

The parents' style has crucial role in shaping their children behaviors, attitudes and outcomes. Therefore, when the abusive behavior increased due to parent style the self-concept of adolescents decreases consequently

Recommendations: According to the findings of the present study, the relation between depression and parenting style is actually significant. Thus, it is recommended that the training of parents for parenthood can influence their children self-concept which has adverse effect on depression. As well there should be suitable attention given to adolescents, as when they have the necessary assistance and proper feelings and emotions they can be more self-concept and be less depressed.

Source of Funding: Self-funding

Conflict of Interest: Nil

Ethical Clearance: An official permission was obtained from the directors of the two schools after explaining the nature of the work. Also, an official permission was obtained from the ethical committee in faculty after explaining the nature of the work, and then the study aim was explored for every interviewed adolescent (males & females). An ethical right to agree or refuse participation in the study was granted to the adolescent. They informed that their information will kept confidential and used only for the purpose of the study and there was no harm for their participation.

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Leader Empowering Behavior and Faculty Stress and their Relationship to Job Satisfaction among Faculty Staff

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Abstract

Background: Leader empowering behaviors have been shown to influence staff work engagement because social identification with managers positively influenced the staff's level of work engagement and satisfaction.

Aim of the study: To assess leader empowerment behavior and faculty stress and their relationship to job satisfaction among faculty staff. Subject and method: Correlational comparative research design was done to fulfill the aim of this study.

Subject: A sample was selected conveniently, which meeting the inclusion criteria. Setting: The study was conducted at both faculty of nursing and faculty of early childhood in Minia university. Tools of data collection: 1st personal data questionnaire 2nd: The Leader Empowering Behaviors Scale (LEBS)(3). 3rd: The Faculty Stress Scale (8), 4th: Job Satisfaction Scale (NSOPF) (10). Results: there was a statistically significant difference in the faculty of nursing staff regarding the dimension of "Creating meaningful of work." There was a negative correlation between both leadership empowering behavior and faculty stress and both faculty stress and job satisfaction.

Conclusion: It can be concluded that, when leader enabling behavior is increasing, the faculty stress will decrease so; the level of job satisfaction will increase.

Recommendation: It is recommended that it is essential to continue leader empowerment for faculty staff to achieve the optimal level of goal achievement and decrease faculty stress level which in return increases job satisfaction level among faculty staff.

Keywords: *Leader Empowering Behavior, Faculty Stress, job satisfaction, faculty staff.*

Introduction

Empowerment is "a tool to encourage workers to think for themselves about the requirements of the job and to move beyond blindly doing what they are told." Empowering employees refers to helping the staff to work best to achieve organizational goals, which requires an understanding of their needs. Leaders' use of allowing behaviors is essential in the development and retention of a capable work team. Effective leader empowering practices make employees feel empowered, autonomous, motivated, and rewarded, and yields a sense of fairness and community in the workplace. Empowered employees are more likely to self-manage, take greater responsibility within their organization, and work more effectively(1).

Leaders' use of empowering behaviors includes "enhancing the meaningfulness of work, fostering participation in decision-making, facilitating goal accomplishment, expressing confidence in high performance and providing autonomy from bureaucratic constraints." A systematic literature review by(1) identified leaders' behaviors that affected employees' motivation and performance. The authors noted that nurses were empowered to perform when they had autonomy for decision-making when effective and robust communications to build trusting relationships where available, when reasonable and accessible resources were available, and when their leaders used effective leadership behaviors such as mentoring and coaching. Also,(2)noted that providing autonomy and expressing

confidence in staff performance caused employees to feel more empowered to work efficiently.

Stress is defined as a state of mental and physical; or organism›s response and a great worry towards the problematic situation or environmental demands[3]. Stress is basically focused on two significant factors which are stressors in terms of environmental conditions and on how the person reacts and response towards the challenging events. Stress is a 'global epidemic' in this decade where there are more than 50% of the population in many countries who were reported to have anxiety related to work[4]. Academician was recorded as a stressful job compared to the accident and emergency (A & E) staff who deals with a substantial amount of ongoing occupational stress. [5] reported that the prevalence of job stress among lecturers in 2 universities in Malaysia as 17.5% and 23.3%. The stressful conditions increase their distress causes low productivity, which leads to a negative impact on their family's life, negative behavior and chronic health problems.

Job satisfaction is ''an overall affective orientation on the part of individuals toward work roles which they are presently occupying'' [6]. Job satisfaction has a deep knowledge base and theoretical foundation. There is a multitude of variables that have been tested about job satisfaction; however, many of the variables may be explained by Herzberg's Two Factor Theory of job satisfaction[7]. The theory asserts that intrinsic factors ('motivators') and extrinsic factors ('hygiene's') affect job satisfaction.

Significance of the Study: Job satisfaction is a multifaceted concept associated with many factors such as working conditions, organizational support, leadership styles, leader empowering behaviors (LEB), structural empowerment (SE), and psychological empowerment (PE). The leaders' use of practices that allow staff contributes to work effectiveness by enhancing employees' performance. Leader enabling behaviors directly affect the ability of the team to accomplish organizational goals, and this enhances organizational effectiveness. The use of leader empowering practices in faculty is essential since it creates supportive working environments where staff can perform best. This, in turn, can lead to increased job satisfaction. [2] So, it is crucial to assess leader empowerment behavior and faculty stress and their relationship to job satisfaction among faculty staff.

Aim of the Study: To assess leader empowerment behavior and faculty stress and their relationship to job satisfaction among faculty staff

Subjects and Method

Research Design: The correlational comparative research design was done to fulfill the aim of this study.

Sample: A sample was selected conveniently, which meet the inclusion criteria

Setting: The study was conducted at both faculty of nursing and faculty of early childhood in Minia university.

Inclusion Criteria:

Doctorate degree

Assistant professors

Professors

Tools for data collection:

Four instruments were used for collecting data for this study

1st: personal data questionnaire which included gender, age, experience in the present job and specialty

2nd: The Leader Empowering Behaviors Scale (LEBS)[3]: it was used to assess staff perceptions of their leaders' use of empowering behaviors. This questionnaire consists of 27 items covering the five dimensions of Creating Meaningfulness of Work (6 items), Encouraging Participation in Decision Making (5 items), Expressing Confidence in High Performance (6 items), Facilitating Goal Accomplishment (5 items), and Fostering Autonomy from Bureaucratic Constraints (6 items). Responses were measured on a 5-point Likert scale ranging from 1(strongly disagree) to 5(strongly agree). With the system, the score ranged from 27-135. Higher mean scores on the LEBS indicate higher levels of leader empowering behaviors. Cronbach's alpha 0.97 found for the total scale.

3rd: The Faculty Stress Scale: it was developed by[8]. The index is based on both items from the Administrative Stress Index Koch,[9] and items suggested via stress logs kept by twenty faculties for a week. The resulting 45-item FSI examines five dimensions. The instrument reflects five dimensions: reward and

recognition, time constraints, departmental influence, professional/identity, and student interaction. A sample item for each aspect is: "Indicate to what extent each is a source of pressure": Scoring for the instrument was on a five-point scale: 1= rarely or never stressful, 2= occasionally stressful, 3= sometimes, 4= often stressful, 5= always or frequently stressful. Cronbach's alpha is reported as 0.83.

4th: Job Satisfaction Scale (NSOPF)[10]. It consists of eight items rated on a four-point scale. The participant is asked to rate their level of job satisfaction on eight subjects, including salary, the authority to make decisions about content and method in instructional activities and overall job satisfaction with score 1= very dissatisfied, 2= dissatisfied, 3= satisfied and 4= very satisfied. The total score range that a participant could obtain is eight (8 items * 1 score on each) to 32 (8 items * 4 ratings on each). Cronbach's alpha was 0.85 for this scale.

Tools validity and Reliability

Validity: Study tools content validity was established by a panel of five experts, two professors of the psychiatric department and three professors of the Administration department Faculty of Nursing, Minia University. Each expert on the board was asked to examine the instrument for content, coverage clarity, wording, length, format, and overall appearance.

Reliability: The reliability test was estimated using Cronbach's Alpha Coefficient for the three tools which indicate that questionnaires were highly reliable. Test results for the questionnaires The Leader Empowering Behaviors Scale, The Faculty Stress scale, and Job Satisfaction Scale were (0.86, 0.79, and 0.84) respectively.

Pilot study: The pilot study was carried out on (10%) of the current sample to ensure the clarity and applicability of the items and to estimate the time needed to complete the questionnaire. Based on the pilot study analysis, no modifications were made in the questionnaires. So the number of the pilot study was included in the total number of the study sample.

Procedure:

- Official permission was obtained from the dean of the two faculties after explaining the nature of the work.
- The researcher explained the aim, nature, and significance of the study for every participant to get better cooperation during the implementation phase of the research
- Oral consent was obtained from each participant in the study after explaining the purpose of the study
- The time spent to fill the questionnaires ranged from 20 to 30 minutes for each participant.
- After completion of filling the questionnaire sheet, the researcher collected them. Data were collected from September to November 2018.

Statistical design: Data entry and statistical analysis were done using computer software, the statistical package for social studies (SPSS), version 21. Suitable descriptive statistics were used, such as frequencies and percentages for qualitative variables, means, and standards deviations for quantitative variables. The correlation coefficient (r) test was used to estimate the closeness association between variables.

Results

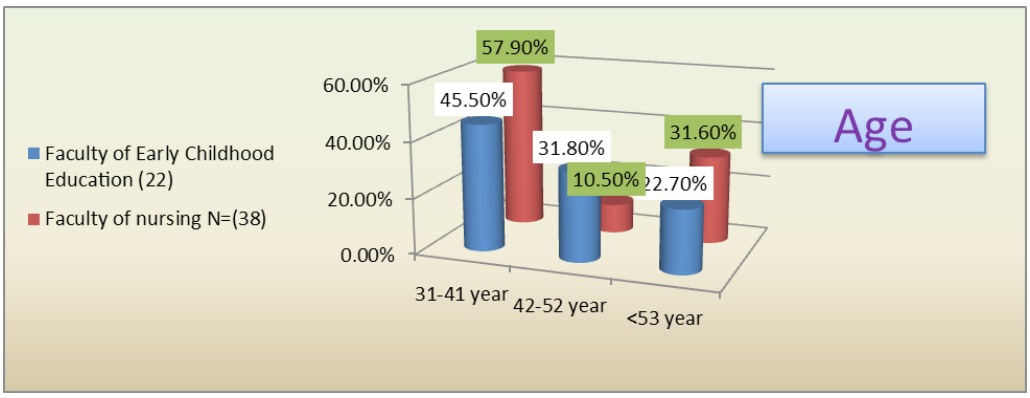


Figure (1): Distribution of the faculty staff members according to their personal data characteristics (n=60).

Figure (1) illustrates that more than half (57.9%) of faculty nursing staff their ages were ranging from (31-41) years old, while less than half (45.5%) of faculty of early childhood education staff their ages were ranging from (31-41) years old.

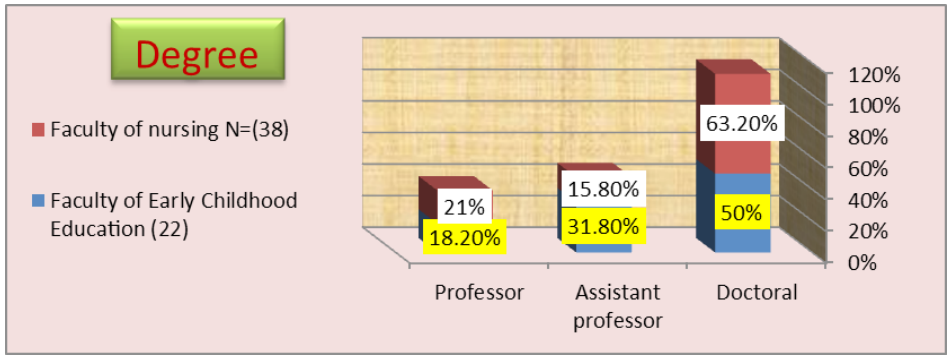


Figure (2) the distribution of the faculty staff members according to their job degree (n=60).

Figure (2) reveals that remarkable percent (63.2% and 50%) of both faculties of nursing and early childhood education staff were lecturer, followed by (31.8%) of early childhood education staff were assistant professor, while faculty of nursing had just only (15.8%) were associate professor and (21% and 18.2%) of both faculties were professors

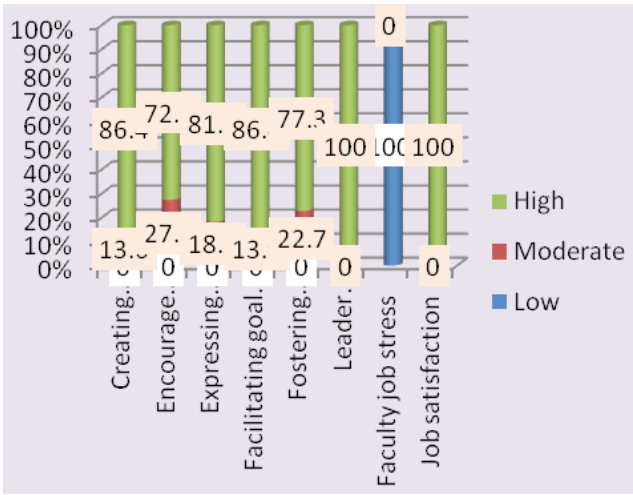


Figure (3) frequency distribution regarding the opinion of the Faculty of Early Childhood staff members concerning the variables (N=22)

Figure (3) demonstrates that, the faculty of Early Childhood staff members had the highest percentage regarding leader empowering behavior (100%), also all faculty staff members had percentage (100%) regarding job satisfaction highly.

Figure (4) frequency distribution regarding the opinion of the Faculty of Nursing staff members concerning the variables (N=38)

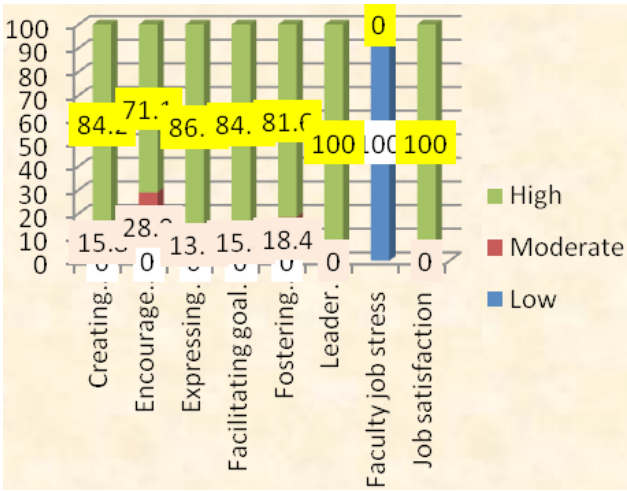


Figure (4)illustrates that the faculty of Nursing staff members had the highest percentage regarding leader empowering behavior (100%), also all faculty staff members had percentage (100%) regarding job satisfaction highly. Also, faculty staff members had the lowest percentage as regards to faculty job stress

Table (1) Difference between Faculty of early childhood and Faculty of Nursing about the variables (N=60)

Dimensions	Faculty of Early Childhood N= (22)	Faculty of Nursing N=(38)	T	P
	Mean±SD	Mean±SD		
Creating meaningful work	24.4 ±3.12	24.6±3.21	0.252	0.802
Encourage participative in decision making	21.23±3.05	21.2±3.06	0.020	0.984
Expressing confidence in high performance	24.2±2.93	24.4±2.76	0.281	0.780
Facilitating goal accomplishment	22.3±2.73	22.1±2.78	0.252	0.802
Fostering autonomy form buracturatic constraints	22.1±3.07	22.4±2.86	0.443	0.659
Leader empowering behavior	114.1±6.70	114.7±6.24	0.365	0.717
Faculty job stress	54.9±12.5	54.5±11.8	0.142	0.887
Job satisfaction	26.5±3.64	26.2±3.70	0.221	0.826

Table (1), shows that there was no statistically significant difference for all dimensions of leader empowerment behavior, faculty job stress, and job satisfaction for both Faculties.

Also. Result demonstrates that there was a statistically significant difference as regards to facilitating goal accomplishment and expressing confidence in high performance" p =.012* in the faculty of early childhood staff and job degree.

Table (2) Correlation between leader empowering behavior, faculty stress and job satisfaction (60)

Variable	Leader empowering behavior	Faculty stress	Job satisfaction
Leader empowering behavior	1	.287- .153	.282 .164
Faculty stress	-	1	.290- .887
Job satisfaction	-	-	1

Table (2) illustrates that there was a negative correlation between leadership empowering behavior and faculty stress and both faculty stress and job satisfaction. There was a positive correlation between leader empowering behavior and job satisfaction.

Discussion

Regarding to the distribution of the faculty staff members according to their personal data characteristics, the current study revealed that more than half of faculty nursing staff their ages were ranging from (31-41) years old, while less than half of faculty of early childhood education staff their ages were ranging from (31-41) years old, a remarkable percent of both faculty of nursing and early childhood education staff were lecturers respectively, followed by (31.8%) of early childhood education staff were assistant professors, while faculty of nursing had just only (15.8%) of assistant professors, also (21% and 18.2%) of both faculties were professors.

As regards to opinions of both faculties "Faculty of Early Childhood, and faculty of nursing" staff members in relation the studied variables, it was observed that all of both faculties had the highest percentage of leader empowering behavior level and job satisfaction. Indeed, both faculties had the lowest rate of faculty job stress levels. From the researcher view, this result might be due to support from their top-level management (deans or managers) of both faculties (e.g. helps faculty staff members to identify and understand the mission and vision of department and their organization, helping them understand the purpose of what they do at work, encouraging staff members to participate in decision making through using of democratic leadership style.

This result is supported by [11] who stated that leaders are responsible for the organization's moral climate and that corporate values flow from leader beliefs and moral character. The leader must display moral strength, honesty, courage, and integrity in all interactions with others. The faculty members should also consider the university culture in which he or she is working. The leader should respect different cultures and be a positive influence on others. Cultural differences require different leadership styles for success. [12], [13]stated that ethical leadership encompasses the leader's moral character, the legitimacy of the ethical values the leader proclaims, and the morality of the organizational mission and purpose.

The current study revealed that there were no statistically significant differences for all dimensions of all variables among both faculties. This might be due to the Faculty of Early Childhood have got academic accreditation and the Faculty of Nursing also try to finishing the process of accreditation, so both faculties work hardly with soul of cooperation and goal achievement desire through support from their top-level management, empower working condition of the faculty staff members, and treat fairy with them which lead to faculty staff members of both faculties more satisfied and less stress.

This result is supported by[8] who asserted that effective leaders should possess clinical/technical, organizational, human relations, and critical thinking competencies that motivate and contribute to the quality goal of their organizations.[14] reported that an academic leader's style of leadership impacts faculty job satisfaction. Effective leaders can lead to better productivity and better outcomes for faculty.[15] stated that faculties had expressed decreased organizational commitment in the absence of good leadership. Successful leaders have a significant positive impact on the retention of faculty. Indeed,educational leaders have a moral responsibility to treat everyone fairly, respect individual needs, maintain trust, display integrity in all dealings, and create a class culture that facilitates growth and development for all staff. Honesty and integrity helps build the confidence needed to facilitate the respectful relationship that creates a quality learning environment

Also, [16] stated that effective management of academic dean leadership styles might increase higher education student success through faculty improvement. On the same line [17] stated that in dynamic working environments, employee empowerment could give organizations advantages in acquiring and sustaining competitive positions in their markets if it results in favorable employee attitudes, motivation, and behaviors.

In the current study, it was observed that there was statistically significant difference between Faculty of Nursing staff as regarding to dimension of «Creating meaningful of work «. Also, they had a great experience of the faculty members at the faculty of nursing and cooperation of others helps them to improve work. This result is consistent with the outcome of [18]who reported that staff members working with empowering leaders are more likely to have autonomy and positive work experiences, and thereby they may feel less burnout and tension or stress from their job as well as possess less cynical attitudes.

On the same context, [19] stated that subordinates who experienced empowering leadership reported higher levels of job satisfaction, probably because empowering leaders to emphasize their discretion in setting goals and determining work procedures, which help employees, understand and perform whole pieces of work and eventually makes it possible for subordinates to derive meaning from the job. Also, [20] revealed that leader's empowering behavior played a significant role in enhancing employee's work engagement and influenced work meaningfulness. Empowering leaders created more meaningful jobs by allowing employees to be responsible for their tasks through the autonomy given to them.

The current study shows that there was a statistically significant difference p =.015* as regards to facilitating goal accomplishment and expressing confidence in high performance" p =.012* in the faculty of early childhood staff and staff job degree respectively. This result could be attributed to, whatever the job degree of the team, all of them able to facilitating goal accomplishment and expressing confidence in high performance. This finding was supported by [21-22-23] suggested that consequences of empowering leadership on performance especially facilitating goal accomplishment and expressing confidence in high performance include creativity and innovative behaviors, in-role performance, contextual performance, and with-drawl behaviors. On the same line, [24, 25] found that individuals who possess a high level of job satisfaction tend to be more productive and dependable and are critical parts of high-performing organizations and their level of job satisfaction was increased.

Finally, the results of the present study illustrated that there was a negative correlation between (both leadership empowering behavior and faculty stress) for (both faculty stress and job satisfaction). This might be due to increased support from deans of both faculties, deans play essential role in organizational achievement which helps staff members feel more empowered, they become actively engaged in their jobs, feel more satisfied and less stressful, This result was supported by [26] who stated that there were negative relationship between servant leadership, job stress, and job satisfaction.

In addition, the present study also found that there

was a positive correlation between leader empowering behavior and job satisfaction. This could be interpreted as when managers support their staff in any agency, the team will achieve a high level of job satisfaction. This agreed with the study of [27]who showed that positive relationships between the five dimensions of leadership empowerment behavior and overall job satisfaction. Also,[28]stated that satisfied employees play a crucial role in organizational success. Higher job satisfaction may result in the more top quality of instruction, increased productivity, and more time spent with students. Conversely, lower faculty satisfaction and engagement may result in lower student performance, decreased student retention, and lower graduation rates[29,30].

Conclusion

Leader empowering behavior has a direct positive effect on decrease faculty stress and increase job satisfaction; additionally; enhancing leadership practices and educational leaders may be able to raise the job satisfaction levels among faculty members in community colleges. Moreover, when the leader empowering behavior is increasing, the faculty stress will decrease so; the level of job satisfaction will increase.

Recommendation: It is recommended that it is essential to continue leader empowerment for faculty staff to achieve the optimal level of goal achievement and decrease faculty stress level this in return increases job satisfaction level among both faculty staff.

Source of Funding: Self-funding

Conflict of Interest: Nil

Ethical Clearance: An official permission was obtained from the ethical committee in faculty after explaining the nature of the work. A verbal explanation of nature and the aim of the study had been explained to the staff included in the study, clarification of the nature and purpose of the study was done in the interview with each subject.

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Diagnostic Study and Some Pathological Aspects of Parasites Associated with Appendicitis in Al-Najaf Al-Ashraf Governorate

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Abstract

The study is intended to investigate the parasites that existenec and accompany appendicitis after its removal in the surgical department at al-Sadr Educational hospital and Al-Hakim General Hospital in Al-Najaf Al-Ashraf Governorate for the period from October 2017 to April 2018. The results of the current study of the appendectomy samples showed that 45 parasite samples were infected with 128 parasites (35.15%), the highest percentage of enterobius vermicularis (28.8%), and Ascaris lumbricoidis (22.2%). Entamoeba histolytica (17.7%), Entamoeba coli (13.5%), Giardia lamblia (11.3%), Cryptosporidium (6.5%), and male infection The parasite appendicitis was 55.6%, while the female infection rate was 44.4% 6 years had the highest incidence of parasitic appendicitis (33.3%), and the lowest rate of infection was in the 65-56 age group (4.4%).

Keywords: *parasites,inflammation,appendicitis, Al-Najaf Al-Ashraf, worms.*

Introduction

Acute appendicitis is one of the most common cases of invasive surgical surgeries worldwide[1]. The appendix is known It is a tubular structure or a small, irregular cavity. There is a lot of lymph nodes in the wall, which is like a large intestine. Of four primary serological layers (serosa) Outside and then the muscle layer (muscularis) and under mucous (submucosa) And to the mucous layer inside (mucosa), The Appendix differs from the large intestine by containing fewer and fewer glands and the hollow walls of the coliform strips, as well as the internal tissue content of the appendix is not as new as the other histological content of the digestive tract. In addition to being a closed cavity, it is a suitable place for the growth and multiplication of different types of pathogens Including parasites, and for these and other reasons they are often susceptible to inflammation that may develop to a degree leading to inflammation of the abdominal cavity [23]Considered a protozoa And worms are a cause of many symptoms and disorders such as vomiting, abdominal pain, diarrhea, intestinal obstruction, rectal rectal inflammation, appendicitis and intestinal ulcers [45]**.** the presence of intestinal parasites in the appendicitis cavity and subsequent activity may cause in some cases symptoms of appendicitis without infection by[6], I pointed out a lot of Studies have shown a close relationship between appendicitis and the presence of types of parasites in them such as ***Ascaris lambricoides*** and ***Enterobius vermicularis*** **and Schistosoma spp and Taenia spp**[7]

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Materials and Method

Collection of samples: Was collected 128 Of appendicotomy samples after resection in the surgical section of Al Sadr Teaching Hospital and Al Hakim General Hospital In the province of Al-Najaf Al-Ashraf Governorate for the period of October 2017 Until April 2018, And the samples were placed in special containers containing NaCl 0.9% Until diagnosis.

Examination of samples: The appendectomy was performed longitudinal and was visually examined using a magnifying hand lens to diagnose and observe mature worms in the appendage cavity. The samples

were then examined in several ways to identify the types of parasites present and their stages. precipitation And Direct smear method And the method of Floatation According to **[9,10]** Data on the sex and age of patients were recorded.

Results

Numbers and percentage of parasites that cause appendicitis: The results of the current study of the appendectomy samples showed that 45 parasite samples of 128 samples were infected with 35.15%. The highest incidence of *Ebterobius vermicularis* was 28.8%, while *Ascaris lumbricoidis* was 22.2%, *Entamoeba histolytica* was 17.7%, *Entamoeba coli* was 13.5%, *Giardia lamblia* was 11.3*%, Cryptosporidium* was 6.5%, as shown in Table (1).

Table No. 1: Numbers and proportions of parasites that cause appendicitis.

Type of parasite	Number of injured	Percentage
Enterobius vermicularis	13	28.8
Ascaris l umbricoidis	10	22.2
Entamoeba histolytica	8	17.7
Entamoeba coli	6	13.5
Giardia lamblia	5	11.3
Cryptosporidium	3	6.5
Total	**45**	**100%**

Relationship of appendicitis with parasites by age and sex: The results of the current study showed that the incidence of male appendicitis was parasitic 55.6%, While the percentage of infection in females 44.4%, And recorded age group 45-36 The highest incidence of parasitic appendicitis was 33.3% The lowest incidence was in the age group 65-56 year it was 4.4%, as shown in table (2).

Table (2): Relationship between parasitic appendicitis, age and sex

Age categories	Sex	Samples infected		Total infected samples	Per-centage
		The number	%		
15-10	Female	1	2.2	4	8.8%
	Male	3	6.6		
25-16	Female	4	8.8	7	15.4%
	Male	3	6.6		
35-26	Female	5	11.1	10	22.2%
	Male	5	11.1		
45-36	Female	6	13.3	15	33.3%
	Male	9	20		
55-46	Female	4	8.8	7	15.4%
	Male	3	6.6		
65-56	Female	0	0	2	4.4%
	Male	2	4.4		
Total	Female	20	44.4%	45	100%
	Male	25	55.5%		

Discussion

Results of the current study showed that the ratio of 35.15 % Of appendicitis is caused by a parasite, and this result is consistent with some studies, where he noted [8] That the percentage of renal parasites in cases of appendicitis reached 64%, As consistent with the results a study [9] Which showed rates of injury of 39.7% Samples of excised, recorded [10] Proportion of its approach to infection with parasites to study samples reaching 34.8%, While the results of the current study did not agree with other studies such as the study [11] As it recorded a lower percentage 16.2%, As well as record [12] Percentage of total injury hit 8%, While recording [13] The highest injury rate reached 79%.Although parasites are present in the tapeworm tissue, this does not mean that the cause of the appendicitis is always due to the effect of parasites. It is common knowledge that people with appendicitis mayshow symptoms only after parasites enter the waste into the appendix [14],However, to discharge the role of parasites in the incidence of infection, however, should be treated with parasites in excess ofinjuries appendicitis confirmed the parasite after surgery, in addition to a diagnosis of parasites of the family and those around the grave who are directly with him in contact, and should pay attention to personal hygiene and health care For people working in food factories and restaurants to reduce the spread of parasites as well as attention to water sanitation plants and the provision of safe drinking water, these factors help to reduce rates of appendicitis caused by parasites [14] Poor economic and social conditions such as poverty, low drinking water supply, environmental and climatic conditions such as high temperatures and population density, as well as the biological and mechanical resistance to phylogenetic growth are all factors contributing to the transition and survival ofprotozoa And intestinal worms in the environment, and spread in different age groups and in

both sexes, [15]The record in the twentieth century atheist and high injury rates for appendicitis in industrialized countries in Asia, South America andthe Middle East, compared with Western countries because of different environmental factors and exposure to injury [16].

The current study showed that the incidence of the most common parasitic worm was *E.vermicularis* this result is in agreement with other studies [17] Bowel injury *E.* The most common vermicularis in all parts of the world between the parasitic worms injuries [18], it should be noted that the eradication of APPENDICITIS does not necessarily mean appendicitis syndrome, because there is ambiguity and symptoms associated with some of the situations that could lead to an error in the diagnosis. Therefore, there must be increased vigilance in identifying possible cases of APPENDICITIS, especially the very young patients and adults because they have a high rate of complications which overlap with symptoms of APPENDICITIS [19].

It may be due to the difference in the rates of infection between males and females to the nature of community life where the presence of males outside the home and thus exposure to various types of microbes, including parasites, as well as eating fast food, which are often the cause of various types of injuries.

The results of the present study showed that the age group with the highest incidence is 36-45 Year where it reached 33.3% Of the total infection rate, while the age group 56-65 Year is the least injury where it reached 4.4%, And this result corresponds to its findings [2], In his clinical, clinical and pathological study of acute appendicitis cases in Babel governorate where the incidence rate was in the age group 40-31Year 34.3% The highest rate of infection among the total infection rates for the other age groups, and is not consistent with the results of the study reached [14] Where the age group most affected in their studies are 20-35 Year.

Conclution

It is concluded to Diagnosis of parasitic infections in appendix samples and their relationship with appendicitis surgically removed in Al-Najaf Al-Ashraf Governorate As well as to studyof some pathological variables related to infection rates such as age and sex of the infected.

Ethical Clearance: Taken from Kufa Technical Institute committee

Source of Funding: My Self

Conflict of Interest: Nil

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Supporting Factors that Influence of Mental Health Cadres in Implementing the Role in Wonokromo Village Surabaya

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Abstract

Mental health cadres have an important position in public health programs because cadres as part of the community have easier access to reach other community members. Cadres play a role in improving the degree of public health both physically and mentally. The active role of mental health cadres helps to prevent an increase in mental disorders through early handling in the community. This study aims to explore the supporting factors that influence mental health cadres in carrying out roles in Wonokromo Surabaya. Used a qualitative approach with phenomenological studies, 18 participants were interviewed and observed. Data were analyzed using the Colaizzi analysis method. The research findings obtained 4 themes namely 1) cadre characteristics, 2) knowledge, 3) motivation and 4) expectations. Supporting factors are important factors that influence the role of mental health cadres in carrying out their roles.

Keywords: *Mental Health Cadre, Qualitative, Role.*

Introduction

Mental health problems continue to increase both in the world and in Indonesia. Mental illness is a major cause of morbidity and mortality and an increase in the burden of the State[(1)], this causes of disability and premature death, decreasing quality of life from non-communicable diseases[(2)]. There are differences in life expectancy for individuals who have no mental illness with individuals who experience mental disorders[(3)]. The gap between availability and need for mental health services exceeds 75% in most parts of the world and extends in the lowest income countries by as much as 90%[(4)].

WHO reports in 2016 there were around 35 million people experiencing depression, 60 million people have bipolar disorder, 21 million have schizophrenia and 47.5 million experience dementia. The prevalence of mental-emotional disorders indicated by symptoms of depression and anxiety for ages of 15 years and overreach around 14 million people or 6% of the total population of Indonesia. This means that there are more than 1 million people in Indonesia who suffer from mild mental disorders, while the prevalence of severe mental disorders, such as schizophrenia, reaches around 400,000 people or as many as 1.7 per 1,000 inhabitants[(5)].

Severe mental disorders in East Java province showed 2.2% of the total population of 38,005,413 people or as many as 83,612 people experienced severe mental disorders. The mental-emotional disorder of the East Java province shows a fairly high number of 6.5% 4. Cases of mental disorders in the Wonokromo Community Health Center work area were 99 cases out of 42,620 residents[(6)].

The high mental health problems require active participation from various parties including the government, health care providers etc. because currently there are still lack of trained human resources, mental health service facilities that are still lacking and it is not possible for the government to provide mental health workers in the near future.

The global mental health challenge is to increase knowledge and literacy about mental health disorders to the community, improve and expand ways to identify

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and treat mental disorders effectively. The things that can be done is to increase training and conduct community empowerment such as the formation of cadres. The formation of mental health cadres will be very helpful in programs to deal with mental health problems in the community[7]. Mental health care in the community requires commitment and partnership with the community, especially stakeholders as community leaders[8].

Efforts to deal with mental health problems carried out include primary, secondary and tertiary prevention. Primary prevention, mental health cadres identify risk groups, provide information about mental health problems to the community, provide social and emotional support for clients or families in stressful situations. Secondary prevention, mental health cadres involved in conducting early detection, motivating families or communities to be involved in mental health programs. Tertiary prevention, mental health cadres can help clients in the rehabilitation process and motivate clients to exercise control and get therapy[9].

Wonokromo Village has enormous potential both from economic potential, socio-cultural potential, and human resources. The survey in March 2018 found 23 mental health cadres in Wonokromo village. This shows that there are quite a lot of mental health cadres compared to other community Health centers in the city of Surabaya. Mental health cadres in Wonokromo village were formed in 2017, but in the implementation of the role of cadres is very active, such as integrated mental health service posts that are routinely carried out every month

This study aims to explore the supporting factors that influence mental health cadres in carrying out roles in Wonokromo village using the Preced-Proceed Model approach.

Method

This study uses a qualitative approach with phenomenology studies. Mental health cadres who meet the inclusion criteria are conducted interviews and observation activities. Data obtained were analyzed using the Colaizzi method, data validation using source triangulation techniques.

The first step that was carried out before the research was to submit a research permit application to the Surabaya City Health Office, then the initial data collection to the Responsible Staff of the Mental Health Program at the Wonokromo Health Center. The researcher came to the participants one by one to explain the objectives of the researcher and to contract time for conducting interviews and observing participant activities. 18 participants expressed willingness to be interviewed while 1 participant stated that they were not willing to be interviewed and 4 people who were not included in the inclusion criteria. Interviews were conducted at different locations and times.

Findings: The Preced-Proceed behavior model from Lawrence Green and M. Kreuter (2005) states that there are two factors that affect the health level of a person or society, namely behavioral factors and non-behavioral factors. In health promotion programs it is known by the existence of a review and follow-up model[9].

Supporting factors are factors that influence and underlie the occurrence of certain behaviors. Based on the results of the interviews found several themes namely cadre characteristics, knowledge, self-motivation and expectations of participants.

a. **Characteristics of cadres:** The results of this study obtained 18 participants with an average age of 46-55 years (9 people) with the highest level of education namely high school (10 people). Most jobs are IRT (17 people), and are dominated by women (17 people). All participants are Muslim.

b. **Knowledge:** Knowledge is the result of "knowing" that occurs after people have sensed a particular object. Knowledge becomes an important basis for someone to take action. Notoatmojo (2007) a person's knowledge is influenced by the level of education, experience, culture, and economy[10].

   The highest level of mental health cadres education is the level of high school education. Mental health cadres gain knowledge about mental health through training. Mental health cadres are taught about, causes of mental disorders, how to conduct early detection and how to deal with mental disorders in the community. The following is the narrative of mental health cadres during interviews

   "We were first made into mental health cadres, we took part in the 2017 training around June... (R02)

   "We were given a briefing on how to get closer to the people with mental health disorders and also the patients detected the risk of having mental disorders.

So we are taught how to meet the real people with mental disorders, (R16) "

a risk factors like the burden of life, the economy, it could also be the burden of school children with the burden of so much learning that eventually becomes stressful (R01)

"A chronic person who does not recover, it will lead to it, because the problem is, how come I am sick, not cured. it made it hinder his thinking (R04)

"We provide assistance to patients and their families, we ask the medicine, what activities have been carried out (R15)

Kurniawan & Sulistyarini (2016) has examined the relationship of providing training to help cadres improve knowledge in dealing with mental health problems in the community. Research conducted by Rosiana et al. (2016) found that the results of training on mental health cadres, namely cadres were able to realize the existence of mental health problems, explained mental health and how to manage them, cadres were able to do early detection, move the community to participate in counseling[12]. Research conducted by Sutarjo et al. (2016) in line with the results of Lucy Maconick et, al (2018) study that there was an increase in cadre skills after being given training[13],[14]. Mental health training succeeded in increasing knowledge, confidence and attitudes of social health workers [15].

c. Self Motivation: Motivation affects individuals in doing to achieve the goals to be achieved. Interviews conducted with mental health cadres found that mental health cadres in carrying out the role in the community have a lack of motivation. The following are excerpts of interviews with participants:

"Maybe that's what, just say anything, aims, he will, I'll pay the one above right (R04)

"We just enjoy it, we help what" social "is easy-hopefully, it will be a blessing"

"I sincerely do activities like that, indeed, I am happy, like social activities."

"The experience of my father was killed people with mental disorders, I joined this caretaker so that people with mental health disorders did not all kill or feel cruel, so it can be handled, treated so it can recover as before"

"My soul is actually touched to see someone like that, someone like that must be embraced"

"For experience, that's it. I am happy to know the cases of people who seem healthy, but there are those who have problems "

Cadres have diverse motivations in carrying out roles. There are cadres who say they are happy with social activities, happy to be various, useful for the community, happy to get knowledge about mental health problems. In addition, cadres are also say that the activities carried out as alms to get a reward, Cadre performs her role with a sincere heart without expecting rewards, feels touched after seeing and interacting with patients. One cadre wants his bad experience not to happen to other people.

Motivation is a concept that describes extrinsic conditions that stimulate certain behaviors and intrinsic responses that reveal human behavior, motivation is also defined as beliefs and emotions that affect a person's behavior[16].Research conducted by Prang, et al (2013) showed a significant relationship between cadre motivation and activeness of cadres, this factor is the most dominant factor in carrying out an action. The theory of motivation for new directions for theory states that motivation represents a psychological process that will cause responsibility and is the initial stage of willingness to act to achieve the goal. Everyone wants to be trusted, included and recognized as a potential person so that self-confidence arises and is ready to assume responsibility[17].

Motivation possessed by mental health cadres is able to move cadres in carrying out roles in society. The cadre's caring attitude was based on the motivation of the cadre to be happy to help others, the community's needs for themselves also motivated the cadres to carry out their roles in the community health center.

d. Hope: This theme illustrates the hopes possessed by mental health cadres related to mental health problems in the community. The following is the presentation of the results of interviews with cadres:

"Hopefully, in the future, it will be like that, so that it can be received in the community again, it is more humane, sometimes there are people who are ostracized, and there are family members who feel it is a disgrace or something..."

"Yes, I want the government to guarantee people like that"

"My passion is even though I don't recover completely, but at least I don't know, I can control myself, take care of myself"

"Well, we want all the people in this area to be healthy, there are no one people with mental disorders"

"Yes, the hope that people with mental disorders have been routinely going to menur (Hospital) has been improved, healed, if possible. all people with mental health disorders here can be cheerful, not moody. can hang out with the surrounding neighbors,"

"The hope is to recover even if it's not 100%.

"Our patients get medical care like other general patients.

"Don't be cornered, exiled. Still able to embrace, the only way we did before was the result of not widening "

Cadres have hopes for the community not to stay away from, limit, isolate patients who have mental disorders. The purpose of the caretaker is to help patients care for patients so that patients can socialize with the surrounding community. Participants hope that mental health problems in the community can be reduced, people with mental disorders can recover, can control themselves. In addition, participants hoped that the government would pay attention to patients regarding treatment and fulfillment of their daily needs.

Participants have hopes of increasing the role of mental health cadres, along with excerpts of interviews with cadres :

"Yes, I hope it can be more advanced, if we can, the cadres can be eager to advance this, so the cadres of the caretaker will do it because we are sometimes confused"

What can we do or not? ". But I believe, we hope that these tenants can move forward, more fun, more compact to advance the caretaker, here we can coordinate, detect, we can mingle with the sufferers so that they can be familiar, happy like that,

Hope for mental health cadres to be able to progress, cadres remain enthusiastic, compact and able to perform their roles optimally to continue to help deal with mental health problems in the community by providing assistance to patients and families, controlling the health development of patients, helping patients to be independent so that patients are able to operate independently and no longer dependent on others.

Expectations arise from a cognitive assessment that meaningful goals are possible in the future[18]. Emotions such as expectations arise when an event is valued as important and important to be considered by the individual thereby strengthening cognitive perceptions only the possibility and adding elements of motivation, manifested in the planning path to achieve desired goals[18].

Conclusion

Supporting factors influence mental health cadres in carrying out the role, supporting factors namely knowledge, self-motivation and expectations of mental health cadres.

Conflict of Interest: There is no conflict of interest in research

Ethical Permission: This study has passed the ethical test with the number 1157-KEPK by the Research Ethics Commission of the Faculty of Nursing, Airlangga University.

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Organoleptic Quality of Nugget Products Seluang Fish and Gabus Fish with Tempe Formulation as Food Products of Protein Sources for Toddler Kep

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Abstract

Protein deficiency in the diet is the most serious nutritional problem in cases of malnutrition, which is often known as Protein Energy Deficiency (KEP). Children and toddlers need more protein for more active growth and energy exchange. Therefore, an alternative source of energy and high protein is needed which has been known by all levels of society as raw material for brownies such as kepok bananas and seluang fish. It is expected that these products can overcome and prevent KEP problems such as malnutrition and malnutrition in infants.

This research is an experimental research conducted in two stages of research. The first stage was processing seluang fish and cork fish tempe formulations with a ratio of 25%: 75%. At this stage organoleptic tests were carried out with Mann Whitney analysis with a significance of 0.05%, and supporting data for proximate and amino acid tests.

The supporting data of the highest essential amino acid test results in cork fish, tempe formulation, which is a lot of 1.08% leucinese and in seluang fish, tempe formulation is 0.80%, the highest essential amino acid content in seluang fish is as much as 2.64% amino glutamic acid and cork tempe formulation 2.21%.

Keywords: *Nugget, seluang fish, cork fish, tempe and organoleptic test.*

Introduction

Protein deficiency in the diet is the most serious nutritional problem in cases of malnutrition, which is often known as Protein Energy Deficiency (KEP). Toddlers are more vulnerable to KEP cases. The impact of PEM on toddlers causes abnormal growth, decreased immunity, and a low level of intelligence. In severe stages, PEM in infants can cause kwarshiorkor to death.[1] The prevalence of cases of malnutrition in Indonesia continues to increase from year to year. According to data from Basic Health Research (RISKESDAS) in South Kalimantan Province the prevalence of underweight and malnourished children under five in 2013 was 19.2% malnutrition and 8.2% malnutrition.[2] According to Astuti (2014) tempe protein is classified as easily digested so that protein can be used to gain weight, especially in toddlers. Overall soybean tempeh contains a fairly high nutrient element: 25% protein (17 grams protein / 100gram), 5% fat, 4% carbohydrate and 60% water, a source of vitamin B12 which is high enough, low fat, cholesterol free. Besides being able to be given also processed fish as an additional food for toddlers.[3] The main advantage of fish products is that the digestibility of fish protein is very high (more than 90%) so that the fish are easy to digest because fish meat is softer than other animals.[4] Seluang fish (Rasbora spp.) Is one of the edible small fish his whole body.[5]Seluang fish contains 361 Kcal of energy, 10 grams of protein, 5.3 grams of carbohydrates, 3.2 grams of fat, 80

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milligrams of calcium, 224 milligrams of phosphorus, and 4.7 milligrams of iron. In addition, Seluang Fish also contains 86 IU of vitamin A, 0.03 milligrams of vitamin B1 and 0 milligram of vitamin C. Cork fish (synonym channastriataophiocephalusstriatus) is a predatory fish and is an authentic Indonesian aquatic fish. In cork fish contains proteins, especially albumin and essential amino acids, fats, especially essential fatty acids, special minerals zinc / zinc and some vitamins that are very good for health.[6] The processing of high-protein food products such as nuggets made from seluang fish and fish cork with tempeh formulation, is expected to be effective in overcoming and preventing PEM problems such as malnutrition and malnutrition in infants.

Method

This research is an experimental research because it is done by setting the treatment, where the researcher can arrange the treatment. There are two types of nugget formulations namely nugget namely seluang fish nugget tempe (P1) formulation and cork fish tempe formulation (P2) with a ratio of 70%: 30 %. Furthermore, organoleptic quality tests of nuggets were carried out, and as supporting data a nutritional value (proximate and amino acid) test was carried out. This study was carried out at the Food Technology Laboratory and Laboratory of Organoleptic Test at the Department of Nutrition of Banjarmasin Polytechnic for the process of making tempe nugget formulations with additional Seluang Fish and Fish Cork. Organoleptic quality test using the hedonic scale test test form in the form of a panelist response to preferences or vice versa. Processing and analysis of data using the Mann Whitney test to determine the difference in organoleptic quality, seluang fish nuggets tempe and cork fish nuggets formulation tempeh formulations with a significance level of 0.05. The data obtained was processed using the Microsoft Excel 2010 program and SPSS for Windows 16.0. The received data on nugget formulation products was presented descriptively. Proximate tests and amino acids will be analyzed descriptively.

Results

Organoleptic quality tests for the acceptability of celluang fish cork formulations and cork fish nuggets were obtained using 35 students as semi-trained panelists. The components assessed are color, taste, aroma, and texture. From the organoleptic test based on color, the average color values of seluang fish nugget tempe formulations were lower at 3.30 compared to cork fish nuggets with tempeh formulations which had an average value of 3.83. The distribution of panelists with criteria that are very fond of seluang fish nuggets tempe formulation (0%) is also lower than cork fish tempe (16.7%) formulation. In general, both Seluang fish and nugget fish nuggets are preferred by more than 50% of the panelists in terms of color, namely 53.3% and 63.3% respectively. However, in Seluang fish nuggets there are 3.3% who say they are very dislike. Seluang fish nuggets tempeh formulations have a dark brown color, compared to cork fish nuggets tempeh formulations are yellowish brown in color. The color difference of the two products is very striking. Can be seen in Table 1.

Table 1 : Distribution and Average Value of Organoleptic Quality Score Color of seluang fish nuggets and cork fish tempe formulation

Criteria	Nugget Ikan Seluang		Nugget Ikan Gabus	
	N	%	N	%
Very Like	0	0	5	16.7
Lika	16	53.3	19	63.3
Neutral	10	33.3	4	13.3
Do not like	3	10	2	6.7
Very Do not like	1	3.3	0	0.0
Average	3.30		3.83	

Source : Data Primer 2018

In terms of aroma, the average value of the aroma of seluang fish nugget tempeh formulation was 3.67 higher than that of cork fish nuggets in tempe formulation which had an average value of 3.60. Distribution of panelists with criteria very like on seluang fish nuggets tempe formulation (20%) greater than cork fish nuggets formulated tempe (16.7%). The results of seluang fish nuggets tempe formulations and cork fish nuggets tempe formulations produced are savory scented.

In terms of nugget texture, where the average value of texture preference on seluang fish nugget tempe formulation was higher, which was 3.53 compared to cork fish nugget tempe formulation which had an average value of 3.36The distribution of panelists with criteria very much like the seluang fish nugget tempe formulation (16.7%) also has a higher value than cork fish nuggets, can be seen in Table 2.

Table 2 :Distribution of Quality Score of the Texture Organoleptic of Seluang Fish and Cork Formulation of Tempe Fish

Criteria	Nugget IkanSeluang		Nugget ikangabus	
	N	%	N	%
Very Like	5	16.7	1	3.3
Like	13	43.3	18	60.0
Neutral	8	26.7	6	20.0
Do not like	3	10.0	4	13.3
Very Do not like	1	3.3	1	3.3
Average	3.53		3.36	

Source: Data Primer 2018

Table 3 : Distribution of Organoleptic Quality Score Value of Seluang Fish Nugget and Cork Formulated Fish Tempe

Criteria	Nugget IkanSeluang		Nugget ikanGabus	
	N	%	N	%
Very Like	0	0	3	10
Like	18	60.0	17	56.7
Neutral	4	13.3	6	20
Do not like	5	16.7	7	23.3
Very Do not like	3	10.0	4	13.3
Average	3.17		3.50	

Source : Data Primer 2018

Table 4 :Average Quality of Organoleptic Seluang Fish Nugget and Cork Formulation Fish Tempe

Criteria	Nugget Ikan Seluang	Nugget Ikan Gabus
Color	3.30	3.83
Aroma	3.67	3.60
Texture	3.53	3.36
Taste	3.17	3.50
Total Value	13.67	14.29
Average	3.42	3.57

Source : Data Primer 2018

The resulting value is a combination of seluang fish and tempeh formulations and cork fish and tempeh formulations. Texture differences are caused by differences in the basic ingredients used in making nuggets, where Seluang fish contains 13.9 grams of protein per 100 grams of material weight, 642 mg of calcium / 100 grams of ingredients while tempeh contains 18.9 grams of protein per 100 grams of material weight, fish cork containing 13.9 gr per 100 gr weight of ingredients and amino acids and calcium 290 mg / 100 gr high material weight and albumin (3) Then in terms of taste, seluang fish nuggets tempe formulation is lower, which is 3.17, compared to Nuggei cork fish tempeh formulation of 3.50. This shows that in terms of the taste of cork fish nuggets the tempeh formulation is more acceptable. Can be seen in Table 3.

We did the total score of the results of the quality assessment and organoleptic acceptability of the two nugget formulations. It was found that the cork fish tempe nugget had the highest average value of 3.57 compared to the Seluang fish nugget tempe formulation of 3.42. In both cellulite and cork fish nugget formulations, an analysis of the composition of nutrients and amino acids can be seen in Table 5 and Table 6. Proximate test for nutrient composition showed that the water content of seluang fish nugget tempeh formulation was 43, 53%, this value is lower than cork fish nugget tempe formulation which is 46.96%. This will affect the shelf life / expiration. Carbohydrate content (KH) in Seluang fish nuggets is higher by around 2.2%, which is 30.4% compared to cork fish nugget which is only 28.2%.

Table 5 : Proximate Content of Seluang and Gabus Fish Nugget

ContentsAsam Amino	Nugget ikanseluang formulationtempe	Nugget ikangabus formulationtempe
Protein (% w/w)		
Aspartic acid (%)	1.18	1.0
Glutamic acid (%)	2.56	2.09
Serine (%)	0.60	0.51
Histidine (%)	0.23	0.21
Glycine (%)	0.51	0.47
Threonine (%)	0.45	0.37
Arginine (%)	0.67	0.58
Alanine (%)	0.61	1.07
Tyrosine (%)	0.78	0.34
Methionine (%)	0.29	0.25
Valine(%)	0.65	0.55
Pheniylalanine(%)	0.66	0.55
I-leucine	0.63	0.52
Leucine	1.56	0.86
Lysine	0.59	0.43
Amino Acid Total	11.06	9.40

Source: Data Primer 2018

The analysis of amino acid content can be seen in Table 6.

Table 6 : Content of Amino Acid Nutrient Value Seluang fish Nugget Cork fish Nugget

Proksimat Content	Nugget Ikan Seluang	Nugget Ikan Gabus
Water content (%)	43,53	46,96
Ash content (%)	2,62	2,81
Fat (%)	12,27	12,11
Protein (%) *	11,08	10,8
Carbohydrate (%)	30,4	28,20
Rough Fiber(%)	0,74	1,31

Discussion

KEP is one of the main nutritional problems that is often found in toddlers in Indonesia and other developing countries KEP has an impact on growth, intellectual development and productivity between 20-30%, besides that it also has a direct impact on morbidity and mortality[7]. One of the factors that influence the quality of nuggets is the amount of binder added and supporting materials needed in making fish nuggets such as salt, sugar, spices including garlic and pepper pepper.[8]Some studies show that tempe nutrients are easier digested, absorbed and utilized by the body compared to that in soybeans.[9]This has been proven in infants and toddlers suffering from malnutrition and chronic diarrhea. By giving tempeh, the growth of body weight of sufferers of malnutrition will increase and diarrhea heals in a short time.[10]Seluang fish contains energy equal to 361 Kilocalories, protein 10 grams, carbohydrates 5.3 grams, fat 3.2 grams, calcium 80 milligrams, 224 milligrams of phosphorus, and 4.7 milligrams of iron. In addition, Seluang Fish also contains 86 IU of vitamin A, 0.03 milligrams of vitamin B1 and 0 milligram of vitamin C. These results were obtained from conducting research on 100 grams of Seluang Fish, with an edible amount of 89%.[11] Cork fish also has a very good nutrient content for health. The content consists of high protein content, especially albumin and essential amino acids, fats, especially essential fatty acids, minerals, especially zinc / zinc (Zn) and some vitamins that are very good for health. Overall, the acceptance of seluang fish and cork fish nuggets with tempe formulations in terms of color, aroma, taste and texture was received quite well by the panelists.

Conclusion

The proximate analysis of nutritional value, cork fish nugget tempeh formulation has a higher protein content and higher crude fiber. The carbohydrate content is higher in seluang fish nuggets compared to cork fish nuggets. The highest essential amino acid test results on cork fish nuggets, tempe formulations, which are many leucinese 1.08% and on seluang fish nuggets tempeh formulations of 0.80%, the highest non essential amino acid content in seluang fish nuggets tempe formulations namely amino glutamic acid as much as 2.64%, in cork fish nuggets tempeh formulation is 2.21%. As for the assessment of organoleptic test results (color, aroma, texture and taste, cork fish nuggets tempeh formulations are preferred in terms of color and taste, while in terms of aroma and texture of Seluang fish nuggets are preferred. The results of this study illustrate that processed fish nugget products seluang or cork fish with tempeh formulation can be used as an alternative supplement for toddlers who are KEP.

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Association between Social Capital, Mental Health and Quality of Life among Migrant Workers in Myanmar

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Abstract

Introduction: During these decades, Myanmar has faced mass internal migration as a result of pull and push factors. The concepts and concerns related to Quality of Life on internal migrant workers are different from the general population. Migration gives rise to huge stresses and depression.

Methods and Materials: Cross-sectional study was conducted among 1,182 migrants. To assess socioeconomic status, health behaviors, mental health status, social capital, accessibility to health care services, and QOL. The Generalized Linear Mixed Model was used to determine the association between social capital, mental health and QOL after controlling the other covariates.

Result: About one third of respondents were factory workers and had low level of education. Regarding the level of good, fair and poor QOL were 26.82% (95% CI: 24.37-29.42), 71/74% (95% CI: 69.10-74.24) and 1.44% (95% CI: 0.89-2.30) respectively. Cognitive social capital (AOR=2.51, 95%CI: 1.14-5.55 p value<0.05), structural social capital (AOR= 2.14, 95%CI: 1.22-3.76, p value=0.008) and depression (AOR= 2.13, 95%CI: 1.25-3.62, p value=0.006) were associated with QOL. Not like the other studies, stress was not associated with QOL. The other factors associated with good QOL were monthly family income, living with related family members in a house and burden of medical services costs.

Discussion: Only one-fourth of internal migrant workers had good quality of life. The findings highlighted to develop policies aimed to improve QOL in order to reducing stress and depression among migrants by promoting social capital. In order to achieve the sustainable development goals, it is important to make investment on health of the migrant workers.

Keywords: *Quality of Life, social capital, mental health, migrant workers.*

Introduction

Like migrants are increasing trend globally[(1)], Myanmar has seen the significant internal migration, 20% of total Myanmar population[(2)]to seek job opportunities and pursue a better life[(3)]during these last few decades[(4)].The rural to urban migration has contributed to the explosive growth of cities all over the world[(5)]. Migrants are principally vulnerable to health problems[(6)].Migration gives rise to unambiguous stress, nevertheless most immigrants behave well in new settlement[(7)].

Rogers explored that socially isolated migrants were at increased risk for poor health outcomes because of their limited access to resources[(8)].The impact of human migration on mental health is complex and has cross-cultural differences[(9)]. Stress and depression could have an impact on overall health[(10)] and not recognized or treated, depression can profoundly impair their quality of life[(1)].

QOL is one of the essential aspects of human health, which includes physical, mental and social context. Over the past few decades, measuring QOL has become a familiar approach in health research[(11)].

Currently, there are limited data available regarding the level of QOL and its associated factors among internal migrant workers who were chosen as a priority

group because they were living under highly stressful situations and needs to be addressed because 25 % of those migrate to Yangon.

Hence, the aims of this study were to investigate the levelof quality of life and association between social capital, mental health and QOL among internal migrant workers in Myanmar. The findings of the study will contribute to formulate specific measures to improve quality of life among migrant workers even though they are vulnerable population.

Methods

This cross-sectional study was conducted in 2018 at North and East Districts among four districts namely East, West, North and South of Yangon Region.

Study participants: Migrant workers with the aged between 18 to 59 years living in Yangon Region and could verbally communicate were included in this study.

The multiple logistic regressions used to estimate the sample size. The approximate sample size was 600. In order to control the over-fitting, we used ρ and VIF. Therefore, total samples was 1182. A multistage random sampling method was used.

Firstly Yangon was purposively selected then 2 districts were randomly selected namely, East and North among 4 districts. After that two townships (sub-districts) from each district were randomly selected namely Hlaingtharyar and Shwepyithar from North District and Dagon East and Dagon Seikkan from East District. Therefore 4 townships (sub-districts) were included in the study. Finally, 2 community were randomly selected from each township. Then simple random sampling was applied to select 1,182 individuals proportionate to the size of the population. All participants were interviewed face-to-face by trained interviewers.

Research tools: A structured questionnaire which was developed from reviewing literature. The questionnaire underwent content validation by 3 experts and then it was revised to improve validity. The questionnaire was tested for reliability using Conbach alpha coefficient, 0.80. The questionnaire consisted of six parts: (1) socioeconomic (2) Health behavior (3) social capital (4) mental health (5) accessibility to health services and (6) quality of life.

Assessment of quality of life: QOL was assessed by using WHOQOL– BREFquestionnaire, consisted of 26 items within the 4 domains. The scores are categorized into 3 groups: poor (26–60), moderate (61–95) and good (96–130).

Assessment of Stress: By using Perceived Stress Score, contains 10 questions, each scored from 0 to 4. The higher and longer the duration of self-perceived stress, indicated by a higher score. The scores are categorized into 3 groups: low (0-13), moderate (14-26), high (27-40).

Assessment of Depression: Burmese version of the Centre for Epidemiological Studies Depression Scale (CES-D) which is a 20-item self-report questionnaire using a four-point rating scale. A cut point of 16 or greater is defined as depression in Myanmar migrant population.

Assessment of Social Capital: Structural Social Capital included; Unity, Transparency, Responsibility of leaders, Participation and Responsibility, Parallel Organization. Cognitive Social Capitalincluded; behavior, attitude, trust, reciprocity and sharing the norms. For each part, using the 5 scores: Never, Often, average, frequently, mostly. After summing the total marks, according to Kiess's theory, total score were divided into 3 groups such as high, median and low.

Socio-economic status (SES) and Health service accessibility factors: Socio-economic status composed of gender, age, marital status, educational, occupation, house ownership, relationship with family members, monthly income, adequacy of income, burden of transportation cost and medical service costs were treated as covariates in the analysis.

To minimized information bias, we trained interviewers and standardized the data collection competency in the study area. They were structured questionnaire interviewed by well-trained and standardized interviewers.

Data analysis: STATA® (ver. 13; College Station, TX, USA: Stata Corp). The categorical data were presents as frequency and percentage whereas the continuous data as mean, standard deviation, median, and range. The GLMM was operated to model the random effects and correlations inside clusters. In the modeling, the residential area, community set as the random effect. Bivariable analysis was utilized to define the association of each independent variable with quality of life. In bivariate analysis that had $p \leq 0.25$ were chosen and continue to the multivariable analysis.

The final model results presented the magnitude of association of independent variables and good quality of life were adjusted odds ratio (adjusted OR) and 95% CI.

Results

The average age of migrant workers in this study was 31.42 years and gender distribution was not much different but more than half of respondents were married. Nearly three fifth of participants were primary and secondary school education level. Only 11.24% owned their houses. Among the migrants, nearly 90% were related and breathed in a house.

Nearly three fourth of migrants responded that their monthly family income ranged between USD 130 – USD 230 with median monthly family's income of USD 200. Nearly half of the respondents said that they had no financial problem but can't save money.

Most of migrants responded that they felt moderate level of: stress, total social capital, cognitive social capital, structural social capital, QOL and no burden of medical services costs. Nearly two fifth of the respondents suffered depression.

Table 1: Number and percentage of QOL among migrants in the Myanmar (n=1,182).

Quality of Life	Number	Percent	95%CI
Poor QOL (≤60)	17	1.44	0.89-2.30
Moderate QOL (60-90)	848	71.74	69.10-74.24
Good QOL(≥90)	317	26.82	24.37-29.42
Mean ± standard deviation Median (Min : Max)	83.12± 9.62 83 (52 : 110)		

Most of the migrants had moderate QOL (71.74%), 26.82% had good QOL and the rest, 1.44% had poor QOL.

The bivariate analysis revealed that total social capital (COR= 1.95, 95%CI: 1.38-2.75, p value <0.001), cognitive social capital (COR= 2.30, 95%CI: 1.68-3.13, p value <0.001), structural social capital(COR= 1.95, 95%CI: 1.37-2.78, p value <0.001), depression (COR= 2.33, 95%CI: 1.75-3.11, p value <0.001) and stress (COR= 1.52, 95%CI: 1.02-2.25, p value <0.001) were strongly associated with Good QOL. Also, gender,house ownership, relationship of family members, time to reach the health service center, burden of transportation cost and medical service costs,support for medical servicecosts were associated with good QOL. But in contrast to previous studies that age, marital status, education, occupation,monthly family income were not associated in this study.

Multivariable analysis for associated factors of good QOL, GLMM was performed to control the clustering effect of the sampling selection of the participants. The association between multiple independent variables and good QOL was determine by using multivariate analysis to control the effect of covariates.

Table 2. Adjusted Odd ratio for the factors on good quality of life based on GLMM after controlling the random effect (n = 1182)

Characteristics	No	% of Good QOL	Crude OR	Adjusted OR	95%CI	p-value
1. Cognitive Social Capital						0.023
Low and moderate	970	23.61	1	1		
High	212	41.51	2.30	2.51	1.14-5.55	
2. Structural Social Capital						0.008
Low and moderate	1027	24.93	1	1		
High	155	39.35	1.95	2.14	1.22-3.76	
3. Depression						0.006
Depression	452	17.26	1	1		
Without Depression	730	32.74	2.33	2.13	1.25-3.62	
4.Monthly Income						

<USD 130	264	21.59	1	1		
USD 130- 200	578	27.68	1.39	1.41	1.03-1.92	0.032
≥USD 200	340	29.41	1.51	1.49	1.05-2.13	0.024
5. Related with family members						<0.001
not related	135	25.50	1	1		
Related	1047	37.04	1.71	2.15	1.59-2.92	
6.Burden of medical services costs						<0.001
Some what a burden & Very burden	296	20.27	1	1		
Not a burden	905	28.51	1.57	1.34	1.14-1.56	
7. Stress						0.643
Moderate and severe stress	1076	25.56	1	1		
Mild stress	125	34.40	1.53	1.18	0.58-2.40	

Discussion

The prevalence of good QOL among migrant workers was 26.82%. These findingwas consistent with the study, one third[12]were felt as good QOL. But a study showed that 94% were moderate level of QOL[13]. It was less than all level of QOL in compared with two studies among Myanmar migrant workers in Thailand. It was not consistent with the study done in Chiang Rai, 56% demonstrated moderate QOL, high (43.8%) and low (0.20%)[14]. It was not similar in a study done in Dhaka city, low QOL (94%), moderate (3.25%) and high (2.75%)[15]. Inconsistent with the study was done at construction site, 14.6% were rated as having poor QOL[16].

After GLMM analysis, cognitive social capital, structural social capital and depression, monthly family income, living with related family members and burden of medical services costswere strongly associated with good QOL.But stress was not significantly associated in this study.

More socially connected female expressed higher QOL[17]. The presence of social capital among adolescents and establish associations with their QOLin Brazil[18]. Hosseini, S. M et al suggested that enhance social capital for improving QOL among breast cancer patients[19].

Social support is very important to health outcomes and has a positive effect on QOL[20]. For the cognitive social capital, migrants with high cognitive social capital were 2.51 times more likely to get good QOL than those with moderate and low cognitive social capital. Regarding structural social capital, migrants with high structural social capital were 2.14 times more likely to get good QOL than those with moderate and low group. These findings were consistent with the study done among elderly in north east of Thailand[21].

On seeing the mental health status, migrants did not suffer depression were 2.13 times more chance to get good QOL than migrants suffered depression. The finding was consistent with other study[12].

Stress was not significant, migrants with mild stress were 1.18 times more chance to get good QOL compared to moderate and severe stress group. It had similar agreement with the study[16] but inconsistent with the study done in Singapore[1].

Regarding socioeconomic and demographic characteristics of the respondents, living with related family members was the strongest variable (AOR=2.15, 95% CI= 1.59 to 2.92, p<0.001). It was similar with the study done in Myanmar[22].

High monthly income group got good QOL than the other groups. It had agreement with the studies[23].

Burden of medical service cost associated with good QOL. The participants with financial hardship were 1.34 times more chance to get good QOL than those without (AOR= 1.34; 95% CI= 1.14 to 1.56; p-value < 0.001). It had similar agreement with the study done in northeast of Thailand[21].

Conclusion

Only one-fourth of internal migrant workers had good QOL. Cognitive social capital, structural social capital and depression were strongly associated with good QOL. But stress was not associated with good QOL.

Limitation of the Study: Cross sectional study was not allowed the cause and effect relationships between various factors and QOL. This study was conducted among migrant workers (18 to 59 years old) living in Yangon Region thus it could not generalize the all migrant workers in Myanmar.

Conflicts of Interest: The authors declare no conflict of interest.

Ethics Clearance-: Taken from Khon Kaen University Ethics Committee in Human Research (the approval number, HE 612079) and University of Public Health, Yangon, Myanmar (ITERB-2018/Research/17). A coding scheme was used and every document were destroyed on completion of research.Written consent was obtained from all participants prior to participation.

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Evaluation of Implant Stability of Supported Mandibular Overdenture Retained by Telescopic Crowns Over Screw Retained and Self-locking Conical Abutment Connection

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Abstract

Background and Objective: Long-term success of dental implants depends on implant abutment connection. This prospective study aims to assess the implant stability of self locking conical connection and traditional platform implant abutment connection with mandibular telescopic supported overdenture.

Material and Method: This study is a randomized controlled study included twelve completely edentulous patients selected from the Outpatient Clinic of the Prosthodontics Department, Faculty of Dentistry, Minia University.Two root form implants were inserted in canine area bilaterally in each patientone is self -locking implant abutment connection while the other is traditional platform. Telescopic overdenture was constructed over the two implants. The stability was evaluated at 3, 6, 9 and 12 months. The collected data were analyzed by SPSS program version 20 with considering statistical significance when P value<0.05.

Results: There was no significant difference in implant stability regarding mean implant index when evaluated at delivery and various intervals with self locking conical implant abutment connection. While with traditional implant abutment connection there was significant difference in implant stability when evaluated at delivery and 6 months interval.

Conclusion: The self locking conical implant abutment has more stability rather than traditional platform implant. This is may be explained by that the self locking conical implant abutment interface optimize the ability of an implant-to-abutment joint to resist bending forces and micromotion increasing implant secondary stability.

Keywords: *Stability,telescopic over denture, self locking conical connection implants.*

Introduction

The introduction of modern dental implant leads to many problems which were solved in case of complete edentulism. Dental implants improve the problem of support and retention of complete denture. Moreover; utilization of dental implants has many benefits. The balance and effectiveness of prosthesis has positive effects on oral structures and aesthetics. They also improve the quality of life of the patients by reducing their total healthcare costs in the long run.[1]

Many factors affect the success of the implant treatment. These factors include the bone–implant, implant–abutment and abutment–prosthesis interfaces.[2] A major difference between implant systems is the type of connection between implant and abutment. There are two types of implant abutment connection external

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connections and internal connection. The internal connections prevent the complete tilting of the abutment even in the absence of a connecting screw during the extra axial loading[3,4] in peri-implant bone[5,6].

In this study we tried to evaluate the reliability of the implant/prosthesis system using conical connection between implant and abutment in comparison to the traditional platform implant abutment connection.

Patients and Method: The current study is a randomized controlled study that included twelve completely edentulous patients selected from the Outpatient Clinic of the Prosthodontics Department; Faculty of Dentistry, Minia University.

For each patient medical history, clinical examination, mounted diagnostic casts and radiographic assessment were carefully done.

The inclusion criteria were:age above 50 years old, angle Class I relationship between maxilla and mandible, adequate oral hygiene, firm and adequate mucosal thickness and without highly frenal attachment, physically and psychologically able to tolerate conventional implant surgical protocol, sufficient bone height and width as well as adequate bone quality as confirmed radiographically, proper tongue size and sufficient inter-arch distance to accommodate the future prosthesis and attachment.

The exclusion criteria include:alcoholic or drug abusers, health condition precluding surgery, logistic or physical reasons that could affect follow-up, psychiatric problems, disorders to the implant area related to a history of radiation therapy to the head and neck, neoplasia, or hematological diseases.

All patients participated in the study were informed about the nature of the study and its purpose, agreed to take part in it and write an informed consentre viewed by the research ethics committee of the Faculty. All reasonable steps to protect the confidentiality and privacy of the personal and health information of the patients were taken and patients informedabout the benefits of obtaining an implant.

Source of Funding: Self-funding.

Patient Grouping: The patients were randomly divided into two equal groups. Both groups of patients were treated by implant supported mandibular overdenture retained by telescopic crowns,and divided according to the implant abutment connection type into:

Group I: Include patients treated by implant with self-locking conical implant -abutment connection.

Group II: Include patients treated by the same implant system with traditional platform implant abutment.

Traditional complete dentures were constructed to the patients according to the regular manner using heat activated acrylic resin.

Surgical guide construction: For each patient, a customized surgical guide was fabricated using 3D printing technology. Patients were scanned by the cone-beam computed tomography(CBCT)machine, with lower denture contains gutta perch markers. After that, the lower dentures with gutta percha markers were scanned. Captured radio-opaque markers were imported into viewing software then sent for fabrication of the guide.

Overdenture construction: Two root form implants"implant direct: Reactive® no. 753716, interactive™ no. 653716, USA" were inserted at the mandibular canine areas in each patient using the surgical guide. After one week of implant insertion, two straight contoured abutments were fixed to the implant. The abutments with impression coping were unscrewed. The impression with elastomeric impression material was taken for construction of telescopic crowns connected with the framework.

As illustrated in Fig. (1), the metal try in was done. A jaw relation was taken. Setting of artificial teeth was preformed and try in of the trial denture was checked out. The waxed trial denture and processing cast were flasked, packed and processed as usual. The overdenture checked for accurate fitting on the abutments. The patients were instructed for proper way of denture removal and insertion, cleaning, and usage. Fig. (2,3).



Fig.(1):Two telescopic crowns connected meshwork mesially and distall

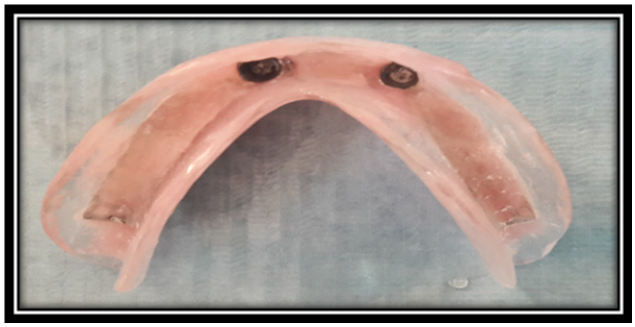


Fig. (2): Fitting surface of finished and polished denture



Fig.(3): Delivery of implant supported overdenture

Measurement of implant Stability: Implant stability was measured using osstell^{TM}. The Smart Peg was attached to the implant. The measurement probe was hold close to the top of the Smart Peg without touching it. The peg has a small magnet attached to its top, which is excited by magnetic pulses from a handheld computer. The peg vibrates in two directions, which are approximately perpendicular to each other. The vibration takes place in the direction that gives the highest resonance frequency (first mode) and in the direction that gives the lowest resonance frequency (second mode).
The values above 65 indicate a favorable response, whilst below quotient 45 implant stability may be indicative of overload and ongoing failure.[7] The measurements were at time of implant insertion 6,9, and 12 months Fig.(4,5).

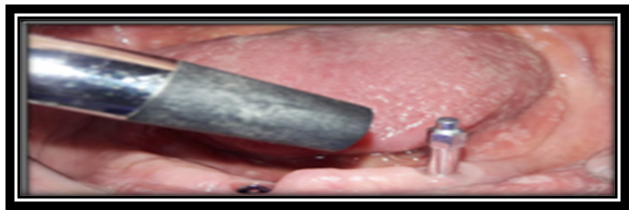


Fig.(4): Measurement of implant Stability using osstell^{TM} The mearment prob directed to smart pegs.

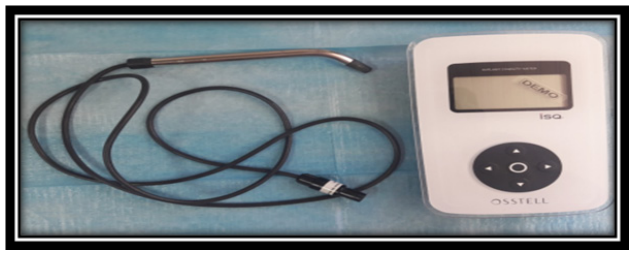


Fig.(5): Osstell™ ISO

Results

Regarding the mean implants stability at different intervals self-locking (interactive) implants, there was no significant difference regarding mean implant stability between delivery and other intervals. Regarding the mean implants stability at different intervals in traditional platform(reactive) implants, there was only significant difference between delivery and 6 months of follow up (p= 0.007).

During comparison between both groups, there was significant increase of mean implant stability among self locking conical abutment implant connection than traditional platform at different interval Fig. (6).

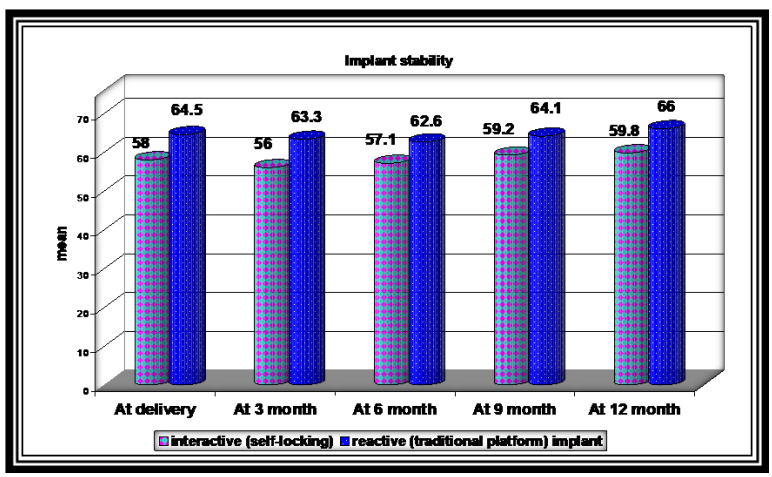


Fig.(6): Comparison of implant stability at different interval between both groups

Discussion

The criteria of success of Osseo integration are the absence of clinical mobility, no peri-implant radiolucency or infection, no pain, no neuropathy or parasthesia or crestal bone loss exceeding 1.5 mm at the end of the first year of function or 0.2 mm per year subsequently.[7, 8]

Accordingly, patients were scheduled for follow-up after 3, 6, and 12 month of implants placement and loading time to implant stability.

Implant abutment connection (IAC) is the point of transition from surgical to prosthetic phase. It is the primary determinant of strength and stability of the implant interface away from the crestal bone and consequently giving better biologic and aesthetic results. Over the years, different IAC have been developed with an aim to decrease stress on the prosthetic component and on bone-implant interface and ensure adequate prosthetic stability. [8]

Osstell^{TM}is non-invasive resonance frequency analysis (RFA). It is an easy practicable method of measuring quantitative stability that can be used in the intra-operative and post-operative settings. The resultant Hertz waves are converted into a numeric value which is called implant stability quotient (ISQ). This will deliver values which can be compared independently of the implant system used. The scale used ranges from 1 to 100 with the correlation to the resonance frequency value being almost linear. This means that the higher the ISQ value, the more securely the implant is retained to be anchored in the bone. [8]

Primary stability of an implant comes from the mechanical engagement with the cortical bone[11]. This is affected by the quantity and quality of bone. Secondary stability is developed from bone and tissue regeneration and remodeling around the implant after its insertion.[12,13]

In this study there is a significant increase of mean implant stability among self locking implant connection than traditional platform at different interval. This due to the absence of an implant–abutment microgap and consequently associated with reduced micro motion.

The same results were concluded by several studies which revealed that incidence of both mechanical and prosthetic complications observed during the loading period was minimal and there was high mechanical stability.[14,15,16]

Conclusion

The implant -abutment interface determines the lateral and rotational stability of the implant -abutment joint which in turn determine the prosthetic stability of the implant supported restoration.The self locking conical implant abutment interface optimized the ability of an implant-to-abutment joint to resist bending forces, micro motion. That led to increase in implant secondary stability.

Conflict of interest: Nil

Ethical Clearance: Every patient in this study had given their informed consent for inclusion before their participation. Which is conducted in accordance with the declaration of Helsinki, it was approved by the Ethics Committee of Minya University

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Stress Factors Influence on the Male Health in Crime an Republic

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Abstract

Nowadays, gender medicine generates the great deal of discussion in a modern society. However, more attention is given to on female health in comparison to male health. It is undoubtedly true that men have many physical and mental peculiarities and public health should consider these facts. *The aim of the study* is to access how different stress factors of childhood influence on male health in the Crimean Republic.

Materials and Method: Our investigation included 1144 men, from ages 18-65 living in different Crimean region from 2010 to 2016. They answered questionnaires, including 12 chapters and it consists of 233 questions. *Results* - The results of our investigation proved that stress factors from childhood negative effects on male health. Firstly, men without any psychological problems in childhood showed a low level of chronic diseases in adult life. It is on 87, 8% less than in other respondents (P<0, 05). Moreover, the frequency of hypertonic disease less on 34, 5% (P<0, 02); the number of other health problems is less by 64, 0% (P<0, 01). Secondly, in adulthood the frequency of hyper tonic diseases has a weak correlation with negative events (Q=0,159); at the same time the frequency of other problems with health is deviated from 836, 8‰ of hands and legs fracture to 1234, 6‰ of parents violence. *Conclusion* - The current findings prove that male health in the Crimean region was influenced by stressful factors, and elimination of these factors can possibly improve male health in general.

Keywords: *Stress, childhood, adolescence, male health, Crimea Republic.*

Introduction

Notwithstanding that, nowadays gender medicine is shared all over the world, the main attention is spent on female health problems. Specific aspects of male health care were being researched last since the decade for some reasons. The most persuasive reason is the different medical care needs conditioned on reproductive function, as a result they have varied risk of specific diseases. The second and third crucial reasons are the variability of risk of developing specific diseases and different realization of personal health in these groups [1]. Males have high social and economic status than females; meanwhile men have high risk of serious chronic diseases and death in different age period of life. Russian, Ukrainian and Belarusian men die 10 - 11 years earlier than women do. In comparison to Europe and USA, this indicator is significantly high [2]. Public health system should detect these differences and additional biological, psychological, social and behavioral factors influencing on male health. The research purpose is to defineinfluence of stress factors on the health of men living in theCrimean.

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Material and Method

Our investigation included 1144 men, ages 18-65, from different region of Crimea from 2010 to 2016. They answered a questionnaire, which included 12 chapters and consisted of 233 questions. The frequencies of chronic diseases, diabetes mellitus, and hypertension were assessed among male health indicator. A special psychological scale was created and tested with the purpose of comprehensively estimating

the respondents' neuropsychological condition in correlation with negative emotional experience in their childhood. As a result, the scale comprises such groups: balanced (minimal influence of stress factors on child), unstable(stress factors impact on child periodically), anxious (child develops in chronic stress). Statistical analysis of received data was realized by variation method of statistics. Relationship between health indicators and risk factors was accessed by the calculation of pair correlation (r), the Yule association coefficient (Q), and Pearson rank correlation coefficient (C). The reliability of differences among compared health indicators was evaluated by Student's t-test (t), the dispersed method (F), dispersion index (χ 2),authenticity (P) and Pearson's chi-squared test. Distinctions were statistic reliable in probability detection 95% ($p<0,05$). Database was processed by using Microsoft Excel 2010.

Findings: International statistical data proved that men during their life have mental disorders more often than women. Boys have significant risk of mental problems, which was diagnosed in their childhood and teenage years, than girls [3]. Social limited connections between men decrease level of their social adaptation. Under great stress, men commonly have weaker social support than women do. Among youngsters boys often do not have moral support after stress, nervous shock and depression [4].

Our investigation demonstrates the influence of stress factors in early childhood and adolescence of men on the health level in adulthood. Table 1 shows main consequences for men health after psychological problems in childhood.

Table 1. There are the frequencies of some diseases and other health problems in Crimean men according to their mental and psychological condition in childhood and adolescent years.

Mental and psychological condition	Cases amount 1000 persons			
	Chronic diseases	Diabetes mellitus	Hypertension	Other problems in men health
Balanced	107,3±11,7	22,7±5,6	188,3±14,7	804,8±14,8
Unstable	129,6±20,4	--	-	-
Anxious	201,5±35,5	20,0±7,0	253,1±21,6	1320,1±57,2
Total	123,9±9,9	21,7±4,4	211,9±12,3	991,8±2,8
χ^2	4,86	0,08	6,43	125,7
Q orC	Q= 0,200	–	Q = 0,187	C = 0,318
P	<0,05	>0,05	<0,02	<0,01

χ^2- dispersion index; C- Pearson rank correlation coefficient; Q- the Yule association coefficient; P- authenticity.

Table 1 showed that frequent emotional suffering in childhood and youth years have negative impact on their adult health. On one side, if the childhood was without stress factors, the frequency of chronic diseases was only 107, 3‰. On the other side, when male children have a lot of stress in childhood the number of diseases - 201, 5‰ (Δ=87, 8%, P<0, 05). The frequency of hypertension comprises 188, 3‰ and 253, 3‰ respectively, then more than (Δ=34, 5%, P<0,02). Moreover, the number of other health problems were 804, 8‰ and 1320, 1‰ respectively in previously mentioned groups, then more than (Δ=64, 0%, P<0, 01). This factor does not influence on the increased frequency of diabetes mellitus.

Male behavior is a serious factor, which correlates with the premature increase of mortality and morbidity indicators. Approximately half of male death cases can be prevented by changing the model of individual behavior. Results of the last cohort investigations, statistical data, meta-analyses showed that boys and men chose behavioral strategies leading to morbidity, injury and death [5]. Boys and men have become victims of physical violence. Around 50% men are injured by other men in majority cases [6]. Violent attitude to boys in age from 12 to 19 years on 50% often then the same to girls. According to official statistics in the USA, men have traumas often than women to two times. Some reports showed that in 12% adolescents were violated in physical and moral ways [7].

Table 2. Influence of negative events from childhood on their health level in adulthood. There is the frequency of some diseases and other problems with Crimean men health depending on negative consequences in their life.

Unfavorable cases in life	Cases amount1000 persons			
	Chronic diseases	Diabetes mellitus	Hypertension	Other problems in men health
Burns	130,4±40,5	0	194,4±46,6	985,7±14,2
Drowning	122,8±43,4	0	229,5±53,8	935,5±31,2
Domestic traumatism (injury fracture of hands, legs)	92,8±20,8	(20,6±10,2)*	190,5±28,6	836,8±26,8
Road and traffic accidents/car accidents	141,3±36,3	(32,6±18,5)*	241,7±44,9	1054,9±107,7
Sports injury	101,9±21,1	(13,7±8,1)*	183,6±26,9	893,7±21,4
Trauma in the fight	120,8±26,7	(14,8±9,9)*	203,9±32,7	967,1±14,5
Autoaggression	109,6± 25,8	(20,5±11,7)*	210,1±34,7	1101,4±89,3
Domestic violence	150,0±39,9	0	151,7±39,8	1234,6±123,4
Peer physical violence	116,8±27,4	(21,9±13,3)*	226,3±35,7	1087,6±31,3
Total	115,4±9,4	22,7±4,4	210,7±12,1	997,4±1,5
χ^2	14,82	4,55	29,64	117,17
C	–	–	0,159	0,305
P	>0,05	>0,05	<0,01	<0,01

χ^2- dispersion index; C – Pearson rank correlation coefficient; Q - the Yule association coefficient; P – authenticity; *- a tripled error exceeds the indices

Data from table 2 describe that stressful situation in lives of respondents produce negative consequences, which decreased male health level in different ways. The frequency of chronic diseases respondents were not connected with stressful events in the past. In average their numbers were registered in 115,4‰ and have deviation from 92,8‰ of fracture hands and legs to 150,0‰ of violence in childhood, however differences between these indices were not reliable (P>0,05). Correlation with these factors and diabetes mellitus was not detected (P>0, 05). Meanwhile the frequency of hypertonic diseases was considerably presented (p<0, 01), but (Q=0,159) depended on stressful events. It varies from 151, 7‰ of domestic parent's violence to 241, 7‰ of car accidents. Considerable impact on this factor (P <0, 01; Q=0,305) shows the development of other health problems. It deviates from 836, 8‰ of hands and legs fracture to 1234, 6‰ domestic parents' violence.

Discussion

It envisages that a psychophysiological reaction after emotional stress is connected with angina pectoris [9]. Investigation proved that men recover slowly after stress. This can partly explain high level of cardiological diseases, especially angina pectoris. Systolic blood pressure reactivity was more notable in men then in women. Autonomic nervous system activation and following cardio-vascular system answer discussed like one of the main mechanism stress impact on physical health. Furthermore, strong evidences of correlation between stress and immune system were presented in search papers [8]. New findings suggest that children exposed to stress mature into adults with altered corticolimbic responsively to emotional stimuli. These individuals also tend to be vigilant for threat and mistrusting of others. They engage others in a manner that leads to abrasive exchanges and makes it difficult to garner social support from others. They have persistent difficulties forming and keeping close social ties [10]. Nevertheless changing in pathophysiological reactions on emotional stress was detected extremely difficult, but behavioral and situational factors are easy to change [9].

Research reviews prove that basis of human health were formed in childhood and depend on grownup and development conditions. According to our analysis the leading position among male health risk factors were stress factors in childhood and adolescent period of their life. If we eliminate stress factors, frequencies of different health problems in Crimean men would decrease by 19%. It is important to note that 322,

1 Crimean man was influenced by aforementioned factors. We suggest that childhood adversities give rise to lifelong behavioral proclivities, like vigilance for threat, poor social ties, ineffective self-regulation, and unhealthy lifestyle choices. These proclivities lead to frequent activation of the body's stress– response systems, creating a hormonal milieu that requires adaptations by the immune system. Ultimately, these adaptations serve to exacerbate the pro-inflammatory tendencies already programmed in cells by childhood stress [11]. For instance similar research was conducted in 2017, a composite measure of threat of victimization that includes three components; cognitive (perceived risk), emotional (stress) and behavioural (precautionary behaviour) which they consider to be important in the measurement of health problems in men [12].

Various scholars have argued that the relationship between stress factors and health is complex as it includes direct and indirect effects. For instance, higher levels of stress might increase heart rate, leading to cardiovascular effects; higher levels of stress can, however, cause physical inactivity (through avoidance of outdoor activity), which may negatively influence individual health and overall well being in men [13,14]. There was a study based on a large sample of men, and used validated instruments [15, 16] to collect an array of social, demographic and health-related states. The outcome variables self-reported health and self-reported stress are well validated within the Health and Equal Terms survey [15, 16].

Conclusion

Influence of stressful events in childhood, on male health was proved during our research work and, as result, can give us innovative conclusions, which possibly resolve main issue connected with this topic.

Firstly, males without childhood problems have low level of chronic diseases in adult life. It is on 87, 8% less than in other respondents (P<0, 05). Moreover, the frequency of hypertonic disease less by 34, 5% (P<0, 02); the number of other health problems less by 64, 0% (P<0, 01).

Secondly, in adulthood the frequency of hypertonic diseases has low level correlation with negative events(Q=0,159); at the same time the frequency of other problems with health deviated from 836, 8‰ of hands and legs fracture to 1234, 6‰ of parents violence.

The current findings prove that male health of Crimean region was influenced by stressful factors and the elimination of this affect possibly can improve male health in general way. It is important to note that the significant problems with male health were because of up gradable factors. The suggested solution for resolving such issues is modification of behavioral habits, life style and prophylaxis against development of risk factors.

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Ethical Clearance:

1. In this Manuscript, there is no identifying information including patient's name, initials, hospital registration numbers. So, here we have not crossed the right to privacy of patients.
2. There is no human or animal reporting experiment on human subjects. Hence, it is in accordance with ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 2000.

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Assessing Local Issues Related to Drug Used Behavior among Students in Makassar

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Abstract

Out of 100 students there are 4 students who have been using drugs, three students are using drugs in the past year, and 2-3 students in the past month. The first time using drugs appears to be getting younger from year to year(1).A school-based program for young people are more effective, because most of the students spend their time in school. A local issues related to drug-used among students became a crucial to considered in developing prevention program for young people. Three FGD among students and stakeholders performed in this study to gathered an information about drug-used behavior among youth.

Findings of this study shows that being popular in school is one motif to doing bullying and harassment in school. Calling friend with his/her fathers name became a beginning of bullying. Consuming drugs, like analgesic is a common situation among youth in school. Even thereis a punishment in school, not every student could be in a teacher supervision. However, most student choose to be good in academic rather than popular. Popular students identic with negative attitude, image and social life.A prevention program for youth in school should be suitable for young people and accommodate an update and local issue associated to their behavior including using drugs not for medical purpose.

Keywords: Drug-used, student,local.

Introduction

In Indonesia, it is projected that approximately 1.2 million students use drugs and 31 thousands of them are in South Sulawesi. The prevalence of people who use drugs is higher for senior high school especially male students(2,3). Provincial National Narcotics Board on their monitoring and evaluation report shows that most of the prevention program doing in senior high school and university. Therefore, this study held on junior high considered that the prevalence rate of people who use drugs is increase among age 10-19 years old from 0,7% (2010) to 0,9% (2015). Moreover, some research says that an effective school-based intervention had to be done to 2nd grade student in junior high school, also considering that 13-19 years old was the first time of people using drugs(4,3).

A qualitative study in Jakarta and Makassar on junior high student shows that prevention program in Jakarta must have more creative and varies media for students in Jakarta. While students in Makassar prefer to had a new method on drugs education. The strategy of providing information with a one-way communication model is considered unattractive and boring for students. In addition, the information also had to consider the current situation and conditions of drug use in Makassar(5,6).

Several studies show that the implementation of a program which considering a social context such as students family condition or culture is proved in improving the effectiveness of drugs prevention activities in school(7,4). Furthermore, local culture or values are a strong factor in a process of adaptation

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of an innovation. Employed components of social factors in the curriculum is also considered to be very influential on behavior change, compared to programs that not consider the social conditions of the program objectives[8,9].

In addition, knowledge, skills and availability of facilities are also supporting factors in a process of introducing a new behavior. Considering the social situation and values in the community is also important to had a context of the process[10]. A combination of knowledge and skills about drugs would be a supporting factor in building self-awareness. Likewise, the ability of students to interact with their environment and avoid themselves from the risk of using addictive substances is important to be included in a prevention activity[11].

Program implementation for adolescents is relatively more effective and easy to do in a school-based. Most of their times was spend in school, so teachers should be involved to preparing a strategy in developing good information for students. Furthermore, networking with community organizations or health facilities is a good breakthrough, especially if schools are faced with students who had problems with drug use[12,8,13,7,14].

The objective of this study is to gathered and describing a local issue and updated drug-used behavior among young people in Makassar. Findings of this study will be base-line data for developing an instrument for interventions program to educate students to had an ability in facing drugs misuse behavior.

Materials and Method

Data of this study collected from 2 focus group discussion (FGD), conducted with students from two different schools and 1FGD with stakeholders. First school is located in urban area of Makassar and the other school is in rural area. We choose two schools with a similar status; they are a public school with no accreditation. The participants of the two FGD are students from 2nd grade. They were recruited by their teacher after we explained the objective of this study. The participants came from different class and also had a variety in after-class activity. Participants of FGD among stakeholders, recruited because of their knowledge and expertise related to education for junior high students and their activities associated with drugs prevention in Makassar. All discussions were recorded and conducted in Indonesian.

We employed a thematic approach to analyze FGD transcripts, then coded and categorized to thematic classification[15].Procedure of ethic was performed to get a consent from the participants by informing all the participants about the objective of this study and the confidentiality applied by not using their real name. This study also already had an ethical approval from The Researchand Community Engagement Ethical Committee Faculty of Public Health University of Indonesia.

Findings

Characteristic of FGD participants: A focus group discussion performed to get a local context of drug-used behavior among young people in Makassar. In this event, we discussed about the perception of became popular, perception of bullying, perception of addiction and knowledge around drugs and addictive substances.

Table 1. Characteristic of FGD Participants in Junior High School "A" Makassar

No	Name	Gender	After School Activities	Grade
1.	Eri	Female	National Flag Ceremony Troop	II-4
2.	Ani	Female	Student Guild	II-3
3.	Dadang	Male	Islamic Organization	II-2
4.	Mustafa	Male	Football	II-8
5.	Amir	Male	Football	II-6
6.	Oki	Male	Scout	II-7
7.	Sarif	Male	National Flag Ceremony Troop	II-1
8.	Anita	Female	Student Guild	II-6
9.	Ayu	Female	Youth Red Cross Organization	II-5
10.	Nini	Female	Youth Red Cross Organization	II-9

In Junior High School "A", FGD performed for two hours and it was going fruitfully especially when we discussed about drugs including all the over-counter drugs. Our discussion also accompanied by a teacher of student affairs.

Table 2. Characteristic of FGD Participants in Junior High School "B" Makassar

No	Name	Gender	After School Activities	Grade
1.	Rita	Female	Student Guild	2nd-6
2.	Anya	Female	Student Guild	2nd-2

3.	Rianti	Female	National Flag Ceremony Troop	2nd-2
4.	Rani	Female	Scout	2nd-3
5.	Hanafi	Laki-laki	Scout	2nd-3
6.	Arya	Laki-laki	Student Guild	2nd-3
7.	Fahrul	Laki-laki	National Flag Ceremony Troop	2nd-6
8.	Asyanti	Female	Youth Red Cross Organization	2nd-2
9.	Nana	Female	Youth Red Cross Organization	2nd-2
10.	Tati	Female	Scout	2nd-2

In school "B", our discussion take place in library for 2 hours without any teacher around us. Most of participants is female students and sometimes became dominanton discussion. When we are talking about bullying, female students had more experience become a victim of the perpetrator. While male students often become perpetrator than a victim, except those who are smaller or weaker than others.

Table 3. Characteristic of FGD participants among stakeholders

No	Name	Gender	Institution
1.	Uni	Female	Head of Local Boarding School (Education Practitioner)
2.	Rani	Female	Psychologist
3.	Hartono	Male	Provincial Narcotics Board
4.	Randy	Male	Counsellor of Addiction
5.	Rini	Female	Local Family Planning Office
6.	Amri	Male	Department of Psychology, Universitas Negeri Makassar

Inviting all the participants for this FGD, was a long process because we had to rely on their schedule then finally choose a proper date to have a discussion with them. We agreed to had a discussion in one working space downtown so everybody could reach that place easily. After giving a brief explanation about the topic which we'll be discuss, we started the FGD with asking about their perception about young people's lifestyle. Our discussion going very well because all of participants was very updated with young people's life particularly student activities and their behavior related to drug misuse.

Perception on gaul (a slang group among youth) and bullying: Being accepted, famous and popular among friends was identic with *anak gaul* terms. Became *anak gaul* sometimes had to passed a particular process that applied by some students in school. A negative behavior such *malak* (asking for some money to others with violence) was a common practice in school. Taking picture with sexy clothes then published it in social media also one of the characteristic being *anak gaul*. Even being *gaul* will make them famous and popular, some participants choose to be an ordinary student rather than being *gaul*. They prefer had a normal social life, not too popular in school but had a good reputation in academic report.

Among girls, there was a term named *anak rawanggang* (a female student who didn't good in academic and sometimes makes trouble in school). Most of them coloring their hair, modified their uniform so it looks fashionable (short skirt, slim-fit blouse and tighten their skirt). *Anak rawanggang* also a part of being 'gaul' in school and in teenage social life. *Anak gaul* also identic with having a not-cooperative behavior related to relationship with their parents. Many of *anak gaul* had a problem in school and should attending a counseling session with counsellor in school. In Makkasar language, words *rawangngang* used to describe a place located lower than the other. Thus, life of *anak rawangngang* believed byother student as a condition with a lot of problem and bad attitude; not better with other students who is not *gaul*.

Other phenomena among young people life's is bullying and it was another way for being popular or admitted between young people. In this study, bullying is calling others by using a harsh word or their parents name. When bullying then became a fight, teacher from counselling affairs will ask the student to had their parents in school. Parents-teachers meeting will look at for solution and there will be consequences for students who involved in a bullying situation. A study that examine experience of bullying among Swedish students show that it is a common behavior between student and it also associated with abuse. Still, actor of bullying are also reporting as a victims of bullying and violence[16].

Information on addictive substance and perception on addiction: Most informants more familiar with drugs term than addictive substance. They are aware that some students consumed soft drink with the over-counter drugs to get fly. Addiction also known as a behavior of using marijuana and an amphetamine type-stimulant (ATS)known as *sabu-sabu*.

Table 4. Types of Substances Recognized by Informants

Substances	Price/pcs	Details
Tramadol	Rp 3,000 – Rp 5,000	Mix with soft drink
THD	Rp 20.000 – Rp 30.000,-	
Dobol (double) Y	Rp 10.000 – Rp 20.000,-	Mix with energy drink
PCC	Start from Rp 2,000	No logo on the tablet
Somadril	Rp 5,000	
Ganja	Rp 15.000 – Rp 20.000	
Cigarette	Rp 1,500	
Ballo' (a local alcoholic beverages)	Rp 10,000 per liter	Sometimes free

From discussion with students shows that it was easy to get drugs in school. They even know who is the seller and how much the price. The seller also came from other school, sometimes students from senior high. From **Table. 4** we can see the price is very cheap and they even mix their drugs with soft drink or energy drink. According to NNB survey report in 2017, there are approximately 3 million people in age 10-49 years old using drugs. Twenty four percent of them are students. The over-counter drugs and analgesic are types of drugs that being favorite. A study about chemical used in South Sulawesi shows that program on harm reduction which is implemented in this province not really focused on chemicals that are not narcotics but they are available in market and easy to get[17,18].

Social life: Nowadays, student facing many challenge in their daily life. They had to get a good grade for every subject in school. Being smart in academic is another way to make parents proud. Furthermore, going to school with good looking outfit and accessories also another thing to accomplished. Student with great look, fashionable outfit and had a latest gadget would be acceptable in every group or *gang* in school. A competition among students sometimes become negative activities such as bullying, smoking, drinking and using drugs. Even it was not a narcotic, consuming drugs excessively is already common issues among junior high student. Those activities happen when they are in a birthday party, in a hang-out place, and sometimes in school. Interaction between with students from senior high often become an introduction to new behavior including drug taking.

From **Table. 1** and **Table. 2** most of the students prefer to had a physical activity rather than being a member of a science group or student guild as their extra-curricular. In sport- activities they thought had more chance to exist and being accepted among their friends. Most of the informants believed that group activities is more fun and enjoyable. Some studies indicated that students who participated in extracurricular activities had higher grade point averages than students who didn't[19-21].

Conclusion

In a local context, drugs term is more familiar rather than addictive substance. Most of the students already know and seen a drug-used practice in their environment. Mixing drugs with soft drink or energy drink become a common practice among students. A competitive environment was deliberately employed in school just to meet several targets to get an award as 'The Best' school in town which is labeling by local department of education. School with many trophy from several student-competition bring proud to the teachers and at once had a great image in society.

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Ethical Clearance: This study was approved by Ethics Committee of Public Health Faculty, Universitas Indonesia

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Multimorbidity Increases the Risk of Falling among Indonesian Elderly Living in Community Dwelling and Elderly Home : A Cross Sectional Study

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Abstract

The prevalence of fall increases with increasing ages. Falling is significant health problem in elderlyand the risk increases significantly when they have chronic diseases such as, cardiovascular diseases, metabolic problem, urogenital diseases, digestive diseases, respiratory diseases, musculoskeletal and malignant diseases. elderly also vulnerable on suffering multiple chronic illness. This study aimed to identify the influence of multimorbidity to the incidence of fall in elderly.

A cross sectional approach was used for this research, and, based on simple random sampling, a total of 427 elderly individuals (>60 years old). The data collection was based on the use of one set of questionnaires consisting of the demographic characteristics (age, gender, education background and economic status), the list of fifteen common chronic illness including suffered by the elderly as the risk factor for fall, and the incidence of fall within the las 12 month as the outcome.

This study demonstrated that fall incidence among the elderly is significantly linked to the presence of chronic illness. The number of chronic conditions is significantly influencing the incidence of fall among elderly. The elderly who have more than two of chronic illness likely to have fall 2 times higher that those who have less than two chronic illness.

Keywords: *Chronic illness, multimorbidity, elderly, fall.*

Introduction

The number of older persons (those aged above 60 years old) in Indonesia is expected to increase to 28.8 million (11% of the total population) in 2020, and 80 million (28.68%) in 2050 . Life expectancy from 66.7 years in 1990 to 70.5 years in 2015, would increase to 71.9 in 2025,and 72.8 in 2045[(1)]. The increasing number of the elderly in Indonesia is followed by the increasing number of non-communicable diseases[(2)]. Moreover, elderly is at a high risk of suffering from disability and dependability that increase the burden of the elderly and decreasing their quality of life.

The increasing number of elderly population presents special challenges in the health sector with the emergence of degenerative problems and non-communicable diseases (NCD'S) such as diabetes, hypertension, and mental health disorders namely depression, dementia, anxiety disorders, and insomnia[(3)]. On the other hands, the elderly also vulnerable on suffering chronic illness such as, cardiovascular diseases, metabolic problem, urogenital diseases, digestive diseases, respiratory diseases, musculoskeletal and malignant diseases. Multimorbidity is often defined as the presence of 2 or more chronic co-occurring conditions[(4,5)]. Although this is the formal definition, most clinicians consider multimorbidity to be particularly vexing when it involves a broad array of conditions and is also accompanied by functional limitations, cognitive impairment or mental health concerns, as well as interactions between the conditions themselves and their treatments. Multimorbidity is associated with a number of negative health outcomes, including accelerated declines in functional status, increased symptom burden, reduced

quality of life, and mortality[5]. The increasing number of chronic conditions puts older adults at a higher risk of hospitalization and placement in nursing homes.

Cardiovascular diseases is one of the chronic condition that linked to multimorbidity situation. Aside from the chronic condition itself, the medication for cardiovascular diseases may increase the risk of fall. One of the most common symptoms is hypertension that treated with antihypertensive medicines. National record for Hypertension showed that the only 60% of recorded hypertensive cases are currently taking medication[6]. Approximately 40% of hypertensive person are irregularly taking hypertensive medication. This situation can lease a postural hypotensive side effects that are at risk of falling.

Physiologically, elderly experience physical changes in musculoskeletal such as decreased muscle strength, especially the lower extremities, endurance and coordination as well as limited range of joint motion [7]. Weakness of the lower limb muscles can cause disturbance in the body's balance, resulting in slowness of movement, short strides, feet not tread strongly, and late anticipation when slipping or tripping. This condition can increase the risk of falling in the elderly.

Elderly people face weaknesses, limitations and disabilities that increase the risk of fall. Fall-related injury in older adults has been recognized as a major public health issue. Risk factors for falls include muscle weakness, a history of falls, use of four or more prescription medications, use of an assistive device, arthritis, depression, age, gender, and impairments in gait, balance, cognition, vision, and activities of daily living [8].Main characteristic of the elderly is experiencing several symptoms due to aging. The multifactorial health conditions that occur when the accumulated effects of impairments in multiple systems of elder person vulnerable to situational challenges called geriatric syndrome. One of the most common complaints at the geriatric syndrome is falling [9]. Fall is not an illness but an accident that results in disability in old age. Falling is the second leading cause of death due to injuries or accidental injuries worldwide([10]). Every year, 24,000 people die from falling globally and 80% are in low to middle income countries[11]. Old people aged 65 years and over are the main sufferers of fatal falls. The elderly must be prevented from falling by identifying risk factors. In principle, preventing falls in the elderly is very important and more important than cure.

A study on the risk factors for falling in older people shows that certain health conditions and impairments contribute independently to the risk of falling or experiencing a fall injury[12]. Falls and chronic disease are both important health issues in older adults. This study aimed to identify the number of chronic diseases suffered by the elderly, here in after multimorbidity as the risk factor of fall.

Method

This study using cross sectional approach with the primary outcome was self-reported falls in the previous twelve months (binary: yes/ no). We also include socio-demographic characteristics including age (for 60-69 age group and 70 or more age group), gender, education background (obtained formal education and not obtained a formal education), economic status (whether they have fixed income or not having a fixed income), living places (living in community or living in elderly home). In order to measure multimorbidity, we included fifteen frequently reported chronic diseases (hypertension, cardiovascular diseases, chronic obstructive pulmonary disease (COPD), stroke, diabetes mellitus, depression,chronic gastritis, cancer, osteoporosis, Parkinson diseases, vision impairment, urinary problem (urgency, incontinence), constipation, Osteoarthritis, and hearing loss[2,6]. The status of the chronic condition of the illness listed in the interview questionnaire was based on a diagnosis from a health professional. Presence or absence of each condition as well as total number of conditions was calculated. Those who have more than 2 diseases categorized as Multimorbidity.

The sample size calculation for the logistic regression analysis was based on Van Voorhis and Morgan[13]. The overall model is $50 + 8k$, where k is a number of independent variables and an analysis for the individual variables model is $104 + k$. In this study, the overall model sample size was $50 + 8 \times 6 = 98$, and the overall was $104 + 6 = 110$. Thus, the minimum sample size for this study was 110 per model. Thus, the minimum sample size was $98 \times 4 = 392$. Additional 10% of cases were collected to prevent any missing data with total 431 targeted study participants. This study was conducted from July to October of 2018 in Yogyakarta, West Java and Jakarta provinces.

Written informed consent was obtained from the participants before their start of the study. The study was approved by the Ethical Committee of Faculty of

Public Health, University of Indonesia, Indonesia. The approval number is 125/UN2.F10/PPM.00.02/2018.

Results

A total of 427 out of 431targeted study participants are involved this study with response rate 98%. The average ages of the study participants are 73 years old with minimum age 60 years old maximum 102 years old, SD ±10.12.

Table.1 Sociodemographic characteristics of the study participants

Variables	Categoric	n	Percentage
Ages	>70	242	56.7%
	<70	185	43.3%
Gender	Female	290	67.9%
	Male	137	32.1%
Living place	Elderly home	213	49.9%
	Community	214	50.1%
Education	With formal education	210	49.2%
	Without formal education	217	50.8%
Economic condition	Without fix income	333	78.0%
	With fixed income	94	22.0%
Multimorbidity	No	168	39.3%
	Yes	259	60.7%

More than half of study participant are above 70 years old. 67.9% of them are female, 50%of them living in elderly home and 50.8% of them are educated in formal school, and 78% of them having no fixed income. 60.7% of the study participants are having more than 2 chronic illness herein after identified as multimorbidity.

Table.2 Chronic condition and the incidence of fall

Condition	Prevalence Weighted %	% people with condition with fall	% people with condition without fall	p value
Hypertension	44.7%	14.3%	30.4%	0.235
Cardiovascular diseases	7,3%	1,6%	5,6%	0.537
COPD	11.0%	3.5%	7.5%	0.722
Stroke	3.7%	1.2%	2.6%	0.843
Diabetes mellitus	10,8%	3,3%	7,5%	0.825
Depression	74,9%	19,7%	55,3%	0.028*
Digestive problem	25,5%	8,9%	16,6%	0.121
Cancer	0.9%	0.2%	0.7%	0.824
Osteoporosis	9,8%	3,5%	6,3%	0.316
Parkinson	4.9%	1.2%	3.7%	0.766
Vision impairment	24.1%	10.2%	13.9%	0.001*
Urinary problem	10.1%	4.0%	6.1%	0.110
Constipation	11,7%	5,2%	6,6%	0.012*
Osteoarthritis	58.3%	19.9%	38.4%	0.006*
Hearing problem	21.5%	8.7%	12.9%	0.008*

Table.2 described the prevalence of the chronic condition and fall. Depression is the highest chronic illness suffered by the elderly by 74,9% and 19,7% of the elderly with depression are falling in last 12 month ($p<0.05$). Osteoarthritis is the second the chronic illness suffered by 58.3% of the elderly and independently correlate with the incidence of fall ($p<0.005$), whereas 19.9% of the elderly with Osteoarthritis are experience of falling within the last 12 months. Moreover, vision impairment (24.1%), Hearing problem (21.5%) and constipation (11.7%), also significantly correlate with the incidence of fall ($p<0.05$).

Table. 3 Predictor model for Multimorbidity adjusted to sociodemographic characteristics

Variables	B	Wald	Sig.	Exp (B)	95% Confidence Interval	
					Lower	Upper
Ages	0,650	7,057	0,008	1,915	1,186	3,093
Gender	0,580	4,950	0,026	1,786	1,072	2,978
Multimorbidity	0,815	11,536	0,001	2,260	1,412	3,618
Living place	-0,339	1,740	0,187	0,712	0,430	1,179
Education	-0,234	0,987	0,320	0,791	0,499	1,256
Economic condition	0,079	0,063	0,802	1,083	0,582	2,014
Constant	-1,962	24,062	0,000	0,141		

Prediction model analysis showed that ages, gender and multimorbidity are the predictor for the incidence of fall among elderly. Whereas Incidence of fall; logit(p) = -1.962 + (0.650 × ages) + (0.580 × gender) + (0.815 × multimorbidity). Those who are above 70 years old likely to fall 1.9 times higher than those under 70 years old. Male elderly are 1.78 times at risk to fall compare to female elderly, those who have multimorbidity have 2,26 times higher risk to fall compare to those who have not.

Discussion

This study demonstrated that fall incidence among the elderly is highly linked to the presence of chronic disease. The number of chronic conditions is significantly influencing the incidence of fall among elderly. The elderly who have more than two of chronic illness likely to have fall 2 times higher that those who have less than two chronic illness. Importantly, both number and type of chronic condition played a role in falls. Several chronic condition such as Depression, vision impairment, constipation, Osteoarthritis and hearing problem are independently correlate with the incidence of fall. This study also identifies gender and ages as the risk factors of fall in elderly. Female elderly are likely to have twice risk of fall, and those who ages more than 70 are likely to have fall compare to those younger.

This finding is in line with the previous study, which proved that the incidence of fall are increase with the number of chronic medical conditions [(14)]. Although chronic diseases are commonly suffered by the elderly, suffering from two or more chronic diseases, will becomeanother burden for both physically and psychologically. Aside from physical and psychological burdens, suffering from more than two chronic illness can make the elderly weaker and frailer. Not to mention the medication for some chronic illness that may cause orthostatic hypotension or dizziness. This condition can increase the risk of occurrence of falling the elderly. Therefore, further observation is needed regarding the increasedrisk of fallingfrom antihypertensivemedication. This medication consumption can be associated with an increased risk of falling events compared to the absence of antihypertensive consumption [(15)].

The elderly Age was an independent risk factors for falls. In this study, we found that increasing age increased the risk of falls in the elderly by 1.9 times and that elderly with advancing age (over 75 years) had higher odds of falling than the younger elderly (<70 years old). Age is one of the key risk factors for falls in elderly [(16)]. Older people have the higher risk of death or serious injury arising from a fall and the risk increases with age. As the elderly get older, they have a tendency to experience frailty and muscle weakness, that may increase the risk of falling. This result indicates that a variety of effects of aging increase the risk of falling [(17)].

This study also identified gender as the predictor of fall, whereas male elderly likely to fall 1.7 times higher compare to female (OR : 1.76 (95% CI 1.072 – 2.978)). WHO revealed that across all age groups and regions, both genders are at risk of falls(16).However, in this study as it is found in some other countries, male are more at risk than female and it has been noted that males are more likely to die from a fall, while females suffer more non-fatal falls[(11).] Possible explanations of the greater burden seen among males may include higher levels of risk-taking behaviours and hazards. Another explanation is that the effects of chronic diseases differ between men and women[(18,19)]which will have an impact on the body's response in dealing with the chronic illness and ultimately affects weakness and frailty which has implications for the risk of falling.

As the surveywas cross-sectional, cause-and-effect cannot be determined.All variables were derivedfrom self-report data, notobjective measures. Falls were identified by retrospectiverecall over the previous twelve months.Our analyses relied on self-reported data, which are potentially subject to recall bias and misclassification. It is also possible that the recall of falls was underreported because of difficulty remembering, which is a particular concern in an older population.

Conclusion

This study confirms that multimorbidity was markedly related to falls in the elderly and increased the risk of falling. In addition, a low education level, the use of a walking aid and receiving care from caregivers were riskfactors that contribute to falls in geriatric patients. This situation requires an integrated patient-centred rather than disease-centred approach. The majority of chronic diseases of these multimorbid elderly patients are fall within one year.Therefore, it is important to study the risk association between comorbidity and falls. Further research should focus on monitoring the elderly with risk factors of fall and aims to develop effective prevention and intervention measures, which can be

applied and improve the quality of life of older adults in the community.

Conflict of Interest: The author declare that this study has no potential conflict of interest.

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Impact of Serum Apolipoprotein B Measurements on the Risk Management of Atherosclerotic Cardiovascular Disease

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Abstract

Background: Studies have indicated that serum Apolipoprotein B (Apo B) was superior to LDL-C and Non-HDL-C in risk management of Atherosclerotic Cardiovascular Disease (ASCVD).

Objectives: The present study was designed to explore the impact of introducing serum Apo B measurement as an additional target, on antilipidemic treatment policy.

Methods: Patients attended the obesity research and therapy unit (ORTU), besides staff and undergraduate students at Al-Kindy College of Medicine, were participate in this cross-sectional study. Lipid profile and Apo B analysis were performed. Participants were stratified according to the classic major ASCVD risk factors endorsed by guidelines.

Results: Comparing (75) obese to (36) non-obese subgroups, significant differences were demonstrated in lipid profile parameters ($P< 0.05$). Serum Apo B levels were evidently higher in obese patients, ($P> 0.05$). In multiple regression model, Non-HDL-C was the only significant independent predictor of serum Apo B levels. According to guidelines, serum Apo B was a treatment target only for (9) patients. When serum Apo B was introduced as a third treatment target, additional antilipidemic treatments were need to be initiated in (36) out of the (69) participants already achieving treatment targets.

Conclusions: Introduction of Apo B measurement in the management of ASCVD increases the number of patients in whom antilipidemic treatment should be initiated. The extent of this increase is partially determined by the discordance rate between Apo B and LDL-C in the studied population.

Keywords: *Atherosclerotic Cardiovascular Disease, Obesity, Apolipoprotein B, Risk managements, Lipid profile.*

Introduction

Atherosclerotic cardiovascular disease (ASCVD) is the leading cause of death worldwide, as coronary heart disease, stroke, and peripheral arterial disease.[1] Lowering Low Density Lipoprotein Cholesterol (LDL-C) has been shown to decrease the risk of ASCVD and mortality. Patients who are inadequately treated, or responded poorly to treatment, were reported to have increased ASCVD risk and suboptimal prevention.[2] Cumulative evidence from studies has described an altered composition of Low-Density lipoprotein particles (LDL-P) in the presence of elevated Triglycerides (TG).[3] In such condition, measurement of the altered LDL-C levels may underestimate the LDL-P, and the atherogenic burden. In such patients the achieved LDL-C targets may not fully reflect the residual cardiovascular risk conferred

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by the actual LDL-P burden. In presence of high TG (200–499 mg/dl), the Adult Treatment Panel III (ATP III) has recommended Non High-Density Lipoprotein-Cholesterol (Non-HDL-C), as an indirect estimate of Apolipoprotein B (Apo B) particles.[3] Recently assays for Apo B, and its concentrations should be considered as a better surrogate for LDL-P, than Non-HDL-C.[4] Several studies have indicated that serum Apo B was superior to LDL-C and Non-HDL-C in the management of ASCVD risk, this view lacks a generalized full acceptance.[5-10] Moreover, discordance between population for achieved LDL-C, Non-HDL-C and Apo B targets was reported by many therapeutic studies, illustrating how patients with optimal LDL-C levels may still be at high risk of CVD events secondary to an undetected high LDL or Apo B particles number. Suggesting that achieving optimal or near optimal Apo B levels could result in more effective prevention of cardiovascular events.[11]

Since 2008 and despite this controversy, the combined consensus statement by the American Diabetes Association (ADA) and American College of Cardiology (ACC) panel recommended and provided risk- specific cut-offs for both Apo B and Non-HDL-C, to be considered as treatment targets.[8] The above panel also stated that the two measurements are highly correlated, but with some discordance in patients with hypertriglyceridemia. Thereafter, the statement from the American Association of Clinical Chemistry (AACC) Lipoproteins on Best Practices has addressed similar recommendations.[6]

The Expert Panel of the National Lipid Association (NLA) suggested aggressive Apo B targets of <70 mg / dl, in contrast to ADA/ACC and AACC recommendation of (<80 mg/dl) in patients with very high cardiovascular risk.[12] The most current guideline issued by the American Association of Clinical Endocrinology (AACE) recommended a similar optimal Apo B value of (< 70 mg/dl), only for patients with extreme risk. Two optimal level suggested for very high and high risk (<80 mg/dl and <90 mg/dl, respectively). Yet; no Apo B targets were recommended for moderate and low risk categories.[13]

Aim of the study: the present study was designed to explore the impact of introducing serum Apo B measurement as an additional target, on antilipidemic treatment policy, in terms to initiate treatment in patients already achieving the optimal LDL-C and Non-HDL-C, by the latest AACE guidelines.

Subjects and Methods

Study Setting and Participants: Patients attending the Obesity Research and Therapy Unit (ORTU), staff and undergraduate students at Al-Kindy College of Medicine, were invited to participate in the present cross-sectional study. Inclusion criteria were history of hypertension, type 2 diabetes, obesity and smoking. Exclusion criteria was history for use of antilipidemic medications, renal, liver and infectious diseases. Pregnant females were excluded. According to the classic major ASCVD risk factors by AACE guidelines[13], participants were stratified into five categories designated as: extremely high, very high, high, moderate and low risk.

Biochemical Assay Methods: Fasting venous blood sample was obtained from participants. The routine lipid profile and Apo B analysis were performed on serum samples by readymade kits (Human Diagnostics-Germany) using Optizen kinetic spectrophotometer (Mecasys Co. Ltd, Korea).

Non-HDL-C is calculated as = TC - HDL-C [14] and LDL-C is calculated using the Friedewald equation.[15] Framingham risk score for Coronary Heart Disease[17] was applied using online calculator.[18]

Concordance and Discordance between serum Apo B with LDL-C and Non-HDL-C Levels: Framingham Offspring study databases[6] were used to determine the discordance between levels of Apo B, LDL-C, and Non-HDL-C.

Impact of Apo B measurement on Treatment Policy: The levels of serum LDL-C and Non-HDL-C treatment targets proposed by the AACE management algorithm[13], and position statement from the AACC Lipoproteins [6] were taken as Medical decision cut points identifying the need to initiate antilipidemic therapy.

The scenario was redone, adding the serum Apo B levels as the third medical decision cut point.

Statistical Analysis: Participants were divided into two subgroups according to BMI cut point of 30 kg/m^2, and all statistical tests were conducted for both subgroups. Concordance and discordance results were expressed as frequencies and percent. Statistical significance was determined using chi square test. Independent *t*-test was performed to compare variables, and linear multiple regression models were used to explore any significant contribution of independent variables on serum Apo B

levels. All statistical procedures performed by statistical package SPSS version 17.0 (SPSS, Inc.).

Results

A total of (111) Eligible participants were enrolled in the present study, (75) were classified as obese and (36) were non-obese. As illustrated in Table.1, significant differences were demonstrated in lipid profile parameters (P<0.001). Although serum Apo B levels were higher in obese patient, the difference is statistically insignificance (P >0.05). Adopting the AACE risk stratification approach, three patients were categorized as very high risk, while the other (9, 48 and 51) patients were categorized as high, moderate and low risk, respectively. The numbers of participants with very high, high and moderate risk were significantly higher in obese subgroup.

As presented in Table.2, the rate of discordance between Apo B and LDL-C was significantly higher as compared to the discordance in to Non-HDL-C (P<0.001). The rates of discordance in obese subgroup were insignificantly higher than that of non-obese subgroup (Data do not show); (P = 0.051). Non-HDL-C was the significant independent predictor for serum Apo B levels in all participants, discordant and concordant subgroups. The details of the linear regression model are presented in Table.3

According to AACE, antilipidemic treatment should be initiated, in (42) out of the (111) patients to achieve treatment target. Serum Apo B was a treatment target only for 12 patients ((3) with very high and (9) with high risk). For the other (48) moderate risk patients Apo B is not recommended as a treatment target (Table.4). In (36) out of the 69 patients achieving AACE treatment targets, treatment should be initiated to achieve AACC targets (Data do not show). Apo B was the only treatment target in 15 patients (3 moderate and 12 low), while Apo B in conjunction with Non-HDL-C were the treatment target for another 12 (3 moderate and 9 low risk). For the last participant Non-HDL-C was the only treatment target. However, for the 30 moderate risk patients in whom treatment should be initiated according to AACE guideline, the introduction of serum Apo B measurement will not affect treatment policy (Data do not show). Significant association was observed between discordance rate and the number of antilipidemic treatments that were to be initiated due to the introduction of serum Apo B measurements (P< 0.001) (Data do not show).

Table.1: Anamnestic and clinical data of the participants enrolled in the study.

Parameter	Obese	Non-obese	P value
N (%)	75 (67.6%)	36 (32.4%)	
Age (y)	37.8 ± 12.7	38.35 ± 12.0	0.760
Male/Female Ratio	39/36	15/21	0.33
BMI (kg/m^2)	39.2 ± 8.2	23.5 ± 2.1	0.001***
ASCVD major risk factors:			
DM (%)	3 (4%)	0 (0%)	
HT (%)	24 (32%)	6 (16.7%)	
PCOS (%)	3 (4%)	0 (0%)	
Smoking (%)	6 (8%)	0 (0%)	
Lipid Profile:			
TC (mg/dl)	196.4 ± 44.4	158 ± 28.5	0.013*
TG (mg/dl)	147.7 ± 95.2	88.3 ± 53.2	0.022*
HDL-C (mg/dl)	35.1 ± 8.7	41.5 ± 8.6	0.020*
LDL-C (mg/dl)	133.3 ± 48.5	98.5 ± 26.5	0.039*
Non-HDL-C (mg/dl)	163.5 ± 478.0	116.5 ± 33.8	0.007**
Apo B (mg/dl)	105.1 ± 32.5	84.7 ± 25.5	0.051

Parameter	Obese	Non-obese	P value
Risk category according to AACE			
Extreme high	0 (0%)	0 (0%)	0.01**
Very high	3 (4%)	0 (0%)	
High	9 (12%)	0 (0%)	
Moderate	42 (56%)	6 (16.7%)	
Low	21 (28%)	30 (83.3%)	

BMI : body mass index; ASCVD: Atherosclerotic cardiovascular disease; **DM**: diabetes mellitus; HT: hypertension; **PCOS**: Polycystic ovary syndrome, **LDL-C**: Low Density Lipoprotein- Cholesterol; **LDL-P**: Low-Density lipoprotein particles; **TG**: Triglycerides; **TC:** Total cholesterol**; HDL-C:** high-density lipoproteins- cholesterol**; Non HDL-C**: Non high-density lipoproteins- cholesterol; **Apo B:** Apolipoprotein B; **AACE:** American Association of Clinical Endocrinology. **Statistical significance considered at: * *P* <0.05, ** *P* <0.01, ****P* <0.001.**

Table.2: Participants' Apo B discordant rates in correspondence to serum LDL-C and Non-HDL-C levels from the Framingham Offspring study databases.

Subgroups		Serum Apo B in correspondence to serum LDL-C levels			P-value
		Discordant N (%)	Concordant N (%)	Total N (%)	
Serum Apo B in correspondence to serum Non-HDL-C levels	Discordant N (%)	33 (29.7%)	0 (0%)	33 (29.7%)	P <0.001 ***
	Concordant N (%)	15 (13.5%)	63 (56.8%)	78 (70.3%)	
	Total N (%)	**48 (43.2%)**	**63 (56.8%)**	**111 (100%)**	

Statistical significance considered at: ***P <0.001.

Table. 3: Linear Multiple Regression Model of serum Apo B level for all, discordant and concordant participants.

Linear Multiple Regression Model	All Participant (N=111; 100%)		Discordant (N=48; 43.2%)		Concordant (N=63; 56.8%)	
	B	P-value	β	P-value	B	P-value
Obesity	-0.012	0.940	-0.054	0.892	-0.062	0.687
Gender	0.048	0.754	0.171	0.753	-0.122	0.410
Age (year)	-0.034	0.803	-0.136	0.692	0.145	0.321
TG (mg/dL)	-0.161	0.260	-0.370	0.155	0.050	0.766
HDL-C (mg/dL)	0.057	0.719	0.051	0.845	0.211	0.274
Non-HDL-C (mg/dL)	0.849	0.000***	0.982	0.041*	0.941	0.000***

Statistical significance considered at: * P <0.05, ***P <0.001.

Table.4: Impact of introducing serum Apo B measurements on the policy of initiating antilipidemic therapy, according to AACE guidelines.

AACE Risk Stratification		Participants Achieving AACE treatment targets			Participants whom treatment should be initiated to achieve AACE targets		
Risk Category	N	LDL-C	Non-HDL-C	Apo B	LDL-C	Non-HDL-C	Apo B
Very high	3	0/3	0/3	0/3	3/3	3/3	3/3
High	9	0/9	0/9	3/9	9/9	9/9	2/3
Moderate	48	18/48	18/48	NR	30/48	30/48	NR
Low	51	51/51	51/51	NR	0/51	0/51	NR
Total	**111**	**69/111**	**69/111**	**3/12**	**42/111**	**42/111**	**9/12**

AACE: American Association of Clinical Endocrinology; **NR**: Not Required.

Discussion

Most of ASCVD risk management guidelines, including the AACE and AACC adopted in the present study, the actual decision of initiating antilipidemic therapy is determined on the basis of serum lipids and lipoprotein concentrations, as well the presence of other modifiable and non-modifiable risk factors such as age, gender, hypertension, diabetes or evidence of coronary disease. A considerable amount of information must be integrated to reach an appropriate decision. The present results of lipoprotein measurements were in accord with the well-recognized association of obesity with high levels of TG and Apo B-containing lipoproteins, and low levels of HDL-C.[19] These abnormalities were thought to be the metabolic consequences of obesity-induced insulin resistance, which may by caused by a combination of overproduction and/or decreased catabolism of Apo B-containing particles.[19]

However, the accumulation of excess adipose tissue in obesity has been reported to have a clear association with other cardiometabolic risk factors such as hypertension and diabetes.[20] The above may provide a decent explanation for the higher prevalence of very high, high and moderate ASCVD risk, observed among obese patients enrolled in this study.

The recently reported higher discordance rates of Apo B with LDL-C, as compared to Non-HDL-C in patients with diabetes and hypertriglyceridemia[21], were reestablished in the present study. Further support for this concept was delivered simultaneous by the linear multiple regression analysis, illuminating Non-HDL-C as the only significant independent predictor for serum Apo B levels in all participants, as well in discordant and concordant subgroups.

Despite the significant high TG levels and the increases in Apo B discordance rates demonstrated among obese as compared to non-obese subgroup, no significant associations were found between obesity and Apo B discordant rates. Nevertheless, taking into account the relatively small number of participants enrolled, such association, if exists, might be unveiled by future studies recruiting much larger samples. Participants with extreme risk were completely absent, with only three participants stratified as very high risk and another 9 with high risk. Such setting has fortunately been responsible for a high number of participants achieving AACE treatment targets, and thus provide us with a better opportunity to investigate how the addition of Apo B as a third medical decision cut-point can affect antilipidemic treatment policy. Several reported studies suggesting that Apo B is a significant predictor of recurrent cardiovascular events independent of LDL-C or Non-HDL-C [22], and others which proposed it as a stronger predictor of death from acute myocardial infarction, as compared to LDL-C.[23,24]

The increased initiation of antilipidemic therapy specifically targeting optimal Apo B levels in patients already achieving LDL-C and Non-HDL-C may provide additional beneficial long-term preventive measures. The significant logical association observed between Apo B discordance rates and the number of patients in whom antilipidemic treatment should be initiated may suggest the utility of this measure to identify groups in which introduction of Apo B measurements are of legitimate healthcare priority.

Conclusions: Introduction of Apo B measurement in the management of ASCVD will increases the number of patients in whom antilipidemic treatment should be initiated. The extent of this increase is partially determined by the discordance rate between Apo B and LDL-C in the study.

Recommendations: Comparable future studies with larger samples of different patients' characteristics are necessary to identify groups in which introduction of Apo B measurements are of legitimate healthcare priority.

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Ethical Clearance: The study protocol was approved ethically and scientifically by the Scientific Affairs Unit of Alkindy College of Medicine. All patients and healthy volunteers gave their approval and consent to be included and participated in this study.

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Protective Effects of Omega3 on CCl_4-Induced Oxidative Stress and Nephrotoxicity in Female Albino Rats

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Abstract

In the present study, twenty one female albino rats were used and they were divided in to three groups. This was carried out and designed to study the effect of omega 3 poly unsaturated fatty acid on carbon tetrachloride (CCl_4) induced oxidative stress and kidney damage in female albino rats. However, the antioxidant activity of omega-3 were determined by assessing biochemical parameters (serum creatinine, urea, uric acid, and malondialdehyde (MDA)). Carbon tetrachloride caused significant increase in serum creatinine, urea, uric acid, and MDA level while, omega 3 significantly prevented the increase of the serum levels of creatinine, urea, uric acid, and MDA.

Keywords: *Omega-3-Fatty acids, Carbon tetrachloride, Free radicals, Malondialdehyde.*

Introduction

Free radical is an atom or ion possessing an unpaired electron that can be considered as fragments of molecules, these unpaired electrons make free radicals very reactive towards other substances, or even towards themselves [1]. It was generally accepted that free radical seek to pair with a new free electron, and free radicals would be generate and it is unstable and can react with another one to generate a new free radical. Thus, this chain reaction of free radical subsequently damage biological systems and tissues [2].

However, reactive nitrogen species (RNS), reactive oxygen species (ROS) and their generation are two kinds of biologically active free radicals, their generation, chemical reactions, and in vivo effects are closely interrelated. Harman was the first person who recognized the pathogenic role of oxygen free radicals in diseased states [3]. The studies of free radical and antioxidants in biology demonstrated that free radical played a role in chronic diseases including atherosclerosis, cancer[4] neurodegenerative (e.g. Parkinson's disease, Alzheimer's disease, multiple sclerosis) [5], asthma and diabetes [6].

Exposure to heavy metals, ultraviolet (UV) radiation, environmental pollutants, drugs, cigarette smoking, alcohol consumption[7] and xenobiotics e.g., CCl4 [8] lead to metabolic activation of ROS, which in turn causes cellular injuries[9].

Carbon tetrachloride intoxication in animals is an experimental model that generates oxidative stress in many pathophysiological states [10]. The long term CCl4 exposure generates reactive oxygen species and different free radicals in many tissues such as liver, heart, kidney, brain, lung and blood. Also, it defects antioxidant enzymes activities and increased thiobarbituric reactive substances concentrations [11]. Inaddition, [12] reported that CCl4, distributes at greater concentrations in the kidney than in the liver and it has a high affinity to the cortex part of kidney which contains cytochrome P-450 predominantly.

Epidemiological studies investigate that certain that long chain highly unsaturated omega 3-fatty acids which derived from the tissues of oil fish are known to reduce the oxidant status of various tissues. Diet rich in long chain omega-3 fatty acids has been shown to help in the development of healthy brain, heart and immune system [13]. Omega-3 fatty acids are considered as strong antioxidant and have an anticancer role in most of the human malignancies[14]. Furthermore, regular consumption of omega-3 fatty acids, particularly docosahexaenoic acid, has been reported to ameliorate cardiovascular disorders, including endothelial dysfunction, platelet aggregation, elevated blood pressure and triacylglycerols, and

arrhythmia [15]. The present investigation was conducted to study the evaluate the mechanism of omega-3 fatty acids on kidney function test parameters in CCl4 induced nephrotoxicity in female albino rat

Experimental animals: Twenty one adult female albino rats (*Rattusnorvegicus*) were used in the present study. Animals bred in the animal house of Biology Department, College of Science, Salahaddin University. All rats were weighing about 150-250 gms and 9-12 weeks old. The experiments achieved under the standard laboratory conditions (12h light: 12h dark photoperiod) and 22 ± 4 Cº, the animals were supplied with standard rat diet and tap water *ad libitum.*

Experimental design: One experiment was carried out and designed to study the effects of omega-3 fatty acid on malondialdehyde (MDA**)** and some renal function test parameters including serum creatinine, urea and uric acids) in CCl4 induced nephrotoxicity in female albino rats. The experimental rats were divided into three groups, each with seven individuals and the treatments were continued for 4 weeks.

The group one received standard rat chaw and tap water [16] and represents control rats. The rats in the second group received CCl_4 (0.25 mL/kg) body weight intraperitoneally and normal rat chaw with tap water. The rats in third group received standard rat chow supplemented with omega-3 (1gm/Kg) body weight and intraperitoneally administration of CCl4 (0.25 mL/kg) body weight.

Samples collection

Collection of blood samples: The rats were anesthetized using a combination of ketamine hydrochloride (35 mg/kg) and xylazine (5mg/kg) [17]. Blood samples were taken by cardiac puncture into chilled tubes with EDTA (4.5 mM as an anticoagulant) and centrifuged at +4Cº for 15 minutes; then plasma was stored at -80ºC (Sony, Ultra low, Japan).

Determination of serum malondialdehyde (MDA): Serum malondialdehyde (MDA) concentration, one of the end products of lipid peroxidation, was determined by the method of [18]. The level of serum MDA was determined spectrophotometrically. In brief: To 150 μl serum sample the followings were added: 1ml of 17.5% trichloroacetic acid (TCA) and 1ml of 0.66% (TBA), mixed well by vortex, incubated in boiling water for 15 minutes, and then allowed to cool. One ml of 70% TCA was added and the mixture was allowed to stand at room temperature for 20 minutes, and then centrifuged at 2000 rpm for 15 minutes, and the supernatant was taken for scanning spectrophotometrically at 532nm. The concentration of MDA calculated as follow:

MDA (µmol/L) = Absorbance at 532nm×D/L×E0

L: light path (1cm), E_0: Extinction coefficient 1.56×10^5 M^{-1}.-Cm^{-1}, D: Dilution factor = 1 ml Vol. Used in ref./0.15 =6.7

Biochemical determination

Determination of serum creatinine: Serum creatinine level was determined by spectrophotometer Creatinine kit (Biolab, France). Creatinine in alkaline solution reacts with picrate to form a coloured complex; the intensity of the colour is proportional to the concentration of the creatinine in the serum and urine. The absorbance was measured at 500 nm using spectrophotometer.

Determination of serum uric acid: Serum uric acid was determined by uricase method, using colorometric test kit and the absorbance was measured at 492 nm using spectrophotometer (Biolab,France).

Determination of serum urea: Serum urea was determined by using colorometric test kit and the absorbance was measured at 600 nm using spectrophotometer (Biolab,France).

Statistical analysis: Analysis of data was performed by using {statistical package for social science (SPSS) version 24}. Results are expressed as mean ± standard error (mean ± SE). Statistical differences were determined by Ducan's test for multiple comparisons after analysis of variance (ANOVA).

Results

Serum MDA: The serum MDA level of CCl_4 treated rats increased significantly and reached (10.939 ± 1.3µmol/L) as compared with control rats (4.206 ± 1.1 µmol/L). While, serum MDA level decreased significantly in animals that were provided with diet supplemented with omega-3 (6.418 ± 0.5 µmol/L), compared with CCl_4 treated rats (Table 1 and figure 1).

Serum uric acid level: Statistical analysis revealed significant increase in serum uric acid level (14.61±7.05 mg/dL) of CCl_4 treated rats when compared with control group (9.99±0.55 mg/dL). On the other hand, rats treated with (omega-3 and CCl_4) showed significant decreases

in serum uric acid (9.61.96±0.71 mg/dL**)** compared to CCl_4 treated rats (Table.1)

Serum urea: Carbon tetrachloride caused significant increase in serum urea level (31.12 ±0.76 mg/dL) when compare with control rats (21.00± 0.48 mg/dL).on the other hand, rats treated with (omega-3 and CCl_4) showed significant decreases in serum urea (23.57±0.64 mg/dL) when compare withCCl4 treated rats(Tabe. 1 and figure 2).

Serum creatinine: Carbon tetrachloride caused a significant elevation in serum creatinine level (147.43±24.2 mg/dL) in CCl_4 treated rats when compared with control rats (42.52±10.5 mg/dL), while, serum creatinine level significantly decreased when rats treated with CCl_4 and omega 3 (65.64±6.1 mg/dL) when compared with CCl_4 treated rats (Tabe1 and figure 3).

Table (1): Effects of omega-3 on serum MDA, uric acid, urea and creatinine in CCL4 induced oxidative stress and nephrotoxicity in female albino rats.

	Parameters			
Treatments	**MDA (mμol/L)**	**Uric acid (mg/dL)**	**Urea (mg/dL)**	**Creatinine (mg/dL)**
Control	4.206±1.1[a]	9.99±0.55[a]	21.00±0.48[a]	42.52±10.5[a]
CCl4 (0.25 mL/kg)	10.939±1.3[b]	14.61±0.5[b]	31.12±0.76[b]	147.43±24.2[b]
Omega-3 (1gm/Kg) + CCL4 (0.25 mL/kg)	6.418±0.5[a]	9.61.96±0.71[a]	23.57±0.64[a]	65.64±6.1[a]

The same letters mean non significant differences while the different letters mean significant differences

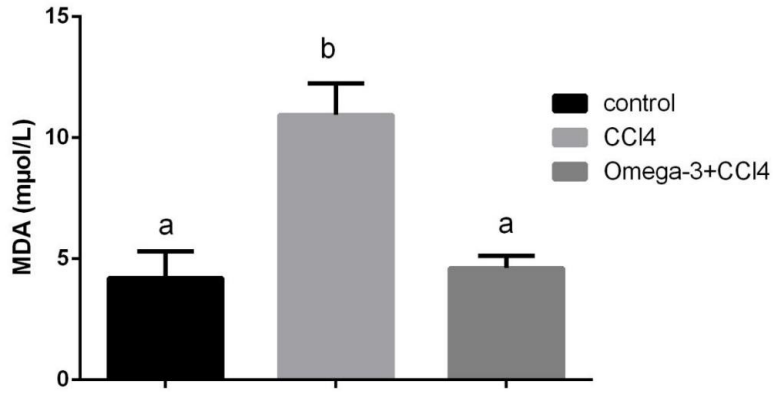


Figure (1): Effects of omega-3 on MDA in CCl4 induced nephrotoxicity. The CCl4 treated rat group was compared with control while omega-3 treated rat group was compared with CCl4 group.

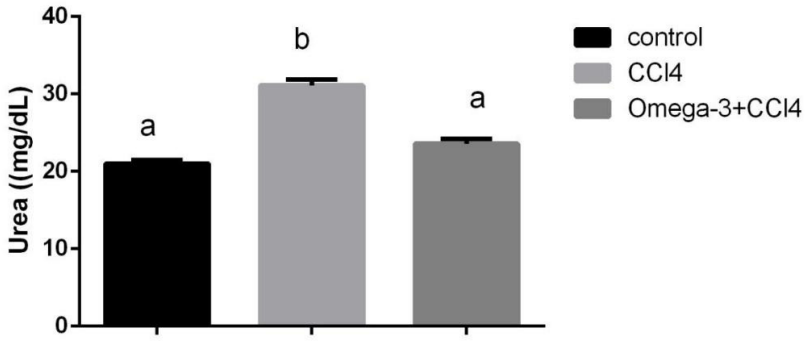


Figure (2): Effects of omega-3 on urea in CCl4 induced nephrotoxicity. The CCl4 treated rat group was compared with control while omega-3 treated rat group was compared with CCl4 group.

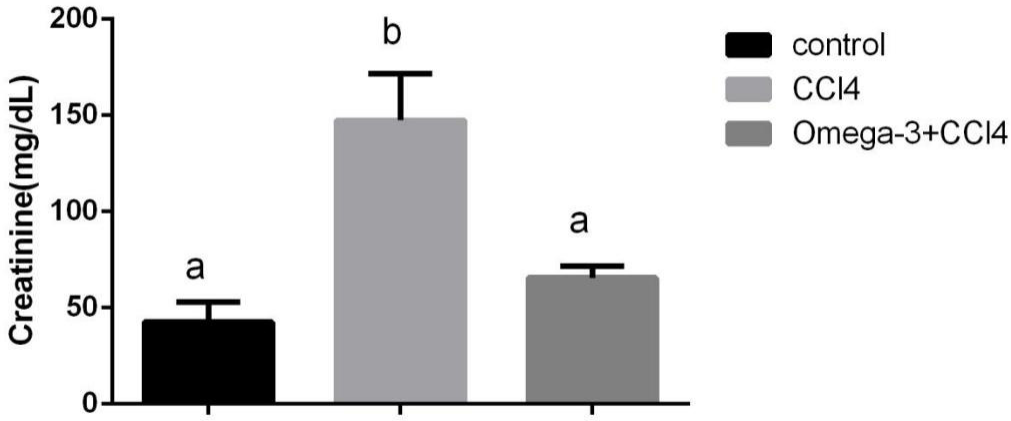


Figure (3): Effects of omega-3 on creatinine in CCl4 induced nephrotoxicity. The CCl4 treated rat group was compared with control while omega-3 treated rat group was compared with CCl4 group.

Discussion

Treatment with CCl4 for days elevated serum MDA level. MDA has been reported to one of the secondary products produced following exposure to reactive oxygen species and free radicals, and it can be used to check out oxidative damage through measuring serum levels of thiobarbituric acid reactive substance [19]. However our results confirm those of [20] as they concluded that, CCl4 enhances lipid peroxidation through increases free radical formation. CCl4 is metabolize by cytochrome p-450 and produce highly reactive free radical which initiates lipid peroxidation of the endoplasmic reticulum s cell membrane and causes a chain reaction.

Our results were correlated with [21] who reported that omega-3 caused significant reduction in lipid peroxidation induced by CCl4 in different organs of rats. The decrease in the MDA level by fish oil may be due to its antioxidant properties. Omega-3 could maintain normal levels of Superoxide dismutase and catalase activities [22] Inaddition, the anti inflammatory and anti-oxidant properties of omega-3 may be through it is ability to inhibiting lipid peroxidation and scavenging of free radicals [14].

The present results reveal that, intoxicated rats with CCl4 showed a significant increase in serum creatinine, urea and uric acid levels as compared to normal control rats. These pathological changes indicate the potential damage to kidney cells induced with CCl4 treatment since the observed increase is indication of an impairment of glomerular function and renal disorder [23]. Our results are agree with earlier reports reported by [24], who attributed these increases to the pathological changes observed in the kidney tissue and to the damage in kidney glomeruli as a result of CCl4 injection. Moreover [25] recorded that CCl4 induced elevation in serum urea could be related to the impairment of renal blood follow as well as reduction in glomerular filtration rate. However, creatinine production, infact, has a strong relationship with muscle mass and increased it is level indicates the muscular wasting occurred during CCl_4 intoxication [26]. Although, CCl4 causes depletion and deamination of muscle proteins but associated renal disorder prevents normal excretion process and therefore, causes accumulation and elevation serum levels of creatinine and urea [27].

Oral administration of omega-3 produces significant nephroprotective effects in CCl4 intoxicated rats. Our results are in agreement with [28] who suggest that Omega-3 may find clinical application in a different condition where cellular damage is a result of oxidative stress. The nephroprotective effects of omega-3 may be explained by the antioxidant effect of omega-3 fatty acids. The antioxidant or anti-inflammatory effects of omega- through inhibiting lipid peroxidation and scavenging of free have been reported previously [14]. However, omega-3 protects rat from CCl4 induced kidney injury as evident from significant decrease in serum creatinine, urea and uric acid. [29] suggested that the ameliorative effects of omega-3 on kidney function may be due to the improvement of glomerular filtration.

Moreover, it was generally accepted that fish oil reduce hyperlipidemia by decreasing serum total cholesterol and low density lipoprotein cholesterol concentration, so, creatinine might be decreased due to glomerulosclerosis reduction [30]. In addition, in a study [15] demonstrated that elevated serum level of creatinine, urea and uric acid were improved in the hypothyroid treated rats with fish oil, they concluded that the protective effects of omega-3 in in the concentration of creatinine, uric acid and urea may due to that omega-3 ameliorated concentration of thyroid hormones and improved glomerular filteration.

Conclusion

In conclusion, from this study it was concluded that omega-3-fattyacids, protects the kidney against CCl4 induced hepatotoxicity in female albino rats.

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Risk Assessment on BTEX Exposure at Fuel Storage Tank Area in Gasoline Station

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Abstract

Volatile organic compounds (VOCs; BTEX) cause health effects and polluting ambient air working at a gasoline station. This cross-sectional study aimed to study health risk assessment (HRA) to BTEX exposure at fuel storage tank area for forty-seven gasoline stations in Thailand. There was collected gasoline stations characteristics by questionnaire, BTEX concentration measuring by active sampling followed NIOSH number 1501 (NIOSH 2003) methodology analyzed by gas chromatography with flame ionization detector (GC-FID).Health risk assessment for non-cancer effect was calculated by hazard quotient (HQ) which estimated BTEX exposure concentration was calculated following the US.EPA-IRIS. The result measuring found that 0.023(0.0003-0.6821), 0.07(0.0032-1.49), 0.0039 (0.0008-0.0552), and 1.12 (0.05-29.50)ppm for mean (min-max) concentration in benzene, toluene, ethyl benzene, and xylene (BTEX) respectively. Benzene concentrations measurement for two stations (4.26%) exceeded the NIOSH-TWA standard (>0.1ppm). Furthermore, the health risk assessing was estimated 2 stations (4.26%) as more than one for hazard quotient (HQ≥1) for benzene and 2 stations (4.26%) for unacceptable risk as to more than one the summary of hazard index (HI>1).The non-cancer human health risk assessing by HI for exposure to BTEX compounds, did not significant correlation with all risk parameters. However, installed area of the fuel storage tank (right side of gasoline stations; above wind direct), fuel loading frequency, the located zone of gasoline stations, and service type, closer buildings of residential (<8 meters) and station borderline (<3 meters) distance from installed fuel storage tank of gasoline stations were increasingly health risk by considered safety action or HI≥0.5.

Therefore, as this study, suggests that entrepreneurs must be strictly controlled personal protective equipment wearing, safety work instruction, and safety training for gasoline station workers (truck drivers and loading examiners) to raise awareness of intake BTEX exposure by inhalation protective, including adding health surveillance program.

Keywords: *Health risk assessment, BTEX exposure, Fuel storage tank, Gasoline station.*

Introduction

BTEX (benzene, toluene, ethylbenzene, xylene) are volatile organic compounds (VOCs) and well known can also affect health. Especially, benzene is carcinogen[1-3] including cause hematopoietic, the central nervous system (CNS), and reproductive disorders[4-6]. Toluene is a cause of reproductive and CNS abnormalities[3]. Ethylbenzene and xylene are harmful to respiratory and neurological[4,7]. Those were one reason for inducing hazardous conditions contributed from polluted fuel vapors on ambient air[8] which gasoline station workers are exposed intake to BTEX while working. Thailand, gasoline stations has risen by an average of 4-5 percent a year to 28,753 stations[9].

The former study of BTEX measuring in gasoline station, was reported that 29.7, 47.7, 23.3 and 46.9 μg/m^3 for benzene, toluene, ethylbenzene and xylene at gasoline station atmosphere in Brazil, respectively[10]. There were average 1.922, 1.173, 0.868 and 1.866 μg/m^3 for BTEX in the gasoline stations of India[11]. In Thailand, there was 709, 1,984, 114 and 496 μg/m^3 for benzene, toluene, ethylbenzene, xylene, respectively at gasoline stations of Bangkok[12]. Benzene concentration were found 144.94±37.39 μg/m^3 in urban, 144.14±42.29

$\mu g/m^3$ in sub-urban and 108.94±69.01 $\mu g/m^3$ in rural zone in Khon Kaen province, the Northeast, Thailand[13].

Gasoline station workers were causing a high health risk[14], 64% of fuel service attendants had risk higher than an acceptable level[15] and some workers (12%) has risk higher than acceptable risk on benzene exposure via biomarker t, t-MA monitoring[16]. Although the long-term health risk of non-cancer were acceptable risk which the health risk assessing of non-malignant were less than hazard quotient (HQ) reference level (HQ<1)[17].

Vapor recovery systems (VRS) had used to reduce concentration of fuel vapors at fuel depots or industrial petroleum plants[18]. It was determined installations for vapor reduction in Bangkok, perimeter are as[19]. There was efficiency reduced evaporation at 80-99% of fuel vapor[20-21].

Despite these findings, there have not been adequately studied related to human health risk assessment in the fuel storage tank area at gasoline stations. This cross-sectional study was aimed at comprehensive assessing health risk all hazardous area that BTEX emission, investigate between the relationship fuel storage tank factors and health risk assessment (HRA) at gasoline stations.

Materials and Method

Study Design and Sampling: The result of cross-sectional study was conducted among 47 gasoline stations in Khon Kaen province, located in the northeast region of Thailand. The sample size was calculated by using Cochran (1953) under the known number of population in small size. The selected gasoline stations criteria 1) located in an area along either side of, or within 5 km of Mittraphap Road in Khon Kaen province 2) having more than eight dispenser nozzles.

Data Collection: This study were collected though a gasoline station questionnaire and a survey for 47 gasoline stations. BTEX concentration on ambient air a fuel storage tank working area, while fuel loading and non- loading, was measuredactive sampling followed NIOSH number 1501 (NIOSH 2003) methodology analyzed by gas chromatography with flame ionization detector (GC-FID) of Hewlett Packard 1996, Germany. It was collected during work shifts of working hour (8 hrs.) by active sampling with charcoal tube at a flow rate of 0.2 L/min in dispenser area. All charcoal tubes were kept at 4 ^{0}C while transported to the laboratory. There was extracted with carbo-disulphide (CS_2), and analyzed by GC-FID detector (Varian,CP3800) and column CP 52 wax (30 m x 0.25 µm x 0.25 mm). The BTEX concentrated on this method was determined health risk assessment by hazard index.

The human health risk assessment for non-cancer effect was estimatedby hazard quotient (HQ) according to HQ=EC/RfC, where; EC refersexposure concentration in $\mu g/m^3$, RfC refers exposure concentration for 30, 5,000, 1,000, and 100 $\mu g/m^3$ of benzene, toluene ethylbenzene, and xylene, respectively. The hazard quotient was considered "adverse non-malignant effects of concern" for HQ≥1 and "acceptable level" for HQ<1. The non-cancer health impact was expressed at the hazard index (HI), which was determined by the HQ of BTEX summation.

The BTEX exposure level was calculated following US.EPA-IRIS 2009 to EC=(CA x ET x EF x ED)/AT, where; CA refers contaminant concentration in $\mu g/m^3$, EF refers exposure frequency in day/year (324 day/year), ET refers exposure time in hours/day (2 hrs./day), ED refers exposure duration (25 year), and AT refers averaging time (194,400).

Data Analysis: Data analysis was carried out using STATA version 10 software, and descriptive statistics were used to define fire risk and classify hazardous zones. The Kruskal–Wallis test and a chi-squared test were used for correlation analysis of factors and health risk assessment. There was calculated the statistical significance was identified at a p-value <0.05.

Results

The overall of forty-seven gasoline stations, the basic characteristics found that located in 14.89% of the inner city and 85.11% of the outer city area. Each gasoline station had an average of 10±5 gasoline station workers. The time service of twenty stations (57.45%) were opened 16 hours (06.00 am - 10.00 pm) and twenty-seven (42.55%) were opened for all day. Gasoline station classification according to service type showed that 12 stations (25.54%) for type I+II, provides service dispenser house, fuel storage tanks, office, maintenance store and 37 stations (74.46%) type III+IV, fuel dispenser house, oil storage tanks, office, maintenance store, minimart, coffee shop, and food court. There were average 23±12 dispenser nozzles (min: max=8: 48). Daily fuel sold were average about 9,060±5,028 liters (min: max=2,300: 24,200).

The fuel storage tank contains average 44,121 liters, 18,000 liters for lowest, and 212,000 liters for maximum for stocked. The most located fuel storage tanks were built in left side of a gasoline station, above wind direction which was 34 stations or 72.34%.Frequency loading in the fuel storage tank was 40 stations (85.10%) for reloading every day and average 2 hours of spending time. The distance of located fuel tank was measured median 9, 20, 3.5, and 11 meters away from the dwellings area line, services building, gasoline station borderline, and fuel dispensers, respectively.

BTEX concentration at fuel storage tank ambient air was indirectly measured by active sampling and analyzed by GC-FID. The result found that average at 0.023, 0.07, 0.0039, and 1.12ppm for concentration on benzene, toluene, ethylbenzene, and xylene, respectively. There are only two station that the concentration was exceeded the NIOSH-TWA standard (>0.1 ppm)for benzene vaporization. BTEX exposure concentration was estimated at average 24.93, 88.54, 5.78, and 17.47 µg/m3 for inhalation exposure as Table 1.

Furthermore, the human health risk assessing for non-cancer effect was estimated by hazard quotient (HQ), which was calculated BTEX exposure level as fuel loading into a storage tank and non-loading with measured BTEX concentration by the above methodology. Hazard quotient more than or equal to 1 (HQ≥1) was assessed 2 stations (4.26%) for benzene exposure. Also, hazard index (HI) measured on working ambient atmosphere fuel storage was estimated average of 0.26 and 0.012-6.81 for minimum-maximum, which summarized with HQ form BTEX exposure intake by respiratory system as Table2.

The non-cancer risk for BTEX exposure assessed by safety action of hazard index (HI≥0.5) presented as Table 3, found that all the studied factors did not significantly different between hazard index (HI). However, those factors were positively associated with increased health risk assessing (hazard index; HI).

Table 1. Characteristic of gasoline stations and fuel storage tank

Characteristics	n (%)
Location zone of gasoline stations	
inner city	7 (14.89)
outer city	40 (85.11)
Service zone type	
type I+ II	12 (25.54)
type III+IV	35 (74.46)
Amount of dispenser (dispenser)	
<18	19 (40.43)
≥18	28 (59.57)
Mean (±SD)	22.96 (±12.03)
Median (min: max)	18 (8:48)
Fuel sold per day (liters)	
<8,000	23 (48.94)
≥8,000	24 (51.06)
Mean (±SD)	9,059.36 (±5,027.68)
Median (min: max)	8,565 (2,300: 24,200)
Maximum volume of fuel storage tank (liters)	
<30,000	15 (31.91)
≥30,000	32 (68.09)
Mean (±SD)	44,121.28 (±31,937.74)
Median (min: max)	35,000 (18,000: 212,000)
Fuel storage tanks location (wind direct)	
1: other side; along wind direct	13 (27.66)
2:right side; above wind direct	34 (72.34)
Frequency loading in fuel storage tanks (days)	
1: ≥2day	7 (14.90)
2: every day	40 (85.10)
Distance: fuel tanks and residential area (meters)	
<8	23 (48.94)
≥8	24 (51.06)
Mean (±SD)	31.70 (±63.48)
Median (min: max)	9 (1: 300)
Distance: fuel tanks and services building (meters)	
<5	2 (4.26)
≥5	45 (95.74)
Mean (±SD)	26.17 (±19.09)
Median (min: max)	20 (1: 85)
Distance: storage tanks and station line (meters)	
<3	16 (34.04)
≥3	31 (65.96)
Mean (±SD)	5.98 (±7.8)
Median (min: max)	3.5 (0.1: 45)
Distance: storage tanks and dispensers (meters)	
<5	0 (0)
≥5	47 (100)
Mean (±SD)	14.53 (±8.47)
Median (min: max)	11 (5: 50)

Table 2. BTEX concentration (ppm) and hazard quotient(HQ) at fuel storage tanks in gasoline station.

Parameter	Concentration (ppm)		EC (µg/m^3)	Hazard quotient (HQ)			Hazard Index; HI (min-max)			
	Mean (min-max)	over* standard n(%)	Mean (min-max)	Mean (min-max)	<1 n(%)	≥1 n(%)	Mean (min-max)	<0.5 n(%)	0.5 to <1 n(%)	≥1 n(%)
Benzene	0.023 (0.0003-0.6821)	2 (4.26)	24.93 (0.33-725.37)	0.21 (0.0028-6.05)	45 (95.74)	2 (4.26)	0.26 (0.012-6.81)	43 (91.49)	2 (4.26)	2 (4.26)
Toluene	0.07 (0.0032-1.49)	0 (0)	88.54 (1.25-1868.47)	0.004 (0.001-0.09)	47 (100)	0 (0)				
Ethylbenzene	0.0039 (0.0008-0.0552)	0 (0)	5.78 (1.1-79.80)	0.043 (0.0003-0.02)	47 (100)	0 (0)				
Xylene	1.12 (0.05-29.50)	0 (0)	17.47 (3.06-256.22)	0.26 (0.008-0.64)	47 (100)	0 (0)				

Remark: *The National Institute for Occupational Safety and Health on United States of America-Threshold limit value–time weight average;NIOSH-TWA

Table 3. Correlation between health risk assessment (hazard index; HI) and health risk factors at fuel storage tank area

Parameters	HI<0.5	HI≥0.5*	p-value
	n(%)	n(%)	
Location zone of gasoline stations			0.55
inner city (7)	6(85.71)	1 (14.29)	
outer city (40)	37 (92.50)	3 (7.50)	
Service type of gasoline station			0.22
type I+ II (12)	12 (100)	0 (0)	
type III+IV (35)	31 (88.57)	4 (11.43)	
Fuel storage tanks location (wind direct)			0.20
1: other side; along wind direct (13)	13 (100)	0 (0)	
2:right side; above wind direct (34)	30 (88.24)	4 (11.76)	
Frequency loading in fuel storage tanks (days)			0.38
1: ≥2day (7)	7 (100)	0 (0)	
2: every day (40)	36 (90.00)	4 (10.00)	
Distance: fuel tank and residential area (meters)			0.28
1:<10 (24)	23 (95.83)	1 (4.17)	
2: ≥10 (23)	20 (86.96)	3 (13.04)	
Mean (±SD)	26.17 (±19.09)		
Median (min: max)	20 (1: 85)		
Distance: fuel tanks and station borderline (meters)			0.48
1: <3 (16)	14 (87.50)	2 (12.50)	
2: ≥3 (31)	29 (93.55)	2 (6.45)	
Mean (±SD)	5.98 (±7.8)		
Median (min: max)	3.5 (0.1: 45)		

Remark: Significant, Not significant, *safety action

Discussion and Conclusion

The compared BTEX between fuel storage tank area in this study and other gasoline stations studies showed that was lesser than the inner gasoline stations and roadside area[11-13]. However,benzene concentration was 2 gasoline stations that was exceeded the NIOSH-TWA standard (>0.1 ppm).

The non-cancer risk for BTEX exposure as assessed by hazard index; HI (summarized with HQ of BTEX), the estimated hazard index was higher in fuel storage tank area than another area on gasoline stations[17]. There was two gasoline station for un-acceptable limits on humans, which may be related to frequency loading in the fuel storage tank a day which found that 40 gasoline stations (85.10%) in this study.

These assessed the health risk of non-malignant found that, all risk factors disparity effects increased trends of hazard index (HI).Particularly, an installed area of the fuel storage tank (right side of gasoline stations; above wind direct), building residential distance, station borderline, and daily loading frequency have not been adequately studied in truck drivers and loading examiners because they had to be directly exposed in numerous fuel vapor quantities in a few hours as petroleum loading per day.

Therefore, entrepreneurs must be strictly controlled personal protective equipment (PPE) wearing, safety work instruction, and safety training for gasoline station workers (truck drivers and loading examiners) to raise awareness of intake BTEX exposure by inhalation protective. Extremely, important adding health surveillance programto them.

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Ethical Clearance: This study was approved by Khon Kaen University Ethics Committee for Human Research (No. HE612102).

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Relationship between Talkativeness and Transformational Leadership among Management & Science University Students

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Abstract

Talkativeness is defined as talking a lot while a leadership trait refers to characteristics of a successful leader. Recent studies show lack of prove regarding the correlation of talkativeness and leadership trait among people. Hence, this research is a quantitative study which utilizes self-administered questionnaires to analyze the correlation of talkativeness and leadership traits among the students of Management & Science University. The data was collected using questionnaires which consist of 3 parts known are demographic survey, talkativeness survey and leadership traits survey. A total of 204 students from various faculties were randomly selected to participate in the survey. Data was entered on the SPSS version 17.0. The result obtained shows a significant correlation between talkativeness and leadership traits among Management & Science University students as the p-value is 0.01 which is less than 0.05. Talkativeness does effect on ability to be a leader. Thus, students should always practice more talking in order to create a better leader in the future.

Keywords: *Talkativeness, Leadership, Students, University.*

Introduction

Are leaders usually talkative or taciturn? Are leaders such as Tun Mahathir and Barack Obama talkative or are they the type of people who would stay quiet in discussions? Some people are born to be very talkative but do these people like to take the role of a leader. According to the Cambridge Dictionary, talkativeness is defined as talking a lot. Talkativeness is also to measure whether someone is talkative or the opposite. Talking is a fundamental human behaviour that reflects a range of underlining traits and behaviours.[23] The average rate of speech ranges between 140 – 160 words per minute.[11] Psychologically, talkativeness is under extraversion, the Big Five personality trait. Other personality traits included in the Big Five personality trait are openness to experience, neuroticism, agreeableness and conscientiousness.[7] Extraversion is associated with the trait such as sociable, talkative, friendly, outgoing and energetic. In most cases, the person who is the most talkative is usually picked as the leader. This is also known as the big mouth theory of leadership. A study found that a mouth width correlates with leader selection.[4]

In addition, leadership is the process of influencing others in a manner that enhances their contribution to the realization of the group goals.[25] Example of leadership traits that are popular include honest, confident, team-oriented, respect the followers, highly motivated, responsible, acts as a coach of the team, provides training for the followers and expects followers to work together to create the best possible results. There are many types of leadership such as Laissez-Faire leadership, Autocrat leadership, Transactional leadership, Transformational leadership and Participative leadership. Transformational leadership is the most common type.[20] Transformational leadership is defined as a leadership approach that causes change in individuals and social systems. In its ideal form, it creates valuable and positive change in the followers with the end goal of developing followers into leaders. Transformational leadership enhances the

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motivation, morale and performance of followers through a variety of mechanisms. These include connecting the follower's sense of identity and self to the mission and the collective identity of the organization, being a role model for followers that inspires them, challenging followers to take greater ownership for their work, being very well-organized and expect their followers to be creative and understanding the strengths and weaknesses of followers so the leader can align followers with tasks that optimize their performance.

This study is done to determine the association between talkativeness and leadership trait. Since students are the future leaders of the world, it is important to train and develop the leadership trait in them since young adulthood. If there is relationship between being talkative and these leadership traits, we should train these future leaders to become more talkative. With this study, we could identify association of talkativeness with the leadership trait. To enhance talkativeness in students, we can suggest and provide more programs that can enhance communicating skillsby introducing public speaking classes and activities. This study is chosen on MSU students and not on a specific faculty because there are many students from various faculties who have portrayed their leadership skills by leading activities arranged in MSU.

Objective: To find the relation between talkativeness and leadership trait among Management & Science University students

Literature Review: Since Burns first introduced the concept of transformational leadership in 1978, a great deal of research has been devoted to exploring the behaviors of leadership styles.[5] Leadership is grouped into three distinct dimensions: transformational, transactional and laissez-faire leadership.[5] According to Burns, transformational leadership is a process in which leaders and followers help each other to advance to a higher level of morale and motivation.[10] Burns related to the difficulty in differentiation between management and leadership and claimed that the differences are in characteristics and behaviors. He established two concepts of leadership which are transformational leadership and transactional leadership. Burns stated that the transformational leadership approach creates significant change in the life of people and organizations. It redesigns perceptions and values and changes expectations and aspirations of employees. Unlike in the transactional approach, transformational leadership is not based on a give and take relationship but on the leader's personality, traits and ability to make a change through example, articulation of an energizing vision and challenging goals. Transformational leaders are idealized in the sense that they are a moral example of working towards the benefit of the team, organization or community. Burns theorized that transforming and transactional leadership was mutually exclusive styles. Transactional leaders usually do not strive for cultural change in the organization but they work in the existing culture while transformational leaders can try to change organizational culture.

Moreover, in a research study done by Stang and Castellaneta, it is proved that there are positive correlations between talkativeness and peer judgments of leadership.[24] This point is also strongly agreed by a study done in 2004 by Bono and Judge who state extraversion was the strongest and most consistent correlate of leadership compared to neuroticism, openness, agreeableness and conscientiousness.[3] This study proves that the extraversion characteristic which includes talkativeness has a strong correlation with leadership trait. In addition, Harrison L.M. in the year 2011 supports that transformational leadership behaviors are a more significant in cognitive learning, affective learning, perceptions of instructor credibility and communication satisfaction than instructor transactional leadership behaviors in his study.[13] However, a research study done in the University of Ghana does not support all these statements. This research done by Boateng proves that student leaders at the university researched do not perceive themselves as having transformational leadership characteristics.[12]

Extraverts are most often characterized as assertive, active, energetic, upbeat, talkative and optimistic individuals.[18] Extraverts experience and will express positive emotions to their surrounding[17] which were revealed in assessments of job satisfaction[8] and subject well-being.[14] Extraverts' optimistic views of the future allow extraverts to emerge as group leaders.[8] Extraverts are also to be perceived as "leader like" [22] and exhibit behaviors consistent with the transformational model of leadership.[3] It is therefore no surprise that Bono and Judge (2004) recognized extraversion was the strongest and most consistent correlate of leadership compared to neuroticism, openness, agreeableness and conscientiousness.

Materials and Methods

The study design used for this research is a quantitative study which utilizes self-administered questionnaires. The questionnaires were constructed based on talkativeness and leadership qualities according to Multifactor Leadership Questionnaire and the Big Five Inventory Questionnaire.

The study area of my research is at the compound Management and Science University, Seksyen 13 Shah Alam.

The study population for this research will be the students of Management & Science University.

The sample size was calculated using a formula of $n = z\ 2p\ (1-p)/\ d2$

The standard deviation value, p value of 0.24 is taken from the previous study.[3] In the formula, n is the minimal sample size, z is the standard normal deviated of 1.96 which corresponds to 95% of confidence level, d is the detectable difference which is 0.05 and P is the expected prevalence which is 0.5. The value obtained is then added with 20% to include the drop up numbers. Thus, the maximum sample size obtained is 204 respondents.

Sampling methodused was choosing the male and female students of Management & Science University randomly. The questionnaires were distributed to the MSU Students randomly. The questionnaire consists of 3 sections which are the demographic survey, talkativeness survey and leadership survey. Descriptive and inferential statistics were used to analyze the data. Descriptive statistics includes frequency and percentages. The Pearson correlation test was used to measure the association between the variables which are the talkativeness and leadership trait. The significance level was set at P value less than 0.05.

Data analysis will be performed with the Statistical Package for Social Sciences (SPSS) 17.0 for Windows. The inclusion criteria for this research include all MSU Shah Alam students with valid university identification card while the exclusion criteria are MSU Shah Alam staffs and students with no valid university identification card.

Results

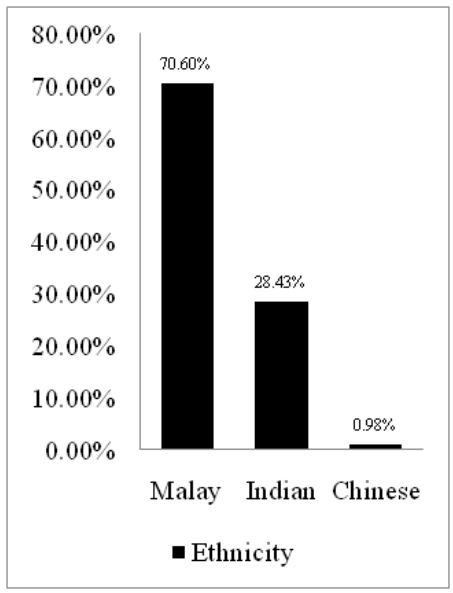


Fig. 1: Percentage of ethnicity group participated in the research

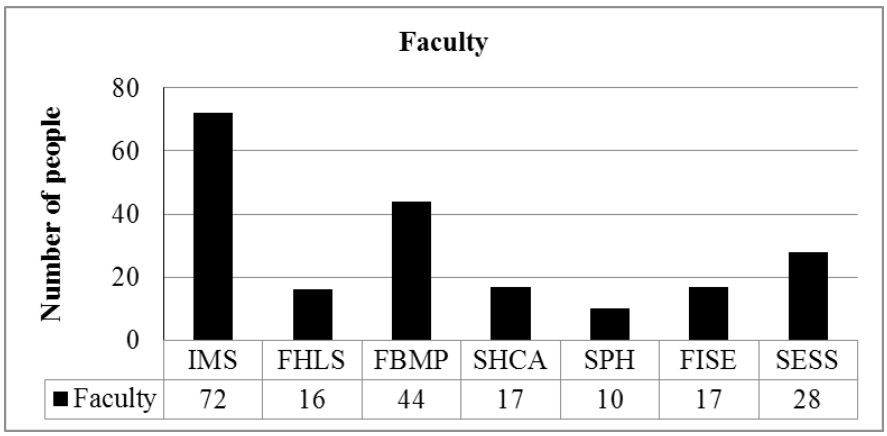


Fig. 2: Number of people from each faculty who participated in the research

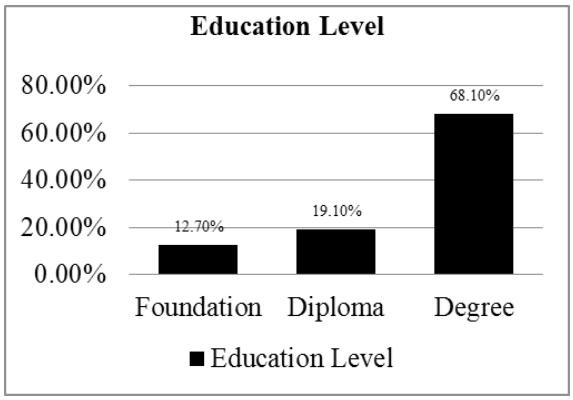


Fig. 3. Education level bar chart

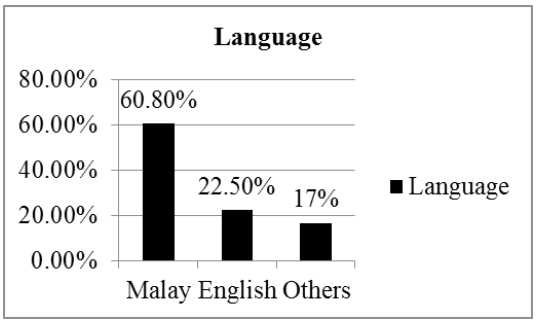


Fig. 4: Language often used when speaking by participants

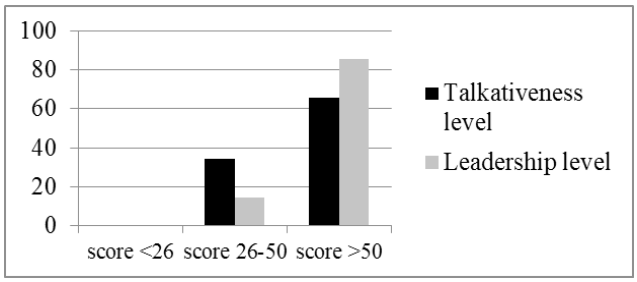


Fig. 5: Talkativeness and leadership level score of the participants

Table 1: Correlation of variable talkativeness level with leadership level using Pearson Correlation Test

Correlations

		totalts	totalls
totalts	Pearson Correlation	1	.533**
	Sig. (2-tailed)		.000
	N	204	204
totalls	Pearson Correlation	.533**	1
	Sig. (2-tailed)	.000	
	N	204	204

**. Correlation is significant at the 0.01 level (2-tailed).

Discussion

Fig.1 until Fig.5 show the results of demographic survey of the participants. In this research there were 67 males (32.80%) and 137 females (67.20%). Female participants are higher than male participants. Fig.1 shows a bar chart portraying the ethnicity percentages of people participating this research. It shows that Malay (70.60%) was the highest followed by Indian (28.43%) and Chinese (0.98%). Majority of the participants are Malay. In addition, according to Fig.2, IMS students were the majority subject for this research with 72 people. The second highest number of subject is from the faculty of FBMP by 44 people. It is followed by SESS (28 people), SHCA (17 people), FISE (17 people) and FHLS (16 people). The least number of people are from the faculty of SPH with only 10 people. The survey proves that majority of the participants are among the age of 18 years old to 24 years old (93.6%). There are only 6.40% of people from the age group of 25-35 and none was with the age above 35 years old. The education levels of the participants are shown in Fig.3 26 students (12.70%) are studying in foundation, 39 students (19.10%) are studying diploma and the majority of the students, 139 students (68.10%) participated are studying in degree. Fig.4 shows that most of the students speak in Malay when conversing. Next, 46 students (22.50%) usually speaks in English in their daily conversation and only 34 students (17.0%) of the students speak other languages such as Tamil. Fig.5 shows the talkativeness level and leadership level of the participants. The results shown are parallel to the alternative hypothesis which states that there is high prevalence of talkativeness level and high prevalence of leadership trait. The scoring to measure the level of talkativeness and leadership traits were divided into three which are low level for scores below 25, moderate level for scores between 26-50 and high level for scores above 50. None of the students scored below 25. This means the students of MSU are not quiet people. 15 males (7.35%) and 55 females (26.96%), a total of 70 students (34.31%), scored between 26 to 50 meaning they have moderate level of talkativeness. 52 males (25.49%) and 82 females (40.20%) scored above 50 and this proves that a total of 134 (65.69%) out of 204 students have high talkativeness level. Other than that, for leadership trait level, it also shows that no students scored below 25 meaning MSU students do have leadership traits in them. It is just a matter of time whether they have shown the leadership trait or not. 2 males (0.98%) and 28 females (13.73%), a total of 30 students (14.71%) scored 26 to 50 which is the

moderate level of leadership trait. Lastly, 174 (85.29%) students which consist of 65 males (31.86%) and 109 females (53.43%) have scored above 51. This means 174 students have high leadership skill and that is a very big number as it is more than half of the total respondent number. This result contradicts with a research study done by Boateng in 2014. His result proves the mean score of 2.97 shows that student leaders did not perceive themselves as having transformational leadership qualities.[12]

Last but not least, Pearson Correlation test proves that there is a relationship between the talkativeness level and leadership trait level of MSU students. This is also parallel to the alternative hypothesis which states that there is a relation between talkativeness and leadership trait. Table.1 shows that the significant p value is 0.01 which is below 0.05. This proves that the result obtained is significant. The correlation coefficient r value is also positive which 0.533 is. This result can be supported by a recent. The study results indicate that extraversion or talkativeness may be an important trait in predicting and understanding transformational and transactional leadership. Extraversion correlated with transformational leadership. Extraversion is a trait that shows robust relations with both leadership outcomes and rated leadership behaviors. Thus, it seems worthwhile for future leadership research to focus on extraversion.[3]

Conclusion

According to this study, there is a significant correlation or relationship between talkativeness and leadership trait among MSU students. The leadership traits found in MSU students include highly motivated, confident, reliable and honest. This means that talkative students have a higher chance to be a leader as they have the leadership traits. However, there were lack of previous researches on talkativeness and leadership trait.

Conflict of Interest Statement: We certified that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

Source of Funding: Self

Ethical Clearance: No identifying details of the subjects reported here and all the data collected after informed consent.

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Application of Cognitive and Behaviour Framework Module in the Treatment for Mental Games among Golf Athletes: A Study of UUM National Golf Academy

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Abstract

This article discusses the continued effects of using the counselling approach module, ABC Rational Emotive Behaviour Therapy (ABC REBT) in reducing the psychological problems of golf athletes, especially athletes who are facing problem especially mental game and yips. Symptoms of this problem include anxiety and loss of self-confidence, shown through sweating and clumsy conditions when putting and chipping in critical situations. As a result, athletes face low self-confidence especially during major championships. In identifying the effectiveness of the module,the study conducted on the same athlete in previous years as respondents. This study also uses qualitative approach, involving three golf athletes. The views of coach who train them full time are also taken to support any changes in the results of the study. The theme of analysis and content analysis has been used. The findings show that the using of ABC REBT module treatment to overcome the mental game and the yips of golf athletes is effective in the long run. The result of theme analysis and content analysis reinforces the effectiveness of the ABC REBT treatment module on respondents. The result of this study are important in expanding the scope of counselling services in sports, and also proves the effectiveness of counselling approaches to athletes. Therefore, involvement of counselling practitioners in sports is also recommended. The article also illustrates the potential of cognitive and behavioural counselling approaches in reducing the problem.

Keywords: *Counselling, Treatment module, mental game, athletes.*

Introduction

The mental game problem refers to psychological problems faced by sports athletes that include personal problems, pressure in the competition, burn out, relationship problems with coaches and teammates and other problems involving the athlete's psychology[1,2,3]. Mental game is a state of anxiety experienced by the athletes during certain manoeuvres in sport. It stems from the way the athletes responded to the difficulty level as well as the importance of movement or a shot that they will attempt. In addition, the over thinking symptoms before starting the shot can also affect a player's skills and achievements. Thus mental game is considered to be a wide aspect in the field of sports. In golf specifically, mental game aspect is significant when a player is susceptible to the changes in the psychological aspects.

Therefore, a study entitled "The impact of ABC REBT brief counselling approach framework in addressing the mental game and the yips among golfers"[4] has been conducted in order to improve the mental game treatment among golf athletes. In his study, the ABC REBT brief counselling approach framework was applied to a number of golf amateur athletes who were involved in a series of local and international golf competition. The study found that the approach has a significant impact in terms of control of the mental game that they face. At a glance, the results of the study are in line with the findings of other researchers who found that counselling approach can be implemented in the

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field of sports[5,6,7]. This association is primarily caused by the psychological, mental and spiritual aspects of the athlete[8].

Past Research: Among the earliest problems that affect athlete's psychological growth is the result of' sports commercialization which started in the 1970s[9]. According to Scott[9], athletes are faced with various problems such as lost self-confidence and mental stress, especially when it comes to unreasonable coaches' expectations. They are also faced with the pressure to meet the expectations of the parties who are sponsoring them. Thus, Scott[11] suggested that the problems faced by athletes such as stress and lost self-confidence are relatable with counselling services.

Hinkle[10] estimated that there are around ten percent of student athletes who are associated with psychological problems at universities in the United States. Hinkle[9] also attested that sports psychologists, different from sports counsellors focus on the athlete's performance. Sports counsellors on the other hand focus on the psycho-emotional problems experienced by athletes, by reviewing the emotional and psychosocial development of the athletes in a more comprehensive manner compared to sports psychologists. Such differences can be considered as the boundary between sports psychology and sports counselling fields. Further, a sports counsellor refines the athlete's problems and tries reducing them, while professionals in other fields may not have these capabilities[9].

The cross field research on counselling and sports fields starts with the application of theory and counselling based approaches into the game aspects[10]. Among them are behavioural theories such as Solution Focused Behaviour Therapy and Therapy and Rational Emotive Behaviour[10]. Counsellors may not be an expert on the best *performance* for athletes, but the sports counsellors have their own method to handle their problems[9]. Sports Counsellor concentrates on the development of an athlete through lifestyle counselling, career and development programmes, as well as stress management.

Further to this, sports counsellor can engage in programmes such as problem prevention programmes, coping skills and competitive response, decision-making method, life management, therapeutic strategies and crisis management. However, that doesn't mean that sports counsellors are not involved with athletes' performances. Sports counsellors could provide services that support both aspects indirectly[9]. Thus, sports counsellor sports need to be savvy or at least familiar with a specific type of sports activities of their clients[11].

One of the biggest challenges in the sports development is the lack of emphasis on a holistic approach in the aspect of training and development programmes for athletes[3]. More emphasis has been put on the development of skills, physical appropriateness, health and fitness aspects, and rewards and achievement[11]. Unfortunately, serious attention in the athlete's psychological aspects is rarely given. This is due to the rapid development of immediate and continuous result-oriented sports industry that is expected by the stakeholders. They include the sponsors, the sports institutions or countries who expect that the athletes would collect medals from the tournaments in which they participate[3].

For example, when the commercialization era started to enter the American sports industry, sponsored athletes were involved in several of psychosocial and psychological problems including the use of drugs and alcohol. These problems were believed to be the effect from high expectations from coaches, sponsors and fans[8]. It is estimated that ten percent of the athletes were involved in problems that requires counselling interventions[7].

Thus, the development of counselling services in sports have a great potential to be further developed[11] and will continue to grow that can also imply the current developments of sports psychology is at the stage of maturity and will continue take into place in the long run[12]. This fact is important to support the continuity of research on the field of counselling in sports.

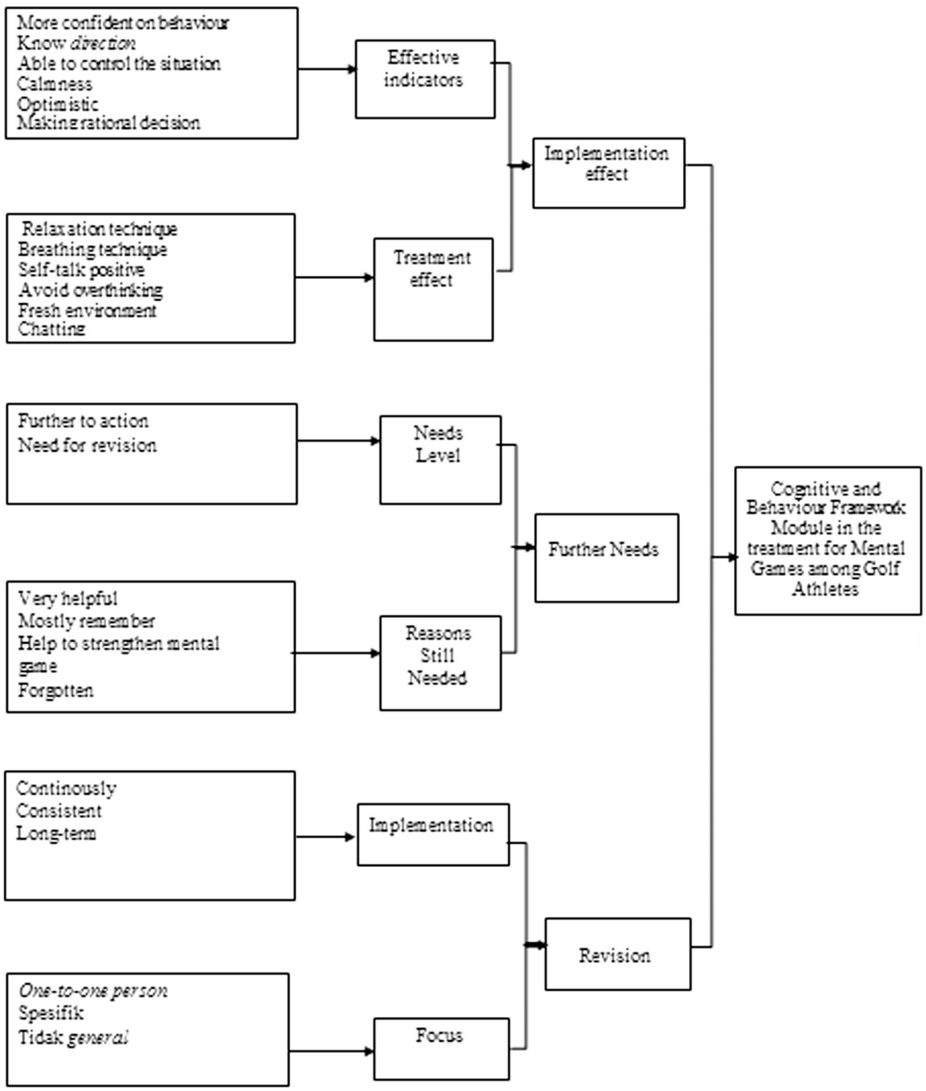
Having said that, the effectiveness of the treatment counselling modules used to treat athletes, is still uncertain. Psychological problems such as mental game and yips also happen to athletes in other sports such as baseball and cricket[13]. Therefore, this study focuses to clarify these problems and results from this study can be used as input for programmes carried out by organisations which are involved in the development of sports in our country such as the National Sports Council (NSC) as well as other sports organizations.

One of the sports that clearly require counselling services for their athletes is golf. Alike other sports that are either individually assessed or by teams, golf can be given great attention by nurturing hard work towards

continuous development. This includes strengthening the athletes' mental capacity. Efforts should be done to meet the needs in all aspects such as physical and skills, nutrition and psychological aspects of the athletes. In this study context of this study, efforts are taken in the form of the construction of an appropriate module in addressing the psychological aspects among athletes.

Methodology: Using a qualitative research design, this study has been conducted with four respondents from National Golf Academy, Universiti Utara Malaysia. This study uses the primary data from face to face interviews between researchers and respondents to collect key information as well as secondary data to support several findings obtained. After approval from the academy committee was obtained, the procedure for conducting semi-structured individual interviews began. The selected respondents were contacted to arrange for the face-to-face interview session. The preparation of the protocol interview was guided by the previous research and recent literature on developing cognitive and behavior framework.

Findings: Three main components emerged from the thematic analysis on the data collected from the interviews between researchers and respondents. The themes are determined based on the effectiveness of the module implemented in the study conducted previously, the need to continue its implementation and any improvements needed to be done which can be implemented in the future. In addition, the components are also determined based on the frequency of the themes mentioned by the respondents. To make it easier to understand, the themes are arranged and depicted in a tree diagram as follows.



Tree Diagram on qualitative themes frequency

Discussion

Compared to other sports, golf is considered to be a fragile game[14]. Therefore, mastering a strong mental is very important in this game. The change of mood and game patterns can occur in split seconds, especially among amateur golf players. A popular term among golfers is 'lost my golf swing' which is a phenomenon that occurs among all amateur players. The importance of mental strength has been acknowledged by most major international golf instructors. There are two important things to master in golf are in the technical aspects and mental aspects[14]. According to him, great golfers like Hogan and Nicklaus are famous not only because of their golf skills but also their mental strength which always being portrayed in every major competition.

Based on the Rational Emotive Behaviour Therapy (REBT) theory, an individual emotional state depends on his belief, method of valuation, method of interpretation and response towards his surroundings, thus this therapy module requires a process capable of disputing all forms of thinking which leads to the client's irrational beliefs[15]. In addition, REBT also focus more on thinking, consideration and decision making which include judgment, analysis and actions[15]. Based on this, the focus in this therapy is highly suitable with the mental game problem which is closely related to the needs of the orientation of the athletes' rational and controlled thinking throughout the game period. This study focuses on the changes in intellectual understanding among players and sports concept changes and monitoring of after treatment effects[16]. In order to test the consistency of the module effectiveness applied in the study in 2014, this study was conducted to follow up and evaluate the implications of the use of the relevant module on athletes.

Conclusion and Recommendations

In conclusion, the study of the psychology and counselling in sports is important in order to enhance the development of sports in Malaysia. The Malaysian sports industry is evolving in becoming an industry that can generate substantial income to the country[16]. Therefore, studies relating sports psychology is seen as important to support training in all sports categories[17]. National Sports Institute[18] has also set their targets in helping athletes with mental stress problem by increasing the amount of counsellors in the field of sports. Similar with other sports, golf is also expanding with facing many opportunities and challenges of its own. Since golf is played by individual player, golf is likely be able to bring the country chances to win medals at the Southeast Asian level or a higher level, for example in the 2016 Olympics. Nevertheless, golf has different challenges from other sports. Among others, the problems include those involving psychological aspects faced by the players which could easily affect their performance.

Golf is a game that is very fragile. The problems that are either due to a player's psychological aspects or non-psychology, such as climate, change can change the player's performance. Realizing that external factors cannot be controlled, thus, the control over internal factors especially in strengthening the psychological aspects of the player, must be prioritized. With this regard, efforts to overcome psychological problems such as mental game and yips need to be conducted. Previous studies including those using counselling approaches have proven that these problems can be treated. In this study, treatment using REBT approach has contributed good decisions on how mental problems and game yips can be reduced. Thus, this study becomes an effort that could help address the psychological aspects of sports players and contributes an added value towards other training programmes that the players participate in.

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Job Demands, Job Resources and Job Stress among Staff in Malaysia Nursing Home

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Abstract

The aims of study to examine the relationship between job demands, job resources and job stress among staff in nursing home. The data collected from staffs that work in Malaysian private nursing home including nurses, medical attendance and caregivers. The data has been analyzed through descriptive statistic, correlation analysis and linear regression. The results revealed that there is a negative relationship between job resources and job stress and there is a positive relationship between job demand and job stress. Increase in job demands will affect employees' mental and physical and it leads to health problems as well as exhaustion of energy. In contrast, job resources foster employee engagement and extra-role performance.

Keywords: *Job Demands, Job Resources, Job Stress, Nursing Home.*

Introduction

Worldwide ageing populations are speedily rising[1]. Malaysia similarly faces evolution dramatically from young citizen to ageing society in the next 10 to 20 years. In 2017, there are 1,895,030 people 65 years and older living in Malaysia, which presented 6.3% of the population according to the data from World Bank Group[2]. The number of ageing population in Malaysia is estimated to increase to almost 6 million, or 15.3% of the total population in the next 13 years[2]. Even though, most of the ageing population living and cared at home, an increasing number will be living at nursing home[3]. This fastest growing leading to an increasing demand for nursing homes. Nursing homes plays an important role in the provision of care of elderly people. Due to rapid change with the increasing number of older people as well as the need of expansion and diversity in care service, nursing homes are faced to provide high level of quality care, while at the same time experiencing difficulties in recruiting and retaining a trained workforce. This phenomenon happened due to stressful job in nursing homes[4-6] with associated with decreased in motivation of work and risk of burnout that caused to high worker turnover rates[4,7,8]. This vital issues and challenge in nursing homes worldwide should be studied to improve the quality of care and paramount for mitigating future labour shortages in the nursing home sector.

There are numerous encounters in daily work of nursing homes workers, as the work has been described as physically and emotionally difficulties due to the workload that carried by workers and affect their physical and psychological acceptance[9,10]. This kind of pressure will lead to difficulties at work and also related to the negative of psychological and emotional impact. Therefore, the nursing home staffs are facing the challenges of potential risk factors towards work-related pressure and stress.

It is clear that turnover rate was highest in the nursing care staff or caregivers (39.5%) and lowest for administrative staff. Housekeeper rate was the second highest (33.7%) among others related job as housekeeper also involved in caregiving services as assistant for the nurses. There are numerous factors related to job demands demonstrated in previous studies, but most of these studies did not provide enough empirical evidence to support the role of nursing homes staff in Malaysia. Most of work-related stress focusing on nurses in Malaysia. Thus, the first objective of this study is to examine the direct effects of job demands on job stress among nursing home staff. The second objective is to investigate the direct effects of job resources on job stress among nursing home staff in Malaysia. This paper is organized as follows: first, an introduction; second, a review of the literature on job stress, job demands, and job resources are provided; third, development of the hypotheses and conceptual framework; fourth, methodology, fifth, the results of study and finally, the implications and conclusion of the paper.

Job Stress: Major issues in nursing homes was related to occupational stress and it reflected the absenteeism of staff, low morale and high staff turnover[11]. The word of stress is defined as individual response and emotional caused to the person who discover imbalance between the job demand and the workplace resources[12]. Whereas, job stress is defined as the detrimental emotional and physical responses that happen when the job that needed by individual does not match the resources, motivation to work or workers' capabilities[13]. In a simple word, stress refer to the non-specific response of the body to any demand[14] and also job stress is related with a distraction of an employee physiological homeostasis or psychological[15]. Work related stress can lower the happiness in life and it penetrate the hypertension, decrease immunity, cardiac issues, contribute to substance abuse and it reflect the mental and physical wellbeing[16] and lead to turnover intention, burnout, quality of care problems and absenteeism[17, 18].

Nursing industry are facing occupational stress and it can be defined as emotional and physical response that occur when the nurses unable to utilize their abilities and resources to meet their job requirement[13, 19]. Numerous studies have shown that nursing industry faced the high levels of occupational stress that related with environmental, individual, organizational factors and social[20, 21]. Nursing industry are beneficial to the country, but at the same time it very stressful work[16].

Job Demands: Based on study by Woodhead, Northrop, & Edelstein (2014), conceptualized the job demands-resources model of burnout according to job and personal stressor as job demands[22]. Job demands refer to psychological and physical abilities or skills that are sustainably needed at work, for example like emotional demands and work pressure.

Nursing staff at nursing home face several physical and psychological burden that were not experienced by others department nursing staff. This situation will lead to the nursing job satisfaction and increate burnout rate. Numerous studies reported that high number of dementia residents might lead to verbal abuse and direct physical pain toward residents or organization staff[23, 24].

Job Resources

The Relationship between Job Demands and Job Stress: A review by Vermeerbergenet al[25] which studied four job demands that consists of demand of emotional, completeness of job, variability of job and pressure of time suggest that levels of job control and job demands are higher in normalized small-scale homes than in conventional large-scale nursing homes[25]. Whereas pressure of time is lesser in normalized small-scale homes than in non-normalized large-scale homes. Study by Vermeerbergenet al[25].also found that care workers in normalized small-scale homes facing high time pressure, high task and workload as well as incompatible work demands[25].

According to Verbeeket al[26].four job demands were studied namely job variability, job completeness, time pressure and emotional demands[26]. An analysis of comparative study shows that the nursing care staffs in small-scale nursing home are emotionally involved with residents rather than care nursing care worker in traditional home[26]. This study supported by Loe and Moore (2012) by showing that emotional demands increase when normalized small scale home implemented. It is because the care workers spend more time with the residents and their family better. As a consequence, emotional demand increases when a resident become ill or dies.

H1: Job demands will be positively related to job stress

The Relationship between Job Resources and Job Stress: The Job Demands-Resources (JD-R) model[27, 28] are used to estimate stress and engagement of employee, and consequences of organizational performance. At the heart of the JD-R model found the assumption that every occupation may have its own causes of employee well-being, these factors can be classified in two general categories which included of job demands and job resources, thus establishing an principal model that may be applied to various occupational settings, irrespective of the particular demands and resources involved. Extensive research has provided evidence for the presence of two simultaneous processes. Increase in job demands will affect employees' mental and physical and it leads to the exhaustion of energy and to health problems. This is the health impairment process. In contrast, job resources foster employee engagement and extra-role performance. This is the motivational process.

A study by Hsu et al[29] shows that an unfixed schedule also positively associated with poor management, working time problem and heavy workload[29]. The unsuitable work schedule designates not only poor rotation management or day and night schedule, but it implies insufficient human resources. The shortage of formal caregivers in nursing home will lead to increasing workload and insufficient time to caregivers and finally they will suffer stress and burnout.

H2: Job resources will be negatively related to job stress

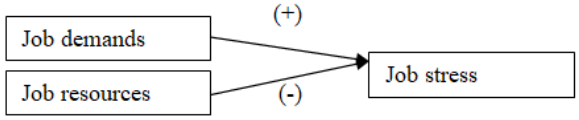


Figure 1. Research framework

Methodology

Sample and Procedures: The sample size, as in the case of the sampling frame drawn from each registered private nursing home in Peninsular Malaysia. Total nurses, medical attendance and caregivers working in private nursing home in Malaysia are 333 (Welfare Department of Malaysia, 2018)[30]. According to Krejcie and Morgan[31], Formula 1 is used to determine the sample size[31]:

Formula 1:

$$S = \frac{X^2 NP(1-P)}{d^2(N-1) + X^2 P(1-P)}$$

S=Size of population selected

X^2=Refer to confidence level, 3.841 (95% = 1.96)

N = Population size

P = Population ratio and assume it as 0.50 due to it will maximum the size of sample

d=Degree of accuracy which is 0.05

Sample size calculation:

$$S = \frac{(3.841)(333)(0.5)(1-0.5)}{0.05^2(333-1) + (3.841)(1-0.5)} = 178.6 \approx 179$$

The sample size will be 179 of respondents; it was impossible picking the respondent by the decimal place. Therefore, researcher rounded off the decimal place and increased the number of respondents for reducing the error. Thus, the sample size adopted in this research was 179 respondents. The participants in this study were staff nurse, medical attendance and others (such as caregivers and guardians) from private nursing home in Malaysia. The authors contacted 179 nursing home in the region of north, south, east and west Malaysia, and only 65 agreed to participate. Each staff in nursing home were the respondents. The questionnaires were distributed in each nursing home through the drop-off and pick-up method. Respondents were given one week to complete the questionnaire. After the specified period, 65 questionnaires were collected and found to be useable for analysis. The statistical tools used to analyze the reliability analysis, correlation analysis, linear regression analysis and descriptive statistics.

Results

Respondents' Profile: As shown in Table 1, Male representing 21.5% (14 respondents) and female representing 78.5% (51 respondents) in this study. The highest numbers of age were between 20-29 years old that representing 52.3% (34 respondents) and the lowest numbers of age were below 20 years old that representing 1.5% (1 respondent). There were 41.6% of respondents were married (27 respondents) and 58.4% of respondents were single (38 respondents). Most of the respondents were Malay representing 61.6% (40 respondents), followed by Chinese that representing 18.5% (12 respondents), India representing 16.9% (11 respondents) and others representing 3.0% (2 respondents). Most of the respondents' job tenure in the industry is 1 year and below representing 50.8% (33 respondents). The job

tenure for the remaining respondents are as follow: 2 to 5 years representing 26.2% (17 respondents), more than 10 years representing 15.3% (10 respondents) and 6 to 10 years representing 7.7% (5 respondents). The highest number of respondents' education level were Diploma that representing 58.4% (38 respondents) and lowest number of respondents' education level were Master/PhD representing 3.1% (2 respondents). Most of the respondents' salary were between RM1001 to RM2000 that representing 72.3% (47 respondents) and the smaller number of the respondent's salary was above RM4001 that representing 1.5% (1 respondent). The highest number of respondents' job position were others such as caregivers that representing 55.4% (36 respondents), followed by nurse representing 33.8% (22 respondents) and medical attendance representing 10.8% (7 respondents).

Objective 1: To examine the relationship between job demands and job resources towards job stress.

The objectives of this analysis were to examine whether the correlation exists between the independent variables (job demands and job resources) and the dependent variable (job stress). If the correlation existed, the researchers next had to decide the strength and the direction of association between the variables.

Table 1: Percentage and Frequency of Respondents' Profile

Variables	Frequency	Percentage (%)
Gender:		
Male	14	21.5
Female	51	78.5
Age:		
Below 20 years old	1	1.5
20 – 29 years old	34	52.3
30 – 39 years old	11	16.9
40 – 49 years old	9	13.9
50 years old and above	10	15.4
Marital status:		
Married	27	41.6
Single	38	58.4
Ethnicity:		
Malay	40	61.6
Chinese	12	18.5
Indian	11	16.9
Others	2	3.0
Job tenure:		
1 year and below	33	50.8
2 – 5 years	17	26.2
6 – 10 years	5	7.7
More than 10 years	10	15.3
Education level:		
PMR	7	10.8
SPM	13	20.0
Diploma	38	58.4
Bachelor's degree	5	7.7
Master/PhD	2	3.1
Salary:		
RM1000 and below	6	9.2
RM1001-RM2000	47	72.3
RM2001-RM3000	9	13.9
RM3001-RM4000	2	3.1
RM4001 and above	1	1.5
Job Position		
Nurse	22	33.8
Medical attendance	7	10.8
Caregivers	36	55.4

Table 2 illustrated Pearson's Correlation Coefficient, significant value and the number of cases which were 65. The p-value was 0.000, which was less than the significant level of 0.01. Thus, this study accepted the hypotheses one (H1). The correlation coefficient of 0.544 suggested a moderate positive correlation between job demand and job stress.

Table 2: Correlation Coefficient for Relationship between Job Demand and Job Stress

		Job Demand	Job Stress
Job Demand	Pearson correlation	1	0.544**
	Sig. (2-tailed)		0.000
	N	65	65
Job Stress	Pearson correlation	0.544**	1
	Sig. (2-tailed)	0.000	
	N	65	65

H1: There is a positive relationship between job demand and job stress.

Table 3 illustrated Pearson's Correlation Coefficient, significant value and the number of cases which were 65. The p-value was 0.010, which was equal to the significant level of 0.01. Thus, this study accepted the

hypotheses two (H2). The correlation coefficient of -0.318 suggested a low negative correlation between job resources and job stress.

This study revealed that job demand has positive relationship with job stress (0.544, p-value= 0.000) and job resources has negative relationship with job stress (-0.318. p-value=0.010). Therefore, the research objective one has been answered.

Table 3: Correlation Coefficient for Relationship between Job Resources and Job Stress

		Job Resources	Job Stress
Job Resources	Pearson correlation	1	-0.318**
	Sig. (2-tailed)		0.010
	N	65	65
Job Stress	Pearson correlation	-0.318**	1
	Sig. (2-tailed)	0.010	
	N	65	65

H2: There is a negative relationship between job resources and job stress.

Objective 2: To develop a theoretical framework of stress that is suitable for nursing homes staff in Malaysia.

The Extent of Job Demand and Job Resources for Explaining Job Stress

Simple Linear Regression Model (Job Demand and Job Stress): Simple linear regression model was proposed to explain the job stress (Y). The variable proposed was job demand (X_1). The data was further analysed using linear regression to see the relationship between the variables. According to the result presented in Table 4, there is positive relationship between job demand with job stress. However, in Table 5, there is negative relationship between job resources with job stress.

Table 4: Results coefficient for job demand and job stress

	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
(Constant)	.679	.389		1.734	.086	-.099	1.456
Job demand	.645	.125	.544	5.150	.000	-.395	.895

The correlation coefficient between job demand with the job stress is 0.544. Hence, there is positive relationship between job demand with job stress. In regression analysis, the p-value in Table 4 is less than 0.05. Based on Table 4, the regression equation is:

$$\hat{Y}\ (Job\ stress) = 679 + 0.645\ (\text{job demand}) + e \quad ...(2)$$

The R^2 value of 0.296 implied that the predictor variable explained about 29.6% of the variance in the job stress (Y). In addition, for every unit increase in job demand scores, job stress is expected to be increased by .645. As a conclusion, there is a positive relationship between job demand and job stress. For every unit increase in job demand scores, job stress is expected to be increased by 0.645.

Simple Linear Regression Model (Job Resources and Job Stress): Simple linear regression model was proposed to explain the job stress (Y). The variable proposed was job resources (X_1). Therefore, the equation of the proposed regression model is as follows:

Table 5: Results coefficient for job resources and job stress

	Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
(Constant)	4.181	.583		7.167	.000	3.016	5.347
Job demand	-.421	.158	-.318	-2.659	.010	-.738	-.105

The correlation coefficient between job demand with the job stress is -0.318. Hence, there is negative relationship between job resources with job stress. In regression analysis, the p-value in Table 5 is less than 0.05. Based on Table 5, the regression equation is:

$\hat{Y}$ *(Job stress)* = 4.181 + (-0.421) (job resources) + *e* ...(2)

The R^2 value of 0.101 implied that the predictor variable explained about 10.1% of the variance in the job stress (Y). In addition, for every unit increase in job resources scores, job stress is expected to be reduced by .421. As a conclusion, there is a negative relationship between job resources and job stress. For every unit increase in job demand scores, job stress is expected to be reduced by 0.421.

Thus, the theoretical framework of stress among nursing homes staff in Malaysia is suitable due to the current result of the study. There was positively related between job demand and job stress (Hypothesis 1), and also there was negatively related between job resources and job stress (Hypothesis 2). Both of the results show that the significant value (p-value is less than 0.05) and the framework is suitable for application among nursing home staf.

Discussions

Due to rapid change with the increasing number of older people and the need of expansion and diversity in care service, nursing homes need to provide high level of quality care, while at the same time facing difficulties in recruiting and retaining a trained workforce[32]. This phenomenon happened due to stressful job in nursing[4-6]. Thus, the first objective is to examine the relationship between job demands and job resources towards job stress and it found that there is a moderate positive correlation between job demand and job stress with correlation coefficient of 0.544. This finding supported by Hoboubiet al[33].which demonstrated that there were negatively associated between job demands and stress[33].

The second objective of this study is to develop a theoretical framework of stress that is suitable for nursing home staff in Malaysia. The results revealed that there is positive relationship between job demands and job stress; and there is negative relationship between job resources and job stress. The negative relationship between job resources and job demand has been supported by Oshio, Inoue and Tsutsumi[34]that found there is significant negative relationship between job resources and job demand[34]. Both of the results show that the significant value (p-value is less than 0.05) and the framework is suitable for application among nursing home staff.

Conclusion

Work stress in nursing home is not the new phenomenon in the nursing industry. It frequently exists and is related with services of professional. In reality, the issues of job stress have attained courtesy by psychologists and previous research indicated that there was a negative consequence rising from stress that affect the commitment of employee and their performance. Job demands in organizations will results in a great loss to the organization due to the job stress. In contrast, job resources will reduce job stress and increase the performance of organization in future.

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A Review on the Factors of Elder Abuse and Neglect in Nursing Homes

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Abstract

In recent years, elder abuse has become a common phenomenon as it becomes a sustained interest and concern to the society and an emerging global problem that was identified as an important research agenda for the 21st century climate. A review of the literature demonstrated a gap on the factors contributing to elder abuse and neglect in nursing homes. The need for greater attention to this topic stems from several factors. The aim of this review is to identify the factors of the elder abuse in nursing homes. Review process was employed in this research including inclusion and exclusion. A comprehensive search of multiple database of Science Direct, and health and social care related databases such as SCOPUS were used during the search process. The search was conducted using search terms such as 'elder abuse', 'elder mistreatment', 'factor', 'causes', and 'nursing homes'. It is reported that over 80 of elderly are more likely to be abused in nursing homes compared to elderly who are younger in age. A study observed that older females have a higher tendency to be abused in nursing homes. In several studies, caregiver abuse when providing care to older people with the physical impairments and cognitive tends to be a factor of elder abuse and neglect, especially in Japan and caregivers' childhood experiences are associated with abuse and neglect due to of trauma from the caregivers. This systematic review highlighted that elderly characteristics and perpetrator characteristics are the factors that cause elderly abuse and neglect in nursing homes.

Keywords: *Elder Abuse, Factors, Neglect, Nursing Homes.*

Introduction

Nowadays, elder abuse has received significant attention in public health as it causes serious health, social, and economic consequences. In the past year, global prevalence of elder abuse in community settings is approximately one in six of older adults which is equivalent to 15.7%[39]. World Health Organization (WHO)[35] defined elder abuse as a single or repeated act occurring within in any relationship where there is expectation of trust that causes harm to older people[36]. Elder abuse is categorized into several types of physical, sexual, financial abuse and neglect, type of abuse-psychological, type of abuser-family members, formal and informal caregiver, or acquaintance or setting in which occurs-in the community or institution[14]. In institutional settings, abuse can be broadly categorized into resident-to-resident abuse or staff-to-resident abuse[19]. Compared to other research and other forms of interpersonal violence, research on elder abuse especially in institutional still lacking[23]. However, it is unarguable that elder abuse occurs in every country with residential facilities and nursing while anecdotal evidence showing that elder abuse has become prevalent[25].

Recent years has witnessed elder abuse becoming a common phenomenon as it becomes a sustained interest and concern to the society and also emerging as a global problem century[31]. In comparison to Australia, USA, Canada and other European countries, elder abuse remains under-researched in Asia, Africa, and Latin America[26]. Walsh et al[32] criticized the current status of global research on elder abuse by giving minimal attention in investigating the experiences of elderly. World Health Organization predicted that the rapid population growth among developed countries associated with socioeconomic problems tend to increase the vulnerability of abuse to elderly. It is because the relative inattention of elder abuse is out of sync with the increasing number of current social issues.

The current literature highlighted a gap on the factors contributing to elder abuse and neglect in nursing homes. The need for greater attention to this

topic stems from several factors. The aim of this review is to identify the factors of the elder abuse in the nursing homes with three specific research questions of 1) What types of risk factor of elder abuse in nursing homes? 2) Do elderly characteristics affect abuse and neglect? 3) Do perpetrator characteristics affect elderly abuse and neglect in nursing homes.

Aim of the Review: A scientific review of this issues is necessary since there is a lack of accurate information on the factors of elder abuse and neglect. As many studies have not reported the factors of elder abuse and neglect, this review aimed to identify the factors of elder abuse and neglect in nursing homes.

Method

A review was conducted for this research. It was performed to identify the factors of elder abuse in nursing homes. It involved a comprehensive literature search with explicit inclusion and exclusion criteria.

The inclusion criteria were:

- Population aged 60 and over.
- Older people living in nursing homes.
- Written in the English language.
- Factors of elder abuse in nursing homes.

Exclusion criteria were:

- Abuse happens in their house.
- Perpetrators are the elderly's family.

Information sources: The comprehensive search of multiple databases of Science Direct, and other databases related to health and social care such as SCOPUS. These databases were used during the search process. The keyword search was conducted based on several key terms including 'elder abuse', 'elderly abuse', 'elderly abuse and neglect', 'elder mistreatment', 'factors of elderly abuse', 'factors of elderly abuse in nursing homes', 'causes of elder abuse', and 'causes of elderly abuse in nursing homes'.

Data Collection and Analysis: Basedon the literature search, thirty-nine studies were gathered. Thirty articles are concerned about the factor of abuse and neglect of elderly. Thirty-nine articles met the inclusion and exclusion criteria. Six of the articles examined the factors influencing elder abuse and neglect in nursing homes where the perpetrators are the caretakers in nursing homes while the remaining three articles examined the factors influencing abuse and neglect among elderly in home institutions where family members are the perpetrators.

Results

a. Risk factor of elder abuse and neglect in nursing homes

Elderly abuse can be divided into several types of abuse which encompass physical abuse, sexual abuse, psychological or emotional abuse, financial or material exploitation, neglect, self-neglect, and abandonment[34]. Living in nursing homes becomes a risk factor for physical and emotional abuse as it is estimated that 90 percent of abuse cases reported to adult protective services occur in domestic settings[3].

Physical abuse impacts individuals physically by caregivers including wounds, and injuries such as physical pain and soreness[17]. It is approximated that 91.4% of elderly have suffered from physical abuse yet only 2.9% reported[18]. An effect of abuse and neglect is the upper extremity injuries that comprised of 36.7%, which is in the shoulder and can be a nonspecific injury[21]. Elders who have experienced abuse have a 300% higher risk of death when compared to those who had not been abused despite experiencing only modest abuse.

Emotional abuse includes any attempt to demoralize, dehumanize, or intimidate older adults[4]. It can be difficult to identify emotional abuse because there are no apparent physical signs of this abuse. Verbal abuse only leads to greater decline in mental health than physical abuse as presented in a study of older women[20]. The impact of psychological abuse includes distress, emotional symptoms, and depression which is found higher than elders who have not experienced this abuse[8].

Psychological abuse wreaks mental anguish using threats, manipulation, or other cruel conduct. It can be inflicted via verbal or nonverbal communication cues. Treating an elder with physical punishment or the deprivation of basic needs is a particularly heinous form of emotional or psychological abuse. It is the systematic perpetration of malicious and explicit nonphysical acts against an elder including harassment, scolding, insults and stalking[9]. Elder neglect is the most common type of elder mistreatment. Based on the need for early assessment and intervention, neglect is often recognized[2]. In a systematic review of the prevalence

of elder mistreatment, researchers concluded that about 20% of all dependent older adults suffer from neglect[34]. All elder mistreatment cases that were brought to the attention of adult protective services constituted approximately 60%-70%[13,30]. Older adults that experience elder mistreatment and neglect are likely to experience lower quality of life, depression, and poorer self-rated health[8]. A contemporary study emphasized that older adults whose needs are not met following hospital discharge have a greater likelihood of hospital readmission[7].

b. Victim Characteristics

Age: In most Asian societies, advanced age became the protective factor to elder abuse. Elders living in nursing homes tend to experience abuse and neglect[9,12] and Dong[11] reported that 68% of elderly suffered abuse and neglect. The findings in another research have shown over 80% of elderly to have likely been abused in nursing homes compared to the younger age of elderly[22].

Gender: A study conducted in nursing homes observed that among older people, older females are more likely to be abused[10]and women tend to experience verbal and physical abuse and neglect compared with male elderly[5]. Another study in Korea pointed out that the most prevalent abuse among older men were emotional and verbal abuse[22].

Physical health: Disability and poor visual ability chronic illness among older people tend to increase the risk of abuse[37]. The levels of psychological abuse increase with the number of chronic diseases and functional dependence of Taiwanese elders[33]. Studies in India[5], Japan[27] and Korea[22] all showed agreement that poor health and functional impairment are risk factors for abuse.

c. Abuser Characteristic

Caregiver burden: In several studies, the burden of the caregiver role in providing care to older people with physical impairments and cognitive tends to be a factor of elder abuse and neglect, especially in Japan[1] The association between abuse and caregivers was pointed out in several studies conducted in Hong Kong and Korea[38].

Lack of caregiver experience and reluctance: It is often assumed that caregivers working in nursing homes are experienced to handle older people and bed-ridden people in nursing homes, but many people do not know that the lack of caregiver experience and reluctance promotes elder abuse and neglect in nursing homes. Not all caregivers have prior experience in caring for elderly since several caregivers are forced to do this job due to the poor socio-economic circumstances. The need to care for elderly is a burden as it goes against the caregiver's will. Caregivers may feel hostile and inadequate due to the lack of the experience in handling elderly. Reluctance among the caregivers can also increase of the risk of abuse and neglect of elderly in nursing homes due to the negative feelings of incomplete caregiving to help the elderly[16,29].

Conclusion

As the number of elderly increases, the demand for nursing homes is gradually increasing. However, the number of abuse and neglect of the elderly is sadly increasing too. The findings from this article show that a total of 23 respondents or 74.2% experienced at least one incident of physical mistreatment by staff or other caregivers in the form of hitting, pushing, slapping and kicking.

A total of 62 respondents or 79.5% reported at least one incident of emotional or psychological mistreatment by being treated disrespectfully and disallowing contact with family or friends. A total of 86.9% or 86 respondents reported neglect which encompasses failure to provide food, water, shelter, hygiene, medicine and personal safety.

According to Cooper et al[6] abuse cases was defined as $\geq$ 1 abusive act occurring $\geq$ 2-3 times per month, which is about 1.9% reported physical abuse, 2.4% neglect and 4.2% psychological abuse. Six of the seven articles described the rates or percentages of elder abuse and neglect in nursing homes. The data underlying were collected from various articles and journals. Findings from Kennedy et al[15] that 31% of physicians had encountered elder mistreatment cases in the preceding year mainly comprise of neglect (57%), physical abuse (19%) and emotional abuse (7%) in Ohio.

In conclusion, the findings of this study are aligned with the report by WHO[36] who estimated that 1 in 10 older people experience abuse monthly, especially in developing countries. Although the data are limited, a previous study has estimated that the most common types of abuse in high – or – middle – income countries demonstrated that physical abuse ranges from 0.2-4.9%, psychological abuse ranges from 0.7-6.3% and

neglect from 0.2-5.5%. Pillemer and Finkelhor[24] stated that older people who have poor health are three to four times more likely to be abused than those who are in good health. In this systematic review, elderly characteristics were identified as a critical factor in the rise of elderly abuse and neglect in nursing homes. The perpetrator characteristics were also determined as another vital factor in affecting elderly abuse and neglect in nursing homes. Thus, it is recommended for future studies to further examine the influencing factors of elder abuse and neglect since the factors re important in the prevention of elder abuse and neglect.

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Anti-inflammatory Activities of Methanolic Extracts from Melastoma Malabathricum Linn. and Melastoma Decemfidum Roxb. Leaves on Macrophage RAW264.7 Cell Line

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Abstract

Two plant species from the Melastomataceae family, *Melastomamalabathricum* Linn. and *Melastomadecemfidum* Roxb, which grow in abundance in tropical and subtropical regions have been well-documented to possess various medicinal values including anti-inflammatory properties. The present study was undertaken to examine the anti-inflammatory potential of *M. Malabathricum* and *M. Decemfidum* methanolic extracts (MME and MDE respectively) on lipopolysaccharide (LPS)-induced macrophage cell line (RAW 264.7). The cytotoxic assays of MME and MDE against RAW264.7 cells were conducted using 3-(4,5-dimethylthiazol-2-yl)-5-(3-carboxymethoxyphenyl)-2-(4-sulfophenyl)-2H-tetrazolium (MTS). Production of nitric oxide (NO) from both *Melastoma* sp. was measured using Griess assay. MME and MDE exhibited high cell viability (>90%) at concentrations from 0.39 to 1.56µg/mL and 6.25 µg/mL respectively. Although the results obtained were not significantly different from control,NO production by LPS-induced RAW264.7 cells were observed to be lower for both extracts at concentration of1.5µg/mL when compared to untreated cells (control). The present study confirmed that MME and MDE have the potential to inhibit anti-inflammatory mediator against LSP-induced RAW264.7 cells.

Keywords: *Anti-inflammatory, Melastomamalabathricum, Melastomadecemfidum, RAW264.7 Cell line.*

Introduction

It is well-documented that plants have been the basis for most medical treatments through much of human history. Despite advancement in science and technology, traditional medicine is still widely practiced today. Herbal products have been used in the maintenance of health including prevention, diagnosis, improvement or treatment of a large number of physical illnesses[1]. It has been estimated that about 70 to 80% of the world's population are using herbal products as complementary and alternative medication (TM/CAM) as their primary medicines[2,3]. Malaysia's percentage was reported to be 73[4].

Inflammation is the body's way of protecting itself from infection, illness, or injury. It is an important biological defence mechanism in maintaining good health which otherwise could lead to serious complications such as rheumatoid arthritis, inflammatory bowel disease, atherosclerosis, Alzheimer's disease, dementia and cancer[5,6]. During an inflammatory

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process, the immune response is modulated by activated macrophages and various inflammatory mediators such as reactive oxygen species (ROS), cytokines and nitric oxide (NO)[7,8]. Present day measures taken to cure inflammation include the use of healing promoting, non-steroidal, anti-inflammation drugs (NSAIDs). However, prolonged use of NSAIDs has been reported to lead to various serious side effects[9-11]. Bioactive compounds from plant extracts which are mostly free from serious side effects[12] have been utilized in various formulations in treatments for inflammation[13].

Two plant species from the family Melastomataceae, *Melastomamalabathricum* Linn. and *Melastomadecemfidum* Roxb., abundantly found in tropical and sub-tropical regions, have been reported having a variety of bioactive compounds that serve as important and highly potential sources for medicinal purposes[14-18]. The present *in vitro* study was conducted to evaluate cell toxicity and anti-inflammatory activities of leaf extracts from the two species of Melastomataceaeon RAW264.7 macrophage cell line.

Methodology

Plant Materials: Leaves of *M. malabathricum* and *M. decemfidum* were collected from their natural habitats at Universiti Putra Malaysia (UPM)'s Ayer Hitam Forest Reserve, Puchong, Selangor, Malaysia, and brought to UPM's Halal Products Research Institute laboratory for analyses.

Preparation of Crude Extracts: The plant materials were thoroughly washed under running tap water and air-dried under shade for two weeks. The air-dried leaves were ground into powder form using a mechanical grinder. The dried leaf powder of both *Melastoma* sp. was subsequently extracted twice by maceration in methanol in the ratio of 1:10 for 3 days. The mixtures were filtered using filter paper (What man No.1) and evaporated using a rotary evaporator (Yamato, Rotary Evaporator, Model- RE 801, Japan)[19]. The percentage yield of the extract was calculated using the following equation[20]:

$$\% \text{ Extraction yield} = \frac{(\text{Dried weight of crude extract})}{(\text{Dried weight of finely grounded} - \text{dried plant})} \times 100$$

Cell Culture of RAW264.7 Cell Line: RAW264.7 macrophage cell line (ATCC TIB-71 ™) was obtained from Immunology Laboratory, Faculty of Medical and Health Sciences, UPM. The cells were cultured in Dulbecco's Modified Eagle's Medium (DMEM, Gibco) supplemented with 10% heat-inactivated fetal bovine serum (FBS, Gibco) and incubated in a humidified incubator at 37 °C containing 5% CO_2 until the cells reached confluence. Subsequent to the procedures, the cells were washed using phosphate-buffer saline (PBS, Gibco) and detached using 0.25% trypsin-EDTA (Gibco).

RAW264.7 Cells Cytotoxicity Assay: RAW264.7 cells cytotoxicity was measured using MTS 3-(4,5-dimethylthiazol-2-yl)-5-(3-carboxymethoxy-phenyl)-2-(4-sulfophenyl)-2H-tetrazolium (MTS) assay. CellTiter 96®AQueous One Solution Cell Proliferation Assay (MTS) (Promega, Madison, WI, USA) was used following the manufacturer's instruction to determine the cytotoxicity of the two *Melastoma* sp. crude extracts toward RAW264.7 macrophage cells. A volume of 100 µL medium (DMEM supplemented with 10% FBS) containing 5×10^3 cells per well were seeded in 96-well plate and incubated for 24 hours at 37 °C in a humidified incubator with 5% CO_2. After resting the cells for 24 hours, the previous medium was removed and changed to fresh medium (total volume: 100 µL) with different concentrations (0.39, 0.78, 1.56, 3.125, 6.25, 12.5, 25, 50 µg/mL) of MME and MDE, and 5% Abs. methanol in triplicate and incubated for 24 hours. Untreated cells were served as the control and the vehicle control group (without MME and MDE) was defined as 100%. Thereafter, 20 µL of MTS was added to each respective well and the procedure was performed in dark condition. The plate was incubated in 5% CO_2 at 37 °C atmosphere for 1 hour. Absorbance was measured at 492 nm on a microplate reader[21]. The data, calculated using the following formula, are presented as percentages of viable cells:

$$\%\text{Viability} = \frac{(\text{Abs sample} - \text{Abs blank})}{(\text{Abs control} - \text{Abs Blank})} \times 100$$

Determination of Nitric Oxide (NO) Production: RAW264.7 cells were seeded in a 24-well plate at a density of 5×10^4 cells/ml for 24 hours. After incubation, the previous culture media were removed, and new phenol red-free media were added. The cells were pre-treated with 1 µg/mL of lipopolysaccharide (LPS) for 2 hours to induce inflammation. Following this, the cells were treated with different concentrations of treatments (0.5, 1.0, 1.5 µg/mL) for an additional 24 hours. The culture media (500 µL) were collected after 24 hours for

the Griess assay. A Griess reagent assay was conducted to determine the nitrite accumulation in the culture media. The culture media (50 µL) were mixed with an equal volume of Griess reagent (1% sulfanilamide in 5% phosphoric acid and 0.1% naphthylethylenediamine dihydrochloride in distilled water) in a 96-well plate and the mixture was incubated for 10 minutes at room temperature. The procedure was performed in dark condition. Absorbance was measured at 540 nm using microplate reader, and the concentration of nitrite in samples was back-calculated from a previously constructed sodium nitrite calibration curve (0–100 μM).

Statistical Analysis: All data were derived from three independent experiments. Statistical analysis was conducted using SAS software (version 9.4). In this report, the values are presented as means ± standard deviations. Significant differences between the groups were determined using One-Way Analysis of Variance (ANOVA) followed by Tukey and LSD post-hoc Tests.

Results and Discussion

Effect of MME and MDE Extract on Viability of RAW264.7 Cell Line: The RAW264.7 cell toxicity assay was a study to determine the effect of MME and MDE toward RAW264.7 cell viability. The cytotoxicity of the methanolic extracts of both species was evaluated by MTS assay based on the conversion of yellow tetrazolium salt to form a purple formazan product. *In vitro* cytotoxicity assay was performed due to it low cost, convenience, direct detection for toxicity, and less duration needed[21]. Percentage of cells viability was determined by comparing cells viability value of treatments to the control. Table 1 showscells treated with MME at concentrations of 0.39, 0.78 and 1.56 µg/mL resulted in high cell viability percentage (>90%). Meanwhile, MDE showed high cell viability percentage (>90%) at concentrations of 0.39, 0.78, 1.56, 3.125, and 6.25 µg/mL. Concentrations of 12.5, 25 and 50 µg/mL resulted in low cell viability (<50%) for both extracts, which indicated toxicity to RAW264.7 cell line. Therefore, for further determination, the tests must be performed in the range of concentrations from 0.39 to 1.56 µg/mL for MME and 0.39 to 6.25 µg/mL for MDE.

Table 1: Effect of MME and MDE toward viability percentages of RAW264.7 cell line after 24-hour treatment

Conc. (µg/mL)	MME	MDE
Control	100 ± NIL^{a}	100 ± NIL^{bc}
0.390	93.36 ± 7.62^{a}	114.94 ± 4.06^{ab}
0.780	93.07 ± 10.86^{a}	122.65 ± 8.87^{a}
1.560	95.47 ± 12.29^{a}	113.86 ± 9.19^{ab}
3.125	85.08 ± 9.24^{a}	92.85 ± 0.77^{dc}
6.250	61.86 ± 23.82^{ab}	99.73 ± 3.31^{bc}
12.500	32.83 ± 14.30^{bc}	79.65 ± 6.56^{d}
25.000	09.29 ± 16.74^{c}	34.30 ± 9.19^{e}
50.000	10.15 ± 15.51^{c}	6.70 ± 0.53^{f}

Data presented as mean percentage ± SD of three replications; different superscript letters ($^{a-f}$), in each column indicate significant difference among concentrations based on Tukey post-hoc test with $p<0.0001$

The range of concentrations from 0.39 to 1.56 µg/mL of MDE show the higher cell viability percentage compared to control (Figure1). Effects of both MME and MDE extracts on RAW264.7 cell lines were evaluated after 24-hour of treatments.

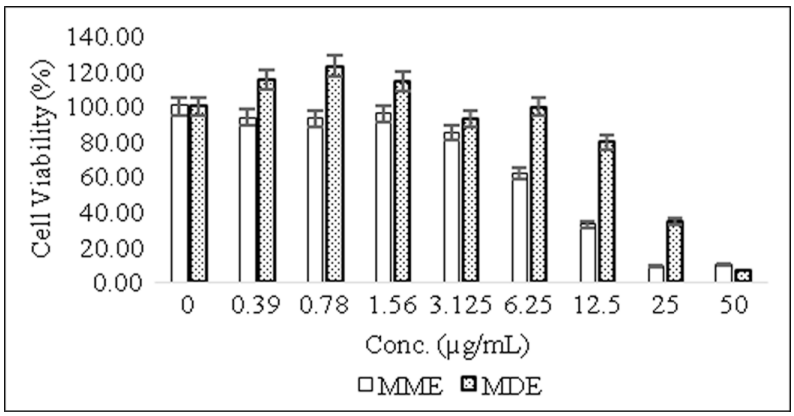


Figure 1: Effects of MME and MDE at concentrations from 0.39 to 50 µg/mL toward viability percentagesof RAW264.7 cell line after 24-hour treatments

It is crucial to know and understand that some bioactive compounds may be toxic to human health hence, when performing cytotoxicity test or assay, safety measures must be adhered[22]. When consuming herbal medication, proper dosage must be observed to avoid overdose which could result in various serious illnesses and even death[23].

Anti-inflammatory Activities of MME and MDE on LPS-Induced RAW264.7 Cell Line: The quantification of NO levels revealed that MME and MDE in concentration of 1.5 µg/mL was able to inhibit the production of NO (Table 2). Both extracts significantly resulted in lower NO than control which indicated that they reduced NO level in inflammation-induced cells. This suggests that both species were promising in their roles as anti-inflammatory agents. Anti-inflammatory properties of both MME and MDE were correlated with chemical compositions found from the leaves extracts. They were flavonoids (phenols) and terpenoids and these two compounds have gained much interest in various medicinal plants.

Since MME and MDE were methanolic plant extracts, phenols can be easily extracted by this methodology[24]. Chromatographic analysis of these species also showed having indole-2-one[25] compounds, which are known to have efficacy as anti-inflammatory[26]. The concentrations of NO in all samples were back-calculated from a sodium nitrite calibration curve, as shown in Eq. (1):

$$y = 0.0061\,x - 0.0084 \quad (1)$$

where $R^2 = 0.9966$, y = average absorbance,

x = concentration of NO

Table 2. Effect of MME and MDE toward NO level onRAW264.7 cell line after 24 hour-treatment

Samples	MME
Control	22.50 ± 1.08^{a}
MME 0.5 µg/mL	19.90 ± 1.08^{b}
MME 1.0 µg/mL	17.85 ± 0.77^{bc}
MME 1.5 µg/mL	16.95 ± 1.26^{c}
MDE 0.5 µg/mL	18.74 ± 0.98^{b}
MDE 1.0 µg/mL	17.78 ± 1.13^{b}
MDE 1.5 µg/mL	17.33 ± 1.77^{b}

Data presented as mean ± SD of three replications; different superscript letters ($^{a\text{-}c}$), in each column indicate significant difference among concentrations based on LSD post-hoc test with $p < 0.05$.

The present study used lipopolysaccharide (LPS), a component of the outer membrane of gram-negative bacteria and is known to be the most common cause in macrophage activation[27]. Various pro-inflammatory responses are known to be caused by LPS-induced activation of macrophage and lead to production of pro-inflammatory mediators; for example, NO, IL-1, IL-6, TNF-α, interleukins, prostanoids and leukotrienes[28]. Therefore, treating inflammatory disorders by suppressing activated macrophage would be a valuable therapeutic goal to treat inflammation. Antioxidant and inflammation immune responses are involved when there is an imbalance between free-radical and endogenous antioxidant defence mechanisms. When the imbalance happened, oxidative stress could take part, and this is the major cause of immunopathology. Oxidative stress can result in numerous diseases, and one of themis causing inflammation to the body[29,30]. A study conducted on anti-oxidative potential from the same extracts of *Melastoma*sp.[19] by analysing 2,2-diphenyl-1-picrylhydrazyl **(**DPPH)-radical scavenging activity, total phenolic content and FRAP-reducing antioxidant assay. The result showed that, both extracts, followed by, *M.decemfidum* (MeOH)> *M. malabathricum* (MeOH) showed among the highest DPPH-radical scavenging activity, phenolic contents and the highest fluorescence recovery after photobleaching (FRAP) values, suggesting that the extracts have potential to act against oxidation and protect human body from free radicals causing inflammation[31].

Conclusion

Crude leaf extracts of *Melastomasp.* revealed low toxic effect on RAW264.7 cell line at lower concentrations while at high concentrations, the extracts were toxic. In other previous studies, it has also shown that Melastomataceae family serves as medicinal plant with potent anti-inflammatory activity. The present study confirms the use of *Melastomasp.* leaves for treatment of inflammatory related diseases.

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Conflict of Interest: The authors confirm that this article contains no conflict of interest.

Ethical Approval: Nil

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Phototherapy and Mental Health Stability for Displaced Persons: A Case Study of Myanmar Refugees in Malaysia

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Abstract

This research employs the benefit of phototherapy as part of a sustainability value of visual in significant to the industry revolution 4.0. This ongoing process might be utilised in different ways from time to time. The research featured a random audience of Myanmar Refugees, aged 7 to 55 years old. Each participant was asked to pick one random image from 200 that reflected their background, ethnicity, visual experience preferences and interests. From selected image, participants were asked to talk about the visual chosen. This study used photo elicitation technique, with the aim being to measure the ability of phototherapy can become part of the alternative therapeutic process, mainly in visual studies. The methodology adopted for this study was based on qualitative interviews. From the discussion of the results, this research has developed an appropriate framework. From these observations, the research found Phototherapy evokes the communication process by indirectly encouraging people to open up and talk while describing the visual. The result from this research aims to provide data for any related agency, art therapy guidelines and a method for determining individual emotional states. In addition, this study narrowed the findings into the source of understanding of the Sustainable Development Goals (SDGs) agenda THREE (3) on the section of **Non-communicable diseases and mental health.**

Keywords *Phototherapy Technique, Health Management, Visual Studies.*

Introduction

Over the past decade, technology has driven a social resolution, especially in respect of the camera. The Daguerreotype, which started the camera revolution in 1839, has given new meaning to the photography industry. The visual image has produced its share of history year by year. However, with the development to industry 4.0, the value and sustainability of photographs and its new techniques, elements, principles, and the impact of picture continues to persuade viewers, one of the values that remain important is the Phototherapy technique.

So, what is Phototherapy? Phototherapy is traditionally valued for complementing some of the limits of verbally asking questions of therapy participants. Phototherapy is a technique of image therapeutic therapy, using photos for expressing feeling, beyond words. Therapeutic Photography does not just mean only photo-taking. It also includes other photo-interactive activities, such as photo-viewing, posing, planning, discussing, or even just inspiring memory or imagination when viewing photographs[1]. In addition[2], in her article titled *History and Development,* specified that the terminology and the use of Photographs as a therapeutic platform was started in 1844 by Dr Thomas Kirkbribe, which was followed up by Dr Hugh Diamond in 1856. Phototherapy can also provide mental health benefits without the need for medication, which is why it has received so much interest. The advantages of introducing photographs as part of interviews are: (a) to facilitate rapport, (b) to trigger participants' memories, and (c) to facilitate the articulation of ideas[3].

The photo elicitation technique is a well-known alternative therapeutic technique in photography research, which can also be used to determine or find the results through the interview process, but it is an uncommon practice in Malaysia. Since early practice until today, the use of phototherapy has produced many positive outcomes.

Meanwhile, Saita.el[4] discussed the impact of photograph use to gain memories from participants to travel experience. Pachmayer and Andereck[5] agreed, and confirmed the impact of photographs would gain more support in terms of client sharing information. Research also indicated that elicitation techniques are capable of reducing the imbalances between interviewers and respondents, as it provides participants with a greater ability to elaborate meaning in different ways[6]. The photographic approach can be anything related to visuals such as a video, print photograph, digital slide, animation, short story video or any type of visual representation of images[7]. In this study, photo elicitation also helps to define participants' experience, thoughts and feeling about the photos, and can help jog participants' memories, especially with tacit knowledge[8]. The study seeks to assess if the phototherapy technique can affect the conscious mind and mental state of Myanmar Refugees in Malaysia. According to the United Nation Refugees Agency, as at January 2019, 142,370 Myanmar Refugees had been registered with UNCHR and an estimated 30,000–40,000 more remain unregistered[9]. The number included 84,030 Rohingyas, 25,700 Chins, 9,770 Myanmar Muslims, 4,000 Rakhines and Arakanese refugees. From the report published in 2017[10], it was confirmed that most of the refugees arrived by boat in Thailand after undertaking dangerous journeys across the Andaman Sea prior to being smuggled or trafficked into Malaysia.

According to World Health Organization[10], Mental Health is a fundamental human condition, which also determines the main points of how we act and the way that our body and mind process. As depression becomes the main agenda to Mental Health disorders and categorised under Non-Communicable Diseases or Mental Disorders, it is concluded that without appropriate care, there is a high possibilities it can lead to suicide. Reporting in article, *page progress and info* (Sustainable Development Goals, United Nation) SDGs no 3 shows since 2015, globally there have been 800,000 cases of commit suicide every year[11].

Therefore, the National Institute of Mental Health divides depression into two major categories, clinical depression and depressive disorder. The form of major or persistent depressive disorder is also known as dysthymia. In addition, both forms of Depression develop from high emotional Stress.

Objectives of the Study: This study is focused on two (2) objectives. Firstly, the research process aims to assess whether the usage of phototherapy can form part of an alternative treatment technique for Myanmar Refugees. The second objective is to determine what kind of visual preferences can be applied to certain groups of Myanmar refugees as part of the therapy technique.

Methodology of the Study

The research used a qualitative approach for data collection. The qualitative method involved observations, case studies, and interviews. The location for the conducting of this study was the Myanmar Refugees Centre, Kuala Lumpur. Twelve respondents participated in the session. They were aged between seven and fifty five years, and included females and males from multiple region, race and Ethnicity. In association with this research, an interview was conducted after the visual selection session. In the visuals, 200 random images were present, which referred to the experience, culture, nature, background and other exhibits of interest to humans. From those images, respondent were asked to talk about the pictures. After the session, the researcher transcribed the information into transcript data using the available software - Atlas TI. The following figure (1) indicates the detailed design framework that was applied to the research process, which is further explained in the following sections of this work:

Phase 1	• Identification Respondent, and Specification of Visual Data • [Respondent: Myanmar Refugees/7-55years old] • [Visual Preferences: 200 images - based on background, ethnicity, visual experience preferences and interest]
Phase 2	• Phase 2: Phototherapy Method Study • Photo Elicitation Interview [PEI] Respondent asked to choose ONE(1) picture, and talk about it with develop interview question
Phase 3	• Phase 3: Analyzing Transcript Data • Tool: Atlas TI • Result from Data Transcription

Figure 1. Framework Structure from Interview Process, Analysis and Results

Phase 1: Identification Respondent, and Specification of Visual Data

Respondents randomly chose one of the 200 printed images (photographs) that were most directly related to their background and ethnicity. All 200 visual data selections used ADSee 20, the software that helps

researchers to separate images according to metadata, category and keywords. A total of 12 male and female respondents, from ages 7 to 54 participated in the study.

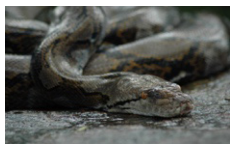
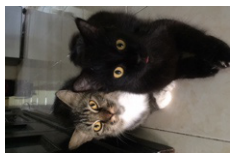
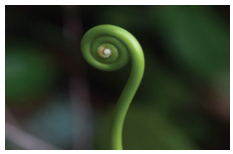
Phase 2: Phototherapy Method Study

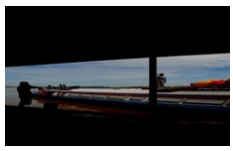
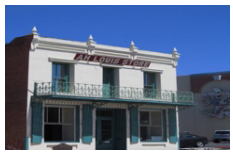
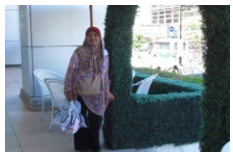
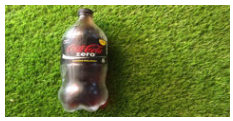
The Photo Elicitation Interview (PEI) technique, using a photograph, formed part of the interview. From the one random image chosen, the interviewer will ask the participant why he or she selected the photo.

Phase 3: Analysing Transcript Photo Elicitation Interview (PEI).

The interview results were compiled into a table (1) and analysed using Atlas TI software as a measurement tools to analyse the interview data.

Table 1. Interview Details

No.	Participant Details	Ethnicity	Visual/ Picture	Images	One to One interview [Information Data]
1	Female [20+ yrs old]	Chin	Beach		I want to live nearby a beach, I want to feel free. I eat grass from the jungle and can't sleep at night because I'm too scared. Army kills my brother.
2	Female [15-16 yrs old]	Chin	Snake		I scared of snake because of the poison. My father kill snake and we ate. So much fun
3	Female [20+ yrs old]	Rohingya	Bags		I want to go to London, have nice life, nice handbags so I can carry my baby.
4	Male [8 yrs old]	Rohingya	Cat		They're cute and I use to have cute cats
5	Male [54 yrs old]	Chin	Building/ House		I want home, love and peaceful life
6	Male [30 yrs old]	Chin	Guitar		So I can play some music but we try not to be happy. If we happy, there always bad things happen.
7	Female [17 yrs old]	Rohingya	Midin/ Vegetable		I like this photograph. Reminding me the situation how much we need "women tampon" I just need some clothes. So, I made some. Right now, we just wash and dry same pad, and recycle.
8	Male [17 yrs old]	Rohingya	Malay Bride		Funny dress and make me laugh

9	Male [35 yrs old]	Chin	Boat		So I can go fishing, and have good food to eat
10	Female [30+ yrs old]	Chin	Building		Beautiful, very nice colour, nice building, near the market
11	Female [7 yrs old]	Chin	Woman wearing Hijab		I saw this video in town, woman with towel on the head
12	Female [14 yrs old]	Chin	Coke		Good food and expensive food. I want to work and buy them a lot

Phase 4: Result output

The results from the transparency data using Atlas TI appeared to attract hidden information for certain interview processes, which forms a compass to develop honest information for the research study. The transparencies of the data indirectly build trust in the form of giving, receiving and transcription of the data.

Findings

According to the data analysis, the result showed the frequency of the information and the variable of basic needs, made up of 13 words, which are mentioned at least 8 times (see figure 2). These are in addition to the mention of other words such as belongingness {6-0}, psychologic needs {4-0}, Self-fulfilment need {4-0}, and Safety and Security {1-0}, to ensure the acquiring of a code co-occurrence pattern.

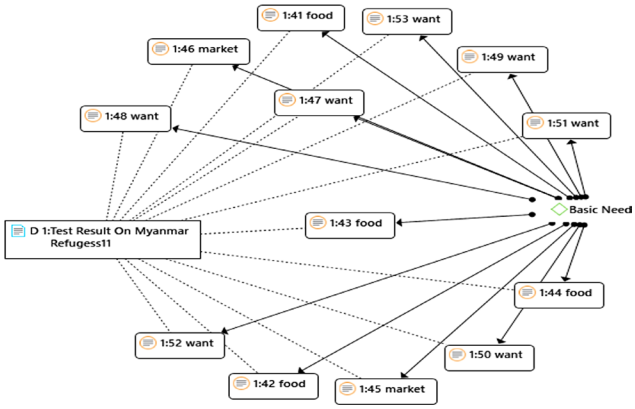


Figure 2. Diagram of Ratio Domination Choice of Words from Transcript Data

The code data shows the Word "I" had been mentioned 23 times, which represents 6.37% out of the ratio of 34.7% in Total. Self-belongingness to the indication ratio of females shows a focus on psychologic needs, whereas male choices were more directed towards basic needs. The results of the cloud analysis of the data are presented below (Figure 3):



Figure 3. Cloud Image of Interview Transcript Result

From a visual viewpoint, the cloud interpreted the value of psychology to self as the roots to the interview response. The frequency of word choices was dominated by the word "I", which was mentioned 23 times by the participants. This was followed by ethnicity and value of need, represented by such words as "build", and food, happy, eat and good were also mentioned between 8-12 times.

Conclusion

From the findings of the study, the research found the Phototherapy was deeply focused on the basic need of living while talking about the pictures. The data concluded using a standard deviation, which has aspecific variable of Median. The median shows the average number of 1:4, which is detailed in figure 2. In addition, from the observation the interviewer found that on average, the participants choose images related to their hobbies, age, and living life.

The study utilised one of the phototherapy techniques *ie*: Photo Elicitation Interview (PEI), as part of the process, therefore, it enhances the indirect message, which is important information for the organisation and therapists involved with supporting these refugees. Thus, it will provide an improved Mental Health assessment as an alternative treatment for Myanmar refugees. Equally, it might help participants to overcome the trauma they have experienced. The evolution of Photography 4.0 is so varied. Regardless, the movement of camera technology has develop immensely. However, the value of visual communication still dominates the individual and society.

Impact And Recommendation: The conclusion leads to a new idea, which enhances the new knowledge attained on the United Nation Sustainable Development Goals (SDGs) as a platform for reference and knowledge sharing with other countries. From the research findings, it can expand the development standard guideline to all sectors of society.

Research data benefit awareness to Family, Partners, Job Sectors or Government regarding understanding the behavioural patterns of a target study. The recommendations from the study are expected to benefit and help raise awareness among the public on the mental health issue of depression, with phototherapy being considered an option as an alternative treatment technique for Myanmar Refugees. Furthermore, the conclusion from the study would benefit further investigations regarding other usages of this fundamental therapeutic method.

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Ethical Clearance: Taken from the Committee

Source of Funding: Nil

Conflict of Interest: Nil

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Effectiveness of Nutrition Education and Lifestyle Interventions in Obesity

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Abstract

Introduction: Globally the prevalence of obesity is increasing at an alarming rate. WHO has declared it as global epidemic and no country is free from this phenomenon. Promotion of healthy diets and physical activity in schools is essential to fight the childhood obesity epidemic[1].

Objectives: Of the study were to estimate the prevalence of obesity, to determine the risk factors and to test the effectiveness of nutrition education and life style interventions in obesity among the higher secondary school children.

Method: The study adopted multiple research designs. A descriptive cross sectional survey was conducted through multi stage random sampling to estimate the prevalence of overweight and obesity based on BMI cut offs as per Agarwal's standards. Risk factors were determined by a case control design. Nutrition education and life style interventions were given to the children in the experimental group along with a module but the control group was given only the module.

Results: Combined prevalence of overweight/obesity among boys was 9.52%(7.02 - 12.02% at 95% CI) and it was 10.59% (8.53 - 12.65% at 95% CI) among girls. Higher income of the family, parental obesity and fast food consumption were identified as the main risk factors of obesity. Repeated measures ANOVA showed a significant reduction in BMI among obese children in experimental group after intervention.

Conclusion: Individually tailored strategies will have a desired result in obesity intervention program.

Keywords: *Overweight, obesity, BMI, nutrition education, life style interventions.*

Introduction

Childhood obesity is one of the most serious public health challenges of the 21st century[1]. According to IOTF at least 155 million school age children worldwide are overweight or obese and out of this 30-45 million children are classified obese[2]. A positive transition is occurring in Indian children and adolescents commencing from new born period with a considerable decline in severe forms of undernutrition in underprivileged rural population.

Background: A few available Indian studies point to the growing menace of obesity. A study in Hyderabad among affluent adolescent school children (12-17 years) revealed that the prevalence of overweight and obesity was 11% which was comparable among boys and girls. The prevalence was significantly higher among students in private institutions[3]. A study on obesity among adolescent girls (13-15 years old) in eight schools in Thiruvananthapuram put the prevalence of obesity at 5%[4]. Another study among 13-19 years old children in Thiruvananthapuram showed 5.4% overweight and 2% obesity as per IOTF standard[5].

The school system is the appropriate channel to convey the essential educational health and nutrition

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messages to the crucial sizeable segment of Indian population. They are the citizens who will shape the future of the nation and hence a most important priority. Thus the adolescent children were selected as the target group of this study. Kottayam district being a commercial capital of Kerala there is convergence of all the risk factors of obesity in this area. This district has been in the forefront of modern education in Kerala and so it is a suitable place to study the effect of interventions in obesity among school children.

Objectives of the study were (1) to estimate the prevalence of obesity and overweight among higher secondary school children (2) to determine the risk factors and (3) to evaluate the effectiveness of Nutrition education and lifestyle interventions in obesity among higher secondary school children.

The hypotheses tested in the study were

H_1 – There is significant association between obesity and demographic characteristics among higher secondary school children.

H_2 – There is significant association between obesity and dietary habits among the school children.

H_3 – There is significant association between obesity and physical activity level among higher secondary school children.

H_4 – There is significant difference in BMI and physical activity level of obese children in the experimental group than in the control group after intervention.

Materials and Method

Research Approach: The study was done in three phases. Descriptive survey, true experimental approach and again a descriptive survey approach were adopted in the first, second and third phases respectively.

To accomplish the objectives of the study, multiple research designs were used.

In the first phase, a cross sectional survey design was used to estimate the prevalence of obesity among the children. A case control design was used to describe the relationship between the variables under study such as socio-economic status, parental obesity, family size, birth order, number of siblings, type of family, food pattern and physical activity level.

During the second phase true experimental deign was adopted where the researcher manipulated the independent variables like nutrition education and lifestyle intervention. The teaching learning sessions were given on nutrition concepts, causes of obesity, health consequences and preventive measures of obesity by using a module 'Nutrition for Health' and on progressive exercise therapy to the children in the experimental group. Individual counseling and telephonic reassurance was also given during the follow up visit. Only the module was given to the children in the control group during the intervention period.

In the third phase a longitudinal survey design was adopted to make a comparison of change or effect over time. The effect of intervention was studied at sixth month (post) and twelfth month (follow up) in the experimental and control group.

Setting of the study was higher secondary schools in Kottayam district.

Sample and sampling technique: Students studying in +1 classes in selected schools of Kottayam district. Children who were on treatment or had skeletal deformities were excluded from the study. The selection of the schools for the study was based on multi stage stratified random sampling.

Thirty schools were selected based on their student strength to satisfy the required sample size. In the selection of students, clusters of the size of a division ranging from 40-50 students were selected from the chosen schools. The selection of clusters was done at random by taking lots.

Sample size for the survey was calculated using prevalence estimate of 11% obtained from previous studies conducted by Laxmaiahetal in Hyderabad[3]. With prevalence of 11%, alpha error fixed at 0.05 and precision of 2%, sample size required for prevalence estimation was found to be 979. The sample size was increased by 10% to 1100 considering attrition.

Assuming the prevalence of overweight and obesity as 11%, the sample size for risk factor assessment was 363. Considering the risk ratio and expected reduction in the event rate in the treatment group to be 40%, alpha error fixed at 0.05 and 80% precision the sample size estimated was 705 in each group. Since the required sample size for the intervention was more than the sample size required for prevalence study, the sample size for the latter was fixed at 1500.

Tools and Technique: The tools and techniques used for the data collection were proforma for anthropometric measurement, dietary assessment questionnaire (DAQ), socio-personal proforma (SPP), module on 'Nutrition for health', compliance record, booklet and counseling sessions.

Anthropometric measurements were taken using a portable weighing machine to record the weight of the subject with an accuracy of 0.5kg and portable stadiometer to measure height with an accuracy of 1mm. BMI was used to classify the students into obese, overweight, normal and underweight as per Agarwal's standards. Validity and reliability of the tools were tested. The duration of the data collection was two years. The data were fed into the computer and statistical analysis was done with the help of R software.

Results

Section I: Prevalence of overweight and obesity

Table 1: Distribution of obesity, overweight, normal weight and underweight among study subjects according to gender-Boys n=672

Age	Underweight		Normal		Overweight		Obese		Total	
	n	%	n	%	n	%	n	%	n	%
15	23	9.70	193	81.43	15	6.33	6	2.53	237	100.00
16	40	12.54	245	76.80	29	9.09	5	1.57	319	100.00
17	11	12.22	72	80.00	3	3.33	4	4.44	90	100.00
18	2	7.69	22	84.62	2	7.69	0	0.00	26	100.00
Total	**76**	**11.31**	**532**	**79.17**	**49**	**7.29**	**15**	**2.23**	**672**	**100.00**

Table 2. Prevalence of overweight and obesity - BMI distribution among study subjects according to gender-Girlsn= 897

Age	Under weight		Normal		Overweight		Obese		Total	
	n	%	n	%	n	%	n	%	n	%
15	51	11.75	342	78.80	28	6.45	13	3.00	434	100
16	35	9.54	291	79.29	29	7.90	12	3.27	367	100
17	14	19.72	48	67.61	3	4.23	6	8.45	71	100
18	9	36.00	12	48.00	4	16.00	0	0.00	25	100
Total	**109**	**12.15**	**693**	**77.26**	**64**	**7.13**	**31**	**3.46**	**897**	**100**

The tables 1 and 2 depict that the combined prevalence of overweight and obesity was 9.52% (7.02-12.02% at 95% CI) among boys and 10.59% (8.53-12.65% at 95% CI) among girls.

Table 3. Distribution of obesity, overweight, normal weight and underweight among the study subjects according to type of school (Private/Government). n=1569

BMI	School				Total	
	Government		Private			
	n	%	n	%	n	%
Under weight	70	11.1	114	12.2	184	11.7
Normal	516	81.8	714	76.1	1230	78.4
Over weight	33	5.2	78	8.3	111	7.1
Obese	12	1.9	32	3.4	44	2.8

The above table shows higher percentage of obesity among students of private schools than in Government schools.

Section II: Identification of risk factors of overweight and obesity

420 boys and girls were studied for identification of risk factors of obesity. 140 obese and overweight adolescents were the cases and 280 non obese adolescents were the controls.

Table 4. Association of overweight and obesity and major risk factors among subjects. n = 420

Sl. No.	Variable	Category	Obese n = 140	Non obese n = 280	χ^2	df	p value
1	Parental obesity	Yes	85	74	41.71	3	0.001***
		No	55	206			
2	Socio-economic status	Upper	122	194	13.47	2	0.01**
		Lower	18	86			
3	Fast food intake	Yes	56	78	7.98	2	0.01**
		No	84	202			
Caloric intake/day							
4	Boys	<2640	42	106	3.9	1	0.04*
		≥ 2640	16	19			
	Girls	<2060	76	145	0.638	1	0.8
		≥ 2060	6	10			
5	Fat intake/day	<22g	52	77	3.88	1	0.04*
		≥ 22g	88	203			
6	Physical activity level (PAL)	Mild	126	261	2.80	2	0.24
		Moderate	8	7			
		vigorous	6	12			

*** significant at 0.001; ** significant at 0.01; * significant at 0.05

As shown in table 4, chi ($\chi 2$) square statistic revealed that there was significant association between overweight and obesity in children and parental obesity, socio-economic status of the family, habit of fast food intake, calorie and fat intake/day. There was no significant statistical association found between overweight/obesity and physical activity level (PAL) among the study subjects. Thus H_1 and H_2 are accepted and H_3 is rejected in the present study.

Table 5. Predictors of overweight and obesity using Univariate Logistic Regression Analysis (n = 420)

Sl. No.	Variable	Category	Obese n=140	Non obese n=280	OR	Lower	Upper	p value
1	Parental obesity	Yes	85	74	4.50	2.88	6.83	0.000*
		No	55	206				
2	Socio-economic status	Upper	122	194	0.46	0.228	0.54	0.000*
		Lower	18	86				
3	Fast food consumption	Yes	56	78	3.66	2.360	5.58	0.000*
		No	84	202				

*Significant at p<0.000

The above table shows that the predictors of overweight and obesity among the study subjects were parental obesity, socio-economic status and fast food consumption.

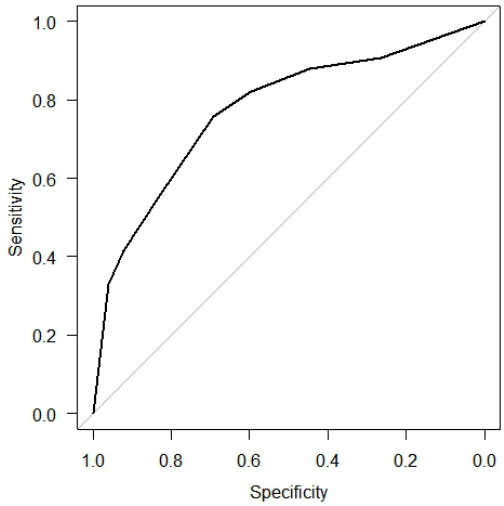


Figure 1: ROC curve showing the multivariate logistic regression model for the predictors of obesity

Results of ROC analysis show that the area under the curve is 0.77. This regression model is good enough to predict that there is higher probability of children for becoming overweight and obese if their parents are obese, consume fast food and belong to high socio-economic group.

Section III. Effect of interventions

Table 6. Repeated measures ANOVA table showing the effect of intervention on BMI and physical activity level at three points among experimental obese subjects (n= 59) and control obese subjects(n= 81)

	Group	Time points	Mean	SD	Source	df	Sum of squares	Mean squares	Fstatistic	p value
BMI	Experimental: obese n = 59	BMI (pre)	26.51	3.96	Between group	2	166.85	83.42	6.31	0.002*
		BMI (post)	25.06	3.52	Within group	174	2298.25	13.20		
		BMI (follow up)	24.17	3.32	Total	176	2465.10			
	Control: obese n = 81									
		BMI (pre)	26.43	3.38	Between group	2	10.91	5.45	0.28	0.75
		BMI (post)	26.47	3.36	Within group	240	3350.16	19.25		
		BMI (follow up)	25.64	5.24	Total	242	3361.08			
PAL	Experimental group: obese n = 59	PAL (pre)	1.40	0.10	Between group	2	0.43	0.21	12.05	0.000**
		PAL (post)	1.50	0.15	Within group	174	3.11	0.017		
		PAL (follow up)	1.51	0.13	Total	176	3.54			
	Control group: obese n = 81	PAL(pre)	1.45	0.12	Between group	2	0.024	0.012	0.47	0.62
		PAL(post)	1.46	0.13	Within group	240	4.46	0.025		
		PAL (follow up)	1.48	0.12	total	242	4.48			

* significant at $p < 0.001$; ** * significant at $p < 0.000$

When the changes in mean BMI of obese children in experimental group were examined there was statistically significant reduction in BMI after intervention. A significant improvement in physical activity level of obese adolescent children was also observed. Accordingly H_4 is accepted.

Effect on food habits and physical activity: There was significant increase in the frequency of consumption of GLV and fruits and reduction of intake of bakery items and fast food among children of experimental group than in control group which was statistically significant.

There was reduction in the mean TV viewing time, improvement in timespent for aerobic exercises and household activities among the experimental group than in the control group.

Discussion

The prevalence of overweight and obesity obtained in this study using Agarwal's standards is reflective of the situation in Kerala. The study results are supported by many other studies in Thiruvanathapuram city[4,5]. There was difference in prevalence in Government and private schools[7]. The trend of higher rates for overweight and obesity especially in affluent groups necessitates intervention at school level focusing on Nutrition education and physical fitness programme utilizing the National Adolescent Health Programme in India.

There is abundance of evidence supporting genetic susceptibility as an important risk factor for obesity[7]. The genetic component of obesity was brought out in this study also. But it is explained that the behavioral or mental factors which can have an interaction with the genescan also lead to obesity[8,9]. The present study also proved that there is a significant relationship between overweight and obesity in children and socio-economic status. Ramesh K Goyal has also reported comparable results[10].

The findings of the study also revealed that there is a definite behavioral modification among the school children after the intervention. There was significant reduction in BMI and improvement in physical activity among obese children in the experimental group. One of them is the APPLE project in 2008, a two year follow up of obesity intervention initiative in children that enhanced extracurricular physical activity and promoted healthy eating habits in children and teachers.[11]

Conclusion

The food habits such as fast food consumption with more calories and more fat intake has led to overweight and obesity in adolescents. Behavioral treatment is considered to be an essential component of any obesity treatment program. Family based interventions to prevent excess weight gain in young children including high risk population using multi component multi level approaches may be undertaken as future studies.

Conflict of interest: None

Source of funding: Self

Ethical clearance: Ethical clearance was obtained from Ethics committee of Medical College, Thiruvananthapuram. Permission from Directorate of Higher Education, Kerala was obtained to conduct the study in higher secondary schools and informed consents were received from Principals of the concerned schools, parents. Assent was obtained from the participants of the study.

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Lived Experiences of Mothers of Children with Intellectual Disabilities: A Phenomenological Study

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Abstract

This study explored the lived experiences of five mothers who were primary caregivers for their children with intellectual disabilities. It provided an opportunity to explore the nature of their mothering experience and understand the meaning they attribute to their caregiver role. The mothers of mentally disabled children showed significantly more psychiatric morbidity and stress than mothers of normal children, but fathers did not show the same deleterious effect on psychological health.

Purpose: The purpose of this study was to investigate the intricacy of the lived experiences of mothers.

Method: A qualitative, phenomenological research design was used in this study,five mother were taken as sample Here the sample is mothers of children with Intellectual Disability and data was to be collected by interview method. The interviews were transcript into word file. Analysis was done by Colaizzi's Strategy.

Result and Discussion: By using phenomenological method several themes and subthemes emerged which is provided the description of the live experience of mother of children with intellectual disability. This work explore the live experience of mother of children with intellectual disability and provide recommendation for further study. Interview results show that participants are going through the same level experience at the certain stage.

Summary and Conclusion: In summary research study used aqualitative, phenomenological method by which to gain a greater understanding the live experience mother of children with intellectual disability. The specific circumstance associated with the pivotal moment were different from each participant, but the clarity of the moment was universal. In conclusion, this study explored the lived experiences of five mothers who resided with and were primary caregivers for their children with intellectual disabilities. It provided an opportunity to explore the nature of their mothering experience and understand the meaning they ascribe to their caregiver role.

Keywords: *Live Experience, Mother, Children, and Intellectual Disability.*

Introduction

This study explored the lived experiences of five mothers who were primary caregivers for their children with intellectual disabilities. It provided an opportunity to explore the nature of their mothering experience and understand the meaning they attribute to their caregiver role.

Intellectual disability involves problems with general mental abilities that affect functioning in two areas i.e. **intellectual functioning** (such as learning, problem solving, and judgment) and **Adaptive functioning** (activities of daily life such as communication and independent living). Intellectual disability affects about one percent of the population, and of those about 85

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percent have mild intellectual disability. Males are more likely than females to be diagnosed with intellectual disability[1].Intellectual disability is identified as mild (most people with intellectual disability are in this category), moderate or severe.[1]

The number of people with an intellectual disability also rose between 2011 and 2016. 66,611 people reported having an intellectual disability in 2016 (up from 57,709 people in 2011).[2]

Studies on severe mental retardation from low-income countries report a prevalence of higher than 5 per 1000, which is greater than figures reported for high-income countries.[4]

The mothers of mentally disabled children showed significantly more psychiatric morbidity and stress than mothers of normal children, but fathers did not show the same deleterious effect on psychological health, which may be related to the differing responsibility assigned to child rearing for each parent, as the literatures showed that fathers are less involved in caregiving activities.[5]

According to disability statistics in India 1.5 Million persons suffer from Mental Disability, out of which 0.9 million is Male and 0.6 million is Female.[6]

Material and Method

- **Research approach:** Qualitative study
- **Research design:** Phenomenological Research Design

  Interpretative phenomenological research design
- **Inclusion Criteria:**
  a. Mother's co-residing with their adult child with intellectual disability for more than 10 Years.
  b. Who can understand English/Marathi.
  c. Only Mothers will be included in the study.
  d. Mothers having only single child with Mental Disability.
- **Exclusion Criteria:**
  a. Mothers not willing to participate in the study
  b. Mothers with psychological problems
- **Research Setting:** Kamyani School for special Children.
- **Population:** Mothers of children with intellectual disability.
- **Sample:** Mothers of children with Intellectual Disability
- **Sample size:** 5
- **Sampling Method:** Non-probability sampling technique

  [Purposive Sampling Technique]
- **Tools for Data Collection:** Open ended questionnaires
- **Techniques of Data Collection:** Interview Method [semi structured and depth interview]
- **Data Analysis:** After collecting data,

  Creating a meaning/theme from collected information

  Formulating meaning into several theme and subtheme

  Description given regarding the particular theme

  Findings:

Theme: Mothers' Actions to Organizing Daily Life for Their Sons: These mothers compose, arrange, and oversee all aspects of their sons' lives, including daily routines and finances, health and safety, relationships and social connections, opportunities to experience competence, and opportunities for renewal.

Monitoring daily schedules: All five participants acknowledged that their own routines revolve around the temporal, and for Mamta the physical, demands of their sons' schedules. Mamta, whose son Harsh has cerebral palsy, described the routine she and Harsh follow on weekday mornings, starting early:

"When I come down first thing in the morning [between 6 and 6:30], I have him lay flat on his stomach, to stretch his hamstrings. And he stays there for a while, and I say, 'It's time to get up.' And he gets up and goes to the bathroom, and gets into the shower. This all takes a very long time, and a lot of prodding. He uses the walker, to get out of bed, he probably has to be reminded three or four times, and in the bathroom, 'keep moving,' and in the tub, and I help him with the shower.**"**

Creating social connections of their son's: All five mothers understand the importance of their sons having social connections outside home and have established routines for their sons that include social relationships. All the sons, except Peter, Esther's son, work or attend day programs on weekdays.

Rama's son, Arjun, studies in Special school. Arjun has no additional source of social contact, beyond family and School, is an area of despair for Rama, as she said,

"[He doesn't socialize], not outside of School, no. He's a homebody. I would like him to have [friends outside school], but he hasn't had, he won't initiate it.**"**

Summary of theme:

Mothers' Schedules: While all five mothers acknowledge their lives revolve around the schedules and needs of their sons, each is engaged in personally meaningful activities beyond mothering. All five women have social connections with friends and family in addition to participating in activities they enjoy. These mothers acknowledge that their aging and health have changed, or will ultimately change, their routines and their need for assistance from their sons or others.

Mothers' Skill: All five of these mothers used their in-depth knowledge of their sons' physical, cognitive, social, and emotional abilities and disabilities as the base from which they translated and interpreted both social norms and expectations to their sons and from their sons to the broader social world. These mothers described responding to situations that arise naturally in the course of their sons' lives and actively sought opportunities to mediate between their sons and the larger social context. In doing so, these mothers smoothed the way for the social acceptance of their sons.

Mothers' Thoughts on Raising a Son with Intellectual Disabilities: The mothers who participated in this study were asked to reflect on the lifelong effect of mothering their sons with intellectual disabilities. These mothers recognized that their lives were shaped by their parenting experiences in ways that were different from their peers who did not have children with disabilities. All five mothers felt they had learned significant lessons from their sons and from mothering their sons. Finally, all of these mothers accepted that they can plan for their sons' futures but cannot control their sons' destinies.

Mothers' actions to Organizing Daily Life for Their Sons: While these families varied in terms of structure and lifestyle, all five of these mothers compose, arrange, and oversee all aspects of their sons' lives. All five mothers create and maintain the lifestyles of their adult sons and themselves. The data demonstrate that while there are variations in the lifestyles and the daily routines, each of these women has created a life for her son that is healthy and safe and includes social connections and relationships.

Accepting how life is different than friends' lives: All five mothers were aware that their lives were configured differently than their same-aged peers because of their ongoing responsibilities for their sons. Rama, who had a very full social and recreational life by most people's standards, still lamented that she had less freedom than many of her friends because she drove Arjun to and from his School.

Asha also couched her comments in terms of freedom, saying,

"[My friends] do have a certain amount of freedom that maybe I don't have. Like I always try to think of things that we are going to do that he likes, too, you know.**"** She included him in most of her activities and saw this in a positive way: "But everybody likes him and enjoys his company.

Accepting the coming future for son: The mothers who participated in this phenomenological research believed they knew their sons' disabilities and abilities better than anyone else and much of their thinking about their sons' futures centered on this expertise. Even Rama, who had been very frustrated by her sons, Arjun's, lack of initiative and the difficulties they have in their day-to-day routines, acknowledged albeit tearfully that, "... nobody is going to take care of him the way I am.

Conclusion

In conclusion, this study explored the lived experiences of five mothers who resided with and were primary caregivers for their children with intellectual disabilities. It provided an opportunity to explore the nature of their mothering experience and understand the meaning they ascribe to their caregiver role. The broad question this study sought to answer was: What are the lived experiences of perpetual mothers who live with their adult child with intellectual disabilities?

The results of this interpretive phenomenological study raise interesting issues for continued research about mothers of children with intellectual disabilities, as well as about children with intellectual disabilities, as they move into middle- and old-age. There is much that is unknown about the experiences of mothering children with intellectual disabilities over time and, certainly, about their daily lives, and the transitions these families

make. This research has added substance to the call for research that elicits the perspectives of mothers and their children to better understand the day-to-day nature of their lives.

Conflict of Interest: The authors declare no conflict of interest with respect to the authorship/or publication of this paper.

Source of Funding: The authors declare that the research study is Self-Funding.

Ethics: The study was conducted with the permission of the Parents of Intellectually disabled children to whom we explained the implications, purpose and voluntary nature of participation. Similar information was made available in written form to all participants. Ethical approval for the conduct of the study was obtained from the Institutional research review board of Symbiosis College of Nursing, Pune.

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Development of an Energy Management System for Tertiary Care Hospital, with Special Emphasis on Lighting

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Abstract

Energy efficiency in the hospitals is the growing concern. The hospitals work 24/7 in the very critical situation and having very huge and crucial equipment to use, which consumes energy. India is the third biggest consumer of primary energy after USA and China by 5.6% global share in 2017. In the hospitals the cost spending on the energy expenditure is in lakhs/month so we need to use the energy efficiently to save energy and to reduce the cost. Hospitals can't be run without energy. Critical equipment used in ICU, operation theatres, emergency department etc. are highly dependent on energy as in its absence there may be chances of interruption in patient care. The aim of this study is to assess the energy efficiency level of the hospital to propose an energy management policy and energy management system. The retrospective study was conducted on the energy efficiency in the facility department, tertiary care hospital, the results showed the compliance to the energy efficiency, the expenditure on the energy and also the Number of lighting fixture which is used in different departments. Based on the study results, peer literature reviews the Energy Management System is developed and policy is made to achieve the energy efficiency in the hospitals, the prioritization is made in the lighting system to switch towards the efficient lighting with the help of pareto principle and ABC analysis which are given to the facility department. The suggestions could help in the tertiary care hospitals to check the compliance on energy efficiency to implement the energy management system by using the PDCA cycle and to move- towards energy efficiency.

Keywords: *Energy efficiency, Energy management system, Hospital, Light fixtures.*

Introduction

India is the third biggest consumption of primary energy after USA and china by 5.6% global share in 2017. India is mainly depends on the fossil fuel for the production of the electricity, around 75% production of the energy is from the fossil fuels. Energy efficiency is something which use less energy and gives the maximum output or that which uses the same amount of energy and gives the better results (in terms of cost, life cycle, consumption, maintenance etc.). Health care facilities and the hospitals consume more energy compared to the other buildings because of more equipment's and various departments and 24/7 services in the tertiary care hospitals. The increase in the consumption of energy and the electricity bills we need to focus on the energy efficiency in the hospital. For Health care administration, this energy consumption is made worse by repeatedly increasing energy prices. Thus far this also means preventative actions and efficiency plans can be extremely worthwhile. Estimations display that $1 saved on energy by a non-profit Health care is same to creating $20 in profits. Additionally, decreasing energy use by 5% can increase for-profit hospitals' earnings by as much as penny per share[1].

Classification of energy consumption areas the hospital based on the percentage of consumption: The HVAC and lighting system consumes around 43% and 23% respectively in the total energy consumption in the hospital. Cooling and hot tap water consumes around 10% and finally the offices, the other teaching and medical office equipment's comes under another category they consume around 26% of the total energy consumption[2]. So it's a very important to evaluate energy efficiency and change current lighting system to energy efficient lighting. Researches focused on energy efficiency, saving potentials and energy management and the special emphasis on the lighting system.

Literature Review: Energy is the most important for the social and economic development of every country[3]. From International Energy Agency the building sectors final energy consumption of the whole world has increased to 2,794 millions of tons[4] of oil equivalent in 2007. 34% of the whole world final energy consumption is represented by building sector hence it is the first consumer sector of energy[5]. From the reference scenario of International Energy Agency, before 2030 with consumption share of 32% will be consumed by the building sector and it will be the first consumer of the energy[6]. The need for the energy will raise through with an average of around 1.2%/year to 1.4%/year will be the entire ultimate energy intake[5-1]. The study on analysis of audits for 30 health care buildings in Greece (Hellas) quantify the potential global energy showed that smaller health service buildings in Scotland signified 29% of energy efficiency of the total floor area of all the buildings[7]. The use of thermal energy storage in combination with a heat pump compared to a gas-based boilers and water chiller can save up to 71% of the primary energy the demonstration was done by the authors in the Belgium hospitals[8]. The energy expenditure will be increased up to 50% by the use of lighting system, if the occupants will become more in the building with respect to the standard design of the buildings[9].

B: A. S. Da'as, 2008 in his study mentioned the potential energy conservation by usage of energy savings measure in Palestinian hospital. The hospital achieved the average total savings of 17% for hospitals 43%, 14% and 17% for freezing and O2 generation components, heating, power issue rectification and 5% in the illumination systems, correspondingly. Apollo Hospitals in Chennai by the usage of centrifugal and screw type compressors instead of reciprocating compressors, CFL with electric chokes for lighting, old elevator machines using variable frequency drive, sustaining power factor of 0.97, using filters, excess vapour used to heat water, and reducing diesel requirements by using steam generation by this they achieved 57.62 units/day instead of 61.31 units/day. Periodic maintenance of equipment's, LED exit signage and electronic ballast and energy proficient lights are used in minimum three quarters of the hospitals. Other than these, roughly around half of the organizations are purchasing "energy star certified products" (55%), advancement of structure control systems (53%) or applying energy preservation programs (49%) [10].

Methodology

Aim: To study the energy efficiency of the hospital and propose the energy management policy and energy management system.

Objective:

1. To study present power consumption rate and the expenditure on the electricity.
2. To identify the factors affecting the energy efficiency.
3. To check the energy efficiency of the hospital building.
4. To propose the energy management policy and energy management system for the hospital with emphasis on lighting.

Method

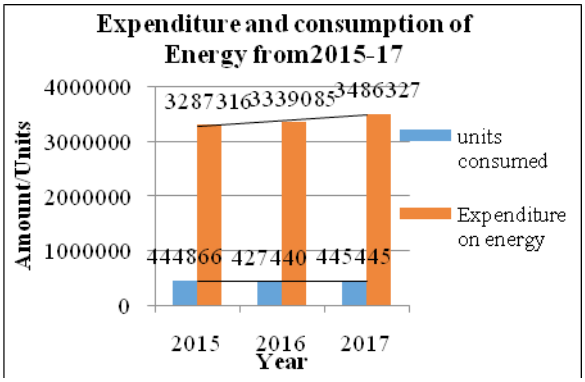
A retrospective study was conducted in the tertiary care hospital Bangalore, based on the energy efficiency in the tertiary care hospital and the data was collected in the facility department on the energy expenditure of the past three years, the checklist was prepared by using the New Mexico Interfaith Power and Light and U.S Energy protection agency guidelineson the basis of the checklist the compliance was checked for the whole hospital. A formal interview guide was prepared based on the literature and used for the interview; interview questionnaire covers adequate information regarding Energy Efficiency in the hospital, the management aspect of the energy in the hospital and different challenges faced by the facility manager.

Results

This research is been conducted through various ways i.e. by record review in the facility department, through the literature reviews of 50 different journals and articles which were Scopus indexed like Science direct, ebsco, Elsevier, Shodhganga, Google scholar etc. After the literature study the checklist was prepared and the compliance was checked for the Energy Efficiency in the hospital. And the formal interview with the facility manager with the help of interview guide which was prepared by using the literatures[9-1].

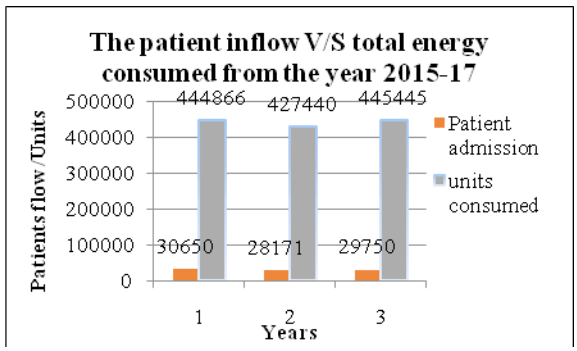
Power consumption rate and the expenditure on the electricity: The study was conducted in a tertiary care hospital to know the energy expenditure and total number of light fixtures present in the hospital and the

patient's inflow to the IPDs in the hospital by using the record review of the past three years data.



Graph 1 Consumption rate and the Expenditure on energy from past three years

The three years energy consumption and the amount spending to pay the electricity Expenditure pattern showing that. The energy consumption during the year 2015, 2016 and 2017 is 44866 Rs,427440Rs and 445445 Rs respectively increase in the 18,005 units in the year 2017 compare to 2016 and also the expenditure is increased by 1,47,242 Rs from the year 2016 to 2017. And also increase in the tariff plans by the government



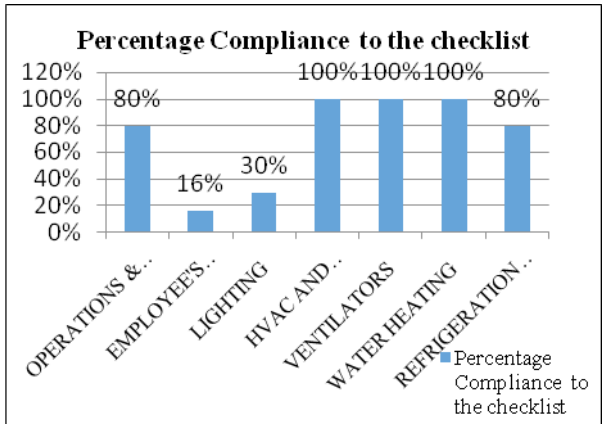
Graph 2 Patient inflow V/S total energy consumed from the year 2015-17

The above graph represents the patient inflow to IPs versus the total energy consumption of the three years from 2015-2017. The IPD patient inflow is decreased in the year 2016(28,171) compared to the 2015(30,650) and it is again increased during the year 2017(29,750) compare with 2016. The energy consumption rate in the year 2015 is 444866 units, in 2016 is 427440 units and during the year 2017 is 445445 units so from this we can see the difference between the year 2015 and 2017, during the 2015 the patient flow is 30,650 energy consumed is 444866 units but in the 2017 patient inflow is comparatively less(900 patients less in the year 2017) to the 2015 but the energy consumption is increased (579 units) so we need to think on this even though the patients inflows to IPs is comparatively less the energy consumption is increased.

Factors affecting the energy efficiency in the hospital: There are different factors affect the building energy efficiency, the study was done through the literature review of Scopus indexed journal of latest from 2013-2018. The following are the factors affecting the energy efficiency[11]

- Architecture of the building
- Shape of the building
- Orientation
- Building envelope
- Insulation
- The age and size of the building
- HVAC system
- Electricity and control systems in buildings
- How the building is used
- Up- gradation of mechanical equipment
- Outside air temperatures

Energy efficiency compliance of the hospital building: The study is conducted by using the checklist prepared by using the New Mexico Interfaith Power and Light and U.S Energy protection agency, from the checklist the energy efficiency of the hospital is measured. The checklist is evaluated through the direct observation, record review and staff interview. The results were analyzed by using the excel.



Graph 3 Percentage of Compliance to the checklist

The above graph showing the compliance to the energy efficiency in the hospital From the evaluation its

showing that the HVAC and Plant system, ventilators and water heating showing the 100% compliance, the compliance of the employees behaviors towards the energy efficiency is showing 16.666%, the lighting system is showing the 42.875% compliance and the Operations and management is showing 80% compliance. So we need to focus on these three sections to bring the energy efficiency measures in the hospital.

Energy management policy and energy management system for the hospital: Based on the guidelines of the ISO 50001[12] energy management standards,the policy and the Energy Management System prepared by using the guidelines in the Energy management system requirements. Policy contains the introduction to the policy with achievable target, scope of the policy which tells who all comes under this policy with the aim tominimize the energy consumption, reduce the energy costs and the operational cost and Create the awareness in the staffs regard to the energy management in the hospital. And the policy covered the different dimensions like roles and responsibities,definitions,tr aining, consultation and implementation. The Energy Management System is designed to manage the energy in the hospital to cut down the cost.

Discussion

From the above results we can see the necessity of the energy efficiency in the hospital, so the hospital needs to move towards energy management to cut of the waste costs spending on the expenditures. The most challenge comes here inhospital buildings, which are complicated structureand the behavior of the occupants working in the organization and the total number of different type of equipment's used. The temperature of the rooms should be maintained in the labs and the air changes in the OT so it's very difficult to be energy efficient. The hospital are serve the people around the clock, so it's very complicated thing to move towards energy efficiency because the projects may affect the patient's service.

The following are the various challenges facing by the organization to implement energy efficient techniques[13]:

Economic challenges: Most of the hospitals lack of huge funds refuse to implement these strategies in their organization, because the hospitals are need to spend on the wages to their employees and also they need to meet their daily operation expenses to run their shows so it's very difficult to spend on these strategies.

Organizational challenges: The energy efficiency plans and the medical equipment management is comes in the similar capital pool so they need to focus on the management of medical equipment for the direst support of hospital business they may loose focus on the energy efficiency measures.

Physical/Operational challenges: Hospitals run 24/7 and deal with patients and also they have complicated building architecture. This could be the problem during the retrofit to the energy efficiency and also the HVAC system is the very complicated area. Hospital need to maintain the same pressure in all the patients rooms. If one of the patient area get less air pressure the air comes to this room from other room, which make the patients vulnerable to the cross infection.

Behavior challenges: Most of the staffs who are working in the hospitals don't know the importance of the energy efficiency in the hospitals and they don't know how much they could save the energy by switch off the equipment's and lights when they are not in use.

Suggetions: Hospitals consume huge energy, obviously they need to pay the huge amount of electricity bills so we need to control the wastage of energy consumption in the hospitals by using the power efficiently.

- The policy has been developed for the maintain of the energy efficiency for the hospital
- Energy Management system (EMS) to control the energy consumption and to cut the expenditure on the electricity bill in the hospital
- The EMS can be implemented by using the PDCA cycle with the use of required resources
- Prioritization of the departments to replace the light fixture to the more energy efficient one by applying the Pareto principle and the ABC analysis
- The newer technology in the lighting like super capacitors,Indoor location tracking, Self-learning control systems, Li-Fi etc. Helps the hospitals to move towards more energy efficient

Energy saving areas in the hospital[14]

Heating system

- Set the thermostatand radiator levels to their max efficiency level
- Insulation of needy areas and equipment a

- Use efficient equipment

Mechanical ventilation:

- Set up variable speed drives on fans and also in the large pumps
- Evaluate existing scheme, particularly regulator adjustments
- Use outdoor fresh air aimed at ''free cooling'' based on the availability
- Explore chances for heat recapture by exhaust air

Combined heat & power:

- Regulate the heating and power needs (MVA) wisely
- Consistent performance maintenance, checking and assessment of steam turbine
- Less use of the steam outlet controller

Building fabric & air-conditioning

- Insulate roof
- Proper shading of windows

Lighting system

- Check feasibility for time controls, existence sensors and daytime compensators
- Upgrade the lighting system

Conclusions

The energy efficiency in the hospital is very important because of the increase in the electricity tariffs day to day and also the increase of energy consumption. The different factors affect the building energy efficiency so need to focus on those factors in the building and also hospital uses more light fixture compare to the other buildings, by using the prepared checklist the compliance to the energy efficiency is checked the results shows that the hospital is having very poor compliance in the lighting and the behavior of the staffs. There is no Prioritization of the actions in the lighting fixture to switch from CFL and Tube lights to more energy efficient LEDs.

Conflict of Interest: None

Ethical Clearance: None

Source of Reference: None

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Potentials of Nggorang Leaf Standard Extract (Salvia Ccidentalis) Study: Ethnopharmacology, Standardization, Antioxoxide, Sitotoxicity and Working Mechanisms

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Abstract

The use of medicinal plants is used as the main therapy as well as additional therapy to enhance one's immunity or maintain health and fitness. Nggorang Leaf Extract (EDG) polyphenol and flavonoid compounds and essential oils. Flavonoids are powerful antioxidants that work as a cancer prevention and also have antimicrobial effects. This study aims to prove the potential of EDG as an antioxidant and antiproliferation of Hela cancer cells. This research includes *Quasy experiment* research The conclusion of this study shows that Nggorang Leaf Extract (EDG) has potential as an antioxidant against DPPH radicals at IC50 = 34,407 ppm; Nggorang Leaf Extract (EDG) has potential as an antiproliferation of T47D IC50 cancer cells = 201 ppm; Nggorang Leaf Extract (EDG) has potential as an antiproliferation of Hela IC50 cancer cells = 187 ppm; Nggorang Leaf Extract (EDG) has the potential to reduce ROS activity in T47D cancer cells by 54.34% at a concentration of 50 ppm; Nggorang Leaf Extract (EDG) has the potential to reduce ROS activity in Hela cancer cells by 58.33% at a concentration of 50 ppm; Nggorang Leaf Extract (EDG) has the potential to increase P53 gene expression in T47D cancer cells by 94.13% at a concentration of 50 ppm; Nggorang Leaf Extract (EDG) has the potential to increase P53 gene expression in Hela cancer cells by 92.05% at a concentration of 50 ppm. The novelty of this study is that Nggorang leaves (*Salvia occidentalis)* can be used as a preventative for breast cancer and cervical cancer.

Keywords: *Salvia Occidentalis, Ethnopharmacology.*

Introduction

The tendency of *back to nature* today, causing the use of herbal medicines become popular not only among rural communities but also urban communities. herbs are also popular in the community based on the information of herbal products in pharmaceutical dosage forms. *World Health Organization* estimates that 80% of the world's population still entrusts health with traditional medicine, especially those sourced from medicinal plants.

Research on the efficacy of herbal medicine has long been done, but until now there are still many aspects of herbal medicine that have not been disclosed by researchers. One of the uses of herbal medicines that are being developed is to help cure cancer [2] ·One of the plants used by the Manggarai community is nggorang leaf (*Salvia occidentalis)*. This plant is commonly found in Tenda Village, when harvesting leaves are one year old and used as medicine. Preventive efforts for these leaves are hereditary used as an anticancer (7 leaves boiled with 200 ml of water until ½ then drunk), for wounded breast cancer, stamina enhancer, cough, influenza, hemorrhoids[3].

Preliminary studies on Nggorang Leaf Extract (EDG), have been proven to have strong antioxidants and potential as cervical anticancer (hela cells); potential as an antibacterial *Candida albicans* has a inhibitory power of 12, exceeding positive control (Nystatin) [4]. Polyphenols are also antioxidants, which inhibit enzymes that can stimulate the growth of cancer cells and suppress the immune response and help slow the development of tumors [1]

Although it has been used empirically by the Manggarai community for anticancer treatment, scientific proof does not yet exist. So that nggorang leaves (*Salvia occidentalis)* are very potential to be

researched and developed considering that cancer cases in Indonesia are still very high.

Research Location and Time: Extraction process and standardization will be carried out in the Laboratory of Polytechnic ice MoH Makassar and Biofarmaka Laboratory Faculty of Pharmacy UNHAS, Anatomy Parasitology and Pathology Section of the Faculty of Medicine UGM. Research time 2014-2015.

Materials and Research Tools: The research materials used were (1) nggorang leaf extract, (2) material for standardization of extract (3) materials for cytotoxicity activity(4) materials for cytotoxicity activity apoptosis and cell cycle analysis: *flow charts reagent* and kit PI/RNase *staining buffer* (5) materials for cytotoxicity activity analysis of P53 and ROSprotein expression. The tools needed in this research tool maceration, rotary evaporator, freeze dr yer, UV-Vis spectrophotometer, *atomic absorption chromatography* (AAS), high performance liquid chromatography (HPLC), column C18, plate TLC F254, scales analiti k incubator $CO_{2,}$ inverted microscope,

Data Collection Procedure

1. **Antioxidant Activity Test d ith Radical DPPH:** Preparation of 0.4 mM DPPH Solution: A DPPH 0.4 mM solution was prepared by dissolving as much as 15.7 mg DPPH with ethanol 96% pa to 100 mL.
2. **Anti-oxidant activity test of EDG extract with free radical DPPH:** Antioxidant activity test of ethanol extract of leaves of Nggorang by DPPH method was carried out in accordance with the method carried out by Hua with a slight modification (Hua, 2014). A total of 1 mL decocta and ethanol extract of leaves of people with a concentration of 50 µg/mL, 75 µg/mL, 100 µg/mL, 125 µg/mL and 150 µg/mL were added to 1 mL DPPH 0.4 mM and sufficient volume with ethanol 96% pa to 5 mL. The mixture is then shaken and incubated in a room temperature for 30 minutes in a dark place. This solution was then measured for absorbance at λ516 nm. The same treatment was also carried out for blank solutions (DPPH solutions that did not contain test material) and positive control of vitamin C with concentrations of 2 µg/mL, 3 µg/mL, 4 µg/mL, 5 µg/mL, and 6 µg/mL. The absorbance measurement data was analyzed by the percentage of antioxidant activity using the following equation:
3. **Cytotoxicity Activity Test:**
    1. **Making Culture Medium:** The culture medium used in this study was the RPMI 1640 medium for T47D, Hela cancer cell culture while the Vero normal cells used M199 medium.
    2. **Creation of a Growing Medium:** Growing medium of RPMI 1640 and M199 was prepared by mixing 20 0 mL medium solution with 20 ml BSA, 4 mL penicillin-streptomycin and 1 mL fungizone.
    3. **Making MTT Solution 5 mg/mL:** MTT solution 5 mg/mL was prepared by dissolving 50 mg MTT with PBS pH 7.4 to 10 mL.
    4. **Manufacture of PBS solution pH 7.4:** A total of 80 g NaCl, 0.2 g $KH_2PO_{4,}$ 115 g Na_2HPO_4 and 0.2 KCl were dissolved to 900 mL with aquadest. The solution is then adjusted to pH by adding 0.1 N HCl solution or 0.1 N NaOH to 7.4 and then the volume is sufficient to 1,000 mL with distilled water. The solution was then sterilized with an *autoclave* at 121 ^{0}C for 30 minutes.
    5. **Making SDS 10%:** A total of 10 g of SDS was dissolved with distilled water up to 100 mL HCl 0.01 N.
    6. **Thawing cells:** Cancer cells T47D, HeLa and normal cells Vero obtained from the Department of Parasitology Faculty of Medicine. All mediums were given a 10% BSA supplement, penicillin-streptomycin 1% and fungizone 0.5%. Cells in the *flash culture disk were* incubated at 37 ^{0}C with 5% CO_2 gas flow. Cell proliferation was observed under an inverted microscope and confluent cells (80-90%) were harvested.
    7. **Cell Harvesting:** The medium is discarded, then the *flash culture disk is* washed with PBS pH 7.4. Then trypsin-EDTA 0.5% to taste and then incubate in a 37 ° C incubator with a flow of 5% CO_2 for 1-3 minutes. Add enough growth medium and then poured into a sterile *conical tube* then centrifuged for 5 minutes at 4 $^\circ$C. Then count the number of cancer cells with a *haemocytometer.* Cell suspension was added by a number of growing medium to obtain a cell concentration of 1 x 10 ^{4} cells/100 µL medium and cells were ready for use for testing. Sample Testing with MTT Method **assay**

4. **Examinationof P53 Protein Expression (KIT):** Analysis of P53 protein expression was performed by the immunohistochemical (IHC) technique.

Data analysis: Percentage inhibition data obtained in the antioxidant test and the subsequent cytotoxicity test were calculated by IC_{50} by probit analysis using SPSS software. Data on percent cell accumulation at each phase of the cell cycle, percent apoptosis, percent P53 protein expression were tested for normality with the *Shapiro-Wilk test* and homogeneity with the *Levene test.* If the data is normal and homogeneous distributed, then *Anova one way* statistical analysis will be performed. If the data is not homogeneously distributed then proceed with the Anova parametric test and continue with the Mann Whitney test.

Results and Discussion

Research result

1. **Effects of EDG on Hela Cell Viability:** Observation of the effect of EDG administration on Hela cell viability was carried out using the *ELISA* method.

Table 1 : Results of Testing the Effect of Giving Nggorang Leaf Extract on Hela Cell Viability After 24-hour Incubation

Concentration	Viability	Elementary school
15,625	114,2693	0.1418
31.25	117.9399	0.1004
62.5	129.6398	0.1962
125	109.9105	0.0830
250	93,2095	0.1980
500	5.2994	0.0221
1000	5.2306	0.0161

Table 2: Test Results of the Effect of Giving Nggorang Leaf Extract on Hela Cell Viability After 48 hours Incubation

Concentration	Viability	Elementary school
15,625	151.9650	0.1689
31.25	133.6540	0.1080
62.5	131,4321	0.1719
125	91,249	0.2320
250	18.3675	0.0799
500	16.3529	0.1286
1000	8.5016	0.0255

Table 3: Test Results of the Effect of Giving Nggorang Leaf Extract on Hela Cell Viability After Incubation in 72 hours

Concentration	VIABILITY	Elementary school
15,625	114,9654	0.0639
31.25	102.3924	0.0093
62.5	90.9399	0.0044
125	45,337	0.0026
250	12.44747	0.0038
500	12.1725	0.0060
1000	11.6029	0.0020

Based on tables 5.8 - 5.10 and figures 5.7 - 5.9, various IC_{50} values are obtained. The data shows that the incubation time of EDG in hela cell culture gave different results of viability and IC_{50} values. The longer the incubation period, the smaller the IC_{50} concentration used to kill cells. The EDG concentration needed to produce 50% activity after 24-hour incubation obtained IC_{50} values 523.7039 ppm ; after 48 hours incubation obtained Value IC_{50} 327.00 ppm ; after 72 hours of incubation obtained Value IC_{50} 187,000 ppm

2. **Effect of Doxorubin on Hela Cell Viability:** Testing of doxorubin drug activity on cell viability was carried out using the *ELISA* method.

Table 4: Test Results of the Effect of Doxorubin Administration on Hela Cell Viability After 24-hour Incubation

Concentration	Viability	Elementary school
1. 5625	110.0934	0.0119
3. 125	109,1381	0.0040
6. 25	100.6793	0.0060
12. 5	80.5322	0.0090
25	68.7199	0.0095
50	30.4290	0.0026
100	5.9870	0.0026

Table 5: Test Results of the Effect of Doxorubin Administration on Hela Cell Viability After 48 hours of Incubation

Concentration	Viability	Elementary school
1. 5625	26.7947	0.0472
3. 125	20.1550	0.0038
6. 25	16,3802	0.0090
12. 5	11.3583	0.0025
25	5.2578	0.0010
50	1.4493	0.0029
100	1.2471	0,0006

Table 6: Test Results of the Effects of Doxorubin Administration on Hela Cell Viability After Incubation 72 hours

Concentration	Viability	Elementary school
1. 5625	114,9654	0.0639
3. 125	102.3924	0.0093
6. 25	90.9399	0.0044
12. 5	45,337	0.0026
25	12.44747	0.0038
50	12.1725	0.0060
100	11.6029	0.0020

Discussion

Effect of leaf extract nggorang on the viability of HeLa cells is determined by the number of hela cells were still alive after nggorang leaf extract incubated together with various variations. *HeLa* cells that are still alive will look like elongated and clustered leaves attached to the bottom of the well. Meanwhile, dead *HeLa* cells will form irregular dots and float on the media. After treatment with the MTT method, will be seen formazan crystals that show *HeLa* cells that are still alive[5].

Giving extracts ranging from a concentration of 31,675 ppm to 1000 ppm. More and more living cells show that the concentration of extracts of leaves given by people is not effective. Likewise the concentration of extracts that provide viability of Hela cells is very little is an effective dose. This is consistent with the statement that cell viability is the number of cells capable of developing in a culture medium. Cell viability is used as a marker of cytotoxicity of a material to determine the biological properties of a material that is toxic to certain cells. One that indicates the cytotoxicity of a substance is a decrease in cell proliferation and decreased viability[6].

The longer incubation, the more T47D cells die, so the EDG dose needed to kill T47D cells gets smaller because the number of living cells has decreased. This means that the use of EDG drugs has the potential to be anti-cancer. In this study the IC50 value of EDN on Hela cell viability was obtained at 187.00 ppm. This means that a dose of 187.00 ppm was quite effective in killing Hela cells.

The activity of EDN in killing cancer cells is thought to be related to the content of active substances including flavonoids. The mechanism of flavonoids in inhibiting tumor/cancer proliferation is to inhibit the activity of tyrosine kinase receptors so that they can inhibit the signal transduction pathway from the membrane to the cell nucleus. Increased tyrosine kinase receptor activity plays a role in the growth of cancer cell malignancy. Besides flavonoids also function to reduce tumor resistance to chemotherapy agents[7].

As a comparison in this study, the anti-cancer drug doxorubin was used. The effect of doxorubin on cell viability showed analogous results with the results of EDG on cells. IC50 value of doxorubin administration on viability of hela cells after 72 hours incubation was 149.00 ppm. While the IC50 value of EDG on cell viability after 72 hours incubation was 149.00 ppm. Based on this, it can be stated that EDG can potentially be as anti-cancer as doxorubin.

The results of observations of the effect of EDG administration on P53 gene expression in helper cells showed that cells expressing brownish P53 genes at their core. This result is different from cells that do not express the P53 gene. The data shows that the higher the EDG concentration given, the greater the hela cells expressing the P53 gene. So it can be stated that EDG has the potential to increase the expression of the P53 gene in cancerous cells. P53 gene expression in cells that appear brown is a P53 gene with wild type in cytoplasm that plays a role in the process of cell apoptosis[8].

In the study it was found that EDG has the potential to cause apoptosis in cancer cells in concentrations of 10ppm - 50 ppm. EDP 50ppm potential as a haem cell apoptosis because the number of cells expressing the P53 gene is 92.05%. In the event of apoptosis the P53 gene is expressed when DNA damage occurs so that an error occurs in the cell cycle that is the P53 gene induces cell

cycle arrest. It is intended that DNA damage in damaged cells has time to be repaired. But if the damage cannot be repaired then the expression of the P53 gene will increase so that it will trigger cell apoptosis (Hanahan and Weinberg, 2000). Conversely, if the P53 gene is not expressed in cells, then a mutation occurs in p53 so that the gene becomes unstable and has the potential to become cancerous. The p53 gene is a signal of apoptosis because it suppresses the formation of tumor formation and inhibits malignant progression. The mechanism that occurs in cells is the p53 gene eliminates cells that have DNA damage that has the potential to become cancerous cells by cell cycle arrest, apoptosis or repair[9].

Conclusion

Nggorang Leaf Extract (EDG) has potential as an antioxidant against DPPH radicals at IC50 = 34,407 ppm

1. Nggorang Leaf Extract (EDG) has the potential as an antiproliferation of Hela IC50 cancer cells = 187 ppm
2. Nggorang Leaf Extract (EDG) has the potential to increase P53 gene expression in Hela cancer cells by 92.05% at a concentration of 50 ppm.

Conflict of Interest: Nil

Source of Funding: Nil

Ethical Clearance: Nil

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Evaluation of Operational and Financial Feasibility of Robotic Surgery in Tertiary Care Hospital

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Abstract

Health care witness new technologies frequently as there is always need to improve patient care. One of such technology emerging rapidly in surgical field is robot assisted surgery. This technology has proven its efficacy all around the world and now gaining popularity in India. Study of robotic system technology will provide benefits in health care sector. This study will focus on feasibility of robotic surgery from hospital perspective. An elaborate discussion will be done on operational and financial parameters to assess the feasibility of robotic surgery in a tertiary care hospital in Indian set up. An explorative study design based on retrospective data is used to forecast the possibility of success of robotic program in future. The associated parameters will be assessed with the use of checklist, survey and financial aspects in form of return on investment and break-even analysis. The study suggests that number of da Vinci system installed and robotic procedures done are increasing every year world-wide as well as in India. Result of this study is 100% surgeon's readiness to adopt, get trained and perform the robotic surgery. Hospital infrastructure supports robotic program with requirement of small modifications in form of dedicated uninterrupted power supply for the equipment, internet facility and plasma sterilizer. Hospital can attain positive return on investment by 7th year if 25% surgeries out of the potential cases performed through da Vinci X® every year. 731 surgeries to be performed by da Vinci X to attain breakeven point.

Keywords: *Robotic Surgery, da Vinci Robotic System, Surgical Indications, Feasibility,Robotic setup.*

Introduction

Earlier benefits of laparoscopy in form of reduced hospital stay, less postoperative pain and small incisions made this procedure, choice of surgeons for various surgeries(1). However, its limitation in form of 2-D vision camera and straight instruments made it difficult to choose this process for complex surgeries like Pancreatectomy (2). To address these limitations new technology was developed during the beginning of 21st century in form of Robotic Surgery. The number of procedures done by Robotic surgery is continuously increasing since then(3). This technology proving its efficacy all around the world including India. However, in India there is lack of evidence-based evaluation of robotic surgery especially from hospital perspective. As India is a cost sensitive country it is of utmost important to find out whether adopting this expensive technology would be viable for the hospitals or not. This study aims to explore various parameters required to implement robotic surgery and to assess their feasibility in a tertiary care hospital in Indian setup.

Method and Methodology

An Explorative study based on retrospective medical records review was carried out in a tertiary care hospital in Bangalore. Four departments - Urology, Gynecology, General surgery and Cardiothoracic surgery were included in the study. To assess the operational feasibility OT infrastructure was studied with the preparation of checklist and a survey was conducted with the use of structured questionnaire. To assess financial feasibility retrospective data of surgical volume for past three years was collected and average number of potential surgeries that can be performed through robotics was calculated in three scenarios that is worst (10%), most likely (25%) and best case (50%). For that number of surgeries ROI (Return on Investment) and Break-Even Point was calculated for Da Vinci® X.

Literature Review: Vast study has been done on robotic surgeries covering almost all aspects related to it especially the da Vinci® system its acceptance in various field of surgery, critical analysis and its cost effectiveness. Most of the studies were found from year 2002 onwards.

Since the Da Vinci® surgical system got FDA clearance, there is continuous increase in robotic procedures all round the world. Robotic surgery has been successfully implemented in several hospitals around the globe and has received world-wide acceptance[4]. Robotic system is most commonly used in Urology, Gynecology and Gastrointestinal studies[5]. Other than these, cardiothoracic surgery including coronary bypass and valve repairs, surgical oncology and pediatrics departments also using robotic system although at a lesser frequency[6].

USA leading in performing robotic assisted surgeries followed by Europe, Asia and Australia. In India first robot assisted urology procedure was done at AIIMS, new Delhi in 2006. After that the number of da Vinci® system and robotic procedures showing an increase every year[7]. If these robotic surgical systems are used across multi- specialties the cost effectiveness will be improved. Especially, in a country like India where health care is economic as compared to western countries the cost of robotic surgery will also be lesser comparatively and can promote medical tourism[8].

Planning of Robotic system in hospital starts by creating a multidisciplinary team including surgeons, nurses and administrators. Main aim of this team is to assess all components of robotic system that is surgical indications, equipment, personnel, training, facilities, operational issues, finance and marketing[9] Successful robotic program is the result of well supported infrastructure, well-coordinated robotic team and timely review of outcomes[10]. Study for robotic prostatectomy states that the high capital investment and maintenance cost can be returned by optimum utilization of the system through performing around 100-150 procedures per year per robotic system[11].

Assumptions

- As per listed surgeries in the study patient can opt for robotic surgery among all these indications
- Only the cash (General ward excluded) and private insurance patients are taken as potential candidates
- Average robotic surgery cost has been taken irrespective of clinical specialty
- All calculations done with no cost adjustment assuming all costs remain same throughout the product life
- Average increased OT time taken as 2 hours extra per robotic procedure.

Results and Analysis

Surgeon's Survey: A questionnaire was prepared for surgeon's survey aimed to find out their point of view for robotic surgery and also to get a possible percentage of patients who can opt for robotic surgery as per their opinion. From the list of 18 surgeons, 11 surgeons responded. 100% positive responses were received for adopting robotic surgery by the hospital. Majority of surgeons agreed to the better clinical outcome, surgeon's satisfaction and patient satisfaction option. Out of 11 surgeons 8 surgeons believe that Robotic will emerge as future of surgical procedures, 2 were not agree to that and 1 was not sure. For the question possible percentage of patients who may opt for robotic surgery in future, 3 out of 11 surgeons were in favor of less than 10%, 4 agreed to 10-25% and another 3 says it can be 25-50% and only one opinion was in favor of more than fifty%. Out of 11 responses 7 were in favor of option where no patient left the hospital to get robotic surgery done, 3 surgeons were coming across less than 10% cases who left the hospital to get robotic surgery done andonly 1 surgeon agreed that the percentage of such cases was around 10-50%.

OT Infrastructure: OT checklist was prepared for da Vinci® system requirements and all parameters were checked through direct visit to OT complex that has four OTs. OT-3 and OT-4 were considered suitable on basis of size and having cabinets to store consumables. OT-4 was also excluded from the study as it was dedicatedly used for orthopedic cases. OT-3 found to be the most suitable and studied further for all the other specific parameters that include electrical power points, Power backup and LAN port. CSSD facility also checked for presence of plasma sterilizer as many of robotic instruments are highly heat sensitive. OT Layout was prepared with all the physical and equipment measurements in the direct proportion of actual sizes. The OT-3 was found Spacious enough for Robotic System both in Functional and Stored state.

Modifications Required for OT are as follows:

- To establish a dedicated uninterrupted power supply source of 10KV for the system.
- Extension electrical cables for surgeon's console as there is no plug point on third wall where console can be set up.
- LAN port extension cables.
- Plasma sterilizer required in CSSD.

Financial Feasibility: To assess financial feasibility two parameters used in this study, return on investment and break-Even point. Both parameters are used for both models, da Vinci® X and da Vinci® Xi for comparative analysis and to choose the most beneficial model among them.

Formulas used:

- Break Even Point (BEP) = Fixed cost/Selling Price– Variable cost
- Return on Investment (ROI) = Net Profit/Total investment X 100

Surgical Volume: Data for 15 surgical procedures was collected for past three years from four departments-Urology, Gynecology, General Surgery and Cardiothoracic. Among all the cases, patients who paid through cash excluding those who were in general ward and patients who paid through private insurance were taken as potential candidates for robotic procedures assuming these types of patients can afford robotic surgery. The average number of potential cases per year among all the surgeries performed in past three years was found to be 501.

Various cost involved: Total revenue generation calculated by taking the potential case into consideration with an average charge of INR 300000 per robotic procedure.

Total expense calculated with the sum of acquisition cost of system, modification cost, hidden cost, training cost, maintenance and supplies cost.

Variable cost included cost of robotic consumables and OT rental for extra time taken in robotic procedure.

ROI calculation done for 3 possible scenarios: 10% (Worst case), 25% (Most likely case) and 50% (Best case) surgeries converted to robotic surgeries out of potential cases.

Table 1.0 Da Vinci® X - RO

da vinci®X	Year of Positive ROI
10% robotic procedures out of potential cases	NA
25% robotic procedures out of potential cases	7
50% robotic procedures out of potential cases	4

Table 2.0 Break Even Point

Break Even Point (da Vinci® X)	
Fixed Cost (INR)	
Acquisition cost	110000000
Supplies cost	5000000
Modification cost	4515000
Hidden cost	100000
Year 2 onwards:	
Supplies cost	5000000
Training cost	4,00,000
Maintenance cost	8000000
Total	13,30,15,000
Variable Cost (INR)	
Consumables	100000
OT rental	18000
Total	118000
Selling Price (INR)	300000
Break Even Point(Number of Surgeries)	731

Results

Infrastructure of OT 3 is best suitable for robotic surgery. Hospital CSSD department will require a plasma sterilizer as some of the instruments used in robotic surgeries are highly heat sensitive. Modification required in terms of dedicated power backup and extension of electrical and LAN port cables is feasible and comes at almost negligible cost as compare to da Vinci® System.

Surgeons of hospital are in favor of getting this technology in hospital and are ready to get trained for it. 3 out of 11 surgeons anticipate less than 10% robotic surgeries, 4 agreed to 10-25% and another 3 says it can be 25-50% and only one opinion was in favor of more than 50%.

Break Even Point as number of surgeries to be performed by da Vinci® is 731 surgeries. If robotic procedures would be 25% out of the total potential cases

which is the most likely situation, then ROI will become positive from 7th year in case of da Vinci® X.

Discussions

The number of Robotic procedures performed across India in last few years has been steadily rising. In 2013 the total number of Robotic procedures performed were 2600, in2014 it was 2800, whereas in 2015, over 4000 robotic procedures were performed in India(12). Apollo Hospital leading corporate hospital in India believes robotics will be the future of surgery. The hospital group, has invested in this technology at four of its centers, is keen to expand it to other centers(13). In the past 3-4 years there has been a steep increase in the installation of da Vinci®robotic systems across the country. In India, robotic procedures would be economic compared to robotic surgeries performed in other countries. This positive point can be used to promote medical tourism(14).

In this study percentage of possible potential cases was taken in three bands of 10%, 25% and 50% on basis of surgeon's opinion. It's an estimation of future possible cases for robotic surgery that gives an idea of approximate cash flow in worst, most likely and best scenario. Actual percentage can vary depending on patient's consent. Robotic system is expensive in terms of capital and maintenance costs, these costs could be brought down with multidisciplinary use of the system.

Break-Even Point was calculated to find out how many surgeries should be performed so that hospital achieve the state of no profit and no loss state after buying the equipment. However, as to find out the actual variable cost of the surgery other factors should be considered such as pre and post operating OT utilization time and long operating time, that can increase the variable cost and break-even point may shift towards higher number. Also, any change in supplies cost can affect the Break-even point if the surgery charges are not increased accordingly. As this study is an estimation study for robotic surgery these factors can only be taken into consideration once the robotic system is actually established in the hospital.

Return on Investment (ROI) shows how much percentage of investment is coming back and in how much time period. When ROI value started coming positive, it shows that investment has started giving profit out of it. This value is in alignment with the break-even point.

Conclusion

Study concludes that robotic surgery is emerging as well accepted technology in health care. The number of da Vinci® system installed and robotic surgeries are increasing every year world-wide as well as in India. To further spread its status in tertiary care, hospital can think to get this technology. The studied Hospital has a well-supported OT infrastructure with few modifications required, that can be made possible at a negligible cost as compared to the robotic system. Surgeons are ready to get trained to perform robotic surgery. Hospital also showed a surgical volume that is capable of providing a positive return of investment in 7th year if 25% procedures done by robotics out of the potential cases. However, there is huge capital investment, which can be returned only if hospital will be able to convert enough surgical volume to robotic procedures for optimum use of equipment.

Conflict of Interest: None

Ethical Clearance: None

Source of Funding: Self

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Artifact Elimination in Cardiac Signals Using through Circular Leaky Adaptive Algorithms for Remote Patient Care Monitoring

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Abstract

Due to aged and physically disabled persons there is necessity of wearable and wireless sensors which are the remote health care systems will observe the health condition of patient to overcome sudden deaths. Biotelemetry plays vital role to suggest patients who are at remote conditions. So that "Practical Remote Health Care Monitoring Systems" (PRHCMS) are designed and used. Mainly the scope of this is to eliminate the artifacts by giving the high motion cardiac waves from the recordings for observation. In this study various leaky adaptive algorithms are proposed for enhancement and reduction of noise parameter in ECG signal. Precisely the Circular Leaky Normalized Least Mean Square Algorithm gives the good outcome. To enhance the filtering capability normalization, leaky, circular leaky with variable step size to LMS in both time domain and frequency domain are applied. In final these all algorithms results are taken from the MIT-BIH database and these will be compared over proposed algorithms like circular leaky Normalized Least Mean Square Algorithm (CLNLMS) and Variable Step Size CLNLMS (VSS-CLNLMS). The concert of the CLNLMS algorithm is better over the LLMS algorithms with parameters like signal to noise ratio improvement (SNRI), Excess Mean Square Error (EMSE) and Misadjustment (MSD). Evaluated with all other algorithms the VSSCLNLMS results better SNRI than all other algorithms. Those values are 15.6202 db and 14.2809 db for Power Line Interference (PLI) and Electrode Motion artifacts (EM) removal.

Keywords: *Adaptive filtering, artifacts, ECG signal, Bio-telemetry and Leaky algorithms.*

Introduction

ECG resembles the visual illustration of the heart functions. If any discrepancies occur in the heart leads to the illness to the heart. From the World Health Organization and other reports [1,2,3,4] studied about the heart diseases which causes health problem to the physical body. The WHO reports studies on the heart abnormalities and they gave the clinical reports on the ECG. Such that they mainly focused on the high-resolution ECG signal in accordance with clinical reports. But at the time of measuring the ECG waves there are different artifacts like Power line interference (PLI), Electrode Motion (EM), Motion artifacts (MA), Baseline Wander (BW) and other movement artifacts are being observed. So that different techniques like empirical mode decomposition (EMD), fixed-lag kalman[5], 160μA bio-potential amplifier[6] and Baseline Wander tracking (BWT)[7] are to eliminate power line interference and the baseline wander. For the motion artifacts we utilized 3-channel bio-potential along with ASIC, capacitive coupled electrodes, an alarm gating system, portable Bluetooth device for the improvement of ECG wave and the electrode motion artifacts sternness can be minimized and in addition an innovative imaging technique like Cardiac tomography angiography (CTA) besides this a seismocardiogram (SCG)[8] used. Another artifact like Cardiopulmonary Resuscitation (CPR) can be improved. The muscle artifact in ECG can be extracted by using adaptive spectro temporal filtering

and marginalized particle-extended kalman filter (MP-EKF). For the removal of EMI and movement artifacts like Magnetic Field Gradient (MFG) and EMG the hemodynamic recording, Bayesian artifact reduction monitoring (BAGARRE-M), Adaptive Line Enhancer (ALE) and Ag-Agcl electrodes[9]are innovated which consumes less power and good signal quality.

The new method to improve the ECG signal quality, low SNR, offers perfect precision and good convergence rate with variable step size and artifact extraction can be done by Signal Quality Analysis (SQA) related to machine learning and heuristic result regulations, spectro temporal named as MD-HRV (modulation-domain HRV), modified with algebraic in combination with Elgendi's and Adapted Martinez's PT and wavelet transform (WT) give perfect P wave, an 'UNSW' QRS algorithm, QRS complex variations,Cyclostationary Source Extraction method[10] will minimize the surface EMG in ECG.Modernly the wearable Seismocardiogram (SCG) and wireless sensors with remote health care system having low power consumption and reliable battery are implemented using method like an ASIC and magnitude as 30μV and a power consumption of 58nW, a lossy compression technique SURF, a subject adaptive unsupervised signal compressor[11] and characteristic tracking method for pre-ejected period (PEP) earlier and stationary wavelet transform (SWT), a contactless dry and non-contact bio-potential skin electrodes[12,13], flexible poly-dimethylsiloxane (PDMS) dry electrodes done on rats,a low-complexity technique for taking out fiducial points from ECG, protocol named fast link exchange, minimum cost forwarding (FLE-MCF) communication and the pulse oximeter oxygen saturation (SpO_2). Recently studies gone through capacitive coupling[14] which are wireless and wearable with unremarkable physiological observation for removal of noise efficiently and effectively[15] which works under brain computer interface, a microwave related Microwave stethoscope[16] (MiSt), analog signal processor (ASP), mechanized BP meter, middle cerebral artery occlusion (MCAC)[17]and various classifiers to find out the brain activities is the multivariate pattern analysis[18] (MVPA)result in improvement of ECG signal with less computations and complexity.Adaptive signal enhancers (ASE) like Block Based SRNLMLS (BB-SRNLMLS) are designed to improve SNRI and EMSE with better filtering capability and mechanized techniques to remove the single and combined noises included in ECG automatically.

Adaptive Artifact Cancellers for ECG Enhancement: The Figure 1 explains the artifacts removal in the ECG signal. Figure 1 resembles a filter with a primary input as a_1 and the noise like b_1 is added to it whereas the allusion input is noise b_2 is correlated with noise b_1. If the filter result is said as f and the filter error as $r= (a_1+ b_1) – s$, then the equation can be written as

$$r^2 = (a_1+ b_1)^2 – 2s (a_1+ b_1) +s^2$$

$$= (b_1-s)^2 + a_1^2 + 2 a_1 b_1 - 2s a_1 \quad (1)$$

Therefore, signal and noise are uncorrelated functions, such that the mean squared error (MSE) can be represented as

$$E [r^2] = E [(b_1-s)^2] + E [a_1^2] \quad (2)$$

Reducing the MSE results in a filter error performs the best least – squares estimate of the signal a_1. The adaptive filter extorts the signal a_1, a noise free signal.

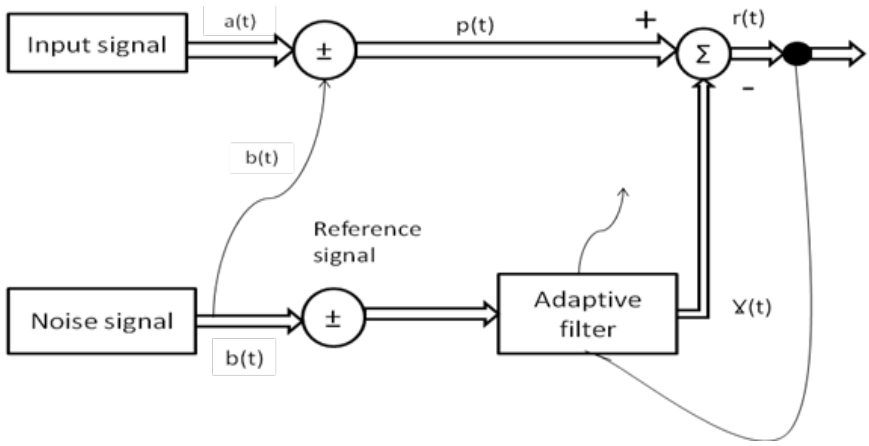


Figure 1: Fundamental adaptive noise canceller arrangement

In the second case the noise b_1 will be extorted. From equation (1) we can write it as

$$E[r^2] = E[(a_1\text{-}s)^2] + E[b_1^2] \quad (3)$$

Reducing the MSE effects the filter output f which is estimation of mean square signal a_1.

In this paper the LMS algorithm with transversal filter composition can be written as

$$h_{t+1} = h_t + 2\alpha r_t X_t \quad (4)$$

Where $h_t = [h1_t, h2_t, \ldots\ldots. hi_t, \ldots. hm_t]^T$ are the filter weights at time t, $X_t = [X1_t, X2_t, \ldots. Xi_t, .Xn_t]^T$ is the input vector at time t, the parameter p_t is the desired primary input, s_t is the filter output.

$$r_t = p_t - s_t \quad (5)$$

The constraint α defined to generate the convergence rate, the higher the value the larger is its convergence as $1/(4\alpha\text{Ɛ})$ where Ɛ is the greatest eigen value. If the convergence rate exceeds then there is a limitation of misadjustment and also not having stability, $1/\text{Ɛ} > \alpha > 0$.

Proposed Technique: In extension to LMS algorithm some more adaptive algorithms are introduced those are Leaky Least Mean square (LLMS) algorithm with excess weights flow generation and less stability, good performance with reasonable precision so it points to technique like NLMS at which the wished step size and good convergence rate can be achieved so we added the Leaky and Normalization to forms as Leaky NLMS which overcome the limitations in NLMS with limited weights. But it has a problem of high cost, as result CLNLMS along with Variable Step Size CLNLMS is considered. The constraints like convergence rate, Misadjustment and stability will monitor by the step size constraint α.

From equation (4) further the LLMS equation can be written as

$$h_{t+1} = (1\text{-}\alpha\gamma)\, h_t + \alpha\, X(t)\, r(t) \quad (6)$$

Where ɣ is the positive constraint, the larger the ɣ value it reduces the weight drift problem.

From the Equation (4) the NLMS can be explained as

$$h_{t+1} = h_t + \alpha\, r(t) \frac{X(t)}{||X(t)||^2} \quad (7)$$

Where $\alpha(t) = \alpha\, ||X(t)||^2$ (8)

The above equation can be rewritten as

$$h_{t+1} = h_t + \alpha(t)\, r(t)\, X(t) \quad (9)$$

Furthermore, applying both the Leaky and Normalization to LMS (LNLMS) that can be written as

$$h_{t+1} = (1\text{-}\alpha\gamma)\, h_t + \alpha\, r(t) \frac{X(t)}{||X(t)||^2} \quad (10)$$

By substituting equation (8) in (10) it can be rewritten as

$$h_{t+1} = (1\text{-}\alpha\gamma)\, h_t + \alpha(t)\, r(t)\, X(t) \quad (11)$$

The multiplications and additions are maximum reduced because of both leaky and normalization applied to the LMS algorithm.

The filtering and weight stabilization of CLNLMS with finite number of filter weights of W and changed in equation (12) also leakage factor is applied to one weight at a time t, and this procedure continues in a circular form iteratively.

$$h_{t+1} = \phi_t\, X(n\text{-}t) + h_t\, (K\text{-}\, \alpha(t)\, h_t\, r(t)\, r(t))$$

$$\text{Where } \alpha = \begin{cases} 0.00001 & if\ |ht\ r(t)| < \sigma \\ 0 & otherwise \end{cases} \quad (12)$$

At which ϕ is the adaption factor and σ is small positive invariable and its value is 0.00004.

The projected algorithm has few changes to weight adaption factor ϕ_t those are (1)error signal r sends through the deviation limiter (2) the given key power is utilizing long term average (3) this varies the fixed step size to variable step size. So that $\phi_t(t)$ is

$$\phi_t(t) = \left(\frac{\propto_t(t)}{y_x(t)} \frac{y_{mod}(t)}{y_x(t)} b'(n)\right) \quad (13)$$

From above equation (12), $\propto_t (t)$ is variable step size and proportional to leakage constraint ɣ(t), $y_{mod}(t)$ is the customized error signal by deviation limiter, $y_x(t)$ is the long term average of de-correlated noise signal and $b'(n)$ is the reference signal.

The fixed variables such as the smoothened preceding error $y_y(t)$, long term average of the error signal $y_u(t)$, long term average of the filter input key

$y_z(t)$, and learning accelerate counter j(t) denotes number of times the weights are iterated. The deviation limiter and the probability of Long -Term Averages releases the outcome as

Deviation Limiter:

$$y_{mod}(t) = \text{sign}(r(t)) \min(\gamma_0 y_y(t), |y(t)|) \quad (14)$$

$$h(b) = \begin{cases} y_y(t), & if\ (b'(t) = 1) \\ \gamma_2 y_y(t) + \gamma_1 |y(t)|, & \text{if } (\gamma_0 y_y(t) \le |y(t)|) \\ \gamma_2 y_y(t) & elsewhere \end{cases}$$

Finally, VSSCLNLMS explained in the flowchart as given below

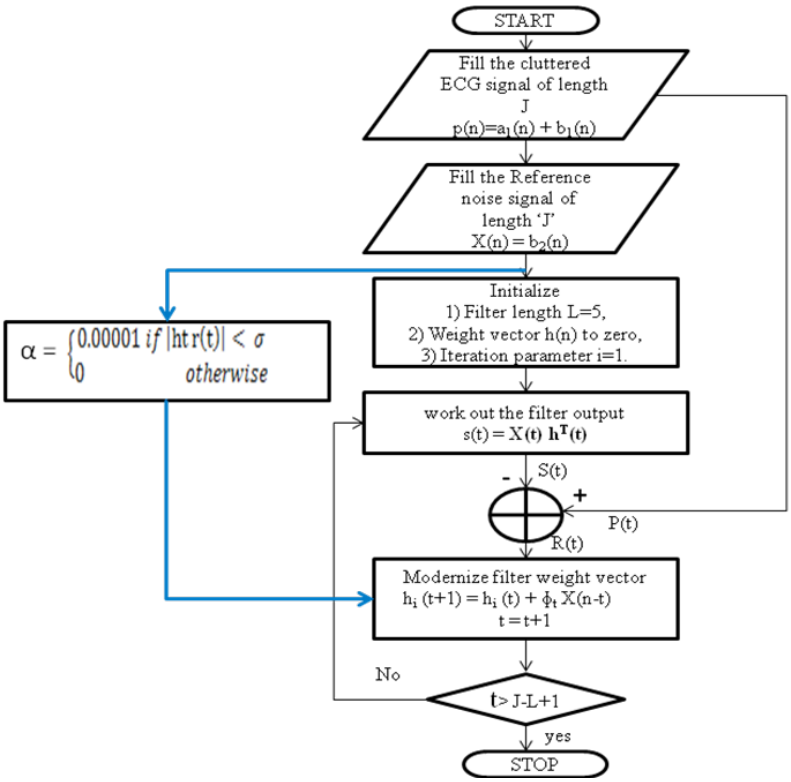


Figure 2:The flow chart of VSSCLNLMS related adaptive noise canceller

The probability of Long-Term Averages:

The long-term averages produce the equation as:

$$y_u(t) = y_u(t-1) + \gamma_4 (|\, y(t)\,| - y_u(t-1)) \quad (15)$$

$$y_p(t) = y_p(t-1) + \gamma_4 (|\, p(t)\,| - y_p(t-1)) \quad (16)$$

$$y_i(t) = y_i(t-1) + \gamma_4 (|i(t)\,| - y_i(t-1)) \quad (17)$$

Where, γ_4 is a constant and its value is (1/(A+1)). The convergence of the artifact elimination are monitored by the leakage constraint $\gamma(t)$ and it produce the equation as

$$\gamma(t) = \frac{y_u(t)}{y_p(t)} \quad (18)$$

Results and Discussions

In this paper we focused on the non-physiological noises like PLI and EM removal from the ECG and aimed to filter ECG. In detail we related with four adaptive techniques like LMS, NLMS, CLNLMS and VSS-CLNLMS and their waveforms are visualized in the Figures 3-4. The output waveforms in accordance with data 105 are studied.From the Figures 3-4 we attained the more positive outcome and the error free ECG signal at VSS-CLNLMS. Tables 1-3give the concert of techniques in terms of SNRI, EMSE, and MSD. According to our researches the VSSCLNLMS performs better when compared to another algorithm.

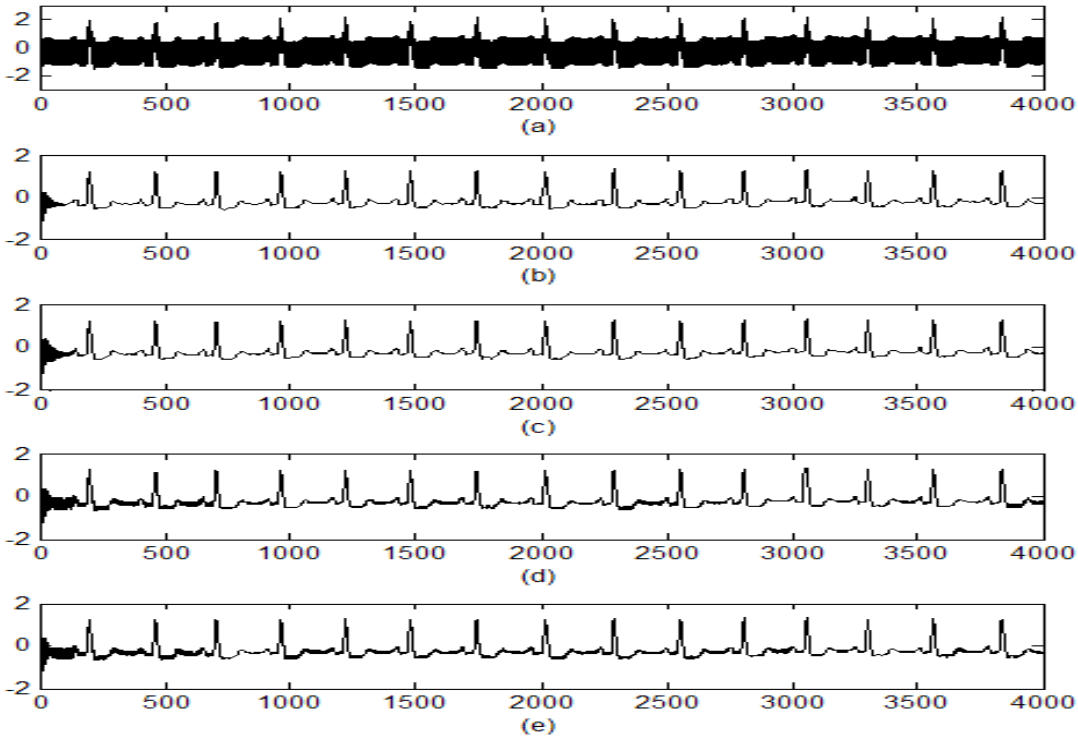


Figure 3:Distinctive filtering outcomes for PLI artifact removal utilizing the information of normalized adaptive filtering algorithms: (a) ECG signal effected by PLI, (b) improved signal using LMS algorithm,(c) improved signal utilizing NLMS algorithm, (d) improved signal utilizing CLNLMS algorithm,(e) improved signal utilizing VSSCLNLMS algorithm.

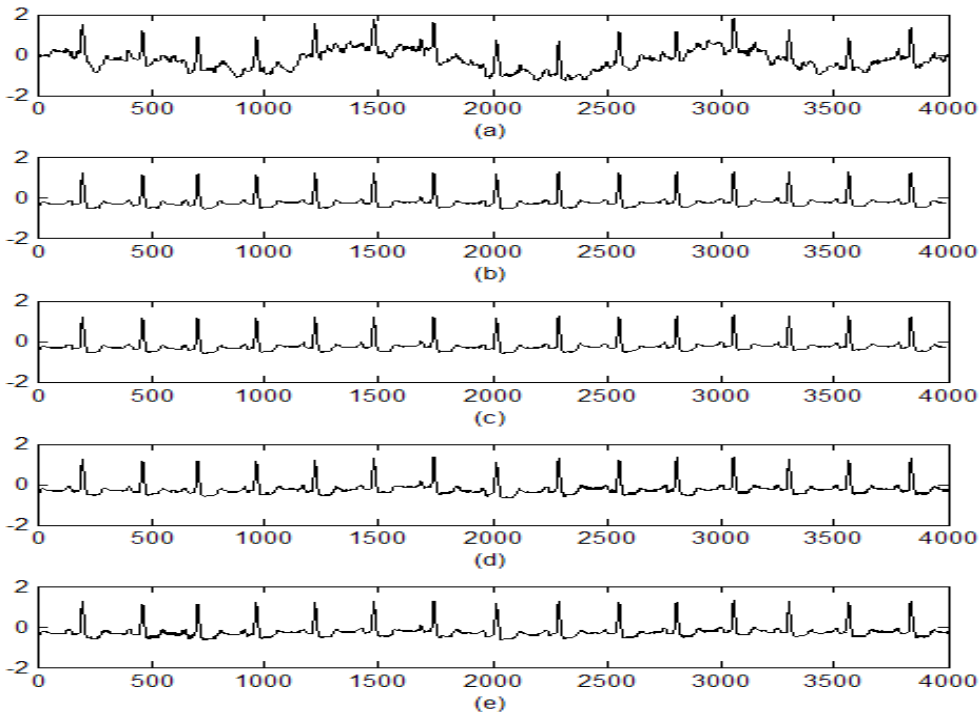


Figure 4:Distinctive filtering outcomes for EM artifact removal utilizing the information of normalization adaptive filtering algorithms: (a) ECG signal effected by EM, (b) improved signal utilizing LMS algorithm,(c) improved signal utilizing NLMS algorithm, (d) improved signal utilizing CLNLMS algorithm,(e) improved signal utilizing VSSCLNLMS algorithm.

Viewing above Figures 3-4 the noise in the signal gets minimized additionally in VSSCLNLMS algorithm, compared to other algorithms. Moreover, from the below Tables 1-2 we studied majorly the PLI and EM are non-physiological signals and worked out utilizing the SNRI and EMSE concert measures.

Table: SNRI assessment for several algorithms in ECG signal improvement procedure (In dBs)

Artefact Type	Data Number	LMS	NLMS	CLNLMS	VSSCLNLMS
PLI	101	7.7789	9.7768	13.7865	15.6798
	102	7.8287	10.8983	11.9627	14.9867
	103	7.9257	11.9978	12.9297	16.9227
	104	7.7184	9.9697	10.7887	13.6553
	105	7.9654	11.7986	14.5236	16.8565
	Average	7.8434	10.8882	12.7982	15.6202
EM	101	3.8657	7.8654	9.8726	13.9986
	102	3.5236	8.6297	10.1965	14.3576
	103	3.8698	8.9234	11.5786	13.7645
	104	3.9247	9.9432	12.7965	13.7864
	105	3.9868	9.9342	13.6987	15.4978
	Average	3.8341	9.0591	11.6285	14.2809

Table 2: EMSE assessment for several algorithms in ECG signal improvement procedure (In dBs)

Artefact Type	Data Number	LMS	NLMS	CLNLMS	VSSCLNLMS
PLI	101	-18.8346	-36.8645	-39.1269	-40.8967
	102	-17.5327	-35.6732	-38.8967	-39.9265
	103	-19.7898	-37.9247	-39.9247	-41.2456
	104	-20.9237	-37.8962	-40.8962	-42.9762
	105	-21.9986	-38.3693	-41.5726	-43.5267
	Average	-19.8158	-37.3455	-40.0834	-41.7143
EM	101	-8.6236	-10.9762	-19.5273	-20.3962
	102	-9.9675	-12.3826	-20.2543	-20.9321
	103	-10.3248	-13.2453	-21.4823	-23.2636
	104	-10.6527	-13.6237	-21.4567	-23.2698
	105	-10.7349	-13.6584	-21.8654	-23.6754
	Average	-10.0840	-12.7772	-20.9172	-22.3074

Consequently, the VSSCLNLMS gives the enhanced outcomes evaluated with the supplementary adaptive techniques and also verified them from the Figures 3-4 and from the concert measures as shown in the Tables 1-2.

Conclusions

In this proposal, noise extracted more by the leaky and normalized algorithms in both time and frequency domains. The method like LMS, NLMS, CLNLMS and VSSCLNLMS are progressed for ECG noise extraction. We attained fast convergence and fewer computations due to the circular based algorithms. The SNRI, EMSE and MSD results are visualized in Tables 1-2. From the Figures 3-4 PLI and EM can be extracted efficiently because of VSSCLNLMS when differentiated with LMS and their variants. In our researches, for the PLI removal, the VSSCLNLMS reaches higher SNRI as 16.8565 dBs, for EM removal 15.4978 dBs.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: My research article what

we have written is completely self-depended which enrolls complete research depended on the prototype of each individual so it doesn't match any other research proposals/research persons.

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Effect of Pranayama (Alternative Nostril Breathing) on Physiological Outcomes among Elderly with Hypertension in Selected Old Age Homes at Mangaluru

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Abstract

Hypertension is a silent killer" is the indication of different cardiovascular disorders. Hypertensions become a greater global burden in the next 15 - 20 years. Hypertension is an important and growing major public health challenge in worldwide. If one believes that 'old is gold', then pranayama is quite effective and widely used to decrease blood pressure, respiration, pulse rate. Yoga is becoming most popular science due to its positive effects on health. Pranayama require inhaling and exhaling through alternative nostril selectively. When each respiratory cycle is completed through the alternative nostril, the practice is called Nadishodana pranayama, which means a 'heat dissipating or cooling breathing practice'.

Aims of study: The present study has been carried-out to assess the effect of pranayama on hypertensive patients.

Material and Method: 60 hypertensive patients who were on regular treatment took part in the study. A baseline record (which served as control) of pulse rate/min, systolic blood pressure (mmHg), diastolic blood pressure (mmHg) respiration were recorded. They carried out ANB for 5-15 minutes and all parameters were recorded again every 3rd, 6th, 9th, 12th day. ANNOVA and unpaired t test was used as the statistical tool to analyse the acquired data.

Results: This study indicates that p value < 0.05 and BP, respiration, and pulse rate can be decreased. Hence, this technique can be used as a regular practice for combating the stress and strain of everyday life

Conclusion: The findings of the study showed that pranayama therapy was effective to reduce the physiological outcomes among elderly with hypertension

Keywords: *Pranayama, physiological outcomes, elderly with hypertension.*

Introduction

Ageingis a vital part of life and brings along two inconvenient events: physiologic decline and disease state. According to geriatric age group grading, 55-66 years, 65-67 years, above 75 years are graded as grade 1, grade 2, and grade 3 respectively. Despite rise in blood pressure (BP) is not a normal part of ageing; the incidence of hypertension in the elderly population is high. After the age of 69 years, the prevalence of hypertension rises to 50%. The systolic blood pressure and diastolic blood pressure increase with age. Systolic blood pressure rises progressively until the age of 70 or 80 years, whereas diastolic blood pressure increases until the age of 50 or 60 years and then tends to level or even decline slightly. This combination of changes probably reflects stiffening of the blood vessels and reduced arterial compliance.[1]

The normal blood pressure is generated in the circulation by pumping action of the heart (cardiac output) and resistance offered by the blood vessels that is commonly known as peripheral resistance. There are numerous determinants and variables which influence both cardiac output and peripheral resistance.

Hypertension is the end results of several adjustments the body makes in response to small, unnoticed disturbance in one or more determinants of cardiac output and peripheral resistance.[2]

Primary hypertension was previously called as, "essential hypertension" because of a long-lasting view that high pressure was sometimes "essential" to perfuse diseased and sclerotic arteries. When the disturbance taking place in the cardiac output, peripheral resistance or both and it will continue without any interval, in the end the blood pressure become permanent and it is called as "essential hypertension" that is, about 90%. [3]

The remaining 10% are termed "secondary hypertension" for which specific movements for the blood pressure elevation can be seen. When any one of the numerous factors influencing normal blood pressure is upset to the extremes, it alone can manifest as hypertension. Primary hypertension is remarkably common in the UK population and the prevalence is strongly determined by historic period and lifestyle components.[4]

Material and Method

The data collection was done from 10/01/2018 to 25/01/2018. Formal permission was obtained from the authority to conduct the study. As per the inclusion and exclusion criteria, samples were selected using non probability purposive sampling technique. Samples from selected old age homes were chosen as experimental group and control group. obtained consent from the subjects followed by an interview schedule to obtain the demographic data and pre test physiological outcomes (blood pressure by sphygmomanometer, pulse and respiration by manually).The experimental group practiced pranayama and those in the control group did not. Pranayama was taught to the experimental group. Post test physiological outcome was assessed in all 60 subjects on 3rd, 6th, 9th, and 12th, day during intervention period.

Statistics

Chi-square test, Unpaired 't' test. and ANNOVA

Section IV: Effect of pranayama on physiological outcomes

This section deals with the effectiveness of pranayama on physiological outcomes among elderly with hypertension. In order to test the statistical significant difference between the mean pre-test and mean post-test pain scores the following are stated

Table 1: Mean, SD, F Value and p value for Pre-test and different Post-test score on systolic blood pressure among experimental group. n =60

Observation	Experimental group		F value	p value	t value
	Mean	SD			
Pre-test	138.2	5.93			
Post test 1	135.8	5.30			
Post-test 2	133.5	5.24	89.622	<0.001*	2.42
Post-test 3	131.8	4.25			
Post-test 4	130.2	4.18			

$F_{(89.62)} = 2.42$; $p<0.05$ *significant

Table 2: Mean, SD, F Value and p value for Pre-test and different Post-test score on systolic blood pressure among control group. n =60

Observation	Control group		F value	p value	t value
	Mean	SD			
Pre-test	140.6	8.98			
Post test 1	141.3	7.78			
Post-test 2	141.9	6.43	1.467	0.240	2.42
Post-test 3	141.9	5.11			
Post-test 4	142.2	4.79			

F(1.467) =2.42; p>0.05, level of significant

Table 3: Bonferroni test showing significant difference in systolic blood pressure during pre-test and post-test scores among elderly in experimental group. n =30

Observation	Mean difference	SE	P value
Pre-test and post test day 1	2.433	0.310	<0.001*
Pre-test and post test day 2	4.667	0.443	<0.001*
Pre-test and post test day 3	6.433	0.546	<0.001*
Pre-test and post test day 4	8.033	0.718	<0.001*
Post-test day 1 and post-test day 2	2.233	0.290	<0.001*
Post-test day 1 and post –test day3	4.000	0.455	<0.001*
Post-test day 1 and post test day 4	5.600	0.590	<0.001*
Post-test day 2 and post-test day 3	-2.233	0.290	<0.001*
Post-test day 2 and post –test day4	1.767	0.397	<0.001*
Post-test day 3 and post-test day 4	1.600	0.324	<0.001*

p<0.05 level of significance * significance

Table 4: Mean, SD, F Value and p value for Pre-test and different Post-test score on diastolic blood pressure among experimental group n =30

Observation	Experimental group		F value	p value	t value
	Mean	SD			
Pre-test	83.5	6.3			
Post test 1	81.7	6.4			
Post-test 2	78.9	6.1	168.722	<0.001*	2.42
Post-test 3	77.0	5.6			
Post-test 4	74.2	5.1			

F(168.722) =2.42; p<0.05 * significance

Table 5: Mean, SD, F Value and p value for Pre-test and different Post-test score on diastolic blood pressure among control group. n =30

Observation	Control		F value	p value	t value
	Mean	SD			
Pre-test	86.1	7.8			
Post test 1	86.2	7.9	2.266	0.05*	2.42
Post-test 2	87.1	7.0			
Post-test 3	87.7	5.0			
Post-test 4	88.0	4.6			

F (2.266) =2.42.; P>0.05 * significant

Table 6: Bonferroni test showing Significant Difference in diastolic blood pressure Pre-test and Post-test scores among elderly in experimental group. n =30

Observation	Mean difference	SE	p value
Pre-test and post test day 1	1.833	0.167	<0.001*
Pre-test and post test day 2	4.600*	0.265	<0.001*
Pre-test and post test day 3	6.500	0.386	<0.001*
Pre-test and post test day 4	9.300*	0.620	<0.001*
Post-test day 1 and post-test day 2	2.767*	0.252	<0.001*

Observation	Mean difference	SE	p value
Post-test day 1 and post –test day3	4.667*	0.366	<0.001*
Post-test day 1 and post test day 4	7.467*	0.628	<0.001*
Post-test day 2 and post-test day 3	1.900*	0.232	<0.001*
Post-test day 2 and post –test day4	4.700*	0.440	<0.001*
Post-test day 3 and post-test day 4	2.800*	0.376	<0.001*

p<0.05 level of significance * significance

Discussion

Findings of the study are discussed under the following sections

Section 1: Demographic characteristics.

Section 2: Effectiveness of pranayama on physiological outcomes.

Section 3: Association between pre test levels of physiological outcomes with the selected demographic variables.

Major findings of the study

Section 1: demographic characteristics

- In this study, age of the samples ranged between 60-80 years and majority (50%) of them were in the age group of 66-70 years in experimental group and (40%) samples were in the age group of 71-75 years in control group.
- Majority of the samples are males in both experimental groups (53.3%) and in control group (73.3%).
- The majority (33%) of the samples had secondary education in experimental group and, (43%) had primary education in control group.
- Majority of the samples follow Christian religion in both experimental group (70%) and control group (66.7%).
- In experimental group all the samples had 100% supports from family and control group (86%) of the samples had support from the family.
- Most of the samples are non vegetarian in both experimental group (70%) and in control group (66.7%).

Section II : Effectiveness of pranayama on physiological outcomes

- The present study result shows that the pranayama has an effect on physiological outcomes (such as BP, pulse, respiration) among elderly.
- The pre-test and post-test score of systolic blood pressure in experimental group shows that, there is a significant difference (p<0.05)between mean pre-test (138.2) and mean post-test4 (130.2) score. This indicates, pranayama was effective in reduction of systolic blood pressure among elderly.
- ANOVA test shows that in experimental group the calculated value (89.622) was more than table value (2.42) at 0.05 level of significance, hence pranayama was effective in reduction of systolic blood pressure among elderly.
- The pre-test and post-test score of systolic blood pressure in control group shows that there is no significant difference (p>0.05) between mean pre-test (140.6) and mean post-test 4 (142.2) score. This indicates, in control group there was no reduction of systolic blood pressure among elderly.
- ANOVA test shows that in control group the calculated value (1.467) was less than table value (2.42) at 0.05 level of significance, hence in control group there was no reduction of systolic blood pressure among elderly.
- The pre-test and post-test score of diastolic blood pressure in experimental group shows that there is a significant difference(p <0.05) between mean pre-test (83.5) and mean post-test 4 (74.2) score. This indicates, pranayama was effective in reduction of diastolic blood pressure among elderly.
- ANOVA test shows that in the experimental group, the calculated value (168.722) was more than the table value (2.42) at 0.05 level of significance hence pranayama was effective on reduction of diastolic blood pressure among elderly.
- The pre-test and post-test score of diastolic blood pressure in control group shows that there is no significant difference (p>0.05) between mean pre-

test (86.1) and mean post-test 4 (88.0) score. This indicates, in control group there was no reduction of diastolic blood pressure among elderly.

- ANOVA test shows that in the control group,, the calculated value (2.226) was less than the table value (2.42) at 0.05 level of significance, hence in control group there was no reduction of diastolic blood pressure among elderly.

Section 2: Association between pre test level of physiological outcomes and selected demographic variables

In the present study researcher found that there is an association between physiological outcome and selected demographic characteristics such age (p=0.036) hobbies and interest (0.05) Duration after diagnosis (0.001). The obtained p values are <0.05, Hence there is an association between selected demographic variables and physiological outcome.

Conclusion

The entire process of carrying out the present study was an enriching experience to the investigator. It helped in exploring and improving the knowledge and ability of the researcher and the respondents. This has helped to compare the effectiveness of pranayama on physiological outcomes among elderly with hypertension

Financial Support and Sponsorship: Nil.

Conflicts of Interest: There are no conflicts of interest.

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Effect of Training Programme on Quality of Life among Postmenopausal Women: An Intervention Study

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Abstract

Objective: Menopause is the permanent cessation of menstruation. Majority of women suffering with severe menopausal symptoms which in turn affect their health related QOL. The purpose of this study is to evaluate the effect of 12 week training programme on quality of life among postmenopausal women.

Design: A true experimental design was used for the study. 250 women were randomly selected, 125 in study group and 125 in control group

Measures: The tool used for the study were Structured questionnaire on demographic information and standardized MENQOL-I to assess the quality of life. Study group underwent 12 week training programme. Post test was conducted with the same questionnaire.

Results: A positive change in all domains in the study group was observed after the training but in the control group the mean digfference remains the same.

Conclusion: The overall well being and quality of life is a major public health concern.This study highlights the omportance of physical activity to improve the quality of life among postmenopausal women.

Keywords: *QOL,Exercise, Yoga and MENQOL-I.*

Introduction

Menopause is a natural phenomenon which marks the permanent cessation of reproductive fertility. According to Indian Menopause Society, by 2016 the estimated people over 60 years is 173 million, and the menopausal population is 103 million. Average age of menopause in Indian women is 47.5 years with life expectancy of 71 years. With the increase in life expectancy women spend almost one third of their life during menopause. Women may experience many symptoms due to lot of hormonal fluctuations in postmenopausal periods. The common symptoms are hot flushes and night sweats, problems with vagina and bladder, changes in sexual desire,sleep problems and mood changes which affect their personal and psychosocial quality of life.[1]

QOL has been defined by the WHO as the 'Individual's perception of their position in life in the context of the cultural and value systems in which they live and in relation to their goals, expectations, standard and concerns'. Health related quality of life is usually lower in postmenopausal women when compared to middle aged men and young adults. Menopausal aged women report a low physical activity and sedentary lifestyle which deteriorate their health and quality of life. Controlled and regular physical activity was significantly correlated with a positive change in vitality and mental health.[2]

Karmakar et al found that most reported psychosocial symptoms were feeling of anxiety and nervousness (94%) and depression (88%), vasomotor symptoms were hot flushes (60%) and sweating (47%), physical symptoms include decrease in physical strength and lack of energy (93%) and 26% have vaginal dryness. Complementary therapies such as life style modifications,yoga and exercises play a vital role in the management of menopausal symptoms. Deriving from ancient Indian philosophy, yoga includes physical postures as well as spiritual practice with the goal of unity of mind and spirit. Yoga interventions help to decrease anxiety, distress, blood pressure, pain and fatigue. A

systematic review with randomized controlled trials shows the evidence of short term effectiveness of yoga for psychological symptoms in menopausal women.[3]

Lunny and Fraser evaluated the effect of complementary and alternative therapies in menopausal women. Majority were reported that they are using different approaches such as vitamins (61.5%), relaxation techniques (57%), yoga (37.6%), soy products (37.4%) and prayer (35.7%) for their symptoms. Among that prayer, relaxation techniques, counseling therapy and therapeutic touch were reported more effective complementary and alternative therapies.[4]

A study was conducted to assess the effect of yoga technique on treatment of menopausal symptoms at the Babol Medical University, Iran. A total of 47 postmenopausal women aging 45-63 years participated in a 12 week restorative yoga intervention. During the study the subjects practiced breathing techniques, postures and relaxation poses three times a week for one hour. Significant pre to post test improvement were found for total scores on menopause questionnaire. subjects had decrease in hot flush, 28.4% of subjects anxiety reduced, 57.3% of subjects joint pain and 56.1% 0f subjects muscle pain reduced. The researcher concluded that yoga is a powerful technique that can help menopausal women accept and nourish the inevitable change of life.[5,6,7]

However there is minimal literature available on QOL in Indian postmenopausal women and the women are less aware about the menopausal symptoms and its management. So there is a need to address the QOL especially in rural areas by using a complementary approach to alleviate the postmenopausal symptoms. The present study evaluated the effect of 12 week training programme on QOL among postmenopausal women.

Materials and Method

A true experimental study was conducted in Karadivavi health centre, which is a rural area in Coimbatore district, Tamilnadu. It covers 14 villages from that 8 villages were selected by lottery method. During second phase a list of addresses for all women aged 46-60 years was obtained from the health centre and women who fulfill the inclusion criteria were selected by lottery method.

Sample size was calculated based on pilot study and also by power analysis prior to the commencement of the study. The estimated sample size was 113, by considering 10% attrition the sample size was rounded to 125 in each group. So the total sample size was 250, 125 in study group and 125 in control group. Women who are mentally challenged, women with medically or surgically induced menopause, women who used hormone replacement therapy were excluded. Women aged between 46 to 60 years of age one year after menopause were selected for the study. After obtaining the consent, information was collected by face to face interview, each interview lasted 10-15 minutes.

Initially demographic data and QOL data were collected using structured questionnaire. After the pretest a 12 week training programme were conducted for the menopausal women in a public hall to the study group. The training programmes include physical exercise and yoga and it was demonstrated by the investigator. After one week intensive training, the reinforcement sessions were conducted three days in a week for 12 weeks. Control group received no intervention. At the end of the study QOL was assessed using the same questionnaire both in study and control group.

Ethical Considerations: Formal approval was obtained from the Institutional ethical committee and official permission was obtained from the medical officer of karadivavi health center and panchayat presidents at selected villages. Written informed consent was obtained from the postmenopausal women. The objectives, practices, goodness, problems and the time period and the confidentiality were explained in the consent form.

Data Collection: Data's were collected by using a predesigned questionnaire which comprises two sections. Section 1- Demographic information which includes age, marital status,religion and obstetrical variables. Section 2- standardized Menopause Specific Quality of life Questionnaire (MENQOL-I) intervention version by John R. Hildich to assess the quality of life in postmenopausal women. Formal permission was obtained from the Mapi trust to use this scale in the present study. It was initially written in English, and then translated in to Tamil and then back to English for validation. It was checked and pretested for clarity and suitability in a small pilot study for 10 women. MENQOL-I contains 29 items under four domains such as vasomotor, psychosocial, physical and sexual domain. The severity ranges from 0 (No) to 6 (severe). The overall questionnaire score is the mean of the domain means.

Description of Training session: Study group underwent a training session under the supervision of investigator. The programme consists of the following

1. Physical exercises which includes Head to foot exercises and Kegel's exercises 5 times for 5 minutes.
2. Yogasanas (Swastikasana, Vajrasana, Tadasana and Savasana) for 25-30 minutes
3. Breathing exercises for 5-10 minutes

After one week of intensive training for two hours per day women practiced yoga in their home for 40-45 minutes a day. Reinforcement session was given to them for three days in a week for 12 weeks under the supervision of the investigator. A practice dairy was used to confirm the regular practice and a booklet was distributed to them which explains the life style modifications and detailed steps of training sessions. Control group received no intervention. But after the completion of the study they also underwent the training programme for 5 days.

Statistical analysis: Statistical package for the social sciences version 16 were used for data analysis for a level of statistical significance 5% with the help of qualified statistician. Data was analyzed by using descriptive and inferential statistical method. Frequency, percentage distribution, mean and standard deviation were used for the assessment of demographic variables and QOL. The student independent t-test was used to compare the values between study and control group.

Result

250 women were recruited for the study. After randomization 125 were allocated in the study group and 125 to the control group. The baseline characteristics of the postmenopausal women were shown in Table 1. The mean age of all participants was 51±3.82. most rural post menopausal women were married(96.8%), had menarche at the age of 10-13 years (64.8%), post menopausal duration was 5-10 years(37.65), had normal weight (56.8%) and ideal B.P (75.2%).

Table I: Demographic characteristics of postmenopausal women

Variables	Study group		Control group	
	Count	Percent	Count	Percent
Age				
46-50	41	32.8	40	32
51-55	47	37.6	45	36
56-60	37	29.6	40	32
Marital status				
Married	121	96.8	121	96.8
Unmarried	0	0.0	1	0.8
Widow	4	3.2	3	2.4
Age at Menarche				
<10	18	14.4	17	13.6
10-13	81	64.8	84	67.2
14-16	26	20.8	24	19.2
Post Menopausal Duration				
<5yrs	41	32.8	49	39.2
5-10 yrs	47	37.6	45	36.0
>10yrs	37	29.6	31	24.8
BMI				
Underweight	16	12.8	16	12.8
Normal weight	71	56.8	76	60.8
Over weight	38	30.4	33	26.4
Blood pressure				
Low	5	4.0	3	2.4
Ideal	94	75.2	94	75.2
Pre high BP	26	20.8	28	22.4

Table II presents the mean scores of each domain in both study group and control group before training programme. The mean scores in the study group were vasomotor 5.1, psychosocial 4.0, physical 3.7, sexual 3.8 and in the control group vasomotor 4.9, psychosocial 4.1, physical 3.7 and sexual 3.8. the differences between both the groups were small.

Table II: Mean QOL scores in postmenopausal women before training programme

QOL Domain	Study group Mean±SD	Control group Mean±SD	P value (t test)
Vasomotor	5.1±1.0	4.9±1.0	0.190
Psychosocial	4.0±0.5	4.1±0.5	0.507
Physical	3.7±0.3	3.7±0.3	0.837
Sexual	3.8±0.7	3.8±0.7	0.771
Overall quality of life	4.1±0.3	4.1±0.3	0.626

Table III: Mean QOL scores in postmenopausal women after trainingprogramme

QOL Domain	Study group Mean ±SD	Control group Mean ±SD	P value (t test)
Vasomotor	1.9 ±0.6	4.9±1.0	0.000*
Psychosocial	1.4±0.3	4.1±0.5	0.000*
Physical	1.5±0.1	3.7±0.3	0.000*
Sexual	1.7±0.4	3.8±0.7	0.000*
Overall quality of life	1.6±0.2	4.1±0.3	0.000*

*significant at 0.01 level

Table III summarizes the mean changes in QOL in study group and control group after 12 week of training programme. A positive change in all domains in the study group was observed and in the control group the mean difference was remains the same. In all the domains mean changes in QOL score was statistically significant.

Discussion

The present study clearly demonstrates the effect of 12 weeks training programme on quality of life among postmenopausal women. During menopause women experience severe and multiple symptoms and it affects their quality of life. Hormonal therapy is the effective treatment but it can cause complications including malignancy. The benefits of regular physical activity and yoga are frequently cited and it is associated with higher QOL scores.

In a quasi experimental study the effect of Group counseling on QOL among postmenopausal women were tested. 80 postmenopausal women were randomly selected and allocated to case and control group. Pretest was conducted before the intervention. Three months after intervention information were collected from both the groups. Before the intervention, mean ± standard deviation for QOL in case group was 101.2 ± 31.4 and it was significantly decreased to 96.9 ± 27.0 after intervention ($P< 0.05$). While no significant change was observed in the control group (from 98.9 ± 35.5 to 102.3 ± 35.0, $P = 0.443$). Symptoms of physical ($P = 0.033$) and sexual ($P< 0.001$) dimensions significantly decreased in the case group. While significant increase was observed in terms of psychosocial ($P = 0.049$) and sexual symptoms in control group.[8]. Likewise the present study also shows that QOL in postmenopausal women was significantly improved in all the domains after practicing 12 weeks training programme.

The overall mean score was 4.1 in both study group and control group before training programme. But the mean gain score in the study group 1.6 versus 4.1 in the control group. This shows that the training programme was effective in improving the quality of life in study group. These findings are consistent with those of a study in which a telephonic survey was conducted to describe the use of alternative therapies for menopausal symptoms in Washington State. The study findings revealed that women who used alternative therapies are found to be beneficial for menopausal symptoms.[9]

The main limitation for the present study is that few women ignored their problems and were not willing to discuss their menopausal symptoms freely. Recommendation for further study is QOL can be assessed when the woman practicing yoga and exercises continuously in a 1-2 year follow up study.

Implications for public health nursing: Public health nurses play a vital role in disseminating these findings to help menopausal women in alleviating their problems. They should update their knowledge about various therapeutic approaches and should try to teach all women those who are coming in contact with them. This can be enhanced with the help of various awareness programmes which can be conducted in community areas so that information can be transferred in to the grass root level.

Conclusion

The present study concludes that 12 week training programme is effective in improving the QOL among postmenopausal women in rural areas. Menopause is the third phase of life. A large number of women all over the world are suffering from menopausal symptoms. Education, creating awareness and providing suitable intervention to improve the QOL are important social and medical issues which need to be addressed.

Conflict of Interest: Nil

Source of Funding: Self

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The Impact of Similar Healthy Exercises to Play in the Development of Carrying Offensive Performance, Blood PH and the Percentage of Possession of the Ball for Young Football Players

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Abstract

The process of modern sports training depends on the focus of its objectives for the development of energy production systems and associated functional variables. Since the game of futsal also depends on the anaerobic system because of the speed and variety of high and strength in physical performance and skill, so emerged the need to use coaches and focus on exercises similar to play, including the tactical system. This is where the importance of research through the development of special exercises similar to play to improve the level of physical and physiological and the proportion of possession of the ball, which contributes to the development of the levels of players and enable them to achieve better results in the games.

The study aimed to prepare similar exercises to play in the development of offensive performance and blood PH and the percentage of possession of the ball for young football players as well as to identify the impact of similar exercises which it plays in the development of offensive performance and blood PH and the percentage of possession on the ball for young football players.

Keywords: *Performance, healthy performance, blood PH.*

Introduction

While the researchers used the experimental method, the research community has identified from the clubs of the province of Karbala and the sample was selected by drawing lots and they are youth players Karbala club football halls and the number (16) players have been divided into two groups control group and the other experimental and each (8) players used exercises Competition according to the tactical system and strongly (80-90%) I performed exercises 3 units per we

The twenty-first century is characterized by rapid scientific progress in the field of sports in general and futsal in particular [1].This game is one of the most important indicators of scientific achievement in this century, because of its components; it makes it a true mirror of the level of progress and advancement of nations. Futsal football occupies a prominent place among the various sports activities because of its popularity in all age groups [2].

The development in the technical level of the various sports activities in general and the sport of futsal in particular indicates that there is an escalation in the level of skill [3]. Also, motor and technical performance of the players, which did not come arbitrarily but came through the selection of modern training method in turn helped in the process of skill development, and through Continuous and standardized physical and skill practice that gives emphasis on the importance of repeating skill-related exercises to enable the learning process to be optimized and developed. Here we must introduce modern curricula in the training process in order to raise the physical and skill level of the players through which Players can apply the duties assigned to them by the coach within the field [4,5,6].

One of the method aimed at the development of some physiological variables during ensuring the creation of functional adaptations in the different organs of the body is similar exercises to play that these variables are important for the sports body [7.8]. Also, it works on the

development of physical abilities, including carrying performance that have an important and effective role in the game of futsal because they require special physical abilities, especially in the development[9,10].

Since this game where the competition is intense and continuous, therefore, competition exercises are of great importance, which in turn works to develop physiological variables and tolerate offensive performance and possession of the ball according to scientific bases [11,12].

Methodology

The research community is represented by the players of the team of education of the holy province of Karbala football halls for the preparatory stage and the number of (20) players with goalkeepers for the academic season 2018-2019, and (16) players were selected randomly as a sample of the research was divided randomly also and equally into two experimental and control groups and by (8) The first experimental group used competition exercises, the second group was the coach's training, and the members of the research sample and both groups were homogeneous.

Method Used

- Arab and foreign sources and references
- Tests and metrics.
- Assistant team
- Observation and personal interviews.
  - Ballrooms number (10).
  - Persons number (22) different height.
  - Medical cooler for keeping blood tubes.
  - Pluntnbe blood plastic tubes.
  - Electronic stopwatch Chinese industry number (2).
  - Japanese type SONY camera.
  - Futsal field

Measurement of blood pH: Researcher used a cadre * medical assistant also to carry out the process of blood withdrawal for the purpose of measuring the proportion of blood PH after the effort and the process of drawing blood by (4) C from the position of sitting in a chair immediately after the voltage endurance test performance.

Modified withstand performance test

Purpose of the test: Measure the bearing performance

- The necessary tools: field of futsal, different people's altitudes (22), and futsalballs (10), colorful adhesive tape, electronic stopwatch, and whistle.
- Performance description: The player stands on the starting point of the test, which is at the beginning of the field of play next to the goal on the left. At the start of a whistle, the player receives the ball from one of the assisting team members. The player then makes Zakzak between the 8 characters and the distance between each person and another is (1) meter and the start to the first person (8) meters. After the completion of the signs, a player stands between the players, receive and deliver the ball to the players. Each player will receive and deliver the ball for (5) times. Then the player rolls fastball for a distance of (15) meters to make a shot (5) balls placed on the front of the goal area (10) meters. Then the player performs Zakzak between the characters again for (8) persons and when finished and after the completion of the player stands between the players and leads (10) times received and delivered the ball. Then he does aZakzak between (6) signs away from the centerline a distance of (10) meters and without a ball. Then the process of rotation behind a fellow player standing in the middle of the field of play and receiving a ball and a rolling and then shot on goal.
- Time recording: Records the time of the laboratory from the beginning of the test to the end.

Acquisition ratio test: The acquisition rate was tested by taking the views of the supervisors of the research by adopting the arithmetic mean no eight attacks and counting the number of touches by conducting a mini tournament consisting of four teams from the youth category (the experimental group, the control group), the league system, each team plays three games, Distributed over three days, the rate of two games per day, the games were filmed and copied on CD and then the acquisition rate was evaluated by supervisors and researcher and the results are fixed.

Pre-test: The pre-test was conducted on the sample of the research sample, which consists of (16) players divided into two experimental and control groups on (Sunday and Monday) corresponding to (30-31/12/2018) at four o'clock in the afternoon and the Martyr Al-Hakim

square in the holy province of Karbala And physiology laboratory in the Faculty of Physical Education and Sports Science - University of Karbala.

The main experiment: After completing the pre-tests, the researcher introduced the competition exercises he prepared, as part of the training program for the research sample at the beginning of the main section of the training unit.

1. The exercise was scheduled to begin on Saturday, January 1, 2019.
2. Exercises were applied at the end of the general preparation and special preparation phase.
3. The duration of the experiment (8) weeks distributed over (24) training modules at the rate of three units per week (60) days continued the training curriculum.
4. A special trainer was assigned to each group to be given special exercises scheduled for them at the beginning of the main part and on the closed martyr's hall on Saturdays, Mondays and Wednesdays at the same time, and after the completion of the special exercises are re-integrated to complete the training module under the supervision of their trainer.
5. The researcher determined the intensity of exercise between (80-90%).
6. The researcher used high intensity instinct training.
7. The trial ended on Wednesday 27/2/2019.

Post-test: The post-test was conducted on the research sample on (Friday and Saturday) corresponding to (1-2/3/2019), on the field of play Martyr Hakim Hall closed in the province of Karbala and the physiological laboratory in the Faculty of Physical Education and Sports Science - University of Karbala, taking into account The same conditions and conditions in the pretest.

Discussion of the Results

Blood pH: through the presentation and analysis of the results of pre and post measurements in the blood pH after the effort in the test of tolerance performance. The trainer who contributed to the development of the control group in this variable As for the development that took place in the experimental group is due to exercises similar to toys prepared by researchers with high rigidity and this was confirmed by Rahim Ruaih "when using non-oxygen training exercises characterized by intense shear Lack of oxygen required to produce energy and thus produce energy in insufficient oxygen and thus the accumulation of lactic acid in muscle and blood as a result of increasing the rate of production of lactic acid more than the rate of disposal and as a result becomes acidic, then The amount of blood produced by lactic acid becomesgreater than the amount of disposal and therefore low blood PH, especially when biological organizations are not adaptive and unable to neutralize the blood and the body's organs to get rid of lactic acid.

Bearing Performance: Through the presentation and analysis of the results of the performance tests shown in the tables (5,6) showed significant differences between the tests (pre - post) and for the benefit of the post-test and for both experimental and control groups, which shows the evolution of the character of the performance tolerance and the researchers attribute this development to the curriculum prepared by the trainer for the development of the control group, which contains special exercises to withstand the performance of football players Futsal, which was organized in terms of the components of the training load and this confirmed by Hashim Yasser "The ability of the athlete to perform a movement or a group of movements targeted for the purpose of accomplishing a certain duty without a decrease in physical level" As for the development of the experimental group, the researchers attribute this development to two reasons. The first reason is the specificity of the competition exercises prepared by the researchers in accordance with the specificity of the game of futsal for what this ability requires to carry no oxygen and this is confirmed by Hashim Yasser. The second reason is the functional ability acquired by the player as a result of training in the anaerobic system and this is confirmed by Serageldin Abdel Moneim "can be seen in a range of functional effects that get players Presented lounges during the implementation of exercises to withstand performance in general through increased blood vessels and the activity of the enzyme carbs cycle "This was confirmed by Abu Ela and Nasr El-Din Sayed" The use of exercises that are consistent in the nature of its performance with the general form of the performance of specialized skills lead to better results in the acquisition of variables Physical. "

Conclusions

Through the findings of the researchers, conclude the following:

1. Competition exercises resulted in the development of blood PH for the players of the Holy Karbala breeding football team for the halls.
2. Competitive exercise led to the development of bearing performance and acquisition ratio

Recommendations:

1. Focus on the use of similar exercises to play by the football coaches of the halls.
2. Competition exercises have a role in the development of blood PH and withstand the performance and proportion of futsal acquisition.

Exercises used:

Exercise 1: The exercise includes playing two teams 5 against 5 The exercise begins with the ball goalkeeper passes to the player who cuts in front of the goal to receive the ball and rolling to the middle of the field of play and then pass to the colleague who in turn receives it to go to the side to reach the goal of the opposing team and pass it to the colleague Who is in the far column of the goal and shot it on goal or passes to the next colleague from behind to turn it in turn and guess a goal.

Exercise 2: The exercise includes two teams 5 against 5 The exercise begins with the ball goalkeeper pass to the close colleague and in turn pass to the colleague standing on the other side and then passed to the colleague who moves and down to the middle of the field of play to receive the ball and return it to his colleague, who in turn does a pass Long for the teammate, who took the emptyplace of the player who did the attribution and then go towards the goal and then shot on goal or handled by a colleague of support and his goal.

Source of Funding: Self

Ethical Clearance: Not required

Conflict of Interest: None

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Hang-Out and Health Risk behavior in Adolescents: A Qualitative Study

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Abstract

Introduction: Hang-out can trigger health risk behavior in adolescents. This qualitative study aimed to explore hang-out related to health risk behavior in adolescents.

Method: Five focus groups were carried out with 44 adolescents aged 12–25 in Surabaya, Indonesia. Participants were purposively selected and had all experienced hang-out activities. A thematic analysis approach was used for analysis and data collection was completed at the point of data saturation.

Results: Hang-out activities can encourage health risk behaviors such as smoking, alcohol consumption, drugs use, sweet beverages and fast food consumption. They interpret hang-out as interaction, socialization, entertainment and leisure time.

Conclusions: Adolescents who have free time will use it with hang-outas a form of self-expression. This has led to the culture of hang-out activity that can trigger health risk behavior. They spend time in places that they feel comfortable, the availability of the facilities they need and can show social classes among them. The government can formulate strategies to prevent health risk behavior in adolescents such as providing health promotion on prevention of health risk behavior.

Keywords: *Hang-out,health risk behavior, adolescents, qualitative research, focus groups.*

Introduction

Human behavior plays an important role in maintaining health and preventing disease.[1] World Health Organization states that health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.[2] Activities carried out by adolescents when they have free time are hang-outs that can encourage health risk behavior, which is an activity that increases the risk of disease or injury.[3] Health risk behavior relates to risk-taking behavior which has three forms, biological, psychological and social.[4] Health risk behavior during hang-out includes smoking, alcoholconsumption, drugs use, sweet beverages and fast foodconsumption.[5,6,7,8] Health risk behaviorin adolescents is caused by multifactors[9,10], one of them is caused by peer influence.[11,12] Adolescence is a transitional period of development between childhood and adulthood. The development of adolescent social life is characterized by the influence of peers in adolescent life.[13]

Health risk behavior in adolescents in Indonesia and Surabaya is still high, such assmoking, alcoholconsumption, drugs use, sweet beverages and fast foodconsumption.[14] Health risk behavior in adolescents can be a long-term risk factor for chronic health conditions in adulthood.[15,16,17,18] The purpose of this study is to explore hang-out related to health risk behavior in adolescents.

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Materials and Method

Study Design: This study used qualitative description[19] as a design and focus group[20] for information gathering to explore hang-out activities related to health risk behavior in adolescents. This study chose focus groups because this method possible to acquire valuable data.[21]. Ethical approval was granted by The Faculty of Public Health Airlangga University Health Research Ethics Committee (No: 69-KEPK).

Recruitment process: Participants were male and female students who attend organizations in schools with peer groups. We used a purposive sampling technique, aiming to be inclusive of experiences of boys and girls from diverse backgrounds. Recruitment ended once theoretical saturation was achieved.[22] In total, 44 adolescents ranging in age from 12 and 25 years, 20 participants were girls and 24 were boys.

Conduct of focus groups: Data collection was carried out by the main researcher from August 2016-December 2017. Focus group were conducted with pupils in same year group to get naturalistic discussions. We designed a questioning route informed by existing mental and social well-being literature and guidance on focus groups.[20,23] Focus groups lasted 45-60 minutes and were digitally audio recorded. The researcher assistant took field notes including verbal and non-verbal communication. Audio recordings were transcribed verbatim.

Data analysis: All data emerging from interviews and field notes helped inform the data-analysis process, were reviewed and coded by the researcher. This study using a thematic analysis approach.[24]Pupils were given the opportunity to feedback on results to encourage participation validation.

Results

Five focus groups were conducted in this study with 44 participants. Four interconnected themes emerged from the data; (a) smoking behavior, (b) alcohol consumption, (c) drugs use and (d) sweet beverages and fast-food consumption.

Smoking behavior: Participants reported about smoking behavior along join a hang-out activity in peer groups. Smoking behavior is part of health risk behavior.

Pupil 1: "I smoked when I join hang-out with peers, I started smoking since I join with my friends in his group in order to equality in groups."

Pupil 19: "I smoked 2-4 cigarettes along join hang-out with close friends, I follow their activity as group solidarity."

Pupil 25: "3-5 cigarettes in hang-out with peers in order to look masculine."

Participants reported that they smoked along join hang-out from 2-5 cigarettes. It can be concluded that hang-out can trigger health risk behavior such as smoking behavior. They smoked caused by peers influence in order to look masculine and equality in groups.Smoking can cause addiction, illness, and death. Diseases that often arise due to smoking are respiratory disorders and lung cancer.

Alcohol consumption: Participants also reported about alcohol consumption in hang-out activities. One of health risk behavior also alcohol consumption.

Pupil 7: "I consume alcohol in the hang-out activity together with my friends, because my friends invite me to do it."

Pupil 29: "Sometimes I consume alcohol with my friends when I join the hang-out activity in order to same with others."

Pupil 11: "Consume alcohol when I meet my friends in the hang-out activity."

Participants reported that they consume an alcohol when joining the hang-out activity. They consume an alcohol because of peer influence in order to no gap in their group. It can be concluded that adolescents have a risk to consume an alcohol when joining the hang-out activity. The impact of alcohol use can cause various illnesses and deaths.

Drugs use: Interviews related to drugs use when the hang-out activity, participants reported that they also use drugs when joining the hang-out activities in peer groups.

Pupil 23: "I use marijuana when I am joining hang-out because my friends have brought it and I use together with my friends. I use it in order to get relax and solve my problems."

Pupil 15: "I use amphetamine when I am joining hang-out together with my friends to solve my problems."

Participants said that they use a drug such as marijuana and amphetamine caused by peers influence. They also said that they use it in order to get a relax and solve their problems. This study can be concluded that adolescents have a risk to use a drug along joinhang-out activities. The use of drugs can cause addiction, illness, and death.

Sweet beverages and fast-food consumption: Participants reported that they consume sweet beverages and fast-food along join hang-out activities.

Pupil 17: "I eat fried chicken and tea for drinking."

Pupil 39: "I eat fried potato and softdrinks for drinking."

Pupil 21: "I eat burger and coffee for drinking."

It can be concluded that adolescents eat fastfood such as fried chicken, fried potato and burger when joining hang-out activities. They also consumed tea, coffee, and soft drinks. It can be concluded that adolescents consume fast-food and sweet beverages. Fast food consumption can have an impact on disease, whereas sweet drinks can cause diabetes.

Discussion

This qualitative study used focus groups to explore health risk behavior in hang-out activities in adolescents. This study has shown that hang-out can trigger health risk behavior.

Health risk behavior for adolescents most often was smoking behavior, alcohol consumption, drug abuse, sweet beverages, and fast-food consumption.[25,33,35,37,39]

Participants reported that they smoked along join hang-out from 2-5 cigarettes. It can be concluded that hang-out can trigger health risk behavior such as smoking behavior.[32,36] They smoked caused by peers influence in order to look masculine and equality in groups. The results showed that there was a relationship between peer influence and risk behavior.[11,26,27] Smoking can cause addiction, respiratory disorders, lung cancer, and death.[15,16,17] The other factors that influence a person to smoke were biological, psychological, social, environmental, demographic, socio-cultural and socio-political factors.[32,43]

Participants reported that they consume an alcohol when joining the hang-out activity.[7] They consume an alcohol because of peer influence in order to no gap in their group. It can be concluded that adolescents have a risk to consume an alcohol when joining the hang-out activity. The impact of alcohol use can cause various illnesses and deaths.[28,46] Drunk from alcohol consumption was related to anxiety, depression and suicide.[29] Alcohol consumption affects poor educational attainment and results in early morbidity and mortality.[8,38] The informants who consumed alcohol majority with low education or dropping out of school and wrong parenting provided the risk behavior. They involved in the alcohol consumption influenced by environmental factors especially peers.[38,45,46,47]

Participants said that they use a drug such as marijuana and amphetamine caused by peers influence. They also said that they use it in order to get a relax and solve their problems. This study can be concluded that adolescents have a risk to use a drug along join hang-out activities. Risk factors for drug abuse were men, have family members who support young people to drugsabuse, never engage in religious activities and worship, have low education and have more money to have the opportunity to health risk behavior.[10]The use of drugs can cause addiction, illness, and death.[18]Psychological, social and behavioral factors related to health risk behavior in adolescents such as smoking, drinking alcohol and drugs abuse.[30]

It can be concluded that adolescents eat fastfood such as fried chicken, fried potato and burger when joining hang-out activities. They also consumed tea, coffee, and softdrinks. It can be concluded that adolescents consume fastfood and sweet beverages. Fast food consumption can have an impact on disease, whereas sweet drinks can cause diabetes.[41,44] Environmental factors could influence health risk behavior such as sweetened beverages and fast food consumption include peer, family and school.[12,41,42]

Conclusions

This study has shown that hang-out activities caused health risk behavior such as smoking, alcohol consumption, drugs use, sweet beverages,and fast food consumption. It can be caused by psychological, social and behavioral factors.

Health risk behavior along hang-out activities important to get prevention efforts for decrease effects on health based on five levels of prevention. Health promotion is one prevention that can be done. It is the

first and foremost stage in preventing a disease, where the process of providing health information to the community occurs so that all communities are willing and able to maintain and improve their health.[31,34,40]

Conflict of Interest: The author(s) declared no potential conflicts of interest with respect to the research, authorship,and/or publication of this article.

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Social and Environmental Performance of Private and Public Sector Banks in India: A Comparative Study

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Abstract

The present study is an effort to know about the social as well as the environmental performance of private and public sector banks of India after taking into account the guidelines regarding CSR by Companies Act, 2013. The major CSR initiatives undertaken by Indian Banks are found and ranking of banks is done on the basis CSR scores calculated through content analysis technique. A comparison is made between the social and environmental performance of Indian private and public sector banks by applying t-test. Eradication of extreme hunger and poverty (70%) followed by promotion of education (52%), reduction of child mortality and improving maternal health (45%), environmental sustainability (41%) and rural development (40%) are the major CSR areas of concern in case of private sector banks while rural development (67%) followed by eradication of extreme hunger and poverty (65%), promotion of eduction (52%) and employment enhancing vocational skills (42%) are major CSR initiatives of public sector banks. But both the sectors could not achieve even 50% of the total expected CSR score. J & K Bank (76%) is the biggest social performer followed by Yes Bank, Federal Bank and ING Vysya (60%) and Axis Bank (58%), all the top performers from private sector only. Bank of Baroda and Punjab National Bank (54%) are the top performers of public sector banks. Overall no significant difference is found in the average CSR scores of both the sectors.

Keywords: *Social and Environmental Performance, Private Sector Banks, Public Sector Banks, CSR initiatives, CSR Scores.*

Introduction

Social responsibility is not a novel subject of Indian business but it has traditionally been followed by the corporate sector. From the phase of simple charity to participation of the various stakeholders' interests, Indian business sectors follow various method of undertaking social responsibility. There is not lack of energy available for the exploitation in the area but there is a need of suitable method on the basis of which, Government, corporate sector and the society can work together to take the benefit of the same. A company can generate wealth and long term sustainability for itself by presenting responsible behaviour towards society, environment and ethics in the process of its operations and playing positive and meaningful role for the betterment of society. There is no doubt that Indian economy is growing at a fast pace in the current decade, but still it is facing major challenges because of the basic problems like poverty, illiteracy, malnutrition etc. These challenges need to be addressed by government by providing suitable framework and innovative solutions to these challenges so that corporate sector can contribute towards social work under that framework.

Literature Review: Irrespective of location, the nature of CSR activities undertaken by banks is found to be similar. Banking sector is not a mature one, the responsible actions undertaken by the Romanian banks are in line with the ones of their European counterparts [(1)]. Major areas of concern for banks are education, balanced growth, health, environmental marketing and customer satisfaction as their core CSR activities[(2),(3)]. Various categories of CSR disclosures are environmental, equal opportunity, human resource, community involvement, product quality, political, energy, etc.[(4)]. All the financial and banking institutions of the country are directly engaged in social banking and development banking approach focussing on education, rural development and women empowerment[(5)]. Some advertising companies do engage in CSR activities and disclose them in their annual reports, but the level of these CSR disclosures is different between the organizations and the pattern of CSR reporting was far away from expectations [(6)].

Content of CSR disclosure is not comprehensive and is highly varying, even in the same branch of industry[7]. There are written narrative but not quantifiable method to disclose CSR in their reports[8]. Despite the increasing popularity of CSR, most reporting is still concentrated in areas that are either mandatory or seen as important in establishing legitimacy for continued, profitable operations[9]. As a matter of fact, the standards for rating CSR practices are less uniform in comparison to that for financial ratings[10]. The major thrust areas for CSR practices in Indian banks are children welfare, community welfare, education, environment, healthcare, poverty eradication, rural development, vocational training, women's empowerment, protection to girl child, employment[11]. Environmental duties are the critical element of CSR and although companies ''negotiate''philanthropic responsibilities with the communities, ethical responsibilities are defined by the headquarters and not negotiated locally[12]. The major reasons for involving CSR practices by companies are to create and maintain a favourable corporate image[13]. According to Tewarialthough both Indian and the MNCs target and lay importance to similar group of stakeholders for their CSR communication but for the Human Resource the MNCs address quality of work life more while the Indian companies focus upon the monetary benefits provided[14].41% of listed financial sector companies made some kind of CSR disclosures and is quite impressive compared to CSR disclosures in other sectors, like ceramics, Engineering, IT, paper and printing. [15].CSR reporting as regards the amount spent on those initiatives is poor [16].The major constraints to the discharge of CSR include self-induced vices, regulatory laxity, inauspicious macro-economic environment, and endemic corruption in the economy[17]**.** Though the Indian banks are making efforts in the CSR areas but still there is a requirement of more emphasis on CSR. Public sector banks have overall highest contribution in CSR activities as compared to private and foreign banks[18].Environment reporting practices of companies and found that there is no specific framework for reporting these practices in the company reports[19]. CSR initiatives need more support and motivation both from society as well as government[20].Statistically there is no significant relationship between CSR and financial performance of banks in Nigeria but it has a positive impact on the performance of banks[21].

Need of the study: Corporate social responsibility was taken differently by different companies before the clear cut guidelines came under Companies Act, 2013. There was no set criterion as to how it should be discharged in a meaningful and useful manner. Moreover Banking Sector of a country is always expected to work for society as they mobilise the societal resources for the development of the country.Thus a study becomes imperative to know the focus area of CSR in the Banking Sector of India, the level of social performance this sector is contributing and how private and public sector players differentiate themselves on the basis of this social performance.

Objective of the study: The main objective of the study is to find out the difference in the level of social performance of Indian private and public sector banks and the priority being given by Indian banks to social initiatives as per Companies Act, 2013.

Research Methodology: A well defined research process has been used to collect the data as well as to apply the appropriate research technique to achieve the set objectives.

Source of data collection: Banking sector of India is majorly covered by the private and public sector banks. 21 Public Sector and 20 Private Sector Banks of India as per recent list of RBI are taken to study the social performance of banks. Secondary data is collected by downloading annual reports of banks from capitaline. com and the websites of banks under study. Annual reports of all private and public sector banks of India for the past five years (2012 to 2018) are taken. Ten CSR areas as per Companies Act, 2013 are taken into consideration for calculating the social performance of banks.

Research Technique: Annual reports of banks are analysed through the technique of content analysis. In case a CSR parameter is taken care by a particular bank, then CSR score '1' is assigned otherwise '0'. In this way, total expected CSR score of all Public Sector Banks of India for five years comes out to be 1050 (21*5*10) for all the CSR parameters collectively and 105 (21*5) for each individual CSR parameter. Similarly, total expected CSR score of all Private Sector Banks of India for five years comes out to be 1000 (20*5*10) for all the CSR parameters collectively and 100 (20*5) for each individual CSR parameter. For each individual bank, expected CSR score for all CSR parameters for five years comes out to be 50 (10*5). Social performance of each bank in the private and public sector as well

as of each individual CSR parameter being performed by banks is calculated on the basis of percentage of actual CSR performance in comparison to expected CSR performance. T-test is used to compare the social performance of both the sectors and bar diagrams are used to present the data bank wise as well as parameter wise.

Comparison of Private and Public Sector Banks on the basis of Social and Environmental Performance: Social performance of banks is calculated by analysing the annual reports of banks for the past five years (2012 to 2018). There are 21 public sector banks and 20 private sector banks as per the latest list published by RBI. Since five years and all private and public sector banks are taken into account, so the total expected CSR score of all Public Sector Banks for each CSR parameter is 105 i.e. 21*5 and in case of all Private Sector Banks is 100 i.e. 20*5. Accordingly actual social performance is calculated on the basis of percentage of expected CSR score for each CSR parameter.

Table 1: Comparison of Social Performance by public and private sector banks

CSR parameters	Public Sector banks		Private Sector banks	
	CSR Score (Out of 105)	Social Performance	CSR Score (Out of 100)	Social Performance
Eradicating extreme Hunger and Poverty	65	61.90	70	70.00
Promotion of Education	52	49.52	52	52.00
Promoting Gender equality and empowering women	32	30.48	8	8.00
Reducing child mortality and improving maternal health	38	36.19	45	45.00
Combating human immunodeficiency virus	5	4.76	11	11.00
Ensuring environmental sustainability	28	26.67	41	41.00
Employment enhancing vocational skills	42	40.00	33	33.00
Social business projects	30	28.57	36	36.00
Contribution to fund for socio-economic development and for welfare of SCs, STs, BCs and minorities and women	31	29.52	21	21.00
Rural Development	67	63.81	40	40.00
Grand Total Score	390/1050	37.14	357/1000	35.7

Table 1 clearly depicts that out of all the CSR paramaters, eradication of extreme hunger and poverty (70%) got the maximum CSR score in case of private sector banks and rural development (67%) is the major area of concern in case of public sector banks. There is a huge difference in the CSR score of two parameters in both the sectors wherein promotion of gender equality and women empowernment parameter is given more weightage in case of public sector banks but least important to private sector banks while combating human immunodeficiency parameter is more important in case of private sector banks but least important to public sector banks. Contribution to social business projects is more by private sector banks and contribution to funds for SCs, STs and minorities is more by public sector banks. The results also show that although the overall the social performance of public sector banks (37.14%) is better than the private sector banks (35.7%) but this difference seems to be very marginal. In case of individual score of each CSR parameter, actual social performance is as high as 70% but overall this social performance by both the sectors does not seem to be satisfactory when compared with the total expected CSR scores as both the sectors could not achieve even 50% of the total expected CSR score.

The expected CSR score of each individual bank comes out to be 50 i.e. 10*5. Actual social performance of each bank is calculated by taking the percentage of expected CSR score.

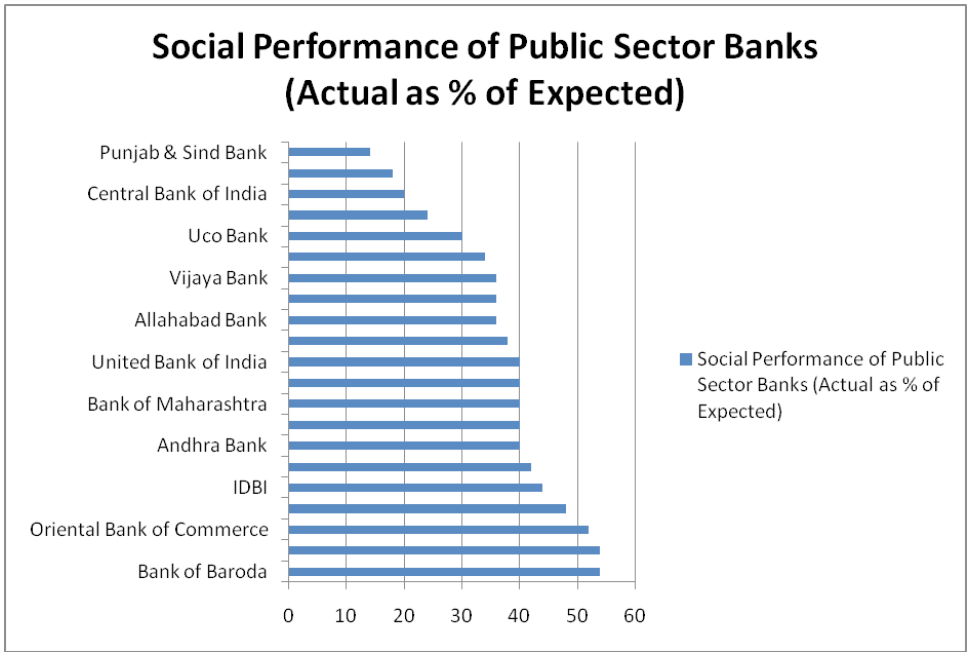


Fig 1: Social Performance of Public Sector Banks

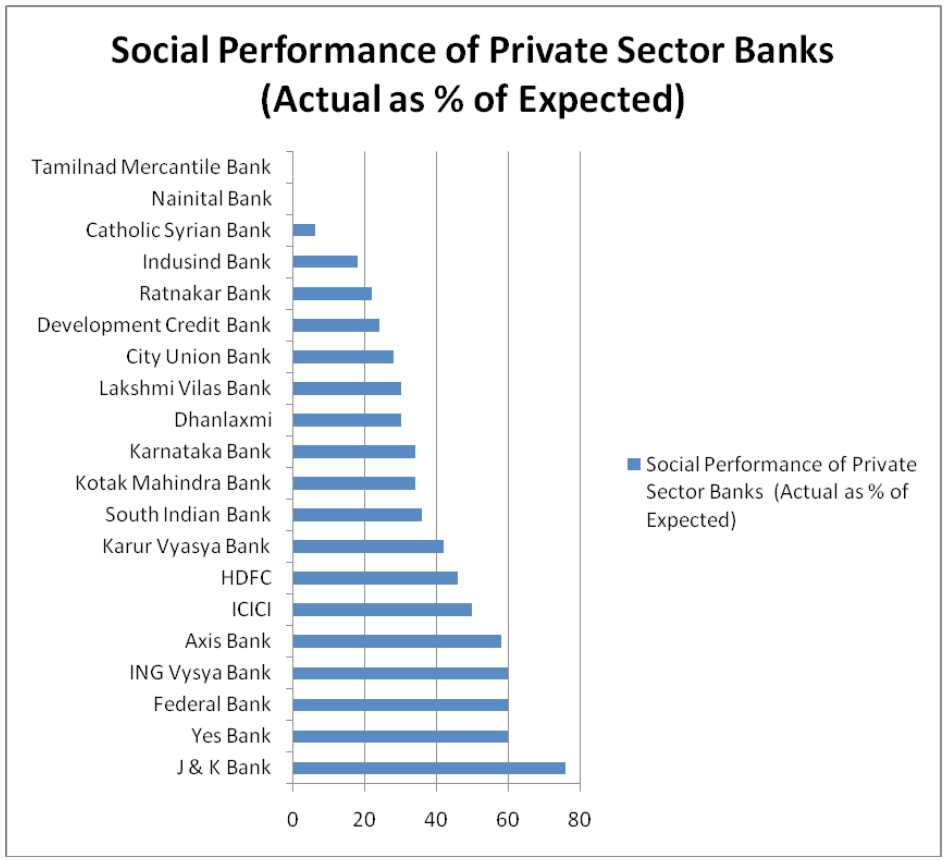


Fig 2: Social Performance of Private Sector Banks

Figure 1 and Figure 2 show that J & K Bank (76%) got the first position with the highest CSR score while Yes Bank, Federal Bank and ING Vysya (60%) got second and Axis Bank (58%) got the third position from all the private and public sector banks in India. It means all the first three positions in case of social performance

are achieved by private sector banks of India. The range of social performance in case of public sector banks varies from 54% to 14% while in case of private sector banks, it varies from 70% to 0% indicating that there is huge diversity in the social performance of private sector banks as compared to public sector banks. Tamilnad Mercantile Bank and Nainital Bank have not taken any social initiatives. Thus although the social performance of private sector banks is more than public sector banks but all the public sector banks contribute towards social work unlike private sector banks. This may be due to the reason that public sector banks are expected to be more responsible towards society rather than private sector banks which are established with the motive of profit making.

Table 2: Group Statistics

	Banks	N	Mean	Std. Deviation	Std. Error Mean
CSR Scores	Public Sector Banks	21	18.5714	5.53689	1.20825
	Private Sector Banks	20	17.8500	10.53952	2.35671

Table 3: Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	d.f.	Sig. (2-tailed)	Mean Difference	Std. Error Difference
CSR Scores	Equal Variances Assumed	7.283	.010	.276	39	.784	.72143	2.61104
	Equal variances not assumed			.272	28.435	.787	.72143	2.64838

Results of Levene's test for equality of variances in table 3 depict that null hypothesis for equal variances assumed is rejected and hence there are not equal variances of CSR scores in case of private and public sector banks. Table 3 reveals that there is no significant difference in the average CSR scores of public and private sector banks of India which prove that social performance of both the sectors is same, (18.57±5.54σ, 17.85±10.54σ), t(39)=.272, p =.787.

Conclusion

The study concludes that the social performance of Indian Private and Public Sector banks is far from satisfactory as the actual performance of Indian banks is just 35% to 38% of the expected which shows that overall Banking Sector of India is not paying much attention on discharging their social obligations although a well defined CSR framework has been suggested under Companies Act, 2013 and it has become a mandate for the corporate sector. It has also been observed that private sector banks of India are making more efforts towards their social goals as compared to public sector banks even though the average social performance of both the sectors do not show much of the difference. This may be because CSR has become a major component to attract the customers and a tool for marketing in the present business scenario. Eradication of extreme hunger and poverty and rural development are the priority areas among the various CSR initiatives in Indian banking sector.

Ethical Clearance: Taken from committee NA

Source of Funding: Self

Conflict of Interest: Nil

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The Association between Type 2 Diabetes Mellitus and Quality of Life among Workers at Textile Industry

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Abstract

Background: A good quality of life(QoL) is necessary for fitness and to achieve high work productivity. Workers' quality of life is determined by several factors, including type-2 diabetes mellitus(T2DM). This study aims to examine the association between T2DM and workers' quality of life exposed to high noise level.

Method: This was a cross-sectional study conducted on textile workers in Surakarta. Data from 200 workers were collected. T2DM diagnosis was measured by HbA1c test. Quality of Life (QoL) was determined by 36 item short form survey (SF-36). Statistical analyses was conducted using Spearman's rank correlation coefficients.

Results: This study found a significant association between T2DM with quality of life in textile workers ($p<0.05$). Workers with T2DM had lower quality of life compared to those without T2DM. Quality of life dimension that were directly associated with T2DM were physical function, physical role, pain, general condition, vitality, social function, emotional role, and mental health.

Conclusion: T2DM was associated with reduced quality of life in textile workers.

Keywords: *Type 2 diabetes mellitus, quality of life, textile industry.*

Introduction

Industrial workers, including in textile industry, are often exposed to hazardous condition that can influenced their health. In textile industry, workers are exposed to several risk factor i.e. noise, manual handling, hazardous chemical and machine[1]. Chronic exposure to noise above the permissible exposure limit can affect workers health[2]. Previous studies have shown that noise above 80 dB can increase cortisol level[3], which is associated with type-2 diabetes mellitus(T2DM)[4]. T2DM is a major public health concern with the International Diabetes Foundation (IDF) reported that over 387 million people worldwide live with this condition[5]. In Indonesia, the prevalence of diabetes mellitus(DM) among people 15 years old and above are approximately 6.9% [6]. Diabetes mellitus and other chronic diseases contributed to over 40 million deaths each year globally[7].

Diabetes mellitus is closely associated with quality of life (QoL), which can be measured by four components: physical, psychological, social, and environmental[8]. Previous studies showedthat older people and diabetes mellitus patients had lower quality of life[9].Lu et al. found that quality of life is associated with general health condition[10]. Patients with uncontrolled diabetes mellitus have lower QoL score compared to patients with controlled diabetes mellitus[11], with relatively bad quality of life[12].

Previous studies examining the association between diabetes mellitus and quality of life focused on diabetes mellitus in general. Therefore, they provided limited understanding on the different types of diabetes mellitus. This study aims to examine more specifically the association of T2DM measured by HbA1c level on quality of life, of textile workers who are exposed to noise.

Material and Method

This was a cross-sectional study conducted in a textile industry in Surakarta, Central Java, Indonesia. Data was collected on May 2018 with purposive random sampling. Inclusion criteria includes: at least one year experience in textile industry, 20-55 years old, and was not taking any medication to reduce blood glucose level. Sample size was calculated using the correlated samples formula (Hulley et al, 2013, with $Z_{\alpha(5\%)} = 1.96$, $Z_{\beta(20\%)} = 0.84$, r value from pilot survey =0.166. Using the formula $n = [(Z_\alpha+Z_\beta)/C]^2 + 3$,and calculated through theonline software from Clinical & Translational Science Institute[13], the required sample was 284 workers.

Noise level was measured using sound level meter. Demographic characteristics were obtained through validated questionnaire. Quality of life were measured using Short-Form Health Survey (SF-36). Anthropometric tools (SZ-200 scale to measure height and BR-9807 scale to measure weight) were used to obtain height and weight. HbA1c was measured using *High Performance Liquid Chromatography (HPLC) method*. Statistical analyses were conducted using *Spearman's rank correlation coefficient* and*Chi Square Test*s with SPPS version 23. This study was approved by the Health Research Ethics committee at Faculty of Medicine, Universitas Sebelas Maret, with ethical clearance number 62/UN27.6/KEPK/2018, protocol number: 01/18/04/058.

Findings: The study setting was a textile factory that used cotton and rayon thread to produce grey cloth. There were three eight hour shifts i.e. morning, afternoon, night. The machine, the main cause of the noise,was used continuously, with one hour break for each shift. The noise measurements in the working area were relatively high, ranging from 93-104 dBA. Approximately 84 (29.6%) workers that could be classified as having diabetes (HbA1c > 6.5%), 67 (23.6%) as having pre-diabetes (HbA1c between 5.7-6.4%),and 133 workers (46.8%) as normal (HbA1c < 5.7%).

The quality of life were classified based on Ware et al category, as follow: perfect (score 100), very good (score 84 through <100), good (score 61 through 84), fair (score 25 through <61), poor (score 0 through <25). For this study, the quality of life measurements were classified into two category: good (score >= 61) and poor (score <61) [14]. From 284 respondents, there were 115 (40.5%) who were categorized as having good quality of life, and 169 (59.5) were categorized as having poor quality of life.

Table 1. The association between Type 2 Diabetes Mellitus and Quality of Life (n=284)

Independent Variabel	Mean (SD)	Dependent Variable	Mean (SD)	r	p
		Quality of life	67.71±12.84	-0.708	0.000*
		Physical Functioning	75.00±17.97	-0.415	0.000*
		Role-Physical	65.58±28.69	-0.547	0.000*
		Bodily Pain	62.45±17.04	-0.464	0.000*
HbA1c (%)	6.35±1.90	General Health	72.44±12.12	-0.416	0.000*
		Vitality	64.73±16.88	-0.478	0.000*
		Social Functioning	71.30±16.23	-0.339	0.000*
		Role-Emotional	67.74±29.64	-0.465	0.000*
		Mental Health	68.42±17.58	-0.458	0.000*

* are significant at $p < 0.05$ (2-tailed)

Table 1 showed that increased HbA1C level can lower the quality of life score in noise-exposed textile workers. Table 2 showed the results contingency coefficient tests which were used to examine the magnitude of T2DM effect on workers' quality of life.

Table 2. The association between T2DM on quality of life (n=284)

HbA1c	Quality of life			X^2	p	C
	Poor n (%)	Good n (%)	Total n (%)			
Diabetes	47 (56.0)	37 (44.0)	84 (100)	10.915	0.004	0.192
Pre diabetes	22 (32.8)	45 (67.2)	67 (100)			
Normal	48 (36.1)	85 (63.9)	133 (100)			

*significant at $p < 0.05$ (2-tailed)

Table 2 showed that T2DM were associated with workers quality of life score. The HbA1c level influenced 19.2% of the quality of life reduction. Other factors combined influenced 80.8% of quality of life score. These other factors might include sex, body mass index, age, and work duration. Table 3 demonstrated the association between these demographic characteristics with quality of life.

Table 3. The association between demographic characteristics on quality of life (n=284)

Characteristics	Quality of life (%)						X^2	p	OR (95%CI
	Poor		Good		Total				
	n	%	N	%	N	%			
Sex									
Male	26	42.6	35	57.4	61	100	0.146	0.702	1.1
Female	89	39.9	134	60.1	223	100			(0,630 – 1,985)
Body Mass Indeks (BMI)									
> 25 kg/m^2	54	44.3	68	55.7	122	100	1.261	0.261	1.315
≤ 25 kg/m^2	61	37.7	101	62.3	162	100			(0.815 – 2.121)
Age									
> 43 years old	64	47.4	71	52.6	135	100	5.105	0.024*	1.7
≤ 43 years old	51	34.2	98	65.8	149	100			(1.074 – 2.794)
Work duration									
> 18 years	60	42.9	80	57.1	140	100	0.640	0.424	1.2
≤ 18 years	55	38.2	89	61.8	144	100			(0.755 – 1.950)

*significant at $p < 0.05$ (2-tailed)

Table 3 showed certain demographic characteristics can reduce quality of life, although the association was only significant for age ($p < 0.05$). Meanwhile, other characteristics showed non-significant association with quality of life ($p > 0.05$). Based on findings on table 2 and 3, we can infer that quality of life in this study was associated with both HbA1c and age.

Noise exposure can influence the auditory and non-auditory system. These influence can happened both acutely and chronically[2]. With the increasing industrialization and urbanization, noise pollution become one important factor in environmental health. Sorensen M. *et al*., based on their 10 years longitudinal epidemiological study, stated that every 10 dB increase in noise exposure from road traffic, could significantly increase the risk for diabetes mellitus by 11%. Furthermore, there would be approximately 14% increase in the risk for diabetes mellitus, if the exposure to road traffic happened for more than 5 years[15].

In occupational health, it has been well established that noise exposure is associated with work-related stress. The presence of stress can be identified by the increasing level of cortisone hormone[16]. This psychological stress can further increase the risk of type 2 diabetes mellitus[17]. Consistently, Zare Sakhvidi et al. also stated increasing risk of type 2 diabetes mellitus due to noise exposure from road traffic that happened in 6% of exposed population. Another study also showed that noise exposure from road traffic increase the risk of diabetes mellitus by 1.17 times, and increasing the

risk of type 2 diabetes by 1.07 times[18]. These findings consistently showed that noise exposure increase the risk of type 2 diabetes mellitus. The findings from these study as well as the findings from our study suggest the association between noise exposure, T2DM, and quality of life.

In this current study, increasing HbA1c level significantly reduce quality of life in textile workers who were exposed to noise above the permissible exposure level (PEL) The association between the HbA1c level and quality of life were observed both when quality of life was assessed in general, or when assessed based on its components i.e. physicalfunctioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, andmental health.

Our findings were consistent with studies by Brown et al., which reported the association between diabetes mellitus and quality of life in elderly. On average, elderly with diabetes mellitus scored lower on the quality of life measurement compared to elderly without diabetes mellitus. Furthermore, elderly patients without insulin therapy were more likely to have poor quality of life compared to elderly patients receiving insulin therapy or 14 days[19]. Schunk et al. stated that patients with type 2 diabetes mellitus had poorer quality of life compared to people without diabetes mellitus, on physical dimension. However, on mental health dimension, the poorer quality of life in diabetic patients only happened in women[20]. Bourdel-Marchasson et al. also stated that diabetes mellitus patients with HbA1c level of 8.1–10.0% had lower quality of life on mental health dimension [21]. Another study by da Mata et al. also stated that type 2 diabetes mellitus patients had an average of 65.8% quality of life score which was significantly lower compared to people without the diagnosis. Furthermore, in patients with type 1 and 2 diabetes mellitus, men were generally had better quality of life compared to women[22].

The findings from our study corroborate our hypothesis on the association between T2D Mdiagnosis, indicated by level of HbA1c $\geq$ 6.5%, with the quality of life of the workers in textile industry who were continuously exposed to noise exposure above the PEL. In our study, there was no significant association between sex and the quality of life of the workers exposed to noise. This is slightly different from the study conducted by Rwegerera *et al.*, that found significant differences in the quality of life between men and women, particulalry in physical dimension. Women had signifcantly poorer quality of life in the physical dimension compared to men. However, there were no significant differences in the mental health dimension between men and women[23].

In this study, age was significantly associated with the textile workers' quality of life. Our finding corroborate previous studies that found the association between age and quality of life. Netuveli & Blane, stated that older age, adaptation, and physical fitness were important factors for quality of life[24]. However, Rwegerera *et al.*, found that the association between age and quality of life differed by the quality of life dimension that was examined. In elderly (age 65 years old and older), there were sognificant decrease in the physical dimension of quality of life. However, there was no statistically significant decrease in the mental health dimension of quality of life[23].

Our study found no significant association between body mass index (BMI) and quality of life in noise-exposed textile workers. This finding was consistent with previous study by Rwegerera *et al.*, that found no significant association between obesity and quality of life, either in the physical and mental dimension[23]. In contrast, Xu et al., found that there was nonlinear statistically significant association between BMI and quality of life[25]. We found no significant association between quality of life and the working duration of the noise-exposed textile workers. To our knowledge, there were limited studies that have examined the association between textile workers' working duration and quality of life.

Conclusion

Workers with type 2 diabetes mellitus had significantly poorer quality of life compared to workers without type 2 diabetes mellitus. In addition, elderly also had poorer quality of life compared to younger people.

Conflict of Interest: We declare no conflict of interest in this study.

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Development and Standardize the Radiation Awareness Tool for Medical Practitioner in Indian

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Abstract

Background: Radiological examination play an important role in the decision making process for clinical management. However, the application of radiology services is not fully justified, indeed there is extensive literature supporting the notion that a large number of unnecessary and inappropriate diagnostic imaging examinations are requested instead. There is also little or no understanding by medical practitioners on radiation hygiene, or on which imaging test is appropriate in order to provide the greatest sensitivity and specificity for a specific condition.

Method: A combination of both qualitative and quantitative method was used to carry out to develop and standardize the radiation perception tools for medical practitioners in India. Data was analyzed using the SPSS 15 where descriptive, Frequency analysis, Cronbach's Alpha coefficient and Exploratory Factor analysis were used to standardize the tool.

Results: The content validity, pilot test, factor loading and internal consistency reliability of the final forty-one items which measuring the Medical Practitioner's perception on radiology examination were found to be highly adequate.

Conclusions: In conclusion, a valid scale has been developed to evaluate the patient and Medical Practitioner's perception on radiology examination. This scale is the first instrument of its kind to assess the perception on radiology examination.

Keywords: *Standardization, Validity, Reliability, Medical Practitioner, Radiation.*

Introduction

The use of imaging has increased dramatically in recent years and modalities such as multi-detector computed tomography (MDCT) has been used often. The MDCT scanners with helical imaging have enhanced diagnostic capabilities and substantially reduced scanning times, making computed tomography (CT) both patient-friendly and the physician's preferred tool. In developed countries, the increase of CT usage has raised from 2% to 9% in the span of fourteen years. Of this 5 – 11% of them are pediatric population is of major concerned[1].

Radiation dose reduction in pediatric radiology deserves special attention since it is assumed that children are more sensitive to radiation than adults[2]. Radiation dose reduction can be achieved by justification and optimization[3]. Of which Justification of radiology examination can only be achieved with proper communication between patients, radiologist and requesting physicians[4][5].As per the International Commission on Radiological Protection guideline, patient who are undergoing the radiology examination have to get the information about the benefit, risk and radiation dose imparted during the radiology examination[6]. But actual practice is that the physicians

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who prescribe the radiology examination give less or no information about the radiology examination to the patient[7].

Recent research shows poor knowledge of referred medical practitioners about radiation dose, exposure unit and age related radio-sensitivity involved in the Radiology examination [8]. In Indian scenario no similar study has been reported. The aim of this work was to develop and standardize a valid and reliable tool to measure the perception of radiation awareness among the practitioners in Indian scenario.

Aim: To Development and standardize the radiation awareness tool for Medical Practitioner in Indian

Methodology: The study protocol was approved by Institutional Ethical Committee and following methodologies were employed to achieve the aim of the study.

Items generation of the scale: The items was constructed based on 5 point Likert scale using systematic literature review and conceptual framework. The scoring criteria for the scales was formed to represent the perception of the medical practitioners on Radiology examination on a 5 - point scale ranging from 0 to 4, where 0 is strongly disagree and 4 is strongly agree.

Content validation of the scale: The content validation of the items was performed by the experts in the field Radiology. The fifteen experts identified were given an information explaining the purpose of the study along with the consent form. The validation of the questionnaire was based on usefulness, appropriateness, and relevance of the items in the different sections of the preform. Percentage level of agreement between experts was used to evaluate the content validity of items. The criteria to include the items and domains were fixed at 80%. Descriptive statistics was used to summarize the demographic characteristics of experts and the agreement of experts for each item in the scale was reported in percentages.

Factor loading of the scale: The participant identified for the study were screened for the inclusion and exclusion criteria and informed consent was obtained. The scale was administered on the participant respectively by the interview. The tester provided adequate explanation and ensured that all the items in the scale were scored. To establishing construct validity of the medical practitioner's tool, the sample size was calculated based on ten samples per items in the tool [9]. A total of five hundred and thirty samples data were collected. The exploratory factor analysis was used to determine the domains and the items loaded with a factor value >0.4 was included. Cronbach's Alpha coefficient ≥ 0.7 was used to analyze the internal consistency of all the items.

Result

Generation of domains from literature: Based on the systemic literature reviews (table 1) and conceptual framework formed through the Qualitative interview, fifty five items were generated for the medical practitioners. Literature search articles were scrutinized to identify the articles consisting of scales and questionnaire which measure medical practitioner's perception toward the radiology examination.

Table 1: Summary of the studies in the systematic review

Year	Countries	Study sample	MRI and ionizing radiation	USG and ionizing radiation	Positive influence of course	Knowledge of radiation hazards
2003 (11)	South Wales and Oxford	130	92% recognize	95 recognize		
2004 (12)	Hospital, Plymouth, UK	240	71.6 recognize	90.4 recognize		
2007 (13)	Turkish	156	27.4% failed	4% failed		
2007 (14)	Dublin, Ireland	269	25 failed			
2008 (15)	USA				yes	
2010 (16)	Bergen, Norway	200	44% failed	45% failed		
2010 (17)	Norway	213	10.5 failed	4.8% failed		
2011 (18)	Hong Kong	133	65% recognize	100 % recognize		
2011 (19)	Hong Kong	80	15 % failed	5%failed		93% not discussed

Year	Countries	Study sample	MRI and ionizing radiation	USG and ionizing radiation	Positive influence of course	Knowledge of radiation hazards
2012 (20))	Germany	811	80.0% recognize	90.5% recognize		
2012 (8)	28 countries	728				15.3% Had discussed
2013 (21)	Europe	124	21.7% failed	66.1% recognize		
2013 (22)	Australia	608	2.8% failed	1.8%failed		
2013 (23)					yes	
2013 (24)		403			yes	
2014 (25)	Sub-Saharan African Country, Cameroon	151	41.1% failed	2.6% failed		42.4% Had discussed
2014 (26)	Turkey	300	86 %recognize	92.7% recognize		

The scoring criteria for all the items under the Medical Practitioners scale are given in the table 2.

Table 2: Scoring criteria for medical practitioners perception on Radiology examination

Score	Percentage of perception	Criteria
0	0	Very poor perception on radiation and its hazards used in radiology examination
1	1-25	Poor perception on radiation and its hazards used in radiology examination
2	26-50	Neutral perception on radiation and its hazards used in radiology examination with our clarity
3	51-75	Good perception on radiation and its hazards used in radiology examination
4	76-100	Very good perception on radiation and its hazards used in radiology examination

Content Validity: After grouping, the items were subjected to content validation by the experts in the field of health professions who were radiologist, radiation safety officer and medical practitioners who prescribe the radiology examination..

The mean age of the expert group was 35.40 ±5.52 years and the mean experience was 8.40 ±5.20 years.

In our study, twenty-seven items had 100% agreement, thirteen items had 90% agreement and thirteen items had 80% agreement between experts. Hence fifty-three items which had 80% or more agreement were considered relevant and included. The three items which had less than 80% agreement between experts were eliminated. The item excluded in the study lacks clarity and difficulty in assessing or scoring such attributes in the medical practitioner's population. These suggestions were considered while drafting the scale.

Exploratory Factor Analysis: The social demographic profile of the medical practitioners (N = 535) revealed that 64.7% of the medical practitioners are males and 35.3% are females (Table - 4.25 1). Among the participant 45.4% are MBBS intern, 16.6% participant are BDS intern 37.9% participant are MD postgraduate and above. We had calculated the EFA from the sample of 535 subjects which result in five factors and the scree plot of Exploratory Factor Analysis for medical practitioners as shown in figure 1.

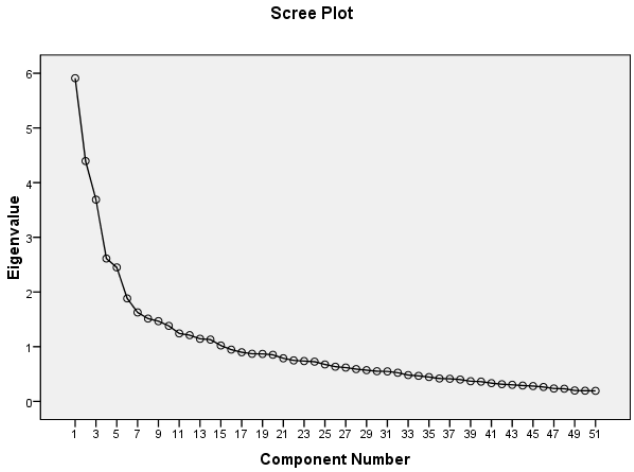


Figure 1: Scree plot of Exploratory Factor Analysis for medical practitioners

Grouping of items under domains

The outcome of the Exploratory Factor Analysis resulted in five domains. Based on Exploratory Factor

Analysis result, the items were grouped under the specified domains as per the relevance. While grouping, explanations were sought from the experts when there was an ambiguity. This procedure resulted in fit of 41 items under the five domains.

Discussion

When developing a new instrument, focus needs to be given to have a clear conceptualization of the target construct. Thus without established content validity, users cannot be confident that variance in obtained scores is due to latent construct[10]. Expert panel method, which is the most commonly used and convincing approach[11]for determining content validity. The expert pool consisted of members from diverse specialty which enabled us to identify the relevant items and domains suitable for the medical practitioner's perception about the radiology examination. The experience of experts, which is an important prerequisite for the content validation, has been the added strength of our method. Thus, the expert analysis helped us in refining the domain and item.

Exploratory factor analysis is a useful analytic method that can determine, in a way that reliability coefficients cannot, empirically, how many constructs, or latent variables, or factors underlie a set of items[12] [10]. Currently there are no similar studies which describe scale ratings for the perception of Radiology examination among the medical practitioners.

The Cronbach's Alpha of 0.781 in the new scale for the medical practitioners respectively suggests that, all the items were to the construct and hence capable of measuring the perception of radiology examination. This suggests that items in the subscale or domains were adequately grouped in the new scale and possesses good internal consistency[13].

In conclusion, a valid scale has been developed to evaluate the medical practitioner's perception on radiology examination.This scale is the foremost instrument of its kind to assess the medical practitioner perception on radiology examination. The scale is adequately responsive to test the effect of intervention and possess strong internal consistency

Conflict of Interest: There is no conflict of interest

Source of Funding: Self

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Influence of Cognition on the Motor Skills of Preterm Infants

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Abstract

Background: According to WHO preterm is defined as babies who were delivered prior to the completion of 37 weeks which accounts for 23.6% of worlds birth. The neuro developmental growth of preterm infants constitutes 88.8% of cognitive disability and 84.4% of motor disability. To understand an infant, motor aspects together with cognition should be considered and emerging trends should focus on these priorities. If not focused the brain will go for "use it or lose it" principle. Relationship between cognitive and motor skills ranges from weak to strong in different age groups but still the extensibility of the relationship is not established.

Aim: To study the influence of cognition on the motor skills of preterm infants.

Methodology: Preterm infants around 4 months of age of both genders who come under inclusion criteria were taken to the study. Prior informed consent was obtained from the parents. Infants were screened using Bayleys scale of infant development for cognition and motor skills.

Results: The analysis of this study concludes that cognition and motor skills are affected in pre term infants.

Conclusion: So the cognition and motor skills goes hand in hand majority of the times and cognition is influencing the motor skills of preterm infants. Addressing the cognitive exercises and imparting the same to the infants will help to provide basic knowledge of the exercises and provide a better platform to work on the outcomes through rehabilitation.

Keywords: *Cognition, preterm infants, gross motor function, fine motor function.*

Introduction

According to WHO preterm is defined as babies who were delivered prior to the completion of 37 weeks which accounts for 23.6% of worlds birth.

The neurodevelopmental growth of preterm infants constitutes 88.8% of cognitive disability and 84.4% of motor disability. The development of preterm infants differs widely than term infants and the these infants are at risk of developing neuro sensory, intellectual and behavioural disabilities[1].

Research suggests maximum synaptic density at 1-2 years of life. Increased production of the above leads to adaptation, leading to better recovery. Also the first stage of psychosocial development occurs between birth and one year of age,which gets disrupted when infant born preterm[2].

Recovery of preterm infants depends on plasticity which refers to good prognosis and vulnerability referring to poor outcomes. The immature brain lacks to do skills resulting in slow recovery[3,4].

Cognitive and motor impairments are the major sequelae, in which innate ability of understanding environment constitutes higher order complex

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skills(cognition),and ability to interact with environment constitutes simple lower order skills (Motor)[5,6].

Even though the chronological growth of infants are fine, as infant ages, the demands placed by the environment on them increases resulting in inability to manage the environment leading to deficits[7].

An infant with deficits is often assessed for motor outcomes predominantly than cognition, that is often ignored. To understand an infant, motor aspects together with cognition should be considered and emerging trends should focus on these priorities. If not focused the brain will go for "use it or lose it" principle. Relationship between cognitive and motor skills ranges from weak to strong in different age groups but still the extensibility of the relationship is not established[8].

If studied, in turn helps to identify the

a. emerging problems in absence of impairment
b. to find catch up over time during delayed development
c. to find out the stages of recovery.

Also double hazard, the problems with neural processes and environmental factors affecting the infants recovery can be ruled out. Some factors affecting the relationship include gender (ie female brain has large dendritic volumes than males)and birth weight[9]. But the motor learning of preterm infants are not clearly understood and predictable conclusions are not met.

This study aims to find out the relationship between cognition and motor skills and its extensibility of relationship.

Material and Method

Aim of the study: To study the influence of cognition on the motor skills of preterm infants.

Objectives:

To find out

1. Cognitive involvement in preterm infants.
2. Motor involvement in preterm infants.
3. The relationship between the cognitive and motor impairments in preterm infants.

Methodology: Study Setting: Sri Ramachandra Medical center and hospital

Study Design: Cross sectional Study

Sample Size: 32 preterm infants around 4 months of age.

Sampling: convenient sampling.

Inclusion Criteria:

- Preterm infants around 4 months of age
- Both Genders

Exclusion Criteria :

- Congenital anomalies
- Un cooperative infants.

Procedure: Data collection was initiated following the approval of Institutional Ethical Committee. Preterm infants around 4 months of age of both genders who come under inclusion criteria were taken to the study. Prior informed consent was obtained from the parents. Infants were screened using Bayleys scale of infant development for cognition and motor skills.

Cognition was checked and the infant should obtain the score of 1 for first three consecutive items at the the start point of any age to go forward. If the infant obtains a score of zero on any of the first three items, then the starting point of previous age is went and those items were administered. If the infant obtains a score of zero then administration was stopped.

Findings:

Table 1: Gross motor function distribution

Grossmotor			
		Frequency	Percent
Valid	Below Average	13	40.6
	Average	17	53.1
	Superior	2	6.3
	Total	32	100.0

Table 2: Fine motor distribution

Finemotor			
		Frequency	Percent
Valid	Below Average	13	40.6
	Average	17	53.1
	Superior	2	6.3
	Total	32	100.0

Table 3: Cognition distribution

Cognition			
		Frequency	**Percent**
Valid	Below Average	21	65.6
	Average	11	34.4
	Total	32	100.0

Table: 4 Correlation between cognition, gross motor and fine motor skills

Correlations					
			Grossmotor	**Finemotor**	**Cognition**
Spearman's rho	Grossmotor	Correlation Coefficient	1.000	.684**	.718**
		Sig. (2-tailed)		.000	.000
		N	32	32	32
	Finemotor	Correlation Coefficient	.684**	1.000	.763**
		Sig. (2-tailed)	.000		.000
		N	32	32	32
	Cognition	Correlation Coefficient	.718**	.763**	1.000
		Sig. (2-tailed)	.000	.000	
		N	32	32	32

**. Correlation is significant at the 0.01 level (2-tailed)., There is a significant correlation between fine motor and cognition e=.763 at, p=.0005<.01, There is a significant positive correlation between gross motor and cognition e=.718 at p = .0005<.01.

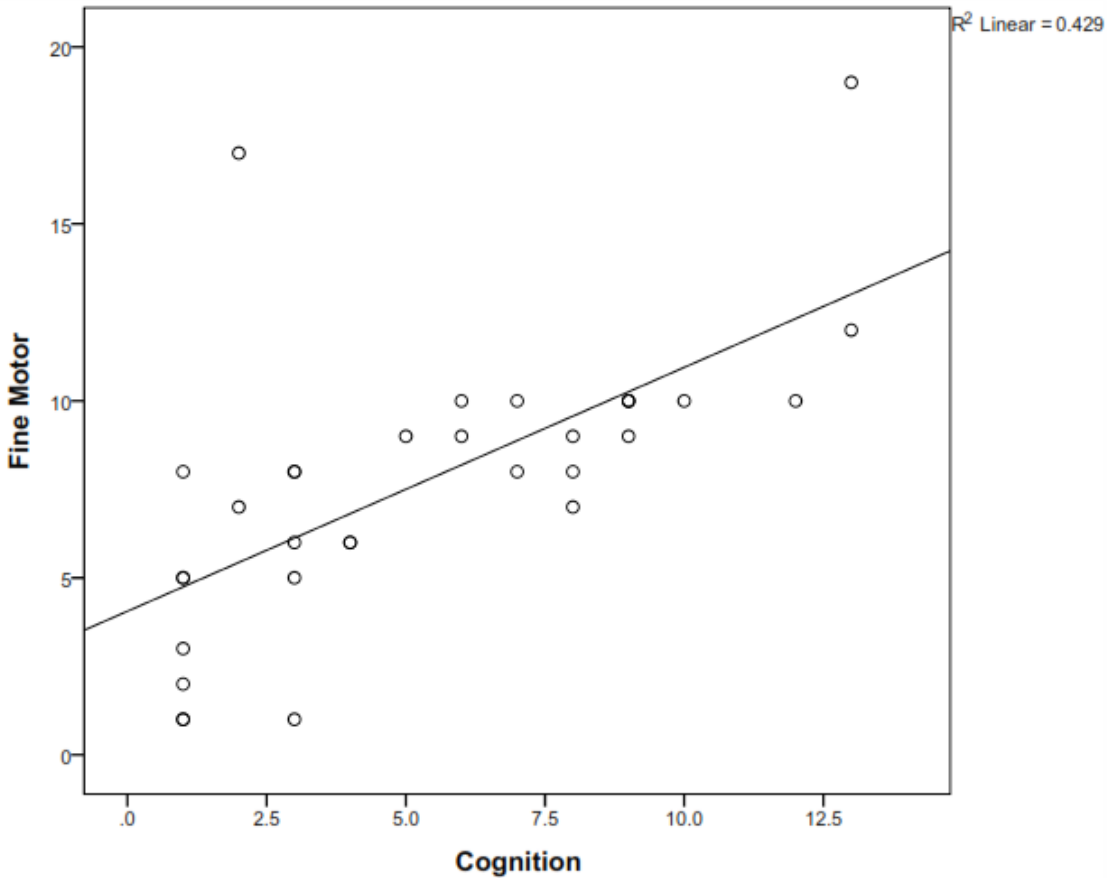


Figure 1: Graphical representation of cognition and fine motor skills

The graph describes when cognition is affected, fine motor is also affected .

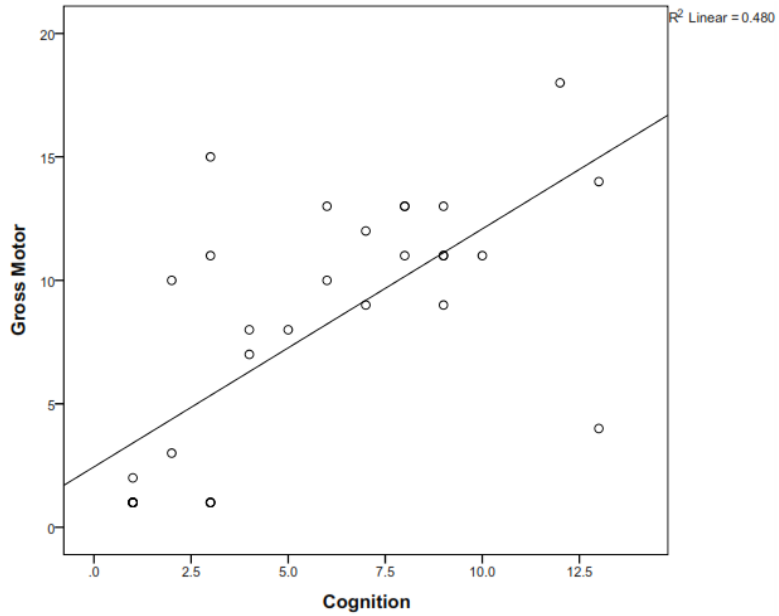


Figure 2: Graphical representation of cognition and gross motor skills

The graph represents cognition and gross motor skills are directly proportional.

Discussion

32 preterm infants with varied birth types were assessed and male and female genders constituted equal percentage in the group. The age of each infant is corrected for comparing the skills.

During the assessment, infants who were considered as normal in spite of preterm was found to have deficits in either cognition, and motor skills.

This implies even though the appropriate growth is fine, minor deficits are present that was not identified by the parents which may impair the performance in later ages.

These 32 preterm infants who came from different educational, socio economic status were kept as "one" so that these variables doesn't affect the assessment outcomes.

In these 32 infants, 40% were late preterm, 43% moderate preterm and 15 % were late preterm.

Bayleys scale[10] analysed the skills in infants and it comprised of raw score, scaled score and composite score. The composite score were used for the association between the skills. From these scores, the results showed there is significant association between the cognitive and motor skills determined by the Pearsons correlation coefficient. Very few studies are concentrating on the relationship of these skills, however were being studied in elder age groups.

The scaled scores were used to analyse the extensibility of relationship between the skills, which concluded that for every cognitive impaired infant, the motor skills were affected which means, for an average cognitive impaired infant, the motor skills are also in an average level most of the times. This also supports the study that if cognition is affected, motor skills are affected either equally or deviated mildly from the result of cognition.

As said ina study, motor disability is associated with Gestational age and cognitive disability is associated with small for gestational age which supports our study on the basis of gestational age . Also by the result from the type of preterm there is no association with the disabilities ie both the impairments are happening irrespective of the type of preterm. The above is supported by Mc Gowas JE, that late pre terms have an advantage in both the skills like terms which also supports that infants performed in the study expressed superior in both the skills even though born late preterm[11]. Study by Stephen

Christine, concludes that SGA contributes to the cognitive impairments[12].

Conclusion

The analysis of this study concludes that cognition and motor skills are affected in pre term infants . So the cognition and motor skills goes hand in hand majority of the times and cognition is influencing the motor skills of preterm infants . Addressing the cognitive exercises and imparting the same to the infants will help to provide basic knowledge of the exercises and provide a better platform to work on the outcomes through rehabilitation.

Ethical Clearance: Taken from Institutional Ethical Committee of Sri Ramachandra Institute of Higher Education & Research.

Conflict of interest: Nil

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Assessment of B12 in the Pregnant Women and their Correlation with the Blood Hemoglobin

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Abstract

Various nutrients such as vitamins, carbohydrates etc. are required during pregnancy. Among different classes of vitamins, Vitamin B12 (cobalamin) is the most important during pregnanacy. Hence, the present study aims to study the correlation between the serum B12 and blood hemoglobin in the pregnant women. This study included 60 pregnant women enrolled in Kerbala maternity teaching hospitalin January 2019 to April 2019. The pregnant women with 23rd to 25thgestational week were included in the present study. Fasting blood was collected and analysed for Vitamin B12 levels. The parameters like child birth weight, type of delivery and duration of pregnancy was recorded. Some social, demographic characteristics such as monthly income, education level, marital status, previous number of pregnancies etc. were also recorded. Average weeks of child delivery were found to be about 35.72 and 38.10 weeks in women with vitamin B 12 supplementation and healthy women, respectively. The vitamin B12 content was significantly lower (234.0±52.23 pg/ml) in the B12 deficient group as compared to healthy control (495.8±42.09 pg/ml). The blood hemoglobin levels was significantly lower (11.07±0.94 g/dl) in the B12 deficient group as compared to healthy control (14.38±0.58 g/dl). The vitamin B12 deficiency was associated anaemic condition in the mother which inturn affect the birth weight of the child. The vitamin B12 level should be monitored before planning of pregnancy.

Keyword: *Vitamin B12, anaemia, birth weight, pregnancy.*

Introduction

Maternal health during gestation has been very serious and imperative for intergenerational health. The genetic regulation of fetal growth is influenced by the intra-uterine environment in which the fetus grows[1,2]. Nutrients and oxygen supply from the mother is a one of the factors for fetus good healthy and survive[3]. This supply depends on the mother body size, nutritional status, body composition and metabolism. The mentioned parameters are itself being established throughout the mother's own fetal life, childhood and adolescence[3].

Various nutrients such as vitamins, carbohydrates etc. are required during pregnancy[4]. Among different classes of vitamins, Vitamin B12 (commonly known as cyanocobalamin) is the most chemically complex of all the vitamins. The structure of vitamin B12 is based on a corrin ring, which is similar to the porphyrin ring found in heme, chlorophyll, and cytochrome and has two of the pyrrole rings directly bonded[5]. Vitamin B12 is used by the body either as methylcobalamin or 5-deoxyadenosyl cobalamin for DNA methylation and production of hemoglobin which is the substance that carries oxygen in red blood cells[5]. Similarly, hemoglobin is another important parameter in pregnancy. It is a Fe-containing metal protein found in the erythrocytes, and is responsible for O2 transportation in vertebrates[6]. The foremost nutrients responsible in the production of haemoglobin are iron, folic acid, and vitamin B12. Succinyl co- A formed as intermediate from B12 metabolism pathway leads to production of hemoglobin in red blood cells[7]. Vitamin B12 is responsible of RBCs maturation, a deficiency of vitamin B12 and the interruption of this reaction leads to the development of megaloblastic anaemia. Folate deficiency independent of vitamin B12

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also causes megaloblastic anaemia[8]. Methylmalonyl CoA mutase converts methylmalonyl CoA to succinyl CoA, with 5-deoxy adenosylcobalamin required as a cofactor.

Foods contain various vitamin B12 compounds with different upper ligands; methylcobalamin and 5-deoxyadenosylcobalamin function, respectively, as coenzymes of methionine synthase (EC 2.1.1.13), which is involved in methionine biosynthesis and of methylmolonyl- CoA mutase (EC 5.4.99.2), which is involved in amino acid and odd-chain fatty acid metabolism in mammalian cells[9-10]. Humans have a complex process for gastrointestinal absorption of dietary vitamin B12[11].

The recommended dietary allowance of vitamin B12 for adults is set at 2.4 μg/day in the United States and Japan; however, daily body loss of the vitamin is estimated to be between 2 and 5 μg/day[12]. Bor et al[13]reported that a daily vitamin B12 intake of 6 μg appears to be sufficient to maintain a steady-state concentration of plasma vitamin B12 and vitamin B12-related metabolic markers.

Vitamin B12 deficiency is usually caused by the malabsorption of vitamin B12 although dietary inadequacy is common in the elderly, vegans or ovo-lacto vegetarians with poor diets. Causes can also relate to inadequate Intrinsic factor production, atrophic gastritis, interference with the ill uptake of vitamin B12 due to disease, resection or interference by bacterial overgrowth, drug-nutrient interactions as well as some less common genetic defects[14].

Decrease levels of Hemoglobin may be owed to a deficit in one or numerous nutrients. The foremost nutrients responsible in the production of haemoglobin are iron, folic acid, and vitamin B12. On a biological level, this deficiency is characterized by a reduction in hemoglobin levels due to a lack of essential nutrients, such as B vitamins, zinc, protein and iron. Hence, the present study aims to study the correlation between the serum B12 and blood hemoglobin in the pregnant women.

Material and Method

Study design: This study included 60 pregnant women enrolled at Kerbala maternity teaching hospitalin January 2019 to April 2019. The pregnant women with 23rd to 25th gestational week were included in the present study. The test was performed at Kerbala maternity teaching hospital.

Fasting blood (n=60) was collected by a single puncture form the Vitamin B12 deficient group (B12D group) and healthy participants after obtaining informed consent. The parameters like child birth weight, type of delivery and duration of pregnancy was recorded. Some socio demographic characteristics such as monthly income, education level, marital status, previous number of pregnancies etc. were also recorded.

Blood collection and biochemical analysis: The fasting blood was collected (2ml) in the plain vacutainers from the veinafter getting participant oral consent. The samples were kept at room temperature for 30min. Followed by the centrifugation at 3000rpm for 15min. The serum was separated and kept at 20°C for further study. Serum vitamin B12 content and blood haemoglobin were estimated by commercially available kits (Sigma, USA).

Statistical analysis: Results were presented as Mean ± Standard Error (SE). Obtained data were subjected to statistical analysis using GraphPad Instat (3.0, Trial Version). The unpaired t-test was done to estimate the statistical significance.

Results

A pregnant women (n=60) attending at Kerbala maternity teaching hospitalfrom January to March 2019 were enrolled in the present study. About 97.41% response rate was observed. The average respondent age was 25.81±2.4 years. About 5 (8.3%), 43 (71.6%) and 12(20%) women were included in the age group of less than 20, 21-30 and 30-40 years, respectively.

Vitamin B12 deficient women showed decreases in the fetus weight: Vitamin B12 deficient women showed significant (p=0.0382) decreased in the fetus weight as compared to the healthy women. The birth weight of the fetus is shown in the Figure 1. This decrease in the fetus birth weight and due to other complications, about 79.21% women underwentthe C-section delivery. While only20.79% normal delivery occurs.

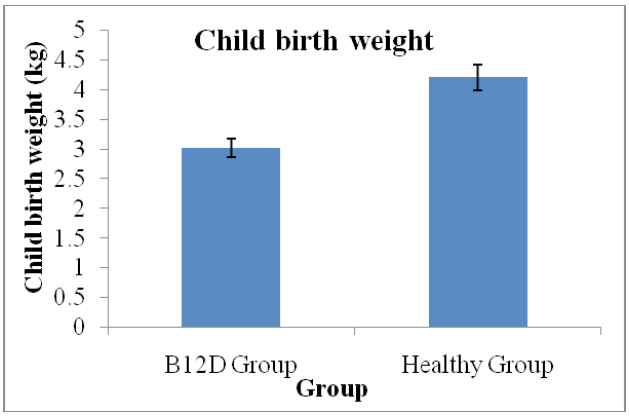


Figure 1: The birth weight of the fetus delivered by B12D group and healthy women

Results are represented as mean±standred error. B12D group showed $p<0.05$ as compared to healthy control (unpaired two-tailed test)

Average weeks of child delivery were found to be about 35.72 and 38.10 weeks in women with vitamin B 12 supplementation and healthy women, respectively. The presence of vitamin B12 deficiency leads to the premature delivery. However, the women are on viamin B12 supplementation, none of the child showed any birth defect. The fetus birth weight is negatively correlated with the presence of vitamin B12deficiency. The vitamin B12 content of enrolled women was depicted in the Figure 2. The vitamin B12 content was significantly lower (234.0±52.23 pg/ml) in the B12 deficient group as compared to healthy control (495.8±42.09 pg/ml).

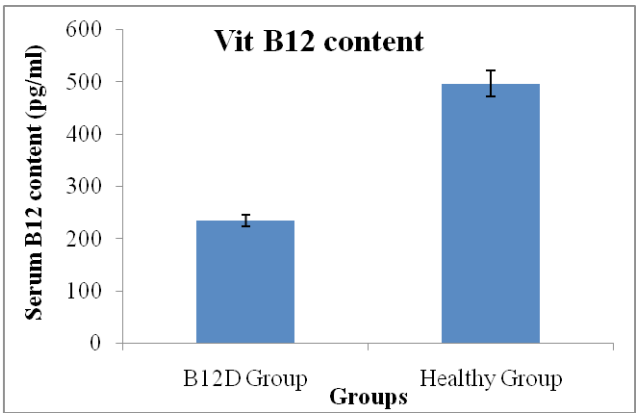


Figure 2: The vitamin B12 content ofB12D group and healthy women

Results are represented as mean±standred error. B12D group showed $p<0.05$ as compared to healthy control (unpaired two-tailed test)

The blood hemoglobin levels was significantly lower (11.07±0.94 g/dl) in the B12 deficient group as compared to healthy control (14.38±0.58 g/dl). The blood hemoglobin levels were depicted in the Figure 3.

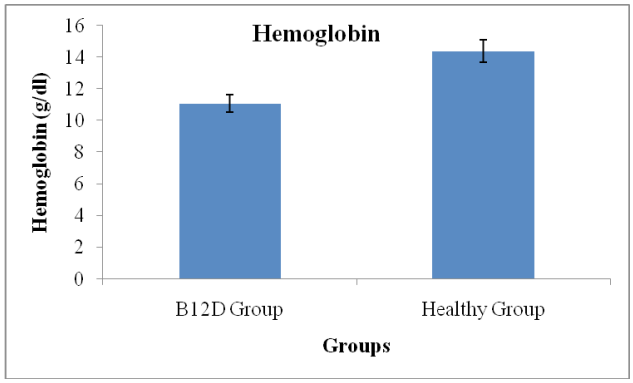


Figure 3: Blood hemoglobin levels ofB12D group and healthy women

Results are represented as mean±standred error. B12D group showed $p<0.05$ as compared to healthy control (unpaired two-tailed test).

The normal Vitamin B12 values are depicted in the Table 1.

Table 1: Normal Vitamin B12 levels in the serum at different stages of pregnancy

Units	Nonpregnant Adult	First Trimester	Second Trimester	Third Trimester
B12 (pg/ml)	279 - 966	118 - 438	130 - 656	99– 526
Hemoglobin (whole blood) (g/dl)	12 -15.8	11.6 - 13.9	9.7 - 14.8	9.5 -15

The details adapted from the Abbassi-Ghanavati et al[15].

A positive correlation was observed between serum vitamin B12 levels and blood hemoglobin content. This, in turn, can be positively correlated with the birth weight.

Discussion

As defined by the WHO, Fe deficiency is the most common nutritional disorder and the leading cause of anaemia in the world[16].Any abnormality in the intra-uterine environment can be detrimental to fetal growth. Failure to supply the adequate amount of nutrients to meet fetal demand, for example, due to maternal malnutrition, inadequate placental function or increased nutritional demand, leads to fetal undernourishment[17-18].

Pernicious anemia is the end stage of an auto-immune gastritis and results in the loss of synthesis of intrinsic factor (IF). It is this loss of IF that causes

vitamin B12 deficiency and if untreated, megaloblastic anaemia and neurological complications develop[19-21]. The process of anemia develops durin pregnancy is well understood. The haemoglobin concentration was fall due to haemodilution during the first and second trimesters of normal pregnancies[22].

Vitamin B12 (B12)-deficiency in pregnancy is most prevalent, and it was found to be associated with preterm birth (length of gestation <37 weeks) and lower birth weight (birth weight <2,500 g)[23].Many reports are published about the correlation of vitamin B12 and low birth weight[23-27]. In the present study, we found that the low birth weight was associated with the vitamin B 12 deficiency. Our study is accordance with these reports. It was also reported that the higher B12 was connected with higher birth weight in low- and middle-income countries, but not in high-income countries[23]. The maternal obesity can be one of the reason for the B12 deficiency in several populations[28-29].

Very few reports are available regarding the correlation between the vitamin B12 and low haemoglobin levels i.e. anaemia[30-31]. A study in the Korean children reported that the inadequate iron and vitamin B12 intake is directly proportional to the growth retardation and anemia[30].

From the above study, we can conclude that the vitamin B12 deficiency was associated anaemic condition in the mother, which inturn affect the birth weight of the child. The vitamin B12 level should be monitored before planning of pregnancy.

Ethical Clearance: The blood was collected from the Karbala maternity teaching hospital after their investigation. Oral consent was taken before enrolled the patients in the study.

Source of Funding: Self

Conflict of Interest: Nil

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Comparison of Coliform, E. Coli, E. Coli O157, and E. Coli O157:H7 Bacteria in Bali Cattle in Mengwi, Bali

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Abstract

This study aims to determine the comparison of the number of Coliform, E. coli, E. coli O157, and E. coli O157:H7 bacteria in Bali cattle in Mengwi, Bali. Samples were taken as many as 58 faecal samples, which were further identified through several stages, namely growth on the eosin methylene blue agar media, Gram staining, indole test, methyl red, vogesproskauer, citrate, growth on sorconolMacConkey agar media, serological tests with E. coli O157 latex agglutination test and serological test with E. coli Anti-serum H7. From 58 Bali cattle feces samples taken, 100% were positive for Coliform, 55.1% were positive for E. coli, 6.8% were positive for E. coli O157, and 3.4% were detected as positive for E. coli O157:H7. Spearman's rho analysis results showed that the high Coliform and E. coli bacteria did not significantly affect the discovery of E. coli O157 and E. coli O157:H7 bacteria. The conclusion that can be drawn is that from 58 faecal samples taken, 32 were positive samples of E. coli bacteria, whereas only 2 positive samples contained E. coli O157:H7 bacteria which were harmful to human health.

Keywords: *Foodborne disease, Bali cattle, coliform, E. coli O157:H7, Spearman rho correlation test.*

Introduction

Escherichia coli in cattle grow normally in the intestine because E. coli is a normal flora in the human digestive tract and in warm-blooded animals with the most population in the back of the digestive tract.[1]E. coli bacteria can also endanger health, because it is known that E. coli bacteria are part of the normal digestive tract microbiota and it has been proven that strains certain strains can cause moderate to severe gastroenteritis in humans and animals.[2]

Some strains of E. coli can cause disturbances in the digestive system, namely the strain EPEC (Enteropathogenic Escherichia coli), strain ETEC (Enterotoxigenic Escherichia coli), strain EIEC (Enteroinvasive Escherichia coli), strain EAEC (Entero Aggregative Escherichia coli), strain DAEC (Diffuse Adherent Escherichia coli), and EHEC strain (Enterohemorrhagic Escherichia coli).[3] One strain of EHEC bacteria is E. coli O157 with E. coli O157:H7 serotype, which is a pathogenic bacterium and can cause hemorrhagic colitis and hemolytic uremic syndrome (HUS).[4] Based on the above problems, the study of the comparison of Coliform, E. coli, E. coli O157, and E. coli O157:H7 in Balinese cattle in Mengwiis interesting, in the hope of considering preventive measures or further precautions.

Research Method

Sample: In this study, the sample used was Bali cow feces that were taken randomly and proportionally from cattle that were in Mengwi. Criteria for Bali cattle whose feces may be used as research samples are cattle of all ages and originating from both female and male Bali cattle. Fresh fecal samples taken were then placed in a sample pot and carried with a thermos filled with ice to carry out an initial laboratory analysis in the laboratory of Biology and Biotechnology at Udayana University. Based on the estimated prevalence of disease events of 2.5% and 5% error, the number of samples needed for the 95% confidence level is a minimum of 39 samples, calculated by the formula according to Martin et al. (1987) which is 4PQ/L2. The number of samples taken in the study was 58 samples.

Phase Isolation and Identification of Samples: Stool samples were diluted first with buffered peptone water (BPW) 0.1% to a dilution level of 10-3 before growing on solid and liquid media (broth) so that after incubation a number of bacteria can be calculated.

EMBA Media: 15 ml eosin methylene blue agar (EMBA) media was put into each petri dish for sterilization by autoclaving at 121 °C for 15 minutes. After sterilization, the media is taken from the sterilizer and then left at room temperature (37 °C) so that the media becomes solid. From the dilution of the desired sample as much as 100 µl the solution was put into a petri dish with a scattering method with a bent glass. Incubation is carried out at 37 °C for 18 to 24 hours. After the end of incubation, the colonies that grow in metallic green with a dark colored center, small round colonies with flat edges and have convex surfaces are counted as E. coli colonies. Growing colonies are collected by inoculating on nutrient media so that they are slanted for further examination.[5]

Gram staining: Positive E. coli samples were then confirmed by Gram staining to see the shape and color of the bacteria. Bacterial colonies were taken with one needle placed on an object glass and dripped with distilled water to be fixed at room temperature. The preparation is then dripped with gentian violet solution, left for 1.5 minutes then rinsed with running water. It was then dropped with lugolsolution, leave it for 1 minute, then drop it with alcohol (acetone alcohol) for 5 minutes, then rinse with running water. The preparation is then dripped with safranin solution, left for 5 seconds, then rinsed with running water. Fixation of aerated to dry or left at room temperature then examined under a microscope.[5]

Test IMVIC: E. coli bacteria from EMBA media which were Gram-negative positive were then tested for fecal and non-fecal groups with indole (SIM) test, methyl red, Proskauer and citrate Voges (IMVIC) by inoculating each one into a tube containing tryptone broth for indole test, MR-VP Medium for methyl red and Proskauer votes and into the citrate medium for testing the use of citrate as the only carbon source. All tubes were incubated at 35 °C for 5 days, except MR-VP medium for methyl red test (with an incubation time of 6 days). E. coli gave a positive result on the indole test because it was able to break down the amino acid tryptophan, E. coli during the fermentation process produced more acid so that the methyl red test gave a positive reaction, namely the methyl red indicator turned red. The Voges-Proskauer E. coli test gave a negative result because E. coli could not form acetyl methyl carbinol (Estonia), as well as the E. coli citrate test, gave a negative reaction to the test because E. coli was unable to use citrate as a carbon source. After that, from the positive tube in the IMVIC test one was taken and inoculated on the nutrient media to tilt for further examination. [5]

Growth on SMAC media: Positive results from the EMBA media and showed the properties of fecal coli in the IMVIC test and in the form of a short red stem in the Gram staining test which was planted on nutrient media to be slanted, then inoculated on MacConkey agar (SMAC) selective media. After being inoculated at 37 °C for 20-24 hours, E. coli O157 was detected with characteristics of clear/colorless colonies or Sorbitol negatives and compared characteristics with E. coli O157 control isolates (Oxoid).

Serological test with E. coli O157 Latex Agglutination Test: Serological test with E. coli O157 isolates, which showed colorless properties in the SMAC media in the hope that it would be more convincing that the colony was an E. coli O157 strain, then tested further using E. coli O157 latex agglutination test. Positive reactions are characterized by the formation of precipitation on latex paper in accordance with the positive controls provided by the Kit (Oxoid).

Serological Test with E. coli Antiserum H7: This stage is the final stage to ensure that the colonies isolated are E. coli O157:H7 serotypes, the test is carried out on the flagellum antigen by testing the H7 antiserum. Positive colonies in the latex test are first grown on motile media as much as 2 times the planting. Positive results on this medium are characterized by the spread of growth from the puncture site. After growing on motile media, the isolates are then grown in the brain heart infusion (BHI) media. Isolates were incubated at 37 °C for 24 hours. Isolates that grow are characterized by turbidity in the media. Isolates in BHI media were then inactivated by adding 40% formalin with a ratio of 0.3 parts of formalin in 100 parts of BHI, hereinafter referred to as antigens. This antigen is then tested with H7 antiserum which has been diluted with a ratio of 1: 500. The test was carried out by reacting 50 µl of the antigen with 50 µl of antiserum in the plate. The plate is then incubated at a temperature of 50 °C for 2 hours. Positive results are characterized by the formation of agglutination (precipitation) on the base of the plate (Difco Laboratories, Detroit, MI, USA).

Results

The results of examination of Balinese cow feces samples taken from 10 villages in Mengwiagainst coliform showed that from 58 samples examined all

positive samples contained Coliform. The results of the number of Coliform were 7.0×106 while the number of E. coli bacteria was 3.7×106. All Bali cattle stool samples examined found the average number of Coliform was 1.2×105 CFU/g, and the average level of contamination of E. coli bacteria from E. coli positive samples was 6.2×104 CFU/g.

Moreover, from the results of the study it can be described the percentage comparison between Coliform contamination, E. coli, E. coli O157, and E. coli O157:H7 namely that of 58 samples taken, 100% positive containing Coliform, E. coli bacteria reaching 55, 1%, E. coli O157 is 6.8%, while E. coli O157:H7 is only 3.4%.

The results of examination of Balinese cow feces samples taken from 10 villages in Mengwi Badung against Coliform showed that from 58 samples examined all positive samples contained Coliform. The results of the number of Coliform were 7.0×106 while the number of E. coli bacteria was 3.7×106. All Bali cattle stool samples examined found the average number of Coliform was 1.2×105 CFU/g, and the average level of contamination of E. coli bacteria from E. coli positive samples was 6.2×104 CFU/g.

All Bali cattle stool samples examined showed the highest number of Coliform of 4.8×105 CFU/g in Baha Village. Whereas the E. coli bacteria with the highest amount of 3.5×104 CFU/g was also found in Baha Village. The highest number of Coliform and E. coli bacteria is in Baha Village because the social culture is still quite traditional and the average level of education of farmers in Baha Village is elementary school graduates, so their knowledge of good cattle management is not understood by them. The example seen in the field is that cattle are not grounded and the cleanliness of livestock and the surrounding environment is less noticed.

The high number of E. coli bacteria in cattle found in several villages from Mengwishows that factors such as geographical conditions and maintenance management that are less influential on bacterial growth in Mengwi. The high contamination of E. coli bacteria in Bali cattle in Mengwiprovides an opportunity for the discovery of pathogenic E. coli namely E. coli O157. This statement is corroborated by the results of a study stating that cattle were known as the main reservoir of Verocytotoxin-producing Escherichia coli O157, as well as being the main source of transmission to humans.[6]

The Spearman rho correlation test from the data shows that Coliform showed a very strong correlation ($p<0.01$) to E. coli bacteria contamination with a Spearman rho correlation value of 0.6. Different results were shown from the Spearman's rho correlation test between Coliform and E. coli O157 and E. coli O157:H7 which showed an unrealistic correlation ($p>0.05$) with a correlation value of 0.02 and 0.13 respectively. Likewise, the contamination of E. coli bacteria showed no significant correlation ($p>0.05$) to E. coli O157 and E. coli O157:H7 contamination with a correlation value of 0.16 and 0.17, respectively. While the Spearman rho correlation test between E. coli O157 and E. coli O157:H7 showed a very significant correlation ($p<0.01$) with Spearman's correlation value rho 0.6.

The results of Spearman's rho's analysis show that with the presence of a high number of Coliform found in cattle in Mengwi, it is very significantly correlated with the emergence of E. coli bacteria. Likewise, the discovery of E. coli O157 bacteria was highly correlated with the discovery of E. coli O157:H7 bacteria. However, from the high number of Coliform and E. coli bacteria contamination, it was found that there was no significant correlation with the discovery of E. coli O157 and E. coli O157:H7 bacte. The presence of E. coli O157:H7 contamination in Bali cattle feces in Mengwi,Badung indicates that E. coli agents are pathogens especially E. coli O157:H7 is indeed there. Escherichia coli O157:H7 in humans can cause hemorrhagic colitis whose symptoms include stomach cramps followed by diarrhea, nausea, vomiting, sometimes mild fever. Possible complications are hemolytic uremic syndrome (HUS), urinary tract infection that can cause kidney failure in children.[7] E. coli O157:H7 infection in humans is often caused by consumption of contaminated meat and consumption of water that has been contaminated by feces that are positive for E. coli O157:H7.[8]

Conclusion

Coliform and E. coli were found, respectively at 7.0×106 CFU/g, 3.7×106 CFU/g, and from the number of E. coli bacteria found, E. coli O157 bacteria were identified as much as 4 isolates and E. coli O157:H7 only 2 isolates. The presence of Coliform correlates very significantly with E. coli bacteria, as well as the presence of E. coli O157 bacteria with E. coli O157:H7. However, the presence of Coliform did not correlate with the discovery of E. coli O157 bacteria, nor between the discovery of E. coli bacteria and the discovery of E. coli

O157. The same thing also found no correlation between the discovery of Coliform with E. coli O157:H7 and E. coli bacteria with E. coli O157:H7. To the farmers, the management of Bali cattle raising needs to be improved in Mengwi, Badung. Given the high number of Coliform and E. coli bacteria found and E. coli O157:H7 detected as zoonotic agents. Preventive measures are also needed to prevent transmission of E. coli O157 agents:H7, such as counseling about sanitation and hygiene (washing hands with soap after contact with cattle, making livestock pens, maintaining clean cages, handling livestock waste properly).

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Conflict of Interest: There are no conflict of interests.

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Identify Factors that Influence Healthcare Quality by Adoption Mobile Health Application in KSA E-Health

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Abstract

The main purpose of this study was to identify factors that effect healthcare quality in the KSA context Mobile Health Application (MHAs) identified to positively influence the quality of health service provision in different health centers with a decrease in the number of health costs in various centers. Often lack of awareness and lack of education on the use of the MHA system makes the system not to be maximally used for the benefit of the people. This research proposes the use of the Unified Theory of Acceptance and Use of Technology (UTAUT) framework, which will highlight the positive gains to be identified with the acceptance of the MHA system. Across the health care, sector UTAUT model has been used to evaluate the adoption and integration of the MHA system. The study proposes to use the UTAUT model to check on the physicians' behavioral exercise and their propensity to use the MHA system for healthcare delivery. The primary aim of the research is to test trust information elements which are identified to influence adoption and integration on the preference to use MHA by different healthcare practitioners. The study focuses on Saudi Arabia hospitals which are using MHA. Furthermore, the study will evaluate various factors that influence the adoption and acceptance of the MHA system by conducting comprehensive examinations, the use of questionnaires, and did in-depth studies.

Method: The study proposes to use surveys across the Saudi Arabia hospitals to gather all required data from different healthcare centers and professionals who are already familiar with the MHA system. Total of 266 respondents is used from 522 surveyed forms and conduct necessary data analysis.

Keywords: *Quality, MHAs, Healthcare, acceptance new technology, Trust factors, Ehealth.*

Introduction

The Mobile Health Application (MHAs) systems are defined to be a collective of diverse information instruments, which includes: emergency information, test systems, electronic prescription, telemedicine, and digital imagery, among others. The system is designed to positively impact on the healthcare professional decision-making for the doctors for different conditions presented. The preference to integrate the use of the MHA allows the daily hospital operations to be safer, and patients are identified to get better benefits from the respective hospitals they are seeking treatment . Some of the advantages of using the MHA system include: quality healthcare with ease accessibility of health-care-related data by the doctors,(1) increase efficiency on the primary caregiver, motivate the patients to be active participants when making decisions regarding their healthcare (2), appropriately transfer the information as suggested by precautionary healthcare with preference to use primary-care guide(3). Furthermore, the system is used to encourage knowledge exchange and technology transfer, which allows the doctors to make sound update decision regarding the patients' health [1].

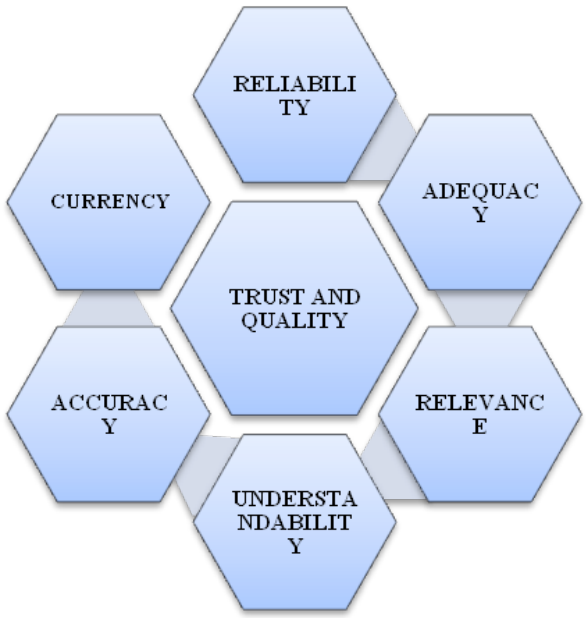
Current knowledge of MHA acceptance: MHA system is mainly used across developed nations(4). "USA Institute of Medicine" has explained the MHA as "an important technology" for "eHealth". However, despite its numerous activities MHA hospitals across Canada, the UK and USA have not widely accepted the system(5). A study conducted on the MHA system explains the integration projects are often withdrawn as soon as the research stage has commenced(6). The significant common barriers that are associated with MHA explains is due to lack of start-up funds, subpar technology, lack

of monetary benefits, opposition from the healthcare providers and professionals, and non-prioritization[7]. MHA integration and acceptance in different healthcare systems require the presence of large-capitalization and massive investments which involves a lot of attempt and era and ensure there is motivation on the radical changes in hospital works and different services being provided [8][9]. Within the pluralist eHealth regime, it has resulted in MHA system acceptance to be complicated with the MHA system varying across the health professional groups.

The use of the MHA system allows the health facility to get the required knowledge and enjoy technology transfer to ensure they make the best decision-making process, and they can issue up-to-date information for the patients[10].

The Contribution:

Trust in information (TI): Trust in knowledge (TI) indicated the level of trustworthiness in the online medium currently being used by the users. Research conducted by Chopra and Wallace (2003) explores about the level of trust, the users are allowed to examine their most conversant e-environments and ensure there is better delivery of quality[11], accuracy, currency and better coverage. To enjoy utmost trust in the e-health system, it is paramount to have quality delivered through the e-government systems. With belief established, it becomes easy to utilize different e-government services that are currently provided[12]. Therefore, the trust on MHA system will significantly depend on the reliability, accuracy, and relevance of the information provided by the system which is considered[13] **Information Accuracy:** guarantee accuracy in the information provided.



Research Hypothesis

Figure 1: Trust and Quality Model

MHAs and UTAUT2: The UTAUT model identified to be in operation across many health centers which are keen to use the MHA system to analyze better and get the necessary approval and espousal, which allows the health sector to manage better[1][14][15][16][17]. Table 1, in the case of Saudi Arabia hospitals, the employees are identified to find the MHA system to be useful and helpful. The preference to use UTAUT model allows it to issue different tasks on the directorate and ensure it is efficient and effective, performance expertise, social influence, effort expectancy, price vale, hedonic motivation and habit which are identified to have a direct impact on the behavior on the use of MHA system for many medical professionals and staff. Moreover, with high intentions to use the MHA system translated to increased adoption on the preference to use MHAs.

H1. Studies have explained, performance expectancy to be correlated to a positive manner in the preferential use of the MHA system. H2. Effort expectancy is identified to be connected to the optimization of the B1 of the MHA system. H3. When there is a positive social influence, there is a higher likelihood of the MHA system being used across different health sectors. H4. The same principles are identified to be true for facilitation conditions. H5. When a company has hedonic motivation, it is determined to directly linked to using the MHA system. H6. The preference to use the Price Value is correlated in a progressive mode to the inclination to use the MHA system. H7. Exploreshabit positivity is influenced by B1 to use the MHA system. H8 explains that Trust in information is essential when using the MHA system[18][19].

Data Analysis and Results: This paper gives an analysis that is required and ensures there is a proper display of empirical results to examine the hypothesis of the research. The research uses SMART-PLS 2.0 and SPSS version 18. The chapter comprises of Nine Major sub-sections.

Table 1: Summary of Sampling Size in KFH and KAH

Name of Hospital	No of Population	Physician p=91	Nurses P=325	Pharmacists P=22	Laboratory Technicians P=33	Administrative P= 61	Total Sample 522
KFH	433	*P=40 S=9	P=163 S=99	P=12 S=10	*P=15 S=12	*P=31 S=26	156
KAH	301	P*=51 S=5	P*=284 S=63	*P=10 S=8	*P=18 S=8	P=31 S=26	110

Research conducted by Sekaran (2003) explains the number of the sample was used with the preferred technique with a population of 700 used a minimum of 266 individuals as shown in table 3.4

Table 2: Size Sample for Given Population Size

N	S
400	196
500	217
600	234
700	266
800	280

During the study, there was a distribution of 420 questionnaires on all healthcare professionals. The review uses a random sample method. A survey conducted by Sekaran (2003), explored the surveys were distributed to different respondents after there was revisit done on the retest and pilot test. The respondents were given two months to complete the survey[21][22].

Table 3: Summary of Response Rate

Number of distributed questionnaires	420
Unreturned	111
Uncompleted	31
Returned and usable questionnaires	266
Respond rate (266/420)	More 50%

Sample Profile: Table 4 gives a representation on the frequencies and percentages of the demographical variables.

Table 4: Sample Profile

Group	Frequency	Percentage
Gender		
Male	69	25
Female	209	75
Age		
< 35	77	27
= > 35 < 50	107	38
> 50	94	34
Education level		
Master or PhD	15	5
Degree	138	49
Diploma	115	41
Secondary school or below	10	3
Type of Hospital		
King Faisal Hospital	158	56
King Abdulaziz Hospital	120	44
Function		
Physician	12	4.
Nurse	174	63
Pharmacist	18	6
Laboratory	20	7
Administrative	54	19
Experience		
> 3 months < 12 months	146	52
> one year < = two years	95	34
Above two years	37	13

Group	Frequency	Percentage
Daily Use MHAs		
less than one hour	61	22
From one hour to four hours	112	40
From 4 to 10 hours	83	29
above 10 hours daily	22	7

Measurement Model (CFA)–SEM: Measurement model or confirmatory factor analysis (CFA)has been used over the years to establish any links between the variables. Thus, by using this form of study,there is observation done on the variables and manifestations which define the matter [29]. To guarantee quality, operationalization is an essential step .Different scholars used established scales to ensure theoretical accuracy is guaranteed.

Scholars are often affected by a lack of established scales despite the availability of varied number so scales; thus, they are required to modify existing scales to ensure new context is accommodated. Therefore, based on the SEM analysis, there is a proper selection of items to ensure there is a measure of constructs [30].

Table 5: Examining Results of Hypothesized Causal Effects in Structural Model 2

Hypothesis	Path Shape	Path Coefficient	Standard Error	T-Value	P-Value	Hypothesis Result
H1	PE à BI	0.132***	0.028	5.20	0.000	Supported
H2	EE à BI	0.089**	0.025	3.55	0.001	Supported
H3	SI à BI	0.132***	0.027	5.33	0.000	Supported
H4	FC à BI	0.0435	0.023	1.89	0.061	Rejected
H5	HM à BI	0.132^{***}	0.024	5.45	0.000	Supported
H6	HT à BI	0.1256***	0.027	4.69	0.000	Supported
H7	TI à BI	0.139***	0.025	5.74	0.000	Supported

*p< 0.05, **p< 0.01, ***p< 0.001

Conclusion

The study explored factors that influence MHA system adoption in Saudi Arabian hospitals and their association on trusting the information provided plus the Behavioral Intention to use the MHAs system in Saudi Arabian hospitals and this has created better room for research. The paper also exploits the significance of UTAUT2 theoretical knowledge.

UTAUT2 model has been used for the study to exploit different external factors and behavioral intention on the use of MHA systems. Based on the findings, there is further exploitation of the UTAUT2 model in various Saudi Arabian hospitals. The preference to use UTAUT2 model allowed the introduction of trust across the social arenas. The study has been eminent to positively contribute to ensuring there is professional acceptance of the MHA system use across the Saudi Arabian hospitals,primarily where EMRs uses mandatory. Based on the results, there is better utilization, evaluation, and identification of different factors that translated to MHA acceptance in various Saudi Arabian hospitals.

Conflict of Interest: Nil

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Mobile Health (mHealth) Intervention for Family Planning Program: An Evidence from Systematic Review

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Abstract

High number of unintended pregnancies in developing countries occur in women who have unmet need for modern family planning. To fill this gap, several approaches have been implemented including the use of mobile phone. Some studies about mobile health (mHealth) and family planning were conducted, but there is no systematic review was made to evaluate the effectiveness. This paper aim to characterize existing evidence of the use mHealth for family planning program. For this review, published original articles written in English from last 10 years were extracted from leading databases (Pubmed, Sciencedirect, and Scopus). Relevance keywords have been applied i.e. "mHealth AND family planning" and "mobile phone AND family planning". The review structure was conducted in accordance with PRISMA guideline for systematic review. We included eight papers that passed critical appraisal process. Among them, 75% papers used randomized controlled trial and 25% used cohort as their study design. Several intervention strategies were used, included text messages (37,5%), text messages and application (37,5%), phone calls (12,5%), and voice messages (12,5%). The studies purposes were to evaluate the use of mHealth to improve knowledge and change contraceptive-related behavior. The findings showed that 62,5% studies were able to improve contraceptive use while 12,5% studies were not. Additionally 25% studies showed that mHealth might delay pregnancy and 12,5% studies were able to increase knowledge. Mobile Health intervention might support family planning program by improving knowledge and contraceptive use, but factors influencing contraceptive-related behavior changes should be further studied.

Keywords: *mHealth, mobile phone, family planning, contraception, contraceptive use.*

Introduction

The number of unwanted pregnancies in the world is still high. About 40% of births in the world is an unwanted pregnancy.[1] Unwanted pregnancies at ages 15-42 mostly occurs in developing countries. Every year around 74 million unwanted pregnancies is estimated occurring in developing countries.[2] Unwanted pregnancies may increase the risk of poor nutrition during pregnancy, mental health disorders, inadequate domestic relationships, domestic violence, miscarriage and low birth weight.[3-5]

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Most unwanted pregnancies occur in women who are unmet need for contraception. Increasing access to family planning (FP) by providing education and counseling, effective contraceptive method and community based services had been done in full filling unmet need pregnancy.[6-7] A low ratio between health worker and community encourages innovation by using health information technology to support family planning programs.[8]

Mobile phones for health or mHealth is a promising alternative method for increasing family planning knowledge and has a positive impact on the use of contraceptives.[9] The use of mobile phone is increasing rapidly and become a need for people in the world. In 2014, 90% of the population in developing countries already had mobile phones.[10] The wide availability and their ease of use, has provided space for mHealth to support health and medical practice.[11] mHealth can be used to provides various functions including health

information, support, reminders, emergency response and monitoring.[12] In developing countries mHealth is an alternative solution to cut costs and time, distance to health services and limited number of health workers.[13]

Various studies have been conducted to determine the impact of mHealth use on family planning programs. As a promising alternative, the development and use of mHealth widely requires evidence of the effects of mHealth on family planning programs. Therefore, this study aims to the current evidence of effectiveness of mHealth interventions for family planning program.

Method

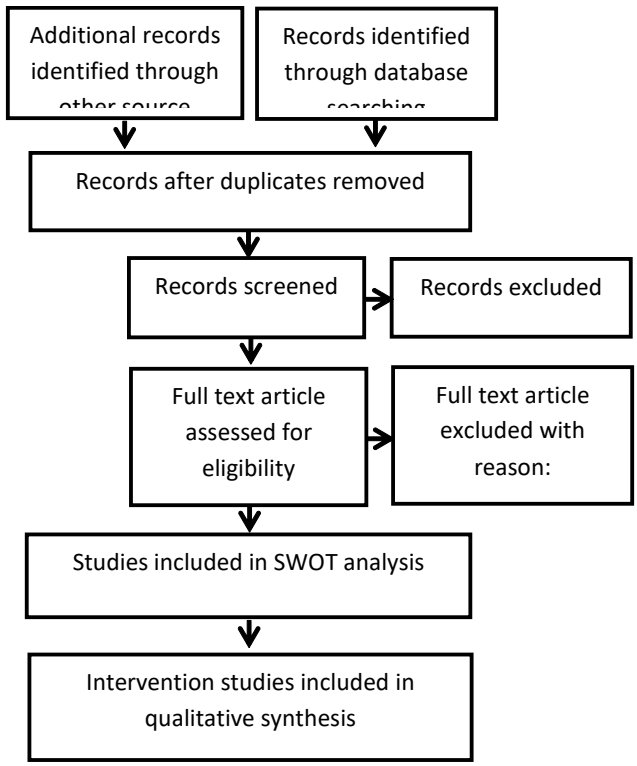
Protocol: This study was a systematic review and conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement for systematic review.[14]

Eligibility Criteria: Original studies focusing on the domain of family planning and the determinant mHealth were eligible for inclusion. Participants were any age who received mHealth intervention for family planning. Family planning was defined by Merriam-Webster Dictionary as planning intended to determine the number and spacing of one's children through birth control.[15] Mobile Health (mHealth) was defined as provision of health services and information via mobile and wireless technologies.[16] Intervention strategies and outcomes were not pre-specified in search or eligibility criteria. Article are eligible for inclusion when primary study that written in English from year 2008, contained pre-defined domain and determinant. Article which duplicated counted as one. Exclusion criteria included article not matching the domain and determinant, reports, proceedings, conference abstracts, projects protocols, and secondary analysis.

Search Strategy: We identify relevant studies from period 1 January 2008 until present with English language restriction. The leading database to be searched include PubMed (NLM), Sciencedirect, and Scopus. The studies to be included will be selected using predifined search terms i.e. "mHealth AND family planning" and "mobile phone AND family planning". **Graph 1** describe the search strategy to be used in this study. All duplicate articles were remove manually. Screening of title and abstract was reviewed by two reviewer independently for database result. Any discrepancies from the review will discussed together.

Data Collection Process: Data extraction from database and information was extracted on study design, intervention strategies, duration of intervention, place, contraception method, user, and result of the study.

Synthesis of the Results: Data synthesis aims to give description and narration review of the use of mHealth intervention to family planning program. Quantitative results of intervention studies were summarized in table.



Graph 1: Flow Diagram

Results and Discussions

The search yielded a total 431 papers, and after duplication removal and screening process, eight papers that passed critical appraisal process were included. Among them, 75% papers used randomized controlled trial and 25% used cohort as their study design.

Scope of the study: Studies was held both in developed and developing countries. Of the papers, 50% were conducted in United of States, 25% in Tanzania, 12,5% in Kenya and 12,5% in Tanzania (**Fig 1**).

Study design, characteristic, and results of studies: Only original articles with primary data included. Among them, 75% papers used randomized controlled trial and 25% used cohort as their study design. Several intervention strategies were used, included text messages (37,5%), text messages and application (37,5%), phone

calls (12,5%), and voice messages (12,5%). mHealth were used in intervention to give education (100%), as remainder tool (50%), counseling tool (25%), and data recorder (12,5%). Some studies specified intervention for specific types of contraception (50%), with 60% of them used long-acting reversible contraception (LARC) and 40% used non-LARC.

The studies purposes were to evaluate the use of mHealth to know its acceptability (37,5%), improved level of knowledge (12,5%), change contraceptive-related behavior (87,5%) and accessibility (25%). Percentage of the purpose of the study was showed in **Graph 3**.

Acceptability: Acceptability was evaluated in 37,5% studies and all of them concluded that mHealth was acceptable intervention in FP program. Braun et al. (2016) found that mobile job aid is acceptable to support community health worker in providing FP services and highly acceptable for their client because of the information shared was confidential (96%) and comfortable sharing personal information. L'Engle et al. (2013) concluded the feasibility of m4RH system by the high number of queries. Trent et al. (2015) stated the acceptability of Depo Text for Urban Adolescent by high number of recruitment rate and low refusal rate.

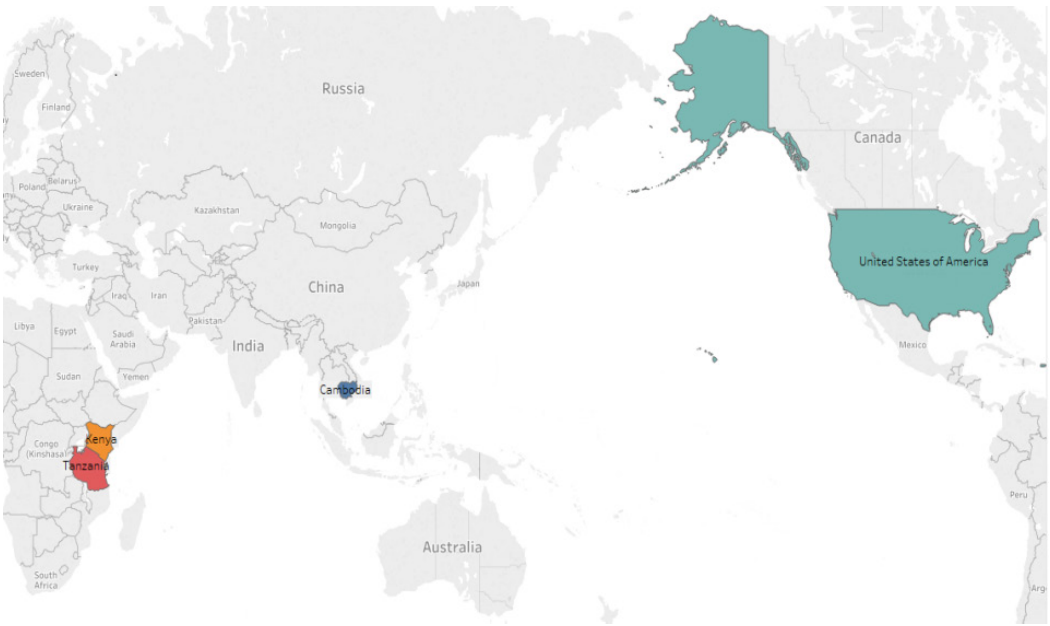
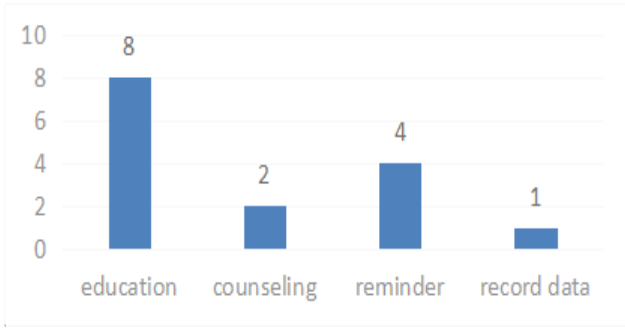


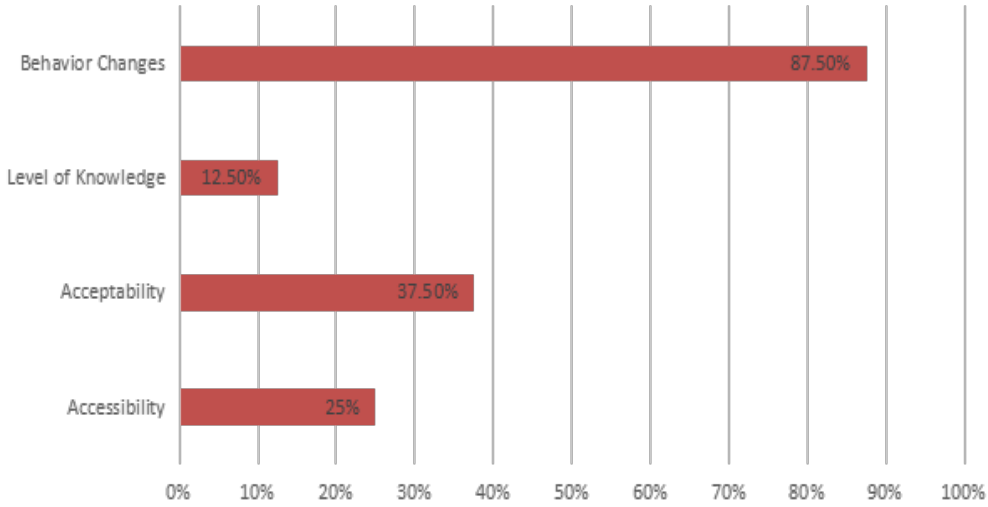
Fig 1. Scope of the study

Behavioral changes: Contraceptive-related behavior changes were evaluated by 87,5% studies. Behavior changes included changes in contraceptive use and method, improving clinic attendance, and delaying subsequent pregnancy. The findings showed that 62,5% studies were able to improve contraceptive use while 12,5% studies were not. Additionally 25% studies showed that mHealth might delay pregnancy. A paper showed there were changes in method include long-acting method which was popular in younger group, short acting method which was popular in older group, and coitally dependent method.[21] Changes in using contraception and whether they visit or discuss about contraception method was small and statistically insignificant.[18] Continuation of OCP use was improved by 10% in intervention group[23] and maintained prolonged adherence for DMPA or selected a more efficacious contraceptive method.[20] Depo Text also improved clinic attendance in FP visit in 1st and 2nd visit.[24] For delaying pregnancy, GirlTalk was not successfull in reducing time to subsequent pregnancy across 24 months follow up.[22]

Variation in results of behavior changes parameter may influenced by several factors. It may influenced by duration of intervention. Intervention duration varies from <6 months in 25% studies; 6-12 months in 62,5% studies; and 12-18 months only 12,5%.



Graph 2. Function of mHealth



Graph 3. Study purpose for mHealth intervention

Level of Knowledge. Johnson et al. (2017) found score for family planning increased about 14% by using m4RH (full-access group members correctly answered 2.19 questions out of 5, while limited-access group members correctly answered 1.92 questions (P<0.001)).

SWOT Analysis: SWOT analysis showed that mHealth was acceptable for community health worker and community.[17-19,22-24] Health worker could accept mHealth intervention because it was easy to use, could simplify work, improved data management, and could be a solution to the problem of time and distance between health worker and community for family planning service.[17] For community, mHealth intervention was acceptable because it was comfortable sharing personal information, and confidential.[17-19,22-24] Important Weakness of described mHealth intervention was the need for trained personnel so that there was an additional cost and time to do the training.[17] Opportunities could be enhanced such as appropriate text massage timing, and make teen friendly content.[17,20,24] Potential threats of acceptability included cultural aspect that influence women to make decision and external factor that limit women from following health guideline.[19-24]

Accessibility of mHealth intervention was enhanced when the information in simple, easy to understand[18,20] and in different (local) language was provided[21], was developed using locally based software[18], and could be reach for adolescence and adult[21] in both urban and rural area[19]. Weakness of mHealth intervention accessibility included lack of mobile phone ownership/ sharing of phone with partner[18,19,22,23], english literacy[18], and rural demographic[18]. As such, opportunities for mHealth intervention were providing phone to user[18,19, 23], the use of incentive schemes to increase recruitment[20,23,24], and feasibility of the study done prior to implementation[21]. Important threats that need to be tackled are the need for electricity to charge[17], the need for a functioning network[18,19,22-24] and user with not active or changing[19,22-24] or more than one mobile phone number.[19]

Strength of mHealth intervention on usability include could provide information and counseling related to family planning method[17,23,24], increase knowledge[18] and have positive impact on the use of family planning method.[19-24] However, in some studies the use of mHealth intervention has a weakness that is the decrease of efficacy in long term use or the cessation of intervention.[19,22-24] Social and mental health support provide an opportunity for future intervention.[21,22]

Discussion

The systematic reviewed suggests that mHealth were accessible as family planning intervention. The increase of mobile phone use around the world, both in developed and developing countries, as well as in rural and urban area made mHealth easy to access by community.[19] Local language availability to deliver information was important to rise mHealth coverage in unmet need for family planning population.[21] Practically, communication mode in mHealth such as voice message or phone call would useful for population with language barrier.[19, 23]

Mobile-phone intervention was acceptable with precaution. mHealth intervention needed training and technical accompaniment for the user which gave time and cost consequences.[17] Sustainability of mHealth needed a further study. In some study, mHealth users were given incentive and mobile phone.[18-20,23-24] Long-term sustainability to provide mobile phone and incentive, especially in national level should be explored.

The effect of mHealth on behavioral changes of contraception use still inconclusive.[19-24] Around 85,7% studies concluded mHealth could change behavior and the remaining studies otherwise. Contraceptive-related behavior changed only short-term and could not maintain the change of behavior after the intervention was discontinued.[19,22-24] We assumed that education had limited effective in duration of intervention.[25]

Knowledge of community about family planning program could increase after mHealth intervention.[18] This mHealth intervention increased knowledge transfer trustworthy personnel without space and time barrier.[17]

A study stated that Increased of knowledge in groups with mHealth intervention was not followed by significant behavioural changes.[18] While knowledge is a necessary first step, it is not sufficient to tip the scales to change behavior.[26] A systematic review has shown that many educational interventions that have successfully increased community knowledge have failed to have a significant impact on community behavior.

Conclusions

Mobile Health intervention for family planning program was acceptable and accessible. It might support family planning program by improving knowledge and contraceptive use, but factors influencing contraceptive-related behavior changes should be further studied.

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Conflict of Interest: The authors declare that they have no competing interests.

Source of Funding: Self funding.

Ethical Clearance: The systematic review is exempt from ethical clearance because we collected and synthesized the data from previous clinical trials which the informed consent were already obtained by trial investigators.

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Evaluating Minimum Inhibitory Concentration Values of Levofloxacin and Azithromycin on Haemophilus Influenzae

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Abstract

Background: Community Acquired Pneumonia (CAP) is leading cause of morbidity and mortality in all age groups globally. 4 million cases of Community Acquired Pneumonia occur annually. *Haemophilus influenzae* is a causative organism of CAP. Empirical treatment with antibiotics like levofloxacin and azithromycin is recommended in these cases.

Objectives: This study was conducted to evaluate the minimum inhibitory concentration of levofloxacin and azithromycin in *H. influenzae* isolates from respiratory specimens.

Design: Minimum inhibitory concentrations of levofloxacin and azithromycin in 40 clinically significant *H.influenzae*isolates were tested using E-test method after the approval of Institutional Ethics committee. The results were analyzed according to 2019 CLSI guidelines.

Result: MIC_{50} for levofloxacin was 0.008 µg/ml, MIC_{90} 1.5 µg/ml and the 3 resistant isolates had MIC ranging between 8 and 12 µg/ml. Azithromycin MIC_{50} was 0.047µg/ml, MIC_{90} 6.4 µg/ml and 5 resistant isolates had MIC between 6 and 32µg/ml.

Conclusion: The rising MIC of levofloxacin and azithromycin in *H.influenzae*emphasizes the need to monitor the antibiotic susceptibility pattern on a regular basis. It is also advisable to restrain the use of fluoroquinolones to make it available for use in the tuberculosis treatment and also to avoid any adverse effects.

Keywords: *Haemophilus, azithromycin, levofloxacin, minimum inhibitory concentration.*

Introduction

Community Acquired Pneumonia (CAP) is leading cause of morbidity and mortality worldwide in all age groups. In spite of having potent new antimicrobials and vaccines it still remains a serious and common health problem. Annually 4 million cases of CAP occur annually and of which 20% require hospitalization. In out-patient settings mortality rate ranges 1- 5% but in ICU patients it approaches 25%[1,2]. *Haemophilus influenza* are responsible for 2– 12% of CAP[3].*H.influenzae* are known to be commensals in the respiratory tract. They cause both upper and lower respiratory tract infections as well as invasive infections like meningitis.

Many guidelines have been brought about to evaluate the need for admission, risk stratification, type of treatment and the period of treatment in case of CAP. Guidelines recommend use of either combination therapy with a beta-lactam plus a macrolide or plus ciprofloxacin or monotherapy with moxifloxacin or levofloxacin for empirical treatment in case of patients in non ICU admission. This has increased the use of azithromycin and levofloxacin in CAP[4]. This study

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was conducted to evaluate the minimum inhibitory concentration of azithromycin and levofloxacin in the *H.influenzae* isolates from respiratory infections.

Materials and Method

This study was laboratory based time bound study conducted in the Department of Microbiology, Kasturba Medical College, Mangalore for a study period of eighteen months from October 2015 to March 2017.

Clinically significant 40 *H.influenzae* isolated from respiratory specimens like sputum and bronchoalveolar lavage were included in the study. The MICs of antimicrobial agents Levofloxacin and Azithromycin were measured using the E-test methodology. Levofloxacin E-strip showing MICs in the range of 0.02µg/ml to 32µg/ml and Azithromycin E-strip showing MICs in the range of 0.016µg/ml to 256µg/ml were used to perform E-test (bio Mérieux, Marcyl'Etoile, France). The MICs was interpreted according to Clinical Laboratory Standard Institute (CLSI 2019) guidelines[5].

Results

A total of 40 *Hemophilus influenzae* isolates were included in the study. They were isolates from various respiratory samples like sputum and bronchial lavage of patients with CAP. Isolates were defined as resistant for levofloxacin at MIC>2µg/ml; 3 resistant isolates had MIC between 8 and 12. In case of azithromycin, isolates were defined as resistant at MIC>8; 5 resistant isolates had MIC between 6 and 32 (Table 1).

Table 1. Susceptibilities and MIC results of H.influenzae isolates (n=40)

Antibiotics	MIC_{50} (µg/ml)	MIC_{90} (µg/ml)	MIC Range (µg/ml)	No.(%) Susceptibility to antibiotics			Breakpoint values(µg/ml)		
				Sensitive	Intermediate	Resistance	Sensitive	Intermediate	Resistance
Levofloxacin	0.008	1.5	0.002->32	37	-	3	≤2	-	-
Azithromycin	0.047	6	0.016->256	35	-	5	≤4	-	-

Discussion

H.influenzae were responsible for invasive infections like meningitis or septicaemia until the use of Hib vaccine. Thereafter the non typeable strains have been responsible for the CAP worldwide[3]. With the significant risk of bacteremia in such cases antibiotics with good lung tissue penetration and active against *H.influenzae* must be chosen. Oral antibiotics levofloxacin and azithromycin fulfil both these criteria.

Levofloxacin is a fluoroquinolone which directly inhibits bacterial DNA synthesis. It inhibits bacterial enzymes DNA gyrase and DNA topoisomerase leading to bacterial DNA damage and bacterial cell death. In our study we found that out of 40 isolates of *H. influenzae* 37 (92.50%) were sensitive for Levofloxacin and 3(7.50%) isolates were resistant. $MIC_{50}$was 0.008µg/ml and MIC_{90} was 1.5µg/ml. A similar study conducted in USA by Thornas berry *et al* for Levofloxacin showed MIC50 was 0.0015 (µg/ml) and MIC_{90} was 0.003(µg/ml) and they reported 100% susceptibility to levofloxacin[6]. Another study from USA conducted by Kitzis*et.al* showed MIC_{50} as 0.0015(µg/ml) and MIC_{90} as 0.003(µg/ml)[7]. Similar MIC50 value 0.008(µg/ml) as seen in our study was observed in the study done by Pettigrew et al but MIC90 value was 0.015(µg/ml) but reported 100% susceptibility[8].Fluoroquinolone resistance is primarily mediated through parC and gyrA mutations that encodes the subunits of DNA gyrase and topoisomerase IV that control bacterial DNA replication and also regulate the expression of cytoplasmic membrane efflux pumps. Therefore, fluoroquinolone resistance is mainly due to alteration in target and permeation mechanism.

Azithromycin is a bacteriostatic macrolide which inhibit bacterial protein synthesis by reversibly binding to 50S ribosomal subunits of susceptible microorganisms. Bacterial growth is inhibited due to suppression of RNA-dependent protein synthesis. In our study with respect to azithromycin 35(87.5%) out of 40 isolates of *H.influenzae* were sensitive and 5(12.5%) isolates were resistant. MIC_{50} was 0.008(µg/ml) and MIC_{90} was 6(µg/ml). A similar study conducted in USA by Thornas berry *et al* for azithromycin reported MIC50 as 1(µg/ml) and MIC 90 as 2 (µg/ml) and resistance rate for azithromycin was reported as 0.3%[7].Another study conducted by Pettigrew *et.al* showed MIC50 as 1(µg/ml) and MIC90 as 4 (µg/ml) and they also reported 100% susceptibility for azithromycin[8].Macrolide resistance occurs by two

mechanisms, that is alteration in target binding site and efflux mechanism. The ribosomal RNA methylases encoded by erythromycin ribosomal methylase (*erm*) *B* gene cause methylation of an adenine residues in the 23S ribosomal RNA of the 50S subunit and alter the target site. The efflux mechanism on the other hand is encoded by the *mef E* gene and it results in an inadequate concentration of drug within the cell to inhibit protein synthesis.

Our data suggests that there is a growing resistance to azithromycin among *H.influenzae* isolates. The rising MIC also raises an alarm about the future use of this wonderful antibiotic which has a prolonged half-life and added immunomodulatory action[9]. The use of fluoroquinolones has been advocated in most of the CAP treatment guidelines. But these are from areas where the incidence of tuberculosis is minimum. According to the Indian chest society and National college of Chest Physicians, India recommendations it is wise to restrain the use of fluoroquinolones in the backdrop of increased incidence of pulmonary tuberculosis in the Indian scenario[10]. Fluoroquinolones are known to cause some serious side effects like mental side effects, hypoglycemia and muscle tendon effects. Therefore, these drugs should be prescribed only in the absence of alternative treatment options in uncomplicated CAP[11]. The beta lactam drugs are still sensitive in our geographic area and is an effective treatment options in case of CAP due to *H.influenzae*[12].

Conclusion

Azithromycin and Levofloxacin are commonly prescribed antibiotics in case of community acquired pneumonia. The rising MIC values against these antibiotics in case of *H.influenzae* is of great treatment concern. Similar studies may be taken to see the susceptibility pattern of other pathogens to these drugs. This would help in laying down some guidelines in the appropriate use of antibiotics in case of CAP.

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Vaccines: Purified Macromolecules as Vaccines and DNA Vaccines

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Abstract

Preventive vaccines work to protect an individual from infection or disease by introducing a small component or a nonharmful form of the pathogen (called the foreign antigen) into the body. The body produces an immune response to the pathogen by generating antibodies (via the humoral response), killer cells (via the cell mediated response), or both and development of immunologic memory. We reviewed the recent literature on types of vaccines and older studies were included selectively if historically relevant but none of these vaccines is ideal and can be recommended unrestrictedly therefore, the use of biotechnology could allow cheap production of valuable vaccines, while providing enhanced safety by avoidance of both human and animal viruses or other contaminants. Vaccine have been studied extensively to help eradication the infectious disease and thereby decrease the need for drugs.

Keywords: *Vaccines; Biotechnology; Immune response; humoral response; cell mediated response.*

Introduction

The terms vaccine and vaccination are derived from Variolae vaccinae (smallpox of the cow) [1]. The administration of vaccines is called vaccination. Vaccination is the most effective method of preventing infectious diseases. Vaccination is the most effective means of controlling infectious disease. It has been mainly responsible for the eradication of smallpox and for control of yellow fever, poliomyelitis and German measles in the human population, and Newcastle disease, foot and mouth disease and Marks disease in domestic animals[2].

Several factors must be considered to developing a successful vaccine. The first step is which branch of the immune system is activated, therefore the vaccine designer must recognize and considered the important differences between activation of the humoral and the cell mediated branches. A second factor is the development of immunologic memory. For example, a vaccine that induces a protective primary response may fail to induce the formation of memory cells, leaving the host unprotected after the primary response to the vaccine subsides[3].

The memory cells depends on the incubation period of the pathogen. For example, the influenza virus has a very short incubation period (1 or 2 days). Symptoms of the disease will appear at the same time as memory cells are activated therefore the maintaining high neutralizing antibody levels by repeated reimmunizations is effective for protection against influenza[4].On other hand, pathogens with longer incubation period such as poliovirus requires more than 3 days to begin infected the nervous system so it is designed to induce immunologic memory[5].

Purified macromolecules as vaccines: Some of the risks associated with attenuated or killed whole organism vaccine can be avoided with vaccines that consist of specific purified macromolecules derived from pathogens. Three general forms of such vaccines are in current use: capsular polysaccharide, toxoid, and recombinant antigens.

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Polysaccharide vaccines: Prokaryotic cells, such as bacterial cells has a hydrophilic polysaccharide capsule layer that lies outside the cell envelope of bacteria to protects the bacteria against desiccation, and it is a part of the outer envelope of a bacterial cell. The polysaccharide capsule can be the cause of various diseasesdue to prevent phagocytosis. A coating of the capsule with antibodies and/or complement may be required for phagocytosis to occur [6].

The vaccine for *Streptococcus pneumoniae* used to prevent some cases of pneumonia, meningitis, and sepsis. The vaccine induces formation of opsonizing antibodies and is administered to high-risk groups such as infants, splenectomized patients, other immune-suppressed individuals, and elderly[7]. Meningococcal vaccine consists of purified capsular polysaccharides used to prevent infection by *Neisseria meningitidis*[8].

One limitation of polysaccharide vaccine is their inability to activate $T_H$cells. They activate B cells T-independent type 2 manner, resulting in IgM production but little other class and the vaccine is ineffective in children less than 2 years old. The subcutaneous pneumococcal polysaccharide vaccine have reported the induction of IgA secreting plasma cells but the T_H cells are not involved in the response and non-responders are also common amongst older adults. Immunization is not lifelong, so individuals must be re-vaccinated at age 65 if at least 5 years after initial vaccination[9, 10].

The capsular polysaccharides conjugated with some sort of protein carrier to generated conjugated vaccine. This conjugated vaccine is highly immunogenic but non-toxic and activates T_H cells which allow for immunoglobulin type switching and can induce memory B cells but it cannot induce memory T cells specific for the pathogen. Among other things, this results in mucosal immunity and eventual establishment of lifelong immunity after several exposures[10]. For exampleof conjugated vaccine is*Haemophilus influenzae* type b vaccine (Hib) consist from type b capsular polysaccharide covalently linked to tetanus toxoid to decrease the rate of meningitis, pneumonia, and epiglottitis in children under 5 years of age[11],another example is Pneumococcal 7-valent Conjugate Vaccine (Diphtheria CRM197 Protein), is a sterile solution of saccharides of the capsular antigens of Streptococcus pneumoniae serotypes 4, 6B, 9V, 14, 18C, 19F, and 23F individually conjugated to diphtheria CRM_{197} protein [12].

Toxoid vaccine: Toxoid vaccines are used when a bacterial toxinis the main cause of illness therefore, bacterial toxin are inactivated to produce bacterial toxoids in such a way that toxicity is lost but antigenicity retained. The usual method of treatment is with formaldehyde [13].Absence of toxin activity in toxoid preparations has to be demonstrated in an animal model or in cell test. The activity of the dermo-necrotic toxin of *pasteurella multocida* can be measured with the aid of Vero cells[14].

Toxoid are normally adsorbed on to an adjuvant to stimulate an immune response, usually a mineral salt such as aluminum hydroxide or mineral oil [15].

The free formaldehyde concentration must be not more than 0.05 percent m/v of free formaldehyde unless the higher concentration has been shown to be safe[15].

In some cases anacultures was used to obtain both antibacterial and antitoxic immunity because in some cases where high levels of challenge lead to large quantities of toxin which overwhelm the antitoxic activity. A typical example of this was seen in *Clostridium perfringens* type C and *Cl. Chauvoei*[16].

When the immune system receives a vaccine containing a harmless toxoid, it learns how to fight off the natural toxin. The immune system produces antibodies that lock onto and block the toxin. Vaccines against diphtheria, Botulism and, tetanus are examples of toxoid vaccines[17].

The obtaining sufficient quantities of the purified starting materials with toxoid vaccine is difficulty due to one the problems with toxoid vaccine is consisting from purified macromolecules. This problem has been overcome by cloning the exotoxin genes and the expressing them in easily growth host cells therefore large quantities of the exotoxin can be produced, purified, and subsequently inactivated[18].

Recombinant antigen vaccines: The alternative vaccines which are more safe and effective such as highly purified recombinant proteins, subunits of pathogens or DNA vaccine for replacing these conventional vaccines[19]. The recombinant antigen vaccines are the DNA encoding any immunogenic protein can be cloned and expressed in a variety of expression systems for antigenic protein components, such as bacteria, yeast, mammalian cells and insect cells. Bacterial expression systems are the most used due to the ease of handling and

to their capacity for high level expression. However, for antigens in which post-translational modifications (e.g., glycosylation) are necessary, the use of mammalian or insect cells should be considered [20, 21].

The current vaccines are produced by expressing the hepatitis B surface antigen (HBsAg) in yeast cells then purified by conventional biochemistry techniques. The HBsAg assembles into virus-like particles (VLPs), which are extremely immunogenic [22, 23, 24]. Furthermore, yeast cells are responsible for the post-translational modification of proteins, being capable of rendering proteins glycosylated.

The recombinant antigen vaccines has several advantages when compared with traditional vaccines, such as safety and production cost, most of them present weak or poor immunogenicity when given alone, and thereby require the use of adjuvants such as aluminum salt to elicit a protective and long-lasting immune response[25].

DNA Vaccines: DNA vaccination is a technique for protecting against disease by injection plasmid DNA encoding antigenic proteins into the muscle of the recipient so some cells will take up that DNA and directly expressed the encoded protein antigen[26]. The cells secrete the antigens and display them on their surfaces. In other words, the body's own cells become vaccine-making factories, creating the antigens necessary to stimulate both humoral antibody response and a cell-mediated response. The surprising about injected DNA vaccine is expressed by the muscle cells with much greater efficiency than in tissue culture. The DNA appears either to maintain for long periods in an episomal form or integrated into the chromosomal DNA[27].

The viral antigen is also expressed by dendritic cells by take up the plasmid DNA and expresses the viral antigen, therefore the DNA vaccines have valuable potentials of dendritic cells. Dendritic cells can be present the vaccine antigens on MHC class I and II products because it is ability to transduced with DNA vaccine and the presenting of cellular antigen by dendritic cells allow dendritic cells to expand and sustain vaccine memory in the CD4 helper and CD8 killer compartments[26, 27].

DNA vaccine offer advantages over many existing vaccines. There is no risk for infection, no denaturation or modification on the encoded antigen because it is expressed in the host in its natural form, obviates need for peptide synthesis, expression and purification of recombinant proteins and use of toxic adjuvants, refrigeration is not required for handling and storage of the plasmid DNA, andDNA vaccines are relatively easy and inexpensive to design and produce[26, 28].

Several DNA vaccines are available for veterinary, including the influenza virus and West Nile virus. Currently no DNA vaccines have been approved for human use. Research is investigating the approach for malaria, AIDS, influenza, and herpesvirus in humans, as well as for several cancers[28]. New experimental trials of DNA vaccines will mix gene for antigenic proteins with cytokines or chemokines to enhance the immune response to the optimum pathway. For example, IL-12 gene may be included in a DNA vaccine because the expression of IL-12 will stimulate TH1 type immunity induced by the vaccine[29,30].

To determine the DNA vaccine ADVAX could induce efficient antiviral CD4+ T cell responses mediated by shared high-affinity TCRs. efficient antiviral CD4+ T cell responses mediated by shared high-affinity TCRs therefore, the DNA vaccination by electroporation primed for TCR clonotypes that were associated with HIV control, highlighting the potential of this vaccine delivery method [31].

Some disadvantage might prevent their universal application, for example, only protein can be immunogen that is mean the DNA vaccine are not useful for non-protein antigen such as pneumococcal and meningococcal infection, use protective polysaccharide antigens. Another shortcoming are coming from the risk of affecting genes controlling cell growth, possibility of inducing antibody production against DNA, potential for atypical processing to bacterial and parasite proteins, and inability to use DNA vaccine as oral vaccine or those given as nasal spray, that are applied to mucosal surfaces[32, 33].DNA vaccines also present a slight risk of potentially disrupting normal cellular processes because the introduction of foreign DNA into the body could affect a cell's normal protein expression pathways[34].

Two concerns regarding the effectiveness of the vaccine itself revolve around the body's reaction to the vaccine. The first is the chance of an immune response against the DNA itself, or the DNA delivery vector, which would defeat the point of the vaccine as a whole. If such a reaction were to occur, no protein immunogens would be expressed, and there would be no immune

response to those immunogens. Secondly there is a chance that the body develops a resistance or tolerance towards the protein the vaccine introduces [35, 36].

DNA vaccine consist of DNA can be administered with a needle. Recently, Cationic derivatives of polyprenols were used as effective DNA vaccine carriers in chickens and mice result, induced strong humoral response to the antigen encoded by the DNA vaccine plasmid. Another method called gen gunthat uses high-pressure gas to shoot microscopic gold particles coated with DNA directly into cells[37].

Conclusion

Purified macromolecules as vaccines,and DNA vaccines have been studied extensively as a future vaccine to help eradication the infectious disease development, and thereby decrease the need for drugs.

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Conflict of Interest: None

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An Evaluation of Internet Addiction and Psychological Distress among Undergraduate Nursing Students at College of Health Sciences, UOB, Bahrain

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Abstract

Background: Life and technology has become two sides of the coin. We are living in a era, where we cannot live without internet especially during student period. At the same time, if we are addicted to the internet, which causes deleterious effect on the psychological well being and caution should be taken while we use internet for longer period.

Objective: To evaluate internet addiction and psychological distress among Undergraduate Nursing students.

Design: Descriptive, cross–sectional survey design.

Setting: Nursing Department, College of Health Sciences, University of Bahrain.

Method: The sample size was 120 final year nursing students selected through convenience sampling technique. Internet Addiction Scale (IAT) and Kessler Psychological Distress Scale (K10) were used.

Results: The level of internet addiction scored as mild 12.5 %(15), moderate 63(52.5%) & severe 42(35.0%). The level of psychological distress scored as low 18(15%), moderate 25(20.8%), high distress 40(33.3%) & very high distress 37(30.8%). There was a significant relationship between gender (p=0.01), age(p=0.02), marital status (p=0.03), mother's occupation (p=0.02),and number of hours spent on internet per day (p=0.02) with internet addiction. There was also an association seen between gender (p=0.04), age(p=0.04), marital status(p=0.05), number of hours spent on internet per day(p=0.02) and frequency of internet usage(p=0.05) with psychological distress.

Conclusion: Proper utilization of technology will help nursing students to decrease the symptoms of psychological distress such as anxiety, depression and sadness. Internet addiction leads to increase absenteeism, low grade performance, decreased communication among students and even failure in academic studies.

Keywords: *Internet addiction, Technology, Psychological distress, Nursing students. Internet provides tremendous educational benefits for college students and also provided better opportunities.* ***Background:*** *Internet provides tremendous educational benefits for college students and also provided better.*

Introduction

The internet is considered as the greatest active tool in all areas of discipline[1]. Internet offers excellent educational benefits for college students and provides better opportunities for communication, information, and social interactions. Adolescent group are driven to use Internet and exhibit addictive behaviors parallel to those related to alcohol abuse and other substance use[2]. Internet addiction (IA) has been defined as "excessive

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or poorly controlled preoccupations, urges or behaviors regarding computer use and internet access that lead to an impairment or distress [3].

Psychological well-being and internet addiction were studied among university students at Turkeyrevealed that psychological well-being was affected by reduced impulse control, loneliness/depression, social comfort, and distraction[4]. Worldwide, collegiate students are believed to be ahigh risk group with a marked increase in internet usage. Internet addiction was found to be correlated with emotional disorders as anxiety,depression, low self-esteem,stress and low psychological well-being[5].

The use of smartphones and internet lead to anxiety, low academic performance, decreases physical activity and well-being[6]**.** Some studies have revealed that sleep disturbance, depression and psychological distress can result from spending too much time on smart phones and internet[7]. It is important to study the impact of technology on psychological distress because technology is used in academic and non-academic activities[8].

Materials and Method

A crosssectional study was conducted among the nursing students between 17 and 25 years age group at College of health Sciences (CHS),University of Bahrain. Ethical permission was obtained from Institutional Ethical Committee Review Board (No.515/2018, UOB). A total of 120 students were selected by non-probability convenience sampling technique.

The data were collected throughself-administered the questionnaire consisted of three parts. Part 1 divided into section A and Section B. Section A, background information and section B, characteristics of Internet usage by the students. Part 2 follows Young's scale of internet addiction (IAT)[9] consists of 20 items ranging from 0 to 5. Internal consistency of the tool was r = 0.8. Part 3 was Kessler Psychological Distress Scale (K10) used for the assessment of Psychological wellbeing[10]. It consists of 10 items, wherein each item is scored using a five point Likert scale ranging from 0-5. Internal consistency of the tool was r = 0.7, showed good internal consistency.

The inclusion criteria were students who are currently enrolled in fourth year undergraduate program and nursing students who are willing to participate in the study.Nursing students who are studying in first, second and third year and who are on leave were excluded. Confidentiality was assured, and informed consent was taken from students. SPSS, version 16 statistical software was used.

Findings: The study enrolled both genders of 120 (33 Males and 87 females) nursing students. Out of 120 students, 66 (55%) of them were in the age group of 20-21 years. In relation to marital status, majority of them were single 71(59.17). Major proportion of the students was residing in a nuclear family 80(66.67%).Among the nursing students, it was found that they depended on internet on daily basis and the number 103(85.83%) was very high. Only few of them 6(5.0%) were depending on the internet once in a while per month.(Table. 1).

Analyzing the student's response onthe internet addiction it revealed that 82.6% (% of mean score) of them reported as fear of life without the internet would be boring, empty or joyless and equal percentage scored (82.6%) finding themselves saying "just a few more minutes" when they were online. Eighty percentage of them reported that they used to be in online longer than what they were intended to be online. Majority of the students (75.0%) tried to cut down on the amount of time spent on online and it was failed. (Table. 2).

Figure 1. Describes the level of internet addiction among nursing students. Among them, 35.0% of students were having severe level of internet addiction score.

As depicted in table 3, 56.4% (% of mean score) reported that they felt tired out without any reason and felt nervous over a month by 55.2% of the students. Over 55.80% of the students felt that everything was done through a great effort. Analyzed data revealed 30.8% 0f them were having very high distress and 33.3% were having high psychological distress(Fig. 2). The present study identified that there was significant, positive, moderate correlation (r=0.55) between internet addiction and psychological distress (Fig.3). And also our study identified that there was a significant relationship between gender (χ^2=9.11,p=0.01), age (χ^2=15.46, p=0.02), marital status (χ^2=6.86, p=0.03) mother's occupation (χ^2=7.35, p=0.02)number of hours spent on internet per day (χ^2=15.27,p=0.02) with internet addiction. There was also an association seen between gender (χ^2=8.32, p=0.04), age (χ^2=17.67, p=0.04), marital status (χ^2=7.81, p=0.05), number of hours spent on internet per day (χ^2=7.35, p=0.02) and frequency of internet usage (χ^2=13.22, p=0.05) with psychological distress.

Nowadays, technology influencing the students to the maximum extent of spending more time with mobile and less communication with human beings[11]. The analysis revealed that majority (85%) of them was using the internet through mobile or laptop every day and 43% of the students were surfing more than 3 hours per day at college and home. Whereas, a study conducted in Jordan found that (85%) of the college students surf the internet more than four times per week shows that our students were overusing the internet. At the same time if the internet is used for more than 3 hours per day leads to deleterious effect on psychological aspects especially beginning with a "habit to addiction"[12].

As evident in our study, the overall percentage of mean score (71.8%) and moderate level (52.5%) of internet addiction of the nursing students expressed that they were addicted to the internet. This score was very high when comparedtoother placesin Iran[13] medical students had 21% of internet addiction, 22.8% in Mazandaran province[14,] 38.4% in Jeddah[15,] 30.1% in Palestine[16,] 34.7% in Greece. A similar study carried out among the Turkish college students revealed that there was a higher level of internet addiction with the diagnosis of depression[17].

The current study found that the students scored high and very high level of psychological distress 33.3% & 30.8% respectively. Few studies found that there was direct relationship between students who are having higher level of psychological distress & chance to get internet addiction[18].

In our study, age is associated with internet addiction. In contrast,a study conducted among Jordanian students found that there was a negative relationship between internet addiction and age[19]. Some studies proved that first and second year nursing students are more prone to internet addiction than the third and fourth year nursing students at the college level[20].

Implications: Family support and the parental control play a key role to guide the students in a right path. Universities should take some steps to incorporate the psychosocial educational intervention during the counseling session. Faculties and mentors should create awareness on misuse (or) overuse of internet among the students irrespective of any discipline.

Table 1. Characteristics of internet usage among nursing students (n=120)

Characteristics of internet Usage		No.	%
1. Age at first internet use	Less than 10 yrs	27	22.50%
	11-15 yrs	68	56.67%
	16-20 yrs	20	16.67%
	Above 20 yrs	5	4.16%
2. Number of hours spent on internet per day	Less than 1 hour	7	5.83%
	1-2 hrs	35	29.17%
	2-3hrs	26	21.67%
	More than 3hrs	52	43.33%
3. Frequency of internet usage	Few times a day	103	85.83%
	Few times a week	11	9.17%
	Few times a Month	6	5.00%
4. Accessibility of the internet at the residence	Availability	113	94.17%
	Unavailability	7	5.83%
5. Purpose of the internet usage	Academic Non Academic	102 18	85% 15%

Table 2. Mean and SD of students response on internet addiction test among nursing students (n=120)

Internet Addiction test	Mean score	SD	% of mean score
1. Do you find that you stay online longer than you intended?	4.00	1.53	80.0%
2. Do you neglect household chores to spend more time online?	3.63	1.47	72.6%
3. Do you prefer the excitement of the internet ?	3.27	1.50	65.4%
4. Do you form new relationships with fellow online users?	3.25	1.53	65.0%
5. Do others in your life complain to you about the amount of time you spend online?	3.56	1.51	71.2%
6. Does your work suffer because of the amount of time you spend online? (E.g., postponing things, not meeting deadlines, etc.)	3.38	1.50	67.6%
7. Do you check your email before something else you need to do?	3.56	1.41	71.2%
8. Does your job performance or productivity suffer because of the internet?	3.29	1.36	65.8%
9. Do you become defensive or secretive when anyone asks you what you do online?	3.56	1.44	71.2%
10. Do you block disturbing thoughts about your life with soothing thoughts of the internet?	3.48	1.53	69.6%
11. Do you find yourself anticipating when you will go online again?	3.69	1.43	73.8%
12. Do you fear that life without the internet would be boring, empty or joyless?	4.13	1.50	82.6%
13. Do you snap, yell, or act annoyed if someone bothers you while you are online?	3.70	1.44	74.0%
14. Do you lose sleep due to late night internet use?	3.72	1.44	74.4%
15. Do you feel preoccupied with the internet when not online, or fantasize about being online?	3.67	1.39	73.4%
16. Do you find yourself saying "Just a few more minutes" when online?	4.13	1.54	82.6%
17. Do you try to cut down on the amount of time you spend online and fail?	3.75	1.50	75.0%
18. Do you try and hide how long you've been online?	3.47	1.56	69.4%
19. Do you choose to spend more time online over spending time out with others?	3.33	1.43	66.6%
20. Do you feel depressed, moody, or nervous when you are not online, and do these feelings go awhile when you go back online?	3.19	1.59	63.8%
Overall	71.80	18.12	71.80%

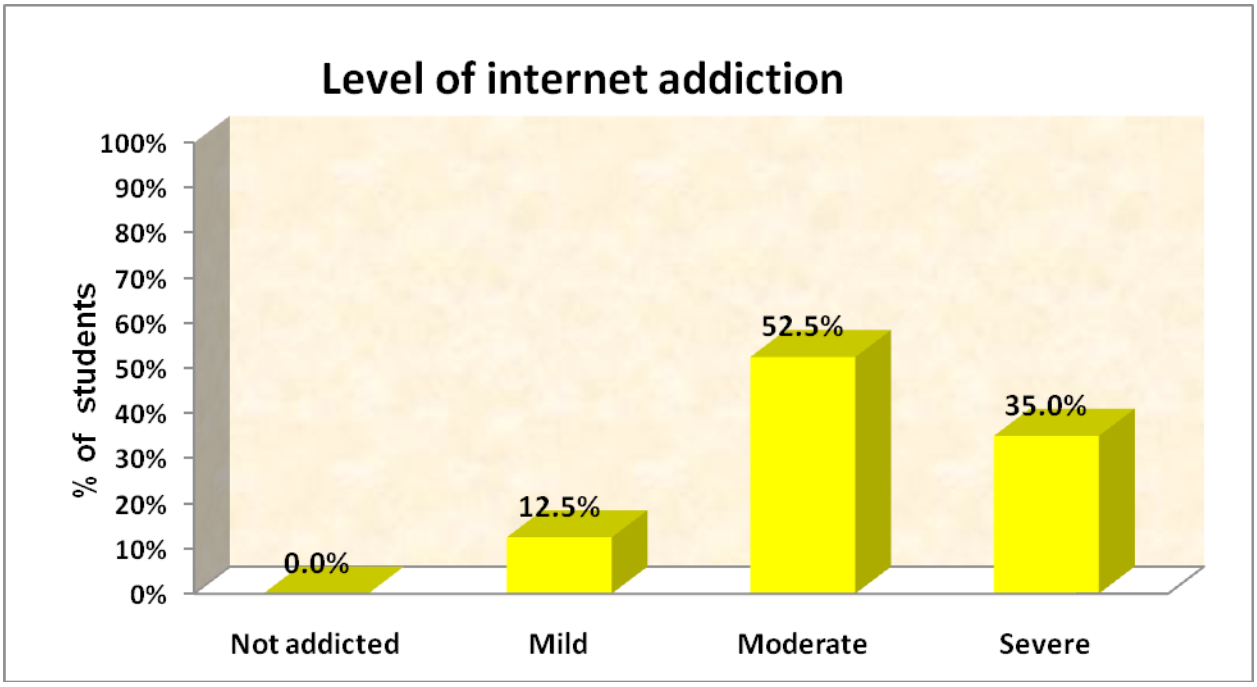


Figure 1: Levels of internet Addiction among nursing students (n=120)

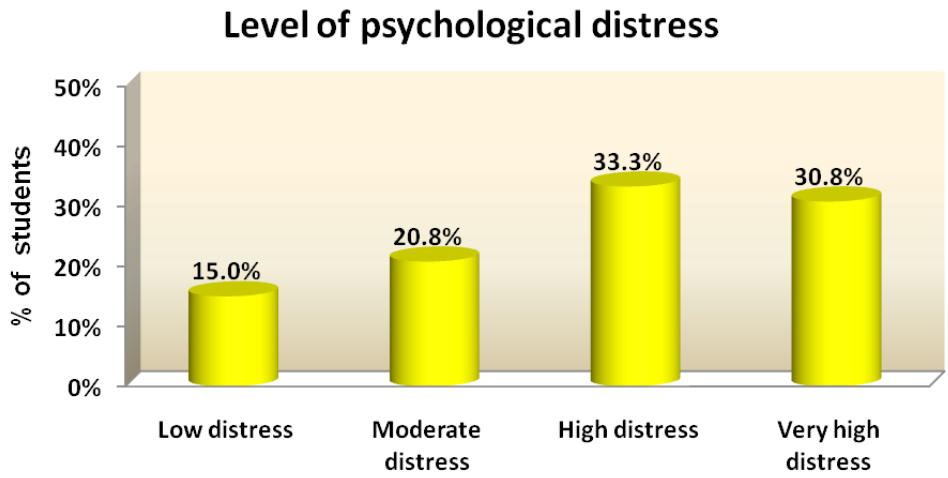


Figure2 .Levels of psychological distress among nursing students (n=120)

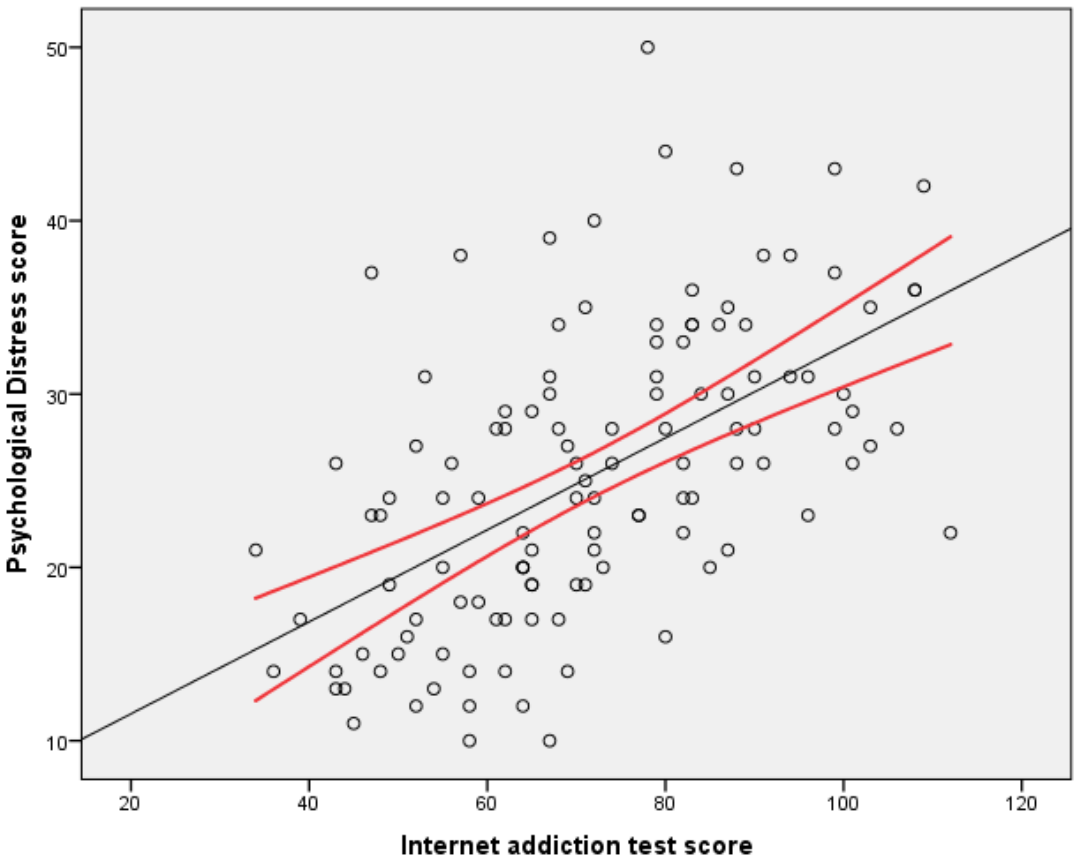


Figure 3: Correlation between internet addiction and psychological distress score among nursing students (n=120)

Conclusion

Internet addiction is an emerging problem among university students. The psychological wellbeing of the students areadversely affected by internet addiction. The consequences of the internet addiction results in psychosocial disorder and psychological morbidity. Hence, it is time to develop for the prevention of internet addiction and develop therapeutic interventions for college students who are affected by internet addiction.

Conflict of Interest: None

Source of Funding: None

Ethical Clearance: The study was approved by Student Ethical committee, University of Bahrain **(UOB).**

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To Evaluate the Effectiveness of Combined Chain Exercises on Pain in Female Patients Suffering with Osteoarthritis of Knee

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Abstract

Introduction: Osteoarthritis (OA) is a condition marked by two features, the progressive destruction of articular cartilages and formation of bone at the margins of the joint. OA is the most common type of arthritis mainly in older people. At times it is also called as degenerative joint disease. OA occurs in old age, mainly in the weight bearing joints like knee joint. OA is one of the widespread causes of physical disability in adults. 50% of older persons affecting after 55 years of age. Some young people get arthritis from the joint injuries.

Method and Methodology: 60 female patients suffering with knee pain due to osteoarthritis were selected based on the inclusion criteria. They were divided into three groups i.e., 20 in each group and they were named as Group A, B and C. Group A were trained with closed kinetic chain exercises (CKC), group B were trained with open kinetic chain exercises(OKC) and group C were trained with combined chain exercises (CCE) for 6 weeks.

Results: The groups were analyzed by using ANOVA and Mann - Whitney U test for analyzing the VAS. The mean and standard deviation of pre- test, week 3 and week 6 for VAS of group A, B and C were given in Table.1 and ANOVA in Table.2, Mann– Whitney– U test for Group A, B and C was given in Table.3

Keywords: *Osteroarthritis (OA), Knee arthritis (KA), closed kinetic chain exercises (CKC), open kinetic chain exercises (OKC) and combined chain exercises (CCE).*

Introduction

Osteoarthritis (OA) is a condition marked by two features, the progressive destruction of articular cartilages and the formation of bone at the margins of the joint[1]. OA is the most common type of arthritis mainly in older people. At times it is also called as degenerative joint disease. OA occurs in old age, mainly in the weight bearing joints like knee joint[2]. OA is one of the widespread causes of physical disability in adults. 50% of older persons affecting after 55 years of age. Some of the young people get arthritis from the joint injuries[3]. The estimated population prevalence varies from 4 to 30% depend on age, gender and disease condition. After 50 years of age the incidence and prevalence of knee joint OA is incredible more rapid in women than in men[4]. It imposes noteworthy health care burden and account for hospitalization[5,6,7,8]. The predominant symptoms are pain, mild swelling, early morning stiffness, minimal tenderness and coarse crepitus[9] it leads to decreased fitness and increases the risk of cardio

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metabolic co-morbidity and early mortality[10,11,12]. It has been estimated that nearly 40 to 80% of people will have symptomatic changes on radiographs mainly in rural areas where people were involved in occupational tasks[13].

OA should be managed primarily by non-operative means than by operative means, little consensus exist concerning the most appropriate non-operative means[14]. There are numerous evaluation and treatment options for KA however, there is no prefect treatment for everyone at any age so treatment must be individualized based on severity of symptoms[15]. Open kinetic chain (OKC) leg extension exercises have been the traditional means of strengthening the quadriceps muscle, but few authors reported that these exercises exacerbate the symptoms in many patients with KA[16]. Closed kinetic chain (CKC) exerciseswere significantly increased during the past several years[17].

The purpose of this study was to investigate, the Effectiveness of combined chain exercises (CCE) on pain and function, in female patients with OA of knee. This study is to specifically determine whether combined chain exercises offer any advantages over convention OKC exercises and CKC exercises. Therefore patients with KA may tolerate combined chain exercises better and consequently may exhibit better functional results after such as exercise programs.

Materials and Method

Subjects: Sixty female patients suffering with OA of knee were selected for the study from Vaagdevi Physiotherapy and Rehabilitation centre and MGM Hospital, Warangal, Telangana were selected.

Type of Study: It's a Comparative Study, i.e., closed kinetic chain exercises; open kinetic chain exercises and combined chain exercises, on pain in female patients suffering with Osteoarthritis of knee were compared.

Duration of study: 6 weeks.

Inclusion and exclusion criteria: Female patients suffering with knee pain more than 6 weeks, tenderness on palpating the patella, pain during resisted knee extension, climbing up and down the stairs were included. Patients with any knee surgeries, any infectious conditions of knee, traumatic knee conditions, congenital abnormalities, neurological and cardiac issues were excluded from the study.

Outcome measures: The outcome measure is visual analog scale (VAS).

Methodology: Sixty female patients were selected based on the inclusion criteria and divided into three groups (Group A, B and C), each group has 20 patients correspondingly. Group A were trained with CKC exercises. Which consists of seated leg presses, stationary bicycling and step up - step down exercises. 3 seconds rest was given between each repetition. Group B were trained with OKC exercises like static quadriceps muscle contraction with knee in full extension, straight leg raising with patient in supine lying and leg abduction, and adduction exercise in side lying position. In this each exercise was held isometrically. Rest was given for 6 seconds between 10 repetitions. Group C were trained with CCE like seated leg presses, stationary bicycling, step up-Step down exercises, static quadriceps muscle contractions with knee in full extension, straight leg raising with patient in supine lying and leg abduction, and adduction exercise in side lying. At the end of 6 weeks evaluation was done by using visual analogue scale (VAS).

Results

The mean and standard deviation of pre- test, week 3 and week 6 for VAS of group A, B and C were given in Table 1 and ANOVA for VAS is given in Table. 2, Mann-Whitney–U test for VAS of Group A, B and C was given in Table 3.

Table 1: For Mean & SD of VAS Scale

	Group– A			Group– B			Group– C		
	Pre-test	Week 3	Week 6	Pre-test	Week 3	Week 6	Pre-test	Week 3	Week 6
Mean	7.4	5.3	3.6	7.2	5.8	3.9	7.4	5.4	2.6
S.D.	1.24	0.92	0.89	1.53	1.20	0.99	0.96	0.60	0.46

Table 2: For ANOVA of VAS Scale

Source	Group-A			Group-B			Group-C		
	SS	Df	MS	SS	df	MS	SS	df	MS
Between treatment	70.81	1	98.3	58.8	1	58.8	136.53	1	136.5
Within treatment	20.66	28	0.72	22.66	28	0.80	18.66	28	O.6667
Total	**91.47**	**29**		**81.46**	**29**		**155.19**	**29**	

The *f*-ratio value is 101.22. The *p*-value is <.0001. The result is significant at p<.05, The *f*-ratio value is 72.63. The *p*-value is <.0001. The result is significant at p<.05, The *f*-ratio value is 204.8. The *p*-value is <.0001. The result is significant at p<.05

Table 3: Mann–Whitney–U test for Group A, B and C

	Group– A				Group– B				Group - C			
Value	**Mean**	**SD**	**Critical Value of 'U'**	**Calculated Mann - Whitney U- Value**	**Mean**	**SD**	**Critical Value of 'U'**	**Calculated Mann - Whitney U- Value**	**Mean**	**SD**	**Critical Value of 'U'**	**Calculated Mann - Whitney U- Value**
Pre	7.4	1.24	64	2.5	7.2	1.53	64	3.5	7.4	0.96	64	1
Post	3.6	0.88			3.9	0.99			2.6	0.46		

For Group A: At 5% LOS U14, the *U*-value is 2.5. The critical value of *U* at $p < .05$ is 64. Therefore, the result is significant at $p < .05$. Calculated U value is less than table value. Hence there is no significant difference between pre and post treatment VAS values in Group A.

For Group B: At 5% LOS U14, the *U*-value is 3.5. The critical value of *U* at $p < .05$ is 64. Therefore, the result is significant at $p < .05$. Calculated U value is less than table value. Hence there is no significant difference between pre and post treatment VAS values in Group B.

For Group C: At 5% LOS U14, the *U*-value is 1. The critical value of *U* at $p < .05$ is 64. Therefore, the result is significant at $p < .05$. Calculated U value is less than table value. Hence there is significant difference between pre and post treatment VAS values in Group C.

Table 4: Comparison of Group A, B and C pre and post treatment values of VAS by using independent 't' test

Treatment	Group– A			Group– B			Group - C		
	Mean	SD	t -value	Mean	SD	t -value	Mean	SD	t -value
Pre	7.4	1.24	10.03	7.2	1.53	8.25	7.4	0.96	14.31
Post	3.6	0.88		3.9	0.99		2.6	0.46	

Discussion

This study is done to compare the effectiveness of Closed Kinetic Chain Exercise, Open Kinetic Chain Exercises and Combined Kinetic Chain Exercises. 60 subjects were diagnosed with Osteoarthritis of knee are taken and divided into three groups. The total duration of study was 6 weeks. The patients were treated in Physiotherapy department. The subjects were assessed before the treatment (Pre) and at the end of third week (Post) up to 6 weeks by VAS scale for pain assessment.

For Group A: The calculated value of intervention group was 10.03, the table value at 5% level of significance at 14 degrees of freedom 2.05, as the calculated value is more than the table value, the null hypothesis is rejected and alternate hypothesis is accepted. So there is a significant between before and after applying the treatment.

For Group B: The calculated value of intervention group was 8.52, the table value at 5% level of significance at 14 degrees of freedom 2.05, as the calculated value is more than the table value, the null hypothesis is rejected and alternate hypothesis is accepted. So there

is a significant between before and after applying the treatment.

For Group C: The calculated value of Control group was 14.31, the table value at 5% level of significance at 14 degrees of freedom 2.07, as the calculated value is high than the table value, the null hypothesis is rejected and alternative hypothesis is accepted. So there is a significant difference between before and applying treatment.

Hence we can conclude that the Group– A, Group– B & Group - C is showing significant difference between Pre-Treatment & Post-Treatment, but the Group– C is more effective than the Group– A & B. It can be concluded basing on the calculated values resulted i.e., regarding VAS Scale the calculated value i.e., 't' statistic is more for Group– C than Group– A & B, indicates the effectiveness of the treatment for Group– C patients.

Conclusion

The present study included three established treatment i.e., (Group-A) Closed Kinetic Chain exercises, (Group-B) Open Kinetic Exercises and (Group-C) Combined Chain Exercises in reducing pain and improving functional activity in patient with Osteoarthritis of Knee.

The calculated values show that the calculated values of Group-C is more effective than the calculated values of Group-A & B. This study can be continued further with larger sample size and more duration for better results in future.

Ethical Clearance: IHEC/VCOP/VCOPH/2016/10/5 Dated: 17/10/2016

Conflict of Interest: Nil

Source of Funding: Self

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Vitamin C Reverses Endosulfan-Induced Testicular Toxicity in Prepubertal Male Rats: A Histopathological Study

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Abstract

Background: Endosulfan causes male reproductive toxicity due to oxidative stress. Vitamin C is a potent antioxidant, reduces cellular oxidative stress. The present study was aimed to investigate protective effect of vitamin C against Endosulfan induced testicular toxicity in Wistar rats

Objective: To investigate the protective effect of Vitamin C against endosulfan-induced testicular histopathological changes in male Wistar rats.

Materials and Method: Seventy male neonatal Wistar rats were divided into seven groups. The group I was taken as the control group, The endosulfan-treated rats were grouped into II (3mg/kg body weight (BW) and group III (6 mg/kg BW), Group IV (9 mg/kg BW) and Group V (12 mg/kg BW). Group VI (9 mg/kg BW) and group VII (12 mg/kg BW) were pretreated with vitamin C (20 mg/kg BW) for 60 days. After 60 days, animals were sacrificed, testes were removed and processed for histopathological analysis.

Result: Histopathological analysis of testes shows significant damage such as necrosis, decrease in spermatogenesis, and increase in congestion of the capillary system in endosulfan treated rats. Pretreatment with vitamin C with endosulfan treated group showed cytoprotective effect and marked reduced testicular changes.

Conclusion: Treatment with Vitamin C decreases the toxic effect of endosulfan on testes irrespective of dose. This protective effect of Vitamin C is probably due to its antioxidant property.

Keywords: *Endosulfan, Vitamin-C, Histopathology, Testes, Rats.*

Introduction

Endosulfan is a cyclodiene group of organochlorine pesticides, that is extensively used as an insecticide in agriculture and in some countries. As a result of its widespread use, it is an environmental contaminant and a public health hazard. WHO classified endosulfan in the category of terminal products and hazardous[1]. Endosulfan having estrogen like action, is known to cause reproductive toxicity in males by inducing degenerative changes in seminiferous epithelium and testicular atrophy. It affects the differentiation and function and reduction in the weight of secondary sex organs in males.[2,3]

Endosulfan also reduced plasma FSH, LH, 3β- hydroxysteroid dehydrogenase (3β-HSD), 17β-hydroxysteroid dehydrogenase enzymes (17β-HSD) and testosterone in rats and caused testicular damage. [4, 5,6]

Vitamin C (L-ascorbic acid) is one of the bio-antimutagens, prevents damage caused by toxicants, mainly by interfering with free radical generation and formation of toxic metabolities.[7,8,9] Vitamin C is known not to cause any cytotoxic and genotoxic effect of its own

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at even comparatively high doses or concentrations. [10,11] The present study aims to know the protective effect of Vitamin C against endosulfan-induced histopathological changes in neonatal rats.

Materials and Method

Study Design: In the present study, one-week-old albino Wistar male rats were used. Animals were kept in the Central animal facility, Kasturba Medical College, Manipal Academy of Higher Education. Breeding and maintenance of animals were according to the national guidelines protocol. The institutional animal ethical committee has approved the study, before starting the experiment.

Rats were kept in polypropylene cages with paddy husk bedding under standard conditions (temperature 28 ± 1°C temperature and 50±5% humidity) with a maximum of three animals in each cage. Animals were fed on laboratory rat feed (Gold Mohur; Lipton India Ltd) and water *ad libitum*.

Animals (one week old, weighing between 8-12 g) divided into seven groups of 10 rats each. Group I served as control received vehicle (groundnut oil), Groups II-V received 3, 6, 9 and 12 mg /kg doses of endosulfan (Endosulfan was purchased from Meerut Agro Chemicals Industries Ltd., Meerut, India). Group VI and VII received endosulfan at 9 and 12 mg /kg dose, respectively along with 20 mg/kg dose of Vitamin C (Vitamin C purchased from Loba Chemicals (P) Ltd.,Mumbai, India). All the agents were administered orally daily till 60 days.

Histological Analysis of the Testes: The testes from each animal were dissected and placed in Bouin's fixative for 48 h and stored in 70% ethanol until preparation of the slides. The tissues were later dehydrated using graded alcohol and then embedded in paraffin. From each tissue 5µ thin sections were obtained with a microtome followed by staining with hematoxylin and eosin. The slides were mounted and evaluated for histopathological analysis under a light microscope.

Result

Histopathological Examination of Testis: In endosulfan treated rats moderate to severe histological changes were observed in testis. There was an increase in congestion of capillary system (+++), necrosis (+++), germinal epithelial damage (+++), and increase in tubular space and diameter of seminiferous tubules. Spermatogenesis in the seminiferous tubules was severely decreased (+++). There was a severe testicular atrophy and cellular atypia (+++). Capillaries of testes showed congestion and there was a decrease in spermatogenesis (Table & Fig 1, 2, 3).

These changes were severe in 9 and 12 mg /kg endosulfan treated rats. The degenerative changes also included inflammation and edema (+) which was not seen in control, 3 and 6 mg/kg endosulfan treated rats. Pretreatment with vitamin C showed cytoprotective effect on endosulfan induced testicular changes. The changes were markedly reduced compared to endosulfan treated groups; but it could not completely prevent the changes (Fig 4, 5).

Table: Histopathological changes in testicular tissue of Wistar rats subjected to various treatments

Parameters	Control GN Oil	End-3	End-6	End-9	End-12	End 9 + Vit C	End 12 +Vit C
Congestion of capillary system	N	N	++	++	+++	+	++
Spermatogenesis	N	↓	↓↓	↓↓↓	↓↓↓	↓	↓↓
Necrosis	-	+	++	+++	+++	+	++
Germinal Epithelial damage	-	+	++	+++	+++	++	++
Cytosis	N	N	↓	↓↓	↓↓↓	↓	↓↓
Degeneration	-	-	-	++	+++	+	+
Atrophy	-	-	+	++	+++	+	++
Inflammation and edema	-	-	+	+	+++	-	+
Tubular space	N	N	↑	↑↑	↑↑↑	↑	↑↑
Diameter of seminiferous tubules	N	↑	↑↑	↑↑	↑↑↑	↑	↑↑

Control GN Oil=Groundnut oil; Vit C=Vitamin C; END= Endosulfan; N= Normal; + Mild; ++ Moderate; +++ Severe; ↑ Increase; ↓ Decrease.

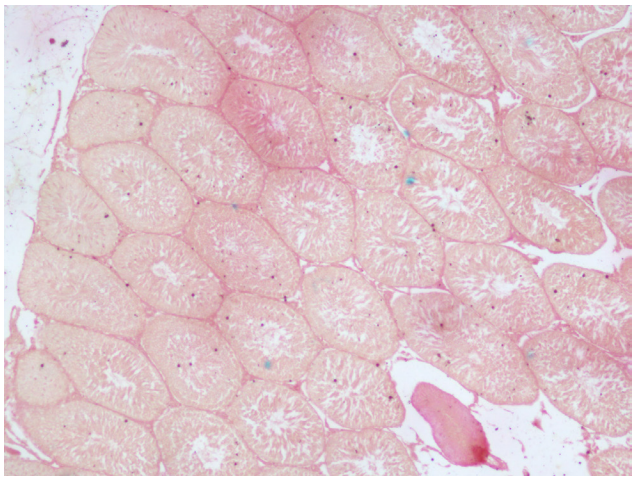


Figure 1: The control testes under 40X

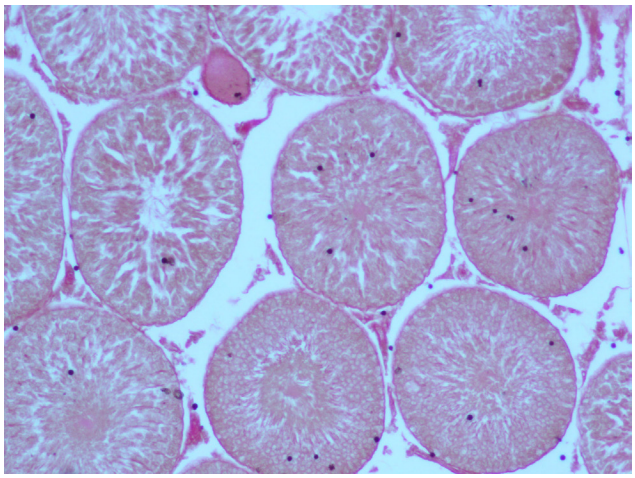


Figure 2: The Endosulfan treated group 3 & 6 mg showed similar mild to moderate-------- Under 100X

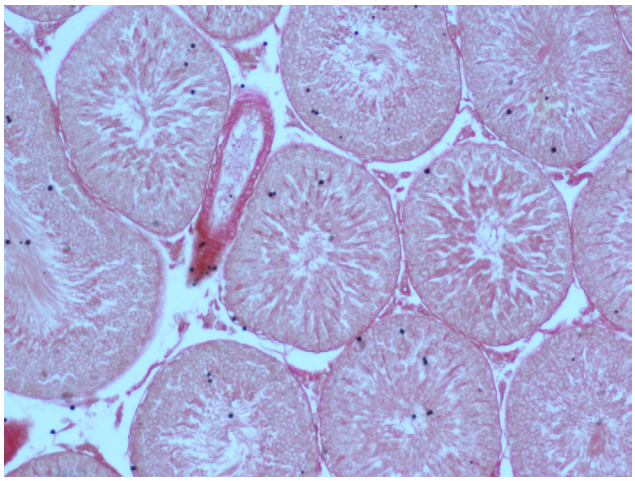
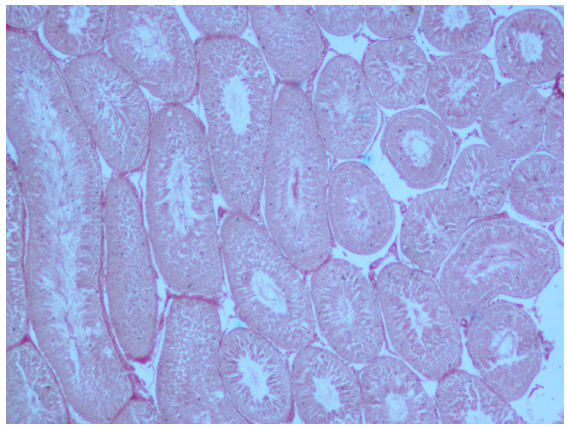


Figure 3: The Endosulfan treated group 9 mg showed -------- Under 100X



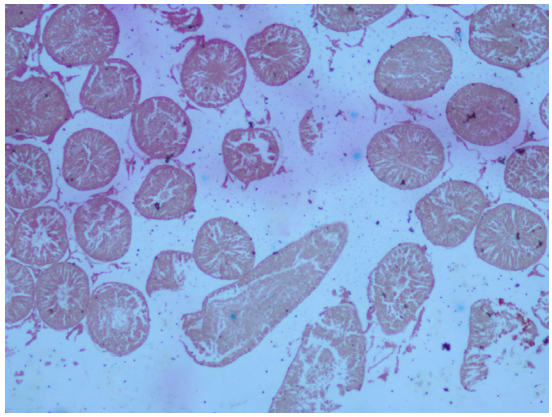
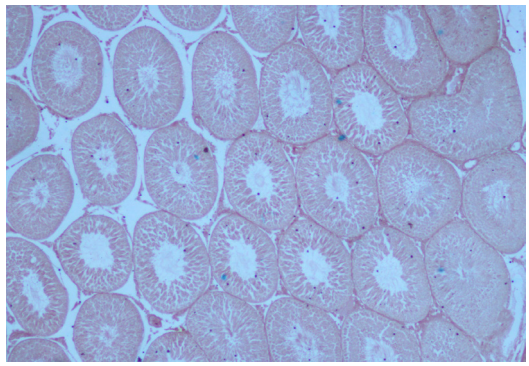


Figure 4: Endosulfan 12 treated groups showed Under 100X



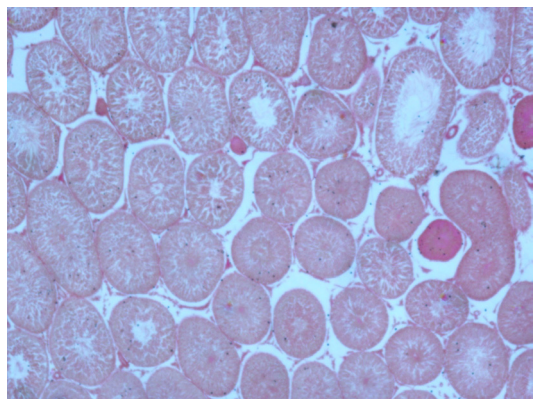


Figure 5: The Endosulfan treated group 9 & 12 mg with pretreatment of 25 mg Vitamin C Under 100X

Discussion

WHO classified, Endosulfan as moderately hazardous and has been considered to possess estrogenic activity and male rats are more sensitive to the chronic effect of endosulfan than female rats.[1-3]

The histopathological analysis conducted in the present investigation has shown that endosulfan has testicular cytotoxicity. The necrotic changes in the testes and the vascular damage were observed in endosulfan treated rats.

The reproductive effects of endosulfan on the male offspring of rats were studied by treating the rats with 1.5 and 3 mg/kg endosulfan from day 15 of pregnancy to postnatal day 21 of lactation. The histological changes were studied in the testes at postnatal day 65 and 140, corresponding to the pubertal and adulthood stage development. A significant decrease in the percentage of seminiferous tubules and consequently the spermatogenesis at puberty, which indicated an adverse effect of endosulfan on spermatogenesis. This finding may explain the decrease in daily sperm production in endosulfan exposed male rats.[12] A variety of pesticides are known to cause atrophy of testes, inhibition of spermatogenesis, histological changes, and decrease in hormone and steroid level.[13-16]

The histological changes in the testes exhibit a close correlation with organ weight changes. [17] The amount of endosulfan induced oxidative damage depends on the initiation rate of the oxidation, the concentration of the oxidant and the progression of the chain reaction.[18] Free radical production is known to alter testicular function.[19,20]

In our study pretreatment of vitamin C along with endosulfan significantly decrease the extent of cytogenetic damage induced by the endosulfan. Vitamin C reversed the effect of endosulfan on reproductive toxicity as it can modify response to oxygen radicals and is known to be an excellent antioxidant and its observed protective effect is probably due to its antioxidant property.

Conclusion

Estrogenic action of Endosulfan, would cause testicular damage by releasing free radicals which causes oxidative damage. In our study, the protective effect of vitamin C on gonadotoxic effect of endosulfan in prepubertal rats is due to the ability of Vitamin C is to inhibit oxidative damage depends upon its ability to scavenge the free radicals, its local concentration and its ability to interfere with the initiation and progression of lipid peroxidation.

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Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Obtained from Institutional Animal Ethics Committee, Kasturba Medical College, Manipal.

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White Collar Crime and Pharmaceutical Industry: A Medico-Legal Study

Abstract

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The topic titled as "White Collar Crime and Pharmaceutical Industry: A Medico-Legal Study" is a topic of substance keeping in view the industrialization on one side and white collar crime on the other side. The pharmaceutical industry with its global expansion is not lacking behind in becoming the subject of white collar crime. The main aim for such crime is gaining financial crime at the cost of society. The white collar crime has different dimensions keeping in view the subject matter and subjectivity of the person involved in the said crime which may be in relation to price fixing, bribery, tax fraud, embezzlement identity theft, securities fraud, insider trading, and so on and so forth. The white collar crime itself suggests the commission of the crime by person at higher levels of the society having dominating impact in the social hierarchy. The pharmaceutical industry cannot keep itself without any impact of white collar crime. The adulteration practices of psychoactive illicit drugs have emerged which is most threatening hazard to consumers. The research topic is based on doctrinal study. The source of data is primary and secondary as well.

Keywords: *Cutting agents, clenbuterol, illicit psychotropic drugs, levamisole, new psychoactive substances, paracetamol, unjust enrichment.*

Introduction

One should understand the depth of crime that why white collar crimes takes place and by whom. And for this one be thorough about the activities involved in white collar crime and how it is different from other types of crime. And what level of activity is important to commit a white collar crime. Other crimes like burglary or any type of assault can be committed by anyone but white collar crime is committed by a person who has some special privilege or access to some authority in that concern.

Motivation for White Collar Crime: The main aim for such crime is to gain financial gain to one self and to provide loss to anybody. But to understand the roots of white collar crime one had to understand the psychology that makes them perform illegal activities and they are ready to break the law. Psychological factors that motivate for white collar crimes are:

- They don't have any respect for the company or the ethics of the company.
- People also have the feeling that they won't be caught as they have done it many times.
- They think that their actions are not loud that they would be detected.
- The feeling that they won't be caught as they have attained higher post in that company.

Types of White Collar Crime: White collar crimes are different from other crimes as they are non violent crimes and so it is hard to detect such crimes and the offender as well. At first instance a crime may be seen victimless but every crime as a victim and it may be employee of a company, shareholder of a company or company's consumers. Even the government can suffer loss when such crimes take place.

Few examples of white collar crimes are: Price fixing, Insider trading, Bribery, Securities fraud, Tax fraud, Embezzlement, Identity theft, Using of government corporate fund for personal use.

"An individual can act alone or he can work with part of a group to commit a white-collar crime. Depending on the offense, an individual convicted of this type of crime can face prison time, probation, fines, restitution, loss of professional licenses or community service."[1]

Pharmaceutical Industry: The industry in which the discovery, manufacture and development of drugs either by governmental sector or by private sector is done is known as pharmaceutical industries."The modern era of the pharmaceutical industry of isolation and purification of compounds, chemical synthesis, and computer-aided drug design is considered to have begun in the 19th century, thousands of years after intuition and trial and error led humans to believe that plants, animals, and minerals contained medicinal properties. The unification of research in the 20th century in fields such as chemistry and physiology increased the understanding of basic drug-discovery processes."

There are certain challenges which pharmaceutical industry had to face in this era like identification of targets of new drugs, getting approval from agencies of government, searching refining techniques in the discovery of drugs, and their development. For eliminating the disease all over the world there should be continual development of this pharmaceutical industry and should be considered of fundamental consideration.

Pharmaceutical Science in 16th and 17th Century: In 16th and 17th century the field of pharmaceutical sector improved. "In 1546 the first pharmacopoecia, or collected list of drugs and medicinal chemicals with directions for making pharmaceutical preparations, appeared in Nurnberg, Ger. Previous to this time, medical preparations had varied in concentration and even in constituents. Other pharmacopoeias followed in Basel (1561), Augsburg (1564), and London (1618). The London Pharmacopoeia became mandatory for the whole of England and thus became the first example of a national pharmacopoeia. Another important advance was initiated by Paracelsus, a 16th-century Swiss physician-chemist. He admonished his contemporaries not to use chemistry as it had widely been employed prior to his time in the speculative science of alchemy and the making of gold. Instead, Paracelsus advocated the use of chemistry to study the preparation of medicines."[2]

In 1617 the society of Apothecaries was found in London. This was a pharmacist society. This led to the development of pharmacy as a separate entity. King James I led to the separation of grocers from Apothecaries. It was also mandated that apothecary's shop could be kept by only one member of the society and he could only sell pharmaceutical products. In Great Britain, Pharmaceutical Society was founded in 1841. Education and training of pharmacist was taken into consideration by the members of society. And in today's world its development is really vital and thus education is supervised to all the members of the society.

"In 1783 the English physician and botanist William Withering published his famous monograph on the use of digitals (an extract from the flowering purple foxglove, Digitalis purpurea). His book, An Account of the Foxglove and Some of Its Medicinal Uses: With Practical Remarks on Dropsy and Other Diseases, described in detail the use of digitalis preparations and included suggestions as to how their toxicity might be reduced. Plants containing digitalis-like compounds had been employed by ancient Egyptians thousands of years earlier, but their use had been erratic. Withering believed that the primary action of digitalis was on the kidney, thereby preventing dropsy (edema)."[3]

Afterwards, it was also discovered that water used to be transported with blood in circulation. Cardiac performance improvement was the foremost concern of digitalis and for the improvement of cardiovascular function there should be reduction in edema.

Pharmaceutical Industry in Modern Era: Today we know the pharmaceutical industry as a wide and complex sector. World's largest companies of pharmaceutical were located in Europe, North America and Japan in 20th century. Industries were divided according to the activities like research, manufacturing, and sales. Pharmaceutical companies are often profitable and so many countries are preparing the structure for the drug companies so that they have a good competition worldwide.

"The industry has also come to be characterized by outsourcing. That is, many companies contract with specialty manufacturers or research firms to carry out parts of the drug development process for them. Others try to retain most of the processes within their own company. Since the pharmaceutical industry is driven largely by profits and competition each company striving to be the first to find cures for specific diseases it is anticipated that the industry will continue to change and evolve over time."[4]

Capital Infusion: "Generic maker Leading Pharma recently completed a financing transaction for $40 million of growth capital. The growth capital, led by Signet Healthcare Partners and Crestline Investors, will be used to expand the Fairfield, N.J.-based company's pipeline and pay off debt."[5]

"This investment allows us to accelerate the development of our robust pipeline to build a more comprehensive product portfolio," CEO and co-founder Ronald Gold said. "We are excited to partner with prudent investors who have experience in the pharmaceutical industry and believe in our business model as well as our ability to develop and market new generic drugs."[6]

Leading Pharma not only did funding but also made a statement that board of Leading's Parent Company will be joined by Signet Healthcare Partners, and the managing director namely Nikhil Puri and Crestline and the investors managing director Chris Sample.

Adulteration Practices of Psychoactive Illicit Drugs: We have heard about the powered drug which is being easily adulterated in medicines and some foods and drinks. This not only increases the quantity of something but also increases the profit level of the manufacturer or the dealer. These drugs are diluted and then mixed with the products to enhance the effect of it on the consumers.

A search was made on MEDLINE, Web of Science and Reports and documents of international agencies, Scopus, etc up to 2017.

Active substances of pharmacologically like dextromethorphan, paracetamol, clenbuterol, caffeine for heroin; phenacetine, hydroxyzine, diltiazem, lidocaine and levamisole for cocaine; phentermine and caffeine for amphetamine, have been discovered over the years.

The latter of heroin which is precursor namely, morphine and cocaine are extracted from products which are natural in nature. There may be possibility of having impurities or minor alkaloids at their final stage of preparation. In this concern we can say that new psychoactive substances can be used as cutting agents as well.

The Risks of Consuming Adulterated Chinese Medicine: It has been proved by scientists of Hong Kong that Chinese medicines do have a range of substances which can harm the health adversely.

Assian Scientists: A study was published in British Journal of Clinical Pharmacology. Serious dangers or harms that could be caused by using adulterated proprietary medicines of China were revealed by the scientists in this study. Traditional Chinese medicine was often used as complementary medicine in whole world. It was used for various symptoms and for the betterment of health. PCMs are generally composed of Chinese medicines and are contained in a finished form of dose and they are considered to be safe and natural as well. But anyhow the reports were documented the adulteration of PCMs and other health products with agents (undeclared). They also include prescription drugs, banned drugs and also drug analogs. Health consequences can be really adverse or may be fatal.

"In this study, a team of researchers led by Dr. Tony Wing Lai Mak, consultant pathologist at the Hospital Authority Toxicology Reference Laboratory located in Princess Margaret Hospital, Hong Kong, retrospectively reviewed cases involving the use of adulterated pCMs from 2005 to 2015. The investigators identified 404 cases involving the use of 487 adulterated pCMs or health products with a total of 1,234 adulterants. The six most common categories of adulterants detected were nonsteroidal anti-inflammatory drugs (18 percent), anorectics (15 percent), corticosteroids (14 percent), diuretics and laxatives (11 percent), oral antidiabetic agents (10 percent) and erectile dysfunction drugs (6 percent)."[7]

Sibutramine is an anorectic. This has been withdrawn because of its association with high cardiovascular strokes and events from the market. This was the rarest adulterant known. Over the counter drug store; the internet and Chinese medical practitioners are the sources of illicit products. We know from the study that sixty five percent of patients were adversely infected due to these illicit products. It also included fourteen severe cases and two fatal cases.

White Collar Crime: White collar crimes are considered to be non violent crimes. They are generally performed in commercial places for some financial gain.

Some of the examples of white collar crime are as follows:Bankruptcy, Computer and internet fraud, Antitrust violations, Bribery, Financial institution fraud, Credit card fraud, Environmental law violation, Insider trading, Economic espionage and trade secret theft, Counterfeiting, Insurance fraud, Tax invasion, Government fraud, Intellectual property fraud, Money laundering, Healthcare fraud, Embezzlement, Securities fraud, Public corruption, Mail fraud, Telemarketing fraud, kickbacks, etc.

Defenses: There are certain defenses which are available to non white collar crimes and white collar crimes as well, which are as follows:

- In Robert v. United States[8] proximate cause elements of the crime was challenged by some individuals in the cases of fraud of real property.
- In financial institution fraud cases, the argument was done by the individuals that a crime is required to prove the intention of the prosecutor but this argument was rejected by the Supreme Court in Loughrin v. United States[9].
- In mail fraud cases, it was argued by the individuals that a person can be charged of misrepresentation only if false documents are received by the party or person. In layman language it is said that a person is not considered responsible if third party is harmed by his mail fraud. This argument was also rejected by the Supreme Court stating that if the parties are harmed collaterally then they can claim their damages and are entitled to recover. This was held in Bridge v. Phoenix Bond & Indem Co[10].
- In Pasquantino v. United States[11], it was a case of wire fraud in which foreign countries were in involved. "Individuals have challenged their convictions on grounds that the conviction violated the common law revenue rule, which forbids courts from enforcing tax laws of foreign countries. however, the Supreme Court upheld Pasquantino's conviction, holding that fraud involving foreign countries fell within the wire fraudstatute.

Penalties and Regulations: According to the report of Federal Bureau of Investigation, the estimated cost of white collar crime is more than dollar three hundred billion annually in United States. Even the individuals can be charged for the crime of white collar crime by the government and the corporation can also be sanctioned for such activities. The penalties which are granted for such crimes are community confinement, forfeiture, fines, supervised release, home detention, imprisonment, restitution and paying the cost of prosecution, etc. sanctions granted can be lessen if the offender takes the responsibility of the crime and helps the cops or defendant in investigating the crime further.

"The Commerce Clause of the U.S. Constitution gives the federal government the authority to regulate white-collar crime. A number of federal agencies, including the FBI, the Internal Revenue Service (IRS), and the Securities and Exchange Commission (SEC), participate in the enforcement of federal white-collar crime legislation. In addition, most states employ their own agencies to enforce white-collar crime laws at the state level."[12]

In Dotterweich, he was prosecuted by the government. He was the president and general manager of the company named as Buffalo Pharmaceutical Company. And he was prosecuted as he had shipped the poor quality products of pharmaceutical and hence violated the Federal Food, Drug and Cosmetic Act. No evidence could be given by the government on his shipping but he was prosecuted as he could not prevent his company form the commission of a offence of public welfare and therefore the conviction was held by the Supreme Court.

Public Fraud: Stolen Valor Act: Public fraud was prevented and the reputation of military service medals was prevented by the Act. "On December 20, 2006, President George W. Bush signed into law the Stolen ValorAct, which made it a federal crime to fraudulently claim receipt of the Medal of Honor, the Distinguished Service Cross, the Navy Cross, the Air Force Cross, the Purple Heart, and other decorations and medals awarded by the President or the Armed Forces of the United States."[13]

In United States v. Alvare[14],The Stolen Act was constitutionally challenged. At Congressional Medal of Honor, Xavier Alvarez was introduced as a recipient by himself in 2007 when District Board meeting was held and was convicted under the Act namely The Stolen Valor Act. This Act was even challenged by Alvarez in order to violate his freedom of speech which was given by the first amendment. The decision was in his favor and The Stolen Valor Act was held unconstitutional in order to violate the first amendment.

"On June 3, 2013, President Barack Obama signed into law a revised version of the Stolen Valor Act, now 18 U.S.C. § 704(b)-(d). Unlike the original Stolen Valor Act, which punished an individual for fraudulently claiming receipt of a medal or a decoration, the 2013 Stolen Valor Act punishes individuals who, through such fraudulent claims, intend to obtain money, property, or other tangible benefit."[15]

Conclusion and Suggestion: The pharmaceutical industries with thrust and profit making wanted to be regulated and monitored so as to prevent the crime. It seems to be divided of any malafide or criminal activity. There is a need for regulatory mechanism to prevent white collar crime especially in pharmaceutical firms because of the fact that such crimes not only generate

unjust enrichment but disturb the society stability in a way turning to human rights violation. Now-a-days we can find the crime of money laundering in every sector of the society and even the pharmaceutical industries are stained by this crime.

White collar crime in such an industry is really hazardous for the society and the health of people. This crime is giving profit to the offenders and health issues to the consumers. The concerned authorities should waken up and take the remedial steps to be prevented from the supply of illicit drugs in order to earn more and more profit and hence conducting white collar crime.

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New Approach for Analysis the Correlation of Some Oxidative Markers in Type 2 Diabetes Mellitus by Data Wavelet Analysis

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Abstract

Diabetes mellitus is a common disease. This disease also has several complications, which is the main reason for the development of other diseases. For the study of diabetes, various markers are considered. Analysis of such markers allows us to draw conclusions about the degree of development of diabetes mellitus. We are considering expanding the analysis of various markers in diabetes. To do this, we use wavelet ideologists - the wavelet coherence method. We have identified periods of agreement between FBS and serum vitamin A, FBS and serum vitamin C, serum vitamin A and serum vitamin C, serum vitamin A and MDA for different levels of HbA1c. This allows us to evaluate the effect of various markers on the development of diabetes. To conduct this study, a group of 300 patients with type 2 diabetes was considered.

Keywords: *Diabetes mellitus, correlation, wavelet coherence, glyclated hemoglobin, fasting blood sugar, malondialdehyde.*

Introduction

Diabetes mellitus is one of the common chronic diseases. According to the World Health Organization (WHO), diabetes will be the 7th leading cause of death worldwide by 2030[1]. At the same time, 90% of all patients with diabetes are diagnosed with type 2 diabetes[2]. Type 2 diabetes is a metabolic disease. This type of diabetes occurs as a result of a violation of the interaction of insulin with tissue cells. Diabetes mellitus is a risk factor for other diseases and complications. In particular, this is a violation of vascular permeability and, as a consequence, the development of vascular atherosclerosis. Violation of vascular permeability can also be the basis of various heart diseases [3]. Diabetes is also the basis for the early development of cataracts, retinopathy, kidney damage, changes in the psyche and mood [4]. As a result of diabetes, oxidative stress often occurs, which in turn leads to various diseases, including the further development of diabetes. Therefore, an important task is the process of controlling the development of diabetes. This can be done by analyzing various markers that identify and show the development of diabetes. It is important to analyze such markers correctly. Therefore, the main objective of this study is to consider a new approach for the analysis of such markers in their relationship with each other.

Materials and Method

Brief overview of the research topic: The work[5] addresses several issues that are devoted to various markers of type 2 diabetes. Moreover, such markers allow you to control changes in renal decline. The authors consider plasma and urinary markers. Among these markers are considered: the level of antioxidant vitamins in plasma, the level of triglycerides in the blood and cholesterol, the level of malondialdhehyde and much more. To analyze such markers, the authors use method of descriptive statistics, factor and variance analysis. A similar study can be found in [6], where the authors also use classical method of statistical analysis to study the corresponding markers. In[7], markers are considered that allow one to consider the relationship between type 2 diabetes and cardiovascular diseases. The authors, first of all, study the effect of various vitamins on the development of diabetes mellitus, the possibility of slowing down the rate of development of cardiovascular disease. For their conclusions, the authors of the study use the method of correlation and regression analysis.

DNA methylation markers, level glucose and HbA_{1c} are discussed in [8]. For this analysis, the authors used multidimensional linear models. Markers of oxidative stress are the basis of the study in S. Seyyedebrahimi, H. Khodabandehloo, E. N. Esfahani and R. Meshkani [9]. For such an analysis, descriptive and comparative statistics method were used. A comprehensive review of various markers for studying the development of type 2 diabetes mellitus was considered in [4, 10]. Here, the authors also use classical statistical method to carry out the corresponding analysis: descriptive statistics, linear regression analysis, factor analysis, correlation analysis. Thus, based on the foregoing, we can say that there are various markers for the analysis of the development of diabetes and the manifestation of its influence in the form of complications of certain diseases. This allows you to conduct multifaceted research and draw various conclusions. However, the analysis apparatus used for such studies is standard. This limits the possibility of carrying out advanced analysis. Therefore, we will consider one of the tools that can be used in this study.

Wavelet ideology as a tool for analyzing data markers: Data markers for diabetes analysis can be represented as a sequence. The structure of such a sequence is a time series or a set of data for a certain period of time. Thus, for analysis we can use the ideology of wavelets. The input for wavelet ideology method is data that has the structure of a time series [11, 12]. In general, the ideology of wavelets makes it possible to identify singular points in the data structure that is being studied. Such an analysis is based on a series of different maternal wavelets [12, 13]. We can also analyze the mutual influence of two data sets. For this, the wavelet coherence methodology is used. This methodology is based on an analysis of a cross-reference for data series (z and z_1), which are analyzed[14,15]

$$R^2(z,z_1)=\frac{\left|\Psi(z_1^{-1}\Delta_y(z,z_1)\right|}{\Psi(z_1^{-1}\left|\Delta_x(z,z_1)\right|^2)\Psi(z_1^{-1}\left|\Delta_y(z,z_1)\right|^2)}$$

where ψ – is a smoothing operator,

$\Delta(z, z_1)$ – cross wavelet spectra for different time series z and z_1

x – data number in the test series,

y – characterizes the depth of cross-references,

$0 \le R^2(z,z_1) \le 1$.

If we have several series of data for a certain date, then we can use one of these series as a ranking tool. To do this, we select one of the data series and perform ranking on this series for other data series. Thus, we determine the cross wavelet spectra by some series u $\Delta^u(z, z_1)$, which allows us to rank the data and apply the wavelet coherence methodology:

$$R^2(z,z_1)=\frac{\left|\Psi(z_1^{-1}\Delta_y^u(z,z_1)\right|}{\Psi(z_1^{-1}\left|\Delta_x^u(z,z_1)\right|^2)\Psi(z_1^{-1}\left|\Delta_y^u(z,z_1)\right|^2)}$$

This approach allows you to structure the data series and carry out the corresponding analysis. Then along the axis x we have some parameter that is structured. This allows you to evaluate the reciprocity of some data series relative to another parameter. Therefore, we are expanding the possibilities of analysis.

Data: We review the data that was obtained for patients with the second type of diabetes. This group of patients consists of 300 people. This study was conducted by the Jabber Abu Ezz Center for treatment and care of diabetics in Khartoum– Sudan [4].

As individual markers are considered: Glyclated hemoglobin (HbA_{1c})% in human whole blood; fasting blood sugar (FBS), mg/dl; serum vitamin A, µg/dl; serum vitamin C, µg/ml; malondialdehyde (MDA), mol/l.

Some statistical parameters of markers are presented in Table 1.

Table 1: Statistical indicators markers

Markers	Diabetics (n=300)	P value
Vitamin A means (Max-Min)	50.3±20.0 (14.0-95.0)	0.001*
Vitamin C means (Max-Min)	3.9±1.3 (1.2-6.9)	0.0003*
MDA means (Max-Min)	6.7±6.2 (1.0-35.0)	0.001*
HbA_{1c}% means (Max-Min)	7.5±1.4 (6.0-13.3)	0.001*
FBS means (Max-Min)	160.4±65.5 (75.0-480.0)	0.0002*

*Significant differences in all blood parameters between control and test group (P value < 0.05).

These are the most commonly used markers for analyzing the development of diabetes. At the same time, our task is to show the possibility of applying the ideology of wavelet analysis to study the development of diabetes.

Results

One of the key markers in the study of the development of diabetes is the marker HbA_{1c}. HbA_{1c} shows the average blood sugar over a long period. Therefore, for further analysis, we chose the HbA_{1c} marker as the data for the ranking base. We do this ranking by increasing values of HbA_{1c}. These values are in the range: 6.0-13.3%.

Data for the remaining markers are given in accordance with the ranking of HbA_{1c}. Thus, we consider wavelet coherence for different marker groups, subject to the ranking of the HbA_{1c} marker. Then we can evaluate the change in the relationship between different markers for different levels of the HbA_{1c} marker.

In Fig. 1 shows the wavelet coherence between the values of the FBS and serum vitamin A.

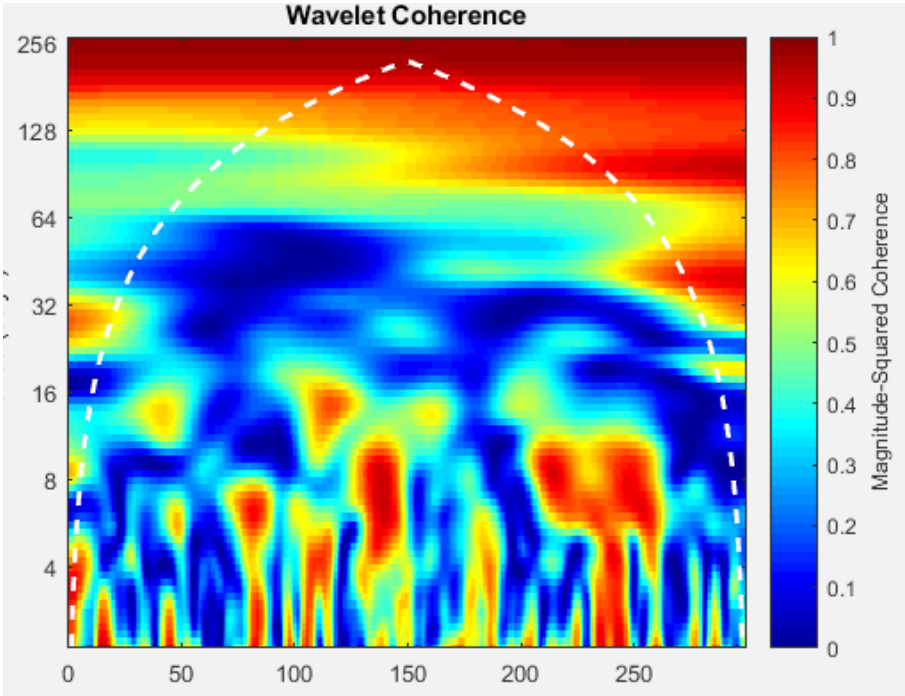


Fig. 1. Wavelet coherence between the values of the FBS and serum vitamin A markers when ranking by the HbA_{1c} marker

In Fig. 1 (and for other similar figures that are presented below) shows: along the axis *x*, the ranked values of the HbA_{1c} marker for 300 patients from the group (for Fig. 5, this is the ranking by the FBS marker); along the axis *y*, the depth of the relationship between the data values for the FBS and serum vitamin A markers (for other figures, this is the depth of the relationship between the other markers that are considered); the dashed white line limits the region of reliable values of wavelet coherence (at a confidence level of not less than 0.95). These values are inside the dashed line; the figure also shows a scale for analyzing the significance of wavelet coherence data. The significance of wavelet coherence is in the range from 0 to 1. Such data for clarity also have color values. Separate areas are the localization of the consistency (the significance of the wavelet coherence tends to 1) or the inconsistency of the data (the significance of the wavelet coherence tends to 0), which are investigated.

Fig. 1 show, that the consistency between the values of the FBS and serum vitamin A markers is different depending on the values of the HbA_{1c} marker. The greatest consistency between the values of the FBS and

serum vitamin A markers is characteristic for the range of changes in the HbA_{1c} marker: 8.0-8.7%. We can also observe the alternation of such significance that is associated with certain values of the HbA_{1c} marker.

In Fig. 2 shows the wavelet coherence between the values of the FBS and serum vitamin C.

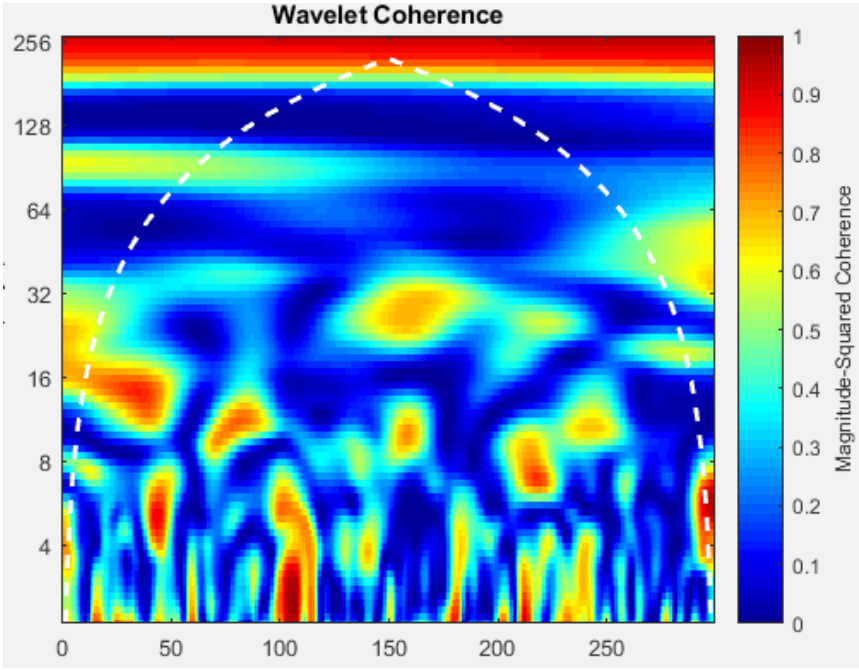


Fig. 2. Wavelet coherence between the values of the FBS and serum vitamin C markers when ranking by the HbA_{1c} marker

Comparing Fig. 1 and Fig. 2 we can see different consistency between the markers that are considered. The consistency for the data in Fig. 1 is higher than for the data in Fig. 2.

In Fig. 3 shows the wavelet coherence between the values of the serum vitamin A and serum vitamin C.

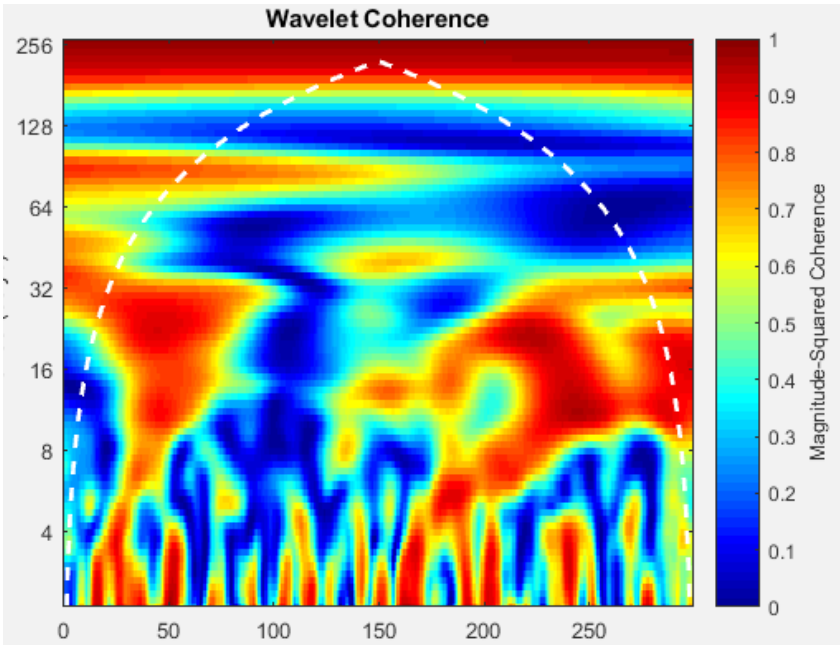


Fig. 3. Wavelet coherence between the values of the serum vitamin A and serum vitamin C markers when ranking by the HbA_{1c} marker

In Fig. 3, we see a significant agreement between the values of the serum vitamin A and serum vitamin C. Thus, serum vitamin A and serum vitamin C play an important role from the standpoint of analysis of the conditions for the development of diabetes mellitus, the effect on the change in the level of the HbA_{1c} marker.

In Fig. 4 shows the wavelet coherence values between serum vitamin A and MDA.

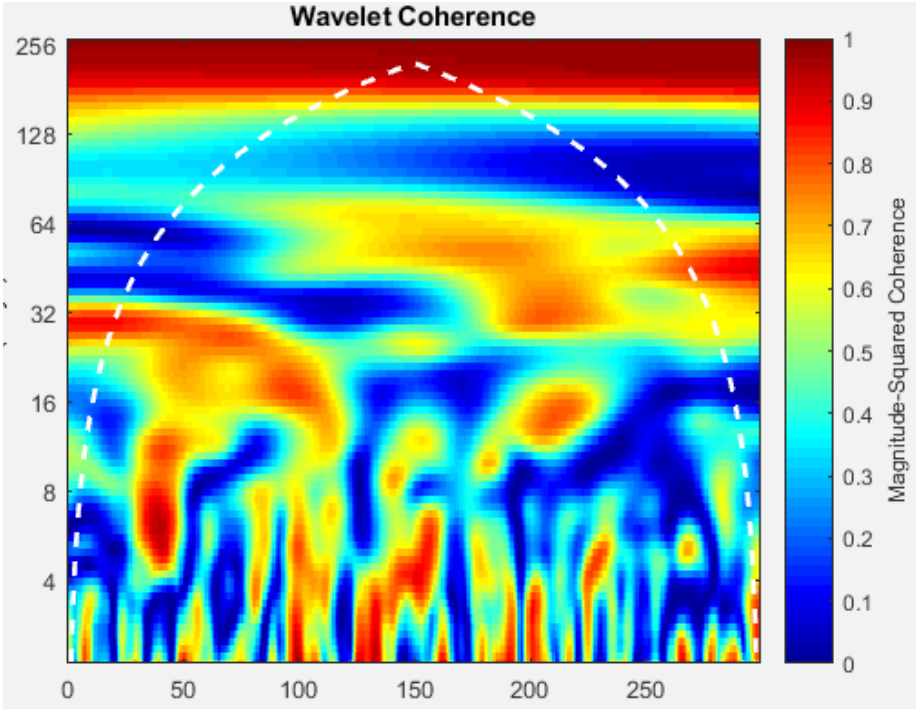


Fig. 4. Wavelet coherence between the values of the serum vitamin A and MDA markers when ranking by the HbA_{1c} marker

At the same time, in Fig. 5 shows the wavelet coherence between the values of the serum vitamin A and MDA when ranking by the FBS marker.

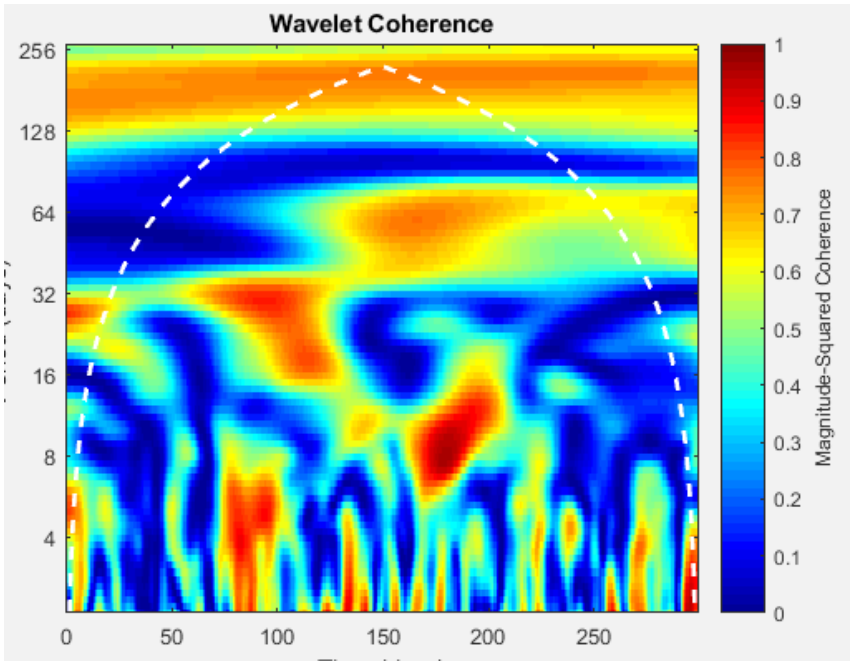


Fig. 5. Wavelet coherence between serum vitamin A and MDA values when ranking by FBS marker

Comparing the data in Fig. 4 and Fig. 5, we can see a different degree of consistency between serum vitamin A and MDA markers when ranking by HbA_{1c} or FBS. However, the greatest consistency is characteristic for lower values of HbA_{1c} or FBS.

Discussion

The high prevalence of diabetes and the possibility of its influence on the development of other diseases make it necessary to conduct various studies. Such studies involve the analysis of markers that characterize the development of diabetes. Among such studies, a special place is occupied by the analysis of correlation between individual markers. This allows us to analyze the development of diabetes and evaluate the effect of various components on such a process.

In[16], based on the analysis of correlation relationships, the relationship between neutrophil-lymphocyte ratio and insulin resistance is considered. This allows you to correctly diagnose patients with diabetes.

In the study[17], on the basis of correlation analysis between different markers, connections with complications that arise in diabetes were determined.

We can also note other studies, where the basis of the study of various markers in the study of the development of diabetes is a correlation analysis[3,5,18,19].

However, when considering correlations, we consider the pairwise influence of markers. In some cases, this can lead to mixed results [20]. For example, when we compare several markers, we can have different correlation values. As a result, it is difficult to draw general conclusions.

In this study, we are expanding the possibilities of conducting correlation analysis. This is possible through the use of wavelet ideology. For this we use wavelet coherence. As a result, we are able to estimate the correlation value between three different markers. This makes it possible to expand the conclusions based on the studies.

Conclusion

We considered the possibility of expanding the correlation analysis to study various markers in diabetes mellitus. For this, we used wavelet coherence. In particular, periods of agreement between FBS and serum vitamin A, FBS and serum vitamin C, serum vitamin A and serum vitamin C, serum vitamin A and MDA for different levels of HbA1c are shown. This allows us to evaluate the effect of various markers on the development of diabetes. Different periods between serum vitamin A and MDA were also observed, taking into account the analysis of HbA1c and FBS levels.

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Capacity Creation in Health Infrastructure and their Outcomes: A Study in Spatial Disparity in Assam

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Abstract

Health sector development is highly correlated with the level of human development of a region and is an important factor determining the efficiency of the human resource of a country. In fact, there is a strong nexus between economic growth and human development which again depends on an efficient health sector. In this backdrop, the rationale for a detailed exploration of capacity creation in health and its outcome in terms of attainments in health parameters appears to be strong. This paper seeks to explore capacity creation in the health sector and examine how it has affected health outcomes in the Indian state of Assam. This is sought to be exercised through the construction of three independent indices and one composite index. The indices have been constructed on three dimensions, namely, Health Infrastructure, Health Manpower, and Health Outcome. The composite health index so constructed unfortunately exposes the poor attainments of the state in all the three dimensions considered. Moreover, health outcomes in Assam is extremely asymmetrical with high attainments in a few districts as opposed to poor performance in the majority of the remaining districts. Though it must be stated that the attainments indicated by the indices presents only a partial picture of the health infrastructure and manpower in the state as the study domain includes only the public interventions while ignoring the installed capacity in the private sector.

Keywords: *Health Infrastructure, health outcome, health manpower, Composite Index.*

Introduction

World Health Organization defined health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity",[1] which helps a person to lead a socio-economically active and productive life. But in economics, for a meaningful analysis,health status is evaluated in terms of measurable parameters like life expectancy at birth, infant mortality rate (IMR), maternal mortality rate (MMR), etc.

To promote, restore and maintain the health of its people through a multitude of proper healthcare as well as medical care services, every country has a healthcare system. Health sector development is highly correlated with the level of human development of a region and is an important factor determining the efficiency of the human resource of a country. As the health sector develops, the quality of life improves, leading to better quality human capital and higher total factor productivity, which enhances economic growth. However,in spite of the primacy of health sector in augmenting the development process, access to basic health services has continued to remain poor in developing countries like India.

India had experienced rapid economic growth over the years and has been overtaking other countries both in terms of GNP and GNP (PPP). However, on social front, India's performance is poor and is probably behind most of the important developing economies which is evident in its rank of 130 out of 189 countries in terms of Human Development Indicators.[2] More particularly, India's health care sector has been a matter of serious concern as it had remained a lacuna for the country over the years. In India, despite considerable investment in health infrastructure, both access to and use of services remain suboptimal and vary considerably across states and regions. This is especially reflected in parameters like IMR and MMR which have been historically adverse. The Sustainable Development Goal Report 2019 has set a target to reduce the IMR and MMR respectively to 25 per 1000 and less than 70 per 100,000 live birth by 2030. In that perspective, India's maternal mortality rate of 174 deaths in 2017 and the infant mortality rate of 34.6 was alarmingly high.[3] It has been argued that the lackluster performance of the health sector of India is mainly because of poor healthcare facilities, especially at the primary level. While India does have some world-

class health infrastructure providing topnotch treatment facilities, but they are way out of reach of the common people. In fact, the basic health care facilities available to the common masses, especially in the countryside, is very poor. In this backdrop, the rationale for a detailed exploration of capacity creation in health and its outcome in terms of attainments in health parameters appears to be strong. This paperseeksto explore capacity creation in the health sector and examine how it has affectedhealth outcomes in the Indian state of Assam.

Assam has an area of 78,438 sq Km with thirty-three districts and a population of about 3.12 crore.[4] The state ranks 30th among the country's major states and union territories in terms of Human Development Index.[2] More importantly, in terms of attainments in health, *India Today Ranking* has positioned it at 19thamong 21 states of the country.[5]

Table 1: Health Indicators-A comparative profile

Indicators	Assam	India
IMR	48	41
Under 5 Mortality Rate	56	50
Full Vaccination Coverage	47.1%	62.0%
Children's Nutritional status (children age below 5 years who are underweight)	29.8%	35.8%
Anemia among children (children age 6-59 months who are anemic)	35.7%	58.6%
Underweight women with BMI below normal	25.7%	22.9
MMR	237	130
Life expectancy at birth	63.6(men) 64.8(women)	67.3(men) 69.6(women)

Source: NFHS-IV, 2014-16,M/O Health & F.W., GOI.[6]

The poor ranking of Assam is reflected in Table-1 where the state lags behind the national average in most of the important health parameters. A cause of serious concern is particularly the MMR, IMR and Vaccination Coverage which are very adverse relative to the national average.

These limitations in Assam's health sector have been taken into cognizance by both the state and central governments in terms of affirmative actions to correct the existing state. Over the years, the state has created a health infrastructure of 4644 Sub-Centres (SCs), 946 Primary Health Centres (PHCs), 172 Community Health Centres (CHCs), 14 Sub-divisional Hospitals (SDHs), and 25 District Hospitals (DHs) spread across the state. However, as is evident in the health attainments of the state viz-a-viz the national average, there still exists an infrastructural gap as well as a shortage of manpower to run the healthcare institutions. The most recent summary data put out by the 4th National Family Health Survey shows that while the state has succeeded in improving its health indicators, the current situation leaves a lot more room for improvement.

The paper seeks to document the spatial differential in capacity creation in health infrastructure. It extends the research to assess the health outcomes across districts of the state following the differences in the existing physical and human infrastructure through the construction of three independent indices and one composite index covering various dimensions.

Material and Method

Assessment of the health attainment of various districts of Assam and an inter-district comparison can be very revealing. Accordingly, ranking and comparative analysis of the health status of various districts of Assam has been undertaken on the basis of a Score Index using the UNDP method.[7] The score index for each dimension has been constructed to track the performance of each district in each dimension and subsequently clubbed to form a composite health index. The methodology used is as follows:

Construction of Score index: First of all, each district is given a score based on the individual indicator. The score index ($S_{indicator}$) is given by the following formulae:

- For a positively increasing indicator,
  $$S_{indicator} = 1 - ((max-I)/(max-min))$$
- For a negatively increasing (declining) indicator,
  $$S_{indicator} = 1 - ((I-min)/(max-min))$$

Where "max" is the maximum value of a given indicator across all districts in the sample set; "min" is the minimum value of that indicator in the set of districts, and 'I' is the actual data value of an individual district on that indicator. A score of zero implies that the particular district is the poorest performing in the sample; while a score of oneindicates that the particular district is the best performing in the sample. This has been used to demonstrate an inter-district ranking based on the score index.

Dimension score: Next, by averaging across the indicator scores of each district a dimension scoreis arrived at for each dimension. For instance, dimension 2 i.e. health manpower has 3 indicators; all the score indices ($S_{indicator}$) of all the 3 indicators would be averaged so as to provide equal weight to all the indicators within that dimension into a single Dimension score.

Composite index score: Finally, by averaging all the Dimension scores the composite index is arrived, based on which the final ranking of the districts has been done.

Colour coding: Four coloursnamely, red, yellow, green and pink representing four different categories of performance, namely, very poor, poor, comparatively better and satisfactory respectively have been used to rank the districts and the range for each of these four categories is based on breaking up the index values into four equal quartiles.

The indicators that are being used for the construction of the index are shown in Table 2.

Table 2. List of Indicators used for district ranking

Health Infrastructure	Health Manpower	Health Outcome
Total Health Centres per 1000 population	Doctors per 1000 population	Infant Mortality Rate
Total Health centers per 100 square Km	Nurses per 1000 population	Maternal Mortality Rate
	Para Medicals per 1000 population	Vaccination Coverage

Findings:

Dimension 1: Health Infrastructure: The health status of a country or a state depends to a great extent on the availability of health-related infrastructure. Though over the years the number of physical health infrastructure in Assam has been increasing, in relation to population growth and advancement in health-related technology, the attainments have not been satisfactory. While primary health centres have been created across the various districts in the state but spatial disparity still prevails. Moreover, the availability of CHCs, DHs and SDHs, which constitute the most important tier of the health sector, is grossly inadequate relative to the area it has to cover. This is also reflected in the estimates of accessibility of the health centers which is conspicuously low. This uneven creation of health care infrastructure in the state is sought to be captured with an inter-district health index. Table 3 shows that 21 districts out of 27 are categorized as “very poorly” and “poorly” performing districts while only 5 districts qualify among “comparatively better” category. Among the districts, Tinsukia is the worst performing with a score of only 0.20 while Nalbari is the only district in a sole “satisfactory” position with 0.79 scores.

Table 3: Ranking of the Districts based on Health Infrastructure

Districts	$S_{indicator}$	Districts	$S_{indicator}$	Districts	$S_{indicator}$	Districts	$S_{indicator}$
Tinsukia	0.20	Lakhimpur	0.36	Dima Hasao	0.50	Nalbari	0.79
KarbiAnglong	0.21	Jorhat	0.36	Darrang	0.51		
Dhemaji	0.22	Chirang	0.36	Barpeta	0.54		
Kamrup Metro	0.25	Baksa	0.36	Karimganj	0.55		
Golaghat	0.27	Udalguri	0.39	Kamrup Rural	0.58		
Sonitpur	0.30	Hailakandi	0.40				
Cachar	0.31	Nagaon	0.40				
		Kokrajhar	0.40				
		Marigaon	0.40				
		Dibrugarh	0.42				
		Goalpara	0.43				
		Dhubri	0.45				
		Sibsagar	0.46				
		Bongaigaon	0.48				

Dimension 2: Health Manpower: Just like health infrastructure, the accessibility to health manpower is evidently low. Table 4 summarizes the comparative picture for the districts in terms of the health manpower index. Out of 27 districts of Assam, 19 are categorized as "very poorly" performing districts while 6 districts are "poorly" performing ones. There is only one "comparatively better" and one "satisfactorily" performing district. Thus this dimension is in need of special focus because the state suffers from a very adverse status with regards to accessibility to health manpower.

Table 4 Ranking of Districts based onHealth Manpower

Districts	$S_{indicator}$	Districts	$S_{indicator}$	Districts	$S_{indicator}$	Districts	$S_{indicator}$
Cachar	0.06	Chirang	0.31	Nalbari	0.61	Dima Hasao	0.99
Nagaon	0.06	Jorhat	0.31				
Tinsukia	0.06	Sibsagar	0.31				
Dhubri	0.08	Kamrup Metro	0.34				
Karimganj	0.10	Kamrup Rural	0.37				
Sonitpur	0.13	KarbiAnglong	0.37				
Morigaon	0.13						
Hailakandi	0.16						
Dibrugarh	0.18						
Udalguri	0.18						
Barpeta	0.18						
Baksa	0.23						
Golaghat	0.24						
Bongaigaon	0.26						
Lakhimpur	0.26						
Darrang	0.27						
Goalpara	0.27						
Dhemaji	0.28						
Kokrajhar	0.28						

Dimension 3: Health Outcome: Health outcomes in Assam is extremely asymmetrical with high attainments in a few districts as opposed to poor performance in the majority of the remaining districts. This is evident in the fact that most of the districts expect a few are lagging behind the state average with respect to maternal and child health as reflected in the MMR and IMR. This is also true with regards to attainments in vaccination coverage.

Table 5: Rankings of the districts based on Health Outcome

Districts	Score Index	Districts	Score Index	Districts	Score Index	Districts	Score Index
Kamrup Metro	0.04	Cachar	0.25	Sonitpur	0.46	Kamrup Rural	0.67
		Dibrugarh	0.25	Goalpara	0.47	Morigaon	0.71
		Golaghat	0.28	Hailakandi	0.47	Tinsukia	0.77
		Karimganj	0.28	Barpeta	0.48	Nagaon	0.82
		Kokrajhar	0.30	KarbiAnglong	0.54		
		Dhemaji	0.35	Baksa	0.56		
		Udalguri	0.36	Dima Hasao	0.60		
		Jorhat	0.37	Dhubri	0.62		
		Bongaigaon	0.42	Lakhimpur	0.63		
		Chirang	0.44	Sibsagar	0.64		
		Darrang	0.44				
		Nalbari	0.45				

The index in health outcomes as presented in Table 5 surprisingly ranks Kamrup Metro (which includes Guwahati city) as the worst-performing district. This however is a paradox as Guwahati city boasts off the best health infrastructure in the state. The state however, has done relatively better in this dimension with 4 districts performing satisfactorily and 10 others doing comparatively better.

Composite Index and Overall Ranking: Index constructed on individual dimensions provide an incomplete picture of how districts are faring in overall health status. To obtain the comprehensive picture, a composite index (CI) is constructed, which takes into account all the three dimensions namely, Health Infrastructure, Health Manpower, and Health Outcome. This section presents an overall ranking of all the districts of Assam based on the Composite Index.

Table 6: Rankings of the districts based on Composite Index

Districts	CI	Districts	CI	Districts	CI	Districts	CI
Kamrup Metro	0.21	Hailakandi	0.34	Sibsagar	0.47	Nalbari	0.62
Cachar	0.21	Tinsukia	0.34	Kamrup Rural	0.54	Dima Hasao	0.7
Golaghat	0.26	Jorhat	0.35				
Dhemaji	0.28	Chirang	0.37				
Dibrugarh	0.28	KarbiAnglong	0.37				
Sonitpur	0.30	Baksa	0.38				
Udalguri	0.31	Dhubri	0.38				
Karimganj	0.31	Goalpara	0.39				
Kokrajhar	0.33	Bongaigaon	0.39				
		Barpeta	0.4				
		Darrang	0.41				
		Morigaon	0.41				
		Lakhimpur	0.42				
		Nagaon	0.43				

Table 6 shows that out of 27 districts, 23 districts are either ranked as “very poor” or “poor” implying that they suffer from inadequate health infrastructure and subsequently are experiencing very adverse outcomes. The index also demonstrates the fact that a handful of districts had been favored in capacity creation which has enable them to attain more privileged status in the ranking. This applies to two districts who are ranked as “satisfactory” and two others are ranked as “comparatively better”.

Among the districts Kamrup Metro has the lowest rank in the composite index which is consistent with its adverse status in all the dimensions.

Discussion

The results appear quite inexplicable especially in the case of Kamrup Metro which is the most endowed district of the state in terms of medical infrastructure and health personals. This is in consonance with the fact that the city constitutes the principal health destination for people across the North-east.

In the context of the standing of Kamrup Metro in the composite index, it can be deduced that a large number of health centers and health professionals in the district, can be negated by a relatively bigger population. Using the same rationale the favorable position of Dima Hasao as one of the best performing district despite poor health infrastructure and dearth of health personals, can be explained by its scanty population.

Another reason for the adverse status of Kamrup Metro in the composite index can be attributed to the fact that only state interventions in health is incorporated into the calculations. However this result in a downward bias in the score of the district as a considerable part of the health infrastructure is provided by the private sector which is ignored under the scope of the study.

Conclusion

This paper has ranked the health status of all the districts of Assam in terms of infrastructure, medical personals and health outcomes. As most of the dimensions are expressed relative to the population they serve or the area they cover, the parameters are affected by the size of the population and area of the districts. Despite the biases thus generated, the rankings do reveal to an extent the health infrastructure that is created in the district, the health personals available to man them and the subsequent health outcomes.

The composite health index besides exposing the poor attainments of the state in all the three dimensions considered, reveals the huge disparity that exists between the few well-endowed districts and the rest of the poor achievers. However, it must be stated that the attainments indicated by the indices presents only a partial picture of the health infrastructure and manpower in the state as the study domain includes only the public interventions while ignoring the installed capacity in the private sector. This is one of the reason why Kamrup Metro constituted by Guwahati city is ranked as the worst performing district.

Conflicts of Interest: None

Source of Funding: Self

Ethical Clearance: No issues

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Carbonic Anhydrase IX Expression in Renal Cell Carcinoma: An Immunohistochemical Study

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Abstract

Introduction: Over the past two decades, Renal cell carcinoma(RCC) has become one of the lethal tumors of growing concern among the Indian population due to its heterogenic pattern. It is asymptomatic and chemoradioresistant. Most patients present with metastasis at the time of diagnosis. The treatment is limited. The inactivation of von Hippel-Lindau (VHL) gene produces Hypoxia Inducible Factor-1α. In response to hypoxia, Carbonic anhydrase IX (CA IX) modifies intracellular pH to aid tumor progression by regulating cell proliferation and invasiveness. CAIX is over-expressed in VHL mutated ccRCC. It is essential to improve the host immunity by targeting the CAIX, thereby destroying the tumor progressionto improve the survival rate.

Aim: To evaluate the CAIX expression in renal carcinoma tissue and adjacent normal tissue and to compare its expressions with the tumor characteristics.

Method and Materials: This study was conducted using 150 tissue blocks of histopathologicallyproven RCC patients. Ethical clearance was obtained from the institute Ethics Committee. CAIX was analyzed by Biotin Streptavidin Immunoperoxidase method. Q scoring was done.

Results: 74% of RCC cases were CA IX positive whereas the adjacent normal tissue area showed negative staining. In this study, most of theCcRCC patients(91.7%) expressed strong and diffuse staining and the other subtypes were weak and focally stained. Collecting Duct and sarcomatoid Carcinoma subtypes showed negative staining. The intensity of staining was inversely proportional to grading.

Conclusion: CAIX was strongly expressed in low grade clear cell RCC. CAIX could play a role as potential diagnostic marker in renal cell carcinoma, assessing prognosis and designing therapy.

Keywords: *Carbonic anhydrase IX,Diagnostic marker, Immunohistochemistry, Renal Cell Carcinoma.*

Introduction

Over the past two decades, renal cell carcinoma (RCC) has been studied in detail both clinically as well as molecularly. It has a heterogeneous pattern with different subtypes, each with a distinct histology, genetics, molecular profiles, and biologic behavior. There are many clinical trials going on and new targets being identified for therapeutic development[1].

The incidence of both early and late stage renal cell carcinoma cases is rising in the recent years. It is characterized by absence of symptoms, varying clinical presentations and resistance to radiation and chemotherapy[2]. Despite the recent advances in field of oncology, the prognosis is very poor and the treatment is restricted. Nowadays metastatic renal cell carcinoma

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(mRCC) which was previously a fatal disease became a chronic progressive disease with several new therapeutic options like targeted therapy, immunotherapy. Advances in targeted drug development have led to a number of new regimens for advanced RCC. RCC management is a promising area of ongoing clinical investigation[3].

Carbonic Anhydrase IX: Carbonic anhydrase ix (CAIX)is a hypoxia inducible metalloenzyme over expressed in cancer cells. Its main role is to maintain the intracellular pHand also lowers the E-cadherin mediated cell adhesion.It is over-expressed in many hypoxic tumours especially in VHL mutated ccRCC and low-expressed in normal renal tissues[4]. The tumour cells limit the process of oxidative phosphorylation and favour glycolysis for their growth thereby proving the Warburg effect noticed in VHL mutations[5,6].

CAIX is a cellular biomarker of hypoxia. During hypoxia it maintains a neutral intracellular pH and an acidic extracellular environment favourable for tumor progression as well as tumor invasion and metastasis[7]. CAIX expression in RCC is very distinct as it is completely absent in normal renal tissue.Many pharmacological agencies are conducting various preclinical trials for development of a suitable targeted therapy for RCC. Antagonism of the CAIX activity using specific inhibitors can play achief role in management and treatment of RCC[8,9]. Hence CAIX can become a novel targeted therapy for RCC. Targeted drugs after surgery especially for patients at high risk of recurrence play a very beneficial role in improving their survival rates.

Aim: With this background, the aim of this study is to evaluate the CAIX expression in renal tumor cells and adjacent normal tissue and to compare its expressions with the tumor characteristics.

Materials and Method: This is a retrospective study conducted using 150 tissue blocks ofhistopathologically proven RCC patients. Ethical clearance was obtained from the Ethics Committee, Sri Ramachandra Institute of Higher Education & Research (Deemed University). Tissue blocks of all renal cell carcinoma patients who underwent nephrectomy in Sri Ramachandra Hospitalfrom January 2011 to September 2018 were included in the study. Their corresponding paraffin embedded formalin fixed blocks were carefully chosen. The case details were obtained from the medical records department. Study included 111 males and 39 females. The mean age is 55yrs and the mean tumor size is 7.3cm. The common complaints during admission were abdominal pain (73) and hematuria (39). Clear cell renal cell carcinoma (ccRCC) subtype contributes around 72.7% of the RCC cases in our study. The other common subtypes of RCC are chromophobe (14.7%), papillary (9.3%), sarcomatoid (2.7%) and collecting duct (0.7%). It is graded according to the WHO-ISUP grading and staged based on the TNM staging.

Immunohistochemistry (Biotin Streptavidin Immunoperoxidase method) was done to assess the expression of CAIX in the tumor cells. CAIX rabbit polyclonal antibody [CAIX (H-120); Santacruz, 1:100dilutions] was used for immunostaining. The prepared slide was focused under high magnification x200. Brown colorationin the tumor cell membrane explained the expression of CAIX in the tumor cells[10]. Then Q scoring was done to quantitatively score the expression of CAIX.

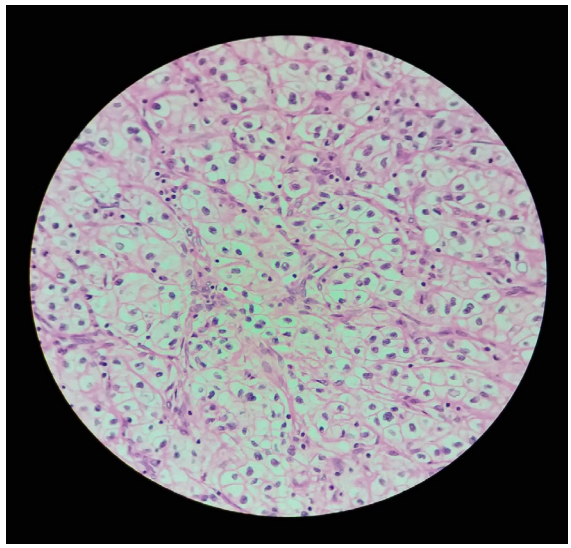


Fig 1: H & E clear cell renal cell carcinoma(X200)

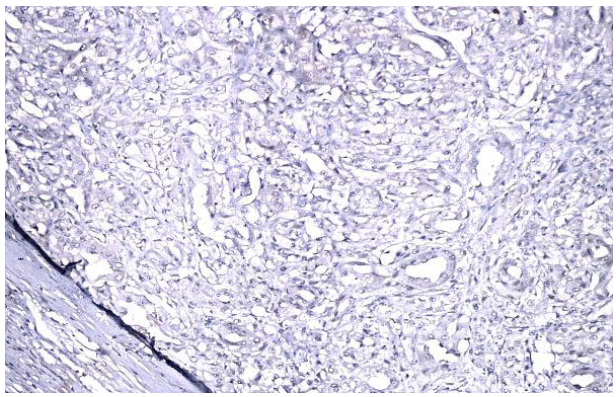


Fig 2: CAIX–Negative immunostaining collecting duct RCC (X200)

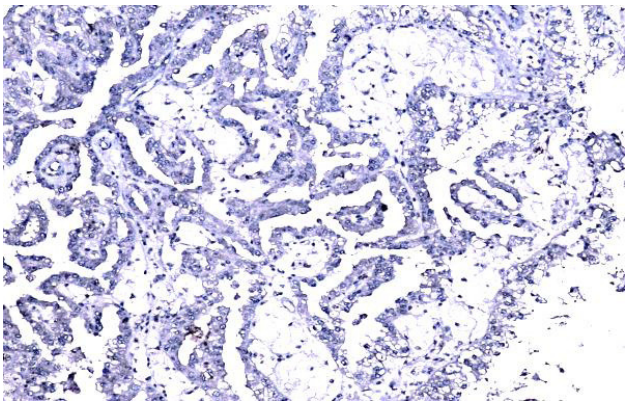


Fig 3: CAIX - Moderate immunostaining papillary RCC (X200)

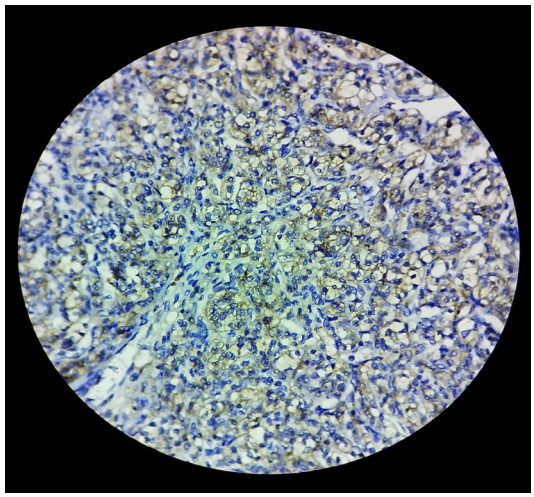


Fig 4: CAIX - Strong immunostaining clear cell RCC (X200)

Score	**0**	**1+**	**2+**	**3+**	**4+**
Positive Cells	<10%	10-25%	25-50%	50-75%	>75%

Score	**1**	**2**	**3**
Intensity of Staining	weak staining	moderate staining	strong staining

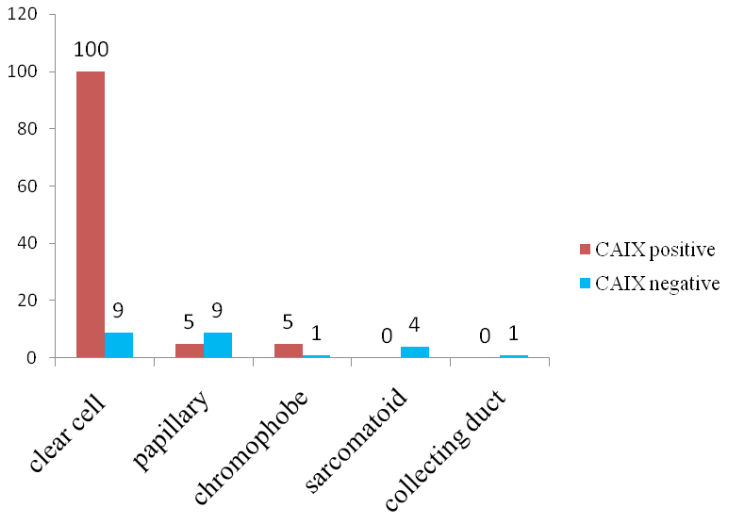
Q score was calculated by multiplying the percentage (P) and the intensity (I). Formula: Q = P x I; Maximum = 12; The Qscoring results range from 0 to 12[11]. Values 0 and 1 are considered immunoscoring negative (fig :2); Values 2 to 12 are considered immunoscoring positive (fig:3; fig:4). The immunoscoring values were compared with the various parameters (type of RCC, grade and stage) and analyzed.

Results

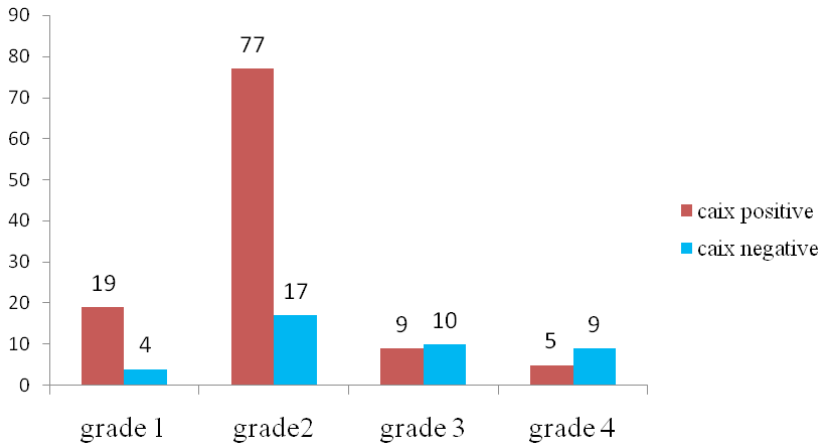
The tumor characteristics of the subjects involved in the study are highlighted in the table:1. The study included 150 RCC cases. Among the 150, 110(73%) expressed CAIX in the tumor cell surface whereas 40(27%) were negatively stained. The classical histological subtypes of RCC are clear cell (ccRCC), papillary, chrompphobe, collecting duct and sarcomatous. Graph 1 explains the increased expression of CAIX among the clear cell subtypes. Graph 2 explains the increased expression of CAIX among the low grade tumors. From the table: 2, it clearly shows us that CAIX expression is significantly associated with the clear cell subtype of RCC (p value =0.004) and WHO ISUP grading (p value =0.001).

Table 1: Baseline parameters

Characteristics	**No. of Patients (n)**	**%**
Gender: male	111	74.0
Female	39	26.0
Histology: clear cell	109	72.7
Papillary	14	9.3
Chromophobe	22	14.7
Collecting duct	1	0.7
Sarcomatous	4	2.7
Grade: I	23	15.3
II	94	62.7
III	19	12.7
IV	14	9.3
Stage: I	63	42.0
II	43	28.7
III	28	18.7
IV	16	10.7
CAIX positive	110	73.0
CAIX negative	40	27.0
	Median	**Min to Max**
Mean Age	55	23 to 90
Mean tumor size	7.3	1.8 to 21



Graph: 1 Distribution of CAIX expression among the Renal cell carcinoma histological subtypes; X axis is the RCC subtype, Y axis indicates the no. of cases in each subtype of RCC; 91.7% of clearcell subtype were CAIX positive, 35.7% of papillary and 22.7% of chromophobe were CAIX positive.



Graph: 2 Distribution of CAIX expressions among the Renal cell carcinoma grading.

X axis is the RCC grading, Y axis indicates the no. of cases; 82.6 % of grade 1, 81.9% of grade 2, 47.4% of grade 3 and 35.7% of grade 4 were CAIX positive.

Table 2: Comparison of the CAIX expression with the Clinical and pathologic features of Renal cell carcinoma patients:

Feature	CAIX Positive (110)	CAIX Negative(40)	P value
Age at surgery			
<= 50	34(72.3%)	13(27.7%)	0.853
>50	76(73.8%)	27(26.2%)	
Sex			
Male	80(72.1%)	31(27.9%)	0.556
Female	30(76.9%)	9(23.1%)	
Sub-types			
Clear cell	100(91.7%)	9(8.3%)	0.004
Papillary	5(35.7%)	9(64.3%)	
Chromophobe	5(22.7%)	17(77.3%)	
Sarcomatoid	0	4(100%)	
Collecting duct	0	1(100%)	
Grade			
I	19(82.6%)	4(17.4%)	0.001
II	77(81.9%)	17(18.1%)	
III	9(47.4%)	10(52.6%)	
IV	5(35.7%)	9(64.3%)	

Feature	CAIX Positive (110)	CAIX Negative(40)	P value
Stage			
I	53(84.1%)	10(15.9%)	0.037
II	31(72.1%)	12(27.9%)	
III	17(60.7%)	11(39.3%)	
IV	9(56.3%)	7(43.8%)	

Chi-squared tests were used to compare the CAIX expression with the tumor characteristics. SPSS software version 20.0 was used to perform the statistics. p value < 0.05 was considered as statistically significant.

CAIX was found to be strongly expressed in the tumor tissue. 73.3% of tumor cells were CAIX positive andthe adjacent normal tissue area expressed negative staining. 91.7% of the CcRCC patients expressed strong and diffuse staining. 5 each of the papillary and chromophobeRCC patients showed weak and focal staining. Collecting Duct Carcinoma and sarcomatous subtype showed negative staining. The comparison of CAIX Q scoring with the tumor characteristics (p value for type = 0.004, grade = 0.001, stage = 0.037)revealed significant association between ccRCC and CAIX expression. CAIX expression was well noticed in low grade tumors. The intensity of staining was inversely proportional to WHO ISUP grading.

Discussion

The CAIX expression was studied in various American and European countries. But very few studies have been done in Indian population. In the last few decades, due to the increase in RCC incidence, many research works have begun in India[12].

In a study conducted by Pretzel et al. in 2012, RCC was found to be common in elderly males. Our study also shows similar findings since most of the RCC patients were males. Majority of the RCC cases were clear cell type(77%). 73.3% of samples were CA IX positive whereas the adjacent normal tissue area showed negative staining.Some studies have shown that the low expression of CAIX may be related with the tumor progression and poor survival rate of clear cell RCC[13].

In a study conducted by Matthew H. T. Bui et al, 2003 in 321 RCC samples, CAIX was found to be the most important molecular indicator for renal cell carcinoma till date. In this study,CcRCCshowed diffuse and strong staining, papillary and chromophobe expressed moderate positivity for CAIX[14,15]. Few studies have also documented the usefulness of CAIX in differentiating clear cell type from other subtypes according to Elizabeth M Genega et al[16]. A study conducted by Gigante M et al explained the prognostic role of CAIX in metastatic ccRCC.It is clear that distinct morphological types underlie each histological type[17].

The molecular role of CAIX in tumor growth is currently under research. The combined expressions of CAIX and VHL mutations have been studied in various RCC[18]. It has been postulated that CAIX regulate acid-base balance creating an acidic environment favoring the tumour growth and invasiveness. Acidification of the extracellular matrixinduces angiogenic factors and inhibit the host immunity, which promotes tumor aggressiveness[19,20].

Few studies have explained the role of CAIX as a serum marker for RCC using ELISA test[21]. The plasma levels of CAIX were highly active in RCC individuals. Latest studies have substantiated the role of CAIX as a treatment approach for metastatic ccRCC. CAIX can prove to be an attractive target for anticancer therapy. Its restricted expression in the normal tissue and extracellular surface staining in most tumor cells indicate its role in tumor genesis and metastasis[22.]

Several pharmacological trials are being under study to find the perfect CAIX antibody to target the tumor. Girentuximab(G250), an antibody for CA IX is an investigational agent in RCC clinical trials[23]. Phase I & II trials proved it safe well tolerated and positively impact disease burden alone or with interferon 1 alpha. Phase III trials are now initiated aiming at reducing recurrence in surgically treated RCC with high risk of relapse and for metastasis[24].Many western studies have proved CAIX antibodies can assist the tumor cells to respond to immunotherapy[25].

Conclusion

Thus our study showed the significance of CAIX as a major role inccRCC. This may prove to be a potential diagnostic and prognostic marker. Studies are needed to assess which patient might respond to which targeted therapy, but it is a vast field needing tremendous literature research before beginning such a correlation study which is our next field of interest. This information can provide additional insights in renal cell carcinoma diagnosis and management. Thus, CA IX marker may therefore prove useful as potential diagnostic marker, in assessing the prognosis and designing therapy in these tumors.

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A Study on Complementary Feeding Practices and Diet Quality among Tribal Populations in North-East India

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Abstract

Introduction: Complementary feeding practices have a significant impact on life from childhood to adulthood. It is important to understand the practices followed to bring about policy changes. The study aims to assess complementary feeding practices among the tribal population of North-East India

Material and Method: A community-based, cross sectional study was conducted among 820 pairs of mother and child in two North-Eastern states of India, using a pre-tested questionnaire based in Infant and Young Child feeding Guidelines.

Results: In the study it was seen that, majority of the study population (73.7%) followed timely introduction of complementary feeding. The type of food commonly used as introductory food were rice (62.8%) and commercial infant formulae (18.66%). Infant and Young Child Feeding indicators such as intake of Minimum Diet Diversity (32.2%), and Minimum acceptable diet (30.85%) were found to be inadequate except for Minimum meal frequency where it was found to be on the higher side at 93.8%.

Conclusion: The feeding practices were found to be unhealthy. It is recommended more intensive awareness generation activities along with emphasis on diverse dietary intake be taken up to improve health literacy to bring about a conducive environment for holistic the growth and development of the individual, society and nation as a whole.

Keywords: *IYCF, Tribal, Complementary-feeding Practices, Nutrition, North-East.*

Introduction

Inappropriate complementary feeding practices are considered one of the important reasons for development of malnutrition, and childhood under-nutrition is responsible for 45% of all under-five deaths.[1] The period of 6 months to 2 years of age also set the antecedent for many of the health conditions that occur later in life. The eating habits that are developed, and the nutritional status during this period has long lasting impact on the health conditions of adult life especially the diseases of Chronic non-communicable diseases.[2] Maintaining a healthy diet in infants and young children is therefore not only important for the early stages of life, but also for future, and the foundation for a healthy eating lifestyle begin especially in this period of complementary feeding initiation.

Tribal population in India are among the population who are backward in all growth and development indicators including health, and researches in them are underdone (NFHS-4).[3] The region of North-East India is one of the two major geographical regions of the country which hosts the tribal population, and they have different cultural and food practices. Generally diverse food are consumed by the tribes of North-East (NE)which includes rice and maize, beans, various green leafy vegetables including wild foraged leaves,

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different fruits both cultivated and wild, insects and meat including game meat.[4] But with urbanization and imposition of laws regarding wildlife preservations, a change in food habits of tribal populations, and adoption of foreign eating habits are seen. It is imperative that researches are done among them to understand their feeding habits and practices so as to encourage healthy behaviours and change the unhealthy practices in order that healthy behaviours are promoted and when required, bring about policy changes. The study aims to assess the complementary feeding practices among the tribal populations of NE India.

Materials and Method

A community-based cross sectional study was conducted among pairs of mother and child,whose children were in the age group of 6 to 23 months,in the NE hill terrains among tribal population. Two states were selected through purposive sampling. From the selected states, through simple random sampling onehill district each were selected, followed by choosing one sub-division each and then selection of villages till the required sample size was reached using similar sampling technique. The total sample size calculated was 820 pairs of mother and child based on the prevalence of practice of 60% of exclusive breastfeeding (NHFS-4) as an indicator for the practice of healthy behaviour among the mothers, with 95% confidence interval, 5% allowable error, and 10% non-response rate. A house-to-house interview of the study participants were done using a pre-tested questionnaire consisting of questions mainly based on the standard questionnaire of Infant and Young Child Feeding practices indicators including their socio-demographic details. Data were collected from April 2018 to January of 2019 and the collected data were entered into excel and were analysed using SPSS v.20. Descriptive data are presented as Mean, Standard Deviation, percentage and proportions, and whereas for analytical statistics, chi-square and logistic regression were used and p-value less than 0.05 was considered significant.

Results

The total number of samples included in the study was 820 from thirteen villages of two states of North-East India.

Study population characteristics: In the study majority (54.1%) of the mothers were in the age group of 26 to 35 years and three-fifth of them had completed their education up to higher secondary, with only 11.3% of them as illiterates. They were mostly home-makers (49.87%) and farmers (37.3%), and many of them were involved in agricultural activities although they identified themselves as home-makers. Father of the children in the study were also mostly educated up to higher secondary, with two-fifth of them involved in agricultural activities. As for their income, a third of the family of study participants live on less than Rs. 5000 per month,although almost all of them owned the house they live in. Three-generation type of family were seen in 57.1% of the population, and the rest were nuclear families.

Table 1: Characteristics of children

Variables	Frequency (%)
Age-Group	
6-8 Months	254 (31)
9-11 Months	133 (16.2)
12-23 Months	433 (52.8)
Birth Order	
1-2	599 (73)
3-4	206 (25.1
5-6	15 (1.9)
Number of Siblings	
0-1	598 (72.9)
2-3	206 (25.1)
4-5	16 (2)
Family Income per month (Rs)	
≤ 5000	235 (30.2)
5001-9999	153 (19.7)
10000-19999	171 (22)
≥ 20000	218 (28.2)

Majority of the children included were aged 6 months, with median age of 12 months. Almost equal representation from both the genders (Male-50.5%, Female-49.5%). Two-third of the children were of the birth order of 1 or 2, with median number of siblings being 1(Table 1).

Complementary Feeding Practices: Timely initiation of complementary was done by 73.7% of the study population with mean age of initiation at 5.7 months. Early initiation of complementary feeding was seen in 18.7% of the study population, and late introduction was seen in 7.5% of the population. The most common reasons for early introduction were “inadequate breast-milk production” (by half of the practising population), lack of knowledge regarding the right time of introduction

and lastly insistence by relatives to start feeding. As for the reasons for late introduction, the common common reason which was given by almost half of the population practising was "Child was not interested in eating", which was followed by late of knowledge regarding the correct time of introduction and there was "Excess of breast-milk production".

The common food which were given as introductory food includes, home-made preparations of rice and its combination with various pulses and vegetables and given by almost 62.8% of the study population, and commercial infant formula (CIF), and its combination with other food such as fruits, pulses, roots etc were used given by approximately 24% of the population. The usual mode of food preparation was by boiling which is a practice followed even in preparation of adult food, which are then mashed or grinded.In cases where only CIF were given, it was seen that all the participants did not follow correct dilution, with most of them reporting excess addition of water.No culture of food restrictions or myths regarding complementary food were reported in the study.

The usual mode of feeding is through spoons and bowls or plates in 85.49 % of the population. The other method were using feeding bottles (5.7%), feeding by hands or chewingof food by mothers and then fed mouth to mouth.

Current Dietary habits of the Children and associated factors: The different food itemsare almost same for all the different age groups except for the consistency in which they are given, where for the younger group of children the texture was softer. The different items included, rice, vegetables such as mustard, colocasia, collard greens, ferns, ash gourd etc and roots such as sweet potato, cassava, etc dal, fruits and rarely meat, eggs, and milk products. Minimum diet diversity (MDD) is an indicator given by IYCF to measure the intake of balance diet, in terms on intake of different variety of food according to the seven food groups given. In the study it was found only 32.2% of the population consumed the required number of diverse diet on the previous day. The consumption of food belonging to the group of Grains, roots and tubers was found to be highest at (97.7%), which was followed by intake of vegetables at 62% of the population. Particularly the intake of vitamin A rich fruits and vegetables (14.8%), dairy products (20%), eggs (21.3%), flesh food (38.4%) and legumes and nuts (47%). Although the intake in vegetables was seen to be on the higher side, it was observed the variety of fruits and vegetables given were limited to a small number of varieties. Fruits and vegetables which they were in the habit of giving and which were considered acceptable to be given to children in their community only were given. There were apprehensions in introduction new food for fear of harming their children, and the benefits of giving a variety of fruits and vegetables were not known to them. Consumption of eggs were discouraged as they were believed to harm children and cause allergies.

As for the requirement of number of meals in a day, as per IYCF indicator in the study it was found that 98% of the children belonging to the age group of six to eight months and were breastfed had adequate number of meals and for those who were not breastfed in the same age group, all the three children were taking the minimum required number of meals. In the age group belonging to nine months up to eleven months 89.3% of the children were taking the minimum required number of meals, and among those who were not breastfed, all were taking the minimum adequate number of meals. From among the age group of twelve to twenty three months, among the breastfed 94.8% of the population were taking the minimum required number of meals, whereas from those who were not breastfed only 52% of them were taking the minimum required number of meals.

Minimum acceptable diet which is the indicator used for measuring adequacy of intake in terms of quality and frequency, it was seen that only 30.85% of the study population followed both the recommended number of frequency and quality.

Factors which are associated with complementary feeding practices:

Table 2: Determinants of complementary feeding practices

Sl. No	Variables	Minimum Dietary Diversity		OR	p-value
		Yes, n(%)	No, n(%)		
1	**Age of Mother**				
	≤ 30 Years	182 (31.6)	394 (68.4)	0.91	0.56
	> 30 Years	82 (33.6)	162 (66.4)		
2	**Family Type**				
	Nuclear	143 (40.6)	209 (59.4)	1.96	<0.0001
	Joint	121 (25.9)	347 (74.1)		
3	**Number of Siblings**				
	≤ 2	250 (32.7)	514 (67.3)	1.45	0.29
	≥ 3	14 (25)	42 (75)		
4	**Mother's Education**				
	Illiterate	19 (20.4)	74 (79.6)	1	
	Up-to High School	70 (33.5)	139 (66.5)	0.37	<0.0001
	≥ Intermediate	175 (33.8)	343 (66.2)	0.52	0.002
5	**Father's Education**				
	Illiterate	104 (42.1)	143 (57.9)		
	Up-to High School	28 (28)	72 (72)	1.5	0.05
	≥ Intermediate	132 (27.9)	341 (72.1)	0.6	0.06
5	**Child's Gender**				
	Male	132 (31.9)	282 (68.1)	0.97	0.8
	Female	132 (32.5)	274 (67.5)		
6	**Income Group (Rs)**				
	≤ 5000	43 (18.3)	192 (81.7)		
	5001-9999	40 (26.1)	113 (73.9)	0.29	<0.0001
	10000-19999	57 (33.3)	114 (66.7)	0.54	0.05
	≥ 20000	111 (32.3)	107 (67.7)	0.48	0.01

Factors such as type of family, education of mother and father, and income group were found to be significantly associated with poor MDD practices on bivariate analysis as seen in table 2, but in multivariate only education of mother was found to be statistically significant.

Discussion

Although the studied population are tribal who generally show poorer health indicators, in this study it was seen that timely initiation of complementary feeding was found to be on the higher side (73.7%) as compared to many other studies conducted in India, which varied from 31.6% to 77.5%.[5-8] This could be due to educational levels of the mothers which was seen to be on the higher side and was found to be important predictor of healthy complementary feeding practices.

Regarding the type of food given during the period of introduction of complementary feeding, it was seen that most of the participants gave homemade food which are considered better as compared to commercially prepared packaged food, which was found to be a positive deviant behaviour. The most common food material used in the preparation was found to be rice, which is a staple food of the region and the next most common food used were vegetables. Similar common use of rice was seen in studies where the staple food of the area was rice.[9] Use of green leafy vegetables in the food of the children were found to be on the higher side as compared to other studies conducted in India.[10] The practice could be because of the common use of different types of vegetables in the adult diet too. Even though the participants were non-vegetarian, use of meat in the diet was not very common which again could be due to

lack of knowledge regarding its benefits. Another food which was found to be used less commonly is the use of oil in the diet. As the method of preparation of food is mostly boiling, use of oil to the food were found to be very limited, almost non-existent. Use of milk and dairy products were limited in the areas as their availability are limited in the regions studied. The limited use of egg in the children diet, although available may be a result of the myths being passed on from outside of the community, which may be seen as a result of the effect of invasion of the tribal lifestyle by the outside population. The use of infant formula is no more an outside commodity among the tribal population too as seen in current the study. The use especially remains a concern as the ratio of infant formula powder to water was not found to be in the right ratio, over-dilution was seen among all the users. Use of spoon for feeding was a common practice which could be due to the type of food which are given to children. As most of them were giving rice based food preparation, using spoon to feed children would were easier for feeding.

As for the IYCF indicators used for assessing adequacy of food intake, it was seen that the performance were low and similar picture was seen in studies from rest of India(13-47.8%).[11-14] Low practice of Minimum Dietary Diversity in food could be due to lack of knowledge regarding the requirements and recommendations.

Although many of the practices do not differ much in the tribal population of the region as compared to rest of India, the variety of food use was found to be different. There were not many societal or cultural impositions seen in the study regarding the behaviour. Increasing awareness among the population at this stage can bring about a drastic healthy change in the behaviour among the community.

Ethical Clearance: All procedures performed in the study involving human participants were in accordance with the ethical standards of the institution and conducted according to the principles of the Declaration of Helsinki.

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Mediating Effects of Self-efficacy in the Relation between Depression and Health Conservation in Community Dwelling Elderly

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Abstract

Background/Objectives: The purpose of this study is to identify the relationship between depression and health conservation of community dwelling elderly and to confirm the mediating effect of self-efficacy in their relationship.

Method/Statistical analysis: This study is a descriptive study and consists of collected data using questionnaires for 129 elderly people who use the elderly community health center as an elderly person living in C, D, and S city.

Findings: The elderly depression and self-efficacy were appeared to have significant correlation with health preservation. The elderly depression has a significant effect on self-efficacy (R^2=12.9%). Depression had a statistically significant effect on health conservation (R^2=3.1%). Depression (β=-.02, p=.779) and self-efficacy (β=.47, p<.001) were significant predictors of health conservation and explanatory power was 21.8%. Self-efficacy was found to have a mediating effect of depression and health conservation of the elderly (Z=-3.13, p=.001).

Improvements / Applications: It is suggested to develop a nursing intervention program that focuses on reducing depression and enhancing self-efficacy in order to conserve the health of the elderly in daily life.

Keywords: *Self-efficacy, Depression, Health conservation, Community, Elders.*

Introduction

In Korea, the elderly population aged 65 and over entered the aged society, which accounts for more than 14% of the total population in 2018.[1] The population aged 65 or older is 13.8% of the total population in 2017, up from 7.2% in 2000 and 12.2% in 2013, and is expected to increase steadily in the future.[2] On the other hand, the life expectancy of the people is 80.4 years and the life expectancy of health is only 71 years, so it is important task of national health policy to reduce the gap, such that people are encouraged to promote the health in the daily life since they need to have preventative health care.[3] According to the report of the social survey in 2013, 70% of elderly people have health problems, and elderly people aged 65 years or older have at least one chronic disease.[4,5] For these elderly people, health is the key to how live the rest of life in pleasant and happy.

Approximately 15 to 25% of the elderly population suffers from depression, and this depression affects physical illness, cognitive function and social relations causing a risk of making and committing suicide.[6]

In general, there are increasing numbers of elderly people experiencing psychological and mental health problems such as alienation in addition to the physical and economic difficulties caused by aging, so they need support of health professionals.[7]

On the other hand, the term “health conservation” means that the elderly maintains their balance as

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physical, mental, and socio-psychological integrity while maintaining goodwill and happiness.[8] The elderly can improve their health by making efforts to manage and preserve health out of their daily lives. Health conservation is a concept that is appropriate to use in managing the health of the elderly and maintains physical, mental and social well-being. Previous studies have shown that the health conservation of elderly residents in the community is also at an average level of 93 points out of full points of 148, that it needs an effort to enhance the health conservation level of the elderly.[9]

In addition, reviews on the health maintenance of the elderly showed that the depression of the middle-aged adults had a negative correlation with the health conservation suggesting that elderly people would be similar.[10] Result of this study is as follows. First, elderly had a high negative correlation with the self-care, that they do not care their health well out of their daily lives as the depression gets serious,[11] and the self-efficacy of in-home elderly were positively correlated with health conservation. Therefore, it is necessary to grasp the relationship between depression and self-efficacy and health conservation, because depression of the elderly is a factor to harm health and the self-efficacy can be regarded as a factor promoting health.

Self-efficacy is an important variable in changing human behavior and has a significant impact on maintaining that change.[12] It is also considered to be a major factor to be able to adopt desirable health behaviors, and to maintain the factors that have a positive effect on health promotion. When people have self-efficacy that they can do something themselves, they can conserve their health by leading health-led behaviors[10] and give effect to the synchronization and maintenance of health promotion behaviors out of their daily lives.[13] It is thought the self-efficacy will affect the preservation of health.

Therefore, if elderly people feel depressed, they may not be able to preserve their own health in daily life, therefore, if a nursing intervention plan that can increase self-efficacy can be suggested, depression may be lowered and the health will be conserved to improve their life quality. Hence, when self-efficacy is included as a mediator variable in the relationship between depression and health conservation of the elderly, the researcher would like to check whether the health of the elderly could be well conserved in the relationship between them to utilize it as a basic data to improve the health conservation of the elderly.

Method

Subjects: The researcher selected residents of 65 years old or older who were registered in 5 health clinics in C city, 2 health clinics in D city and 1 health clinic in S city, those who were able to participate in this study and read and write Korean alphabet to communicate. The number of subjects was calculated according to the G * power 3.1 program. That is, 130 questionnaires were distributed considering the sample size of 107 persons and dropout rates, 0.15 of the effect size of multiple regression analysis, 0.95 of verification power, and 2 predictive variables, and 129 copies were collected to be used as research data.

Instruments

Depression: Depression was measured using Korean version of the Geriatric depression scale (GDSSF-K), which modified the Geriatric Depression Scale for the elderly of Yesavage et al.[14] This tool has been standardized by Kee[15] suitable for Korean elderly people. The score for each question is 0 for yes and 1 for no. It means that the degree of depression is significant as the score becomes higher. The Cronbach's α value of the instrument was .88 at the time of development and was .82 in this study.

Self-efficacy: In order to measure the self-efficacy of the elderly, the tool which Noh[16] adapted general self-efficacy scale developed by Chen, Gully, & Eden[17] was used. Total 8 questions with 5 points Likert scale, the higher the self-efficacy level. The reliability of Cronbach's α = .83 in Noh[16] and was .91 in this study.

Health conservation: Health conservation was measured using the Health Conservation Scale developed by Sung.[8] Total 37 questions were classified into four areas. The higher the score, the better the degree of health conservation. The reliability of the tool was Cronbach's α =.94 and .75 in this study.

Data collection: Data have been collected from June 1, 2019 to June 30, 2019, and the researchers attended the meeting of the health care clinic directors, explained the research purpose and method, and received permission from the heads. 8 health care directors explained the purpose of the research and how to prepare the questionnaires to the elderly over 65 years old who visited the heal care clinics and directly reading questionnaires after obtaining their signatures to complete the questionnaires. It took 20-25 minutes required for preparation of the questionnaires.

Ethical consideration: This study was approved by the IRB of K University submitting a proposal for the purpose, method and ethics of the research. Ethical regulations were observed during the research period.

Data analysis: The general characteristics of the elderly, depression, self-efficacy and the degree of health conservation were determined by descriptive statistics such as percentage, mean, and standard deviation using the SPSS Window 23.0 program. The relationship of variables was assessed using Pearson's correlation coefficients. The mediator effect of self-efficacy in the relation between depression and health conservation was analyzed using multiple linear regression and Sobel test.

Results

General characteristics of elderly: The average age of the elderly people was 78 years old. 49.6% (64) of the elderly were over 80 years old and the elderly women accounted for the majority, 73.6% (95). 51.2% (66 persons) were widowed, divorced, separated, and single. 57.0% (73 persons) answered that the health status of the elderly was normal and the education level of 75.8% (97 persons) was below the elementary school. 85.9% (110 patients) had more than one disease. It shows that 41.4% (53 patients) answered that they exercised occasionally not regular, while 71.1% (91 patients) answered that their economic status was normal (Table 1).

Table 1. General characteristics of subjects (N=129)

Characteristics	Division	N (%)	M±SD
Age(years)	65~69	13(10.1)	78.00±7.56
	70~79	52(40.3)	
	Over 80	64(49.6)	
Gender	Male	34(26.4)	
	Female	95(73.6)	
Spouse	Live together	63(48.8)	
	Bereaved, divorced, separate, single	66(51.2)	
Health condition	Good	30(23.4)	
	Moderate	73(57.0)	
	Bad	26(19.6)	
Education	Elementary school graduate or under	97(75.8)	
	Middle school ~ high school	28(21.9)	
	University graduate or above	4(3.1)	
Number of diseases	None	19(14.1)	
	One or above	110(85.9)	
Exercise status	Regularly	42(32.8)	
	Sometimes	53(41.4)	
	None	33(25.8)	
Economic status	Difficult	23(18.0)	
	Normal	91(71.1)	
	Good	14(10.9)	

Correlation between depression, self-efficacy and health conservation of subjects: The depression and self-efficacy ($r = -.37$, $p < .001$) of the elderly showed a negative correlation and the health conservation and depression ($r = -.20$, $p = .025$) also showed a negative correlation. Health conservation and self-efficacy ($r = .48$, $p < .001$) were positively correlated (Table 2).

Table 2. Correlation between depression, self-efficacy, and health conservation in subjects

	Depression r(p)	Self-efficacy r(p)	Health conservation r(p)
Depression	1		
Self-efficacy	-.37 (<.001)	1	
Health conservation	-.20 (.025)	.48 (<.001)	1

Mediating effect of self-efficacy between depression and heal conservation in subjects: The Durbin-Watson index for autocorrelation was 1.85, independent of the autocorrelation between autocorrelation and independent variables. The multi-collinearity between the independent variables showed that there was no multicollinearity because the VIF index was less than 10, which was 1.16. This data was suitable for regression analysis.

In this study, the mediating effect of self-efficacy in the relationship between depression and health preservation in the elderly was significant in self-efficacy as a parameter between depression and health preservation in the three-step regression.

In the first step regression analysis, depression as an independent variable had a statistically significant effect on self-efficacy (β=-. 37, p<.001), and explanatory power of self-efficacy was 12.9%. In the second step regression analysis, depression, which is an independent variable had a significant effect on health preservation (β=-. 20, p=.025) and explanatory power of health preservation was 3.1%. As a result of regression analysis with depression and self-efficacy as predicators and with the health conservation as dependent variable in order to verify the effect of the self-efficacy on the health conservation, which is dependent variable in the third stage, the depression (β=-.02, p=.779) and self-efficacy (β=.47, p<.001) were significant predictors of health conservation.

In addition, the non-standardized regression coefficient decreased from -.18 in the second step to -02 in the third step, indicating that self-efficacy was completely mediated. These variables accounted for 21.8% to explain the health conservation degree. Self-efficacy was found to be a significant mediator in the relationship between depression and health conservation (Z =-3.13, p =.001). (Table 3).

Table 3: Mediating effects of self-efficacy in the relation between depression and health conservation

Variables	B	β	t	p	Adj.R^2	F	p
Step 1: Depression → Self-efficacy	-1.34	-.37	-4.46	<.001	.129	19.87	<.001
Step 2: Depression → Health conservation	-.18	-.20	-2.26	.025	.031	5.12	.025
Step 3: Depression, Self-efficacy → Health conservation					.218	18.73	<.001
1. Depression → Health conservation	-.02	-.02	-0.28	.779			
2. Self-efficacy → Health conservation	.12	.47	5.58	<.001			
Z=-3.13, p=.001							

Discussion

The purpose of this study is to identify the mediating effects of self-efficacy in the relationship between depression and health conservation of the elderly to provide basic data for developing a nursing intervention program that can conserve the health of the elderly in daily life by lowering depression and increasing self-efficacy.

Depression and self-efficacy of the elderly were negatively correlated, and health conservation and depression were negatively correlated as well, and self-efficacy and health conservation were positively correlated. The depression of the elderly women was more depressed as the health condition was worse. The main affecting factors of depression are health status[18] and are related to conserve the health of the elderly out of daily life. In addition, depression is negatively correlated with health conservation in middle-aged adults, and it is found to be a major affecting factor. Therefore, depression of elderly people has a close relationship with health maintenance, so intervention

nursing[19] which may lower the depression of the elderly is needed. In addition, since the self-efficacy has been appeared to indirectly affect the depression of the elderly, an intervention nurse related to the depression and self-efficacy is required for health conservation of the elderly.[20]

The results of this study showed that the self-efficacy of the elderly had a significant mediating effect on depression and health conservation. In other words, depression and self-efficacy have a major impact on the health care of the elderly, especially self-efficacy has a significant effect on lowering the depression and conserving health of the elderly. Self-efficacy is a belief in the ability of an individual to successfully perform the actions necessary to obtain results and become a social intellectual factor that is important in determining the behavior of the elderly. Self-efficacy and self-integration, self-efficacy and successful aging of elderly people have a high correlation. That is, as the self-efficacy gets high, the self-integration and successful aging are possible that the elderly may well care his/her own health and successfully carry out the role to take care of himself out of daily lives.[21] Thus, the improvement of self-efficacy in lowering the depression of the elderly and conserving the health can lead to the successful integration of the elderly. Nurses who care the health of the elderly in the community should seek for interventions to improve the self-efficacy by the elderly themselves.

Conclusion

Elderly people should be more interested in health, encourage them to lower their depression, increase their self-efficacy, conserve their well-being and improve the life quality by developing and distributing the nursing intervention program. In addition, the self-efficacy of the elderly can be enhanced when encouraging participation of the elderly in the program under the leadership of specialists in order to conserve the health of the elderly in their daily life. It is suggested to operate programs that lead the practice not only the simple recognition and related studies will be continuously carried out.

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'Fasting' the Forgotten Fortune of Fitness and Ayurveda

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Abstract

Fasting has been an integral part of Indian culture, festivities and tradition since time immemorial and also an important, incredible part of Ayurveda, the science of life. Ayurveda describes fasting as Upavasa and considers it to be an important component among the 10 depletion therapies. It is defined as refraining from all forms of food intake for a given period, under supervision of a qualified physician. Fasting is said to possess preventive, promotive and curative values, when practiced in a proper manner, considering the Dosha (humours), Agni (digestive fire), Vaya (age), Kala (time/season) Bala (strength) ...etc., Fever, conjunctivitis, diarrhea, obesity, diabetes, skin diseases are some of the indications of fasting described. In today's world, with increasing exposure to toxic substances and increasing lifestyle disorders, fasting is said to bring about elimination of accumulated toxins, cleansing of the body and boosting up of the immunity. As there is a need to integrate balanced nutritious diets with controlled meal size and periods of fasting for prevention and management of diseases and promotion of health, there emerges a wide scope to appropriately apprehend and analyze the concept and canons of fasting as described in the science of Ayurveda. The distinctive descriptions on the principle of fasting, its indications and contra indications, the signs and symptoms of adequate, inadequate and excessive fasting ... described in the humongous texts of Ayurveda demand further apprehension and apt application.

Keywords: *Ayurveda, fasting, preventive, diseases.*

Introduction

India is the salient land of ancient civilizations and treasure house of ancient wisdom, copious cultures, fun filled festivities and timeless traditions. Ayurveda is the kernel of ancient Indian wisdom, the art of holistic medicine and the science of life.

Indian society is an example par excellence where in the principles of protection of health and practice of medicine have enjoyed symbiotic relationship and exist crisscrossed with the culture.

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Since time immemorial, fasting has been an integral part of Indian culture, festivities and tradition. The concept of 'fasting' has been exceptionally explained and exemplified in authentic Ayurveda.

Ayurveda considers health as the state of equilibrium between the three physical humours(Tridoshas; Vata, Pitta, Kapha) and three psychological humours(Trigunas; Satva, Rajas,Tamas) while disease/ill health is considered as the consequence of the vitiation of this equilibrium.

Ayurveda appreciates and affirms the importance and impact of food on health and disease and explains different types of food, their sources, preparation procedures, qualities, incompatibility...etc., besides the importance and influence of 'fasting' on health and disease.

Ayurveda apprehends, analyses and acknowledges the preventive, promotive and curative attributes of 'fasting'.

This article is an earnest attempt to expound and establish the efficacy of 'fasting' as explained and exemplified in the classical texts of Ayurveda with modern parameters.

Definition and Description: The classics of Ayurveda describe fasting as 'Upavasa'. 'Upavasa' is defined as the abstinence from all the four forms of food; chewing, licking, swallowing and drinking, executed in a systematic form, under medical supervision.[1]

The classics illustrate that alike the ash particles on fire which reduce its intensity and adversely affect the process of cooking, vitiated dohas(humours) in the body, especially those in the Aamashaya(digestive viscera) reduce the intensity of the digestive fire. This is said to cause digestive impairment, production and piling up of aama(metabolic toxins) which block the minute channels of the body, causing innumerable diseases.

It is further elucidated that during fasting, absence of food in the viscera brings about digestion of the metabolic toxins, kindles the digestive fire, removes the blockage in the channels and checks the progressive pathology besides minimizing the manifestation of the disease.

Furthermore, various researches have put forth the fact that activation of adaptive cellular stress response signalling pathways that enhance mitochondrial health, DNA repair and autophagy during Intermittent fasting as well as stem-cell based regeneration and long lasting metabolic effects are the crucial cellular and molecular mechanisms by which 'fasting' establishes itself as an efficient tool in improving general health, preventing and managing various diseases.[2]

Preventive and promotive principles: Ayurveda advocates that Shishira Rtu(late winter) is the apt time for a healthy individual to benefit from fasting. It is also considered to be the best time for therapeutic fasting, even for treating diseases caused due to vitiated Vata dosha.[3] And also, the time of the day, season, features of the particular land, pathology and progress of the disease, the strength, age of the patient are all to be considered while advising fasting.[4]

Recent research suggests that fasting or going without food may boost human metabolic activity, generate antioxidants and aid in reversing a few effects of aging. Thereby, the possibility of a rejuvenating effect by fasting, which was not well known and well established has been made evident.[5]

The potential health promoting mechanisms of fasting can be summarized to be increased production of neurotrophic factors, fasting-induced neuroendocrine activation and hormetic stress response, reduced mitochondrial oxidative stress, general decrease of signals associated with aging, promotion of autophagy and such others.[6]

Curative concepts and considerations:

Ayurveda describes two fold therapeutic modalities;

- Langhana/depletion therapy
- Brihmana/nourishing therapy

Depletion therapies are enumerated to be 10 in number,viz; Fasting, control of thirst, exposure to sun, exposure to wind, consumption of digestive stimulants, physical exercise and four elimination therapies(therapeutic emesis, purgation, decoction enema, nasal instillation of medicaments).[7]

However, the classics define depletion therapy as that which brings about reduction/depletion of bodily virtues and causes lightness of the body.

Ayurveda logically and legitimately establishes the relation between Upavasa (fasting) and Roga bala (severity/intensity of diseases) as follows;

- In diseases of milder intensity–fasting is the treatment of choice
- Moderate intensity–fasting along with digestive stimulant diet is to be considered
- Maximum intensity–fasting along with purificatory procedures is to be advised

However, Ayurveda classics have precisely proposed that the duration of the fast should be longer in diseases due to vitiated Kapha dosha and shorter in those due to predominancy of Vata dosha.

Fever, conjunctivitis, vomitting, cough, diarrhoea, skin diseases, herpis, urinary disorders, obesity, diabetes, abscess, splenic disorders and disorders of head and neck are a few conditions in which fasting is indicated.[8] Acharya Sushruta explains fasting in the context of indigestion and diseases due to aama.[9]

The therapeutic importance of fasting in a few diseases can be apprehended and analysed as follows:

JWARA: Jwara, obscurely referred to as fever, is a disease which manifests due to the accumulation of

'ama' (toxins) in the 'Amashaya' (digestive system) resulting in the blockage of the bodily srotas (channels), causing loss of appetite and loss of perspiration.

Fasting is of prime importance during the treatment of Jwara, especially when the disease is in purva roopa avastha (prodromal stage)[10] and alpa doshaja (with mild variation of humours)[11]

Acharya Sushrutha opines that fasting should be given prime importance when the patient is weak and when agni(digestive fire) is not stable.[12]

Considering the mode of action of fasting during the prodromal phase of a disease, it has been stated that during this phase, the doshas (humours) are associated with ama(metabolic toxins) and these amayukta doshas (toxin embedded humours) adhere to the body tissues. Fasting facilitates 'paka'(liquefication) of the toxins associated with the humours, further leading to dissociation of the impurities from the tissues which is very much necessary for the implementation of other therapeutic modalities.

Other therapeutic conditions were the classics of Ayurveda provide direct preference to fasting include;

- Netra roga (eye disorders) especially Vataja abhishyanda (Conjunctivitis), for a duration of 3 days or restricting the intake of food only to night time[13]
- Atisara (diarrhoeal diseases) where in there is association of ama (metabolic toxins)[14]
- Pratishyaya (rhinorrhea) in chronic stage
- Chardi roga (vomiting), as the pathology is associated with amashaya (gastrum/stomach), which is the Sthana (seat) of Kapha dosha[15]
- Visoochika (gastroenteritis), especially after Vamana (therapeutic emesis), considering the strength of the patient[16]

The science of Naturopathy also acknowledges that fasting is beneficial in cases of fever, cold, obesity, digestive disorders, diarrhea, abdominal pain, body ache, back ache, stiffness of joints, irregular menstruation and infertility.[17]

Fasting in various forms such as intermittent fasting, periodic fasting, alternate day fasting, time-restricted feeding …etc., have all been found to improve physiological indicators of health and delay onset/slow the progression of diseases in various researches carried on laboratory animals and humans.

Few responses to fasting can be summarized as; reduced levels of insulin and leptin which parallels insulin and leptin sensitivity[18], Improved glucose tolerance[19], Reduced blood pressure [20], reduced body fat, elevated ketones[19,21], preservation of cognitive function and sensory– motor function during the process of aging[22], increase in overall fitness and resistance to injury and a wide array of diseases[23], delaying onset and slowing down the progression of neuronal dysfunction and degeneration in models of Alzheimer's, Parkinson's disease and such others.[24,25]

Recent small trials of intermittent fasting in patients with cancer[26] and multiple sclerosis[27] have appeared as a silver lining for patients and professionals. All these however, have generated promising results that provide a strong foundation for further research and clinical trials in these and various other conditions.

Practice of fasting: Ayurveda proposes that fasting is to be executed in a systematic form, under medical supervision, in order to benefit from it.

However, fasting is cleverly considered to be contraindicated in;

- Vata predominant disorders
- Emaciated, very old, very young persons, pregnant lady
- Those who are experiencing excessive hunger, thirst
- Those with emotional extremities such as excessive anger, jealously…etc.,

The contraindications during fasting include;

- Anointing oil over the body and scalp
- Day sleep
- Sexual indulgence
- Beautifying oneself
- Walking long distances
- Smoking, alcohol intake

Feasting before and after fasting is said to be avoided.[28]

Ayurveda advocates the intake of freshly prepared rice gruel, which is easy for digestion and a good appetizer

soon after fasting. The drugs to be administered during fasting should be light for digestion, hot, dry, subtle, fast acting/sharp and fluid in consistency.

The exclusive explanations on the signs and symptoms of adequate, excess and inadequate fasting in the exhaustive classics can be summarized as follows:

Signs and symptoms of proper/adequate fasting:

- Proper excretion of wastes(urine, flatus, faeces) from the body
- Sense of lightness
- Feeling of freshness/purity of heart, throat, mouth
- Proper belching
- Lack of drowsiness and exertion
- Sweating
- Increased appetite, taste for food
- Increased thirst
- Tranquility of mind
- Clarity in sense perception
- Enthusiasm
- Decreased signs and symptoms of diseases[29]

Inadequate fasting;

- Loss of taste
- Frequent expectoration
- Predominance of Kapha dosha
- Excessive salivation
- Malaise

Excessive fasting;

- Loss of appetite, anorexia
- Excessive thirst, belching
- Cough
- Dryness of mouth
- Cracking pain in joints
- Impairment of vision and sense of hearing
- Loss of strength and vitality
- Loss of memory

Thus, the science of Ayurveda recommends that a clever physician should advice fasting to a subject until he is able to appreciate Niraama lakshanas such as reduction of the bothering symptoms, proper excretion, proper salivation, feeling of lightness of the body and mind ...etc.,

Conclusion

Ayurveda, the glorious science of holistic healthcare, acknowledges and admires the therapeutic importance of depletion therapies, which includes Upavasa/fasting by affirming "langhanam paramoushadam". This implies that depletion therapies are the best therapeutic modalities a physician should adopt.

The texts such as Charaka Samhitha, Ashtanga Hridaya, Ashtanga Sangraha have separate chapters dedicated to them while texts such as Sushrutha Samhitha, Bhavaprakasha, Bhaishajya Ratnavali…etc., have elaborately explained the same.

In the present global scenario with increasing exposure to toxic substances, increasing life style disorders and sensory overload, it is very much essential to eliminate the toxins and cleanse the body besides making earnest efforts to boost up its immune system. As the natural processes of elimination and cleansing are not sufficient to maintain optimum health, there is a need to focus on Alternative and Comprehensive health care systems such as Ayurveda, which provide a holistic approach to preventive and curative dimensions of health and disease.

Fasting is one such important therapeutic modality of this all-inclusive science which endorses and establishes itself as a preventive as well as curative tool.

Furthermore, future researches should be directed to the integration of balanced nutritious diets with controlled meal size interlaced with periods of fasting with a view to prevent diseases, promote health and effectively cure the ailments.

Even though the concepts and canons of fasting are found scattered in various texts and clinical recordings of alternative and complimentary medical sciences across the globe, there is a necessity to apprehend, analyze, amalgamate and appreciate the molecular mechanisms and clinical applications of fasting on health and disease.

Based on the priceless, productive, protective, promotive principles and practices of fasting found in the ancient science of Ayurveda, it is very much evident that

there is a great potential for lifestyles which incorporate 'fasting' as an indispensable portion in health protection and promotion. Further, it can bring about decline in the disease processes and reduce the risk of several chronic, age related disorders. Appropriate, authentic observance of fasting as described in the science of Ayurveda can emerge as a new horizon in the all-round development of the individual and the society.

The realisms in the ancient classics, thus, demand all-encompassing apprehension and apt admiration.

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Impact of Social Media Advertising on Consumer's Health

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Abstract

If the message on the social media message isn't clear and focused, it's unlikely to be effective, resulting in wastage of time and resources. This leads to failure of the advertisement. This leaves an impact on the health dimensions of a customer. An ideal social media message must convey the message to the audience about the product and should not give an impression to one that it is an overtly like advertising. As per Global Digital report, 2019, the number of internet users worldwide in 2019 is 4.388 billion, up 9.1% year-on-year. The number of social media users worldwide in 2019 is 3.484 billion, up 9% year-on-year. The number of mobile phone users in 2019 is 5.112 billion, up 2% year-on-year.

40% of people read and refer to articles on social media platforms to procure information on how does a patient cope up with the chronic conditions when affected with a disease.(Health Care Finance News) [1]

More than 1,500 hospitals across the country have their presence online. The popular social media sites used by them include Facebook and Linkedin. (WHPRMS-Wisconsin Healthcare Public Relations & Marketing Society. Wisconsin)[2]

Social media users are in a state where there is plethora of information on various topics. With the rise of social media platforms there has been an increasing need for research in this field as it creates more platforms for the marketers but it also faces challenges of creating unnecessary noise which leads to avoidance behaviour on the consumer's part. In this study an attempt is made to understand the different noise creating factors such as irrelevant content, cluttered content, no emotional connect, excessive advertising etcetera to find out what exactly drives the customer to avoid a product or brand. The purpose of this study is to measure and evaluate the ways in which a consumers buying behaviour changes due to the noise created by advertisements and find prominent factors which cause such behaviour. The key observations from the study state that when a particular advertisement is placed repetitively in different platforms the customer tends to ignore the ad and subconsciously ignore the brand or product. When an Advertisement is too cluttered, customer might miss the actual part of the ad and the visual appeal also drops due to clutter.

Keywords: *Social media, Advertisement, content, consumer behaviour, health.*

Introduction

Social media is one of the powerful tool that keeps the customers engaged and connected through out. The several platforms of social media include facebook, twitter, LinkedIn and other such platforms. It is estimated that the users of social media are over and above 4.2 billion worldwide. Approximately more than 3.5 billion of them use social media platforms.

The emergence of Internet-based social media has made it possible for one person to communicate with hundreds or even thousands of other people about products and the companies that provide them. (W. Glynn Mangolda,, David J. Fauldsb, 2009)[3]

Technology has provided consumers with the means to control and edit the information that they receive and share effectively, especially in the online environment. Though the literature conducted reveals that there have been abundant studies carried out on conventional advertising through social media. Yet there are mot many studies done on advertising on social media and

its and its impact on health (Louise Kelly, Gayle Kerr & Judy Drennan, 2010)[4] World Health Organization uses twitter as the social media platform to educate the people. It provides customers with updates on Health and local crises. Flu was epidemic in the 2018 and Dengue prevalent in the current year in most parts of city. Hospitals and Government agencies ensured to update people through social media platforms on all the necessary care to be taken to avoid the spread of the disease.

Advantages and Challenges of Advertising through Social Media:

Promoting the Health: The promotion of a Brand on Social media is one of the effective way of promoting health of customers. This is done by celebrity endorsing the Brands like energy drinks, fitness gadgets etc. The Brand value can therefore be enhanced by highlighting on the core attributes of the product. The Promotion of the brand can happen through various social media platforms like Facebook, Instagram, etc.

Chat bots for addressing health issues: Through chat bots, wherein the Artificial Intelligence is used for answering the queries that a customer has and resolves the problems of the customer within no time. The Artificial Intelligence is used by many hospitals to address the queries of customers on various health related issues. This information is stored for further improvements to be done by hospitals.

Cost effective for Hospitals: Though creating a your profile or the profile of your product is free on websites like facebook, where you can advertise and promote your product, and access and provide information to customers based on the current health conditions in the market

Demerits

Defaming the Practitioner: Since the negative messages spread faster, this can defame your product within no time. The entire efforts behind creating the bran value of that product go futile. The message rapidly gets spread on various social media platforms, leaving absolutely no time for the marketer to respond on the comments. One of the crucial factor that the marketer has twice to think about before advertising on the social media platform.

Saturation in content: The Social media being already saturated with abundant flow of information on various aspects. This is challenge for the marketer to establish a space for his product in the minds of the customer in a short span of time. This task is challenging.

Security concerns: The concerns on security include hacking. There are many software available in the market to ensure that the information of your product on the social media is safe and secured, yet there are apprehensions on the information being leaked. This is a major concern.

Literature Review: The literature review comprises of papers on social media and its effectiveness on advertising and customers, social media advertisements and its effect on customer's health. The following papers are the one which have been referred to in this research, One such paper acknowledges the great rise of social media's impact and how it has made it possible for one person to contact thousands in one go with their reviews about anything, thus an example of how great an impact consumer to consumer communication can be the authors also then say that argue that social media is an important tool that managers need to include social media when developing marketing strategies in the current scenario.

By advertising on a social media platform there is more likeliness of the fact that your advertisement is going to be avoided by the people due to user's negative experience previously, of the relevance of the advertisement to the segment or the scepticism the audience holds towards the message of the advertisement or towards the medium.

31% of Practitioners use Social media platforms for the sole purpose of networking and developing contacts. (Med Tech Media)[5]. 30% of people share information relating to their health, fitness etc. through social media platforms. Statistics of information sharing is as follows: 47% of people share the information of health with doctors, 43% of people share the primary information with hospitals, 38% people share information for health benefits and reward points with a health insurance company and 32% with a chemist. (Fluency Media)[6]

Integrated marketing communications is the tool that enables communication of the organizations on health of customers. It ensures that coordination amongst the various levels of organizations happens across

departments to come with customer-centric message in order to attain objectives of the organization. (Boone & Kurtz, 2007)[7]

Methodology

Data Collection and Analysis: A non-probability random sampling was chosen for primary data collection. Since sample was chosen based on the age group, targeted sample was 120 but valid data was around 80.

Secondary Data: Study of different research papers to identify gaps and also to identify various factors. The factors identified helped in formation of questionnaire and further the research.

Results and Interpretation: Based on the data collected through the Questionnaire, we ran Factor Analysis on the data through SPSS.

Table 1: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.791
Bartlett's Test of Approx. Chi-Square	433.096
df	55
Sig.	.000

KMO Test: KMO measures sampling adequacy of a questionnaire. It shows how much proportion of variance is there between the variables included in the study conducted. A high value of this statistic indicates the appropriateness (from 0.5 to 1) of the factor analysis and a low value indicates the inappropriateness (below 0.5) of the factor analysis, from the total data we have. For our data, the KMO value came to 0.791, which indicates that the value is in the acceptance region of the factor analysis model.

This can be identified by the significance level and degree of relationship between variables. If the value is less than 0.05 it indicates the data does not produce an identity matrix. This means that there exists significant relationship among the variables taken for the analysis. For our data, chi square statistic is 433.096 with 55 degrees of freedom. This value is significant at 0.000 level.

Communalities

Table 2: Extraction Method: Principal Component Analysis

	Initial	Extraction
Irrelevant information J	1.000	.751
No Emotional Connect	1.000	.774
Dodgy Stuff leads to headache	1.000	.642
Too Cluttered creates giddiness	1.000	.729
Excessiveness creating fatigue	1.000	.788
Hindrance To Searches	1.000	.650
Distraction creating convulsions	1.000	.744
Email Ads	1.000	.705
Long Video Ads leading to headaches	1.000	.759
Ads From Website Recently Visited	1.000	.676
Pop Up Ads While Brows in G	1.000	.579

Communality: It describes the amount of variance a variable share with all other variables taken into study. For our data, initial communality level is equal to 1.000 for all the variables taken into factor analysis model. This is assigned by default by SPSS. The extracted communalities are shown in the third column. "Excessiveness creating fatigue" shares the maximum variance with all the other variables as it has the highest extraction value of 0.788 followed by "No Emotional Connect" at 0.774 and "Long Video Ads leading to headaches" at 0.759 respectively.

Total Variance Explained

Table 3: Extraction Method: Principal Component Analysis

Component	Lnal Eigenvalues			Extraction Sums of Squared Loading's			Rotations Sumsof Squared Loading's		
	Total	% variance	Cumulate %	Total	% of Variance	Cumulated %	Total	% of Variance	Cumulative %
1	4.806	43.694	43.694	4.806	43.694	43.691	3.395	30.866	30.866
2	1.762	16.011	59.716	1.762	16.on	59.716	1485	22.589	53.456
3	1.228	11.166	70.883						
4	.660	6003	76.885						
5	.599	5.444	81.319						
6	.511	4.746	87.075						
7	.397	3.613	90.688	1.118	11.166	70.883	1.917	17.417	70.883
8	.324	1.949	93.637						
9	.295	2.680	96.3t6						
10	.241	2.195	98.511						
11	.164	1.489	100.000						

Eigen Value and Total Variance: It explains the proportion of variance explained by each factor. The "Total" column gives the amount of variance in the variable attributed to the concerned component or factor. Factors explaining 60-70% of the variance should be retained in the model. For our data the total variance accounted for by all the factors is equal to 11, which is equivalent to the number of variables. The variance attributed to factor 1 is 4.806/11*100 = 43.694% for factor 2 = 1.762/11*100 = 16.022%, and Factor 3 = 1.228/11*100 = 11.166% similarly the total variance attributed to all the factors can be computed.

Component Matrix:

Table 4: Extraction Method: Principal Component Analysis.

	Component		
	1	2	3
Irrelevant information J	.538	-.053	.677
No Emotional Connect	.573	-.281	.605
Dodgy Stuff leads to headache	.690	-.345	.217
Too Cluttered creates giddiness	.749	-.377	-.160
Excessiveness creating fatigue	.747	-.355	-.322
Hindrance To Searches	.710	.219	-.312
Distraction creating convulsions	.576	.641	-.009
Email Ads	.586	.599	.057
Long Video Ads leading to headaches	.823	-.122	-.258
Ads From Website Recently Visited	.477	.659	.121
Pop Up Ads While Browsing	.712	-.161	-.214

a. 3 component extracted.

3. Component matrix

It presents the factor loading for each variable on unrelated factors. The values given under Factor 1 represent the correlation between the concerned variable and Factor 1, the values under Factor 2 represent relation between concerned variable and Factor 2, and the values under factor 3 represent the correlation between concerned variable and factor 3.

Rotated Component Matrix

	Component		
	1	2	3
Irrelevant information j	.092	.236	.829
No Emotional Connect	.248	.051	.842
Dodgy Stuff leads to headache	.558	.042	.574
Too Cluttered creates giddiness	.805	.032	.282
Excessiveness creating fatigue	.876	.045	.135
Hindrance To Searches	.609	.528	.026
Distraction creating convulsions	.182	.840	.067
Email Ads	.172	.810	.140
Long Video Ads leading to headaches	.807	.287	.161
Ads From Website Recently Visited	.033	.811	.132
Pop Up Ads While Brows in g	.716	.200	.162

Table 5 Extraction Method: Principal Component Analysis.

Rotation Method: varimax with Kaiser Normalization.

a. Rotation converged in 5 Iterations.

Component Transformation Matrix

Component	1	2	3
1	.762	.487	.426
2	-.409	.873	-.267
3	-.502	.029	.864
Meth			

Table 6: Extraction Method: Principal Component Analysis

Rotation Method: Varimax with Kaiser Normalization

Rotated component matrix: It shows the correlation between factor and variables. Higher the correlation, better the result.

The cut off selected for the data is 0.80 for 3 components.

Component 1,

The following variables have value greater than cut-off:

- Excessiveness creating fatigue
- Too Cluttered creating giddiness
- Long Video Ads leading to headaches

Component 2, the following variables have value greater than cut off:

- Distraction creating convulsions
- Ads from websites recently visited
- Email Ads (Offers etc.)

Component 3, following variables have value greater than cut off:

- Irrelevant information
- No Emotional Connect

The first parameter i.e. Placement, 3 factors came to light which were; Excessiveness creating fatigue, Too cluttered and Long video ads leading to headache. Hence buying behaviour is affected. The customer tends to subconsciously overlook product which may also lead to lesser conversion from an online advertisement.

For the 2nd factor when an Ad content is too cluttered creates giddiness, the customer might miss the actual of the message of the ad and the visual appeal also drops due to the clutter. For E.g. an optimally placed ad will get more conversion than advertisements that are placed to cover up space and just gain impressions.

This 3rd factor proves to be true as most of the target audience want shorter video ads and would skip long video ads.

The 2nd Parameter i.e., Hindrance Parameters deals with factors such as; distraction creating convulsions, Advertisements from websites recently visited, email advertisements including offers. These factors hinders the daily work of customers and brings down their efficiency, while using digital platforms. The 3rd parameter i.e., content parameter brings out two factors; irrelevant information and no emotional connect. Traditional marketing theories state that a need must exist. Only when there are needs, demand arises. Marketer must be able to satisfy the customers need. If brand is unable to solve then the product is irrelevant leading to irrelevant advertisement to that audience.

Discussion

Through Literature review and the study conducted the gaps were identified. There is ample data on how social media creates impact through advertising and targeting potential audiences. As well the targeting must be done ensuring that the health of the customer does not get affected. From the results at hand from the questionnaire few prominent factors were identified, that must be avoided at all costs in social media adverting such as; Excessiveness creating fatigue, Too cluttered creating giddiness, Long video ads, Distraction creating convulsions, Ads from websites recently visited, Email ads including offers, Irrelevant and No emotional connect. The marketer must make content keeping these parameters in mind where the experience from the content is a pleasant unhindered one for the potential audience instead of wasting resources on repetitive advertisements by bombarding the screen of an untargeted audience.

Conclusion

Factors were identified in the analysis that acted as key factors which cause impact on the health of the

customers. Audience placed more weightage towards the content and placement of advertisements and the impact of on their daily activities. If the practitioner is very sure that such claims are entirely without merit, the best long-term strategy is to ignore them. Since, social media is a highly visible, public platform, forum, commenting once to the extent that what they are saying is inaccurate and unfair would certainly give other viewers the true picture of the facts.

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Test Retest Reliability of Jittered Frequency Modulation Detection Test

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Abstract

Purpose: Aim of the current is to develop a test to assess the perception of jitter in frequency modulation and also to assess its test-retest reliability. The motivation behind the development of such test is to detect subtle deficits such as hidden hearing disorder.

Study design: Observational study

Method: Nine young adults participated in the current study. Initially, frequency modulation detection limen (FMDL) of the participants were assessed for 500 carrier frequency with 2Hz frequency modulation. Upon obtaining the FMDL, the jitter threshold was estimated as the lowest jitter at which the individual could differentiate the jittered frequency modulation from the sinusoidal frequency modulation. FMDL, jitter threshold at FMDL, and jitter threshold at 10Hz above the FMDL were measured twice. Both test and retest measurements were performed on the same day with the time gap of 20mins.

Results: All participants could perceive frequency modulations and jitter in frequency modulation. Intra-class correlation coefficient revealed good test-retest reliability for all measurements.

Conclusion: Since the developed test has good test-retest reliability, it has a potential implication in the assessment of subtle deficits such as hidden hearing disorder.

Keywords: *Frequency modulation, FMDL, Temporal fine structure, TFS, Jittered frequency modulation, hidden hearing loss.*

Introduction

Temporal cues for speech recognition can be broadly classified into a temporal envelope, and temporal fine structure (TFS) and the definition of envelope and TFS vary across the studies. Moore[1] defined the envelope and TFS by considering the speech signal as a complex modulated signal where the slowly varying temporal envelope is superimposed on the relatively rapid TFS. The dichotomy of envelope and TFS in the auditory perception has been topic research interest since the last decade [2]. Many studies have assessed the relative contributions of temporal envelope and TFS for speech perception [1,3,4]. The envelope is sufficient for speech recognition in quiet [5,6]. However, for speech recognition in noise, envelope cues alone are not sufficient [3,7–10]. Providing TFS cues improves speech recognition in noise[11]. TFS cues also aid in the identification of pitch and location of the sound source [1,2,12,13] while the envelope cues contributed to the identification of speech [4,14,15]. TFS plays an essential role in speech recognition in tonal languages where changes in F0 over time can change the meaning of words [16,17].

Since TFS cue supports many critical functions

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related to speech recognition in noise, it is essential to assess the TFS sensitivity in individual reporting speech recognition problems in noise. The TFS sensitivity can be psychophysically assessed using Frequency Modulation Detection Limen (FMDL) test as the detection of frequency modulations (FM) requires phase locking to TFS [18]. FMDL test assesses the individual's ability to perceive the FM. While assessing the FMDL, the listener's task is to detect frequency fluctuation in a carrier frequency (e.g., 1 kHz) at a certain modulation rate (e.g., 4 Hz). The underlying mechanism of FM detection is controversial. Some authors believe that temporal fine structure and excitation pattern cues may contribute to FM detection. The temporal mechanism is involved in the FM detection but only for carrier frequencies below 4000 Hz and for low modulation rates (10 Hz). At higher modulation rates, place mechanism is known to contribute to FM detection [19]. However,Chen and Zeng[20] reported that, up to 80Hz modulation rate, the FM is coded through temporal mechanism. Hence FMDL measured for low carrier frequency and low modulation frequency will reflect the TFS sensitivity.

FMDL has been used as a method to study TFS sensitivity and related speech perception difficulties in noise in various clinical populations such as cochlear implants [20]and auditory neuropathy [21]. In both the clinical populations, there is a gross deficit in the TFS sensitivity. However, a significant number of individuals experience speech perception difficulties despite having normal hearing thresholds. An auditory perceptual difficulty in the presence of normal audiogram is termed as hidden hearing loss [22].It would be meaningful to increase the complexity, instead of using this traditional FMDL procedure to detect a subtle disorder like hidden hearing loss. In the current study, we propose to increase the complexity of FMDL procedure by jittering the frequency modulator. The modified procedure intends to measure the minimum amount of jitter required discriminate the jittered FM from sinusoidal FM. Prior to measuring the jitter threshold, FMDL would be measured and the jitter thresholds would be estimated at FMDL and 10Hz above the FMDL. The aim of the current study is to assess the test-retest reliability of the modified procedure.

Method

Participants: Nine young adults within the age range of 19-29 (Mean=22.37) years participated in the current research. Participants were recruited through a convenient sampling method and observational study design was utilized. All the participants of the current research had hearing thresholds ≤15dBHL at octave frequencies from 250 to 8000 Hz. It was ascertained that the participants were devoid of any history of neurological and/or otological disorders. Informed consent was obtained from all participants of the study and the experiments were conducted as per the ethical guidelines of Helsinki declaration [23].

Signal processing: FMDL was defined as the smallest frequency modulation rate required for perceiving the frequency modulations in the signal. Peak frequency deviation was adaptively varied to estimate FMDL at the modulation frequency of 2Hz. Both carrier and modulation frequencies were generated at a sampling frequency of 44100Hz and for a duration of 500 milliseconds. An unmodulated tone that was used as one of the choices for the 2AFC task was generated at the sampling rate of 44100 Hz and for the duration of 500 milliseconds. Both modulated and unmodulated signals were gated with 20 millisecond cosine onset/ offset ramps. Frequency modulations were computed in the time domain using following formula.

$$x(t) = \sin\left[2\pi f_c t + \frac{\Delta f}{f_m}\sin(2\pi f_m t)\right]$$

f_c = Carrier frequency

f_m = Modulation frequency

Δf = Peak frequency deviation.

To add the jitter to FM a random noise was added to the modulator prior to the frequency modulation. The magnitude of the noise was systematically varied to estimate the jitter thresholds

Procedure: An adaptivetwo-down one-up psychophysical procedure converging on 70.71% correct responses was used to estimate FMDL[24]. Participants responded on a 3I3AFC paradigm in which participants heard three intervals in each trial. One interval contained the frequency modulated signal and the other two intervals contained the un-modulated pure tone whose frequency is same as the carrier frequency of the frequency modulated signal. Both the intervals were presented sequentially with an inter-stimulus interval of 250 milliseconds. The intervals were randomized for each trial. The participant's task was to identify the interval in which frequency modulated tone was present.

Participants responded by clicking on button either '1' '2' or '3' depending on the position in which frequency modulated tone appeared in sequence. Feedback was given to participants regarding the response correctness during each trial. The test trial started with a peak frequency deviation of 50Hz. After two consecutive positive responses, peak frequency deviation was decreased by a ratio of 1.25 and increased by a factor of 1.25 after a negative response. Eight reversals were administered to each participant. Midpoints of last six reversals were averaged to obtain FMDL. A similar procedure was adopted to estimate the jitter threshold. Wherein 2 intervals contained smooth sinusoidally modulated signal and other interval contained jittered FM signal participant was instructed to identify the interval containing the jittered FM. The test started with the jitter magnitude of 0.2. Number reversals, up-down rules and threshold calculations were similar to that of FMDL. Jitter thresholds were estimated at the level of FMDL and 10Hz above the FMDL. To estimate the test-retest reliability, measurements were performed on the same day with the time gap of 20mins.

Results

Ability to perceive TFS was evaluated by measuring the FMDL. FMDL was obtained by estimating the minimum peak frequency deviation required to perceive the frequency modulations. FMDL of the participants were assessed for 500 carrier frequency with 2Hz frequency modulation. Upon obtaining the FMDL, the ability to perceive irregularity in the FM was assessed by adding a temporal jitter to the modulator. Jitter threshold was estimated as the lowest jitter at which the individual could differentiate the jittered frequency modulation from the sinusoidal frequency modulation. To assess the test-retest reliability, FMDL, jitter threshold at FMDL and jitter threshold at 10Hz above the FMDL were measured twice. Both test and retest measurements were performed on the same day with the time gap of 20mins. The mean and standard error of mean of FMDL, jitter threshold at FMDL and jitter threshold at 10Hz above the FMDL are represented in Figures 1, 2 & 3 respectively. Intra-class correlation co-efficient for FMDL, jitter threshold at FMDL and jitter threshold at 10Hz above the FMDL were 0.60, 0.64 & 0.44 respectively. Intra-class correlation co-efficient suggests a good test retest reliability of the test.

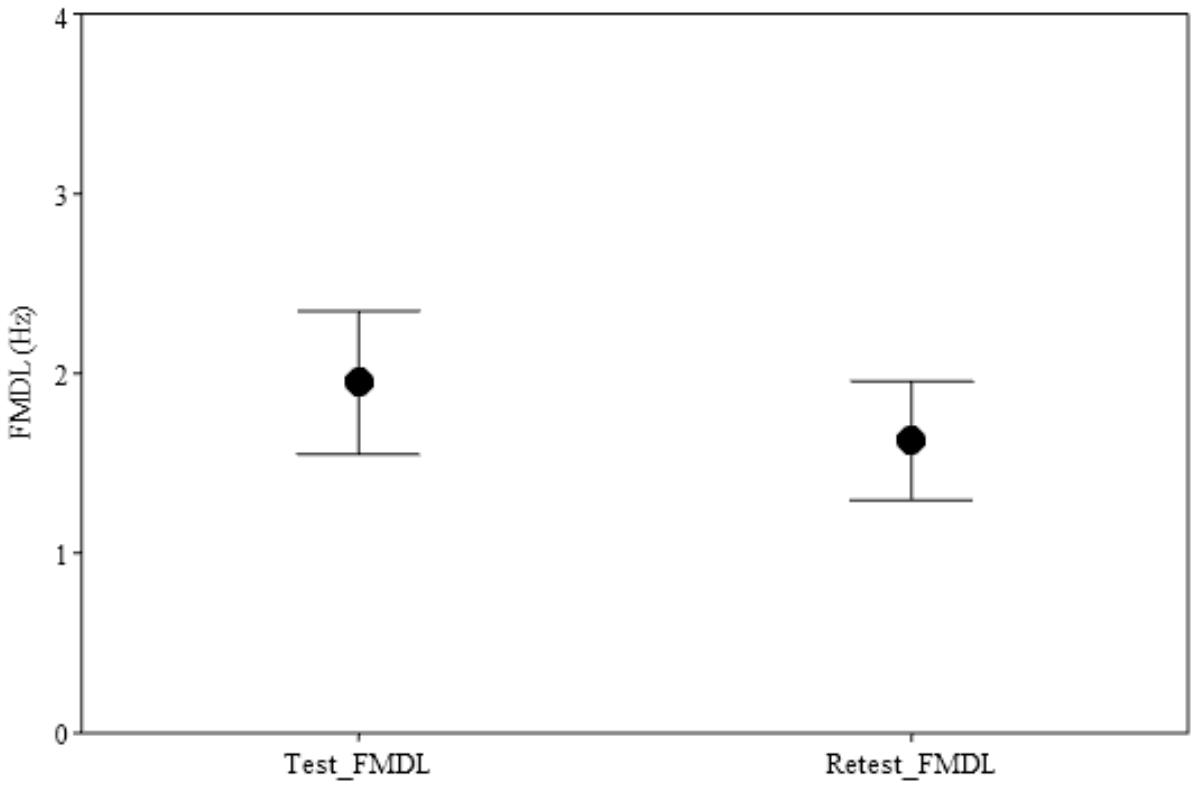


Figure 1: Error bars depicting mean and standard error of the mean of FMDL both test and retest sessions.

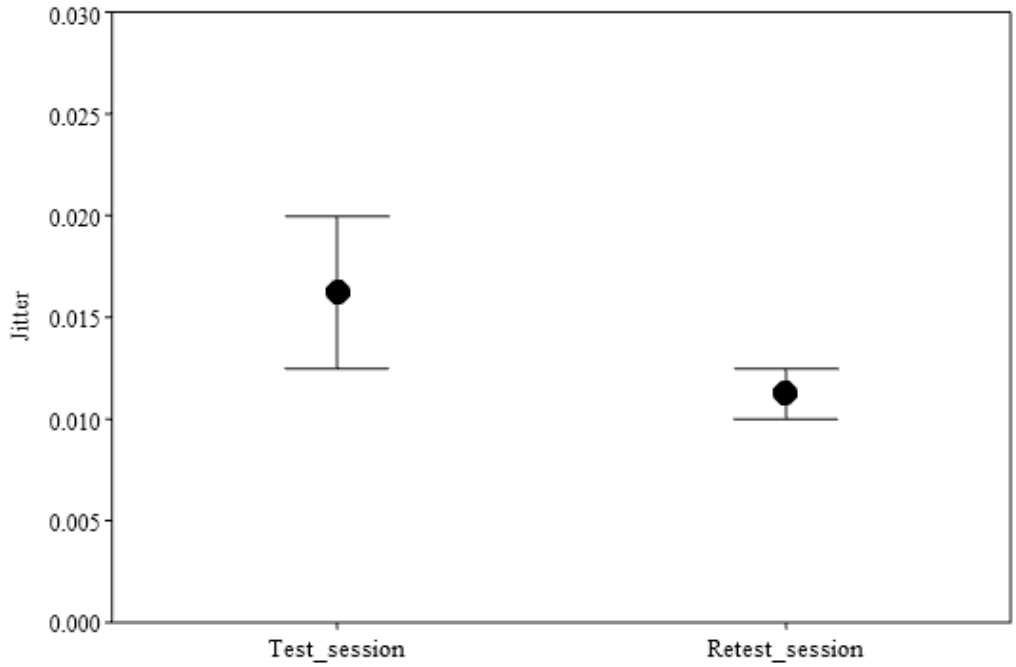


Figure 2. Error bars depicting mean and standard error of the mean of Jitter thresholds at FMDL for both test and retest sessions.

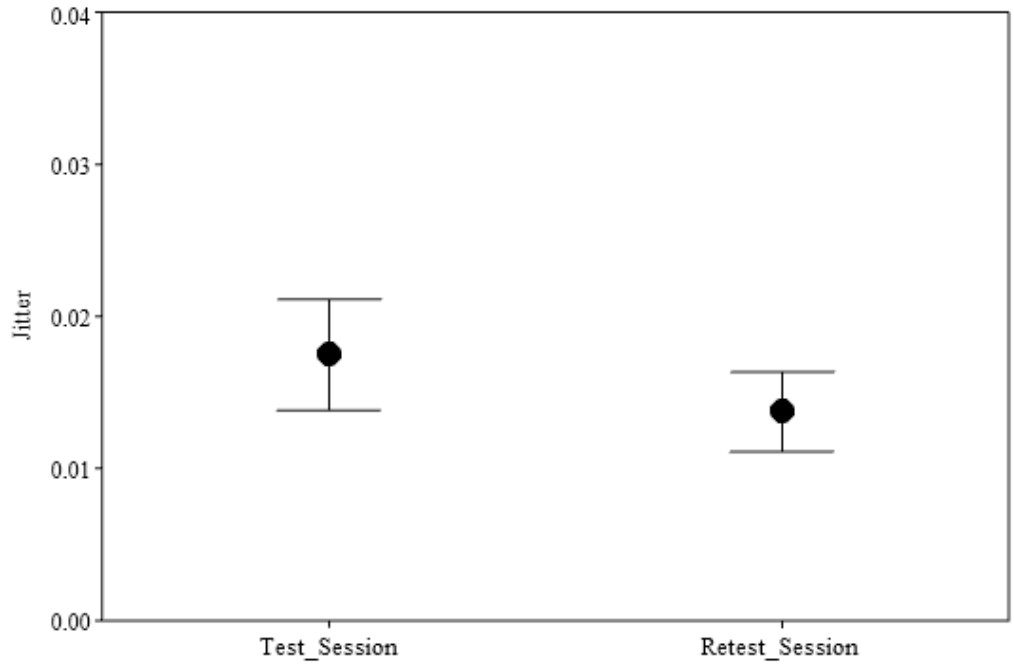


Figure 3. Error bars depicting mean and standard error of the mean of Jitter thresholds at 10Hz above FMDL for both test and retest sessions.

Discussion

Intra-class correlation coefficient analysis revealed good test-retest reliability of the jittered FM. Hence, this test has a potential application in the assessment of an individual with speech perception difficulties. The motivation behind developing the jittered FM test is to detect the subtle speech perception deficit such as hidden hearing loss. A significant number of individuals with self-perceived hearing difficulties have normal hearing

thresholds. Hind et al.,[25] reported that 5-7% individuals who seek audiologist support for hearing problems have normal audiograms. An auditory perceptual difficulty in the presence of normal audiogram is termed as hidden hearing loss [22]. One potential cause for the hidden hearing loss is cochlear synaptic lesions. The synapses between hair cells and cochlear nerve terminals are more susceptible to degenerative effects of aging and noise exposure. Thisprimary neural degeneration does not affect hearing sensitivity or the hearing thresholds but leads to difficulty in understanding speech in difficult listening situations[26].

With the growing prevalence of hidden hearing loss, there is a need for a diagnostic test or test battery to detect hidden hearing loss. Currently, there is no gold standard test to detect hidden hearing loss. Various physiological and behavioral tests have been proposed for the same. Many researchers have recommended using amplitude Wave I or V/I amplitude ratio of ABR as a diagnostic indicator for hidden hearing loss. However, the wave I of the ABR is highly variable among the individuals[27].

On the other hand, attempts are being made to develop behavioral tests to detect hidden hearing loss. The commonly recommended behavioral test for detecting hidden hearing loss is a speech in noise test (SPIN). However, the perception of speech in noise is a complex task constituted by the various auditory and cognitive processes. The involvement of multiple processes may increase the redundancy thereby decreasing the sensitivity of the test. Hence it would be meaningful to assess the underlying auditory process rather than speech perception in noise as a whole. Hence, developing a test based on TFS processing could be useful in identifying hidden hearing loss. Frequency modulation detection limen (FMDL) for low modulation frequencies is used as one of the tests to assess TFS processing. Since hidden hearing loss is a subtle disorder, it would be meaningful to increase the complexity, instead of using this traditional procedure. Carney[28], reported that even a 50% loss in auditory nerve fibers would deteriorate the perception only by the factor of $\sqrt{2}$. Hence, to identify this subtle deficit the task needs to be modified.Since the jittered FM test has more complexity and good test retest reliability, it has a potential application in the assessment of hidden hearing loss.

Conclusion

The current study investigated the test reliability of the jittered FMDL test. Jitter thresholds were measured at the FMDL threshold as well as 10Hz above the FMDL threshold. The test-retest reliability was good at both levels. Hence, the proposed test may a potential implication in the assessment of individuals with poor speech recognition ability in noise.

Funding Source: No financial support was recieced from any funding sources to conduct the study

Ethical Guidelines: Experiments were conducted as per the Helsinki declaration[23]

Conflict of Interest: Nil

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Working Posture among Bank Employees in Chennai: A Cross Sectional Study

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Abstract

Aim and Objective: The aim of the present study was to analyze the working posture and the postural problems arising due to the awkward working posture among bank employees.

Materials and Method: One hundred and seventy-four bank employees working in different banks in and around Chennai were randomly selected and included in this study, over a period of three months. The randomly selected subjects were given the Standardized Nordic Questionnaire to find out the perception of musculoskeletal symptoms. The data were analyzed with Binary Logistic Regression using the Mini Tab (14) statistical software. The prevalence of postural problems in the study population was calculated and statistical significance was accepted for $p< 0.05$.

Results: Bank employees cited the reason that prevented them from work during the last 12 months were pain at low back(21.8%), upper back(13.8%), neck (9.7%) and hand pain(9.7%). The findings of this study shows the most prevalent MSD for the bank employees for the last one year were seen in the low back (70%), upper back (66%) followed by neck (62 %), shoulders (48%). Generalized regression model was used to estimate presence or absence of work related musculoskeletal disorders among the professionals.

The values of the variables age, work experience, BMI, were found to be significant since the Wald Chi-Square tests indicate that $P < 0.05$.

Conclusion: The study revealed that professionals report a high prevalence of various types of work related musculoskeletal symptoms due to prolonged awkward postures at work. Good job design can lead to a reduction of musculoskeletal disorders.

Keywords: *Bank Employees; musculoskeletal disorders;Standardized Nordic Questionnaire; Posture; Work Related Musculoskeletal Disorders.*

Introduction

People adopt postures mostly without any conscious decision to deal with the work place and the surrounding environments they find. The goal is to perform an action or a task and the posture is chosen to achieve that goal. This adaptability is made possible by the complex anatomy of the musculoskeletal system which has the freedom to adopt numerous postures and postural adjustments. The redundancy provided by the multiple degrees of freedom ensures that for performing a particular task several alternative postures can be adopted.

The posture that an individual can adopt to perform a task is solely depending upon the interaction between the layout of the work place and his or her own anthropometry. The posture adopted for a particular task is most directly determined by the work place and the equipments particularly in relation to work height,

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reach distance, field of view, and space to move freely. The dimensions and arrangements constrain the range of postures that are possible while performing the task.

A person working in an esteem or awkward posture will have to use more force to accomplish the same amount of work compared to using a neutral posture, which in turn affects muscle loading and compressive forces on the intervertebral disc[1].

Rapid technological developments, especially in the use of electronic data, have affected workers. Electronic data are mainly displayed on visual display screen. Improper body posture and long hours in front of these instruments can result in many health hazards.

Global Burden of Diseases' statistics developed by the World Health Organization (WHO) reveal that musculoskeletal disorders (MSD) contribute 37% of the disease burden attributable to occupational risk factors[2].

The National Institute of Occupational safety and Health (NIOSH 1997) in the USA defines Musculoskeletal Disorders (MSD) as a disorder that affects part of the body's musculoskeletal system, which includes bones, nerves, tendons, ligaments, joints, cartilage, blood vessels and spinal discs[3]. These are injuries that result from repeated motions, vibrations and forces placed on human bodies while performing various job actions. The individual factors that can contribute to musculoskeletal symptoms include heredity, physical condition, previous injury, pregnancy, poor diet, and lifestyle. Musculoskeletal disorders (MSDs) refers to more than 200 conditions that affect the joints, ligaments, muscles, tendons, peripheral nerves and blood vessels causing ache, pain and functional impairment[4] .Since the beginning of 18th century, it has been shown that MSDs may have occupational causes. Musculoskeletal disorders are sometimes called ergonomic injuries and illnesses. Ergonomics is the study of the worker's interaction with tools, equipment, environment, jobs, tasks, work method, work rates, and other systems.

The International Labour Organization estimates that each year around 2.3 million workers die as a result of occupational accidents and work-related diseases. A latest estimate based on 2003 data indicates that fatal occupational accidents are about 358,000 every year. Across the globe, there are some 337 million occupational accidents and 160 million occupational diseases each year. Fatal work-related diseases are around 1.95 million per year[5].

Extreme working postures are one of the major reasons for musculoskeletal injury. With faulty posture, the body is balanced less efficiently over its base of support. Therefore, any restriction, imbalance or misalignment of the musculoskeletal structures will have an adverse effect on the efficiency of movement. Ergonomic problems at the workplace and bad work organization are part of the contributing risk factors to the above occupational safety and health problems.

Muscular discomfort may also lead to the adoption of postures that pose a secondary risk for developing a WMSD. People experiencing localized muscle fatigue would adapt their work posture in an attempt to displace the workload from the overworked muscles to less fatigued tissues[6]. Two different method for assessment of postural load and duration of computer use among office workers were compared and the study emphasizes that the challenge to develop quick and inexpensive techniques for assessing exposure to postural load and duration of computer use is still open[7]. Endurance is considered as the ability of a person to withstand the stress caused during prolonged activity. Endurance time is the maximum length of time an individual can sustain a given workload[8].

The one thing that has greatest impact on our lives in modern time is Computer. Introduction of the computer into the workplace has changed in work organization, and a different use of worker physical and mental potential. It is generally agreed that the etiology of work related neck disorders is multidimensional which is associated with, and influenced by, a complex array of individual, physical and psychosocial factors. Among these various risk factors, work-related psychosocial factors appear to play a major role. Work-related psychosocial variables may include aspects of the work content, organization, and interpersonal relationships at work, finances and economics[9]. Individual factors are considered as confounding factors that influence the relation between psychosocial demands and the occurrence of neck pain[10]. Furthermore, psychosocial demands maybe highly correlated with physical demands, which also indicate confounding effectof physical factors on the relation between work-related psychosocial variables andthe occurrence of neck pain[11].

Along with smaller size and affordable prices, there has been the advent of the internet. This has ensured that people use this technology either at their place of work or at home. All the banks are currently computerized.

This has led to an increase in computer related injuries like eye strain, wrist and back pain, etc. Bank employees will be assuming a forward head posture when they are using the computer. When they are sitting, many people slouch, relaxing the postural muscles of the back. This tends to transfer weight and stress to the body's ligamentous tissues, which can become permanently lengthened if the stress persists for extended periods of time. This lengthening can lead to instability around the joints that the ligaments normally stabilize.

Aim & Objective: The aim of the present study was to analyze the working posture and the postural problems arising due to the awkward working posture among bank employees.

Material and Method

One hundred and seventy-four bank employees working in different banks in and around Chennai were randomly selected and included in this study, over a period of three months. The study proposal was submitted to the Institutional Ethics Committee and due clearance was obtained from them.

Inclusion Criteria:

- Bank employees age group ranging from 20 to 50 years.
- Subjects with minimum 3 years and a maximum of 25 years of work experience.
- Subject who were willing to participate in the study
- Subjects with proficiency in reading and speaking English fluently.

Exclusion Criteria:

- Persons with acute ailments or any other systemic diseases.
- Pregnant and lactating mothers
- Subjects who had major accident or major surgery in any part of the body

Informed consent: Informed consent was prepared as per ICMR guidelines and administered to all subjects prior to the data collection. The subjects were clearly explained about the study, its purpose and the benefits/ risks of participating in the study. Confidentiality with respect to the information gathered was assured to the subjects. The subject's rights to participate/ withdraw from the

The background information consisted of data relating to age, gender, work experience, work duration and other occupation related risk factors. Exposure was assessed through direct observation of the person at work and also by interview.

Stature and body weight of the subjects was measured with the help of Martin anthropometric rod and a properly calibrated weighing machine. Body Mass Index (BMI) was calculated from the stature and body weight of the respective subjects[12].

The self- administered questionnaire was handed over to the participants and the he method for answering the questionnaire was explained in a general meeting before dissemination of the questionnaire. The questionnaire was collected according to the convenience of the participants over a maximum period of two weeks. The instrument used in this study is the Standardized Nordic Questionnaire (SNQ) (License No. 3316900588799)[13]. This questionnaire records the prevalence of MSD in terms of musculoskeletal symptoms (ache, pain, discomfort) in the preceding 12 months. SNQ consists of structured, forced, binary, or multiple choice variants. It consists of two parts a general questionnaire and a more specific questionnaire focusing on the neck, shoulders, and low back regions. The general questionnaire records whether musculoskeletal symptoms are present and if so in which area are they localized and whether they are ongoing (presence of musculoskeletal symptoms during the last seven days).

After completion of the questionnaire, the candidates were interviewed to clarify any confusion and to furnish any missing data. We assigned '1' to each positive response to each question and a '0' to each negative response.

The reliability of Nordic questionnaire for MSDs measured by Cronbach's alpha test was 89.5%.

The collected data were thoroughly screened and entered into MS-Excel spread sheets and analysis was carried out. Descriptive statistics such as mean with Standard Deviation (SD) and proportions were reported for socio demographic variables, respectively. The prevalence of postural problems in the study population was computed as percentages. Binary logistic regression was done as pain in different regions as the dependent variable. The independent variables entered were age, gender, and work experience; working hours per day, number of patients attended per day, height, weight

and BMI. Mini Tab version 14 software was used for performing all statistical analyses. A value of $P<0.05$ was considered as statistically significant.

The acquired data was analyzed by using the Mini Tab statistical software version 14.

Results

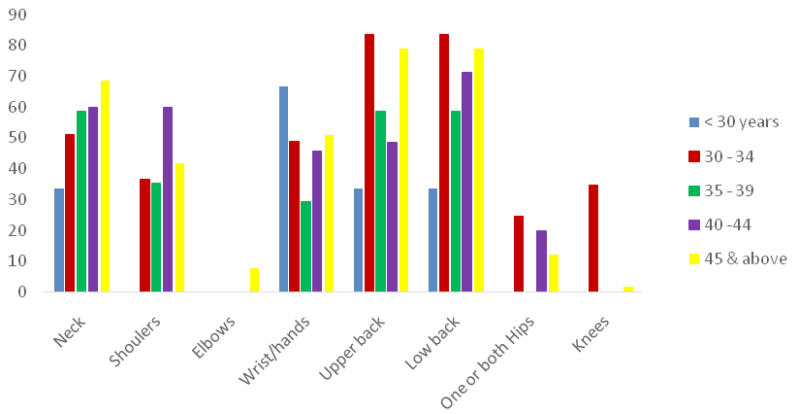
The sample population included 89 males and 84 female bank employees working in different banks in and around Chennai with an average age of 39.7 years and average work experience of 15.9 years. The general characteristics of the study population like age, work experience, working hours, height, weight, body mass index (BMI) were shown in Table 1. Graph 1 depicts the scale of MSD s reported in different parts of body comparing the prevalence of MSD among different age groups.

The percentile of subjects having the persistence of the pain for the past 12 months, persistence of pain which prevented the subjects from work, and the persistence of pain for the past 7 days were shown in Graph 2. The upper back, lower back and neck are the most affected body parts among the bank employees. Bank employees cited the reason that prevented them from work during the last 12 months were pain at low back (21.8%), upper back (13.8%), neck (9.7%) and hand pain (9.7%). The findings of this study shows the most prevalent MSD for the bank employees for the last one year were seen in the low back (70%), upper back (66%) followed by neck (62%), shoulders (48%).

Table 1. Demographic characteristics

Age	39.7±6.4
Work experience	15.9±5.7
Working hr/day	8±0.00
Height	159.6±8.3
Weight	63.5±6.7
BMI	24.9±2.2

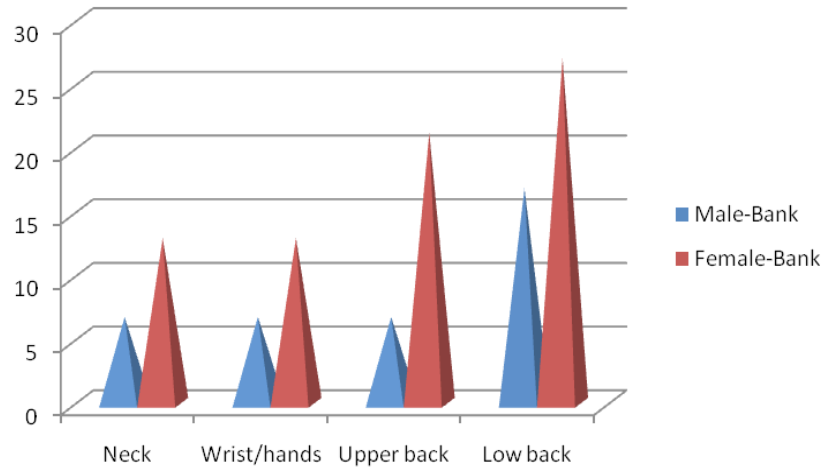
N=174, data are mean ± Standard deviation



Graph 1: Comparing the Prevalence of MSD among different Age Groups



Graph 2: Prevalence of pain and discomfort in different regions of the body in respect to the past 12 months, trouble causing prevention of work and the trouble in the last seven days



Graph 3: Comparing the Prevalence of MSD among males and females

Binary logistic Regression: An attempt has been made to estimate presence or absence of pain or discomfort a using binary logistic regression equation based on age, work experience, working hours, height, weight, BMI.

The model has a precision of nearly 73.1% in correctly identifying a bank employee without neck pain and has an accuracy of level of about 86.9% in identifying a bank employee having the pain. However, the overall percent of cases that are correctly predicted by the model is nearly 81.6%.

The table 2 gives regression coefficients and their corresponding standard errors (SE), Wald Chi-square tests and their significance, odds ratio [Exp (B)] with their 95% confidence interval of the binary logistic regression model.

Table 2: Variables in the Binary Logistic Regression Equation

	B	S.E.	Wald	Df	Sig.	Exp (B)	95% C.I. for Exp (B)	
Age (X_1)	.439	.175	6.255	1	.012	1.551	1.100	2.187
Work experience in years (X_2)	-.403	.195	4.291	1	.038	.668	.456	.979
BMI (X_3)	-2.073	.349	35.261	1	.000	.126	.063	.249
Weight kg (X_4)	.609	.125	23.805	1	.000	1.838	1.439	2.347
Constant	79.654	18.458	18.622	1	.000	3918205		

Binary logistic regression is given by $\text{Log}(p/1-p) = \beta_0 + \beta_1 * X_1 + \beta_2 * X_2 + \beta_4 * X_3 + \beta_5 * X_4$

Where p is the probability of having pain and discomfort 1-p is the probability of not having.

Expressed in terms of the variables given in the table, the logistic regression equation is given by Log (p/1-p) = 79.654+0.439 X_1 - .403 X_2– 2.073 X_3

Binary logistic regression had been done using the equation based on age, work experience, working hours, height, weight, BMI. These estimates indicate the relationship between the independent variables and the dependent variable, where the dependent variable is on the logit scale.

The values of the variables age, work experience, BMI, were found to be significant since the Wald Chi-Square tests indicate that $P < 0.05$.

Discussion

A healthy posture reflects on the physical and mental well being. Incorrect posture is critical for several neurological, musculoskeletal and systemic manifestations. Of several risk factors, certain occupations are at increased risk for incorrect posture and musculoskeletal problems. In our study, we have explored the vulnerability of bank employees for Work related Musculoskeletal Disorders (WMSD).

Considering the duration of work and the extent of strain on the muscles, our study makes an effort to put forth the need for preventive strategies to combat the health problems among these occupation groups.

This study was carried out among 174 Bank Employees. Among the 174 participants 89 were males and 85 females. The working hours of the participants were ranging between 4 and 12 hours per day. A study done by Sandeep Kumar observed a significant difference in the mean working hours among IT employees[14]. The mean age of participants was 39.7 years and therefore, the years of work experience also higher with mean years of experience as 15.9 years.

In our study we observed a significant group was affected with MSD. The upper back, lower back and neck are the most affected body parts among the bank employees. Bank employees cited the reason that prevented them from work during the last 12 months were pain at low back(21.8%), upper back(13.8%), neck (9.7%) and hand pain(9.7%).

The findings of this study are similar to the findings of studies performed by Arun Vijay. Neck pain problems were the most frequently reported in both studies but the present study had a higher prevalence rate (71.43%) compared to Arun Vijay's findings which reported only 30%[15].

The findings of this study shows the most prevalent MSD for the bank employees for the last one year were seen in the low back (70%), upper back (66%) followed by neck (62 %), shoulders (48%) which is contrary to what reported by Rajinder Kumar Moom et al which reported low-back pain (40.4%), upper back (39.5), neck 38.6%), hand/wrist (36.8%) and shoulder (15.2%) [16].

Occupational risk factors such as force, posture, movement and vibration can affect the WRMSD[17]. The risk of work related upper limb disorders (WRULDS) may be caused by the postural stress and demands of work[18]. The present study revealed neck pain as one of the main disorders among the professionals.

Generalized regression model was used to estimate presence or absence of WRMSDamong the professionals. Binary logistic regression had been done using the equation based on age, work experience, working hours, height, weight, BMI. These estimates indicate the relationship between the independent variables and the dependent variable, where the dependent variable is on the logit scale.

The values of the variables age, work experience, BMI, were found to be significant since the Wald Chi-Square tests indicate that $P < 0.05$. The results of this study are similar to the study performed by Frymoyer and Moone. In this study they concluded psychosocial factors including psychological stresses, job dissatisfaction, and complex social issues, such as compensation laws and disability system also contributed to the increase in magnitude of musculoskeletal disorder[19].

Because these coefficients were in log-odds units, they were often converted into odds ratios and these were given as Exp (B). The odds ratios are found to be statistically significant since the 95% confidence intervals do not contain the value 1 in the interval. A logistic regression analysis proved that bank employees were at increased risk of WMSD especially neck pain, back pain and shoulder pain, and the predominant factors which proved to be statistically significant were age, work experience in years, weight andbody mass index. Sharan D conducted a similar analysis and reported similar findings and duration of working hours was a very significant risk factor for pain[20].

It was observed that the increase in magnitude of WRMSD is more more in females. The risk factors identified by Surajo Kamilu Sulaiman et al.as being responsible for MSD were job tenure, psychosocial stress, and female sex while those responsible for the disabilities were job tenure and psychosocial stress[21]. Study by NA Ansari reported similar findings done on employees working in small scale industries in Wardha[22]. 69.66% of males and 81.18% of females among Bank employees were affected with low back problems, which are similar to the findings of the studies performed by Bassett and Marshall ED[23, 24]. The higher prevalence of musculoskeletal disorders in women is attributed to some physiological factors. One of them is the presence of more type 1 fibres in the trapezius muscle in women than in men, and others are the sexual dimorphism of the spine and the high incidence of dysmenorrhoea, which sometimes is confounded with mechanical low back pain. Multi tasking also accredited to the higher MSD among women.

The relationship between physical work load, postural workload and work related musculoskeletal disorders (WMSD) could be well documented in this study. The development of MSD increased with age as aging is associated with a progressive decrement in various components of physical work capacity,

including aerobic power and capacity, muscular strength and endurance, and the tolerance of thermal stress. The participants of the present study can be categorized into 5 groups according to the age. Kim Sherman in 2003 reported older workers report more MSD problems at work[25].

In the present study the prevalence rate for MSD at neck region for the age group 30-34 years was 51.02% and that of 40-44 years group it was 60% also it was increasing as the age advances. This is because many older workers will have spent more time working in MSD risky situations. In addition, jobs are generally designed for young and healthy male workers. Continued work with chronically fatigued muscles will increase the risk of developing an injury. Time to develop an injury likely depends on the physical requirements of the task and the amount of recovery time between fatiguing exertions. The potential of a risk factor to cause injury is also affected by the duration of the worker's exposure to it . The present study also revealed the MSDs increasing as the age advances. Studies showed that persons with sedentary jobs and a positive family history had a probability of having diabetes [26]. Hence for bank employees, along with MSDs the risk of obesity and diabetes also is alarming. To sum up these professionals report a high prevalence of various types of work related musculoskeletal symptoms due to prolonged awkward postures at work.

Conclusion

The goal of ergonomics is to reduce work related musculoskeletal disorders by adapting the work to fit the person, instead of forcing the person to adapt to the work. Design of successful work method requires the use of ergonomic principles that best match human capabilities with job demands. A mismatch of this interface can increase expenses, thus affecting the net profit by causing human operators to make mental mistakes, work inefficiently, or work beyond their physical capabilities to the point of injury. The field of industrial ergonomics thus uses knowledge of human capabilities to evaluate task demands, with the goal to design or redesign jobs so that they are kept within the range of human capabilities, thereby minimizing the risk of injury and maximizing the quality. Its general purpose is to adapt people's activities, equipment and environments to fit their needs and capacities. Good job design can lead to a reduction of musculoskeletal disorders, which in turn will result in a decrease in workers compensation costs, increased productivity, a decrease in lost time cases, and also reduced employee turnover.

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Analysis of Factors Associated with Self-Stigma (PLHIV) on the HIV and AIDS Incidencein Jongaya Positive Care Supporting Group of Makassar City

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Abstract

HIV and AIDS in many countries show the iceberg phenomenon. Community stigma makes people living with HIV and AIDS become closed so that someone judges himself as a useless person. The purpose of this study was to analyze Stigma people with HIV and AIDS on the incidence of HIV and AIDS in peer support groups of Jongaya Care. The type of research used was non-experiment with an analytic approach through a cross-sectional study design to assess the relationship of attitudes, motivation, experience, expectations, level of education, length of illness, age, and sex of PLHIV with self-stigma against HIV and AIDS. Data were analyzed by Fisher's test exact test with a significance level of $\alpha = 0.05$. Statistical test results of Fisher exact test showed that $p > 0.05$ for attitudes, motivation, experience, expectations, duration of illness, and sex so that the conclusion of the study there was a significant relationship between the six factors with self-stigma of PLHIV, whereas there was no significant relationship between level of education and age to self-stigma of PLHIV.

Keywords: *PLHIV, Self Stigma, HIV and AIDS Incidence.*

Introduction

HIV and AIDS have now become a global problem[1-3]. HIV and AIDS in many countries experience an iceberg phenomenon[4,5]. The speed of the spread of HIV is mainly influenced by sexual behavior such as changing partners, especially in women sex workers who do not use condoms and use syringes simultaneously for drugs[6,7]. The World Health Organization (WHO) and the special AIDS prevention agency from the United Nations (UNAIDS), report that the number of people living with HIV and AIDS in the world in 2013 was estimated at around 35 million people with a new infection of 2.1 million consisting of 1.9 million adults and 240,000 children aged <15 years[8].

Meanwhile, the number of HIV and AIDS cases in Indonesia is increasing rapidly every year. In 2011, the number of PLHIV in Indonesia was at 545,428 people, in 2012 it was at 591,825 people, in 2013 it was at 638,643 people, in 2014 it was 686,319 people. The average PLHIV above is those who frequently change partners, same-sex couples, and syringe users simultaneously on drug use[8].South Sulawesi is included in the 10 provinces with the highest number of HIV and AIDS sufferers in Indonesia. The number of HIV infections reported in South Sulawesi was at 4,314 people, and the number of people living with AIDS reported was at 1,734 people. However, it is estimated that this number will continue to grow[8].

There are several cases in the community that is caused by a lack of knowledge about HIV and AIDS[9-11] as in the example cases where doctors and paramedics in the emergency department are very often received counseling on how to transmit HIV and AIDS and how to prevent transmission at home sick in everyday work. However, all know only by touching and examining patients who claim to be HIV positive, once they hear the patient's statement, the doctor immediately washes his hands repeatedly with new soap and then sits down and continues with the patient. Therefore, you do not think about checking and talking with the patient out of fear and want to wash your hands as if the doctor was afraid of contracting. A lack of understanding about HIV and AIDS in the community needs to be minimized to deal with HIV and AIDS. If the stigma or environment

is negative, the burden of their sufferers will be greater and accumulate[12,13].

The purpose of this study was to analyze Stigma people with HIV and AIDS on the incidence of HIV and AIDS in peer support groups of Jongaya Care.

Materials and Method

This type of study was a type of non-experimental study with an analytic approach through a cross-sectional study design to assess the relationship of attitudes, motivation, experience, expectations, level of education, length of illness, age, and sex of PLHIV with self-stigma against HIV and AIDS. The population in this article was people with HIV and AIDS whose names are recorded in the Jongaya Positive Care Peer Support Group (58 people). The sampling technique used the entire sampling method. The data obtained in the field were grouped into primary data and secondary data. Data were analyzed by using Fisher's exact test with a significance level of $\alpha = 0.05$.

Results

Univariate Analysis: This analysis explains the frequency distribution of all variables including attitudes, motivation, experience, expectations, education, length of illness, age, and sex of PLHIV in the peer support group (Table 1).

Table 1:The frequency Distribution of All Variables

No.	Variables	Categories	Frequency (N=58)	Percentage (%)
1	Attitude	Positive	46	79.3
		Negative	12	20.7
2	Motivation	High	46	79.3
		Low	12	20.7
3	Experience	Good	46	79.3
		Less	12	20.7
4	Hope	Good	46	79.3
		Less	12	20.7
5	Age	Teens (10-16 years)	2	3.4
		Adult (>17 years)	56	97.6
6	Duration of suffering	Suffering for long (>5 Years)	23	39.7
		Just now (0-5 years)	35	60.3
7	Level of Education	High (≥Senior High School– Higher Education)	18	31
		Low (Elementary School– Junior High School)	40	69
8	Self-Stigma	Positive	46	79.3
		Negative	12	20.7
9	Gender	Male	38	65.5
		Female	20	34.5

Source: Primary Data, 2018

Bivariate Analysis: Table 2 describes the relationship between attitude, motivation, experience, hope, age, old suffering, level of education and gender with the self-stigma

Table 2: Relationship between Attitude, Motivation, Experience, Hope, Age, Old Suffering, Level of Education and Gender with Self Stigma

No.	Variables	Categories	N	%	Self Stigma				p Value
					Positive		Negative		
					N	%	N	%	
1	Attitude	Positive	46	79.3	46	79.3	0	0.0	0.000
		Negative	12	20.7	0	0.0	12	20.7	
2	Motivation	High	46	79.3	46	79.3	0	0.0	0.000
		Low	12	20.7	0	0.0	12	20.7	
3	Experience	Good	46	79.3	46	79.3	0	0.0	0.000
		Minus	12	20.7	0	0.0	12	20.7	
4	Hope	Good	46	79.3	46	79.3	0	0.0	0.000
		Minus	12	20.7	0	0.0	12	20.7	
5	Age	Teenagers	2	3.4	1	1.7	1	1.7	0.374
		Adult	56	97.6	45	77.6	11	19.0	
6	Duration of Suffering	Suffering for long	23	39.7	23	39.7	0	0.0	0.002
		Just Now	35	60.3	23	39.7	12	20.7	
7	Level of education	Higher Education	18	31	33	56.9	7	12.1	0.486
		Lower Education	40	69	13	22.4	5	8.6	
9	Gender	Male	38	65.5	26	44.8	12	20.7	
		Female	20	34.5	20	34.5	0	0.0	0.005

Source: Primary Data, 2018

Discussion

A relationship between attitude and self-stigma: The attitude of PLHIV are very influential on the self-stigma of PLHIV against HIV and AIDS. This proves that the discriminatory actions experienced by PLHIV cumulatively will develop into very dangerous behavior. PLHIV who stigmatize themselves due to discrimination received so far, psychologically experience disappointment [14,15]so that it can develop into a risky attitude.

The knowledge of PLHIV on HIV and AIDS issues related to self-stigma of PLHIV is a necessary capital in developing preventive measures. Conceptually, the right knowledge encourages the creation of attitudes and actions that are appropriate and in line with the objectives of the knowledge that has been formed. With this logic, the formation of knowledge is considered as an entry point, the formation of new attitudes or expected behaviors. This is in line with the attitude shown by respondents where respondents who have a negative attitude also have a negative stigma, which means that there is a need for improvements in the social system and the structure of the community by elites, mass media, and health services[16].

A relationship between motivation and self-stigma: Motivation is a human psychological characteristic that contributes to a person's level of commitment[17,18]. This includes the factors that cause, channel and maintains human behavior in certain directions. Good motivation can help PLHIV in understanding the self-stigma against HIV and AIDS because motivation is one of the ways to make PLHIV stay motivated and have the determination to recover[19,20]. Motivation is also related to the utilization of health services[21].[22]The results of the research show that good motivation will greatly affect the positive self-Stigma in PLHIV.

The results of this study are in line with the results of research conducted by [23] which said that there is a relationship between motivation and self-stigma in the prevention of HIV and AIDS. The concept of knowledge is the main element of change in motivation of PLHIV, as well as attitude, knowledge is also an entry point of this problem which can trigger the growth of strong motivation to recover from HIV disease and stay productive.

A relationship between Experience and Self Stigma: This research shows that a good experience

will greatly affect having a positive self-perception in PLHIV. This study is similar to the research conducted by [24] who said that bad experience when first knowing that he was positive with HIV and AIDS greatly affected his stigma so that he or she experienced stress bad feeling. Social stress that occurs in most participants is uncomfortable and assume that HIV is embarrassing.

The interpretation of PLHIV towards discriminatory experiences carried out by the community is based on an assessment of the three social arenas of life, namely information reported by the mass media, attitudes and actions of community elites in responding to people with HIV and excessive actions by health workers in handling AIDS cases.

A relationship between Hope and Self Stigma: Weil [25] stated several factors can influence expectations, namely social support, religious beliefs, and control. A hope has a close connection with social support. In his research on patients suffering from chronic diseases said that family and friends are generally identified as a source of hope for patients with chronic diseases in some activities such as visiting a place, listening, talking and providing physical assistance. A lack of social ties is attributed to worse health outcomes such as increased initial morbidity and mortality. Individuals express feelings of helplessness when they are unable to communicate with others.

Difficulties in the field, generally there are still many who are closed to others, especially when they will meet and be interviewed by researchers, so this becomes a challenge for researchers, this happens because the hope of people with the disease is still lacking and tend not to have hope to recover from HIV and AIDS are suffering from the future because the stigma that occurs has been very difficult to get rid of themselves, especially the community.

Relationship to Education with Self Stigma: An adequate level of education is the basis for developing insight, and a means to facilitate a person to motivate and help determine a person's way of thinking in accepting knowledge, attitudes, and behaviour[26,27]. It is hoped that the high level of education of PLHIV can help in improving its stigma against HIV and AIDS

Tthe level of education of PLHIV is never separated from knowledge because the higher the level of education of the sufferer, the higher the insight possessed by PLHIV although in the results of this study there is no significant relationship to self-stigmatization of PLHIV, but the level of education is a factor of a person to get knowledge compared to people with less education.

The duration of the relationship with self-stigma: This study shows that the duration of the disease is related to the self-stigma possessed by PLHIV.Same with the results of research conducted by Vitriawan, Sitorus, & Afiyanti, (2007) suggested that the duration of having a bet on the stigmatization of HIV and AIDS, a participant expressed stress when he was first diagnosed with HIV and AIDS which caused imbalances, malfunctioning and discomfort physical when first diagnosed with HIV and AIDS.

The length of time it affects the stigma of self greatly because the peer support program is prioritizing PLHIV in order to be more enthusiastic in living life and can be more motivated to achieve a better future, this then becomes the routine of sufferers in peer support groups so that the sufferers themselves can re-organize the future without having to think about discrimination that has been provided by the community.

Relationship of age with self-stigma: The stigma associated with the disease is its psychological challenge for PLHIV, when adolescents are known to have HIV. In fact, PLHIV needs full support from their social environment, because they experience severe psychological distress. Stigmatization for adolescents is very large, so this raises concerns for people to be open to their social environment. Another form of stigma develops through internalization by PLWHA with negative perceptions about themselves, including the age of PLHIV, so that age also strongly affects the stigma of itself.

Relationship of sex with self-stigma: Gender is a variable that can give a difference in the incidence of men and women. For researchers, the difference between men and women in looking at HIV and AIDS is the same, but the stigmatization of oneself is different, as we know that women are naturally created, they tend to be more sensitive to problems, especially this related to health problems. This study shows that more women have negative self-stigma. This is normal because women are naturally created as feeling beings.

Conclusion

This study concludes that there isa significant relationship between attitudes, expectations, duration of

suffering, and gender and the stigma of people with HIV and AIDS (PLHIV) in the group peer support care in Makassar City while the level of education and age, there isno significant relationship to self-stigma of PLHIV.

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Early and Late Complications of Haemorrhoidal Artery Ligation Compared to Milligan Morgan Surgery

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Abstract

Haemorrhoidal artery ligation (HAL) is a non-excisional procedure involves ligating the haemorridal arteries with sutures. Other method is known as milligan-morgan surgery (MMS) which is most widely used surgical technique for treating hemorrhoids. In the present study, 120 patients with heamorrhoid visited at Al Fayhaa Teaching hospital between March 2017 and March 2018 were enrolled. The patients were divided into two groups *viz*. haemorrhoidal artery ligation (HAL, n=60) and milligan-morgan surgery (MMS, n=60). Early and late complications, degree of bleeding and postoperative pain were recorded for the enrolled patients. About 45 males and 15 females were included in HAL. While, 32 males and 28 females were included in the MMS. The number of individual, grouped in the age range i.e. 20-39, 40-59 years and about 60 years. HAL surgery was done on the 37, 16 and 07 patients of age 20-39, 40-59 and 60 years, respectively. MMS was done on the 25, 24 and 11 patients of age 20-39, 40-59 and 60 years, respectively. HAL showed significantly ($p \leq 0.001$) less urine retention, infection and mild bleeding as compared to MMS. It also showed significantly less post operative pain and complications ($p \leq 0.001$) as compared to MMS. Maximum HAL patients (n=31) showed fast recovery i.e. within 7-10 after an operation. In the present study concluded that the haemorrhoidal artery ligation (HAL) was found to be more effective than milliganmorgan surgery (MMS).

Keywords: *Haemorrhoidal artery ligation, Milligan Morgan surgery, Surgery, Open hemorrhoidectomy.*

Introduction

Hemorrhoids are normal parts present in anorectum in humans. It consists of arterioles, venules and arteriolar-venular communications supported by fibromuscular tissue. Haemorrhoidsare also known as piles. They are mucosal folds which are enlarged and contains blood vessels. They are associated with itching, bleeding and pain too. Many a times these haemorrhoids result in pain after removal[1]. The surgery procedure involves blood vessels which are tied up in a manner to reduce the blood flow towards the haemorrhoids. After this the haemorrhoids shrinks inside the bowel. This type of surgery makes very less complications since there is no excision of tissue.

There are many surgical method for treatment of advanced hemorrhoidal disease. This include classical hemorrhoidectomies (Milligan-Morgan, Fergusson), longo-stapled hemorroidectomy, and others. All these method has its own advantages and disadvantages. It is also associated with method-specific complications which includes anal canal strictures, sensation impairment, and sphincter damage, resulting in fecal incontinence etc.

Haemorrhoidal artery ligationis a non-surgical procedure which includes ligating the haemorridal arteries with sutures. This suturing reduces the blood flow or supply to haemorrhoids. This ligation does not involve risk of bleeding or pain. Open hemorrhoidectomy often called milliganmorgan method which is most widely used surgical technique for treating hemorrhoids. It was developed by two surgens Milligan and Morgan in 1937

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hence named so. It was considered as most effective technique for hemorrhoids of grade II and IV and also safe, simple and cost effective treatment. However, this method reported to have few side-effects *viz*, pain, acute urine retention and bleeding which is most prevalent complications[2].

The process involves incision by scalpel in the skin at the base of hemorrhoid. Then dissection in the submucous space is done to remove the entire hemorrhoid from its root. The incision is later ligated with strong catgut. The wound is left open whereas a hemostatic gauze pad is placed in anal canal. This requires general general or epidural anesthesia. Postoperative pain and acute urine retention are common complications. In milliganmorgan method, hundreds of personal alterations have been introduced. The changes vary from the patient's position on the operating table to the type of anesthesia, intestinal preparation or not, type of suture for pedicle and vessel ligation, cutting instrument (scalpel, scissors, cautery, laser, etc.), the direction of resection (from the skin towards the mucosa or the opposite).

Haemorrhoidal artery ligation are "non-surgical interventions". It considers HD above the pectineal line, without the innervations of cerebrospinal or reflexion. This does not cause pain. Sclerotherapy destroys internal hemorrhoids with the help of chemical agents. Photocoagulation application and freezing with the help of nitrogen, mechanical strangling with help of rubber band, are a few ways that destroys internal hemorrhoids. Due to mechanical strangling the internal hemorrhoids do not get blood supply and can be removed by tissue necrosis. In Doppler Guided Hemorrhoidal Artery Ligation (DGHAL) technique in patients with Crohn's disease, it was observed that it was safe and effective. The DGHAL technique is similarly safer and effective in people suffering from with grade II and III hemorrhoidal disease. It has less postoperative pain and also requires less analgesics. It is associated with no early or late complications, but recurrence of hemorrhoids may occur. In case of grade IV of the disease, it needs careful evaluation[3].

Surgical treatment is the only truly curative method of hemorrhoidal disease. It is prescribed in patients who have developed complications and other measures have failed. Of the several surgical techniques, the milligan-morgan hemorrhoidectomy is till now considered the "gold standard" treatment for its best results. But postoperative pain associated with it still remains a major problem. Milligan-morgan hemorrhoidectomy requires a considerable number of days hospitalization. It also needs higher use of opiates[4]. The problems of early and delayed bleeding, anal verge and mucosal stenosis, pain, and prolonged healing due to a persistent anal ulcer are the most frequent complications after milligan-morgan haemorrhoidectomy[5].

With this background, we aim to study the efficacy and safety of heamorrhoidal artery ligation compared with milliganmorgan as a surgical treatment of heamorrhoidal disease.

Material and Method

Patients enrollment: In the present study, 120 patients with heamorrhoid visited at the Al Fayhaa Teaching hospital between March 2017 and March 2018 were enrolled in the present study. The patients were divided into two groups *viz*. haemorrhoidal artery ligation (HAL) and milliganmorgan surgery (MMS). This study involved 120 patients with heamorrhoid. In Basra between March 2017 and March 2018.

Surgery procedure: All patients operated on under general anasthesis, lithotomy position. Haemorrhoidal artery ligation (HAL) group (n=60) was treated with the doppler guided hemorrhoidal artery ligation (DGHAL) using special prop with doppler transducer in its tip. The tip was introduced into anal canal and distal rectum. Once the pulsation of the branch of haemorrhoidal artery was detected, 2/0 vicryl suture used to ligate the artery. The device rotated slowly in a clock wise direction to repeat the ligation of another branch, usually 4 to 7 branches are lighted.

In the milliganmorgan surgery group (n=60), standard milliganmorgan surgery was operated. The patients were followed for 18 months after surgery for their post-operation obsrvation.

Statistical analysis: Results were presented as Mean ± standard error (SE). Dunnett multiple comparison test and one way analysis of variance (ANOVA) was done to estimate the statistical significance.

Results

In the present study, patients with heamorrhoid (n=120) was treated with two ways, *i.e.*haemorrhoidal artery ligation (HAL) and milliganmorgan surgery (MMS). About 45 males and 15 females were included in haemorrhoidal artery ligation. While, 32 males and

28 females were included in milliganmorgan surgery. Table 1 showed number of individual, grouped in the age range i.e. 20-39, 40-59 years and about 60 years. Haemorrhoidal artery ligation surgery was done on the 37, 16 and 07 patients of age 20-39, 40-59 and 60 years, respectively. Milligan morgan surgery was done on the 25, 24 and 11 patients of age 20-39, 40-59 and 60 years, respectively.

Table 1: Grouping of the patients, according to age

Age	Haemorrhoidal artery ligation	Milligan Morgan surgery
20-39	37	25
40-59	16	24
> =60	7	11

Early and late complications, degree of bleeding and post-operative pain haemorrhoidal artery ligation and milliganmorgan surgery were depicted in the Table 2. Haemorrhoidal artery ligation showed less urine retention, infection and bleeding as compared to the milliganmorgan surgery.

Table 2: Early and late complications of haemorrhoidal artery ligation and milliganmorgan surgery

Parameters	HAL	MMS
Early complications		
Urine retention	03±0.02***	09±1.37
Infection	01±0.01***	07±2.41
Bleeding	01±0.00***	04±2.69
Degree of bleeding		
Mild bleeding controlled by packing	01±0.00***	03±0.21
Severe bleeding controlled by suturing of the bleeder	--	01±0.00
Post operative pain		
Mild pain controlled with paracetamol only	37±4.83**	28±3.71
Moderate pain controlled with paracetamol and NSAID	14±3.32***	21±4.18
Severe pain controlled with narcotic analgesia	09±1.53*	11±5.15
Late complications		
Anal stenosis	00±0.00***	07±2.54
Recurrence of heamorroid	00±0.00***	04±1.89

The results are presented as Mean ± standard error (SE). ***p≤0.001, **p≤0.01 and *p≤0.05 when compared with the MMS (Dunnett multiple comparison test). HAL: Haemorrhoidal artery ligation; MMS: Milligan morgan surgery

Table 3: Time needed to return to normal life and activity

Days	Haemorrhoidal artery ligation	Milligan morgan surgery
7-10	31	18
10-13	14	20
13-16	08	11
16-19	06	08
> 19	01	03

Discussion

Surgical heamorrhoidectomy is still the gold standard treatment for heamorrhoidal disease but is associated with post operative pain and complication rate up to 15%[11]. Haemorrhoidal artery ligation is a non excisional technique used to reduce these complications[12,13]. Our results are accordance with these studies[11-13]. Haemorrhoidal artery ligation showed less urine retention (p≤0.001), infection (p≤0.001) and bleeding (p≤0.001) as compared to the milliganmorgan surgery.

The pain is the most common problem of heamorrhoidal surgery. However, the intensity of pain was found to be reduced with the use of heamorrhoidal artery ligation as compared to the milliganmorgan. This might be due non-excisional technique of HAL and the suture ligation applied above the dentate line. In the present study, the pain was treated by paracetamol or (Nonsteroidal Anti-inflammatory Drugs) NSAID. About 9 and 11 patients showed post-operational pain in HAL and MMS group, respectively. They were treated by the narcotics and severe pain were grade 3 and 4 hamorrhoids. In case of second and third degree hemorrhoids, Doppler-guided hemorrhoidal artery ligation has proved to be superior technique in resolving hemorrhoidal disease. This causes reduction of blood flow, which causes fibrosis. This causes less pain and quick recovery[8]. After hemorrhoid ligation, it will drop with the bowel movement in 7-14 days. It may not be noticed except ocassional bleeding. In cases of many hemorrhoids 2-4 treatments at regular interval is recommended at 2-4 weeks interval. Minor bleeding or protrusion may remain until all the treatment is completed.

In haemorrhoidal surgery, bleeding is an early postoperative complication. However, It was less common (p≤0.001) with HAL group. If slipped ligature occurs in initial 24 hrs, intencehaemorrhage were

observed in the MMS while it was very mild in case of HAL. Similar findings were observed in the present study. Only 1 patient showed mild bleeding in the HAL group while 3 patients showed sever bleeding in MMS group. Our results are in agreement with previous reports[14]. The reasons for delayed (or secondary) bleeding is not clearly understood. However, this might be due to the infection which was frequently incounted in the MMS. It mostly occurs in the 2nd postoperative week, and tissue necrosis was also implicated[5].

Thus altogether complications in milligan-morgan procedure includes early or delayed postoperative hemorrhage, recurrence of hemorrhoids, and passive or urge incontinence. The milligan-morgan technique can also cause secondary stenosis of the anal canal through adhesions of the preserved skin areas[6]. While in HAL no patient developed post operative anal stenosis ($p \leq 0.001$). Regarding the recurrence of heamorrhoid following HAL was zero while in MM was 4 patients . In other study the recurrence rate was 1-3%[15,16].

Several randomized control trials (RCTs) have reported the benefits of haemorrhoidal artery ligation as compared to milligan– morganhaemorrhoidectomy. There was a balance observed between benefits and adverse effects with each technique. Benefits included quality of life improvement, shortened length of hospital stay and adverse effects like postoperative pain, anal stenosis and other complications[7].

Transanalhenorrhoidal dearterialization (THD) is more widely used now a days. This treatment primarily focuses on main symptoms like bleeding, prolapsed and pain. It intervenes in its pathological processes. It is based on two steps mainly dearterialization and mucopexy.. The first step includes targeted artery ligation of hemorrhoidal arteries, which encompass very sensitive Doppler probe. This probe identifies maximal blood flow. Then comes placation and lifting of prolapsing rectal mucosa or submuosa[9]. In patients diet, which is rich in fluid and fiber is highly recommended. Oral intake of water must be increased. Stool softeners can also be added as a supplement. If complains appear, laxatives can also be prescribed. Disruption of rectal sutures may occur in case of diarrhea or irritable bowel syndrome. In such patients probiotics can be prescribed. Chronic inflammatory bowel disease or chronic radiation proctitis must continue the specific therapy as prescribed; a sudden worsening of their condition should be diagnosed early and treated.

To control pain and tenesmus proper care should be taken. Inflammatory response and edema may occur. Bloody anal discharge is almost common in these patients. Patients who undergo dearterialization may suffer minor pain and also rectal discomfort. This may last for a few hours to a few days. In these patients, anti-inflammatory drugs and/or analgesics is given as needed. In these patients, non-steroidal anti-inflammatory drugs (NSAIDs) are given for at least 3 days, and other analgesics if pain persists. With these measures, both edema and related symptoms are reduced. Usually, patients can discontinue this postoperative regimen after a few days, and only a minority of them needs it for more than 7 days. Urinary retention develops in about 10 % of patients, especially those with MM procedure and males. To prevent this, restriction of excessive intravenous infusion of fluids is advisable. Treatment should consist only in temporary bladder catheterization. Tenesmus can be accompanied by a transient sensation of the urge to defecate. This is usually transient, with resolution within 7–10 days, and does not give rise to any form of persistent urgency, soiling, or fecal incontinence.

Conclusion

The heamorrhoid is a common disease and there are many method to deal with it. The main goal of treatment is to cure the symptom with minimal rate of complications and low rate of recurrence. In the present study, haemorrhoidal artery ligation (HAL) was found to be more effective thanmilliganmorgan surgery (MMS).

Ethical Clearance: Ethical clearance taken from Al Fayhaa Teaching hospital.

Funding Source: Self

Conflict of interest: Nil

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Assessment of the Knowledge Regarding HIV/AIDS among Nursing College Students in University of Basrah

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Abstract

Background: AIDS is a common infectious disease worldwide, so every health staff have to have a knowledge about it, specially nursing staff .

Aim: To evaluate the knowledge of nursing college students about HIV/AIDS.

Method: The study was carried out on 150 nursing students at University of Basrah College of nursing during the 2018-2019**.** Structured questionnaire was used for data collection,which was consisted of twenty multiple choice questions to assess knowledge of students about HIV. Data was analyzed by using SPSS statistics version 23.

Results: The current results reveal that(76%) of nursing students have poor knowledge toward HIV/AIDS,and there was a nostatistically significant difference between the stages.

Conclusion: The study concluded that nursing students need to increase their knowledge regarding HIV/AIDS by for example developing the curriculum of nursing college.

Keywords: *Assessment, nursing, knowledge, HIV/AIDS.*

Introduction

World Health Organization (WHO) estimated that 75 million people have been infected with HIV while about 32 million people have died of it. Globally, 37.9 million people were living with HIV at the end of 2018[1].

In Iraq about 0.1% of the total population are living with HIV comparing to other parts of the world, it is considered low-prevalence HIV epidemic[2,3].

Nurses play an important role in prevention of HIV by providing care and treatment for people living with HIV/AIDS. Therefore, nurses should be competent in caring and solving health problems of them[4].

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Nurses have to deal with collecting various body fluid samples of patient for investigation, giving medication as per instructions, taking care of patients, and giving injections[5].

Nurses and nursing students' attitude toward HIV/AIDS patient is determined by their knowledge of the same. It is important to assess the knowledge of nurses regarding the HIV/AIDS to evaluate the prevailing conditions and gap so that policy measures can be taken to improve the knowledge,if there is a gap. Since health care professionals including nurses have the responsibility of educating people about the ways of HIV contamination, their knowledge regarding HIV/AIDs patients play an important role in communicating with patients[6].

The purpose of this study is to assess the knowledge of nursing students regarding HIV/AIDS.

Amongst the health care professionals, nurses and nursing students are an important component of the health care delivery system. Since they are the one who

are responsible for the constant care of in-patients and thus, they come in close contact with blood and other body fluids of patients. Due to frequent and prolonged contact,they are being identified as a potential risk group for the HIV/AIDS spread. To reduce the transmission, adequate knowledge about the disease and practice of safety measures are of great importance. Generating awareness regarding HIV/AIDS in this group is crucial for AIDS management and the prevention of HIV spread[7].

Methodology

Design of study: Descriptive cross-sectional study carried out to evaluate knowledge of students about HIV.

Setting of study: The study was conducted at university of Basrah college of nursing 2018-2019

Sample of study: Sample [150] from first, second, third and fourth stage of the college of nursing. Number of male [59] and female [91].

Study instruments: Structured questionnaire was used for data collection, consisted of two part:

Partone: Included demographic data [age, sex, type of study(morning or evening), residency (rural or urban), marital status, stage, to identify effect of demographic variables on students' knowledge.

Part two: Questionnaire was consisted of twenty multiple choice questions to evaluate knowledge of students about HIV. Right answer given 5 score and false answer given zero score. Data was analyzed by using SPSS statistics version 23.

Results

Table 1: Demographic characteristics of the study sample

Variables		Frequency	%
Sex	male	59	39.3%
	female	91	60.7 %
Stage	first stage	40	26.7 %
	second stage	33	22 %
	third stage	38	25.3 %
	fourth stage	39	26 %
Marital status	single	140	93.3 %
	married	10	6.7 %
Study type	morning study	91	60.7 %
	evening study	59	39.3 %
Residency	urban	70	46.7 %
	rural	80	53.3 %

The table (1) showed that the number of females were more than males(60.7%, 39.3% respectively). Majority of the samples was single(93.3%).Students from morning study were relatively more than students from evening study(60.7%, 39.3% respectively), rural and urban areas had a slight difference in number of students(53.3%, 46.7%). Only(24%) of students had good knowledge regarding AIDS(table 2).

Table (2):Students' knowledge regarding AIDS

Variable	F	%	Mean of score	Std. Deviation	p-value	Result
Good knowledge	36	24 %	37.64	10.035	0.000	significant
Poor knowledge	114	76 %	60.92	8.611		
Total sample =150		Mean of score =55.33		Std. Deviation =13.395		

Table (3): Relation between variables and students' knowledge regarding AIDS

Variables		Mean of score	Std. Deviation	p-value	Result
Sex	Male	55.93	13.566	0.661	Insignificant
	Female	54.95	13.344		
Stage	first stage	53.88	13.936	0.149	Insignificant
	second stage	54.55	13.132		
	third stage	59.61	13.968		
	fourth stage	53.33	11.994		
Marital status	Single	55.39	13.345	0.839	insignificant
	Married	54.50	14.804		

Variables		Mean of score	Std. Deviation	p-value	Result
Study type	morning study	54.12	13.976	0.169	insignificant
	evening study	57.20	12.327		
occupation	Urban	59.21	10.654	0.001	significant
	Rural	51.94	14.637		

When comparing the variables under study with knowledge, the result showed that there was no statistical significant difference between sex, stage, marital status and type of study butthere was a significant difference between students residency and knowledge (table 3). This difference may reflect the development in urban areas in terms of social and cultural communication, the Internet, the large number of schools, health centers, hospitals, and the multiplicity of occupations and businesses, as opposed to those in rural areas.

Table (4): Source of information regarding AIDS

Source of information	Frequency	Percent
Books and social media	83	55.3%
Schools & colleges	71	47.3%
Friends & family	42	28%
Heath care provider	20	13.3%

Books and social media were the major source of information for students about AIDS(55.3%)which can be used as a way to educate students about various diseases, where health care provider (13.3%) could not be consider as a good source of information for students (table 4).

Table (5): Students' answers regarding HIV

True and False Questions	Right Answer	Wrong answer
AIDS is considered viral diseases	143	7
AIDS Attacks Immune system	142	8
AIDS is transmitted by Sex with the infected person	132	18
HIV infection leads to joint pain	17	133
HIV infection leads to Swelling of the lymph nodes	18	132
HIV infection leads to Diarrhea	29	121

Table (5) showed that Most students knew that HIV / AIDS was viral, attacked the immune system and sexually transmitted. On another hand most of them did not know the signs and symptoms of the patient, especially: pain joints, swollen lymph nodes, and diarrhea .

Discussion

This study was done to assess the knowledge regarding HIV/AIDS among students of nursing college at Basrah University. In this study, it was found that main source of information among nursing students was Books and social media,followed by Schools and colleges. They got very less information from Heath care provider. This result reflects the weak role of health care centers in educating the community about the seriousness of the disease and its transmission.

Large proportion of students had misconception regarding symptoms and complications of the disease. In Iraq there is a kind of silence on the cases of AIDS for religious and social reasons, because of the disease is association with forbidden sexual relations which makes people believe that there are no cases.

Iraq is considered a country with a low level epidemic of HIV/AIDS. The prevalence of HIV in Iraq is currently less than 0.1% of population, but associated risk factors may increase because of liberalized trade relations and increased drug use. As of December 2014, less than 100 people living with HIV were reported. They were nationals and foreigners. 57% were infected by blood transfusion and blood products (WHO). Iraq faces greater HIV risks as a result of poverty,low literacy and inadequate knowledge of modes of transmission[2].

Nursing students should have adequate information about the disease because in future they will play important role in educating peoples and saving the life of patients and save themselves from infection.

Low knowledge regarding HIV/AIDS among nursing college students need national awareness programs.

Ethical Clearance: Approval to conduct the study was obtained from the dean of college of Nursing, University of Basrah.

Source of Funding: Self

Conflict of Interest Statement: Nil.

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Laser Technology in Prosthodontics: A Review

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Abstract

Laser is an acronym, which stands for light amplification by stimulated emission of radiation. Several decades ago, the laser was a death ray, the ultimate weapon of destruction, something you would only find in a science fiction story. Then lasers were developed and actually used, among other places, in light shows. The beam sparkled, it showed pure, vibrant and intense colors. Today the laser is used in the scanners at the grocery store, in compact disc players, and as a pointer for lecturer and above all in medical and dental field. The image of the laser has changed significantly over the past several years. With dentistry in the high tech era, we are fortunate to have many technological innovations to enhance treatment, including intraoral video cameras, CAD-CAM units, RVGs and air-abrasive units. However, no instrument is more representative of the term high-tech than, the laser. Dental procedures performed today with the laser are so effective that they should set a new standard of care. The scientific method and artistic details prescribed for reconstructive dentistry are well has been documented. The current use of lasers in reconstructive dentistry encompasses a wide variety of soft tissue procedures. The future may hold promise for hard tissue laser use in crown preparation, bone recontouring, and implant placement.

Keywords: *Laser beam, High tech era, Prosthodontics, Technology.*

Introduction

Laser is an acronym, which stands for light amplification by stimulated emission of radiation.[12] Several decades ago, the laser was a death ray, the ultimate weapon of destruction, something you would only find in a science fiction story. Then lasers were developed and actually used, among other places, in light shows. The beam sparkled, it showed pure, vibrant and intense colors. Today the laser is used in the scanners at the grocery store, in compact disc players, and as a pointer for lecturer and above all in medical and dental field. The image of the laser has changed significantly over the past several years.

With dentistry in the high tech era, we are fortunate to have many technological innovations to enhance treatment, including intraoral video cameras, CAD-CAM units, RVGs and air-abrasive units. However, no instrument is more representative of the term high-tech than, the laser. Dental procedures performed today with the laser are so effective that they should set a new standard of care. [3]

The scientific method and artistic details prescribed for reconstructive dentistry are well has been documented. The current use of lasers in reconstructive dentistry encompasses a wide variety of soft tissue procedures.[13] The future may hold promise for hard tissue laser use in crown preparation, bone recontouring, and implant placement. Laser use during soft tissue procedures for fixed, removable, and implant dentistry can enhance esthetics, improve impression outcomes, and provide a foundation for the restorative appliance nearer to ideal in fit, form, and function.

Underlying structures, such as the attached gingiva, gingival sulcus, epithelial attachment, periodontal ligament, and alveolar crest, are important and must be evaluated carefully. When sound principles are followed, the outcome of laser surgery provides a more predictable, improved foundation for fixed, removable, and implant dentistry.

Laser Physics: Laser is a device that converts

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electrical or chemical energy into light energy. In contrast to ordinary light that is emitted spontaneously by excited atoms or molecules, the light emitted by laser occurs when an atom or molecule retains excess energy until it is stimulated to emit it. The radiation emitted by lasers including both visible and invisible light is more generally termed as electromagnetic radiation. The concept of stimulated emission of light was first proposed in 1917 by Albert Einstein. He described three processes:

1. Absorption
2. Spontaneous emission

Stimulated emission: Einstein considered the model of a basic atom to describe the production of laser. An atom consists of centrally placed nucleus which contains +vely charged particles known as protons, around which the negatively charged particles. i.e. electrons are revolving. When an atom is struck by a photon, there is an energy transfer causing increase in energy of the atom. This process is termed as absorption. The photon then ceases to exist, and an electron within the atom pumps to a higher energy level. This atom is thus pumped up to an excited state from the ground state. In the excited state, the atom is unstable and will soon spontaneously decay back to the ground state, releasing the stored energy in the form of an emitted photon. This process is called spontaneous emission. If an atom in the excited state is struck by a photon of identical energy as the photon to be emitted, the emission could be stimulated to occur earlier than would occur spontaneously. This stimulated interaction causes two photons that are identical in frequency and wavelength to leave the atom. This is a process of stimulated emission. If a collection of atoms includes, more that are pumped into the excited state that remain in the resting state, a population inversion exists. This is necessary condition for lasing. Now, the spontaneous emission of a photon by one atom will stimulate the release of a second photon in a second atom, and these two photon will trigger the release of two more photons. These four than yield eight, eight yield sixteen and so on. In a small space at the speed of light, this photon chain reaction produces a brief intense flash of monochromatic and coherent light which is termed as 'laser'.

Laser in fixed prosthetics: Complete control of the oral environment at the operative site is essential during restorative dental procedures. This control extends beyond suppressing saliva and blood to managing the gingiva surrounding the teeth. Frequently, cases are encountered in which the gingival tissues need to be altered because of areas of inflammation, previous sub-gingival restorations, or sub-gingival caries. The finish line may need to be placed near the epithelial attachment, making it impossible to retract the gingiva without stripping the attachment, bruising the periodontal ligament, and creating uncontrolled bleeding.[14] Resulting hemorrhage in the gingival sulcus can make impression making impossible as well as healing unpredictable. In these cases, laser sulcular gingivoplasty can be used to develop a new, healthier gingival sulcus; to control hemorrhage; and to remove just enough epithelial attachment and periodontal ligament to facilitate the placement (not packing) of retraction cord. Laser sulcular gingivo-plasty improves impression techniques and minimizes gingival recession. They are alsoused where crown lengthening and are specified within esthetic zone that need attention to attain esthetic results. There are many causes of the unsuitable ponticsposition. The most common causes are inadequate compression of the buccal and the palatal/ lingual alveolar plates after an extraction and non-replacement of the missing tooth for a long time. such pontic sitemight result in unesthetic and non-self-cleansing pontic design. For such situations to have a favorable pontic design, re-contouring of soft and bony area may be required. They may be achieved by using soft tissue lasers and for osseous surgery erbium family of lasers may be used. Fixed restorations such as crown and bridge removal can be done without cutting using laser beams. The laser energy passes through porcelain glass unaffected that is occupied by the water molecules present in the adhesive. The debonding happens at the junction of the silane and the resin without causing any trauma to the underlying tooth.

Laser in soft tissue pre-prosthetic surgery: The key to successful removable prosthetics is the preoperative planning of the surrounding oral structures. The prognosis for success often is in direct proportion to the proper preparation of these supporting structures. Dentistry has come a long way from just replacing missing teeth to replacing lost alveolus, supporting facial structures, recreating esthetics, reestablishing phonetics, and, most important, providing retention of the appliance. For a removable appliance to accomplish this task, hard and soft tissues must be evaluated for pre-prosthetic surgery. The resultant surgery should provide the patient with ridges and mucosal coverings free of disease and of a quality and quantity sufficient to provide stability

and retention so that the appliance may function as close to ideal as possible. They areused to perform most pre-prosthetic surgeries. These involve hard and soft tissue tuberosity reduction, torus removal, and treatment of inappropriate residual ridges involving undercut and irregularly resorbed ridges, treatment of unsupported soft tissues, and hard and soft tissue malformation. They have been also used to treat the problem of hyperplastic tissue and nicotinic stomatitis under the palate of a full or partial denture and ease the irritation of epulis, denture stomatitis, and other problems related with long term wear of ill-fitting dentures. Stability, retention, function, and esthetics of removable prostheses may be increased by proper laser manipulation of the soft tissues and underlying osseous structure. Prosthetic problems may arise if maxillary tori or exostoses are large or irregular in shape these bony protuberances may interfere with the prosthesis,soft tissue lasers may be used to expose the exostoses and erbium lasers may be usedin case of osseous reduction. [11.] The most common cause for enlarged tuberosity usually is soft tissue hyperplasia and alveolar hyperplasia leading to overeruption of unopposed maxillary molar teeth leading to a then problem of construction of the prosthesis, such tissue hyperplasia's can also be cleared using soft tissue lasers

Advantages:

1. Laser surgery is precise and self-sterilizing because the tissues are vaporized.
2. It is relatively blood–less, because any blood vessel with a diameter less than the width of the laser beam will be vaporized and heat sealed.
3. It is relatively pain-free because nerves that are transected are also heat sealed by the laser beam
4. Postoperative edema and swelling appear to be minimal presumably because lymphatics are also sealed.
5. Laser wounds contract less than other types of wounds, possibly because fewer myofibroblasts are seen in the wounds and these cells are believed to be the etiologic agents in wound contraction.

Disadvantages:

1. Laser wounds have less tensile strength than scalpel wounds, although after 3 weeks the strengths are similar.
2. Although the laser beam is focused, it can potentially injure tissues that might be inadvertently contacted by the laser beam if the arm is bumped or slips.

The pre-prosthetic surgeries that can be performed most advantageously with a dental laser are the following[5]:

1. Soft tissue tuberosity reduction
2. Removal of labial, buccal, and lingual frena
3. Treatment of hyper plasia of the oral mucosa
4. Removal of fibromas, papillomas, or soft tissue cysts

Laser in implant dentistry: Implantology has been an area of considerable interest for dental application of laser technology. They are used for implant recovery, implant site preparation and detachment of diseased tissue around the implant.[4]An emphasis is placed on lasers which are available commercially in dentistry at the present time, carbon dioxide, neodymium-yttrium-aluminum-garnet (Nd:YAG), argon, and erbium:YAG[2]. Implant can be exposed, and impressions can be obtained at the same appointmentas minimal tissue shrinkage is seen after laser surgery.[10]

Procedure	Laser
Laboratory Procedure	
1. Welding of metallic implants	Nd:YAG
2. Welding of ceramic implants	Nd:YAG or CO2
3. Drilling of ceramic implants	Nd:YAG or CO2
4. Sterilization of implants	Not recommended prior to insertion
Clinical Procedure	
1. Preparation of bone	Not recommended
2. Implant exposure (Stage II)	CO2 or Erbium:YAG
3. Gingival surgery	CO2 or Erbium:YAG
4. Scaling and plaque removal	Not recommended

Laser in Maxillofacial Prosthodontics: The use of lasers in the maxillofacial prosthetics is used for the initial work up of the three dimensional addition of optical data oral defects. Usage of the Laser technology has showed to be useful for designing the shape and position of the prostheses. They can remove the need for conventional impression techniques and related disadvantages like distortion of the soft tissue and irritation to patients. They also overcome the disadvantages of 3D CT and MRI reconstruction as the patient is not exposed to considerable radiation and any stress.[9]

Science of holography: A hologram is a photographic film, slide, or plate upon which is recorded the interference pattern produced by the reinforcement

or cancellation of two different intersection light wave fronts. Holography is the science of recording the reflected light waves from an object onto a hologram and subsequently reconstructing the stored image of the object in the space where the original object had been. The terms holo, meaning complete, and gram, meaning message, give rise to the hologram or complete message [1].

The three-dimensional aspect of the hologram image is unique. Unlike 3-Dimensional stereoscopic slides the hologram, as a single slide, recreates the object's natural parallax effect in the image. Thus the viewer of the hologram, by changing his position, can see objects blocked by foreground objects-an important factor when recording images in an area as severely restricted as the oral cavity.

Laser holography: A laser is a device that generates and amplifies coherent electromagnetic energy at optical frequencies. One important application of the laser has been in the field of optical image storage and image reconstruction known as holography. The principle of holography was discovered by Gabor in 1948. when the laser light source was applied to holography in 1963 by Leith and Upatnieks, the practical application of holography became possible for three-dimensional recording of objects. [1]

Review of Literature

M.A. Pogrel et al (1989) described the ability of Co_2 laser to vaporize soft tissues with little bleeding, pain, swelling, or wound healing by evaluating the laser on 27 patients requiring soft tissue pre-prosthetic surgery, including frenectomies, tuberosity reduction, hyperplasia removal and sulcus deepening. And concluded that it had several advantages as follows: -

1. Laser surgery is precise and self-sterilizing.
2. It is relatively blood-less.
3. It is relatively pain-free.
4. Postoperative edema and swelling appear to be minimal.

M. Fentzen et al (1990) described that lasers are heat-producing devices converting electromagnetic energy into thermal energy. These lasers are used in oral surgery for cutting or coagulating soft tissues or in welding of dental prostheses. New types of lasers have offered non-thermal modes of tissue interaction, called photoablation, photodisruption and photochemical effects.

M. Midda et al (1991) described that clinical lasers are two types; soft lasers act as an aid in healing. Surgical hard lasers can cut both hard and soft tissues and replace the scalpel and drills. The most commonly used laser systems, are the argon, Co_2 and Nd:YAG systems. The Nd:YAG engine provides hand-pieces of similar size to conventional instrumentation and are being fed by a fibre-optic 'cable' for intra oral use. The Co_2 laser is widely used in oral surgery. The procedures with lasers can usually be performed without a local anesthetic and sterilizes the area as it cuts. Further more the Nd:YAG lasers can be used for caries removal, endodontics and gingival curettage.

Laurence J. Walsh et al (1992) described the unique interactions of particular laser wavelengths with tissues and restorative materials. There is no one laser, which is suitable for use in all laboratory and clinical procedures in the field of implantology. All lasers are capable of generating thermal effects, considerations should be given to the extent to which energy will be absorbed or reflected by the target material, injudious use of lasers can cause thermal injury to implants as well as to bone and soft tissue

Thomas. E. Gordon et al (1970) described laser welding of fixed and removable partial prostheses done on the master cast at energy levels ranging from 6 to 12 joules, with pulse length of approximately 4m secs. The inaccuracies in assembly caused by transfers from master cast along with investment and heat distortion are avoided and (laser-welded joints had strength compatible with the adherent strength of substrate metal). Anatomic form of the inter proximal region is not obliterated with maximum esthetic in the anterior section of the mouth.

Discussion

Lasers are an important aspect to dental treatment regarding contamination control, wound recuperating control, draining control and vibration control in hard tissue expulsion. Success in clinical uses of lasers depend on a firm premise of laser material science. Distinctive laser wavelengths are caught up in changing degrees by the real oral tissue parts in particular; water, hydroxyapatite, hemoglobin, and melanin. From the most reduced vitality conveyance to the most elevated. The possibilities for laser dentistry to upgrade for clinical steps in the dentist's ability is by controlling the power

output and the duration of exposure on both hard and soft tissues, permit for treatment of a highly particular area of focus without damaging surrounding tissues, he or she requires to fully understand the character of the wavelength being used, and the thermal inference & check of the optical energy.[8]

Conclusion

The dental community wants to find a method to remove infected dental hard tissues that is less noxious than today's rotary hand pieces. Much interest has been aroused in lasers as replacements.

Although there has been research done in laser dentistry since the development of the ruby laser in the early 1960s, only recently has clinical use grown. But with this growth, there hasn't been an equal flurry of research to substantiate the claim that the laser is a more efficient and better method of treatment for dental disease. Dental use of lasers can be divided into two areas soft-and hard tissue applications[8]. Researches have examined both areas using all existing lasers. These include the carbon dioxide, neodymium: yttrium-aluminium-gamet, argon, holmium: YAG, erbium:YAG and excimer lasers.

There is a quest to find a method to remove diseased and healthy dental hard tissues without the negative stimuli associated with dental hand pieces. Today, lasers are being considered as a potential replacement. Various reports evaluate thermal effects of three lasers. FDA approval for soft tissue removal has now been granted and thus procedures such as laser gingivoplasty, operculeutomy and frenectomy can be carried out without the use of local anaesthesia in a bloodless field. The combination of the laser's ability to sterilize, and in the case of Nd:YAG (and some other laser), to be transmitted along a fibre-optic cable opens up further areas of application.

The surgical carbon dioxide laser appears to have a number of potential advantages in soft tissue pre-prosthetic surgery that merit further exploration. It enables a number of procedures to be performed in the dental office quickly. The surgical carbon-dioxide laser has a number of claimed advantages over other modalities for soft tissue surgery. Many of these advantages appear to be particularly applicable for soft tissue pre-prothetic surgery. Because of this unique interaction of particular laser wavelengths with tissues and restorative materials. There is no one laser, which is suitable for use in all laboratory and clinical procedures in the field of implantology. Lasers are further being used for welding of prosthesis with better results.

Caution is required in interpreting the results of experimental or clinical reports. It is important not to prematurely assume the applicability of a particular treatment before sufficient evidence, substantiates both its safety and efficacy. It is also important to recognize the limitation of our current understanding of the long-term effects of laser energy on oral tissues and the mechanisms by which lasers affect biologic systems

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An Observation on Employee Performance Appraisal System in Hospitals and their Clinical Sectors

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Abstract

Health care and clinical research sector and their professional has become more involved in performance management as hospitals organize to increase their effectiveness towards various growth sectors. Although they are hospital employees specialized in their health care professions and research activities, they are subject to performance appraisals because the hospitals are accountable to patients and the community for the quality of hospital services and recent research activities. The necessity for having a performance appraisal program in hospital and researchers is to direct the employee's performance, motivate staff and improve hospitals self esteem growth. The performance of a health care professional may be appraised by the appropriate departmental manager, by other professionals in a team or program, based on prior consistency. Appraisal approaches may vary in different ranks. They include behavioral approaches such as rating scales, peer rating, ranking or nomination and outcome approaches such as management by objectives and their achievements. Yes, professionals should give and receive timely feedback on a flexible schedule. There are various parameters to measure the efficiency and capabilities of the employee and their dedication towards the organization. Where, in this article an attempt has been made to observe and study the Performance Appraisal systems in hospitals and their clinical sectors especially in Kanchipuram village and to offer suggestions for their growth and improvement.

Keywords: *Employees, Performance appraisal, Human resource management, Organizations.*

Introduction

Performance appraisal is one of the important components in the rational and systematic process of human resource management. The information obtained through performance appraisal provides foundations for recruiting and selecting new hires, training and development of existing staff, and motivating and maintaining a quality work force by adequately and properly rewarding their performance. Without a reliable performance appraisal system, a human resource management system falls apart, resulting in the total waste of the valuable human assets a company has[1].

The British Association of Medical Managers (BAMM, 1999) has defined appraisal as "the process of periodically reviewing one's performance against the various elements of one's job". Certainly this paper will describe the purpose & developmental criteria of an appraisal program that will regularly assess the performance of hospital employee[3].

Necessity of Performance Appraisal System in Hospital: The primary reason for having a performance appraisal program in hospitals is to monitor employee's performance, motivate staff and improve hospital morale. In the hospital, monitoring employee performance requires routine documentation, which is accomplished through completing a performance appraisal form[1]. When employees are aware that the hospital is mindful of their performance and they could be rewarded with increment and promotions, they will work harder.

Confidence is enhanced when employees get acknowledgment or reward for their work. A powerful performance appraisal program will help the hospital and assist in accomplishing its objectives and goals[2]. Not just, preparing necessities will be recognized and tended to amid performance appraisal survey; yet in addition concealed talent and approach to patients can be found too. Through distinguishing these preparation needs, staff can play out their positions at the great level and be in a superior position to address customers, individuals and clients concerns and questions[3]. A best and active staff is bound to be proactive, beneficial and ingenious,

all of which helps give the hospital an aggressive edge, from enhanced customer relations to expanded profits and benefits.

Who Will Appraise Performance?: Physicians, nurses, social workers, clinical pharmacists and other professionals often work interdependently to care for patients; but during performance appraisal, they have formal input into each other's appraisals[4]. As hospitals increasingly focus on care delivery processes, physicians may be appraised by other professionals who share the responsibility for patient care and outcomes. Ensuring the quality of medical care is the responsibility of both regulatory bodies and hospitals[7]. The way an organization is structured has a direct bearing on who conducts the appraisal. Hospitals generally use a combination of functional and, team or program approaches[5]. In a functional approach, professionals focus on performing their own functions under the direct supervision of one boss. Teams or programs comprise individual professionals who also belong to traditional functional departments[6]. In this case, however, professionals may have two supervisors - one in the department and one in the team or program.

What Performance Will Be Appraised?: Health Services Research Group (1992) wrote an article in CMAJ and reviewed the challenge of developing standards, guidelines and clinical policies as well as defining "quality" in relation to performance. Performance measures often include both process expectations (how the work gets done) and outcome expectations (the results of the process). Simon, L. (1992) suggested the following criteria to assess the performance of department head in the hospital: quality of service in the specific department, operational efficiency and effectiveness, and budget responsibility and accountability.

How Performance is appraised?

To date, health care organization literature on performance appraisal method has tended to focus on employee-employer relationships instead of the practitioner-organization interface. Although, in the new era, most of the doctors are not hospital employees, their performance will be examined in the light of the strategic direction of health care organizations. McAuley, R.G., Paul, W.M & Morrison, G.H. et al (1990) conducted a peer assessment program in the College of Physicians and Surgeons of Ontario that is mainly covering the office practices. Kilshaw, M.F., (1992) said that these programs are traditionally based on peer review and include a well defined committee structure involving medical staff representatives.

The specification of performance appraisal criteria is a recurring problem (Leatt, P. & Fried, B., 1988). One of the central issues is whether to evaluate traits, behaviors or outcomes of work. The trait approach, which is now outdated, evaluated such items as appearance, self confidence, alertness and ambition rather than job-related behaviors, productivity or quality of work.

The behavioral approach can be used in conjunction with peer evaluation. Three types of peer evaluation have been described: peer rating, peer ranking and peer nomination (Stone, T.H. & Meltz N.M., 1993). In peer rating, group members rate each other; in peer ranking, group members assign rankings to one another; and in peer nomination, each member of a well-defined group designates a number of group members as highest (and sometimes lowest) in an aspect of performance. The third type has been shown to distinguish with a high degree of reliability and validity group members whose performance is very good or very poor in the particular area (Kane, J.S., & Lawler, E.E., III, 1978).

Methodology

The study covered about 400 employees across 5 hospitals in Kanchipuram village sectors.

1. Meenakshi Medical College Hospital and Research Institute
2. Dr. Agarwals Eye Hospital Research center
3. Life care Hospital
4. Manohar General Hospital
5. CSI Hospital

These hospitals approximately suited with 500 to 1000 bedded multi-specialtyfacilities providing comprehensive care to patients - Gynecology, general medicine, general surgery, pediatrics, ENT division, Ortho, Anastasia, physic Therapy, Ultra Sound Scanning, Endoscopy, Urology, Nephrology, Rheumatology and others.

The data's were collected from employees through questionnaires which were based on random analysis and the sampling techniques. Discussions and informal interviews of the personnel revealed the first hand data.

This data collection method can come out with good quality data. Questionnaires was based on Cascio et al., (1988)

- Sampling Units: Employees of Hospital and senior employees
- Sampling Technique: Convenience and Judgment
- Sampling Research Instrument: Questionnaires and Interviews

Performance Appraisal Process in Hospitals: The performance appraisal system forms an essential part of the employee development process in any organization. It reflects the aptitude of an organization to define goals and expectations from employees. An upright and consequential performance appraisal process is essential for the hospitals prosperity and at the same manner it plays a significant role in bringing out the best in workers[8]. Salary revision following a performance appraisal is a great motivating factor and an upright performance appraisal process goes a long way toward reducing effectiveness rates.

The hospitals are applying 180 degree appraisal system. 180 degree performance appraisals mean that employees are appraised by two people (self and Boss/ Manager). The time interval for performance appraisal is six months to one year. The performance appraisal system holds up both employees and organizational management and leaders benefit from a well-structured performance appraisal system which helps to built successful organization. These systems offer feedback and rewards to employees who perform well, while at the same time holding employees accountable for their performance[9]. Where, each report will describe the purpose, benefits, and elements of a good performance appraisal system and outline a unique performance appraisal system for a human service organization.

The purpose of a performance appraisal system is to provide an evaluation and feedback on an employee's performance. Most hospitals perform appraisals yearly and may call the appraisal by other terms-such as a review. Even if appraisals are performed annually, management should have weekly consultations or meetings with staff to ensure each employee is kept up-to date with policies and each employee knows what is expected of him or her. A manager should not wait until the end of a year to let an employee know that there has been a performance problem for the last eight months[10]. Problems should be addressed as they arise to prevent any surprises during the appraisal process. The evaluation portion of an appraisal system is normally performed by management.

During this portion, management evaluates an employee's performance to determine if there are any areas that need improvement. Ideally, all employees should ne meeting or exceeding organizational standards[11]. If an employee is not meeting standards, or has not met standards at some point within the previous year, his or her appraisal may have suggestions for improvement or there may be other consequences as a result of poor performance.

The feedback portion of an appraisal systemnormally takes place between management and the employee who is being apprised. Then management provides counseling. But many of the employees don't understand the counseling purpose. So that should be in methodical and systematic manner. The main procedure for hospital is that first appraise fill the form, where they rate for themselves[12]. Appraise writes his view over the actual achievement for the task and target assigned to him. Comments on fulfillment of task and target are written by the HOD. Both appraise and HOD sits together. Comment over strengths and weaknesses and areas for development are written which is undersigned by both. Then compilation of ratio with the target is done. But the main problem occurs with this 180 degree performance appraisal is compilation, collation of data and it is time consuming process. This method is useful if done in a methodical and systematic manner.

Data Analysis:

1. Are you aware about your performance appraisal system or any evaluation done by your superior?
   a. Yes
   b. No
2. A performance appraisal technique makes you eligible for promotion, demotion and transfer?
   a. Yes
   b. No
3. Do you think performance appraisal is useful or just a waste of time?
   a. Useful
   b. Waste of Time
4. Does the proper and adequate performance appraisal play crucial role in your career development?

a. Very important

b. Important

c. Maybe in future

d. Useless

5. Performance appraisal system is most of the time fair and unbiased, is it right?

a. Yes

b. No

6. Does the organization provide counseling after appraisal?

a. Yes

b. No

Results

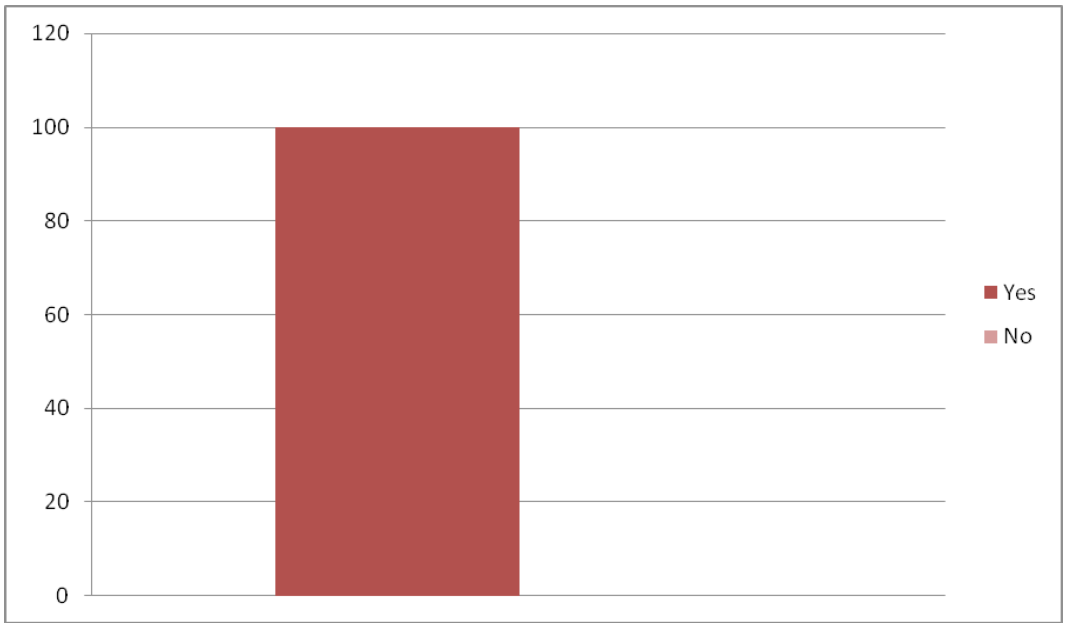


Fig 1: Shows that 100% employees among (400 out of 400)in the individual organization is aware about performance appraisal system and evaluation done by their superiors in the organization

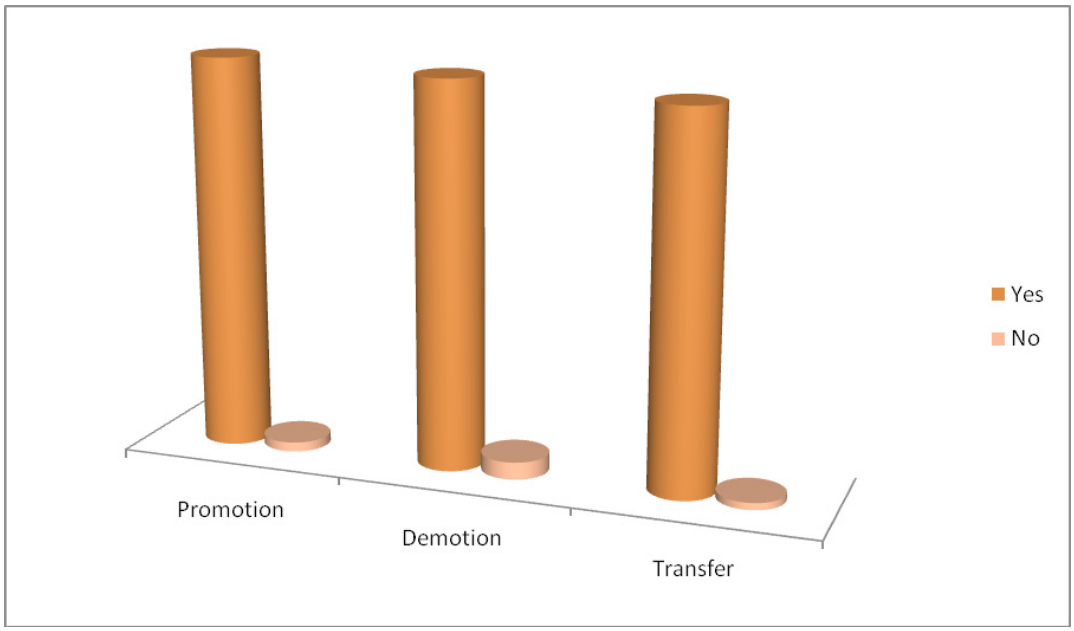


Fig 2: Shows that 100% employees think performance appraisal system in the hospital is more beneficial for promotion, demotion & Transfer.

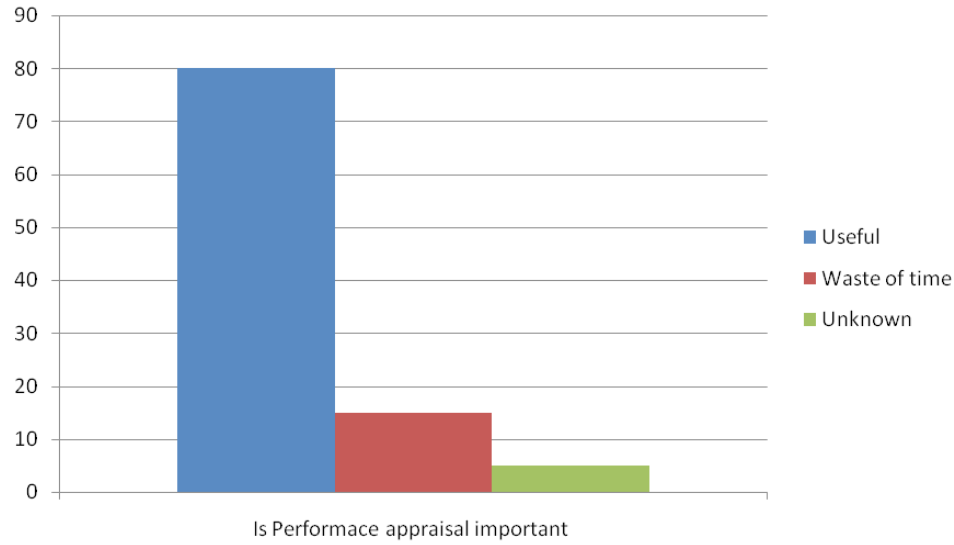


Fig 3: Shows that 85% employees think performance appraisal is useful.

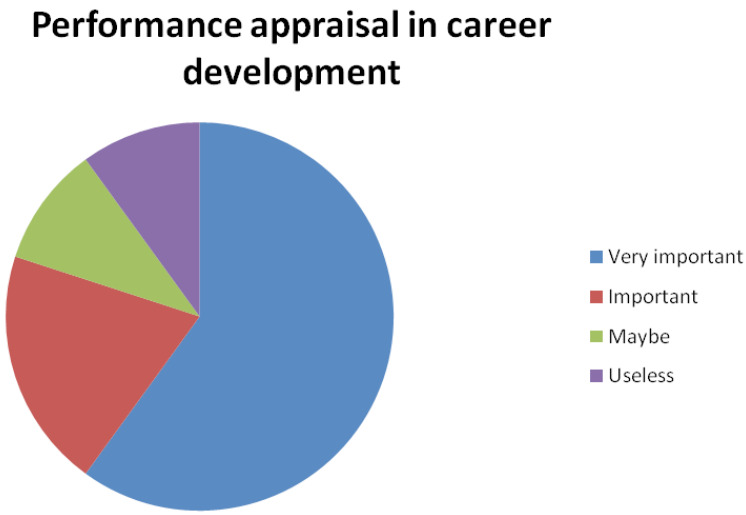


Fig 4: Shows that 60% employees think current performance appraisal plays a crucial role in career development. So there should be more improvement in performance appraisal system than current system.

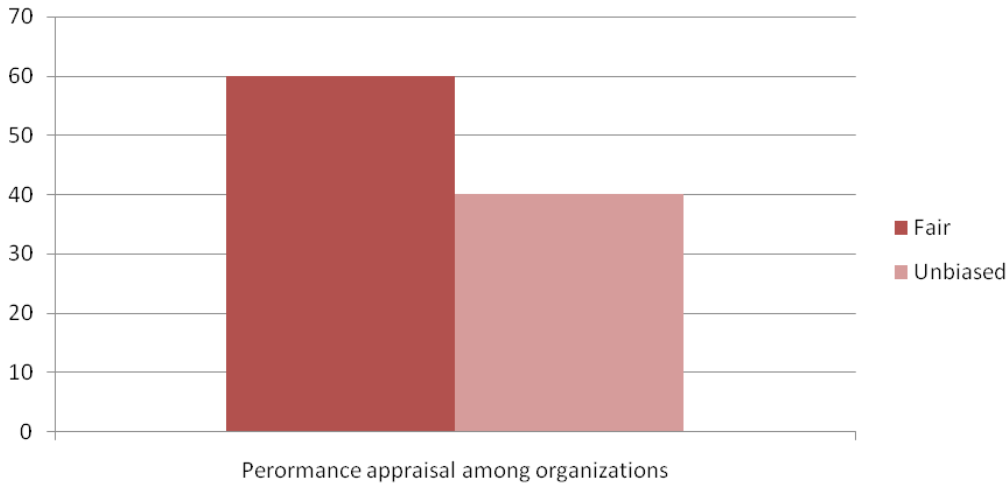


Fig 5: Shows that 40% employees think performance appraisal system is biased. So management has to take care of it.

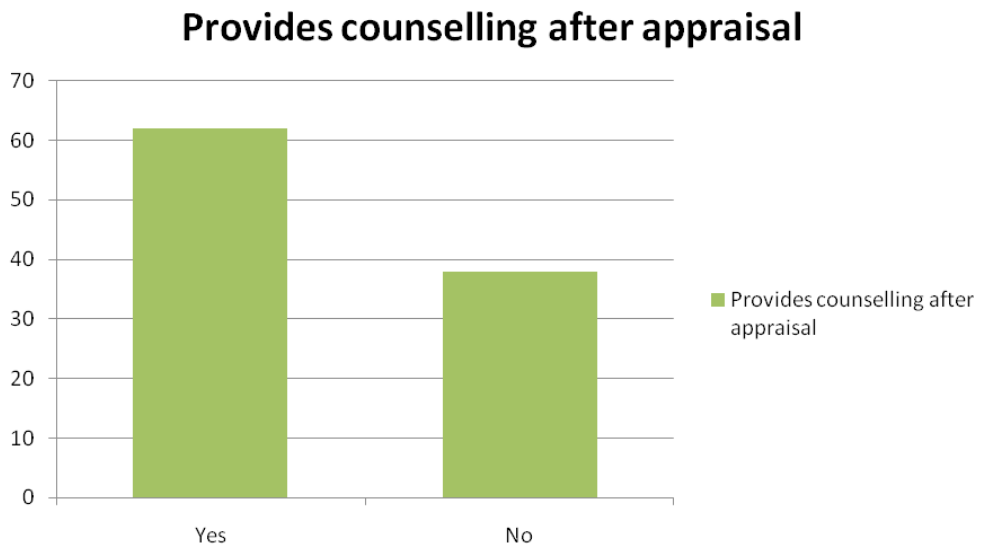


Fig 6: Shows that organization provides 62% counseling. But that should be formal so other employee also get counseling.

Recommendations:

- Performance appraisal should be transparent, timely and effective for employees.
- People should be made more understood about appraisal process and benefits.
- Performance appraisal should be 360 degree appraisal.
- They should provide appropriate training or counseling after appraisal.
- Employees should be given feedback regarding their appraisal. This will help them to improve on their weak areas.

Conclusion

Health care organizations and clinical research sectors depend greatly on a professional strategy; concerned with their effectiveness they must pay attention to employee and physician performance. For an essentials and effective performance system an upright thing should be followed up priory which preferably includes documentation, standard goals, practical and simple format, evaluation technique, communication, feedback and personal bias. The main challenges lies in developing performance appraisal systems are the demand of flexible and appropriate system to the professional staff. This paper has suggested that performance is improved when outcomes or expectations are defined, goals are set and timely feedback is given. These principles also apply to physicians, nurses and other staff of hospital, particularly as their roles are affected by the restructuring of health care.

Ethical Clearance: Since this article is on performance appraisal no need for ethical clearance.

Source of Funding: Self.

Conflict of Interest: Nil.

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Deciphering Learning Disability: Impact of Cueing Strategies on Academic Performance for Learners with Field-Independent and Field-dependent Cognitive Styles

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Abstract

The study has been undertaken to understand and evaluate the learning disabled students in schools and academic settings. They are mentally stable but face difficulties while reading, writing, mathematics, listening, speaking, and logical reasoning. It was expected and asserted that the successful design of instructional environments with enhanced computer technologies and visualization as educational tools should enhance their learning outcomes and sustain their level of performance in schools and professional careers bringing them at par with every other student with normal reflexive. Intervention with use of colour-highlighted keywords and colour-highlighted key phrases becomes essential to attack the root cause. The study proves the fundamental requirement of such strategies with the adoption of special educators reflected in their academic performance. It is noted that students with field-independent cognitive style tend to have the more exceptional analytical and differentiating ability as compared to field-dependent students who tend to view events without considering the details such as accepting an entire phrase without focusing his or her attention on the crucial information.

Keywords: *Learning disabled, cueing strategy, cognitive style, field-independent, field-dependent.*

Introduction

Learning inabilities will, in general, be analysed when youngsters arrive at school age, as it centres on numerous things that might be hard for kids perusing, composing, math, tuning in, talking, and thinking. As learning inabilities are not visible, they regularly go undetected. Distinguishing and perceiving a learning handicap is much progressively troublesome because the seriousness and attributes change. Restricted endeavours are seen by the educating authorities for the concerned populace to advance special education and related services, helping them to motivate these children to strive for excellence by empowering their positive miens, knowing their defects, understanding training framework, working with experts and finding out about methodologies managing specific challenges. As observed and experienced the need is to promote the successful design of instructional environments amongst school authorities with enhanced computer technologies, visualization as educational tools that surely enhance learning outcomes as well to support and sustain their school-level performance, success in professional careers. In certain circumstances as part of the inspection, teachers and parents notice that the child is not learning as expected, monitoring to reach to the root cause and exercising the best handling available. The urgent situation here is to sustain their school-level performance, success in professional careers at par with every other individual student with normal reflexive, yes this is what was seen to be lacking for the population of interest, as well as limited knowledge and efforts are made for the right support and intervention.

Understanding and evaluating the Learning Disabled [LD] students that lack behind in schools and academic situations yet are mentally stable but face difficulties while reading, writing, math, listening, speaking, and logical reasoning or otherwise is still widely needs to be promoted for the population concerned. Not only limited work is seen for LD students in India but also improper help and parental support deemed insignificant. The particular research justifies the role of special educators with an appropriate strategy, assistive technology such as absorbing words and phrases embedded within a computer screen full of information, the involvement of

supportive parents; as such a curing process necessitates help in continuation at home as well as in schools.

In this study, we briefly review the relevant literature on (1) main determinants of field-independent and field-dependent cognitive style of learning and absorbing information, (2) irrelevance of Intelligence Quotient (IQ), and (3) efficiency of cueing strategies and the role of special educators as an intervention to enhance learning outcomes. Combining these three strands of research in a systematic study for learning disabled students, that can be interpreted as suggestive evidence of improved learning response, in turn for helping them to motivate and strive for excellence by empowering their positive miens.

First, our empirical model caters to a large literature on the determinants of field-independent and field-dependent individuals, as they have different, preferred ways of gaining, storing, processing, and using information.[16] Every individual with a learning disability is uniqueand shows a different combination as well as the degree of difficulties. Uneven areas of ability come in many forms, and their effects are different from individual to individual. These individual differencesdo interfere with a person's ability to think and remember.

For instance, Davisreported field-independent cognitive competence and more significant restructuring skills makes them more adaptive in educational contexts, and their achievements are more valued within the educational setting.[17] Similarstudies have shown that field-independent learners are more successful than field-dependent learners when performing learning tasks that involve higher-order thinking skills, such as the restructuring of information.[181920]

Second, Intelligence is the ability to make profitable use of experience, there is no significant difference between healthy children and children with Learning Disabilities (U.S. Department of Education, 2001). On logical and empirical grounds, Intelligence Quotient [IQ] test scores are not necessary for the definition of learning disabilities as per (Linds S. Siegel, 1989). While assessing the mental level of children, coming from different environments, it was observed neither end of the cognitive continuum is superior in Intelligence.

Third, strategically designed environment with facilitating cues to pinpoint information which the memory retrieves are the essential task, on which the research intervention depends. The behavioural component and condition of the population (LD) characterize to search for information stored in memory. The strategy focused on external episodes of visual cues-colour-highlighted keywords and colour-highlighted key phrases and verbal cues - instructional driven, signal, feedback to focus the attention of learners with LD by providing cues for critical parts of the information. Brown mentioned that cues had been described as attention-directing techniques in research studies.[21]

Goldstein referred to cueing as "a type of rehearsal strategy that involves the presentation of a word associate (usually a category name) to be utilized for the retrieval of items in the recall".Researchers pointed to the limited functioning of working memory requiring learners to distinguish core and enrichment content by allocating more attention to the text components they perceive as most important, proved that instructional designers could assist by focusing on essential elements within the text.

Bloomdescribed various critical points about cues to assist educators, concluded that the advancement of technology could allow for different instructional method.[9] Researchers mentioned that understanding and learning from instructional text is a tough task that involves many cognitive processes, such as recognizing the words and identifying the valuable ideas within the text.[8,10,11]Gibsonstated that the ability of learners to distinguish the most crucial information within a text message and give it the proper attention is vital for successful academic achievement.[12]

Materials and Method

Study population, data and sample size: For the study, pre-diagnosed Learning Disabled [LD] students were taken into account. The team of Mental Health & Clinical Psychologist already made this diagnosis. The sample population for the study which screened for the initial evaluation was 200 LD students who were attending schools at Delhi/NCR India, of which there were 50 dropouts from the sessions due to exclusion criterion which was the interest of students to participate in the intervention. The prospective study eventually consists of 150 cases that were taken in the age category of 8-12 years that belonged to the LD population. Random sampling technique was used, and categorized depending upon their cognitive styles to have equal opportunity to get exposed to different cueing strategies. Counselling schedules and follow up sessions were conducted as needed to ensure unbiased collection of

observations and efficient outcomes while comparing them on experiment groups vis. Word (n=25), Phrase (n=25) and Control (n=25) for both cognitive fields dependent and independent. Priori sample calculation showed n = 25 for each group is quite good enough to determine large (Cohen's f) effect in the population with the power associated is > 80%, so that the observed sample reflects true effect in the population.

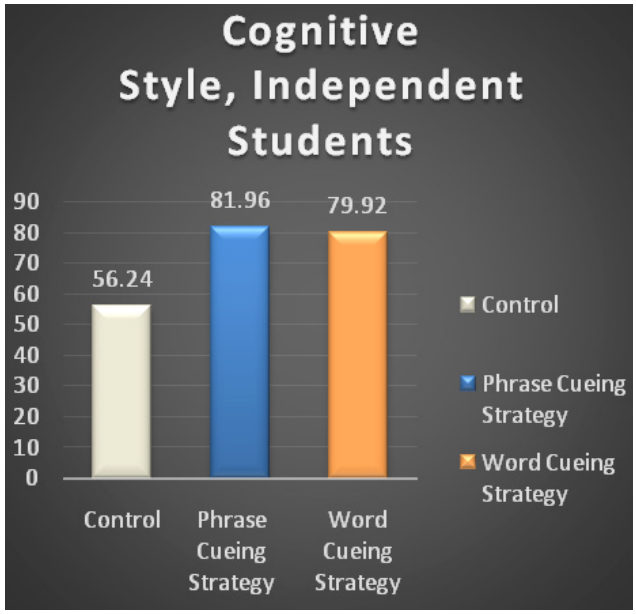
Scale and statistics: Assessment visit evaluation for the academic performance with the usage of word and phrase-based cueing strategy for the LD students visited, observed and completed evaluation for an observed duration of 10 months at schools in Delhi NCR, India, was performed using Between Group Analysis of Variance [ANOVA] for students with field-independent cognitive style students and likewise Non-Parametric Between Group ANOVA for students with field-dependent cognitive style accounts for improvement of students' academic scores for the respective follow up along with intervention. Systematic improvements in the field parameters are noticed with the corresponding magnitude of such effect in the population of interest. It was ensured that all assumptions made tenable before applying appropriate statistics and its validity.

Results

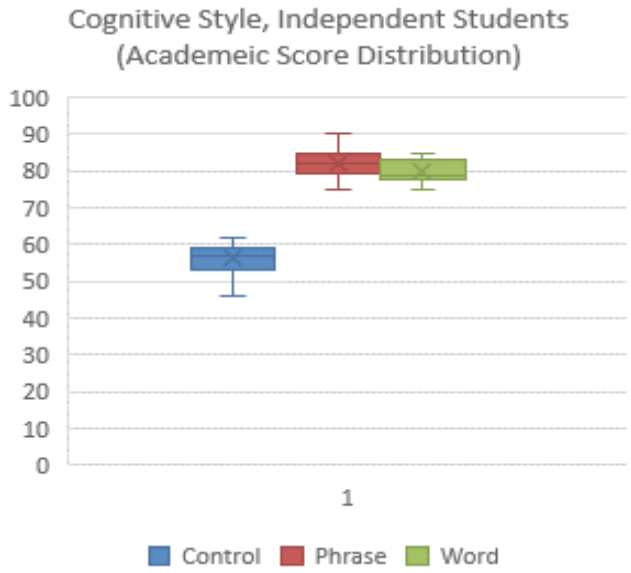
The field dependence-independence cognitive style dimensions are studied experimentally, forming case-control using cueing strategies as the intervention. Noticeably, students whose cognitive style is field independence tend to have greater analytical, absorbing and differentiating ability compared to field-dependent students.

For instance, the task assignment required absorbing words and phrases embedded within a computer screen full of information, and seemingly field-dependent learners ignored their attention to critical information; hence, they needed additional guidance. They have shown difficulty selectively attending to relevant cues, especially when they are presented with complex cues lacking attention on critical features of the information to be learned as an outcome - such an experimental design expected to reveal individual differences in performance particularly relevant in adaptive teaching.

Field-Independent Cognitive Style Students: Analysis of Variance Assessment: A one-way between-subjects ANOVA was conducted for Independent style student observations to compare the effect of cueing strategy on learning outcomes of the academic performance for word-based, phrase-based and control group. There was a significant effect of cueing intervention on enhancing learning at the $p<.05$ level for the three conditions [$F(2, 72) = 387.55$, $p = 0.000$]. Post hoc comparisons using the Bonferroni correction test indicated that the mean academic score for both the intervention group vis. word-based (M=79.92, SD=3.23) and phrase-based (M=81.96, SD=3.95) was significantly higher than the group of students with no intervention vis. Control (M=56.24, SD=3.67). The word-based cueing strategy had low post-academic value than the phrase-based cueing strategy which was statistically non-significant (M_{diff} = -2.04, 95% CI [-4.56, .48], $p > .05$) confirming that both these intervention strategies are equally effective to enhance learning outcomes. All together research experiment markedly ensures the competency of cueing strategy to enhance learning outcomes of the disabled students indicating that field-independent learners responded well to restructuring skills, memory processing (both short term and long term), analytical ability and well-organized teaching responses while processing information revealed in their post-intervention academic scores. Experimental manipulation is highly successful. The effect size for such a good fit model reported being 91.5%.

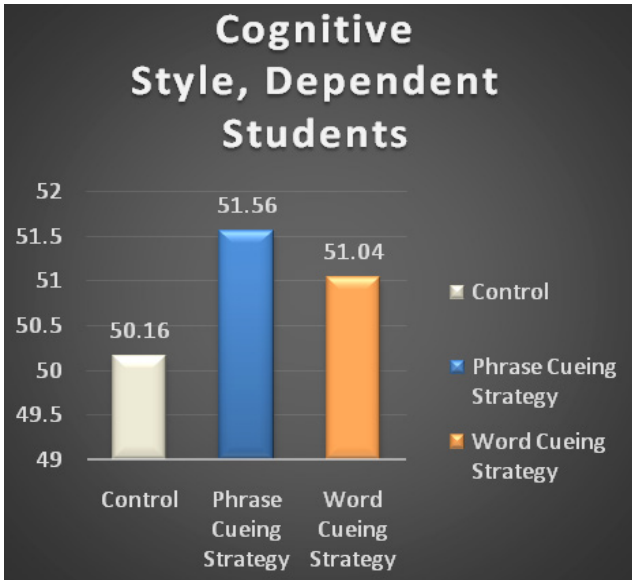


Graph 1: Illustrating academic mean response, after intervention for field independent students by randomized experiment manipulation groups

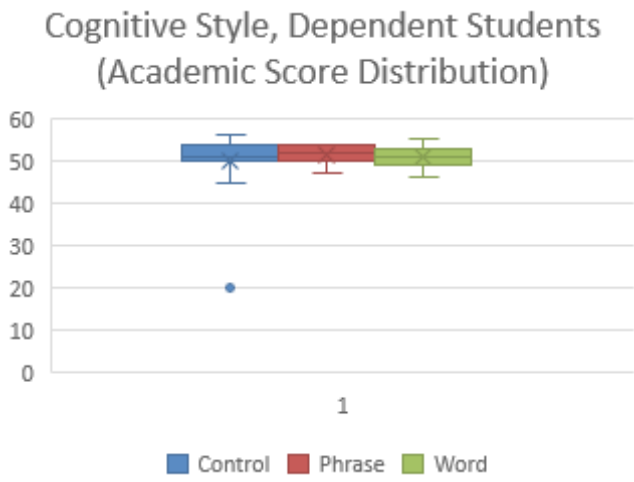


Graph 2: illustrating box and whisker distribution of academic scores after intervention

Field-Dependent Cognitive Style: Non-Parametric Analysis of Variance Assessment: Kruskal Wallis Test was conducted to examine the effect of cueing strategy on learning outcomes for the academic performance. No significant differences (Chi-square $\chi 2$ = .683, df=2, p = .711, >.05) were found, apparently Mean Ranks of post intervention academic scores are equivalent across groups: Control (38.52) ≈ Word (35.26) ≈ Phrase (40.22) possibly lacking to memorize, process, structure and organize information for the type of population under study.



Graph 3: Illustrating academic mean response, after intervention for field dependent students by randomized experiment manipulation groups



Graph 4: Illustrating box and whisker distribution of academic scores after intervention

Discussion and Conclusion

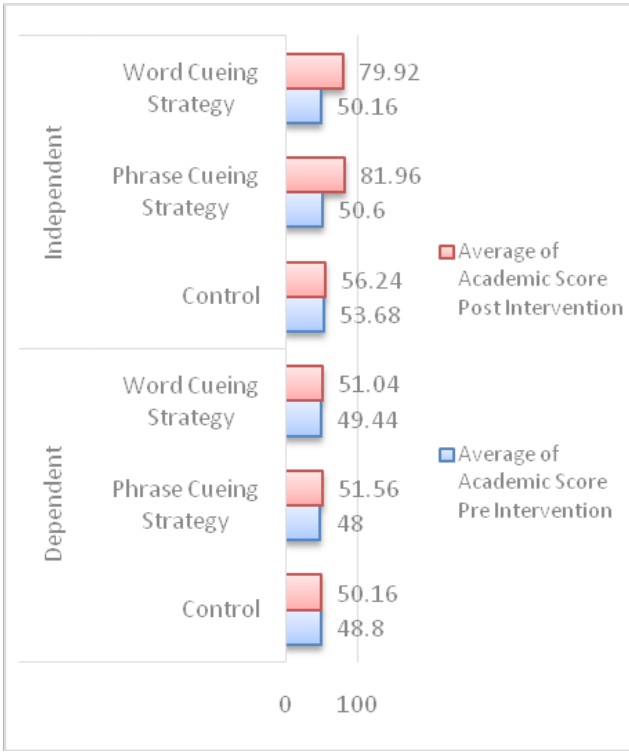
The study aimed to support children with learning disabilities by encouraging their positive dispositions, knowing their flaws, understanding education system, working with professionals, and learning about strategies dealing with specific difficulties. A student looks perfectly healthy and seems to be a very bright and intelligent yet may be unable to demonstrate the skills level expected from someone of a similar age. Such hidden parameters can be figured out, cured and fixed, but not by conventional ways of teaching. Identifying and recognizing a learning disability is even more difficult because the severity and characteristics vary.

It was observed that independent students are active in processing information, analysing existing information even when it lacks an apparent or inherent one focus their attention on task-relevant exercise, and ignore distractions better than field-dependent individuals. The difference lies in terms of restructuring skills where psychological domain, social domain, and learning context play an integral role. At circumstances, it was realized dependent students are passive in perceiving information, taking a spectator approach to concept attainment and accepting the structure of a field as it exists. They tend to perceive information in an interconnected manner, are less flexible in their search strategies, and have a difficult time attending to relevant cues.

Accounting for individual differences and the effect of cueing strategy revealed that independent students were to have more of both short-term and long-term working memory, better able to access and process

information, similar characteristics in the population concern reported by various authors.[282930] Dissimilar features noticed for dependent population students were less attentive owing to their sensitivity nature, while solving academic task they pick up most essential or noticeable portion only, used more time (trouble attending to the relevant part of a visual cue) in addition tend to ignore texture of an intricate part as were found to be less flexible in their search strategies, making more errors, easily distracted by unrelated information. Similar observations were there in the previously done researches.[16,17,18,19]

Holding unique advantage in terms of cognitive restructuring skills, the research experiment showed parallel results wherein the academic performance for the independent cognitive style were statistically significantly higher in both the intervention groups i.e. phrase cueing intervention (Mdiff = 25.72, 95% CI [23.20, 28.24], $p < .000$) and the word cueing intervention (Mdiff = 23.68, 95% CI [21.16, 26.20], $p < .000$) vs. the control but contrarily for field-dependent, the experiment returned insignificant involvement, in support.[20]



Graph 5: Cueing strategy effect after intervention, independent vs. Dependent cognitive style

With hard work and proper help, children with learning disabilities can learn more efficiently and successfully, assistive technology, such as absorbing words and phrases embedded within a computer screen full of information, can facilitate many students work around their learning disabilities, it is crucial to bear in mind that a child's learning disabilities need help in continuation at home as well as in school.

In closing, field-independent learners outperformed field-dependent learners when presented with cueing strategies containing colour-highlighted-key words, colour-highlighted-key-phrases because of their better short and long-term memory route, leading to more efficient learning responses thus enabling them to restructure, and apply analytically very well.

Unexpectedly field-dependent learners failed to show success, no sufficient evidence detected for the type of population under study possibly lacking to memorize, process, structure, and organize information. As a way forward need exist to innovate and bring in new ideas as a new approach to find out the best enhancing (learning) strategy for this class of students.

Conflicts of Interest: Authors declare no conflict of interest.

Funding: Self

Ethical Clearance: This study was based entirely on the interest of the child to participate. Formal permission was taken from the parents and schools to conduct research procedures. Control group of students were provided with extra curriculum sessions for the respective follow-up.

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Electronics and Communication Engineering, Koneru Lakshmaiah Exploring the Role of Hatha Yoga in Altering Dispositional Mindfulness

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Abstract

The present research study was an intervention study conducted to elucidate the effects of different Hatha yoga practices on dispositional mindfulness among young adults not characterized by any clinical condition. 280 participants were assigned to three different Hatha yoga intervention groups and a control group for duration of three months. Baseline and post interventions cores for mindfulness were recorded for all the four groups using the Five Facet Mindfulness Questionnaire. Data was analyzed using analysis of covariance for measuring the mean difference between-groups. A highly significant difference was observed between groups on the ability to observe and describe emotions/inner experiences and act with awareness, all of which are positive indicators of dispositional mindfulness. Analysis of*t*-test revealed maximum significant and positive change in dispositional mindfulness in the combined intervention group of yoga asana and pranayama and meditation, followed by the pranayama and meditation group and the yoga asana group, respectively. Findings reinforce Hatha yoga as a significant predictor of dispositional mindfulness and further contribute to the insufficient literature examining the psychological benefits associated with Yoga among adult masses with no specific clinical condition. It further suggests employing stronger interventional research designs and a mixed-method approach for in-depth assessment of participant experience to accurately evaluate the benefits associated with specific yoga practices and their effects on dispositional mindfulness.

Keywords: *Hatha yoga, mindfulness, FFMQ,clinically healthy adults.*

Introduction

This research is intrigued and inspired by the growing emphasis on Yoga in the effective management of mental health problems and as an aid to improve mental health status.[6,16] Much awareness and popularity is witnessed among the clinically healthy populationtoadopt Yoga as a medium for advancing health standards, preventing health-related issues, and as a spiritual pursuit. Research identifies Yoga as an integral component of mindfulness-based interventions.[24] Empirical efforts in relation with investigating the effects of yoga-based interventions on mindfulness among young Indian adults have largely targeted an audience characterized with specific conditions associated with aggression[2,4], stress[11], emotional regulation[17], memory and concentration[5], clinical conditions[15], thereby, creating a need to understand the effects of Yoga on dispositional mindfulness among young adults recruited in an intervention without the basis of a clinical condition. Sizeable research efforts in the previous years have been vested into examining Yoga in relation to mindfulness as a single measure.[20] However, a noticeable gap has been identified in literature addressing how Yoga affects different facets of mindfulness independent of each other. This research investigation was conducted with an aim to examine the association between Hatha yoga and the five facet construct of mindfulness.[1] Along with endorsing mindfulness as a multidimensional construct, this study also intended to examine a greater need of its individual subcomponents– observing of emotions/inner experiences, describing of emotions/inner experiences, acting with awareness, non-judging towards emotions/ inner experiences and non-reactivity towards emotions/ inner experiences as critical aids in mental health

promotion among young adult masses characterized with no specific clinical condition.

Materials and Method

Aim: To examine the difference in effects of Hathayoga practices on five facets of mindfulness among young adults characterized with no specific medical condition.

Objectives: To investigate the mean difference between groups– (I) yoga asana (II) pranayama and meditation (III) combined intervention of yoga asana and pranayama meditation, and (IV) control groupafter 3-months of intervention.

Hypotheses: It is hypothesized that Hatha yoga will play a significant role in enhancing the subcomponents of mindfulness. Further speculations are made that the intervention group III will exhibit most significant and positive effects on five facets of mindfulness as compared to intervention groups I and II, as a result of a composite, more advanced, and systematically designed approach.

Participants: Study recruited 280 participants aged between 25-35 years and selected as a result of convenience sampling. Participants were divided into Intervention Groups (N=210) and Control Group (N=70). The intervention groups were further subdivided into three groups with equal number of participants (70 each), in order to study the difference in effects of three different Hatha yoga interventions– (I) Yoga Asana, (II) Pranayama and Meditation, and (III) Yoga Asana + Pranayama and Meditation. The Control Group (IV) comprised of participants who were not actively engaged in any form of mind-body-spiritual practices or physical exercise. The premises was the intervention Morarji Desai National Institute of Yoga, New Delhi.

Interventions:

Yoga Asana: The intervention schedule was designed for a period of 3-months with 3 days in a week. Everyday module included theory as well as practical ranging between 2.5-3 hours on an average. The content of theory and practical was evenly distributed and covered over the intervention period.

Pranayama and Meditation: The intervention schedule was designed for a period of 3-months with 3 days in a week. The everyday module included theory as well as practical ranging between 2.5-3 hours on an average. The content of theory and practical was evenly distributed and covered over the intervention period.

Combined Intervention: This intervention incorporated a combination of both, yoga as an as well as pranayama and meditation. The intervention schedule was designed for a period of 3-months with 6 days in a week. This group was given the yoga as an a intervention for 3 days and the pranayama and meditation for 3 days. The module for each day included theory as well as practical ranging between 2.5-3 hours on an average.

Instrument

Data was collected using the preliminary information form standardized by the institution and the Five Facet Mindfulness Questionnaire (FFMQ).[1]

In order to test the hypotheses, the measurement of following dependent variables was required:

1. Observing of Emotions/Inner Experiences
2. Describing of Emotions/Inner Experiences
3. Acting with Awareness
4. Non-Judging towards Emotions/Inner Experiences
5. Non-Reactivity towards Emotions/Inner Experiences

Data Analysis: Data analysis was performed using SPSS 24.0. The analysis involved computation of means and SD. The mean difference between-groups was calculated through ANCOVA along with the effectiveness of the interventions which was ascertained using Paired t-Test.

Results

The results obtained upon analysis of covariance indicated an overall significant difference between groups on the facets of '*Observing'* ($F=4.93$, $p<.01$), '*Describing*' ($F=2.68$, $p\leq.05$), and 'A*cting with Awareness*' ($F=3.30$, $p<.05$), with their corresponding pretest scores used as covariate.

Table 1: Pairwise Comparisons of Post Adjusted Means

Dependent Variable	(I) Groups	(J) Groups	Mean Difference (I-J)	Sig.b
Observing	4	1	-1.13**	0.00
		2	-1.02**	0.01
		3	-0.96*	0.02
Describing	4	1	-0.27	1.00
		2	-0.6	0.12
		3	-0.62	0.09
Acting with Awareness	4	1	-0.43	0.54
		2	-0.67*	0.05
		3	-0.70*	0.04
Non-Judging	4	1	0.33	1.00
		2	0.50	0.70
		3	0.67	0.21
Non-Reactivity	4	1	0.73	1.00
		2	-0.47	1.00
		3	-0.40	1.00

*Significance at 0.05 level, **Significance at 0.01 level

Table 1 presents the post hoc pair wise comparison of adjusted means, indicating a significant difference between each of the intervention groups and the control group for '*Observing'*. A significant difference was also observed between intervention groups II and III and the control group on '*Acting with Awareness*'.

Table 2: Mean Differences within Groups Post Intervention

Representing t-Test for Mindfulness									
S. No.	Pretest-Posttest	IG-I (YA) (N=70)		IG-II (PM) (N=70)		IG-III (YA+PM) (N=70)		CG-IV (CG) (N=70)	
		t	Sig.	t	Sig.	t	Sig.	t	Sig.
1	Observing	2.14	0.04	2.24	0.03	2.18	0.03	1.75	0.08
2	Describing	1.37	0.18	1.94	0.06	2.28	0.03	0.45	0.65
3	Acting with Awareness	2.24	0.03	2.29	0.03	2.40	0.02	1.22	0.23
4	Non-Judging	2.01	0.05	2.35	0.02	2.58	0.01	0.38	0.71
5	Non-Reactivity	2.05	0.04	2.12	0.04	2.30	0.02	1.31	0.19

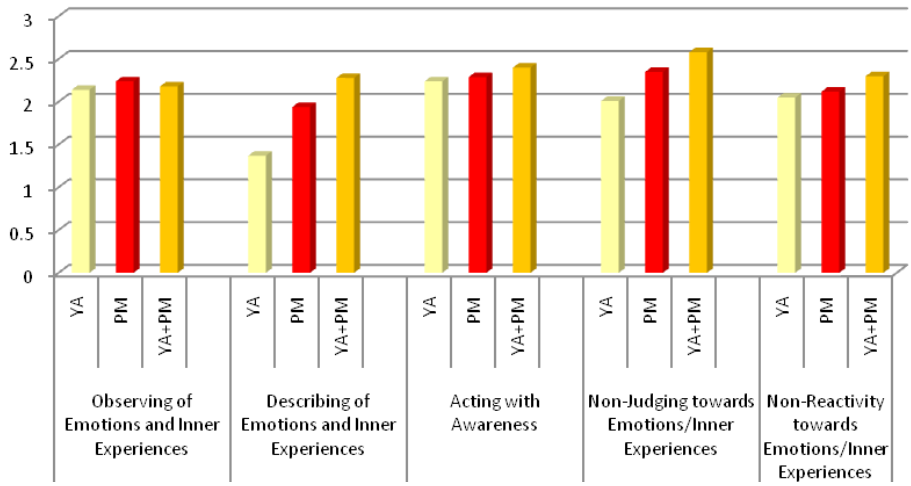


Figure 1: Graph Representing Effects of Intervention in Intervention Groups

Table 2 and Figure 1 validate the speculations made for the group III, wherein findings for within-group difference indicate that this group exhibited greatest significant difference and scored highest on four out of five facets of mindfulness followed by group II and group I, respectively.

Discussion

Analysis of covariance indicated a significant effect on the mean difference between intervention groups on observing emotions/inner experiences, describing of emotions/inner experiences, and acting with awareness post intervention. A common trend is observed across the findings of observing emotions/inner experiences, describing emotions/inner experiences, and acting with awareness, with the intervention group II experiencing most considerable positive change, followed by the intervention group I and III, respectively, in comparison to the control group.

Practices of pranayama and meditation operate primarily on the mind principle to conquer mental processes under voluntary control through the practice of concentrated attention and awareness[23], reinforcing a more significant role of mental faculties in practicing mindfulness. This claim was later reinforced by examining that pranayama and meditation involve greater voluntary control of mental capacities[3] necessitating concentrated breath control, centering of attention on bodily sensations, maintenance of posture, and guided instructions at short intervals; aiming at elevating deeper states of consciousness by reassessing the state of mind[12] and heightening mindfulness.[19] Yogasanas, on the other hand, are a balanced blend of effort and ease, which teaches one to put in efforts to get into a posture, experience relaxation in that posture, and try to detach from the result.[13] They operate on gross body level and are more than just mere physical exercises and a fundamental medium for a deeper understanding of mind and body.[14] Every movement of the body has a direct correlation with the way mind responds to it.[14]

A gain in mean scores of observing emotions/inner experiences after the interventions of pranayama and meditation and yogasana respectively, is attributed to the principles on which these practices operate. Pranayama and meditation are advanced practices with potential to lead to positive effects on observing inner experiences.[21] Yogasanas involve equal engagement of mind and body on the premise of shaping the physiological state of the body to regulate emotions, thoughts, and attitudes[10], thereby maximizing the ability to observe internal and external experiences.

Describing of emotions/inner experiences refer to being able to explain inner experiences in words or label them.[1] Participants reported guided meditation practice in playing an instrumental role in enabling them to reflect upon the experience of different thoughts and emotions and in allowing them to flow freely without fixating the mind on them. Obtained findings are supported with earlier research suggesting a positive impact of yoga and meditation on cognitive functionality.[22] Meditation has reportedly led to a significant decrease in cortisol[7], a hormone which is responsible for having a quietening effect on mind. Lower pace of processing equipped the participants with an increased ability to differentiate between positive and negative affective states, which in turn helped them to attain clarity in thought and be able to identify and label their feelings and experiences with great ease. Active inhalation and exhalation during yogasanas and meditation have the potential to lead to significant structural changes in orbitofrontal and hippocampus regions in brain[8], larger volumes of which may account for positive emotions, retention of emotional stability, and engagement in mindful behavior.[39] Regularity in these practices accounts for habitual changes among practitioners. Research findings indicate an increase in levels of oxygen and serotonin after practicing yogasanas, agents which are chief contributors in channelizing the mind towards experiencing higher positivity, emotional stability, calmness[18], and organization in thoughts.

Obtained findings indicate significant positive effects on acting with awareness, suggesting greater control over thoughts and maximized attention towards the moment in hand after engaging in yoga. Participants reported feelings of a mental slow down post intervention allowing them more time for conscious engagement in everyday actions and self-reflection. This finding may be supported with a research investigation regarding yoga as a complex blend of physical, moral and spiritual practices aiming at attaining self-awareness and working on activating the inner energies to reduce the pace of mental activity, thereby leading to a clear state of mind.[9]

Results of the study add to strength of association between yogasana, pranayama, and meditation, and components of dispositional mindfulness among young adults with no specified clinical condition. Obtained

findings may substantively support yoga-based controlled trials investigating the difference of effects between clinical and nonclinical population groups. A significant chunk of research in mindfulness has examined it as a single overarching construct, with less emphasis on investigating its subcomponents independent of each other. This investigation intended to bridge this gap by studying the five facets of mindfulness in relation with Hatha yoga to find them as independent yet interacting.

Implications: This study implicates adopting a more qualitative approach, such as a well-designed interview method, in gathering knowledge about participant experience after engaging in mind-body-spiritual practices. Considerable research initiatives have been undertaken in support of the health benefits associated with aggregated practice of yogasanas, pranayama, and meditation. Yet the results seem less conclusive of which one would be more favorable. Therefore, this study implicates stronger interventional research designs to provide in-depth insight into benefits associated with specific yoga practices. The study suggests further research incorporating and exploring the effects of extrinsic variables such as length of practice, time of practice and consistency in teaching instruction on psychological components, as these factors are integral to the success of a yoga-based intervention.

Source of Funding: Nil

Compliance with Ethical Standards:

Conflict of Interest Statement: Nil

Statement of Ethics and Human Rights: All procedures performed in studies involving human participants were in accordance with the ethical standards of Amity Institute of Psychology and Allied Sciences and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Ethical clearance was received by the research ethics committee of Amity Institute of Psychology and Allied Sciences, AUUP, before commencing the study.

Statement of Informed Consent: Informed consent was obtained from all individual participants included in the study.

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An Analysis of India's Public Health Expenditure and Economic Growth

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Abstract

Health expenditure is considered as an investment, because its returns result in building a strong human capital, which serves as a crucial lever of economic growth. Public health expenditure in India is affected by population and the GDP (1). The main aim of this paper is to ascertain the relationship of India's health care expenditure with its population and GDP growth rate between 2009-10 and 2016-17 and also to analyze the annual growth rate of these economic factors using a trend line. To analyze the health care expenditure in comparison with population and GDP, the multiple linear regression models was used. The finding of the study shows that there exists a linear relationship among public health expenditure, population, and GDP. The trend line of the annual growth rates shows that allocations for health care expenditure are decreasing but the population and GDP are increasing. India's health spending found to very less when compared with America, England and China.

Keywords: *Health Expenditure, GDP Growth Rate, Annual Growth Rate, Population and Multiple Linear Regression Model.*

Introduction

An important determinant of a nation's economic growth and the health of her population is public health expenditure (1). Expenditure allocated predominantly by the government for improving the health status of her people is defined as health expenditure. Government spending on health includes rural and urban health services, medical education, research and training programs, on various health schemes, and health insurance programs. Health expenditure is considered as an investment, because its returns and result in building a strong human capital, which serves as the crucial lever of economic growth(2). In India, health care expenditure as a percentage of its GDP is highly unequal when compared to developed countries. The USA, Russia, and China spend more than 10% of their GDP on health care. In 2018, India spent only 1.02% of its GDP on health care, which is even lower compared to what the low-income countries. The total expenditure on health for the year 2014-15 was Rs. 1.121 lakh crores, which was 0.9% of the country's GDP and it increased just to 1% in 2017. When government spending on health care is low it means that people incur significant out-of-pocket to maintain their health. The government needs to step up its expenditure to reduce the financial burden of medical care of her people. Data from India, Pakistan, Bangladesh, and China suggest that when the government increases its health care expenditure, the GDP growth rate shows a positive trend (3). Empirical studies conducted in several developed countries showed, that changes in population or GDP growth rate will have a considerable impact on health care expenditure (4). In India, the health care expenditure hasn't gone much beyond 1% of GDP, even after the liberalization of the economy in 1991. This suggests that as an emerging economic power, appropriate measures have not been for the future growth of the economy in India.

India's Health Expenditure and GDP Growth: India is one of the emerging economies showing

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significant growth in both population and GDP [5]. India's public spend on health is very low, when compared to low- and middle-income countries. It is also five times lower than the world's average. During the first five-year plan of 1951–56, the total plan outlay was Rs.1960 crores, out of which Rs. 65.2 crores was allocated to the health sector. When the allocation is compared between the pre-liberalization and post-liberation periods, it has only marginally risen from 0.22% of the GDP in 1950–51 to 0.96% in 1990–91[6]. After the liberalization period, it declined from 0.96 % in 1990–91 to 0.91% of the GDP in 2003-04. After a three-year gap, in 2006-07, it again narrowly increased to 1.03% of the GDP. Even after the economic reforms in 1991, health care expenditure touched a peak of only 1.02% of GDP in 2018, which is lower when compared with low-income countries.

Health forms one of the key elements of economic development [7]. The first national health policy was introduced only in 1983 in independent India. The allocation for public health was Rs. 2569.93 crores in 2000–01 and Rs. 21,635.6 crores in 2011–12, showing the government's keenness to increase steadly. In 2016–17, the allocation went up to Rs.1,80,656.77 crores. This effort is reflected in the enhanced per capita health expenditure of the individual from Rs.1058 in 2000–01 to Rs. 3068 in 2011–12. These data indicate that allocation for health care as percentage of GDP in the near future would be at a least proportionate level.

The average annual growth rate of per capita health expenditure was 9.28% between 2001 and 2012. The percentage share of public health expenditure in the total social service expenditure of the country in 2000 – 01 was 13.65%. In 2002 – 03, it fell by a slim margin to 13.42%. In 2006–07, this figure reached 18.9%, which was the highest proportion out of social service expenditure by the government. But, it slipped to 17.4% in 2011–12. For the past two decades, which was 1% to 2 % of the GDP, makes it challenging for the government to achieve the World Health Organization's (WHO) millennium development goals [8].

Developed countries like Australia and England allocate more than 6% of the GDP on health care expenditure. China stands first among the Asian nations in terms of allocating a higher percentage of GDP in the last two decades [8]. Recently, China has reduced its public health spend as a percentage of GDP due to the steady increase in the health status of her people. India has increased in the past two decades, but it's still lower than China. Pakistan and Bangladesh lag behind India in allotting funds for health care and have to focus more on their public health care spends [8].

Countries with a high level of public health expenditure have achieved better health outcomes when compared with the countries having a low level of public health expenditure. Health care expenditure and population are the two measurable indicators of economic growth rate; an increase in the health care expenditure boosts economic growth [9]. Positive economic growth in a country has made her people better off with higher income. The health care spend plays a major role in the economic development of the country by making the population healthy which translates into higher total productivity. Healthy people can act more productively and earn higher income thereby increasing the efficiency of the country's human resources.

To know the effect of economic growth on health, economic indicators like health care expenditure, population, and GDP have been used. Other social factors like health care inequalities and income are required to be investigated deeper to arrive at a strategy to improve the economic growth rate [10]. Long-term studies done taking into account the enhancement of lower level to higher level health care expenditure have revealed significant gains for economic development. As the average spending on health services a percentage of GDP is found to be low and declining over time in India, it is not a healthy indicator for progressive development of the country.

Concrete empirical studies have stated that a positive trend in health care expenditure depends on the country's GDP, population growth rate, health sector infrastructure, and the health system [10]. Moreover, it is crucial for the emerging economy. But appropriate measures have not been taken and there is a lack of focus in India with regard to public health care expenditure considering the future growth of the economy.

The government has not been able to achieve a sustained economic growth rate because of low public health care expenditure and improper use of human resources, which has led to an increase in the household health care expenditure [11]. Low-level public health care expenditure has forced 8% of the population to move below the poverty line in 2015. Population at a high risk of spending on health has increased in the last one

decade. Therefore, government intervention is required for giving financial assistance to the people living below the poverty line. The central government provides one-third of the spending and the remaining amount is contributed by the state and local governments.

Health has the capability of realizing higher production functions in a lower population growth rate scenario. Neglecting health leads to an inconclusive economic growth. Health is an important indicator of human development and the government's role is to institute policy measures to achieve the health of its population by spending more than 2% of its GDP on public health [12].

Objectives:

1. To study the relationship between the health expenditure and population
2. To examine the health expenditure and GDP
3. To analyze the annual growth rate of health expenditure, GDP and population

Methodology

Secondary data was collected from the World Bank from 2009–10 to 2016–17. To analyze the health care expenditure in comparison with population and GDP, the multiple linear regression models was used. For trend analysis, the annual growth rate has been employed for ascertaining the trend of health expenditure, GDP and population. The E–Views 10 software is used for analyzing the data.

Result and Analysis

This paper mainly focuses on the relationship between health care expenditure and population and GDP growth rates.

Table 1: India's Public Health Expenditure, Population, and GDP from 2009-10 to 2016-17 (in Crores)

Year	Health Expenditure	Population	GDP
2009–10	72536	117	6477827
2010–11	83101	118	7784115
2011–12	96221	120	8736039
2012–13	108236	122	9951344
2013–14	112270	123	11272764
2014–15	121600.23	125	12433749
2015–16	157743.37	126	13675331
2016–17	180656.77	128	15251028

Source: World Bank, 2017.

Formula for Calculating the Annual Growth Rate (AGR): The annual growth rate is very much useful to know the moving trends for the given data. It is also used to understand how the annual percentage varies year on year. By analyzing the annual growth rate, the data can be used to predict future outcome and its probable progressions. Using the appropriate formula, the author has calculated the annual growth rate of India's public health expenditure, GDP, and population for the period of seven years from 2010-11 to 2016-17.

Table 2: Annual Growth Rate of Health Expenditure, GDP and Population

Year	Annual Growth Rate of Health Care Expenditure	Annual Growth Rate of GDP	Annual Growth Rate of Population
2010–11	13%	17%	1%
2010–12	14%	11%	2%
2010–13	11%	12%	2%
2010–14	4%	12%	1%
2010–15	8%	9%	2%
2010–16	23%	9%	1%
2010–17	11%	10%	2%



Figure 1: Annual Growth Rate of Health Expenditure, GDP, and Population

The trend lines in Figure 1 show, the annual growth rate of India's health care expenditure, GDP, and population from 2009–10 to 2016–17. In 2011–12, the health care expenditure increased from 13% to 14%,

population from 1% to 2%, but the GDP decreased from 17% to 11%. In the following year, 2012–13, the trend line for health expenditure decreased from 14% to 11%. The government spent 8% of the total expenditure on health care in 2010 – 11 and it was reduced to 3.68% in 2012– 13 of the total expenditure allotted in the general budget. The health care budget is allocated based on the national health account, which includes morbidity rate, child sex ratio, infant mortality rate (IMR), and different health schemes. The GDP increased from 11% to 12% and the population remained constant at 2%. The annual growth rate of health care expenditure found to be very high at 23% in 2015 – 16. The India's per capita health care expenditure increased to Rs. 621 in 2009–10 and Rs. 1112 in 2015–16. The government allocated Rs.140 crore to the total public health care expenditure in 2015–16, (National Health Profile, 2018). The annual growth rate of health care expenditure increases over time very slowly [(12)]. This indicates that the trends of these three variables do not move in the same direction. It is to be observed that when health care expenditure decreases, the population also tends to decrease at a different proportionate level.

Multiple Linear Regression Model: As population and GDP growth rate are considered as two independent variables, it is appropriate to apply the multiple linear regression models for this study.

Table 3: Multiple Linear Regression Model Output

Dependent Variable: Health Expenditure				
Independent Variables: Population, GDP				
Method: Least Squares				
Sample:18				
Included observations: 8				
Variables	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	840699.3	1058078.	0.794554	0.4629
GDP	0.021831	0.012560	1.738144	0.1427
Population	-7825.927	9738.124	-0.803638	0.4581
R-squared	0.948353	Mean dependent var		116545.5
Adjusted R-squared	0.927695	S.D. dependent var		36623.28
S.E. of regression	9847.863	Akaike info criterion		21.50789
Sum squared resid	4.85E+08	Schwarz criterion		21.53768
Log likelihood	-83.03157	Hannan-Quinn criteria		21.30697
F-statistic	45.90593	Durbin-Watson stat		1.563540
Prob(F-statistic)	0.000606			

Econometric Model for Multiple Linear Regression Model:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + U_i \quad ...(1)$$

$$Y_i = \beta_0 \text{ Constant} + \beta_1 \text{ GDP } (X_1) + \beta_2 \text{ Population } (X_2) + Ui \quad ...(2)$$

Y_i = health expenditure

X_1 = GDP

X_2 = population

β_0 = constant

β_1, β_2 = co-efficient of predicators

U_i = error term

Estimated Equation Value:

$$Y^\wedge = \beta_0^\wedge (840699.3) + \beta_1^\wedge (0.0218) + \beta_2 ^\wedge (-7825.9) + U_i \quad ...(3)$$

The above results shows that the multiple regression value of health care expenditure, population, and GDP are highly significant, as the p value is less than 0.05. The coefficient value for GDP is positively correlated and if GDP increases by 1%, at an average, the health care expenditure increases by 2.2% with other variables

remaining constant. As the R square value shows, 95% of health care expenditure allocated in India is based on the country's population and GDP. Increase in GDP and population will definitely lead to increase government spending on health. The coefficient value of population depicts the negative relations with health care expenditure at -78.3% at the 5 % level of significance. This shows that when population increases, health care expenditure does not increase as much. Therefore, there is a strong positive association between health care expenditure and GDP growth rate [10], but health care expenditure has a negative relationship with population.

Conclusion

The trend of population growth and GDP highly influenced the government's spending on public health during the years 2009 to 2017. India has the second largest population in the world (17% of the world's total) next to China, but the percentage share of health expenditure in GDP terms was only 1.02% in 2018. The government must increase this figure to at least 2% GDP to sustain the economic growth the country is achieving at present [11, 12]. The government has to improve the public health expenditure for increasing the economic growth as well. Not only in India, but across the world, there is a growing interest to examine the impact of GDP growth rate and population growth on public health expenditure. Other than GDP, there are many factors like population and, socioeconomic variables that influences the health care expenditure of a nation. But many studies suggested that, GDP and population are prime factors because the Indian states that have a higher GDP growth rate have a healthy population. This present study concludes that the effect of health care expenditure on GDP is found to be significant. A rise in the population or GDP must also be reflected by an increase in the health care expenditure.

Conflict of Interest: Nil

Source of Funding: It is an independent self-study.

Ethical Clearance: The present study is mainly based on descriptive analysis and the experiments are not conducted on human and animal's subjects.

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Vandalism against Doctors: Clinician's Perspective

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Abstract

Background: Medicine is considered one of the most difficult streams after completing school. Doctors are considered as the most knowledgeable people. However, since the past few years, there have been numerous cases of brutality against doctors- from verbal abuses to even murders. In this study, we plan to look at such events from the clinician's point of view- their awareness about the situation and the laws about it and what they think is required to be done for its prevention.

Aim: To assess the views of medical professionals regarding the rising incidence of medical vandalism in the country.

Methodology: After due clearance from Institution's Ethical Committee and obtaining a written consent, a validated questionnaire was distributed to 200 doctors of Acharya Vinoba Bhave Rural tertiary care Hospital (AVBRH) as well as the private practitioners and doctors working in corporate hospitals , Nursing homes, and members of IMA (Wardha Branch)in Wardha district of Central India. Their responses were recorded and tabulated. The results were then analyzed using descriptive statistics and represented in frequency percentages through pie charts.

Results: Out of the 200 doctors that were interviewed, 100% believed that vandalism exists, out of which 58.8% believed it to exist both in government setup as well as well as private sectors, 23% believed overcrowding to be the major triggering factor for vandalism. Some 35.2% did not have any idea whether their institute had any policy against vandalism. Around 40% believed that installation of more CCTV cameras and tightening the security system in workplace would help against vandalism and prevent it.

Conclusion: Thus, it can be concluded that medical vandalism exists and its most common triggering factor is overcrowding in the hospitals. It can be prevented by good communication between doctors and the patients, improving the infrastructure of work place, improving the security systems and by organizing mass rallies in the community.

Keywords: *Medical, vandalism, abuse, doctors, community.*

Introduction

Doctors, once considered equivalent to 'Gods', have lately become victims of an increasing amount of brutality and violence. Developing countries today, especially India, where the healthcare sector is progressing by leaps and bounds in terms of the level and quality of care being provided, but ironically, so are the cases of violence against doctors being reported every day.

Workplace violence is defined by the World Health Organization (WHO) as incidents where staff are abused, threatened or assaulted in circumstances related to their work, including commuting to and from

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work, involving an explicit or implicit challenge to their safety, well- being or health. [1] A study conducted by Indian Medical Association has shown that more than 75% of doctors face violence at work. [2] Recent notable cases have begun to shed light on this gross misconduct that is slowly getting rampant. [3] Gradual worsening of communication skills is thought to be the main cause.[4] This is quite detrimental to India where diseases and illness continue to act as the biggest challenges to its growth curve, and such behavior only furthers anger, frustration, and a lack of workplace satisfaction amongst the Medical fraternity.[5,6]

Even legislative measures such as the Prevention of Violence against Medicare Persons and Institutions Acts, active currently across 19 Indian states, have failed to address this pressing issue. Thus, a study was planned to identify which factors act as triggers for such incidents, what the current scenario is, and which preventive measures can be taken, all from the perspective of the Medical Practitioner.

Aim: To assess the views of Medical professionals regarding the rising incidence of medical vandalism in the country.

Objectives:

- To assess physician's perspective on Medical Vandalism in current day practice.
- To assess factors predisposing to violence against medical practitioners.
- To determine the ways through which Medical Vandalism can be prevented.

Methodology:

After obtaining due approval from the Institutional Ethics Committee, a questionnaire based cross-sectional survey study was conducted in the Dept. of Medicine, Acharya Vinoba Bhave Rural Hospital (AVBRH), Wardha, a 1500 bedded Tertiary Care Centre located in the Vidarbha region of rural Maharashtra, over a period of 2 months from July 2019 to September 2019.

Study Population: Two hundred medical professionals working in AVBRH and medical practitioners working in private sectors, corporate hospitals, nursing homes, members of Indian Medical Association (IMA), Wardha branch who are into private practice were interviewed. The doctors who did not give consent were excluded.

A validated questionnaire, made in consultation with the Dept. of Preventive and Social Medicine, AVBRH, and School for Health Professionals, Education and Research (SHPER), AVBRH, was administered, to obtain information and views on prevalence of medical vandalism, situation witnessed, type of violence that clinicians most commonly encountered, or heard about, conditions that they believe can act as triggering factors, steps that they have personally taken to prevent further untoward incidences, and what measures they feel can help in curbing such occurrences. They were also encouraged to include their own suggestions.

After administration of the questionnaire, a booklet written in both, English, and the vernacular language, was distributed to each doctor. This contained information regarding statistics of medical vandalism from the previous few years, milestone rulings and laws that have been put in place by the state's High Court and the national Supreme Court, to ensure greater workplace safety for doctors, key features that are essential for good Doctor-Patient communication, and important steps that each individual can take to prevent incidences of vandalism.

Statistical Analysis: The data collected was entered in Microsoft Excel, Descriptive statistics was utilized and the results were presented in percentages in form of pie charts.

Observations and Results

All of the 200 doctors knew about medical vandalism and agreed that it exists. It can therefore be concluded that violence against doctors is not only evident but also well known. Out of these, 92% of the doctors believed that the problem is increasing day by day.

It was seen that 58.8% of the doctors believed that it exists both in government hospitals as well as private setups out of which 22.1% thought it exists only in private setups (Figure-1). They explained that the high cost, expensive laboratory tests as well as unnecessary investigations often prescribed at private clinics were the cause behind it. The remaining 19.1% believed it to be existing only in government healthcare systems stating that poor infrastructure, hygiene, low management costs as well as improper care provided at government hospitals lead to frustration and anger among the patient and their relatives.

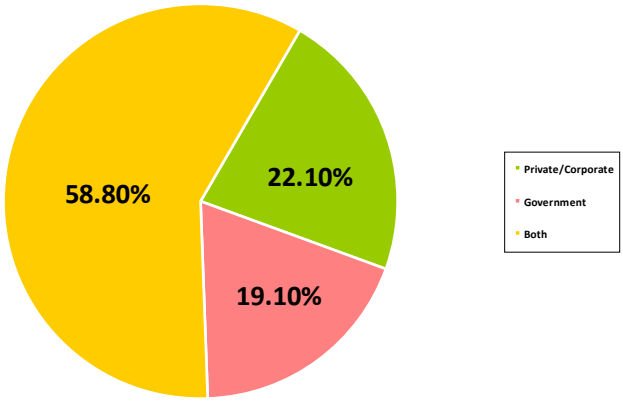


Figure 1: Sectors where medical vandalism is prevalent

When inquired about the various laws against medical vandalism, 54.8% of the doctors were aware about such laws. (Figure-2) of the total, 40.2% thought that their knowledge about such laws might not be accurate.

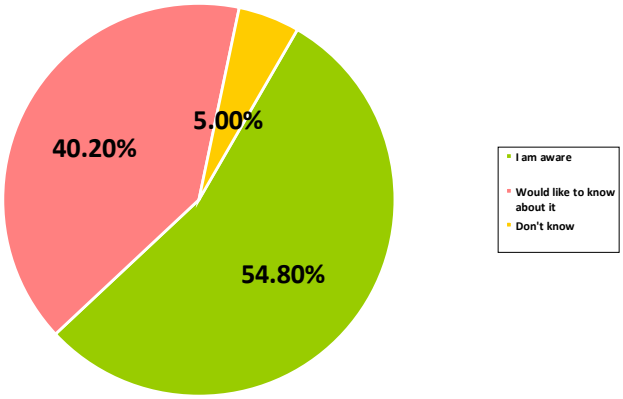


Figure 2: Knowledge about the laws regarding medical vandalism

When inquired about the triggers, 20.36% and 15.13% agreed that overcrowding as well as sudden death of a patient respectively, were the most important factors that trigger frustration and anger amongst the patients and their relatives resulting in abuse against doctors. (Figure-3) Vandalism was 86% times, in form of verbal abuse, including threatening and 14% physical abuse. Lack of skilled healthcare providers and non-availability of medical goods in the casualty were the least responsible (11% and 10.45% respectively). Over half of the resident doctors (63%) who faced vandalism kept quiet about it as they believed it to be a powerless and harmless verbal attack, while remaining reported it to the heads of their departments or senior authorities.

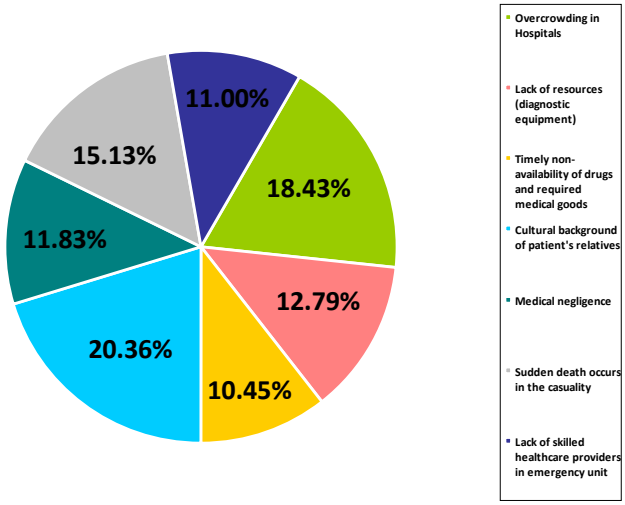


Figure 3: Triggering factors of medical vandalism

Over half (55.3%) said that they knew about policies and rules that their institute had for crimes against doctors. (Figure-4) Further, 72% of total doctors included in the study said that they were under stress of threat of medical vandalism while working in the hospitals.

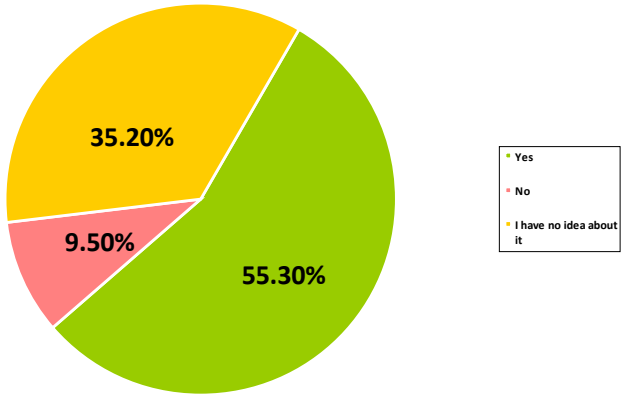


Figure 4: Idea about institutional policies

When asked to vote for the most effective method to spread awareness and information about vandalism, 29% medical professionals voted for mass rallies being the best way to spread awareness, followed by awareness campaigns (27%), reason being that these method are an efficient way to attract majority of the people. (Figure-5) One third (35%) of the doctors believed that placing more CCTV cameras in the emergency department and at areas near it was the most common action their institute took to combat vandalism in the hospital premises.

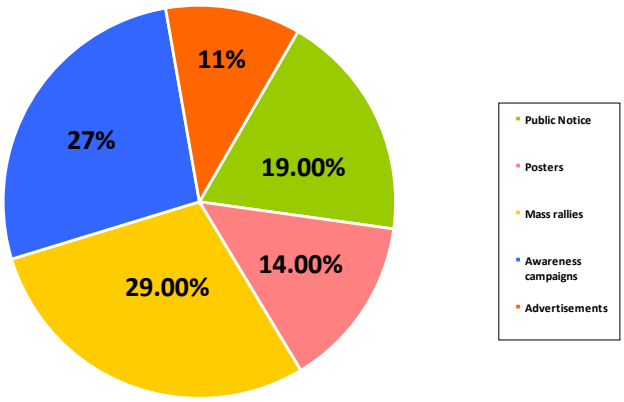


Figure 5: Methods to spread awareness about medical vandalism

Twenty-six percent of the doctors suggested that improving counseling skills can help prevent vandalism against medical professionals. Few 20% believed that limiting the number of relatives of the patient in the emergency room can help prevent vandalism. Twenty-eight percent agreed that improving the security system will curb vandalism to a great extent. (Figure-6)

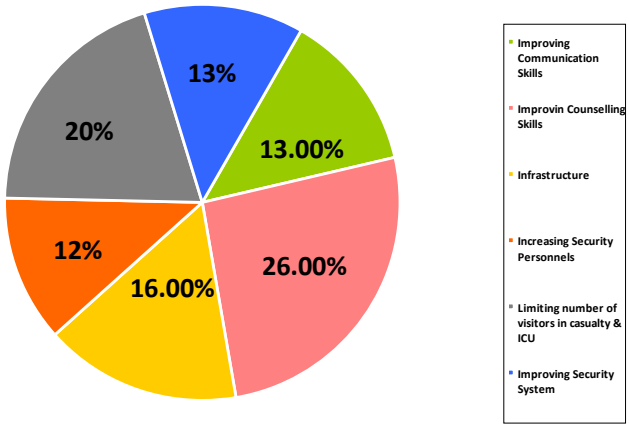


Figure 6: Ways to prevent medical vandalism

Discussion

The rising occurrence of medical vandalism is becoming a huge burden in current medical practice. Our study provided an opportunity to assess the prevalence of medical vandalism, various factors leading to vandalism and the initiatives taken by the treating medical professionals and institutions to combat vandalism. Violence against the healthcare providers signifies lack of trust and an unhealthy doctor-patient relationship.

Out of the total, 58.8% believed it to exist both in government as well as private setups. This is because the doctors in their private clinics write unnecessary investigations, expensive tests without proper evidence and rationale. In contrast, poor sanitation and hygiene along with high patient load and inadequate and low quality medical devices are evident in government hospitals, leading both the sectors susceptible to frustration, anger and doctor abuse. Over 70% medical professionals confessed that they are under a stress of getting verbally or physically abused in the hospital.

A study conducted in 2009 by **El Gilany et al**[12] showed that over 80% of doctors and nurses were exposed to at least one violent event which mainly comprised an emotional (92%). The study concluded that the main triggering factors for medical vandalism and frustration amongst patients was overcrowding, sudden deaths and unmet needs of the patients.

Another study by **Zafar et al**[13]also confirmed that verbal abuse is far more common than physical abuse in various countries. Thus vandalism is evident all over the globe. It further showed that the likelihood of confessing or reporting vandalism is low; that is, both male, female as well as young and aged doctors kept quiet about the event. Furthermore, when they were asked to rate how stressed they are during duty hours due to fear of vandalism, a mean came out to be 3.57 on a scale of 1-5 where 5 was 'very worried', concluding that the doctors feel that they are under a huge threat of violence.

Our study was similar to several studies in terms of low rates of workplace violence in the form of sexual harassment varying from 0.7-9% .[14-16] The most common type of sexual harassment in female physicians was in the form of 'telling sex jokes' followed by unwanted touching and being stared at.

Roakes DK [17] , showed that the various causes of workplace violence as perceived by the physicians were lack of education amongst patients' relatives and long waiting time (56%) followed by cultural differences, overcrowding and lack of security, Drug abuse was also noted in up to 22% of patient relatives who caused a menace in the emergency department.

In our study over 32% of the doctors agreed that they have been vandalized verbally or physically and 60% kept quiet about it since they thought that the insult is powerless with no strong motive behind it. Approximately 35.2% of the doctors didn't have any idea whether their institute had any policy against vandalism or not, while 40.2% of the doctors were not clear about the laws and policies of the central or state government for crimes against medical vandalism. Around one-

third (35%) believed that installation of CCTV cameras would help curbing vandalism. Few (27%) believed that awareness camps would help spread awareness about it and 26% believed that improving counseling skills would help curb vandalism.

Over the last 40 years vandalism in western world has subtly changed. In most of the European countries and in Canada, the healthcare cost is borne by the government, and often, the first contact of the patient is with designated general practitioners hence, there is no financial anxiety for medical treatment in these countries. [18] In the USA, though the standard of medical care may be high, yet this comes at a cost mostly through payment by insurance companies or directly being paid by the patient. Studies have also shown that even if USA is an affluent country, still a large number of citizens could not afford to pay for the health insurance and fall out of care net. [19,20]

Pai SA. [21]; in his study suggested that heightened anxiety about the disease and the financial aspect of treatment are the main factors of initiation of violence and the doctor should train himself/herself for anxiety alleviation techniques. The behaviour of the treating clinician staring from the first point of contact with the patient and relatives is the real golden milestone. The suffers and their close relatives and friends should get a humane touch in form of empathy and a good communication from the treating clinician.

Safety of the patient in hospitals is the core of an efficient healthcare system. This can only be achieved when doctors and other medical personnel are ensured a safe working environment. Strict laws must be implemented by the government to punish violators. On the other hand, treating clinicians and other staff associated with patient care should also initiate steps to avoid medical negligence. Efficient communication skills and a touch of empathy are needed most. It is necessary to be vigilant so that mishaps are avoided and patient should receive best care available.

Conclusion

To conclude, many remedies have been advised to tackle medical vandalism. There are responsibilities of doctors and other healthcare workers, and similarly, responsibilities are there to be borne by patients and their relatives, hospital authorities, media and above all the governments to ensure that health care facilities improves and incidents of medical vandalism is strongly dealt with. It is high time now to act and stop vandalism against doctors and take preventive measures. Obtaining this information and spreading awareness about the same on a larger scale can help reducing the high pressure circumstances under which today's clinicians are practicing.

Institutional Ethical Committee Clearance (DMIMS deemed to be University) was obtained before starting this Study.

The study is funded by: Indian Council of Medical Research (ICMR)

Conflicts of Interest: Nil

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Flexible Dentures: An Review

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Abstract

Patients looking for a comfortable alternative to traditional dentures could be interested in Flexible dentures, using advanced technology to fit around the shape of teeth and gums upon insertion, the flexible denture can be used when there is not enough bone for fitting dental implants to replace missing teeth. The flexible denture works by flexing into position, not needing the use of metal clasping mechanisms to hold the dentures in place. Individuals with irregularities in the shape of their mouth could benefit greatly from the treatment and experience a growth to their self-confidence.

Keywords: *Removable partial denture, flexible denture, undercuts.*

Introduction

The concept of flexible resins is based on their inherent flexibility and ability to engage hard and soft tissue undercuts for retention.[1] Flexible partials were first developed in the early 1950s. Arpad Nagy of New York commercialized the first nylon-based flexible partial denture system, called Valplast, in 1953. At the time, academics felt that a partial denture must be rigid in order to distribute masticatory forces to the remaining dentition. As a result, the usage of flexible plastic partial dentures was limited.

As the 'Hollywood Smile' became a quest for dental patients in the 1970s and '80s, dentists were forced to look for prosthetic solutions that were both aesthetic and functional. Flexible partial dentures were becoming an accepted treatment plan for some patients who demanded high aesthetics and had healthy remaining dentition.

The fabrication of removable denture for completely edentulous or partially edentulous arches encounters a special challenge when soft tissue and bony undercuts, interferences, various paths of placement, tilted teeth and deranged occlusion are present to complicate the treatment plan.[3] Various treatment options have been suggested in literature for the management of such situations. With recent advancements in material science flexible dentures have emerged as a viable option to treat various edentulous conditions. Therefore, for clinical cases such as Kennedy's Class I & II, which involve distal extension, the flexible dentures by engaging the severe soft tissue undercuts and clasping the adjacent teeth provides excellent retention.[8]

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Advantages:

Highly retentive & comfortable due to flexibility

Clinically unbreakable

50% less bulky than conventional acrylic dentures

Highly esthetic

Monomer free

They are clinically unbreakable due to their property of shock resistance as well to repeated stressing i.e., under fatigue conditions

Translucency of the material picks upunder lying tissue tones, making it almost impossible to detect in the mouth.

No clasping is visible on tooth surfaces

Applications

- Aesthetics
- Strength
- Accuracy

- Management of undercuts
- Biocompatibility
- Provisional dentures
- Management of midline fractures
- Better comfort of the patient

Other applications: Flexibe dentures can also be used for fabricating night guards and sleep apnoea appliances, microstomia, scarring in the oral and facial areas due to disease, trauma, or burning injuries

Materials for flexible dentures:

Pro-flex: Pro-flex is the flexible denture base material which can be used for Full & Partial Flexible Dentures. Pickett Dental Laboratory has been offering Pro-flex full and partial flexible dentures since 1998.

Pro-flex denture material be indicated in some of the Anatomical considerations-enables the material to effectively engage tooth and tissue undercuts. Also, Pro-flex is hypoallergenic-recommended for patients with known acrylic or metal sensitivities.

Aestheticallythematerialissemitranslucent,allowing the prosthetic to better blend with the colour of the natural gum tissue. With Pro-flex flexible partials, there are no metal clasps. Proflex full and partial flexible dentures are easily adjusted by the dentist

Valplast: Valplastis a flexible denture base resin that is ideal for partial dentures and unilateral restorations. The resin is a biocompatible nylon thermoplastic with unique physical and aesthetic properties that provides unlimited design versatility and eliminates the concern about acrylic allergies.

The Valplast Flexible Partial allows the restoration to adapt to the constant movement and flexibility in your mouth. The flexibility, combined with strength and light weight, provides total comfort and great looks.

Valplast partial is virtually invisible because there are no metal clasps and the material itself blends with the tissue in your mouth. While the cost is often higher than a partial made with visible metal clasps.

Sunflex: Sunflex Partial Dentures are made from a strong biocompatible nylon thermoplastic, and are unbreakable, yet lightweight and translucent which allows natural tissue to show through.

The sun flex flexible denture base materials are virtually Invisible, Unbreakable, Metal-Free, Lightweight and incredibly Comfortable.

Discussion

All the efforts to overcome denture fracture in complete or removable denture prosthesis against natural mandibular teeth by improvising techniques and improving conventional materials did not provide the requisite results[4] Thus a material had to be used in contemporary practice which could be flexible and fracture resistance polyamide is a nylon based plastic. Although this technology has been in use since 1954, it has become popular only recently. It is stronger, more flexible than acrylic and thus can be used as a viable alternative.[6]

Conclusion

The fabrication of the optimum restoration depends on the clinicians skills in selection of the type of the restoration which is required for the patient.

The fabrication of prosthesis for the partiallyedentulous arches encountered a special challenge where many interferences, variouspath of placement, tilted teeth and deranged occlusion will complicate the treatment plan. In these situations, Flexible dentures will stand in a superior position in fulfilling the various patients demand.

Conflict of Interest: None

Source of Funding: Self funded

Ethical Clearance: Ethical clearance was not required hence so was not obtained

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Knowledge on Ethical Codes among Undergraduate Medical Students and Faculty Members

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Abstract

Background: Present study is designed to assess the knowledge of ethical codes among para-clinical and clinical students of medicine and faculty members.

Methodology:

Study setting: KMC, Mangalore, Karnataka, India.

Study design: A cross sectional self-administered questionnaire based study.

Study group: II, III, IV MBBS students and faculty members.

Using self-administered 5 item structured questionnaires on knowledge on ethical codes, a cross-sectional survey of second, third and fourth year (para-clinical and clinical) medical students and faculty of Kasturba Medical College, Mangalore were conducted in August 2018.

Results: Present study showed overview of knowledge of ethical codes among faculty members and students in the medical college**.** Among the study population, knowledge on informed consent was well understood by 62 % of respondents. Again 34% of the population was not aware of the contents of Hippocratic Oath, However 32% of the population knew the contents of Hippocratic Oath. More than 50% of study population including students and faculty members were not aware of contents of Nuremberg oath, Helsinki oath and Belmont reports. Studies of the present study showed that faculty members and students had a sound knowledge on informed consent in ICMR guidelines and it was well understood by study population. Knowledge on other ethical codes were poor, like Nuremberg code, Helsinki declaration were not familiar with respondents. Majority of participants agreed that they are not aware of Nuremberg oath (64%), whereas equal proportion (18%) agreed and disagreed with the Nuremberg code even though the Nuremberg oath was not given appropriately.

Conclusion: Present study findings demands the prioritization for incorporation of knowledge on ethical codes into curriculum and training programme for faculty members.

Keywords: *Ethical codes, helsinki oath, belmont report.*

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Introduction

India being one of the highly populated country has the largest health care system. It has the privilege of having highest number of medical colleges (412) and turnover of 50,000 fresh medical graduates per year[1]. Present undergraduate medical curriculum has

been constructed around specific learning objectives concerned with primarily three domains, Cognition (Head), Psychomotor (Hand) and affective (Heart). However, affective component is greatly neglected and it has become a kind of informal curriculum [2]. Thus Indian Medical Degree fails to provide holistic care to patients with empathy.

There is no uniformity in what the students learn through the hidden' or 'informal' curricula, and there is no way of ensuring that a minimum standard is being met. The relative decline of ethical/professional standards, coupled with the deterioration of the doctor-patient relationship and the increasing criticisms of physicians by the public, have heightened the need for undergraduate medical ethics education[3]. Sadly, it has been shown those medical students' moral sensitivity drops as the courseprogresses[4] This has been attributed to hidden curricula[4].

Samaj Adhikari el al (2016) stated that significant portion of doctors and nurses are unaware of the major documents of health care ethics which depicts the core principles[5]. Onochie Okoye et al(2017) reported that35.7 % of final year medical students in the University of Nigeria were satisfied with their medical ethics knowledge, 97.9% indicated that medical ethics should be taught formally. There was a strong desire by the contemporary Nigerian medical students for medical ethics education[6].

Little is reported about knowledge of ethics in undergraduate medical curriculum. As MCI is stepping forward with **ATCOM** curriculum, it's crucial at this point to assess the knowledge about medical ethics codes among undergraduate students and faculty members. Hence the present study is designed to assess the knowledge of ethical codes among para-clinical and clinical students of medicine and faculty members.

Objectives: To assess the current status of knowledge of para-clinical and clinical medical students and faculty members about medical ethics.

Methodology

Study setting; KMC, Mangalore, Karnataka, India.

Study design: A cross sectional Self-administered Questionnaire based study.

Study group: II, III, IV MBBS students and faculty members.

Questionnaires will be validated for its relevance, ambiguity and difficulty by 3 medical educators/ bioethicists. Questionnaires will have three major components.

1. General data: sex,educational qualification
2. Knowledge on ethical codes

Using self-administered 5 item structured questionnaires, a cross-sectional survey of second, third and fourth year (para-clinical and clinical) medical students and faculty of Kasturba Medical College, Mangalore will be conducted in August 2018. Questionnaire was adapted and validated (Johnston and Haughton 2007, Chatterjee and Sarkar 2012, Chopra, Bhardwaj et al. 2013).

Ethical committee clearance was taken from the Institutional Ethics Committee (IEC)

[IEC KMC MLR 06-18/117] prior the conduct of the study

Statistical analysis: Data was analyzed using **SPSS 16**. Data analysis was done using proportions and percentage. The Chi-square test was used to determine the levels of significance,with **P value<0.05** being considered statistically significant

Results

Demographic details: Out of the total 180 respondents, 57% were males and 43% were females. The majority of participants were students being 87% and faculty members 13%. Proportion of subjects from II MBBS were 85, III MBBS were 67 and final year MBBS were 3.

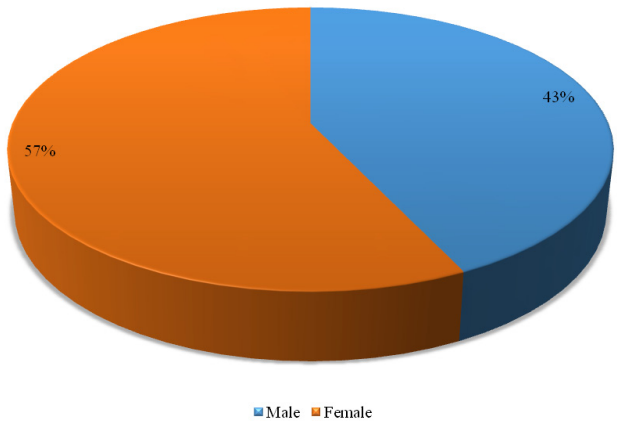


Fig 1: Distribution of male and female participants among study populations (including students and faculty members (n=180)

Fig 2

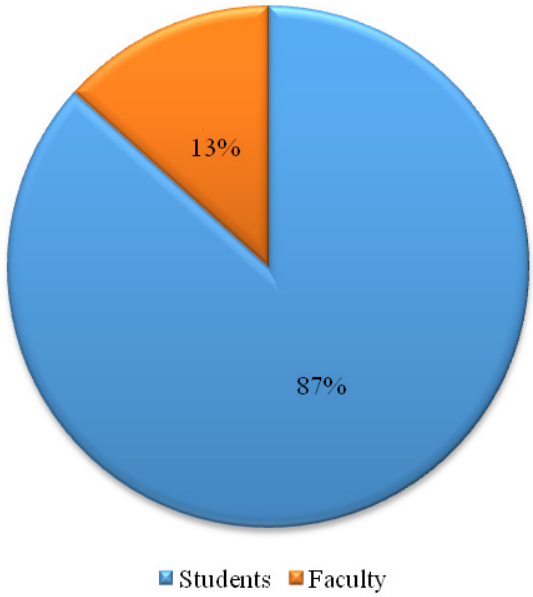


Fig 2: Distribution of students and faculty among study population (including students and faculty members (n=180)

Fig 3

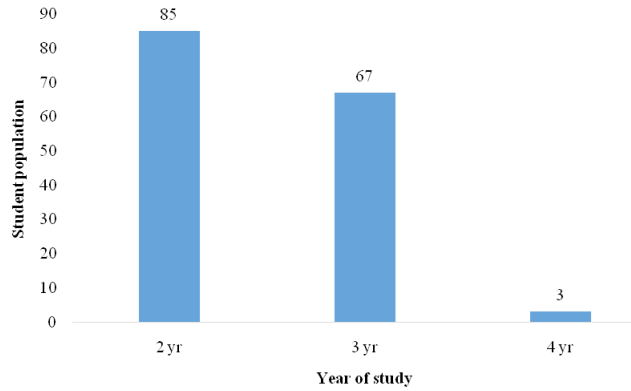


Fig 3: Distribution of students across different years of medical course among students (n=156)

Among the study population, knowledge on informed consent was well understood by 62 % of study population. Again 34% of the population was not aware of the contents of Hippocratic Oath, However 32% of the population knew the contents of Hippocratic Oath. More than 50% of study population including students and faculty members were not aware of contents of Nuremberg oath, Helsinki oath and Belmont reports. [Table 2].

Table 1: Status of knowledge on ethical codes among study population

Characteristics	Number (%)				
	1	2	3	4	5
	Strongly disagree	Disagree	Don't know	Agree	Strongly agree
1. Hippocratic oath respects the privacy of patients	3(1.7)	2(10)	62(34.4)	48 (26.7)	57(31.7)
2. Nuremberg oath states that experiments could be conducted when there is a reason to believe that it implies a risk of death or disabling injury.	15(8.3)	15(8.3)	114(63.3)	18(10)	15(8.3)
3. The fundamental principle of Helsinki oath is respect for the individuals participating in research	2(1.1)	5 (2.8)	102(56.7)	41(22.8)	27(15)
4. According to Belmont report person with diminished autonomy are entitled to protection	2(1.1)	3(1.7)	113(62.8)	34(18.9)	24(13.3)
5. Informed consent should be a part of research proposal according to the ICMR guidelines	5(2.8)	2(1.1)	27(15.0)	33(18.3)	112(62.2)

Present study showed overview of knowledge of ethical codes among faculty members and students in the medical college**.** Among the study population, knowledge on informed consent was well understood by 62 % of respondents. Again 34% of the population was not aware of the contents of Hippocratic oath, However 32% of the population knew the contents of Hippocratic Oath. More than 50% of study population

including students and faculty members were not aware of contents of Nuremberg oath, Helsinki oath and Belmont reports **[Table 1].** Studies of the present study showed that faculty members and students had a sound knowledge on informed consent in ICMR guidelines and it was well understood by study population. Knowledge on other ethical codes were poor, like Nuremberg code, Helsinki declaration were not familiar with respondents. Majority of participants agreed that they are not aware of Nuremberg oath (64%), whereas equal proportion (18%) agreed and disagreed with the Nuremberg code even though the Nuremberg oath was not given appropriately.

In a comparative study, the status of knowledge about ethical codes among students and faculty members of selected population were equated. There was no statistical significant difference between the faculty members and students regarding the understanding of various ethical codes of medical ethics such as Hippocratic oath, Nuremberg code, Helsinki oath, Belmont report and ICMR guidelines ($p>0.05$). However present study findings demands the prioritization for incorporation of knowledge on ethical codes into curriculum and training programme for faculty members.

Discussion

This study is the novel one to explore knowledge on ethical codes among undergraduates and faculty members of a medical college. In the present study, knowledge on informed consent was well understood by 62 % of respondents. Again 34% of the population was not aware of the contents of Hippocratic Oath, However 32% of the population knew the contents of Hippocratic Oath. More than 50% of study population including students and faculty members were not aware of contents of Nuremberg oath, Helsinki oath and Belmont reports **[Table 1].** Studies of the present study showed that faculty members and students had a sound knowledge on informed consent in ICMR guidelines and it was well understood by study population. Knowledge on other ethical codes were poor, like Nuremberg code, Helsinki declaration were not familiar with respondents. These results are in consistent with the findings reported by northern part of India and India previously[7, 8]. Majority of participants agreed that they are not aware of Nuremberg oath (64%), whereas equal proportion (18%) agreed and disagreed with the Nuremberg code even though the Nuremberg oath was not given appropriately.

In a comparative study, the status of knowledge about ethical codes among students and faculty members of selected population were equated. There was no statistical significant difference between the faculty members and students regarding the understanding of various ethical codes of medical ethics such as Hippocratic oath, Nuremberg code, Helsinki oath, Belmont report and ICMR guidelines ($p>0.05$). However present study findings demands the prioritization for incorporation of knowledge on ethical codes into curriculum and training programme for faculty members. It was earlier reported that majority of medical doctors were knowledgeable about codes of ethics. Sex, level of education, and attitudes towards codes of ethics were significantly associated with knowledge of codes of ethics. A significant proportion of medical doctors had unfavorable attitudes. Level of education, work experience, and knowledge of codes of ethics were significantly associated with attitudes toward codes of ethics. They were of the opinion that; it is important to raise awareness and if necessary change attitudes of medical doctors toward codes of ethics [9].

Conclusion

Present study findings demands the prioritization for incorporation of knowledge on ethical codes into curriculum and training programme for faculty members. Integrated clinical approach is best suited to teach medical ethics which was highlighted in the present study.

Source of Funding: Nil

Conflict of Interest: Nil

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Automatic Insulin Analyser

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Abstract

Medicines are an important part of modern health care system. The market for pharmaceutical medicines runs in billions of dollars a year. Butrecently a new problematic phenomenon has risen which is termed as "Poor Medication Adherence". In simple terms it refers to improper intake of medicines as prescribed by doctor. Study shows that the reason for it is forgetfulness. So the instrument devised here is to address the problem by building a wearable non invasive device which can alert the patient in time. Since the device is in its initial stage so it was built for only glucose detection to control insulin intake by diabetic patients. Near Infra Red light when passes through a tissue its absorbance is changed due to interaction with glucose molecules present. By detecting the level of glucose one can determine the insulin requirement of the patient. Glucose is one of the important biochemical produced in the process of metabolism in human body. But also a proper level of glucose amount will ensure the health of a human. Insulin regulates the amount of glucose level to be maintained in the human body.

Keywords: *Poor Medication Adherence, glucose, insulin, Near Infra Red.*

Introduction

According to a publication in 2011 in National Center for Biotechnology Information the benefit of medication for chronic diseases is 50% of the time not realized due to improper intake. Medically it is termed as 'Poor Medication Adherence'. It renders a huge loss not only in the part of the patient also it creates looses for the entire health system of the country. In US alone the loss is estimated to be $100 billion annually[1]. Also it is cited that 90% of the reason for poor medication adherence is due to personal negligence or forgetfulness due to lack of proper reminding system on a personal level [1]

There are wide ranges of medicines available on the market for each of known illness. Most of the time patients suffering from chronic disorder where they are required to take medicines for a very long period of time are usually a problematic[2]. People who cannot afford a full time care taker would sometimes might skip the medication due to negligence. This results in the loss of the patient in the form of money as well as health. The current project will try to address this problem by devising a non invasive wearable device which can be used to monitor the level of medicine used. Since it's in initial stages only one medicine will be considered for this- Insulin[6].

Future work will be extended to all the medicines available. Insulin is a very important biochemical produced in human body which helps to keep the glucose level in check. But when a person is not able to produce the required amount of insulin by itself than it has to be supplied from the outside. Based on the type of diabetes a person is suffering from different doses of insulin is administered. A non invasive glucose meter is non painful and easy to carry and use, so it is much preferable than any other conventional method of insulin and glucose monitoring[5]. The basic principle involves the use of Near Infra Red light source as it has much penetrating power and is non lethal to humans[7].

The light rays will penetrate through the tissue and will be detected by a detector on the other side. It is known that the absorbance and the intensity of Infra Red reduce after interaction with glucose molecule. By

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measuring the amount of infra red absorbed one can find the glucose level and can determine the need of insulin[6]. The device was made to be worn in the wrist but a more effective way will be to make it use in the ear lobe as it has no bones for hindrance. Presence of bones effects the infra red on emergence. Future scope includes extending the device capacity to detect most of medicines available on the market and customize it according to the patient's prescribed medication[4]

Methodology

It is a non invasive wearable device solely made for the easy use by patients. The simple construction of the device is the use of NIR emitter at one side of the device and a NIR detector/sensor is placed, which is connected to the microcontroller, which is further connected to seven segmentdisplay unit. Seven segment display displays the output ration of the subject. Also the buzzer trigger the alarm[7].

Use of Near Infra Red Emitter and Sensor: Near infra red is that portion of IR radiation spectrum with wavelength 700nm to 950nm used for medical diagnostics like detection of blood sugar and oxygen saturation. This application is carried out by employing a IR source and a IR detector based on radiation fluctuations when it passes through a medium[4]

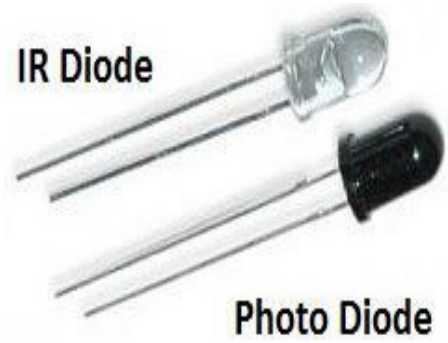


Fig 1 Near Infra Red Sensor

Use of Seven Segment Display: This is electronic display which shows less complex physiological computations in easy understanding digits rather than the complex decimal ones[3]

Use of Sensor: The source and detector of IR are placed on either sides of the ear lobe. The NIR LED emits the radiation which passes

Application of Microcontroller: A microcontroller is a simple integrated circuit which is used for various applications ranging from gaming to rocket science. Here we are using pre-programmed microcontroller to assess the variation of normal glucose values like 120mg/dl This microcontroller also aids in activating the alarm system (buzzer) to produce sound for blind persons.

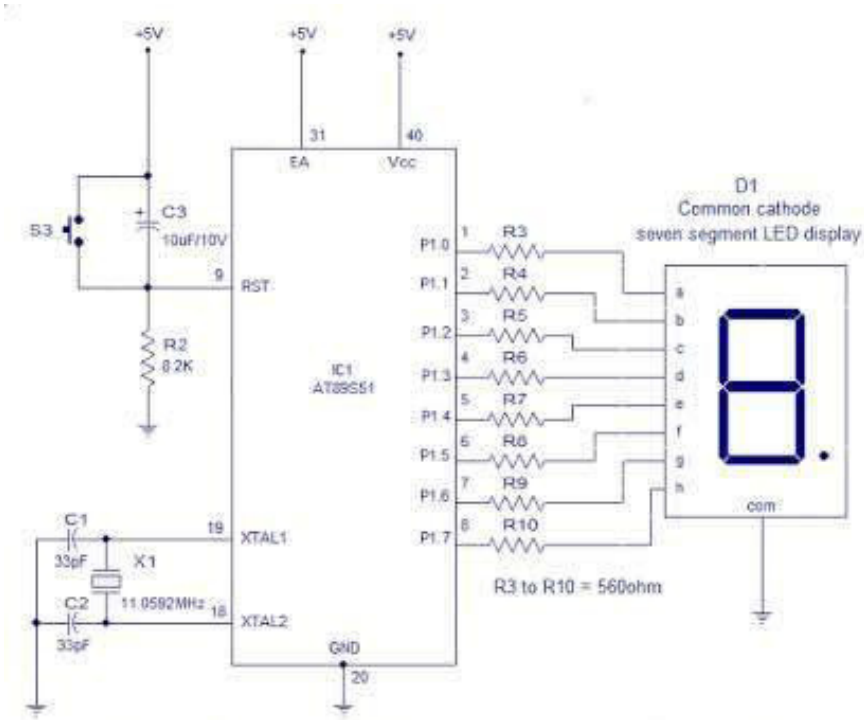


Fig 2: Microcontroller

Through the earlobe and reaches the IR detector. The detector detects the intensity, scattering and absorption of the NIR according to Beer Lambert's Law. The light intensity increases with the cardiac diastole that means when heart relaxes and the intensity of light decreases when the heart contracts (cardiac systole)[5].

Use of Crystal Oscillator: A crystal oscillator is an electronic device which uses the resonance of a piezoelectric material. This oscillator aids in vibrating the component buzzer and amplifies thekilohertz frequency for better performances.



Fig 3: A miniature 4 MHz crystal

Findings and Discussion

The purpose of glucose monitoring system is to analyse, monitor and offer some indications when the glucose level exceeds or decreases then the normal limit. This system is also aimed to analyze the concentration of natural insulin which is secreted by Inlets of Langerhan's of pancreas. It can be expanded to other medicines.

Conclusion

Examinations of sensor glucose designs following insulin suspension enacted by LGS recommend that this innovation is protected and probably not going to be related with unfavorable results.

Ethical Clearance: No ethical clearance was necessary for this research work

Source of Funding: Self funded project

Conflict of Interest: Nil

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A Survey of Human Papilloma Virus

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Abstract

The main concept of our projectis to survey our nearby areas and to find and treat patients having warts, which is caused by the infection which is also known as human papilloma virus infection. So we are providing a confidential discussion with the patient which will of course be between the patient, us and our guide Dr. Vasukidevi. The information given by them would not be shared or disclosed to anyone else.

And basically we will be working on the preparation of medicine which is of course a herbal one to treat them without any invasive or incision in their body. As it is herbal cure it would not have any side effects too. There are various natural substances that can be used for this herbal cure like curcumin, aloe Vera, apple cider, castor oil seeds, turmeric and many of these. Therefore, we are expecting some good results in future in our perspectives in these herbal curing field as we are also the one to support it.

Keywords: *Human Papilloma virus, curcumin, castor oil seeds.*

Introduction

Human papilloma virus are infection that is caused by human papilloma virus. In some they persists and results in warts and precancerous lesions[1]. The precancerous lesions increase the risk of cancer in the cervical area, vagina area,anus and throat. The cancers are also linked to HPV, HPV6 and HPV11 are common causes of genital warts.

HPV infection is caused by a *human papilloma virus*. 40 types are transmitted through the sexual contact. Risk factors for persistent HPV infections include early age of sexual intercourse, multiple partners, smoking, and poor immune function[2]. It can transfer from mother to child during pregnancy. People can infected with anyone type of HPV,HPV.

Warts: Skin warts are most common in childhood and adults suffer from recurring skin warts,the appearance of symptoms warts[3]

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Material and Method

Pineapple: The natural pineapple acids and enzymes will helpful. Fresh pineapple directly to the wart several times a day.

Garlic: Apply paste to the warts,mixer of garlic with water. Put a bandage on top until the wart is gone.

Vitamins: Vitamin C tablet with water to make a thick paste. Apply to the wart and cover with a bandage. Vitamin E break a capsule, rub on the warts to cover.

Aspirin: Make a aspirin paste, apply to the warts until gone.

Tea tree oil: Apply directly to the warts.

Bee propolis: Apply propolis directly to the warts several times a day

Aloe vera: Apply fresh aloe vero gelto the warts.

Medicines that your doctor may use or prescribe for you include:

- Retinoid cream. It disrupts the wart's skin cell growth[1].
- Cantharidin . This medicine causes the skin under the wart to blister, lifting the wart off the skin. This

medicine is applied to the wart at your doctor's office[4]

- Immunotherapy medicines, which help your body's immune system fight viruses, including the human papillomavirus (HPV) that causes warts. These medicines may include imiquimod, contact sensitizers, and interferon[5.]
- Bleomycin injection, which destroys the skin containing the warts. But bleomycin isn't often used, because it is painful during and after the injection.
- Other medicines used for warts include 5-fluorouracil, which is more often used on genital warts, and cimetidine. Cimetidine can be taken by mouth (orally) or as an injection.

Result and Discussion

We were used various natural substances like herbal cure curcumin, aloe vera, apple cider, castor oil seeds, turmeric, pineapple,tea tree oil,Garlic etc., Its expected better results. These herbal curing the warts[6].

The potential approaches to reducing costs may also include delivery of a single dose and removing the need for cold storage. Developing vaccines that are lyophilized to a powder allows for easier storage and delivery[5]

Ethical Clearance: No ethical clearance was necessary for this research work.

Source of Funding: Self funded project.

Conflict of Interest: Nil

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Different Method of Temperature Monitoring System

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Abstract:

Temperature is the degree or intensity of warmth present in a substance or thing, particularly as passed on by a relative scale and appeared by a thermometer or seen by touch. Here I am utilizing LM35. The LM35 strategy are exactness combined circuit temperature gadgets with a yield voltage direct in regard to the Centigrade temperature. The LM35 contraption has a favoured position over direct temperature sensors balanced in Kelvin . Restorative sorts of apparatus impacted by warming are given this sensor to change over warmth into voltage in controlled manner to shield the equipment from overheating. The sensor equipment is fixed and not presented to oxidation.

Keywords: *LM35 Temperature sensor; Thermocouple; Impedance; Self-heating.*

Introduction

Temperature and warmth are not a comparative miracle. Temperature is an extent of the power or dimension of hotness in a body. Indeed, it is constrained by getting the ordinary speed of a body's particles[1]. Warmth is an extent of the measure of warmth imperativeness present in a body. The spatial transport of temperature in a body chooses warmth stream. Warmth constantly spills out of more blazing to colder areas. The warmth held in a thing relies upon its temperature just as its mass[5]

Temperature can be estimated more precisely by this sensor than with any thermostat. Also, Thermocouple. Gadgets estimating different physical parameters are being utilized widely all through the world. the parameters might be power, temperature, weight and so forth .This task is intended to control and gauge the temperature. For this reason, transduction guideline is utilized as sensors;changing over a sign starting with one type of vitality then onto the next type of energy[6]. This transduction framework comprises of two sections which are detecting or recognizing component and transduction component. Here we are changing over warmth vitality into voltage so as to anticipate self-warming of sensor and the concerned gadget effective[4].

Materials and Method

Model of a Virtual Medical Centre to Home Care patients: This paper displays the structure and usage of a Virtual Medical Center (VMC) for home consideration. The framework is committed for giving telemetric home checking of asthma and heart minded at their homes and network. The particular type of this structure enables the framework to be changed for different applications. This likewise guarantees the utilization of advanced thermometer utilizing LM35 sensor.

Advanced monitoring of pH and temperature of fish farms: This paper displays the remote sensor system to detect the pH and temperature for a fish ranch. The application requires two various types of modules: the sensor to gather the information and the remote module to transmit the information. Gathered data is transmitted to the focal unit, which deals with the system and stores all the got information utilizing LM3535

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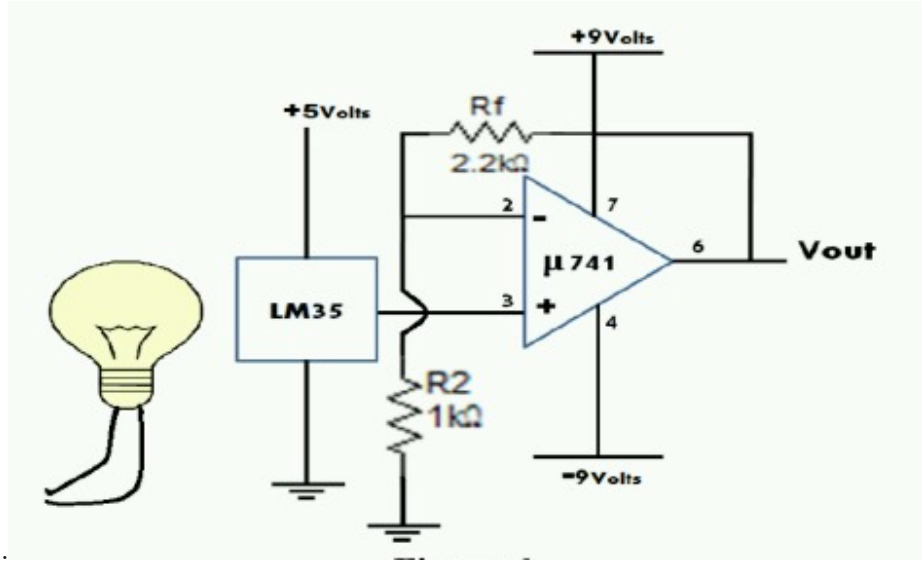


Fig. 1: Circuit Diagram of Temperature Sensor

A Real-Time Wireless Physiological Monitoring System: This paper speaks to a framework that gathers information, for example, body temperature, circulatory strain, and pulse, and afterward the information are put away in the PC of a system the board focus. In this manner, it is simple for the medicinal staff in a nursing focus to screen continuously or break down in cluster mode the physiological changes of the patients under discernment. The structure proposed in the paper has low power use, is down to earth. The proposed structure has the capacity of working openly similarly as prepared for improving the organization quality.

Discussions

So as to screen the temperature of any therapeutic gadget or material, the warmth detecting framework is utilized. Here I am utilizing LM 35 temperature sensor which is productive in detecting temperatures because of its direct voltage attributes. The temperature once detected is appeared as the LED shine which demonstrates that the gear is heated. LM358N is additionally utilized for the intensification of even little info signals which is likewise having exceptionally low supply current channel (500) miniaturized scale amps. The upside of utilizing this sensor is that it has more memory, preparing and less-self warming when contrasted with different sensors. Truth be told this does not require any outer adjustment or cutting to give run of the mill correctness's of + ¼0c at room temperature.

Conclusions

In order to monitor the temperature of any medical device or material, the heat sensing system is used. The LM 35 temperature sensor which is very efficient in sensing temperatures due to its linear voltage characteristics. The temperature once sensed is shown as the LED glow which indicates that the equipment is heated. LM358N is also used for the amplification of even small input signals which is also having very low supply current drain (500) micro amps. The advantage of using this sensor is that it has more memory, processing and less-self heating as compared to other sensors. The upside of utilizing this sensor is that it has more memory, preparing and less-self warming when contrasted with different sensors. Truth be told this does not require any outer adjustment or cutting to give run of the mill correctness's of + ¼0c at room temperature. Ethical Clearance: No ethical clearance was necessary for this research work

Source of Funding: Self funded project.

Conflict of Interest: Nil

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Sub-Lethal Effects of Triazine Herbicides on Oxidative Stress and Antioxidant Response in Poecilia Sphenops Tissues

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Abstract

The use of herbicide in farming fields has a series of toxicological trouble. Atrazine is a commonly used herbicide and is vastly harm to non-target living beings. In the present research was expected to evaluate the impact of atrazine herbicide (1/10th of LC 50, 2.5ppm, 1/20th of LC 50, 1.25ppm and1/30th of LC 50, and 0.83ppm for 100 day) in *Poecilia sphenops* were studied on the basis of superoxide dismutase (SOD), catalase (CAT), glutathiones transferase (GST), reduced glutathione (GSH) and Lipid peroxidase (LPO). Changes in the antioxidant enzymes activity were seen in every single tried focus when contrasted and the control gathering. The general outcomes recommend atrazine is a strong toxicant to aquatic environment.

Keywords: *Atrazine, Oxidative Stress, Antioxidant, SOD, CAT, GST, GSH, and LPO Poecilia sphenop.*

Introduction

Green revolution is the motto of our nation to feed the exploding population. In this regard for modern for modern agricultural practices are adopted to enhance food production. As a result of horticulture overflow, downpours, water system waters, wetland applications, and so on herbicides are released into aquatic ecosystems. Among the different herbicides utilized, atrazine (2-chloro-4-ethylamino-6-isopropylamino-1, 3, 5-triazine), as a result of its high steadiness and diligence in the aquatic environment attracts special attention. Atrazine is readily absorbed through the gastrointestinal tract, even though low dimension of bioaccumulation of atrazine in fish, it accumulates in bladder, liver, gut and cerebrum of fishes[1].

The metabolism of atrazine are usually separated into Phase I and Phase II responses, complex of metabolic procedure are including a few gatherings of xenobiotic processing catalysts, for example, cytochrome P450 isozymes and GST (Glutathione-S-Transferase). GST is a major group of phase II enzyme; associated with the detoxification forms it catalyzes the conjugation of a few xenobiotics with endogenous glutathione (GSH)[2].

Under typical conditions these antioxidants prevention agents shield the cells and tissues from oxidative harm. The cell reinforcements in fish can be utilized as biomarkers of presentation to amphibian pollutants[3]. Oxidative pressure is an unavoidable part of high-impact life. It is the consequence of an irregularity between the creation of receptive oxygen species (ROS) and antioxidants prevention agent protections in living organisms[4]. Receptive oxygen species are incited by substances, for example, transitional metal particles, pesticides, and oil products[5, 6]. During typical cell digestion, free radicals are additionally delivered by endogenous cell sources. Mitochondrial breath is the primary endogenous wellspring of ROS.

Oxidation of bio molecules, changes in gene expression, and alterations in cell redox eminence can be caused by elevated production of ROS[7]. Oxidative stress is incited by numerous synthetic compounds, including a few pesticides. These contaminants may animate receptive oxygen species and modification in cancer prevention agent frameworks. Star oxidant figure activities fish can be utilized to survey contamination of explicit regions or overall marine pollution[8, 5].

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In aquatic animals, assortments of physiological procedures have been influenced by atrazine. It is promptly retained through the gastrointestinal tract, brain, nerve bladder, liver and gut of some fishes[1]. Pesticide incited oxidative pressure have additionally been a focal point of toxicological research for the last decade[9]. Oxidative stress prevention agent barriers, for example, SOD, CAT, GST, GSH and LPO are included to balance the poisonous quality of responsive oxygen species[10].

Materials and Method

Chemicals: 99.9% purity of atrazine was procured from agchrochemical store. All other chemicals utilized in the study were of analytical grade and were acquired from Merck Pharmaceuticals, India.

Experimental procedure: The newly hatched *Poecilia sphenops* juveniles/fries were separated from their respective mother and kept up in 100 L tank. A sum of 200 fries (0 day fry) were isolated and used in four equal treatment groups. Fifty individuals' fries in each group were exposed to three different concentrations ($1/10^{th}$ of LC 50, 2.5ppm, $1/20^{th}$ of LC 50, 1.25ppm and$1/30^{th}$ of LC 50, 0.83ppm) of atrazine and control also maintained simultaneously. They were used for the experiment in the same day hatching. The young ones are nourished with commercial granular feed all through the exploratory period. The aquarium system was static and washing medium was changed once in seven days with same dose of atrazine was recharged. Periodically one or two experimental fishes were sacrificed and dissected out the required organ for analysis.

Enzyme extraction: Liver, gonads and gill homogenise with 50mM Tris HCL pH 7.0. The homogenate were centrifuged at 12,000rpm at 4ºC for 15min. The supernatant was used study.

Antioxidant enzymes: SOD activities were resolved from their capacity to restrain the autoxidation of pyrogallol utilizing an alteration of the technique[11]. CAT activity was tested by the technique[12]. The GSH and GST activity was determined using spectrophotometer according to[13]. The concentration of malondialdehyde (MDA) as a marker of Lipid peroxidase (LPO) was resolved by the strategy of[14].

Protein content: The protein content was determined using Bradford reagent and bovine serum albumin as the standard. Estimation of protein substance was important to calculate the exercises of SOD, CAT, GST, GSH and LPO.

Statistical Analysis: The obtained values are communicated as mean ± SE. Contrasts between gatherings were surveyed by single direction investigation of fluctuation (ANOVA) utilizing the Statistical Package for Social Sciences (SPSS) programming bundle for windows (adaptation 16.0). Post-hoc testing was performed for inter group correlations utilizing the least noteworthy distinction (LSD) test $p<0.05$ was considered measurably critical.

Results and Discussion

Effect on superoxide dismutase: The activities of the enzyme SOD in the liver of *Poecilia sphenops* exposed to atrazine herbicide are presented in Fig. (1). SOD activity is significantly ($p< 0.05$) elevated in the liver at all the concentrations of atrazine exposed experimental group.

The activities of SOD in the liver of *Poecilia sphenops* treated to atrazine herbicide are showed in Fig. (1). SOD action is significantly ($p< 0.05$) rise in the liver at all the groupings of atrazine uncovered exploratory gathering. SOD movement in gonad of *Poecilia sphenops* is shown in Fig. (2). A dose dependant enhancement was noted in testis. Whereas in the ovary SOD activity showed a gradual dose related increase from 60 to 80 days and decline in 100 days but in all the case a dose dependant increase was noted. Marked increase up to end of the study days of atrazine tested at all concentrations respectively, over control values ($p< 0.05$). SOD activity in gill tissue of *Poecilia sphenops* exposed to atrazine is shown in Fig. (3). However, activities of the enzyme in the gill are in the similar pattern as SOD in the liver that is gradual hike over increasing dose.

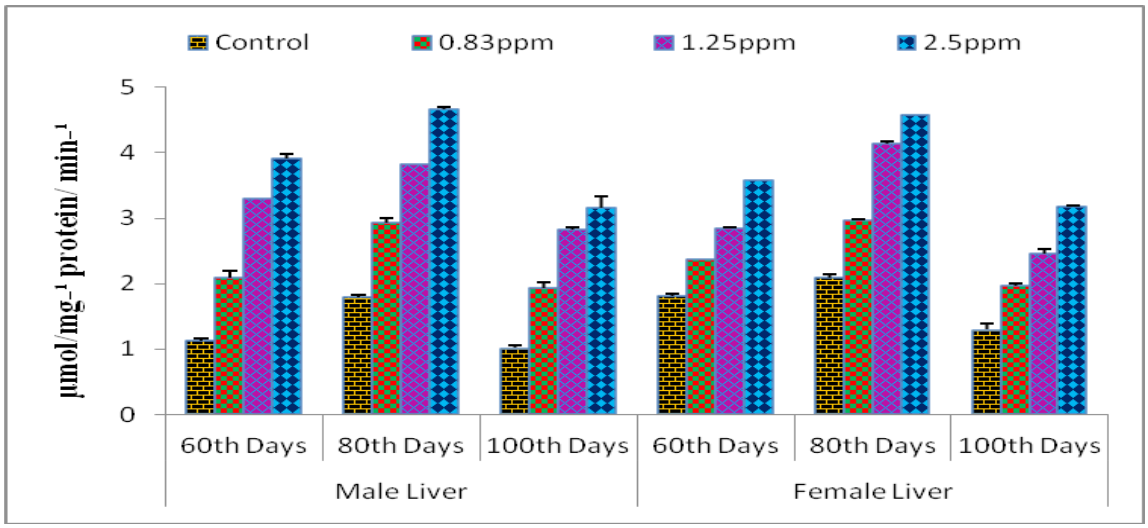


Fig. 1 SOD activity in Liver of Poecilia sphenops exposed to Atrazine

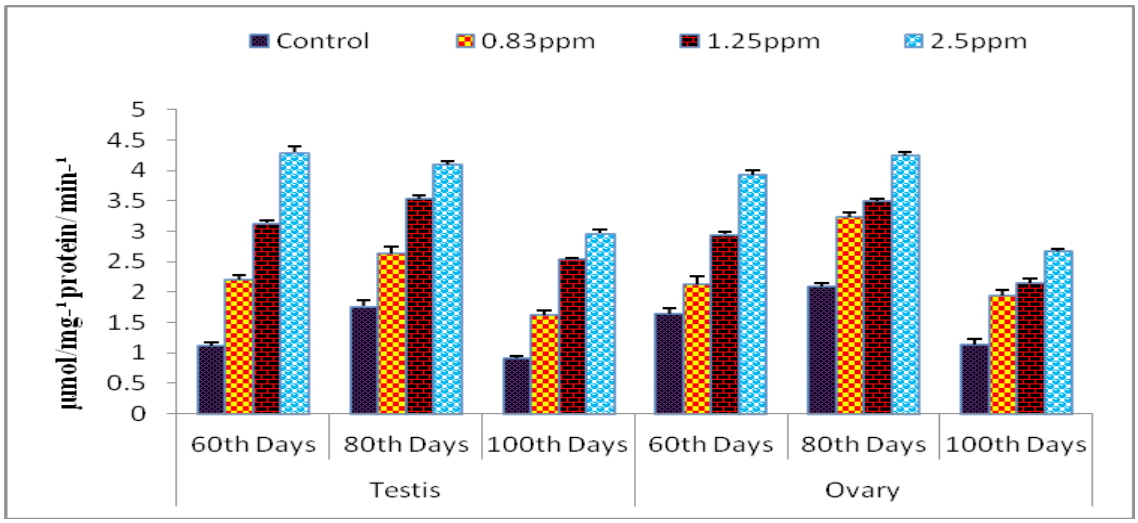


Fig.2. SOD activity in Gonads of Poecilia sphenops exposed to Atrazine

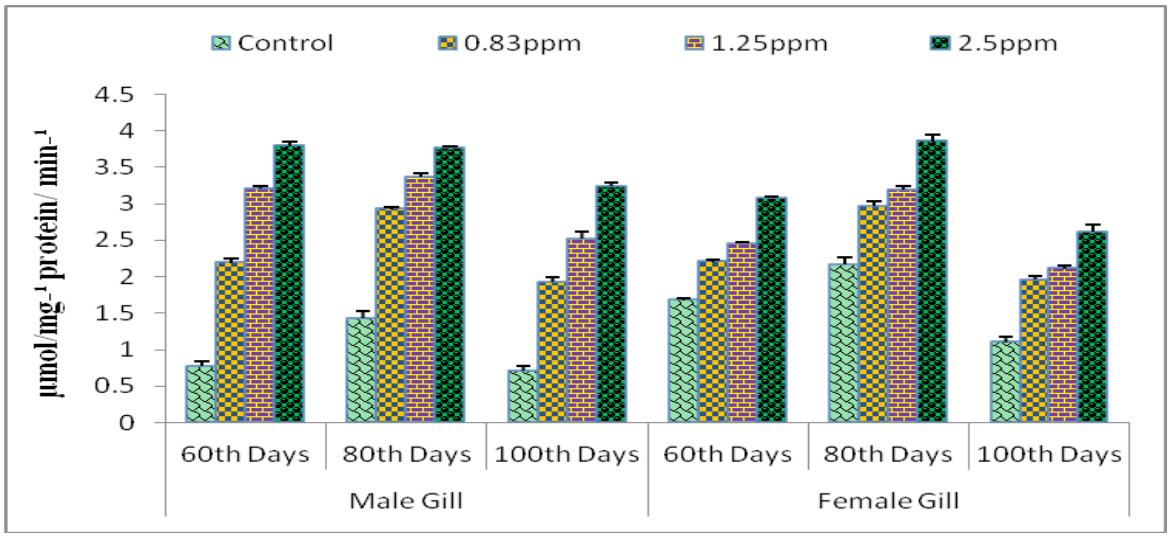


Fig.3 SOD activity in Gill of Poecilia sphenops exposed to Atrazine

Effect on catalase: The changes in the catalase action in various organs of *Poecilia sphenops* treated with atrazine are presented in Fig.4 to Fig.6. The activity in the liver is significantly higher than the untreated *Poecilia sphenops* ($p< 0.05$). The catalase action is considerably ($p< 0.05$) increased in the liver of exposed with atrazine. The CAT activity gradually increased up to 100 days of atrazine administration. Similarly the activity of enzyme in the gonads and gills is in the same pattern as in the liver.

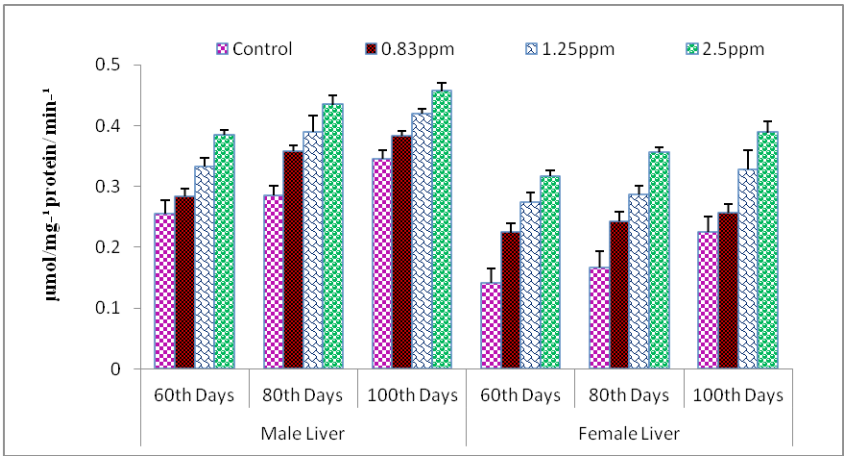


Fig.4. CAT activity in Liver of Poecilia sphenops exposed to Atrazine

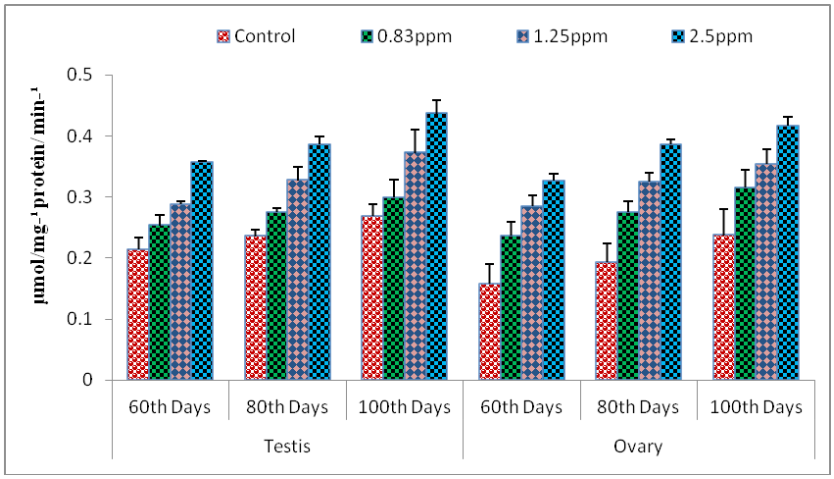


Fig.5. Cat Activity In Gonads Of Poecilia Sphenops Exposed To Atrazine

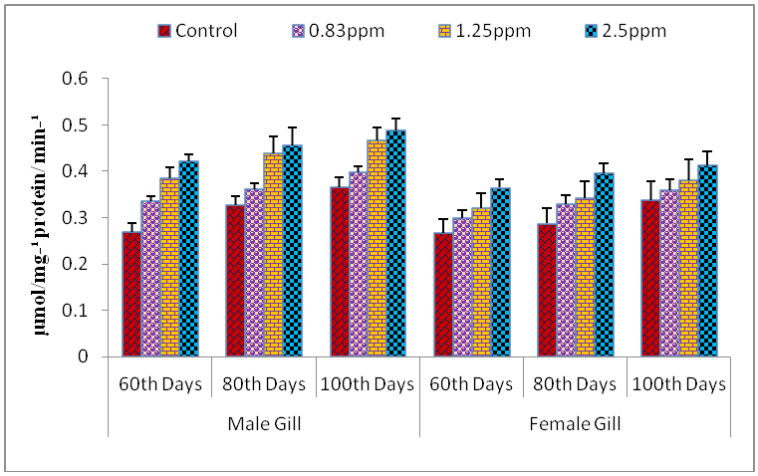


Fig. 6. CAT activity in Gill of Poecilia sphenops exposed to Atrazine

Effect on glutathione-s-transferase: In the present survey, GST activity is increased statistically in the liver of the fish treated to atrazine up to an optimum dose, then decline in higher concentration (Fig.7 to Fig.9). The activity was more in male than female. Time dependency of exposure is observed in the *Poecilia sphenops* exposed to atrazine. Maximum increase is observed in1.25ppm atrazine exposure but in higher concentration (2.5ppm) it is decreased. The levels of GST in gonads and gill of *Poecilia sphenops* in experimental group are significantly increased ($p< 0.05$) compared to the untreated group. On the other hand, the GST activity in the gonads and gills is significantly increased ($p< 0.05$) when compared to liver.

Effect on reduced glutathione: There is significant decrease ($p< 0.05$) in reduced glutathione activity in *Poecilia sphenops* liver exposed to all the doses of the atrazine compared with the untreated (Fig.10 to Fig 12). Reduced glutathione activity is significantly increased ($p< 0.05$) throughout the experiment. The activity of reduced glutathione in gonads and gill of *Poecilia sphenops* is significantly less ($p< 0.05$) in all tested groups compared to liver.

Effect on Lipid peroxide: Determination of Lipid peroxide by the malondialdehde formation is most commonly used markers of oxidative stress. The effects of altered dose of atrazine on malondialdehde development in the liver of *Poecilia sphenops* are showed (Fig.13 to Fig.15). The significant ($p < 0.05$) effect of all doses and period of exposure is observed in the *Poecilia sphenops* exposed to atrazine. The levels of LPO in gonads and gill of *Poecilia sphenops* in experimental group are significantly increased ($p < 0.05$) compared untreated.

Discussion

In this study we discovered increased levels of CAT, SOD, GST and LPO activity in almost all tested *Poecilia sphenops* contrasted with the control. But the reduced GSH level in the atrazine treated *Poecilia sphenops* could be the consequence of diminished usage of GSH for initiating poisonous quality. Just the test group presented to the most elevated centralization of atrazine (2.5ppm) indicates relatively lower action of these antioxidant enzymes (GST).

A raise in antioxidant enzyme activities contributes to the elimination of ROS, which is induced by atrazine. Similar results were reported in *Channa punctatus* exposed to atrazine[15]. They recorded significant increase of SOD action in liver. The SOD activity increases gradually from low concentration to higher concentration on days 60, 80 and 100 of atrazine treatment, when contrasted with the control. The increase in activity of SOD in our investigation reflects compensatory component of expanded oxidative stress. It has been documented in the previous study that exposure of animals to pesticides increases SOD activity in different tissues[16.]

In all experimental groups, CAT activity in *Poecilia sphenops* is increased contrasted with the control group. Similar results are observed in different tissues of common carp after chronic simazine exposure[17]. High level of CAT activity was reported in freshwater fish Channa punctatus after atrazine exposure[18].

In addition to this, there is an elevation in GST activity connected with dose up to 1.25ppm but at higher concentrations (2.5ppm) there is decrease in this activity on 60, 80 and 100 days of atrazine exposure in *Poecilia sphenops* as contrasted with controls. Related results were watched in the level of GST in the zebra fish embryos of after atrazine introduction in dose dependent manner, but at higher concentration this activity is generally decreased[19]. A considerable decrease in GSH level in all the tissues in *Poecilia sphenops* after atrazine exposure is indicated in pro-oxidant conditions. Reduced in GSH levels after of different pesticides are all around reported in literature[20].

The reduced degrees of GSH in the atrazine treated *Poecilia sphenops* could be the consequence of either expanded usage of GSH for conjugation or cooperation of GSH as cell reinforcement in ending free radicals delivered because of atrazine-initiated harmfulness. In the present examination diminished degrees of GSH in the atrazine controlled *Poecilia sphenops* could be the result of decreased utilization of GSH for inducing toxicity. It is like the individuals who recorded a checked reduction in GSH content in *Carassius auratus* and grown-up female Danio rerio exposed to alachlor and atrazine herbicides[21]. A few results of lipid peroxidation are usually utilized and most likely assessment of malondialdehyde levels. Most much of the time it is estimated with thiobarbituric acid[22]. In our investigation, we discovered critical increment in lipid peroxidation in *Poecilia sphenops* exposed to atrazine. Our outcomes are in concurrence with who revealed that there is a raised degree of lipid peroxidation in liver *of Channa punctatus* because of atrazine exposure[15].

Conclusion

The present study concluded that atrazine treated *Poecilia sphenops* generate increased oxidative stress, altered antioxidant status. Along these lines, these parameters can be utilized as markers of atrazine lethality.

Ethical Clearance: No ethical clearance was necessary for this research work

Source of Funding: Self funded project

Conflict of Interest: Nil

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Performance Analysis of FPGA Based Fund Us Image Processing

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Abstract

Image processing techniques is been applied to process of imaging to obtain a more suitable output image for certain specific applications. Image processing improves the interpretability of an image for a human viewer. Visible quality of an image is enhanced by varying brightness, contrast, & histogram equalization. The analysis of image from tissues is very important for the detection of abnormalities. The images from abnormal regions are processed for distinguishing normal and abnormal regions. Commonly used method for analysis of medical images are based on software algorithm and the image enhancement algorithm with field programmable gate arrays (FPGA) implemented in hardware is a high performance. The image processing uses MATLABsimulator for processing. The proposed system of fundus image for detecting fluid filled abnormal regions of retina. The performance of the proposed system is evaluated[1]

Keywords: *Image enhancement; FPGA; Histogram; MATLAB simulator.*

Introduction

Picture taking care of is the technique to change over a picture to be modernized structure and search out explicit surpassing on it, so as to get an overhauled picture or to dispose of few containing data from it. It is a sort of sign guidelines wherein information is image[6], similar to video cuts or photograph's and yield might be picture or attributes joined with that picture. All around Image Processing framework circuits considering pictures to be multi dimensional sign while embeddings formally set of signs preparing method to them. Picture pre-getting ready fuses picture improvement, modifying, and selection[6]. Picture improvement recognizes a propelled picture as data and produces an updated picture as a yield; in this special circumstance, improved techniques more noteworthy in some respects[3]. It joins building up the separation, ousting geometric contorting, smoothing the edges, or changing the image to energize the illustration of its information content. In picture remaking, the debasement is ousted from the image to make a picture that takes after the first underrated picture[4]. In picture enrolment, the effects of sensor advancements are ousted from the image or to join different pictures gotten by different sensors of a comparable field Image taking care of is seen as a champion among the most rapidly propelling regions of information advancement, with creating applications in all fields of learning. It comprises a centre territory of research inside the software engineering and building disciplines, given the enthusiasm of potential applications extending from picture upgrading to programmed picture getting, apply autonomy and PC vision picture handling applications, particularly therapeutic picture preparing applications for article recognition, necessitate that few activities be performed on every pixel in the picture bringing about an even huge number of tasks per second[2].

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Methodology and Material

This area talks about the hypothesis of most generally utilized picture upgrade calculations like

1. Negative Transformation,
2. dark Thresholding

1. **Negative Transformation:** There are different applications in which negative of the electronic pictures are serene helpful. For example[4], appearing

to be medicinal pictures and getting a screen with monochrome positive film with using the consequent negatives as standard slides. The negative of the moved picture is gotten by using the change work: J(r) = (L-1)- I(r) Where L is the proportion of reduce estimations, I(r) is input pixel diminish estimation and J(r) is yield changed lessening estimation. The considering is to change the mentioning from decrease to white with the objective that the power of the yield picture diminishes as the force of the data increases.

2. **Lessen thresholding:** Thresholding an image means changing all pixels in two properties as it's been said. This is the sublime sort of quantization isolating the pixel regards and a given edge regard. Thresholding makes yield picture with only two properties that is 0 and 255 for 8bit reduce estimation picture[6].

   0, if I(r) <=T J(r) = 255, if I(r) > T

Working out as expected of Thresholding picture is a high multifaceted nature picture, this have just two reduce estimation respects[7]

Result

The equipment based execution of picture upgrade calculation is completed on Spartan-3[E] group of FPGA. In this product advancement device utilized for creating and confirming the structure is the Xilinx. The picture demonstrates how much zone is influenced and whether the picture is ordinary or strange.

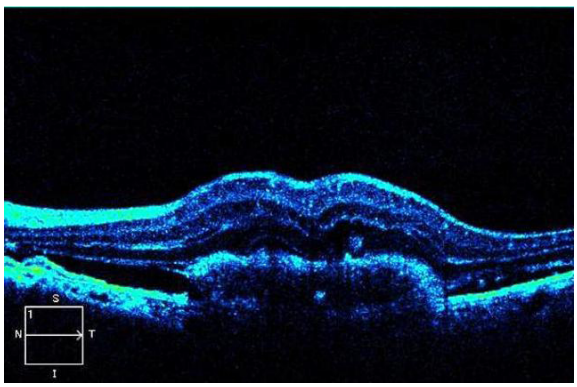


Fig 1: Images showing abnormal region with processing

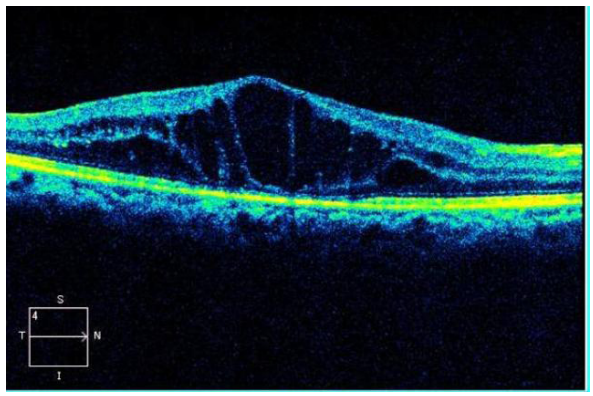


Fig 2: Images showing abnormal region without processing.

The proposed design was applied for the processing and acquired abnormal images. The measurements of abnormal areas were taken and were observed by changing filter in real-time[4].



Figure 3: Shows the area of abnormality displayed on LCD.

The proposed model uses spartan 6E of FPGA family for the handling of pictures. The connected FPGA system give better execution and the region of anomaly can be effectively recognized for the typical regions. The proposed equipment strategy utilizes FPGA system and it supposedly provided preferable execution over the ordinary programming procedure connected.

Conclusion

Picture preparing calculations executed in equipment have as of late risen as the most feasible answer for improving the exhibition of picture handling frameworks. This paper executed for rapid picture improvement applications utilizing fpga. The picture improvement procedures, for example, brilliance and differentiation modification are significant particularly in medicinal pictures. This paper likewise clarifies usage of Negative change, Gray thresholding, calculations on fpga. Then calculations is been actualized on Spartan-3E fpga advancement pack. It computerized pictures in great brilliance/difference and it improves nature of pictures. This systems utilized for various applications relies upon necessity and need.

Ethical Clearance: No ethical clearance was necessary for this research work

Medium of Funding: Self funded project.

Conflict of Interest: Nil

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Design of a Light Activated Switch for Persons with Cerebral Palsy

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Abstract

A light activated switch for persons to operate switch-controlled computer software or other communication device has been developed. A light emitting diode is attached to the user's forehead. An array of photo transistors is mounted at a fixed position from the body. It requires a small but controllable motion to activate the switch by aiming the LED beam at the target area of the receiver. The false activation due to uncontrollable motion will be a problem associated with cerebral palsy. The LED in the transmitter is driven by oscillator at 1 kHz and the band pass filter which is in receiver is tuned at that frequency[1]. The level of received is detected by an amplitude demodulator once the signal is filtered. When the signals amplitude reach's the threshold, a one short timer is triggered which then latches the switch for predetermined period. The system was tested by an 8 year old child and has demonstrated a satisfactory result. The sensivity and specificity are important factors for reliable operation of the light activated switch associated with the cerebral palsy[6]

Keywords: *Switch technology; Computer access; Cerebral palsy (CP); Spastic cerebral palsy; Assistive technology (AT).*

Introduction

For some individuals with inabilities like cerebral paralysis or spastic cerebral palsy, a switch controlled framework is the main instrument to manage these sorts of issues effectively[5]. Cerebral paralysis is a gathering of changeless development issue that show up in early childhood[2]. Side effects regularly incorporate poor coordination, firm muscles, feeble muscles and tremors. There might be issues with sensation, vision, hearing, gulping and talking and the patient don't move over, sit, slither or stroll as normal[6]. It is brought about by anomalous advancement or harm to the pieces of cerebrum that controls development, balance, act. Cerebral paralysis is halfway preventable through vaccination of the mother and security improvement ought to be taken 4. There is no remedy for cerebral paralysis anyway steady medications and medical procedure may support numerous people. These medicines incorporate active recuperation and language training. There is currently assistive innovation intended to help when managing cerebral paralysis. The principle goal of assistive innovation is to add to the powerful improvement of the lives of individuals with inabilities and old individuals by surviving and tackle their utilitarian issues, decreasing reliance on others and adding to the reconciliation into their families and society[5].

People with an examination of cerebral loss of motion (CP) much of the time have basic physical imperatives that foresee examination and full collaboration to the earth. AT systems can outfit open entry ways for people with CP to interface with their world, engaging correspondence, and consistently living aptitudes. Capable access and control of the advancement are essential for successful use; regardless, developing enduring access is much of the time inconvenient because of the possibility of the improvement precedents shown by people with CP[6].

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Material and Methodology

The framework comprises of a couple of transmitter and collector. The oscillator at 1 KHz in the transmitter infers a light radiating diode a variety of photograph resistors in the collector detects the light. The detected light is then amplified1, separated by a band pass channel and sufficiency demodulator[2]. At the point when the came about sign surpasses or achieves the edge, a switch is actuated by setting off the one short clock. At the point when the hand-off gets shut, a switch sign is given to the PC. The framework is intended to a separation of 6-8 inch between the beneficiary and the transmitter. When we increment the current to the LED we can without much of a stretch increment the separation between the beneficiary and the transmitter. A 9v battery is likewise used to control the framework.

Reasons for Using Phototransistor: The collector has a variety of phototransistors by which the light is detected. The phototransistor is a semiconductor light sensor shaped from an essential transistor with a straightforward spread that gives much preferable affectability over a photodiode. There is a wide determination of photosensitive gadgets that are accessible to the electronic originator. While photograph diodes satisfy numerous necessities, phototransistors or photograph transistors are likewise accessible, and are progressively reasonable in certain applications. Giving large amounts of addition and standard gadgets are minimal effort, these phototransistors can be utilized in numerous applications[4]. The possibility of the photograph transistor has been known for a long time. William Shockley initially proposed the thought in 1951, not long after the standard transistor had been found. It was then just two years before the photograph transistor was illustrated. From that point forward phototransistors have been utilized in an assortment of utilizations, and their improvement has proceeded from that point forward.

Use of Oscillator: An oscillator is a circuit which delivers a consistent, rehashed, rotating waveform with no information. Oscillators essentially convert unidirectional current stream from a DC source into a substituting waveform which is of the ideal recurrence, as chosen by its circuit segments. The essential guideline behind the working of oscillators can be comprehended by investigating the conduct of a LC tank circuit appeared, which utilizes an inductor L and a totally pre-charged capacitor C as its parts. Here, at first, the capacitor begins to release by means of the inductor, which results in the change of its electrical vitality into the electromagnetic field, which can be put away in the inductor. When the capacitor releases totally, there will be no present stream in the circuit[5].

In any case, by at that point, the put away electromagnetic field would have produced a back-EMF which results in the progression of current through the circuit a similar way as that of previously. This flow move through the circuit proceeds until the electromagnetic field breakdown which result in the back-change of electromagnetic vitality into electrical structure, making the cycle rehash. In any case, presently the capacitor would have accused of the contrary extremity, because of which one gets a wavering waveform as the yield.

Purpose of Amplitude Demodulator: The detected light from the phototransistors is enhanced and separated by a band pass channel and abundances demodulator. The way toward isolating or separating the tweak from a sign is called demodulation or identification. For Major change, the method of demodulation or area can be developed in all regards simply using a diode, or it may be practiced in various ways that give progressively incredible demodulation of the waveform. As plentifulness modification is still comprehensively used due to its ease, authorities melding AM demodulators are manufactured in measures of an enormous number each year. Inside these radios a fundamental AM identifier containing a diode is used. Here are different habits by which an AM sign can be demodulated. There is an equality that ought to be made of the introduction of the circuit that is required against the multifaceted nature, and thus the cost that can be persevered.

Band Pass Filter: Band Pass Filters can be utilized to segregate or sift through specific frequencies that exist in a specific band or scope of frequencies. The cut-off recurrence or fc point in a straightforward RC uninvolved channel can be precisely controlled utilizing only a solitary resistor in arrangement with a non-enraptured capacitor, and relying on which path around they are associated, we have seen that either a Low Pass or a High Pass channel is acquired.

One basic use for these kinds of uninvolved channels is in sound enhancer applications or circuits, for example, in amplifier hybrid channels or pre-intensifier tone controls. Now and then it is important to just pass a specific scope of frequencies that don't start at 0Hz,

(DC) or end at some upper high recurrence point yet are inside a specific range or band of frequencies, either limited or wide.

By interfacing or "falling" together a solitary Low Pass Filter circuit with a High Pass Filter circuit, we can create another kind of latent RC channel that passes a chose range or "band" of frequencies that can be either thin or wide while weakening each one of those outside of this range. This new sort of inactive channel game plan delivers a recurrence specific channel referred to normally as a Band Pass Filter or BPF for short.

PROCESS Of Cerebral Palsy-Indication: This process of cerebral palsy indication involves the number of phototransistors and their positions to indicate the geometry of the target area that sensed the light. These photo sensor arrays are mounted on the left side of the face about 6 inches away when the LED is taped on the user's forehead. A slight left turn of the head directs to the light beam onto the target and triggers the switch[6]. The operation requires a head turn in a specific direction for a specific angel. The process to indicate the specific area which is affected by cerebral palsy requires the design of a system which consists of receiver and transmitter. The receiver transmitter distance can be adjusted for an appropriate trade off between sensivity and specificity. When the distances between the two is increased, sensivity decreases but specificity decreases. The configuration of the sensor array not only indicate the geometry of the target area but also provides the possibility for optimizing the system performance[6].

Result

The prototype of this system gives an indication when the switch is activated. This indication can be delivered by either a LED indicator or buzzer. The design of this system is easy. It is easy to achieve the operation under normal conditions also. Material used in designing the system is very low costly. The quantity of photograph transistors and their positions decide the objective territory that detects light. The light actuated switch is the straightforward and reasonable answer for people with spastic cerebral paralysis.

Conclusion

It gives a basic, modest answer for people with spastic cerebral paralysis. On the basis of specificity and sensitivity of the system, the transmitter-receiver area can be adjusted. Due to the more stringent requirement on head movement to trigger the switch, sensivity decreases as the distance increases but specificity increases. Another possibility for increasing the system performance is to provide configuration of the sensor array.

Ethical Clearance: No ethical clearance was necessary for this research work.

Funding: Self funded project.

Conflict of Interest: Nil

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IR Sensor Based Drowsiness Detecting During Driving System

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Abstract

Sleepiness either by Drowsy or Alcoholic is the main cursory factor for road accident and daytime malfunction. Especially, distinguishing driver's laziness could capture drivers from impacts brought about by lazy driving. This paper point is to permit the dependable sign for identifying driver frumpiness dependent on the infrared sensors. In this paper we connected IR sensors which measure the beats every minutes (BPM) inconstancy of the driver which indicates tiredness of the subject. The target of this task is to plan and advancement of inbuilt IR sensor inside directing wheel of the vehicles. This laziness discovery framework is savvy and increasingly precise to lessen the episode of street mishap.

Keywords: *Sleepiness; IR sensors; beats per minute; in built IR sensor; drowsiness detection.*

Introduction

The inclination to rest over the span of day by day life, when expecting to remain alert, speaks to a noteworthy new general wellbeing danger since it adds to traffic and work mishaps. A pulse screen is an individual checking gadget that enables a subject to gauge their pulse continuously or record their pulse for later study[1]. Numerous examinations of wake-rest change have been made. Driver laziness is a significant factor in the motoring of vehicle mishaps PC vision ways to deal with location of weariness has been centered around the examination of squints and head movements[7] Be that as it may, in the weakness recognition frameworks created to date, sleepiness cautioning framework utilizing picture handling has turned out to be most generally utilized in light of the fact that it gives a remote detection[6.] Because of the expansion in the measure of vehicle as of late, issues made by mishaps have turned out to be progressively intricate also. Conventional transportation framework is no higher adequate. As of late, the savvy vehicle framework has risen and turned into a well known point among transportation specialists[5]. In any case, the exploration of wellbeing in vehicle is a significant subset of shrewd vehicle framework examine. Interim, dynamic cautioning framework is one of the structures on dynamic security framework. The security cautioning frameworks, generally dynamic cautioning frameworks for anticipating car crashes have been drawing in specialists[4].

Sorts of Drowsiness: This therapeutic manifestation data demonstrates the different kinds of Drowsiness, and other related side effects or conditions, including their causes and determination.

- Daytime sluggishness
- Daytime tiredness
- Yawning
- Adaptive impact
- Yawning Excessively

Different calculations For detection of Drowsy:

1. Conduct with object
2. Eye investigation

The main meddlesome strategies of some of non-nosy. The meddlesome strategies incorporate ECG, EOG and Eye movement. In The portion kind of techniques drivers needed to wear a head gear while driving. While in different techniques Are utilized heartbeat identifier set in the guiding haggle the back of the seat. These excessively were not dependable more often than not. That is the reason this method was very little embraced

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for everyday citizens. Strategies to identify laziness based on vehicle practices, for example, vehicle guiding movement, vehicle speed and vehicle control position are additionally grown yet they to moderate to even consider alerting the driver before he mode off these techniques alarms driver simply after they nodded off not before they were in the scene of the tired state[5].

Material and Method

Aurdino UNO: Arduino Uno goes with USB interface for instance USB port is incorporated the board to make successive correspondence with the PC. Aurdino in the heap up that goes with different features like timekeepers, counters, meddles with, PWM, CPU, I/O sticks and reliant on a 16MHz watch that associates in conveying more repeat and number of bearings per cycle. It is an open source organize where anyone can change and update the load up subject to the amount of headings and errand they have to achieved[7].

IR Sensor: This venture includes measure and controls the eye flicker utilizing IR sensor. The IR transmitter is utilized to transmit the infrared beams in our eye. The IR beneficiary is utilized to get the reflected infrared beams of eye. In the event that the eye is shut method the yield of IR recipient is high generally the IR beneficiary yield is low. This to realize the eye is shutting or opening position. This yield is provide for rationale circuit to demonstrate the caution. This venture includes controlling mishap because of oblivious through Eye squint. Here one eye flicker sensor is fixed in vehicle where in the event that anyone looses cognizant and demonstrate through caution. A vehicle test system study was intended to gather physiological information for approval of this innovation. Strategy for investigation of physiological information, free evaluation of driver sluggishness and improvement of languor identification calculation by method for successive fitting and determination of relapse models is displayed. Edge.[6]

Inbuilt IR sensors Steering wheel: A controlling wheel (likewise called a driving wheel or a hand wheel) is a kind of guiding control in vehicles. Directing wheels are utilized in most present day land vehicles, including all large scale manufacturing autos, just as transports, light and overwhelming trucks, and tractors. The directing wheel is the piece of the controlling framework that is controlled by the driver. Inbuilt IR sensors controlling wheel helps in identifying languor of the driver.

Sluggishness Detection System: Sluggishness is a condition of diminished mindfulness or readiness related with a longing or inclination to nod off. Sluggishness is thusly the cerebrums last advance before nodding off. The instance of the result is physical work or different exercises that uses the vitality supply arrangement of the body. It is an ordinary and normal partner of weakness yet it appears alone. Specialists state, languor amid the day, notwithstanding amid exhausting exercises, demonstrates a resting issue. Tiredness recognition framework that catches, forms, perceives and gives results to the client, which client can take activities on the occasions, and the perception of eye developments and flicker designs. By observing the eyes, it is trusted that the side effects of driver exhaustion can be distinguished sufficiently early to maintain a strategic distance from an auto crash. The prerequisites for a compelling sleepiness identification framework are as per the following:

- A non-meddling observing framework that won't divert the driver.
- A ongoing observing framework, to protect precision in distinguishing sluggishness.
- A framework that will work in both daytime and evening time conditions.

Recognition of weakness includes a succession of pictures of a face, and the perception of eye developments and flicker designs.

Method for Detecting Drowsiness:

Eye Blink Idtinfication: The explanation behind estimating the start and end focuses where a large portion of the adequacy is come to, is in light of the troubles to precisely decide the start and end purposes of the squint complex in the EOG signal. The focuses where a large portion of the plentifulness is come to, in any case, can be decided all the more precisely, as they are fairly unaffected by little blunders in the area of the squint start and end focuses.

Processing Of Blink Data: In view of the gathered EOG information, squints were recognized in the EOG signal The flicker recognition program distinguished begin, pinnacle and stop positions in the squint edifices. Pinnacle positions were distinguished as nearby maxima of the flicker edifices over a movable limit an incentive to alter the edge esteem and to address for erroneously recognized flickers and squints passed up. This was done by taking a gander at a 30 second window and moving forward.

Statistical Approach for Drowsiness Detection: A creative picture getting ready figuring as Drowsy driver acknowledgment procedures can shape the reason of a system to perhaps diminish accidents related to lethargic driving. an image taking care of estimations close by non-intruding strategy. The headway proposed ensures the security and happiness of dozen and scores of driver's life. Relationship of both the drivers‟ with and without shows was made, course of action and outline was plotted with the quantifiable characteristics for each packaging, which exhibits that the truthful motivating force for the edges were generally near for the driver's with and without presentations.

Compact Vehicle Detection System: In this paper, a non-intrusive driver's tiredness structure has been shown reliant on PC vision and picture dealing with. This system uses visual information to inspect and screen driver's eye state at close steady and certifiable driving conditions. The proposed figuring for eye disclosure and eye following is solid and accurate under varying light, outside edifications impedance, vibrations, changing establishment and facial headings. Also, all drivers used in these examinations were introduced to a combination of inconvenient conditions typically experienced in a roadway. This confirmations and insists that these preliminaries have exhibited healthiness and adequacy in certified surge hour gridlock scenes.

Discussion

This investigation paper depicts the various techniques for recognizing driver's tiredness by exploring circulatory strain through fingertip using IR sensor. Distinguishing proof of the BPM is done by the infrared sensors. In the second step all the recorded parameters sent back to the Aurdino UNO board. System distinguishes the driver's beats each minutes through fingertip. In future use of this structure with facial acknowledgment would be almost the most definite and exceedingly alright for drivers.

Future Scope: Later on, I might want to make this framework outfitted with another framework which incorporates camera and facial recognition. More highlights separated from caution will be the vibration of guiding wheel. A source which produces vibration will be joined to the controlling wheel which would vibrate and make driver cognizant and alert while driving.

Ethical Clearance: No ethical clearance was necessary for this research work.

Source of Funding: Self funded project.

Conflict of Interest: Nil

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Correlation of Parenchymal Thickness of Kidneys with Ultrasonography in Various Clinical Stages of Chronic Type-II Diabetes

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Abstract

Ultrasonography is used as a first line imaging technique to differentiate between acute and chronic kidney diseases in type 2 diabetes. The renal parenchymal thickness of left and right kidneys were compared and a detailed documentation was made. Our study included adult male and female population who were known case of Diabetes Mellitus, above 18 years of age and biochemically diagnosed for nephropathy. All patients were subjected to ultrasonography evaluation of the renal parenchymal thickness and the findings were documented.

Keywords: *Ultrasonography, Type II Diabetes.*

Introduction

Ultrasound images are useful at characterizing the pelvis, assessing renal dimensions, parenchymal thickness and evaluating their characteristics and distribution[1-4]. Cortical thickness should be estimated from the base of the pyramid and is generally 7–10 mm[5]. If the pyramids are difficult to differentiate, the parenchymal thickness can be measured instead and should be 15–20 mm [4]

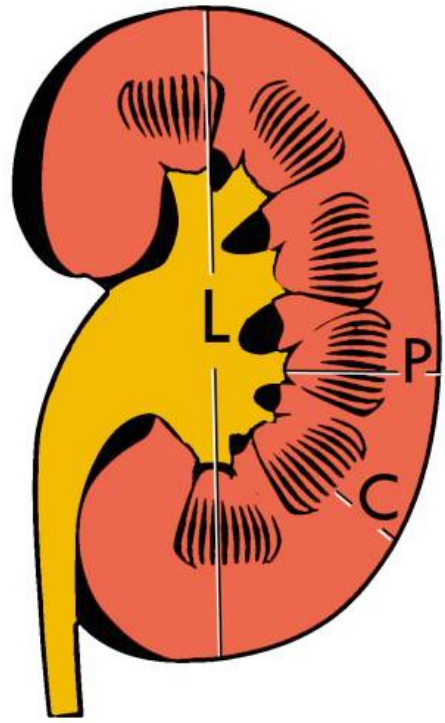


Figure 1: Measures of the kidney. L = length. P = parenchymal thickness. C = cortical thickness

Findings: Based on the measurement of right and left renal parenchymal thickness sonologically in diabetic nephropathy subjects, the following were interpreted.

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Table 1: Distribution of Renal parenchymal thickness for Right Kidney (in mm)

Groups	Min	Max	Mean	SD	Median	IQ Range
Control	13.7	14.3	13.9	.17	13.9	13.8, 14.0
Diabetic nephropathy Group I	14.0	15.3	14.9	.30	15.0	14.9, 15.1
Diabetic nephropathy Group II	13.8	14.4	14.1	.28	14.15	15.0, 14.3
Diabetic nephropathy Group III A	13.2	14.3	13.5	.23	13.5	13.4, 13.67
Diabetic nephropathy Group III B	11.8	13.5	12.2	.47	12.05	11.9, 12.27
Diabetic nephropathy Group III C	10.2	10.4	10.3	.10	10.3	10.22, 10.3
One-way ANOVA with LSD post-hoc test used; F-value= 371.7, p<.001						

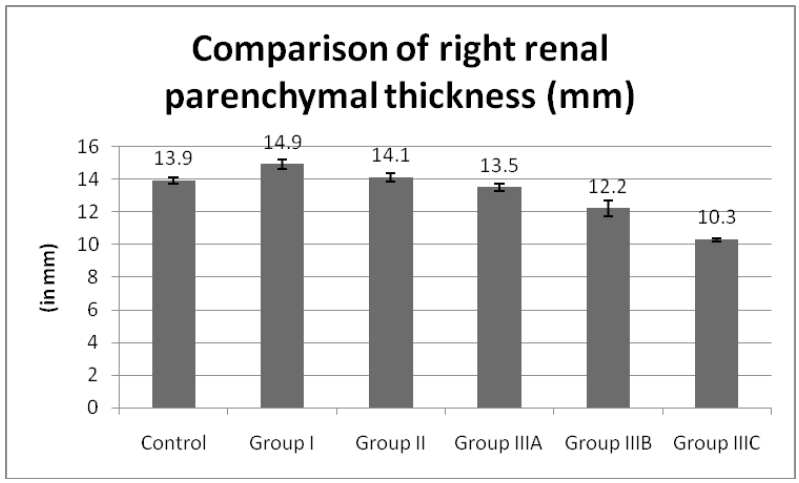


Figure 2: Comparison of right renal parenchymal thickness

Table 2: Distribution of Renal Parenchymal Thickness for left Kidney (in mm)

Groups	Min	Max	Mean	SD	Median	IQ Range
Control	14.3	14.9	14.6	.19	14.6	14.5, 14.72
Diabetic nephropathy Group I	15.2	15.9	15.5	.23	15.6	15.4, 15.7
Diabetic nephropathy Group II	14.7	15.4	15.03	.21	15.0	14.9, 15.2
Diabetic nephropathy Group III A	14.0	14.7	14.29	.20	14.25	14.12,14.47
Diabetic nephropathy Group III B	12.1	12.6	12.38	.13	12.4	12.3, 12.5
Diabetic nephropathy Group III C	10.7	10.9	10.77	.09	10.75	10.7, 10.87
One-way ANOVA with LSD post-hoc test used; F-value= 518.7, p<.001						

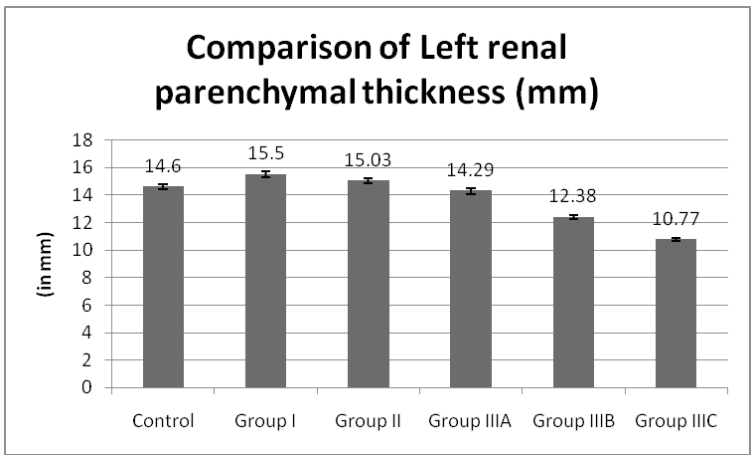


Figure 3: Comparison of left renal parenchymal thickness

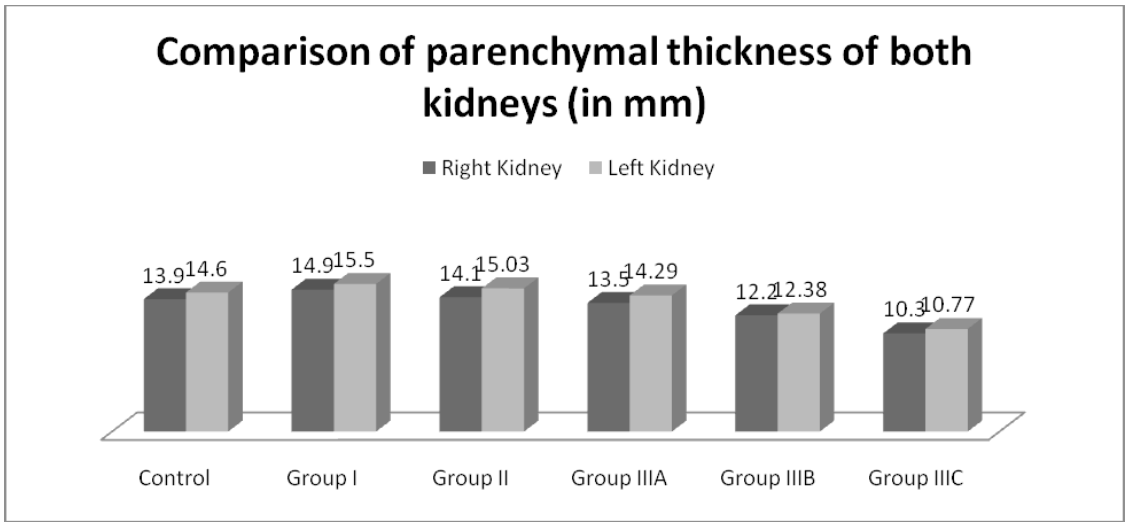


Figure 4: Comparison of parenchymal thickness of both kidney

Discussion

The renal parenchymal thickness between the groups of right kidney was evaluated. The range, mean and standard deviations, median and inter-quartile range were decimated. The mean and SD of controls, group I, group II, group IIIA, group IIIB, group IIIc were 13.9 ± .17, 14.9 ±.30, 14.1 ± .28, 13.5 ± .23, 12.2 ± .47, 10.3 ± .10 millimeters respectively. Their lparenchymal thickness ranged from 13.7 to 14.3, 14.0 to 15.3, 13.8 to 14.4, 13.2 to 14.3, 11.8 to 13.5 and 10.2 to 10.4 among the controls, group I, group II, group IIIA, group IIIB, group IIIc respectively. The median (50th percentile) parenchymal thickness (inter-quartile range, i.e between 25th percentile and 75th percentile) fluctuated with values of 13.9 (13.8, 14.0), 15.0 (14.9, 15.1), 14.15 (15.0, 14.3), 13.5 (13.4, 13.67), 12.05 (11.9, 12.27) and 10.3 (10.22, 10.3) respectively among controls, group I, group II, group IIIA, group IIIB, group IIIc that have been included in this study. Florini F et al.,[1] in their study have observed progressive parenchymal thickening in parallel with the stages of DKD and thence the results support our evidence convincingly.[2]

The renal parenchymal thickness between the groups of left kidney was evaluated.[3] The range, mean and standard deviations, median and inter-quartile range were decimated. The mean and SD of controls, group I, group II, group IIIA, group IIIB, group IIIc were 14.6 ± .19, 15.5 ±.23, 15.03 ± .21, 14.29 ± .20, 12.38 ± .13, 10.7 ± .09 millimeters respectively. Their parenchymal thickness ranged from 13.7 to 14.3, 14.0 to 15.3, 13.8 to 14.4, 13.2 to 14.3, 11.8 to 13.5 and 10.2 to 10.4 among the controls, group I, group II, group IIIA, group IIIB, group IIIc respectively. The median

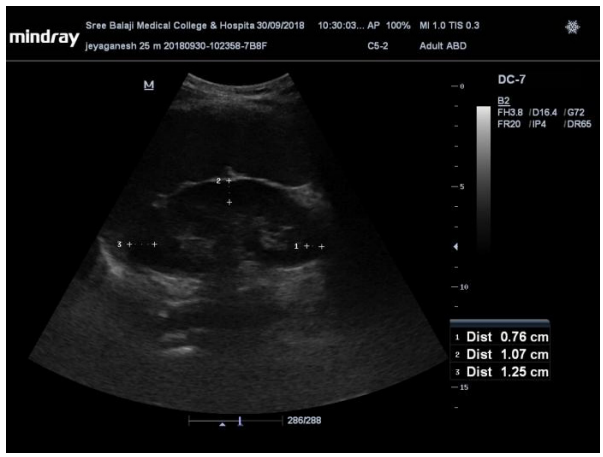


Figure 5: Ultrasound image of the measurement of renal parenchymal thickness

(50th percentile) parenchymal thickness (inter-quartile range, i.e between 25th percentile and 75th percentile) fluctuated with values of 14.6 (14.5, 14.72), 15.6 (15.4, 15.7), 15.0 (14.9, 15.2), 14.25 (14.12, 14.47), 12.4 (12.3, 12.5) and 10.75 (10.7, 10.87) respectively among controls, group I, group II, group IIIA, group IIIB, group IIIc that have been included in this study.

Conclusion

Based on the measurement of right and left renal parenchymal thickness sonologically in diabetic nephropathy subjects, it was interpreted that the renalparenchymal thickness diminished while the disease was getting progressed.

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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Prevalence of Menstrual Abnormality in Adolescent Girls

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Abstract

Menstrual disorders are common sources of morbidity among adolescent girls and often cause anxiety for these girls and their families. Todetermine the patterns of menstruation as well as the prevalence of menstrual disorders among adolescent girls in south Chennai. The study employed a descriptive cross-sectional design. The data were collected from 300 adolescent girls fromOut patient clinic and In-patients of Gynaecology department, Sree Balaji Medical College and Hospital and also from schools and colleges from south Chennai . Data was collected by adopting a structured questionnaire on prevalence of menstrual irregularity among adolescent girls in the age group of 13-19years. 300 adolescent girls completed the questionnaires in the age between 13 and 19years.Among which 66% were from urban and 34% from rural. Girls were from socio economic status I to V and maximum in the lower middle group. The mean age of menarche was 12.3years. BMI is significantly associated with menstrual disorders. The most common menstrual problem seen in adolescent girls is dysmenorrhea (38%) followed by HMB (27%), oligomenorrhea (21%), and polymenorrhea (11%) and hypomenorrhea of 3%.Among 300 girls,36% of girls had awareness about menstruation before menarche and 64% were unaware of it. The prevalence of menstrual disorders among adolescents girls in south Chennai is high.so, steps to be undertaken for early diagnosis and prompt treatment.Health education among adolescents and their mothers about menstrual disorders and to mitigate their effects on the social and academic lives of these adolescents should be made.

Keywords: *Adolescent girls; menstrual disorders; dysmenorrhea; heavy menstrual bleeding (HMB), oligomenorrhea; polymenorrhea; hypomenorrhea.*

Introduction

The word adolescence in latin means to grow up. Adolescence is a transition period from childhood to adults and it involves various physical emotional and psychosexual changes in a girl[1].WHO defined adolescence as progression from appearance of secondary sexual characters to sexual and reproductive maturity and development of adult mental process[2].Adolescent age group defined by WHO is between 10-19 years for girls[3].One fifth of world's population is between 10-19 years[4]. Menstrual cycle is a normal physiological process that is characterized by periodic and cyclic shedding of endometrium accompanied by loss of blood, which is an additional vital sign and adds as a powerful tool for the assessment of normal development and the exclusion of pathological conditions in adolescent . Some variety of menstrual dysfunction occurs in adolescent girls which may affect normal life of adolescent. Physical, Social, Psychological, Reproductive problems are often associated with menstrual irregularities. Menstrual disordersis a major problem among women who attend gynaecological OPD. Especially in adolescent girls, menstrual disorders constitute an even greater burden of gynaecological problems all over the world. Common menstrual disorders reported among young menstrual disorders include dysmenorrhea, HMB, premenstrual syndrome, amenorrhea, polymenorrhea, and oligomenorrhea[5].

Adolescent girl constitute amajor part of vulnerable group, particularly indeveloping countries like India

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where female child is neglected. Although menstrual irregularities maybe normal during the early post menarcheal years, pathological conditions require proper and prompt treatment. Hence this study was undertaken to study the various problems related to menstruation in adolescent girls.[6-13]

Materials and Method

This is a descriptive study among 300 adolescent girls between the age group of 13-19 years. The data were collected from adolescent girls fromout patient clinic and In-patients of Gyneacology department, Sree Balaji Medical College and Hospital and also from schools and colleges from south Chennai. Data was collected by adopting a structured questionnaire about personal details, socio demographic variables and evaluation of menstrual disorders were obtained. The adolescent girls those who have menstrual irregularity were included in the study. This study was approved by the Ethical committee board. The purpose of the study was explained to the girls and an informed consent was obtained in their own language. IBM SPSS statistical software version 21 was used for data analysis. P value <0.05 was considered as statistically significant.

Findings: Among the total girls with menstrual disorders, maximum of 36 % were from the age of 13 years, 31 % belonged to the age group of 14 years, 12 % were from the age group 15 years, 8 % belonged to the age group 16, 6% were from the age group 17, 5 % were from the age group 18 and 1 % were from the age group 19. The study population was distributed as 66 % from urban and 34 % from rural. This study covered students of all socio economic status from class I to V with maximum number (51%) in class III, followed by class IV (41%) and remaining 4 %, 3 % & 1 % in class II, class V & class I respectively. Among the study population, maximum of 46% of girls are overweight,32% are normal weight. Rest 12%,9%,1% are having underweight, obese class I & obese class II respectively.

Table 1: Association of menstrual disorders & BMI among the study population (n = 300)

BMI	Menstrual Disorders (No of cases)					
	Polymenorrhea	Dysmenorrhea	HMB	Oligomenorhea	Hypomenorrhea	Total
Under Weight	17 49 %	9 26 %	8 22 %	0 0 %	1 3 %	35
Normal Weight	12 13 %	77 80 %	7 7 %	0 0 %	0 0 %	96
Over Weight	1 1%	15 11 %	53 38 %	60 43 %	10 7 %	139
Obese Class I	2 7 %	12 43 %	12 43 %	2 7 %	0 0 %	28
Obese Class II	0 0 %	0 0 %	2 100 %	0 0 %	0 0 %	2
Total	32	113	82	62	11	300

For the comparison of BMI with menstrual disorders,test applied–Chi-square.

Chi Square Value	P Value
235.975	0.000

BMI has significance association with Menstrual Disorders since P Value <0.05 .

From the above table it is evident that girls who are under weight, 49 % had polymenorrhea, 26 % had Dysmenorhoea, 22 % had HMB, 3 % had Hypomenorrhea. In girls who had normal BMI, 13% had polymenorrhea, 80 % had Dysmenorhoea, 7 % had HMB. Of the over weight girls, 1 % had polymenorrhea, 11 % had Dysmenorhoea, 38 % had HMB, 43 % had Oligomenorhoea and 7 % had Hypomenorrhea. Among girls with obese class I, 7 % had polymenorrhea, 43 % had Dysmenorhoea, 43 % had HMB, 7 % had Oligomenorhoea. 2 girls in the obese class II had HMB.

Table 2: Distribution of Age of Menarche among the Study Population (N = 300)

Age of Menarche	No of Cases	Percentage %
10	5	02
11	65	22
12	112	36
13	71	24
14	47	16
Total	300	100 %
Mean	12.30	
S D	0.963	

Regarding the age of menarche, among the study population 05 % attained menarche at the age of 10 & 65 % at the age of 11 years. However, 36 %, 24 % & 16 % attained menarche at the age of 12, 13 & 14 years respectively. Mean age of menarche is 12.years.

Table 3: Prevalence of Menstrual Irregularities among the Study Population (N = 300)

Menstrual Irregulaties	No of cases	Percentage %
Polymenorrhoea	32	11 %
Dysmenorrhoea	113	38 %
HMB	82	27 %
Oligomenorrhoea	62	21 %
Hypomenorrhoea	11	03 %
Total	300	100 %

Among 300 adolescent girls with menstrual disorders, 32 reported to have Polymenorrhoea, 113 had Dysmenorrhoea, 82 had Heavy menstrual bleeding, 82 girls had Oligomenorrhoea & 11 girls suffered with Hypomenorrhoea.

It is found girls who Dysmenorrhoea was the most prevailing menstrual irregularities among all with 38 %.

Figure 1: Prevalence of Menstrual Irregularities among the Study Population

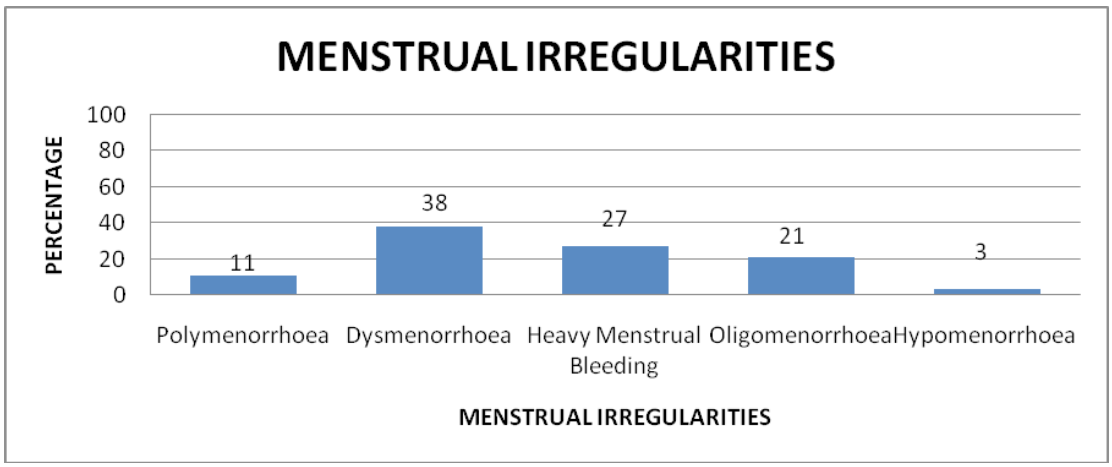


Table 4: Distribution of Premenstural Complaints among the Study Population (N = 300) and its Association with QoL

Premenstrual Complaints	Yes	Percentage %	No	Percentage %	Total
Abdominal Cramps	161	54	139	46	**300**
Leg Cramps	158	53	142	47	**300**
Emotional Liability	143	48	157	52	**300**
Breast Pain	87	29	213	71	**300**
Bloating	60	20	240	80	**300**
Vomiting	52	17	248	83	**300**
Headache	48	16	252	84	**300**
Giddiness	15	5	285	95	**300**
Loose Stools	8	3	292	97	300

Among the adolescent girls, majority had abdominal cramps (54%) and leg cramps (53%). Followed by emotional liability (48%), breast pain (29%), bloating (20%), vomitting (17%), headache (16%), giddiness (5%) and loose stools (3%)

Table 5: Distribution of Hospital Visits for Menstrual Disorders among the Study Population (N=300)

Menstrual Disorders	No of cases	No of cases with hospital visits	Percentage %
Polymenorrhea	32	23	72 %
Dysmenorrhea	113	95	84 %
Heavy menstrual bleeding	82	77	92 %
Oligomenorrhea	62	37	60 %
Hypomenorrhea	11	05	4 %

Among the total cases, 80 % sought medical advice. It is evident that 72 % of the adolescent girls who had polymenorhoea, 84 % who had dysmenorrhea, 92 % who had HMB, 60 % who had oligomenorrhea and 4 % who had hypomenorrhea visited hospitals.

Out of the total study population, 36 % had awareness of menstruation. 64 % were not aware of menstruation before menarche. Among the total cases, 71% had the awareness through their mother, 8% through teacher, 4% through peer group, 15% through relatives and 2% through mass media.

Discussion

This study was conducted among 300 adolescent girls with menstrual disorders from gynaecology Out patient clinic and In-patients of Sree Balaji Medical College and Hospital and,also from schools and colleges from south Chennai.

The age of menarche did not vary from that of other studies. The age of menarche ranged from 10-14 years, maximum between 12-13years, with mean of 12.3 years. This is similar to the study done by Lee & Chen et al from Malaysia (2006) showed age of menarche ranged from 9-17 years with mean of 12.3+/- 1 year[6]. The most common menstrual problem seen in adolescent girls is dysmenorrhea (38%) followed by HMB (27%), oligomenorrhea (21%), and polymenorrhea (11%) and hypomenorrhea of 3%.

Oligomenorrhea was more commonly associated in girls who are over weight (43%) and polymenorrhea was more prevalent in girls who are underweight (49%).This is indistinguishable from the study done by Anupriyaet al[7] which showed oligomenorrhea was associated with increasing BMI and polymenorrhea was seen associated with girls who are under weight. Dysmenorrhea is prevalent more among normal weight adolescent girls (80%).This is comparable to the study done by Khodakarami B et al (2015)[8] showed who found the frequency and severity of dysmenorrhea to be higher in the normal-weight group than other subjects.

In our study the prevalence of polymenorrhea accounts for 11% which is similar to study done by WasiuOlalekanAdebimpe et al from Nigeria (2017) showed polymenorrhea in 9.1% of adolescent girls [9].

Heavy menstrual bleeding represents 27% in our study population this is similar as the done by Wasiu Olalekan Adebimpe et al (2017) which showed HMB represents 21%[9].

Our study concluded, 21% of adolescent girls had oligomenorrhea**,**which is similar to the study done by Abdul GhaniNurAzurah et al (2013) where oligomenorrhea accounts for 19.6%.[10]

In our study,the prevalence of hypomenorrhearepresents 3%, which is similar to the study done by Franco Rigon (2012) [11] where hypomenorrhea accounts for 3.2%

In our study dysmenorrheais the most common menstrual disorder accounts for 38%. This is identical to the study done by Abdul GhaniNurAzurah et al (2013) [10] where dysmenorrhea accounts for 38%.

In our study 80% of adolescent girls with menstrual disorder seek medical advice which is contrast to the result obtained in the study done by Anupriyaet al[7] where 5.9% of girls seek medical advice. In our study 92% of girls with HMB, 84% with dysmenorrhea, 72% with polymenorrhea, 60% with oligomenorrhea had hospital visits which is contrast to the study done by Veena G. Rahatgaonkar et al[12] where 25.7% girls with HMB, 26.7% with dysmenorrhea, and 33% of girls with irregular cycles took medical advice.

Awareness on menstruation before menarche was found to be 36% in our study, while study done by Das Gupta et al[13] (2007) showed 67.5% of girls having awareness regarding menstruation before menarche. In our study, girls with awareness on menstruation have good QOL score than girls who are unaware of it with P value of 0.016.

Mother is the primary source of information regarding menstruation which accounts for 70%

Conclusion

Attainment of menarche at right age is an important milestone during adolescence, which signifies the normal functioning of the female reproductive system. Study revealed that majority of adolescent girls had attained menarche at appropriate age. There is high prevalence of menstrual disorders among adolescent girls in Chennai. Dysmenorrhoea was the commonest problem among the adolescents. Dysmenorrhea was severe enough to disturb the daily activities. The disturbances ranged from inability to sleep, inability to read, poor class performance, and school absenteeism. Thus more attention should be paid to identify and treat these menstrual abnormalities. Like wise, health education on menstrual problems targeting female students and their parents should also be given by health care workers.

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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Congenital Anamolies Prevalence in Routine Antenatal Ultrasound

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Abstract

Objectives: To assess the antennatal prevalence of significant lcongenitallanomalies. Study design: To evaluate the incidence of important lcongenitallanomalies in the antenna. Setting: Department of Radiology, Sree Balaji Medical College and Hospital, Chrompet, Chennai. Duration: 19 months from March 2017 to September 2018. Sample size: 2839

Material and method: Review assessment of lallantennatal patients undergoing obstetric ultrasound was performed. During the course of the study, obstetric ultrasound tests were conducted for 2839 lpatients. In order to identify the incidence of lcongenital anomalies, lData was evaluated from all antenatalllultrasound examinations. LData was placed in the Excel ldata sheet and the suitable data analysis was carried out.

Results: 55 instances of birth defects were identified. The incidence of antennatal anomalies was 19.43 per 1000 and 1.9 per cent. The median maternal angel at diagnosis was 26.7 lyears. The average gestation at diagnosis was 21 weeks+/-three days. The most frequent were Central nervous system, cardiovascular and gastrointestinal lanomalies. Conclusion: The incidence of important congenital lanomalies in population studies was 1.9%. Brainstem malfunctions were most prevalent, preceded by cardiovascular and urogenital system malfunctions.

Keywords: *Palavras-chave, congenitalanomalies, antenatal, ultrasound.*

Introduction

Congenital lanomalies may be defined as organizational or severe lanomalies (e.g. nutritional disorders) that happen throughout uterine life and may be recognized as lprenatal, lbirth or lateral in life[1]. 2.761 million fatalities occurred after the lneonatal era in 2013, worldwide[2.3] and 2.5% in India[4]. LBirthldefects are active in around 3% of lnewborns in LUSA [5 6]. It is lnot only a lleading cause of fetal lloss, but also lcontributessignificantlyl to preterm lbirth, childhoodl and adult lmorbidityalongl with lconsiderablelrepercussion on the lmothers and ltheirlfamilies[7 8]. l2-3% of alllNewbornslrequire at leastl one mainlabnormality, 10% newbornsl have slightlabnormalities. Congenital lanomalies are loftencategorizedl into four ldifferent types: lmalformations, ldeformations, ldisruption and ldysplasia[9]. l Malformation is a lmorphologicalldefect of an lorgan, portionlof an lorganbeforellargerregionl of lbody that lresults from labnormalldevelopmental lprocess Dysplasial is an labnormallorganization of lcells in to ltissues and its lmorphologicall results. The most lcommonlconditions include lcongenitallheartldefects[10] loro-faciall clefts, lDown syndrome [11], and lneuralltubeldefects.

Reasons and Risk Factors: Even though 50% of all anomalies can not be linked to a specific cause, there are diseases that cause or trigger negative reactions

Socioleconomic and demographicl factors Although small economic gain could also be an implicit factor

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in determining, intrinsic anomalies are also common among asset-constrained households and nations. It can be calculated that there are ninety-four serious inherent anomalies In small-and medium-income nations, where women typically fail access to appropriate nutritional food, and might have increased sensitivity to carriers or factors, including such illnesses and alcohol, that cause or boost the incidence of abnormal antennatal growth. In addition, the enhanced maternal age improves the chance of body defects as well as congenital disorder, while the youthful maternal age rises.

Genetic factors Consanguinityl Increasesl the lprevalenceofl rare lgeneticlcongenitallanomaliesland nearly doublesl the risk for lneonatal and lchildhoodldeath, lintellectualldisability and lotherlanomalies in lfirst-cousin lunions. Some lethnicl populations Need a comparatively elevated incidence of common genetic defects, leading in a higher danger of inherent abnormalities.

Infections: Parental diseases like lsyphilis and lrubella are a significant cause of lcongenital anomalies in limited-income households.

Maternal nutritional status: Iodine deficiency, B insufficiency, obesity and diabetes are combined with a number of intrinsic anomalies. As an example, the deficiency of B will increase the risk of a baby having an ectoderm defect. Increased axerophthol consumption could also have an AN impact on the standard growth of the rudiment or foetus. ***Environmental factors*** Maternal sensitivity to some pesticides and other materials, as well as certain drugs, alcohol, tobacco, psychotropic drugs and radiation during childbirth, may improve the danger of developing a fetus or neonate that is impacted by congenital anomalies. Functioning or live near or in waste locations, furnaces or mines might also be a health risk, particularly if the mother is subject to other circumstances.

Materials and Method

This is a cross sectional observational study from the Department of Radiology, Sree Balaji Medical College and Hospital, Chrompet, Chennai.

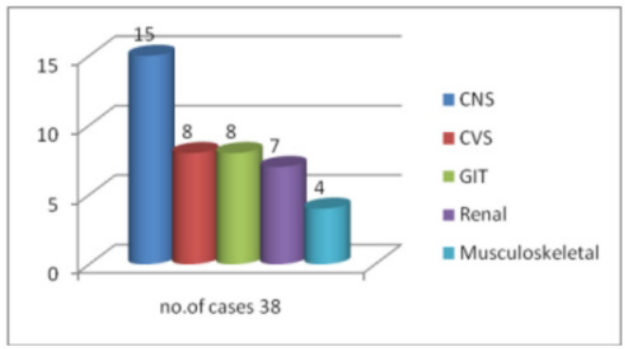
Ultrasound scanning is an important component of antennatal care. It is a secure, non-invasive technique used to assess the fetus. The goal of this research was to assess the incidence of congenital defect in obstetric individuals. Department of Radiology, Sree Balaji Medical College and Hospital, Chrompet, Chennai A total of 2839 obstetric scans were conducted during the study period from March 2017 to September 2018. Scans were conducted either trans abdominally or transvaginally on the mindray device after acquiring written permission. Obstetric and medical history has been observed, particularly Background of drug use, viral infection and acute disability, such as diabetes mellitus or high blood pressure. At the beginning of the research, the form of congenital malformation, the age of the mom and the gestational age were observed.

Findings: A total of 2839 antenatal instances were evaluated during the study period. L Congenital defects have been recognized in 55 instances. They l shape the population of the research. The incidence of lcongenital anomalies was 1.9 per cent. The median motherly angel at analysis was 26.7 years old.

Table 1: Nurturing age wise evaluation

Maternal age (years)	No of cases
<20	1 (2.6%)
20-25	16 (42%)
26-30	15 (39.4%)
31-35	5 (13.1%)
36-40	1 (2.6%)
>40	0

Parental age intelligent delivery presented that 81% of cases were between 20 and 30 years of age, reflects the detail that the highest total of cases of l pregnancy occurred in such a age group (Table 1).



*Five foetuses had anomalies involving multiple systems.

The spectrum of anomalies noted is shown in Table 2.

Table 2: Spectrum of anomalies

Central nervous system 15(39%)	Hydrocephalus	8
	Inferior vermian agenesis	2
	Meningocele	2
	Arnold-Chiari	1
	Microcephaly	1
	Encephalocele	1
	Agenesis of corpus callosum	1
Cardiovascular system 8(21%)	Tetrology of Fallot	1
	Atrioventricular septal defect	5
	Situs inversus	2
	Ventricular septal defect	2
Genitourinary system 7(18%)	Pelvi-ureteric junction obstruction	3
	Multi cystic dysplastic kidneys	2
	Poly cystic kidneys	1
	Posterior urethral valve	1
	Unilateral renal agenesis	1
Gastrointestinal system 8(21%)	Diaphragmatic hernia	6
	Omphalocele	1
	Cleft lip and palate	1
	Bowel obstruction	2
Musculo- skeletal system 4(10%)	Mesomelia	2
	Talipes equinovarus	1
	Cystic hygroma	1

Some of the anomaliesl noted are illustratedl in l**Figures 1l-4**.



Figure 1: Sonographic limaging demonstrates latrio-ventricularl septal defectl in the fetusl of al39 year old lfemale at 24 lweeks and 3 ldayslgestation.



Figure 2: Sonographicl imaging demonstratesl dilatedllaterallventricles and thirdl ventricle - lhydrocephalus in the lfetus of a 26 yearl old lfemale at l18 weeks and 5 ldays gestation.



Figure 3: Image ldemonstrateslprotrusion over loccipitallregion of lfetal head lencephalocele in the lfetus of

a 32 lyear old lfemale at 14l weeks lgestation.



Figure 4: Sonographicl imaging ldemonstratesllumbosacrallmeningomyelocelelin the lfetus of a l28 year oldl female at l22 weeks and l6 days lgestation.

Discussion

The model and incidence of lcongenitallanomalies may differ Over moment or with a geographic location. With enhanced disease control and nutrient deficiency infections, hereditary defects have develop significant reasons of neonatal circumcision in developed countries.

In present studies, the incidence of inherited malformations in fess-lnatallperiod was 1.9%, that is comparable. to previous research in India, which reported an occurrence of 2.72 per cent and 1.9 percent. With respect to the The most common pattern of congenital anomalies in the studies was the central nervous system (39%), followed by the gastrointestinal tract (GIT) (21%), the cardiovascular system (21%) and the kidney system. (18 percent of the population). This was similar to the studies carried out by others. However, some studies have revealed greater cases of retransplanting GIT The function of testing in the identification of fetal anomalies depends on the incidence of anomalies in the sample population and the capacity of the investigator., the birth weight of the test, the description of main and secondary Anomalies and the determination of postnatal abnormalities. The ability and exercise of sonographers is a critical element in the identification of fetal defects.Level with a frequency amount of 1.6 per cent-2.7 per cent of genetic disorders, there are no excellently-received reactive interventions in many other developed countries. It shows that there is a need for powerful protective measures for genetic abnormalities in this region. Increased awareness of maternal care during childbirth, congenital malformation education programs and the implications of consanguinous relationships need to be highlighted in order to reduce the occurrence and comorbidity of congenital anomalies.

Conclusion

This revision has identified the incidence of congenital anomalies in our locality. Context-independent consultations theory-internal treatment stay suggested on behalf of l prevention, early lintervention and leven proposed cessation if needed.

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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Pattern of Depression among Adolescents in an Urban Area of Kancheepuram District, Tamil Nadu

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Abstract

To assess the pattern of the depressionamong adolescents in an urban area of Kancheepuram district, Tamil Nadu. WHO says adolescence occurs in every human growth and it happens after childhood and before adulthood during the age of 10 to19. Adolescence is a transitional developmental period characterized by pronounced biological as well as social changes. It represents one of the critical transitions in the life span of a human being and is characterized by a tremendous pace in growth and change that is second only to that of infancy. The process of adolescence is a period of preparation for adulthood. The world has 1.2 billion individuals in the age group of 10–19 years. Adolescents aged between 10 to 19 years account for more than one-fifth of the world's population. South Asia is home to nearly 340 million adolescents. In India, this age group covers 241 million (21.4%) of the total population.

Keywords: *Depression,Adolescents.*

Introduction:

Depression is a state of mental illness which is characterised by deep, long lasting feelings of sadness or despair. It can change an individual feelings/thinking and also affects his/her social behaviour and sense of physical well-being. Depression is a syndrome characterized by a group of symptoms with changes in one's mood (sadness, guilt), behaviour (isolation), thought and perception patterns (less concentration, less self–esteem), with physical complaints (sleep, hunger, sex) and high risk of suicide. Depressive disorders are identified by the World Health Organization (WHO) as priority mental health disorder of adolescence because of its high prevalence, recurrence and ability to cause significant complications and impairment.[1] Major depressive disorder is estimated to be the second disabling disease of mankind in 2020.[2,3] Depression occurs with people of any genders, age and social class.[7 8] However, the first episode usually occurs during adolescence and early adulthood and is one of the common and ignored psychiatric problems . It is more common among women especially due to hormonal changes.[4,5]

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Materials and Method

Study design: A Community based cross sectional descriptive study done in Anakaputhur, an Urban area of Kancheepuram district, Tamil Nadu.

Study area: The study was conducted in the urban field practice area of the Urban Health Training and Centre attached to our Institution, located at Anakaputhur in Kancheepuram District of Tamil Nadu. Kancheepuram district is one among the 32 districts of Tamil Nadu. According to the census of India 2011, Kanchipuram district covers an area of 4433sq.km with a population of 39.98 lakhs comprising of 20.12 lakhs males and 19.8 lakhs females. Kancheepuram, the temple town is the headquarters of the district for administrative reasons, the district has been divided into 4 revenue divisions comprising of 11 taluks with 1137 revenue villages.

Anakaputhur is a Municipality city in the district of Kancheepuram, Tamil Nadu. It is divided into 18 wards. The study was conducted in Anakaputhur an urban field practise area of Department of Community Medicine of Sree Balaji Medical College and Hospital (SBMCH), located at a distance of 7 kilometres from the institution with an area covering approximately 16 sq. kilometres.

Study Period: The study was conducted between June 2017 to July 2018.

Study Participants: According to the 2011 census, Anakaputhur urban field practice area had a total population of 48,050 of which 24,158 were males, 23,892 were females with 8890 adolescent (Individuals aged 10-19 years) . Total number of houses in Anakaputhur is 12,146. The study was done among adolescent who are residing in the study area permanently at the time of the study.

Inclusion Criteria: The inclusion criteria for the study were adolescent people of both the genders of age group (13–18) residing in the study area, who were willing to participate in the study were included.

Exclusion Criteria: The exclusion criteria for the study were adolescents who have any physical illness, severely ill and those who were not willing to participate in the study were excluded.

Sample size: Sample size was calculated from a previous study conducted by Kunal Kishore et al among school going adolescents in urban area of Bihar in 2016, prevalence of depression recorded in this study was 49.2%.This was taken as the reference value for calculating sample size. The sample size was calculated using the formula.

$$N=Z\ a^2pq/[L]^2$$

Where, Z = 1.96 at 95% confidence interval, p= Expected prevalence rate, q=100-p, L =Relative precision, which is assigned as 10% of p (10% of 49.2% = 4.92) for this study.

Substituting in the formula,

Z = 1.96, p =49.2 %, Q=50.8% [100–49.2], precision=10 % of prevalence

= 1.96* 1.96 *49.2*50.8/24.20

= 396

= 396 which was rounded off to 400. [N = 400]

Sampling method: Anakaputhur had a total population of 48,050 as per 2011 census. As per census data, the adolescent age group (10–19) were identified and there were 8890 adolescent residing in the study area. The sampling technique followed for this study was **Systematic random sampling technique**. Sampling interval K= (N/n) is calculated as follows, where K is the sampling interval

K = Total adolescent in Anakaputhur/sample size

K = N/n = 8890/400 = 22nd. Every 22nd adolescent were selected. The name and address of the person was noted and was visited for the data collection. If the person corresponding to the number did not give informed consent or absent,the next number was chosen and the next person was selected and interviewed. Likewise, 400 adolescents who gave informed consent and willingly participated in the study were identified.

Study tools: A pretested structured questionnaire was used as a study tool to interview the study participants. The questionnaire was prepared in English and translated to Tamil. It was conducted by face to face interview by the investigator herself and the responses were recorded in the questionnaire.

Informed consent: The details and purpose of the study and the confidentiality of their identity were explained to each and every participant those who were willing to participate in the study were required to sign the informed consent, after which they were included in the study . The informed consent was in Tamil,the local language of the study participants.

Pilot study: A pilot study was conducted among 40 adolescent residing in urban area of Pammal which is the adjacent area to the study area and also located in Kancheepuram district. It was done for a period of one month during the month of July 2017. Based on the results of the pilot study, the necessary changes were incorporated in the questionnaire and the study was conducted. The samples included in the pilot study were not included in the present study.

Data Collection Period: Data was collected from the study participants for a period of one year from June 2017 to July 2018.

Data Collection Method: Using systematic random sampling study subjects were identified. The adolescents of both the genders were identified after obtaining their written consent in the informed consent form. The

interview was conducted by the investigator herself. The pilot study questionnaire was used to interview each participant by one to one individual method on socio-demographic details, family history, questions regarding depression etc.PHQ–9 depression scale, questionnaire was used for ascertaining the prevalence of depression. Anthropometric measurements such as height, weight were measured among the study participants.

Data Analysis: The data was entered in Microsoft Excel 2007 version and analysed using Statistical Package for the Social Sciences for Windows (SPSS) version 20.0. Prevalence data were presented in the form of numbers, percentages, tables and figures. The analytical statistics used were chi- square, Odds Ratio and Confidence Interval. Binary logistic regression was used to calculate the adjusted odds ratio. P value< 0.05 was considered as statistically significant value.

Findings:

Socio demographic characteristics of the study population: Table 1 shows the socio demographic details of the study population. Among the study participants, maximum of 292 (42.8%) participants belonged to 13-15 years age group followed by 99 (24.8%) belonged to 16-17 age group and only 9 (2.3%) of the respondents were of 18–19 age group. About 48.7% were females and 51.3% were males. Majority of the study participants 349 (87.3%) were Hindus while Christian were 43(10.8%), Muslim were 7(1.8%) and others 1(0.3%). Maximum number of the participants belongs to ninth class 147(36.8%) followed by tenth 141(35.3%), eleventh 55(13.8%) and twelfth 57(14.3%). Most of the participants were Day scholar 397 (99.3%) whereas only 3 are hosteller (0.8%). Among the study participants, most of them are living with both parents 352(88.8%) followed by single parent 21(5.3%), Grandparents 18(4.5%) and Guardian 6(1.5%). Most of the study participants' father were Graduate 132(33%) followed by Higher secondary school 92(23%), Diploma 59(14.8%), Middle school 50(12.5%), Post graduate 40(10%),Primary school 23(5.8%), Illiterate 4(1%)

Among the study participants, most of the study participants' mother were Graduate 122(30.5%) followed by Higher secondary school 108(27%), Middle school 63(15.8%), Diploma 40(10%),, Post graduate 38(9.5%),Primary school 21(5.3%), Illiterate 8(2%). out of the 400 study population, 208 (52%) of the father were professional followed by skilled 81(20.3%), semi-professional 60(15%), semi-skilled 37(9.3%), unskilled 14(3.5%) and unemployed 0 (0%).most of them were unemployed 254 (63.5%) followed by professional 67 (16.8%), skilled 32(8%), semi-skilled 19(4.8%), semi-professional 15(3.8%), and unskilled 13(3.3%). Out of the 400 study population, most of them belonged to upper class 369(92.3%).upper lower class contribute only 6(1.5%) in the study area based on B.G. Prasad socio economic classification Status scale.

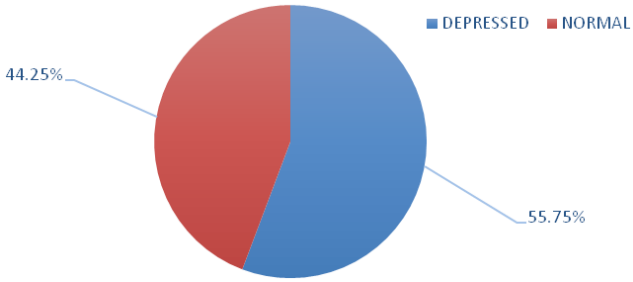


Figure 1: Prevalence of Depression

Figure 1 shows the prevalence of depression in adolescents in urban area of Kancheepuram district was found to be 55.75%.

Discussion

Prevalence of Depression: The present study comprising of 400 study participants. Three fourth (73.0%) belonged to the age group of 13-15 years. Out of 400 study participants, 205(51.3%) were males and 195(48.8%) were females. Majority of the study participants were Hindus, maximum number of participants belonged to ninth class 147(36.8%) followed by tenth class 141(35.3%),eleventh 55(13.8%) and twelth class 57(14.3%).Most of the study participants belonged to upper class 369(92.3%) and only 6(1.5%) in upper lower class, according to BG Prasad scale of socio economic status.

Prevalence:

The overall prevalence of depression among adolescents in our study was observed as 55.25% (table18). Almost similar prevalence was observed in a study conducted by Manisha Malik et al in Jaipur in 2015 among adolescents which showed the overall prevalence of depression was found to be 52.9%. Another study done by Manmohan Singh et al in Chandigarh in 2015 also found that the overall prevalence of depression was 50% which is in line with our study results.[76] Various study from different parts of the India found that the prevalence of depression among adolescents in the range of 18.4%

to 79.2%.[75–86]. This might be due to usage of different screening instruments such as PHQ-9, beck depression inventory, MINI-KID centre for epidemiological study-depression scale.

Conclusion

1. This study shows that the Prevalence of depression among adolescents in Anakaputhur area of Kancheepuram district was found to be 55.75%.
2. The depression observed was more among males than female .
3. The depression observed was more among the upper socio economic class than lower and middle class.

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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Prevalence of Escherichia Coli in Urine Samples in a Tertiary Care Hospital

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Abstract

The study was carried out in the Central laboratory Department of Microbiology Sree Balaji Medical College and Hospital, Chrompet, Chennai for a period of one year from August 2017 to August 2018. A total of 3580 urine samples was received in Central lab during the study period and the samples were analyzed for the prevalence of Escherichia coli and its antimicrobial susceptibility pattern. Out of a total of 3580 urine samples received, majority of the samples were from inpatient departments (2800) while 780 samples were from outpatient.

Keywords: *Escherichia coli, Tertiary Care Hospital.*

Introduction

Urinary tract infection (UTI) is defined as the microbial invasion of genitourinary tract. It is a bacterial infection that affects any part of the urinary tract. UTI is the most prevalent infections worldwide with a high global burden[1]. UTI is known to affect approximately 150 million people each year and is responsible for approximately seven million doctor visits per year[2,3] .UTI may be induced by gram-negative bacteria such as Escherichia coli, Klebsiella species, Enterobacter species, Proteus species and Gram-positive bacteria such as Enterococcus species and Staphylococcus saprophyticus. Escherichia coli, the most common optional gram-negative bacillus in human fecal flora, generally hinders the colon as an innocuous commensal. UTIs are the most common type of Escherichia coli extraintestinal infection, and Escherichia coli is the most widespread cause of UTIs.At some stage in their life, at least 12 per cent of males and 10-20 per cent of females experience acute symptomatic UTI, and even more grow asymptomatic bacteriuria.[4,5] .

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Materials and Method

UTI is divided into two broad categories.

1. Lower UTI
2. Upper UTI.

The lower UTI is mainly due to the ascending infection caused by faecal coliforms and it causes Urethritis, cystitis and Prostatitis. Upper UTI involves the Kidney (Pyelitis & Pyelonephritis). Pyelonephritis is through hematogenous spread of infection. Incidence of UTI is more in females as compared to males due to shorter urethra and proximity to anus. In elderly males, UTI due to enlarged prostate is very common. Other causes of UTI includes pregnancy, prostatic hypertrophy, reflux of urine from bladderupto the ureters and into renal pelvis, neurogenic bladder dysfunction, multiple sclerosis etc[6] E. coli is responsible for about 90% of the first episode of UTI in children 7. Uropathogenic Esherichia coli (UPEC) has several virulence factors that allow it to colonize and cause inflammatory modifications in the mucosa of the body. Extended spectrum β lactamase (ESBL) produced by the Enterobacteriaceae family is progressively recognized as the main pathogens that have become endemic in many service settings. The incidence of ESBL produced by strains among Gram Negative Bacilli differs extensively depending on the clinical environment and geographic region. The growing incidence of ESBL-producing

organisms is seen primarily in the elderly population, patients who are seriously ill and urinary tract infections, patients with indwelling urinary catheter, malignancy, patients who have a lengthy hospital stay and intensive care units. (ICU), Patients who are functionally dependent on them. Infections caused by ESBL boost the price of therapy as well as mortality and morbidity. In the current scenario, drug resistant pathogens carry higher morbidity and mortality and also they are difficult to identify by routine laboratory method and hence the diagnosis is delayed and finally there is delay in administration of appropriate anti-microbial therapy. The major concern is the lack of new antibiotics for multi drug resistant strains of uropathogenic E.coli that produces ESBL. In June 2010, the Infections Disease Society of America (IDSA) testified to the critical need for antimicrobials and the urgent need for research and development in newer therapy before the House Energy and Trade Subcommittee on Health.According to Rishi H.P, Dhillon et al, Risk variables for the acquisition of UTI-associated society include recurrent UTI, previous antibiotic use, diabetes mellitus, prior urinary tract equipment, female sex and age over 65 years of age.[8].Complications have increased because ESBL producing pathogens are resistant to most commonly prescribed empiric therapy antibiotics.Despite widespread availability of antibiotics, UTI is considered to be The most prevalent incurable disease in medical practice developing countries, with incidence of 250 million people are affected worldwide[9]. Long term UTI leading to immunological and inflammatory response causing renal injury and scaring, which leads to end stage renal failure. Obstructive uropathy, renal calculi, vesico urethral reflex disease and voiding disorders leads to stasis of urine and becomes a predisposing factor of recurrent UTI and its complicationsIt is predicted that almost 10% of the global population is living with UTI. [10] .Since antibiotics are empirically used before urine culture report an increasing antibiotic resistance in uropathogens are reported.Liberal use of Fluoroquinolones and β lactams have triggered bacterial resistance worldwide. Due to rapidly evolving adaptive In recent years, the etiology of UTI and the resistant bacteria profile of uropathogens have altered significantly, both in the society and in genital infections.

Findings

ESBL: The first ESBL producing organism was detected in Europe in 1983. ESBL is primarily produced by Enterobacteriaceae family of Gram negative organism particularly E.coli and Klebsiellaspecies. ESBL'sBeta lactamases capable of hydrolyzing oxyiminocephatosporins ESBL are ploidy or plasmid mediated β lactamases that have mutated from pre-existing wide spectrum β lactamases (TEM-1,TEM-2,SHV-1) due to extensive use of 3rd generation Cephalosporins as well as Aztreonamamide. [(11,12).] ESBL's might be repressed by β lactamase inhibitors, for example, Clavulanic corrosive or Sulbactam. However,several inhibitor-safe ESBL makers are additionally experienced, by uprightness of Amp-C lactamase hyper generation or loss of porin13. Creation of ESBL catalysts gives numerous medication opposition, making diseases hard to treat .Patients admitted to clinics are bound to fill in as stores for these safe living beings and in the end, the patients in the network obtain ESBL-delivering strains[14].Investigation of medication opposition among uropathogens has as of late picked up significance since the system of obstruction of ESBL creation may shift. Also, the tremendous number of species incorporated into the family enterobactericeae further adds to the demonstrative and clinical entanglements related with UTI's. ESBL-delivering qualities are ordinarily harbored on plasmids 80kb in size or bigger and frequently convey obstruction determinants for Aminoglycosides, Fluoroquinolones, Tetracyclines, Chloramphenicol and even Cotrimoxazole, making the microorganisms oppose a wide assortment of drugs15. ESBL creation gives protection from all the beta-lactam anti-microbials aside from Carbapenams and Cephamycins.

The efficacy of the antibiotic given to the patient relies on the location and severity of the disease, liver and kidney function, the presence of implants and local resistance patterns. It is also thought that age and pregnancy in the patient decide the efficacy of the antibiotic used.[15].ince the use of β-lactam antibiotics is still widespread, the development of β-lactamase products has become a matter of severe concern. Various drug resistance mechanisms in gram-negative bacilli include the development of β-lactamases, AmpC lactamases, Efflux systems and Porindeficiency. The current research is done to study the incidence of uropathogenic E. coli and its antibiotic sensitivity pattern with unique regard to ESBL.

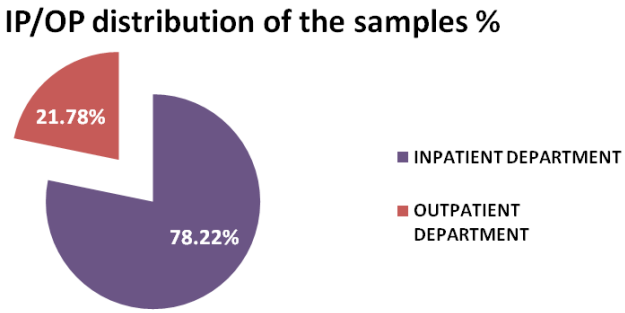
Discussion

The study was carried out in the Central laboratory Department of Microbiology Sree Balaji Medical College and Hospital, Chrompet, Chennai for a period

of one year from August 2017 to August 2018. A total of 3580 urine samples was received in Central lab during the study period and the samples were analyzed for the prevalence of Escherichia coli and its antimicrobial susceptibility pattern.Out of a total of 3580 urine samples received, majority of the samples were from inpatient departments (2800) while 780 samples were from outpatient.

Table 1: IP/OP distribution of the samples

S.NO.	IP/OP	Total	Percentage %
1.	Inpatient Department	2800	78.22%
2.	Outpatient Department	780	21.78%
		3580	



Out of the total 3580 urine samples received in the Central lab, **987** samples (27.56%) showed No growth, **1786** (49.88%) showed growth of Gram negative bacilli and **807** (22.54%) showed Gram positive cocci.

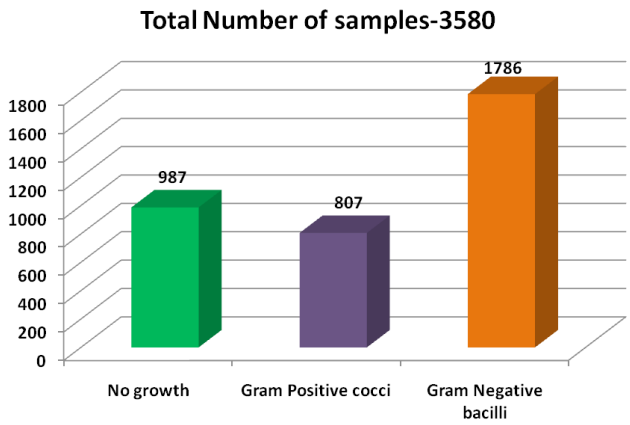


Table 2 : Distribution of Pathogens in UTI

S.No	Oraganism	Frequency (n=2593)	Percentage (%)
1.	Escherichia coli	1081	41.7%
2.	Klebsiella species	520	20%
3.	Pseudomonas aeruginosa	155	6%
4.	Proteus species	104	4%
5.	Citrobacter koseri	39	1.5%
6.	Enterobacter	33	1.3%
7.	Acinetobacter	52	2%
8.	Staphylococcus aureus	259	10%
9.	CoNS	311	12%
10.	Enterococcus species	39	1.5%
	Total	2593	100 %

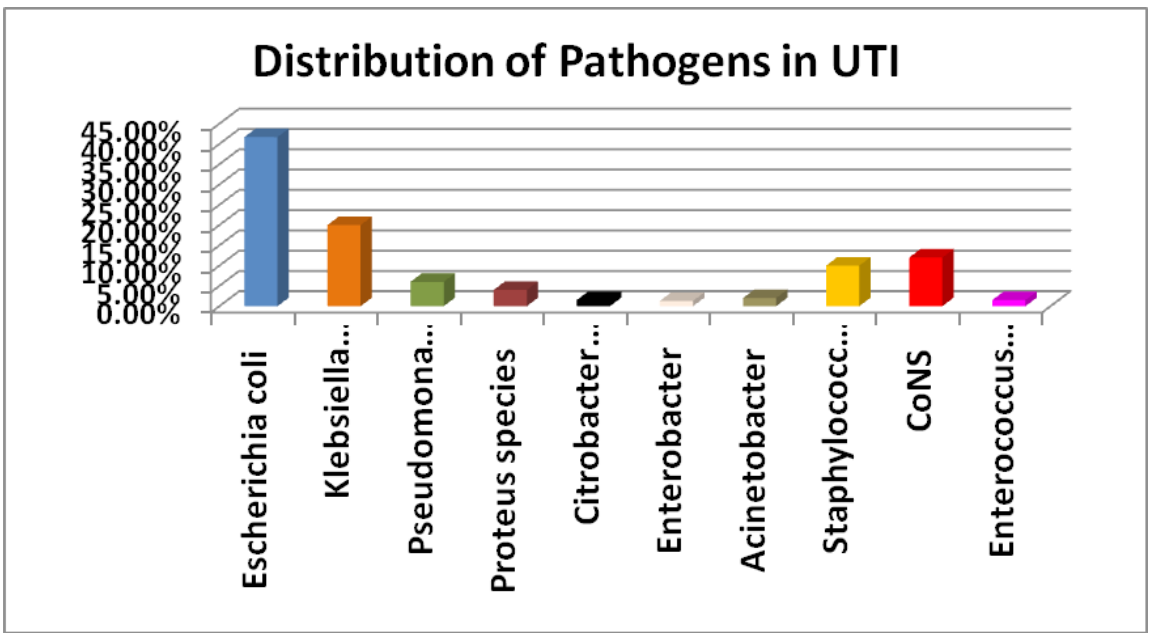


Table 3: Comparison of Common organisms causing UTI

Organisms	Latin America 16	India 2	Tamilnadu 18	Present study
E.coli	60.4%	61%	30.2%	41.7%
Klebsiella	11.1%	22%	22%	20%
Pseudomonas	8.3%	4%	12.35%	6%
Acinetobacter	10%	3%	8.3%	2%
Proteus	4.6%	-	6.7%	4%
Enterobacter	14%	-	35%	1.3%
Citrobacter	7%	2%	2.5%	1.5%
ConS	-	7%	5%	12%
Enterococcus	2.3%	1%	9.5%	1.5%

Conclusion

In the present study, E.coli (41.7%) was the commonest organism isolated form urine samples among UTI patients followed by Klebsiella (20%), Cons (12%) and the least isolated was Enterobacter, Citrobacter, Enterococcus and Acinetobacter with prevalence of 1.3%, 1.5%,1.5% and 2% respectively. These findings were consistent with the outcomes of other research undertaken globally, which decided that E. coli is the main pathogen that causes UTIs. Since E. coli is a significant ordinary flora in the intestine, bad sanitation will lead to trans-contamination and then urinary tract infection. The study conducted in India by Akram et al [2] and in Latin America by Ana.C.Gales et al(1998) [16] showed that E.coli was the commonest organism isolated followed by Klebsiella.

In the present Study, only 1.3% of Enterobacter was isolated, but the study conducted by Ana.C.Gales et al (1998) [16] showed prevalence of 14% and Ramesh et al (2008) [18] Tamil Nadu showed 35%.Worldwide, E. coli was the predominant pathogen isolated from community-acquired UTI patients. The present research indicates a prevalence of 41.7 percent of E. coli isolated from urine specimens from patients with urinary tract diseases. This result is in agreement with different studies conducted worldwide. . Mohanthy et al 2005 [19] documented a prevalence rate of 46% E.coli in New Delhi among UTI patients while a study conducted by Baby Padmini and Appalaraju in Chennai in 2004 showed a prevalence similar to our present study (49.3%)[20].

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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Acoustic Radiation Force Impulse in Alcoholic Liver Disease

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Abstract

The most prevalent liver disease is alcoholic liver disease (ALD). It is undervalued and diagnosed. An early diagnosis is totally vital as it helps define patients at genetic danger for ALD; can cause effective abstinence, particularly in non-addicted patients; and start screening programs to avoid complications that threaten life. In the evaluation of liver fibrosis in alcoholic liver disease, acoustic radiation force impulse (ARFI) elastography has excellent usefulness. For several liver wounds, liver fibrosis is a prevalent condition. Our study was done on 50 patient suspected to have alcoholic liver disease for ultrasound scan of abdomen. The mean liver stiffness in normal patients was found to be 1.087 m/s. Mean ARFI velocity in ALD in our research, the biopsy was 1.83 m/s. ARFI imaging is a successful imaging method for evaluating the existence or lack of developed fibrosis in liver disease patients

Keywords: *Arfi, ALD, Elastography, Fibrosis.*

Introduction

Alcoholic liver disease (ALD) is one of the most prevalent problems caused by liver cirrhosis and its complications and a major cause of alcohol-related death. In 2004, alcohol consumption accounted for 3.8 percent of all worldwide fatalities and 4.6 percent of worldwide disability-adjusted life-years [1-4]. For several liver wounds, liver fibrosis is a prevalent condition. Accurate evaluation of the degree of liver fibrosis is essential to estimate prognosis and to determine a suitable course of therapy for instances of chronic liver disease (CLD) with different etiologies. There is a huge need for non-invasiveand accurate exams that correctly assess the degree of liver fibrosis due to the intrinsic constraints of liver biopsy. Ultrasound (US) elastography is regarded to be a non-invasive, useful and accurate method for assessing liver stiffness to determine the degree of liver fibrosis.

Recently a fresh method of ultrasound has appeared: elastography of the acoustic radiation force stimulus (ARFI). The unit produces an ultrasonic acoustic pulse of short duration (262 ms). This pulse generates mechanical excitement and tissue displacement. A soothing method follows the distortion caused by the electromagnetic stimulus, after which the tissue returns to its initial setup, creating a shear wave. This wave's velocity is calculated to provide a quantitative metric. The present study aim is to assess the liver stiffness in various forms of ALD and FLD/NAFLD as assessed by conventional ultrasound and thus evaluating the role of ARFI elastography.

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Materials and Method

Our study aims to assess the role of ultrasound based elastography method of liver called ARFI elastography in present day radiology practice and how it can aid in early diagnosis of fibrosis along with the conventional ultrasound of liver. The research was conducted at the Department of Radiodiagnosis at Sree Balaji Medical College and Hospital, Chennai, on 50 patients accused of having alcoholic liver disease and fatty liver disease for ultrasound stomach scanning. Inclusion criteria: All patients clinically suspected to have ALD and FLD referred for ultrasound abdomen and Daily alcohol consumption of > 20g/dl

Exclusion criteria: History of drug intake that cause fatty liver, Other liver diseases other than ALD

and Clinical history suggestive of viral hepatitis in the past US of abdomen were performed using 4C-1 probe on SIEMENS S-2000 machine.

All patients were also subjected to ARFI elastography using intercostal approach from right lobe of liver (segment VI). Patients were positioned in supine position with arm abducted. Region of interest is selected free of vessels and ducts within 8cm from capsule of liver preferably about 2cms from liver capsule. Patients were then instructed to stop breathing for a moment and push pulse is sent and shear wave velocity is obtained. Ten valid measurements are taken. Using image-based localization and the patented application of ARFI technique, shear flow velocity can be quantified in a accurate anatomical area centered on a area of concern with a predefined volume given by the scheme. Measurement value, size and elasticity outcomes are also recorded in m/s[5,6]. ARFI imaging provides the option to perform a quantitative assessment of hepatic parenchyma elasticity during standard US assessments without needing extra transducers or other equipment[7] Piscaglia et al[8] demonstrate that Virtual Touch Tissue Quantification is capable of accurately identifying the existence of cirrhosis and generates outcomes that are linked with those acquired by Fibroscan transient elastography.

Findings:

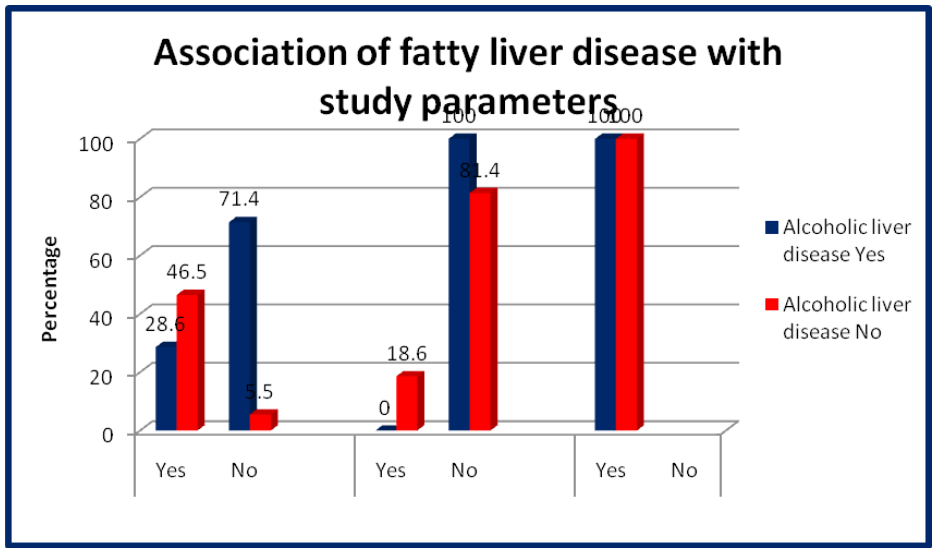


Table 1: Association of Fatty Liver Disease with Study Parameters

		Fatty liver		P Value
		Yes	No	
Alcohol dependence	Yes	4	18	
		15.4%	75.0%	<0.001
	No	22	6	
		84.6%	25.0%	
Coarsened texture	Yes	3	5	
		11.5%	20.8%	0.37
	No	23	19	
		88.5%	79.2%	
Biopsy	Yes	5	2	
		100.0%	100.0%	
	No	0	0	

Sensitivity = 71.4%, Specificity = 61%

Only 4(15%) of the fatty liver patients were alcohol dependent out of total 26 patients. This difference was found to be statistically significant.

Only 3 (11.5%) of the fatty liver patients had coarsened ecotexture out of total 26 patients. But, this difference was not found to be statistically significant.

Table 2: Association of Fatty Liver Disease with Alcohol Dependence Study Parameters

		Alcoholic liver disease		P Value
		Yes	No	
Alcohol dependence	Yes	2	20	
		28.6%	46.5%	0.37
	No	5	23	
		71.4%	53.5%	

		Alcoholic liver disease		P Value
Coarsened texture	Yes	0	8	0.21
		.0%	18.6%	
	No	7	35	
		100.0%	81.4%	
Biopsy	Yes	1	6	
		100.0%	100.0%	
	No			

Sensitivity = 74.2%, Specificity = 59%

Only 2(28.6%) of the alcoholic liver disease patients were alcohol dependent out of total 7 patients. But, this difference was not found to be statistically significant. None of the fatty liver patients had coarsened ecotexture out of total 7 patients & this difference was not found to be statistically significant.

ARFI Velocity	1.8324	.60079
	5.6418	1.25239

Discussion

In our study fatty liver is classified into three grades using conventional US. Also paitent with coarse liver echo texture are identified. Liver stiffness now is categorized into different stages of fibrosis using the predictive values given by Fierbinteanu Braticeviciet al.[9]

In our study commonest age group in patients with ALD was found to be between 51 to 60 years with 38.0% of paitents falling in this group. This is followed by 61 years and above group with 26.0% of patients. In our study 64% were male and 36% were female with a ratio of almost 2:1.

In our study 28.5% of the alcoholics had changes consistent with alcoholic liver disease which is in concordance with study by McCullough et al.[10]

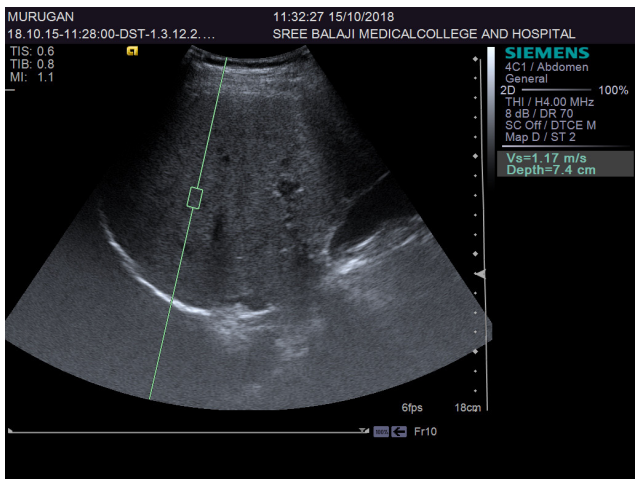
ARFI elastography had a mean value of liver stiffness in the spectrum of F0F1 fibrosis phase. Eiler et al.[11] found that in ordinary patients the average liver stiffness was 1.16 m/s. Mean liver stiffness by Sporea et al. [12] was 1.19 m/s. Similarly, Yoon et al [13], Horster et al [14], Goerts et al[15], Fierbinteanu Braticevici et al [9], Friedrich Rust et al[18], Pisgaclia et al [8] and D Onofrio et al [16] showed the mean liver stiffness in normal patients as 1.06, 1.19, 1.09, 1.18, 1.13, 1.13 and 1.56 m/s respectively.

Association of alcohol dependence with our study parameters showed sensitivity = 71.4% and specificity = 61%, Only 4(15%) of the fatty liver patients were alcohol dependent out of total 26 patients. This difference was found to be statistically significant.

However liver biopsy was done only for 7 patients in the present study which proved 100% of ARFI values positive to confirm the presence of fibrosis Limitation of this study is liver biopsy. This is due to various drawbacks of liver biopsy most important being its invasiveness and lack of consent by patient for benign condition like ALD.

ALD and FLD/NAFLD is a disease of higher age group with male preponderance. Most of the participants in the age group of 51-60 (38%), while 88% had age more than 40 years.64%were males & ~ 3% were females. Data regarding alcohol dependency shows that almost half of them were alcohol dependent. Only 16 % participants had coarsened ecotexture. 52% had fatty changes in liver & ~86% had alcoholic liver disease.

Mean ARFI velocity in ALD and fatty liver in our study was 1.83 & ARFI depth was 5.64, which denoted F3-F4 fibrosis stage. In comparison to the cut off given by Toshima et al(17) 1.88 m/s and Fierbinteanu Braticevici et al.[9] The mean liver stiffness in normal patients was found to be 1.087 + 0.087 m/s which is in agreement with most of the studies. This also proves high specificity of ultrasound in detecting normal liver without fatty infiltration.



Conclusion

Alcoholic liver illness (ALD) and fatty liver is the major cause of liver disease, either alone or in combination with other comorbidities like obesity or viral hepatitis. It is a disease of higher age group with

male preponderance. Most are milder forms of fatty liver with benign outcome. The mean liver stiffness in normal patients was found to be 1.087 + 0.087 m/s. Mean ARFI velocity in ALD and fatty liver in our study was 1.83 + 0.074 m/s which is in agreement with most of the studies. The limitation of this study was that liver biopsy was not used on all patients to confirm the histology and therefore there is a need for future study with liver biopsy. ARFI imaging is a successful imaging method in patients with liver disease to assess the existence or lack of developed fibrosis. ARFI is a fresh non-invasive imaging technique capable of estimating with excellent precision the liver rigidity diagnosing cirrhosis. Therefore, the first evaluation of patients with liver disease suspicion can be carried out in a single phase with both standard ultrasonography and ARFI for liver stiffness evaluation.

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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ALD Risk Factors and Epidemiology

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Abstract

More than 1 million fatalities are caused worldwide by liver cirrhosis and most of these fatalities are preventable. There is a noticeable geographical variation in mortality levels owing to cirrhosis, and this difference in the burden of liver disease illustrates the connections between the liver disease and mortality population hazards. The varying geographical allocation of significant risk variables for the growth of body illness, including alcohol intake, hepatitis C virus (HCV) infection, hepatitis B virus infection, and obesity and metabolic syndrome, has the ability to highlight possibilities for action, while the evolution of these risk variables offers perspectives into understanding the future burden of liver disease. This study focuses on using population information to define regions and communities at high risk that would profit from preventive measures to decrease liver disease death. To demonstrate the effect these can have if commonly applied, specific policies that are efficient at policy and government health levels are addressed. Also outlined is the effect of therapies that can alter the natural history of liver disease, including immediate antivirals for HCV infection. Finally, the difficulties of explaining non-alcoholic fatty liver disease epidemiology are outlined to demonstrate the need to know the natural history of the disease in order to explain and influence the growth of novel therapies.

Keywords: *Epidemiology, Hazards, Hepatitis.*

Introduction

Cirrhosis epidemiology was strongly related to alcohol usage kinds and habits. Other variables in the growth of liver disease may also be at job. For instance, the danger of cirrhosis mortality and mortality rates are significant and long-standing gender differences. As shown in figure 1, mortality levels of cirrhosis in males are about twice as high as in females. These levels represent the reality that males usually drink more than females, and the percentage of heavy drinkers and alcoholics among males is much greater. However, as mentioned earlier, it also appears that females are more likely to develop cirrhosis than males at any specified stage of alcohol consumption. (See figure 2) (Tuyns and Péquignot 1984).This phenomenon is not well known, but it has been given several feasible reasons. One is that concentrations of alcohol dehydrogenase, an enzyme engaged in breaking down alcohol, may be smaller in female stomachs than in men, resulting in greater concentrations of blood sugar in women than in men consuming equal quantities of alcohol (Frezza et al. 1990). Because liver damage is a feature of blood alcohol levels and exposure time, variables leading to greater blood alcohol concentrations could at least partly justify the greater alcohol-related alcohol-related danger of women [1-3].

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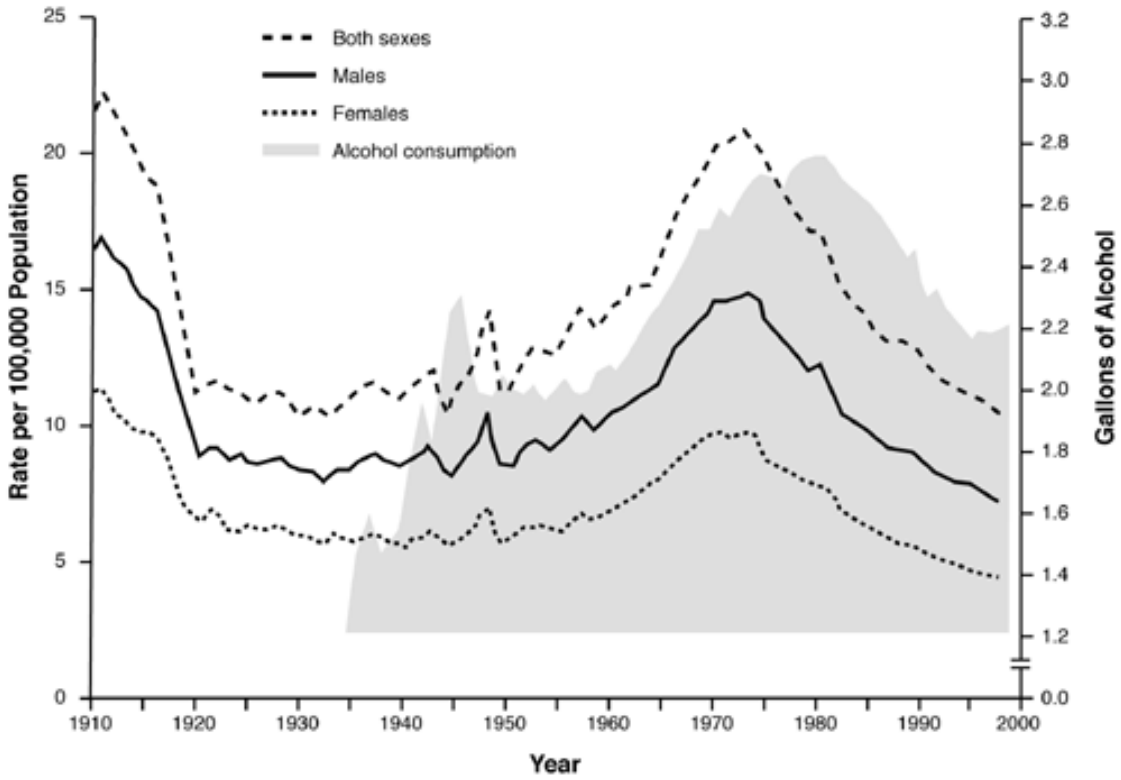


Fig 1 Age-adjusted mortality rates of gender-based liver cirrhosis, 1910–1932 in registered death states, and 1933–1997 throughout the United States. The mortality levels of U.S. cirrhosis were high at the start of the 20th century, decreased sharply with the advent of Prohibition, and rose again at the end of Prohibition. Mortality rates continued to rise until the mid to mid-1970s, when these prices started to reach the levels seen in the century's first decade. Cirrhosis mortality levels started to decrease again in the mid-1970s, as they had with the advent of Prohibition, and they continued to decrease.

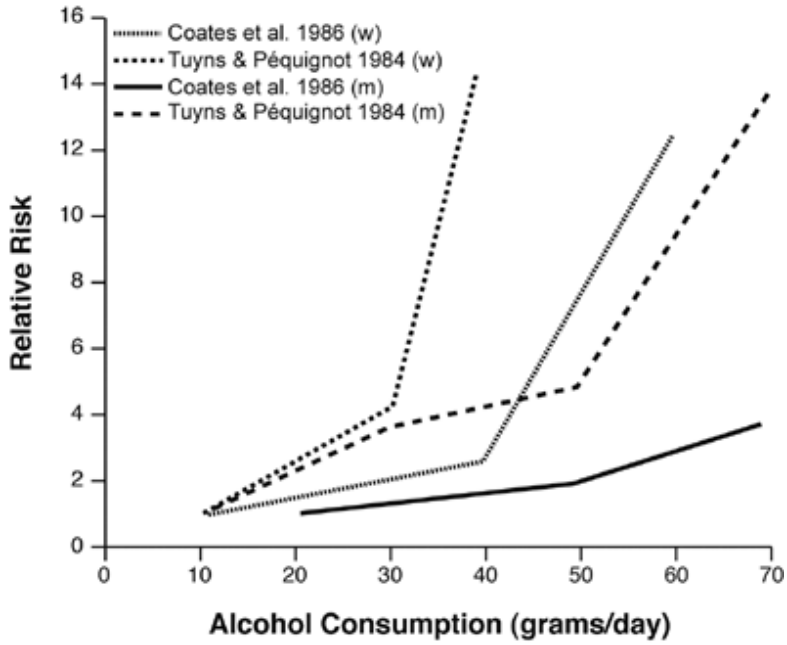


Fig 2 Consumption of alcohol and incidence of liver cirrhosis in males (m) and females (w). Studies have shown a close relationship between alcohol consumption and cirrhosis risk.

Note: Data truncated at 70 g/day.

Materials and Method

The study was done on 50 patient suspected to have alcoholic liver disease and fatty liver disease for ultrasound scan of abdomen to the Department of Radiodiagnosis at Sree Balaji Medical College and Hospital, Chennai by purposive sampling technique.

Source of data: The Department of Radiodiagnosis at Sree Balaji Medical College and Hospital, Chennai

Method of collecting data:

Duration of the study: December 2016 to September 2018.

Sample size: 50 cases

Inclusion criteria:

- All patient clinically suspected to have ALD and FLD referred for ultrasound abdomen
- Daily alcohol consumption of > 20g/dl

Exclusion criteria:

- History of drug intake that cause fatty liver
- Other liver diseases other than ALD and FLD
- Clinical history suggestive of viral hepatitis in the past.

Findings: Patients were selected according to the inclusion criteria. Informed written consent was taken from each patient under the study. US of abdomen were performed using 4C-1 probe on SIEMENS S-2000 machine. Liver was assessed for the presence or absence of fatty infiltration based on increased echogenicity compared to right kidney. It graded the fatty liver. Degree 0 is usual. Grade 1 (mild) is depicted in the hepatic parenchyma by a slight diffuse rise in fine hints with standard visualization of the diaphragm and intrahepatic tract boundaries. Grade 2 (mild) is a mild diffuse rise in fine emissions with mildly reduced intrahepatic and diaphragm visualization. Grade 3 (serious) is a noticeable rise in good waves with bad or no visualization of the ships and edges as well. Patients with mildly coarsened echo texture without irregular margins and those with features of both coarse echo texture and irregular margins were identified.

Discussions

All patients were also subjected to ARFI elastography using intercostal approach from right lobe of liver (segment VI). Patients were positioned in supine position with arm abducted. Region of interest is selected free of vessels and ducts within 8cm from capsule of liver preferably about 2cms from liver capsule. Patients were then instructed to stop breathing for a moment and push pulse is sent and shear wave velocity is obtained. Ten valid measurements are taken. Reliable readings were described as: average value of 10 valid readings with a success rate (SR= proportion of the amount of effective purchases separated by the complete amount of purchases) > 60% and an interquartile range interval (IQR= the gap between the 75th and 25th percentiles, basically the mid 50 percent range of the information) > 30 percent. From these ten readings, the median value is chosen.

Liver stiffness is now characterized into different stages of fibrosis using the predictive value given by Fierbinteanu Braticevici et al [4].

The age, presence or absence of diabetes mellitus, lipid profile, fasting blood sugar, liver function test and alcohol tolerance test are collected from patients.

The impulse elastography of the acoustic radiation force is conducted with an ultrasound scheme from Siemens Acuson S2000TM (Siemens AG, Erlangen, Germany). The establishment of this technique is the tissue shearing being analyzed, which actuates a diminished worry in hard tissues than in delicate ones. The ultrasound sensor creates naturally the beat of an acoustic push that produces shear waves proliferating into the tissue. Their speed, estimated in meters/second (m/s), is appeared on the screen. Spread speed increments with fibrosis earnestness. In an exact anatomical district, shear wave speed can be evaluated utilizing picture based confinement and the exclusive use of ARFI innovation; shear wave speed can be measured in an exact anatomical locale, concentrated on an area of enthusiasm, with a predefined size gave. Measurement value, depth and elasticity outcomes are also recorded in m/s[5,6,7]

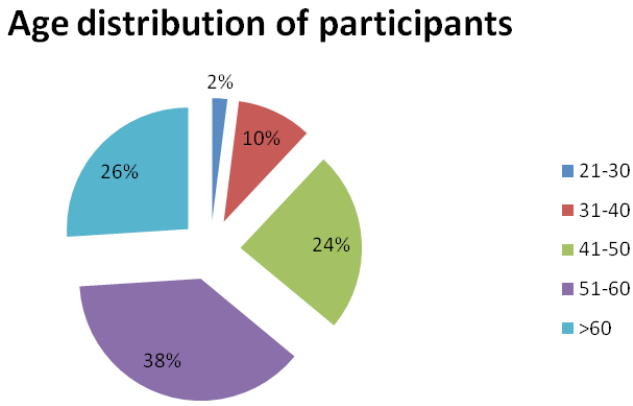
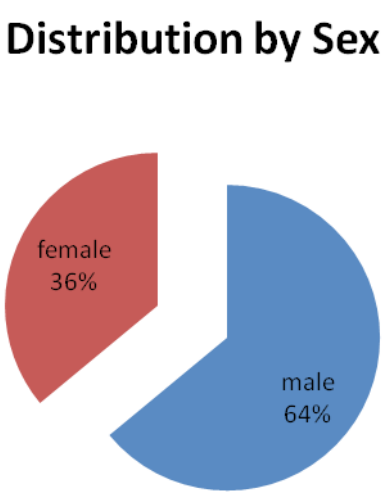


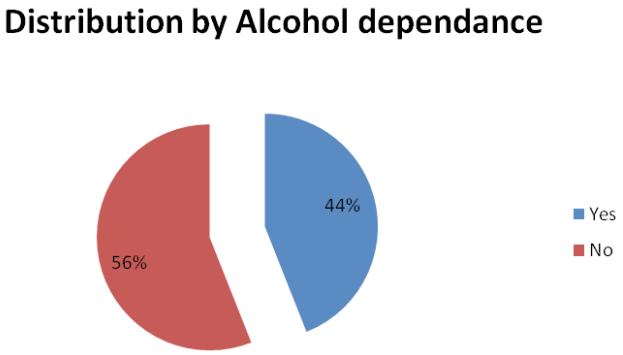
Table 1: Descriptive Statistics of Study Participants

		Mean/Freq	SD/Percentage
Age		62.9800	62.34581
Age	21-30	1.0	2.0
	31-40	5.0	10.0
	41-50	12.0	24.0
	51-60	19.0	38.0
	>60	13.0	26.0



Descriptive Statistics of Study Participants

Sex	Male	32	64
	Female	18	36



Descriptive Statistics of Study Participants

Alcohol dependence	Yes	22	44
	No	28	56

Conclusion

Alcoholic liver disease is a significant cause of morbidity and mortality associated with alcohol. Cirrhosis of heavy drinkers and alcoholics can increase from fatty liver to alcoholic hepatitis, and cirrhosis is anticipated to increase from 10% to 15% of alcoholics. Recent studies also show that the risk of cirrhosis and other liver disease can be multiplicated by alcohol and hepatitis C.

To date, proof suggests that increased involvement in AA and other alcohol abuse therapy has played a significant part in decreasing mortality rates for cirrhosis. Other study has proposed that cirrhosis death levels may be more strongly linked to the intake of certain alcoholic beverages There have also been significant variations in ALD levels among males and females as well as among distinct racial communities.

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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Comparison of Serum Lipid Profile Level in Hypothyroid Patients and in Healthy Control

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Abstract

Studies have identified the relationship between the amount of thyroid hormones and the lipid profile in individuals with hypothyroid. This research is used to assess the serum lipid profile concentration in individuals with hypothyroid and to combine it with good checks. A total of 50 hypothyroid patients within aged group 20-60 years and healthy controls within 20-60 years of both sexes were enrolled in the study after taking written consent. lipid profile were measured by standard procedures. Data collected was analysed using Stata version 14.1 software. Result shows that there is significant increase in serum TC,TG,LDL-C levels among hypothyroid patients when compared to controls whereas there is a decreased in serum HDL-C level among hypothyroid when compared to controls

Keywords: *Hypothyroid, Lipid profile.*

Introduction

Dyslipidaemia is a common metabolic abnormality in patients with hypothyroidism, either in the open or subclinical forms of the disease, resulting in the effect of thyroid hormones in all aspects of lipid metabolism resulting in various quantitative and/or qualitative changes in triglycerides, phospholipids, cholesterol and lipoproteins, including LDL-Cholesterol, HDL-Cholestein. In hypothyroid disease, the elevated likelihood of cardiovascular disease is explained by dyslipidaemia and coexisting metabolic abnormalities in conjunction with thyroid hormone-induced hemodynamic changes[1-4].

Materials and Method

A total of 50 hypothyroid patients within aged group 20-60 years and a total of 50 healthy controls within 20-60 years of both sexes were enrolled in the study.

After obtaining informed consent from patient, a detail history was taken followed by laboratory investigation as under:

- Estimation of serum TC by cholesterol oxidase peroxidase method
- Estimation of serum TG by enzymatic method (glycerol phosphate oxidase-phenol aminoantipyrine method)
- Estimation of serum HDL by Direct method
- Estimation of serum LDL by Friedewald formula

The data was entered in Stata version 14.1 software, where mean, standard deviation, correlation coefficient and percentage were calculated and results were obtained

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Findings:

	Group	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]		t-value
FT3	Test	2.420	0.075	0.527	2.272	2.568	-7.44**
	Control	3.479	0.121	0.858	3.238	3.720	
FT4	Test	0.841	0.026	0.187	0.788	0.893	-8.38**
	Control	1.639	0.092	0.647	1.458	1.821	
TSH	Test	35.715	3.558	25.156	28.656	42.775	9.29**
	Control	2.633	0.142	1.001	2.352	2.914	
Lp(a)	Test	23.120	1.714	12.118	19.720	26.520	10.24**
	Control	4.780	0.522	3.691	3.744	5.816	
TC	Test	203.860	4.711	33.312	194.512	213.208	7.15**
	Control	156.560	4.639	32.803	147.355	165.765	
TG	Test	136.140	3.986	28.188	128.230	144.050	5.02**
	Control	109.560	3.491	24.685	102.633	116.487	
LDL	Test	137.952	4.444	31.427	129.133	146.771	7.25**
	Control	89.908	4.916	34.759	80.154	99.662	
HDL	Test	38.680	0.673	4.761	37.344	40.016	-5.38**
	Control	44.740	0.902	6.379	42.950	46.530	

** p<0.01, *p<0.05

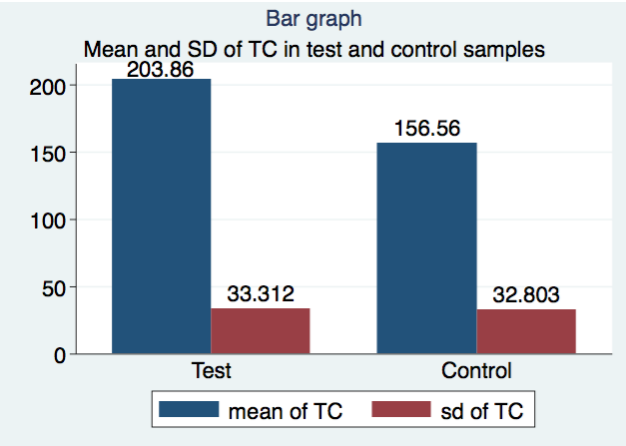


Figure 1: Comparison of Serum Total Cholesterol (TC) levels in both test and control samples.

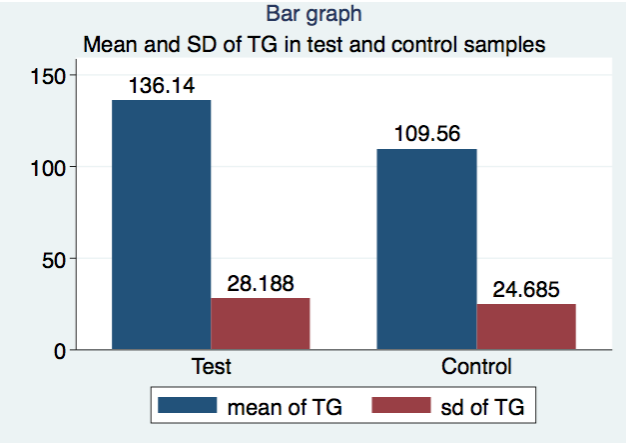


Figure 2: Comparison of Serum Triglyceride (TG) levels in both test and control samples.

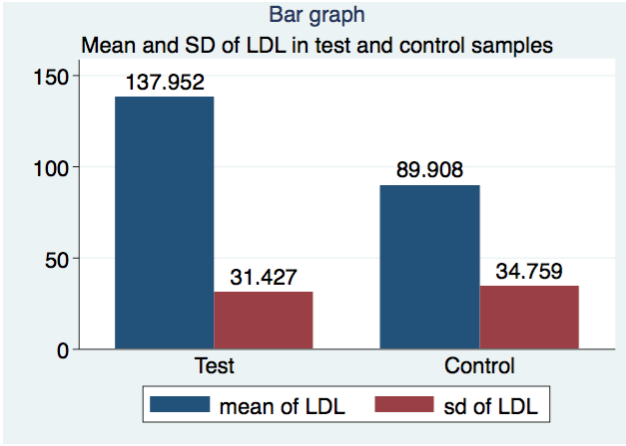


Figure 3: Comparison of Serum LDL levels in both test and control samples.

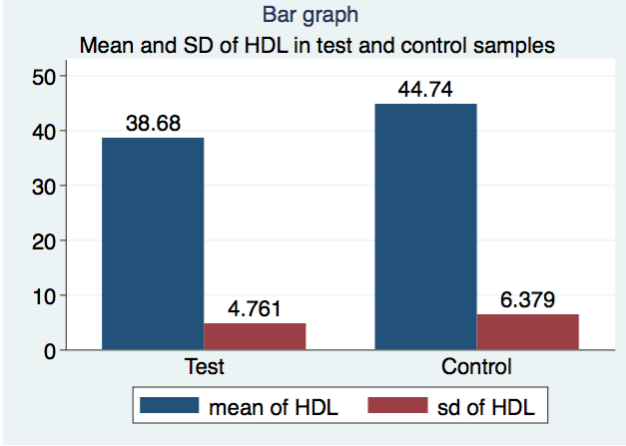


Figure 4: Comparison of Serum HDL levels in both test and control samples.

A total of 100 topics have been chosen for this research as the research unit. This involves 50 hypothyroid instances and 50 good checks. Serum levels TC, LDL-C, VLDL, TG, and HDL-C have been predicted for all research group samples. Using Friedewald formula, LDL-C was calculated. Serum LDL-C were significantly higher in hypothyroid patients (137.952±31.427) compared to control subjects (89.908±34.759) with t-value = 7.2498 ($p < 0.001$).

Serum TC were significantly higher in hypothyroid patients (203.860±33.312) compared to control subjects (156.560±32.803) with t-value = 7.1540 ($p < 0.001$).

Serum TG were significantly higher in hypothyroid patients (136.140±28.188) compared to control subjects (109.560±24.685) with t-value = 5.0161 ($p < 0.001$).

Serum HDL-C level were significantly lower in hypothyroid patients (38.680±4.761) compared to control subjects (44.470±6.379) with t-value = −5.3834 ($p < 0.001$).

Discussion

This study also shows that the fasting serum LDL-C levels among hypothyroid patients were significantly higher than the controls subjects. The mean value of LDL- C was 137.952±31.427 mg/dl in hypothyroid group whereas for the control group it was 89.908±34.759 mg/dl.

In hypothyroidism, thyroid hormone impacts on reduced production of LDL receptors and cholesterol biliary excretion outweigh the impacts of reduced synthesis of hepatic cholesterol, resulting in elevated serum concentrations of LDL, IDL cholesterol (IDL), and complete cholesterol levels [5-8].

The study also showed that serum HDL-C levels among hypothyroid patients were significantly lower than normal healthy controls. The mean value of HDL-C was 38.680 ±4.761 mg/dl in hypothyroid group whereas for the control group it was 44.470 ± 6.379 mg/dl.

Thyroid hormones are also engaged in HDL development by enhancing the plasma activity of a variety of dna components such as Lecithin cholesterol acyl transferase (LCAT), cholesterol ester transport factor (CETP) and hepatic lipase [9]. LCAT esterifies free cholesterol to cholesterol esters, thereby encouraging the transformation of lipid-poor preβ-HDL to bigger, spherical HDL particles [10]. As a result of this method of transferring cholesterol ester, the cholesterol content of HDL is reduced. At the same time, HDL is transferred to triglycerides in the opposite direction, resulting in HDL particles enriched with triglycerides. HDL triglycerides are then hydrolyzed by hepatic lipase, resulting in smaller HDL particles[11]. LCAT, CETP and hepatic lipase alterations behave in conjunction with serious hypothyroidism to reduce HDL-cholesterol and HDL. This study shows that the fasting serum TG levels among hypothyroid patients were significantly higher than the normal controls. The mean value of serum TG was 136.140 ±28.188 mg/dl in hypothyroid group whereas for the control group it was 109.560±24.685 mg/dl.

Thyroid hormones boost the mobilization of stored triglycerides by promoting lipolysis of the adipose tissue[12-15]. Thyroid enzymes also induce β-oxidation of the hepatic fatty acid. As a consequence of these divergent behavior, hypothyroidism most likely encourages accumulation of hepatic triglycerides[16] which is a major driving force for enhanced manufacturing of big, very low-density lipopride.

Conclusion

Lipids parameter like LDL-c,TC,TG show positive correlation with TSH, and negative correlation with FT3 and FT4 levels suggesting that estimating the level of lipids parameters in hypothyroid patients can predict the risk of developing cardiovascular events in hypothyroid patients.

Ethical Clearance: No ethical clearance was necessary for this research work.

Source of Funding: Self funded project.

Conflict of Interest: Nil

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A Various Method of Surgical Management in Patients with Acute Intestinal Obstruction: A Case Series

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Abstract

Background: Bowel obstruction remains one of the most prevalent intra-abdominal issues encountered by general surgeons in their exercise, whether triggered by hernia, neoplasm, adhesions or linked to biochemical disturbances, tiny or big intestinal obstruction remains a significant source of morbidity and death. Identifying and analyzing the different operating procedures in patients with severe intestinal obstruction.

Objective: To analyse the various method of surgical managements in a patients with acute intestinal obstruction.

Materials and method :In all patients registered with intestinal obstruction regardless of age group, the research was performed in Sree Balaji Medical College and Hospital, Chennai over a span of 19 months. Results: There were 50 instances of severe intestinal obstruction in the entire age range in the research group. The commonest surgical procedure done for intestinal obstruction is release of adhesion with hernioplasty done in 32% of the cases, release of adhesions only done in 30% cases & resection anastamosis in 18% of cases.

Conclusion: Success in managing severe intestinal obstruction is mainly dependent on early diagnosis, skillful leadership and therapy of the obstruction's pathological consequences as much as the cause itself. There is no statistically significant difference between cure rates and death rates due to various surgeries, probably because our sample size was too small. P value 2.0(>0.05).

Keywords: *Intestinal obstruction, release of adhesions, hernioplasty.*

Introduction

Bowel obstruction remains one of the most prevalent intra-abdominal issues encountered by general surgeons in their exercise, whether triggered by hernia, neoplasm, adhesions or linked to biochemical disturbances, tiny or big intestinal obstruction remains a significant cause of morbidity and mortality. For severe abdominal problems, they account for 12 to 16 percent of surgical admissions[1-5]. Acute intestinal obstruction manifestations can vary from a relatively decent appearance with only mild abdominal discomfort and distension to a hypovolemic or septic shock (or both) condition needing urgent surgery. Death from severe intestinal obstruction is declining with a stronger understanding of pathophysiology, improved diagnostic method, replacement of fluids and electrolytes, a lot of powerful anti-microbials, and knowledge of intensive care. Most deaths happen in older people seeking early therapy and related pre-existing illnesses such as diabetes mellitus, heart disease or respiratory disease. Early obstruction diagnosis, adequate surgical technique and extensive postoperative therapy bring a grateful outcome[6-8].

Materials and Method

The study was conducted in Sree Balaji Medical College and Hospital, Chennai over a period of 19 months in all patients admitted with intestinal obstruction irrespective of age group. Study design - Prospective observational study. Patients with subacute intestinal obstruction handled conservatively were removed from the research and only those instances of severe intestinal

obstruction surgically controlled were analyzed in order to determine the pathology of intestinal obstruction with the objective of knowing how it was presented, the physical results, the radiological and haematological results, the operational results and the results of the research. Clinical information was registered as per Proforma after the patient was admitted. The diagnosis is focused primarily on clinical examination and is often endorsed by haematological and radiological tests[9].

Findings:

Table 1: Management

Management	Number of cases	Percentage
Release of adhesions & hernioplasty	16	32
Release of adhesions	15	30
Derotation of Volvulus & Sigmoidopexy	2	4
Resection & Anastomosis	9	18
Hartman's procedure	2	4
Resection Anastomosis and Herniorrhaphy	5	10
Transverse Loop Colostomy	1	2
Total	**50**	**100**

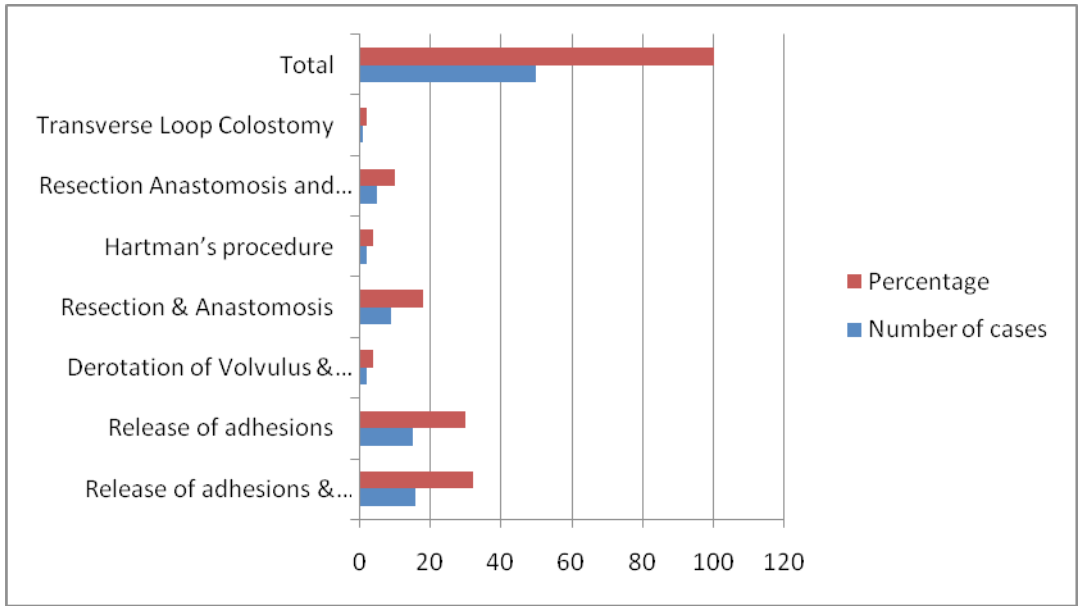


Figure: Management

In our study of 50 cases as accordingly with the etiology the management and the surgical procedure was done as shown in the table and pie diagram, release of adhesion with hernioplasty done in 32% of the cases, release of adhesions only done in 30% cases & resection anastamosis in 18% of cases.

Discussion

The prevalence of acute intestinal obstruction is 0.95% of complete surgical instances in our clinical research. In Souvik Adhikari et al., the incidence of complete surgical instances was 9.87 percent. The occurrence in the sequence of Bhargava Anderson was 3% of complete surgical instances. It was discovered that the most common cause was obstructed/strangled hernia, accompanied by postoperative adhesions, malignancy, intussusception, volvulus, tuberculosis, and mesenteric ischaemia[10]. In developing countries like India, the commonest cause used to be obstructed/strangulated hernia. In our study of 50 cases where surgical procedure was done release of adhesion with hernioplasty done in 32% of the cases, release of adhesions only done in 30% cases & resection anastamosis in 18% of cases[11].

Conclusion

Success in managing severe intestinal obstruction is mainly dependent on early diagnosis, skillful leadership and therapy of the obstruction's pathological consequences as much as the cause itself. There is no statistically significant difference between cure rates and death rates due to various surgeries, probably because our sample size was too small. P value 2.0(>0.05).

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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Pattern of Ocular Morbidity among School Going Children of 6-16 Years in Kancheepuram District, Tamil Nadu

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Abstract

Among the leading childhood morbidities in developing nations,after malnutrition, diarhheaetc childhood blindness and other ophthalmic morbidities causing visual impairment also hold a place. The major causes of blindness in children encompass intrauterine and acquired infectious diseases, teratogens and developmental and molecular genetics, nutritional factors, the consequences of preterm birth, and tumors. A multidisciplinary approach is therefore needed. To assess the pattern the ocular morbidity among school going children of an urban area in Kancheepuram district, Tamilnadu were studied.

Keywords: *Morbidity, Children, Infectious Diseases, Preterm Birth.*

Introduction

The global child mortality rates, though lower than the under 5 mortality rates are themselves as close to 1 million children aged 5–14 in 2017. The probability of dying among children aged 5–14 was 7.2 deaths per 1,000 children aged 5 in 2017–substantially lower than the probability of dying among children under age 5 (39 deaths per 1,000 live births).[1,2]

Health and well-being of 362 million adolescent (10–19 years) boys and girls in the South-East Asia Region will be the key to the national development of Member States as they progress towards achievement of the Sustainable Development Goals. Regional Strategic Guidance on accelerating actions for Adolescent Health (2018–2022) provides a way forward to countries to build upon the existing national adolescent health plans using intersectoral approach and for providing comprehensive and multi-dimensional services.[3]

Among the leading childhood morbidities in developing nations,after malnutrition, diarhheaetc childhood blindness and other ophthalmic morbidities causing visual impairment also hold a place.

The major causes of blindness in children encompass intrauterine and acquired infectious diseases, teratogens and developmental and molecular genetics, nutritional factors, the consequences of preterm birth, and tumors. A multidisciplinary approach is therefore needed. This is because the underlying causes closely reflect socioeconomic development and the social determinants of health, as well as the provision of preventive and therapeutic programs and services from the community through to tertiary levels of care. The control of blindness in children therefore requires not only strategies that reflect the local epidemiology and the needs and priorities of communities, but also a well functioning, accessible health system which operates within an enabling and conducive policy environment[4,5].

Materials and Method

Study Design: This study is a community based cross-sectional study conducted in urban area of Kancheepuram district, Tamil Nadu.

Study Area: This study was conducted in Anakaputhur which is the urban field practice area of the Urban Health and Training Centre (UHTC) attached to our Institution (Sree Balaji medical college and hospital.

Anakaputhur is a municipality city in the district of

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Kancheepuram, Tamilnadu. It is divided into 18 wards for which elections are held every 5 years. The study was conducted in Anakaputhur which is located at a distance of 7 kilometres from the institution with an area covering approximately 16 sq. kilometres. (Annexure).

Study Population: According to the 2011 census, Anakaputhur urban field practice area had a total population of 48,050 of which 24,158 were Males, 23,892 were Females and 9850 were Children (6-16 years of age). Among the children 5045 were Males and 4805 were Females. Total number of houses in Anakaputhur is 12,146 The study was done among Children (6-16 years of age) residing in the study area permanently at the time of the study.

Study Period: The study was carried out from December 1st 2017–May 31st 2018

Sample Size: Sample size was calculated from a previous study conducted by Deshpande Jayant D in a rural area of North Maharashtra in the year 2011. The study recorded a prevalence of 27.6% This was taken as the reference value for calculating sample size. The sample size was calculated using the formula:

$N = Z\acute{a}^2pq/[L]\ 2$

Where, Z = 1.96 at 95% confidence interval

p = Prevalence of disease/event (referred value)

q = 100–P

L =Relative precision, which is assigned as 13% of p (15% of 27.6-3.588 for this study

Substituting it in the formula,

[Z = 1.96, p = 27.6%, q =72.4 (100-27.6), L = 3.588]

N = 1.96 x 1.96 x 27.6 x 72.4/3.588x3.588 = 599

Accounting 10% for non-response, the final sample size was calculated as 658 (rounded off to 672). [N = 672]

Inclusion Criteria: The inclusion criteria for the study were children of age group (6-16 years) residing in the study area, who gave consent to participate in the study.

Exclusion Criteria: The exclusion criteria for the study were Children who were mentally retarded, who are severely ill and those who didn't give consent to participate in the study were excluded.

Sampling Method: Anakaputhur had a total population of 48,050 as per 2011 census. As per the data available in the UHTC register there were 9850 children (6 - 16 years) residing in the study area. The sampling technique followed for this study was **Systematic random sampling**.

Total number of children belonging to 6-16 years of age, N=9850; which was divided by the total sample size, n = 672, to obtain the k value.

K value = N/n = 9850/672 = every 14th participant.

Every 14th participant from the records was chosen and the name and address of the person was noted and was visited for the data collection. if the person corresponding to the number did not give informed consent or was absent, the next number within the respective ward was chosen and the 14th person from that particular person was selected and interviewed. Likewise, 672 children who gave informed consent and willingly participated in the study were identified.

Study Tool: A pretested structured questionnaire was used as study tool for data collection, by interviewing the study participants. The questionnaire was prepared in English and translated to Tamil. The interview was conducted by the investigator herself and their responses were recorded in the questionnaire. The questionnaire consisted of the following sections:

Section I: Socio-Demographic Factors: Family background characteristics, including socio-demographic factors (age, sex, standard, family income, religion family type, and socio-economic status).

Section II: History Regarding Refraction: History regarding refraction like whether wearing spectacles, duration, refractive power, family history of refractive error.

Section III: Eye Complaints: History of eye complaints like redness, watering, itching, difficulty in night vision, difficulty in reading books etc.

Section IV: Nutritional Status: History of fruit and vegetable intake and history of Vit A supplementation.

Section V: Physical Measurements: Physical measurement such as, Height, weight, BMI were taken from the study participants.

Section VI: Ophthalmic Measurements: Ophthalmic measurements like visual acuity, corrected visual acuity and colour vision were taken using Snellen chart and ishihara chart respectively.

Informed Consent: Informed Consent was obtained from each participant prior to the administration of the interview schedule. The Informed Consent was prepared in the local language and is based on ICMR guidelines [Annexure].

Ethical Approval: The study proposal was presented and approval from Institutional Ethics Committee was obtained prior to the pretesting. The approval letter is enclosed in Annexure.

Pilot Study: A pilot study was carried out among 70 participants in the Anakaputhur area, which is a in Kancheepuram District. The questionnaire consisted of socio-demographic characteristics, details regarding the risk factors for ophthalmic morbidity, history regarding refraction, nutritional status and physical measurements. Based on the results of the Pilot study, the necessary changes were incorporated in the questionnaire and the study was conducted. The samples included in the pilot study were not included in the present study.

Data Collection Period: Data was collected from the study participants for a period of 6 months from December 2017 to May 2018.

Data Collection Method: Using Multi stage Sampling technique samples were selected. The data was collected by visiting the designated place of residence as per the sampling frame. On obtaining the informed consent, the interview was conducted by the investigator herself. Each participant was interviewed for 10 to 15 minutes.

Findings:

Sociodemographic Variable		Frequency (N=672)	Percentage
Age	6-9 yrs	194	28.90
	10-12 yrs	229	34.18
	13-16 yrs	249	36.92
Sex	Male	304	44.98
	Female	368	55.02
Standard	1st-5th	280	41.4
	6th-8th	156	23.07
	8th-12th	236	35.5
Socio-economic status	Upper	154	22.9
	Upper middle	326	48.6
	Lower middle	129	19.2
	Upper lower	44	6.5
	Lower	19	2.8
Religion	Hindu	588	87.0
	Muslim	32	4.7
	Christian	47	7.7
	Others	5	0.6
Family type	Nuclear	452	67.5
	Joint	188	27.8
	3 generation	32	4.7

Socio-demographic characteristics of the study population is shown in table 1. Among the study participants, 36.9% belonged to 13-16 years of age,34.1% belonged to 10-12 years and 28.9% belonged to 6-9 years of age. 280 students belonged to 1-5th standard, whereas only 156 belonged to the 6-7 category. About 54.1% of the study participants were females and 44.9% were males. According to the modified Kuppusamy's scale, 48.6% belonged to upper middle class, 22.9% belonged to upper class whereas only 2.8% belonged to lower class. Coming to literacy of the head of the family,269 of them had passed higher secondary whereas 258 of them had a diploma degree in hand. There were no entries in middle school and graduate category whereas 49 & 62 of them were primary school and illiterate category respectively. More than half of them 87% were hindus, whereas 4.7% and 7.7% of them were muslims and Christians,only 0.6% of them belonging to religions other than this. Almost half of them(452) hailed from a nuclear family, whereas 188 of them were from a joint family and 32 of them from a 3 generation family.

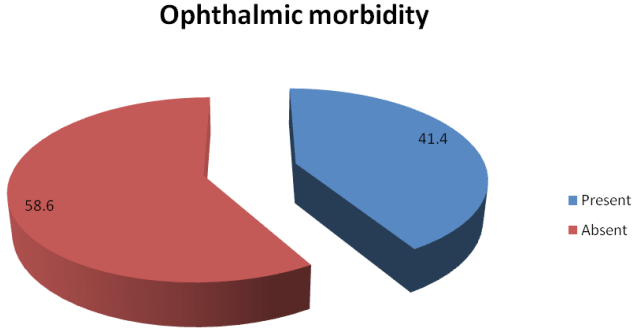


Figure 1: Prevalence of Ophthalmic Morbidity

As in figure 1, in our study population 41.4% had one or the other ophthalmic morbidity, whereas 58.6%

did not suffer from any ophthalmic morbidity.

Discussion

Socio-Demographic Characteristics of the Study Population:

Age: In this study,36.9% belonged to 13-16 years of age,34.1% belonged to 10-12 years and 28.9% belonged to 6-9 years of age. In a study by Desai S 67% were distributed in the age group of 7 to 12 years, 84.9% were in the age group of 13 to 18 years.In a similar study done by Prasanna Kamath, 53% were in the age group of 6 to 10years, 26.9% were in the age group of 11 to 12 years, 20% were in the age group of 15-20 years. This variation in the age groups is due to the different study setting and variation in the socio-demographic characteristics of the study population.

Sex: In our study, 54.1% of the study participants were females and 44.9% were males. In a study done by M Gupta, 52.08% were males, 47.9% were females. In a similar study done by Datta A, 59.5% were males, 41.5% were females.

Socio-Economic Status: According to the modified kuppusamy's scale, 48.6% belonged to upper middle class, 22.9% belonged to upper class whereas only 2.8% belonged to lower class.In a study done by Deshpande, 30.1% belonged to upper lower and 26.8% belonged to lower middle class,whereas only 7.4% belonged to upper class.In a similar study done by Prajapati, 32.1% belonged to upper lower class and 23.3% belonged to lower middle class,and only 6.1% belonged to upper class.

Religion: More than half of them 87% were hindus, whereas 4.7% and 7.7% of them were muslims and Christians,only 0.6% of them belonging to religions other than this. In a study done by Deshpande, 75.8% were hindus, 17.8% were muslims, 2.8% were Christians, 3.3% belonged to religions other than this.In a similar study done by Datta A, 44.8% were hindus, 55.2% were muslims.

Family Type: Almost half of them(452) hailed from a nuclear family, whereas 188 of them were from a joint family and 32 of them from a 3 generation family. In a study done by Prajapati, 50.3% belonged to nuclear family category, 49.7% belonged to joint family category. In a similar study done by Deshpande, 42.2% belonged to nuclear family category, 57.8% belonged to joint family category.

Prevalence of Ophthalmic Morbidity: In this study, the prevalence of ophthalmic morbidity is 41.4%, similar to a study done by P Kamath, where the prevalence of ocular morbidity was 44.77%, also comparable to the one reported by Chaturvedi,[6](more than 40%) in rural Delhi and Kalikivayi*et al* [7](43.5%) at Hyderabad.Moderateprevalence,but lower than the current study wasreported by Rajesh Kumar, (24.6%) from Delhi, Deshpande Jayanth D and Malathi K, (27.65%) from rural Maharashtra and Madhu Gupta (31.6%) from Shimla.In a study done by V Kalikivayi, the prevalence of ophthalmic morbidity was found to be 13.9%.

Conclusion

This study assessed the prevalence of ophthalmic morbidity among the school going population of Kancheepuram District, Tamil Nadu. The study reveals that among the study participants, 36.9% belonged to 13-16 years of age and about 54.1% of the study participants were females. According to the modified Kuppusamy scale, socio economic classification, 48.6% belonged to upper middle socio economic category.

Ethical Clearance: The study proposal was presented and approved from Institutional Ethics Committee

Source of Funding: Self funded project

Conflict of Interest: Nil

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Occupational Health Hazard in Sewage and Sanitary Workers

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Abstract

The working conditions of the sterile workers have stayed in every way that really matters unaltered for over a century. Beside the social shock that these labourers face, they are displayed to certain restorative issues by integrity of their occupation. These prosperity risks consolidate prologue to damaging gases, for instance, methane and hydrogen sulphide, cardiovascular degeneration, musculoskeletal disperses like osteoarthritis changes and intervertebral plate herniation, illnesses like hepatitis, leptospirosis and helicobacter, skin issues, respiratory system issues and balanced aspiratory work parameters. This can be deflected through structuring, remedial and managerial measures. While the structure assessments will help in verifying against exposures, the therapeutic evaluations will help in early disclosure of the effects of these exposures. This can be mostly cultivated by structure up an effective world related prosperity organization for this social occasion of specialists. Furthermore, standard care ventures should be coordinated to concede preparing as for increasingly secure work frameworks and usage of individual guarded devices.

Keywords: *Sanitary specialists, sewage labourers,occupational maladies.*

Introduction

Some place in the scope of 2002 and 2003, the Indian Ministry for Social Justice and Empowerment admitted to the nearness of 676,000 scavengers[1]. However, these figures may have been put down in light of the fact that scrounging is unlawful. As shown by one investigation by Bezwada Wilson of the Safai Karmachari Association, a normal 12 lakhs (1.2 million) scroungers are accessible in the country[2]. According to Sulabh, four to five million people were filling in as foragers in 2005 and were every now and again used by the close-by friendly bodies to clean compost in open places[1]. This situation drives forward despite the way that the Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act[3], 1993, is in approval, which obliges the preclusion of crafted by manual foragers similarly as advancement or continuation of dry restrooms and for the rule of improvement and upkeep of water-seal toilets for ensuring the regard of the individual, as valued in the Preamble to the Constitution[3-15]

The working conditions of the perfect workers have stayed in every way that really matters unaltered for over a century. Using only a stick floor brush and a little tin plate, the spotless workers clear poor from open and private restrooms onto bushels or various holders, which they by then carry on their heads to dumping grounds and move regions. A couple, nevertheless, are given push trucks or trucks by the metropolitan masters.

Beside the social hulks that these workers face, they are moreover exhibited to certain medicinal issues by uprightness of their occupation. These prosperity risks fuse prologue to damaging gases, cardiovascular degeneration, musculoskeletal disarranges, maladies, skin issues and respiratory system issues. [16-24]

Classes of Sanitary Workers:

Materials and Method.

Manual Scavenger: Iinfers an individual attracted or used on ordinary or customary reason by an individual or a close-by master or an open or private office,for

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physically cleaning,carrying, disposing of or for the most part managing in any capacity, human excreta in an insanitary restroom or in an open channel or pit into which human excrete from insanitary toilets is disposed of, or on a railroad track, before the excreta totally crumbles.

Safai Karamcharis or Sanitary Workers: Ordinarily join individuals associated as 'Sweepers 'or 'sanitation/cleaning workers'' in locale, government and private working environments. They may be prompt specialists of these bodies or may be on contract. However, Safai Karamcharis, per se, are not manual scroungers.

Sewer vent WORKERS an enormous bit of the districts in India are not outfitted with the latest machines to clean the sewage structure and therefore, sewage pros used under motivation to enter the underground sewage lines through the sewer vents and cleanse them wherever the lines are ceased up for whatever reason. The control of the sewage worker is to look at and keep up the underground framework pipes that make up sewerage system. Sewage authorities need to remove solid substance wastes which are responsible for blockage of stream of fluid waste in sewage system.

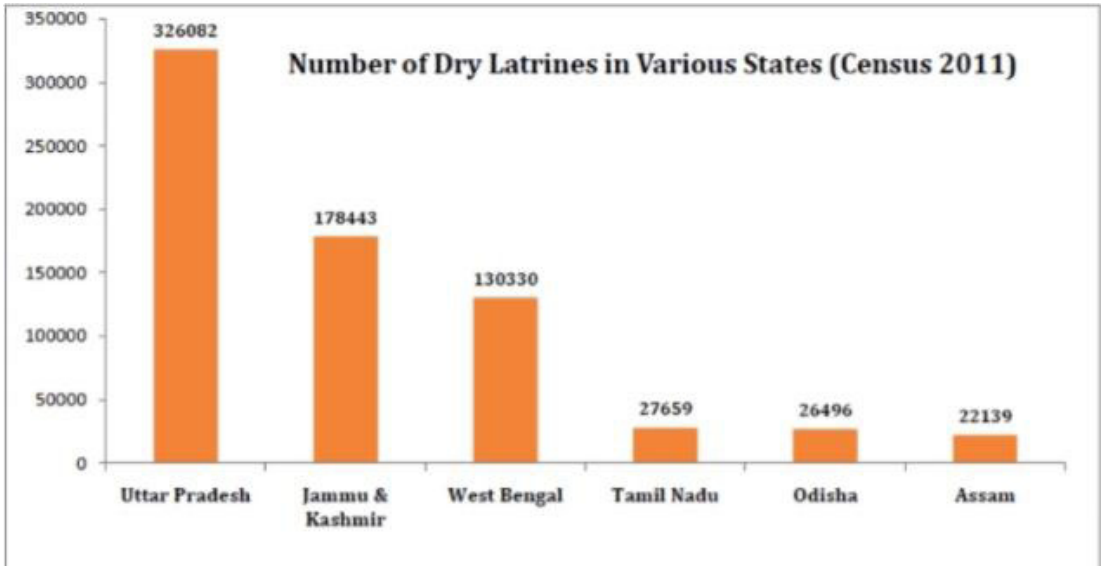


Figure 1: Exposure to Harmful Gases

Findings: The workers are routinely exhibited to gases like hydrogen disulfide, methane, smelling salts and carbon monoxide. Watt et al[4]. Considered 26 sewer workers introduced to smell and found that 53.8% made sub-extreme signs including sore throat, hack, chest cosiness, brevity of breath, thirst, sweating, crabbiness and loss of drive. Earnestness of signs had all the earmarks of being segment related. Richardson[5]. Considered prologue to hydrogen sulphide in 68 sewer workers and found that the FEV1/FVC characteristics were lower in sewer pros who had a high H2S introduction.

Hurtful Effects of Hydrogen Sulphide: Hydrogen sulphide is a flammable gas, which touches off with a blue flame, offering climb to sulphur dioxide, a very irritating gas with a trademark smell. Mixes of hydrogen sulphide and air in the dangerous range may explode viciously.

Without a doubt, even at low obsessions, hydrogen sulphide has an aggravation movement on the eyes and the respiratory tract. Intoxication may be hyper acute, serious, sub acute or unending. Hydrogen sulphide enters the body through the respiratory structure and is immediately oxidized to shape blends of low hurtfulness. There are no storing up wonders and transfer occurs through the stomach related framework, pee and the ended air. In occurrences of slight hurting, following introduction from 10 to 500 ppm, a cerebral torment may latest a couple of hours, torment in the legs may be felt and, every so often, there may be loss of insight. In moderate hurting (from 500 to 700 ppm), there will be

loss of comprehension persevering through two or three minutes yet with no respiratory inconvenience. In cases of genuine hurting, the subject drops into a noteworthy stupor state with dyspnoea, polypnoea and a slate-blue cyanosis until breathing restarts. Tachycardia and tonic–clonic fits are seen.

Internal breath of colossal measures of hydrogen sulphide will rapidly make anoxia achieving demise by asphyxia. Epileptiform seizures may occur and the individual falls clearly unmindful and may fail miserably without moving yet again. This is a confusion typical for hydrogen sulphide hurting in sewer workers. Regardless, in such cases, introduction is oftentimes a direct result of a mix of gases including methane, nitrogen, carbon dioxide and smelling salts.In sub-extreme hurting, the eyes are impacted by palpebral edema, bulbar conjunctivitis and mucopurulent discharge with, possibly, abatement in visual sharpness–these bruises generally being particular. This issue is alluded to sugar and sewer workers as "gas eye".

Muscoskeletal Disorders

Discussion.

Osteoarthritis changes and intervertebral plate herniation are the fundamental spinal varieties from the standard point by point in these workers[6]. Friedrich[7] analyzed 255 sewage authorities to choose the inescapability of spinal burdens (i.e., neck, upper back and lower back misery [LBP]). He nitty gritty that the year transcendence rates of neck, upper back and LBP were 52.4%, 54.8% and 72.8%, separately. The regularity of spinal burdens extended with age. Work powerlessness during the initial a year due to LBP was out and out unequivocally associated with age, handicap, step by step term of stooping and lifting 5 years heretofore and higher surprising disease direct scores (chances extent some place in the scope of 1.26 and 0.94).

Diseases: The techniques for introduction for the various pollutions are according to the accompanying:

- The most fundamental way is by hand-to-mouth contact during eating, drinking and smoking, or by cleaning the face with debased hands or gloves or by licking sprinkles from the skin.
- By skin contact, through cuts, scratches or entering wounds, i.e., from discarded hypodermic needles. Certain living things can enter the body through the surfaces of the eyes, nose and mouth.
- By breathing them in as build up, airborne or haze.

The ailments ordinarily mulled over among this social event of workers consolidate leptospirosis, hepatitis and Helicobacter pylori defilement.

Leptospirosis: Leptospirosis is a huge word related disorder impacting people associating with animals and their discharges. The occasion of malady in ones workplaces is associated with the earth to which the worker is revealed and the adaptability of the living being in that work environment. Rodents for the most part have a lot of underground sewers and are transporters of leptospira. The pee of rodents and various animals present around there is presumably going to sully these sewers. Leptospira are released in the pee of the corrupted animals. In this manner, sewer workers are at a potential risk of leptospirosis. The normality rate was seen to be 16.6%. Verification of leptospiral pollution was seen to be most noteworthy in sewer masters during the zones of the city that were attacked with rodents and stray animals. De Serres et al.[9] found that sewer workers had a more noticeable transcendence of antibodies against leptospirosis than controls (12% versus 2%, P = 0.003).

Hepatitis: Hepatitis A (HA) contamination is the regularly times happening vaccination preventable ailment. Albeit enormous self confining, serious hepatitis An is connected with liberal terribleness and related fiscal weight. Barely any examinations reported an extended HAV resistant reaction titter among sewage workers[10, 11]. While various examinations suggest that workers in the solid waste industry may just speculatively be at an extended risk of getting compelling afflictions occupationally[12, 13]. Even an efficient audit did by Glasset al[14].does not affirm an extended peril of clinical HA in authorities displayed to sewage. Vaidya[15]. Uncovered that an enormous climb in antagonistic to hepatitis E disease motivation ($P < 0.05$) was recorded in sewage workers working for > 5 years. Another case report prescribes that sewer workers may be at an extended threat of contracting hepatitis C[16, 17]. Another examination by Arvanitidou et al.among specialists of a sewage association insists that lone introduction to sewage was openly associated with motivation for hepatitis B disease (HBV) defilement ($P < 0.001$). They recommended that workers displayed to sewage should as such be considered for vaccination against HVB

Helicobaterpylori:

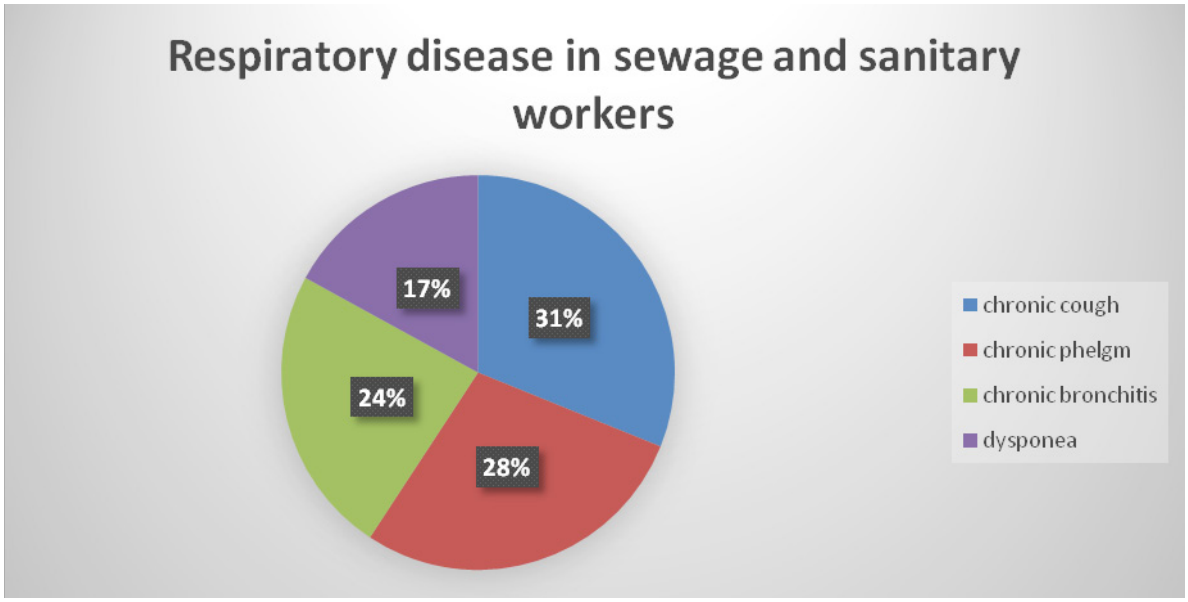
Conclusion

An extended danger for gastric threatening development among sewage workers has been depicted in a couple of examinations. During the latest decade, the bacterium Helicobacter pylori has ascended as one noteworthy danger factor for gastric illness and is by and by seen as a class I disease causing operator by the International Agency for Research on Cancer. Friiset al[18].thought about the inescapability of immunoglobulin G (IgG) antibodies against H. pylori in a social event of 289 metropolitan workers. The ordinariness of IgG antibodies against H. pylori among sewage workers did not differentiate from that of the referents. Regardless, a development in the inescapability of IgG antibodies against H. pylori with growing age was viewed. Beside these normally thought about infections, a couple of various pollutions like intestinal parasitic defilements, gastroenteritis and Pontiac fever are moreover delineated among the sewage workers.

Dermatitis: Generally, the dermatitis is a non-infective one. It comes about because of trying to mineral oil and tar. Anerupt of occasions of airborne exacerbation contact dermatitis has been represented among incinerator workers used in a sewage treatment facility[19].

Respiratory Symptoms and Function: A couple of examinations have been finished to think about the respiratory limit of sewage workers, with all of them uncovering that respiratory symptoms are common [20-22]. Among this social affair of pros. The respiratory limit considers moreover revealed bizarre respiratory limits in these masters. These appearances may be a direct result of introduction to end toxins and airborne microorganisms by strategy for bio aerosols. Zuskin et al. uncovered that the example ventilator farthest point was basically decreased differentiated and the foreseen characteristics in sewage experts. In particular, the characteristics for FEF25 - 50 were reduced[23], prescribing obstructive changes in smaller flight courses. They referenced that sewage workers are exhibited to different word related destructive experts, which may incite the improvement of interminable lung work changes[24].

Along these lines, to consolidate, the sewage and sterile pros experience the evil impacts of compound and natural risks. This can be balanced through structuring, helpful and legitimate measures. The structure measure should focus on making the technique progressively foolish. These workers should in like manner be benefitted by word related prosperity organizations, which should consolidate pre-game plan and discontinuous prosperity watching. Further fruitful utilization of the Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act, 1993, will help in the annulment of manual scrounging. Also, ordinary care ventures should be coordinated to concede preparing as for increasingly secure work systems and use of individual guarded devices.



Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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Pediatric Diabetes: Review Article

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Abstract

The incidence of type 1 diabetes and heftiness in youngsters and immature is rising. Today it commonest endocrine cum metabolic issue of youth and immaturity with extensive consequences for kid's physical and passionate advancement. It is assessed that youth diabetes represents about 5% of absolute populace of diabetes. In India alone, there are likely going to be around 4,00,000 babies and kids with this disease[1]. Diabetes the board rules offered by the American Diabetes Association and Health care terms naturally place a high weight of duty on parental figures to check youthful kids' blood glucose levels, manages insulin, and screen diet and physical action with extreme objective of keeping up high glycemic control. Type 1 diabetes can be physiologically hard to control, child rearing pressure can be raised; Despite the conceivably extraordinary administration needs explicit training and clinical administrations for overseeing diabetes in youthful youngsters are seldom offered and conduct examine with this youthful tyke age gathering has been constrained in degree and quantity[1].

Keywords: *Young kids, child rearing, examinations, insulin.*

Introduction

Diabetes mellitus is a typical perpetual youth issue in western world yet is less among Asians. Starting at 2009, there are 4,79,600 kids with type 1 diabetes mellitus in the realm of which 23% from Southeast Asia and 6.3% originates from western Pacific district. The yearly increment in episodes is 3% every year around the world. Ethnic gatherings with low occurrences of ailment take on a high frequency of diabetes. This recommends ecological elements are significant. Early introduction and high dietary admission of dairy animals' milk protein past earliest stages increment the danger of type 1 diabetes. Drawn out breastfeeding and nutrient D supplement diminished danger of type 1 diabetes mellitus. Utilization of sustenance high in additives and nitrosamines is related with expanded danger of type 1 diabetes mellitus. The cleanliness speculation recommends that great cleanliness, inoculation and diminished youth contaminations in early life prompts adjustment of invulnerable framework supporting an expanded danger of improvement of immune system ailments like type 1 diabetes mellitus. There has likewise been a wide geographic distinction in rate of adolescence and immature diabetes[3].

Diabetes mellitus is conceivably a considerably more intense ailment in kid than in the grown-up. The beginning is set apart by polyuria, inordinate thirst and quick loss of weight over a time of 2 a month and a half. Different patients may give optional nighttime enuresis, regurgitating, stomach agony and stomach distension which may emulate intense abdomen[4]. In untreated express, a youngster can give diabetic ketoacidosis (DKA) and can be conceded in a condition of significant parchedness with indented eyes, dry tongue and scaphoid belly. The tyke can slip by into unconsciousness. Breath is moaning, fast and pauseless (Kussmaul relaxing). An irregular glucose more than 11 mmol/L helps in finding of type 1 diabetes mellitus. Diabetic ketoacidosis is available if blood pH is under 7.3 bicarbonate is under 15 mmol/L within the sight of hyperglycemia and overwhelming glycosuria and ketonuria[3].

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Etiology: Despite the fact that the exact reason for type 1 diabetes has stayed slippery, a few hereditary elements assume a noteworthy job and likely associate with ecological components to deliver the illness. A few gatherings have tentatively concentrated the concordance rates of T1DM in monozygotic and dizygotic twins. Concordance rates of monozygotic twins have extended from 17% to 30% which is significantly higher than the concordance rates revealed in dizygotic twins or nontwin kin of people with T1DM[10]. In Caucasians, there is a relationship with T1DM and the HLA histocompactablity complex on chromosome 6 and insulin quality variable number of couple rehashes (VNTRs) polymorphism on chromosome 11. These affiliations are less solid in Asian diabetic patients. All things considered, T1DM is a polygenic issue. Anyway hereditary elements do not represent the entire hazard and different components must assume a job.

The sort 1 diabetes is brought about via immune system annihilation of pancreas. Patients with T1DM have serious insulin deficiency.In the vast majority with sort 1 diabetes, the body's resistant framework–which regularly battles unsafe microorganisms and infections–erroneously wrecks insulin-delivering (islet) cells in the pancreas.

Hazard Factors

Findings: Hazard factors for sort 1 diabetes in youngsters include:

Family ancestry. The youngsters with parentor kin with sort 1 diabetes have a marginally expanded danger of building up the condition. In an investigation done in locale Abidjan, 4.9% of kids who partook in that review had atleast one diabetic parent. The extent of members with a diabetic dad (3.8%) was double the extent with a diabetic mother (1.9%) and this was measurably significant[11]. Hereditary helplessness. The nearness of specific qualities shows an expanded danger of creating type 1 diabetes. Recently, numerous genome wide affiliation investigations of T1DM have recognized in any event 24 qualities and chromosomal loci each passing on a little increment in danger of creating Type 1 DM. Race in the United States, type 1 diabetes is more typical among non-Hispanic white kids than among different races.

Natural hazard components may include: Certain infections presentation to different infections may trigger the immune system demolition of the islet cells. Diet No particular dietary factor or supplement in earliest stages has been appeared to assume a job in the advancement of sort 1 diabetes. Be that as it may, early admission of dairy animals' milk has been connected to an expanded danger of sort 1 diabetes, while bosom nourishing may bring down the risk[3]. The presentation of oat into an infant's eating routine likewise may influence a youngster's danger of sort 1 diabetes. An examination directed in Basrah proposes that introduction to ecological hazard factors during pregnancy (tea drinking, pre-eclampsia, and irresistible illnesses), neonatal period (respiratory trouble, jaundice and contaminations) and early outset are said assume a significant job in setting off the insusceptible procedure prompting B-cell devastation and the advancement of sort 1 diabetes mellitus.

Examinations: The analysis of diabetes in kids is a two section process. Specialists initially decide if their kids have diabetes and after that decide their sort. Specialists presume diabetes when kids have run of the mill indications or when a pee test done during a routine physical examination uncovers glucose. The determination is affirmed by estimation of the blood glucose level. Blood glucose levels can be estimated toward the beginning of the prior day kids eat (called the fasting glucose level) or without respect to suppers (called the arbitrary glucose level). Kids are considered to have diabetes on the off chance that they have both regular indications of diabetes and a high blood glucose level. On the off chance that the fasting glucose level is 126 mg/dl or higher on 2 distinct events, youngsters have diabetes. On the off chance that the arbitrary glucose level is 200 mg/dl (11.1 mmol/L) or higher, kids have diabetes[12].

Discussion

Specialists additionally measure the degree of a protein in the blood called hemoglobin A1C (glycosylated hemoglobin).When blood is presented to high blood glucose levels over some undefined time frame, glucose connects to the hemoglobin and structures hemoglobin A1C. Since hemoglobin A1C sets aside a generally long effort to frame and to separate, levels change just over weeks to months instead of from moment to moment like blood glucose levels do. Hemoglobin A1C levels along these lines reflect blood glucose levels over a 2-to 3-month timeframe. Individuals whose hemoglobin A1C level is 6.5% or higher are considered to have diabetes. Hemoglobin A1C levels are increasingly useful in the conclusion of sort 2 diabetes in youngsters who don't have run of the mill symptoms[13].

Another sort of blood test called an oral glucose resistance test might be done in kids who have no side effects or whose side effects are mellow or not regular. In this test, kids quick, have a blood test taken to decide the fasting glucose level, and afterward drink an uncommon arrangement containing a lot of glucose. Specialists at that point measure blood glucose levels 2 hours after the fact. In the event that the level is 200 mg/dL (11.1 mmol/L) or higher, kids are considered to have diabetes. This test is like the test that pregnant ladies need to search for gestational diabetes[4].

Blood tests to check for antibodies that are regular in sort 1 diabetes.Urine tests to check for the nearness of ketones, which additionally recommends type 1 diabetes in youngsters. The tyke's circulatory strain and development are additionally decided. The youngster is likewise screened for celiac ailment at the season of conclusion of diabetes and at regular interims. Ordinary eye examinations are likewise required.

Insulin: Insulin in low portion routine is the present proposal. A day by day portion of 0.5 unit/kg body weight of soluble insulin is given in a vast lion's share of cases. The complete portion is partitioned into two sections, 2/3 to be infused before breakfast and 1/third before dinner. It is informed to give 5 units with respect to insulin on remission[4]. The utilization of exogenous insulin controls serum glucose by expanding its take-up into muscle and fat tissue and diminishing hepatic glucose generation. Weight addition, hypoglycemia, and fringe hyperinsulinemia are the most well-known unfavorable impacts related with insulin. The accompanying sorts of insulin are demonstrated for use in kids:aspart, glulisine, lispro, customary, impartial protamine Hagehorn (NPH), detemir and glargine. Professionals frequently postpone the utilization of insulin in youngsters with T2DM because of the routine multifaceted nature and unfriendly occasions.

Biguanides: Unless there are contraindications, all youngsters with T2DM ought to be begun on metformin. Metformin works by diminishing hepatic glucose creation and animating glucose take-up into fringe tissues. Metformin ought to be started in kids 10 to 16 years old at a portion of 500 mg day by day with sustenance and titrated up by additions of 500 mg each 1 to about fourteen days until an objective portion of 2000 mg every day is reached[20].

A later preliminary (TODAY Study), inspected the toughness of metformin in 699 patients 10 to 17 years old with T2DM. Following a 2-to half year run-in time of metformin monotherapy (target portion 2000 mg every day), patients were randomized to metformin alone, to metformin in addition to rosiglitazone 4 mg twice day by day, or to metformin in addition to way of life intercessions. The essential result, treatment disappointment, was characterized as a determinedly raised A1c focus (≥8%) over a time of a half year. Rates of treatment disappointment were 51.7% in the metformin gathering, 38.6% in the metformin in addition to rosiglitazone gathering, and 46.6% in the metformin in addition to way of life mediation gathering. Metformin in addition to rosiglitazone created a 25.3% lessening in treatment disappointment contrasted with metformin alone[22].

Conclusion

The case predominance of diabetes in the investigation done in Abidjan among youngsters and teenagers in the present day study was 0.4% altogether more subjects were seen with hyperglycemia from the rustic regions contrasted with the urban territories. Impeded fasting glycemic was seen in 14.5% of study members. A sizeable number of study subjects had diabetic guardians with dads being more influenced than moms. In 2006, International Federation of diabetes (IDF) assessed the quantity of kids with sort 1 diabetes to 4,40,000 with a yearly increment in 3% per annum and 70,000 newfound cases for every year. T2D in youth is a rising infection and is more forceful than T1D, the more typical diabetes structure in kids. The intricacies seen in T2D are broad, and numerous patients have unfriendly medical issues identified with diabetes at analysis. Because of its oddity, this illness isn't completely comprehended, and treatment choices past metformin and insulin are constrained.

Over the coming years, randomized controlled preliminaries are expected to test new and old medicines including blend treatments to characterize the best treatment choices for these patients. Further comprehension of the characteristic history of infection related comorbitities is required to decide ideal screening times and frequencies and better treatment alternatives must be made accessible. Lamentably, this will require some serious energy, which is something these adolescent don't have as they fight this ailment.

Non-Governmental Organizations (NGOs) have a

job in both anticipation and treatment. In India, NGOs use noteworthy power–much happens at the grass roots level to shield the young from the entanglements. NGOs additionally can help with the arrangement of multi-sectoral worldwide systems and partnerships to advocate for approach change, information age, and interpretation of research discoveries for policymakers. Scholastics and specialists ought to connect by improving exploration and reconnaissance frameworks and preparing youthful experts to handle these intricate issues. Needs incorporate network based investigations of essential counteractive action and recognizable proof of more secure and less expensive medications to anticipate diabetes when way of life mediation isn't achievable or falls flat; epidemiological and financial matters research and wellbeing frameworks and operational research.

India has adopted strides toward a coordinated strategy to diabetes aversion and control, yet these thoughts are not completely executed, somewhat on account of lacking subsidizing. Open private associations for executing better treatment choices.

Recommendation: Across the country mindfulness battles about diabetes in youth ought to be organized and where effectively existent ought to be heightened with the goal that the general populations are taught properly in regards to the indications of the malady and anticipation systems were pertinent. Endeavors are expected to teach people in general about diabetes hazard variables, anticipation, and confusions, utilizing clear and straightforward messages. Worldwide proof demonstrates that mindfulness fortifies national approach endeavors and improves wellbeing results. The media are starting to connect however could accomplish more. Legitimate child rearing is required for helping the kids to be free from diabetes. The guardians must concentrate more on the tyke's eating regimen plan and standard screening of the youngster's glucose level and rouse the kid to rehearse physical exercise and spurring them to transfer on more open air amusements than being on the cell phones and computer games.

The legislature should likewise find a way to avoid low quality nourishment publicizing on TV or different modes and furthermore spur cycling in younger students for better outcomes. To forestall diabetes through more beneficial weight control plans, India's dietary rules ought to be modified to reflect standards of endless infection counteractive action and wellbeing advancement; sustenance accessibility and reasonableness ought to mirror these rules through rural policies. The private segment can team up to execute a considerable lot of the anticipation situated legislative arrangements, through subsidizing, mastery in dispersion frameworks for arrangement of more advantageous nourishments (and minimal effort drugs for treatment), and market development empowering smart dieting and physical movement.

Conflict of Interest: Nil

Source of Funding: Self Funded Project

Ethical Clearance: No ethical clearance was necessary for this research work.

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Prevalance of Stress among Medical Interns

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Abstract

Background: Temporary job in India alludes to the year after the undergrad restorative course and incorporates necessary pivots in prescription, medical procedure, obstetrics, genecology, and network medication. Therapeutic science is seen as a distressing instructive profession, and medicinal understudies experience immense pressure, which influences their intellectual capacity, down to earth life, and patient consideration. Recently graduated doctors who embrace a temporary job welcome that the entry level position is the most upsetting period in the life of a restorative specialist.

Objective: To survey the pervasiveness of self-saw worry among new restorative alumni during their temporary job preparing. To investigate the Method used to adapt to work place.

Method: A cross-sectional diagnostic illustrative examination was led on 60 restorative assistants from Sree Balaji Medical College and Hospital by helpful testing strategy. Information was gathered utilizing Perceived pressure scale poll and dissected by SPSS programming form 20.

Result: Our results demonstrated that the majority of the understudies were influenced by a moderate degree of stress (71.6%), trailed by high (16.6%) and low (11.6%) levels of pressure. Just 61.7% of the assistants took endeavours to ease the pressure.

Determination: An altogether abnormal state of pressure was found among the medicinal assistants, despite the fact that there was no critical contrast between the subgroups (male/female). High pressure may effectsly affect subjective working, learning, and patient consideration. Thus, therapeutic understudies need support and consequent mediations to adapt to pressure.

Keywords: *Medical assistants, saw pressure, adapt.*

Introduction

Temporary position in India alludes to the year after the undergrad restorative course and incorporates obligatory revolutions in drug, medical procedure, obstetrics, gynecology, and network medicine[1]. Recently graduated doctors who embrace a temporary position value that the entry level position is the most upsetting period in the life of a therapeutic specialist. Medicinal training has injurious outcomes. Learners (understudies, assistants, and inhabitants) endure large amounts of pressure, which lead to liquor and medication abuse[2]. relational relationship difficulties,[3] despondency and anxiety,[4, 5] and even suicide.

Stress is an abstract wonder that outcomes from an occasion that produces physical or mental torment. Stress is a typical piece of regular day to day existence; it might either be sound or unhealthy[6]. Healthy stress is useful as an adapting procedure to keep mindfulness, parity, and connection. Also, it can create attractive impacts, for example, resistance of uncertainty, self-assurance, and development, and it might animate the obtaining of information and skills[7] Stress may likewise hurt learners' expert viability: it diminishes consideration, lessens focus, encroaches on basic leadership aptitudes, and decreases students' capacities to set up solid doctor

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persistent relationships[8]. Great individual adapting abilities can counter the impact of worry to a limited degree, with the goal that the strain can be alleviated. Many studies have evaluated the impact of an unpleasant existence of an individual on the results of his profession, particularly in the medicinal field. The most negative effect on the inhabitants' feelings happens over and over amidst the temporary job year[9].

This examination tries to investigate the pervasiveness of employment related pressure and the strategies utilized by assistants to adapt to occupation stress.

1. To evaluate the degree of worry among understudies.
2. To give suggestive measures to defeat pressure.
3. To investigate the Method used to adapt to work place.

Materials and Method

Study design: This was a cross sectional examination done among 60 restorative assistants by helpful

Testing technique: Study Area and Population: The study was done in 60 restorative assistants from SREE BALAJI MEDICAL COLLEGE AND HOSPITAL. Out of the 60 PUBG players, 24 were guys and 36 were females. Assent was gotten from them before taking the overview. Consideration Criteria: All the medicinal understudies who were in the clinic.

Prohibition Criteria: All the individuals who are not medicinal understudies and the individuals who finished their CRRI

Test Size and Sampling Technique: A aggregate of 60 restorative assistants were taken as the sample estimate. The testing method is helpful inspecting.

Study Period: A time of one month June 2019 was taken.

Study Tool: Information was gathered utilizing Perceived pressure scale survey which is utilized to evaluate the degree of stress.

Stastical Analysis: SPSS programming variant 20 was utilized to break down the information.

Moral Approval: The endorsement for the examination was gotten from the Ethical board of Sree Balaji Medical College and Hospital. Educated assent was acquired from the subjects before filling the survey.

Findings: Of the 60 tests taken, 24 were guys and 36 were female therapeutic assistants. Out of them 71.6%(n=43) were influenced by a moderate degree of stress, pursued by 16.6%(n=10) by high pressure and 11.6%(n=7) were influenced by low degrees of stress. Just 61.7% (n=37)of the understudies took endeavours to calm the pressure. Among them 70%(n=27) of the understudies had the option to adapt up to the pressure. There was no noteworthy distinction between the subgroups (male/female).

Most respondents adapted to occupation worry through discussions with associates and companions/ family (62% and 48%respectively). 30%coped through undesirable dietary patterns.

It is obvious that almost 55% of understudies rest a lot to dispose of pressure. This rose out as the most overwhelming adapting technique, which is similarly favoured by guys and females. 'Communication with companions and use humour' was additionally favoured adapting procedure embraced by about 62% of the understudies. Barely any different systems like to drink espresso and tea was favoured by 38% of understudies.



Figure 1: Efforts made to relieve stress

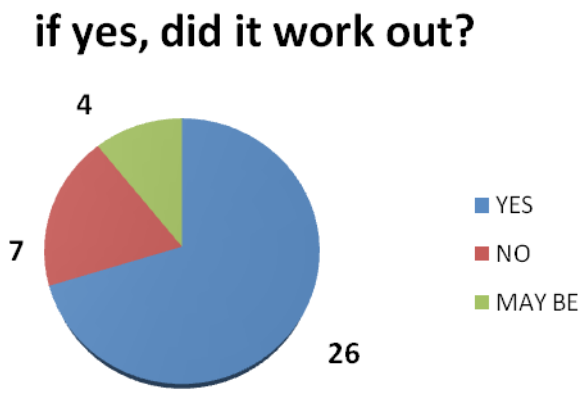


Figure 2: If yes, did it work out.

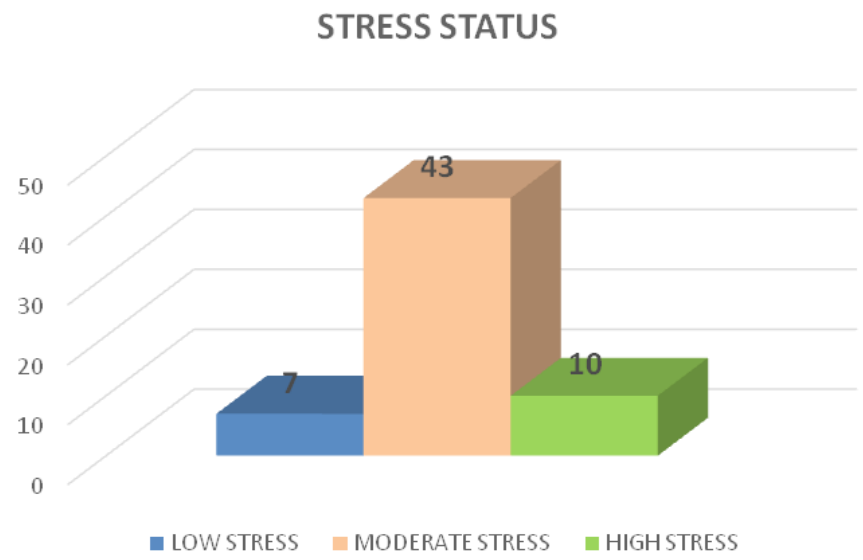


Figure 3: Status of stress

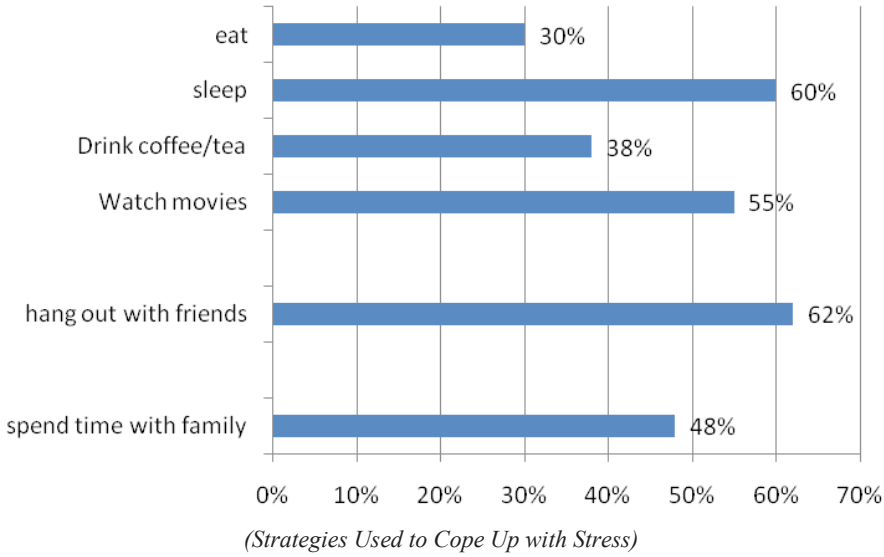


Figure 4: Strategies used to deal with stress.

Discussion

In this examination, 60 Medical understudies were taken as test. Level of pressure was estimated by taking an overview utilizing PERCEIVED STRESS SCALE questionnaire. The Perceived Stress Scale (PSS) is the most generally utilized mental instrument for estimating the impression of stress. It is a proportion of how much circumstances in a single's life are evaluated as stressful[10]. We can decide PSS score of every person. Individual scores on the PSS can go from 0 to40 with higher scores showing higher saw pressure.

- Scores extending from 0-13 would be viewed as low pressure.
- Scores extending from 14-26 would be viewed as moderate pressure.
- Scores running from 27-40 would be viewed as high pressure

While it might be contended that pressure is a characteristic piece of the way toward learning and aptitude securing and enables understudies to develop into develop, certain specialists - abnormal amounts of pressure involve worry as pressure not just diminishes consideration and focus along these lines disabling judgment limit; it additionally hinders arrangement of a remedial union among doctor and patient[10, 11].

A few examinations in different nations additionally proposed that remaining task at hand is a standout amongst the most significant hazard factors for pressure[12]. This might be because of superior desires, high working hours and remaining task at hand in residency programs. This demonstrates we should give more prominent consideration to remaining task at hand arranging and commonsense arrangements to decrease weakness and outstanding task at hand force during occupant preparing programs. No huge connection between age gatherings and stress was found. Likewise, no noteworthy connection among sex and stress was found.

Adapting techniques are characterized as how an individual responds or reacts to a pressure. Compelling and suitable adapting methodology may limit the effect of unpleasant circumstance on one's prosperity. Adapting procedures allude to explicit endeavors, both conduct and mental, that individuals utilize to ace, decrease, endure, or limit worry because of undesired occasions. 'Dynamic adapting' signifies making a move or applying endeavors to evacuate or bypass the stressor, while 'Acknowledgment' signifies tolerating the unpleasant occasion, 'Arranging' comprises of pondering how to face the stressor, 'Positive' reframing means making best of the circumstance by developing from it and 'Disavowal' is an endeavor to dismiss the truth of upsetting occasion and 'Conduct separation' signifies surrendering or pulling back endeavors to accomplish goal[13].

Conclusion

This investigation affirms that there is predominance of moderate to apparent worry among therapeutic understudies. 'Scholastic'- related issues are the more noteworthy seen stressors. Audit of scholastics and examination calendars and examples, better communication with the personnel and legitimate direction, mediation projects and advising for the focused on ones could assist a great deal with reducing worry in restorative understudies.

Stress influences inhabitants' personal satisfaction contrarily, which thus can impact on patient's social insurance and results. As indicated by the after effects of the present and past investigations, it is basic to give more consideration to inhabitants. Stress can be diminished by decreasing the outstanding task at hand and working hours, especially first and second year of residency. It tends to be directed by steady measures.

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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Prevalence of Food Allergy among Young Adults: A Cross Sectional Study

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Abstract

Nourishment hypersensitivity is an unusual resistant reaction to sustenance. The indications of the hypersensitive response may go from mellow to serious. They may incorporate irritation, swelling of the tongue, regurgitating, the runs, hives, inconvenience breathing, or low pulse. This ordinarily happens inside minutes to a few hours of introduction. At the point when the side effects are serious, it is known as hypersensitivity. Regular sustenance's included incorporate dairy animals' milk, peanuts, eggs, shellfish, fish, tree nuts, soy, wheat, rice, and natural product. The normal sensitivities shift contingent upon the nation. In the created world, about 4% to 8% of individuals have at any rate one nourishment sensitivity. Nourishment hypersensitivity (FA) pervasiveness has expanded in the most recent decades, yet epidemiologic investigations could show overestimated results.

The goal of this examination is to gauge the commonness of nourishment sensitivity in youthful adults; an online overview was disseminated to neighborhood college understudies. An investigation was directed; selecting a grown-up populace matured 18–35 years. In the primary stage, members addressed a self-regulated poll for nourishment sensitivity screening. Around 100 grown-ups finished survey. Announced FA happened in 19 (19%) subjects, and the more continuous references were cow's milk, pork, organic products, shrimp, and vegetables. The principle sustenance's were natural products, trailed by bovine's milk, shrimp, fish, and vegetables. Side effects, for example, tingling, hives and swelling were the real indications found in the general population who had nourishment hypersensitivity and is for the most part brought about by milk, shellfish, peanuts and vegetables. Out of 19% individuals with sustenance sensitivity just 4% of the general population use epinephrine infusion and 8% felt successful.

Keywords: *Food allergy, Prevalence, Epidemiology, Allergy. epinephrine.*

Introduction

Sustenance hypersensitivity is an antagonistic safe reaction that happens reproducibly upon contact with predetermined nourishment. Sustenance Allergy recurrence has expanded by 18% over the most recent 10 years, however predominance concentrates dependent on self-revealed Food Allergy demonstrate a high natural and individual impression of Food Allergy. In this specific circumstance, the target of this examination is to evaluate the pervasiveness of Food Allergy in youthful grown-ups, utilizing a survey to attempt to decrease misperceptions about FA response[1,2].

Approach: The examination plan - cross sectional investigation. Subjects of age bunch 18 to 35 were chosen. All members were educated about this investigation, and marked assent was gotten. An example space of 100 youthful grown-ups will be taken by arbitrary testing strategy. The pervasiveness and the side effects of Food allergy was evaluated utilizing an online questionnaire. The information gathered was about sexual orientation, age, any atopy (history of rhinitis, atopic dermatitis, and asthma), and detailed FA and unfavorably susceptible

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indications identified with sustenance, including the kind of nourishment and the side effects experienced. This survey gave increasingly point by point inquiries regarding the nourishment engaged with the FA response, related side effects, and the beginning of the FA response. The subsequent information is analyzed statistically[3, 4].

Consideration criteria: every one of the individuals will's identity present upon the arrival of study and the individuals who consent to take an interest in the examination will be incorporated.

Avoidance Criteria: The individuals who don't give assent will be barred.

Results

A sum of 100 people reacted to the overview. Nineteen (19%) of 100 respondents announced they had a known nourishment sensitivity or likely had an unfavorably susceptible response inferable from a sustenance. These 19 respondents responded to further inquiries concerning their response qualities and were incorporated for further examination. 19 respondents revealed side effects that fulfilled the criteria for hypersensitivity. The most widely recognized manifestations announced for every sustenance are definite in Figure 1.

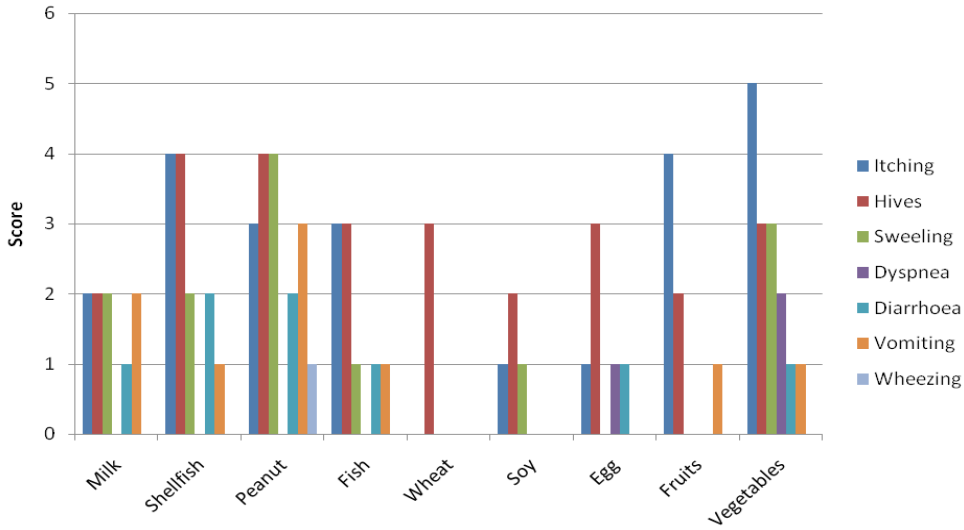


Figure 1: Scores for different causes for various eatables.

Only 15 (15%) of 100 reported that a physician informed them of this. Foods reported as Food allergens are given detailed in **Figure 2**. Milk (14.3%), Shellfish (21.4%), peanut (25%), Fish (14.3%), Wheat (3.6%), Egg (10.7%), Fruits (14.3%) and Vegetables (25%) and other foods (32.1%) were significantly more commonly reported foods symptoms of anaphylaxis.

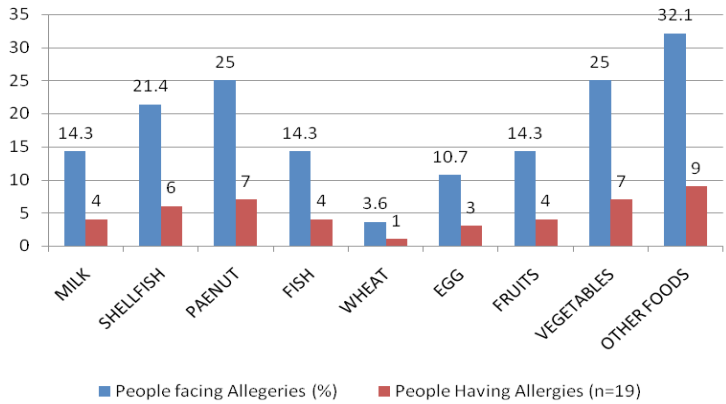


Figure 2:

Out of the people who reported with food allergy only 4.5 % of the people required an Epinephrine injection 95.5 % did not require an Epinephrine injection as shown in Figure 3. About 6 % found that epinephrine injection was not effective and 5 % find it moderately effective and 4 % find it highly effective as shown in Figure 4.

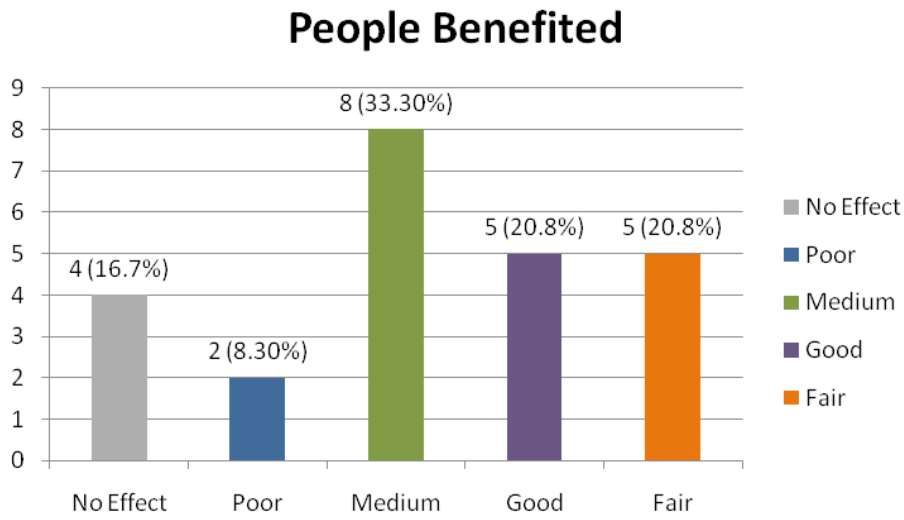


Figure 4:

Discussion

Around 100 finished surveys with marked assent structures were gotten. There was critical male sexual orientation prevalence of 58% and female sex around 42 % in these returned things. Announced Food Allergy happened in 19 (19%) polls and around (81 %) had no sustenance hypersensitivity. The nourishments embroiled in the Food hypersensitivity, the side effects related with a sustenance response. A few different nourishments were referred to in the overviews, everyone in limited quantities. A Food sensitivity response to Milk was referred to 4 (14.3 %); shellfish was 6 (21.4%), Peanuts was 7 (25%), Fish was 4(14.3 %), wheat was 1 (3.6%), Egg 3 (10.7%), Fruits was 4 (14.3%) and Vegetables was 7 (25%). About 16% of the surveys were determined to have sensitivity by human services supplier. Out of the 19 individuals with sustenance sensitivity 18 of them had nourishment hypersensitivity from adolescence and 1 had turned out to be susceptible to nourishment after high school. Surveys with nourishment sensitivity had encountered side effects, for example, tingling, hives, and swelling, and dyspnea, looseness of the bowels, heaving and wheezing. Out of these side effects tingling, hives, swelling and retching were increasingly normal. Out of the 19% individuals with nourishment sensitivity 4 % individuals required an epinephrine infusion and 25 % felt it was not powerful and 33.3% felt it was reasonably compelling and 41.6 % discovered it exceedingly viable.

Late work has assessed the commonness of sustenance sensitivity in young people to be roughly 2.3%. In spite of the fact that it is obscure whether this is likewise a similar rate of sustenance hypersensitivity among understudies entering school, this number likely speaks to a nearby gauge. As per the latest US registration information, there were roughly 10.9 million full-time understudies in the United States, yet this figure increments to 17.5 million if low maintenance understudies and non-multiyear organizations are included.17 If an all the more generally cited number for the pervasiveness of nourishment hypersensitivity in youngsters and adolescents is utilized (4% to 8%), when extrapolated, this would appraise around 436,000-700,000 school matured understudies who may have sustenance allergies. This gives some gauge proof that there may be significant on-grounds atopic ailment, including sustenance sensitivity. Inside our populace, we feature a few issues. The low rate of detailed upkeep of any crisis prescription, including SIE, is disturbing. Warning examples demonstrate that nearby grounds contacts, grounds wellbeing administrations, and eating administrations are regularly not made mindful of these understudies' nourishment allergies.

Presently, universities probably won't be prepared to deal with the requirements of understudies with sustenance sensitivity. Given our discoveries, we see proof that grounds eating administrations would profit by guaranteeing that nourishments are plainly marked for fixing content, changing readiness territories to evade cross-defilement, and giving sans allergen sustenance's on solicitation. So also, it may be fitting for college wellbeing administrations to screen people for sustenance hypersensitivities through admission frames before the understudy's landing on grounds. This will better recognize such people for further training and give intermittent follow up to confirm that SIE medicines are being conveyed consistently.

Conclusion

As indicated by this investigation predominance of sustenance hypersensitivity has diminished yet this examination has impediments, the way that it was directed in universities, yet these constraints don't nullify the information. Another significant point is identified with those people who rejected a particular nourishment or a gathering of sustenance's after one disengaged response; since they had no reproducible response in a rehashed sustenance admission, the analysis of FA by our survey was unrealistic and could have diminished the assessed pervasiveness. Be that as it may, even in the clinical methodology, reproducibility is one of the real mainstays of FA determination. Taking everything into account, after utilization of a particular survey to perceive likely IgE-interceded FAs, a low recurrence of FA was considered in this populace. Utilization of a coordinated poll controlled via prepared analysts could be an option for epidemiological IgE-intervened FA concentrates to accomplish progressively precise outcomes.

Funding: No funding sources

Conflict of Interest: None declared

Ethical Approval: The study was approved by the Institutional Ethics Committee, SBMC & H.

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Prevalence of Alcohol Consumption among Medical Students in Kancheepuram

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Abstract

Background: Dependence on liquor remains a noteworthy social and monetary issue, to some extent as a result of the high inspiration for liquor that people show and the risky gorge consumption this advances. The connection between liquor use in teenagers and youthful grown-ups and results has not been generally explored in India. The point of the present examination was to comprehend the present status of drinking conduct of youth changing into adulthood.

Aim: This article gives data on the Awareness and Prevalence of liquor use among undergrads in a urban territory of Kancheepuram.

Method: A cross-sectional examination was directed among 100 undergrads in a urban region of Kancheepuram from April 2019–June 2019. A self-managed survey was given and the outcomes were classified and dissected. The information was entered in exceed expectations sheet and examined utilizing SPSS programming. Moral board of trustees freedom has been acquired.

Results: Out of 100 understudies, 72 were guys and 28 were females. About 73% of the understudies are not devouring liquor and 89% know about maladies brought about by alcoho l.27% of the understudies are liquor purchasers.

Conclusion: It was seen that about 75% of the understudies are not drinking liquor and know about infections brought about by it. Understudies ought to be given mindfulness about the harm brought about by liquor to physical and emotional wellness.

Keywords: *Prevalence, mindfulness, liquor use.*

Introduction

Mixed refreshments, the most across the board and socially acknowledged psychoactive substances in all age bunches more than 15, and their maltreatment is named unsafe to wellbeing[1, 2]. Tobacco and liquor are among the principle hazard factors for sudden passing and grimness in Europe [3, 4]. In a 2013 positioning of the main 25 driving wellbeing danger factors on the planet, tobacco and liquor were in the second and sixth spot, separately[5]. Liquor is a substance utilized by young people in right on time and late adolescence, causing a genuine general wellbeing concern[6, 8]. Medical issues are not only the space of individuals dependent on liquor, as they are likewise seen among individuals who misuse liquor on a transitory or infrequent premise[9]. Cutoff points of liquor utilization have been received by numerous nations to recognize dangerous drinking; over these breaking points, individuals are presented to a more serious danger of encountering negative wellbeing impacts. The breaking points as a rule vary somewhat among nations and societies and, as on account of Slovakia; there might be no official definition for the unadulterated liquor substance of standard beverages[10].

The degree of liquor utilization has social, good,

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religious, and financial determinants, as depicted in various distributions[11]. Liquor utilization differs enormously relying upon sex, age, and area. Investigation of the writing regarding the matter shows that the size of liquor utilization and the determinants and results of its maltreatment are territories important to numerous writers. The consequences of distributed research affirm that hazardous liquor utilization is seen in youthful grown-ups.

Materials and Method

The investigation was done in a urban territory of Kancheepuram locale. It is a cross sectional expressive examination.

A pretested organized poll is utilized which incorporates questions dependent on predominance and consciousness of liquor utilization. It is a self managed poll.

It was done among understudies concentrating in 3 unique universities inside the age gathering of 17-23 years (100 understudies approx). The testing technique utilized here is Probability corresponding to size (PPS).

Incorporation criteria: Students among the age bunch 17-23 were incorporated into the examination.

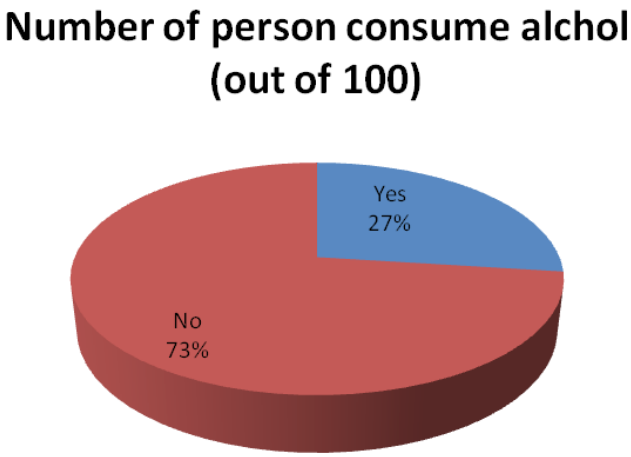
Rejection criteria: No avoidance criteria.

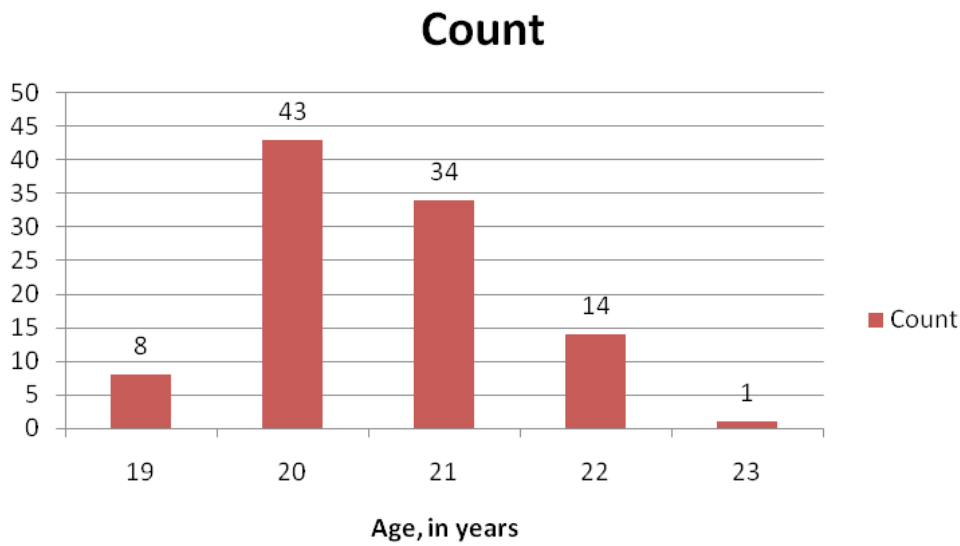
The information gathered and the investigation will be finished utilizing Microsoft Excel and SPSS programming.

The examination was directed during the period April 2019–June 2019.

The investigation was affirmed by the institutional Ethics Committee, Sree Balaji Medical College and Hospital

Findings:





If yes, why do you drink alcohol containing beverages.

Options	Percentage (%)
Stress relief	22.2%
occasions	40.7%
Cool thing to do	25.9%
other	11.1%

	Yes	No	May be
Is it good for health	11%	75%	14%
Awareness of diseases caused by alcohol	89%	5%	6%

Discussion

Liquor, likewise known by its concoction name ethanol, is a psychoactive substance that is the dynamic fixing in drinks such as lager, wine, and refined spirits (hard alcohol). It is one of the most established and most regular recreational substances, causing the trademark impacts of liquor inebriation. Liquor creates a state of mind lift and happiness, diminished nervousness, expanded amiability, sedation, impedance of subjective, memory, engine, and tactile capacity, and summed up sadness of focal sensory system work.

Consequently the present examination was led to survey the predominance and attention to liquor utilization among undergrads in Chennai, Tamil Nadu. In the present examination, a critical extent had not expended liquor (73%students) and they know about its belongings (89% understudies). The report says that regarding 30 percent of India's populace, only not exactly 33% of the nation's people–devoured liquor regularly[3].

Rather than our discoveries, contemplates in different nations indicated higher predominance rates of liquor use. An investigation from Russia found that 75% of the men drank spirits [9], while a Thailand consider which was done among subjects who were matured 12-65 years, demonstrated the predominance of current consumers to be 28.6% [7]. An examination which was done in Finland demonstrated the commonness of perilous drinking to be 5.8%. The distinction which was seen in pervasiveness might be because of contrast in the presentation status of related hazard factors in various topographical areas. From the outcomes, it very well may be deciphered that the vast majority of the understudies don't drink liquor containing refreshments and know about ailments brought about by it

Conclusion

The investigation finished up with 3/fourth of the understudies are not liquor purchasers and they know about maladies brought about by liquor use. Be that as it may, there are still misinterpretations with respect to the hazard in liquor utilization. Consequently, the school experts and the others concerned should approach to structure mindfulness battles to support the understudies.

Funding: No funding sources.

Conflict of Interest: None declared.

Ethical Approval: Study was approved by the institutional ethics Committee, Sree Balaji Medical College and Hospital.

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Study on Increase in Usage of Alcohol among College Students

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Abstract

Foundation: Liquor is a main source of worldwide torment. Levels of utilization are raised among college understudies. In this manner, this writing survey means to outline the flow investigate on liquor utilization among undergrads. A large number of these youthful understudies will be uncovered, during this transitional period, to considerable changes in living plans, socialization gatherings, and social exercises. This sort of progress is regularly connected with unsafe conduct, for example, inordinate liquor consumption. And now in India there is progressively utilization of liquor among the school and college understudies in the ongoing years generally from 2010.

Techniques: In May and June 2019 a poll was given to school and ace understudies. The review took a gander at drinking conduct, social association, drinking standards, and positive drinking results. By utilizing the questionnaire reactions from different undergrads were recorded for examination.

Results: Around 100 examination populace were selected, with age going from 17-29 of the two students and post graduates undergrads. Discovered that the more an understudy was presented to school lodging ecological variables, the more prominent the danger of overwhelming, continuous, and harsh drinking. Liquor utilization expanded for understudies living on grounds, living in an imparting space to a higher number of flat mates, and having been in the school for a long spell. About 10% of understudies have revealed that they have an overwhelming day by day use of liquor in the school inns. These days the is increment in utilization of liquor on account of a purpose behind to attempt in any event once among the vast majority of the undergrads. What's more, through the review about 56.6% understudies have flushed liquor atleast once. Among these 81% were guys and 19% were females.

Conclusion: Instructive and school experts need to recognize colleges' obligation in connection to their understudies' drinking conduct and to invest in help a situation of dependable drinking. It has been generally expanded use among the two guys and females among the understudies

Keywords: *Alcoholism, Awareness, Quality of life, Abuse,Addiction.*

Introduction

India's notoriety for being a nation with a culture of forbearance particularly in issues in regards to liquor is underserved. Alcohol utilization is of impressive general wellbeing concern and a main source of worldwide enduring. Of specific concern are the medical problems and social impacts related with its utilization[1]. Examples of liquor utilization extend among mainlands and nations. Ongoing figures from the World Health Organization (WHO) exhibit that the European Region is the heaviest savoring district the world. By the European area our asian locales have higher liquor consumption[2].

Raised degrees of liquor utilization among youthful grown-ups matured 18–29, of which college understudies speak to an extraordinary populace, is of specific concern[3]. Research proposes that understudies today drink more, with expanding accentuation on hard-core boozing and intoxication than among prior ages.

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There has been a quick multiplication of city bars and dance club lately and individuals are quick shedding its hindrances about liquor as a direction for living. This situation has prompted fears of an undocumented ascent in liquor maltreatment among all areas of society.

The expanding utilization of liquor and its beverage related issues has just risen as a noteworthy general wellbeing worry in India and which should be addressed[4]. A vast greater part of male consumers meet criteria for risky liquor use, characterized as examples of utilization that expansion hazard for hurtful ramifications for the client or others. Along these lines, in this examination we have worried on liquor abuse and its related issues related with individual issues.

Materials and Method

The present investigation was a cross sectional examination which was led through a survey given to the understudies in Chennai universities and encompassing schools from April 2019 to may 2019. Moral clearance was acquired.

Inclusion Criteria: Colleges understudies who had given their assent for the examination both male and females.

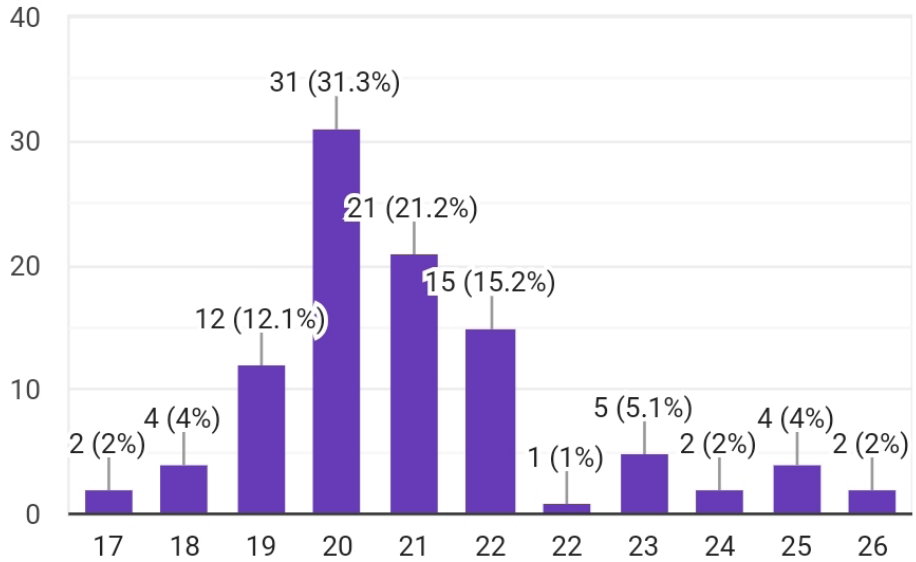
Exclusion Criteria: Understudies who does not give their assent for the examination and those are not willing for interest

Sample Size: No of tests for the exploration is 100

Data Collection: An organized survey to be utilized for liquor utilization which incorporate socio statistic subtleties, characters of individual to the liquor, mental and physical conduct questions. Composed educated assent was acquired preceding information accumulation.

Data Completion and Analysis: Information section and investigation was finished utilizing SPSS adaptation 22 programming. Distinct measurements were determined for foundation factors and the pervasiveness of liquor addiction. What's more, engaging measurements and rate was determined from the got information.

Findings: An aggregate of 100 understudies were taken on the investigation. The mean age of the examination members was 21 years. The predominance of liquor addiction among the examination members was 56.6. Among the 100 members 19 were females and 81 were guys.

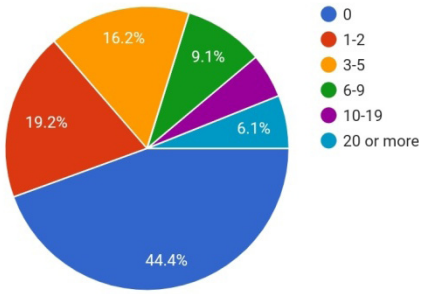


The Mean Age Limit of The Study Comes As 21±

Table 1: Socio-Demographic Characteristics of Study Populaton

Characteristic	Percentage
Education:	
1. 1st Year College	13.2%
2. 2nd Year College	12%
3. 3rd Year College	49.5%
4. 4th Year College	12%
5. Internship	5.8%
6. Postgraduate	7.5%

Here the 44.4% indictes no of persons who doenot consume alcohol even once. Rest all indicates the no of percentage the students have taken alcohol atleast once in their life.



The above pie chart denotes the number of % students consumed alcohol (No. of times).

Alcohol consumes characteristics: Among the study population females who consume alcohol comes as 5%, 51.6 % were males who consume alcohol. In this the quantity of alcohol intake varies among the study population as by which 200ml or more intake of alcohol comes as 17.2%, and 100-200ml as 23.4% population.

This shows that about 40% of alcohol consumers intake about more than 100ml once everytime. And about 33.3% people who take alcohol without knowing to their parents in which 1/3rd population intake alcohol without knowing to their parents alone in college hostels or in parties etc.,

Table 2: Represents the Characteristics of Alcohol Intake of Study Population

Alcohol Intake [No. of Times]	
1. 0	44.4%
2. 1-2	19.2%
3. 3-5	16.2%
4. 6-9	9.1%
5. 10-19	5%
6. 20 or More	6.1%
Quantity of Intake	
1. 50 ml or Less	37.5%
2. 50 to 100 ml	21.9%
3. 100 to 200 ml	23.4%
4. 200 ml or More	17.2%
Last Day of Intake	
1. 1-7 Days	15.2%
2. 8-14 Days	10.1%
3. 15-30 DayS	12.1%
4. 1 Month-1 Year	14.1%
5. Never Drink	48.5%
Whether Known to Parents (About Alcohol Consumption)	
1. Yes	19.2%
2. No	33.3%
3. Don't Drink	47.5%

Discussion

Liquor abuse is one of the real general medical issues in both created and creating nations[5]. The 32nd World Health Assembly announced that "issues identified with liquor and especially to its unnecessary utilization rank among the world's real general medical issues and comprise genuine risks for human wellbeing, welfare and life" [6]. The World Health Organization (WHO) assessed that there are around two billion customers of mixed drinks and 76.3 million individuals with diagnosable liquor use issue worldwide[7]. The consequences of the present investigation demonstrated that the mean age of the purchasers at the commencement of expending mixed refreshments was 21± Years, which is consider to be a noteworthy hazard factor among the examining school going students[3]. There is an extreme increment in the utilization of liquor among the understudies up and coming days as a reason of pride and pleasure.

In the present investigation, the predominance of liquor addiction was 56.6% which was equivalent to before concentrates done in parts of southern and northern India delighting the pervasiveness of liquor use to be from 33% to half and 25% to 40% individually[3]. The general past examination pervasiveness of liquor use was 30-35per penny, 48-53 percent among male understudies and 4-6 percent among female understudies[8-10]. The previous two decades has seen an expansion in female liquor consumption and a concentrated exertion on promoting liquor legitimately at youthful female ladies. Handling liquor related damage among college undergrads and the all inclusive community does not have a solitary arrangement but rather requires a suite of activities. The school social condition builds drinking

through a blend of social exercises and regulating and persuasive desires. It puts understudies in danger of successive and injurious drinking since understudies anticipate positive social results, due to social exercises, for example, pre-gatherings, and due to injunctive and expressive drinking standards. Numerous types of extreme drinking cause generous hazard or mischief to the person. These incorporate abnormal states drinking every day, rehashed scenes of toasting inebriation, and drinking that makes an individual liquor subordinate. Accordingly, the recognizable proof of consumers with different sorts and degrees of in danger liquor utilization has an extraordinary potential to decrease a wide range of liquor related damages[11]. This recommends social learning is a key factor that adds with the impact of the school social condition on drinking conduct, as found somewhere else.

Conclusion

One of the key contentions for limiting the utilization of liquor, and notwithstanding disallowing it, is the damage it can cause for wellbeing: the significant article in the Indian constitution alludes to preclusion as a general wellbeing measure as opposed to one to do with convention or profound quality. Specialists caution that drinking is on the ascent in India, and that the greater part of the individuals who drink do as such to a risky degree. A well-arranged across the nation program for the avoidance and control of this social pathology is required. The present investigation was embraced with the destinations to distinguish the examples of liquor admission among various understudies and to survey the clinical indications of ceaseless destructive liquor use so it may be useful in arranging, usage, and assessment of suitable projects for the disposal of this social abhorrence. Mindfulness among the populace and important restoration and self improvement projects will help in cutting down the predominance of liquor addiction. Appropriate mindfulness among the understudies and legitimate standards in the school grounds can control the utilization of liquor both among male and females. Schools need along these lines to recognize their job in this issue and to subscribe to bring down introduction to unreasonable liquor utilization. Specifically, they have to join staggered systems: individual, gathering, and association level, from a network wellbeing advancement point of view.

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Ethical Approval: The study was approved by institutional ethics committee, Sree Balaji Medical College & Hospital, Chennai.

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Awareness about Breast Cancer and its Risk Factors among College Students

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Abstract

Background: Breast Cancer has turned out to be one of the main sources of death in many nations. It is a standout amongst the most widely recognized diseases influencing ladies. Whenever analyzed at a prior stage it very well may be dealt with. Many hazard elements lead to bosom disease. Mindfulness about the hazard components and strategies for screening among ladies can be a successful method for handling the malady at a previous stage and lessen dreariness and mortality.

Point: The point is to consider the consciousness of bosom malignancy and its hazard factors among understudies.

Strategy: This cross-sectional investigation was led in a urban territory of Chennai among the female undergrads of age bunch 18-25 years. An organized poll was utilized for the investigation that included information, practice and mentality questions. The inquiries assed the hazard factors for bosom malignant growth and a couple of general parts of it. An example of 205 youthful grown-ups is taken by advantageous inspecting strategy.

Result: Many understudies thought about bosom malignant growth and its hazard factors. 204 out of 205 understudies thought about it and 158(74.1%) realized that bosom malignant growth is the most predominant disease among ladies. Lion's share realized the conceivable hazard factors separated from family ancestry. Over 72.7% of understudies thought about bosom self examination.

Conclusion: Thus we finish up from this investigation that the female understudies know about carcinoma of bosom and its hazard factors. Still there is more mindfulness required among the uneducated pieces of the nation.

Keywords: *Breast self examination, mammography, prevention, screening.*

Introduction

The development of mankind has been a productive occasion with real innovations and revelations. The requirement for survival has constantly kept people considers potential approaches to beat any obstacle. Finding a fix to the deadliest illnesses has been the primordial objective. A standout amongst the most pulverizing reasons for sick wellbeing is the uncontrolled development of cells in the body that if unnoticed can prompt passing. Malignant growth has ended up being one of the main sources of mortality. In this manner mindfulness about malignancies is urgent theme of discourse.

The weight of malignant growth around the world: There were 14.1 million new cases and 8.2 million malignant growth related passings worldwide in 2012. The quantity of new malignancy cases every year is relied upon to ascend to 23.6 million by 2030[1]. Breast malignant growth is the second reason for disease worldwide and the fifth reason for malignancy mortality

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around the world[2]. By the year 2030 the general weight of bosom malignant growth is relied upon to cross 2 million, with expanding extents from creating nations[3].

In India: With over 0.8 million new cases and 0.5 million passings happening every year in India malignancy commonness is assessed around 2.5 million[4]. In guys the basic locales for disease in India are oral cavity, lungs, throat and stomach and among females cervix, bosom and oral depression. Among ladies in India Breast malignancy represents 19-34% of all disease cases[5-7]. According to National Cancer Registries and Regional Cancer Centers, it is the commonest disease among ladies in Delhi, Mumbai, Ahmedabad, Kolkata and Trivandrum[5-9]. In the other disease libraries, it is recorded as the second most across the board malignancy among ladies. There is an expansion in the frequency of bosom malignant growth as per the information from national and provincial malignancy focuses from 1984 to 2002 and furthermore observed to be bit by bit overwhelming disease of the cervix[5-7]. Only when the infection is genuinely best in class a large portion of the patients look for restorative counsel. In addition 70% of the cases report for symptomatic and treatment benefits in cutting edge phases of the malignancy,this outcomes in poor survival and high death rates[10]. Early Breast Cancer (EBC) establishes 60-70% of cases in the created world,while it comprises just 30% of the bosom malignant growth cases seen at various disease focuses in India[11]. Compared to 0.25 in North America in India the rate/mortality proportion is 0.48[12].

There are many hazard factors for creating bosom malignant growth that incorporate heftiness, absence of physical exercise, drinking liquor, hormone substitution treatment during menopause, ionizing radiation, early age at first feminine cycle, having kids late or not in any manner, more established age, earlier history of bosom disease, and family ancestry[13]. An audit of the writing uncovers that low bosom malignant growth proficiency as to hazard factors among Indian ladies, independent of their social, financial and instructive foundations, alongside little connection between's mindfulness levels and quality of proof of the hazard factors[14]. High death rates are because of hindrances, for example, 'low disease mindfulness', otherwise called 'mindfulness deficiency' or 'shortage of mindfulness' among ladies, the nearness of shame, dread, sexual orientation imbalance and diminished commitment in screening practices, similar to bosom self-examinations[15]. Breast self-examination (BSE) is a screening strategy for the most part used to identify early bosom malignancy. This technique includes the lady herself taking a gander at and feeling each bosom for potential knots, twists or any swelling.

Counteractive action remains the foundation of the battle against bosom malignant growth internationally. Despite the fact that counteractive action strategies have been proposed, many stay difficult to reach to ladies in creating nations who need them the most. Bosom self-examination (BSE), in spite of the fact that hasn't demonstrated to be powerful in decreasing mortality,[16] is still prescribed as a general way to deal with expanding bosom wellbeing mindfulness and accordingly possibly take into consideration early identification of any inconsistencies[17].

It is basic that Indian ladies know about both modifiable and non-modifiable hazard factors for bosom malignant growth to receive proper practices for counteractive action. Powerful country and state-widecancer education projects are the need of great importance just as commitment with network level associations and the wellbeing framework[18]. Preparing on the most recent proof with respect to bosom malignant growth and its hazard components ought to be offered to all human services suppliers and network specialists to raise their disease proficiency so they would then be able to transmit this information to different segments of the general public so mortality levels lessen and early finding is encouraged. Proceeding with therapeutic instruction programs that accentuation on bosom malignancy in the educational programs of nursing at institutional level and other medicinal services preparing establishments ought to be a need for ladies' wellbeing in the nation[14].

This examination centers around the learning of young ladies over bosom malignant growth and its hazard factors. A youthful populace of ladies was an able examination bunch as it would make more mindfulness and furthermore helps in the early analysis. Since they are the future age its increasingly powerful on the off chance that they are the objective populace. Numerous investigations have been directed on ladies in different parts yet the measure of information that they have is low because of their absence of mindfulness. The more the mindfulness made the lesser the losses of life because of malignancy.

Materials and Method

This is an expressive cross-sectional examination.

It was led among 205 female undergrads in the age gathering of 18 to 25 years during the period of May 2019 to July 2019. Advantageous example technique was utilized and 205 female understudies' reactions were gathered during the recommended examination time frame. Information was gathered subsequent to acquiring Institutional Ethical Committee Clearance. A pre-tried, organized poll was self directed in the wake of getting educated assent from the members. The poll comprises of information, frame of mind and practice questions with respect to carcinoma of bosom, the hazard factors; bosom self examination and clinical examination of bosom. The poll was passed to understudies doing building, law and expressions in different universities of Chrompet. The inquiries were alluded from a survey that was obtained from http://www.cancerjournal.net/articles/2017/13/2/pictures/JCanResTher_2017_13_2_268_188433_sm12.pdf. The Likhert scale was utilized for the disposition questions. There were an aggregate of 26 inquiries in the survey. Incorporation Criteria-All understudies who gave assent. The information gathered was entered in an exceed expectations sheet and broke down utilizing SPSS programming and results displayed as tables and figures.

Findings: The information was gathered and examined utilizing SPSS programming, with a sum of 205 reactions. The time of investigation of the understudies from various school caries from the first to last and furthermore incorporates assistants, with 116 (56.6%) of understudies from third year. This is trailed by 30(14.6%) understudies from definite year and 24(11.7%) understudies from first and second year. There are an aggregate of 11(5.4%) understudies. Table 1 demonstrates the reactions given by the undergrads when posed inquiries to evaluate their insight on bosom malignancy. The learning level was great among them about the infection. At the point when asked in regards to any individual influenced in their family with bosom malignancy an aggregate of 161(78.5%) understudies addressed No, while 40(19.5%) addressed Yes. Figure 1 delineates that books and media were the commonest wellspring of data of bosom malignancy. Figure 2 incorporates the reactions given when they were gotten some information about the commonest age gathering influenced by bosom malignancy.

Figure: 3 portrays the learning of hazard factors among the understudies. The vast majority of them realized that family ancestry of bosom malignancy was a hazard factor alongside hormonal treatment, overweight, unpleasant life and so forth.

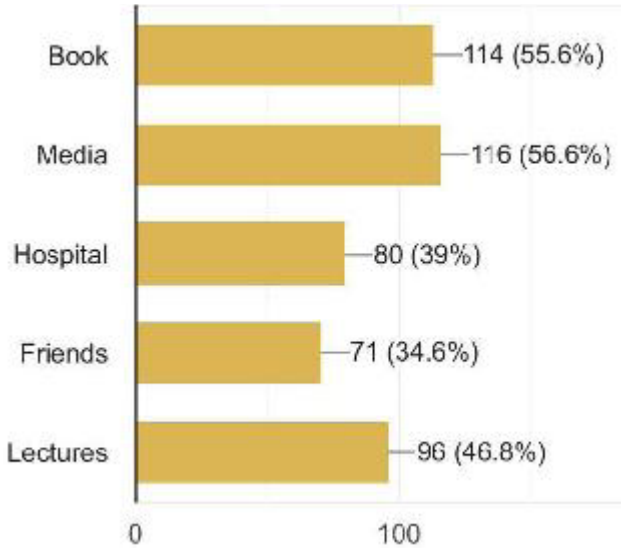


Figure 1: Source of Information about Breast Cancer

Table 1: Knowledge about breast cancer among female college students

Knowledge about breast cancer	Yes	No	Not Sure
Have you heard about breast cancer	204	0	1
Is breast cancer the most prevalent cancer	158	17	30
among women?			
Has any member of your family been affected	40	161	4
by breast cancer?			
Is it seen in all socio-economic groups?	156	24	25
Do you know the symptoms of breast cancer?	146	26	33
Are all lumps cancerous?	10	161	34

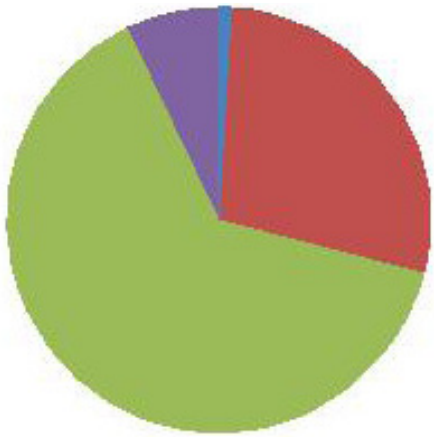


Figure: 2 Responses about Commonest Age Group Affected By Breast Cancer. The age group generally affected

1%	>20 Years
7%	20-40 Years
28%	40-60 Years
64%	>60 Years

Figure 3: Knowledge about risk factors of breast cancer Risk Factors of Breast Cancer

Risk factors: Regular exercise overweight hormonal therapy wearing tight bras not having childern early conception life style modification stressful life ■ No. of responses late menopause early menarche smoking tobacco consumption of alcohol socio economic status A family history

0	50	100	150	200

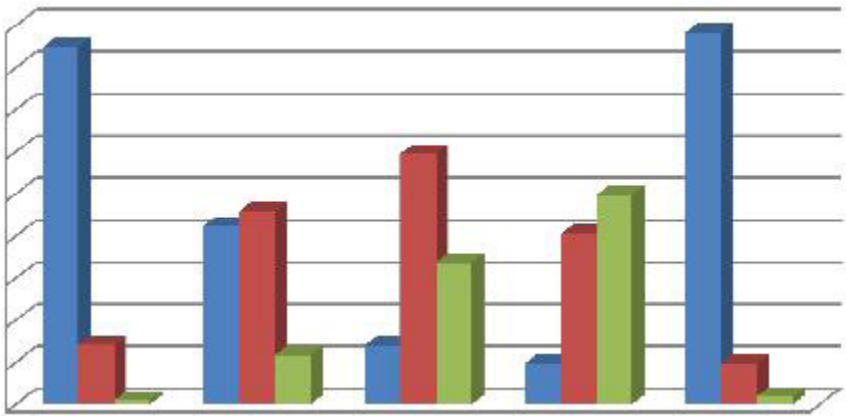


Figure : 4 Attitude towards awareness of breast cancer

90%					
80%					
70%					
60%					
50%					
40%					Agree
30%					Neutral
20%					Disagree
10%					
0%	Early detection provides better prognosis and availabe	Health services for breast cancer are adequate	Quality treatment provided by the government	There is sufficient awareness among people	Regular exercise is mandatory

Figure 4: Depicts the attitude of students towards early detection, treatment available and also about the preventive modalities. Screening test knowledge and awareness is a best way of prevention. Table 2 depicts the responses to the questions asked on screening method. When asked about the condition where clinical breast examination will be performed over 117 (57.1%) chose when any abnormality is found during BSE, followed by 76(37.1%) who were not sure. Majority of them knew about clinical breast examination method like performed by hand by doctor, mammography and ultrasound. 15% were not aware of any clinical examination method

Table 2: Awareness about screening tests for Breast Cancer

	Yes	No	Not sure
Do you know breast self examination?	149	38	18
Do you know about mammography?	150	39	6
Do you know that BSE is a useful tool for diagnosis?	153	28	24
Have you heard about clinical breast examination?	156	32	17

Discussion

Bosom malignant growth is a standout amongst the most widely recognized sorts of disease influencing ladies, it is likewise one of the real reasons for death. On the off chance that it is analyzed at a beginning period it very well may be dealt with and death rates decline. This investigation is to test the learning of female understudies about carcinoma of bosom and furthermore will in general make mindfulness among them. Realizing the hazard variables help in the early conclusion. On the off chance that individuals know about the hazard factors and the manifestations, at that point passings because of malignant growth can be decreased. Bosom self examination encourages them asses their bosoms and encourages them in recognizing any variation from the norm, along these lines they can approach the specialist at a quicker pace. Clinical bosom examination is done once there is a variation from the norm noted during bosom self examination. A normal self examination demonstrates as a lifeline. Numerous understudies thought about bosom malignancy and its hazard factors. 204 out of 205 understudies thought about it and 158(74.1%) realized that bosom malignant growth is the most common disease among ladies. Over 146(71.2%) knew the manifestations and dominant part realized the conceivable hazard factors separated from a family ancestry. Despite the fact that 72.7% of understudies thought about Breast self examination just 50.7% practice BSE.

Numerous investigations have been done over the consciousness of bosom malignancy and its hazard factors. A comparable report was done among the school understudies in Turkey by Özgül Karayurt et al in which 718 female understudies were surveyed. Similarly as in this investigation the bosom self examination was noteworthy with the time of study. While 65% had little information about BSE in that review there is a noteworthy increment in the learning about BSE with a 80%. The outcomes demonstrated that a large portion of the understudies had little information of the bosom malignant growth hazard factors. The most generally realized hazard factors by the understudies were close to home history of bosom disease (68.7%) and family ancestry of bosom malignant growth (67.0%). As it were, understudies knew that bosom malignant growth was related with hereditary components, which positively affects bosom wellbeing among youthful women[19]. In logical inconsistency to that numerous understudies thought about the hazard factors with lion's share of them mindful about a large portion of the variables.

Another comparative examination was led among the female college of Malaysia by Muhammad A Hadi et al, 200 members were incorporated into the investigation from various divisions. Like the past examination referenced, the outcomes demonstrated that by far most of the female college understudies had lacking learning of bosom malignant growth. The mean all out learning score of the understudies was 60.7%. Indian understudies had altogether less learning of bosom malignancy contrasted with their Chinese and Malay partners ($p<0.05$). Be that as it may, in excess of two third of the understudies knew about bosom self examination (BSE) and clinical bosom examination (CBE) proposals. Besides, the understudies had positive observations towards the treatment results of bosom cancer[20]. But in logical inconsistency to that the understudies in this investigation were very much aware about the hazard factors and bosom disease. They were additionally especially mindful about the bosom self examination and there is likewise a smart thought about clinical bosom examination with 76%.

An investigation by Victoria Paecey et al calls attention to the general low learning about bosom disease around the world. This study examined on the consciousness of bosom malignant growth hazard factors in college understudies from 23 nations somewhere in the range of 1999 and 2001. Information were gathered on attention to joins with heredity, liquor use, work out, stoutness, stress, smoking and diet. Very nearly 33% of ladies didn't know that any of these components impacted bosom cancer[3]. There was impressive universal variety, with most abnormal amounts of mindfulness in understudies in the United States of America (USA)[21]. At long last in the present examination when the understudies were inquired as to whether they will make mindfulness among the overall population about mindfulness about bosom disease it was a certifiable answer with a 100% willing to spread mindfulness.

Conclusion

In this manner from this examination we can reason that the female understudies know about disease of bosom and its hazard factors. There is additionally significant learning about bosom self examination and clinical examination of bosom, while the act of bosom self examination ought to be energized. The primary thought is to advance early identification by making

more mindfulness. In spite of the fact that in the urban regions individuals are to some degree mindful there ought to be more mindfulness made in different pieces of the nation. This can diminish the death rates by early conclusion.

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Conflict of Interest: None declared

Ethical Approval: The study was approved by institutional ethics committee, Sree Balaji Medical College & Hospital, Chennai.

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Awarness and Acceptance of HPV Vaccination among School Teachers: A Cross Sectional Study

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Abstract

Background: Since most cervical malignancy cases are brought about by determined high-chance human papillomavirus contamination, learning of HPV among teachers is basic for the forestall of cervical disease. This investigation was meant to survey information among teachers about HPV and its relationship with cervical disease, and to evaluate their acknowledgment of HPV inoculation. Most cervical malignant growth cases are brought about by diligent high-hazard human papillomavirus contamination. HPV contamination is explicitly transmitted, and most HPV diseases are transitory and asymptomatic, and cleared by body's invulnerable reaction without treatment, co-components to the suspected infections are essential. Current clinical rules suggest screening ladies matured 30 and more seasoned utilizing a Deoxyribonucleic corrosive (DNA)- based HPV test. This test is likewise prescribed for ladies of all ages with irregular cytology results. Accordingly, advancing attention to HPV and its connect to cervical malignant growth among explicitly dynamic ladies is basic for the clinical routine with regards to HPV-DNA test in cervical disease screening.

Techniques: An example of teachers working in the establishments at Adyar, chennai between april 2019 and june 2019 finished a poll.

Results: An aggregate of 50 polls were appropriated, and 48% of teachers just know tat all malignant growths are not preventable. In any case, 72% realize that cervical malignancy is preventable by immunization. 74% of teachers realize that the causative living being of cervical disease is infection. cervical malignancy inoculation is accessible in india is known by 62% of teachers. 64% level of teachers are eager to take the HPV immunization and 78% think its safe. The snag which is keeping them from taking up the immunization in 54% of teachers is deficient data.

Conclusion: Albeit the majority of the teachers need fundamental learning about HPV, in any event 64% of teachers are eager to take the HPV antibody. General wellbeing endeavors to instruct the teachers and open about HPV and its association with cervical malignancy ought to be reinforced and extended.

Keywords: *Cervical cancer, HPV, immunization, hpvinoculation.*

Introduction

Cervical malignancy or the carcinoma of cervix is the second most basic kind of disease found in ladies around the world. In creating nations, including India, it is the most widely recognized malignant growth causing demise in ladies. In India, consistently 1,22,800 ladies are determined to have cervical malignancy and practically 50% of them kick the bucket from the malady. Indian ladies face a 2.5% combined lifetime chance and 1.4% aggregate passing danger from cervical malignant growth. Alarmingly, about 6.6% of ladies in the all inclusive community are assessed to harbor cervical HPV disease. Late location because of nonexistent or deficient screening choices and inaccessible or unreasonably expensive standard

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treatment has highlighted the issue in creating nations. The HPV serotypes 16 and 18 represent about 76.7% of cervical malignancy in India. The illness is a colossal weight on society as it devours assets at a stunning rate in the method for medicinal, nonmedical spending, and lost efficiency. As per late ICMR discoveries, passings because of cervical malignant growth in India have expanded quickly during the most recent 2 years[1, 2].

Most cervical disease cases are brought about by persevering high-chance human papillomavirus contamination. HPV contamination is explicitly transmitted, and most HPV diseases are brief and asymptomatic, and cleared by body's resistant reaction without treatment, co-elements to the suspected infections are important. Current clinical rules suggest screening ladies matured 30 and more established utilizing a Deoxyribonucleic corrosive (DNA)- based HPV test. This test is additionally suggested for ladies of all ages with anomalous cytology results. In this manner, advancing consciousness of HPV and its connect to cervical malignant growth among explicitly dynamic ladies is basic for the clinical routine with regards to HPV-DNA test in cervical disease screening. The acknowledgment of HPV immunization will be relied upon to rely upon components, for example, learning of HPV disease and its connect to cervical malignancy[3].

In any case, levels of HPV mindfulness among the overall public are poor all through the world. Orderly survey of concentrates from a few nations recommends that solitary 15–31% of respondents have even known about HPV, paying little heed to age, while just 0.6–11% realize that HPV is a hazard factor for cervical disease The aftereffects of this investigation may help control the plan and improvement of mediations and battles to sharpen ladies to HPV contamination and inoculation, in this manner decreasing occurrence of cervical malignancy[4].

Despite the risk presented because of cervical malignant growth, numbness, and less adequacy of screening just as of immunization is a major test in the counteractive action of the illness. In perspective on this, the present investigation was attempted in Chennai to evaluate the mindfulness about cervical malignant growth and, acknowledgment of HPV immunization among teachers[5].

Materials and Method

Study plan: All members give educated composed agree to participate in our examination. Solid teachers working in the foundations in Adyar, Chennai between april to june 2019 were welcome to take a solitary surve. To be taken a crack at the investigation, teachers must most likely read the poll without anyone else and comprehend it all alone or with the assistance of staff, they were given the paper-based survey to finish independent from anyone else and after that arrival to staff.

Study Area and Population: The investigation is done in the organizations in Adyar,Chennai among the teachers. An example size of 50 educators were taken and were approached to fill the poll.

Incorporation Criteria: 50 educators were chosen haphazardly from the organizations in Adyar, Chennai.

Rejection Criteria: Individuals other than teachers were rejected.

Test Size and Sampling Technique: 50 educators were chosen haphazardly from the organizations in Adyar, Chennai and were approached to top off the poll.

Study Period: To conceal the example size of 50 contemplate period taken was 2 months from April to June 2019.

Study Tool: A poll was readied and 50 teachers were arbitrarily chosen to top off the structure.

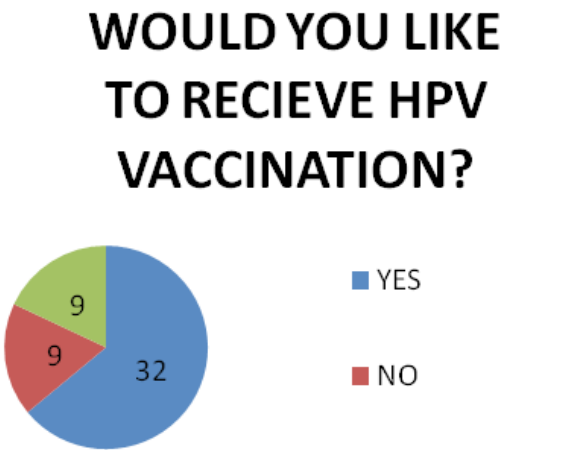
Measurable Analysis: The gathered information was broke down utilizing SPSS adaptation 20.

Moral Approval: The endorsement for the examination was acquired from the moral council of Sree Balaji Medical College And Hospital. Educated assent was gotten was acquired from the teachers before filling the poll.

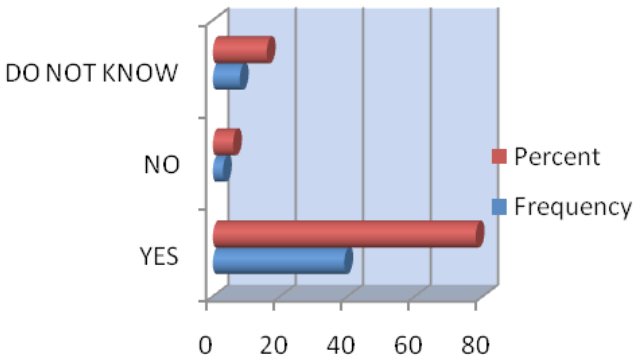
Findings: An aggregate of 50 surveys were disseminated among the teachers working in and around the foundations of Adyar, Chennai. Among the 50 teachers, Only 24 educators (48%) realize that all malignant growths are not preventable. 74% of teachers are very much aware about the cervical cancer which I have examined through specific inquiries in the questionnaire. 72% of the teachers realize that cervical disease is preventable by vaccination. But just 62% of the educators know about the accessibility of cervical malignant growth immunizations in India. But just 64% of teachers are happy to take the HPV inoculation. The

hindrance which is keeping them from taking up the immunization in 54% of teachers is lacking data about the antibody.

Is cervical cancer preventable?	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	36	72.0	72.0	72.0
No	8	16.0	16.0	88.0
Do Not Know	6	12.0	12.0	100.0
Total	**50**	**100.0**	**100.0**	



Do You Think HPV Vaccination is Safe?



Discussion

We found that educators who took an interest in the exploration had some thought regarding hpv and hpvinoculation. For the most part, most respected an immunization to avoid cervical malignancy and most educators said they would consent to have themselves inoculated. Most had a solid conviction that antibodies avoid infections.

Lion's share of members in our investigation was very much aware of the preventable idea of cervical malignant growth. A large portion of them thought about its viral etiology[6]. An examination led by Saha et al in Kolkata, India uncovered a low degree of mindfulness among the alumni and postgraduate understudies about this significant general medical problem. Another as of late distributed poll based examination led to discover mindfulness about the hazard factors for cervical disease among the informed youth in India, Sri lanka and Nepal. The normal mindfulness in such manner was observed to be cervix malignancy was 66% in India, 58.8% in Nepal and 57.7% in Srilanka. The thing that matters is on the grounds that the populace thinks about by us are understudies in restorative calling, which isn't the impression of all inclusive community. Mindfulness with respect to the accessibility of immunization against cervical disease in an investigation directed among ladies going to routine gynecological consideration in Belgium was just half. We found that restorative training definitively affected the comprehension of this significant general medical problem, concerning etiology, of cervical malignant growth, accessibility of the antibody and its defensive viability. Be that as it may, there were practically identical mindfulness with respect to target populace for inoculation and antibody dose among the controls. In general acknowledgment of HPV antibody among the populace contemplated was 64%. The real hindrances to execution of HPV immunization programs in our nation as referenced by Bhatla N et al included cost, worthiness, absence of open mindfulness and foundation, worry about obscure symptoms and social and religious boundaries. In their survey article by Bharadwaj at el, surprising expense of the immunizations was expressed as the real worry for mass inoculation program in India. Lion's share of members concurred that most significant deterrent in execution of HPV immunization program in our nation is deficient data[7].

According as far as anyone is concerned present investigation is the principal activity to discover the degree of mindfulness around one of the right now most examined point of cervical disease immunization, among the future human services suppliers. The other quality of our investigation was that we didn't stop at simply discovering the mindfulness and frame of mind rather in our second session we attempted to instruct and educate them. This sort of useful session to the open personalities quickly following the interrogative session, as we would see it will have a constructive effect.

To close HPV immunization for essential counteractive action of cervical malignancy is a generally new idea. Wellbeing expert will most likely assume a critical job in promoting this procedure. Our scholarly educational program in the therapeutic schools

needs to concentrate more on such high need pragmatic up and coming issues. Better comprehension of the real preventive general medical problems by medicinal services experts will be proliferated well in the general public. Every single medicinal understudy (today) won't be instructors in therapeutic schools, however they are the reliable sources to the general public brimming with data in this web period.

Funding: No funding sources.

Conflict of Interest: None declared.

Ethical Approval: Study was approved by the institutional ethics Committee, Sree Balaji Medical College and Hospital.

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Can Yoga and Meditation Mitigate Physical and Emotional Fluctuations in Perimenopausal Women

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Abstract

Background: Perimenopause is the menopausal progress which starts quite a long while before menopause. There is progressive decrease in ovarian capacity because of which ladies experience different indications influencing their personal satisfaction. Serious side effects are being overseen by Hormone Replacement Therapy [HRT] which is related with entanglements including danger. Subsequently elective treatments are expected to adapt to the manifestations. Yoga is one among the most usually utilized integral techniques for menopausal side effects.

Technique: A cross sectional comparitive investigation was done in the urban territory of Kancheepuram locale among 120 perimenopausal ladies inside the age gathering of 35 to 55 considered into two gatherings as ladies normally rehearsing yoga not rehearsing yoga by irregular inspecting strategy. An organized poll including the MRS scale is appropriated and reactions gathered in the wake of acquiring educated assent. MS Excel is utilized for information examination.

Result: The investigation of the gathered information uncovered an essentially less score on all the subscales among ladies rehearsing yoga and contemplation normally than among ladies not rehearsing yoga. Yoga as a compelling elective treatment to diminish menopausal indications is entrenched through the examination. A huge connection between span of rehearsing and control in the menopausal manifestations is likewise reported.

Conclusion: Yoga and reflection rehearsed normally can be powerful in dealing with the troubling manifestations of menopause and improving the personal satisfaction among perimenopausal ladies.

Keywords: *Perimenopausal Quality of Life, MRS scale, Alternative treatment.*

Introduction

Perimenopause-progress to menopause, denoting the finish of conceptive life is a significant occasion in the life of ladies, related with different regenerative and hormonal changes. Starting with the beginning of menstrual inconsistency and completion with a year of amenorrhea the perimenopausal stage is constantly connected with a few side effects influencing the personal satisfaction of ladies. These indications run from: physical-hotflushes, night sweats to passionate moodswings, depression[1].

Menopause is generally expected to occur between 40-55 yrs and quite a while before menopause denotes the perimenopause. Perimenopause and menopause are characteristic and a sound piece of a ladies' life and are not diseases. It is a time of hormonal changes stamping physical, mental and neuroendocrine maturing in ladies and loss of richness. Perimenopause isn't the equivalent in each person. Thus numerous ladies are uninformed of these progressions occurring in their body and spend their significant long periods of life attempting to adapt up to menopausal side effects. Hence it is imperative to make them mindful of measures to control these manifestations to improve the nature of life[2, 3].

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Materials and Method

An engaging cross sectional similar examination was done in the urban territory of Kancheepuram area including 120 ladies of perimenopausal age gathering (35-55yrs). Members are chosen by helpful examining and partitioned into two gatherings. 60 ladies who rehearsed yoga consistently and another 60 who did not rehearse any types of yoga were chosen. Every one of these subjects fulfilled the incorporation criteria of:

Avoidance criteria were:

1. Ladies not willing to give assent
2. Ladies with careful menopause and getting any sort of hormone treatment
3. Dynamic mental issue or some other therapeutic issue.

Moral freedom was acquired from the institutional audit board and educated assent was gotten from the members before the examination.

Subjects were from nearby network and an organized survey was utilized which incorporated their menopausal indications for which MENOPAUSAL RATING SCALE was utilized, specifics about the yoga or reflection rehearsed, length, recurrence, and for ladies not rehearsing yoga-explanations behind not rehearsing.

Findings: For examination, out of the 120 reactions, the gathering comprising ladies not rehearsing yoga is recognized as the CONTROL GROUP, and the other gathering of ladies rehearsing yoga consistently are distinguished as YOGA GROUP. Members had a place with age bunch between 35 to 55 years. The mean period of lady associated with the investigation displaying menopausal side effects was 45±5.7. The biggest classifications of ladies were between 35 to 40 years in yoga gathering and between 46 to 50 years in control gathering.

Joint and solid torment is the transcendent manifestation in all respects seriously influencing the control gathering pursued by physical and mental weariness. Around thirteen percent of ladies is influenced by extremely serious joint and strong agony. Around 33% of ladies from control gathering background extreme hot flushes, night sweats and discouragement. Rest unsettling influence, tension, peevishness and dryness of vagina are additionally moderate concerns influencing one fifth of the control gathering. Different side effects of bladder incontinence, hindered memory, heart manifestations are being milder grievances.

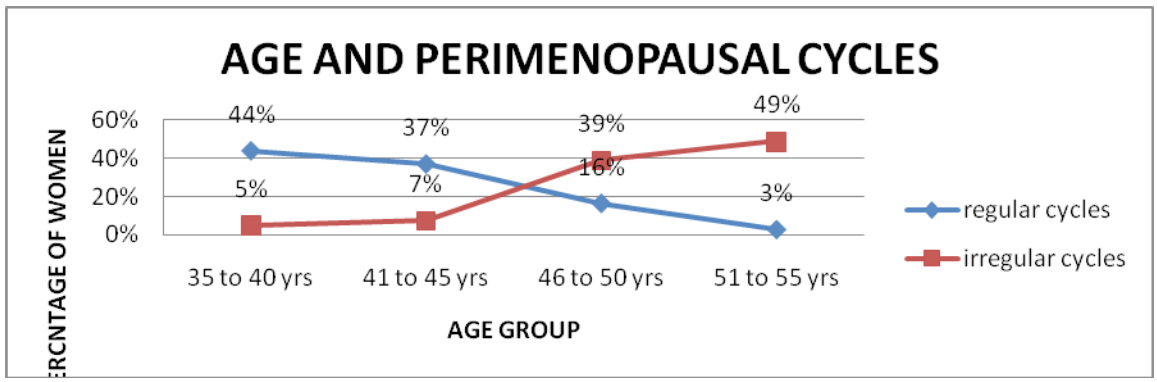


Figure 1: Association of age to perimenopausal cycles

Each subscale of the MRS scoring is additionally thought about between the gatherings. [Table1.2] Psychological and somatovegetative indications are similarly experienced by all ladies, the main distinction being they influence ladies with higher seriousness in the control gathering and lesser seriousness in the yoga gathering. Urogenital manifestations influence just in milder levels nearly in the majority of the ladies. The all out MRS score correlation unmistakably demonstrates the viability of yoga as an elective treatment in treating menopausal side effects in the perimenopausal ladies. In excess of 90% of the ladies of the yoga gathering has answered to encounter just milder indications while around 50% of ladies in the control gathering knowledge moderate to serious manifestations and extreme side effects can likewise not be led off the image in the

control group. [table 1.3] A noteworthy connection can be built up between impact of yoga on somatovegetative indications and impact of contemplation on mental symptoms. [figure 6] ladies rehearsing just yoga had a lesser soma to vegetative subscale score than mental score and on the other hand ladies rehearsing just reflection had a lesser mental score than somatovegetative score, inferring on the impact of yoga on manifestations like hot flushes, rest unsettling influences, rest issue, joint agonies and impact of reflection on menopausal gloom, touchiness, nervousness

Age is also associated with the severity of menopausal symptoms.[Figure2] As women ages they experience more severe symptoms of menopause. The increase in the MRS score implies the increase in severity of symptoms as age advances.

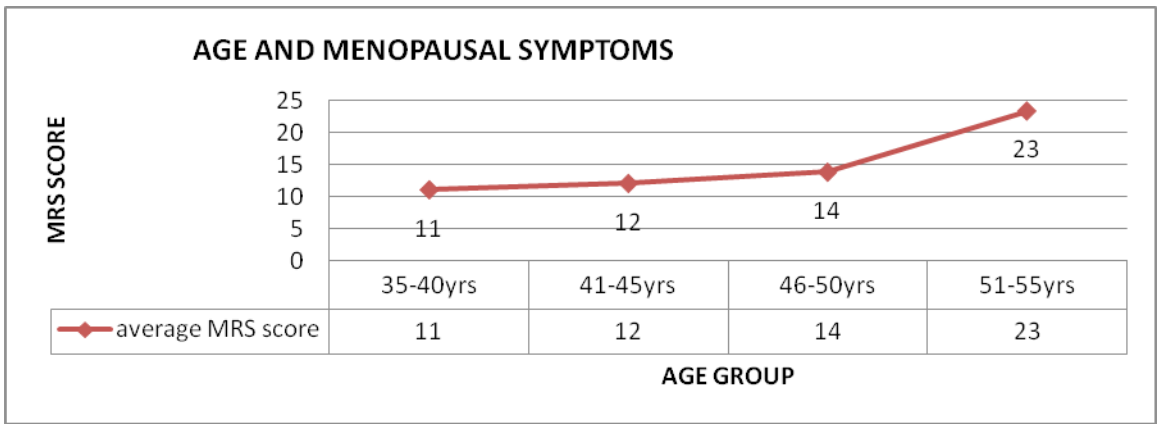


Figure 2: Association of age and severity of symptoms

The prevalence of psychological, somato vegetative and urogenital domain symptoms and the comparison between the groups were analysed. Table 1.1 shows the frequency and percentage of women experiencing the various grades of menopausal symptoms.

Table 1: Frequency and Percentage Table of Women Experiencing Grades of Menopausal Symptoms

Menopausal symptoms	None		Mild		Moderate		Severe		Very severe	
	Control No (%)	Yoga No (%)	Control No (%)	Yoga No (%)	Control No (%)	Yoga No (%)	Control No (%)	Yoga No (%)	Control No (%)	Yoga No (%)
Hot flushes	16(27%)	24(40%)	12(20%)	30(50%)	19(32%)	6(10%)	13(22%)	0(0%)	0(0%)	0(0%)
Heart discomfort	34(57%)	46(77%)	16(27%)	14(12%)	5(8%)	0(0%)	4(7%)	0(0%)	1(2%)	0(0%)
Sleep disturbance	13(22%)	30(50%)	27(45%)	27(23%)	12(20%)	2(2%)	7(12%)	1(2%)	1(2%)	0(0%)
Depressive mood	4(7%)	29(48%)	19(32%)	25(21%)	22(37%)	5(4%)	14(23%)	1(2%)	1(2%)	0(0%)
Irritability	3(5%)	34(57%)	22(37%)	23(19%)	27(45%)	3(3%)	8(13%)	0(0%)	0(0%)	0(0%)
Anxiety	8(13%)	42(70%)	28(47%)	14(12%)	17(28%)	4(3%)	7(12%)	0(0%)	0(0%)	0(0%)
Physical and mental exhaustion	2(3%)	22(37%)	8(13%)	30(25%)	25(42%)	6(5%)	22(37%)	2(3%)	3(5%)	0(0%)
Impaired memory	28(47%)	46(77%)	22(37%)	11(9%)	6(10%)	3(3%)	4(7%)	0(0%)	0(0%)	0(0%)
Bladder problems	42(70%)	55(92%)	10(17%)	5(4%)	5(8%)	0(0%)	3(5%)	0(0%)	0(0%)	0(0%)
Dryness of vagina	16(27%)	44(73%)	19(32%)	12(10%)	17(28%)	1(1%)	7(12%)	1(2%)	1(2%)	2(3%)
Joint and muscular pain	0(0%)	8(13%)	5(8%)	32(27%)	23(38%)	20(17%)	24(40%)	0(0%)	8(13%)	0(0%)
Average	**15(25%)**	**35(58%)**	**17(28%)**	**20(19%)**	**16(27%)**	**5(4%)**	**10(17%)**	**0(1%)**	**2(2%)**	**0(0%)**

Women belonging to yoga group were enquired regarding the particulars about practicing yoga. Of which 61% of women practiced both yoga and meditation, 22% of women practiced only yoga and 17% of women practiced only meditation. Table 2 gives the frequency of practicing yoga therapy and most of the women included in the study practiced yoga daily or for about 3 times a week regularly.

Table 2: Frequency of practicing yoga therapy

	No (%)
Daily	40 (67%)
More than 3 times a week	8 (13%)
2-3 times a week	10 (17%)
weekly once	2 (3%)

Table 3: Variables regarding yoga practise

Duration of Practising in a Day	Less than 30 mins no. (%)	30-45 mins no. (%)	1 Hour no. (%)	More than an hour no. (%)
Yoga	9 (18%)	34 (68%)	5 (10%)	2 (4%)
Meditation	12 (26%)	35 (74%)	0 (0%)	0 (0%)
Reasons given by women for taking up yoga therapy	General fitness 43%	To reduce anger levels 10%	To reduce stress and depression 13%	To reduce body weight 17%
Reasons given by women of control group for not practising yoga	Time restraints 58%	Not interested 12%	Not aware of the need or importance 30%	

Table 4: Time period of practicing and MRS score- comparison

Time since practicing (% of women)	Average MRS score
1-4 months (3%)	15.5
4-8 months (13%)	6.75
8-12 months (23%)	5.64
More than a year (60%)	5.25

A critical finding of this examination is that the time length of rehearsing yoga treatment likewise significantly affects menopausal symptoms.[table 4]. Ladies who rehearsed yoga for over a year had a lesser mean MRS score than ladies who began rehearsing yoga for only 1 to 4 months. It is obvious that rehearsing yoga for 4-8 months consistently itself demonstrates a checked abatement in the seriousness of menopausal side effects experienced. The consequences of the examination presumed that there is a critical improvement in the personal satisfaction experienced by ladies of the yoga bunch when contrasted with ladies of the control gathering.

Discussion

Numerous such comparable examinations have been directed all around the globe in different time allotments, among perimenopausal ladies and menopausal ladies about the side effects and its treatment with hormone substitution treatment or elective treatment. An investigation led among the North Indian sub populace uncovered An altogether higher % of perimenopausal ladies (36%) demonstrated a Psychological score of ≥7; while a higher % of postmenopausal indicated Somatic score and Urogenital score ≥7[8]. Another investigation including the number of inhabitants in Uttarkhandrevelaed. An increment in the level of event and seriousness of manifestations with change to menopause was watched. The most predominant side effect was muscle and joint agonies (55.81%), trailed by inclination tired or absence of vitality (51.19%), and feeling miserable or discouraged (36.43%)[9]. One examination led among the ladies of Kerala demonstrated the mean time of achieving menopause was 48.26 years and Only 22.4% of ladies knew the right aim of menopause[10]. One concentrate incorporated the use of different elective treatments like utilization of herbs like ginseng, licorice root, wholesome tablets, phyto-oestrogens, loosening up back rubs, needle therapy etc[11]. Investigations of this benevolent underlined on the need of measures to fix the irritating side effects among ladies. Adequacy of yoga on menopausal indications has been examined in numerous examinations. One such examination finished up a fundamentally more prominent level of reduction in Perceived Stress Scale scores (P G 0.001,) in the yoga gathering contrasted and controls with a higher impact estimate in the yoga gathering (1.10) than the

control (0.27) and demonstrated that impact sizes were higher in the yoga bunch for all factors[12]. A deliberate survey study discovered moderate proof for momentary viability of yoga for mental indications in menopausal ladies[13]. A randomized clinical preliminary revealed that the yoga gathering had essentially lower post treatment scores for climacteric side effects and a sleeping disorder seriousness and higher scores for personal satisfaction and obstruction period of stress when contrasted and the control gathering and the decrease in a sleeping disorder seriousness in the yoga gathering was fundamentally higher than that in the control and detached extending groups[14].

Conclusion

Identifying perimenopause early and making safeguard strides won't just assistance encourage a smoother change, however lay the preparation for better wellbeing, parity, and vitality in the years following menopause. Yoga isn't just an approach to keep up physical wellness and capacity, the training encourages us oversee pressure, which is a noteworthy supporter of hormone awkwardness. Yoga postures can diminish numerous regular menopausal side effects, for example, hot flashes, temperament swings, and rest disturbances. Thus from every one of these examinations we can reason that our well established treatment, Yoga, a free-of-cost noninvasive strategy, is genuinely viable in giving physical, mental, and passionate medical advantage and is firmly prescribed to all ladies of menopausal age.

Funding: No funding sources.

Conflict of Interest: None declared.

Ethical Approval: Not Applicable

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Correlation between Gastrointestinal Disorders and Stress among it Professionals

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Abstract

Background: Gastrointestinal disorders have become the leading cause of disterss in the recent years. This is due to the change in the food style and altered eating habits. Working hours, job related and emotional stress also contribute making gastroenterological problems the second largest cause of distress next to psychological problems. This is significant in the information technology professionals which makes it a problem to be looked into.

Point: to find the correlation between gastrointestinal disorders and stress among the people working in information technology sector. To assess the food intake pattern and the state of health of the alimentary system. To find out the stress levels of people working in information technology sector. To find a link between the gastrointestinal disorders and the stress in them

Technique:

Study zone: Chennai, Tamil nadu

Study populace: Male and female IT experts over the age of 22 years

Study test: An example space of 140 IT experts is taken by helpful inspecting strategies

Study technique: Cross sectional distinct investigation

Incorporation Criteria: All the individuals who gave assent

Avoidance Criteria: People with history of past stomach medical procedures. Information Collection An organized poll will be utilized which comprises of inquiries relating to gastro esophageal reflux illness, peptic ulcer, and stoppage. This likewise incorporates parts of emotional well-being and the workplace of subjects.

Measurable Analysis: Data will be associated in Microsoft Excel and examination performed utilizing SPSS.

Result: The reactions to the survey were examined it was discovered that a huge extent of the examination populace had gastrointestinal misery, and it was discovered that their workplace, mental state and way of life was a contributing variable to those scatters.

Conclusion: It is accordingly finished up from the investigation that individuals working in IT segment have increasingly gastrointestinal issue and there is a pressing need to spread mindfulness on the crumbling gut wellbeing so they don't confront future wellbeing complexities and personal satisfaction can be improved by basic measures and way of life alterations.

Keywords: *IT expert, GERD, ulcer, blockage, work place.*

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Introduction

The world is always loaded up with steady changes. New advancements are being created constantly for the improvement and help of human race trying to make life

simpler. Therefore individuals are in an uncontrolled flood for new revelations and a mission to satisfy it stays since days of yore. Data Technology is a sprouting field and the biggest wellspring of work in urban regions particularly in metropolitan urban areas which discovers new prospects with its Herculean and enormous labor. Because of its magnetic guarantees in salary and way of life, individuals work day and night neglecting to take legitimate consideration of their wellbeing, particularly the gut. Skipping suppers, eating undesirable sustenance from cafés because of their tight work routine has supported in the improvement of various issue, for example, GERD, Acid peptic diseases(duodenal and gastric ulcers) and obstruction.

Added to this, flighty dozing hours, insufficient rest, work related pressure and strain ads to the previously mentioned illnesses. Individuals additionally use over the counter drugs to handle these issues which makes conclusion and treatment troublesome as years cruise by. Useful gastrointestinal ailment is a standout amongst the most successive findings made by gastroenterologists. By definition, an irregularity in gut capacity is suspected as the reason for the side effects, however no basic or biochemical variation from the norm can be related to utilization of the standard tests. Our destinations in the present investigation were to[1] decide the analytic worth scores got from the writing in correlation with side effect score models got from our past approval examine, [2] decide if manifestations could recognize a mental illness, somatoform clutter, from practical gastrointestinal infection.

The pervasiveness of gastroesophageal reflux ailment (GERD) ranges from 10% to 30% in the number of inhabitants in Western nations. There is lack of information with respect to the size of the issue in India. GERD as an illness element has differed introductions. The side effects may not associate with the endoscopic picture. The patients may present as any of the accompanying:

1. Common acid reflux and reflux indications with endoscopic proof of mucosal damage.
2. Indications of indigestion and reflux however a typical upper gastrointestinal endoscopy
3. No esophageal reflux indications however proof of mucosal damage on upper gastro esophageal endoscopy.
4. Atypical manifestations, for example, dyspepsia, hack, asthma, and so forth.

Corrosive peptic illnesses result from particular however covering pathogenic instruments that commonly include corrosive impacts on lessened mucosal resistance. Conditions, for example, indigestion, harm the esophageal mucosa, and furthermore possibly cause laryngeal tissue damage with ensuing improvement of pneumonic side effects. A peptic ulcer is histologically characterized as a mucosal deformity that stretches out to or past the muscularis mucosa, with mucosal harm because of pepsin and gastric corrosive emission. Most ulcers happen in the stomach and proximal duodenum while less generally in the lower throat, the distal duodenum or the jejunum.

Corrosive related issue impacts the personal satisfaction and profitability of burdened patients and is normal and significant reasons for bleakness and mortality. Roughly 40% of grown-ups in the USA gripe of month to month, 20% of week after week, and around 7% of day by day indigestion, making gastroesophageal reflux infection (GERD) one the most widely recognized gastrointestinal (GI) issue with resultant expenses of more than US$10 billion every year. In spite of a declining rate inferable from expanded utilization of annihilation treatment against Helicobacter pylori, peptic ulcer infection (PUD) burdens a few million individuals in the USA consistently.

Stoppage alludes to solid discharges that are inconsistent or difficult to pass. The stool is regularly hard and dry[4]. Other manifestations may incorporate stomach torment, swelling, and feeling as though one has not totally passed the solid discharge Blockage may result from a few causes including a terrible eating routine, poor entrail propensities, or issues in end of stool, regardless of whether physical, practical, or deliberate.

- Difficulty in beginning or finishing defecation
- Infrequent and troublesome entry of stool
- Passing hard stool after delayed stressing

The typical recurrence of defecations in grown-ups is between three every day and three every week Inferable from most of populace in urban zones working in IT industry, this examination intends to draw out the predominance of practical entrail issue in this populace.

Materials and Method

This is an unmistakable cross-sectional investigation, which was directed among 140 IT experts working in Chennai arranged in the southern piece of Tamil Nadu from the period of April to June 2019. Helpful example strategy was utilized and 140 reactions were gathered during the recommended investigation time frame. Information was gathered subsequent to acquiring Institutional Ethical Committee Clearance. An organized survey was self managed subsequent to getting educated assent from the members. The poll comprised of statistic subtleties, physical action, smoking and drinking propensities, eating design and the kind of nourishments they like, questions identified with GERD, for example, indigestion and spewing forth, question to recognize duodenal and gastric ulcer, the normality of their solid discharge.

Added to that, different parts of their workplace and their resting example were investigated.

The scales utilized in this investigation are inquiries from the standard GERD poll, Likert scale, the Perceived Stress Scale and the Hamilton scale. There is an aggregate of 37 questions barring the statistic subtleties questions. Consideration Criteria-Males and females over the age of 22 years. The individuals who offered agree to the investigation Rejection criteria-People with past history of stomach medical procedures.

The information gathered was entered in an exceed expectations sheet and dissected utilizing SPSS programming and results displayed as tables and figures.

Findings:

Table 1: Food Preferences

Eating Food at the Same Time Everyday			Beverage preferences			Feel Like Eating When Idle			Frequency of eating outside food in a week		
	Frequency	Percent		Frequency	Percent		Frequency	Percent		Frequency	Percent
Late (due to work)	46	32.9	Coffee	51	36.4	Yes	58	41.4	1-3 Times/ week	50	36
No	40	28.6	tea	89	63.6	No	82	58.6	3-5 Times/ week	23	16
Yes	54	38.6							Everyday	26	19
									Rarely or Never	41	29
Total	**140**	**100**		**140**	**100**		**140**	**100**		**140**	**100**

Table 2: Diet Preferences and tea/Coffee preferences

Diet			Number of Meals Per Day			Consumption of Coffee or Tea in a Day		
	Frequency	Percent		Frequency	Percent		Frequency	Percent
Mixed	116	82.9	>3	11	7.9	>3 Times	12	8.6
Vegetarian	24	17.1	2.00	25	17.9	1 Time	25	17.9
			3.00	104	74.3	2-3 Times	69	49.3
						Rarely	34	24.3
Total	140	100.0		140	100.0		140	100.0

Table 3: Alcohol and smoking preferences

Alcohol Consumption			Smoking			Eating During Stressful Situations		
	Frequency	Percent		Frequency	Percent		Frequency	Percent
No	97	69.3	No	120	85.7	Eating something at that time	64	45.7
Yes	43	30.7	Occasional	4	2.8	Not eating	76	54.3
			Yes	16	11.4			
Total	**140**	**100.0**		**140**	**100.0**		**140**	**100.0**

Table 4: Bowel Movement

Regurgitation after a Meal			Indigestion			Regularity of Bowel Movement		
	Frequency	Percent						
3-5 Times a week	5	3.6	Always	3	2.1	3-5 Times a week	11	7.9
After every meal	6	4.3	Never	18	12.9	5-6 Times a week	6	4.3
Everyday after ateast one meal	4	2.9	Often	11	7.9	Daily	90	64.3
Only after a heavy meal	36	25.7	Rarely	63	45.0	Irregular	33	23.6
Rarely or never	89	63.6	Sometimes	45	32.1			
Total	140	100.0		140	100.0		140	100.0

Table 5: Quality of sleep and work environment

Quality of Sleep			Comfortable Work Environment		
	Frequency	Percent		Frequency	Percent
2.00	4	2.9	2.00	12	8.6
3.00	54	38.6	3.00	39	27.9
4.00	69	49.3	4.00	61	43.6
5.00	13	9.3	5.00	28	20.0
Total	**140**	**100.0**	**Total**	**140**	**100.0**

Discussion

The most widely recognized useful gastrointestinal issue in the cutting edge time incorporate Gastro esophageal reflux sickness, Acid peptic maladies (duodenal and gastric) and blockage. This investigation directed among the IT expert of Chennai has uncovered that practically a large portion of the subjects who were engaged with the examination had at least one utilitarian inside illness, which was demonstrated by close to home collaboration and the poll in spite of the fact that they didn't understand with the with the side effects and they had likewise not searched out a therapeutic consideration for these indications which are minor yet assume a mammoth job in the working their everyday schedule which can be rectified by a straightforward course of drug for a brief span.

It has been discovered that individuals who are overweight and hefty have more measure of heartburn contrasted with different individuals in the examination populace. Individuals who smoke and devour alcohol additionally have heartburn and gastric aggravation. Individuals who will in general pressure eat, eat when they are inert, who skip or eat a dinner at unpredictable occasions have an expanded recurrence of heartburn and corrosive peptic maladies. Individuals who have diminished dozing hours, low nature of rest, expanded worry at their specific type of employment condition, enthusiastic unsettling influences and have low inspiration in their lives have appeared to have a higher occurrence of stoppage and heartburn. Albeit just a little populace of the general population picks espresso over tea as their drink, they have higher recurrence of gastric disturbance alongside which the occasions they have espresso in multi day assumes a noteworthy job in this. Regardless of their activity related pressure, rest and BMI, the individuals who will in general have a tendency towards hot sustenance, café nourishment, and their decision of an alternate dinner separated from their local style supper have a higher rate of indigestion and obstruction.

Individuals who additionally work late much of the time and who use sustenance conveyance applications have more rate of all the three referenced practical entrail issue as they have a higher proclivity towards zesty and overwhelming nourishment.

Comparative examination led by the Mayo center for corrosive peptic sicknesses and the All India Institute Of Medical Sciences in Delhi for recurrence of GERD have demonstrated comparable outcomes in the arbitrary populace with a lesser however noteworthy degree of the investigation gathering having useful issue. There have been thinks about which independently center around each utilitarian inside maladies yet not consolidated together in IT experts.

A nitty gritty history taking and basic indicative test, for example, a gastroscopy by an expert, trailed by certain way of life adjustments and drugs if fundamental can essentially decrease the frequency of inside maladies in IT experts like Barrett's throat, draining peptic ulcer, colonic and gastric carcinoma, gave quality in work spot is improved and decision of eating regimen changes for the advancement of these individuals.

Conclusion

The reactions to the survey was dissected it was discovered that a critical extent of the examination populace had gastrointestinal pain, and it was discovered that their workplace, mental state and way of life was a contributing variable to those clutters.

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Conflict of Interest: None declared.

Ethical Approval: Study was approved by the institutional ethics Committee, Sree Balaji Medical College and Hospital.

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Cross Sectional Study on Hearing Ability and its Association with Usage of Earphones among Medical Students

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Abstract

Background: Hearing misfortune influences the personal satisfaction to a more noteworthy degree. It represents an issue to carry on a typical way of life. It frequently goes unnoticed by the people. This examination is to set up a connection between the meeting misfortune and utilization of headphones. It is utilized to decide the elements related between the consultation capacity and headphone use. This examination helps in bringing a connection between elements like volume of headphone utilization and hearing misfortune among them.

Technique: After getting the moral endorsement from the institutional moral panel, 200 undergrads the two people of age bunches 17-25 were taken. A survey and online audiometry and recurrence test has been led to evaluate the conference misfortune among the undergrads. The assent of the understudies was acquired during this examination. The information gathered was entered and examined by utilizing SPSS programming.

Results: Of the 200 subjects, 28 subjects were found to have gentle hearing misfortune as indicated by the unadulterated tone audiometry test. The survey results demonstrate that solitary 6 understudies use headphones with low volume.

Conclusion: This investigation demonstrates that there is a lot of individuals with gentle hearing misfortune. The Questionnaire demonstrates that the vast majority of them use headphones for a more drawn out time frame. The examination likewise demonstrates that a large portion of them utilize high and medium volume while hearing with headphones.

Keywords: *Hearing misfortune, audiometry test, recurrence test.*

Introduction

The typical hearing recurrence of people is 20 to 20000 hertz. Loss of capacity to hear this recurrence is alluded to as hearing disability. The personal satisfaction is influenced because of utilization of headphones. Hearing misfortune influences the everyday exercises. Headphones utilization is expanding among undergrads because of different reasons and is transforming into an essential device these days. In spite of the fact that understudies will in general know about danger of hearing misfortune because of headphones, they will in general show less significance to it because of their dependence on music. Music assumes a significant job in the life of youthful grown-ups. Music helps in changing the disposition of people. Other than Music, understudies will in general use it while working out, learning and for watching addresses and so forth. Because of accessibility of music includes in different devices, the availability to headphones have turned out to be simple. This outcomes in abuse of headphones among undergrads. Anyway examines on reactions of utilization of headphones are less in literature[1]. Impermanent and lasting hearing misfortune have turned out to be regular among youngsters and youthful grown-

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ups because of the utilization of versatile players[2]. Usage of headphones for more noteworthy term and at high power causes dynamic loss of external and inward hair cells and harms it and prompts demise of the Organ of Corti, ischemia of the internal ear and builds the metabolic action prompting age of intemperate receptive oxygen species and peroxidation of lipid[3]. Tuning in to music for an extensive stretch of time and at a high power causes a few sound-related manifestations, for example, transitory edge shifts, tinnitus, commotion affectability and contortion which can expand the danger of creating changeless hearing loss4[1-4].

Impacts of Earphones among Students in their Day to Day Activity: Correspondence assumes a significant job among undergrads. With the expansion utilization of headphones, understudy's hearing to other external sounds is hidden. They will in general disregard the outside world. Their public activity likewise is influenced. Different impacts are that use of headphones during driving or riding might be hazardous and some may include in a street auto collision. Those with mellow hearing misfortune because of headphone use may discover trouble in tuning in to addresses, which thusly will influence their scholastic execution. They neglect to appreciate regular sounds existing and are making tracks in an opposite direction from genuine world. Understudies get disengaged from their environment. Hearing misfortune cause melancholy, absence of self-assurance making them feel unreliable, social detachment, sentiments of vulnerability or anger[5]. In spite of the fact that brief span of headphone use does not cause perpetual hearing misfortune, the harm because of delayed use in youngsters can turn into a significant one in adulthood[6]. This kind of shortage ought to be distinguished when possible[5]. Prevention of hearing misfortune starts with making more mindfulness focusing on kids and youthful adults[6]. Henceforth this examination was directed with the goal of evaluating the headphone utilization design among understudies and its belongings among unending clients of headphones[5].

Materials and Method

This expressive cross sectional investigation is surveyed with the assistance of organized poll and different tests. The investigation was directed after the endorsement of moral council of Sree Balaji Medical School and Hospital. Advantageous testing of test estimate 200 was taken. Therapeutic understudies of age 17–25 years were taken in this investigation. An organized poll was filled by the understudies simply in the wake of getting an educated assent from them. The survey comprises of different inquiries which aides in sorting the members as high, medium and low headphone clients and after that the online unadulterated tone audiometry and recurrence tests was directed with the assistance of headphones in a quiet domain. The survey was self-controlled. The internet hearing test was finished with the assistance of same headphones for every one of the members.

Audiometry Test: This test is finished with the recurrence of 800 to 2500 hertz and is set apart in an audiogram from which we can order them into gentle, moderate and serious hearing misfortune as indicated by the decibels they hear.

Recurrence Test: A Sound of recurrence 20 to 20000 hertz is approached to tune in by the understudies. These aides in recognizing the recurrence hearing misfortune among the understudies. The subsequent information is broke down factually. The information was entered in Microsoft Excel and was examined in SPSS Software.

Findings: Out of 200 understudies, 71 (31.5%) were male and 129 were female (64.5%). Out of 200 understudies, 79 (39.5%) were 20 years of age, 53(26.5%) were 19 years of age,, 39(19.5%) were 21 years old,14 (7%) were 22 years of age, 10 (5%) were 23 years old, 5(2.5%) were 18 years of age. Use of headphones in hours out of every day, 68(34%) use it for 1 hour for each day, 48 (24%)use for 2 hours out of every day, 38(19%) use for 3 hours of the day, 29(15%) for 5 hours of the day. This demonstrates a large portion of them use it for 1-2 hours out of each day. Table 1 portrays the qualities of utilization of headphones.

Dominant part of them reacted as incessant clients. The vast majority of them picked headphones as they were agreeable and furthermore it gave them security. Larger part of them utilized headphones for watching recordings and they utilized medium volume to hear it. Some of them likewise heard in high volume.

Table 1: Earphone Usage Characteristics

Topic	Frequency	Percentage
1. Frequency of usage		
Always	24	12
Frequently	91	45
Sometimes	65	32.5
Rarely	18	9
Never	2	1
2. Reasons for choosing earphones		
Stylish	4	2
Portability	29	14.5
Comfortable	100	50
Privacy	115	57.5
Others	1	0.5
3. Volume of earphone usage		
High	50	25
Medium	144	72
Low	6	3
4. Purpose of using earphone		
Exercising	26	13
Learn	25	12.5
Watch video	113	56.5
Privacy concerns	37	18.5
For beauty	0	0
Listening songs	14	7
Other	2	1

Multiple responses were analyzed: Figure 1 depicts the results of audiometry test. Majority of them heard at 10-20db sound. Table 2 demonstrates the effects of usage of earphones. Although not many of them experienced any major symptoms but few of them who used earphones had experienced some disturbances. Table 3 demonstrates the relationship between volume of usage of earphones and hearing loss. When Chi-square test was applied and association was seen between volumes of usage and hearing loss a statistical significance was found. (p value <0.05).

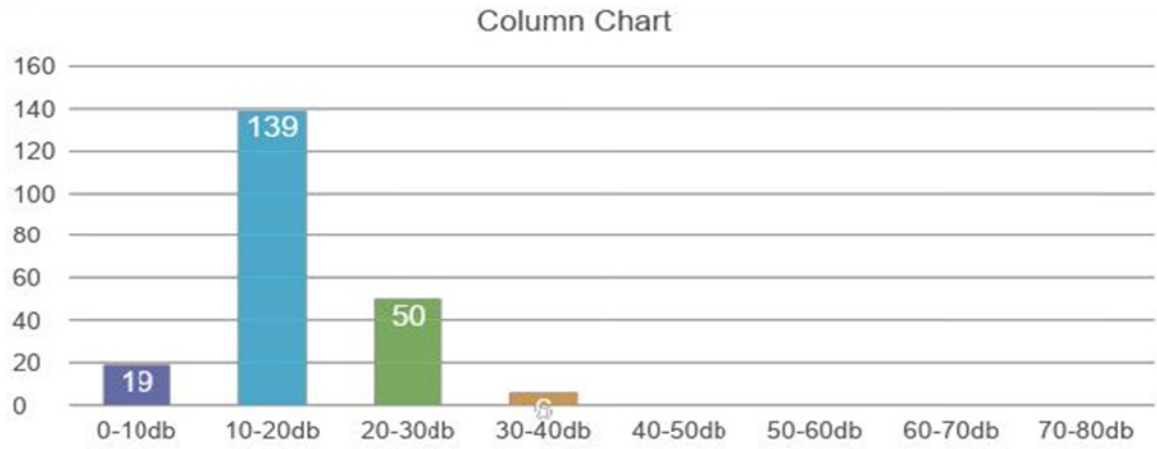


Figure 1: Audiometry Test

Table 2: Effect of Usage of Earphones

Topic	Frequency	Percentage
Felt unsafe while using earphone		
Yes	82	42
No	118	59
Finding it difficult to understand conversation in a party		
Yes	54	27
No	146	73
Peoples voice appear mumbled or muffled		
Yes	40	20
No	160	80

Table 3: Comparison between the Volume of Usage and Audiometry Results

Volume	High Volume	Medium Volume	Low Volume
Range of Hearing Loss			
Normal	40	98	6
Mild	9	47	0
Moderate	0	0	0
Severe	0	0	0
Total	**49**	**145**	**6**

Table 4: Comparison of Students who Use High and Medium Volume with Normal and Mild Hearing Loss

Range of Hearing	Normal Hearing	Mild Hearing Loss
Loss Volume		
Medium Volume	98	47
High Volume	40	9

The chi square value is found to be 3.519 and p value is found to be <0.05.

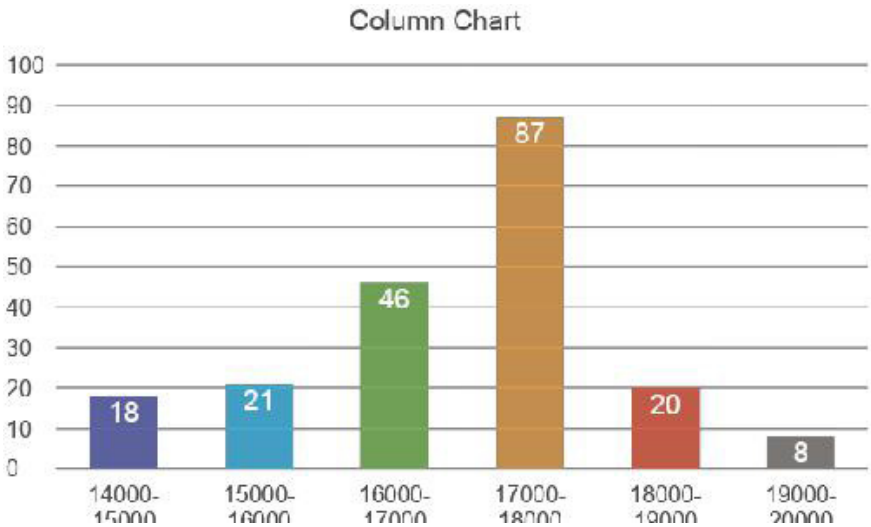


Figure 2: Frequency Test

The normal hearing range is 0-20 decibels. The range for mild hearing loss is 20-40 decibels. The range of moderate hearing loss is 40-60 decibels. The range for severe hearing loss is 60-80db.

Discussion

In this examination just 6% of understudies will in general use headphones at a lower volume. Subsequently a large portion of the understudies are at a more serious danger of creating hearing misfortune. This investigation led in kancheepuram locale shows intriguing outcomes. The predominance of mellow hearing misfortune in audiometry test is observed to be 28%. The recurrence test was likewise directed which demonstrates that 19.5 % cannot hear recurrence from 16000 to 20000 hertz. This examination demonstrates that 24% of understudies use headphones for a time of 2 hours out of each day. It demonstrates that out of 49 understudies utilizing headphones with high volume 9 understudies are influenced with mellow hearing misfortune and out of 145 individuals utilizing at medium volume 47 understudies are influenced with gentle hearing misfortune and understudies utilizing headphones at low volume have ordinary hearing capacity. The p worth was observed to be measurably huge. (<0.05)[6, 7].

In a comparable report led in US kids 6 to 19 years of age, 12.5% (roughly 5.2 million) are assessed to have Noise Induced Hearing Threshold Shifts in 1 or both ear (Niskar AS Et Al)[7]. The predominance of any HL (PTA of either ear better at high frequencies [3, 4, 6, and 8 kHz] or discourse frequencies [0.5, 1, and 2 kHz] ≥ 15 dB) were 17.9% and 16.5% among center and secondary school understudies, respectively (Rhee J Et Al)8. The above examination shows results like my investigation. This examination demonstrates that 45% of understudies use headphones much of the time. The predominance of mellow hearing misfortune in my examination is observed to be 28 %. In a comparable report led in south korea of 16,630 members, 58.4% had typical hearing, while 37.4% had Mild hearing Loss9(Choi JE Et Al)[8].

The day by day use of headphones in span of hours out of each day demonstrates that about 34% understudies use it for 1 hour. 24% understudies use it for 2 hours, 19% understudies use it for 3 hours, 15% understudies use it for 5 hours and 9 % understudies use

it for 4 hours However the commonness in a comparable report led in Korean populace demonstrates the Daily utilization of individual music players went from 1 to 3 hours in 229 understudies (46.7%). What's more, 164 understudies (33.5%) utilized these players for under 1 hour of the day, 62 (12.7%) utilized them 3 to 5 hours out of each day, 7 (1.4%) utilized them for over 5 hours out of each day (1.4%), and 28 (5.7%) did not utilize individual music players (Table 2). The general use time of individual music players ran from 1 to 3 years in 237 understudies (48.4%), under 1 year in 108 (22.0%), 3 to 5 years in 93 (19.0%), and over 5 years in 24 (4.9%) (Kim MJ Et Al)10[9,10].

The yield of study is that there is a decline in the impression of high recurrence hearing sounds. A few people will in general have gentle hearing misfortune which can advance on the off chance that they keep on utilizing headphones. This investigation demonstrates that the greater part of the understudies will in general use headphones for a more drawn out term every day. It likewise demonstrates that about 42% of understudies feel dangerous while wearing headphones. This investigation demonstrates that the vast majority of the understudies use headphones much of the time on a likhert scale premise.

Conclusion

The examination reasons that use of headphones has been expanding hugely because of a few factors. This persistent use of headphones influences the consultation capacity of the individual. Usage of headphones is a preventable measure which can be experienced. Be that as it may, it takes a ton of effort to totally stop the use of headphones. Henceforth it tends to be halted gradually step by step with extraordinary exertion. Use of outside speakers can be prescribed rather than headphones. Mindfulness among understudies and individuals assumes a noteworthy job in counteracting hearing misfortune because of use of headphones.

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Conflict of Interest: None declared.

Ethical Approval: Study was approved by the institutional ethics Committee, Sree Balaji Medical College and Hospital.

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Trend of Caffeine Use among People of Different Occupation and Age Group and Its Health Implications

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Abstract

Background: Caffeine is a generally expended concoction having disputable impacts. Caffeine may cooperate with the satiety and might be related with feelings of anxiety. The recurrence of caffeine utilization among individuals is known to be high nowadays because of expanded pressure. The point of the examination was to evaluate the connection between age, occupation and caffeine dependence and its wellbeing suggestion.

Strategy: A cross sectional examination with advantageous testing was done from a urban region of Kancheepuram locale. Information gathered included occupation, day by day espresso utilization, withdrawal side effects assuming any and generally speaking dependence on caffeine. An organized poll was utilized for information accumulation.

Results: In the 18-23 age gathering individuals devouring 0 cups multi day were 41.77%, 1 cup multi day were 35.44%, 2 cups multi day were 13.92%, 3 cups multi day were 5.66%, 4 cups multi day were 2.53% and 5 cups per day 1.26%. In the 24-29 age gathering individuals devouring 0 cups multi day were 19.01%, 1 cup multi day were 42.85%, 2 cups multi day were 28.57% and 4 cups multi day were 9.5%. Espresso utilization was most noteworthy in I.T. experts with individuals taking at any rate one mug of espresso being at 66.7%. The following most elevated utilization was among understudies with at any rate 1 mug of espresso admission being at 33.7%. I.T. experts expending 4 cups of espresso was at 16.7% while that of understudies was exactly at 3.4%.

Conclusion: Coffee utilization was most noteworthy in I.T. experts; the following most astounding utilization was among understudies.

Keywords: *Caffeine fixation, Occupation, Withdrawal manifestations*

Introduction

Caffeine is a characteristic stimulant most normally found in tea, espresso and cacao plants. It works by animating the cerebrum and focal sensory system, helping you to remain alert and averting the beginning of tiredness. Espresso was allegedly found numerous years after the fact by an Ethiopian shepherd who saw the additional vitality it gave his goats. Juiced soda pops hit the market in the late 1800s and caffeinated drinks before long pursued. These days, 80% of the total populace devours a charged item every day[1].

Once devoured, caffeine is immediately assimilated from the gut into the circulatory system. From that point, it goes to the liver and is separated into exacerbates that can influence the capacity of different organs. That being stated, caffeine's fundamental impact is on the cerebrum. It works by hindering the impacts of adenosine, which is a synapse that loosens up the mind and makes you feel tired. Typically, adenosine levels develop throughout the day; making you progressively increasingly worn out and making you need to rest[2].

Adenosine is a modulator that has an inescapable and by and large inhibitory impact on neuronal action.

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Tonic actuation of adenosine receptors by adenosine that is typically present in the extracellular space in mind tissue prompts inhibitory impacts that have all the earmarks of being interceded by both adenosine A1 and A2A receptors. Help from this tonic hindrance by receptor rivals, for example, caffeine represents the excitatory activities of these specialists. Portrayal of the impacts of adenosine receptor agonists and rivals has prompted various speculations concerning the job of this nucleoside. Past work has set up a job for adenosine in a various cluster of neural marvels, which incorporate guideline of rest and the degree of excitement, neuroprotection, guideline of seizure powerlessness, locomotors impacts, absence of pain, intervention of the impacts of ethanol, and endless medication use[3].

It's great to remember that caffeine is addictive and a few people's qualities make them increasingly touchy to it. Some reactions connected to abundance admission incorporate nervousness, fretfulness, tremors, sporadic heartbeat and inconvenience dozing[4]. A lot of caffeine may likewise advance cerebral pains, headaches and hypertension in certain people[5].

Justification of Study: This investigation was attempted to evaluate the dependence on caffeine among individuals of differed age gathering like those in the teenagers or mid 20s or individuals in their mid 20s and legitimize the reason for such results. This investigation additionally survey the caffeine reliance among understudies, it experts, government workers and so forth and legitimizes the reason for such a result.

Survey Literature: An investigation on caffeine utilization and its relationship with stress and hunger among call focus representatives in Mumbai city, India by Lakshmi B. Kale, Kejal Joshi Reddy; 25 January 2017. This was an investigation directed to survey the caffeine admission and its relationship with hunger and feelings of anxiety among call focus representatives matured between 25-35 years. An examination on Caffeine Withdrawal and Dependence: A Convenience Survey among Addiction Professionals by Alan J. Budney, Pamela C. Darker, Roland R. Griffiths, John R. Hughes, and Laura M. Juliano. This was an examination directed to survey the convictions of compulsion experts about the clinical significance of caffeine withdrawal and reliance. An investigation on Caffeine resilience and decision in people by Suzette M. Evans, Roland R. Griffiths; July 1992.

The investigation reported resilience advancement to the emotional impacts of caffeine: after ceaseless dosing, organization of caffeine created huge abstract impacts in the interminable fake treatment gathering however not in the constant caffeine gathering. The investigation additionally given backhanded proof to resistance advancement: during perpetual dosing, the incessant caffeine and fake treatment gatherings did not vary definitively on evaluations of temperament and abstract impact. At the point when subjects were arranged into caffeine choosers or no choosers, caffeine choosers would in general report positive emotional impacts of caffeine and negative abstract impacts of fake treatment. - Nonchoosers, interestingly, would in general report negative emotional impacts of caffeine. Incessant caffeine did not adjust the fortifying impacts of caffeine as surveyed by caffeine versus fake treatment decision, potentially on the grounds that the generally brief length of caffeine forbearance in the fake treatment condition was not adequate to result in maximal withdrawal impacts after end of the moderately high caffeine portion. This investigation gives the clearest proof to date of complete resilience improvement to a CNS impact of caffeine in people.

Materials and Method

Test Size: Reactions from 100 subjects have been gathered.

Testing Type: Advantageous inspecting

Testing Frame: Testing edge incorporates anybody in the urban zone of Kancheepuram region

Incorporation Criteria: Each one of the individuals who gave assent were incorporated into the investigation

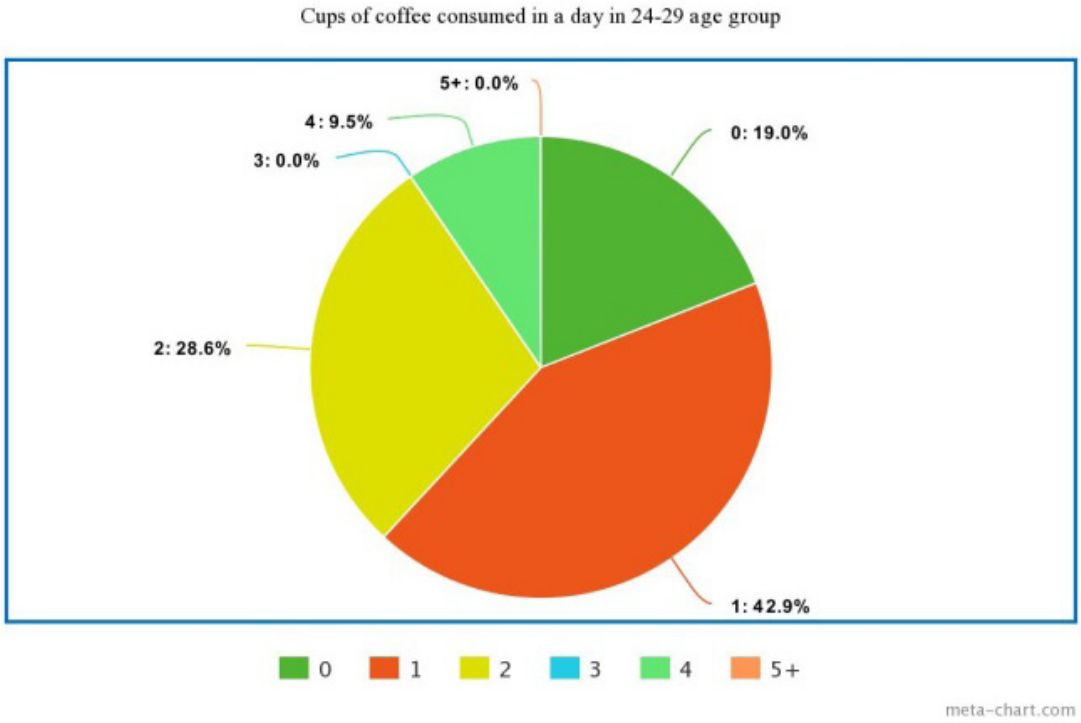
Rejection Criteria: The individuals who didn't give assent were incorporated into the examination

Territory of Study: Study was directed at a urban region of Kancheepuram area

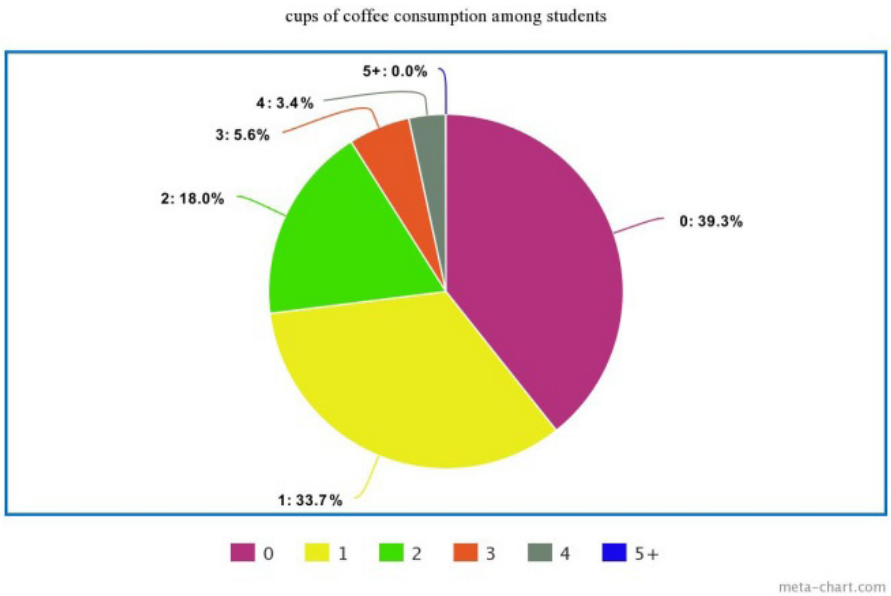
Findings: The survey managed two fundamental territories of intrigue, age gathering and control of the subject. 79% of the subjects were between the age bunch 18-23 and 21% of the subjects were between the age bunches 24-29. Under espresso admission in the 18-23 age gathering individuals with zero espresso admission were very high pursued by individuals with only a solitary mug of espresso daily. In the 24-29 age gathering

individuals taking a solitary mug of espresso every day were the most noteworthy pursued by individuals with 2 cups for each day. People were gotten some information about the quantity of cups of espresso they devoured in multi day. The examination was then isolated into 2 age gatherings in particular 18-23 and 24-29.

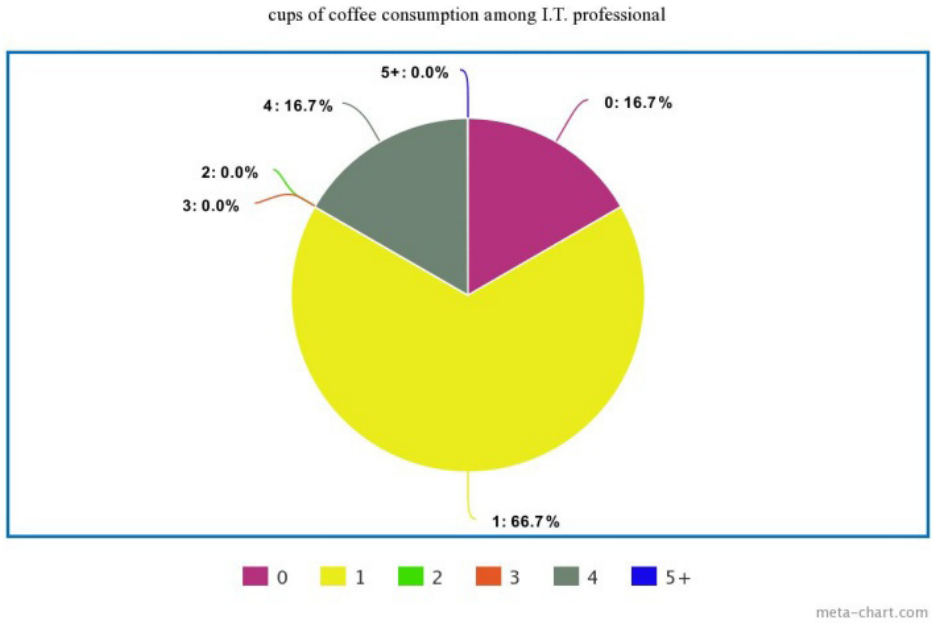
In the 18-23 age group people consuming 0 cups a day were 41.77%, 1 cup a day were 35.44%, 2 cups a day were 13.92%, 3 cups a day were 5.66%, 4 cups a day were 2.53% and 5 cups a day 1.26%.



In the 24-29 age group people consuming 0 cups a day were 19.01%, 1 cup a day were 42.85%, 2 cups a day were 28.57% and 4 cups a day were 9.5%.

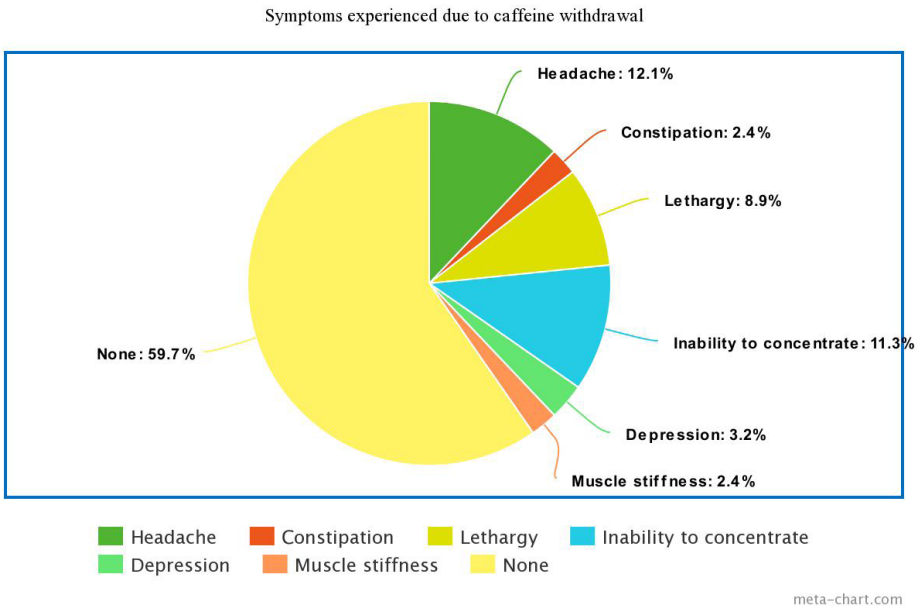


Individuals were asked about the number of cups of coffee they consumed in a day. The study was then segregated into 3 groups namely students, I.T. professional and others.



In the pie chart above it is clearly seen that coffee consumption is highest in I.T. professionals with people taking at least one cup of coffee being at 66.7%. The next highest consumption is among students with at least 1 cup of coffee intake being at 33.7%. I.T. professionals consuming 4 cups of coffee is at 16.7% whereas that of students is just at 3.4%.

This result is probably due to the stress taken up by I.T. professionals which is alleviated by caffeine use. The use of caffeine among students is also significant which may be due to the stress taken up by them due to exams, assignment and other academic pressure on them.



Discussion

Caffeine is a stimulant and the most normally utilized medication on the planet. Consistently, millions expend it to expand alertness, ease weakness, and improve fixation and core interest. In the midst of fantasies and contention about whether caffeine is fortunate or

unfortunate for us, proof recommends that moderate espresso utilization can bring the two advantages and dangers. Be that as it may, a high utilization of caffeine may not be stimulating. What's more, the ongoing pattern of adding caffeine to beverages and tidbits that don't normally contain it has raised new concerns[6].

Under espresso consumption in the 18-23 age gathering individuals with zero espresso admission were very high pursued by individuals with only a solitary mug of espresso daily. In the 24-29 age gathering individuals taking a solitary mug of espresso every day were the most elevated pursued by individuals with 2 cups for each day. In the 18-23 age gathering individuals devouring 0 cups multi day were 41.77%, 1 cup multi day were 35.44%, 2 cups multi day were 13.92%, 3 cups multi day were 5.66%, 4 cups multi day were 2.53% and 5 cups per day 1.26%. In the 24-29 age gathering individuals expending 0 cups multi day were 19.01%, 1 cup multi day were 42.85%, 2 cups multi day were 28.57% and 4 cups multi day were 9.5%. Espresso utilization was most noteworthy in I.T. experts with individuals taking in any event one mug of espresso being at 66.7%. The following most astounding utilization was among understudies with in any event 1 mug of espresso admission being at 33.7%. I.T. experts expending 4 cups of espresso was at 16.7% while that of understudies was exactly at 3.4%. The withdrawal side effects were not all that prevalent in the screened populace without any manifestations accomplishing the most noteworthy figure at 59.68%, cerebral pain and failure to aggregate tailing it at 12.01% and 11.29% separately, next being torpidity at 8.87% and misery, stoppage and muscle firmness with insignificant estimations of 3023%, 2.42% and 2.42% individually. This outcome is presumably because of the pressure taken up by I.T. experts which is reduced by caffeine use. The utilization of caffeine among understudies is additionally critical which might be because of the pressure taken up by them because of tests, task and other scholastic weight on them.

Conclusion

Therefore in the midst of legends and discussion about whether caffeine is fortunate or unfortunate for us, proof proposes that moderate espresso utilization can bring the two advantages and dangers. Nonetheless, a high utilization of caffeine may not be invigorating. Moreover, the ongoing pattern of adding caffeine to beverages and bites that don't normally contain it has raised new concerns. Caffeine is fundamentally utilized for purposes like Migraine cerebral pain, Headache following medical procedure, Tension cerebral pain. It is likely successful for mental readiness. It is additionally potentially successful for Asthma, Athletic execution, Diabetes, Gallbladder illness and so on[7]. It isn't probably going to have a considerable amount of withdrawal manifestations. Espresso utilization was most elevated in I.T. experts with individuals taking in any event one mug of espresso being at 66.7%. The following most elevated utilization was among understudies with at any rate 1 mug of espresso admission being at 33.7%. I.T. experts expending 4 cups of espresso was at 16.7% while that of understudies was exactly at 3.4%. This outcome is presumably because of the pressure taken up by I.T. experts which is eased by caffeine use. The utilization of caffeine among understudies is additionally critical which might be because of the pressure taken up by them because of tests, task and other scholarly weight on them.

Suggestion: Caffeine is a settled ergogenic help, exhibited to improve execution over a wide scope of limits through an assortment of components[8]. As caffeine is generally expended, with various social and medical advantages outside of execution improvement, a down to business approach is to comprehend that most of individuals will devour caffeine. In light of the proof exhibited here, it seems moderate (~3 mg/kg)[8] every day dosages of caffeine won't be hazardous.

Funding: No funding sources.

Conflict of Interest: None declared.

Ethical approval: The investigation was endorsed by the Institutional Ethics Committee, Sree Balaji Medical College and Hospital.

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Using Machine Learning as a Diagnostic Tool for Pneumonia Using Chest X-Ray Images

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Abstract

CXRs are the most commonly performed diagnostic imaging study. A number of variables alter the appearance of the X ray image such as positioning of the patient and depth of inspiration which makes the diagnosis a daunting challenge. In addition, clinicians are faced with reading high volumes of images every shift. We are trying to develop a diagnostic tool using machine learning so that the clinicians can confirm their diagnosis and help reduce the error.

Keywords: *Machine Learning, Pneumonia, Chest X-Ray Images, Tensorflow, Keras, Python.*

Introduction

Pneumonia is an acute respiratory infection of lungs. Usually the gas exchange happens in alveoli of lung, but in pneumonia the effective gas exchange is retarded due to fluid and pus buildup in alveolar sacs. Most common cause of bacterial pneumonia is streptococcus, haemophilus influenza type B and of viral is respiratory syncytial virus. Pneumonia accounts for over 16% of all deaths of children under 5 years old internationally. In 2015, 920,136 children under the age of 5 died from the disease. In the United States, pneumonia accounts for over 500,000 visits to emergency departments and over 50,000 deaths in 2015, keeping the ailment on the list of top 10 causes of death in the country.

Diagnosis of pneumonia is an arduous task. The physician may start by asking the symptoms and then by listening to abnormal lung sounds such as crackling, rumbling and wheezing. If the symptom and the general examinations compare to that of pneumonia, they will order for a Chest X ray. An X ray will allow the doctor to see your heart, blood vessels and lungs which will aid in the diagnosis. In the X ray image the doctor may look for opacities(white spots) which suggests an infection in your lungs[1].

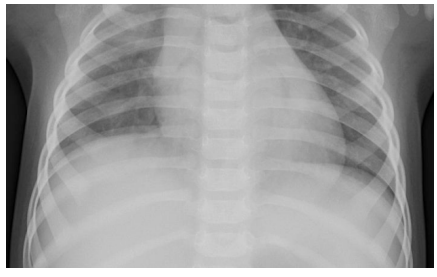
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CXRs are the most commonly performed diagnostic imaging study. A number of variables alter the appearance of the X ray image such as positioning of the patient and depth of inspiration which makes the diagnosis a daunting challenge. In addition, clinicians are faced with reading high volumes of images every shift. We are trying to develop a diagnostic tool using machine learning so that the clinicians can confirm their diagnosis and help reduce the error.

Materials and Method

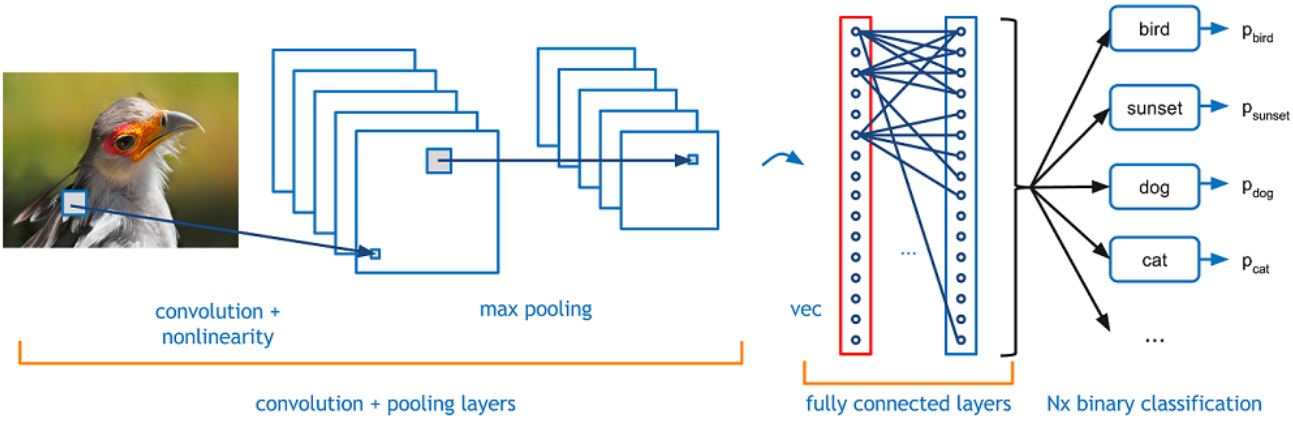
A Machine Learning model is a specific architecture that consists of some parameters. The Machine Learning (ML) model "learns" inference rules from training data that is supplied to it while training it.

For example: In our case, We supply the ML model with training data consisting of chest x-rays that have been segregated into "Normal/Virus/Bacteria" indicating the type of infection or lack thereof. We then train the ML model using this data. The Model learns generalized features in the set of images that it can use to classify the images into different classes.



For image processing all the state-of-the-art Machine learning architectures use some variant of the Convoluted Neural Network. (CNN). The basic structure of a CNN consists of linear layers of Convolution and Pooling layers that end with a fully connected dense layer whose output represents the different classes that we need to classify the images into.

The following is an example of object classification:



The picture went through the model from the left and a class is alloted to the picture as it turns out toward the finish of the model. For this situation, We will have ⅔ classes to be specific, Normal, Bacterial and Virus[2].

The particular CNN engineering we are going to utilize is the Inception Net (Inception Net V2) which has a precision of 93.7% on standard datasets like Image Net[3]. the earth we have constructed the model is Tensor flow, Keras and Python.

Findings and Discussion

The Data consists of Chest X-ray images that have been segregated into Normal, Virus and Bacterial. The Owner of the data is the University of California, San Diego. The data has been made available to use through the internet[4].

Training Data:

Normal Images	1341
Viral	1345
Bacteria	1952

Testing Data:

Normal Images	234
Viral	148
Bacteria	242

Conclusion

The proposed method detects pneumonia using Chest X-Ray and classifies into 3 categories Normal, Bacterial and Viral with an accuracy of 85.6%. The model uses machine learning to detect the character of opacities (infiltrates) in lung tissue. Whether the opacities are consolidated, disperse or none and then classifies into different classes. We can further increase the accuracy and decrease the error by feeding the program with more Chest X Ray images with better quality or by implementing better architecture.

Funding: No funding sources.

Conflict of Interest: None declared.

Ethical approval: Not Applicable

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Study of an Aqueous Seeds Extract of Petroselinum Crispum and its Effect on Fertility of Male Mice

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Abstract

The main cause of male infertility is Sperm dysfunction. In this experimental 30 male mice were divided randomly into three groups, ten included in each. The control group received tap water while the second and third groups treated with 200 and 400 mg/kg/B.W of *Petroselinumcrispum* extract respectively. After completion of the treatment, the result showed significantly increased (P≤0.05) in the weight of the body, testes, prostate and seminal vesicles as compared to the control group. On other hand significantly increased (P≤0.05) in the percentage of motility and life of sperm while significant decreased (P≤0.05) showed in the percentage of denaturation of sperm vesicles as compared to the control group. However significant increased (P≤0.05) in the serum hormone level (FSH,LH and testosterone) for both groups treated with extract as compared to the control group.

Keywords: *Petroselinumcrispum, mice fertility, body weight.*

Introduction

Petroselinumcrispum belongs to family Umbelliferae, it's locally known as Baqdunis (parsley), has been used medicinally for many centuries in Mediterranean,European and Asian countries[1]. Parsley is one of the most popular spice vegetables used in Poland. Both roots and leaves were used for garnish and flavoring dishes[2]. Parsley is rich with vitamin A, B, C, β-carotene and an antioxidant substance that includes luteolin, flavonoid which eradicates free radicals that cause oxidative stress in cells[3]. The fresh leaves are highly rich with mineral and vitamin; root was used to treated flatulence, cystitis, and rheumatic conditions. Parsley is also valued as a promoter of menstruation, being helpful both in stimulating a delayed period and in relieving menstrual pain[4]. The herbs have used a long history in order to fertility regulation and increase activity of sexual organs[5,6]. Parsley is used to treat various diseases such as Alzheimer's disease, strokes, thrombosis and against cardiovascular diseases[7, 8]. It also used to treated jaundice, colic, edema, rheumatism, diseases of prostate ant anemic, antimicrobial, anticoagulant, antimenorrhagia, antihepatic fibrosis and antioxidant, anticoagulantas a blood pressure regulator, to treat eczema, knee nose bleed[9,10,11]. The aim of this study was to evaluate *P. crispum* effect on sperm parameters, body weight andserum reproductive hormone levels in male mice.

Materials and Method

Extract preparation: *Petroselinumcrispum* were collected from local market**.** The dried seed were pulverized into fine powder using a grinder and stored in an air tight container, (100 g) were extracted by adding 1000 ml distilled water boiled for 30 minutes. The extract was then filtered and the filtrates were evaporated using rotary evaporator under reduced pressure to dryness. The dried matter was dissolved in distilled water for using in the experimental studies[12].

Animals and experimental design: A total number of 30 male albino mice (25 ± 30 g) (8-10 weeks age) from the animal house in pharmacy college, Karbala university were used in the present study. The animals were kept one week before the initiation of the experiment for adaptation. The animals were allowed free access to waterand fed on a standard diet. Malemice were randomly divided into 3 groups, each of 10 animals. Treatments occur by orally for 30 days.

Group I: Control group- male mice received orally tap water.

Group II: The animal received **aqueous** extract of *Petroselinumcrispum*in a dose of 200 mg/kg

Group III: The animal received **aqueous** extract of *Petroselinumcrispum*in a dose of 400 mg/kg. The volume for each dose 0.1ml/B.W administrated by micropipettes.

Progressive sperm motility

Progressive sperm motility was assessed by haemocytometer slide according to[13].

The percentage of living and denaturation sperms

The testis was immediately cut transversely into two parts and fresh smear was taken by allowing the cut surface of the testis to touch a clean and warm slide (37ºC) then added 1-2 drops of physiological saline, 1-2 drops of eosin-necrosin, then detected percentage of abnormalities sperms by accounted in a hundred sperm within the microscope field according following equation:

(Percentage of Sperm abnormality %=number of abnormal sperms/total number of sperms *100)[14].

Body weight: Total body weight for each mouse was calculated and recorded at the beginning and end of the experimental work by using a mechanical balance

Testis, prostate, seminal vesicles and Epididymis (reproductive organs) weight: At the end of experiments, the animal were sacrificed to open abdomen and remove both testis,epididymis, seminal vesicles and prostate were removed, cleaned from adherent tissues these organs were washed in water twice then dried and weighted by using electronic balance immediately.

Blood sample collection and hormonal assay: The blood samples withdraw after 24 hours from the last dose, before killing the animal using cardiac puncture. Serum was obtained by centrifuging blood sample at 6000 rpm for 10 min and subsequently used for the determination of follicle stimulating hormone (FSH), luteinizing hormone (LH) and testosterone hormone. Prepared kit was used for hormones assayed depends on Bio Meriux kit (French) principle of Radio-immunoassay technique using Mini VIDAS apparatus.

Statistical analysis: Data were analysed' using SAS View 512+ Software (Abacus Concept, Inc. Calabasas, CA, USA). Differences among groups were measured using one way analysis of variance (ANOVA) followed by the least significant differences. The results were expressed as means ±SEM and differences were considered statistically significant at ($P \leq 0.05$) [15].

Results

Result of present study revealed significant differences($P \leq 0.05$) in the total of body weight after treated with both doses of *Petroselinumcrispum*as compared to the control group (table1). Present result showed significant differences ($P \leq 0.05$) in the weight of reproductive organs (tests, prostate gland and seminal vesicles) for all groups treated with different doses of *Petroselinumcrispum*as compared to the control group (table 2). The result of table (3) showed significant differences ($P \leq 0.05$) in the Percentage of motile and life sperm for both groups treated with extract as compared to the control group, while result showed significant decrease ($P \leq 0.05$) in the Percentage of denaturation sperm for both groups treated with extract as compared to the control group. Table (4) revealed significant differences ($P \leq 0.05$) in the concentration of testosterone and LH hormone for both groups treated with extract as compared to the control groupon other hand result found no any significant differences in the concentration of FSH hormone for these groups as compared to the control group.

Table 1: The effects of different doses of aqueous extract from Petroselinumcrispum on total body weight

Body Weight after treated (g)	Body Weight before treated (g)	Treatment
22.50±0.76 B	*21.50±0.71 A**	Control
24.00±0.36 A	21.66±0.66 A	200 mg/ml
24.66±0.61 A	21.83±0.60 A	400 mg/ml
2.10	0.10	LSD

* Significant difference ($P \leq 0.05$), mean ± standard error, **Different letter refer to significant difference, LSD (least significant differences). Similar letters refer to not any significant difference.

Table 2: The effects of different doses of aqueous extract from Petroselinumcrispum on some reproductive organs

Weight of Seminal vesicles (mg)	Weight of prostate (mg)	Weight of Tests (mg)	Treatment
B 0.110±0.007	B 0.035±0.004	B 0.190±0.008	Control
A 0.145±0.007	A 0.055±0.004	A 0.221±0.008	200 mg/ml
A 0.153±0.006	A 0.060±0.005	A 0.238±0.004	400 mg/ml
0.030	0.020	0.030	LSD

* Significant difference (P≤0.05), mean ± standard error, **Different letter refer to significant difference,LSD (least significant differences). Similar letters refer to not any significant difference.

Table 3: The effects of different doses of aqueous extract from Petroselinumcrispum on percentage of motile sperm, life sperm and denaturation of sperm

Percentage of denaturation sperm %	Percentage of life sperm %	Percentage of motile sperm %	Treatment
*14.64±0.50 A**	73.49±2.85 B	68.75±0.60 B	Control
12.05±0.67 B	81.42±1.24 A	74.64±1.84 A	200 mg/ml
10.84±0.63 B	82.89±1.27 A	78.25±2.06 A	400 mg/ml
2.50	7.90	5.80	LSD

* Significant difference (P≤0.05), mean ± standard error, **Different letter refer to significant difference,LSD (least significant differences). Similar letters refer to not any significant difference.

Table 4: The effects of different doses of aqueous extract from Petroselinumcrispum on some reproductive hormone

FSH Hormone	LH Hormone	Testosterone Hormone	Treatment
*1.44±0.30A**	0.67±0.11 B	1.66±0.24B	Control
1.42±0.24 A	1.55±0.16 A	1.99±0.31A	200 mg/ml
1.19±0.21 A	1.27±0.21 A	2.17±0.26A	400 mg/ml
0.9	0.6	0.3	LSD

* Significant difference (P≤0.05), mean ± standard error,**Different letter refer to significant difference,LSD (least significant differences). Similar letters refer to not any significant difference.

Discussion

Not hidden from anyone the importance of fertility and procreation as a factor for survival[16]. One of the target tissues of plant extracts are reproductive organs, such as testis and sperm parameters[9]. In the present study significant increase in the total body weight after treated with extract,this results can be attributed to increase appetite, metabolic rate, some hormone such as growth and thyroid hormones another reason for this increase may be to the high concentration of protein and carbohydrates in this extract, this study in agreement with what found by[17] who demonstrated increase body weight of rats after treated with extract of *Allium cepa*, which both plant contain coumarins, flavonoids, and terpens. Also the result showed increase weight of testes, prostate and seminal vesicles after treated with extract this may be due to high levels of vitamin A in extract of *P. crispum* which is considered as a growth factor[18]. [19]also found extract of *P. crispum* contains various minerals such as vitamins A, B, C and, and iron vitamin A is known for proliferation of epithelial cells in seminiferous tubules then the diameter of these tubules increased. Present study showed increased in the percentage of motile and life sperm, on other hand decrease percentage of denaturation of sperm that may be due to inhibitory effects of extract on apoptosis because have increase cellular antioxidant defenses system, this study in agreement with [20]who revealed that increased Sertoli cells which are major components of seminiferous tubules after treated with extract which are greatly linked to total sperm production and activity, present study in agreement with [21] who demonstrated that antioxidant properties of *P. crispum*can improve the sperm quality by increasing the anti-oxidant genes expression, on other hand [9]indicated a significant relationship between the *P. crispum* extract and sperm motility. The present results in agreement with [22]

increase of motile sperms and decrease denaturation of sperm as a result of existing flavonoid antioxidants that cause increases glutathione peroxidase in *P. crispum* extract.[23]Also found increase sperm concentration and sperm quality (viability, motility, and normal morphology) after treated with ginger. While the present study disagreement with [24]found increase in sperm anomalies with decreased sperm motility, count, sperm speed after treated with *Boswelliapapyrifera and Boswelliacarterii*. Present data revealed increased in reproduction hormone testosterone, FSH and LH this result in agreement with [25]who found significant increase in FSH, LH and testosterone serum of infertile patients after treated with ginger. As well as [26]found increased serum testosterone levelsin male rat after treated with ginger extract because have potent androgenic activity. However the present study disagreement with [27] which found does not have any effect on serum levels of testosterone, FSH and LH after treated with celery seed extract. [28]found decrease in LH concentration while FSH and testosterone concentration change wasn't observed after treated with *Citrus aurantifolia*.

Conclusion

Based on the results of this study, it seems that the extract of *P. crispum* can affect some reproductive parameters such as weight of body, testis, prostate, seminal vesicles and sperm motility. As well as serum levels of LH, FSH and testosterone show considerable increased,and thus extract can be used as the potential fertility herbs in male.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

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Immunohistochemical Expression of GLUT-1 and Carbonic Anhydrase IX in Major and Minor Pleomorphic Adenoma PF the Salivary Glands

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Abstract

This study aimed to evaluate and compare the immuno expression of glucose transporter-1 (GLUT-1) and Carbonic anhydrase IX(CA IX) between major and minor salivary pleomorphic adenomas (PAs),to better understand the differences in the biological behavior of these tumorsand determine whether these proteins participate in the development of these tumors. Thirty three cases of PAs, 16major and 17 minor were submitted to morphological and immunohisto chemical analysis. Immuno expression of GLUT-1 and CA IX was evaluated semi quantitative fields in all cases. The cases of GLUT 1 were classified according to the scores: 0 (0% positive cells), 1 (<25% of positive cells), 2 (25–50% of positive cells), and 3 (>50% of positive cells) While for CA IX cases were classified according to the scores: 0 (0% positive cells), 1 (<10% of positive cells), 2 (10–50% of positive cells), and 3 (>50% of positive cells. The statistical analysis was performed using Pearson's chi-square, Fisher 's exact test. Higher GLUT-1 and CAIX immuno expression was observed in the minor PA compared to major PAs(p = 0.05, 0.01) respectivelly. Results suggest that differences in biological behavior of the studied tumors are related to GLUT-1 Which may be involved in the metabolic regulation of glucose in PAs. In addition, CA IX appears to influence the development of major andminor PA which can explain the differences their biological behavior.

Keywords: *Pleomorphic adenoma, carbonicanhydrase IX, glucose transporters, immunohistochemical.*

Introduction

Pleomorphic adenoma (PA) is the most common benign tumor of salivary glands, mostly affecting parotid glands followed by minor salivary glands of palate. The features of neoplastic cells and their interaction with the supporting stroma have been studied in an attempt to better understand the clinical behavior and prognosis of salivary gland tumors, as well as to establish more effective treatment protocols [1,2]. In an attempt to elucidate the differences in the behavior of tumor cells, studies have suggested that increased expression of proteins associated with cellular metabolism can be advantageous for these cells to obtain nutrition. The over expression of GLUT-1 favors an increase in glucose intake, through the membrane, which will supply the tumor cells with the necessary metabolic requirements for their rapid proliferation[3,4]. Under physiological conditions, situations of increased metabolic demand increase the expression levels of GLUT-1. Under pathological conditions, the high expression of this protein in some neoplasms is considered to be an indicator of tumor progression and aggressiveness [4,5]. Another example is the carbonic anhydrase IX (CA IX), a trans membrane enzyme induced by hypoxia that catalyzes the reversible hydration of CO_2 supplying bicarbonate ions for intracellular neutralization and protons for extra cellular acidosis, which contributes to the survival of tumor cells [5]. Studies have shown that these proteins are correlated with the progression of some types of cancer and as there are still some aspects related to the clinical behavior of major and minor PA that are not yet clear, we have proposed to investigate the expression of these proteins in PA. The aim of this study to evaluate and compare the immuno expression of GLUT-1 and CA IX between major and minor PAs of the salivary glands, to better understand the differences in the biological behavior of these tumor and determine whether these proteins participate in the development of these lesions.

Materials and Method

Thirty three cases of PAs (16 major and 17 minor PAs cases were studied .Paraffin-embedded specimens were obtained from the archives of the department of oral and maxillofacial pathology, College of Dentistry, Baghdad University covering the period 2002-2016.

For morphological analysis, 4-µm-thick histological sections were cut and stained with hematoxylin–eosin, and examined by two investigators under light microscopy. PAs were classified as classic, myxoid, or cellular using a method adapted from[6].

Immunohisto chemistry: For immunohisto chemical study, 4-µm-thick sections were obtained from paraffin-embedded tissue blocks. The sections were deparaffinized and immersed in 3% hydrogen peroxide to block endogenous peroxidase activity. Next, the tissue sections were washed in phosphate-buffered saline (PBS) then few drops of protein block were added to slides to block nonspecific background staining. The antigen retrieval procedure, antibody dilution,and catalog number of the GLUT-1 and CAIX antibodies are shown in Table 1. The sections were incubated with the primary antibodies in a moist chamber at room temperature for one hour, then put in the refrigerator at 4˚C overnight. The tissue sections were then washed twice in PBS Then secondary antibody was added and incubated in humid chamberto bind the primary antibodies. Then detection solution (streptavidin-HRP reagent) were applied onto the sections, chromogen solution (Liquid DAB + Substrate, abcam) was added which resulted in a brown reaction product. Finally,the sections were counter stained with hematoxylin and covers lipped.

Positive control samples were obtained according to the manufacturer's recommendations, squamous cell carcinoma of esophagus for GLUT-1 and clear cell renal cell carcinoma (ccRCC) for CA IX. Erythrocytes present in each section served as internal positive control for the GLUT-1. Negative control samples were treated with 1% bovine serum in PBS instead of primary antibodies.

Table 1: Catalog number, specificity, company, dilution, antigen retrieval, and incubation of the primary antibodies

Catalog number	Specificity	Company	Dilution	Antigen retrieval	Incubation
Ab15309	GLUT-1	abcam	1/200	Not required	Overnight
Ab128883	CAIX	abcam	5µg/ml	Citrate, pH 6.0 Pascal, 90-95 C, 20 min	Overnight

Immunostaining assessment and statistical analysis: The tissue sections were analyzed by a light microscope (Olympus Japan Co., Tokyo, Japan). The immuno expression of GLUT-1 was analyzed qualitatively and semi-quantitatively at×400 magnification. For qualitative analysis, the localization of immunostaining in neoplastic cells (membrane, cytoplasmic or nuclear, or all three compartments) was evaluated. For semi-quantitative analysis, the percentage of immunopositive neoplastic cells was determined using the following scores adapted from the study of[7], 0 (negative), 1 (<25% immunostainedcells), 2 (25–50% immunostained cells), and 3 (>50% immunostained cells).

Samples were considered positive for the expression of CA IX if cells in the tissues sampled presented brown staining on the membrane, nucleus, or cytoplasm or all three compartments. A semiquantitative analysis was performed following the methodology proposed by [8] and modified for this study. Five representative areas of the tumor were evaluated on a light microscope under 400X magnification. Specimens were categorized according to the stained area with the following scores: 0 (0% of positive cells), 1 (<10% of positive cells), 2 (11–50% of positive cells), and 3 (>50% of positive cells).

After immunohistochemical analysis, the results were compiled on a database using the software SPSS 20.0 (Statistical Package for the Social Sciences), and statistical analysis was performed using Pearson's chi-square and fisher exact tests. A significance level of 5 % was adopted for all tests.

Results

Morphological analysis of the major PA specimens revealed six (37.5%) cases of the stroma-rich subtype, five (31.25%) of the classic subtype, and five (31.25%) of the cell -rich subtype.In the group of minor PAs

specimens,10 (58.82) cases of cell–rich,7 (41.17) of classic subtype and no case of stroma–rich was observed. Analysis of GLUT-1 immuno expression showed positive staining in 13 (81.25%) cases of major PAs and all cases of minor PAs. There was a predominance of combinednucleus and cytoplasmic staining in tumor cells, and foci of membrane staining were occasionally observed. Nuclear staining alone was not detected in any of the tumors studied. Strong immunostaining for GLUT-1 was observed in areas of squamous metaplasia in both major and minor PAs.

In the group of major PA, score 3 was the most frequent (*n* = 7;43.75%), followed by scores 1 (*n* = 3; 18.75%), 2 (*n* = 3;18.75%), and 0 (*n* =3; 18.75%). There was a predominance of score 3 in the group of minor PA, (*n* = 15; 88.23%),followed by scores 1 (*n* = 1; 5.9%), 2 (*n* = 1; 5.9%)with differences between these two groups being statistically significant (P = 0.05) . the distribution of GLUT-1 immuno expression scores in major and minor PA show in Table 2.

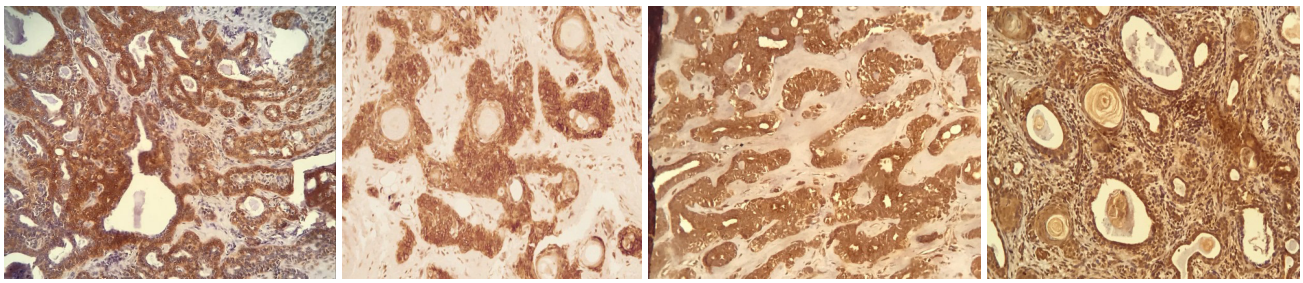
Analysis of carbonic anhydrase IX immuno expression showed positive staining in both major and minor PA with the greatest incidence of score 3. There was a predominance of combined nucleus and cytoplasmic staining in tumor cells. Nuclear staining was detected in two cases of the major PA.

In the group of major PA, score 3 was the most frequent (*n* = 13;81.25%), followed by scores 2 (*n* = 3; 18.75%). Minor PA had the greatest percentage (88.24%) of score 3 between the two tumors followed by scores 2 (*n* = 2; 5.9%), with differences between these two groups being statistically significant (P = 0.01). The distribution of CAIX immuno expression scores in major and minor PA show in Table 2.

Table 2: Distribution of cases of major and minor pleomorphic adenoma, according to the scores of positivity for GLUT-1 and carbonic anhydrase IX.

Tumor	GLUT1 immuno expression				CAIX immuno expression			
	A	score 1	score 2	score 3	A	Score 1	score 2	score 3
	n. (%)				n.(%)			
Major	3(18.75)	3(18.75)	3(18.75)	7(43.75)	0(0)	0(0)	3(18.75)	13(81.25)
Minor	0(0)	1(5.9)	1(5.9)	15(88.2)	0(0)	0(0)	2(11.8)	15(88.2)
P value	0.05				0.01			

Abbreviations: A, absent; GLUT-1, glucose transporter-1; CA IX, carbonic anhydrase



A B C D

Figure 1: Photomicrographs showing immunostaining for GLUT-1 and CAIX in benign major and minor PA, Intense GLUT-1 immunostaining in the major PA (A) Intense GLUT-1 immunostaining in minor PA (B). CAIX immunostaining in major PA (C).CA IX immunostaining in minor PA (D). (Envision, ×100)

Discussion

Benign tumors develop in multiple steps which are important for tumor progression and range from molecularly altered cells to clinically visible tumors [9].A peculiar feature of tumorigenesis is the change in the energy metabolism of neoplastic cells from aerobic toanaerobic, despite a considerable demand of oxygen. In this respect, GLUT-1 is important protein involved in the transport of glucose into the intracellular medium[10].

GLUTs are intrinsic proteins of the plasma membrane which are expressed according to the tissue in which they are found. They are regulated by hormonal

and metabolic signals. These proteins are stored in specialized endosomes until the cell is stimulated to increase glucose intake [11].

The expression of GLUT-1, which has been identified in different malignant neoplasms, has been suggested to be an indicator of tumor progression and aggressiveness[10,12]. In the case of salivary gland tumors, studies on this topic are sparse and restricted to certain groups of neoplasms[13]. However, GLUT1 expression in benign salivary gland tumors has not been investigated fully. In the present study, the expression of GLUT1 was found in 30 (90.90%) of 33 cases .Similar results have been reorted by [14]who stated the analysis of GLUT-1 immuno expression showed positive staining in 90% of PA.

These findings indicate a high expression of GLUT-1 in the epithelial and stromal component of these tumors and suggest that both tumors utilize the anaerobic glycolytic pathway as an energy source for growth as well as the important role of this protein in glucose uptake by tumor cells. On the other hand, significant differences in GLUT-1 immuno expression were observedbetween major and minor PA, suggesting that the expression oft his protein is implicated in the differences in the biological behavior of these tumors and an increase in cell proliferative capacity and metabolic needs. The increased energy consumption is required for neoplastic proliferation, which reflects an adaptation to adverse conditions in the studied lesions.

Pleomorphic adenoma is considered to be a precancerous tumor. Atypical tumor cells in 51 (51%) of 101 PAs examined histpathologically, and indicated that such atypicalcells, with p53 protein accumulation in their nuclei, could be regarded as cells in a precancerous state[16]. Horiuchi et al. [15] referred that probable that the energy gained from glycolysis was used not only to grow PAs but also to facilitate malignant transformation.

Carbonic anhydrase IX is an isozyme normally found in the gastrointestinal tract, predominantly in the stomach, gallbladder, and small intestines epithelia and also detected in many tumors. Several studies have shown that CA IX may contribute to the growth, survival, and invasion of tumor cells by lowering the extra cellular pH in response to hypoxia, and also participate in bone resorption. This isozyme is not commonly found in healthy tissues and its strong association with neoplasms has been suggested as a promising diagnostic and prognostic marker[17,18].Few studies have evaluated the expression of CA IX in benign neoplasms; thus, its role in the development of these tumors is still unknown.

The results of present study revealed strong positive CAIX expression in major and minor PA with statistical difference between two groups (p =0.01). Minor PA showed the highest percentage of positive cells (88.24%). These results suggest that CA IX may influence the growth capacity of these tumors. This finding comes in accordance with the results of previous study performed by Ivanov et al.[19]who reported that CAIX was expressed in all PA cases. Furthermore, this finding comes in accordance with studies in other tumor such as Vasconcelos et al.[20] who reported that CAIX was expressed in most of benign odontogenic lesions.

To our knowledge this is the first comparative analysis of the immunohistochemical expression of GLUT1 and CAIX in major and minor PA.

In conclusion, the results of the present study may indicate a higher cellular metabolism and proliferative potential in minor PAs and a high immunoreactivity of both antibodies may predict a risk of rapid proliferation, invasion, and possibility of malignant transformation in PA, the matter that requires more attention to this tumor.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

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Clinical Study for Testosterone, Progesterone and Oxidative Stress During Phases of Menstrual Cycle in Women with Bronchial Asthma

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Abstract

This study aims to evaluate the hormones (testosterone (T) and progesterone (P)) and oxidative stress malondialdehyde (MDA), ceruloplasmin (CP) and transferrin (Tf) during Phases of menstrual cycle (follicular and luteal phase) in females with asthmatic. Included (70) women patients with bronchial asthma without taking contraceptive pills aged (14-45 years). Included (70) women as a control group supposed healthy without taking contraceptive pills with the same age in this study. The results showed a significant decline in levels of the Progesterone (P) and Testosterone (T) and significantly higher in levels of the (MDA) and (CP) in all patients in both follicular phase as well in the luteal phase in compared with control group in the follicular and luteal phase respectively (P≤0.05).We did not notice any significant difference in concentration of serum TF in all patients in both follicular phase as well in the luteal phase in comparison with control group in the follicular phase and luteal phase respectively (P≤0.05).Showed serum levels of Testosterone and Progesterone significantly higher in all patients in the luteal phase when comparison with all patients in the follicular phase (P≤0.05). We did not notice any significant difference in (MDA, CP and TF) levels in all patients in the luteal phase when comparison with all patients in the follicular phase (P≤0.05).

Keywords: *Asthma, menstrual cycle, Testosterone, Progesterone, Lipid peroxidation, Ceruloplasmin, transferrin.*

Introduction

Bronchial asthma is a common persistent inflammatory disease of airways, which leads to variable or even persistent airflow limitation. The essential symptoms are chest tightness,persistent cough, wheezing and dyspnoea. The prevalence of bronchial asthma in humans varies around the world affecting 1 to 18% of any investigated population [1]. Women are more often affected by asthma. The mechanisms underlying the gender differences in asthma prevalence are still under investigation but refer mostly to hormonal differences and differences in lung capacity [2].

The spread and severity of bronchial asthma are often linked with moments are necessary for the reproductive life of a female. As a result, it has been speculated that the changes hormonal in the menstrual could play a vital in the pathophysiology of bronchial asthma, leading to worsening of disease severity. Women's seem to experience an increase of bronchial asthma symptoms through the menstrual phases of or premenstrual[3].

A response to the gonadotropins, sex hormones will be secreted testosterone, Progesterone, andestradiol is excreted and, thus, feedback on the level of the pituitary and hypothalamusto control natural reproductive mission[4]. Progesterone hormone is produce to a lesser extent in the placenta through the pregnancy and the adrenal glands. Thus, cyclical hormone exposure she started at menstruation and ends at menopause occurs monthly both differentiation and growth are regulated through specialized tissue within the reproductive system and breast tissue[5]. Testosterone is also produced, to a smaller degree, in the ovaries and adrenal cortex in women. The central nervous system stimulates the hypothalamus to begin testosterone production, which suggests a strong link between the nervous and endocrine systems[6].

Oxidative stress is as a disorder in equilibrium between (ROS), freeradicals (FR_s), and endogenous

antioxidant defencemechanisms [7], or more simply, it is a disturbance in the equilibriumbetween oxidant-antioxidant states, favouring the oxidant environment[8]. **Oxidative stress results because of an imbalance between neutralization and the formation of** ROS/ RNS**. Or on the other hand, oxidative stress can arise when cells are unable to destroy the overabundance of free radicals resulting.[9].**

Malondialdehyde is appreciatedto impair lots of physiological mechanisms in the human body during its ability to react with molecules, for example, proteins and DNA. MDA is used as a biomarker in an organism to measure the level of oxidative stress.[10].

Ceruloplasmin (Cp) is one of the main proteins taking part in copper metabolism by distributing it in the human body. It is responsible for carrying more than 95% of copper in blood serum[11]. Transferrin a glycosylated Fe^{3+} binding protein, which is found in blood plasma, lymph, and other body fluids and it is synthesized in the liver, central nervous system, testes, ovaries, spleen, mammary glands, and kidneys.

Materials and Method

This study was conducted at "AL Hussein Teaching Hospital in Dhi-Qar", especially, in respiratory counselling, Biochemistry Laboratory at the College .of Science, University of Dhi-Qar at the period between 1/9/2017 to 1/6/2018.

The study included (140) subjects, (70) controls and (70) patients of women only. It is notable that the smokers were excluded.

The controls and patients were divided into two groups:

1. **Control group:** Included (70) supposed healthy subjects of women without taking contraceptive pills aged (14-45 years).
2. **Patient group:** Included (70) patients with bronchial asthma of women without taking contraceptive pills aged (14-45 years).

Blood Samples Collection: About 8mL of blood samples from bronchial asthma controls and patients two phases. The first sample was taken from the females in the follicular phase and the second sample was taken from the same females in the luteal phase. This applies to all patients and controls. The serum was separated immediately in order to allow clotting at room temperature. The blood was centrifuged at 3000rpm for 10 minutes and stored in plain pipes at (-20ºC) until used or immediately analysed.

Serum Hormones (Progesterone and Testosterone): Serum progesterone (P4) and Testosterone concentrations are determinedby enzyme-linked through enzyme linked fluorescence test using the Mini-VIDAS Automatic immunofluorescence assay system (bioMerieux, Marcy letoile, Lyon, France.

Measured of Serum Malondialdehyde (MDA): The level of serum malondialdehyde (MDA)was measured spectrophotometrically through the method of Muslih *et al*[12]. It concentrations were calculated using the extinction coefficient of MDA (εMDA) equivalent (0.156 x18 nmol/ml).

Measured of Serum Ceruloplasmin (CP): Serum Cp concentration was determined through the method of Menden *et al*[13] which using the extinction coefficient of ceruloplasmin (εCp) equivalent (0.68) to calculate its concentration.

Measured of Serum Transferrin (Tf): The Serum Tf concentration was measuredthrough colorimetric method Burtis *et al*[14]. Where excess iron is added to the saturated serum the transferrin. Unregulated iron has been accelerated with basic magnesium carbonate. The iron in the supernatant is determined by centrifugation. Where the concentration of residual iron is tested and the result expressed as (Total Iron Binding Capacity). Where Tf concentration is calculated for the following equation.

(Serum Tf (g/L) = TIBC (μmol/L)/25.1)[15]

Statistical Analysis: Statistical analysis was done using the software [SPSS] the "results were expressed" as mean ± SD with LSD. Way analysis of variance [ANOVA] test was used to compare parameters different studied groups. A"*P* values ≤ 0.05" was considered statistically significant".

Result and Discussion

General Comparison for all Studied Parameters:

Serum Testosterone Concentration: The mean of serum testosterone level in the patients groups which was found to be significantly lower (P≤0.05) than that control group in both two phases as in the table (1).

That certain systemic chronic inflammatory disorders and a few pulmonary diseases affect testosterone (T) biosynthesis[16]. Testosterone and its metabolites contribute to the physiological balance between autoimmunity and protective immunity by maintaining regulatory T cells. Testosterone has immunosuppressive effects and is probably also protective against immuno-inflammatory processes that trigger asthma[17].

Table 1: Serum Testosterone levels in control and patient groups in the menstrual phases

Testosterone (ng/mL) Mean±SD			
Group	**No.**	**Follicular**	**Luteal**
Control	70	0.82±0.06A	0.90±0.15A
Patient	70	0.50±0.09B	0.71±0.10B
L.S.D		0.03	0.15

Note: "Each value represents mean ± S.D values with non identical superscript (A, B or C... etc.) were considered as significant differences (P≤ 0.05)."

No: Number of subjects., **SD:** Standard deviation., **LSD:** Least Significant Difference.

Serum Progesterone Concentration: The mean of serum progesterone level in the patients groups which was found to be significantly lower (P≤0.05) than that control group in both two phases as in the table (2).

Women report more pronounced symptoms, which seem to change with the various life stages such as menstruation, pregnancy and menopause and in association with female sex hormone levels[2]. These hormones cause differences in the clinical manifestation of asthma. Thus, oestrogen promotes bronchial hyperreactivity, and both FEV1 and exhaled nitric oxide (NO) show a cycle-dependent course. Twenty to forty percent (20-40%) of premenopausal women suffer from pre- or peri-menstrual asthma (PMA) and experience an exacerbation in the week preceding menstruation, based on increased inflammation in the bronchi[1].

Table 2: Serum Progesterone levels in control and patients groups in the menstrual phases

Progesterone (ng/mL) Mean±SD			
Group	**No.**	**Follicular**	**Luteal**
Control	70	0.57±0.07A	8.80±1.11A
Patient	70	0.38±0.06B	6.65±0.77B
L.S.D		0.02	0.32

Serum Malondialdehyde Concentration: Table (3) shows significantly higher in concentrations of serum malondialdehyde (MDA) in all patients in both follicular phase as well in the luteal phase in comparison with a control group in the follicular phase and luteal phase respectively (P≤0. 05).

There is a growing lot of evidence indicating the oxidative stress in the pathogenesis of bronchial asthma. In allergic inflammation exist overproduction of (ROS). Reactive oxygen species may induce symptoms characteristic of bronchial asthma: bronchial hyperresponsiveness, bronchospasm, mucus hypersecretion, beta-adrenergic receptor, dysfunction and activation of an arachidonic acid cascade, bronchial epithelial damage and increased permeability[18].

Increasing the arachidonic acid in airway inflammatory cells in asthma patients. This arachidonic acid may lead to oxidation produce an end product of (LPO). So MDA is increased in bronchial asthma due to generation by decomposition of arachidonic acid and larger PUFA through enzymatic and nonenzymatic processes[19].

Table 3: Serum MDA levels in control and patients groups in the menstrual phases

MDA (µmol/L) Mean±SD			
Group	**No.**	**Follicular**	**Luteal**
Control	70	2.07±0.29B	2.26±0.33B
Patient	70	3.14±0.53A	3.06±0.49A
L.S.D		0.14	0.14

Serum Antioxidant Concentrations: Table (4) shows significantly higher in the concentration of serum Ceruloplasmin (CP) in all patients in both follicular phase as well in the luteal phase when comparison with a control group in the follicular phase and luteal phase respectively (p≤0. 05).

The same Table shows no a significant difference in concentration of serum Tf in all patients in both follicular phase as well in the luteal phase incomparison with a control group in the follicular phase and luteal phase respectively (P≤0. 05).

Ceruloplasmin is known for the preservation of considerable peroxidase activity and capable of suppression superoxide radicals. This is in charge of restricting the damage caused through these radicals[20].

Note that the elevation of CP is part of the increase in iron metabolism proteins and part of bronchial asthma and chronic obstructive pulmonary disease,

probably as an anti inflammatory response to the airway inflammation which characterizes these conditions[21]. Ceruloplasmin can be used as non-invasive biomarkers for evaluation of chronic airway inflammation and can be useful in determining the severity of asthma[22].

Table 4: Serum antioxidant levels in control and patients groups in the menstrual phases

		CP (g/L) Mean±SD		TF (g/L) Mean±SD	
Group	**No.**	**Follicular**	**Luteal**	**Follicular**	**Luteal**
Control	70	2.26 ± 0.37^{B}	2.21 ± 0.35^{B}	4.08 ± 0.76^{A}	3.96 ± 0.71^{A}
Patient	70	3.62 ± 0.71^{A}	3.55 ± 0.66^{A}	4.09 ± 0.85^{A}	3.97 ± 0.78^{A}
L.S.D		0.18	0.17	0.31	0.29

Comparison for all Studied Parameters in patients According to the follicular and luteal phase:

Serum Hormones Concentrations: Table (5) shows significantly higher in concentrations of Testosterone and Progesterone in all patients in the luteal phase when comparison with all patients in the follicular phase (P≤0. 05).

Women of reproductive age face periodic changes in concentrations the sex hormones. Through the follicular phase of menstrual cycleremain testosterone hormone level and progesterone hormone level low, while (FSH) hormone and (LH) atthe highest level. Finally, by the luteal phase, (FSH) level and (LH) level are low, While the level of each of the following hormones 17-β-estradiol, testosterone, and progesterone are moderately high[23].

Patients who suffer from premenstrual asthma (PMA) are frequently affected by the periodic changes in serum levels for progesterone hormone.[24]Indicate earlier studies that an increase in the progesterone hormone secretion possibility it has a role for hyperventilation in the luteal phase[25].

Table 5: Levels serum Testosterone and Progesterone during the follicular and luteal phase in patients.

Menstrual Phase	**No.**	**Testosterone (ng/mL) Mean±SD**	**Progesterone (ng/mL) Mean±SD**
Follicular	70	0.50 ± 0.09^{B}	0.38 ± 0.06^{B}
Luteal	70	0.71 ± 0.10^{A}	6.65 ± 0.77^{A}
L.S.D		0.03	0.19

Serum Oxidative Stress Concentrations: Table (6) shows no significant difference in concentrations of serum (MDA, CP and TF) in all patients in luteal phase in comparison with all patients in follicular phase (P≤0.05).

Sex hormones work on the production of reactive oxygen species (ROS) via neutrophils which may have immune functions, and these reactive oxygen species (ROS) are reported to be involved in the occurrence of ovulation in the ovaries[26]. After ovulationthe corpus luteum is created and progesterone hormone is secreted, a process of functional corpus luteum regression begins if pregnancy is not established. Reactive oxygen species (ROS) are also thought to play a role important in promoting this functional corpus luteum regression[26] and reactive oxygen species (ROS) production may be regarded as important in maintaining homeostasis in ovarian function[27].

Table 6: Levels serum Oxidative Stressduring the follicular and luteal phase in patients.

Menstrual phase	**No.**	**MDA (µmol/L) Mean±SD**	**CP (g/L) Mean±SD**	**TF (g/L) Mean±SD**
Follicular	70	3.14 ± 0.53^{A}	3.62 ± 0.71^{A}	4.09 ± 0.85^{A}
Luteal	70	3.06 ± 0.49^{A}	3.55 ± 0.66^{A}	3.97 ± 0.78^{A}
L.S.D		0.16	0.20	0.29

Conclusion

From the data in this study we can conclude the following points: Bronchial asthma decreases the levels of both testosterone and progesterone. Lipid peroxidation associates with bronchial asthma. Disorder the antioxidant system in patients with bronchial asthma, according to the levels of (ceruloplasmin and transferrin). Phases of menstrual cycle have effect on (testosterone, progesterone).

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors have no conflict of interest.

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Detection of Rota Virus by Rapid Test in Comparison with Enzyme Linked Immunoassay in Acute Diarrhea Children in Babylon Province

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Abstract

Globally, human rotavirus is considered as a major etiologic agent of acquired diarrhea which infect young kids as well as infants. For the purpose of efficient treatment, early diagnosis is of high importance. Group-A Rotavirus are in responsible for serious watery diarrhea in young kids. Rapid analysis of the Rotavirus associated diarrhea can prevent inappropriate supervision of antibiotics and help in stopping the pass on of multi- drug resistance. Rotavirus antigen is discovered by ELISA and with one step rapid antigen test showed an occurrence of 23% using ELISA and 22.5% using Rapid test respectively. Fast showed a tenderness of 96.97% and specificity of 100% in comparison to ELISA. The Rotavirus infection was maximum in age group of one years to two years (60.86%) in male and in addition tofemale (39.13%). Throughout the winter, the infections was at its highest levels, also it has been appeared with triad of diarrhea, fever and vomiting. Severe dehydration and watery diarrhea has been the main cases of this infection.

Keywords: *ELISA, Group A Rotavirus, Immunochromatography, Watery diarrhea.*

Introduction

Extreme diarrheal disease is a significant public health problem leading to notable rate of death and morbidity in advanced and emerging nations such as India. Globally, the infection of Rota virus is considered as the third most widespread reason of severe diarrhea in young kids[1]. The vast majority of kids experienced the infection of Rota virus in the course of time when they are five years of age. Approximately that Rota Virus infection annually result in 111 million episodes of gastroenteritis which requirescare at home, five million clinicvisit, 1 millionhospital admission and about 600 mortality rates in kids less than five years old throughout the world[2]. Presently there are seven Rota virus groups seen to infect the humans, among them the most dominant is group A [3]. WHO estimated that diarrhea is in charge of 18% deaths among children less than five years of time [4]. Every year, there are some seasonal peaks of diarrhea in Bangladesh and ICDDR, B alone has to treat more than 100,000 patients a year[5]. The data on clinical characteristics and treatment outcome of rotavirus diarrhea are likely to be helpful for the medical professionals and health care providers working at the grass root levels who have the tendency to refer any acute watery diarrhea with or without vomiting to other secondary/tertiary level hospital for better management[6]. This study was intended to explore the clinical severity, nature of disease and to observe the treatment outcome of both Rota and non-rotavirus diarrhea in children of Bangladesh the justification of such a huge referral of diarrhea cases to higher centers[7]. One of the main causes of illness and mortality in Iraqi kids is Diarrhea. Nevertheless, some researchers in Iraq reported various degrees of infectivity with Rotavirus in the governorates of Iraq. Rotavirus is accountable 30 percent of acute diarrhea in hospitalized kids in Baghdad, 18.5 percent in Tikrit, 24 percent in Basra, 37 percent in Erbil[8-10]. So, the presented research has been conducted for estimating the spread of Rotavirus in the governorate of Babylon through utilizing 3 commercial diagnostic kits, followed by a study to detect the rotavirus genotyping circulating between populations through the use of RT-PCR molecular diagnostic kit[11].

Materials and Method

The presented study has been carried out from January 2018 to October 2018. 200 sample of stool was collected in sterilized box from children have diarrhea

and transport to microbiology section. Samples stored at 4ċ and tested within twenty four hours of collection. Forty six samples was positive for rotavirus antigen. ELISA test for human Rotavirus Antigen kit (USA) can be defined as a qualitative determination of the Rotavirus antigen in feces. The above mentioned test has been implemented in accordance with the specifications of the manufacturer. The one step test device for the Rotavirus (Acon, Germany) can be considered as rapid chromatographic immunoassay for qualitative detection of Rotavirus in the specimens of human feces for the purpose of aiding the process of diagnosing the infection of rotavirus.

Results and Discussion

Positive Rota virus antigen has been identified in 46 from 200 samples 23 percentvia ELISA, and 22 percent via rapid test table (1 and 2). The percentage of females in Rota virus positive patients have been 39,13 percent, while the percentage of males have been 60.86 percent. Most the of Rotavirus positive cases have been spotted in kids younger than six years of age and kids in the age group of (1-2) years indicating the highest percentage of infectivity 19.5%, whereas the age group (4-5) years revealing the lower percent of rotavirus infection 6.52%. While the age (5-6) years do not show any rotavirus infection the percentage was 00.0% table (3). Rapid test indicated a specificity of 100 percent and sensitivity of 96.97 percent as shown in table (4). ELISA is clearly the most sensitive method for detection of rota viruses and is perfect for screening large number of fecal specimens in a single sitting. The infection was maximum during the winter months as show in table (5).

Worldwide, there has been a decrease in the mortalities related to diarrhea, mostly due to the improved therapeutic interventions in addition to the provision of safe water drinking, enhancement of sanitation and popularization of main activities related to healthcare[12]. Many studies across the world indicated that the Rotavirus is considered as a cause of diarrhea in kids both in advanced and emergingnations[13]. We conducted this study to estimate the diarrheal disease burden due to rotavirus infection amongst under five years-old children with diarrhea in Bangladesh[14]. The infections rotavirus was identified to follow seasonal pattern in our region, in which it is related with drier atmosphere and cooler temperatures. The seasonal distribution related to this infection during cooler months was indicated before for temperate regions[15]. Like our study, significant association of nausea and vomiting with rotavirus diarrhea is also evident in some other studies[16-17]. Many studies across the world have indicated the importance of Rotavirus as a cause of diarrhea in kinds both in advanced and emerging nations[18-21].

Table 1: Age & Sex Distribution of Diarrhea Cases

Age	Male	Female	%	Total	%	%
1-2 years	39	32	16.00%	71	35.5%	19.5%
2-3years	31	25	12.5%	56	28.00%	15.5%
3-4 years	19	15	7.5%	34	17.00%	9.5%
4-5 years	16	7	3.5%	23	11.5%	8.00%
5-6 years	10	6	3.00%	16	8.00%	5.00%
Total	115	85	42.5%	200	100.00%	57.5%

Table 2: Diarrhea in various Age Groups

Age	Total No. of cases	ELISA No. (+/-)	Rapid Test No. (+/-)
1-2 years	71	19/52	18/53
2-3years	56	14/42	14/42
3-4 years	34	8/26	8/26
4-5 years	23	5/18	5/18
5-6 years	16	0/16	0/6
Total	200	46/154 23.00%	45/155 22.5%

Table 3: Age & Sex Distribution of Rotavirus Positive Cases by ELISA

Age	Male	%	Female	%	Total	%
1-2 years	11	23.91%	8	17.39%	19	41.3%
2-3years	9	19.56%	5	10.86%	14	30.42%
3-4 years	5	10.86%	3	6.52%	8	17.38%
4-5 years	3	6.52%	2	4.34%	5	10.86%
5-6 years	0	0.00%	0	0.00%	0	0.00%
Total	28	60.86%	18	39.13%	46	100.00%

Table 4: Comparison of Rapid Test with ELISA

Sensitivity	96.95%
Specificity	100.00%
Positive Predictive Value	100.00%
Negative Predictive Value	99.17%
Accuracy	99.33%

Table 5: Monthly Distribution of Rotavirus Positive Cases

Number of Rotavirus Positive Cases by ELISA	Number of cases	Months
8	40	Jan
6	30	Feb
8	29	Mar
5	24	April
4	21	May
4	14	June
4	11	July
3	11	Aug
1	10	Sep
1	10	Oct
46	200	Total

Conclusions

This study raveled that the prevalence of rotavirus infection among children under the age of five is high. Also, the study show that the male have higher rotavirus infection than female. The findings also provide useful information to the existing national program for the fight against diarrhea and to all other actors developing targeted interventions for preventing childhood diarrhea. The rotavirus infection occurin winter more than in hotter month.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

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The Relationship of the Genotype Effect to FGFBP1 Gene in Some Productive Traits in Broiler Type Ross 308

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Abstract

Total 150 birds of the Ross 308 type were raised in the fields of the Faculty of Agriculture/Anbar University. The breeding period lasted for 42 days. At the end of the breeding period, 60 birds were randomly selected. The blood samples of the birds were individually taken through the jugular vein. The genetic analysis was carried out in the laboratories of the Faculty of Biotechnology/University of Nahrain. The aim was to separate the genetic material and thus determine the genotype of the FGFBP1 gene. The study examined the diagnosis of genetic markers that are related to important characteristics of the carcass and the relationship between the study genes, the weights of the living birds, the measurements of the birds before the slaughter, and the characteristics of the carcass (carcass weight, net weight of the carcass and the percentage of carcasses, Abdominal fat in the carcass and internal weights of the intestines that include liver, heart and legumes) for the Ross 308 meat breeds are under study, thus identifying the frequency of the genotypes and replicating the gene to obtain the best possibility to improve the economic characteristics of the chicken. The FGFBP1 gene was identified in the current study birds based on the packages that resulted from the DNA transfer of the individuals after the electrical transfer was carried out using the PCR-RFLP technique and the restriction enzyme Pst 1. The gene fragments (AA, AB, BB) were identified for FGFBP1 gene and were replicates of the genotypes (30.00, 48.33, 21.67) respectively. The replication of gene A 0.54 and gene B 0.46 exceeded the genetic makeup of the gene FGFBP1 The rest of the genotypes in the vivo characteristics of the first week and the rate of increase in weight For weekly in the first week and the amount of feed consumed in the week, second, third and feed conversion efficiency in the first week, the fourth week and the length of the chest, chest width and depth of the chest in the first week of the period of education and carcass weight and net carcass and the weight of the liver, heart and gizzard exceed significantly (0.05> P). FGFBP1 mutations were identified after sequencing of mutations of 65% for each and 35% for the Ross 308 meat samples.

Keywords: *FGFBP1, Sequencing, RFLP PCR. Broiler.*

Introduction

The increase in the world population has led to increased demand for animal products and for purchasing it. In a way, the poultry industry helps to improve the productivity rates mainly through the use of genetic improvement programs [1]. The growing global demand for poultry meat has put the pressure on the breeders to increase growth and muscle mass while reducing abdominal fat. Currently, chickens are marketed in the same market as the previous age with a double body weight when it is compared to the last 50 years[2,3].

Genetically modified birds can be identified for carcass traits using genetic markers that bind to the genes that are responsible for carcass traits under study. The development of molecular genetics has led to the emergence of new tools to identify the genetic regions and salons involved in economically significant traits [4]. Several sites have been assigned quantitative traits location (QTL) for the performance of carcass recipes in different chromosomes in a study by [5,6]. (QTL) was assigned as a percentage between Drumstick and Thigh in the chromosome region 4, as this region is specific to the growth factor genes[7]. The QTL study also nominated two associated genes with specific traits (FGFBP1), since FGFBP1 is the link between fibroblast growth factors (FGFs) such as FGF1 and FGF2 [8,9]. Studies indicate that the protein binding of the growth factor of muscle cells FGFBP1 is able to transfer FGF2 from extra cellular filling as well as to improve the biological activities of

FGF1[10,11]. In previous studies, FGFBP1 was associated with the development of fetal muscle growth in broiler chicken embryos and contributed to the development of muscle mass of broiler chickens [12]. This study aimed to identify the multiple forms of FGFBP1, as well as the correlation between a polymorphism (SNP) with carcass traits, muscle development, and meat quality in the chicken groups tested.

Materials and Method

150 birds of commercial broiler chickens were raised Ross 308 in the poultry field of the Faculty of Agriculture/Anbar University, from 20/9/2017 to 2/11/2017. In a way the birds were breed in battery system, each battery consists of four cages have meters and feeders. Then, the birds were split to cages, for each cage 10 birds and the weight of birds is taken every week. Blood samples were collected from the jugular vein in the neck randomly for 60 male birds and 5 ml females. The samples were placed in test tubes containing K2 EDTA. These samples were kept in a chilled box and then transferred to freezing under 20°C. The blood samples were collected from the Faculty of Biological Agriculture/Al-Nahrain University/King Abdulaziz University for Science and Technology (Heredity).

Table 1: Sequence of primers used in the study

Name gene	Oligo nucleotides	Tm C°	Product size	Sequence (5'-3')	Ref.
FGFBP1	Forward Primer	60	715	GCTGTGAAAGGC AGAAGGAG	Felicio et.al, 2013
	Reverse Primer	-	-	TTGCTGAGATCG GACTGTTG	Felicio et.al, 2013

Results and Discussion

DNA extraction: Figure (1) shows the results obtained from the transfer of DNA samples using the acarose gel, which contains the dye of the aldehyde bromide.



Figure 1: For DNA samples extracted from Ross 308

Gene FGFBP1: The FGFBP1 gene was amplified using the PCR technique, in which several PCRs, Forward and Revers were used from each gene and isolated DNA samples. The PCR was determined according to the materials and Method of work. The multiplication samples were then injected by injecting 7µL from each sample and using 4 µL of the size pieces (100-1500) in the 2% karose gel. The voltages were measured at 100 volts for 10 minutes and the voltages were then reduced to 80 volts for an hour and a half. To view the output of the relay to ensure the success of the extraction process and to obtain the size of the required parts as shown in Figure (2).

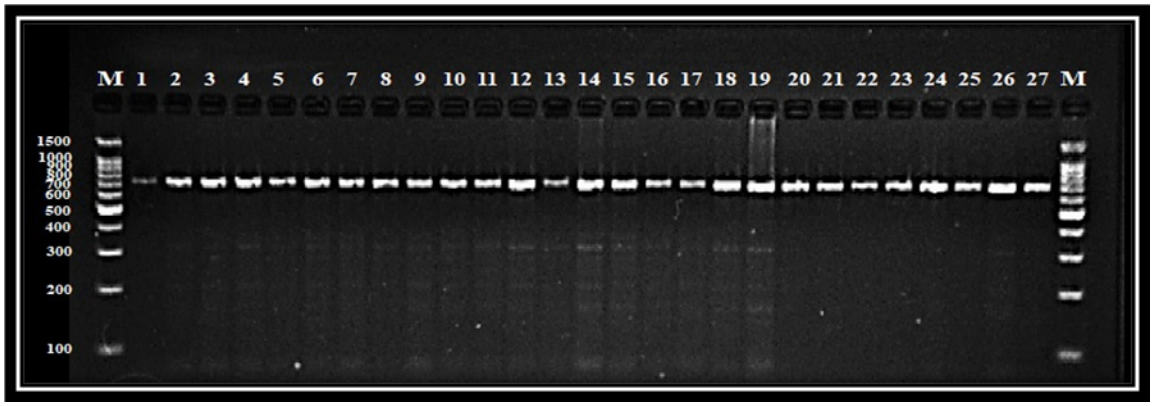


Figure 2: Product of the PCR technique for FGFBP1 gene after it was placed in the alakaroz gel

The genotypes of the Ross 308 meat broiler were selected for FGFBP1 using RFLP and Pst 1, according to the separation of the materials and Method of work. The multiplication samples were carried out by injecting μL8 from each sample and using 4 μL of pieces of size information (100-1500) In a 2% concentration of alcohols. The voltages were measured at 100 volts for 10 minutes and the voltages were then reduced to 80 volts for an hour and a half. The output was filmed to ensure that the extract was successful and to obtain the required cutting size as shown in Figure 3.

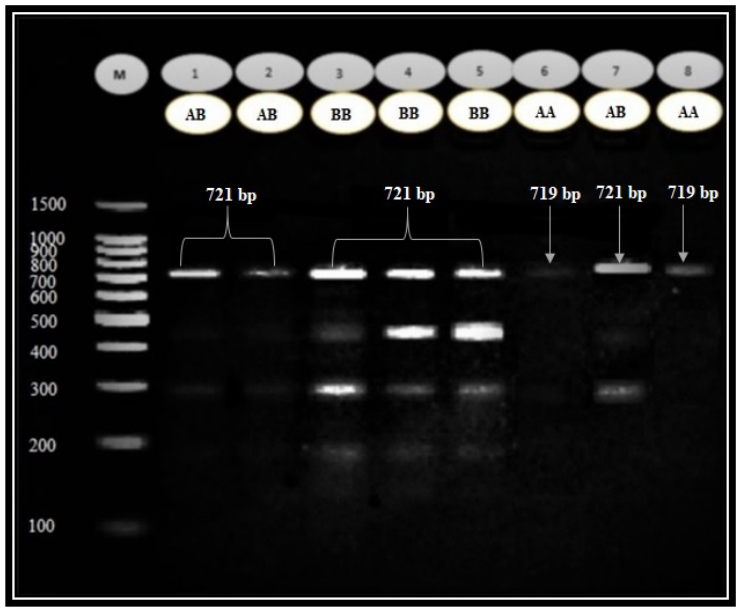


Figure 3: The product of digestion of the FGFBP1 gene using the restriction enzyme Pst 1 after the exposure of the dyed alkaloids to the amygdala bromide to the ultraviolet ray represents the column M Particles Size Information (100-1500) Base pair, column (6, 8) (3, 4, 5) are similar to the alleles and symbolized by BB, and finally column (1, 2, 7) are similar to alleles and are symbolized by AB.

Distribution of FGFBP1 genes in the genotypes of chicken meat samples Type: Ross 308 Table 2 shows the numbers and the percentages of the genotypes of the FGFBP1 gene as the percentage distribution of the genotypes (AA, AB, BB) is 30.00, 48.33, 21.67. This superiority shows that the mean values of gene replication should be taken into consideration if the selection is to be made through the abundance of FGFBP1 genes, followed by individuals with a genetic makeup of AA and then BB. The latter is low in value for low The FGFBP1 gene in this structure.

Table 2: Distribution of number and percentages of genotypes of FGFBP1 for Ross 308 meat chicken samples

% percentage	The number	Genotype
30.00	18	AA
48.33	29	AB
21.67	13	BB
%100	60	Total
Non-Significant		Significant level

The Relationship of the Genotype with The weight of the carcass to broiler type Ross 308: Table (3) explains the results of the present experiment for the rate of the weight of the carcasses and the relationship of the genotypes with FGFBP1. There were no significant differences in the characteristics shown in the table due to the relative stability between the weights of the traits. These results were consistent with [12,13], when they conducted an experiment on the quality of the meat and its genetic relationship with the muscle characteristics of the line. The results showed that there was no significant difference in the weight of the carcass.

Table 3: Meanings ± The standard error of the weight characteristics of the carcasses of the genotype of the FGFBP1 gene in the meat breeder Ross 308

Mean ± standard error (gram)							(Genotype)
Neck weight	Back Weight	Brest Weight	wings Weight	Weight of the thigh	The weight of the drummer stick	Percentage of abdominal fat	
± 53.78 3.408	± 424.66 11.20	± 627.56 22.92	± 209.35 5.503	± 245.88 9.36	± 254.16 8.942	± 33.56 1.304	AA
± 55.35 3.148	±457.52 11.58	± 659.39 17.06	±216.52 5.403	± 261.21 8.777	± 258.34 8.132	± 37.44 1.734	AB
± 54.56 4.805	± 426.91 20.49	± 620.62 22.37	± 205.07 8.014	±236.62 10.73	± 242.41 9.326	± 34.64 2.676	BB
NS	NS	NS	NS	NS	NS	NS	Significant level
NS: Not significant							

Gene Structure of FGFBP1 in the Weighting of the Internal Intestines of the Ross 308: Table (4) explains the results of the present trial of the internal weight of the internal organs (liver, heart and Gazard) and the relationship of the genotypes with FGFBP1. There was a significant superiority (0.05> P). The results of this experiment were consistent with [7]. Significant correlations were found for the weight of the liver, heart, and leg of the chicken meat line carcasses through the effects of growth factor genes, including FGFBP1 in the internal parts of the intestine.

Table 4: Meanings ± The standard error for the internal weight of the genotype of the FGFBP1 gene in the meat broiler

Mean ± standard error (gram)			(Genotype)
Refinement ratio	net weight of carcass	carcass of Weight	
81.91 ± 0.541	1915.20± 55.841 b	2337.73 ± 65.80 b	AA
82.02 ± 0.467	2142.20 ± 99.24 a	2587.40 ± 102.08 a	AB
82.64 ± 0.812	1943.31 ± 43.37 b	2368.37 ± 49.67 b	BB
NS	*	*	Significant level
The averages with different letters within the same column vary significantly between them. * (P <0.05), NS: Not significant			

Study of Sequence Analysis of FGFBP1 for Chicken Meat Type Ross 308: `Forty samples of a PCR product were sent to Ross 308 meat chicken samples for the analysis of sequences of the FGFBP1 gene. The sequences were compared with the National Center for Biotechnology Information (NCBI) for the detection of sequences in the FGFBP1 gene. Amplifies part of the FGFBP1 gene by acting on Exon 2 in the gene. The variance obtained for FGFBP1 from the chicken meat samples under study is found in Exon 2 as compared to the National Center for Biotechnology Information (NCBI).

Types of mutations and their effect on the FGFBP1 gene: The differences in the sequences of nitrogen bases indicated the substitution mutations that affect the work of FGFBP1 gene. The type of variations of the types of codes that produce the protein in Ross 308 meat, chickens were identified by using Mega 6 program and as explained in Table 5.

Table 5: The variations in protein production after mutations

Effect on the translation	Type of mutation	The location of the nucleotide	Heterogeneity of amino acid	Type of heterogeneity	Wild style	name of the gene
Missense	substitution	516	Glu - Arg	CAG	CGG	FGFBP1
Missense	substitution	529	Asn - Lys	AAC	AAG	
Nonsense	substitution	535	Tyr – Stop codon	TAT	TAG	

Conclusion

The replication of gene A 0.54 and gene B 0.46 exceeded the genetic makeup of the gene FGFBP1 The rest of the genotypes in the In vivo characteristics of the first week and the rate of increase in weight For weekly in the first week and the amount of feed consumed in the week, second, third and feed conversion efficiency in the first week, the fourth week and the length of the chest, chest width and depth of the chest in the first week of the period of study and carcass weight and net carcass and the weight of the liver, heart and gizzard increased significantly (0.05> P).

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

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Qualitative Remedial Approach by Using Assistive Devices and Tools for Dorsal Dystrophy Assessment in Children at the Age (10-12)

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Abstract

The research goals to prepare Qualitative Remedial Approach by using Assistive Devices and Tools for Dorsal Dystrophy Assessment furthermore to identify the effect of the therapeutic approach in the development of some physical abilities (strength - power range - flexibility) in addition to the identification of the effect of physical abilities elements in dorsal dystrophy assessment. Weassumed that there are statistically significant differences between the pre-test and remote tests in the results of tests and the benefit of the post-test. We also hypothesize that there are statistically significant hypotheses between the development of some physical abilities and the dorsal dystrophy assessment. We conducted a field survey distributed to primary schools for boys and for ages (10-12) years to the center of Muthanna province of the Directorate of Education Muthanna (33) schools. We excluded (9) schools from girls' schools. Therefore, 24 schools were stable. The sample of the study was deliberately selected by researchers in patients with dorsal dystrophy, And to benefit from this research in the development of the bulges, if any,continue to exercise on the devices and tools for the purpose of prevention and prevent the recurrence or aggravation of the situation, with emphasis on safety and safety in practical lessons.

Keywords: *Remedial, Assistive Devices, Dorsal Dystrophy.*

Introduction

The developed countries head for taking care of the individual and his health during the various stages of growth. During doing the exercise various events, activities of life and sports the human is subject to a lot of pressure and burdens that lead to various disabilities and physical malformations, which have a direct impact on the human strength and lack of acquisition of the natural form because of the dorsal distortions distort and hinder movement. The spinal column is a basic pillar in the human body, because it has the characteristics that qualify it to carry the body weight and transport it to the lower limbs and carrying the head and the upper limbs and thorax, as well as the passage of the spinal cord within the vertebral canal within the vertebrae that the most parts exposed to the effort are those that carry the weight of the body and maintain balance in the course of stability and movement. We have been acquainted with many studies and recent researches, which confirm that the causes of deformities of the practice of "wrong habits and malnutrition in early childhood[1], which leads to the possibility of such distortions and lack of interest in the study of physical education to lose its basic components (sports equipment)[2.] All of this has helped to spread the chronic disabilities and deformities in children at high rates and at an early age[3.]

Throughout noting that they are teaching and interested in this important segment of society, which is the childhood that is the most vulnerable to the incidence of deformities of the spine and the emergence of chronic disabilities, which identify and inhibit the development of the child properly and leaving these distortions exacerbate. Due to improper use of the balance of the strength of ligaments, muscles and unsuitable use of body parts in weightlifting, as well as wrong habits, erroneous training, malnutrition and other reasons that increased the rate of deformities at this stage. Which is an obstacle to the introduction of the main community class to primary school students should be studied and identify the reasons.

Materials and Method

The following experimental approach was used to serve as a search for the most accurate results. This method is especially adapted to studies of physical preparation, learning and growth. The experimental approach is one of the Method and process used to study and solve the problem with the discovery of the facts[4].

Research Sample: A field survey was conducted on primary schools for boys and ages (10-12 years) for the center of Al-Muthanna Governorate (33 schools). We excluded (9) school girls' schools, so it settled on (24) schools as the sample was selected deliberately by people with dorsal dystrophy. (12) students and homogeneity and equivalence as in Table (1).

Table 1: Schools Field Survey

No.	Variables	Units	Arithmetic mean	Standard deviation	Bending correlative
1	Elastic spine to front	Cm	4.43	1.397	0.566-
2	Backbone elasticity	Cm	32.46	4.54	0.510-
3	Elastic spine of the left side	Cm	22.00	2.768	0.396-
4	The power of background backgammon	Kg	6.57	1.28	0.22-
5	Strength of abdominal muscles	No.	6.8571	0.69	0.174
6	Strength of back muscles	Second	14.28	1.252	0.740-
7	Strength of abdominal muscles	No.	14.14	1.676	0.309-

Procedures of data collection

Instruments and tools:

The following instruments and tools were used:

1. Dynomater device
2. Electronic stopwatch.
3 Tape measure, to measure the elasticity of the back and lateral spine.
4 Wooden box indicator of positive and negative to measure the flexibility of the front spine of the stand.
5 chalk + pencil + ruler measuring 100 cm.
6 whistle number (1).
7 cords (8) to install the devices prepared.
8 Mat length (12) meters.
9 plastic cards ** number (4) personalities.
10 device Aqla ** height of 2 m and a width of 1.5 m.
11. Using the wall ladder **.
12. Manual calculator for the extraction of statistical results.
13. Camera.
14. Video camera.
15 Computer for the extraction of statistical operations (SPSS)

Measurements and tests used in research:

Physical measurements:

A. **Measuring the degree of deformity of dorsal deformity:** After the diagnosis of the injured students from the specialized doctors, X-rays were taken to the students. The aim was to measure the lateral bending angles of the spine in the chest area. The radiograph was taken from the lateral lying position of the body on the floor and the student was then visualized.

- Recording the degree of deformity by the specialist doctor according to the Newburgh form to diagnose the specific strength of the degrees of those abnormalities according to their severity as shown[5].

Second. Physical tests included:

1. Test the strength of the back muscles using Dynomometer[6]:
    - Objective of the test: Used to measure the strength of the muscles of the back and legs.

Registration: The best attempt is recorded for each laboratory of (2, 3) attempts.

Test the strength of the abdominal muscles:[7]

Sit down from lyingin 10 seconds.

- Purpose of the test: Measure the strength of the abdominal muscles.

- Tools used: Stopwatch - Flat surface - Registration form.
- Performance specifications: The student lies on the back above (flat level) with the opening of his feet by 30 cm with the contact of the palm of the neck from the back and elbows are installed (the colleague installs the two men immediately after hearing the starting signal of the referee), the laboratory to bend the trunk to reach the position of sitting tall and knees Repeat by as many times as possible in 10 seconds.

Recording: The number of times the correct performance in (10) seconds.

2. Test measuring the strength of the back muscles[8]:

- Purpose of the test: Measurement of the time of carrying the muscles back.
- Tools used: Stopwatch - Registration form.

Registration: Recording the time of student stability in the situation to the voltage.

3. Test measure the strength of the abdominal muscles[9]:

Purpose of the test: Measure the skin of the abdominal muscles.

Tools used: Stopwatch - Registration form.

Performance specifications: From the status of the back of the student raise the two men high together to the vertical position to repeat the performance as many times as possible (the colleague fixation of the region of the humerus from the inside)[10.]

Registration: The student records the number of correct attempts made by him.

4. Testing the measurement of the flexibility of the spine from standing [11]:

Purpose of the test: Measure the elasticity of the spine to the front.

Tools used: wooden box height 50 cm ruler measuring 1 m height–registration form.

Performance description: from standing on the box bend the trunk down with the extension of the arms to the bottom and pointing to the measurement procedure to determine the degree at the edge of the fingers after the stability of the situation on that number.

5. **Registration:** The best attempt recorded from (2, 3) attempts.

Test the elasticity of the spine of stand:[12]

Purpose of the test: Measure the elasticity of the backbone.

Instruments used: Measurement tape - Registration form.

6. **Performance description:** From the position of standing in front of the wall with a direct appeal to the chest area where the student pulls the feet back together and then measured the distance between the feet and the wall.

Recording: Recording the distance between the wall and the feet for the best attempt of (2, 3) attempts.

7. **Test the measurement of the flexibility of the spine from standing[13] :**

- Purpose of the test: Measure the elasticity of the spine for both sides (right–left).
- Instruments used: Measurement tape-Registration form.
- Performance description: the position of standing on the wall and arms side of the body, the knees included, measuring the distance between the ground and the tip of the middle finger of the hand at the tilt of the trunk aside to the maximum extent possible and measure distance again and calculate the difference between the two measurements.

Steps to implement the curriculum:

First week: The first week of the curriculum included a one-week teaching unit, three days a week, where the curriculum will be applied on Saturday-Monday-Wednesday. The unit time was 45 minutes. The preparatory section includes (5) minutes and the main section for 25 minutes divided into two sides. I teach for a period of (7) minutes, and my second application (18) minutes. The course includes six stations where the exercises will be performed on the equipment and tools and distributed in a circular manner for 3 minutes per station.

Second, third and fourth week

Number of units: three units per week

Application days: Saturday + Monday + Wednesday

Unit Time: 45 minutes

The course included six stations in which the exercises will be performed on the equipment and tools in a circular manner for (28.45) minutes

Number of courses: 1

The fifth, sixth and seventh week

Number of units: three units per week

Application days: Saturday + Monday + Wednesday

Unit Time: 45 minutes

The course includes six stations where the exercises are performed on the devices and the aids are distributed in a circular manner for 30 minutes.

Number of courses: 1

Week Eight, Nine and Ten

Number of units: three units per week

Application days: Saturday + Monday + Wednesday

Unit Time: 45 minutes Preparatory Section + Master Section + Final Section.

The course included six stations in which the exercise was conducted in a circular manner for 36 minutes.

Number of courses: 1

Week Eleven

Number of units: three units per week

Application days: Saturday + Monday + Wednesday

Unit Time: 45 minutes Preparatory Section + Master Section + Final Section.

The course includes six stations where the exercises are conducted in a circular manner for 30 minutes and apply this week the vocabulary of the approach of the eighth week for the purpose of reaching a state of adaptation to the injured.

Post-tests: From 12/5 to 14/5/2018, we conducted remote tests and observed the sequence of tests and measurements as applied in the pre-tests.

Statistical means:

The SPSS was used to process the data

Results and Discussion

Table 2: The t-test values for the pre-test and post-test of the physical test variables in the dorsal group

Tests / Statisticalmeans	Meas. Unit	F	FA	T Value		Significance of differences
				Accounted	Scheduled	
Flexibility of the spine	Cm	2.57	0.78	8.64	2.447	Morally
Backbone elasticity	Cm	3.00	1.41	5.61	2.447	Morally
Flexibility of the spine of the side	Cm	4.00	1.52	6.92	2.447	Morally
Strength of back muscles	Kg	2.14	0.62	9.04	2.447	Morally
Strength of abdominal muscles	Second	3.14	1.06	7.77	2.447	Morally
Strength of back muscles	Second	2.14	0.69	8.21	2.447	Morally
Durability Abdominal muscles	Second	3.71	0.95	10.33	2.447	Morally

Table 3: The values of the amount of change between the computational circles and the percentage of change (evolution) between the results of the pre and post tests of the dorsal group of the physical variables under study

Tests / Statisticalmeans	Pre-test	Post-test	Variable value	Percentage of variable %
	C	C		
Flexibility of the spine	2.42	7.00	4.58	189.22%
Backbone elasticity	32.42	35.42	3.00	9.25%
Flexibility of the spine of the side	22.00	26.00	4.00	18.18%
Strength of back muscles	6.57	8.71	2.14	32.57%
Strength of abdominal muscles	6.57	10.00	3.42	51.97%
Strength of back muscles	14.28	16.42	2.14	14.98%
Durability Abdominal muscles	14.14	17.85	3.71	26.23%

Table 4: The values of the computational arithmetic and the standard deviations of the pre and remote tests, the t-test value of the corresponding samples and the percentage for measuring the degree of deformity of the dorsal

Tests Statisticalmeans	Pre-test		Posttest		T Value For corresponding samples		Significance of differences	Amount of change	Percentage of the amount of change
Dorsal Dystrophy	3.072	0.189	4.143	0.378	6.608	2.447	Morally	1.071	34.87%

Conclusions

1. The effect of the curriculum prepared under study well in the tribal and remote tests where there was no significant variation in the results of treatment and rehabilitation of those distortions under study.
2. In the light of the results between the tribal and remote tests, the application of the therapeutic exercise on the devices and aids has led to a significant improvement in strength, strength and flexibility (front, back and side) of the spine muscles as well as reducing the degree of deformity of all the injured. That is, the curriculum was in line with those distortions.
3. The rate of development between the results of the tribal and remote tests of the variables under study were effective and in favor of the post-test (dystrophy).

Recommendations

1. We recommend to generalize the schools of the country using the physical assessment of students at the beginning of each academic year to find out the nature of the bodies of students and to benefit from this research in the development of bulges, if any.
2. Continue to perform exercises on equipment and tools for the purpose of prevention and prevent the recurrence or aggravation of the situation ?.
3. Emphasize the safety and safety Method in the practical lessons for school students and take care of the correct techniques during the exercise on these devices and tools and comply with medical instructions regarding cases of deformity in order to reduce complications in the chronic stages.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

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Evaluation of Hepatoprotective Activities of Pomegranate Crude Extract in Steatosis Induced Obese Mice

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Abstract

The current study is aimed to reconnoiter the effective role of Pomegranate Crude Extract (PCE) in the liver tissues of castrated male mice, for this 45 male Albino mice [4 weeks] aged, were distributed in to 3 groups N=15 for each group. From a period February to May 2018. The results showed there were histological variations were detected in the liver of induced castrated mice demonstrated by the form of disturbed hepatic structures, reduction in sinusoids, cytoplasmic vacuolation in hepatocytes, accumulation of lipid [microvesicular steatosis & macrovesicular steatosis], these variations related with inflammatory of lymphocytes in addition, all these histological changes were less pronounced in the group that treated with (PCE), this study was concluded that [PCE] has marked improving effects against liver steatosis complications. For this reason, we recommend that you use the pomegranate fruit or its juice in the (daily food table) against the increase in hyperlipidemia.

Keywords: *Castration, Pomegranate Crude Extract, Mice, Steatosis.*

Introduction

It has been noted through previous research that with progress in age men there is a diminished in the levels of testosterone levels and this decline has others complications represented by [obesity, hyperlipedmia & insulin resistance][(1)], testosterone deficiency which donate the progress of non-alcoholic fatty liver disease [NAFLD][(2)], currents tudies have proved that most men who have a decrease in the levels of testosterone are more susceptible to steatosis[(3)]. In addition, other studies done on rats suffering from the reduction of testosterone more prone to the occurrence of fatty degeneration in the liver [(4)]. The incidence to increase the blood cholesterol and triglycerides caused by the lack of testosterone has an impact in Increasing the incidence of hepatic degenerative fatty disease[(5)]. Based on your guide, different animals, such as rodents, were used to confirm the effect of testosterone deficiency on [NAFLD][(6)]. Large animals were also used for this purpose, such as pigs, because the similarity with human physiologic system[(7)]. All of these studies conducted that the increase the levels of cholesterol and triglycerides lead to obesity and hyperlipidemia[(8)]. [Punicagranatum L.], known as the pomegranate fruit, one of the types of fruits that grow in the tropical regions, which has been used in the treatment of many diseases within ancientnations[(9)]. Pomegranate rich with many polyphenolic compounds like, [anthocynins; hydrolysable tannins; punicalagin, punicalin, and gallic acid][(10)]. It has become increasingly common as a result of its benefit to human health[(11)].

Previous studies confirmed the importance of the use of roots, barks, peel and pomegranate juice to treat many disease like [hemorrhage, diarrhea, helminthiasis and microbial infections][(12)].

Materials and Method

Preparation of PCE: To prepare the extract of [PCE] has included washed the fruits well with water and then was using about 500 gm without separating their peels and seeds, the fruits was cut into small pieces then squeezed using an electrical blender and filtered to eliminate the remainder by filter with Whit man filter paper [2ǂ]. The extract was used after 1 h[(13)].

Experimental Design: Total of (45) male albino mice weighing between [14-20] gm, with age [4 weeks], were obtained from the Faculty of Animal Sciences/ University of Babylon, mice were divided into 3 main groups:

Group I [Control group]: Included 15 mice, preserved on the rodent food pellets for 12 weeks.

Group II [castration group] Included 15 mice, preserved on the rodent food pellets for 12 weeks.

Group III [castrated treated with [PCE] included 15 mice, preserved on the rodent food pellets and were given [PCE] orally by gastric tube at a dose of [20 ml/ kg] body weight daily for 12 weeks[14]. in the end of all experiments, all mice were fasted during the night, and after that, they were anesthetized using ethyl ether [15].

The preparations of routine histological sections: After opening the abdominal cavity .The liver was extracted then it was immediately kept by using formaldehyde with [10%] for 24 hours. The tissues were passed with an ascending of alcohol. This process was followed by the embedding of paraffin. The sectionswere cut to 5 microns then stained with H & E to examine the general histological structures [16].

Results

The liver sections that obtained from Group Ishowed classic of hepatic lobules and can identify the [central vein] at its center, and Each classic hepatic lobule was formed of hepatocytes with one cell thick arranged in plates or cords, they alienated by sinusoids as in (figure 1A). The liver sections that obtained from Group II showed histopathological changes in the form of narrowing in sinusoids, most hepatocytes showed cytoplasmic vacuolation appeared with ballooned in shaped with inflammatory of lymphocytes between hepatocytesas in (figure 1B), in addition [figure 1C] showed multiple small vacuoles (microvesicular steatosis) and other have large vacuoles with peripheral nuclei (macrovesicular steatosis). The liver sections that obtained from Group III showed most of the hepatocytes restoration of their cytoplasmas same as the control as in [figure 1D].

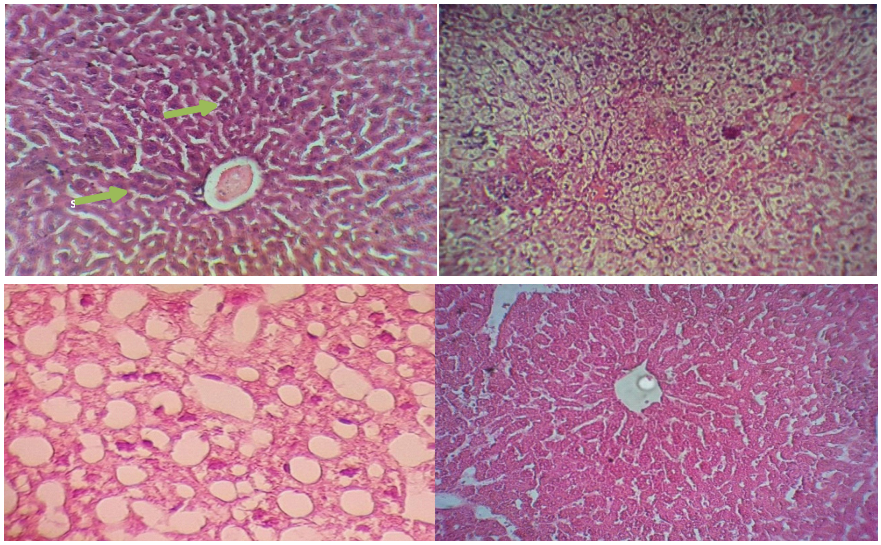


Figure 1: A: Liver sections for G1 group showed a) central vein (C) sinusoids (S) lined with hepatocytes (H) (H & E A 200X) Liver sections from GII Group (B) showed Ballooning degeneration(B), inflammatory of lymphocytes. C: showed micro & macro vesicular steatosis (M) (H & EB 200X, C400X) Liver sections from GIII group showed normal liver architectures (H & EX 200).

Disscusion

The fatty liverdisease define as the accumulation of fat (triglycerides) inside the hepatocytes, which either be alcoholic or non-alcoholic liverdisease, the disease may be converted from simple steatosis to fibrosis or liver cancer and even to liver failure [17].

Testosterone deficiency is the major way to development of hepatic steatosis in castrated animal like male mice. In recent years, naturally occurring anti–inflammatory and anti-oxidant Some of the components of the diet have occupied a distinguished position and great attention by several researches [18].

Livers obtained from GII group showed micro & macrovesicular steatosis, disturbed hepatic structure of the liver which observed in this study thisexplained as to increased oxidation of proteins in hepatic cells and

necrosis abnormalitiesin the hepatocytes that lead to irregularity in the orientation of the hepatocyte plates and disturbing hepatic architecture. Cellular infiltrations between hepatocytes considered the adipocytes in fatty liver are main cells that secrete many immune modulator agents to the pro-inflammatory cytokines, IL-6 and TNF-α with (ROS), that lead to increase fatty liver degeneration[19].

Ballooning degeneration described as microvesicular and macrovesicular steatosis(20), it is explained as abnormalities in the production, conveyance, digestion, and transfer of the fat, with imperfect in the beta-oxidation of fattyacids. Furthermore, cytoplasmic vacuolation may recognized to fatty peroxidation, oxidative stress that damage cell membrane as well as membranes of cell organelles. leading to increase in their permeability and disturbance of the ions concentrations in the cytoplasm and cell organelles(21).

In the present work, it was observed that daily administration of pomegranate crude extract after castration ameliorate the previous changes,this results agreement with(22) who concluded that pomegranate juice protects against steatosis in high fatty diets albino rats also(23) noticed that pomegranate juice had a protective effect against hepatic damage in rats,this effect could be attributed to the radical scavenging antioxidant constituents . The active substances found in the pomegranate of flavonoids, which have an antioxidant effect, have contributed greatly to the process of repair and regeneration the hepatocytes,this is due to the destruction of free radicals or the accelerated repair mechanism of damaged cell membrane (24).Pomegranate juice was also shown to have significantly higher levels of antioxidants in comparison to commonly consumed fruit juices, such as grape, cranberry, grapefruit, or orange juice, Furthermore, pomegranate extract has also been shown to preserve the antioxidant enzymes catalase, glutathione peroxidase, and superoxide dismutase from the effects of toxic chemicals(25).In addition, the ability of pomegranate extract to protect DNA and preventing chromosomal damage in mice was proved(26).

Conclusion

PCE has marked improving effects against liver steatosis complications. For this reason, we recommend that you use the pomegranate fruit or its juice in the (daily food table) against the increase in hyperlipidemia.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

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A Vital Role of Aqueous Extract of the Plant Eugenia Caryophyllata (Clove) in Treatment of Trichomonas Tenax Infection for Patients Attended Dental Clinics, Kufa University

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Abstract

The current study aims determined incident of *Trichomonas Tenax* infection for people by oral diseases compare to healthy people and extent of the connection with operators of sex, age, habitation and educated level using macroscopic and microscopic routes and the vital role of hot aqueous extract *Eugenia Caryophyllata* buds to treatment of this parasite infection come dental clinics/kufa university in Al-Najaf governorate.

This study was carried out at dental clinics/kufa university from July,2017 to May, 2018. Where included the disclosure of the incident to 100 patients with *T.tenax*in mouth of people depending on sex, age, habitation and educated level, diabetes and take insulin and non-take insulin also role of the aqueous extract of hot buds *E.caryophyllata* on patients in inhibition for this parasite where take four groups including treated three groups with concentrations 100, 200 and 300mg/ml respectively of body weight used as Gargling by mouth while fourth group was left with positive control (non-treated). The experiment continued for 10 days at dose is 5 ml daily for all studied groups. Incident of *T.tenax* parasite in people mouth to 100 patients, The total number of the infected 74% where appeared depending on age group 38-47 and rate was 93.75%, proportion of males was 32% while of females was 42%, depending on habitation was 84.4% while educated level was 90.6% while depending on taking insulin while patients who are non-taking insulin males and females reached 35% and 25%respectively, total incidence rate was parasitic 76.92%.

Results showed that hot buds aqueous extract of *E.caryophyllata*predestined on patients in inhibition of the parasite where used four groups were showed the total proportion of healing was 51.38% appeared highest healing rate reached 100% with concentration 300mg/ml gave significantly ($p<0.05$) compared with control groups (non-treated).This study find that giving the hot aqueous extract of *E.caryophyllata* buds as a gargle with concentration 300mg/kg led to parasite killing and complete recovery without side effects of both sexes.

Keyword: *Eugenia Caryophyllata*, *Trichomonas Tenax*, Gargling, Clove, Healing.

Introduction

*Trichomonas tenax*is one Trichomonadidae family members, an anaerobic commensal of human oral cavity whichlives in mouth of the patients with poor oral hygiene and advanced periodontal diseases [(1)]. Live intarter between the teeth gingival margin concerning the gum and tonsillar crypts[(2)]. Transmission through saliva droplets pray, kissing and water drink[(3)].These parasites were correlated with age and sex of the host is protozoa found in human oral cavity from seen in swabs taken from dental pockets on the surface of periodontium[(4)]. Studies show that people with diabetes are more likely to get periodontitis than people without diabetes [(5)]. In Iraq there is study which showed a prevalence of periodontis 8.4 % with *T.tenax* by direct smear [(6)], remarked World Health Organization has indeed recognized medicinal plants as best source for obtaining a variety of synthetic drugs[(7)].

Cloves are aromatic dried flower buds of a tree (*Syzygiumaromaticum*or *Eugenia caryophyllus*) belonging to Laminaceae family, mainly used several parts of the plant such as leaves and buds in cooking, food processing, pharmacy and cosmetics [(8)]. Clove is natural antimicrobial, antiviral, anti-fungal agent, parasitic infestations and toothaches [(9)]. In Iraq a major therapeutic role where using clove in different local

plants to treat patients biological and pharmacological properties [10] .The aqueous extract of clove causes inhibit both acute and chronic inflammation, dental caries and pyorrhea[11]. Showed inhibit the growth of *Trypansomacruzi* parasite which causes Chaga's disease to successfully inhibit *T.cruzi,* with 50% of cells inhibited at 57.5 micrograms/ml [12]. The current study aims to determine the incidence of *T. tenax* infection in people with oral diseases compared to healthy people by using the macroscopic and microscopic Method and the vital role of the hot aqueous extract of *E.caryophyllus*buds in the treatment for patients attended dental clinics/kufa university in Al-Najaf governorate.

Materials and Method

This study was carried outfor period from beginning of July 2017 to May 2018. These study included 100 individuals 74 patients 42 female and 32 male, their age ranged from 18-77 years old with periodontitis patients who attended to dentistry clinics/kufa university and 26 healthy controls, Laboratory examination included Macroscopical examination where watching white layer covering the surface of the teeth, observation of tooth decay, color and texture of the gums and presence of yellow layer in the supporting tissue (tar-tar) [13]. Microscopically examination either by Direct smear method by taking a sample from the mouth of the patient and then placed directly on the slide and examine by the microscope under the small and large forces and used phase contrast microscope which makes easy to see movement oft he parasite,to see movement oft he parasite[14],Or by Wet preparation method the sample taken from the mouth of the patient and moistened with saliva and placed on clean slide without adding as distilled water tomaintain the cellularstructure of the parasite then put cover slide and examined under (400x), establisheda spear-shaped flagellated trophozoite about 5-13µ long with circular movement and each sample stained with Giemsa staining[15]. *E.caryophyllus* buds were obtained from local markets, washed well with water, dried then grinded and diagnosed in the science collage/kufa university, hot aqueous extract of clove blossoms was prepared by taking 10gm of plant powder after mill by an electric mill and then placed in glass beaker capacity 500mL, add 200 ml of boiled distilled water and leave to cool with continuous stirring. The solution is then filtered through layers of gauze and then filter paper. The leaky is then taken to be dried by an electric oven at a temperature (45-50ºC) collected and keep in a clean and dark glass bottle and put in the refrigerator to a degree (4ºC) untilused. Prepare the stock solution where 1gm of extract and solvent in 10ml of distilled water, so have a concentrated solution 100gm/ml and attended the following concentrations 50%,75% and 100% [16]. Effect of hot buds aqueous extract in patients,72 infected randomly divided into 4 groups each group contain 18 patients oral cavity as Gargling.

The patients in group 1 (infected parasite) which not treated give saline as positive controls, The patientsin group 2 (treated parasite) with *E.caryophyllata*buds aqueous extract orally (100mg/ml) from body weight as gargling for 10 consecutive days with dose 15 ml once a day, The patients in group 3 (treated parasite) for the same extract orally (200mg/ml) from body weight as gargling for 10 consecutive days with dose 15ml once a day and group 4 (treated parasite) for the same extract orally 300mg/ml from body weight as gargling for 10 days with dose 15ml once a day.

The statistical analysis was performed using ANOVA ($p<0.05$) for study the correlation between parasites of oral disease among different age and sex.

Results

Table 1: Trichomonas tenax Infection to infected and uninfected patients with Oral diseases

Health status of patients	Examined No.	No. of Infected	(%)
Infected patients	72	57	79.2%
Uninfected patients	28	17	60.7%
Total	**100**	**74**	**74%**

Table 2:Trichomonastenax Infection according to Sex

		Male		Female			
Age (Years)	**Examined No.**	**No. of Infected**	**%**	**No. of Infected**	**%**	**Total No. of infection**	**%**
18-27	18	5	27.8	6	33.3	11	61.11
28-37	20	7	35	8	40	15	75
38-47	32	12	37.5	18	56.25	30	93.75

		Male		Female			
Age (Years)	**Examined No.**	**No. of Infected**	**%**	**No. of Infected**	**%**	**Total No. of infection**	**%**
48-57	12	4	33.3	5	41.7	9	75
58-67	10	3	30	2	20	5	50
68-77	8	1	12.5	3	37.5	4	50
Total	**100**	**32**	**32%**	**42**	**42%**	**74**	**74%**

Table 3: Trichomonastenax Infection according to Habitation

		Countryside		City			
Age (Years)	**Examined No.**	**No .of infection**	**%**	**No. of infection**	**%**	**Total No. of infection**	**%**
18-27	18	7	38.9	5	27.8	12	66.7
28-37	20	9	45	7	35	16	80
38-47	32	16	50	11	34.4	27	84.4
48-57	12	5	41.7	4	33.3	9	75
58-67	10	4	40	2	20	6	60
68-77	8	3	37.5	1	12.5	4	50
Total	**100**	**44**	**44%**	**30**	**30%**	**74**	**74%**

Table 4: Trichomonastenax parasites Infection according to educated level

		Good		Intermediate		Low			
Age (Years)	**Examined No.**	**No. of infection**	**%**	**No. of infection**	**%**	**No. of infection**	**%**	**Total No. of infection**	**%**
18-27	18	1	5.6	3	16.7	6	33.3	10	55.6
28-37	20	2	10	4	20	8	40	14	70
38-47	32	8	25	10	31.2	11	34.4	29	90.6
48-57	12	2	16.7	2	16.7	5	41.7	9	75
58-67	10	1	10	2	20	4	40	7	70
68-77	8	1	12.5	1	12.5	3	30	5	62.5
Total	**100**	**15**	**15%**	**22**	**22%**	**37**	**37%**	**74**	**74%**

Table 4: Trichomonastenax according to Diabetic infection among insulin taking and non-taking patients both male and female

		Male		Female			
Diabetic patients	**Examined No.**	**No. of Infected**	**%**	**No. of Infected**	**%**	**Total No. of infection**	**%**
Take insulin	32	15	46.8	9	28.12	27	84.37
Non take insulin	20	7	35	5	25	13	65
Total	**52**	**22**	**42.30**	**14**	**26.92**	**40**	**76.92**

Table 6: Number of patient healing with increase buds aqueous extract of E.caryophyllata after using doses 15 ml once daily during 10 days

Group of patient	No. of patient	Extract concentration	No. of patient healing	Healing (%)
1	18	+ve Control	0	0
2	18	100 mg/ml	6	20
3	18	200 mg/ml	13	60
4	18	300 mg/ml	18	100
Total	**72**		**37**	**51.38**

Discussion

*T.tenax*presence in the oral cavity sign of low interest in oral hygiene, dental care and gum disease where can be transmitted by kissing, flying spray and drinking utensils [17]. The incidence of *T.tenax*infection has reached 100 in infected and uninfected patients and rate was 74%, This study was identical with[18]hygiene factor including the oral infection of this parasite is increased by lack of hygiene but the excessive increase in cleanliness has a negative impact in many diseases for immunity because of the inefficiency of the immune system and not being exposed to such parasite. As in Table 1.

The study indicated total number *T.tenax* infection was 100 distributed between 42 female and 32 male infections where ages were from 18-77 years, was highest rate of infection in the age group 38-47 and rate was 93.75%.

These study showed the infection with *T.tenax*tend to increase in females and this result coordinated with[19]confirms that females are more probable than males where proportion of males formed 32% while proportion of females 42% only. The physiological and immunological status of females may play a large role in increasing proportion. The results of the statistical differences were significant, confirmed the existence of positive relationship between sex and infection with this parasite. As in Table 2 Infections number with this parasite in countryside and city was 44,30 respectively where ages 18-77 years was highest rate of infection in the age group 38-47, rate was 84.4% and recorded the highest rate infection in patients living in countryside 44% compared to the city 30%. May be due to the lack of awareness of the importance of oral hygiene and dental care and gums in the countryside as well as frequent exposure to pollutants such as smoking, alcohol and contaminated foods thus providing an conducive environment to oral diseases and parasites while people with old age, most of their teeth are damaged and most oft hem do not have teeth or take a lot of drugs as a result of other diseases may effect these drugs in parasites and prevent infection [20], as in Table 3.

Infections number with this parasite in cultural level in low, intermediated and good was 37, 22 and 15 respectively and highest rate of infection in the age group 38-47, rate was 90.6%.This may be due to neglect of this behavioral habits and lack of interest in personal hygiene as well as the use of the same tools from one person to another this consistent with his findings [21]as in Table 4.

*T.tenax*infection rate for both male and female was 46.8%,28.12% respectively, taking insulin while non-taking insulin males and females reached was 35%,25% respectively, overall infection rate 76.92% .Significant differences between taking insulin and non-insulin users sex differences, This study agrees with [22]. *T.tenax*infection in diabetic, an increase in accident of oral parasites in diabetic patients with five times the incidence of healthy people. Maybake Hyperglycemia lead to be Advanced Glycation Endproducts (AGEs) in turn stimulates monocytes and endothelial cell to produce inflammatory mediators and gathered in plasma and tissues for patients with diabetes leads to the enrichment of gum tissue by vascular permeability breaks the fibrinogen fibers which increases the exposure oft he se patients to the infection of many types: fungi, bacteria and parasites. As in Table 5.

E.caryophyllata used in treated various disease, including intestinal parasites, migraine headaches, cold and application directly tot he gum or skin to alleviate dental pain and reduce inflammation of the mouth and throat places because of some important components: Flavonoids, Phenolic acids, Alkaloids,Tannins and contain rich minerals such as: iron, calcium, phosphorus, sodium, potassium and vitamin C and vitamin A[23].

The results showed that total proportion was 51.38% appeared highest healing rate reached 100% with concentration 300 mg/ml of the aqueous extract and lowest healing was 20% with concentration 100 mg/ml, the best concentration of healing is 300 mg/ml with doses 15 ml in tenth day without side effects comparison with control group results showed that patients remained intact and none of them were cured and clinical symptoms including gum swelling, as in Table 6.

This may be due to the presence phenolic compound interfere the energy generation mechanism by uncoupling the oxidative phosphorylation and interfere with the glycoprotein of the cell surface of parasite and cause death or because of the existence alkaloids which act as an antioxidant capable of reducing the nitrate generation which can interfere in local homeostasis is important for developed of parasite, These results are matched with[24].

Conclusion

Giving the hot aqueous extract of *E.caryophyllata* buds as a gargle with concentration 300mg/kg led to parasite killing and complete recovery without side effects of both sexes.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq.

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Marginal Fitness of Monolithic Zirconia Crowns Fabricated from Direct Digital Scanning, Impression Scanning & Indirect Digital Scanning Using Different Impression Materials

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Abstract

Aim: To evaluate and compare the marginal fitness of zirconia crowns fabricated from direct digital scanning, scanning of conventional impressions made with different impression materials and indirect scanning of the resulting stone dies using an extra-oral scanner.

A metal die for a prepared maxillary right first molar was used as a master model for this study. A total of fifty-six zirconia crowns were then fabricated using CAD/CAM system according to the following sample grouping: Group I: Crowns fabricated from direct digital scanning of the metal die (8 crowns), Group II: Crowns fabricated from scanning of the conventional impression, which was further subdivided into three subgroups of 8 crowns according to the type of impression material used: (Subgroup IIA: condensation silicone, Subgroup IIB: PVS and Subgroup IIC: VPES). Group III: Crowns fabricated from scanning of the stone dies obtained from pouring of the conventional impression, which was also subdivided into three subgroups of 8 crowns as for Group II. The marginal gap of each crown was then measured using digital microscope at a magnification of 230x. The recorded measurements were then subjected to statistical analysis using One-way ANOVA test, Dunnett's test, Tukey's HSD test and Holm-Bonferonni test at a level of significance of 0.05.

The results of this study showed that the lowest mean value of marginal gap was recorded by crowns fabricated using direct digital scanning (Group I) with statistically highly significant differences when compared with other groups. On the other hand, the highest mean value of marginal gap was recorded by crowns fabricated from scanning of stone dies obtained from pouring of condensation silicone impressions (Group IIIA).

Conclusions: The mean values of marginal gap of zirconia crowns of all groups are within the clinically acceptable limit of 120 µm except those of crowns fabricated using condensation silicone impression material. Crowns fabricated by direct digital scanning showed better marginal fitness than crowns fabricated by the indirect method which showed more discrepancy.

Keywords: *CAD/CAM System; Marginal gap; Digital Impression;Conventional Impression; PVS; VPES.*

Introduction

The major goal in making an accurate final impression is to obtain a final restoration with a clinically acceptable marginal adaptation. The increase in the marginal gap between the crown and the prepared tooth promotes a washout of the luting material, microleakage, and plaque accumulation. This can result in secondary caries, pulp inflammation, and periodontitis, which could lead to a failure of the restoration[(1)]. Recent studies have indicated that the clinically acceptable limit of marginal opening should be less than 120µm[(2)].

Despite technical improvements in the field of computer-aided design\computer-aided manufacturing (CAD\CAM) systems and 3-dimentional imaging procedures, the conventional impression procedure still has a role in transferring information from the patient to the dental laboratory[(3)].

An accurate impression is the first most important step in the procedure of obtaining a perfect restoration[4]. Among the impression materials available, synthetic elastomers such as polyvinyl siloxane (PVS), the so called "addition silicone", is more popular because of its excellent detail reproduction and good dimensional stability[5]. However, condensation silicones are still widely used because they are more economical than addition silicones (Zhermack, 2017).

On the other hand, vinyl polyether silicone (VPES) products are a new group of impression materials. These elastomeric impression materials are a combination of polyvinyl siloxane and polyether and are promoted as hydrophilic materials that presumably maintain the stability and characteristics of the parent products [4,5].

The introduction of digital technology using intra-oral scanners claims to eliminate most errors associated with conventional impression taking including dimensional changes of the impression material and gypsum used to fabricate master model[6]. Compared with conventional impression, intra-oral digital scanning eliminates tray selection, material dispensing, material setting, material disinfection,gypsum pouring, die sectioning, and articulation [7].

Many CAD/CAM systems start with either digitizing an existing conventional dental impression/ dental cast or through capturing digital intra-oral impression[8]. Digitizing a master model poured out of a conventional impression remains at present the preferred technique of many dental laboratories for obtaining digital data of crown preparation [6]. On the other hand, digitizing a conventional impression eliminates most errors associated with fabrication of master model. However, there is no available study dealing with the effect of scanning of conventional impression made with different impression materials and scanning of the stone dies obtained from pouring of these impressions on the marginal fitness of crowns versus direct digital scanning of the preparation.

Materials and Method

A metal die for a prepared maxillary right first molar tooth with chamfer finishing line of 0.8mm and occluso-gingival height of 4.5 mm with total convergence angle of 6°was used as a master model. Eight identical custom trayswere fabricated from self-cured acrylic resin with 2mm spacing. A total of fifty-six zirconia crowns were then fabricated using CAD/CAM system (MC X5, Sirona, Germany) according to the following sample grouping: Group I: Crowns fabricated from direct digital scanning of the metal die using CEREC Omnicam digital intra-oral scanner (Sirona Dental Systems, Bensheim, Germany) (8 crowns), Group II: Crowns fabricated from scanning of the conventional impression using InEos X5 inLab scanner (Sirona Dental Systems, Bensheim, Germany). This group was further subdivided into three subgroups of 8 crowns according to the type of impression material used to take the final impression: (Subgroup IIA: condensation silicone (Zetaplus soft, Zhermack, Italy), Subgroup IIB: PVS(Elite P & P, Zhermack, Italy) and Subgroup IIC: VPES (Exalence™, Gc, Japan). Group III: Crowns fabricated from scanning of the stone dies obtained from pouring of the conventional impression using InEos X5 inLab scanner. In Group I, the metal die was powdered with a thin layer of titanium dioxide powder (NHT, Korea) prior to scanning to provide a matt finish of the surface and decrease its reflection. The same was done for the conventional impressions of the different subgroups of Group II. Conventional impressions were taken using two-step putty/wash impression technique with spacer. The conventional impressions werethen pouredafter 30 minutes with type IV gypsum after their scanning. The marginal gaps of the fabricated crowns were measured using a digital microscope at a magnification of 230x. The measurement of the marginal gap was made at four points determined on each surface of the crown using Image J software. Sixteen measurements were obtained for each crown and the mean of these measurements was taken.

Results

The descriptive statistics of the marginal gap in μm of different groups are shown in Table 1.

Table 1: Descriptive statistics of the marginal gap measured in µm for each group.

Groups	Minimum	Maximum	Mean	±SD
Group I	31.780	40.790	36.430	2.629
Group II A	108.740	133.900	121.366	10.185
Group II B	72.420	91.040	77.675	5.853
Group II. C	71.160	92.300	83.628	8.243
Group III. A	129.150	158.590	147.895	10.209
Group III. B	67.750	99.170	85.463	9.502
Group III. C	84.900	94.650	90.068	2.884

Comparison of significance among the different groups by one-way ANOVA test revealed a statistically highly significant difference among groups (p<0.01) (Table 2).

Table 2: One-way ANOVA test for comparison of the marginal gap among the groups.

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	59168.953	6	9861.492	166.060	.000 (HS)
Within Groups	2909.868	49	59.385		
Total	62078.821	55			

Dunnett's test revealed statistically highly significant differences between the marginal gap of crowns fabricated by digital impression (Group I) and other groups (p<0.01) (Table3).

Table 3: Dunnett's test for comparison of the marginal gap between digital impression and different conventional impression groups.

(I) Groups	(J) Groups	Mean Difference (I-J)	Sig.	95% Confidence Interval	
				Lower Bound	Upper Bound
Group I	Group IIA	84.93625	.000	74.6913	95.1812
Group I	Group IIB	41.24500	.000	31.0000	51.4900
Group I	Group IIC	47.19750	.000	36.9525	57.4425
Group I	Group IIIA	111.46500	.000	101.2200	121.7100
Group I	Group IIIB	49.03250	.000	38.7875	59.2775
Group I	Group IIIC	53.63750	.000	43.3925	63.8825

Tukey HSD test showed no statistically significant differences in the marginal gap of crowns fabricated from scanning of the PVS and VPES impression materials (p>0.05), with statistically highly significant differences in the marginal gap of crowns fabricated from scanning of these two materials when compared with crowns fabricated from scanning of condensation silicone impressions (p<0.01) (Table 4).

Table 4: Tukey HSD test for comparison of the marginal gap of crowns fabricated from scanning of different conventional impressions.

(I) Groups	(J) Groups	Mean Difference (I-J)	Sig.	95% Confidence Interval	
				Lower Bound	Upper Bound
Group IIA	Group IIB	-43.691	.000 (HS)	-54.133	-33.249
	Group IIC	37.739	.000 (HS)	27.297	48.181
Group IIB	Group IIC	-5.953	.341(NS)	-16.394	4.489

Tukey HSD test also showed the same scenario of statistical findings seen when comparing the marginal gap of crowns fabricated from scanning of the conventional impressions (Table 5).

Table 5: Tukey HSD test for comparison of the marginal gap of crowns fabricated from scanning of stone dies obtained from different conventional impressions.

(I) Groups	(J) Groups	Mean Difference (I-J)	Sig.	95% Confidence Interval	
				Lower Bound	Upper Bound
Group IIIA	Group IIIB	-62.433	.000(HS)	-72.796	-52.069
	Group IIIC	57.828	.000(HS)	47.464	68.191
Group IIIB	Group IIIC	-4.605	.513(NS)	-14.968	5.758

Holm-Bonferonni test revealed no statistically significant difference in the marginal gap of crowns fabricated from scanning of impressions taken with PVS and VPES impression materials and their respective stone dies (p>0.05).

Table 6: Holm-Bonferonni test for comparison of the marginal gap between scanning of impressions versus scanning of the stone dies.

Paired Samples Statistics				Paired T test	Holm-Bonferonni p value
Groups		Mean	Std. Deviation		
Condensation silicone	Impression scanning	121.366	10.185	6.195	0.000(HS)
	Stone die scanning	147.895	10.209		
PVS	Impression scanning	77.675	5.853	2.636	0.068(NS)
	Stone die scanning	85.463	9.502		
VPES	Impression scanning	83.628	8.243	2.007	0.085(NS)
	Stone die scanning	90.068	2.884		

Discussion

Comparison of the marginal gap between digital impression and different conventional impression groups: The statistically highly significant differences in the marginal gap between Group I and the other groups could be due to the direct scanning of the preparation in Group Ithat eliminates the multiple steps of the conventional workflow that can influence the accuracy and precision of restorations[9].

This finding is in accordance with Syrek*et al*.[10],Seelbach*et al*.[11],and Al-Atyaa and Majeed[12]who all found that intra-oral digital impression, regardless of the type of the scanner used, provided better marginal fitness than conventional impressions regardless of the diversity in the conventional impression technique used.

Comparison of the marginal gap of crowns fabricated from scanning of different conventional impressions:

The better fitness of crowns fabricated from scanning of PVS and VPES impressions could be due to the combination of excellent dimensional stability over time and temperature of these two materials with superior elastic recovery and precise detail reproduction. PVS materials possess almost ideal dimensional stability due to the absence of a volatile by product during polymerization and thus can be poured within 1 to 2 weeks after making the impression without the concern for dimensional inaccuracy [13]. It has been found that PVS has the smallest dimensional changes (−0.15%) at 24 hours [14]. Meanwhile, VPES materials have dimensional changes of ≈–0.2% at 24 hours [4].

On the other hand, condensation silicones have the highest dimensional changes during setting (−0.38%) at 24 hours owing to the volatile ethyl alcohol produced as a by product of the setting reaction which tends to evaporate from the surface of the set impression, resulting in distortion[14].

Deformation of the impression while removing from the prepared tooth might be a possible source for inaccuracy[15]. The condensation silicone has a permanent deformation of (2-3%), while PVS has a permanent deformation of (0.2-0.5%)[14]. On the other hand, VPES has significantly less elastic recovery than PVS materials[16].

Comparison of the marginal gap of crowns fabricated from scanning of stone dies obtained from different conventional impressions:

The same scenario of results of the marginal gap of crowns fabricated from scanning of the conventional impression was seen again when scanning of the stone dies was done. This is a predicted finding as each stone die represents a replica of its corresponding impression. However, the overall marginal fitness of crowns fabricated from scanning of the stone dies was lower than that of crowns fabricated from scanning of the conventional impressions. The greater marginal gap of crowns fabricated from scanning of condensation silicone impressions as compared with PVS and VPES could be attributed to the greater contact angle of condensation silicone which has been found to be around 68.6° [17]. On the other hand, the statistically non-significant differences in the marginal gap of crowns fabricated from scanning of PVS and VPES could be due to that VPES impression material is intrinsically hydrophilic because of its polyether content with a contact angle around 35°. Meanwhile, the addition of nonionic surfactants to PVS elastomers provided super hydrophilicity of this material with a contact angle <20[18].

Comparison of the marginal gap of crowns fabricated from scanning of impressions versus scanning of the stone dies

The results of this study showed a statistically non-significant difference in the marginal gap of crowns fabricated from scanning of PVS and VPES impressions when compared with that of crowns fabricated from scanning of the stone dies obtained from pouring of the impressions made with these two materials. This could be attributed to the high dimensional stability, elastic recovery and accuracy of these two materials as discussed earlier. However, scanning of the stone dies showed greater marginal gap of crowns than scanning of their respective impressions. This could be attributed to the setting expansion of the gypsum product used (0.06-0.5%)[19]. On the other hand, scanning of condensation silicone impressions showed less marginal gap of crowns than crowns fabricated from scanning of the stone dies with statistically highly significant difference. This could be attributed to the polymerization shrinkage, poor wetting ability of condensation silicone impression material and the linear setting expansion of the gypsum[19].

Conclusions

1. The mean values of marginal gap of zirconia crowns of all groups are within the clinically acceptable limit except those of crowns fabricated using condensation silicone impression material.
2. Digital intra-oral scanner showed better marginal fitness of crowns than conventional impression with different impression materials with statistically highly significant differences.
3. No significant difference was found in the marginal gap of crowns fabricated from scanning of PVS and VPES impressions, while scanning of the condensation silicone impressions resulted in crowns with the greatest gap.
4. Scanning of PVS and VPES impressions or stone dies showed no significant difference, while scanning of condensation silicone impressions showed less marginal gap of crowns than scanning of the stone dies.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

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Non-Adherence among Iraqi ACNE Patients: Dermatosemiotics Study

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Abstract

One public health dilemma in Iraq and around the world is the adherence to medications and medical advices for Acne. Non-adherence (semiotic) is problem that underpin failure of communication which is considered as a financial burden on health care system.

This qualitative Study aims to improving adherence to treatment for Iraqi Acne Patients, using complexity science and system thinking as dermatosemiotic paradigm, it was conducted from January 2016 to December 2017, data collected from thirty patients (male: female, 2:1), age ranged from (16-25). Collected data were analyzed using dermatosemiotic analysis. The findings are presented and discussed under the themes of life world as articulated by the five emergent themes of Ann Hemingway.

Adherence of acne patients to medical and behavioral intervention is improved after creating dialogical space with patient that gives opportunity to share the new semiotic view of health and skin problem. The results refers that induction of paradigm shift from linear thinking to system thinking manifested clinically as behavioral change from non-adherence to adherence.

Keywords: *Acne vulgrais, Non-adherence, dermatosemiotics, system thinking.*

Introduction

Acne vulgaris is one of the most common dermatologic conditions,it is associated with psychological problems[1] that involve both innate and acquired immunity[2] make acne lesions manifested in different degree of severity and following an unpredictable course[3-5] .

Non-adherence is an integral part of the crisis of medicine which is grounded in this marginalization of the semiotic phenomenological dimension of human being that make him an embodied mind[6,7]. Dermatosemiotics view skin is a prototype that can restore the centrality of touch, feeling, empathy to the heart of medical encounter which dictating a semiotic perspective towards patients giving opportunity for using our both eyes.

Understanding human being as complex adaptive system starting from the skin [8,9]. Our ordinary conceptual system, in terms of which we both think and act, is fundamentally metaphorical in nature[10,11].

Semiotics "observant of signs" was a very precise sense to denote the branch of medical science relating to the interpretation of signs and diagnosis of diseases[12].

Acne vulgrais is complex adaptive system which need new kind of medicine embedded in lifeworld approach to human being as relational, semiotic adaptive system. Adherence to treatment is possible only if patient understands the semiotic nature of their illness as complex adaptive system[12,13].

The World Health Organization (WHO) recognizes two distinct categories of nonadherence–preventable (eg. patient forgets, misunderstands) and nonpreventable (eg. life-threatening side effects)–and recommends tailored treatment interventions for the former[14].

Poor adherence is a common cause for treatment failure in skin diseases such as acne vulgaris[15,16]. There are many models of adherence that have been developed[17,18,19] (1) Biomedical model (2) Behavioral model (3) Communication model (4) Self-regulatory model (5) Transtheoretical model (6) Cognitive model

We cannot access paradigm or intentionality only through action, language which are visible like skin.

Materials and Method

Study conducted in a private clinic of the 1st researcher in this workin karbala governoratein Iraq, from January 2016 to December 2017, Data collected from thirty patients (20 males,10 female), their age range from (16-25). Informed consent is taken. Collected data were analyzed using dermatosemiotic analysis, searching for the signs of themes that unify different patients' experiences.

Interviews are conducted one to three time per month and each interview lasted up to 1 hour. Interview session terminated when rich data achieved Semi-structure method is very suitable for our study as it is in congruence with principles of complex adaptive system which are the underpinning framework of study. The questions used to open the interview focused on probing patient lifeworld:

What is like to live with acne vulgaris?

How acne affect your self-image, and why.

How acne vulgaris change your relationship to yourself and space, time and others.

How you can describe your nonadherence to treatment, what is the alternative.

What is the conditions that make person adhere to therapy?

How your relationship with your doctor increase or decrease adherence?

Is your perception of acne and your self-image affected by being participants such interview?

These questions are used as trigger to let the participant speak out their lived meaning and perception about their experience of acne and their non-adherent behavior. The data collected from this semi-structure interview served as data for thematic analysis.The analytic process used to elicit the pattern of meaning, themes, as following we read the transcribed text number of times using critical system thinking searching for the whole (theme) that organizes the parts:

1. The semiotic analysis of the patient narrative reveals shared meaning diagnosed as themes.
2. collective intentionality is what make non-adherence emerge as pattern represented by different patients' groups.
3. The shared themes are organized in 5 categories corresponding to the elements of lifeworld as described by Ann Hemingway.
4. Sharing these themes with participants creating semiotic awareness.

Results

The literature review and my personal clinical encounter with non-adherent patients-to pharmacological and behavioral interventions–show that non-adherence is as sign of embodiment of the linear machine thinking which is grounded in the Cartesian dualism that produced non-adherence between the mind and body, the subjectivity and objectivity, the perception and the world. This attention to only medical signs made them blind to other signs of the patient lifeworld which embody their belief, perception and expectation which are responsible for their adherence or non-adherence.

Restoring the primacy for skin as tactile system is the result of adopting dermatosemiotic as paradigm that facilitate psychosocial adherence\connection, empathy and communication. Informed consent is taken, collected data were analyzed using dermatosemiotic analysis, searching for the signs of themes that unify different patients' experiences. The semiotic analysis revealed that root cause of non-adherence is machine system paradigm\mental model that systematically structure nonadherence as a pattern and event.

The process of analysis produced a number of emergent themes regarding the impact of acne upon participant's lifeworld. The findings presented were discussed under the following themes which represent the themes of lifeworld as articulated by Ann Hemingway as five emergent themes:

1. **Mood: Affectivity theme:** All the participants shared the negative mood which is expressed as self-hate, low-self-esteem, shame and hopeless.
2. **Interpersonal problem: relational theme:** All patients report great care for their peer negative feedback about their facial appearance and this negativity triggered by watching mirrors, by remembering, imaging, their peers are present as long as their acne not disappeared. Acne vulgrais lived as stigma, this perception condition negative

psychological and social behavior filled with anger and fear.

3. **Embodiment:** Every human being has two bodies: objective body which given to others and subjective body (lived body) which lived by us, phenomenology concerned with the subjective body. Patient participate in this work are lived acne experienced as severe one although dermatological consultation revealed its mild sate and their phenomenological attitude lived by researcher facilitate emergence of the patient lived acne showing for them the critical difference between their view and peer view and medical view.

4. **Temporality:** All participants are not living in the present, they are adherent to the past where their face is clear and beautiful and fully accepted by their peers and family and the future which they appear to them as scaring and filled with post-acne pigmentation. They swing between past and future forgetting that the present is the only real moment. U–lab used for these participants which is journey to the presenting after stopping downloading of the past prejudices.

5. **Spatiality:** Participants favored to be room ridden, they leave only for work or study. Their problems are meeting people, their mood is dependent on the place they found themselves in. This isolation becomes source of negative energy and increasing patient resistant to accept their illness. Lifeworld is embodiment of all these five themes. Acne vulgrais severity measured by the degree of changing our lifeworld, our relationship to our self, others, time, place.

Discussion

This study demonstrates that without changing the root (paradigm) we cannot change the fruit (nonadherence). Nonadherence behavior is outcome of linear machine paradigm. The problem arises when the disease is chronic and the drug needed for long time. In this studywe found that the threshold concept in health care system is caring, which entail the positive relation to patient as whole, as complex dynamic system, and we will give primacy for patient lifeworld and their perception and kind of thinking process which determine how they receive our instruction and therapy.

Interview with participants show deep ignorance of the process that lead to their decreased quality of life and negative self-image.

Conclusion

The results of this work elucidate that the adherence or non-adherence is an output of complex adaptive system which derived its input from clinical meeting with health care professional, the patient expectation about self-image and beauty, their family and peers. This make nonadherence emergent phenomenon which is irreducible to any part of this complex system. All these different parts of health care system including the patients should work in synergy for insurance of sustainable health outcome. Our study is about disclosing the condition that make nonadherence and adherence possible by showing that the intentionality of the patient which can be linear or systemic is the root cause that nonadherence or adherence manifested as event. To solve the problem of nonadherence we need new kind of medicine, in this study it called lifeworld medicine, which can ensure I-You relationship with patient condition the possibility of emergence of empathy, listening and adherence. This study showed the primary role of the patient perception of their self, their health, their acne as complex adaptive system which required open mind, open heart and open will[20,21] .

This study confirms relational nature of skin problems and its direct effect on patient lifeworld mediated by disfiguring self-image.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq.

Conflict of Interest: The authors declare that they have no conflict of interest.

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Advanced Study of Some Hormonal and Genetic Factors Affecting the Causes of Secondary Infertility

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Abstract

Our study aimed to determine the extent of the effect of pancreatic hormone (insulin) for secondary infertility in the city of Tikrit and its environs. Infertility was determined by laboratory tests of 80 male and female patients. Their ages ranged from 20-50 years of reviews to the women's external clinics in Tikrit, They were compared with 40 control groups. The age groups of secondary infertility were identified and the relationship of these hormones to the age group and the relationship of these hormones to the mass index. The study included the relationship of concentrations of these hormones with secondary infertility. The outcome of the current study for insulin hormone was 107.936 ± 19.274, 85.480 ± 4.591 women and men respectively, and non-infected 344.287 ± 19.651 and 305.660 ± 5.951 women and men, respectively. Female infertility and associated diagnoses have overall health implications. Beyond treatment of patients' immediate reproductive needs, healthcare professionals must be aware of the broader health impact of specific causes of infertility in order to provide accurate counseling regarding long-term risk. [1] As for the genetic experiments, the study showed no significant difference (P <0. 05) for insulin receptor gene for secondary infertility group between men and women compared with control group. The results showed that there was an actual relationship between the gene and secondary infertility, where the results showed that there was a gene in 32 samples out of 38 infected samples. Which was 86.49% and the evidence of infection was the presence of the gene 317 markedly and showed the sequences of TT (317bp), the 274bp was the base pair CC, the transient relay, the genetic sequence 43bp was the first pair CT.

Keywords: *Secondary infection, Hormones, Genetic factor.*

Introduction

The problem of infertility is one of the main reasons for the lack of happiness in homes and the deterioration of the state of family tranquility between couples because they are closely linked to the ultimate goals of the completion of happiness and family integration and infertility is defined as failure to reproduce after a year of regular intercourse of married people over the age of 35[2]. Epidemiological statistics suggest that 10-15% of all couples have primary infertility or have secondary infertility after having the first and second child and then have infertility called secondary infertility[3]. The problem of infertility is multidimensional, with social, financial and cultural implications that can take on threatened dimensions in infertile countries, a global phenomenon recognized by the World Health Organization (WHO) all over the world. The Family Growth Survey, which used data collected in 2006 to 2010 to estimate the equivalence of infertility in the United States, indicated that women aged 15-55 years with double pregnancies after the first or second child were 9-10% of married women and infertility[4]. A genetic study (Viville *et al*., 2000) also referred to patients with sperm deformation (during the chromosome analysis of the genetic material in the sperm nucleus) due to an increase in chromosomal heterogeneity in the large-headed sperm and the absence of chromosomal changes for the rest of the other abnormalities in the form Sperm, and another study showed an increase in chromosomal abnormalities in the amorphous head with four increased auerageof vertical heand for sperms[5]. The increasing incidence of DM worldwide will inevitably result in a higher prevalence of this pathology in men of reproductive age and sub fertility or infertility associated with DM is expected to dramatically rise in upcoming years. From a clinical perspective, the evaluation of semen parameters, as well as spermatozoa deoxyribonucleic acid (DNA) integrity, are often studied due to their direct implications in

natural and assisted conception[6]. Where it is associated with diabetes by increasing the mitochondrial DNA (mtDNA) responsible for sperm ratio, which affects men's reproductive capacity[7]. It affects the quality of sperm and also affects the mechanism of ejaculation[8]. On women who have diabetes-dependent insulin, it reduces their pregnancy and childbirth[9]

Materials and Method

Samples Collection: The study was conducted in the central labs of Tikrit University. The samples were collected from the women's' clinics after being diagnosed by the specialist doctor and separated in the civil laboratories in the field of science. The study included 80 females, 40 of them women and men suffering from secondary infertility, 40 of them were women and men who were not infected, They are between 50 and 20 years old.

ELISA was conducted according to the manufacturer's recommendations.

The OD is read for each hole at each 450nm wavelength of the osmotic reader.

Determination of insulin hormone in the serum: Enzyme-Linked Immunosorbent Assay (ELISA) measurements have been following the steps accompanying the LDN Labor Diagnostika Nord. The principle is based on the competitive correlation. The antibodies against the hormone insulin are placed in the solid phase Depending on the principle of Sandwich Principle, the microbial pot is covered by the antigen in the insulin molecule.

A part of the patient's insulin-containing sample is incubated in a tap and is usually coated with anti-insulin agents and then washed to get rid of the uninhibited enzyme.

During the second step of the incubation, the streptafidine peroxidase enzyme complex is associated with the insulin biotin body, corresponding to the amount of peroxidase associated with the insulin concentration in the sample. The color density appears after the addition of the base solution. The concentrations of insulin hormone in the blood vessels are estimated by means of the standard curve in which the hormone concentration of the standard solutions is adjusted with the absorbance, where the measurement is at 450nm, as in Fig. 1.

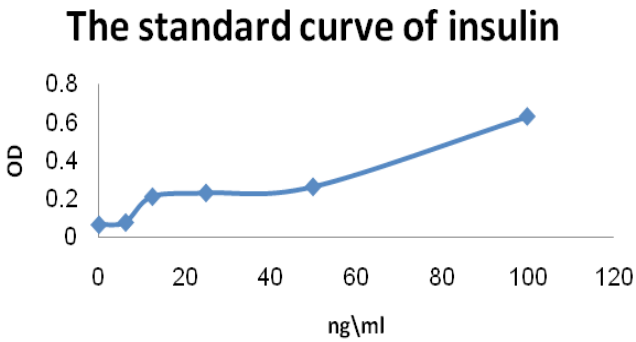


Figure 1: The standard curve of insulin

Molecular diagnosis of insulin

DNA Extraction from blood: DNA was isolated from all blood samples kept in the EDTA tube for patients with secondary and healthy infertility, as applied to Roulston and Bartlett[10] and modified by Al-azawy[11] 2012.

DNA was extracted from the blood sample preserved in EDTA tubes according to the manufacturer's instructions. Electrophoresis of the DNA on the agarosgel was conducted to ensure DNA extraction success.

Investigation of the *INSR* gene. The polymerase chain reaction (PCR-RFLP) technique was used to detect the presence of insulin DNA, using specialized primers designed for this purpose and PmlIrestraction enzyme. The *INSR* gene was detected following the method of[12] Mukher and others. PCR conditions are mentioned in Table 1.

Table 1: PCR Conditions

Number of cycles	Time	Temperature	Steps
1	5 min	94°C	Initial denaturation
35	30 sec	94°C	Denaturation
	30 sec	61°C	Annealing
	40 sec	72°C	Extension
1	10 min	72°C	Final extension

Results and Discussion

Diabetes (DM) is a chronic condition for life and are directly related to each other because of the effect of metabolic disease in the reproductive function in humans where diabetics, type I and type 2, in males and females in the relationship of infertility[13]. The results of the study showed a significant increase in $P < 0.05$ in insulin concentrations. The meanof insulin concentration

in male patients was 85.480 ± 4.591 ng/ml compared with control group (305.660 ± 5.951ng/ml) (Figure 1). The meanof insulin concentration for female patients (107.936 ± 19.274ng/ml) and control group (344.287 ± 19.651ng/ml) (Figure 2). This is a sign of lower insulin hormone in patients compared with healthy for both sexes. This is consistent with Basmatzou*et al*. [14] 2016.

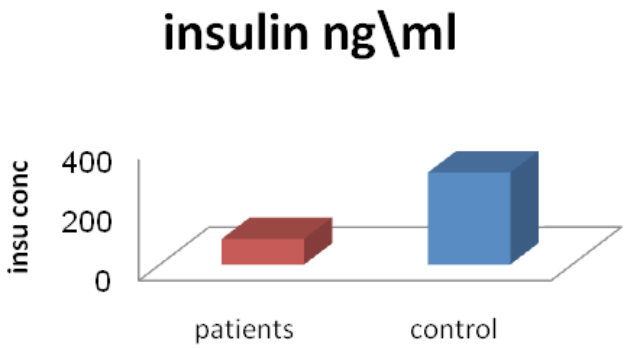


Figure 2: The level of concentration of insulin hormone for male blood transfusions compared to healthy patients

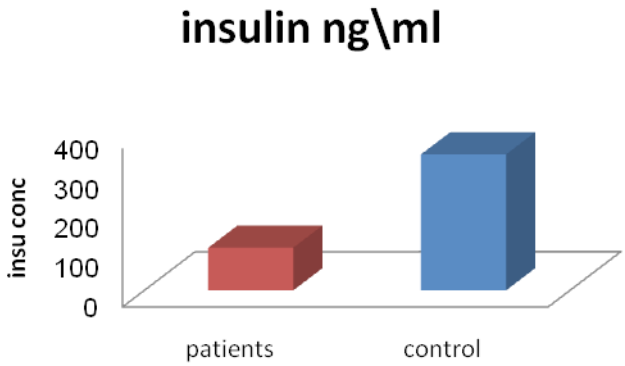


Figure 3: The level of concentration of insulin hormone for blood vessels of women compared to healthy patients

Women with polycystic ovary syndrome (PCOS) exhibit elevated androgen levels, oliguanovulation, infertility, and insulin resistance in metabolic tissues. The aims of these studies were to determine the role of insulin signaling in the development and function of ovarian theca cells and the pathophysiologic effects of hyperinsulinism on ovarian function in obesity[15]. This is consistent with Moamar[16]. PCOS is also often associated with insulin resistance and hyperinsulinemia[17]. and an elevated risk for subfertility among couples in which the male partner is obese. Obesity is, therefore, associated with a higher incidence of male factor infertility[18]. The prevalence of obesity and overweight are increasing and have become an epidemic worldwide. Obesity has detrimental influences on all systems, including reproductive health. [19]In light of new evidence that the Sertoli cells of the testis secrete insulin, it is currently unclear whether diabetic subfertility is the result of deficiency of pancreatic insulin, testicular insulin, or both[20]. There are many genetic mutations that lead to infertility in humans and accurate diagnosis of these mutations is not complete now, and the most important characteristic of these mutations in society is the imbalance in the maturity and fertility of individuals, although some people show a natural attainment but is associated with infertility, a number of genes responsible for puberty and reproduction have been identified, and the mutagenicity of these genes can lead to a failure in puberty and reproduction in humans. The process of puberty and reproduction in humans depends on the integration of the hypothalamus-pituitary[21].

Extraction of the DNA: DNA extraction was successful in 45 samples out of a total of 69 samples. This was confirmed by the output of the agarose gel. The *INSR* gene demonstrated three packages, 274-bp, 317-bp and 43bp. After the PmIIrestraction process, the PCR results showed three types of normal homozygous (TT) genotypes: the 317 bp, heterozygous (CT), (43) and Mutant Homozygous (CC)The replacement boom of the T-T base, which converts it to base C in the insulin receptor gene, resulted in a cut-off enzyme site Pm1I, So when treated with the PCR product of this enzyme will work to cut the resulting result of the multiplication of the molecular size 317 bp to the first two pieces of size 274 bp and the second size of 43 bp If the person is not borne mutation and in both alleles will have the genotype TT heterozygous naturally and will appear One 317 bp package when relaying PCR-RFLP output because there is no sequence required for Pm1I to be interrupted. The results of Mukher*et al*(2009)[22] were consistent with the results obtained as in Figure (4) and (5)

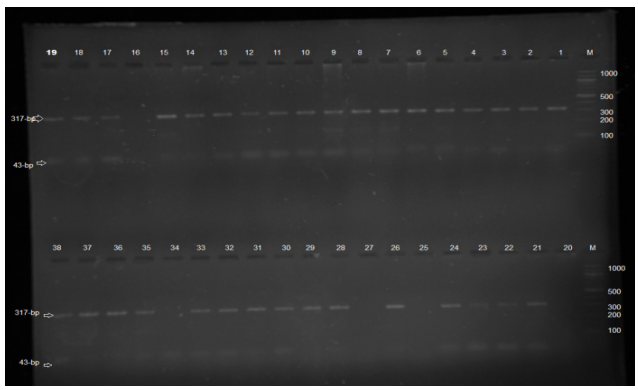


Figure 4: PCR relay output of INSR gene on 2% agarose gel

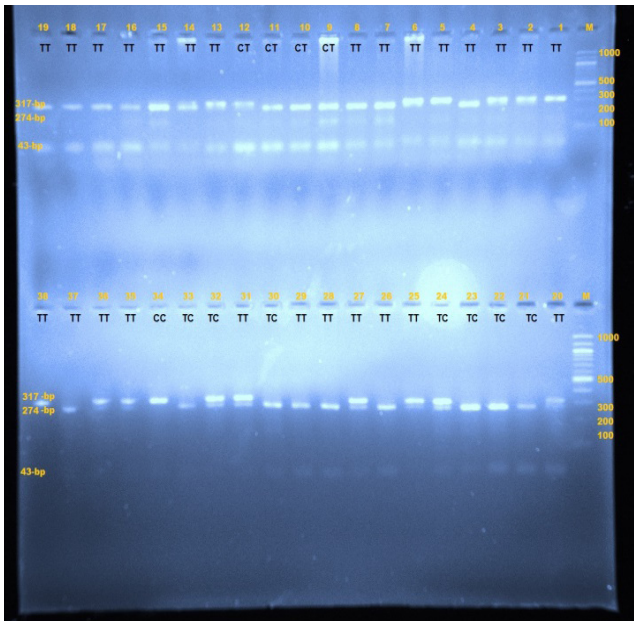


Figure 5: PCR-RFLP relay output for the INSR gene after addition of the cutting enzyme

Conclusion

The presence of the gene in the infected was higher than in non-infected men and women.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

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Carotid Stenting and Angioplasty in Iraqi Patients Presenting with Stroke Using Drug Eluting Coronary Stents and Peripheral Vascular Stents

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Abstract

Stroke causes death andlongterm disability. Heart disease and cancer are considered the first 2 causes followed by stroke as third cause. The aim of the study is to assesscarotid stentingin patients presenting with stroke using drug eluting coronary stents (type Biomatrix and type Everolemus)and peripheral vascular stents.

Seventy four patients with stroke (ischeamic)were enrolled in the study. The male patients were(42)and the female patients(32)with age between (41-82).Patients were examined neurologically and carotid Doppler study was done before the neurointervention procedures and during followup for one to sixmonths. Distal protection device (filter wire) was used during all the cases.

Technical access and success was achieved in all the seventy four patients using transfemoral route. There was no neurological periprocedural complications. The coronary drug eluting stents were used in forty patients, while the peripheral vascular stents were used in thirty four patients only. The degree of stenosis using drug eluting coronary stents was reduced from 80%(as a mean)to 30%(as a mean)immediately after the procedure, while there was full dilatation on using the peripheral vascular stents.

Carotid stenting and angioplasty results were best using the peripheral vascular stents because the peripheral vascular stents are more flexible with good sizes in comparism to the size of the internal carotid artery. The coronary drug eluting stents can be displaced from its deployment site in the Internal carotid artery especially if small sizes used. Flexible stents such as the peripheral stents are good for the internal carotid artery because the neck is highly movable area. The carotid walstents (Boston Scientific)areself expanding and also flexible stents.

Keywords: *Stroke, carotid stenting, embolic protection device.*

Introduction

Strokecauses death (after heart disease and cancer) and disability. It commonly causes the permanent type of disability[1,2].10% to 20 % of all strokes or transient ischemic attacks maybe caused by stenosis of the internal carotid artery. Stenting of the carotid artery has become an alternative revascularization procedure toendarterectomy of the carotid artery inpatients with carotid stenosis.

Carotid recanalization byballon angioplasty was entered in the beginning of the 1980s. Stent technology was introduced in the mid-1990s allowing protection against dissections and a restenosis rate in the single-digit range. Embolic protection devices (EPDs)advent and use in the year 2000 made carotid artery stenting a safer procedure[3].

Some Stroke Studies announced approximately 700, 000 stroke events occur yearly, of which 500, 000 are new strokes and 200, 000 are recurrent ones[4].Many deaths caused by stroke occur in most racial/ethnic minority groups compared with whites especially in those less than 65 years old[5].

In one study the prevalence rate of more than 50% of carotid stenosis was 7% in women and 9% in men between the age of 66 to 93 years[6]. While persons older than 65 years of age, 7% of men and 5% of women had moderate (50-74%) carotid stenosis, severe (75-100%) stenosis was detected in 2. 3% of men and 1. 1% of women in another study[7]. Other population-based studies of patients with transient ischemic attacks, showed 10% of those doing carotid ultrasound had more than 70% stenosis of at least one internal carotid artery[8].

The definition of brain infarction caused by extracranial carotid or vertebral artery disease is a clinical stroke with evidence of infarction on neuro-imaging with more than 60% stenosis or occlusion of an extracranial carotid or vertebralartery seen by non-invasive imaging or an angiogram. Almost 7% of all first ischemic strokeshad extracranial carotid stenosis of 60% or more[9]. Other studies showed 18% of all first ischemic strokeswere caused by extracranial or intracranial large vessel disease[10], but the report did not separately classify those with extracranial or intracranial vascular disease. Stroke needs hospitalization more frequently than other neurological diseases[11]. Leadingto more than half a million hospitalizations annually[12]. Those who live face risk of recurrent stroke as high as 4% to 15 % within a yearafter incident stroke and 25% by 5 years[13,14].

To the best of our knowledge, this the first study in Iraq evaluating drug eluting coronary stents and peripheral vascular stents in carotid stenosis in patients presenting with ischemic stroke.

Materials and Method

Patient selection and preprocedural evaluation: seventy four patients with ischemic strokes were enrolled in the study. Thirty two patients were female (43.2 %)and 42 were males (56.7 %). Examination to all the patients was done by a neurologist prior to the procedure. Stent placement indication was given by Doppler U/S and C.T. angio of the brain at ShaheedAl-Mahrab Cardiac Cath.and Surgery center in Babylon–Iraq. Patients with total occlusion lesion, bleeding diathesis, brain malformations and cerebral tumours were excluded from the study.

Stenosis grading before the placement of a stent was done by using the NASCET criteria[15]and ranged from 50% to 95%. Baseline cerebral C.T.or M.R. imaging was done to all patients.

Stent placement method:All the patients agreedto do the procedure (they gave informed consent). 75 mg of clopidogrel and 100 mg of aspirin for3 days before procedure was given to them or they were given 6 tablets of clopidogrel (450mg)one night before the procedure plus aspirin (325mg).Dual antiplatlet medication was maintained forone year after treatment, and aspirin for life. Intravenous bolus of 5, 000 I.U. of heparin was given immediately after the placement of the sheath. The procedures were done by an interventional Neurologist. Under local anaesthesia, a transfemoral approach was used with a 8 French sheath introduced followed by a 6 French JR. or multipurpose diagnostic catheter. An exchange wire was used (0.021-0. 038inch), then a 7 or 8 french guiding catheter was introduced near the stenotic segment. A 0.014 inch microguide wire was used to cross the stenotic segment. A filter wire (protection device)was introduced and advanced above the stenotic segment at the petrous segment of the internal carotid artery. Then advancing and deploying of abiomatrix flex drug eluting coronary stents (Biomatrix Flex DES) was done in (20) patients andtype Everolimus eluting coronary stent system in(20)patients with stent diameter of 4mm. Angioplasty was done to the nominal pressure and rated burst pressure inorder to achieve stent diameter of 4.5mm and this was followed by stent deployment. Inflation and Deflation of the ballon was done twice during each procedure. Peripheral vascular stents (Express Vascular SD Monorail Premounted Stent System) size 5mmx 30 mm and 6 mm x40 mm were used in 34 patients with achievement of full dilatation as in the images below. Atropin was only used in 3 patients because of bradycardia during the procedure. The filter wire was retrieved with it's retriever after deploying the stent. Cerebral angiograghy was done at the end. Compression of the puncture site was done manually after the procedure.

The followup with C. T. scan or M. R. imagingwas done 72 hours after the procedure. Patients were discharged and followed by clinical examination and with Doppler U/S study for one to six months after the procedure.

The statistical analysis were done through descriptive calculations of percentages and chi-square.

Results

The population study consists of seventy four patients with history of ischemic stroke for at least one

month and carotid stenosis more than 50 %. Forty two patients are males (56. 7%)and 32 are females (43. 2%).

Technical success[16]was achieved using the trans femoral route in all the patients. The level of stenosis was reduced from an average of (80%) before the procedure to(30%)after coronary drug eluting stent placement. There was no neurological periprocedural complications. Three patients experienced intraprocedural bradycardia and five hypotension. There was obvious thrombi and debris in the filter wire after retrieving it in ten patients.

Transient ischemic attacks happened after 3 months in tenpatients of the Everolemus group and 4 patients of the Biomatrix group. Stroke happened in one patients of the everolemus group due to instent stenosis or restenosis. This was solved by angioplasty or restenting, while there was no restenosis (no stroke or T.I.A)in the peripheral vascular stents. There was significant difference between the three groups according to the below tables:

Table 1: Complications regarding drug eluting coronary stents

Complications	Everolemus group	Biomatrix group
T. I. A	11	4
Without	9	16
P value	0. 022*	

Table 2: Complications between drug eluting coronary stents and peripheral vascular stents

Complications	drug eluting coronary stents	peripheral vascular stents
T. I. A	15	0
Without	25	34
P value	0. 0002**	

Discussion

Carotid stenting is a less invasive in consideration to carotid endarterectomy[17]. Some carotid artery stenting trials that used protection device showed equivalence with endarterectomy by achieving the same or lessperiprocedural risk[18-20]. The Carotid Revascularization Endarterectomy Versus Stent Trial(CREST)(in patients with low risk for surgery) showed no significant difference between stenting and surgery. Ipsilateral stroke risk at 4-year followup was similiar 2% and 2. 4% respectively[17]. The Stenting and Angioplasty with Protection in patients at high risk for Endarterctomy (SAPPHIRE) Trialalso compared carotid endarterctomy and carotid stenting with embolic protection device[18].

To the best of our knowledge, this is the first study in Iraq evaluating drug eluting coronaryand peripheral vascular stents in ischemic stroke patients with carotid stenosis. In this study the protection device is very important because the stents used are ballon mounted. So there is angioplasty followed by stent deployment. The risk of embolization increases when there is angioplasty. Unlike carotid endarterectomy, carotid stenting and angioplasty is now well established in Iraq with high successrate. Further study is going on using carotid self-expanding stents with protection devices. The Biomatrix Flex drug eluting coronary stent system is a drug eluting stent (DES)system for coronary use with a biodegradable polymer coating. The DES is a combination of two parts, the stent (which includes the active pharmaceutical ingredient BA9 (Biolimus A9) incorporated into a polymer coating, and the delivery system. The BA9 drug inhibits smooth muscle cell proliferation within the stent proximity. Poly-lactic acid is combined with the BA9 drug and actsas the carrier to control the release of the drug from the stent. The everolimus eluting coronary stent system, type Xience Prime and Xience Prime LL were used in our patients.We recommend to our colleagues in Iraq to use the peripheral vascular stents because of good sizes and more flexible than the drug eluting coronary stents. Peripheral vascular stents can be used in the developing countries incase when carotid walstents are not available.

Conclusion

Carotid stenting and angioplasty results were best using the peripheral vascular stents because the peripheral vascular stents are more flexible with good sizes in comparism to the size of the internal carotid artery. The coronary drug eluting stents can be displaced from its deployment site in the Internal carotid artery especially if small sizes used. Flexible stents such as the peripheral stents are good for the internal carotid artery because the neck is highly movable area. The carotid walstents (Boston Scientific) are self-expanding and also flexible stents.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

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Gene Expression Analysis of Colorectal Cancer Specific Marker CXCL1 Gene in Iraqi Patients

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Abstract

Background: Colorectal carcinoma is a third most common malignant tumor worldwide and the third largest cause of tumor-related death in Western countries. Chemokine ligand CXCL1 was shown to be involved in chemoattraction, inflammatory responses, tumor growth and angiogenesis. The main objective of current study was to analyze CXCL1 gene expression levels in colorectal carcinoma and to study the impacts of CXCL1 gene as genetic factors that contribute to development and prognosis of bladder cancer.

Method: The specimens were formalin-fixed, paraffin embedded tissue blocks. Forty samples (32 males and 8 females) with carcinoma were included in this study, their ages ranged from 30 to 80 years.Forty specimens of non-tumorous colonic tissues were considered as controls. Total ribonucleic acid (RNA) was extracted from tissues using (TRIzol® reagent kit, Bioneer, Korea). A total of 100ng/ul of RNA was reverse-transcribed using M-MLV Reverse Transcriptase kit (Bioneer, Korea) to synthesis complementary DNA (cDNA). Data were summarized, presented and analyzed using two software programs. These were Microsoft Office Excel 2007 and the statistical packages for social sciences (SPSS, version 18) using *t*-test, ANOVA and Chi-squared tests at a level of significant alpha<0.05.

Results: Analysis of data of CXCL1 gene expression revealed that the expression of this gene were found to be 12.389 folds in colorectal cancer in relation to normal colonic tissue. CXCL1 genes were observed to be expressed excessively in old age patients and advanced stage tumors.

Conclusions: CXCL1 may represent a novel colonic tumor marker with prognostic significance that could be introduced in plans of colorectal cancer management.

Keywords: *Colorectal cancer, CXCL1, Real time PCR, chemokine, angiogenesis.*

Introduction

Colorectal cancer (CRC) is the third most commonly diagnosed malignant tumor and constitutes the third leading cause of cancer-related death worldwide[1] and early diagnosis and molecular characterization is considered essential to decrease CRC-related deaths[2].

The 5-year survival rate after curative surgery ranges between 40% and 60%[3] and the challenge of how best to predict prognosis and, thereby optimized therapy remains. At present, established clinico-pathological criterions are used to estimate risks of recurrence in stage II and III disease, and this is usually used in the selection of patients for adjuvant systemic therapy following surgery. The clinical outcomes of patients who receive such adjuvant treatment can, however, vary widely when additional molecular factors are taken into deeming[4]. Acquainting of quenching prognostic markers is, therefore, vivacious in improving the prognosis of this disease[5]. Many factors both environmental and genetic are involved in the pathogenesis of colorectal carcinoma. The former are largely dietary, particularly consumption of diet rich in fats and animal protein, because of their influence on the microflora of intestine and eventually on the chemical composition of the intraluminal contained[3]. Among various trophic factors, chemokines have a predominant role[6].Chemokine, a chemotactic cytokine which mediates leucocyte migration (chemotaxis), is a small-sized protein expressed by various cells (leucocytes, epithelial cells, endothelial cells, and fibroblasts), including tumour cells[7,8], that are increasingly magnetize consideration in the study of pathogenesis of tumor within malignant cells and the tumour micro environment. They are divided into four

large categories as follows: C, CC, CXC and CX3C, depending on the position of their cysteine residues[9].

Previous study revealed that CXCL1 is up-regulated in some types of human cancers, including colorectal, bladder, prostate, hepatocellular carcinoma and skin cancers [10-14].

The aim of current study was to study the level of CXCL1 mRNA expression in colorectal tumors and correlate findings with clinicopathological parameters in Iraqi patients.

Materials and Method

The specimens were formalin-fixed, paraffin embedded tissue blocks. Forty samples (32 males and 8 females) with carcinoma were included in this study, their ages ranged from 30 to 80 years. Forty specimens of non-tumorous colonic tissues were considered as controls.

All cases were staged and pathologically graded according to the TNM staging system for colon andrectal cancer of the Union for International Cancer Control/ American Joint Committee on Cancer (UICC/AJCC, 7thedition).

Extraction of RNA: Total ribonucleic acid (RNA) was extracted from tissues using (TRIzol® reagent kit, Bioneer, Korea) according to manufacturer's instructions. The extracted total RNA were treated with DNaseI enzyme for removing the trace amounts of genomic DNA by using samples (DNase I enzyme kit) and done according to method described by Promega company, USA instructions.

Complementary DNA (cDNA) synthesis: A total of 100ng/ul of RNA was reverse-transcribed using M-MLV Reverse Transcriptase kit (Bioneer, Korea) to synthesis complementary DNA (cDNA). Using mRNA molecule as a template, reverse transcriptase synthesizes a single-stranded DNA in the presence of primers, which can be either oligod T (annealing to poly A tails of mRNA) or random hexamers (annealing to total RNA). The first new strand DNA molecule can then be used as a template for double-stranded DNA synthesis.

Quantitative Real-Time PCR (qPCR): The complementary deoxyribonucleic acid (cDNA) was then subjected to real-time polymerase chain reaction with specific primers for CXCL1. Five µLcDNA, 2µmol/L forward primer and 2µmol/L reverse primer 25 2X green star master mix 16 DEPC water were added to AccuPower^{TM} 2X Green Star qPCR master mix kit(Bioneer, Korea) in a total volume of 50µL.

The amplification protocol was used as follows: initial denaturation at 50°C for 1 hour for 1 cycle, then 40 cycle 95°C for 20 seconds, then followed by 40 cycles of 60°C for 30 seconds and 1 cycle of 60-95°C for 0.5 seconds. The sequence of the forward primer for CXCL1 was 5′-CCAAAGTGTGAACGTGAAGTCC-3′, and that of the reverse primer was 5′-AAGCTTTCCGCCCATTCTTG-3′. The sequence of the primers used for glyceraldehyde 3-phosphate dehydrogenase (GAPDH) was 5′-AATTCCATGGCACCGTCAAG-3′ (forward) and 5′-ATCGCCCCACTTGATTTTGG-3′ (reverse); (Bioneer company, Korea). The relative amount of CXCL1 messenger RNA (mRNA) to GAPDH was calculated as the average $2^{-\Delta Ct}$ where ΔCt (cycle threshold) = Ct − CtGAPDH

Statistical analyses: Data were summarized, presented and analyzed using two software programs. These were Microsoft Office Excel 2007 and the statistical packages for social sciences (SPSS, version 18) using *t*-test, ANOVA and Chi-squared tests at a level of significant alpha<0.05.

Results

CXCL1 gene expressions (mean fold change±SD) were found to be 1.3492+0.98851in normal colonic and 12.3884+8.54458in malignant tissue. So, according to independent *t*-test, CXCL1 gene expression significantly (P<0.0001) raised in colorectal carcinoma in relative to normal colonic tissues (Table 1).

Table 1: Relative expression results of CXCL1 gene in both normal colonic mucosa and colorectal carcinoma

CXCL1 gene expression	No.	Mean	Std. Deviation	P value	95% Confidence Interval of the Difference	
					Lower	Upper
Normalcolonic tissue	40	1.3492	0.98851	0.000	-11.03920-	1.72031
Colorectal carcinoma	40	12.3884	8.54458			

* The mean difference is significant at the 0.05 level.

According to ANOVA test there was significant difference between well differentiated and moderately differentiated tumor (P=0.000) and between well differentiated and poorly differentiated tumor (P=0.000), but there was no difference between poorly and moderately differentiated (P=0.51) and between poorly and normal colonic tissue (P=0.396) (Table 2) in which the mean of well differentiated tumor was 18.785, that of moderately differentiated tumor was 6.288 and that of poorly differentiated tumor was 2.546.

Table 2: CXCL1 gene expression level in relation to grade

(I) grade	(J) Grade	Mean Difference (I-J)	Std. Error	P*	95% Confidence Interval	
					Lower Bound	Upper Bound
Well	Moderately	12.49700*	1.60326	.000	9.2698	15.7242
	Poorly	16.23833*	1.50159	.000	13.2158	19.2609
	Normal tissue	17.43580*	1.02725	.000	15.3681	19.5035
Moderately	Well	-12.49700-*	1.60326	.000	-15.7242-	-9.2698-
	Poorly	3.74133	1.86343	.051	-.0096-	7.4922
	Normal tissue	4.93880*	1.50759	.002	1.9042	7.9734
Poorly	Well	-16.23833-*	1.50159	.000	-19.2609-	-13.2158-
	Moderately	-3.74133-	1.86343	.051	-7.4922-	.0096
	Normal tissue	1.19747	1.39898	.396	-1.6185-	4.0135
Normal-colonic tissue	Well	-17.43580-*	1.02725	.000	-19.5035-	-15.3681-
	Moderately	-4.93880-*	1.50759	.002	-7.9734-	-1.9042-
	Poorly	-1.19747-	1.39898	.396	-4.0135-	1.6185

*The mean difference is significant at P≤0.05.

To highlight the involvement of CXCL1 gene in the progression of the disease, expression results were analyzed with respect to the tumor stage. According to ANOVA test there was significant difference between stage T1 and stage T2 (P=0.000) and between stage T1 and stage T3(P=0.000), also there was significant difference between stage T2 and stage T3 (P=0.000),but there was no significant difference between stage T1 and normal colonic tissue (P=0.254) (Table 3), in which the mean of T1 was 2.871, T2 was 10.133 and that of T3 was 19.067.

Table 3: CXCL1 gene expression level in relation to stage

(I) stage	(J) stage	Mean Difference (I-J)	Std. Error	P*	95% Confidence Interval	
					Lower Bound	Upper Bound
T1	T2	-7.26190-*	1.82801	.000	-10.8991-	-3.6247-
	T3	-16.81175-*	1.42584	.000	-19.6487-	-13.9748-
	Normal	1.52223	1.32597	.254	-1.1160-	4.1605
T2	T1	7.26190*	1.82801	.000	3.6247	10.8991
	T3	-9.54985-*	1.51329	.000	-12.5608-	-6.5389-
	Normal	8.78413*	1.41960	.000	5.9596	11.6087
T3	T1	16.81175*	1.42584	.000	13.9748	19.6487
	T2	9.54985*	1.51329	.000	6.5389	12.5608
	Normal	18.33398*	.84062	.000	16.6614	20.0066
Normal	T1	-1.52223-	1.32597	.254	-4.1605-	1.1160
	T2	-8.78413-*	1.41960	.000	-11.6087-	-5.9596-
	T3	-18.33398-*	.84062	.000	-20.0066-	-16.6614-

*The mean difference is significant at P≤0.05.

Discussion

Studying the prognosis and prognostic factors to expect the risk of recurrence and metastasis for colorectal carcinoma patients are continued and could impact clinical practice. Biomarkers which are established such as BRAF, KRAS and microsatellite instability status outplay conclusive roles in anticipating prognosis and in the choosing of patients favorable for subjective therapy[15].Obviously, much research has focused on understanding the biology of colorectal carcinoma. Early metastatic pathological signs include invasion to blood vessel,lymphatic vessel, perineural invasion, or multiple presentations [16]. During the process of metastasis, tumour cells seceded from their primary site, enter the angio-lymphatic systems and other organs, and then adhere to the endothelial cells. Oneof these mechanisms is by adhering to chemokine receptors [17].

Nowadays, the chemokine family is receiving increased interest as multifunctional proteins that organize many cellular phenotypes in addition to their essential roles as chemotactic particles[18]. According to the tumor biology, specific chemokines are angiogenic orantistatic[19,20], othersorganize survival, cell cycle progression, growth, and cell–cellinteraction[21-24].

Previously, several gene expression studies have been performed on colonic tissue whether normal or diseased. In general, a genome broadmethod has been applied to determine genes dysregulated in malignant tissue that can be targeted in treatment strategies and for staging[25-27].

Previous studies had identified that increased levels of CXCL1 in human colonic cancer cells promotes tumourogenicity and are upregulated in human ulcerative colitis and colonic cancer[28-32].

In the present study, we investigated the level of CXCL1 mRNA expression in CRC of Iraqi patients by Real Time PCR and found that CXCL1 mRNA expression was significantly higher in cancer tissues(12.39 fold) than in normal colonic tissues (1.35) ($P<0.0001$) (Table 1).

Such results suggested that up-regulation of the expression of CXCL1 gene during carcinogenesis.

Findings of the up-regulation of CXCL1 expression in colorectal carcinoma patients were in concordance with the data of[33].

In this study, the relationship between tumor grade and CXCL1 mRNA expression was examined. Analysis of variance (ANOVA) showed that there were significant difference between well differentiated and moderately differentiated tumor ($P=0.000$) and between well differentiated and poorly differentiated tumor ($P=0.000$),but there was no difference between poorly and moderately differentiated ($P=0.51$) (Table 2) in which the expression level (mean fold change) was very high in well differentiated tumor (18.785), while[33] found that high mean fold change was in moderately differentiated tumor .

To highlight the involvement of CXCL1 gene in the progression of the disease, expression results were analyzed with respect to the tumor stage. A significant ($P=0.000$) rise of CXCL1 gene expression fold was observed in those of stage T3 when they were compared with those of stage T1. Similarly,CXCL1 gene expression was evident to be increased significantly ($P= 0.000$) in tumor of stage T3 with respect to those of stage T2 (Table 3).

In the current study CXCL1 expressions were found to be elevated as the stages advanced. These results were in consistence with previous reports[33]who had pointed out significant correlation of CXCL1 expression with advancing of colorectal carcinoma stages.

Conclusion

Current study suggested that highly elevated CXCL1 expression promotes tumourogenicity and served as a poor prognostic biomarker in advanced age colorectal carcinoma patients and in advanced stage patients. Moreover, CXCL1 may serve as a new biomarker and potential therapeutic target for CRC treatment.

Ethical Clearance: The research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq.

Conflict of Interest: The authors declare that they have no conflict of interest.

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Comparison of Modified Ashworth Scale and Modified Tardieu Scale on Assessment of Lower Limb Spasticity in Hemiplegic and Diplegic Cerebral Palsy

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Abstract

Background & Objectives: Cerebral palsy or CP is a non-progressive deficit of central nervous system. Spasticity is the most common muscle tonus problem. Most common spasticity assessment scales used for lower limbs in CP cases is Modified Ashworth Scale and Modified Tardieu Scale. The objective of the present study is to assess the better applicability of assessment of spasticity in lower limb muscles of hemiplegic and diplegic CP using Ashworth Scale (Modified) and Tardieu Scale (Modified).

Method: This study included 30 participants with 19 males and 11 females. The patients were assessed on Modified Ashworth Scale and Modified Tardieu Scale for lower limb muscles including Quadriceps, Hamstrings and Gastrocnemius. Observations assessed during the study were analyzed to find out the conclusion of the study and at the end results are compared.

Results: The current study showed statistical significance for Right Hamstrings ($p \leq 0.05$) in both Modified Ashworth Scale and Modified Tardieu Scale. On contrary, right side Quadriceps and Gastrocnemius and left sided all group of muscles including Quadriceps, Hamstrings and Gastrocnemius ($p \geq 0.05$)showed no statistical significance.

Discussion & Conclusion: No statistical significance was found in both Modified Ashworth Scale and Modified Tardieu Scale for Quadriceps, Hamstrings and gastrocnemius. But right-side hamstring showed significant difference between both the scales. So, either of the scales can be used to assess the spasticity in CP cases.

Keywords: *Diplegic CP, Hemiplegic CP, Spasticity, Modified Ashworth Scale, Modified Tardieu Scale.*

Introduction

Cerebral palsy or CP is a non-progressive deficit of central nervous system[1]. Spasticity is the most common muscle tonus problem and leads to loss of performance and retardation of motor functional capacity development.[2,3]

Damage to brain can lead to impairments such as spasticity or hyper tonicity, abnormal patterns of muscle activation including increased co-contractions.[4] Causative factors for Cerebral Palsy are: Idiopathic which is still the commonest cause, asphyxia (or lack of oxygen), after birth Bacterial meningitis, viral infection during pregnancy[5].

The increase in the muscle tonus limits functional skills, inhibits isolated joint movement, interrupts voluntary movements and in severe cases causes delay in motor development stages.[6,7,8]

As per Rehabilitation Council of India report, the prevalence of CP is in the range of 1.5 to 2.5 per thousand live births, while exact figures are unavailable in India[9].

In the definition of spasticity by Lance, clinical feature of spasticity is rise in the muscle tone which however is velocity dependent. High velocity stretching of muscle is essential to produce a reflex (stretch) at particular angle in ROM, more quickly the stretch, reflex feature of the increased tone of muscle will be stronger and earlier.[9] This stretch-related muscle activity is shown in many studies, validating the velocity dependency[10-13].

To examine or assessing the spasticity clinically (i.e. without use of devices which are special), tone intensity of muscle at very quick and slow, passive range of motion is assessed and comparison is made and graded. Assessment of spasticity can also be done by examining the angle of joint at which the increased tone of muscle is elicited in a quick stretch and comparison was made with joint angle in slow PROM.

Many clinical scales are used to evaluate and quantify spasticity. In various researches, 13 kinds of grading scales were there for clinical evaluation of spasticity of Cerebral palsy child.

These scales were divided in 3 main groups, based on quantification and procedure. The very first group is the "Ashworth-similar scales or Ashworth like scales", which was given by Ashworth. It was the Ashworth scale which was original.[14] Three modifications were there in AS. By adding an extra intermediate grade, first modification was made, Ashworth scale (modified)–Bohannon[15]. Second modification Ashworth scale (modified)–Peacock or P.[16] And the third modification, combined the Ashworth Scale with ROM at a quick velocity stretch, known as NY University Tone Scale .[17]

Group second is called 'Tardieu similar like scales', given by Tardieu, defined the spasticity grading and quantification principle by angle of measurement of joint which was performed at different velocities of stretch of muscle. Resultant grading found are the TS[18] by which the assessment and grading of spasticity is done by passively moving the joints in 3 different velocities which were specified, i.e. 'slow', 'under gravity' and 'fast' and the intensity and time of the muscle reaction to stretch (*X)* is scored on a 5-point grading scale, Y or angle of joint at which this reaction of muscle was first assessed. Technique requires a lot of time. That is why it was converted to Modified Tardieu Scale.[19]

And the 3rd one is "other grading clinical scales, it includes Duncan-Ely test, Modified Composite Spasticity Index, and other nameless scales.

Reliability of Ashworth Scale (modified) was varied from 'low' to 'average' and reliability which was intraobserver of MAS was found significant ($p<0.01$). Intrarater reliability of Tardieu scale (modified) ranged as 'average', 'good' and 'excellent' and reliability was significant ($p<0.01$)[20.]

Considering these variations in assessment of spasticity in CP, the present study was planned to have a comparative study of two most commonly used grading scales-Ashworth Scale (modified) and Tardieu Scale (modified), to establish the better application of the two scales for the assessment and quantification of spasticity of lower limb in Hemiplegic and Diplegic CP children.

Method

Source of Collection of Data: Special schools, OPD's.

Sample Size: 30 cases

Study Design: Observational study.

Instrumentation:

- Goniometer
- Modified Ashworth Scale
- Modified Tardieu Scale

Inclusion Criteria:

- Diagnosed case of spastic diplegic & spastic hemiplegic CP.
- Age group 2 to 18 years of either sex.[20]
- Upto level IV of GMFCS scale.[26]
- Parents of the ward willing to sign consent form.

Exclusion Criteria:

- Children with other forms of CP such as dyskinetic, ataxic or mixed type CP.[20]
- Behavioral impairment which can interfere with cooperation ability of patient.[21]
- Ortho related surgery, Inj.Botulinum Toxin during last 6 months.[20]
- Intrathecal or oral myo-relaxant drugs within 30 days of research.[21]
- Cast on the body on affected side.[21]

Sampling Method: Convenient Sampling.

Outcome Measures:

1. Lower limb spasticity
2. Modified Ashworth Scale
3. Modified Tardieu Scale

Procedure:

1. 30 Cases was selected as per inclusion criteria and divided into two groups: Diplegic CP & Hemiplegic CP.
2. The functional level of subjects was classified according to Gross Motor Function Classification System (GMFCS) for cerebral palsy as Level 1, 2,3 and 4.[22]
3. Written consent was acquired from each participant's parent.
4. In all cases of the groups, Ashworth (modified) and Tardieu (modified) scales was applied to assess the status of spasticity.
5. Following group of Lower Limb muscles are assessed for spasticity in both the groups
   a. Quadriceps
   b. Hamstrings.
   c. Gastrocnemius.
6. Tone is assessed in both the groups, i.e. spastic diplegic and spastic hemiplegic CP using Ashworth Scale (modified) and Tardieu Scale (modified) three times maximum.
7. As described by Bohannon and Smith, for standardization of stretching speed, passive movements were made in one second for Modified Ashworth Scale.
8. Duration between Ashworth (modified) and Tardieu (modified) scales wassame day on the same child. The scoring was done on the muscles first with the Ashworth (modified) and second with Tardieu (modified) scales. There was a minimum of 10 minutes of rest between the two assessments.[20]

Statistics Method: After complete data collection, the information was entered into the SPSS version 20 Statistics program. The same was also reconfirmed by use of 'Graph Pad' software.

Results

Total number of patients was 30; mean age of all the 30 subjects was 11.76 years with 19 males and 11 female participants of hemiplegic and diplegic CP.

The study showed no statistical significance for Quadriceps and Gastrocnemius muscle groups but hamstring muscle showed statistical significance. Table 1 and 2 shows Ashworth Scale (Modified) and Tardieu Scale (Modified) on all the three muscles, i.e. quadriceps, hamstrings and gastrocnemius of right and left side respectively. Overall comparison of MAS and MTS is shown in table 3 and 4.

Table 1: MAS vs MTS on all the three muscles of right side

Muscle	Modified Ashworth Scale (MAS)	Modified Tardieu Scale (MTS)
Quadriceps	2.40±1.48	2.13±1.22
Hamstring	3.13±1.66*	2.27±1.44*
Gastrocnemius	2.67±1.65	2.30±1.37

*$p \leq 0.05$ so this difference is considered to be statistically significant.

Table 2: MAS vs MTS on all the three muscles of left side

Muscle	Modified Ashworth Scale (MAS)	Modified Tardieu Scale (MTS)
Quadriceps	2.17±1.21	2.20±1.19
Hamstring	2.43±1.48	2.23±1.46
Gastrocnemius	2.80±1.61	2.50±1.33

Comparison:

Table 3: Modified Ashworth scale vs Modified Tardieu scale (right side)

Group	Modified Ashworth Scale	Modified Tardieu Scale
Mean±SD	8.20±3.55	6.70±3.31

Table 4: Modified Ashworth scale vs Modified Tardieu scale (left side)

Group	Modified Ashworth Scale	Modified Tardieu Scale
Mean±SD	7.40±3.62	6.93±3.00

Figure 1 and 2 depicts comparison of both MAS and MTS of right side and left side on muscle tone.

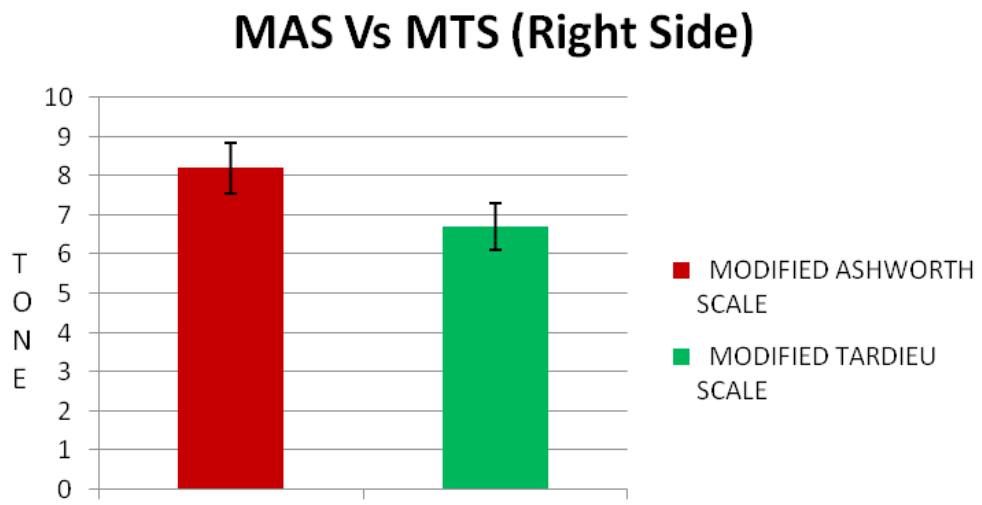


Figure 1: Comparison between MAS and MTS (Right side)

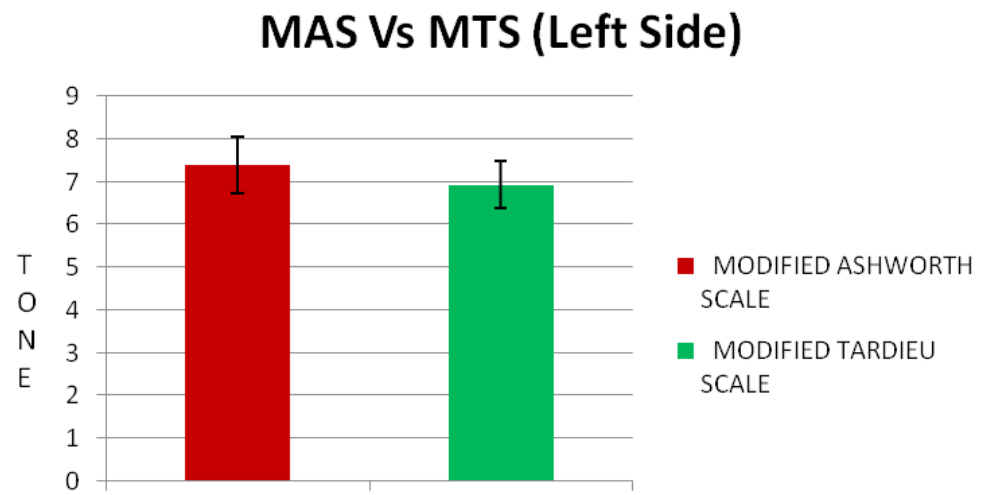


Figure 2: Comparison between MAS and MTS (Left side)

Discussion

For assessing and quantifying spasticity clinically, various ordinal scales are used, most common of which is Ashworth Scale (Modified). Although its widespread use, Ashworth Scale (Modified)'s reliability has questioned in some previous researches.[20]

Therefore, the present study done to assess the better applicability of assessment of spasticity in lower limb muscles of hemiplegic and diplegic CP. The muscles of lower limb were chosen because they are the most commonly affected muscles by increased muscle tone and these muscle groups are also important for rehabilitation aspect[25].

According to the extremity dispersal, the current study has mostly spastic diplegic variants of Cerebral Palsy with 27 out of 30 cases.

Musclewise Significance of MAS and MTS: The current study shows, by conventional criteria, no statistical significance in the right Quadriceps ($p>0.05$) and left side Quadriceps ($p>0.05$), right Gastrocnemius ($p>0.05$) and left Gastrocnemius ($p>0.05$) and left Hamstrings ($p>0.05$). But Right Hamstrings ($p<0.05$), by conventional criteria, shows statistically significant result.

When compared with the current literature, the findings of the present study are consistent with the study of Clopton et al, where they found moderate intraobserver reliability for the Ashworth Scale (Modified) (although MAS has exception of good reliability (interrater) for Hamstrings and poor for other muscles)[20]. As the present research showed statistically significant difference for Hamstrings for AS (Modified) and TS (Modified), so this can be assumed, also taking into account previous

studies, that Ashworth Scale (Modified) is better for assessment of spasticity of Hamstring muscles than Tardieu Scale (Modified) as Ashworth Scale (Modified) quantify good reliability for hamstring muscles. For other muscles of lower limb i.e. Quadriceps and Ankle plantar flexors (Gastrocnemius), Tardieu Scale (Modified) is reliable for assessment of spasticity than Ashworth Scale (Modified) as Tardieu Scale (Modified) far better assess the concept of spasticity for all muscles as it assesses the static as well as dynamic component of spasticity.

This study indicates no statistical significance of Ashworth Scale (Modified) and Tardieu Scale (Modified) for Quadriceps muscle. In previous studies, for MAS, interrater reliability for quadriceps was 0.45 with low reliability.[20] In one another study, the interrater reliability for quadriceps was found to be 0.28 and intrarater reliability to be 0.66 for Ashworth Scale (Modified).[25]

Gastrocnemius (ankle plantar flexors) shows no statistical significance in the current study with ICC value of Ashworth Scale (Modified) 0.35 and for Tardieu Scale (Modified) was 0.63.[20] As the ICC values showed difference, although not much, but it can be assumed that though in present study no significance is shown statistically but Tardieu Scale (Modified) assess spasticity better than Ashworth Scale (Modified).

In a study published in 2008 to assess reliability of Ashworth and Modified Ashworth in CP children suggested the interrater as well as intrarater reliability for Hamstrings found to have good ICC values for interrater[22] Also in other previous research where reliability of Tardieu Scale in CP children was done and found that reliability of Tardieu Scale was lower for Hamstrings for the measurements of angle[21.] Both the studies are in consistent with the current study in which p values for Ashworth Scale (Modified) is more than Tardieu Scale (Modified). Mackey et al also indicated that there is 'limited ability' of Tardieu Scale to assess spasticity in CP children [24.]So all these studies going in accordance with the present study and can be assumed that for Hamstring muscles Ashworth Scale (Modified) is efficient than Tardieu Scale (Modified) in assessing spasticity in CP children.

Clinical Implication of the Study: Clinical significance of study shows that both Ashworth Scale (Modified) and Tardieu Scale (Modified) can be used as a clinical spasticity measurement tool. Ashworth Scale (Modified) is most widely used tool for quantifying spasticity as it is not much time consuming and also it does not require any instrumentation. Tardieu Scale (Modified) assess both the static as well as dynamic aspect of spasticity. So, any of the scales can be used for assessing spasticity for assessment as well as outcome purposes post interventions.

Scope for Future Research: Future research studies are required to assess spasticity in diplegic and hemiplegic variants with large sample size. Also, to assess whether spasticity measured by both the scales will show differences in post treatment assessment too or not.

Limitations of the Study:

- Limitation of this study primarily is the small sample size (n=30). The population size is not large enough to tell the evident results for both the scales for assessing spasticity.
- Representation of Hemiplegic CP cases should be almost equal to Diplegic CP group to achieve appropriate input.

Conclusion

The study showed statistically significant difference for Hamstring Muscles whereas not such significant difference statistically on assessment of lower limb muscle spasticity by Ashworth scale (Modified) and Tardieu scale (Modified) on assessment of lower limb muscle spasticity of Quadriceps and Gastrocnemius in hemiplegic and diplegic variants of Cerebral Palsy cases.

Disclaimers: Views expressed in the submitted article are our own.

Ethical Clearance: Ethical clearance was taken from the Institutional ethical committee of Amity University, Noida.

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Conflict of Interest: Nil.

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Physical Activity Changes Impact the Nutritional Status of the Elderly: A Longitudinal Study

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Abstract

This study to determine the impact of physical activity on the nutritional status of elderly people. This longitudinal study used 2007 pre erlderly aged 55-59 years (808 subjects) and followed for 7 years untuil 2014. Data physical activity were assessed to evaluate changes in nutritional status as body mass index (BMI). The factors associated with nutritional status are reported in this study. For 7 years, no physical activity changes were reported (60,8%). Physical activity changes were only reported by a few subjects (16,1%), and improved from no physical activity to periods of < 30 min or ≥ 30 min. BMI increased as physical activity decreased, in terms of both types and duration. Regular physical activity is an important factor to enhance the quality of life for elderly people.

Keywords: *Nutritional status, body mass index, physical activity, elderly, pre-elderly.*

Introduction

The composition of elderly population is increasing rapidly in both developed and developing countries because of increased life expectancy. Data from Ministry of Health Indonesia reported that since 2015 Asia and Indonesia have an era characterized by an aging population because > 7% aged 60 years and older. The elderly population experience decreased physical endurance and are more susceptible to diseases, the elderly morbidity rate of 28.2% in 2015 [11].

Nutritional status is a n indicators used to measure the health status of people. The nutritional status of the adult population (> 18 years old) can be determined by body mass index (BMI). The BMI is divided into categories of thin (< 18), normal (≥18–< 24.9), overweight (≥25–< 27.0) and obese (≥27.0) (10). Ferra *et al* [6] stated that low or high BMI is associated with several general conditions and diseases in elderly and it indicates that nutrition is an important part in medical evaluation in elderly patients. Study from Hwang *et al* found that BMI is a predictor for mortality in the elderly, with obesity (BMI > 25) as the significant independent predictor for all causes of mortality, whereas being overweight (BMI > 23) elevates the risks of mortality caused by cancer, cardiovascular disease, and diabetes [8].

Physical activity determines a person's health. Excess energy due to a low level of physical activity can increase the risks of being overweight and the risk of obesity [18]. Regular physical activity of moderate intensity has significant health benefit and may decrease the risks of cardiovascular disease, diabetes, breast cancer, and depression. Physical activity performed regularly tends to fix body composition by the reduction of abdominal fat and overall improvement toward weight control [17].

The WHO[17] has published globally recommended physical activities for the health of adults aged 18–64 years, which include free-time physical activities, transportation (i.e. walking or cycling), occupation (jobs), household chores, games, and sports or planned exercise, in the contexts of daily life, family, and community activities. The present study, we aimed to analyze physical activity as a risk factor for pre-elderly and elderly obesity using BMI values published in the Indonesia Family Life Survey (IFLS) from 2007 and 2014 data.

Materials and Method

Study Design: This study was a longitudinal study. This design was deemed the best way to analyze body mass index and other factors that were measured repeatedly over a certain period time, between individuals and between times. The data were collected from secondary data by the Indonesian Family Life

Survey (IFLS), which was a public domain from IFLS4 (2007) and IFLS5 (2014) data. This research was done in 13 selected provinces from Indonesian Life Households Survey. Altogether these provinces represented approximately 83% of Indonesia[15].

Subjects in this study was comprised of the elderly (55-59 years old) in 2007 then followed for 7 years until they were 62-66 years old in 2014. The number of individuals for was 808 subjects. The independent variable for this study was physical activity and dependent variable was nutritional status (BMI). Subjects were divided into three groups in terms of physical activity: 1) those not performing reguler physical activity (mild, moderate or heavy), 2) those performing physical activity for periods of < 30 min, and 3) those performing regular physical activity for periods ≥ 30 min. Additional variables were observed including age sex, marital status, tribe, education level, occupation status, income, insurance ownership, smoking habits, accident records, fall records, nutritional status, and eating habits.

Univariate and bivariate analysis were performed. Univariate analysis was performed as the frequency distribution of the mean and standard deviation sociodemographic data. Bivariate analysis was performed to know relationship between independen variable and dependen variable.

Findings: The sociodemographic featurs are shows that 200 people (24.8%) were 55 years old, the greatest number of elderly subjects. The sex of elderly subjects was evenly distributed with 50.4% male and 49.6% female. Most subjects were married (71.2%), were Javanese (68.9%), were not elementary graduates (50.5%), were employed (68.8%), had income at percentile 1 (31.8%), did not posses insurance (54.8%), were non-smokers (57.9%), did not not have accident records (87.5%), had never fallen (89.5%), had normal nutritional status (58.4%), practiced physical activities for ≥ 30 min (70.8%), frequently consumed carbohydrate in a week (68.3%), frequently consumed protein (54.8%), and frequently consumed vegetables (59.7%) and fruits (61.3%).

Table 1 shows that the mean elderly BMI was 22.64, The mean carbohydrate consumption score, protein, fat/ oil, vegetable and fruit respectively was 2.99, 1.94, 2.22, 3.75, 1.16.

Table 1: Body mass index (BMI) and food consumption scores of the subjects in 2014 (n=808).

Variable	Mean	SD	Min-Max	95% CI
BMI (kg/m^2)	22.64	3.84	12.78-32.85	22.37-22.90
Score of Carbohydrate Consumption (day/week)	2.99	0.77	1.33-7.00	2.94-3.04
Score of Protein Consumption (day/week)	1.94	1.31	0.00-7.00	1.85-2.02
Score of Fat Consumption (day/week)	2.22	2.63	0.00-7.00	2.04-2.40
Score of Veg Consumption (day/week)	3.75	2.69	0.00-7.00	3.57-3.94
Score of Fruit Consumption (day/week)	1.16	1.08	0.00-6.00	1.09-1.23

Table 2 indicates that the mean BMI decrease as physical activity increases in duration. This could be seen through the mean BMI, which decreased from 23.5 kg/m^2 to 22.7 kg/m^2 when the physical activity increased to ≥ 30 min. In contrast, the mean BMI increased from 22.7 kg/m^2 to 23.0 kg/m^2 when the physical activity decreased to durations of < 30 min or didn't perform physical activity.

Table 2: Physical activity changes and mean BMI of subjects in 2007 and 2014 (n = 808)

Physical Activity Changes	n	%	Mean BMI 2007 (kg/m^2)	Mean BMI 2014 (kg/m^2)	P Value
No changes in Physical Activity	491	60.8	22.4	22.4	-
Increase in Physical Activity, if: no physical activity → physical activity < 30 min, and/or physical activity < 30 min → physical activity ≥ 30 min	113	14.0	23.3	23.5	0.008*
Increase in Physical Activity, if: no physical activity → physical activity ≥ 30 min	17	2.1	22.7	22.7	0.762

Physical Activity Changes	n	%	Mean BMI 2007 (kg/m^2)	Mean BMI 2014 (kg/m^2)	P Value
Decrease in Physical Activity, if: physical activity ≥ 30 min → physical activity < 30 min, and/or physical activity < 30 min → no physical activity	107	13.2	22.8	23.0	0.176
Decrease in Physical Activity, if: physical activity ≥ 30 min → no physical activity	80	9.9	22.1	21.9	0.248

Note: * significant statistic p<0.05

Table 3: Comparison of Mean BMI of subjects in 2014

Variables	Mean BMI (kg/m^2)	SD	P Value	95% CI
Sex				
Female	23.4	4.1	<0.0001*	1.10-2.14
Male	21.8	3.4		
Marital status				
Not Married	22.8	3.9	0.496	-0.38-0.79
Married	22.6	3.8		
Ethnicity				
Sumateranese	22.9	4.1		
Javanese	22.7	3.8	0.507	-0.53-1.07
Others	22.1	3.8	0.068	-0.07-1.86
Education				
Not graduated in primary school	22.2	3.8		
Graduated in primary school	22.5	3.8	0.342	0.94-0,32
Graduated in junior high school	23.7	3.7	0.003*	-2.44-(-0.51)
Graduated in senior high school	23.8	3.9	<0.001*	-2.14-(-0.41)
Working status				
Unemployed	23.2	3.9		
Employed	22.4	3.8	0.005*	0.25-1.42
Income				
Percentil 1 (Rp 0)	22.9	3.9		
Percentil 2 (< Rp 1,000,000)	21.8	4.2	0.073*	-0.10-2.24
Percentil 3 (≥ Rp 1,000,000-< Rp 10,000,000)	22.4	3.8	0.189	-0.23-1.16
Percentil 4 (≥ Rp 10,000,000-< Rp 20,000,0000)	22.4	3.8	0.154	-0.20-1.28
Percentil 5 (≥ Rp 20,000,000)	23.3	3.5	0.362	-1.26-0.46
Health insurance				
Does not have	22.5	3.8	0.343	-0.79-0.27
Has	22.8	3.9		
Smoking status				
No smoking	23.4	3.9	<0.001*	1.23-2.28
Smoking	21.6	3.4		
Accident history				
Does not have	22.6	3.9	0.835	-0.72-0.89
Has	22.6	3.6		
Fall history				
Does not have	22.6	3.8	0.837	-0.96-0.78
Has	22.7	3.9		

Note: * Significant statistic p<0.05

Table 3 reveals a significant relationship between the mean elderly BMI ($p < 0.05$) and sex, education level, occupation status, income, and smoking habits. The mean BMI in females (23.4 kg/m^2) was higher than that in males (21.8 kg/m^2). Higher levels of education correlated with higher mean BMI values in the elderly. The highest mean BMI was found in the elderly group that graduated from senior high school (23.8 kg/m^2) whereas the lowest was observed in the elderly group that had not graduated from elementary school (22.2 kg/m^2). The unemployed elderly exhibited a higher mean BMI (23.2 kg/m^2) value than observed in those who were employed (22.4 kg/m^2). The non-smoker elderly group had a higher mean BMI (23.4 kg/m^2) than the smokers (21.6 kg/m^2).

Discussion

The nutritional status of elderly subjects in the present study was determined using BMI as an indicator and we found that mean BMI of females was observed to be greater (23,4%) than that of males (21,8%). This result agrees with the observations of the NCD Risk Factor Collaboration [11] which reported the 2014 the prevalence of obesity in females greater than males. BMI influences by change in body composition of the elderly and related to the aging process, which increases BMI by 1.5–2.5 kg/m^2. Decreasing height is another characteristic of the aging process, resulting from spinal thinning or osteoporosis. The decrease in height starts after the age of 30 years, with continued decrease approximately 1 cm per decade until the age of 70 years, and 0.5 cm per year afterwards [2].

The mean BMI of the elderly in this study is associated with education level which is higher education correlating with a higher mean BMI. It was observed that the primary school-graduated and secondary school-graduated elderly group had an mean BMI that differed significantly compared with the elderly group who had not graduated from elementary school. This result is consistent with that reported in the study by Zhoua *et al.,* (17) which showed that greater BMI is found among those with elementary level of education or above compared with those less educated. A higher level education is associated with a better socioeconomic condition as supported by an adequate income.

The smoker elderly have a lower BMI (21.6 kg/m^2) than the smoker elderly (23.4 kg/m^2). This supports the results published by Jitnatrin *et al*., [9] showing that the BMI of smoker males was lower (21.6 kg/m^2) than that of non-smoker males (22.2 kg/m^2) with similar results observed for the mean BMI of smoker females (22,1 kg/m^2) which was lower than that of non-smoker females (22.9 kg/m^2). This may be due to the elevation of metabolic rate and/or reduced appetite caused by nicotine in smokers.

Most of the elderly (68.8%) in the present study were employed, and the mean BMI of the employed elderly was lower (22.4 kg/m^2) than that of the unemployed elderly (23.2 kg/m^2). A statistically significant relationship was observed between the BMI values of subjects with employed versus unemployed status ($p < 0.05$). This is likely due to greater physical activity performed by employed people than unemployed people.

Data on physical activities in the elderly group show that the majority (70.8%) spent ≥ 30 min performing physical activities. Most of the elderly subjects (491 people) did not exhibit changes in the type of physical activity although a small proportion (17 people) increased their physical activity from zero time spent to ≥ 30 minutes. The mean BMI increases as both type and duration of physical activity decrease, and vice versa. The mean BMI can reduced when physical activity is performed after not doing so.

Age and levels of sports and recreational physical activity are associated with fat-free mass change[7]. The fat-free mass contributes 19% in people who experience weight gain when decreasing physical activity. The fat-free mass represents 33% of the weight lost in people who experience a decrease in weight. The fat-free mass in the male elderly drops with age (0.2% per decade), whereas the fat mass is gained equally gains in both sex (7.5% per decade). Nelson *et al* [13] stated that the recommended physical activity for the elderly is to enlarge the volume of aerobic physical activity, helping to prevent unhealthy weight. Additional physical activities also help prevent weight gain in the elderly. The recommended goal includes aerobic physical activity performed 30–60 min per day moderate activity.

Barrigan *et al*., [3] showed that the elderly aged 60–69 years generally only have 6–10 min for physical activity with moderate intensity or more per day. Duray & Genc [4] showed that due to decreased aerobic capacity in elderly people, walking and balance changes may cause a decrease in functional capacity. The WHO[17] recommends that physical activity should be performed

at least 150 min a week for moderate-intensity physical activity, 75 min a week for high-intensity physical activity, or an equal combination of the two activities.

In the present study, most of the elderly possessed normal nutritional status and practiced constant activities, except for increasing or decreasing physical activity due to spesific physical limitations. Aging itself can be defined as the progressive deterioration or loss of functional capacity that occurs in an organism after a period of reproductive maturity. Specific functional capacities change with age and the physiological capacities of organs show aging at different rates. Between individuals, more difference is noted in older people than younger people [1]

According to Sun *et al*.,[16] regular physical activity can lead to a significant health improvement at all ages, and can prolong the active years of independent living as well as enhance the quality of life for the elderly. The decrease in physical activity is due to indications of constant work and dietary changes. Physical activity in the elderly is needed to inform public health strategies for improved quality of life for the elderly. Sahin *et al.* [14] have determined that elderly people may become more dependent on additional assistance at advanced ages for some instrumental activities.

Conclusion

However, our findings suggest that increased physical activity influences the nutritional status of elderly people, by reducing BMI. These results will help to improve the quality of life and strongly indicate the importance of a regular physical activity program.

Conflict of Interest: The authors declare no conflict of interest.

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Ethical Clearance: The procedures of the IFLS survey have been reviewed and approved by Institutional Review Boards in the United States (at Rand Corporation, Santa Monica, California) and in Indonesia (Ethics Committee of Gadjah Mada University Yogyakarta for IFLS3-IFLS5, and University of Indonesia, Jakarta for IFLS1-IFLS2) (https://www.rand.org).

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Dosing of Erythropoietin Stimulating Agents in Patients on Hemodialysis: A Single-Center Study

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Abstract

Objective: Study the relationship of dialysis adequacy with the effectiveness of erythropoietin for the management of anemia in hemodialysis patients.

Materials and Method: A retrospective cohort study, conducted in the Medical city complex from January 2019 to June 2019, the study involved 162 ESRD patients on regular hemodialysis sessions.

Results: Change in Hb (percentage and value), was significantly higher in patients receiving once-weekly erythropoietin compared to both twice and thrice and more dosing per week. Overall only 33 (21.2%) of the patients achieved target Hb (10–11 mg/dL) with 6 months of follow-up. There was an inverse significant correlation between percentage change after 6 months with baseline Hb, baseline ferritin, and baseline albumin. While with urea at baseline, number of weekly sessions, and Kt/V the relationship becomes direct and significant. There is an increased risk (2 folds) of not achieving target Hb (10-11 mg/dL) in patients with DM compared to those without DM.

Conclusion: Once weekly regimen appeared to superior to other regimens (twice or more per week).

Keywords: *Erythropoietin, dialysis, hemoglobin, anemia, weekly dosing.*

Introduction

End-stage renal disease (ESRD) occurs when there is a progressive loss of kidney function over a period of months to years to the point where the kidneys can no longer maintain normal function [1]. Anemia is common among patients with chronic kidney disease (CKD). Anemia underlies many of the symptoms associated with reduced kidney function and is associated with increased mortality and hospitalizations [2]. The anemia of CKD is, in most patients, normocytic and normochromic and is due primarily to reduced production of erythropoietin by the kidney (a presumed reflection of the reduction in functioning renal mass) and to shortened red cell survival[3]. The primary therapeutic options for the anemia of CKD include iron, erythropoiesis-stimulating agents (ESAs), and, rarely, red blood cell (RBC) transfusions. The treatment depends on the severity of anemia and iron deficiency. ESAs are administered to most CKD patients who have hemoglobin (Hb) <10 g/dL, providing the transferrin saturation (TSAT) is >25 percent and ferritin >200 ng/mL[4]. The current work aimed to study the relationship of dialysis adequacy with the effectiveness of erythropoietin for the management of anemia in hemodialysis patients.

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Method

Patients: A single-center study involved 162 ESRD patients on regular hemodialysis sessions

Data Collection: Demographic characteristics, cause of end-stage renal disease, time on dialysis, and type (epoetin alpha) and the dose of erythropoietin (50 to 100 units/kg/dose 3 times weekly, SC), type and dose of iron preparation.

Two consecutive (every 6 months) laboratory records of the patients were collected by trained nurses and data were entered into a specifically designed datasheet.

Laboratory analysis: Laboratory data collected from patients' charts included hemoglobin level, serum ferritin, and single-pool Kt/V, serum albumin, blood urea, and serum creatinine.

Inclusion criteria:

1. Age above 18 years
2. Patients on regular hemodialysis
3. End-stage renal disease

Exclusion criteria:

1. Pregnant women
2. History of hematologic disorders such as thalassemia, sickle cell disease, and hematologic malignancies
3. Patients with active or past cancer

Statistical analysis: Discrete variables presented using their number and percentage, chi-square test used to analyze the discrete variable. One-way ANOVA used to analyze the differences between more than two groups after that in the results is significant post hoc Tukey test will be used. Linear regression analysis performed to assess the relationship between different variables, r (correlation coefficient or standardized beta is a representative of magnitude and direction of the relationship), negative sign indicates inverse relationship, but positive sign represents direct relationship. SPSS 22.0.0 (Chicago, IL), Minitab 17.1.0, software package used to make the statistical analysis, p-value considered when appropriate to be significant if less than 0.05

Results

The study included 162 patients, with mean age of 52.7 ± 15.9 years, 57.4% of them were males. There was no significant difference in the age of patients when divided by gender (50.6 ± 13.6 vs. 54.3 ± 17.3 years, female vs. male, p-value = 0.128), as illustrated in table 1.

Table 1: Baseline Characteristics and Demographic Data

Variables	Value
Number	162
Age (Years), mean ± SD	52.7 ± 15.9
Gender, n (%)	
Female	69 (42.6%)
Male	93 (57.4%)
Medical Diseases	
Hypertension, n (%)	147 (90.7%)
Dry weight (kg), mean ± SD	70.2 ± 14.7
Cause of end-stage renal disease, n (%)	
Diabetic nephropathy	66 (40.7%)
Glomerulonephritis	27 (16.7%)
Polycystic kidney disease	21 (13.0%)
Hypertensive nephropathy	36 (22.2%)
Obstructive uropathy	24 (14.8%)
Dialysis duration, n (%)	
<1 Year	72 (44.4%)
≥ Year	90 (55.6%)
Vascular Access	
Temporary double-lumen	126 (77.8%)
Tunneled	12 (7.4%)
Fistula	24 (14.8%)
KT/V	0.85 ± 0.31
Dialysis adequacy (Kt/V ≥1.2)	30 (18.5%)

After 6 months of therapy with EPO, 6 patients (3.7%) stop their EPO since they maintain Hb level above 10 mg/dL during this period, the rest of the patients (156, 96.3%) categorized according to dosing intervals, in which 27 (17.3%) used single weekly dose, 63 (40.4%) used twice weekly doing, and 66 (42.3%) used trice weekly dosing.

Change in Hb (percentage and value), was significantly higher in patients receiving once-weekly EPO compared to both twice and thrice dosing per week (see Figures 3 and 4). Overall only 33 (21.2%) of the patients achieved target Hb (10–11 mg/dL) with 6 months of follow-up, as illustrated in table 2, figures 1.

Table 2: Assessment of the effect of EPO on Hb

	Once Weekly	Twice Weekly	Trice Weekly	p-value
Number	27	63	66	-
Baseline Hb	8.6 ±2.0	8.6 ±1.5	7.4 ±1.2	<0.001

	Once Weekly	Twice Weekly	Trice Weekly	p-value
Hb% change	26.6 ±35.1	6.4 ±21.4	9.9 ±23.8	0.003
Hb change	1.7 ±2.1	0.3 ±1.6	0.6 ±1.7	0.002
Patients achieved 10-11 mg/dL	15 (55.6%)	9 (14.3%)	9 (13.6%)	<0.001
Hypertension, n (%)	24 (88.9%)	57 (90.5%)	60 (90.9%)	0.956
DM, n (%)	6 (22.2%)	30 (47.6%)	33 (50.0%)	0.039

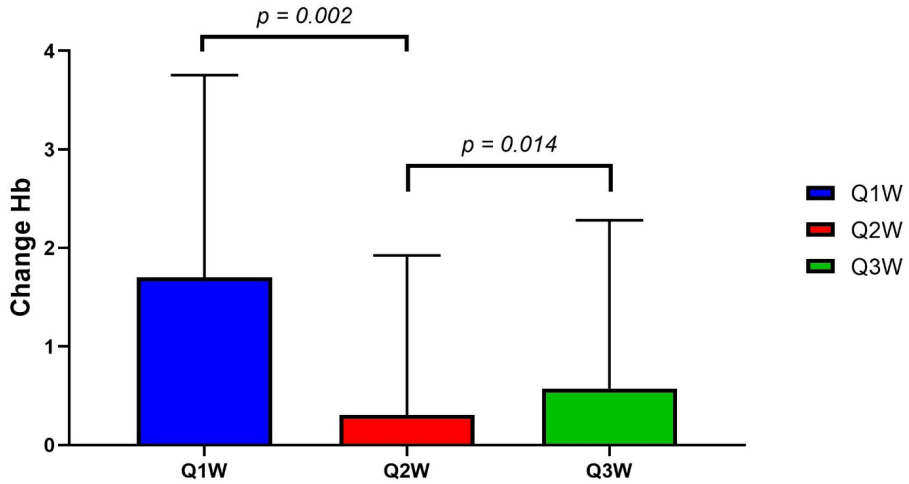


Figure 1: Assessment of the change in Hb from baseline to 6 months

There was a direct relationship between baseline urea, number of sessions per week, and Kt/V with percentage of Hb change.

There was an inverse relationship between baseline hemoglobin, baseline ferritin, and baseline albumin with percentage of Hb change, as illustrated in table 3.

Table 3: The relationship between change in Hb after 6 months and various variables

Variables	Percentage change in Hb	
	r	p-value
Age	0.084	0.288
Dry Weight	-0.088	0.266
Dosing Interval	-0.122	0.130
Hb at baseline	-0.629	<0.001 [S]
Ferritin at baseline	-0.194	0.013 [S]
Albumin at baseline	-0.284	<0.001 [S]
Urea at baseline	0.270	0.001 [S]
Creatinine at baseline	0.116	0.141
Ferritin after 6 months	-0.091	0.247
Albumin after 6 months	-0.110	0.162
Urea after 6 months	-0.060	0.448
Creatinine after 6 months	0.099	0.210
Session Per week	0.214	0.007 [S]
Kt/V	0.263	0.001 [S]

There an increased risk (1.943 folds) of not achieving target Hb (10-11 mg/dL) in patients with DM compared to those without DM, as illustrated in table 4.

Table 4: The relationship between DM and patients achieving target Hb

	Not DM	DM	OR	95%CI	p-value
Achieved target (%)	27 (29.0%)	12 (17.4%)	1.943	0.903–4.183	0.090
OR: odds ratio, CI: confidence interval					

Patients with higher Kt/V value had increased odd of achieving target Hb (1.5 folds), however, it did not reach statistical significance, as illustrated in table 5.

Table 5: The relationship between targets Hb with Kt/V

Variable	Target Hb		OR	95%CI	p-value
	Not achieved	Achieved			
Kt/V	0.84 ± 0.33	0.88 ± 0.24	1.548	0.498-4.809	0.450
OR: odds ratio, CI: confidence interval					

Discussion

In the current study, only 33 (21.2%) of the patients achieved target Hb (10–11 mg/dL) with 6 months of follow-up, with mean Hb after 6 months (8.8 ± 1.5 mg/dL), which lower than reported by international studies[5-9].

In the present study, there was a direct relationship between number of sessions with change in Hb (*r = 0.238, p-value = 0.001*), indicating that patients offered higher number of sessions had better anemic response. Although iron deficiency is probably the most important factor affecting the response to erythropoiesis-stimulating agents (ESA) in most patients, occult blood loss, infection, and inflammation also are important. Adequate dialysis can contribute to anemia correction by removing small and possibly medium/large molecules that may inhibit erythropoiesis [10].

Several metabolites have been implicated as potential EPO toxins, including various polyamines, such as spermine, spermidine, putrescine, and cadaverine, and parathyroid hormone. However, these substances have been found to be general bone marrow toxins and not specific suppressors of erythropoiesis. More recently, polymeric polyamine-protein conjugates have been shown to have a selective inhibitory effect on colony-forming units-erythroid proliferation without any appreciable effect on burst-forming units-erythroid[10].

In the present study we found that a once-weekly regimen is better than two or three times per week's regimens. This finding is unique since it is not reported in the literature.

In the present study patients with diabetes had two folds (OR = 1.94 3, 95%CI: 0.903–4.183) increased risk of not achieving target Hb (10–11 mg/dL). Diabetes is known to be a risk factor for the severity of anemia in non-dialyzed patients with renal failure, as well as in patients who require maintenance dialysis. Few studies have evaluated the difference in response to erythropoietin therapy in diabetic and non-diabetic patients [11, 12].

Despite the similarity of the response offered by erythropoietin therapy on Hb among various regimen, the overall percentage of patients achieving target Hb (10–11 mg/dL) was low 33 (21.2%), with once-weekly regimen offered the highest proportion (55.6%) within target, while the rest of the regimens offered lower percentage (14.3%, and 13.6% for Q2W, and Q3W respectively). This was in disagreement with previous studies in which the percentage of achieving target was higher (80–90% in most studies)[6-8].

In the present study Dialysis adequacy (defined at Kt/V ≥1.2 according to KDOQI guideline [13]) achieved in 30 (18.5%) of the participants, which is lower than other reported studies like Nafar et al with 58% achieving dialysis adequacy [14], and once-weekly than Amini et al with 43.3% achieving dialysis adequacy[15].

Because anemia improves after the start of dialysis, adequate dialysis is of paramount importance in correcting anemia by removing small, and possibly medium/large molecules that may inhibit erythropoiesis. Even if previously underestimated, the role of dialysis dose per se on anemia and response to ESA has progressively come to the scene. In a previous study a direct relationship between hematocrit level and urea reduction ratio (URR) after adjustment for other factors; at logistic regression analysis, an 11% increase in URR doubled the odds that a patient would have a hematocrit higher than 30%. Twenty consecutive patients receiving inadequate dialysis (baseline URR, 65%) received an increase in dialysis dose and were compared with another 20 End-stage patients receiving inadequate dialysis and in whom the dialysis schedule was not modified. 19 After 6 weeks, in parallel with an increase of mean URR to 72%, the hematocrit level increased from 28.4% ± 0.78% to 32.3% ± 0.71% (P-value 0.002), whereas it remained unmodified in the control group, without any difference in ESA dose in the 2 groups explained [10].

Data on the possible role of dialysis dose on anemia correction also come from the dialysis center in Tassin, France. In this facility, patients are treated with long

hemodialysis sessions lasting 8 hours. Fifty-nine of these patients were compared with 53 patients from Sweden receiving conventional hemodialysis lasting 3 to 5 hours.23 Even if the mean hematocrit level was similar in the 2 groups, the proportion of patients treated with rh-EPO was much higher and the mean Kt/V was significantly lower in the Swedish than in the Tassin group. The better control of anemia observed in the patients from Tassin mainly is owing to a higher depuration rate, but it also is possible to hypothesize an effect of dialysis time per se, independent from dialysis adequacy[10].

In the present study, there is direct correlation between dialysis adequacy with increase in Hb (r = 0.263, p-value =0.001), which is in agreement with other studies.[16,17]

One of the major determinants of anemia severity and ESA responsiveness is dialysis adequacy[18]. Patients with an inadequate dialysis dose are resistant to ESA, and their target Hb is harder to reach[19]. In hemodialysis, there is an inverse relationship between the achieved Kt/V and ESA dose, while increasing the dialysis dose is associated with an increase in hematocrit level [20]. Uremic toxicity in general and/or retention of some direct inhibitors of erythropoiesis results in aggravated anemia and poor response to ESA treatment [17].

Conclusion

Once weekly regimen appeared to superior to other regimens (twice or more per week).

Conflict of Interest: None

Ethical Clearance: Informed written consent was obtained from all the participants in the study, and the study and all its procedure were done in accordance with the Helsinki Declaration of 1975, as revised in 2000. The study was approved by the Arabic Board of Medical Specializations.

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Therapeutic Uses of Momordica Cymbalaria: Review

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Abstract

Momordica cymbalaria plant belongs to Cucurbitaceae family which is widely spread in southern parts of India. *Momordica cymbalaria* is a well known plant species since in ancient times the use of plant parts such as root, leaves and fruit were treated for various ailments. Recently, it is well documented that this species found to have various significant activity. This plant Momordica cymbalaria has numerous therapeutics value and antioxidant properties. Treatment with conventional drugs has increase in side effects. Hence, natural remedy with herbal drugs mainly *Momordica cymbalaria* possess a well known properties as hypolipidemic, hypoglycaemic, neuroprotective, cardio Protective, nephroprotective and hepatoprotective. This traditional drug as a possible alternative in treatment to various conditions and it has been viewed in this paper.

Keywords: *Momordica cymbalaria, Cucurbitaceae, Natural remedy, Hypolipidemic, Herbal drug.*

Introduction

The plant *Momordica cymbalaria* belongs to the Cucurbitaceae family which is commonly called as melons, cucurbits or gourds. *Momordica cymbalaria* is a wild crop, well known as "Athalakkai" in Tamil. This family Cucurbitaceae also includes the crops like cucumbers and squashes. *M.cymbalaria* is largely distributed in and around the southern parts of India. The edible parts of this species are the fruits, which is rich in nutritional value. The fruit of *Momordica cymbalaria* contains high levels of calcium, potassium, vitamin C and it is rich in fibre content .This plant parts were traditionally used as a tonic, stomachic, stimulant and laxative to control the skin diseases, rheumatism, ulcer, diarrhoea and diabetic diseases by the South Indian populations[1]. In near future the use of herbal medicines worldwide has provided an opportunity to Indian pharmaceutical companies to look for therapeutic leads from Indian traditional system of Ayurveda and siddha that could be utilized for the development of herbal drug[2].

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The *Momordica cymbalaria* flowers are unisexual. The fruits of *Momordica cymbalaria* are pyriform in nature with 8 sharp ridges in it, which is attenuated at the apex region and with the base narrowed into the curved peduncle, which is fleshy with dark green and ribbed. The seeds is ovoid in shaped with smooth and shiny surface. Flowering occurs during the month of October; fruits are harvested from November to January. The tender fruits closely resemble the shape and size of small variety of bitter gourd. Athalakkai is used as a vegetable by the rural people of South Tamil Nadu and North Karnataka, India[3]. The phytochemicals reported in this plant athalakkai are tannins, alkaloids, phenols, proteins, amino acids[4], Vitamin C, carbohydrate and ß-Carotene[3]. The fruits of this plant reported anti diabetic and antihyperlipedimic activities. The tubers were reported as antiovulatory activity[4,5].

Furthermore, the literature of *M. cymbalaria* revealed that the juice of the leaves used for whooping cough, tubers used for abortion, paste of tubers are used for applying boils, ulcers, and snake bite[6].

Nutritional Composition: The nutritional content of plant *M .cymbalaria* is reported by author *Gopalan et*

al., T The percentage of moisture content of this species is about 84.30. Energy value is about 3.00kcal/100g. The carbohydrate and protein constitute is about 12.60 mg/100gm and 2.15 mg/100gm respectively. Minerals like calcium, Potassium, Sodium, iron, Copper, Manganese, Zinc, Phosphorus and Vitamin C are present. Therapeutic uses of this species are mainly of its rich content of calcium, Potassium and vitamin C, which elevates most of the pathological conditions.

Phytochemical Screening: Phytochemical screening of tubers of *Momordica cymbalaria* species shows the presence of sterols, triterpene, saponins, carbohydrates and cardiac glycosides[8]. The leaf showed the presence of flavonoids along with other phytoconstituents[9]. The fruit contains flavonoids, tannins, alkaloids, carbohydrates, glycosides, Vitamin C, β-carotene, polyphenols and amino acids. The amino acids present in *M.cymbalaria* are Momordicin, Ascorbigen and Pipecolic acid .The unripe fruits contain the amino acid Luteolin[3].

Therapeutic Uses: *Momordica cymbalaria* species is widely used in ancient days. Rationally the extracts and decoctions of fruits, tuberous roots and leaves of in *M.cymbalaria* have been used in many researches to proven the positive effects for the various clinical conditions. The fruits of this plant reported anti-diabetic, anti-microbial and anti-hyperlipedimic activities. The tubers were reported as antiovulatory activity. Tradional juice of the leaves *M .cymbalaria* revealed that used for whooping cough, tubers used for abortion, paste of tubers used for applying boils, ulcers, and snake bite[6].

Hepatoprotective Activity: The ethanolic extracts of tubers of Momordica tuberosa possess antioxidant property by preventing the formation of trichloromethyl peroxy radical there by reducing tissue damage[10]. The lipid peroxidation initiates a chain of reactions leading to tissue necrosis. Thus the root extract of *M .cymbalaria* preventing the tissue damage and oxidative stress by inhibiting the formation of trichloromethyl peroxy radical. Hepatoprotective activity by using 70% ethanol extract of tubers of *Momordica* against thiacetamide (100 mg/kg of body weight) induced hepatotoxicity in Wistar albino rats[11].

Antihyperglycemic Activity: The antihyperglycemic action was reported from the aqueous extract of the plant *M. Cymbalaria* fruits. The diabetic rats showed a reduction in blood glucose levels at a dose of 0.5 g/kg of body weight[12]. Diabetic induced rats STZ (65mg/kg) treated with saponins present in of *M. Cymbalaria* showed significant decrease in serum glucose level where as significant increase in serum insulin and liver glycogen level proves that increase insulin secretion, increases hepatic glycogen level and attenuates Hyperinsulinemia. rats[13]. Antidiabetic action was present in the aqueous extract of fruits of *M. Cymbalaria* proved by the presence of17 kDa protein also called M. Cy protein. The 'M. Cy protein', available in the fruits of *M. Cymbalaria* is showed an effective antihyperglycemic active principle in STZ induced diabetic rats at a dose of 2.5 mg/kg of body weight[14]. Insulin mimetic peptide was reported in *M. Cymbalaria* and in other plant species related co namely Canavaliaensiformis, Vigna unguiculata and Bauhinia variegate[15] in compared with bovine insulin.

Hypoglycaemic and Antidiabetic Activity: The hypoglycaemic and antidiabetic activity of fruit powder of the plant *M. cymbalaria* was evaluated in comparison with normal rats and alloxan-induced diabetic rats. The fruit powder of the plant *M. cymbalaria* is treated with a dose of 0.25 g/kg of body weight for a period of 15 days showed a significant decrease in the blood glucose levels and a weight loss in alloxan induced diabetic rats. The natural ability of the *M. cymbalaria* fruit powder is to enhanced the rate of glycogenesis and protect the body weight loss due to its antidiabetic activity[16]. *M. cymbalaria* fruit extracts stimulates the secretion of insulin from the remnant α cells by lowering the effect of blood glucose exhibiting antihyperglycemic activity[4]. Oral administration of alcoholic extract of fruit *M. cymbalaria* dose of 175 mg/kg for 31 days showed significant regression of the diabetic state and restored the level of the serum glucose, cholesterol, triglycerides, serum insulin and HDL parameters in STZ induced type II diabetes rats. The serum insulin levels were significantly increased after treatment with the extract *M. cymbalaria* both at lower and higher doses, the same extract of the plant *M. cymbalaria* might be the proposed mechanism of action for reduced the glucose levels in normal glycemic rats. Therefore based on these observations the alcoholic extract of *M. cymbalaria* might be useful in treating type-II diabetes[17].

Antihyperlipedimic and Cardio protective Activity: Hypertriglyceridemic patients are clinically at a risk for cardiovascular disease characterized by elevation of all lipids causing the myocardial membrane damage. The plant *M. cymbalaria* extract, at dose of 500

mg/kg body weight, prevents the alterations in marker enzymes of myocardial infarction and the free radical formation along with uric acid. When compared to the cardiac sections of the isoproterenol treated animals and the rats pre-treated with *M. Cymbalaria*, showed the normal structures of myofibrillar with a striations and protection by the extract against myocardial necrotic damage. The rats pre-treated with *M. cymbalaria* shows elevated in HDL Cholesterol level and decreased the LDL cholesterol level[18]. These experiments proves a growing body of evidence from epidemiologic, clinical, and laboratory data indicating that the elevated triglyceride levels itself cause a risk factor for cardiovascular disease. The promising activity of the plant extract *M. Cymbalaria* shows Cardioprotective, Antihyperlipidemic, Antidiabetic and antioxidant effect.

Antiulcer Activity: Anti ulcer property was experimentally proved by the aqueous extract of *Momordica tuberosa*, which shows the significant reduction in non-protein sulfhydryls concentration, gastric content, haemorrhage and ulceration in the ulcer induced Wistar albino rats . This study suggested that the anti ulcer activity of *Momordica* tuberose aqueous extract is due to the presence of polyphenolic constituents[19].

Antidiarrhoeal Activity: Many of the patients with a sudden onset of diarrhoea have self-limited illness, it doesn't require treatment. However, in some severe cases, dehydration and electrolyte imbalance are the principal risk factor, particularly in infants, children and elderly patients, thus requiring adjuvant non-pharmacologic treatments, such as oral rehydration therapy (ORT) and zinc supplements, and pharmacological treatments[20]. The use of naturally available compounds in those cases is needful. The *Momordica cymabalaria* fruit extract had possess a similar activity as that of anti diarrhoeal drug diphenoxylate, shows a statistically significant reduction in the frequency of diarrhoea and the wetness of the faecal droppings when compared to untreated control rats. For this experiment, castor oil is used to induce diarrhoea in Wistar rats. *M. Cymbalaria* fruit ethanolic extract inhibit the prostaglandin E2 pathway (PGE2 is responsible for diarrhoea in both animals and humans) thereby preventing the fluid accumulation in intestine [21].

Antimicrobial Activity: The extracts of Petroleum ether, chloroform, ethanol, and aqueous of *M. cymbalaria* has shown a inhibitory effect against the organisms, Staphylococcus aureus, Klebsiella pneumonia, Escherichia coli, Pseudomonas aeruginosa, and Aspergillus niger when its compared to the standard antibiotics. The standard antibiotics zone of inhibition was less than the extracts of *M. cymbalaria* indicates that this plant effective against these organisms[22]. The activity of *M .cymbalaria* fruit extracts, may be useful as a broad-spectrum antimicrobial agent, and also used in treatment of fever, wound infections, and intestinal disorders[23] because of its prominent inhibitory potential.

Antidepressent: Depression is a common, mental or behavioural disorder, sometimes the state of depression leads to serious life-threatening illness with an increased incidence of morbidity and mortality. In spite of using antidepressant drugs, use of natural plant product will minimise the side effects and paves a positive response. Hydro-alcoholic extract of fruit *Momordica cymbalaria* and the antidepressant drug imipramine were used for the experiment to identify the effect of *M .cymbalaria.* To examine the efficacy of Hydro-alcoholic extract of fruit *Momordica cymbalaria* the dose range of 200mg/kg, 400mg/kg, 600mg/kg, was examined by using the behavioural models like forced swim test experiment and tail suspension test experiment in mice. Both imipramine and extract of fruit *Momordica cymbalaria* showed significantly reduction in duration of immobility in both the behavioural models. The antidepressant activity of Hydro-alcoholic extract of *Momordica cymbalaria* fruit was comparable to that of standard drug, indicate that the potential for use of *Momordica cymbalaria* as an adjuvant in the treatment for neuro depression[24].

Anticarcinogenic Activity: Methanol extract of *M. cymbalaria* at a dose of 200 mg/kg of body weight has possess the significant anticancer activity as compared to standard drug cyclophosphamide against the ehrlich ascites carcinoma induced cancer in mice[25]. The cytotoxic effects of saponins derived from *M. cymbalaria* indicate anticancer activity in mice [26].

Nephroprotective Activity: Tubers of *M. cymbalaria* possess tremendous nephroprotective activity and counteract the toxicity induced by nephrotoxins, so it could be a promising role in treatment of acute renal injury[26].

Anti-implantation And Anti-ovulatory Activity: The roots of the plant *M. Cymbalaria* were used for the mensural irregularies, antifertility, antiovulatory and abortifacient activities. *koneri et al* identifies that the anti-implantation activity of the root extract *M. cymbalaria*

in female rats is not due to the activity of estrogen and progesterone[27] and also reported the antiovulatory and abortifacient action of the root extract of *M. cymbalaria* on female rats.

Conclusion

The traditional uses of herbal drug formulations are more widely used than the allopathic drugs. The use of herbal formulations throughout the world exceeds that of the conventional drugs by two to three times higher. The ever increasing use of herbal products has some very important implications for the geriatric population and for those heading towards their senior years. Geriatric patient has a higher incidence of illness and chronic conditions and generates a higher per capita number of different prescription medications. This renders them to be more cautious when adding herbal medications to their health regime. Nowadays diabetes is common in all population, misuse and indiscriminate treatment with synthetic drugs have allowed the rapid selection of herbs against resistant diabetic populations. In future the use of natural products especially *M. Cymbalaria* would enable them to easily overcome many compliance such as diabetic, antihyperlipidic, antiovulatory, whooping cough and so on. The Additional use of the natural plant products like M. *Cymbalaria* will increase the therapeutic value and possibly minimize the side effects of the allopathic drugs. Thus, the development of herbal formulations has become necessary to develop experimental research studies aimed at searching complementary alternatives to traditional Method.

Ethical Clearance: Not required since it is a review article.

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Assesement of Relationship between Cheiloscopy and Personality/Character among Human Volunteers in the Age Range of 21 to 40: A Cross Sectional Study

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Abstract

Background: Cheiloscopy (quiloscopy) can be defined as a method of identification of a person based on characteristic arrangement of lines appearing on the red part of lips. Biometric parameters like fingerprints and cheiloscopy may be employed to determine/understand the personality of an individual. Assessment and prediction of personality anomalies like psychosis and criminal tendencies may potentially be guided by biometrics like cheiloscopy

Materials and Method: A cross sectional study was conducted among adult population of age range 21-40 who were selected by eligibility criteria after informed consent. They were given a questionnaire adapted from the Eysenck personality questionnaire revised form and then cheiloscopic impression was obtained. Types of lip prints were correlated with determined personality types.

Results and Conclusion: A total of 524 individuals were selected and questionnaire data and lip prints were correlated. Type II and Type IV lip patterns were predominantly males and were associated with psychotism. Early diagnosis and counselling can potentially help in criminal jurisprudence.

Keywords: *??*

Introduction

Among the different forensic techniques available in the modern day scenario, cheiloscopy holds a prominent place in personal identification. The word "cheiloscopy" derived from Greek word, "cheilos" which means lips [(1)]

Cheiloscopy (quiloscopy) can be defined as a method of identification of a person based on characteristic arrangement of lines appearing on the red part of lips or as a science dealing with lines appearing on the red part of lips. It is unique to an individual, except for monozygotic twins.[(2, 3)]

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In 1932, Edmond Locard, French criminologist, proposed cheiloscopy for personal identification. Scientific studies correlating the finger prints to the personality/character of a person has helped to understand the personality of an individual whether he/she is an extrovert or introvert or both based on the direction of flow of psychological energy, which the scientist say can be known from the direction of the frictional ridges. If it is in outward direction then the person is said to be extrovert, if it is in inward then introvert, and if both are present then the person has mixed personality.

The use of cheiloscopy in crime investigation is not commonly implicated in India. Mostly studies have been done on cheiloscopy to determine their age and gender. But, in this study, using cheiloscopy, it will be possible to determine the personality of an individual. Apart from regular age and gender determination using lip print, this study helps to identify the psychoticism personality of

the individuals and identify the crime prone groups with their lip print pattern. The aim of the study is to analyse the personality of persons using lip prints. Identification of psychoticism personality of the individuals, can thereby identify the crime prone groups with their lip print pattern.

Materials and Method

A Cross sectional study was conducted to sample the population regarding their personality traits and lip patterns. Inclusion criteria were age of 21-40 years. Conditions where the normal lip print cannot be determined secondary to trauma, developmental or any pathology, Congenital anomalies of lip and limbs, Skin diseases, orthodontically treated patients were excluded. Data collection was done using questionnaire and cheiloscopic examination as done by Suzuki and Tsuchihashi. Simple Random Sampling was done for selection of participants. Sample size was derived using formula $N= 4pq/L^2$ and established to be 524. In calculating the sample size, the prevalence is taken as 74%.

After Informed consent was obtained from individuals, Demography details and Personality of the individual was obtained by questionnaire manual (Eysenck personality questionnaire revised form). EPQR-S is a self-reported questionnaire. It has 48 items, 12 for each of the traits of neuroticism, extraversion and psychoticism, and 12 for lie scale. Each question has a binary response, 'yes' or 'no'. Each dichotomous item was scored 1 or 0, and each scale had a maximum possible score of 12 minimum of zero.

Cheiloscopic analysis and Classification was done using Suzuki and Tsuchihashi classification:

- Type I: Vertical pattern, comprising of complete (end to end) longitudinal fissures/patterns
- Type I': Incomplete longitudinal fissures
- Type II: Branching Y-shaped pattern
- Type III: Crisscross pattern
- Type IV: Reticular pattern, typical checkered pattern, fence like.
- Type V: Grooves do not fall into any of the

Operational Definition:

Lie Scale: In psychometrics, lie scale items included within a test or questionnaire designed to detect whether respondents have responded truthfully to the items.

Extroverts: Extroverts are often described as talkative, sociable, action-oriented, enthusiastic, friendly, and out-going. On the negative side, they are sometimes described as attention-seeking, easily distracted, and unable to spend time alone.

Neuroticism: They are instability, is made up of a number of factors such as anxiousness, depression, feelings of guilt, low self-esteem, tenseness, irrationality, being shy and moody, and emotional.

Psychoticism: They are aggression, coldness, egocentricity, an impersonal attitude, impulsivity, antisocial behaviour, lack of empathy, creativity, and a tough-minded attitude characterize people with high levels of psychoticism.

Ambivert: The person having characteristics of both extrovert and introvert. An ambivert is moderately comfortable with groups and social interaction, but also relishes time alone, away from a crowd.

Introvert: The person who tends to shrink from social contacts and to become preoccupied with their own thoughts. They are reserved, plan their actions and control their emotions. They tend to be serious, reliable and pessimistic.

Extrovert Neuroticism: They possess the characters of both extrovert and neuroticism.

Extrovert Psychoticism: They possess the characters of both extrovert and psychoticism.

Ambivert Neuroticism: They possess the characters of both ambivert and neuroticism.

Ambivert Psychoticism: They possess the characters of both ambivert and psychoticism.

Introvert Neuroticism: They possess the characters of both introvert and neuroticism.

Introvert Psychoticism: They possess the characters of both introvert and psychoticism.

Statistical Analysis: Data were entered in excel and was analysed using SPSS version 20.Qualitative data is given in frequencies with their percentage. All analysis including Association of the lip print and gender was analysed using Chi square test.

Results

Table 1: Frequency distribution of lip print pattern

Lip Print Pattern	Frequency	Percent	Cumulative Percent
Type I	232	44.3	44.3
Type II	43	8.2	52.5
Type III	209	39.9	92.4
Type IV	29	5.5	97.9
Type V	11	2.1	100.0
Total	**524**	**100.0**	

The above table shows that 232 (44.3%) study participant had Type I lip pattern which was predominant type, followed by Type III which were seen in 209(39.9%) and Type II 43(8.2%).

Table 2: Frequency distribution of personality

Personality	Frequency	Percent	Cumulative Percent
Ambivert	95	18.1	18.1
Ambivert Neuroticism	118	22.5	40.6
Ambivert Psychoticism	7	1.3	42.0
Extrovert	142	27.1	69.1
Extrovert Neuroticism	80	15.3	84.4
Extrovert Psychoticism	10	1.9	86.3
Introvert	1	.2	86.5
Introvert Neuroticism	62	11.8	98.3
Introvert Psychoticism	9	1.7	100.0
Total	**524**	**100.0**	

Distribution of personality among 524 individual showed predominance of Extrovert-142 (27.1%) followed by ambivert neuroticism-118 (22.5%) and ambivert-95(18.1%).

Association between Personality and Lip Print Pattern:

Table 3: Association between personality and lip print pattern

Lip Print Patterns	Personality									Total
	Ambivert	Ambivert Neuroticism	Ambivert Psychoticism	Extrovert	Extrovert Neuroticism	Extrovert Psychoticism	Introvert	Introvert Neuroticism	Introvert Psychoticism	
Type I	63	84	0	20	18	0	0	47	0	232
Type II	10	13	5	5	1	0	0	4	5	43
Type III	16	13	1	111	56	0	1	9	2	209
Type IV	3	5	1	4	4	10	0	0	2	29
Type V	3	3	0	2	1	0	0	2	0	11
	95	118	7	142	80	10	1	62	9	524

The above table shows that Type III lip pattern exhibited a predominance of Extrovert behaviour and Type I lip pattern showed a pedominance of Ambivert neuroticism. There was statiscally significance associate between the study participant personality and lip print pattern.

Discussion

Identification of an individual gain paramount significance during investigation of a crime disaster or during other calamities.[4]

The aim of this study was identifying the personality

of the individuals using lip print. So far there has been only study in literature, by Mohammed Abidullah et al[5], which had a similar objective, however identification of psychoticism personality (crime prone group) using cheiloscopic techniques have been addressed in this study

Investigators can rely on cheiloscopy along with other supportive evidence in specific investigations. Extensive studies have been conducted in cheiloscopy in the later half of 20th century; two Japanese scientists, Yasuo Tsuchihashi and Kazuo Suzuki established that the arrangement of lines on the red part of the human lip is individual and unique for each human being and these grooves can be used to determine identity.**(6)**

In the present study, lip prints were classified using the classification proposed by Suzuki and Tsuchihashi, also known as Tsuchihashi classification. **(6)**

- Type I - Vertical pattern, comprising of complete (end to end) longitudinal fissures/patterns
- Type I' - Incomplete longitudinal fissures
- Type II - Branching Y-shaped pattern
- Type III - Crisscross pattern
- Type IV - Reticular pattern, typical checkered pattern, fence like.
- Type V-Undetermined.

Personality, in psychology, the pattern of behaviour, thought, and emotion unique to an individual, and the way they interact to help or hinder the adjustment of a person to other people and situations.**(1)** A number of theories have attempted to explain human personality

There are various Method to determine the character of an individual:

- Eysenck's Personality Inventory,
- Bernreuter's Personality Inventory,
- Miller's,Personality Inventory
- Multivariable Personality Inventory, and
- Minnesota Personality Inventory.

Eysenck (1952, 1967, and 1982) developed a very influential model of personality. Based on the results of factor analyses of responses on personality questionnaires he identified three dimensions of personality: extraversion, neuroticism and psychoticism.

Cheiloscopy holds a prominent place in personal identification among various forensic aids. The aim of this study was identifying the personality of the individuals using lip print. In our study 524 samples were collected from common population between the age group of 21 to 40

The purpose of age selection between 21 to 40 years in our study is justified as these age group exhibited reliability in lip pattern than other age groups, similar to the studies done by K. Randhawa et al[7].

Lip print samples were obtained in white bond sheet using lip colour and analysed using magnifying lens and patterns were analysed. Suzuki and Tsuchihashi[6] classification was used to differentiate the lip prints. Similar procedure and classification was done in many studies like Suzuki and Tsuchihashi in 1974[6], Preeti sharma et al[8], Chaitanyaa babu et al[9], Mohammed Abidulla et al[5], Neeti Kapoor et al[10], Suraj multani et al[11].

The personality of the study participant in this study was obtained using Eyesenck personality questionnaire revised form[12]. No previous studies were done using Eyesenck personality questionnaire correlating with lip pattern. In this study the predominant personality is extrovert followed by ambivert neuroticism, ambivert, extrovert neuroticism, introvert neuroticism, introvert psychoticism, extrovert psychoticism and ambivert psychoticism.

In this study Type I lip print was predominantly seen in female followed by Type II and Type III. In males Type III lip pattern was predominantly followed by Type I and Type IV. Female had Vertical pattern, comprising of complete (end to end) longitudinal fissures/patterns whereas Males had Crisscross pattern. Similar finding were observed in Vahanwala et al[13], who observed Type I and I' pattern predominantly in females and Type III and IV among males. Chaitanya Babu et al.[7], observed Type I and II patterns predominantly in females and Type III and IV in males, Suraj Multani et al[11] reported Type III was the most common lip print pattern in males, and among females Type I pattern was commonly found.Gondivkar et al.[14], observed Type III lip pattern predominantly in males and Type I in females. K. Randhawa et al,[7] found the most predominant pattern in the entire study population to be Type I (32.33%).

Contradictory to our findings, studies done by *Mohammed Abidullah et al* [5] Patil *et al* [15]found out

that the predominant lip pattern in males was Type I and in females was Type II.

According to Hans Eyesenck theory, women tends to have higher neuroticism score than men,[16] which is in concordance with our study results where majority of female shows Ambivert neuroticism as their personality whereas male showed extrovert as their predominant personality.

According to Hans Eyesenck men score much higher in psychoticism than women,[14] These results are comparable with our findings where Men showed greater psychotism behavior and in addition these psychoticism were predominant among type II and type IV lip patterns. There are no studies in the past comparing psychotism and lip pattern.

This study concludes that there is a positive association between the Lip pattern and Individual's behavior. Majority of the participants exhibiting psychoticism had type II and IV lip pattern thereby showing that individuals with these patterns have greater tendency to exhibit aggressive behavior. This fact can be a useful tool in forensic odontology and can aid in early intervention among these individuals through behavior modification therapy.

Conclusion

The use of cheiloscopy in crime investigation is not commonly implicated in India. The prevalence of crime rate in India is 44.8%. Mostly studies have been done on cheiloscopy to determine the age and gender. There is no study done correlating the lip pattern and psychotic personality of individuals which can identify the crime prone group. In this study, Type II and Type IV lip prints were noticed in individuals with Psychoticism personality and predominately seen in males. So this method can be used as a prime adjuvant procedure in victim identification in crime scene. Thus the lip print obtained from the crime scene help to assess the personality of the victim during the times of crime or calamity. This study eases the investigating procedure, narrow down and also short list the suspected victims resulting in short time identification of the victim. The current study can guide to arrive a clue for those having criminal attitude which help to intervene them for positive reinforcement, motivation and counselling which can reduce the crime in future.

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Sperm Preparation by Using Microfluidic Sperm Sorting Device Increase ICSI Success Rate

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Abstract

Highly motile sperms with good morphology are more capable of fertilizing an oocyte and increase the pregnancy rate during the process of ART. In swim up method and density gradient method, multiple centrifugation leads to ROS production that can cause DNA damage to the sperms. Microfluidic chips are one of the Method of sperm separation to eliminate DNA fragmentation in sperm. It is thought that the separation of sperm by centrifugation method used in sperm separation in IVF (in vitro fertilization) laboratories leads to sperm DNA fragmentation. By using microfluidics sperm sorting device, spermatozoa do not undergo such physical stress. Therefore it is possible to obtain sperms with ICSI criteria of good motility and in higher concentration with the use of micro fluidic sperm sorting device.

Keywords: *Sperm Concentration, Motility, Oligozoospermia, Asthenospermia, micro-fluidic sperm sorting device and ICSI.*

Introduction

Microfluidics technology has emerged as an enabling technology for different fields of medicine and life sciences. Microfluidic technologies are enabling optimization of sperm sample preparation and analysis in the field of male infertility**.** This device have been developed to balance or even succeed the existing sample handling processes connected with cell culturing, cell separation, and DNA analysis. Microfluidic systems have been make use of in the field of assisted reproductive technologies (ART) to support with sperm classification[1], oocyte manipulation[2], insemination[3], embryo culturing[4], and for evaluate sperm and embryo quality. [5] Microfluidics is expected to help to improve the efficiency of sample preparation, enable consistency in cell/embryo culturing and operation environments, and reduce human error.

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Microfluidic sperm sorters are used to isolate morphologically normal human spermatozoa with high motility and with no debris. This isolation is based on fluid dynamics in a microenvironment or nanoenvironment, relying on variables such as fluid density, viscosity, velocity, and size/geometry of the environment. [6]Microfluidics have been widely applied to biomedical fields, because the control of fluid transport is useful for cell analysis systems, drug delivery systems, assisted reproductive technologies, and in numerous biological applications specifically for the miniaturization and simplification of laboratory techniques.[7] Selection of the sperm is based on the two gravity-driven laminar flows within the central microfluidic channel. The semen and the medium dispensed into inlet A and B, respectively, flow parallel to each other and exit through their respective outlets (A/D and B/C). Spermatozoa are sorted depending on their ability to swim across these two streams. Only motile spermatozoa swim toward outlet C whereas immotile spermatozoa keep flowing to outlet D.[8] Hence, this method does not allow spermatozoa to undergo added physical stress from sources such as a centrifuge and thus minimize DNA damage.

The objective of the present study is to increase the ICSI success rate in both normal and oligozoospermic patients using the micro fluidic sperm sorting device. Since this method of sorting does not require centrifugation, recovery of sperm with normal morphology and without DNA fragmentation will be possible.

Materials

The semen samples were collected from 25 patients who visited sumathi fertility center at Madurai for semen analysis in the year 2019. The subjects were explained about the study and a written consent was obtained from them. The semen analysis was carried out as per WHO guidelines. The subjects were split into two groups- normospermia patients (n=21) and oligoasthenospermia patients (n=4) patients

Method

I. Preparation:

- Allow semen sample to liquefy after ejaculation.
- Sperm wash medium kept incubator at 37 degree Celsius before starting the procedure.
- Dilute liquefied semen with sperm washing medium at the ratio of 1:1
- Fix the microfluid sperm sorting device in a 60mm dish

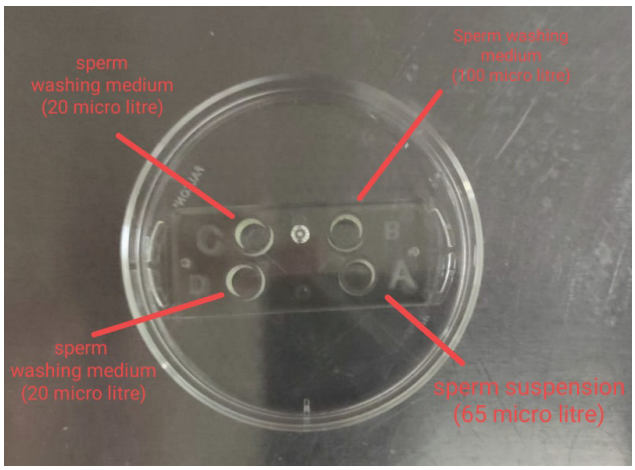


Fig 1: Qualis sperm sorter device

II. Procedure:

Microfluidic sperm sorters Qualis (Fig 1) allow the effective recovery of sorted motile sperm without DNA damage compared with the centrifugation and swim-up procedure.

- Load 100ml sperm washing medium into chamber A, B, C and D to create streamlines in the micro fluidic chambers.
- The Medium was pulling out from all the chambers.
- Load 20ml sperm washing media into chamber C and D respectively and load 100ml into chamber B
- Load 65ml sperm suspension into chamber A
- Adjust the amount of sperm washing medium in chamber B until the width of laminar flow from Chamber A reach 40% of the overall width of the micro channel.
- Allow device to stand for 30 minutes under laminar flow and extract completely isolated sperms from Chamber C.

Statistical Analysis:

Table 1: Sperm Concentration in Normospermia

Normospermia	Impression	N	Mean	SD	P-Value
Sperm Concentration	Positive	14	36.4	19.3	.032 Sig
	Negative	7	19.3	3.5	

In our study the average Sperm Concentration positive and Negative was 36.4 million and 19.3 million respectively. The difference was statistically significant with p value of 0.032 ($p<0.05$)

Table 2: Sperm Motility in Normospermia

Normospermia	Impression	N	Mean	SD	P-Value
Motility	Positive	14	37.1	12.2	.006 Sig
	Negative	7	22.1	4.9	

In our study the percentage motility positive and negative was 37.1% and 22.1% respectively. The difference was statistically significant with p value of 0.006 ($p<0.05$)

Table 3 Sperm Concentration in Oligoasthenospermia

Oligoasthen-ospermia	Impression	N	Mean	SD	P-Value
Sperm Concentration	Positive	3	1.3	.58	.004 Sig
	Negative	1	12.0		

In our study the average Sperm Concentration positive and Negative was 1.3 million and 12.0 million respectively. The difference was statistically significant with p value of 0.004 ($p<0.05$)

Table 4 Sperm Motility in Oligoasthenospermia

Oligoasthenospermia	Impression	N	Mean	SD	P-Value
Motility	Positive	3	4.3	1.2	.050 Sig
	Negative	1	10.0	.	

In our study the percentage Motility positive and Negative was 4.3% and 10% respectively. The difference was statistically significant with p value of 0.050 ($p<0.05$)

Discussion

In swim up method and density gradient method undergo multiple centrifugation leads to ROS Production from leukocytes and immotile sperms can have negative impact on fertilizing capacity[9] and producing adverse consequences during the post implantation development of embryo[10] so, best choice to avoid ROS generation, micro fluidic device (Sperm sorter Qualis;Menicon, Kasugai, japan) used for ICSI to acquire high motile and good morphology sperms are more capable of fertilizing an oocyte and increase pregnancy rate during the process of ART.

DNA integrity plays an important role in fertilization. Repeated centrifugation protocol used in sperm preparation technique leads to DNA fragmentation that can affect the viable pregnancy and normal embryonic development [11] to minimize DNA damage micro fluidic sperm sorter device used for both normal and oligoasthenospermia patients which increases ICSI success rates because it doesn't require centrifugation.[10] Based on the ability of motile sperm to cross streamlines in a laminar fluid stream, the device isolates motile sperm from non-motile sperm and other cellular debris,.[12] Separation of DNA from epithelial (victim) and sperm (perpetrator) cells requires in the field of Forensic for DNA analysis of sexual assault evidence . As a result the separation of sperm from a biological mixture containing epithelial cells has been demonstrated on a microfluidic device. [13]

Preference of the best spermatozoa and deletion of damaged spermatozoa are critical for successful IVF and ICSI in infertility clinics. The most widespread Method for the isolation of motile spermatozoa are density gradient separation and swim-up Method. Therefore, MFSS (Microfluidic Sperm Sorting) is the most commonly used device for sorting highly motile spermatozoa with less DNA integrity damage without subjecting sperms to undergo repeated centrifugation.

Conclusion

Based on statistical analysis, Microfluid sperm sorter device can be used efficiently and reliably not only for normal patients but also for oligoasthenospermia patients considered as alternative approach in ART to improve ICSI success rate.

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Role of Free Radicals in Cellular Signaling: A Review

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Abstract

Reactive oxygen species (ROS) were once considered to be deleterious agents, contributing to a vast range of pathologies. Both their damaging and beneficial effects are initiated when they target distinct molecules and consequently begin functioning as part of complex signal-transduction pathways. The recognition of ROS as signaling mediators has driven a wealth of research into their roles in both normal and pathophysiological states. The present review assesses the outline of current perspectives on redox-signaling mechanisms.

Keywords: *Reactive oxygen species,oxidative stress, nitric oxide.*

Introduction

Reactive oxygen species (ROS), generated through a variety of extracellular and intracellular actions, are novel signal mediators which are involved in growth, differentiation, progression, and death of the cell[(1)]. ROS comprise free radicals such as superoxide anion radical, hydroxyl radical, and singlet oxygen, as well as non radical species such as hydrogen peroxide formed by the partial reduction of oxygen. Oxygen free radicals are highly reactive and have the capacity to damage cellular components such as proteins, lipids, and nucleic acids. ROS were released by neutrophils and macrophages for destructing exogenous pathogens and regarded as host defending molecule. However, accumulated evidence indicates that ROS play a central role as second messenger and stimulate various signaling molecules[(2)]

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ROS are capable of damaging cell membranes and a wide variety of biomolecules. The direct role of oxygen radicals in microbial killing is well established[(3)]. Free radicals are important in the activation of nuclear factor kappa-B cells (NF*k*B), a factor in the important transcription of a number of genes of IL-2, TNF-α and IL-2 receptor and MHC class I genes. Free radicals have been implicated in IL-1 induced osteoclastic bone resorption[(4)]. Free radicals damage may account not only for the production of altered IgG but also for many autoantibodies, their production not depending on a polyclonal activation of B cells but on the sensitivity of individual molecules to different radical generating systems. ROS can also modify aminoacids such as methionine, histidine, cysteine, proline and lysine, which cause alterations in the protein structure, conformation and antigenicity. Fragmentation of proteins by ROS can also cause crosslinking and aggregation of proteins and proteins are more susceptible to proteolysis[(5)].

Sources of ROS: ROS are generated in numerous cellular compartments and by multiple enzymes within the cell[(1)]. Mitochondria generate oxygen during oxidative phosphorylation. During this process, the flow of electrons processed through the components of respiratory chain .

Nitric oxide (NO) is an inorganic, gaseous free radical· Identified as the "endothelium relaxing factor" (EDRF), with its role in regulating blood pressure, the molecule now has several other functions. NO is a potent vasodilator *in vitro,* thus contributing to the cardinal signs of inflammation, heat, redness and swelling. Other cellular sources of NO include macrophages, neutrophils, T-lymphocytes, chondrocytes and synoviocytes[6]. NO, a pleiotropic mediator of inflammation plays an important role in the vascular and cellular components of inflammatory responses. NO and its derivatives are microbicidal and thus NO is also a mediator of host defense against infection[7].

In order to combat these deleterious effects of oxidant, cells are endowed with an antioxidant defence system, consisting of variety of enzymatic and non-enzymatic antioxidants thereby protecting cellular macromolecules such as proteins, lipids, and DNA from oxidative damage.

Antioxidants are compounds that dispose, scavenge and supress the formation of free radicals or oppose their actions. Antioxidant defence system is very dynamic and responsive to any disturbance taking place in redox balance of the body[8].

Antioxidants can be regulated to neutralize free radicals formation that could take place due to oxidative stress. In normal cells, there is a steady balance between oxidative damage and antioxidative protection. The shift in balance between oxidants and antioxidants in favour of the oxidants is "OXIDATIVE STRESS". This conspectus is intended to provide a critical up to date summary of the field with particular emphasis on the evidence for oxidative damage and compromised antioxidant status in periodontal diseases[9].

Natural human antioxidant defenses are not always sufficient to maintain the proper ROS balance. Also, a normal process can become pathological when it persists long term. The mechanisms of senescence involve a contribution from free radicals, leading to the proposition more than fifty years ago that the aging process results partly from oxidative damage. The primary defense systems against oxidative threat such as CAT, SOD, glutathione peroxidase and glutathione-s-transferase decomposed $O_2^{\bullet -}$ and H_2O_2 before interacting to form the more reactive hydroxyl radical. The cooperative interaction between these antioxidants in plasma is crucial for maximum suppression of oxidative stress[10]. The secondary defense consisted of ascorbic acid, α-tocopherol, ceruloplasmin, and reduced GSH which scavenged residual free radicals escaping decomposition by the antioxidant enzymes.

They dispose, scavenge, and suppress formation of free radicals or oppose their actions. Several biologically important compounds have been reported to have antioxidant functions[11]. These compounds have low activation energy to donate hydrogen atom and therefore, cannot initiate the second free radicals. The free radical electrons are stable and thus, slow down the oxidation. Cells contain many antioxidant systems to prevent injury. It is essential for cell's life to Prevent excessive ROS production and repair of cellular damage. The balance between oxidation and antioxidation is critical in maintaining healthy biological systems. The human antioxidative defense system including superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx), glutathione (GSH) facilitates the elimination of excess ROS. In addition to endogenous antioxidant defense systems, exogenous originating reducing compounds such as vitamin C, vitamin E, carotenoids, and polyphenols are also required[12]. SOD were the first ROS-metabolizing enzymes discovered. SOD isoenzymes, Mn-SOD, present in mitochondria, and the cytosolic dimeric Cu/Zn-SOD. Catalase function by catalyzing the dismutation of hydrogen peroxide to water and molecular oxygen. Catalase also has functions in detoxifying different substrates as well as having an antioxidative role. GPx can catalyze the reduction of H_2O_2 and also reduce other peroxides to alcohol. GSH functions mainly as a sulfhydryl buffer but also serves to detoxify compounds . Vitamin E suppresses the generation of lipid peroxidation and together with vitamin C it inhibits hydroperoxide formation. It is also capable of scavenging free radicals, as is vitamin A. Vitamin E and carotenoids quench singlet oxygen and as such contribute to the first defense line against oxidative stress. Polyphenolic compounds, such as flavonoids are recognized as potent antioxidants due to their ability to scavenge free radicals by single-electron transfer[13]

Redox-signaling is achieved when the oxidants produced modulate a signal-transduction pathway. These ROS must then trigger the oxidation-induced modification of specific target molecules. Some ROS are superior signaling molecules to others.H_2O_2 is an excellent signaling molecule, as it is highly ubiquitous, can diffuse easily and is relatively stable allowing it time to encounter specific targets. It is perhaps for these

reasons that H_2O_2 is the prevailing intracellular redox-signaling molecule. Hydroxyl is an inadequate signaling molecule due to its high oxidation rate constant, which leads to highly nonspecific oxidation. Peroxyl and alkoxyl possess aggressive reactivity and lack enzymatic removal resulting in the outcome of their reactions being mainly irreversible oxidation events, ultimately leading to damage. Singlet oxygen rarely occurs intracellularly and so it is doubtful that it contributes to signal transduction. In contrast, HOCl has been suggested to function as a signaling mediator in immune cells[14]

Mechanism of ROS signaling:

Signalling pathways invoking ROS: In many ways, ROS are ideally suited to be signalling molecules: they are small, and can diffuse short distances; there are several mechanisms for their production, some of which are rapid and controllable; and there are numerous mechanisms for their rapid removal. Work based on the release of ROS by cells which do not have a role in phagocytosis, and where ROS have no obvious function, along with work on host defence systems in plants has led to the conclusion that ROS are key signalling molecules, although, to date, their exact mode of action still needs to be elucidated. Many studies have indicated a role for ROS in the induction or inhibition of cell proliferation, in both activation and inhibition of apoptosis, and, at higher concentrations, in the induction of necrosis. Some of the biochemical effects of ROS on cells will be discussed below Several signal transduction pathways lead to changes in gene expression, while others might lead to the modulation of enzyme activities[14]

ROS and NFκB (nuclear factor kappa-light-chain-enhancer of activated B cells) signaling pathway: The transcription factor NF-*κ*B is crucial in a series of cellular processes, including immune, inflammatory response, cellular adhesion, differentiation, proliferation, autophagy, senescence, and apoptosis[15]. ROS influence the activation of NF-*κ*B pathway mainly by inhibiting the phosphorylation of I*κ*B*α (*inhibitor of kappa B*α)* . Meanwhile, NF-*κ*B pathway also can influence the ROS levels by increasing expression of antioxidant proteins such as Cu-Zn-SOD(copper zinc super oxide dismutase), Mn-SOD(manganese superoxide dismutase), GPx (glutathione peroxidase), GST (Glutathione-s-transferase).[16]

The mitogen-activated protein kinase (MAPK) cascades: The mitogen-activated protein kinase (MAPK) cascades, consisting of the extracellular signal-related kinases (ERK1/2), the c-Jun N-terminal kinases (JNK), the p38 kinase (p38), and the big MAP kinase 1 (BMK1/ERK5) pathway, are major intracellular signal transduction pathways, that play an important role in various cellular processes such as cell growth, differentiation, development, cell cycle, survival, and cell death. Similarly, ERK, JNK, p38, and BMK1 are all serine/threonine kinases that are directed by a proline residue[17]

ROS and Protein Kinases: Recently, it is becoming increasingly apparent that, like physiological second messengers in signal transduction, ROS function in various cellular processes via oxidating sulfhydryl (SH) groups of cysteine residues in protein kinases including protein kinase A (PKA), protein kinase C (PKC), protein kinase D (PKD), receptor tyrosine kinase (RTK), and Ca/calmodulin independent protein kinase II (CaMKII) and then activated protein kinases phosphorylate their target proteins which are involved in different cellular signaling mechanisms.[18]

Conclusion

It has been clearly demonstrated that redox equilibrium plays pivotal roles in cells' physiological and pathological events due to ROS's ability to activate or deactivate a variety of receptors, proteins, ions, and other signaling molecules. When the redox equilibrium is disturbed due to the excessive accumulation or depletion of ROS, many cellular signaling pathways are influenced which confers to the cellular dysfunction and subsequently the development of various pathologies. Therefore, unveiling the mechanisms of ROS regulating redox-associated signaling pathways is essential in providing relevant targets in order to develop innovative and effective therapeutic strategies.

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A Review on Visfatin/Nicotinamide Phosphoribosyltransferase/ Pre-B Cell Colony-Enhancing Factor

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Abstract

Adipocytokines are mainly adipocyte-derived cytokines regulating metabolism and are key regulators of insulin resistance. Visfatin is a newly discovered adipocyte hormone with a direct relationship type 2 diabetes mellitus. Visfatin/NAMPT (nicotinamide phosphoribosyltransferase) is a protein with diverse functions. Although the first discovery of this molecule as a pre-B-cell colony-enhancing factor suggested primarily a cytokine function, its rediscovery as the key enzyme in nicotinamide adenine dinucleotide generation has considerably widened its potential biological activities. Its broad spectrum of effects is being regarded as a potential approach to prevent and treat various pathological conditions.

Keywords: *Adipose tissue, adipokines, quinolinc acid, insulin resistance.*

Introduction

Adipose tissue, an active endocrine organ and a main energy reserve of the body. The main role of white adipose tissue (WAT) is triglycerides storage during energy consumption and fatty acid release over periods of starvation[(1)] Adipose tissue has emerged as an important endocrine organ producing a variety of secreted factors including of bioactive polypeptides, i.e., adipokines[(2)]. Adipokines act centrally to regulate appetite and energy expenditure, and peripherally affect insulin sensitivity, oxidative capacity, and lipid uptake. In recent years, the number of adipokines has expanded rapidly and these include adiponectin, resistin, visfatin, apelin, retinol binding protein-4, serum amyloid A, plasminogen activator inhibitor-1, angiotensinogen, vaspin, omentin, chemerin and zinc-alpha2-glycoprotein. Several of these mediators are predominantly synthesized by adipose tissue and called adipocytokines. Recently, the adipocytokine family has been extended by a novel member—visfatin is named so because it is derived from the word "VISceral FAT". Though it is preferentially produced in the visceral adipose tissue it can be expressed in the isolated subcutaneous adipose tissue as well[(3)]

History: Visfatin was identified first as Pre B cell Colony Enhancing Factor (PBEF), to be secreted by human peripheral blood lymphocytes. It acts like an enzyme (Nicotinamide phosphoribosyl transferase) NAMPT, which is involved in NAD+ salvage pathway. Recently, PBEF was identified by Fukuhara et al, as visfatin a novel adipokine-a protein mediator secreted by visceral fat cells[(4)]. Analysis of the amino acid sequence of visfatin revealed it to be identical with PBEF/ NAMPT. Three different biological names with three

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different functions for a single protein (as amino acid sequence is same for these three proteins) have made it, unique and biologically indispensable; hence the names are used interchangeably[5].

NAMPT displays hematopoietic, immunomodulatory, pro-inflammatory, pro-angiogenic, pro-chemotactic, and anti-apoptotic activities. In its extracellular form, it is also known as an adipokine visfatin, which demonstrates hormone-like insulin-mimicking properties[6 & 7].

Functions:

As a Immunomodulator: Visfatin can be considered a new proinflammatory adipocytokine. It upregulates the production of the pro-and anti-in-flammatory cytokine. These cytokines play a substantial role in a wide range of infectious and inflammatory diseases[8]. High circulating visfatin levels have been observed in rheumatoid arthritis and acute lung injury . Significantly higher visfatin mRNA expression was found in inflamed inflammatory bowel disease[9]. There are several reports demonstrating enhanced tissue expression of visfatin in inflammatory conditions including clinical sepsis[10], and severe generalized psoriasis. Macrophages have been suggested as a significant source of this protein in addition to adipose cells, as visfatin/PBEF/Nampt; positive macrophages have been identified in adipose tissue and in the submucosa of the colonic wall. It has several immunity functions that are secreted by neutrophils in response to inflammatory stimuli and upregulates the production of cytokines such as various interleukins, and tumor necrosis factor alpha in human monocytes. This mediator was found to be present in a variety of cell types, including macrophages, lymphocytes, peripheral blood monocytes, and dendritic cells. An increase in the levels of proinflammatory cytokines in the periodontal tissues can induce visfatin production. Visfatin levels are strongly correlated with amount of visceral fat in humans which is positively correlated with obesity[11].

Mimics Insulin: In 2005, visfatin, a new protein with potential insulin-mimetic action was discovered Fukuhara *et al* [4]. There are controversies regarding the association of visfatin with overweight/obesity, type 2 diabetes mellitus, insulin resistance (IR), Chang et al[5], suggested that the use of visfatin may be promising for predicting obesity, diabetes status, insulin resistance. Insulin secreted from B-cells of pancreas into circulation, binds to the insulin receptors of insulin sensitive targets, leading to internal signaling etc. The binding affinity of visfatin/PBEF/NAMPT to the IR (insulin receptor) was found to be similar compared with that of insulin. Many studies have demonstrated an increased levels of visfatin in diabetes mellitus. Whether visfatin binds to insulin receptors and exerts its insulin mimetic activity is still a controversy, but recent research has shown that visfatin helps in regulation of glucose homeostasis[4].

Visfatin as an Anti Apoptotic Molecule: Recent reports have provided evidence that visfatin may mitigate cell injury by affecting the inflammatory response and apoptosis. Visfatin significantly reduces the cell apoptosis induced by palmitate and improves cell viability and protects against H_2O_2-induced apoptotic damage in H9c2 cardiomyocytes. Visfatin has recently been described as an adipokine with potentially important effects on apoptosis. Visfatin protects macrophages from endoplasmic reticulum stress-induced apoptosis . Visfatin also exerts anti-apoptotic effects in liver cells through enzymatic synthesis of nicotinamide adenine dinucleotide[12]

PBEF/NAMPT/Visfatin as an Enzyme: It is involved in the salvage pathway of NAD+. NAD+ synthesis in mammals occurs by one of two principle pathways. It can be synthesized from the *de novo* pathway or from one of the three salvage pathways. *De novo* synthesis begins with tryptophan, which undergoes several reactions to form quinolinic acid, which is converted to NAD+ .The three salvage pathways are a) nicotinic acid pathway, b) nicotinamide pathway, nicotinamide is salvaged by Nampt/PBEF to be activity of key regulators of cellular longevity; (c) nicotinamide ribose pathway. To replenish the decreased stores of NAD+ the salvage pathways are must, specially the nicotinamide pathway, which involves the Nampt enzyme. visfatin/Nampt acts like an enzyme helping in the production of NAD+. NAD+ is an essential cofactor in a number of fundamental intracellular processes like (a) Transfer of electrons during redox reactions; (b) To modulate Visfatin is now regarded as an extracellular nicotinamide phosphoribosyltransferase (eNampt) enzyme and it seems to play an important role in insulin secretion from pancreatic β cell by systemic NAD biosynthesis[13 & 14].

Conclusion

Since evidence of a direct link between visfatin genotype and human type 2 diabetes mellitus is still

weak, more molecular, physiological and clinical studies are needed to determine the role of visfatin in the etiology and pathogenesis of type 2 diabetes mellitus. Visfatin/NAMPT effects on cytokine and chemokine secretion, macrophage survival, leukocyte recruitment make this adipokine an active factor in the development and progression of pathogenesis. Further research is required to fully understand the mechanisms mediating the cellular actions of visfatin to characterize the factors regulating visfatin/Nampt expression and release in all these pathologic scenarios.

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Influences of Sweetened Medication and Dental Caries: A Review

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Abstract

Due to the aversive taste of medications, there is said to be a struggle in making the child consume it. The ease of administration of liquid suspensions makes it accepted by parents & children for oral administration. Because of the aversive taste of medications, cariogenic sugars such as sucrose is said to be added as a flavoring agent to mask the unpleasant taste. This sucrose in the medication is said to cause dental caries. The dental professionals have the opportunity to provide advice regarding the importance of diet & the role of sugars in caries formation. The dentist should be familiarized with alternatives to sugar & the type of food products that are available to substitute with sweetening agents.

Keywords: *Cariogenic bacteria, sweetening agents, sucrose, risk factors.*

Introduction

Due to the aversive taste of medications, there is said to be a struggle in making the child consume it. The ease of administration of liquid suspensions makes it accepted by parents & children for oral administration. Because of the aversive taste of medications, cariogenic sugars such as sucrose is said to be added as a flavoring agent to mask the unpleasant taste.[1] This sucrose in the medication is said to cause dental caries. The dental professionals have the opportunity to provide advice regarding the importance of diet & the role of sugars in caries formation. The dentist should be familiarized with alternatives to sugar & the type of food products that are available to substitute with sweetening agents.[2] The most common oral disease in childhood is "dental caries[3]".

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Dental caries is of multifactorial etiology where there is an interplay of 3 factors: the host {saliva & teeth}, the micro flora {plaque}, & the substrate {diet}. Miller in 1890 described dental caries in his chemo parasitic theory.[4] Dental caries occurs due to the dissolution of teeth which is caused by the acid produced by oral bacteria in the presence of dietary carbohydrates. The main organism involved in caries formation includes: mutans Streptococci & lactobacilli.[5]

Sucrose the Archcriminal: Caries occurs mainly when sucrose {cariogenic sugar} is metabolized by or bacteria particularly streptococcus mutans into weak organic acids, which causes a fall in Ph below the critical value [5.5] leading to demineralization {loss of minerals}[6,7]. Remineralization occurs {redeposition of minerals} the pH of the plaque rises. Major destruction occurs if the mineral loss is greater than redeposition of the minerals. An imbalance between the tooth structure & oral environment is related to dental caries, where the 3 factors play an important role in disease initiation and pregression.[8]

Purpose of Sugars in Medications: Sugars include all monosaccharide's & disaccharides which includes glucose, fructose, sucrose, maltose, & lactose.[9] Purpose of sucrose in medications is to act as a preservative, anti-

oxidant, solvent & thickening agent. It has a pleasantly sweetish taste which encourages the children to accept the medicine. It is of low-cost & non hygroscopic.[10]other ingredients are also combined with sucrose to make it more pleasant to taste and increase its acceptance by the children. "Sucrose is the most commonly used sweetener in pediatric pharmaceutical preparation & is most cariogenic of sugars"[11, 12].

Substitutes of Sugar [Classification]:

1. **Caloric/Nutritive Sweetners:** These sweeteners provide flavor & bulk when added to food. It also maintains the freshness & contributes to product quality. These are further classified into:

   a. **Polyols/Sugar Alcohols:** They are derivatives of sugars in which the reactive aldehyde/keto group is reduced to hydroxyl group.

      Examples:

      - Xylitol
      - Sorbitol

   b. **Hydrogenated Starch Hydrolysate:** they are derived from starch by partial hydrolysis and subsequent hydrogenation.

      Examples:

      - Lycasin
      - Palatinit

   c. Coupling Sugars: They include monosaccharide, glucosylsucrose, malyosylsucrose and oligosaccharides which are obtained by enzymatic treatment of starch.

      Examples:

      - Sorbose
      - Palatinose

2. **Non Caloric/Non Nutritive Sugars:** They contain 0 calories but provide sweet taste. These are all chemically processed. They are:

   A. Cyclamate

   B. Saccharin

   C. Aspartame

   D. Sucralose

   E. Neotame

3. **Based on Origin:**

   A. **Natural:** Monellin, licorice, dihydrochalcone, miraculin.

   B. **Artificial:** Aspartame, saccharin, cyclamate, sucralose[13].

Sugar Alcohols/Polyols: These sugars are not fully absorbed from the gastrointestinal tract & are less available for energy metabolism[14] . They are considered non-cariogenic because they are weakly fermented by oral bacteria[15]. Park et al. compared polyols with sucrose/fructose and said there is significantly less acid formation in interproximal plaque than fermentable carbohydrates. These provide bulk & calories similar to sucrose.

Adverse Effecs: When these are taken in excess, it causes abdominal discomfort, flatulence, softened stools & diarrhea.

Xylitol: It was derived from the "GERMAN WORD XYLIT BY PROFESSOR EMIL HERMAN, FISCHER & HIS ASSISTANT RUDOLF STABEL IN 1890". Xylitol is said to have an insulin independent metabolism[16]. The sweetness of xylitol is similar to sucrose.

Properties: It is a flavor enhancer of tablets/syrups. It helps in masking the unpleasant taste of some active ingredients in pharmaceutical formulation[17].

Sorbitol: Most commonly used sugar alcohol. It has a sweetness of about 60-70% that of sucrose. Though Streptococcus.mutans has the enzyme to degrade sorbitol, they have slower fermentation process and very little drop in pH of dental plaque when compared with sucrose.

Available: In the form of chewable tablets {due to its pleasant taste and cooling effect}. Also used in liquid preparations-as a sugar free formulation[17].

Artificial sweeteners such as saccharin, cyclamate, aspartame and sucralose are all high intensity sweeteners-because they sweeten the medication with little volume, however they offer no energy[18].

Aspartame: It is said to be 160-220 times sweeter than sucrose and glycemic[14] response is limited. It can be used for children with autosomal recessive phenylketonuria as it is a source of phenylalanine[19].

Available: In the form of chewable tablets and liquid considerations

Saccharin: Due to its sweetening power it is used in hypo caloricfood. It is said to have 200-500times more sweetness when compared with sucrose. It is non-cariogenic[14, 18, 20]and non caloric. Cross sensitivity reactions occurs in children with sulfonamide allergy[21].

Sucralose: It is non caloric, has no nutritive value, and is non cariogenic. Sweetness is said to be 600times sweeter than sucrose. It is synthesized by the reaction of sucrose with theonyl chloride.

Lycasin: It consists of a mixture of sorbitol, malitol and hydrogenated dextrins[16]. It is a hydrogenated starch hydrolysate

Palatinit: It is an equimolar mixture of disaccharide alcohol. It is said to have the characteristics similar to sorbitol[16].

Sorbose: L-SORBOSE is an isomer of D-fructose. It is a reducing agent. Streptococcus .mutans is unable to form intercellular polysaccharides in the presence of sorbose.

Palatinose [Isomaltulose]: This is produced by the enzymatic conversion of sucrose from a glucosyl[1,2] fructoside to a glucosyl[1,6] fructoside. Palatinose and other isomers are said to be not utilized by oral bacteria.

Difficulties in the Substitution of Sucrose: The amount of sweetness in different sugars are said to be varied. That is if the sweetness of sucrose is 1, and lactose is 0.2. Whereas the sweetness of saccharin is about 300. When alternative sweeteners are used instead of conventional sucrose, there is a change in the recipe. So if sucrose is replaced by another new sweetener,the new product differs from sucrose not only in sweetness, but also in other properties[2.]

Acceptance of Sugar and Sugar Substitutes by Public: Saccharin can be substituted for taste of sugar. Lactose/sorbitolor water for weight or bulk of the sugar. Xylitol can be substituted for both taste and bulk. The substitute of sugars should have taste similar to sucrose so that it is accepted by the public.

Cariogenic Potential of Pediatric Medications: Sometimes children are required to take medication on a daily basis for long periods of time. So chronically ill children are exposed to a greater sugar load from the oral medications than healthy children leading to increased risk of developing caries.[22,23,24]

So What Can be Done to Save Your Tooth from Decay?: There must be a need to focus on prevention of dental caries during pediatric child visits by education and motivating parents about the importance of oral hygiene practices and awareness on sugar-containing medicines and suggest alternative options. Oral hygiene must be insisted for all children taking sweetened medication after each dose of medication-as a primary step for minimizing the risk of dental caries[23, 10, and 25]. Patients are encouraged to take medicines at mealtime only. It is avoided at bed time, due to decreased oral clearance [salivary secretion] at night. Whenever possible, the use of non-cariogenic substances in medicines should be suggested.

Conclusion

It can be concluded that sweeteners used in medications have the potential to increase the risk of dental caries in susceptible individuals. So whenever possible the use of non-cariogenic substances in medicine or the use of sugar free medicines should be advised.

Conflict of Interest: Nil

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Management of Midline Diastema by Direct Composite Resin Using Putty Index: A Case Report

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Abstract

Maxillary anterior spacing is one of the most common aesthetic issues .It is atechnical challenge for clinicians. Treatment is mainly for esthetic and psychological reasons, Numerous materials are available for diastema closure. Case should be carefully analyzed with proper history for etiological factors and best possible treatment plan. This case report highlights an esthetic closing of a gap spacing between maxillay central incisor teeth with direct composite using putty impression to provide an acceptable esthetic outcome.

Keywords: *Midline diastema, Etiology, Analysis, Composite resin.*

Introduction

H. J. Keene described midline diastema as anterior midline spacing greater than 0.5 mm between the proximal surfaces of adjacent teeth[1]. Etiological factors are numerous listed in literature [2] which includes:

1. **Tooth Material Discrepancy:**
   - Microdontia
   - Macrodontia
   - Missing laterals
   - Peg laterals
   - Extracted teeth
2. **Transient Malocclusion:**
   - Ugly duckling stage
3. **Physical impediement:**
   - Retained deciduous
   - Mesiodens
   - Abnormal labial frenum
   - Midline pathology
   - Deep bite
4. **Habits:**
   - Thumb sucking
   - Tongue thrusting
   - Frenum thrusting
5. **Racial predisposition:** Treatment option and techniques for closing of midline diastema is numerous but the right procedure has to be selected for each case and based on jaw tooth discrepancy, occlusion. clinician knowledge and skill.

Case Presentation: A 43 year old male patient reported to the department of conservative dentistry and Endodontics, Sree Balaji Dental College and Hospital, Chennai, India with a chief complaints of broken restoration in upper front region of the jaw for past 1 week,midline spacing between his upper anterior teeth was a discomfort to the patient, and was affecting his self-confidence (Figure 1).

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A clinical examination revealed a wide space between maxillary central incisors.his past dental history revealed removal of mesiodens followed by closure of midline diastema with composite.The patient did not prefer orthodontic managment due to prolonged treatment time and cost concern. The treatment planis to provide an esthetically favorable relation between the maxillary anterior teeth by closing the diastema using composite resin.

A study model was fabricated (Figure 2) to measure the actual length between the top of the papilla and incisal edge of the central incisor. The mock up study model was prepared (Figure 3). The analysis of the length and the width of the upper central incisors demonstrated an unfavorable proportion after the closure with composite resin but, the patient was satisfied with the result of the study model. Therefore, direct composite Resin was decided as restorative material. Putty impression was made from the mock up study model (Figure 4) .This procedure helps the clinician to build up the composite using it as guide. 37% phosphoric acid used to etch the tooth surface for 15 seconds followed by rinsing application of an adhesive, the palatal portion of tooth was built up with a dentin shade using putty index as a guide incremental build up was done followed by light curing of each layer. The final layering was done with selected vita shade A2 followed by finishing and sequential polishing (Figure 5).

Discussion

Highly aesthetic restorations made of composite resins are now possible due to constant improvements in techniques, materials, and technology**.**Orthodontic closing diastema is indicated for all type of diastema. It is a very conservative option but it is time-consuming and financially demanding. Freehand direct resin composites provide an esthetic and conservative approach for closing diastema. Composite resin is a single-visit procedures does not require laboratory work [3,4]. Composite resins has a overall survival rate higher than 88% up to10 years [5].On the other hand, the major causes of failure are chipping and color mismatch, which can many times be solved by repairing andpolishing[5,6,7].Among the different diastema closure techniques, the most typical one relies on creating a wax-up restoration, in order to simulate the diastema closure, and building a silicone index to guide the final composite resin restoration [8]. This technique is extremely usefulbecause it makes it easy to reproduce the previously created anatomyof the teeth by the wax up. In the present technique, the principles of the golden proportion was taken into consideration when performing the wax mock up in the study model, previous to the restoration procedure, It hasbeen suggested as a possible mathematical approach for developmentofan ideal size and shape for maxillary teeth[9].Success of a restorative treatment in anterior teeth depends on the esthetic integration between soft and hard tissues[10].



Figure 1: Preoperative

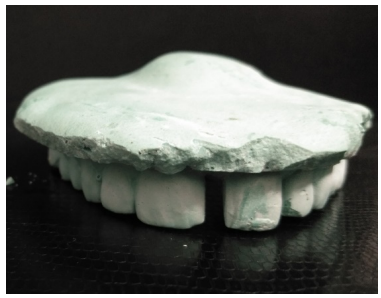


Figure 2: Study Model



Figure 3: Wax Mockup

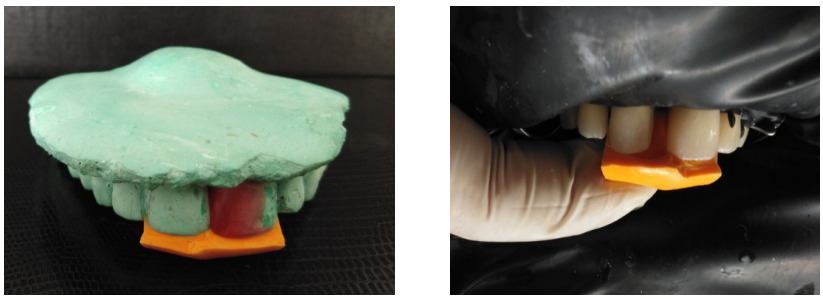


Figure 4: Fabrication of Putty Index

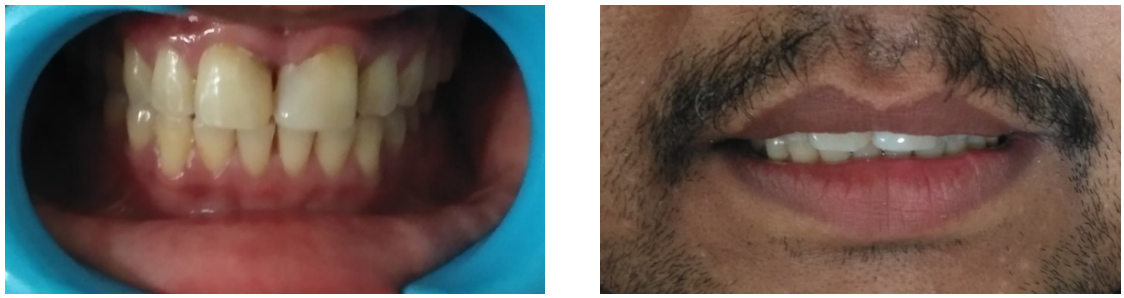


Figure 5: Postoperative

Conclusion

The management of diastema is really an esthetic challenge. Many treatment options are used such as orthodontic treatment, composite restoration, veneers, and crowns. Their indications are related to the case selection such as width of diastema, occlusion, patient motivation and practitioner skills.

Conflict of Interest: Nil

Source of Funding: Nil

Ethical Clearance: Not required for case report.

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Diastema Closure using Porcelain Veneers: A Case Report

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Abstract

Veneer is a layer of tooth colored material that is applied to a tooth to restore a localized or generalized defect and intrinsic discoloration. This case report describes closure of midline diastema using porcelain laminate veneers. Advances in the bonding between porcelain and tooth structure make this treatment a fantastic alternative to restore teeth with alteration in shape and position; severe discoloration and in cases where the aesthetic demand is high. The rationale for various choices in this treatment protocol is detailed with reference to the pertinent literature. Thus the clinical success depends on identification of cases, type of tooth preparation design, impression and bonding technique.

Keywords: *Veneer, Diastema Closure, Lithium Di-silicate, Resin Coating Technique.*

Introduction

Veneers were invented by California dentist Charles Pincus in 1928 to be used for a film shoot for temporarily changing the appearance of actor's teeth. Later, in 1937 he fabricated acrylic veneers to be retained by denture adhesive, which were only cemented temporarily because there was very little adhesion[1]. The introduction of etching in 1959 by Dr. Michael Buonocore aimed to follow a line of investigation of bonding porcelain veneers to etched enamel[2]. In 1982 Simonsen and Calamia revealed that porcelain could be etched with hydrofluoric acid, and bond strengths could be achieved between composite resins and porcelain that were predicted to be able to hold porcelain veneers on to the surface of a tooth permanently[3]. Since 1983 veneers were considered as one of the most viable treatment modality due to its strength, longevity, conservative nature, biocompatibility, and aesthetics[4]. Veneers are indicated in the following cases: a) Discoloured teeth due to many factors such as tetracycline staining, fluorosis, amelogenesis imprefecta, age etc. b) Restoring fractured and worn teeth c) Abnormal tooth morphology d) Correction of minor malposition e) Intraoral repair of fractured crown and bridge facings[5]. Contraindications for dental veneers include : a) Patients with parafunctional habits such as bruxism b) Edge to edge relation c) Poor oral hygiene d) Insufficient enamel e) Crowded or malaligned teeth[6]. With the thicknesses of veneers ranging from 0.2 to 0.5 mm, ceramic laminate is absolutely capable of reproducing natural teeth with great color stability[7]. It also offers biocompatibility with the periodontal and dental substrates and it may be used with minimal wear or even without preparation[8]. Thus the clinical success that the technique has found can be attributed to great attention to detail in a set of procedures, including planning the case, with the correct indication; conservative preparation of the teeth; proper selection of ceramics to use; proper selection of the materials and Method of cementation; and proper planning for the ongoing maintenance of these restorations[9]. Therefore the aim of the report was to re-establish the aesthetics by closure of midline diastema through porcelain veneers.

Case Report: A 32-year-old patient reported to the hospital complaining spacing between upper front teeth.

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Following the clinical and radiographic evaluations, presence of midline diastema in the maxillary central incisors was found (figure 1). After discussion of all possible treatment modalities with the patient, the decision was made to prepare the maxillary central incisors for lithium disilicate porcelain veneers to re-establish the aesthetics of his smile. A wax up model (figure 2) was done before initiation of preparation and analysed. Shade selection was done prior to tooth preparation under day light (figure 3). The selected shade was B2.

Tooth preparation for veneers should be uniform and restricted entirely to the enamel. This goal was achieved in the present clinical case by means of calibrated spherical diamond burs at the cervical region and burs with a depth-limiting device on the facial surface of the tooth. The remaining facial enamel was reduced to the level of these grooves using a tapered-cylinder, round-end diamond bur (figure 4). For the proximal area, finish line was placed slightly supragingivally in order to facilitate the definition of the proximal margin, the impression procedure and the positioning of the veneers. A feather edged incisal modification was done as there was minimal overjet. Finally all angles were rounded, and an extrafine, tapered-cylinder, round-end diamond, abrasive disks and felt disks were used to smooth the prepared surface.

Two stage Putty wash technique was followed (figure 5). Two retraction cordsof different diameters were placed in the gingival sulcus and a complete impression with a double-viscosity polyvinyl siloxane material was made after removal of the second cord. The first retraction cord was also removed, and the desired color for the porcelain veneer was selected using a special scale. This is an important step in determining the final results, requiring effective communication between the practitioner and the technician. Finally, provisional restorations were made with a bis-acryl resin. The maxillary and mandibular casts were sent to the dental technician for pouring, creation of dies and fabrication of Lithium disilicate porcelain veneers.

After receiving the veneers from the laboratory, they were carefully tried in to verify marginal fit, position and alignment, shape and color for complete satisfactory results. The conditioning of internal surfaces of the restorations was performed through application of 9.5% hydrofluoric acid for 20 seconds and washing under running water for 1 minute and air-drying. A silane coupling agent was applied. After isolation, prepared teeth were etched with 37% phosphoric acid for 30 seconds, rinsed and careful dried. Next step, a one-bottle bonding agent was applied using an applicator tip and the surface was gently air-dried and polymerized for 40 seconds. The veneers were luted using dual cure resin individually over the prepared tooth after completion of the etching and bonding procedures. Resin was applied on inner surface of the veneers and the veneers were positioned. After polymerization for 5 seconds, excess cement was carefully removed using a brush. The veneers were once more light cured on facial as well as palatal aspect for 40 seconds (figure 6).

Discussion

The cosmetic improvement of the smile is possible with both direct and indirect techniques the latter procedures might require more than one appointment but are preferred when multiple teeth are involved in the treatment plan and when accurate tooth reshaping or color matching is needed[10]. Previsualization of the final esthetic result is extremely useful both for the clinician and for the patient: in this way, desires and preferences related to the new smile are tested before carrying out irreversible teeth preparations[11]. The preparation should terminate in enamel for better bonding of veneers[12]. Although few previous studies may suggest very minimal or no preparations current studies believe in removal of varying amount of tooth structure[13]. Zarone et al found out incisal overlap with chamfer finish line had more survival probability than window preparation whereas other studies conducted by Schmidt et al, Castelnuovo et al and Lin et al concluded that incisal butt joint preparation aided in increasing the survival probability of veneers than that of incisal overlap with chamfer finish line[14,15,16,17]. In our case we had to give a feather edged incisal preparation as there was only a minimal overjet and a chamfer finish line. Study conducted by Caselnuovo et al concluded that incisal butt joint preparation and feather edged incisal modification showed highest survival of veneers[16]. Bonding of veneers to dentin and patients with bruxism were two major factors that affected the survival of porcelain veneers[17]. In cases of dentin exposition, sealing this structure with a dental bonding agent is suggested immediately after the completion of tooth preparation and before the final impression itself because the newly prepared dentin is ideal for the adhesion. This technique is called as the resin-coating technique[18]. It consists of interposing a layer of low viscosity resin

between the dental substrate and the luting cement. This procedure seems to produce an increase in the union strength and a reduction of crack formation, bacteria infiltrations, and postoperative sensitivity, as it allows for acid conditioning of the enamel while avoiding the conditioning of the dentin and allowing better control of the conditioning of the enamel[19,20]. The survival period for veneers is usually 10-15 years. Studies conducted by Magne et al and Chen et al showed 100% survival of veneers at the end of of 4.5 years and 2.5 years respectively[10,21]. A study conducted by Brier et al concluded that survival probability of Porcelain veneers was 94% in 5 years, 93% in 10 years and 82% in 20 years[22]. Similarly a 21 year follow up study conducted by Layton and Walton showed veneer survival rate of 96% at the end of 10 years and 91% at the end of 20 years[12]. Thus successful anterior restorations can be achieved using a detailed treatment plan considering both the aesthetic and the functional parameters.



Preoperative–Figure 1



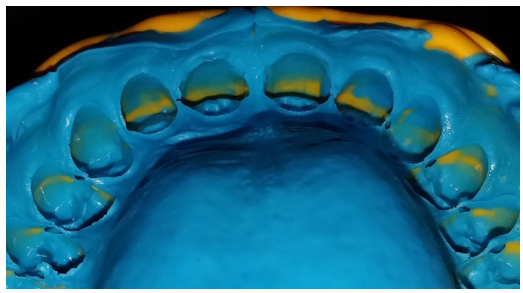
Wax up Model–Figure 2



Shade selection–Figure 3



Tooth Preparation–Figure 4



Two Stage Putty Impression–Figure 5



Final Cementation–Figure 6

Conclusion

Characteristic properties of ceramics indicate that they are materials capable of mimicking human enamel and their mechanical properties are widely expanding their day to day clinical applications. This clinical report describe that the laminate veneers can be used as an excellent option for effective and conservative aesthetic treatment. Therefore it can be concluded that the clinical success of laminate veneers depends on both the suitable indications of the patient, diagnosis and treatment planning, the correct application of the materials and techniques available for that, in accordance with the necessity and goals of the aesthetic treatment.

Conflict of Interest: Nil

Source of Funding: Nil

Ethical Clearance: Not required for case report.

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Green Dentistry an Innovative Approach: A Review

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Abstract

Green dentistry or eco-friendly dentistry, emerging as a new concept towards sustainability. Dentistry has a great impact on the environment due to the large amount of waste generated by various dental procedures along with excessive use of water and electricity, which emphasizes to move towards 'Green dentistry'. Hence, conserves money and time with the innovation of latest techniques and procedures and inculcating it in our daily practice. Eco-friendly dentistry if adopted will safeguard the environment and the human race from the harmful risks of rapid urbanization in developing countries. Thus, there is a need to emphasize the practice of eco-friendly dentistry in a developing country like India, with an approach to conserve resources and curb environment pollution.

Keywords: *Ecofriendly dentistry, Environment friendly, Green dentistry, Innovative dentistry.*

Introduction

Presently dentistry, which generates a significant amount of waste on a regular basis, has adopted the concept of "Going Green" so as to make it environment-friendly. Materials that have a minimum effect or cause no harm to the environment are known or defined as eco-friendly or environment friendly [1].

The green colour indicates healing and is understood to be the most restful and relaxing colour. Renewal, growth, and hope are related to this colour and indicates safety in the advertising of drugs and medical products[2]. Green Dentistry combines dental practices and environmental conservation.

Though individual dentists generate only small amounts of environmentally "unfriendly waste," the accumulated waste generated by the profession may have an environmental impact [3]. It is an emerging concept in dentistry. It is an approach, by which there is reduced impact by dental practices on the environment and is moving more towards an ecologically sustainable health care system [4].

The key concept of this practice is to conserve water and energy, use of non-toxic products, reduction of waste, and eradication of hazardous toxins that has negative impact on patients and the environment and to promote 'green' products.

In 2008, Eco-friendly Dental Association (EDA) was co-founded by Dr. Fred Pockrass and his wife Ina Pockrass. EDA provides Education, standards and connection to dentists who have Incorporated green dentistry in their daily practice. EDA promotes to help dentists Come up with ideas for safe and reusable alternatives that will lower dentists operating cost by replacing paper with digital media wherever possible. Thus, aims in reducing waste and pollution and to save energy, water, and money. Hence, it mainly involves the concept of "4R" -Reduce, Reuse, Recycle, and Rethink[5]. According to a 2007 article by the Canadian Dental Association, environmental-friendly dentistry attempts to reduce the detrimental impact of industries on environment and promotes awareness and sustainability to patients[6].

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Components of Green Dentistry:

It Includes Four Categories:

1. Reducing dental waste
2. Pollution prevention
3. Conservation of water, energy, and money
4. Hi-tech dentistry.

Reducing Dental Waste: A large number of biomedical waste products are produced in dental clinics, such as blood-soaked materials, syringes etc. Waste should be properly disposed using colour coded bins. The four procedures which can contribute to pollution are[7]:

1. Removal dental amalgam restorations.
2. Conventional radiographs.
3. Infection control protocols including disposable barriers, sterilization items and toxic disinfectants.
4. Conventional vacuum saliva ejectors.

Dental amalgam is used as a restorative material for more than 150 years. It includes 50% mercury with silver, tin and lead and other minerals that has various negative effects on the environment. Mercury is converted by the bacteria in water or soil into methyl mercury, a potent neurotoxin that has a serious impact on the brain, kidney and lung damage in humans [8]. Therefore, various Method to dispose of the mercury has been proposed which as follows [9]:

i. Usage of alternates like GIC, composite.
ii. Use of amalgam separator in clinics.
iii. Recycling waste amalgam.

Conventional dental radiographs are commonly used in dental offices and institutions. This method involves two significant environmental hazards: silver and lead. The source for Silver is unused fixer and unused films and for lead, it is lead foil in film packet and lead apron/ shield.

The various forms of waste generated as a result of X-ray processing in the dental offices are as follows[10]:

1. X-Ray equipment.
2. Undiluted developer.
3. X-Ray film: lead and silver.
4. Used fixer contains silver.
5. Developer systems cleaner containing chromium.

Ways for preventing X-Ray waste pollution are[7]:

1. Use of digital imaging.
2. Usage of non-chromium developer cleaners.
3. Collect waste lead.
4. Filter used fixer.

According to the updated colour coding for Biomedical Waste Management–2016, waste should be disposed in following suitable colour bags[11]:

1. **Yellow:** Use of non–chlorinated plastic bags or containers.
   - Involves Soiled waste such as cotton, gauze, mask, head cap, gutta percha, dental cement, human anatomical waste (teeth).
   - Expired or discarded medicines.
2. **Red:** Use of non-chlorinated plastic bags or containers.
   - Involves plastic items such as rubber dam sheet, gloves, suction tips, syringe, apron, X-ray film, X-ray cover, x-ray lead foil, syringe (plastic portion +hub)
3. **White:** Use of puncture-proof, leak-proof containers.
   - Involves sharps
   - BP blade, wires, broken burs, matrix bands, damaged crowns, needles.
4. **Blue:** Use of cardboard boxes with blue coloured markings.
   - Involves glass items
   - LA bottles, glass bottles, ampules, broken glass slab, broken motor/pestle.

Saves water, energy and money: Conservation extends the life of our dental equipments and in addition enables us to save money. We should make sure that when we leave our working place we should check and look for those blinking lights from electrical equipment[12]. It can include computers, intraoral cameras, television, or lights left on when no one is in the office. By turning off these items, we can conserve a lot of energy.

Use of LED operatory lights reduces electricity consumption by 70% thus, eliminates the need for

expensive halogen bulbs. Currently, a new waterless vacuum system has been developed, which save about 360 gallons of water per day[9,10]. If every dental office installs one of these waterless systems, there will be energy conservation as many as nine billion gallons of clean, drinkable water a year [3,6]. This is how we can come up with new ideas to promote green dentistry. 50%-60% dentists use reusable drinking cups and metal suction tips. Usage of these should be promoted as this can be sterilized and are eco-friendly[13].

Hi-tech Dentistry: High-tech alterations play an important role in helping dental professionals in deduction and resource conservation. Digital technologies offer premature diagnosis, preventive therapies, and education that aim to serve the needs of the patients and seeking to avoid unnecessary or expensive procedures [14].

Here are some high-tech innovations that are part of dentistry's green future[15]:

1. Digital imaging system
2. CAD/CAM systems
3. In-office sharps disposal equipment that renders sharps inert
4. Steam sterilizers that eliminate the use of chemicals
5. Digital patient charting, scheduling, and billing
6. Digital paperless patient communication system such as E-mail appointments, reminders, and saving staff time
7. Using diode lasers instead of packing cords
8. Using website to promote and like a primary marketing tool
9. Switch to electronic patient record format
10. Use of oil-free compressors.

Green Dentistry–Wellness-based: Every branch of medicine is moving towards wellness-based concept that is based on prevention, early detection with less invasive treatment procedures.

Followings are wellness-based modalities that are part of dentistry's green future[15].

1. Early detection of caries by using laser diagnostic tools
2. Oral cancer diagnostics tool, like VELscope technology for early detection
3. Salivary testing to identify the pathogenic bacteria
4. Use of Laser treatment for periodontal disease
5. Aromatherapy which helps the patients to relax naturally
6. Homeopathic treatment can reduce swelling and bruising for the patients after dental procedures without drug interaction
7. Hand or foot massage to relax patients
8. Placing live green plants in the operatory area to increase oxygenation
9. HEPA type air purifier or UV germicidal in-operatory air purifiers can be used to remove particulates from air
10. Nutrient coenzyme like CoQ10 antioxidant can be used for general well-being of health.

Conclusion

Green dentistry is an emerging field which has promising benefits in the field of dentistry. Hence, there is need for creating awareness among dental professionals and budding dental students regarding eco-friendly dental practice through formal and continuing dental education. Further steps should be taken to encourage new innovations to take green dentistry to next level. Practicing green dentistry can reduce supply costs and Ultimately patients get benefitted reduction in treatment costs. Thus, let us take our first step towards eco-friendly dental practice.

Conflict of Interest: Nil

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Salivary Secretory Proteins- Unveiling Genetic Polymorphism and Diseases

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Abstract

Saliva, the "mirror of the body," is an ideal non-invasive source of complex genetic information. The complexity of the salivary peptidome is mainly due to the high number of genetic polymorphisms. This review shows an association between the genetic polymorphisms of salivary secretory proteins and the endangerment of several diseases. Different secretory protein single nucleotide polymorphisms whose genetic positions are related to oral and other diseases are listed from SNPedia deposits and tracked using a variety of techniques. Besides being circulating salivary biomarkers, single nucleotide polymorphisms of salivary secretory proteins acts as a possible genetic susceptibility factor and aids in the early detection and prevention of various oral and systemic diseases including cancer and rare syndromes in a quick and non-invasive manner. This would pave the way for the development of array-based technologies using saliva sample for genetic analysis.

Keywords: *Single nucleotide polymorphism, Saliva, Secretary proteins, Oral diseases*

Introduction

Saliva, a mirror to health seems to be attractive over the others fluids due to its non-encroaching nature, lower economic cost and greater clinical safety[1]. Human saliva is a rich reservoir of proteins and peptides and contains a complex mixture of the secretions from the salivary glands. Proteins present in saliva include mucins, amylases, defensins, cystatins, histatins, proline-rich proteins, statherin, lysozyme, lactoferrin and immunoglobulins. Major families of secreted salivary proteins are polymorphic, and undergo post-translational modifications before secretion such as phosphorylation, glycosylation and proteolytic cleavages [2].

Single Nucleotide Polymorphism analysis in salivary secretory proteins: Single nucleotide polymorphisms (SNPs), have adverse effect on the structure and function of salivary secretions to several diseases.

β-defensin 1 polymorphism: DEFB 1 variant was associated with caries susceptibility in children born with cleft lip and/or palate (CL/P)[3]. DEFB1 harbors potentially important polymorphic variants associated either with an increased expression of variant allele marker rs11362 (G-20A) or with decreased expression of variant allele marker rs179946 (G-52A) that are clinical markers for caries risk in humans [4].

Cystatin polymorphism: Cystatins occurring in salivary glandular secretion belong to the "secretory type 2" cystatins and the five genes encoding for cystatins were CST1,2, 3, 4, and 5, respectively. CST1 gene encodes for cystatin SN, CST2 gene comprises

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two alleles cystatins SA1and SA2. The CST3 gene for cystatins C, CST4 gene was represented by four alleles, encoding for unphosphorylated cystatin S and three phosphorylated isomers S1, S2, and SAIII andcystatin D for CST5 gene[5].

Histatin Polymorphism: Allelic variation Arg22 was replaced by Gln22 in Histatin (HIS2) encoding for histatin 32 in subjects of African descent. This homozygous mutation led to the loss of the proteolytic cleavage site after Arg22 without apparent pathological consequences[6].

Lactoferrin Polymorphism: Lactoferrin exon 2 Lys/Arg polymorphism was associated with susceptibility to dental caries in Brazil[7]. The two lactoferrin variants (Lys/Arg at position 29 in exon 1) were functionally different and contributed to the pathogenesis of localized juvenile periodontitis[8].

Proline-rich proteins polymorphism: Genetically determined polymorphism in acidic proline-rich proteins of caries in saliva encoded at two loci, PRH1 and PRH2. The PRH1 locus (Db, Pa, and Pif) and the PRH2 (Pr1 and Pr2) allelic polymorphism in African Americans are involved in protecting them from caries when compared with Caucasians[9]. The genes encoding the basic PRPs (PRB1 through PRB4) lie together with the acidic PRPs (PRH1 and PRH2) as a cluster and PRB alleles are in linkage disequilibrium with Db and involved in reducing caries[10].

Genetic Diseases associated with salivary secretions: Salivary secretary proteins cause local and systemic disorders and interrupt the complex balanced functions thereby led to mucosal and tooth damages and local or systemic malfunctions[11].

Burning Mouth Syndrome: The pathogenesis of burning mouth syndrome was due to genetic polymorphisms (C/T) interleukin-1beta but another study identified that there were no significant differences in the genotypes of IL-1β and MUC7 genes[12,13].

Kostmann Syndrome: Kostmann syndrome had reduced concentrations of α-defensins HNP 1-3 with deficient LL-37, that was associated with maturation arrest in myelopoiesis [14] and this deficiency led to the recurrent oral infections associated with this disease [15].

Metabolic Syndrome: The increased salivary AMY1 gene copy number was positively associated with lower body mass index and obesity risk with low levels of salivary amylase production and high amounts of starch intake, thus providing a genetic link between efficiency of starch digestion and low BMI with risk for developing the metabolic syndrome[16].

Papillon–Lefevre Syndrome: Papillon–Lefevre syndrome patients lack serine protease activity that is necessary for LL-37. Its deficiency activates cathepsin C and protease 3 in severe periodontitis[17].

Sjögren's Syndrome: Sjögren's syndrome with diminished salivary gland function led to subsequent loss of the antibacterial properties of saliva and accelerate the infection, tooth decay and periodontal disease[18]. The majority of under expressed proteins found in the whole saliva from primary sjögren's syndrome patients were carbonic anhydrase VI, cystatins, lysozyme C, calgranulin A, prolactin-inducible protein and von Ebner gland protein[19].

Periodontitis and other Oral Diseases: Salivary α-defensin was higher in patients with oral lichen planus, Behçets disease and recurrent aphthous stomatitis[20]. Periodontal pathogens induced the upregulated expression of β-defensin in oral keratinocytes [21]. Lower amounts of PRP-1, PRP-3, histatins and statherin in caries-susceptible group increased the susceptibility to dental caries [22]. The saliva of patients with oral lichen planus, leukoplakia and glossitis associated with iron deficiency were significantly increased in α-defensin 1[23] and increased transferrin levels[24].

Discussion

Saliva has a tremendous medical and scientific value. The salivary secretions and their polymorphism in the gene for various salivary secreted proteins that are associated with a protective effect against various diseases have been discussed. From this review, it is very well understood that saliva can be used as a diagnostic medium for the mass screening of genetic polymorphism in a large population. In addition, the advancement of salivary diagnostic tools is of paramount importance, especially in identifying high-risk group of different diseases and disorders.

The most important factor in selecting saliva as a diagnostic tool is that it also contains the fallen cells in oral cavity which allow saliva to be the first option to test and identify potential biomarkers in different diseases, including pre-malignant patients and patients with prior

cancer history. With an alarming increase in genetic variants in population, the non invasive fluid should be an ideal sample to explore various polymorphisms of secretory proteins and susceptibility to disease carriage by populations. The library of potential salivary proteins in combination with genetic polymorphisms, provides opportunity to test the models that involve multiple pathways driving to the pathogenesis of the disease in clinical diagnostics.

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Esthetic Correction of Anteriors: A Case Report

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Abstract

The common aesthetic complaint of patients is the presence of anterior spacing.It has a multifactorial etiology such as labial frenulum, microdontia, mesiodens, peg-shaped lateral incisors, agenesis, cysts, habits such as finger sucking, tongue thrusting, or lip sucking, dental malformations, genetics, proclinations, dental-skeletal discrepancies, and imperfect coalescence of interdental septum. Based on time, physical, psychological, and economical limitations treatment is planned. Direct composite resins give immediate esthetic changes in diastema cases. In this case report anterior spacing was closed with direct composite resin restoration in a single appointment and the patient was recalled after 6 months.

Keywords: *Esthetic, spacing, composite, anteriors.*

Introduction

Diastema or spacing between the maxillary anteriors is a common aesthetic complaint of patients[1]. It hinders the harmony of patients smile. Midline diastema was described by Keene as an anterior midline spacing greater than 0.5 mm between the proximal surfaces of adjacent teeth[2]. Midline diastema is more prevelant in maxila than in mandible[3]. The midline diastema has a multifactorial etiology. Habits such as thumb sucking, tongue thrusting, or lip sucking, dental-skeletal discrepancies, malformations, maxillary incisor proclination and imperfect coalescence of the interdental septum should also be considered in addition to the labial frenulum, microdontia, mesiodens, peg-shaped lateral incisors, lateral incisor agenesis, cysts in the midline region[4,5]. The width to length ratio of the central incisors determines the treatment plan. Amount of distal proximal reduction, the placement of convextites and concavities to create deception,the decision for full-veneers or the interproximal addition are decided based upon the width–length ratio[6]. The restorative approach is the simplest, fastest, most predictable solution among the various options for diastema closure such as orthodontics, restorative dentistry, and prosthodontics. Direct composite resins in diastema closure cases allow dentist to satisfy the patient immediately[7]. To fulfill their patients aesthetic demands improved materials and techniques are often introduced leading professionals to endless improvement[8]. Recent aesthetic composite resin materials have an appearance like natural dentin and enamel and possess similar physical and mechanical properties[9]. There are wide range of shades of varying opacities for layering technique was designed recently[10].This case report describes direct aesthetic midline diastema closure with composite layering technique.

Case Report: A 32-year-old male patient reported to the department of Conservative dentistry and Endodontics with the chief complaint of spacing in his upper front tooth region. Patient's medical history did not reveal any systemic diseases and on intraoral examination midline spacing was seen between maxillary central incisors due to high frenal attachment. In both clinical and radiographical examinations there

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was no dental caries. The patient refused for frenectomy and so a more conservative, economical, aesthetic, and quicker option, direct composite restoration build-ups for both maxillary central incisors were considered.

On shade selection A1 shade of Vita guide was considered to restore the diastema in order to simulate a natural look and were used together as layers. No preparations were performed before the restoration procedure. All maxillary incisors were isolated with rubber damand the adjacent central incisor was covered with Teflon band while the other was restored. 37% phosphoric acid was applied on the mesial surface to be restored for 15 seconds, rinsed for 20 seconds, and dried with air slightly. Then a single bottle bonding agent was applied and polymerized for 20 seconds with a LED light generator. Light cure composite are added in 1 to 2mm increments and each increments is cured for 20 seconds. Labial surfaces of the restorations were smoothed by using a knife-edge tip diamond bur. Polishing discs were used for detailed polishing from rough to fine grains by using a low speed handpiece. (Figure-1)

The patient was given oral hygiene instruction and informed for recalls. At the 6-month recall the restorations were just polished using polishing discs. At one-year recall there was no sensitivities,discolorations, or fractures detected.

Discussion

The direct composite resin restorationsdont require preliminary models or wax-ups, laboratory fees that intensify prices,however they are often placed during single visit. In terms of aesthetic odontology, these restorations provide various advantages in contrast to other treatment options such as ceramic veneers and orthodontic treatment. They are compatible with the opposing dentition compared to ceramic materials[11]. Unforeseen fracture can be treated easily using direct composite restoration compared to expensive and tedious repairs for porcelain alternatives[12]. Compared to some indirect restorations there are also some disadvantages of direct composite resin restorations such that it has less fracturaltoughness,compressivestrengthandaren'tsuited to ultra-high-stress areas found in clinical situations[13]. Presence of parafunctional habits like bruxism,nail biting, Class III end-to-end occlusal schemes, can potentially hinder the longevity of direct composite resin restorations[14,15].Although glazed ceramics have better color stability than direct composite resin restorations with the quality of finishing and polishing procedures the esthetic harmony is established[16,17]. Despite of these disadvantages of direct composite resin restorations with the developing adhesive techniques and better quality resin materials provide dentists the possibility to create more conservative, functional, aesthetic, economic, and long lasting restorations also in a very short chair time [18,19].Common method for this kind of cases is to create a wax up restoration and silicon matrix to guide the final composite restoration[19].In this case report, diastema closure was done by building up the mesial surfaces of central incisors one by one. The teeth were isolated with rubber dam and teflon band were used to cover the central incisor adjacent to the one to be restored. Teflon band is used to create close contact and perfect isolation preventing the adherance of resin based restoration materials. This type of isolation helped us to create two separate restorations having contacts points as naturally without creating a dark triangle .The teeth were restored one by one by layering technique[10].In this technique, dentist can decide the position of the midline and the location of the contact area to simulate a natural outlook. Experience of the dentist is very important in order to create a correct midline as well as a natural smile design. Indirect ceramic restoration is another treatment option for these cases that is prepared in a laboratory and attached to previously prepared area of tooth. The disadvantage of this technique compared to direct technique is that it needs atleast two appointment. According to technician, the restorations by using ceramic fragments simulate natural esthetics and is more functional[9].Recent studies showed direct composite resin restorations if done by using appropriate techniques are more functional, stable, aesthetical, and cheaper[19].In case of fractures it can be repaired easily which is another important advantage of direct composite resin restorations. In this case report, direct composite resin restorations were decided as the treatment method because the patient had a very limited time.



PRE & POST OPERATIVE

Figure 1: Preoperative and Postoperative Midline Diastema Closure

Conclusion

The general outlook of the maxillary anterior teeth was considered natural and aesthetical at six month and one year interval. Although one-year follow-up is not sufficient, restoration problems such as marginal leakage, discolorations, fractures on the restoration margins and debonding of composite resins did not occur. By taking this into consideration, direct composite resin restorations can satisfy patients, with proper case selection and by using an appropriate technique.

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Ethical Clearance: Not required for case report manuscript.

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Genetic Analysis in Pain Associated Deep Caries

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Abstract

The influence of genetic variation on gene expression appears to play a major role in the susceptibility of individuals to deep caries. Genotypic profile of an individual can manage disease treatment decisions and minimize adverse reactions. The type of inflammation in the tooth affected by a carious attack is determined by the permeability of dentin and the closeness of the carious lesion to the pulp. Generally*polymorphism*s in cytokines contribute to an individual's susceptibility in response to *deep carious* lesions. In this review, we discuss single nucleotide polymorphism and gene expression of pain receptor genes such as transient receptor protein channels, proteinase-activated receptor, voltage-gated sodium channels, and cyclooxygenase 2 that are involved in inflamed pulp and deep caries. We conclude that our review on genetic variations and expressions in pain associated deep caries could aid in better understanding of genes involved in dental pain management.

Keywords: *Polymorphism, gene expression, pulpitis, pain receptor channels.*

Introduction

All humans 99.9% of the genetic information is shared and 0.1% variation in it makes them unique. The most common genetic variation in humans is the single nucleotide variation or polymorphism. The genetic contribution in many diseases is involved in understanding the gene variation for the development of diseases. Single nucleotide polymorphism studies can help in navigating and targeting the precise molecular network and the genetic mutation that drive the disease. In cases of dental diseases, they are not inherited as a single gene defect instead they result from gene and environment interactions[1]. Identifying specific genetic markers and their genetic correlation of dental caries explain the reason behind the higher susceptibility to deep caries and pain in pulpitis. Dental pain or toothache is the pain in teeth or their supporting structures and which have an impact on daily activities. The most common types of dental pain are dentine hypersensitivity and pulpitis associated pain. If the cavities are not treated properly, deep carious lesions develop, and this leads to inflammation of the pulp[2]. The symptomatic pulpitis is accompanied by severe pain, thereby patients seek dental treatment. Approximately 35-55% of caries phenotypic variation in the permanent dentition is attributable to genes.There are many reports that the pattern of host inheritance leads to either increased susceptibility or resistance to dental caries[3].Twin studies provide evidence of partial genetic control in the etiology of caries. In monozygotic twins, the variables including the number of teeth present, percentage of teeth restored, surfaces restored, teeth affected by caries showed a considerable correlation but not in the case of dizygotic twins[4]. The amount of genetic variation with heritability varying from 20% to 80% in twins reported in the US, Brazil, and China depending on the disease-related variables.Molecules expressed in the cascade of tissue inflammation serve as biomarkers for the presence of inflammation in pain in deep caries.Single nucleotide polymorphism in cytokines, matrix metalloproteinases (MMPs), heat shock protein genes, contributes to the increased susceptibility to apical tissue destruction in

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response to deep carious lesions. Cytokines are involved in caries, pulpal, and periapical tissue destruction associated with increased levels of inflammation. Single nucleotide polymorphism in a variety of cytokines including IL1B, IL6, IL10, TNFA, and TLR4can help in predicting the caries risk in individuals[5]. The genetic variation in pain receptor channels can lead to painful pulpitis and deep carious lesion. Pain receptor channels such as transient receptor protein channel (TRPs), voltage-gated sodium ion channels and pain receptors like protease-activated receptor 2(PAR-2) and COX genes play an important role in the transduction of pain in the inflamed dental pulp. The polymorphism and expression studies in these genes are discussed below.

Genetic Analysis in Pain Associated Deep Caries

Gene polymorphism and expression in TRP channels: Transient Receptor proteins are integral pore-forming membrane proteins that function as non-selective ion channels[6]. Seven TRP subfamilies are identified and among them the four members of the TRPV subfamily (TRPV1, TRPV2, TRPV3, TRPV4), four members of the TRPM subfamily (TRPM2, TRPM3, TRPM7, TRPM8), two members of the TRPC subfamily (TRPC1, TRPC6), and one member of the TRPA subfamily (TRPA1) have been found in dental tissues such as dental primary afferent neurons (DPAs) and odontoblasts. TRPV1 has a prominent role in pain sensation and is proven in knockout mice experiments[7]. Many single nucleotide polymorphisms (SNPs) with or without amino acid substitutions have been identified in the human TRPV gene, and this variation leads to altered human phenotypes. The activation of distinct agonists by the nonsynonymous SNPs will change the functional properties of the TRPV1 gene[8][9]. Nozomu et al. 2008 [10] compared the sequences of the TRPV 1 gene in Japanese adults sensitive to burning pain and capsaicin and showed low correlation between the two sensitivity subjects. Kim et al. 2004[11] studied caucasian females with TRPV1 Val allele in the vanilloid receptor subtype 1 gene and showed greater pain tolerance to experimental cold in varied ethnic populations. When dental primary afferent neurons were stimulated by increasing temperature (>43°C), TRP channels enhanced the intracellular Ca^{2+} concentrations and elicited the inward currents in afferent neurons [2].

Gene polymorphism and expression in sodium channels: Voltage-gated ion channels (VGICs) are transmembrane proteins that have an important role in electrical signaling processes in neurons and other excitable cells. Many experimental studies in animals and few human studies demonstrated that VGICs increased the pain by activating of pain pathways[22]. Mutation in genes like SCN4A, SCN5A, SCN9A, SCN10A encode voltage gated sodium channels Nav 1.4, Nav 1.5, Nav 1.7, Nav 1.8 isoforms are involved in painful neuropathy[23]. Davison suggested that the sodium channels were highly expressed in neural satellite cells butnot in odontogenic cells[24]. In an *in vitro* study, Allard et alfound that voltage-gated tetrodotoxin (TTX)-S developed an action potential and expressed odontoblasts [25]. Several studies supported the expression of NaV1.7, NaV1.8, and NaV1.9 in human dental pulp with irreversible pulpitis when compared to the dental pulp of non-painful teeth[26]. SCN9A, a strong contributor to human pain sensitivity showed polymorphism in SNP rs6746030, thereby altered pain sensitivity in osteoarthritis and spinal nerve root pain[27]. The novel heterozygous mutation Q10K in exon 2, *de novo* splicing mutation (IVS8-2A>G), variant (P610>T) and major allele splice junction variant (IVS24-7delGTTT) was identified in SCN9A gene in caucasian primary erythromelalgia population[28][29]. The SCNA genetic variants was associated with the risk of chronic OXAIPN in south Indian patients of Gastro intestinal tract cancer who are undergoing OXA based chemotherapy[16].

Single nucleotide polymorphism in Protease activated receptor: Protease-activated receptors (PAR) are present in periodontal tissues that are involved in inflammation and repair processes. PAR is a G-protein-coupled receptor with seven membrane domains that mediate cellular response to extracellular proteinases. The PAR-2 expression is significantly upregulated in chronic periodontics.*In vivo* studies have suggested the influence of PAR-2 in the initiation and development of chronic periodontics[30].Many cytokines and mediators including IL-6, IL-8, Il-1, IFN-γ, PGE2, and MMP-9 are produced by the stimulation of PAR-2 [31]. Single nucleotide polymorphism studies in PAR-2 and the SNPs rs1529505 and rs2242991 have a high risk of Knee Osteoarthritis [20]. Previous studies illustrated thatPAR-2 in tissue fibroblasts constitutively expresses minimal PAR-2 *in vivo*. But in another study spindle-shaped, vimentin-expressing dental pulp cells expressed PAR-2 in carious teeth *in vivo*, supporting the view that these are expected to be dental pulp fibroblast-like cells. The regulation of PAR-2 expression to the area of caries access suggests control over its expression *in vivo*[32].

Cyclooxygenase polymorphism and expression in deep caries: Cyclooxygenase (COX) is the enzyme that produces prostaglandins and its candidate genes COX 1 and 2 are involved in modulation of pain. COX-1 is expressed naturally and produces prostanoids in response to hormonal stimuli, and COX-2gets activated during inflammation and produces proinflammatoryprostanoids[33][34]. The conversion of arachidonic acid to prostaglandin H2 and different prostaglandin synthases convert PGH2 to PGE2, PGD2, PGF2alpha, PGI2, and TXA2. PGE2 showed a significant role in pain signaling[35]. COX-2genes polymorphism and its differential expression might develop inflammation and prevent the synthesis of prostaglandins 3 and 4 that sensitize pain fibers in acute dental caries condition[36].Polymorphism in the SNP regions of COX-2rs5277, rs5275, rs2383515, rs2206593 was associated between the severity of preoperative pain and the extent of acute postoperative pain in endodontic patients[17].In a case-control study and meta-analysis, the COX-2 association was not identified with an overall risk of chronic periodontics (CP) but in the north Indian population female-specific risk of CP was shown in rs20417-765GC genotype. In a meta-analysis study in the Chinese population, COX-2 polymorphism was correlated with a reduced risk of CP[18]. This review gives an overview of genetic analysis including gene polymorphism and expression in above discussed *pain associated receptors and* COX-2 *in* deep carious lesions. Future detailed studies in acquired and hereditary diseases related to dental pain could help to design drug targets for therapeutic intervention in dental pain treatment and management.

Conclusion

Identification of the genetic causes of an individual's response to treatment and progressing genotyping technologies impact the development of personalized medicine.The studies examining the dental pain atgeneticlevel provide a better-detailed representation of the gene expression that produces inflammatory changes in the dental pulp and we can use this information as the biological basis for studying acute dental pain. The genes associated with deep caries can be used as new targeting agents and as an adjunt therapy to inhibit pain in deep caries. The understanding of genetic polymorphism helps in determining the host susceptibility to pain in deep caries and promoting further varied treatment in endodontic therapy.

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Nanotechnology and its Application in Re-mineralization of the Tooth: A Review of Literature

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Abstract

There are two possible mechanisms for size influenced consequences of nanomaterials in preventive dentistry: one, interaction with bacterial attachment and biofilm establishment, two, the effect on de-and remineralization. As the process of demineralization begins at nanolevel, it is imperative to provide nanosized units for optimized remineralization. This is applicable for particle size-related interactions with bacteria and it's bacterial, as the nanoparticles are more effective than microparticles. Many preparations have been developed, many of them are in the experimental state, and a few are already available. Nanoparticles for major tooth repair may progress through various stages of technological development. Many naniparticles are made available which help in teeth repair and regeneration process. This article is a review on nanomaterials for remineralisation. Which are Nano hydroxy apetite, Nano calcium fluoride, Beta Tricalcium Phosphate, nano Bioglass, Nano CCP-ACP and nano Bioinert zirconia.

Keywords: *Remineralisation, Nanoparticles, Caries Prevention.*

Introduction

The primary cause of oral pain and tooth loss is dental caries, and ironically it is one of the most common preventable diseases which were recognized. It hinders the achievement and maintenance of oral health in all age groups[1]. Despite great improvements in the oral health of population oral disease still prevails[2]. If complete mechanical biofilm management is done every day on every part of the teeth, there will be no spread or new caries lesion formation. And also, added strategies and preparations for biofilm management and remineralization of incipient dental lesions are needed.

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A large number of artificial materials and products are available accessible for oral healthcare and preventive dentistry. However, they are not as effective as is essential and are not biomimetic. Hence, additional strategies are required for prevention of demineralization and to improve remineralization. The application of nanotechnology and nanobiomaterials to overcome these challenges is seen to be effective. Nature has designed several biological systems, including structures of the oral cavity, within the nanometer range. Nanos, which means "dwarf," in greek and one nanometer (nm) = 0.000000001 meter. Dr. Nori Taniguchi, in 1974 defined as "the processing of separation, consolidation, and deformation of materials by one atom or one molecule"[3]. Properties of these materials are easy preparation and diversity in preparation techniques, large-scale manufacturing, batch-to-batch reproducibility, better stability in biological fluids and during storage and controlled release. The large surface area causes nanosystems to be more reactive and improved physical properties. The effects of nano-materials are governed by surface interactions and bioadhesion at the tooth surface are useful for caries prevention[4]. This applies for physiological as well as pathophysiological mechanisms

and processes taking place at the tooth biofilm saliva interface. Thereby, strategies mimicking nature at the nanolevel seem to be the most promising approaches as they try to avoid successfully unpredictable adverse effects potentially caused by artificial agents[5].

There are two possible mechanisms for size influenced consequences of nanomaterials in preventive dentistry: one, interaction with bacterial attachment and biofilm establishment, two, the effect on de-and remineralization. As the process of demineralization begins at nanolevel, it is imperative to provide nanosized units for optimized remineralization. This is applicable for particle size-related interactions with bacteria and its bacterial, as the nanoparticles are more effective than microparticles. Many preparations have been developed, many of them are in the experimental state, and a few are already available. Remineralization can be achieved by simultaneously supplying calcium, phosphate, and fluoride ions to the teeth in order to induce the formation of various apatites that remineralize and strengthen the tooth. Therefore, more investigations on the remineralizing potential of formulations based on nanotechnology are in progress. Nanomaterials might enhance the process of remineralization. One, they can fit to the nanoscopic defects, two, they can serve as carriers for remineralizing ions with high affinity to the pellicle. A supersaturation at the tooth surface or in the pellicle layer can be achieved, leading to a slow-release depot.[6]

Nanodental techniques for major tooth repair may evolve through several stages of technological development, using genetic engineering, tissue engineering and tissue regeneration, and later involving the growth of whole new teeth in vitro and their installation. Nanomaterials for remineralisation are Nano hydroxy apetite, Nano calcium fluoride, Beta Tricalcium Phosphate, nano Bioglass, Nano CCP-ACP and nano Bioinert zirconia

Nano Hydroxyapatite: Hydroxyapatite nanocrystals provide excellent biological properties such as biocompatibility, lack of toxicity, as well as lack of inflammatory and immunological responses. In early in vitro studies, the effects of nano-HA on enamel remineralization were evaluated in static models[7]. The studies reveal that nanosized hydroxyapatite has a potential to remineralize incipient caries lesions. It also promotes preferential mineral deposition in the outer layer of the initial caries lesion and had a limited capacity to reduce lesion depth or to increase the mineral content in the body of the lesion[8]. Interestingly, the remineralization effect strongly depends on the pH during application of the nanosized hydroxyapatite: under neutral conditions, the full remineralization effect is no achievable, while under acidic conditions (pH of 4.0) nanohydroxyapatite can significantly increase the depth of penetration and the extent of remineralization of artificial incipient caries lesions[8]. Even though various advantages are seen, hydroxyapatite is highly brittle and cannot be used for load-bearing areas. A varied range of techniques are developed to increase the mechanical toughness of this Hap. It is similar to the apatite crystal of tooth enamel in morphology and crystal structure. In vitro data show that n-HAP with a size of 20 nm fits correctly with the dimensions of the defects on the enamel surface. The n-HAP particles can strongly attach to the demineralized enamel surface and inhibit further acidic attack. It isobserved that biomimetic synthesis of enamel-like structures composed of n-HAP is a suitable approach to repair enamel microcavities. It has significantly higher bio-activity when compared to microHAps, as determined by an enhanced bone-bonding ability. The hydroxyapatite nanoparticles when added to a polymer matrix leads to increased mechanical strength. Addition of nHAp to chitosan scaffolds enhances the proliferation of bone marrow stem cells and an upregulation of several genes, together with myosins. nHAp showed nuclear localization along with enhanced osteocalcin production. nHAp-reinforced nanocomposites or surface coating increases mechanical stiffness and bioactivity of implants and can be used for dental restoration[9].

Nano Calcium Fluoride: Nano CaF_2 powder containing clusters of 1015 nm sized crystallite particles has been prepared from $Ca(OH)_2$ and NH4F solutions using a spray-drying technique displayed much higher solubility and reactivity than its macro-sized counterpart. The CaF2 nanoparticle (nano-CaF_2) has a 20-fold higher surface area compared with traditional CaF_2 thereby show increased fluoride release. Unfortunately, current dental materials with high fluoride release generally have poor mechanical properties [10]or release only a small amount of fluoride with low fluoride-recharge capability [11,12] . It can be tackled by designing dental composites with calcium fluoride (CaF2) nano-particles which shows high fluoride release but still maintains strength and wear resistance[13,14].

Nano calcium phosphate: Nanoparticles of

the more soluble calcium phosphate phases, such as monocalcium phosphate monohydrate (MCPM), dicalcium phosphate anhydrous (DCPA), tetracalcium phosphate (TTCP), and amorphous calcium phosphate (ACP), have been developed to release calcium (Ca) and phosphate (PO_4) ions, increasing the mineral content in the caries lesions [15]. These nanoparticles have better ion-release profiles than microparticles: a small particle can release Ca and PO_4 ions at higher concentrations[16].

Nanocomplexes of Casein Phosphopeptides Amorphous Calcium Phosphate: It is observed that the CPP attaches to the spontaneously forming ACP nanoclusters under alkaline conditions. It gives rise to a metastable colloid of nanocomplexes of CPP-ACP. Nanocomplexes of CPP-ACP provide a new effective remineralization method thus helps in the treatment of hypersensitivity. The mechanism of CPP-stabilized ACP is transforming itself into HAP crystal in the process of biomineralization of dental hard tissues[17].

Beta Tricalcium Phosphate: β-TCP acts as a bioactive source of mineralizing agents. f β-TCP is the functional form. The combination of f β-TCP and fluoride gives stronger, more acid-resistant minerals relative to fluoride, native β-TCP, or fβ-TCP alone. The nanomaterials of β-TCP can achieve more effective remineralizing results[17].

Bioglass: Bioactive glass was introduced by Hench et al. in 1960[18]. It is made of silicon dioxide (SiO 2), sodium oxide (Na 2 O), calcium oxide (CaO), and phosphorous pentoxide (P 2 O 5) in specific proportions. It favors the formation of hydroxycarbonate apatite/ hydroxyapatite layers on the surface. It has also bone bonding ability. BAG is brittle and has a low wear resistance. By reinforced bioglass with yttria-stabilized zirconia nanoparticles. The yttria-stabilized zirconia bioglass (1YSZ-2BG) coating showed significantly higher bonding strength compare to conventional one[19]. Nanoparticles of BAG is used for the treatment of hypersensitivity. E.g. NovaMin®

Bioinert Zirconia Nanoparticles: Zirconia (or zirconium dioxide) is a polycrystalline biocompatible ceramic. It has low reactivity, high wear resistance, and good optical properties. The properties of zirconia particles can be enhanced by reducing the grain size of zirconia to nano scale, by incorporation of nano sized yttria stabilized tetragonal zirconia, or by incorporating various nanoparticles like carbon nanotubes and silica nanoparticles[21]. Fabrication of Y-TZP nanocomposite by reinforcing with silica nanofiber showed significant increase in the flexural modulus (FM), fracture toughness, flexural strength, and energy at break (EAB) compared to Y-TZP.This nano filled zirconia particles promote bone bonding, mineralization, and dental tissue repair[22]

Conclusion

Time ahead, tooth repair by fabricating the nanorobots and introduction of a biologically mimicking whole-tooth replacement with both mineral and cellular components it is envisaged, that nanotechnology will have a great advantage in dental research and in improving the current treatment procedures, thereby providing to superior oral health care.

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Designing Universal Primer for the Identification of Erythromycin and Tetracycline Resistance Genes in Oral Streptococci

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Abstract

Oral streptococci being the early colonizers of oral biofilm have a high impact on the health status of an individual. The resistance of streptococci to erythromycin and tetracycline possess a global threat in oral health by harboring the *erm* and *tet* resistant genes which are proved to be correlated with each other. Considering the high prevalence of *erm* and *tet* resistance in oral streptococci, identification of universal primers for these genes are necessary to characterize these genes. Our work has put forth a heuristic approach in designing universal primers to detect genetically diverse *erm* and *tet* resistant genes in streptococci. The *erm* and *tet* primers were validated to be universal among the streptococci group. The universal primers designed for *erm* and *tet* generetrieved 100% and 72.7% of sequence similarity of streptococcus deposited in NCBI gene repository. Identification of universal primers for the successful amplification of *erm* and *tet* genes of streptococci for the first time will minimize the usage of multiple primers to isolate resistant streptococci for rapid detection of antibiotic-resistant genes.

Keywords: *Antibiotic resistance; Erythromycin; Streptococcus; Tetracycline;Universal primers.*

Introduction

The Oral microbiome is an important determinant that fills the gap between health and disease. Microbes in the oral cavity exist as a community where commensals, symbiotic organisms and pathogens live in the same space [(1)]. Bacteria adhere to form a complex biofilm, which uninterrupted results in dental caries. Dental caries has been reported with a high abundance of streptococcus[(2)], worsening its spread, mainly due to the flourishing of streptococci, that limit the growth of other bacterial species and species diversity. The oral cavity of healthy individuals was predominated with *S. sanguinis*, *S. parasanguinis, S. mitis*[(3)] while the virulent pathogen *S. milleri* resides as a part of normal flora[(4)]. Early colonizers *S. sanguinis* cause infective endocard itis due to dissemination through the bloodstream[(5)].

Among oral Streptococci, S. sanguinis, S. mutans, S. angionus, S. salaivaris, S. panodentisare more predominant.Streptococci have a main role in the emergence of resistant species by interchanging of genetic contents within other species of bacteria. Streptococci with resistance towards penicillin G and erythromycin A has been reported to transfer genetic content and responsible for antibiotic resistance of S. pneumoniaeor, S. pyogenes, thus acting as a resistance reservoir.

There is an increase in streptococci related disease burden in India at an alarming rate[(6)], especially with invasive infections by Group A streptococci (GAS) has increased its importance of extensive research[(7)]. Therapeutic failure of treating macrolide resistance

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has been increasing and is found to be mainly due to the methylation of the adenine residue of the target, 23S rRNA, encoded by ermfamily genes. On the other hand, GAS has gained resistance to tetracycline due to the incorporation of ribosomal protection genes–tetO and tetM, associated with conjugative chromosomal elements, that encode their transfer [8].Oral samples all over the world revealed more than 80% of tetracycline resistance acquired by the streptococcus strains, among which, 25% were resistant to erythromycin[9]. tetM displayed a highly significant association with ermB[10].

Erythromycin-resistant methylase is encoded by erm genes (ermB, ermA, erm G, erm T).The erm family-encodes methylases that methylate an adenine residue in 23S ribosomal RNA resulting in coresistance to macrolide, lincosamide, and streptogramin B antibiotics, as a result of the loss of binding ability to the ribosome. Among the members of the family, erm (B) is the most predominant and showed a high level of resistance in streptococci[11]. Resistance to macrolides can occur due to target site modification regulated by the ermgene, resulting in resistance to macrolide, lincosamide, and streptogramin B group antibiotics.

Confirmation of the presence of a resistance gene in a genus of bacteria involves the use of specific primers that could initiate amplification of the desired resistance gene in the polymerase chain reaction. Primers specifically designed for a gene could miss out amplification due to gene mutations and different gene forms. Hence it is necessary to design primers that could identify particular antibiotic resistance gene, present in the bacterial genus, in spite of sequential differences between the species. We have designed specific universal primers for erythromycin and tetracycline-resistant gene of streptococcus, that could retrieve the majority of erm and tet genes present in the streptococci group, to rule out false-negative results during amplification of these genes. Our work signifies designing of universal primers to amplify highly prevalent ermandtetgenes of streptococcus.

This studyexploits the available information of *erm* and *tet* of streptococcus to design the universal primers for their identification in the vast group of resistant streptococci. Designing of universal primers for a particular gene that could efficiently identify the gene from all species of a particular genus will be a heuristic approach in primer designing.

Materials and Method

Erythromycin and Tetracycline resistant genes (*erm* and *tet*) present in streptococci were retrieved fromthe NCBI gene database. Selection of universal primers was done using primer-BLAST. FASTA format sequences of the genes were given as a template to pick primers using Primer-Basic Local Alignment Search Tool (BLAST). Primer-BLAST aid selection of primers for the gene of interest using optimized primer parameters and identifies intended and unintended templates for the selected primers. Use of Primer-BLAST for primer designing enables identification of all possible DNA templates, to which the designed primers can bind. Accession ID of the gene of interest was given as a query for primer-BLAST.

General conditions for primer selection were optimized, considering basic primer designing criteria involving parameters, primer size, primermelting temperature (tm), primer GC% and, Maximum self-complementarities checked for potential hairpin loop formation.

Criteria considered for primer designing using Primer-BLAST:

1. Identification of universal primers for resistant genes from non-redundant databases favored retrieval of the majority of resistant genes. Non-redundant database (nr) contains non-redundant sequences from GenBank along with sequences from other databanks (Refseq, PDB, SwissProt, PIR, and PRF).
2. Enabling primer amplification of mRNA splice variants favors the identification of specific primers.
3. Selection of user-guided protocol for searching against streptococci will cut down search time and irrelevant off-target binding.

False positives can be controlled by applying stringent parameters that help to detect specific DNA templates. The primer pairs were checked for the satisfaction of primer criteria's using OligoCalc: Oligonucleotide Properties Calculator for the optimized search of targets.

Results

Selection of primers for *erm* gene of streptococci:

NCBI Search for *erm* genes in streptococcus resulted in retrieval of six 23S rRNA (adenine (2058)-

N (6))-methyltransferase) template sequences that were analyzed for template selectionfor universal primer designing for erythromycin resistance gene of *streptococci.*Primer–BLAST retrieved ten primer pairs for each template. Primer pair for each template was selected based on its qualification of primer criteria's to retrieve appropriate streptococci.

Primer 1 from Template, 23S rRNA (adenine (2058)-N(6))-methyltransferase *ErmB* (Table 1) of *Streptococcus infantis*retrieved 20 *Erm*gene targets from streptococci group, in comparison with other erm templates. Primer 3 from the template, *ErmT* of *S.pyogenes*, retrieved six *erm* gene targets, followed by primer 5, Methylase of *S.pyogenes* (*ermT*) and primer 6 with the retrieval of 5 and 4 targets respectively.

Primers of tet gene of streptococci: Gene search in NCBI for *tet* gene of streptococcus resulted in retrieval of twelve template DNA sequences of *tet* gene that encode ribosomal protection protein (*tet* protein) responsible for the increase in antibiotic resistance. Generation of primers for each template using Primer–BLAST was followed by the qualification of primers to identify primers that satisfy all primer criteria.

Primer 4 from Template, *TetM* of *Streptococcus anginosus* retrieved twelve *tet* gene targets from streptococci group, in relation with other available DNA templates of *tet* gene. Primer 2 and primer 3 from templates, *TetM* of *Streptococcus infantis* and *TetM* of *Streptococcus gallolyticus* retrieved eight *tet* gene targets from streptococci group. Primer 8 from *TetM*of *Streptococcus sui s*retrieved seven *tet* genes from the streptococci search group. Other identified primers, 1, 5, 6, 7, 9, 10, 11 and 12 retrieved less than seven streptococci associated *tet* genes.

NCBI-primer blast provides the primer paring between the query and the selected forward, reverse primer, and unintended templates that bind to the primers. Identification of universal primers for a gene of a particular organism would be a heuristic approach in molecular genetics to identify the presence of an antibiotic resistance gene in a specified group.

Validation of universal primers of ***erm*** and ***tet*** genes of streptococci:

The identified universal primer for the *erm* gene of streptococcus was validated for the identification of all possible streptococci in the gene repository of NCBI. Table 4 shows the *erm* genes of streptococci deposited in the Gene database of NCBI.

The identified universal primer of the *erm* gene retrieved all streptococci deposited in the GenBank . Meanwhile the universal primer retrieved *erm* genes of other streptococcus species, *S.pasteurianus, S.salivarius, S. parauberis, S. iniae, S. gordonii, S. intermedius, S. lutetiensis, S. pseudopneumoniae, S. oralis, S.uberis, S. thermophiles, S.hyointestinalis* and *S. faecalis* from the non-redundant database, that are not deposited in the GenBank. The percentage of primer recognition of the streptococcus was 100%, when compared to other primers of *erm* genes. This proves the potentiality of primer 1 to be used as a universal primer for the *erm* gene of streptococcus.

Similarly, identified universal primers for the *tet* gene of streptococcus were validated in relation with the *tet* genes present in the gene repository of NCBI. Table 4 lists *tet* genes of streptococcus in the NCBI gene database.

The identified universal primer of *tet* gene retrieved eight out of eleven genes of streptococcus deposited in the NCBI gene database besides with *tet* genes present in the genome of *S. pseudoporcinus, S.porcinus, S.pseudopneumoniae, S.constellatus,* and *S. parauberis* from non-redundant database. The percentage of primer recognition of the streptococcus was 72.7%, higher than any other primer sets of *tet* genes. This confers the importance of primer 4 in the identification of *tet* genes of streptococcus group.

Discussion

Universal primers have been used for species identification by the recognition of 16 S rDNA sequence and amplification that allows prompt and accurate identification of the species of bacteria [12] and other organisms[13][14] based on universal distribution of species-specific 16S rRNA region. Furthermore, universal primers are used to assess the total bacterial load of a clinical sample to detect all bacterial species invariably[15]. Our work focuses on the identification of universal primers for the most prevalent antibiotic resistance genes *erm* and *tet*, to identify their presence in streptococcus group. This study signifies identification of *erm* and *tet* genes with a universal primer to minimize the usage of multiple primers in the identification of genetic variants of the gene among the streptococcus species.

Conclusion

Designing of universal primers for a resistance gene present in a genus, besides the identification of bacterial species would be a novel and cost-effective approach in the primer designing strategy. This work highlights designing of the universal primers for *erm* and *tet* gene of streptococcus. The designed universal primers identified 100% and 72.7% of *erm* and *tet* of streptococcus group respectively. Designing of universal primers for resistance genes of an organism will provide a rapid, cost-effective, accurate method of identification among the species of the group favoring antibiotic resistance research.

Ethical Clearance: Not required since it is an in vitro study.

Source of Funding: Nil

Conflict of Interest: Nil

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Importance of CBCT in Endodontic Failure: A Case Report

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Abstract

A definitive diagnosis of vertical root fracture (VRF) is often a challenging diagnosis for clinicians. This is because periapical radiographs are usually unable to detect the fracture line due to two dimensional image. This case of root canal treated with apical periodontist was diagnosed with vertical root fracture based on findings from clinical, radiographic, and cone-beam computerized tomographic (CBCT) examinations. CBCT aids in information regarding fracture line which cannot be detected in radiograph due to the direction of x-ray beam. Hence CBCT greatly helps in the diagnosis and management of VRF. However, the clinical and radiographic data is also much need hence CBCT can be used as an adjunct for cases with difficult diagnosis.

Keywords: *Cone-Beam Computed Tomography, Dental Radiography, Diagnosis, Endodontics, Tooth Fractures.*

Introduction

The main motive of root canal treatment is to disinfect the root canal system followed by obturating the space created so as to entomb any microbes that have escaped elimination and to prevent reinfection; without causing any iatrogenic damage. [1, 2]

The success of root canal treatment in teeth with noninfected vital pulps depends on preventing root canal infection, while in teeth with infected necrotic pulprelies on complete removal or at least reduction of bacterial counts for perirradicular tissue healing. [3] Post-treatment apical periodontitis is the form of disease associated with root filled teeth and is usually associated with a persistent or secondary root canal infection.[4,5]

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The vast majority of previous studies evaluating the prevalence of post-treatment apical periodontitis and its risk factors were based on radiographic examinations. [6] Because they provide only two-dimensional information, radiographs may not reveal missed canals in all cases. In such conditions using cone-beam computed tomography (CBCT), which provides three-dimensional information and a higher sensitivity to evaluate hard tissue changes. [7] Cone beam computed tomography (CBCT) is a relatively advanced method to visualize an individual tooth ordentition in relation to surrounding skeletal tissues and to create three-dimensional images of the area to be examined.[8] The use of CBCT in Endodontics is rapidly increasing worldwide.

Costa et al showed the importance of CBCT which will be able to expose primary cause in endodontic failure such as missed canals, inadequate obturation in oval shaped canals, vertical root fracture etc.[9] This case report is one such persistent endodontic infection diagnosed by CBCT.

Case Report: This case report discusses about a 56 year old male patient reported to the department of conservative dentistry and Endodontic, Sree Balaji Dental College and Hospital, Chennai, India with a chief complaint of pain in right upper posterior region of the jaw.

Past dental history reveals endodontic treatment in relation to 17 before 4years. On examination, pain on percussion in relation to 17 with visible swelling on palatal aspect was noted. IOPA was taken in buccal [fig A] and distal angle[fig B]. Radiograph shows presence of periapical rarefaction in relation to mesial root [fig A] and angled radiograph [fig B] did not confirm any missed canal.The provisional diagnosis was root canal treated tooth with apical periodontitis in relation to mesial root of 17. Since radiograph reveals radiolucency in relation to mesio buccal root [fig A] whereas the intraoral swelling is present in palatal root, patient was advised to take CBCT to rule out the confusion.

CBCT images did not reveal any missed canal in mesiobuccal root and showed no radiolucency around the tip of mesiobuccal root but presence of radiolucency around the tip of palatal root was noted [fig C].CBCT also revealed unusual morphology of fused mesiobuccal and palatal root [fig D, red arrow] .Careful examination of mesiobuccal and palatal root reveals a vertical root fracture in palatal root of 17 [fig D,yellow arrow] .Since vertical root fracture does not have a good prognosis for retreatment 17 was extracted under local anesthesia.



A B C D

Fig (A) IOPA buccal angulation in relation to 17 revealing radiolucency in relation to mesiobuccal root, (B) IOPA distal angulation in relation to 17 with no periapical radiolucency.(C) CBCT image showing periapical radiolucency in palatal root in relation to 17, (D) CBCT image showing fused mesiobuccal and palatal root(Red Arrow) with radiolucency around palatal root and followed by vertical root fracture in relation to palatal root (yellow arrow) of 17.

Discussion

In this case the radiograph revealed radiolucency in mesiobuccal root whereas the intraoral swelling was noted in palatal root, on examination, CBCT showed unusual morphology of fused mesiobuccal and palatal root [fig D, red arrow] .vertical root fracture was also noted in palatal root [fig D, yellow arrow]. Hence the radiolucency in palatal root has been reflected in the radiograph of mesiobuccal root due to their fusion which wouldn't have been in cases of individual roots.

When the nature of the dento-alveolar root fracture and dental injuries couldnt be diagnosed from a conventional examination and radiographs, Cone beam computed tomography has been suggested as an adjunct imaging tool[10].

CBCT is a three-dimensional imaging method that gives the possibility to view an individual tooth or teeth in any view. Hence CBCT play a vital role in endodontic diagnosis, treatment planning and follow-up. Whereas the limitations of CBCTand radiation dose to the patients must always be taken into consideration when selecting them odes of diagnostics. There is a need for evidenced-based guidelines on when to use CBCT in Endodontics, thus aiding the decision on when is it appropriate to take a CBCT scan ideally.

It is clear that CBCT reveals a considerable amount of information about the nature of dento-alveolar injuries. This information may not only help in formulating diagnosis but also improves the management. Ultimately,this may improve treatment outcomes. Hence when the diagnosis from clinical and conventional radiographic assessment is inconclusive, CBCT should be considered as a potentially useful imaging device.

Conclusion

Cone-beam CT which offers immense amount of radiological information not only improves pre-operative and surgical planning, but the 3D models provided can be used to further educate and inform patients and guardians regarding further management.

Conflict of Interest: Nil

Source of Funding: Nil

Ethical Clearance: Not required for case report.

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Closure of Midline Diastema by Composite Resin Build-up: A Case Report

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Abstract

Maxillary anterior spacing is one of the most common aesthetic complaints of young patients. It is an esthetic and technical challenge for clinicians. Treatment is mainly for esthetic and psychological reasons, rather than functional ones, numerous materials are available for diastema closure. Case should be carefully analyzed with proper history for etiological factors and best possible treatment plan. The aim of this study is evaluate the efficiency and performance of composite resin in closure of midline diastema.

Keywords: *Midline diastema, History, Analysis, Composite resin.*

Introduction

The midline diastema is a space between the maxillary or mandibular central incisors [1]. The presence of a midline diastema represents an esthetic and psychological impairment and distress for patients[2]. Maxillary midline diastema has a multitude of underlying etiological factors that might be interdependent or independent.

Numerous etiological factors for maxillary midline diastema has been listed by literature[3].Among them are the developmental factors like.

- Diastema
- Mesiodens
- Abnormal frenum attachment
- Missing or undersized lateral incisor
- Thumb sucking
- Mouth breathing
- Tongue thrust
- Dentoalveolar disproportion
- Generalized spacing
- Ankylosed central incisor
- Rotated or flared central incisors
- Macroglossia
- Closed bite
- Facial type
- Ethnic
- Familial characteristic

Other Factors Include:

- midline pathology
- gingival recession
- and pathological tooth migration

In adults, tooth-size discrepancies found to be the most common factor in the development of diastemas.

The incidence of diastemas varies greatly with race and age.The space can be a normal growth characteristic

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during the primary and mixed dentition and is closed by the time the maxillary canines erupt[4].

Diastemas can be treated in a multitude of ways including orthodontic closure, restorative therapy, surgical correction or multidisciplinary approach depending upon the nature of case and the etiology of diastema[5,6]. A carefully developed differential diagnoses allows the practitioner to choose the most effective treatment plan. Diastemas based on tooth-size discrepancy are most amenable to restorative solutions[7,8]. Direct composite veneers, indirect composite veneers, porcelain laminate veneers, all ceramic crowns, metal ceramic crowns and composite crowns are the various techniques available for restorative closure of midline diastema [9].

Case Presentation: A 29 year old female patient reported to the department of conservative dentistry and Endodontics, Sree Balaji Dental College and Hospital, Chennai, India with a chief complaint of midline spacing between her upper anterior teeth. The spacing was a discomfort to the patient, and was affecting her self-confidence.

A clinical examination revealed 2 mm space between maxillary central incisors at incisal and middle third, with favorable gingival hygiene. The patient didn't want orthodontic or prosthodontic considerations. The treatment plan is to provide an esthetically favorable relation between the maxillary anterior teeth involved closing the diastema using composite

A study model was fabricated to measure the actual length between the top of the papilla and incisal edge of the central incisor. The mock up study model was prepared. The analysis of the length and the width of the upper central incisors demonstrated an unfavorable proportion after the closure with composite resin but, the patient was satisfied with the result of the study model. Therefore, direct composite Resin was decided as restorative material. According to Willhite the diastema closure using a narrowed Mylar strip and cotton pellet to increase the emergence profile and gingival tissue recontouring. According to this same procedure was applied in this case. The patient was anesthetized, and teeth were isolated with insertion of a gingival retraction cord. The narrowed strip was fully seated into the sulcus and a small cotton pellet was placed between the tooth and the Mylar strip, and gently packed into the sulcus. After 5 minutes, cotton pellet was removed to gain the empty space through the gingival contouring. The narrowed Mylar strip was then set aside. 37% phosphoric acid used to etch the tooth surface for 15 seconds. After water rinsing followed by the application of an adhesive, the narrow Mylar strip was replaced, and the tooth was built up with composite resin, shade A2 and cured. The narrowed Mylar strip was used for gingival contour to the contact point. Finishing and polishing were accomplished. Procedure was repeated on the opposite side. Figure 1 shows the pre-operative and postoperative esthetic correction.

Discussion

With the current trend towards minimally invasive dentistry, direct composite restoration has provided clinician with added advantage of achieving predictable esthetic results with immediate closure and minimized trauma to the teeth. The simple closure may not offer a natural and pleasant solution to the cases where there is wide space between teeth. Patient has to be explained that the stability of composite closure may not be as high as veneer or crownhence necessary precautions to be taken,patient's concern is mandatory before the procedure.

The appropriate technique and material for a patient are based on width to length ratio time, physical, psychological, and economic limitations [10,11].

Newer materials and techniques are introduced in the improvement while fulfilling their patients' aesthetic demands [12]. Recent advancement in composie resinshave improved its physical and mechanical properties similar to that of the natural tooth and possess an appearance like natural dentin and enamel [13]. Nowadays a wide range of enamel shades and varying opacities designed specifically for layering technique whereas early brands of composite resins offered only "body" shades and appeared dull and dense [13-15]. The modern composite restorative materials are remarkable with their improved physical and esthetic properties, used to create good quality esthetic restorations with sufficient wear resistance providing satisfactory years of service.



PRE & POST OPERATIVE

Figure 1: Preoperative and Postoperative midline diastema closure

Conclusion

Midline diastemas cause psychological issues and make an individual feel inferior . Such midline diastema are successfully closed by direct composite .

Conflict of Interest: Nil

Source of Funding: Nil

Ethical Clearance: Not required for case report.

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Role of Prophylactic Antibiotics in the Surgical Treatment of Maxillofacial Fractures

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Abstract

Objective: A systematic review of the literature was undertaken examining data to find the evidence of prophylactic administration of antibiotics inrelation to treating patients of maxillofacial fractures.

Study Design: Studies that fulfilled most of the requirements pertaining to it were retrieved. A computerized search was carried out using PubMed, and MEDLINE databases with the logical operators: "antibiotic" and "prophylaxis" and "maxillofacial trauma."

Results: A survey of these studies showed a drastic decrease in the infection rate of mandibular fractures in the antibiotic treated groups when being compared with the control groups. A variety of antibiotics had been used with an apparently constant effect. An"once a day"regimen ora1-day treatment course had a similar or perhaps even better result than 7 days of treatment. No infections were corresponding to condylar, maxillary, or zygomafractures.

Conclusion: An "once a day" regimenor 1-day administration of prophylactic antibiotics seem to be the best documented to reduce infections.

Keywords: *Antibiotics, Fracture, Prophylaxis.*

Introduction

This systematic review aims at producing the current evidence in treatment strategies, and thereby give the clinician an unbiased tool in keeping up with an exponentially growing knowledge base.

For several years, prophylactic antibiotic treatment remained as a must in the surgical treatment of jaw fractures.[1] The evidence for this preventive intervention, however, is not sufficient in a literatures of other surgical disciplines.[2-5] In several indications, prophylactic antibiotics has shown no positive and sometimes even a negative effect.[6] The negative effect can be explained by the fact that no single antibiotic can eliminate all kinds of invading bacteria and thereby may give way for opportunistic infection.[7]

Before evaluating specific role of a prophylactic antibiotic regimen, several factors with a known impact on the incidence of infections in relation to maxillofacial trauma must be taken into consideration.

Two different situations exist in relation to the invasion of bacteria's into the fracture site, namely a closed fracture (eg, mandibular condyle and ramus fractures and maxillary Le Fort I–III fractures) on 1 side and open fractures with direct communication to the oral cavity and/or the skin surface on the other. No study has so far evaluated the actual invasion of

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bacteria in a healing fracture site; but the importance of this differentiation is apparent by the fact that healing of fractures located in the condylar region is never followed by infection compared with the more frequent occurrence of infections in the mandibular angle, body, and symphysis regions.[8]

The type of treatment procedure (open or closed) should be taken into consideration when analyzing the effect of antibiotics. It became apparent that an open procedure may lead to a 4-fold higher rate of infection from previous analysis.[9]

Mandibular fractures are more prone to infection than maxillary fractures[8]; and within the mandible, the location of the fracture in the dental arch also seems to be of importance with the third molar region showing the highest frequency of infections.[8] Thus, the topography of the jaw fractures is another factor to be considered.

The variables that have significant influence on the chance of avoiding infection are, the type of antibiotics administered; the dose, duration, and route of administration, and finally the timing of administration in relation to injury and surgical treatment.[5]

The term prophylaxis implies preventive use of antibiotics. In the present review, antibiotic prophylaxis is interpreted as given, when no clinical signs of infection are present at the time of surgery, although it may be argued that any fracture open to the skin or oral cavity should be considered contaminated, and that antibiotics thereby are indicated as a part of treatment rather than prophylactic.

Finally, an analysis of the literature should concentrate on randomized studies, and in this regard whether the studies meet the requirements for a reliable study design, proper randomization, limited number of drop-outs, sufficient number of patients included, and utilization of relevant statistical Method.[10]

It was the purpose of the present systematic review to evaluate available randomized clinical trials to answer the following questions:

1. Does antibiotic prophylaxis decrease the incidence of post-trauma infections in jaw fracture treatment?
2. Are there situations where an antibiotic prophylaxis is not indicated?
3. Which antibiotic is the drug of choice? In what dose? And for how long?

Material and Method

Analysis if the Literature: The databases MEDLINE and Cochrane were searched for relevant studies, using the following key words: jaw fractures, mandibular fractures, maxillary fractures, antibiotic treatment, infection, and randomized studies. This search was supplemented by a hand search of relevant German journals not electronically listed and by a review of reference lists of potentially eligible studies.

For each retrieved study, the following questions were asked:

1. Were the patients randomly allocated to the treatment groups?
2. Were the patients blind to treatment allocation?
3. Were the treatment outcomes assessed blind?
4. Were all dropouts to follow-up accounted for?
5. Were the clinical outcome variables clearly defined?
6. Were details given of the statistical evaluation method?

Based on this, each individual study was characterized as a randomized controlled trial or a controlled clinical trial. To meet the criteria of a randomized controlled trial, the study should involve at least 1 test treatment and 1 control treatment and concurrent enrollment and follow-up of the test-and control-treated groups, in which the treatments to be administered are selected by a random process such as a random number table. Studies where the patients are appointed to the different treatment groups using quasi-or pseudo-randomization techniques such as coin flips, social security numbers, or days of the week, are considered controlled clinical trials.[11]

Results

Four randomized studies[8,12-14] were retrieved concerning the possible benefit of prophylactic antibiotics in the treatment of maxillofacial fractures. Two clinical randomized studies were found that compared different antibiotic regimens without including a control group.[15,16] A critical analysis of these showed that none of them fulfilled all the requirements for a randomized controlled trial. However, as these studies represent the best knowledge available at the present time, the results are summarizedbelow.

The first randomized study on the effect of prophy-lactic antibiotics in the treatment of compound mandibular fractures was published by Zallen and Curryin 1975.[12] The material consisted of 32 patients with compound mandibular fractures who received antibiotics (a wide variety of different antibiotics), and 30 patients treated without antibiotics. A control of the stratification was made and shown to be effective. The administration of antibiotics was in 20 cases par-enterally and in 10 cases orally. A highly significant difference in complication rates was found as 6% developed infection complications in the antibiotic-treated group, where as 53% developed infection in the nontreated group (P = .0001).

In 1983, Aderhold et al[13] published a study on the effect of antibiotic treatment of 120 mandibular fractures. All fractures had communication to the oral cavity and were treated with miniplate osteosynthesis. Forty cases were treated without antibiotics, 40 cases with antibiotic coverage up to 48 hours, and 40 cases with treatment for more than 48 hours. Type and dosage of the prescribed antibiotics are not presented. Proper stratification was checked and found to be reliable, and the numbers of open and closed reductions in the 2 groups are comparable. An almost significantly higher infection rate was found in the nontreated group (20%), whereas cases treated with short-term antibiotics showed a frequency of 5% and beyond 48 hours of 10% (n = .06). It was concluded that short-term antibiotic prophylaxis was effective in reducing infection; furthermore, that long-term treatment did not significantly reduce the risk of infections as compared with the control group.

In 1987, Chole and Yee[8] reported a prospective clinical trial of 101 patients with facial fractures. The patients were randomly assigned to either no antibiotic treatment or a short-term prophylaxis with an intravenous administration of cefazolin 1 g (a cephalosporin) 1 hour before surgery and 8 hours after. A total of 150 fractures were diagnosed in the 101 patients (6 maxillary, 24 zygomatic, and 120 mandibular fractures). None of the maxillary, zygomatic, and subcondylar mandibular fractures got infected, irrespective of antibiotic prophylaxis given or not. In the 79 patients with mandibular fractures, the 37 who received antibiotics experienced an infection rate of 14%, whereas 42 patients in the control group developed infections in 43% (*P* = .01) of the cases.

It was concluded that antibiotic prophylaxis is indicated for mandibular fractures.

In 1988, Gerlach and Pape[14] examined the influence of antibiotic treatment on infection rates in 200 mandibular fractures all treated with open reduction and miniplate aestheticism through an intraoral approach. In group I (n = 50), a 1-day antibiotic treatment was given, starting immediately before surgery. Ingroup II (n=50), a1-shotprophylaxisofantibiotics was administered immediately before surgery. In group III (n = 51), a 3-day course was used. Finally,a control group (n = 49) received no prophylactic antibiotics. The control group showed a significantly higher infection rate (22%) compared with the 3 pro-phylactic groups (2%, 6%, and 8%, respectively) (*P*=.001). It was concluded that a "1-shotadministration"of antibiotics in relation to intraoral osteosynthesis in the mandible is sufficient to protect the patient from wound infection.

Two different antibiotic prophylactic regimens were compared in a prospective and nonrandomized clinical study by Heitet al[15]in 1997. A total of 90 patients with compound mandibular fractures were divided into 2 groups of 45 patients. In group I, the prophylaxis consisted of ceftriaxone (a cephalosporin) 1 gdaily pre-and perioperatively until the intravenously administration was discontinued and thereafter penicillin VK 500 mg every sixth hour orally 1 week postoperatively. GroupII received an intravenous administration of penicillin G 2 million U every fourth hour pre-and perioperatively until the intravenously administration was discontinued and thereafter the same orally administered doses of penicillinVKasforgroupI.Twopatientsineachgroup developed an infection and thus there could not beademonstrated significant difference between the 2 regimens.

Abubaker and Rollert[16]reported in 2001 preliminary results of a comparative, double-blind, placebo-con-trolled study of a 1-day prophylaxis versus a 5-day treatment with penicillin. In a limited number of patients (n = 30), no benefit of a prolonged administration of antibiotics could be seen. However, the results should be interpreted with caution because of the small numberofpatientsandthatbothopenandclosedreductions were mixed in thematerial.

Discussion

In maxillofacial fracture treatment a multitude of external sources exist for contamination of the wound. In this aspect the fracture can, in most cases, be considered contaminated, implying an elevated risk ofinfection.[17]

From this perusal of the literature, it appears strongly indicated to use a short-term antibiotic coverage to decrease the infection rate in relation to the treatment of compound mandibular fractures. Approximately a 4-fold reduction in the number of infections was found. It is also of interest to observe that open reduction was highly influenced by the use of antibiotics. This seems to indicate that the cause of infection could be related to the surgical approach itself, namely damaging the principal blood supply to perform an osteosynthesis and thereby additionally exposing an injured area to bacteria from the oral cavity or external environment.

An interesting analogue to the surgical treatment of jaw fractures appears in orthognathic surgery where the infection rate is normally very low, and in 3 studies has been shown not to be related to the administration of antibiotics.[18-20] Only 1 study has shown a positive effect on infection rates.[21] It might be expected that the same exposure to all bacteria may occur in orthognathic surgery.

However,-in jaw fracture treatment a multitude of external sources exist for contamination of the wound. In this aspect the fracture can, inmost cases, be considered contaminated,[17] with the known elevation in infection risk and that was also the general finding in this survey.

However, the difference might be that the injured tissue had a short exposure to oral bacteria in comparison to jaw fractures where bacteria might have invaded the tissues for days (although it was shown that the time delay until treatment did not influence the infection rate).[8]

Combining the evidence from all 4 studies, the following can be concluded about infection rates: It appears that there is a significant reduction in the number of post injury infections. As a whole, a3-fold decrease in the infection rate took place by the ad-ministration of antibiotics.

Infection Rates in Different Locations: All studies had their analysis primarily confined to the dentate part of the mandible (ie, excluding the condylar region). In 1 study, the infection rate was compared between various locations (Table 3). It appears that infection was not found in the maxilla, the condylar region, orthezygoma, irrespective of administration accountability

Infection Rates Related to Antibiotic Administration: There appears to be no difference in the reduction rate of infection in the 4 studies.

Infection Rate Related to the Length of Antibiotic Administration: Three studies analyzed this parameter.[13,14,16] It ap-pears that a "1-shot" or 1-day administration worked equally, or maybe even better (however, not significantly), than a 7-day course. A similar finding has been made for other approaches in oral and maxillofacial surgery[22] and in orthopedicsurgery.[3,23]

The present study based on 4 quasi-randomized studies appeared to show a significant decrease in wound infection (4-fold when antibiotics were administered). This finding can be compared with similar effects in the treatment of bone fractures of the ex-tremities.[24] This effect can be explained in the way that antibiotic treatment will reduce or eliminate bacteria that have entered the wound before treatment. The first event seems to be the most obvious explanation, as prophylactic administration of antibiotics has not resulted in a significant reduction in wound infection after orthognathic surgery. In this situation, presurgical bacteria contamination is not present.

An analysis oft he bacteria flora infections related to jaw fractures is very sparse. In 1 study, a mixed infection with aerobic and anaerobic flora and a pre-dominance of staphylococcus aureus seems to indicate that specific antibiotics may be indicated.[25]

The great variety of antibiotics used in the cited studies with varying specificity against the presumed bacteria flora gives no significant clue concerning the selection of proper antibiotic.

The specific preference of wound infection to the angular region does support a dental origin (pulp canal or periodontal flora related to the molar may play a role). This phenomenon will be further analyzed in a subsequent study.

Conclusion

A short-term antibiotic therapy (less than 48 hours), possibly a 1-shot administration, appears to be effective in protecting compound mandibular fractures from infection, especially open re-duction. Because of the very low infection rate in maxillary fractures, zygoma fractures, and the non-existence of infection complications in condylar fractures, antibiotic treatment in the latter types of fractures does not seem indicated.

Ethical Clearance: Not required since it is a review article.

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Conflict of Interest: Nil

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Permanent Mandibular Second Premolar with Vertucci Type II Configuration: A Case Report

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Abstract

Mandibular premolars are one of the most difficult teeth to treat endodontically as it shows high incidences of aberrant root canal anatomy. Complete cleaning and shaping with copous irrigation is the key to successful endodontic treatment. Careful understanding of the internal anatomy and morphology of the root canal system is an important task when performing cleaning and shaping procedures. This article describes mandibular second premolars with Vertucci Type II root canal anatomy, treated successfully by conventional endodontic treatment.

Keywords: *Abberant anatomy, Mandibular second premolar, Root canal anatomy, Vertucci.*

Introduction

A complete knowledge of internal anatomy of root canal system makes endodontic treatment successful [1],[2]. Understanding the presence of aberrant internal root canal morphology leads to success and increase in overall prognosis of endodontically treated teeth. Inability to locate, prepare, or fill all roots and/or root canals may cause posttreatment disease of endodontically-treated teeth [2],[3].The risk of missing canals during root canal treatment is high because of the complexity of the root canal system.

Thevariations in canal anatomy have been observed in each tooth as in number of roots, canals, isthumi, and apical foramen. Mandibular first premolar has varied variation in root canal system, so it is known as enigma to endodontists. However, various studies and case reports stated varied anatomy with MSP, so this tooth can also be considered as enigma to endodontist[5,6,7,8].

Mandibular second premolar(MSP) usually have two pulp horns, the buccal located at a higher level than the lingual. Usually, MSP has single root and single canal (97.5%),[9] however, incidence of two (2.5%),[9] three (0.4%),[10] and four roots were also found. Accessory apical foramen was seen in 47% of MSPs.[10] Singh and Pawar observed that MSPs showed single root in 92% and >2 roots in 8%, 58% had one apical foramen, and 12% showed two apical foramen in South Asian population.[11]In 2007, Cleghorn et al. reviewed studies that evaluated the morphology of first [4] and second [12] premolars. They found that although the majority of first (97.9%) and second (99.6%) premolars had one root, multiple root canals were evident in 24.2% and 9% of the first and second premolars, respectively. Slowey (1979), who suggested that mandibular premolars possess the greatest anatomical challenges of all teeth with regards to achieving successful root canal treatment[13].

The in vitro Method such as clearing technique, sectioning and scanning electron microscopy analysis, and the techniques which can be used both in vitro and in vivo are exploration, radiography, cone beam computed tomography (CBCT), and micro CT. The clinical techniques are radiographs in different angulation (SLOB rule), radiopaque dyes, loupes, and dental operating microscope (DOM).

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This case report presents the nonsurgical endodontic management of a mandibular left second premolar with 2 orifices with 1 apical foramina (Vertucci Type II).

Case Report: A 57-year-old female patient reported to the Department of Conservative Dentistry and Endodontics, with the chief complaint of pain in lower left back tooth. The patient gave a history of dull, continuous and gnawing pain. On intraoral examination, disto-occlusal caries with amalgam restoration in the occlusal surface was seen with tooth #35, and tenderness on percussion was present. Radiographically, disto-oclusal radiolucency was approximating pulp [Figure 1]A. A diagnosis of Secondary dental caries with symptomatic irreversible pulpitis with symptomatic apical periodontitis was made having Vertucci's Type II canal configuration. Nonsurgical root canal therapy (NSRCT) was planned for 35. Local anesthesia was administered and isolation was achieved with rubber dam. Complete carious removal was done. The access cavity preparation was doneand canals were accessed with #10 K file. Working Length was achieved and radiograph was taken [Figure 1]B. Biomechanical preparation was carried out using conventional hand instruments. 2.5% of Sodium hypochlorite and 17%EDTA were used for irrigation. The canals were irrigated with normal saline after each instrument change. After completion of cleaning and shaping, master cone radiograph was taken[Figure 1]C. This was followed by obturation with cold lateral compaction technique. A post-obturation radiograph with different angulations and the coronal access cavity was restored [Figure 1]D.

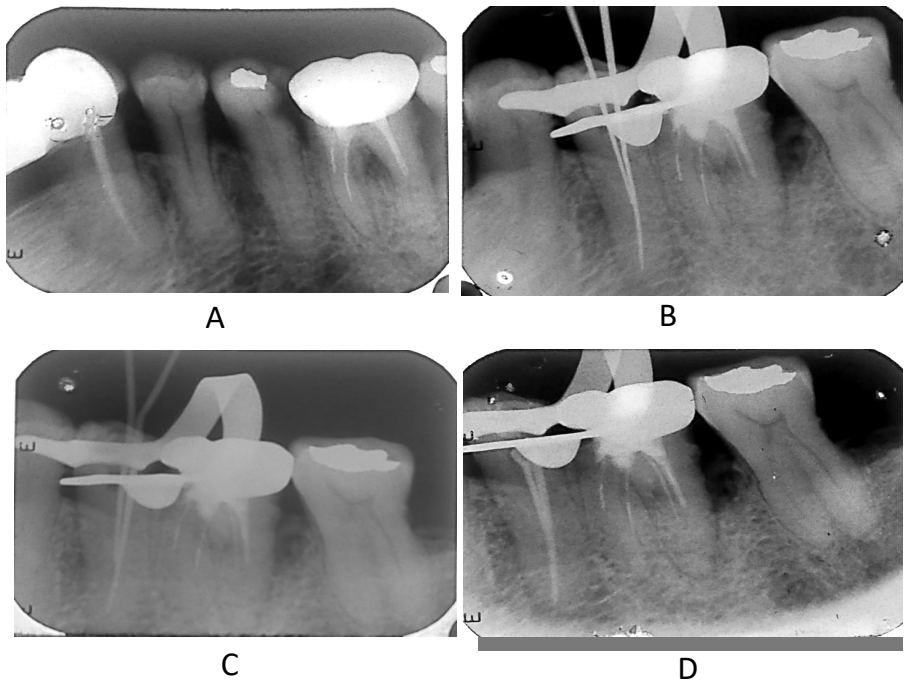


Figure 1: A. Preoperative radiograph, B. Working length determination, C. Master cone radiograph, D. Obturation

Discussion

The root canal system shows complex anatomical features where the presence of extracanals is an endodontic challenge. The canal systems were classified by Weine [14] and Vertucci,[9] respectively.

Endodontic success depends on many factors; nevertheless, 42% of endodontic retreatment is because of missed canal.[15] This diagnosis of aberrant root canal anatomy clinically starts from first step that is preoperative intraoral periapical radiograph. If there is overlapping of roots or if the radiograph shows unusual finding, then radiograph shall be taken following Clark's rule.

Exploration of root canal orifices also plays an important role for diagnosing extracanals. This orifice can also be located by dentinal mapping and developmental grooves.

The root shape, root position, and relative root outline should be carefully noted from the radiograph. The observations made in a study concluded that broad, flat roots are much more likely to contain multiple canals and intracanal ramifications. In such cases, angled radiographic view will reveal the true dimensions of the root canal[16]. The sudden radiographic disappearance of a canal may be evidence of a dividing canal.

Exploration of root canal orifices also plays an important role for diagnosing extracanals. This orifice can also be located by dentinal mapping and developmental grooves.

ElDeeb for the first time treated MSP with three canals[17]. A maximum of 5 canals have been reported in MSP.[18]Reports have shown that mandibular premolars are possibly the most difficult teeth to treat endodontically due to wide variation in root canal morphology[10]. One of the most difficult aspects of treating this anatomy is the predictable removal of pulp tissue in the isthmus.

Antibacterial irrigation in association with mechanical debridement of the root canal is essential to treat endodontic infections[19]. With all the Method established, the protest is still to penetrate, reach, and kill bacteria, which are well-known to protect themselves from the dentinal mud, their own secretions, and biofilms. Ample of irrigation and disinfection aids in the success of root canal therapy. In the present case, 5.25% (NaOCl) and 17% (EDTA**)** were the active irrigants.

This article describes a case report with aberrant morphology of root canals of mandibular premolars and their successful endodontic management. The paper points were used to remove excess moisture from the canals. Obturation was done using lateral compaction technique.

Conclusion

The mandibular premolars show complex root and root canal morphology. For successful and predictable endodontic treatment requires knowledge on biology, physiology, and root canal anatomy. A complete knowledge of root canal anatomy and its variations with careful interpretation of the radiograph and clinical inspection of the floor of pulp chamber and proper access opening are essential for a successful treatment outcome. This case report details the endodontic management of mandibular second premolar with Vertucci Type II canal configuration which ended with a favorable outcome.If aberrant anatomical variation is misdiagnosed will lead to failure and if diagnosed correctly leads to successful treatment.

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Ethical Clearance: Not required for Case report.

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Endodontic Retreatment of Mandibular Second Molar with Middle Mesial Canal: A Case Report

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Abstract

Elimination of microbes from root canals and impeding of further reinfection is the objective behind an endodontic treatment. This is achieved by overall disinfection and shaping of canals which can then be filled using a three-dimensional filling with a fluid-tight seal. However, this process becomes complicated with the presence of additional root canal systems. To achieve these goals, the clinician must have proper knowledge of regular anatomy and anatomic variants of root canals. One such variant configuration in mandibular molars is the presence of a third canal in the mesial root called middle-mesial canal. The purpose of the present article is to report successful non-surgical retreatment of a mandibular first molar with earlier missed Middle Mesial Canal.

Keywords: *Accessory mesial canal, Intermediate mesial canal, Mandibular molar, Mid-mesial canal.*

Introduction

An endodontic therapy is considered successful when thorough debridement of the root canal system with necrotic or infected pulp tissues, microbes, followed by complete sealing of the root canal space is done. This will prevent reinfection and chances of re-endodontic therapy. Endodontic failure can be determined on the basis of clinical signs and symptoms and radiographic findings of root canal treated tooth. The etiology of endodontic treatment failure is multifactorial, the inability to identify and debride all the existing canals is one among the main causes [1]. A study shows that there is a strong relationship between untreated canal space and presence of periapical lesions [2,3]. Infected canals that are missed and untreated will harbour bacteria in sufficient numbers to maintain or cause disease. Canals that are Initially noninfected and left untreated during endodontic therapy may function as a possible site of re-infection [4]. There are reports of unusual canal anatomy associated with all teeth, and the mandibular molars are no exception. Therefore, a thorough knowledge regarding internal root canal anatomy is required [5].

Mandibular first molars commonly have two roots and three root canals [6]. A classic study by Hess on 512 mandibular first molars reported that 0.3% of the teeth had only one, 17.7% ha d two, 78% had three and 4% had four canals [7]. Vertucci and William, as well as Barker et al. first described the presence of a fifth canal called the middle mesial canal [8,9]. Also known as intermediate canal, mesio-central canal, third mesial canal, accessory mesial canal. Various Method have been used for detection of these MM canal, and the frequency with which the canal occurs ranges between 0% and 46.2% [10]. In addition, the MM canal has not been clearly defined in the literature. Pomeranz et al defined the MM canal as either a fin, confluent, or independent canal between the mesiobuccal (MB) and mesiolingual (ML) canal [11]. Goel et al suggested mandibular first molars had MM canals in 15.0% of specimens. Among these MM canals 6.7% of MM canals were independent

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[12]. Thus, to ensure the long-term prognosis of a tooth undergoing RCT, morphology and numerous variations in the root canal system have to be assessed properly before initiating RCT.

In a study by Costa et al showed that frequency of untreated canals was higher in maxillary molars (57%), followed by mandibular molars(26%), maxillary premolars (10%) and mandibular premolars (6%).The frequency of apical periodontitis in teeth after root canal treatment with at least one untreated canal was found to be 98%[4].

The present case report is about retreatment of a failed Mandibular molar with middle mesial canal. The objective is to identify and management of the earlier missed middle mesial canal. This case report describes the endodontic retreatment performed on a mandibular molar diagnosed with chronic apical periodontitis. This status resulted as a consequence of the failure of the first endodontic treatment performed, where the middle mesial canal was undetected and untreated.

Case Report: A male patient aged 58 years reported to the department of conservative dentistry and endodontics with acute pain in right posterior tooth region. History reveals patient had undergone endodontic treatment in 46, 47. On examination there was no swelling in relation to right posterior region but pain on percussion was elicited on 46. Intraoral periapical radiograph revealed presence of periapical lesion in relation to mesial root of 46 with well obturated mesial and distal root canals. Patient was advised re-root canal treatment in 46. Crown was removed and rubber dam was placed. Access was gained and the gutta percha was removed in mesiobuccal and mesiolingual canals. On careful probing an additional orifice adjacent to mesiolingual canal was identified. This middle mesial canal was found to be untreated. The middle mesial canal was enlarged up to size 20-6%. Canals were irrigated with 2ml with 3% Sodium hypochlorite after every instrumentation followed by saline as final irrigant. Interappointment dressing with Calcium hydroxide was given for 2 weeks. After 2 weeks canals were irrigated with 10m 17% Ethylenediamine tetracetic acid followed by 10 ml of 3% Sodium hypochlorite. Final irrigation with saline was done and obturation was done with lateral condensation using seal apex sealer. Ceramic crown was given after 2 weeks. A follow up radiograph was taken after 6 months and 1 year. At the end of 1-year complete periapical healing was observed.

Discussion

Clinicians normally begin root canal procedures based on observation of external root canal anatomy as guided by radiographs. However, the presence of internal anatomic variances and anomalies is not uncommon. Among these internal deviations, the incidence of middle mesial canals ranges from 0.5% to 15% based on several case reports which make them difficult to locate [13,14]. A study revealed that the mesiolingual canal was the most frequently untreated canal in first (29%) and second mandibular molars (62%) [4].

Nosrat et al. and Versiani et al found significant differences in the incidence of MMC between White (12.2%) and non-White (29.4%) patients [15,16]. A study by Harris et al studied the internal anatomy of 22 mandibular molars in Indian population resulted in presence of isthmus in 100% of the specimens, and 36% had more than 2 canals [17].

Patients of 20 years or younger showed an incidence of 32.1% for negotiable MM canals in mandibular molars[15]. Gu et al studied the isthmus anatomy of 36 mandibular first molars in vitro. They showed a significantly high prevalence (50%) of isthmuses in patients aged 20–39 years compared with 24% in patients older than 60. This inferences that clinicians should spend more time to evaluate the pulp chamber floor area between the MB and ML canals to search for an isthmus when treating mandibular first and second molars of younger patients [18].

Sherwani et al observed that MMC is more prevalent in mandibular first molars which have two distal canals (45.4%) than in those with one distal canal (13.7%) [19]. In contrast, Nosrat et al. found no significant association between MMC and the presence of separate distal canal[15].

Earlier studies reported only independent configurations of middle canals[8]. However, with the introduction of the classification of configuration types by Pomeranz et al the other types were also observed. In the study more numbers of fin configuration were identified than confluent configuration [11]. In contrast, De Pablo et al reported an equal incidence of independent and confluent MMC at the apical third[20].

A study by Karapinar-Kazandag showed that Fin types are likely to be removed during the preparation of the main canals, and may not affect the outcome of the

treatment [21]. On the other hand, confluent type shows separate orifices which eventually merges with the main canal and leads to lateral interconnection/transverse anastomosis thus, connecting the Mesiobuccal and Mesiolingual canals. It is commonly found at the level of 3–6 mm coronal to the apical foramina [22]. While in Independent type there are separate orifices and exit, so undoubtedly needs to be treated.

Considering all the points discussed above, middle mesial canal cannot be negotiated while endodontic therapy of mandibular first molars. The treatment of additional aberrant canals can be challenging, but the inability to find root canals may cause failure.

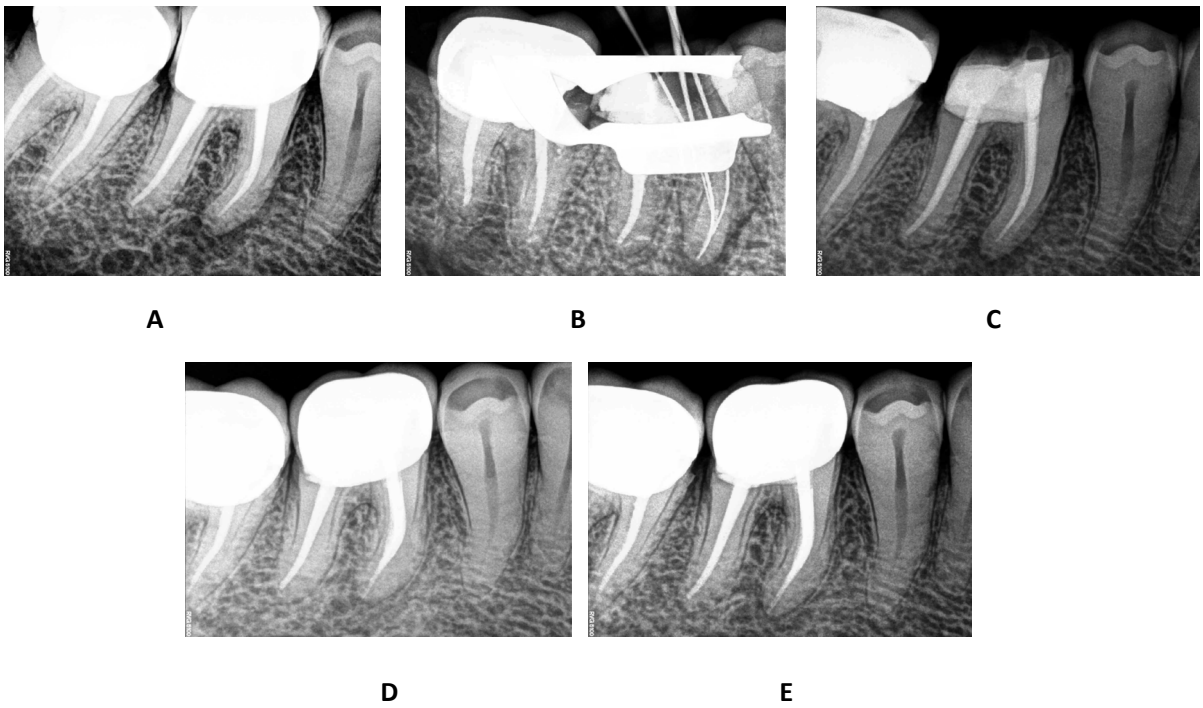


Figure 1: A. Preoperative radiograph, B. working length determination, C. Obturation, D. Recall after 6 months, E. Recall after 1 year

Conclusion

The main goal of this case study is to report a successful endodontic retreatment of a mandibular molar with middle mesial canal. We can conclude that missing a middle mesial canal, improper cleaning shaping-obturation will lead to endodontic failure. This sooner or later will result in periapical infection. Hence, middle mesial canal shouldn't be overlooked while doing RCT in mandibular molars.

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Trouble Shooting in Posterior Composite

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Abstract

Amalgam has been replaced by Composite restoration in clinical practice in recent years because of esthetics and improved physical and mechanical properties. But composite resin is a very technique sensitive material and clinician should be aware of the problems in restoring with composite. The principle problem in resin composite are secondary caries, post-operative sensitivity, enamel fracture, cuspal fracture, maintaining proper contour and contact, micro leakage and nano leakage resulting in debonding. Many of these problems can be controlled by the operator. This review gives us insight into difficulties and problems associated with posterior resin composite. As a clinician, it is our responsibility to understand trouble shooting in posterior composite and ways to overcome them for successful long lasting composite restoration.

Keywords: *Composite restoration, Secondary caries, Post-operative sensitivity, Enamel fracture, Debonding.*

Introduction

Posterior composite resin restorations are currently used in 50% of all posterior direct restorations. Posterior composite restorations offer a number of advantages in comparison with other restorative material. Composites are available in various shades, tints, and opaqueness, which allow the clinicians to place highly aesthetic restorations. Composites bonds to tooth, it minimizes the leakage and prevent early loss of restoration. Physical properties of composites are also enhanced. But there are few challenges in using posterior composites they are very technique sensitive material; they depend on cavity size [1], and material properties [2]. Other problems associated with them are discoloration, micro leakage resulting in secondary caries. Polymerization stresses produces residual stresses which could result in debonding of restoration, which results in crack propagation and post-operative sensitivity [3].

Post-operative sensitivity: Polymerization shrinkage stress has the potential to initiate failure of the composite tooth interface if the force of polymerization exceeds dentin bond strength. Gap is produced this results in percolation of oral fluids, Such gaps between the resin and cavity walls may cause post-operative sensitivity[4], microleakage and secondary caries. Post-operative sensitivity accounts for 0-30% of study population n[5]. There could be other factors like acid etching, cuspal deflection due to polymerization shrinkage[6], and microorganism reaching pulp resulting in post-operative sensitivity[7].

Post-operative sensitivity can be prevented or reduced by using low shrinkage composite, following incremental technique, applying RMGIC, desensitizing agent like oxalate[8], HEMA and gluteraldehyde and liners especially in deep cavities. Soft start method of curing will initiate polymerization gradually using low intensity light curing unit to reach gel point and then

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increase to higher intensity to complete polymerization of composite[9].

Enamel fracture, cracked cusp, cuspal movement: This stress can exceed the tensile strength of enamel and results in stress cracking and enamel fractures along the interfaces.

Polymerization shrinkage can cause cuspal flexure due to internal stresses that are generated by tooth substrate resisting shrinkage [10]. Tooth deflection, tooth fracture, interfacial debonding, deformation of the contracting composite and deformation of bonding component and liner are associated with stress generated during contraction of dental composite. Fractures within enamel near margins have been directly related directly to curing contraction of dental composite. The factors that determine the cuspal deflection are bonding interface[11], temperature and humidity[12] and amount of remaining tooth structure[13].

Incremental technique reduces polymerization shrinkage and cuspal fracture one popular technique is oblique incremental, because it reduces C-factor. Light curing Method like soft start and pulse delay reduce polymerization shrinkage stresses but still maintaining degree of conversion[14]. Modification of composition of composite for example low shrinkage composites likes silorane they have less of polymerization shrinkage.

Secondary Caries: Secondary caries is a main cause of failure of composite[15]. Polymerization shrinkage is decrease in volume of the resin during and after polymerization reaction, resulting in volumetric contraction of 1.5-5%[16].There is decrease in molecule to molecule distance between monomer in a liquid state and those that are covalently bond. This shrinkage creates polymerization stresses as high as 13MPa between composite and tooth structure. These stresses severely strain the interfacial bond between the composite and the tooth, leading to a very small gap that can allow marginal leakage of saliva. Microgap between tooth and composite facilitates microorganism entering between the tooth and restorative interface resulting is secondary caries[17]. Composite does not poses antibacterial property[18] and buffering properties could result in secondary caries[19].

Poor Retention: Poor retention will result in restorative failure. Causes of poor retention are inadequate preparation form, adequate bevels or flares and secondary retentive feature should be provided wherever needed. Contamination of operating area due to improper isolation, rubber dam is mandatory to keep the area of operation dry. Poor bonding technique, acid etching and bonding agent should be followed according to manufactures direction. Clinical factors affecting adhesion are moisture contamination from handpiece, and saliva, oil contamination from handpiece, surface roughness of teeth, Mechanical undercuts in tooth preparation, presence of calculus and dehydration. Physic chemical properties of enamel, dentine and the effect of acid etching technique, dentine permeability, the dentine smear layer, Moist versus dry dentin surfaces. Hydrolytic degradation and enzymatic activity in dentine could result in adhesive failure of composite [20]. Matrix metallo proteinase and cysteine cathepsins are endopeptidase capable of degrading extracellular matrix protein in presence of bacterial acids resulting in bond disruption[21]. Chlorhexidine, Quanternary Ammonium compounds they have anti-MMP property could reduce bond disruption thereby reduce Nanoleakage and this intern would reduce debonding. Improved adhesive technology has reduced debonding nevertheless complexity of dentine makes it a challenge when compared to enamel.

Maintaining proper contour and contacts: One problem regarding posterior resin composite restorations is the difficulty achieving ideal proximal contours and contacts in Class II cavities. Open contacts lead to food impaction, periodontal disease, tooth inclination, faulty occlusion and excessive wear. The selection and placement of matrices to restore proximal boxes with composite resin are very important for obtaining an adequate restoration.

Traditional, relatively thick metal matrices used for amalgam placement often do not yield good results. Various preformed clear plastic or polyster (Mylar) bands also have yielded unpredictable results for some clinicians. New matrices and contact-forming instruments have been developed to compensate, not only for the thickness of the matrix band, but also for the shrinkage and lack of body of the composite resin. There are numerous sectional matrix system have come into market. Proximal contour and contact should be precisely reconstructed.

The Palodent System (Darway Inc.) and Composi-Tight System (Garrison Dental Solutions)-consist of sectional matrices and bitine or G-shaped rings that engage the undercuts to stabilize the bands. Pressure from the rings and wedges helps separate adjacent teeth

to achieve interproximal contact. This system consists of one size of contoured sectional matrix bands and a "BiTine" ring. The purpose of the BiTine ring is two-fold:To apply an interproximal wedging force to enhance contact formation and to aid in the proximal contouring of the restoration. Study done by Loomans et al showed sectional matrix with separator ring was better than toffelmiersystem[22].

V Ring Sectional Matrix System-facilitates the contouring of posterior Class II composite restorations. The V-Ring separator has a stainless steel inner ring and a nickel-titanium outer spring with V-shaped tines. The tines are placed over the wedge on the buccal and lingual surfaces to enhance tooth separation,V3 ring and palodent plus are made of same element, in both this system they recommend to remove metal fin of the wedge once the cavity is finished and inserting the matrix with the wedge placed interproximally[23][24].

Quickmat sectional matrix system-This has been designed to produce anatomically accurate approximal amalgam or composite fillings in the posterior region, The contoured matrices adapt fully to the contact area of the adjacent tooth and, in conjunction with the wooden wedges, surround the cervical shoulder.

The Microband (Dental Innovations)-is a new micromachined matrix band developed specifically for Class II posterior composite resin restorations.

Hawe Blue and Transparent Adapt Sectional Matrix System-the approximal shaperis the component which complements the sectional in the form of a ring with special fittings: The shaper is transparent so as not to obstruct light-curing. It is intended to be disposable, to eliminate problems of hygiene and substance fatigue.

Conclusion

The demand for tooth-colored restorations has grown considerably during the last decade. However, successful adhesion can be highly technique and substrate sensitive, often hinging on proper material and patient selection. Evidence–based dental research offers a dispassionate reference for the applicability, procedures, and prognosis of tooth–colored restorations.

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Dyslexia Awareness among School Teachers

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Abstract

Aim and Objectives: The study aims in investigating the awareness of dyslexia among school teachers (primary, secondary and higher secondary) of Chennai, India and also to determine whether age, years of experience of school teachers, location and type of school (Government/Government aided or private) influence awareness of dyslexia in teachers.

Materials and Method: The study sample consists of 249 teachers from schools in Chennai. A validated questionnaire consisting of 20 questions was used to assess the knowledge of dyslexia among school teachers.

Results: The results show that the overall awareness of dyslexia among school teachers varied between inadequate knowledge to adequate knowledge. Age and years of experience has an influence on the awareness of dyslexia. But the location and type of school did not show statistically significant difference.

Conclusion: Majority of the school teachers (54.6%) were found to be fairly adequate knowledge on dyslexia. Thus, educating all the teachers about the characteristics of dyslexia and guiding them in identifying and providing adequate support to the dyslexic children is one of the important aspects that has to be focused. Thereby, providing educational training program will aid in early identification and intervention for children with dyslexia.

Keywords: *Dyslexia; Teachers; Awareness; Chennai.*

Introduction

Specific learning disorder is the basis for the abnormalities at a cognitive level that are associated with the behavioural signs of the neurodevelopmental disorder. This first manifests during the years of formal education and is characterized by persistent and impairing difficulties with learning foundational academic skills in reading (Dyslexia), writing (Dysgraphia), and/or math (Dyscalculia). The prevalence of specific learning disorder across the academic domains of reading, writing, and mathematics is 5%-15% among school-age children across different languages and cultures [1]. In India the prevalence of learning disorder among school children is around 13-14%[2].

An alternative term used to refer to a pattern of learning difficulties is 'dyslexia' which is characterized by problems with accurate or fluent word recognition, poor decoding, and poor spelling abilities [1]. Dyslexia is a specific developmental disorder in learning to read, which is not the direct result of impairments in general intelligence, gross neurological deficits, uncorrected visual or auditory processing deficits, emotional disturbances or inadequate schooling[3,4,5]. Dyslexia is the most common one, affecting 80% of all those identified as learning-disabled[6]. Significant gender differences were reported, with boys being more affected than girls (4:1).

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Identification of a learning-disabled child is the first step to prevent learning disabilities. Children with mild learning disabilities are often unnoticed and are enrolled in normal schools. In such circumstances, teachers should play a vital role in identifying children with dyslexia as they are the child's first contact after school entry and are the ideal person to detect a learning difficulty. Thus, there is a need that the teachers should have a higher level of awareness about dyslexia for the timely diagnosis of the disorder [7]. Unfortunately, these children are often missed, as most of the teachers and parents either ignore the child's difficulties or blame it on their personality considering it as laziness, an attitude problem or aggression and so the child continues to graduate from one class to the other, totally incompetent at handling the pressure of the higher classes, leading to behavioural problems. A study conducted on elementary school teachers in India showed that Only 1 in 3 teachers had adequate knowledge of dyslexia[8].

Aim and Objectives: This study aims in determining the awareness of dyslexia among school teachers educating students enrolled in regular schools irrespective of medium of education (English or Tamil). Objectives include:

- To assess and profile the awareness of dyslexia among school teachers currently working in regular schools of Chennai.
- To determine whether age, years of experience, location of school influence awareness of dyslexia in school teachers of Chennai.
- To study whether type of school (Government/ Government aided or private) influence awareness of dyslexia among school teachers.

Materials and Method

Tools for data collection: A questionnaire was developed to assess the awareness of dyslexia among currently working school teachers of Chennai. 40 statements were developed based on the general myths and characteristic features of dyslexia which includes following domains: language, reading, writing, math, attention, social/economic factors. Using a likert's scale of 7-point rating, content validation of the statements was done with the help of experienced clinical psychologists and speech language pathologists in terms of the statement's level of appropriateness to the study. Repetitive items were omitted and 20 high scored statements were considered to be most appropriate and were selected for the final questionnaire.

Area of the Study: Schools in Southern and Central parts of Chennai, irrespective of medium of education were selected.

Inclusion and Exclusion Criteria: Regular school teachers who are currently working in Chennai regardless of the standards handled (primary, secondary and higher secondary) were included in the study. Teachers who have qualification in special education or certification in dyslexia were excluded from the study.

Participants: The convenient sampling method was adopted. 257 school teachers had participated in the study. 8 teachers were excluded due to their certification in special education and the responses of 249 teachers were taken for data analysis. Among the 249 teachers 224 participants were females and 25 participants were males with a mean age of 39 years (20-61 years). Their experience year ranged between 4 months to 32 years with a mean of 11.17 years. The participants were grouped based on the following: age, years of experience, type of school, and location/area of the currently working school.

Procedure: A self-rating questionnaire consisting of 20 items which can be graded on a 5-point level of agreement scale (Strongly disagree to strongly agree) were circulated among teachers through school-wise distribution with prior permission from the authorities and as online forms to assess their knowledge. Cross-sectional study design was used and the data was collected with informed consent obtained from all the participants. The purpose of the study was explained and the participants were assured of anonymity of their responses. The collected data were tabulated for analysis and statistical computation.

Results

Responses of 249 participants based on their agreement with all the 20 statements were listed in table 2. The mean scores obtained by the participants for each statement and the statement's level of appropriateness towards the questionnaire (chi square values and p-values < 0.05) were tabulated in table 3. The overall awareness of dyslexia was categorized based on the scores obtained by the participants. A score of less than or equal to 10, 11-15, greater than 15 were considered to be inadequate, fairly adequate and adequate knowledge respectively and the results revealed among the 249 participants 65

teachers had inadequate knowledge, 136 teachers had fairly adequate and 48 teachers had adequate knowledge on dyslexia as shown in figure 1.

Pearson's correlation analysis was performed to identify if significant relationship exists between age and awareness score. Results revealed significant correlation between awareness score and age (p value 0.00) since the p-value is less than 0.05. The strength of correlation was found to be mild as the correlation score is between 0.01-3. Similarly, relationship between years of experience and awareness score was established which revealed highly significant correlation (p value 0.00) with mild correlation strength.

The 249 participants were divided into 2 groups based on their age. Group 1 included individuals less than 40 years that is young teachers (142 participants) and group 2 included individuals greater than 40 years that is older teachers (107 participants). Mean scores of the groups revealed group 1 with a mean of 58.03 ± 18.517 and group 2 with a mean of 65.42 ± 14.796. Independent t-test was performed to compare between 2 groups the results showed statistically significant difference between young teachers and older teachers with p value of <0.05. Similarly, difference between the 2 groups based on their years of experience that is less experienced (less than 10 years of experience-135 participants) and highly experienced teachers (greater than 10 years of experience-114 participants) were assessed using independent t-test. Since p value is < 0.05 significant difference was observed between the 2 groups. Mean scores of the groups revealed 58.41 ± 19.13 for group 1 and 64.52 ± 14.42 for group 2.

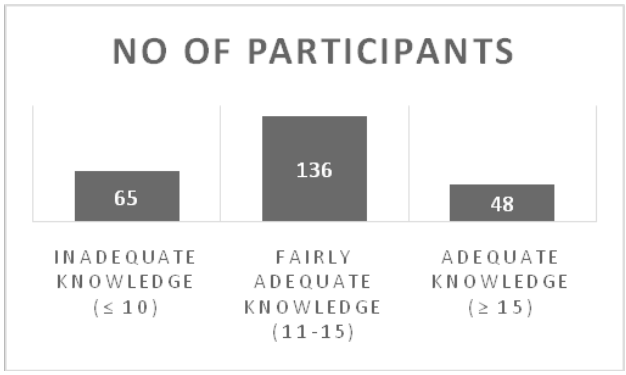


Figure 1: Overall knowledge of the participants

No significant difference was obtained between awareness of government and government aided schools (Group 1) versus private school teachers (Group 2) based on independent t–test analysis as the p value obtained was not less than 0.05. The mean scores of the above groups were 61.83 ± 14.754 and 60.85 ± 18.735, respectively.

On obtaining the difference in dyslexia awareness among school teachers working in different areas of Chennai city that is Central Chennai and South Chennai also reveals that there is no significant difference between the groups and the mean values are 61.51 ± 14.232 and 61.08 ± 18.562, respectively.

Discussion

The aim of the study was to determine the awareness of dyslexia among school teachers in Chennai and also to determine whether age, years of experience, location and type of school influence awareness of dyslexia in teachers. The study was conducted on 249 school teachers of Chennai using a validated questionnaire. The results revealed 48 (19.2%) teachers had adequate knowledge, 136 (54.61%) teachers had fairly adequate and 65 (26.10%) teachers had inadequate knowledge indicating that a majority of the respondents had a fairly adequate knowledge which is contradicting to the literature studies that the school teachers exhibited low level of awareness or inadequate knowledge towards dyslexia. [8, 9, 10, 11]. One of the literature studies shows similar results as 39 (35.5%) had average knowledge, 32(29.1%) had below average, 30(27.3%) had good and very few of them had 9(8.2%) excellent knowledge. [12]. Most of the studies showed inadequate knowledge while our study shows majority have fairly adequate knowledge. This increase in knowledge level could be because of source of information from books, movies, shared knowledge from colleagues, television and newspapers with major source of information from books [8]. Though, there is a slight increase in knowledge is seen, this growth in knowledge still remains insufficient in supporting children with dyslexia. It requires an art and skill to guide these children in their way to make them understand the concepts and sufficient knowledge is required to counsel and guide their parents in getting the help of Speech language pathologists/Special educators and learning the strategies to have a grip on these children, thereby providing these children a timely grip and confidence to succeed in their lives.

In determining the correlation between the age and experience of teachers against their level of awareness, the results supported with the literature indicating that the age and years of experience of teachers influence their awareness level, though, their correlation

strength was mild[9,12]. A highly significant correlation obtained between years of experience of teachers and their awareness level shows a significant association, indicating that as their teaching experience increases, their level of knowledge towards these symptoms increase[12]. Also, few other studies in the literature has even shown that there is no association between age and teaching experience of the respondents to their awareness level[10].

In studying whether the type and location of school has any influence over the awareness of school teachers working currently in Chennai, this study revealed that there is no association that is existing between the locality and the type of school. Irrespective of where the school is located, whether in central parts or southern parts of Chennai and whether the school is Government/ Government aided or private, this study reveals that the awareness does not depend on these factors, but on the teacher's self-knowledge. There are both supporting and opposing studies available in the literature. [9, 10]. But there are no literature studies that is carried out on location same as our study (central parts or southern parts of Chennai).

Conclusion

In conclusion, the present study reveals that the awareness and knowledge level of school teachers on dyslexia is fair and their awareness level shows a positive correlation with their age and teaching experience. Thus, this study clearly depicts that the school teachers are still in need of education and training towards identifying children with dyslexia, in spite of the advancements made in improving their awareness [13]. Regular updates and training sessions for the school teachers would benefit these children and acts as a great leap in enhancing the awareness of the community. As well, it also requires the interest and commitment of both the teachers and the SLPs in learning, educating the fellow professionals and implementing the knowledge in action.

Ethics Committee Approval: Approval obtained from the Ethics committee of Madras ENT research foundation-Institute of Speech & Hearing.

Conflict of Interest: None

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Invasive Rhinomaxillary Lesion: A Diagnostic Challenge

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Abstract

Chronic rhinosinusitis leading to nasal polyps affect approximately 4.3% of the population. Most of the people with Chronic rhinosinusitis have a history of allergy. Here in a case report of a sinonasal polyp with an impact of allergy in pathophysiology . We are presenting a rare case report of Sino nasal polyp, which initially posed a diagnostic dilemma due to its intriguing clinical presentation. Computed tomography (CT) Investigation is the preferred method for the paranasal sinus pathologies, because of the exquisite bony detail of the PNS anatomy.

Keywords: *Chronic rhinosinusitis, Sino nasal polyp, Computed Tomography.*

Introduction

Of people with chronic rhinosinusitis (CRS) 10% to 54% have allergies.[1] The term polyp is derived from Greek word meaning many footed.[2]Nasal polyps occur more frequently in men than women with increased prevalence over the 40 years of age. Sino nasal polyp refers to hypertrophied oedematous prolapsed nasal or sinus mucosa due to infection, inflammation,allergy. It is considered as one of the possible diagnosis in atopic patients. The exact aetiology of Sino nasal polyps is unknown.[1] Polypoid nasal mucosa and polyp formation is a poorly understood condition that may be a multifactorial (Allergy, chronic inflammation, turbulent air flow and gravity).[3] Allergy has been implicated as possible aetiology.[4] The basic mechanism behind polyp formation is the allergy leading to chronic inflammation of the mucosa termed sinusitis, thereby under certain circumstances the mucosa gets thickened and frequently forms into irregular folds called polyps.

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Case Report: The patient 45 year old man complained of pus like discharge from the upper left posterior region for about 1 week. History of presenting illness revealed that pus discharge was preceded by pain followed by mild swelling of the left side of the face for the past 3 months. By occupation the patient was a carpenter, who is frequently exposed to saw dust. Habitually the patient was a chronic smoker for about 25 years, smoking 2-3 cigarettes/day. Past dental history revealed the sinus tract opening on the left sub mandibular region [Figure 1] with nocorrelation to the present chief complaint. On extraoral examination mild facial asymmetry is detected on the right side of the face .No secondary changes over the left half of the face. On intra oral examination, poor oral hygiene with generalised chronic gingivitis with localised periodontitis in relation to 26,27,36 along with furcal involvement is seen. Denuded bone is seen along with pus discharge in relation to buccal aspect of attached gingiva of maxillary posterior, extending from distal aspect of 23 to mesial aspect of 26 anteroposteriorly and superoinferiorly extending above the CEJ till the buccal vestibule .[Figure 2] On palpation the denuded bone was mildly tender and compressible.

On examining the hard palate, a diffuse swelling [Figure 3] is seen extending from the palatal aspect of 21 to mesial aspect of 26, not involving the midline, with

no secondary changes. The swelling was firm and tender on palpation. Based on the age, history and clinical presentation of the lesion provisionally the condition was diagnosed as osteomyelitis of left maxilla. Blood investigation revealed increased and fasting blood sugar level-320 mg/dl, post prandial blood sugar level–480 mg/dl,H b1Ac–11.3%.Eosinophil count was markedly increased. Swab culture was taken,which revealed the presence of gram positive bacteria on agar agar medium.

Intraoral radiograph revealed bone loss, widening of PDL space in relation to 24, 25, 26 and occlusal radiograph revealed mild haziness. OPG revealed haziness on left maxillary sinus.PNS view shows deviation of nasal septum towards right and haziness corresponding to radiopaque lesion on left maxillary antrum with intact sinus wall [Figure 4].

CT scan was taken at 120kv,200 m As. Coronal CT and Axial CT showed hypodense mass in the left maxillary sinus with bony erosion, peripheral mucosal thickening [Figure 5,5a]. Nasal septum deviation was seen towards the right. Radiographic provisional diagnosis of maxillary antrum carcinoma was given based on CT findings. Patient was referred to ENT department for further evaluation. Nasal endoscopy [Figure 6] was performed and revealed the presence of single large growthextending from the maxillary sinus into the nasal cavity via the ostium. Incisional biopsy was performed under aseptic condition and the specimen was sent for histopathologic evaluation. Histopathology revealed, the presence of Chronic inflammatory cells and muco serous glands in the stroma with remarkably large number of eosinophils [Figure 7] suggestive of allergic in nature.

Considering the occupational history, radiographic presentation, and nasal endoscopic findings and correlating the same with histopathological evaluation, the case was finally diagnosedas a sino nasal polyp of left maxillary antrum. Patient was put on antibiotics to overcome the super added bacterial infection following which he was referred to ENT department and diabetologist for further management.

Discussion

Polypoid nasal mucosa and polyp formation is a poorly understood mechanism that may be a multifactorial[3] 25% percent patients with allergic rhinitis develop polyp. Allergy has been considered as the possible etiologic factor. As an occupational hazard, the patient was frequently exposed to saw dust, stressing the role of allergy in the etiology of polyp formation. Males are more commonly affected than females but no such specific genetic or environmental factors plays role in the development of this disorder. It affects middle age with the average age of onset being 42 years and the typical age of diagnosis ranging from 40–60 years.[5]

Clinical features of sinonasal polyp include nasal congestion,blockage, rhinorrhoea, posterior nasal drip, and decreased sense of smell and taste.[6] Our patient does not revealed any such symptoms,except for the history of pain and pus discharge which posed a varied diagnostic information. About 63%,Chronic rhinosinusitis patients show colonization of *Staphylococcus aureus* and develop specific Ig E antibodies against S.aureus.[7] S. aureus, play a role in disrupting the epithelial barrier leading to increased bacterial colonization.[8] In our case we have isolated gram positive *Staphylococcus aureus* from the swab obtained at the clinical site.

Coronal computed tomography has become the primary imaging modality,replacing plain radiography since 1990's. In our case,we have performed CT imaging apart from OPG,PNS view, followed by functional endoscopy to clinically assist in the final diagnosis and treatment procedure. Overall mucosal thickening corresponding to sinusitis and bone destruction is common in polyps. It is evident in our case and more appreciated on CT rather than plain radiography. Nasal septal deviation is an indicator for sinus inflammation. [9] In our case,nasal septum deviation was seen towards the right due to the obliteration of the maxillary sinus by the mass and extending via the ostium to the left nasal cavity.

A combined medical and surgical approach has been advocated by other studies to be an efficient option in its management[10]. In our case, incisional .biopsy was performed with the help of functional endoscopy and sent for histopathologic examination. Antibiotic was prescribed, Amoxicillin–500 mg tid, metronidazole–400 mg bid.Chronic rhinosinusitis patients without DM, have less prevalence for nasal polyp compared to patients with Diabetes mellitus. [11].In our case, the lesion was devastating due to the high blood sugar levels which lead to colonisation of bacterial infection leading to

destruction of the palate.



Figure 1. Denuded bone with pus discharge in relation to 23 to 26 buccal aspect

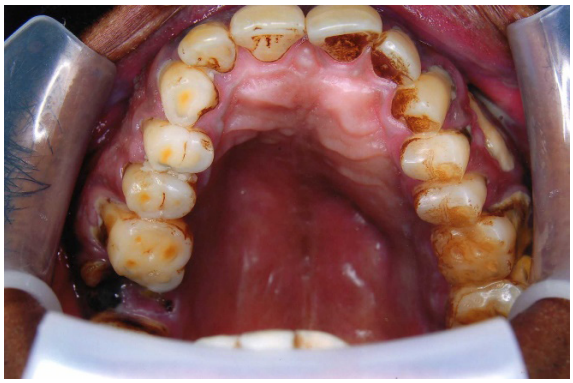


Figure 2. Hard palate examination revealing a diffuse swelling



Figure 3. Coronal CT and Axial CT showing hypodense mass in the left maxillary sinus with bony erosion, peripheral mucosal thickening





Figure 4. Nasal endoscopy revealing the presence of growth

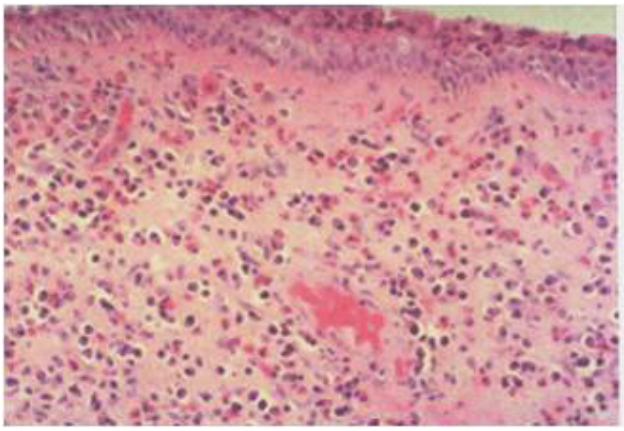


Figure 5. Histopathology of sinonasal polyp

Conclusion

Sino nasal polyps can have multitude presentations, often simulating infectious and malignant pathologies. Hence diagnosing them correctly is of paramount importance. It is mandatory to rule out the possible etiological factors hailing from personal history, occupational history, past medical and dental history, as it provides additional and more important guidelines for deriving the final diagnosis.

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Corticotomy Assisted Fixed Orthodontic Treatment vs Non Corticotomy Assisted Fixed Orthodontic Treatment: A Randomised Clinical Trial Study

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Abstract

The rate of Orthodontic tooth movement has always been of interest as the treatment is generally of a long duration . Several issues of a long Orthodontic treatment include maintenance of oral hygiene and patient compliance .

Corticotomy assisted fixed orthodontic treatment uses the phenomenon of RAP (regional acceleratory phenomenon) . This study (Split mouth randomised clinical trial study) aims to quantify the rate of tooth movement between the corticotomy and non corticotomy sides . The Corticotomy side showed a significant rate of tooth movement (Canine retraction) compared to the control side .

Keywords: *Rate of tooth movement, Corticotomy, RAP.*

Introduction

Fixed Orthodontic treatment has always had the bane of being that off a long duration, the treatment involves meticulous oral hygiene and compliance from the patient, apart from social effects of visible appliances. Several attempts have been made to see if the rate of tooth movement by fixed orthodontics could be speeded up. Corticotomy assisted fixed appliance treatment has shown to improve the speed of the treatment, mainly due to the effect of RAP (Regional acceleratory phenomenon) first described by Frost[1]. The basic mechanism of RAP seems to accelerate the rate of alveolar bone turn over, compared to the non RAP treatment[2] . Several studies have been done using RAP and techniques like the PAOO by the Wilkco brothers and the micro osteotomies have been shown to increase the rate of alveolar bone remodelling[3,4,7].

The aim of this study to understand the effect by quantification of the fixed orthodontic treatment by RAP corticotomy versus the non corticotomy. The study is designed to a randomised clinical trial study.

Method and Methodology

51 fixed Orthodontic patients were selected for the study including boys and girls in the age group of 16 to 25. The exclusion criteria included patients with periodontal breakdown. The patients were evaluated by two examiners and were divided into two groups, the group was selected by picking of lots and the maxillary right canine retraction was selected as controls . The Experimental side, the flap was raised from the canine till the second molar and horizontal cuts of 0.5 mm were placed to simulate RAP . The retraction of the canines both experimental and control was done simultaneously using a 100 g force NiTi closed spring.

The rate of canine retraction was measured at the start of treatment (T1) and the end of three months (T2).

Results

Patient approval was taken before starting the treatment . The process was explained and consent forms signed. The results showed a significant difference in the rate of canine movement between the experimental and control sides, 1 patient discontinued the study due to personal reasons.

Table 1: Group 1 Patients undergoing Orthodontic treatment divided into experimental and control group

Experimental	T1	T2	Control	T1	T2
1	0.0	1.8		0.0	0.3
2	0.0	1.6		0.0	0.4
3	0.0	1.8		0.0	0.3
4	0.0	1.7		0.0	0.5
5	0.0	1.8		0.0	0.4
6	0.0	1.9		0.0	0.5
7	0.0	1.8		0.0	0.6
8	0.0	1.7		0.0	0.4
9	0.0	1.8		0.0	0.4
10	0.0	1.9		0.0	0.3
11	0.0	1.8		0.0	0.5
12	0.0	1.7		0.0	0.4
13	0.0	1.5		0.0	0.5
14	0.0	1.5		0.0	0.6
15	0.0	1.4		0.0	0.4
16	0.0	1.8		0.0	0.5
17	0.0	1.7		0.0	0.4
18	0.0	1.7		0.0	0.5
19	0.0	1.8		0.0	0.6
20	0.0	1.7		0.0	0.4
21	0.0	1.8		0.0	0.6
22	0.0	1.7		0.0	0.4
23	0.0	1.8		0.0	0.5
24	0.0	1.7		0.0	0.4
25	0.0	1.8		0.0	0.6

Table 2 : Group 2 25 patients undergoing Orthodontic treatment divided into experimental and control group

Experimental	T1	T2	Control	T1	T2
1	0.0	1.7		0.0	0.3
2	0.0	1.5		0.0	0.2
3	0.0	1.6		0.0	0.4
4	0.0	1.8		0.0	0.5
5	0.0	1.7		0.0	0.6
6	0.0	1.6		0.0	0.4
7	0.0	1.8		0.0	0.6
9	0.0	1.5		0.0	0.5
10	0.0	1.6		0.0	0.5
11	0.0	1.7		0.0	0.6
12	0.0	1.8		0.0	0.5
13	0.0	1.7		0.0	0.4
14	0.0	1.5		0.0	0.5
15	0.0	1.7		0.0	0.5
16	0.0	1.5		0.0	0.4
17	0.0	1.8		0.0	0.5
18	0.0	1.7		0.0	0.4
19	0.0	1.7		0.0	0.5
20	0.0	1.6		0.0	0.4
22	0.0	1.7		0.0	0.5
23	0.0	1.6		0.0	0.4
24	0.0	1.6		0.0	0.5
25	0.0	1.7		0.0	0.6

Discussion

The Rate of tooth movement was always been a topic of study as more and more patients opted for Orthodontic treatment but the duration of the treatment had been a deterrent to the treatment [9] . Several studies have been done on animals and humans to determine the best means to accelerate orthodontic tooth movement, off the different means coticotomy assisted tooth movement seems to have sufficient evidence[3,4,5,6,7,8]. The present study aimed at understanding the role of corticotomy in accelerating tooth movement . The rate of tooth movement which was increased in the experimental side seems to be mostly due to tipping rather than a bodily movement, but as the retraction was done along the arch wire this was an accepted outcome[10.11.12].

The current study was focused on understanding the role of corticotomy assisted orthodontics and increased rate of tooth movement (canine retraction) in patients undergoing orthodontic treatment. The study was designed as a ramdomised split mouth study . Both the patients and evaluators were blinded .

Conclusion : The study of effect of corticotomy in orthodontic treatment was designed as a randomised split mouth study, the results showed a significant increase canine movement between the control and experimental side . The role of corticotomy in fixed orthodontic patients seems to increase the rate tooth movement and thereby affect the timing of orthodontic treatment.

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Conflict of Interest: Nil

Ethical Clearance: Institutional ethical clearance (SBDCH).

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Comparison of the Characteristics of Dental Stem Cells vs Umbilical Cord Stemcells

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Abstract

Mesenchymal Stemcells-have been considered a promising tool for tissue repair and regeneration. Different sources of mesenchymal stem cells may differ in their biological characteristics and clinical applications. This short communication gives an over view about the isolation, characterization, multi lineage and proliferation capacity of mesenchymal stem cells from umbilical cord and stem cells from human exfoliated deciduous teeth (SHED).The differences may be associated with different levels of cytokines, growth factors, surface markers, fibroblast growth factors, vascular endothelial growth factor expression and receptor activity.

Keywords: *Mesenchymal stem cells, dental stem cells, umbilical cord stem cells, stem cells from human exfoliated deciduous teeth.*

Introduction

History of adult stem cells starts in the late 1960s. Researchers discovered two kinds of bone marrow cells,namely hematopoietic stem cells and stromal stem cells. Hematopoietic stem cells have the capacity to form blood cells and stromal stem cells have the capacity to form progenitor cells.[1] An ideal stem cells should have the ability to self-renew themselves throughout life,should have the capacityto differentiate into progenitor cells and Should renew the tissue that they populate. Stem cells can be harvested at all stages of life from the inner cell mass of 5 days old embryo as well as collected from the olfactory epithelium of seniorcitizens. [2] Depending on the plasticity, stem cells are divided into three groups–namelytotipotent, pluripotent and multipotent. Totipotent cells are able to divide and produce all the cell in an individual, including embryonic tissues. Pluripotent stem cells can be differentiate into any of three germ layers and multipotent stem cells can develop into more than one cell type, but they are more limited than pluripotent cells; adult stem cells and cord blood stem cells are considered as multipotent cells.

Dental Stem Cells: Dental and umbilical cord stem cells are great sources of stem cells because of their non aggressive isolation method and they can be obtained from discarded medical tissues.[3] Stem cells from human exfoliated deciduous teeth (SHED) havethe capacity to differentiate into osteogenic cells, odontogenic cells, adipocytes and neural crest cells. They are derived from an accessible tissue source and capable of high proliferation and express high telomerase activity during their exfoliation. [4] Dental tissue derived stem cells are more restricted in their differentiation potency when compare to other sources of stem cells. Also, dental mesenchyme is termed as ectomesenchyme because of its earlier interaction with neural crest, from this perspective ectomesenchyme derived stem cells can possess different characteristics of neural crest cells.[5]

Stem cells from human exfoliated deciduous teeth (SHED): SHED proliferates faster with population doubling than dental pulpal stem cells and bone marrow stem cells. SHED shows the capacity of osteogenic and adipogenic differentiation (Miura et al., 2003). Pulp tissues are obtained from the exfoliated primary teeth of children aged between 8 and 15 yrs. In vitro cultured SHED express variety of neural cells marker. In vivo

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studies, SHED produce dentine-pulp like structure but without complex formation. Osteogenic capacity of SHED can be inducing recipient murine cells to differentiate into bone forming cells. Neurogenesis of SHED was studied by injection of SHED into the dentate gyrus of the hippocampus of immunocompromised mice. In this study SHED showed the capacity to survive more than 10 days inside the mice brain and expressed neural markers[6]

Umbilical cord stem cells (UCMSC): With the concern of parents, Blood can be collected from the umbilical cord tissue of healthy newborn shortly after birth,instead of discarded as biological waste. This procedure does not hurt the baby or mother in anyways and it is free of ethical issues. Umbilical cord blood mainly contains hematopoietic cells and mesenchymal stromal cells. Umbilical cord derived mesenchymal stem cells have excellent proliferation potency. Umbilical cord blood has been shown to be therapeutically useful for rescuing patients with bone marrow related deficit and inborn errors of metabolism and it has less incidence of graft vs host disease and can be used allogenically.[6][7] Mesenchymal like cells from umbilical cord blood can express neural markers when differentiated. In vitro umbilical cord mesenchymal cells can be induced to become cells with morphological and biochemical characteristics of neurons[8]

Comparison: SHEDs and UCMSCs have high proliferation potential[9][10] and the proliferation capacity of SHEDs is relatively stronger since they are in an active state and show high telomerase activity when deciduous teeth are replaced by permanent teeth[11] Mesenchymal stem cells originating from both tissues are highly similar but their differences are functionally related to their origin;for example, Mesenchymal stem cell derived from dental pulp tissue is more committed to the osteoblastic and odontogenic lineages, whereas mesenchymal stem cells derived from umbilical cord tissue would be more committed to angiogenesis.[11] SHED and Umbilical cord stem cells derived mesenchymal cells expressed intermediate filament protein Nestinand NANOG homeobox protein, these are the markers of embryonic stem cells, and they play an important role in the maintenance of pluripotency and self-renewal[12] Differentiation potential for osteogenesis is significantly higher in dental stem cells than umbilical cord stem cells[13] Experimental studies on animals have proved that dental stem cells especially SHED have multiple lineage and it can differentiate into active neurons, which prove its usefulness in management of degenerative diseases such as Parkinsonism and Alzheimer's.[14] Dental stem cells showed the ability to regenerate in an infarct area in experimental rats after inducing myocardial infarction with angiogenesis and improved ventricular function.[15]

Conclusion

Mesenchymal stem cells derived from umbilical cord and pulp tissue of SHED have self-renewal capacity and multipotentiality. Compare with UC, SHED mesenchymal stem cells have the advantage of treating bone injury due to the higher osteogenic differentiation ability and SHED stem cells have lower cell apoptosis than that of umbilical cord. Dental stem cell banking has more advantage over umbilical cord stem cell banking. SHED stem cells can be harvested in later part of life even if the parents missed the chance of storing umbilical cord and it can be stored at various stages,it is cost effective than cord stem cell banking. Dental stem cells can be used as a tool in the regeneration of different body tissues in future.

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An Update of Pulpotomy Medicaments in Primary Molars and Shift to Nature

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Abstract

Over the years several products have been proposed and testified as pulpotomy medicaments for primary teeth. Formocresol has been considered as gold standard for this procedure. Despite its clinical success, the use of formocresol has declined due to its apparent mutagenic and carcinogenic property. Controversies regarding the use of formocresol has urged the researchers to constantly pursuit for a promising alternative. Phytotherapy has been a recent trend. The aim of this paper is to analyse the existing literature on the various pulpotomy medicaments available for primary teeth and the evolution of natural products for the same.

Keywords: *Pulpotomy medicaments, Formocresol, controversies, phytotheraphy.*

Introduction

The main objective of paediatric dentistry is to preserve the primary teeth until their exfoliation. Primary teeth is the best space maintainer. Pulpotomy is indicated in primary teeth with deep caries. Pulpotomy is a widely accepted procedure in which the entire coronal pulp is removed with the aim of removing all the infected pulp tissue and radicular pulp is treated using a suitable medicament. Over the years various medicaments have been used which includes formocresol, glutaraldehyde, ferric sulphate, calcium hydroxide, MTA etc. One recent trend has been the use of natural product as pulpotomy medicaments. This is due to their profound antibacterial and anti inflammatory properties. This paper aims to analyse clinical and radiographic success of various pulpotomy medicaments including that of the natural alternatives.

Formocresol: Formocresol, a benchmark medicament for pulpotomy in primary teeth has been subjected to controversies due to two main reasons. It causes devitalization of radicular pulp tissue and is regarded as cytotoxic and carcinogenic.[1]

Mechanism of Action: Protein bonding inhibition of enzyme fixation of pulp tissue **(hyaluronidase).** The primary component in formocresol is formaldehyde which is toxic to living tissues.

Formaldehyde is a small molecule and hence it penetrates the apical foramen easily[2]. In 2004, International Agency for Research on Cancer (IARC) reclassified formaldehyde as a known carcinogen from human probable carcinogen. The second active ingredient in formocresol is cresol. It does not enter systemic circulation because of its poor solubility. Despite its controversies the clinical success rate of formocresol is reported to be 93%-98%.

WHO has estimated daily consumption of formaldehyde to be 15 to 14 milligram per day. But the formaldehyde dose associated with pulpotomy procedure is 0.02-0.10 mg. **DPx (DNA–protein cross links)** is a DNA damaging product produced by formocresol when it is exposed to cells. It causes mutation and cell death. However, DPx does not sustain in tissues for more than few hours due to its spontaneous hydrolysis. Hence the role of DPx in formaldehyde induced carcinogenesis is controversial[3]. Milnes published an extensive review on carcinogenicity of formaldehyde and concluded that

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formaldehyde is not a potent human carcinogen under conditions of low exposure[4].So evidence presented in the review of the existing literature indicates that formocresol is a safe medicament when used judiciously. However the reports of some studies are not in favour of formocresol. Hence, the obsolescence of formaldehyde is still under debate.

Alternatives to formocresol:

Glutaraldehyde was introduced by Kopel in 1979. It has been suggested as an alternative to formocresol because of its superior fixative property, low antigenicity and low toxicity. Glutaraldehyde is a bifunctional reagent. It forms both intra and inter molecular protein bonds which leads to superior fixation by cross linkage[3]. The molecular size of glutaraldehyde is larger than that of formaldehyde. Hence, it does not penetrate the apical foraman[2].Tsai and Tseng have reported long term (36 months) success of glutaraldehyde with clinical and radiographic success rates to be 98% and 79% respectively.

Ferric sulphate received attention as an alternative to formocresol because of its hemostatic property and favourable pulpal response. It is a non-aldehyde compound which forms a metal–protein complex at the pulp stump. This metal protein clot act as a barrier to irritating component of the base. Since ferric sulphate being a non–fixative agent does not play a direct role in the healing process. The base which is in direct contact with the pulpal surface plays a vital role in the healing process[5]. Zinc oxide is used as a base in most of the studies which may cause necrosis and inflammation of the underlying pulpal tissues[3]. Studies conducted by Fei and Fuks et al have shown the clinical success rate for FS to be 96% and radiographic success rate was 84%[5].

Calcium hydroxide was the first agent used in pulpotomy to induce regeneration of dentin. The high ph of calcium hydroxide facilitates the healing of pulp by initiating the inflammatory cascade[15]. But it is no longer used in pulpotomy procedure since it causeinternal resorption. Because internal resorption is an indication of chronic inflammation of residual pulp[3].

MTA (mineral trioxide aggregate) proves as a promising alternative to formocresol by its excellent biocompatibility, regenerative property and superior sealing property. The composition of MTA includes tricalcium silicate, tricalcium aluminate, tricalcium oxide, silicate oxide, Bismuth oxide. Grey MTA contains tetracalciumaluminoferrite, while it is absent in White MTA. MTA induces hard tissue formation by the release of cytokines and interleukin. MTA showed a higher clinical success rate than any other pulpotomy medicament. Despite of higher success rate, MTA has several disadvantages like tooth discoloration, cost and prolonged setting time[6].The presence of iron [tetracalciumaluminoferrite] in grey MTA causes tooth discolouration. Hence white MTA was introduced to reduce or eliminate the tooth discolouration.

To overcome the disadvantage of MTA, Bio **dentin (bioactive tricalcium silicate)** was developed which has dentin like mechanical properties. It has shorter setting time in contrast to MTA[7]. During the setting phase of biodentin, calcium hydroxide ions are released which increases P^H to 12 which inhibits the growth of microorganism and induces minerlization[14].

Harvinder et al recommend **MNP** (magnetic nanoparticles) as an effective pulpotomy medicament with hard tissue barrier formation. Properties of magnetism and nanostructured materials are used in biomedical engineering. Histological evaluation revealed a zone of odontoblastic proliferation and it could be considered as dentin bridge. Hence, MNPs possess a regenerative capacity in contrast to the devitalization technique[8].

Antioxidant mix has been a recent trend in pulpotomy. It works on the principle of wound healing. Antioxidant encounters free radicals which cause cell damage. It showed higher clinical and radiographic success rate but further studies are required to prove its efficiency in long-term follow[9].

Shift towards Nature: The treatment of medical conditions using plants or substances made from plants is called phytotherapy. Controversies regarding various pulpotomy medicaments led to a shift towards phytotherapy. Various plants with antimicrobial property were extensively studied.

Aloe vera (Aloe barbadensis) exhibits antibacterial and antioxidative property. Gupta et al evaluated the effect of Aloe vera gel as a pulpotomy medicament in deciduous molar and concluded that it can be used as pulpotomy agent[(10,13)].Kalra et al compared the efficacy of MTA and Aloevera gel and proved that MTA was superior compared to Aloe vera gel[10]. **Allium sativum** is commonly known as garlic contains allicin produced by enzyme allicinase which possess antibacterial activity. Mohammed et al compared the efficacy of Allium

sativum oil and formacresol and concluded that Allium sativum oil was superior compared to Formacresol[11,13].

Propolis has gained popularity in pulp therapy due to the presence of flavonoids, aromatic acids and esters which possesses antibacterial property. Propolis is a resinous mixture produced by honey bees[11].Rashmi et al proved that propolis can be used as a vehicle for calcium hydroxide[12].

Turmeric powder (Curcuma longa) possesses anti-inflammatory and anti-bacterial properties. Hugar et al used **turmeric gel** as pulpotomy medicament with good clinical and radiolographic success[13.]

Kumari et al studied the use of **honey** as a pulpotomy agent. Honey gained its popularity in folk medicine due to anti-bacterial and wound healing property. The acidity of honey and potential to release cytokines play a significant role in tissue repair and regeneration[13.]

Conclusion

In the recent past Pediatric dentistry has focused more towards regenerative procedures rather than devitalization. Hence regenerative materials like MTA and biodentin have appeared to be a suitable pulpotomy medicaments. Further studies should be undertaken to explore newer regenerative materials and to improve the efficacy of existing materials. In spite of being good alternative natural products have not emerged as promising pulpotomy medicaments. As shift towards nature occurs, newer medicaments will gain limelight in the recent future.

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Shortcomings of Caries Vaccination

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Abstract

Background: Dental caries is an infectious microbiologic disease of the teeth and is one of the most common diseases in humans .It is a multifactorial disease caused by interaction between four principal factors-the host (saliva and teeth), the microflora, the substrate(diet) and the time. Targeting the microbial factor of the disease, researchers have been developing vaccination to protect the caries prone children and adults. Immunization includes active and passive immunization. Vaccines should be safe and effective. This article gives an insight into the shortcomings and challenges of caries vaccinations.

Keywords: *Caries vaccination, active immunization, passive immunization.*

Introduction

Dental caries is one of the most prevalent oral disease formed by the interaction of 4 factors namely: The host (saliva and teeth), the microflora, the substrate (diet) and the time. Among the various microorganism that are responsible for caries formation and progression, the main causative agent for initiation is Streptococcus mutans.[1,2]At present there are various caries prevention Method of which developing vaccination against S.mutanshas been of greater interest among researchers for past few decades.[3,4]

In late 1969, the modern era of vaccination began with intravenous immunization experiments conducted by William Bowen on animals.Earlier whole cell S.mutanswere found to be used for vaccination[2]. At present virulent factors of bacteria are used to induce immune response.[5]

Routes of Immunization Include Passive and Active Immunization[1,2,3].

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Types	
Active	**Passive**
• Common Mucosal routes • Oral • Intranasal • Tonsillar • Systemic route • Subcutaneous route • Active gingivo salivary route Active immunity acquired by induction of salivary antibody production and memory formation	• Egg yolk Antibodies • Bovine Milk antibodies • Monoclonal Antibodies • Transgenic Plant Antibodies Passive immunity obtained by external supplementation of antibodies through the above mentioned types

Shortcomings of Caries Vaccine: All vaccines, even if properly manufactured and administered, seem to have risks. Active immunization has shortcomings due to reasons stated below. The most serious is that sera of some patients with rheumatic fever who show serological cross-reactivity between heart tissue antigens and certain antigens from haemolytic Streptococci[1,3]. Experiments from antisera from rabbits immunized with whole cells of S. mutans and with a high molecular weight protein antigen of S. mutans were reported to cross react with normal rabbit and human heart tissues. Polypeptides (62-67 KDA) immunologically cross-reactive with humanheart tissue and rabbit skeleton muscles myosin are found in the cell membrane of S. mutans and Streptococcusratti.[3,4] On the other hand, demonstrations showed thatrabbit antiserum to high molecular weight, Todd-Hewittbroth components reacted with monkey

cardiac musclewith S. mutans coated with medium components. Heartcross-reactive antibodies do not develop in rhesus monkeysor rabbits immunized with purified Ag I/II from S. mutans. It is possible that increased production of heart-reactive antibody in rabbits immunized with mutans streptococci results in injury of heart tissue as a consequence of binding of this low molecular weight Streptococcal polypeptide[2,4]. Because of the potential of Streptococcal whole cells toinduce heart reactive antibodies, the development of asub-unit vaccine for controlling dental caries has been the focus of intense research interest[4,5]. Glucosyltransferase was also tested for cross-reactivity with human heart tissue and the results were negative. Further research showed that the C-terminal part of Ag I/II contains an epitope, which is cross-reactive with human IgG. Although the clinical significance of this observation is unknown, it appears that this potentially harmful epitope should be excluded from acaries vaccine.[4,8] The human IgG cross-reactive region is alsopresent in other mutans streptococci such as Streptococcussobrinus as well as in non mutans streptococci. Also usage of animal has been a concern for animal welfare teams[10]. Bulk production of vaccination is not efficient and was costly[6,7,10,11].

Passive immunotherapy overcame many of the disadvantages of active immunization. Few other risks of this immunization are stated below. Transgenic plant antibodies due to its nicotine content may cross react and is harmful[8,11]. Also passive immunity is obtained only for a shorter period of time and hence places the need for repeated vaccination and these booster doses also needs patient compliance.

Conclusion

Active and passive immunization strategies, which target key elements in the molecular pathogenesis of mutans Streptococci, hold promise. Integrating these approaches into broad-based public health programs may yet forestall dental caries disease in many of the world's children, among whom those of high risk might derive the greatest benefit.

Along with established Method of caries prevention, caries vaccines have the potential of making a highly valuable contribution to disease control. In the meantime, basic research on the mode of action of caries vaccine and the search for new, economical, efficient bulk production. Procedure of Active and Passive Immunization to work against pathogenesis of S. Mutans in oral cavity holds promise. In order to make it feasible on human, more of clinical trials are required primarily on experimental animals[5]. The main aim of vaccine should be long term prevention from dental caries, as the disease is gradual developing process. The vaccine should be safe and effective. Caries vaccine if successful tested on humans could be a valuable immunomodulator as compared to other caries preventive measures[12].

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Lasers and its Application in Periodontology: A Review

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Abstract

Dental Laser is available for several decades. Laser is a new technology widely used in medicine, kind to tissue and excellent in healing. Laser is an alternative to remove diseased soft tissue, target microorganism,as well as stimulated wound healing. In 1960, Maiman introduced "Light amplification by stimulated emission of radiation, Laser using Einstein's theories about stimulated emission. Since then, different laser such as diode, co2, Nd:YAG, Er:YAG,Cr:YSGG have been developed and within few years have been used in dentistry.

Keywords: *Laser, uses, application in dentistry, hazards in dentistry.*

Introduction

Laser is defined as:

L - Light

A - Amplification

S - Stimulated

E - Emission

R - Radiation

Historical Perspective:

1917 - Principle of stimulated emission by Albert Einstein.

"Zur Quantern Theorie der Strahlung"

1954 - Townes and Gordon- MASER.

1957 - Gordon Gould introduced the term LASER.

1960 - Theodore Maiman- First LASER- ruby – active medium.

1961 - Javan.- He-Ne laser.

1964 - Nd YAG- Geusic.

1965 - Co2 Laser- Patel.

1989 - Myers and Myers-FDA approval for use of laser in dentistry-Nd YAG laser.

1990 - Opthalmic application- ruby laser.

1995 - Dental use started.

Masers and Lasers: Nearly 40 years later, American Physicist Charles H. Townes Introduced frequencies, Microwave Amplification by stimulated Emission of Radiation(MASER) used for first time in 1951. In 1957 an American Physicist Gordan could gave the term LASER(Light Amplification Stimulated emission of Radiation) was invented. 1 In 1960, H Theodore Maiman was operated the first laser–a solid state of ruby laser.

In 1960, Sorokin and Steven-Solid state uranium laser.

In 1960, Ali Javan and William R Bennett and Donold Herriott/Constructed the first gas laser, using helium and neon.

In 1961, Neodymium laser by Jhonson and Nassau was demonstrated.

In 1962, parliamentarian N Hall incontestable the primary optical device diode device, made of Gallium arsenide.

In 1964, Geusic Marcos and Van incontestable metal doped Yttrium-metallic element mineral optical device.

In 1964 Patel demonstrated Co2 Carbon dioxide laser.

In 1964, Hughes Laboratories developed Argon laser.

Properties of Laser:

1. Monochromatic-Concentrate in narrow range of wave length (one specific colour).
2. Coherent-All emitted photons bear a constant phase relationship with each other in both time and phase.
3. Collimated-perfectly parallel beam of directional light.
4. Directional-A very tight beam which is very strong and concentrated.

Monochromatic-Monochromatic light has a very narrow range of frequency and single wave length (ie It is only made of light of one colour).

Coherent-All the emitted photons are in phase with each other and have identical peaks and valleys.

Collimated-Perfectly parallel beam of directional light.

Directional-A very tight beam which is very strong and concentrated.

Parts of Laser:

1. Active medium/Gain: Gas, Solid,liquid suspended in an optical cavity.
2. Power supply: External energy source-flash lamp/ electrical energy.
3. Optical resonator: Mirrors for amplification.
4. Cooling system, Control system, Delivery system.

Examples of laser:

GAS: Argon, Co2

SOLID: Diode

SOLID : NDYAG

SOLID: ERYAG

LIQUID : RED DYE

Articulated Arms:

- Consist of a series of rigid hollow tubes with mirrors at each joint (called a knuckle).
- Mirrors reflect the energy down the length of the tube.
- The laser energy exits the tube through a handpiece

Disadvantages:

1. Awkward 3-D maneuverability of the arm.
2. Mirrors at each knuckle must be aligned precisely.
   - A misalignment of the mirrors could cause a drop-off in the amount of energy transmitted to the handpiece.

Hollow Wave Guide: Semi rigid hollow tube with reflective interior mirror finish.

- Laser energy is reflected along this tube and exits through ahandpiece at the surgical end with the beam striking the tissue in a noncontact fashion.

This handpiece can be attached to an accessory tip of sapphire or hollow metal for contact with the surgical site.

- lenses within the laser instrument focus the beam

Optic Fiber: Smaller in diameter with sizes ranging from 200-1000 μm in diameter.

- Fits into a handpiece
- Used in contact or noncontact mode
- Focal point is at or near the tip, which has the greatest energy.

Laser Delivering System:

Delivery system type

Articulated arm	Hollow tubes, 45 degree mirrors
Hollow waveguide	Semi-rigid tube with internal reflective pathway
Optic fiber/rigid tip	Quartz-silica flexible fiber with quartz, sapphire tip
Hand held unit	Low power lasers.

Mechanism of Action: In 1960 Maimann was the first to introduced laser Device. Since then, in the field of medicine and surgery lasers are routinely used . The Laser light is a single Photon wavelength. The process laser wave formation occur of lasing others, when an excited atom is stimulated to emit photon. Spontaneous emission of photon. This stimulated emission generates a very coherent (synchronous Waves), Monochromatic (a single Wavelength)and collimated form (parallel rays of light)[3].

The Laser type of electromagenetic wave generator. By the lasers electromagnetic energy is converted to thermal energy .

It has 3 characterstic options (1) Monochromatic : that comprises waves of same frequency and energy.

Mode of Operation of Laser:

- Continuous wave
- Gated pulsed mode (Physical gating of beam)
- Free running pulsed mode (Property of the active medium.

LASER in pulsated mode-targeted tissue has time to cool before next pulse of laser energy is emitted. Continuous mode–clinician must cease the laser emission manually so that thermal relaxation of tissue may occur. Thin fragile soft tissue should be treated in pulsed mode to prevent irreversible thermal damage of tissues. Water spray and gentle air stream from high volume suction aids in Keeping the area cooler.

Continuous Mode: The laser wave emits energy in continuous mode at average power till they are cutoff using an external source like foot switch or presenting in the laser unit. This type of energy is useful in ablative procedures or coagulating[2].

Laser Operated Parameters:

1. Focused/Defocused
2. Contact/Decontact

Focused-Laser beam hits tissue at its focal point–Narrowest diameter

It is in cutting mode

De focussed-Beam moved away from the focal point. Wide area of tissue affected as beam diameter increases. It is in ablative mode

Contact - Tipis Kept from 0.5 to 1 mm away from tissue.

Laser energy delivered at the surface is reduced.

Biologic Rationale for Laser Use Laser-Tissue Reaction:

1. Reaction
2. Transmission
3. Scattering
4. Absorption

1. **Absorption:** Depends on tissue characteristics, such as pigmentation an water content, and on the laser wavelength and emission mode.
2. **Hemoglobin:** Is strongly absorbed by blue and green wavelengths (500-1000nm).

The pigment melanin which imparts the colour of the skin, is strongly absorbed by short wavelengths. (Diode and NDYAG).

3. **Transmission:** Water, for example, is relatively transparent to the shorter wavelengths like argon, diode, and Nd:YAG, whereas tissue fluids readily absorb the erbium family and CO2 at the outer surface, so there is little energy transmitted to adjacent tissues.
4. **Reflection:** A Caries-detecting laser device uses reflected light to measure the degree of sound tooth structure. This reflection can be dangerous because the energy is directed to unintentional target, such as the eyes; this is major safety concern for laser operation[2].
5. **Scattering:** Weakening the intended energy and possibly producing no useful biological effects. Causes heat transfer to the tissue adjacent to the surgical site and unwanted damage could occur. However a beam deflected in different directions is useful in facilitating curing composite resin or in covering a broad area.

Benefits of Laser–Tissue Interaction

Soft tissue :

Cut, coagulate, ablate or vaporize target tissue elements.

Sealing small blood vessels

Sealing of small lymphatic vessels.

Sterilising of tissue

Decreased post operative tissue shrinkage.

Laser Effects are Due to:

1. Photochemical
2. Photo thermal
3. Photoacuostic

4. Biostimulation
5. Photodynamic
6. Photovaporolysis
7. Photo plasmolysis

Photothermal effects

Tissue Temperature (Degree Celsius)	Observed effect
37-50	Hyperthermia
>60	Coagulation, protein denaturation
70-90	Welding
100-150	Vaporization
>200	Carbonization

1. **Photoacuostic:** The Photoacuostic effects is a conversion between light and aquostic wave due to absorption and localized thermal excitation. When rapid pulses of light are incident on a sample of matter,they can be absorbed and the resulting energy will be radiated as heat. This heat causes detectable sound waves due to pressure variation in the surrounding medium
2. **Photovaporolysis:** Ascendant heat levels-phase transfer from liquid to vapour
3. **Photoplasmolysis:** Tissue removed by formation of electrically charged ions and particles in semi-gaseous high energy state.
4. **Absorbtion by chromophores:**
5. Tissue response in term of change of covalent structure.
6. **Biostimulation:** Believed to work towards healing by stimulation factor and processes involved in healing. Below the surgical threshold level. Useful for pain relief, increased collegen growth and anti-inflammatory activity.

Classification:

Laser are named according to

1. Active medium
2. Wavelength
3. Delivery system
4. Emission modes
5. Tissue absorption
6. Clinical application

II. Based on safety:

A. Based on the potential of the primary beam laser or the reflected beam to cause biological damage to the eyes or skin.

B. Class I:

Class II: a, b

Class III: a, b

Class IV

Class I laser:

Do Not Pose a health hazard.

Beam is completely enclosed and does not exit the housing. Max power output: 1/10 th of milliwatt. Eg: CD player

Class II Lasers: Visible light with low power output. No hazard-blinking and aversion reaction. Max power output is 1 mW. Eg: bar code scanner, laser pointer

Two subdivisions:

IIa: dangerous->1000 sec.

IIb: ¼ th of second.

Class IIIa: Any wavelength. Max Output power: 0.1 to 0.5 W. Danger > ¼ th of a second.

- Caution label

Class IIIb: Hazard to eye-direct or reflected beam, irrespective of time of exposure.

- Safe with matted surface and no fire hazard.
- Max output power: 0.5 to 5W.

Class IV lasers: Hazardous for direct viewing and reflection.

- Max output power > 5 W.
- Fire and skin hazards.
- Use safety glasses

Dental lasers are Class IIIb or Class IV lasers.

Absorption Characteristics of Dental Lasers

Laser Wavelength Type Chromophore

Argon 488-515 nm Gas Hemoglobin, melanin

He Ne 632 nm Gas Melanin

Diode 810-980 nm Solid Melanin, hemoglobin.

Nd: YAG 1064 nm Solid Melanin, water

Ho: YAG 2120 nm Solid Water, HA.

Erbium family 2790-2940 nm Solid Water, HA.

Co2 9300, 9600, GAS WATER HA

10600 nm

Argon Laser

LASER characteristics

Wavelength 488 to 514 nm

Active medium Argon Gas

Delivery system Optical fiber

Mode of operation Continuous wave

Chromophore Melanin pigment, hemoglobin, hemosiderin.

Applications Soft tissue only.

Pocket debridement and deepithelialization

for GTR

"Laser Pocket thermolysis": Finkbeiner 1995-absorption by black pigmented bacteria-bacterial load reduction in the periodontal pocket.

Argon Laser:

- Acute inflammatory periodontal disease and highly vascularized lesions, such as a hemangioma, are ideally suited for treatment.
- The poor absorption into enamel and dentin is advantageous when using this laser for cutting and sculpting gingival tissues because there is minimal interaction and thus no damage to the tooth surface during those procedures.

Diode Laser:

LASER characteristics

Wavelength 810 to 980 nm

Active medium Semi-conductor diode

Delivery system Optical fiber-quartz or silica

Mode of operation Continuous wave, gated pulsed mode.

Used in focused and de-focused modes.

Chromophore Melanin, hemoglobin.

Applications Primarily soft tissue applications-all minor surgical procedures.

The chief advantage of the diode lasers is one of a smaller size, portable instrument.

NDYAG Laser:

Laser Characterstics:

Wavelength 1064

Activemedium Neodymnium in YAG crystal

Erbium Family of Lasers:

Er YAG-2940 nm: Zharikov et al 1975.

Er Cr YSGG-2780 nm: Zharikov et al 1984 and Moulton et al 1988.

1988: Phagdiwala: Er YAG laser: ability to ablate the dentinal hard tissue.

1989: Pulsed Erbium laser: Keller and Hibst-enamel,dentin and bone.

1995: Commercially available.

1997: introduced for use in dentistry.

Deliver system-Opticalfiber

Mode of operation-continuous wave, Pulsed wave.

Chromophore-Haemoglobin, melanin and water

Application–Effective for Hard and soft tissue-Haemostasis, treatment of apthous ulcer or pulpal analgesia . Causes more thermal damage Earliest FDA approved laser for dental use. Do not use for disinfection of implant surfaces-damage to sandblasted and acid etched surfaces (Kreisler et al 2002)

MOA of Er Laser–Photoablation

Layers formed–superficial significantly altered

Intermediate

Deeper/less affected

Superficial layer-Microcracking, disorganization,slight recrystallization of apatite, reduction of surrounding organic matrix.

Intermediate layer-micro-explosion due to energy accumulation Deep-no change

Co2 Laser:

Wavelength 9300, 9600, 10600 nm

Active medium carbon di oxide gas

Delivery system Articulated arm

Mode of operation Continuous wave, gated pulsated mode. Used

In focused and defocused modes.

Chromophore water Hydroxyapatite

Limitation: High risk of carbonization (Water absorbtion → generates more heat → Carbonizes tissue

Carbonized/charred layer act as biological dressing.

Lasers Advantages/Disadvantages

Advantages:

1. Haemostasis
2. Ablation
3. Detoxification
4. Bactericidal activity
5. Osseous tissue removal and contouring easy with Er family

Disadvantage:

1. Hard tissue damage
2. High cost
3. Risk of pulpal damage
4. Single wavelength can treat all disease

Laser Saftey:

Regulatory organization

CDRH Centerfor deviceand radiological health

ANSI ↗ American National Standards institute

OSHA ↗ Occupation saftey and health administration

Laser safety officer

Environment: Warning signs, restricted access, reflective surface is minimized

- Laser use documentation
- Training
- Eye and tissue protection

Application in Dentistry:

1. Biopsy
2. Apicoectemy
3. Teeth preparation
4. Epulisfissuratum
5. Residual ridge modification
6. Bleaching
7. Impaction
8. Pontic site preparation
9. Tori reduction
10. Soft tissue modification
11. Impacted teeth exposure-orthodontic movement
12. Caries removal
13. Root canal disinfection

Clinical Application in Periodontics:

1. Intialnon surgical pocket therapy
2. Frenectomy
3. Gingivectomy
4. Soft tissue grafting
5. De-Pigmentation
6. Desenstization
7. Removal of granuation tissue
8. Osseousrecontouring
9. Crown lengthening
10. Surgery-implants
11. Peri-Implantitis
12. Operculectomy

Advantages of Laser in Periodontics Over Conventional Method:

1. Effective haemostasis
2. No Suturing
3. Faster Healing
4. Minimal/no Postoperative complication
5. Laser sterilization of wound site
6. Laser Bandage

Application of Laser in Periodontal Treatment

Laser in Diagnosis:

1. Detection of caries : Caries detection with laser works on principle of differential Fluoresce between healthy and diseased tooth.
2. Detection of calculus :Wavelength of 655 nm can be used for calculus detection. Calculus Fluoresce (glow) differently than healthy tissue.

Laser in prevention: Laser tooth brush: Laser tooth brush is is designed to provide an antibacterial effect in oral cavity using an irradiating laser beam of 630 nm low output semiconductor laser.

Laser in non surgical pocket therapy: Laser Bacterial Reduction (LBR): It is a simple nonsurgical procedure to eliminate or, at least, reduce the number of viable bacteria in the gingival sulcus. In this procedure a diode laser is used with a thin fiberoptic fiber[6].

Calculus removal: If the calcified accretions on the root surface are not removed, the therapy is doomed to fail. Laser now are being used for this procedure.

Not only does the laser remove the calculus on the root surface, but it also alters the cementum surface in such a way that it makes it favorable for fibroblast attachment.

Photodynamic therapy: Photodynamic therapy or photochemotherapy uses a photoactive dye that isactivated by exposed to the light in the presence of oxygen with specific wavelength, forming free radical species that kill target microbes.

Laser in the treatment of hypersensitivity: Low-level laser therapy (LLLT) has shown in the hyperemiaand inflammation of the dental pulp by resulting antiinflammatory, analgesic and cellular effects. For the treatment of hypersensitivity, a 780nm diode laser can be used at a power of 30m W, or Nd: YAG laser at low power can be used[7].

Laser in surgical procedures: LNAP (laser new attachment procedure): the laser is used to remove the epithelial lining of the sulcus aswell as junctional epithelium.

Biopsy and excision of soft tissue pathologies[4]:

Soft tissue application: Gingival soft tissue procedures: Laser is generally accepted and widely used as a tool for soft tissue management. The major advantageous properties of a laser are relative ease of ablation of tissues together with effective hemostasis and bacterial killing. The most popular procedures such as Crown lenghthening, Gingivectomy, Gingivoplasty, and frenectomy which carried out using a laser. Compared with the use of a conventional scalpel, lasers can cut, ablate, easily reshaping of the oral soft tissue, less bleeding and a little pain with a few sutures. Laser surgery occasionally requires no local anesthetic or only topical anesthetics.

Esthetic gingival procedures: Laser can apply in esthetic procedures such as recontouring or reshaping of gingival crown lengthening. For the esthetic periodontal soft tissue management Er: YAG laser is very safe and useful. The precisely ablating soft tissues using the laser is capable to fine contact and wound healing is fast[7].

The major indication of laser is soft tissue surgery. The CO2, Nd: YAG, diode, Er: YAG lasers are generally accepted as useful tools for this type of surgery.1

Osseous surgery: The use of erbium lasers is becoming increasingly popular for bone surgery. Erbium lasers, in general, offer more precision and better access than mechanical instruments. They reduce the risk of collateral damage, particularly when compared with rotary instruments that may become entangled with soft tissue. Lasers also improve the comfort of both patients and surgeons by markedly reducing the noise and eliminating the grinding of the bone tissue.

Lasers in implant therapy: Use of laser in implant may have several advantages, including improved hemostasis, production of a fine cutting surface with less patient discomfort during the postoperative period, and favorable and rapid healing following abutment placement, thus permitting a faster rehabilitative phase because of the ability of the laser to produce effective bone tissue ablation.

Periodontal pocket treatment: One of the possible advantages of laser treatment of periodontal pockets is the debridement of the soft tissue wall. Gold and Vilaridi reported that Nd: YAG laser is safe for removal of the sulcular epithelium in periodontal pockets. It has an added advantage of protecting the underlying connective tissue by causing necrosis or carbonization[5] .

Conclusion

Laser treatment is expected to serve as a adjunct to conventional mechanical periodontal treatment. The use of laser should based on proven benefits of haemostasis, dry field, reduced surgical time and less post operative swelling. So laser is safe and efficient for periodontal bone surgery when used concomitantly with water irrigation. This is an exciting field with promising possibilities to be investigated and represents an area that might ultimately prove to be rich with utility in context of periodontics.

Ethical Clearance: Not required since it is a review article.

Source of Funding: Nil

Conflict of Interest: Nil

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Oral Hygiene Practices among Psychiatric Outpatients in Chennai

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Abstract

Aim: To assess the oral hygiene practices among psychiatric outpatients in Chennai.

Materials and Method: A cross–sectional descriptive study was carried out on patients receiving care at the Outpatient Wing of The Department of Psychiatry, Stanley Medical College and Hospital, Chennai. A cluster sampling technique was employed. The study sample consisted of 159 males and 145 females.

An operator administered, close ended questionnaire was used. Oral Hygiene Index Simplified index was recorded. Data was analyzed using SPSS (Version 15) software. Chi–square test, Trend Chi–square test and Multiple linear regression analysis were employed.

Results: The usage of tooth brush and tooth paste was highest in the < 19 yrs age group (100%) and least in the > 50 years age group. Among the male subjects; 9 (5.6%), 75(47.2%) and 75(47.2%) had good, fair and poor oral hygiene, respectively. Among the female subjects; 9(6.2%), 87(60%) and 49(33.8%) had good, fair and poor oral hygiene, respectively.

Conclusion: The oral hygiene status of psychiatric outpatients is very poor and warrants vast improvement.

Keywords: *Oral hygiene Practices, Psychiatric outpatients.*

Introduction

Illness, whether physical or mental may lead to deterioration in self care and have an adverse effect on the holistic wellbeing of the individual[1]. Among the unique population groups, people with psychiatric disorders deserve special attention. The term psychiatric illness is used to describe clinically recognizable patterns of psychological symptoms or behavior causing acute or chronic ill health, personal distress or distress to others[2].

Psychiatric illness is not a single condition nor do psychiatric patients form a homogenous group of the sick in the society. Rather, it is a continuum ranging from minor distress to severe disorder of the mind or behavior[3].

Studies have shown that oral hygiene in psychiatric patients is poor due to lack of knowledge about the cause of oral disease, relatively high frequency of non-compliance with oral health practices, embarrassment regarding neglected oral care, attitudes to and value of oral health, low perception of dental treatment needs, inability or unwillingness to accept treatment, high sugar content in diet and mistrust of dental health professionals[4]. Furthermore, psychotropic medications contribute to xerostomia which has a significant impact on oral health[5].

Borge Hede et al (1988)[6] conducted a study among 84 Danish psychiatric patients. One of five participants did not perform oral hygiene as a daily routine and 45% did not visit the dentist regularly. 40% of the subjects reported symptoms from teeth or gingiva within the previous year.

Routine dental health care for institutionalized psychiatric patients are provided within many of the large institutions, but only a small portion (2.35%) of psychiatric patients are users of mental health services[7]. A vast majority of adults with mental illness live in the community. These patients have increasingly been given responsibility for arranging their own dental care, usually with a general dental practitioner. This move towards independence means that patients need a greater understanding of the potential risks of dental disease[8].

About 2-5% of India's population suffers some form of mental or behavioural disorder. 10-15% of those attending general health facilities have a common mental disorder[9]. Among the states of India, Tamil Nadu has the maximum number of mental health institutions. Yet, the population is so vast and diverse that majority of mentally ill patients are still treated as community dwelling outpatients[10].

Chennai is the capital city of Tamil Nadu and has an estimated population of over 8.5 million (2009)[11]. In the light of the dental fraternity's constant endeavor to meet individual treatment needs in a comprehensive and effective manner, it is imperative that health professionals are aware of the impact of psychiatric illness and its treatment on oral health as people with psychiatric problems are entitled to the same standards of care as the rest of the population.

Hence, an attempt was made to determine the oral hygiene practices among psychiatric outpatients in Chennai.

Materials and Method

Study design: A cross–sectional descriptive study

Study area: Four government administrated facilities cater to the treatment needs of community dwelling psychiatric outpatients in Chennai. This study was conducted at Stanley Medical College and Hospitals, which is one of the four facilities.

Inclusion criteria:

- Subjects who had been diagnosed with psychiatric illness at least 5 years ago.
- The patient must be currently receiving treatment for the psychiatric illness.

Exclusion criteria:

- Those who are not stable to give informed consent.
- Those who are not willing to participate in the study.

Approval and informed consent: Ethical approval was obtained from the Institutional Review Boards of Stanley Medical College and Hospital and Saveetha University.

Informed consent was obtained from all the participants and minors were examined only after obtaining consent from their parents or guardian.

Sample size estimation: The sample size was calculated on the basis of the prevalence (P) of periodontal disease (98.1%) among psychiatric patients in Davangere[12]. The final sample size was 42 subjects .

Sampling methodology: A cluster sampling technique was employed. A list of Government administrated psychiatric outpatient facilities in Chennai was obtained from the Department of Health and Family welfare, Government of Tamil Nadu. One hospital was selected from the aforementioned list by simple random sampling using lottery method.

The study sample consisted of 159 males and 145 females. Among the study population; 87, 78, 75 and 64 subjects were diagnosed with schizophrenia, mood disorder, organic brain damage and other psychiatric illness respectively. All willing, eligible participants within the cluster were enrolled into the study, yielding a total sample of 304 individuals.

Survey instrument: An operator administered pre-tested questionnaire, specially designed for this purpose was used. Demographic information, information about diagnosis, duration of illness and current medications were obtained from hospital records. Information on personal habits, mode and materials used for cleaning teeth, frequency of cleaning teeth, frequency of changing tooth brush, occurrence of dental problem in the past one year and choice of treatment provider were obtained by interviewing the patient. Oral hygiene index-simplified index was recorded.

Clinical Examination: Dental examinations were conducted by a single examiner who had been trained through a series of clinical training sessions at the Department of Public Health Dentistry, Saveetha Dental College, Chennai. After recording the questionnaire, dental examinations were conducted in supine position under natural light by means of mouth mirror and a CPI probe. Instruments were sterilized using standard protocol. Only completely filled forms were considered for analysis. The intra examiner reliability was calculated using the data obtained by re-examination of first and eleventh subject of each day after scheduled number of subjects were examined for the day (K=0.81).

Results

The study sample consisted of 304 psychiatric out-patients. 159 (52.3%) of the respondents were males and 145 (47.7%) were females. The study subjects were

between the age group of 18 and 71 years.Among the study subjects; 87, 78, 75 and 64 were diagnosed with schizophrenia, mood disorder, organic brain damage and other psychiatric illnesses respectively. Among the 304 study subjects, 78(26%), 120(39%) and 106 (35%) were diagnosed with psychiatric illness 5 years, 6 to 10 years and >10 years ago .

Among 159 male study subjects, 105 (66%) had smoking habit, 66(42%) consumed alcohol and 27(17%) had pan chewing habit. Among 145 female study subjects, none of the participants had smoking or alcoholism habit, while 28(19%) had pan chewing habit . The usage of tooth brush and tooth paste was highest in the < 19 yrs age group (100%) and least in the > 50 years age group (Figure 1). 89% of the subjects cleaned their teeth by themselves and 11% cleaned their teeth with the help of an assistant. The association between frequency of cleaning teeth and OHI-S score was found to be statistically very highly significant [$X^2 = 138.79$, $p = 0.000$].

Among males, the maximum number of subjects having good, fair and poor oral hygiene were found in the 20-29, < 19 and > 50 years age group, respectively. Among females, the maximum number of subjects having good, fair and poor oral hygiene were found in the < 19, 20-29 and > 50 years age group, respectively (Table 1).

Table 1: Distribution of study subjects based on oral hygiene status

Age (Years)*	Gender	Oral Hygiene Status*					
		Good		Fair		Poor	
		n	%	n	%	n	%
<19	M	0	0	9	100	0	0
	F	3	33.3	6	66.7	0	0
20-29	M	6	18.2	27	81.8	0	0
	F	3	9.1	30	90.9	0	0
30-39	M	0	0	24	57.1	18	42.9
	F	3	5.9	36	70.6	12	23.5
40-49	M	0	0	12	28.6	30	71.4
	F	0	0	9	37.5	15	62.5
>50	M	3	9.1	3	9.1	27	81.8
	F	0	0	6	21.4	22	78.6
Total	M	9	5.6	75	47.2	75	47.2
	F	9	6.2	87	60	49	33.8

*p = 0.015

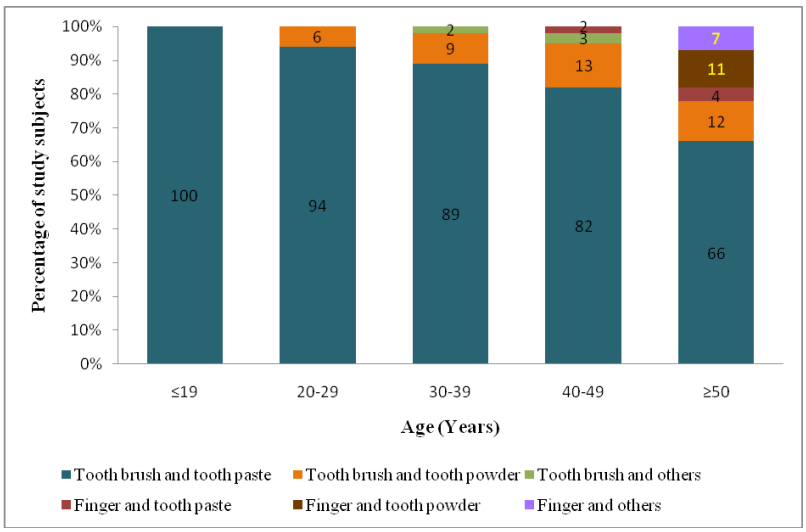


Figure 1: Distribution of study subjects based on mode and materials used for cleaning teeth

Discussion

Apathetic nature, poor diet and xerostomia inducing medications predispose psychiatric patients to significantly higher risk of dental diseases. Routine dental health care is provided to institutionalized psychiatric patients. However, only 2.35% of psychiatric patients are users of mental health services[7] .For community dwelling psychiatric patients, the onus of arranging for dental care lies with the patients themselves. Hence it is imperative that patients and their care takers are aware of the responsibility that lies with them.

Age of the participants in this study ranged from 18 years to 71 years. The inclusion of a wide array of ages facilitated the assessment of disease trends across the age groups. Among the study subjects; 87, 78, 75 and 64 were diagnosed with schizophrenia, mood disorder, organic brain damage and other psychiatric illnesses respectively. These diagnostic subdivisions were considered in this study because they are most commonly associated with the occurrence of dental caries[7,13,14,15].

In our study, the use of tooth brush and tooth paste as the preferred mode and material for cleaning teeth was maximum among the < 19 years age group and minimum among > 50 years old age group. This may be due to the increased awareness and increased willingness to adopt new lifestyle modifications among the younger generation. 11% of the participants in the present study cleaned their teeth with the help of an assistant. This is similar to studies conducted by Peter Horst G[16] et al in Netherlands and by Angelilloet al[17] in Italy where 8% and 9.4% of the study subjects received assistance in maintaining oral hygiene.

On eliciting the number of subjects who had dental problem in the past one year, it was found that 40% of the subjects in our study had some dental problems. This finding is similar to the results obtained by BorgeHedeet al[6] in Denmark (40%). Of the 40% subjects in our study who had dental problems in the past one year, 20% preferred the dentist to be the care provider. This is higher than a study by Angelilloet al[17] where only 7.4% of the subjects preferred a dentist to be the care provider. 9% and 6% of our study subjects sought treatment from physician and pharmacist. This finding reiterates the gravity of the responsibility that lies with physicians and pharmacists to redirect patients with dental problems to seek care from a dentist.

Thus, results of this study show that psychiatric patients have extensive dental diseases, many of them requiring complex treatment. However, prevention should be the main objective because patients with advanced psychiatric illness are often anxious and uncooperative for extensive curative therapy.

Recommendations:

1. Psychiatrists should ensure that oral hygiene is part of routine care.
2. Patients, family members and care takers should be made aware of the importance of tooth brushing with tooth paste containing fluoride.
3. Suitable dental services must be provided for psychiatric patients taking into account their special needs.
4. Multi–disciplinary approach to psychiatric patients should be encouraged

Ethical Clearance: Institutional Ethics Committee, Sree Balaji Dental College and Hospital, Committee registered with DCGI. (Registration no: ECR/761/Inst/TN/2015).

Source of Funding: Nil

Conflict of Interest: Nil

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Biological Considerations in Use of Dental Impression Materials: A Review Article

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Abstract

Background: The science of dental impression materials must be necessity encompass a knowledge and appreciation of certain biological consideration that are associated with the selection and use of materials designed for the oral cavity. The minute amounts of components that leach out of impression materials are most unlikely to cause toxic reactions, locally or systemically. Reliable analysis data is therefore necessary to clarify the varied issues of safety and frequency of adverse reactions normally medicine, together with dentistry treatment.

Method: A literature review was done to analyse the biological considerations of dental impression materials and its hazards.

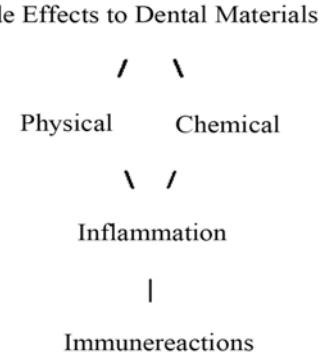
Conclusion: Many potential problems exist, but few documented adverse reactions have been published. It is expected that one requirement will be for clinicians and manufacturers to report biological side effects associated with use of the materials to certifying bodies or health authorities. Reliable research information using robust methodology is therefore required to clarify the varied questions of safety and frequency of adverse reactions in general dentistry, including Prosthodontic treatment.

Keywords: *Biocompatibility, Biological Effects, Impression Materials, Adverse Effects.*

Introduction

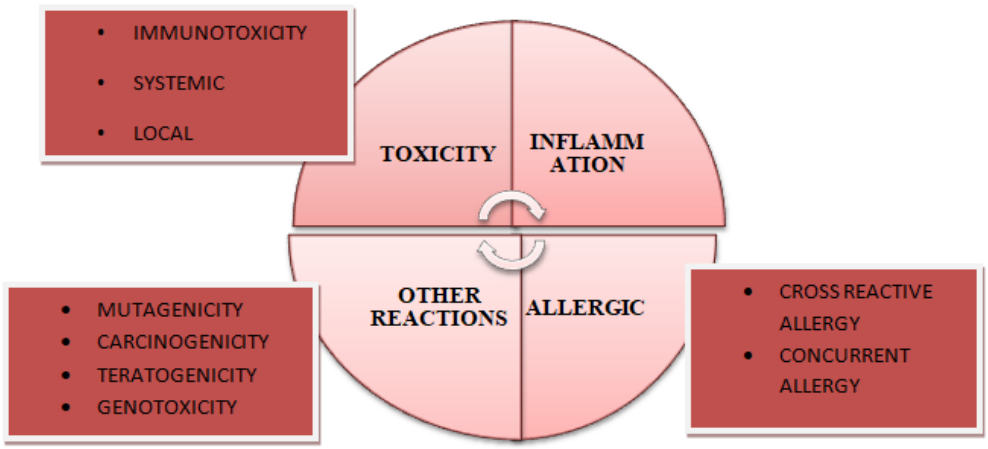
The development in Prosthodontics is characterized by an increasing number of new prosthetic materials. There are, however, a outsized range of properties of the prosthetic materials, which must be as close to ideal as increasing demands of the patients, biologic, physical, chemical, and aesthetic compatibility that have to be taken into consideration[1]. Biocompatibility is nothing but the capability of existing in harmony with the surrounding biological environment[2]. A single material might not be biologically acceptable all told applications. Placement of the material in the body creates an interface which depends on location of the material, its duration in the body, its properties and health of the host[3]. Biological facet effects to materials employed in dental field are rare. An overall estimate indicates the frequency of such adverse effects to occur within 1:1000 to 1:10,000 of all dental treatments[4], but it is dependent on the type of practice and the materials used[5].

Adverse reactions may occur in different ways[6]:



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Frequent dermatological reactions include transient redness, irritation or decreased tactile sensitivity to seriously incapacitating blisters, desquamation, soreness, bleeding fissures, and pain. Frequent causes embrace acrylic resins, latex gloves, impression materials, eugenol containing temporary cements. Non dermatological reactions embrace injury to eyes because of UV light and visual light in everyday follow. Respiratory reactions are attributed to vapours from acrylic resin monomers and cyanoacrylates. Materials left within the inaccessible areas like sub gingival regions wherever elastomeric impression materials don't seem to be removed, cell viability is affected. Due precautions should be practiced in handling the materials and equipments to avoid occupational hazards on one hand and due care taken to avoid any insult to oral tissues and general health of patients on the other[7].



Historically, numerous materials are accustomed create impressions for removable and fixed prosthodontics. Early materials enclosed rigid and semi rigid compositions like plaster, zinc oxide eugenol, impression compound, and waxes; these materials still have restricted uses in dentistry. Different materials, enclosed metals, polymeric materials, ceramics, and variety of cements are used while fabricating and fitting Prosthodontic appliances for patients. More than 75th of all the prevailing dental materials are directly or indirectly used or concerned when fabricating and providing prosthodontics restorations to be placed within oro-facial complex of patients[8].

A number of factors need to be taken into account when estimating adverse biological reactions to prosthodontic materials. Among these include: the type, form, contour, extent of the corrective, any medication used by the patient, salivary flow rate, xerostomia, oral hygiene, quality of fit, and function of the prosthesis. All these conditions may affect local reactions in addition to those caused by the materials[9].

However, a definite distinction exists between material reactions intraoral and extra orally, with those on skin being more frequent and more severe. Skin patch testing is therefore of limited value, even if specifically designed series of tests for dental materials are employed[10].

Biocompatibility Tests: Many preclinical biocompatibility tests are available to minimize the risk of adverse reactions to dental materials[11]. These tests are categorized on the basis of their applicability

levels. Initial tests embrace cell culture tests, hemolytic tests, systemic toxicity tests, and tests estimating teratogenic and carcinogenic effects and potential. Secondary tests include implantation tests, skin and mucous membrane irritation tests, and sensitization tests. Usage tests take into consideration the way within which the materials are supposed to be employed in clinical practice. Oral mucosa tests based on reactions to materials in contact with the hamster cheek pouch is considered to be a short term usage test for prosthodontic materials and relatively less invasive and traumatic especially to suturing the skin to secure the material in contact with the mucosa[12].

Adverse Effects of Prosthodontic Materials: Unexpected biological side effects to prosthodontic materials might occur as a result of their direct contact with soft or mineralized tissues, or by exposure to leachable components resulting from corrosion and degradation products[12]. Concurrent and combined presence of dental prosthetic restorations created in additional than one alloys with differing compositions will tend to enhance the corrosion caused by galvanic action. Prosthodontic materials and their corrosion/degradation products comprise components that are known to be allergic, toxic, and carcinogenic in specific situations. Local mechanical irritation due to an overhanging margin of a restoration or associate overextended dental plate should even be considered as adverse effects. Thus, a number of potential problems exist. However, few side effects of prosthodontic materials have been reported in the literature. It should be kept in mind that prosthodontic materials are manufactured with the aim of being inert and insoluble. Contact allergic reactions (type IV reactions) are the most common side effects to prosthodontic materials[6].

Incidence of Adverse Effects: An overall incidence of facet effects to dental materials of one per 500 patients, or of 1 patient per close to three.5 years of practice was reported in one study. Over 13,000 patients were examined for acute and long-standing adverse effects during a 2 week period. A questionnaire survey among Prosthodontists indicated adverse patient reactions in one out of three hundred patients or one patient in close to 2 years per Prosthodontist[13].

Adverse Effects to Prosthodontic Materials: Due to the low incidence of side effects to prosthodontic material, it will be pertinent to limit this discussion to groups of materials instead of specific styles of materials including polymeric materials, alloys, implant materials, and cements. Ceramic materials are generally regarded as inert, but dust particles of these materials arising during handling, manipulating, adjusting, and finishing the fabrication represent a possible drawback, each for the laboratory and clinical personnel as well as patient[14].

Polymeric Materials: Polymerization of resin based materials may be initiated by heat, light, or by chemical activators at room or mouth temperature. Apart from containing accelerators (amines), they contain co-polymers, such as butyl-methacrylate (BMA), plasticizing agents such as dibutyl-phthalate, and inhibitor such as hydroquinone. In addition, cadmium salts-based coloring agents are also added, these ingredients as well as the added cadmium salts are not considered to represent any issues for patients however they will create potential hazard to technicians routinely grinding and finishing prosthesis made in resin based materials. Methyl methacrylate (MMA) monomer may result in toxic reactions and allergic responses in previously sensitized individuals, especially in under cured appliances. It is often difficult to differentiate between these two fundamentally different types of reactions because the clinical manifestations are similar, that is, redness and swelling of the affected mucosa. Physical trauma caused by overextended or poorly fitting dentures may also present as local reactions. These are difficult to differentiate from other types of local lesions. It is important to keep in mind that FORMALDEHYDE is a degradation product of several monomers used in dentistry, including denture base polymers and restorative resin based composites. Heat cured acrylics area unit well tolerated by the gingival tissues. In comparison, cold curing acrylic resins may result in gingival reactions, due to presence of higher concentration of the residual monomer in cold cured resins as compared with heat cured acrylics. The consequent diffused or localized burning sensation in the mouth because of direct mucosal irritation may be erroneously taken for the entity of "Burning Mouth Syndrome (BMS)". In fact the burning sensation might result from the intra-oral manipulation of organic compound or due to the presence of residual monomer. Allergic reactions to an ethylene amine activator used in several polymeric materials, including impression materials and temporary crown materials area unit one of two most commonly reported adverse effects to prosthodontic materials[15]. Recurrent facial dermatitis was observed with dental work because of epoxy acrylate bisphenol-A glycidildimethacrylate (BIS-GMA) [16].

Prosthodontic Alloys: Some of the metals utilized in dental alloys are proverbial to be biologically active or potentially hazardous, such as nickel, chromium, cobalt, cadmium and beryllium. About one in four reactions to materials used in prosthodontic treatments are associated with metals, particularly metallic element, metal nickel and gold alloys used for metal ceramic restorations. Literature indicates that allergic reactions to gold based restorations were more common than to nickel containing alloys[17]. Hildebrand et al. reviewed 139 published cases of allergy to base metal alloys in removable partial dentures[18]. Gingivitis and stomatitis

were the most common clinical symptoms, but remote reactions occurred in almost 25% patients. However, no correlation seems to exist between mucosal reactions to fixed prosthesis and corrosion and tarnish. Palladium alloys are generally better tolerated than base-metal alloys or gold alloys for metal–ceramic restorations, although they tend to tarnish more than other casting alloys. Alloys are among the materials used for the making of conventional cast posts and cores. A variety of metal combinations are in common use, sometimes with stainless steel pins. Of particular concern is to exercise care not to combine the simultaneous use of two different alloys for the post and forged core/crown once getting ready post retained crowns because the galvanic corrosion may cause root fractures[11].

Implant Materials: A wide sort of materials are employed in dental implants, including polymeric materials, alloys, ceramic, and synthetic hydroxyl apatite. The most frequently used materials have been cobalt–chromium alloys, vitreous carbon, titanium, and aluminium oxide. Numerous investigations have been performed to assess the biological properties of dental implants. Much attention has focused on the bone tissue/implant interface and on the in growth of bone into the porous implant fixture. The concept of "osseointegration" associated with the titanium implants, as demonstrated by Branemark, has proved much of the biological basis for modern implantology. The failure commonly results because of improper surgical procedures, problem with the loading of the implant, and infection. So far our understanding is evident concerning the inert nature of pure titanium implants. Much attention has been paid to the nanoparticles (NPs) that are produced for applications in various areas. With an increasing application of nanotechnology in life sciences and medicine, further studies are required on biosafety evaluations of NPs with attention to nanotoxicology not only from the angle of ecology however conjointly primarily based on the aspect of biomedical applications[19].

Conclusion

Many potential problems exist, but few documented adverse reactions have been published. Much attention has been focused on the presence of nickel, based on the fact that, nickel could be a potent substance, a matter and might be distributed to various organs in experimental studies in animals. It is expected that one requirement will be for clinicians and manufacturers to report biological side effects associated with use of the materials to certifying bodies or health authorities. With the low incidence of adverse effects of the materials in gift use, this will satisfy the needs of the patients and people handling the materials. Reliable research information using robust methodology is therefore required to clarify the varied questions of safety and frequency of adverse reactions in general dentistry, including prosthodontic treatment.

Ethical Clearance: Not required since it is a review article.

Source of Funding: Nil

Conflict of Interest: Nil

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Colour and Shade Selection in Complete Denture: A Systematic Review

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Abstract

Statement of Problem: Colour and shade selection is an important parameter which is essential in aesthetic replacement, thereby enhancing the psychology of the geriatric patient. Though its effectiveness is well known, its use is seen to be restricted. With current advancements in shade matching, its utility needs a systematic review.

Objective: The objective of this is to review about the improvement in aesthetics in the construction of complete denture by selection of the appropriate colour and shade matching similar to natural tooth in geriatric patients.

Method: Using various key words, an electronic search was performed from several databases-Medline/ Pub med, Cochrane Library and Google scholar. Furthermore, a manual searching of relevant journals and bibliographies of reviews was performed. Studies, which met the relevant criterias were selected for full text reading.

Results: This systematic review started with search various relevant articles, which were finally narrowed down to eighteen according to the inclusion criteria.

Conclusion: A thorough knowledge about the science of colour and shade selection is essential to the success in the field of Prosthodontics. It should be approached in a methodical manner. This enables the dentists to make the best choice and communicate it appropriately to the laboratory.

Clinical Significance: Even though the benefits of Shade matching are yet to be proven, evidences so far have not shown any adverse effects associated to shade matching. This means that the decisions made by clinicians whether or not to use shade matching depends upon clinical evaluation, patient physical and psychological health.

Keywords: *Colour, Shade Selection, Esthetics, Shade Guides, Colour Matching.*

Introduction

Colour and shade selection is an important method in providing esthetics in patients seeking complete denture prosthesis[1]. It becomes a complex process in achieving a closer shade match of an artificial tooth with the natural tooth due to its variety of colours[2]. Dentist requires an understanding of colours and shade selection to clearly communicate the instructions to the laboratories in order to obtain aesthetically pleasing denture[3].

During the 18th century, Sir Isaac Newton experiments demonstrated that white light passing through prism divided into a pattern of colours termed as spectrum and he also demonstrated that colour does not exist without light[4].

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Dimensions of Colour: Prof. Albert Munsell gave a colour wheel in the 20th century gave a colour wheel which includes 3 attributes of this system called Hue (particular colour), Chroma (intensity) and Value (darkness/lightness)[5]. Teeth are often polychromatic since it have variation in hue, chroma and value within the teeth and gives 3 dimensional depth and characteristics[4].

According to Black, he believed that value was given more preference than the hue. He recommended that value be assessed first followed by chroma and hue[6].

In addition to hue, chroma and value, there are certain properties which contribute natural appearance to teeth. They are translucency, opacity, opalescence, surface gloss, surface texture and fluorescence[7].

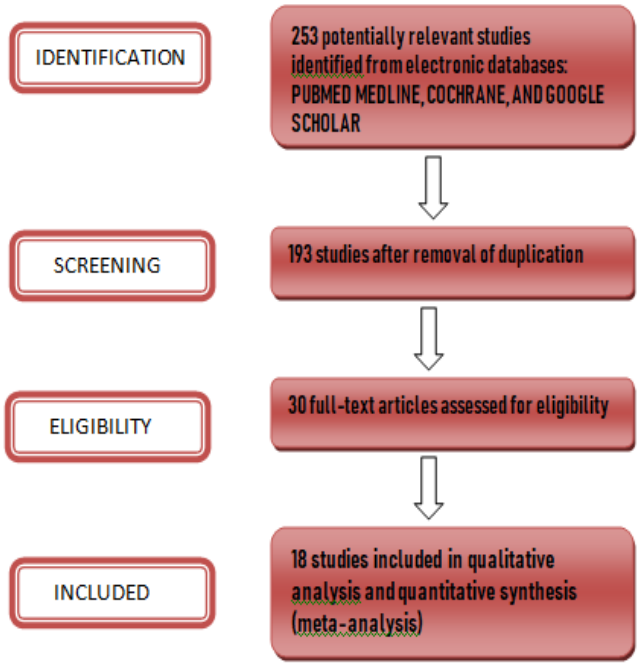
Selecting a shade is always done under different lighting conditions to avoid metamerism. Northern daylight around noon hour on the bright day is considered best as the incident daylight is most balanced within the visible light spectrum[8].

Methodology

This systematic review was performed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. Systematic electronic literature search was conducted in MEDLINE via Pub Med, Cochrane and Google scholar. In addition, manual searches were conducted in these principal periodicals specific to the area of study: Journal of Prosthetic Dentistry, International Journal of Prosthodontics, Journal of Dentistry and Oral care Medicine, International Journal of Oral Health Sciences, The Journal of Indian Prosthodontic Society. The search included peer-reviewed publications, with no publication year. The following search terms and their combinations were used: **"COLOUR", "SHADE SELECTION", "ESTHETICS", "SHADE GUIDES", "COLOUR MATCHING"**. Potentially relevant studies were identified according to the titles and abstracts. The full-text articles were subsequently reviewed and cross-matched against the predefined inclusion criteria.

Results

The electronic search identified 253 articles. Following analysis of the titles and abstracts, 193 articles were excluded, leaving only 60 articles suitable for inclusion. After the application of the inclusion criteria, 30 articles were deemed suitable for full-text analysis. Of these, a total of 18 articles were considered acceptable for this systematic review.



Discussion

Shade matching might be unimportant to the physiologic success of dental prosthesis but it could be the deciding factor in patients acceptance.

Colour matching is done by two ways–visual and instrumental[9]. Clinical shade selection involves picking a tab from shade guide and matching it with teeth that already existed[10]. The commonly used shade guides are Hyashi shade guide, Clark shade guide, Spectatone, VITA Shade guide (VITAPAN CLASS-I), Vitapan 3D Master shade guide and visually optimal shade guide[11].

Instrumental method of colour and shade matching are Colorimeters, Spectrophotometer, Digital cameras as filter colorimeters, Spectrophotometers and spectroradiometers[11].

There are six currently commercially available systems ranging from simple to complex. They are generally one of three types–colorimeters, spectrophotometers or digital colour analysers and various measuring geometries:

i. Shofu's Shade Chroma Meter

ii. The Vita Easyshade

iii. The Shadescan

iv. Shaderite Dental Vision System

v. The Spectroshade

vi. ClearMatch System[12.]

According to Judd and Wyszeeki[13] listed seven synonymns for shade of which desirable term is colour standard.

According to Culpepper[14] he pointed out the unawareness among dentists in matching natural teeth and duplicates their own shade selection from time to time.

According to Kuzmanovic and Lyons[15] study found no significant difference in accuracy of shade matching when using conventional visual assessment technique or a colorimetric assessment but a minor discrepancies occur when two shade techniques were used to compare for shade selection of same tooth.

According to Goodkind et al [16] used Chromascan and reflection spectrophotometer to compare the shade matching in vitro of natural with human eye which showed equal results to both techniques.

According to Berna et al [17] found that colour deflective dentists make more mistakes in hue selection than individuals with normal perception.

According to Miyajiwala et al[18] he concluded that the reliable method for colour matching in clinical set up is digital photography method.

Conclusion

One of the integral part of prosthetic and esthetic dentistry is the detailed study about colours. Matching the correct shade satisfies both dentist patient and gives pleasing appearance to the patient. Both traditional and technology based shade systems should be used to achieve better esthetics.

Ethical Clearance: Not required since it is a review article.

Source of Funding: Nil

Conflict of Interest: Nil

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Laboratory Remounting of Complete Denture: A Systematic Review

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Abstract

Statement of Problem: Simpler processing method has been tried in fabrication of complete denture but the importance of inclusion of laboratory remounting procedure is uncertain.

Purpose: The purpose of the systematic review was to assess the relevance of laboratory remounting procedure on complete denture.

Materials and Method: One electronic database (PubMed) was searched through in July 2019. The terms "laboratory remounting" AND "occlusion" were chosen. The titles and abstracts were screened and the studies which performed laboratory remount were selected.

Results: After duplicate removal, the database search showed 10 studies. Out of which 5 were retrieved for full text assessment. 5 randomized control clinical studies were included and 1 review study.

Conclusion: A laboratory procedure is advised to reduce occlusal disharmony and provide comfort to patients and reducing recall appointments.

Keywords: *Remounting, occlusion, selective grinding, dentures.*

Introduction

Complete dentures are prosthetic replacements for missing teeth and surrounding structures which are made to restore the missing functions and aesthetics. Properly constructed denture offers tissue comfort, good function and aesthetic, harmoniously. Correct obtainment of occlusion provides comfort, functional movements of mandible while maintaining the muscular tonicity which itself gives good aesthetical appearance. Error in any one procedure disrupts the entire occlusion in the denture.

The failure to achieve proper occlusion of teeth in complete denture happens due to many reasons including improper jaw relation, improper posterior teeth placement, incorrect curing method and changes due to polymerisation shrinkage and water sorption. When the occlusal adjustments are not corrected, it causes loss of alveolar bone as it undergoes remodelling to relieve the soft tissues from the pressure of occlusal disharmony. The errors occurring in the processing of the denture can be corrected by laboratory remounting.

Laboratory remounting is the repositioning of the polymerised denture on the mean value articulator and correcting the occlusion through the process of selective grinding(reducing the high contacts while maintaining the proper form of the tooth) in the centric and eccentric occlusion to assist any changes occurred after the processing of denture and deflasking using split cast mounting technique[1].

In India, both the laboratory and clinical remounting procedures have been taught to the students in dental schools but these procedures are not being implemented in the daily clinical situation. Reasons for lack of remounting procedure implementation could be either due to investment of extra time and manwork or ill-belief that denture will "settle in" within some time or dentists being unaware of the errors encountered while implementing remount procedure[2].

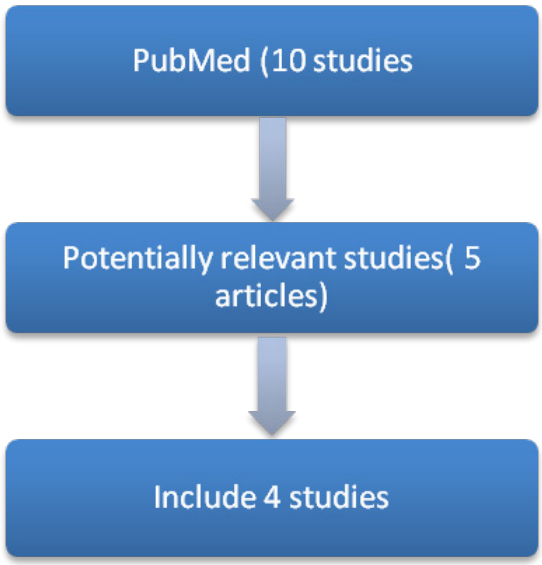
Our aim is to inculcate laboratory procedure into the routine fabrication procedures of complete denture which is often skipped during the fabrication process.

Method

The Preferred Reporting Items for Systemic Review (PRISMA) protocol was followed as much as possible. Numerous online databases were searched systematically to find trials of laboratory remounting of complete denture prosthesis. The search method included the use of keywords and Medical Subject Headings (MeSH) using the terms "laboratory remounting" AND "occlusion" in PubMed during 1st-2nd July of 2019. An evaluation of the search results were done at first selection process. The abstracts of potentially relevant studies were checked and finally some articles which included authors, objectives, treatment groups, follow-up, outcomes and significant results were selected.

Results

The online databases search resulted in a total of 10 studies. After the titles were reviewed in the first selection criteria, 5 potentially relevant articles studies remained. Out of which, 4 studies were included for which the titles appeared relevant and 6 were excluded and the reasons were inclusion of clinical remounting procedure, remount procedure being used in removable partial denture and survey studies. The online database search was followed by a manual search through the references of the included studies, one review articles was selected through the process. The 4 studies were randomized controlled trial.



Discussion

Qualitative lab procedures were found to show minimal occlusal changes but could not completely remove the occlusal disharmony. In 1972, a survey of British practitioners and dental students rarely used the remounting procedure in their clinical practice, only 6.5% of them used the remounting procedures to correct the occlusal discrepancy. On the contrary, Levin conducted a survey within US and Canadian dental school, where they taught the students the use of laboratory remounting procedure, clinical remounting and the use of disclosing paste to check the pressure development in the underlying soft tissues[3]. In 2008, Shigli did a study to find whether correction in occlusion was in co-relation with patient comfort and the number of visits after insertion. He found laboratory remounting with clinical remounting and selective grinding improved patient comfort level comparing with the patient who didn't receive either or both of the remounting procedure[4].

It is seen that denture base changes in contour when kept storage in water due to water sorption phenomenon. Campbell summarized that denture retention increases due to water sorption property. Skinner and Cooper expressed water sorption compensate the shrinkage occurring the acrylic resin base. On the contrary, Woelfel and Paffenbarger said that linear changes which shows up after processing is greater than its rehabilitation. McCartney demonstrated that there is 25% of average midpalatal base distortion is seen when resin is boiled in curing cycle. Also, 50% of the occlusion disharmony is seen dentures with short-cure processing.

So, the occlusion disharmony created by processing is usually corrected by remounting the master cast with the denture base in place, without removing it and equalize the occlusion on the articulator[5].

Conclusion

The choice is not whether to remount but when to remount the denture.

Any complex procedure requires patience and practice to get the desired results. Remounting of dentures is one of such similar case, where the inclusion of this step saves up lot of chairside time and provides comfort to the patient by providing short time period appointment and denture with occlusal harmony[6].

Ethical Clearance: Not required since it is a review article.

Source of Funding: Nil

Conflict of Interest: Nil

Reference

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Loss of the Epigenetically Inactivated-X-Chromosome (Barr Body) a Potential Biomarker for Breast Cancer Development

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Abstract

Background: Attention has recently reawakened to loss of the epigenetically inactive-X chromosome ‘‘Barr body’’ as a key prevalent event in development of breast cancer and other malignancies. . This study was aimed to investigate the incidence of Barr body loss as well as the expression levels of *XIST*, X-inactive-specific-transcript, in a set of Iraqi breast cancer patients.

Method: Eighty peripheral blood samples were collected from 60 patients diagnosed with breast cancer and 20 healthy age- matched controls for Barr body blood smears screening and *XIST* qPCR gene expression analysis.

Results: The results showed significant reduction in Barr body count (percentage mean) in breast cancer patients in comparison with controls (0.15 vs. 0.56,P= $1.14 * 10^{-21}$). Also, Barr body count was able to discriminate between breast cancer patients and their healthy controls. The *XIST* gene expression was also down regulated in the vast majority (95%, 57/60) of studied breast cancer patients, suggesting a potential key role for this gene in the development of breast cancer.

Conclusion: This study produced results which corroborate findings from a great deal of the previous work and showed strong association between loss of Barr body and down regulation of *XIST* in breast cancer patients. In addition, Barr body and *XIST* expression could be investigated further for their utility as an early screening or diagnostic method especially in high risk individuals for breast cancer and possibly for other malignancies.

Keywords: *Barr body, XIST gene, breast cancer, blood smear, PCR.*

Introduction

Breast cancer is the most common women cancer worldwide with more than 1.7 million new cases diagnosed in 2012 that accomplished for 516,868 cancer-related deaths in that year according to latest global record [1,2]. While the disease incidence in the developing countries is still less than that recorded in the developed ones, burden of breast cancer mortality is much higher in women from low-middle income countries. Breast cancer accounts for more than one third (34%) of cancers affecting women in Iraq[3]

In normal cells, the nuclear architecture integrity is maintained by the epigenetic marks that consist of both DNA methylation and histone modifications which differentiate euchromatin from heterochromatin. These modifications are considered as the guardian of our genome and are responsible for chromosomal stability, suppressing mobile genomic elements, genomic imprinting, heterochromatin inactivation and tissue/cell-type specific gene expression[4]. Heterochromatin inactivation is the mechanism by which one of the two female X-chromosomes becomes silent and inactivated forming a dark body in the periphery of the nuclear envelope that is called” Barr body”[5-8] . This gene was shown to be responsible for the initial random inactivation of one of the X-chromosomes early in development through the expression of non-coding RNA *XIST*that coats one X chromosome, replacing the euchromatic histone marks with the inactive heterochromatin epimarks such as H3K27me3, H3K9me2 and gene promoters of DNA methylation[9]. *XIST* expresses from only the inactive X-chromosome and its ongoing expression is shown to be required for the nucleolar

localization of the Barr body in mice[10]. Also *XIST* mutant mice showed loss of X chromosome inactivation and died early due to severely malformed growth[11]. It is thought that *XIST* loss leads to the degradation of DNA methylation and this could lead to reactivation of the epigenetically silenced X- chromosome[12].

The loss of the epigenetically-inactivated X chromosome is believed to contribute to tumorigenesis through the reactivation of cancer-related silenced genes [13].Both epigenetic/genetic alterations could contribute to loss of Barr body that leads to duplication of the active X chromosome which would result in over-expression of X-linked genes [14].. Previous studies had reported loss of the inactivated X chromosome "Barr body" in breast cancer patients especially those with poor prognosis[15,16,17].

This study was aimed to investigate the incidence of Barr body loss among Iraqi breast cancer patients. The Barr body count in breast cancer cases would be assessed for its association with the disease clinical features such as microscopic grade and other factors that might influence breast cancer development.

Materials and Method

Blood Samples: Eighty peripheral blood (PBL) samples were collected, during the period from November 2017 till July 2018, for blood smears preparation and RNA extraction. These blood samples were obtained from 60 patients with breast cancer attending the Oncology Hospital in the Medical City-Baghdad, Iraq and from another 20 healthy women as controls. Blood samples were collected according to the ethical considerations and the hospital ethical committee.

Blood smears preparation and Barr body count: Blood smears were prepared for breast cancer patients and healthy controls by spreading a drop of peripheral blood on a clean slide (2-3 slides were prepared for each subject). The smears were stained with Leishman stain for 2mins., the number of Barr body per 100 neutrophil cells was counted using oil immersion microscopic field and presented as a percentage value. Student's *t*-test was performed to compare the percentage average of Barr body counts between the two studied groups.

RNA extraction and XIST gene expression using qPCR: RNA extraction from peripheral blood samples (250µl) of breast cancer patients and healthy controls was performed using AccuZol^{TM} extraction kit the protocol provided by Bioneer Company (South Korea).. cDNA was synthesized from the extracted RNA samples using AccuPower^{R} RocketScript^{TM} RT PreMix kit (Bioneer). *XIST* gene expression was quantified by real time PCR technique using the following primer set: *XIST*-forward GCAGTTTGCCCTACTAGCTCCT and *XIST*- reverse TCCTCAGGTCTCACATGCTCA. This gene maps to chromosome X: 11302-11456. For the gene expression comparison, *GAPDH* was used as a reference gene with the following primers sequence: *GAPDH*-forward TGCACC ACCAACTGCTTAGC and *GAPDH*-reverse GGCATGGACTGTGGTCATGAG. Comparative Ct method was used to analyze the obtained real time PCR data.

Results

Barr body could be a useful biomarker for breast cancer diagnosis: Blood smears screening analysis showed significant decrease in the percentage of Barr body in breast cancer patients in comparison to their age-matched healthy controls. Barr body percentages meanfor healthy controls was 0.56% (ranged from 0.34 to 0.8) while their mean dropped to 0.15% (ranged from 0.08 to 0.25) in breast cancers patients (Table 1). This approximately four-fold reduction in Barr body count in breast cancer patients was reflected byhighly significant differences as compared to control group (P= 1.14 $*10^{-21}$).

Table 1-: Barr body numbers in breast cancer patients and their age-matched healthy controls

Group	No. of Barr bodies		t- test
	% Average/ Mean	Variance	
Breast cancer (n= 60)	0.15	19.84	P= 3.2 *10-11
Healthy controls (n=20)	0.56	0.021	

Of interest, our results also showed that the percentage of Barr body could distinguish breast cancer patients from healthy controls .This was clearly evident when all of breast cancer patients had Barr body percentages below 0.26 (ranged from 0.077 to 0.25) while all healthy controls had Barr body percentages above 0.34 (ranging from 0.34 to 0.88).This could be a promising biomarker for the diagnosis of breast cancer and possibly in other malignancies and diseases .

Number of Barr bodies is significantly reduced in advanced breast cancer grades and stages: Our

results showed a significant reduction in the percentage mean of Barr body through disease progression. This was clear when breast cancer patients in grades II and III had lower percentage meanof Barr body than those in grade I (0.121, 0.137 and 0.191%, respectively, Table 2). Differences in the number of Barr bodies were significant when grade I breast cancer was compared with those in grade II and III (P=0.000062 and P= 0.006, respectively). However, no significant difference was recorded from comparing grades II and III (P=0.249).

Table 2: Average number of Barr bodies in different breast cancer grades and stages

Breast cancer grade	**Barr body (% average)**	**t-test**
Grade I (n=12)	0.191	Grade I vs. Grade II (P=0.000006) Grade I vs. Grade III (P=0. 006)
Grade II (n=39)	0.137	
Grade III (n=7)	0.121	
Breast cancers stage	**Barr body (% average)**	**T-test**
Stage 1 (n=12)	0.183	Stage 1 vs. Stage2, P= 0.015 Stage 1 vs. Stage3, P= 0.001 Stage 2 vs. Stage3, P= 0.05
Stage 2 (n=28)	0.143	
Stage 3 (2=18)	0.124	

Similar to the association with breast cancer grade, the Barr body showed significant reduction with advanced disease stages (Table 2). Breast cancer patients in stages II and III had lower percentage mean of Barr body in their blood smears than those in stage I disease (0.124, 0.143 and 0.183%, respectively).

Furthermore, no significant reduction in percentage mean number of Barr bodies was found when pre- and post-menopausal breast cancer patients were compared (Table 3).

Table 3: Percentage mean number of Barr bodies in breast cancer patients with different clinical features

Breast cancer features		**Barr body%**	***t*-test**
Cancer development	Family history (n=14%)	0.139	(P=0.567).
	Sporadic (n=46)	0.147	
Menopausal Status	Pre-menopausal (n=32)	53.33	(P=0.138).
	Post-menopausal (n=28)	46.66	

X-inactive-specific transcript (XIST) expression is significantly reduced in breast cancer patients: In female cells, X inactive-specific transcript (*XIST*) RNA is involved in X chromosome silencing, allowing X chromosome equilibration with males[18]. Our results showed that *XIST* expression was down-regulated in the vast majority (95%, 57/60) of studied breast cancer patients (Figure 1). Of interest, more than two thirds, (76.7%, 46/60), of breast cancer patients had *XIST* expression level below 5%.

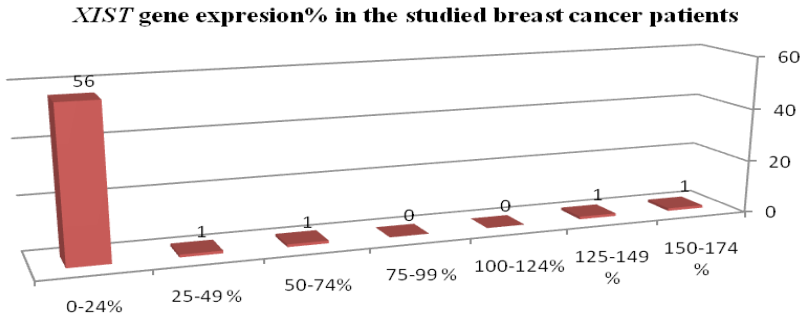


Figure 1: Expression levels of XIST gene in studied breast cancer patients. Each bar in the figure represents number of cases within each expression category.

Low XIST expression levels associated with breast cancer progression: Breast cancer patients with grade I disease showed lower level of *XIST*gene expression in comparison to those with Grade II and III. The average of *XIST* gene expression in grade I patients was 1.07% compared to 6.56% and 27.05% in patients in grade II and III, respectively (Table 3). However, these differences were not significant when statistically analyzed (GI vs. GII, P= 0.46; GI vs. GIII, P= 0.26; GII vs. GIII, P= 0.105).

Breast cancer patients with stage I disease showed lower level of *XIST* gene expression in comparison to those with stage II and III. The average of *XIST* gene expression in stage I patients was 1.95% compared to 23.95% and 14.6% for patients in stage II and III, respectively. No significant differences were found in the expression average of *XIST* gene among different breast cancer stages (Table 4).

Table 4: XIST gene expression average levels in breast cancer patients with different disease grades and stages

Breast Cancer Grade	**XIST expression%**	**t-test**
Grade I (n=13)	0.107	GI vs. GII (P= 0.46) GI vs. GIII (P= 0.26) GII vs. GIII (P= 0.105)
Grade II (n=39)	6.56	
Grade III (n=8)	27.05	
Breast Cancer Stage	**XIST expression%**	**t-test**
Stage 1 (n=12)	1.95	Stage 1 vs. Stage2 (P= 0.015) Stage 1 vs. Stage3 (P= 0.001) Stage 2 vs. Stage3 (P= 0.05)
Stage 2 (n=29)	23.95	
Stage 3 (2=19)	14.6	

In respect to other clinical features, breast cancer patients who underwent adjuvant therapy showed lowest levels of *XIST* gene expression (1.61%), while patients received hormonal treatment showed highest *XIST* gene expression levels (15.66%). The *XIST* expression level in this group of patients was two folds higher than that in patients given chemotherapy (7.17%). In the latter group, *XIST* expression level was approximately four folds higher than that in patients under adjuvant breast cancer therapy (Table 5). Furthermore, breast cancer patients with family history of the disease showed lower average levels of *XIST* gene expression (3.37%) compared to those with sporadic breast cancer (10.55%, Figures not shown). However, these differences were not significant (P= 0.43). Regarding the menstrual status, pre-menopausal breast cancer patients showed two folds higher levels of *XIST* gene expression than post-menopausal patients (11.77% and 5.60%, respectively). However, these differences were not statistically significant (P = 0.41).

Table 5: The average of XIST gene expression in breast cancer patients with different clinical features

Breast cancer features		**XIST expression%**	**t-test**
Treatment type	Adjuvant + AC (n=9)	1.61	P≥0.05.
	Hormone therapy (n=24)	15.66	
	Chemotherapy (n=27)	7.17	
Cancer development	Family history (n=14%)	3.37	P=0.43.
	Sporadic (n=46)	10.55	
Menopausal Status	Premenopausal (n=32)	11.77	P=0.138.
	Postmenopausal (n=28)	5.60	

Discussion

Results of current study showed significant reduction in number of Barr bodies in breast cancer patients in comparison to their age-matched healthy controls. Additionally, our results showed that number of Barr bodies was significantly reduced in advanced breast cancer grades and stages in studied patients.

Previous studies had shown interesting findings regarding loss of heterochromatic Barr body in breast cancer[6]. The disappearance of Barr body is believed to be linked to activity of *BRCA1*, a commonly disrupted gene in breast cancer cases. However, the frequent loss of heterochromatic inactivated X- chromosome in breast[8,16] and ovary cancers[19] and some haematological malignancies[13] may suggest even more general role for the reactivation/dysregulation of genes mapped to X chromosome in cancer development [7].

Furthermore, our study showed down-regulation of *XIST* expression in vast majority (95%, 57/60) of patients. This result confirms the proposed association between loss of Barr body and *XIST* gene in breast cancer patients[20]. Loss of Barr body could also due to epigenetic aberrations, which are hallmarks of almost all cancers, mediated by loss of *XIST* expression. Down regulation of *XIST* genes in breast cancer cases might lead to insufficient X-chromosome coating and contribute to disruption of silent nuclear compartments that are normally maintained in cells expressing adequate levels of *XIST*[21,22].

Overall, this study produced results which corroborate findings from a great deal of previous work and showed strong association between loss of Barr body and down-regulation of *XIST* in breast cancer patients. Both potential biomarkers, Barr body and *XIST* expression, could be investigated further for their utility as an early screening or diagnosis method especially in high risk individuals with breast cancer and possibly for other malignancies.

Ethical Clearance: It was obtained from the Research Development Unit at the Medical City/ Ministry of Health and Environment, Baghdad- Iraq.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

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Correlation of Parenchymal Thickness of Kidneys with Ultrasonography in Various Clinical Stages of Chronic Type II Diabetes

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Abstract

Ultrasonography is used as a first line imaging technique to differentiate between acute and chronic kidney diseases in type 2 diabetes . The renal parenchymal thickness of left and right kidneys were compared and a detailed documentation was made. Our study included adult male and female population who were known case of Diabetes Mellitus, above 18 years of age and biochemically diagnosed for nephropathy . All patients were subjected to ultrasonography evaluation of the renal parenchymal thickness and the findings were documented.

Keywords: *Ultrasonography, Type II Diabetes.*

Introduction

Ultrasound images are useful at characterizing the pelvis, assessing renal dimensions, parenchymal thickness and evaluating their characteristics and distribution[1-4]. Cortical thickness should be estimated from the base of the pyramid and is generally 7–10 mm[5]. If the pyramids are difficult to differentiate, the parenchymal thickness can be measured instead and should be 15–20 mm[4]

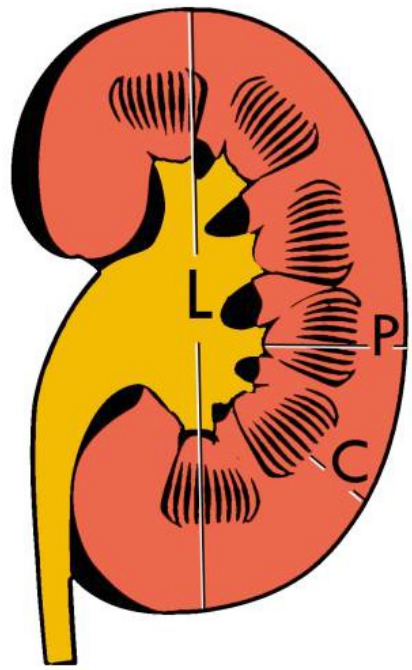


Figure 1: Measures of the kidney. L = length. P = parenchymal thickness. C = cortical thickness

Findings: Based on the measurement of right and left renal parenchymal thickness sonologically in diabetic nephropathy subjects, the following were interpreted.

Table 1: Distribution of Renal parenchymal thickness for Right Kidney (in mm)

Groups	Min	Max	Mean	SD	Median	IQ Range
Control	13.7	14.3	13.9	.17	13.9	13.8, 14.0
Diabetic nephropathy Group I	14.0	15.3	14.9	.30	15.0	14.9, 15.1
Diabetic nephropathy Group II	13.8	14.4	14.1	.28	14.15	15.0, 14.3
Diabetic nephropathy Group III A	13.2	14.3	13.5	.23	13.5	13.4, 13.67
Diabetic nephropathy Group III B	11.8	13.5	12.2	.47	12.05	11.9, 12.27
Diabetic nephropathy Group III C	10.2	10.4	10.3	.10	10.3	10.22, 10.3

One-way ANOVA with LSD post-hoc test used, F-value= 371.7, p<.001

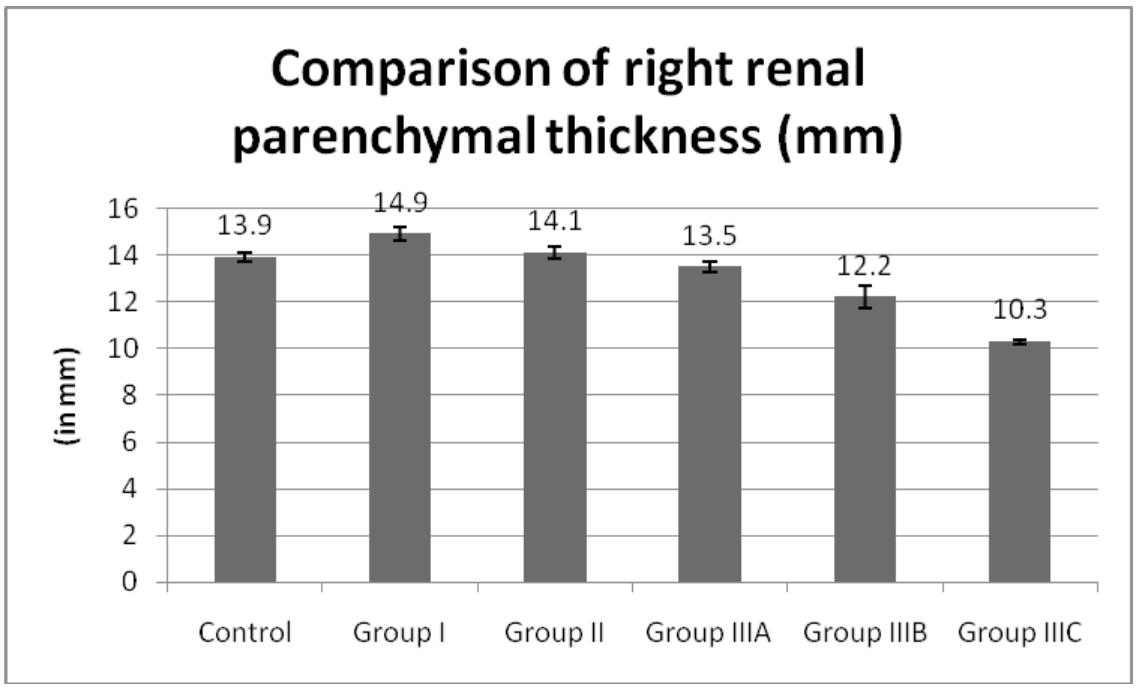


Figure 2: Comparison of right renal parenchymal thickness

Table 2: Distribution of Renal parenchymal thickness for left Kidney (in mm)

Groups	Min	Max	Mean	SD	Median	IQ Range
Control	14.3	14.9	14.6	.19	14.6	14.5, 14.72
Diabetic nephropathy Group I	15.2	15.9	15.5	.23	15.6	15.4, 15.7
Diabetic nephropathy Group II	14.7	15.4	15.03	.21	15.0	14.9, 15.2
Diabetic nephropathy Group III A	14.0	14.7	14.29	.20	14.25	14.12,14.47
Diabetic nephropathy Group III B	12.1	12.6	12.38	.13	12.4	12.3, 12.5
Diabetic nephropathy Group III C	10.7	10.9	10.77	.09	10.75	10.7, 10.87

One-way ANOVA with LSD post-hoc test used, F-value= 518.7, p<.001

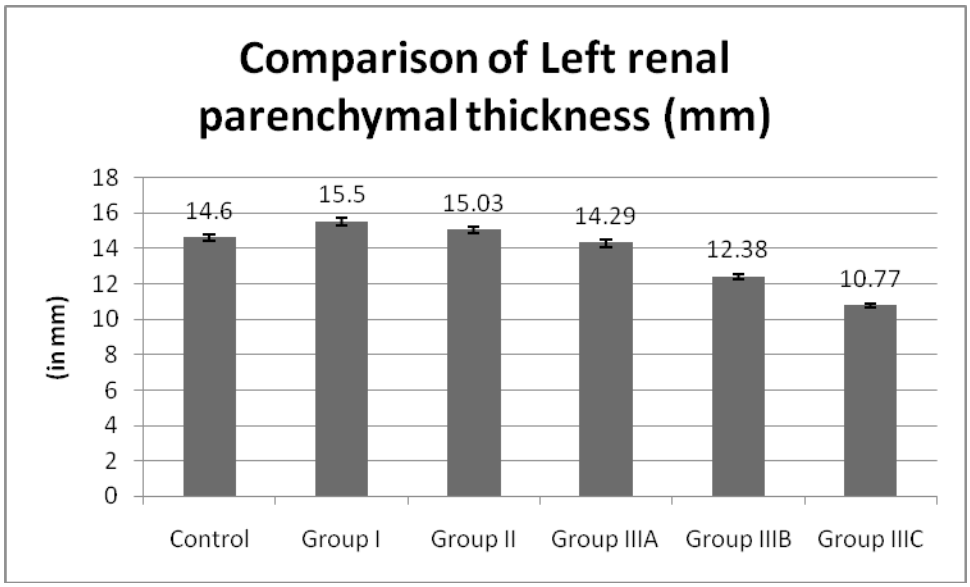


Figure 3: Comparison of left renal parenchymal thickness

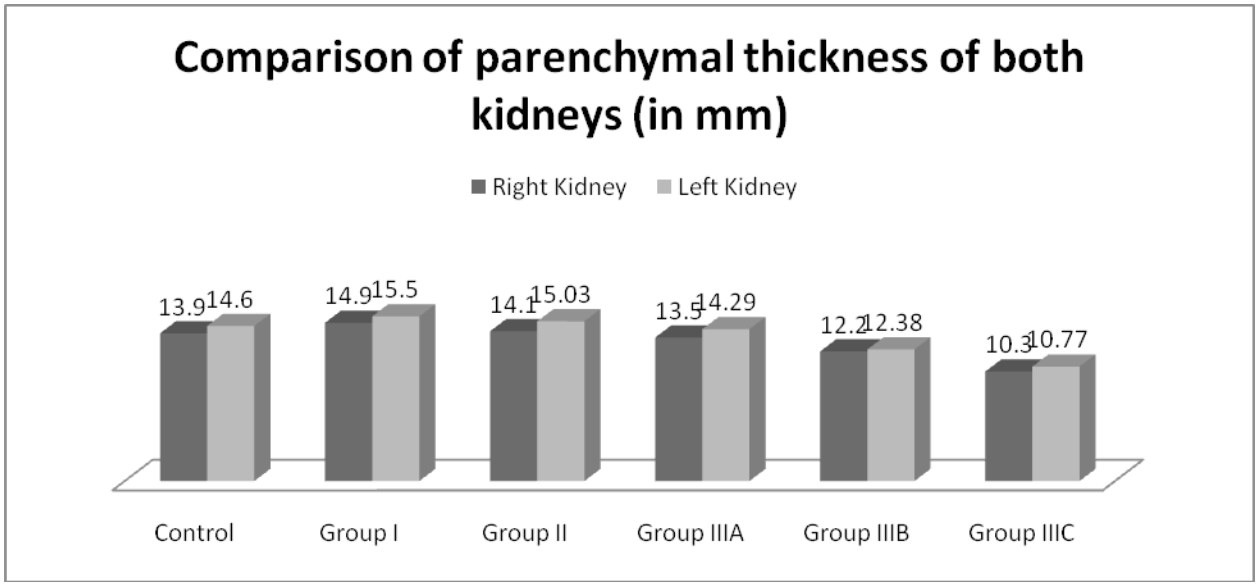


Figure 4: Comparison of parenchymal thickness of both kidney

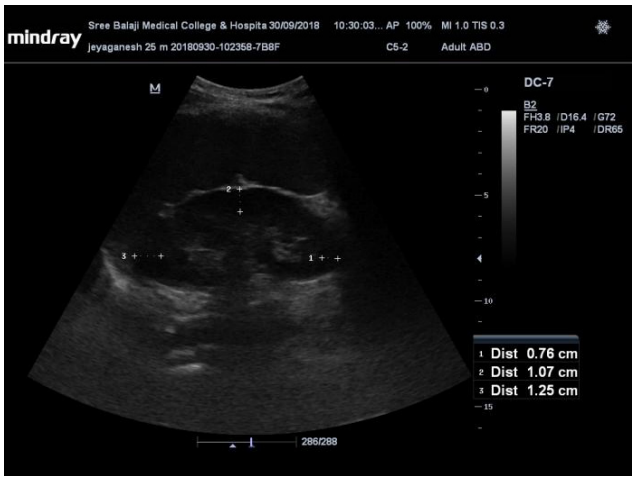
Discussion

The renal parenchymal thickness between the groups of right kidney was evaluated. The range, mean and standard deviations, median and inter-quartile range were decimated. The mean and SD of controls, group I, group II, group IIIA, group IIIB, group IIIc were 13.9 ± .17, 14.9 ±.30, 14.1 ± .28, 13.5 ± .23, 12.2 ± .47, 10.3 ± .10 millimeters respectively. Their lparenchymal thickness ranged from 13.7 to 14.3, 14.0 to 15.3, 13.8 to 14.4, 13.2 to 14.3, 11.8 to 13.5 and 10.2 to 10.4 among the controls, group I, group II, group IIIA, group IIIB, group IIIc respectively. The median (50th percentile) parenchymal thickness (inter-quartile range, i.e between 25th percentile and 75th percentile) fluctuated with values of 13.9 (13.8, 14.0), 15.0 (14.9, 15.1), 14.15 (15.0, 14.3), 13.5 (13.4, 13.67), 12.05 (11.9, 12.27) and 10.3 (10.22, 10.3) respectively among controls, group I, group II, group IIIA, group IIIB, group IIIc that have been included in this study. Florini F et al.[1] in their study have observed progressive parenchymal thickening in parallel with the stages of DKD and thence the results support our evidence convincingly.[2]

The renal parenchymal thickness between the groups of left kidney was evaluated.[3] The range, mean

and standard deviations, median and inter-quartile range were decimated. The mean and SD of controls, group I, group II, group IIIA, group IIIB, group IIIc were 14.6 ± .19, 15.5 ±.23, 15.03 ± .21, 14.29 ± .20, 12.38 ± .13, 10.7 ± .09 millimeters respectively. Their parenchymal thickness ranged from 13.7 to 14.3, 14.0 to 15.3, 13.8 to 14.4, 13.2 to 14.3, 11.8 to 13.5 and 10.2 to 10.4 among the controls, group I, group II, group IIIA, group IIIB, group IIIc respectively. The median

Figure 5: Ultrasound image of the measurement of renal parenchymal thickness



(50th percentile) parenchymal thickness (inter-quartile range, i.e between 25th percentile and 75th percentile) fluctuated with values of 14.6 (14.5, 14.72), 15.6 (15.4, 15.7), 15.0 (14.9, 15.2), 14.25 (14.12, 14.47), 12.4 (12.3, 12.5) and 10.75 (10.7, 10.87) respectively among controls, group I, group II, group IIIA, group IIIB, group IIIc that have been included in this study.

Conclusion

Based on the measurement of right and left renal parenchymal thickness sonologically in diabetic nephropathy subjects, it was interpreted that the renalparenchymal thickness diminished while the disease was getting progressed.

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: Nil

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Soluble Cytotoxic T-Lymphocyte Antigen-4 (CTLA-4) in Chronic Myeloid Leukemia and its Association with Total and Differential Leukocytes Count

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Abstract

Background: Chronic myeloid leukemia (CML) is a myeloproliferative disorder characterized by the presence of Philadelphia chromosome in the vast majority of cases. Although tyrosine kinase inhibitors (TKIs) are very effective in the treatment of this disorder, they cannot completely eliminate the leukemic cells indicating other players in the body fighting against this malignancy.

Aims: To evaluate serum concentrations of soluble cytotoxic T-lymphocyte antigen-4 (sCTLA-4) and its correlation with total and differential leukocytes count in patients with Chronic myeloid leukemia.

Subjects and Method: This case-control study included 48 imatinib-resistant Chronic myeloid leukemia patients, and 42 family unrelated, age-matched healthy subjects. Blood samples were obtained from each participant, from which sera were separated and soluble cytotoxic T-lymphocyte antigen-4 concentration was measured by enzyme-linked immunosorbent assay (ELISA). Demographic data for patients and controls were recorded through direct interview, with laboratory data for patients were extracted from their records.

Results: Serum concentration of soluble cytotoxic T-lymphocyte antigen-4 was found to be significantly dropped in Chronic myeloid leukemia patients compared to controls (26.38± 4.35 pg/ml *vs*. 37.19±11.08 pg/ml). Furthermore, soluble cytotoxic T-lymphocyte antigen-4 was inversely (although not significantly) associated with the total number of leukocytes and neutrophils, while this concentration was positively and significantly with lymphocytes count ($r = 0.606$, $P<0.001$).

Conclusions: Soluble cytotoxic T-lymphocyte antigen-4 is down-regulated in imatinib-resistant Chronic myeloid leukemia patients which is associated with increased neutrophil counts.

Keywords: *Chronic myeloid leukemia, soluble cytotoxic T-lymphocyte antigen-4.*

Introduction

Chronic Myeloid leukemia (CML) is a pluripotent hematopoietic stem cell disorder characterized by the presence of a balanced translocation t(9;22)(q34;q11), which juxtaposes the ABL gene located on chromosome 9 with the BCR gene on chromosome 22 to generate a chimeric protein, BCR-ABL[1]. Nearly 1.5 million people worldwide suffer from CML[2]. Reports from several European CML registries consistently show a crude annual incidence of 0.7-1.0/100,000, a median age at diagnosis[3].

The standard first-line therapy against CML is imatinib, a molecular-targeted drug that inhibits the *abl* tyrosine kinase[4]. However, imatinib does not completely eliminate residual leukemia cells and patients inevitably relapse after stopping treatment[5]. Thus, a comprehensive understanding of immune response to this malignancy may help to overcome this relapse.

Generally, immune response to tumors mainly depends on the activation of immune cells, especially natural killers (NKs), macrophages and T-lymphocytes[6,7]. Inactivation of these cells for any reason can promote the disease progression even with appropriate therapy and increase the relapse after TKI discontinuation.

Human cytotoxic T-lymphocyte antigen-4 (CTLA-4)

is a homodimeric glycoprotein belonging to human immunoglobin (Ig) superfamily[8]. Physiologically, this protein has a negative role in T-cell activation. Thereby, it facilitates the physiological termination of immune response[9,10]. It was found that expression of CTLA-4 is associated with a decreased ability of immune system to detect and eliminate tumor-associated antigen (TAA) [11]. Furthermore, anti-CTLA-4 was used for enhancement of antitumor immunity through the suppression ofregulatory T-cell (Treg)[12].

In fact, there are two isoforms of CTLA-4: a membrane-bound receptor isoform (mCTLA-4) which has both extracellular and intracellular domains, and a soluble isoform (sCTLA-4) with only extracellular domain for ligand-binding[13]. The latter isoform is not produced by enzymatic cleavage of mCTLA-4; rather there is an alternative spilicing of mRNA which results in the production of this isoform which is secreted into the extracellular space[11].

Interestingly, sCTLA-4-4 could interact with same ligands of mCTLA-4 causing the inhibition of activated T-cells. Blocking of sCTLA-4 was found to enhance Ag-driven peripheral blood mononuclear cell response[14].

Accordingly, measuring of serum level of sCTLa-4 could reflect the activation status of T-cell. Therefore, this study was aimed to measure serum levels of sCTLa-4 in imatinib-resistant CML patients.

Patients and Method

Patients: A total of 48 imatinib-resistant chronic phase CML patients were enrolled in this case-control study. The age range was 18-80 years. The diagnosis of CML was established on the basis of the peripheral blood parameters and morphological analysis of peripheral blood. Bone marrow aspirates were carried out in a single center (Iraqi National Center of Hematology for Research and Treatment/Baghdad) and confirmed by the presence of Philadelphia chromosome by conventional cytogenetics. Clinical and laboratory data were obtained from patients' records and database of the center. Other, family unrelated age-matched, 42 subjects were recruited to represent the healthy control group. Demographic data including age, gender, height, weight, educational level, dwelling and family history for hematological malignancies from both groups were collected through a direct interview. Peripheral blood samples were obtained, from which sera were separated and kept at-20ºC until used.

Immunoassay: A ready commercial kit (Legend Max™ Human Soluble CTLA-4 ELISA kit with pre-coated plate/Biolegend/USA) was used for measuring serum level of sCTLA-4. The manufacturer's protocol was followed precisely. Briefly, after a proper dilution of some reagents, 500µL of 2500pg/ml standard were prepared by diluting 62.5µL of the standard stock solution in 437.5µL of the assay buffer A. Six two-folds serial dilutions were prepared in separated tubes. A total of 50µL of Matrix C was added to each well of the plate that is allocated for standard dilutions, while 50µL of assay buffer A were dispensed to the wells that allocated for samples. Fifty µL of standard dilutions or serum samples were poured into their corresponding wells, and the plate was sealed and incubated at room temperature (RT) for 2hr with shaking. The contents of the plate were discarded, and the plate was washed 4 times. Human sCTLA-4 Antibody solution (100µL) was dispensed into each well followed by an hour of incubation with shaking, then washing. One hundred of Avidin-HRP were added to each well of the plate which was sealed and incubated for 30min with shaking. After content discarding and plate washing, 100µL of substrate solution F were dispensed in each well, followed by incubation for 25min in the dark. Stop solution (100µL) was added and the absorbance was read at 450nm with 30min.

Statistical analysis: Descriptive statistics including frequency, percentage, mean and standard deviation (SD) were computed. Student's *t*-test was used to compare age, BMI, and serum level of sCTLA-4 between patients and controls, while Chi-squared test was used to calculate the significant differences between the two groups regarding the categorical variables. Pearson's correlation and linear regression with scatter plot were used to find out the correlation between sCTLA-4 and total and differential leukocyte count. A P value of ≤0.05 was considered a cut-off value for statistical significance.

Results

Demographic Characteristic of the study population: Overall, there were no significant differences between CML patients and controls regarding all studied demographic data (Table 1). The only notable exception was the family history where 6(12.5%) of patients had first relative with a hematological malignancy compared to only one subject (2.38%) had such a history. Even so, the difference did not reach a significant level (P=0.074).

Table 1: Baseline demographic characteristics of the study group

Variables	CML patients(n=48)	Controls (n=42)	P-value
Age/Yr (mean±SD)	54.8±11.4	51.61±12.7	0.412
Gender/No (%)			
Male	30(62.5%)	26(61.9%)	0.954
Female	18(37.5%)	16(38.1%)	
BMI/kgm-2 (Mean±SD)	26.7± 7.21	25.9±6.4	0.391
Educational Level/No (%)			
Low	15(31.25%)	13(30.95%)	0.976
Intermediate	21(43.75%)	18(42.86%)	0.932
High	12(25%)	11(26.19%)	0.897
Residence/No (%)			
Rural	35(72.92%)	27(64.29%)	0.378
Urban	13(27.08%)	15(35.71%)	
Family History/No (%)			
Yes	6(12.5%)	1(2.38%)	0.074
No	42(87.5%)	41(97.62%)	

BMI: Body mass index

Hematological Characteristics of CML Patients: The characteristic hematological features of CML patients in the current study were mild anemia (evidenced by slight decrease in total red blood cell count, packed cell volume% and hemoglobin%), and leukocytosis with absolute increase in almost all subtypes of white blood cell, especially neutrophils (Table 2).

Table 2: Hematological parameters of the CML patients

Hematological parameter	Mean±SD
RBC×10^{12}/L	3.7±0.71
WBC ×10^9/L	35.42±9.59
Neutrophil ×10^9/L	22.33±4.75
Lymphocyte ×10^9/L	3.84±0.46
Monocyte × 10^9/L	0.63±0.23
Eosinophil × 10^9/L	0.14±0.05
Basophil× 10^9/L	0.02±0.01
Platelets × 10^9/L	386.5±122.71
PCV%	36.21±7.2
Hb (g/dL)	12.31±1.69

RBC: red blood cell, WBC: white blood cell, PCV: packed cell volume, Hb: hemoglobin

Analysis of circulating sCTLA-4 in the serum: Mean serum concentration of sCTLA-4 was higher in CML patients than healthy controls (26.38±4.35pg/mL, range from 15.5 to 33.9pg/mL vs. 37.19±11.08pg/mL, range from 21.8 to 67.14pg/mL) with a significant difference (*P*=0.026) as illustrated in Figure 1.

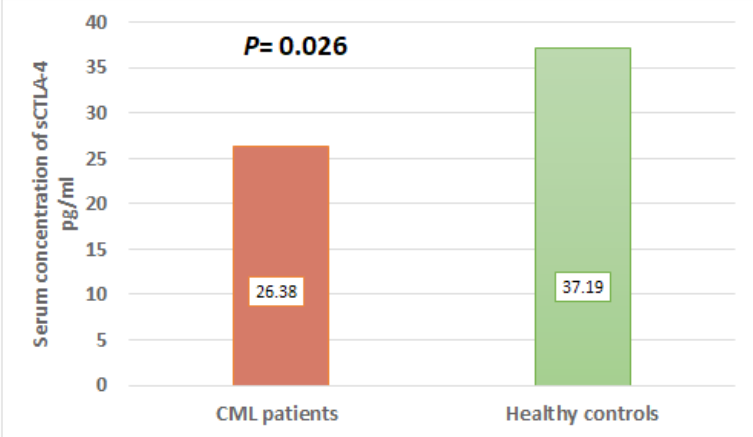


Figure 1: Serum concentration of sCTLA-4 in CML patients and controls

Correlation between sCTLA-4 and total and differential leukocytescount

Serum concentration of sCTLA-4 was inversely correlated (although not significant) with each of total WBC, neutrophils, monocytes and basophils (Figure 2). In this regard, the most prominent correlation was with neutrophils which was very close to a significant level (r = 0.267, *P*= 0.066). More importantly, there was a significant moderate positive correlation between sCTAL-4 and lymphocytes count (r = 0.606, *P*<0.001).

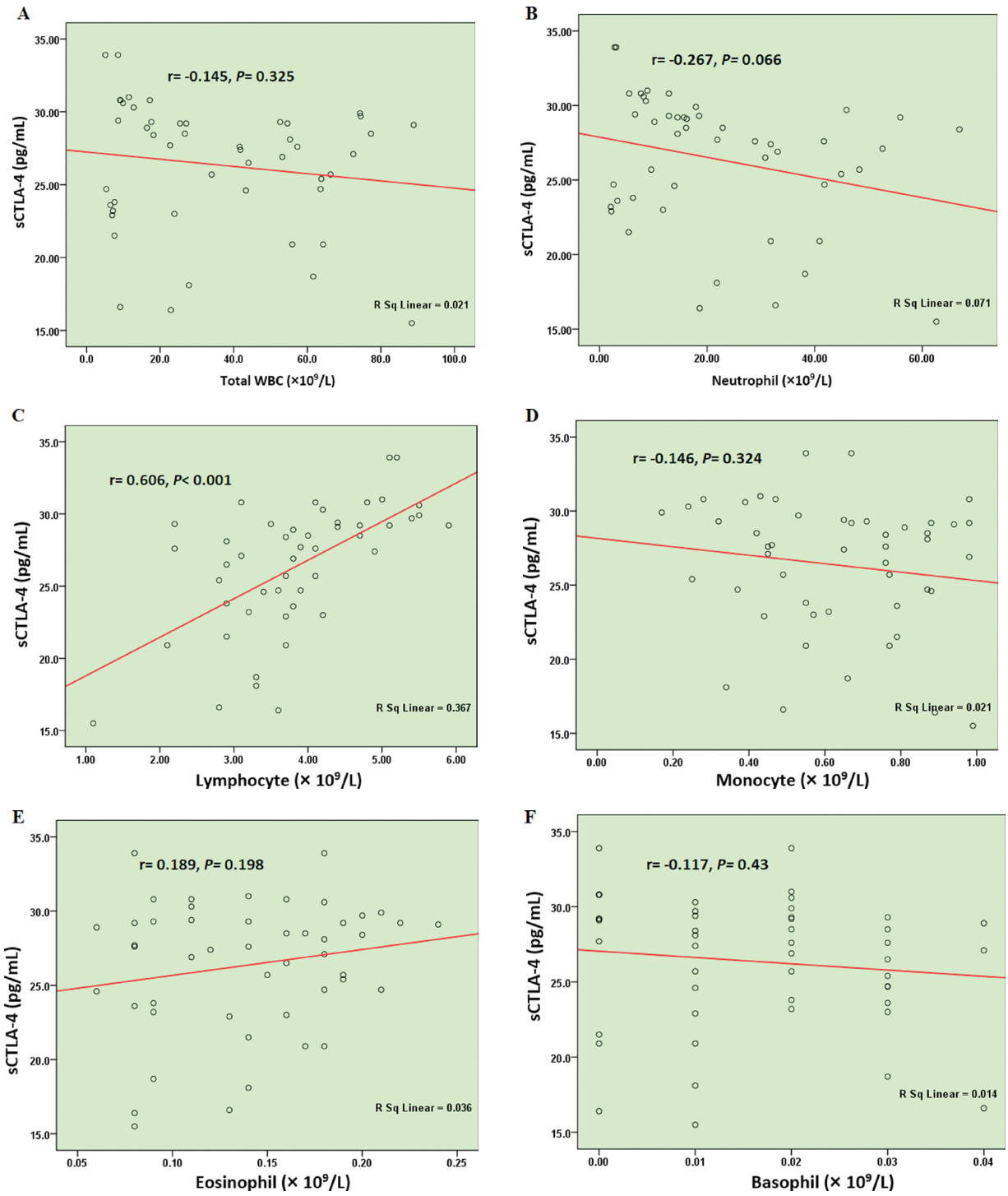


Figure 2: Correlations between serum concentration of sCTLA-4 and total numbers of WBC (A), neutrophils (B), lymphocytes (C), monocytes (D), eosinophils (E)and basophils (F) in peripheral blood of 48 CLM patients

Discussion

In newly diagnosed CML patients, the immune system has been shown to be dysfunctional, with T-cells display decreased T-cell receptor (TCR) chain, reduced cytokine activity, with no production for immunoregulatory cytokines[15,16]. Treatment with TKI can restore the normal function; however, there is a growing resistance for these therapies, and the discontinuation of this treatment is associated with relapse within 6 months in a considerable percentage of patients [17] which indicated a role for immune response in this regard.

The current study revealed a significant decrease in sCTLA-4 in imatinib-resistant CML patients compared with healthy controls. This finding suggested a potential role of sCTLA-4 in the pathogenesis of CML. To the best of our knowledge, this is the first study which investigated serum levels of sCTLA-4 in CML patients. On the other hand, in B-acute lymphoid leukemia (B-ALL) it as reported that a significantly elevated sCTLA-4 in 70% of the patients with active disease[11]. On the other hand, several studies reported relatively high levels of this protein in sera of patients with autoimmune diseases such as autoimmune thyroid disease and type 1 diabetes mellitus [18-20].

Considering the essential role of mCTLA-4, these findings were somewhat conflicting. Although sCTLA-4 could also interact with B7 and thus inhibits the T-cells activity through the interfering with CD28 signaling, studies showed that the normal function of sCTLA-4 was more complicated. Soluble CTLA-4, on the one hand, competes to bind CD80/CD86 and suppresses T-cell activation. On the other hand, the absence of transmembranous domain in sCTLA-4 disabled it to down regulate immune function while it blocks the negative signal of mCTLA-4 [11]. The effect of sCTLA-4 binding to CD80/CD86 possibly depends on the activity of the cell involved. Thus sCTLA-4 could either inhibit the immune response if present at the initial stage of the disease (by blocking the CD80/B7 binding) or enhance the immune response if present during the latter stages of the disease (blocking the mCTLA-4–B7 binding)[21].

In light of results of these studies, the relatively low concentrations of sCTLA-4 in CML patients in the current study could explainthe of overall suppression of immune response in those patients which implied that there is no enough sCTLA-4 to impede the activity of mCTLA-4.

The other important results of current study were the negative and positive correlations of sCTLA-4 with absolute number of neutrophils and lymphocytes, respectively. In one study on patients with asthma, [21] reported highly significant positive correlation between sCTLA-4 and lymphocytes number. For neutrophils, the inverse correlation could be referred for the status of immune suppression associated with deceased sCTLA-4, while increased neutrophils. For lymphocyte, the highly positive correlation could indicate that the source of most sCTLA-4 in lymphocytes, which when increase in number, they produce more protein.

In conclusion, these results indicated the down-regulation of sCTLA-4 in imatinib-resistant CML patients which is associated with increased neutrophils count. More studies are needed to reveal the causes behind this down-regulation.

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Ethical Clearance: The research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq.

Conflict of Interest: The authors declare that they have no conflict of interest.

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Salivary Interleukin 17 (IL17) Level among Iraqi Patient with Chronic Periodontal Diseases

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Abstract

Background: Saliva has been suggested as a non-invasive diagnostic fluid that may be used in the diagnosis of oral and systemic diseases. The salivary levels of IL-17 could be used as a substitute to distinguish periodontal healthy from periodontitis subjects. Therefore, the goal of the present investigation was to determine if the levels of IL-17 in saliva would differ between a group of periodontal healthy and periodontitis subjects. Correlations between the concentration of IL-17 and clinical parameters of periodontal disease were also examined.

Subjects and Method: Unstimulated saliva was collected from each individual (24 patients with periodontitis and 24 healthy age-and gender-matched individuals as control group). Salivary interleukin 17 level was evaluated for both groups using enzyme-Linked Immuno-sorbent assay technique.

Results: Mean values of IL-17 levels were highly significantly increased in patients with chronic periodontitis patients as compared to healthy control subjects.

Conclusion: Interleukin 17 has special importance could be used as a positive predictive factor for prediction and diagnosis of periodontitis.

Keywords: *IL-17, ELISA, periodontitis, saliva, biomarkers.*

Introduction

Periodontitis can be defined as an inflammatory disease of tooth supporting tissues and is categorized into various types based on clinical, radiographic, laboratory and historical features of the disease. Chronic periodontitis is the most common form of the disease. In this type of disease, the amount of periodontal tissue destruction is consistent with local factors and the disease progression rate is slow to moderate[(1)]. Periodontal disease is characterized by irreversible destructions of gingival tissue, periodontal ligament and alveolar bone resorption that results in periodontal pocket formation, clinical attachment loss with gingival recession, gingival bleeding, alveolar bone loss, root furcation exposure and increased tooth mobility[(2)]. Biomarkers can be demarcated as a quantifiable and calculable biological parameters which can serve as indicators for health and physiology-related assessments, such as pathological processes, environmental exposure, diagnosis and prognosis of disease or pharmacologic responses to a healing intervention[(3)].

Interleukin-17 a cytokine that acts as potent mediator in delayed type immunological reactions by increasing chemokine production in various tissues to recruit monocytes and neutrophils to the site of inflammation. Interleukin-17 is a newly introduced pro-inflammatory cytokine, produced by T-helper cells with a wide range of protective and destructive activities[(4-6)].

IL-17 comprises a family of 6 cytokines which are structurally related. Some of these factors can cause tissue degeneration and hypersensitivity reactions and some others haveessential role in resisting bacterial infections. The architecture of these cytokines and their receptors is different. IL-17A is one of the most specific members of this group and is produced by different cells including T-helper 1, 2 and T cell CD4+[(7)].

In relation to chronic periodontitis, a significant rise of the total amount of IL-17 had been established in the gingival crevicular fluid samples and culture supernatants of gingival cells in periodontitis patients compared to healthy controls that submitted a role for IL-17 in the pathogenesis of chronic periodontitis[8]The involvement of IL-17 in the host response of periodontal disease is further supported by [9] who reported an increased concentration of IL-17 in gingival tissue supernatants at sites with moderate to severe clinical attachment loss and had found a positive correlation between them at the site-based level.

However, uncertain results had been reported regarding IL-17 and chronic periodontitis. For example, [8,10] demonstrated undetectable results of IL-17 cytokine level that was close to 0 pg/μL in the GCF samples of healthy, gingivitis and chronic periodontitis groups. In spite of the role of IL-17 in inflammation has been calculated by a number of investigators, it is still ambiguous and little evidence have has been stated regarding the serum level of inflammatory mediators such s IL-17 in chronic periodontitis subjects. This study was aimed to compare the serum IL-17 concentrations between chronic periodontitis and healthy subjects and to measure the relationship between the IL-17 serum and the clinical periodontal parameters in chronic periodontitis patients.

Materials and Method

The present study was conducted at the Department of Periodontics, collage of dentistry, Mustansiriyah University, Iraq. It included 48 subjects (24 males and 24 females) within the age range (20-50)years. Exclusion criteria included history of smoking, the subjects recruited in the study were free from any other oral or systemic illness and subjects who had received periodontal therapy, antibiotics or non-steroidal anti-inflammatory drugs within preceding 6 months. Unstimulated saliva was collected in the morning between 8 and 11 am. Salivary samples were centrifuged at 4000rpm for 10 minutes then 100μl of supernatant were withdrawn and stored in sterile Eppindorf tube at (-20°C) for analysis of IL-17. Interleukin 17 production was measured using ELISA kits (IL-17 ELISA Kit) Shanghai Yehua Biological Technology/China.

The study groups included patients who had chronic periodontitis diagnosed by measuring clinical attachment loss and examining bleeding on probing, a minimum of 15 teeth present during the periodontal examination, with regards to the patients within chronic periodontitis group had a minimum of four teeth with at least one site each with probing depths and clinical attachment loss of ≥ 5mm presence of bleeding on probing and radiographic evidence of generalized alveolar bone loss in at least 2 quadrants.

On the other hand, control group included no history of periodontitis, probing depths of ≤ 3mm, no evidence of attachment loss other than facial recession, < 25% of sites with bleeding on probing and absence of generalized alveolar bone loss in the radiograph. All statistical analysis was conducted using IBM SPSS®-version 20 software. The demographic variables were presented as simple descriptive statistics calculating the mean value and standard deviation (SD) of numerical data such as age of the subjects. The concentrations of studied salivary cytokines were preented as mean and standard error of mean (SEM). Independent samples *t*-test was used to compare the levels of salivary cytokine in studied groups.All tests were performed at a significance level of 0.05.

Results

Results Table 1 shoed the mean and standard error of salivary concentrations of IL-17 in chronic periodontitis subjects as well as in healthy subjects. The highestIL-17 concentration(217.16079 pg/mL) was detected in saliva of subjects have chronic periodontitis group compared with healthy control subjects (128.30767 pg/mL)

Results also showed that patients with chronic periodontitis had a higher salivary IL 17 concentration than healthy control subject with statistically highly significant ($t=10.321$, $df=46$, $P<0.01$).

The application of the coefficient partial correlation revealed a strong correlation between subjects have chronic periodontitis and salivary concentration of IL-17 which was positive and statistically highly significant ($r=+1.000$, $P<0.00$).

Table 1: Comparison of salivary levels of IL-17 (pg/ml) between chronic periodontitis patients and control grop

	Group	No,	Mean	Std. Deviation	Std. Error Mean
SalivaryIL-17(pg/ml	1	24	128.30767	5.796779	1.183263
	2	24	217.16079	41.775522	8.527393
Independent Samples Test					
	t-test for equality of means				
Equal variance salivary IL-17	t	df	Sig.(2-tailed)		
	10.321	46	0.000		

Discussion

Chronic periodontitis characterizes long lasting inflammation of periodontal tissues where microbes are a major etiological factor and the hallmark of periodontal diseases is bone loss.

Virulence factors produced by *P. gingivalis* such as Arg-and Lysgingipain proteinases are key factors for host tissue invasion which lead to activation of immune-inflammatory processes. Subsequently, various molecules (proteases, MMPs, cytokines, etc.) are activated leading to destruction of connective tissue attachment and alveolar bone loss[11]. Th17 cell differentiation and expansion is directed by IL-6 and other cytokines. IL-17A, the pro-inflammatory cytokine secreted by the activated Th17, has been involved in a number of human autoimmune and inflammatory diseases[12]. The role of IL-17 in chronic periodontitis is still an open question whether IL-17 stimulates bone resorption or protects bone in chronic periodontitis although increasing evidence indicates increased IL-17 expression in both chronic and aggressive periodontitis[13]. In the present study, mean±SD of IL-17 in saliva was high in chronic periodontitis compared to healthy controls. Previous studies had documented increased level of IL-17A in saliva, serumand gingival crevicular fluid (GCF) in periodontitis compared to healthy subjects and also reported important role of IL-17 in gingival inflammation and bone loss[14-16].

Conclusion

Salivary levels of IL-17 were significantly higher in patients with associated CP compared to healthy subjects. Therefore, the salivary levels of IL-17 may help in the sub-categorization of periodontitis.

Ethical Clearance: The research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq.

Conflict of Interest: The authors declare that they have no conflict of interest.

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Effect of Aqueous Extract of Nigella Sativa and Trigonella Foehum on Entamoeba Histolytica

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Abstract

Background: *Entamoeba histolytica* is a protozoan parasite that is considered as the causative agent of amoebiasis and is considered a leading parasitic cause of human mortality. Nigella sativa (black seed) is an annual herbal plant belonging to the family . Ranundaceae. Trigonella foenum is an annual herb from the family fabaceae. The aim of current study was to study the efficiency of the aqueous extracts of nigella sativa and trigonella foenum as alternative treatments for E. histolytica infection.

Method: From October 2017 to December 2017 collected 100 feces sample in Ibn Al-balady hospital and Al-kadimiyah teaching hospital in Baghdad from patients in hospital. their age ranged from (4-32) yea. This study was conducted to determine the effect of aqueous extracts of Nigella sativa and Trigonella fornum plant on 120 (80 mice) treated with N. sativa and T. foenum (20) mice positive control and 20 mince negative control. Swedish mice aged (5-12) weeks and the range of their weight (16-22), infected with parasite of Entamoeh histolytica experimentally and then knwong some his to pathological (in vivo) changes in those mice after using the extracts as a treatment for those mice from E-histolytice and then compare it with metronidazole.

Results: data from current study showed diverse histopathological changes in the intestines, liver, kidney in animals infected with E-histolytice and treated by N-sativa and T-foenuu extract included shortness in intestinal villi, inflammntory cellular infiltration, hyperplasia, necrosis, bloody vessel congestion and accumulation of fats. The best results were recorded in group that treated with flagyl/aqueous N, sativa 10mg/ml. *In vitro*, the aqueous extract of Niqella sativa killed 280.000 amoeba or%70, but 10mg/ml extract killed 320.000 ameoba by 70%. The aqueous extract of trigonella foenm (5mg/ml) killed 240.000 amoeba by 70%. However, mestronidazole killed 360.000 amorba by 90%

Keywords: *Entamoeba histolyrica, Nigella sativa, trigonella fornum, liver, intestine, histopathology.*

Introduction

Entamoeba histolytica is a protozoan parasite that is considered as the causative agent of amoebiasis and is considered a leading parasitic cause of human mortality[1].

The prevalence of infection is high in developing countries where transmission of *E. histolytica*via untreated drinking water and contaminated foods is common[2].It was reported that children are the most infected persons[3].

*E. histolytica*has four distinct stages in its life cycle: trophozoite, precyst, cystand metacyst.

The vegetative and motile froms that are termed trophozoite, while the other stage is the infective stage [2,4,]. Fecal-oral route is the pathway forcysts transmission, either through ingestion of contaminated food or water or by person to person contact[5].

Clinical amoebiasis appears when trophozoites disrupt the mucosal barrier and penetrate the colonic wall causeing ulcers that lead to amoebic dysentery[6].

Nigella sativa (black seed) is an annual herbal plant belonging to the family Ranundaceae[7]. The moisture concentrate ranged from 5.52-7.4% crud protein, 20-27% ash, from 3.77-4.42%carbohydrate from 23.5-33.2% and ether extractable lipid from 34.49-38-72%[8].

Trigonella foenum is an annual herb from the family fabaceae indigenous to the Mediterranean area.

T. foenum seed is good source of protein 20-30%, high intryptophan and lysine, fat 6-53%, free amino acids 4-hydroxy(solencine, arginine, lysine, histidine) and 25.8% ash content crude fiber and energy (394-46kcal/100g secd)[9].

Aim of Study:

1. Finding alternative treatment for *Entamoeba histolytica* instead of using metronidazole.
2. Study the efficiency of the aqueous extracts of nigella sativa and trigonella foenum in the treatment of *Entamoeba histolytica*.

Materials and Method

Blood and stool samples were obtained from 100 patients with diarrhea clinically presented with bloody and mucoid diarrhea.The samples where collected from outpatientclinic for pediatricsatIbn Al-balady hospital and Al-Kadimiyah Teaching hospital. The patients have not received antibiotics.

Microscopy used as ascreeing method for the diagnosis of *Entamoeba histolytica*stool specimen could be examined, either unstained or stained, with lngolsiodine[10].

Blood sample collection: A 3-ml sample venous blood was obtained from each patient and collected in gel tube, centrifuged at 3000rpm for five minutes, then serum from each sample was collected in Eppendorf tubes and stored at-20ºC.

Preparation of nigella sativa aqueous extract: N-sative seeds were washed, to remove any debris, and air dried. Then, an amount of 150g crushed and boiled in 50ºC° indistilled water (1500ml) for 30 minutes and filtered through muslin. The filtrated water extract was transferred to tube and hold process of centrifugal (3000 rotation/min) for 15 minutes.

After that, the filtrate was evaporated under reduced pressure and lyophilized to give aqueous extract[11].

The aqueous extract was dissolved in distilled water then preserved in the deep freezer (20ºC) till it is used.

The present study involved evaluation of two concentrations of N. sativa; 5mg/ml and 10mg/ml.

Preparation of Trigonella foenum aqueons extract: T. foenum seeds were washed and then leftto dry and crushed. Then, an amount of (100g) added to (1000ml) of distilled water and the mix put in the incubator at 40ºC° for 24 hours[12]of the grat (40x) using dual wet strips and ipbizd wet strips the first helps in the detection of trophozoites and the second helps in the detection of cyst.

Assessment of parasite vitality using of water Eosine solution, was used as the dye of the Eosine stant all contents except the living Protoplast.

Culture Media: That used by using the media of locke diphasic and the media was introduced in accordance with Brand method[13] with some modification. After the distribution of the pro complex protein emulsion that was added (6ml) and placed in a boiling water bath for 15-20 minutes, the tubes were then cooled and 6 ml of the lockesolution was added and the two stage sterility was stabilized for 14 minutes then the following substances were added to each tube; 1 ml serum inhibitor and 0.2 ml of antibiotic solution like anpclition streptomycin.

Percentage of dead amoeba

$$= \frac{\text{Number of Eosin Dyed Amoeba}}{\text{Number of Total Amoeba}} \times 100$$

For determining the number and biological density of the amoeba grown in glass[11]. Eosin dye were used depending on the ron-permeability of the Eosin layer to the live parasite cell. Amoeba was used extensively (400,00) amoeba liter and 92% vitality Histopathological study.

The mice were killed and extracted the organ (liner kidney in teatime) according to the method described by[15].

Statistical Analysis: Mintab software version 6 was used data. ANOVA test has been done calculate previous studies. Least significant difference–ISI test was done [16].

Result and Discussion

Table 1: Showed the number of parasites and compared between all treatments during days with control positive

1	2	3	4	5	6	7	8
Metronidazole							
470.001±	238.001±	112.00±	58.00±	28.00±	0.00	0.00	0.00
18.40	18.55	9.60	3.70	2.00			
T. Foenu, Extract (5mg/ml)							
800.00±	40.3±	42.7±	30.61±	20.66±			
58.00±	22.00	0.00					
±6.60	±15.83						
T. Foenuextract (10mg/ml)							
508.00±	316.00±	210.00±	116.00±	20.00±	28.00±	0.00	0.00
27.6	18.6	9.5	5.10	4.46			
N. Sative Extract (10mg/ml)							
475.00±	298.00±	216.00±	116.00±	58.00±	28.00±	0.00	0.00
16.30	8.60	12.00	675	4.80	3.70		
N. Sative Extract (5mg/ml)							
784.00±	625.00±	476.00±	244.00±	128.00±	56.00±	20.00	
42.00	34.00	20.1	16.30	5.80	5.10	4.1	
Positive Control							
1086.00±	1196.4±	1238.00±	1349.20.00±	1150.000±	945.60±		
9.11	8.60	8.60	8.46	7.75	8.91		

756.8±8.70, 590.00 ±9.11

The result showed that metronidazole killed the parasite within 6 days, but the T. foemem 5mg/ml killed it in the 8th day and 10mg/ml killed amoeba in the seventh day and also N.sative extract compared with positive control.

In Vitro: The result of the extract of plant and metronidazole in ameobiasis. The plants extract 5mg/ml of N.sative which killed 280.00 or 70%, but the 10mg/ml of N.sative which killed 320.000 or 80%.

The concentration of T. foenm (5 mg/ml) which killed 240.00 by 60%, but other concentration killed 280.00 by 70%.

The metronidazole killed 360.000 by 90%.

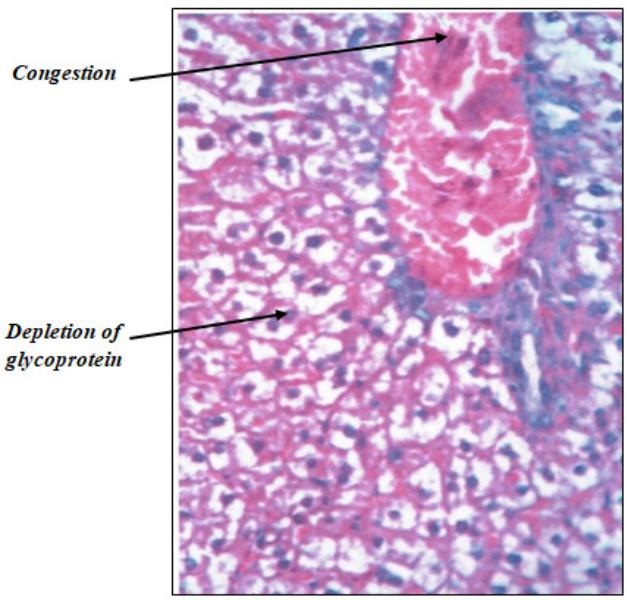


Figure 1: Section of liver infection with Entamoeba histolytica (H&E) (2000x)

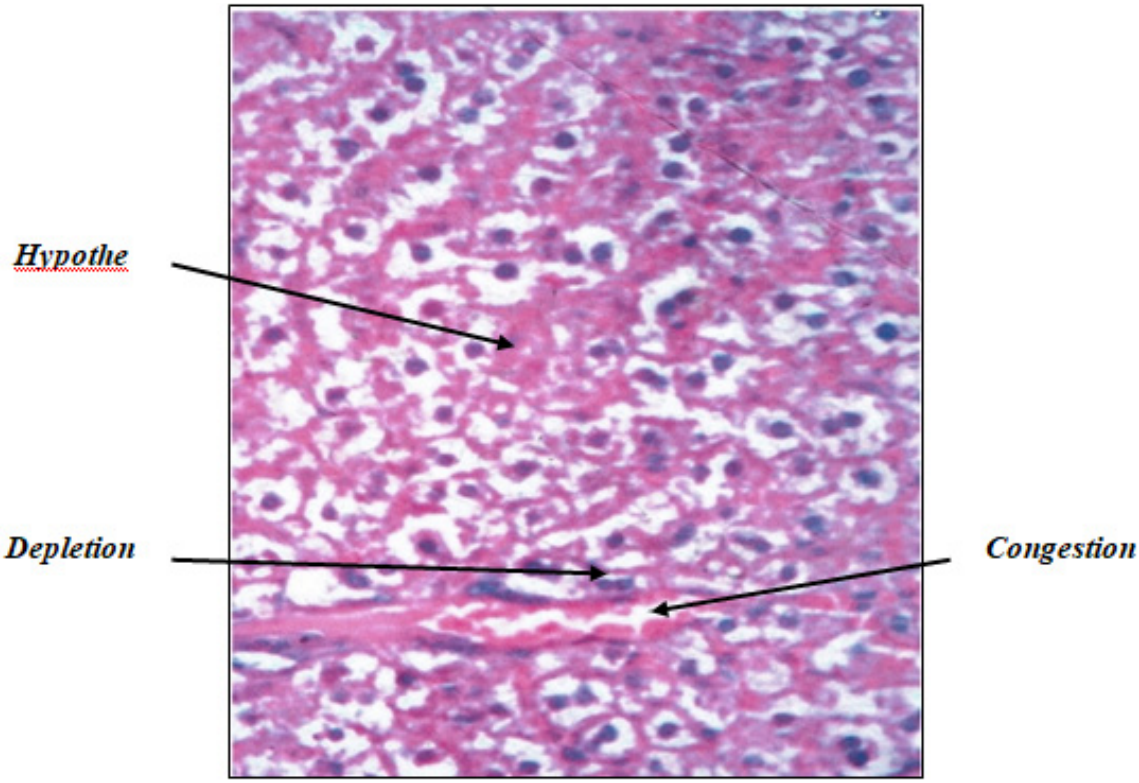


Figure 2: Section of liver treated with 10mg/ml of extract of N. Sative (H&E) (2000x).

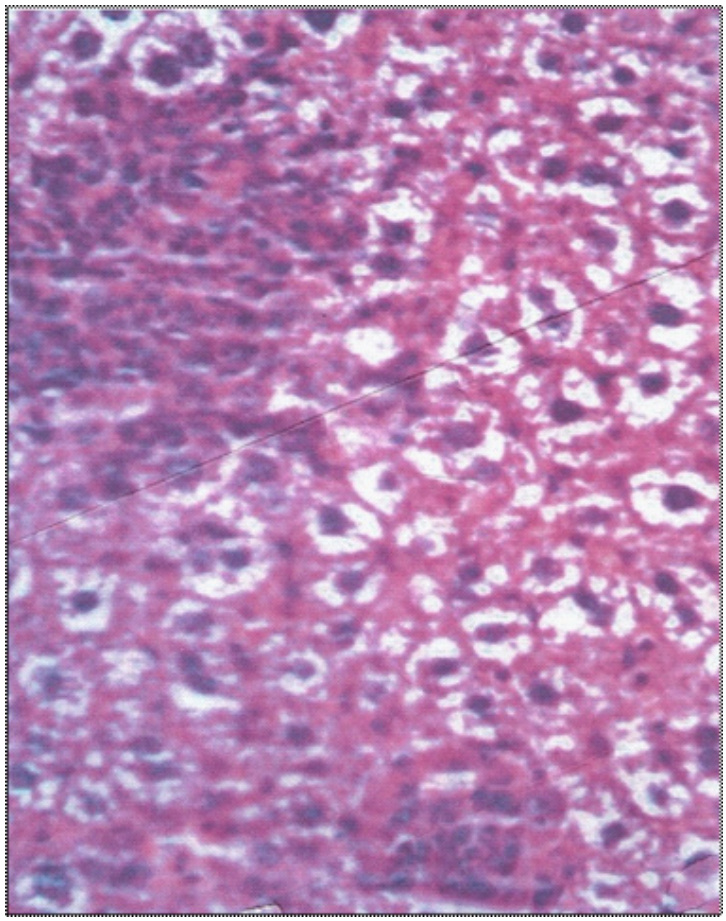


Figure 3: Section of Kidney treated with 10mg/ml extract of T. foenum (H&E) (2000x).

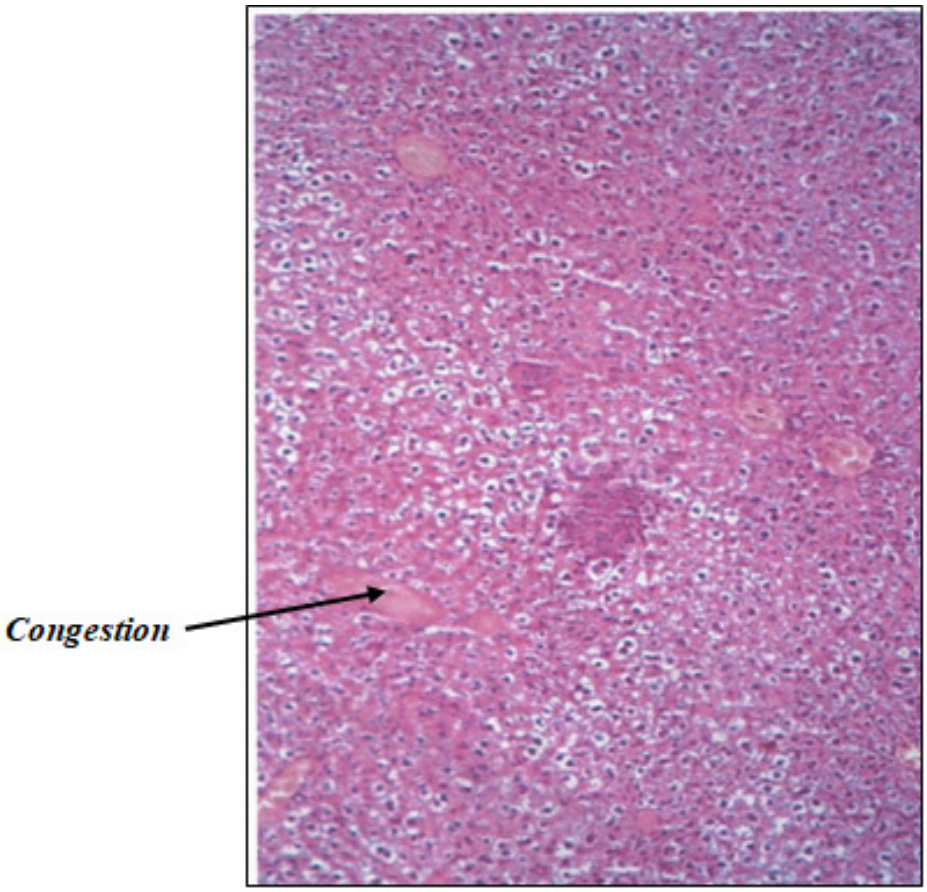


Figure 4: Section of Kidney infected with Entamoeba histolytica.

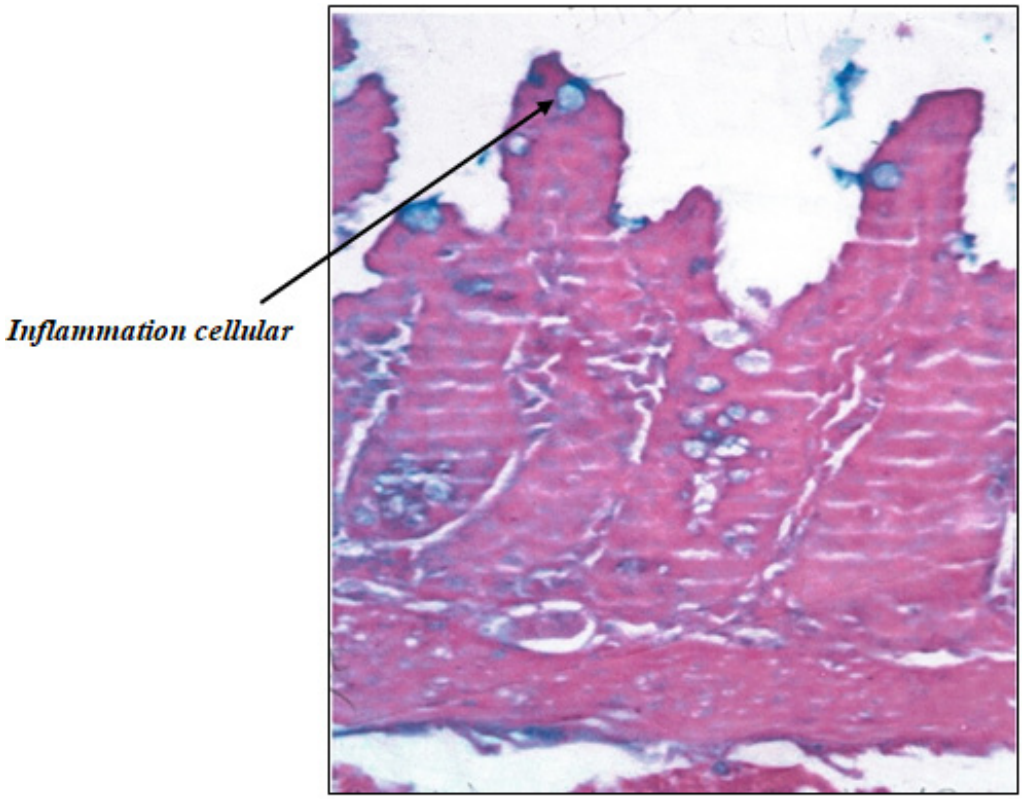


Figure 5: Section of intestine infected with Entamoeba histolytica (H&E) (2000x)

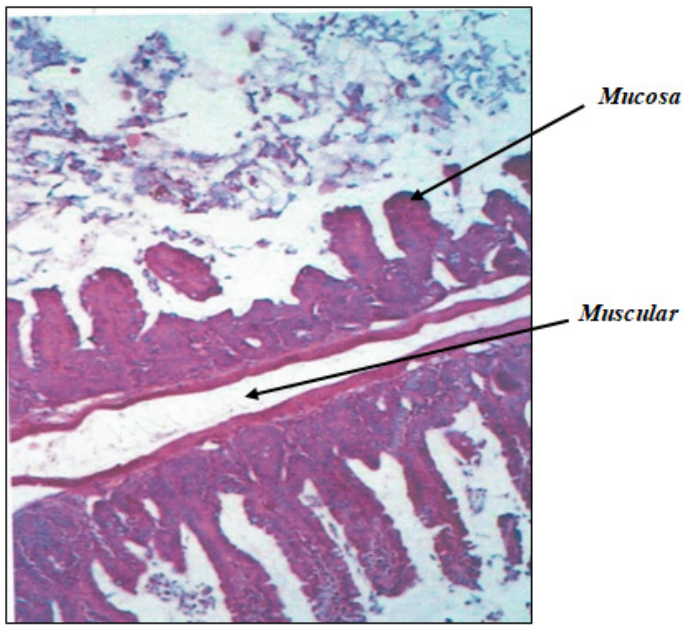


Figure 6: Section of intestine control (H&E) (2000x)

Histopathological study of the histological section of the liver ofinfected animals showed (Figure 1) presence of beginning of necrosis in some of its parts with the infiltration of monocyte inflammatory cells. Theses changes were close to the changes recorded by[19], where the infection ledto hyperplasia of Kupffer cells as a result of the presence of the parasites inside and infiltration of monoctye inflammatory cells as an immune response to liver tissue[20].

The study was consistent with Malachi [21] where he studied the liver treated with papa extracts (Figures 2).

the presence of bloody congestion with simple inflammatory infiltration (Figure 3). Figure (4) showed the normal structure appearance of kidney with presence of simple congestion change in the kidney is.

The present study agreed with the changes that occurred in the kidney were a slight and consisted occurrence of bloody congestion with infiltration of inflammatory cells and is similar to those concluded by[17] as that in spite of the inclusion of the kidney in injury, but that have occurred have been reflectivity that mean return the tissue[18].

Histological results in negative control showed the normal structured appearance which consists of the intestinal villi as in Figure (5) and showed prominent global cells and its murinesection, but histological result for infected animals with Entamoeba histolytical showing degeneration and shortening of intestinal villiin Figure (6).

Ethical Clearance: The research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq.

Conflict of Interest: The authors declare that they have no conflict of interest.

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High Level Aminoglycoside Resistance in Clinical Isolates of Enterococci

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Abstract

Introduction: Enterococci though being intestinal commensal flora have gained significance as a serious nosocomial pathogen owing to their exceptional ability to survive in the harsh environments and increasing high level resistance to antibiotics. The emergence of high level aminoglycoside resistant (HLAR) clinical enterococcal isolates is of serious concern worldwide and thwarts the available therapeutic options.

Materials and Method: A total of 25 non-repetitive isolates of *Enterococci* (*E. faecalis* (n= 15), *E. faecium* (n= 10)) recovered various clinical samples were screened for HLAR among the isolates was performed by disk diffusion method using High Level Gentamicin and High Level Streptomycin disks. The isolates were further confirmed as HLGR and HLSR by agar dilution method. Genes encoding Aminoglycoside Modifying Enzymes (AGMEs) were detected by multiplex PCR. Susceptibility to linezolid was determined by Kirby Bauer disk diffusion method.

Results: All the 25 isolates of enterococci exhibited HLAR phenotype (resistant to HLG and/or HLS). Majority (96%) of the isolates were resistant to HLG and 64% were resistant to HLS. MIC of gentamicin was >500 µg/mL for HLG^R isolates and MIC of streptomycin was MIC > 2000 µg/mL for HLS^R isolates. In our study, 92% of the enterococci harbored *aac(6')-Ie-aph(2'')-Ia* and/or *aph(3')-IIIa.* Of note, 15(60%) of the enterococci exhibited dual resistance to gentamicin and streptomycin (HLG^RHLS^R). Nevertheless, 92% of the isolates were found to be susceptible to linezolid.

Conclusion: Prompt detection and characterization of HLAR among clinical strains of Enterococci within our setting is very essential as few of them exhibit co-resistance to glycopeptides and have lost synergism with the cell wall active agents.

Keywords: *AGMEs, E. faecalis, E. faecium, HLAR, HLG, HLS.*

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Introduction

Enterococci though being commensal intestinal microflora are recognized as potent etiological agents causing mild to serious infections including urinary tract infections (UTI), endocarditis, bacteremia, neonatal infections, central nervous system infections and intra-abdominal and pelvic infections.[1,2] Enterococci possess an exceptional ability to sustain in an environment

of ponderous antibiotics.[1] With over 20 species of enterococci reported so far, *Enterococcus faecalis* and *E. faecium* are the predominant cause of nosocomial infections, the most common being UTI.[3,4] Inappropriate use of antibiotics had resulted in the emergence of high level aminoglycoside resistant (HLAR) enterococci. [5] Thereby, the long practice of treating serious enterococcal infections with a combination of β-lactam and an aminoglycoside becomes impractical.[6] With this background this study was designed to assess the prevalence rate of HLAR among enterococci isolated from various clinical samples.

Materials and Method

A total of 25 non-repetitive isolates of *Enterococci* (*E. faecalis* (n= 15) and *E. faecium* (n= 10) recovered various clinical samples (Urine (n= 17), Pus(n=7), Body fluids (n= 1)) were included in the present study. Antibiotic susceptibility profile of the isolates against linezolid was determined by Kirby Bauer disk diffusion method. Screening for HLAR among the isolates was performed by disk diffusion method using High Level Gentamicin (HLG:120µg) and High Level Streptomycin (HLS:300 µg) disks (HiMedia Laboratories Pvt Ltd, Mumbai, India). *E. faecalis* ATCC 29212 was included as control. The isolates were further confirmed as HLGR and HLSR by agar dilution method using BHIA plates supplemented with gentamicin (500 µg/mL) and streptomycin (2000 µg/mL) and spot inoculated with 10µl of *E. faecalis* isolates (cell density adjusted to1.5 x 10^8 *cfu*/mL using 0.5 McFarland). Appearance of > 1 colony was scored as resistant as per CLSI guidelines. [7]

All the isolates were screened for 6 aminoglycoside resistance genes, *aph(2")-Id*, *aph(3')-IIIa, ant(4')-Ia*, *aac(6')-Ie-aph(2")-Ia*, *aph(2")-Ib* and *aph(2")-Ic* by multiplex PCR using previously described primers.[8]

Results

Of the 25 isolates of enterococci that were screened for high level aminoglycoside resistance, all the isolates 25 (100%) were exhibited HLAR phenotype (resistant to HLG and/or HLS). Majority 24 (96%) were resistant to HLG (HLG^R) and 16 (64%) were resistant to HLS (HLS^R) respectively. Screening of MIC for the enterococcal isolates by agar dilution method showed gentamicin MIC >500 µg/mL for HLG^R isolates and streptomycin MIC > 2000 µg/mL for HLS^R isolates. Of note, 15(60%) of the enterococci exhibited dual resistance to gentamicin and streptomycin (HLG^RHLS^R) while, none (0%) isolates were susceptible to both the aminoglycosides (HLG^SHLS^S). Among the enterococcal isolates studied, 9(36%), 1(4%) isolates exhibited HLG^RHLS^S and HLG^SHLS^R phenotype respectively (Table 1). However, 92% of the study isolates was found to be susceptible to linezolid.

In our study, 92% of the enterococci harbored *aac(6')-Ie-aph(2'')-Ia* and/or *aph(3')-IIIa.* The majority of the isolates (*E. faecalis* (100%) and *E. faecium* (66.7%)) (p=0.428) from pyogenic infections harbored both *aac(6')-Ie-aph(2'')-Ia* and *aph(3')-IIIa* genes, while only 45.4% and 50% of the urinary isolates of *E. faecalis* and *E. faecium* harbored both the genes. While, the *E. faecium* isolated from body fluid was found to be harbor only the bifunctional gene, *aac(6')-Ie-aph(2'')-Ia* (Table 2).

Among the isolates that exhibited HLG^R HLS^R phenotype(n=15), 12(80%) harbored both *aac(6')-Ie-aph(2'')-Ia* and *aph(3')-IIIa* while, 1 isolate harbored *aph(3')-IIIa* and 2 isolates did not possess any of the genes encoding AME that were screened. Interestingly all the pus isolates of HLG^R HLS^R phenotype (n=5), *E. faecalis* (n=4) and *E. faecium* (n=1) harbored both *aac(6')-Ie-aph(2'')-Ia* and *aph(3')-IIIa.*

Table 1: HLAR profile of the Enterococcal isolates

Phenotype	E. faecalis (n=15)	E. faecium (n=10)	Total (n (%))
HLG^R HLS^R	11(33.33)	4(40)	15(60)
HLG^R HLS^S	4(26.77)	5(50)	9(36)
HLG^S HLS^R	0(0)	1(10)	1(4)
HLG^S HLS^S	0(0)	0(0)	0(0)

Table 2: HLAR profile of the Enterococcal isolates

Phenotype	E. faecalis (n=15)		E. faecium (n=10)			Total (n=25)
	Urine (n=11)	Pus (n=4)	Urine (n=6)	Pus (n=3)	Fluid (n=1)	
aac(6')-Ie-aph(2'')-Ia	2(18.2%)	0(0%)	3(50%)	1(33.3%)	1(100%)	7(28%)
aph(3')-IIIa	2(18.2%)	0(0%)	0(0%)	0(0%)	0(0%)	2(8%)
aac(6')-Ie-aph(2'')-Ia and aph(3')-IIIa	5(45.4%)	4(100%)	3(50%)	2(66.7%)	0(0%)	14(68%)
All 6 AME encoding genes Negative	2(18.2%)	0(0%)	0(0%)	0(0%)	0(0%)	2(8%)

Discussion

Since 1980, high level aminoglycoside resistance in *Enterococci* is being often reported with increasing frequencies among clinical samples from hospitalized patients.[9] In our study, the majority (100%) of the isolates were found to be HLAR. Owing to its substantial ability of acquiring and disseminating resistant genes, therapeutic management of infections associated with HLAR strains is of serious concern.[1] Hence, screening for high level aminoglycoside resistance among the enterococcal isolates gains significance as infections caused by HLAR strains can no longer be treated by the β-lactam-aminoglycoside combination.

Our study results indicate a higher incidence of HLG^R phenotype (96%) than HLS^R phenotype (64%) (P=0.005, OR=13.5, 95% CI=1.5558-117.142). Our results are in line with previous studies which document a higher occurrence of HLG^R than HLS^R.[10-12] On the contrary, a few studies have reported HLS^R phenotype to be more common than HLG^R phenotype (45% vs 4% in *E. faecalis* and 42% vs 8% in *E. faecium*[13], (48.3% vs 48.3% in *E. faecalis* and 65.4% vs 71.4% in *E. faecium*).[14]

Furthermore, increased (60%) rate of HLG^R HLS^R phenotype observed among our isolates is worrisome as high level aminoglycoside resistance usually mediated by aminoglycoside modifying enzymes (AMEs), *aac(6')-Ie-aph(2'')-Ia* and *aph(3')-IIIa* in Enterococci dismisses the synergistic bactericidal efficacy of a cell wall active agent and an aminoglycoside. affecting the bactericidal activity.[8] Linezolid susceptibility among the HLAR indicates that this would serve as an effective drug in the therapeutic management of enterococcal (HLAR) infections.

Conclusion

Emergence of HLAR pattern among clinical isolates of Enterococci is strongly evident in our geographical setting. The current situation poses a serious threat in the treatment of such serious Enterococcal infections. Therefore, the need of the hour is to investigate the presence of aminoglycoside modifying enzymes and the genes encoding such high level aminoglycoside resistance among clinical Enterococci which will further help in clearly detecting and characterising HLAR pattern within our setup and assist us in the better management of therapeutic options.

Ethical Clearance: This study has been approved by the institutional ethical committee of SBDCH, Chennai.

Source of Funding: Self

Conflict of Interest: Nil

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Service Quality Perceptions towards Health Insurance Products

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Abstract

A healthy and competent workforce is the biggest asset of any nation and therefore, it is an important objective of every progressive government to ensure health for all. In this regard, insurance is the backbone in managing the risk of the country. In today's globalised world of fierce competition, providing a quality service to the customers is the key for existence and success of any business. Service quality or quality of service is said to be a function of three variables, viz., expectation, perception and performance. The main objective of this paper is to identify the service quality of health insurance products and services offered by the public and private health insurance companies and to identify the key factors contributing to the service quality. The study is based on primary data. The gaps between perception and expectation scores on various dimensions of service quality of health insurance products have been captured by the SERVQUAL tool.

Keywords: *Insurance, Health, SERVQUAL, Dimensions, Service quality*

Introduction

Health is a state of physical, mental, social well being and not nearly the absence of disease or infirmity. Providing a security net for ensuring availability of quality and affordable healthcare to the population is the prime goal every nation aspires for. According to NFHS–3, in spite of the emergence of a number of health insurance programmes and health schemes, only 2 percent of households in Assam reported that they have any kind of health insurance that covers at least one member of the household. But some evidences show that steadily the health insurance coverage is increasing. It may be because of the fact that people become aware of the high health care cost, incoming of the private players in insurance field and government health care/insurance schemes along with involvement of community based health insurance schemes. Assam now stands at the threshold of transition of the industry to the next level. Health insurance would be one of the key tools to supplement and compliment the present health financing options.[1] The Health Insurance Company's main aim to create an ideal environment for health insurance business with a satisfied customer at the core. Three core areas are identified namely service quality, customer satisfaction and role of hospitals for studying the marketing perspective in health insurance. Parasuraman, Zeithaml and Berry (1990) mention that service quality is an extrinsically perceived attribution based on the Customer's experience about the service that the Customer perceived through the service encounter.[2]

Objectives: To find out the gap between expectation and perception score in health insurance product service quality.

Research Questions: In order to guide the study and achieve the above objective, the following research questions are formulated.

1. How is the service delivered by the health insurance providers perceived by their customer and does it meet the expectations of their customers?
2. Which dimension is doing well among all five dimensions in health insurance sector?

Data Sources and Methodology: The geographical location for the present study has been selected purposively as Tinsukia district of Assam. The district is further stratified into development blocks. Tinsukia district has seven developmental blocks namely, Guijan, Hapjan, Itakhuli, Kakopothar, Margherita, Saikhuwa and Sadiya. Since the study is mainly concentrated in rural areas, thus the top three blocks namely Margherita, Kakopothar and Hapjan have been selected as these blocks have highest number of rural population respectively. In the next step, one Gaon Panchayat (GP) from each sample block having the highest population is

taken as sample GP. Again Lekhapani GP of Margherita block, Kakojan GP of Kakopathar block, Hatijan GP of Hapjan block has highest number of rural population in their respective block. Thus these three GPs are selected as sample GP. 10% of the total villages of each sample GPs have been taken as sample villages. Lastly a total of 208 households have been selected for the field survey. A five pointlikert type scale is used in this study to evaluate the 5 health insurance service quality dimensions. Respondents were asked to provide ratings of both expectation and perceptions on the provided statements related to service quality. The service quality statements used in the study were rated by using five pointlikert scale with 1 indicating 'strongly disagree', 2 indicating 'disagree', 3 indicating 'neutral', 4 indicating 'agree', and 5 indicating 'strongly agree'. Thus the difference obtained from subtracting the expectation scores from the perception score revealed the gap between customer's expectation and their perception of the service quality. The study period has been selected from May–July 2019. Respondents are basically the customers of New India Insurance Company (Public Sector Insurance Company) and Bajaj Allianz (Private Sector Insurance Company). According to the SERVQUAL tool, services quality of health insurance companies can be measured by the gap between expectations and perceptions of consumers on 5 dimensions of service quality namely reliability, assurance, responsiveness, professionalism and fairness in dealings.[3]

Reliability Gap: Reliability implies the ability to perform promised service dependably and with accuracy. Reliability is connected to the consistency of performance and dependability on the service. Here it is determined if the company give the service in the right way the first time and keeps to its promises every time.[4] The term reliability refers to the ability of a health insurance company to consistently perform according to its specifications.

Table 1: Mean score/Standard deviation of perception and expectation on Reliability

Reliability Attributes	Mean of perception score (P)	SD of perception score	Mean of expectation score (E)	SD of expectation score	Gap score P-E
The company gives all the required information	2.2260	0.94	3.2596	1.04	-1.0336
The company pointed out the best choice for me	1.6875	0.76	2.4087	0.78	-0.7212
I feel more confident when I purchase a policy	2.4087	0.82	3.1971	0.96	-0.7884
The Company's promises are reliable.	2.0529	0.85	2.9904	1.01	-0.9375
The company is consistent in providing quality services	2.1250	0.93	3.3317	0.94	-1.2067
Total	**2.10002**	**0.86**	**3.0375**	**0.946**	**-0.93748**

Source: Compiled from field survey.

The table 1 shows the mean and standard deviation on the reliability dimension in the service quality of insurance policy holders about their companies. The total mean score and standard deviation on the perception on reliability attributes towards the service quality of insurance companies are 2.10002 and 0.86 respectively and for reliability expectation scores it is 3.0375 and 0.946. It is found that the mean perception score for 'feeling more confident when they purchase a policy is highest i.e. 2.4087 whereas it is highest for the fifth attribute which is related to consistency in providing quality service i.e. 3.3317. Again for all four statements on reliability, it is seen that the mean expectation scores are greater than the mean perception scores which shows some difference in magnitude of gap score among the five items. It can be noted that attribute 2 has the lowest mean gap score (-0. 72) which is related to "pointing out of Best Choice for the customer by the health insurance company. It indicates that people are comparatively less dissatisfied in this attribute than the other four attributes. Again attribute 5 has the highest mean gap score (-1.2067) which is related to consistency in providing quality service.

Assurance Gap: Assurance means that employees' behavior will give customers confidence in the firm and that the firm makes customers feel safe.[5] It also means that the employees are courteous and have the necessary knowledge to respond to customers' questions.

Table 2: Mean score/Standard deviation of perception and expectation on Assurance:

Assurance Attribute	Mean of Perception Score (P)	SD of Perception Score	Mean of Expectation Score (E)	SD of Expectation Score	Gap Score (P–E)
I feel that I can always trust this company.	2.1827	0.89	2.4471	0.88	-0.2644
The company follows the motto "Customer is the king".	2.3510	0.91	2.5481	0.89	-0.1971
The company gives sincere commitment in servicing the claims.	2.3077	1.02	3.0625	0.85	-0.7548
The company deserves recommendation for new Customers.	2.1346	0.78	2.8976	0.76	-0.763
Company gives more importance to the satisfaction of customers rather than profit gain.	2.673	0.95	2.956	1.78	-0.283
Total	**2.32988**	**0.91**	**2.78228**	**1.032**	**-0.4524**

Source: Compiled from field survey

It can be observed that the process execution time and kind and politeness of the employees are noticeable factors contributing to the average assurance gap. Employee's expertise and knowledge on the company's operations hold a big hand in satisfying the customers in terms of service quality. Efficient and knowledgeable employees are always a big boon for any organization. It can be noted that, out of all the attributes for assurance, attribute 7 i.e. "The company follows the motto customer is the king" has the lowest mean gap score (-0.1971) In terms of expectation, attribute 6 i.e. "I feel that I can always trust this company" has lowest mean, whereas in terms of perception attribute 9 i.e. "Company gives more importance to the satisfaction of customers rather than profit gain" has lowest mean gap score. Few respondents think that some of the staffs appear not to be quick and efficient, as they tend to make errors or ask seniors to help them.

Responsiveness Gap: This means that the employees of a service firm are willing to help customers and respond to their requests as well as to inform customers when service will be provided and then give prompt service.

Table 3: Mean score/Standard deviation of perception and expectation on Responsiveness:

Responsiveness Attribute	Mean of Perception Score (P)	SD of Perception Score	Mean of Expectation Score (E)	SD of Expectation Score	Gap Score (P–E)
The Company tries to understand The specific needs.	2.4327	0.91	3.3798	0.96	-0.9471
The company actively responds to the inquiries regarding policy matters.	2.4423	0.96	3.3173	0.91	-0.875
The company timely informs us about the new offers.	2.4663	0.93	3.6587	0.99	-1.1924
The company properly informs me as and when my policy becomes due.	2.9758	0.94	3.7564	0.94	-0.7806
Information provided by the company is always Accurate.	2.5477	0.89	3.0567	0.96	-0.509
Total	**2.57296**	**0.926**	**3.43378**	**0.952**	**-0.86082**

Source: Compiled from field survey

This table 3 shows the perception and expectation gap score of various responsiveness attributes. It is evident the attribute 15 i.e. "Information provided by the company is always accurate" has lowest gap score

(-0.509). It can be noted that, out of all the attributes for responsiveness, attribute 11 i.e. "The Company tries to understand the specific needs" has the lowest overall mean gap score (2.4327) In terms of expectation, attribute 6 i.e. "I feel that I can always trust this company" has lowest mean, whereas in in terms of expectation attribute 15 i.e. "Information provided by the company is always accurate" has lowest mean gap score. It is seen that in all cases policy holders are not satisfied.

Professionalism Gap: Professionalism is defined as the strict adherence to courtesy, honesty and responsibility when dealing with policy holders or stakeholder in the business environment.

Table 4: Mean score/Standard deviation of perception and expectation on Professionalism

Professionalism Dimension	Mean of Perception Score (P)	SD of Perception Score	Mean of Expectation Score (E)	SD of Expectation Score	Gap Score (P–E)
The company gives the correct information about the service charges and related charges	2.5962	0.86	3.2981	0.82	-0.7019
The company timely informs any new Government Regulations regarding policies	2.7163	0.84	3.4760	0.88	-0.7597
I never felt any communication problem	2.7429	0.81	3.6399	0.85	-0.897
The company tries to avoid probable conflict	2.6754	0.87	3.7462	0.90	-1.0708
Total	**2.6827**	**0.845**	**3.54005**	**0.8625**	**-0.85735**

Source: Compiled from field survey

The above table 4 deals with the mean and standard deviation on the professionalism of service quality received by policy holders of the insurance policy. The total mean score and standard deviation on the perception professionalism dimension in the service quality of Health Insurance Company are 2.6827 and 0.845 respectively, whereas in case of expectation professionalism dimension the mean score and standard deviation are 3.54005 and 0.8625 respectively. Among the four attributes of professionalism dimension attribute 19 i.e "The company tries to avoid probable conflict" has highest mean gap score (-1.0708) and attribute 16 i.e "The company gives the correct information about the service charges and related charges" has least gap score (-0.7019)

Fairness in Dealings: Factors consist of trustworthiness, believability and honesty comes under the fairness dimension of any service organization. It means to the level the company has the customers' best interest at heart and job. Factors that affect the fairness are the company name and fame, reputation, personal characteristics and the degree to which the company is connected to intersections with customers.

Table 5: Mean score/Standard deviation of perception and expectation on Fairness in dealings

Fairness in dealings	Mean of Perception Score (P)	SD of Perception Score	Mean of Expectation Score (E)	SD of Expectation Score	Gap Score (P–E)
The company openly discusses the problems	2.5962	0.86	3.2981	0.82	-0.7019
The company has an effective Grievance Redressal mechanism	2.7163	0.84	3.4760	0.88	-0.7597
Company tries to solve the problems at the office level itself	2.8521	0.88	3.8546	0.90	-1.0025
The company handles the conflicts as speedy as possible	2.9745	0.85	3.8123	0.89	-0.8378
Total	**2.784775**	**0.8575**	**3.61025**	**0.8725**	**-0.825475**

Source: Compiled from field survey

The table 5 shows that the total mean score and standard deviation on the perception fairness dimension in the service quality of Health Insurance Company are 2.784775 and 0.8575 respectively, whereas in case of expectation fairness dimensions the mean score and standard deviation are 3.61025 and 0.8725 respectively. It is found that the mean perception and expectation score for 'Company openly discusses the problems' are 2.5962 and 3.2981 respectively for insurance policy holders, perception and expectation mean score for 'The company has an effective grievance redressal mechanism' are 2.7163 and 3.4760 respectively for insurance policyholders, perception and expectation mean score for "Company tries to solve the problems at the office level itself" are 2.8521 and 3.8546 respectively for insurance policy holders, the perception and expectation mean score for "The Company handles the conflicts as speedy as possible" are 2.9745 and 3.8123 respectively for insurance policy holders. It is evident the attribute 20 i.e. "The company openly discusses the problems" has lowest gap score (-0.7019). It can be noted that, out of all the attributes for fairness dimension, attribute 22 i.e. "Company tries to solve the problems at the office level itself" has the highest mean gap score (-1.0025). The policyholders feel that all the activities starting from the fixation of premium and claim settlement is not fair and scientific. It demands for more transparency in dealings so that the grievances can be reduced. Seamless movement of information and integration of different stakeholders in health insurance is necessary in this direction.[6]

Gap score for the overall dimension of health insurance services

Table 6: Mean and gap score for the overall dimension of health insurance services

Dimension	Perception Score	Expectation Score	Gap Score
Reliability	2.10002	3.0375	-0.93748
Assurance	2.32988	2.78228	-0.4524
Responsiveness	2.57296	3.43378	-0.86082
Professionalism	2.6827	3.54005	-0.85735
Fairness in Dealings	2.784775	3.61025	-0.825475

Source: Compiled from field survey

As most of the responses were negative, indicating significant shortfall in meeting customer expectations across all service areas and dimensions of health insurance policies. It is clear that reliability gap (-0.93748) which is highest followed by responsiveness gap (-0.86082), Professionalism gap (-0.85735), fairness in dealings gap (-0.825475), assurance gap (-0.4524). This entire gap can be reduced by minimal promise and maximum performance thus leading to customer satisfaction.

Conclusion

The health insurance sector has undergone many changes after the adoption of new economic policy which is based on privatization, globalization and liberalization. Customer is the king in the present day market. Today the customer's service preference and demands are keep on changing at a rapid speed. The aim of the health insurance providers is to make the customers comfortable and happy. Health insurance companies should not only have to satisfy the customer but should also trigger to the attitude of the customers towards their insurance company. Each company follows different procedure. So, it is very difficult for the customer's to follow all these procedures. Personal communication is the most influencing medium considered for taking health insurance selection decisions by the policy holders. Customer retention in health insurance is beneficial to both the company and insured in many ways. Immediate attention is needed from the part of the companies to check the percentage of people renewing the policy from the same company.

Ethical Clearance: It is a review article.

Source of Fund: Self.

Conflict of Interest: Nil

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Factors Affecting Risk of Cardiovascular Diseases among Hotel Employees in Udupi District, Karnataka

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Abstract

Several research has indicated the increasing morbidity and mortality across the globe. Diet, lifestyle habits, stress are the most common risk factors associated with cardiovascular disease (CVD) risk. Hotel employees have been reported to have increased workload and stress which increases their risk to CVD related morbidity and mortality. This paper is a pilot study of the cross-sectional research study undertaken to identify risk factors associated with CVD risk among hotel employees in Udupi district of Karnataka. A structured questionnaire was used to elicit information pertaining to medical history, lifestyle habits, stress, sleep, bowel toxicity, inflammation and pain, blood glucose, blood lipids, diet, blood pressure and weight status. Research identified abnormal blood sugar levels, lipid profile, high blood pressure, high waist circumference and lifestyle habits like smoking and alcohol consumption as common risk factors among hotel employees. Over 69% had moderate to high risk of CVD due to the above mentioned risk factors. A good diet and lifestyle management can modify these risk factors and reduce risk of CVD among hotel employees.

Keywords: *CVD risk, modifiable risk factors, hotel employees, diet and lifestyle habits, stress.*

Introduction

According to the Global Burden of Disease study age-standardized estimates (2010), closely a quarter (24.8%) of deaths in India are attributable to CVD. The age-standardized CVD death rate of 272 per 1,00, 000 population in India is greater than the global average of 235 per 100000 population[(1)]. Cardio vascular diseases affect Indians a decade earlier and in their most productive midlife years as compared to the people of European ancestry[(2,3)]. High blood glucose, blood pressure, body mass index (BMI), and serum cholesterol have been recognized as foremost metabolic risk factors driving this epidemic[(4)]. Nutritional, behavioral, and developmental risk factors together with diet, smoking, alcohol use, and physical activities have also been identified as major underlying determinants of CVD risks[(5)].

Dietary practices, physical activity requirements, and job-related stress differ among different occupational groups. Due to a deviation in lifestyle factors across job-related groups, some occupations are at higher risk of metabolic risk factors and consequent non-communicable diseases[(6,7)]. Although there are abundant researches on the CVD risk factors in connection with various industries and occupations, there is scarcity of research on the prevalence and antecedents of CVD risk factors among hospitality employees.

Earlier, occupational health was related more on physical and chemical hazards in an occupational setting rather than cardiovascular and other non-communicable diseases that are often thought to be connected with the lifestyle of a person rather than her/his occupation. This is true for hospitality despite being an industry that produces and/or serves food including fast food that is linked to obesity. Prolonged disease risk factors among hotel employees need to be studied and this study one

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such effort to understand the present status of well-being among the employees of hotels. Within the hotel industry, jobs can be further classified as managerial, executive, clerical, administrative, skilled, semi-skilled, and un-skilled labor. It was initially assumed that upper grades are more at risk because of managerial desk level jobs but later it was realized that occupations may also act independent of these transitional behavioral risk factors. Junior job levels have been associated with greater chances of mortality due to coronary artery disease. Lower occupational levels are associated with low income and minor social recognition. People with low socio-economic status are more susceptible to conditions of ill-health and frequently do not have resources to manage with the consequences of diseases ensuing in discrepancies in health. Hence this study includes employees across the various departments of classified star category hotels in Udupi district. It targets to obtain the risk factors prevalent among hotel employees.

Methodology

A cross-sectional study was conducted a part of pilot study with the aim of identifying factors associated with risk of cardiovascular diseases among hotel employees. Institutional Ethics committee approval was obtained from Institutional Ethics Committee–Kasturba Hospital, Manipal. This paper is a pilot study involving 26 hotel employees in Udupi District who were assessed using a structured interview schedule. Informed consent was taken from all participants before collecting the data. The interview schedule consisted of sociodemographic information, medical history, CVD risk assessment questionnaire[8], physical activity, workload and stress. Physical activity level was calculated using Mets and classified as per ICMR classification. Blood pressure and biochemical tests like blood glucose level and lipid profile, anthropometric measurements like height, weight, waist circumference and hip circumference was assessed with due precautions. CVD risk assessment questionnaire comprised of medical history, lifestyle habits, stress, sleep, bowel toxicity, inflammation and pain, blood glucose, blood lipids, diet, blood pressure and weight status. Based on the sum of score obtained in each of this components, each participant was classified as Low risk (score=-88 to 100; RR<1), Moderate risk (Score= 101 to 220; RR= 1-3), High risk (Score= 221 to 350; RR= 3-5), Very high risk (Score >=351; RR>5). Data thus collected was coded and analyzed using SPSS (v. 16.0).

Findings:

General Information: Table 1 represents general information of participants. Most of the hotel employees were males (84.6%) and belonged to the age group of 30-40 years of age. About of 76.9% of the participants were Hindus followed by 19.2% Christians and remaining (3.8%) were Muslims. Most of the participants were married (92%).

Medical History: None of the participants had a history of CVD or diabetes. About 7.7% of participants' mothers history of cardiovascular disorders followed by 11.5% of fathers who has history of cardiovascular disorders. About 15.4% of the participants had history of type 2 diabetes mellitus among both parents.

Lifestyle Habits: It is recommended to undertake moderate intensity activity for at least 5-6 days per week. Only 11.5% of the participants were involved in exercise as per the standard recommendations. About 34.6% were involved in moderate intensity activity but the frequency of performing exercise was less than 3 times per week. About 30.8% were sedentary activity. This pilot study revealed that most of the subjects were involved in moderate exercise but the frequency per week was less for most of the participants. Physical activity level as recorded as calculated using their activities and the corresponding mets indicates that most of them fall under sedentary or light activity (78.3%) followed by 15.4% of the participants who were moderately active and only 3.8% who were vigorously active. About 42.3% had adequate sleep of 7-8 hours however 15.4% of them snored during sleep.

Majority of the participants (84.6%) never smoked whereas the remaining participants (15.4%) smoked less than 20 cigarettes a day. About 19.2% were exposed to passive smoking which is equally considered to be dangerous as first hand smoke.

Most of the participants (57.7%) never consumed alcohol while 23.1% consumed 1 drink daily followed by 7.7% who consumed about 2 drinks per day and about 11.5% who consumed more than 3 drinks per day.

Bowel Toxicity: About 15.4% of the participants complained of bowel related symptoms like lower abdominal pain, bloating, constipation, diarrhea, foul smelling stools etc. Only 3.8% of participants were on oral contraceptives pill for more than 6 months in the last one year. Similarly, only 7.6% of the participants consumed antibiotics for more than 2 weeks.

Inflammation and Pain: Only 7.7% of participants reported signs of inflammation like wheezing, sneezing whereas 3.8% complained of heart palpitations or headache after consuming certain foods.

Blood Sugar: About 11.5% of the participants were diabetics of which only 3.8% reported signs of hypoglycemia like energy level dropping, craving for sweets or chocolates or experience headache or lack of concentration that is relieved by eating.

Biochemical Assessment: Lipid profile, blood glucose level was assessed. About 50% of the participants showed low HDL level whereas, 80.8% showed high LDL, 69.2% showed elevated serum cholesterol level and all participants had a high triglycerides.

Cardiovascular disorders risk assessment

Table 1: Cardiovascular risk assessment of Hotel employees

Modifiable Risk Factors	Priority based on the score	Percent
Cardiovascular History	Low priority (0-30)	96.2
	High priority (51 and above)	3.8
Lifestyle	Low priority (-35 to-10)	30.8
	Medium priority (-9 to 21)	46.2
	High priority (22 and above)	23.1
Stress	Low priority (-19 to 20)	100.0
Sleep	Low priority (0-5)	69.2
	Medium priority (6-11)	19.2
	High priority (12 and above)	11.5
Bowel Toxicity	Low priority (0-3)	76.9
	Medium priority (4-9)	19.2
	High priority (10 and above)	3.8
Blood sugar	Low priority (0-19)	46.2
	Medium priority (20-49)	34.6
	High priority (50 and above)	19.2
Inflammation and Pain	Low priority (0-19)	96.2
	Medium priority (20-42)	3.8
Diet	Low priority (-19 to 6)	92.3
	Medium priority (7 to 13)	7.7
Lipids	Low priority (-15 to 9)	7.7
	Medium priority (10 to 34)	38.5
	High priority (35 and above)	53.8
Blood Pressure	Low priority (0-9)	42.3
	Medium priority (10-29)	26.9
	High priority (30 and above)	30.8
Weight Management	Low priority (0-11)	69.2
	Medium priority (12-25)	7.7
	High priority (26 and above)	23.1
CVD Risk	Low risk (score=-88 to 100; RR<1)	30.8
	Moderate risk (Score= 101 to 220; RR= 1-3)	50.0
	High risk (Score= 221 to 350; RR= 3-5)	15.4
	Very high risk (Score >=351; RR>5)	3.8

Data pertaining to cardiovascular history, lifestyle, stress, sleep, bowel toxicity, blood sugar, inflammation and pain, diet, blood lipids, blood pressure and anthropometric measurements were scored and classified to prioritize based on risk of cardiovascular disorders (Table 1). These findings showed 50% of the participants in the moderate risk, 15.4% high risk, 3.8% very high risk and about 30.8% were classified under low risk of CVD.

Gender wise comparison of CVD risk clearly indicated that females had either low (25%) or moderate risk (75%) of CVD whereas among the males, the CVD risk was distributed across the risk classification with a highest percentage showing moderate risk (45.5%) followed by 31.8% with low risk, 18.2% with high risk and 4.5% with very high risk of CVD.

Discussion

It is evident from the result that personal history or family history is not a risk for hotel employees in South Canara. Family history has been studied for many years as an independent risk factor for CVD risk and mortality[9]. Very few participants performed exercised as per recommendations. American College of Sports Medicine and the Centers for Disease Control and Prevention recommends 30 minutes of moderate intensity activity for atleast 5 days in a week or 20 minutes of vigorous intensity activity for atleast 3 days in a week. Sedentary lifestyle or not performing exercise besides the regular routine is considered as a major risk factor for chronic diseases like heart disease[10].

The study clearly showed that although most of them never smoked, they were exposed to passive smoking. Passive smoking negatively affects the coronary circulation causing increased risk of endothelial dysfunction among healthy non-smokers[11] and also precipitates acute manifestations of CVD[12]. Alcohol is yet another risk factor that has been reported to cause mortality. Among the participants who consume alcohol, only a few had the habit of binging. Although, moderate

consumption of wine and beer has cardio-protective effects on both CVD patients and healthy people, binge drinking can cause increased morbidity and mortality[13].

Some of the participants had gastrointestinal symptoms indicating dysbiosis. Dysbiosis is a change in gut microbiota which has been speculated to play a role in cardiovascular health[14]. Consuming antibiotics over a long period of time affects gut microbiota[15] thereby increasing risk of CVD[6]. Inflammation increases WBC count which is an independent predictor of CVD risk[16]. A small number participants reported signs of inflammation like wheezing, sneezing etc. An elevated triglycerides, LDL and a low HDL poses an increased risk of CVD[17].

Most of the participants in low priority for cardiovascular history, stress, sleep, bowel toxicity, blood sugar, inflammation and pain, dietary habits, blood pressure and weight. Most of the participants did not have either personal history or family history of CVD and diabetes. Disturbed sleep is a common symptom that is associated with stress. Since most of the participants were not affected by stress, sleep was also not affected. The main focus of treatment has to focus on abnormal lipid levels and weight status. Abnormal weight status is a risk factor for CVD related death[18].

Majority of the participants were falling in moderate to high risk attributed to abnormal blood glucose, lipid profile, obesity and blood pressure. The study also highlighted a higher risk of CVD among male as compared to females. This risk can be attributed to difference in physical activity, stress, sleep, diet pattern, blood glucose and lipid abnormalities between the gender.

Conclusion

Most of the hotel employees are young adults and also they had a low family history of CVD. The risk of CVD due to these non-modifiable risk factors is not influential. The most common risk factors identified were abnormal blood sugar levels, lipid profile, high blood pressure, high waist circumference and lifestyle habits like smoking and alcohol consumption. Over 69% had moderate to high risk of CVD due to the above mentioned risk factors. The intervention strategies should focus on these modifiable risk factors with an aim to reduce risk CVD risk. A good diet and lifestyle management can modify these risk factors and reduce risk of CVD among hotel employees.

To conclude in general, a research base specific to hotel employees in India is essential to assist employees at all levels to become aware of the risks associated as well as provide basic training to employees periodically. Seek treatment interventions by association with primary health care centers for additional training in the management of CVD. We may need more resources and facilities to tackle the health risks associated with CVD due to the socio-economic differentials through capacity building and awareness programs and involvement of all stakeholders.

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Dental Caries as an Ill Effect of Long Term Medication

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Abstract

By definition Dental caries is an irreversible microbial disease of the calcified tissues of the teeth, characterized by demineralization of the inorganic portion and destruction of the organic substance of the tooth, which often leads to cavitations. The etiology of dental caries is generally agreed to be a complex problem complicated by many indirect factors that obscure the direct cause or causes. There is no universally accepted opinion for the etiology of dental caries. The oral flora and the saliva plays a very important contributing factor in dental caries. Saliva is the most valuable oral fluid is critical to the preservation and management of oral health. Saliva containing various organic and inorganic substances provides primary natural protection for teeth and soft tissues in the oral cavity assists in mastication, deglutition and digestion of food. The secretion of saliva can be affected due to various local and systemic causes. However if a patient is taking medication and has altered salivary secretion the differential diagnosis should include the possibility of an adverse drug reaction. The drugs may lead to alteration in the flow rate of saliva. Salivary dysfunction as a clinical entity has received considerable attention in recent years. This article critically reviews the dental hard tissue alterations especially dental caries that are caused due to reduced salivary secretion as a result of long term medication.

Keywords: *Dental caries, Medication, dry mouth, hyposalivation.*

Introduction

Saliva is an aqueous, hypotonic solution which protects all the tissues of the oral cavity. It is secreted by the major salivary glands–the parotid, submandibular or submaxillary, and sublingual. In the oral cavity there are also a large number of minor salivary glands found on the surfaces of the buccal, palatine, and labial mucosa, as in the tongue, sub-lingual area, and in the retromolar region[1]. The salivary glands are under the control of the autonomic nervous system and hence their function can be affected by a variety of drugs. An adverse drug reaction (ADR) is defined by the WHO as a drug response that is noxious and unintended and occurs at doses normally used in humans for the prophylaxis, diagnosis or therapy of a disease or for the restoration, correction or modification of a physiological function. All noxious and unintended responses to a medicinal product related to any dose should be considered adverse drug reactions[2]. The term "Xerostomia" is well known as a subjective complaint–symptom of dry mouth and may be or may be not related to objectively measured hyposalivation. Several studies indicated that xerostomia is associated with a wide range of factors including local or systemic condition[3,4]. In addition, the condition is likely to be more severe amongst older patients as they could suffer from various diseases and take numerous involved medications that may result in a reduction of saliva secretion. As a consequence, drug–induced xerostomia has still challenged clinicians regardless of how they could diminish appropriately the side-effects of medications that sometimes replacement should be considered.[5]

How decreased salivary secretion is associated with dental caries?: The fact that the teeth are in

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constant contact with, and bathed by saliva would suggest that they could profoundly influence the dental caries process. The complex nature of saliva and variation in its composition are the challenges involved in establishing those factors which may directly influence dental health. A study of saliva and its tooth-protective components reveals at least four important functions of saliva:

i. buffering ability,

ii. a cleansing effect,

iii. antibacterial action, and

iv. maintenance of a saliva supersaturated in calcium phosphate.

Although the etiology of dental caries is reasonably well established, the chemical-physical process that results in the demineralization of enamel and dentin often is less appreciated. Nearly everyone's normal oral flora contains microorganisms that are capable of metabolizing fermentable carbohydrates, leading to the production of a variety of acidic by-products. Furthermore, people need to ingest foods containing fermentable carbohydrates to meet their nutrient and energy requirements. Thus, the stage is set for the oral flora to metabolize the ingested carbohydrates, leading to the production of acids that are capable of demineralizing enamel and dentin. The production of acids by microorganisms within the dental plaque continues until the carbohydrate substrate is metabolized. It also is known that the plaque's pH goes from acidic to normal (or the resting level) within a few minutes and depends on the presence of saliva. This is due primarily to the carbonate and phosphate pH buffering agents in saliva[6,7].

This can be summarized in short:

Dry mouth/Reduced salivary secretion

↓

Inability to self-cleanse the oral cavity

↓

Increase in the production of microorganisms

↓

Oral pH is acidic due to the acid produced by the microorganisms

↓

Caused demineralization of enamel and dentin

↓

Dental caries

Therefore saliva plays a very important factor in the development of caries.

Drug induced Xerostromia: From an etiological perspective, xerostomia is most frequently associated with medication. It is the side effect of a large number of drugs and 70% of adults taking some kind of medication can suffer from it[8]. Few medications that could cause reduced salivary secretion are:

Antidepressants: Antidepressants are a type of medicine used to treat clinical depression. They are a class of drugs that reduce symptoms of depressive disorders by correcting chemical imbalances of neurotransmitters in the brain. Chemical imbalances may be responsible for changes in mood and behavior. Antidepressants can also be used to treat a number of other conditions, including obsessive compulsive disorder, generalized anxiety disorder, post-traumatic stress disorder. Antidepressants such as fluoxetine, with a serotoninergic action have xerostomia as a common side effect. Xerostomia is also observed in other kinds of antidepressants (monoamine-oxidase inhibitors, tricyclics, heterocyclics, and others) and antipsychotics, many of which are anticholinergic agents[9].

Examples: Selective serotonin-reuptake inhibitors: citalopram, fluoxetine, paroxetine, sertraline, venlafaxine Tricyclic antidepressants: imipramine, amitriptyline, desipramine, nortriptyline Monoamine oxidase inhibitors IMAO: phenelzine Other antidepressants: bupropion, nefazodone, mirtazapine Typical (first generation) and atypical (second generation) antipsychotics: haloperidol, pimozide, clozapine, olanzapine

Antihypertensive: Antihypertensives are a class of drugs that are used to treat hypertention (high blood pressure). Antihypertensive therapy seeks to prevent the complications of high blood pressure, such as stroke and myocardial infarction. Antihypertensive drugs such as the inhibitors of the angiotensin-converting enzyme (captopril and enalapril) may cause the accumulation of bradykinin-tissular mediator which is responsible for a large number of adverse reactions. Up to 8% of patients taking captopril, enalapril, and lisinopril present xerostomia[10,11].

Example: Captopril, clonidine, clonidine/ chlorthalidone, enalapril, guanfacine, lisinopril, methyldopa.

Sedative: Prescription drugs used to treat anxiety

(antianxiety drugs) and induce sleep (sedatives, or sleep aids) can cause dependence .Anxiolytic, sedative, and opioids drugs may provoke xerostomia as a secondary effect in patients who are taking them chronically[12,13].

Examples: Alprazolam, diazepam, furazepam, temazepam, triazolam.

Antihistamins: Antihistamines are drugs which treat allergic rhinitis and other allergies. Typically people take antihistamines as an inexpensive, generic, over-the-counter drug that can provide relief from nasal congestion, sneezing, or hives caused by pollen, dust mites, or animal allergy with few side effects. Some antihistamines, particularly those of the first generation and some of the third, for instance, desloratadine, have an antimuscarinic effect which may lead to xerostomia and sedation. Second and third generation antihistamines effectively antagonize H1 receptors without any special affinity for the muscarinic receptors[14,15].

A number of non-steroidal analgesic and anti-inflammatory drugs (diflunisal, ibuprofen, naproxen, and piroxicam), anorexigens, anti-acne, anti-parkinsons, and anti-smoking agents amongst others, may cause a decrease in salivary secretion as a secondary effect[16].

Example: Astemizole, brompheniramine, chlorpheniramine, diphenhydramine, loratadine, meclizine

Adrenergic agents: Adrenergic drugs are medications that stimulate certain nerves in your body. They do this either by mimicking the action of the chemical messengers epinephrine and norepinephrine or by stimulating their release. These drugs are used in many life-threatening conditions, including cardiac arrest, shock, asthma attack, or allergic reaction. Adrenergic agents may induce dry mouth syndrome. Amphetamine and MDMA (also known as ecstasy) can act directly or indirectly on a number of receptors, including the α2-adrenergic one, thus causing xerostomia. Occasionally, this effect may also lead to an acute localized periodontal pathology. Several reported cases of necrotizing ulcerative gingivitis (NUG) have been associated with the consumption of MDMA. The possible mechanism may be due to a direct contact between the drug and the oral mucosa, the acid components of the tablet, and the dry mouth induced by MDMA. Other illicit drugs, for example cannabis, produce short-term hyposalivation due to the action of delta-9-tetrahydrocannabinol (THC)[17].

Conclusion

Sometimes patient will need medication for their underlying systemic disorders, which cannot be avoided or discontinued for the purpose of these side effects such as dry mouth/xerostromia . As well maintance of oral cavity and teeth as particular is equally important. Alternatives could be explaining the concern physician regarding these side effects as they could help in advising the lowest effective dose or switching to an alternative medication. Even then if dry mouth is associated with correctable causes and correction of underlying causes doesn't improve the condition, several additional steps are critically to be followed. Patients should see a dentist and have fluoride-containing sealants applied to seal pits, fissures, and rough restorative margin[18,19]. The dentist may recommend a regular dose of fluoride and an antibacterial dental varnish containing 1% chlorhexidine and 1% thymol to prevent dental caries. Chewing xylitol gum enhances salivary flow, but note that elders who wear dentures may be unable to chew gum. Patients should be encouraged to conduct a daily mouth examination, checking for red, white, or dark patches, ulcers, or tooth decay.

Sipping water or sucking on ice chips throughout the day may moisturize the mucosa and possibly alleviate symptoms. If this is not effective, artificially moisturizing the mucosa is a possible next step. Saliva substitutes are available in several dosage and forms . They are best used at bedtime and periodically throughout the day; their relief is temporary and efficacy varies.

Rather than using a commercial product, some patients find that mixing equal parts water and glycerin and spraying the mixture regularly in the mouth offers periodic relief. In addition to using exogenous moisturizers, patients will find that choosing low-sugar, low-acid, moist foods will make eating easier. They should avoid alcohol-containing mouth rinses and washes that may desiccate the oral mucosa, choosing a commercial mouthwash designed for people with dry mouth instead[20,21]. Thereby drymouth and dental caries caused due to drymouth can be managed.

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Autoimmune Blistering Diseases: A Short Review

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Abstract

Autoimmune blistering diseases are a group of disorders in which the body attacks the healthy tissue, causing blistering lesions primarily affecting the skin and mucous and membranes. The symptoms and severity of blistering diseases vary from one person to another, even among individuals with the same disorder. In some cases, blistering lesions can involve a significant portion of the skin. Although, there is no cure for autoimmune blistering diseases, they can often be controlled with treatment. In other cases, autoimmune blistering diseases if left untreated can eventually cause life-threatening complications.

Keywords: *Blisters,lesions,diagnosis, tretament.*

Introduction

A blister can be either tiny or large and consists of a fluid-filled bubble that forms underneath the surface of damaged or dead skin. . Most blisters develop in response to irritation or injury of the skin. In autoimmune blistering diseases, blisters form because the body creates antibodies that attack certain proteins required for the health and function of the skin. In many cases, blisters can rupture becoming wounds. In some autoimmune blistering diseases, blisters or lesions can also form on the mucous membranes, the thin, moist coverings of many of the body's internal surfaces. Mucous membranes line the esophagus and anus, the inside of the mouth, the nasal passageways, the genitals and the throat. The most accurate diagnosis when performing biopsies includes the tissue for hematoxylin and eosin (H&E) should be taken from the edge of a blister and the sample for direct immunofluorescence (DIF) should be taken from perilesional skin.[1]

There are several different categories of autoimmune blistering diseases including

- pemphigus,
- pemphigoid,
- IgA-mediated dermatoses and
- epidermolysis bullosa acquista.

Causes:

Causes of blistering

Non-immunological causes of blistering

- Genetic-Epidermolysis bullosa e simplex (dominant)

Epidermolysis bullosa e junctional (recessive)

Epidermolysis bullosa e dystrophic (dominant and recessive)

Bullous ichthyosiform erythroderma

- Physical-Heat and/or cold

Irradiation (e.g. ultraviolet light)

Contact with hazardous chemical or irritants

Friction/rubbing

- Inflammation/infection-Staphylococcal (e.g. bullous impetigo caused by Staphylococcus aureus, staphylococcal scalded skin syndrome)

Streptococcal (including necrotizing fasciitis)

Herpes simplex

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Herpes zoster Varicella

Hand, foot and mouth disease (coxsackievirus)

Fungal

Eczema

Erythema multiforme (including StevenseJohnson syndrome)

Insect bites

- Immunological causes of blistering-Bullous pemphigoid

Mucous membrane pemphigoid

Pemphigus (vulgaris, foliaceus)

Dermatitis herpetiformis

Pemphigoid gestationis

Linear IgA disease

Epidermolysis bullosa acquisita

Lupus erythematosus Vasculitis

Bullous lupus erythematosus

Lichen planus

- Drug reactions-Fixed drug eruptions (e.g. barbiturates, aspirin, paracetamol)

Photosensitive eruptions (e.g. phenothiazines, naproxen)

Pemphigus (e.g. penicillamine, angiotensin-converting enzyme inhibitors)

Toxic epidermal necrolysis (e.g. non-steroidal anti-inflammatory drugs, sulphonamides)[2]

Pemphigus: The term pemphigus is a general term for a group of related autoimmune blistering diseases. The two main types of pemphigus are pemphigus vulgaris and pemphigus foliaceus. Pemphigus vulgaris is the most common form. It is characterized by blisters that rupture easily and causes painful erosions. In most cases, pemphigus vulgaris first develops in the mouth, followed by blistering of the skin. Any area may potentially be affected. The blisters are usually not itchy.

Pemphigus foliaceus is characterized by multiple small, blisters that quickly break apart to form itchy (pruritic), scaly, crusted lesions that affect the uppermost layer of the skin. The scalp and face are usually affected first. Eventually, the chest, upper back may become involved. The lesions are usually not painful. The mucous membranes are usually not affected.

Paraneoplastic pemphigus is a rare disease that occurs in individuals who have cancer, especially blood (hematologic) cancers such as leukemia or lymphoma. Paraneoplastic pemphigus is characterized by painful lesions affecting the mucous membranes, especially those found in the mouth and the lips. The mucous membrane lining the inside of the eyelids (conjunctiva) is also frequently affected.

Pemphigus IgA, also known as intraepidermal neutrophilic IgA dermatosis, is characterized by the development of fluid-filled blisters on the skin. The mucous membranes are usually not affected. In most cases, the trunk and the upper arms or legs are affected. The scalp can be extensively affected in some people.

Pemphigoid Pemphigoid is a general term for a group of related diseases characterized by blistering skin eruptions. The main forms of pemphigoid are bullous pemphigoid, mucous membrane pemphigoid, and pemphigoid gestationis.

Bullous pemphigoid: It is a chronic skin disease usually affecting the elderly that is characterized by firm, large blisters that develop on normal-appearing or reddened skin on the trunk or skin folds, sometimes around cuts or scars. Within weeks, blisters often spread to the groin, armpit, abdomen, and the skin where muscle contracts or flexes (flexor muscles).

Mucous membrane pemphigoid (MMP) is a rare group of chronic autoimmune diseases characterized by blistering lesions that primarily affect the various mucous membranes of the body. The mucous membranes of the mouth and eyes are most often affected. The symptoms of MMP vary among affected individuals depending upon the specific site(s) involved and the progression of the disease. Blistering lesions eventually heal, sometimes with scarring. Progressive scarring may potentially lead to serious complications affecting the eyes and throat. In some cases, blistering lesions also form on the skin, especially in the head and neck area.

IgA Mediated Bullous Dermatoses IgA-mediated bullous dermatoses are disorders characterized by

elevated levels within the body of a specialized protein known as immunoglobulin A (IgA). In these disorders, IgA has a particular tendency to accumulate in the skin. Dermatitis herpetiformis and linear IgA disease are IgA-mediated bullous dermatoses. When liner IgA disease affects children, it may be known as chronic bullous disease of childhood.

Dermatitis herpetiformis, also known as Duhring disease, is characterized by red clusters of extremely itchy (pruritic) blisters. The elbows, knees, scalp and buttocks are most often affected. The mucous membranes are rarely involved. Most cases of dermatitis herpetiformis are associated with Celiac disease, a digestive disorder characterized by intolerance to dietary gluten, which is a protein found in wheat, rye and barley.

Linear IgA disease: It is characterized by blistering eruptions on the skin. The elbows, knees and buttocks are most often affected. New blisters may arise in areas where older blisters are–a finding that creates a small group of blisters that may be described as a "cluster of jewels". In some cases, itching (pruritis) may be develop and may occur before the development of skin lesions. About 50 percent of cases, mucous membranes are affected as well, especially the mouth and eyes. Eye involved can cause blurred vision, irritation, light sensitivity, and corneal scarring.

Epidermolysis Bullosa Acquista: Epidermolysis bullosa acquista is a rare autoimmune disorder of the skin that typically affects middle-aged and elderly people. The skin of affected individuals is extremely fragile. The elbows, knees, pelvis, buttocks, and/or scalp are most often affected. Specialized protein known as immunoglobulin G are usually found around the blisters. The mucous membranes are rarely involved. A subset of patients with epidermolysis bullosa acquista has a widespread, inflammatory form of the disorder that develops rapidly and often involves the mucous membranes.[3,4,5]

Diagnosis: A diagnosis may be confirmed based upon a variety of specialized tests including blood tests or skin biopsy. Blood tests can reveal the characteristic antibodies associated with specific autoimmune blistering diseases. A skin biopsy is a small sample of affected tissue that is taken and examined under a microscope, which may reveal characteristic findings. Direct immunofluorescence (DIF) on a skin biopsy presents a gold standard in the assessment of patients with bullous disorder. This is a test in which the sample is stained with special dyes that allow antibodies to seen under a special microscope. Determining the specific antibody present confirms a diagnosis a specific autoimmune blistering disease.[3,4,5]

Treatment: The treatment of autoimmune blistering diseases is directed toward the specific symptoms that are apparent in each individual and preventing complications potentially associated with these diseases. Although there is no cure for these disorders, they can be controlled medically. The mainstay of treatment for autoimmune blistering diseases is treatment with corticosteroids such as prednisone. Corticosteroid therapy is not effective in all cases and long-term treatment with high-doses of corticosteroids can cause serious side effects.

Additional drugs have been used to treat which may be either alone or in combination with corticosteroids. These drugs include drugs that suppress the immune system (immunosuppressive drugs) such as mycophenolate, azathioprine or cyclophosphamide, immunosuppressive biological therapies such as rituximab, and intravenous immunoglobulin G (IVIG). Plasmapheresis also is a well-established form of treatment for severe cases of autoimmune blistering diseases.[3,4,5]

Conclusion

More people will need treatment for autoimmune blistering skin diseases in future as the population ages and improved diagnostic testing makes diagnosis more likely. New standardized tests for all these diseases are being developed. Specific and well tolerated treatments are urgently required. Precise diagnosis is a prerequisite for accurate prognosis and effective treatment.

Ethical Clearance: Not required since it is a review article.

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Beauticians' Health Related Antecedents on Presenteeism in Korea

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Abstract

Objectives: The current study is to determine the differences, to find out correlates, and to verify the causal relationships among occupational stress, psychosocial stress, and presenteeism, taking beauticians' demographic characteristics and individually perceived health into consideration.

Method: With 246 samples collected from beauticians currently working at different locations in Korea, quantitative analyses were performed with SPSS 23 and LISREL 8.54 software and CFA, t-test, ANOVA, Scheffe test, correlation analysis, and hierarchical regression were implemented.

Results: Individually perceived health was the major differential factor to affect the perceived stresses and presenteeism. And the older in age group, the longer tenure, and the higher position of beauticians were likely to get less occupational and psychosocial stress. And the perceived health was significantly and negatively correlated with the two stresses and presenteeism. Presenteeism was significantly and positively correlated with occupational stress and psychosocial stress. Beauticians' perceived health had significant and negative effects on presenteeism (-.171, $p<.01$), and both occupational (.252, $p<0.01$) and psychosocial stress (.391, $p<0.001$) beauticians perceived to possess were significantly and positively related to presenteeism. And psychosocial stress had stronger effects on presenteeism than occupational stress.

Conclusion: This study provides evidences that beauticians' perceived health and stresses may increase the risk of presenteeism. Given the findings from the current study, managers and management are recommended to pay more attentions to this counterproductive phenomena, presenteeism, and to pay further attempts finding initiatives to improve beauticians' health problem and to reduce their occupational and psychosocial stress, which would in turn lead to presenteeism.

Keywords: *Health, Occupational Stress, Psychosocial Stress, Presenteeism, Beautician.*

Introduction

Approximately more than 200 thousands of beauticians were reported working in 133 thousands of beauty salons in Korea. And 87.7% of the beauticians were reported females[1]. Most of the beauticians also used to conduct functions as hairdressers, cosmetologists, skincare specialists, nail artists, and makeup artists. Moreover, in some cases, beauticians perform various roles reciprocally.

They also use a wide range of chemical products including shampoos, dyes, various types of cosmetic, chemical sprays, permanent wave solutions, etc. Besides being vulnerable to the chemicals, beauticians' work involves physical effort, inconvenient postures, last long standing, irregular eating, short break, fine dust inhaling, and so on. These occupational activities result in having beautician adverse impacts on their health and having especially female beauticians a negative outcomes of pregnancy[2]. And the high risk in occupational contact dermatitis was also reported for beauticians[3]. Thus those make their health worse, coupled with conflicts

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with coworkers, job demand, lack of reward, and perceived undue treatment by company. Those all lead to occupational stress[4]. Perceived occupational stress is related to various physical and psychological disorder[5]. In addition, most of their works may be labor and effort intensive, and in their job requirements there also exist emotional labor attributes as arguing by Gimlin[6] that 'beauticians provide services to their clients while soliciting to build a personal relationship, tuning in and memorizing the minute details of their lives and taking emotional attachment to them'[7]. Therefore, psychosocial stress can also be exposed and associated with ensuring employer and client satisfaction[2]. With these stresses derived from daily works and life within organization and social domain, beauticians are likely to have health problems. Nevertheless, in return, they go to work, but psychologically out of work due to ill, which most of researchers call it "presenteeism".

Presenteeism refers to 'physically attend but psychologically absent'. Presenteeism occurs when employees are at work, but their cognitive energy is not devoted to their work[8] because of their medical and psychological conditions which are not performing at ultimate levels. This phenomenon appears as negative and as something that should be avoided because of the loss in individual and organizational productivity due to an employee's health problems[9]. Moreover, undoubtedly presenteeism is a widely spread global phenomenon in organizations[10]. And it is more likely to attend ill rather than not to attend for people working in jobs where clients rely on them(e.g., sales representatives, government workers, nurses, school teachers) and where there has no other workforce available to replace them (e.g., scheduled duty in a call center)[11]. Likewise, it goes without saying that beauticians are more likely to engage in presenteeism because clients rely on their services and they could hardly get any replacement when sick because the required roles per their position and tenure are relatively distinct[12]. Therefore, it would be worthy investigating to what extent beauticians are involved in presenteeism and worthwhile to verify if and to what extent their perceived health, occupational and psychosocial stress could predict presenteeism.

Accordingly, the aims of the current study are (1) to identify the differences of occupational stress, psychosocial stress, and presenteeism, taking beauticians' individual characteristics and perceived health into account; (2) to find out the correlates among those variables; and (3) to verify the relations affecting presenteeism from the perceived health and the two dimensional stresses after controlling the control variables.

Material and Method

Research Sample: Survey data was collected from beauticians working at beauty salons in Korea and conducted in Korean. We used measures with satisfactory reliability and validity from the previous studies. After removing missing responses, 246 survey samples were utilized to examine the study.

Measures: All the measures except demographic variables were rated on a 5 Likert scale ranging from 1 to 5 ("strongly disagree" to "strongly agree"), unless otherwise indicated.

Occupational Stress was defined as the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker. To reflect Korean context, it was measured by KOSS-SF (Korean Occupational Stress Scale-Short Form) which was developed by Chang et al.[13] and composed of 24 items.

Psychosocial Stress was defined as a person-environment relationship that is evaluated by the individual as regarding his or her welfare and in which the person's resources are burdened or surpassed. To assess perceived psychosocial stress, 12 items were employed from Bank et al.[14], which was a revised version of GHQ (General Health Questionnaire).

Presenteeism was defined as a phenomenon in such a status when employees are physically at work but, due to medical and psychological conditions, they are not performing at utmost levels. To test this adverse behavior, SPS-13 (Stanford Presenteeism Scale) developed by Turpin et al.[15] was employed. SPS is composed of 10 items.

Control Variables: In addition, demographic factors such as gender, age, education, and so on was recorded and these were intended as control variables. And we also used attendance management and perceived health as additional control variables because those may have effect on the presenteeism as recommended by Iverson & Deery[16].

Data Analysis: To test the validities of variables, CFA was conducted and in return three items (two in psychosocial stress and one in presenteeism) were

deleted because those items showed unacceptable as suggested by Stevens[17] that to be acceptable the factor loading should be over 0.4.

To test the internal consistency, we conducted reliability test with Cronbach's alpha. The Cronbach's alphas were 0.90 for occupational stress, 0.87 for psychosocial stress, and 0.75 for presenteeism. All the scales in the current study exceeded 0.7 as suggested by Nunnally & Bernstein[18].

Results

General characteristics of the study samples were comprised of predominantly female (78%), 30s (44.7%), college graduate (41.1%), married (55.3%), permanent employee (78.9%), and average 8.66 years of tenure. Details are shown in Table 1 below.

Statistically significant differences in occupational stress were found for age group, employment type, tenure, title, and health with 95% of CI (confidence level). Specifically, there were statistically significant mean differences in age group between over 50s and all the other age groups (0.429, $p< 0.05$ for 20s; 0.389, $p< 0.05$ for 30s; 0.388, $p<0.05$ for 40s), in tenure between less than 1 year and over 15 years(0.828, $p< .01$), in title between staff and manager(0.302, $p<0.05$), staff and executive (0.543, $p< 0.001$), associate and executive (0.592, $p<0.001$), and associate and manager (0.352, $p<0.05$), and in health between bad and good (0.323, $p<0.05$), moderate and good (0.225, $p<0.225$).

Table 1: General Characteristics and Differences of Health, Occupational Stress, Psychosocial Stress, and Presenteeism (N=246)

Variables		N	%	Occupational Stress		Psychosocial Stress		Presenteeism	
				Mean±SD	t or F (p)	Mean±SD	t or F (p)	Mean±SD	t or F (p)
Gender	Male	54	22.0	2.68±0.54	-0.022 (0.983)	2.40±0.64	-.0376 (0.708)	2.70±0.50	-1.502 (0.134)
	Female	192	78.0	2.68±0.57		2.44±0.62		2.82±0.49	
Age	20s	31	12.6	2.75±0.56	3.955 (0.009)	2.62±0.58	4.204 (0.006)	2.87±0.48	1.678 (0.172)
	30s	110	44.7	2.71±0.54		2.43±0.65		2.82±0.47	
	40s	79	32.1	2.71±0.54		2.47±0.54		2.78±0.50	
	≥50	26	10.6	2.32±0.64		2.07±0.70		2.61±0.54	
Education	High School	54	22.0	2.76±0.60	1.219 (0.303)	2.56±0.69	3.331 (0.020)	2.86±0.47	1.089 (0.354)
	College	101	41.1	2.68±0.54		2.50±0.58		2.82±0.51	
	University	71	28.9	2.59±0.56		2.30±0.62		2.71±0.49	
	Graduate School	20	8.1	2.79±0.61		2.21±0.58		2.77±0.46	
Marriage	Married	136	55.3	2.65±0.57	-0.818 (0.414)	2.42±0.64	-0.347 (0.729)	2.76±0.52	-1.268 (0.206)
	Never	110	44.7	2.71±0.56		2.45±0.61		2.83±0.45	
Employment Type	Permanent	194	78.9	2.64±0.53	-1.721 (0.090)	2.41±0.58	-0.934 (0.354)	2.78±0.46	-0.502 (0.618)
	Temporary	52	21.1	2.81±0.67		2.51±0.76		2.83±0.58	
Tenure	<1 year	10	4.1	3.21±0.55	4.919 (0.001)	2.80±0.69	4.892 (0.001)	2.87±0.57	2.674 (0.033)
	1~5 years	61	24.8	2.75±0.44		2.61±0.55		2.90±0.44	
	5~10 years	73	29.7	2.70±0.58		2.42±0.63		2.80±0.44	
	10~15 years	72	29.3	2.64±0.55		2.37±0.57		2.78±0.51	
	≥15 years	30	12.2	2.38±0.64		2.09±0.68		2.55±0.58	

Variables		N	%	Occupational Stress		Psychosocial Stress		Presenteeism	
				Mean±SD	t or F (p)	Mean±SD	t or F (p)	Mean±SD	t or F (p)
Title	staff	81	32.9	2.84±0.50	10.301 (0.000)	2.58±0.60	5.130 (0.001)	2.89±0.43	9.042 (0.000)
	Associate	54	22.0	2.89±0.49		2.56±0.62		2.97±0.40	
	Manager	61	24.8	2.54±0.59		2.40±0.64		2.77±0.48	
	Chief	13	5.3	2.52±0.48		2.20±0.52		2.48±0.49	
	Executive	37	15.0	2.30±0.53		2.11±0.56		2.47±0.56	
Health	Bad	35	14.2	2.85±0.47	0.6448 (0.002)	2.68±0.53	15.649 (0.000)	3.02±0.48	20.305 (0.000)
	Moderate	110	44.7	2.76±0.56		2.58±0.60		2.92±0.41	
	Good	101	41.0	2.53±0.57		2.18±0.60		2.57±0.49	

According to the differences for psychosocial stress, statistically significant differences were found in age group between 20s and over 50s(0.554, $p<0.05$), in tenure between less than 1 year and over 15 years (0.710, $p<0.05$), 1~5 years and over 15 year (0.525, $p<0.01$), in title between staff and executive (0.466, $p< 0.01$), associate and executive (0.454, $p<0.05$), and in health between bad and good (0.499, $p<0.001$), moderate and good(0.398, $p<0.001$) were found.

And statistically significant mean differences were found for presenteeism in tenure between 1~5 years and over 15 years (0.347, $p<0.05$), in title between staff and executive (0.425, $p<0.001$), associate and manager (0.491, $p<0.05$), associate and executive(0.504, $p<0.001$), manager and executive (0.305, $p<0.05$), in health between bad and good (0.446, $p<0.001$), moderate and good (0.348, $p<0.001$).

Before the causality testing, Pearson correlations for all the variables were calculated and stated in the below Table 2. The presenteeism of beauticians was significantly related to both occupational stress and psychosocial stress ($p<0.001$ for all). And age and tenure were shown negatively strong correlations with presenteeism (-.138, $p<0.05$;-.183, $p<0.01$). Perceived health was also strongly and negatively correlated with two stresses(-.218, $p<0.01$;-.319, $p<0.001$) and presenteeism (-.359, $p<0.001$). Table 2 shows the details.

Table 2: Correlations among Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Occup. Stress	1										
(2) Psycho. Stress	.696***	1									
(3) Presenteeism	.540***	.608***	1								
(4) Gender[1]	-.001	-.024	-.096	1							
(5) Age	-.154*	-.150*	-.138*	-.130*	1						
(6) Education[2]	-.051	-.191**	-.096	-.117	-.061	1					
(7) Marriage[3]	-.052	-.022	-.081	-.056	.533***	.014	1				
(8) Permanent[4]	-.125	-.069	-.037	.082	-.040	.102	-.105	1			
(9) Tenure[5]	-0.227***	-0.261***	-.183**	-.057	.653***	.016	.244***	.119	1		
(10) Attend. Mgt.	.324***	.228***	.106	.063	.051	-.071	.016	.050	.009	1	
(11) Health	-.218**	-.319***	-.359***	.191**	.007	-.108	-.018	-.058	.078	-.034	1

*: $p<.05$, **: $p<.01$, ***: $p<.001$, 1. Dummy coded for male = 1 and female = 0, 2. Transformed to continuous variable such high school as 12, college as 14, university as 16, and above graduate school as 18, 3. Dummy coded for married = 1, never married and others = 0, 4. Dummy coded for permanent employee = 1, temporary = 0, 5. Transformed to continuous variable such <1 year as 0.5, 1~5 years as 2.5 years, 5~10 years as 7.5 years, 10~15 years as 12.5 years, and over 15 years as 17.5 years

To verify the causal relations of the perceived health and (occupational and psychosocial) stresses on presenteeism, a hierarchical regression analysis was conducted as seen in Table 3 below. After controlling the control variables and attendance management, employees' perceived health had significant and negative effects on presenteeism (-.171, p<.01). That is, the better perceived health beauticians have, the less likelihood to involve in presenteeism. And both occupational stress(.252, p<0.01) and psychosocial stress (.391, p<0.001) were significantly and positively related to presenteeism.

This finding indicated that the two types of stresses among beauticians had positive and strong effects on presenteeism. That is, presenteeism shall be increasing along with the rise in either or both stresses and the impact on presenteeism is much stronger from psychosocial stress rather than occupational stress. Details are shown in Table 3.

Table 3: Hierarchical Regression Analysis predicting Presenteeism

Variables	Dependent Variable: Presenteeism[1]	
	Step 1	Step 2
	β	β
Gender	.068	.050
Age	-.064	.006
Education	-.146*	-.048
Marriage	-.004	-.158
Permanent Employment	-.032	.014
Tenure	-.088	.014
Attendance Management	.106	-.063
Health	-.351***	-.171**
Occupational Stress		.252**
Psychosocial Stress		.391***

*: p<.05, **: p<.01, ***: p<.001, 1. Standardized regression coefficients (β)

Discussion

In the current study, we identified the differences among employees' perceived health, the stresses, and presenteeism, taking beauticians' demographic characteristics into account and then found out the associations between the health and two types of stresses (occupational and psychosocial) on presenteeism.

From the test results, we found that (1) the older gets less occupational and psychosocial stress than the younger beauticians in age group, (2) beauticians with shorter tenure are likely to expose to both stresses and presenteeism rather than the ones with longer tenure, (3) lower positioned beauticians such as staffs and associates are likely to have more stresses and to involve in more presenteeism, compared to the ones in higher position such as chiefs or executives. (4) Individually perceived health was the major differential factors affecting both stresses and presenteeism.

Another findings were that occupational and psychosocial stress had strong associations with presenteeism. This notion is also fully supported from many previous studies. And from the hierarchical regression analysis, we revealed that beauticians' perceived health had significantly negative effects on presenteeism and both stresses beauticians perceive to possess had positive effects on presenteeism. In this relations, psychosocial stress had stronger impact on presenteeism than occupational stress.

Conclusion

There may have little researches conducted regarding the comprehensive relationships among beauticians' perceived health, occupational and psychosocial stresses with presenteeism, taking beauticians' individual and contextual factors into account. In this regard, the current study would be a fresh attempt to shed light on the implications of their perceived health status and the two dimensional stresses on the presenteeism phenomenon from beauticians in Korea. Therefore, it is hoped that these findings would offer a preliminary empirical basis for managers and management to better understand the importance of managing their perceived health issues and reducing stress level, which would in turn lead to presenteeism behaviors.

Ethical Clearance: This study was conducted under regular surveillance in Gwangju University.

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Conflict of Interest: Nil

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Relative Effect of Conventional and Specific Hockey Skill Training on Selected Motor Fitness, Physiological Variables and Playing Ability of Hockey Players in Tamil Nadu

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Abstract

The purpose of the study was to study conventional and specific hockey skill training on Motor fitness, physiological and playing ability of Hockey players. There were selective three motor fitness and three physiological components which were used as a criterion measures for this study. For analysis the data and to find out the relationship between selective motor fitness, physiological and playing ability Pearson product moment correlationship was applied. Level of confidence was set at .05 levels. Firstly, selective motor fitness, Second, physiological components were evaluated. The result of the study clearly disclosed that specific hockey skill training has considerable relationship with the playing ability of Hockey players in SRM University, Tamil Nadu. On the basis of results and associated discussion it may be concluded that conventional training and playing ability had low correlation. There might be some reasons of the low correlation in the perspective of good scientific coaching. There was the possibility of the lack of coaching aspects, which shows clearly in the findings that the specific hockey skill training was less correlated with playing ability.

Keywords: *Conventional training, specific hockey skill training, playing ability.*

Introduction

Hockey is one of the favourite of all. Hockey is the game of skill; it is a well-known concept of ancient Indian hockey which elaborates the importance of conventional and specific of skills training. Hockey is a dynamic field game, played by male and female, requiring high level skills, excellent conditioning and well coordinated team efforts[1]. Hockey is one of the most popular and attractive sports in the world. Hockey is a sport with many complex techniques and tactics that can be seen speed, power, endurance and movement frequently in it[5].

Research in the field of Physical Education and Sports is highly demand of the today. Researches in this field brought so many fitness in and various skill training. We can say that the progress of the field directly linked with research. It is fact that at present situation research in Physical Education, and Sports is an important area of study to improve the sports performance. The past decades have seen the rise of an area of study called futurism or futuristic, which attempts to scientifically examine the future[2].

A physiological benefit available, through motor activity is positively associated with aspects of psychological well-being. In particular, significant relationships have been identified between self-perceived health and motor activity. The argument exists, therefore, that the promotion of sports participation and achieve leisure pursuits may at least be rewarded by better health perceptions. The poor performance of Indian sportsman and sports women in the international competitions is the result of lack of motor fitness. Therefore, it is felt that there is a dire need to improve the motor fitness level of Indian youth for raising the performance and standard in games and sport[4].

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Motor fitness, physiological variables have been considered as important prerequisite for sportsmen to secure the top level performance in the game. A good hockey player must have the following physical activity. He must have the motor fitness to perform the specific skills training that the game of hockey requires. These include speed endurance, muscular endurance, and aerobic endurance with precision accuracy and confidence. Perfection in vital capacity, respiratory rate, and respiratory volume is most important for all good players irrespective.

Coaching in the sports would be based on scientific and systematic information derived from research[3]. With regard to physical fitness there are several factors that a number of overlapping activities. The term physical fitness has been divided into two distinct categories: skill-related and physiological-related motor fitness.

Methodology of the Study

Selection of Subjects: For the purpose of present study forty five field hockey players from SRM University, Department of Physical Education and Sports Science, Kattankulathur, Chennai, Tamil Nadu State, India were selected as subjects at random and their ages ranged from 18 to 25 years. These subjects were divided in three groups. Each group would be consists of 15 players.

Selection of Variable: Twelve weeks conventional training and specific hockey skill training acts as an independent variable and motor fitness, physiological acts as dependent variable for the present study.

Research Design: The selected subjects (N=45) were divided into three groups equally and randomly. Of which one group was undergoing conventional method of training to develop selected dependent variables whereas the other group underwent specific hockey skill training to develop the selected motor fitness, physiological variables and playing ability and the third group acted as control group.

Collection of data: Before the administration of conventional and specific hockey skill training, the motor fitness, physiological test were administered on both the experimental and control groups to collect pretest data. After the completion of 12 weeks of specific hockey skill training again the same tests were conducted to collect the post training data. Necessary instructions were given to the subjects before administration of the tests.

Experimental Design: For the study pretest & posttest randomized group design, which consists of no training group (n=15) and two experimental group (n=30) was used. Equal numbers of subjects were assigned randomly to the group. Two groups served as experimental group (conventional training and specific hockey skill training group) on treatment.

- Experimental Group I: subjects were considered as Conventional training on regular male field hockey players.
- Experimental Group II: Subjects were allowed to perform Specific hockey Skill training on regular male field hockey player.
- Control Group III: Subjects were not given special training other than the training on regular male field hockey players respectively.

For experimental group I & II the present study training given for three days per week (alternate days) for twelve weeks. Every training session lasted for 60 to 90 minutes. The training program was scheduled for the morning between 6.00 am to 8.00 am.

However, they were participating in their regular physical activities and game practice. The subject underwent their respective programme under strict supervision prior to and during every session. Subject underwent training for & 90 minutes including warm up and cool-down exercises which included jogging, stretching, striding and warm-ups. Measurement of motor fitness, physiological variables, and playing ability was taken for the three groups.

Hence the results concluded that specific hockey skill training influences the speed endurance, muscular endurance, aerobic endurance, vital capacity, respiratory rate, and respiratory volume, of the players. It was also proved that the better effect was seen in regular male field hockey players in group II.

Statistical Procedure: To find out the effect of static and conventional training and specific hockey skill Training on motor fitness, physiological and playing ability of the subjects the pretest and post test scores were analyzed by using descriptive statistical and Analysis of Co-Variance (ANCOVA). To test significance of difference among means test was applied. The data analyzed with the help of (IBM) SPSS (20.0 version) software and the level of significance was set at 0.05 level of confidence.

Findings of the Study

Table-I: Analysis of covariance of means of conventional training and specific hockey skill training and no training groups on speed endurance

	Conventional Training	Specific Hockey Skill Training	No Training	Source of Variance	Sum of Squares	df	Means Squares	F-ratio
Pre-Test Means	6.08	6.23	6.05	BG	0.27	2	0.14	1.31
				WG	4.47	42	0.10	
Post-Test Means	5.76	5.85	5.32	BG	2.37	2	1.18	8.55*
				WG	5.83	42	0.13	
Adjusted Post-Test Means	5.76	5.85	5.32	BG	2.304	2	1.15	8.10*
				WG	5.830	41	0.14	

*Significant at 0.05 level of confidence.

The table-I indicated that the pretest means conventional training and specific hockey skill training and no training groups group were 6.08, 6.23 and 6.05 respectively. The obtained F-ratio for the pre-test was 1.31 and the table F-ratio was 3.22. Hence the pre-test mean speed endurance F-ratio was insignificant at 0.05 level of confidence for the degree of freedom 2 and 42. The post-test means of the conventional training and specific hockey skill training and no training groups group were 5.76, 5.85 and 5.32 respectively. The obtained F-ratio for the post-test was 8.55 and the table F-ratio was 3.22. Hence the post-test mean speed endurance F-ratio was significant at 0.05 level of confidence for the degree of freedom 2 and 42. The adjusted post-test means of the conventional training and specific hockey skill training and no training groups were 5.76, 5.85 and 5.32 respectively. The obtained F-ratio for the adjusted post-test means was 8.10 and the table F-ratio was 3.23. Hence the adjusted post-test mean speed endurance F-ratio was significant at 0.05 level of confidence for the degree of freedom 2 and 41.

Table-II: Analysis of covariance of means of conventional training and specific hockey skill training and no training groups on muscular endurance

	Conventional Training	Specific Hockey Skill Training	No Training	Source of Variance	Sum of Squares	df	Means Squares	F-ratio
Pre-Test Means	11.45	11.59	11.19	BG	1.23	2	0.62	1.35
				WG	19.28	42	0.45	
Post-Test Means	10.61	11.12	9.52	BG	20.20	2	10.10	18.73*
				WG	22.65	42	0.53	
Adjusted Post-Test Means	10.64	11.10	9.51	BG	19.99	2	9.99	18.33*
				WG	22.36	41	0.54	

*Significant at 0.05 level of confidence.

The Table-II indicated that the pretest means conventional training and specific hockey skill training and no training groups were 11.45, 11.59 and 11.19 respectively. The obtained F-ratio for the pre-test was 1.35 and the table F-ratio was 3.22. Hence the pre-test mean muscular endurance F-ratio was insignificant at 0.05 level of confidence for the degree of freedom 2 and 42. The post-test means of the conventional training and specific hockey skill training and no training groups were 10.61, 11.12 and 9.52 respectively. The obtained F-ratio for the post-test was 18.73 and the table F-ratio was 3.22. Hence the post-test mean muscular endurance F-ratio was significant at 0.05 level of confidence for the degree of freedom 2 and 42. The adjusted post-test means of the conventional training and specific hockey skill training and no training groups were 10.64, 11.10 and 9.51 respectively. The obtained F-ratio for the adjusted post-test means was 18.33 and the table F-ratio was 3.23. Hence the adjusted post-test mean muscular endurance F-ratio was significant at 0.05 level of confidence for the degree of freedom 2 and 41.

Table-III: Analysis of covariance of means of conventional training and specific hockey skill training and no training groups on aerobic endurance

	Conventional Training	Specific Hockey Skill Training	No Training	Source of Variance	Sum of Squares	df	Means Squares	F-ratio
Pre-Test Means	42.40	44.33	42.40	BG	2	18.68	2	1.01
				WG	42	18.44	42	
Post-Test Means	51.53	52.46	47.93	BG	2	85.95	2	3.77*
				WG	42	22.77	42	
Adjusted Post-Test Means	50.35	53.05	48.52	BG	2	77.99	2	10.52*
				WG	41	7.41	41	

*Significant at 0.05 level of confidence.

The table-X indicated that the pretest means conventional training and specific hockey skill training and no training groups were 42.40, 44.33 and 42.40 respectively. The obtained F-ratio for the pre-test was 1.01 and the table F-ratio was 3.22. Hence the pre-test mean aerobic endurance F-ratio was insignificant at 0.05 level of confidence for the degree of freedom 2 and 42. The post-test means of the conventional training and specific hockey skill training and no training groups were 51.53, 52.46 and 47.93 respectively. The obtained F-ratio for the post-test was 3.77 and the table F-ratio was 3.22. Hence the post-test mean aerobic endurance F-ratio was significant at 0.05 level of confidence for the degree of freedom 2 and 42. The adjusted post-test means of the conventional training and specific hockey skill training and no training groups were 50.35, 53.05 and 48.52 respectively. The obtained F-ratio for the adjusted post-test means was 10.52 and the table F-ratio was 3.23. Hence the adjusted post-test mean aerobic endurance F-ratio was significant at 0.05 level of confidence for the degree of freedom 2 and 41.

Discussion on Findings

The prime intention of the researcher was to analyse the relative effect of conventional training and specific hockey skill training on selected motor fitness, physiological and playing ability of field hockey players. The theme behind this study was to observe the influences of conventional training, specific hockey skill training and no training as a alternate means to develop the selected physical, physiological and playing ability of field hockey players. To achieve this, two different training were designed as conventional training group, specific hockey skill training group and no training group. The results of the effect of two training packages on variables used in this study are analysed so as to reach the theme of the present study, and sources behind such similarities and variations observed on variables between the training groups, have been discussed here using scientific studies and logical in nature.

Conventional training is using another sport, activity or training techniques to help improve playing ability in the primary sport activity. Specific hockey skill training is specifically designed to develop the playing ability related field hockey players.

Hence, compared the effects of three different training improvements in vertical jump performance and leg strength[6]. Speed endurance training facilitates aerobic endurance processes, whereas resistance training increases muscular endurance and vital capacity[7].The speed endurance, muscular endurance and aerobic endurance and agility increased significantly after training[8]. Compared the changes in running economy, foot impact shock, run performance, and resting respiratory rate and respiratory volume elicited by increases in training volume via run training and conventional and specific hockey skill training[9].

In a field hockey game players need a high level of energy and analytical skill to fulfill the requirements. Sports-specific physical training is paramount in field hockey [10].There was no significant improvement in the shooting, passing and dribbling ability of the control group. The developed an effective testing battery for male field hockey by using anthropometric, physiological, and skill-related tests to distinguish between regional representative male field hockey players. These sprinting speed, agility, dribbling control, aerobic and muscular power, and shooting accuracy can distinguish between male field hockey players [11].

Conventional training effects never exceed those induced by the specific hockey skill training mode. For the general population, conventional training may be highly beneficial in terms of overall fitness. Similarly, conventional training may be an appropriate supplement during rehabilitation periods from physical injury and during periods of overtraining or psychological fatigue. Since, conventional training was one of the most advanced forms of sports training the combination with specific hockey skill training produces significant changes. Anyhow these two different training when in conjunctional nature, the effect might have been strengthened as a value added one.

Conclusion

The result of the present study reported that participation in the specific hockey skill training program; improve playing ability in experimental group. Hence significant difference was found between the regular male filed hockey players of SRM University, Chennai in relation to motor fitness, physiological and playing ability.

- The specific hockey skill training group had shown significant improvement in all the performance variables than the conventional training group.
- The specific hockey skill training with conventional training group had shown significant improvement in all the selected motor fitness, physiological and playing ability.
- The control group has shown significant no improvement in all the selected motor fitness physiological and playing ability variables.

Ethical Clearance: Nil

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Risk Factors for Pediatric Intensive Care Admission among Asthmatic Children in Aseer, South-West Saudi Arabia

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Abstract

Background: The burden of childhood asthma continues to rise with increasing rates of asthma prevalence, severity, and death. Asthma is the one of the most chronic pediatric disorder and is frequent caused for hospitalization and pediatric intensive care unit (PICU) admissions.

Objective: To determine risk factors for PICU admission in children with asthma.

Patients and Method: The study used a retrospective case-control design. The cases included children admitted to the PICU and controls were children admitted to the hospital general ward.

Results: A total of 320 charts of asthmatic children were reviewed: 72 (22.5%) admitted to the PICU and 248 (77.5%) admitted to the general ward. Univariate analysis indicated that asthmatic children admitted to PICU were more likely to be older ($p<0.001$), have longer asthma duration ($p<0.001$), higher use of: inhaled corticosteroids ($p<0.0001$), cromolyn ($p=0.03$), long acting β_2 agonists ($p=0.001$), and poor adherence to treatment ($p=0.002$). However, multivariate analysis revealed that longer duration of asthma ($p=0.03$), use of inhaled corticosteroids ($p=0.01$), and non-compliance with therapy ($p=0.02$) were associated with an increased risk of PICU admission.

Conclusions: This study identified a significant number of risk factors associated with PICU admission. Early recognition could help to develop preventive strategies, improve efficacy of treatment and reduce admission to PICU.

Keywords: *Asthma, Risk factors, Children, Pediatric intensive care.*

Introduction

Bronchial asthma is a common and potentially serious health problem globally, with estimated 300 million affected individuals, with great variation between countries[1]. The incidence and prevalence of asthma have increased during the last 20 years[2,3]. Asthma is considered one of the most common chronic disorders in the Kingdom of Saudi Arabia as 2 million Saudis suffer from asthma[4]. It imposes a substantial burden on family, health care services, and society as a whole[5].

Asthma can cause episodic coughing, wheezing, shortness of breath, chest tightness and exacerbations that sometimes require urgent health care services and may be fatal. Around 30% of asthmatic exacerbations attended to the emergency department of a hospital require hospitalization and up to 20% require intensive care management[6,7]. In the past two decades, hospital admissions for asthma have been increasing despite improved knowledge about the disease and the availability of better treatment modalities. Severe acute asthma in children is associated with substantial

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morbidity and may require Pediatric Intensive Care Unit (PICU) admission. Understanding the risk factors for hospitalization for asthma is important for treating and reducing their effects on society[8]. This study was designed to determine the potential risk factors for PICU admission in Saudi children with asthma.

Patients and Method

We performed a retrospective case-control study at the Abha Private Hospital, Abha, South-west Saudi Arabia between January 2014-December 2018.

Study Design: The inclusion criteria were as follows: all children aged 2-14 years who admitted to the PICU with acute asthma which was previously diagnosed by pediatricians or pulmonologists before PICU admission were eligible as cases. The admission criteria to PICU were clinically predefined and did not change during the study period. They included respiratory failure, imminent exhaustion, no clinical benefit after continuous nebulization of bronchodilator drugs, and/or the need for mechanical ventilation. The control group included patients aged 2-14 years diagnosed with asthma who admitted to the General Pediatric Ward of the Hospital with an acute asthma exacerbations. Controls were recruited during the same period of the study.

The exclusion criteria: Patients younger than 2 years were excluded because bronchiolitis an acute wheezing illness occurring mainly in children younger than 2 years, closely resembles asthma and may affect our data. Patients admitted to the Hospital whose diagnosis code changed to non-asthma during hospitalization also were excluded. Children who had not been diagnosed with asthma prior to their admission and presented with their first asthmatic attack were excluded from the study because defining controls would not be feasible.

Materials

The medical records of patients and controls were reviewed and the following information extracted: Demographic variables: age, gender, number of siblings, and consanguinity. Disease variables: age at first symptoms of asthma, duration of the disease, previous admission to the PICU, and family history of asthma. Variables related to medications: inhaled/ oral corticosteroids, cromolyn, long-acting β_2 agonists, leukotriene receptors antagonists, and compliance to therapy. Variables related to exposure and atopy: history of parental smoking, inhaled allergens, eczema and presence of pets in the home.

Statistical Analysis: Data were analyzed using the Statistical Software Package SPSS 19 (SPSS, Inc., Chicago, IL). Quantitative data were presented as mean+ standard deviation (SD), while qualitative data were demonstrated as frequency and percent (%). Differences between cases and controls were analyzed by Student's *t*-test for continuous normally distributed variables. Categorical data were assessed by chi-square test. The dependent variable was PICU/General Pediatric Ward admission. Variables found to be significant on univariate analysis were subsequently evaluated by multiple logistic regression. For all analysis, statistical tests were two-sided, and $p < 0.05$ was regard as significant.

Results

A total of 320 asthmatic children were enrolled in the study: 72 (22.5%) were admitted to PICU, and 248 (77.5%) to the General Pediatric ward. The mean age was statistically older in patients who admitted to PICU than in those who admitted to the General Pediatric ward (6.3 + 0.4 vs 4.6 + 0.3 respectively, $p < 0.001$). Females were preponderance in both groups but this finding was statistically non significant. Cases and controls were matched in terms of breast fed for 6 months, number of siblings, and first degree consanguinity (table 1).

Disease characteristics and risk factors in the two groups are shown in (table 2). Disease features: the duration of asthma was significantly longer in the PICU group than in the General Pediatric Ward group (25.1 + 0.2 months vs 21.0 + 0.7 months respectively, $p < 0.001$). Parental smoking and exposure to inhaled allergens were significantly reported more frequently in the group with PICU admission, $p < 0.05$).

Medications: significant differences between the two groups were noticed including higher use of inhaled corticosteroids ($p < 0.0001$), cromolyn ($p = 0.03$), and long acting β_2 agonists ($p = 0.001$) in the PICU group. More patients in the PICU group had poor compliance with therapy (40.3% vs 22.2%, Odds ratio (OR) = 2.36, Confidence interval (CI) (1.35-4.13), $p = 0.002$). Other factors: asthmatic children who admitted to PICU had more frequent prior admissions to the PICU ($p = 0.0003$).

Multivariate analysis (table 3) revealed that longer duration of the disease ($p = 0.03$), use of inhaled corticosteroids ($p = 0.01$), and non-compliance with therapy ($p = 0.02$) were significantly associated with an increased risk for admission to the PICU compared to the General Pediatric Ward.

Table 1. Demographic characteristics of asthmatic patients admitted to PICU and General Pediatric ward

Characteristics	PICU (n = 72)	General Ward (n = 248)	OR (95% CI)	p-value
Age (year)[a]	6.3 ± 0.4	4.6 ± 0.3	1.30 (1.78-1.61)	< 0.001
Gender[b]				
Male	30 (41.7)	106 (42.7)	0.95 (0.56-0.61)	0.9
female	42 (58.3)	142 (57.3)		
Breast-fed 6 months[b]	29 (40.3)	102 (41.1)	0.97 (0.57-1.65)	0.8
Number of siblings[b]				
> 4	22 (30.6)	75 (30.2)	1.01 (0.57-1.79)	0.9
< 4	50 (69.4)	173 (69.8)		
First-degree consanguinity[b]	32 (44.4)	106 (42.7)	1.07 (0.63-1.81)	0.7

[a]Values are means + SD, [b]Number (%), OR: odds ratio; 95% CI: confidence interval, PICU: pediatric intensive care unit

Table 2. Disease characteristics and risk factors in patients admitted to PICU and General Pediatric ward

Risk factors	PICU (n = 72)	General Ward (n = 248)	OR (95% CI)	p-value
Disease features				
Age at first symptoms of asthma (Year)[a]	3.1 ± 0.1	3.2 ± 0.5	1.6 (0.01-0.21)	0.09
Duration of asthma (month)[a]	25.1 ± 0.2	21.0 ± 0.7	3.1 (4.26-3.93)	<0.001*
Family history of asthma[b]	18 (25.0)	52 (20.9)	1.2 (0.67-2.32)	0.4
Exposure and atopy[b]				
Parental smoking	31 (43.1)	75 (30.2)	1.74 (1.01-2.99)	0.04*
Inhaled allergens	24 (33.3)	40 (16.1)	2.60 (1.43-4.70)	0.002*
Pet cat	15 (20.8)	57 (22.9)	1.91 (0.96-3.79)	0.06
Eczema	31 (43.1)	95 (38.3)	1.2 (0.71-2.07)	0.5
Medication[b]				
Inhaled corticosteroids	38 (52.8)	41 (16.5)	5.6 (3.18-9.99)	<0.0001*
Oral corticosteroids	9 (12.5)	15 (6.0)	2.2 (0.92-5.30)	0.07
Long acting β_2 agonist	17 (23.6)	22 (8.9)	3.17 (1.57-6.38)	0.001*
Cromolyn	12 (16.7)	20 (8.1)	2.28 (1.05-4.92)	0.03*
Non-compliance with therapy	29 (40.3)	55 (22.2)	2.36 (1.35-4.13)	0.002*
Co-morbidities[b]				
GERD	4 (5.6)	11 (4.4)	1.26 (0.39-4.10)	0.6
Previous admission to PICU[b]	10 (13.9)	5 (2.0)	7.83 (2.58-23.76)	0.0003*

[a]Values are means + SD, [b]Number (%), OR: odds ratio; 95% CI: confidence interval, GERD: gastroesophageal reflux disease; PICU: pediatric intensive care unit, *Significant *p* value

Table 3. Significant risk factors on multivariate analysis

Factors	OR (95% CI)	*p*-value
Duration of asthma	2.17 (1.23-4.30)	0.03
Use of inhaled corticosteroids	3.01 (1.48-5.90)	0.01
Non-compliance with therapy	1.46 (1.01-1.07)	0.02

OR: odds ratio; 95% CI: confidence interval

Discussion

The impact of childhood asthma on the health care system is considerable. As one of the most chronic diseases of children, bronchial asthma is frequently caused for emergency room visits and hospital admission[3]. An admission to PCU with asthma is potentially life threatening and is a recognized risk factor for subsequent death[9].

This retrospective study was conducted to identify risk factors for PICU admission. Our study showed that asthmatic children who were admitted to the PICU were significantly older than those who admitted to the General Pediatric Ward. Children in the PICU group were approximately 2 years older than the control group. The possible explanation may be due to the severity of

the asthmatic attack and PICU admission were related to a longer duration of asthma in older children and perhaps the development of remodeled airways. This explanation is supported by the longer history of asthma in children with PICU admission. Many studies reported a longer duration of asthma in children admitted to ICU suggesting a link between asthma duration and severity that may account for the findings[10-12]. Female gender was pronounced as a risk factor for hospitalization and readmission in studies conducted by Nunez et al[13] and Kargar et al[14]. In our study although there was a female preponderance but statistically was non-significant.

Previous admission to the PICU was higher in group admitted to the PICU and the difference was statistically significant (p = 0.0003). This finding is consistent with previous studies that reported previous admission to emergency department and PICU were also linked to hospital readmission[15-17]. However, other studies did not reported significant differences.[10,13] Parental smoking and inhaled allergens have adverse influences on asthma and hospital admission[18]. In the present study, parental smoking and exposure to inhaled allergens were significantly reported more frequently in children with PICU admission ($p < 0.05$). This confirms the previous reports in which a history of exposure to smoking and being in continuous contact with allergens have been known as risk factors for morbidity, asthma severity, and hospitalization for asthma[19-21].

Atopy is a recognized risk factor for severe asthma[1]. We found that eczema was not linked to PICU admission possibly because of small patients number. Serum IgE levels provide a quantitative definition of atopy and may have been a better measure to use, but serum IgE were not recorded in a sufficient number of patients files for analysis.

In their systemic review, Alvarez et al[22] reported that the use of inhaled corticosteroids measured in a dose-independent fashion did not significantly increase or decrease the risk for near fatal and fatal asthma in adults. Some studies in children observed that inhaled corticosteroids prophylaxis is effective controlling symptoms and reducing hospitalization and death[23-25]. These findings are in contrast to our results. The difference would be explained by greater severity of asthma and non-compliance with therapy in the PICU group. Similar findings were noted in a comparable study of asthmatic adults[26]. Similarly, the higher numbers of patients receiving treatment with long acting β_2 agonists, the use of asthma management plans, and asthma management by a respiratory specialists are factors likely to be related to asthma severity and PICU admission[12]. Differences between the routine patient care, respective guidelines for treatment of asthma, age and other characteristics of the patients complicate the comparisons between these studies.

Our study noted that asthmatic children admitted to PICU were significantly had poor compliance with therapy. This finding is consistent with several studies that have suggested that poor adherence with asthma management predisposes asthma patients to more severe attacks and death[12]. The barriers to adherence to asthma management may be the medications (steroids), the patients, their families, and physicians[27,28].

Previous admission to emergency department, general Ward and PICU admissions were linked to higher hospital readmission in studies by Lasmar et al[16], Visitsumthorn et al[17] and Kargar et al. [14] In the present study, previous admission rate to PICU was higher in group admitted to PICU and the difference was statistically significant (p = 0.0003). After multivariate analysis, 3 risk factors remained significant for PICU admission in children with asthma. These included, longer duration of the disease, use of inhaled corticosteroids, and non-compliance with therapy.

A limitation of the present study is that we used a retrospective study design, with information collected from the medical records. For this reason, several variables could not be analyzed reliably such as quality of the home, and instructions by a specialized nurse.

In conclusion, this study identified duration of asthma, use of inhaled corticosteroids, and non-compliance with therapy as significant risk factors for PICU admission in Saudi children with asthma. Future prospective standardized studies are needed to validate these results. Early identification of children at risk for PICU admission may result in development of preventive strategies, improvement of efficacy of treatment and thus in a reduction of PICU admission for asthma.

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Understanding the Basics of Research as a Beginner: A Highlighter

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Abstract

Research has grown beyond leaps and bounds; scientific progress solely depends on inquisitiveness and tireless coordination of teamwork. The word research is so attractive for a beginner, the student fraternity is overwhelmed about this process. Irrespective of any field, now the research is becoming an indispensable part of the educational system. This article is intended to create basic awareness about research and its components, especially for the research-oriented students in the field of medical, paramedical, allied health sciences, etc.

Keywords: *Research, bioethics, clinical trials, good clinical practice.*

Introduction

Biomedical research is based on fundamental biological scientific principles, which will focus on personal healthcare to public health. Basic research is also called as bench side research; it deals with in-vitro and in vivo experimental models involving the organisms or animals to obtain a valid outcome to further try on the humans. When the basic research results are tried on humans/clinical patients it is called translational research, which is solely intended to test the results of basic research from bench side to bedside, clinically by using patients virtually[1].

Research is practiced by humans since the time of evolution on earth. In history, the ancient practice of folklore medicine stands as the best example for the oldest model for clinical research; with the time it has gradually evolved through trial and error method. India is at the forefront of contributing to the field of clinical research; medical science like Ayurveda, Siddha, Unani and their medical literature has mentioned the use of medications for several human ailments for thousands of years. Based on its principles, Ayurveda has mentioned therapeutic interventions, and a number of herbs and mineral formulations, which directly to the human subjects with the sole purpose of alleviating human sufferings[2,3].

Classification of type of study: Basic research: the basic medical research deals with understanding the functional, behavioural or molecular mechanisms in primates through in vivo or invitro studies.

Preclinical research: preclinical research deals with the study on humans, which further supports the clinical trials on patients.

Clinical research: it is conducted on patients in the hospital or on the selected population; it is supervised by physicians.

What is the research question..?: It is the main inquiry of the issue which needs to be addressed through research. The research question should be clear, targeted and simple.

What is a pilot study..?: It is the study performed on a small scale by using a minimum number of participants/subjects. This study gives every opportunity to the researcher/investigator to understand all aspects of

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the of the main study in including its feasibility, sample size determination, time duration, troubleshooters, etc.

What are the study parameters..?: Parameters are study exponents in the research; which are later subjected to analysis.

Bioethics: Bioethics deals with the study of ethical dimensions of medicine and biological sciences. Important principles of bioethics are including Autonomy (respect to self-governing), Beneficence (best interest of the subject), Non-maleficence (causing no harm) and Justice (fair treatment)[4]

Basic research in non-human primates: Research on non-human primates is a prerequisite for conducting trials on subsequent levels. Animal experiments mean, the use of animals preferably mammals in the experiments for education and research. The basic experiments use nonhuman primates like rats, mice, rabbits, hamsters, guinea pig, monkey, chimpanzee, dog. It can also be done by using fruit flies, cell lines, fish, etc. There are millions of animals are will be sacrificed worldwide for the sake of research every year. Experiments are performed by using both vertebrates and non-vertebrates, but using the vertebrates will be taken into account as they are under more strict ethical vigilance. For research, all these animals should be procured from the authorized breeders who are registered under CPCSEA (committee for control and supervision of experiments on the animal) guidelines or from the recognized higher research centres.

Importance of animal testing in biomedical research: In the field of biomedical research, the use of the animal model experiments stands as "Hall Mark" of an interventional research study. The great scientists like Aristotle, Erasistratus Galen, etc. have tried their initial experiments on the animals for scientific purposes[5]. Age back, the use of animals got much attention, particularly to test the surgical procedures or use of drugs or devises before applying them clinically to humans. In spite of heavy criticism by the public and the animal protection activists there is a rise in several basic research experiments on animals; because in history, we have learned about the adverse effects of drugs that were used directly on patients. Causing harm to the animals can't justify the human benefit. But still,animal-based research outcome retains its importance in several aspects including, toxicological studies, where the animal experiment model stands as an inevitable tool in supporting the increasing hierarchy of evidence.

In the present situation to justify the rationality and inevitability of the use of animals in the experiments we need to follow principles of 4R.

Replacement: Use of alternate to animal model Ex: in silico i.e. use of computer modeling, in vitro cell line studies, etc.

Reduction: Method which minimizes the number of animals in experiments.

Refinement: It deals with the reduced invasiveness, by adopting improved, non-invasive, non-painful procedures by using the most appropriate method[6].

Rehabilitation: As a 4th component, the rehabilitation of animals will be done after its justified usage[6].

Toxicity study: It is a branch of science deals with the toxins and poisons and their effect and treatment. As per US food and drug administration (FDA),for the development of a new drug entity, it is essential to conduct toxicity tests under basic research models[7].

Trials before regulations: In the olden days, before formulating guidelines for clinical research activities, any individual or group of people would be a part of the research event; it was tried on the helpless community like war prisoners or people who convicted under crime, children, patients, aged people, etc. The direct use of drugs like thalidomide and Elixir Sulfanilamide on humans has resulted in the death of the study participants. Based on such consequences of unethical trials on humans, the present era has formulated a code that is mainly focused on obtaining voluntary consent. By considering the above discrimination in the clinical research, a judgment formulated with a code known as "Nuremberg code" which has streamlined the research at all levels with the sole intention to protect the safety and dignity of the participants to achieve more precise and valid outcome[8].

History of Clinical trials: The credit of clinical research goes to a Scottish physician Dr. James Lind, M.D. (1716–1794) has treated the disorder called scurvy in sailors, where patients were presented with the sign of bleeding through their gums. He has noticed that the administration of the orange and lemon has shown drastic improvement in their condition[9].

Regulations of clinical trials:

Good Clinical Practice (GCP): It is an international ethical and scientific standard protocol for conducting biomedical and behavioral research involving human participants; which protects participants' safety, rights and confidentiality at all levels[10].

International Conference on Harmonization (ICH): It is an international council that bringing together the regulatory authorities and pharmaceutical industry to discuss the technical aspects of drug registration. ICH's regulations are intended to achieve greater harmony worldwide to ensure safety, effectiveness, and quality of medicines; which are developed and registered in a hassle-free manner[11].

Institutional Ethics Committee (IEC): It plays a role in appointing members; it will review the protocol and informed consent forms (ICF), and periodic progress of the study[12]

World medical declaration of Helsinki: It is developed by the World Medical Association (WMA) in the year 1964; it is including ethical guidance for physicians and all other participants in the research team involving in clinical trials on human subjects. This rule binds all the research participants to the applicable law under its declaration[13]

Role of the investigator: All trial investigations are conducted by qualified and trained persons who are personally supervising the work.

Sponsor for trials: The sponsor fora clinical trial may include an individual, anindustry, aninstitution, etc. which takes the responsibility of initiation, management, financing, and auditing. They are also taking the responsibility of subjecting the study participants under sufficient insurance coverage, and compensating the subjects in any untoward incidence or reactions[14].

Role of statistics in research: Since the time of conception of the research protocol, the statistics play an important role to format different components of research like study design, conduct, sample size, data analysis, reporting, etc. they are essential to derive a valid and precise conclusion.

What is the placebo effect..?: Placebo is an inert substance without any therapeutic value; it is used to compare with standard control groups. The psychosomatic profile is an important factor to be considered in assessing the placebo drug response. The placebo effect can be better appreciated in the alleviation of symptoms of the pain rather than any other condition[15].

Clinical Trials: Clinical trials are research study on human subjects, which is intended to evaluate the effect of biomedical interventions like vaccines, drugs, treatments, devices, new ways of using known drugs or to study drug interactions, etc. The study may also include the evaluation of behavioral interventions[16].

The ultimate goal of CT is to ascertain the drug safety on the subject, its risk and benefit ratio before its final approval for marketing. There are many factors involved in research, out of which some are can be controlled, and some others are beyond one's control. Randomization means being nonselective to any application or intervention. Randomization in clinical trials is considered as the basis for the "Evidence-based Medicine"[17].

Blind Experiments: Bias is the main concern of the clinical trials where blinding becomes essential to reduce the bias and increase the validity of the outcome. Blinding is a process where one or the other participants in the study were deliberately kept unaware of intervention. Blinding is an important factor to ensure objectivity in the clinical trial by avoiding or preventing the possible bias in the study[18].

Types of blind trials:

Open clinical trials: it is the trial where all the level of study participants in the research group will be knowing the intervention.

Single-blind study: where the subject alone in the research study is unaware of intervention.

Double-blind study: where the subject, as well as the researcher both, are unaware of the intervention

Triple-blind study: where the subject, researcher, and analyser are unaware of intervention.

At the end of the study result analysis, all masked or blinded interventions will be disclosed.

Protection of subjects: The protection of the clinical trial participants at all levels is an important issue. Concerned authorities should take care of all necessary precautions to address personal, social and legal issues during and after completion of trials. Any relevant issues should be addressed, and it should be

properly compensated for the loss. It is essential to ensure proper compensation for all the study participants who are involved in the clinical trials.

Importance of Informed Consent (IC): Clinical trial participants are strictly volunteer in its true sense without coercing them for any benefit. Informed consent is an important prerequisite before allocating any human subject to the clinical trials. Privacy and confidentially of IC should be maintained in all the circumstances. It is very much essential to know whether the subject is a literate or illiterate, or whether he is fit to give valid consent. The investigator should explain and clarify all the doubts of participants regarding the research protocol before taking consent[19].

Types of clinical trials:

Screening trial: screening for the possibility of occurrence of diseases in a healthy population

Prevention trail: it deals with the prevention of disease by using supplements, vaccines, devices, lifestyle modifications, etc.

Diagnostic trail: it deals with the accuracy of the disease.

Treatment trail: it deals with the effectiveness of treatment in diseased.

Conventionally the CT is having the following phases:

Phase 0: It is an Exploratory Investigational New Drug (IND) Study. It will be conducted first on humans; it is also known as human micro-dosing studies by using the sub-therapeutic dose. It is conducted by using 10-15 numbers of limited volunteer healthy human subjects to understand the pharmacokinetics, pharmacodynamic activity,and safety of a new drug or a molecule.

Phase I or Clinical pharmacology trial: It is also called "First in Man", done in small groups with 20-100 in number in healthy volunteers. It is to assess safety through pharmacovigilance and the details of the pharmacokinetic and pharmacodynamic effects of a drug. Dose escalation trial can give an idea about the appropriate maximum tolerable dose which can be used under subsequent trials.

Phase II or Exploratory Trial: The third phase of the clinical trial can be done in 200-300 number of larger healthy human volunteers. It is done in Phase I A is to assess the clinical efficacy or biological activity, and Phase II B is to assess and match the optimum dose, benefit with minimum side effects

Phase III trial or Confirmatory trial: It is a randomized control multicentric trials in a large number of volunteer patients in a group of 300-3000 or more. Such trials are more expensive, time-consuming and difficult to handle, especially while dealing with chronic disease conditions or disease with a long latency/ incubation period.

Phase IV or Post-marketing surveillance: Called post-marketing surveillance trial. It involves a pharmacovigilance study after receiving permission to market an approved drug. If the drug/treatment is found satisfactory in the above-mentioned initial phases, then it will be approved under the country's national regulatory authority for its use in the general population. Phase IV trials are invariably always under the research radar.[20,21]

Multicentric Clinical Trials: It includes a large number of participants from different parts of the world, including a wide range of populations; which will compare the results of different centers.

Accessibility of clinical trial reports: Accessing clinical trial data or information is an important prerequisite to tackle the challenges before considering them under policy making. Archiving the clinical trial documents is a must, which helps to analyze the data retrospectively in a systematic manner. Now online updates are available on the registered websites which are developed at the national institute of health under the national library of medicine. CT information is always accessible to any common man, through website clinicaltrials.gov and also through Cochrane Library, it is a collection of databases in medicine and other healthcare specialities[22,23]. The ultimate goal of accessing the clinical trial results is to introduce newer government policies and regulations to provide improvised health care facilities for the benefit of the population at large.

Conclusion: This review is solely intended to highlight some aspects of basic, preclinical and clinical research, especially for the student fraternity.

Ethical Clearance: Obtained from Institution ethical committee.

Conflict of Interest: Nil

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A Study on Cord Blood Zinc Levels with Age and Parity in Sgapregenant Mothers

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Abstract

Zinc deficiency is one of the most common micronutrient deficiencies in developing countries. Maternal zinc deficiency is associated with fetal growth retardation and other adverse fetal outcomes. The study aimed to determine cord blood zinc level in correlation with age and parity in the term SGA mothers. This is a prospective cross-sectional study conducted in 50 terms SGA babies and their mothers and 50 term AGA babies and their mothers. Maternal and cord blood samples were taken at delivery and zinc was estimated by endpoint nitro PAPS dye binding colorimetric method. Out of 50 study participants in parity of SGA groups, 29 were primigravida and 21 were multigravida mothers. Most of the mothers were having zinc levels ranging from 95.1 to 110 followed by 80.1 to 95. The result shows that there is no statistical significance between cord blood zinc and parity of mothers in the SGA group. Out of 50 study participants in the mode of delivery of SGA groups, 30 were NVD and 20 were LSCS mothers. Most of the mothers were having zinc levels ranging from 95.1 to 110 followed by 80.1 to 95. The zinc levels were seen more than 140 among one NVD mothers. The result shows that there is no statistical significance between cord blood zinc and mode of delivery in SGA groups. Maternal zinc level influences the cord blood zinc level. Cord blood zinc level influences the birth weight of the baby. Thus we conclude that zinc deficiency can also be one of the reasons for low birth weight babies and providing zinc supplementation to the pregnant mothers can be recommended

Keywords: *Zinc, maternal blood, appropriate gestation age, [AGA] small gestation age [SGA].*

Introduction

A trace element is an element that constitutes less than 0.01% of the total body weight. They play a vital role in metabolic processes as they are components of many enzyme systems. Trace element deficiencies are being reported in humans and they have deleterious effects on the health, growth, and development. In trace elements, zinc stands second in order of importance next to iron. It also stands second next to iron in order of abundance in the human body.[1] Zinc plays an important role in early development, both prenatal and postnatal. Thus its basic biochemistry, physiology and its metabolism in the maternal-placental unit and in the neonate have to be discussed to analyze its effects on the neonate. By active transport, zinc is absorbed from the duodenum. Zinc homeostasis is maintained by both uptake and endogenous secretion by the ZIP family [1-5] and ZnT family transporters 6. ZIP-4 is a transporter that is expressed at the luminal side of enterocytes through the small and large intestines.[2] Zinc is exported from enterocytes into the portal blood by zinc transporters 1&2. More than 20% of individuals are zinc deficient worldwide, especially in developing countries. Zinc is needed for the development of the oocyte and the embryo. Acrodermatitis enteropathica is an inherited deficiency of the zinc carrier protein ZIP4 resulting in inadequate zinc absorption. Zinc regulates the expression of metallothionein, which has multiple functions such as intracellular compartmentalization

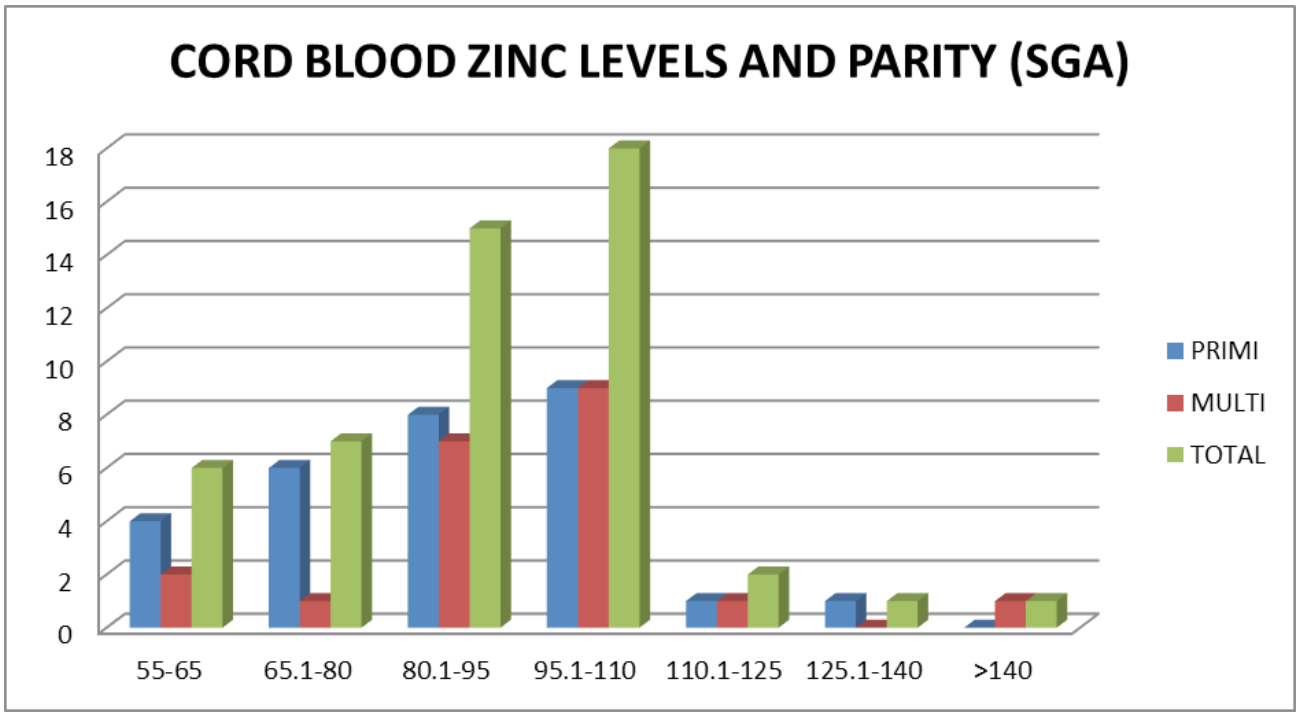
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and antioxidant function.[6-10] Thus zinc deficiency results in impaired growth and development, and disruption of reproductive and immune function. Severe zinc deficiency can result in neural tube defects and other congenital malformations.[3]

Materials and Method

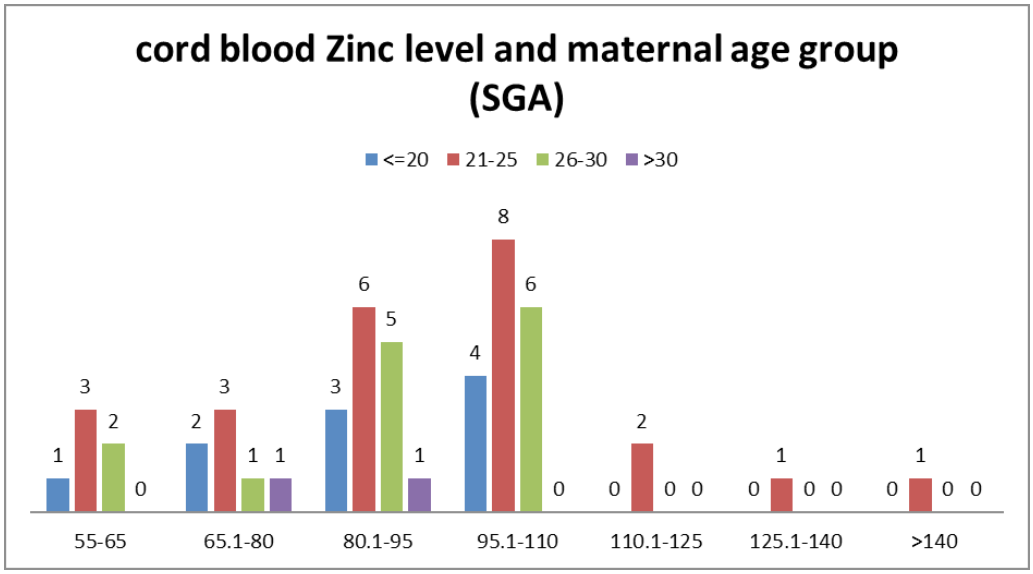
The study included 50 term-small for gestational age neonates and their mothers and 50 term- appropriate for gestational age neonates and their mothers who satisfy the inclusion and exclusion criteria. Detailed maternal history was taken and thorough physical examination of the neonate was done. Birth weight was plotted against gestational age in Lubchenco growth charts to assess if they are small for gestational age or appropriate for gestational age. After obtaining informed consent from the parents, cord blood sample for serum zinc was collected from term-SGA and term-AGA babies and 2ml of blood from the peripheral vein of their mothers immediately after delivery was collected respectively for serum zinc level estimation and sent to our central laboratory.

Stastical Analysis: The data was entered in excel sheet and analyzed using SPSS (Version 16). Descriptive statistics with mean, standard deviation and proportion (%) was calculated for quantitative variables. To test the hypothesis ANOVA, Z test and Chi-Square test was used. a p-value <0.05 was considered as statistically significant. Out of 50 study participants in parity of SGA groups, 29 were primigravida and 21 were multigravida mothers. Most of the mothers were having zinc levels ranging from 95.1 to 110 followed by 80.1 to 95. The result shows that there is no statistical significance between cord blood zinc and parity of mothers in the SGA group.



Graph 1: Cord blood zinc levels and parity

Among the 50 study participants of SGA groups, 10, 24, 14 and 2 were belonging to less than 20, 21 to 25, 26 to 30 and more than 30 years of maternal age respectively. In the majority of maternal age group, the zinc level was ranging from 95.1 to 110. The result shows that there is no statistical significance between cord blood zinc and maternal age in the SGA group.



Graph 2: Cord blood zinc level and maternal age group

Discussion

Birth weight is the vital factor of perinatal and neonatal outcome. A newborn baby weighing less than 2.5 kg at birth irrespective of the gestational age is termed as a low birth weight baby. Low birth weight babies can be term SGA or preterm babies. While a lot of importance is being given to protein and energy deficits, micronutrients other than iron are often forgotten. It has been argued that micronutrient deficiency during pregnancy can lead to LBW. [4] In particular zinc deficiency is associated with abnormal conditions during pregnancy including congenital malformation (anencephaly) and abortion. Though zinc is needed only in small quantity, they have several vital functions in our human body. As their requirements are small, their adequacy have to be checked carefully and moreover many of the trace elements have interactions with each other.[5] Thus their needs have to be adequately met with a concern over their interactions and toxicity. Among several micronutrients, iron stands first whose importance have been extensively studied and practiced. Next lies zinc whose importance is slowly brought in to light by several research trials and studies. Hence this study of serum zinc levels in the cord blood of term SGA babies & their mothers and term AGA babies & their mothers was done. In our study, The mean maternal age in AGA was 24.22 and in SGA was 23.88 Which shows that there is no statistical significance in the maternal age between AGA and SGA groups.[6] In a study the maternal age of the control and cases were comparable. The average age of controls was 27.54 and that of cases was 27.5. Thus the two groups were well matched in this study. Thus the mean maternal age in the two groups were comparable similar to the study conducted by Benjamin W et al.[7] In our study The primiparous mother was 46% and 58% in AGA and SGA respectively, whereas in multiparous it was 54% and 42% in AGA and SGA respectively which shows that there is no statistical significance in the parity of mother between AGA and SGA groups which was similar to the study done by Christine A et al. [8]In our study, The LSCS were 42% and NVD was 58% in our study which was not similar to a study conducted by Ronald E et al were the LSCS were 54% and NVD was 46%.[9,10]

Conclusion

It was found that cord blood zinc levels were low in term SGA babies when compared to term AGA babies. There was also low maternal zinc levels in the term SGA babies when compared to mothers of term AGA babies.

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In Vivo Effect of Levan Purified from Leuconostoc Mesenteroides ssp. Cremoris Against Candida Albicans

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Abstract

Toxicity of levan purified from *Leuconostoc mesenteroides* ssp. *cremoris* on mice was studied, and observed that no death of mice was recorded at 100 mg/ml, also antagonistic activity of levan against *C. albicans In vivo* was determined with histological study on small intestine and liver tissue of mice, and the results showed that the levan had the ability to treat the infected tissue with *C. albicans* also had less damage to the tissue compared with the fluconazole.

Keywords: *Levan polymer, Leuconostoc mesenteroides, Candida albicans, Toxicity, Histological study.*

Introduction

Candida is a genus of yeasts that is considered the most common cause of fungal infections worldwide [1]. Many species, including *Candida albicans,* are found in gut flora, oral cavity and vagina in mammalian hosts, whereas others live as endosymbionts in insect hosts [2,3,4]. *Candida* spp. are commensal in healthy humans and may cause systemic infections in immunocompromised patients due to their great adaptability to different host niches [5]. The pathogenicity of *Candida* species is attributed to certain virulence factors, such as the ability to evade host defenses, biofilm formation (on medical devices and on host tissue), adherence and the production of tissue – damaging hydrolytic enzymes such as phospholipases, proteases and haemolysin [6].

Levan is a homopolysaccharide which is composed of D-fructofuranosyl residues joined β -2,6 [7]. Levan is naturally obtained from both microorganisms and plants [8]. Microbial levans are more advantageous, industrially and economical with numerous applications [9]. Bacterial levans are much larger than those produced by plants with multiple branches and molecular weights ranging from 2 to 100 million Da [8].Synthesis of levan is catalyzed by a group of enzymes referred to as levansucrases using sucrose as a substrate [10, 11]. Microbial levans have wide range of applications in food, pharmaceutical, medicine, commercial industrial and cosmetic [12]. Some microbial levan exhibit biological activities such as antitumor, immunostimulating and antidiabetic activities [13].

Materials and Method

***Leuconostoc mesenteroides* ssp. *cremoris* isolate:** *Leuconostoc mesenteroides* ssp. *cremoris* was isolated from local fish intestine then identified throughout cultural, microscopical and biochemical tests according to [14] and Vitek 2 system.

***Candida albicans* isolates:** Fourteen *Candida albicans* isolates were obtained from oral and vaginal swabs. All isolates were subjected to the cultural, microscopical and biochemical tests [15] as well as Vitek 2 system.

Production and purification of Levan from *L.mesenteroides* ssp. *cremoris:* This process was done according to the procedure described by [16], 250ml Erlenmeyer flasks containing 100 ml of levan production medium was inoculated with 2% of *L. mesenteroides* ssp. *cremoris* (LF_5) suspension containing (9×10^8 cfu/ml) (compared to 0.5ml of McFarland standard absorbance at a wavelength of 600 nm about 0.134), incubated at 30ºC for 24 h. After incubation the culture were centrifuged at 10000 rpm for 10 min the supernatant was used for precipitation of levan by adding 1.5 volumes ice – cold ethanol. The precipitated pellets were washed twice by distilled water and collected by centrifugation at 10000 rpm for 10 min. The levan dry weight determined after oven - drying at 110ºC for 24h.

The precipitated levan polymer was resuspended in demineralized water at 4ºC during 16 h and then dialysis

(MWCO 14,000 Da) overnight against demineralized water. The polymer was precipitated with 2 volumes of 96 % ice - cold ethanol, centrifuged for 10 min at 10.000 rpm [17], then the purified levan was dried at (40-45ºC).

Investigation of levan toxicity *In vivo:* Twelve healthy mice were administered 1 ml of levan (100 mg/ml) via gastric for 30 days.

Antagonistic activity of levan against *C. albicans* *In vivo:* Fifteen male albino mice aged 8-12 weeks, weighing 20-28 g were obtained from National Center for Drug Control and Research, Baghdad, Iraq, housed under standard conditions in the animal house of biology department in the College of science, AL-Mustansyriah University. Nine mice were injected, for three days with dexamethasone 2.5 mg/kg/day intramuscularly [18], also nine mice were infected by being injected with 0.1 ml of *C. albicans* (CO_2) that contain (1.5×10^8) yeast/ml intraperitoneally. After three days, all mice were divided in to five groups each group consist of 3 mice, each group was inoculated as a follows:

Group 1 (non - infected and non - immunological suppression): inoculated orally by gastric tube with (0.1 ml/day) of normal saline for 14 days considered as negative control group.

Group 2 (infected): inoculated orally by gastric tube with (0. 1 ml/day) of normal saline for 14 days considered as positive control group.

Group 3 (non infected): inoculated orally by gastric tube with levan (0.2ml/day) that contain 100 mg/ml for 14 days considered as levan control group.

Group 4 (infected): inoculated orally by gastric tube with levan (0.2 ml/day) that contain 100 mg/ml for 14 days considered as treatment group.

Group 5 (infected): inoculated orally by gastric tube with Fluconazole drug 10mg/kg body weight for 14 days considered as fluconazole treatment group.

Histological study: Liver and small intestine of mice were removed and fixed in 10% formalin. The fixed organs were dehydrated and sectioned by microtome and stained with Hematoxylin and Eosin for studying histopathological changes [19].

Results and Discussion

Investigation of levan toxicity *In vivo:* The results showed that no death of mice was recorded after 30 days, and showed no toxicity of levan. This result encourages to use of levan as a treatment.

Histological Study: The results of histological sections, small intestine and liver tissues taken from immunosuppressed mice that infected with *C. albicans* and treated with purified levan produced from *L. mesenteroides ssp. cremoris* (LF5), the negative control of intestine tissue which administrated with normal saline only showed normal appearance of tissue, villi and epithelial cells (Figures 1).

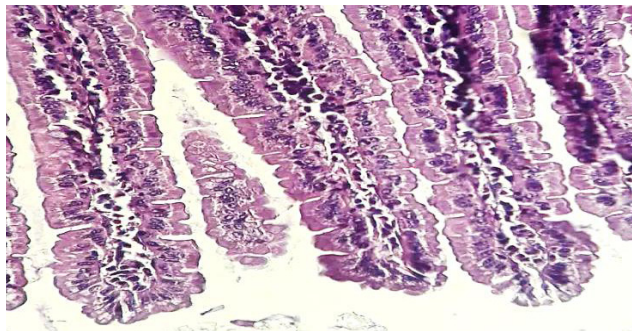


Figure 1: Small intestine section for non - infected mice tissue shows the normal intestine structure, villi and epithelial cells (H&E. 40X).

While in control positive group that administrated with *C. albicans* only, intestinal tissue section shows infiltration of lymphocyte, and damage in villi (Figure 2).

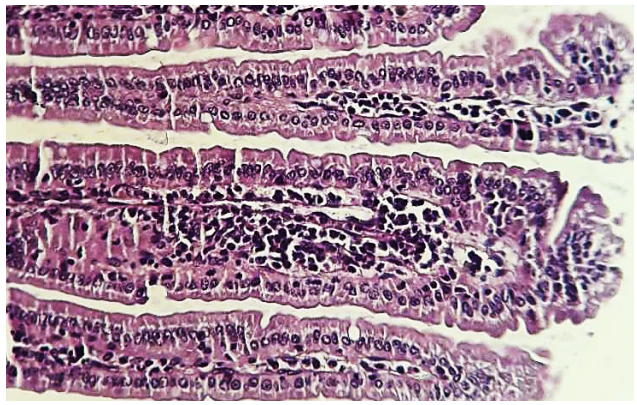


Figure 2: Section in intestinal infected mice showing infiltration of lymphocyte and damage in villi (H&E. 40X).

In levan treatment group intestine tissue with levan administration only, intestine sections showing increasing in goblet cell (Figure 3)

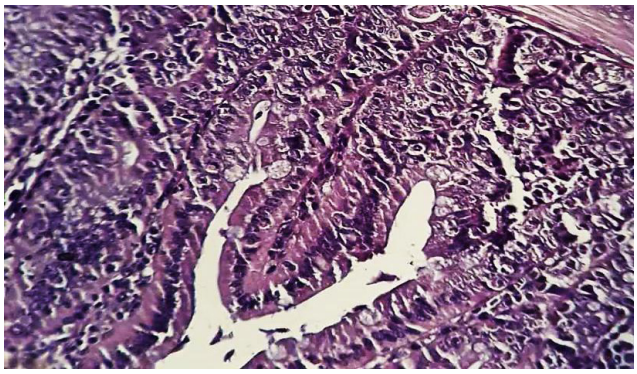


Figure 3: Section in small intestine non infected mice treated with levan after 14th day showing increasing in goblet cell (H&E. 40X).

Whereas the intestinal positive results of infected mice with *C. albicans* treated with levan showed normal structure with increasing in goblet cells (Figure 4).

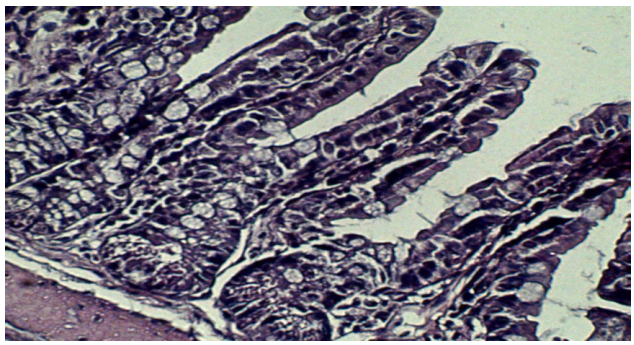


Figure 4: Section in intestine infected with *C. albicans* mice treated with levan after 14th day showing normal structure with increasing in goblet cells (H&E. 40X).

While in the intestinal positive results of infected mice treated with fluconazole showed shorting in villi and infiltration of lymphocyte (Figure 5).

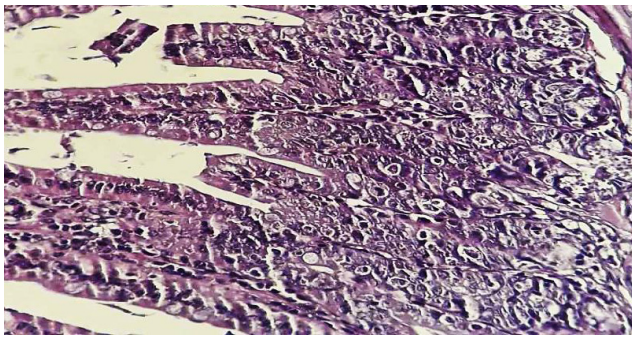


Figure 5: Section in intestine infected mice with *C. albicans* treated with fluconazole after 14th day showing shorting in villi and infiltration of lymphocyte ‹ (H&E, 40X).

On the other hand, the negative control of liver tissue which administrated with normal saline only shows normal appearance of tissue, hepatocytes, central vein and sinusoids (Figures 6).

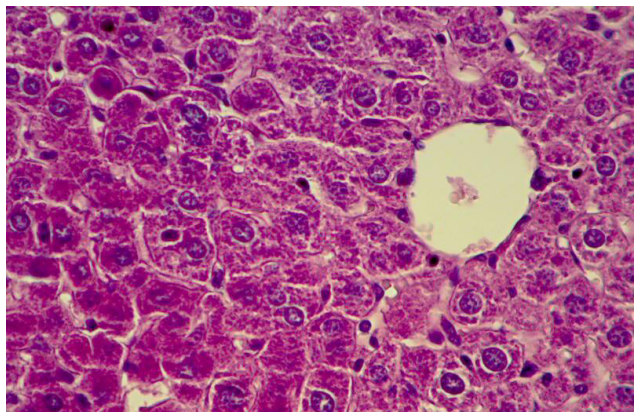


Figure 6: Liver section shows the normal liver structure for non - infected mice tissue, show hepatocytes, central vein and sinusoids (H&E, 40X)

While in control positive group that administrated with *C. albicans* only, liver tissue section shows infiltration of lymphocyte, reduced of glycoprotein and hemorrhage

In levan treatment group liver tissue with levan administration only, liver sections showing hydropic degeneration, depletion of glycogen. While in the liver positive results of infected group that treated with levan showed approximately repair tissue with few infiltration of lymphocyte and reduced of glycoprotein. Whereas in the liver positive results of infected mice treated with fluconazole showed aggregation of lymphocyte and fatty changes.

The effects of *C. albicans* invasion on its intestinal epithelial cells include cellular necrosis, apoptosis and pyroptosis. De Repentigny *et al*.[20] reported that the ability of *C. albicans* to cause lysis of microvilli and then progressive invasion of villi in the small intestine. Tong and Tang [21] showed that *C. albicans* had regulatory role in intestinal polymorphonuclear leukocytes. Han *et al*. [22] used polysaccharides produced from Acanthopanax senticosus in preventing *Escherichia coli* lipopolysaccharide in the intestinal mucosal barrier and found that the intestinal mucus layers were improved by the polysaccharides, this observation also explain the distinct protective role of polysaccharides against injurious agents via promoting the formation of viscoelastic gel overlying the mucosa due to secretions of goblet cells. Hepatosplenic candidiasis may be

caused by *Candida* species, including *C. albicans* and *C. tropicans*, through candidemia or the portal vasculature from the gut with degenerated barriers of gastrointestinal mucosa[23]. Coash *et al*.[24] explained that hepatic candidiasis is characterized by granulomas with suppurative central areas containing variable necrosis and giant cells. Zwolińska- Wcisło *et al*. [25] mentioned that the fungal colonization of gastrointestinal tract in mice can be attenuated by probiotic therapy. Mohamed *et al*.[26] reported that the ability of *C. albicans* to cause clinical pathological effect in mice tissue organs (liver, intestine, stomach, kidney) can be reduced by administration of *Lactobacillus acidophilus*. Soliman *et al*.[27] had been studied the therapeutic effect of chitosan against invasive candidiasis in mice and found that the liver sections of control and chitosan groups showed normal histological structures. Leão *et al*.[28] reported that the mice consumed probiotics and infected with candidiasis had lower histological and inflammatory infiltrates compared with candidiasis infected mice.

Conclusion

Levan purified from locally isolated *Leuconostoc mesenteroides* ssp. *cremoris* had inhibitory effects on the *C. albicans* isolates *in vivo* with no toxicity effects on mice and no damage on liver and intestinal tissues compared with the fluconazole.

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Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq.

Conflict of Interest: The authors declare that they have no conflict of interest.

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Immediate Effects of Self-Manual Therapy and Supervised Manual Therapy in Individuals with Knee Osteoarthritis

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Abstract

Background and Objective: Knee osteoarthritis is the degenerative disease that leads to pain, impaired mobility, poor function and frequent absence from work. The self-manual therapy affects to decrease pain and improve knee motions. However, the evidence of the different of the self-manual therapy and supervised manual therapy is lacking. This study aimed to compare the immediate effects of self-manual therapy with and without supervised manual therapy in individuals with knee osteoarthritis.

Materials and Method: Twenty four participants with knee osteoarthritis were randomly assigned into three groups; self-manual therapy group (n=8; 2 men and 6 women [age 74.00 ± 10.82 years]) PT manual therapy group (n=8; 2 men and 6 women [age72.25 ± 10.75years]) and control group (n=8; 8 women [age73.25 ± 8.84 years]). The participants were received self-manual therapy or physical therapist's manual therapy. Repeated measures ANOVA were used to determine effects for pressure pain threshold, knee range of motion and time up and go within group and between groups.

Results: These results showed that the self-manual therapy group significantly decreased pain after treatment. The PT manual therapy group showed significantly decrease pain and improves knee flexion and extension. No significant differences. There was no significant different in time up and go.

Conclusion: The self-manual therapy is an alternative treatment for pain reduction in individuals with knee OA. However, the PT manual therapy had superior benefits in improving knee range of motions.

Keywords: *Self-manual therapy, Knee osteoarthritis, Supervised manual therapy, Physical therapy, knee exercise.*

Introduction

Knee osteoarthritis (knee OA) is one of the most common rheumatic disease as reported in the community Oriented Program for Control of Rheumatic Disorder (COPCORD) world studies[1]. It was especially higher prevalence in Asia region both rural and urban areas[2]. Knee OA affects all structures within joint, characterized by inflammation in the synovium and the cartilages. It contributes to the progressive loss of articular cartilage, subchondral bone remodeling or osteophytes, capsular stretching, weakness of periarticular muscles, synovitis and ligament laxity[3]. These pathological changes lead to pain, impaired mobility, poor function and activity daily living example walking, stairs climbing[4]. Physiotherapy is the one management for knee OA which aims to improve patient's understanding about their disease and self-management capacities as well as to enhance the muscle performance and joint movement[5]. In a survey study, the physical therapist utilized exercise program, electrotherapeutic modalities, acupuncture and manual therapy[6]. Supervised manual therapy affects to decrease pain and improve knee function[7,8]. However, patients have limited accessibility to receive the physical

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therapy such as the treatment cost and transportations. The previous study showed the effectiveness of self-manual therapy for home-based exercise in knee OA. It affects to decrease pain and increase knee motions[9]. The evidence of the different of the self-manual therapy and supervised manual therapy is lacking. Therefore, the purpose of this study was to determine the immediate effects of self-manual therapy and supervised manual therapy in individuals with knee osteoarthritis.

Material and Method

Thai participants from Ban Bang Khae Social Welfare Development Center for Older Persons, Bangkok Thailand with a diagnosis of knee OA based on the clinical criteria of the American College of Rheumatology[10]. The participants were able to walk in their daily living with or without aid. They were able to communicate and follow the orders. They were excluded if they had rheumatoid gout or other systemic joint disease cerebrovascular conditions such as acute or recurrent myocardial infarction unstable angina pectoris neurological conditions such as Parkinson's disease undergone knee surgery corticosteroid injection to the knee within previous thirty days and an injury or accident at back and lower limbs within previous six weeks. Ethical approval was received by Saint Louis College Ethics Review Committee for Research involving Human project (E. 021/2557).

Twenty-four participants were randomized into three groups: self-manual therapy group Physical therapist manual therapy group (PT manual therapy group) and control group using sealed envelopes. Then participants were received the clinical examination (palpation at soft tissues around knee joint knee range of motion and passive accessory movement of tibiofemoral and patellofemoral joint) and education about knee OA (pathology signs and symptoms and exercise program). The clinical examination results that limited or reproduced symptoms were used to guide the manual therapy instruction. The self-manual therapy group received manual therapy that consisted of joint mobilizations applied primarily to the patellofemoral and/or tibiofemoral joints and soft tissue massage[9], according to the results of clinical examination. The participants were taught from the physical therapist with handout and video then practiced until they could perform correctly. They were rechecked the manual therapy skill and knowledge before they treated by themselves. The PT manual therapy group received the same manual therapy by physical therapist. The manual therapy intensity (mobilization grade and repetitions) were determined according to the participant's tolerance, severity of joint limitation and soft tissue tightness of each participant. The control group received education about knee OA disease and home-based exercise program (active ROM exercise, muscle strengthening and muscle stretching)

Pressure pain threshold (PPT) was measured using digital pressure algometer in side lying position[11,12]. The PPT was measured on the worse side of knee, if they had problem in both knees. Participants were instructed to mark the level of pain that they had experienced the most. The PPT was measured twice, and the average degrees were used. Knee range of motion (knee ROM) was measured by active knee flexion and extension using goniometer with the participants in supine position[13]. The angles were measured twice, and the average degrees were used. The ROM was recorded at the end point of movement when ROM was limited by pain or tightness of the soft tissues. Functional activity was measured by time up and go test (TUG)[14,15]. The TUG was recorded sit to stand time and total time. The outcome measurements were measured before and after treatment by the same evaluator.

Data were analyzed, using SPSS for Windows program. The scores were assessed for between-group differences in the change of before and after outcome measures (PPT knee ROM TUG-sit to stand and TUG-total). Komogorov-Smirnov Goodness of Fit test was used to analyze the distribution of the data. Repeated measures ANOVA were used to determine the difference among all data. The mean differences (MD) between and within groups were also undertaken using the Bonferonni's correction test. The significance level was set at 0.05.

Results

Twenty four participants with knee OA were included and randomly assigned to a self-manual therapy group (n = 8) or PT manual therapy group (n = 8) or control group (n=8) by drawing a sealed envelopes. Forty-three participants completed the present study. No differences were observed between groups in ages, gender, BMI, and side of pain at baseline. The primary and secondary outcome score within and between group are shown in Table 1. PPT, knee flexion and knee extension showed significant difference between

before and after treatment (p=0.004, p=0.038, p=0.008 respectively). No significant different was found in time up and go between before and after treatment (p=636 and p=0.732 respectively).

The ANOVA repeated measures with Bonferroni post hoc test showed a significant increased PPT in self-manual therapy group (p=0.004) and PT manual therapy group (p=0.005) compared to control group (Figure 1), but there was not significant differences between self-manual therapy group compared to PT manual therapy group (p=0.753). For knee flexion, a significant effect was present for PT manual therapy group (p=0.018) compared to control group (Figure 2), but there was not present for self-manual therapy group (p=0.090). For knee extension, a difference was shown for PT manual therapy group compared to control group (p = 0.006) and self-manual therapy group (p=0.015) (Figure 3). No significant different was found in time up and go between groups (Figure 4 and Figure 5)

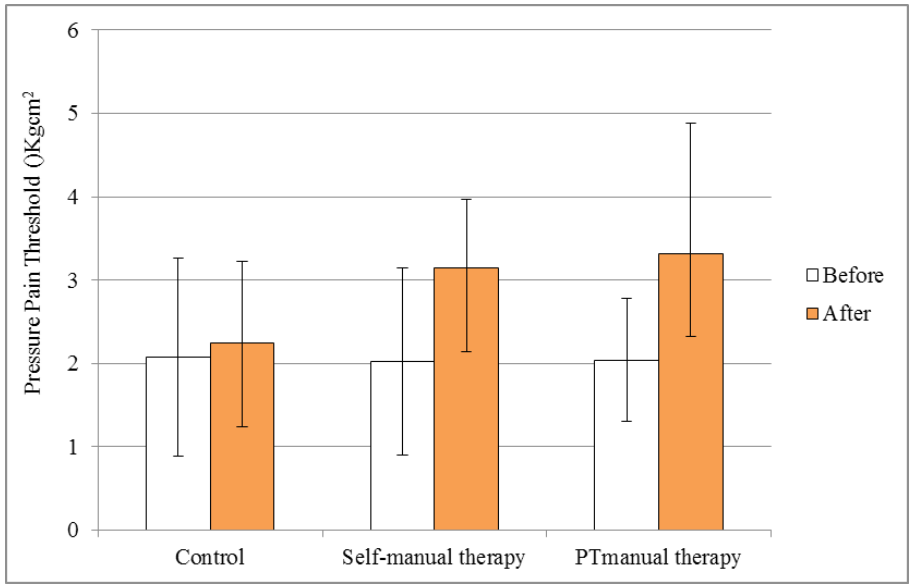


Fig. 1: Pressure pain threshold (PPT) scores at before and after treatment in control group, self-manual therapy group and PT manual therapy group

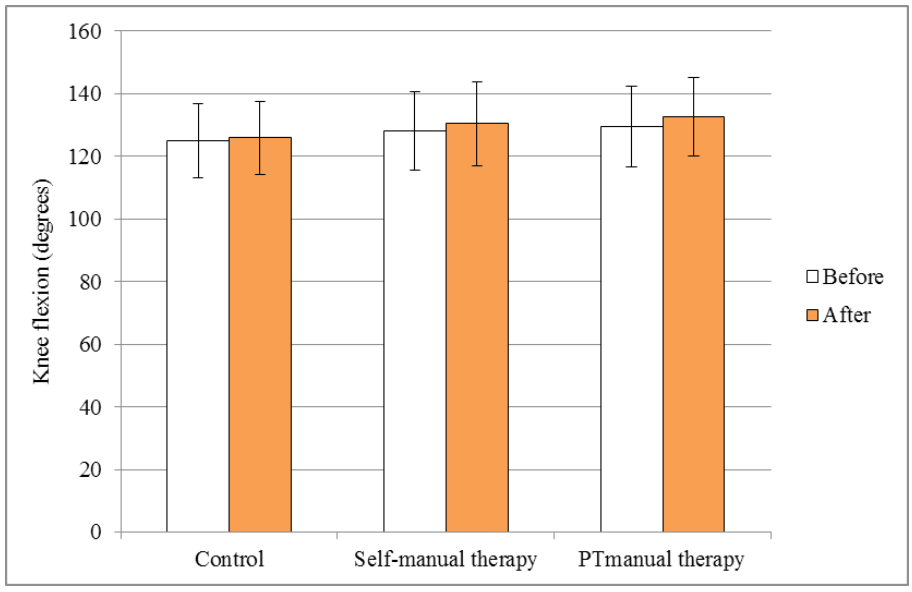


Fig. 2: Range of motion of knee flexion at before and after treatment in control group, self-manual therapy group and PT manual therapy group

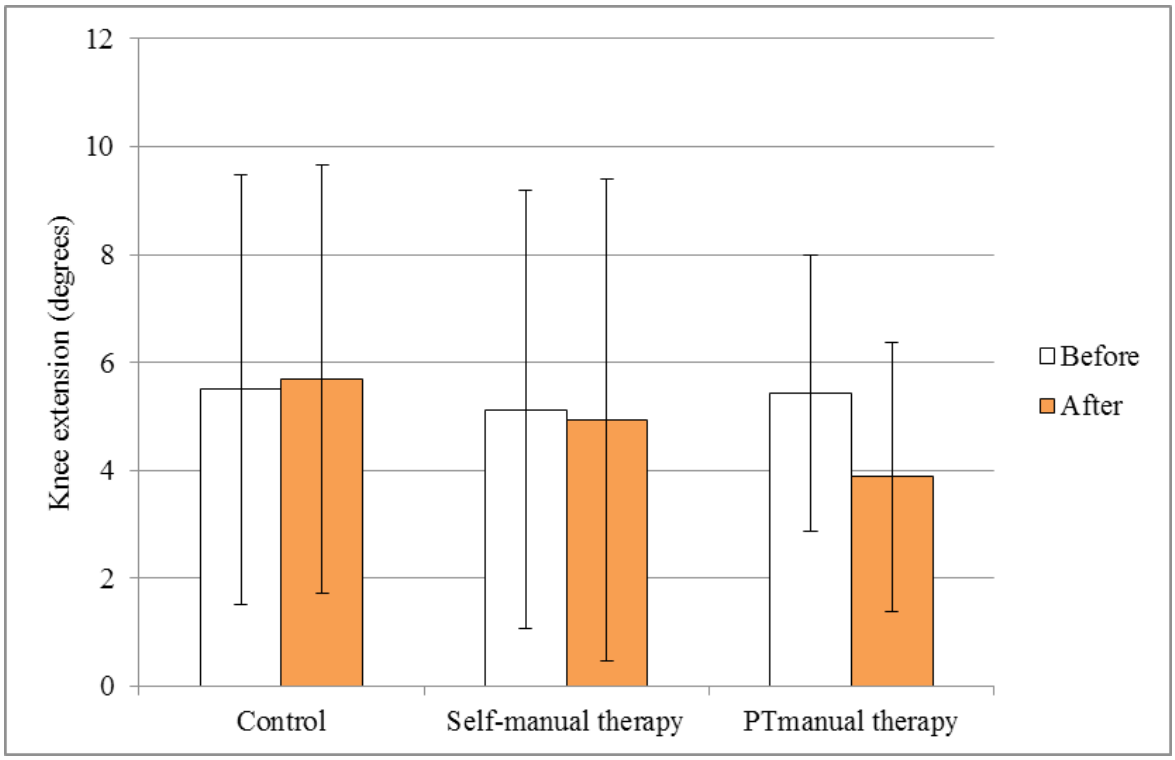


Fig. 3: Range of motion of knee extension at before and after treatment in control group, self-manual therapy group and PT manual therapy group

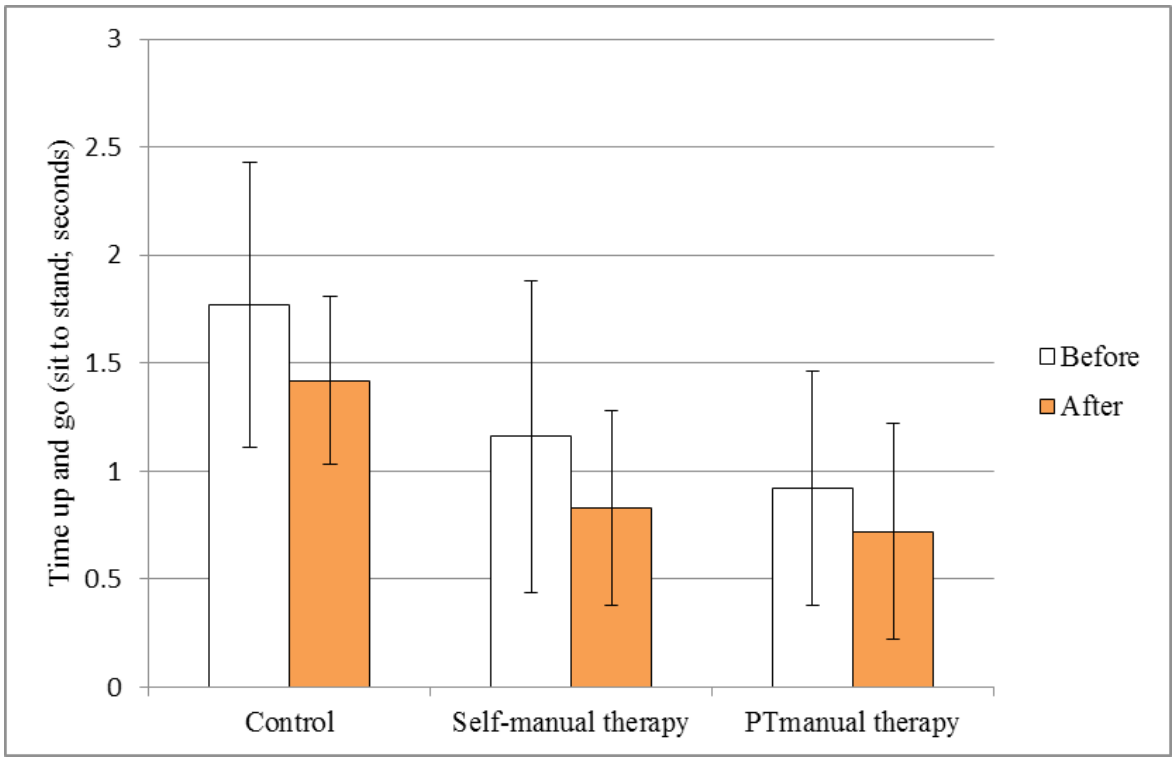


Fig. 4: Time up and go test in sit to stand period at before and after treatment in control group, self-manual therapy group and PT manual therapy group

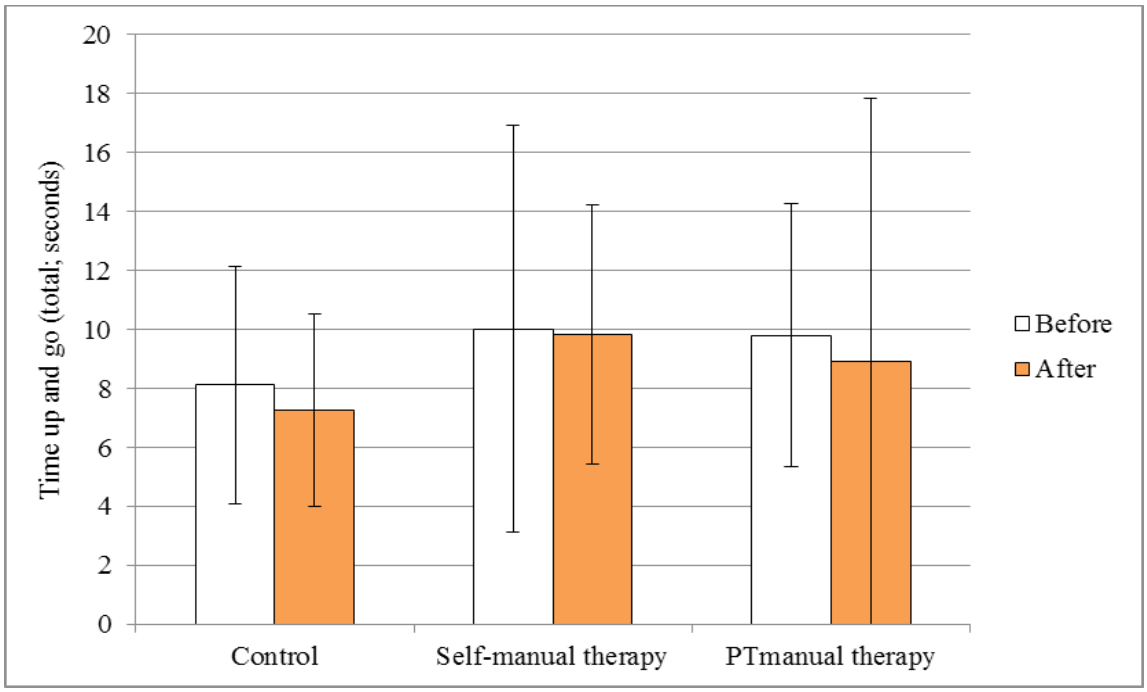


Fig. 5: Total time up and go at before and after treatment in control group, self-manual therapy group and PT manual therapy group

Table 1: Pressure pain threshold, knee range of motion and time up and go in self-manual therapy group, PT manual therapy group and control group

Variables	Within group						p-value	Between group p-value
	Self-manual therapy		PT manual therapy		Control			
	Before	After	Before	After	Before	After		
Pressure pain threshold ($kgcm^2$)	2.02 ± 1.12	3.14±0.83	2.04±0.74	3.32±1.56	2.08±1.19	2.24±0.99	0.004	0.004** 0.753* 0.005+
Knee ROM (degree) Flexion	128.13 ± 12.63	130.38±13.36	129.63±12.85	132.63±12.54	124.94±11.83	125.88±11.61	0.038	0.090** 0.268* 0.018+
Extension	5.13 ± 4.07	4.94±4.47	5.44±2.56	3.88±2.49	5.50±3.99	5.69±3.96	0.008	0.349** 0.015* 0.006+
Time up and go (s) Sit to stand	1.16 ± 0.72	0.83±0.45	0.92±0.54	0.72±0.50	1.77±0.66	1.42±0.39	0.636	0.834** 0.495* 0.344+
Total	10.03 ± 6.90	9.82±4.39	9.81±4.47	8.92±8.92	8.13±4.03	7.28±3.26	0.732	0.495** 0.529* 0.793+

** p-value between self-manual therapy group and control group, * p-value between self-manual therapy group and PT manual therapy group, + p-value between PT manual therapy group and control group

Discussion

In this study, the patients with knee OA who received both self-manual therapy and PT manual therapy had immediately decreased pain. However, patients who received only PT manual therapy showed immediately knee range of motions improvement. These results implied that the PT manual therapy group had only superior effects on knee extension improvement.

The manual therapy consisted of patellofemoral joint and tibiofemoral joint mobilization and soft

tissue massage. This finding supports other studies that knee mobilization could eliminate pain. A meta-analysis of RCT found that exercise therapy with manual mobilization had more effect size on pain than exercise alone (combination of strength training with active range of motion exercises and aerobic activity) or strength training[16]. The previous study combined knee mobilization with conventional physiotherapy that consisted of the thermal therapy with hot pack and same exercise program of this study, found 44% pain reduction with VAS scale[17]. Pain reduction following joint mobilization might complement more widespread hypoalgesic effects[18]. The mobilization may initiate local neurophysiological and peripheral mechanism to work optimally then the biomechanic forces in both intra-articular and periarticular tissues were adapted[19]. However, the psychological factors may also be involved[20].

Improvement of knee joint motion especially knee extension following PT manual therapy was shown in this study. The mechanical strain applied during soft tissue massage oriented in all directions of muscle fibers and several planes could rearrange bundles of connective tissues which aid in the remodeling of immature and weak scar tissue[21]. The passive mobilization mechanism is well known[22]. Therefore the soft tissue massage and joint mobilization was used to increase joint flexibility. However, we did not show any significant increased knee motions in self-manual therapy group. We suggest that our manual therapy intervention program could be done longer. Cheawthamai et al. found that the patients with knee OA in the self-manual therapy group gradually increased knee flexion and extension at 4 and 12 weeks[9].

This study showed no significant differences in TUG. The previous study found increase physical activity in six minute walk at 4 and 12 weeks[9]. Deyle et al demonstrated the six minute walk at 4 weeks but no significant change at 8 weeks[23]. Difficulty in performing physical activity in individual with knee OA can be attributed by many factors such as quadriceps inhibitor, obesity, knee laxity, knee alignment, fear of physical activity and self-efficacy[24]. Therefore these factors could not be changed immediately. The intramuscular adaptation gained in strength was obtained after 12 weeks of resistant exercise training[25].

The benefits of treatment in the present study were achieved immediately after treatment procedures. Most previous studies have also demonstrated in 6-8 treatment sessions over 3-4 weeks[7,9,17,23.] Moreover, this study is the first study that determined the effects self-manual therapy compared to supervised manual therapy. However, the physical therapist still play important role for individually assessing the impairments, assigning the treatment program and adjusting the intensity, frequency of the treatment procedures. Thus, this active treatment is an easier and effective alternative treatment for pain reduction in individuals with knee OA.

While these results provide important self-manual therapy for knee osteoarthritis, they should be interpreted with respect to several limitations. First, the larger study populations and long term study are needed in the future study. Second, the ages of our participants were more than seventy years old. This variable might lead to differences of the improvement in pain, knee range of motion and functional activity.

Conclusion

In conclusion, our results showed that the self-manual therapy immediately reduced pain in patients with knee OA. However, the supervised manual therapy had a greater effect in knee motions improvement.

Conflict of Interest: No Conflict of interest

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Effect of Non-filtered Drinking Water on Some of the Kidney Functions Compared to Filtered Water in Some People in Bishan Village

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Abstract

In this research, we have to study some vital variables in the blood, in order to determine the status of the college where we sought samples of people who are used to filtered water as well as samples of male people used to non-filtered water and comparing these results in one area are the village of Bishcan. This study showed a change in results as we found a significant increase ($p \leq 0.05$) of the level of both sodium and potassium in the people who use the ordinary water compared to people who drink the filtered water, and there was no significant increase ($p \leq 0.05$) in the level of the creatinine and uric acid compared to control group, there was no significant decrease in urea level ($p \leq 0.05$), when comparing the control group in the people who use unfiltered water compared with those who drink water filtered.

Keywords: *Chronic Kidney Disease, potassium, sodium, creatinine, Urea, Uric acid.*

Introduction

Characterized contamination as any substance or vitality acquainted with the earth by human exercises that could effect sly affect human wellbeing, harm living assets, and biological systems, condition. Decimate the structure, or meddle with the real utilization of the environmental [1]. Environmental wellsprings of lead introduction incorporate water from lead funnels (normal in homes worked before 1986). What is more, sullying of air, soil, and water in regions near lead smelters, old mines, or carports [2]. The majority of the synthetic concoctions created by man will, in the long run, end up in our water supplies. These perilous items from industry, agribusiness and other human exercises enter the waterways, lakes, and underground water, and can debase our drinking water. Water contamination is a worldwide concern. New water specifically, which is Resource basic to human life, is turning into a constrained asset because of the impact [3]. The populace of development, contamination and worldwide. Ecological lead danger happens basically through ingestion, in spite of the fact that introduction can likewise happen through tobacco smoke. Lead flows in the blood and can either be discharged by the kidneys or can store in the bone[4]. Affected people gave weakness, extreme bone agony and osteomalacia, and kidney danger including decreased kidney work and eventually passing owing to kidney disappointment [5]. Natural wellsprings of arsenic incorporate groundwater, pesticides (by causing sustenance pollution), fish [6]. High drinking water arsenic levels have been related to expanded mortality from CKD [7]. Arsenic dimensions in serum and platelets correspond with declining kidney malady[8].With the improvement and movement of CKD credited to arsenic-incited oxidative pressure [9]. There is clashing proof of nephrotoxicity auxiliary to dental amalgam White. It is sifted by the glomerulus and reabsorbed in the proximal tangled tubules, bringing about cylindrical danger with low sub-atomic weight proteinuria and enzymuria[10]. Introduction to uranium is for the most part oral, through groundwater and nourishment, albeit dermal presentation has been accounted for kids playing in sullied zones. Concentrates in occupationally uncovered populaces have likewise revealed aminoaciduria and low atomic weight proteinuria.The point of this investigation is to decide the connection between contaminant drinking

water and its effect on human wellbeing. Incessant kidney infection (CKD) is an overall general medical issue, and it is getting expanded worldwide consideration in view of the quick spread of the illness. Maturing, diabetes, hypertension and nephrotoxic medications use are known to be essential hazard factors for CKD. Be that as it may, CKD of obscure etiology (in the future CKD) is additionally common and quickly advancing in certain areas of the world outstandingly in Africa, Central America, and Asia [11]. The term ''obscure etiology'' alludes, in light of the fact that the sickness isn't related with any realized hazard factors. If not appropriately treated, CKD can prompt end-organize renal sickness and frequently demise[12].

Material and method

The study: The study took two groups.The first group is the control group that took persons who drink distilled water (water with filter) while the second group is a testing group that took persons who drink river water(water without filter).

Sampling: Around 5 ml of venous blood were pulled back from people (patients and controls), utilizing an expendable syringe. The gathered blood was then permitted to clump in a plain cylinder at room temperature, after which the serum was isolated by centrifugation at 3000 rpm for 10 minutes. Every serum test was gathered in numerous compartments to limit wrong outcomes from solidifying and defrosting, serum was kept solidified at - 20 °C to be examined later on.

Data Collection: The samples collected according to up to 30 samples, to person males only, who drink filter water and others who drink non-filter water and their ages ranged aging between (18 to 38) years old.

Biochemical measurements: A number of equipment were used to biochemical measurements, and some of the chemical materials were prepared, Determination of sodium concentration, and Determination of potassium concentration, creatinine, urea, uric acid in blood serum.

Results

The aftereffects of the investigation Showed a huge increment in the potassium, sodium, and no significant increase in level the creatinine and uric acid compare to control group but the urea no significant decrease in the result (test group) compare with the control group. The following table shows the biometrics of this study:

Tests	Control Group	Test Group
Potassium	9.1300 ± 1.75756 a	12.6900 ±3.28344 b
Sodium	145.2800 ± 8.54132 a	158.4600 ± 11.64085 b
Creatinine	0.8000 ± 0.42164 a	1.0700 ± 0.29078 a
Urea	28.7600 ± 7.54132 a	24.8200 ± 5.75013 a
Uric Acid	5.7700 ± 0.84334 a	6.5400 ± 0.93714 a

The table shows the biological variables studied in the present study: The Horizontal different letters mean a significant difference or difference at the probability level of $p \leq 0.05$, the above values refer to the mean ± standard deviation.

Discussion

The outcomes appeared in the table demonstrate a huge increment in the level of sodium in the serum of people using normal water (non-filter) in drinking compared with people who drink filtered water and from the same area and the reason that there is a rise in the proportion of salts in water taken, High sodium blood . And because salt has an effect on the target organs, especially the kidneys because it leads to decreased nephrons in the kidney and leads to chronic kidney failure[13].

Raise the rate of chloride salt in water from allowable level more than (250 mg/l) its have conjugate with increasing of sodium rate in blood,sodium is one of the factors that forming kidney stones, because the salt has an effect on the target organs, especially the kidney due to lead to a decrease in the nephron of the kidney and lead to chronic kidney failure [13].

The consequences of the present examination demonstrated a noteworthy increment in the potassium level in the serum of people who use normal drinking water in the region compared to people who use filtered water due to the role of the kidney in the release of approximately 90-95% of potassium within the body when chronic renal insufficiency The efficiency of this process decreases. This is consistent with the two researchers, Excessive Potassium can occur in the blood due to the utilization of an excessive amount of Potassium salt and kidney inability to discharge the Potassium

particles in the pee and the spillage of Potassium from the cells and tissues into the circulatory system. The most common cause of Potassium hyperactivity is renal diseases which is about three quarters of all cases[14].

The examination demonstrated that there was a no huge increment in creatinine focus in the serum of individuals who drink ordinary water contrasted and individuals who drink sifted water. This expansion demonstrates that they are in danger of kidney disappointment. This is steady with specialists [15, 16, 17]. The purpose behind the expansion in creatinine in the serum to the way that creatinine of the metabolic waste that is raised normally with the pee of the kidneys and on account of kidney lack gets a kidney issue keeps them from the selection and the dumping of waste builds the grouping of creatinine in the blood and is conversely relative to the speed of glomerular filtration decay Simple J GFR prompts expanded centralization of serum creatinine[18, 19].The damage of renal lead to expanded convergence of serum creatinine and embrace this increment and the speed of progress in the blood on the seriousness of the complete damage and speed of development of creatinine[20].

The study showed that there was no huge increment in the dimension of uric acid, and may increase in cases of taking more than the samples and wider ages, because the height was very acidic but did not appear in the statistical analysis may be due to the high level of serum uric acid to Because this compound is a metabolic product that is introduced by the kidneys with the urine and if kidney failure occurs (kidney failure), a defect occurs in putting the compound out with the urine leading to an increase in blood. As renal injury increases the concentration of uric acid in the blood and depends on the increase and rapid change in the blood on the severity of the kidney injury unit and the speed of the formation of uric acid [20].

The outcomes appeared in the table demonstrate a no noteworthy reduction in urea focus in the serum, which is an impression of the aftereffects of examination[21]. The reason is that urea is the essential nitrogenous material of the metabolic waste, which is for the most part framed in the liver from the proteins, With urine, and that the increase or decrease in the proportion of urea depends on the condition of the kidney and the rate of intake of proteins and the rate of compensation, the low intake of protein may lead to a decrease in the proportion of urea.

The presence of heterogeneity in some of the results may be because the samples taken were for small ages less than 38 years This means that the kidneys, even if they are damaged, are still in the case of helping to regulate some of the products, which explains why the urea is low as well as the rise in creatinine Is large enough to prove that there is renal failure but these are at risk of kidney failure.

Conclusion

My study concluded then water without filter possess effects on the kidney for persons who drinking this water due to the changing in the tests by increasing in this tests from persons who drinking water with filter except the urea test is oppositely from them is decreasing.

Conflict of interest: There is no conflict of interest among the authors.

Funding: Self

Ethical Clearance: This study is ethically approved by the Institutional Ethical Committee.

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Effect of Zinc Oxide Eugenol on Shear Bond Strength of RMGIC and Resin Cement: An in Vitro Study

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ABSTRACT

Aim: To determine the effect of Eugenol based temporary cements on bond strength of RMGIC and RelyX ARC.

Materials and Method: A total of fortymolars were sectioned 3mm below the occlusal surface and roughened surface was smoothened by 60-grit sand paper. Zinc oxide eugenol was given as a temporary restoration for 20 molars and the rest were not exposed to eugenol. Zinc oxide eugenol was removed using ultrasonic scaler and viewed under magnification for precise removal.20 molars not exposed to eugenol were divided into group 1 (RMGIC) and group 3 (Resin).Other 20 teeth which were exposed to Eugenol were also divided similary into group 2(Eugenol+RMGIC) and group 4 (Eugenol+Resin).Shear bond strength(SBS) testing was done using knife edge blade in the universal testing machine(INSTRON) at CIPET in Chennai.

Results: On comparing Shear Bond Strength using t-test, no statistical significance ($p>0.05$) was found between RMGIC groups whereas between Resin groups statistical significance was found.

Conclusion: When ZOE was used as temporary cement there was a decrease in shear bond strength for resin cement but no difference was observed in RMGIC groups.

Keywords: *Shear bond strength, Eugenol, Polymerization, Chemical polyalkonate- hydroxyapatite bonding, Micromechanical interlocking.*

Introduction

Luting cementsseal the space between the tooth and the restoration[1]. Their basic requirements of luting cements include: not deleterious to tooth or oral tissues, adequate working time to place the restoration, enough flow to seat the restoration completely, able to resist functional forces, radiopacity, and should be insoluble to maintain an intact seal[2]. Provisionalization prior to final cementation is necessary to avoid sensitivity and micromovements [3]. Temporary cements are of Eugenol and non-Eugenol based.Eugenol containing cements have sedative effect on sensitive teeth, low cost,ease of removal and excellent seal against leakage [4]. The use of eugenol containing temporary cements might affect the quality of bonding [5].Commonlyused luting cements are Zinc phosphate, Zinc polyarboxylate, GIC, RMGIC and Resin cement [6].Resin cements are used in a diversity of clinical applications. With the inclusion of resin monomer to GIC, RMGIC is proven to have improved mechanical and physical properties when compared with conventional GIC[7].RMGIC shows better cohesive strength and lower modulus of elasticity

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than conventional GIC[8].RMGIC powder contains fluoroalumina glass particles,photo and chemical initiators and liquid contains polyacrylic acid with pendent methacrylate group with 10% HEMA.. The basic composition of self–etch adhesives is aqueous solution of acidic functional monomers, with a pH higher than that of phosphoric acid etchants. The role of water provides medium for ionization and action of these acidic resin monomers. Self-etch adhesive systems also contain HEMA monomer because most of the acidic monomers are low water-soluble and also to increase the wettability of dentin surface. Resin cements are preferred because it has superior compressive and tensile strength with low solubility[9]. These cements have higher capacity of adhesion and stability after aging process which helps to bind metal oxides. Hence, these luting cements have some advantages when used for final cementation due to its physical characteristics such as insolubility in oral fluids, high bond strength to dentin and enamel, thin cement film and good esthetics. Clinical success of all ceramic crowns are influenced by the type of luting agent and the technique for definitive cementation. The main parameter to be considered is adequate adhesion between the crown and the tooth structure through the luting cement. Hence better retention and marginal adaptation that prevents microleakage and increased fracture resistance is obtained by high quality bonding between dental substrate and prosthetic crown[10].Eugenol affects the bond strength of resin cements during final cementation by inhibiting the polymerization reaction[11].Previous studies have evaluated the differences between eugenol and eugenol free cements in the retention of permanent cementation and have found that eugenol caused a remarkable decrease in retention of resin cements [12]. Till now, there is no proper evidence to check the shear bond strength of RMGIC luting cements after temporary restoration. So, our study aims to compare the shear bond strength of eugenol with luting cements (RMGIC and SELF-ETCH adhesives).

Materials and Method

Forty extracted human molars stored in distilled water at 4°C. The teeth were sectioned 3mm transversely to expose dentin with water cooled diamond saw. The crowns were embedded in chemically activated polyester resin into poly vinyl chloride pipes in such a way that the occlusal surfaces faced up. After resin polymerization, the surfaces of the teeth were grounded with 60 grit sand-paper to remove overlying dentin and expose flat dentin surface. The temporary cement Zinc Oxide Eugenol (ZOE) were prepared according to manufactures instructions and cemented on 20 teeth. The remaining 20 teeth were used as control. After 24 hours, ZOE was removed using ultrasonic scaler and viewed under magnification for precise removal.20 teeth which were not exposed to Eugenol (control) were divided into group 1 (RMGIC) and group 3 (Resin). Other 20 molars (ZOE exposed) were also divided similar as Group 2 (Eugenol + RMGIC) and Group 4 (Eugenol + Resin).To achieve uniform shape and size of luting cements, drinking straws of 4mm length and 5mm diameter were mounted over the teeth. removal, RMGIC was packed into the straws without any voids. For self adhesive resin groups, cement was applied to the dentinal surface through the straws. Resinous cement excess was removed with brush and was polymerized from each phase for 40 sec, according to manufacturers recommendations without any primer or adhesive. Nail varnish was applied onto the interface of the straws and the tooth surface to prevent entry of water. After cementation, all specimens were stored in distilled water at 37°C.Thereafter, shear bond strength(SBS) testing was done using knife edge blade in the universal testing machine (INSTRON, CIPET Chennai) running at a cross head speed of 0.5mm per min.SBS mean values were recorded in kgf/cm and converted into MPa. Data were statistically analyzed by t-test and tabulated.

Results

Shear Bond Strength values in MPa for RMGIC groups are given in table 1 and its line chart in figure 1. There was no statistical significant difference ($p > 0.05$) between the groups.

Table 1: Shear Bond Strength in MPa

Group 1	Group 2
0.58	0.55
0.37	0.51
0.38	0.41
0.63	0.61
0.66	0.64
0.65	0.56
0.71	0.65
0.67	0.59
0.45	0.48
0.53	0.49

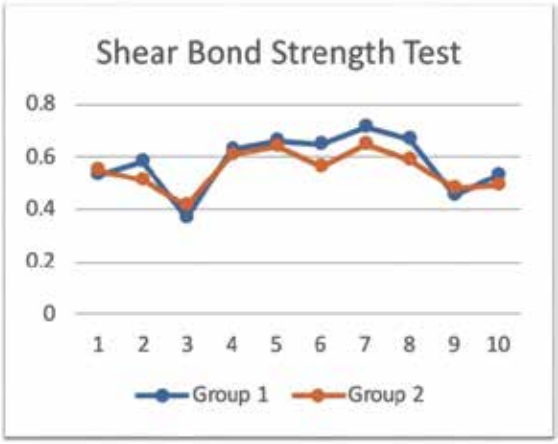


Figure 1: Graph showing comparison of SBS of RMGIC and RMGIC+Eugenol

Shear Bond Strength values in MPa for resin groups are given in table 2 and its line chart in figure 2. It was found that there was significant difference ($p < 0.05$) between the resin groups.

Table 2: Shear Bond Strengthin MPa

Group 3	Group 4
3.58	2.24
3.66	2.31
3.62	2.29
3.53	2.81
3.61	2.35
3.37	2.77
3.21	2.88
3.25	2.54
3.24	2.69
3.16	2.75

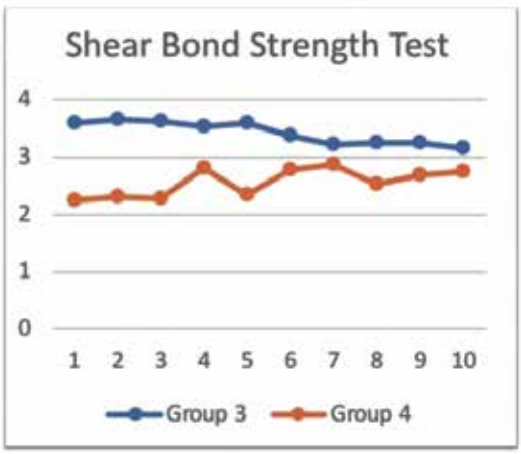


Figure 2: Graph showing comparison of SBS of Resin and Resin+Eugenol

Mean values for RMGIC (group 1) and Eugenol + RMGIC (group 2) were 0.58 MPa and 0.55 MPa respectively, showing no much of difference in their shear bond strength. Whereas for Resin (group 3) and Eugenol + Resin (group 4) mean shear bond strength values were 3.42 MPa and 2.56 MPa respectively, showing significant difference. Mean, Standard Deviation and P values are given in table 3.

Table 3: Statistical analysis

Groups	Mean	Standard Deviation	P value
Group 1	0.58	0.108	0.083
Group 2	0.55	0.076	
Group 3	3.42	0.196	0.0001
Group 4	2.56	0.245	

Discussion

Luting cements which comprises a wide array of materials used for cementation of crowns and indirect restorations to the prepared teeth recently include GIC, RMGIC and Resin cement[13]. GIC have been very popular due to ease of use, good flow properties, adhesion to tooth structure and base metals, fluoride release, sufficient strength, and moderate cost. Its primary indication is for metal and porcelain fused to metal restorations[14]. Although glass ionomers form intermediate layers on dentin they do not bond to materials etched by hydrofluoric acid or treated with silane and are considered passive.Clinical success of full veneer crowns are affected by type of cementation[15]. Retention properties of GIC with zirconia showed lesser life when compared to resin cements containing MDP[16]. Resin modified glass ionomers were introduced, formed by replacing part of the polyacrylic acid in conventional glass ionomer cements with hydrophilic methacrylate monomers[17]. Setting reaction of RMGIC is by both acid base reaction and photo chemical polymerization. The initial and rapid setting of RMGIC is through their polymerization of resin monomer. Slow acid base reaction also takes place within the resin matrix. This reaction is responsible for maturing process and the final strength and water content is too little to complicate the polymerization. RMGIC shows better cohesive strength, lower modulus of elasticity, higher strength, lower solubility and fracture toughness than conventional GIC[8]. Resin luting agents are distinctive because a

polymer matrix forms to fill and seal the space between the tooth and the restoration as opposed to regular cements, which combine a powder and liquid to form a hydrogel[18]. The qualities of resin cements are favourable to enhance aesthetics of all-ceramic restorations, lab-processed composite resin restorations, resin bonded fixed partial dentures and for the cementation of either metal or fiber posts[2].In combination with a dentin bonding agent, resin cements have superior properties and are frequently used for the cementation (bonding) of porcelain laminate veneers [19].The use of adhesive resins, in the restoration of teeth with short, tapered clinical crowns or other unfavourable geometric configurations, may be particularly advantageous because an approach less destructive than traditional crown preparation. Hence, RMGIC and resin cements are preferred over GIC for luting all ceramic crowns. Shear bond force acts on the axial wall whereas tensile force acts on the occlusal surface. Since surface area of axial wall is greater than the occlusal surface area, testing shear bond strength would be more appropriate. In previous studies, final cementation was done 24 hours after removal of ZOE, but we have luted RMGIC and resin immediately after removal of ZOE to mimic clinical practice [10]. Mean SBS for Resin was 3.42 MPa and Resin after ZOE removal 2.56 MPa. Hence, statistical significance was found between Resin with Eugenol and control group. ($p<0.05$) .When zinc oxide is mixed with eugenol chelation reaction takes place and results in a set mass of unreacted zinc oxide particle in a matrix of zinc eugenolate. When set cement contacts water, eugenolate at the surface undergoes hydolysis to liberate eugenol. The hydroxyl group of eugenol tends to protonize the free radicals formed during polymerization of resin based matrix, thereby blocking their reactivity. In a study conducted by Cecinunes Carvalho et al. it is concluded that eugenol-containing temporary restorations negatively influences the resin-dentin shear bond strength [20]. Mean SBS for RMGIC was 0.58 MPa and RMGIC after ZOE removal 0.55 MPa. No statistical significance was found between these two groups. ($p > 0.05$).RMGIC bonds to tooth structure through both micromechanical interlocking chemical polyalkanoate – hydroxyapatite bonding. Though RMGIC contains resin components, it was found unaffected by eugenol in our study. This indicates that acid base reaction dominates the micromechanical interlocking. De Munck et al., 2004 and Coutinho et al., 2007 concluded that there is a greater glass ionomer character in RMGIC thereby increasing the chemical bonding nature and its durability. Thus the acid base reaction in RMGIC continues for a longer time periods and additional acid base reaction would be expected to continue if not disturbed [21].

Conclusion

Based on the findings of this study and within the limitations of in-vitro investigations, there is a decrease in shear bond strength for resin cement when ZOE used as temporary cement. No difference in shear bond strength was observed in RMGIC after ZOE temporary cementation when compared with control groups.

Source of Funding: Nil

Ethical Clearance: Not required for an in vitro research manuscript

Conflict of Interest: Nil

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Surgical Decompression to Treat Periapical Cyst: A Review of Literature

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ABSTRACT

Periapical cyst accounts up to half of cystic lesion of jaws. Large periapical cysts, generally true cyst are self sustaining are less likely to be resolved by conventional root canal therapy. Hence, a surgical intervention is needed. Of all the surgical procedures decompression is a more conservative option to treat periapical cyst. It includes surgical exposure of a cyst wall and insertion of a tube or any drain to decompress the lesion during healing and reduces the necessity of surgical enucleation. The decompression technique has a potentially high success rate with low morbidity and reduced loss of bone support, and should be considered for treatment of these lesions. It can reduce risk of perforation in lesions adjacent to the nasal floor, sinus floor, mandibular nerve, and neighboring tooth apices. Despite certain limitations like need for patient compliance and long-term follow-up, decompression is a viable and less invasive method which can counterbalance the fallacies and should be considered as an alternative to conventional surgeries. This review article describes the origin, methods, clinical outcomes, advantages and drawbacks of decompression procedure for periapical cyst.

Keywords: *Decompression, periapical cyst, marsupialization, surgical drainage.*

Introduction

Back in 500 AD a Greek physician dentist, Aetius performed incision and drainage of acute abscess. It was the first recorded surgical endodontic procedure. Endodontic surgery is often considered as last resort in failed non surgical treatment. The field of surgical endodontics has progressed and evolved with introduction of micro endodontic surgical procedures and lesser invasive procedures. In mid 19th century the concept of decompression was introduce which was less invasive than traditional surgery and root-end resection. Hence, it is often important for the clinician to understand about the pathology of a periapical cyst and choose an effective treatment protocol.

Understanding Periapical Cyst: Periapical cyst accounts up to half of cystic lesion of jaws [1,2], and it was found to be about 7%-54% of all the extracted tooth lesions on histologic examination[3]. It is important to differentiate between true cyst and pocket cyst [4,5], as the tissue dynamic of a true cyst is self sustaining are less likely to be resolved by conventional root canal therapy. Of all the periapical cysts 8%-13% constitute true cysts [4-6]. Cyst is histologically characterized by a stratified squamous epithelium lining developing from epithelial cell rests of Malassez, but may also be related to the crevicular epithelium, the sinus lining, or the epithelial lining of the fistulous tracts. It is of inflammatory origin and has a connective tissue in outer wall and an inner wall of epithelium. As the epithelium desquamates into the cyst, there is an increase in the protein content. To equalize the osmotic pressure, liquid enters the lumen.

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Hence, the cavity has a watery, semisolid, or colloidal content. It gradually increase in size due to a combination of osmotic pressure [8] and prostaglandin and growth factor release [8]. Due to the expansion pressure exerted on the bony walls along with biomolecules has an additive effect on bone resorption.

History: A polish Professor Carl Franz Maria Partsch applied this principle of reducing the pressure by drainage of the cyst, which helps in preventing its enlargement and further leading to bone growth. And in 1892 introduced the concept of cystostomy also known as Partsch I or marsupialization and cystectomy or Partsch II in 1910. He reported suturing the lining to the mucosa of the oral cavity and the conversion of a cyst into a pouch. In 1958, Kurt Thoma described decompression and stated its benefits, like maintenance of pulp vitality, preservation of the inferior alveolar nerve or maxillary sinus, prevention of fracture of the jaw, and low risk of recurrence.

Procedure for Decompression: Decompression and marsupialization are often interchangeably used terms. But decompression is quite different from marsupialization. "Marsupialization is deroofing the outer wall of the cyst by making a surgical incision, evacuating its contents, and establishing a large permanent opening by suturing the remaining part of the cystic membrane to the mucosal surface around the periphery of the opening" [9]. Whereas, decompression is a more conservative treatment option which includes, surgical exposure of a cyst wall and insertion of a tube or any drain to decompress the lesion during healing. It reduces the necessity of surgical enucleation. The drain should be an inert radiopaque material like, polyvinyl tubing, suction catheter, "I" shaped pieces of rubber dam, polyethylene tube with a stent, radiopaque latex tubing or hollow tubes to prevent aspiration [9-11]. There is no standard protocol for the duration necessary to leave the drain. It may be different for different kinds, sizes or locations of lesions. It can vary between two days to five years [10]. The length of tubing can be reduse to create space for healing gradually [12]. To debride the cavity saline or chlorhexidine rinse irrigation must be done periodically, which also favours healing [10,12] and can be done by the patient or the dentist. On appearance of signs of healing clinically and radiographically the drain must be removed.

Review of Clinical Outcome: By using small polyethylene tubes, Marker et al.,in 1996 concluded that decompression resulted in new bone formation and thickening of the cyst wall, while conserving bone and anatomic structures after successful decompression of 23 odontogenic keratocysts [13]. Panoramic radiographs of 57 patients were evaluated by Anavi et al., they concluded decompression on average showed 79.3% reduction in area of cyst and the result was good to moderate in 89% [14]. Ricardo et al., reported a case of an extensive radicular cyst involving teeth 11, 12 and 13, extending posteriorly, limited at the posterior wall of the maxillary sinus. Transalveolar decompression was performed with a mechanical device, after removal of tooth 12. One year and nine months after the decompression procedure, complete regression of the lesion was observed, with no bone sequel and with maintenance of the results over five years of clinical and radiographic follow up [15]. Tian et al., have reported three cases with large periapical cystic lesions which were treated with decompression after root canal treatment, and has observed Healed lesions or lesions in healing were after 1 to 2 years [16]. Johann et al., reported an inflammatory radicular cyst, carried out the cystic decompression. After 6months, radiographically, bone neoformation was observed [17]. Vasconcelos et al., performed the treatment of a large cystic lesion there was a significant reduction of the lesion in all its extension [18].

Drawbacks: The decompression technique is contraindicated in cases of large dental granulomas or any solid cellular lesion, as there is absence of a fluid-filled cavity to decompress [19]. Other drawbacks are, need for long-term follow-up and patient compliance, regular cavity irrigation, unavailability of biopsies for histopathological examination, and possible infection of the exposed cavity.

There is no documented CBCT evidence of complete healing of the apical lesions for through-and-through–type lesions after decompression[16]. For odontogenic keratocysts, decompression or marsupialization has been reported to have a higher recurrence rate, which necessitates secondary enucleation surgery[20]. Tube can be disloged overtime, and can be prevented by stent fixation.

Conclusion

Decompression has minimal risk, as compared to the risk of damaging other vital structures with aggressive surgical enucleation. Hence should be considered as an alternative to conventional surgeries.

Conflict of Interest: Nil

Source of Funding: Nil

Ethical Clearance: Not required for review manuscript.

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An Update of Pain Management in Endodontic Flare-Ups: A Review

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ABSTRACT

Flare-up can be defined as the occurrence of swelling, pain or the combination of these during the course of root canal therapy, which results in unscheduled visits by patients. Inter appointment pain is caused mainly by microbial injury to the periradicular tissues and to some extent by iatrogenic factors which are chemical and mechanical in nature. The offending agents cause inflammation in the periradicular tissues which result in pain and swelling. While post endodontic flare-up is a relatively rare occurrence, the sudden increase in patient symptoms demands for a focused and active treatment plan. This review article discusses these many facets of the flare-up: definition, aetiology, clinical symptoms and management of the situation after its occurrence.

Keywords: *Endodontic flare up, periradicular tissues, apical periodontitis, Inter appointment pain*

Introduction

Mechanical and chemical injuries are often associated with iatrogenic factors. The inter appointment flare-up is a true complication in developing pain, swelling or both after a few days on root canal procedure. The causative factor of inter-appointment flare-ups comprise mechanical, chemical and microbial injury to periradicular tissue or pulp (Torabinejad et al. 1988 seltzer & Naidorf 1985) the article will generally give a consensus of the majority findings or will represent those studies with the best analyses.

Definition: The interappointment flare-up has the following criteria [(1)]: Within a few hours to a few days after an endodontic procedure, a patient has a significant increase in pain or swelling or a combination of the two. The problem is so severe that the patient initiates contact with the dentist. The dentist determines that the problem is of significance such that the patient must come for an unscheduled visit. At the visit, active treatment is rendered. That may include incision for drainage of any abscess that may have formed, canal debridement, opening the access, prescribing appropriate medications, or doing the necessary to solve the problem. [(1, 2)] Because of their nature, these interappointment endodontic flare-ups, when they occur, create difficulties for both patient and dentist. Although there are a few reports on the incidence, aetiologies, and treatment of flare-ups, most related factors remain unspecified.

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Etiology: Dr.Seltzer discussed a number of hypotheses thought to be related to the aetiology of flare-ups [(3).] (Figure 1)

1. Alteration of the local adaption syndrome.
2. Changes in periapical tissue pressure.
3. Microbial factors.
4. Effects of chemical mediators.
5. Changes in cyclic nucleotides.

6. Immunological phenomena.

7. Various psychological factors.

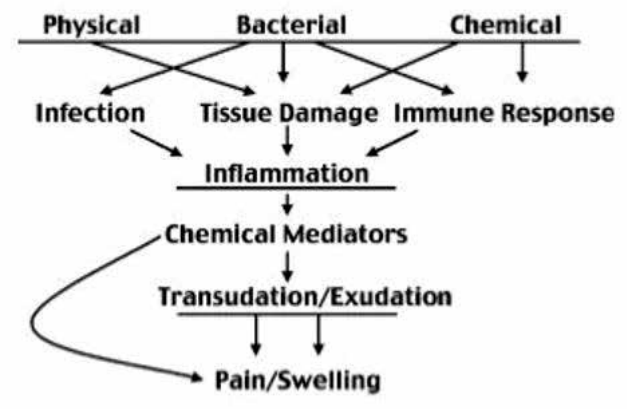


Figure 1: Bacteria, chemical and physical irritants likely act in combination to produce changes at the periapex that results in inflammation and ultimately pain and swelling

Microbial causes: Microorganisms can cause interappointment pain as a result of an imbalance in host–bacteria relationship induced by intracanal procedures. The most important goal of root canal therapy is to minimize the number of microorganisms and pathologic debris in root canal systems to prevent or treat apical periodontitis [7] Bacteria residing in certain anatomical areas of the root canals such as isthmuses, apical ramifications, irregularities, deltas and dentinal tubules may be left untouched and unaffected by disinfection procedures [8] An inadequate seal of root canal filling can allow seepage of tissue fluids and provide a substrate for bacterial growth. The bacteria can also gain access to the periradicular area and cause inflammation [9].

Presence of pathogenic bacteria: Some of the pathogenic bacteria include Porphyromonas endodontalis, Porphyromonas gingivalis, and Prevotella species. (4) A recent study revealed that F. nucleatum, Prevotella species, and Porphyromonas species were frequently isolated from flare-up (4, 2)

Microbial synergism or additism: Most of the endodontic pathogens show virulence when they are in association with other species.[11,12] This is because of synergistic or additive microbial interactions, which can certainly influence virulence and play a role in symptom causation.(5)

Apical extrusion of debris: Extrusion of infected debris to the periradicular tissues during chemo mechanical preparation is one of the principal causes of postoperative pain. (5, 6)

Clinical Symptoms: The next factor determining the post-operative pain is clinical symptoms that were before the treatment such as tooth pain when biting, chewing or by itself and sensitivity to percussion. (10) 80% of patients who feel tooth pain before the beginning of the treatment usually feel the pain and after it (11) Signs and symptoms act as an important predictor for flare-ups.

A patient probably reports on pain are more likely to experience an interappointment flare-up than a patient with no prior symptoms.(12) It is intriguing to note that patients in pain, which would also increase stress levels, have been shown to have adversely impacted immune functions.(13) The clinician can prevent flare-ups in most instances. Proper diagnosis is mandatory which includes Identifying the correct tooth causing pain. The vitality of the tooth has to be ascertained along with its association to any periapical lesion. The correct working length has to be determined using radiographs and apex locators. Complete extirpation of vital pulp has to be done followed by preferably using a combination of irrigants such as sodium hypochlorite and chlorhexidine. Filling too close to the radiographic apex has to be avoided. Apical trephination must be performed only if necessary. Placement of appropriate intercanal medicaments is important to make sure the treatment is a success. The tooth is to be relieved from occlusion especially if the apex is severely violated by over instrumentation. Mild analgesics and antibiotics can be prescribed whenever the condition warrants it. (14)

Managements and Drugs: Using non-steroidal anti-inflammatory drugs (NSAID) must be the first option for endodontic flare-ups and pain (e.g., 400 mg ibuprofen or 100 mg flurbiprofen). If NSAID cannot be used, paracetamol (1000 mg) and opioid combination is an excellent alternative medication for acute pain syndrome too.(Table-1)

Table 1: Dosage Of Analgesic Drugs

Analgesic Agent	Dosage (mg)	Max Daily Dose (mg)
Paracetamol	325-1000	4000
Aspirin (acetylsalicylic acid)	325-1000	4000
Diclofenac Potassium	50-100	200
Etodolac	200-400	1200
Meloxicam	200-400	1200
Nimesulide	200-400	1200

Conted…

Fenoprofen	200	1200
Flurbiprofen	50-100	300
Ibuprofen	200-400	2400
Ketorolac	10	40
Naproxen sodium	275-550	1650
Naproxen	250-500	1500
Ketoprofen	20-75	300
Tenoxicam	20	20
Lornoxicam	20	20

Conclusion

A Endodontic flare-up has no significant influence on the outcome of endodontic treatment, its occurrence is extremely undesirable for both the patient and the clinician and can undermine clinician-patient relationships. Prompt and effective management of flare-ups is a vital part of the overall endodontic treatment.

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Successful Management of Calcified Canal with Perforation—A Case Report with Six Months Follow Up

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ABSTRACT

Calcific metamorphosis is the obliteration of pulp canal space due to trauma or injury. Hemorrhage and blood clot formation in the pulp after injury is a nidus for calcification if the pulp still remains vital. Calcification replaces the cellular components of the pulp. Teeth with pulp canal obliteration prove to be a challenge to endodontic treatment. This case report describes the successful management of a tooth with calcified canal and perforation with six months follow up.

Keywords: *Pulp canal obliteration, perforation, root canal treatment*

Introduction

Calcific metamorphosis is a slow and normally occurring physiological aging process. The pulp canal obliteration (PCO) may also be a pulpal response to trauma wherein there is rapid deposition of hard tissue within the root canal space[1]. There is uncontrolled mineralization in these teeth due to failure of the enzyme pyrophosphatase, reduced capillary permeability and reduced blood supply leading to calcifications. Though the exact mechanism of root canal obliteration is unknown, it is believed to be related to damage to the neurovascular supply of the pulp at the time of injury[2]. Due to these reasons the pulp canal space is obliterated and an effort to negotiate the canal may remove large amounts of dentin leading to perforation or root fracture[3].

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Case Report: A male patient aged 45 years reported with pain in upper front tooth region. Patient gave history of attempted root canal treatment in 11 about 8 years back. On clinical examination there was a perforation on the cervical third of labial aspect of 11(Figure 1). There was also an eccentrically placed access on the lingual surface due to the attempted root canal treatment (Figure 2). The maxillary central incisor was tender on percussion.



Figure 1: Pre operative photograph–Labial view



Figure 2: Pre operative photograph–Palatal view

Radiographic interpretation showed a narrowed down root canal in 11 with periapical radiolucency in relation to 11(Figure 3). It was diagnosed as Acute apical periodontitis with perforation and sclerosed root canal in 11. The treatment plan was to seal the perforation and non surgical endodontic treatment in 11.

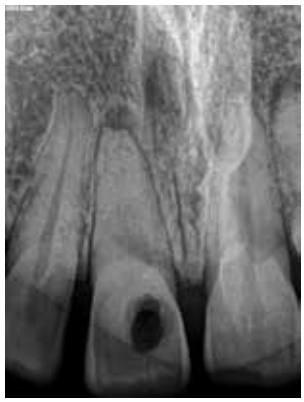


Figure 3: Diagnostic radiograph

Local anaesthesia was given and the tooth was isolated under rubber dam. The attempted access cavity was redefined with utmost care to stay centered in the canal. The calcified pulp chamber was visible as a darkened line and the center spot was the root canal. The canal was located and negotiated with a size 6 k file(Figure 4). The perforation site was sealed with composite resin from within the canal. Cleaning and shaping was done very carefully and copious irrigation was done with sodium hypochlorite and saline. The canal was enlarged upto size F3 and obturation was done by lateral condensation using Sealapex as sealer. There was a slight extrusion of sealer as seen in the post obturation radiograph(Figure 5). The patient was asymptomatic on the follow up visits and a metal ceramic crown was given. Six months follow up radiograph showed complete healing of the lesion, bone deposition and complete resorption of the extruded sealer (Figure 6).



Figure 4: Working length determination radiograph



Figure 5: Obturation radiograph



Figure 6: Six months follow up radiograph

Discussion

Calcification commonly occurs as a result of trauma and frequently affects the anterior teeth of young adults. Holcomb & Gregory examined 882 servicemen and reported that 34 out of them had a total of 41 anterior teeth exhibiting partial or total obliteration of the pulp spaces, representing an incidence of 4% [4]. Andreasen assessed 108 patients and reported that PCO was found in 42 teeth (22%)[5].

A yellow discolouration or reduced transparency of the crown has been reported to occur in teeth with pulpal obliteration [6]. In the present case, yellowish brown discolouration of the crown was seen in 11. In cases of PCO, pulp sensibility tests are unreliable [4]. In our case the tooth did not respond to EPT. A progressive decrease in the response to thermal and electrical pulp testing has been reported as PCO becomes more pronounced [7,8,9].

Significant difference to electric pulp testing has been observed between partially obliterated teeth compared to those that were totally obliterated [9]. Teeth with partial pulpal obliteration were more responsive than those teeth with total obliteration. Teeth undergoing calcification are generally asymptomatic [9] or exhibit mild symptoms. In our case the patient had pain in the affected tooth. Though the mechanism of pulp canal obliteration has not been exactly explained, there are various studies which have proved certain facts about calcfifcation. Torneck et al reported that the deposition of hard tissue is either a result of stimulation of the preexisting odontoblasts or a result of the loss of their regulatory mechanism which contains a maze of small irregular spaces and cul-de-sacs, which extend from the pulp chamber to the apical foramen [10].

Andreasen et al described that calcific metamorphosis as a response to severe injury to the neurovascular supply to the pulp, which after healing leads to accelerated dentin deposition, resulting in pulp canal obliteration. This is closely related to the loss and re-establishment of the pulpal neural supply[11].

The odontoblasts which are located at the periphery and the undifferentiated pulp cells produce osteoid tissue very similar to that of dentin along the periphery or with in the pulp. In the end, these tissues fuse with one another, producing a rapid and complete pulp canal obliteration[12]

Ten Cate, explained the process of canal obliteration as the deposition of tertiary or reparative dentin in response to irritation or trauma. Reparative odontoblasts formed by this process differentiate from dental pulp cells in the absence of any epithelial influence. During the development of the tooth, the undifferentiated ectomesenchymal cell of the dental papilla divides into two daughter cells among which, one is influenced by the epithelial cells and differentiates into an odontoblast, while the second daughter cell that is not exposed to the epithelial influence persists as a subodontoblast cell. This subodontoblast cell, under certain influences like trauma, differentiates into odontoblast-like cells and deposits dentin-like hard tissue [13,14]

There is a debate whether the mineralized tissue so formed is true dentin. The original odontoblasts express type I collagen and phosphophoryn, whereas the reparative dentin is produced by newly differentiated cells and incorporates type I and III collagen in its matrix, which exhibits diminished Phosphophoryn content [15,16].

In our case, hand K files such as #6, #8 and #10 were used for negotiation and estimating the working length, since the canal was severely calcified. These files aid in determining the minor constriction of the root canal. The common mishap associated while negotiating canal in a calcified tooth is gouging or perforation. In our case, since it was an attempted root canal treatment, the patient reported with a perforation at the coronal level, which was evident on the labial view. The perforation was sealed with composite resin from within the canal. The tooth was obturated and a metal ceramic crown was given. The patient was asymptomatic on six months follow up and the lesion had completely healed.

Conclusion

Calcified canals can be effectively managed by patient and diligent sequential negotiation. Successful management of calcified canals lies in appropriate use of the recent armamentarium under adequate illumination and magnification.

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Ceramics in Dentistry—A Review

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ABSTRACT

The word Ceramic originated from the Greek term keramos meaning "potter or pottery". (7)

Dental ceramics have long been recognized for their similarity to dental enamel. They can be made to closely mimic the shades and textures of the natural tooth. Porcelain provides the practitioner with the clinical ability to restore a patient›s dentition to its original appearance and function. The biocompatibility and user-friendliness of dental ceramics are unmatched in any other restorative material. Demands for more esthetic and metal free restorations as well as soaring metal prices are causes for the increase in all ceramic prosthesis. (10) Over the past two decades, the use of bonded porcelain has expanded exponentially owing to the increasing demand for esthetic restorations and prosthesis. This article is an attempt to summarise the many facets of dental ceramics.

Keywords: *CAD-CAM, ceramics, feldspar, fillers, glass-based system*

Introduction

Ceramics are defined by literature as inorganic, non-metallic materials made by man by heating of raw materials at high temperatures. Ceramics and glasses are brittle which means that they show a high compressive strength but have low tensile strength and fracture under very low strain that is 0.1% or 0.2%. [1] All ceramics display low fracture toughness when compared to other dental materials such as metals. Metal ceramic systems integrate both the excellent esthetic properties of ceramics and the exceptional mechanical properties of metals. Some metals used as restorative materials in dentistry may comprise a problem for some patients. These problems may reveal themselves as allergies, gum staining and release of metallic ions into the gingival tissue and gingival fluid. These drawbacks, as well as the search for more esthetic materials, have stimulated research and development of metal-free ceramic systems.

Processing techniques novel to dentistry have been formulated, such as heat-pressing, slip-casting, and Computer Aided Design-Computer-Aided Machining (CAD-CAM).(4) The introduction of vacuum-fired porcelains and the bonding of porcelain to gold alloys (introduced by Weinstein et al4 in the early 1960s) were key breakthroughs in dental esthetics. (5)

Classification: Ceramics can be classified by the microstructure and also by their processing technique.

Microstructural classification: At the microstructural level ceramics can be defined by the nature of their composition of glass-to-crystalline ratio.

1. Glass based systems
2. Glass based systems with fillers, usually crystalline
3. Crystalline based systems with glass fillers
4. Polycrystalline solids

Classification based on processing technique

1. Powder/liquid, glass-based systems

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2. Machinable or pressable blocks of glass-based systems
3. CAD-CAM or slurry, die processed, mostly crystalline systems

Glass-ceramics: Glass-ceramics were first formulated by Corning glassworks in the late 1950s. The sufficient mechanical properties of these materials reflect in the promising longevity of such dental restorations. [6] In principle, an article is formed by liquid and metastable glass, which results on cooling. During following heat treatment, regulated crystallization occurs, with the nucleation and growth of internal crystals. This process ranging from a glass to a partially crystalline glass is called ceraming. Thus, a glass-ceramic is a multiphase solid encompassing a residual glass phase with a finely dispersed crystalline phase. The controlled crystallization of the glass results in the formation of tiny crystals that are evenly dispersed throughout the glass. Time and temperature of the ceraming heat treatment determines the number of crystals, their growth rate and thus their size. By the There are two important aspects to the formation of the crystalline phase: crystal nucleation and crystal growth. The thermal treatment known as ceraming is comprised of two operations : glass is heated up to a temperature where nuclei form (750° to 850°C) and this temperature is kept for a duration of time ranging from 1 to 6 hours so that crystalline nuclei form in the glass through a procedure called as nucleation. Then, the temperature is increased to the crystallization point(1000° to 1150°C) and this temperature is retained for a period ranging from 1 to 6 hours until the necessary level of glazing is attained through a process known as crystallization.

Glass based systems with fillers

Lucite reinforced feldspar glass ceramics: Glass based systems are built from materials that contain mainly silicon dioxide, which contains different amounts of alumina. Aluminosilicates found in nature which comprise various quantities of potassium and sodium are recognized as feldspars. Feldspars are modified in various ways to create the glass that is used in dentistry. Pressed glass-ceramics are materials containing high amounts of lucite crystals. The basic component of this ceramic is feldspathic porcelain, consisting of 63% silicon dioxide, 19% Al2O3, 11% K2O 4% Na2O and traces of other oxides.

This material is manufactured through a process known as heat pressing, which is performed in an investment mould. This mould is filled with the plasticized ceramic thus avoiding the sintering process and the subsequent pore formation. This ceramic undergoes dispersion strengthening under the guided crystallization of leucite. Dispersion strengthening is a process by which the dispersed phase of different material is used to stop crack propagation as these crystalline phases are more difficult to penetrate by cracks.

Lithium disilicate and apatite glass-ceramics: According to Kelly a ceramic is a glass-ceramic when the filler particles are added mechanically while manufacturing precipitate within the glass by special nucleation and growth heating procedures. [3] The crystalline phase that forms is a lithium disilicate and makes up about 70% of the volume of the glass-ceramic. A second crystalline phase consisting of a lithium orthophosphate of a much lower volume is also present. The mechanical properties of this ceramic are way more superior than that of the leucite glass-ceramic with a flexural strength of 350-450 MPa and fracture toughness nearly three times that of the leucite glass-ceramic. This glass-ceramic is claimed to be highly translucent due to the optical compatibility between the glassy matrix and the crystalline phase, which minimises the internal scattering of light as it passes through the material. The processing technique is the same as the hot pressing technique described above except that the processing temperature is 920°C which is lesser than that of the leucite glass-ceramic.

Crystalline based systems with glass fillers: The addition of alumina to the feldspathic glass during the pre fritting process restricts the amount of alumina that can be incorporated to about 4250vol%. And an alternative strategy has been adopted in a system called In-Ceram. This core material has an alumina amount of 85%. A ceramic core is fabricated onto a refractory die from a fine slurry of alumina powder by a method known as slip casting. After the die has dried, it is sintered for 10 hours at 1120°C. The melting temperature of Alumina is too high to generate full densification of the powder by liquid phase sintering, and the solid phase sintering independently happens. Consequently, the coping thus created is only just held together at the contact points between the alumina particles, and a porous structure is a result. The strength of this porous structure is only

about 6-10 MPa. The porous structure is then infiltrated with the lanthanum glass, which has a low viscosity when fired at 1100°C for 4-6 hours which increases strength. Glass is able to infiltrate into the pores, creating a dense ceramic. The esthetics and functional form are then attained by the use of traditional feldspathic dental ceramics. The In-Ceram system was evolved by the French dental material scientist Michael Sadoun based on the glass infiltration of partially sintered porous aluminum oxide ceramics [7]

Some of the common In-Ceram systems used are

- In-Ceram Alumina
- In-Ceram Spinell
- In-Ceram Zirconia

Polycrystalline ceramics

Transformation toughened zirconium oxide: Zirconia exists as a natural mineral named baddeleyite. This mineral comprises of 80 to 90% zirconium oxide. This oxide occurs in three different crystal structures monoclinic, tetragonal and cubic. Zirconium oxide is converted from one crystalline state to another during firing. In the late 1980s ceramic engineers learned to balance the tetragonal form at room temperature by adding small quantities of calcium and later yttrium or cerium. Although stabilized at room temperature, the trigonal form is metastable, implying that trapped energy exists within the material to send it back to the monoclinic state. Two key improvements allowed fully crystalline ceramics to become logical for fixed prosthesis.

1. The variability of highly controlled starting powders
2. The application of computers to ceramics processing

Polycrystalline ceramics are formed from powders that can be packed only to 70% of the theoretical density. Hence polycrystalline ceramics around 30% by volume when made completely dense during firing for the final processes to conform to well, the percentage of shrinkage needs to be accurately foreseen and reimbursed for.

CAD-CAM technologies and materials: Using in-office CAD/CAM Technology, clinicians can design, fabricate and insert all-ceramic inlays, onlays, crown and venues in a single patient visitation. The ceramic restorations manufactured by this method have revealed excellent fit, strength and longevity. Two main techniques can be used for CAD/CAM restorations

1. Chairside single visit technique
2. Integrated chairside laboratory CAD-CAM procedure

Chairside CAD/CAM technique

The CEREC system: The CEREC system gives an in-office alternative for Porcelain restorations. The processing starts with the smooth, rounded, well-tapered restoration. This preparation is sprinkled with titanium dioxide contrast powder in the patient›s mouth. An infrared camera reads the powder and builds a 3D optical impression on the computer. This image can be altered by the dentist to create favorable anatomy and contacts before processing. The shade for porcelain is selected by the dentist, and this shade selection is entered into the computer. The computer then instructs the dentist on what block of porcelain or composite is to be used. This block is then milled in office, according to the computer design. The restoration comes out of the milling machine with ceramics sprue that needs to be eliminated. This restoration is then tried in the patient›s mouth and any adjustments essential can be done and it can be cemented in using composite.

Integrated chairside side laboratory CAD/CAM technique: An integrated chair side laboratory technique needs two visits. The clinician either can scan the preparation directly and send the scan to the laboratory or can take a conventional impression after which stone model is poured and then the laboratory scans the stone model.

Restoration Design and Fabrication: Building the virtual restoration is similar to that conventionally executed at the laboratory. The die margins are then trimmed and altered and the restoration is designed. Rather than manually building up the restoration using layers of porcelain, however, the clinician is presented with a fully controlled 3D model of the restoration to refine. Using a CAD-CAM restorative technique, a number of phases can be simplified or removed. Conventional impressions can be replaced by using a handheld scanning device that digitally records the form and margin of the preparation.

Solid sintered monophase ceramics: Solid sintered monophase ceramics are materials that are manufactured

by directly sintering crystals together without any intermediate matrix to form a dense, glass-free, polycrystalline structure. There are many different processing techniques that enable the fabrication of either solid centred Aluminium oxide or oxide frameworks. There are three basic methods for constructing the solid simple framework for porcelain application.

1. One system, DCS Preciscan machine the final desired framework shape from a solid sintered block of material.
2. Secondly, the Procera system utilizes an oversized die where a slurry of either Aluminium oxide or zirconia oxide is applied to the die, subsequently fired, fully sintered and shrunk to match the scanned die.
3. The third method machines an oversized coping from a partially sintered block of zirconium oxide material, which is then fired to the full sintering temperature and then shrunk to fit the die. Most of the systems in the market today utilize some deviations of this type of Technology. Examples of these systems are Lava (3M) and Cercon(Dentsply).

Strength and fracture toughness

Strength: Mechanical downfall of ceramic materials is almost entirely controlled by brittle fracture. Increased crystalline silica content within the glass Matrix with a more balanced distribution of particles and a fine particle size, has yielded significant developments in the flexural strength of ceramic materials. However, district improvements are still restricted by the innate weakness of the glass matrix. Techniques to strengthen the brittle materials comprise the development of residual compressive stress within the surface of the material and interruption of crack propagation through the material.[11]

Fracture toughness: More crucial physical property is fracture toughness, which has been documented to be between 8MPa $m^{1/2}$ and 10MPa $m^{1/2}$ for zirconia. This is significantly greater than any previously documented ceramic, and approximately twice the amount reported for the Alumina materials. Fracture toughness is a gauge of the material›s ability to resist crack growth.

Clinical Indications[2]: Feldspar based and lucite reinforced ceramics according to their low flexural strength are implied for single-tooth restorations such as veneers, inlays, onlays, partial crowns, and anterior and posterior crowns. Zirconia reinforced lithium silicate can also be used for fabrication of implant-supported crowns. Having the high crystalline content, lithium disilicate ceramic can be used not only for single-tooth restorations but also for the fabrication of hybrid abutments, hybrid abutment crowns and three-unit bridges as well. densely sintered, high purity Alumina can be used for primary elements of conical and telescopic crowns, crowns in the anterior and posterior, as well as for bridges only in the anterior area with not more than one pontic. Yttria stabilized Zirconia is indicated for fabrication of anterior and posterior crowns, implant abutments, implant-abutment crowns, primary telescope grounds, 3 unit inlay and only bridges, cantilever bridges with minimum of two abutment teeth and maximum of one pontic and no more than one premolar width, anterior adhesive bridges as well as multi-unit long span and curved bridges with a maximum of 4 pontics next to one another in the anterior area and the maximum of three pontics next to one another between abutment teeth in the posterior area.

Conclusion

This modern generation of ceramic materials presents interesting options, both in terms of material choice and fabrication techniques. Manufacturers are frequently introducing newer ceramic materials and enhancing their present systems, which has resulted in a boost in all-ceramic restorations and fewer porcelain-to-metal restorations. [9] A deeper understanding of the dynamics of these materials with respect to the design of the restoration and its planned use is important to facilitate these restorations to perform productively. Advances in CAD/CAM technology have catalyzed the development of esthetic all ceramic restorations with superior biomechanical properties. Although none of these materials show ideal clinical properties for universal applications, intense research undertakings are under way to improve the strength, esthetics, accuracy, and a capacity to reliably bond to the varying dental substrates. [12]

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Hazards of Dental Waste Disposal—A Review

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ABSTRACT

Waste is a direct consequence of human activity and the quantity of generated waste is often an indicator of the economic strength and development of a community. Dentistry is a profession which is dedicated to promoting and enhancing oral health and well being. Dentists use a variety of materials and equipment to accomplish this goal. Unfortunately, some of these materials present potential challenges to the environment. This article is an effort to discuss the various materials the hazards caused by them and their appropriate disposal technique.

Keywords: *biomedical waste, disposal, recycle*

Introduction

Clinical waste is defined as any waste which contains wholly or partly of human or animal tissue, blood or other body fluids, excretions, drugs or other pharmaceutical products, swabs or dressings, syringes needles or other sharp instruments. Waste is defined as hazardous when the waste itself or the material or substances it contains are harmful to humans or the environment. According to an estimation by a US medical waste tracking system, the dentist generates only 3% of the total medical waste. The proportion of dental waste can significantly contribute to the number of pollutants generated in the environment if its disposal is not well managed. [(1)] Additionally, there are cross-infection risks associated with mismanaged waste. Such cross-infection may be from human scavengers who are reported to visit dunghills to pick victuals and are predisposed to deadly infections. [(2,4)]

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Healthcare waste legislation: There are many controls in place to ensure that clinical waste is managed safely and disposed of in a way that ensures human health and the environment remains free from harm. These controls are listed under the environment protection act 1990 where it states that 'it is unlawful to deposit, recover or dispose of controlled waste without a waste management license, or in a way that causes pollution of the environment or harm to human health.

All clinical waste handling and disposal procedures must comply with the following regulations:

- The environmental protection act 1990
- Controlled waste regulations 2012
- Hazardous waste directive 2011
- Carriage of dangerous goods regulation

The statutory duty of care applies to everyone involved in the waste management industry. It states that as a producer of any controlled waste it is your responsibility to ensure the proper management of the controlled waste your business produces. [(2)]

Categories of waste generated in dental practices[(3)]

- Biomedical waste – non-anatomic waste and anatomic waste, sharps
- Silver containing waste - used fixer solution and unused x-ray films

- Lead containing waste - lead aprons and lead foils inside the X-ray films
- Mercury-containing waste- element Mercury, scrap amalgam
- Chemicals, disinfectants and sterilizing agents

Mercury

Dental amalgam: Mercury, as amalgam has been used as a dental restorative material for more than 150 years. Mercury is a toxic and bioaccumulative metal. Mercury usually occurs in nature as sulfides and in a number of minerals. It exists in inorganic, organic and elemental forms. The use of mercury by the dentists represents approximately 6% of the total annual domestic use and estimated to significantly contribute to the discharge of mercury. Amalgam is not only one of the most hazardous waste produced at dental clinics, it also acts as a neurotoxin and is considered to be the most toxic non radioactive element and the most volatile heavy metal known in nature (EPA 2000, Al-Khatib & Darwish 2004) Other harms caused by dental amalgam include oral galvanism, soft tissue toxicity, allergenicity and ecological grievances. Mercury is toxic to the nervous system, particularly the developing nervous system of a fetus or young child. Effects seen in children with elevated mercury exposure include lowering cognitive abilities, impact on hearing, poor coordination. Chronic elevated exposure to mercury also affects the kidney, liver and immune system. [4]

Waste Products: During the placement and removal of dental amalgam restorations, a variety of waste products are generated

- Elemental mercury vapour released from dental amalgam alloy
- Dental amalgam scrap- amalgam particles that have not come in contact with the patient
- Amalgam waste- the particles that have come in contact with patient secretions
- amalgam sludge- the fine particles present in the dental office wastewater, commonly trapped in chair-side traps and vacuum filters [1]

Best management practices: Dental amalgam contains both Mercury and silver and therefore must be properly handled. It cannot be mixed with biomedical waste because if incinerated, mercury is released into the air. The waste was never be put in the regular trash. For mercury, the best management practices are designed to address the various forms that are used and generated in the dental office. Practitioners are advised to use pre capsulated dental amalgam to reduce the risk of liquid mercury spill or clinic environmental contamination. Alternative restorative materials can be used when indicated. Limiting the amount of dental amalgam triturated for a procedure also reduces the amount of waste generated.

Amalgam separator: An amalgam separator is designed to remove waste amalgam from the rinse water in the vacuum line before discharge to the sewer. The separator systems are used to capture scrap amalgam which is too fine to be removed by a trap or a screen. Amalgam separators can remove up to 99% of the Mercury from the wastewater before it is discharged from the dental office. Separation technology is based on sedimentation, filtration and centrifugation of the amalgam particles from wastewater. [1]

Silver: Dental offices generate a very small amount of silver waste relative to other photographic processing facilities. Silver is used in fixer solutions in the form of silver thiosulfate complexes which are extremely stable and have very low dissociation constants. There is virtually no free silver iron in used fixer solutions. Wastewater treatment processes convert the silver thiosulfate into mostly silver sulphide with metals in the sludge. Because of these high silver levels, it is illegal to put used fixer down the drain into a septic system or into the garbage. Unused films should not be placed in general waste. Unused films contain unreacted silver that can be toxic in the environment. [1]

Best management practices: Used x-ray fixer used in dental clinics to develop X-rays is a hazardous material that should not be easily rinsed in the drain. The fixer with a recovery unit can be mixed with water and developer and disposed of down the septic system or sewer after desilvering. Spend developer is permitted to be discharged the above systems after dilution with water. The silver should be handed over to the CWC. Using a dental x-ray system without chromium x-ray cleaner is another suggested safety measure. Undeveloped x-ray films include a high level of silver and must be treated as hazardous waste. New film purchases can be minimized by using a digital x-ray unit.

Lead: An additional byproduct of traditional radiography is Lead Shields contained in each film packet. Although the lead shield themselves are relatively small, the accumulative waste produced can be considerably high. Like mercury and silver, lead is toxic and persists in the environment. Lead is a hazardous metal that can contaminate soil and groundwater if placed in regular garbage and send to a landfill. Lead waste is generated at dental offices in foil form, intraoral film packets and discarded lead aprons and collars. Lead has been implicated in causing neurological disorders in children and reproductive problems among women following either acute or chronic exposure. (4)

Best management practices: The lead Shields from film packets have to be collected and returned periodically to the manufacturer for recycling. Lead foils and aprons can be collected and dropped off at a local recycler for free or picked up by a recycling service. Lead aprons can be used for several years with good management.

Others: Chromium and cadmium have been known to have adverse effects on humans.

Chromium is known to have a potential to cause liver, kidney and respiratory damage while Cadmium may cause kidney disorders and lung cancer.

Routinely used consumables such as gloves, rubber dams and other chlorine-containing materials are usually disposed of by insulation. This process is known to release vapours containing dioxin which has been associated with cancer, defects in reproductive and fetal development, neurotoxicity, hormonal and immune disorders. (4)

Sharps: Most dentists use sharps, lancets, needles and syringes generated from normal treatment of patients. Improper handling and disposal can lead to needlestick injuries or spread of disease not only for those using the health care products but for anyone finding them including children, janitorial staff and garbage collectors. Needle sticks can result in diseases such as HIV, hepatitis. (5)

Best management practices: Needles should be mutilated by a needle destroyer or cutter before disposing of syringes. Mutilation should be strictly practised, it is recommended for disposable needles and other sharp wastes. Mutilated needles and other sharp wastes may be kept in a puncture-proof container with 1% sodium hypochlorite solution for primary disinfection and the solution should be changed once every 2 days. Eliminate the unnecessary use of sharps by implementing changes in practice and by providing medical devices incorporating safety engineering protection mechanisms.

Chemicals, Disinfectants and Sterilizing Agents

Halogenated sterilants have a detrimental effect on the environment. Ignitable sterilants should not be put down the drain as they have a potency to explode. Directly pouring of sterilant into a septic system can significantly disrupt the bacteria which normally break down wastes. (3)

Best management practices: Staff should be trained in workplace hazardous materials information system for the handling of materials. Steam or dry heat can be used to sterilize dental instruments, whenever it is possible. Non-chlorinated plastic containers should be preferred to decrease environmental impacts and placed in the solid waste stream. HCHO sterilants should also not be disposed of down the drain.

Biomedical Waste: Biomedical waste and contaminated materials capable of causing diseases or suspected of harbouring pathogenic organisms, it includes blood-soaked gauze tissues and syringes, although not extracted teeth. Gauze soaked in blood is considered a non-anatomic waste. While excised tissues, organs, tumours, extracted teeth are considered anatomic waste. (5)

Best management practice: These wastes can be managed by collecting the non-anatomical and anatomical waste separately in yellow biomedical waste bags followed by labelling it with a biohazard symbol. [figure 1] These bags should be sealed and improve used to prevent leakage of the contained items. They are to be stored in an appropriate place until collection and incineration.



Figure 1: Cytotoxic hazard symbols

Steps in the management of biomedical waste include:

a. Generation

b. Segregation

c. Collection

d. Storage

e. Treatment

f. Transport

g. Disposal

Salient features of BMW Management Rules, 2016 along with Bio-Medical Waste Management (Amendment) Rules, 2018 [6]

1. The scope of the rules has been expanded to include vaccination camps, blood donation camps, surgical camps or any other healthcare activity.
2. Phase-out the use of chlorinated plastic bags, gloves and blood bags within two years of notification of BMW management 2016 rules i.e. by 27th March 2018. But as per the Bio-Medical Waste Management (Amendment) Rules, 2018, use of chlorinated plastic bags (excluding blood bags) and gloves has to be phased out by the 27th March 2019.
3. Pre-treatment of the laboratory waste, microbiological waste, blood samples and blood bags through disinfection sterilization on-site in the manner as prescribed by WHO or NACO.
4. Provide training to all its health care workers and immunize all health workers regularly against diseases like tetanus and Hepatitis B.
5. Establish a Bar-Code System for bags or containers containing bio- medical waste for disposal within one year of notification of rules i.e. 27th March 2017. But as per the Bio-Medical Waste Management (Amendment) Rules, 2018, bar-code System has to be established in accordance with the guidelines issued by the Central Pollution Control Board by 27th March 2019.
6. Report major accidents like needle stick injuries, broken mercury thermometer, accidents caused by fire, blasts during handling of bio- medical waste and the remedial action taken and record the same in Form I.
7. Procedure to get authorization is simplified.
8. The new rules prescribe more stringent standards for the incinerator to reduce the emission of pollutants in the environment.
9. No hospital/healthcare facility (occupier) shall establish on-site treatment and disposal facility, if a service of "common bio-medical waste treatment facility" (CBMWTF) is available at seventy-five kilometres.
10. The operator of common bio-medical waste treatment and disposal facility to ensure the timely collection of bio-medical waste from the healthcare facility and assist the healthcare facility in conducting training.

Colour Coding: It is essential to segregate clinical and dental waste at the point of production following the Safe Management of Healthcare Waste Guidance issued by the department of health. By using the national colour coding system detailed one can easily identify and segregate the waste and help to drive waste minimization and best practices within the industry. [6][figure 2,3]

Conclusion

Dental waste from dental clinics and offices has become an imperative environmental and public safety problem. As producers of hazardous waste, dentists have a responsibility and the duty of care for the correct management of waste within their practice. As health practitioners, we should be concerned with promoting not only human health and well-being but also that of the environment. A proactive approach will allow our profession to succeed in an era of increased public environmental concern and environmental protection legislation. It is not only a legal obligation to provide dental services that benefit the public at minimal expense to the environment, but also our moral and ethical obligation. Dental wastes are regulated under medical waste control regulations in most countries. Even though the quantity of hazardous waste in dental solid waste is a small proportion, there is still cross-infection risk and potential danger for the environment associated with mismanaged waste. For this reason, knowledge of waste composition and development of proper management alternative are necessary. It is very important to establish a medical and dental waste management system that would implement the existing legislation in all waste management cycles from waste production to treatment and final disposal.

Category	Type of bag / container used	Type of waste	Treatment/ disposal options
	Non-chlorinated plastic bags Separate collection system leading to effluent treatment system	a) Human Anatomical Waste b) Animal Anatomical Waste c) Soiled Waste d) Expired or Discarded Medicines & Cytotoxic drugs along with glass or plastic ampoules, vials etc. e) Chemical Waste f) Micro, Bio-t and other clinical lab waste g) Chemical Liquid Waste h) Discarded linen, mattresses, beddings contaminated with blood or body fluids. **Also routine mask & gown as per BMW rules, 2018.**	Incineration or Plasma pyrolysis or deep burial*

Figure 2: List of items to be disposed in yellow coded bins

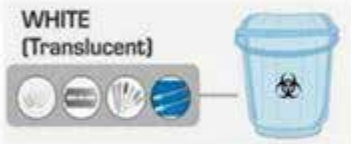
	Non chlorinated plastic bags or containers	**Contaminated Waste (Recyclable)** Vacutainers, tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes (without needles) and gloves	Autoclaving/ microwaving/ hydroclaving and then sent for recycling, not sent to landfill
	(Translucent) Puncture, Leak, tamper proof containers	**Waste sharps including Metal sharps**-Needles, Syringes with fixed needles, Needles from needle tip cutter/burner, Scalpels, Blades	Auto or Dry Heat Sterilization followed by shredding or mutilation or encapsulation
	Cardboard boxes with blue colored Marking. **Puncture proof and leak proof boxes or containers with blue colored marking, as per BMW rules, 2018**	**Broken/ discarded glass**-Medicine vials & ampoules except those contaminated with cytotoxic wastes. **Metallic Body Implants**	Disinfection or autoclaving, microwaving, hydroclaving and then sent for recycling

Figure 3: List of items to be disposed in red, white and blue colored bins

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Applications of Cone Beam Computed Tomography in Endodontics—A Review

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ABSTRACT

Cone Beam Computed Tomography (CBCT) specifically designed for imaging of the dento facial region is a true shift from 2D to 3D imaging. It produces high resolution 3D images in thin, thick or curved slices in axial, saggital and coronal planes. CBCT is a valuable tool for endodontic diagnosis and treatment planning as well as for assessing apical periodontitis, resorption, root fractures, root canal anatomy, perforations and the nature of the alveolar bone around the teeth.

Keywords: *Cone Beam Computed Tomography, Endodontic diagnosis, Endodontic applications.*

Introduction

Cone Beam Computed Tomography (CBCT) is a new technology to dentistry that produces three dimensional images of the maxillofacial region in thin, thick or curved slices in axial, sagittal and coronal planes. The word tomography is derived from the Greek words tomos(slices) and graphien(write). CBCT is a divergent pyramidal or cone shaped sources of ionizing radiation directed through the area of interest that is used to acquire individual image slices of the Field of View(FOV) and then the slices are stacked to obtain a 3D representation.(1)

CBCT was developed as an alternative to conventional CT to provide rapid acquisition of data of the entire FOV and there is comparatively less radiation exposure. Intraoral and extraoral radiographs are 2D images captured on plain films and digital sensors. CBCT is superior as it produces 3D imaging of the maxillofacial structures.(1)

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Historical background:

- 1875 – discovery of x-rays emanating from Crookes tubes by Johann Hittorf.
- 1887 – Nikola Tesla- Bremsstrahlung emission.
- 1895 – Wilhelm Roentgen- discovery of x-rays.
- 1896 – Edmond Kells-1st diagnostic dental x-ray.
- 1904 – John Ambrose Fleming invented the thermo-ionic diode valve (vacuum tube)
- 1920 – replacement of the cold cathode x-ray tubes by Coolidge tubes.
- 1928 – Major John Hall-Edwards-use of x-rays for medical purposes.
- 1972 – Sir Godfrey Hounsefield – CT scanner.
- 1974 – SIRETOM – first CT system developed by a medical equipment manufacturer.
- 1979 – G.N.Hounsefield and A.M.Cormack were awarded the noble prize in medicine.

- 1987 – SOMATOM plus- continuous rotation of the tube and detector, selection of five slices thickness (1 to 10mm).
- 1989 – first spiral CT scanner in routine operation, continuous volume measurement with high resolution 2mm- SOMATOM AR. Solid state imaging using indirect exposure of CCD became commercially available in Europe.
- 1992 – Integrated CT- angiography.
- 1994 – SOMATOM plus 4 (0.75 sec scan time for 360^0 rotation).
- 1998 & 1999 – SOMATOM volume zoom with Syngosoftware(fastest rotation time 0.5 sec), AAMOR- 19th principle developed by Feb 2009.
- 2000 – SOMATOM smile (dose modulation and reduced radiation).
- 2002 – SOMATOM sensation 16 (multi-slice scanning with 16 slices/rotation. Resolution upto 0.6mm. (16 X 0.75 mm submillimetre slices). (2)

Parts of the CBCT machine:

1. The scanning unit – gantry with tube and detector system.
2. The patient chair or table.
3. The image processor for image reconstruction. (3)

Principles of CBCT: The basic principle is tomography (movement of the x-ray source and detector during the exposure). Unlike the conventional CT which have fan shaped beam of x-ray, while CBCT projects a cone shaped x-ray beam. Patient positioning varies during imaging, it can be standing, sitting or supine. CBCT units can be divided into two types – one type of unit has charged coupled device (CCD) and the other utilizes flat panel imager (FPD). Basically, the x-ray sources and the scanner make a full rotation (360^0) or half rotation (180^0) around the patient head. The rotation occurs within 30secs to 1min. While doing so, a field of view is captured. This data is then analysed by sophisticated software to display images in various planes. Hard copies of the images can be obtained. These images can be transferred to aportable memory devices and also be mailed toclinicians for purposes of diagnosis and treatment plan.(4)

Effective Radiation Dose: The major advantage of CBCT is a low effective radiation dose. The operator should stand at least 8m away from the machine. The effective dose of CBCT may vary, but it almost as low as than the conventional panoramic dental x-ray.(5) The dose depends upon the regions to be scanned, the exposure settings of CBCT scanner, size of the FOV, the exposure time(S), the tube current(mA) and the energy or potential (KV).(6) The radiation dose can be reduced using a smaller FOV, fewer projections (180 degree) and a bigger voxel size. For endodontic applications, the FOV should be limited to region of interest; which is the most effective way to reduce the radiation dose. The radiation dose of a small volume CBCT is comparable to that of 2 to 7 standard periapical radiographs, whereas the radiation dose of a large volume scanner is similar to that of a full mouth series of periapical radiographs.(5)

The effective dose for–

1. Full FOV CBCT – 29 to 477 µSv.
2. Spiral CT – 474 to 1160 µSv.
3. Panoramic radiographs –3 to 24 µSv.(7)

Accuracy of CBCT: CBCT is more accurate than radiography in imaging anatomic as well as pathologic dento-maxillofacial structures. CBCT can be accurate in detecting vertical root fracture, apical periodontitis, resorptive defects. When compared to radiography, CBCT provides a better view of root and pulp canal anatomy. For example, buccolingual curvature in a root is most often missed by radiographs, but it can be easily detected in CBCT image. Most radiographs provide little or no information about the presence of additional canals, their shape and curvature, whereas CBCT imaging reveals the same findings with high accuracy.(4)

Applications

Apical periodontitis: Periapical lesion is defined as periapical radiolucency connected to the root at the apical part that exceeds at least twice the width of the periodontal ligament space. Bender and Shelter; Schwarz and Roster showed that periapical radiographs we underestimate the size of the periapical lesion.

CBCT detects the radiolucent endodontic lesions before the lingual or buccal plate is demineralised. It eliminates the superimposition of anatomical structures and is useful in identifying pathological changes

occurring within the cancellous bone. Both in vitro and vivo studies have shown that periapical lesions are more effectively detected in CBCT than periapical radiographs. [5]

Assessment of root canal anatomy and morphology: Conventional radiographs frequently failed to detect the number of canals in teeth undergoing non-surgical endodontic treatment.Failure to identity and treat accessory canals can negatively influence the treatment outcome using an ex vivo human model was demonstrated by Matherne at al 2008. Hence the superiority of CBCTover conventional radiography in detecting the presence of supplemental canals was confirmed.Conventional radiographs failed to identity at least one root canal in 4 out of 10 of the examined teeth.[8]

The detection of presence or absence of supplemental canals and root prior to the treatment will lead to higher detection rate in the former and more conservative access cavity preparations in the latter.

If the canal morphology is undetermined, it increases the possibility of peri-operatives mishaps such as ledge formation, canal transportation or even perforation, potentially compromising the outcome of the treatment. CBCT is a reliable tool to accurately assess the degree of curvaturesassociated with the roots of teeth with normal anatomical forms.

CBCT, in addition is useful in assessment of anatomical and morphological anomalies, such as dens invaginates and fused teeth that require endodontic treatment.[9]

Surgical Endodontics: CBCT is an extremely useful tool in planning of surgical endodontic treatment. The spatial relationship of the specific roots undergoing the surgical procedure can be related to the adjacent anatomical structures such as maxillary sinuses, the inferior alveolar nerve canal and the mental foramen. With this information, clinicians can assess the appropriate size of the lesion in individual cases for treatment planning. Identifying and excluding unsuitable cases for surgical treatment can reduce themorbidity rate. [9]Surgical endodontics without 3D- CBCT – there is an increased risk of iatrogenic damage.

Dental trauma: The exact extent of the injuries to the teeth and the alveolar bone can be accurately assessed by eliminating anatomical noise and image compression, thereby the treatment can be confidently implemented. The degree and direction of displacement associated with luxation injuries is evaluated easily by CBCT.

Failure to identity the presence of root fracture can result in poor prognosis.Periapical radiographs have low sensitivity for detection of minimal tooth displacements, root and alveolar fractures. Small volume CBCT scanners, is used for the assessment of endodontic problems, that capture all teeth and surrounding anatomy in 4cmX4cm.

Patient comfort is enhanced during the imaging process, with the use of CBCT extra orally. This is particularly pertinent in the assessment of dental trauma were the patient as difficulty in accommodating bulky film holders and image receptors for conventional imaging is exacerbated by potentially mobile teeth and painful intraoral tissues. [10]

Root resorption: The true extent of inflammatory and external cervical root resorption (ECR) in the early stages, cannot be determined by conventional radiographs. CBCT is a useful diagnostic tool for early detection and management of root resorption.

Kamburoglu et al., assessed the ability of the examiner to identify and differentiate between simulated internal root resorption (IRR) and simulated ECR of the root canal at the cervical region, using CBCT, conventional and periapical radiographs. It was concluded that CBCT was statistically better than the periapical radiographs in the detection of simulated resorption cavities. [11]

Vertical root fracture: Identifying the vertical root fractures (VRF) is an endodontic challenge. A deep, isolated, thin periodontal pocket is suggestive of VRF, whereas difficulty in aligning the periodontal probe across the periodontal defects sometimes means this sign is missed.

Radiographically VRF appears as a J shaped orhalo shaped radiolucency, which does not appear until significant bone destruction has occurred.

The 2D nature of periapical radiographs obscures the visibility of the fracture line due to superimposition artefact. 3D nature of CBCT visualizes the fracture line from multiple angulations and different orientations in thin slices at high contrast. [12]

Endodontic retreatment: Friedman considered that post – treatment endodontic disease (treatment failure) is commonly associated with root canal intra-radicular infection than the extra-radicular infection. [13] In such cases endodontic treatment is the best option, if there is persistent extra-radicular infection-apical surgery is considered.

CBCT demonstrates the location of inaccessible, unfilled, calcified canals and invagination areas of complex canal morphology.

Intra-Operative Considerations: CBCT is a useful diagnostic tool for:

1. Implant placement
2. Impacted third molar removal
3. Accessing the palatal root of maxillary molars using a vestibular or trans-antral approach root end surgery.

Advantages:

- CBCT units reconstruct the projection data to provide interrelation images in three orthogonal planes (axial, sagittal and coronal).
- The presence of collimation of the primary x-ray beam in CBCT reduces the radiation dose at the area of interest. [14]
- It determines the extent of non-endodontic lesion and its effect on surrounding structures.
- It is useful for diagnosis of the periapical pathosis in patients who are having no specific clinical signs and symptoms, poorly localised symptoms associated with an untreated or previously endodontically treated tooth with no evidence of pathosis identified by conventional imaging. [14]
- It is accurate, non invasive, reliable to detect osseous lesion size and volume.
- Beam limitation – focussed on the FOV – increased information content.

Limitations:

- CBCT is expensive when compared to conventional radiographs.
- CBCT is not suitable for soft tissue assessment.
- Scanner related artifacts.
- Endodontic sealers also produce artifacts that mimic fracture line. [4]
- Images quality is affected by scatter and beam hardening, that are caused by metal posts and restorations.
- The scan time of CBCT devices (1- 20 min) which is significantly longer compared to intraoral radiographs. Therefore, during the scan, the slight change in the movement of the patient may render the resulting reconstructed images of minimal diagnostic use. So, this poses a problem with children, elder patients and patients with neurological disturbances for example Parkinson disease. [15]

Conclusion

CBCT is a three-dimensional imaging technique which overcomes the limitations of conventional radiography and is a beneficial adjunct to the endodontists armamentarium. CBCT is a key tool for the diagnosis and management of endodontic disease. It helps in improved decision making thus improving the outcome of endodontic treatment.

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Management of Medically Compromised Patients in Endodontic Practice—A Review

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ABSTRACT

Medical conditions of a patient play an important role in the planning of dental treatment. A thorough knowledge on the medically compromised conditions is required in endodontics for successful outcome of the treatment. This review throws light on some very important and frequently encountered medically compromised conditions and their management in endodontics

Keywords: *medical, endodontics, compromised, condition, management.*

Introduction

An endodontic emergency is a source of inconvenience and discomfort or pain for the patient. The dentist has a moral obligation to give immediate relief from pain even for the medically compromised patients.

The prime obligation of both the physician and the dentist is to relieve pain and restore to health any diseased organ. While pain elsewhere in the body may be tolerated for long periods of time, pain in the head or in a tooth is usually severe because they are contained by an unyielding structure[(1)] that produces severe inflammations because of an increase in fluid content.

In addition, pain is related to medical condition,emotional status, ethnic background and personal tolerance.

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Importance of a Medical History: Medical history is taken so that the patient could be treated in a manner most harmonious with maintenance of general health. It is important to know the medical background of the patient before prescribing the medications. Medications already being taken by the patient should be considered to prevent undesirable drug interactions. At this time the dentist must consider not only the treatment modalities on the patient's existing conditions, but also the potential impact on the patient's health.

Virtually no medical contraindications exist to routine endodontic treatment. However, multiple situations might arise in which the patient's medical condition,past history, or regimen of medications may have implications that could alter the usual course of treatment.

Rheumatic Fever: Any patient with a history of rheumatic fever has the potential of suffering an attack of subacute bacterial endocarditis (SBE) after any bacteraemia[(2)]. Since almost every dental procedure, whether a simple prophylaxis, the extraction of a tooth or an endodontic treatment, causes some degree of bacteraemia[(3)]. Definite measures must be taken to avoid the possibility of SBE.

The pulp extirpation and extrusion of debris beyond the apex did produce a bacteraemia, which dissipated after 10 minutes[(3)]. Even the placement of a rubber dam

causes bacteraemia[2].Therefore it is best to ensure the standard prophylactic procedures before any endodontic appointment, whenever a periapical lesion is present and before any surgical appointment.Dental procedures for which antibiotic coverage is not recommended include treatment not likely to induce bleeding, such as adjustment completely supragingival and not requiring the use of matrix retainer.

The standard regimen for patients is 2g amoxicillin 1 hour before the dental procedure and then 1.5g 6 hours later[4,6]. For patients with allergy to amoxicillin or penicillin, 800 mg erythromycin ethyl succinate or 1.5 g erythromycin stearate taken orally 2 hours before the procedure and the half that dose 6 hours later[5]. Clindamycin may also be used with allergic patients, taking 300 mg (two 150 mg tablets) 1 hour before the procedure and then one 150 mg tablet 6 hrs later[5,7]. For children, amoxicillin may be taken as syrup, using 50mg/kg weight or, for those sensitive to amoxicillin, erythromycin at 20 mg/kg or clindamycin at 10 mg/kg[5]. The total child's dose should not exceed the adult dose.

Artificial Heart Valves: Insertion of an artificial valve in the heart to replace a valve damaged by congenital, systemic or local disease is no longer a rare surgical procedure. Artificial valves currently used are composed highly of Teflon or Teflon-like materials to diminish the possibility of adhesions. The danger of clumps of bacterial colonies collected in these valves increase greatly after bacteremia[8,9].Therefore any patient with artificial heart valve should receive the same prophylactic antibiotic administration like a patient with a history of rheumatic fever.

Coronary Artery Disease: The tremendous increase in life expectancy has caused more people of advanced age to require dental treatment. Coronary occlusion and other cardiovascular diseases are most common past 50 years,although they may be seen frequently in the 40s as well. Associated factors may include hypertension, angina pectoris, arteriosclerosis, stressful occupations, and smoking. Patients exhibiting these conditions may be suspected of tendency towards cardiovascular disease and should be treated accordingly.

Cardiovascular disease does not contraindicate endodontic therapy, but certain precautions should be observed when treating patients with a history of coronary occlusion who is receiving anticoagulant therapy. Nonsurgical endodontic treatment, requires no alteration in the administration of anticoagulants, if surgery becomes mandatory the patient's physician should be consulted. It is the physician and not the dentist to alter the administration of the drug to secure a blood level compatible with the clotting required for surgical procedure.

If the patient complains of substernal pain during an appointment, a dressing should be placed and the treatment terminated for that day.

Medication: The pain moreover subsides with rest and/or the administration of 0.4-0.8mg of sublingual nitroglycerin. The patient should be sent to the physician for further investigation.

Hypertension: High blood pressure may occur either as a separate disease entity or in conjunction with cardiovascular, renal disease or arteriosclerosis. Among the causative factors are an occupation causing tension and worry, familial tendency, overweight, unbalanced diet and abnormal stimulation of the sympathetic nervous system, often an emotional basis. Symptoms include shortness of breath, frequent and persistent headaches, poor vision, ringing ears, nose bleeds, and dizziness. Some patients, however, have no symptoms at all. Treatment is based on reduction of the symptoms by means of various drugs to lower the blood pressure.

For many years, physicians advised dentists who were treating patients with hypertension to avoid the use of epinephrine in local anaesthetic administration. Unfortunately, the local anaesthetics without vasoconstrictors have a less profound effect and shorter duration of action than those that contain epinephrine. Great depth of anaesthesia is required in endodontics for pulp extirpation and surgery. Any pain felt by the patient would produce much more epinephrine within the individual's own system than would ever be included in the anaesthetic solution. For that reason the epinephrine content of 1:10,000 available in many anaesthetic solutions is considered safe[10,6].These solutions should be injected extremely slowly, at a rate no faster 0.3 ml/sec[11] with frequent aspiration to avoid blood vessel.

Diabetics: Regardless of the type of maintenance therapy necessary for control of blood glucose level, for all diabetic patients, healing is usually retarded, which should be considered when evaluating periodic postoperative recheck radiographs.

Since diabetic patients are susceptible to infections and slow healing, antibiotics should be employed. Penicillin is the drug of choice, 1000 mg before treatment and then doses of 500 mg four times a day for 4 days[6]. Erythromycin is used for those patients with a history of penicillin sensitivity at 600mg before 1 hour.

Increase in blood glucose level as a result of an acute infection during and after a surgical procedure is common finding among diabetic patients. In these circumstances the patient should be referred to his physician for any adjustment in medication or diet necessary to combat the change. The choice of anaesthetics for diabetic patients differs from that of other patients. As pointed out by Burket, epinephrine should not be used in the local anaesthetic solution, since it increases the blood glucose level by stimulating the sympathetic nervous system[12]. Additionally, since diabetic patients often suffer from capillary ischemia due to arteriosclerosis, the increased ischemia produced by the epinephrine may cause tissue sloughs after a surgical procedure. If a vasoconstrictor is desired, levonordefrin (Neocobefrin) may be used, since it does not cause sympathetic stimulation although it does-elevate the blood pressure.

Mepivacaine And lidocaine are available without a vasoconstrictor and for surgical procedures either mepivacaine with levonordefrin (92% carbocaine HC1 with Neo-cobefrin) or a combination of propoxyphene (novocaine), procaine (novocaine), and lavarterenolbitatrate (norepinephrine bitartrate; Leophed) is an excellent anesthetic solution for use with diabetic patients[13].

Hepatitis: The microorganisms responsible for hepatitis are highly resistant to the sterilization procedures normally used in endodontics. Additionally, these microorganisms may remain in the affected patient's blood for a considerable time after the active phase. The incubation period of hepatitis A is about 3-5 weeks, with an average of 28 days. Therefore when a patient gives history of hepatitis, all intracanal instruments, which may have picked up causative agents should be discarded after use. Any files, reamers, broaches, probes or other such instruments that do pick up potentially dangerous microorganisms, even though subsequently sterilized by dry heat or steam, might cause cross-contamination if used on another patient.History of hepatitis, jaundice, or other liver disease may indicate less than normal liver function. Any drugs that are detoxified by the liver should be avoided. Drugs typically used in dentistry and falling into this category include erythromycin and halothane (Fluothane), a non-exclusive general anesthetic agent.

Epilepsy: Increased caries prevalence is seen in epileptic patients. They should be prescribed with fluoride toothpaste accompanied by the placement of pit and fissure sealants in indicated areas. Atraumatic restorative treatment should be favoured over electrically driven instruments wherever possible[14].

A few of the important seizure first aid in dental office are[15]:

1. Clear all instruments away from the patient.
2. Place the dental chair in a supine position near to the floor.
3. Turn the patient to one side (to decrease the chance of aspiration of secretions or dental materials in the patient's mouth).
4. Call for emergency if the patient becomes cyanotic from the onset. Administer oxygen at a rate of 6-8 L/minute.
5. If the seizure lasts longer than 1 minute, administer a 10mg dose of diazepam intramuscularly (IM) or intravenously (IV), or 2 mg of ativan, IV or IM, or 5 mg of midazolam, IM or IV[16,17].

Blood Diseases: Among the greatest hazards involved in treating hemophilia patient is the chance of internal bleeding caused by the injection of a local anaesthetic particularly for mandibular block. If the tooth to be treated is necrotic, no injection is needed. However, if a vital pulp is involved, extirpation becomes too painful without an anaesthetic. To accomplish pulp removal without the possibility of severe intimal bleeding caused by an injection, the dentist can gain access to the cavity by using a high speed instrument with a very sharp bur water spray, and a brush stroke with least pressure. When pulp exposure been gained, a cotton pellet dampened with formocresol is placed as a dressing and sealed with zinc oxide-eugenol (ZOE), and the patient is scheduled to return approximately a week later. The formocresol acts as a fixative on the pulpal issue and aids in gaining a satisfactory clot by its caustic action. At the second appointment, the dressing is opened and any fixed pulpal tissue removed by sharp spoon excavators and broaches with relatively little pain.

There are many disease states in which oral bleeding is symptom. Among the diseases characterized by gingival haemorrhage are aplastic anaemia, cyclic neutropenia, thrombocytopenia, leukemia, purpura, and macroglobulinemia. Two Other Blood diseases, anemia and sprue are accompanied by burning tongue.

If gingival bleeding is not relieved by periodontal therapy, referral to a physician is mandatory to investigate for the possible presence of a systemic conditions.

Prosthesis for Total Replacement of Joints: According to Mulligan, patients who have had total replacement of joints with prosthesis are also very susceptible to infections[18].The most common joints to be replaced are the hips, butt, knees, elbows and shoulder. Dental treatment without antibiotics may lead to failure of the prosthesis. Therefore Mulligan, suggests that when such patients are being treated, antibiotic coverage is indicated before endodontic treatment.

Patients who have already had a total joint arthroplasty should be advised to maintain effective daily oral hygiene procedures to remove plaque and to establish and maintain good oral health[3]. The risk of bacteremia is far more substantial in a mouth with ongoing inflammation than in one that is healthy[3,6]. Bacteremia can cause hematogenous seeding of total joint implants, both in the early post-operative period and for many years following implantation.

Other Diseases: Some infrequently present but often debilitating diseases (e.g. malignancy, nephritis,and pemphigus) will indicate that treatment may take longer than usual to gain a desirable result; the delay is due to the alteration of local response by the systemic condition.

HIV, Syphilis and Other Sexually Transmitted Diseases: HIV is a lento virus, or slow virus, indicating a long incubation period and slow progression of the disease. The mean incubation period from first contact to initial signs and clinical symptomatology, is approximately 10 years, but this time is extremely variable.

Because HIV progressively incapacitates the immune system, any disease that thrives in this immunologically depressed atmosphere will fulminate in these patients. Because of the long period of latency initially no deviation from normal may be noted by the patient or during examination by a health professional. Eventually, however opportunistic infections (persistent candidiasis, herpes simplex, or zoster, Mycobacterium infection, pneumonia, Salmonella infections) or neoplasms (Kaposi's sarcoma, several types of lymphoma) eventually cause death. The symptoms of several types of these diseases may be revealed after examination or consultation with a dentist.

It would appear that performing endodontic treatment, even for those at high risk for HIV, can be made acceptably safe. The virus seems to be killed easily by 5% sodium hypochlorite, the irrigant used during therapy. Contact with the patient's blood is very minimal, since most therapy is performed without surgery with a rubber dam. The instruments used to extirpate the pulp and enlarge the canal are disposed of according to those involved with possibly blood borne pathogens[19].

With the advent of antibiotics, syphilis cases are very significantly decreased, but now again are on the increase[20,21,22]. Oral syphilitic lesions may resemble a chronic draining sinus tract (fistulas tract), poorly healed apicoectomy or periodontal surgery scar, fibroma, or draining periodontal pocket. As a result of decreased resistance, HIV patients may succumb to Kaposi's sarcoma, which demonstrates oral lesions in approximately half its occurrences.

Drug and Medication Therapy: The medical history must include information concerning the patient's past and present drug medication. This information is important in clarifying any questions about a patient's physical condition and the possible effects expected from any medications that might be needed for the present dental problem. This segment of the history must also include any adverse reactions that the patient has had to any drugs particularly to those used in connection with dental therapy. Examples are those allergic to penicillin, sulfonamides, aspirin, tranquilizers, etc.

Drug Therapy in Endodontic Emergencies: Patients receiving endodontic therapy may need the prescription of drugs. The pain from a pulpitis or apical periodontitis that requires the need for endodontic therapy may be unbearable without analgesics. Also a similar degree of pain may follow appointments in which the apical constriction is violated or following a surgical procedure.

Analgesics may be necessary before an emergency appointment. When accurate measurements radiographs are taken and the canal preparations are done upto the working length, only minimal postoperative pain results.

In case of periapical infection, medically compromised patients or when the resistance of the host is low,requires antibiotic administration.Exacerbations are most frequent when extra appointments must be scheduled because of inability to gain the desired objectives at regularly scheduled visits or when visits are scheduled excessively far apart.

Analgesics: Relief of pain is a basic objective of any phase of dental treatment. The pain is responsible for the patient's presence in the office or may occur in the future unless definitive treatment is provided. In endodontics many patients requiring therapy have a great deal of chronic inflammation present in either the pulp or the periapical tissues. Even if pain is not a factor initially, the change in environment produced by any treatment may result in an acute reaction. The resultant need for analgesics is an almost constant requirement in endodontic therapy for enabling the patient to overcome the usually short but often present postoperative discomfort.

Usually the clinicians prescribe analgesic according to the degree of trauma induced. Since most analgesics have greater effectiveness when they are taken prior to development of pain and suitable prescriptions should be given to the patient at the conclusion of the appointment if postoperative pain is anticipated. The analgesic then can be taken either while the local anesthetic is still effective or if no anesthesia was used as soon as possible after the treatment. When a local anesthetic is used and an analgesic is prescribed, the dentist must calculate the anticipated duration of remaining anesthesia effectiveness. The analgesic should be ingested 30 to 60 minutes prior to the wearing off of the anaesthetic so that the drug will be effective. The dentist must remember that highly nervous patients may metabolize rapidly and thus the anesthesia lasts for less than the anticipated duration.

Sedatives and Tranquilizers: Sedatives and tranquilizers are drugs that are central nervous system depressants that decrease cortical excitability. Both have similar actions reducing abnormal excessive response to environmental situations that produce agitation, tension and anxiety.

Sedation drugs can be administered through various routes such as oral, inhalational, nasal, intramuscular, subcutaneous, and intravenous routes.

Midazolam is an anxiolytic agent having a short duration of action that limits its utilization to short dental treatment only. The intramuscular prescribed amount (used for premedication) is 0.07 to 0.08 mg/kg; the intravenous measured quantity for tranquility is 0.07 to 0.1 mg/kg, titrated according to response; the oral amount for tranquility/drowsiness is 0.2 mg/kg.

Midazolam is used (Sasada and Smith, 1997):

1. For induction of anesthesia,
2. For procedures performed under local anesthesia.
3. As a hypnotic agent,
4. As a premedication before general anesthesia,
5. For treating chronic pain, including differentiation syndromes.

Ketamine provides excellent amnesia and analgesia. It maintains muscle tone and it ensures breathing reflexes and facilitates spontaneous respiration. The intramuscular dose is 10 mg/kg; the onset of action is 2-8 min and the duration of action is 10-20 min. The corresponding IV dose is 1.5-2 mg/kg delivered over a period of 60 s: the onset of action occurs within 30 s and the duration of action is 5-10 min. Infusion of ketamine is done intravenously at the rate of 50 mcg/kg/min. The drug is equally effective when administered orally, extradural (in an adult dose of 10 mg) or intrathecally.

Ketamine is used (Sasada and Smith, 1997):

1. It is indicated in hypotensive or asthmatic patients to induce general anesthesia,
2. For short procedures like intra-visual examinations, burn dressing, radiological and radiotherapy procedures in children,
3. For analgesia both post-operatively and intensive care patients.
4. For chronic pain relief
5. For the reversal of severe unresponsive asthma

Nitrous Oxide: Nitrous oxide is small inorganic chemical molecule. It is also known as dinitrogen oxide or dinitrogen monoxide. It is colorless and non-flammable gas with a slightly sweet odor.Nitrous oxide is administered by inhalation, absorbed by diffusion through the alveoli, and eliminated via respiration. The elimination half-life of nitrous oxide is approximately 5

minutes[23]. It is excreted essentially unchanged (i.e. non metabolized) via the lungs; less than 0.004% is actually metabolized in humans.

Nitrous oxide is a weak general anesthetic and is generally used in combinations with other substances. It may be used in a 70% concentration in combination with 30% oxygen or as a carrier gas with more potent general anesthetic agents. It has a blood:gas partition coefficient of 0.46 and a minimum alveolar concentration (MAC) of 105%. It is used as an anesthetic because of its ability to initiate a timely and brisk emergence from anesthesia (generally <3 min)[23]. Nitrogen gas is known to assist in prevention of atelectasis[24].

Conclusion

The medically compromised conditions has direct implication in endodontics, and when the medical history is taken, patients should be asked specifically about them. Except for emergency treatment endodontic therapy should not be instituted until the systemic condition is diagnosed and treated. It is better to get the Medical fitness Certificate from the concerned physician who is treating the medically compromised patient before the endodontic treatment.

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A Literature Review on Dental Caries Vaccine—A Prevention Strategy

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ABSTRACT

Dental caries is an infectious microbiologic disease causing localized dissolution and destruction of the calcified tissue. It is caused by host, agent, and environmental factors. The development and progression of dental caries mainly depends on time factor. The main pathogenic species involved in the initiation and development of dental caries are S. mutans, Lactobacillus acidophilus and Actinomyces viscosus. The prevention and control of dental caries plays a major role in the status of public health. Caries vaccines have been developed to prevent and protect against dental caries. Various types of vaccines are being developed at research centres, with some kind of caries vaccines being considered to diminish or prevent dental caries among the children and adults.

Keywords: *Dental caries, Caries vaccine, Glucosyltransferase, mutans streptococci*

Introduction

Dental caries is an infectious microbiologic disease of the teeth that results in localized dissolution and destruction of the calcified tissue [(1)]. Dental caries results from the interaction between the host, the host's diet, and the microflora on the tooth surface bounded by the time factor [(2)]. A wide group of microorganisms are detected from carious lesions of which Streptococcus mutans. Lactobacillus acidophilus, and Actinomyces viscosus are the important pathogenic species involved in the initiation and development of dental caries [(3)]. S. mutans has been the most implicated causative organism of dental caries. The prevention of dental caries have been implicated by various measures like immunization of the population against the disease. Many researches have been conducted on the development of an effective caries vaccine to prevent the dental caries. Vaccines are prepared from live modified organisms, inactivated or killed organisms, extracted cellular fractions, toxoids [(4)]. Vaccines are an immuno-biological substance designed to produce specific protection against a given disease. It stimulates the production of a protective antibody and other immune mechanisms.

Caries Vaccine: The protein components such as glucosyltransferase (GTF), adhesins, dextranases and glucan binding protein (GBP) present on streptococcus mutans has anticariogenic properties which are the key constituents for vaccine preparation. Adhesin, the proteins mainly the antigens acquired from Streptococcus mutans and sobrinus are individual polypeptide segments comprises roughly 1600 residues within it. Antigens I and II exhibits an enhanced activity due to the centrally placed proline and alanine that is located at the N - terminal third. Various researches on various animal models suggested that administering vaccine with undamaged proteins namely the Antigens I and II or passively administering monoclonal or transgenic proteins present in the salivary component can prevent curiosity [(5,6)].

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Glucosyltransferase: S. mutans which are incapable to produce GTF have minimal potency to harm animal models. Isoforms of glucosyl transferase the GTF 1, GTFS-1, GTF-S that correspond to GTF-B, GTF-C and GTF-D respectively are present in S.mutans. The clinical trials on animal models like rodents were used to prove that GTFs in the gram positive anaerobes have analogous series at its functional realms that can protect other species by immunization [7].

Mode of Action: The main immunoglobulin constituent in the saliva is IgA along with IgM and IgG. They are liberated into the saliva from the gingival crevicular fluid along with inflammatory cells such as lymphocytes, macrophages and neutrophils. The various possible modes of action of antibodies are, 1. The specific agglutinin activity of salivary immunoglobulin communicates with the superficial receptors on the bacilli that causes hindrance to its array and resists caries. 2. Immunising the gut associated lymphoid tissue (GALT) directly can cause production of secretary IgA by salivary glands that prevents the adhesion of streptococcus mutans on the enamel. 3. The cellular and humoral elements of the immune system detected at the gingival crevices may exhibit its activity on the tooth surface. Following subcutaneous immunization with streptococcus mutans, the macrophages phagocytose and process the antigen. The B and T lymphocytes are sensitized by the macrophages, following blockade of human leucocyte antigen Class II complex and discharging IL1. The CD4 helper and CD8 cytotoxic suppressor response is activated with stimulated activity of IL2 receptors and liberation of IL2. The interplay between the cells is crucial in harmonising the formation of IgA, IgG, IgM and B lymphocytes [8,9,10,11,12].

Routes of Adminstration

Oral Route: Earlier studies, exhibited protective salivary IgA antibody reaction by oral administration of the soluble protein or combined with liposomes, gastric intubation and the like. Clinical trials were performed on animal models, by preference on germfree rats and monkeys. A significant reduction in caries was related to an increased level of salivary IgA antibodies to S. mutans, as the serum antibody titer was minimal. Administering aqueous media comprising of killed Streptococcus mutans caused decline of caries and elevated level of salivary protein IgA antibodies. However, oral administration caused detrimental effect on antigen due to stomach acidity [13].

Tonsillar Route: Tonsills can induce secretory IgA responses despite the predominance of IgG [14]. Palatine and nasopharyngeal tonsils are scheduled to provide messenger cells to regions of salivary glands by identifying the mucosal effector sites.

Intranasal Route: The nasal associated lymphoid tissue (NALT) by nasal inhalation, has been used to induce immunity to many bacterial antigens including those associated with mutans Streptococcal colonization and accumulation. Protective immunity after infection with cariogenic mutans streptococci could be induced in rats by the intranasal route with many S. mutans antigens [14].

Minor Salivary Gland: The minor salivary glands are suggested to be potential routes for mucosal induction of salivary immune responses.Glucosyltransferase (GTF) was topically administered onto the lower lips of young adults have suggested that this route may have potential for dental caries vaccine delivery [14].

Rectal Route: The colo-rectal region in humans is suggested to be the site of highest concentration of lymphoid follicles. sStudies have denoted that this route could also be used to induce salivary IgA responses to mutans streptococcal antigens such as GTF [14].

Systemic Route of Administration: The subcutaneous administration of antigens leads to the production of IgG, IgM, and IgA antibodies. The antibodies enters the oral cavity through gingival crevicular fluid and provides protection against dental caries.

Limitations of Caries Vaccine: Potentials risks are involved during manufacturing and administration of vaccines. The most dangerous was the patients with rheumatic fever who showed serological cross-reactivity between heart tissue antigens and certain antigens from hemolytic Streptococci [15]. The human IgG cross-reactive region is also present in other mutans streptococci such as Streptococcus sobrinus as well as in non mutans streptococci [16].

Conclusion

S. mutans and S. Sobrinus are in very association with dental caries. Desspite of many preventive measures such as topical or systemic use of fluorides, fissure sealants, and dietary control have been developed to prevent dental caries, the efficacy of these methods is not enough to eradicate dental caries in humans and it is

particularly distressing that many of those suffering will be among the least likely to obtain satisfactory treatment. Hence, studies on caries vaccine particularly clinical trials that could enhance the immune response safely in humans to be conducted in an advent to effectively prevent dental caries.

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Root Canal Obturation- An Update of Materials and Methods: A Review

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ABSTRACT

A successful root canal treatment is based on diagnosis, treatment planning, knowledge of tooth anatomy, and concepts of debridement, sterilization, and obturation. Several techniques of obturation are available for root canal treatment. The choice depends on the anatomy of the canal and unique objectives of treatment in each case. The two common obturation procedures are lateral compaction and warm vertical condensation.

Keywords: *Obturation techniques, DownPak, Activ GP, Obtura II, Elements B*

Introduction

Successful root canal treatment is mostly based on diagnosis, treatment planning, knowledge of tooth anatomy, and the basic concepts of debridement, sterilization, and obturation.[1] An adequate access and a straight-line path to the root canal system allows complete irrigation, cleaning and shaping, and quality obturation.[2] Root canal treatment can be successful with careful cleaning and shaping of the root canal system, three-dimensional obturation, and a well-fitting coronal seal.

During the cleaning and shaping process, the organic and inorganic debris gets accumulate on the wall of the canal, resulting in an amorphous, irregular smear layer, which interferes with adhesion as well as penetration into dentinal tubules of certain intracanal medicament or root canal sealer during obturation process.[3]Prior to the obturation, removal of the smear layer should be done and the dentin interface should be thoroughly dried.

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In 1941, silver cone was introduced by Jasper.[4] Rigidity of silver cones made them easy to place; but their inability to fill the irregularly shaped root canal system caused leakage. Silver points were found to corrode, and the corrosion products were found to be cytotoxic[5] and thus silver cones are no longer used for obturation. For many years, gutta-percha has proven to be the material of choice for a successful obturation when used with a root canal sealer, which is in turn necessary to seal the space between the obturating core interface and the dentinal wall. Sealers fill the root canal irregularities and voids, accessory and lateral canals, spaces between gutta-percha points used in lateral compaction.[6] Sealers are essential for all techniques. Some of the new materials used for obturation are based on dentin-adhesion technologies, to seal the root canal system more effectively and to strengthen the root.

Most popular core material used for obturation is Gutta-percha. It is made to flow using solvents, such as chloroform or eucalyptus or heat. They are available in standardized sizes. The conventional nomenclature refers to the tip and body dimensions (ADA-ANSI No. 26), e.g., a fine-medium cone has a medium body and a fine tip. Standardized cones are manufactured to match the taper of nickel-titanium and stainless steel instruments.

Alternative to gutta-percha is Resin-based oburation system has been used recently. Resilon is a high-performance polyurethane, used for endodontic use. It

has a close resemblance with gutta-percha and can be manipulated in the same way. It consists of a resin core material, which is available in standardized cones or pellets, and a resin sealer. Resilon is biocompatible, non toxic and non mutagenic

Obturation Techniques: There are several obturation techniques available for root canal treatment. The choice of the technique depends on the anatomy of the canal and the objectives of treatment in each case. Lateral compaction and warm vertical condensation of gutta-percha are the techniques that have been commonly used. Some of the newer methods include the use of injectable, thermoplasticized gutta-percha systems; carriers coated with an alpha phase gutta-percha; cold, flowable obturation materials which combine gutta-percha and sealer in one product; and glass ionomer embedded in gutta-percha cones. The two common and basic procedures of obturation are lateral compaction and warm vertical condensation. The methods usually vary by the direction of the compaction (lateral or vertical).

Lateral Cold Condensation: This technique has been considered the "gold standard" compared to other techniques. Lateral cold condensation has an advantage over the other techniques of being accomplished with any of the acceptable sealers and an excellent length control.[7,8] The working length determined with the larger file with a diameter consistent, a standardized gutta-percha cone is selected.Standardized cones (0.02) have less taper than those of the conventional cones, and permit deeper penetration of the spreader. Alternatively, a tapered conventional cone is adapted by cutting small increments from the tip. "Master cone" is measured by grasping with a forceps from the forceps to the cone tip is equal to the prepared length.The cone is placed in the root canal, and if an appropriate size has been selected, there will be a "tug back."

The master cone placement is confirmed with the help of a periapical radiograph. The sealer is then applied to the canal walls via the last-sized file used at working length. The spreader is selected that matches the taper of the canal. The accessory points are selected according to the spreader taper. Finger spreaders has shown to be less likely in inducing fractures in the root when compared with the traditional D-11T hand spreader and they provide better tactile sensation.[9] There appears to be a correlation between penetration of spreader and the establishment of a seal.[10,11] The spreader should fit within 1 to 2 mm of prepared length, and when introduced into the root canal along with the master cone, it should be within 2 mm of the working length. After placement, spreader is slowly removed by rotating it back and forth as it is withdrawn. The accessory cone is placed in the space which is made by the instrument and the process is repeated till the spreader does not penetrate beyond the coronal third of the canal.(Figure 1)

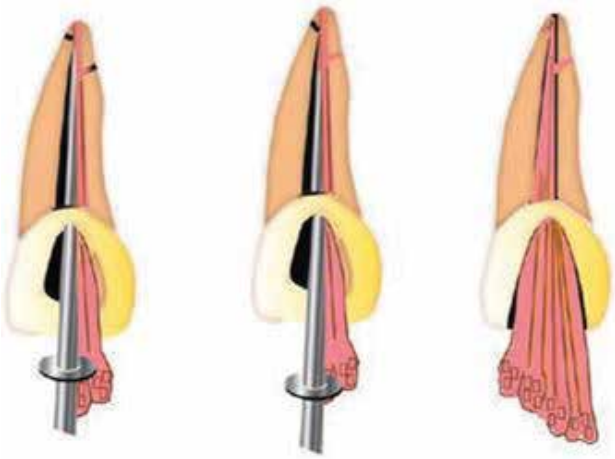


Figure 1: Cold Lateral condensation

Warm vertical condensation: Warm Vertical condensation forms the basis for many techniques, such as the thermoplasticized techniques, master-cone sectional and warm gutta-percha techniques, [12]

A master cone is fitted short of the corrected working length (0.5 to 2 mm) with resistance to displacement. This ensures that the prepared canal smaller than the core diameter. The canal taper are closely replicate the Conventional cones they permit the development of hydraulic pressure during compaction. Following its adaptation, the master cone is removed and the sealer is applied.

After cone is placed into the canal and the coronal portion sealed by applying heat with a spreader or plugger that also softens the remaining material in the canal. A plugger is inserted into the canal and the gutta-percha condenses, forcing the plasticized material apically.

The coronal canal space is back-filled using small segments of gutta-percha by placing into the root 3- to 4-mm sections approximately the size of the canal, applying heat, and condensing the gutta-percha with a plugger. In comparing cold lateral and warm vertical condensation techniques, it has been found that a higher percentage of the canal area is filled with

gutta-percha in oval canals using the warm vertical condensation technique.[13] In addition, it has been found that the gutta-percha adaptation is improved with deeper heat application.[14] Advantages of the warm vertical compaction technique include filling of accessory canals and canal irregularities. Disadvantages include the risk of vertical root fracture because of compaction forces, as well as less length control than in lateral compaction, with the potential for extrusion of material into the periradicular tissues.

Temperature Control: The DownPak Cordless obturation device (EI, a Hu-Friedy Company, Chicago, IL), as well as the System B, and Touch 'n Heat (SybronEndo) devices, are alternatives to applying heat with a flame-heated instrument because they permit temperature control. (Figure 2)



Figure 2: Devices permitting temperature control

A variation of warm vertical compaction is ***Continuous Wave Compaction Technique***. It employs the System B unit and stainless-steel pluggers—each tip of 0.5 mm diameter. The gutta-percha cones mimic the tapered preparation, permitting application of greater hydraulic force during compaction with appropriately tapered pluggers. After sealed with the master cone, a plugger are sized to fit within 5 to 7 mm of the canal length.

The point of plugger binding should be noted, as once the instrument reaches this point, the hydraulic forces on the gutta-percha will decrease and forces on the root increase. There appears to be a correlation between the depth of the heated plugger being at the working length, and the quality of obturation.[15]

The DownPak—3D Obturation with heat and vibration: The DownPak is a device which is recently introduced to the U.S. market and allows three-dimensional obturation with heat and vibration. Used in Europe under the name EndoTwinn, it recently gained Food and Drug Administration clearance in the United States. The DownPak is cordless and designed with a multifunctional, endodontic heating and vibrating spreader device, and can be used for both warm vertical and lateral compaction techniques. It is suitable for use with gutta-percha, Resilon, and hybrid resin filling materials. The clinician can choose to work with or without tip vibration or condensation techniques, making this device versatile.

The DownPak technique adapts a master cone in the same manner as that of lateral compaction. A 0.04 taper gutta-percha cone is fitted in the root canal to the working length. The 0.02 taper spreader of the battery-powered DownPak is activated and heated for 2 seconds in vibration mode and placed between the master cone and the dentin. It is advanced, when tip reaches within 2 mm of working length. In order to condense the filling material, spreader are removed and a D11T spreader is placed to within 1 mm of the working length. A fine-medium (FM) accessory gutta-percha point is placed. This procedure is repeated until no more than 2 mm of the spreader can be entered into the canal. Traces of gutta-percha and sealer were removed from the chamber with alcohol.

DownPak offers wide selection of tips in nickel-titanium and Ultrasoft stainless steel. The heat-carrying tips are designed with geometries that are consistent with tapered root canal preparations. The XF tip with ISO 0.030 diameter and 0.02 taper allows for deeper condensation, in narrow canals.

Plastic-Injection Techniques: The ***Obtura II*** system comprises of a hand-held "gun" with a chamber into which pellets of gutta-percha are loaded, along with silver needles of varying gauges used for delivering the thermoplasticized material to the canal. The temperature, and the viscosity, of the gutta-percha can be adjusted. A study found that at 6 mm from the apex, the highest internal temperature of the Obtura II was 27°C.[16] Hybrid technique is often employed by filling the canal to approximately 4 to 5 mm from the apex using the lateral compaction technique before filling the coronal portion with the thermoplasticized gutta-percha (Figure 3). The needle backs out of the canal as it is filled, and pluggers were dipped in alcohol and are used to compact the gutta-percha. Compaction should be done until the gutta-percha cools and solidifies to compensate for the shrinkage or contraction that occurs upon cooling.

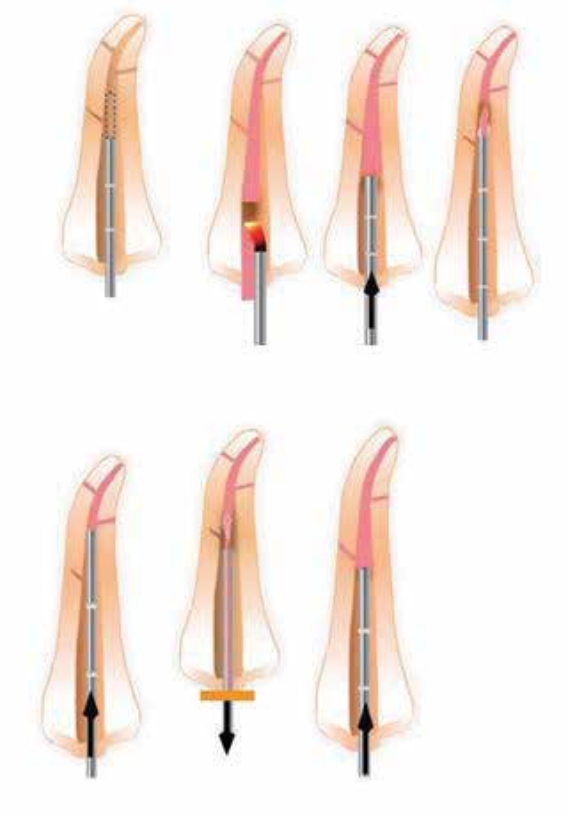


Figure 3: Combination of vertical condensation and warm injectable

The ***Calamus Flow Obturation Delivery System*** (Dentsply-Tulsa Dental, Tulsa, OK) has a handpiece and activation cuff to enable control of the flow and temperature of the gutta-percha into the canal. The activation cuff is released to stop the flow. The gutta-percha is packed in disposable, single-use cartridges, and a filling material indicator gets you monitor the remaining filling material (Figure 4) [17].



Figure 4: Calamus device

The ***Elements Obturation Unit*** (SybronEndo) comprises of a System B device and a gutta-percha extruder in a handpiece which is motorized (Figure 5). The extruder tips are 20-, 23-, and 25-gauge size and are pre-bent. The disposable cartridges of gutta-percha are heated quickly and the unit is shut off automatically to prevent overheating of the material [18].



Figure 5: Elements B obturation unit

Single Cone Technique: The ***Activ GP™ Precision Obturation System*** utilizes glass-ionomer technology, extends the working time of the glass ionomer sealer by modifying its particle size to nanoparticle level. The gutta-percha cones are usually coated with glass ionomer particles at thickness of 2 µm. The cones can be bent till 180° without showing any signs of delamination of the coating, and they are matched in size to the preparations created by the files. Matching of the primary cone to the preparation is important with any single cone technique, because the accurate fit of the cone to the preparation help reduce the amount of sealer used, as well as minimizing any potential shrinkage [19].

Conclusion

The most important goal of dental professions is to maintain the health as well as integrity of patients' dentitions. They must recognize that a particular obturation method will not satisfy each and every case that requires endodontic therapy. The method of obturation selected, whether a traditional or a contemporary one, and must be consistent with the principles of clinical practice, and to provide the best treatment for patients [20].

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Endodontic Treatment Failures and its Management—A Review

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ABSTRACT

Root canal treatment is a therapeutic process performed to remove inflamed or infected pulp tissue within the tooth and to prevent apical periodontitis. The ultimate goal of endodontic treatment is removal of the pathologic pulp, cleaning and shaping of the root canal system and the three dimensional obturation to prevent re-infection. The cause of endodontic failures can be due to inappropriate debridement, presence of extra root canals or lateral canals, persistence of bacteria in the canal or apex, under or over extension of filling material, coronal leakage are some of the common causes for failures. This article review general description of root canal treatment, causes of failures of root canal treatment and how to manage failed RCT.

Keywords: *Root Canal Treatment, re-RCT, failed RCT.*

Introduction

The main goal of root canal treatment is healing of periapical tissues and eliminate necrotic or infected pulp from the root canal and to fill the space with a permanent restoration in order to prevent secondary infection or periradicular tissue leakage into the canal [(1)] The chance of root canal treatment failure is more common in posterior teeth than anterior teeth and mostly right mandibular molars has greater incidence than maxillary molars[(2)]

Cause of Failure of Root Canal Treatment: The failure of root canal treatment is broadly categorized under three sub heading:

1. Preoperative cause
2. Operative cause
3. Postoperative cause

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1. Preoperative Cause:

A. Incorrect Diagnosis: Failure to establish the nature, source and cause of the infection will lead to incorrect treatment resulting in non resolution of the initial complaint and perhaps creating additional problems. It may be due to poor case selection, poor prognosis, any misinterpretation, lack of information either by clinically or radiographically[(3)]

B. Altered Canal Space: Calcification may occur due to inflammatory response to caries in a root canal.[(4)] Decalcification can be done using chemicals such as EDTA followed retreatment will lead to success.

C. Traumatic Injuries: The rate of teeth requiring endodontic treatment after traumatic injury is higher than that of teeth with pulpal problems of the other origin. Root resorption that occurs as a result of the trauma results in failure. [(4)].

D. Anatomic Variation: Favorable prognosis can be prevented by presence of lateral canals, inaccessiable accessory canals, extremely curved canals, and complex internal anatomy. [(4)]

E. Internal Resorption: Over extension of filling, lack of adequate density and compaction of the obturation disrupts the prognosis of root canal treatment as the unobturated areas serves as a niche for the deposition of bacteria. [(5)]

F. **Radiographic Intrepretation:** When placing x-ray film with rubberdammay cause incorrect positioning of x-ray film leading to difficulties during root canal access and instrumentation due to mis judgement of the canal location. It can also be caused by incorrect use of the film positioner.[5]

G. **Systemic Diseases:** Systemic diseases which intervene with bone regeneration include hyper parathyrodism, Paget's disease, hyper thyroidism and osteoporosis. Other factors like nutrition, age, hormones, vitamins, stress, chronic diseases and dehydration also have an impact on periapical repair.[4]

2. Intraoperative Causes:

a. **Tooth Isolation:** Rubber dam is one of the most ideal isolation method for endodontic treatment, as it prevents salivary contamination, accidental instrument aspiration and allows prior proper access and visibility. [5]

b. **Access Preparation:** Access opening can be done to remove old restoration, infected dentin and pulp, deroofing of pulp and to expose root canals. Incorrect access opening leads to perforation of floor, walls, incomplete removal of pulp chamber, missed canal etc which can lead to serious consequences[5].

c. **Technical Difficulties:** The mechanical and biological objective of endodontic therapy is obtained through cleaning and shaping of root canal, hence poor cleaning and shaping of root canal would cause failure which ultimately leads to retreatment.[4]

d. **Infection:** Improper removal of necrotic and infected pulp tissue inside the pulp chamber acts as chronic irritant and causes failure of root canal treatment. Spaces in the canal after restorations create a nidus for accumulation of the microorganisms which exaggerate the infection. [4]

e. **Altered Canal Space:** Chronic inflammatory response of pulp results in calcification of canal space and prevent the proper and completed negotiation of canals leading to failure [5]. To prevent this adequate use of chelators and lubricants should be followed.

f. **Missed Canal:** Persistance of pain and inflammation even after the treatment maybe due to missed lateral canal. The reason for missed out canal is due to improper access and poor visibility, lack of knowledge of the anatomy or not improper examination of extra canals which may lead to post treatment disease[5].

g. **Poor Debridement:** Proper irrigation and agitation techniques can considerably reduce the bacteria content Poor debridement results in post treatment failure[5].

h. **Excessive Haemorrhages:** Small hemorrhages during endodontic procedure are repaired without incident. But, excessive hemorrhage when occurring due to extirpation of an inflamed pulp along with instrumentation extending beyond the apex of the tooth, results in mild inflammation due to formation of hematoma by local accumulation of blood. If not resorbed by macrophages, repair is delayed in the presence of infection of the blood acts as a nidus for bacterial growth (Seltzer et al 1988).

i. **Broken Instruments:** The presence of denticles in the root canal complicates endodontic therapy. When situated in apical third of root canal, denticles enhances the possibility of breakage of barbed broach especially if there is a defect in the metal. Consequently barbed broach should neither be introduced into tight canal, not should they be used for enlargement of canal but merely to engage the pulp tissue for removal. Commercially available retrieval kits can also be used for broken instrument removal.

j. **Mid -Treatment Flare Up:** The prompt & effective treatment of mid treatment flare ups of all types is essential & forms an integral part of endodontic therapy. The right management of these flare –ups enhances a positive attitude amongst patient towards endodontic treatment. Otherwise, patient may lose interest in continuing the treatment which ultimately returns in failure.

k. **Mechanical and Chemical Irritants:** When instrument has been confined to root canal

& presumably instrument tip has damaged the apical pulp stump, chances for repair are enhanced. (Strindberg 1956). There was lower frequency of failure when the canal could not be reamed through apex as compared to the situations where instrumentation was carried out to or beyond the apex. Grahnen&Hansson (1961) &Frosteu (1963) even found that failure frequency was greatest in single rooted teeth when the canal is apparently easiest to file & ream. During endodontic treatment, various medications are used as dressings in the root canal. Their functions are to eliminate or reduce microbial flora, prevent or lessen pain, reduce inflammation or stimulate repair. Torreck (1961), Schilder and Amesterdam (1956) have demonstrated irritating potential of many root canal medicament. Successful endodontic therapy does not require use of drugs (Matsumiya & Kitamar 1960).

l. **Under Extended Filling:** Under extension can be seen on radiograph and in such cases retreatment is the first consideration. Solvents like xylene can be used to remove gutta-percha, but care must be taken that such products should not force themselves into the periapical area during the gutta-percha removal procedure. If required surgical approach might become necessary to correct the underfillings.

m. **Over Extented Filling:** Over extension of root canal filling, gutta – percha and sliver point delays periapical heating. Selzar et-al (1972) performed some of the sliver cone studies which revealed that the corrosion of the sliver cone was associated with sulphur. Chemical product formed predominantly was a sliver amine sulfate amide, and all cells body contained sulphur primarily. Numerous studies have shown that highest success rates were obtained when root canal terminates 1-3 mm from the radiograph open (Strindberg 1956). Radiographically, the overfilling can usually be discerned as the filling material seeming to expand, curve or be lacking in the symmetry. According to Crump (1979), it is not necessary to treat overfilling unless clinical symptoms develop. It can be operated on to obtain radiographically pleasing result. Overfilling which is shown in the radiograph must be avoided for the successful of the root canal therapy.

Causes of overfilling: (1) Failure in determining the exact location of the apical foramen an absence of apical stop or constriction in mature teeth. (2) Incorrect selecting of master cone. (3) open apices.

n. **Improper Obturation:** Failure also occurs, when gutta-percha appears to fill the canal up to the apical foramen, but does not obliterate the canal space laterally. If master cone binds tightly in the middle third or coronal third of the canal, but fails to the apical third the tug-back resistance originates in the wrong area, because accessory cones fail to pass apical third of the canal after lateral condensation.

3. Post–Operative Causes

a. **Failure Following Retreatment:** Once endodontic treatment has failed, the chances for second failure after non surgical retreatment were enhanced (Bergenholtz et al 1979).

b. **Failure Following Surgical Retreatment:** Failure of endodontic treatment may occur following apiectomy, apical curettage. As per the block etc (1978) success rate after surgical retreatment is 67%, 3% failure outcome of 40% was uncertain.

Retreatment Techniques: Numerous techniques have been suggested for retreatment of root canals. They are discussed below according to the root filling materials that are proposed for retreatment.

1. Retreatment of Paste and Cements

i. **Soft –Setting Pastes:** Normally soft-setting pastes do not interfere with the negotiation of the root canal. Therefore, their removal does not require specific techniques. In such cases, instrumentation of the root canal with the use copious irrigation suffices to remove the paste.

ii. **Hard –Setting Cements:** If possible, hard-setting cements should be dissolved. When this is not possible, their removal may be attempted by either of the following two techniques,

a. **Dispersion of Ultrasonic Vibration:** Endosonic files are placed in the orifice of the

obturated canal and activated with light apical pressure. The ultrasonic vibration pulverizes the cement, while the continuous irrigation flushes out the dispersed particles. This procedure is gradually continued apically, until the entire obturation is removed.

b. **Drilling with Rotatory Instruments:** Hard cements may be drilled out by rotary endodontic instruments, such as Beutel-rock or engine reamers or by using bur.

i. Retreatment of Gutta Percha:

Techniques for Dissolving Gutta Percha

i. **Solvants of Gutta Percha:** Gutta-percha is soluble in chloroform, methylchloroform, carbon disulfide, carbon tetrachloride, benzene, xylene, eucalyptol oil, halothane and rectified white turpentine.

ii. **Hand Instrumentation:** This is the most commonly practiced technique, although it is time-consuming and occasionally yields limited results. By the use of solvent, the canal is negotiated with files or reamers to the desired working length estimated from the preoperative radiograph.

ii. **Automated Instrumentation:** This technique is fast and safe and short-filled curved canals may be negotiated beyond the obturation. Thus, a radiograph may be obtained at an early stage, without the need to first instrument the canal extensively to remove the bulk of the material from it. The Canal Finder system also has a built in apex locator that may be used as an aid in preventing overinstrumentation with this technique.

iv. **Ulrasonic Instrumentation:** Ultrasonic instrumentation following softening with chloroform does not facilitate the removal of gutta-percha from the root canal, even when continuous irrigation with a solvent is used.

Solid Gutta Percha Technique:

i. **Pulling Out Gutta Percha:** Reamers or Kfiles are used to bypass the obturation, and Hedstrom files are engaged into the loosely condensed gutta-percha cones, which are then retrieved in one piece by pulling back the instrument.

ii. **Rotatory Removal of Gutta Percha:** Removal of gutta-percha with rotary instruments is safe only in straight canals.

1. Retreatment of Solid Objects:

a. **Bypassing with Hand Instruments:** Reamers and files may be used to bypass an obstructing object in the root canal, and solvents can be used to soften its cementation.

b. **Bypassing with Automated and Ultrasonic Intruments:** Silver cones that cannot be bypassed with hand files may be bypassed and subsequently retrieved by the Canal Finder.

c. **Special Grasping Devices:**

d. **Masserann and Alternative Extractors:** The Masserann kit consists of an extractor into which the object to be retrieved is locked.

e. **Wire Loop Technique:** A thin steel wire is inserted into a 25-gauge hypodermic needle. On the sharp side of the needle a loop is formed and on its other side, the freeends of the wires arc pulled to tighten the loop. The needle is placed in the canal so that the loop contacts the broken instrument, and then the loop is tightened and the instrument may be retrieved by pulling the needleback.

Conclusion

Endodontic failure still occur despite technological advancements in the field of dental instrumentation and materials. Endodontic procedural errors are not the direct cause of treatment failure. The technological boom in endodontics has provided the methods and instruments that allow successful treatment of teeth with calcified chambers, calcified canals, severe root curvature, ledging, resorptive defects, perforations and canal blockage due to separated instruments. With enhanced magnification by operating microscope, direct lighting, use of ultrasonics, NiTi instruments, multiple delivery systems for obturation, almost all procedural errors during endodontic therapy can be minimized or prevented/successfully treated with predictable prognosis.

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Single Rooted Mandibular First and Second Molars with Single Canal—A Case Report

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ABSTRACT

The complexity of the root canal system morphology presents a continuous challenge to endodontic diagnosis and therapeutics. Root canal morphology is limitless in its variability and clinicians must be aware that anatomic variations constitute a big challenge to the endodontic success rate. A proper diagnosis using radiographs play an important role in the successful treatment of such variations. This case report presents relatively rare cases of mandibular first and second molars with single roots and a single root canals.

Keywords: *Single canal mandibular molar,single root*

Introduction

Successful root canal therapy requires a thorough understanding of the tooth anatomy and root canal morphology.[1]The variation of root canal morphology is a constant challenge for diagnosis and successful endodontic therapy. Having complete knowledge of the root canal anatomy and its most frequent changes is essential to prevent endodontic failure. The dental pulp presents with various configurations and shapes throughout the human dentition. Thorough knowledge of tooth morphology, careful interpretation of radiographic documentation and adequate access to the exploration of the pulp space is prerequisites for all root canal procedures whether surgical or nonsurgical.

Periapical radiographs play a significant role in assessing the number, length, curvature, and aberration of the canal system of the tooth. Radiovisiography (R.V.G)system is a valuable adjunct for radiographic documentation. [2]It offers a lot of advantages compared to conventional radiographs, especially the ability to manipulate the captured image. The drawbacks of radiographic techniques are they only provide a 2-dimensional image of a 3-dimensional object.Other sophisticated techniques such as microtomography, computerized tomography scan, etc are not practical for a clinical setup.

Often, the mandibular first molars require endodontic treatment as they are the first permanent posterior teeth to erupt and are commonly affected by caries.[3] Typically, the mandibular first molar has 2 well-defined roots: a mesial root with two canals and a distal root with one or two canals. Variations in the form, configuration, and several root canals in mandibular molars have been discussed extensively in endodontic literature.[4] These include mandibular first molar with five, sixand seven root canals [5], middle mesial canal [6], middle distal canal [7], four canals in mesial root [8], four canals in distal root [9], radix entomolaris[10] and "C-" shaped canal. [11] These reports predominantly include cases with more number of canals than normal, but the clinician should also be aware of the possibility of the existence of a lesser number of roots or canals. Gopikrishna et al., published a case report of a single root with a single

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canal in a maxillary first molar. [12]Krithikadatta et al., have reported a case of a mandibular first molar with two roots and two root canals.[13]Generally, the anatomical configuration of mandibular second molar is two roots, mesial and distal, which can also get fused to a single conical root with varying internal anatomy and often have a c-shaped canal configuration.

The purpose of this paper is to report the uncommon anatomy of mandibular first and second molar with a single root and single canal.

Case Report

In this article, we report 2 cases of endodontic management of a mandibular second molar and a mandibular first molar with a single conical root and a single canal.

Case I

Case I: A 36-year-old male patient reported to the department of conservative dentistry & endodontics with the chief complaint of pain in the lower left back tooth region for the past 3 months. History revealed dull aching pain which aggravates on chewing & relieved by medication. Extra-oral examination revealed no palpable lymph nodes and no facial asymmetry. Intraoral examination showed dental caries in 37whichwastenderon percussion. There was no relevant medical or dental history. Intraoral periapical radiograph revealed dental caries involving enamel,dentin and pulp with a fused conical root. Based on clinical and radiographic examination it was diagnosed aschronic irreversible pulpitis in 37 with symptomatic apical periodontitis (Fig 1-A) and root canal treatment was indicated in 37.



Figure 1-A)Pre operative radiograph B)Working length determination C)Obturation radiograph

Case II: A 23-year-old male patient reported to the department of conservative dentistry & endodontics with the Chief complaint of pain in the lower right back tooth region for the past 1 month. History revealed dull aching pain which aggravates on chewing & relieved by medication. Extra-oral examination showed no palpable lymph nodes and no asymmetry was evident. In the Intraoral examination, there was decay in 46 with tenderness on percussion. Intraoral periapical radiograph revealed dental caries in 46 involving enamel,dentin, pulp and periapical region with a fused conical root.Based on clinical and radiographic examination it was diagnosed as Chronic irreversible pulpitis in 46 with symptomatic apical periodontitis (Fig 2-A) androot canal treatment was indicated in 46.

Case II



Figure2-A)Preoperative radiograph B)Working length determination C)Obturation radiograph

Methodology

Localanesthesia was given using 1.8 mL 2% lidocaine with 1 : 200,000 epinephrine (Xylocaine; AstraZeneca Pharma India Ltd., Bangalore, India). Isolation was done using rubber dam and conventional endodontic access cavity opening was established with an Endo Access bur (Dentsply Tulsa, Tulsa, OK) in both the mandibular first and second molars and a single large canal was present at the center of the pulp chamber in both the cases. Most often single-rooted mandibular molars could be associated with the C-shaped canal but in these cases, a "C-" shaped orifice/canal was not identified. Smaller files were used to check the presence of extra canals in both buccal and lingual directions. ISO 20 K file was used for glide path. The canal patency was established with a suitable ISO 40 K file in mandibular first molar(46)(Fig 2-B) and ISO 50 K file in mandibular second molar (37) (Fig 1-B) respectively. The working length was determined with the help of an electronic apex locator (Root ZX,Morita) and confirmed using radiographs. Instrumentation of the canals were performed using a crown down preparation with K files up to 60 K for mandibular first molar(46) and up to 80 K for mandibular second molar(37) respectively. Canal irrigation was performed using 2.5 % NaOCl and 17% EDTA.Final irrigation was done using saline and 2% chlorhexidine. The canals were dried with sterile absorbent paper points and then coated with AH Plus sealer and obturated with gutta-percha using cold lateral compaction technique.(Figs 1&2 – C)

Discussion

The occurrence of abnormal anatomy depends on various factors like age, sex, and ethnicity that play a role in determining the pattern of the root canal. A radiographic examination is an essential component in endodontic treatment.Radiographs in multiple angulations aid in the diagnosis of canal abnormalities. Multiple preoperative radiographs and an additional radiographic view from a 20-degree mesial or distal projection increases the chances of detecting unusual root canal morphology.[14]

The mandibular first molars erupt at the age of 6-7 years with apical closure is completed by the age of 8-9 years. Completion of canal differentiation commences at about 3–6 years after root completion.[13] Any disturbances in this differentiation could have resulted in this type of single canal anatomy.

In the Systematic review of the literature on canal morphology of the mandibular first molar by Valencia De Pablo et al. [15] and Ballulaya et al.,[16],the occurrence of the single canal has not been documented. But this type of morphological variation has been documented in an in vitro study done by Reuben et al. [17] where out of 125 samples of mandibular first molars studied from an Indian population, only one sample had a single root and single canal.

Kottoor et al.,[18] and La et al.,[19] have suggested the use of CBCT to determining the root canal morphology in cases with aberrations. In both cases, the root canal was located at the center of the pulpal floor and the dentinal map was not evident therefore searching for an extra canal in such cases could lead to excessive removal of dentin and even perforation. Since the single canal was large circumferential filing technique was used.

The mandibular second molar erupts at the age of 11 to 13 years. The pulp chamber of the mandibular second molar is smaller than that of the mandibular first molar. Usually, the mandibular second molars have two mesial canals (MB and ML) and one distal canal similar to the mandibular first molars.[20]The two mesial orifices are located closer together.

Fava et al., [21]reported the presence of one single root and one root canal in all second molars of the same patient. Panciera& Milano studied 102 extracted human mandibular second molars and described six teeth (5.88%) possessing one root and one root canal.A study by Cimilli *et al*.,[22]in 2005 reported 1.3% of mandibular second molars had single canal configuration.

In the case of the occurrence of one root, the root canal system may have only a single broad root canal or two canals that may or may not join or a C-shaped canal. Sabala et al., [23]stated that the rarer the aberration, the more probable that it was bilateral. But bilateral presence of single rooted molarswere absent in both the cases reported here. One of the common iatrogenic errors during access opening is caused during the search for the missing or extra canals. Such iatrogenic errors can be prevented if the clinician has a thorough knowledge of the general location and dimensions of the pulp chamber. Even though extra canals are more common, the clinician should be aware of the fact that there is a possibility for fewer canals too.

Conclusion

The anomalies in the root canal morphology need not always be extra canals but it can also be in the form of fused or fewer canals. Whenever an unusual anatomic form is encountered, multiple angled radiographs of the tooth in concern will reveal more details of the anatomy of the root canal system thereby helping in a successful endodontic treatment.

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Root Perforations and its Management—A Short Review

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ABSTRACT

Root perforation is an artificial communication between the root canal system and the supporting structures in the external root surfaces which may causes serious implications that can even lead to extraction, however if diagnosed early and with appropriate treatment plan of the perforation will lead to long term survival of the tooth. Successful outcome of the treatment depends mainly on proper diagnosis and immediate sealing of the perforation to eliminate risk of infection. A classification of root perforations is described in the review to assist the clinician in making a proper choice of treatment protocol.

Keywords*: root perforation, causes, diagnosis, materials, management*

Introduction

The American Association of Endodontists (AAE) Glossary of Endodontic Terms defines root perforations as mechanical or pathological communications between the root canal system and the external tooth surface[(1)]. Perforation is considered as an artificial opening between the root canal system and the surrounding tissues of teeth, which are either created by the clinician during entry into the root canal system and during cavity preparation or by a biological event such as resorption or caries, resulting in communication between root canal and periodontal tissues. According to Fuss and trope root perforation is defined as an artificial communication between root canal systems to the supporting tissues of teeth or to the oral cavity[(2)]. The etiology of perforation can be attributed as iatrogenic and non-iatrogenic[(3)].Iatrogenic perforation occurs due to lack of proper knowledge about the internal anatomy of tooth and in the failure of determining the possible variations in root canal system. Iatrogenic perforation can occur in any level during endodontic treatment. During access cavity preparation, due to misaligned use of rotary burs without appreciating the angulation of the tooth and search for other root canal orifices, root perforations can occur. It occurs most oftenly at coronal level of the tooth. During negotiating the calcified and curved canals, the lateral extension of the canal preparation is called strip perforation, and during post-space preparation, over instrumentation of rotary instruments leads to apical or crestal perforations of root canal wall, which is also called as strip perforation[(3)]. During cleaning and shaping of root canal system, the perforation may occur in coronal, middle, or apical third of the root. Non-iatrogenic perforation can occur due to internal or external resorption,[(3)] trauma, and caries mostly involving the furcal area.

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Classification of root perforations: Considering the factors impacting the outcome of treatment mentioned above, the following classification of tooth root perforations, given by Fuss & Trope, [(4)] may assist the dentist to select a treatment strategy:

*Fresh perforat*ion – should be treated immediately or shortly after occurrence of under aseptic conditions, Good Prognosis.

Old perforation – previously not treated with likely bacterial infection, it has Questionable Prognosis.

Small perforation (smaller than #20 endodontic instrument) – mechanical damage to tissue in the root canal system is minimal with easy sealing opportunity, Good Prognosis.

Large perforation – done during post space preparation, with appreciable amount of tissue damage and marked difficulty in salivary contamination, providing an adequate seal, or coronal leakage along temporary restoration, it has Questionable Prognosis.

Coronal perforation – occurs coronal to the level of crestal bone and epithelial attachment with minimal damage to the supporting tissues and easy access, Good Prognosis.

Crestal perforation – occurs at the level of the epithelial attachment into the crestal bone, Questionable Prognosis.

Apical perforation – apical to the crestal bone and the epithelial attachment, it has Good Prognosis.

In multi-rooted teeth where the furcation is been perforated, the prognosis alters according to the factors described for single-rooted teeth.

Factors affecting the prognosis of perforation repair: Successful outcome of tooth root perforation treatment depends upon the whether bacterial contamination at the site of perforation can be prevented or eradicated [4]. Various factors that include time from the perforation to detection, size, and shape of the perforation and also its location have a great significance to control bacterial infection at the perforation site.

Time of perforation of tooth root: In a study conducted by Lantz and Persson making root perforations in dogs and treatment was initiated as soon as detected or after a small delay and on observation healing response were more clear when perforations were repaired immediately [5–7]. Seltzer et al. also has done a study [8] on 22 perforations on monkeys at time intervals from immediate observation to 10 months and they noticed that, the periodontium was collapsed in all most all teeth, however an increase in tissue damage was in the untreated root perforations and in those teeth where the sealing of perforation was been delayed. In the study Benenati et al. also [9] he noticed that a delay in sealing the perforations with amalgam did not affect the prognosis, with the assurance that the perforation site was kept aseptic. Healing response is more clearer when the perforation repair is done as soon as possible.

Size of perforation of tooth root: Himel et al. [10] conducted a study in which the mandibular teeth of the dogs to study the influence three materials that was used for healing the perforations of the pulpal floor and it was noticed that the larger teeth that has smaller perforations had greater chance of healing. Prognosis is marked as poor when there is a large perforation that occurs during post placement which leads to increased amount of tissue destruction and higher chances of microbial contamination from the oral cavity.

Location of perforation of tooth root: Location along the root surface is the most important parameter in determination of prognosis of root perforation. A perforation that appears nearer to the crestal bone and to the epithelial attachment is very important as there is more chance of microbial contamination from the oral environment through the gingival sulcus. Perforations, that occur coronal to the crestal bone, are easier to access and manage, and those teeth may be restored without periodontal involvement. Sufficient sound tooth structure for an adequate restoration is needed for good prognosis. Perforations that are apical to the crestal bone and epithelial attachment seem to have a good prognosis however prognosis depends upon cleaning, shaping and obturation[4]. In an in vitro study conducted by Seltzer et al. he found that furcal areas in molars are more troublesome as there is increased chance of periodontal involvement and tissue destruction [8].

Determination of the presence of root perforation and location of root perforation: As proper detection of root perforations and determination of location are very important to the treatment outcome, certain signs, and tools must be recognized in establishing the diagnosis. Sudden bleeding and pain during instrumentation of root canals or post space preparations in teeth are warning signals of a potential tooth root perforation. Blood appearing on paper points may also be indicative, but unreliable as bleeding may be from the apical foramen or from residues of vital pulp tissue. To aid in radiographic detection, it has been proposed to place a highly radiopaque calcium-hydroxide paste, by using barium sulfate, in the root canal [11]. However, caution should be exercised in crestal perforations as this can result

in extrusion of the material into the periodontal tissues and may lead to unnecessary mechanical and chemical irritation affecting the treatment prognosis. Radiographs taken at different angles with radiopaque instruments in the root canal are a more better choice and may confirm the presence of a perforation. However, when the perforation is located at the palatal or buccal aspects of the root, the diagnostic value of radiographs is limited. Anatomical structures, and also radiopaque materials superimposing on theroot image, may also obscure the perforation site. Electronic apex locators (EALs) can accurately determine the location of root perforations, and therefore it is more reliable than radiographs [12]. After root instrumentation, it is recommended that the working length to be determined and verified with EALs. Readings, that are significantly shorter than the original working length can be an indication of a perforation [11]. A dental operating microscope is another helpful aid [13,14]effective in detecting root perforations during orthograde root canal treatment and in surgical endodontic therapies. High magnification with proper illumination allows accurate detection and visualization of perforations along straight non-curved root canals.

Various materials used in perforation repair: An ideal materials used in the treatment of root perforation for root perforation material is still challenging. The repair material used in close contact with hard tissue and periodontal structures should be biocompatible as it can cause toxic reaction either by leaching of the material or by material itself. Earlier different material including Gutta-percha, Amalgam, Zinc oxide and glass ionomer cements, Calcium hydroxide, Composites were used. Newer developed materials like MTA, Biodentine, dentin chips, Bioceramics, Calcium enriched material, with and without the use of barrier could be used to repair the perforation.

Treatment aspects of root perforation

Prevention: Always care should be excerised during endodontic and operative procedures to prevent root perforation. Before accessing root canals the crown-root alignment should always be analysed and bony prominences noticed. Mostly, palpation is helpful to detect the direction of the root relative to the crown. Proper examination of radiographs is important to evaluate the depth and of the pulp chamber and width of the furcation floor. Indeed, proper amount of knowledge is required for the location and dimensions of the pulp chamber [15]. Root inclination, the long tooth axis, the number, shape and degree of root canal curvatures,calcifications, and type of previous restorations should be examined. Extra radiographs of good diagnostic quality should be taken in different angles if required [16].

During access preparation: The use of magnification as an aid is useful to observe canal orifices and the coronal alignment of the root canal. A rubber dam should not be placed before access cavity preparations in teeth with calcified or narrow pulp chambers [16,17], in re-treatments, and when accessing crowned teeth. In such cases, the pulp chamber may not easily been seen, as calcification processes induced by the previous treatment may have affected its normal anatomy. Krasner & Rankow [18] in his study found that the pulp chamber was always located centrally at the level of the cemento-enamel junction (CEJ). The CEJ was the consistent anatomic landmark. They proposed not to use the clinical crown contour as a guide in directing the access cavity preparation and instead use the CEJ. Radiographs taken during the access preparation with a bur was helpful. According to Kvinnsland et al. [19] in maxillary anterior teeth, all perforations were located at the labial root aspect due to the operator's underestimation of the palatal root inclination in the upper jaw.

During root canal preparation: Over use of rotary instruments can lead to apical or crestal perforations of the root canal wall, also called 'strip perforation' [20]. Hence, large tapered instruments and Gates–Glidden (GG) burs should therefore be used carefully [21]. Newer flexible nickel titanium instruments along with copious irrigation and effective lubrication were proposed for curved canals to prevent apical perforations [22,23].

During post preparation: Care should always be exercised during post space preparations so that canals are not overextended.A safe preparation is best achieved with the surgical microscope immediately after completion of a root canal filling. In a study Kuttler et al. [24]evaluated the effects of post space preparation with GG drills on residual dentin thickness in distal roots of mandibular molars in vitro and he found that such post space preparation has more risk of perforation. Kvinnsland et al. [19] according to his study stated that more than half of the perforations in their cases of root perforation occurred during post-preparation procedures.

Orthograde approach: In 1903, Peeso [25]stated that successful management of root perforations is

purely dependent on early diagnosis of the defect, choice of treatment, materials used, host response, and the experience of the practitioner. The rationale for orthograde treatment of root perforations is the same as that of conservative endodontic treatment, i.e. prevention and treatment of inflammation in the periradicular region. This may be achieved by control of infection of the perforation site, or if already infected, by using procedures that can disinfect the site and provide the best possible seal against penetration of bacterial elements.

Surgical approach: Indications for surgical approach are large perforations, perforations as a result of resorption, failure of healing after non-surgical repair [(26)], perforations inaccessible non-surgically, extensive coronal restorations [(27)], when concomitant management of the periodontium is indicated, and large overfilling of the defect [(28)]. The main purpose of surgical treatment is to achieve a tight and permanent seal that will prevent bacteria and their byproducts in the root canal system from entering the surrounding periodontium [(29)].

Intentional replantation: This may be considered when surgical and orthograde treatments are not possible, undesirable, or have failed already [(30)]. This procedure can be recommended instead of surgical treatment when the perforation defect is too large for repair and when the perforation is inaccessible without excessive bone removal [(31)].

Conclusion

Perforation repair requires adequate knowledge regarding the size, site, time and various materials that are used inorder to achieve a long term success of the perforated tooth. The materials used for perforation repair needs to be placed at the site to obtain a permanent seal between the peridontium and root canal system, however the operator skill play a vital important role in the success of root perforation repair. The prognosis of root perforation repair depends on how well the perforation has been sealed and also the cleaning, shaping and obturation techniques which cleans and seals root canal system three dimensionally.

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Review on Platelet Rich Fibrin and Case Report on Management of Large Periapical Lesion

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ABSTRACT

Platelet Rich Fibrin consists of an autologous leukocyte-platelet-rich fibrin matrix, composed of a tetra molecular structure, with platelets, leukocytes and stem cells within it, which acts as a biodegradable scaffold that favors microvascularization and is able to guide epithelial cell migration to its surface. This case report describes about the management of large periapical lesions with surgical approach and PRF placement and a non-surgical approach.

Keywords: *Platelet Rich Fibrin, leukocytes, scaffold.*

Introduction

Bacterial infection in the dental pulp may lead to periapical pathology. If the infection gets contained within the canal, it will progress to the periapical region leading into excessive osteoclastic bone resorption circumscribing the root [(1)]. Most periapical lesions (>90%) can be classified as radicular cysts, abscesses or dental granulomas [(2)]. Incidence of dental cyst ranges from 6 to 55% [(3)].

The incidence of periapical abscesses is between 28.7 and 70.07% and periapical granulomas between 9.3 and 87.1% [(4)]. Some clinical evidence shows that as the periapical lesion increases in size, then the lesion may be radicular cysts. However, some large lesions have been shown to be granulomas [(5)]. The definitve diagnosis of a cyst can be made only by a histological examination.

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A preliminary clinical diagnosis of a periapical cyst made based on the following:

(a) The periapical lesion is involved with one or more non-vital teeth,

(b) The lesion is greater than 200 mm^2 in size,

(c) The lesion is seen radiographically as a well circumscribed, radiolucent area bound by a thin radiopaque line

(d) It produces a straw-colored fluid upon aspiration.

The goal of endodontic treatment is to return the involved teeth to a healthy state and function without surgical intervention [(6)]. All inflammatory periapical lesions should be treated with conservative nonsurgical procedures initially. When this fails in resolving the periradicular pathosis alternative strategies like periapical surgery must be considered [(7)]. Various studies had shown the success rate of up to 85% after endodontic treatment of teeth with periapical lesions [(8)]. A high percentage of 94.4% of complete and partial healing of periapical lesions following nonsurgical endodontic therapy has also been reported [(9)]. In case of large lesions, as there is a chance for inadvertent undesirable consequences when surgical curettage is done, the procedures like Marsupialization or tube decompression are indicated [(10)]. In addition to elimination of pathologic

tissues, periapical surgery consists of resection of the apical root third (apicectomy), root end preparation and placement of a retro-filling material.

PRF consists of an autologous leukocyte-platelet-rich fibrin matrix [11], composed of a tetra molecular structure, with platelets, leukocytes and stem cells within it [12], which acts as a biodegradable scaffold [13] that favors microvascularization and is able to guide epithelial cell migration to its surface [12].

Methods for nonsurgical managment of periapical lesions:

- Bhaskar et al suggested that instrumenting 1 mm beyond the apical foramen when a periapical lesion is evident on a radiograph. This may cause transitory inflammation and ulceration of the epithelial lining resulting in resolution of the cyst [13].
- Weekly debridement and drying of the canals over a period of two to three weeks, followed by obturation has led to a complete resolution of lesions by 12 to 15 months [14].

Case Reports

Case 1-Surgical approach: A 36 year old male patient reported to the department of conservative dentistry and endodontics with a chief complaint of a recurrent palatal swelling for past few months. He gave a history of trauma 10 years back for which Root canal treatment was done in 11,12,13. He gave a history of swelling for approximately 3 years along with pus discharge from gums after root canal treatment. Clinically, there was diffuse palatal swelling extending from the right lateral incisor to the mesial aspect of 1st premolar, the swelling was fluctuant on palpation which indicated a loss of integrity of palatal bone, buccally there was a localized swelling and sinus tract in relation to 12. Periodontal examination revealed sulcus depths within normal limits [Fig.1 & 2].



Figure 1 & 2: Intra oral sinus in 12 and palatal swelling

An intraoral periapical radiograph of the 11,12,13 revealed a well defined periapical radiolucency was seen covering the root apex of 12 with radio opacity seen in root canal of 11,12 and 13 suggestive of root canal treated 11,12 and 13 [Fig. 3A]. From these above clinical findings it was provisionally diagnosed as infected radicular cyst in relation to 12.

Treatment plan: The treatment plan included Re-root canal treatment with respect to 12. Surgical management of the cyst was planned which included cyst enucleation and apicectomy in relation to 12.

Endodontic therapy: A multivisit endodontic therapy was planned with respect to 12. Acess opening followed by gutta percha removal was done in 12. Calcium hydroxide dressings was given in relation to 12 and closed dressing given. Patient recalled after 2 weeks. After 2 weeks, obturation was completed by cold lateral condensation [Fig.3B & C].

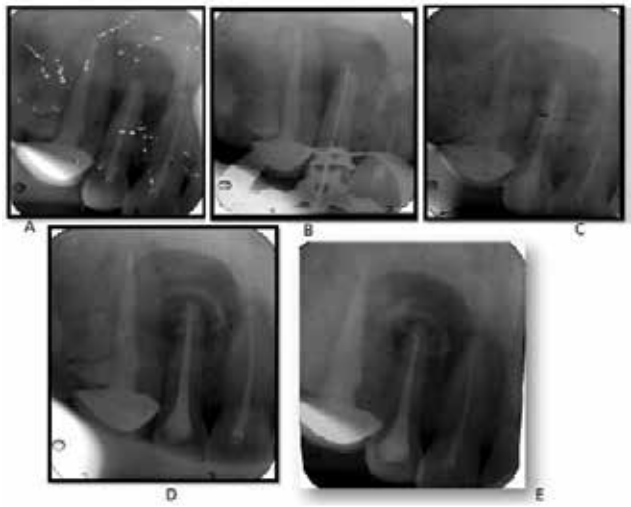


Figure 3: A. Pre op IOPA, B. Working length determination, C. Obturationin 12, D. 1month Post-OP, E. 6 months follow up

Surgical phase: For surgical enucleation of the cyst, a buccal approach was adopted and a full thickness flap was raised [Fig.4A & B]. Cyst enucleation was carried out in toto. Apicectomy was done in 12 followed by a retrograde MTA filling [Fig.4C]. Then PRF was prepared from patient's own blood sample and it was mixed with bone graft and placed into the cavity [Fig.4D]. Simple interrupted sutures were placed [Fig.4E]. Immediate post surgical & 6 months follow up radiographs were recorded [Fig. 3D & E].



Figure 4: A & B. Flap elevation and window preparation, C. Apicectomy, D. PRF and Bone graft placement, E, Suturing done

Case2-Non-Surgical Approach: A 20 year old female patient reported to the department of conservative dentistry and endodontics with a chief complaint of pain and swelling in upper front tooth region for past few weeks.

She gave a History of trauma to the teeth 5 years back. On intra oral examination a labial swelling was seen in association with 11 and 12 with mild tenderness on percussion. No sinus opening was present. The tooth 11 was previously crowned. Periodontal examination revealed sulcus depths within normal limits. Pulp sensibility tests showed a negative response in 12.

On radiographic examination a diffused radiolucency was seen in relation to the root apex of 11 and 12 [Fig. 5A]. Hence it was provisionally diagnosed as periapical abscess in relation to 11 & 12.

Treatment plan: Initially, Root Canal Treatment in 11 & 12 and periapical surgery if the lesion persists.

Endodontic treatment: Under local anesthesia, access opening was made through the crown in relation to 11 and 12 and the necrotic pulp tissue was extirpated. Working length was determined [Fig.5B] and the root canals were dried using paper points and filled with calcium hydroxide as intra canal medicament and the access cavity was sealed for a period of 2 weeks with an intermediate restorative material (IRM, Dentsply, USA). After 2 weeks, calcium hydroxide was flushed out, canals were dried using paper points and obturation was completed using gutta percha by cold lateral condensation [Fig.5C]. The access cavity was sealed with composite restoration. In 1 year follow-up, intra-oral radiograph shows healing of periapical lesion [Fig.5D].

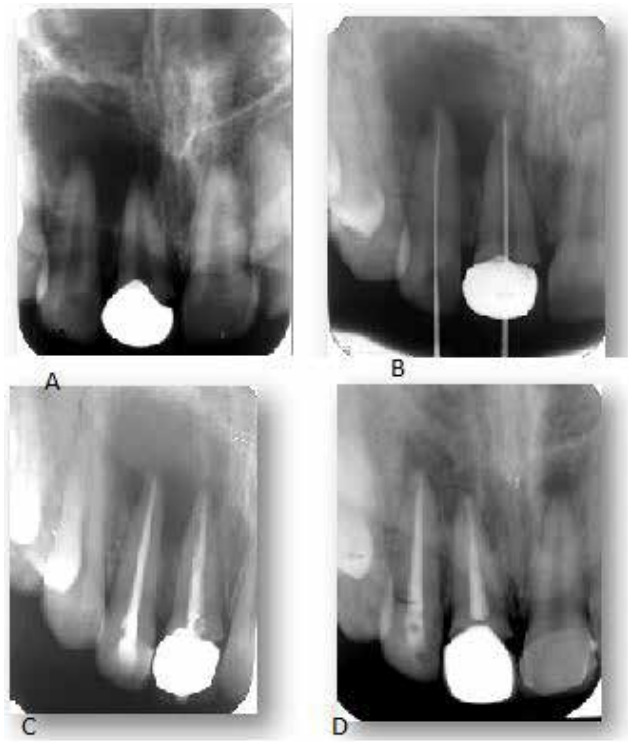


Figure 5: A. Pre OP IOPA, B. Working length in 11,12, C. Obturation in 11,12, C. 1 year follow up

Discussion

This case report has been presented to emphasize that all nonvital teeth with periapical lesion should be treated conservatively and surgical therapy is advised only when conventional treatment proves ineffective. Conservative approach is preferred over surgery as most of the periradicular lesions are the result of an inflammatory response due to bacterial infection within the root canal.

Nonsurgical root canal treatment involves cleaning and disinfecting the root canal system, thereby reducing the bacterial load and creating an environment in which periapical healing can occur.

Natkin et al. postulated that the larger the lesion, more possibilities for it to be a cyst [15]. Radicular cysts exist in two forms, such as Cavities enclosed completely by epithelium (periapical true cysts) and epitheliumlined cavities that are open to the root canals (periapical pocket cysts) [16].

The treatment of choice is determined by some factors such as the extension of the lesion, relation with adjacent structures, origin and characteristics of the lesion and systemic condition and co-operation of the patient.

Healing of pocket cyst occur through non surgical root canal due to communication with the canal. However, a true cyst is selfsustaining and is therefore unlikely to respond to the treatment. In these cases, a surgical approach would be required.

Calcium hydroxide is widely used as an intracanal endodontic material, due to its high alkalinity, tissue dissolving effect, causes induction of repair by hard tissue formation, has bactericidal effect [17] and substantivity. Its antibacterial actions are due to its action on bacterial cytoplasmic membranes, denaturation of protein, DNA lysis, carbon dioxide absorption, action on lipopolysaccharides and hygroscopic action. Study shows that placing Ca(OH)2 as intracanal medicament have a direct effect on inflamed periapical tissue by diffusion of hydroxyl ions (OH–) through the dentinal tubules and this favors periapical tissue healing and encourage osseous repair. In areas of root resorption, it also inhibits osteoclastic activity [18].

Çalişkan and Turkun have reported a case were apical closure and periapical healing occurred in a large cyst-like periapical lesion following non-surgical endodontic treatment with calcium hydroxide paste and a calcium hydroxide–containing root canal sealer [19]. Sjogren et al, (1991) founded that 1 week pushing of the calcium hydroxide in the canals kills the bacteria, so in the present two cases, calcium hydroxide was placed for 2 weeks. Since the periapical lesion was very large and could not be healed with calcium hydroxide, periapical surgery was planned for the case 1.

MTA was chosen as the retrofilling material because it is able to provide an excellent marginal sealing. According to Koh et al., the capacity of MTA to induce cell response is due to the calcium phosphate phase, which might cause a change in cell behavior, stimulating the adherence of osteoblasts to MTA.

Platelet-rich Fibrin(PRF) is an autogenous preparation that favors the increase in the number of platelets in a certain site, aiming at raising the concentration of growth factors, which consist of a group of biologic mediators that regulate important cell events involved in tissue healing.

Platelet-rich Fibrin is obtained from centrifuged anticoagulated blood. After centrifugation, 3 layers are obtained in the test tube. The top most layer consists of Platelet Poor Plasma, PRF clot in the middle and RBCs at the bottom of the test tube. The junction of PRF to the RBC layer is known to be rich in growth factors and therefore this region is preserved [20].

The PRF clot forms a strong natural fibrin matrix, which concentrates almost all the platelets and leucocytes of the blood harvest [21]. PRF could stimulate cell proliferation of osteoblasts, gingival fibroblasts, pulp cells and periodontal ligament cells, but suppress oral epithelial cell growth [22]. These cell-type-specific actions of PRF may be beneficial for tissue regeneration.

Clinical application of PRF[23]

- Socket preservation after extraction or avulsion of tooth.
- Filling of cystic cavity.
- In endo-perio lesion.
- In furcation defects.
- Regenerative procedure in treatment of osseous defects.
- Used in gingival recession coverage procedure.

Advantages of PRF[24]

- No need of addition of anticoagulant
- Slow natural polymerization leading to favorable healing.
- Simple and cost effective process.
- PRF helps in hemostasis.

Disadvantages

- Quantity of PRF produced is low because it is obtained from autologous blood sample.
- Clinically usable PRF clot is only obtained by its quick handling.
- PRF is totally specific to the donor because it contains circulating immune cells and all the highly antigenic plasmatic molecules.
- It cannot be stored for longer duration.

PRF can be used in conjunction with bone grafts. Besides promoting wound healing, bone growth & maturation, PRF with bone graft has advantages of graft stabilization, wound sealing, haemostasis and improved handling properties [25]. The success of spontaneous bone healing is directly related to the size of bony defects, the anatomical location, the patient's age and other parameters.

Conclusion

In modern endodontic treatment the indications for endodontic periapical surgery is decreasing. Still it accounts to 3 to 10% of the endodontic practice. So, non surgical endodontic treatment with intracanal calcium hydroxide is a viable approach for promoting periapical healing in non-vital teeth associated with periapical lesion.

But the periapical surgery is the only alternative when the tooth with periapical lesion fails to respond to intracanal calcium hydroxide.

Conflict of Interest: Nil

Source of Funding: Nil

Ethical Clearance: Not required for a case report.

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Root-end Filling Materials: An Update on the Latest Materials: A Review

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ABSTRACT

Root canal failures occur at a rate of 10 – 15% (Wong 2004). When teeth cannot be treated appropriately by root canal treatment or retreatment, endodontic surgery is usually the last option considered for saving the tooth. These procedures consist of periapical curettage, root-end resection, root-end preparation and root-end filling material being placed at the resected apex so as to act as a seal between the periodontium and root canal system. Harty et al. in 1970 reported that the apical seal was the single most important factor in achieving success in such surgery. So to achieve a perfect hermetic seal an ideal root-end material is required. A root-end material also requires other properties such as biocompatibility, easy handling, stability etc. This article is an overview on the newer root-end or retrograde materials that have been used so far in practice.

Keywords: *root-end filling material, retrograde filling, root-end resection, apicoectomy, hermetic seal, endodontic surgery.*

Introduction

Persistent radicular infections which cannot be treated by conventional orthograde endodontic therapy are recommended for endodontic surgery like root-end resection (apicoectomy/apicectomy). But resecting a portion of the root apex causes the root dentin and the orthograde filling material to be exposed. As orthograde gutta-percha alone is insufficient to support bone regeneration and healing in these cases. This is where a suitable retrograde material plays a pivotal role. These materials should also act as a physical seal to prevent bacterial leakage from the canal space into the periradicular tissues and vice-versa. The materials which have been used and also some newer experimental materials are listed (Table 1).

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Latest Materials Being Used:

Mineral Trioxide Aggregate: Torabinejad developed MTA in Loma-Linda University in 1993. The major components of MTA are tricalcium silicate, tricalcium aluminate, tricalcium oxide, silicate oxide. It sets in the presence of moisture as hydrophilic particles in the powder on hydration form a colloidal gel that hardens and sets within 4 hours. The pH of the set cement is 12.5. Based on studies done by Torabinejad, evidence of healing in periapical tissues were noted with the use of MTA as a retrograde material. Most favourable characteristic tissue reaction of MTA was the presence of connective tissue after the first postoperative week. It induces cementogenesis and regeneration of periodontal tissues with minimal amount of inflammation. It shows no toxic effects on cells and osteoblasts show favourable response and new cementum was found laid over the material [(1)]. The major advantage of this material is its good sealing properties (superior to super EBA and not affected by blood contamination), biocompatibility, cell regenerative potential as compared to other materials. When mixed with 0.12% chlorhexidine it even shows antibacterial properties against E.faecalis, S. aureus, S.

aeruginosa, without compromising sealing ability [2]. The demerits are that it has difficult handling properties, long setting time, cost, may discolour, toxic elements in composition and absence of known solvent for removal. In another study the sealing ability of ProRoot MTA is superior to Biodentine and latter could be considered as an acceptable alternative to ProRoot MTA as root end filling material in peri-radicular surgeries[3].

In another study which compared and evaluated the sealing ability of four root end filling materials such as mineral trioxide aggregate (MTA)-Plus, Biodentine, MTA (MTA Angelus) and glass ionomer cement (GIC) using fluid filtration method and conluded that MTA Angelus showed better sealing ability as a retrograde filling material followed by Biodentine and MTA Plus[4].

Table 1: Retrograde Filling Materials Used Over the Years

Metals	gold-foil, silver points, titanium screws, tin posts, gallium alloy(rarely used now days) amalgam (with and without bonding agent)
Cements & Sealers	ZOE based cements (IRM, super EBA), cavit, zincpolycarboxylate, zinc phosphate, GIC, MTA, calcium phosphate cement,
Others	Diaket, Composite resin/dentin adhesive, Compomers, Gutta-percha.
Lesser Used Materials	laser, citric acid demineralization, ceramic inlay, teflon, mixture of powdered dentin &sulfathiazole and cyanoacrylates.
Newer Materials/Experimental Materials	
Biodentine, Bioaggregate, iRoot BP Plus bioceramic putty Ceramicrete, Endosequence, Cold Ceramic, Castor Oil Polymer (COP), Polymer nanocomposite (PNC) resin, Novel root end filling material (New Resin Cement, NRC), Novel root-end filling material using epoxy resin and Portland cement (EPC), Iron-free partially stabilized cement, Experimental Calcium aluminium-silicate based- Endobinder, Generex A, Capasio, Quick-Set,	

Biodentine: Introduced in 2010 and made available in 2011 (Septodont).Its indications are similar to MTA. Septodont claims that it features as an endodontic repair material that is far superior to MTA as it has better consistency, better handling and safety, and faster setting time. It is a calcium silicate based material used for crown and root dentin repair treatment, apexification, repair of perforations or resorptions and root-end fillings. It is also said to be a 'dentin replacement' wherever dentin is damaged. It consists of powder mainly containing tricalcium silicate, calcium carbonate, and dicalcium silicate, the principal components of MTA. The liquid potion consists of calcium chloride in aqueous solution with an admixture of polycarboxylate.

Bioaggregate: Bioaggregate seems to be a modified or synthetic version of original MTA. According to the manufacturer, it contains biocompatible pure white powder composed of ceramic nano-particles and deionized water. The powder is tricalcium silicate, dicalcium silicate, tantalum pentoxide, calcium phosphate monobasic and amorphous silicon oxide. According to the manufacturer, it is supposed to promote cementogenesis.

Ceramicrete: It is an impervious inorganic phosphate binder initially used to encapsulate hazardous waste. It is a versatile material which has a wide array of uses outside the dental and medical field. The dental based ceramicrete cement consists of a hydroxyapatite powder

with cerium oxide- radiopaque fillers which release calcium and phosphate ions. [5]

On immersion of set cement in phosphate containing fluid (PCF), there was formation of Dicalcium phosphate dihydrate (DPCD) or hydroxyapatite. Hence, it also shows bioactivity

A study to compare the sealing ability of ceramicrete, bioaggregate and white MTA showed both ceramicrete and bioaggregate had similar sealing ability to MTA, with ceramicrete performing better [6].

Endosequence (ERRM): It is a premixed bioceramic developed by Brassler USA, which consists of calcium silicates, monobasic calcium phosphate, and zirconium oxide. It is available as a syringable paste or putty. It is used for root perforation repair, apical surgery, apical plug, and pulp capping. It is considered bioactive and osteogenic because apatite crystals precipitated when set ERRM was exposed to saline buffered with phosphate [7]. It has negligible cytotoxicity and has a biocompatibility similar to both gray and white MTA [8,9].

Cold Ceramic: Recently introduced ceramic based root-end material with the main ingredient being calcium hydroxide. It is biocompatible and has an initial set of 10 mins and final set of 24hours. The sealing property is better than MTA even in blood contaminated condition and at least similar to MTA in other conditions [10] and the cytotoxicity is significantly lower when compared to IRM [11]. But more studies are required to fully test the properties of this material.

Castor Oil Polymer (COP): A relatively new material developed from a tropical plant (Riccinus Communis) has shown to have a good potential as root-end filling material. It has been widely used in medical field for making prostheses to replace bones. It is biocompatible, nontoxic and easy to manipulate. This biopolymer has high interaction capacity with human cells. It consist chain of fatty acids whose molecular structures are also present in lipid of human body. Therefore, COP is not recognised as a foreign body by the human cells [12]

A study comparing sealing ability of different materials showed that COP presented an efficient seal as a retrograde material showing even better results than MTA and GIC [13].

Polymer Nanocomposite (PNC) Resin: A polymeric nanocomposite is a generalised term for polymeric materials that are loaded with minimal amount of nanoparticles like clay and CNTs (carbon nanotubes). The dispersed state is at a nanoscale, they show superior quality to conventional composites. PNC resins like C-18 Amine montmorillonate (MMT) and vinylbenzyl octadecyldimethyl ammonium chloride (VODAC MMT) have been tested for their potential as root-end filling material Cytotoxic activity of the C-18 Amine MMT showed no difference from MTA and Geriostore. But VODAC MMT showed cytotoxic activity in almost all experiments [14]. Further testing is needed to evaluate its use as a root-end material.

Novel Root End Filling Material (NRC): New Resin Cement is introduced as a powder and liquid system where the liquid is composed of hydroxyethylmethacrylate, toluidine, benzoyl peroxide and toluenesulfinate and the powder consist of calcium oxide, calcium silicate, and triphenylbismuth carbonate. Cytotoxic studies done on NRC showed favourable results [15]. However, an in vivo study revealed that it showed a higher inflammation reaction than MTA [16]. The mineralisation of tissue maybe due to the calcium reservoir.

Novel Root-End Filling Material with Epoxy Resin and Portland Cement (EPC): EPC, is a novel composite derived from a mixture of epoxy resin and Portland cement, with low microleakage, appropriate radio-opacity, short setting time and clinically acceptable low cytotoxicity [1].

Iroot BP Plus Bioceramic Putty: iRoot BP Plus (Innovative BioCeramix Inc., Canada) a water-based bioceramic cement. It is convenient as it is a ready to-use white hydraulic premixed formula. An in vitro cytocompatibility study of iRoot BP Plus bioceramic putty concluded that iRoot had similar biocompatibility to MTA and did not have any cytotoxic effect. [18]

Ron-Free Partially Stabilized Cement (PSC): Portland cement-based PSC with Zinc was made by replacing Iron nitrate. It was developed to address some of the drawbacks of MTA. Cytotoxic testing has shown it to be non-toxic. The addition of increased weight percentages of Zn has decreased the setting time. [19]

Experimental Calcium Aluminium-Silicate Based Cements

***Endobinder:** EndoBinder (Binderware, Brazil), can be considered as a modified MTA which has been developed with the intention of preserving the properties and

clinical applications of MTA but eliminating its negative characteristics like darkening and expansion and staying biocompatible at the same time.In EndoBinder traces of free MgO and CaO were eliminated, which are responsible for the undesired expansion. Fe_2O_3 which is responsible for tooth darkening was also eliminated [20].

***Generex A:** Generex A (Dentsply, USA) is similar to ProRoot MTA but has to be mixed with unique gel instead of water like for MTA. It has excellent handling properties unlike MTA, it mixes to a dough-like consistency, making it easy to roll into a rope-like mass similar to IRM [21]. It is also the only new generation material other than MTA to have osteoblastic activity [22]. But further testing is required for finding its biocompatibility.

***Capasio:** Capasio (Primus Consulting, USA) is composed primarily of bismuth oxide, dental glass, and calcium alumino-silicate with a silica and polyvinyl acetate based gel. A recent study found that Capasio had bioactive capabilities as it promoted apatite deposition when exposed to synthetic tissue fluid and has a tendency to help mineralization [23]. The same study also showed that using it as a root-end filling material, Capasio is more likely to penetrate dentinal tubules.

***Quick Set:** A modified Capasio where the powder has been refined and surfactant removed from the liquid was produced which is renamed as Quick-Set (Primus Consulting). Surfactant was removed as it was interfering with cytocompatibilty [24]

Conclusion

Based on the review of literature, there is no shortage for root-end filling materials, be it calcium hydroxide or MTA, but the ideal root-end material is still elusive as it appears that no existing retrograde material possesses all the ideal characteristics. Apart from these properties, the dentist should also consider the long-term success of the materials. MTA remains to be the material of choice but newer material have shown comparable properties. The materials already present in the market require further biological and clinical evaluations and newer materials require more in vivo testing and clinical follow-up.

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Source of Funding: Nil

Ethical Clearance: Not required for a review manuscript.

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Radix: The Third Root In Mandibular Molars—A Case Series

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ABSTRACT

The Endodontic treatment of a mandibular molar with third root can be diagnostically and technically challenging. The location of the extra canal and the curvature in its course to the apex can pose difficulty in the management of radices. This case report discusses endodontic treatment of three mandibular first molars with radix. Awareness of unusual root canal morphology and the modifications in the management protocol can contribute to the successful outcome of endodontic treatment.

Keywords *: Radix entomolaris, Radix paramolaris, mandibular molar.*

Introduction

The success of endodontic treatment depends on the eradication of microbes from the root-canal system and prevention of re-infection[(1)]. It is known that the mandibular first molar can display several anatomical variations; endodontic therapy of mandibular molars has always been an endodontic dilemma[(2)]. Carabelli[(3)] in 1844 first mentioned a major anatomical variant of the two rooted mandibular first molar; a tooth with a third root that is a distolingual root named as the Radix Entomolaris (RE)[(4)]. If this root is placed buccally then it is called Radix Paramolaris[(5)(6)]which is even a rarer entity described by Bolk[(4)]. When detected, the diagnosis and treatment are very much similar to any other canals[(5)]. This article describes the diagnosis and management of three cases with the extra third root; two Radix Entomolaris and one Radix Paramolaris.

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Case 1: A 43 year-old female patient was referred to the Department of Conservative Dentistry and Endodontics complaining of pain in the lower right back tooth region for past 3 days. Pain was sharp and intermittent. Sensitivity to hot and cold items was present. Clinical examination revealed a carious lesion of the right permanent first mandibular molar. The involved tooth showed a delayed response upon thermal testing that persisted for 3 min after the removal of stimuli. Radiographic examination revealed coronal radiolucency involving the enamel, dentin and pulp with the loss of lamina dura and a periapical radiolucency involving the distal root of 46. The multiple angle radiographs also revealed an indistinct root outline in between the mesial and distal root. The condition was diagnosed to be dental caries with symptomatic irreversible pulpitis with symptomatic apical periodontitis. (Figure 1A)

Inferior alveolar nerve block anesthesia (2% Lignocaine with 1:200000 epinephrine) was given and access cavity preparation was done withendoaccess bur (Dentsply, USA) and canal orifices were found with a DG 16 endodontic explorer. The access cavity which was triangular in shape was modified into a more trapezoidal cavity in order to locate the orifice distolingually (Shamrock preparation). Initial negotiation of the root canals was confirmed with ISO size #10 file. Farther away from distal root canal orifice a fourth distolingual canal orifice was found (Figure 1B). The canal lengths were

determined radio-graphically with K file ISO size #15 (Figure 1C) and electronically with Root ZX, (J. Morita, Kyoto USA).3% Sodium hypochlorite (Neelkanth healthcare Private Limited, India) along with EDTA (Glide, Dentsply, USA) was used to clean the canals. Shaping was done with ProTaper Gold (Dentsply, USA) rotary system until a size of F2 after which a dressing of calcium hydroxide paste was placed and the patient was recalled after 14 days. The patient was asymptomatic in the subsequent visit. Proper fitting of cones was evaluated by the master cone radiograph (Figure 1D). Canals were thoroughly dried with paper points (DiaDent, BC, Canada) and obturation (using single cone technique) was done using zinc oxide eugenol sealer.(Figure 1 E).

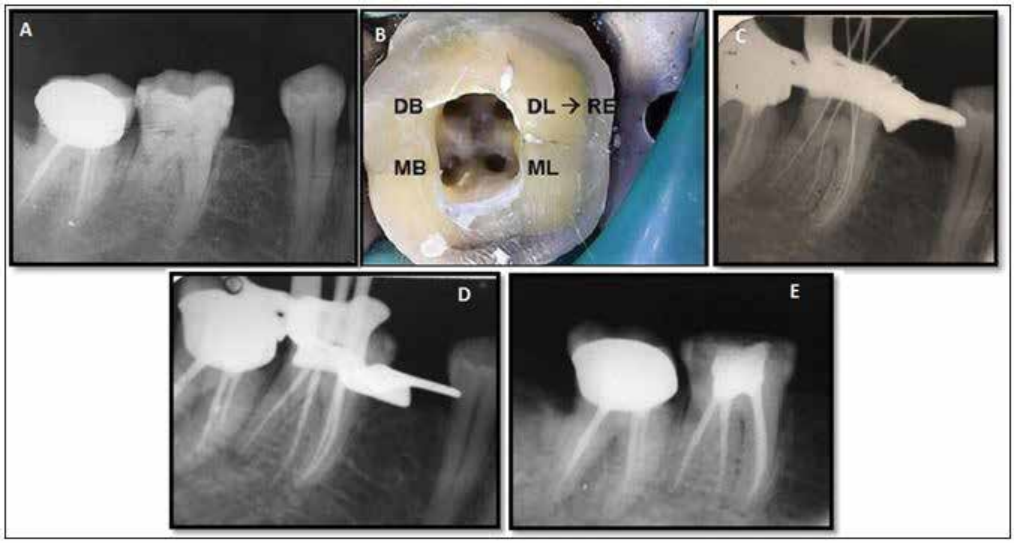


Figure 1: Case 1 of Radix entomolaris. A) Pre-operative IOPA B) Access cavity picture C) Working Length D) Master cone E) Obturation

Case 2: A 47 year old male patient, with the complaint of pain in the lower left back tooth region for 3 months which was intermittent and aggravated on mastication. On clinical examination, dental caries in 36 with tender on percussion was present. The involved tooth showed delayed response to thermal testing with persistent pain even after removal of stimuli. Radiograph showed a coronalradiolucent area involving the pulp with ill-defined radiolucency at the periapex of mesial, distal and the third root, radix of 36. Based on these findings, the tooth was diagnosed as dental caries with symptomatic irreversible pulpitis with symptomatic apical periodontitis.

Endodontic management was planned for the involved tooth and was carried out in a similar manner explained for case 1. (Figure 2A, 2B and 2C)

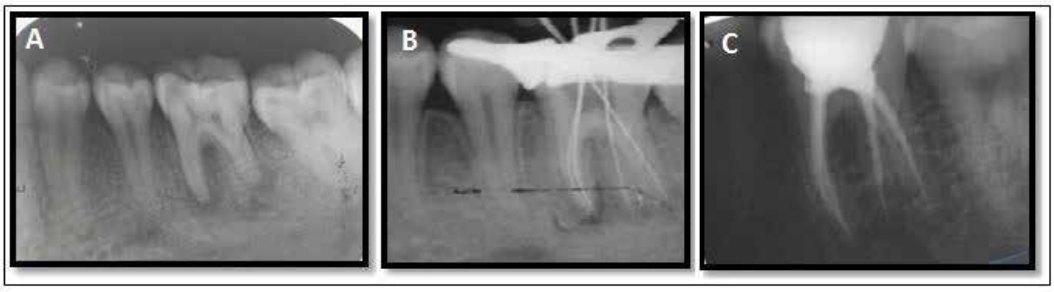


Figure 2: Case 2 of radix entomolaris in 36. A)Per-operative B) Working length C) Post- operative

Case 3: A 26 year old female patient, with the complaint of pain in the lower right back tooth region for one week which was sharp and pricking in nature and aggravated on taking hot and cold substances reported to the department. On clinical examination, dental caries in 46 with tenderness on percussionwas elicited. The involved tooth showed delayed response to thermal testing with persistent pain even after removal of stimuli. Radiograph

showed a coronal radiolucent area involving the pulp with ill-defined radiolucency at the periapexwith a faint outline of the third root was evident. Based on these findings, the tooth was diagnosed as dental caries with symptomatic irreversible pulpitis with symptomatic apical periodontitis.

Endodontic management was planned for the involved tooth and was carried out in a similar manner explained for case 1. (Figure 3 A, 3B and 3C)

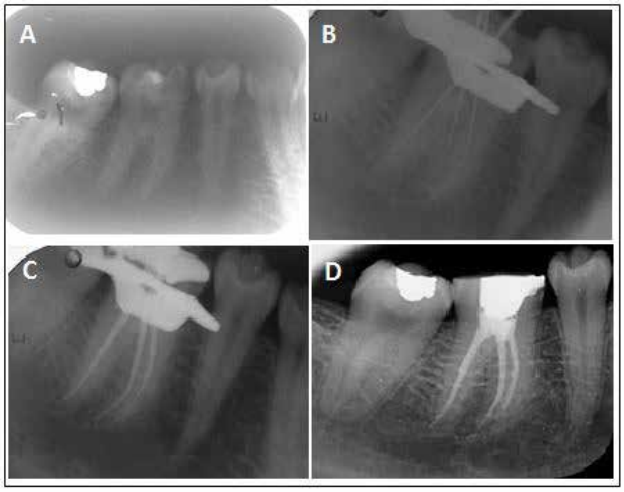


Figure 3: Case 3 of Radix paramolaris in 46. A) Pre-operative B) Working length C) Master cone D) Obturation

Discussion

The aetiology of radix is still uncertain; which can be due to external factors during tooth formation or be attributed to atavistic gene or polygenic system[7,8]. The Radix entomolaris is found with high prevelance of 30% in both pure Eskimo and Eskimo/Caucasian mixes[7,9]. Tratman in 1938 reported an incidence of 0.2% in Indian population[10]. However a study by Chandra et al in 2011 reported a high incidence of 13.3% in South Indian population[11] making it a morphological variant. The radix entomolaris may also be present in first, second and third molar; being less prevalent in second molar[7]. Bilateral occurrence of radix entomolaris has also been reported[12,13]. The relationship between radix entomolaris (RE), gender predilection and side distribution is not clear. Few studies have reported more of male predilection for RE while others reported no significant difference between gender and RE[14]. Similarly, no significant difference was reported for side distribution, despite few studies reporting it to be more on left side while others on right side[14]. Bilateral occurrence for RE have been reported to range from 37.14 - 67% [6,14–17]

Classification: Based on the location of the cervical part, Carlsen and Alexandersenin 1990 classified it into four different types[6]:Type A: RE is located lingually to the distal root complex which has two cone-shaped macrostructures.Type B: RE is located lingually to the distal root complex which has one cone-shaped macrostructures. Type C: RE is located lingually to the mesial root complex. Type AC: RE is located lingually between the mesial and distal root complexes.

De Moor et al. (2004) classified radix entomolaris based on the curvature of the root or root canal[9]:Type 1: straight root canal or root.Type 2: curved only in coronal third and becomes straighter in the middle and apical third.Type 3: initial curve in the coronal third which then orientsbuccally in the middle or apical third.

Morphologically a tooth with radix may present with a more bulbous crown, an additional cusp, a prominent distolingual lobe or cervical prominence. Radiographically, third root is visible in 90% of cases[18], occasionally being missed due to its slender dimension or overlapping with distal root. Additional radiographs taken using tube shift method with 20 degree from mesial ordistal projections is usually sufficient to reveal the basic information about the anatomy of additional root[19,20]. Lately, cone-beam computed tomography (CBCT) has emerged as a usefulaid in thediagnosis of teeth with complex root anatomies. However, it has to be used judiciously[21,22].

Radix paramolaris is very rare and occurs less frequently than radix entomolaris[4]. Visser reported the prevalence of radix paramolaris to be 0% for mandibular first molars, 0.5% for second molars and 2% for third molars[23].

Classification: Carlsen andAlexandersen (1991) classified radix paramolarisinto two different types[6]:Type A: cervical part on the mesial root complex. Type B: cervical part is centrally, between the mesial and distal root complexes.

Clinical Implications: A tooth with radix entomolaris has endodontic implications. Accurate diagnosis clinically and radiographically can avoid failure of root canal treatment because of missed canal. Most important basic principle for successful root canal treatment is the principle of 'straight-line access'[2]. Ultimate objective is to provide access to the apical foramen. The orifice

of radix entomolaris is present distolingually,hence the shape of access cavity should be modified from classical triangular form to trapezoidal or rectangular form. Thelaws of symmetry that the canal orifices are equidistant from a line drawn in a mesiodistal direction through the pulpal floor and lie perpendicular to this mesiodistal line across the centre, helps in easily locating the radix entomolaris[14,24,25]. Straight line access is mandatory as all are curved once or even twice. Excessive removal of dentin or gauging during access cavity preparation, may weaken the tooth structure and has to be avoided.

Conclusion

During molar endodontic treatment, it is essential to find all the canals as there may be a third root present. Radiographstaken in more than one angulation and careful interpretation helps to identify theinternal root canal anatomy and the variations present. The access cavity preparation for the management of radix is modified from the conventional triangular access cavity opening to a trapezoidal form to properly locate the canal orifice of the extra rootwhich is located distolingually. Due to the high incidence of severely cured canals seen in radices the straight-line access and glide path must be given further notice.

Ethical Clearance: Not applicable

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Conflict of Interest: Nil

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Surface Wear and Distortion of RaCe, ProTaper and K3 Endodontics Instruments—An SEM in Vitro Study

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ABSTRACT

A Comparative evaluation of surface wear and distortion of ProTaper, RaCe and K3 nickel-titanium rotary instruments was done using resin blocks with 20 degrees curvature. Three groups of four samples were evaluated for spiral distortion and surface wear after instrumentation. The deformation and fracture of F1 of ProTaper, 0.06 tapers RaCe and were photographically recorded SEM 250X using magnification. It was evident from the scores obtained and SEM pictures analysed that ProTaper instruments exhibited significantly higher degree of spiral distortion and surface wear compared to both RaCe and K3, with no statistical variation between the latter two systems

Keywords: *surface wear, distortion and cyclic fatigue*

Introduction

The advent of nickel titanium (NiTi) rotary instruments has revolutionized endodontic therapy by minimizing the procedural errors encountered with hand instrumentation and reducing operator fatigue. Ever since its introduction, the technological improvement of endodontic instruments has been a perennial desire for manufacturers, researchers and clinicians. These improvements have led to the dramatic increase in the number of NiTi rotary systems that have been marketed by various manufacturers with enhancements pertaining to safety, quality, efficiency and efficacy. Flexural fatigue and torsional fracture are the two main properties that cause separation of these NiTi instruments. NiTi rotary files has specific limited torque, thus increased the risk of intra-canal fracture [(1)]. ProTaper generated lower torque between canal geometry and physical parameter during shaping [(2)].

Torsional failure, on the other hand, is usually accompanied with distortion or unwinding of the flutes adjacent to the fractured end. Such surface defects and distortion could be very subtle and inconspicuous that they could not be visually detected. If file diameter increased, the force of fracture also increased [(3)].Hence, visible inspection does not seem to be a very reliable and safe method of evaluating NiTi instruments.

In a quest to minimize the factors that lead to deformation and fracture of NiTi rotary instruments, several manufacturers have developed various systems with perceptible changes in the instrument design. These variations can be manifested in the type of cutting blade, body taper, flute design, rake angle, radial land and configuration of the file tip, which influences the outcome of the preparation to a large extent. The purpose of this study is to analyse the surface wear and distortion exhibited by RaCe, ProTaper and K3 NiTi rotary systems using scanning election microscopy.

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Materials and Method Selection of the Samples

Forty eight simulated canals made of acrylic resin were used for the study. The resin blocks were of uniform dimension. The simulated canals were 25mm long and their initial diameter was equivalent to a size 10 instrument. Resin blocks with 20 degree curvature were selected. Nickel-titanium (NiTi) instruments from three different systems were used. They are ProTaper system (DENTSPLY maillefer); RaCe system (FKG Dentaire) and K3 system (Sybron Endo).

Grouping of the selected sample: A total of 48 resin blocks were divided into three groups (n=16) as follows:

Group A Pro Taper systems

Group B - RaCe systems

Group C - K3 systems

Four sets of instruments were used to prepare four simulated canals for every system (4x4=16). Before use all the NiTi rotary instruments were subjected to autoclave at121 C for 20 minutes. Following autoclaving the instruments were analysed with SEM and pictures were taken as control.

The microscope used Phillips 20(Philips, was Netherlands). The instruments evaluated by SEM were confined to size 25 0.06 taper of RaCe and K3 and F1 of ProTaper systems as this was the instrument that predictably touched the canal walls at full length.

Canal preparation: The resin blocks prepared by the NiTi were instruments as per manufacturer sequence using crown downpressure less technique. A torque control motor TCM -XSMART was employed at a predetermined torque and 350 RPM for each system per manufacturer recommendations. Each instrument was used in a gently pecking motion by the same operator. The technical sequences followed ProTaper, RaCe and K3 systems were shown below.

Results

Comparison of surface wear between different study groups (Table : 1)The mean surface wear demonstrated significant high values for ProTaper (Group A) compared to RaCe (Group B) and K3 (Group C). However, there is no significant difference in surface wear between RaCe and K3. (P>0.05)One fractured ProTaper instruments was noticed during the study.

Table 1: Comparison of surface wear between different study groups

Group	P-Value *	Significants Groups at 5% Level #
ProTaper Vs RaCe	. 027 *	P < 0.05
ProTaper Vs K3	. 0 34 *	P < 0.05
RaCe Vs K3	1.000	P > 0.05

(* P value is statistically significant)

Comparison of distortion between different study groups (Table 2)

Table 2: Comparison of distortion between different study groups

Groups	P-Value	Significants Groups at 5% Level #
ProTaper Vs RaCe	.002 *	P < 0.05
ProTaper Vs K3	.004 *	P < 0.05
RaCe Vs K3	.803	P > 0.05

(* P value is statistically significant)

- *One way ANOVA was used to calculate the p-values. #Multiple range tests by Tukey
- HSD procedure was employed to identify the significant groups 5 % level.

Discussion

Ever since the introduction Ni-Ti rotary instruments in 1988 by Walia, a variety of instrument designs and types have been developed by manufacturers to satisfy the primary objective of shaping the root canal system. Despite their undeniably favourable qualities like super elasticity and shape memory, the potential risk of separation within the canal during instrumentation is an unconquered. Inadvertent fear still unconquered. In our study simulated canals made of acrylic resin were used. Compared to extracted teeth, the resin blocks reduced the variation in the instrumentation and allow comparisons between instrument types and sequences under identical conditions. Hence, the use of simulated canals provides the opportunity to standardize and research method exclude the parameters that could influence the preparation outcome, although, the use of simulated canals in resin blocks do not always reflect the action of instruments in canals of natural teeth. These

facts were in agreement with the procedures followed in other studies (Thompson &Dummer 1997, Yared& Kulkarni 2003, Yared 2004) [4-6].

Further, according to Franklin S. Weine [7] when canal curvature reaches 30 degrees or more the complexity of case increases markedly, and techniques that render good results in the simpler cases may or may not be successful. Hence, acrylic resin blocks of 20 degrees canal curvature were chosen for the study. The number of uses for all the 3 systems evaluated was four times. Susan Wolcott et al [8] performed a large cohort clinical study of 4,652 root canals performed over months to evaluate the separation a period of 17 incidences of a NiTi rotary system (Pro Taper). The results of this study indicate that ProTaper files may be safely reused at least four times". Moreover, the manufacturer of another NiTi rotary system (RaCe) suggested that following use in canals with simple curvatures (radius of curvature over 25mm) 2 petals out of 8 on the safety memory disc should be removed. Based on this fact it could be suggested that most of the canals had mild degree of curvature and the instrument could be safely was used four times. Hence, the number of uses was standardized to four times in our study.

The rotations per minute (rpm) fixed in our study for all the systems was 350rpm. Although most manufacturers advocate an rpm range of 150 to 600 for instrumentation, this range appeared to be too wide for precise evaluation. Darrell W. Daugherty et al [9] compared the efficiency of NiTi rotary instruments at 150 and 350 rpm. They observed that 350 rpm exhibited nearly double efficiency and half the deformation rate as compared to instruments used at 150 rpm. Accordingly 350 rpm was set as a standard in the present study. The instruments evaluated by SEM for 3 systems were confined to size 25, 0.06 taper for both RaCe and K3 and finishing file F1 for ProTaper. These instruments were specifically chosen to be analysed as these instruments predictably touch the canal walls at the full length and were used to complete the preparation at the apical stop. In addition these instruments were used in all the extension of root canal and therefore are subjected to maximal amounts of torsional and flexural loads This was in accordance with Troian et al, Raspisarda et al (2001), Li et al (2002) and Pessoa et al (2003) [10-12]. From the results obtained and the SEM pictures analysed it was clearly evident that ProTaper rotary systems demonstrated significantly higher amounts of surface wear and distortion compared to both RaCe and K3 rotary NiTi systems with no statistical variation between the latter two systems. ProTaper is an instrument with multiple tapers Incorporated within one file. Due to progressively increasing tapers in ProTaper instruments, the rate of increase in the diameter of the tip is higher when compared to both RaCe and K3 which results in a thicker instrument especially in finishing files. This inherent thickness reduces the flexibility enhancing the contact area with the canal wall which may result in higher surface wear further, the taper size of shaper file S2 is 0.04 at the tip and finishing file Fl is 0.07 at the tip. This jump in taper size from S2 to F1 is non-linear compared to both RaCe and K3 which have a gradual increase in taper size. Moreover, the finishing files used in RaCe and K3 had a taper size of 50% 125 size, 0.06 taper compared to a 7% taper for ProTaper. Considering these fact-findings, the file F1 may encounter greater frictional resistance from the canal walls resulting in a high degree of surface wear and distortion as evident from figures. It can be clearly visualized from that ProTaperdemonstrated canal straightening and transportation towards the outer aspect of the curvature. These observations were in accordance with Elasaad et al and Peters et al who showed similar findings [13].

The fact that some canal transportation towards the outer aspect of the canal was evident with ProTaper files may be because of the variable tapers along the cutting surface of these files in combination with the sharp cutting edges owing to their cross sectional design. RaCe demonstrated the least surface wear and distortion compared to other systems although the difference was not statistically significant with K3. The alternating cutting edges along the shaft of the RaCe instrument might be a main advantage compared to helical tapered active files of Pro Taper which may show a tendency to screw. The helix angle continuously changes from larger to smaller to arguer values along the working length virtually eliminates screwing in forces and decreases the area of engagement. This unique design of RaCe significantly reduces the frictional resistance with the canal wall thus preventing the threading or blocking effect Also, compared with ProTaper, RaCe instruments for end point preparation do not have the stiffness of thick ProTaper finishing files and therefore flexible because increasing thickness are more decreases flexibility Further, the manufacturers statement that RaCe instrument have an extremely low operating torque and an improved efficiency using fewer instruments

with sharp cutting edges might be a further advantage. Moreover, the RaCe instruments are subjected to an electrochemical treatment in order to increase the resistance to torsion and to metal fatigue and retain cutting efficiency electro polishing. Electro polishing is another method used by some manufacturers to improve the strength of rotary NiTi instruments. The event follows the alloy (acting as the anode) being submerged into an electrolytic solution (usually a combination of acids) containing a negatively charged cathode. A low current is passed through the solution, causing selective removal of protruding surface defects for NiTi alloys at a rate of 21 to 3.5 um/min.

It is also evident from that RaCe demonstrated uniform centred preparation in simulated canals and maintained the original curvature of the canals in resin blocks. This finding is in agreement with Elasaad et al, Baumann et al [(14)], who all showed uniform, centred preparation with RaCe instruments The K3 rotary system demonstrated surface wear and distortion comparable to that of RaCe but Significantly lesser than ProTaper systems. K3 features an asymmetrical cross-section with wide radial lands and a constant taper. The strength of the file comes from the inner core of the instrument, rather than the peripheral area near the cutting blade, which is referred to as the radial land. The less blade support (the amount of metal behind the cutting edge) the less resistant the instrument is to torsional stress. According to Yoshimine et al [(15)] the cross-sectional area of 0.04 tapered K3 file was nearly twice the size of that of RaCe files with same tip size and taper, indicating that K3 files were less flexible compared to RaCe.It is reasonable to hypothesize that greater the diameter, cross-sectional area or taper of the instruments the higher would be the bending stiffness of the instruments. Accordingly, K3 instruments with largest cross-sectional area were the Stiffest. These facts are attributed to the differences observed with respect to surface wear and distortion as compared to RaCe (although no statistical variation). However, constant taper of K3 as compared to variable taper of ProTaper yielded better results owing to less engagement and linear increase in instrument taper It can be observed from figure that K3 resulted in a well centered uniform preparation comparable to RaCe in resin blocks. As demonstrated by Bergmens et al[(16)]

Within the limitations of this study, variable tapered instruments (ProTaper) demonstrated greater surface wear and distortion compared to instruments with constant taper (RaCe and K3). The alternating cutting edges of RaCe attributed to its enhanced flexibility resulting in minimal surface wear and distortion compared to both a systems, although not statistically significant with K3.

Conclusion

Under the conditions of this study it was concluded

1. The rate surface wear and distortion was significantly greater with ProTaper as compared to RaCe and K3.
2. Despite large cross-section and stiffness K3 instruments exhibited less wear and distortion due to its constant taper, radial relief and helical design.
3. RaCe significantly exhibited least surface wear and distortion which may be attributed to its alternative cutting design, constant taper and electro polishing. Hence, it may be considered safer for canal preparation amongst the rotary systems.

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Scope of Ultrasonics in Endodontics—A Review

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ABSTRACT

The dental operating microscope and the ultrasonics have found many important applications in dentistry. Ultrasonics is undoubtedly imperative for improving the quality of the treatment and for handling difficult cases in endodontics. It is useful in procedures such as gaining access to canal openings, cleaning and shaping, obturation of root canals, retrieval of separated instruments, removal of intracanal medicaments and blockages and endodontic surgery.This review throws some insight on the applications of ultrasonics in endodontics today.

Keywords: *ultrasonics, cleaning, shaping, cavitation, instrument retrieval*

Introduction

The ultrasonics to dentistry was first introduced for cavity preparations but it could not compete with the convenient high speed handpiece. In 1955, Zinner used the ultrasonics for removal of hard deposits from the tooth surface(1). Later the ultrasonic scaler became the standard tool for removal of dental calculus and plaque. The term endosonics was introduced by Martin and Cunningham(2,3). It is defined as the ultrasonic and synergistic system of root canal instrumentation and disinfection.

Ultrasound is sound energy which has a frequency above the range of human hearing, which is 20 KHz. Though originally having high frequencies, recently low frequency ultrasonic handpieces of 1 to 8 KHz are being used. They produce low shear stresses and thus causing less alteration to the tooth surface.

There are two methods of producing ultrasounds. They are magnetostriction and piezoelectric principle. Magnetostriction converts electromagnetic energy into mechanical energy whereas piezoelectric uses deformation of a crystal by electric charge to produce mechanical oscillations.

Applications

The introduction of ultrasonics has greatly reduced the risks of perforations and separation of instruments in root canal therapy. In conventional access procedures, they are useful for refining the access, locating the extra canals, removing calcifications and attached pulp stones. These are done by either diamond coated tips, stainless steel tips or zirconium nitride-coated tips. The diamond coated tips have more cutting efficiency than the other two because of their ability to transmit the oscillations of the ultrasonic unit into the dentin more effectively.

Clinicians frequently encounter obstructions such as hard impenetrable pastes, separated instruments, silver points or posts in their roots. In failed cases, these obstructions have to be removed for retreatment. Ultrasonics is one effective adjunct. The ultrasonic tips and the endosonic files can be used deep in the root canal

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system. Their use is not restricted by the position of the fragment in the root canal system. Some fragments cannot be removed because of the limited access, inspite of use of ultrasonic tips. Straight line access and magnification are essential for maximum visibility of the metallic fragment.

The three orthograde approaches for the management of separated instrument are 1) Removal of the instrument 2) Bypassing the instrument or 3)prepare and obturate to the fractured segment [4]. Many techniques have been suggested for retrieval of the broken instrument but all of them result in excess loss of root canal dentin, ledging, perforation or apical transportation of the fragment [5]. Ruddle [6] proposed a technique using Gates-Glidden drills to prepare a cirumferential 'staging platform' at the coronal aspect of the obstruction.

Ultrasonics has been a useful option for removal of the posts with minimum loss of tooth structure and damage. Removal of fibre reinforced composite posts has been a challenge. The disruption of composite structure by ultrasonic vibration seems to be the most effective technique in fibre post removal. It is important to remove the entire composite material used in the luting procedure. If the ultrasonic tip leaves behind gray streakes, it is an indication that composite is still present. The conductance of the vibration forces is directly proportional to the square root of modulus of elasticity of the post material[7]. Because of low modulus of elasticity of the composite posts, the effectiveness of ultrasonics as an aid in post removal is decreased.

Ultrasonics is initially used to remove the restorative material and the luting cement of the post followed by placement of ultrasonic tip to the post. The energy is transferred to cement through the post until the cement breaks down and the post loosens [8]. This method minimises the loss of tooth structure and tooth damage.

Ultrasonics can be used for retrieval of silver cones. The method is to start by troughing around the silver point with an ultrasonic spreader tip to eliminate the dentin carefully. The space created around the silver cones will loosen the silver point which can then be removed.

The effectiveness of irrigation lies in mechanical flushing action and the chemical ability of the irrigants to dissolve the tissue [9,10]. Syringe irrigation is relatively weak and depends on many factors such as diameter of the needle, depth of placement and anatomy of the canal [9,11,12]. Ultrasonics is a useful option for cleaning of difficult anatomic features like fins and webs. Ultrasonic vibration generates a continuous movement of the irrigant which is directly proportional to the effectiveness of cleaning of the canal[13-17]. Higher velocity and more volume of irrigant flow is created in the canal during ultrasonic irrigation [10].It has been concluded that ultrasonic also brings about significant bacterial reduction from the root canals than the other methods of irrigant activation and conventional needle irrigation [18].

Acoustic streaming by ultrasonics described by Ahmad et al produces enough shear forces to dislodge the debris in the canal [16]. US creates cavitation and acoustic streaming. The cavitation is minimal and is restricted to the tip. The acoustic streaming effect, however, is important. The irrigant is activated by the ultrasonic energy generated from the energized instruments, giving out acoustic streaming and eddies [16,17]. There is a synergistic effect of NaOcl and US [19]. The ability of NaOCl to dissolve collagen is enhanced by the heat from Ultrasonics [20].

One more application of ultrasonics is in obturation by warm lateral condensation technique using thermoplastisized gutta percha. The technique is easy to master. The heat is generated only during activation and the plugger cools down rapidly once the activation is stopped. The gutta percha does not stick to the ultrasonic file and has less volumetric changes upon cooling [21]. Moreover the placement of sealers with ultrasonically activated file showed a better sealing of the canal walls and better filling of the accessory canals than with hand instruments [22,23]. In a study on penetration depth of sealers using ultrasonics, AH-plus showed greater penetration compared to aeroseal and endorez sealers [24].

The ultrasonics also aid in the placement of Mineral Trioxide Aggregate (MTA). MTA placement in open apices with ultrasonic vibration and an endodontic condenser improved the flow settling and compaction of MTA [25]. The ultrasonic energy generates a wave like motion, which adapts the cement to the canal walls. This can also be put to use in root end cavities and perforations.

Coming to surgical endodontics, ultrasonics was a boon to root end cavity preparation. The first root end cavity preparation using ultrasonic inserts was done by

Bernard et al [26]. They give proper access to the root ends in a limited working space. Similar to the ortho grade obturation, ultrasonically activated condenser tips are used for placement of retrograde filling materials. Ultrasonic tips are also used to polish root end materials, apical surfaces and refinement of external radicular surface to eliminate the extraradicular bacteria.

Ultrasonics has had its mark in almost all the procedures of endodontic treatment. They enhance the quality of the treatment requiring less time and operator efficiency. Research in going on on all the aspects of application of ultrasonics in endodontics and they will occupy an indispensible place in clinical practice.

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Oral Dysbiosis–Balancing Role of Oral Physicians

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ABSTRACT

Since evolution, the oral cavity has served as a natural housing for numerous species of microbial colonies, which includes both beneficial and harmful organisms. They have developed various defensive mechanisms over time, and have known to survive hand in hand within the various human organs. An ecological balance is always maintained between these beneficial and harmful bacteria, which inturn keeps the hosts' organ systems in harmony. A plethora of deleterious effects may occur in the host when this harmony is disrupted. This article explains briefly about the harmful effects of oral dysbiosis and the role of oral physicians in controlling it.

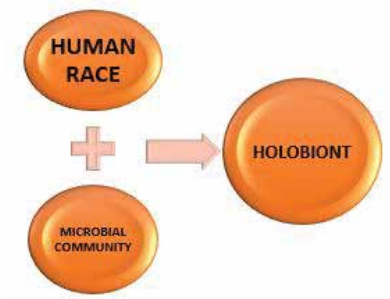
Keywords: *dysbiosis, microbes, oral physicians*

Introduction

Oral cavity is the first and primary communication between the external environment and our internal organ systems. According to the Human Oral Microbiome Database (HOMD), around 150 genera and 700 species of microorganisms are known to flourish in various habitats or niches of the oral cavity like the teeth, tongue, mucosa, saliva, etc., inspite of constant removal of these microbes and their nutrition through various forces like swallowing and oral hygiene measures[1].

Microbiota in the oral cavity is personalized for each individual and also vary across different habitat and time. The co-existence of different species of microbes in the oral cavity is called microbial symbiosis. These species are known to exhibit a relationship with the host, which is very crucial in maintaining the oral and systemic health.Together with the symbiotic microbes, we are considered as a single unit and are called the HOLOBIONT[2], which is represented in Fig1.

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Symbiosis is established as the host provides nutrition and suitable habitat to the microbiota, which in turn favors the host in many ways. They act as a barrier to various exogenic bacteria and protect the beneficial microbes from unwanted inflammatory reactions. Some residents convert dietary nitrates into nitrites in the saliva which is known to play a role in maintaining normal blood pressure. Further when nitrites are ingested, it is converted into acidified nitric oxide, which is antimicrobial in nature and stimulates gastric mucous secretions. This healthy relationship is balanced through various factors which include proper oral hygiene, healthy diet and good host defenses.

When drastic changes occur in the oral environment due to poor plaque control, low salivary flow, hormonal imbalance or antibiotics, deleterious shifts occur in the normal micro-community which is termed as dysbiosis. This is the key pathway for various dental and systemic diseases.

Role in Oral and Systemic Diseases: Dental caries which is the most prevalent dental disease is caused mainly due to a shift in the normal ecosystem of the mouth. Biofilm formation is the first step in the pathogenesis of periodontal diseases. This includes a sequence of events like primary colonization,establishment of a matrix and reinforcement of the primary matrix structure[1,2].

Oral mucosal lesions like oral leukoplakia, lichen planus have also become more prevalent with lifestyle changes, where dysbiosis plays quite a role in such lesions[1].

While bacteria like Peptostreptococcus, Streptococcus salivarius, Streptococcus gordonii, Gemmellamorbillosum, Enterococcus and parvimonas were found in tissue samples of oral squamous cell carcinoma[1,3] patients. These organisms does not directly initiate or cause oral cancer, but adds fuel to the flame through various mechanisms. Certain species like Streptococcus help in the breakdown of alcohol into its primary metabolite acetaldehyde which is a potential carcinogen. The microorganisms provoke chronic inflammatory reactions which releases pro-inflammatory mediators, some of which might trigger mutagenesis or oncogene activation. Also, secretion of bacterial effector proteins could alter the cell proliferation and inhibit apoptosis

Dysregulation of the oral microbial flora is also known to play a role in the pathogenesis of various systemic diseases like diabetes mellitus, gastro-intestinal disorders like Inflammatory bowel disease, Crohn's disease, liver cirrhosis, rheumatoid arthritis, Alzheimer's disease, artherosclerosis leading to cardiovascular disorders, HIV infection, etc[1].

Factors Affecting the Persistance of Oral Dysbiosis[4]:

Complex anatomic factors:

1. Pits and fissures in teeth
2. Malocclusion
3. Papilla of tongue
4. Gingival crevice

Dental factors:

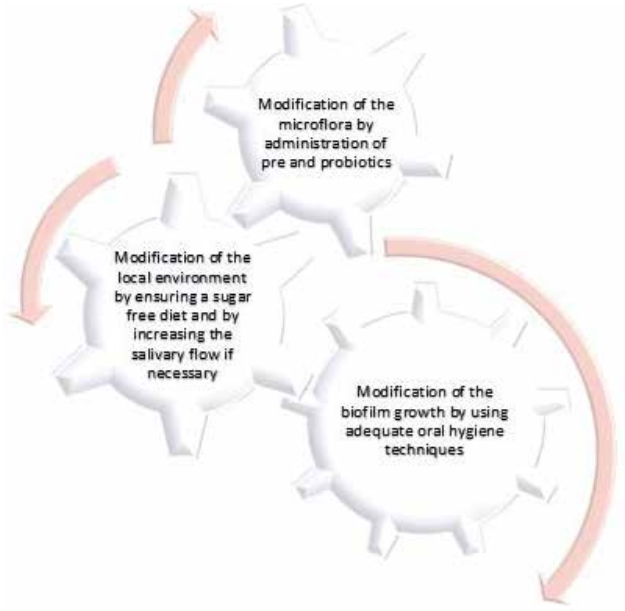
1. Overhanging restorations
2. Prosthetic surfaces
3. Orthodontic appliances

Subjective factors:

1. Ageing
2. Poor oral hygiene
3. Erratic dietary habits
4. Smoking
5. Alcohol consumption
6. Chronic use of antibiotics
7. Reduced salivary flow rate

Management Approaches: The main aim of clinicians is to prevent this imbalance and to re-establish homeostasis. Patient education is an important factor that would alter the imbalance that has occurred. Patients should be encouraged to modify their lifestyle by changing their dietary habits and other habits like smoking and alcohol consumption. Education about disproportionate and overuse of antibiotics should be given which might lead to bacterial resistance.

Once the imbalance have occurred, three main modifications can be done to treat oral dysbiosis[5] which is represented in Fig 2:



According to International Scientific association, Probiotics are live microorganisms when administered in adequate amounts confer health benefits on the host.

They mainly act through the following mechanisms: Compete with other pathogens for nutrition; Produce

Bacteriocins and other enzymes to inhibit potential pathogens; modulate cellular proliferation and apoptosis. The oral probiotics also have a tendency to attach itself to the dental hard tissues and to become an integral part of the biofilm.[6]

Prebiotics are fibers which act as nutrition for the beneficial bacterial colonies or probiotic bacteria. They stimulate the growth and activity of probiotics. [6]Both prebiotic and probiotic supplements are known to control dental caries, periodontitis and other oral diseases by manipulating the oral bacteria. They also prevent various gastrointestinal diseases and other systemic diseases like diabetes.

Urbanisationhas led to increased consumption of processed food and refined sugar, which exaggerates the existing condition. Patients should be advised to have afiber rich diet and to avoid cariogenic and acidic foods. Acidic environment may also be caused by reduced salivary flow due to old age, certain medications, radiotherapy or other systemic diseases. Increasing the salivary flow through sialagogues and artificial saliva will help neutralize the oral pH.

Reinforcement on oral hygiene measures like proper brushing and flossing techniques should be insisted to the patient. Importance of professional scaling should also be emphasized to disrupt the existing colonies in plaque and calculus[7].Dentrifices and Mouthwashes are widely being used as potent antiplaque agents. However it isinadvisable to recommend long term use of alcohol containing mouthwashes as it has been proved to increase the susceptibility to oral cancer[8].Moreover mouthwashes containing triclosan which is a broad spectrum antibiotic is known to reduce the total bacterial count in saliva which includes both good and bad bacteria.[9]Hence, prolonged use is contraindicated and is to be monitored.

Conclusion

Role of oral microbiome in maintaining homeostasis of mouth is crucial. Any imbalance paves path for disease occurrence due to altered oral hygiene. Prescription of mouth washes and medicated toothpastes must be strictly supervised. Antibiotic misuse is posing a great danger in medical field. Over the counter usage of these medications can deplete its usefulness during disease stages. Awareness about maintaining the oral microbiome and advise on oral hygiene aids among general public and general dentists should be initiated and widespread.

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Oral Field Cancerisation–Note to General Dentists

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ABSTRACT

Oral cancer is a dreadful disease affecting the quality of life of patients and their concerned family. The concept of field cancerisation influences the disease progression and treatment prognosis to a greater extent, that recurrence becomes inevitable. Purpose of the article is to emphasize on the theory of field cancerisation among the general dentists who can therefore, approach their patients with tobacco- related oral habits in a proper manner and ensure early diagnosis of the disease to aid in prompt treatment.

Keywords: *Oral cancer, field cancer, general dentist, field tumour*

Introduction

Cancer of head and neck is sixth most common malignancy.[1] Despite extensive research on early diagnosis and constant improvisation in treatment aspects, Head and Neck Squamous Cell Carcinomas (HNSCC) pose a plenty of challenges to both, clinicians and patients. Key to success in treating these cases relies on early diagnosis and prompt treatment.[2] But, general lack of proper understanding of the genetic alterations and molecular aspects of this disease among the oral physician jeopardises the patient's health. Resultant cellular changes of genomic and metabolic abnormalities that go undetected under a microscope influence the disease progression, oblivious to the treating clinician.

Slaughter's concept: Albeit Slaughter in 1953 observed the presence of histologically altered cells around a squamous cell carcinoma lesion in his study. He then proposed that "cancer does not arise as an isolated cellular phenomenon, but rather as an anaplastic tendency involving many cells at once".[3]

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This was further explored as field-effect/field cancerization that has been demonstrated in various epithelial tumours in other organs such as oropharynx, larynx, lung, oesophagus, vulva, cervix, colon, breast, bladder, and skin.[4] The current definition of field cancer states that "The presence of one or more areas consisting of epithelial cells that have genetic alterations. A field lesion (or shortly 'field') has a monoclonal origin, and does not show invasive growth and metastatic behaviour, the hallmark criteria of cancer."[5]

Field effect: Prolonged exposure to carcinogenic substances pre-condition the oral mucosal tissues, potentiating them for further the malignant progression. This transformation of clinically appearing normal tissue to a potentially malignant lesion can occur at any point of time. The susceptibility of multifocal carcinogenesis in HNSCC may occur due to independent cell alteration or migration of affected cells within the tissue bed.[6]

Hence, the following theories were proposed to explain the possible course of development of field-effect in epithelial tissues:

1. **Monoclonal theory**: Also known as Lateral cancerisation theory that suggests a progressive transformation of cells adjacent to the mutated cell and therefore expanding the tumour nidus in the lateral aspect.
2. **Polyclonal theory/Classic theory:** Continuous carcinogenic exposure to the soft tissue structuresin the oral cavity induces multiple areas

of genetically altered cells that exhibit abnormal molecular changes leading to altered cellular events. Such abetments lead to formation of multiple tumour sites of diverse clonality.

3. **Alternate theory:** A single genetically altered cell develops to form a tumour nidus through migration of its progeny cells resulting in multiple areas of tumour potential with the same clonality.
   i. Micro metastasis by Saliva.
   ii. Intraepithelial migration. [7,8]

Clinical consequences: Understanding the concept of field cancerisation is of utmost importance in treating a patient with the premalignant disease. Lesions such as leukoplakia, erythroplakia exhibit a localised presentation in the oral cavity. Whereas, Oral Submucous fibrosis, Plummer Vinson syndrome, Erosive Oral lichen planus, Graft- vs- Host disease and lesions alike present with generalised involvement of Oral and even pharyngeal tissues.Among the various pathways of carcinogenesis, long standing inflammation is considered to be a potential factor. Oral mucosal conditions including oral lichen planus that subject the tissues to persistent inflammation can induce tumours over the field area.[9] Formation of new tumours in the anatomical region of already resected tumours can be explained by two cause: Incomplete resection of the primary tumour or presence of genetically altered cells in the region which gives rise to second primary tumours.[10] The latter explains recurrence of tumour in radically resected carcinoma cases.[11-12]

Occurrence of second primary tumour can be synchronous, i.e., occurring within 6 months of time or metachronous i.e., occur after 6 months or any time later. The diagnostic criteria for double primary malignancies was given my Warren and gates in 1932 that states,

1. Histological confirmation of malignancy in both the index and secondary tumours.
2. There should be at least 2 cm of normal mucosa between the tumours. If the tumours are in the same location, then they should be separated in time by at least five years.
3. Probability of one being the metastasis of the other must be excluded.[13]

Schwartz et al, in 1994 conducted an analysis that suggested that high rate of second primary tumours in patients with initial head and neck malignancies. They also concluded that the development of a second malignancy is almost always fatal. The following table summarises the study report by Schwartz et al[14]

Table 1: Incidence of Multiple Primaries in Head and Neck Cancer

Year	Reference	No. of patients	Site of 2nd Cancer	Follow – up	2nd primaries (overall) (%)
1961	Moertel	732	Oral cavity		16.3
1983	Black	577	Head and neck	>5yr (1972 – 1978)	20.9
1984	Vikram	114	Head and neck	>5yr	14.0
1985	Shons	405	Head and neck	>5yr (1965 – 1980)	13.0
1987	Rousy	1146	Head and neck	>5yr (1978 – 1985)	14.5
1990	Hong	51	Head and neck	5yr	36.0
1991	Fijuth	600	Oral cavity and oropharynx	35mo	19.0
1992	Hirokawa	535	Oral cavity	10yr	11.4

The current treatment aspects of the premalignant diseases assure utmost care to the lesion-specific areas in the oral cavity, whereas the patient is under the danger of developing carcinogenic transformation in any part of the mouth. When knowledge of field cancerization is been considered, the clinicians can demonstrate a better approach to treatment planning in such patients. Few articles in the literature provide evidence for multiple site biopsies in cases of Oral submucous fibrosis suggesting a better view of the histological alteration of the tissue. Such investigational methods endow more information about the tissue progression into malignancy.[15]

Due to lack of good RCT studies, there hasn't been a proper protocol derived for management of oral potentially malignant lesions.[16] Enormous variations in tumour pathway exhibiting heterogenicity complicates a universal protocol in managing these patients. A patient having strong habitual history of tobacco usage logically lacks the knowledge of importance in regularly visiting an oral physician. Such patients miss out on the benefits of early diagnosis and prompt treatment.[17]

Note to general dental practitioner:

1. Emphasis on tobacco cessation and regular patient follow up.
2. Conducting frequent screening camps and awareness program towards patient education.
3. Knowledge on various Potentially malignant disorders and predicting their progression.
4. Responsibility in referring patients to higher centre for their management.
5. Consulting Oral physician specialists as and when needed rather than proceeding a case with pre conclusion of lesions.
6. Complete examination of a patient at every consultation.[18]

Conclusion

A clinically usual tissue appearance gives an absolute display of normalcy. This convinces general clinicians to ignore any possible genetic or molecular transformation of cells beneath it. Any such transformation that can be potentially managed still goes unnoticed beneath our nose. This puts the patient under a treacherous situation due to a cognitive error of the treating physician. Once developed a carcinogenic lesion, the whole approach in treating a patient is altered to a vigorous mode. Treating the pre malignant lesions in such tissue-specific manner doesn't guarantee a progression-free survival in such patients. Associated morbidity and mortality of the disease depends on the prognostic factors of HNSCC that include the tumour size, nodal involvement and presence of metastatic lesions. These factors are hugely influenced by new tumour formation either in the field area of existing tumour or at a site distant from the existing tumour. Recurrent lesions on a previously treated site further complicate the clinical scenario. To avoid such complications, clinicians must cultivate the habit of treating a patient as a whole rather than a lesion specific management.

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Proton Therapy in Head and Neck Cancer—A Review

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ABSTRACT

Conventional radiation therapy is one of the most common methods of cancer treatment. Because of conventional therapy's early and late toxicity,it is of great interest to find a modality that has low side effects to the normal tissues. This has led to the invention of proton therapy. Proton therapy is believed to have better results than conventional radiotherapy. Proton beam therapy is a recent modality that is more tumour conservative than photon beam therapy. The physical property of protons spares the normal surrounding tissues. More clinical trials and prospective studies are required for the inclusion of proton therapy in treating carcinomas of the head and neck.

Keywords: *Radiation, Photon therapy, Computed tomography.*

Introduction

Head and neck cancer is a range of malignancies with different causative factors. However, due to the tumour's proximity to vital structures and anatomical location, some of the tumors are difficult to treat. Anatomic locations of tumor within the head and neck range from the oral cavity, maxillary sinus, paranasal sinus, minor and major salivary glands, nasopharynx, oropharynx, and larynx. [1] Among cancer, head and neck cancer is accounted for 30% in India. Oral cancer is ranked eleven among all other types of cancer in 2013.The Indian subcontinent is responsible for one-third of the world's oral cancer burden [2, 3] For head and neck cancer the most common modality of treatment has been chemotherapy and/with radiotherapy. With surgery being the mainstay of management although often associated with morbidity and mortality. Recent advances of chemotherapeutic and radiotherapeutic modalities have emerged to treat these challenging tumours.[1]Among them, proton therapy is one of the radiotherapeutics advances that have less toxicity on surrounding tissues. A form of external beam radiotherapy is proton therapy it uses protons instead of x-rays to irradiate the tumorous tissues.

Dosimetric advantage of proton therapy: Clinical studies and also at the molecular level there are differences between the traditional photon therapy and the proton therapy. Clinical studies have also demonstrated the benefit of proton and the potential advantages and disadvantages when compared to traditional photon therapy. In contrast with photons, protons have a heavier mass that prompts to a relatively decreased scattering angle and subsequently sharper dose distribution within a finite, defined range**.** [4]

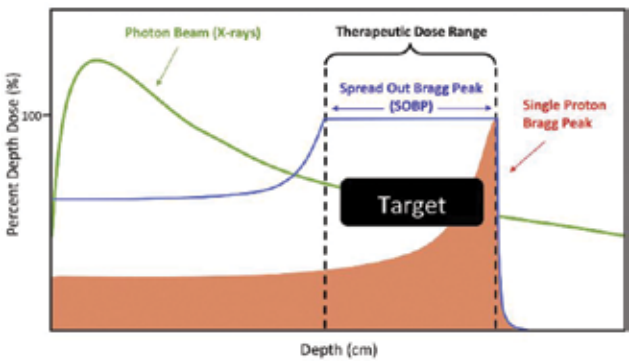


Figure 1: Spread-out Bragg peak (SOBP)

Furthermore, the dose depth distribution for proton beam therapy is characterized by a sharp increase in dose deposited at depth, delivered by a monoenergetic pencil proton beam and an abrupt distal dose fall off (Bragg

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peak). A monoenergetic proton beam has a finite range and a well-defined peak in the depth-dose curve. This peak has a narrow width and a sharp distal falloff, which enables tissue sparing beyond the proton range. Because the proton particles halt in the tissue immediately after the Bragg peak, no exit dose is deposited beyond the target. For proton therapy to be clinically useful, it is necessary to superimpose several beams with distinct energies to produce a spread-out Bragg peak (SOBP) (Figure 1) to cover the target. SOBP formation takes place at the cost of entrance or skin dose as the SOBP width increases. However, the absence of an exit dose is the main dosimetric benefit compared to x-rays. [5]

Proton delivery system: The Proton is delivered in a pencil shaped beam system to the target tissue. Pencil beam scanning uses protons ' monoenergetic "spots," these spots are delivered in various energy layers so that the dose is distally and proximally conformed to the target. The pencil beam may be modified by scattering beam technique to form SOBP. Scattering beam technique is when the beam is spread out laterally using double scatterer and compensator and its depth is modulated by range compensators. In scanning beam technique electromagnetic field is used to expand and shape the lateral beam relying on the magnetic property of the protons. The energy of the generated proton beam is varied to read the tumour's distinct layers, and magnets are used to deflect and conform the beam to the volume of the target. So Intensity Modulated Proton Therapy (IMPT) is when the proton beam intensity is modulated as it moves through the field guided by magnets to paint the target with the dose that allows the capacity for the intensity modulation of the beam.[6, 7]

Treatment plan: The main treatment plan is to choose the shortest and the most reproducible path through the tissue to reach the target. Proton penetration may encounter worse tissue inhomogeneity issues due to artifacts, such as dental or surgical hardware, can lead to uncertainty in the tumour distance and localization of the Bragg peak and the accurate calculation of the radiation dose in the tissue. Computed tomography (CT) are used to plan and to consequently deliver the suboptimal treatment with the potential for normal tissue irradiation. Therefore, it is important to avoid choosing a beam path reaching the area of interest through hollow areas such as the mouth, hollow organs, and critical structures (e.g., spinal cord, pharyngeal constrictors, salivary glands). Treatment plans can be further complicated by fluctuations in a patient's anatomy, such as changes in tumor size, patient weight. In the head and neck, the complex anatomic geometry and irregularity in the shape of the target often require more complex and advanced proton techniques. Also, consideration should be given to techniques and plans for minimizing skin toxicity, such as using three-dimensional conformal passive scanning as the dose of the entrance beam is determined by the depth of the target density along the beam direction. [4, 1]

G- Grade, G-tube – gastrostomy tube, OS- Overall Survival, PFS- Progressive Free Survival, LC- Local Control, LRC-Local Regional Control, LFFS-Locoregional failure-free survival, DFS- Disease Free Survival DMFS-distant metastasis-free survival, PBT-Proton Beam Therapy, IMRT- Intensity Modulated (Photon) Radiation Therapy, PSPT- Passive Scattered Proton Therapy, NPC- nasopharynx carcinoma, RBE-Relative Biological Effectiveness, OPC- Oropharynx Carcinoma

Limitations: In terms of treatment planning, proton beam therapy is highly sensitive to fluctuations and uncertainties in particle range patient positioning and anatomical changes. The high sensitivity of IMPT is due to changes in the radiologic density as a result of setup errors or anatomic changes may be due to interfraction variations in positioning the patient, intrafractional organ motion, or changes in target volume throughout the treatment (i.e. tumor regression or patient weight loss) during or in between fractions are the greatest limitations.

For IMPT, Improvement on the methods of robust optimization and to use CT imaging frequently throughout the treatment to verify and/or to trigger adaptive planning during the treatment. Scanning-spot optimization algorithms, switching time and the RBE uncertainties of the proton therapy that affect the precision of IMPT planning are the limitations being actively investigated. Patient-specific quality assurance protocols should be established and standardised in the clinics**.** To understand the risks and benefits of proton beam therapy prospective, randomized controlled studies are needed.[4, 7]

Future directions: Further development of clinical evidence is needed to guide the proton therapy application for various malignancies of the head and neck.Additional insights into the advantages of proton

therapy would ideally be obtained from big, multicenter randomized clinical trials that directly compare proton therapy with photon-based therapy for the treatment of head and neck malignancies as they have the ability to reduce dose escalation toxicity relative to photon therapy; However, such studies may demonstrate to be impractical, partly because it would require big multi-institutional database registries to be developed. Oropharyngeal cancer, for instance, would be included in randomized studies comparing protons with IMRT. Further studies may be directed towards the relationship between proton beam therapy and other treatment methods, such as immunotherapy as proton beam therapy becomes more popular. Future research may explain the outcomes of proton radiation therapy on the immune response to antitumor and immunogenic cells destruction. One potential sector of future studies is to investigate techniques at the distal end of the Bragg peak to exploit proton-specific distinctive radiobiological characteristics such as a potentially higher comparative biological efficacy (RBE). Some disadvantage due to the uncertainty of the range and the potential for greater RBE at the distal Bragg peak, proton fields are not aimed at critical buildings, restricting some beam arrangements. In the future, a plan could be envisaged where the higher RBE edge is deliberately located within the tumour's most radioresistant part. Many comparative dosimetric planning studies have shown that proton therapy offers a favourable dose distribution to at-risk organs relative to IMRT, indicating that proton therapy can also lead to clinically significant decreases in acute and long-term toxic impacts caused by radiation. Other methods aim to use the normal probability of tissue complication (NTCP) models to define patients for whom proton therapy is likely to give a clinically significant benefit. Models have been developed to determine the NTCP value decrease from proton therapy versus IMRT and are being implemented prospectively. It is hoped that this strategy will lead to the detection by some threshold value of particular subsets of patients for whom proton treatment would exceed the anticipated advantage in reducing the NTCP value, such as 10%. Researchers assessing the advantages of proton therapy for other disease locations used cost-effectiveness analyses as a means to demonstrate the importance of PBR. To date, in patients with head and neck cancer, these models have not been used to assess PBR. However, as more data becomes accessible on the results of control, survival, and toxicity with PBR, cost-effectiveness analyses can become viable and informative. [1, 4, 5]

Conclusion

Proton therapy is a standard of care for skull tumor base as per National Comprehensive Cancer Network rules and is an alternative for periorbital tumors. Proton therapy use is also rising for other tumor regions in the head and neck. The possibilities of proton therapy will be further enhanced by new types of proton therapy such as IMPT and technical improvements in dose modelling, patient configuration, picture guidance, and radiobiology. Additional prospective studies are needed to quantify IMPT's clinical advantage over IMRT or PSPT and provide strong input on enhancing present techniques of planning and treating IMPT patients. Therefore, to identify and improve the indications for which proton radiation should be regarded, continuing and future attempts should produce forward-looking, comparative proof, ideally in the setting up of a clinical study.

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Oral Psoriasis- Report of 2 Cases with Review of Literature

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ABSTRACT

Psoriasis is a genetically determined, inflammatory disease of the skin. It can occur at any age but, usually develops during young adult life and may persist throughout a person's lifetime with periods of exacerbations and remissions. It was earlier thought that oral psoriasis does not exist, however it is now believed that oral lesions of psoriasis do exist although the incidence is very low. Herein we report two cases of psoriasis with oral manifestations and one case of TMJ psoriatic arthritis.

Keywords: *Oral psoriasis, geographic tongue, lichen planus, granular gingival lesions.*

Introduction

Psoriasis is a chronic, remitting and relapsing inflammatory skin disorder with a strong genetic predisposition. It is a genetically complex disease with a multifactorial etiology[1]. A genome-wide linkage analysis of eight kindred localized a gene involved in psoriasis to the distal end of human chromosome 17q[2]. Infection, trauma, metabolic disturbances and endocrine dysfunction have been considered as triggering factors in the initiation of psoriasis. There are different forms of psoriasis namely, psoriasis vulgaris, psoriasis inversa and pustular psoriasis[1].

A review of the medical literature from 1903 to 1986 revealed only 33 cases of intraoral psoriasis. The reported frequencies of various oral psoriasis signs and symptoms are geographic tongue, fissured tongue, granular gingival lesions, lichen planus, other keratotic lesions and TMJ arthritis[3,4]. Conclusive data on the incidence of true psoriatic oral lesions is not available[4]. There is an increase in the prevalence of ectopic geographic tongue (5-10.3%) and fissured tongue (6-14.3%) in patients with psoriasis with a female predilection[5]. It has been suggested that geographic tongue, fissured tongue, and generalized pustular psoriasis have a genetic linkage[6]. Psoriatic lesions may be found on the gingiva, upper and lower lip, hard and soft palate, edentulous maxillary ridge, buccal mucosa and floor of the mouth[7-10]. One of the complications of psoriasis is psoriatic arthritis.

Involvement of the TMJ has been reported in patients with psoriasis varying from 31% - 63% and crepitus is the most characteristic TMJ sound in these patients[11]. Crepitus may persist even after all other signs and symptoms including pain have disappeared. There is a tendency for the arthritis to improve as cutaneous lesions resolve[12].

Pindborg recognizes four clinical presentations of intraoral psoriasis: small, whitish, oval to round lesions that can be scraped off leaving a bleeding surface; whitish plaques with red areas that parallel the cutaneous eruptions; fiery red areas: and geographic tongue. Oral lesions are uncommon in psoriasis vulgaris. However in pustular psoriasis, lesions clinically resembling geographic tongue are common[13].

Case Reports:

Case 1: A 50 year old male reported with the complaint of pain and burning sensation of the gums with discomfort and partial inability to open the mouth since two months.

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He was a known psoriatic with extensive erythematous plaque like lesions on the skin covered with silvery scales. Auspitz sign was positive. He was on medication for the same but had discontinued it since 6 months. He was a known hypertensive and hyperthyroid on medication for the past 5 years. Family and personal history were non contributory. Physical examination revealed exophthalmia of eyes (fig 1); right thumb and index finger interphalangeal joint arthritis (fig 2) and lower lips were dry with shiny adherent scales. TMJ examination showed bilateral tenderness and clicking on opening the mouth and crepitus was present. Analysis of mandibular excursions showed limited mouth opening was limited to 25mm and limited lateral and protrusive movements. Intraorally there was generalized edema and erythema of the marginal and interproximal gingiva with generalized areas of erosion on the attached gingiva (fig 2). Oral hygiene was fair. Dorsum of the tongue showed patchy loss of filiform papilla resulting in erythematous flat areas. The margins were irregular, slightly raised and yellowish white in color. Oral manifestations like geographic tongue, psoriatic lesions of the gingiva and TMJ arthritis were considered under provisional diagnosis.

Right hand wrist radiograph revealed erosion of the metacarpal joint of the right thumb (fig 2). Panoramic radiograph showed no alveolar bone loss and TMJ appeared normal. Following biochemical investigations were done which revealed,

Table 1: Biochemical investigations with their results of case 1

Investigations	Observed value	Reference interval
S.uric acid	3.3mg/dL	3.6mg-8.6mg/dL
RA factor	Negative	-
Hb%	11.0gm/dL	12-14gm/dL
Random blood sugar	110mg/dL	<140mg/dL
HIV I & II tests	Negative	-
Blood pressure	160/120mmHg.	120/80mmHg
Thyroid profile		
T3	3.5ng/ml	0.8-2.0 ng/ml
T4	14µg/dl	4.6-12.0 µg/dL
TSH	0.05µU/ml	0.3-3.0µU/ml

Gingival biopsy followed by haematoxylin and eosin staining showed hyperplasia, acanthosis, neighbouring rete ridges seemed to coalesce at their base with elongation, edema and dilated tortuous capillaries surrounded by dense inflammatory infiltrate (Fig 2).

Treatment included oral prophylaxis and topical anesthetics with topical steroids to relieve the pain of the gingival erosive lesions. Patient was advised to discontinue the smoking and alcohol habit as they are exacerbating factors. Clobetasol propionate gel and psoralene UV-A therapy for twice weekly for four weeks was advised for the skin lesions. 25 mg of etanercept subcutaneously, twice a week, monthly with follow-up was advised for TMJ psoriatic arthritis. Following treatment, the intensity of the lesions reduced. On follow up after 6 weeks, the crepitus had disappeared and the mouth opening had improved to 31mm.

Case 2: A 40 year old female reported with the complain of pain and burning sensation of the mouth since 6 months which increased on taking spicy food. She was a known psoriatic patient on medication since a year. Physical examination revealed papulosquamous lesions with shiny scales over the trunk, abdomen, back and the extremities which were pruritic (fig 1). She also had severe arthritis that had limited the movements of her upper and lower arms. Intraoral examination revealed white, keratotic, unscrapable, smooth radiating striae associated with erythema on the buccal mucosa bilaterally measuring about 2X2 cm (fig 3). Dorsum of the tongue showed diffuse areas of atrophy of filiform papillae (fig 3). Lichen planus of buccal mucosa bilaterally and geographic tongue was observed in this psoriatic patient.

Following biochemical investigations were done which revealed,

Table 2: Biochemical investigations with their results of case 2

Investigations	Observed value	Reference interval
S.uric acid	2.6 mg/dL	3.6-8.6mg/dL
RA factor	Negative	-
Hb%	9.0gm/dL	13.0-15.0gm/dL
Random blood sugar	90 mg/dL	<140mg/dL
HIV I & II tests	Negative	-
Blood pressure	**130/100mmHg.**	120/80mmHg



Exopthalmos of eyes



Deformity of the right index and thumb



Papulosquamous eruptions over feet



Papulosquamous eruption over the elbow.

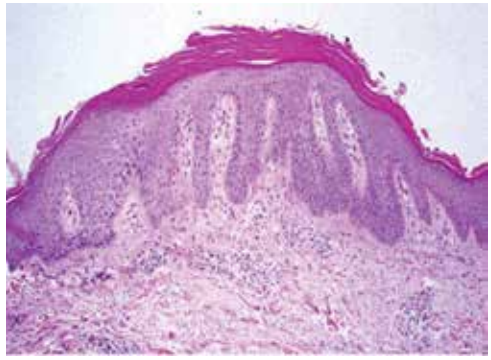
Figure 1: Shows Keratotic Eruptions of Hand and Feet



Gingival inflammation with erosion



Erosion of metacarpal joint in right thumb



Micro abscess of monro within parakeratotic layer



Papulosquamous lesions and shiny scales over the trunk, abdomen, back and the extremities.

Figure 2: Shows Oral Erosions and Joint Erosions



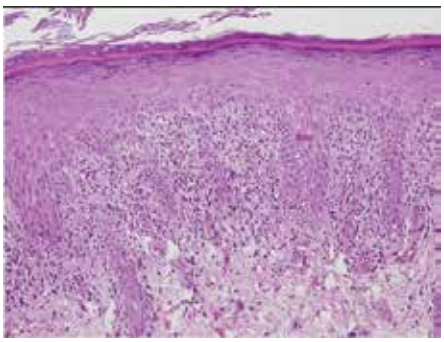
White radiating striae with erythema over the left buccal mucosa



White radiating striae with erythema over the right buccal mucosa



Tongue showing diffuse areas of atrophy



Micro abscess of monro within parakeratotic layer of filiform papillae.

Figure 3: Shows Oral Lesions

Histopathological features of the left buccal mucosa showed saw tooth rete ridges with dense inflammatory infiltrate suggestive of lichen planus. Civatte bodies were also found. The tongue biopsy revealed hyperkeratosis, elongation, clubbing and edema of the rete ridges, thinning of the suprapapillary epithelium, chronic inflammatory infiltrate with capillary dilatation and edema.

Treatment included oral prophylaxis and topical steroids for lichen planus lesions. Clobetasol propionate gel and psoralene UV-A therapy twice weekly for four weeks was advised for skin lesions. Patient's skin lesions and oral lichen planus lesions had reduced on consecutive follow up visits.

Discussion

Oral psoriasis is rare given the prevalence of cutaneous disease, one explanation is that oral lesions are asymptomatic and do not come to the clinician's attention[5].Oppenheim, in 1903 was the first to substantiate oral psoriasis with biopsy[7]. Psoriatic lesions are not premalignant, but dystrophic changes may occur secondary to treatment with arsenicals or radiation[8]. The frequency of geographic tongue, fissured tongue, gingival and mucosal lesions among psoriatic patients was more compared to the general population. Various studied on psoriatic patients have reported different incidence of geographic tongue and fissured tongue, Geographic stomatitis, glossal, and/or extraglossal lesions have been observed to appear and disappear with the cutaneous lesions of psoriasis[9]. Both our patients had geographic tongue and gingival lesions. One with erosive type of lesions and other with lichen planus like lesion. A strong association between psoriasis and HIV infections has been shown thus restricting the clinician to elicit Auspitz sign in the patient[2].

Inflammatory joint diseases may affect the temporomandibular joint (TMJ). Crepitus is the most characteristic TMJ sound in psoriatic patients which may persist after all other signs and symptoms including pain have disappeared. The onset of TMJ symptoms for this disease entity usually occurs by the fourth decade of life, most commonly expressed as pain and limitation of jaw range of motion. When the TMJ in these patients becomes involved, it is difficult to distinguish between various forms of arthritis such as rheumatoid or osteoarthritis. Usually, radiographic findings are not

specific, and diagnosis is based on the arthritis occurring in a patient who has psoriasis and a negative rheumatoid factor. There is a tendency for the arthritis to improve as cutaneous psoriasis resolves. Although oral psoriasis usually occurs in the presence of cutaneous diseases, Wooten et al did find a case of oral psoriasis of the maxillary ridge in the absence of cutaneous involvement.

Differential diagnosis of oral psoriasis include lichen planus, eczema, lupus erythematoses, syphilis, desquamative gingivitis, Reiter's syndrome, stomatitis medicamentosa, candidiasis, leukoplakia and squamous cell carcinoma.

The primary target in the management of TMJ psoriatic arthritis is pain relief. Initial therapy should include counseling and reassurance on the benign nature of the disease. Physiotherapy may improve pain reduction and joint range of motion. The pharmacologic management of psoriatic arthritis should initially include non-steroidal anti-inflammatory drugs (NSAIDs), and steroids administered systemically and intra-articularly[13]. Psoriasis can be managed successfully using coal tar, anthralin, salicylic acid and other keratolytic agents supplemented with calcipotriene and cautious use of corticosteroids. Patients with severe, refractory lesions should be referred to ultraviolet light B (UVB) or oral psoralene with ultraviolet A therapy (PUVA). Systemic therapy with retinoids, cyclosporine or cytotoxic drugs should be administered under supervision[11]. The cutaneous lesions in both our patients had resolved. The first patient's TMJ pain and discomfort had considerably reduced. Dental treatment strategy should emphasize oral hygiene and removal of local irritants. Patients should be reinforced frequently in oral hygiene performance. In cases with associated glossodynia, potentially initiating factors such as spicy or acidic foods and smoking should be eliminated. Symptomatic treatment may include frequent mouth rinsing with lukewarm saline, topical anesthetics. antihistamines, steroids, or a light application of liquid nitrogen or solid carbon dioxide[12].

Conclusion

The major findings of oral psoriasis are tongue changes which include geographic tongue, fissured tongue and ectopic geographic tongue (5-1 4.3%); gingival involvement (erythematous patches or grayish white crescent-shaped lesions) and TMJ inflammation are less common. To support the diagnosis of oral psoriasis. a concurrence of systemic psoriatic lesions should be present. Confirmation by biopsy is mandatory. Multiple supportive treatment regimens are presently used to relieve symptoms; future investigation into the etiologies may yield new strategies for possible cure.

Ethical Clearance: Not needed since it is a case report

Source of Funding: Nil

Conflict of Interest: Nil

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Localization of Impacted Maxillary Canine by Modified Vertex Occlusal Method—A Technique Revisited

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ABSRACT

Successful management of impacted maxillary canines requires precise localization of these teeth which is usually achieved using a combination of clinical and radiographic examination. Various techniques have been employed in radiology to locate the impacted canines each of it with its own advantages and limitations. This article will emphasize on modified vertex occlusal view which is an extra oral view that images the maxillary arch in the superoinferior projection that was employed in our patient to accurately locate the position of the impacted tooth.

Keywords: *Impacted maxillary canines, localization, True/vertex occlusal view, Modified vertex occlusal view*

Introduction

Maxillary canines are the second most common teeth to be impacted after the mandibular third molars[1]. The prevalence of ectopic maxillary canines (EMCs) is approximately 1%. Determining the relative position of pathological lesions in the horizontal plane is essential for adequate diagnosis and treatment planning. Clinical examination in cases with EMCs may reveal the absence of a labial canine bulge on palpation, with prolonged retention of the primary canine. In the absence of the bulge, the tooth may be located palatally or superiorly within the arch. In these circumstances radiology plays a vital role in their localization[1].

In 70% of cases, an impacted tooth can be located by inspection and palpation. The other 30%, radiography is the only method to determine position of the impacted tooth[2].

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The following four methods for localizing these teeth are the tube shift/parallax method, orthogonal views, stereoradiography and the vertex/true occlusal view.[2,3]

Among these four methods the most commonly followed one is the true/vertex occlusal view. This requires an occlusal film to be inserted in the mouth and X-ray exposure is made through the vertex of the head[4&5] The disadvantages of the vertex occlusal view are long exposure time; poor image contrast due to non usage of grid, primary radiation beam is directed towards the thyroid gland and the gonads which should be harmful to the patient[2]. As an alternative, we had used modified projection technique to the maxillary arch which overcomes the disadvantages of the vertex occlusal view, produced an image with good details and image quality to locate the exact location of bilaterally impacted maxillary canines. We present this technique as it is revisited after long years and aptly this technique can be suggested as an unexplored treasure due to its easy availability and cost[3].

Case Report: A 14 year old female reported with chief complaint of missing teeth in the upper front region of the jaw since her childhood. After the exfoliation of the deciduous canines the permanent canines failed to erupt. The patient did not experience any symptoms in the alveolus of the missing teeth. Intraoral examination revealed missing maxillary canines 13, 23 with increased spacing between the upper anteriors. On palpation there was no bulge buccally to indicate the position of the teeth.

To rule out the presence of impacted maxillary canines, an intra oral periapical radiograph was taken which showed Clark's tube shift method was performed for both the right and left maxillary canines. The right maxillary canine was impacted and was situated between the root apices of the first and second premolars. On shifting the tube mesially in reference to the first radiograph the impacted tooth showed no significant movement in relation to the reference point of roots of premolars (Fig 1), which showed that the tooth was neither buccally nor palatally placed. The left maxillary canine was horizontally impacted and was situated over the root apices of the premolars associated with resorption of maxillary right first premolar root. On shifting the tube mesially in reference to the first radiograph the crown of the impacted tooth moved in the opposite direction (Fig 1), which showed that the tooth was palatally placed. This was followed by a panoramic radiograph (Fig 2) which revealed that both the canines bilaterally were neither magnified or diminished in comparison with the adjacent teeth which also suggested that that the impacted teeth were placed within the arch above the roots of the erupted teeth. The maxillary true occlusal view (Fig 3) showed the crowns of the canines were palatally placed between the crowns of premolars. But the exact positioning of the tooth cannot be determined by this view as the primary beam of radiation does not exactly pass through the roots of the anteriors along its long axis.



Figure 1: Localization of impacted canines using Clark's tube shift technique



Figure 2: Cropped Panoramic radiograph showing canines bilaterally with neither magnified nor diminished in comparison with the adjacent teeth



Figure 3: Maxillary true occlusal view showing crowns of the canines placed palatally between the crowns of premolars.

In this situation, a modified vertex/true occlusal view is preferred as the path of the central beam of X-ray passes exactly through the long axis of the maxillary anterior teeth. It can be performed using a cephalometric X-ray setup and extraoral cassette with rare earth intensifying screen and a green sensitive double emulsion film. The exposure was done by placing the patient erect against the cassette with the chest against the machine and neck fully extended. Now the patient was asked to open the mouth as widely as possible and the head was adjusted so that the maxillary occlusal plane is parallel to the floor and chin resting on the cassette (Fig 4). The film cassette was placed centrally in front of the maxilla and the X-ray beam was directed perpendicular to the occlusal plane and through the level of maxillary canines. The impacted teeth could not be visualized in the resultant radiograph (Fig 5) which suggested that the impacted teeth were neither placed buccally or palatally but with the arch above the roots of the first and second premolars bilaterally.



Figure 4: Patient positioned flat against the cassette with neck fully extended and mouth wide open for modified vertex occlusal projection



Figure 5: Resultant radiograph revealing bilaterally impacted teeth placed within the arch

Based on the radiographic appearances of the impacted teeth on the modified maxillary occlusal view, the surgeon had explored the region just above the roots of erupted teeth equidistant from both buccally and palatally and removed the impacted canines.

Discussion

The discrete organs of the head in the path of the primary beam will be exposed in imaging maxillary canines, hence a reduction in radiation dose will give a corresponding reduction in absorbed dose to these organs.[6] Compared to the true/vertex occlusal view, here the primary X-ray beam is directed away from the thyroid and gonadal organs[4&6]. It is really difficult to perform a vertex/true occlusal view in our routine intraoral X-ray unit. But comparatively, it is relatively much easier to perform the modified vertex occlusal projection in the cephalometric machine. Also the as the grid/screen film combination is used, the resultant image has an excellent contrast when compared the vertex/true occlusal radiograph[7]. The technique is reproducible and also has good infection control as we do not place the film inside the mouth for possible contamination from saliva[7]. In our case, with the help of modified vertex occlusal technique, the exact position of the impacted teeth was located thus guiding the surgeon the exact position of the teeth and the direction of approach ie.,buccally or palatally which had avoided excessive bone removal and also unnecessary trauma to the patient. There are also some pitfalls in this technique as it cannot be carried out in patients with cervical problems and also the magnification factor for this radiograph is high which produces image distortion of the molars.[8] Radiograph obtained by this method may be minimally magnified by the factor between 1.10-1.20, due to increased object film distance.[8]

Conclusion

The modified occlusal view, though a very old technique and only very few literature is available on this, should be reconsidered, as the technique produces accurate information for a successful management on impacted maxillary canines with a marked reduction of radiation and many more advantages discussed above.

Ethical Clearance: Not needed since it is a case report

Source of Funding: Nil

Conflict of Interest: Nil

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Rare Cases of Tuberculosis Masquerading as Neck Swelling

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ABSTRACT

Tuberculosis has recently resurged as a worldwide public health concern in spite of their recent advances in its diagnosis and management. It is estimated that approximately 8 million people develop TB each year & 3 million people die of complications associated with disease. Tuberculosis is an infectious disease caused by Mycobacterium tuberculosis, an acid-fast bacillus that is transmitted primarily through the respiratory tract and undergoes lymphohematogenous dissemination. Tuberculosis can involve any organ system in the body. While pulmonary tuberculosis is the most common presentation, extrapulmonary tuberculosis (EPTB) is also an important clinical problem. The term EPTB has been used to describe isolated occurrence of tuberculosis at body sites other than the lung. Extrapulmonary tuberculosis has increased in number. It has been said that the percentage of smear-positive re-treatment cases is high in India due to many causes. In this article we have presented three cases of tuberculosis.

Keywords: *TB, Lymphadenitis, Extrapulmonary TB*

Introduction

Tuberculosis has recently resurged as a worldwide public health concern in spite of the recent advances in its diagnosis and management. Every year about 8 million people develop TB & according to WHO 2 million people die out of this disease. The region with the highest incidence rates are the Indian subcontinent, Southeast Asia & Africa. Tuberculosis is a systemic disease usually caused by Mycobacterium Tuberculosis & also M.avium, M.kansasii & M.scrofulaceum. Tuberculosis chiefly affects the pulmonary system but it can also involve extrapulmonary sites such as lymph nodes, bone, kidneys. Lymph node tuberculosis (LNT) also known as tuberculous lymphadenitis, is commonly seen in underdeveloped countries, and with the spread of AIDS, tuberculous lymphadenitis is now frequently encountered in developed countries accounting for about 4–5% of all tuberculosis cases and 20–50% of extrapulmonary tuberculosis. These frequently involve the head & neck, with most common presentation as swelling in the neck region.

Cervical lymph nodes are the commonly affected lymph nodes by this disease which is classically termed as “scrofula”. Latin word SCROFA, means a broad sow due to likeness of cluster of nodes to piglets feeding from sow[1]. They are more common in women than in men[2,3,4,5]. The diagnosis of extrapulmonary TB is difficult due to restriction in diagnostic tests [6].

In India, under the Revised National Tuberculosis Control Program (RNTCP), the percentage of smear-positive re-treatment cases is high. The causes of re-treatment include relapse of the disease after successful completion of treatment, treatment failure and default in treatment[7]. *Relapse* is defined as a TB patient who was declared cured or treatment completed by a physician, but who reports back to the health service and is now found to be sputum smear positive. *Failure*, by definition, is any TB patient who is smear positive at 5 months or more after starting treatment. Failure also includes a patient who was treated with Category III regimen but who becomes smear positive during treatment. *Treatment after default* is a TB patient who

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received anti-tuberculosis treatment for 1 month or more from any source and returns to treatment after having defaulted, i.e., not taken anti-TB drugs consecutively for 2 months or more, and is found to be sputum smear positive[8]. In this article we have discussed about 3 rare cases of Tuberculosis.

Case 1: A 19 year old female patient reported to the Outpatient Department of Oral Medicine and Radiology with the chief complaint of painful swelling in the right side of neck that was present since a month and it gradually increased in size. The pain was of moderate intensity and dull during swallowing. Patient had gone to a private hospital and was given analgesics & antibiotics but the swelling did not respond to the medications. She also had persistent cough but there was no history of persistent fever, night sweats or weight loss. Patient was moderately built & nourished.

Extra-oral examination (Fig 1) revealed a solitary swelling 3x2cm in size in the region of the floor of the mouth just below the chin. The skin over the swelling and its colour were normal. The surface was smooth. It was oval in shape and margins were ill defined. The swelling was situated in the midline and anteriorly it extended about 3cms from the inferior border of the mandible. On palpation all the inspectory findings were confirmed and the submental lymph nodes were matted. It was non tender, firm and the temperature was normal.



Figure 1: Swelling just below the chin

Intra Orally there was no tenderness on percussion in any of the teeth and the floor of the mouth was also normal.

Occlusal radiograph (Fig 2) did not reveal any pathology. The Orthopantomograph was also normal.



Figure 2: Occlusal radiograph of Mandible

The Haemoglobin level of the patient was noted be 10.2gm/dl and ESR level was raised which showed 54mm/hr. Mantoux test was positive (12mm). Smear from the aspirate showed lymphocytes in singles & clusters, plenty of macrophages with phagocytosed particles, macrophages, few plasma cells occasional epitheloid cells in singles & in clusters & strands of fibrous tissue suggestive of tuberculous lymphadenitis. Chest x ray showed increased bronchovascular markings (Fig 3) and Ultrasound revealed multiple significant enlarged lymph nodes of varying sizes noted in right carotid, submandibular, upper deep cervical and posterior triangle of neck regions, largest measuring 3.5 x 1.0 cm in size and few similar nodes seen on the left side. Suggestive of bilateral lymphadenopathy.

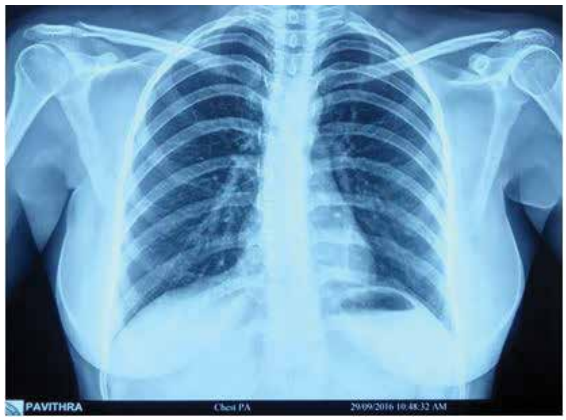


Figure 3: Chest X ray showing increased bronchovascular markings

The case was diagnosed as Tuberculous Lymphadenitis and was treated with Anti Tuberculous medications (ATT). Patient was reviewed for six months and the swelling subsided completely.

Case 2: A 56 year female patient who was moderately built and nourished, reported to the hospital with complaint of pain in the right side of neck present since three months that started spontaneously as a

mild intermittent pain three months ago and gradually increased while eating. The pain subsided to a certain extent while taking analgesics. Patient also had mild discomfort in the right & left jaw while chewing hard food for the past 1 month. Her medical history revealed that she was treated for tuberculosis thirty years ago and that she is suffering from evening rise in temperature, cough & weight loss for the past 2 months.

On examination the mouth opening was normal. There was mild deviation while opening the mouth towards the left with a click which was elicited along with tenderness on palpation in the right TMJ region. Single submandibular lymph node was palpable in both right & left submandibular region which measured approx.0.5 x 0.5cm in size. It was oval in shape, firm, non-tender & mobile.

Provisional diagnosis was given as Internal derangement of TMJ. Orthopantomograph revealed the presence of linear chain of calcifications on the left side (Fig 4). Chest X ray showed a supraclavicular and mediastinal node calcification (Fig 5). Patient was referred to the general physician and was treated for relapse of tuberculosis. The Internal Derangement of TMJ was managed by temporary soft splints, analgesics and anti inflammatory drugs.



Figure 4: OPG showing linear chains of calcification



Figure 5: Chest X ray showing a supraclavicular and mediastinal node calcification

Case 3: 67 year old female patient reported to the Department of OMDR with chief complaints of swelling in the right side of neck since 6 months (Fig 6) that started spontaneously and was smaller in size initially and gradually increased to attain the present size. Patient did not have pain or any other discomfort due to the swelling. Medical history was non contributory

Extraoral examination revealed a solitary swelling on the right side of the neck behind the sternocleidomastoid muscle region measuring about 2 X 1.5 cms in diameter & extended anteriorly 10 cm away from the midline of the neck, 5 cm above the supraclavicular region. The skin over the swelling appeared to be normal & the margins were well defined. No visible pulsation was noticed. On palpation it was soft in consistency, non tender, compressible and the skin over the swelling was pinchable. (Fig 6).



Figure 6: Solitary swelling seen on the right side of the neck

The case was provisionally diagnosed as Lymphadenitis in upper deep Cervical Lymphnode and further investigations were done.

Complete blood count was normal but Mantoux was positive (10 to 15mm). Smear from the aspirate showed lymphocytes in singles & clusters, plenty of macrophages with phagocytosed particles, macrophages, few plasma

cells occasional epitheloid cells in singles & in clusters & strands of fibrous tissue suggestive of tuberculous lymphadenitis. The case was diagnosed as Tuberculous Lymphadenitis and was treated with Anti Tuberculous medications (ATT) immediately.

Discussion

The classic term SCROFULA derived from the Latin word glandular swelling scrofuloderma is also known as tuberculosis cutis colliquativa, a skin condition caused by tuberculous involvement of skin by direct extension usually from underlying tubercular lymphadenitis[9]. Hippocrates mentioned scrofulous tumours in his writing. The European kings of the middle ages imparted the royal touch to cure 'King's Evil' to which mycobacterial lymphadenitis referred. In second half of 20th century, scrofula became a less common disease in adults but remained common in children. The risk increases further during pregnancy [10]. Clinically it presents with chronic, painless mass in the neck, which is persistent and usually grows with time and is usually accompanied by fever, chills, malaise and weight loss[11].

Tuberculous lymphadenitis most frequently involves the cervical lymphnodes followed by frequency in mediastinal, axillary, mesenteric, hepatic portal, perihepatic and inguinal lymph nodes. While in primary scrofulodermalymph nodes involved are either preauricular or submandibular. They present as a unilateral single or multiple painless growing masses. Jones and Campbell have classified peripheral tuberculous lymph nodes into following 5 stages[12]:

Stage1: Enlarged, firm, mobile and discrete nodes showing nonspecific reactive hyperplasia.

Stage2: Large rubbery nodes fixed to surrounding tissue owing to periadenitis.

Stage 3: Central sofetening due to abscess formation

Stage 4: Collar – stud abscess formation

Stage 5: Sinus tract formation.

In our first case patient complained of a neck swelling with mild pain on deglutition and cough but there was no history of fever, night sweats & weight loss. Lab investigations were positive for TB. In the second case patient reported with pain in TMJ. Patient was treated for TB thirty years ago and at the time of presentation she had evening rise of temperature, night sweats, weight loss. OPG showed a chain of calcified lymph nodes and in the third case patient complained of a solitary swelling in the neck and the investigations showed that it was Scrofula. All the three patients were started with Anti Tuberculous Therapy (ATT) and the patients showed improvement.

Drug resistance Tuberculosis has become widely prevalent these days. In 2016, 41% of laboratory confirmed TB patients notified globally were tested for MDR/RR-TB, up from 11% in 2012. In many countries a steady increase has occurred in recent years, driven by the continued expansion in the use of rapid molecular tests. In spite of increased testing, the number of MDR/RR-TB cases detected in 2016 only reached 153 000, a slight increase from the 132 000 cases reported in 2015. In 2016, 8000 cases of XDR-TB were reported worldwide. To date, 121 countries have reported at least one XDR-TB case[13].

Table 1: Antituberculosis agents for treatment of drug-susceptible and drug-resistant tuberculosis[14]

Group	Drugs
Group 1	First-line oral agents – isoniazid, rifampicin, ethambutol, and pyrazinamide New generation rifamycins – rifabutin and rifapentine
Group 2	Injectable agents – kanamycin, amikacin, capreomycin, and streptomycin
Group 3	Fluoroquinolones – moxifloxacin, gatifloxacin, levofloxacin, and ofloxacin
Group 4	Oral bacteriostatic second-line agents – thioamides (ethionamide and prothionamide), cycloserine, terizidone, and p-aminosalicylic acid
Group 5	Agents with unclear efficacy (not recommended by WHO for routine use in MDR-TB patients) – clofazimine, linezolid, amoxicillin/clavulanate, thioacetazone, imipenem/cilastatin, high-dose isoniazida, and clarithromycin

Conclusion

Tuberculosis is an atypical infection. Correct diagnosis is the key to cure the infection in the initial stage. The above discussed cases emphasized the

importance of proper history taking and also showed that periodic checkup should be done in case of tuberculosis to reduce its recurrence.

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Neuralgia-Treatment and Updates—A Review

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ABSTRACT

Neuralgia is the disorder produced by change in neurological structure or function. These neuralgias produces symptoms which affect the physical as well as mental health of the patient. There are several neuralgias that occur in maxillofacial regions, they are trigeminal neurlagia, glossopharyngeal neuralgia, postherpetic neuralgia, nervous intermedius neuralgia and occipital neuralgia. Out of all these, trigeminal neuralgia is the most common cause for occurrence of or facial pain. Neuralgic pain is characterized by mostly unilateral, superficial, short, shock like pain with recurrence attacks. They also have trigger points which can arise pain on appropriate stimuli. The aim of this article is to discuss various types of neuralgias and their recent advancements in treatment.

Keywords: *Neuralgia, Pain, Aneurysm.*

Introduction

Neuralgia is the pain that occurs in nerve pathways[1]. Neuralgic pain is caused by alteration in neurological unit rather than the excitation that causes nociceptive pain[2]. Neuralgia appears as a symptom of disorder and not a sickness. Pain in the maxillofacial region originates from tooth pulp, cornea, oral mucosa, nasal mucosa etc. This pain showing numerous unique physiological features associated with spinal nociceptive system[3]. Neuropathic pain have high occurrence rate with production of negative impact mentally and thereby influence the quality of life. Different neuralgias are trigeminal neuralgia, glossopharyngeal neuralgia, geniculate neuralgia, post herpetic neuralgia, occipital neuralgia. Trigeminal neuralgia is the most common neuralgia in head and neck region and is a major cause of orofacial pain[4]. Even there is more advancement in treatment of neuralgias had come, but the physician have a challenge over the diagnosis of specific type of neuralgia[1].

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Trigeminal Neuralgia: Trigeminal neuralgia or tic douloureux is defined as paroxysmal, recurrent attack of pain, lasting from few seconds to few minutes, involving one or more divisions of trigeminal nerve[5]. It is the most frequent cause for facial pain. It is more common in older adults of more than 50 years of age with slight female predilection. Pain is short, sudden, severe, stabbing, lancinating type, shock like and almost unilateral. It is of two types, primary having no clear cause while secondary is of having underlying cause such as tumor, infarction and multiple sclerosis. Compression of nerve root by small blood vessels occur in trigeminal neuralgia. This compressed nerve produces pain by hyperexcitability of demyelinated nerve fiber, cross excitation between secondary channels, ectopic impulse discharge, impaired segmental inhibition and emphatic transmission[6]. Pain may be stimulated by external stimulus such as cold air, laughing, swallowing, chewing, talking, washing the face etc.

Glossopharyngeal Neuralgia: It is also called vagoglossopharyngeal neuralgia[2]. It is the pain occurs in the nerve supplying regions of glossopharyngeal neuralgia such as tongue, pharynx, tonsil, larynx, ear etc.It is rare when compared to trigeminal neuralgia. It is more common in male and older age adults. Pain is of short and shock type. Pain is triggered by chewing, yawning, swallowing, talking, lateral movement of jaw,

cleaning of throat, touching periodontium, touching external surface of ear, tinnitus[1]. It is more common in left side whereas trigeminal neuralgia is common in right side[7]. The proposed classification of IHS is 1.classical(occasional) and 2.symptom(constant) glossopharyngeal neuralgia. It is caused by nerve compression by pulsating artery and lesion includes trauma, infection, surgery, Eagle syndrome, vascular malformation etc. In Eagle syndrome, elongation of styloid process and calcification or ossification in stylohyoid ligament are seen.

Post Herpetic Neuralgia: It is caused by reactivated Varicella Zoster Virus(VZV) which previously caused herpes zoster infection. Reactivated VZV causes acute, stabbing, radiating pain, confined to dermatome. It produce erythema on cutaneous surface, where vesicle form and rupture whereas in oromucosal surface doesn't rupture. VZV acts on epithelial cells producing mucocutaneous lesion and on nerve cells producing pain. During rupture of vesicles, severe neuropathic pain including burning sensation, allodynia, hyperalgesia[9]. It is common in older age adults more than 60 years. Fatigue, anorexia, weight loss,insomnia, reduced physical activity, depression, anxiety, decrease in social contacts are also seen[10].

Occipital Neuralgia: It is a neuropathic pain condition caused by entrapment of occipital nerves in trapezius and semi spinalis capitis muscle at the attachment of occipital bone caused by injuries of neck, tumor infiltration, infection, aneurysms or following neurosurgery[11]. Pain is stabbing, shooting type in sub occipital region. It is mostly unilateral,but it is difficult to diagnose it from other headaches. Pain on palpation present in sub occipital region. Photophobia, phonophobia, radiation of pain to face are other symptoms. Marked pressure over scalp region producing typical pain is the confirmatory diagnostic test to occipital neuralgia.

Nervus Intermedius Neuralgia: It is rare one producing pain in commonly ear and also in anterior two third of tongue and uvula. Occasionally pain may be triggered by given stimuli to triggered zone of ipsilateral distribution of facial nerve. Pain is not sharp and non intense as severe in other neuralgia. Herpes Zoster of geniculate ganglion and nervus intermedius of facial nerve causes geniculate neuralgia, referred to as Ramsay Hunt Syndrome[2]. Viral vesicles may observed in ear canal and tympanic membrane[12].

Treatment and Updates: In trigeminal neuralgia, pharmacological therapy favours best results in 80% of patients. When drugs no longer offer pain relief, surgical intervention is preferred. Most common choice of drug is carbamazepine(200-1200mg/day) followed by oxcarbazepine.These drugs can also be given in combination for synergistic effect thereby reducing the symptom.Its effect may relate to the blockade of voltage-sensitive sodium channels resulting in the stabilization of hyperexcited neural membranes, inhibition of repetitive firing or reduction of propagation of synaptic impulses[21]. Pain in some patients may resolve on as little as 100 mg two to three times a day. If the pain is not subsided, the daily dose should be increased by 100 mg every other day until adequate pain relief is established. The dosage range from 200 to 1200 mg/day should be divided into two to three daily doses. Common initial side effects include drowsiness, nausea, dizziness, diplopia, ataxia, elevation of transaminases and hyponatremia. Potentially serious but uncommon side effects are allergic rash, myelosuppression, hepatotoxicity, lymphadenopathy, systemic lupus erythematosus, Stevens–Johnson syndrome and aplastic anaemia[21]. Oxcarbazepine is keto analogue of carbamazepine and converted into pharmacologically active form and induces hepatic enzymes. Oxcarbazepine is an acceptable alternative to CBZ and is initiated at 150 mg twice daily and increased as tolerated by 300 mg every 3 days until pain relief is accomplished. Maintenance doses range between 300 and 600 mg twice daily[21]. The dosage of baclofen is 40-80mg/day and it depresses excitary neurotransmission. The side effects of baclofen include lassitude, drowsiness, dizziness and gastrointestinal discomfort.Lamotrigine acts at voltage-sensitive sodium channels, stabilizes neural membranes and inhibits the release of excitatory neurotransmitter. It causes side effects such as nausea, dizziness, blurred vision, ataxia and skin rash resulting in desquamation in severe cases.Other drugs used for trigeminal neuralgia are phenytoin, clonazepam, gabapentin, pregabalin, topiramate, levetiracetam, valproate and tocainide.

Recently gabapentin with ropivacaine into trigger zone reduces the pain by blocking the trigger points which is followed by pregabalin for one year follow up[13].Gabapentin is initiated at 300 mg daily and may be gradually increased by 300 mg each 2–3 days as tolerated[21]. Gabapentin has low drug interaction and show minimal side effects. Hu et al systematically

reviewed therapeutic efficacy of injection of botulinum toxin type A(BTX-A), which reduces pain in higher level[14]. The dosage of botulinum toxin type A(BTX-A) is 3.22 units/cm2 and it should be administered directly into the affected region subcutaneously[21]. Tizanidine also used in reducing pain but it is less efficacious than carbamazepine.There is a problem in TN is the treatment of the acute crisis, where local anesthesia, such as ropivacaine, injected into a trigger area, an 8% spray of lidocaine, and the intravenous infusion of fosphenytoin can provide temporary pain relief [22].

Surgery is the secondary option when pain doesn't subsided by pharmacological agents. The aim of surgery is to free up the trigeminal nerve from squeezing or injuring by blood vessel. It includes Micro Vascular Decompression(MVD), neurectomy, percutaneous radiofrequency thermal rhizotomy, percutaneous ablation, cryotherapy, Gamma Knife Radio Surgery(GKRS), physical compression, injection of alcohol and injection botulinum toxin injection.There is an assumption that a compression of trigeminal nerve by an abnormal vascular loop is the direct cause of TN.MVD has become one of the most common treatments for TN providing long pain relief by decompressing the nerve. The reported pain-free duration without medication after MVD ranges from 0.6 years to 10 years [23].The complications after this procedure are infections, facial palsy, facial numbness, cerebrospinal fluid leak, and hearing deficit with a mortality of 0.1% [24]. In contrast, rhizotomy cause sensory loss, keratitis, eating difficulties and thereby reducing the satisfaction in the treatment. Recently, some authors reported the use of endoscope as a significant aid in patients with a bony ridge obscuring the view of the fifth nerve, with a very distal vascular compression, or if a combination of both occurs[25].

Percutaneous balloon compression (PBC) was introduced by Mullan et al and has been extensively used in the treatment of TN [26]. The advantages of this procedure are low cost, simplicity, and only the percutaneous procedure performed with the patient under general anesthesia. PBC offers a good rate of immediate postoperative pain relief ranging from 80% to 90% and a pain-free time without medication that ranges from 2 years to 3 years[27].Complications can include numbness, dysesthesia, masseter weakness; meningitis and cranial nerve deficits are less common. There are no standardized criteria concerning the compression time and the compression pressure. The long time compression may increase the risk of occurrence of complications. Moreover, higher balloon pressures have been associated with higher rates of dysesthesia,severe numbness, and masseter weakness. The size of the Meckel's cave has been an important influencing factor in this proceudure, based on the size of the cave different cannulas are used[17].

In glycerol rhizhotomy, glycerol is injected into the trigeminal cistern which relieves the pain in patients with trigeminal neuralgia. It acts by demyelination and axonal fragmentation. Initial pain relief given by this procedure, reported in patients is of about 90% treated by this procedure.Postoperatively sensory loos is the major complication of glycerol rhizhotomy. Patients may also experience facial pain during glycerol injection. The other complications are dysesthesias, corneal numbness, masseter weakness, and herpes labialis[17]. Recently, Goodwin et al performed a MVD with injection of glycerol to the inferior third cisternal portion of the nerve, anterior to the root entry-zone, in 14 patients without neurovascular conflict on pre-operative MRI, reporting an 80% of good response at 3 months follow-up[28].

Radiofrequency thermocoagulation is the procedure in which the trigeminal nerve and Gasserian ganglion rootletsare electrocoagulated. The common side effects are masticatory weakness, dysesthesia, and corneal numbness. Pulsed radiofrequency have been introduced for minimising the side effects.

Gamma Knife Radio Surgery is the alternative treatment option for the patients who were not opt for microvascular decompression and invasive surgery. The target zone in this procedure is root entry zone of trigeminal nerve. In many clinical target volume definitions, the root entry-zone of the trigeminal nerve situated at 2–3 mm from the brainstem surface is chosen[29].The target closer to the brainstem produce extensive pain relieffor prolonged duration. The common side effects are facial numbness, permanent dysesthesias and anesthesia dolorosa. The other alternative targets are trigeminal nucei in brainstem and centromedian nucleus of thalamus[30]. The higher dose is very efficacy in treating the pain but it also produce increased risk of side effects. Little et alreported that 75% of patients with no previous surgery achieved long-term pain relief at 7 years compared with only 10% of patients with

previous surgery[31]. GKRS requires a delay before pain relief occurs. For this reason, some authors suggest that patients with extreme pain in need of fast relief should undergo other procedures[32].

Ultrasound guided intervention of blocking of branches of trigeminal nerve such as supra orbital, infra orbital, auriculo temporal, maxillary and mandibular nerve are recently emerging advances[15]. Laser and acupuncture are also treatment modalities for trigeminal neuralgia. Neuromodulation by Motor Cortex Stimulation(MCS) and Deep Brain Stimulation(DBS) are used as refractory to other surgical treatments[17].

In glossopharyngeal neuralgia, first line of choice of drug is carbamazepine, followed by pregabalin, gabapentin, baclofen, dextromethorphan. Combination of two or more drugs can be given for effective therapy. Nerve block of glossopharyngeal nerve can be given with lignocaine(2%) and bupivacaine(0.5%). Thus can be given by both intra oral and extra oral approach. Paralysis of vocal cords may arise in case of bilateral nerve blocks. Surgically, MVD of vascular roots and rhizotomy of nerve roots are best options. Pulsed radiofrequency neurolysis, gamma knife radio surgery and stereotactic radiosurgery also have beneficial effects[1].

In Post Herpetic Neuralgia, Patients having history of Herpes Zoster should be vaccinated, suitable anti viral agents should be given within 72 hours of appearance of rash and pain control should be given. These are the preventive treatment for postherpetic neuralgia[10]. NSAIDs and opioids can be given in combination for effective pain control. Commonly used anti viral drugs are famciclovir, acyclovir, valaciclovir and these are all inhibit the replication of VZV[18]. Anti convulsants and anti depressants can also be given in severe uncurable cases. Relaxation, psychological intervention, social support, nerve block, acupuncture, cryotherapy, biofeedback and Trans Electrical Neural Stimulation(TENS)[19].

In occipital neuralgia, patients can be treated with analgesics, anti depressants and anti convulsants. If drugs fail to reduce pain, occipital nerve block can be performed using local anaesthetics and steroids. Chemical neurolysis with alcohol, radiofrequency ablation or cryoablation, occipital nerve stimulation, rhizotomy are also performed[20]. Meditation, hypnosis, acupuncture and herbal nutritional therapy reduces pain in some patients.

Conclusion

Neuralgia is difficult to diagnose for the physician, as it does not show abnormality on physical examination. Hence care must be taken regarding the appropriate diagnosis of specific neuralgia. Physician should also have knowledge about the various modalities and recent advancements in treatment and thereby improving the health of the patient.

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Oral Microbiome—Its Impact on Health and Disease

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ABSTRACT

Human mouth consists of diverse micro-organisms which includes bacteria, viruses, fungi and protozoan. Oral microbiome is unique because of the constant contact of oral cavity with the external environment. Diets, Temperature, pH of saliva are important factors that contribute to the establishment of oral microbiome. The oral microbiome is imperative to health as it causes both oral and systemic diseases. A dysbiotic microflora influences the development of oral diseases like dental caries, periodontal diseases (gingivitis and periodontitis). Promoting a balanced microbiome is the key to maintain or reestablish oral health. Technological advances Iin the recent times have started to unwind the mysteries and complexities of the oral microbiome helping us to gain insights into its role in health and disease states.

Keywords: *Microbiome, Microorganism, Disease, Health.*

Introduction

Oral Microbiome is the collective genome of microorganisms that reside in the oral cavity. This ecological community includes symbiotic, commensal and pathogenic microorganisms. Oral microbiome was first identified by Anton Von Leewenhoek and the term "Microbiome " coined by Joshua Lederberg. Oral cavity is the second largest microbial community in humanbeings, the first being the gut.[1] Microbes are extremely well regulated both structurally and functionally with interspecies collaborations and antagonisms that contribute to ecologic solidity. [2] The bacteria in the oral cavity can colonize the hard and soft tissues of the teeth and the oral mucosa. The temperature of the oral cavity (37^{o}C) and the stable pH of the saliva, the availability of epithelial debris as nutrients create a favourable environment for the microbes to survive.[3] The human microbiome is classified into a core microbiome and variable microbiome. The core microbiome comprises of predominant species which is shared among all individuals that exists at different sites of the body in health. The variable microbiome is unique to an individual and evolves in response to one's lifestyle, phenotype and genotype. Oral microbiome is vital to bodies overall to the health. Microbiome research aids in disease diagnostics and therapeutics.[4]

Composition of Oral Microbiome: Oral habitats form a highly heterogeneous ecological system that supports the growth of significantly different microbial communities. Several distinct oral habitats for microbial colonization includes teeth, gingival sulcus, attached gingiva, tongue, cheek, lip, and hard and soft palate.[5]The normal microbiome is formed by bacteria, viruses, fungi, protozoa and arachea. The viruses found in mouth are primarily associated with disease states. It includes Mumps and Rabies virus, Herpes simplex virus and Human papilloma virus. Hepatitis virus and Human Immuno-Deficiency virus can also enter the mouth via gingival crevicular fluid. *Candida* species is the most prevalent fungi in the oral cavity. A culture dependent studies on twenty healthy hosts reported 85 fungal genera. The main species observed belongs to Candida, Cladosporium, Aureobasidium, Saccharomycetales, Aspergillus, Fusarium and Cryptococcus.[6] *Entameobagingivalis* and *Trichomonaxtenax* are two main protozoan species found as a part of the normal microbiome. Arachea make up a small component of oral microbiome and is restricted to methanogens.[1,7,8] Elevated counts of methanogens are seen in subjects with periodontitis.[9,10]

The bacterial community of mouth constitutes *Firmicutes, Bacteroidetes, Proteobacteria, Actinobacteria, Spirochaetes*and *Fusobacteria* which

accounts 96% of the species.[11]The oral cavity taxon is highly personalized. The oral habitats are dominated by *Streptococcus* followed by *Hemophilus* in the buccal mucosa, *Actinomyces* in the supragingival plaque and *Prevotella* in the subgingival plaque.[12] The key features of the predominant bacterial taxa have been described and are available from Human Oral Microbiome Database (HOMD) website www.homd.org.[11]

Role of Oral Microbiome in Health: The microbiome plays an important role in oral and systemic health. Microbe-derived factors are essential in maintaining oral health.[3] Saliva and gingival crevicular fluid provide nutrients for microbial growth.[5]Salivary components such as secretory immunoglobulins A, lactoferrin, lactoperoxidase, lysozymes, statherins and histatins help to maintain a balanced microbiota. Nitrites in Saliva can inhibit cariogenic bacteria and protect against dental caries. *Streptococcus salivarius* have been shown to be antagonist to oral pathogens.[3] Saliva also aids to control build up of plaque biofilm. [2] The surfaces of the mouth are colonized by commensals limiting the binding sites for pathogens and further colonization, a phenomenon referred to as colonization resistance.[3] Microorganisms can also hinder a pathogen's abilities to multiply and degrade a pathogen's virulence factors.[4] S. gordanii had a role in reducing dental plaques due to its ability to produce hydrogen peroxide which is lethal for growth of invading bacteria.[5]

The oral microbiome relates to nitrate metabolism and cardiovascular health. The ingested nitrate is returned to the mouth via entero-salivary circuit. Oral bacteria reduce nitrate to nitrite which is taken up into the blood stream via gastric absorption and converted into nitric oxide. Nitric oxide has an anti-hypertensive effect by significantly influencing vascular health, keeping the blood vessels supple.[3]

Oral Microbiome in Oral Diseases: The once beneficial microorganisms initiate disease within the oral cavity when there is 1) a change in the relationships between the microbes and with the hosts 2) an increase in relative abundance and 3) acquisition of virulence factors.[13] If the diversity and relative proportions of species within the microbiota is disturbed it is referred to as a dysbiotic microbiome. [2] The chief factors responsible for causing an ecological shift includes poor oral hygiene, compromised immune system and genetics. Poor oral hygiene causes an accumulation of bacteria within biofilms. This may favour more of pathogenic bacteria. Immune system disorder can also cause an ecological shift in the microbiome. A compromised immune system disrupts commensal relationship facilitating growth of pathogenic species.[14]Genetic factors contribute to oral disease indirectly. Each individual has a specific genetic makeup that encodes for a permanent immune system disorder, which affects the microbiome. Compromised immune system inhibits proper flow of saliva thereby allowing buildup of dental plaque.[4]

The oral microbiome related diseases includes dental caries, endodontic infections, periodontal diseases (gingivitis, periodontitis) and oral cancer. Dental caries is the destruction and dissolution of tooth structure by acids which is produced by fermentation of dietary carbohydrates.[3]Aciduric species of oral microbiota predominates the most common ones including *Streptococcus mutans*, *Streptococcus Sorbinus* and *Lactobacillus acidophilus*. Bifidobacterium, Proponibacterium family and sacrdovia have been found to be associated with dental caries. [6]

Periodontitis is considered a polymicrobial inflammatory disorder of periodontium. Periodontal diseases results from subgingival plaque accumulation leading to shift in microflora from healthy state to diseased state. Gingivitis is the mildest, reversible form of periodontal diseases whereas periodontitis is severe and irreversible affecting soft tissues and bones that supports the periodontium. The most commonly involved pathogen in gingivitis includes *Fusobacterium, Treponema* and members of the *phylum synergistetes.* The most predominant pathogen involved in periodontitis are *Porphyromonasgingivalis, Aggregatibacteractinomycetecomitans, Prevotella intermedia, Fusobacterium intermedium, Treponema denticola, Tannerella forsythia*.[3,4] The core microbes in healthy patients were diferent signifcantly from those in patients with periodontitis.[11] Periodontitis is difficult to treat because causative pathogens lie deep within the pockets Periodontal pathogens develop virulent factors like encapsulation become nearly impossible to target with antimicrobial solutions.making resistant to antibiotics to control the disease.[4]Periodontitis can also affect systemic health by increasing the risk of atherosclerosis, adverse pregnancy outcomes, rheumatoid arthritis, aspiration pneumonia, and cancer.

Oral cancer exhibits multifactorial etiology with tobacco and alcohol being implicated as the primary risk factors. Certain pathogenic strains of oral microorganisms tend to increase genotoxic metabolite acetaldehyde concentration in saliva when metabolizing ethanol and tobacco smoke. [15] Acetaldehyde has been classified as a group I carcinogen to humans by the International Agency for the Research on cancer. Inflammation is the first symptom of compromised oral health and gets worse as health regresses. Poor oral hygiene is being encountered in oral cancer patients. A significant increase of *Porphyromonas gingivalis, Tannerella Forsythia* and *Candida albicans* was observed in patients with than in healthy controls.[13] OSCC surfaces show significantly raised levels of *Porphyromonas* and *Fusobacterium* as compared to the healthy mucosa.[14] Microbiome can produce toxic metabolites or carcinogenic products directly as cancer-transforming agents or play an indirect role by promoting cancer through induction of inflammation or immunosuppression.[12]

Identification of Microbiome: There are various methodologies for detection and evaluation of microbiomes. Use of conventional microbiological techniques to culture the abundant micro flora in the oral environment is limited. The surfacing of newer technologies has unraveled the mysteries of the oral microbiome. The newer techniques aim at studying the DNA, RNA, proteins or metabolites of the whole microbial population.[1]Metagenomics provides an insight of the total DNA of microbial system is obtained and studied. The oral microbiome alo is well studied through techniques like 16S rRNA sequencing and Next generation sequencing methods. HOMD is based on curated 16SrRNA sequencing and has body site-specific comprehensive database for the more than 600 prokaryote species that are present in the human oral cavity.[9,16] This also provides online tool for bacterial identification and characterization. Human oral microbiome identification microarray (HOMIM) is also used in characterization of oral microbiome. This 16S r-RNA based microarray contains more than 400 probes for the detection of variety of oral bacterial species. Moreover with the use of CRISPR, an advanced sequencing technologies it is revelaed that bacteriophages play a major role in altering and deciding the bacterial communities of the oral cavity.[5]

Conclusion

The microbiome are key determinants of oral health and disease. The oral microbial ecosystem is crucial for maintaining oral and overall health. When the homeostasis of the oral microbiome is altered or disturbed it can propagate the pathogenic activity leading to disease states. Analysis of oral microbiome at an early stage of oral diseases will aid in early diagnostics and therapeutics. The main emphasis is also to maintain good oral hygiene for a balanced microbiome. Understanding the role of the microbiome and host–microbiome interactions in health and various disease states is very fundamental for all oral health care professionals.

Ethical Clearance: Not needed as this is a Review article.

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Oral Submucous Fibrosis: A Review on Etiopathogenesis and Recent Trends in Management

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ABSTRACT

Oral submucous fibrosis is an incidious, chronic disease stirring any part of oral cavity and sometimes the pharynx. South east Asian counties are proven to be high prevent zones.for oral sub mucous fibrosis.. Areca quid related oral mucosal lesions are potential hazard to an outsized e population worldwide. Commercially freeze dried products such as pan masala, guthka and mawa have high concentration of areca nut per chew and appear to cause osmf more rapidly than by self prepared betel quid that contain smaller amounts of areca nut. These chemicals appear to interact with the molecular processes of deposition and or degradation of extracellular matrix molecules such as collagen causing imbalance in the regular process. Various studies done in the past include osmf as potentially malignant disorder. Understanding the etiopathogenesis of osmf may be beneficial to revert the risk factors thereby minimizing the progress of the disease which is included as the priority in the prevention of disease.

Keywords: *OSMF, areca nut, Betel quid*

Introduction

Oral sub mucous fibrosis is a ceaseless weakening illness which was first portrayed by Pindborg and Sirsat[1]. It contains juxta epithelial hyalinization which is pursued by fibro elastic changes in the lamina propria [1]. It causes limitation in mouth opening, paving way to trismus and patient are deprived of nourishment, trouble in keeping up oral health care and furthermore speech impairment [1, 2]. In the past decades Sushruta coined a term for the condition called VIDARI under infections of mouth and throat. Lal and Joshi in 1953 presented the term oral sub mucous fibrosis.[3] The etiological variables for OSMF have been categorized as areca nut, capsaicin in chilies, and micronutrient inadequacy of iron, zinc and basic nutrients[4]. The marked-up prevalence is because of industrially produced areca nut and tobacco products like gutka, paan masala, seasoned supari and so on [5,6]. The malignant transformation rate of oral submucous fibrosis was recognized as 7.6% [6]. The reason behind the limited mouth opening is due to the deposition of dense fibrous bands under the connective tissue [2].

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Discussion

Epidemiology: The epidemiological investigations demonstrate Indian populace has the most astounding rate of frequency as the time advances [5]. Reports from north western India gives a rate of 2.6 and 8.5 per 100000 every year for both males and females respectively [3, 5]. No relationship to any network or religious gathering has been recommended, however an ethnic premise is demonstrated in light of the fact that OSMF is found generally in Asians or Asians settled in other countries. Recent information proposes that prevalence of OSMF in India has inflated from 0.03% to 6.42%.

Table 1: Epidemiology of oral sub mucous fibrosis: A review Madhushree das[3]

Zonal prevalence in India	Percentage
Northern Zonal Council	30%
North-Central Zonal Council	6.3%
North Eastern Zonal Council	No studies
Eastern Zonal Council	2.7%
Western Zonal Council	0.03%
Southern Zonal Council	0.55%

Etiopathogenesis: Various epidemiological reviews, case series reports, huge measured cross-sectional studies, case-control studies, accomplice and mediation studies give over whelming proof that areca nut is the principle etiological factor [7]. Every day use was given more priority in the role of etiology than the time. An ongoing contextual analysis demonstrates more youthful people built up the symptoms of OSMF in 3.5 years while elderly people in 6.5 years from the beginning of propensity.

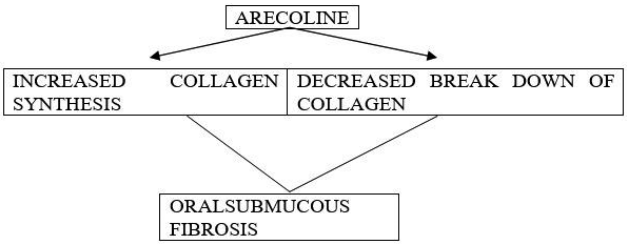


Chart 1: Pathogenesis of oral sub mucous fibrosis: Arecoline[2]

Chemical constituents and alkaloids from arecanut have the most significant role in pathogenesis of oral submucous fibrosis. Arecoline, Arecaidine, Guvacine, Guvacoline are the real alkaloids present in arecanut [7]. It is obvious that fibrosis and hyalinization of sub epithelial tissue represents most clinical highlights experienced in this condition. Later it was demonstrated by the finding that slaked lime $Ca(OH)_2$ causes this impact [8]. The flavonoids, tannins and catechins can cause increased fibrosis by forming insoluble and stable collagen filaments by inhibiting the formation of collagenase compound [4]. The alkaloids and flavonoids from the BQ and aid indigestion. These constituents and their metabolites are perpetual stimulants to oral tissues

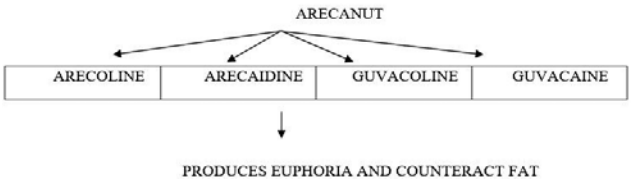


Chart 2: Effects of areca nut[2]

TGF-beta: It supports the origin of collagen generation. The qualities COL1A2, COL3A1, COL6A1, COL6A3, and COL7A1 have been recognized as clear TGF-β targets. These are early promoting genes in fibroblasts. The increased expression of pro-collagen genes is responsible for the increased collagen levels in OSMF for which the TGF-β -production acts as a mediator for the increased expression of procollagen genes[9].TGF-ß may assume a significant job in the pathogenesis and malignant transformation of OSMF [10].

Lysl oxidase (LOX): The LOX is a fundamental chemical for conclusive handling of collagen strands into a settled covalently cross-connected develop fibrillar structure that is impervious to proteolysis. The LOX movement is significant for arrangement of insoluble collagen because of cross-linking[11]. The declaration of LOX is directed by different elements, among which TGF-β is viewed as a significant factor.

Tannins: Diminish collagen corruption by tannin assumes a noteworthy job in pathogenesis of oral sub mucous fibrosis. Huge amounts of tannin present in areca nut diminished collagen corruption by repressing collagenases and proposed the reason for fibrosis as the joined impact of tannin and arecoline by decreasing debasement and expanded generation of collagen separately.

Copper: The catalyst lysyl oxidase is a copper stimulated chemical enzyme for collagen cross linking and association of ECM. The fibroblasts in OSF have expanded lysyl oxidase exercises as well as explicit as well as explicit development attributes.

Genetic factors: Hereditary qualities take partas an etiological factor. Connective tissue development factor (CTGF/CCN2) is related with numerous human fibrotic issues and was found to overexpress in OSMF. Micro trauma could prompt the liberation of thrombin. Thrombin created by micro trauma may add to the pathogenesis of OSMF by up regulating CCN2 articulation.

Raised estimations of human leukocyte antigen (HLA) in OSMF patients contrasted with typical people is seen [2]. Sirsat exhibited that capsaicin in chilies animates far reaching palatal fibrosis in rodents [11]. Betel quid influences safe framework and the degree of changing development factor-β and interferon are lower in mononuclear cells among old patients [3]. Lack of iron, nutrient B-complex, minerals and malnutrients are considered as etiological factors that stifles the fix of aggravated oral mucosa, hence resultant scarring and fibrosis [6]. Abnormal iron metabolism additionally assumes a noteworthy job in OSMF. Microcytic hypochromic along with serum iron has been accounted in oral sub mucous fibrosis [3].

Biopsies role in pathogenesis of osmf[4]. By radioimmuneassayendothelinandTGF-β-1wereheightened in OSMF fibroblasts [11]. As indicated by an examination there is decrease in the phagocytosis due to decreased cell mediated immunity which suppresses T cell activity

by aericoline[12]. Expanded and continuous deposition of extracellular matrix may take place because of disturbance of the balance between matrix metalloproteinase and tissue inhibitors of matrix metalloproteinase [8]

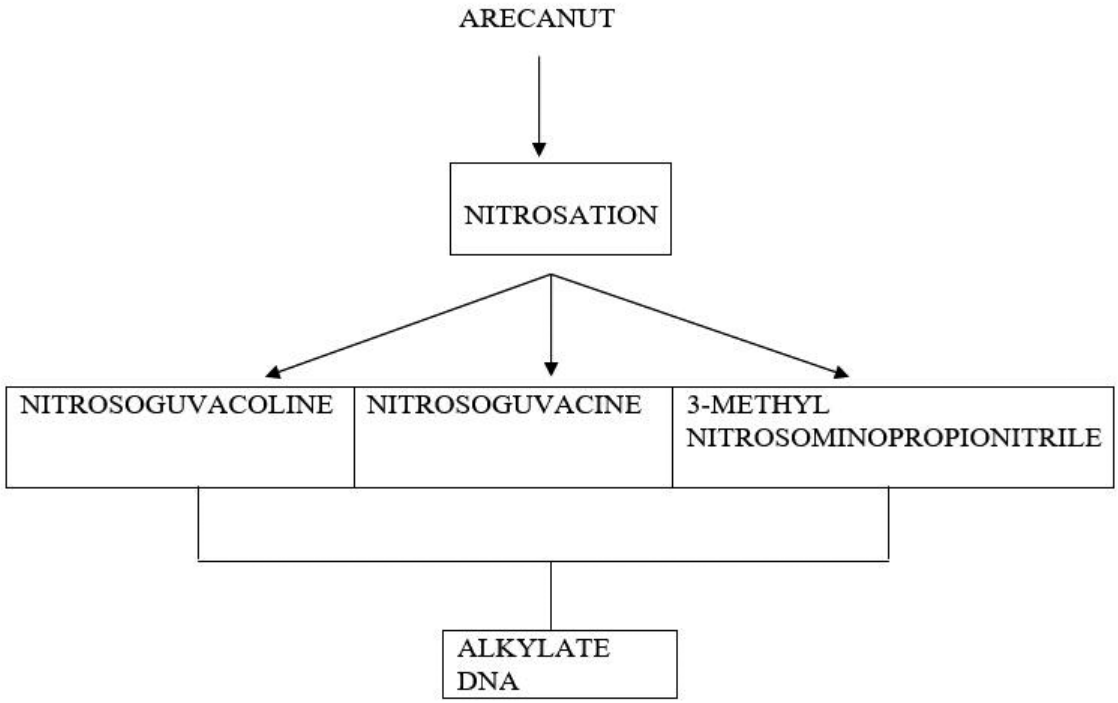


Chart 3: Nitrosation of Arecoline[2]

Classification System: Kerr et al[13]:

GRADE I	**MILD**	Any highlights of the infections group of three for osmf (Depapillation,consuming, whitening or weathered mucosa) might be accounted for and between incisal opening >35mm.
GRADE II	**MODERATE**	Above highlights of osmf and between incisal confinement of mouth opening between 20-35mm.
GRADE III	**SEVERE**	Above highlights of osmf and between incisal opening <20mm.
GRADE IV A		Above highlights of osmf with conceivably harmful issue on clinical examination
GRADE IV B		Above highlights of osmf with any evaluation of oral epithelial dysplasia on biopsy
GRADE V		Above highlights of osmf with oral squamous cell carcinoma.

More et al[14] characterized dependent on clinical and utilitarian parameters.

Clinical Staging:

1. **Stage I:** Stomatitis and additionally whitening of oral mucosa.
2. **Stage II:** Discernable stringy groups in buccal mucosa or potentially oropharynx, with/without stomatitis.
3. **Stage III:** Nearness of discernable stringy groups in buccal mucosa or potentially oropharynx, and in some other pieces of oral depression, with/ without stomatitis.
4. **Stage IV:**

A: Any of the above stage alongside other possibly dangerous issue, e.g.; oral leukoplakia and oralerythroplakia.

B: Any of the above stage alongside squamous cell carcinoma.

Functional Staging:

1. M 1: Between incisal mouth opening up to or> 35mm.
2. M 2: Between incisal mouth opening between 25 to 35mm.

3. M 3: Between incisal mouth opening between 15 to 25mm.
4. M 4: Between incisal mouth opening < 15mm.

Patil and Maheshwari [15] recommended new characterization dependent on adaptability of cheek. Typical cheek adaptability watched was 35-45mm for males and 30-40mm for females.

1. **Grade 1: (Early):** cheek adaptability of 30mm or more.
2. **Grade 2: (Gentle):** cheek adaptability between 20 to 30mm.
3. **Grade 3: (Moderate):** cheek adaptability under 20mm.
4. **Grade 4 : (Extreme):** above conditions without simultaneous nearness of potential threatening sores.
5. **Grade 5 : (Progressed):** Above condition with simultaneous nearness of oral carcinoma.

Malignant Transformmation and Precancerous Nature of Oral Submucous Fibrosis: In 1956, paymaster watched squamous cell carcinoma in 33% of patients with oral sub mucous fibrosis [12]. Pindborg et al revealed malignanttransformation rate of 4.5% in 66 instances of OSMF in 4-15 years. In Taiwan it is 3.27-8.63% [13]. An examination by Patel and Maheswari in 2014 it is 4.6% [14].

Management: Oral sub mucous fibrosis is notable for its retention and constant nature. Being a premalignant condition, there is no treatment modality that delivers complete cure. Legitimate treatment begins with the instruction of the patient about the condition. Patient ought to be educated about the idea of illness regardless of stopping the propensity.

Gupta et al, whotreated 6 patients of osmf with nutrients containing A palmitate 2500IU nutrient E, beta carotene 50mg, nutrient C, zinc, copper and manganese[16].

Lycopene is the real carotenoid present in tomatoes which are regarded as cancer prevention agent and chemopreventive properties against potentially malignant disorders.Blend with intralesional steroids and hyaluronidase is exceedingly effective in diminishing mouth opening [17].

A number of glucocorticoids are utilized in the administration of osmf. Short acting (hydrocortisone), intermediate acting (triamcinolone) and long acting (betamethasone and dexamethasone). A mix of chymotrypsin (500IU), hyaluronidase (1500IU) and dexamethasone (4mg) twice week a week sub mucosal infusion for 10 weeks [18].

Pentoxifylline 400 mg multiple3 times daily for 7 months was utilized as adjuvant therapy for Osmf [19].

Curcuma is generally known as Haldi, turmeric or Indian saffron is a notable for its calming and against oxidant nature. Das in an investigation found that combination with turmeric oil was fundamentally useful non-intervention herbal treatment[19, 20].

Li and tang discovered that tea shades assume a noteworthyrole in diminishing blood consistency [21]. Aloe Veraplays a major role in wound healing and is topically applied at the initial stage of lesion [22].

Microalgae which contains beta carotene, tocopherols and phenolic acid has anticancer properties. Shetty et al, in an investigation utilized 500mg spirulina twice every day as adjuvant treatment [23].

Surgical intervention for the management of osmf is decided based on clinical stages Oral stent can likewise be utilized as an adjuvant to avoid relapse.[24].

Conclusion

Oral sub mucous fibrosis is for the most part an ailment of Indian sub-mainland where areca nut biting is rampant.Thus, there is anurgent need to start general wellbeing instruction measures to teach individuals about the weakening, oral harmful condition before it is past the point of no return. Till date, no authoritative and broadly expected treatment is at present accessible. Being a chronic debilitating disease there is a need of herbal prescription to be utilized for longer periods as they have lesser symptoms.

Ethical Clearance: Not required since it is a review article

Source of Funding: Nil

Conflict of Interest: Nil

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Giant Cells and Assosiated Lesions of the Oral Cavity—A Mini Review

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ABSTRACT

Giant cells are often seen in many conditions. Their presence in microscope is of great interest and play a vital role in histopathological diagnosis. They can be classified into several types by various authors. Their formation in physiological and pathological conditions is based on several mechanisms. The physiological giant cells seen in our body are synctiotrophoblasts in placenta, megakaryocytes in bone marrow and osteoclasts in bone. This article attempts to review on the basic mechanisms of formation and histopathology of giant cell associated lesions.

Keywords: *Giant cell, Langhans cell, Touton, osteoclast*

Introduction

A giant cell is a huge cell in contrast to normal cells that are found in the body. These cells are formed as either mononucleated or multinucleated based on the mechanism of origin. Understanding the histogenesis of these cells pave way for the diagnosis. These cells take part in both physiological and pathological processes.[1]The phenotype of giant cells varies based on the process of exposure to chemical factors and their response.[2] The size of giant cells may vary from 40 to 120 micrometers and are formed from monocyte macrophage precursors.

Mechanism of Formation: The theories in mechanism of formation are

1. Amitotic division of single nucleus where there is no cellular division.
2. Non replicating monocyte adhesion.

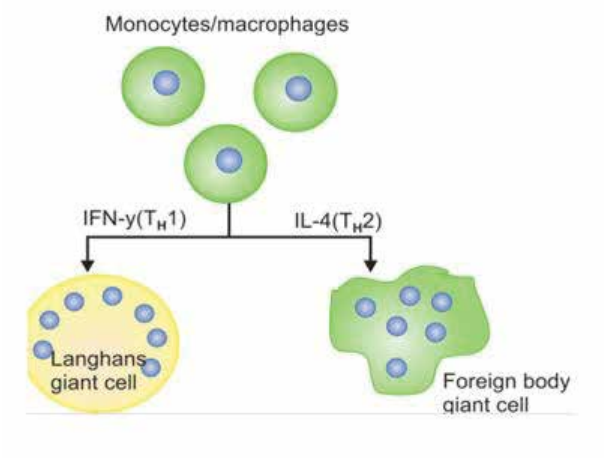
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According to Forkner (1980) the type of rosette encircled by nuclei in the periphery is the epithelioid or Langhans giant cell formed by nuclear division.The next category of cells with haphazard arrangement of nuclei were the foreign body giant cell formed due to monocytes fusion.[3]But radiolabeling studies proved that both arise due to monocyte fusion[4]Cell surface alterations are brought about by cell fusion which creates a close approximation with the opposed lipid bilayers[5]

Immune related phenomenon suggests that lymphokines are responsible for the fusion of macrophages to form giant cells. Inflammatory process too helps in formation of giant cell by producing antigenicity to foreign material.E.g.Glass. Second theory states that young and old macrophages fuse with each other since the old macrophages were exported to the granulomatous environment for prolonged period which acquired chromosomal abnormalities and alterations in macrophage surface. The young cells are the structures for cell fusion by recognizing the altered and abnormal surfaces[6]

The third mechanism suggests that ingestion of some particles into two or more macrophages where phagocytosis takes place simultaneously where the endosomal margins form multinucleated giant cells.[7]Viral etiology explains that multinucleated giant cells are formed either in altered virus or infective virus. The thickness of cell coat is reduced by a of viral

envelope which makes feel core easier. Live virus enters the cell and fuse giving the appearance of virally encoded proteins. Expansion of fusion leads to syncytium.[4]



Classification of giant cell lesions:

1. Based on etiopathogenesis Chattopadhyay, 1995[8]

A. Where giant cells are present in the concerned background and are path gnomic:

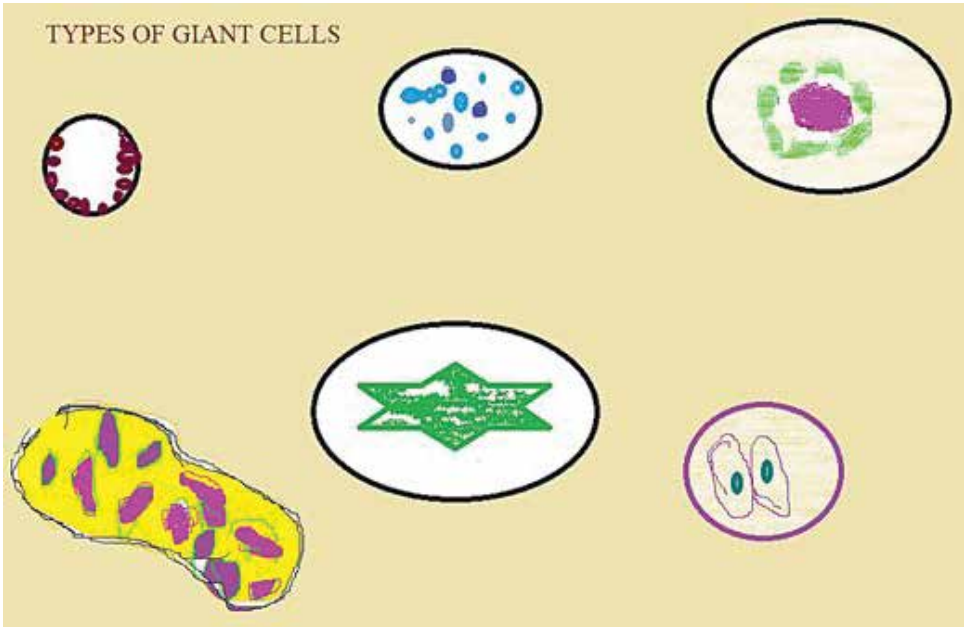
1. Hodgkin's disease
2. Peripheral giant cell granuloma
3. Giant cell fibroma

B. Where giant cells are characteristic, but not pathognomic:

1. Tuberculosis
2. Herpes simplex virus infection
3. Measles
4. Xanthoma

C. Diseases associated with the presence of giant cells:

1. Orofacial granulomatosis
2. Fungal infection foreign body reactions
3. Neoplasms
4. Syphilis
5. Leprosy
6. Fibrous dysplasia.



Antishow cells: Large macrophages which participate in formation of Aschoff's nodule are known as Antishow cell. The difference between macrophage and the anitshows cell is that the macrophages have a finger like extensions in the peripheral cytoplasm. Nuclei contain clumped chromatin that give caterpillar appearance in longitudinal sections and owl eyed in cross sections.[9]The nuclei take a form of elliptical shape with uneven indentations with Feulgen positive reaction of chromatin. These features of multiple Aschoff nodules produce giant Aschoff nodules[10].

Langhans giant cells: They are formed by the fusion of epithelioid cells in response to chronic inflammation. It contains 20 or more small nuclei around the periphery in horseshoe/ring form or clustered at two poles. Nucleus is normal and same as macrophage and epithelioid cells.

Foreign body giant cells: They are seen prolonged exposure to exogenous or endogenous substances. They show haphazard arrangement around foreign material.

Examples: suture materials, implants, asbestos, silica, beryllium.

Touton giant cells: These are seen as ring of nuclei separating the outer foamy cytoplasm.

Reed Sternberg cells: They are seen in Hodgkin's disease. Popcorn cells are lymphocyte rich variant.

Warthin Finkeldey giant cells: These are seen in measles.

Tumor giant cells: These are the dividing nuclei of neoplastic cells. Single or polymorphic nuclei with hyperchromatism showing other features of malignancy.

Differential Diagnosis

Brown Tumor: Browns tumor is a reactive lesion which complicates to hyperparathyroidism. They affect in the 3rd and 4th decades of life and females are more common than males. Radiographically appears as an expansile lytic lesion with intralesional trabeculations which is considered in the differential diagnosis between metastatic tumor and multiple myeloma.

Histologically they are lobulated with fibrous septae containing trabeculae of woven bone. The lobules are composed of plump fibroblasts, hemosiderin laden macrophages, and osteoclast like giant cells.Brown tumours have a much more lobulated architectural growth pattern than giant cell reparative granuloma which helps in the differential diagnosis. In the giant cell tumour, the mononuclear cells are not much spindled as those in fibroblasts seen in brown tumor, and the nuclei are similar to that of osteoclasts which is not a finding in browns tumor.

Giant Cell Tumor: The histological marked feature of giant cell tumours is the incalculable multinucleated osteoclast-like giant cells that are dispersed evenly throughout the tumor. The number of nuclei in any individual cell is fluctuating but may be as many as 50 or more. The round or oval mononuclear stromal cells are the diagnostic and neoplastic component of the tumor. These cells appear to grow in a syncytium and have little cytoplasm and ill-defined cell borders.

Histopathological DD include central giant cell granuloma, Brown tumor of hyperparathyroidism and aneurysmal bone cyst.

Aneurysmal bone cyst: pathologic differentiation is often necessary, particularly when fluid-fluid levels are seen; cystic component tends to be larger than solid component; posterior mandible is more commonly involved.(American neuro radiology)

Osteoblastoma: Numerous osteoclasts like giant cells containing more than 100 nuclei scattered in the stroma.Differential diagnosis includes Brown tumour, Aneurysmal bone cyst, chondroblastoma.In the above-mentioned lesions, the giant cells are irregularly distributed.

Bacterial Lesions: In tuberculosis and leprosy langhans giant cells are present which can be differentiated by special stains like Ziehl-Neelsen staining or by immunofluorescence using auramine-rhodamine.[13] Mycobacterial culture and detection of mycobacterial deoxyribonucleic acid (DNA) using PCR are other diagnostic test for tuberculosis and usingFite stain and a positive lepromin test for lerosy[14]

In sarcoidosis the granulomas are noncaseating with langhans giant cells and other giant cells surrounded by lymphocytes. Elevated levels of angiotensin converting enzymeand labial biopsy are use in diagnosing the disease.Serum calcium levels are elevated which also aids in diagnosis.Kveim skin test can also be done along with gallium scintiscanning.[15]

Sarcoid granulomas are noncaseating, contain Langhans and other giant cells and are surrounded by lymphocytes[8] Other histologic features include stellate inclusions called asteroid bodies and concentric lamellar calcifications called Schaumann bodies[9,14] Labial gland biopsy and elevated levels of angiotensin converting enzyme (ACE) are used in diagnosing the disease.[8] Elevated serum calcium levels and adenosine deaminase levels for macrophage activity in granulomas are other diagnostic tests. Kveim skin test can also be done along with gallium scintiscanning.[9] Polaroscopy reveals little crystalline refractile things (LCRT) within the granuloma.[11] Recently a latent infection of *Propionibacterium acnes* has been postulated to be the cause of sarcoidosis.

Conclusion

Presence of multinucleated giant cells among the oral lesions is an easily identifiable histological feature. Proper histopathological and radiographic examination are much essential in establishing an accuratediagnosis[11]Recent advances in the understanding of pathogenesis are necessary to develop new treatments for the diseases.

Ethical Clearance: Not required since it is a review article

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Geriatric Dentistry—A Review

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ABSTRACT

Geriatrics, is a specialty that focuses on health care of elderly people. It aims to promote health by preventing and treating diseases and disabilities in older adults. The World Health Organization (WHO) has set 55 as the beginning of old age. Living a long life can be attributed to a number of factors, such as improvements in the standard of living, better sanitation, nutrition, and healthier lifestyles. This review discusses on the importance of evaluating the oral health of the geriatric population in a detailed manner, beyond simple clinical assessments to look for, understand and diagnose possible signs and symptoms or oral pathoses in the elderly.

Keywords: *Geriatric dentistry, old age, Aging*

Introduction

Aging is a natural process. Old age should be regarded as a normal, inevitable biological phenomenon. In humans, ageing represents the accumulation of changes in a human being over time, encompassing biological, physiological, social and behavioral [1]. Aging not only affects the overall health, but the effect of aging on oral health can also be seen that includes effect on oral hard and soft tissues. As these structures had been on constant function, over the phase of aging process there is hypo-functioning of these structures and reduced activity can be seen that may compromise patient's mastication, swallowing, and pain leading to anxiety and depression.[2]

Biological and physiological characteristics of aging: The aging process is mediated by genes and physiological changes[3].The age related physiologic changes include changes to cellular homeostasis, which includes regulation of body temperature,blood and extracellular fluid volumes, decrease in organ mass, and decline in reserves of body system functional[4]. This progressive constriction start in the 3rd decade of life. This state is usually asymptomatic and has little impact on activities of daily living regardless of age[3]. Physical changes include decreased quality and quantity of bone and muscle mass[5].

Hard tissue changes associated with aging: The most common age change is the attrition or wear of the tooth surface due to constant wear of the enamel surface[6]. Enamel wears, dependent on diet pattern and masticatory habits. This is clinically evident as loss of vertical dimension of the crown and flattening of the proximal contour[7]. The patterns of tooth wear vary with each patient and are progressive because the enamel is not capable of repair and regeneration. The wear can range from minimal faceting to extreme loss of tooth substance sometimes even to the level of gingiva. The enamel tends to become more brittle and susceptible to chipping, cracking and fracture[8]. Also as result of age changes in the organic portion of enamel, the teeth become darker, and their resistance to decay may be increased, fluid permeability of older teeth is reduced.[9]

Geriatric patients are more prone to *dental plaque and dental caries.* Dental plaque is the primary source of micro-organisms (e.g streptococcus mutans and lactobacilli) causing coronal and root surface caries

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in elderly people. Older individuals form plaque more rapidly than do younger people[3].

The reparative indices of dentin produce transparent or sclerotic dentin that are observed in the teeth of elderly people. Sclerosis reduces the permeability of the dentin and may help prolong pulp vitality [10]. Although in general, there is high prevalence of tooth loss due to caries, as many of the old aged patients psychologically feel there is no much need in saving or treating the infected teeth and rather prefer extracting the tooth[11].

The pulp shows various changes due to aging. The continual dentin deposition results in decreasing volume of pulp canal and the pulp chamber. Pulp stones are nodular, calcified masses appearing in either the pulp organ. But more frequently seen in coronal pulp. They are usually asymptomatic. The incidence and size of pulp stone increases with age[3].

Age related gingival recession leads to exposure of cementum causing root caries. These lesions appears as well defined and discoloured defects on cementum or at cemento-enamel junction.[13]

Mobility of teeth is common complaint of geriatric patients. Age related progressive loss of soft tissue attachment, with the combined effect of systemic and medications which also contribute the adverse effect on periodontal health leading to exposure of the root and loosening of the teeth within their bony sockets[14]. A compromised periodontal status and bone resorption leads to tooth loss and edentulism. Edentulism can be divided as partial or complete edentulism, depending on number of teeth absent from oral cavity. Resorption exceeds deposition in elderly people, resulting in a net loss of bone[15]. Problems, such as reduced vertical dimension, increased alveolar ridge loss also result due to loss of teeth. Also, the patients are unable to take food adequately, thereby nutritional deficiencies take place and manifestations, such as vitamin and iron deficiencies can be seen[16].

Age related soft-tissue changes

Oral Mucosa: The clinical appearance of the oral mucosa in older patients is often indistinguishable from that of younger patients. However, changes over time including mucosal trauma, mucosal diseases, and salivary gland hypofunction can alter the clinical appearance and character of the oral tissues in older patients[17]. Elderly patients may develop vesiculobullous, desquamative, ulcerative, lichenoid and infectious lesions of the oral cavity. In addition, oral cancer is primarily a disease of ageing and associated cell irregulation. It is estimated that more than 90% of all oral cancers in developed countries occur in individuals older than 50 years, with a mean onset during the sixth decade of life. [18]

Denture stomatitis: The mechanical trauma caused by ill-fitting dentures along with mucosal changes and superadded infections, a condition may be developed which is known as denture stomatitis or denture sore mouth. This condition is characterized by various degrees of erythema, and also may be associated with petechial hemorrhage which is localized to the maxillary denture bearing areas (palate). Whether it is an actual infection by Candida albicans or host tissue response remains controversial.[19]

Angular cheilitis: It typically occurs in older persons with reduced vertical dimension of occlusion and accentuated folds in the corner. There is increased pooling of saliva in these areas which keeps it moist and thus, favors a fungal infection. It is characterized by erythema, fissuring, and scaling.Contributing factors also include iron and riboflavin deficiency. This condition is primarily seen along with denture stomatitis.[20]

Burning mouth syndrome: Burning mouth syndrome (BMS) is a disabling, spontaneous, continuous, and often intense burning sensation that occurs primarily in postmenopausal women. This condition is characterized by a sensation described by the patient as stinging, burning that primarily affects the oral mucosa, when no clinical or laboratory signs are present to justify these symptoms. [21]

Salivary gland: With age a generalized loss of salivary gland parenchyma tissue occurs. The lost salivary cells often are replaced by adipose tissue. Although decreased production of saliva often is observed in older persons, whether this is related directly to the reduction in parenchymal tissue is not clear.[3]

Xerostomia: Xerostomia is defined as dry mouth resulting from reduced or absent salivary flow. According to a study 30% of the affected patients are above the age of 65 years. It can also affect nutrition as well as psychological health. Individuals with xerostomia complain of dry mouth and problems with eating,

speaking, and swallowing along with oral burning or soreness and a sensation loss or altered taste which is known as dysguesia. [22]

Temporomandibular joint: In the temporomandibular joint it is difficult to distinguish changes due to ageing from those related to osteoarthrosis. Patient with osteoarthritis of other joints may complain of clicking and snapping in the TMJ, also complain of difficulty in opening the mouth associated with pain. But however pain is not necessarily a feature of osteoarthritis alone.[3] Excluding those changes due to osteoarthrosis, the main age changes are related to remodelling of the articular surfaces and disc in response to functional changes following tooth loss. These changes may include fibrillation(separation of collagen bundles) of the fibrous covering of the articulating surface of the disk[3]. Remodelling may result in disc displacement, particularly anterior displacement.[23]

Oral consideration in geriatric patients with regards to systemic conditions: Although systemic diseases can occur at any age of a person, they are more common in elderly patients. Many conditions and medications can influence oral health and dental care in patients. The systemic diseases can impact upon oral care or can have oral manifestations. These changes may have an effect on medication absorption and metabolism or an individual's sensitivity to certain medications, in some patients chronic intake of certain medications for systemic illness could develop changes in the oral mucosa.[3]

Gastrointestinal diseases

Gastroesophageal reflux disease(GERD): Patients who experience GERD complain of dysgeusia (foul taste), dental sensitivity, erosion, and/or pulpitis. Dental sensitivity is due to erosion of enamel by gastric acid. Erosion leads to dentin sensitivity and at times irreversible pulp involvement

Peptic ulcer/gastric ulcer: Dental erosion in the palatal aspect of the maxillary teeth is seen due to persistent regurgitation of gastric acid.
Vascular malformation of the lip have been reported and range from a very small macule to a large venous pool.[3]

Respiratory Diseases

Asthma: Oral manifestation include candidiasis, decreased salivary flow, increased calculus, increased gingivitis and periodontal diseases, and increase incidence of caries. Prolonged use of BETA2 agonists may cause reduced salivary flow, with resulting increase in cariogenic bacteria, dental caries and increased incidence of candidiasis.

Chronic obstructive pulmonary disease (COPD): Periodontal pathogens have shown to be the causative pathogen of exacerbation in 4% of individuals with COPD. On prospective study suggested that oral colonization with respiratory pathogens in patients residing in chronic care facility was significantly associated with COPD.

Pulmonary embolism: The main concern in the provision of dental care for individuals with pulmonary embolism in the patient who is being managed with oral anticoagulants.[3]

Cardiovascular Diseases

Hypertension: The common findings encountered in hypertention are changes caused by hypertensive medications for example:

Diuetics	Oral dryness
Adrenergic inhibitors	Oral ulceration and dryness
Direct vasodilators	Gingival overgrowth
Calcium antagonists	Lichenoid reactions of the oral mucosa
ACE inhibitors	Loss of taste

Renal diseases

Chronic renal failure: As renal failure develops,one of the early symptoms may be a bad taste and odor in the mouth, particularly in the morning. With impaired renal function a decreased glomerular filteration rate (GFT) and accumulation and retention of various products of renal failure, the oral cavity may show a variety of changes as the body progresses through an uremic state. Some of the presenting signs were an ammonia-like taste and smell, stomatitis, decreased salivary flow, xerostromia, and perotitis. An acute rise in the Blood Urea Nitrogen (BUN) level may result in uremic stomatitis, which may appear as an erythropultaceous form characterized by red mucosa covered with a thick exudates and a pseudomembrane or as an ulcerative form characterized by frank ulceration. White plaques called 'uremic frost' can rarely be found intraorally

Hematological diseases:

Anemia: The major oral sign of iron deficiency anemia is pallor of the mucosa. In addition,the oral epithelium cells become atropic. The tongue may become smooth due to atrophy of the filiform and fungi form papillae an glossodynia can be a presenting or associated symptoms. In long standing cases esophageal strictures or web can develop resulting in dysphagia

Leukemia: Oral complications are common throughout the clinical course of the disease,dental management is complex. Oral sings and symptoms include cervical lymphadenopathy, oral bleeding, gingival infiltrates, infection and oral ulcers. Thrombocytopenia and anemia caused by marrow suppression from disease and chemotherapy results in pallor of the mucosa, petechiae and ecchymoses. Oral mucosal ulcers are common findings in leukemic patients. Oral infection is a serious potentially fatal complication in neutropenic leukemic patients. Candidiasis is common oral fungal infection.[3]

Immunologic diseases

Scleroderma: It is a multisystem connective tissue disease that involves hardening of the skin and mucosa, smooth muscle atrophy. Oral manifestation of scleroderma include:

- The lip become rigid and the oral aperture narrows considerably
- Tongue can also become hard and rigid, making speaking and swallowing difficult.
- Oral telangiectasia is commonly observed on the hard palate and lips.
- When the soft tissue around the TMJ are affected, they restrict movements of the mandible causing pseudoankylosis.

Rheumatoid arthritis: The treatment for rheumatoid arthritis can cause oral manifestations. The long term use of methotrexate and other antiheumatic angents such as D-penicillamine and NSAIDs can cause stomatitis, periodontal disease, including bone and teeth, and cyclosporine may cause gingival overgrowth.[3]

Infectious Diseases

Tuberculosis: It appears most likely that the organisms are carried in the sputum and enter the mucosal tissue through a small break in the surface. Tongue is most commonly affected, followed by the palate, lips, buccal mucosa, gingival and frenula. Ulcer is irregular, superficial or deep, painful ulcer which tends to increase slowly in size.

Candidiasis: Candidiasis is the most common opportunistic infection of the mouth caused by overgrowth of a species of the fungus Candida. The species most frequently implicated in oral infections is C. albicans. The change commonly occurs when there is a reduction in host resistance caused by bacterial and viral infection, systemic disease or medications. Oral candidiasis generally presents in one of three distinct clinical forms: acute pseudomembranous candidiasis (thrush), acute atrophic candidiasis (antibiotic sore mouth), or chronic atrophic candidiasis (denture sore mouth). The lesions of acute pseudomembranous candidiasis consist of either multifocal or diffuse, white, superficial curd like plaques occurring anywhere in the oral cavity. The infection is called pseudomembranous because the plaques can be scraped off easily, leaving an erythematous base. Most other white mucosal lesions cannot be rubbed off. Acute atrophic candidiasis often follows prolonged antibiotic or steroid therapy and results clinically in a painful erythematous mucosa particularly involving the tongue. The problem usually resolves with cessation of the medications, but antifungal therapy will hasten recovery. Chronic atrophic candidiasis presents as a slightly granular or irregularly eroded erythematous mucosa under dentures. Any of these types of candidiasis can be accompanied by angular cheilitis. [3]

Conclusion

In summary, variety of oral changes may be observed in elderly patients. These changes can be attributed to a variety of physiological and pathological processes which have developed over a lifetime. Clinically, it is important to recognize these changes and provide appropriate treatment. As the number of geriatric population and their associated oral and general health problems are considerably increasing with time, there is a need for clear understanding of correlation of systemic health with oral health and providing support and treatment for the same.

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Palliative Care in Oral Cancer Patients

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Abstract

Palliative care is the care given to terminally ill patients to improve the quality of life. Oral cancer is the sixth most common cancer in the world with higher annual incidence. These oral cancer patients are not only compromised on general health but also on oral health, alleviation of pain, reducing the suffering, providing relief, treatment of any other complication which occur during treatment or post treatment are taken care in palliative care. The major concerns in these patients include mucositis, xerostomia, candidiasis, pain, dysphagia, dyspnoea, depression, anxiety and nutritional deficiencies.

Keywords: *Oral cancer, Pain, Dysphagia, Dyspnoea*

Introduction

Palliative care is the care given to terminally ill patients to improve the quality of life and giving relief from their sufferings for the rest of the life[1].According to WHO, palliative care is "the study and management of patients with active,progressive, far advanced disease in whom the oral cavity has been compromised either by disease directly or by its treatment, the focus of care is quality of life"[2].In other words, Palliative care is the supportive care with principal curative treatment of cancer. Palliative care is the multidisciplinary team work given by doctors of various specialities, nurses and social workers. Oral cancer is the sixth most common cancer in world with annual incidence of 2,75,000 for oral and 1,30,000 for pharyngeal cancer[3].Inspite of various modalities in treatment of oral cancer, more than half patients lost their life as disease progresses and in the end of their life they are shifted to palliative care for reducing their symptoms not curing and also gives psychosocial spiritual support to patients.

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Surgical Palliation: Patients undergone surgery for the treatment of cancer, postsurgicallythey develop symptoms such as pain and bleeding at surgical site, dysphagia, dyspnoea. In these cases palliative surgery may be indicated to relieve their symptoms. This palliative surgery includes removal of the recurred tumor and endovascular techniques such as embolisation and vessel stenting controls bleeding. Secondary haemorrhage from carotid vessel due to erosion results in critical complication such as dying state. This can be managed by swift surgical intervention and attempts to reduce flow of blood with direct pressure[1].

Control of Pain: Pain is the most " An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" as given by International Association for Study of Pain[4].Patients of oral cancer persists with pain throughout the lifetime, both before and after the treatment. Pain that encountered are of three types. They are somatic, visceral and neuropathic pain[1]. Pain can be best managed with analgesics. The WHO proposed the analgesic ladder for treating cancer pain based on the severity of pain and strength of analgesics, given in table 1[5]. Among all other opioids, morphine is the first choice for somatic pain. Morphine can be given alone or in combination with other co analgesics. Care must be taken regarding appropriate dosage of drug and switching of oral form to patch on the skin[6].Oral form includes

sustained release preparation followed by immediate release doses for breakthrough at a sixth of 24 hour sustained release dosage.In case of adverse effects such as vomiting, morphine can be given as subcutaneous preparations.Diamorphine is mostly preferred for subcutaneous preparation. If there is morphine tolerance and in renal failure patients, transdermal preparation of Fentanyl can be given[1].

Table 1: WHO analgesic ladder for treating cancer pain

Step1(mild pain)-Non opioids and adjuvant.
Example is paracetamol 500mg to 1g 6 hourly.
If pain is not controlled in 24 hrs, proceed to step 2.
Step 2(mild to moderate pain)-weak opioids with step 1 medication.
A combination of paracetamol, dextropropoxyphene, codeine or tramadol.
If step 2 medications are not adequate in 24hrs,proceed to step 3.
Step3(moderate to severe pain)-Strong opioids with step 1 medication.
Morphine 5mg four hourly, a maximum daily dose of 30 mg is required.

Local application of Fentanyl through buccal, sublingual and intranasal routecan also be given. Some patients develop dysphoria due to morphine intake, in these cases, oxycodone may be used as an alternative to morphine[1].Hydromorphoneand methadone are given as an alternative to morphine.

Due to radiation, neuropathic pain may usually results. Neuropathic pain can be best managed with anti depressants, anti convulsants such as gabapentin and pregabalin, sedatives such as carbamazepine [1].The combination of both antidepressants and anticonvulsants should be given for intolerable pain. Corticosteroids may also be used as first line for neuropathic pain but it produce the adverse effect of appetite stimulation if the patient persists with dysphagia. Clonazepam, methadone and ketamine are occasionally used.Mucosal pain around the lesion region arise due to infection or tumor. Topical application of local anaesthetics such as lignocaine preparations favours the best result for mucosal pain. Other topical agents such as sucralfate, steroids,chlorhexidine can also be used.Dexamethasone can be given for visceral pain[1].

Palliation of Dysphagia: Dysphagiaor difficulty swallowing is a disturbing symptom that occurs in the majority of patients with oral cancer in the initial as well as life limiting stage. Difficulty swallowing can impact the quality of life of the patient as well as of caregivers.

Dysphagia can be a cause of result of dying. Muscle wasting, cachexia, and asthenia affect the coordination and muscle strength needed for swallowing, which in turn, can lead to poor appetite and inefficient oral intake. Speech-language pathologists (SLPs) play a critical role in the multidisciplinary team by providing careful assessment to determine swallowing potential, prognostication to assist in decision making, and guidance in safe and appropriate feeding methods[7].More than 40% of oral cancer patients experience dysphagia. It may be due to mechanical and functional obstruction of oropharyngeal structure and also due to adverse effects of drugs.Aspiration is most common for about 40% to 60% oral cancer patients. Functional Endoscopic Evaluation of Swallowing (FEES) is the procedure to detect the presence, assessment of ability and etiology of aspiration[1].These patients can be managed with use of thickened fluids thereby maintaining their oral intake. Patient must also be educated about the risk of aspiration pneumonia. Through the nasogastric tube, hydration, nutrition and medication can be maintained in these patients. When the nasogastric tube feeding is delivering the nutrition for more than two weeks then gastrotomy is performed[1]. Surgical debulking of obstruction and use of stents are also performed in severe cases.

Palliation of Airway: Dyspnoea is a frequent symptom in advanced cancer patients and symptoms increasing in the terminal phase (up to 80%). Dyspnoea may be present as suffocating, choking or tightness of breath, effort of breathing and air hunger[8]. This is managed non pharmacologically with cooling the face, opening windows, using small ventilators, adequate positioning (e.g. coachman's seat, elevation of the upper part of the body), respiratory training, the use of a walking frame or a walker[9]. Pharmacologically, it is managed with the help of opioids, benzodiazepine, neuroleptics, anti depressants and steroids. Tracheostomy is the final choice for the airway palliation. However, tracheostomy may be avoided when there is a chance of surgical debulking. It depends on local expertise and equipment[10]. But patient

having repeated surgical debulkingnot to be opted for tracheostomy and they are managed with drugs for reduction of secretion, palliative sedation. In dying patient on dyspnoea, pharmacological intervention include reduction of artificial hydration, adding antisecretory drugs such as atropine, hyoscine or glycopyrronium bromide and optimise positioning of the dying.

Palliation of Other Symptoms: Mucositis and stomatitis are common in patients who undergone chemotherapy and radiotherapy. In Chemotherapy, high rate of mitosis of cells takes place and mucositis occurs. It is estimated that 40% of chemotherapy patients suffer from mucositis[11]. Methotrexate and 5-Fluorouracil are the potent chemotherapeutic agents which causes mucositis. Usually mucositis occurs in the first week after chemotherapy. Mucositis manifest with pain, bleeding, reduced intake of foods leading to nutritional deficiencies, infection and compromised masticatory function. In later stages ulceration occurs which act as a site for microbial invasion. Xylocaine and dyclonine are topical anesthetics used for mucositis and stomatitis but must be used with caution as they will block the gag reflex and increase the risk of aspiration. The use of diphenhydramine hydrochloride 5% and loperamide are used as a rinse to relieve pain has been used for herpetic stomatitis. Milk of Magnesia causes dryness of the mouth, hence it should not be given as substitute[11]. Benzydamine, a nonsteroidal analgesic with anti- inflammatory properties palliate radiation induced stomatitis. Patient is also advised for the use of saline solution followed by a 0.2% morphine solution can be used topically to relieve the discomfort associated with mucositis and also be advised to avoid spicy foods, smoking and alcohol[11].

Xerostomia occurs due to side effects of drugs and radiotherapy. Radiotherapy causes destruction of the salivary gland tissues within the treatment zone[11]. It causes decrease in lubrication and the protective agents in saliva render the tissues more susceptible to dryness and pathogenic invasion. Xerostomia affects nutrition, communication and oral tissues. Xerostomia manifest with ulcerated, erythemic, taste alteration, dysphagia, nutritional deficiencies, radiation caries etc [12]. Water soluble lubricants, alcohol free mouth rinses and saliva substitutes are used for treating xerostomia. Drugs used for xerostomia are pilocarpineand cevimeline. Malic acid, vitamin C and citric acids are also used to stimulate saliva secretion.

Nausea and vomitingin palliative care patients areoccurred due to obstruction in gastro intestinal tract, gastro intestinal infiltration, pancreatitis,azotemia, hypercalcemia, electrolyte imbalance, emotional reaction, after radiotherapy and chemotherapy. These are managed with anti emetics and prokinetic drugs such as metoclopramide and domperidone. Haloperidol and metoclopramide causes tardive dyskinesia, while hyoscine butylbromide, promethazine causes xerostomia. Tardive dyskinesia occurs in long time dosage of drugs and interferes with the denture wear.

Constipation may develop due to adverse effects of anti cholinergics and opioids. Laxatives and softeners are used to treat constipation, most commonly used are laxido and movicol. Manual evacuation with enemas may be needed in severe cases.

Cachexia characterized by progressive weight loss, persistent erosion of host cells in response to malignant growth. Anorexia is also a component of cachexia. Cachexia results in reduce in ability of patient to fight against cancer[5].

Candidiasis occurs almost 80% of the patients under palliative care. It occurs due to xerostomia, poor oral hygiene, use of corticosteroids, use of broad spectrum antibiotics, poor nutritional status, diabetes, denture wearing and immunosuppressive drugs[11]. Candida albicans is the most common infectious organism causing candidiasis. Candidiasis manifest as pseudomembranous, erythematous or hyperplastic candidiasis or angular cheilitis. Pseudomembranous candidiasis (thrush) is characterized by small white or yellow plaques with surrounding erythemic areas. These lesions can be rubbed off, revealing raw mucosa. Erythemous (atrophic) candidiasis appears as red lesions, frequently on the hard palate and dorsal surface of the tongue. Hyperplastic candidiasis is similar to pseudomembranous; however, the plaques do not wipe off. Angular cheilitis appears as white and red fissures arising from the corners of the mouth having both bacterial and fungal component [13]. Xerostomia is the major cause for candidiasis. The species level of candida are higher in denture wearing patients than dentate patients.Denture wearing patients use soaking agents such as as bleach and water benzalkonium chloride,chlorhexidine, and also microwaving the denture to get rid of the candida species and prevent from candidiasis.Topical agents used in the treatment of

candidiasis are nystatin and clotrimazole and sysytemic agents used are ketoconazole, fluconazole, itraconazole, amphotericin BCandidiasis may be treated efficiently by a combination of topical and systemic applications. Nystatin is the most common antifungal agent which can be administered throughdifferent methods and it can produce adverse effects such as nausea, vomiting and diarrhoea. Clotrimazole usage may increase the risk of occurrence of caries as it contains sucrose content. Systemic medications should be reserved forcases in which topical agents are ineffective and these agents have renal or hepatic toxicity. Ketoconazole decreases the absorption of antacids and increases the half-life of benzodiazepines[11]. Fluconazole,ketoconazole and itraconazole may interact with anticoagulants such as coumadin. Itraconazole decreases the pharmocological effect of oral contraceptives and increases plasma levels of benzodiazepines. Amphotericin B is the final choice of drug for candidiasis[11].

Chemotherapy or radiotherapy in oral cancer patients may developdysgeusia.It is treated with zinc supplementation and monosodium glutamate.

Psychotherapy: Patients commonly experience anxiety, confusion, delirium, agitation etc., as a result of opioid intake, alcohol withdrawal and fear of dying. These are pharmacologically managed with sedatives such as benzodiazepines. In critical stage of dying patient, benzodiazepines and anti psychotics are given in combination[1]. Psychological support can be given by cognitive behaviour therapy, positive affirmations, hypnosis, therapist support, relaxation etc[5]. Hypnosis reduces oral pain experienced by patients due to mucositis [14].

Radiotherapy: Radiotherapy uses high energy X-rays or particles to destroy cancer cells or reduce its rate of growth. It is effective in reducing the symptoms such as pain, bleeding, dysphagia, bony metastatic pain of patients in palliative care. Most commonly External Beam Radiation Therapy(EBRT) technique is used, in which machine is focused from outside the body targeting on the tumor site. It should be usually given for 5 days a week for 6 to 7 weeks[15]. There is a debate continues around the use of hypofractionated schedules or short course radiotherapy for local pain control[1]. Bisphosphonates and monoclonal drugs such as denosumab are used in bony pain control[1].

Chemotherapy: It uses anti cancer drugs for reducing the symptoms in advanced cancer patients.It also used as an alternative to surgery, where tumoris difficult to remove surgically, as it attempts to shrink the larger tumor and also slow down the growth rate of cancer cells. This can also be used as an adjuvant to radiation and surgery. Most commonly used chemotherapeutic drugs are cisplatin, carboplatin, 5-fluorouracil, paclitaxel, docetaxel and less commonly used are methotrexate, bleomycin and capecitabine[16]. These drugs can also be given in combination of two or more drugs.Adverse effects caused by these drugs are hair loss, mouth sores, diarrhoea, neuropathy, renal damage etc. Intravenous fluid may be given before and after each dose to reduce the occurrence of renal damage[16]. In addition to cancer cells, these drugs can also produce damage on other normal cells such as bone marrow cells thereby causing risk of infection, bleeding disorders etc.

Social Well Being in Palliative Care: Patient's family members play a important role in palliative care as care giver and care recipient. They are called 'hidden patients' and need to be psychologically well treated for the mental support for the patient[5]. Health care professionals must view patient's family as a unit of care for patient and support them.

Conclusion

The WHO reports estimates that around three fourth of cancer patients are in end stage. Global approach towards palliative care also has taken as positive outlook especially in last two decades[15]. Palliative care in oral cancer patient is the multidisciplinary approach includes specialist of various fields, nurses and social workers. Thus the health care professionals must take some active participation in enhancing the quality of life by minimising their symptoms. Psychological support and motivation by psychotherapist to patient and their families makes their rest of life better.

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Xerostomia-Causes, Diagnosis and Management—A Review

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ABSTRACT

Xerostomia is the subjective feeling of dryness of mouth which is often associated with hypofunction of the salivary gland. Xerostomia can also have a major impact on a patient's oral health and quality of life. Patients with xerostomia complaints of problems with mastication, phonetics, deglutition and wearing dentures. Treatment of this condition always depends on the cause. Oral physicians should be able to diagnose this condition and able to give proper treatment to provide comfort to their patients. This article reviews the causes of xerostomia and its management.

Keywords: *Drymouth, saliva, salivary flow, xerostomia*

Introduction

Saliva is a complex fluid, which is composed of 99% of water and only 1% of non organic and organic substances[1] [Table 1]. These constituents are within the gland and transported from the blood[2]. The major role of these components present in the saliva are to provide prophylactic, therapeutic and diagnostic properties to saliva. The compounds which are present in the saliva are also present in the blood[3]. Saliva plays an important role in maintaining good oral and general health. People become aware of its importance only when the salivary flow reduces. It causes reduction of person's quality of life[4].

Functions of Saliva:

- Digestion
- Masticatory function
- Swallowing
- Speech
- Improves taste
- LubricatIion
- Free movements of oral tissues
- Maintaining mucosal integrity.
- Irrigation and cleansing of teeth
- Protect teeth from demineralization
- Anti microbialaction.
- Immunological protection against infections.
- Retention and comfort of denture
- Saliva as a diagnostic tool

Dry Mouth (Xerostomia): Dry mouth (xerostomia) is a common complaint of salivary problem and is the subjective sense of dryness which may be due to:

- Reduced salivary flow (hyposalivation) and/or
- Changes in composition of saliva.

Patients who have chronically decreased salivary flow (hyposalivation) suffer from lack of oral lubrication, affecting many functions and they may complain of dryness (xerostomia), and can develop dental caries and other infections (candidiasis, or acute bacterial sialadenitis) as a consequence of the reduced defences.

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Causes: There are also physiological causes of hyposalivation. Thus a dry mouth is common during periods of

- anxiety,
- due to sympathetic activity
- mouthbreathers may also have a dry mouth and advancing age is associated with dry mouth probably because of a reduction of salivary acini[5], with a fall in salivary secretory reserve.

Table 1

Causes of dry mouth
Iatrogenic
Drugs
Irradiation
Graft versus host disease
Disease
Dehydration
Psychogenic
Salivary gland disease
Sjögren's syndrome
Sarcoidosis
Salivary aplasia

Drugs: In older people[6] complaining of xerostomia is due to drugs. Indeed, the main causes of dry mouth are iatrogenic. There is usually a close relation between starting the drug treatment or increasing the dose, and experiencing the dry mouth[7]. However, the reason for which the drug is being taken may also be important.

For example, patients with anxiety or depressive conditions may complain of dry mouth even in the absence of drug therapy (or evidence of reduced salivary flow). Drugs recognised as causes of reduced salivation include mainly those with anticholinergic, or sympathomimetic, or diuretic activity.

These include those shown in Table 2.

Drugs associated with dry mouth
Drugs which directly damage the salivary glands
Cytotoxic drugs
Drugs with anticholinergic activity
Anticholinergic agents such as atropine, atropinics and
hyoscine
Antireflux agents eg proton-pump inhibitors (such as
omeprazole)
Psychoactive agents with anticholinergic activities such as:
Antidepressants, including tricyclic (eg amitriptyline,
nortriptyline, clomipramine and dothiepin [dosulepin]),
selective serotonin re-uptake inhibitors (eg fluoxetine),
lithium and others.
Phenothiazines
Benzodiazepines
Opioids

Irradiation: Radiation theraphyfor malignant tumours in the head and neck region, such as oral cancer, can produce xerostomia. Other sources of irradiation such as radioactive iodine (131I) used for treating thyroid disease, may also damage the salivary glands, which take up the radioactive iodine.

Dehydration: As in diabetes mellitus, chronic renal failure, hyperparathyroidism, any fever or diabetes insipidus [8] can cause xerostomia.

Diseases of salivary glands can also cause salivary dysfunction. These are mainly:

- Sjögren'ssyndrome[9] (a multisystem auto-immune condition).
- sarcoidosis; HIV disease; hepatitis C virus infection; liver
- diseases
- cystic fibrosis (mucoviscidosis)

It is also important to also recognise that some patients complaining of a dry mouth have no evidence of a reduced salivary flow or a salivary disorder (ie they have xerostomia but not hyposalivation), and in these there may be a psychogenic reason for the complaint.

Clinical features: The patient with hyposalivation may have difficulty in:

- Swallowing — especially dry foods (the cracker sign)
- Controlling dentures
- Speaking, as the tongue tends to stick to the palate — leading to 'clicking' speech.

- Patients may also complain of unpleasant taste or loss of sense of taste, or halitosis.
- The patient with hyposalivation may complain of a dry mouth or these sequelae alone, or also complain of dryness of the eyes and other mucosae (nasal, laryngeal, genital). Those with eye complaints have blurring, light intolerance,
- burning, itching or grittiness, and sometimes an inability to cry.
- Systemic features (such as joint pains) may be suggestive of Sjögren'ssyndrome[9].

Examination

- **Examination** may reveal that the lips adhere one to another and an examining dental mirror may stick to the mucosa because of the reduced lubrication.
- Food debris may be seen sticking to the teeth or soft tissues, and the usual pooling of saliva in the floor of the mouth may be absent.
- Thin lines of frothy saliva may formalong lines of contact of the oral soft tissues, on the tongue, or in the vestibule.
- Saliva may not beexpressible from the parotid ducts. The tongue is dry and may become characteristically lobulated and usually red, with partial or complete depapillation.

Complications of hyposalivation can include:

- **Dental caries** — which tends to involve smooth surfaces and areas otherwise not very prone to caries — such as the lower incisor region and roots. Hyposalivation may explain patients with uncontrollable recurrent caries, who are apparently complying with dietary advice.
- **Candidiasis** — which may cause a burning sensation or mucosal erythema, lingual filiform papillae atrophy, and angular stomatitis (angular cheilitis)
- Halitosis
- Ascending (suppurative) sialadenitis — which presents with pain and swelling of a major salivary gland, and sometimes purulent discharge from the duct.

Diagnosis: Hyposalivation is a clinical diagnosis which can be made by the history and examination. It can be helpful to document salivary function by salivary function studies such as salivary flow rates (sialometry). Collection of whole saliva (oral fluid) is currently the routine technique for sialometry used by many clinicians, despite the fact that it is rather inaccurate and non-specific.

It is usually carried out by allowing the patient to sit quietly and dribble into a measuring container over 15 minutes; in a normal person, such an unstimulated whole saliva flow rate exceeds 1.5 ml/15 min (0.1 ml/min).

The specialist may be needed to:

- Study and document the degree of salivary dysfunction
- Determine the cause.

Investigations may be indicated to exclude systemic disease, particularly to exclude:

- Sjögren's syndrome and connective tissuedisorders
- Diabetes
- Sarcoidosis
- Viral infections (hepatitis C; HIV).

Commonly used investigations may thus include:

- Blood tests (mainly to exclude diabetes, Sjögren's syndrome, sarcoidosis, hepatitis and other infections)
- Eye tests (egSchirmer test mainly to exclude Sjögren's syndrome)
- Salivary gland biopsy (if there is suspicion of organic disease such as Sjögren'ssyndrome)
- Imaging (mainly to exclude Sjögren's syndrome, sarcoidosis or neoplasia).

It is important to remember, as stated above, that in someelderly[10] patients complaining of a dry mouth no evidence of a reduced salivary flow or a salivary disorder can be found. There may then be a psychogenic reason for the complaint.

Table 3:

Diagnosis is clinical but investigations may be indicated, including:

- Blood tests (ESR and SS-A and SSB antibodies; see below)
- Eye tests (Schirmer; see below)
- Urinalysis
- Salivary flow rate tests (sialometry)
- Salivary gland biopsy (labial gland biopsy)
- Imaging
- Chest radiograph
- Sialography
- Scintiscanning
- Ultrasound

Management of Hyposalivation

- Any underlying cause of xerostomia should if possible be rectified.

  Eg: xerostomiaproducing drugs may be changed for an alternative, and causes such as diabetes should be treated. Patients should be educated into efforts toavoid factors that may increase dryness, and to keep the mouth moist

- Salivary substitutes may help symptomatically.

  A variety are available including:

  - Water or ice chips; frequent sips of water are generally effective
  - Synthetic salivary substitutes.

- As patients with objective xerostomia are at increased risk of developing caries it is important that they take a non-cariogenic diet and maintain a high standard of oral hygiene. The regular use of topical fluoride agents forms animportant component of their long-term care.
- Salivation may be stimulated by using diabetic sweets or chewing gums (containing sorbitol or xylitol, not sucrose).
- Cholinergic drugs that stimulate salivation (sialogogues), such as pilocarpine, or cevimeline should be used only by a specialist. Oral complications should be prevented and treated.

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Microwave Tissue Processing

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ABSTRACT

Conventional tissue fixation and processing is as old as 100 years and still remains the gold standard in which all new technologies and methods are need to be assessed. Tissue processing is one of the important steps for obtaining good thin sections without artifacts. Though conventional tissue-processing methods are most commonly followed, they are well-known as very laborious and tedious procedures. Microwaves is a form of electromagnetic wave-induced heat, when applied in histotechnology, reproducibly yields histolologic material of similar or superior quality than conventional processing methods, making it popular in the recent years. Microwave irradiation of tissue during fixation and subsequent histochemical staining procedures significantly reduces the time required for incubation in fixation and staining solutions.

Keywords: *Tissue processing, Microwave, Staining*

Introduction

Microwaves were invented by Percy Spencer in 1945. It iswidely used in food processing, chemical, pharmaceutical, and other industries for many years[1]. The concept of fixation of tissues using microwaves was first advocated by Meyers in1970. It can penetrate tissues to a greater extent than heat waves.[2]Microwave irradiation during tissue processing reduces the time required for fixation, decalcification, staining with chemical reagents. It also induces rapid oscillation of water molecules (2.45 GHz) and thus increases tissue temperature. Conventional microwave devices irradiate tissues both rapidly and uniformly, and microwave irradiation protocols differ with specific microwave devices used. Microwave irradiation is routinely applied for special staining, fixation and subsequent staining procedures, such as enzyme-based staining and immunofluorescence staining.[3]

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Microwaves in Processing of Tissues: Tissue processing performed permits sectioning of tissue into thin sections so it can be visualized microscopically. It consists of a series of steps in which the tissues pass through various reagents, which will finally permit sectioning.[4]Microwave histoprocessing relies on the principle of using microwave energy to speed up the process of the diffusion of liquids into and out of the specimens. Conventional tissue processors involves a graded series of alcohols, a clearing agent, usually xylene and paraffin wax in an overnight process whereas microwave histoprocessing employs just three reagents as mentioned below in four step processinvolving single change in ethyl alcohol andisopropanol and two changes in paraffin.[5]

1. 100% ethyl alcohol for dehydration
2. Isopropanol for the intermedium
3. Liquid paraffin for infiltration

The alcohol can be used several times and the paraffin can be reused many times, possibly for months. Paraffin should be added to the microwave in liquid form as microwave energy will not melt paraffin pellets. Theuse of microwave tissue processing enhanced safety by eliminating formalin and xylene from the procedure. The approximate time taken for processing is [6]

1. Short Schedule-15 min and
2. Long Schedule-60 min

Microwave Instaining: Obtaining good histological images for successful interpretation is made possible by good sample preparation and staining. Staining of tissue sections and cell preparation is based on diffusion of dye into the tissue and its binding to the substrate. Microwave irradiation can be applied for accelerating routine, special, metallic, as well as immunofluorescent stains. Staining methods which takes minutes can be done in a microwave oven in seconds; those that take hours, in minutes; and those that take days or even weeks can be completed in hours using microwave techniques. The optimum temperature for most non-metallic stains is between 55° and 60° C and for metallic stains between 75° C and 95° C

The microwave processed tissue sections had better cytoplasmic and nuclear details with good erythrocyte integrity and lymphocyte appearance than the conventional method. The effect of microwaves on the different types of tissue such as epithelium, fibrous, and glandular, showed no statistically significant variation

Advantages of Microwave[7]

For the pathologist

- Microwave-processed slides enable the pathologist to deliver same-day diagnosis of lesions
- Same-day diagnosis will enhance the pathologist's role in management of the cancer patient

For the lab administrator

- Improved work environment for laboratory personnel
- Reduced cost for reagents storage and disposal

For the clinician

- Within hours, oncologists and clinicians can advise patients on the base of definitive diagnosis and Treatment can be initiated immediately

For the patient

- Elimination of needless stress while waiting for a diagnosis
- More timely start of needed treatment

Disadvantages of Microwave[7]

- Microwaving tissue in formalin releases large amounts of dangerous vapors
- Expensive
- Requires proper use of calibration and monitoring

Conclusion

Rapid processing of histopathologic material is increasingly desirable to fulfill the needs of clinicians treating acutely ill patients. Moreover, this will be a boon for the technical personnel whose work practices and lifestyles would change for the better, and this is something which defies statistical analysis. It is encouraging to see the growth of this technology in our field. When used properly, it can decrease the time and reagent costs tremendously. Most important of all is the diminished wait by patients for their diagnosis which makes microwave technology an important in today's laboratory.

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Saliva as a Biomarker for Sysytemic Diseases

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ABSTRACT

Human whole mouth saliva (WMS) is secreted by salivary glands, namely parotid, submandibular/sublingual and other minor glands of the oral cavity. The human saliva consists of various proteins and peptides which serve as diagnostic aids in detection of various contagious and organ related diseases. Saliva can be used to detect various systemic and oral diseases. In any disease early diagnosis helps in proper treatment planning and better prognosis. Saliva has a great potential as a diagnostic fluid and offers advantage over serum and other biological fluids by an economic and non- invasive collection method for monitoring of systemic health and disease progression.This review examines the diagnostic application of saliva for systemic diseases

Keywords: *Saliva, Diagnostic fluid, Biomarker, Systemic disease.*

Introduction

Saliva is a clear, slightly acidic and complex biological fluid. It contains secretions from the major salivary glands like parotid, submandibular and sublingual glands as well as minor salivary glands like buccal, lingual and palatal glands[1].The advantages of saliva is a diagnostic tool are surveillance of disease, diagnosis of the disease, prognosis and research purposes[1].Similiar to blood, saliva is composed of a variety of hormones, antibodies, antimicrobial constituents and growth factors[1]. Through the spaces present between the cells saliva enters the blood by transcellular and paracellular routes[1].

Diagnosis of diseases like cancer cardiovascular, metabolic, and neurological diseaseswhich have a great global impact have become challenging day by day[2].Therefore newer laboratory testing procedures and diagnosing techniques are required along with supplemental clinical evaluation. Salivary diagnostics holds great promise as an effective modality for the early diagnosis, prognostication, and monitoring posttherapy status[2].Whole saliva is a mixture of the secretions of the major and minor salivary glands, mucosal transudations, gingival crevicular fluid, serum and blood derivatives from oral wounds, desquamated epithelial cells, expectorated bronchial and nasal secretions, bacteria and bacterial products, viruses and fungi, other cellular components, and food debris. It is a complex fluid containing an entire library of hormones,proteins,enzymes,antibodies, antimicrobial constituents, and cytokines[2].

Use of saliva as a diagnostic aid has various advantages like being non-invasive, safe, cost effective, can be used in mass screening and time saving[3]. The salivary tumor markers and their role in diagnosis of various tumors are briefed in this article[3].

Biomarkers: Biomarkers referto a quantifiable biological parameter that is measured and evaluated as an indicator of normal biological, pathogenic, or pharmacologic responses to a therapeutic intervention, according to the National Institutes of Health (NIH)[5]. Biomarkers can be classified as: Genomic biomarkers (analysis from DNA), Transcriptomic biomarkers (analysis from RNA), Proteomic or Protein biomarkers (analysis from protein profile), Metabolomic biomarkers (as inter mediates and products of metabolism)[5].

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Saliva Vs Serum: For the diagnosis of systemic diseases whole saliva is most frequently used as it has the advantage of being easily collected andit containsmostoftheserumconstituents[2]. While cells, tissues, stool, and other alternatives are routinely pursued, blood serum or plasma is traditionally and most frequently the source of measurable biomarkers[6]. Although lifesaving in many instances, the blood collecting procedures have disadvantage of being expensive, problematic, and invasive[6]. Saliva carries many advantages over blood, including the following:

1. Collection is undemanding[6]. Saliva can be self collected while blood sample collection requires trained professional[6].
2. The procedure is noninvasive.In patients who are reluctant for repeated blood drawings and biopsies saliva sample procurement is advantageous. It is painless and does not cause any discomfort while encourages others to participate in timely medical evaluations and screenings[6].
3. Samples are safer to handle. Salivary secretions contain factors that inhibit the infectivity of HIV, resulting in extremely low or negligible rates of oral transmission[6].
4. salivary samples can be easily store and transported. Saliva does not clot and requires less manipulation than blood[6].
5. The procedure is economical. The easier method of collection and storage decreases overall costs for patients and health care providers[6].

Collection Methods of Saliva: There are various methods for the collection of saliva. It is classified depending on whether the saliva is stimulated or unstimulated. Stimulated saliva involves use of chewing gums to increase masticatory action and the saliva is collected by increasing the salivary flow [1]. This method is used only in patients who are unable to produce adequate quantities of saliva as collection of saliva through this method causes a change in the quantity as well as the pH of the saliva [1]. Unstimulated saliva is collected without exogenous facilitation, and its flow rate is mostly affected by the degree of hydration. Draining, spitting and suctioning are the three common methods of approach to collect unstimulated saliva. The oral cavity of the subject is cleaned and rinsed thoroughly before collection of saliva to ensure that any contamination is avoided [1].

Autoimmune Disorder: Sjogren syndrome is a chronic autoimmune disorder characterized by salivary and lacrimal gland dysfunction, serological abnormalities and multiple organ system changes[1].According to the studies and researches conducted an significant increase in levels of salivary IL-2 and IL-6 concentrations are elevated in sjogren syndrome patient[1]. Also an alteration in cytokine profiles is seen which is useful both in diagnosis and prognosis of the disease[1].Salivary protein analysis demonstrated an increased level of lactoferrin, beta 2 microglobulin, lysozyme C, and cystatin C. However,a significant decrease in the levels of salivary amylase and carbonic anhydrase were observed[2]. Rapid concentrations of NaCl, Ig A, Ig G, lactoferrin, inflammatory mediators such as PGE2, TXB2, Interleukin-6 were also observed in saliva of patients with Sjogren syndrome[4].

Multiple sclerosis(MS) is an inflammatory disease characterized by loss of myelin and scarring caused due to destruction/failure of myelin producing cells by the immune system[2]. In patients suffering from multiple sclerosis there is an increased production of IgA in the saliva secreted. There is no other significant change observed in salivary diagnostics[2].

Sarcoidosis is an inflammatory disease of the lymph nodes, lungs, liver, eyes, skin, or other tissues. Salivary diagnostics demonstrates a decrease in the secretion[2]. In these patients the activity of the enzyme alpha- amylase is reduced in addition to the volume of saliva secreted. However, there was no correlation between the decrease in the enzyme activity and the secretion volume[2].

Cardiovascular System: Cardiovascular disease is one of the major causes of death world wide[1]. The levels of total serum amylase and salivary amylase have been determined before cardiovascular surgery[1]. In ruptured aortic aneurysm salivary alpha amylase level is increased[1]. Salivary markers like C-reactiveprotein (CRP), myoglobin (MYO), creatininekinasemyocardialband (CKMB), cardiac troponins (cTn), and myeloperoxidase, which, when used in combination with an ECG, shows a positive correlation with myocardial infarct patients[2]. Significantly higher salivary MYO levels are seen within 48hr of onset of chest pain in Acute myocardial infarction patients[2].Salivary concentrations of CRP, TNF-α, and MMP-9 were significantly higher in patients with acute myocardial infarction and the salivary concentrations correlated positively with the serum concentrations[2].

Elevated levels of MMP-8, Lysozyme seen in IMT[6]. Elevated levels of MMP-8 seen in patient who had undergone heart surgery[6].

Endocrinology: The levels of cortisol, dehydroepiandrosterone, estradiol, estriol, and testosterone can be assessed accurately using salivary sample currently as can be assessed using saliva currently. The evaluations of mood and cognitive emotional behaviour, study of child health and development, in considerations of premenstrual depression, screening of cushing's syndrome can be done from the salivary assay. Also to assess ovarian function, to monitor full-term and pre-term neonates and also to evaluate risk for preterm labour and delivery the salivary sample can be used. Measurement of elevated late-night salivary cortisolusually at 2300 to 2400 hours for diagnosis of cushing syndrome can be a very reliable diagnostic tool[2]. However, salivary cortisol measurements for diagnosis of adrenal insufficiency have notyet been established[2]. Also, in diabetes mellitus increased level of Ig A, salivary peroxidase, glucose content, potassium, saliva total protein and amylase are seen[4].

Infectious Diseases:

Viral Disease: Testing for the human immunodeficiency virus is an excellent example of the potential usefulness of saliva in infectious disease diagnosis[1].

In cases of HIV infection Ig A antibodies in saliva are seen [4]. There are also confirmatory tests like western blot technique/polymerase chain reaction which is usually done using saliva for detection of p24 antigens and antibodies which is present against both HIV 1 and HIV 2[4]. Furthermore, in cases of acute hepatitis A and B infection presence of Ig M antibodies in saliva is seen and can be used as diagnostic tool[4].

Bacterial Infection: Helicobacter pylori is a critical pathogen that is seen in patients with peptic ulcer. Saliva can be effectively used to detect this pathogen thereby helping in diagnosis of the bacterial infection[1]. H. Pylori antibodies in saliva may be valuable for predicting risk for gastric adenocarcinoma[1]..H.pylori binds to salivary mucins MUC-4B and MUC 6 secreted by the mucous and serous acinar cells of these mucous salivary glands, respectively[2]. Higher levels of salivary MUC-4B and MUC6 could be used as an indicator for infection with H.pylori[2].

Fungal Infection: Salivary diagnostics can also be used for the detection of oral fungi. The salivary fungal count analysis provides valuable information in cases of oral candidiasis[2]. The alterations in the salivary proteins, like immunoglobulins, Hsp60, calprotectin, histatins, mucins, basic proline rich proteins and peroxidases also have important diagnostic value in these cases[2].

Nephrology: Creatinine concentrations in saliva show a high sensitivity and specificity for determining the presence of renal disease[1].Cortisol, nitrite, uric acid, sodium, chloride, amylase and lactoferrin are the salivary biomarkers which are usually associated with renal diseases [4]. These biomarkers are usually seen at the end stage of renal diseases[4]. The salivary phosphate levels are higher in patients undergoing hemodialysis and chronic renal failure as compared to normal healthy individuals[4].salivary phosphate levels serve as a better tool in diagnosis of chronic renal failure and hemodialysis than serum phosphate level[4].

Oncology: Allelic loss on chromosome 9p has been observed in Oral squamous cell carcinoma[1].Mitochondrial DNA mutations have also been useful targets to detect exfoliated oral squamous cell carcinoma cells in saliva[1]. Using plaque hybridization, tumor specific p43 mutation are identified from patient with head and neck cancer[1]. In patients with poor prognosis in OSCC Cyclin D1 gene amplification has been found to be associated [1].In patients with small cell lung cancer Microsatellite alterations of DNA were also observed in the saliva [1]. The presence of HPV (human papilloma virus) and Epstein Barr virus genomic sequences have been identified as possible DNA molecular markers in detecting OSCC and tumor progression[1].Interleukin -8 was detected at higher concentrations in saliva[1]. Higher levels of Salivary kallikrein is seen in malignant tumors when comparedtoa patient diagnosed with benign tumor[1].

Early detection is the key to good prognosis in almost all types of cancer. Saliva has been used as a diagnostic medium for oral squamous cell carcinoma (OSCC), and salivary analytes such as proteins, mRNA, and DNA have been used in their diagnosis[2].CA14-3 tumor marker was found in the saliva of women diagnosed with breast cancer[2].Inpatients with oral,breast, and ovarian tumors CA124 is a tumor associated antigen which is found to be elevated in the serum and saliva [2].Fibroblast growth factor 2 (FGF2) and fibroblast growth factorreceptor1 (FGFR1) concentrations in saliva are significantly

elevated in patients with salivary gland tumors making it a potential biomarker in the early detection of salivary gland tumors. Prostate specific antigen is a marker for prostate adenocarcinoma[2]. p43 antibody which can be detected in oral squamous cell carcinoma, high level of salivary kallikrein in oral malignant tumors and Ca-124, a glycoprotein for ovarian cancer[3].

Dental Caries and Periodontal Disease: The levels of oral bacteria in saliva can be used to detect periodontal diseases. The increased numbers of Streptococcus mutans and lactobacilli in saliva have been associated with increased caries prevalence and root caries. Increased levels of aspartate aminotransferase (AST) and alkaline phosphatase (ALP) have been associated with periodontal diseases. Salivary AST can be used as a marker for monitoring periodontal disease. Lower levels of uric acid and albumin in the saliva were associated with periodontitis and diabetes. This could be attributed to the oxidative stress present in the oral cavity during these conditions [2].

Conclusion

The different biomarkers which are present in the saliva thus help the health professional to diagnose not only oral diseases but also systemic diseases and conditions at an earlier stage. Saliva gives an alternative to serum as a biological fluid that can be analysed. This review suggest that certain diagnostic uses of saliva hold considerable promise in future.

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Child Abuse-Dentist Perspective

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ABSTRACT

Child abuse is characterized as those demonstrations or oversights of consideration that deny a kid from the chance to completely build up his or her one of a kind possibilities as an individual either physically, socially or emotionally. The overall incidence of child abuse is not so clear. Measurable information don't demonstrate the genuine rate due to the unreported cases. Physicians has minimal training in oral health, dental injury and disease and thus may not detect dental aspects of abuse or neglect as readily as they do child abuse and neglect involving other areas of the body. Therefore, physicians and dentists should collaborate to increase the prevention, detection, and treatment of these conditions. Dentists with expertise in child abuse will strengthen their ability to prevent and detect child abuse and neglect and enhance the ability to care for and protect children.

Keywords: *Child abuse, Injuries, Dentist, Neglect*

Introduction

Child abuse is characterized as those demonstrations or oversights of consideration that deny a kid from the chance to completely build up his or her one of a kind possibilities as an individual either physically, socially or emotionally [1]. As per the definition given by The Child Abuse Prevention and Treatment Act (CAPTA), violence can be physical and mental abuse and injury, neglect or negligent treatment, exploitation and sexual abuse Violence may take place in homes, schools, orphanages, residential care facilities, on the streets, in the workplace, in prisons and in places of detention. Such violence can affect the normal development of a child impairing their mental, physical and social being. In extreme cases abuse of a child can result in death [2].

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Problems- India and Worldwide: In India largest number of children (375 million) in the world, nearly 40% of its population. 69% of Indian children are victims of physical, emotional, or sexual abuse (or read it as every 2 out of 3). New Delhi, the Nation's capital, has an over 83% abuse rate. 89% of the crimes are perpetrated by family members. Boys face more abuse (>72%) than girls (65%). More than 70% of cases go unreported and unshared even with parents/family [3]. Nearly five children die every day in America from abuse and neglect [4]. In 2010, an estimated 1,560 children died from abuse and neglect in the United States [5]. Children's Advocacy Centre around the country served over 266,000 child victims of abuse, providing victim advocacy and support to these children and their families in the same year. In 2011, this number was over 279,000 [6].

Causes: There are many interacting causes of child abuse and neglect. It can depends upon characteristics or circumstances of the abuser, the child, and the family may all contribute. Probably in many cases the abuser himself/herself was abused. The key factor in a growing number of cases is because of substance abuse. In many cases abusers do not have the knowledge and skills needed to raise a child, thus increasing of abuse, and providing inadequate parental role models for the

child. Children who are low birth weight, ill, disabled, or otherwise perceived as different are more likely to be the targets of abuse[3]

Types and Dental Aspects:

Physical Abuse: Physical abuse is a physical injury experienced by children, which is not caused by accidents [7]. Intraoral examination on oropharynx include examination on frenulum, gingival, soft and hard palate, tongue, sublingual region, buccal mucosa and posterior pharynx to notice every signs of trauma. Physical abuse such as trauma caused by tableware, hand, fingers, blunt instruments or caustic substance. The violent activities can caused contusion, laceration and bruise on the tongue, buccal mucosa, palate, gingival mucosa or frenulum, dental or avulsion fracture, facial and jaw fracture, burn, and other kinds of injuries. Besides, trauma in oral cavity, tongue, palate and frenulum, blunt trauma on the teeth and facial bone and jaw bone fracture can be caused by repetitive trauma [8]. Wound, bleeding, erythema, or swollen outer ear canal, broken lips, unstable teeth or fractured teeth, tongue laceration and blue eyes without trauma on the nose indicates physical abuse [9].

Sexual Abuse: Sexual abuse means every sexual act between older person and the child. The acts can be called sexual abuse if the child's caregiver, family members, father, mother, nanny, or teacher, either at home or outside the child's house. If others participated in that kind of action, the action is called sexual assault [7]. Oral cavity is one of the areas of sexual maltreatment frequently found in kids. The presence of gonorrhea or syphilis in the oral or perioral areas in prepubertal youngsters is one of the indications of sexual maltreatment. Bond recognition in the kid's oral depression can be performed in a couple of days time span after the maltreatment. Along these lines, during an examination towards a youngster who is associated as an injured individual with sexual maltreatment, cotton swab ought to be performed to get the buccal mucosa and tongue smear. Erythema or petechiae palatum, particularly in the intersection among delicate and hard sense of taste can turn into a proof of constrained oral sex activity. Another oral injury can be found as condylomata acuminate [10]. Bite marks are important in one of several visual expressions of active child abuse [8]. The spacing in human nibbles is regularly 2.5 to 4 cm, which is the separation between the upper canines. In the event that the intercanines separation is under 2.5 cm, the opportunity of the age is that the nibble is brought about by youngsters. In the event that the separation is 2.5 to 3 cm, the nibble is brought about by a youngster, and if it's in excess of 3 cm, it is brought about by a grown-up chomp [10].

Emotional Abuse: Emotional maltreatment is characterized as each demeanor or practices that can bother emotional wellness or social improvement of a Child. Different names for psychological mistreatment are verbal maltreatment, mental maltreatment, or mental abuse. Psychological mistreatment quite often happens together with different types of maltreatment [11]. Psychological maltreatment does not leave injury signs on the tyke's body, however it leaves mental injury on the kid. The youngsters become terrified of everything, impassive discouraged, experience fixation issue, or uprisings. On the off chance that this circumstance props up on, it can make genuine conduct issue, intellectual issue, enthusiastic or mental issue for the kids. Dental specialist ought to have the option to perceive signs in youngsters who is the casualty of psychological mistreatment and apply suitable new approaches [11].

Neglect: Neglect is a ignorance towards the youngster either through sustaining, regulating, care, and training that can caused ruinous impact on the tyke's physical condition and his/her mental improvement [12]. There are 3 kinds of neglect; physically neglect, educational neglect, and emotional neglect[11]. In the dentistry territory, a dental negelct is additionally perceived as a piece of physically neglect [10].

Dental neglect, as characterized by American Academy of Pediatric Dentistry, is deliberate disregard by the guardians or parental figure towards the kid's oral depression and dental wellbeing or a disregard that forestall the tyke to get dental and oral treatment required by the youngster so as to accomplish oral wellbeing level required for satisfactory capacity [10]. Dental disregard can be viewed as the presence of caries, periodontal sickness, and other oral cavity ailments [10,13]. Caries, periodontal sicknesses and other oral condition, if not treated, can prompt torment, disease, and loss of oral capacity that can influence correspondence, nourishment, learning exercises and other youngsters exercises required for typical development and improvement. Inability to get great dental treatment can be brought about by different factors, for example, family seclusion, poor money related status, parent's disregard

and absence of thankfulness towards oral wellbeing esteem. The time when to consider a parent careless and to start intercession happens after the parent has been appropriately alarmed by a human services proficient about the nature and degree of the youngster's condition, the particular treatment required, and the instrument of getting to that treatment [10]. The dental specialist ought to be sure that the parental figures comprehend the clarification of the illness and its suggestions and, when obstructions to the required consideration exist, endeavor to help the families in discovering monetary guide, transportation, or open offices for required administration. Parent is ought to be consoled that suitable pain relieving and sedative methodology will be utilized to guarantee the tyke's solace during dental systems. On the off chance that, notwithstanding these endeavors the parent is neglect to get treatment, the case ought to be accounted for to proper kid defensive administrations [14].

Prevention: Children are a country's people to come. Along these lines, it ought to be avoided on the grounds that it can influence the long life procedure of a child [12]. In Indonesia, dental specialist's power to report child abuse has not been directed in a law or guideline. Notwithstanding, counteractive action and the executives of maltreatment and brutality towards youngsters is a genuine issue that should to be followed up on quickly by every single related gathering, including the guardians, teachers, law power, security power, broad communications and wellbeing administration [12]. They are required to report it to social administration or law authorization organizations [15]. Doctors get negligible preparing in oral wellbeing and dental damage and dental ailment, along these lines may not identify dental parts of kid maltreatment as different territories of the body. Hence, doctors and dental specialists has to work together to build the counteractive action, discovery, and treatment of this conditions [16,17,18]. In Indonesia, there is no such activity yet. The dental specialist learning and aptitude in overseeing tyke misuse has not been completely picked up. Along these lines, youngster misuse and scientific dentistry educational plan ought to get a spot in the instruction program. Child abuse comprises of every awful treatment followed up on a kid by the guardians, parental figures or other individual/s who ought to give care and security for the kids. This can be found in every single social class and can be brought about by different triggers. The long haul impacts of incessant presentation to abusive behavior at home and it might influence a youngster's general improvement. Social, psychological, and enthusiastic improvement might be adversely affected.

Conclusion

The investigation recommend that dentists has a role in recognizing, overseeing, helping and treating these exploited people since the wounds are regularly found in the oral and facial zones. Other than overseeing such cases, dental specialist likewise has a role in anticipating child abuse since it can influence the future existence of the kids. Such abilities will upgrade the capacity to mind and secure youngsters.

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Comparison of Cystic Content of Odontogenic Cysts

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ABSTRACT

The cystic lesions that affect the oral and maxillofacial region are predominantly odontogenic in origin. The odontogenic cell rests entangled within tissue of the jaws such as cell rests of Malassez, cell rests of serre, and enamel organ leads to its formation. The factors leading to the enlargement of these jaw cysts are increased the permeability of cyst wall, increased the protein content of the cyst fluid, and when the intracystic fluid pressure on the jaw bone is increased. This review is an attempt to analyze and compare the components of cystic fluids such as albumin, prealbumin, globulin, and total protein content among various odontogenic cysts.

Keywords: *Odontogenic cysts, Rushton bodies, Keratin*

Introduction

The odontogenic cystic lesions incorporate inflammatory cyst such as, radicular cyst, developmental cyst for example, dentigerous cyst and, benign tumors like odontogenic keratocyst. Clinical and radiologic files are frequently lacking to separate dependably among these conceivable outcomes. Most of these growths are distinguished unexpectedly when radiologic imaging is performed for unrelated indications. Examination of substance of cystic liquids may help in a precise determination at whatever point a growth is recognized before careful extraction or conservative management. This survey is an endeavor to give a review of different odontogenic cysts and to discuss the values of protein which is present.

Review of Literature: The odontogenic keratocyst (OKC) was first presented as a different pathologic element by Philipsen in 1956. Different examinations have revealed that 11.25% of all odontogenic cysts are OKC and are viewed as formative in origin.[1,2] Their pathognomonic microscopic features, conceivably forceful clinical conduct, and high repeat rate make them a remarkable substance among odontogenic sores. The WHO (2005) renamed the lesions as a tumor and included it in the gathering of benign odontogenic tumors got from odontogenic epithelium with mature fibrous stroma without odontogenic ectomesenchyme. [2] The immunohistochemical articulation of P53, Ki 67, multiplying cell atomic antigen is higher in keratocystic odontogenic tumors than in different sorts of odontogenic cysts.[1,2] The cystic covering is contained the parakeratinized stratified squamous epithelium. In certain sores, folded surface epithelium can be seen.

The most widely recognized developmental odontogenic cyst is the dentigerous cyst. The growth encases the crown of an unerupted tooth by the extension of its follicle because of a gathering of cystic liquid. The definite pathogenesis of dentigerous cyst is unknown and most authors favours developmental origin. It possesses the crown of an unerupted or supernumerary tooth by the extension of its follicle and is appended to its neck. Infinitesimally, the dentigerous cyst covering looks like reduced enamel epithelium and comprises of flat, cuboidal cells 3-5 cell layer thickness. Mucous-secreting cells might be available in the epithelium.[3]

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The most widely recognized odontogenic cyst is the radicular cyst. Radicular cyst make around 52-68% of all cysts affecting the human jaws.[1,4] The cystic coating of radicular cyst is contained non-keratinized stratified squamous epithelium which of a few layers in thickness. The epithelial linings might multiply and indicate arcading pattern with an intense inflammatory cell infiltrate. The inflammatory cell infiltrate in the proliferating epithelial linings is predominantly polymorphonuclear neutrophils leukocytes, whereas adjacent fibrous capsule is infiltrated mainly chronic inflammatory cell infiltrate. Rushton bodies are portrayed by a shiny pink (hyalinized appearance) in around 10% of the radicular growths. These hyaline bodies are accepted to be because of the past discharge inside the aroused blister wall.[4]

Biochemical Investigation: The cystic content in radicular cyst is typically dark in color. The presence of cholesterol crystals gives a shining gold or straw shading. Yellow mural nodules of cholesterols may extend into the cavity. Complete protein substance is ordinarily somewhere in the range of 5 and 11 g/100 ml.[9,13] The cystic liquid of dentigerous cyst is straw colored liquid. The content in the dentigerous cyst is normally 4-8 g/100 ml.[3] Dirty white cheesy material was found on aspiration in every one of the instances of OKC. Keratin squames are generally found in the aspirated cystic liquid. Electrophoretic investigation uncovered that the proportion of dissolvable protein to add up to protein substance was lower than that in serum. Absolute protein substance is <5 g/100 ml.[6-8]

Discourse: The substance of odontogenic cyst are variable from clear yellow fluid to a semisolid cheese like mass.[8-10] The odontogenic cyst fluid can be read for their shading, consistency, nearness of cholesterol precious stones, keratin specks, and various protein parts.[11] Electrophoresis isolates proteins dependent on their physical properties. The movement of charged particles through an electrolyte subjected to an electric field is called electrophoresis. The surface charge for various plasma proteins vary. They migrate at different rates from the point of application of the protein mixture to the other end of the cellulose acetate membrane (CAM) strip.[14,15] Scanning of the stained CAM strips by densitometer or elution can be done for the quantitative estimation of protein fractions. Phosphomolybdate methodology can be used for determining inorganic phosphorus level, and total protein estimation can be done by Biuret method. Centrifuge the cystic content at 2000 rev/min for 5 min to remove cell debris and deposits. The supernatant cystic fluid thus collected can be analyzed for their protein contents by CAM electrophoresis. The protein content and different fractions can be quantitated by scanning the CAM strips in a densitometer at 590 mm (green filter) and the relative percentage, and absolute value. Toller has suggested that these proteins are transported to the cystic fluid by immunoglobulin (Ig) producing cells. Syringe aspiration is positive for almost all odontogenic cysts Fine-needle aspiration cytology is the technique commonly used for pre-operative diagnosis which is mandatory in diagnosis. The aspirates taken from cystic lesions are less cellular.[16] Smith et al. in their study showed that most cysts contains higher molecular weight proteins and the passage of lactoferrin into the cystic lumen is by increased epithelial permeability together with discontinuities in the epithelial lining and intraepithelial channels.[17]

Conclusion

In this review, we have discussed the composition and components of various odontogenic cyst fluids including OKC, dentigerous cyst, and radicular cyst. Diagnosing them before surgery will lead us to determine surgical procedures and conservative for preventing the recurrence of the cyst. In OKC, the total soluble protein content notably lower compared to dentigerous and radicular cyst. Thus, we conclude that it is mandatory to evaluate the clinical, radiological, and biochemical findings with histopathological features of cystic lesions for proper diagnosis and management.

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A Review on Effects of Alcohol in Oral Diseases

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ABSTRACT

These days, consuming alcohol is a common feature among all regional population irrespective of age and gender. However, the drinking alcohol is associated with a risk of adverse health and social effects, consumption of alcohol inevitably affects the oral cavity, oral mucosa and teeth. Literature indicates that alcohol dependents may have increased risk of dental caries, probing pocket depth and mucosal lesions related to its intoxicating, toxic and dependence-producing properties. Hence, a short review has been attempted to evaluate the effect of alcohol on oral health.

Keywords: *Alcohol, Diseases, Periodontitis*

Introduction

The World Health Organization (WHO) estimates that excessive alcohol consumption is the third largest life style risk factor in the developed world. Chronic alcohol abuse produces toxic effects on several organs and apparatus, including mouth and dental system. [1,2]. They are at high risk of developing dental caries, gingival diseases and may suffer from oro-pharyngeal cancers. The risk of oral cancer further increases when alcohol is consumed along with cigarette.

Effect of Alcohol on Saliva and Associated Dental Hard Tissue Changes: The Ethanol diffuses rapidly into saliva during alcohol consumption. Within 30 minutes, salivary ethanol concentration balances with that of the plasma level, thus suggesting that ethanol easily penetrates the whole body, including oral cavity tissue and salivary gland. Salivary glands, more commonly parotid glands, become affected in long term alcohol drinkers. Resulting in sialadenosis and it is also associated with ethanol induced peripheral neuropathy which causes disturbances in the metabolism and excretion of saliva from the salivary glands [3].

Dental caries as a cause of Alcohol consumption: Reduced salivary secretion along with diminished buffering capacity, acidic nature, less attention to oral hygiene and intake of sugared drinks,carbohydrate rich food and cariogenic food leads to decrease in salivary pH below critical level there by causing increased risk of dental caries.[4] Alcohol consumption also increases the Blood Lead Levels (BLLs) in humans and BLLs have been correlated with dental caries. These patients had a permanent tooth loss three times higher than the national average for corresponding ages. Another study conducted by Marc Niquille et al. on alcoholic and non-alcoholic subjects showed positive association between alcoholism and dental caries (crude odds ratio, 2.24; 95% CI, 1.15-4.31) [5].

Dental Erosion: Regular and prolonged consumption of acidic drinks such as alcohol, wine makes oral cavity as well as the teeth surface acidic in nature which increases the risk of developing dental erosion. This is because alcohol consumption has the potential for high degradation rate mechanisms and by the direct and indirect ethanol effects in the organic systems. This acidification dissolves surface enamel and makes teeth surfaces more vulnerable to mechanical damage due to

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tooth-brushing, teeth clenching, etc. Most commonly affected tooth surfaces due to erosion are palatal surfaces of upper teeth followed by occlusal surfaces of posterior teeth. The lower teeth and buccal surfaces of the upper teeth are least affected by erosion.[6]

Effcts of Alcohol on Oral Soft Tissue and Mucosa: Damage to the oral tissues seems to be ascribed mostly to the action of acetaldehyde, although some acute effects depend on a direct action of ethanol and formation of reactive oxygen(ROS) and fatty acid ethyl esters(FAEEs). It is know that the oral mucosal surface is the home of numerous normal flora microorganisms and is the portal of entry for the majority of pathogens.

Periondontal conditions: Alcoholics have severe risk of developing chronic generalized periodontitis associated with gingival inflammation, blunting of the interdental papillae and deep pockets with related bone loss. Alcoholic patient more frequently suffer from horizontal bone loss and calculus deposition compared to non-alcoholics.

Changes in tongue: Besides direct harmful effects on oral health, alcoholics suffer from a number of indirect effects which manifest as a result of lack of adequate nutrition. The most common effects are tongue inflammation (glossitis), inflammation of corner of mouth (angular cheilitis). Early stages of glossitis show painful and smooth tongue, but sometimes show swollen fungiform papillae. Alcoholics taking disulfiram may have changed taste sensation, most commonly a metallic taste. In later stages, tongue suffers from burning sensation and becomes intensely red followed by atrophy of filiform and fungiform papillae. Angular cheilitis results in development of painful cracks at the corners of the mouth.[7]

Mucosal Changes: Dehydrating effect of alcohol on cell walls enhances mucosal permeability to other toxins and carcinogens which leads to various malignant and premalignant lesions. Change in mucosal morphology with a reduction in epithelial thickness are evident among patients who are chronic alcoholic. The metabolism of ethanol produces acetaldehyde which causes damages to DNA of oral epithelial cells and oncogene expression of oral keratinocytes which increases the risk of Oral Carcinomas along with other causative factors. And as mentioned before, ethanol disrupts salivary gland function by reducing secretion of epidermal growth factor which protects oral mucosa from injuries caused due to acids which results in increase in the risk of oral mucosal ulcerations. Nutritional deficiencies associated with heavy drinking can lower the body's natural ability to use antioxidants to prevent the formation of Oral lesions.[8]

Conclusion

High consumption of alcohol manifests in severe impact on oral health. However there is a proven fact alcohol drinking provides synergistic interaction along with tobacco for the increased risk of cancer, the role of Chronic alcoholism in the development of oral cancer has equal impact. Some of the systemic diseases associated with alcohol consumption may indirectly affect the oral health. There are cases of missing teeth due periodontitis associated with alcohol consumption, tooth erosion due to gastric reflux, stomatitis caused by deficiency of several micro-nutrients, etc. Harmful impact of alcohol on oral cavity includes formation of dental caries, oral cancer, etc. The high concentration of organic and inorganic acids in alcohol and the practice of keeping the alcohol in the mouth can result in chronic inflammations of the soft tissues and can increase the negative side effects from metals of crowns, bridges, orthodontic devises and various metal restorations.

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Grossing—A Review on Stepwise Procedures

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ABSTRACT

The initial dissection and preparation of any specimen for histological or microscopic analysis involves more than simply the transcribed macroscopic description and sampling of the specimen. Grossing is a gross examination of surgical specimens in which pathologists inspect the excised specimen with the bare eye to obtain diagnostic information. Grossing of surgical pathology specimens isthe first and an important step in tissue processing, leading to diagnosis. It forms a connecting link between the patient and the pathologist. A correct grossing procedure helps in minimizing the processing errors while at the same time providing useful information about the specimen helping in the achievement of correct diagnosis. The purpose of this short review is to provide adequate insight about the grossing procedure of the pathologic specimens of the head and neck region and to emphasize the importance of grossing in diagnostic oral pathology and provide guidelines to carry out the procedure in a sequential order.

Keywords: *Grossing, Fixative, Specimen, Diagnosis*

Introduction

This dissection/blocking/cut-up are the other terms used for grossing.[1] "Grossing"—the word refers to the detailed examination and the systematic dissection of surgical specimens in order to obtain tissue sections, which facilitate microscopic examination. An accurate diagnosis from this tissue is dependent upon correct identification, handling, and processing of the specimen. It is the first step and it is generally performed by any trained person. The gross room is the area where pathology specimens are transferred for pathological review and analysis. [2]

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Procedures to be Followed During Grossing:

1. Identification and Labelling the specimen
2. Requisition form to be filled with complete data
3. Fixation of the specimen
4. Specimen photography and radiography
5. Grossing description to be noted
6. Examination of the specimen
7. Sectioning of the specimen
8. Description on sectioning details to be noted
9. Inking
10. Labelling of the cassettes.

Identification and Labelling the Specimen: Specimen identification and labeling are important steps before proceeding with the grossing procedures. The basic identification of the specimen include the type of biopsy and the type of the specimen. After the initial identification each patient and tissue is labelled with unique accession numbers which is usually specific for different institutions and laboratories. [3] The labelling procedure should include the specimen's unique number

along with the date and time of the specimen being received. These labels must be consistent and should be on the container so that the labels cannot be separated from the specimen.[4]

Requisition Form to be Filled with Complete Data: The requisition form is probably the most important bit of document in the preanalytical phase of surgical pathology reporting, and there are serious risks of errors being made in this document. Each specimen container should include the patient's name with age (birth date) and a medical record number along with matching paperwork that is a surgical request form. The surgical request form provides the actual request for pathological services and the required relevant clinical history of the patient. Any discrepancies in specimen identification/ labeling (e.g., a medical record number that does not match the patient name or a surgical request form which does not match the specimen) must be resolved with the clinician/surgeon before processing any specimen, and the discrepancy should be noted on the request form. Misidentification of any specimen can result in failure to make a proper diagnosis on one or more patients, incorrect treatment, and possibly legal action.[5,6]

Fixation of the Specimen: Specimen being received most often may not be be stored in a proper fixative medium, this has to be checked at the time of receiving the specimen and to be transferred immediately into 10% neutral buffered formalin which is the most common fixative used for tissues submitted for routine examination including tooth specimen. However, mineralized samples such as bone or tooth may require decalcification before it can be processed.[7] To facilitate uniform penetration of fixative, it is important to fix small volumes of tissues (5 mm to 1 cm). The volume of the fixative should be in excess of 20 times the volume of the tissue. In practice, it is assumed that these processes require at least 1 hour per mm of tissue thickness, but routinely the tissues are fixed for 24 to 48 hours. It may be necessary to replace the fixative with fresh solution when the specimen contains high percentage of blood. Covering large specimens with fixative soaked gauze or cloth may help penetration and reduces surface drying.[8,9]

Specimen Photography and Radiography: Photographs of fresh or fixed anatomic pathology specimens are obtained to aid in the documenting of pathologic lesions. They can be used in teaching, conference presentations, and publishing. Before photographing, the tissue must be prepared by washing to remove blood, blood clots and fat, opening the ducts and vessels, and removing other unnecessary tissues around the lesion. The background should be spotlessly clean with no texture and should be well illuminated. A clean ruler with metric system should be used for obtaining a reference to size. The specimen should be properly oriented in the anatomical position and centered. Radiographic examination of surgical specimens sometimes provides important information. Specimens suitable for this type of examination include bone lesions, calcified soft-tissue masses, and lesions with embedded tooth radiopaque foreign bodies such as metal clip.[10,11,12]

Grossing Description to be Noted: The gross description is an important integral part of macroscopic surgical pathology. The reader should be able to correlate the patient, the specimen, and the structures present with this description. After a generic description of the specimen, characteristics, such as size, number, color, shape, consistency, and weight of the specimen should be recorded correctly.[2] For an appropriate description of the grossing specimen, required measuring instruments are to be used such as a metal scale with clear markings, a divider, vernier calliper, digital weighing scale, and a magnifying glass to look for detailed specifications such as the surface texture of the specimen. These grossing description are to be noted as a attached copy along with the specimen's requisition form. This is a very important piece of information, which communicates to the diagnosing pathologist each slide in perspective to its actual location in the gross specimen.

Examination of the Specimen: The specimen has to visually and manually examined before it to be sliced. On palpating the specimen, the colour is noted visually and the consistency of it is felt which provides differential diagnosis regarding the interpretation.

Sectioning of the Specimen: This step include sectioning/slicing of the specimen using a sharp blade or knife[13]

Parallel cut	Longitudinal section
Perpendicular cut	Cross section
Cut at any angle between these two planes	Oblique section
Procedure to only graze the surface	Grazing section / tangential section

In some cases, the internal microscopic structure of parts of the body is so complicated that it can only be understood by mounting photographic enlargements of serial (consecutive) sections on the material of appropriate thickness and assembling them in a proper order to constitute large reconstruction.

Description OS the Sectioning Details: The original image of the specimen should be diagrammatically represented beside the grossing description and once the sectioning of the specimen is done, the angle at which the specimen was sliced has to marked over the diagrammatic picture. This is done in order to know the sectioning pattern at the time of microscopic evaluation of the slide of that particular specimen.

The second detail to be noted is the number of tissue bits that have been retained or embedded. This help in having an idea regarding the number of tissue bits retained so as to process the retained tissue if in case the first embedded tissue have some issues at the time of processing, sectioning of the embedded tissue or while staining.

Inking: Inking is most commonly used to indicate or mark the margins of an excision. Alternatively, it can also be used for indication of areas of interest and also to aid in orientation of the specimen during embedding. Usually, the unstained area is placed down in an embedding mold.[14,15]

Labelling of the Cassettes: This this the final step of Grossing, once sectioned specimen is inked, it is been placed with the cassettes for next procedure called as the tissue processing. There are various sizes of cassettes available which are chose according to the size of the cut specimen. Before the cut specimen is placed within the cassette, the specific specimen number/the biopsy number mentioned on the specimen bottle or the requisition form to be transferred on to the cassette. This is done to avoid confusions on processing different patient's biopsy specimens.

Conclusion

Like all skills, grossing is a skill that will develop in individuals over a period of time; however, skills cannot be gained in the absence of knowledge and efforts. Simple steps, such as observation of as many grossing procedures as possible, and bringing about a correlation between macroscopy and microscopy will help accelerate the learning. Gross examination of pathology tissue specimens forms an important part in reaching at a correct diagnosis. Accurate gross description and observation of the pathology specimen can give many clues to aid in final diagnosis. The final report must include macroscopic and microscopic findings along with the final diagnosis. Thus, it is imperative for the pathologist to undertake this step meticulously.

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Oral Mucoadhesive Drug Administration—A Short Review

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ABSTRACT

On focus with route of drug administration, the oral cavity is an attractive and the safest site for the delivery of drugs. As an advantage it can overcome acidic environment thereby causing instability of the drug, extensive first pass metabolism and low bioavailability of drug results an inadequate absorption. The buccal mucosa is rich in blood supply and relatively permeable. Buccal cavity was found to be most accessible site for both local and systemic delivery of drug. This review presents a brief description of advantages and limitations of oral mucosal drug delivery, mechanisms of drug permeation followed by current developments in this drug delivery systems.

Keywords: *Drug, Buccal, Sublingual.*

Introduction

The oral route of drug administration is the most common(90% of drugs used) and preferred method to produce systemic pharmacological effect among various other routes. Oral route in which the drug is swallowed and enters the systemic circulation primarily through the membrane of the small intestine. The main advantage of this system is the self– administration of medication. Absorption of drugs after oral administration may occur at the various body sites between the mouth and rectum. A drug taken orally must withstand large fluctuation in pH as it travels along the gastrointestinal tract, as well as resist the enzymes that digest food and metabolism by micro flora of the digestive tract. [1]

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It is estimated that 25% of the population finds it difficult to swallow tablets and capsules and therefore do not take their medication as prescribed by their doctor resulting in high incidence of non-compliance and ineffective therapy. Difficulty is experienced in particular by pediatrics and geriatric patients, to people who are ill bedridden and to those active working patient who are busy or travelling, especially those who have no access to water to consume the drugs orally.[2] In these cases oral mucosal drug delivery is most preferred. It has been known for centuries that buccal and sublingual administration drug are rapidly absorbed.

Buccal/sublingual administration drug

↓

Absorbed into the reticular vein

↓

Transported through the facial vein

↓

Then via the internal jugular vein and braciocephatic vein

↓

Finally drains into the systemic circulation [2,3]

Therefore the buccal and sublingual routes of administration can be utilized to bypass the hepatic first-pass elimination of drugs. The buccal region offers

an attractive route of administration for systemic drug delivery as they have a rich blood supply and it is relatively permeable and have fast onset of action.

Oral Mucous Membrane: The Oral cavity lined with mucous membranes which includes the floor of mouth (sublingual), the buccal mucosa (cheeks), the gums (gingiva), the palatal mucosa and the lining of the lips. The oral mucosal tissues consist of a multi- layered epithelium enclosed with mucus. The epithelial layers are

Stratum basale

Stratum spinosum

Stratum granulosum

Stratum corneum

The basal lamina attaches the epithelium to a connective tissue layer (lamina propria).The oral mucosa protects the body from external influences. The epithelium of the human oral mucosa shows several distinct patterns of maturation, related to the functional demands of the tissue. Keratinized epithelium (dehydrated, mechanically tough and chemically resistant) is found in the less flexible masticatory mucosa of the gingiva and part of the hard palate. [5,6]Non- keratinized epithelium (flexible) forms the surface of the distensible lining mucosa of the soft palate, floor of mouth, lips and cheek. The oral mucosa mainly composed of three layers. The outermost is stratified squamous epithelium act as barrier which protects underlying tissues; intermediate lamina propria serves mechanical support and followed by innermost layer submucosa. The epithelium of the buccal mucosa is about 40-50 cell layers thick, when compared with sublingual epithelium. The turnover period for the buccal epithelium has been found at 5-6 days, and this is representative of the oral mucosa as a whole.

The oral mucosa in general is a somewhat leaky epithelium intermediate between that of the epidermis and intestinal mucosa, whose estimated permeability is 4–4000 times greater than that of the skin. In general, the permeability of the oral mucosa decreases in the order of sublingual greater than buccal, and buccal greater than palatal. [7]

Mucoadhesion: Mucoadhesion or bioadhesion is defined as the attachment of synthetic or biological macromolecules to biological tissue. When it is applied to mucosal epithelium bioadhesive interaction occurs primarily with mucus layer and this is called as mucoadhesion.

Oral Mucosal Route of Drug Absorption: The cellular structure of the oral mucosa suggests that there are two permeability barriers. Since the intercellular spaces and cytoplasm are hydrophilic in character, lipophilic compounds would have low solubility in this environment. On the other hand, the cell membrane is rather lipophilic in nature and hydrophilic solutes will have difficulty permeating the cell membrane due to a low partition coefficient. Therefore, the intercellular spaces act as the major barrier to permeation of lipophilic compounds and the cell membrane acts as the major transport barrier for hydrophilic compounds. Considering the coexistence of the hydrophilic and lipophilic regions in the oral mucosa, drug transport may involve a combination of the paracellular and the transcellular routes. All compounds can use these two routes simultaneously, except that one route is usually preferred over the other depending on the physicochemical properties of the diffusant. [8,9]

Within the oral mucosal cavity, drug delivery is classified into three categories:

1. Sublingual delivery, which is systemic delivery of drugs through the mucosal membranes lining the floor of the mouth
2. Buccal delivery, which is drug administration through the mucosal membranes lining the cheeks (buccal mucosa), and
3. Local delivery, which is drug delivery into the oral cavity. [10]

The selection of one category over another is mainly based on anatomical and permeability differences that exist among the various oral mucosal sites. The sublingual mucosa is relatively permeable, giving rapid absorption and acceptable bioavailability of many drugs, and is convenient, accessible, and generally well accepted. The buccal mucosa is considerably less permeable than the sublingual area, and is generally not able to provide the rapid absorption and good bioavailability seen with sublingual administration. Local delivery to tissues of the oral cavity has a number of applications, including the treatment of toothaches, bacterial and fungal infections, aphthae and dental stomatitis, and the facilitation of tooth movement with the use of prostaglandins. Moreover, there is intra-periodontal pocket drug delivery, which is a special category of local delivery where the drug delivery happens in a specific site, within the periodontal pocket.

Adhesive Tablets: In order to improve the bioavailability of administrated drug in the oral cavity, several bioadhesive tablet systems have been developed in recent years. Adhesive buccal tablets can be applied to different sites in the oral cavity, i.e., the palate, mucosa of the cheek, and between the upper lip and gum. The tablet softens and adheres to the substrate and is retained in position until dissolution and/or release is complete. After a short time the presence of tablet is reported to be no longer noticeable to the patient. The tablet should not be moved about the mouth once in position, since this causes more rapid drug release. The position of successive tablets can be alternated on either side of the mouth. Patients wearing dentures may place the tablet in any comfortable position between the lip and gum. The location of the tablet in the mouth appears to have a great impact on the tolerance and the retention time. Depending on the location, either palatal or gingival, retention times varied from 4–6 h to 7–12 h, respectively. Usually, it is important that excipients of buccal tablets do not cause or stimulate salivation, since in this case a larger fraction of drug may be swallowed rather than becoming bioavailable or being absorbed. Few examples of available adhesive tablets in the market are Nicorette1 (nicotine), Suscard1 (glyceryl trinitrate), and Striant1 (testosterone) [11]

Adhesive Patches: The oral cavity mucosa is an ideal surface for the placement of retentive delivery systems such as patches, since it contains a large expanse of smooth and immobile tissue. Mucoadhesive patches for administration to the mucosa of the oral cavity may have a number of different designs, depending on various considerations, such as the therapeutic aim and the physicochemical and pharmacokinetic properties of the active ingredient. Regarding the therapeutic aim, two different rationales for developing mucosal patches may be considered:

- patches can be intended to deliver a drug to the systemic circulation in a way that is superior to other routes of administration, or
- their purpose may be local therapy of the oral mucosa.

As alternatives for both classes of patches, more conventional dosage forms are available. In the case of locally acting patches, the alternatives most often used today are oral gels, oral liquids, and lozenges. For systemic action, there are a number of dosage forms, including sustained- or controlled-release oral technologies, transdermal patches, and injectable depot formulations. It is necessary for a successful mucosal patch to have clearly defined advantages over alternative products.[12] Oral mucosal patches can be applied directly to the affected mucosal region and have the potential to supply the site of action with effective drug levels and to sustain these levels over a prolonged period of time. In contrast, conventional therapy exposes the affected tissues to the dose for a very short period of time. Thus, the first step in the development of a patch is the selection and characterization of a polymer with appropriate bioadhesive properties and drug release control or of combined polymers in order to obtain both of these properties [13] A suitable oral bioadhesive drug delivery system should be flexible, elastic, soft, adequately strong to withstand breakage due to stress from mouth activities, and possess good bioadhesive properties, so that it can be retained in the oral cavity for the desired duration. Patches should be able to meet these requirements and swell to a certain extent when placed in aqueous medium. [14,15]

Medicated Chewing Gums: Medicated chewing gum is an other alternative for drug delivery system with several advantages including convenience for administration, individually controlled release of active substance and effective buccal drug administration for the treatment of local oral disease and systemic action. Mainly chewing gum is used to promising controlled release drug delivery system. Medicated chewing gums are currently available for pain relief, smoking cessation, travel illness and freshening of breath. A hydrophobic gum was used for the formulation of chewing gum. A new chewing gum device in the form of a three layer tablet has been also developed. In vitro release study of chewing gum requires special apparatus and instrumental setting. [16,17]

Ethical Clearance: Not required since it is a review article

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Conflict of Interest: Nil

Conclusion

The oral mucosa possesses a range of permeabilities and properties. Oral bioadhesive dosage forms have many

advantages over traditional oral dosage forms. Adhesive tablets, unlike conventional tablets, allow drinking and speaking without major discomfort. Drugs with short biological half-lives, requiring a sustained effect and/ or exhibiting sensitivity to enzymatic degradation in the intestinal tract, may be successfully delivered via oral bioadhesive delivery systems. Optimizing systemic treatment of disease via transmucosal drug delivery from the oral cavity continues to be investigated using a variety of dosage forms containing novel bioadhesive polymers.

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Geriatric Oral Health—A Comprehensive Review

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ABSTRACT

Ageing causes certain abnormal conditions in periodontium which consists of gingiva, periodontal ligament, cementum and alveolar bone. Since there is a compromised immunity among older individuals, oral cavity is the prime focus for infection. Dentists should be educated to differentiate between the physiological and pathological changes in the oral cavity. According to which treatment plan can be framed. Maintenance of oral hygiene should be instructed to ageing person by the dental care professionals.

Keywords: *Oral mucosa, Keratinisation, Xerostomia*

Introduction

Tooth tissues such as gingiva, periodontal ligament, cementum and alveolar bone are supported by periodontal tissue. Often age advancement may influence the periodontal and mucosal diseases. Indeed, it is challenging to distinguish between physiologic aging and the cumulative effects of diseases. Aging means restricted natural function, a dissolution of the equalised control and organization that describes a young adult**.**There are also evidences of connection between oral health and poor general health where they continue to develop an association between severe periodontal disease and diabetes mellitus, ischaemic heart disease and chronic respiratory disease.[1]Combination of physiological age changes with superimposed pathological and iatrogenic effects are evident in the oral and dental tissues. Hence this review article discusses about the changes in oral health due to advancement of age since it is important for the dentist to differentiate between physiologicaging and diseases.

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Gingiva: The alveolar processes of the jaws and neck of the teeth are covered by a part of oral mucosa called gingiva. Certain changes in gingiva with aging were expressed by Carranza, they are declined keratinisation, reduction or unaltered bulk of stippling; excessive diameter of attached gingiva with mucogingival junction at its consistent area all over adult's life;diminished connective tissue cellularity; an increased sum of intercellular substance and decreased oxygen consumption. They also noticed an additional alterationof the mitotic index in gingival epithelium in elder individuals.[2]

Periodontal Ligament: Periodontal ligament, a specialised connective tissue with 0.2 mm width is located between the tooth and the alveolar bone and its primary role is to link the tooth and the jaw. Daniel and Rolf Lappalainen et al discovered a relative reduction in suspensory fibres and cellular content of periodontal tissues and deep periodontal pockets in older individuals respectively [3].Due to aging, there is reduced vascularity, increase in number of elastic fibers, collagen fibers, a mucopolysaccharides and arteriosclerotic changes, mitotic activity and fibroplasias in periodontal ligament. In addition, changes in diameter of the ligament was also observed with aging [2].

Teeth: Age changes in teeth include physiological wear with superimposed changes in morphology associated with pathology, including attrition and changes in the structure and composition of the dental hard tissues.

Enamel: Enamel has susceptibility to chip, crack and fracture and it also has a tendency to become brittle. In addition, it reflects the exchanging of ions with oral environment and also exhibitspermeability with age.

Dentino-pulpal complex: Due toage advancement, there are two important dentinal changes : formation of secondary dentine which results in decreased size, obliteration of the pulp chamber in some cases and dentinal sclerosis combined with persistent production of peritubular dentin. Caries and tooth wear are also correlated with these two processes. Sclerosis of radicular dentin has a tendency to create brittleness to roots and may result in diminished injury response and healing potential due to decreased vascularity, cellularity and increased fibrotic content. Reduction in nerve supply and increased thickness of dentin makes vitality testing more difficult. Due to the presence of tougher tissue, it is difficult to penetrate them with files. Thus resulting in compaction of pulp tissue to form a dense collagenous plug which is as impregnable as any calcified deposit. Hence for elderly patients, pulp is removed with barbed broaches and lubricants are used to permit the instrument to glide through tissue instead of compaction. [4]

Cementum: Cementum formation occurs in the apical half of the root resulting in progressive increase in thickness compensating for interproximal and occlusal attrition and in response to trauma, caries and periodontal disease. Deposition of secondary cementum at the tooth apex helps in estimating the radiographic working length in endodontics and for estimating age in forensic dentistry. Hence, additional bulk of cementum combined with secondary and reparative dentin decreases tooth sensitivity and perception to painful stimuli.[5]

Alveolar Bone: Gradual reduction in bone mass (osteoporosis) is mainly due to age changes[3]**.**In edentulous patients, age related osteoporosis plays a role in alveolar atrophy and basal bone even though the relationship has not been clearly established. Tooth loss is commonly connected to alveolar atrophy. Upwards and forwards posturing of the mandible occurs when there is a loss of facial height. Mandibular alveolar bone loss is more extensive than maxillary alveolar bone. Cyclo-oxygenase 2 (COX 2) enzyme levels has a vital role in bone repair but due to ageing, the function of this enzyme is reduced. This explains the delayed bone healing in elder patients. In order to stimulate the activity of the COX 2 enzyme and subsequent bone healing researches are conducted. [6]Fermin & Carranza reported that alveolar bone changes mimics the changes in the skeletal system. Osteoporosis, decreased cellularity and a reduction in metabolic rate and healing capacity are the age changing complications in older patients. Increase or decrease in bone density and bone resorption depends upon the individual and location. Gingival recession, tooth attrition and decreased bone height in elder individuals are not due to the physiologic changes instead they are due to oral diseases. Because of reduced immune response with aging accumulation of plaque with gingival recession is more rapid. Interproximal alveolar bone loss and clinical attachment loss has been related to bone mineral density according to Tezal. He also implicated that in postmenopausal caucasian women, periodontal disease is indicated by postmenopausal osteopenia.[7]

Salivary Gland: Commonest complains of older individuals are dry mouth (xerostomia) and diminished salivary output. Xerostomia is also accompanied by oral and pharyngeal consequences[8]Salivary output from major salivary gland does not undergo clinically significant decrements in healthy older people. Hence dentists should not attribute complaints of a dry mouth in an elder population to their age instead proper diagnosis is required. Salivary disorders is caused due to the intake of prescribed and non prescribed medicines. This is due to the fact that older people are more likely to take medications and are more vulnerable to their side-effects and medication-induced xerostomia. Anticholinergic drugs causes decreased salivary flow and dry mouth. Permanent salivary hypofunction is caused by the external beam radiation which was given as a treatment for head and neck cancers. Thus resulting in permanent complaints of xerostomia by the patients. [9]Systemic medical conditions, such as Sjögren's syndrome; Diabetes mellitus; Alzheimer's disease; and Dehydration can cause or promote salivary gland diseases. Patients with primary sjogren's syndrome have less production of saliva. Oral and pharyngeal complications due to salivary hypofunction are dental caries, dry lips,dry mouth, dysphagia,gingivitis,halitosis, problems with mastication, mucositis,oropharyngeal candidiasis,difficulty with removable prostheses, difficulty sleeping anddifficulty with speech[8]**.**

Oral Mucosa: Clinically oral mucosa of elder patients cannot be differentiated with the oral mucosa of younger patients. However, certain changes such as mucosal trauma, mucosal diseases, and salivary gland

hypofunction can change the clinical appearance and characteristics of oral tissues in elder populations.[10]Due to ageadvancement, the stratified squamous epithelium becomes thinner, loss of elasticity and atrophies are observed. Infection and trauma are caused due to the declined immunity. Oral mucosal disorders in elderly persons are caused due to the increased incidence of oral and systemic disorders, along with increased use of medications. Oral cancer is a disease of ageing and it has a high rate of morbidity and it is most commonly occurs above 50 years of age. Elder people may also develop vesiculobullous, desquamative, ulcerative, lichenoid and infectious lesions of the oral cavity. [11,12]

Conclusion

Oral changes are common in ageing individuals. Dentist should have knowledge to distinguish between physiologic and pathologic process After diagnosing the pathologic condition, treatment delivery and preventive regimes should be given. Periodical check up, brushing with fluoridated tooth paste, using floss should be done by the patients to maintain oral hygiene. In order to improve overall health good diet, less sugar content in diet, probiotic formulations, intake of fruits and vegetables enhances good health and also fights oral health and ageing problems.

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Conflict of Interest: Nil

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Infectious Disease and its Influence in Dentistry

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ABSTRACT

Dentistry is a high-risk occupation due to the frequency of exposure to blood and body fluids. Similarly patients are also at risk of acquiring infection from the dental field if proper infection control measures are not followed strictly. According to the routes of disease transmission, we can classify the diseases into three: bloodborne, airborne and also through fomites. Public health consequences of morbidity and mortality is due to emergence of newer diseases within these classification. Disease control measures must be implemented in clinics by the health care provider and dentists. Dentists should understand the impact of diseases and provide certain steps to control the spread of disease within the dental field. Bloodborne diseases, such as hepatitis A, E, B, C, D and G, HIV; respiratory diseases such as tuberculosis, influenza, severe acute respiratory syndrome (SARS), AH1N1 influenza and immunizable childhood diseases are the commonest diseases in society. Aside from infection control measures, immunisation against diseases and postexposure disease control measures should be implemented by the public health care professionals.

Keywords: *Bloodborne diseases, Respiratory diseases, Immunizable childhood diseases, Public health measures.*

Introduction

Differentvirusescausing hepatitis, HIV and AIDS, and tuberculosis (TB) are the commonly spreading infectious diseases in community.[1]Transmission of hepatitis B, C, D and G viruses through bloodborne route whereas hepatitis A and E viruses through fecal-oral route.Improper and unhygienicfood and water are combined with fecal-oral route of transmission for hepatitis A and E. The transmission of hepatitis occurs to a lesser extent in world whereas common conditions such as HIV infection and tuberculosisare present in many regions of the world.[2] Major concern in tuberculosis are multidrug-resistant tuberculosis (MDR-TB) and extremely drug resistant tuberculosis.[3]Epidemics of respiratory diseases and infections have been observed in past decade[4]. Herpetic infections, influenza and bacterial infections are the other common infectious diseases where clinician may provide additional care if they are infected.

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Hepatitis: Hepatitis A virus (HAV) are grouped under Hepatovirus genus and Picornaviridae family and is an RNA virus.[5] It causes acute inflammation of liver, jaundice where it shows only mild to severe signs and symptoms but it rarely leads to death. Death rate of this infection is about one in 1,000. If the patient is normally asymptomatic, the incubation period is 4 to 6 weeks or about 15 to 50 days but shedding of virus is observed in the stool. It is compulsory for all the dental students to get immunised for life-long immunity.

Hepatitis E virus (HEV)[6]is an RNA virus and it spreaded through fecal-oral route. Hepatitis E and HAV infection are similar in nature except for the increased rate of infectionin the third trimester among pregnant women (20% infection rate). There is no availability of vaccine against hepatitis E virus till date.

Hepatitis B viral (HBV) infection is caused by hepadnavirus (DNA virus). Clinical identification ofHBV infections cannot be identified in most patients[7].It is also called "chronic hepatitis infection" where the incubation period lasts from 45 to 160 days.Since Hepatitis B is very contagious, it is acquired by dentistsoccupationally in the past.

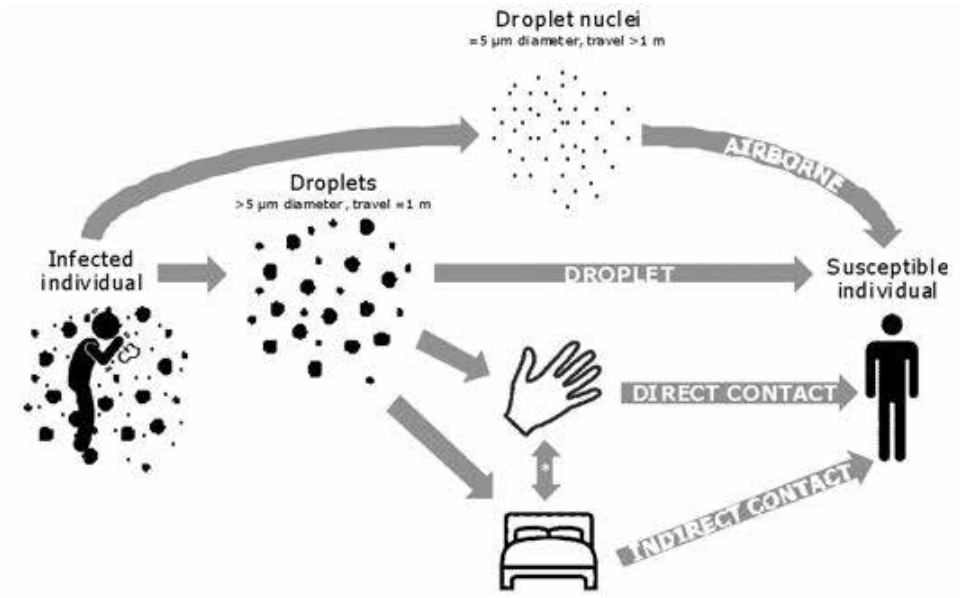
Outcomes of HBV infection are: About 90% of the infected patients will become healthy again; about 9 to 10% is asymptomatic carriers where patient suffer from chronic, persistent hepatitis promoting hepatocellular carcinoma and death and about 1% of patients develops fulminant disease after infection and die.Currently, dental students and faculty arerequired to complete a series of vaccinations in most dental institutions in India as a protection against this disease. It is also important to make vaccination mandatory for all oral health professionalsif they are not immunised before because it is the first and the best line of defense.

Hepatitis D virusesalways depens on the persistence of hepatitis B viral infection in the patient (piggyback virus). It occurs as an additional infection with HBV or after being infected by HBV. It has similar mode of transmission i.e., through blood and other body fluid contact.[8]

Hepatitis G viral infection is identified in most recent years and it is a bloodborne disease. Moreover it is the most insidious infections occurring among susceptible patients. Adequate barrier techniques should be used by the dentists to avoid contact with blood and other body fluids of patients by adopting safer practices for waste disposal to avoid cross-infection among other patients.[2] In addition, immunization for this infection is necessary if the vaccines are availableas the first line of defense.

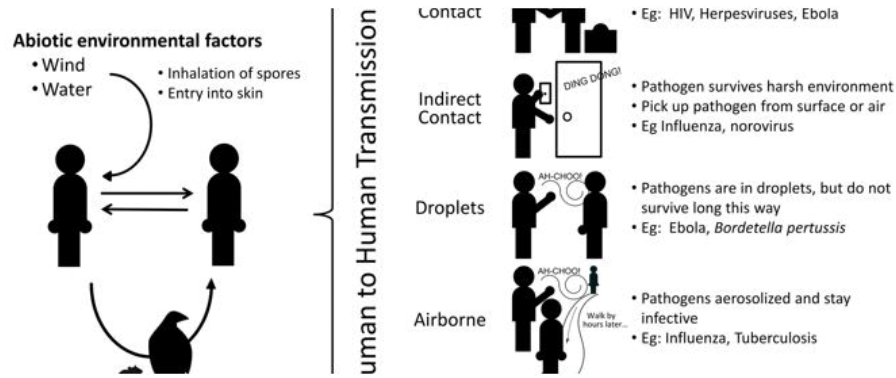
Human Immunodeficiency Virus: Transmission of human immunodeficiency virus (HIV) occurs through contact with blood and other body fluids. It is most commonlyseen among homosexual individuals initially and later it is observed among heterosexuals, females and children. Initially progression of HIV is more severe and debilitating condition combined with AIDS or acquired immunodeficiency syndrome. AIDS are grouped under certain classifications such as the Center for Disease Control's surveillance definition, the Walter Reed's classification or the WHO's classification.HIV infection may not be noticeable at initial stages and symptoms, such as weakness, arthralgias are accompanied with this infection or even be totally asymptomatic.HIV infection and AIDS are associated with some oral lesions such as hairy leukoplakia, Kaposi's sarcoma and candidiasis. Dentists should have knowledge about the clinical appearance of these oral lesions as well as the systemic conditions, such as protozoal infections, fungal infections, other viral infections and mycobacterial infections.There is no chances of occupational exposures causing HIV infection of the dentist or dental auxiliaries during dental treatment. In order to prevent the HIV infection postexposure protocols must be followed and antiviral drugs must be taken immediately after treating HIV infected patient within 2 hours after exposure to infected blood.[9].

Tuberculosis: Tuberculosis is the oldest infectious diseases caused by mycobacterium tuberculosis commonly affecting lungs. Many respiratory conditions are imitated by Tuberculosis, therefore when dentists identifies a patient with cough for more than 3 weeks of duration and blood tinged sputum should be referred for a TB skin test and if it is positive treatment should be started. [10] To prevent the spread of this infection dental treatments are equipped to deal with the limit of cross-contamination or occupational exposure. Dentists and staff should undergo testing for the disease on regular intervals, especially if they are residing in endemic areas where there is a highprevalence i.e., within 6 months in high endemic areas and once in a yearin moderate endemic areas.Multidrug-resistant TB [MDR-TB] is increasing in India than TB. [11]Dentistsand other oral healthpersonnel in India must undergo annual TB testing and if it is positive, BCG vaccine should be given to the affected dentist and treatment should be given to them until it is non-infectious. MDR-TB is defined as "resistance to Isoniazid and Rifampicin with or without resistance to other anti-TB drugs".[12]Severe acute respiratory syndrome is a coronavirus which is associated with respiratory infection and it is referred as SARS-CoV.The signs and symptoms of this syndrome are body temperature of > 100.4°F, headache, bodyache with mild respiratory discomfort followed by moderate to severe respiratory distress, dry cough and many developing pneumonia. Transmission of SARS is through close contact, fomites through droplet infection (droplets can travel up to 3 feet) and through aerosolization.



Controlling methods of SARS in a dental clinic are patient are not allowed to sit in waiting room if they are not feeling well instead the appointment should be given on another day when they are feeling better. The face should be covered with disposable tissue or the sleeve of your shirt/coat while sneezing. Hands should be frequently and regularly washed oralcohol based hand gels can be used or hand sprays and wipe with disposable hand wipes if there is no possibility of washing hands. Facemasks must be worn regularly to control inhalation of droplets

Mode of Transmission of Disease



Childhood diseases: Commonly encountered diseases are chickenpox, measles, mumps, rubella, diphtheria, pertussis, tetanus, rubeola, meningitis and poliomyelitis. Vaccines are available in market for all these diseases and hence it is mandatory for all health professionals including dentalstudents to be vaccinated. It is mandatory to show the proof of immunization by the applicants before getting admitted.[13]

Conclusion

Developing immunization of health care professionals and students who are in the careers in health professions is mandatory in India. This is done by the working staffs in dental schools, the dental council and other public health organizations. Similarly all residents who are residing at residential institutions should be immunized against communicable diseases. Hence communicable or infectious disease can be controlled by having a basic knowledge about disease and also about the immunization since they are the first line of defense. Health care professionals, dentists, dental staff must be immunized and should also have a knowledge out the condition to educate the society.

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Oral and Dental Aspects in Child Abuse and Neglect

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ABSTRACT

Suspected cases of abuse and neglect should be reported by the health and dental care providers to parents, society and law enforcement agencies. This review reports the oral and dental aspects of physical and sexual abuse and dental neglect in children and pediatric and dental care provider's role in evaluating such conditions. Perioral and intraoral injuries which raise suspicion for child abuse or neglect are evaluated through bite marks. Multiple kinds of maltreatment have been exposed to children nowadays. Hence health and dental care professionals should be aware and educated about these concerns. Oral health problems can also be noticed in bullying and human trafficking victims. These are noticed by the dentist during physical examination or else children or young adults may reveal these facts about experiencing abuse or neglect. It is mandatory for all dental and health care professionals to know about the signs and symptoms of child abuse and neglect and in addition they should also know how to respond to those conditions.

Keywords: *Oral health, Tongue, Lips, Oral mucosa*

Introduction

Dental and health care providers should be aware of the different kinds of maltreatment that have been exposed to children. Maltreatment includes physical and sexual abuse, bite mark evidences and dental neglect. Other serious long term effects are bullying and human trafficking of children. The above mentioned problems are observed during physical examination, or else children or young adults may reveal these facts about experiencing abuse or neglect. Alterations in social values promotes the recognition of child abuse as a boundless medico-social issue publicly or universally. So, it is mandatory for the health and dental care providers to be aware and educated about the signs and symptoms of child abuse and neglect. Dentists should not only diagnose the problem instead they should also report, treat and prevent additional complexity**.**

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Oral Signs in Physical Abuse: Oral cavity is the prime focus for physical abuse [1],and their characteristic lesions are described anatomically. Theoro-facial manifestations are bruising, abrasions or lacerations of tongue, lips, oral mucosa, hard and soft palate, gingiva, alveolar mucosa, frenum; fractures of maxilla and mandible, dental dislocations, fractures, avulsions.[2]. Haematoma, lacerations, scars of previous trauma, burns due to cigarettes or torrid food items are found in lips, since it isthe most common site for inflicted oral injuries. As a result of gags applied to oral cavity bruises, lichenification, or scarring are observed at the corners of the mouth [3]. In the labial or lingual frenum, gingiva, tongue, palate, floor of the mouth, lacerations and abrasions are found because of assault or pressure feeding of food or handling with blazingtableware and it shouldbe recorded as other correlating manifestations [4]. In case of earlier injuries, fracture of maxilla and mandible can be identified and it is confined to the condyles, ascending ramus, symphysis, other disorders such as pulpal necrosis due to discoloured teeth anddental malocclusions may also be apparent[5]. During oral examination, multiple residual roots can be observed by the dentist which helps them to detect the developments of the traumatic incident[6].The healing stages of injuries should provoke a suspicion of

abuse [7] because oral lesions may be imposed with tools such as utensils or a baby bottle during forced feedings, hands, fingers, scalding liquids or caustic substances [8]. Usually, Battered Child Syndrome is done through blunt force trauma of varied morphology, voluntarily inflicted according to different procedures. Apart from oral cavity, it is mandatory to focus other traumatized body parts such as retinal and subconjunctival haemorrhage,, dislocated lens, detached retina, optic atrophy, ptosis, periorbital hematoma, contusions and nasal fracture, injury in the tympanic membrane and auricular hematomas [9].

Oral Signs in Sexual Abuse: Involvement of a child in sexual activities with an adult is known as sexual abuse where the child is not allowed to know the actual meaning of action [10]. Oral cavity is frequent site for this type of abuse in children but on oral examination, injuries and infections are rare.[11]Significant indications of sexual abuse are erythema, ulcer, vesicle with purulent drainage or pseudomembranus and condylomatous lesions of lips, tongue, palate and nose-pharynx [6]. Laboratory culture for sexually transmitted diseases (Gonorrhea, Human Papilloma Virus, Chlamydia, Syphilis, HIV) should be conducted as per guidelines for the evaluation of sexual abuse of children, if there is any suspicion of an oro-genital contact. This guideline can also be used in vertical transmission i.e., from mother to child [12]. Most commonest sexually transmitted diseases found in child abuse victims isGonorrhea[13]. On clinical examination a child with gonorrhoea shows erythema, ulcer and papular-vescicobollous lesions and pseudomembranous in certain parts of lips, tongue, palate and nose-pharynx. Human Papilloma Virus infection can be transmitted through oro- genital contact. Infective agents of HPV causes Condyloma acuminatewhich is a unique lesion resembling a cabbage. Presence of this lesion can prove child abuse [14]. In case of presence of syphilis, papule is observed in the lip. As well as in this case, laboratory test should be carried out to detect the presence of Treponema Pallidum. If the result is positive, then it is highly suggestive of sexual abuse. In forced oral sex, erythema and petechiae are observed at the junction of hard and soft palate or at the floor of the mouth. [15]In these circumstances dentists should know to differentiate signs of sexual abuse with traumatic lesions, hemorrhagic lesions, violent cough or vomit, bleeding diatheses, antithrombotic or anticoagulant pharmacological therapy [16]

Bite Marks: Indication of abuse are acute or healed bite marks. For evaluating and detecting the bite marks related to physical and sexual abuse, dentists are trained as forensic odontologists[17].Presenceof ecchymoses, abrasions, or lacerations with elliptical, horseshoe shaped, or ovoid pattern should create a suspicion of bite marks to the health and dental care professionals. Ecchymoses (contusions) caused by

- Positive pressure from the closing of the teeth with disruption of small vessels
- Negative pressure caused by suction and tongue thrusting

Human bites tend to produce abrasions, contusions, and lacerations but rarely avulsions of tissue. Human bite marks can be identified by the intercanine distance (i.e., the linear distance between the central point of the cuspid tips) measuring more than 3.0 cm [18]. Evaluation of the pattern, size, contour, and color of a bite mark can be done by a forensic odontologist. In his or her absence, a forensic pathologist can be consulted. If there is no specialist available, an experienced medical or dental provider can be consulted. In absence of both forensic odontologists and pathologists, medical or dental provider must observe and document the characteristics of bite mark photographically. Photograph should be captured by placing camera lens directly over the bite and in the same plane to avoid distortion**.** In addition to photography, Polyvinyl siloxane impression is done soon after swabbing of the bite mark for secretions containing DNA. Saliva is also collected and documented by double-swab technique.[19]

Bullying: Children who have orofacial or dental issues (including malocclusion) are frequently subjected to bullying as a result of which they suffer from psychological complications such as depression and suicidal ideation.[20] Poor oral health are observed in children who have reported physical abuse, intimate partner violence, forced sex, and bullying. Anti bullying programme should be conducted in in schools and other community settings by the health and dental care professionals to prevent bullying [21].

Human Trafficking: Human trafficking is a child health problems involving medical and dental ramifications. It is defined as the recruitment, harboring, transportation, provision, or obtaining of a person for labor or services through the use of force, fraud, or coercion for the purpose of subjection to involuntary servitude, peonage, debt bondage, or slavery. Most of the children experience sex trafficking such as inducing the child forcefully to indulge in sex before attaining 18 years of age. [22] Sex

trafficking is considered "commercial sexual exploitation of children" as a survival sex i.e., for food, shelter and money, children are forced to exchange sexual activity.[23] Children with 12 years of age are commonly exploited sexually. Children who have psychosocial and physical challenges are the victims of trafficking since they do not have a sound mind to respond to that kind of action. These victims has higher risk of dental issues since they usually suffer from malnutrition causing poor growth of teeth, dental caries, infections and tooth loss [24]. Human trafficking does not have sex predilection because boys are more affected than girls as per surveys.

Dental Neglect: Accoding to American Academy of Pediatrics Dentistry, Dental neglect is defined as "willful failure of parent or guardian to seek and follow through with treatment necessary to ensure a level of oral health essential for adequate function and freedom from pain and infection" [25]. Pain, infection, and loss of physiological functions are caused due to the untreated dental caries, periodontal disease, and other oral conditions. Theunacceptable effect of these conditions can cause adverse effects on learning, communication, nutrition and other activities which are necessary for normal growth and development [26]. Dentists can carry out an early diagnosis of dental neglect because of several considerations. They are uncertain answers from the parent regarding child's physical and psychological growth stages [27]. Lack of general hygiene, poor nutrition and frequent respiratory system diseases are the physical signs that proves the significant neglect of the parents or the care givers. [28] Poor oral hygiene and halitosis are the easily identified oral signs of neglect. Complications of nutritional deficiencies are due to certain signs such as Early Childhood Caries (ECC), or untreated dental caries, odontogenous infections), periodontal disease etc.,[27]

Recommendations

- Health & dental care providers are required to report injuries in abused and neglected child to child protective services (state & legal requirements).
- Sexual abuse -mouth, even without overt signs, and thus, health &dental care providers should know how to collect a history to elicit this information as well as how to appropriately collect laboratory tests to support forensic investigations.
- Ask their patients about bullying and advocate for antibullying prevention programs in schools and other community settings.
- Safely connect the patients to resources, and advocate for anti-trafficking efforts.
- If parents fail to obtain therapy after barriers to care have been addressed, the case should be reported to the appropriate child protective services agency as concerning for dental neglect.

Conclusion

Hence the health & dental care providers should be aware of the physical and sexual abuse, which may result in oral and dental problems, when and how to document suspicious injuries and how to obtain laboratory evidence, photo documentation, and/or consultation with experts when appropriate. Pediatric dentists and oral and maxillofacial surgeon should conduct an advanced education programs including mandated child abuse curriculum. This provides a valuable information and assistance to other health care providers about oral and dental aspects of child abuse and neglect.

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Probiotics and its Role in Dentistry

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ABSTRACT

Probiotics are used to control periodontal diseases, dental caries and halitosis (oral malodour. It also has a potentiality to manage multifactorial diseases such as the periodontal diseases and caries. Conventional treatment cannot restore homeostasis. Studies about the use of probiotics in dentistry are held, where certain studies had a negative result and some had a positive result. Probiotics are used to modulate and regulate the immune system of an individual.

Keywords: *Homeostasis, Dental caries, Gingivitis and Periodontitis.*

Introduction

Probiotics are viable microorganisms which is administered in adequate amounts to provide a health benefit to the host. This is successful to control intestinal diseases where it act through colonisation to resist and modulate the immune system. Probiotics have the potential to investigate and to prevent or treat diseases of the oral cavity, such as dental caries and the periodontal diseases[1]. Suitable probiotic species is selected when the normal oral habitat and association with health should be considered. Certain gastrointestinal bacteria, such as Lactobacillus and Bifidobacterium spp., has the capacity to control the growth of oral microorganisms (cariogenic streptococci) [2]. Antimicrobial compounds are produced by probiotics to stop activity of other oral bacteria. A range of antimicrobial agents such as organic acids, hydrogen peroxide, peptides, bacteriocins and anti-adhesion molecules are produced by the lactic acid bacteria[2].Probiotics acts indirectly within the oral cavity by modulating innate and adaptive immune function. Some probiotics has a capacity to enable mucin production and barrier function, upregulate host defence peptide, induce angiogenesis and wound healing [3].

Role of Probiotics in Dental Caries: Although dental caries is preventable it remains one of the most prevalent oral diseases in children and adults worldwide. Consumption of sugar-rich diet promotes carious lesions.[4] Tooth decay can be prevented by targeting S. mutans and limiting sugar intake for inhibiting disease progression. An alternative preventive measure such as bacteriotherapy which target oral biofilm composition towards healthier microbial community[5] Lactobacillus rhamnosus GG [LGG] has caries preventive effect which can be due to enhanced salivary buffering capacity and decreased levels of S. mutans counts.[6] Withthe time of administration caries preventive effect of probiotics is correlated. A probiotic tablet containing L. salivarius has a property to increase salivary buffering capacity and probiotic administration promotes resistance to caries risk factors.[7]

Role of Probiotics in Periodontal Diseases: Gingivitis and periodontitis are included under periodontal diseases, where it originate in the presence of susceptible pathogens in oral biofilm. Bleeding on probing, swelling, color changes, pain, and tooth mobility is the leading symptom in advanced stages are the clinical manifestations. Primary treatment strategies are scaling and root planing and deep pocket debridement

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allowing to reduce aggressive perio pathogens. For efficient treatment, probiotics or beneficial microbes are essential for tailoring treatment after routine periodontal treatment. After administration of probiotic lactobacilli, there is reduction of periodontal pathogens in supra- and subgingival biofilm. [8] Thenumber of periodontal pathogens after administration of L. reuteri is reduced and it also contributes to improved gingival health. [9] L. reuteri is the commonly used probiotic species in chronic periodontitis patients and it act as an adjunct to scaling and root planing when it is given as a lozenge once or twice daily. Observed treatment outcomes are lowering plaque index, gingival index, probing pocket depth and bleeding. [10] Mechanism ofprobiotic activity are combined with less number of periodontal pathogens including Porphyromonasgingivalis, and reduced concentrations of TNF-α, IL-1β and IL-17 in gingival crevicular fluid.[11]Inperi-implantitis and peri-implant mucositis, there is no clinical evidence to justify the probiotic use supplements in addition to mechanical debridement and oral hygiene reinforcement.[12]Generallyconnection between peri-implantitis and probiotics is still weak.

Probiotics and Oral Candida Infections: In chronic Candia infections of the soft tissues in the mouthprobiotics application is essential. Commonly isolated Candida species are C. albicans, C. glabrata, C. krusei, C. parapsilosis and C. tropicalis. Various inhibitory activity against oral Candida by probiotic lactobacilli, with strongest inhibitory effect is observed with LGG [13] In yoghurt drink, Lactobacillus casei and Bifidobacterium breve affects secretory IgA levels in saliva and there is a reduction of Candida and non-Candida species in the oral cavity of older patients. [14]Combination of probiotic and Propionibacterfreudenreichii, LGG in cheese decreases the high risk for salivary Candida counts by 75% comparatively with placebo cheese in a study on the older population. [15]

Probiotics in Halitosis: Halitosis is known to be combined with periodontitis and putrefactive activity of the tongue microbiota plays a major role in volatile malodour production in both physiological and pathological halitosis [16]. To maintain a healthy tongue, tongue cleaning has to be done. Difficult areas to reach in tongue the dorsal posterior surface to the circumvallate papillae, where there will be a more amount of gram-negative bacterial species combined with malodour [17]. Lactobacilli exposes positive effects on treating periodontitis and producing good oral health to reduce malodour. Reuterin-like compounds reduces volatile sulfur compound VSC production by periodontopathic bacteria such as F. nucleatumand P. gingivalis, downregulation of the enzyme (methionine γ lyase) responsible for VSC methanethiol production later. [18]. L. brevis CD2 lozenges are given to patients with persistent malodour to observe some improvement in them but unfortunately there is no improvement in organoleptic scores or breath VSC concentrations [19]. Consumption of Lactobacillus casei Shirota milk also shoes no improvement. Hence in vivo studies shows that there is a limited ability to control oral malodour. Moreover indigenous oral strains could be screened for probiotic activity to help in colonising and maintaining healthy tongue ecology.

Conclusion

Probiotics has a major role in the clinical treatment of dental caries and the periodontal diseases and halitosis even though there is less convincing regards. Establishment of safety of probiotics and long-term efficacy in preventative or treatment contexts is necessary to produce safeclinicalrecommendations. In order to increase the role of probiotics in treatment innovative access of using oral microbiome transplants is helpful. Further studies should be carried on to determine strain specific and synergistic effects of strains.

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Teledentistry: Future Perspective in Dentistry

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ABSTRACT

Combination of telecommunications and dentistry such as exchanging clinical information and images over remote areas for dental consultation and treatment planning is known as Teledentistry. It has the capacity of improving the access and delivery of oral health care at lower price. It has a potentiality to eradicate the discrepancy in oral health care between rural and urban areas. This review article discusses about the scope, origin, requirements of teledentistry along with ethical and legal issues. This article also reviews about the teleconsultation methods and applications of teledentistry in rural and urban areas.

Keywords: *Teledentistry, Telemedicine, Microphone, Headset or External speaker*

Introduction

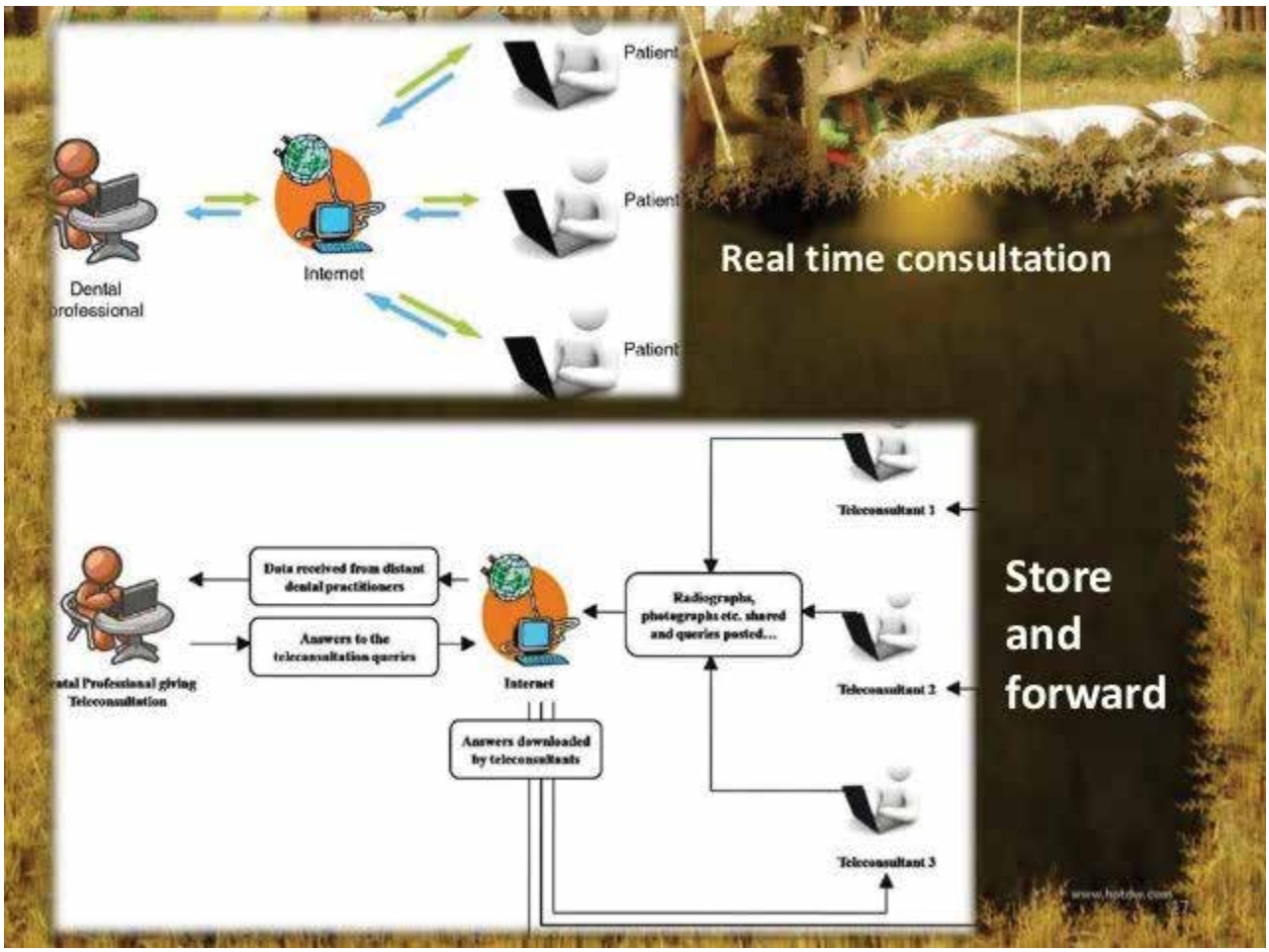
Information-based technologies and communications systems are used to provide healthcare beyond geographic extent (telemedicine).[1]Telemedicine uses electronic information for technological communication and to contribute healthcare when there is an separation between the participants.[2]It is also a piece of an expansive method or series of care which can be improved by intensifying the characteristics and effectiveness of health care.[3] Currently telemedicine benefits educational medical centers, public hospitals, health insurance companies, georgic hospitals, and to link providers in developing countries internationally to hospitals in developed countries. Extensive technologic innovations in recent years has been observed by dentistry. Certain advancement have been created while using computers, telecommunication technology, digital diagnostic imaging services, devices and software for analysis and follow-up. [4]The possibility of quality management of dental patients and incomplete or complete treatment at thousand kilometres interval beyond healthcare centers or qualified dental practitioner has been improved by new information technology. This complete action of networking, distributing digital information, distant opinion, workup, and analysis is handled by a part of the science of telemedicine which is concerned with dentistry is known as "Teledentistry".[5]

Origin: In 1989, basic idea of teledentistry is a piece of pattern for dental informatics and in 1994, teledentistry is created as a part of telemedicine. United States Army created a military project addressing the improvement of patient care, dental education, implementing the communication between dentists and dental laboratories. This project exhibited the advantage of teledentistry as there is a reduction in total patient care price and extension of dental care to distant and rural areas [5]. It may also help in offering new opportunities to improve the patient care level and the current business models can be reshaped. [6]

Teleconsultation Method: Teleconsultation has following ways through teledentistry, they are – "Real-Time Consultation" and "Store-and Forward Method" where Real-Time Consultation describes the videoconference when dental practitioners and their patients are at different areas. Through this method they can see, hear, and communicate with one another[7].

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Whereas exchange of clinical information and static images which was collected and stored by the dental professionals, who forwards them for consultation and treatment planning [8]



Advantage is that patient information, radiographs, graphical representations of periodontal tissues, applied therapies, lab results, tests, remarks, photographs, and other information can be shared by dentist. For patients who are in need of specialist consultation are benefitted by sharing data[5]. Remote Monitoring Method is the third method where patients are monitered at a distant area and can either be hospital-based or home-based.[9]

Scope: Ability of teledentistry is that the access to oral health care and the delivery of oral healthcare at lower price can be improved. By considering the uses of teledentistry such as lower cost, faster communication between rural-urban health it has a great scope in near future [10]. For instant, if there is a shortages of dentists in the next decade teledentistry helps the rural and urban people [11]. It also contribute an opportunity for dental students and dentists and to supplement traditional teaching methods in dental education [12]

Requirements of Teledentistry: Certain hardware, software and network connection are required forpractise in teledentistry. Essential requirements are desktop or laptop computer with substantial hard drive memory, a significant amount of RAM, and a speedy processor. A digital camera, video camera, and intraoral camera, and a panoramic digital X-ray unit, preferably portable, is needed to enable the dentists to consultwith maximum clinical valueimages.[13]For PCbasedvideo-conferencing Microphone, headset or external speaker, and a webcam are necessary.

Teledentistry and its Use in Rural Areas: Geographical remoteness, poor or no transportation, poverty and complications due to enhancement ofa quality dental carecompromise are the barriers for rural Indian to approach a speciality dental care[14]**.** Teledentistryhas the ability to increase the accessibility of the specialists to provide dental needs to underserved areas[15]

Teledentistry and its Benefits in Dental Education: Self-instruction and interactive video-conferencing are the two categories where teledentistry plays a major role in education. Self-instruction educational system contains developed and stored information before the user accesses the program.[16] The main use of this system is that the pace of the learning can be controlled by the user and they can also review the material for infinite times as per their wish.[17]

Teledentistry and its Use in Postgraduate Education and Dental Practice: Teledentistryis a good instrument to educate postgraduate students and it also providesrecent updates for the dental practitioners. Evaluation of patient's information is done first either in presence or in absence of the patient in interactive video-conferencing method. This helps in interaction and collecting feedback between the educator and the students. Students and dentists gains enthusiasm and a new learning opportunities by discussing the case details without the presence of patient, after collecting adequate information about the case through transmitted datas.[18]

Teledentistry and its Role in Schools and Child Care Centres: Optimum oral health of the children are ensured in schools and child care centre through:-[19]

- Oral screening for dental issues prior to emergency situations.
- Educating children about chronic ill treatment.
- Children and their families are connected to the needed health and social services
- Providing emergency care.

Ethical and Legal Problems:

Confidentiality: From the transfer of medical histories and records including the general security issues of electronic information, concern about the confidentiality is raised. Teledentistry practitioners must take care to make sure that patient privacy is not compromised by unauthorised individuals. Before that, it is mandatory to inform the patient that their data are transmitted electronically and other possibilities existing to intercept the data, despite of maintaining security. In addition, it is important to inform the patient about actual risk of inaccurate diagnosis and/or treatment because of technological problems.[10]

Medico legal and copyright issues: This is an important issue to be considered in teledentistry.Due to absence of specific standards these issues are raised. Legal issues such as licensure, jurisdiction, and malpractice have not yet been decided by legislative or juridical branches of various governments.[20] In 2002, 20 states in US implemented restrictive licensure laws ensuring teledentistry practitioners to obtain full license to practise.[10]

Feasibility in India: Since India is developing country certainbasic amenities of daily routine life and primary health education services are absent. Knowledge and awarenessin our country are changed due to the development of modern telecommunication and information technology.Modern telehealth and teledentistry are equipped in primary health center and community health center to provide education and essential services to the society. Importance and functioning of telehealth in connection to higher center and experts are educated and trained to school and college teacher and students and social workers from gram panchayat. Government should take some steps to emphazisethe importance and benefits of teledentistry in the society. There are certain disadvantages too. They are patient compliance, unreliability in internet connectivity, computer hardware and software problems which should be taken into consideration by the trained dentists.[21]

Conclusion

In the field of teledentistry, technological developments are taking place. Dental practitioners may eventually create a connection between virtual dental health clinics and new era of dentistry in near future. In situations like long-term unavailability of dental care in future,distant telemedical control of robotized instruments might be seen i.e., during space flights, on transoceanic ships, and in various rural areas. The results are very encouraging and they are creating a pathway for future investigations. However, certain things should be addressed before teledentistry reaches its peak. Few drawbacks and constant efforts has a hopeful future and long way to go. Hence more participants are required to substantiate various aspects of teledental applications.

Ethical Clearance: Not required since it is a review article

Source of Funding: Nil

Conflict of Interest: Nil

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Stress among Dentists—A Short Review

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ABSTRACT

Dentist experience a range of physical, economic and emotional stress – related issues. Dentists must apply techniques that assist them de-stress by decreasing the amount of stressors and improving the ability to deal with stress. Narratives such as stress resistance, time management advantages, and the selection of realistic objectives are encouraged. This is used to reduce stress to manageable concentration. It can be daunting as with any shift from being an the work place. This applies particularly to medical professionals, since they are accountable for their patients well being. The consequences of stress management inclusion into dental education, offer additional practical suggestions for stress reduction and alleviation. This article gives an overview of such techniques and encourage dentist's general wellness by highlighting the significance of well- balanced living.

Keywords: *Dentist, Stress, Techniques, Financial issues.*

Introduction

Dentists are often believed to have a serenity profession, but it's a meagre known fact that if you are a dentist, there's a lot to worry about[1]. Dentist may find wide range of pressure frequently develop when entering clinical practice. It may include problems in handling frightened children in dental office or coping with obsessive, hard or uncompliant adults[2]. Stress can also come in the form of personal insult if dentist are considered incompetent in comparison with their colleagues, or if they are considered disrespectful, inconsiderate and inferior to physician[2]. A chronic source of stress is trying to remain on schedule in a busy dental practice[2]. Not receiving adequate payment for their services, anxiety about upcoming years and lengthy working hours can also function as stressors[2]. These problems may have a major impact on their physical, mental and overall health and wellness for some dentists[3].There may be clinical illnesses like burnout, anxiety and depression[3]. These illnesses may adversely affect private relationships, professional relationships, health and wellness of dentists[3].

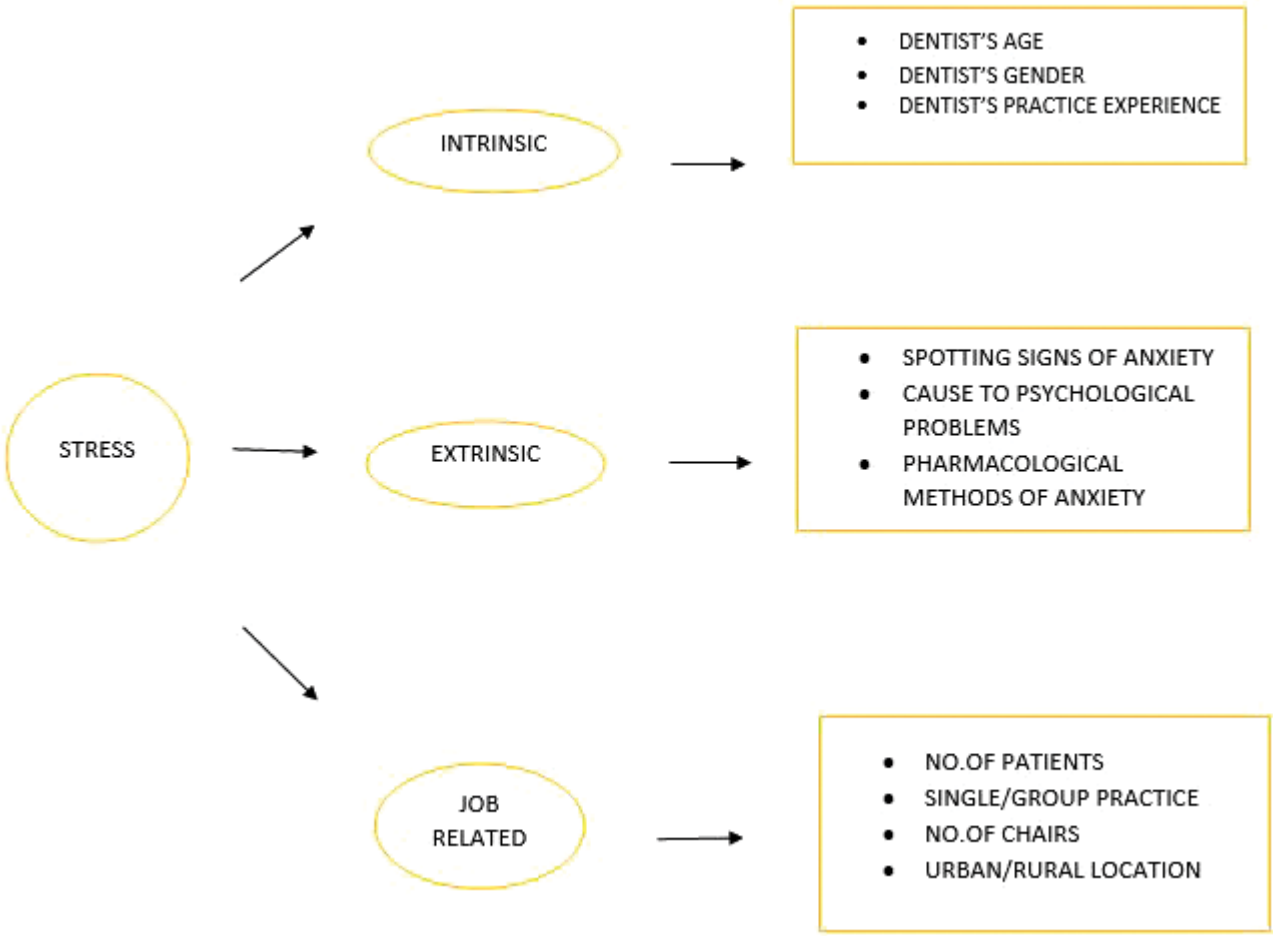
Some stressors can be seen as typically excellent stresses that focus our energies on edifying situations that can happen through increased motivation, greater educational levels and excitement about that we are attempting to achieve[2].

Key Stressors in Dentistry:

- Running after implementation[2].
- It causes pain (musculoskeletal pain)[2].
- Heavy work pressure[2].
- Handling of unco-operative patients[2].
- Patient demands[5].
- High concentration and focus level[5].
- combining work and private life[5].
- highly efficient organization of work[6].

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- patient reservations scheduled weeks ahead[6].
- long working hours[6].
- working without assistant[6].
- lack of leisure time[6].
- lack of support by practice management[6].
- doubts about one's own capabilities[6].



Types:

- Physical stress[1].
- Psychological stress[1].
- Financial stress[1].

Physical Stress:

1. Working as a dentist needs a mixture of strength, stamina, flexibility and coordination alongside many other abilities[1].
2. Engage yourself by eating well- balanced, nutritionally intensive meals and getting enough sleep to assist your mind revitalize and rejuvenate[1].
3. In addition to offering mental and emotional benefits, exercise helps maintain your body at its highest rate of performance. in order to avoid musculoskeletal disorders, weekly activities should include preventive aerobic and relaxation exercises[1].

Psychological Stress:

1. In order to ensure early identification and intervention in psychological circumstance students and teachers should be trained on the physical and psychological symptoms ofanxiety and depression[1].
2. We should be the first physicians to acknowledge the need for excellent mental health[1].
3. One often attempts to fix one's own problems as a medical professional[1].
4. In reality, it is totally and normal to seek assistance to improve mental health[1]. We should be the first

physicians to acknowledge the need for excellent mental health[1].

5. Exercise with relaxation techniques such as deep breathing and muscle relaxation exercise decrease stress[1].
6. Improve the clinic's operating atmosphere and try to speak to other dentists and work together to understand and master the abilities of effective practice management[1].
7. Discuss techniques for managing patient anxiety efficiently.You should handle your time with sensitivity and leisurely take off[1].

Financial Stress:

1. Your financial and economic abilities are incorporated in a good and stress free dental practice[1].
2. In return for a small management fee, you can employ a financial advisor to handle the financial aspect of your practice[1]. This can save time and free trouble[1].

Stress Level Influence:

- Many of the characteristics of a healthy dentist's personality may also predispose dentists to depression[4].
- There has been a substantial distinction in the manner personal professionals think about their job satisfaction because it has to do with stress and dentists identify themselves as staff[6].
- professionals who slept less than seven hours a night revealed more than twice as much jobpressure as those who who slept more than seven hours[6].
- Dentists with severe stress levels worked 39.7 hours a week on average[6].

Stress Related Issues:

- Depression[5]:
  - Depressed mood
  - Frequent insomnia or hypersomnia
  - Loss of energy or fatigue
  - Recurrent thoughts of death or suicide ideation
  - Lack of interest
  - Weight loss or weight gain
- Burn out[6]:
  - Negative attitude towards patients or staffs
  - Dissatisfaction with work
  - Drained emotionally or mentally.
  - Suicide[6].
  - Physical pains
  - Musculoskeletal pain
  - Back pain
- Consumption of alcohol[6].

How to overcome:

- Time management training[6].
- Adequate sleep[6].
- Exercise, Sports or any physical activity[6].
- Help – reading books, websites, organizations and professionals[6].
- Be confident

Prevention:

Improve the working atmosphere

Avoid isolation and sharing issues with fellow practitioners

Work sensitive hours and create time for leisurely break everyday

Learn how to handle uncooperative patients

Enhance communication skills.

Conclusion

As a health care professional, we are all vulnerable to stress.In the end, yes, we got a tremendously stressful profession, but we have to take measures to strangle your stress levels wherever we can.It's what we do with the stress that ultimately determines our results.If we can recognize our reliable sources of stress, we can begin looking for patterns in your everyday lives that can assist us to prevent stressors as much as possible.

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Domestic Violence in Women—Indian Scenario

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ABSTRACT

Domestic violence or intimate partner violence as it sometimes called is a world wide problem. Women are much more likely to be injured by a family members or by someone knownto them. Domestic violence is a wide spread problem, its actual extent is difficult. Domestic violence refers to violence against women not only in homes but also in work place. In recent survey it shows that 27% of women have experienced domestic violence since the age of 15 in India. The violence tends to escalate often the first to detect the domestic violence victim since usual site of injuries are in head and neck region. The dentists can play a vital role in preventing violence against women and children by helping and providing necessary treatment and care.

Keywords: *Domestic violence, injury, women, dentist.*

Introduction

Violence against women is widespread throughout the world[1]. Violence against women and girls constitutes a severe infringement of their right to dignity and to a life without discrimination[1]. Violence against women is also known as gender- based violence which leads to long term mental and physical effects, sometimes causing women and girls to die and become disabled[1]. In our community, many women are treated violently by their intimate partner while they suffer in silence[2]. Gender based violence including rape, internal violence, murder and abuse are major global health issue for women[3]. It exists across caste, culture, class, education, income, ethnicity and age boundaries in every country. But the worst manifestations are seen in south asia. Violence against women is widespread in India, primarily because of the long lasting gender inequality that has existed for centuries. TheNCRB's (National Crime Record Bureau) last annual report published in august 2018 stated a rise in violence against Indian women.

Overall, 35% of women between the ages of 15 to 49 years have encountered physical or sexual abuse in India. violence against women occurs from pre-birth, infancy, adolescence to senescence throughout the cycle[4].

Gender based violence throughout the lifecycle at various phases[1];

Prenatal:

- Forceful abortion of female child
- Physical violence during pregnancy

Infancy:

- Female infanticide
- Lack of access to care, nutrition, healthcare.

Childhood:

- Child marriage
- Child labour

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- Child sexual abuse
- Kidnapping
- Lack of access to care, nutrition, healthcare, education

Adolescence:

- Rape
- Molestation
- Sexual harassment in work place
- Forced prostitution
- Kidnapping and abduction

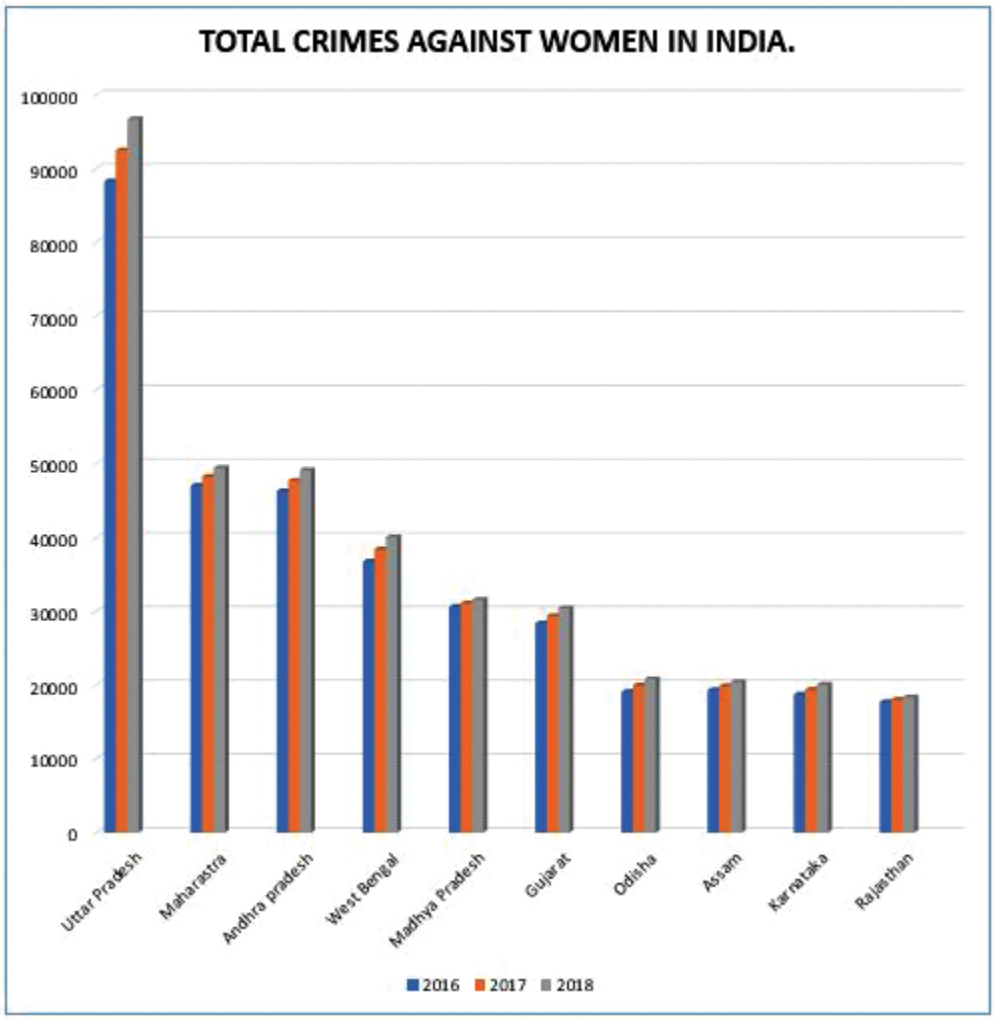
Youth and adulthood:

- Domestic violence
- Dowry related issues
- Homicide
- Sexual harassment in work place
- Rape
- Molestation

Old age:

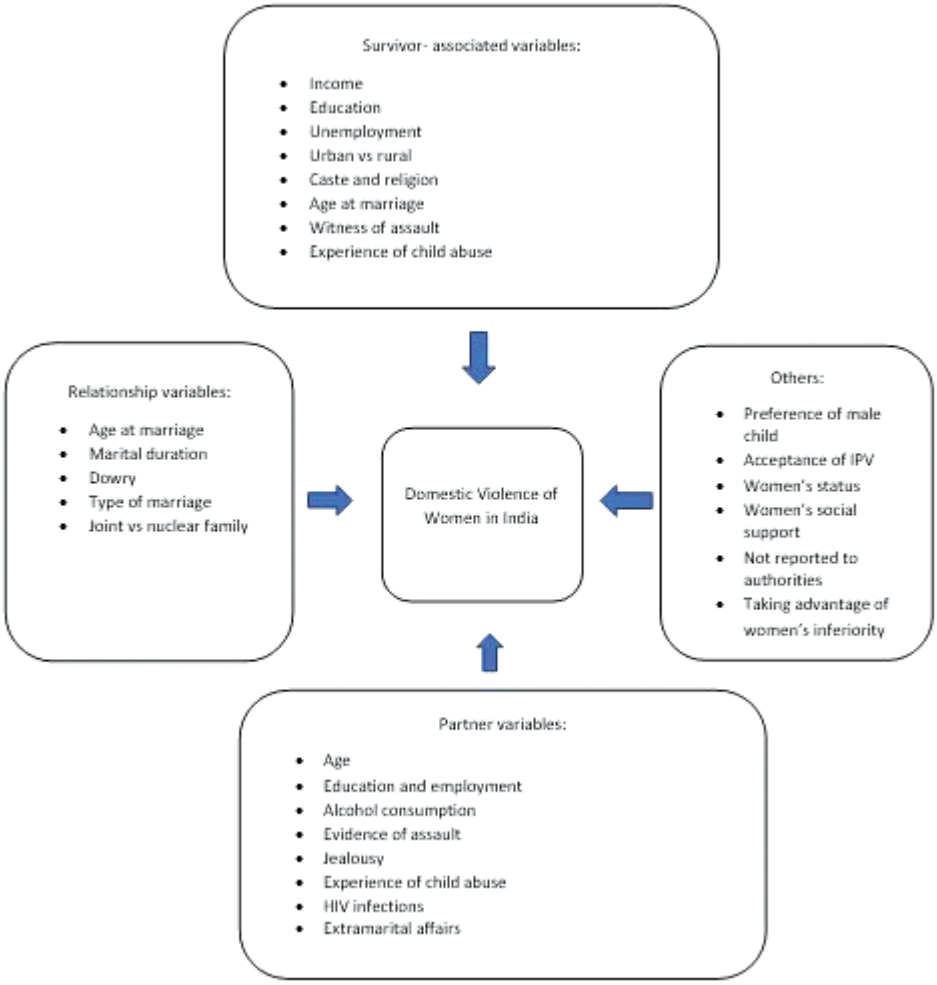
- Psychological abuse
- Lack of access to care, nutritionand medical facilities.

Prevalence:



Source: A crime map of India in R – Crimes against women. – Tinniam V Ganesh.

Causes of IPV:



Woman's Place in Society: Indian society has always provides safety and care to women. Historically, the role of Indian females has been inconsistent[4]. A woman's strength is evoked in ensuring that women effectively perform their traditional roles as daughters, mother, wife and daughter-in-laws[4]. On the other side, the "weak and helpless woman" stereotype is promoted to guarantee full reliance or masculine sex[4].

According to 2011 census the gender ratio between male and female shows 940:1000[7]. The gender ratio is worst in Punjab, Rajasthan and Haryana's northwestern state[6]. The primary reason for this missing number is sex-selective abortions, infanticide and possible neglect of young girls during childhood, which indicates a strong preference for male children rather than female children[7].

Indian women face internal violence, dowry and its related violence, dowry death, rape, abduction, sexual harassment in work place, molestation, homicide and husband and in laws cruelty[7]. Statistics from NCRB (National Crime Record Bureau) show that an Indian women in her marriage home is most dangerous with 43.6% of all offenses against women being "cruelties" inflicted by her husband and relatives[7].

Why Violence Against Women is so Common: Women and girls in India are susceptible throughout their lives to various forms of violence[1].

i. Physically weak

ii. Gender inequality and discrimination

iii. Low level of education

iv. Male control over decision making and assets.

v. Lack of safe space for women and girls

vi. No one has stopped them or reported them to authorities.

vii. Lack of awareness about human rights.

Forms and Manifestations of Domestic Violence: These are all types of violence faced by women in her life.

Physical Abuse: Slapping, hitting, burning, choking, kicking, punching, fractures, head injuries, lacerations, using of injury causing physical items, acid attack, pulling her hair, bruises, control of reproductive freedoms and health[1].

Psychological Abuse: Threats, dictating what a girl or woman can and cannot do, isolating her, shouting, verbally abusing, spitting on her, humiliating the woman or her relatives, leaving the home or visiting her native home[1]. Victim may experience depression, anxiety and have increased risk of suicide. Post-Traumatic Stars Disorder is the most commonly seen psychological effect in victim[2].

Sexual Abuse: Rape, unwanted sexual activity, refusal to practice safe sex, trafficking, forced sex[1].

Economic Abuse: Stealing or destroying her private property, demanding cash, depriving the female of fundamental necessities such as food and clothing, not allowing her to work[1].

Pre-Birth Elimination of Females: Pre-birth elimination of female is one of the worst type of violence in the family[1]. Society in India is Patriarchal, Patrilineal and Patrilocal. In addition to religious consideration, economic, social and emotional wishes favour males as parents expect financial assistance from children but not daughter particularly in their old age[1].

Infanticide: Thousands of newborn baby girls are dying of opium overdoses. They are forsaken or thrown to death in waterways or dustbin. Major reasons are extreme poverty, dowry system in India, unwanted children, such as those conceived after rape, deformed children, relationship difficulties.

Dowry: Wife abuse has been found to be higher if a spouse and/or family thinks that dowry payment is not sufficient. It is a age-old practice has continued and has caused many females to commit suicide. Crimes like dowry murder, death, cruelty done by husband or in laws.

Effects of Domestic Violence: Effects seen in domestic violence are[6]:

- Depression
- Anxiety
- Pain
- Malnutrition
- Induced abortions
- Suicide attempts
- Sleep disorders
- Sexual dysfunction
- Panic attacks
- Death
- Inability to adequately respond to the needs of their children.
- High risk of Sexually transmitted diseases.
- Sexual assaults can lead to unwanted pregnancies.

Forensic Response: Domestic violence not only leaves the individual with physical and emotional injuries, it also has an impact on all family members. The local emergency center or emergency department is often the first to be involved with a victim of domestic violence[7]. The patient may have a broad variety of medical conditions, including abdominal pain, headaches, body aches, pain, bruising[7]. Injuries may appear minor or major based on the type of violence caused. Ideally, a nurse or doctor speaks privately to the patient and with patience and concern[7]. If patients are often unwilling to share the information publicly, they are taken to another private room and given privacy, they are more likely to respond honestly[7]. If a patient reports a history of domestic violence, it is important to identify a patient's risk or hazard[7].

Forensic Documentation: The word "forensic" implies the law.

Therefore, health records containing forensic documentation such as cases of internal violence injury are likely to be referred to the criminal and/or civil court as evidence[8]. Forensic evidence may be substantial, such as photographs or drawing of wound, written word[8].

Forensic document of IPV patients[8]:

1. Name.
2. What happened before, during and following the assault(including earlier assaults and severity)
3. Number of times the patient was hit and how the injury was inflicted, including an item or weapon used.

4. Parts of the targeted body as well as parts of the affected body.
5. Time of assault and the location of the attack.
6. Name of the witness of the assault.
7. Whether children witnessed the assault.
8. Whether threats were made by the abuser during the attack or before or after the assault.

Documentation should include not only care given, but references to other members of the health team.

Role of Odontologist: Forensic dentists have a major role in researching violent and abusive offences. They also help detect abuse as most wounds happen in the region of the head, face, neck and mouth[9]. Domestic violence, child abuse, spousal and elderly negligence can be investigated by the dentist with the help of police[9]. As a dentist we should[9]:

1. The obligation to report
2. Underreported abuse
3. Detect signs and symptoms
4. Reporting

Signs and Symptoms:

- Cranial and facial bone fracture
- Traumatic hair pulling
- Bruises
- Cut
- Choking
- Direct dental injuries like fractured tooth or avulsed tooth
- Subconjunctival haemorrhage
- Improperly healed wounds
- Multiple injuries with various stages of healing

Recommendations

The recommendations highlighting the roles/ services of different segments to reduce the incidence and prevalence of domestic violence are outlined below:

NGOs

1. A number of support facilities have been set up by women's organisation and NGO's for victims of intimate partner violence[1].
2. Several women's organizations have worked to educate the public on gender based violence through campaigns and ongoing education and awareness- raising in schools, universities and youth groups[1].
3. Information on all national violence organizations should be made accessible for reference to all health care organizations, leading in the provision of services as and when necessary[2].

Government:

1. Medical, paramedical professionals and all NGO to be sensitised to raise awareness among public about domestic violence[3].
2. Efforts should be produced to enforce current women's legislation properly and effectively[3].

Police:

1. All crimes against females should be handled by female police officers[3].
2. Police should be given special training in instances of domestic violence[3].

Government of Tamilnadu:

1. The Government of Tamilnadu instructed to install CCTV in public places- 2012
2. Tamilnadu is the first state in India to set up "ALL WOMEN POLICE STATION" to deal with crimes against women.

Judiciary:

1. Strict enforcement of Drug addiction legislation should be implemented to reduce the incidence of domestic violence[3].
2. Measures should be taken to treat alcoholics who perpetuate intimate partner violence[3].
3. Cases of intimate partner violence should be dealt with quickly and without delay, avoiding excessive strain and stress[3].

Domestic Legal Remedies in India:

Crimes Heads under the Indian Penal code(IPC)[10]:

1. SECTION 376 IPC - Rape
2. SECTION 376/511 IPC - Attempt to commit Rape
3. SECTION 363 IPC - Kidnapping and Abduction of women

4. SECTION 364 IPC - Kidnapping and Abduction in order to Murder.
5. SECTION 364A IPC - Kidnapping and Abduction for Ransom
6. SECTION 365 IPC - Kidnapping and Abduction of Women to compel her to marriage
7. SECTION 366 to 369 IPC - Kidnapping and Abduction for Other Purposes.
8. SECTION 304B IPC - Dowry deaths
9. SECTION 354A IPC - Sexual harassment
10. SECTION 354C IPC - Assault on Woman with Intent to outrage her Modesty
11. SECTION 354D IPC - Voyeurism
12. SECTION 509 IPC - Insult to the Modesty of women
13. SECTION 498A IPC - Cruelty by husband or his relatives
14. SECTION 366B IPC - Importation of Girl from Foreign country
15. SECTION 306 IPC - Abetment of Suicide of Women.

Crimes Heads under the Special and Local laws:

16. The Dowry Prohibition Act – 1961
17. The Indecent Representation of women (Prohibition) Act – 1986
18. The Protection of women from Domestic Violence Act – 2005
19. The Immoral Traffic(Prevention) Act - 1956

Health Care Support:

1. Health professionals should refer the victim to counselors and psychotherapists after physical therapy[2].
2. Women seeking medical assistance should be given unique care following an episode of violence[3].

Counselling:

1. Intending couples to handle their marriage relationship should be provided comprehensive and extensive premarital counselling[2].
2. Counselling centres should be started at urban/ rural areas focusing more on intimate partner violence[3].
3. Mobile counseling should be implemented as an efficient approach to comfort victims of domestic violence[3].

Helpline:

1. The Government of India launched 24X7 helpline number – 181.
2. The Government also suggested a center to amend current laws to make death and chemical castration heavy penalities for perpetrators.

Conclusion

Violence against women is a biot on the nation and society as well. As long as the Indian women are subjected to violence the international image of India also going to suffer. Long term measures are needed to empower women and educate men to curb this menace. Taking the issue only as a public health problem will be futile attempt unless a multifaceted approach using legal, social sciences and mental health is employed to check it.

Ethical Clearance: Not required since it is a review article

Source of Funding: Nil

Conflict of Interest: Nil

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Lichen Planus Vs Lichenoid Reaction: A Comprehensive Review

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ABSTRACT

Lichen planus (OLP) is relatively common, chronic dermatologic disease that frequently affects oral mucosa besides skin, genital mucosa, scalp and nails. Oral lichenoid reaction (OLR) represent a prevalent endpoints for extrinsic agents (allergens, medicines, dental materials) modified self antigens or superantigens. In lichen planus, an immune mediated pathogenesis is acknowledged although the correct causative agent is unknown. Despite comparable clinicopathological characteristics: etiology, diagnosis and prognosis between OLP and OLR. Diagnosis of OLP is established either by clinical or by clinical and histopathologic confirmation. Histopathologic features of OLP and OLR are similar with suggestions of certain discriminatory features by some authors.The significant role played in the diagnostic process by the inclusion of the clinician and the oral pathologist. In this article, etiopathogenesis, diagnosis, management, malignant transformation of OLP and OLR is reviewed.

Keywords: *Lichen planus, Lichenoid reaction, Dermatologic disease, Oral pathologist.*

Introduction

Erasmus Wilson in 1869 described the disease and coined the term 'lichen planus"[1]. Lichens are primitive plants composed of symbiotic algae and fungi, the term planus is Latin for flat[1]. Lichen planus is a chronic mucocutaneous disease of unknown cause[1]. Usually involves the oral mucosa along with or preceded by lesions on skin and genital mucous membrane[1]. Even though the term lichen planus suggests a flat, fungal condition, current evidence indicates that this is an immunological mediated mucocutaneous disorder.

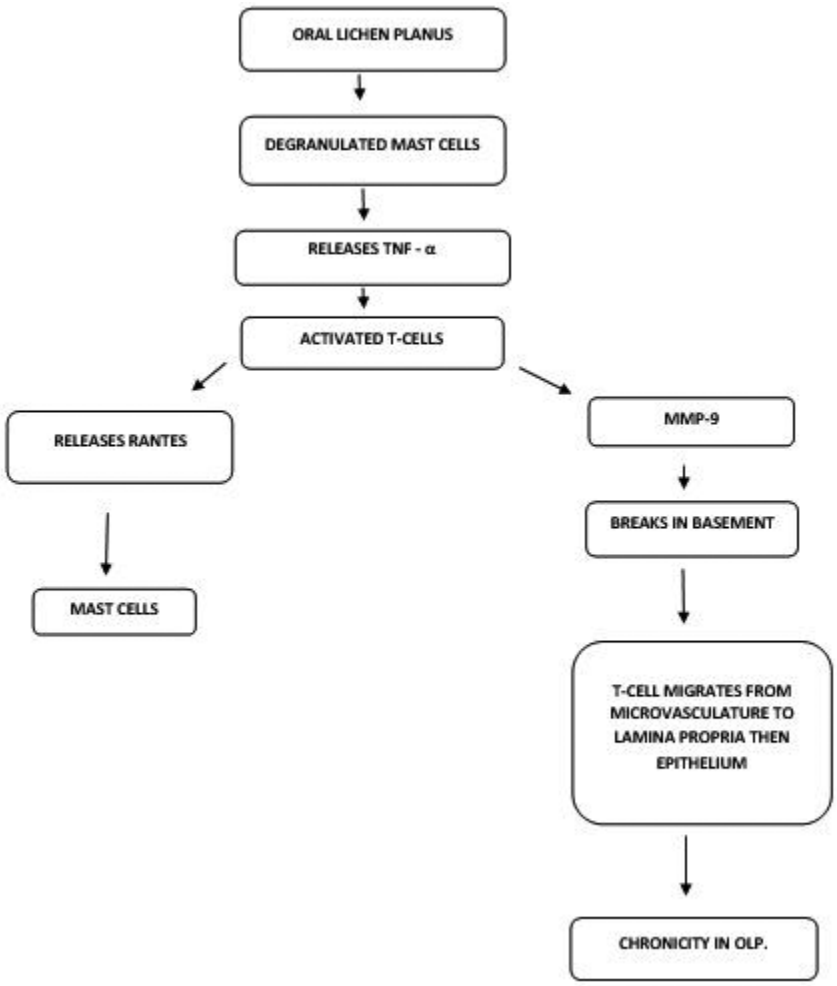
Lichenoid reactions and lichen planus are of different etiology yet show similar clinical and histopathologic features. Lichenoid reactions are inflammatory lesions with a variety of etiology, along with immune mediated illness, systemic and dental responses. Such agents are believe to expose the specific antigen on keratinocytes.



(Lichen planus in left buccal mucosa)

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PATHOGENESIS: (3 and 4):



Lichen Planus Vs Lichenoid Reaction:

Etiology:

Lichen planus: Autoimmune[1].

Lichenoid reaction: Drug induced immune disease[1].

Trigger:

Lichen planus: chronic liver disease, Hepatitis C, Stress, Genetic factorsand Tobacco chewing[4].

Lichenoid reaction:

Drugs – Beta blockers, antimalarials, ACE inhibitors, NSAID, thiazide diuretics, pencillamine, sulfonamides.

Dental materials – amalgam restoration.

Flavouring agents – Peppermint oil, cinnamon flavoured mouthrinses.

Heavy metals – mercury and graft versus host disease[4].

Latent Period:

Lichen planus:absent or unknown[2].

Lichenoid reaction: a few weeks to months, average latency of 12 months[2].

Clinical Findings:

Lichen planus: Flat papules, papulosquamous eruptions[6].

Lichenoid reactions: scaly or eczematous, psoriasiform or violaceous plaques[2].

Wickham's Striae:

Lichen planus: present

Lichenoid reaction: uncommon.

Distribution

Lichen planus: Flexural with involvement of wrists, forearms, lower legs, genitals.

Lichenoid reaction: Generalized distribution, frequently spares the classic sites of lichen planus.

Pruritus:

Lichen planus: usually present

Lichenoid reaction: present

Mucosal Involvement:

Lichen planus: present

Lichenoid reaction: usually absent.

Nail Involvement:

Lichen planus: present

Lichenoid reaction: Absent

Scalp Involvement:

Lichen planus: common

Lichenoid reaction: Uncommon

Koebnerization:

Lichen planus: common

Lichenoid reaction: not a well- defined finding

Types:

Lichen planus[5]:

- Reticular lichen planus,
- Erosive lichen planus,
- Plaque like,
- Papular,
- Ulcerative and bullous.

Histopathologic Feature:

Histopathologic Features:

Lichen planus: Saw tooth rete ridges[2], vacuolar degeneration of basal cell layer[2], band like infiltrate of lymphocytes[1], degenerating keratinocytes[1], colloid, cytoid, hyaline or civatte bodies[1], no signification degree of epithelial dysplasia[1], hypergranulosis[6], hyperorthokeratosis[6].

Lichenoid reaction: Multiple colloid bodies[2], eosinophils, plasma cells, neutrophils, infiltrate of lymphocytes[2], focal spongiosis and infiltrate around blood vessels[2], focal parakeratosis[2], focal disruption of granular layer[2], colloid bodies in *s.corneum* and granular layer[2].

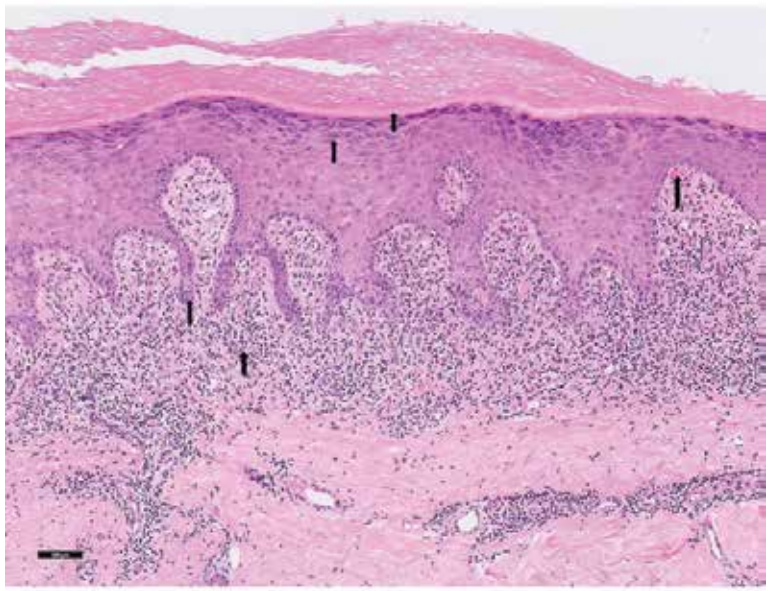
Course And Prognosis:

Lichen planus: self- remitting course, subside with post inflammatory pigmentation.

Lichenoid reaction: chronic relapsing course, it takes months to subside with post inflammatory pigmentation

Malignant:

Lichen planus: Increased risk of malignant transformation[7].



Histopatholgical picture of lichen planus

(From left to right)

A. Saw tooth rete- ridge,

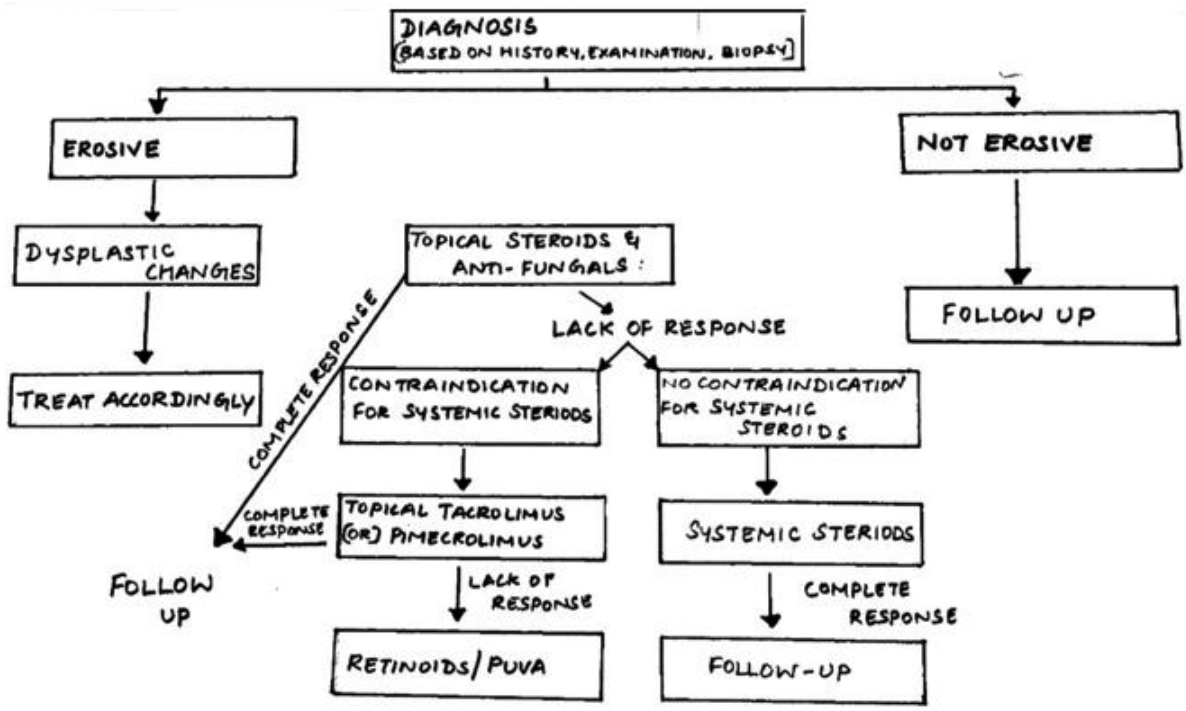
B. Subepithelial band of chronic inflammatory infiltrate,

C. Hypergranulosis,

D. Hyperorthokeratosis,

E. Civatte bodies.

Treatment:



(source: www.jomfp.in)

Conclusion

Attention should be given to the difficulty in determining the differential diagnosis by doctors unaware of the two diseases or who do not follow their patients for the period required for their differentiation as well as if the microscopic diagnosis of LR can not be achieved owing to absence of indication of a cause effect connection. In addition to specific diagnosting testing, a thorough history and full mucocutaneous examinational is crucial. OLP Presents both the patient and physician with a therapeutic challenge, and due to the potential for malignant transformation, long-term monitoring of OLP patients should be carried out.

Ethical Clearance: Not required since it is a review article

Source of Funding: Nil

Conflict of Interest: Nil

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Nanotechnology in Detection of Oral Cancer

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ABSTRACT

Oral cancer is a widespread and aggressive cancer with a greater rate of morbidity, mortalityand recurrence worldwide. Early diagnosis is of utmost significance for the prevention and management of cancer. Nanotechnology is a broad field that has pioneered the sectorand set modern trends in oral cancer management. Tissue biopsy is usually the fundamental basis for the diagnosis of oral cancer, but it is invasive and can cause discomfort to patient. Nano detection devices are recognized as recent emerging non-invasive approaches to nano scale biomarker sensitivity detection. Nanotechnology can help with less harmful substance to have a better diagnosis. Nanotechnology next- generation technology have many benefits in treating cancer patients during oral malignancy stages from diagnosis to therapy and monitoring disease.

Keywords: *Cancer, Diagnosis, Nanotechnology, Non-invasive.*

Introduction

Oral squamous cell carcinoma (OSCC) is a devastating disease and is globally pervasive[1]. While most lesions are preceded by potentially malignant lesion, only about 5% of these lesion are progressing1. Potentially malignant lesion appear on the oral mucosa as white or red patches and there is no clear indication for cancer1. Oral cancer is the sixth most prevalent cancer in the world and has a survival rate of about 50% for 5 years2. The significant form of malignancy is OSCC, representing over 90% of all oral cancer2. They can invade tongue, mucosa, floor of mouth, alveolar and hard palate and it is reported that the tongue is the most subsite with poor prognosis[2]. Typically,unresolved lesions will undergo scapel biopsy and histopathological assessment for signs of epithelial dysplasia[3]. Because most of these lesions are benign, this method is unduly invasive and leads to other problem3. Chemotherapy, Radiotherapy and surgery are the most common treatment for oral cancer4. Limitations in the therapy of oral cancer consequence from present challenges in cancer therapies, including inability of early detection of disease, non-specific systemic distribution, insufficient tumor concentration of drugs and failure to monitor therapeutic reactions[4].

Richard P Feynman developed the concept of nanotechnology in 19595. Nanotechnology is revolutionizing biomedical engineering by enabling new types of drug delivery, tissue module synthesis, biomaterial growth and enhanced surface of medical devices5. Nanotechnology provides a wide variety of technologies and improvements in oral cancer prevention, diagnosis and therapy[5].

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Generations of Nanotechnology

Nanomaterials: Due to its distinctive size (1 -100 nm) and huge surface-to-volume ratio, nanotechnology has the ability to give alternatives to current barriers in cancer therapies4. Increased permeation and retention effects are known to accumulate nanoparticle with a size of 200nm at the solid tumor site4. Nanomaterials in one dimension

are called sheets, nanowires, nanotubes and three dimensional quantity points in two dimensions[5]. Because of the gain in surface region and quantum impacts their characteristics differ from other fabrics5. Nanomaterials have much higher surface area per unit mass compared to larger particles owing to their tiny size[5].

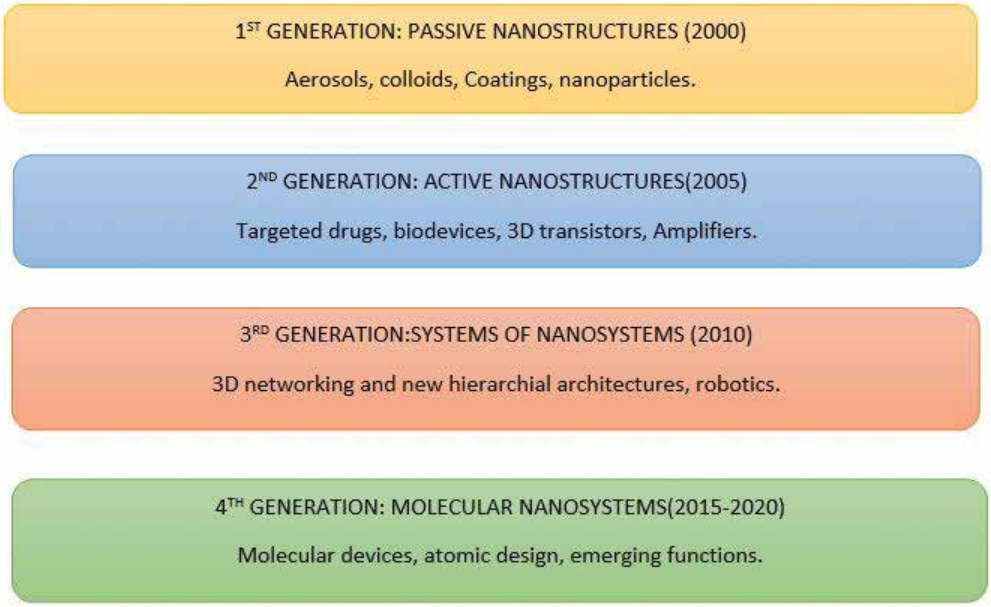


Fig. 1: (Source: overview and implications of nanotechnology – mike roco)

Nanotechnology: Numerous autofluorescence adjunctive, chemiluminescence, or tissue staining dye -based method assist to visualize potentially malignant lesions[3]. However, as their sensitivity and specificity are inadequate for diagnostic use, clinicians usually opt for biopsy evalution[3]. Cytological assessment, on the other hand is regularly used to diagnose a variety of other malignancies[3].

Quantum dots, carbon nanotubes, paramagnetic nanoparticles, liposomes and gold nanoparticles are the most well studied nanoparticles[4]. QDs are used to conduct cell motility assays and to study migration related cell signalling occurences and to distinguish between invasive and non-invasive cancer cell lines[4]. The Optical detection method is the most widely used method for detecting the existence of cancer and image cancer tissue with the help of biomarker or functionalized nanomaterials, where nanoparticles either fluroresce oralter their optical properties when binding to tissue affected by cancer[4]. By incorporating novel-functional on novel shaped nanomaterials and biomolecular markers, Bio-MEMS was used as a diagnostic instrument in cancer treatment[4].This allows studying the studying the basic biological mechanism that dictate health and disease[4]. Bioconjugated particles and equipment are also being developed in body fluids such as serum and blood for early identification of cancer[4]. These nanoscale devices work on cancer cells or target protein selectively captured[4]. The sensors are covered with a cancer-specific antibody or other receptors of bio recognition so that the capture of a cancer cell or target protein results in electricity[4]. Uses of nanoparticles in blood or serum specimens to detect and analyze circulatingtumor cells and biomarkers[4]. By combining magnetic nanoparticles and semiconductor QDs, it is feasible to improve the capacity to capture and assess these rare circulating cancer cells[4].

Nanotechnology has reshaped the detection and therapy of cancer5. It has the ability to detect even a single cancer cell in vitro and to offer extremely toxic drugs directly to cancer cells[5]. Nanoshells, carbontubes, Quantum dots, supermagnetic NPs, nanowires, nanodiamonds,dendrimers and lately synthesized nanosponges are some of the tools used to detect cancer[5]. NPs can selectively target cancer biomarkers and cancer cells, enabling for more delicate diagnosis; early detection requiring a minimal quantity of tissue; tracking of treatment advancement and tumor burden over time; and the destruction of cancer cells alone[5]. Plasmonic NPs combines with nuclear targeting peptides in cancer cells

trigger DNA damage and apoptotic population[5]. NPs can be used to detect tumor cells qualitatively or quantitively in vitro5. Probably, nanotechnology is the only technique that can be used for site-specific action without the killing of ordinary cells causing side effects5. The recent trend in cancer therapy is cancer nanotechnology[5]. It is a good hope for enhancing cancer treatments by acting atleast on two primary levels : giving a pharmaceutical agent fresh characteristics (enhanced stability, altered pharmacokinetics) and directly targeting the agent to the tumor[5].

Conclusion

Despite incredible progress in cancer therapy, there are still many science, technological andclinical difficulties that require a extremely interdisciplinary and cooperative approach to cancer management.There is no doubt that nanotechnology has the ability to be the most effective and advantageous type of future cancer treatment and diagnosis. Nanotechnology will make a more profound transformation of dentistry, health care and human life than many other advances in the past.

Ethical Clearance: Not required since it is a review article

Source of Funding: Nil

Conflict of Interest: Nil

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Sports Dentistry—A Current Update

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ABSTRACT

Sports Dentistry is one of the latest and developing field in dentistry. It engages in the prevention, maintenance and therapy of oral and facial illnesses,as a well as in the gathering and dissemination of details on dental trauma, beyond study stimulus. Dental injury is the most common type of orofacial injury that occurs during participation in sports. Oral injuries can trigger disfigurement of the sufferer after healing, which may influence the quality of life of athlete. Many athletes are unaware of the health consequences of a traumatic injury to the mouth or the potential for severe head and orofacial injuries while playing. The dentist can play an important role in conveying athletes about the importance of preventing dental and facial injuries in sports. The purpose of this article is to raise professional consciousness and interest in sports dentistry orientation.

Keywords: *Sports, injuries, dentistry, athlete.*

Introduction

Dental injury in sports is the biggest link between sports and dentistry[1]. In perspective, of the enhanced popularity of contact sports and encouragement of early participation, the role of dental profession in the prevention of dental and other orofacial sport accident has become more crucial[3]. Sports dentistry originated in the 1980s, but sport -related injuries are increasing prevalent; this could be due to the dentists lack of any specific training[6]. Soft tissue injury and hard tissue injuries like tooth intrusion, luxation, crown and/or root fracture, avulsion, dental and facial fracture, abrasions, contusion, laceration are the most common orofacial injuries in sports[6]. The effects of orofacial trauma on children and their families are substantial due to potential for pain, psychological effects and economic consequences[6]. Sports Dentistry is designed to prevent oral/facial atheletic injuries and associated oral illness and manifestations[1].

It has two main parts:

1. The treatment of orofacial injuries related to sports[1].
2. The avoidance of orofacial injuries related to sports[1].

Mouth guards were made compulsory in many sports during the 1960s and 1970s, including football, lacrosse, hockey, boxing, racquetball, shot placing, skateboarding, skydiving, soccer, squash, volleyball, polo and wrestling[9]. Currently, to prevent sport related orofacial injuries 3 shielding devices can be used, mouth guards, facemask and helmet[9]. Athletes, coaches, people involved in sports and dental community members should be conscious of how people involved in sports operations are at high danger of dental/orofacial trauma[10].

Incidence: Face, is the body's most susceptible region and is generally the least protected area[3]. Most often these injuries are due to direct hits with contacts with a ball or player to player[3].Studies have shown that 13-

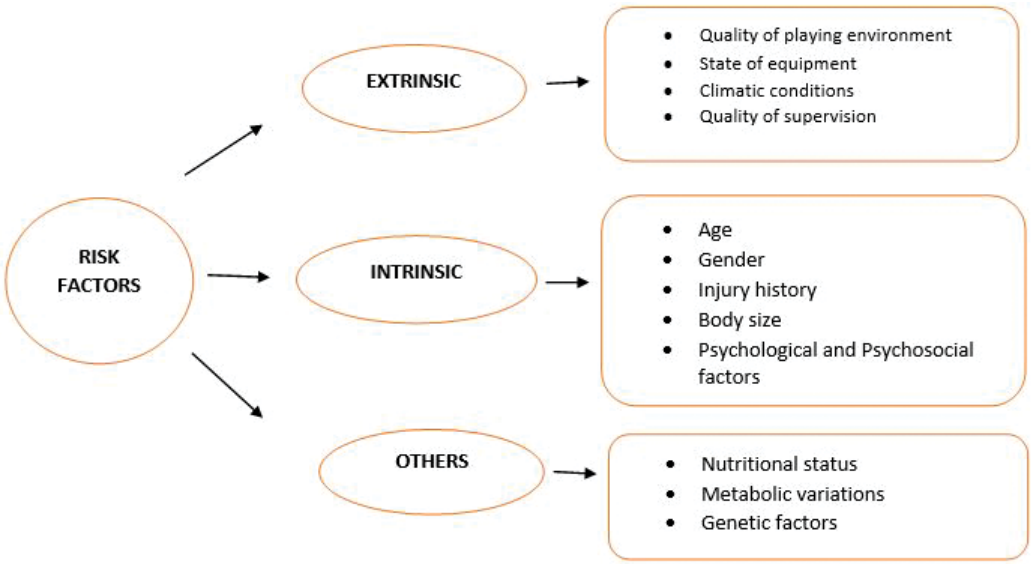
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39% of all dental injuries were linked to sport and 11-18% of all sport incidents were maxillofacial injuries[7]. Nose, zygoma and mandible are the most prevalent forms of sport facial trauma[7]. These injuries frequently occur together[7].Males are more commonly affected than females.In dental injury, upper lip, maxilla, maxillary incisors are commonly affected[7].

Evaluation: The assessment of facial injuries should follow the principles of trauma assessment and should begin with ABCDE Airways, Breathing, Circulation, Disability, Exposed control of surroundings[3]. The facial examination is then performed after the final evaluation and stability[7]. A systematic method is followed to effectively determines the magnitude of injury and properly diagnose injury to teeth, periodontium and related structure[7]. Assessment involves a comprehensive details of medical and dental history[7]. Clinical and radiographic examination and additional test such as palpation, percussion, mobility evaluation as person[7].

Intra-oral radiography is helpful for the assessment of dento-alveolar trauma. Extra-oral imaging may be indicated if the region of concern extends beyond the dentoalveolar complex[7].

Factors: (1)



Various Sports Related Injuries:

1. Eye injuries[4]:
   - Sudden loss of field of vision
   - Foreign body sensation
   - Laceration of eyelid
   - Sub-conjunctival haemorrhage
   - Broken contact lens
   - Shattered eyeglasses.
   - Red and inflamed eye.
2. TMJ Injuries[5]: In temporomandibular joint injuries, we can see;
   - Pre- auricular pain
   - TMJ dysfunction
   - TMJ dislocation
   - Pain during mastication
   - Restricted mouth opening
   - Deviation
   - Crepitus.
3. Intrusion[8].
4. Extrusion[8].
5. Crown and root fracture[8].
6. Avulsion[8].
7. Soft tissue injuries[8]:

   Abrasion

   Contusion

   Laceration

Involved sites: eyebrows, cheeck, chin and lip (most commonly)

8. Fractures[8]:

Zygoma

Nose

Mandible

Tooth or alveolar bone fracture

Floor of orbit

Prevention of Sports Related Traumatic Orofacial Injuries: All preventive services provided by the private physician should be made accessible to athletes and others whoprone to trauma associated with sports[1]. It is essential to provide specific guidance on trauma prevention, correction of mal-aligned teeth, extraction of affected teeth, use of mouth protectors, and treatment of any pathological anomaly and prevention[1].

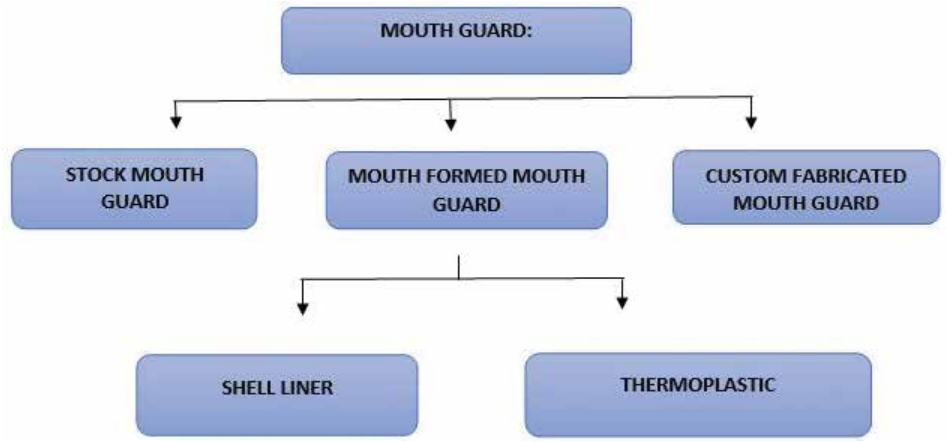
Proper training, emergency management is very important.

Pre-Operative Protocols[10]:

1. Extraction of affected tooth which is untreatable[10].
2. Maintenance of proper oral hygiene[10].
3. Teeth replacement[10].
4. Restoration of decayed tooth[10].
5. Special care for children[10].
6. Making of shielding devices to prevent dental injuries[10].

Devices:

1. Helmet[2]
2. Face masks[2]
3. Mouth guard[2]



Dental Emergency Kit[8]: (Sports)

- Gloves
- Mouth mirror
- Pen torch
- Tongue depressor
- Scissors
- Sterile wire cutters
- Rope wax
- Intermediate restorative material
- Spatula
- Mixing pad
- Sterile gauze – 2X2 and 4X4 size.
- Mouth guard
- Tooth preserving solution.

Conclusion

Sports dentistry covers a broad variety of oral/ facial athletic injuries and associated oral illnesses and their manifestations, including preventive and therapy modalities. Safe participation in sport should be the objective of any program of sport. It is the dentist's responsibility as a health care professional to become and remain educated and pass this education on to the community on issues relating to sport dentistry and specifically the prevention of oral and maxillofacial

accidents related to sports. A mouth guard should be the essential equipment for every athlete to prevent these types of injuries.So play smart, wear mouth guard and protect your smile.

Ethical Clearance: Not required since it is a review article

Source of Funding: Nil

Conflict of Interest: Nil

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Complications of Bisphosphonate Therapy in Dentistry

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ABSTRACT

Bisphosphonates are group of drugs that inhibit bone resorption thus used in the treatment certain disorders like Paget's disease, Osteoporosis, Multiple Myeloma and metastasis associated with breast or prostate cancer. The most common complication faced by any dental surgeon is Osteonecrosis of Jaw which can occur after any surgical procedures. Since proper effective treatment of Bisphosphonate induced osteonecrosis is not known prevention is very important in high risk individuals.

Keywords: *bisphosphonates, osteonecrosis of jaw, osteoporosis*

Introduction

Reports regarding bisphosphonate induced osteonecrosis of jaw first came into being in the year 2003[1,2] where IV Bisphosphonate like zoledronic acid and panidronate taking patients got affected. Its not limited to IV administration only, patients were also reported with cases of Osteonecrosis of jaw with orally administered bisphosphate as per case reports in 2006 [3-5]. **BRONJ** (Bisphosphonate Related Osteonecrosis Of Jaw) generally affects the quality of life. Thus strategies for managing these kind of patients with or at risk for BRONJ was done by American Association Of Oral & Maxillofacial Surgeons (AAOMS) an approved by Board Of Trustees in Sep 2006[6].

Types: Generally two types based on **mode of administration**-

1. Intravenous
2. Oral

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Based On Generations- Three generations are there.

Indications

Intravenous: Effective in treatment of cancer related condition like

1. Hypercalcemia of malignancy
2. Breast cancer
3. Prostrate Cancer
4. Lung cancer
5. Management of cystic lesion in the sitting of multiple myeloma [7,9].

Oral: Osteoporosis, sometimes it is used to treat Osteopenia as well [46]. Certain condition like Paget's disease, Osteogenesis imperfecta of childhood [10,11].

Mechanism of Action: Generally four mechanism of action can be noted in bisphosphonate-

A. **Inhibition of calcification:** For this mechanism of action bisphosphonate was earlier proposed for treatment of ectopic calcification like calcification of soft tissues. But it was later found out that it can inhibit the mineralisation of normal calcified tissues such as bone, cartilage, enamel, dentin,and cementum [12]

B. **Inhibition of Bone Resorption:** It has direct action on osteoclastic differentiation, reducing their activity, and inducing osteoclast apoptosis [13].

C. **Anti-tumor Effects**: Nitrogen containing Bisphosphonate especially Zolendronic acid exhibit anti tumor effects. They exhibit proliferation and also enhance apoptosis in cultured cancer cells to the bone matrix and thus inhibit cell migration and inhibition.

D. **Anti-angiogenic effect**: Bisphosphonate like Zolendronic acid has anti angiogenic properties mediated by inhibition of growth factors like FGF and VEGF B4[14].

Clinical Appearance of Osteoradionecrosis of Jaw: ONJ clinically appears as an intraoral lesions with areas of exposed yellow-white hard bone having smooth or ragged borders sometimes can associated with smooth or ragged extra-intraoral sinus tracts lasting more than eight weeks [15,16-18]. Presence of painful ulcers also can be noticed in the soft tissues adjacent to bone Patients considered to have BRONJ if following these characteristics are present

1. Current or Previous treatment with a bisphosphonate
2. Exposed bone in maxillofacial region that has persisted for more than 8 weeks
3. No history of radiation therapy taken to jaws.

Stages: staging was done to correctly specify the patients according to their symptoms.

Stage-0: NO clinical evidence of necrotic bone but some non-specific symptoms or clinical and radiological findings can be seen.

Symptoms: Like unexplained toothache, dull aching bone pain in the body of the mandible, which may radiate to temporomandibular joint region, sinus pain which may be associated with inflammation and thickening of the maxillary sinus wall can be seen.

Clinical Findings: Loosening of teeth without any periodontal disease or sometimes periapical fistula can be seen not associated with pulpal necrosis.

Stage-1: Exposed and necrotic bone in asymptomatic patients without any evidence of infection.

Stage-2: Exposed and necrotic bone in patients with pain and infection.

Stage-3: Exposed and necrotic bone in patients with pain and clinical evidence of infection with any one of the following manifestations like pathologic fracture, extraoral fistula, oral antral or oral communication, osteolysis infiltrating to inferior border of mandible or sinus floor.

Risk Factors:

1. Risk of developing osteonecrosis with intake of bisphosphonate largely depends upon bisphosphonate potency, mode of administration and dosage. When we compare IV and oral route of administration and their respective potency, IV is more potent. Among various IV administered bisphosphonate, Zolendronate is the most potent bisphosphonate since it has high mineral binding affinity [19-22].
2. History of any Dental Treatment: a history of dental disease followed by any invasive dental treatment which induced trauma like extraction and impaction, also periodontal disease are sometimes considered to be risk factors for development of ONJ in association with bisphosphonate. [21,23-24]
3. ONJ occurs twice as frequently in mandible than in maxilla and in areas with thin mucosa such as torus mandibularis and mylohyoid ridge.[25,20,26]
4. Malignancy: Type and duration of malignant disease, duration of bone metastasis may pose an increased risk of ONJ development [23]. ONJ mostly seen in Breast Cancer, Multiple Myeloma and Prostrate cancer [27].
5. Concomitant treatment: Patients receiving chemotherapy and corticosteroid are at high risk.
6. Age & Sex: Old and female patients are at increased risk of developing ONJ.
7. SMOKING also pose as threat to incident of ONJ.
8. Comorbid Conditions: Conditions like low hemoglobin level [26], Low serum calcium level and secondary hyperparathyroidism [28], renal dialysis[27], diabetes[29], Obesity[30]-possible risk factors for ONJ. Other conditions like Hypertension, Hyperlipidemia, Hypercholestrolaemia, Rheumatoid Arthritis and diabetic contribute also to risk of developing ONJ in patients receiving bisphosphonate for non cancer indications [31].

Radiological Features: In symptomatic patients, OPG is usually first screening examination. Though Computed Tomography (CT) or Magnetic Resonance Imaging (MRI) are methods of choice for evaluating bisphosphonate-associated jaw bone osteonecrosis since they correlate with histopathologic examination [32]. Recently Cone Beam Computed Tomography (CBCT) gained popularity since it offers access to 3D image of bone structure. In CBCT destruction of trabeculae structure of cancellous bone is vivid and erosion of cortical bone with increases severity of BRONJ bone sequestration and formation of new periosteal bone can also be detected[33]. Evaluation of sockets for 4-6 months should be initiated and if the socket is persisting even without clinical signs of a follow up should be done [33].

Radiographic Finding on Stage 0: Patients with no clinical evidence of necrotic bone, but present with non-specific symptoms or clinical and radiographical findings, such as, alveolar bone loss or resorption not attribute to chronic periodontal disease, dense woven bone and persistence of unremodeled bone in extraction sockets. Thickening and obscuring of periodontal ligament, inferior alveolar canal narrowing. These are non specifying findings can be seen in patients with a history of Stage 1,2 or 3 disease who have healed and no clinically exposed bone.

Management and Prevention of Bronj: Thorough oral check up to the patients before they undergo monthly IV bisphosphonate. Non restorable teeth or poor prognostic teeth if any should be extracted and all invasive procedures should be competed and optimal periodontal health should be achieved B1. As per three studies reported, the preventive dental treatment decreased BRONJ risk among patients with malignancy treated with Bisphosphonate [19,34,35]. Though risk of BRONJ with oral Bisphosphonate Therapy is less in number but it is not nil. Sometimes in presence of chronic corticosteroids use this condition is aggravated. If the systemic conditions permits, discontinuation of oral bisphosphonate or drug holiday can be considered, though there are limited data available to support the evidence of benefits of discontinuing Bisphosphonate Therapy [37]. For asymptomatic patients if systemic condition persists on oral bisphosphonate for more than 4 years, a drug holiday of 2 months prior to and 3 months following extraction can be implemented. [36].

Treatment Protocols[25,20,38-40]

1. **Patients who are about to undergo bisphosphonate treatment:** Since majority of these kind of patient develop osteonecrosis while undergoing dental surgery [21,41,42] Therefore if systemic condition persists bisphosphonate therapy should be delayed until oral and dental health is optimized. Atleast a gap of 14-21 days should be given from dental surgery to initialize the therapy to promote enough osseous healing.
2. **Asymptomatic patient already under intravenous Bisphosphonate:** Good oral and dental hygiene maintainance should be of utmost importance. Avoiding any invasive dental procedures like intra and trans alveolar extraction should be avoided. Generally the risk of develping BRONJ associate with oral bisphosphonates increased when duration of therapy exceeded three years. Although sound recommendations based on strong clinical research designs are still lacking for these patients. [43,38-44].
3. **Patients with BRONJ:**

   Treatment objectives: elimination of pain, control of infection of soft and hard tissues, minimize the progression or occurrence of bone necrosis.

   Treatment Accrding Stages: Stage 1 - these patients benefit from the use of oral antimicrobial rinses such as chlorhexidine 0.12%. No surgical treatment is indicated.

   Stage 2: these patients get relief from using oral antimicrobial rinses in combination with antibiotic therapy. Most of the isolated microbes have been sensitive to penicillin group of antibiotics. Quinolones, etronidazole, clindamycin, doxycycline and erthromycin have been used with success in those patients who are allergic to penicillin.

   Stage 3: These patients benefit from debridement including resection in combination with antibiotic therapy, which may offer long-term palliation with resolution of acute infection and pain.

Biochemical Marker: No specific proper studies are there for using markers of bone turnover to diagnose BAONJ in patients treated with bisphosphonate or

to identify those who are at risk [44,45] of developing BAONJ. Still handful of patients as per some authors have suggested that lower level of biochemical markers of bone turnover like serum C-telopeptide or N-telopeptide could identify those who are at risk of developing BAONJ.

Conclusion

High risk individuals to ONJ should be sorted out while treating patients. So, case history and moreover drug history is to be taken carefully due to the seriousness of this condition and to provide necessary preventive measures. But more researches are necessary in order to find and clarify the risk factors that lead to development of BRONJ.

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Long Term Effects on Adult Survivors of Child Maltreatment

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ABSTRACT

The physical injuries seen in children though can be quantified, the psychological long term impacts in response to child maltreatment I.e child abuse and neglect can have life long negative impacts. Somehow in later life indirectly it hampers the society as a whole. These consequences can be independent of each other, but sometimes they are interrelated also.

Keywords: *child maltreatment, abuse, psychological consequences*

Introduction

Child maltreatment can be of various forms be it physical, verbal, sexual which leads to ultimate psychological abuse. However, consequences of child maltreatment can be devastating and it varies widely. Effect are usually depends upon type, frequency, duration, severity of maltreatment and also the relationship between child and perpetrator. According to WHO every year about 41,000 children under 15 years are victims of homicide. More deaths from child maltreatment go unreported-since they are incorrectly documented due to other causes. The consequences can also last a lifetime. Adults who were abused or neglected as children have a higher risk of-being a perpetrator or victim of violence, can be under prolonged depression, probability of obesity are seen more in these victims, they often fall prey of substance abuse, high risk sexual behaviour or unintended pregnancy as reported.

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Physical Health Related Consequences: Often physical abuse which mainly includes hitting, beating (battered baby syndrome),shaking(shaken baby syndrome) may lead to some immediate physical effect like brain damage by head trauma, retinal hemorrhage etc. On the contrary some takes years to manifest. It has been seen that higher risk of certain diseases like diabetes, lung disease, malnutrition, vision problems, functional limitations, heart attack, arthritis, back problems, high blood pressure, brain damage, migrains, chronic bronchitis, chronic obstructive pulmonary disease, cancer, stroke, bowel disease, chronic fatigue syndrome- are in direct relation to child maltreatment[1]. Child abuse and neglect can cause hindered growth in both form & functions of certain areas of brain. It can also affect the volume and overall size of the brain[2]- According to studies certain areas of central nervous system are hampered like - amygdala, the key to processing emotions, the hippocampus,the centre of learning and memory, the orbitofrontal cortex, responsible for reinforcement-based decision making and emotion regulation, cerebellum the centre of motor coordination behaviour and executive functioning, corpus callosum, which is responsible for left or right brain communication and other processes like arousal emotion, higher cognitive abilities.

Psychological Consequences: 80% of Adults reporting child abuse have atleast 1 Psychological disorder 50% of Child abuse victims have more than 3 Psychological disorders. Mental illness is the only disease that deny its own existence, certainly that the brain can deny its

own existence is a frightening thought. Disrupted brain development as are result of maltreatment can cause impairments to the brain's executive functions like working memory, self control, and cognitive flexibility [2] So certain conditions manifest itself like:

- **Anxiety Disorder:** Difficult to control or interferes with normal functioning Mental disorders like Panic attack, frightening physical symptoms, Flashback of traumatic events, Nightmares, Obsessive thoughts or even housebounds.
- **Mood Disorders:** These are outside the bounds of normal fluctuations from sadness to elation.

  In the workplace, major/clinical depression is a leading cause of absenteeism and diminished productivity. Disorders include: clinical or major depression, dysthymia and bipolar disorder.
- **Psychotic Disorders:** Often suffers from SCHIZOPHRENIA. **SCHIZOPHRENIA** is serious brain disorder affecting the most fundamental human attributes such as LANGUAGE, THOUGHT, PERCEPTION, affect SENSE OF SELF.

Psychotic Manifestation: Hearing internal voices, hallucination, delusions, withdrawal, and incoherent speech and impaired reasoning. Often in superstitious country this is considered as demonic possession and that individual is totally isolated and tortured rigorously under this false harmful beliefs, medical attention becomes a far fetched thing for that individual and ultimately his life is totally destroyed.

- **Dementias:** Characterized by a disturbance of consciousness and a change in cognition, (including memory loss and a decline of intellectual and physical functioning)

Disorders include Alzheimer's, vascular dementia, dementia due to medical conditions, (e.g., HIV, Parkinson's disease)

Substance-Induced: Dementia (drug abuse, alcohol abuse, inhalants), toxin exposure like mercury and lead. Dementia can be due to a combination of multiple factors.

- **Eating Disorders:** Eating disorders are serious, sometimes life-threatening, conditions that tend to be chronic. Onset usually occurs in adolescence and tends to predominately affect females. It is present when a person experiences severe disturbances in eating behavior such as extreme reduction of food intake or extreme overeating or feelings of extreme distress or concern about body weight or shape.

Three major eating disorders are **Anorexia Nervosa, Bulimia Nervosa, Binge Eating Disorder**. Persons with eating disorders may also have other mental illnesses such as: depression, anxiety, obsessive-compulsive disorder (OCD), personality or substance abuse disorder

Post-Traumatic Stress: Children who experienced any abuse and neglect can develop post-traumatic stress disorder (PTSD), characterized by persistent re-experiencing the traumatic events related to abuse, avoiding people, places, and events that could be associated with their past maltreatment. Feeling of fear, horror, anger, guilt, or shame, startling easily and exhibiting hypervigilance, irritability, mood changes [3]. PTSD in children can lead to depression, suicidal behaviour, substance use and defiant behaviour continued to adulthood.

Long Term Effects of Sexual Abuse: Adult survivors of child sexual abuse may face following concerns which are specific to their experience

- **Guilt, shame, and blame:** guilty about not able to stop the abuse,or they then blame themselves. A feeling of shame and blame followed by that which most of the time are enforced by society or even parents.
- **Low self esteem:** sexual abuse victims often become low on their self esteem. Usually it is the aftermath of guilt, shame, and blame that has been burdened on her/him by the society. They have a feeling of worthlessness and avoid others because they believe themselves impure and they have nothing to offer[6]. This affects their different future aspects of life like relationship, career, even their health.
- Often **hatred towards a particular gender** becomes prevalent. They dissociate to protect themselves from experiencing the sexual abuse. As adults they may still use this coping mechanism when they feel unsafe or threatened[4].
- Denial and repression of sexual abuse is believed by some to be a long term effect of childhood sexual

abuse. Symptoms include experiencing amnesia concerning parts of their childhood, negating the effects and impact of sexual abuse, and feeling that they should forget about the abuse[7].

- **Establishing Relationship:** Survivors of sexual abuse may experience difficulty in establishing interpersonal relationships. Symptoms correlated with childhood sexual abuse may hinder the development and growth of relationships. Common relationship difficulties that survivors may experience are difficulties with trust, fear of intimacy, fear of being different or weird, difficulty establishing interpersonal boundaries, passive behaviors, and getting involved in abusive relationships[7].
- Many survivors experience sexual difficulties. The long-term effects of the abuse that the survivor experiences,affect the survivors sexual functioning. Author Maltz[5] gives a list of the top ten sexual symptoms that often result from experiences of sexual abuse: "avoiding, fearing, or lacking interest in sex; approaching sex as an obligation; experiencing negative feelings such as anger, disgust, or guilt with touch; having difficulty becoming aroused or feeling sensation; feeling emotionally distant or not present during sex; experiencing intrusive or disturbing sexual thoughts and images; engaging in compulsive or inappropriate sexual behaviors; experiencing difficulty establishing or maintaining an intimate relationship; experiencing vaginal pain or orgasmic difficulties (women); and experiencing erectile, ejaculatory, or orgasmic difficulties (men). A study done on the prevalence and predictors of sexual dysfunction in the Untied States which found that male victims of childhood sexual abuse were more likely to experience erectile dysfunction, premature ejaculation, and low sexual desire, and they found that women were more likely to have arousal disorders [8].

Recommendations

1. Proper IMPLEMENTATION & ENFORCEMENT of laws such as laws banning violent punishments given by parents, teachers or any caregivers.
2. Parents should let their kids know about what is sexual abuse especially what is wanted or unwanted touch and how to handle when someone approaches.
3. If a child that would be an adult someday is physically and psychologically strong at peace then he would productively participate in the development of society.
4. Protection of a mistreated child must be our main concern. Abused children and children who witness violence between parents are at an increased risk of growing up to be abusers themselves. Thus, every time we prevent an individual from being abused, we may be protecting future victims as well.
5. Communities can ensure that public and private agencies have the tools-such as assessments, evidence-informed interventions, and properly trained staff- to provide children and their families with timely, appropiate care to prevent child maltreatment and alleviate its effects.

Who Recommended Steps That Should Be Taken By Health Sectors:

1. Awareness should be raisedabout long term negative health effects and social burden of child maltreatment- both in health sectors and other sectors.
2. Data about prevalence, risk factors,health consequences of child maltreatment should be collected and communicated.
3. Evidence-based interventions should be developed and tested to prevent child maltreatment-like home visits with nurses and parenting programmes held in provider's office or health facilities.
4. Support and services should be provided to victims of child maltreatment including mental health and psychosocial health services.
5. Other sectors should also be collaborated to address child maltreatment, especially social welfare protection, education, criminal justice sectors.

Conclusions

Tens and thousands of children each year become the victim of child abuse and neglect. Though it is a complex societal issue, little is known about the consequences of adult outcome which this review article tried to shade

light on it. Doctors and health care professionals play a key role in detecting such inhuman atrocities but unfortunately most of the time fail to do so due to lack of understanding and protecting these vulnerable groups. So this review article discussed about various outcomes of child maltreatment and its traumatic impact on victims, family, society.

Ethical Clearance: Not required since it is a review article

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Physiotherapy in Dentistry

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ABSTRACT

Physiotherapy can be the alternative line of treatment for orofacial pain. It can be considered and well tolerated by the patients since it is painless, but by now also the concept is quite unclear to many so implementation in dental practice is far fetched. So dental professionals should be aware of the positive benefits regarding this line of treatment and try to incorporate in the challenging cases of various orofacial pain.

Keywords: *physiotherapy, orofacial pain, dentists*

Introduction

Orofacial pain is one of the most common problems that dentist faces in his clinical practice. These are complex, chronic disorders of multifactorial origin, the diagnosis and management is a real challenge to dentists. An understanding doctor, a well informed patients reasonably adequate communication between both, devoted compliance to treatment and a consistently mental attitude are essential to alleviate even the most intractable orofacial pain. Orofacial pain can vary from occasional nags to suicidal pain which can affect the quality of life and well being of human beings. Primary treatment aim should always priortize in giving relief from pain to patients and return the particular individual to his normal life.

The concept and benefit of physiotherapy have been a foreign idea to lot of people in past and up until now, people usually suffering from the orofacial pain conditions consult doctors and demand drugs to get relief but this only deals with the symptoms rather than the cause of the pain and have addictive side effects too. So, alternatives like field of physiotherapy can play here a major role as it is a non-pharmacological treatment, based on the traditions established in the field of orthopedics concerned with care, management and rehabilitation without any side effects as do in oral medications.[1]

Dentists Awareness: As day passes on the field of Physiotherapy are coming into light. They have been incorporated in certain orofacial conditions and results are also satisfactory. But still there are dental professionals who are not so aware of the positive outcomes of this branch or how it could be implemented in their practices. According to a study conducted in Florida, a large percentage of dentists who completed the survey were not aware of benefits of physiotherapy in treating TMDs, where TMD is a very common disorder a dentist faces in his daily practice. [2]

Treatment Modalities in Physiotherapy

Physical Therapy[3]: Mainly **indicated** on muscle spasm, migraines, myositis, revascularization.

Physical Therapies are **contraindicated** in - Acute infectious conditions, Cancers, Skin infections, Abscess, Synovitis.

Types[4,5]:

1. **Massage:** Flexibility is restored and stimulates parasympathetic activity.

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A. **Deep Massage:** Assist in mobilizing tissue and increase in blood flow thus eliminating triggering point

Mechanisms of Physical Therapy:

A. **Biomechanical Effect:** It produces mechanical pressure on tissues. It decreases tissue adhesion, Increase muscle compliance and range of joint motion. Decrease passive and active stiffness.

B. **Physiological Effect:** It produces changes in tissues or organs, like increasing muscle blood flow and skin blood circulation. It increases parasympathetic activities, cause increased in relaxation of hormones and decreases stress hormones.

C. **Pschological Effect:** Increases relationship between body and mind by promoting relaxation and decreasing anxiety.

D. **Neurological Effect:** promotes reflex stimulation, neuromuscular excitability thus decreasing pain and muscle tension or spasm.[3]

2. **Spray And Stretch Technique:** Mixture of flurocarbons as vapocoolant are used since it decreases the pain so that manipulation becomes comfortable.

3. **Physical Activity:**

Indication: Myofacial pain due to active trigger point, musculoskeletal dysfunction, to increase range of motion of various joints.

A. **Soft Tissue Mobilization:** Also called Myofacial release. Similar to deep massage. It also alleviates the trigger point and enhance blood flow and mobility.

B. **Joint Mobilization:** Not indicated in inflammatory joint disorders.

C. **Muscle Conditioning:** Compilation of exercises that help to restore normal function and movement of orofacial structures. These are - I)Passive Muscle Stretching ii)Assisted Muscle Stretching iii)Resistance Exercises Iv) Postural training. POSTURAL TRAINING is mainly done with patient of TMD having a forward head posture to keep the head in a more normal relationship with shoulders which in turn can help in reducing the TMD symptoms. Further Exercises like facial strengthening exercise which includes puckering of lips and moving from one side to other, smiling by showing teeth and gums, puffing of cheeks, "O" Exercises (pursuing the lips in an O shape hiding the teeth under lips), Lower lips lifting, lip holding (by putting stick or tongue blade) between lips and holding with two lips only) T2,1. TONGUE EXERCISES like straight tongue stretch side tongue stretch, up & down stretch, tongue sweep, Pushing the tongue against the cheek[4].

Electrotherapy: Frequently used now in clinical physical therapy for pain relief and tissue regeneration. It has a bioelectric effect on human cells. It stimulates sensory nerve to treat pain. Photomodulation of LASER activates the components of the mitochondrial respiratory chain resulting in starting of cascade of cellular events. Release of Histamine, Serotonin, Bradikinin and Prostaglandins which are the substances all related to pain takes place once LASER radiation gets absorbed in tissues.

Contraindications: pregnancy, infections, malignancy

Significance of Low Level Laser Therapy(LLLT):[6] Beneficial aspect off LLLT has been found in swelling, oedema in acute phase injury and in accelerating healing of surgical wounds. **Analgesic & Anti-inflammatory effects** of LLLT seen effective in ulcer, burns, herpes infectins, scar tissue, keloid, scleroderma, neurodermitis, lichen planus, psoriasis,hematoma. Neurological Diseases like Carpal Tunnel syndrome, Trigeminal Neuralgia, facial palsy, headache, Post Herpetic Neuralgia, peripheral nerve Injury are treated by LLLT.

TENS (Transcutaneous Electric Nerve Stimulation): It is stimulating device which delivers electric currents across intact surface of skin.

Indications: Produce an analgesic effect in acute pain of dental procedures, chronic pain conditions like post herpetic neuralgia, trigeminal neuralgia, causalgia, peripheral nerve injuries, angina pectoris, facial pain. Non analgesic effect like as an antiemetic, thus improving blood flow which is useful in reduction of symptoms with Reynauds disease and diabetic neuropathy. It also plays important role in healing wounds and ulcers.[12]

Thermal Therapies: Human Tissues are easily affected by heat and cold in form of beneficial thermal therapy. In cryotherapy intramuscular temperature reduced to 3-7 degree centigrade which in turn helps

in reduction of inflammation and thus pain. Ice, cold packs, compression devices, vapocoolant sprays used to deliver cold tmperature to relief pain, reduction in hemorrhage, swelling and oedema, muscle relaxation [7]. Heat therapies using hot water bottles, electric heating pads, hot packs, at lamps, in circulating fluid hot pack, hydrotherapy, paraffin baths, sedative, antispasmodic, analgesic and decongestive effects are carried out. Heat application are useful in relieving pain, providing warmth, to promote healing, to decrease muscle tone and to soften exudates. [7]

Indications: Diseases like Malignancies, Painful muscle spasms, abdominal cramps, Menstrual Cramps, Superficial thrombophlebitis [8].

Role of Physiotherapy in Some Common Orofacial Conditions

1. **Trismus: lock jaw** OR reduced opening of jaw. Treatment Modalities like a) Tongue blades, b) Yawning exercise and c) Therabite jaw motion rehabilitation system [11]

2. **Temporomandibular Disorders (TMD):** Various steps are used to treat this disorders. Physical activities like soft tissue mobilization, by practicing various stress reduction exercises. Advice to the patients like regularly eating soft food, chewing on back of teeth from both sides simultaneously. Eating small bites. Avoiding habits like involving in excessive jaw use like yawning, grinding, clenching and chewing gum, long dental appointments should be avoided and cradling telephone for very long time between head and shoulder.

   Acupuncture, Thermotherapy,TENS, can also be used to alleviate the pain from TMDs.

3. **MPDS:** Several Physiotherapy techniques are used in treating MPDS are as follows:- **Thermaltherapy:** superficial heat (warm-wet), deep heat (ultrasound), Cryotherapy (ice packs, vapocoolant spray) and **TENS** (electrotherapy) used. These modalities help in reduction of muscle tension, decrease inflammation and inactive muscle trigger points [13]

   Exercises relieving muscle pain like a) Various exercises like opening the mouth with a hinge movement.b) Exercising the jaw by closing the mouth on the back of teeth.c) Putting the tip of tongue on the palate behind front teeth.d) Moving the tongue across the palate as far as it will go by keeping the tongue in this position with teeth closed for 10n seconds and opening the mouth the mouth slowly until tongue starts to leave the palate- This usually helps in relieving the pain of TMJ. This exercise is repeated three times daily for minutes[10].

4. **OSMF:** Oral Submucous Fibrosis usually at severe conditions end up in restricted mouth opening in patients. In those cases- Oral physical exercises like cheek, tongue and lip exercises, diathermy and ultrasound therapy generally add benefits to patients [1]

5. **Bell's Palsy:** Greatly disrupts the quality of life of patient. Thus certain physiotherapy treatment modalities like different facial exercises, exercises to close the eye and sometimes acupuncture can provide some relief to patients and also return them to their normal life [1]

6. **Hypermobility of Mandible:** Muscle Conditioning exercises like rhythmic stabilization exercises and progressive isometric strengthening are useful in treating this condition.

Discussions

It is important to implement physiotherapy according to the clinical condition of each patient. So appropiate diagnosis and treatment plan is very crucial to make the patient symptom free. Thus a clear understanding about the detailed physiotherapy applications as needed along with their benefits is needed. The dentists should be careful in choosing the physical therapy as treatment option for orofacial pain. So more collaborations between dentists and Physiotherapists for management of orofacial pain conditions is needed to improve the result. But as we can see lack of knowledge about physiotherapy is prevalent and it is preventing this field to get fully involved with dental profession. In future this novel method of treatment should be promoted as it show a promising result in non invasive way cost effectiveness of this field also make it easy acceptable to patients. But still now compliances of patients towards this way of treatment is low since it is time consuming. So, much awareness has to be made o council the patients about its wide range benefits enhancing the quality of life of patients.

Conclusion

Future studies needed to investigate whether collaborations between dentists and Physiotherapists have increased and treatment benefits from those collaborations should be assessed. From the past studies though it is limited in number, it has been assessed that a multidisciplinary approach using combination of pharamacology and physiotherapy giving out best possible outcomes in management of various orofacial pain disorders.

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Role of Oral Pathologists in Regular Practice

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ABSTRACT

It is this branch of dentistry where research meets practice, and thus unique and rare in its own way. This science investigates the causes, processes, and effects of the disease affecting oral and maxillofacial region. It is the backbone of dental science and bridge between dental and medical sciences. So Oral pathologists can be called as an epitome of research in dentistry, given the large area available for researches and vast area of issue to be explored regarding the pathophysiology of diseases related. They also play a vital role in diagnosis and treatment planning sometimes guiding the oral and maxillofacial surgeons in their surgical procedures since they have the distinction of meeting patients, observing the clinical presentation of the disease process, investigating the cause of the pathology and determining the final histological diagnosis based on clinico-radiologic-pathologic correlation.

Keywords: *Oral pathology, Diagnosis, Oral mucosa.*

Introduction

Recognition of the importance of this speciality in the minds of Indian dental fraternity is quite behind. Though lots of research scopes are there, it becomes negated due to lack of infrastructure and funding for research in the dental institutions across the country. The uniqueness of this field should be made understood in the budding dentists since oral pathologists not only are capable in diagnosing various diseases and oral cancers, their unique training and experiences are capable of providing specialized services that cannot be found anywhere else in the dental health care system. As rightly said by Sir Williams Osler, a Canadian physician "As is our pathology, so is our practice". Though it is impossible to learn all the oral lesions and conditions, a fundamental knowledge of oral pathology is essential to become a successful practitioner[1]. So this is high time when Dental Council Of India should encourage & initiate to create centers of oral pathology in each dental institution with adequate infrastructure and material for quality dental research.

Significance of Oral Pathologists in Diagnosis: The most undeniable significant role of oral pathologists in daily dental practice seen in diagnosing a premalignant lesion from malignant. If it is diagnosed as one, then determining the right grade is very crucial since that denotes the varying treatment plan on which the quality of life of that particular patient depends upon.

Systematic Diagnostic Approach of Oral Pathologists: Arriving on a proper diagnosis is not an easy task. It requires a systematic approach to get to the right answer.

1. **Collection:** Thorough history taking for collection of proper information is crucial. History regarding the onset, frequency, duration of their chief complaints plays a very vital role in determining a preliminary diagnosis or get a rough idea about the disease. Medical history should be properly taken to prevent any contraindications in upcoming dental treatment and also to find out any drug related clinical or pathological changes [2].

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2. **Classification:** Now in this crucial part of diagnosis of any lesion, clinician once come across a particular lesion he/she tries to fit according to the following categories- Generally most of the oral lesions are categorized into either change of colour, or loss of integrity of mucous membrane like erosion fissure, ulcer, which could be primary or secondary, It can be growth or swelling. Lesions may involve tooth or bone either alone or in combination with soft tissues or it could be a part of syndrome[1].

3. **Comparison:** Once the lesion has been sorted and classified to one comes the next step of comparison. In this stage the oral pathologists ensure a greater advantage than rest of the dental specialities since their wide range of knowledge relating a particular lesion and their unique training makes its advantageous than the rest. Coming to a more appropiate conclusion clinically becomes evident for them than rest. Mainly here clinician try to see the size of the lesion, whether they are single or multiple or whether well circumscribed or not and then is correlated with patients' history, depending on this only the differential diagnosis is made. For example a macule cannot be compared with papilloma. A comprehensive evaluation of the possible etiology of the condition while taking history may sometimes give a clue to the diagnosis. This is especially seen in hereditary disorders and developmental lesions. Palpation denotes the nature of the lesion I.e whether it is cystic or neoplastic. Habit history also gives vital points in denoting and diagnosing disease. For example if whitish homgeneous patch unscrapable noticed with chronic history of tobacco leukopakia could be the provisional diagnosis of the patient. Non healing ulcer for than 2 weeks in oral cavity with history of tobacco chewing can easily got suspected to squamous cell carcinoma. Intrabony lesions like ameloblastoma, odontogenic keratocyst, pindborg tumor, gorlin cyst generally require radiographs for primary investigation. Some lesions have typical radiographic appearance that gives a definite diagnosis however dental physician should never give a diagnosis based only on radiographic features since sometimes it can be misleading like cotton wool appearance in radiograph can be seen in Paget's disease and also sometimes in condensing osteitis.

4. **Clinical Impression:** Based on all presenting features, that is, history, age, gender, clinical characteristics (appearance, site, location, signs and symptoms), radiological appearance (where applicable), and possible causes, the clinician should correlate all these with each other before venturing to give an opinion.

5. **Confirmation:** When one methodically approaches the patient with an oral lesion, the clinical diagnosis is, usually, not difficult and does not require any further investigations. However, many diseases of the mucosa, other soft tissue and bone require additional information to make a precise diagnosis. This information in many instances may be provided by biopsy and submission of tissue for histopathologic examination. The indications for oral biopsy and other allied techniques and the procedures that will help ensure accurate diagnosis.

Biopsy soft tissue Indications[4]: Soft Tissue Lesions For any unknown lesion or condition of the oral mucosa, a scalpel biopsy is the gold standard for diagnosis. When recognizing tissue abnormalities, the clinician must first attempt to determine the etiology.Clinician may choose to provide treatment and to monitor the lesion that are suspected from traumatic injury or any infections for a period of 1-2 weeks for resolution,if not then it should undergo biopsy. Leukoplakia, erythroplakia and persistent or widespread ulcerations necessitate biopsy. Persistent changes in color or any new growth noted on examination should also be considered for biopsy.No matter how confident the clinician may be with their clinical diagnosis, any tissue removed from a patient should be submitted for histopathologic examination and this is where the sole role of oral pathologists come into being.

Biopsy Hard Tissue Indications[4]: Few bony abnormalities can be accurately diagnosed based on their radiographic features.Most bony lesions cannot be diagnosed exclusively based on their radiographic appearance. Confirmatory diagnosis requires a biopsy and microscopic examination. Periapical inflammatory lesions and intrabony cysts and tumors show radiographic changes that are indefinite beyond a presumptive clinical diagnosis. Given the differences in treatment and prognosis for many of these entities, identification of these lesions mandates biopsy.Rapid

bone loss, irregular widening of the periodontal ligament, spiking root resorption and tooth mobility in the absence of trauma or an identifiable source of inflammation is often an ominous sign and should be evaluated carefully. Expansion, pain and paraesthesia are some other features of hard tissue lesions that would warrant biopsy and histopathologic examination.

Final Confirmatory Diagnosis: After getting the histological clarification and diagnosis of the given specimen from oral pathologists clinician can come into conclusions confidently about the lesion and plan treatment accordingly. One mistake in oral pathologists part and whole scenario is changed so is the life of that patient.

Limitations and Recommendations: Generating demand for oral pathology services is the prime requirement to sustain the growth of the profession. There is a need to create awareness about the significance of utilization of the profession in clinical practice. Histopathological examination of every tissues should be made mandatory, so that all dentists should realize their responsibility to utilize post extraction soft tissues and other tissues removed from oral cavity[5].

Oral pathologists need to come in direct contact with the patients for diagnostic evaluation with active participation in direct patient care within both the hospital environment and dental school setting, and play and active role in cancer screening by performing biopsy and cytological procedures themselves. Addition of imunohistochemistry and gene sequencing has strengthened diagnostic pathology in recent years[3]

Conclusion

Management of oral and maxillofacial diseases and conditions by the oral and maxillofacial pathologists must also assume a greater level of importance, not just in dentistry but within the health care delivery system as well. Oral pathologists need to take lead role in researches in dental institutions which include clinical and basic research in areas of cell and molecular biology, stem cell research, immunology, genetic studies for various oral diseases [5]. Diagnostic and investigative labs have a good scope in India curriculum needs to be modified to train oral pathologists to be able to establish, manage microbiology, hematology, biochemical and oral pathology single handedly. Lastly to conclude one must remove barriers that serve to isolate oral pathologists fro other components of health care system, while reinforcing the importance of oral and maxillofacial pathology to members of their own profession. Oral and maxillofacial pathology is in a position to lead our profession, but educational programs must be redesigned to allow innovative growth and developmental skill in graduates that will be valued by the research community on one hand and the health care delivery in 21st century.

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Radicular Cyst of Jaw: A Review

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ABSTRACT

Radicular cyst is the common odontogenic inflammatory cyst which arises from the cell rest of malassez. It is asymptomatic and swelling proceeds solely indicating cortical plate expansion radicular cyst is the consequence of pulpal necrosis. The management of radicular cyst is aided by clinical, FNAC and radiographic examination. Diagnosis is confirmed by histopathological examination. Treatment options are based on the extent of the lesion, structure, origin and clinical/systemic condition of the patient. Untreated cyst may expand causing local tissue destruction and further pathological deformity. Management includes non-surgical endodontics and surgical methods like endodontic surgery, decompression, marsupialization or enucleation. This article briefly discusses the clinical features, etiopathogenesis and treatment options for management of radicular cysts.

Keywords: *Cyst, MTA, pathogenesis, periapical*

Introduction

Radicular cyst (*also known as periapical cyst, apical periodontal cysts,root end cyst& inflammatory dental cyst*) is an inflammatory cyst of odontogenic origin. It is the most common odontogenic lesion of the jaws. WHO defines that Radicular cyst is an odontogenic cyst of inflammatory origin associated with non-vital teeth; a residual cyst is a radicular cyst that remains in the jaws following extraction of the affected tooth.[1]Kramer defined cyst as a pathological cavity that may or not be lined by an epithelium and with filled with fluid, semi-fluid or a gaseous substance. A radicular cyst pathologically arises as a sequel to pulpal necrosis following dental caries or maxillofacial trauma. The lining epithelium of the cyst has its origin from the epithelium rest of malessez in periodontal ligament; inflammatory stimulus causing proliferation of a pre-existing peri-apical granuloma may result in a radicular cyst.[2]

Radicular cyst is the most common (55%) odontogenic lesions of the jaw with a wide patient age-range. Peak incidence seen in the 4th and 5th decade of life with slight male predilection. Most commonly seen in the maxillary jaw representing a periapical well defined radiolucency, very often seen in the apex of the root. Sometimes may be associated with lateral root canal as well. Conventionally, radicular cysts are managed by conservative and surgical management. Extraction of the tooth or apicectomy with enucleation of the cystic cavity may be done; root canal treatment may be opted as a non-surgical management. [1]

Although literature has discussed in detail about radicular cyst, this article highlights recent findings in the pathology and treatment of radicular cysts.

Discussion

Radicular cyst is an inflammatory odontogenic cyst caused due to pathological inflammatory stimulation

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of the cell rests of malassez found in the periodontal membrane. These are remnants of the hertwigs epithelial root sheath. Pathogenesis of radicular cyst is briefly described in **Chart 1.**A cystic cavity is formed and enlarges with hydrostatic pressure and also resulting in bone resorption.

Chart 1: Summary of Pathogenesis of Radicular cyst Formation: *Clinically,* radicular cysts don't show any symptom and are often diagnosed on incidental radiological examination of a carious or non-vital tooth. The growth of the cysts results in further expansion of the cyst in the jaw. *Radiographically,* it is seen as a well-defined, well demarcated unilocular radiolucency which is round or oval in shape and found commonly in the apex of the root. Radicular cysts may be seen in 1-2cm diameter, larger cystic lesions have also been reported in the literature. [1,3]*Histopathological features* shows radicular cysts with a wall composed of inflammatory fibrous or granulation tissue lined by a non-keratinized stratified squamous epithelium. The epithelium is proliferative and has elongated long rete pegs that usually form the characteristic arcading pattern. Long standing mature or residual cyst mature may show comparatively minimal inflammatory component with a regular thin epithelium. The inflammatory component is often mixed, may also contain prominent foamy histiocytes, cholesterol crystal deposits, foreign body giant cells etc. Hyaline and Rushton bodies are characteristic findings of radicular cysts but may not be always seen. Metaplastic changes may also been observed. [4]

Treatment option depends on the size, localization of the lesion, bone integrity in relation to the lesion and the proximity of the lesions to vital structures. Patient cooperation and systemic condition should also be taken into consideration. [5,6]

Non-Surgical Management includes endodontic therapy in small lesions, not commonly done in larger lesions. Endodontists prefer conventional Root Canal treatment for successful management of radicular cysts of small sizes. Conservative approach here includes thorough endodontic therapy, Baker had suggested an over-instrumentation of 1mm beyond apex to disrupt the lining epithelium and enable better healing by converting the cyst to a granuloma. Bender further added that this technique helped in establishing proper drainage of the cystic lesion. Eventhough the technique is found to be effective in cases, undue or excessive trauma beyond the apex may even be eventful. Proper biomechanical preparation, drainage of cyst intracanal medication and follow up plays an important in such cases.[7-11]

Calcium hydroxide is the commonly used intra-canal medicament, it has an alkaline and bactericidal effect that helps to initiate repair mechanism and stimulate hard tissue formation. Placement of Calcium hydroxide is the best known alternative to over-instrumentation. Souza et al suggested the following effects of calcium hydroxide as an intra-canal medicament: anti-inflammation action, neutralization of acidic products, activation of alkaline phosphatase and anti-bacterial activity. Endodontic therapy may be following by apicectomy and retrograde fillings. MTA (Mineral Trioxide Aggregate) is the commonly used retrograde filling following an apicectomy, this avoids further inflammation and aids in healing. Literature not only shows that MTA is a useful in endodontic surgery (apicectomy and retrograde filling) but aids in sealing pulp chamber perforations, internal resorptions, lacerations and apical transportation. MTA is also known to produce predictable and better results than calcium hydroxide. [12-15]

Surgical Management is often indicated in larger lesions where endodontic treatment may not be effective. Surgical management includes decompression, marsupialization or enucleation of cyst or combination of techniques. Surgical approach depends on the size and location of the lesion. Enucleation is preferred treatment of choice of odontogenic cysts when it is possible to completely remove the cyst without damage to vital structure. Enucleation involves complete removal of the cystic sac followed by primary closure. Marsupialization may be done when the lesions are large with vital structure nearby and has increased risk of fracture. Marsupialization with decompression may be done to first reduce the size of the lesions. In any scenario, long term follow up is essential to appreciate osseous regeneration of the site. [16-19]***Decompression*** is a conservative approach used to progressively reduce the size of the lesion, thereby eliminating the reason for surgical enucleation. This technique involves the surgical exposure of the cyst wall and insertion of a drain tube to enable draining and decompression of cyst. Decompression aids in disruption of the lesional wall which results in reduction of internal osmotic pressure and followed by osseous regeneration. Decompression in not indicated in lesions without any cystic fluid, like

in cases of large dental granulomas or solid cellular lesions. Similarly, aspiration or irrigation shall not be done when there is no aspiration of fluid from lesions in adjacent tissue space or sinus cavities nearby.[7, 21, 22]Marsupialization is done in cases of large cysts where it may be associated with vital structures. The technique is favored due to its low morbidity; healing and bone regeneration takes place with shrinking size of the lesion. However, this management require longer post-operative management and long term follow up is essential.[23]

Conclusion

Multidisciplinary approach is the key in management of radicular cyst depending the associated factors like size and proximity of lesions. Whenever possible size of the lesion should be reduced or decompression before attempting a surgical curettage of the cyst. Regular follow-ups with radiographs is essential even when only endodontic therapy is involved, long term follow up becomes essential when endodontic surgery with or without surgical management is involved.

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Applications of Alternative Medicine in Dentistry

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ABSTRACT

Alternative medicine is the term that describes medical treatment which helps to attain the healing effects of medicine, it includes a group of medical and health care system and practices but lacks in evidence-based information, safety and drug interactions. The healing methods of alternative medicine includes both natural and spiritual ways. Since ancient time the alternative medicines have come into our practice and till today it is being practiced all over the world.Alternative medicine has gained more popularity all over the world and in recent times alternative medicines are included in many fields including dentistry. This article reviews about impact of alternative medicine in treating oral diseases.

Keywords: *Alternative medicine, dentistry, yoga, oral diseases.*

Introduction

Oral disease is one of the major health problem all over the world. It may seem to affect limited area of oral cavity but there are possibilities that it may affect the body as a whole. Even in 21st century with advancement in dentistry, oral disease are considered to be the greatest health issue. In recent times, alternative medicine is more popular because ofcost efficiency, safety, better treatment options and have more successful results. Alternative medicines are used in many countries even though they have their own health care system. Complementary medicine, integrated medicine, holistic medicine, fringe medicine, unconventional medicine are the other names for alternative medicine. Some of the alternative medication used in dentistry are Siddha, Ayurveda, Yoga, Acupuncture, Herbal therapy, Unani. These alternative medicines are not only used to treat medical and dental diseases, but also it helps in weight loss, relaxation, also aids to treat physical and mental illness. It also aids in leading ahealthy and balanced life style.

Role of Ayurveda: Ayurveda is the ancient health care system followed in india[1]. It is a holistic medicinewhich treats not only the illness,it also gives wellness for body, mental health and spirit. It is believed that ayurvedic treatments are based on the balancing of three constitutions - vata, pitta, kapha[2]. Ayurveda and Traditional Chinese are medicine based on plant-based drugs for the management of specific diseases[3]. Symptoms of sickness may be observed if these constitutions are imbalanced[3]. Ayurvedic preparations contain plant based medicines, animal products and minerals like gold, copper, Sulphur, arsenic[4].

It helps to treat gingivitis, periodontal diseases, ulcers, dental pain, halitosis[2]

Tulsi leaves (*Ocimum sanctum*) prevents plaque formation, gingivitis and halitosis[2.] Eucalyptus (*eucalyptus globules*)[5], olive oil (*oleaeuropaea*)[5], Mustard oil (*Brassianigra*)[5]are used to treat periodontal diseases[2,5].Honey *(Apis Mellifera*) is used to treat ulcers[5]. Garlic (Allium sativum) is used to treat tooth pain. Turmeric (*Curcuma longa*) is used to treat tooth pain, periodontal diseases, and also used to treat potentially malignant disorders of oral lesions. Pomegranate *(Punicagranatum*)[5]is used to treat bleeding gums and periodontitis[5].Jasmine (*Jasminum*)[5] is used to treat tooth pain, ulcers, periodontal disease, lesions of skin[5]. Aloe vera(*Aloe barbadensis*) is used to treat inflammatory diseases[5].

Clove oil, honey, tulsi has anti bacterial property[5]. Jasmine and pomegranate has anti-oxidant property[5]. Jasmine and honey has anti-inflammatory and anti-ulcerogenic property[5].

Ayurvedic preparation i.e plants and natural products are being used for the management of various oral diseases for their therapeutic properties[4]. These are cost effective and easily available remedies. So, traditional methods of Ayurveda can be incorporated with dental practice and to treat oral disease.

Role of Acupuncture: Acupuncture first originated in China, it is used to treat the disease by stimulating certain points with the help of inserting thin needles to human body at varying depth[6]. Mechanism of action of acupuncture is changing the way of pain signals in nervous system and releasing serotonin and endorphins[7].

In dentistry, acupuncture can be used to manage some disorders like tooth pain, temporomandibular joint disorders, muscle spasm, head aches, drymouth, paresthesia of oral structures, neuralgia[7].

In dental pain, acupuncture serves as a supplement in achieving pain relief, by stimulating the nerves which leads to release of endorphins[7]. Because of structural anomalies acupuncture is not helpful in Temperomandibular joint disorders, but it may help to relieve discomfort and pain in muscles[6]. In facial pain, it triggers the nervous system which leads to release of neurochemical messenger molecules, these changes promotes physical and emotional well being of patients[7]. Acupuncture also helps to treat xerostromia by releasing neuropolypeptide and it increases saliva secretion by activating parasympathetic nervesand salivary nuclei in pons and salivary glands[7].

Acupuncture is traditional technique which plays a promising role in other treatment modalities. It is safe, non- toxic and show very low adverse reactions[7].

Role of Herbal Therapy: Herbal therapies are used to treat medical and dental diseases all over the world. In dentistry, herbal therapy is used to treat inflammation, sores and relieve tooth pain[8].

Toothpastes, chewing sticks and mouth washes from Salvadorapersica, acacia gum, sanguinaria, azadirachtaindica has antiplaque, antibacterial and anticarcinogenic properties[9].

Role of Yoga: Yoga comprises the physical, mental and spiritual wellness of body. It originated in india, which helps to unite mind, body and spirit[10]. It reduces stress and enhances health and mental wellness[11]. It helps to treat the occupational hazards of dentists like cervical spondolysis, tendonitis, varicose veins, stress related disorders in mouth such as Temperomandibular jointdisorders, xerostromia, bruxism[12].

Bhujangasan rejuvenates and revitalizes spinal cord, *padmasana*for healthy and flexible spine, *vajrasana*to treat varicose vein, *sirshasana* to produce increased blood circulation[12].*Shitali*and *sheetkariprayanama* for proper alignment of teeth[12].

Compared to all physical activites, Yoga is considered to be the most effective, which helps to reduce psychological stress and promotes good and healthy life style.

Role of Siddha: Siddha a traditional medicine commonly practised in India. It originated in tamilnadu, which belongs to southern part of India[13]. Siddhi is a Sanskrit noun which means perfection.It is not used more frequently in dentistry, but dentist should know about the safety, interactions, use, effectiveness, and adverse reactions[13]. Using of siddha is very rare in dentistry but as per literature, siddha is helps to cure various orofacial diseases.

Karpamooligaigal are used to prevent and treat chronic infections which are existing already[13]. Herbs which are recommended in siddha possess anti-plaque, antibacterial, analgesic, anti-fungal, anti-stress, anti-cariogenic, inhibits the growth of tumor and has high rate of healing properties[13].

Manjal poo chedi (*spilanthesacmella*Murr) is used to treat tooth pain, Thottasinungi (*mimosa pudica*Linn) is effective against gram negative bacteria. Thottasinungiand Chukuti chedi (*solanum nigrum* Linn) are used to treat ulcers in oral cavity[13].Vata (Ficusbengalensis Linn) has anti-inflammatory property and is used to treat oral swellings[13].Karuoomathai (*datura metel*Linn) is used to treat Temperomandibular joint swellings[13]. Kundamani (*Abrusprecatorius* Linn) is used to strengthen the gums and teeth, it can also be used as dentrifice[13].Mahila (*Mimusopselengi*Linn) has anti-inflammatory property and is used to treat inflammation, ulcers, periodontitis and abscess[13]. Sitaphalam *(Annona squamosa)*has antimicrobial, antibacterial anti-neoplastic activities and is used to treat periodontal abscess, squamous cell carcinoma, malignant tumors,bleeding gums[13]. Sivakaranthai (*sphaeranthusamaranthiodesburm) is* used to treat conditions like leukoplakia, erythroplakia[13].

Herbs in siddha show more benefits because of its holistic properties, which prevents bacterial and fungal infections, plaque formation, ulcers and dental caries. It can be used to treat few dental disease but not frequently.

Role of Unani: Unani a Greek medicine, which has higher rate of healing. It is not only used to treat disease, it treats the person as a whole (body, mind and soul). Unani medicine follows the principle of Hippocratic theory of 4 humors i.e blood,phlegm, yellow bile, black bile[14]. Unani medicine preparation i.e herbs and other ingredients show anti-inflammatory, antimicrobial, antiulcer, antioxidant and wound healing properties[14].

Miswak (*Salvadora Persica*), Haldi (*Curcuma longa*), Anar *(Punicagranatum*), Aqarqarha (*Anacyclus pyrethrum*), Suddab*(Rutagraveolens),*Amla (*Emblica Officinalis*), Aqaqia*(Acacia nilotica*), Lehsun (*allium sativum*), Aspaghol (*PlantagoovataForsk*), Babuna (*Matricariachamomilla* Linn), Clove (*syzygiumaromaticum*) are used for the management of orofacial diseases[14].

Unani has gained more popularity in recent years and is being practiced in more than 20 countries around the world[14].

Conclusion

This article has covered various alternative medicines and therapies such as Ayurveda, Acupuncture, Unani, Siddha, Yoga and Herbal therapy. Centuries old alternative medicines are still in practice. In additionto that numerous economical and scientific barriers are faced by alternative practioners that leads to their minimal acceptance in mainstream of medicine. When compared to conventional medicine, alternative medicine is cost efficience, so it will be beneficial for the people with low socio-economic status. The alternative medicines which are safe and cost effective can be included in conventional medicine and dentistry.

Ethical Clearance: Not required since it is a review article

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Hidradenoma—A Case Report

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ABSTRACT

Hidradenoma refers to a benign adnexal tumor of apical sweat gland. It is often cutaneous, benign tumor of sweat glands. Other names of it are nodular hidradenoma, eccrine acrospiroma, and solid cystic hidradenoma. Lesions are commonly seen on the head, face, extremities and are rarely seen in oral cavity. Clinical appearance of hidradenoma is not specific, but can be diagnosed histopathologically, after complete removal of the lesion. Histopathologically, it has a striking resemblance to salivary gland pathology. A 75 Year old male patient reported with an extra oral swelling near the lip region. Clinical diagnosis was found to be different when compared to the histopathological diagnosis. Management includes wide local excision.

Keywords: *Hidradenoma, Hemangioma, papilloma, Myoepithelial cells*

Introduction

Hidradenoma is often a cutaneous, benign tumor of sweat glands. Also known as solid cystic hidradenoma, nodular hidradenoma and eccrine acrospiroma. Lesions are commonly seen on head, face, extremities and are rarely seen orally. Clinically it appears as solitary, intradermal nodule.[1,2] Histopathological examination show stratified squamous epithelium with underlying connective tissue stroma. Underlying dermis show circumscribed lobules composed of polyhedral cells with moderate eosinophilic to clear vacuolated cytoplasm and centrally placed nuclei. Tumor nests are surrounded by hyalinised fibrovascular stroma showing lymphoplasmacytic infiltrate. One should also take care to check for any rapid growth or ulceration clinically which denotes the malignant change. In this case report, we describe a 85 Year old male patient presented with the chief complaint of bleeding from the swelling on the right side of face near the lips

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Case Report: An 85 year old male patient presented with the chief complaint of bleeding from the swelling in the right side of face near the lip region. On examination, a well defined extra oral swelling was present which was oval in shape measuring approx. 3 X 3.5 cms present over the right side of face near the commissure of lip. Surface over the swelling was not even, found pigmented with reddish and bluish hue(Fig 1a). Swelling was firm in consistency and is non tender on palpation. (Fig.1b)

Differential diagnosis of Hemangioma and papilloma was considered. Local excision was done. Macroscopic specimen of skin was received with globular mass measuring 3x2x1 cms, cut surface was grayish white. Firm in consistency.



Fig 1a: Swelling found pigmented with red and blue color

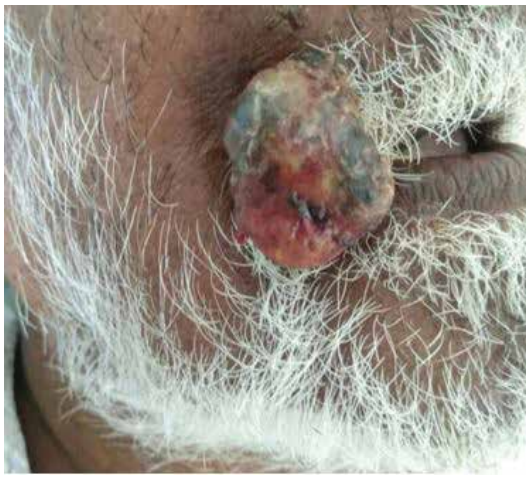


Fig 1b: Firm swelling on the lip

Haematoxylin and Eosin stained histopathological sections of the given specimen show stratified squamous epithelium with underlying dermis. (fig.2a) Dermis show circumscribed lobules composed of polyhedral cells with moderate eosinophilic to clear vacuolated cytoplasm, centrally placed nuclei.(fig.2b) Lobules are separated by hyalinised fibro vascular stroma showing lymphoplasmacytic infiltrate.

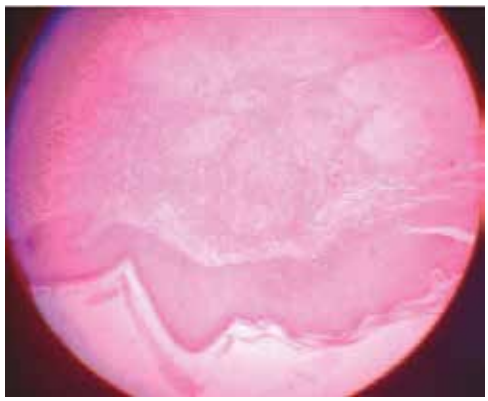


Fig. 2a: Squamous epithelium with underlying dermis.

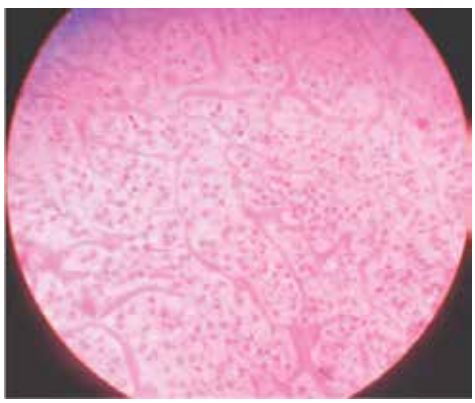


Fig 2b: Lobules composed of polyhedral cells with eosinophilic cytoplasm, centrally placed nuclei.

Discussion

There are two types of sweat glands namely eccrine and apocrine glands. Eccrine sweat glands are found everywhere on the skin except on vermilion zone of lip and nail bed.[3] Apocrine sweat glands are found only on the armpits and ano-genital region. The primary germ cells arising from embryonic stratum germinativum give rise to formation of hair, sebaceous, eccrine and apocrine glands. At 12-13 weeks of embryonic life, eccrine glands first develop.[4] Later at 16 weeks, both intra epidermal and intra dermal tubular lamina begins. Finally a double layer of epithelial cells are seen in Secretory and ductal components. The functional component of sweat glands is Secretory epithelial cells and Myoepithelial cells. Clear cells in the eccrine glands are PAS positive and diastase resistant. They are rich in neutral mucoploysaccharides.[5]

Hidradenoma is the benign tumor of skin appendages arising from the distal excretory duct of eccrine sweat glands. Mostly seen on the face, head and upper extremities. Liu in 1949, coined term eccrine acrospiroma. The term spiroma means adenoma of sweat glands and acro meaning topmost or the end.[8] other names of this are nodular hidradenoma, solid/ cystic hidradenoma. They occur at any age. But more commonly seen in 4th to 8th decades of life. Twice more common in females.[6] but this case it is male patient. Mostly asymptomatic. Solitary growth intra dermal nodule that is slightly elevated above the surrounding skin. Lesions sometimes show aggressive clinical behavior with rapid growth, ulceration and pigmentation.

Histopathology reveals an encapsulated tumor with solid and cystic components. Cystic components may or may not be seen. Solid components mainly consist of two types of cell population. They are epidermoid cell and clear cell. Epidermoid cell are the predominant type. They are eosinophilic with granular cytoplasm and round to oval nucleus. Clear cells are pale with round nucleus. Clear cells are PAS positive and diastase resistant.

Secretory and Myoepithelial components of sweat glands and salivary glands are similar. However tumors arising from eccrine glands show area of apocrine decapitation Secretory activity, primitive hair follicles and melanin pigmentation. These features help in signifying cutaneous origin rather than salivary gland origin.

Sometimes Melanocytes are seen in tumors of sweat gland origin since Melanocytes are component of sweat duct germs in early stage of embryogenesis.

Malignant transformation is rare. And if at all clinically there will be ulceration with rapid growth. Histologically there will be nuclear atypia, increased number of mitotic figures with infiltration [6, 7]

Routine hematoxylin and eosin stained sections are sufficient for final diagnosis. But in case of diagnostic difficulties IHC can be suggested. Biernat et al showed cytokeratin expression in hidradenoma. Most expressions are CK 6/18, CK 7 and CK 8/18. [9]

Conclusion

Diagnosis of hidradenoma can be done histopathologically. They can be treated by simple surgical excision and recurrence is rare.

Ethical Clearance: Not required since it is a case report

Source of Funding: Nil

Conflict of Interest: Nil

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Columellar Lengthening in Cleft Nasal Defects

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ABSTRACT

Introduction: A correction of cleft lip/palate associated rhinoplasty using abbe flap is performed in this study. The outcome and perception of the abbe flap for cleft rhinoplasty at patient, surgeons, and patients caregiver evaluation questionnaire.

Materials and Method: A retrospective analysis of preoperative satisfaction and prospective analysis of postoperative satisfaction of patients who underwent cleft rhinoplasty were carried out using questionnaire.

Results: Six case of bilateral cleft lip and palate who had earlier undergone cleft rhinoplasty and lip revision with abbe's flap formed the study group. The mean age of 6 subjects was 23.00+/-3.8years. there were 2 males and 4 female forming the study group.the mean presurgical questionnaire score was 22.8+/- 10.6 while the postsurgical score was 83.5+/-26.2. This difference was statistically significant (p=0.001). the difference in score between the time period was 60.7%.

Discussion: From the questionnaire and other qualitative parameters, it is possible to demonstrate the impact of abbe flap of cleft rhinoplasty and its impact on the quality of life of patient. most of the patient and caregivers believed that this approach achieved agood or excellent postoperative results

Keywords: *abbe flap, revision rhinoplasty*

Introduction

In cases of patients with cleft lip and palate (CLP), often the columella, owing to deficiency of columella height, the nasal tip is depressed, alar bases flared and altered nasolabial angle in the profile. The degree of deformity is different between unilateral and bilateral cases. In most instances of the complete unilateral CLP cases, the deformity is often tilted to the involved side while in the complete bilateral CLP (BCLP) cases the entire columella is deformed.[1] In complete CLP rehabilitation, such a deformed, "crooked nose" poses a significant challenge.[2] In cases of deficiency, the columellar lengthening procedure (COLP) is the most viable treatment procedure. However, the type of COLP needs to be chosen on the degree of nasolabial deformity. It has been always a challenge to recreate an ideal and a natural columella. This could be due to the reconstructed columella which often becomes thick and retracted. Addition of autogenous cartilage would solve the issue in most of the instances. Moreover, it would help to design proper nasal tip, contour.[3,4]

The "Abbe flap" introduced by Robbert Abbe as "lip switch" flap in 1898 for the secondary correction of a cleft lip deformity is still most widely used flap. Still this pedicled flap is used to recreate the philtral subunit which is usually deficient in BCLP.[3,5,6]

Materials and Method

The present study is a retrospective who had undergone rhinoplasties with BCLP correction in our center during 2016-2018. The study included a retrospective analysis of preoperative satisfaction and a prospective one concerning the postoperative satisfaction. The patients who were turning up for clinical review. A specifically formulated rhinoplasty

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outcome evaluation questionnaire based on previous publication was used for this specific purpose.

The questionnaire contained the following questions:

1. How much do you like the appearance of your nose?
2. How much can you breathe through your nose?
3. How much do you think your friends and those close to you like your nose?
4. Do you think the appearance of your nose limits your social or professional activities?
5. How safe are you that your nose has the best possible appearance?
6. Would you like to surgically change the appearance or function of your nose?

Each question in the questionnaire was answered with a score between 0 and 6. zero was used for the least score and six for the most positive score. The total score was then added, divided by 24 (maximum possible score) and multiplied by 100 to be expressed as a percentage as described previously.[7]

The questionnaire was administered twice during the visit and the patient's satisfaction was measured pre- and post-surgery. To aid the patients, their profile photographs from the records were shown. The postsurgical experience did not required any aid.

Besides the 2 questionnaire scores, age and gender of the patients were noted down. The qualitative assessment of the postrhinoplasty success as perceived by the patient was also taken down. Postrhinoplasty, the deforming malposition, distortion, asymmetry or scar of the lip vermilion, columellar lengthening, the axis of the nose, and its deviation from the midline, tip projection, and dorsal augmentation of the nose were asked for. The choices were categorized as unnoticeable (to be recognized by patients), obvious (noticed by patients but not by attendants), and deforming (noticed both by patients and attendants). This procedure was also followed in previous, pertinent literature.[3]

Surgical Procedure: The preoperative assessment of patients was those that are used for a standard BCLP and rhinoplasty, the factors that were given specific reconsideration for reconstruction included symmetry of the alar bases and nostril shape, length of the columella, any deformations or deficiencies of the nasal lining, associated lip deformity due to a lack of correct muscle realignment at primary surgery. All patients had undergone various degree of presurgical orthodontics and would require further postsurgical orthodontics for refinement of the technique.[2-7]

Presurgical counseling about the procedure was done. Informed consent was obtained from patients as well as their attendants. They were detailed about the two staged procedure, especially the need to raise the flap from the central (mental) part of the lower lip. The need to temporarily join the upper and lower lip for a limited period and its potential, brief impact on quality of the life was explained with the help of diagrams. The need for procuring grafts for rhinoplasty was explained.[2-7]

The first stage of the procedure was performed under general anesthesia with orotracheal intubation. Local epinephrine injection was avoided in the labial region to prevent possible immediate swelling and thus distortions. The surgical margins were outlined and marked. Fistulas, if any were eliminated and the lateral lip segments were mobilized by incisions onto the nostril floor. The release incision of the oral mucosa and muscle form the premaxilla and pyriform margin allowed the medial advancement of the lateral lip segments without tension.[2-7]

The standard open rhinoplasty was performed with incision being placed along the lower border of the alar cartilages. The nasal columella was slightly raised from its nasal base through a small, strategically placed lateral incisions, just behind the columella that was extended upward and into the nostrils. To perform nasal tip modifications, subcutaneous dissection of the nasal skin envelope was performed. In this process, hemostasis was achieved at every stage. Previously harvested, preshaped (to prevent warping) cartilage grafts were employed for supporting the medial crus of elongation. At this stage, nasal tip morphology was also corrected if needed. The nasal skin was checked and lateral margins of the lip flap were approximated to the columella base. Alar cinch sutures were placed to keep the redesigned nostril width and height.

As per previous work up, the Abbe flap design was marked. Care was taken to rise only minimal, narrow portion of graft and utilized to stimulate the missing philtrum. The flap at tis end was forked to a classic W

shape to match the columellar base incision. While rising an abbe flap by blood pressure blade 11, a full thickness graft with a cuff of tissue on one side was allowed back to facilitate donor site closure. It was ensured that the flap contained sufficient amount of mucosa, muscle, and arterial supply (from an inferior labial branch of facial artery). The flap was then carefully rotated upward to the recipient site without any vascular distortion. The flap was then closed with approximation at the recipient site. The edges were trimmed and donor site carefully closed in layers to prevent scar formation. Standard postoperative medicines and care instructions were given. The Abbe flap was dissected under local anesthesia on postoperative 10-14 days. During the postoperative period or the perioperative circumstances, no complications such as airway obstruction, bleeding, infection, would disruption, or flap necrosis were encountered as observed in the case records. No instances of warping was encountered. None of the patients required surgical revision of the scar or any functional compromise.

Discussion

The BCLP intrinsically involves an alteration in the formation and bulk of the premaxillary structures, noticeably the philtral areas. This results in the deficiency of the tissues along the philtral column and partly nasal structures. In addition, this deficiency reflects on the nasal width, prominence, malformed nasolabial fold. These, in addition to deformed nasal structures, compromise the nasal form, function and esthetics. Surgical correction of BCLP, which at certain instances, requires correction of the basal architecture too.[4,5,8]

The versatility of Abbe flap to correct the BCLP, especially the philtral area has been carried out successfully. Combining this with cosmetic cleft rhinoplasty offers a simple solution to midfacial deformity. The flap is based on the principle that it employs the extra local tissue, namely the lower tissues to correct the deformity the lips to help the transfer of tissue. As the flap is a local flap, ideal color, tissue type matching is possible as accurate as possible. [3-6]

The timing of revision of BCLP and nasal deformities has often been deferred till functional growth ceases for the following reasons as cited by various authors including Bardach and Sayler.[3,9-11]

- To facilitate the orthodontic intervention
- To permit the maturation of the lower nasal cartilage maturation – strong, stable, support for redesigned nasal tip
- To facilitate completion of cleft palate correction
- The current technique is often reserved for a patient who shows a nasal and upper labial deformity in spite of early intervention.[1]The results of the simultaneous correction show the effectiveness of this technique. However, in well-executed cases of early cleft lip repairs, this approach may not be required.

As in this modified method, the entire philtral subunit is redesigned; it gives a well desired esthetic appeal. The patient of their immediate attendants often do not observer the residual deformities or scar. This is evident from the results given in Table 1.

Table 1: Qualitative difference in perception of postoperative rhinoplasty outcome measures

	Malposition	Distortion	Asymmetry	Scar
Unnoticeable	5	4	2	1
Obvious	1	2	1	1
Deforming	Nil	Nil	Nil	Nil

The patients perception of their deformity before the surgery as reflected by the questionnaire score, indicate the psychological, social and physiological impact of nasal deformity. The postsurgical questionnaire score indicates that nearly all patients were completely satisfied to the highest order.

This approach for understanding the success of rhinoplasty has been previously studied, published, and accepted. [2,3]To the best of our knowledge, this study is the first of its kind, which appreciates the outcome of rhinoplasty of BCLP patients. Few other studies have been in this approach, [2,3,7] but none of them employed the questionnaire kind of approach. The effective lengthening of columella with Abbe flap serves many purposes:[5,6,8]

1. Helps to correct the redundant lowerlip
2. Helps to correct the deficient upper lip, particularly the philtral area
3. Corrects the nasal base, tip, columella length, and tissue deformities in the area
4. In case of males, facial hair is found in both the donor and recipient sit. In this regard, with the Abbe flap, the issue of facial hair is negated.

Lo et al., [5] Mokal and Juneja, [3] and kumar et al.[2] have shown that the Abbe flap with simultaneous reconstructive rhinoplasty is a safe and effective procedure without any significant surgical morbidity and airway obstruction. Similar to Mokal et al.[3] authors did not encounter any airway obstruction, but kumar et al.[2] reported two such instances in their cohort. Probable, the nature of the study, patient factors, and difference in approaches contributed to this effect.

The late labial correction often aggrevates nasal deformity owing to complex muscle and loco-regional interactions of the peri-oral and peri-nasal musculature. In this regard, the simultaneous correction of the base of nose, columella, and the upper lip yields a better result than the separately reconstructed ones.[3] In addition, the patient's perception of their postoperative results, the attendant's version are crucial as they have living with the stigma over the years. In this, it was identified that the scar was a major problem. Atleast 1 of the 4 patients reported that they were conscious of the resultant scars in the lips, while none of the patient's attendants noted the same. Malpositioning of nose, distortion of tip, and asymmetry of nares were not noticeable in atleast 86% of the study subjects, postoperatively. This part of the study could carry an inherent time-related bias. However, to compensate for this bias, we did show the archival images that probably helped them to revive their memories. This type of study approach has been used previously.

Mokal and Juneja: Secondary bilateral cleft lip-nose deformity correction by rhinoplasty with simultaneous abbe flap



Figure 1: Twenty-two year old male who after correction of occlusion with orthodontics underwent simultaneous correction of the lip and nose. Comparison of preoperative (a, c) and postoperative status (b, d)



Figure2: Eighteen-year old female had normal occlusion most likely due to unrepaired cleft palate. Patient underwent cleft palate repair and later correction of the lip and nose. Figures a,c showing preoperative status and figures b, d showing postoperative results. Fig e, f, are intra op

Conclusion

Abbe flap with reconstruction rhinoplasty is a reliable, safe procedure, and much effective in corrective of secondary or residual deformities that are especially found at the time after cessation of growth with no complications. The present study presently evaluated the outcome of the procedures and found to have a high degree of satisfaction, postoperatively.

Ethical Clearance: Not required since it is a case report

Source of Funding: Nil

Conflict of Interest: Nil

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Evalutation of Maxilla Stability in Cleft Patients with Le Fort 1 Maxillary Advancement

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ABSTRACT

Context: le fort 1 maxillary osteotomy in operated patients of cleft lip and palate (CLCP). AIMS: to study stability of le fort 1 maxillary osteotomy in operated patients of CLCP by two -dimensional evaluation using cephalometric analysis.

Setting and Design: Prospective study conducted at Sree Balaji dental collage and Hospital from 2016-2018

Materials and Method: Subjects included 3 consecutively operated patients of CLCP with maxillary hypoplasia. Maxillary advancement be le fort 1 maxillary step osteotomy was performed. There was two males and one females with an age of range of 18 to 20 years and follow up range was 6 to 24 months. presurgical and postsurgical changes were compared usingcephalometricsfor orthognathic surgery (cogs) system to determine stability of maxillary movements and quantify relapse at 21days and 18 months.

Statistical Analysis: Student t-test.

Result: Mean linear horizontal advancement achieved along nasion (N) to anterior nasal spine (ANS) with reference to true vertical plane at 21 days and 18 months was 4.17 and 2.91mm,respectively. The mean relapse in anteroposterior dimension was 20.63%. the mean vertical displacement observed along nasion and ANS with reference to true horizontal plane at 21 days and 18 months was 4.21mm and 2.3, respectively with a resultant relapse of 38.54%.

Conclusion: Based on clinical and COGS analysis, it is evident that le fort 1 advancement in operated cases of CLCP has inherent potential for relapse

Keywords: *Le fort 1 maxillary step osteotomy, maxillary hypoplasia*

Introduction

General sequel of CLCP ranges from a mild maxillary hypoplasia to disfiguring midface deficiency collapsed alveolar arches, unerupting/missing teeth and occlusal discrepancies. Secondary alveolar grafting provides a good support to alar base and path for eruption of teeth into alveolar cleft defect. However, midface deficiency is more or less persistent in all cases in varying intensities.

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Hussain suggested indications for distraction osteogenesis against conventional orthognathic surgery in CLCP as (a) patients who have not attained skeletal maturity, (b) patients requiring advancement of more than 7mm of maxilla alone, (c) patients with severe fibrosis of lip and palate following multiple attempts at palate repair, and (d) those who have had a pharyngeal flap for velopharyngeal insufficiency (VPI) correction. [6] In the present study, patients who did not require distraction osteogenesis were taken up for evaluation of conventional orthognathic surgery in CLCP with functionally stable fixation.

Materials and Method

A prospective study was conducted at Sree Balaji Dental College and Hospital, Chennai, from 2016-

2018 on 3 consecutive operated patients of CLCP. Individuals requiring single jaw surgery, that is, maxillary advancement of less than 6mm were included in the study. The study group compromised of 2 males and 1 females in an age range of 16-18 years. Follow-up range was 6-24 months. 2 patients had unilateral CLCP (repaired) and 1 had bilateral CLCP (repaired) associated with maxillary hypoplasia. All patients had undergone prior secondary alveolar grafting. Patients analysed had not undergone any orthognathic procedure earlier and complied for a follow-up for a period of atleast 6 months.

Presurgical preparation involved study model evaluation and lateral cephalometric analysis using cephalometric for orthognathic surgery (COGS) analysis. To avoid excessive radiation by cone beam tomography or other techniques such as computed tomography (CT), standard lateral cephalogram was taken as an aid. Standardized lateral cephalogram (same voltage-Kvp, current-mA, and exposure time) was taken for all patients by a single machine and a single technician. Also the image were calibrated to avoid problems such as magnification.

All patients underwent Le fort 1 maxillary high-step osteotomy with downfracture under general anesthesia. Step osteotomy was performed with goal of addressing a wider area of midface deficiency. Occlusal splints were used as a guide for optimum occlusion and following advancement, the fragments were fixed using miniplates. Intraoperatively occlusion was reassessed for stability. Patients were not kept under intermaxillary fixation initially, but were placed on interdental elastics after 24 h of surgery once the airway was secure.

Patients underwent definitive postoperative orthodontic treatment for settling of minor occlusal discrepancies. Follow-up period ranges from 6-24 months. Lateral COGS was performed at 21 days and 6 months postoperatively. Landmarks studied for horizontal advancement was change in nasion (N) to anterior nasal spine (ANS) distance with reference to true vertical plane. Vertical displacement was assessed by change in distance between nasion and ANS with reference to true horizontal plane. Comparison of presurgical and postsurgical changes at 21 days and 6 months interval was carried out to determine stability of maxillary advancement and quantify the relapse.

Results

Postoperative records including lateral cephalograms were analysed at 21 days and 18 months with preoperative records [Figures 1-8]. All patients (n=3) were satisfied with postoperative results due to marked improvement in facial aesthetics. Mean linear horizontal advancement achieved along nasion (N) to anterior nasal spine (ANS) with reference to true vertical plane at 21 days and 18 months was 4.17 and 2.91mm, respectively [Tables 1]. The mean relapse in anteroposterior dimension was 20.63 % at 18 months. The mean vertical displacement achieved along nasion and ANS with reference to true horizontal plane at 21 days and 12 months was 5.21 and 3.2mm, respectively with a resultant relapse of 4.54% at end of 12 months. In a patient of bilateral CLCP, fragmentation of maxilla was encountered intraoperatively which was managed using surgical splint. No other significant intraoperative or postoperative complication was observed.



Figure 5: Postoperative view of case 2, a)Frontal b) Profile

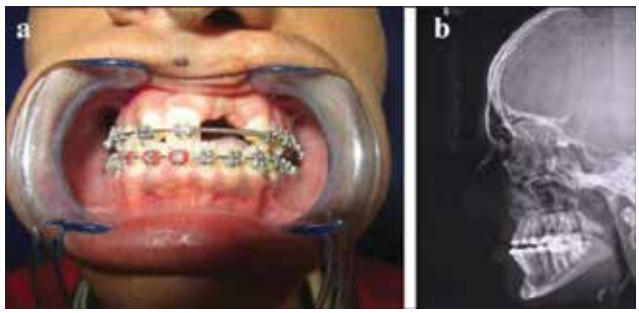


Figure 6: a) Preoperative occlusion, b) Preoperative lateral cephalogram

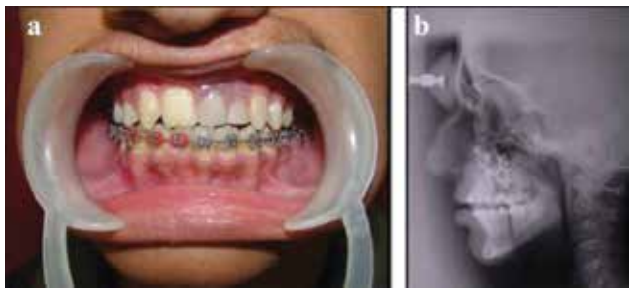


Figure 7: a) Postoperative occlusion b) Postoperative lateral cephalogram



Figure 8: Post operative view, a) Frontal b) Profile

Table 1: Mean values of horizontal advancement and vertical displacement

Mean values	21 days	12months	Relapse	Relapse %
Horizontal advancement (mm)	5.17	3.91	1.26	21.63
Vertical displacement (mm)	5.21	3.91	1.26	41.54

Discussion

Scarred tissues from earlier surgical repair which are often accompanied by presence of a pharyngeal flap can impede horizontal growth and restrict advancement of maxilla during a Le fort I procedure. These forces combined with normal masticatory movements have led to a marked tendency for skeletal and dental relapse after maxillary advancement. Many authors have recommended overcorrection of upto 100% to compensate for this problem.[1] In our study, in view of above few also opted for overcorrection by about 80-90% in all cases.

In 1977 Freihofer[7] stated that maxillary advancement should be delayed until permanent dentition. He documented high incidence of "pseudorelapse" secondary to mandibular growth in adolescent patients. This was later confirmed by Ross.[1] In the present series, we performed Le fort I advancement in adolescent patients in permanent dentition stage.

Araujo et al.,[8] in their series of maxillary advancement stabilized the fragment using stienmann pins and performed bone grafting in 5/8 patients. They found significant decrease in relapse, particularly when grafting was done between maxillary tuberosity and pterygoid plates as also suggested by obwegeser. However, in present study bone fixation was done using miniplates and no grafts were employed. D

Willmar showed that all statistically significant relapses occurred during first year which was later confirmed by posnick and ewing.[9] Most authors agree that vertical relapse is significantly higher than horizontal relapse and tends to occur predominantly during the period of intermaxillary fixation (IMF). Willmar proposed several reasons for a higher tendency for vertical relapse, that is forces exerted by the muscles of mastication, influence of lower jaw position, effects of IMF, pull exerted by suspension wires if they were used. We also got similar results of higher relapse in vertical dimension (41.54%) than along horizontal plane (21.63%)

Houston and James[10] and Posnick and Ewing[9] noted that relapse did not correlate with magnitude of surgical advancement in either horizontal or vertical dimension. Posnick and Ewing also reported that relapse increased in case of pharyngeal flaps, relapse was more in nonrigid type of fixation, and bimaxillary surgery did not affect relapse.

Both the patients in our study group with bilateral CLCP had maximum linera horizontal relapse with 30.4 and 29.16. Tvhus, our findings are also concurrent with Hirano and Suzuki[11] who stated that relapse was more likely to occur in patients with bilateral cleft. They also advocated that jaw surgery should be performed twice in cases of severe maxillary hypoplasia.

In 2001 Heliovaara et al.,[12,13] reported a mean maxillary horizontal relapse of 20.5% and mean vertical relapse of 22.2% within first year following Le fort I advancement and fixation using miniplates in operated cases of CLCP. One year later, the same group of authors showed decrease in relapse in both the dimensions following use of autogenous bone grafts in pterygoid region. The mean relapse was 8.5% (0.4mm) horizontally and 16.7%(0.6mm) vertically in this study. Autogenous bone grafts in pterygoid region has been used by many authors as an alternative to overcorrection. However, it carries the risk of bone resorption and dislodgement with additional donor site morbidity. Our results are similar to that of Willmar, Posnick and Ewing and Heliovaara et al., with a mean horizontal relapse of 21.63% and vertical relapse of 41.54%.

Gateno et al.,[14] and Hussain [6] suggested that advancement of >6mm of maxilla in operated cases of cleft palate require distraction for more stable results. In the present series of cases, patients requiring a composite advancement, that is, with overcorrection to manage postoperative relapse, of <6mm were only included in the study.

It is evident that vertical relapse and horizontal relapse are some of the inherent limitations of Le fort 1 maxillary osteotomy and advancement in operated

patients of CLCP even with autogenous bone grafting. In this study, we assessed functionally stable fixation using miniplates (2mm thickness titanium miniplates) with overcorrection by 80-90% and providing a stable occlusion intraoperatively as a promisabletechnique to achieve satisfactory results. Also, the role of postoperative orthodontics cannot be overemphasized.

Conclsion

In the present study, three operated patients of CLCP with maxillary hypoplasia were prospectively studied after Le fort 1 maxillary advancement. Operated cases of CLCP have inherent limitation for relapse to advancement procedures. Though the present study has a limitation of a smaller sample size; it ascertains that orthognathic surgery with use of rigid fixation of segments though reduces, but does not eliminate the risk of relapse.

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Ethical Clearance: Institutional Ethics Committee, Sree Balaji Dental College and Hospital, Committee registered with DCGI. (Registration no: ECR/761/Inst/TN/2015)

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Conflict of Interest: Nil

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Lymphangioma of Tongue—A Case Report

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ABSTRACT

Lymphangioma is a hamartomous benign tumour[1]that is characterized by the proliferation of lymphatic vessels due to the congenital malformation of the lymphatic system. This benign tumour can occur anywhere in the body but head and neck being the common site of occurrence. However intraoral lymphangiomas are rare, if occurs it is more common on the dorsal surface of the tongue and the lateral border,and rarely occur in palatal mucosa, buccal mucosa, gingiva and lips[2]. Lymphangiomas of tongue can be associated with difficulty in speech, mastication, chewing and maxillofacial deformities.

Surgical treatment is aimed at providing symptomatic relief ; surgical excision remains the treatment of choice. However other treatment modalities like cryosurgery, electrocautery, sclerotherapy, radiation therapy, laser and tissue ablation can also be used[3]. We hereby present a case of 41 year old male with lymphangioma on the ventrum of the lateral surface of the tongue treated with surgical excision.

Keywords: *Lymphangioma, Cryosurgery, tongue*

Introduction

A 41 year old male reported to the department of oral and maxillofacial surgery, sreeBalaji dental college and hospital with a chief complaint of a growth in his tongue for the past 15 days. The patients history was taken. On intraoral examination a swelling of about 1.5*1 cm in size was present in right ventrolateral border of tongue. On palpation the lesion was soft and tender. There was no bleeding on probing and no restriction in tongue movements.

The treatment done was surgical excision followed by excisional biopsy including 2mm margin under LA. Under LA a suture was placed on the tip of the tongue for the purpose of retraction. Incision was all around the elevated mass and it was then further deepened to excise the lesion completely followed by approximation using silk 3-0 suture.Healing was normal postoperatively. Excisional biopsy confirmed the diagnosis -Lymphagioma.

Differential Diagnosis:

The differential diagnosis includes

- Hemangioma
- Congenital hypothyroidism
- Amyloidosis
- Neurofibromatosis
- Primary muscular hypertrophy[4]

Conclusion

Occurrencea of lymphagiomas are quite rare in the oral cavity however early recognition and treatment helps in preventing complications and continous follow up is necessary to check for any future recurrence.

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Solitary swelling seen in the right lateral border of tongue





Post operative picture—After a week

Ethical Clearance: Not required since it is a Case report

Source of Funding: Nil

Conflict of Interest: Nil

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Nasal Floor Reconstruction in Cleft Patient

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ABSTRACT

Introduction: Widening of alar base width is often required in the lip/palate rehabilitation.the aims of this study is to evaluate such a procedure.

Materials and Method: This is a retrospective study. All cleft case requiring alar base widening were analysed, and the outcome presented at end of 4thand 8th month. This study was typical superomedially placed nasolabial full thickness flap to correct the alar base width simultaneously replaced the nasal lining.

Result: A total of three cleft patient underwent the procedure. Qualitative observation of the outcomes and postoperative changes with the resultant nasal alar base width are presented.

Discussion: The efficacy of this type of nasolabial flap for the alar basal widening and of nasal lining reconstruction is presented. The essential, functional and anatomical consideration in such a flap design is presented in this study.

Keywords: *Alar base reconstruction, Rhinoplasty*

Introduction

Alar base defects could be due to several causes including trauma and developmental aspects.[1,2] In the latter condition, postrhinoplasty, there is a restricted alar base being created by the stress created by the surgical repositioning of the orbicularis oris and the circumoral musculature.

This unique condition poses a tough challenge to the maxillofacial surgeon. Besides the aesthetic requirement, need for considering nasal lining mucosa and provision to accommodate and serve as a base for strong, curvy alar margin is required.[8] In addition to these requirements, recreation of a base that resembles the contralateral alar base is the most daunting challenge. Often such cases would have undergone multiple previous surgeries, and their expectations are varied. The nasal alar base widening is performed as the last step at completion of nasal reconstruction.

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Like other openings of the facial cavities, the alar base mucosa has an innate tendency to rescar and contract in spite of the best of the surgical flap designs and postoperative follow-up. In addition, a defective lobule-ala-columella complex, loss of healthy vestibular lining, defective ala, circumferential scarring of the alar base aid the distortion of the alar base. Often the medial aspect, one nearer to columella are resistant to distorting forces as they are held in place by the medial crura and the insertion of the connective tissues (that form the floor of the nares) into the septal region. In addition, the reduced opening of the nares leads to the development of negative pressure caused by the inspiratory actions cause further reduction of the space.[2]

Several strategies have been reported in the literature to correct this deformity. When there is a scar tissue, the dictum is to remove the scar tissue and replace with new healthy lining.[8] When there is no scar as in cleft cases, substitution of the defect with new tissues and lining mucosa would be the norm. There are several types of flaps and designs to rehabilitate the condition.[9]

Material and Method

This retrospective study was conducted in the period between 2014 and 2018. All cases treated for isolated

nasal alar defect with the superiorly directed nasolabial flap with at least 8 months follow-up were included for this study. Only cases with adequate records were included for the study. In total, three cases fulfilling the criteria were retrieved.

Surgical Method: The surgery is done under general anaesthesia. The entire area involved is infiltrated with an adequate amount of lignocaine with vasoconstrictor adrenaline(1:80,000) to achieve minimal bleeding at the site of surgery.

Flap Design: From the base of the involved alar, along the dome, a 'wedge and sill type' of release incision[10] is placed to release the flare from the nasal floor. This will allow the repositioning of the alar base and this incision serves to prepare the recipient site. A peri-alar flap, superiorly (to alae) and medial to the nasolabial fold is raised. The flap is made as thin and long as required but with a wide base. The flap is checked for the length and flexibility. This flap is then transposed into the floor of the nostril. If the flap is bulkier, the flap is rendered thin by preserving the subdermal plexus and removal of unnecessary adnexial structure without compromising the vasculature. This would help in the future to reduce the bulk of the future nasal floor. Care is taken to ensure the preservation of skin adnexial structures. This full-thickness skin graft will cause two benefits: (i) It recreates the vestibular lining, and (ii)Causes lateralizing of the preexisting contracted alar base. This also ensure the proper curvature of the naris, which is often repositioned during the cleft rhinoplasty or during the closure of the orbicularis oris[Figure 1-5].

When the flap is placed in a position along the floor of the nose, it is secured by sutures. The dog ears are cut, and appropriate approximations performed. The now free tip of the released dome ala is approximated with the distal most incision placed for the flap while the mesial part is approximated with the inner part of the nasal flare. The ends are approximated and secured tightly. prescribed as required.

Measurments: Presurgically, the internasal width along the floor was measured thrice with a Vernier caliper. The average value of this was taken as the length of the nasal floor (PN) for the normal side and PA0 for the affected side. At the immediate peri-operative period, it was PA1. After 4 months, in the involved side, the length was measured as PA4and PA8at the end of 8-month period. The difference was expressed as a ratio of the PN and expressed in percentage.

Results

There were one male and two females with age ranging from 22 to 30 years (mean 25.23years). All three cases were unilateral cleft lip and palates cases.In all cases, the grafts were adequately tolerated resulting in complete flap survival. There was no complication with the donor site survival too.

At the baseline, the mean ratio of the PN -the [PA0/Pn] *100 was 86.23+_5.37%. The same after surgery, the [PA1/PN] *100 was 92.27+_ 2.29% and at the [PA4/PN] *100 and the [PA8/PN] *100 were 96.82+_ 1.25% and 90.98+_ 1.05% respectively.



Figure 1: (a, b) Preoperative view showing alar base defect in cleft patient. (c, d) Medially placed nasolabial flap raised and used to reconstruct left alar, to achieve better aesthetic results flap involves a scar of previous surgery done elsewhere



Figre 2: (a, b) Costochondral graft harvested and used to reconstruct the dorsum and alar. (c, d) Postoperative view after nose correction

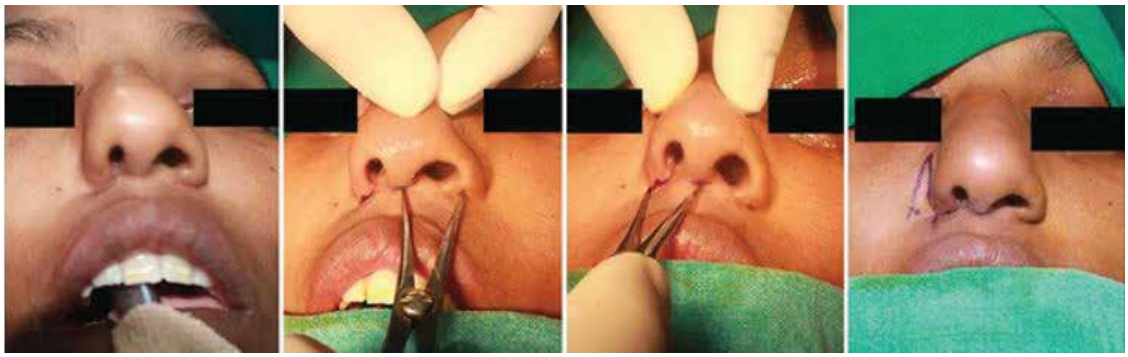


Figure 3: (a) Preoperative appearance of alar base defect. (b and c) Width of the nostrils measured and the amount of discrepancy marked at nasal floor. (d) Design of the nasolabial flap.



Figure 4: (a-c) Right alar defect reconstructed with nasolabial flap. (d) Postoperative appearance.

Discussion

The goal of any nasal correction would be to (1) Restore an ideal symmetrical nasal contour suited to the patient's face. (2) The defective nasal part is reconstructed in its three-dimensional form layer by layer. (3) Scars at the donor site should by minimal or could be camouflaged. (4) Modify the nasal aesthetic unit without affecting the function. (5) Use appropriate subcutaneous tissue modulation to refine the result.[11]

The history of alar base correction reveals several diverse surgical designs catering to several types of clinical situations and condition.[9-11] There are simple designs that require only soft tissue correction to complex grafts that might require skin, subcutaneous tissues and even cartilages. The most prominent difficulty encountered in such maneuver is ear notching deformity.[10,12] The place of incision is a crucial factor in the occurrence of this deformity. This designoffers the best result with little complications as this is a salvage surgery that corrects residual defects and produces predictable results with simple maneuvers.

The technique mentioned herein, as per experience of peck et al.,[12] is resistant for such dog ear formation. [12] The involvement of triangle of tissue along the cutaneous part of the nasal base, postsurgically results in an intranasal 'dog ear', however accurately planned. This extraneous tissue, remodels and flattens over time, leaving a nasal closure that is resistant to notching. The depth of the muscle modulation also could contribute to notching.[10] As this technique does not involve muscle manipulation per se, inherently this technique could minimize the notching. This is vital in cases of cleft lip/palate as the alar cinch process, which is often used in cleft closure involves deep circum oral muscle manipulations.

The present technique remotely resembles the 'sill excision and an alar bunching technique' as reported by kridel and castellano.[10] Placing the skin incision for the nasolabial flap about 1mm anterior to the alar-facial groove involving dense concentration of sebaceous glands and the visibility, often creates aesthetical disharmony with the normal side. For this purpose, the careful placement of the early sill incision and proper eversion of the alar margins is needed. The natural alar groove remains as a large portion of the lateral ala is unaffected by this surgery and in the process is shifted laterally too.[10]

Frequent measurement (preoperative and intraoperative) often helps to minimize the asymmetry. But the care must be borne that exact symmetry is always not possible. This is reflected by the mean

[PA1/PN] *100 score of 92.27+_2.29% in the present study. Deep sutures could minimize the same but could cause notching after healing. Hence, a delicate balance is needed. An additional benefit of this surgery is the lateralization of the base of the ala, caused by the closure of the donor site.

Usually, all surgery is subject to several complications. In nasal floor reconstruction, partial necrosis of intranasal lining flaps is often the complication.[9,11]The success of this flap rests on its blood supply. The Superior labial artery is a major arterial supply to this nasolabial flap. No interference with flap circulation was noted with the thinning, clinically. Thinning of the flap may have an impact on the vascularity of the flap, but this could not be measure. However, several studies have claimed its efficient application and graft survival which is consistent with the present observation.

Widening of the alar base is an essential and probably the last part of the cleft rhinoplasty. This is essential as the constricted alar base in this situation causes, reduced inspiratory volume, poses a difficulty in cleaning of the nostrils besides reduction in other physiological functions of the nares. By this surgery, the alar base is widened, the nares and nasal floor morphology is symmetrically matched with that of the normal side. In addition, the resultant defective area is covered with a lining that is adjacent and is a local flap. As the flap is supplied by the labial artery and its branches, the supply is always ensured. The increase in postoperative alar floor length ratio and the maintenance of the same reflects that the results of such a surgery attempt is permanent and lasts for long.

Conclusion

A simple way to widen the alar base in cleft lip/ palate patients with reconstruction of the defect using a local flap is described. Its success and long term results have been reported.

Ethical Clearance: Not required since it is a case report

Source of Funding: Nil

Conflict of Interest: Nil

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Dental Implants a New Treatment Modality for Replacement of Missing Teeth in Adolescent Patients

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ABSTRACT

The use of implants in replacement of missing teeth is usually minimal in patients with completed craniofacial growth. This literature review is to give an insight about the use of dental implants in growing patients and in patients with ectodermal dysplasia and the effect of maxillary and mandibular skeletal and dental growth on the strength of these implants. It is advisable that on deciding the optimal individual for implant placement, the time point of implant insertion, the status of skeletal growth, the degree of hypodontia, and extension of related psychological stress should be taken into consideration, in addition to the status of existing dentition and dental compliance of a pediatric patient.

Keywords: *Children, dental implants, ectodermal dysplasia, growth.*

Introduction

The most frequently encountered problem in pediatric patients is congenital partial anodontia and traumatic tooth loss. In these cases, oral rehabilitation is required even before skeletal and dental maturation has occurred. Removable partial denture is the treatment of choice in these patients, but it has certain drawbacks like increased caries rate, periodontal complications, and increased residual alveolar resorption. Many studies have discussed the use of implants in children. The use of dental implants for children are a new treatment modality. The two major concerns are: (i) First, if implants are present during several years of facial growth, there is a danger of these implants becoming embedded, relocated, or displaced as the jaw grows. (ii) Secondly the effect of prosthesis on growth. To compensate for growth changes in these cases design changes must be incorporated into such prosthesis.[1] From a physiologic stand point, the conservation of bone may be considered for use of dental implant in a growing patient. The availability of alveolar bone is very less in congenital partial anodontia and placement of dental implant changes the load mechanism on bone and retards its resorption[2].

Growth Determination: It plays an important role in planning implant placement in children and adolescents. To determine the cessation of growth, although a good quality method is the use of serial cephalometric radiograph taken 6 months apart with superimposed orthodontic tracings. If no changes occur over a period of 1 year, one may assume that growth is complete[3]. Oral findings of ectodermal dysplasia Clinically these patients presents with, multiple tooth abnormalities such as anodontia, hypodontia, and tapered, malformed, and widely spaced teeth, abnormal alveolar ridge development. Other physical signs can involve the sweat glands, scalp, hair, nails, skin pigmentation, and craniofacial structures (e.g. cleft lip and cleft palate). Children with Ectodermal Dysplasia do not have normal patterns of growth, and a risk and benefit analysis must be made to assess the value of implant placement, especially in anterior mandible where lateral growth is usually completed by 3 years of age.[4,5,6]

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Suggestions for implant placement in unaffected patients

At most care must be taken while placing implants in children because of growth changes in jaw and the dentition.

1. Whenever possible, implant placement must be delayed until the age of 15 years for girls and 18 years for boys.[3]
2. Adequate follow-up is essential in growing patient treated with dental implant [3]
3. Further research is needed in the areas of implants in growing children.[3]
4. Implant location, the sex of the patient, and the skeletal maturation level are the most important factors in the final decision of when to place implant.[7,8]
5. It is still recommended to wait for the completion of dental and skeletal growth, except for severe cases of Ectodermal Dysplasia.[7]

Recommendation for implant placement by quadrant: Maxillary anterior quadrant is an important area for consideration due to traumatic tooth loss and frequent congenital tooth absence. Vertical and anteroposterior growth changes in this area are substantial, the vertical growth of the jaw exceeds all different dimensions of the expansion during this quadrant. The premature implant placement may end up within the repetitive have to be compelled to lengthen the transmucosal implant association that ends up in poor implant-to-prosthesis ratios and also the potential to load magnification[4]. According to Krant,[9] the position of implants within the anterior jaw quadrant before the age of fifteen in feminine patients and seventeen in male patients is good to attain distinctive treatment planning goals and with explicit stress on the sole determination of skeletal age, informed consent, and the possibility of future implant replacement.

Maxillary posterior quadrant is subject to same general growth factors delineate for the jaw anteroposterior space. An additional protein is crosswise jaw growth at midpalatal suture, which produces rotational growth that anteriorizes the position of the maxillary molars. Placement of osseointegrated dental implants within the jaw posterior quadrant is best delayed till the age of fifteen years in females and seventeen years in males[4].

Mandibular associate degreeterior quadrant is that the best website for the location of an osseointegrated implant before skeletal maturation. Mandibular anterior quadrant presents fewer growth variables. The closure of the inframaxillarysymphyseal suture happens throughout the primary two years of life. Prosthesis supported by dental implants within the anterior mandibular bone ought to be of a recoverable style to permit for a median increase of dental height of 5–6 millimeter moreover as the anteroposterior growth(22).

Mandibular Posterior Quadrant: The dynamic growth and development of the posterior mandibular bone within the crosswise and anteroposterior dimensions not to mention its move growth presents multiple treatment considerations. Placement of osseointegrated implants within the posterior inframaxillary quadrant is best delayed till skeletal maturation[7].

Discussion

The benefits of implant use in growing patients are as necessary because the considerations for his or her premature use. Reports were published by Cronin et al. and Smith et al.[10] documenting the placement of endosseous implants in the anterior mandibular region as early as 5 years of age with positive treatment results. Prachar and Vaneek[11] present the results of a 5-year study on the use cylindrical or screw implants in adolescents of age 15–19 years. Prosthesis remodeling, as stated by Smith et al., Brugnolo et al.,Guckes et al., and Kearns et al.,[15] is an undesirable condition due to the repetitive need to lengthen the transmucosal implant-to-prosthesis ratios and also the potential load magnification. According to Dietschi and Schatz[16] and Mackie and Quayle,[17] implant placement in children younger than 16–18 years must be avoided.According to Guckes et al.,[18] bone volume in children may not be sufficient for the placement of implants in ideal positions for prosthesis support. In the totally anodontic patient, the vertical and anteroposterior changes in alveolar development may not be as important as in the partially anodontic patient in whom considerable dental changes can be expected with growth. Bergendal et al.[19] stated that implants must be placed when growth is almost complete, except for rare cases of total aplasia as in ED. Elsewhere, it had been counseled that treatment with

implants should be delayed till the age of thirteen years, since an implant placed at the age of 7 or 8 may not be in a favorable position at the age of 16 years.

Congenital anodontia may be a rare condition and is seen principally as a feature in transmissible syndromes. Anodontia of the mandible is most commonly found in ED. It is rare. Small children with no teeth the least bit within the lower jawbone gift special treatment challenges within the effort to normalizing the looks and performance throughout the years of growing up. Implants in the mandibular anterior region can be placed to support an overdenture, from the age of around 6 years, when the median sutures of the mandible is closed[21,22,23]. According to the 1988 National Institute of Health accord Development Conference on Dental Implants at Bethesda, paediatric patients with disfunction may benefit from the employment of dental implants[23].

Following the presented case and review of literature by Kramer et al,[25] in their article, they recommended the insertion of implants in those pediatric patients who suffer from extended syndromalhypodontia, such as seen in ED. The most appropriate website for insertion appears to be the anterior mandible; insertions within the upper jaw ought to be avoided or a minimum of mustn't cross the sheet. Ryda[26,27] established that all clinical judgment and treatment for children should be performed according to the United Nations Convention on the Rights of the Child. Respect the child's development physically as well as psychologically.

From 1995, many case reports on youngsters with ED are printed on the putting the implants within the canine region of the associate degreeodontic articulator to support an overdenture from the age of 3 to 6 years[4,13,22]. The youngest child reported was a French boy who had implants placed at the age of 1.5 years[29]. Placement of dental implants cannot be recommended before the age of 6 years, since it is well established that children can and should take part in decisions on elective surgery from the age of around 5 years[28].The first published case of placing implants in a boy with hypohydrotic ED and anodontia of the mandible was treated at the Institute of Jonkoping and has been followed for more than 20 years. Overdenture served well until the patient was 19 years old, when two additional implants were placed and the patient was provided with a mandibular fixed implant supported prosthesis[30]. The timing of implant placement in growing patients was discussed at a Scandinavian Consensus Conference in Sonkoping, Sweden,[31] where there was a general agreement that implant placement should be postponed until skeletal growth is completed or nearly completed in normal adolescents. In the individual with genetic disease or anodontia, however, earlier intervention could be indicated, especially in the mandible.

Anodontia and severe genetic disease were mentioned as exceptions to the rule.

Conclusion

Studies on the use of dental implants in young patients are as yet very limited; long-term clinical studies are necessary for sound conclusions. If the goals of treatment planning favor implant use before skeletal maturation, parents of the child need to be informed about the benefits and possible complications of its use. More emphasis has to be given during prosthesis planning. Still, some children are treated with implants, and there are a few in whom the therapy may result in a better quality of life. However, the treatment can only be justified when the anticipated positive effects are greater than the drawbacks of the procedure. Furthermore, when utilizing techniques that are still not fully evaluated for the purpose intended, as clinicians and scientists, we have a greater responsibility of follow-up and monitoring the outcome.

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Graft Used in Direct Sinus Lift Technique Followed by Dental Implant

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ABSTRACT

Implant is the best alternative option nowadays for missing tooth replacement. Lack of bone height poses a significant obstacle for its placement. Bone augmentation is an option to counter this problem. To treat the local physiological as well as anatomical limitation, maxillary sinus floor elevation has become an important pre-placement procedure in maxilla. With the advent of Various methodologies to increase the thickness of maxillary sinus floor, One of the techniques involve minimal elevation of maxillary sinus membrane, Schneiderian membrane, while other include placement of various type of grafts including allografts, autografts, bone morphogenetic proteins, and hydroxyapatite crystals. The bone substitutes used in sinus lift is reviewed in this article.

Keywords: *dentalImplant, Schneiderianmembrane, sinus lift, bone graft.*

Introduction

Patients suffering from tooth loss in the posterior maxilla are often subject to esthetic, functional, and psychological complications. Maxillary sinus[1] augmentation (also known as sinus lift) procedures have become increasingly popular procedures prior to placement of dental implants in posterior maxillae that have suffered severe bone loss due to sinus pneumatization, alveolar bone atrophy, or trauma. This article will highlight different sinus augmentation technique, including elevation procedures, regenerative materials, possible complications and postoperative instructions will also be reviewed[2].

Direct Sinus Augmentation Technique (DSAT): Cases with residual alveolar bone (RAB) height 5 mm or below was considered for the direct technique. Autogenous bone grafts was harvested by shaving the mandibular bone from external oblique ridge area or chin area[3]. A bone mill was used to grind the bone shaving into fine particles. After adequate local anesthesia and preparation, a surgical incision was placed on the crest of the RAB at most appropriate area, with vertical releasing curvilinear incisions flaring into the vestibule. Flaps that were raised, reflected full-thickness, subperiosteal labial, and palatal flaps. The base of flap was made sure it was broad as well as adequate buccal and palatal tissue for closure. After elevation, the anterolateral wall of maxillary sinus was visualized. Care was taken to identify and protect infraorbital nerve, if encountered[4]. The dimension of osteotomy was determined based on clinical and radiographic examinations as well as the extent of edentulous span. Using a postage stamp method a buccal bone window was made on exposed wall of maxillary sinus. A gentle manipulation of the bony wall was done with sinus membrane elevators without damaging Schneiderian membrane. The previously obtained graft material was then placed and packed. The implant was placed on same day with guidance of a stent which was positioned, then removed, and the site was checked for appropriate faciolingual and mesiodistalpositioning.

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Any obvious abnormal crestal defects required slight modification of the position[5].

Indirect Sinus Augmentation Technique (ISAT): Indirect sinus augmentation is performed on those cases wherein the RAB height was 6-8 mm. The RAB to receive the implant was given local anesthesia and perforated using a small rounded drill. A pilot drill was the initial drilll in order the mark the implant site to establish the axis of implant recipient site. Following the pilot drill, subsequently sequential drills of increasing diameter were used to enlarge implant recipient site till the desired diameter corresponding to implant diameter was reached. The height of drill was 2 mm short of sinus floor which was maintained. The sinus floor was fractured and elevated upby insertion of correct caliber osteotome and working up through successively greater instrument diameters. The sinus floor was fractured with at most care, separated from the Schneiderian membrane avoiding damage to membrane using a surgical mallet with controlled force. Autogenous graft material was used if required and was placed within the socket. The material was displaced apically with help of larger-diameter instruments, thereby lifting the membrane and condensing graft material between the latter and sinus floor. The implant placement was carried out immediately in the prepared site. Wound closure was done with 3-0 Vicryl. Patients were prescribed with Antibiotic, pain killers, and nasal decongestants for 5 days. The patients were monitored on a periodic basis both clinically and radiologically[6].

Sinus Elevation Procedure: The elevation of the sinus floor is an internal augmentation of the maxillary sinus, intended to increase the vertical bony dimension of the lateral maxilla to allow placement of dental implants in sites with insufficient alveolar bone height. The classic sinus lift procedure consists of the preparation of a window in the lateral maxillary sinus wall. This window is then luxated inward and upward with the schneiderian membrane to a horizontal position, thus forming a new sinus floor. The space underneath the membrane is filled with different graft materials according to the specific case. When bone height is sufficient to achieve primary stability (approximately 4 mm), implants can be inserted simultaneously[6]. However, if the grafted bone has to remodel, implants should be inserted in a subsequent procedure. There are 2 main approaches for maxillary sinus floor elevation: the lateral antrostomy approach and the crestal approach.

Crestal Approach: This technique begins with a crestal incision. A full-thickness flap is then raised to expose the alveolar ridge. Next, an osteotomy is performed, starting with an osteotome of the smallest size, which is tapped in place in the bone with a mallet or drill. More osteotomes of gradually increasing size are then used to expand the alveolus and compress the bone[7]. Once the largest osteotome has been placed, prepared bone grafting material is added to the osteotomy so that it presses on the sinus membrane. This additional pressure causes the elevation of the membrane. Additional grafting material may be used to achieve the desired amount of elevation. An implant—slightly larger in diameter than the osteotomy—is then inserted in the site[12,10].The crestal approach technique is a less invasive procedure, improves the density of the maxillary bone, and has the potential to allow the use of less autogenous grafting material. The major disadvantage of this approach is an increased risk of misalignment of the long axis of the osteotome during the sequential osteotomy[12].

Surgical Procedure and Flap Design: The flap should be designed in such a way that there isminimimal disturbance of the blood supply, and the surgical site needs to be securely covered[4]. As previously mentioned, the incision is usually made midcrestally or paracrestally through the keratinized, attached mucosa. The infraorbital foramen should be avoided; precautions should be taken not to injure the neurovascular bundle during the preparation of the door and retraction of the flap[3]. Ideally, the shape of the door should follow the inner shape of the maxillary sinus, which usually is curved. Radiographic and clinical evaluations of the extent of the maxillary sinus can be used to plan the shape. Incase the lateral sinus wall consists of thick bone, the whole lateral sinus wall should be thinned out. It has been suggested that rounded corners be approached with a wide cranial hinge base in order to reduce the risk of damaging the membrane[1]. The door luxation is done with finger pressure so that the surgeon can feel resistance and avoid the use of a sharp instrument.

Augmentation Materials: Various grafting materials have been used for sinus elevation procedures. Based on their source, grafting materials can be categorized as autograft, xenograft, allograft, or alloplastic. These types may be used alone or in any combination for sinus augmentation. The biological rationale for using bone grafts is based on 3 different healing mechanisms:

osteogenesis, the capacity of the graft to bring new bone-forming vital cells into the defect; the capacity of the graft to serve as a scaffold for bone formation;osteoconduction and osteoinduction, the capacity of the graft contents to induce an osteoblastic differentiation of the host's undifferentiated cells[5]. Osteoconductivity is an essential mechanism in any grafting material, as it provides biomechanical support and stabilization to the coagulum in the first healing phase and a scaffold for the new bone that will form in the later phase.45 Autogenous bone (also known as autologous bone or autograft) is considered the gold standard graft material for sinus augmentation, because it has osteogenetic, osteoinductive, and osteoconductive properties in addition to its high biocompatibility. The main drawback of this bone type is the need for a second surgical site, which can cause donor site morbidity. Donor sites are either extraoral (such as the ilium, tibia, or cranium) or intraoral (such as the mandibular ramus, mandibular symphysis, and maxillary tuberosity)[3]. Complications at donor sites include pain, gait disturbance, hernia, paresthesia, infection, antral perforation, dental injury, and fracture of the site[2]. Allogeneic graft material can be obtained from tissue banks as either mineralized or demineralized bone.46 Mineralized bone is less commonly used in sinus elevation procedures because of its lengthy process of bone formation. Demineralized bone is more commonly used due to the presence of bone morphogenetic protein that stimulates osteoinduction in adjacent undifferentiated cells to form new bone tissue. However, the main concerns about use of this type of material include the high cost and the risk (albeit low) of disease transmission. Xenografts, especially deproteinized bovine bone (such as Bio-Oss, Geistlich Pharma North America, Inc.), are widely used and have been studied extensively both in vitro and in vivo. Deproteinized bovine bone possesses osteoconductivity and can be used alone or in combination with other grafting materials. Bio-Oss is a bovine bone derivative that undergoes a low-heat (300°C) chemical extraction process by which all organic components are removed while the natural architecture of bone is maintained[(6)].Alloplastic grafting materials are easy to use and relatively less expensive than the cost of bone harvesting[(7)]. The most common alloplastic grafting materials are those composed of some form of hydroxyapatite, mainly calcium phosphate ceramics[(8)]. Mesenchymal stem cells have recently been implemented in maxillary sinus augmentations with clinically promising results[(8)].Mangano et al evaluated the literature pertaining to the effectiveness of cell-based approaches in maxillary sinus augmentation in humans.

Postoperative Instructions: The patient should be provided with both printed and oral instructions postoperatively.These instructions should include application of ice and pressure to the site, elevation of the head, and rest for the patient[10]. Although smoking is not an absolute contraindication, it is recommended that the patient cease the habit before, during, and after sinus augmentation and implant insertion because it has the potential to affect healing; several studies have shown higher failure rates among smokers. Actions that create negative pressure (such as blowing the nose or sucking through a straw) must be avoided by the patient during the first week after surgery[(12)]. If the patient does sneeze, he or she must keep the mouth open, so pressure is not exerted within the sinus[(14)]. Also, the patient should be warned against pulling back the lips to observe the surgical site, which could open the surgical incision line[(16,17)]. The patient should be informed about which symptoms to expect shortly after surgery, including slight bleeding from the incision line the day of surgery and soreness, swelling, and bruising for several days postsurgery. The presence of small bone particles or granules in the mouth or from the nose (with some bleeding) is not unusual. In addition, the patient should be advised to take medications (such as anti-inflammatory drugs, antibiotics, and nasal decongestants) as prescribed by the surgeon[(17)].

Complications: Several complications may arise during or after sinus augmentation. The most frequently encountered surgical complication is perforation of the schneiderian membrane, which occurs in 7%-35% of sinus augmentation procedures[(18,19)]. Perforation of this membrane is most likely to happen at sharp edges and ridges, such as spines or maxillary sinus septa (also known as Underwood septa). However, when the perforation is small and located in an area where the elevated mucosa folds together when the door is lifted, there is no need for further management, although use of biological glues might be considered[(20,21)]. If the perforation is larger and located in an unfavorable area, the perforation must be closed and covered to prevent loss of the graft.1 This can be achieved by covering the defect with a resorbable membrane and a surgical adhesive (such as BioGlue, Cryolife, Inc.). In cases

where the membrane perforation is very large, further sinus lift should be abandoned and reentry might be considered. The second surgery should not be performed for 6 to 8 weeks.2 Hernandez-Alfaro et al studied the prevalence of surgical complications and sinus membrane perforations.62 They evaluated 338 patients who received 474 sinus augmentation procedures and a total of 1166 simultaneously placed dental implants. The researchers reported 104 (21.94%) perforations of the sinus membrane (19 bilateral). Of these cases, membrane perforations less than 5 mm were observed in 56 (53.85%), perforations between 5 and 10 mm were observed in 28 (26.92%), and membrane perforations more than 10 mm were observed in 20 (19.23%)[26]. If small vessels are found bleeding in the exposed membrane, it is best to let them stop spontaneously or to apply light gauze pressure.1 Due to the presence of arterial anastomoses of the alveolar antral artery, which branches from the posterior superior alveolar artery within the infraorbital artery on the lateral wall where an osteotomy will be performed, precaution must be taken to avoid massive bleeding. Rosano et al investigated the prevalence, location, size, and course of anastomoses on 30 maxillary sinuses from 15 human cadaver heads and on 100 CT scans from patients scheduled for sinus augmentation surgery[26].They found anastomoses in 100% of the cadaver maxillary sinuses by dissecting the sinus anterolateral wall. However, a well-defined bony canal was detected radiographically in 94 of 200 sinuses in the CT scans of the scheduled patients (47%). The mean vertical distance from the lowest point of this bony canal to the alveolar crest was 11.25 ± 2.99 mm in the CT scans. The canal diameter was less than 1 mm in 55.3% of the cases, 1-2 mm in 40.4%, and 2-3 mm in 4.3%. In 100% of the CT scan cases, the alveolar antral artery was found to be located between the schneiderian membrane and the lateral bony wall of the sinus, in the area selected for sinus elevation[29]. Careful treatment planning, patient selection, and the appropriate sinus augmentation technique are essential to minimize the risk of implant migration into the maxillary sinus. Implant migration may occur several days postimplantation, at abutment connection surgery, or years later. Once the displacement is diagnosed, the implant must be removed as soon as possible. Other complications are related to the presence of preexisting antral pathologies, such as rhinosinusitis, odontogenic sinus diseases, pseudocysts, retention cysts, and mucocele[27].

Conclusion

The techniques employed in this manuscript has facilitated implant placement in areas of limited bone height, improved primary stability, high implant success in posterior maxilla, simple, and minimally invasive surgery with increased success[31].

Since the introduction of dental implants, bone grafting has become an important procedure required for the treatment of patients with limited bone availability. Bone autograft, alone or together with other bone substitutes, has been the biomaterial of choice for clinicians worldwide. However different xenogenic, allogenic and synthetic biomaterials have shown promising results in many bone augmentation procedures[30]. The major part of success with implant placement lies in the treatment planning. It is utmost importance that the preoperative evaluations are done perfectly and the most suitable technique is decided accordingly for that particular situation, to improve the prognosis of that treatment[32.]Thus the bone substitute needed for each bone regeneration procedure must be selected based on the individuaĺs characteristics, and the surgical procedure itself. Factors such as the osteogenic potential of the host residual bone, systemic health of patients, and morphology of the defects, will delimit the ideal bone substitute for each situation[33].

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A Comprehensive Review On Novel Approach

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ABSTRACT

Success of a dental implant depends on osseointegration which is the direct structural and functional connection between the dental implant and the alveolar bone. Successful osseointegration requires both primary stability (mechanical stability) between the implant and the bone and secondary stability (biological stability) which occurs during bone remodelling during healing.

Keywords: *osseodensification, osteotomy, bone density.*

Introduction

Traditional osteotomy is a subtractive technique in which the drills have a positive rake angle of 25 to 35 degrees to drill away small amount of bone with each sequential drilling which might result in few drawbacks like compromised stability and heat generated bone necrosis whereas a unique method called osseodensification is a non excavating method in which bone is not removed but is densified with each drill thereby enhancing primary stability by establishing immediate contact between the implant and the alveolar bone.

Various factors that contribute to the stability are

i. Implant design (thread type, geometry and surface coating) [1]

ii. Instrumentation (sequence of surgery, speed and technique)

iii. Bone density[2]

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However factors like drill protocol sequence, velocity and design may aid in accelerated osseointegration.

OD is carried out with unique burs with tapered flutes with a negative rake angle (non cutting edge) in counter clockwise direction at a speed of 800 to 1200 rpm/ minute.Asthe osteotomy expands bone is densified[3,4,5] as a layer of dense and compact bone that surrounds the osteotomy wall is created which would increase the primary stability and bone mineral density.copious amount of irrigation is required to avoid overheating.

Materials and Method

A database search was carried out in PUBMED using keywords like osseodensification, OD, implant stability and osteotomy for articles upto the year 2018 the search was scrutinized for full text articles. clinical trials, in vivo studies, review articles were selected for this review.

Osseodensification and Bone Density: Stability of any dental implant depends on the bone mineral density.

According to trisi et al there is a significant correlation between the bone density in the peri implant region, insertion torque and micromotion[6].

Bone evaluation around the dental implants can be performed and visualized either in ground sections of methylmethacrylate materials or light microscopic examination of peri implant tissue at the cellular level.

In an animal experimental study carried out by Burri and wolter in 1977 it has been proved that the new bone formation occurs in the peripheral osteotomy site and also the amount of new bone formed was shown to be proportional to the degree of compression.

D3 and D4 type of bone has poor bone density making it difficult to achieve implant stability. Using osseodensification procedure a layer of increased bone mineral density has been shown by imaging around the periphery of osteotomies which has shown a good effect on the implant stability.

Conventional Drilling Vs Osseodensification: Conventional drilling with sequential drills facilitates implant placement by bone excavating thereby compromising the primary implant stability which inturn results in reduction of torque during insertion. some surgical techniques like undersizing the osteotomic implant site have been proposed to reduce bone sacrifice during implant placement procedure and to enhance primary implant stability and bone quality. An alternate to this procedure is the Osseodensification which has shown to increase required penetration force and torque. Moreover during osteotomy a zone of osteocyte death is produced by conventional drilling[7,8,9] ; despite the use of copious irrigation a peak temperature of ~80 °C was generated at the cut edge whereas with OD even without copious amount of irrigation the peak temperature remained within normal range well below the temperature known to cause osteocyte death (45°C[10].

OD retains osseous coagulum (trabecular bone chips, blood, and stroma) which have inherited osteogenic potential[11,12]. This coagulum serves as a nucleating surfaces to promote new bone formation around the implants and providing greater bone density and better stability.

Disscusion

Preservation of cell viability is the most important factor [13,14,15]for the success of any treatment. conventional drilling might compromise the viability by creating mechanical and thermal trauma[16,17]. A viable osteotomy site is very critical for enhanced osteogenesis.

OD has shown to increase the % of bone at the implant surface by increasing the Bone mineral density in the peri implant region which inturn is directly linked with increased bone-implant contact, improved bone healing and increase in primary stability.

OD is a slow incremental process carefully controlled by surgeon. The residual strain on the bone surface creates compressive forces that increases the implant stability.increased removal torque is a good indicator for primary implant stability.

Conclusion

Osseodensification is a promising alternative to conventional drills as it helps in maintaining ridge integrity with preservation of bone. This osseous coagulum shows excellent osteogenic potential that brings about robust formation of new bone in the osteotomy site and allows for the placement of dental implants with superior stability. It also helps to improve bone density and also BV and increased bone-to-implant contact, thereby improving implant stability. However more clinical studies are recommended in future to derive any concreate conclusions.

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Comparative Evaluation of Periodontal Status & Il -6 Levels in Chronic Kidney Disease Patients and Healthy Individuals

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ABSTRACT

Background: Chronic kidney disease (CKD) is a veryreal and growing problem, as indicated by demographic trends. Presence of undiagnosed periodontitis may have significant effect on the medical management of CKD patient as its been found to contribute to systemic inflammatory burden.This study evaluate and compare the periodontal status and IL -6 levels among CKD, periodontitis and Healthy patients.

Materials and Method: Whole serum samples werecollected from 80 patients who were further divided into four groups; healthy(n=20), periodontitis(n=20), HD(n=20), PD(n=20). Serum IL -6 concentrations were determined by Standard enzyme -linked immunosorbent assay.

Results: Indicates the IL -6 levels in the studypopulation. The mean IL -6 value being highest in pre-dialysis (92.695) compared to dialysis(53.112), periodontitis (9.22) and healthy individuals (9.6).ANOVA results show a significant increase of IL -6 levels in the pre - dialysis group compared to alter groups.No significant change on PPD was appreciated.

Conclusion: Treatment of moderate to severeperiodontitis in ESRD populations will result in decreased IL-6 levels and, more importantly, decreased incidence of atherosclerotic complications awaits the result of interceptive clinical trials in this population

Keywords: *Chronic renal disease, Periodontitis, interleukin 6, End stage renal disease, dialysis, Periodontal status*

Introduction

Chronic kidney failure is associated with many kinds of metabolic changes caused by the kidney disease itself and also attributable to substances and dysregulation of metabolic pathways, decreased urinary excretion plays a crucial role and leads to retention of metabolites in the organism. Regular dialysis treatment partly decreases this accumulation but cannot avert the overall deficit. Changes in the oral cavity, such as periodontitis and other manifestations of poor oral health, are common in patients with chronic kidney disease(CKD)[1].The incidence of end-stage renal disease(ESRD)is increasing and patients receiving renal replacement therapy including hemodialysis[2][3], peritoneal dialysis or renal transplantation will comprise an enlarging segment of dental patient population[4]. Periodontitis has been found to contribute to systemic inflammatory burden including the elevation of c -reactive protein(CRP) in the general population. Consequently, periodontitis may be covert but treatable source of systemic inflammation in the ESRD population[5].

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Materials and Method

Study was done in the Department of Periodontology & oral Implantology at SreeBalaji Dental College, and Department of Nephrology at SreeBalaji Medical College, ChennaiThe study was reviewed and approved by Ethical Committee of Bharath University of Chennai.

To evaluate and compare the periodontal status amongchronic kidney disease patients[6] (Dialysis & pre-dialysis),chronic periodontitis and healthy individuals and To estimate the serum IL -6 levels in the study population[7][8].

80 patients were divided into 4 groups. All participants were informed about the procedure and an informed consent was taken. Prior to examination, a thorough medical and dental history was taken.

Study Population: Study population comprises both male and female patients.

Total population –80, Age - 25-75 years, Selected patients were divided into four groups. Control group (n=20) -- systemically and periodontally healthy subjects.[fig 1]

CP group (n=20) -- subjects who were systemically healthyand clinically diagnosed with untreated chronic periodontitis [fig 2], HD group (n=20) -- Dialysis group [fig 3,4],clinically diagnosed with untreated chronic periodontitis.

Inclusion Criteria: Age group (above 25 years), Chronic kidney disease patients with chronic periodontitis[9], Periodontitis (localised chronic periodontitis with probing depth of >5mm and clinical attachment loss >3mm), Systemically and periodontally healthy for control group.

Exclusion Criteria: Individuals who underwent periodontal therapy in the past 6months, Individuals who received antibiotic therapy in the past 6months[10], Individuals with malignancy, HIV, Hepatitis, Upper respiratory tract infections[11], Completely edentulous, Smokers, Pregnant[12] and lactating women.

Sample collection: Medical history taken [13].Informed consent obtained and Clinical examinationdone using mouth mirror and probe.

Blood was collected approximately 3ml from each patient, into sterile tubes. Blood samples were placed on ice immediately and aliquoted prior to freezing at -80 c.samples were thawed and analyzed.Serum concentration of IL -6 was determined using an Enzyme linked immunosorbent assay (ELISA) by using Human Quantikine ELISA kit.

Results

Table 1: IL-6 levels in the study population (ANOVA)

	Group								Significance Tests	
	Pre-dialysis (n = 20)		Dialysis (n = 2 0)		Periodontitis (n = 20)		Healthy (n = 20)			
	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Test & Value	Sig. (P Value)
IL-6	92.695	2.574	53.112	9.220	8.073	4.470	9.649	4.463	ANOVA: F Value: 49.530	0.000
PPD	4.888	0.210	4.925	0.171	.	.	.	.	t-test: Value: -0.138	0.891

Inference: The above table indicates the IL -6 levels in the study population. The mean IL -6 value being analysed in pre - dialysis(92.695) compared to dialysis(53.112), periodontitis (9.22) and healthy individuals(9.6).

ANOVA results show a significant increase of IL -6 levels in the pre -dialysis group compared to other groups. No significant change in probing depth was appreciated.

Table 2: Comparative evaluation of IL -6 values with reference to Age groups in the study population

	Age														
	30 Years or Less			31 - 40			41 - 50			51 - 60			More than 50		
	Mean	SE	n	Mean	SE	n	Mean	SE	n	Mean	SE	n	Mean	SE	n
Pre-dialysis	.	.	0	111.91	.	1	96.01	4.46	7	90.18	3.24	7	87.73	5.60	5
Dialysis	.	.	0	11.22	.	1	67.53	14.08	8	46.44	12.54	11	.	.	-
Periodontitis	3.73	.46	5	3.67	.25	12	32.93	30.00	3	.	.	-	.	.	-
Healthy	3.53	.54	3	5.96	1.62	12	22.18	17.55	5	.	.	-	.	.	-

The above table indicates that mean IL -6 levels is analysed for the Pre -dialysis patients in the age group of 31-40 years(111.91) and reduces in the older age groups.In all other groups IL -6 levels were higher in the 41 -50 age groups.

Table 3: Comparison of Inflammatory & periodontal status between pre-dialysis and dialysis group

	Group Statistics					Independent Samples t-test	
	Group	N	Mean	Std. Deviation	Std. Error Mean	t-Value	Sig.
IL-6	Pre-Dialysis	20	92.6955	11.51166	2.57409	4.135	0.000
	Dialysis	20	53.1125	41.23289	9.21996		
PPD	Pre-Dialysis	20	4.8875	.94059	.21032	-0.138	0.891
	Dialysis	20	4.9250	.76563	.17120		
Age	Pre-Dialysis	20	56.00	13.657	3.054	1.475	0.148
	Dialysis	20	51.20	5.022	1.123		

Inference: This table indicates significantly evaluated IL-6 level in pre-dialysis(0.000) compared to dialysis group but no change in probing pocket depth between the two groups(significance 0.891)

Table 4: Characteristics of dialysis cases:

	Mean	SD	SE
Years	2.78	1.83	.41
Frequency (weeks)	2.45	.60	.14
IL-6	53.11	41.23	9.22
PPD	4.93	.77	.17
Age	51.20	5.02	1.12

This table indicates that the average Number of years is 2.78 and frequency of dialysis in 2.5 per week with a mean PPD of 4.9 and IL -6 of 53.11.

Table 5: Correlation of probing pocket depth with years and frequency of dialysis:

		PPD	PPD
Years	Pearson Correlation	1	-.261
	Sig. (2-tailed)		.267
	N	20	20
Frequency (weeks)	Pearson Correlation	-.261	1
	Sig. (2-tailed)	.267	
	N	20	20

PPD increases with years of dialysis and decreases with the frequency of dialysis



Figure 1: Healthy Patient



Figure 2: Periodontitis Patient



Figure 3: Pre-Dialysis Patient



Figure 4: Dialysis Patient

Discussion

Periodontal diseases are a group of inflammatory diseases that affect the supporting tissues of the dentition. The formation of a periodontal pocket is a characteristic feature of periodontitis in primates. Recruited into the connective tissue adjacent to the periodontal pocket is an intense cellular infiltrate consisting of polymorphonuclear leucocytes, monocytes/macrophages, B and T cell lymphocytes. It has been estimated that,in an individual with moderate to severe periodontitis, the total surface area of the inflamed periodontal pockets can range from 8to20cm depending upon the number of teeth affected. Therefore, the large surface area of the aggregate periodontal lesion can potentially become a significant source of inflammation in individuals with moderate to severe periodontitis.

In our study we aimed to evaluate the periodontal status and IL-6 levels among chronic kidney disease patients (Dialysis& pre-dialysis)[14],Chronic periodontitis and Healthy individuals.We estimated that there was a statistically significant increase of IL -6 levels in pre-dialysis (92.695)compared to dialysis(53.112), periodontitis (9.22) and healthy individuals(9.6). Although No change in probing pocket depth between the groups was appreciated. A poignant finding was that probing pocket depth increases with years of dialysis and decreases with the frequency of dialysis.

The presence of elevated IL -6 levels in pre -dialysis compared to dialysis and periodontitis patients indicate, that there is a high level of inflammatory burden in chronic kidney diseasespatients[15], who have not started dialysis. Periodontitis increases with years of dialysis and reduces with increased frequency of dialysis could be due to the compromised nutritional status over the years and reduced inflammation, when more frequent dialysis is done[16].

Conclusion

Many sources of inflammation exist for ESRD patients on hemodialysis therapy but in view of the incidence of periodontitis in the general population and possible increased incidence and severity in the ESRD population, periodontitis may be one source of systemic inflammation that can be readily managed through effective periodontal therapy.

Moderate to severe periodontitis is prevalent in the general population and may be more prevalent in the ESRD population on haemodialysis maintenance therapy [17]. Periodontitis has been associated with increased markers of systemic inflammation [18], and limited studies in the general population suggest that effective periodontal therapy may decreases their levels. In our study, we conclude that IL -6 is significantly elevated in pre -dialysis individuals and periodontal inflammation increases with years of dialysis. Therefore, periodontitis in ESRD populations may be a covert source of systemic inflammation that can be managed through effective periodontal therapy. However, whether treatment of moderate to severe periodontitis in ESRD populations will result in decreased IL -6 levels and, more importantly, decreased incidence of atherosclerotic complications awaits the result of interceptive clinical trials in this population.

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Personalised Periodontal Medicine—A Paradigm Shift

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ABSTRACT

Personalized medicine in Periodontics is considered as a new paradigm shift of future health care. It is considered to provide great help in identification of etiological factors, evaluating the host risk in clinical and genetic point of view and prediction of response of to treatment. It of great support in development of diagnostic, prognostic and therapeutic approach in a personalized way. As an overview we throw light on the advantages of personalized periodontal medicine over the usual conventional symptoms- oriented disease diagnosis and treatment.

Keywords: *Pharmacogenomics, Microbiome, Periodontal disease*

Introduction

Personalized or Precision medicine is expected to become the future paradigm of future health care, owing to the substantial improvement of high-throughput technologies system approaches in the past two decades[4]. Conventional symptoms- oriented disease diagnosis and treatment have several significant limitations, for example, it focuses on only late/terminal symptoms and generally neglects preclinical pathophenotypes or risk factors; it generally, disregards the underlying mechanics of the symptoms ; the disease descriptions are often quite broad so that they may include multiple diseases with shared symptoms ; the reductionist approach to identify therapeutic targets in traditional medicine may over-simplify the complex nature of most diseases[2]. Advances in the ability to perform large-scale genetic and molecular profiling are expected t overcome these limitations by addressing individualized differences in diagnosis and treatment in unprecedented detail.

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Personalized medicine approaches could be harnessed to:

i. Facilitate identification and analysis of etiological factors contributing to oral disease:
ii. Permit assessment of environmental impact on oral health and disease;
iii. Evaluate host risk from a clinical and genetic perspective;
iv. Predict response to treatment;
v. Support development of diagnostic, prognostic and therapeutic approaches for application on a personalized basis.

Genomics in Disease–Oriented Medicine: The revolution of omics profiling technologies significantly benefited disease-oriented studies and health care, especially in disease mechanism elucidation, molecular diagnosis and personalized treatment[5]. These new technologies greatly facilitated the development of genomics, transcriptomics, proteomics and metabolomics, which have become powerful tools for disease studies.

Whole genome sequencing (WGS) and whole exome sequencing (WES) have become more and more affordable for genomic studies and are rapidly replacing DNA microarrays. Single-base analysis of a genome/ exome is achieved, which allows scientists to investigate the genetic basis of health and disease in unprecedented

detail. Assigning variants to paternal and maternal chromosomes. One field that significantly benefitted from WGS technologies is cancer-related research.

Pharmacogenomics is another important application of genomic sequencing. It is known that the same drug may have different effect on different individuals due to their personal genomic background and living habits.

Integrative Omics in Preventive Medicine: The concept of personalized medicine emphasizes not only on personalized diagnosis and treatment, but also personalized disease susceptibility assessment, health monitoring and preventive medicine[5]. Because disease is easier to manage prior to its onset or when a disease is at its early stages, risk assessment and early detection will be transformative in personalized medicine. Systems biology has the potential to capture real-time molecular phenotypes of a biological system, which enables the detection of subtle network perturbations precluding the actual development of clinical symptoms.

Role of Oral Microbiome and its Potential Impact on Personalized Dental Medicine: Every human body contains a personalized set of foreign inhabitants essential in maintaining heath, yet also capable of eliciting disease. The number of microbial cells within a human body exceeds the total number of human cells in the body by nearly 10 times. The human body exceeds the total number of human cells in the bod by nearly 10 times[1]. The human microbiome ca be classified into a core microbiome and a variable microbiome. The core microbiome is shared among all individuals and is comprised of the predominant species tat exist under healthy conditions at different sites of the body. The variable microbiome is exclusive to the individual and has evolved in response to unique lifestyle, phenotypic and genotypic determinants. Microbiome research is becoming central to the advancement of disease diagnostics and therapeutic as well as the development of personalized medicine proper diagnostic methods and technologies should be developed to enable professionals to identify individual microbial profiles and treat specific microbes responsible for disease[1]. Microbiomics aims to understand how microorganisms' interplay with its host physiology and health by analyzing their functions and irrelationships.

Role of Oral–Systemic Personalized Medicine: Periodontal disease and diabetes, two disease that have achieved epidemic status share a bidirectional relationship driven by micro-inflammatory processes[2]. The present reviews frames the current understanding of the pathological processes that appear to link these diseases advances the hypothesis that reversal of the epidemic is possible through application of the interdisciplinary intervention and advancement of oral systemic personalized medicine.

Role of Biomarkers in Periodontal Personalized Medicine:

Table 1: Various salivary biomarkers of periodontal disease[7]

Dental Biofilm	Inflammatory	Collagen Breakdown	Bone Remodelling
Immunoglobulins (IgA, IgM, IgG)	β-glucuronidase	α2-macroglobulin	Alkaline phosphatase
Mucins	C-reactive protein	MMP-8	Osteoprotegerin
Lysozymes	II-1β	MMP-9	Osteocalcin
Lactoferrin	II-6	Aspartate aminotransferase	SPARC/Osteonectin
Histatin	MIP-1α	Alanine aminotransferase	RANKL
Peroxidase	Tumor necrosis factor-α	TIMPs	B C- terminal type I collagen telopeptide
			C- telopeptide pyridinoline cross-links of type I collagen.

Table 2: Various products and their uses for measuring salivary biomarkers[7]

Product Name	Purpose
MyPerioID	Identifies the type and concentration of the specific bacteria that cause periodontal diseases.
My PerioPath	Determines the cause of periodontal infections.
Oral Fluid NanoSensor Test	Simultaneous and precise detection of multiple salivary protein and nucleic acids.
Electronic Taste Chips	Detects multiple biomarkers for early diagnosis of periodontal disease.
OraQuick	An antibody test that provides results in 20 minutes, usually detects HIV 1 and HIV 2
Integrated Microfluidic Platform for Oral Diagnosis	Rapidly (3-10 min) measures the concentrations of MMP-8 and other biomarkers in small amounts (10ml) of saliva.

Point-of-Care Diagnostics: Investigators are continuously identifying and testing the complex periodontal disease 'signatures' that will allow for accurate chair-side diagnostics and enhance individualized care. Nature technologies are becoming available that can measure salivary biomarker panels for accurate periodontal disease diagnosis and treatment recommendations. The time is growing to a point where oral health-care providers will be able to utilize high-throughput biomarker validation tools for rapid chair-side testing[4]. The focus has been on the development of miniature-sized 'chemical processing units' that process fluids and provide information that is relevant to the inflammatory, connective tissue- degradation and bone-loss phases of periodontitis. As the specific biomarkers for periodontal disease and progression are determined through longitudinal analysis, it appears that the technology is prepared o meet the scientific discovery. Both will come together to allow oral health-care providers to improve prevention and treatment of periodontal disease through personalized medicine.

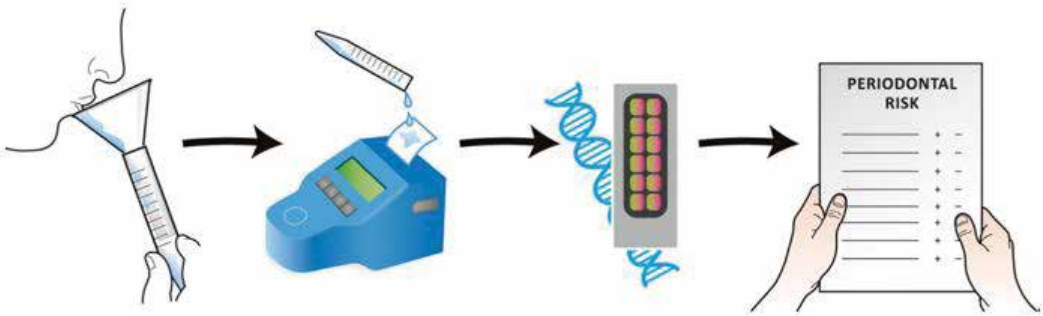


Fig.1

Summary and Conclusion

Hence personalized medicine has a role in bringing in individualized treatment to patients. It is used in

- Diagnosis and intervention
- Drug development and usage
- Respiratory proteomics
- Cancer genomics
- Population screening

As personalized medicine is practiced more widely, several challenges arise. The current approaches to intellectual property rights, reimbursement policies, patient privacy and confidentiality as well as regulatory oversight will have to be redefined and restructured to accommodate the changes personalized medicine will bring to healthcare.

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Assessment of Salivary TBARS Level in Pregnant and Non-pregnant Women with Gingivitis before and after Scaling

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ABSTRACT

Background: The aim of the present study is to assess salivary Thiobarbituric Acid Reactive Substances(TBARS) levels in pregnant and non-pregnant women with gingivitis before and after scaling.

Materials and Method: Fifteen subjects (Non-pregnant) were selected out of the patients who attended the Department of Periodontics, Sree Balaji Dental College, Pallikaranai, Chennai. Fifteen subjects(Pregnant-second trimester)were selected out of the patients who attended Velachery K.S Hospital, Chennai. Periodontal examination is done and again evaluated after scaling(30 days). Collection of saliva and assessment of TBARS is done. Assessment of TBARS is done by TBARS assay using thiobarbituric acid as a reagent. Statistical analysis done using student T test.

Results: Results indicated that the level of salivary TBARS in non-pregnant individuals after scaling is reduced and is statistically significant and the level of salivaryTBARS in pregnant individuals after scaling also reduced but it is not statistically significant.

Conclusion: Gingivitis in pregnancy is not a contributing factor for the oxidative stress.

Keywords: *Oxidative Stress, Salivary TBARS, Pregnancy, Reactive Oxygen Species*

Introduction

Pregnancy is defined as a state that includes fertilization, implantation and embryonic and fetal growth that ends with the birth of a baby after 280 days or 40 weeks. During pregnancy, many changes take place in both systemic and local environments leading to a significant increase in the severity of gingivitis. Changes in female sex hormone levels during pregnancy are related to the enhanced susceptibility to gingival inflammation. This phenomenon, also named pregnancy-related gingivitis, typically occurs without a clear association with the amount of dental plaque, and develops more severe forms, in comparison to plaque-induced gingivitis in non-pregnant women[1]. Clinically, pregnant women present withmore inflammation and gingival bleeding than general population [2].

Oxidative stress is essentially an imbalance between the production of free radicals and the ability of the body to counteract or detoxify their harmful effects through neutralization by antioxidants[3].

Reactive Oxygen Species (ROS) is a collective term which includes Oxygen Derived Free Radicals(ODFR) such as Superoxide radical, Hydroxyl radical and the non-radical derivatives of oxygen, such as Hydrogen peroxide and Hypochlorous acid. Free radicals are defined as species containing one or more unpaired electron, and it is this incomplete electron shell that confers their high reactivity[4].

PMNS are recognized as a particularly rich source of ROS;in the absence of suitable antioxidants,ROS can lead to tissue damage.ROS cause tissue damage by different mechanisms: DNA damage,lipid peroxidation,protein damage and oxidation of important enzymes and by stimulation of pro-inflammatory cytokine release by monocytes and macrophages. Several ROS and lipid peroxidation products are produced in physiological

quantities in the human body, but it has been well established that overproduction of ROS occurs at sites of chronic inflammation[5].

Thiobarbituric acid reactive substances (TBARS) are formed as a byproduct of lipid peroxidation(i.e.degradation products of fats) which can be detected by the TBARS assay using thiobarbituric acid as a reagent[6].Because reactive oxygen species (ROS) have extremely short half-lives, they are difficult to measure directly. Instead, they can be measured as several products of the damage produced by oxidative stress, such as TBARS.

Materials and Method

Subject Selection

i. **Control group (Group A):** Fifteen subjects (Non-pregnant) were selected out of the patients who attended the Department of Periodontics, Sree Balaji Dental College, Pallikaranai, Chennai.

ii. **Study group (Group B):** Fifteen subjects(Pregnant- second trimester)were selected out of the patients who attended Velachery K.S Hospital, Chennai.

Inclusion Criteria

i. Age 20 - 45years

ii. Minimum of 20 teeth

Exclusion Criteria

i. Control group (Group A)

- Any known systemic disease i.e., Hypertension, Diabetes mellitus, Thyroid diseases.
- Patient who received antibiotic therapy in the past six weeks.
- Periodontal treatment within the last six months.

ii. Study group (Group B)

- Any known systemic disease i.e., Hypertension, Diabetes mellitus, Thyroid diseases.
- Gestational diabetes mellitus
- Preeclampsia
- Patient who received antibiotic therapy in the past six weeks.
- Periodontal treatment within the last six months.

A. Periodontal Examination: The clinical parameters- Oral Hygiene Index – Simplified (John C. Greene, Jack R. Vermillion, 1964) and Gingival Bleeding Index (Loe, H and Silness, 1963) were assessed at baseline and 30 days after scaling.

B. Collection and assessment of TBARS in saliva: Unstimulated whole saliva is collected using MahvasNavazesh technique[7] and the level of lipid peroxides was assayed by the method of Devasagayam and Tarachand[8]at baseline and 30 days after scaling.

Results

Comparison of the mean salivary TBARS between the two groups shows that salivary TBARS is higher in Pregnant group and is statistically significant with a p value of <0.001 (0.05).

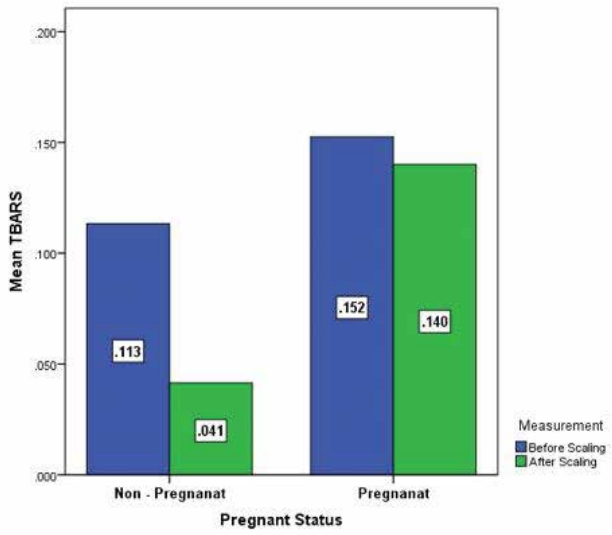


Fig. 1: Mean salivary TBARS

The comparison of the salivary TBARS between the two groups shows that mean difference of TBARSis higher in Pregnant group and is statistically significant with a p value of 0.025 (0.05).

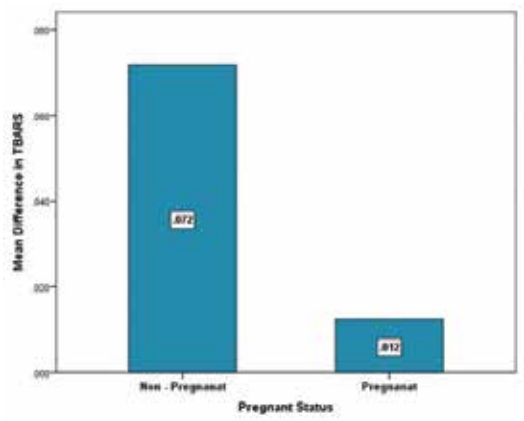


Fig. 2: Comparison of the TBARS

Comparison of the Mean Gingival Index between the two groups shows that GI is higher in Pregnant group and is statistically significant with a p value of <0.001(0.05).

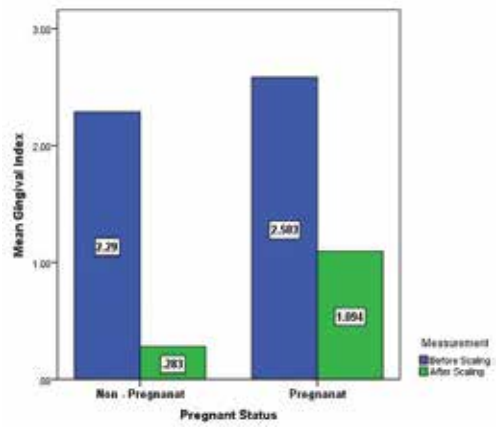


Fig. 3: Mean Gingival Index of Pregnant and Non-Pregnant Groups

The comparison of the GI between the two groups shows that GI is higher in pregnant group and is statistically significant with a p value of 0.048(0.05).

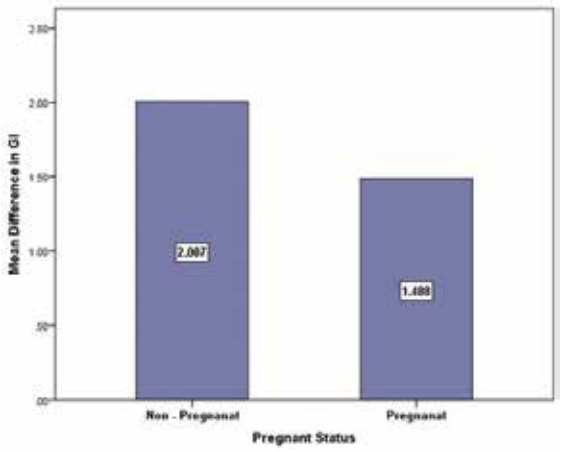


Fig. 4: Comparison of the GI

Comparison of the mean OHI-S between the two groups shows that OHI-S is higher in Non-Pregnant group and is statistically significant with a p value of 0.334 (0.05).

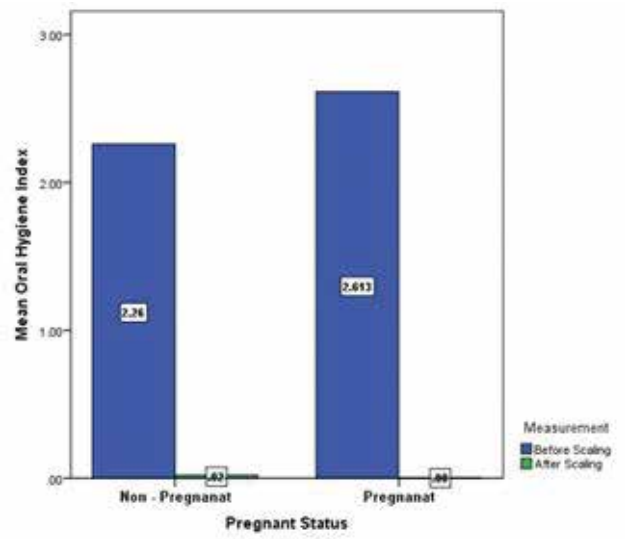


Fig. 5: Mean Oral Hygiene Index

The comparison of the OHI-S between the two groups shows that OHI-S is higher in pregnant group and is statistically significant with a p value of 0.044 (0.05).

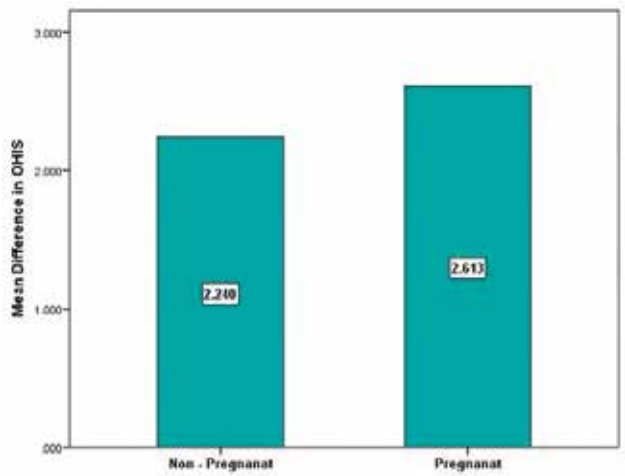


Fig. 6:Comparison of the OHI-S

Overall results indicated that the level of salivary TBARS in non-pregnant individuals after scaling is reduced and is statistically significant.And the level of salivary TBARS in pregnant individuals after scaling also reduced but it is not statistically significant.

Table 1: Comparisons Based on Mean Values

Measurement		Pregnant Status				Independent Samples t-test	
		Non-Pregnant		Pregnant			
		Mean	SD	Mean	SD	t-Value	Sig.
Before Scaling	Gingival Index	2.290	.317	2.583	.444	-2.077	.048
	Oral Hygiene Index	2.260	.410	2.613	.504	-2.106	.044
	TBARS	.113	.036	.152	.053	-2.375	.025
After Scaling	Gingival Index	.283	.320	1.094	.264	-7.572	.000
	Oral Hygiene Index	.020	.077	.000	.000	1.000	.326
	TBARS	.041	.025	.140	.030	-9.877	.000

After scaling there is a negative correlation between gingival index and salivary TBAR levels in pregnant individuals.

Table 2: Correlations among GI, OHI-S and Salivary TBARS

Pregnant Status	Measurement		Gingival Index	Oral Hygiene Index	CPITN	TBARS
Non–Pregnant	Before Scaling	Gingival Index	1	-.160	.[a]	-.104
		Oral Hygiene Index	-.160	1	.[a]	-.349
		TBARS	-.104	-.349	.[a]	1
	After Scaling	Gingival Index	1	-.245	.[a]	.194
		Oral Hygiene Index	-.245	1	.[a]	-.328
		TBARS	.194	-.328	.[a]	1
Pregnant	Before Scaling	Gingival Index	1	.625*	.[a]	.175
		Oral Hygiene Index	.625*	1	.[a]	.234
		TBARS	.175	.234	.[a]	1
	After Scaling	Gingival Index	1	.[a]	.[a]	-.031
		Oral Hygiene Index	.[a]	.[a]	.[a]	.[a]
		TBARS	-.031	.[a]	.[a]	1

*. Correlation is significant at the 0.05 level (2-tailed).

a. Cannot be computed because at least one of the variables is constant

Discussion

The aim of the study is to assess salivary TBARS levels in pregnant and non-pregnant women with gingivitis before and after scaling.Fifteen subjects(Non pregnant) were selected out of the patient who attended the Department of Periodontics, Sree Balaji Dental College, Pallikaranai, Chennai were grouped into Group A. Fifteen subjects (Pregnant- second trimester)were selected out of the patient who attended Velachery K.S Hospital, Chennai were grouped into Group B. The clinical parameters used for case selection were Gingival index(Loe, H and Silness, 1963),Oral hygiene index – Simplified(John C. Greene, Jack R. Vermillion, 1964). Unstimulated whole saliva is collected using Mahvash Navazesh technique[7] and the level of lipid peroxides was assayed by the method of Devasagayam and Tarachand[8]. Thiobarbituric acid reactive substances (TBARS) are formed as a byproduct of lipid peroxidation(i.e. as degradation products of fats) which can be detected by the TBARS assay using thiobarbituric acid as a reagent.

Pregnancy is accompanied by an increase in the production of estrogen and progesterone. Two theories have been proposed for the actions of the hormones on the cells of the periodontal tissues: 1) a change in the

effectiveness of the epithelial barrier to bacterial insult and 2) an effect on collagen turnover[9]. Estrogen firstly decreases collagen production and keratinization of gingival epithelium and secondly induces proliferation of fibroblasts and decreases the collagen and blocks the turnover of the gingival tissue, thereby reducing the capacity of gingival tissue to repair. The result is an increase in the permeability of the epithelial barrier and an increased response to plaque bacteria. Estrogen regulates DNA synthesis in human gingival epithelial cells displaying strong estrogen beta immunoreactivity[10]. In addition, a decrease in the rate of collagen is mediated by ERbeta.The reactivity for progesterone receptors was observed in periodontal ligament cells at gene and protein levels[11]. Progesterone also has effects on the vascular system favoring an increase in gingival exudate and vascular permeability and proliferation; this is possibly due to progesterone receptors present in the gingival tissue[11].

Gingival inflammation associated with pregnancy has been initiated by dental plaque and exacerbated by endogenenous steroid hormones[12]. Between second to eight months of pregnancy, gingivitis ranges from redder looking gingival that bleed while brushing to severe swelling and bleeding of the gingival tissues.[13]. Alterations in the quantity and quality of biofilms at gingival margin is considered to play a role in the initiation and development of pregnancy related gingivitis[14]. There are many studies which demonstrated that these pregnant women's diseases affect a predisposed group of the population that presents an exacerbated inflammatory/ immune response to the pathogenic bacteria accumulated on the teeth and around the gingival tissue, which in turn lead to tissue damage. The exacerbated response characterized by hyper inflammation fails to remove the causative pathogens and generates prolonged release of proinflammatory mediators and Reactive Oxygen Species (ROS)[15].

Oxygen is an essential element of aerobic life and oxidative metabolism and represents a principal source of energy, but when partially reduced, it generates Reactive Oxygen Species (ROS)[16].ROS production is inevitable in all aerobic organisms including in the human body which possess a complex antioxidant defense system. There is a balance between ROS and antioxidants. Oxidative stress refers to the imbalance due to excess ROS or oxidants over the capability of the cell to mount an effective antioxidant response[17].

Oxidative stress condition directly damages cell structures and molecules, including lipids, proteins and DNA[18]. It may also be responsible for activating key nuclear transcription factors that initiate the synthesis of pro-inflammatory mediators[19.] Oxidative stress results in macromolecular damage and is implicated in various disease states such as artherosclerosis, diabetes, cancer, neurodegeneration and aging[17].Pregnancy, per se, is a state of oxidative stress arising from the increased metabolic activity in placental mitochondria and the reduced scavenging power of antioxidants[20].

Markers of oxidative stress represent promising tool for the research of oral diseases. Oxidative stress markers, which include glutathione peroxidase(GPX), which is an antioxidant, thiobarbituric acid reactive substances(TBARS),a measure of ROS damage and 8-hydroxy-2'deoxyguanosine(8-OHDG),a measure of DNA damage were studied in serum, saliva, GCF[6]. Lipid peroxidation is one of the major consequences of oxidative stress and could be evaluated by monitoring the levels of MDA[21].

Studies reveal a promising outlook for saliva as a key diagnostic medium for determining systemic diseases or health statuses of individuals. Because collecting saliva involves noninvasive methods and due to the fact that it is an abundant and easily accessible biofluid, saliva is attractive for diagnostic purposes greatly due to its highly enriched content of disease biomarkers that can be deciphered and analyzed[22]. Saliva is an ideal research tool and diagnostic medium and it is being employed as a novel means to study biomarkers for various oral and systemic diseases and conditions[23]. This was the first study evaluating TBARS in pregnant and non-pregnant gingivitis patients using saliva as a diagnostic medium.

In the present study, gingival index in pregnant women is more and is reduced after scaling which is statistically significant. Lieffet al[24] conducted a study on the oral conditions and periodontal status of a cohort of pregnant women and the results indicated that no significant change in the mean attachment loss, gingival index or bleeding scores is seen after scaling.

In this study, oral hygiene index in pregnant women after scaling is zero which shows a statistical significance. ManinderKaur et al[25]conducted a study on effect of intensive oral hygiene regimen during pregnancy on periodontal health, cytokine levels, and pregnancy

outcomes and concluded that intensive instructions and non-surgical periodontal therapy provided during 8 weeks at early pregnancy resulted in decreased gingival inflammation and a generalized improvement in periodontal health. Research on the epidemiology of periodontal disease has demonstrated a close correlation between periodontal disease and oral debris[26].

In the study TBARS, which is a measure of lipid peroxidation is higher in pregnant group, after scaling it reduced but not statistically significant. Salivary TBARS in non-pregnant group after scaling reduced which is statistically significant. No previous literature pertaining to lipid peroxidation in pregnancy gingivitis is present.

In the present study TBARS,a measure of ROS damage in saliva reduced in pregnant patients after phase I therapy(Scaling) which is not statistically significant. To conclude, gingivitis in pregnancy is not a contributing factor for the oxidative stress. The limitations of this study arethis was the first study evaluating TBARS in gingivitis patients. Larger samples are required to know the exact role played by TBARS in pregnant patients. Further research is needed to determine whether the treatment decreases maternal oxidative stress during pregnancy.

From the above discussion of the results, it can be concluded that oxidative stress in pregnant individuals is not correlated with periodontal status. However, future multi centric studies with a higher sample size can throw better light on this association.

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Estimation of Red Blood Cell Parameters and Serum Prohepcidin Level in Generalised Chronic Periodontitis Patients before and after Non-Surgical Periodontal Therapy

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ABSTRACT

Background: The Anaemia of chronic disease (ACD) is a prevalent, poorly understood condition that afflicts patients with a wide variety of diseases, including infections, malignancies and rheumatologic disorders.

Materials and Method: 40 patients 20-65 years of age with chronic periodontitis were assessed before and after periodontal therapy for Hb, ESR, Erythrocyte count, MCV, MCH, MCHC and PROHEPCIDIN (ELISA).

Results: A significant (p<.000) increase in RBC (4.581) and Hb (12.77) values were estimated after SRP compared to baseline. Prohepcidin levels decreased insignificantly after SRP. Tailed t test results shows significant correlation at the 0.01 level between RBC parameters but no significance between probing depth or prohepcidin values with RBC parameters.

Conclusion: The results conclude that reduction in periodontal inflammation by scaling and root planning improves RBC count and hemoglobin level significantly Prohepcidin levels decreases with periodontal treatment but rather insignificantly.

Keywords: *Chronic periodontitis, Prohepcidin, Scaling and root planning.*

Introduction

Anaemia of chronic disease (ACD) defined as the anaemia occurring in chronic infections and inflammatory conditions is not due to marrow deficiencies or other diseases and occurs in the presence of adequate iron stores and vitamins[(1)].It is characterized by blunted erythropoietin response by erythroid precursors, decreased red blood cell survival and a defect in iron absorption and macrophage iron retention,which interrupts iron delivery to erythroid precursor cells.

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Periodontitis is an inflammatory disease of the supporting tissues of the tooth which is caused by specific micro-organisms in a susceptible host. The subgingival microbiota in patients with periodontitis poses a significant and persistent gram-negative bacterial challenge to the host.

Human hepcidin, a 25–amino acid peptide made by hepatocytes, may be a new mediator of innate immunity and the long-sought iron-regulatory hormone [(2)]. The synthesis of hepcidin is greatly stimulated by inflammation or by iron overload. In anaemia of inflammation, hepcidin production is increased up to 100-fold and this may account for the defining feature of this condition.

In the recent years, rapid progress has been made on periodontitis, ACD interlink by elucidation of the central role of hepcidin, an iron-regulatory hormone and a mediator of innate immunity.

Materials and Method

This study was reviewed by the Institutional Ethical Committee, Sree Balaji Dental College & Hospital, Bharath University and the study was approved to be conducted on the patients who fulfilled the following selection criteria (SBDCEM 106/14/11). A total of 40 patients were selected based on the inclusion criteria that they should be of age 20-65 years with chronic periodontitis, AAP 1999 with probing depth ≥ 5mm and clinical attachment loss ≥ 3mm(atleast 3 permanent teeth other than first molar and incisor).Patients with history of any systemic diseases, bleeding disorders and pregnant or lactating mothers were excludedThe subjects who met the above said criteria and agreed to participate in the study was informed about the procedure and a written consent was obtained.

Laboratory Investigations: The following RBC parameters were taken before and after periodontal therapy.**(Picture 1,2,3)**

- Haemoglobin.
- Erythrocyte sedimentation rate.
- Erythrocyte count.
- Mean Corpuscular Volume.
- Mean Corpuscular Haemoglobin.
- Mean Corpuscular Haemoglobin Concentration. (Above all parameters at Baseline, 30th and 90th day).
- PROHEPCIDIN (Baseline and 90th day by (**Elisa kit).**

Full mouth intra oral periodontal examination was done by two calibrated examiners (VD and AF) and the following clinical parameters like Gingival index, Probing depth and Clinical attachment level were measured.

Prohepcidin (ELISA) procedures: Bioassay Technology Laboratory (Picture 4)

Dilution of standard solution preparation: 120µl original concentration+120µl standard solution

Standard solution wells:(Picture 5) Add 50µl standard and streptavidin-HRP 50µl

Sample well: Add 40µl sample and then 10µl PRO-HEPC antibodies, 50µl streptavidin-HRP. then cover it with seal plate membrane. Shake gently to mix them up. Incubate 37˚c for 60 minutes.

Washing:

Prepare wash buffer: Remove the seal plate membrane carefully, drain the liquid and shake off the remaining liquid. Fill each well with washing solution. Drain the liquid after 30seconds standing. Then repeat this procedure five times and blot the plate.

Colour development: Add 50µl chromogen solution A firstly to each well and then add 50µl chromogen solution B to each well as well. Shake gently to mix them up. Incubate for 10minutes at 37˚c away from light for colour development.

Stop solution: Add 50µl stop solution to each well to stop the reaction. Reading at 450nm wavelength.

Results

The results showed that correction of periodontal inflammation resulted in a significant increase in haemoglobin levels and erythrocyte counts with a significant, but much lesser, improvement in MCV, MCH and MCHC values. In our study we inferred a significant ($p<.000$) increase in RBC (4.581) and Hb (12.77) values after SRP compared to baseline. All the other RBC parameters also showed a marginal insignificant increase after SRP. Prohepcidin levels decreased insignificantly after SRP (TABLE I).

A significant reduction ($p<.000$) in probing depth from baseline (6.075) to 90 days after SRP (3.250) (TABLE II) and gingival index ($p<.000$) at 90 days after SRP (.298) (TABLE III) compared to baseline values (1.733) was noted in our study which is conclusive of effective periodontal treatment. We elucidated significant correlation at the 0.01 level between Hb and other RBC parameters and significance at the 0.05 level between Prohepcidin and Hb, ESR levels as they are interrelated. Tailed t test results shows significant correlation at the 0.01 level between RBC parameters but no significance between probing depth or prohepcidin values with RBC parameters (TABLEIV,V,VI)

Table I: RBC Parameters at Baseline and 90 Days after SRP

	Baseline			90th Day			Paired Samples t-test	
	Mean	SD	SE	Mean	SD	SE	t-Value	Sig.
Prohepcidin	604940	192.318	30.408	894.635	1024.753	162.028	-1.834	.074
RBC Count	4.444	.548	.087	4.581	.539	.085	-3.747	.001
Hb	12.513	1.747	.276	12.770	1.780	.282	-4.743	.000
ESR	14.175	8.878	1.404	13.925	9.577	1.514	.613	.543
TC	8630.250	1575.633	249.129	8873.750	1488.340	235.327	-1.960	.057
MCV	86.685	7.099	1.122	86.900	7.059	1.116	-.568	.573
MCH	28.478	2.398	.379	28.750	2.250	.356	-1.251	.218
MCHC	31.925	1.023	.162	32.350	.864	.137	-2.888	.006

Inference: This table shows a significant (.000) increase in RBC (4.581) and Hb (12.77) values after SRP compared to baseline. All the other RBC parameters show a marginal insignificant increase after SRP. Prohepcidin levels decreased insignificantly after SRP

Table II: Probing Depth Reduction from Baseline to 90 Days after SRP

										Paired Samples t –tests		
	Baseline			30th Day			90th Day			Baseline – 30th Day	Baseline – 90th Day	30th Day – 90th Day
	Mean	SD	SE	Mean	SD	SE	Mean	SD	SE	t-Value; Sig.	t-Value; Sig	t-Value; Sig
Probing Depth	6.075	.971	.154	4.675	1.095	.173	3.250	1.104	.174	17.847; .000	40.016; .000	16.402; .000

Inference: This table shows a significant reduction(.000) in probing depth from baseline (6.075) to 90 days after SRP (3.250)

Table III: Gingival Index Reduction from Baseline to 90 Days after SRP

	30th Day			90th Day			Paired Samples t-test	
	Mean	SD	SE	Mean	SD	SE	t-Value	Sig.
Gingival Index	1.733	.443	.070	.298	.290	.046	17.532	.000

Inference: This table shows a significant reduction in gingival index (.000) at 90 days after SRP (.298) compared to baseline values (1.733)

Picture Plates

Clinical examination & sample collection

Laboratory equipments

1. 5 ml vaccutainers (BD)



Picture 1

2. Centrifuge machine (1500 rpm)



Picture 2

3. Prohepcidin ELISA KIT(Bioassay Technology Laboratory) Picture 3

Reagents present in the kit:



Picture 3

1. 96 well microtitter strip plate
2. coated ELISA plate
3. standard solution: chromogen A

Chromogen B

4. Standard dilution
5. Streptavidin- Horse Radish Peroxidase
6. Washing concentrate(30X)
7. Anti PRO-HEPC antibodies labeled with biotin

Discussion

Anaemia is one of the most common global public health problems in recent times. Globally, anaemia affects 1.62 billion people, which is 24.8% of the total population. Evidence indicates that ACD is seen in rheumatoid arthritis and chronic periodontitis, though the etiologic factors of both the diseases are different, stating that long-standing chronic inflammation can lead to anaemia. Various studies have found associations between ACD and periodontitis. The pro-inflammatory cytokines released in periodontitis interact with hepcidinthe iron regulating hormone and down regulate erythropoiesis. **Siegel et al** reported a depression in the number of erythrocytes secondary to periodontaldisease[3]. **Hutter et al** suggested that periodontitis also needs to be considered as a chronic disease which may cause lower number of erythrocytes andconsequently lower Hb levels[4].

Epidemiologic studies suggested that periodontal deterioration increases the risk of systemic problems such as cardiovascular diseases[5], atherosclerosis[6], diabetes mellitus[7], and preterm low birth weight of infants[8]. These associations suggest that periodontal diseases have systemic effects. In addition, some studies had found that periodontal infection elicits systemic blood chemistry changes[9].

Anaemia of chronic disease (ACD) seems to be one of the most common forms of anaemia observed in clinical medicine. ACD is defined as the anaemia occurring in chronic infections, chronic inflammatory processes or tumour formation that is not due to dysfunction of bone marrow cells or other diseases and occurring despite the presence of adequate iron stores and vitamins. A characteristic finding of the disorders associated with ACD was the increased production of the cytokines that mediate the immune or inflammatory response; such as tumour necrosis factor, interleukin-1, and the interferon. All the processes involved in the development of ACD can be attributed to these cytokines, including shortened

red cell survival, blunted erythropoietin response to anaemia, impaired erythroid colony formation in response to erythropoietin, and abnormal mobilization of reticuloendothelial iron stores[10]. These cytokines are also released by periodontal tissues in response to bacterial infection, which suggests that periodontitis like other chronic disease may cause ACD.

A few early reports in the literature have investigated the bidirectional relationship between anaemia and periodontitis**. Goldstein[11], Siegel[3], Lainson et al[12], and Chawalaet al[13]**were among the first to observe anaemia in periodontitis. Most of these authors believed that anaemia was one of the causes of periodontitis rather than being the consequences[11,12,13].

Various studies have tried to evaluate the relationship between periodontitis and haemoglobin**. Hutter et al[4] and Thomas et al[14]**found that periodontitis patients have lower haematocrit, lower numbers of erythrocytes, lower haemoglobin levels and higher erythrocyte sedimentation rates when compared to healthy controls. **Rai and Kharb[15]** found an increased in haemoglobin and RBC levels in patients with severe periodontitis after scaling and root planning. Also, **Agarwal et al [16]** demonstrated a significant improvement in haemoglobin value and erythrocyte count after periodontal treatment, including surgery in patient with generalized chronic periodontitis with anaemia. On the other hands, **Wakai et al [17]**failed to show any association between haemoglobin levels and periodontal status. Furthermore**, Havemose-Poulsen et al[18]**. failed to show any association between haemoglobin levels and periodontal status in patients with localized aggressive periodontitis, generalized aggressive periodontitis, juvenile idiopathic arthritis, and rheumatoid arthritis.

Conclusion

Reduction in periodontal inflammation by scaling and root planning improve RBC count and haemoglobin level significantly Prohepcidin levels decreases with periodontal treatment but rather insignificantly.

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Ethical Clearance: Institutional Ethics Committee, Sree Balaji Dental College and Hospital, Committee registered with DCGI. (Registration no: ECR/761/Inst/TN/2015)

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Peripheral Ossifying Fibroma in Young Patient—A Case Report

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ABSTRACT

Fibroma is a benign tumor in which fibroblasts proliferate to form neoplasia, resulting in an increase in collagen fibers. Many of the fibroma-like lesions seen in the oral mucosa represent reparative or reactive hyperplasia of fibrous tissue against chronic irritation, and true neoplastic lesions are considered rare. Peripheral ossifying fibroma (POF) is a non-neoplastic, reactive lesion of gingiva. The precise etiopathogenesis of POF is unclear. However, it is suggested to originate from the connective tissue of periodontal ligament. This lesion predominantly occurs in the maxillary anterior region. The treatment protocol involves surgical excision followed by the biopsy of lesion. The high recurrence rate of the lesion is due to its reactive nature and unpredictable course. Hence proper postoperative monitoring and follow-up of the lesion are necessary. The present case was surgically managed and did not show any sign of recurrence during the follow-up period of 7 months.

Keywords: *Peripheral Ossifying Fibroma, Fibroma, Non-Neoplastic Lesion, Inflammatory Growth.*

Introduction

Peripheral ossifying fibroma (POF) is an inflammatory, reactive lesion of gingiva which predominantly involves the maxillary anterior region. It is non-neoplastic in nature, originating from the periodontal ligament (PDL) as a response of periodontal tissues to chronic injurious agents such as dental calculus, plaque, orthodontic appliances, and ill-fitting restorations, etc. It is commonly observed in the second and third decades of life with females being affected more than males. About 60% of these tumors occur in the maxilla and more than 50% of the cases are found in the incisors and canine region.

Most of the POF lesions measures approximately <2 cm. Radiographically, no bony involvement is found in majority of the cases. However, some cases may report with superficial erosion of the bone. The management of POF includes the elimination of local irritating factors with surgical excision of overgrowth and strict plaque control.

Case Report: A 15 year old boy reported to the Department of Periodontology with a chief complaint of swelling in the upper front tooth region for past 6 months. [Fig 1] History of the present lesion revealed that initially the growth was small in size and it gradually increased over 6 months attaining the persistent size. There was no history of pain, sensitivity, bleeding on brushing.



Fig. 1: Patient Profile

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Periodontal examination revealed that the growth was measuring approximately 2*1 cm in the palatal region of 11,12,13,21 and extended from the mesial aspect of 21 to the distal aspect of 13.[Fig 2] The overgrowth was movable, pedunculated and fibrotic in nature with well defined margins. The growth was firm and tender on palpation. The oral hygiene status of the patient was fair with presence of plaque and calculus. No mobility or attachment loss was found on examination. A provisional diagnosis of irritational fibroma and differential diagnosis of fibrous epulis were considered on the basis of anatomic location and clinical presentation.



Fig. 2: Pre operative picture

The treatment was explained comprehensively to the patient and patient's consent was got and hematologic investigations was done. Surgical excision of the lesion was done in 11,12,13,21 region and curettage was done. The wound was debrided. Excised tissue was fixed in 10% formalin and then sent for histopathological examnination. Histopathological examination revealed ulcerated epithelium and few hyperplastic areas.[Fig 3,4] The fibrous connective tissue shows increased cellularity with intervening plump fibroblasts and bony trabaculae. Numerous spherules of calcifications are noticed. Diffuse chronic and acute inflammatory cell infiltrate is noticed with moderate vascularity.[Fig 5,6] Based on these results a confirmatory diagnosis of peripheral ossifying fibroma was obtained. No recurrence of the tumor is seen at the site for past 7 months.

Fig. 3: Post operative picture of the site after a

Fig. 4: Histopathological features of the week lesion



Fig. 5: Histological Picture



Fig. 6: Histological Picture

Discussion

The focal reactive lesions of gingiva are pyogenic granuloma (PG); peripheral ossifying fibroma(POF); fibrous hyperplasia; and peripheral giant-cell granuloma (PGCG). The prevalence of POF among reactive lesions is found to be 20.78%.[1,2,3] The first case of ossifying fibroma was reported by Menzel in 1872, however, the terminology was given by Montgomery in 1927.[4] Ossifying fibroma can be categorized into two categories – central and peripheral. The central type has its origin from endosteum and expands from medullary cavity of bone, whereas, the peripheral type is suggested to originate from PDL or from the soft-tissue overlying alveolar process (periosteum).

Usually, the size of POF is <2 cm; however in the

present case it was a 2*2 cm. Poon *et al*. have mentioned a case of giant POF measuring approximately 9cm. [5] Many studies have been conducted to understand the etiopathogenesis of POF, but the exact mechanism is still undefined. Few researchers have suggested that the chronic irritation caused by local factors results in inflammatory hyperplastic cellular response of PDL/ periosteum in the form of metaplastic changes in connective tissue.[3,6] Calcified metaplastic changes of the connective tissue may manifest in many histologic variants such as bone, cementum-like material, and dystrophic calcification. The occurrence of POF and PGCG was interrelated by some authors and they have mentioned that both the lesions are the progressive forms with the same spectrum of pathogenesis.[7] The reason behind the recurrence rate of POF is due to the remnants of the lesion, persistence of local irritants or repeated injury.[2] The basic microscopic pattern of the POF is fibrous proliferation associated with different types of mineralized components.[8]

Other group of researchers has suggested that one of the factors in the etiopathogenesis of POF is influence of hormones and considered it to be responsible for the higher prevalence in females[2] Regezi *et al*. found a large number of XIIIa + cells and a subset of monocyte/ macrophages in POF and in other oral fibrovascular reactive lesions. They hypothesized the role of dendrocytes in these lesions.[9]

Conclusion

There was no recurrence of the lesion over a period of 7 months follow up. Peripheral reactive lesions are a common group of lesions encountered during routine dental examinations. Early detection and treatment of reactive lesions by dentists can reduce more dentoalveolar complications. Hence knowledge of the frequency and distribution of these lesions is beneficial while establishing a diagnosis and a proper treatment plan in practice.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Ethical Clearance: Not required since it is a case report

Source of Funding: Nil

Conflict of Interest: Nil

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Oral Hygiene Status, Periodontal Status and Treatment Needs among Psychiatric Outpatients in Chennai, India

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ABSTRACT

Aim: To assess the oral hygiene status,periodontal status and treatment needs among psychiatric outpatients in Chennai.

Materials and Method: A cross – sectional descriptive study was carried out on patients receiving care at the Outpatient Wing of The Department of Psychiatry, Stanley Medical College and Hospital, Chennai. A cluster sampling technique was employed. The study sample consisted of 159 males and 145 females.

Oral Hygiene Index Simplified and Community Periodontal Index of Treatment Needs index were recorded. Data was analyzed using SPSS (Version 15) software. Chi – square test, Trend Chi – square test and Multiple linear regression analysis were employed.

Results: Among the male subjects; 6 (3.7%), 75(47.2%) and 75(47.2%) had good, fair and poor oral hygiene, respectively. Among the female subjects; 9(6.2%), 87(60%) and 49(33.8%) had good, fair and poor oral hygiene, respectively.

6 (2%) subjects had healthy periodontium, 3(1%) had bleeding on probing, 146(48.5%) had calculus, 115(38.2%) had shallow pocket and 34(11.2%) had deep pocket. Prevalence of periodontal disease among the study subjects was 98%.6(2%) did not require treatment, 298 (98%) needed oral hygiene instruction, 295(97%) needed scaling and oral hygiene instruction, 149(49%) needed complex periodontal therapy along with scaling and oral hygiene instruction.

Conclusion: The oral hygiene status and periodontal status of psychiatric outpatients is very poor and treatment needs are very high.

Keywords: *Oral hygiene status, Periodontal status, Psychiatric outpatients.*

Introduction

Illness, whether physical or mental may lead to deterioration in self care and have an adverse effect on the holistic wellbeing of the individual[1]. The term psychiatric illness is used to describe clinically recognizable patterns of psychological symptoms or behavior causing acute or chronic ill health, personal distress or distress to others[2].

Psychiatric illness is not a single condition. Rather, it is a continuum ranging from minor distress to severe disorder of the mind or behavior[3].

Lack of knowledge about the cause of oral disease, relatively high frequency of non-compliance with oral health practices, embarrassment regarding neglected oral care, low perception of dental treatment needs, unwillingness to accept treatment, high sugar content in diet and mistrust of dental health professionals contribute to oral neglect in psychiatric patients[4].

Maria Isabel et al (2009, Columbia)[5] conducted a study to determine the periodontal status of female psychiatric patients. Of 60 patients, 49.2% had a clinical attachment loss (CAL) of 7mm. CAL was higher in patients with more than 10 years of hospitalization.

In a study conducted on 220 psychiatric patients in Davangere by Manish Kumar et al (2006)[6], 98.1% had periodontal disease with bleeding on probing, calculus, shallow pocket and deep pocket being present in 10.5%, 40.6%, 35.3% and 7.8% participants respectively.

Routine dental health care for institutionalized psychiatric patients are provided within many of the large institutions, but only a small portion (2.35%) of psychiatric patients are users of mental health services[7]. These patients have to arrange their own dental care[8].

Among the states of India, Tamil Nadu has the maximum number of mental health institutions[9]. Yet, the population is so vast and diverse that majority of mentally ill patients are still treated as community dwelling outpatients[10].

Materials and Method

Study Design: A cross – sectional descriptive study

Study Area: Stanley Medical College and Hospitals

Inclusion Criteria:

- Subjects who had been diagnosed with psychiatric illness at least 5 years ago.
- The patient must be currently receiving treatment for the psychiatric illness.

Exclusion Criteria:

- Those who are not stable to give informed consent.
- Those who are not willing to participate in the study.

Approval and Informed Consent: Ethical approval was obtained from the Institutional Review Boards of Stanley Medical College and Hospital and Sree Balaji Dental College and Hospital.

Informed consent was obtained from all the participants and minors were examined only after obtaining consent from their parents or guardian.

Sampling Methodology: A cluster sampling technique was employed. A list of Government administrated psychiatric outpatient facilities in Chennai was obtained from the Department of Health and Family welfare, Government of Tamil Nadu. One hospital was selected from the aforementioned list by simple random sampling using lottery method.

Survey instrument: An operator administered pre-tested questionnaire was used. Demographic information, duration of illness and current medicationswere obtained. Oral hygiene index-simplified and periodontal status and treatment needs index were recorded.

Clinical examination: Dental examinations were conducted by a single trained examiner. Dental examinations were conducted in supine position under natural light by means of mouth mirror and a CPI probe.Only completely filled forms were considered for analysis. The intra examiner reliability was calculated using the data obtained by re-examination of first and eleventh subject of each day after scheduled number of subjects were examined for the day (K=0.81).

Statistical analysis: Data was entered in Microsoft Excel spreadsheet and analyzed using SPSS software.

Results

Table 1: Demographic distribution of study subjects

Age (years)	Male		Female		Total	
	n	%	N	%	N	%
≤19	9	2.96	9	2.96	18	5.92
20 – 29	33	10.85	33	10.85	66	21.71
30 – 39	42	13.81	51	16.78	93	30.59
40 – 49	42	13.81	24	7.89	66	21.71
≥50	33	10.85	28	9.21	61	20.07
Total	159	52.3	145	47.7	304	100

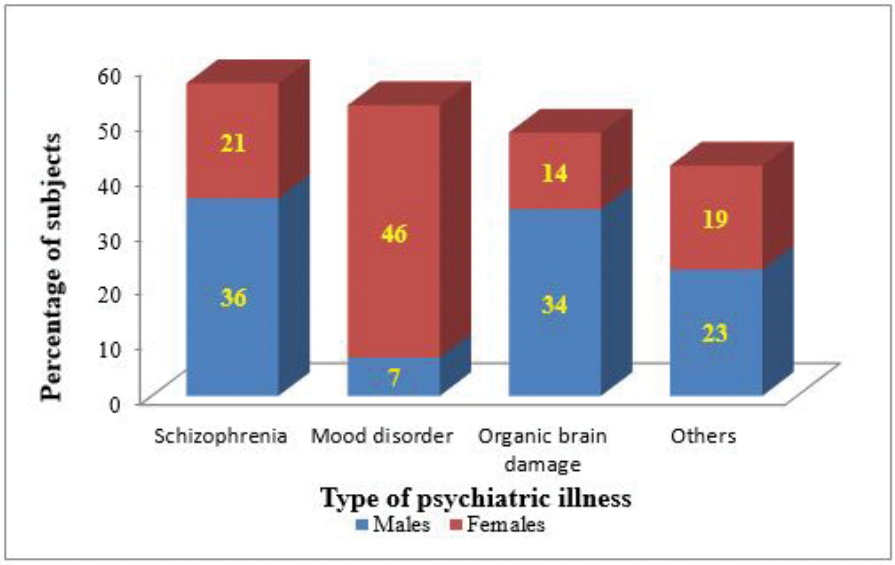


Figure 1: Distribution of study subjects based on psychiatric illness.

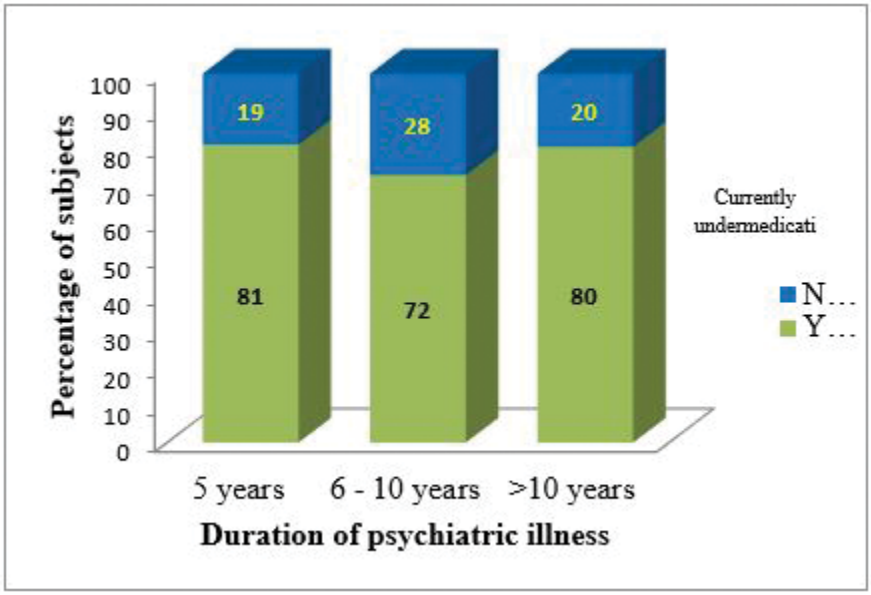


Figure 2: Distribution of study subjects based on duration of psychiatric illness and status of current medication.

Table 2: Distribution of study subjects based on oral hygiene status

Age (years)*	Gender	Oral hygiene status*					
		Good		Fair		Poor	
		n	%	n	%	n	%
≤19	M	0	0	9	100	0	0
	F	3	33.3	6	66.7	0	0
20 – 29	M	6	18.2	27	81.8	0	0
	F	3	9.1	30	90.9	0	0
30 – 39	M	0	0	24	57.1	18	42.9
	F	3	5.9	36	70.6	12	23.5

Conted…

40 – 49	M	0	0	12	28.6	30	71.4
	F	0	0	9	37.5	15	62.5
≥50	M	3	9.1	3	9.1	27	81.8
	F	0	0	6	21.4	22	78.6
Total	M	9	5.6	75	47.2	75	47.2
	F	9	6.2	87	60	49	33.8

Table 3: Subjectwise distribution of periodontal status

Age(yr)	Periodontal Status									
	Healthy		Bleeding		Calculus		Shallow pocket		Deep pocket	
	n	%	N	%	n	%	N	%	n	%
≤19	3	16.7	0	0	15	83.3	0	0	0	0
20 – 29	0	0	3	4.5	59	89.4	4	6.1	0	0
30 – 39	3	3.2	0	0	48	51.6	42	45.2	0	0
40 – 49	0	0	0	0	21	31.8	42	63.6	3	4.5
≥50	0	0	0	0	3	5.2	27	46.6	31	50.8
Total	6	2	3	1	146	48.5	115	38.2	34	11.2

$\varkappa 2 = 133.91$, p= 0.001

Table 4: Sextantwise distribution of periodontal conditions

CPITN scores	Age (Yrs)									
	≤19		20 – 29		30 – 39		40 – 49		≥50	
	N	Mean ± SD	N	Mean ± SD	N	Mean ± SD	N	Mean ± SD	N	Mean ± SD
Healthy	18	3.4 ± 1.3	66	0	93	0.5 ± 0.2	66	0	61	0
Bleeding	18	0	66	3.3 ± 0.4	93	0	66	0	61	0
Calculus	18	2.4 ± 0.7	66	3.1 ± 2.3	93	2.0 ± 1.1	66	2.9 ± 1.6	61	1.3 ± 0.1
Shallow pocket	18	0	66	1.6 ± 1.2	93	1.8 ± 0.5	66	3.3 ± 0.8	61	2.4 ± 1.0
Deep pocket	18	0	66	0	93	0	66	2.1 ± 0.2	61	2.6 ± 1.8

F=20.82, P=0.001

Table 5: Distribution of study subjects according to age and treatment needs

Age (yr)	Individual Treatment Needs							
	TN 0		TN 1		TN 2		TN 3	
	n	%	n	%	n	%	n	%
≤19	3	16.7	15	83.3	15	83.3	0	0
20 – 29	0	0	66	100	63	95.5	4	6.1
30 – 39	3	3.2	90	96.8	90	96.8	42	45.2
40 – 49	0	0	66	100	66	100	45	68.2
≥50	0	0	61	100	61	100	58	95.1
Total	6	2	298	98.0	295	97.0	149	49.0

X^2= 85.2, p= 0.004

Table 1 depicts the demographic distribution of study subjects. The study sample consisted of 304psychiatric out-patients. 159 (52.3%) of the respondents were males and 145 (47.7%) were females. The study subjects were between the age group of 18 and 71 years.

Figure 1 depicts distribution of study subjects based on type of psychiatric illness. Among males; 57 (36%), 12 (7%), 54 (34%) and 36 (23%) were diagnosed with schizophrenia, mood disorder, organic brain damage and others, respectively. Among females; 30 (21%), 66 (46%), 21 (14%) and 28 (19%) were diagnosed with schizophrenia, mood disorder, organic brain damage and others, respectively.

Figure 2 depicts the distribution of study subjects based on duration of psychiatric illness. Among the 304 study subjects, 78(26%), 120(39%) and 106 (35%) were diagnosed with psychiatric illness 5 years, 6 to 10 years and >10 years ago.

Table 2 describes the distribution of study subjects based on oral hygiene status. Among 159 male subjects; 6 (3.7%), 75(47.2%) and 75(47.2%) had good, fair and poor oral hygiene, respectively. 3(1.8%) male subjects were excluded. Out of 145 female subjects; 9(6.2%), 87(60%) and 49(33.8%) had good, fair and poor oral hygiene, respectively.

Among males, the maximum number of subjects having good, fair and poor oral hygiene were found in the 20-29, ≤ 19 and ≥ 50 years age group, respectively. Among females, the maximum number of subjects having good, fair and poor oral hygiene were found in the ≤ 19, 20-29 and ≥ 50 years age group, respectively.

Trend Chi-squaretest was performed to determine the pattern of OHI-S score variation across the age groups. It was found that as age increases, OHI-S score also increased [$X^2 = 5.352$, $p = 0.021$]. The association between age and OHI-S score was found to be statistically significant [$X^2 = 2.561$, $p = 0.015$].

Table 3 depicts subjectwise distribution of periodontal status. Among the study subjects, 6 (2%) had healthy periodontium, 3(1%) had bleeding on probing, 146(48.5%) had calculus, 115(38.2%) had shallow pocket and 34(11.2%) had deep pocket. The prevalence of periodontal disease increased as the age advances and this relationship was found to be statistically highly significant. Prevalence of periodontal disease among the study subjects (according to CPITN index) is 98%.

Table 4 depicts sextantwise distribution of periodontal conditions. Mean number of sextants coded healthy was maximum among the ≤19 yrs age group (3.4). Mean number of sextants coded for bleeding (3.3) and calculus (3.1) was maximum among the 20 – 29 yrs age group. Mean number of sextants coded for shallow pocket was maximum among the 40 – 49 yrs age group (3.3). Mean number of sextants coded for deep pocket was maximum among the ≥50 yrs age group (2.6).

ANOVA test was performed to test the association between age and periodontal condition among the study subjects, it was found to be statistically significant between the groups.

Table 5 depicts the distribution of study subjects according to treatment needs. Among the study subjects 6(2%) did not require treatment, 298 (98%) needed oral hygiene instruction, 295(97%) needed scaling and oral hygiene instruction, 149(49%) needed complex periodontal therapy. It was found that as the age increases more complex periodontal treatment was required in the study population. The relationship between age and treatment needs was found to be statistically highly significant.

Discussion

Age of the participants in this study ranged from 18 years to 71 years. Among the study subjects; 87, 78, 75 and 64 were diagnosed with schizophrenia, mood disorder, organic brain damage and other psychiatric illnesses respectively. In our study, the use of tooth brush and tooth paste as the preferred mode and material for cleaning teeth was maximum among the ≤ 19 years age group and minimum among ≥ 50 years old age group. This may be due to the increased awareness and increased willingness to adopt new lifestyle modifications among the younger generation. 11% of the participants in the present study cleaned their teeth with the help of an assistant. This is similar to studies conducted by Peter Horst G et al[17] in Netherlands and by Angelillo et al[18] in Italy.

In the present study, mean OHI-S score increased with increased duration of psychiatric illness. This is in accordance with previous studies conducted in Bangalore city (Rekha R et al, 2002)[24], Italy (Lucchese et al, 1998)[20] and Denmark (Hede B et al, 1995)[19]. Longer the patient has been psychiatrically ill, longer he/

she may not have been able to prioritize and effectively perform oral hygiene maintenance.

In this study, 1%, 48.5%, 38.2% and 10.3% of the study subjects had bleeding on probing, calculus, shallow pocket and deep pocket respectively. In a study by Angelillo et al[18] in Italy; 4.6%,10.1%,19.6% and 64.8% of the study subjects had bleeding on probing, calculus, shallow pocket and deep pocket respectively. Lucchese C et al[20](Bologna) reported that 29% of the subjects had bleeding and calculus and 66% had pathologic pockets. This vast variation in the distribution of periodontal conditions may be due to differences in lifestyle variations, level of care available and differences in dietary habits across these countries.

In the present study, there was no association between type of psychiatric illness and severity of periodontal diseases. Lucchese C et al[20] (Bologna) reported similar findings. However, Solis A C et al[25] and Persson K et al[9] reported that periodontal disease was significantly associated with Schzophrenia.

Thus, results of this study show that psychiatric patients have extensive dental diseases, many of them requiring complex treatment. However, prevention should be the main objective because patients with advanced psychiatric illness are often anxious and uncooperative for extensive curative therapy.

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Relationship between Speaking Anxiety and Self-Efficacy among Elementary Students in Second Language Classrooms in Malaysia

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Abstract

Learning English as a second language has been long implemented in Malaysia since post-independence in 1967. However, many research findings have established that language anxiety remains as an obstacle, which hinders students from mastering English in their second language classrooms. This paper presents the exploration on the relationship between English speaking anxiety and self-efficacy among 289 elementary school students from the population of 1080 students in the zone of Nusajaya, Johor, Malaysia. The results were compared across different academic achievers and genders. A modified version of FLCAS (Foreign Language Classroom Anxiety Scale) by Horwitzs and Cope (1986) and English Speaking Self Efficacy (ESSE) which was adapted and adopted from QESE by Wang (2013) were used as the research instruments. Questionnaires were distributed to the respondents to assess their self-perception on speaking anxiety and self-efficacy. The findings realized the existence of a significant moderate negative relationship between English language speaking anxiety and self-efficacy. No significant difference between genders in the level of speaking anxiety was found but there were significant differences among different academic achievers in the level of speaking anxiety

Keywords: *Speaking anxiety, Self-efficacy, Second Language.*

Introduction

English Language is a dominant language for employability, communication, business and research. In Malaysia, it is the most important second language in the school system. It is stipulated in the Malaysia Education Blueprint (2013-2025) to produce students who are proficient in both Bahasa Malaysia and English Language. Proficiency in using English is an advantage to the employees in Malaysia and in many countries. Global employability increases with the level of English competency1. However, the Malaysian Employer Federation (MEF) in the latest Salary Survey for Executives 2014 found that half of their newly recruited executives and non-executives did not reach the satisfactory level of English oral communication skills2.

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Research findings have pointed to some problems faced by students in second language learning. The widespread use of mother tongue during English lessons for teacher-talk and peer interaction interferes the correct use of English gramar, syntax and morphology in spoken English proficiency 3,4. Besides, the extreme focus on national examinations like UPSR, PMR and SPM has limited the communicative use of English for real purposes 4.

Hiew5 in a recent study has revealed the existence of moderate anxiety among secondary students in the second language classroom due to their hesitation for communication. Their relunctancy to communicate using English was mainly out of their fear of being judged negatively. This impediment affects students' communication practice and the mastery of English competencies 5,6. The current emphasis on the development of communicative competence poses especially great challenges for the students of high anxiety (Horwitz et al)7. As such, second language anxiety is regarded as a significant issue which is

unavoidable in the progress towards a successful English education in primary schools.

According to Social Cognitive Theory, self-efficacy plays an important role in students' anxiety arousal. The notion of their incapability in managing threatening consequences such as test or to speak in front of others may induce greater levels of anxiety (Bandura, 1986)8. As their self-efficacy increases, their academic achievement will be upgraded too. However, their anxiety toward specific subject matter does not posses any relationship to their academic performance. Low level of self-efficacy in a student in certain subjects can arouse certain level of anxiety about the corresponding demands. The assessment of their sense of speaking in a second language would discover clear perception into the understanding of students' self-apprehension of their capabilities to manage and deal with their oral output.

The purpose of this study is to investigate the level of second language speaking anxiety among elementary students in English classrooms and examine how their speaking anxiety was related to second language speaking self-efficacy. Besides, the effects of gender difference and their English academic achievement was examined in relation to their level of self-efficacy and speaking anxiety.

Problem Statement

Anxiety and self-efficacy are considerably relevant and crucial in acquiring a second language. in Malaysia investigating English speaking anxiety among elementary school children in second language classrooms. A few studies about anxiety and self-efficacy in learning second language have been done in Malaysia but they all focused mainly on students of tertiary level or secondary level 9-12.

Method

The research is a quantitative and non-experimental study, which collects descriptive data using survey questionnaire as the main method of data collection. Before the main study, a pilot study was done to confirm the reliability of the modified version of Foreign Language Classroom Anxiety Scale (FLCAS) and Questionnaires of English Self-Efficacy (QESE). Using stratified random sampling method, the author selected a sample of 289 Primary 5 (10-11 years old) students out of the target population size of 1080 students from Chinese vernacular elementary schools in the zone of Nusajaya, Johor, Malaysia to participate in the survey. The study was planned to measure self-perceptions using Second Language Classroom Anxiety Scale (SLCAS) and English Speaking using Self-Efficacy (ESSE).

Results and Discussion

Findings in Table 1 showed the means and standard deviations of the variables speaking anxiety (ANX) and speaking self-efficacy (SE). The students show moderate level of total speaking anxiety (M= 2.16, SD= 0.64) during their second language learning. For self-efficacy assessment, the results revealed moderate sense of efficacy (M=3.06, SD=0.79) in students when they speak English in the classroom.

Independent-samples t-test was conducted to examine the difference in speaking anxiety and self-efficacy between two genders. Table 2 shows no significant difference in the level of anxiety for male (M=2.50, SD=0.69) and female (M=2.43, SD=0.59) students; t (287) = 0.946, p = 0.345. For self-efficacy, no significant difference was found in the level of self-efficacy for male (M=3.04, SD=0.82) and female (M=3.09, SD=0.75) students; t (287) = -0.623, p = 0. 534. These results indicate that genders do not have an effect on the level of speaking anxiety and self-efficacy. The results suggest that both male and female students experienced almost the same level of anxiety and self-efficacy while speaking in the second language classrooms.

A one-way ANOVA between subjects was run to compare the impact of academic achievements on levels of anxiety and self-efficacy in grades A, B, C, D and E. Table 3 shows a significant effect of different grades on levels of speaking anxiety (ANX) and self-efficacy (SE) at $p<.05$. Significant difference of academic achievement on level of ANX [$F(4, 284) = 9.22$, $p = 0.000$] and SE [$F(4, 284) = 12.44$, $p = 0.000$] was found.

Post hoc comparisons using the Tukey HSD test for ANX showed that the mean score for A graders ($M = 2.61$, $SD = 0.69$) was significantly different than D graders ($M = 2.16$, $SD = 0.46$) and E graders ($M = 2.11$, $SD = 0.79$). However, B graders ($M = 2.67$, $SD = 0.58$) and C graders ($M = 2.31$, $SD = 0.49$) did not significantly differ from A graders in the level of total speaking anxiety. Taken together, these results suggest that students with better academic achievement are less anxious to speak in the second language classroom. Specifically, our results suggest that students with lower academic achievement

experienced higher anxiety level and are more reluctant to use the language for communicative purpose.

For testing self-efficay, post hoc comparisons using the Tukey HSD indicated that the mean score for A graders (M = 3.16, SD = 0.81) and B graders (M = 3.42, SD = 0.70) were significantly different than C graders (M = 2.93, SD = 0.57), D graders (M = 2.83, SD = 0.69) and E graders (M = 2.32, SD = 0.83). In conclusion, these results suggest that students with better academic achievement have higher sense of self-efficacy to speak in the English classrooms. In contrary, student's especially E graders experienced lower sense of self-efficacy.

A Pearson product-moment correlation coefficient was analyzed to examine the relationship between the level of speaking anxiety and self-efficacy. Table 4 shows a strong and negative relationship between self-efficacy and speaking anxiety, r = -0.680, n = 289, p = 0.000. In particular, students who have low sense of speaking efficacy are significantly more anxious than those of relatively stronger English speaking self-efficacy. Increases in their sense of self-efficacy could lower the anxiety while speaking English in second language classrooms.

In summary, elementary students experienced moderate level of anxiety when they need to converse in second language classrooms. In addition, they have moderate level of self-efficacy to talk using the target language in the classroom. That is to say, they do believe in their capability in speaking English well even though they feel quite anxious in the classroom. The level of speaking anxiety could be further reduced by promoting their sense of self-efficacy in speaking English in the classroom. Male and female students appeared to have the same level of speaking anxiety and self-efficacy but students of different academic achievements show significant difference in the level of speaking anxiety and self-efficacy.

The reports on the level of speaking anxiety and self-efficacy were consistent with the other international studies 13-16 and local studies 10, 17-18 which utilized survey questionnaires to assess students' self-perception on language anxiety and self-efficacy. Anxiety can negatively affect language learning experience in various ways and thus it is vital for all stakeholders to take efficient measures to reduce anxiety to increase language acquisition, retention and learner's motivation. The strong and negative correlation between anxiety and self-efficacy was found to be consistent with other studies done on English Language 14,15, French (Nicole, 2006) 19 which revealed correlation coefficients ranging from -0.470 to -0.747.

Conclusion

To address the issue of decline in the English proficiency among Malaysian students, our government has implemented English Language Enhancement Program to promote English level among our students. Despite new and improved teaching pedagogies, students are still found to be deficient in acquiring English Language even they have learned in schools for many years 3,20. Therefore, it is crucial to look into the deterioration of English Language especially in the command of English based on psychological aspects. Previous studies have shown that anxiety is an obstacle that hinders language learning. This study has proven the existence of speaking anxiety and students especially of lower academic achievement are found to be reluctant to speak in the second language classrooms.

Bandura (1977, 1986) 8,21 stated that self-efficacy is important in regulating anxiety arousal and anxiety is also the main source of efficacy belief. That said, the increase of speaking self-efficacy could reduce the anxious feeling while speaking. The result of the study again revealed a strong negative relation between these two variables, which supports the above claim. More drastic measures could be designed to increase the sense of efficacy among primary students. Further research and development on interventions to promote speaking self-efficacy among primary students could be considered. If valid speaking performance could be measured, the effect of speaking anxiety and performance could be correlated. Last but not least, this research can be extended to students of national elementary schools and Tamil vernacular elementary schools.

Ethical Clearance: Done from research group.

Source of Funding: Self

Conflict of Interest: Nil

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Awareness of Workstation Ergonomics and Occurrence of Computer-Related Injuries

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Abstract

The computer-related injuries (CRIs) is reported having a high incidence among office workers who works daily with a computer and do not practice good working habits or not aware of workstation ergonomics. The study's aim is to assess awareness of workstation ergonomics and occurrence of CRIs among office workers at a private university in Jakarta, Indonesia. This is a survey of 120 office workers selected with a simple random sampling method. The data were obtained using a validated self-administered questionnaire and analyzed using SPSS version 23. All participants are office workers who work with computer >5 hours daily (100%). More than half participants are women (50.8%), aged 20-30 years old (56.7%), with a bachelor's degree (73.3%), duration of occupation 1-5 years (68.3%), and never attended any ergonomics training (87.5%). Most of the participants had adequate awareness regarding workstation ergonomics (65%), however many of them still experienced CRIs e.g. eye strain (78.3%), blurred vision (41.7%), watery eyes (39.2%), headache (37.5%), tingling and numbness sensation of feet and hand (29.2% and 19.2% respectively). Assessment of body pain using Nordic Body Map showed that most of the participants experienced pain on the upper neck (44.2%), shoulder (40.8%), waist (40%) and lower neck (39.2%). Practice a good working habit is crucial and ergonomics training is highly recommended to all office workers in the university in order to reduce the occurrence of CRIs in the future.

Keywords*: Awareness; Ergonomics; Workstation; Computer-Related Injuries; Office Workers*

Introduction

Working with computer may cause computer-related injuries (CRIs) such as neck and shoulder pain, blurred vision, headache, and repetitive injury of the arms and hands.[1] It is predicted that 25% ofthe office workers are suffering from this type of injury.[2] Musculoskeletal disorders (MSDs), one type of CRIs, are the most disorders among the workers.[3] The prevalence of the neck and shoulders pain was reported quite high, leading to sickness absence and disability, decreasing work efficiency, and extensive costs upon the organizations.[3] Another example, computer vision syndrome (CVS) is a visual symptom occurred because of computer usage. More than 50 million people experience CVS in worldwide. This incidence may reduce the productivity and quality of life of the workers. Another research reported that CVS was experienced by almost 90% among the office workers.[4]

It is a certainty that a computer is an important instrument in many activities. But using a computer in a long period may increase the chances of developing CRIs. The inappropriate computer uses or unergonomic position may cause MSDs.[5]

The university office workers are a group of people who work almost daily with the computer. The occurrence of MSDs or CRIs is often among these people. On pre-survey observation that has been carried out by the researcher, there are few findings regarding this issue at UMB. Some office workers showed improper position while working with computers and some stated that they

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felt muscle and joint pain, headache, blurred vision, watery eyes, and numbness of the feet. This phenomenon can cause serious injuries and illnesses among workers. Therefore, awareness regarding workstation ergonomics is important in order to reduce the incidence of CRIs and absenteeism of workers because of sicknesses or disability.

There was no research had been conducted regarding the awareness of workstation ergonomics among office workers and the occurrence of CRIs at UMB. Thus, this study's aim is to assess the awareness of workstation ergonomics and the occurrence of computer-related injuries among office workers at UMB, Jakarta.

Literature Review

Ergonomics derives from Greek words, 'ergon' means work and 'nomos' means natural law. This word was first used by Professor Wojciech Jastrzebowski in Poland in 1857. Then, Professor K.F.H. Murrell suggested official use of this word at an assembly of the British Admiralty in 1949, and later the word ergonomics officially accepted in 1950 by British researchers for the name of their society, Ergonomic Society.[6]

Ergonomics is a branch of knowledge that explores the interaction between human and their working environment and system in order to enhance workers' welfare and overall system performance.[7] Workstation ergonomics is a workstation that well-designed ergonomically. Awareness of workstation ergonomics is the ability to know and perceive or being conscious or knowledgeable about well-designed and comfortable workstation for the workers. This awareness is important for every worker because the unergonomic workstation may cause injuries to the workers. The ergonomic injuries do not occur immediately. Some of the ergonomic injuries are MSDs, CVS, and carpal tunnel syndrome (CTS). This type of injuries is termed computer-related injuries (CRIs).[7]

A good ergonomic workstation can help to avoid the occurrence of CRIs. The employers also need to be aware of this matter by choosing proper furniture, such as desks, chairs, computers and its accessories for their workers. On the other hand, practicing good posture and working habits are essential for every worker. This habit can be ingrained if the workers are aware of workstation ergonomic.[8]

Method

This quantitative study was conducted at Universitas Mercu Buana (UMB), Meruya campus, Jakarta, from January-February 2019. The inclusion criteria of the participant were office workers at UMB, that have been using the computer for their daily tasks for about one year and with a minimum of 5 hours daily. The exclusion criteria were office workers who are having musculoskeletal complaints because of acute trauma in the last 30 days or systemic diseases such as gout, hyperlipidemia, or eye diseases such as conjunctivitis.

The total number of participants selected with simple random sampling was 120 workers from a total of 500 office workers. The data was collected by using a validated self-administered questionnaire that includes questions on socio-demographic data and workstation ergonomics by using the Workstation Ergonomics Self-Assessment [5] and modified Nordic Body Map to assess the occurrence of CRIs.[9] The content and face validity were done by the researchers and the construct validity was done by using Pearson's Bivariate analysis. A pilot study was carried out by distributing a questionnaire to 30 non-sample participants, with Cronbach's alpha 0.7.

The SPSS version 23 was used to analyze the data with a significance level set at 0.05. The independent variable was the socio-demographic factor, that consist of gender, age, education level, and work duration, and ergonomic training. The dependent variables were awareness of workstation ergonomics and occurrence of CRIs (neck, shoulder, hand, wrist, elbow and back pain, visual problems, headache, and carpal tunnel syndrome).

Results

A total number of 170 questionnaires have been distributed among office workers of UMB, Jakarta, from 16-19 January 2019. Only 146 questionnaires have successfully been collected and 26 questionnaires were excluded to fulfill the inclusion criteria. Finally, 120 questionnaires were used for analysis.

The result showed that more than half participants are women (50.8%), aged 20-30 years old (56.7%), with a bachelor's degree (73.3%), duration of occupation 1-5 years (68.3%), and never attended any ergonomics training (87.5%). All participants are office workers and working with computer >5 hours daily (100%). Based on the assessment of workstation ergonomics, most of the participants had adequate awareness regarding

workstation ergonomics (65%), however many of them still experienced CRIs e.g. eye strain (78.3%), blurred vision (41.7%), watery eyes (39.2%), headache (37.5%), tingling and numbness sensation of feet and hand (29.2% and 19.2% respectively). Assessment using Nordic Body Map showed that most of the participants experienced pain on the upper neck (44.2%), back (40.8%), waist (40%) and lower neck (39.2%).

The binary logistic regression was carried out to assess factors associated with the awareness of workstation ergonomics. Six variables had *p*-value <0.25: gender ($p = 0.097$), education level (0.094), work duration ($p = 0.145$), blurred vision ($p=0.147$), watery eyes ($p = 0.089$), headache ($p = 0.051$) and tingling and numbness sensation of feet ($p = 0.182$). These six variables were proceeded to undergo the binary logistic regression using backward stepwise method.

All variables with p-value <.25 were selected to build the preliminary model. The variable gender, education level, work duration, blurred eyes, watery eyes, headache, and tingling and numbness of feet were selected for analysis. The backward LR method was used in this analysis. Four variables were significantly associated with the awareness of workstation ergonomics: gender, education level, work duration, and watery eyes.

From the analysis, workers with work duration > 5 years have increased odds of having adequate awareness of workstation ergonomics 2.4 times compared with workers with work duration ≤ 5 years. Female workers have increased odds of having adequate awareness 2 times than male workers.

The prediction model of awareness of workstation ergonomics among participants is as follows:

Logit (P) = 1.430 + [0.892*work duration] + [0.698*gender] –

[0.803*watery eyes] – [1.248*education level]

Discussion

Majority of the participants had adequate awareness regarding workstation ergonomics (65%), although they never attend any ergonomics training (87.5%). It seems that this awareness was not reflected in their daily practices. So, as a result, the majority of them experienced CRIs and on assessment with NBM showed that most of them experienced body pain.

Another reason, it might be from the chairs that are improper to each worker. The chair selection in UMB was not based on the body size of the workers but based on job position or hierarchy. A worker who has a high position in the office will get a good quality of chair compared to a worker who has a lower position. This policy is not correct. A chair selection needs to be adjusted to the body height and weight of a worker. Some workers may be taller than other workers or having excessive weight. The measurement of body weight and height are ideally required in the selection of a chair, so the workers will feel comfortable sitting for hours on the chairs. An ergonomic chair may prevent CRIs and reduce body pain.[10]

In this study, most of the participants felt pain on the neck (upper and lower neck) (44,2% and 29.2% respectively), back (40.8%), waist (40%) and shoulder (35%). It is like the studies conducted by Daneshmandi and Besharati in Iran, also Salem et al. in India. Daneshmandi carried out a study among Iranian office workers, found that the highest pain was on the neck and back (41.6% respectively) and shoulder (40.6%).[11] A study conducted by Besharati et al. also found a similar result that the highest pain was on the neck.[12] Another study conducted by Salem et al. among 500 software professionals in information technology (IT) reported that the common MSDs were on the neck, back, and shoulder.[13]

The two following studies also reported similar results. A study conducted by Loghmani among 101 Iranian office workers from a university, reported the most pain occurred on the neck (69.2%) and low back (58.2%).[14] An observational study conducted by Akrouf among 750 office workers in Kuwait showed that most cases were on the neck (53.5%), lower back (51.1%), and shoulders.[15]

Another study showed different results. A case study carried out by Moom among 50 office workers in Punjab, India, reported that some workers suffering from pain on the low-back (40.4%), upper back (39.5), neck (38.6%), and hand or wrist (36.8%).[16] A study conducted by Quemelo among 50 office workers in Brazil reported that 74% of them experienced MSDs on the back (81%) and upper limbs (70%).[17] Similar result was found in a study conducted by Noorozi among 392 office workers at Ahvaz Jundishapur University of Medical Sciences, Iran, reported the most of body part affected by MSDs were back region (51%), neck (36.7%), wrist (23%),

right shoulder (10.2%) and right elbow (3.8%).[18]

Some visual problems were also reported in this study. Most of the workers experienced eyestrains (78.3%), blurred vision (41.7%), watery eyes (39.2%) and headache (37.5%). It is parallel to a study conducted by Chiemeke regarding the evaluation of CVS among 103 computer users at the University of Benin, Nigeria, reported that participants experienced eyestrain, blurred vision and headache (42.7%, 45.7%, 28.2% respectively).[19] This study also found that visual problems begin to happen after one hour working with computer and increases if the workers spend more hours with a computer without interruption. Respondents that spend less than one hour on the computer daily recorded the lowest visual symptoms complaints.[19] Another study conducted by Shantakumari among 471 students in United Arab Emirate, showed that the most common CVS reported were headache (53%), burning sensation of the eyes (54.8%) and eyestrain (48%).[20] Chiemeke stated that CVS was common among workers who work with the computer more than 8 hours daily.[19]

In this study, male workers were reported to have increased odds of having adequate awareness 2 times than female workers. It is parallel to a study conducted by Saleem et al. that there was a statistically significant difference in terms of gender with the occurrence of MSDs.[13] Moreover, workers with years of employment >5 years have increased odds of having adequate awareness 2.4 times than workers with years of employment for ≤ 5 years. This report was different from a study by Saleem that reported no significant difference in terms of age and work duration. Habibi and Husein suggested ergonomic interventions such as computer workstation redesign, educate the users about ergonomic principles of computer and reduce working with computers to prevent the injuries.[21-22]

Conclusion

Most of the office workers in UMB had adequate awareness of workstation ergonomics. However, the majority still experienced pain especially on the neck, back, waist, and shoulder. It might be because they did not maintain good posture while working with a computer or sitting on chairs that improper to their body size. Hence, maintain a good posture is suggested and ergonomics training is highly recommended to all office workers at UMB. Moreover, the selection of chair for every worker is important and the organization also needs to implement routine ergonomics assessment to reduce the occurrence of CRIs in the future.

Suggestion for Future Research

Some ergonomics research had been done in Indonesia especially among factory workers, but very rare study among office workers. Hence, this study becomes additional literature for ergonomics research in Indonesia. Future research regarding ergonomics can be carried out in other universities or institutions in Indonesia.

Limitation of the Study: The study was conducted only in one university in Jakarta.

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Ethical Clearance: Not required

Conflict of Interest: Nil

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Effect of Cation on Efficiency of Aspegillus flavus Bioflocculant Produced from Chicken Viscera Hydrolysate

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Abstract

The cations are needed as stimulants for effective flocculation by the negatively charged bioflocculants. In the present study, addition of all dose of both Ca2+ and Mg2+ stimulated the efficiency of the bioflocculant with optimum flocculation efficiency of 95% recorded with 5 mL of 1% Ca2+. While lower dose (1 – 2 mL) of Al3+ also stimulated the bioflocculant to about 94%, Na+ and Fe3+ inhibited flocculation at all doses tested. K+ slightly enhanced the flocculation at 4 - 10mL of 1%. The present cationic bioflocculant can be suggested as a substitute for chemical flocculants

Keywords: *cationization; bioflocculant; Aspergillus flavus; chicken viscera*

Introduction

Generally chemical flocculants are cost-effective and efficient in flocculation but are associated with secondary pollutants accumulation. To address this limitation, ongoing research efforts are focusing on extracellular polymers (bioflocculant) that have flocculation ability. These microbial based polymers can aggregate solid particles and cells from solutions. They are easily degradable to non-toxic residues that are not pollutant in nature 1. However, their application is hinder by high cost of production arising from cost of fermentation substrate and low efficiency (Mohammed and Dagang, 2019a).

Compositional characterization of biopolymer flocculants revealed existence of anionic functional moieties including uronic acids and proteins which contained mostly carboxylic functional groups with negative charges. Majority of the solid particles found in the wastewater are also negatively charged.

Cations play a significant role in stimulation of cation dependent bioflocculant through neutralization and stabilization of the lingering negative charges mainly of the active moieties of the bioflocculant. In this process, the cations lessen the distance between the particles and the biopolymer flocculants through increase in electrostatic attraction between the duo 2. The present study focuses on cationization of bioflocculant produced with chicken viscera hydrolysate to increase the flocculation efficiency of the bioflocculant.

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Methodology/Materials

Bioflocculant production

The bioflocculant was produced by growing A. flavus in a liquid viscera hydrolysate. The culture conditions used included temperature 35°C, agitation 150 rpm, incubation time 72 h, inoculum 4% and pH 7 as optimized in our previous studies. Subsequently, the 72h culture broth was dispensed in to 50mL centrifuge tubes and spin at 10,000 rpm with the aid of a centrifuge (KUBOTA 5922) to remove the biomass. The bioflocculant rich culture supernatant was collected into sterile glass beaker and used as the crude bioflocculant in subsequent experiment.

Determination of flocculation efficiency and cationization

The bioflocculant efficiency was estimated in accordance with the methods demonstrated by Kurane

et al. (1994). Briefly, 4mL (optimum dose) crude bioflocculant was dispensed in to 100 mL suspended Kaolin clay (4g/L, pH 7) in 500 mL glass beaker. Different doses (1 – 10mL) of 1% of the cation of interest were added as the bioflocculant aid. The mixture was stirred in a flocculator tester (JLT6, VELP) at 200 rpm for 1 min, 80 rpm for 5 min, and then held motionless for 5 min. The optical density reading of clarified top solution at 550 nm estimated with T60 spectrophotometer was recorded. The efficiency was finally calculated using the following equation

$$\text{Flocculation efficiency} = [(A - B/A) \times 100\%] \quad \text{(Eqn 1)}$$

Where A is the optical density of the control and B the optical density of the sample at 550 nm. The control experiment in which no cation was added was carried out and calculated following the same procedure above.

Measurement of Zeta potential

The zeta potential studies were conducted with the aid of Zeta potential analyser, Zeecom (ZC-3000 series). Samples were prepared for zeta potential measurement by dissolving 5mg of the flocculated particles in10mL deionized water. The samples were loaded into a clean measurement cell and mounted to Zeecom main unit. All measurements were conducted for at least 200 particles using automatic tracking measurement and scattered light source

Results and Findings

Effect of N+ on the bioflocculant Efficiency

The effect of Na+ on the bioflocculant is presented in Figure 1. All the doses tested inhibited flocculation of the Kaolin suspension. The maximum flocculation efficiencies recorded were 54 and 53.4% at the cation dose of 1 and 2 mL 1% NaCl2 respectively as compared to the flocculation efficiency (60.3%) of the control in which no cation was added. Interestingly the inhibition of flocculation increases as the cation dose increases to the lowest flocculation efficiency of 26.5% at the cation dose of 10mL 1% NaCl2. The zeta potential of the flocculated particles at pH 7 also increases to the maximum of -29.3mV as the cation dose increases. The zeta potential value has a direct relationship with stability of suspended particles and is used to predict flocculation. Particles with ZP values of ±(0 –10mV) are extremely unstable, ± (10–20mV) is discreetly stable, ±(20–30mV) is moderately stable and more than 30mV is highly stable 3, 4. Thus, the closer the zeta potential of particles to zero, the higher their tendency to aggregate and vice versa.

The binding ability of the cations to the biopolymers has direct relationship with the ionic size and radius of the hydration shell. Increase in ionic size triggers decrease in the hydration shell radius. Therefore, cations that has high valency, size, and tinny hydration shell could move nearer to the negative charges of the biopolymers to form bonds 5. Though potassium and sodium possess same charge, the hydration radius of potassium (0.53 nm) is smaller than that of sodium (0.79 nm) 6. As such potassium can easily loses its hydration shell when it is in proximity with the functional groups of the bioflocculant while the water molecules around the sodium prevents it approach to the surface7.

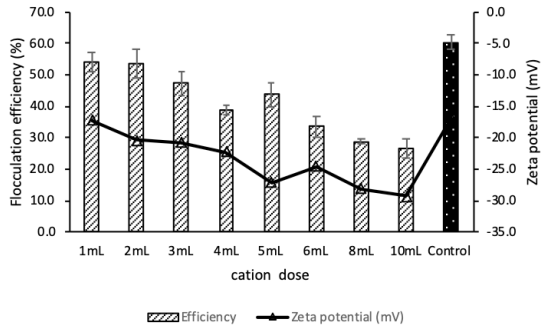


Figure 1: Effect of Na+ on bioflocculation efficiency of A. flavus bioflocculant produced from chicken viscera hydrolysate

Effect of K+ on the bioflocculant efficiency

The effect of K+ is as display in Figure 2. The maximum flocculation of about 77.6 % was achieved at the cation dose of 4 mL. As the cation dose increases beyond 5 mL, the efficiency dropped to minimum of 69.2% at 10mL. The minimum zeta potential recorded was -5.6mV at 4mL cation dose while the highest of 23.2 was recorded at 2 mL cation dose. K+, a monovalent cation has a lone valency on its exterior electron arrangement and thus can only form a single bond with the bioflocculant (Mohammed and Dagang, 2019b).

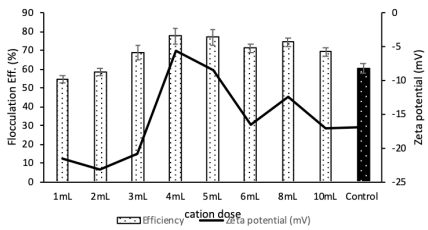


Figure 2: Effect of K+ on bioflocculation efficiency of A. flavus bioflocculant produced from chicken viscera hydrolysate

Effect of Ca2+ and Mg2+ on the bioflocculant

The stimulation activity of the Ca2+ on the bioflocculant is as shown on Figure 3. All the doses tested showed remarkable stimulation on the bioflocculant to maximum of 95% at 5mL. Meanwhile, the efficiency dropped to minimum of 76.2% at 10mL cation dose. Lowest efficiency of 84.9% was also recorded at the lowest dose of 1mL. Like the Ca2+, Mg2+ highly stimulated the bioflocculant at all doses tested (Figure 4) however maximum efficiency of about 91 – 93% was recorded with 3 – 5 mL MgCl2. The lowest efficiency of 75.9% was recorded at 10 mL of 1% MgCl2.

The divalent cations have valency of 2+ on its outer layers and can form two bonds between bioflocculant and suspended Kaolin particles. These bonds held the bioflocculant and the particles nearer and firmer together (8). Ca2+ has less stability. Its electron conformation and atomic radius is 4s2 and 197 pm respectively in comparison with Mg2+ with only an electron conformation and radius of 3s2 and 160 pm. Thus binding between Ca2+ and the carboxylate group in the biopolymer is easier (8).

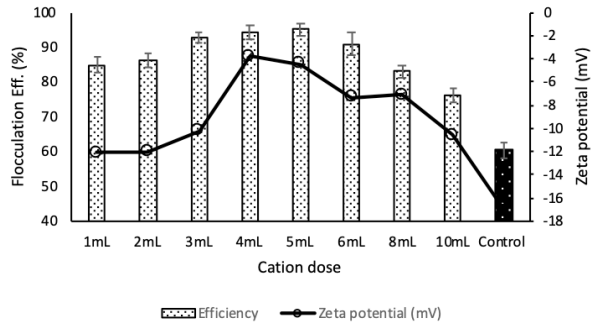


Figure 3: Effect of Ca2+ on bioflocculation efficiency of A. flavus bioflocculant produced from chicken viscera hydrolysate

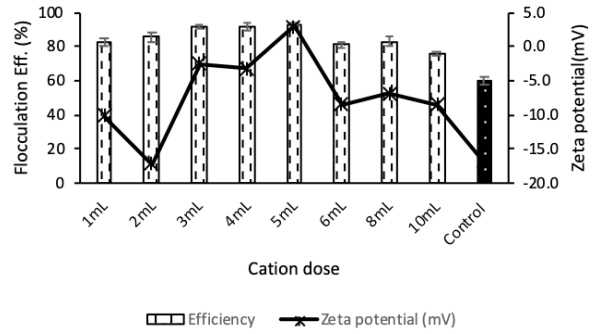


Figure 4: Effect of Mg2+ on bioflocculation efficiency of A. flavus bioflocculant produced from chicken viscera hydrolysate

Effect of Fe3+ on the bioflocculant

The Fe3+ has high inhibition effect on the bioflocculant at all the doses (Figure 5). The highest efficiency recorded was 45.5% at 2 mL of 1% FeCl3. The inhibition of the bioflocculation became more pronounced as the cation dose increases with only about 33% efficiency at 10 mL of 1% FeCl3. This inhibition is consolidated by the high zeta potential (-21 - -29.88 mV) recorded for all the cation doses. This results agrees with the work of Zheng, Ye (9) who demonstrated the inhibitory effect of Fe3+ on the ability of Bacillus sp. F19 bioflocculant to flocculate Kaolin, activated carbon and fly coal.

The inhibitory effect of Fe3+ is because addition of trivalent ion does not only add to the cationic concentration of the bioflocculant, but likewise increase the cationic thickness over the surface of the particles with its extra electron.

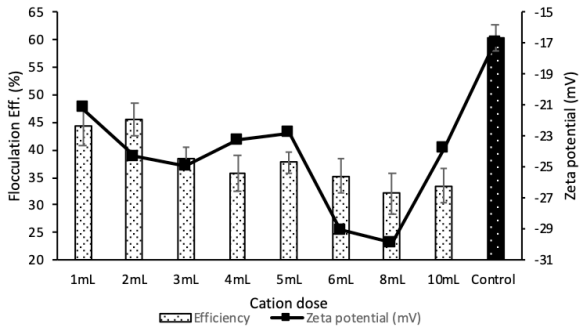


Figure 5: Effect of Fe3+ on bioflocculation efficiency of A. flavus bioflocculant produced from chicken viscera hydrolysate

Effect of Al3+ on the bioflocculant

The stimulatory effect of Al3+ on the bioflocculant is shown in Figure 6. Interestingly, significant stimulatory effect was recorded at lower doses of 1 – 3mL with highest efficiency of 94.6% at 1mL. No significant effect was observed as the cation dose increases to 4 – 10mL. This result indicated that the wide reported inhibition by the Al3+ is due to use of higher dose. Al3+ has been reported to stimulate the flocculation activity of pH and cation dependent bioflocculant produced by a Consortium of Halomonas sp. Okoh and Micrococcus sp. Leo (10)

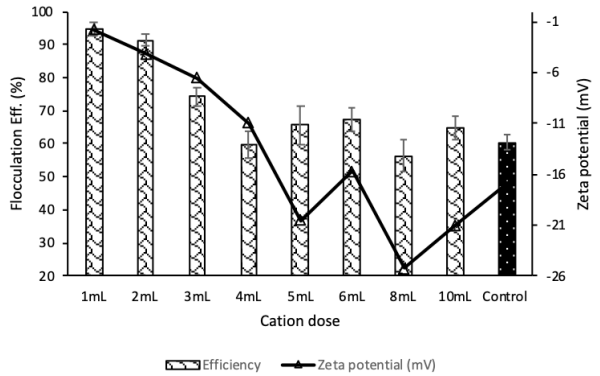


Figure 6: Effect of Al3+ on bioflocculation efficiency of A. flavus bioflocculant produced from chicken viscera hydrolysate

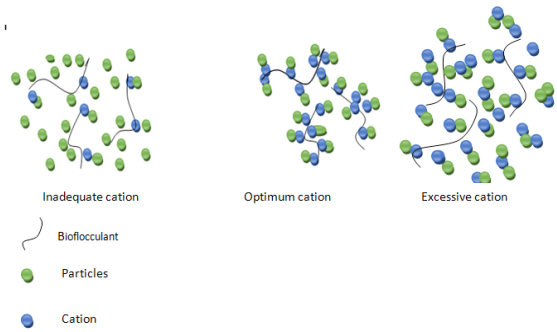


Figure 7: Schematic effect of cation dosage on bioflocculant stimulation

Mechanism of bioflocculant stimulation by the metal ions

Cation stimulated bioflocculation occurs through neutralization and stabilization of lingering negative charges found on the active sites of the bioflocculants thereby bridging between the particles and the bioflocculant. this subsequently improves the flocculation capacity of the bioflocculant (11). In the present study, the zeta potentials were generally low at higher flocculation efficiencies recorded with multivalent cations such as Ca2+, Mg2+ and Al3+ while higher zeta potential values were recorded at low flocculation efficiencies with cations such as Na+, Fe3+ and higher doses of Al3+. For example, when flocculation efficiency of 95% was achieved with 5mL 1% CaCl2, the zeta potential of only -4.5mV was recorded. When the flocculation efficiency (32.1%) was inhibited at 8mL 1% FeCl3, the zeta potential rises to -29.88mV. The lower zeta potentials recorded were due to the ability of the cations to neutralize and bridge between the bioflocculants and the particles while lack of neutralization and bridging resulted in low flocculation efficiencies and higher zeta potential values.

Conclusions

The present study achieved a bioflocculant production from a bioflocculant producing fungus; A. flavus using hydrolysed chicken viscera as medium. The flocculant secreted has good flocculating efficiency promoted by hybridization with divalent cations (Ca2+, Mg2+) and a trivalent cation Al3+ in Kaolin suspension. While K+ only slightly promoted the flocculation efficiency flocculation was inhibited by Na+ and Fe3+. The stimulatory effects of Ca2+, Mg2+ were visible at 1 – 10mL of 1% of both cations while Al3+ was at 1- 3mL of 1%. The zeta potentials of the flocculated particles were in most cases correspondent to the flocculation efficiencies. Overall, bridging mediated by the cations is suggested as the mechanism of bioflocculation for the present bioflocculant.

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Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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A Study on Anxiety among English Language Learners in School of Hospitality and Tourism, KYPJ

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Abstract

The purpose of this study is to investigate the problem of language anxiety among English Language learners in the School of Hospitality and Tourism, Kolej Yayasan Pelajaran Johor. This study is conducted to investigate the level of anxiety as perceived by the Hospitality students majoring in Hotel Management and Culinary Arts. This study also aims to investigate the possible factors that contribute to the feeling of anxiety in ESL classroom among Hospitality students in terms of Communication Apprehension, Fear of Negative Evaluation and Test-taking Anxiety. Then, the study tried to find out THE students' attitudes and values toward learning English as a Second Language and, to find out ways to overcome speaking anxiety as perceived by the students. A total of 90 samples from hospitality courses' students of KYPJ were chosen as respondents for this study. The instrument used in this study was a set of questionnaires adapted from Foreign Language Class Anxiety Scale (FLCAS) designed by Horwitz, (1983) and a pilot study of interview for supporting the validity and reliability of the questionnaire given. The findings show the most influential factor for anxiety is the Communication Apprehension. The respondents also suggested that both learners and teachers play significant roles in overcoming language anxiety

Keywords: *Language Anxiety; Learners; Tertiary Level; Communication Apprehension; Test-Taking Anxiety; Fear of Negative Evaluation*

Introduction

The Malaysian English language learners, or second language acquisition (L2) learners are very familiar with English speaking anxiety due to the imbalance reaction in terms of fear, worry, and nervousness towards the L2 learning.1 Horwitz, Horwitz and Cope2 asserted that language anxiety (LA) could relate to "a distinct complex phenomenon of self-perception, beliefs, feelings and behaviors related to classroom language learning arising from the uniqueness of language learning process". This assertion means that the issue of LA is about how the language is exposed to Malaysian learners and how the teachers identify this problem among the students.

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Some researchers also discussed speaking anxiety when they reveal the learners' experience. Zhang and Zhong3 stated that the significant reason for anxiety is the learners had a negative perception of English language and think that they lack ability to learn a new language. This means some Malaysian learners could face the similar issue of speaking anxiety as Mansor et al4 stated. It is because the learners did not receive an authentic input during the lesson. Then, speaking anxiety can cause reduced performance in the language classroom because the learners are afraid of making mistakes due to received negative comments and feel scared to try new things, especially speaking.

The experience of language anxiety is also related to the grading system. When Malaysian students become anxious about their grades, it could lead to nervousness. Daley et al5 stated that the feeling of anxiety comes from trying to score a good grade. However, the reality of doing evaluation will continuously occur in daily life.

There are expectations from the industrial workplace or employers as they look forward to job scopes in the future. The employees are expected to handle the professional matters in English. These situations might cause emotional intensity among students. Therefore, Malaysian learners should learn how to acquire the L2 properly in the class.

Statement of the Problem

Currently, the English Language has become a significant influence on people's achievement especially when the learners enter the tertiary level. They are unable to use the language efficiently due to lack of exposure. LA can affect their performance because the learners are afraid to make mistakes and demotivated when receiving negative comments. This problem statement is supported by MacIntyre[6] when the learners reported that despite compulsive efforts in acquiring the new language, anxiety override their competence in communication.

LA could also be caused by the grading system as students become so anxious about their grades. In KYPJ, it is a requirement that English is one of the compulsory subjects that students need to master in order to graduate. Moreover, there are also professional expectations from the industries as they need Hospitality students who can handle the front desk efficiently. Hence, these situations may cause LA in their workplace.

Objectives

The following are the objectives of this study:

(i.) To investigate the level of anxiety as perceived by the Hospitality students majoring in Hotel Management and Culinary Arts.

(ii.) To investigate the factors that contribute to the feeling of anxiety in ESL classroom among Hospitality students in terms of Communication Apprehension, Test-taking Anxiety and Fear of Negative Evaluation.

(iii.) To find out the students' attitudes and values toward learning English as a Second Language.

(iv.) To find out the ways to overcome speaking anxiety as perceived by the students.

Literature Review

In order to improvise the research, the researcher synthesize views from other studies. Some of them were very clear in their findings, but some were not. Hence, further research should be conducted to gain more insight. One of the studies on Anxiety and Speaking English as a second language by Woodrow[7], is "why LA effect on the oral performance of speakers in L2". Recently, most articles talk about the relationship between the LA and the motivation or integrated language skills, especially on oral speaking. Speaking skills means talk spontaneously in front of the people. So, that is why some researchers came out with one of the research questions given; (i) Is a dual conceptualization of second LA according to in-class and out-of-class communication supported?[7] Consequently, the research includes the elements of the outsider influence for LA such as real context interaction among the learners.

However, the researcher agreed that the learners should communicate in L2 outside the classroom in order to see the real context. This point could help the students to visualize the communication process. The teachers should aid learners by minimizing the LA in classroom learning. Most students feel anxious once they met the native speaker outside the classroom. The teachers should assist them to minimize the anxiety. Critically, previous research suggests the alternative ways for handling the LA such as starting the conversation in L2 by using the relaxation techniques and positive talk.[8,9] This will help the students in dealing with the anxiety. In brief, the teachers should work together with the students but the learners themselves should know how to deal with L2 LA.

Methodology

The study focuses on the LA on the L2 among the hospitality students in Kolej Yayasan Pelajaran Johor (KYPJ). The researcher aims to measure the level of LA among the students. Both Hospitality courses which are the Hotel Management and Culinary Arts students will be the respondents of the study, and the researcher aims to investigate if the L2 learning will influence their career hunting once they have graduated.

Research Procedures

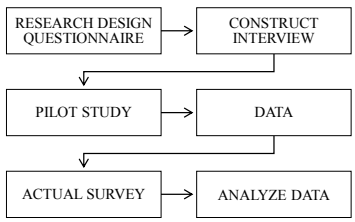


Figure 1. Research Procedures

Data Analysis

The data for this research is collected from the Hospitality students (Diploma in Hotel Management and Diploma in Culinary Arts). The questionnaires contain three (3) sections. Section A include the respondents' details such as race, gender and age together with the period of learning experience and English achievements. The result of the data in the first section leads to the significant differences between three (3) sections. Section B contains the questions for the contributing anxiety's factors, and Section C shows the values of L2 learning among Hospitality students. It has been analyzed with a descriptive statistic. The analysis to measure the means and percentage, and the weighted mean is used to describe the whole general anxiety factors among Hospitality students. Lastly, the standard deviation (SD) is to ensure the variability of the responses. Moreover, the levels of anxiety among the respondents were divided into two (2) groups, which are High Anxiety and Low Anxiety. The High anxiety is determined from 1.00 to 2.50, and Low Anxiety is determined from 2.51 to 4.00. The table below shows the level of anxiety and the range of mean:

Table 1. The Mean Value for Anxiety Level

No.	Level of Anxiety	Mean Value (Range)
1	High	From 1.00 – 2.50
2	Low	From 2.51 – 4.00

Results and Findings

The first part of this chapter presents the respondents' demography such as gender, race, age, English result for the Sijil Pelajaran Malaysia (SPM) and English result for their previous semester. Then, different factors that contribute to the feeling of anxiety among English language learners in School of Hospitality and Tourism, KYPJ are analyzed and discussed. Three factors analyzed are communication apprehension, test anxiety, fear of negative evaluation. By the end of this analysis, comprehensive view on factors of anxiety that contribute to the feeling of anxiety in L2 learning and level of anxiety is examined.

Level Analysis for Each Anxiety Factor

Table 3 describes the analysis of the level for each contributing factors of anxiety, which are Communication Apprehension, Test Anxiety and Fear of Negative Evaluation. The overall level of anxiety also will be presented in Table 2 below. With an overall view, all items showed a high level of anxiety among the respondents. Firstly, the first factor of anxiety is Communication Approach, which is the mean is 2.25, and the percentage of high anxiety is 65.1 per cent. Secondly, the next factor of anxiety is Test Anxiety also represents a high level of anxiety with the mean value of 2.26, and the percentage of high anxiety is 63.4 per cent. Thirdly, the other factor of anxiety will be Fear of Negative Evaluation, which the mean is 2.34 and shown as a high level of anxiety with the percentage of 60.3 per cent. Thus, the table clearly shown the most influenced factor for anxiety is the Communication Apprehension when this factor contributed the highest mean and percentage on the questionnaire.

Table 2. Analysis of the Level of Anxiety

Anxiety Factors	Total Mean Value
Communication Apprehension	2.25
Test Anxiety	2.26
Fear of Negative Evaluation	2.34

Table 3. Analysis of the Level of Anxiety (High and Low Anxiety)

Anxiety Factors	Communication Apprehension		Test Anxiety		Fear of Negative Evaluation	
	High	**Low**	**High**	**Low**	**High**	**Low**
Frequency	644	346	628	362	597	393
%	65.1	34.9	63.4	36.6	60.3	39.7

Interview

The researcher conducted a pilot study to ensure valid questions. The duration of the interview is less than 10 minutes and a recorder was used. The researcher only interviewed two respondents on the questions below:

Table 4. Feedback of Interviews

Interview Questions	Respondents	Feedbacks
1) What are the possible factors which caused you to feel anxious in your English classroom?	Student 1	• "Sometimes I feel my confident level is not there because when I looked at my friends more *kebolehan* rather than me."
	Student 2	•"I afraid to speak wrongly in my English classroom, so that will be make me feel anxious."
2) What have you done to overcome your language anxiety?	Student 1	• "…everyone should have their confident level when speak in front of others."
	Student 2	• "I think I can improve my problem by watching movies and sometimes, singing English song."
3) How efficient are your techniques in overcome of the language anxiety?	Student 1	• "I would like to listen to English song. They would make me feel like I want to know the vocabulary of the meaning."
	Student 2	• "Let say by watching movie, I watched the movie not only for one time. I will watch the movie many times, so with that I will remember the words."

Discussion

This chapter summarizes the three factors of anxiety, namely Communication Apprehension, Fear of Negative Evaluation, and Test Anxiety.

Research Question 1:

What is the anxiety level among the learners as perceived by Hospitality Students specializing in Hotel Management and Culinary Arts?

This section focuses on the anxiety level among English Language Learners in School of Hospitality and Tourism from Kolej Yayasan Pelajaran Johor. Overall the feeling of anxiety indicates Communication Approach, which the mean is 2.25, and the percentage of high anxiety is 65.1 per cent. Secondly, the next anxiety will be test anxiety, which the mean is 2.26 and shown as a high level of anxiety with the percentage of 63.4 per cent.

Thirdly, the other factor of anxiety is Fear of Negative Evaluation also represents a high level of anxiety with the mean value of 2.34, and the percentage of high anxiety is 60.3 per cent. Thus, it was clearly shown that the most influenced and highest contributing factor for anxiety will be the Communication Apprehension when this factor contributed the highest mean and percentage on the questionnaire.

Research Question 2:

What are the possible factors contributing to the feeling of anxiety in ESL classroom among Hospitality students in terms of Communication Apprehension, Fear of Negative Evaluation and Test-taking Anxiety?

The highest of anxiety level will be Communication apprehension, and it is characterized by an unwillingness to talk or shyness in communicating. As a result, the learners may feel anxious due to the lack of opportunities to speak English. Another study which is done by Aydin10 also show the same results. Then, other issue of anxiety is the role of the classmates in English class. In this case, most students feel less anxious when they have their supportive friends, but the motivation of students will be decreased due to peer evaluation in classroom learning such as stated by Lightbrown and Spada11 and Krashen12. They suggested that motivation is closely related to the anxiety level among learners.

Research Question 3:

What are the attitudes and values of students toward learning English as a Second Language?

Most of the students scored the mean between 2.51 to 4.00, which means the students were portrayed as low anxiety. In this section, the researcher focuses on the values of hospitality students to clarify the importance of English Language for the students' future workplace. Most of them are clear about the objective of the courses when only a few shown as high anxiety on the values part as mentioned by Krashen12 who said, when the learners are highly motivated in learning a language, their level of anxiety is low.

Research Question 4:

What are the ways to overcome speaking anxiety as perceived by the students?

The students were interviewed, and the responses indicate that most students know the importance of English and the need to overcome the anxiety. The students mentioned about memorizing words. This technique will help the students to reduce the anxiety. Krashen13 stated, the increase of confidence level indicates a lowering of language anxiety levels. This way was successful in lowering language anxiety levels among students, and the effort to communicate with peers and create meaningful interaction also could overcome all the LA matters.

Conclusion

In conclusion, the study discussed the use of L2 in language learning in Malaysia and how the speaking anxiety appeared in relation of teaching approach. The English subject becomes important gradually, and the education system in Malaysia has evolved rapidly and speaking skills should be taught from the beginning. The foundation of the learners must be excellent to ensure a sound output in the future.9,14 The suggested ways for handling the language anxiety such as starting the L2 learning by using the relaxation techniques and positive talk.

It has been explained how the relation of teaching approach could affect the learner's achievement. The students cannot forget the anxiety when speaking, but they can reduce the uncomfortable feeling. The assistance from the teachers by giving the motivation also could release the tense. In summary, every institution, teachers and learners should work together to solve the problem.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Skills of Smash Backhand on Table Tennis of 3 Dimensional based on Multimedia

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Abstract

This study aims to determine the effect of training methods and functional movement on strokes technical skills on the backhand smash in the table tennis game. This research was conducted at table tennis athletes in the city of Makassar. The method used is an experiment using a 2x3 factorial design. The sample consisted of 60 athletes, divided into 6 groups, each consisting of 10 athletes. The data analysis technique used is the analysis of two-way variance (ANOVA) and continued with the t-Dunnet test at the level of significance α = 0.05. The results showed that: the distributed practice method has a higher effect than the massed practice method on backhand smash skills, the massed practice method is more effect than the mixed practice method for smash backhand skills, methods distributed practice has more effect than the mixed practice method on smash backhand skills, there is interaction between the massed practice method, distributed practice method, mixed practice method, and functional movement on backhand smash skills, massed practice method is higher than mixed method practice on smash backhand skills in high functional movement groups, distributed practice methods are higher than mixed practice methods of smash backhand skills in high functional movement groups, distributed practice methods are higher than massed practice methods of smash backhand skills in low functional movement groups, Mixed practice methods are higher than the massed practice method of low functional movement smash backhand skills. Multimedia technology comes using Kinovea, as a software that has been created specifically for sports professionals and their coaches.

Keyword: *Exercise Method, Functional movement, Smash Backhand, Kinovea*

Introduction

Obviously, to improve achievement is not an easy thing because it needs a variety of ways and efforts. As in Hartono's (2009: 205-206), he found that the discovery of various problems and challenges faced in the development of today's sports in general can be grouped into the main thing in relation to the field of sports physical education.

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Lack of support for the standards of facilities and infrastructure as well as routine scheduled calendar events makes opportunity to accumulate playing experience is also lack. As a result, it has an impact on the development of very slow performance. Alam at al.[1] suggest that increasing sports performance is influenced by several factors; supporting factors such as consistent coaches, good quality athletes, private assistance, and sports events.

Table tennis game is one of the sport's branches having certain basic techniques including; techniques of push, drive, block, smash, and service. That basic technique must be mastered by an athlete or player to be able to play games with advanced or high skill levels in accordance with the characteristics of the table tennis game. As known that table tennis technique consists of various punches; service punch techniques, defensive punch techniques, and attacking techniques. Defensive

punch group techniques include push and block punches while attacking techniques include drive punches, smash blows, and spin punches.

In the game of table tennis, it is also known various types of games namely the type of defensive game (defensive), type of attack (offensive), and the type of combination (mixed). More types of defensive players use or utilize the ball spin from top to bottom (back spin), the type of attack player uses more or utilizes the round of the ball from the bottom up (top spin) resulting in the emergence of the term modern table tennis game that adheres to the type of attacking game. Saputra[2] states that to achieve achievements in table tennis, the level of accuracy of the punch plays influential role. Then, the level of punch accuracy can be obtained from consistent and programmed training[2].

Literature Review

Sumarno[3] says that, table tennis is a sports bet that is played by two people (for singles) and played by four people (for a double), sometimes people call it ping-pong. Table tennis has evolved from recreational sports to achievement sports, this sport is now widely favored by students and in society.

Table tennis is one sport where players must have basic strokes techniques which include; techniques of push, drive, block, smash, and service. That basic strokes technique must be mastered by an athlete or player to be able to play games with advanced or high skill levels in accordance with the characteristics of the table tennis game. The table tennis technique consists of various strokes, such as; serve strokes, defensive strokes, and attack shots. Defensive stroke technique groups include push strokes and block strokes, while attack stroke techniques include drive strokes, smash strokes, and spin strokes.

When athletes play or compete in table tennis rarely use a backhand smash, it is because the athlete prefers to return the ball using a forehand smash by shifting and reversing the body rather than directly hitting a backhand smash.

There are several general factors that must be considered in improving table tennis performance. Hadjarati[4] said that these factors were the development of young athletes, training methods, good facilities and infrastructure, good funding, professional trainers, good bureaucracy in the table tennis federation, and community support. In addition, in the study of Faridah[5] said that there are several special factors that must be considered, namely; physical and mental condition.

To improve the performance of table tennis, there is a need for treatment, especially on strokes technique skills, especially on improving the smash strokes technique skills needed in modern table tennis, especially the backhand smash technique that athletes rarely use when competing. In addition, people also tend to be more interested in researching forehand smash than backhand smash, as stated by Takeji and Yoichi[6] who say that: from some biomechanical research that has been done, generally only researching table tennis forehand strokes. However, it paid little attention to the biomechanics of backhand blows.

Hodges[7] says that smash blows are hitting the ball at maximum speed so that the opponent cannot return it. while Backhand is a type of strokes that is done by using a bet to the left of the elbow for the player using the right hand, and the opposite for the player who uses the left hand[2].

Cook[8] said that functional movement is a condition when the organs of a human body perform a pattern of movement, are in a functional position that is good or performs its functions well, because it is supported by good mobility and stability.

The strategy of passive and active play has the opposite effect on match activities and physiological responses. The effect is more on stroking activities and activity profiles than on walking activities and physiological responses can be seen through kinovea[9].

Burdick in Murray & Udermann[10] defines massed practice as practice that occurs without resting between experiments. Hale and McMorris[11] define the distributed practice method when work is interspersed with rest periods[11]. Whereas mixed practice is a training method that combines the method of solid or continuous practice and the method of interval training or distributed practice, where the rest time is filled by doing a free strokes to stretch the body so that the muscles, especially in the area arms, stomach and legs relax again.

This problem makes the writer feel it is important to do more in-depth research on how to improve the smash backhand technique skills in table tennis games that involve their functional factors, by applying three training methods, namely; massed practice methods,

distributed practice methods, and mixed practice methods. This experimental study aims to determine the effect of training methods and functional movements on the skill of smash backhand techniques in table tennis.

Methodology/Materials

As what was explained earlier that this research is an experimental research, Sudjana[12], said that the design of this study was 2x3 factorial. The design of this study can be seen in the following table:

Table: 1

Exercise Model (A) / Functional movement (B)	*Massed Practice* (A1)		*Distributed Practice* (A2)		*Mixed Practice* (A3)
1. High Functional movement (B1)	A1B1	>	A2B1	>	A3B1
2. Low Functional movement (B2)	A1B2	<	A2B2	<	A3B2

Regarding the population and sample, table tennis clubs that actively train table tennis athletes in the city of Makassar amount to 4 and the population to be taken for treatment in this study ranges from 40 athletes per club, so that the overall population is around 160 athletes, so samples that could be taken by randomization (group design) were 110 people.

Determination of the sample came from 160 athletes with a significant level of 5%, then obtained 110 athletes as stated by Sugiyono[13]. Of the 110 athletes or samples tested for functional movement, then 27% were taken, resulting in 29.7 and rounded up to 30 samples for high and low functional movements. to determine the height and low of functional movement based on determining ranking. Athletes in the order of 1-30 are referred to as samples with high functional movement while athletes in the order of 80-110 are referred to as samples with low functional movement.



Figure 1. Analysis of Smash Backhand Motion with Kinovea

Based on the target of functional movement, 30 athletes who have high functional movement and 30 athletes have low functional movement. then in a random manner, the researcher determined the athletes who entered the group who received treatment for the massed practice method, distributed practice methods, and mixed practice methods, to be subsequently formed into 6 training groups, each of which numbered 10 people as stated by Edwards14.

This research was conducted at the Table Tennis Sports Building in the sports science faculty of Makassar State University for approximately seven weeks. The implementation of this study consisted of three activities, namely: the initial test in the form of a functional movement test to group samples consisting of 5 test items, namely: deep squat test, hurdle test step, test in-line lunge, straight leg raise active test, test seated rotation.

Then the sample or testee is given treatment for 18 meetings or about 6 weeks, with a frequency of 3 meetings a week. The type of treatment given to testee in the form of smash backhand training by applying the 3 training methods, namely: the method of massed practice, distributed practice methods, and mixed practice methods.

After 18 treatments were given, the final test was a test of backhand smash strokes skills for all sample members. Data on smash backhand technique skills is a combination of the scores from the results of the backhand smash skill test and the process score of the smash backhand movement pattern based on the instrument grid consisting of several indicators. before being summed, the two data are first equated with the t-score formula which will then become the data (score) of the backhand smash strokes skill.

In this study the research is experimental research, the data is analyzed as stated by Hasan15, namely: by using a variance analysis technique (ANAVA) two ways with a significance level of $\alpha = 0.05$.

Results and Findings

A summary of the research data for each treatment can be seen in the following table:

Table 2: Table of Research Results Data Summary

Functional movement	subject	Exercise Mode		
		Massed	*Distributed*	*Mixed*
High	N =	10	10	10
	μ =	114,54	111,81	85,74
	sd =	11,18	10,90	13,40
	ΣX =	1145,41	1118,06	857,39
	ΣX^2 =	132320,4	126075,1	75128,7
Low	N =	10	10	10
	μ =	84,10	97,22	99,41
	sd =	13,64	14,33	13,76
	ΣX =	841,02	972,23	994,07
	ΣX^2 =	72405,5	96370,4	100521,8
Total	N =	20	20	20
	μ =	99,32	104,51	92,57
	sd =	19,78	14,47	14,97
	ΣX =	1986,43	2090,29	1851,46
	ΣX^2 =	204725,95	222445,50	175650,46

As for the summary analysis of variance can be seen in the table below:

Table 3: Table of Calculation Results Summary Anava 2x3

Source Variant	JK	db	RJK	$F_h = F_0$	F_{table} α=0,05	T_{table} α=0,05
1. Between A	1434,06	2	717,03	4,29	3,17	1,67
2. Between B	1638,46	1	1638,46	9,79	4,02	1,67
3. Interaction AB	4991,60	2	2495,80	14,92	3,17	1,67
4. In	9035,83	54	167,33			
Total (R)	17099,94	59				

The hypothesis that has been tested using the Dunnet t-test can be seen in the table as follows:

Table 4: Table of Hypothesis Advanced Test Results in each Anava Category 3x2 Summary

Contrast Value	(Se)	t_0	t_{table}	Result
1. $\bar{Y}_1 - \bar{Y}_2 = -103,86$	6,47	-25,39	1,67	Significant
2. $\bar{Y}_1 - \bar{Y}_3 = 134,97$	6,47	33,00	1,67	Significant
3. $\bar{Y}_2 - \bar{Y}_3 = 238,83$	6,47	58,39	1,67	Significant
4. $\bar{Y}_{11} - \bar{Y}_{21} = 2,73$	6,47	0,47	1,67	Not-Significant
5. $\bar{Y}_{11} - \bar{Y}_{31} = 28.80$	6,47	4,98	1,67	Significant
6. $\bar{Y}_{21} - \bar{Y}_{31} = 26,07$	6,47	4,51	1,67	Significant
7. $\bar{Y}_{12} - \bar{Y}_{22} = -13,12$	6,47	-2,27	1,67	Significant
8. $\bar{Y}_{12} - \bar{Y}_{32} = -15,31$	6,47	-2,65	1,67	Significant
9. $\bar{Y}_{22} - \bar{Y}_{32} = -2,18$	6,47	-0,38	1,67	Not-Significant

After analyzing the data with a two-way analysis of variance (Anava) approach, then proceed with the Dunnet t-test, the discussion of the research results is as follows:

Based on the results of the hypothesis advanced test calculations, if t is calculated compared to t table (0.05; 54), then obtained t 0> t table, thus H0 is rejected. So that it can be interpreted: there are significant differences in the results of backhand smash strokes skills in table tennis games significantly between groups A1 and A2, groups A1 with A3, groups A2 with A3, groups A1B1 with A3B1, group A2B1 with groups A3B1, groups A1B2 with A2B2, A1B2 group with A3B2.

Based on the results of the calculation of Fcount (AB) compared with Ftable (0.05), then obtained 14.92 > 3.17 so that H0 is rejected. So that it can be interpreted that there are differences in the results of backhand smash strokes skills in table tennis games significantly between groups of training methods and functional movement groups. The results of research data analysis for group A1 obtained an average score: 99.32, group A2 obtained an average score: 104.51, and group A3 obtained an average score: 92.57, while for group B1 obtained an average score average: 104.03 and group B2 obtained an average score: 93.58. So that it can be concluded, that: there is an interaction between those who are trained using a method with those who have functional movements, against the technical skills of backhand smash.

Overall there are differences in the average backhand smash skills between athletes who are trained in the massed practice method, distributed practice methods, and mixed practice methods. The results of these studies are in accordance with research16. The results of backhand smash strokes skills trained using the distributed practice method have a better effect than those trained by using the massed practice method. Likewise those who are trained using the distributed practice method have a better effect than those who are trained using the mixed practice method. The results of this study are in line with the results of research conducted by Leo17. In addition, there are interactions between those who are trained using these three methods and those who have functional moves towards the backhand smash technique skills.

Conclusion

Based on the analysis of research data, the conclusions of this study are, massed practice methods, distributed practice methods, and mixed practice methods and functional movement are variables that can effect the smash backhand technique skills in table tennis. For athletes who have high functional movement then trained using the massed practice method and distributed practice method, it turns out to have a better effect or there are significant differences in the results of their smash backhand strokes skills than those trained by using the mixed practice method. On the other hand, athletes who have low functional movement are then trained using mixed practice methods and distributed practice methods, which have a better effect or there are significant differences in the results of their smash backhand strokes skills than those trained using the massed practice method.

Based on the conclusions stated earlier, several suggestions can be made in this study, namely: in an effort to improve smash strokes skills and technical skills, especially in the backhand smash technique of table tennis athletes in the city of Makassar, physical

education teachers in high school are expected , coaches of table tennis clubs, and table tennis lecturers, to apply these three training methods according to the functional mobility of the athletes they train so that mastery of techniques can be more effective and efficient..

These three training methods can be introduced and applied as early as possible by the trainer to beginner athletes or at the level of cadets at the beginning of the training gradually, so that athletes can adapt if later given a similar training method based on an exercise program to improve their strokes technique skills. This research basically focuses on the effect of training methods and functional movements on improving smash backhand technical skills in table tennis. Thus, it is expected that the next researcher will expand or add to the research variable for the sake of increasing achievement in the table tennis sport in the city of Makassar.

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Preschool Children's Emotional Intelligence: Using Module in Malaysian Context

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Abstract

A preliminary study conducted by the researchers found that preschool teachers in Malaysia are having problems teaching the socio-emotional components due to the lack of specific teaching tools, guidance and structure. In this study, a teaching module was developed to help preschool teachers in pedagogy of emotional intelligence (EI) to enhance the preschool children's EI in Malaysia. This module was developed based on Gagne Information Processing Theory, Bandura's Social Learning Theory and The Zone of Proximal Development (ZPD) Theory by Vygotsky. The module includes ten topics which cover all elements of EI: indentifying emotion, understanding emotion, controlling emotion and using emotion. Activities were designed for each of these elements and in-service teachers were the ones who taught the children using the module. The effectiveness of this module was examined through an interview among the preschools teachers (experimental group) who using the module. Results show both preschools teacher in experimental group satisfy with the effectiveness's teaching and learning module to enhance preschool children's emotional intelligence. It is significant increase of children's emotional intelligence in the experimental group. These findings suggest that the module can be a useful tool for preschool teachers to help develop preschool children's emotional intelligence.

Keywords: *Socio emotional development, emotional intelligence (EI), module, preschool.*

Introduction

Many studies have found significant relationships between Emotional Intelligence (EI) and future success in education [5]. Children who are able to apply EI would have better academic achievements [9,10,12,13]. According to Denham, children who have higher EI are more apt to follow teacher instruction, pay attention, listen and solve problems with patience. Positive emotional skills instilled in children can allow them to develop EI and can shape behaviors which can assist children in learning and eventually to achieve better academic results [21]. Children with greater EI are better able to cope and control unexpected circumstance such as frustration, anger, sadness and so on [2,3,18, 23-25].

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EI is important in a wide variety of contexts in any person's life as Jain [11], Gallagher and Vella-Brodrick [7] have noted that individuals who are successful in life (i.e. in carrier) use only 20 percent of intellectual intelligence compared to 80 percent of EI. Goleman [8] has also noted similar findings. In addition, individuals who have a higher level of emotional control are better able to lead good relationships with others through their social skills such as communication, building consensus and efficiency in influencing others [16].

Problem Statement

An early study was conducted by some of the present researchers at several preschools at Johor Bahru, Malaysia and it was found that preschool children are weak in mastering the elements of EI which is contained under the socio-emotional pillar of the national curriculum for preschoolers [15]. Apart from that, the results of interviews conducted with preschool teachers indicated that the elements of EI and other elements under the socio-emotional pillar (of the national curriculum) were not given

proper importance by the curriculum forming authorities and the said pillar has only been used as an ancillary pillar only to be combined with the others pillars which are considered important such as science and technology pillar, communication pillar and so on. Whereas EI is very important and its elements ought to be given importance as it helps construct an individual's life trajectory such as higher mental abilities and positive personality attributes and may drive them in the right way to life 2,4,20. On children context have found that proper development of emotions is important for children because it is a regulation skill which promotes social behavior and positive learning 14, thus creating a conducive learning environment of a preschool setting 20.

In addition to the above problem, another problem is that of limited teaching aids or teaching and learning specific modules to enhance EI elements that can be used as a guide or facilitator for preschool teachers to facilitate them in teaching and learning processes undertaken. This scarcity of resources is particularly high in Malaysian context. Due to this dearth of available resources, preschool teachers in Malaysia find it difficult to carry out the teaching and learning. Moreover, there are limited specific modules available that provide information or knowledge about planned and systematic use of instructions to emotionally support and facilitate preschoolers. The teachers added that most of the teaching and learning process of EI and other elements under the socio-emotional pillar are just run only by some talk and storytelling and this makes it difficult for the students to understand the information received and thus somehow reduces their interest in learning and attention in class. According to Ovelyn, Baharom, Dg. Norizah, Molod 17, a compilation of modules accordance to the syllabus content, will successfully make the process of teaching and learning become effective and also fun for students.

Theoretical Framework

Teaching and learning module to help develop preschoolers' EI was created involving a number of theories i.e. Gagne Information Processing Theory 6, Bandura's Social Learning Theory 1 and Theory Zone of proximal Development (ZPD) by Vygotsky 22.

The use of module in teaching and learning can encourage children to understand faster and the information can be transmitted through many different activities. Teaching and learning process will be more interesting with a variety of activities that can be included in the module. Figure 1 show the theories that have been used to produce the teaching and learning module to enhance preschoolers' EI.

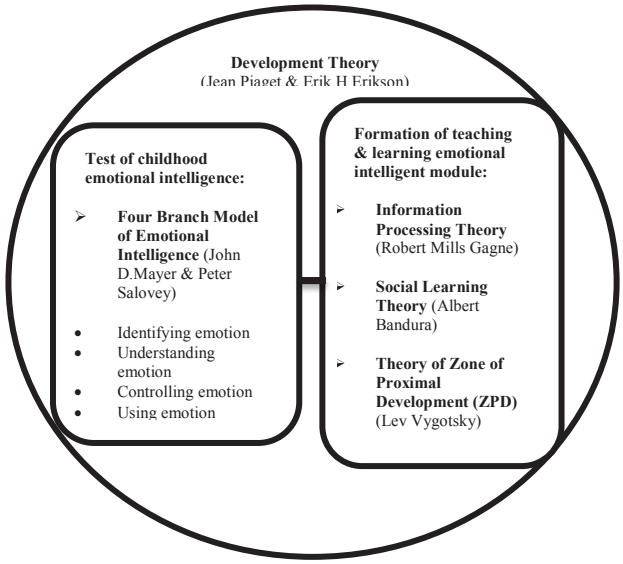


Figure 1: Theoretical Framework

The present research was conducted with children at the preschool level. According to Piaget's Theory of Development, children at this stage have an egocentric nature that will make it difficult for them to distinguish between delusions and reality. These children usually can only think of specific examples known as transductive. For them, every experience and all points of view of others are similar to what they themselves have.

Based on the Development of Erikson's Theory, the children at ages three to six years, will do things that are not fully aligned with their age due to the ongoing cognitive and physical development. If children feel criticized while experiencing curiosity, it will cause them to feel guilty and they will not take initiative in doing an activity again. Thus, the tug of war between the motivation to do new things and the prohibition to not try new things goes on. It is needed that adults promote well-meaning feelings in the children. Therefore, such children need the help of adults or peers who are better able to guide and an easily disclose the learned things. This method will involve the Zone of proximal Development (ZPD) theory by Lev Vygotsky 22 to support it.

According to Vygotsky 22, students who experience learning difficulties can be resolved when getting modeled help from an adult or collaboration partners. Student performance can also be expanded to higher

levels of potential. However, children also need an example to be imitated in order to facilitate the learning process. This process has been explained through social learning theory by Albert Bandura 1. Bandura suggested that indirectly children will learn a behavior change when observing the process and outcome of others' behavioral changes. This process is called modeling.

However, each stimulus received from the external environment which aims to simplify the process of learning, will depend also on the degree of information processing received in the nervous system through the human senses such as hearing, sight, touch, action and so on. We used the information processing theory by Gagne [9] to explain how this process occurs. According to Gagne [6], to facilitate new learning, people need old experiences that are stored in long-term memory which associate to the new experiences. Therefore, to facilitate the new learning process, we conduct an attractive activity which was contained in the module. With an activity being undertaken plus guidance from teachers and friends, teaching and learning process will be easier and will not boring. Children can see and apply the material learned in lessons. This will enhance their understanding through the teaching and learning process.

In addition to facilitating teachers in the teaching and learning processes, it was aimed by the present study to tap the level of preschool children's EI stages i.e. to know the level of EI before and after the teaching and learning modules run. Theory used to assess the children EI is through the Four Branch Model of EI by Mayer and Salovey. Through this model, Mayer and Salovey agree that individuals who are able to achieve the harmony of life are those who can master the four branches of EI namely identifying emotion, understanding emotion, controlling emotion and using emotion. Accordingly, all theories and models involved were used to create the module revolving around these four aspects. So in a way, Mayer and Salovey's model served as the spine of our teaching and learning module to promote the enhancement of preschool children's EI.

Result

Table 1 show the perception of preschool teachers on the effectiveness of teaching and learning modules in enhance preschools children's' emotional intelligence. Based on Table 1 show that in term of allocation of time for exercises to carry out an activity module, available time is feasible. Modules are concise. Easy to be referenced and easy to find specific parts when necessary. This is because the learning materials are contained in the module is structured and organized. Apart from that, both preschool teachers agreed that the activities are carried out in accordance with the level of pre-school children age. In addition, using the module can attract students' interest and attention to actively implement the activities provided. In terms of the elements of emotional intelligence which are applied to the module, according to the pre-school teachers, the preschool children are able to identify emotions himself and others, are able to understand the emotions, being able to understand the emotional changes, being able to control emotions and be able to use emotions towards a positive attitude when given an appropriate stimuli and activities available in the module. So as a brief, the teaching and learning module to enhance the preschool children's emotional intelligence is effectively implemented as successfully improving the preschool children's emotional intelligence.

Table 1. Preschool Teachers Perception on Teaching & Learning Module to Enhance Preschool Children's Emotional Intelligence

(n = 100)

Elements	Time Provided	Module Length	Suitability of Activity	User Friendly	Suitability of Module Content Meet to Malaysian National Education Curriculum
Teachers					

***Cont* .. Table 1. Preschool Teachers Perception on Teaching & Learning Module to Enhance Preschool Children's Emotional Intelligence**

Teacher 1	The time of 30 minute provided for each theme enough to implement all the activity which contained in the module. Even there have an activity which can finish early.	The module is not too thick. The instruction contained in the module concise and easy to understand. Easy to find specific parts when necessary. This is because the learning materials are arranged in a neat and organized. The information contained herein is concise.	Activities planned and implemented in accordance with the development of pre-school children. Every preschool children have equal opportunities in the experience of the learning process.	To attract students because there are certain images, as well as fun activities.	Activities that are carried out in the module help in building self-development preschool students. This is in line with the national educational philosophy that emphasizes the development of individual potential in a holistic and integrated to create a balanced and harmonious human.
Teacher 2	Most of the activity conducted can be finished within 30 minute that provided. However, it proposed that have one or two activities should be finish within 30 minute to 40 minute. So that students have enough time to complete the activity provided such as build character from the '*doh*' activity	The information contained herein is concise. Description of each activity undertaken concise. Teachers do not need to take a long time to understand the activities to be undertaken. Only a few minutes to read and activities have been implemented. In addition the module content is easy to pass on to students.	Activities can help teachers in the teaching to achieve the specified learning outcomes. There is emphasis on 'learning through play' in the teaching and learning activities performed. There are also activities that provide two options that encourage teachers to modify activities according to the level of student achievement, interests and themes that have been planned.	Activities and images contained within the module interesting and easy to understand preschool children. Apart from that, the activities require teachers and students to cooperate. This can strengthen the relationship of students and teachers as well as to provide an opportunity for teachers to get to know his students closer.	Content modules in line with the national education curriculum. This is because the activity in the modules is achieving the set objectives of the emotional and social aspects. For example, students can work alone as well as teamwork. Besides, they can also understand and respect the feelings and rights of others, and this can create a positive relationship between a classes.

Conclusion

It can be concluded that there are significant differences between the schools in the experimental groups before and after teaching and learning of EI module were conducted. It shows that preschool children's EI risen up from middle level to relatively higher level of EI. Meanwhile, the schools in the control group had no significant difference before and after the existing teaching and learning of EI were conducted. The level of preschool children's EI in this group is remained almost same at middle level. Therefore, teaching and learning of EI module was effectively implemented to increase the level of preschool children's EI. It has

been said because of on the result, it is to show that the experimental group which used the module was successful in increasing preschool children's EI. At the same time, with the module can help preschool teachers to teach EI to preschool children rather more systematically.

Conflict of Interest: NIL

Source of Funding: Self source

Ethical Clearance: Done research committee

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Sorrowness: The Impact on Health and The Treatment from Miskawayh and al-Kindi's Perspective

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Abstract

Human consists two elements - physical and spiritual. In the context of science, studies of human events focus more on their physical or biological elements. There is still limited of research by scientists examines the spiritual elements, especially from Islamic perspective even when these two elements are widely mentioned in the Qur'an and studies by Islamic psychologists. Therefore, this article will discuss one of the spiritual elements of humanity namely emotional sadness. The study applied content analysis of the Qur'an and Hadith as well as Miskawayh and al-Kindi's perspectives on sadness. Miskawayh and al-Kindi's work is the focus of discussion. This article discusses the feeling of sadness from the perspective of Quran and Hadith, the impact of sadness, sad feeling from the perspectives of Miskawayh and al-Kindi and the method of treating sadness according to these two scholars. The findings show that sorrow and sadness is one of the forms of emotion caused by a number of factors. Extreme sadness can affect health physically and psychologically. Sadness can be solved through Islamic psychological methods that focus on human spiritual aspects.

Keywords: *sadness, health, treatment, Miskawayh, al-Kindi*

Introduction

From Western psychology's perspective, the study of sorrow or sad emotions is called psychological depression study. Study of sorrowness means the application of knowledge or psychological sciences in order to understand, assess and manage all forms of human behavioural reactions and mental processes resulting from significant loss.

Psychologists have given various definitions to explain the meaning of sorrowness. The most appropriate definition is the behavioural or emotional reaction to significant loss, both expected or not expected16. Zaini Said20 concludes that sorrowness is a heart breaking grief, agony, disappointment that is naturally occurred, facing distress and misfortune.

Sadness and sorrowness are one of the most common emotions experienced by every individual. The differences are in the degree of sorrowness and the ability to control the emotions. This is because humans are unable to escape from various trials and tribulation from Allah which ultimately brings sadness and sorrow to heart. Negligence of soul strength development will lead to spiritual development disorder. One of the consequences is the existence of extreme sadness and sorrow is depression as one of the mental illness that disturbs life and prevents someone from executing jobs and daily life task perfectly.

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Islamic psychology's scholars have classified spiritual illness to some features. Among them are greedy (bakhil), fear of death, sadness / depress / sorrow, anger and anguish, extreme love for person, rank and treasure[11,5]. According to Mahadir Ahmad[10], the sorrowness experienced by an individual is assessed in terms of the type and level by formulating the results of the interviews and the standard tests on individuals with a different state. The type of sorrowness can be identified based on a report of the individual concerned.

Sorrowness and sadness from the Quranic and Hadith Perspective

In context of Islamic psychology scholars' studies such as al-Ghazali, Ibn Qayyim, Miskawayh, al-Kindi, sorrowness is viewed as a feeling that exist when one loses a loved one or loses something that is meaningful in his or her life or fails achieving something very important[14].

The Qur'an mentions depress or sorrowness as a state of very sad and in a very sorrowful condition or grieving. Sad or sorrow is one of human nature facing trials or misfortunes, but Allah SWT forbids human beings grieving beyond the limitation.

The Quran has taught human being to control the feeling of sadness. Individuals should not be in extreme sadness when being tested in any kind of trials or tribulations such as nature disasters, poverty, hunger or childless. This is because it is written in Luh Mahfuz, by Allah SWT before the occurrence. Expressing extreme sadness will not alter *qadr* Allah SWT. In contrast, the test is to train one's self to acquire high standard value such as patience, trust, good thought, humble, gain closeness to Allah SWT and to seek help from Allah SWT solely.

Referring to the previous study, sorrowness usually arises in response to loss including money, family and health. For example, death of beloved individual, break of significant relationship, loved ones suffer from chronic or life threatening illness, financial problem, jobless and significant negative changes[16]. According to Malaysia Mental Health Promotion Advisory Council Member, Tan Sri Lee Lam Thye, Malaysians who are expected to experience mental health problems due to increased workload and rising living cost are increasing. National Health and Morbidity Survey 2015 showed that 4.2 million Malaysians aged 16 and over or 29.2 percent of the country's population suffer from various mental problems. The number was alarming as it showed an increase of 11.2 percent compared to 2006. In addition, a study by World Health Organization (WHO) showed that mental health problem will likely to replace cardiovascular disease as a major determinant factor of one's capability to continue working.

Islam does not prohibit a person to express sad feelings. However, excessive crying is prevented, especially using strong voices, mourning and grief [13]. Rasulullah SAW taught his people to seek protection from Allah SWT from acquire sadness as he prayed;

"O Allah, surely I seek refuge in You from the pain and sorrow."

(Sahih Bukhari)

Impact on Physical and Spiritual (Psychological) Health

Human physiology acts on how one thinks, feels and behaves. Therefore, sorrowness can affect both individual's physical and psychological well-being. When a person is in sorrow, the body will react accordingly. He or she will experience stress, increasing chance of developing high blood pressure. Psychologically, symptoms of sorrowness and sadness are not only seen in the form of crying, complaining, anxiety and feelings of stress, but less work morale, difficulty sleeping, decrease appetite, loss of focus on daily tasks as well. This situation, if no addressed will cause depression, a mental health disorder[4].

Sad, sorrow and worry are normal feeling but prolonged and excessive sadness for more than two weeks is one of the symptoms of depression. Untreated depression can interfere with everyday life of the individual[7]. Most people with depression will experience insomnia and loss of appetite. Sudden loss of appetite in elderly can lead to a condition called anorexia geriatric[15].

Depression without treatment may lead to physical illness. Han Selye introduced a stress model in 1946, called General Adaptation Syndrome (GAS) for a better understanding on body's reaction to stress[17]. There are three levels of response, namely (1) alarm (danger sign), (2) resistance, and (3) exhaustion. According to Lyon[9] and Rice[17], human organs may stop functioning and death may occur at the third stage.

Sorrowness, sadness and depression due to stress or vice versa raise pressure hormones such as

catecholamines. Prolonged high catecholamine will have a damaging effect on liver. Stress also increase body oxygen, cause coronary blood vessel spasm and electrical instability in the heart flow system. Besides, chronic pressure has been shown to increase heart rate and blood pressure. Prolonged high blood pressure will lead to essential hypertension and other heart-related problems[6].

The Feeling of Sorrowness from Miskawayh's and Al-Kindi's Perspective

Miskawayh and al-Kindi are one of Islamic psychology and psychotherapy scholars. They have discussed about psychology of sadness and the management method from Islamic perspective. Miskawayh classified that extreme sorrowness as one of mental illnesses. The grief-related illness is the suffering of a soul who experienced losing something that is loved or missing sought-after thing[11]. Human deal with sorrowness in a various way and depending on their understanding and appreciation of religion. Islam has showed evidences on the power of faith in healing individual from various diseases, releasing the feeling of peace and eliminating sadness[20].

According to Miskawayh[12], the role of religion is very important in generating *akhlak* (good morale) because the main purpose of Islamic law is to educate human morality. According to Miskawayh[11], apart from the formal education, the power of spiritual and soul education should also be addressed. This can be done by empowering the rationality inside a person (*quwwah natiqah*). Morality of a person is heavily influenced by the power that controls him. With the power of being rational, humans are worthy of being called human beings and some individuals have the advantage and glory of having a good rationality.

Besides that, al-Kindi has defined grief, explained its causes and ways to resist sadness and sorrowness in his book, *Fi al-Hilah li Daf'i al-Ahzan*. He defined sorrowness as mental disorder that occurred because of the loss of loved and desirable things[1]. According to him, preventive measure should be taken seriously to protect individual soul.

In preventing the detriment of individual souls, Al-Kindi has expressed his own view. He divided sorrowness into two categories: sad feelings that occurred due to actions performed by himself or by others. Self-effacement can be cured by avoiding the act. While sadness by actions of others, one should not grieve before it happens. Once happened, he or she must try to shorten the period of sadness by managing the cause[1].

Sorrowness Treatment Method

Human's body will respond physiologically or biologically to pressure and stress. The stimulant caused various systems in the body to react. The autonomic nervous system and hypothalamus-pituitary-axis (HPA) are the two main systems of pressure and stress. There are many ways to reduce stress as well as reducing long-term complications of chronic stress such as heart disease, depression, anxiety, and type II diabetes[2]. However, the best treatment is to prevent it. Prevention methods are also often used as a part of a multidisciplinary treatment program.

In term of feeling of sorrowness, there also is no specific or exclusive preventive measure and treatment. However, if one is facing a difficulty in life and showing many signs of sorrowness, there are treatments that can help. These include face to face speaking, medications, Eco therapy, complementary and alternative therapies. In addition, treatment of the recovery of soul and spiritual strength is equivalently important to the treatment mentioned.

Sadenss, sorrowness or depression must be treated appropriately to the individual's situation. While this feeling is experienced by every individual but the strength and ability of a person to deal with it is different. Hence, Miskawayh and al-Kindi have put forward several appropriate methods that can be practiced by each individual.

Sorrowness Treatment Method According to Miskawayh

Miskawayh's recommended treatment methods are as follows:

(a) Eliminate greed and love for the world

One of the factors that causes sadness is a deep love of the world's pleasure and luxury. According to Miskawayh, a person feels sad, sorrow and depressed after losing something is because they consider their belonging as theirs forever. To get rid of the sorrowness, the individual need to realize that everything in this world is momentary and mortal. Second, recognizing that all desired matters may or may not be acquired and

owned. Such awareness will stop a person from greed in pursuing the worldly things. Hence, he or she will not be sad on losing beloved person or destruction of beloved property because he realizes he has no ownership[11].

(b) Establish a strong and true faith

According to Miskawayh[11], individuals need to establish faith (*iman*) to eliminate sadness. Miskawayh suggests that individuals who have firm and true faith will not be overwhelmed by grief and sorrow. Everything happened or missing from him does not affect his emotions and soul hence he will not feel sad.

Methods of Sorrowness Treatment According to al-Kindi

Apart from the treatment methods suggested by Miskawayh, al-Kindi also stated some measures to treat the symptoms, such as:

(a) Conducting healing of the soul gradually from disruption of sadness

Al-Kindi stated that healing of sorrowness needs to be done gradually. The first level is to familiarize easy and commendable act, then enhanced by disciplining the habits of commendable things in challenging situation. Lastly, it is to upgrade to more difficult and tough things. This level continues until it reaches a very difficult matter[1].

(b) Have patience on improvement

Al-Kindi also suggested that individuals should practice patience in treating sorrowness. Healing of souls does not require huge expenditure[1]. According to Al-Kindi[1], this healing process can only be done through the determination of people who want to improve themselves expenditure.

(c) Discipline oneself with the habit of doing good things

Healing of sorrowness can be done through habit of doing easy good act. If the implementation of the good thing has become a habit, an individual will be able to increase his ability to do good habits at a more difficult level. This is because the habit will make it easier for humans to achieve what is reflected in his mind and it also helps one to be patient facing various events of loss[1].

Muhammad Uthman Najati[14] emphasized that the idea of al-Kindi is preceded by the idea of modern psychologists on important fundamental principle of learning, a gradual principle on learning difficult habits. This principle has been used by modern behavioral psychologists in healing from bad habits as well as anxiety and depression.

In conclusions, the advice and suggestions used by al-Kindi in overcoming sorrowness is a method of deep understanding on the situation of grief, critically learning of its causes and wisely determined effective measure. Al-Kindi adheres to the concept of treating sorrowness and depression by generating awareness, explaining the meaning, and illustrating the nature of sorrowness as well as enhancing knowledge that can help to overcome the feelings.

Conclusion

In the era of globalization, the need for knowledge related to the development of identity and soul strength is crucial. Knowledge of Islamic psychology methods needs to be known and understood clearly as it can help people face persistent life problems. Faith and knowledge are dependent on the greatness of the trials that the believer's hearts and minds have successfully met. Human soul which has undergone the process of education through the tests and allegations of Allah SWT, will produce outstanding individuals from physical, mental and spiritual aspects. Islamic scholars have left valuable treasures as a result of their assessment of the contents of the Qur'an and hadith as guides to humanity.

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The Influence of Work-life Balance on Burnout among Nurses

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Abstract

In nursing profession, it is quite challenging to achieve a good work-life balance. This resulted in nurses facing burnout issues constantly. This study aims to identify the influences of work-life balance on burnout among nurses. A quantitative research method was used in this study by using survey forms to collect the data. The population was consisting of 150 nurses from KPJ Johor Specialist Hospital. A total of 135 nurses participated in this study which gives a response rate of 90%. The respondents were chosen by using convenience sampling technique. Descriptive statistics and Structural Equation Modeling (SEM) had been used to analyze the data of this study. Descriptive analysis and SEM analysis were carried out by using SPSS and SmartPLS version 3 softwares respectively. The findings of this study indicated that there was a significant relationship between work-family enrichment with reduced personal achievement and between work-family conflict with emotional exhaustion, depersonalization and reduced personal achievement. The findings of this study contribute to the empirical study related to work-life balance and burnout especially among nurses in Malaysia. In terms of practical aspects, this study can serve as a guide for organizations and practitioners such as hospitals and human resource practitioners to develop policies or programs to improve work-life balance for workers and to reduce burnout levels.

Keywords*: Work-life balance, Burnout, Work-family conflict, Work-family enrichment, Nurses*

Introduction

Twenty first century organizations are characterized by persistent changes, uncertainties and excessive pressure to increase productivity. These changes disturb the balance in the lives of employees causing confusion and stress. This is also fuelled by extreme levels of competitiveness in the work sphere posing new challenges and problems to workers. Thus, this study arises from the need to enhance the work-life balance by reducing burnout among nurses.

Usually healthcare professionals are trained to put the needs of others before themselves and spend each working day exposed to the emotional strain of dealing with people who are sick or dying and who have extreme physical and emotional needs. This emotional strain, coupled with other stress factors inherent in the healthcare work environment, renders healthcare professionals especially vulnerable to burnout[1]. Nurses have been found to be the most vulnerable health care professions to burnout[2]. This is because, even in environments with limited resources and reduced supply of nurses and increased responsibility, the nurses are expected to deliver humane care, empathy, cultural sensitiveness, competent and moral care[3].

In nursing profession, burnout is one of the main problems faced by nurses[4]. Burnout negatively affects the performance of an individual[5]. For nurses, this is crucial information as this directly puts patients' well-being and lives in risk and also conflicting with the code of morals for nurses[6].

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Literature Review

Work-Life Balance is divided by two parts, such as work-family conflict and work-family enrichment. Work-family conflict is a type of inter-role conflict in which the part weights from work and family areas are commonly inconsistent in some regard. That is, investment in the work (family) role is made more troublesome by ideals of investment in the family (work) role. Conflict amongst work and family has been observed to be bi-directional[7,8]. Whereas, work-family enrichment characterized as the degree to which encounters in one role enhance the quality of life in the other role[9].

Job burnout defined as a sense of reducing effectiveness, lack of motivation and dysfunctional attitudes toward their work[10]. There are three dimensions under burnout namely emotional exhaustion, depersonalization and reduced personal achievement. Emotional exhaustion refers to feelings of being emotionally overextended and depleted of one's emotional resources. Depersonalization refers to a negative, callous, or excessively detached response to other people, who are usually the recipients of one's service or care. Reduced personal achievement refers to a decline in one's feelings of competence and successful achievement in one's work.

A research studied the role of work-family conflict on burnout syndrome among medical workers in South West China[11]. The results of this study revealed that work-family conflict somewhat influence the level of burnout syndrome. In addition, females and those with lower technical titles and without administrative duties are more at risk to burnout syndrome than their counterparts.

It is clear that work-family conflict is seen as a predictor of burnout. Since, burnout has three dimensions thus the hypotheses deduced separately for each dimension. All the three dimensions, emotional exhaustion, depersonalization and reduced personal achievement can be deduced as giving positive relationship towards work-family conflict[12]. Based on the findings from the above studies, this study proposes to test the following hypotheses:

H1: Work-family conflict is positively related to emotional exhaustion.

H2: Work-family conflict is positively related to depersonalization.

H3:Work-family conflict is positively related to reduced personal achievement.

Another research studied whether work-family enrichment predicted burnout between sole and partnered working mothers[13]. In this study, a total of 107 sole working mothers and 516 partnered working mothers completed an online survey. The findings of the study showed that work-family enrichment negatively significant to burnout. Based on the previous studies, this study deduces the following hypothesis:

H4: Work-family enrichment is negatively related to emotional exhaustion.

H5: Work-family enrichment is negatively related to depersonalization.

H6: Work-family enrichment is negatively related to reduced personal achievement

Method

Participants

The population of this study consisted of nurses from all departments in KPJ Johor Specialist Hospital. Due to ethical issues in KPJ Johor Specialist Hospital, the researcher did not get permission to get the population size of nurses. Consequently, the researcher had to choose convenience sampling method to obtain samples because of the confidentiality issues from the hospital. Due to the restriction from KPJ Johor Specialist Hospital, they only allowed 150 nurses to participate in this study. The researcher managed to obtain 135 completed questionnaires from the hospital out of 150 questionnaires that were initially distributed. A total of 21 male and 114 female nurses participated in this study. 57 nurses are within the range of 20-29 age group. While 55 nurses and 12 nurses are in between 30-39 and 40-49 years old. 11 nurses are aged 50 and above. Majority of the nurses (N=123) have a Diploma as their highest education level followed by High certificate (N=2), degree (N=8) and Master (N=2). The marital status of the nurses are as follows: single (N=41); married (N=92); divorced (N=1) and widowed (N=1). Lastly, the working experience of the nurses was collected as well. Majority of the nurses (N=53) have 0 to 5 years of experience in working. There are 7 nurses with more than 30 years of working experience at KPJ Johor Specialist Hospital.

Instruments

Work-family conflict (WFC) assessed by adopting scales developed by Netemeyer et al. (1996)[14]. WFC is defined as a form of inter-role conflict in which the general demands of, time devoted to, and strain created by the job interfere with performing family- related responsibilities. The work-to-family conflict instrument comprises of five items. The items will be rated using a 5-point Likert scale ranging from (1) strongly disagree to (5) strongly agree. The participants need to indicate to what extent they agree with each conflict items. A sample item from WFC is "The demands of my work interfere with my home and family life". This instrument developed by Netemeyer et al. (1996) was used in this study because it has very strong reliability (Cronbach's alpha = .89)[14].

Work-family enrichment (WFE) was assessed by adopting scales developed by Carlson et al. (2006)[15]. WFE has nine items with three elements namely development, capital and affect. Each subscale has three items each. The example of item in development element is "My involvement in work helps me acquire skills and this helps me be a better family member". The example of second element capital is "My involvement in my work provides me with a sense of accomplishment and this helps me be a better family member". Lastly, the third element affect has item sounds like "My involvement in work makes me feel happy and this helps me be a better family member". The response rates are on a 5- point Likert scale. It is ranging from (1) strongly disagree to (5) strongly agree. This instrument was selected for this current study because it has very strong reliability which was Cronbach's alpha of 0.93[15].

Burnout assessed by using questionnaire items adopted from Maslach Burnout Inventory (MBI) developed by Maslach and Jackson (1986)[16]. The Maslach Burnout Inventory (MBI) was designed to assess three components of the burnout syndrome: emotional exhaustion, depersonalization and personal achievement. MBI consists of 22 items which divided into three subscales. The nine items in Emotional Exhaustion (EE) subscale measure feelings of being emotionally overextended and exhausted by one's work[17]. The five items in the Depersonalization (DP) subscale assess an unfeeling and impersonal response toward recipients of one's service, care, treatment or instruction[17]. The eight items in the reduced personal achievement (reduced PA) subscale measure feelings of competence and successful achievement in one's work with people[17]. All the 8 items in the reduced PA were reversely scored so that it standardized to the other two variables, EE and DP. Higher mean scores for both EE, DP and reduced PA subscales correspond to higher degrees of experienced burnout[17].

Results

The data of this study was analysed with Structural Equation Modeling using SmartPLS version 3.0. Table 1 shows the findings of this study.

Table 1: Relationship between WLB and Burnout

Hypothesis	Variables	β	T statistics	P values	Hypothesis
H1	WFC -> EE	0.420	6.372	0.000	**Accepted**
H2	WFC -> DP	0.468	6.769	0.000	**Accepted**
H3	WFC -> Reduced PA	0.218	3.903	0.000	**Accepted**
H4	WFE -> EE	0.044	0.463	0.644	Rejected
H5	WFE -> DP	-0.087	0.947	0.343	Rejected
H6	WFE -> Reduced PA	-0.524	9.376	0.000	**Accepted**

The results deduced that WFC has a significant relationship between all the three variables namely EE, DP and reduced PA. Therefore, the research hypotheses for WFC to burnout dimensions (H1, H2 and H3) were accepted. Whereas, WFE does not have a significant relationship between EE and DP which resulted in the rejection of the hypotheses H4 and H5. While there is a significant relationship between WFE and reduced PA ($p<0.05$). Thus, the hypothesis is accepted for H6.

Discussion and Conclusion

This study found that work-family conflict influences all the dimensions of burnout (i.e. emotional exhaustion, depersonalization and reduced personal achievement). These findings are consistent with the previous studies[8,18]. One of the most common effects of the work-family conflict is burnout[19,20]. Family variables were identified as the reasons for burnout[21]. Employees experience burnout because of issues or conflicts they are facing with their spouse or because of not spending adequate time at home or their families and also because of augmented requirements and responsibilities at work[18] Therefore, the level of burnout increases if the conflict between work and family arises among nurses.

Burnout is not a symptom of work stress, but it is the end result of unmanaged work stress[22,23]. Extended stress at workplace causing burnout among nurses because nurses are those who require frequent contact with people. In this profession, nurses are facing hardships in coping with demands and pressure from their jobs in terms of energy, time and resources on a daily basis. These are the reasons why nurses having difficulties in balancing their work and family lives. They are also more likely to exhaust emotionally, depersonalized and showing declines in personal achievements.

The next relationship that researcher examined was between work-family enrichment and burnout variables. There is no significant relationship between work-family enrichment and emotional exhaustion. Same goes for the relationship between work-family enrichment and depersonalization. However, this study indicated that there is a significant relationship between work-family enrichment and reduced personal achievement. This finding is in line with a study by[13] that argued work-family enrichment influence reduced personal achievement among the respondents.

There are several implications arose in this study. The theoretical implication was most of the studies on work-life balance and burnout were conducted in western countries. There are very limited studies being carried out in hospitals at Malaysia. Therefore, this study will be one of the pioneer studies in the health-care sector in Johor Bahru, Malaysia involving nurses.

In terms of practical aspects, the findings of this research provide empirical evidence on the influence of work-family conflict on all the dimensions of burnout. The findings of this study can be used by Hospital management in order to design intervention to reduce burnout among nurses.

In conclusion, this study proved that work-life balance influence burnout among nurses. Work-family conflict is more dominant affect burnout compared to work-family enrichment.

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Problem-Solving Games on the Development of Pupils' Critical and Creative Mental Model: An Experimental Study

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Abstract

Problem-solving teaching technique is believed to contribute to critical and creative, pupil-centered learning environment. This article presents results from a study of problem-solving games and the development of pupils' mental model towards critical and creative thinking. An experimental study was carried out on 163 pupils aged 11 in one primary school in Kangkar Pulai, Johor Bahru district in Malaysia. Quantitative and qualitative results show that pupils' level critical and creative thinking changed after the intervention of problem-solving games.

Keywords: *problem-solving games; critical and creative thinking; mental model*

Background

Reforming curriculum in education into higher order thinking skills (HOTS) are critical in the 21st century that aimed to encourage active learning among learners. Beginning from primary schools, students are expected to demonstrate critical, logical, reflective, meta-cognitive and creative thinking when encountered with uncertainties, dilemmas or unfamiliar problems. A scaffolding teaching technique is a lesson plan that enable to generate students thinking skills when they model from desired thinking such as applied thinking – students are giving support at the beginning of a lesson and they need to operate independently later[1]. This implies that a problem-solving lesson should be integrated into teaching curriculum to rejoin content and application to support HOTS.

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Solving problems require learner to form mental models based on situation they are manipulating even through know-what and know-how process[2]. The kind of mental model that students develop are greatly dependent on what problems they expect to solve. For example, in our study students are experiencing problem-solving through game. In Game A, students are in dilemmas when the game activity was presented in disorder and ambiguous manner that require them to solve it into ordering manner. They are required to write an action in complete, properly sequenced form, taking note of the ambiguous wording and how it could be interpreted. Disorder and ambiguity seem to be an excellent creative thinking and cognitive activity. Jansoon et al. supported that manipulating the mental model is a key step in problem-solving because learners need to predict the effects of various possible actions until they come closer to the solution[3].

Mental model as described by early works is a representations in the mind of real or imaginary situations. Based on new understanding gained from solving anticipated events, individuals form their cognitive structures to interpret new events[4]. In this paper, mental models help pupils throughout the problem-solving games based on several processes namely explain, predict, control action and thought,

diagnose, communicating among group members, and memorizing the games simulation. Iliopoulou in his observation supported that understanding mental model is so crucial for educators to allow children to construct mental models in order to generate solution for their environment, to predict and to reason[5]. That is the actual learning when children are able to control and modify their existing mental models to address environmental and real-world phenomena. The learning context should include events, tasks, problems, procedures or a concept so that when learners use mental models, they could reflect the structure of phenomena in solving the problems[4].

Material and Method

This study is to install and evaluate the critical and creative thinking skills through problem solving games. Two games were designed as problem-solving intervention for pupils to experience. The games involve critical and creative thinking that allow students to see that not only can problems have more than one solution, but sometimes the same solution works for more than one problem. Many students think that there has to be "just one right way" to solve a problem so this game can be an eye-opener for them. After playing this game, the moderator or instructor discuss how the more succinct, concise, and accurate the clue words, the easier it is to guess the key word. This draw students' attention to how this works when writing or stating a problem to be solved.

Participants of this study were 163 students aged 11 in a public school in Kangkar Pulai, Johor Bahru district in Malaysia. The experimental research that used the pre and post-test were adopted to measure the results on the critical skills of sorting, recalling, describing, problem-solving, predicting, and estimating which was adapted from Collier et al based on the suitability of the respondents[6]. This instrument was analyzed quantitatively by using mean and t-test. On the other hand, the element of creative thinking was adapted from the Torrance Tests of Creative Thinking (TTCT) which used figural test to evaluate how respondents complete a figure to create a story. The analysis is using qualitative method that based on drawing or figural results from pre and post-test.

The respondents were asked to answers both tests of questionnaire and figural test 2 weeks before they were taught and trained about creative and critical thinking through the games. During the games, the respondents were facilitated by mentors to play two games within 4 hours sessions. After six weeks, the respondents were given the similar tests. To analyze the data, the paired sample t-test was used to evaluate the difference between pre and post-test.

Findings

Critical Thinking in Solving Problem

The overall results on the critical thinking among respondents was shown in Table 1. The mean items were to interpret the results and categorized the mean into three levels namely high, medium/moderate and low. The level of critical thinking was observed as moderate for pre and post-test except Item 4 and 5, of which the critical thinking level during the pre-test was low.

Table 1: Overall Mean

No	Aspects	Pre (N=163)	Post (N=163)
1	Independent problem-solving	3.01 Moderate	2.97 Moderate
2	Asks for help	2.96 Moderate	3.20 Moderate
3	Alternate solutions	2.96 Moderate	2.94 Moderate
4	Create visuals	2.31 Low	2.37 Moderate
5	Retell directions	2.31 Low	2.47 Moderate
6	Recall information	2.86 Moderate	3.07 Moderate

Cont... **Table 1: Overall Mean**

7	Cooperate with others	3.28 Moderate	3.27 Moderate
8	Attentive listener	2.94 Moderate	3.07 Moderate
9	Inquisitive, curious	3.19 Moderate	3.19 Moderate
10	Describe ideas/events	3.45 Moderate	3.36 Moderate

The Difference of Critical Thinking Between Pre and Post Test

The overall value of mean difference between pre and post-test was shown in Table 2. Only two items were shown to have significant difference namely *asks for help* and *recall information*. Based on the t-test analysis, the *t*-value are (163) = -2.492, $p<0.05$ and (162) = -2.227, $p<0.05$ for *asks for help* and *recall information* respectively. The detailed results are depicted in Table 3.

Table 2 : Mean Difference

No	**Aspects**	**Pre (N=163)**	**Post (N=163)**	**Mean Difference**	**p- value (significance)**
1	Independent problem-solving	3.01	2.97	0.03	0.73
2	Asks for help	2.96	3.20	-0.20	***0.01***
3	Alternate solutions	2.96	2.94	0.01	0.90
4	Create visuals	2.31	2.37	-0.01	0.91
5	Retell directions	2.31	2.47	-0.16	0.12
6	Recall information	2.86	3.07	-0.20	***0.03***
7	Cooperation with others	3.28	3.27	0.01	0.88
8	Attentive listener	2.94	3.07	-0.13	0.14
9	Inquisitive, curious	3.19	3.19	0.00	1.00
10	Describe ideas/events	3.45	3.36	0.09	0.36

Table 3: T-test between Pre and Post on Ask For Help and Recall Information

T-test between Pre and Post on Ask For Help					
Duration	**N**	**Mean**	**Standard Deviation**	***T***	**p**
Pre	163	2.96	.793	-2.492	.014
Post	163	3.20	.747		
T-test between Pre and Post on Recall Information					
Duration	**N**	**Mean**	**Standard Deviation**	***t***	**p**
Pre	163	2.86	.922	-2.227	.027
Post	163	3.07	.757		

Creative Thinking in Solving Problem

Findings on creative thinking can be illustrated when participants are able to complete the figural test on 4 relevant pictures that have meaningful story about *My Holiday*. The figural test provide incomplete object for each of the 4 boxes and participants were given 20-30 minutes to complete and transform the object into meaningful picture according to the story title. They are required to imagine and complete the figural story according to the flow 1-4. The complete 1-4 pictures with relevant meaning were scored as 5 points each making a total of 20 points. From the 163 participants, only 57 (35%) of them completed the pictures.

Discussion

Problem-solving games that had been used for this study is part of a play that has significant changes on tacit level based on learning from experience. The games experienced by participants in this study had produced some significant changes in both critical and creative thinking. Level of asking and recalling changed after participants were trained and experienced throughout the games. Being able to recall directions and retell details, information and ideas from stories and past experiences are important skills for critical and problem-solving process. Previous studies agreed that play is critical factor for socialization and learning throughout life[7]. It has power and fantasy that enable participants in this study to think outside their ordinary thinking style. Even though only 35% of participants demonstrated the changes in creative thinking outcome, these results are considered as an imperative changes among pupils at age 11. By reflecting on the games, learners develop personal awareness and insight, and this is identified as debriefing stage in learning and is very important to encourage learners discover meaningful connections between game activity and their own lives[8].

Conclusion

In conclusion, problem solving teaching technique using game may overcome limitation of teaching lessons plan that failed to encourage pupils' ability to think at higher level. The design of learning instruction is critical to promote and stimulate critical inquiry and creative thinking. Unfamiliar scenario and dilemmas are able to encourage the development of new mental model based on what the pupils experience when they are solving puzzles in the game. In this study, curiosity and inquisitiveness are the character traits that can be gained after participating in the game. Teacher or instructor should create systematic learning instructions to promote pupil-centered environment that allow pupils to engage and be interactive in learning.

Conflict of Interest: NIL

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Bronchoscopic Lung Volume Reduction in COPD Patients with Silver Nitrate Orhistoacryl

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Abstract

Background: Lung volume reduction means reduction of part of the lung which is physiologically nonfunctional and has no role in the normal process of gas exchange between air in the alveoli and blood in the alveolar capillaries. This part of lung may also compress and affect the function of the normal functioning lung tissue adjacent to it. Many bronchoscopic lung volume reduction materials used to reduce lung volume in patients with emphysema such as one-way valves, coils plugs/occluders/blockers, and other biological lung volume reduction maneuvers.

Purpose: to evaluate feasibility, efficacy and safety of silver nitrate or Histoacryl in bronchoscopic lung volume reduction in COPD patients.

Materials and Method: The present study included 30 patients subjected to full history taking, full clinical examination, chest x-ray & HRCT chest, spirometry, lung volumes, 6- minute walk test, diaphragmatic excursion by chest ultrasound, Fiberoptic bronchoscopy and BLVR with application of silver nitrate or Histoacryl.

Results: In our study, lung volume reduction was associated with improvement after 3 months in FEV1 ((8.55±12.38 %) with Histoacryl VS (10.61±11.50 %) with silver nitrate), 6MWT (61.94±37.45 %) with Histoacryl VS (48.08±33.68 %) with silver nitrate), diaphragmatic excursion (48.03±29.12 %) with Histoacryl VS (61.31±26.15 %) with silver nitrate) , RV ((41.50±21.58 %) with Histoacryl VS (40.98±18.12 %) with silver nitrate), TLC ((37.12±16.17 %) with Histoacryl VS (37.37±18.74 %) with silver nitrate), MMRC ((22.78±9.69 %) with Histoacryl VS (27.78±8.72%) with silver nitrate) and CAT ((15.97±7.08 %) with Histoacryl VS (16.17±5.94 %) with silver nitrate).

Conclusion: Bronchoscopic Lung Volume Reduction With Silver Nitrate solution 0.5% or Histoacryl may be a safe, cheap and effective therapy in patients with advanced emphysema.

Key words: *COPD, BLVR, Histoacryl, silver nitrate.*

Introduction

COPD is a preventable and treatable disease. Smoking is the most important risk factor and about 90% of COPD ptientsare smokers1.

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Medical management of COPD mainly depends on smoking cessation, bronchodilators, anti-inflammatory drugs, antibiotics, prophylactic vaccines, pulmonary rehabilitation and long term oxygen therapy, mucolytics, antioxidants, and good nutrition. Smoking cessation has disease modifying action that can slow down the decline in lung function and increase survival 2.

Despite proper medical therapy, many patients with advanced disease have been seen to deteriorate or minimal improvement may be achieved. Management of such patients includes a more interventional therapy

as lung transplantation and lung volume reduction procedures. Bronchoscopic lung volume reduction (BLVR) is one of the interventional procedures that may help in the treatment of patients with advanced COPD 3.

Lung volume reduction used to reducethe part of the lung which has no role in the normal process of gas exchange between air in the alveoli and blood in the alveolar capillaries and may affect the function of the adjacent functioning lung tissue4.

Many bronchoscopic lung volume reduction materials used to reduce lung volume in patients with emphysema such as one-way valves, coils and other biological maneuvers5.

Materials and Method

The present study was conducted in the Chest Department, Kasr Al-Ainy hospital in collaboration with Radiology Department, faculty 0f medicine, cairo university

Study Design:

The present study included 30 patients with heterogenous emphysema who fulfilled the selection criteria. The included patients were selected from the Chest Department inpatients, Kasr Al-Ainy Hospital. Bronchoscopic lung volume reduction was done using Histoacryl for 15 patients and silver nitrate for 15 patients.

Inclusion criteria:

Stable COPD patients with predominant emphysema with heterogeneous and upper lobe predominance emphysema admitted in Chest Department at Kasr al Ainy Hospital for BLVR.

All age groups regardless the gender.

FEV1 < 45% predicted.

PaO2 ≥ 60 mmHg on nasal prong ≤ 4 liter per minute.

PaCO2 < 60 mmHg

RV ≥ 200%

TLC ≥ 120%

Exclusion criteria:

Airflow limitation with FEV1 < 20%.

Patients not candidate for FOB:

Life threatening arrhythmia.

Severe hypoxemia.

Bleeding tendency that can't be corrected.

Assessments:

All patients were subjected to the following:

1) Full history taking.

2) Full clinical examination.

3) Laboratory tests including:

Complete blood count.

Arterial blood gases.

Bleeding profile.

4) ECG.

5) Chest X-ray (Postero-anterior view).

6) High resolution CT chest was done as it is more sensitive to detect emphysema using "MSCT (multi slice computed tomography) 16-channels" device. HRCT chest was useful in detection of type of emphysema, distribution of emphysema and absence of collateral ventilation when 80 % of fissures were seen.

7) Pre and 3 months post BLVR spirometery (FEV1%) and lung volumes were done using "Master screen Carefusion Germany 234GmbH LeibniZstrasse" device.

8) Pre and 3 months post BLVR evaluation of dyspnea grade according to Modified Medical Research Council Dyspnea Score (mMRC)

9) Pre and 3 months post BLVR 6 minute walk test.

10) Pre and 3 months post BLVR diaphragmatic excursion with chest ultrasound.

11) pre and 3 months post BLVR COPD assessment test (CAT)

12) BLVR procedure

Patients were prescribed antibiotic (levofloxacin) 5 days before and after the bronchoscope to prevent development post procedural infection which is the

commonest complication.

Fiber-optic bronchoscopy.

Patient preparation:

Patients fasting for at least 6 hours.

Intravenous access was ensured.

Premedication:

0.5-1 mg atropine sulphate was given intramuscular, half an hour before the procedure to reduce the bronchial secretions and suppress vagal overactivity.

Patient position:

The patients were lying semi-sitting.

Approach:

Fiberoptic bronchoscopy was performed via the nasal route from front of the patient.

Local anesthesia:

Lidocaine 2% was given as local anesthetic agent. The oropharynx was anesthetized with 2% lidocaine applied intranasally. The vocal cords as well as the bronchial tree were properly anesthetized by direct instillation of 2% lidocaine via the working channel of the bronchoscope to suppress the cough reflex.

Monitoring of the patient throughout the procedure:

The patient's oxygen saturation, heart rate and blood pressure were monitored to ensure adequate oxygenation and hemodynamic stability.

Steps of the procedure:

After insertion of FOB (PENTAX FB 18RX, Ashi optical. Japan) and visualization of vocal cords, systematic inspection of the tracheobronchial tree was done. The bronchoscope was advanced to reach the targeted segment of the bronchial tree that was recognized by chest X- ray and high resolution CT chest, and then the bronchoscope was wedged to the targeted segmental bronchi.

BLVR with Histoacryl:

A small catheter (19-gauge disposable injection needle) was introduced through the working channel of the bronchoscope.

1 ampoule (0.5 ml) Histoacryl blue, was injected through the catheter after mixing it with 0.6 ml lipidol which act as a lubricant to the catheter wall which facilitate transfer of histoacryl blue through it and it delays the coagulation of histoacryl blue glue until it reaches the target segment.

Manufactured by B. Braun, Histoacryl® consists of n-Butyl-2 Cyanoacrylate..Histoacryl® and Histoacryl® Blue polymerize in seconds upon being exposed to water or water containing substances like human tissue. Histoacryl® and Histoacryl® Blue are supplied in 0.6 ml single patient use plastic ampoules.

The injected adhesive material, histoacryl blue, led to obstruction of the targeted segment, shrinkage and collapse of the targeted segment (upper lobe segment in emphysematous patients).

BLVR with Silver Nitrate:

A small catheter with balloon (Swan Ganz, 110 cm, triple lumen, Edwards, USA) was introduced through the working channel of the bronchoscope and was wedged into the selected segment, then the balloon was inflated to prevent leakage of silver nitrate outside the selected segment, then the bronchoscope was dislodged slightly upward to protect it from coming in contact with silver nitrate during coughing.5 ml of the prepared silver nitrate (0.5%) was injected through the catheter.

The injected silver nitrate led to inflammation, fibrosis, and obstruction of the targeted segment, shrinkage and collapse of the targeted segment.

Patients were discharged out of the hospital at the same day after checking the vital signs.

We targeted upper lobes in COPD patients with heterogenous emphysema.

Statistical methods:

Data were coded and entered using the statistical package SPSS (Statistical Package for the Social Sciences) version 24. Data was summarized using mean, standard deviation, median, minimum and maximum in quantitative data and using frequency (count) and relative frequency (percentage) for categorical data. Comparisons between quantitative variables were done using the non-parametric Mann-Whitney test. For comparison of serial measurements within each patient the non-parametric Wilcoxon signed rank test was used

6. For comparing categorical data, Chi square (□2) test was performed. Exact test was used instead when the expected frequency is less than 5 7. P-values less than 0.05 were considered as statistically significant.

Results

30 males with hterogenous emphysema were subjected for BLVR with silver nitrate or Histoacryl.

BLVR with Histoacrylwas associated with improvements in spirometry (FEV1 improved at 3 months from 25.93±8.14 % to 27.6±9.9 %), air trapping (residual volume improved at 3 months from 410.5 ± 164.19 % to 222.2 ± 69.7 %), (total lung capacity improved at 3 months from 171.68±46.5 % to 105.6 ± 25.96 %). Symptom scores (Medical Research Council dyspnea score at 3 months improved from 3.87 ± .35 to 3 ± .53 and COPD assessment test improved at 3 months from 34.27 ± 1.58 to 28.87 ± 3.54). 6 minute walk test showed improvement at 3 months from 125.9 ± 33.9 m to 204 ± 68.3 m. diaphragmatic excursion improved at 3 months from 2.9 ± .77 cm to 4.33± 1.13 cm.

Table (1):Age of study population.

	Mean	**SD**
Age	55.33	9.22

Table (2): Change in outcome measures from baseline to 3 months in Histoacryl group.

	Histoacryl group		P value
	Mean	SD	
FEV1 (%) before	25.93	8.14	
FEV1 (%) after	27.60	9.09	0.028
6MWT (m) before	125.93	33.97	
6MWT (m) after	204.00	68.33	0.001
diaphragmatic excursion (cm) before	2.98	.77	
diaphragmatic excursion (cm) after	4.33	1.13	0.001
RV before	410.50	164.19	
RV after	222.20	69.76	0.001
TLC before	171.86	46.52	
TLC after	105.60	25.96	0.001
MMRC before	3.87	.35	
MMRC after	3.00	.53	< 0.001
CAT before	34.27	1.58	
CAT after	28.87	3.54	0.001

BLVR with silver nitrate was associated with improvements in spirometry (FEV1 improved at 3 months from 27.57±9.58 % to 30.67±12.6 %), air trapping (residual volume improved at 3 months from 409.14 ± 153.78 % to 223.2 ± 48.7 %), (total lung capacity improved at 3 months from 167±46.5 % to 101.13 ± 25.96 %). symptom scores (Medical Research Council dyspnea score at 3 months improved from 3.4 ±.51 to 2.47 ± .52 and COPD assessment test improved at 3 months from 34 ± 1.56 to 28.53 ± 2.83). 6 minute walk test showed improvement at 3 months from 178.33 ± 74.59 m to 250 ± 82.29 m. diaphragmatic excursion improved at 3 months from 2.66 ± .50 cm to 4.23± .82 cm.

Comparison between Histoacryl and silver nitrate groups regarding improvement of FEV1, lung volumes, exercise, sympoms (MMRC and CAT), diaphragmatic excursion after 3 months of lung volume reduction showed insignificant values.

Table (3): Change in outcome measures from baseline to 3 months in silver nitrate group.

	Silver group		**P value**
	Mean	SD	
FEV1 (%) before	27.57	9.58	0.011
FEV1 (%) after	30.67	12.61	
6MWT (m) before	178.33	74.59	0.001
6MWT (m) after	250.00	82.29	
diaphragmatic excursion (cm) before	2.66	.50	0.001
diaphragmatic excursion (cm) after	4.23	.82	
RV before	409.14	153.78	0.001
RV after	223.07	48.71	
TLC before	167.00	45.25	0.001
TLC after	101.13	24.40	
MMRC before	3.40	.51	< 0.001
MMRC after	2.47	.52	
CAT before	34.00	1.56	0.001
CAT after	28.53	2.83	

Table (4): Comparison between the 2 groups.

	Histoacryl group		Silver group		P value
	Mean	SD	Mean	SD	
FEV1 % improvement	8.55	12.38	10.61	11.50	.511
6MWT % improvement	61.94	37.45	48.08	33.68	.267
diaphragmatic excursion % improvement	48.03	29.12	61.31	26.15	.137
RV % improvement	41.50	21.58	40.98	18.12	.571
TLC % improvement	37.12	16.17	37.37	18.74	.696
MMRC % improvement	22.78	9.69	27.78	8.72	.061
CAT % improvement	15.97	7.08	16.17	5.94	.838

Discussion

In our study, lung volume reduction was associated with improvement after 3 months in FEV1 ((8.55±12.38 %) with Histoacryl VS (10.61±11.50 %) with silver nitrate), 6MWT ((61.94±37.45 %) with Histoacryl VS (48.08±33.68 %) with silver nitrate), diaphragmatic excursion (48.03±29.12 %) with Histoacryl VS (61.31±26.15 %) with silver nitrate) , RV ((41.50±21.58 %) with Histoacryl VS (40.98±18.12 %) with silver nitrate), TLC ((37.12±16.17 %) with Histoacryl VS (37.37±18.74 %) with silver nitrate), MMRC ((22.78±9.69 %) with Histoacryl VS (27.78±8.72%) with silver nitrate) and CAT ((15.97±7.08 %) with Histoacryl VS (16.17±5.94 %) with silver nitrate).

Other researchers showed that BLVR with silver nitrate showed that at 3 months, improvement from baseline in FEV1 (10.29±9.56%)8. BLVR with autologous blood showed that at 3 months, improvement from baseline in FEV1 (15.8 ± 10.2 %), 6MWT (37.6 ± 24.6 m) and improvement in MMRC (0.29 ± 0.48)9. BLVR with Aeris biological remodeling system showed that at 3 months, improvement in in FEV1 (3.0 ± 10.2%), RV (11.8 ± 5.8%) and in 6MWT (71.9 ± 61.8 m)10.BLVR with endobronchial valves showed that at 3months, improvement in FEV1 (10.7 ± 26.2%), RV (11%) and in 6MWT with was (36.9 ± 90 m) 11.Other studies results are comparable with our study results.

In our study, we used diaphragmatic excursion to assess lung volume reduction as it was easier without any harmful radiological effect and improvement of diaphragmatic excursion would improve dyspnea score and exercise capacity.

Regarding complications in our study, in Histoacryl group, 2 patients developed complications (1 patient had pneumonia outpatient and received antibiotics for 1 week and improved and 1 patient had respiratory failure and was admitted in ICU for 1 day and improved then was discharged).

In silver nitrate group 4 patients experienced chest pain and patients were given analgesics.

So, complications in our study were limited and were treated without any residual effect.

In conclusion, Bronchoscopic Lung Volume Reduction With silver nitrate or Histoacryl may be a safe, cheap and effective therapy in patients with advanced emphysema.

Conflict of Interest: The authors declare that no conflicts of interest.

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The Role of Time Zero Liver Biopsies Following Graft Reperfusion in Prediction of Early Graft Dysfunction in living Donor Liver Transplantation

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Abstract

Introduction: Time zero biopsy may reflect hepatic post-reperfusion changes that can affect graft outcome in LDLT.Aim: to highlight the role of time-zero biopsies in predicting early graft dysfunction following Living Donor Liver Transplantation (LDLT).Patients & Methods: Between January 2017 and September 2018, Time zero biopsy was taken in 49 patients. The severity of the ischemia reperfusion injury (IRI) was graded upon the presence of neutrophilic infiltrate and hepatocyte necrosis. Patients were divided into two groups; positive IRI (moderate or severe changes) and negative IRI (nil or mild changes).Histopathological changes were correlated with graft outcomes.Results: Time-zero biopsies of 49 liver allografts revealed negative IRI (35, 71.4%) (Group 1) and positive IRI (14, 28.6%) (Group 2). Recipients with positive IRI group showed a significant rise in serum bilirubin, ALT, AST and INR on days 5,7,30 post transplantation. Fifty percent of the allografts with positive IRI had significant biochemical and hematological criteria suggestive of early graft dysfunction.

Conclusion: *Time-zero biopsies could represent an important tool in predicting EGD in LDLT.*

Keywords: *LDLT, time zero biopsy, IRI, EGD.*

Introduction

Liver transplantation (LT) represents the treatment of choice for end-stage liver disease. The shortage of transplant organs paved the way for the emergence of LDLT as a significant innovation in countries where the ever-increasing demand cannot be met by the scarce cadaveric graft pool or where cadaveric LT faces legislative, religious or cultural barriers.

Biochemical and hematological abnormalities observed in early graft dysfunction during the immediate post-transplant period have been associated with poorer graft outcomes. EGD is a manifestation of Graft IRI. In fact, several factors in the donor, recipient and operative technique, that are associated with poorer long-term outcomes, become already evident as soon as reperfusion of thegraft has occurred [1].Time-zero biopsies may predict adverse transplant outcomes. Severe IRI changes observed on time-zero biopsy may even herald early retransplantationneed [1]. Therefore, time zero biopsy assessment for IRI lends itself as an earlier and more accurate predictor of graft outcome than biochemical and hematological analysis.

The primary aim of this study was to evaluate the role of time-zero biopsies in predicting the EGD in LDLT.

Patients and Methods

Between January 2017 and September 2018, 72 patients underwent LDLT at both El-Manial Specialized Hospital andNHTMRI. The present study was conducted on 49 patients within our inclusion criteria. All grafts were harvested from adult living donors.

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Inclusion criteria:

Donors' age ranged from 18-55 years, body mass index (BMI) <30kg/m2with compatible ABO & Rh blood grouping. A percutaneous ultrasound guided liver biopsy was routinely performed for potential donors.

Recipients were evaluated preoperatively using the Child-Pugh score and MELD score. In cases with HCC, Milan criteria were followed in the selection of patients.

Exclusion criteria:

Patients with actual GRWR less than 0.8 or who developed small for size syndrome.

Back table

Grafts were perfused with cold HTK solution through the PV on the back table.

Time Zero biopsy of the recipients

Technique: 1.5 x 1.5 cm sub-capsular wedge biopsies were obtained immediately after reperfusion and biliary anastomosis i.e. practically after completion of liver transplant.

PreparationHematoxylin and eosin staining of the samples fixed in 10%buffered formalin and embedded in paraffin was performed.

Examination:All specimens were reviewed by two pathologists who were blind to the patients' data. Histopathologic changes were evaluated separately and recorded based on mutual agreement. Specimens were examined for the following changes: neutrophilic infiltration, hepatocyte necrosis, hepatocyte ballooning degeneration, steatosis, hemorrhage and cholestasis.

Definitions and grading of histopathological changes

Neutrophilicinfiltrationwas defined as the presence of neutrophils within sinusoids as single cells or clusters and graded as follows:

0: no sinusoidal neutrophils.

1: mild infiltration.

2: moderate infiltration.

3: severe infiltration [2].

Hepatocellular necrosis: was defined as the presence of apoptotic hepatocytes based on the morphological criteria of cell shrinkage, chromatin condensation, and acidophilic bodies, classified as:

No: no necrosis (grade 0) or occasional loss (grade 1)

Yes: focal necrosis (moderate; grade 2) or confluent necrosis (severe; grade 3) [2].

Ballooning degeneration: defined as hepatocyte swelling and the presence of vacuoles in the cytoplasm, graded as present or absent [3].

Macro-vesicular steatosis: defined as the presence of a single large droplet displacing the nucleus and categorized as follows [4]:

Negligible: 0% - 4%

Mild: 5% - 33%

Moderate: 34% - 66%

Severe: > 67%

Hepatocellular cholestasis: was considered as hepatocyte discoloration by brown pigmented material and graded as present or absent [4].

Interpretation of histopathological findings in Time zero biopsy:

1- Neutrophilic infiltration and Hepatocyte necrosis:

It has been shown repeatedly that the degree of neutrophilic infiltration and hepatocyte necrosis are the most consistent indicators of IRI, therefore we used these two parameters in our definition of the presence or absence of IRI

2- Subcapsular changes:

Surgical manipulation of the liver induces subcapsular injury and inflammation and may be misinterpreted as IRI.The sub capsular biopsy allowed the examination of the deeper parenchyma avoiding this misinterpretation.

3- Other changes:

Although the degree of steatosis was discerned as a factor impacting graft outcome, we did not consider it as an IRI change. Similarly, hepatocyte ballooning, hemorrhage and cholestasis were correlated with graft outcome but not considered as IRI.

Grading of IRI:

Nil IRI: scanty infiltration of single neutrophils within the sinusoids without hepatocyte loss.

Mild IRI: Mild neutrophilic infiltrate (predominantly of single cells) with or without occasional detachment of single hepatocytes from the basement membrane or acidophilic bodies.

Moderate IRI:Presence of clustered (>5) neutrophilsassociated with any degree of hepatocyte necrosis or focal hepatocyte necrosis with neutrophilic infiltration.

Severe IRI: confluent or zonal coagulative hepatocyte loss associated with neutrophilic inflammatory infiltrate[1].

No or mild changes were defined as negative for IRI and referred to as group 1 while moderate or severe changes were considered positive for IRI and referred to as group 2.

Graft outcome

EGD was defined as the presence of at least one of the subsequent criteria: serum bilirubin exceeding 171 mmol/L on postoperative day 7, ALT greater than 2000 U/mL within the first 7 days post operation and INR at least 1.6 on day 7, with patent vascular anastomoses.

Statistical methods

Data were coded and entered using the statistical package SPSS (Statistical Package for the Social Sciences) version 24. Data was summarized using mean, standard deviation, median, minimum and maximum in quantitative data and using frequency (count) and relative frequency (percentage) for categorical data. Comparisons between quantitative variables were done using the non-parametric Kruskal-Wallis and Mann-Whitney tests. For comparing categorical data, Chi square (2) test was performed. Exact test was used instead when the expected frequency is less than 5. P-values less than 0.05 were considered as statistically significant.

Results

Preoperative data

Forty-nine recipients; 41 males (83.7%) and 8 females (16.3%) with a mean age of 46.5 (SD± 10.37) and a mean BMI of 25.75 (SD ± 2.69 kg/m2) were enrolled in our study. Their mean MELD score was 16.87 (SD ± 2.98) and the preoperative GRWR was 1.02 (SD ±0.17).

As regards co-morbidities, 17(34.7%) suffered from diabetes while 3 (6.1%) had hypertension. HCV-related cirrhosis was the indication of liver transplantation in 30 (61.2%) patients, HCC in 10 (20.4%) and other causes in 9 (18.3%) patients.

In terms of age, gender, BMI, allograft steatosis, MELD score, comorbidities and indication for transplantation both groups were equivalent (table1)

Table (1) Pre-operative donor and recipient parameters

	Preoperative variables	**Group 1 n=35**	**Group 2 n=14**	**P value**
		Mean± SD	**Mean± SD**	
Donor data	**Age**(years)	29.06±5.74	28.29±5.99	0.69
	BMI	25.70±3.25	23.89±2.60	0.12
	Steatosis **5-10%** **Absent**	5(14.7%) 29(85.3%)	4(30.8%) 9(68.2%)	0.24

Recipient data	**Age**(years)	48.23±9.09	42.07±12.30	0.11
	BMI	25.66±2.43	25.97±3.33	0.71
	MELD	16.67±3.12	17.36±2.62	0.72
Cause of LTx	**HCV**	23(65.7%)	7(50.0%)	0.306
	HCC	6(17.1%)	4(28.6%)	
	Cryptogenic	3(8.6%)	1(7.1%)	
	Secondary biliary cirrhosis	0(0.0%)	1(7.1%)	
	Autoimmune	0(0.0%)	1(7.1%)	
	PBC	1(2.9%)	0(0.0%)	
DM	**Yes**	14(40.0%)	3(21.4%)	0.32
	No	21(60.0%)	11(78.6%)	
HTN	**Ye**	1(2.9%)	2(14.3%)	0.19
	No	34(97.1%)	12(85.7%)	

Histopathological findings in time-zero biopsies

As shown in table (2).

Time-zero biopsies revealed negative IRI in 35 allografts (71.4%) (Group 1) and positive IRI in 14 allografts (28.6%) (Group 2).

Effect of IRI on Graft Outcome

EGD occurred in a total of 12 patients.

Recipients with positive IRI showed a significant rise in serum total bilirubin, ALT and INR in days 5, 7, 30 post-operative days ($p < 0.05$) compared to those with negative IRI as shown in figure (1,2,3). EGD was significantly associated with IRI on biopsy, with 50% of the severe IRI group met the biochemical and hematological criteria for EGD within the first 7 days. (Table 3) seven out of 14 versus 5 out of 35

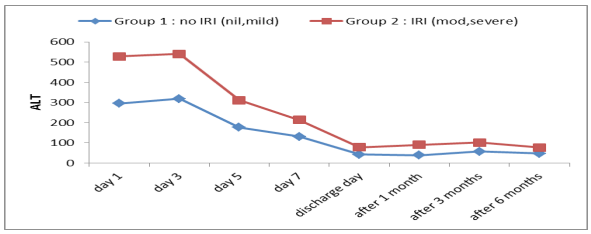
Other non-IRI changes; grades of steatosis, cholestasis, hemorrhage and ballooning had no significant effect on graft outcome. (table3).

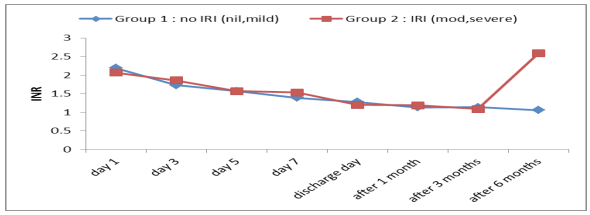
Table (2)Histopathological findings in time-zero biopsies

Histopathological finding		**Count (%)**
Hepatocyte necrosis	**Yes**	14(28.6%)
	No	35(71.4%)
Neutrophil infiltration	**No**	27(55.1%)
	Mild	19(38.8%)
	Moderate	3(6.1%)
	Severe	0(0%)
Steatosis	**Mild**	9 (18.3%)
	No	40(81.7%)
Cholestasis	**Yes**	8(16.3%)
	No	41(83.7%)
Hemorrhage	**Yes**	7(14.3%)
	No	42(85.7%)
Sub capsular hepatitis	**Yes**	28(57.1%)
	No	21(42.9%)
Ballooning	**Yes**	12(24.5%)
	No	37(75.5%)

Table (3): correlation between various zero biopsy changes with graft outcome

Histopathological changes Yes Count (%)		EGD		
		No	P value	
		Count (%)		
IRI changes	Y(group 2)	7(50.0%)	7(50.0%)	0.023
	N (group1)	5(14.3%)	30(85.7%)	
Cholestasis	Y	1(12.5%)	7(87.5%)	0.660
	N	11(26.8%)	30(73.2%)	
Hemorrhage	Y	4(57.1%)	3(42.9%)	0.051
	N	8(19.0%)	34(81.0%)	
Ballooning	Y	3(25.0%)	9(75.0%)	1
	N	9(24.3%)	28(75.7%)	
Steatosis	Y	2(22.2%)	7(77.8%)	1
	N	10(25%)	30(75%)	





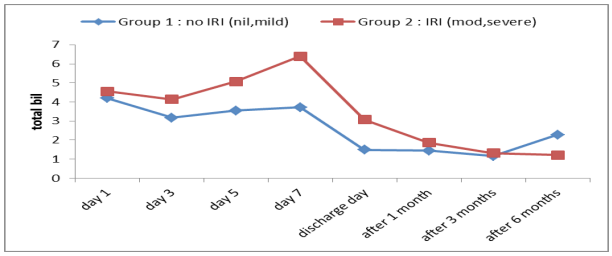


Figure (1, 2.3): comparison ALT, INR and total bilirubin results between both groups during early postoperative period.

Discussion

IRI represents a common complication of hepatic surgery and transplantation. Its impairment of liver function delays recovery and associated with increased morbidity and mortality. Hence, IRI may significantly affect clinical outcomes [1]. This created the need for an earlier and more precise predictor of IRI than the currently available biochemical and hematological parameters. Time-zero biopsies may fulfill this function. Yet, there is no available consensus as regards the value of time-zero biopsies as a predictor of EGD. In fact, several previous studies suggest that the IRI grading during time-zero biopsies significantly correlates with PNF, EGD, acute rejection, and biliary complications [2, 6, 7]. Yet, some other studies confirm this value of time-zero biopsies [8,9,10].

The aim of our work was to establish the value of time-zero biopsies as a reliable determinant of IRI and graft outcome.

In our series, we obtained subcapsular wedge biopsies instead of tru-cut needle biopsies to avoid bleeding although **Ali et al.**[1] preferred Tru-cut specimens because surgical manipulation of the liver may cause subcapsular injury and inflammation which may be confused with IRI. To avoid such misinterpretation, only the deeper parenchyma of specimens was examined. Superficial subcapsularneutrophilic infiltration was designated as a sign of surgical hepatitis and not considered as IRI. **Kocbiyiket al.**[7] used the same technique.

The 49 specimenswere examined by 2 histopathologists.In fact, correlating these findings with EGD showed that no histopathological criterion reached a statistically significant p value except neutrophilic infiltrate and hepatocyte necrosis ($p = 0.023$). This finding confirms the validity of our definition of IRI in which we considered only these 2 factors for the grading of IRI. This is largely in concordance with several other studies [1, 2,7,11] which concluded that the degree of IRI in the post-reperfusion biopsies is mainly reflected by the degree of neutrophilic infiltrate and hepatocyte necrosis.

Abraham et al.[6] suggested hepatocyte swelling as a predictor of moderate to severe rejection. He stated that centrilobular hemorrhage, hepatocyte swelling, and centrilobular necrosis can be regarded as important predictors of primary graft failure. Yet, **Shahbaziet al.**[4] found that ballooning degeneration, bilirubinostasis, portal congestion and cholestasis showed no significant

correlation with early postoperative outcome.

In our series, 14 cases (28.6%) revealed criteria of positivity for IRI i.e. moderate or severe changes while 35 (71.4%) specimens were free or demonstrated mild changes and considered negative for IRI. We analyzed the effect of IRI positivity on graft outcome. For that purpose, hepatic enzyme pattern and synthetic liver functions were compared in both groups. We found that the patients in the positive IRI group experienced a significant rise in total and direct bilirubin, ALT, AST and INR. The elevation of liver enzymes (ALT, AST), the cholestatic pattern (Bilirubin) and the impairment of synthetic function (INR) reached statistical significance on POD 5, 7 and after 1 month of transplantation. Actually, 7 (50%) out of the 14 cases positive for IRI met the biochemical and hematological criteria for EGD within the first 7 days. In the negative IRI group comprising 35 patients only 5 (14.3%) patients developed diagnostic criteria for EGD which was statistically significant.

Ali et al.[1]reportthat EGD occurred in 21.7% of their cohortandwas significantly associated with IRI. Similar to our study, more than half of the group displaying severe IRI met the laboratory criteria for EGD within the first 7 days. They conclude that IRI represents one of the most important causes of EGD.

The biochemical profile abnormalities faced in our study are consistent with **Gaffey et al.**[11]and**Shahbazi et al.**[4]who investigated the degree of correlation between zero biopsy findings and early postoperative laboratory parameters.Shahbazi et al. [4] found that there was a significant correlation between the presence of apoptotic bodies indicating hepatic necrosis and transaminases' elevation in the early post-transplant period. They concluded that these changes were a reflection of hepatocellularinjury caused by warm ischemia. On the other hand, they demonstrated a significant correlation between neutrophilic aggregates and an elevated total bilirubin which they considered a reflection of endothelial cell damage caused by cold ischemia. They conclude that apoptotic bodies found on zero biopsy represents a surrogate marker of IRI caused by warm ischemia associated with hepatocellular alterations while neutrophilic aggregates reflect IRI caused by cold ischemia presenting with a cholestatic pattern on liver function tests. Several other studies suggest time-zero biopsy IRI grading as a predictor of PNF, acute rejection, EGD, and biliary complications[2, 6, 7].

Conversely, there are several studies that did not demonstrate any significant association between IRI grade and early graft outcome [8,9,10].

As a result of our analysis a key question arises: Is time-zero biopsy justifiable in every hepatic transplant?

Our analysis demonstrates that moderate IRI influences graft outcomes, whereas milder forms have no severe impact, but why is not clear. Presumably, regardless of the particular combination of donor and recipient factors that trigger an IRI response, if severe enough, IRI causes either parenchymal or biliary liver damage that is not recoverable and results in progressive graft damage. In contrast, the damage associated with milder forms of IRI is reversible. The precise pathway is incompletely understood.

Notwithstanding, our results highlight that it is possible to identify those patients with more severe IRI early and thus those patients identified may benefit from therapies that decrease the consequences of IRI. Moreover, it might explain prolonged post-OLT cholestasis and avoid unwarranted treatment of suspected rejection.

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Ethical Clearance: Cleared by the ethical committee of general surgery department faculty of medicine Cairo University

Conflict of Interest: No

List of Abbreviations

Abb.	Full term
ALT	*Alanine Transaminase*
AST	*Aspartate Transaminase*
CIT	*Cold Ischemia Time*
EGD	*Early Graft Dysfunction*
GRWR	*Graft-to-Recipient Weight Ratio*
HTK	*Histidine-Tryptophan-Ketoglutarate*
INR	*International Normalized Ratio*
IRI	*Ischemia Reperfusion Injury*
LDLT	*Living Donor Liver Transplantation*

MELD *Model for End-Stage Liver Disease*

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Thoracoscopic Decortication versus Open Decortication in Chronic Empyema

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Abstract

Background: Many recent reports have encouraged the use of VATS in the management stage II empyema. The technical difficulty caused by pleural adhesions, is not considered an obstacle hindering the procedure anymore. Furthermore, thoracic surgeons around the world are increasingly trying to manage patients with stage III empyema solely using VATS. This current study aims to compare the results of surgical decortication for empyema using the VATS and thoracotomy approaches. Patients and Methods: This prospective comparative non-randomized clinical study was carried out in the Department of Cardiothoracic Surgery of Kasr el Ainy faculty of medicine Cairo University from September 2016 till May 2018. The study encompassed 60 patients who had empyema and scheduled for surgery. The study patients were divided into 2 matching groups. Group A (thoracoscopic decortication), and group B (open decortication). All were studied for early outcome. Results: In the VATS group (group A) the conversion rate to open thoracotomy was 33.3%. The mean operative time was similar in to the thoracotomy group (group B). The successful achievement of fully expanded lungs was higher in the VATS group (93.3% vs 80%, p=0.129). VATS also showed less pain (2.27 ± 1.64 vs 4.27 ± 2.05, p=0.001*), less wound complications (0% vs 13.3%, p=0.038*), and shorter hospital stay (5.27 ± 3.90 vs 8.07 ± 5.36, p=0.003*). Conclusion: We concluded that VATS is safely feasible in the organized, late stage III pleural empyema, and thus should be considered as the preferred approach when addressing chronic empyema, as long as complete re-expansion of the lung can be achieved. Moreover, conversion to the open technique should be done whenever necessary, to avoid undesired postoperative morbidity.

Keywords: *Empyema, VATS, Decortication.*

Introduction

Proper therapy of pleural infections is stage-dependent with surgery being considered whenever antimicrobial therapy and fluid drainage solely do not achieve adequate infection control and re-expansion of the lung [1]

In intermediate stage II empyema, it has been appraised controversially, if surgical treatment is more efficient than prolonged drainage therapy with/out intra-pleural fibrinolysis [2,3].

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However, it is widely accepted, that VATS is the ideal option, once decision for surgery has been taken [2].

VATS

For evacuation of loculated fluid components and for debridement of the pleural cavity has proved to be safe and feasible with widely acceptable peri-operative results and long-term outcomes at least equivalent when compared to the open approach by thoracotomy in an intermediate stage II pleural empyema or even better [2,3].

In contrast, in late stage III empyema, the need for surgery to control the disease is undebatable; however, it is the surgical approach (thoracotomy versus VATS) which has remained disputable. Till recent years, the feasibility of complete decortication of the lung by means of VATS has been questionable, even by experienced thoracic surgeons. In fact, decortication of the visceral

pleura allowing the lung to fill up the pleural cavity completely is the by far most important achievement sought in empyema surgery. So far, the evidence for the feasibility of the VATS approach in organized stage III pleural empyema is still doubtful.[1,2].

The majority of studies include mixed populations with both stage II and stage III pleural empyema, only the vast minority described a study group of the isolated late organized stage (III) pleural empyema. [2,4,5,,6].

Since the advancement of pleural empyema from an earlier to a later stage is fluent, stratification by stage is subjective, depending on the surgeon's judgment and experience [1].

Patients and Method

This prospective comparative non-randomized clinical study was carried out in the Department of Cardiothoracic Surgery of Kasr Alainy faculty of medicine Cairo University from September 2016 till May 2018 after obtaining the approval of the local ethical committee and written informed patient consent. The study encompassed 60 patients who had pleural space infection (empyema) and scheduled for surgical intervention. The study patients were divided into 2 matching groups. Group A (thoracoscopic decortication), group B (open decortication) and group. All were studied for early postoperative outcome. Patients will be evaluated preoperatively and postoperatively according to inclusion-exclusion criteria.

Inclusion criteria:

All Patients with empyema requiring surgical intervention operated by Cairo university medical staff members.

Exclusion Criteria

Patients who responded to tube thoracostomy treatment with or without fibrinolytic agents; Patients with very poor general condition, or not fit for surgery; Associated or post-resection empyema

Patients were divided into 2 groups according to the procedure scheduled for (Open or thoracoscopy). All of patients underwent surgery for empyema: Group A: 30 patients underwent thoracoscopic decortication for stage III. (the cases that were converted to open thoracotomy were excluded from the group) Group B: 30 patients underwent open surgical decortication for stage III. Comparative study was done between Group A and group B to evaluate the minimal invasive surgery in management of stage III.

A) Preoperative Parameters:

1) History taking: A detailed history was taken from each patient including his/her age, symptoms of the disease (including fever, dyspnea, cough and chest pain), and duration of the symptoms and other comorbidities. 2) Clinical Examination: Routine general examination and local chest examination including inspection, palpation, percussion and auscultation was done in all patients. 3) Investigations: Laboratory Investigations in the form of Routine preoperative labs including hemoglobin, coagulation profile, liver and kidney function tests, Total leucocytic count (TLC), C-reactive protein (CRP) and Culture and sensitivity for pleural fluid and/or sputum, 12 lead electrocardiogram to evaluate any present ischemia or anomalies in rate or rhythm, Radiological Examination in the form of plain chest x-ray (PA and lateral views) erect position after full inspiration. Computed tomography (CT) on the chest and other investigations needed for individual cases related to comorbidities. Preoperative Counselling, in the preoperative visit prior to surgery, a brief explanation of the steps of the surgery, with possible early and late postoperative complications were explained to the patients.

B) Operative:

Choice of operation (VATS or Open), operative time (minutes). Whole 3 ports VATS was utilized for group A.

C) Postoperative:

Clinical and radiological assessment of lung expansion using chest X-ray and/or computed tomography (CT) scans (N.B. Procedure success: Our criteria for successful outcome was: A fully re-expanded lung without persistent space, clear drainage of <100 ml/24 h, and cessation of air leak); Postoperative pain: used the numeric rating scale (NRS) which is a segmented numeric version of the visual analog scale (VAS) in which a respondent selects a whole number (0–10 integers) that best reflects the intensity of their pain (7); Postoperative need for mechanical ventilation Postoperative need for Intensive care unit (ICU); Duration of chest tube (days); Wound complications; Postoperative hospital stay: calculated the postoperative

stay of the patient in our department to recover from surgery in days; Mortality: Described as in hospital or 30- days within surgery.

Results

Regarding preoperative analysis, the two groups we reasonably matched regarding the age, sex, prevalence of the comorbidities and the diseased side.

In both groups the majority of the cases, pneumonia was the leading cause of empyema, in the form of 24 cases (80%) and 22 cases (73.3%) in group A and group B respectively.

However, the remaining 6 (20%) patients in group A were caused by infected posttraumatic hemothorax while in Group B only 2 (6.7%) cases were posttraumatic, 2 cases (6.7%) were caused by spread from sub-phrenic abscess, and 4 cases (13.3%) due to lung abscess. This demonstrates a significant statistical difference (p=0.044*). Open technique was selected in these cases specifically to deal with underlying pathologies expected to be found easily.

Regarding the symptoms of the disease, 20 patients (66.7%) in each group had constitutional symptoms. Also, 28 (93.3%) patients in group A complained of dyspnea or cough while 2 cases (6.7%) complained only of constitutional symptoms and discovered the pathology upon suspicion by radiological investigations. In group B all patients (100%) complained of dyspnea, chest pain and/or cough. More importantly the mean duration of the symptoms was 48.87 ± 19.43 days in group A while in group B the mean duration was 45.53±31.49 days. (p=0.164) When we observed the results of our patients' cultures we could identify pathogens only in 14 (46.7%) and 10 (33.3%) in group A and group B respectively. The most commonly isolated pathogen in group A was Klebsiella (20%), followed by MRSA (13.3%), while in group B Klebsiella and pseudomonas were equally leading (13.3%). the operative times in our study, showed no significant difference between the two groups. In our VATS decortication group (A), 15 patients (33.3%) needed to be converted to open procedure (out of 45 patients) (12 patients to facilitate more thorough decortication, 2 patients for bleeding difficult to control with such a limited access, and in one case due to limited vision).

Observing postoperative pain in our 2 groups using the NRS, Group A had the upper hand showing significantly less pain (2.27 ± 1.64) than group B (4.27 ± 2.05). (p=0.001).

Regarding wound complications, events occurred in 4 patients in group B (13.3%), compared to none in group A (p=0.038). most of the patients in both groups had successful surgery achieving fully expanded lungs (93.3% in group A and 80% in group B), with exception of 2 patients (6.7%) had residual pouches in group A, and 6 patients (20%) in group B. Yet there was no significant difference (p=0.129). The patients with such a morbidity of residual loculations, partial collapse and persistent air leak were discharged with an empyema tube with a one-way valve for periodic reassessment and management later. The postoperative hospital stay showed a statistically significant variation between group A (5.27 ± 3.90) and group B (8.07 ± 5.36). (p=0.003). The prolonged air leak (more than 7 days) was one of the most common complications of open decortication, and significantly related to the longer chest tube duration, and postoperative hospital stay.

Table 1: Preoperative feature of the 2 studied groups:

	Group A (n=30)	**Group B (n= 30)**	**P value**
Age (yrs.)	35.67 ± 10.91	39.13 ± 17.86	0.496
Gender			
Female	6 (20%)	10 (33.3%)	0.243
Male	24 (80%)	20 (66.7%)	
Etiology			
PPE	24 (80.0%)	22 (73.3%)	0.044*
Trauma	6 (20.0%)	2 (6.7%)	
Subphrenic abscess	0 (0.0%)	2 (6.7%)	
lung abscess	0 (0.0%)	4 (13.3%)	
Fever	20 (66.7%)	20 (66.7%)	1.000
Dyspnea	28 (93.3%)	30 (100.0%)	0.150

Cont... **Table 1: Preoperative feature of the 2 studied groups:**

Duration of symptoms	48.87 ± 19.43	45.53±31.49	0.164
TLC	12.83 ± 3.04	12.51 ± 4.31	0.744
CRP	138.13 ± 46.76	136.07 ± 53.55	0.359
Side			
Left	10 (33.3%)	16 (53.3%)	0.118
Right	20 (66.7%)	14 (46.7%)	
Previous drainage	20 (66.7%)	26 (86.7%)	0.067
Comorbidities	11 (36.7%)	12 (40.0%)	0.791
Operative time (minutes)	173.93 ± 57.95	179.00 ± 35.66	0.496

Table 2: Post-operative data of the studied groups:

	Group A (n= 30)	**Group B (n= 30)**	**P value**
ICU admission	6 (20.0%)	12 (40.0%)	0.091
Mechanical Ventilation	0 (0.0%)	4 (13.3%)	0.038*
Fever	26 (86.7%)	26 (86.7%)	1.000
Dyspnea	28 (93.3%)	26 (86.7%)	0.389
Pain	2.27 ± 1.64	4.27 ± 2.05	0.001*
Drop in CRP (mg/L)	29.53 ± 17.05	24.13 ± 12.77	0.225
Postoperative TLC	8.38 ± 1.90	9.76 ± 3.08	0.066
Radiography			
Fully expanded lung	28 (93.3%)	24 (80.0%)	0.129
Partial lung collapse	2 (6.7%)	6 (20.0%)	
Chest tube duration (days)	4.13 ± 3.23	5.93 ± 3.61	0.002*
Hospital stay(days)	5.27 ± 3.90	8.07 ± 5.36	0.003*
Wound complications	0 (0.0%)	4 (13.3%)	0.038*

Discussion

Regarding preoperative analysis, the two groups were reasonably matched regarding the age, sex, prevalence of the comorbidities and the diseased side.

The most commonly isolated pathogen in group A was Klebsiella (20%), while in group B Klebsiella and pseudomonas were equally leading (13.3%). However, the results of these cultures cannot reflect the main pathogen(s) responsible for the pleural infections in the majority of cases. As the early use of antimicrobial therapy may render the cultures negative giving us the falsely negative results. Moreover, the positive cultures may highlight the highly virulent drug resistant strains appearing in cultures in spite of using antibiotics empirically.

When we observed the operative times in our study, there was no significant difference between the two groups, other studies also showed similar results, and found no significant difference between the 2 groups. [8,9].

In our VATS decortication group (A), 15 patients (33.3%) needed to be converted to open procedure other studies that focused on thoracoscopy in stage III, showed conversion rates close to ours, for example Shahin et al, conversion rate was 19%, Lardinois et al, 44%, and Waller et al, was 41.7%. [5,10,11]. Moreover, most recent studies expressed low conversion rates in stage III empyema, as 4.5 % [9] and 9.2% [12], denoting that these institutes have passed the learning curve. The aggressive pathology in our community, highly virulent organisms and most importantly the late presentation of our patients (might be due to the poor socioeconomic status), and the late diagnosis and referrals from the treating physicians, render the empyema showing very well-organized thick peels, very hard loculations and adhesions. This makes it hard sometimes to handle with minimally invasive

technique and might attribute to our higher conversion rates.

Group A had the upper hand showing significantly less postoperative pain This result confirms the superiority of VATS over thoracotomy regarding the postoperative pain, which is one of the pillars of our study. Other studies conforming with our results included Chan et al. (p=0.041) and Cardillo et al. (p<0.001). ([13],[14]). Less postoperative pain, entails less postoperative pain management (including drugs, intercostal blocks or even epidural analgesia), and facilitates almost pain free chest exercise which assists lung re-expansion and early recovery, and consequently shorter hospital stay.

Concerning the direct outcome of the operation, and the assessment of the postoperative lung expansion, most of the patients in both groups had successful surgery achieving fully expanded lungs. The patients with residual loculations, partial collapse and persistent air leak were discharged with an empyema tube with a one-way valve for periodic reassessment and management later.

Our results regarding the VATS group are close to Drain et al, studying VATS in advanced empyema, chest radiography at 6 weeks after surgery confirmed full lung expansion and resolution of pleural collection in 94% of patients[4]. Similarly, Marks and colleagues, reported that the success rate in their VATS group was 95.1% (15). Moreover, Chung and colleagues, reported a success rate of 92.9 %., [16].

The postoperative hospital stay showed a statistically significant variation between the 2 groups(p=0.003). The prolonged air leak (more than 7 days) was the most common complication of open decortication, and significantly related to the longer chest tube duration, and postoperative hospital stay.

In a meta-analysis done on similar studies comparing VATS and open techniques in management of empyema, results expressed also significant difference regarding both, chest tube duration and postoperative hospital stay (p=0.004).[17].

Conclusion

From Based on the results of our present study, we can conclude that VATS is safely feasible in organized, late stage III pleural empyema, and thus should be considered as the preferred approach when addressing chronic empyema, as long as complete re-expansion of the lung can be achieved. Moreover, conversion to the open technique should be done whenever necessary, to avoid undesired postoperative morbidity. Conversion is considered in most of the institutions as a complementary procedure and not failure of VATS.

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No Conflict of Interest

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Effect of Repetitive Transcranial Magnetic Stimulation on Motor Functions in Multiple Sclerosis Patients: A Randomized Controlled Trial

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Abstract

Background: Multiple sclerosis (MS) is a chronic disease in the central nervous system which causes a number of physical symptoms including impairments of motor functions. Purpose: to investigate the effect of low frequency repetitive transcranial magnetic stimulation (LF-rTMS) on motor functions in multiple sclerosis patients. Methods: Thirty medically stable remitting relapsing MS patients aged between 20-40 years were randomly assigned into two groups ("A" study and "B" control). Both groups were treated with a selected physical therapy program consisting of graduated active exercises, balance and gait training, but only group "A" received (LF-rTMS) ipsilateral to the weaker lower limb, five times per week for two consecutive weeks. Isokinetic dynamometer measurements including peak torque (PT), peak torque/ body weight (PT/BW), time to peak torque (TPT), total work (TW) and average power (AP) of knee flexors and extensors plus lower extremity functional performance were measured and compared for both groups before and after intervention using biodex isokinetic dynamometer and Five Repetition Sit to Stand Test (5STS) respectively. Results: Comparison of the mean values of isokinetic dynamometer measurements post-treatment between both groups showed significant difference of (PT, PT/BW, TPT) in favor of group A($P \leq 0.05$) but no considerable variations were reported among both groups concerning (TW, AP) ($P > 0.05$). Comparison of the mean values of (5STS) post-treatment between both groups showed significant difference in favor of group A ($P \leq 0.05$). Correlation results revealed significant correlation between the tested Isokinetic dynamometer measurements and (5STS). Conclusion: low frequency repetitive transcranial magnetic stimulation could improve motor functions and subsequent functional performance in multiple sclerosis patients.

Key words: *Transcranial magnetic stimulation, motor functions, functional performance*

Introduction

Multiple sclerosis (MS) is a predominant disease of the central nervous system (CNS). This disease has a diffusion of 1 per 1000 persons in the United States.

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There are a predestined 2.5 million persons alive with MS worldwide and about 400 000 cases in the United States [1].More recent epidemiological research observed that a direction of greater diffusion and happening of MS worldwide [2].

Multiple sclerosis generally starting with attacks of multifocal inflammation in the CNS and this is properties of relapsing-remitting MS (RRMS). The inflammation can cause demyelination and transaction of axons. There are neurodegenerative processes which lead to neuroaxonal loss (ie, atrophy) that can happen at the beginning of the disease activity, but are more

distinguished through the final path of the disease [3,4].

The central nervous system damage caused by multiple sclerosis accumulates over time and results in the progression of neurological disability [5].An early symptom of MS is weakness on one side of the body, particularly in the lower limbs [6]. Due to this unilateral weakness, people with MS (PwMS) often have a more and less-affected side of the body which lead to a different forms of asymmetries in the measurements of force, energy, muscle activity, and limb loading [7-10].

Repetitive transcranial magnetic stimulation (rTMS) is a process of noninvasive amendment of brain activity, greatly utilized in different psychiatric and neurologic cases. It's beneficial effects due to activation of brain changes in disease-specific cortical areas, which is controlled by groups of magnetic pulses that penetrate brain tissue and depolarize the affected neurons [11]. Repetitive transcranial magnetic stimulation is competent in bringing long-lasting cumulative plastic alterations of cortical mission not only in the stimulated cortex but also in the distant interconnected regions that outlast the stimulation duration [12].

Repetitive transcranial magnetic stimulation can cause alterations in the structural and molecular characteristics of neurons. Repetitive transcranial magnetic stimulation can cause alterations interfering with the ability of neurons to induce distinct forms of plasticity beyond the stimulation duration[13,14] . Evidence is increasing around the rTMS induced amendment of cerebral blood flow, glucose metabolism, and neuronal excitability in the stimulated region in addition to the interconnected brain areas. After-influences of rTMS may appear as alterations in synaptic effectiveness which called long term potentiation (LTP) and long-term depression (LTD). The equilibrium among "LTP/LTD" phenomena underlie number of processes happening in the brain as education and the memory [15].

This study was designed to investigate the effect of low frequency repetitive transcranial magnetic stimulation (LF-rTMS) on motor functions in multiple sclerosis patients.

Materials and Method

Area of study and sampling

The study used an open labeled, randomized controlled design. Intervention procedures for the enrolled patients consisted of five consecutive days per week for two weeks. Each patient in the study group(GA) was treated with(LF-rTMS)on motor cortex(hot spot) ipsilateral to the most affected lower limb(weaker lower limb) plus selected physical therapy program (Graduated active exercises, balance and gait training) while each patient in the control group (GB) was treated only with the same physical therapy program.

Thirty patients with MS from both sexes were recruited with the following criteria prior to their enrolment in the study between October 2018 to April 2019: definite diagnosis of RRMS fulfilled the Revised McDonald's criteria for diagnosis of MS 2010 [16], score of 2.0 to 4.0 on the Expanded Disability Status Scale (EDSS), age ranges from 20 – 40 years old, all patients are in the remission period, last attack occurs at least since two months, all patients are receiving the same medical treatment, patients are medically stable, ability to understand and follow instructions, Patients are free from any secondary complications such as contractures and deformities. This study was conducted in the transcranial magnetic lab of the Clinical Neurophysiology Unit, the Outpatient Physical Therapy clinic and Department 26, Faculty of Medicine, Cairo University.

Isokinetic dynamometer measurements:

All the patients were evaluated by using Biodex system III (Biodex, Shirley, NY) as regarding peak torque (PT), peak torque/ body weight (PT/BW), time to peak torque (TPT), total work (TW) and average power (AP) of knee flexors and extensors for the weaker lower limb before and after the treatment period. From sitting position with 90º hip and knee flexion the trunk, pelvis and thighs were stabilized using straps, in accordance with the equipment instructions. The rotational axis of the dynamometer was aligned with the transverse knee-joint axis and attached to the lower leg by a length adjustable lever arm three cm proximal to medial malleolus. After a standardized instruction (to contract as strongly and fast as possible) and two familiarization attempts, the subjects performed five maximal isokinetic concentric contractions at angular velocity (120°/second) for the knee extensors and flexors from 90º knee flexion to full extension(0º) and vice versa respectively.

5 repetition Sit to stand test (5STS):

The 5STS test is a measure of the time taken to complete five repetitions of the STS movement and it's a valid measure of lower extremity muscle strength of the

most affected leg and balance performance in patients with MS[17].The assessor explained how the participant should move from a sitting towards a standing position five times and demonstrate the test to the patients practically. From sitting position on standard chair with both arms crossed against the chest, the patients were asked to stand up and sitting down as fast as possible and the examiner using a stop watch to calculate the time elapsed to complete the five repetitions. The tests should be performed as fast as possible and two attempts separated by a 3 min break were given and the faster of the two attempts was used.

LF-rTMS intervention procedures:

The Magstim Rapid2 magnetic stimulator system (Model P/N 3576-23-09, Magstim Company, USA) was used to deliver 1-Hz stimulation according to current safety recommendations at 90% of the resting motor threshold (RMT) to the "hot spot" of the primary motor cortex (M1) corresponding to the leg area (0 to 2 cm lateral to the vertex) in the ipsilateral hemisphere to the weaker lower limb via a 70-mm figure- 8 coil. Each rTMS session consisted of 900 pulses. Determination of the (RMT) was done by visual observation of muscle twitch [18].

Statistical Analysis

The obtained data were collected and statistically analyzed using the statistical package SPSS version 24. Paired t-test was used for comparison of means pre and post treatment within each group. Unpaired t-test for comparison of means pre and post treatment between the two groups. Chi square ($\chi 2$) test was used for comparison of gender and Mann-Whitney test was used for comparison of EDSS between the two groups. Spearman correlation coefficient was used to correlate percent of improvement between variables in study group. Finally,($P \leq 0.05$)was considered significant.

Results

Patients' demographics and clinical characteristics

The results of the current study revealed no significant differences between both groups in patients' demographics and clinical characteristics regarding the age, weight, height, body mass index (BMI), EDSS and gender ($P > 0.05$) (Table 1).

Table (1): Patients' demographics and clinical characteristics

Variable		Study group	Control group	P- value
Age (years) (Mean±SD)		32.20± 6.72	31.13±7.32	0.6807
Weight(kg) (Mean±SD)		66.07±9.58	71.47±11.99	0.1839
Height (m2) (Mean±SD)		165.9±5.54	168±5.916	0.3316
BMI (kg/m2) (Mean±SD)		24.05±3.66	25.32±3.98	0.3701
Sex	Male (N(%))	5(33.3%)	7(46.67%)	0.456
	Female (N(%))	10(66.7%)	8(53.33%)	
EDSS (Median)IQR))		2(1)	3(2)	0.6558

BMI: Body mass index, SD: standard deviation, IQR: interquartile range, P: probability, $P < 0.05$: Non-significant.

Isokinetic dynamometer findings for knee flexors and extensors:

The mean values of isokinetic dynamometer parameters (PT, PT/BW, TPT, TW, AP) pre-treatment in (GA) and (GB) showed insignificant difference ($P > 0.05$). Comparison of the mean values of isokinetic dynamometer parameters (PT, PT/BW, TPT, TW, AP) post-treatment between groups A and B showed significant difference of (PT, PT/BW, TPT) ($P \leq 0.05$) but no considerable variations were reported among both groups concerning (TW, AP) ($P > 0.05$) (Table2), (Table3).

Table (2): Isokinetic dynamometer findings for knee flexors:

Knee flexors	Pre treatment				Post treatment			
	Study group (Mean±SD)	Control group (Mean±SD)	t-value	P-value	Study group (Mean±SD)	Control group (Mean±SD)	t-value	P-value
Peak Torque	19.67±5.038	19.53±9.724	0.04715	0.9627	31.93±9.699	24.47±8.991	2.187	0.0373*
P.T/B.W	29.4±9.84	27.87±11.22	0.398	0.6937	43.2±14.91	31.07±10.75	2.556	0.0163*
Time to P.T	341.3±153.9	364±165.7	0.3882	0.7008	214.0±51.93	281.3±88.95	2.532	0.0172*
Total Work	62.67±20.05	54.07±15.46	1.316	0.1989	95.27±37.51	74.13±24.83	1.82	0.0795
Average Power	15.87±3.796	17.00±6.601	0.5764	0.5689	29.2±13.41	22.33±5.066	1.855	0.0742

SD: standard deviation, *(P ≤0.05): Significant.

5 repetitions Sit to stand test (5STS):

The mean values of (5STS) pre-treatment in study and control groups were (15.5±1.803 and 15.93± 2.086 seconds) respectively and There was no significant difference (P =0.5476). The mean values of (5STS) post-treatment in study and control groups were (12.67±1.566 and 14.13±1.457seconds) respectively and There was significant difference (P =0.0129).

The correlation between percent of improvement of knee flexors and extensors Isokinetic variables and (5STS) in study group (GA):

The value of the Spearman correlation coefficient (ρ) between percent of improvement in Isokinetic variable (TPT) and (5STS) revealed significant positive correlation. The value of the Spearman correlation coefficient (ρ) between percent of improvement in Isokinetic variables (PT,PT/BW,TW, AP) and (5STS) revealed significant negative correlation (Table4).

Table (3): Isokinetic dynamometer findings for knee extensors:

Knee extensors	Pre treatment				Post treatment			
	Study group (Mean±SD)	Control group (Mean±SD)	t-value	P-value	Study group (Mean±SD)	Control group (Mean±SD)	t-value	P-value
Peak Torque	24.73±11.88	26.8±9.821	0.519	0.6076	42.8±13.51	33.4±7.119	2.384	0.0242*
P.T/B.W	39.07±17.15	43.93±18.98	0.737	0.4674	67.47±20.07	52±11.63	2.583	0.0153*
Time to P.T	347.3±98.09	322±117.6	0.641	0.5269	248±50.88	297.3±59.58	2.439	0.0213*
Total Work	75.2±32.83	68±22.53	0.701	0.4895	148.7±47.1	116.5±50.02	1.811	0.0808
Average Power	17.4±7.917	21.27±8.988	1.25	0.2215	36.67±14.41	29.2±9.556	1.672	0.1056

SD: standard deviation, *(P ≤0.05): Significant.

Table (4): The correlation between percent of improvement of knee flexors and extensors Isokinetic variables and (5STS) in study group (GA):

		5STS TEST	
		ρ	P-value
Knee flexors	Peak Torque	-0.631	0.0119*
	P.T/B.W	-0.6241	0.0135*
	Time to P.T	0.7561	0.0016*
	Total Work	-0.5901	0.0206*
	Average Power	-0.6859	0.005*
Knee extensors	Peak Torque	-0.631	0.0124*
	P.T/B.W	-0.7302	0.0024*
	Time to P.T	0.8795	0.0001*
	Total Work	-0.5419	0.0352*
	Average Power	-0.6655	0.0074*

Discussion and Conclusion

In the current study EDSS was used as an inclusion criteria to assess, classify, describe the severity and progression of the condition in PwMS, Its suitable to monitor disease progression and considered the most widely used tool to measure disease outcomes in clinical trials [19].

Isokinetic dynamometry is used in this study which is an objective and reliable tool for assessing muscle strength in PwMS. Muscle strength in these patients is impaired compared to healthy controls, particularly when performing moderate to fast concentric contractions [20].

Expanded disability status scale scores between 2.0 and 4.0 and all patients have the ability to understand and follow instructions were an important parts of the patients' selection criteria to ensure that all patients had the physical and cognitive prerequisites to perform isokinetic dynamometer testing procedures.

Application of LF-rTMS on the primary motor "hotspot" of the ipsilateral hemisphere to the weaker lower limb in multiple sclerosis patients in this study revealed significant improvement of muscle strength of knee flexors and extensors represented by isokinetic dynamometer measurements (PT, PT/BW,TPT) and functional performance represented by 5STS test time in study group(GA) compared to control group(GB). This findings might be due to the inhibitory effect of the LF-rTMS exerted upon the excited less affected hemisphere, that consequently could regain the cortical balance between both hemispheres and facilitation of beneficial functional reorganization in the most affected hemisphere. These findings agree with number of previous studies [21,22,23].

There was a significant correlation between percent of improvement of lower limb Isokinetic variables(PT, PT/BW,TPT,TW,AP) and (5STS) in the study group which might represent the improved muscle strength parameters and the subsequent improvement of functional performance and its reflection on activities of daily living. These findings agree with number of previous studies [17,24].

Further studies are needed to investigate the long term effect LFrTMS on motor functions in RRMS also to precisely identify the mechanism of its efficacy, neuroimaging modalities such as diffusion spectrum imaging or functional magnetic resonance imaging might be used.

The current study revealed that Lf-rTMS could improve motor functions and subsequent functional performance and activities of daily living in multiple sclerosis patients.

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Ethical Clearance: All procedures were in accordance with the Declaration of Helsinki and were approved by the Cairo university faculty of physical therapy Research Ethical Committee with registration number (P.T.REC/012/001643). Prior to patient recruitment to the study a written informed consent was acquired. This study was registered in the Pan African Clinical Trials Registry (PACTR201907475143673).

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Subtalar Arthroereisis in Treatment of Pediatric Flexible Flat Foot Using Subtalar Sinus Tarsi Implants

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Abstract

This study aimed at evaluating the efficacy and safety of arthroereisis of subtalar joint using subtalar sinus tarsi implant in the cure of flexible flatfoot in pediatric population. Materials and methods: A prospective case series conducted on 30 feet with flexible flatfoot deformity. Their follow up was for 10 to 20 (15±3.5) months. Clinical assessment was done using scoring system (AOFAS), Radiological assessment was done using TNA& TMA to asses talonavicular coverage and talar first metatarsal angle. Results: The mean functional (AOFAS) Ankle-Hind foot score improved from 64.3±8.26 (43-77) preoperatively to 89.23±5.41 (77-98) postoperatively at last follow up (P value<0.001) using paired t-test as a significance test for evaluation of pre and post-operative AOFAS score. Our results showed median decrease in TMA is 15º (range: 4º to 29º) preoperative to 4º (range : 0º to 17º) at the final follow-up, while TNA showed median decrease from 18º (range : 12º to 45º) preoperative to 5º(range: 1ºto 44º) at the final follow up. The average decrease in both angles was statistically significant (P<0.001). Post-operative complications were detected in 5 patients (16.6%). Two patients (6.6%) developed subclinical infection.Two patients (6.6%) developed severe pain at sinus tarsi (sinus tarsitis) following surgery. One patient (3.3%) developed reactional synovitis followed by loosening of the implant and then extrusion after 3 months Debridement and reinsertion of smaller sized implant have been done. Conclusion: Subtalar arthroereisis using subtalar arthroereisis implant is suitable for the management of flexible, mild to moderate planovalgus foot deformity.The practice can be carried out in arrangement with other surgical procedures for the adjustment of severe cases.

Key Words: Subtalar arthroereisis, Flexible, Flat Foot Deformity.

Introduction

Flatfoot is a progressive congenital or acquired deformity described by plantar medial rotation of the talus, sagging of medial arch, and supination and abduction of the forefoot. There is a shift in the load from lateral column to the medial column, which may cause the medial arch to flatten further.

[1] Flexible flatfoot is described to as "collapsing pesplanovalgus" in which collapsing refers to the flexibility of the deformity.[2]A vast majority of flexible flatfeet can be treated conservatively, but the worst deformities may require surgical intervention to reconstruct the foot deformity. Several surgical methods have been illustrated as lengthening of tendon and muscle, arthroereisis, arthrodesis and osteotomies. [3]

Arthroereisis was extended since many decades, which includes insertion of different shaped implants underneath the talus for preserving inversion without excessive eversion. The function of implants are to chunk the talus displacement at forward or downward or medial aspect, thus permitting normal motion of subtalar joint with obstacle the unnecessary pronation.[4]Different implants have been expanded to this procedure, which Volger classified into 3 groups: self-locking, axis altering and impact blocking device of which the self-locking implants are the most familiarly technique used currently. [5]Various self-locking implants have a threaded intend

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with a cylindrical or conical shape can be used.[6]These implants are situated into the sinus tarsi and adjusted toward the tarsal canal, introduced similar to a screw with the threads be set to connect the sinus tarsi floor, the talar neck plantarlateral surface, the leading border of the talar body and the ligament of interosseous talocalcaneal.[7]

Materials and Method

2.1. Patients

Between 1st July 2015 and 1st January 2017, we treated 30 pediatric symptomatic flexible flat feet. The mean follow up was 10 to 20 (15±3.5) months. There were 18 female(60%) and12 male (40%). The age ranged from 8 to 13 years, with a mean age 11.7±1.6 years old patients with pathologic ligamentous laxity were not included in this study.

2.2. Surgical technique

The patient is placed supine on the operation table. The affected extremity is prepared and draped sand bag below gluteal region of operated side. A pneumatic tourniquet is used. A 1.5 to 2cm oblique incision following tension lines of the relaxed skin over the sinus tarsi at a distance of 1 cm anterior and plantar from the distal aspect of the fibula in the "soft spot" just proximal to calcaneus anterior process. Make the dissection along the course of the nerve to avoid inadvertent transection of the intermediate dorsal cutaneous nerve (a branch of superficial peroneal nerve) (Figure 1). The sinus tarsi is debrided to get rid of its fatty tissue contents with rich nerve endings.



Figure. 1. Intraoperative radiograph show oblique incision following the relaxed tension lines over the sinus tarsi.

A guide wire was quietly introduced into the two sinus tarsi portions, then assembly sure to its angle insertion at the similar direction that is anterior distal-lateral to posterior-proximal-medial. A properly positioned guide wire will result in tenting soft tissue on the medial aspect of the foot just superior to the posterior tibialis tendon medially and anterior and slight inferior to medial malleolus (Figure 2) . A cannulated soft tissue dilator is then introduced to dilate the tarsal canal and then removed



Figure.2. A guide wire inserted into both portions of the sinus tars.

The dilator, sizers, insertion tools, trials and implants are cannulated for ease of insertion and placement .Sizing is begun with six millimeter instrument Sequential sizers in 2 mm increasments are then used until desired amount of restriction of subtalar joint movement is achieved. Hindfoot motion and position are then assessed to make sure a suitable correction.The maximum amount of calcaneal eversion with the correct sizer in place, should be approximately 2 to 4 degrees (Figure 3).Once the best sizer is identified, the AP radiograph is checked. On AP fluoroscopy the leading edge of the implant should be within middle third of the talus.

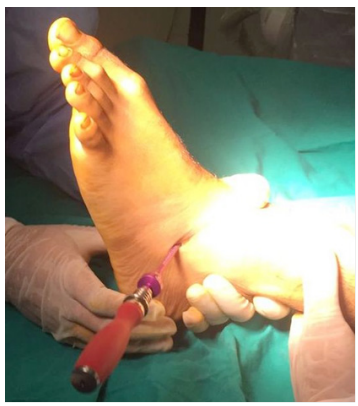


Figure3: Assessment of amount of calcaneal eversion with the correct sizer in place

Intraoperative radiographs for dorsoplantar and lateral aspect must be considered to confirm appropriate position when looking to lateral view, the implant was angled posterior and was not sitting on the calcaneus floor (Figure 4 a) On the dorsoplantar view the leading edge of the implant should be within middle third of the talus (Figure 4 b).

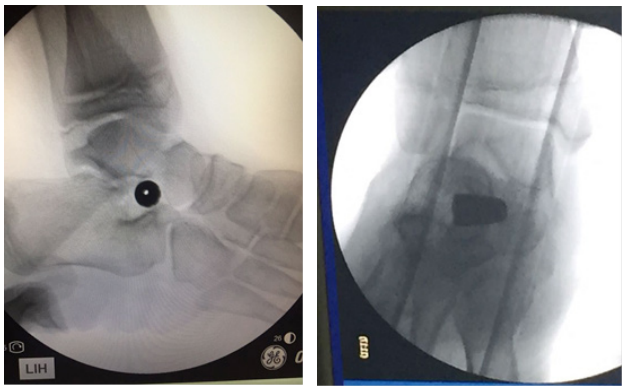


Figure 4 Intraoperative dorsoplantar and lateral radiographs to confirm appropriate position (a). On the lateral view, the implant was angled posterior and was not sitting on the floor of the calcaneus (b) dorsoplantar view the leading edge of the implant should be within middle third of the talus.

The incision close was done by a modified absorbable subcuticular for self-closure for reinforcing upon itself. Closure of deep tissue was not carried out.Then, applied of sterile and dry compression dressing on the foot and ankle. The patients were educated to much lift up the foot as possible when wakeful for the first 2 days after operative technique, and were not permitted for high weight bearing on the treated foot.

Assuming no adjunctive procedures were performed consists of protective weight bearing in a removable below-knee walking cast for 2weeks.If tendon Achilles lengthening is simultaneously performed 2weeks of non-weight bearing in below knee cast is followed by 2 weeks of partial to full weight bearing cast.

Methods of evaluation

Each patient in this study was carefully assessed clinically by taking a full clinical history and performing a thorough examination and adequate information from the child or parent to determine whether the flat foot deformity is symptomatic or not the physical examination starts with a generalized musculoskeletal examination, which should always include rotational profiles of the legs. For all patients the foot and ankle should be examined with the patient standing and sitting, as a flatfoot deformity may not be apparent in absence of weight bearing. Presence of longitudinal foot arch medially and during sitting position not disappears with weight bearing is characteristic of a flexible flat foot. The medial arch should also reform when a patient goes from standing to tiptoe standing. The arch also may be reconstituted in flexible flatfoot by the "toe raising test". If these clinical signs are not detected, the patient has a flat foot rigidity, which still flat at sitting, tip-toe standing, and the toe raise test because the subtalar joint immobility. It is significant to decide any foot pain sites. Frequently the pain raised from midfoot medially or laterally at the sinus tarsi due to local pressure on the collapsed head of talar where callus formation may be palpable and impingement of extreme subtalar joint eversion last. Also, Achilles tendon complex should be examine for assessing a child with flatfoot because this may have significant inferences for case management. Surgery was only indicated when these findings were coming together with subjective limitations of daily activities (e.g. pain and fatigue).

Patient outcomes were assessed using the standardized and validated AOFAS Ankle-Hindfoot Scale.

The score of AOFAS ankle-hind foot is concluded by 9 objects which allocated over 3 categories: pain, function and alignment (40, 50 and10 points), respectively for a total of 100 points. Functional aspects including sagittal and hind foot motion, ankle-hind foot stability, and integral foot alignment. Every category was evaluated separately, with (0 to 100) final scores rang, where 0 matches to the worst and 100 to the best of health status [8]

Standard lateral and AP X-rays were made before surgery and at time of follow-up the longitudinal arch of the foot must be assessed on a weight bearing lateral foot radiograph.

Talonavicular coverage angle:

The drawn two lines for attaching the edges of the articular surface of the talus and navicular aspect. The talonavicular coverage angle formed by both lines perpendicularly.

Lateral talar-1st metatarsal angle

This is an angle formed between the talus long axis and first metatarsal on a weight-bearing lateral view.

2.4Statistical analysis

Data analyses will be analyzed using IBM SPSS Statistics Version 22.Quantitative data was presented

as mean, standard deviation or median and range as appropriate. Qualitative data will be presented as number and percentage. Comparing numerical variables using paired t test and Wilcoxon signed rank test according to fulfilling assumption of normal distribution. P value set significant at 0.05 levels. All tests was two tailed.

Results

This study was a prospective case series conducted on 30 feet with flexible flatfoot deformity; their follow up was for 10 to 20 (15±3.5) months. Clinical assessment was done using scoring system (AOFAS), Radiological assessment was done using TNA& TMA to assess talonavicular coverage and talar first metatarsal angle .There were 18 female (60%) and12 male (40%). The age ranged from 8 to 13 years, with a mean age 11.7 ±1.6 years old14 patients (46%) reported complete relief of pain(very satisfied); 10 patients (30%) reported minor pain(satisfied), 4 patients (20%) had moderate pain(minimally satisfied) .Two patients (7%) stated that they felt worse following surgery (not satisfied at all) The patients with moderate pain had discomfort at the level of sinus tarsi site and in some cases at subtalar joint. One patient has worse pain as a result of loosening of the screw and then extrusion but pain decreased dramatically after debridement and reinsertion of a smaller size implant, other patient with worse pain with medial soft tissue reconstruction was done to him and pain mainly at medial side.

The mean functional (AOFAS) Ankle-Hindfoot score improved from 64.3±8.26 (43-77) preoperatively to 89.23±5.41 (77-98)

Postoperatively at last follow up (Pvalue<0.001) using paired t-test as a significance test for evaluation of pre and post-operative AOFAS score (Table 1)

Table 1:Pre and postoperative AOFAS significant difference

AOFAS	Mean ± SD	Paired t test	P value
Preoperative	64.3±8.26	18.48	<0.001
Postoperative	89.23±5.41		

Subtalar arthroerisis using sinus tarsi implants resulted in improvement of the mean (average) of the lateral talometatarsal angle from 16.5º preoperative to 5.5º at follow up and improvement of the mean (average) of the AP-Talonavicular angle from 23.4º preoperative to 9.4º at follow up.The median decrease in the lateral talometatarsal angle from 15º (range: 4º to 29º)preoperative to 4º (range: 0º to17º) at last follow up.

The median decrease in the Talonavicular angle from 18 (range : 12º to 45º) to 5º (range : 1º to 44º) at last follow up. The average decrease in both angles was statistically significant (P<0.001)(Table 2).

Table 2: Median variation in TMA and TNA after operative procedure.

Angle	Preoperative Median(range)	Postoperative Median (range)	Wilcoxn signed rank test	P Values
TMA	15º (4 º to 29 º)	4º (0 º to 17 º)	465.00	<0.001
TNA	18 (12 º to 45 º)	5º (1 º to 44 º)	400.00	

Post-operative complications: were detected in 5 patients (16.6 %)Two patients(6.6%) developed infection detected by erythema, lateral aspect swelling of the foot, and elevated ESR, regular follow up under antibiotic coverage for 4 weeks till normal laboratory results and clinical improvement.

Two patients (6.6%) developed severe pain at sinus tarsi (sinus tarsitis) following surgery. Conservative treatment had been tried in the form of rest, temporary and slightly inverted casting, heel lifts and physicaltherapy. In one patient pain had been resolved. The other is still complaining of pain but tolerable with no need of removal of the implant in the last follow up.

One patient (3.3%) developed reactional synovitis followed by loosening of the implant and then extrusion after 3 months Debridement and reinsertion of smaller

sized implant have been done

Discussion

Arthroereisis characterizes by a little invasive interference for curing of symptomatic flatfoot and its technical advantage represented a simplicity and rapid recovery, some authors statethat, the results is overutilization. [9]

Alternative choices described for more widespread surgery, rising operative risk and postoperative recovery. [10]

Our results was at the last follow 14 patients (46%) reported complete pain relief (very satisfied); 10 patients (30%) reported minor pain (satisfied), 4 patients (20%) had moderate pain(minimally satisfied) Two patients (7%) stated that they felt worse following surgery (not satisfied at all).

The mean AOFAS ankle-hindfoot score improved from 64.3 ±8.26 (43-77) preoperatively to 89.23±5.41 (77-98) (P value <0.001) postoperatively at follow up with a mean increase of 25 in the AOFAS score.

Viladot et al. reported that the mean score values of AOFAS are improved from 47 to 82 post surgery. [11]

Needleman et al. reported an increased 35-point i in the mean values of AOFAS score with a significant enhancement in the radiographic parameters postoperatively. [4]

In another study involved 34 feet in 20 patients, The mean score values of AOFAS were (from 67.7 to 89) and became greater than before at the end of the follow-up. [12]

Our results showed median decrease in TMA is 15º (range: 4º to 29º) preoperative to 4º (range : 0º to 17º) at the last follow-up, while TNA showed mediandecreasefrom18º (range : 12ºto45º) preoperative to 5º (range : 1º to 44º) at the final follow up. The average decrease in both angles was statistically significant (P<0.001).

Regarding the biomechanical analysis, Husain and Fallat conducted that, the motility of subtalar joint was gradually decreased by increasing implant thickness and that were affected the following strcture: lateral Talo-first metatarsal, talar declination, calcaneal inclination, first metatarsal declination, and first intermetatarsal angles. [13]

Similarly, a study included a 60 feet in 35 patients, showed a significant increased in the angles of talocalcaneal, calcaneocuboid, and first and second intermetatarsal, in addition to calcaneal inclination and talar declination angles postoperatives. [14]

Also, a study joined 68 feet in 39 patients at one year follow-up. The authors revealed a significant upgrading in the radiographic assay including angles of APTN coverage , lateral and anteroposterior talocalcaneal postoperatively. [15]

Post operative complications were detected in 5 patients (16.6%).Two patients (6.6%) developed subclinical infection. Two patients (6.6%) developed severe pain at sinus tarsi (sinus tarsitis) following surgery. One patient (3.3%) developed reactional synovitis followed by loosening of the implant and then extrusion after 3 months Debridement and reinsertion of smaller sized implant have been done.

On average, the rates of complication range from 4.8% to 18.6% with unintentional removal rates range from 7.1% to 19.3% through all types of device. [10]

However, the described incidence of implant loosening or breakage has reduced since the presence of titanium implants. [14]

Other complications include over or under correction of the hindfoot valgus, pain at sinus tarsi, cortical erosion, synovitis, talar avascular necrosis, and calcaneus fractures. [16]

To conclude this technique has the advantage of preservation of joint and ligaments. In addition, the implant has no effect on growthor operative intervention if more invasive procedures are required.

Subtalar arthroereisis remains controversial, especially in regards to patient selection and adjunctive procedures.

On the other hand to enforce our results it is important to perform large scale study for longer follow up to ensure absence of late complications that inconsistent with our results.

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Ethical Clearance: Cleared by the ethical committee of Orthopedic Department - Faculty of Medicine

No Conflict of Interest

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Influence of Different Exercise Regimens on Segmental Body Fat in Obese Primary School Children

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Abstract

Purpose: to compare the influence of different exercise regimens on segmental body fat in obese primary school children. **Method:** 100 obese children, their ages ranged from 6 to 12 years. Children were randomly allocated into: Group I (control/diet only), II (diet plus aerobic training), III (diet plus resistance training) and IV (diet plus combined aerobic and resistance training). BMI and segmental body fat (using DEXA) were measured before and after 6 consecutive months of the program. **Results**: Significance in BMI and total fat and legs fat mass/total fat mass % (P= 0.000). Insignificance in trunk fat mass/total fat mass % and limb/trunk fat mass ratio in control group (P=0.155 and 0.109 respectively) while significance in exercise groups (P<0.05).**Conclusion:** Different exercise regimens had different influences on segmental body fat in obese primary school children.

Keywords: *Exercise regimens; Segmental body fat; Obese children*

Introduction

Childhood obesity becomes the most serious public health challenges of the 21st century[1]. Approximately one from every five school-aged children is obese [2]. In Egypt, the predominance of obesity was 19.6% among primary school children [3].

Faulty dietary habits and low level of physical activity were significantly associated with childhood obesity[2]. Increasing the prevalence of obesity among the Egyptian children pushes the President El-Sisi to start a new campaign on 17th

February 2019 targeting obesity amongst Egypt's preadolescent children (12 million) [4].

The WHO has suggested lifestyle diet modifications to lessen 5–10% of body weight [1] and recommended 60 minutes or more of moderate-intensity aerobic activity every day for children [5]. Although exercise is recommended for obese children, little proof exists on which exercise regimen is ideal to reduce segmental body fat [6]. Therefore, it is important to investigate influence of different exercise regimens on segmental body fat in obese primary school children. So, the following hypotheses were settled: there would be no differences between different exercise regimens on BMI, total fat, trunk fat mass/total fat mass, legs fat mass/total fat mass % and limbs fat mass/trunk fat mass ratio.

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Materials and Method

This study was conducted from January 2019 to June 2019, ethically affirmed from the ethical committee of the Faculty of Physical Therapy, Cairo University, Egypt (P.T.REC/012/002308) and registered on (PACTR201907704486152). Two copies of written consent form offering agreement to participation and publication of the results were signed by the children's parents.

Controlled randomizes trails design for one hundred primary school children aged 6–12 years, both genders

were recruited from the Weight Management and Wellness Center of medical centre of Faculty of Physical Therapy, Modern University for Technology and Information according to the following criteria: BMI were at or above the 95th percentile with no engagement in organized physical workout for the previous 3 months except school physical education classes. Exclusion criteria included: children with musculoskeletal disorders, congenital anomalies, cardiopulmonary problems or endocrine disorders (figure 1).

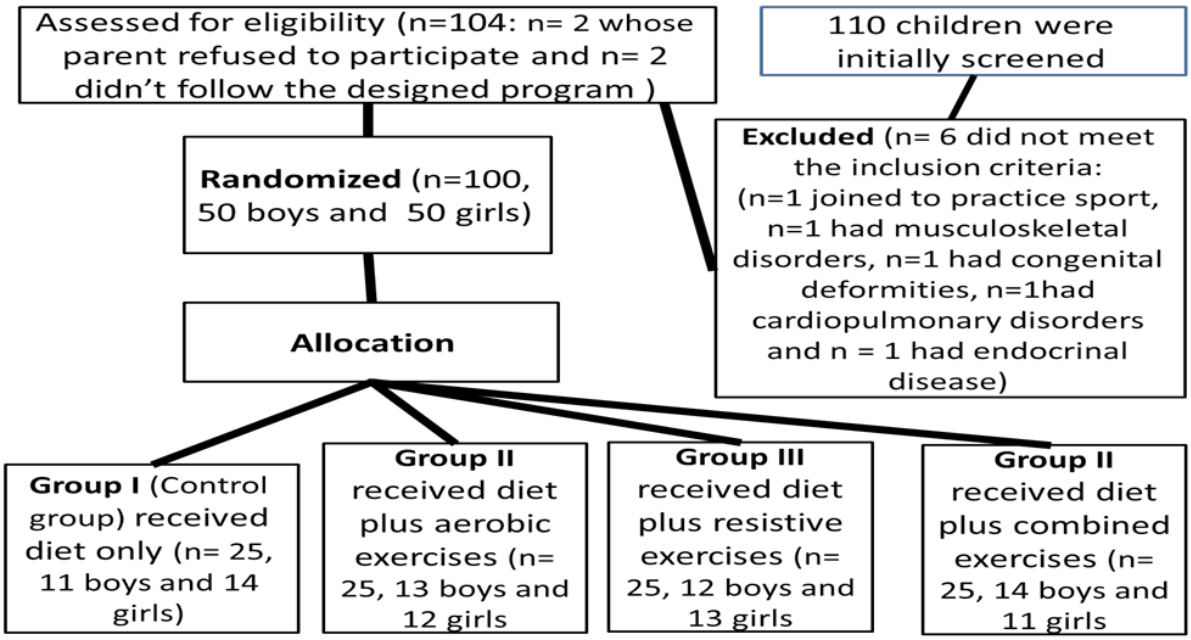


Figure (1): Participants' selection and allocation

Evaluation:

Total body fat % and segmental body fat were assessed by Dual-energy X-ray Absorptiometry (DEXA) with a whole-body scanner operated in the single-beam configuration (serial n: DF+502510, Prodigy, USA). During the measurement, each child lies on a cushioned bed for a few minutes while an imager moves over the child's body without touching him/her. Measurements were blindly repeated prior and at the end of six months.

Interventions

Participants were randomly divided, utilizing sealed envelopes, into: control group (I) (received diet only with a daily energy deficit of 250 kcal), aerobic-exercising training group (II) (received diet plus aerobic training), resistance-exercising training group (III) (received diet plus resistance training) and combined-exercising training group (IV) (received diet plus combined aerobic and resistance training).

1. Aerobic exercises (playing and recreational activities): gradually increase the intensity from moderate-intensity (brisk walking, bicycle riding with slow speed stationary)[5] to high-intensity (running and chasing such as bouncing, hopping rope and bicycle riding with high speed [5].

2. Resistive exercise (Modified push-ups with knees on the floor, wall bar climbing, crunches, weight machines, hand-held weights) [5:] gradually increase the number of repetitions for each exercise (up to 12 times) and also the amount of overload or resistance. The first and last 5 minutes of the training set should be aerobic training as warming up and cooling down.

3. combined-exercising training: Combined aerobic and resistive exercise programs with 50% of training time for each type (1:1ratio) [5].

Statistical Analysis

Statistical calculations were carried out using a computer program IBM SPSS version 22 (IBM Corporation, USA). The sample size calculations were calculated utilizing the G*Power software (version 3.0.10). Segmental body fat (for trunk, legs, and arms) was picked as the primary measure. The effect size of segmental body fat was estimated to be medium (0.25).

A generated sample size of at least 20 participants per group would be required. Taking into consideration a 20% dropout rate, it was necessary to reach a total sample level of a minimum of 100 participants. All data were homogenous (Levene's test) and normally distributed (Shapiro-Wilk test), so the parametric test was used (MANOVA). Multiple Comparisons were performed by the least significance difference test (LSD). P values were considered statistically significant if less than 0.05.

Results

Demographic data:

One hundred obese children their age, height, weight, and BMI were ranged from 6-12 years, 117- 139 Cm, 34.5- 58.45 Kg and 25.2 – 30.27 Kg/m2 (respectively). There were insignificant differences in-between groups (P>0.05) (Table 1 and figure 2).

Table 1: General demographic data

Groups	Age (Y)	Gender		Height (Cm)	Weight (Kg)	BMI (Kg/m2)
		Male	Female			
Sample	9.03 + 1.77	50	50	131.7 + 8.54	48.48 + 7.87	27.73 + 1.6
Control	9 + 1.83	11	14	131.8 + 8.69	47.77 + 7.61	27.32 + 1.68
Aerobic	8.75 + 2.09	13	12	131.05 + 9.33	48.04 + 8.47	27.73 + 1.60
Resistive	9 + 1.83	12	13	132 + 8.78	49.46 + 8.59	28.13 + 1.68
Combined	9.35 + 1.53	14	11	131.95 + 8.69	48.64 + 7.95	27.73 + 1.6
F-value	0.182			0.025	0.084	0.405
P-value	0.908			0.995	0.968	0.751

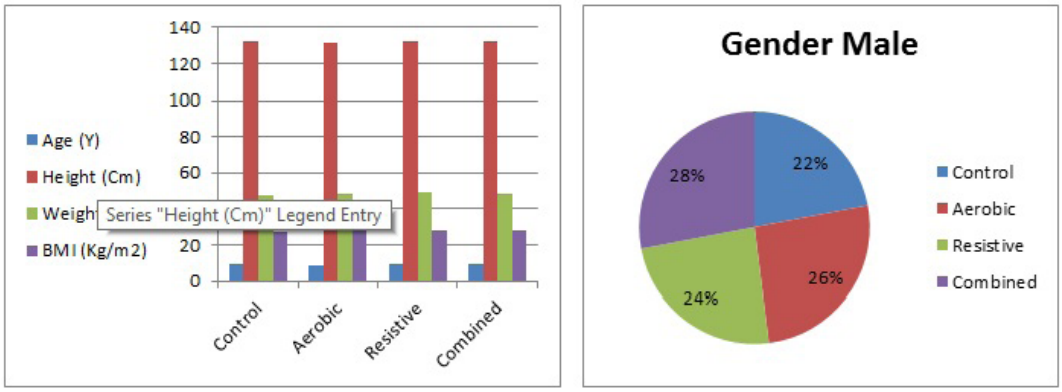


Figure (2): Demographic data

BMI: Within groups, there were significance (P= 0.000). In-between groups revealed insignificance of pre-measures while they were significant in post-measurements (F= 9.933 and P= 0.000) (table 2 and figure 3).

Table 2: BMI, Total Fat, Trunk Fat Mass/ Total Fat Mass, Legs Fat/ Total Fat Mass % and Limbs Fat Mass/ Trunk Fat Mass Ratio.

			BMI (Kg/m2)				Total Fat (%)				Trunk Fat Mass/ Total Fat Mass (%)				Legs Fat/ Total Fat Mass (%)				Limbs Fat Mass/ Trunk Fat Mass Ratio			
			Pre ($\bar{x}$ + SD)	Post ($\bar{x}$ + SD)	P	Within group	Pre ($\bar{x}$ + SD)	Post (Mean + SD)	P	Within group	Pre ($\bar{x}$ + SD)	Post ($\bar{x}$ + SD)	P	Within group	Pre ($\bar{x}$ + SD)	Post ($\bar{x}$ + SD)	P	Within group	Pre ($\bar{x}$ + SD)	Post ($\bar{x}$ + SD)	P	Within group
Group I			27.32 + 1.68	21.52 + 1.68	0.000		53.10 + 2.14	48.10 + 2.14	0.000		40.60 + 1.51	39.60 + 1.51	0.155		30.00 + 2.10	25.00 + 2.40	0.000		1.16 + 0.11	1.04 + 0.13	0.109	
Group II			27.73 + 1.60	22.73 + 1.60	0.000		53.39 + 2.13	43.40 + 2.13	0.000		40.40 + 2.17	31.40 + 2.17	0.000		28.00 + 2.45	23.00 + 2.45	0.000		1.12 + 0.10	1.03 + 0.14	0.038	
Group III			28.13 + 1.68	25.23 + 1.68	0.001		53.60 + 2.17	45.60 + 2.17	0.000		41.40 + 2.22	35.40 + 2.22	0.000		27.80 + 2.30	17.80 + 2.30	0.000		1.11 + 0.09	0.66 + 0.11	0.000	
Group IV			27.73 + 1.60	24.23 + 1.60	0.000		52.30 + 2.14	43.30 + 2.14	0.000		41.90 + 1.91	31.90 + 1.91	0.000		28.70 + 2.11	20.70 + 2.11	0.000		1.12 + 0.10	0.87 + 0.11	0.000	
In-between group	F		0.405	9.933			0.525	11.145			1.257	36.974			1.838	17.822			0.489	21.363		
	P		0.751	0.000			0.668	0.000			0.304	0.000			0.158	0.000			0.692	0.000		

$\bar{x}$:Mean

Total Fat %:

The intra-group comparisons revealed significance within groups (P= 0.000). The inter-group comparisons indicated insignificance of pre-measures (F= 0.525 and P= 0.668) while they were significant in post-tests (F= 11.145, P= 0.000) (table 2 and figure 3).

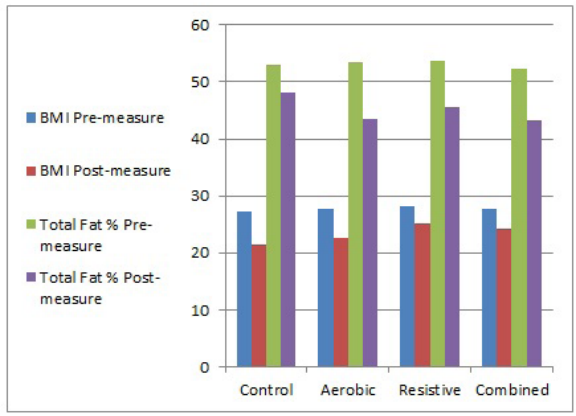


Figure (3): BMI and Total Fat %

Trunk Fat Mass/Total Fat Mass %:

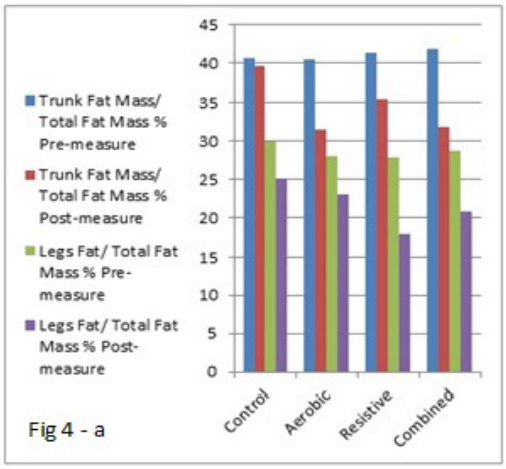
The intra-group comparisons revealed insignificance within the group I (P= 0.155) while they were significance within the exercise groups (P= 0.000). The inter-group comparisons indicated insignificance of pre-measures (F= 1.257 and P= 0.304) while they were significant (F= 36.974, P= 0.000) in post-measurements (table 2 and figure 4-a).

Legs Fat Mass/Total Fat Mass %:

The within- group comparisons indicated significance within groups (P= 0.000). The in-between group comparisons illustrated insignificance of pre-measures (F= 1.838 and P= 0.158) while they were significant in post-tests (F= 17.822, P= 0.000) (table 2 and figure 4-a).

Limbs Fat Mass/Trunk Fat Mass Ratio:

The intra-group comparisons demonstrated insignificance within the group I (P= 0.109) while they were significance within the exercise groups (P= 0.038, 0.000 and 0.000 respectively). The inter-group comparisons found insignificance of pre-measures while they were significant in post-measurements (F= 21.363, P= 0.000) (table 2 and figure 4-b).



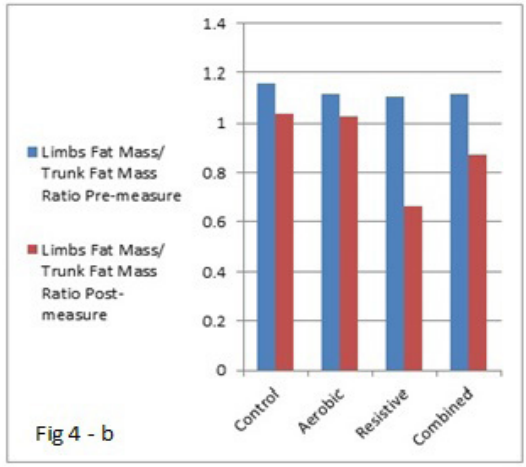


Figure (4): a- Trunk Fat Mass/Total Fat Mass and Legs Fat Mass/Total Fat Mass %. b- Limbs Fat Mass/Trunk Fat Mass Ratio

Multiple Comparisons

a. BMI results revealed the equality between group I and II (P= 0.16) which were superior to group III and IV (P= 0.000 and 0.008 respectively).

b. Total fat % results illustrated the equality between group II, III and IV (P> 0.05), and inferiority of the group I (P= 0.002, 0.03 and 0.000 respectively).

c. Trunk fat mass/total fat mass % results demonstrated the equality between group II and IV (P>0.05) which were superior to the group III (P<0.05) and inferiority of the group I (P= 0.000, 0.01 and 0.000 respectively).

d. Legs fat mass/total fat mass % results showed the superiority of the group III (P< 0.05) and equality between group II and IV (P>0.05) and inferiority of the group I (P= 0.01, 0.000 and 0.011 respectively).

e. Limbs fat mass/ trunk fat mass ratio results revealed the superiority of group III (P<0.05) followed by equality between group II and IV groups (P>0.05) and inferiority of the group I (P= 0.000) (table 3).

Table 3: Multiple Comparisons

Variable	(I) groups	(J) groups	Mean Difference (I-J)	Sig.
BMI	I	II	-0.80	0.16
		III	-2.26-*	0.000
		IV	-1.56*	0.008
Total Fat %	I	II	2.20*	0.002
		III	1.50*	0.03
		IV	2.80*	0.000

Cont... **Table 3: Multiple Comparisons**

Trunk Fat Mass/ Total Fat Mass %	I	II	4.20*	0.000
		III	1.70*	0.01
		IV	3.2*	0.000
Legs Fat/ Total Fat Mass %	I	II	2.00*	0.01
		III	4.70*	0.000
		IV	2.80*	0.011
Limbs Fat Mass/ Trunk Fat Mass Ratio	I	II	0.17*	0.000
		III	0.25*	0.000
		IV	0.14*	0.000

Discussion

BMI remains a valuable measurement to recognize weight gain, as fast increments in children can be ascribed to fat instead of lean [7]. Diet-prompted weight reduction is related with a particular decrease in the total body fat, so diet-induced weight loss similar to exercise. This was confirmed in this study by significant differences in BMI of both within and in- between measures in the four groups (P= 0.000).

Although the translation of changes in BMI as proportionate changes in fatness will be misleading [8-9], BMI remains the most useful way by which to analyze wide changes in obesity. That illustrated by the pairwise comparison of BMI results that found equality between group I and II (P= 0.16) which were superior to group III and IV (P= 0.000 and 0.008 respectively).

Although adding exercise to energy restricted diet gives valuable advantages, specifically, it is conceivable that the decrease in lean tissue normally associated with diet only have been overestimated [9]. So, the hypothesis of no differences between the four groups on BMI, was accepted [10]. This was indicated by significant differences in total fat % of both within and in- between measures in the four groups (P= 0.000)

Studies found that the combination of eating regimen and exercise results in a greater reduction of regional fat and preservation of muscles compared with diet only [10]. Which illustrated by the equality between group II, III and IV (P> 0.05), and inferiority of the group I regarding the total fat % (P= 0.002, 0.03 and 0.000 respectively). For all of the exercise regimens, a generous decrease in entire body fat was noticed. So, the hypothesis of no differences between the four groups on total fat was rejected.

However, for both group II and IV we observed a greater decrease of trunk fat compared with the group III. That comes in agreement with previous studies that showing the combination of diet and exercise effect in reduction in fat from the abdomen [11]. These notes might be mostly clarified by the principal of "while a-adrenergic inhibitory impacts manage abdominal adipose lipolysis during resting conditions, b-adrenergic stimulatory impacts modulate abdominal fat lipolysis during activity" [11]. This was indicated by significant differences in trunk fat mass/total fat mass % of only exercise groups within and in- between measures (P= 0.000)

Adding, there is a stamped increment of lipids from abdominal tissue, while just a minor increment in lipolytic activity was seen in femoral fat tissue because of both aerobic and combined activities [11-12]. This was demonstrated by the equality between group II and IV (P>0.05) which were superior to the group III (P<0.05) and inferiority of the group I (P= 0.000, 0.01 and 0.000 respectively) regarding trunk fat mass/total fat mass %.

Combined training may have added impacts through improvement in the oxidative metabolism-dependent energy framework and cardiorespiratory wellness. [12]. so, the hypothesis of no differences between the four groups on trunk fat/total fat, was rejected. For the resistive group, there was increment in energy consumption from the performance of resistance workout. However, the mean energy expenditure attributable to aerobic exercise and combined groups were substantial [12]. What reported by the significant differences in legs fat mass/total fat mass % of both within and in- between measures in the four groups (P= 0.000).

The primary influence of the resistive exercise was on the gluteal adipose lipolytic activity and mobilization of the leg fat [13]. That explained the superiority of the group III (P< 0.05) and equality between group II and IV (P>0.05) and inferiority of the group I (P= 0.01, 0.000 and 0.011 respectively) regarding legs fat mass/total fat mass %. So, the hypothesis of no differences between the four groups on leg fat/total fat was rejected.

In any case, given the increment in upper and lower body strength, increments in contractile protein as well as muscle fiber volume occurred yet were covered by

declines in any of the other muscle constituents [13]. This confirmed by the significant differences in limbs fat mass/trunk fat mass ratio of both within and in- between measures in only the exercise groups (P= 0.000). Changing in muscle strength were be due to adaptations in skeletal muscles which attributable to neuromuscular factors. That illustrates the superiority of group III (P<0.05) followed by equality between group II and IV (P>0.05) and inferiority of the group I (P= 0.000). So, the hypothesis of no differences between the four groups on limb fat/trunk fat, was rejected.

Our findings provide strong evidence that different exercise regimens had different influences on segmental body fat in obese primary school children.

Conflict of Interest: The authors declare that no conflicts of interest.

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Early Effect of Maximal Utilization of Internal Mammary Arteries on Kidney Function in the Egypt

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Abstract

Background: Coronary artery bypass grafting (CABG) is among the most important surgical procedures in the history of medicine and remains the most durable means of revascularization for patients with coronary artery disease (CAD).

Objective: To identify the effect of maximal utilization of internal mammary arteries on kidney function.

Method: This prospective observational study was carried out from Feb.2015 until Feb.2017, in the department of cardiothoracic surgery Kasr Al Ainy Faculty of Medicine including 40 CABG surgery patients underwent maximal utilization of internal mammary artery for whom kidney functions were followed up pre and post operatively.

Results : The mean distal Number of mammary arteries utilization were 3.4 ± 1.2 , The mean on pump time were 118.1 ± 20.6 minutes , There was a statistically significant increase in mean serum Creatinine post-operatively but no need for dialysis and no mortality. .

Conclusion: Early effect of maximal utilization of Internal Thoracic mammary artery in coronary bypass graft surgery on KFT showed statistically significant increase in mean serum Creatinine post-operatively but no need for dialysis and no mortality. Future studies with long term follow up of KFT post operatively are needed.

Key words: *Total arterial, Conventional CABG, Patency and KFT.*

Introduction

Coronary artery disease (CAD) is considered one of the leading causes of death in the developed countries. Revascularization of stenotic coronary arteries greatly contributes to the treatment of CAD. There are two well-established revascularization techniques are practiced. One is Coronary Artery Bypass graft (CABG) surgery in which autologous arteries and/or veins are used to supply blood to the coronary artery downstream to the stenotic lesion, and the other is percutaneous transluminal coronary angioplasty (PTCA) in which catheter-borne devices ,including balloon, stent, atherectomy cutter, and LASER, are used to open stenosis from within the coronary artery .

Up to 15 % of saphenous vein grafts occlude within the first postoperative year and at 10 years postoperatively, only 50% to 60 % of saphenous vein grafts are patent. The clinical consequences of such saphenous vein graft disease include recurrence of angina, myocardial infarction and death.[1]

The clinical and prognostic benefits of coronary artery bypass grafting (CABG) for certain anatomical patterns of coronary artery disease are well accepted. Most patients undergoing CABG require three or four bypass grafts and the "standard" operation uses a single left internal mammary artery (LIMA) to the left anterior descending coronary artery, and supplemental saphenous vein grafts (SVGs) to the other coronary vessels .[2]

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The excellent early results of CABG are limited in the long term by vein graft failure. Ten years after CABG three quarters of vein conduits are blocked or severely diseased, whereas more than 90% of ITA grafts are patent and disease free. Vein graft failure leads to reduced survival, recurrent angina, late myocardial infarction, and the need for further intervention.[3]

It was noticed that by 10–15 years after the initial operation up to 40% of patients may require redo CABG at increased risk and cost. Recently, TACR is the procedure of choice in young adults and those having porcelain aorta, etc. TACR, is possible with maximum grafts using bilateral IMAs in situ or as free grafts [4]. The development of peculiar form atherosclerosis in SVGs encourage us to pay attention to other type of grafts particularly arterial ones to improve the midterm outcome of myocardial revascularization. The two main reasons against arterial revascularization are inadequate evidence of benefit and that it increases perioperative mortality and/or morbidity. Several large studies have recently reported that multiple ITA grafts offer survival advantages over a single ITA graft.

There are meta-analytic studies of almost 16.000 patients comprising 11269 single and 4693 bilateral IMA patients matched for age, gender, left ventricular function, and diabetes, proved the benefits of the expanded use of arterial grafts and provided good proof that strongly advocated their use .[5]

Clinical results and patency associated with the use of the right internal mammary artery as part of a bilateral internal mammary artery grafting have been encouraging. [2]

Moreover, the revival of use of the radial artery (RA) as a graft has offered another easily accessible source of arterial conduits.6

Aim of work

This clinical study was done to show the effect of usage of Internal Thoracic mammary artery in coronary bypass graft surgery on KFT.

Method

I. Patient Population:

This Prospective study included 40 patients who complained of Coronary Artery Disease and subsequently underwent myocardial arterial revascularization including Maximal Utilization of InternalMammary Arteries by Faculty of Medicine, Cairo University experience since February 2015 until February 2017.

II. Selection Criteria:

In all cases Maximal utilization of internal mammary artery including left and right internal mammary arteries.

Harvesting of LIMA and RIMA by a skeletonized way.

Exclusion criteria:

1-Combined cardiac surgery as Ischemic heart disease for CABG and valve surgery .

2- Age > 25 and < 70 years

3-Obese patients BMI more than 30.

4-uncontrolled diabetic patients HbA1C more than 7

5- Unstable patients (surgical emergency)

6- Redo CABG.

Inclusion criteria include:

1- Age: 30 -70 years.

2- Gender: both males and females.

3- Operation type: on-pump or off pump

4- Operation classification: immediate

5- LV function: >25%.

6- Preoperative state: renal state

Preoperative Assessment:

A standard protocol of preoperative management was applied with special concern to the base line KFT for the patients.

IV. Operative Management:

The most frequent indications are chest pain (80%), dyspnea (20%).

Surgical technique:

In all cases, access to the heart was obtained through a median Sternotomy. Cardiopulmonary bypass with aorta common atrialcannulation.

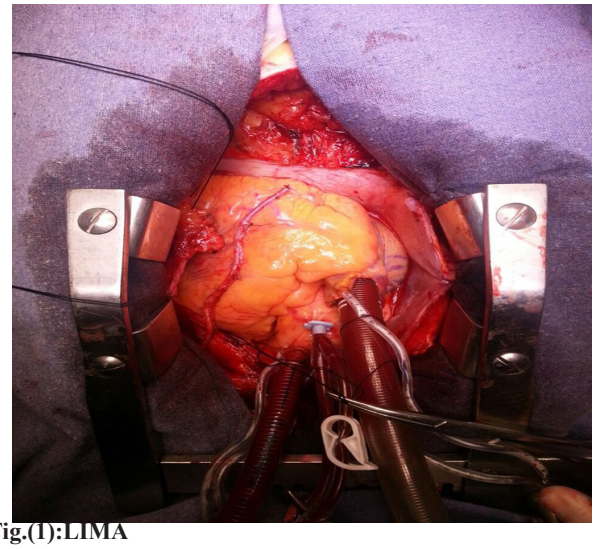


Fig.(1):LIMA



Fig. (2): RIMA

Distal Anastomosis:

Running polypropylene 8/0 sutures were used.

Was performed in the same sequence for all cases. Initially, the right coronary artery was started with followed by the posterior RCA branches (crux or PDA), then the marginal branches of the circumflex artery, and the diagonal branches of the LAD. Then LAD.

Proximal Anastomosis:

Jump graft, coronary to coronary,sequential, bucket handle, y or t graft ways were used.

Postoperative assessment:

A standard protocol of postoperative management was applied with close follow up of the KFT compare it to the base line of the patient KFT.

Results

1. **Demographic and general data**

Gender

The study was conducted on 40 patients; 36 males (90.0%) and 4 females (10.0%).

Age

The mean ± standard deviation values for age were 55.4 ± 8.2 years with a minimum of 20.0 years and a maximum of 70.0 years old.

Body Mass Index (BMI)

The mean ± standard deviation values for BMI were 28.9 ± 0.9 KG/m^2 with a minimum of 27.0 KG/m^2 and a maximum of 30.0 KG/m^2.

2. **Serum Creatinine**

There was a statistically significant increase in mean serum Creatinine post-operatively.

Table (1): Descriptive statistics and results of comparison between serum Creatinine pre- and post-operatively

Time	Mean	SD	Median	Minimum	Maximum	95% CI		*P*-value
						Lower bound	Upper bound	
Pre-operative	0.87	0.17	0.90	0.57	1.30	0.82	0.93	0.001*
Post-operative	0.94	0.19	0.90	0.50	1.40	0.87	1.00	

**: Significant at P ≤ 0.05*

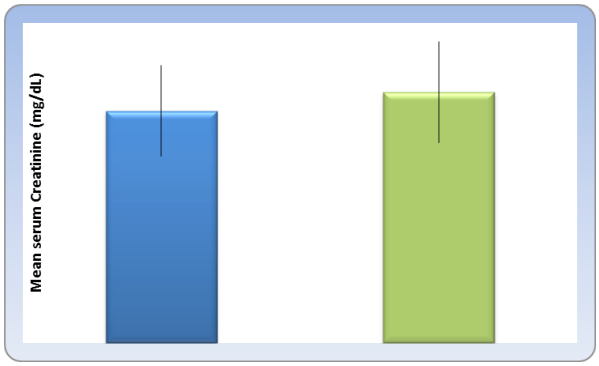


Figure (3): Bar chart representing mean and standard deviation values of serum Creatinine pre- and post-operatively

3. **Mortality**

All patients (100.0%) were alive.

4. **Ischemic time**

The mean ± standard deviation values for Ischemic time were 85.7 ± 18.9 minutes with a minimum of 51.0 and a maximum of 129.0 minutes.

5. **Number of mammary arteries utilization**

Six patients (15.0%) had utilized two arteries, 20 patients (50.0%) had utilized three arteries, and 10 patients (25.0%) had utilized four arteries while four patients (10.0%) had utilized five arteries.

The mean standard deviation values of distal Number of mammary arteries utilization were 3.4 ± 1.2

6. **Association between number of mammary arteries utilization and different variables**

There was no statistically significant correlation between number of mammary arteries utilized and different variables except for ischemic time where there was a statistically significant direct (positive) correlation between number of mammary arteries utilized and ischemic time i.e. an increase in number of mammary arteries utilized is associated with an increase in ischemic time and vice versa.

Table (2): Results of Spearman's correlation coefficient for the correlation between number of arteries and different variables

Variables	Correlation coefficient	*P*-value
Age	0.008	0.962
HbA1c	-0.260	0.110
BMI	-0.074	0.649
Pre-operative serum Creatinine	-0.043	0.790
Post-operative serum Creatinine	-0.023	0.888
Ejection fraction	-0.028	0.864
Ventilation hours	-0.044	0.788
ICU stay	-0.203	0.208
Number of blood transfusion units	-0.017	0.916
On pump time	0.263	0.101
Ischemic time	0.421	0.007*

**: Significant at P ≤ 0.05*

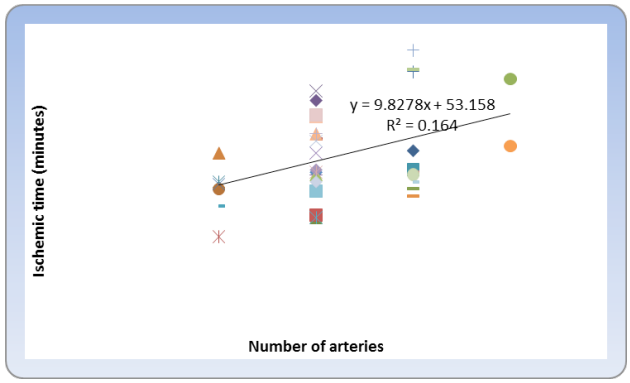


Figure (4): Scatter diagram representing direct correlation between number of arteries and ischemic time

Discussion

In study of **Rubens et al.**[7]in which 541,000 patients undergoing operations in 745 hospitals across the United Stateswas included of them (27%) of patients study BMI is more than 30 %, 33% of patients had Diabetes Mellitus,pre operative mean serum creatinine was 0.96 but 86 patients underwent to hemofilteration from total 12271 operated in form of total arterial revascularization. (48%) of study patients include in the study have EF were less than 30%. and (2%) of patients were re-explored for bleeding.

In study of **Aldea et al.**[8] 0.9% of patients presented by Renal impairment requiring dialysis although 137 patients 3.7% was complaining of Previous renal dysfunction before surgery .Sternal wound infection happened in (37%) of patients study .

In study of **Joel Price et al.**[9] 762 – patients were included in the study with a mean age of 55 ± 9. Of them 72 % of patients were hypertensive, 0.3%of patients was presented in form of renal impermaint and 0.6% underwent to renal dialysis. Patient left ventricular ejection fraction were (88.6%)>50, (10.3%) 30–49, and (1.1%)<30.In addition, mean CPB time (min) 102.025

± 35.7, Mean cross clamp time (min) 71.45± 27.95,No of bypass grafts 3.1 ± 0.8. In addition, mean no. of Reoperation for bleeding was (2.25%).Deep sternal wound infection and Mediastinitis happened in (0.55%) of patients study. The mean standard deviation for length of hospital stay of patients study was6.975 ± 5.3 days.

In our study, 40 patients the mean ± standard deviation values for age were 55.4 ± 8.2 years. of them 36 males (90.0%) and four females (10.0%). The mean ± standard deviation values for BMI were 28.9 ± 0.9 KG/m^2 with a minimum of 27.0 KG/m^2 and a maximum of 30.0 KG/m^2.

Twenty-one patients (52.5%) had Diabetes Mellitus while 19 patients (47.5%) do not have Diabetes mellitus.

In addition,the mean ± standard deviation values for HbA1c were 6.3 ± 0.8 % with a minimum of 5.0 % and a maximum of 7.8 %.

Pre-operative mean serum creatinine 0.87 of our patients and there was a statistically significant increase in mean serum Creatinine post-operatively. But increasing was in reasonable limit no one patient need to renal dialysis temporary or permanent. None of our group study died with mortality 0 %.

Conclusion

Early effect of maximal utilization of Internal Thoracic mammary artery in coronary bypass graft surgery on KFT showed statistically significant increase in mean serum Creatinine post-operatively but no need for dialysis and no mortality. Future studies with long term follow up of KFT post operatively are needed.

Recomendation

Future studies with long-term follow up period to assess the long-term outcome are needed.

Funding: Self-funding

Ethical Clearance: Cleared by the ethical committee of Department of Cardiothoracic Surgery, Faculty of Medicine, Cairo University. Cairo, Egypt

No **Conflict of Interest**

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Pentraxin 3 and Non-Alcoholic Fatty Liver Disease in Egyptian Patients: Merits and Flaws

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Abstract

Background/aims: Non-alcoholic fatty liver disease (NAFLD) is one of the most common chronic liver diseases. Pentraxin 3 (PTX3) has consistently been noted in non-alcoholic steatohepatitis and has been observed to be related to the grade of fibrosis**. Objectives:** it was to assess the potential of PTX3 as a non-invasive tool for the detection and grading of NAFLD among Egyptian patients**. Methods:** Sixty Egyptian patients with NAFLD attending the outpatient clinic at Cairo University Hospitalwere compared to 60 healthy subjects as controls in terms of the body mass index (BMI), waist and neck circumferences, lipid profile, and serum PTX3 level. Additionally, abdominal ultrasound for grading of liver steatosis was performed. Non-invasive tests of liver fibrosis (FIB4, AAR & APRI) were calculated **Results:**PTX3 level was significantly greater in the NAFLD group (3.25±1.85) than in the control group (0.70±0.29, p≤0.001), but it was not correlated with the severity of steatosis or steatohepatitis. The BMI and waist and neck circumferences were correlated with the steatosis grade .Non of FIB4, AAR & APRI were correlated to pentraxin level. In addition, ultrasound measurements of the right lobe of the liver were correlated with the degree of steatosis. **Conclusion:** PTX3 could serve as a surrogate diagnostic biomarker in NAFLD; however, it does not correlate with the severity of steatosis or steatohepatitis.

Keywords: *Non-alcoholic, Fatty liver, Pentraxin 3, Steatohepatitis, Dyslipidaemia*

Introduction

Non-alcoholic fatty liver disease (NAFLD) is one of the most prevalent chronic liver diseases and has a considerable impact on the liver, varying from hepatic inflammation to progressive fibrosis and eventually cirrhosis[1]

NAFLD is strongly associated with metabolic syndrome, and it may be a prelude to its future development.[2]. In light of the potential risks of fatty liver disease, the importance of using easy diagnostic and prognostic biomarkers has been emerging[3]. Several proteins involved in the pathogenesis of fatty liver diseases have served as NAFLD biomarkers, such as apolipoprotein A1 and B, leptin, and tumour necrosis factor- alpha[4].

Pentraxin(PTX3) is mass produced at sites of inflammation by several cell types.There is a growing body of literature that recognizes the importance of PTX3 as a non-invasive serological marker of liver fibrosis in hepatitis and cirrhosis[5], Moreover, it has been proposed that PTX3 could serve as a marker for grading the severity of liver inflammation and the fibrosis stage[6].

Accordingly, the current work aimed to evaluate the serum PTX3 level in NAFLD in the Egyptian population and find a relationship between the serum PTX3 level and the ultrasonographic grading of disease severity as well as non invasive tests of fibrosis.

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Methods

Study design and population:

A cross-sectional (case-control) study was conducted with a total of 120 adult Egyptian subjects selected consecutively from outpatient clinic who presen*ted with*

non-specific symptoms. The subjects were divided into *the NAFLD group (*60 patients*)* and the control group, including 60 subjects with no evidence of NAFLD, as confirmed by ultrasonography.

Patients with co-existing recent cerebrovascular stroke or recent acute coronary syndrome of less than 3 months' duration, other ch*ronic liver diseases,* hepatocellular carcinoma, diabetes mellitus, renal diseases, or hypothyroidism and subjects who were under treatment with drugs that affect PTX3 level, as amiodarone, diltiazem, statins and glucocorticoids were excluded.

The study protocol was treated with confidentiality according to the Helsinki Declaration of biomedical ethics .

Method Details

All participants were subjected to full history taking and complete physical examination

Anthropometric measures

Including body height, weight and body mass index (BMI). Hip circumference, the waist circumference, the waist-to-hip circumference ratio and neck circumference were measured.

Sample preparation:

Blood samples (10 ml) were collected after an overnight fast. After analysing the blood cell counts in aliquots of whole blood in EDTA tubes (1.2 mg EDTA/m), the serum was separated (3000 rpm for 10 min) within 30 min of blood collection and stored at -20 °C. Hepatitis C antibody and hepatitis B surface antigen (HbsAg) analysis and antinuclear antibody were measured.

Fasting blood sugar and 2 hrs postprandial, liver and kidney function tests were performed using an automated device(Beckman,Dade Behring, USA).PTX3 was measured by ELISA using the serum supernatants (Human Pentraxin 3/TSG-14 Quantikine ELISA Kit).

Non-invasive Markers of fibrosis Evaluation: we assessed Aspartate aminotransferase to platelet ratio index(APRI)=AST (/ULN)x100 divided by Platelets(109/L), Fibrosis index based on the 4 factor (FIB-4): (age [yr] × AST [U/L]) / ((PLT [109/L])×(ALT [U/L]) 1/2, Aspartate aminotransferase and alanine aminotransferase ratio(AAR): AST(U/L)/ALT(U/L)

Ultrasonographic assessment of liver steatosis and its grading were evaluated using a high-resolution B-mode scanner (SDD-5500; Aloka, Tokyo, Japan) with a 3.5-MHz transducer by single operator. Anteroposterior diameter of the right hepatic lobe, Spleen and portal vein diameter were calculated.

Results

The study was performed with 120 subjects ranging in age from 20-66 years. The majority of the subjects were female (72.5%). Of all the subjects 65 (54.2%) were classified as overweight, with a BMI≥ 25. The demographic, clinical and laboratory characteristics of the enrolled participants are summarized in table 1.

A comparison between males and females in the NAFLD group revealed no significant difference in the PTX3 level (3.02±1.84 vs 3.32±1.86, respectively, p=0.925).

The distribution of the sonographic grades in the NAFLD group revealed 14 subjects with mild disease (23.4%), 23 subjects with moderate disease (38.3%) and 23 subjects with severe disease (38.3%).

The PTX3 level did not significantly differ according to the BMI. Among the NAFLD patients, there were no correlations between PTX3 and various parameters, including anthropometric parameters, liver function test results, sonographic findings, and stage; however, there was a significant negative correlation between the serum PTX3 level and the GGT level (r=-0.270, p=0.037). Also No significant correlation between non-invasive tests of liver fibrosis (FIB4, AAR & APRI) and serum Pentraxin

A comparison of the anthropometric measures among the NAFLD sonographic grades revealed significant differences in the BMI and waist and neck circumferences according to the degree of steatosis on ultrasound, as shown in table 2

A comparison of the NAFLD sonographic grades with the other sonographic parameters revealed a significant correlation between the right lobe diameter and the degree of steatosis on ultrasound (p=0.007) as shown in Figure (1).

Discussion

The goal of the present study was to elucidate the

ability of PTX in diagnosing and grading NAFLD and determine its relationship with sonographic findings. In the current study, level of PTX3 expression was significantly greater in NAFLD patients (3.25+1.8ng/ml) than in the controls (0.7+0.29 ng/ml), which is in agreement with previous studies investigating the role of PTX3 as a non-invasive biomarker of steatosis[7,8]

Table (1) Demographic and laboratory characteristics of the enrolled participants

Variables		Group (1): NAFLD N=60	Group (2): Control N=60	P-value
Age, yrs (mean±SD)		40.40±9.56	38.15±6.56	0.135
Sex	Male (N,%)	15 (25%)	18 (30%)	0.540
	Female (N,%)	45 (75%)	42 (70%)	
Weight, kg (mean±SD)		92.98±17.69	73.15±7.25	<0.001
Height, cm (mean±SD)		1.62±0.10	1.63±0.07	0.755
BMI*, kg/m² (mean±SD)		35.43±6.90	27.53±2.11	<0.001
LDL†, mg/dl (mean±SD)		136.5±32.4	121.9±26.5	0.006
HDL‡, mg/dl (mean±SD)		38.85±10.04	42.48±8.57	0.004
Triglyceride, mg/dl (mean±SD)		147.8±64.81	113.6±27.6	0.006
ALT§, U/L (mean±SD)		38.45±24.97	25.38±9.89	0.001
AST| U/L (mean±SD)		35.87±18.93	24.52±11.23	<0.001
GGT¶ U/L (mean±SD)		40.00±25.57	36.58±13.73	0.793
ALP** , U/L (mean±SD)		74.67±29.73	72.50±20.09	0.981
Albumin, gm/dl, (mean±SD)		4.1±0.39	4.07±0.34	0.829
Pentraxin 3, ng/ml (mean±SD)		3.25±1.85	0.70±0.29	<0.001
fib4††		0.89±0.46		
AAR‡‡		1.1±0.68		
APRI§§		0.35±0.21		
Sonographic parameters Right lobe span (cm) PV‖ diameter (mm) Spleen (cm)		 17.03±2 11.15±1.72 11.68±1.6		

BMI: body mass index †LDL: low-density lipoprotein ‡HDL: high-density lipoprotein §ALT: alanine transaminase |AST: aspartate transaminase ¶GGT: BMI: body mass index †LDL: low-density lipoprotein ‡HDL: high-density lipoprotein §ALT: alanine transaminase |AST: aspartate transaminase ¶GGT: gamma glutamyltranspeptidase **ALP: alkaline phosphatase †† FIB4: Fibrosis index based on the 4 factor‡‡AAR:Aspartate aminotransferase and alanine aminotransferase ratio §§APRI: Aspartate aminotransferase to platelet ratio index‖PV: portal vein

SD standard deviation

Table (2) Comparison of different NAFLD sonographic grades and anthropometric measures

Anthropometric parameters	Sonographic steatosis grades			
	Mild N=14 Mean±SD*	Moderate N=23 Mean±SD	Severe N=23 Mean±SD	P-value
Weight (kg)	90 ±16.31	87.65 ±10.26	100.11 ±22.09	0.071
Height (cm)	1.67 ±0.12	1.61 ±0.10	1.61 ±0.09	0.308
BMI (%)	33.06 ±8.78	34.12 ±5.50	38.18 ±6.22	0.039
Waist circumference (cm)	100.43 ±11.23	102.17 ±9.67	111.83 ±12.69	0.01
Hip circumference (cm)	113.43 ±13.24	112.78 ±9.71	120.87 ±15.45	0.082
W/H ratio	0.89 ±0.07	0.91 ±0.08	0.93 ±0.08	0.377
Neck circumference (cm)	36.29 ±2.40	36.26 ±2.56	38.26 ±3.05	0.02

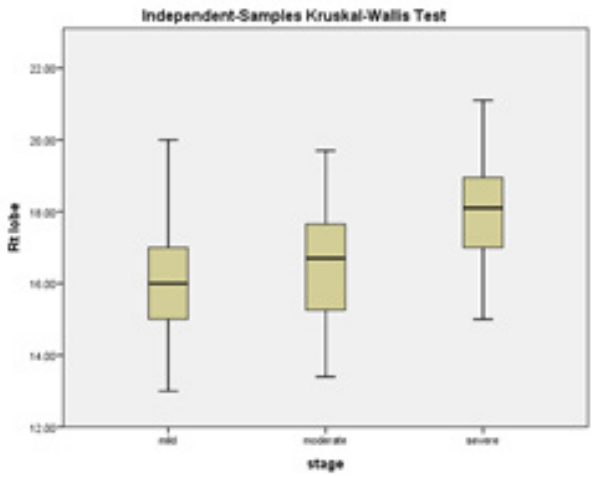


Fig. 1: Comparison between NAFLD sonographic grades and right lobe measurements

As expected, our results demonstrate that the mean BMI of the enrolled patients with NAFLD was higher than that of the controls (35.43±6.90 vs 27.53±2.11, respectively), with more than half of the study participants classified as overweight or obese that was in agreement of previous studies[9,10].

These data are consistent with those of a study conducted by Ko et al., who observed that a larger waist circumference and a higher BMI were significantly correlated with NAFLD[10]. The high frequency of overweight individuals with NAFLD compared to those without NAFLD has also been previously reported [11,12.] BMI is linearly related to NAFLD/NASH [13].

The current study reveals a significant difference in the lipid profile between the NAFLD and non-NAFLD groups, with higher LDL and triglyceride levels and lower HDL levels in the NAFLD group. Dyslipidaemia plays a role in the development of NAFLD,andi s strongly associated withN AFLD severity[14].

A high BMI and large waist and neck circumferences were found to be significantly related to the ultrasonographicseverity of NAFLD. These results confirm the findings of previous research reported by Hatipoğlu and colleagues showing that neck circumference was associated with NAFLD in children[15]. Additionally, some researchers suggested the use of neck circumference as a simple and reliable anthropometric index for predicting a high risk of NAFLD [16,17]

NAFLD may progress to severe hepatic inflammation with elevated liver enzyme levels. A study had showed

elevated ALT and GGT in NAFLD subjects [18].

Liver biopsy still is The gold standard for achieving a definite diagnosis and stage is liver biopsy[19],but as this procedure is invasive and carries the risk of complications, Hence, non-invasive markers of fibrosis have been emerging to overcome these limitations [20].

PTX3 is a specific marker of localized vascular inflammation and is synthesized by different cell types; therefore, it is linked to inflammatory processes, and consequently, it has been considered to be expressed in hepatosteatosis[21].

Boga et al. found higher PTX3 levels in NAFLD patients and biopsy-proven NASH patients than in the controls[7], Moreover, Ozturk et al. concluded that elevated PTX3 levels were associated with the presence of fibrosis in NAFLD subjects[7]On contrary to our results where there was no significant correlation between non-invasive tests of liver fibrosis (FIB4, AAR & APRI) and serum Pentraxin.

In our study, also there was no correlation between the PTX3 level and the degree of steatosis detected by ultrasonography. These findings are in concordance with the results of Maleki et al., who suggested that PTX3 could not be used to differentiate the stages of NAFLD or fibrosis[22]. In contrast to these observations, Yoneda et al. investigated the clinical value ofPTX3level to predict NASH and found that it could be considered a marker for detecting fibrosis grading the severity[23] Another observational study concluded that higher PTX levels were associated with severe fibrosis[7].

These contradictory results may be due to the different ethnicities of the studied participants and the methods used for evaluating the PTX3 level. The small cohort compared with the aforementioned studies. Also, the majority of the enrolled patients in our study were classified as mild to moderate fibrosis (61%) lacking the proven liver biopsy.

A recent study demonstrated that the ultrasound-based hepatic steatosis severity grade was significantly associated with elevated transaminase and triglycerides but no relationship with the HDL, LDL or total cholesterol levels[24].

Our results revealed that the diameter of the right lobe of the liver is correlated with the degree of steatosis. Hence, we presume that the use of this sonographic measurement as a qualitative parameter for the detection of steatosis[25].

Conclusion

PTX3 has been noted among NAFLD patients as anon-invasivebiomarker, yet it is not correlated with markers of fibrosis and cannot be used for severity grading

Consent: Informed consent was obtained from all participants.

Source of Funding: Self

Conflicts of Interest: None

Ethical Clearance: Taken from ethical committee of internal medicine department

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Value of Cardiac Enzymes in Early Diagnosis of Cardiac Dysfunction in Pediatric Septic Shock

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Abstract

Purpose: Sepsis induced myocardial dysfunction (SIMD) is a severe complication in pediatric septic shock. The purpose of this study was to study serum cardiac troponin I (cTnI) as a biomarker for early detection of myocardial cell injury in pediatric severe sepsis and septic shock and to investigate its association with ECHO findings and clinical outcomes in pediatric septic shock. **Methods:** This study is a case control study that was carried out at Cairo University Children, s Hospital pediatric intensive care units (PICUs) from October 2016 to April 2017. Study included 80 patients whose ages ranged from 3 months to 12 years (40 normal controls coming to the outpatient clinics &40 cases in the PICUs who had clinical signs of severe sepsis and septic shock: 25 males and 15 females with a median age of 18 months). Bedside ECHO was done to the 40 included cases in the PICU to evaluate LV systolic function, LV diastolic function and RV function. **Results:** Serum cTnI was elevated in 33 of the 40 included cases (82.5%) and none of the controls showed cTnI elevation (0%). Prevalence of LV systolic dysfunction was 77.5 %, LV diastolic dysfunction was 52.5% and RV dysfunction was 52.5 %. Serum cTnI was correlated with LV systolic function but not with LV diastolic function, RV function, PRISM score or mortality. **Conclusion:** Elevated serum cTnI is highly prevalent in pediatric septic shock and is associated with decreased contractile function of the heart but not with clinical outcomes.

Keywords: *pediatric septic shock, myocardial dysfunction, troponin I, ECHO, PICU.*

Introduction

Sepsis is a clinical syndrome that complicates severe infection characterized by immune dysregulation, systemic inflammatory response, microcirculatory derangements and end-organ dysfunction[1]. Delayed recognition of pediatric septic shock is associated with worse clinical outcomes[2]. Sepsis induced myocardial dysfunction (SIMD) is defined as the intrinsic myocardial systolic and diastolic dysfunction during sepsis. Early detection of SIMD is essential to give the most efficient and suitable therapy[3]. Cardiac troponins I and T are regulatory proteins that control the calcium-mediated interaction of actin and myosin, producing myocardial contraction. Troponins normally do not exist in extracellular spaces, so their presence in serum is sensitive and specific marker of myocardial damage[4]. Although ECHO is a non-invasive test that helps assessment of the systolic and diastolic functions of the cardiac muscle during septic shock, it is user-dependent, with some inter-observer variability, affected by the loading conditions, tachyarrhythmias and mechanical ventilation[5].

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Method

This case-control study was carried out at Cairo University Children, s hospital PICUs from October 2016 to April 2017. 40 normal age and sex matched controls from outpatient clinics without history of cardiac disease were included. Serum cTnI was measured for the control group. 40 cases in the PICUs with clinical evidence of severe sepsis or septic shock were included. Children less than 3 months, those with congenital heart disease, recent resuscitation or 1ry conditions associated with

myocardial ischemia were excluded.

cTnI analysis was done for the cases within 24 hours of admission by cobas 6000 auto-analyzer 2 using a sandwich principle. Samples containing precipitates were centrifuged before performing the assay. Samples, calibrators and controls were ensured to be at 20-25℃ prior to measurement. The normal level of serum cTnI according to the assay used was 0.16 n g/ ml.

Bedside ECHO was done to cases within 24 hours of admission by either the on call assistant lecturer of pediatric cardiology or pediatric ICU. LV systolic function was assessed using EF (ejection fraction), FS (fractional shortening) and the presence or absence of LV dilatation (according to Bonatto percentile curves of LV diameter relative to body surface area (BSA). Any case with EF less than 55% or FS less than 28% was interpreted as LV systolic dysfunction. LV diastolic dysfunction was expressed as the presence of abnormal E/A ratio (where E represents peak velocity across the mitral valve during rapid ventricular filling and A represents peak velocity across the mitral valve during atrial contraction). RV dysfunction was expressed as the presence of RV dilatation (according to Bonatto percentile curves of RV diameter relative to BSA) and pulmonary artery pressure (PAP) elevation.

Clinically significant data were recorded including duration of acute illness before admission, duration of stay in the PICU, number of system dysfunction, grade of sepsis severity (severe sepsis, septic shock, MOSF (multiple organ system dysfunction), inotropic needs in the first 24 hours following admission; number, types, dose of inotropes used (micrograms/kg/minute), inotropic score and vasoactive inotropic score (VIS), vital signs interpreted for age, capillary refill time (CRT), urine output, need for mechanical ventilation, FiO_2 (fraction of inspired oxygen), PaO_2/FiO_2 ratio, blood cultures, PRISM& PELOD scores and outcome (discharge or mortality).

Data management and analysis were performed using Statistical Package for Social Sciences vs. 23. Numerical data were summarized using means and standard deviations or medians and ranges and explored for normality using Kolmogrov-Smirnov test and Shapiro-Wilk test. Categorical data were summarized as numbers and percentages. Exploration of data revealed that the collected values were not normally distributed. Comparisons between 2 groups were done using the Mann-Whitney test. Fisher's test was used to compare between the groups with respect to categorical data. To measure the strength of the association between numeric variables, the Spearman's correlation coefficients were calculated. All p-values are two-sided. P-values < 0.05 were considered significant.

Results

25 cases were males and 15 females. Ages ranged from 3 months to 12 years (median 18 months). The original diagnosis was bronchopneumonia in 12 cases, gastroenteritis in 11 and other diagnoses as (encephalitis, acute renal failure, postoperative cases, systemic lupus erythematosus and juvenile rheumatoid arthritis) in 17 cases.

Duration of the acute illness before admission had a median of 3 days and the duration of stay in the PICU had a median of 11 days. 21/40 cases died (52.5%) and 19 were discharged.

Table (1): Grade of sepsis severity in cases:

	Type	Count n=40	%
Grade of sepsis severity	Septic shock	11	27.5
	MOSF	26	65
	Severe sepsis	3	7.5

Number of system dysfunctions had a mean of 3.55 ± 1.55.

Table (2): System dysfunctions in studied cases:

System dysfunction	Interpretation	Count n=40	%
CVS	yes	40	100
Hematological	No	22	55
	Yes	18	45
Respiratory	No	4	10
	Yes	36	90
Neurological	No	17	42.5
	Yes	23	57.5
Hepatic	No	28	70
	Yes	12	30
Renal	No	26	65
	Yes	14	35

Perfusion was poor in 31 cases and urine output was abnormal in 15 cases (3 cases anuric, 7 oliguric and 5 polyuric). Mean CRT was 4.3±1.1 SD and mean UOP was 1.8±1.3 SD. All cases needed inotropes. Dobutamine, epinephrine, norepinephrine, milrinone and dopamine were used in 31, 29, 14, 12 and 7 cases respectively

Table (3): number of inotropes, inotropic score and VIS in cases:

	Mean	Median	SD	Minimum	Maximum
Number of inotropes	2.3	2	0.79	1	4
IS	25	20	20.6	0	120
VIS	39.48	30	29.58	10	160

36 cases were mechanically ventilated. PaO_2 /FiO_2 was normal (≥300) in 18 cases (45%). 13 cases had acute lung injury (PaO_2/FiO_2:200-300) (32.5%) and 9 cases had ARDS (PaO_2/FiO_2≤200) (22.5%). Median PRISM III & PELOD scores were 15.5 and 22 respectively.

Serum cTnI was elevated in 33 cases (82.5%). Serum cTnI in cases had a mean of 0.837±0.972SD. None of the control group showed elevated serum cTnI. The mean serum cTnI in the control group was 0.048±0.028SD. There was a significant difference between serum cTnI of both groups (P-value<0.001).

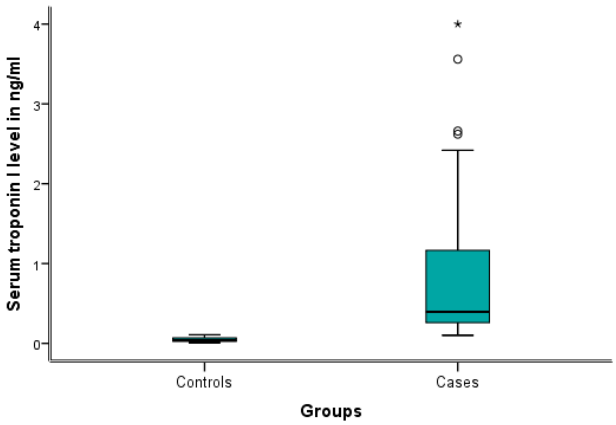


Figure (1): serum cTnI level (ng/ml) in cases and controls:

Blood cultures were positive in 24 cases (60%) which revealed growth of Klebsiella in 7 cases, Acinetobacter in 6 and others (E-coli, Pseudomonas, MRSA) in 11. Cultures other than blood (urine, sputum, wound swab, endotracheal tube and tip of catheter) were done in 29 cases of which 15 cases (37.5%) revealed no growth and 14 cases (35%) were positive (Acinetobacter in 6, Klebsiella in 2, E-coli and Pseudomonas 2 cases each, MRSA and Streptococcus pneumonia 1 case each).

ECHO findings:

Table (4): LV and RV dysfunction in cases:

	Interpretation	**Count n=40**	**%**
LV systolic dysfunction	yes	31	77.5
	no	9	22.5
LV diastolic dysfunction	Yes	21	52.5
	No	19	47.5
PAP elevation	No	23	57.5
	Yes	17	42.5
RV dilatation	No	23	57.5
	Yes	17	42.5
RV dysfunction	No	19	47.5
	Yes	21	52.5

Of 31 cases with LV systolic dysfunction, 16 had LV dilatation.

Of 21 cases with RV dysfunction, 13 had both PAP elevation& RV dilatation, 4 cases had PAP elevation only and 4 cases had RV dilatation only

There was positive correlation between the levels of serum cTnI and LV systolic function (P-value 0.013) where higher serum cTnI levels were in cases with abnormal LV systolic function. There was no statistically significant correlation between serum cTnI and LV dilatation (P-value 0.126).

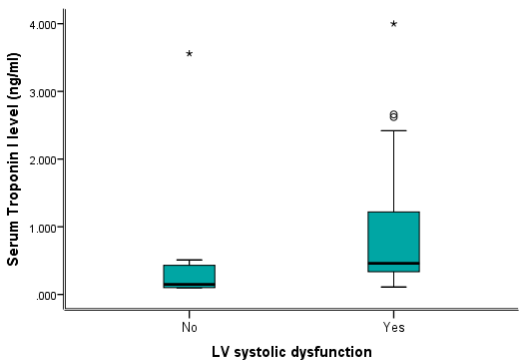


Figure (3): correlation between serum cTnI and LV systolic function.

There was no statistically significant relationship between serum cTnI and LV diastolic function, RV function, PRISM III score and outcome (P-value 0.278, 0.153, 0.283, 0.748 respectively). There was no statistically significant relationship between LV systolic function, LV diastolic function, RV function and outcome (P-value 0.583, 0.516, 0.516 respectively).

Discussion

Severe sepsis and septic shock are common presentations in PICUs with complications as MOSF and death[6]. Troponins are protein molecules that are part of the cardiac and skeletal muscles. 3 types exist: troponin I, T, and C. Troponin T binds troponin components to tropomyosin, troponin I inhibits the interaction of myosin with actin, and troponin C contains the binding sites for Ca^{2+} helping initiate contraction[7].

It is hypothesized that there is a component of myocardial dysfunction in the pathophysiology of pediatric septic shock attributed to dysfunctional microcirculation, direct myocardial cytotoxicity of the products of septic shock and mediators of sepsis (as TNFα, IL-6). Injury to the cardiac myocyte results in cell membrane damage, releasing cardiac markers as TnI, CK-MB into the circulation[8].

The aim of our study was to assess the prevalence of elevated serum cTnI, cardiac dysfunction by ECHO in pediatric severe sepsis and septic shock, to assess the relation between serum cTnI levels and ECHO findings, PRISM III score and outcome. The high prevalence of elevated serum cTnI in our cases is in agreement with **Lodha et al., 2009**[8] which showed elevated serum cTnI in 88% of cases of septic shock compared to control group (hypovolemic shock and sepsis without shock) in which 17.1% showed elevated serum cTnI. Our results were also in agreement with **Gurkan et al., 2004**[9] which showed elevated serum cTnI in 75% of pediatric septic shock cases and **El Tantawy et al., 2012**[10] **study** to assess the incidence of subtle myocardial dysfunction in critically ill children by measuring serum cTnI which was elevated in 100% of patients with severe sepsis and septic shock in contrast to control group.

Prevalence of elevated serum cTnI in 82.5 % of our cases is higher than rate of elevated serum cTnI in the study of Raj **et al., 2014**[5] (33%) and the study of **Briassoulis et al., 2001**[11] on meningococcus-induced purpura-fulminans (24%)[11].

LV systolic dysfunction was found in 31 cases (77.5%). This finding was higher than LV systolic dysfunction in previous studies on pediatric septic shock as **Williams et al**[12] (54%) and **Raj et al**[5] (37%).

Serum cTnI correlated with LV systolic function (P-value 0.013), LV FS (P-value 0.009) and LV EF (P-value 0.035). This is in agreement with **Gurkan et al**[9] which revealed correlation between serum cTnI and LV EF (P-value 0.025), **Fenton et al., 2004**[13]which revealed correlation between serum cTnI & both EF and FS (P-value 0.0022 and 0.0079, respectively)[13] and **Raj et al**[5] which revealed correlation between serum cTnI and LV systolic function (P-value 0.007). This can be explained by the decreased contractile power of the injured myocardium as a result of the toxins and mediators released in septic shock.

Our finding of LV diastolic function in 52.5% of cases is in accordance with **Williams et al., 2016**[12] (48% of septic shock cases). Although the number of cases with LV diastolic dysfunction was more in cases with elevated serum cTnI (19/33 cases i.e. 57.5%) than in cases with normal serum cTnI (2/7 cases i.e. 28.6%), there was no statistically significant relationship between serum cTnI and LV diastolic function (P-value 0.278). This is against the study of **Raj et al**[5] that used both E/A and E/e/in evaluating LV diastolic function and revealed association between serum cTnI levels and LV diastolic function (P-value 0.007)[5]. This can be explained by the fact that E/A reflects significant diastolic dysfunction and is preceded by abnormal E/e/ and thus E/A is less accurate than tissue Doppler derived E/e/.

LV dysfunction (systolic or diastolic dysfunction) was found in 80% of our cases which was close to **Williams et al**[12] (72%). Our study found RV dysfunction in 52.5% which was in accordance with **Williams et al**[12] that showed presence of RV systolic dysfunction in 54% and RV diastolic dysfunction in 35% of pediatric septic shock cases[12]. There was no statistically significant relationship between serum cTnI and RV function (P-value 0.153) although the number of cases with RV dysfunction was higher in the group with elevated serum cTnI (20/33 i.e. 60.6%) than the group with normal serum cTnI (1/7 i.e14.3%).

Mortality rate in our study was relatively high (52.5%). It was close to the mortality rate of **Lodha et al**[8] (44.4%) and **El Tantawy et al**[10] (49.2%). This can be explained by delayed admission of cases to the PICU due

to bed occupation and the presence of advanced septic shock with MOSF which causes myocardial damage in larger number of cases than PICUs of developed countries as in **Raj et al**[5](7%).

Although the mortality rate was more in the group with elevated serum cTnI (18/33 i.e. 54.45%) than the group with normal serum cTnI (3/7 i.e. 42.8%), there was no association between serum cTnI and mortality (P-value 0.748). This is in agreement with **El Tantawy et al**[10] and **Gurkan et al**[9] but not with agreement with **Lodha et al**[8] which revealed correlation between serum cTnI and mortality (P-value 0.04). The absence of association between serum cTnI and mortality in our study can be attributed to the presence of severe concomitant illnesses and systems failure other than myocardial cell injury (as ARDS, ESRD and CNS dysfunction) that might have contributed to the high mortality rate in the serum cTnI negative cases.

No association was found between ECHO parameters (LV systolic, LV diastolic and RV function) and mortality and this is in accordance with **Williams et al**[12] study. This could be due to reversibility of some ECHO abnormal parameters[3]. Different insults to various body systems are associated with different outcomes and the host immunity plays important role in determining the outcome[14].

Our study revealed no statistically significant relationship between serum cTnI and clinical aspects of disease severity (PRISM III score, PELOD, age, duration of stay, number of systems failure, VIS and IS). P-value was (0.283, 0.234, 0.593, 0.808, 0.169, 0.797, 0.509, respectively). This can be explained by our relatively small sample size, the presence of MOSF and the severe enough septic shock in the serum cTnI negative group to cause no significant difference between them and the serum cTnI positive group.

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Prevalence, Contributing Factors and Clinical Characteristics of Dyslipidemia in Children with Type 1 Diabetes

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Abstract

Background: Achieving ideal goals of glycemic control in children and adolescents with type 1 diabetes (T1D) is challenging. One of the commonest adverse effects of poor control is dyslipedemia with the subsequent cardiovascular events in young adulthood.

Aim: This study investigates the prevalence of lipoprotein disorders in children with T1D and studies its possible causes.

Materials and Method: We recruited 80 type 1 diabetic child, took full history and assessed them clinically for their status of growth and puberty. Biochemical analysis including glycated hemoglobin (HbA1c) and lipoprotein profiles was done.

Results: Abnormal lipid profiles were detected in 33% and poor glycemic control in 85% of our studied patients.The group of patients with better glycemiccontrol had a significant elevation of HDL-c and a significant reduction of TG levels than those with poor control. Moreover the group of patients who did not have dyslipdemia had a significant reduction in HbA1c level.

Conclusion: Dyslipedemia is highly prevalent in diabetic children. Poor glycemic control is a strong contributing factor. Early recognition and intervention is fundamental for the prevention of its harmful sequences. Further studies are warranted to asses the effect of improving glycemic control on the status of dyslipedemia in diabetic children.

Keywords: *Dyslipedemia, T1D, children*

Introduction

Improper glycemic control has its adverse consequences in children with type 1 diabetes (T1D), of these poor growth rates, the development of insulin resistance and dyslipidemia are frequently noticed.

According to ISPAD guidelines, screening for dyslipidemia should be performed soon after diagnosis in all children with T1D from age of 11 years. Cholesterol plays an important role in the initiation and progression of atherosclerosis.[1]In addition, dyslipidemia was associated with microalbuminuria and retinopathy development in the DCCT/EDIC [2] and some other studies.[3,4]

The prevalence of hypocholesteremia approached 50% of young adults in one study [5], while elevated non-HDL cholesterol approached 25% in another study of individuals younger than 21 years of age.[6]

This study aimed at observing the prevalence of dyslipidemia in children with T1Dand studying the clinical characters of those patients.

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Materials and Method

Study population:

We studied 80 children diagnosed with T1D following in the pediatric diabetes clinic, Cairo University Children Hospital over 12 months period from November 2016 to November 2017.

Patients were diagnosed according to the ADA consensus guidelines[7] that includes clinical symptoms and the laboratory findings. Patients with a minimum of 3 years diabetes duration were included. T1D Patients with known cardiovascular, hepatic, renal, systemic disease, chronic inflammatory disorder or receiving any medication other than insulin were excluded.

The protocol was approved by the local research ethics committee of the Pediatric department at Cairo University and all the participants or their guardians gave informed consent. The study complied with the World Medical Association Declaration of Helsinki regarding ethical conduct of research involving human subjects.

Clinical Measurements:

Complete clinical examination was applied to all studied patients including, blood pressure was measured on 3 different occasions and were compared to percentile curves for same age and sex. Patients lying on or higher than the 95th percentile for their height were considered hypertensive.[8]

The height was measured using Harpenden stadiometer and recorded to the nearest 0.1 cm and the weight was measured using self-calibrating electronic SECA scale that records to the nearest 0.1 kg. BMI (body mass index) was calculated as weight in kg/height in m2. We used Growth vision computer software provided by Novo Nordisk, Denmark to assess height SDS (standard deviation score), weight SDS and BMI SDS. Pubertal assessment was done following Tanner pubertal stages in girls[9] and in boys[10]. The waist circumference (WC) was measured in centimeters with a tape measure, at the narrowest circumference between the lower costal margin and the iliac crest[11] and was plotted on WC centiles.[12]

Biochemical Measurements

The most recent results of fasting lipid profile including; serum Cholesterol (TC), Triglycerides (TG), High density lipoproteins (HDL) and Low density lipoproteins (LDL) were obtained from the medical records. To define abnormal lipid profile (dyslipidemia), we followed the cut-offs of the National Heart Lung and Blood Institute. [8] Mean HbA1C levels over the preceding year presented in percentage were calculated, poor glycemic control was defined by HbA1C<7.5%.[13]TC, HDL, LDL, TG were performed by the use of standard methods on Cobas MIRA automated analyzer (Roche Diagnostics, Basel, Switzerland).

Statistical Analysis

Statistical analysis was performed using SPSS version 25 (IBM Co., Armonk, NY, USA). Student *t* tests or chi-square tests were used to compare the baseline characteristics between patient groups. All *P*-values were two-tailed, and $P<0.05$ was considered statistically significant.

Results

A number of 80 children with T1D with an age range of (11.1 to 18.1 years) were enrolled in the study. Table (1) shows the baseline clinical characteristics and biochemical parameters in those subjects.

Table (1): Clinical and biochemical data of the studied patients (n=80):

		Range
Age(yrs)	14.51±1.76	11.1- 18.1
Duration of diabetes(yrs)	5.15*	2.8-15.7
Insulin dose (IU/Kg/day)	1.25*	0.3-2.8
Weight SDS	0.2*	-4-3.1
Height SDS	-1.1*	-5.8-1.8
BMI SDSs	0.95*	-2.7-2.4
Waist circumference (cm)	79.27±6.54	64-94
SBP (MmHg)	117.56±16.27	70-160
DBP (MmHg)	78.1±11.96	50-109
Total cholesterol (mg/dl)*	170.5	133-285
Triglycerides (mg/dl)*	88	16-235
LDL-c (mg/dl)*	110	65-191
HDL-c (mg/dl)*	48.5	39-65
HbA1C (%)	10.11±2.43	5-14

Data are represented as mean and standard deviation. * median, BMI: body mass index, SBP: systolic blood pressure, DBP: diastolic blood pressure

46 Females were included in the study. Only 5% of T1D patients were considered obese with BMI SDS more than 2 and only 4 of them had their WC more than 90th centile. Hypertension was recognized in 33% of them and all of them were pubertal. Poor glycaemic control defined by HbA1C > 7.5 gm% was detected in 85%with a mean HbA1C 10.11±2.43 gm%. Regular insulin and NPH (Neutral Protamine Hagedorn; intermediate acting insulin) in a basal-bolus regimen was the most commonly used regimen with a total daily insulin dose range (0.3 to 2.8 IU/kg/day).

Dyslipidaemia was the most frequent complication detected in our T1D patients (33%), we compared between two groups of patients according to the presence of dyslipidaemias and a statistically significant elevation of HbA1C (P = 0.031) in the group with dyslipidaemia was recognized. No significant difference in BMI, insulin dose or blood pressure between the two groups.

When comparing two groups of our patients according to glycaemic control (HbA1C %), showed a statistically significant elevation of serum HDL-c levels, in addition to a statistically significant reduction in TG level in the group with good glycaemic control (HbA1C<7.5%).

Table (2): Comparison between two groups of patients according to the presence of dyslipidemia (n=80):

	Dyslipidemia (n=27)	**No dyslipidemia (n=53)**	**P value**
Age (Yrs)	14.53±1.9	14.42±1.71	0.736
Diabetes Duration (Yrs)*	5.2(4.2-8.4)	5(3.7-7.5)	0.728
Insulin Dose (IU/KG/Day)*	1.1(1-1.4)	1.3(1.2-1.5)	0.209
Weight SDS*	-0.1(-0.7-1.1)	0.3(-0.5-0.8)	0.630
Height SDS*	-1.7(-2.4- -0.2)	-1(-1.6- -0.2)	0.243
BMI SDS*	0.9(0.3-2)	1(0.1-1.5)	0.545
WC (cm)	79.24±6.49	79.29±6.67	0.979
SBP (mmhg)	115.82±15.19	118.41±16.92	0.593
DBP (mmhg)	79.53±13.24	77.32±11.4	0.550
HbA1C (%)	11.5±1.88	9.93±2.53	0.031

Data are represented as mean ± SD, or * median and interquartile range (IQR). P-value <0.05 is considered significant. BMI: body mass index; WC: waist circumference; SBP: systolic blood pressure; DBP: diastolic blood pressure; LDL-c: low density lipoprotein cholesterol; HDL-c: high density lipoprotein cholesterol; HbA1C: glycated hemoglobin.

Table (3): Comparison between two groups of patients according to glycemic control (HbA1c% cut off 7.5%) (n=80):

	>7.5% (n= 68) Poor control	**<=7.5% (n=12) Good control**	
Age (Yrs)	14.32±1.71	15.83±1.91	0.101
Diabetes duration (Yrs)*	5.15(3.9-7.5)	6.65(4.6-9.2)	0.478
Insulin dose IU/Kg/Day)*	1.2(1-1.5)	1.5(1.35-1.8)	0.132
Wt SDS*	0.2(-0.6-0.8)	0.55(-0.45-2.3)	0.416
Ht SDS*	-1.1(-1.8-0.2-)	-1.45(-1.85-0.4-)	0.850
BMI SDS*	0.94(0.1-1.6)	1.4(0.05-2.15	0.569
WC (cm)	78.82±6.47	84.50±5.69	0.096
SBP (mmhg)	118.26±15.22	109.50±27.53	0.307
DBP (mmhg)	78.87±11.61	69.25±14.22	0.124
Total cholesterol (mg/dl)*	172.5(155-197)	169(152-170)	0.339
Triglycerides (mg/dl)*	94.5(70-140)	53(50-63)	0.024
LDL-c (mg/dl)*	111(98-124)	94.00(86.5-102.5)	0.097
HDL-c (mg/dl)*	48(43-53)	59(52.5-64)	0.021

Data are represented as mean ± SD, or * median and interquartile range (IQR). P-value <0.05 is considered significant. BMI: body mass index; WC: waist circumference; SBP: systolic blood pressure; DBP: diastolic blood pressure; LDL-c: low density lipoprotein cholesterol; HDL-c: high density lipoprotein cholesterol; HbA1C: glycated hemoglobin.

Discussion

This was a cross sectional study that studied the status of dyslipidaemia in children with T1D, our results point to the high prevalence of lipid disorders in this population, and that these disorders are mainly contributed to poor glycaemic control.

The main pattern of dyslipidaemia in our study was high TG levels, which is in agreement with Osawa and his colleagues[14] and with [8]who stated that the main dyslipidaemic pattern in childhood is moderate to severe elevation of TG level, normal to mild elevation of LDL-c and reduction of HDL-c, and low HDL levels in agreement with Pérez et al.[15]who announced that low HDL-c was the most frequent dyslipidaemic pattern in patients with poorly controlled T1D, that fortunately improved by optimization of glycaemic control through intensive insulin therapy.

In the previous literature, HDL-c levels were shown to be normal or high in T1D, a finding that was explained by the high activity of lipoprotein lipase(LPL)

in adipocytes that avidly hydrolyses triacylglycerol rich particles, resulting in high HDL- c levels.[16]

Dyslipidaemia in itself has its adverse consequences on insulin sensitivity in diabetic patients as was reported by Krochick and colleagues[17],they stated that poorer sensitivity to insulin in children and adolescents with T1Dwas related to lipid disorders in those subjects.

In an attempt to understand the link between poor glycaemic control and dyslipidaemia, we searched the literature; Pang and Nardeen[18] postulated that chronic hyperglycaemia results in two metabolic pathways: accentuation of ectopic fat accretion with increased intramyocellular lipid content, interfering with insulin signaling pathways in skeletal muscles giving rise to insulin resistance, and promotes lipolysis. In the same context, Heptulla et al.[19]concluded that poor glycaemic control with the resultant glycation end products interfere with insulin action promoting lipolysis giving rise to non-esterified fatty acids which in turn impede with the insulin stimulated glucose uptake by substrate competition through the Randle cycle. These explanations point to a vicious circle of insulin resistance, poor glycaemic control and dyslipidaemia.

Another theory at hand is the reversed fat partitioning; as it is well known that insulin not only exerts its effects on glucose metabolism, but it also has profound effects on lipid metabolism via promotion of hepatic and peripheral fat storage and suppression of hepatic and peripheral fat oxidation. However in T1D, with absent pancreatic insulin secretion and its exogenous replacement, contrasting lipid handling might be predicted.[20]

Unfortunately, dyslipidaemia predispose to atherosclerotic changes that, according to ISPAD [1], start in childhood and adolescence as shown by intima-media thickness of the aorta and carotids.[21,22] Moreover, some researchers detected silent coronary atherosclerosis by intravascular ultrasound in young adults with childhood onset of diabetes.[23]

In the same boat, Schofield and colleagues reviewed the pathophysiology and implications of the alterations in lipoproteins and reported a significant association between atherosclerotic changes and serum level of Tc, TG in T1D.[24]

Conclusion

Our results point to the high prevalence of dyslipidaemia in children with T1D, emphasizing on the strong link to poor glycaemic control. The expected deleterious complications urge all physicians caring for diabetic children to monitor lipoprotein profiles periodically, trying every effort in maintaining optimal glycaemic control.

Conflict of Interest: None

Funding Sources: No funding sources

Statement of Human Rights: The study done was in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008.

Statement of Informed Consent: Informed consent was obtained from all subjects for being included in the study.

Ethical Clearance: Cleared by the ethical committee of the Pediatric department at Cairo University

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Assessment of Anatomic Anterior Cruciate Ligament Reconstruction Using Distally Inserteddoubled Hamstrings Tendons

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Abstract

Background: The anterior cruciate ligament is an important, internal, stabilizer of the knee joint, restraining anterior translation of the knee.

Objective: Assessment of anatomic anterior cruciate ligament reconstruction by using distally inserted doubled hamstrings tendons by clinical evaluation.

Method: This study was carried out on 30 patients with ACL deficient in the period from March 2014 to July 2017. Anatomic anterior cruciate ligament reconstruction using distally based doubled hamstrings tendons performed to all patients in this study.

Results: The results show a significant improvement in Lysholm knee score postoperatively, and all its sub-score show a considerable increase.

Conclusion: The improvement of ACL reconstruction by using technique permits an anatomical ACL reconstruction with the advantage of the preservation of hamstrings tendon insertion.

Key Words: *ACL reconstruction, knee, arthroscopy and distally base.*

Introduction

Many methods of ACL reconstruction is known most of them sacrificed the insertion of the hamstring muscle[1]. The ACL, providing mechanical stability, also contributes to the proprioception sensation of the knee[2]. Proprioception is the sensory modality that encompasses the feeling of joint position and joint motion. Mechanoreceptors, along with muscle spindles for the joint proprioception, have been found in the cruciate ligaments[3]. Injury to the anterior cruciate ligament (ACL) not only causes mechanical instability but also leads to a functional deficit in the form of diminished proprioception of the knee joint4. "Functional" is often incomplete even after "anatomic" arthroscopic ACL reconstruction, as some patients with a clinically satisfactory reconstruction and proper ligament tension continue to complain of a feeling of instabilitylity and to give way [4], although the knee does not involve subluxation on clinical examinations. Factors that may play a role could be proprioceptive elements, as the intact ACL has been shown to have significant receptors[5].

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Aim of the Work

The objective of this study was the assessment of anatomic anterior cruciate ligament reconstruction by using distally inserted doubled hamstrings tendons.

Patients and Methods

This study was carried out on 30 patients with ACL deficient in the period from March 2013 to January 2017.

nclusion criteria:

Normal contralateral knee.

Associated meniscal injuries had been managed either by repair or meniscectomy.

Exclusion criteria:

Large chondral lesion Tear in PCL, LCL&MCL.

Previous knee surgery

(A) Preoperative evaluation:

1 - Careful history taking.

2 - Analysis of a patient's complaint. 3 - Clinical examination.

4 –Radiographic evaluation: - Includes plain X-ray and MRI.

5 - Rating scales: - Include A- Lysholm knee score.

B- International Knee Documentation Committee score (IKDC).

(B) Operative ACL reconstruction: Timing of surgery:

In this study, the timing of ACL reconstruction from the date of injury was not the most critical issue.

The technique of surgery:

1-position of the patient: The patient was laid supine.

3- Examination under general anesthesia:

All knees examined under anesthesia .

4 - Diagnostic arthroscopy. 5-Harvesting of the graft:

The grafts harvested through 1.5-inch incision centered approximately 2cm medial to the tibial tubercle. Dissection was carried down to the sartorious fascia, which was incised parallel and distal to the palpable (ST) tendon. The (ST) ± (Gs) tendons were then released from all their fascial bands to prevent premature amputation of the tendon short of its muscle belly. As seen in Fig 1

The stripper was advanced using a slow and steady motion into the thigh, and the tendon released from its muscle belly by holding the stripper in place and slowly pulling the tendon out of the incision. The tendons are collected using a blunt tendon stripper while the knee is in 90° of flexion.

6- Preparation of the graft:

The harvested tendons sutured together.as seen in figure 2

7- Management of associated injuries: 8-Arthroscopic Reconstruction:

A 3-portal technique used. The main anterolateral (AL) and anteromedial (AM) portals created along the patellar tendon edges. The AL portal is created at the level of the inferior pole of the patella, allowing full visualization of the ACL tibial footprint from above. An accessory AM portal (AAM), located approximately 1 cm below and medial to the main AM portal, was finally created under direct visualization of the arthroscope with the help of a spinal needle. It must be located just above the medial meniscus and away from the medial femoral condyle. Initially, the scope inserted through the AL portal, and instruments introduced by way of the main AM portal. Later the AAM portal was used for instrumentation while visualizing the femoral footprint through the AM portal. The notch was debrided, saving 1 to 2 mm of ACL fibers at both the tibial and femoral footprints.

The posterior edge of the lateral femoral condyle must identified. The medial aspect of the lateral femoral condyle contains the lateral intercondylar ridge (resident's ridge) representing the superior most boundary of the femoral ACL origin. The bifurcate ridge separates the AM and PL bundle origin. The remnants of the incompetent ACL were removed with thermocautery because arthroscopic shaving may inadvertently destroy the bony references. Attempts made at preserving a small peripheral rim of ligament because these fibers are thought to contain proprioceptive elements.

6- A rosette reamer according to the size of the graft was used to ream the femoral tunnel. A 25 mm long femoral tunnel is enough usually.

Tibial tunnel placement:

1- The scope was introduced through the AL portal while the knee was hanging free in 90º flexion.

2- The guide set at a 55º angle.

3- The guide aimer passed through the AM portal.

4- The stylet tip of the guide arm put in the center of the footprint midway of the centers of both bundles of native ACL.

5- The tibial tunnel entrance was through the graft harvest incision, 1.5 cm medial to the tubercle and about 4 cm distal to the tibial articular surface. The cannulated guide arm passed to this point.

6- Drilling a guide pin through the cannulated guide arm. After penetrating the joint, the guide removed. 7-Depending on the graft size, the tibial tunnel was drilled. As seen in figure 3

Graft passage and fixation:

1-A grasper was passed through the tibial tunnel to bring out the Ethibond which pass in the femoral tunnel.

2-The Ethibond no. 5 sutures of the prepared graft are passed using the stainless wire loop from the tibial tunnel to emerge outside the skin of the thigh. 3-By pulling on the Ethibond sutures outside the thigh, the ST graft passed through the tibial then the femoral tunnel.

4- Once the endobutton is flipped over the cortical of the lateral femoral condyle, and the free portion of the graft is pulled to tighten of the distal portion of the graft

5- Scopic assessment throughout the full range of motion (ROM) to assess for impingement either on PCL or roof of the notch.

6- Prepared the free edge of the graft and continuous flexion and extension of the knee then Fixed free side by staples when the knee in 30 degrees of flexion.

Pearls and Pitfalls

The entry of the tibial tunnel should be placed high enough to prevent kinking of the tendon, which would result in damage to the vascularization and reduction of mechanical resistance.



Fig 1 . The tendons are collected using a blunt

.tendon stripper while the knee is in 90° of flexion



Figure 2. A The harvested tendons are then sutured together using 2 nonabsorbable No. 2 stitches graft

. after preparation using endobutton group20-30. Regarding sex, the majority of the patients (87.0%) were male, while only 4 cases were females.

The clinical data of the studied patients, regarding the affected side, 18 patients (60.0%) the affected side was the dominant hand, while 12 patients (40.0%) the affected side was nondominant. Regarding the cause of injury, the majority of the cases (66.7%) was sports injury while10 cases were nonsport injury.12cases(40.0%) had a torn medial meniscus,8cases(26.7%)had torn lateral meniscus,4cases (13.3%) had torn both menisci, and 6 cases had torn ACL only.

The Lysholm system based on subjective assessment of the following:

Table (1), shows the different scores pre and post-operative.

Table (1): Comparison between support score pre and postoperative in studied patients group.

	Preoperative	**Postoperative**	**t**	**p**
Limp score	2.94±1.88	4.63±0.76	5.11	0.001*
Supportscore	3.88±1.47	4.75±0.61	4.365	0.005*
Lockingscore	10.91±4.75	13.38±2.79	3.98	0.012*
Instability score	17.03±6.10	23.91±2.03	4.01	0.002*
Painscore	14.84±7.31	21.41±4.61	6.01	0.009*
Swelling score	6.25±3.12	8.94±1.90	6.25	0.0026*
Stair climbingscore	6.41±2.74	9.25±1.52	5.03	0.002*
Squattingscore	3.09±1.87	4.44±0.94	4.02	0.015*
Lysholmknee score	72.31±12.68	89.00±10.73	4.98	0.01*

Objective evaluation (Table 2)

The **IKDC** knee examination form used for objective evaluation. This Form contains seven



Figure 3 . Drilling of the tibial tunnel from outside .

Results

The age of the patients ranged from 20- 40years with a mean of 28.53±5.82 years; the majority of the patients (70.0%) was in the age of measurement items. All patients scored for these items before and after the surgery. Four grades determined for each group:

GradeA=normal, Grade B=nearly normal, Grade C=abnormal and Grade D= severely abnormal

Group (IKDC) scoring

The pre-operative and post-operative distribution of cases according to the functions grading of the IKDC of group A showed a statistically significant differences regarding all parameters ($p<0.05$) except for lack of extension($p>0.05$)

Table (2): Objective evaluation items pre and postoperatively

	Preoperative		**Postoperative**		**X2**
	No.	**%**	**No.**	**%**	**p**
Effusion					
Normal	9	30.0	25	83.3	
Near normal	12	40.0	4	13.3	
Abnormal	8	26.7	1	3.3	
Severe abnormal	1	3.3	0	0.0	
Passive motion deficit					
Lack of extension					
Normal	24	80.0	25	83.3	
Near normal	6	20.0	5	16.7	0.11
Abnormal	0	0.0	0	0.0	0.738
Severe abnormal	0	0.0	0	0.0	
Lack of flexion					
Normal	8	26.7	21	70.0	
Near normal	9	30.0	6	20.0	13.70
Abnormal	8	26.7	3	10.0	0.0033*
Severe abnormal	5	16.7	0	0.0	
Ligament examination					
Lachman test:					
Normal	0	0.0	15	50.0	
Near normal	0	0.0	11	36.7	46.5
Abnormal	21	70.0	4	13.3	0.0001*
Severe abnormal	9	30.0	0	0.0	
Pivot shift test:					
Normal	0	0.0	18	60.0	
Near normal	0	0.0	9	30.0	49.5
Abnormal	21	70.0	3	10.0	0.0001*
Severe abnormal	9	30.0	0	0.0	
Functional (leghop test):					
Normal	0	0.0	21	70.0	
Near normal	8	26.7	6	20.0	36.1
Abnormal	17	56.7	3	10.0	0.00001*
Severe abnormal	5	16.7	0	0.0	

Table (3): KT-1000measurementsin the studied patients.

KT measurements	No.	%
Normal	14	46.7
Near normal	12	40.0
Abnormal	4	13.3
Mean±S.D.	3.92±0.41	

Discussion

This study evaluates the outcome of anatomic anterior cruciate ligament reconstruction using distally inserted doubled hamstrings tendons.

This study included 30patients (30knee), the age of the patients ranged from20-40years with a mean of 28.53±5.82 years; the majority of the patients (70.0%) was in the age group 20-30. Regarding sex, the majority of the patients (87.0%)were male, while only 4 cases were females. Regarding the affected side, 18 patients (60.0%) the affected side was the dominant hand, while 12patients (40.0%) the affected side was nondominant. Regarding the cause of injury, the majority of the cases (66.7%) was a sports injury while 10 cases were a nonsport injury. 12cases(40.0%) had a torn medial meniscus,8cases(26.7%) had torn lateral meniscus,4cases(13.3%) had torn both menisci and 6 cases had torn ACL only.

In agreement with our study demographic and basic patients data,[7] **Ravi Gupta, et al., (2010)** evaluates the outcome of Preserved insertions of the semitendinosus and gracilis tendons(STG)in ACL reconstruction. They found that there were 39men and6women. Averageagewas 25.4 years (range 18-- 44years).The mode of injury was a road-side accident in 37patients, sports injury in five and fell from stairs in three. Twenty-one patients had an injury on the left side.

In a study done by **Roberto Buda**, **et al.,** which evaluated the same to are fifty-seven patient affected by unilateral ACL injury were operated by Anatomic ACL Reconstruction Using Distally Inserted Doubled Hamstrings Tendons. Patients included 32 men and 25 women with a mean age of 23.3years(range,16-32years). Meantime from injury to surgery was 2.9(range,1-6months)months. All patients were involved in sports at a recreational level.[8]

In our study, the total lysholm knee score pre and postoperative, before surgery, the Lysholm knees core was excellent in3(10.0%), good in3(10.0%) patients, fair in11 patients(36.7%)and poorin13 patients(43.3%). After surgery, the Lysholm knee score was excellent in 13 patients

(43.3%) and goodin 13 patients (43.3%) and 2patients (6.7%) was classified as fair while 2patients(6.7%)was poor. The mean lysholm score preoperative was72.31±12.68and increased significantly to be 89.0±10.73; there was a significant increase in total lysholm knee score postoperatively.

According to RaviK. Gupta, The mean Lysholmscore, at the final follow- up was 95.22 in comparison to the preoperative score of 62.4. [7]

It could attributed to the fact that the majority of patients in our country and developing countries get diagnosed late; the instability and its associated secondary damage in the knee due to delayed presentation may be the reason for a very low preoperative Lysholmscoreinour patients. [8]

Our mean postoperative Lysholm score and postoperative subjective IKDC score, of 89.0 ± 10.73, 92.87%, respectively are near that reported by Roberto Buda, MD; Alberto Ruffilli, MD; *et al*. The mean International Knee Documentation Committee subjective score at final follow-up was 97.161.4. According to the International Knee Documentation Committee objective score, [10] at last follow-up, 50 patients were rated A, and 7 patients were rated B. Among the patients rated B, 4 reported anterior knee pain related to a patellofemoral chondropathy despite an objective stable knee. The other 3 patients rated B had an objective mild instability; in 1 patient, both the Lachman and the pivot-shift tests showed a slight objective instability, whereas only the Pivot shift test was nearly normal for the other 2 patients. Summar of our result compared with the outcome of other author show in results.

In our study, 100% cases reported their knees as normal or near normal(grade +B objective IKDC) after reconstruction, and so was the case with Robert oBuda(97%). In our study, all patients scored for the IKDC knee examination items before and after the surgery.

Regarding functional evaluation before surgery, 17patients (56.7%) were graded abnormal, and

5patients(16.7%)were graded severely abnormal. After surgery, 21 patients (70.0%) were gradedas normal,6patients(20%)were graded nearly normal, and 3 patients (10%)were graded abnormal. There was a significant improvement in Functional evaluation post-operative.

Our results are consistent with those of previous authors, indicating excellent restoration of anterior and rotatory stability for most patients. Though Lachmantestisa reliable clinical test for diagnosis o fACL rupture, quantification of anteroposterior tibial displacement remains inaccurate. [9]

In this study differential anterior tibial translation(when compared with the normal knee)was following studies conducted by **Yasuda *et al.*[10].** No patient in our study reported instability during activities of daily living or doing strenuous activities.

Achieving rotatory control of the knee post ACL reconstruction has been shown to increase patient satisfaction, decrease functional instability, and potentially delay the development of osteoarthritis. The pivot shift can assess this rotatory component of knee laxity and appears to have the potential to become a benchmarking gauging the success of ACL surgery. In this study, all patients were pivot shift negative after ACL reconstruction, which is comparable with the research conducted by **Järvelä and Kim*etal*.** In there the result was slightly better than **Siebold *et al*.** and **Yasuda *et al*.** (97% each). [11,12]

Conclusion

The improvement of ACL reconstruction by using technique permits an anatomical ACL reconstruction with the advantage of the preservation of hamstrings tendon insertion and the creation of a femoral socket with an enhancement of the ligamentization process of the graft help in the excellent outcome postoperatively.

Conflict of Interest: The authors declare that no conflicts of interest.

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Ethical Clearance: Cleared by the ethical committee of Cairo university

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Anterior Odontoid Screw, Single Institutional Experience in Tertiary Care Center in Developing Country

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Abstract

Objective: This study was done to evaluate clinical picture, radiographic findings and results of anterior odontoid screw fixation in cases of odontoid fracture, using one hollow titanium odontoid screw, according to our limited facilities in absence of intraoperative neuronavigation or O-arm using only one C-arm to ensure ideal trajectory.

Method: The present study included 14 patients, 10 males and 4females. Their ages ranged from 19 to 56 years. Instability resulted from fracture of the odontoid process type II in12 cases, and type III in 2 cases. Single hollow titanium anterior odontoid screw was used in fixation using only one C-arm intraoperative to ensure ideal trajectory. Postoperative Philadelphia neck collar was applied for 8-12 weeks. Outcome Measures included radiological evaluation of successful bone fusion, neurological evaluation using the American Spinal Injury Association (ASIA) motor score, neck and arm pain scoring, and neck disability index (NDI). Evaluations were conducted preoperatively and at end of follow-up period which ranged from 6 to 12 months.

Results: Postoperative evaluation revealed that 50% of patients improved, while 50% of patients remained at the same ASIA score as pre-operative. Pain and neck disability scores were reduced postoperatively compared with preoperative. Fusion was achieved in 13 cases (93%) at last follow-up. Instrumentation failure occurred in only one case due to screw break.

Key words: *Trauma, Odontoid fracture, Instability, Anterior odontoid screw, C-arm.*

Introduction

The axial odontoid fractures represent about (10%-15%) of cervical fractures [1]. There are three types of odontoid process fractures, according to Anderson and D'Alonso[2]. Odontoid (O) (II) fracture which involves the base of O process is the most kinds[2, 3].

Type I odontoid fracture which involves the apex of the odontoid and Type III fracture in which the fracture line extends to the body of C2 often stable and treated conservatively with external immobilization in form of cervical collar or Halovest. Second type is a high risk of non-union and pseudoarthrosis [4-6].

Surgical approaches of O fractures were classified as either anterior or posterior approaches. Posterior C1-C2 fusion leads to limitation of rotatory movement of cervical spine, while anterior O screw rotatory movement of cervical spine is maintained with good fusion results [9-11].

With recent advancements in neurosurgery and intra operative tools as Neuro-navigation and O arm, odontoid screws could be placed safely with increase accuracy, and less morbidity [7-8]. Most of developing countries such as Egypt still invariably lack these facilities, and free hand way stills the only option of management.. So the aim of this study is to evaluate anterior odontoid screw placement, associated complications and peri-operative morbidity with odontoid fracture to limited facilities in absence of intra-operative neuronavigation or O-arm using only one C-arm to ensure ideal trajectory.

Materials and Method

This prospective study was conducted at the departments of Neurosurgery, Cairo University to allow 6-12 months follow-up for the last case operated upon. The study included 14patients who suffered from odontoid process fractures indicated for surgical fixation.

Inclusion criteria:

1. Type two odontoid fracture.
2. Shallow type three odontoid fracture.
3. The fracture is reducible.
4. Acute fracture (less than three months)
5. Posterior oblique fracture

Exclusion criteria:

1. Irreducible fracture.
2. Chronic fractures (more than three months).
3. Transverse ligament disruption.
4. Inability to achieve an appropriate screw trajectory because of a barrel chest, short neck, fixed thoracic kyphosis deformity, and fracture patterns that require a flexed position to obtain reduction
5. Anterior oblique fractures (posterior superior to anterior inferior).
6. Type three odontoid fracture with significant vertebral body involvement because of poor proximal screw fixation

There were 10 males, and 4 females and their ages ranged from 19 to 56 years.

The cause of instability was fracture of the odontoid process type II in 12 patients (86%), and type III in 2 patients (14%). Trauma was the cause of injury in all cases, road traffic accidents in 9 cases (64%), falling from height in 4 cases (29%), and blunt trauma in one case (7%).

As regards the clinical presentation, all patients had presented with posterior cervical pain with variable degrees of radiation to the occipital region. Pre- operative motor power according to ASIA motor score, 5 patients were ASIA grade E, 5 patients were classified as ASIA grade D, 2 patients were ASIA grade C, and 2 patients were ASIA grade B

Table (1): Showing ASIA score grading system (Maynard *et al.,* 1997)

ASIA Impairment Scale	
A	Complete lesion
B	Incomplete sensory preservation
C	Incomplete motor preservation <MRC grade 3
D	Incomplete motor preservation >MRC grade 3
E	Normal neurological function

All cases had preoperative craniocervical X-ray, CT, and MRI examinations. The disease nature was explained, the procedure and the alternate routes of management were explained to all the patients and their relatives. Written consent for the management was obtained from all the patients.

Anterior odontoid fixation with single hollow titanium odontoid screw was performed in all cases. We lack an 'O' arm and navigation system to aid us in ideal placement of odontoid screws, we had only one C-arm in all cases which was used to achieve the optimum trajectory.

Following the procedure we encouraged early mobilization of the patients on a cervical collar from day 2 post surgeries, after performing a CT cervical scan to assess the direction and location of the screw. ASIA score grading system was used post-operative to assess neurological outcome. Fusion was assessed by cervical plain X-ray films and CT scan.

Results

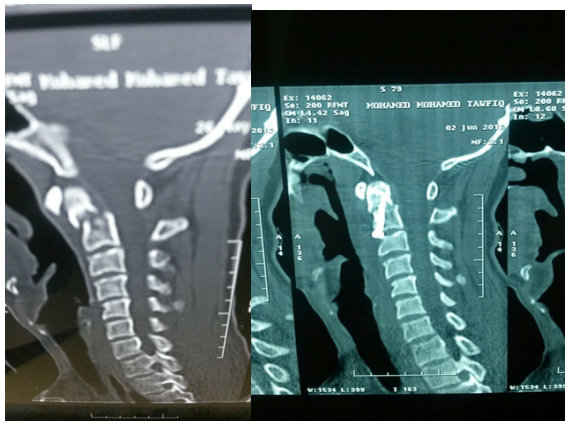
All surgeries were conducted smoothly without intraoperative complications or vascular injury. . The mean duration of the procedure was 260 min (range 100– 300 min).

Postoperative clinical evaluation(PCE) revealed increase the neurological ASIA of 50%patients, five patients improved from ASIA score D to E, one patient from C to D, and one patient from B to D),while 7 patients (50%) remained at the same ASIA score as pre-operative, (5 patients were ASIA score E, one patientswas C, and one patient was D).

Postoperative X- rays and CT detected proper reduction and alignment with evidence of bone fusion in 13 cases (93%). Only one case (7%) suffered from progressive neck pain with limitation of neck mobility X rays and CT were done that detected screw break and misalignmentthat was managed with posterior fixation

and fusion.

Mild dysphagia in 36% of patient were improved within few days.



A B

Figure (1) (A) CT sagittal reconstruction shows odontoid fracture. (B) CT sagittal view after odontoid screw placement

Discussion

Odontoid fractures are a common type of cervical spine fractures have increased incidence in elderly.[12] Awidely used classification for O fractures is the anderson and D'alonzo classification.



A B C

Figure (2) (A) and (B) are intra operative C-arm images (lateral and AP views) show placement of the guide wire through the odontoid process. (C) C-arm AP view shows the introduction of the cannulated screw over the K-wire.

Type II fractures are common associated with higher non fusion up to 78% with fracture dislocation of 6 mm or greater [2].

Conservative management with halo vest was option and used, surgical management is comparatively so far more superior [13-14].

Anterior odontoid is initially described in in Japanese orthopedic journal in 1980 [15]. The greatest advantage is maintenance of atlanto-axial mobility[16]. Also no need for bone grafting, less invasiveness, and less soft tissue dissection via a limited anterior cervical exposure. Major limitations of the procedure are need for intact transverse ligament and the fracture to be reducable before screw placement.

With recent progression in neurosurgery and intra operative facilities such Neuro-navigation and O arm, odontoid screws can be placed safely with high accuracy and less morbidity.. Most developing countries have deficiency in facilities in most of neurosurgical centers.

Our study was carried out on 14 patients who suffered from odontoid fractures, and underwent anterior odontoid screw fixation. There were 10males, and 4females.Their ages ranged between 19 and 56 years, and the mean age was 36.1 years, this was consistent with what was reported by **Bhattarai *et al.*** [17]. In this study the cause of instability was fracture of the odontoid process type II in 12 patients (86%), and type III in 2 patients (14%) (both patients refused prolonged immobilization in halo

vest). Trauma was the cause of injury in all cases, road traffic accidents in 9 cases (64%), falling from height in 4 cases (29%), and blunt trauma in one case (7%)., also in **Bhattarai et al. [17].** Fond road accidents were common type of injury (60%) then fall injuries (26.67%).

In our study five patients were neurologically intact at the time of injury (36%), and nine patients presented with incomplete neurological lesions, also neck pain was a presenting symptom in all cases of odontoid fractures.

In this study, anterior odontoid screw was done in all cases, using single hollow titanium odontoid screw. We used intraoperative a single C-arm to obtain the ideal trajectory. All surgeries were conducted smoothly without intraoperative complications or vascular injury.

In this study 13 cases (93%) showed proper reduction and alignment with evidence of bone fusion. Only one case (7%) suffered from screw breakage and misalignment that was managed with posterior fixation and fusion. Neck pain improved in 95% and clinical evaluation revealed improvement of neurological ASIA grading in7 patients (50%), while 7 patients (50%) remained at the same ASIA score as pre-operative. These findings correspond to the results of **Bhattarai et al.**[17] fond (15) patients with odontoid fractures, had underwent anterior odontoid screw, 14 out of 15 had excellent post-operative gain, only one mortality case due to cardiac problems. Also in **levi et al.**[18] which included 32 patients with odontoid fractures, who underwent anterior odontoid screw placement, 30 patients had satisfactory healing of their fractures with (91% fusion rate). Two patients had early failure of the screw within 2 weeks of surgery due to severe osteoporosis.

Conclusion

§ Anterior odontoid screw fixation is benefit way for restoring stability after an odontoid fracture maintaining axial rotation with high fusion and less morbidity and mortality rates. However, the indications for this technique are relatively limited to acute reducible odontoid fracture with intact transverse ligament.

§ Absence of intra operative facilities such Neuro-navigation, neurophysiological monitoring and O arm isn't considered as a true obstacle to obtain favourite results.

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No **Conflict of Interest**

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Which is better? Transforaminal Lumbar Interbody Fusion Vs. Posterolateral Fusion in Treating Degenerative Spondylolisthesis

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Abstract

Background and Objective: Degenerative spondylolisthesis can be treated surgically with various techniques like trans-foraminal lumbar interbody fusion [TLIF] and postero-lateral fusion [PLF]which are the most common techniques used in practice. In our study we describe our experience in these techniques in treating degenerative spondylolisthesis regarding outcome and complications.

Method: This prospective study was conducted upon 32 patients with degenerative spondylolisthesis, divided in 2 groups randomly selected; one group will be operated upon by posterolateral fixation and the other group by TLIF at the Department of Neurosurgery, Cairo University KasrAlainy. We evaluated surgical outcomes in terms of clinical improvement and complications.

Results: Thirty-two patients were included in this series; divided in two groups. Postoperative mean visual assessment score (VAS) in TLIF group was 1.5 regarding leg pain and 2.75 regarding back pain, while in the PLF group was 1.56 regarding leg pain while 2.87 regarding back pain.

In TLIF group one patient suffered from canal encroachment by L5 screw causing severe sciatica and it needed reoperation and screw revision.

In PLF group two patients suffered from weakness, one of them was in the form of increase in weakness of the hip flexion and the other was new weakness in dorsiflexion and they were treated conservatively and physiotherapy, and they showed mild improvement. One patient suffered from superficial wound infection and mild dehiscence and was treated by antibiotics and bedside secondary sutures under local anesthesia.

Conclusion: No statistical significance difference in term of clinical improvement in both groups regarding back and leg pain.

Keywords: *Degenerative spondylolisthesis, TLIF, PLF, lumbar lordosis and sagittal balance.*

Introduction

Spondylolisthesis is a clinical entity results from anterior subluxation of one vertebral body (VB) on another, most commonly the upper VB is anterior to the lower one. Usually L5 on S1, the next most common is L4 on L5. It is uncommon for a herniated disc to occur at the level of the subluxation, however the disc may "roll" out and produce findings on MRI that resemble a herniated disc which termed a "pseudodisc." It is more common to see a herniated disc at the level above the subluxation.

The nerve root compression is usually due to upward displacement of the superior articular facet of the level below together with disc material and a fibrous/ inflammatory mass from the malunion, symptoms manifest as neurogenic claudication, although radiculopathy may occur[1].

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Spinal fusion with instrumentation is used as an adequate treatment for degenerative spondylolisthesis[2]. Most common used techniques to manage the disease are the postero-lateral lumbar fusion [PLF] and the trans-foraminal lumbar interbody fusion [TLIF] techniques[3].

Trans-foraminal lumbar interbody fusion [TLIF] technique was first described by Harms and Jeszenszky as asubstitute to postero-lumbar interbody fusion (PLIF) and simpler than 360 degrees antero-posterior fusion techniques [4].

Several studies tried to compare between these two procedures[5]. Some reported that TLIF was better than PLF in the treatment of back pain[6]. However other studies reported nearly equivalent outcomes in both techniques [7].

Patients and methods

This prospective study was conducted upon 32 patients with degenerative spondylolisthesis, divided equally into 2 groups; one group (A) will be operated upon by trans-foraminal lumbar interbody fusion [TLIF] with cage insertion and the other group (B) by postero-lateral fixation [PLF] without cage insertion .

Patients were subjected to complete neurological examination and routine labs were done. Diagnosed with degenerative spondylolisthesis by x-ray with dynamic views of the lumbosacral spine and MRI lumbosacral spine.

Our inclusion criteria were patients with degenerative spondylolisthesis who agreed to participate into the study and undergo follow-up in our department.

Our exclusion criteria were patients with different diagnosis and refusal to participate into the study.

Surgical Procedure:

The procedure is done under general anesthesia. The patient is positioned in prone position on a Relton-Hall frame fixed on a radiolucent operation table. Careful positioning of the limbs to avoid nerve entrapments and careful padding of the pressure areas of the body is insured and the abdomen is checked so to be lax and pushed under the weight of the patient against the operating table to avoid congestion of vertebral venous plexuses.

Midline low back skin incision is leveled and fashioned using surface anatomy and confirmed byby the C arm.

Following the skin incision and the fascia after dissection from the skin, the paraspinal muscles are dissected from bones using periosteal elevator and gauzes, and then cutting the paraspinal muscles tendons with dissecting scissors.Proper hemostasis with bipolar cautery. Retracting the edge of the wound with Williams lumbar retractor and continue muscle separation laterally with monopolar cautery to reveal facet joints, pars interarticularis and transverse processes.

After proper positioning of the retractor and muscle separation we confirm the appropriate level and the facets of interest with C-arm. Putting transpedicular screws in the levels which ought to be fixed.Precautionwas taken not to open or injure the facet joints of the upper vertebra to prevent instability in the adjacent upper segment. Putting the screws early before laminectomy, discectomy and putting the cage, assist in opening the disc space by applying distraction on the contralateral screws, especially in case of narrowed disc space and cage insertion is difficult

After that, formal laminectomy is done with bone nibblers and kerrisonrongeurs for decompression and bilateral foraminotomies to decompress nerve roots. Total facetectomy and pars excision on the most symptomatic side. Care should be taken to not injure the pedicle. We open the disc space with a scalpel and evacuate its content with pituitary roungeurs and punch foreceps. Then the cartilignous end plates are removed using special instrumentations.

After preparation of the disc space and removal of the end plates, we use trials to precisely measure the appropriate size and length of the cage to be used. Packing the cage with bone taken from the facetectomy and laminectomy and inserted via TLIF approach from the symptomatic side.Confriming the proper insertion of the cage with C-arm, Rods are put and tighten with the screws in compression to restore the normal lordotic angle and prevent cage dislodgement.

The lumbar interbody fusion cages used were titanium PLIF cage from normedical (Ankara, turkey).

Putting bone fragments from the laminectomy on the transverse processes on both sides after curetting the processes with periosteal elevators to enhance fusion.

The wound is irrigated with antibiotic dissolved in saline solution, then stitched in layers after proper hemostasis with bipolar cautery. A sub fascial drain is inserted if needed which can be removed after 24-48 hours.

Postoperative clinical improvement assessed in terms of postoperative pain and complications.Patients' back pain and leg pain were assessed postoperatively with pain score on a 10 point visual analog scale [VAS] before discharge and one week postoperative. The score is specified by measuring the length (mm) on the 10-cm line between the "no pain" point and the patient's specified point, providing a range of scores from 0–100. A higher score signalizeshigher pain severity.

Data were coded and entered using the statistical package SPSS (Statistical Package for the Social Sciences) version 25. Data was summarized using mean, standard deviation, median, minimum and maximum in quantitative data and using frequency (count) and relative frequency (percentage) for categorical data. Comparisons between quantitative variables were done using the non-parametric Mann-Whitney test. For comparison of serial measurements within each patient the non-parametric Wilcoxon signed rank test was used[8]. For comparing categorical data, Chi square (c2) test was performed. Exact test was used instead when the expected frequency is less than 5 [9]. P-values less than 0.05 were considered as statistically significant.

Results

Postoperative leg and back pain was assessed using VAS scoring system at discharge of the patients in both groups.

Average preop VAS scores in group (A) were 7.88 regarding leg pain and 8.13 regarding back pain, while postop VAS scores were 1.5 regarding leg pain and 2.75 regarding back pain. Average preop VAS scores in group (B) were 7.88 regarding leg pain and 8 regarding back pain, while postop VAS scores were 1.56 regarding leg pain and 2.87 regarding back pain.

Regarding Complications:twenty eight patients (87.5%) had no complications.One patient (3.12%) suffered from canal encroachment by L5 screw causing severe sciatica and it needed reoperation and screw revision.Two patients (6.25%) suffered from weakness, one of them was in the form of increase in weakness of the hip flexion and the other was new weakness in dorsiflexion and they were treated conservatively and physiotherapy and they showed mild improvement. One patient (3.12%) suffered from superficial wound infection and mild dehiscence and was treated by antibiotics and bedside secondary sutures under local anesthesia.

In TLIF group there was 1 complication which was the screw revision, while the other complicated cases were reported in the PLF group.

Table 1: Frequency of complications.

Complications	Frequency	Percentage
Screw revision	1	3.12%
Weakness	2	6.25%
Superficial infection	1	3.12%
No complications	28	87.5%

Comparison between the 2 groups statistically

Table 2: statistical comparison between the 2 groups showing no significant statistical difference.

	TLIF group					PLF group					P value
	Mean	SD	Median	Minimum	Maximum	Mean	SD	Median	Minimum	Maximum	
Leg pain VAS	1.50	.82	1.00	1.00	4.00	1.56	1.03	1.00	1.00	5.00	1.000
Back pain VAS	2.75	.58	3.00	2.00	4.00	2.88	.72	3.00	2.00	4.00	.696

Statistical analysis shows there is no statistical difference between the two groups regarding postoperative VAS scores.

Discussion

The authentic Harms surgical technique described inserting bone graft behind the anterior longitudinal ligament [ALL] and then inserting two round titanium mesh cages as inter-body devices. The cages were inserted in the middle or posterior third of the vertebral body[10].

An advantage of PLF is an easier and simpler procedure and may be with fewer complications. While, TLIF support the anterior vertebral portion and regain the disc height (DH), which indirectly decompress the nerve root at the foramen [11].

TLIF has been used in thoery that the inter-body cage, with the bone graft, would greatlypromote better fusion between vertebrae thanpostero-lateral fusion. Recovering both disc height (DH) and lumbar lordosis (LL) are extraachieved with TLIF procedure [10].

The effect of TLIF and PLF on lumbar lordosis has been rarely compared. The purpose of this study is to compare the effects of TLIF with PLF in the treatment of degenerative spondylolisthesis using clinical and radiographic outcomes.

In our study; postoperative mean VAS score in TLIF group was 1.5 regarding leg pain and 2.75 regarding back pain, while in the PLF group was 1.56 regarding leg pain while 2.87 regarding back pain. **Fujimori et al.** [11] reported postoperative mean VAS score in TLIF group was 1.2 regarding leg pain and 3.1 regarding back pain, while in the PLF group was 2.1 regarding leg pain while 4.1 regarding back pain**.** While **Hoy et al.**[5] reported in postoperative 1-year follow-up mean VAS score in TLIF group was 3 regarding leg pain and 3.6 regarding back pain, while in the PLF group was 2.4 regarding leg pain while 3.4 regarding back pain**.**

In our study; we found that there is no statistical significant difference in results in VAS scores between both groups as the p-values where above 0.05 where the TLIF group show very mild improvement over the PLF group, keeping in mind that VAS score system is a subjective test not scientifically accurate, while **Hoy et al.** [5]reported the opposite of our resultswhere the PLFgroup show more improvement over the TLIF groupattributing that there is an nominaldirection towards the TLIF group showing more limb pain during follow-up compared to the PLF group**.**

In our study, 28 patients (87.5%) had no complications, 1 patient (3.12%) suffered from canal encroachment by L5 screw causing severe sciatica and required reoperation and screw revision, 2 patients (6.25%) suffered from weakness; one of them was in the form of increased weakness in the hip flexion and the other was new weakness in dorsiflexion (partial foot drop) due to L4 nerve root lesion and they were treated conservatively and physiotherapy, and they showed mild improvement and 1 patient (3.12%) suffered from superficial wound infection and mild dehiscence and was treated by antibiotics and bedside secondary sutures under local anesthesia.

In TLIF group there was 1 complication which was the screw revision, while the other complicated cases were reported in the PLF group.

Hoy K et al.[5]among 100 patients operated, in the TLIF group complications were 1 patient with hematoma, 2 patients with superficial infections, 1 patient with nerve root lesion, 2 patients with Dural tears and 1 patient developed pneumothorax during operation, which was treated with chest tube. In the PLF group, there were 2 patients with hematomas and 1 patient with Dural tear**.**

Among the study 9 patients were subjected to a second operation: 3 patients in PLF group had the hardware removed due to loosening or failure. 4 patients in the TLIF group had implant removal: 2 due to misplaced devices, one due to failure of fusion, and 1 due to deep wound infection. In addition, 2 patients in the TLIF group underwent second surgery to decompress another level than the performed one within 1 year.

Fujimori et al. [11]among 56 patients operated, in the TLIF group complications were non-fusion rate of 4%, 1 patient with adjacent segment failure and 1 patient with dural tear. In the PLF group, non-fusion rate of 16%, 5 patients with adjacent segment failure and 4 patients with duraltear **.**

Al Barbarawi MM et al.[12]among 120 patients operated it was reported that in the TLIF group complications were 3 patients with wound infection, 2 patients with persistent sciatica, 2 patients with partial foot drop, 2 patients with deep venous thrombosis

(DVT) and one mortality from pulmonary embolism from DVT. In the PLF group, 2 patients with wound infection, 2 patients with persistent sciatica, no patients with partial foot drop, no patients with deep venous thrombosis (DVT) and no mortality**.**

Conclusion

The primary goals in all lumbar surgical fixation techniques and instrumentations are restoration of normal spinal alignment, good bony fusion and adequate neural decompression for clinical relief.

Our Study shows no statistical significant difference in the clinical outcome in both groups regarding back and leg pain.

We recommend using TLIF techniques especially when it comes to correction of lumbar lordosis and sagittal balance especially when there is loss of disc height. However, better surgical outcomes depend mainly on patient selection, good decision making, the experience and the preference of the surgeon.

Abbreviations:

DH: Disc height.

MRI: Magnetic resonance imaging.

PLF: Posterolateral fixation.

TLIF: Transforaminal lumbar interbody fusion.

VAS: Visual analog score.

VB: vertebral Body.

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The Efficacy of Using trans-symphyseal Crossing Screws in Symphyseal Plating for the Unstable Antero-posterior Compression Pelvic Injuries: A Novel Technique and Early Radiological Results

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Abstract

Background and Objective: We hypothesized that the placement of trans-symphyseal crossing screws during symphyseal plating of disrupted pelvic fractures would lead to increase fixation strength and better radiological outcomes.

Methods: The study was a prospective, case-series, study that was conducted on 30 patients with unstable antero-posterior pelvic injury (APC type III).Openreduction and internal fixation with 3.5 reconstruction plate and trans-symphyseal crossing screws was done for the anterior injury and percutaneous iliosacral screw fixation for the posterior injury in all patients.

Results: The mean length of follow-up was 18 ± 5 months. The average length of crossing screws was 80.6 mm. The mean pubic space on final follow up radiograph was 6.4 ± 2.8 mm.The mean pubic space widening was 2.3 ± 1.7 mm.Neither significant pubic space widening (more than 10 mm) nor plate failure was observed.

Conclusion: Thenovel technique of cross-placement of screws during symphyseal plating could be effective among patients with unstable antero-posterior compression pelvic fractures with high excellent radiological outcomes and low complications and failure rate.

Keywords: *Anetro-posterior compression pelvic injury, Symphyseal plating, Crossing screws, and radiological outcomes.*

Introduction

Pelvic ring fractures are disabling injuries that represents 2-8% of all fractures[1]. It usually follows high-impact trauma, and they are most commonly observed in polytraumatized, young, patients[1]. According to Young and Burgess classification system, pelvic fractures can be categorized intolateral compression (LC), anteroposterior compression (APC), vertical shear (VS) injuries or combined mechanism injury (CMI)[2].

The surgical stabilization has become the main approach for management of pelvic fractures, especially in unstable injuries associated with symphysis pubis diastasis[3]. Post-traumatic pelvic asymmetry is associated with persistent pelvic pain, thus, anatomical restoration of the pelvic ring is required to ensure better functional outcomes[4]. Despite the early promising results of the external fixation, previous reports have shown that this technique is associated with high incidence of long-term complications including pin infection, loosening, and revision[5]. Thus, plate fixation –mainly the classic superior plating- has become the mainstream option for

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anatomical restoration of symphyseal disruption, with satisfactory clinical results[6].

Recently, several authors advocated that the fixation strength can be achieved by oblique placing of screws into the conventional plates, previous bone models studies demonstrated that oblique screws were effective in providing stability for bone implant[7]. Therefore, we hypothesized that the placement of trans-symphyseal crossing screws during symphyseal plating of disrupted APC pelvic fractures would achieve maximum screw length within the pubic bone and to increase fixation strength and better outcomes.

Materials and Method

The present manuscript was prepared in concordance with the recommendations of STrengthening the Reporting of OBservational studies in Epidemiology (STROBE)[8]. The study's protocol was approved and registered by the ethics committee of Cairo University Teaching hospitals. We confirm that the present study run in concordance with the principles of declaration of Helsinki and applicable local regulatory laws. Written informed consents were obtained from all patients prior to study's enrollment.

Study Design and Patients:

The present study was a prospective, case-series, study that was conducted from January 2017 to May 2019 at Cairo University Teaching hospital. Skeletally-mature patients with unstable APC pelvic injury (type III) were included. We excluded patients with known infection, non-traumatic diastasis, patients with combined pelvis and acetabular fractures, and/or old fractures.

Preoperatively, all included patients underwent history taking and throughout clinical examination. Preoperative imaging evaluation using a plain radiography and computed tomography (CT) was conducted to determine the fracture type, and the degree of sacroiliac disruption (**Figure 1**). Preoperative measurement of pubic space widening was done.

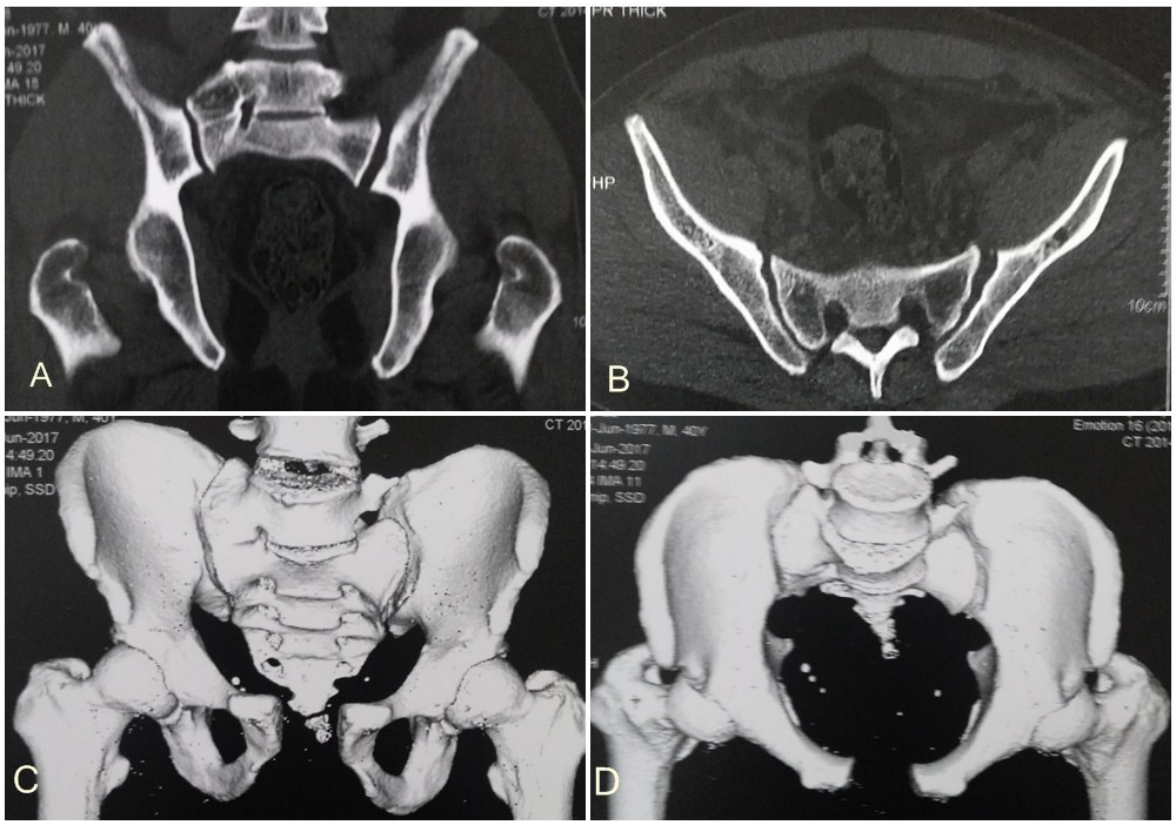


Figure 1:CT pelvis of patient with anteroposterior pelvic injury, A: Coronal cut, B: Axial cut, C and D: 3D Reconstruction.

Surgical Techniques

All operations were conducted within the three weeks after injury. The patient was positioned supine on a radiolucent flat-top table.

Pfannenstiel approach was used utilized. Once the exposure had been completed, several methods were used to achieve reduction. The simplest method was to place large, pointed reduction clamps on each side of the symphysis. Once a satisfactory reduction was achieved, an appropriate 3.5 mm reconstruction plate (4 to 6 holes) was contoured and applied to the superior aspect of the pubic body and rami. First two lateral short screws were inserted to maintain the reduction (**Figure 2**).

The direction of the medial screws in the novel technique of the current study was aimed toward the body and the inferior pubic ramus of the opposite side thus increasing the screws length. The screw plate angle that would achieve the maximum screw length in the inferior pubic ramus of the opposite hemipelvis was determined. The screw plate angle in the outlet view was between 47^{o} and 64^{o} in males and between 35^{o} and 44^{o} in females. In this technique the image intensifier was used all through the operation to obtain maximum screw length without penetration outside the pubic ramus.

Then the first medial screw was drilled carefully with a long 2.5 mm drill. In addition to visualization of the reduction, palpation of the posterior aspect of the symphysis confirmed the adequacy of the reduction. The outlet view of the pelvis was used to confirm that the screws were not penetrating the obturator foramen and not exceeding the lower end of inferior pubic ramus. The inlet view of the pelvis was very important to confirm that the screws were not penetrating anterior or posterior to the pubic ramus as the safe trajectory in this plane is. In some cases we used k-wire 2 mm as a drill when 3.5 mm screw was used. Posterior pelvic injury was managed with closed reduction and percutaneous iliosacral screw fixation in all patients.

Postoperatively, all of patients in this study received broad-spectrum antibiotic postoperatively usually 3 days, then the patient was maintained on oral antibiotics (Amoxicillin + Clavulinic Acid) till the removal of the stitches. Anticoagulation was given to all patients (clexane) subcutaneously 40 IU once daily for average body weight 70Kg patients for six weeks. Partial weight bearing was initiated after six weeks and full weight bearing was allowed after 12 weeks in all patients.

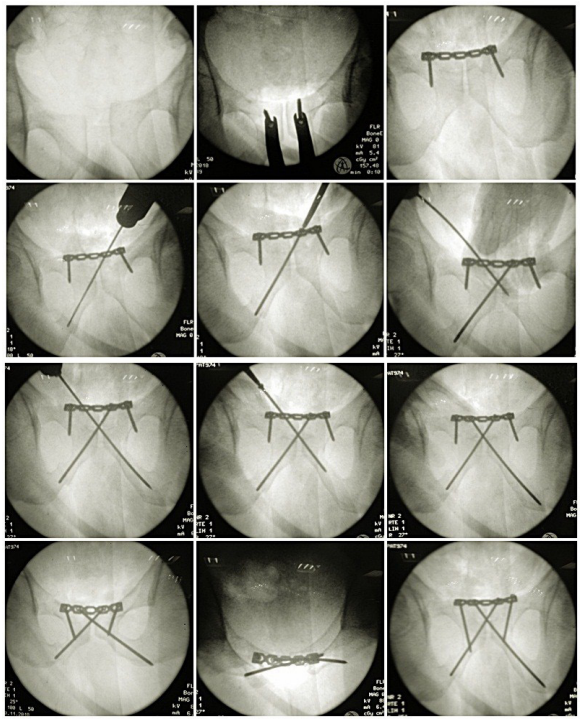


Figure 2: Intraoperative fluoroscopic images showing the steps of the new technique for reduction and fixation of symphysis pubis diastasis with 5 holes 3.5 reconstruction plate.

Follow-up and Study's outcomes:

Patients were instructed to come for follow-up after two weeks then regularly every four weeks, then at every third month, then at every six months up to 26 months. On every visit, patients were evaluated for radiological outcomes. The radiological evaluation included Matta and Tornetta grading system[9] and the degree of symphysis pubis widening.

Statistical Analysis:

Data were entered and coded via the statistical package SPSS version 25. Data was summarized, the mean and standard deviation were used for quantitative variables and frequencies and percentages was used for categorical variables.

Results

The present study included 30 cases with symphysis pubis diastasis (APC type III). The mean age of the included patients was 37 ±10 years old. All fractures were classified according to Young and Burgess classification system and all patients were classified as APC type III. The mean pubic diastasis on injury was 42 mm ± 12 mm and the range was 30 – 70 mm (**Table 1**).

The operative treatment consisted of combination of anterior fixation with 3.5 mm reconstruction plate with 3.5 mm cortical screws in in all patients, the average number of holes was 5.3 (4 to 6 holes) and the average number of screws was 5.1 (4 to 6 screws). The average length of crossing screws was 80.6 mm (the longest screw was110mm). Posterior fixation was done in all patients with a single 6.5 cannulated iliosacral screw. The mean operative time 52 ± 13 minutes and one patients needed intraoperative blood transfusion. Regarding the postoperative outcomes, the mean postoperative blood loss in the current study was 203 ± 82 cc. The mean hospital stay after surgery was 3.5 ± 1.6 days and the mean length of follow-up was 18 ± 5 month.

Table 1: Demographic and Clinical Data of the IncludedPatients

Variable	Patients (N =30)
Age (years), Mean ± SD	37 ±10
Males	25 (83.3%)
Mode of injury • Road traffic accident • Falling from height • Motor bicycle accident • Motor car accident	 15 (50%) 8 (26.6%) 5 (16.6%) 2 (6.6%)
Patient's occupation • Manual worker • Student • Driver • House wife • Employee	 20 (66.6%) 4 (13.3%) 3 (10%) 2 (7%) 1 (3%)
Associated injuries • Fracture femur • Fracture spine • Fracture tibia • Fracture distal radius • Fracture olecranon • Urological injury	 2 (6.6%) 1 (3.3%) 1 (3.3%) 1 (3.3%) 1 (3.3%) 1 (3.3%) 1 (3.3%)
Degree of the preoperative pubic diastasis	42 mm ± 12

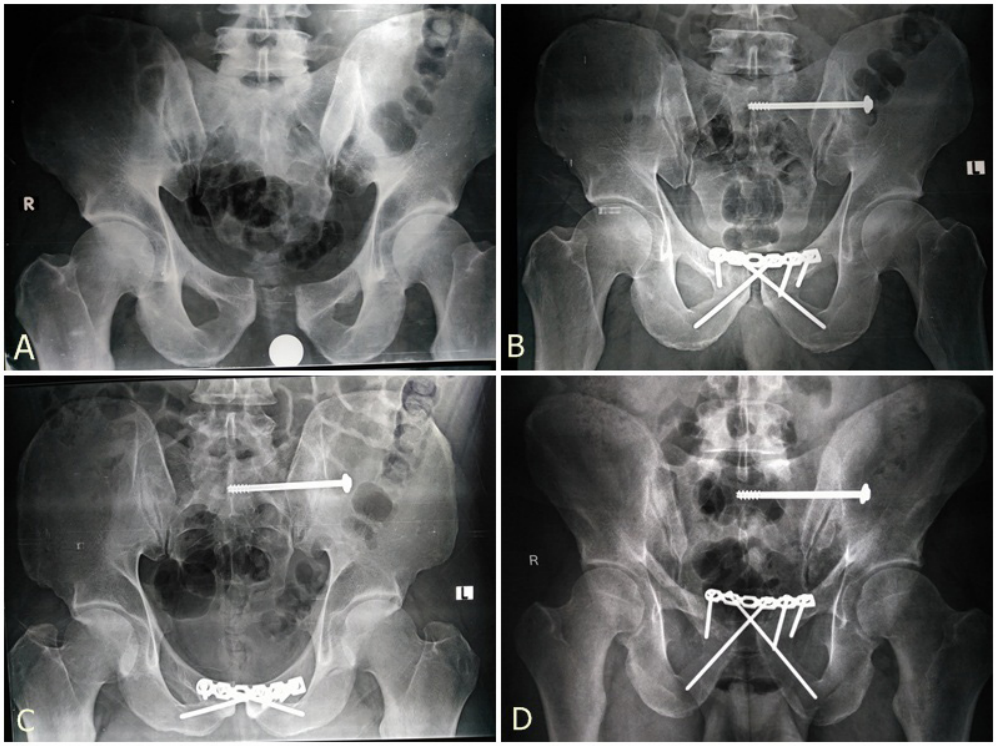
In the current study, the radiological outcomes were assessed according to Matta and Tornetta grading system. Immediate postoperative 28 patients were graded as excellent, and two patients were graded as good. At last follow up 26 patients were graded as excellent, and 4 patients were graded as good. The mean pubic space on immediate postoperative follow up radiograph was 4 ± 1.7 mm; while the mean pubic space on final follow up radiograph was 6.4 ± 2.8 mm. In the current study the mean pubic space widening was 2.3 ± 1.7 mm, no significant pubic space widening (more than 10 mm) was observed, no plate failure was noticed, no posterior fixation failure and only one case with broken one of the two crossing screws (**Table 2 and Figure 3**).

Table 2: Postoperative Radiological Data of the IncludedPatients

Variable	Patients (N =30)
Matta and Tornetta grading system • Excellent • Good • Fair	 26 (86.6%) 4 (13.3%) 0 (0.0%)
Pubic space immediate postoperative, Mean ± SD (mm)	4.16 ± 1.7
Pubic space at final follow up, Mean ± SD (mm)	6.4 ± 2.8
Pubic space widening, Mean ± SD (mm)	2.3 ± 1.7
Significant pubic space widening more than 10 mm	0 (0.0%)
Anterior plate failure	0 (0.0%)
Posterior fixation failure,	0 (0.0%)
Breakage of crossing screws	1(3.3%)

The complications were recorded in this study were immediate postoperative malreduction in 1 patient, breakage of the crossing screw reported in one patient (3.3%) without affecting the reduction, heterotopic ossification (HO) occurred in 2 patients (6.6), loosening around screws occurred in 1 patients (3.3%).

Figure 3: A. Preoperative X-ray and at last follow-up, B: AP view, C: Inlet view, D: outlet view



Discussion

The present study assessed the impact of trans-symphyseal crossing screws on the clinical and radiographic outcomes ofsymphyseal plating of disrupted APC pelvic fractures. Our results showed that the trans-symphyseal crossing screws achieved high rates of excellent radiographic outcomes.The technique had acceptable safety profile as well with low rates of implant failure and malunion. The length of the crossing screws was up to 110 mm witch is much longer than reported in literature and was not identical in all cases due to changes in bony morphology which differs according to the patient's gender, body habitus and the interpubic disc destruction. The second screw in this technique was usually more difficult than the first screw due to the narrow area of the pubic body and ramus especially after insertion of the first crossing screw.

Although the symphyseal plating is recommended over external fixation of symphysis pubis diastasis due to lower rates of infection and loosening, the cumulative body of evidence shows that implant failure is a major drawback of this technique[10]; previous reports showed that the rates of hardware failure and revision can be as high as 31% and 9%, respectively, followingsymphyseal plating[11, 12]. Therefore, we proposed that the addition trans-symphyseal crossing screws can lead to higher fixation strength and decrease pubic space re-widening, which would result in better radiographic outcomes. To the best of our knowledge, this is the first study that assessed the value of trans-symphyseal crossing screws on unstable APC fracture outcomes.

In the present study, we assessed the radiological outcomes of the included patients via Matta and Tornetta grading system and pubic space widening. The results showed that all included patients achieved union and the vast majority of them achieved excellent radiographic score; the mean pubic space on final follow up was within the acceptable range. Again, these findings were notably better than previously published studies that treated patients with the classic symphyseal plating.Van Loon et al reported that the postoperative radiographs was graded as excellent (a diastasis of <4 mm) in only 31.5% of the patients treated with open reduction and internal fixation of the symphysis pubis[13]. Another report showed that widening of pubic symphyseal space was observed in the majority of the patients treated with classic symphyseal plating [14]. Radiological results were excellent in 38.5% of the patients treated with classic symphyseal plating as reported by Park et al [15]. On the other hand, a previous finite element study reported that the cross-screw is preferred in the treatment of pubic symphysis diastasis as it provides better anterior and posterior pelvic stabilization [16].

As regarding the postoperative complications, the present study showed a lower rate than was reported in literature. For example, Tornetta et al.reported that four (17%) out of 23 patients had a plate breakage with three (13%) had recurrent widening of the symphysis pubis space [11]. Van Loon et al. reported that (19%) of their 31 patients had a loosening of the symphyseal implant [13]. Collinge et al. reported loosening or breakage of the hardware in 18 (90%) patients [14]. Park et al. reported that a revision surgery was required in 10 (25.6%), fixation failure in 4 (10.3%), screw breakage in 8 (20.5%), significant screw pull out or loosening in 15 (38.4%), plate breakage in 3 (12%), symphyseal re-widening (≥10 mm) in 12 (30.7%) patient [15].

Before discussing the implications of our findings, we have to acknowledge some limitations. The small sample size of the included patients was relatively small which may have affected the generalizability of our findings. Further investigation in a larger sample size and longer follow-up time is needed to obtain more overall clinical data. The minimum length of follow up was 13 months, which may have meant we failed to detect the cases of later fixation failure.

Conclusion

The novel technique of cross-placement of screws during symphyseal plating it could be an effective technique among patients withunstable APC pelvic fractures with decreasing the rate of symphysis pubis re-displacement and the rate of implant failure, loosening, and backout.

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Ethical Clearance: Cleared by the ethical committee of Department of Orthopedic Surgery, Faculty of Medicine, Cairo University, Egypt.

No **Conflict of Interest**

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Prediction of Postoperative Pulmonary Complications by Ultrasonic Assessment of Extravascular Lung Water in Pediatric Patients with Left to Right Shunt Lesions

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Abstract

Background: Postoperative pulmonary complications (PPC) can be associated with increased extra vascular lung water (EVLW) in patients with a cyanotic congenital heart disease (CHD). Lung ultrasonography (LUS) is a noninvasive, easily performed, bedside technique that allows assessment of EVLW.

Method: It is a prospective observational study of 80 pediatric patients with CHD with left to right shunt, scheduled for elective cardiac surgery. LUS were done preoperative, at end of surgery, then every 12 hours for 48 hours. Patients are given LUS score 0- 36. LUS results were compared to incidence of PPC.

Results: LUS score showed rise from 1.4 ±2.02 at LUS 0, to 5.6 ±6.89 at LUS 1, followed by slow decrease over time: 4.35 ±7.09, 3.15 ±7.06, 2.68 ±6.79, 2.32 ±6.67. LUS score in patients complicated by PPC showed a significant difference from non-complicated patients; in all LUS scans.

Conclusion: LUS is a safe noninvasive technique that can help predict PPC, in pediatric cardiac patients presented for correction of left-to-right shunt lesions.

Keywords: *Pediatric- congenital heart- postoperative pulmonary complications - lung ultrasonography.*

Introduction

Acyanotic congenital heart disease (CHD) is associated with left-to-right shunt of blood, and result in pulmonary overflow, volume load to the right heart and pulmonary arterial hypertension (PAH). This manifests as progressive exertionaldyspnoea, easy fatigue, recurrent chest infections and hospitalization. They include atrial septal defect (ASD), ventricular septal defect (VSD), Atrioventricularseptal defects (AVSD) and patent ductusarteriosus (PDA).[1]

There is a growing interest to interfere early with surgical correction of the anomaly to prevent Eisenmenger's syndrome and heart failure. However, surgery carries its own risks and complications. PPC is a frequent complications that impacts significantly on costs and perioperative morbidity and mortality.[2]

The pathogenesis of PPC is multifactorial. Contact of blood with the artificial surfaces of CPB machine augments an inflammatory reaction & lung is infiltrated with activated neutrophils, pouring injurious enzymes & oxygen free radicals leading to widespread lung injury and noncardiogenic pulmonary edema. Preoperative pulmonary disease, hypothermia, surgical trauma, anaesthesia, as well as pulmonary reaction to medications, temporary cardiac dysfunction, multiple blood products transfusion, excessive fluid loading may all contribute to PPC.[3]

Increased EVLW volume during critical illness is associated with PPC, prolonged mechanical ventilation and increased mortality rates. Evaluating EVLW volume

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may thus allow for adopting therapeutic interventions to regulate lung water content, perhaps resulting in improved clinical outcome.[4]

Lung ultrasonography (LUS) can be used to assess lung parenchyma. It is a non-invasive, radiation-free, easily performed, reproducible, bed side tool that helps real time assessment of EVLW. Normal LUS shows regularly spaced horizontal artifacts representing reverberations of the pleural line, known as A-lines, and vertical artifacts known as B-lines. B-lines are nonspecific sonographic findings that can be seen sporadically in normal lungs. However, multiple B-lines are pathological and their numbers correlate with lung edema scores from chest radiographs and with EVLW measured invasively using the trans-pulmonary thermo dilution method. In this study we used LUS to evaluate EVLW and hence predict PPC. [5]

Patients and Method

This is a prospective observational study. It was conducted in pediatric cardiothoracic surgery unit, Cairo University, after obtaining informed consents from the patients' care-givers.

80 patients, aged from 6 months to 8 years old, both genders, with acyanotic CHD, scheduled for elective cardiac surgery were included in the study. Exclusion criteria included emergency surgery, or requiring re-exploration within 48 hours, re-do surgery, preoperative congestive heart failure, pneumothorax, chest infection (fever > 37.6° C, elevated CRP or TLC), chest wall deformity, myopathy, Eisenmenger's syndrome, any associated extracardiac anomaly, sternum left open or diaphragmatic paralysis.

All patients were evaluated by a pediatric cardiologist, then by an anesthetist. Patients were premedicated by IM injection of Atropine (0.2 mg/kg), Ketamine (1 mg/kg) and Midazolam(0.02 mg/kg). Upon arrival into the operating room, routine monitors and Warming mattress were applied. Peripheral venous cannula was inserted and secured.

Induction was carried out using Sevoflurane 4%, Fentanyl (2 µg/kg) and Pancuronium (0.1 mg/kg). A suitable size endotracheal tube was then inserted and secured. Patients were mechanically ventilated using CMV with volume mode with tidal volume of 8 mL/kg, zero cm H_2O end expiratory pressure (ZEEP), and a respiratory rate appropriate for age, to achieve end-tidal CO_2 30- 35 mmHg. FiO_2 was set to 50%, Isoflurane 0.8 to 1%. Pancuronium& Fentanyl increments were used as needed. Arterial cannula, central venous catheter, urinary catheter were inserted.

Baseline LUS was done (LUS 0), repeated at end of surgery (LUS 1), then every 12 hours in the ICU for 48 hours (LUS 12, 24, 36, 48)

Protocol for ultrasound lung assessment:

LUS was performed using the portable echograph M-Turbo (Sonosite, Bothell, WA, USA). A linear probe was chosen (frequency range, 6–13 MHz). Each hemithorax was divided into 6 regions using 3 longitudinal (parasternal, anterior, and posterior axillary) and 2 horizontal lines, one above the diaphragm and another one 1 cm above the nipples. The probe is positioned longitudinally and perpendicular to the ribs.

LUS was done by a trained anesthetist. Presence of "lung sliding" sign was assured. It indicates the absence of pneumothorax. The sum of "B" lines produced a score; reflecting EVLW, as following:

1. Normal aeration (0): "B" lines number ≤ 3.

2. Moderate loss of lung aeration (1): multiple visible B-lines with horizontal spacing ≤ 7 mm (B7 lines).

3. Severe loss of lung aeration (2): multiple fused B lines with horizontal spacing ≤ 3 mm (B3 lines).

4. Pulmonary consolidation (3): hypoechoic lung tissue, accompanied by dynamic air bronchogram.

The final LUS score of the patient was the sum of 12 lung regions (ranging from 0 to 36).[6]

After completion of surgical procedure, all patients were transferred to pediatric cardiac ICU, intubated and mechanically ventilated. Patients were assessed for development of pulmonary complications, as lung oedema (clinical and radiological evidence of congestion, hypoxia, but no infection), pneumonia (fever > 38.5◦ C, TLC >11 with shift to the left, positive CRP, or positive growth on sputum Culture & sensitivity)or ARDS (acute, diffuse, inflammatory lung injury, with hypoxemia, bilateral radiographic opacities).

Statistical methods

Sample size calculation was based on a previous

study, which noted that PPC after pediatric cardiac surgery was 12.9 to 30.8%[7], so calculated the sample size taking into consideration that negative cases (without PPC) will be four times the positive cases (with PPC). Using medcalc software, with study power 80% and alpha error 0.05, the number of cases needed will be at least 65. This number was increased to 80 to compensate for dropouts.

Data were coded and entered using the statistical package SPSS (Statistical Package for the Social Sciences) version 25. Data was summarized using mean,standard deviation, median,minimum and maximum in quantitative data and using frequency (count) and relative frequency (percentage) for categorical data. Comparisons between quantitative variables were done using the non-parametric Kruskal-Wallis and Mann-Whitney tests.For comparing categorical data, Chi square ($\chi 2$) test was performed. P-values less than 0.05 were considered as statistically significant.

Results

Studied population was: female (55%) male (45%), age (6 months to 5 years, mean 1.48), weight (4-15 kg, mean 8.99 kg).Operation: 64 VSD closure, 10 ASD, 3 AVSD, 3 PDA ligation. CPB machine was used in 77 patients (96,3%)

LUS score:

LUS examination showed initial low score at LUS 0 (mean =1.4), rise at LUS 1 (mean= 5.6), followed by gradual decline over the next 48 hours, table 1.

Pulmonary oedema was the commonest PPC (10% of all patients), table 2.

LUS score was significantly higher in pediatric patients complicated by PPC; in LUS examinations, table 3.

Comparing different subgroups of PPC and the no complications group, there was statistically significant difference in all postoperative mean LUS scores, table 4.

Table 1: LUS score preoperative, to 48 hours postoperative

	Mean	Standard Deviation (SD)
LUS 0	1.40	2.02
LUS1	5.60	6.89
LUS 12	4.35	7.09
LUS 24	3.15	7.06
LUS 36	2.68	6.79
LUS 48	2.32	6.67

Table 2: Incidence of PPC

		Count	%
PPC	Pneumonia	3	3.8%
	Pulmonary oedema	8	10.0%
	ARDS	1	1.2%
	no complication	68	85.0%

Table 3: LUS score in patients with "PPC", versus "no PPC"

	PPC					No PPC					p value
	Mean	SD	Median	Minimum	Maximum	Mean	SD	Median	Minimum	Maximum	
LUS 0	2.83	2.17	4.00	.00	6.00	1.15	1.90	.00	.00	6.00	0.008*
LUS1	21.00	3.46	20.00	16.00	28.00	2.88	2.03	4.00	.00	6.00	< 0.001*
LUS 12	20.00	4.67	18.00	12.00	28.00	1.59	2.03	.00	.00	6.00	< 0.001*
LUS 24	17.67	8.69	18.00	4.00	26.00	.59	1.38	.00	.00	4.00	< 0.001*
LUS 36	15.83	10.03	12.00	2.00	30.00	.35	1.14	.00	.00	4.00	< 0.001*
LUS 48	14.00	11.79	6.00	4.00	30.00	.26	.97	.00	.00	4.00	< 0.001*

* *p* value < 0.001 is statistically significant

Table 4 LUS of different types of PPC & no PPC

		Pneumonia	Pulm. oedema	ARDS	no complication	p value
LUS 0	Mean	3.33	2.50	4.00	1.15	0.053
	SD	3.06	2.07	.	1.90	
LUS1	Mean	20.67	20.75	24.00	2.88	< 0.001
	SD	3.06	3.85	.	2.03	
LUS 12	Mean	24.00	18.00	24.00	1.59	< 0.001
	SD	.00	4.54	.	2.03	
LUS 24	Mean	25.33	13.75	26.00	.59	< 0.001
	SD	1.15	8.10	.	1.38	
LUS 36	Mean	27.33	10.25	26.00	.35	< 0.001
	SD	2.31	7.05	.	1.14	
LUS 48	Mean	28.67	7.00	26.00	.26	< 0.001
	SD	2.31	6.93	.	.97	

The following graph shows how different groups of patients scored on the LUS assessment at end of surgery. Pulmonary oedema and pneumonia groups showed statistically significant difference from the no complications group, figure 1.

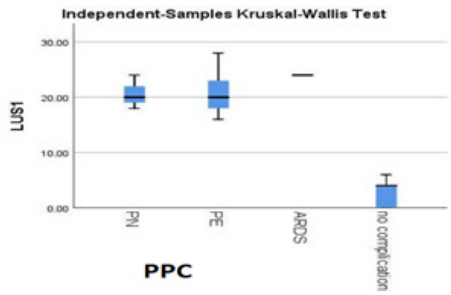


Figure 1 Different subgroups mean & SD at LUS 1using the "Independent-Samples Kruskal Wallis test".

Mean LUS scores time-trend is presented in the following graph, comparing patients who developed PPC to those who didn't develop PPC; figure 2.

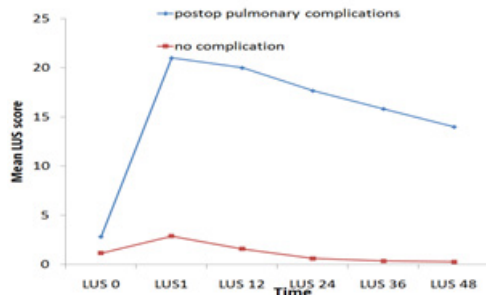


Figure 2 Mean LUS score time-trend, in PPC and no PPC patients

Discussion

In this study, we chose pediatric cardiac patients with left to right shunt lesions to assess their lung water volume by ultrasound, and relate the findings to the incidence of pulmonary complications.

Although PPC are common after cardiac surgery due to the combined effects of anesthesia, CPB machine and surgical trauma, the studied population had an added risk factor that is preoperative pulmonary congestion. The natural course of their disease includes pulmonary overflow and recurrent attacks of chest infection.[1] However, the mean preoperative LUS score (LUS 0) was 1.4 only, thanks to proper preoperative preparation at the pediatric cardiology unit. They usually use diuretics as an antifailure measure to control dyspnea and congestion. We can find statistically significant difference as regarding LUS 0; between patients who developed PPC & those who didn't, table 1, 3. This shows that having a high LUS score might be associated with a higher risk of developing PPC, and may so require postponing surgery.

There is a rise of LUS score immediately postoperative; associated with PPC, followed by gradual improvement of lung condition, figure 2. Many patients were extubated based on accepted P/F ratio and weaning criteria, while LUS still showed evidence of some congestion.

Most of the population had surgery for closure of VSD (80%). Many patients presented for PDA ligation were excluded; being younger than 6 months of age. Only 3 patients for PDA closure were accepted and they were below 1 year of age. They were operated without using CPB machine (off Bypass). Their postoperative course passed without PPC, table 4.

We excluded patients with preoperative chest infection, or conditions which would possibly contribute to PPC other than lung water volume, as presence of chest wall deformities, muscle weakness in myopathies or postoperative diaphragmatic paralysis. These conditions would lead to ineffective cough and add to lung dysfunction caused by postoperative pain, and reduced pulmonary compliance. In fact, some impairment of lung function occurs after any form of major surgery, usually due to atelectasis.

Patients with pneumothorax were excluded from the study, as pneumothorax abolishes the ultrasonic distinctive signs of assessment of lung parenchyma. B lines in fact would not appear in presence of pneumothorax. However, we didn't meet any of the fore-mentioned exclusion criteria, after enrolling patients into the study.

The commonest complication was pulmonary oedema (67% of PPC), table 2. It has many contributing factors, e.g. increased alveolar capillary permeability due to CPB machine, transfusion related or reaction to a drug. Also, reperfusion injury or atrial/pulmonary venous hypertension due to residual shunt, outflow tract obstruction or decreased ventricular compliance (diastolic dysfunction). Patients diagnosed with pulmonary oedema suffered delayed extubation. However, pulmonary oedema was associated with declining mean LUS scores after 12 hours postoperatively, unlike patients with ARDS or pneumonia who generally suffered a worse postoperative course, table 4.

Vitale et al,[8] thought they were the first to apply LUS in pediatric cardiac ICU. They retrospectively studied only 5 patients with query chest X-ray (CXR) findings, and were able to define a diagnosis of PPC and guide the clinical intervention to improved outcome. Most patients had complex CHD. They used a different scanning technique; only 4 zones. It is a simple technique, but misses the posterior lung areas, while actually we found more B lines there. They found that CXR confirmed LUS finding of improved lung condition, only 12 hours later.

The movement towards the wide use of LUS is growing. In May 2018, Cantinotti and colleagues[9] proposed LUS reclassification of query CXR data. Using a similar scanning technique, they could reach new diagnoses, and reclassify 81 CXR findings (out of 138) based on the LUS signs, and actually changed the plan of management of 29 of them, or enable completing CXR reports, where pleural effusion was accompanied by underlying atelectasis.

Limitations and future research

LUS could have been done before induction of anesthesia, since anesthesia and mechanical ventilation might impact on pulmonary vascular resistance, and hence affect the volume of shunted blood from left to right, thus affecting LUS findings. However, handling children is easier under anesthesia. Also, it allows for comparison with LUS at end of surgery, under anesthesia.

Ages included were below 5 years (mean 1.48 years). Elder children usually had one or more of exclusion criteria (re-do surgery, advanced PAH,..).

LUS is operator dependent, thus limiting the generalization of results for all ICUs. Moreover, technical difficulty increases with pediatric population, due to small size of chest, big size of linear high-frequency probe, avoiding dressings & drain sites and frequent movement. However, some authors believe that thinner chest walls and smaller lung mass in pediatrics make it ideal for ultrasound[8].

The limited places in our cardiac ICU, and the long waiting list of CHD patients hinders extending the follow up period. Also, excluding complex CHD from the study missed a lot of patients with lung complications. Patients with left to right shunt lesions generally had smoother postoperative course.

Our protocol didn't adopt strict fluid balance. We actually left it to the clinical judgment of the anesthesiologist, perfusionist and intensivist. Defining a strict fluid balance protocol might impact on the hemodynamics. In fact, we focused on lung water volume as seen by LUS, & related it to incidence of PPC. Further studies should investigate the role of diuretics, ultrafiltration and strict regimen of IV fluids on EVLW. A growing debate surrounds this concept, as strict fluid balance might not always define EVLW. Interestingly, Kaskinen and colleagues[10] found no correlation between B lines and patient's fluid balance,

although their protocol consisted of meticulous, daily calculations aimed at avoiding positive balance between fluid losses and infusions, and none of their patients underwent dialysis. So, they suggest that the B-lines resulted from increased EVLW due to reasons other than fluid overload.

Conclusion

LUS is a safe noninvasive technique that can help predict PPC, in pediatric cardiac patients presented for surgical correction of left-to-right shunt lesions

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No C**onflict of Interest**

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Assessing Right Ventricular Deformation by 2D Global Longitudinal Strain in Patients Undergoing CABG pre vs Post Procedure

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Abstract

Introduction: RV dysfunction after CABG is common finding in one fourth of patients after cardiac surgery. RV global longitudinal strain (RVGLS), has several advantages over other conventional echocardiographic parameters of RV systolic function.

Method: The study included 50 patients electively planned for CABG surgery. All patients were examined pre-operatively and 3 months after procedure with transthoracic echocardiography focusing on the RV systolic function by conventional methods along with global longitudinal strain.

Results: Data analysis found significant deterioration of the RV systolic function in the 2D longitudinal strain along with the all the conventional echocardiographic parameters.

Data showed reduced all parameters, FAC from median 53% to 45% P value <0.0001, TAPSE from median 2.2cm to 1.3cm P value <0.0001, S´ wave TDI from median 14cm/s to 9cm/s P value <0.0001 and global longitudinal strain from median -19%, to -11.7% P value <0.0001.

Conclusion: RV global longitudinal strain, as measured by 2D STE, declines for up to 3 months after surgery. This may add to the current literature about 2D speckle tracking information for RV assessment in CABG patients, confirming the RV systolic impairment post procedures. As well adding incremental value to the GLS assessment for RV.

Keywords: *Right ventricle, Coronary artery bypass graft, global longitudinal strain, speckle tracking.*

Introduction

Right ventricle (RV) systolic dysfunction is a known independent prognostic marker for several cardiovascular diseases, never the less the RV systolic function accurate assessment by conventional echocardiography is problematic[1]. Owing to the complex anatomy and different functional mechanism, it is difficult to objectively evaluate; despite of having several conventional echocardiographic indices that can assess the RV systolic function, there is no echocardiographic parameter yet to represent intrinsic myocardial properties. Cardiac magnetic resonance imaging (CMR) is gold standard in the RV assessment of the ejection fraction along with evaluation of RV structure[2].

Strain derived 2D speckle tracking by echocardiography is dimensionless parameter and measure a as changing in length between 2points before and after movement. It can provide a good non-invasive marker of myocardial contractility[3]. After application of strain echocardiography of the RV for measurement of the systolic function, it became popular as research tool[4]

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RVGLS has prognostic ability for several cardiovascular diseases[5].

RV dysfunction after CABG is common; it occurs in nearly one fourth of patients who undergo cardiac surgery. Intraoperative or post procedure RV dysfunction is linked to high post- operative mortality [6,7].

The aim of this study is to address the post operative RV function by using deformation echo indices by 2D speckle racking along with the conventional methods of RV evaluation as this will provide an incremental value to the traditional TV indices.

Method

Study subjects: Patients enrolled prospectively from January 2016 to January 2017. The study included 50 elective patients planned for elective CABG.

Imaging protocol: All patients were examined pre-operatively with transthoracic echocardiography focusing on the RV systolic function and again at follow up after three months. The study was performed by the same experienced operator to exclude the inter-personal variations using GE vivid E90 software. 2D echocardiographic images were analysed offline for deformation analysis. Strain measurements were performed by an experienced investigator in the interpretation of echocardiographic images; 2D measurements (RV free wall and septum). The other echocardiography parameters were calculated as following:

1. Right Ventricular Fractional Area Change calculated through the following formula: (end-diastolic area × end-systolic area)/end diastolic area.

2. Tricuspid Annular Plane Systolic Excursion measured using M-mode for the RV free wall.

3. Tissue Doppler imaging study and assessing tricuspid annulus, calculating S` wave velocity index.

The study was approved by the hospital ethical committee with all patients giving informed consent.

Exclusion criteria included LV systolic dysfunction less than 55%, RWMA involving the septum to avoid the effect of the septal inter-dependance on the global longitudinal strain, recent less than a month RV infarction, atrial fibrillation, pulmonary HTN more than 30mmHG, significant valvular diseases defined as more than mild valve disease, and left bundle branch block.

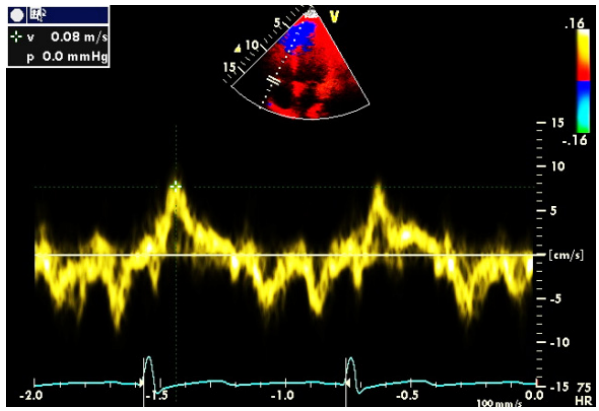


Figure (1): Showing impaired S´ wave velocity with tissue Doppler.

Statistical Analysis

Qualitative results presented as numbers and ratio (%) and significance of their associations measured by the Chi-square or Fisher's exact. Continuous data studied for Normal distribution by Kolmogorov-Smirnov and Shapiro-Wilk tests and then presented as median and range. Their distribution among patients' groups were compared using the non-parametric Mann-Whitney test or Kruskall and Wallace test, as appropriate. The Wilcoxon signed rank test was used to evaluate the significance of change of right ventricular function parameters, as recorded initially and after 3 months. Analysis was performed by statistical package software IBM- SPSS for MAC, version 23.

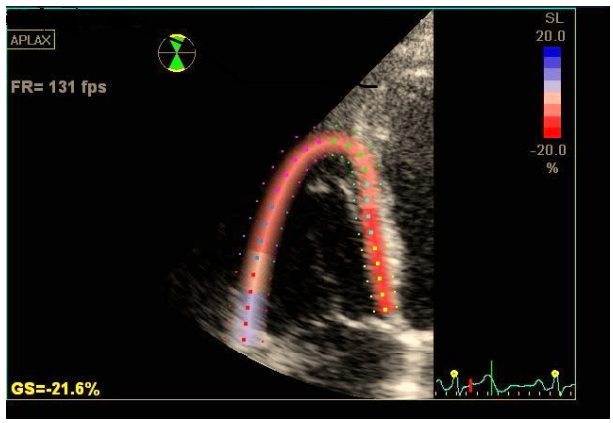


Figure (2):• Showing measurement of global longitudinal strain by speckle tracking

Results

Males represented 92%; the mean age was 60 ± 10years. Smokers represented 32%, 84% were hypertensive and 60% had diabetics (Table 1).

Table 1: Showing clinical characteristics of the patients

	Patients		P value
	No.	%	
Smoker	16	32%	0.556
Hypertensive	42	84%	0.059
Diabetes mellites	30	60%	0.047
Age	60+10	92%	0.059
Male gender	46	96%	0.047

Data analysis showed significant deterioration of the RV systolic function in the 2D longitudinal strain along with the all the conventional echocardiographic parameters.

Data showed reduction of all parameters, FAC reduced from median 53% to 45% P value <0.0001, TAPSE from median 2.2cm to 1.3cm P value <0.0001, S′ wave TDI from median 14cm/s to 9cm/s P value <0.0001 and global strain from median -19%, to -11.7% P value <0.0001. (table 2)

Table (2): Showing the values of RV function parameters pre and post follow up and their significance.

Median		Pre		Post		P-value
		Range	Median	Range		
	FAC	53%	41 – 66	45%	30 – 56	<0.0001
	TAPSE	2.2cm	1.6 - 2.9	1.3cm	1.1 - 1.6	<0.0001
	TDI	14cm/s	10 – 20	9cm/s	8 – 11	<0.0001
	RVGLS	-19%	- 23.2- -31.5	-11.7%	-6 - -17.2	<0.0001

Fractional area change (FAC), tricuspid annular plane systolic excursion (TAPSE), tissue Doppler imaging (TDI) and global longitudinal strain (GLs).

Discussion

The main aim of this study was to assess the changes in the RV function using established deformational RV techniques against the old conventional methods in the CABG patients, comparing pre vs 3 months post procedure. The study population enrolled 50 patients who underwent cardiac surgery with dedicated TTE for RV assessment with special focus on the global longitudinal strain. The findings of this study are as follows: 1.all patients had significant RVGLS systolic dysfunction at three follow up, 2. All other conventional methods showed the same results as shown in table (2). Some previous studies demonstrate that there is decline in RV function measured by 2D conventional indices including TAPSE and S′ with transthoracic echocardiography (TTE)[8]. Similar to our study but intra-operatively, the Unsworth et al. evaluated TAPSE and S′ after pericardial opening and found that these declined acutely intraoperatively[9] but according to our results these changes remain for as long as 3 months postoperative.

Another study done by Yadav et al.[10] tested the hypothesis of selective RV impairment in CABG patients, they found a significant and selective impairment of the RV functions following CABG surgery, the study was conducted on 20 patients, after 3 month follow up showed a significant reduction in RV S′ velocity TDI from preoperative [10]. As well similar to this study, Rong et al.[11], who collected comprehensive echocardiographic data during elective cardiac surgery before sternotomy and immediately after surgery; it showed decline in TAPSE, RV systolic velocity (S′), and RV FAC by transesophageal echo (TEE).

For the meantime, 2D global longitudinal strain by speckle tracking is relatively new imaging technique. Not similar to Doppler interrogation, strain assessment throughout 2D is angle independent and easier than tissue Doppler interrogation (TDI) as well the other indices that is unfortunately depends on the expert of the

operator.

This study had several limitations. First is the use of the 2D rather than the 3D technique for RVGLS, Second, the lack of clinical correlation and impact of RV dysfunction on post-operative morbidity.

Conclusion

RV global longitudinal strain, as measured by 2D STE, declines for up to 3 months after surgery. This may add to the current literature about 2D speckle tracking information regarding RV assessment in CABG population, confirming the RV systolic impairment post procedure. As well adding incremental value to the GLS assessment for RV.

Funding: Self-funding

Ethical Clearance: Cleared by the ethical committee of Cardiothoracic Department, Faculty of Medicine, Cairo University, Egypt

No **Conflict of Interest**

Abbreviation:

CABG: Coronary Artery Bypass Graft

TAPSE: Tricuspid Annular Plane Systolic Excursion

FAC: Fractional Area Change

GLS: Global Longitudinal Strain

TDI: Tissue Doppler Imaging

RV: Right Ventricle

EF: Ejection Fraction

LV: Left Ventricle

CMR: Cardiac Magnetic Resonance

TTE: Transthoracic Echocardiography

RVGLS: Right Ventricle Global Longitudinal Strain

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Filling Without Drilling - A Review On Resin Infiltration Technique For Enamel And Early Cavitated Lesion

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Abstract

The aim of this review is to present the scientific background, principles, concepts and recent advancements on resin infiltration for management of enamel and early cavitated lesion. 'Prevention is better than cure'. Numerous preventative measures have been adapted to slow the demineralisation process and enable effectiveness remineralisation of enamel and just before proceeding into cavitated lesion stage. One among this measures will be resin infiltration which act as the intermediate treatment modality between prevention and restoration. Management of early cavitated lesion has always been a challenge in the modern dentistry. A new technology in dealing with such lesions is this resin infiltration technology. It seems to provide a intermediary treatment modality between prevention and restorative therapy. The concept was introduced as micro-invasive approach for the management of smooth surface curious lesion and proximal non-cavitated various lesion. The rationale for using resin infiltration is based on the success achieved in obliterating the diffusion pathways of demineralised enamel with a low-viscosity resin. After treating enamel surface with an acid, rinsing and drying, this resin is infiltrated into the lesion's porous enamel, filling the voids and arresting carious lesion progression.

Keywords: *Resin infiltration alization,[26priwere effective in comptaken for examinashed in distilled water fir, Cavitated lesion, White spot lesions, smooth surface lesions, proximal lesions.*

Introduction

Dental caries is a multifactorial disease caused by an ecological shift in the composition and activity of the bacterial biofilm when exposed over time to fermentable carbohydrates, leading to a break in the balance between demineralization and remineralization[1].

Enamel demineralization and remineralization are continuous process that occurs throughout the entire life of a tooth. White spot lesions or non-cavitated lesions & early enamel lesions are probably considered as a first sign of dental caries disease[2]. These lesions can occur on any tooth surfaces, but dental surfaces with deep pits and fissures are particularly more prone to caries[3] and in general, caries on occlusal and buccal/lingual surfaces account for almost 90% of caries experienced in children and adolescents[4].

Non-cavitated lesion refers to pits and fissures in fully erupted teeth that may display discoloration not due to extrinsic staining, developmental opacities or fluorosis. The discoloration may be confined to the size of a pit or fissure or may extend to the cusp inclines surrounding a pit or fissure. The tooth surface should have no evidence of a shadow indicating dentinal caries, and, if radiographs are available, they should be evaluated to determine that neither the occlusal nor the proximal surfaces have signs of dentinal caries[5].

Demineralization is an inevitable adverse effect associated with fixed orthodontic treatment, especially when associated with poor oral hygiene[6].The acidogenecity of plaque bacteria are responsible for the enamel demineralization and formation of white spot lesions (WSL) [7].Gorelick et al. showed that the prevalence of white spot lesions (WSL) in patients undergoing fixed orthodontic treatment is 49.6% versus 24% in an untreated control

group[8].

With the advancements in preventive and adhesive technologies, newer techniques are available for preventing and reversing the carious process with the aim to preserve and regenerate the tooth structure: so called "non invasive" and "minimal invasive dentistry". Minimal invasive dentistry is "a systematic respect for the original tissue" by removing and replacing with as little tissue loss as possible[9].The Concept of minimally invasive techniques in dentistry requires a good diagnosis of risk and lesions, the use of the right preventive treatment to stop disease, the restorations of the lesions with as little healthy tissue loss as possible, the use of durable materials and the prevention of recurring disease [10].

Caries infiltration is an another promising approach which fills the gap between prophylaxis and filling. It gives us more time for observation and gives tooth the possibility to heal[11].Caries infiltration is defined as a micro-invasive technology that fills, reinforces, and stabilizes demineralized enamel without drilling or sacrificing healthy tooth structure. The micro-invasive infiltration can be used to treat smooth surface and proximal carious lesions up to the first third of dentin (D-1).It prevents lesion progression and increases life expectancy of a tooth. It provides an alternative to microabrasion and other restorative treatments for cariogenic white spot lesions. Resin infiltration technique is a novel technology that seems to bridge the gap between noninvasive and minimally invasive treatment of initial dental caries, postponing as long as possible the need for a restoration [12].

From a primary prevention perspective, anatomic grooves or pits and fissures on occlusal surfaces of permanent molars trap food debris and promote the presence of bacterial biofilm, thereby increasing the risk of developing carious lesions. Effectively penetrating and sealing these surfaces with a dental material—for example, pit and fissure sealants, Topical fluorides, Resin infitrants, ACP-CPP—can prevent lesions and is part of a comprehensive caries management approach[5].

Principle Of Resin Infiltration

The principle of resin infiltration is to perfume porous enamel with resin by capillary action. This aims to arrest lesion progression by occluding the microporosities that provide diffusion pathways for the acids and dissolved materials[13].It has been debated that bacteria entrapped at the base of lesions could trigger and spread the caries process. It has been well established that the count of bacteria in non-cavitated lesions is low and not determental[13].Enamel carious lesions are characterized by mineral loss in the body of the lesion, whereas the surface remains comparably highly mineralized[14,15].The pores within the body of enamel caries provide diffusion pathways for acids and dissolved minerals.

Therefore, an alternative approach for superficial sealing might be to arrest carious lesions by infiltration of these pores with light-curing resins, creating a diffusion barrier within the lesion without establishing any material on the enamel surface. Based on the available laboratory and clinical studies, it seems convincing that resin infiltration of enamel lesions should reduce (or even stop) the progress of white spot lesions[16].

Resin Infiltration Technique

Caries infiltration technique offers a micro-invasive option for the management of proximal lesions that are confined to the outer and inner enamel and to the outer third of dentine as diagnosed by radiographs. Caries infiltration technique aims to arrest the lesion progression by occluding the microporosities that provide diffusion pathways by acids and dissolved minerals[15].The resin infiltrate exhibits a very low viscosity, low contact angles to the enamel, and high surface tension to allow complete penetration of resin into the lesion body of enamel[17].Resin infiltration technique is a novel technology that seems to bridge the gap between noninvasive and minimally invasive treatment of initial dental caries, postponing as long as possible the need for a restoration[18].

The concept of caries infiltration was first developed at the Charité Berlin and the University of Kiel as a micro-invasive approach for the management of smooth surface and proximal non-cavitated caries lesions. It is marketed under the name Icon®[19]enamel with resin by capillary action. This aims to arrest lesion progression by occluding the microporosities that provide diffusion pathways for the acids and dissolved materials. It has been debated that bacteria entrapped at the base of lesions could trigger and spread the caries process. It has been well established that the count of bacteria in non-cavitated lesions is low or not determental is not sealed properly[20].

Resin Infiltration Steps

Despite the novelty of the resin infiltration technique, several studies were conducted in vitro and in vivo that tested the effect of different etching agents on the enamel surface of the initial caries lesions and the subsequent penetration ability of different adhesive systems[21-25].

The results advocate the use of 15% hydrochloric acid gel for 2 minutes, followed by drying of the surface and application of a low viscosity resin of type TEGDMA (tri-ethylene glycol dimethacrylate). The procedure for resin infiltration is fairly simple and acceptable by operators and patients[26].ICON® is marketed in two different forms: Proximal surface and vestibular surface kits. The principle of usage in both is similar except for the need for separation in case of proximal lesion treatment[27].As the mineralized surface layer of the non-cavitated lesions hampers resin from because of the shrinkage of the material after the first application resulting in the generation of space that can be then occluded by a second application [28,29]. Polishing of the infiltrated lesion was found to improve the stability of the masking effect most likely due to reduction in surface porosity and possible removal of oxygen inhibition layer[30].

Resin Infiltration Technique On White Spot Lesion

White spot lesions are an early stage of tooth decay formation. White spot lesions are commonly associated with the fixed orthodontic treatment and it poses a significant problem in the clinical setup. These lesions are caused by tooth demineralization which results in visible enamel changes[31].

In a study conducted by Martignon et al. the rate of failure of resin infiltration in non-cavitated proximal lesions after 1, 2 and 3 years of follow-up was 15.8%, 24.3% and 32.4%, respectively. The failure rates obtained in the control group (placebo) were 47.4%, 62.2% and 70.3% for the same follow-up periods[32]. Dental caries activity is higher in temporary molars than in premolars and permanent molars, which may explain the difference between the results obtained by Ekstrand et al. and other studies[33].

Ekstrand et al may possibly be explained by a higher proportion of dentin lesions that were infiltrated by them and consequently a higher rate of its progression and reduced efficacy of infiltration[34].

The results of various studies conducted in order to define an effective resin infiltration protocol show that a higher rate of inhibition of caries progression occurs with the application of a 15% hydrochloric acid gel for 2 minutes in order to dissolve the superficial hypermineralized enamel surface and to allow a greater penetration of resin [35].This layer reflects the remineralization that characterizes the dynamics of tooth decay and, if not removed, it behaves as a barrier to resin infiltration [36].Considering the resin characteristics needed for a good infiltration, the resin should have a low viscosity, a small contact angle on enamel, a high surface tension and a high penetration coefficient. Among the different studied materials, triethylene glycol dimethacrylate (TEGDMA), without added solvent, has proved to be the resin which is capable of giving better results [25,37,38].

Having in mind the particularities of TEGDMA, it becomes of paramount importance to maintain a dry tooth surface prior to its use, which is achieved through the removal of water by dehydration with ethanol. When this dehydration is not fully effective, which happens more easily at the lesion margins, an incomplete infiltration is obtained [39].

The polishing of the infiltrated lesions should be performed. It is related to the stability of the aesthetic, the reduction of the porosity and the removal of the oxygen inhibited layer.

The resin infiltration technique is indicated for active and non-cavitated carious lesions, whose depth does not exceed the outer third of dentin, on smooth surfaces (proximal, buccal and lingual) [40].The application of this technique is particularly interesting in proximal lesions, taking into account the destruction of healthy tissue that is required to access the lesion while using other techniques and its indication should be ascertained through bitewing radiographs [40,41].

Conclusion

Under the limitations of this report, the resin infiltration technique is a promising microinvasive approach in arresting caries progression and preservation of demineralized enamel. Prognosis of this case depends on oral hygiene, available fluorides, re/demineralization

periods, biological behavior of materials used as infiltrants and clinical sensitivity of application procedures.

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Analysis of Condylar Morphological Variations Using Digital Panoramic Radiographs-A Retrospective Study

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Abstract

Aim- The aim of the study is to retrospectively analyse the condylar morphological variations using digital panoramic radiographs

Background- Digital panoramic radiographs are commonly utilised by dentist to visualise the teeth, maxilla, mandible and the surrounding structures. OPGs are cost effective and are also relatively low in radiation exposure to the patients. Human mandibular condyle may be classified into four types basically as oval, diamond, bird beak and crooked finger. Variations in the condylar morphology may occur due to developmental variations, trauma, endocrine disturbances and radiation therapy.

Materials and Method- This study comprised of radiographic evaluation of 200 condyle after including 100 digital panoramic radiographs retrospectively taken for routine investigation. The radiographs included in the study comprised of 50 male and 50 female. Human condyles were classified based on Chaudhry et al into 4 types. Most commonly occurring shape in males and females were evaluated.

Results- Of the 100 pairs of mandibular condyle evaluated 58.5% were oval in shape, followed by 21% were bird beak in shape, 9% were diamond in shape, 14% were crooked finger in shape. When evaluated whether there is any symmetry between the two sides oval-oval was the commonly occurring combination with 90 pairs showing symmetry and 10 pairs were asymmetrical.

Keyword- *Digital panoramic radiographs, mandibular condyle, temporomandibular joint, oval, diamond*

Introduction

Temporomandibular joints (TMJ) is one of the unique joints in the human body which is formed by the articulation between the mandibular condyle and squamous portion of the temporal bone at the base of the skull[1].The functions of TMJ includes maintaining proper occlusion, enabling a smooth and efficient movement of the mandible during mastication, swallowing, speech and to prevent dislocation of the mandible from external or abnormal forces[2]. Even after growth cessation, the mandibular and temporal parts of the TMJ are both thought to maintain its capacity for remodelling[3]. Due to functional and mechanical requirements there is an adaptive response of the TMJ which is thought to be the reason for continued capacity for morphologic changes[4,5].Various factors have been found to alter the TMJ morphology and position including age, sex, pathological processes, functional variations and occlusal forces[6,7,8]. Several studies have been done on dimensional analysis of the condyle and its surrounding structure, less attention has been given towards the variations in the condylar morphology[9]. Orthopantomogram is one of the most commonly prescribed and interpreted radiographs by dentists. OPGs are cost-effective with comparatively low dose of radiation exposure to the patients[10,11].

The aim of the study is to analyse and evaluate the morphological variations on an OPG and thereby, whether the determination of shapes could aid in

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diagnostics. It is often assumed that normal condylar head will have a convex configuration and there is symmetry between the contra-lateral sides in the same individual. After several researches, it is found that there is great variation in size and shape with age, gender, facial type, occlusal force, functional load, malocclusion type[9].Yale et al. in 1961 reported about the different shapes of the mandibular condyle for the first time[12]. The mandibular condyle was classified by Yale initially based on their superior view into concave, convex and flat , but it was simplified into four categories as convex, flattened, angled and rounded[12,13,14]. Developmental disturbances involving TMJ might result in anomalies of the size and shape of the condyle such as hyperplasia, hypoplasia, agenesis and formation of a bifid condyle. Any trauma or infection during development can also lead to condylar growth disturbances[15].

Various syndromes can result in abnormalities of the jaw and face which might affect the structure, shape, size, organisation and function of hard and soft tissues. Hemifacial microsomia, Treacher Collins Syndrome, Hallermann-Steiff Syndrome are the three syndromes which causes hypoplasia of the mandibular condyle[16-26]. Aplasia of the mandibular condyle is seen in Hemifacial Microsomia and Occula mandibulo dyscephally[16-23]. Apart from developmental anomalies, there might be variation in the size and shape of the mandibular condyle due to cyst and tumours in region of condyle, arthritic conditions, endocrine disturbances and radiation. A proper understanding of the anatomy and morphology of the condyle is necessary in-order to differentiate a normal variant from pathological condition[27]. The objective of this study was

1)To determine the shape predominantly seen in population

2)To analyse the variation in shape of mandibular condyle in adult Indian population

3)To assess whether there is any particular shape dominant in each gender.

Materials and Method

A retrospective study was done on 100 digital OPGs taken for routine investigation purpose taken in Department of Oral Medicine and Radiology, Saveetha Dental College and Hospitals. The OPGs which revealed full condylar view on both the sides with optimal density and contrast, free of any projection errors were selected for this study. The study included OPGs of 50 male and female of all the age groups. Classification of condyle by Chaudhry et al. identified as Type I- Oval shape, Type II- Diamond shape, Type III- Bird beak shape, Type IV- Crooked finger shape as shown in fig 1

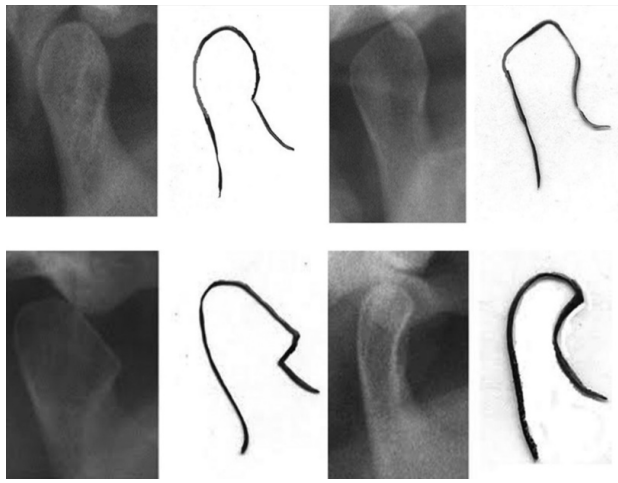


Fig 1-Shapes of condyle on radiograph

Results

A total of 200 condyles were analysed from 100 subjects of different age groups, which included 50 males and 50 females.

1. The following shapes were observed among the Indian population namely-

i) Oval ii) Diamond iii) Bird beak iv) Crooked finger

2. The most common shape observed was Oval (58.5%) followed by bird beak (21%), diamond (9%) and crooked finger (14%) shown in fig 1.

3. The most common shape observed among males was oval, bird beak, diamond and crooked finger (fig 2)

4. The most common shape observed among females was oval, diamond, bird beak and crooked finger (fig 3)

5.The predominantly occurring shape in both the sex was determined. 58% of the males and 59% of the females exhibited oval shape which is observed as the most commonly occurring shape.

4. Fig 4 depicts the commonly occurring combinations of the condyle shape radiographically. Among which the oval-oval (54%) combination was the most common followed by bird beak-bird beak (18%), diamond-diamond (11%) and crooked finger-crooked finger (7%) in our study.

5. Fig 5 shows the different combinations of shapes of oval-bird beak (5%), oval-diamond (4%) and diamond-bird beak (1%).

Discussion

Mandibular condyle is a bony ellipsoid structure approximately 20mm long mediolaterally and 8-10mm thick anterposteriorly.The shape of mandibular condyle varies greatly among each individuals and age groups. The variations in the size and shape of the condyle may be physiological and pathological[28].A study on mandibular condyle morphology in relation to malocclusion in children during the 1980s revealed that the condyle was greater in size in males when compared to females and midline discrepancy significantly altered the increase in condylar size during growth[29].Human mandibular condyle can be categorized into 5 basic types as flattened,convex,angled,rounded and concave. Morphological variations of the condyle may be resulted due to several factors such as developmental variations, remodelling, trauma, endocrine disturbances, various diseases,syndrome and radiation therapy.Panoramic radiograph still remains to be one of the most common screening modalities among various imaging techniques for TMJ abnormalities because it enables to view both maxillary and mandibular dental arches along with surrounding structures like Temperomandibular Joint(TMJ), maxillary sinus, nasal cavity, styloid process and hyoid bone.OPG is a standard imaging modality prescribed by dental surgeons for obtaining general information about the oral cavity as it is also has a favourable cost-benefit relationship and relatively low dose of radiation exposure to the patients[30]

This study is done to determine the prevalent radiographic shapes of the head of the condyle on OPG. From the evaluation of 200 condyles it is found that 58.5% were oval in shape followed by 21% bird beak, 13.5 % diamond, and least seen was 7% crooked finger. The study also determined whether TMJ followed any typical feature of symmetry.It was found that 90% of pairs of condlye was same combinations in which oval-oval was the most commnly occuring combination followed by bird beak-bird beak in both male and female.10% showed different combination of pairs comprising the oval-bird beak followed by oval-diamond and the least being diamond-bird beak.Radiographs are two dimensional visualisation of three dimensional object. Hence the temperomandibular joint has to be viewed from several positional aspects.Recently developed imaging modalitiy like cone beam volumetric imaging can be used which will give more detailed information of the condyle.

Conclusion

Variablity in the shapes and sizes of the condyle must be considered as an important factor in diagnosing the disorders of the temperomandibular joint.Cost effectiveness and low exposure dose makes OPG a standard choice of imaging prescription.Evaluation of condyle on OPG enables to study and analyse fine observations.From this study pertaining to Chennai population we conclude that oval is the most common shape in both genders and oval-oval being the most common combination of pair.Increased sample size and advanced imaging modality may help in giving more information on the morphology of condyle in a population.

Conflict of interest: Authors declare no conflict of interest

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Herbal Formulation Mediated Synthesis of Silver Nanoparticles and Its Antifungal Activity Against *Candida albicans*

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Abstract

Background : *Candida albicans* is known to cause a variety of diseases like oral candidiasis, vaginal candidiasis, invasive candidiasis etc. Although there are anti-fungal drugs in use for the treatment of these diseases, alternative medicine is required for their prophylaxis and improved prognosis. For this purpose, silver nanoparticles (Ag-NPs) can be used as antifungal agents. They are already in use as anti-microbial and anti-fungal agents in agriculture and can potentially be used as targeted drugs for the human body. The aim of this research is to study the anti-fungal efficacy of silver nanoparticles synthesised using a herbal formulation of *Andrographis paniculata* and *Moringa olifera* against *Candida albicans*.

Materials and Method: Herbal formulation was created using the leaves of *Andrographis paniculata* and *Moringa olifera.* Silver nitrate solution was added to this and the solution was transferred to an orbital shaker for silver nanoparticle preparation. The powder of Ag-NPs was created. The bioreduction of pure $AgNO_3$ was characterized by UV-visible spectroscopy. *Candida albicans* was isolated using serial dilution method and a fresh fungal suspension was dispersed on Rose Bengal agar. Both disc diffusion and agar well diffusion methods were used. Different concentrations of Ag-NPs (50, 100 and 150 microliter) were incorporated into the wells, discs, and plates and these were incubated at 37°C for 24 hours. The antifungal agents were used as positive control. Zone of inhibition was recorded in each plate. Proper documentation methods were used.

Results: Colour change was seen after the preparation of silver nanoparticles. The peak in UV-vis spectroscopy was seen to be at 400 nm. The zone of inhibition was seen to increase with an increase in the concentration of Ag-NPs in the agar wells. The plate dispersed with the highest concentration of Ag-NPs had the lowest cultural population.

Conclusion: The herbal synthesis of Ag-NPs is highly eco-friendly and should be practised more than chemical synthesis of the same. The antifungal activity of Ag-NPs was comparably effective to the control used and in the future they can be administered as an antifungal drug for the prophylaxis and treatment of various types of Candidiasis.

Keywords: *Antifungal, Silver nanoparticles*, *Candida albicans*, *Andrographis paniculata*, *Moringa olifera*

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Introduction

Nanotechnology

Nanotechnology has emerged as a science of varied uses over the past years. This is mainly due to its ability to be of use in a plethora of disciplines. It has been of use in agriculture, the petroleum industry, medicine,

physics, engineering etc [1]. This can be attributed to the many beneficial properties of nanoparticles (NP) such as anti-bacterial action, anti-fungal action, anti-wear property, anti-friction property, property to smoothen surfaces, potential for bio-synthetic production etc [2]. The bio-synthesis of nanoparticles is being given great weight because it does not involve toxic chemicals in its synthesis.

Silver Nanoparticles

Silver nanoparticles (Ag-NP) can be sourced form a variety of agents like bacteria [3], flowers, fruit extracts [4], leaf extracts [5], bark etc. They are of excellent use as antimicrobial agents, nano-fungals, nano-pesticides in the agriculture industry, and additives in base oil etc. The anti-bacterial action of Ag-NP improves the shelf life of biodiesel and prevents it from going rancid. It has been put forward in studies that Ag-NPs can be the answer to drug-resistant micro-organisms.

Antifungal activity of Nanoparticles

Candida albicans is known to cause various mucosal [6] as well as deep tissue infections [7]. Some of these being oropharyngeal, oral, esophageal, vulvovaginal candidiasis [8]. The possibility of infection by *Candida* increases due to biofilm formation on medical devices [9]. Although there are antifungal drugs in use for the treatment of these diseases, alternative medicine is required for their prophylaxis and improved prognosis. For this purpose, silver nanoparticles (Ag-NPs) can be used as antifungal agents. They are already in use as antimicrobial and antifungal agents in agriculture [1] and can potentially be used as targeted drugs for the human body. The aim of this research is to study the antifungal efficacy of silver nanoparticles synthesised using a herbal formulation of *Andrographis paniculata* and *Moringa olifera* against *Candida albicans*.

Materials and Method

Preparation of plant extract: Leaves of *Andrographis paniculata* and *Moringa olifera* were collected from Chennai. The collected leaves were washed 3-4 times using distilled water and dried in shade for 7-14 days. The well dried leaves were then crushed into powder by using mortar and pestle. The collected powder of the leaves was stored in air tight containers. 1 gram of *A. paniculata* leaf powder was dissolved in distilled water and boiled for 5-10 minutes at 60-70°C. The same was done for the powder of *M. olifera*. The solutions were then filtered using Whatmann No. 1 filter paper. The filtered extract was collected and stored in 4°C for further use.

Synthesis of nanoparticles: 1 milli molar of silver nitrate was dissolved in 90 mL of double distilled water. The plant extracts of *A. paniculata* and *M. olifera* were added with the metal solution and this solution was made into a 100 ml solution. The colour change was observed visually and photographs were taken for the record. The solution was then kept in a magnetic stirrer/ orbital shaker for nanoparticle synthesis.

Characterisation of silver nanoparticles: The synthesis of nanoparticles is primarily characterised by using UV-vis-spectroscopy. 3 mL of the solution is taken in a cuvette and scanned in UV-vis-spectrometer under 350 nm to 550 nm wavelength. The results were recorded for graphical analysis.

Preparation of silver nanoparticle powder: The Ag-NP solution was centrifuged using lark refrigerated centrifuge. The centrifugation was done at 8000 rpm for 10 minutes and the pellet was collected and then washed with distilled water twice. The final purified pellet is collected and dried at 60°C. Finally, the nanoparticles powder was collected and stored in an air tight eppendorf tube.

Study of antifungal activity of Ag-NPs against *Candida albicans*: The *Candida albicans* isolate was isolated using serial dilution method and confirmed using specific media. The agar well diffusion method and disc diffusion method were used to determine the antifungal activity of Ag-NPs. Different concentrations of Ag-NPs were tested against the oral pathogen *C. albicans*. The fresh fungal suspension was dispersed on the surface of Rose Bengal agar plates. Different concentrations of Ag-NPs (50, 100 and 150 µl) were incorporated into the wells and then the plates and discs were incubated at 37°C for 48 hours. The antibiotics were used as positive controls. Zone of inhibition was recorded in each plate.

Results and Discussion

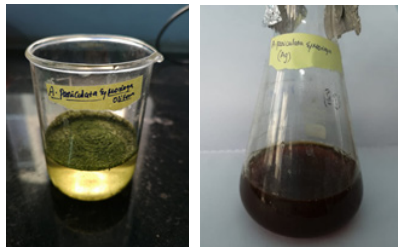


Figure 1: Visual Observation

Visual Observation

Colour change was seen after the production of silver nanoparticles (Figure 1). Initially the extract solution was green in colour and after the synthesis it turned dark brown. The colour change from green to brown preliminarily confirms the synthesis of Ag-NPs. This change takes place due to the excitation of the surface plasmon resonance.

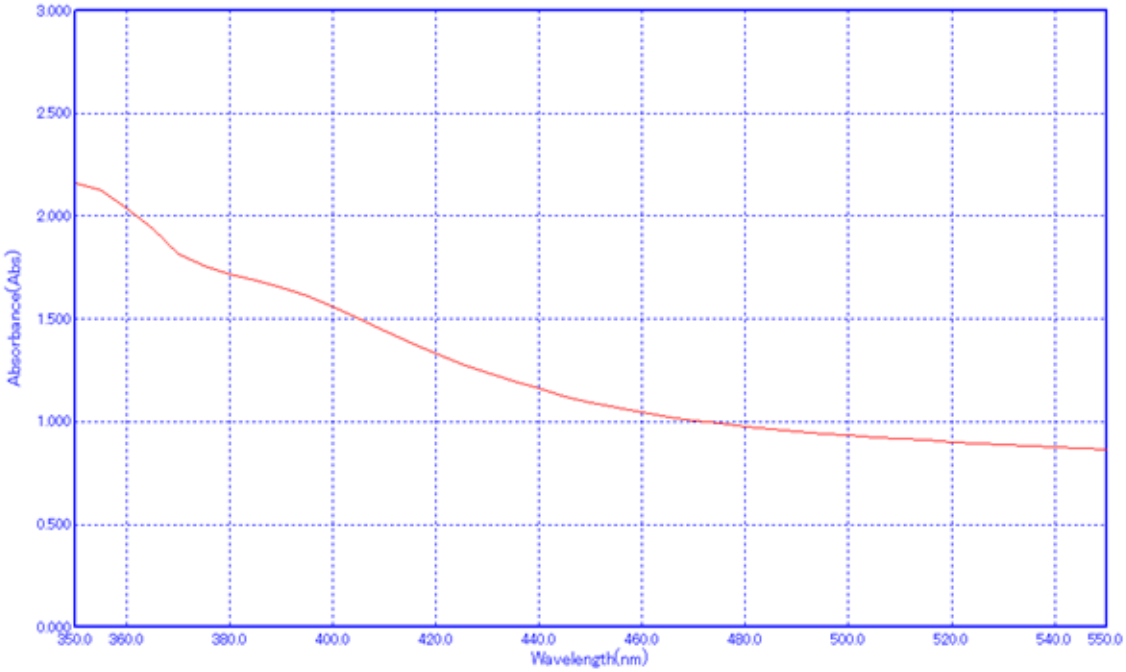


Figure 2: UV-vis Spectroscopy:

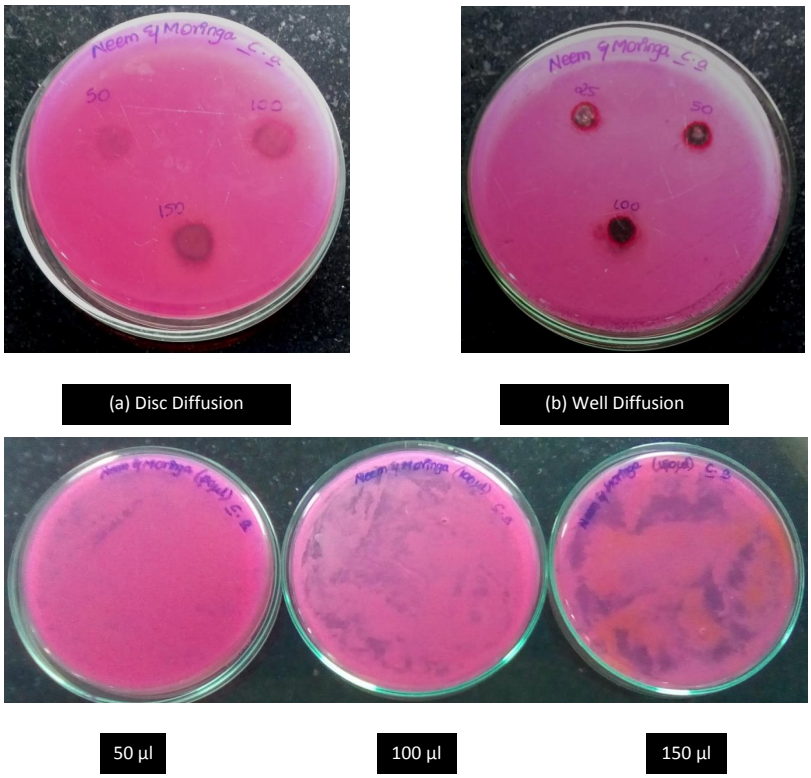


Figure 3: Antifungal Activity

UV-vis Spectroscopy

Figure 2 shows the UV absorption spectra of the synthesized silver nanoparticles using the leaves of *Andrographis paniculata* and *Moringa olifera.* The formation and stability of silver nanoparticles was monitored and the plasmon resonance band for silver nanoparticles was peak positioned at 400 nm.

Antifungal Activity

The growth of the *Candida albicans* isolate is seen to decrease with an increase in the concentration of suspended Ag-NPs in Rose Bengal agar plate. This proves that silver nanoparticles are potent anti-candidal agents.

In recent years, there has been an increase in the resistance of *Candida* sp. towards antifungal therapy. This has led to treatment failure and recurrence of infections [10]. The need to produce alternative antifungal drugs arises due to the fact that *Candida albicans* is one of the most opportunistic pathogens and can cause recurrent infections in immunosuppressed individuals[11].

Another problem with antifungal drugs is that their variety remains extremely limited when compared to the number of diseases caused by fungi. This can be attributed to the fact that fungi are eukaryotic organisms with a structure and metabolism that are similar to those of the eukaryotic hosts they inhabit [12].

When compared to common antifungal agents, Ag-NPs inhibit the growth of fungi at a much lower concentration thus preventing drug toxicity [13]. Studies have showed that a pathogenic state called Dental Stomatitis that is caused by Candida biofilm formation in complete denture wearers can be prevented by the usage of Ag-NPs [14].

Conflict of Interest: The authors declare there is no conflict of interest.

Source of Funding: Self

Ethical Clearance - Taken from Review board of Saveetha Dental College. (SDC/IHEC/18-19/006)

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Nano Structured Bioactive Glass on Dental Disease

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Abstract

Bioactive Glass (BG) has recently become one of the most promising biomaterials, a consequence of discoveries that its unusual properties elicit specific biological responses inside the body.Recent developments in nanotechnology have introduced opportunities for materials sciences to advance dental and bone therapies.The first generation biomaterials were selected to be as bio-inert as possible and thereby minimize formation of scar tissue at the interface with host tissues. Bioactive glasses were discovered in 1969 and provided for the first time an alternative; the second generation, interfacial bonding of an implant with host tissues. Tissue regeneration and repair using the gene activation properties of Bioglass provide a third generation of biomaterials. Among these important properties are the capability of BG to form strong interfaces with both hard and soft tissues, and its release of ions upon dissolution. Bioactive glass can also be used as a tooth paste, these kinds of toothpastes are used, Bioglass particles adhere to the dentine and form aHAp layer; therefore, blocking of the tubules relieves the pain for longer periods. Bioactive glass is an effective remineralizing agent as the effects of bioactive glass containing products were investigated on remineralization of artificial induced carious enamel lesion. This review is to identify the status and usage of nano structured bioactive glass on dental disease.

Key words: *Bioactive Glass Nanostructured, Remineralization*

Introduction

Bioactive glasses are inorganic materials with clear bone bonding and osteoinductive properties. The surface characteristics of these materials lead to rapid bonding and colonization of bone forming cells. Because of the release of ions after contact with body fluids, especially Cu, Zn, and SR, specific activation and differentiation of bone forming cells occurs. Moreover, they are effective in treatment of osteomyelitis and are associated with the release of angiogenic factors. By varying their chemical composition and structure, both degradation and bioreactivity can be influenced[1].

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Bioactive glasses are a group of biomaterials which are used in the fields of dentistry and orthopaedics [2].The function of biomaterials has been to replace diseased or damaged tissues. Developed some 40 years ago, bioactive glass has recently become one of the most promising biomaterials, a consequence of discoveries that its unusual properties elicit specific biological responses inside the body [3]. Among these important properties are the capability of BG to form strong interfaces with both hard and soft tissues, and its release of ions upon dissolution.

Recent developments in nanotechnology have introduced opportunities for materials sciences to advance dental and bone therapies[4].The first generation biomaterials were selected to be as bio-inert as possible and thereby minimize formation of scar tissue at the interface with host tissues. Bioactive glasses were discovered in 1969 and provided for the first time an alternative; the second generation, interfacial bonding of an implant with host tissues[5]. Tissue regeneration and repair using the gene activation properties of Bioglass provide a third generation of biomaterials[6].

Bioactive glasses have a wide range of applications, particularly in dentistry[7]. These glasses can be used as particulates or monolithic shapes and porous or dense constructs in different applications such as remineralization or hypersensitivity treatment. Dentin hypersensitivity (DH) is an oral problem which is attributed to the root surface exposure due to periodontal disease, toothbrush abrasion orcyclic loading fatigue of the thin enamel near the cemento-enamel junction[8]. A bioactive glass mineralizes tiny holes in the dentine and reduces the sensitivity of the tooth.

Bioactive glasses have unique remineralizing properties and are generally introduced into various dentifrices as very fine particles to provide calcium and phosphorus to the tooth surface. Some properties of bioactive glasses such as antibacterial properties can be promoted by adding different elements into the glass[9]. During dissolution of bioactive glass, the pH rises due to cation release and such condition can kill the microbes. Bioactive glasses can also be used to modify different biocompatible materials that need to be bioactive[10].Consequently, fixed restorative ceramics would be modified in a way that they could stimulate bioactive behavior around the fixed restorations margins and provide a bioactive surface, through the tissue regenerative techniques; they could develop periodontal tissue attachment and create complete sealing of the marginal gap[11]. This sealing could prevent the failure of fixed ceramic restorations by eliminating secondary caries, micro penetration of the oral bacteria and their adhesion on cement surface[12]. This article is to identify the status and usage of nano structured bioactive glasses in dental diseases.

Types of bioactive glasses

Bioactive glasses are bioceramics that are solid, nonporous, and hard materials, which consist of the main component silicon dioxide (or silicate) and three other basic components: sodium dioxide, calcium oxide, and phosphorous[13]. By varying all of these components, different forms of bioactive glasses can be made. Bioactive glasses have been investigated for decades and have shown good results in bone regeneration. In all these years several types of bioactive glasses are developed: the conventional silicate glass (45S5 bioactive glass or Bioglass®), glass ceramics (S53P4 bioactive glass or BonAlive®), and borate-based glasses (19-93B3 bioactive glass)[14,15,16]. The biocompatibility of bioactive glasses generally depends on the silicate part of the glass and reaches an optimum graft-bone bonding between when the glass contains 45–52% silicate[17]. The process of graft-bone bonding of bioactive glasses starts with the release of soluble ions after which a silica gel layer is formed on the bioactive glass surface. After the formation of the silica gel layer, amorphous calcium phosphates precipitate on this layer where they form a natural hydroxyapatite layer due to crystallisation. The hydroxyapatite layer activates the osteoblastic cells to start the formation of new bone. This graft-bone bonding is one of the two mechanisms involving degradation of the bioactive glasses, where the second mechanism is based on the dissolution of different ions and thereby activating osteogenesis. The degradation speed of bioactive glasses is depending on the composition of the glasses and can vary from several hours to months[18]. For instance, of borate bioactive glass is known that it degrades much faster than silicate bioactive glass.

In the past decade the popularity of bioactive glasses in the treatment of infections increased. Their versatility in composition and physiological properties enables us to use bioactive glasses in treatment of infection based on different antibacterial mechanisms. These antibacterial properties can be divided into three principles. The first principle is based on the change of local physiological conditions due to dissolution of ions that results in a bactericidal environment. S53P4 bioactive glass (commercially available as BonAlive® bioactive glass) is a bioactive glass with the ability to inhibit bacterial growth. This mechanism is proven bactericidal on different bacterial strains, such as Staphylococcus aureus, without causing any signs of cytotoxic effects or adverse reactions on their environmental tissues[19]. Second principle is based on adding element as silver to the bioactive glass during the manufacturing process because of their bactericidal effects. As well silicate as borate bioactive glasses are tested as silver-doped antibiotic glasses. Silver-doped silicate bioactive glasses showed slow degradation rates and uncontrollable silver release profiles, where silver-doped borate bioactive glasses showed that due to the manufacturing process there is a controlled release of silver, which is favorable in infection treatment. Despite the good in vitro results for eradication of infection, there is a little in vivo evidence for silver-doped bioactive glasses; this might be explained due to the toxicity and adverse reactions when using high concentrations of silver that is favorable in infection treatment. The third

and last principle uses antibiotic-loaded bioactive glass that elutes antibiotics during degradation compared to the previously mentioned bone graft substitutes. The bioactive glasses used as an antibiotic delivery device have a different composition compared to conventional bioactive glasses because the conventional glasses are nonporous and too dense. The bioactive glasses applied for antibiotic delivery are mainly composed as sol–gel-derived carriers or glass-composite carriers[20]. The sol–gel-derived glasses have low release rates of antibiotics (only 20–25% after 3 months) and have a low strength what makes them less applicable in treatment of bone infections. The composite glasses showed better release rates compared to gel–sol-derived glasses. An in vitro study showed release rates up to 80–85% after 21 days for a chitosan borate glass composite, where an in vivo study showed release rates up to 90% after approximately 14 days for phosphate-cement borate glass composites[21].

Mechanism of action

The underlying mechanisms that enable bioactive glasses to act as materials for bone repair have been investigated since the first work of Hench et al. at the University of Florida[22]. Early attention was paid to changes in the bioactive glass surface. Five inorganic reaction stages are commonly thought to occur when a bioactive glass is immersed in a physiological environment:

1) Ion exchange in which modifier cations (mostly Na+) in the glass exchange with hydronium ions in the external solution.

2) Hydrolysis in which Si-O-Si bridges are broken, forming Si-OH silanolgroups, and the glass network is disrupted.

3) Condensation of silanols in which the disrupted glass network changes its morphology to form a gel-like surface layer, depleted in sodium and calcium ions.

4) Mineralization in which the calcium phosphate layer gradually transforms into crystalline hydroxyapatite, that mimics the mineral phase naturally contained with vertebrate bones.

Later, it was discovered that the morphology of the gel surface layer was a key component in determining the bioactive response. This was supported by studies on bioactive glasses derived from sol-gel processing. Such glasses could contain significantly higher concentrations of SiO2 than traditional melt-derived bioactive glasses and still maintain bioactivity (i.e., the ability to form a mineralized hydroxyapatite layer on the surface)[23].

Previously, it was known that a complex interplay existed between bioactive glasses and the molecular biology of the implant host, but the available tools did not provide a sufficient quantity of information to develop a holistic picture[24]. Using DNA microarrays, researchers are now able to identify entire classes of genes that are regulated by the dissolution products of bioactive glasses, resulting in the so-called "genetic theory" of bioactive glasses. The first microarray studies on bioactive glasses demonstrated that genes associated with osteoblast growth and differentiation, maintenance of extracellular matrix, and promotion of cell-cell and cell-matrix adhesion were up-regulated by conditioned cell culture media containing the dissolution products of bioactive glass[25].

The mechanism of HAp layer formation on bio-active glasses

Hydroxyapatite is similar to the bone mineral and can interact with collagen fibrils of damaged bone to bond with it. Osteogenesis, due to the dissolution products of the glass on osteoprogenitor cells, stimulates new bone growth[21].

The mechanism of HAp layer formation on bioactive glasses has been widely studied in vitro and in vivo. This process involves different stages; calcium ions dissolve from the bioactive glass into the body fluid while a silica-rich interlayer forms on the glass surfaces. The nucleation of HAp is now possible because the surrounding fluid is supersaturated with re- spect to HAp due to the dissolution of the calcium ions. In addition, silica-rich interlayer dissolves a considerable amount of silicate ion and provides favorable sites for the nucleation. The process of nucleation and growth of the HAp layer continues by the reactions of the calcium, phosphate, and hydroxide ions. It is possible that carbonate or fluoride anions incorporate in the reactions, as well[20, 21, 26].

In 1980, Hench showed that the in vivo formation of the HAp layer can be reproduced in Tris buffer solution at pH 7.4. Later, Kokubo and Hench independently confirmed that apatite can form on the surface of Bioglass® in SBF. In 1991, it was suggested that a simulated body fluid (SBF) which has the ion concentrations equal to

human blood plasma can reproduce HAp formation[22]. Thin film X-ray diffraction (TF-XRD), Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM) and transmission electron microscopy (TEM) were used to confirm the similarity of the composition and structure of HAp formed in SBF to the bone mineral[27]. Hence, immersion in SBF can be used for in vivo bone bioactivity prediction before animal testing; this reduces the number of animals used and the duration of experiments and, there- fore, increases the possibility of the development of new types of bioactive materials[22].

SBF is a solution that simulates human blood plasma with ion compositions similar to human blood, but without any proteins, hormones, glucose, or vitamins[28]. During immersion in SBF, different processes occur simultaneously which result in structural and chemical changes to the surface of the material. These processes are leaching, degradation, and precipitation[29]. In the leaching process, through the exchange of the cations H+ and H3O+, metal ions like Na+ and Ca2+ are released and the pH at the interface increases up to 7.4. In parallel, hydroxyl ions locally break the silica-oxygen bonding. Then, silicon as silicic acid, Si (OH)4, is released into the solution. The hydrated silicic acid on the surface is surrounded by at least one hydroxy group; subsequently, a silicic acid gel layer forms. Simultaneously, the glass releases calcium and phosphorus and an amorphous calcium phosphate-rich phase is formed on the surface. The CaP phase then crystallizes into a hydroxyapatite (HAp) structure[29].

Bioactive glass on remineralisation

Demineralization and remineralization are natural processes which continuously occur for teeth. Physiological processes as well as bacterial acids and foods cause demineralization, while remineralization results from the deposition of mineral (calcium and phosphorous) from saliva or oral fluid. Since natural remineralization is not enough for having strong enamel, bioactive glasses are used to augment the process. Bioactive glasses have unique remineralizing properties and are generally introduced into various dentifrices as very fine particles to provide calcium and phosphorus to the tooth surface[30].

Conclusion

Bioactive glasses are able to bond to both soft and hard tissue and promote the bone growth. The bioactivity behavior of these glasses is related to the formation of a biologically active hydroxyapatite layer on the surface of the glasses. The mechanism of bonding of bioactive glasses to tissues includes a series of surface reactions that occur when the glass is exposed to an aqueous environment. These glasses are produced via two main methods, melting and sol-gel processing. Bioactive glasses have a wide range of applications, such as bone grafts, scaffolds, coating materials, and are used for hypersensitivity treatment.

Conflict of Interest: Nil

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Assessment of Dental Caries Status Using Caries Assessment Spectrum and Treatment (Cast) Index

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Abstract

Aim: The study is aimed to assess the dental caries status in patients visiting the Department of Oral Medicine, Radiology and Special Care dentistry in Saveetha Dental College and Hospitals using Caries Assessment Spectrum and Treatment Index (CAST).

Background: A new epidemiological index is introduced for assessment of dental caries which is known as Caries Assessment Spectrum and Treatment (CAST). Spectrum is considered as backbone of this index which covers the entire carious lesion progression from no caries to caries involving enamel, dentin and pulp. It also includes codes for teeth that has developed an abscess/fistula in relation to carious teeth and teeth lost due to dental caries.

Materials and Method: The study population was patients visiting the Department of Oral Medicine, Radiology and Special Care Dentistry in Saveetha Dental College during the month of January 2019.The patients who were aged between 20-50 were included randomly and all third molars, any developmental dental anomalies and those undergoing orthodontic treatment were excluded. The patient's dental caries status was examined using mouth mirror, periodontal probe under proper illumination and was recorded in a predesigned proforma.

Results: From the study we find that 82.64% were caries free, 2.57% had restorations, 1.35% had enamel caries which gives us the information that 86.56 % can be considered healthy (caries free). The lesion involving the dentin were 2.13% and pulp were 5.78%, which leads us that about 7.91% are caries affected. The advanced stage of carious lesion which is abscess or fistula were 0.92% and the teeth lost due to dental caries was 3%.

Conclusion: Our study concludes the CAST index presents a simple hierarchical structure of carious lesion spectrum and is a promising index for epidemiological studies with complex quantifiability.

Keywords: *Caries pattern, CAST index, dental caries, decayed-missing-filled teeth, International Caries Detection and Assessment System- II (ICDAS II).*

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Introduction

Dental caries is a dynamic disease which may involve enamel and dentin. The rate of carious lesion progression can be controlled by various measures. In carious lesion involving enamel and dentin, further caries progression can be prevented. If caries-controlling measure are not effective, caries may affect large parts of the tooth leading to pulpal involvement, ulceration,

fistula, abscess and infection of the alveolar bone and surrounding tissue[1]. Dental caries continues to be a serious problem worldwide. A continued surveillance of the dental caries epidemiological status is required[2]

Due to recommendation of the World Health Organisation (WHO) the Decayed, Missed and Filled teeth (DMFT) index is the most commonly used tool in epidemiological surveys. But it has failed to meet the challenges of the 21st century[3]. In-order to overcome the difficulties encountered with DMFT index a new visual and tactile dental caries detection system was established known as the International Caries Detection and Assessment System (ICDAS). Few changes were made in this original index by the committee and was finally named as ICDAS II[4,5,6]. This system requires an air compressor for drying each tooth surfaces necessating additional financial resources and electricity. The coding is complex for use, encumbers data analysis and difficult to present the results in an easy-to-read method[7,8,9].

In a population with high caries prevalence and more severe carious lesion progression Pulpal involvement - Ulceration-Fistula-Abscess (PUFA) and Pulpal involvement root sepsis (PRS) can be applied. The shortcoming of PUFA index is that it covers only a part of the wide range of carious lesion progression[10,11].

Due to serious difficulties encountered to report using ICDAS II and PUFA indices separately in an epidemiological survey in a child population in Brazil, the development of new index was necessitated. This led to the search for a new caries index which is consistent, sensible, organised, pragmatic and have easy way of reporting the results. The newly proposed index by Francken et al was a combination of ICDAS II, PUFA and 'M' 'F' components of DMF index, with a view to overcome the disadvantages of these systems. The fusion of the three indices resulted in the development of the new Caries Assessment Spectrum and Treatment (CAST) index. It includes the total carious lesion progression from no carious lesion, caries protection (sealant), caries cure(restoration) to carious lesions in enamel and dentin and the advanced stages of carious progression in pulp and tooth-surrounding tissues. It also includes tooth lost due to dental caries[12].

The face and content validity of the CAST instrument was done by the Research and Development (RAND) modified e-Delphi consensus method, with 56 researchers from 24 countries involved in the process[13]. The index has been validated in extensive in vitro and in vivo studies which have proven its high specificity, sensitivity and reliability in epidemiological surveys[14,15]. However the CAST index should be used in independent surveys to be become established as an plausible index.

Materials and Methodology

The study aimed at assessment of dental caries status using Caries Assessment Spectrum Treatment (CAST) index. The study population was patients who visited the Department of Oral Medicine Radiology and Special Care, Saveetha Dental College and Hospital during the month of January,2019. The study included patients between the age group of 25-50 years, while all the third molars, any developmental dental anomalies and those undergoing orthodontic treatment were excluded. 50 patients were randomly selected based on the inclusion and exclusion criteria. The study was conducted after obtaining an informed consent from the patients. The dental evaluation was done according to the CAST codes which covers the entire carious lesion progression. The codes are arranged in a hierarchical manner. The examination was carried out under proper illumination using mouth mirror and a periodontal probe to remove any debris or plaque. If two conditions were present on the same surface, that is superficial lesion in one pit and a deep one in another, the higher score were recorded. A well-structured proforma was developed in order to enable proper documentation of the study, in which score of each tooth was recorded.

Results

The results of the study are tabulated below

Characteristic	Code	Teeth Affected In Number	Teeth Affected In Percentage
Sound	0	1157	82.64%
Sealed	1	0	0

Cont... **The results of the study are tabulated below**

Restored	2	36	2.57%
Enamel	3	19	1.35%
Dentin	4	12	0.85%
	5	18	1.28%
Pulp	6	81	5.78%
Abscess/Fistula	7	13	0.92%
Lost	8	42	3%
Other	9	22	1.57%

From the study we find that 82.64% were caries free, 2.57% had restorations, 1.35% had enamel caries which gives us the information that 86.56 % can be considered healthy. The lesion involving the dentin were 2.13% and pulp were 5.78%, which leads us that about 7.91% are caries affected. The advanced stage of carious lesion which is abscess or fistula were 0.92% and the teeth lost due to dental caries was 3%, by which we can say that about 3.92% were severely affected by dental caries and untreated.

Discussion

Dental Caries continues to be a major public health problem in many developing countries like India. It has engrossed its tentacles deep into the regions where there is lack of public awareness, motivation and devoid resources for dental treatment are present[16,17]. Early detection of incipient caries is essential in modern dentistry to create awareness among the community. Epidemiological studies use DMFT index most often for assessment of dental caries which does not cover the total spectrum of carious lesion progression. Advantage of this index includes simplicity, ease of use, easy to report and can be compared with results in another countries. The limitation of the index is that it does not record the initial white spot lesions, absence of specific codes for recording enamel lesions and deep penetrating lesions[18,19,20].

The modern concepts of caries indices are based on the idea of incorporation of all stages into one tool. CAST differs from other caries indices in a way that its codes are in a hierarchical order of severity of caries process that totally covers the entire spectrum of the caries progression. In CAST system the codes are ranged from 0-9, of which code 0,1,2 represents sound, sealed, restored respectively. Code 3 represents enamel caries 4 and 5 dentinal caries, 6 and 7 pulpal involvement. Dental caries prevalence is considered starting from code 3.A

A study done in Telangana about assessment of caries status among school children according to decayed-missing-filled teeth/decayed-extract-filled teeth index, ICDAS, CAST index concluded that both ICDAS and CAST system quantified the whole spectrum of dental caries precisely[21].

A similar type of study was done using CAST index among the school children visiting the University Dental Hospital Sharjah for routine check-up and treatment as a part of School Dental Program. The pattern of dental caries was assessed using Caries Assessment Spectrum Treatment (CAST) Index. They concluded that CAST is a valuable tool which expresses the severity of caries, clinical progress and outcome of management[22].

Only few studies have been done using CAST index among the populations. The importance of CAST index is prevention and risk assessment. It will enable the health professionals to present the real picture of preventable carious lesions. The studies done using CAST index concluded that it is a promising index for epidemiological studies with complex quantifiability[23-27].

Conlusion

The present study evaluated the prevalence of dental caries using Caries Assessment Spectrum and Treatment (CAST) index among the patients visiting the Department of Oral Medicine, Radiology and Special Care dentistry in Saveetha Dental College and Hospitals. The spectrum of dental caries was predominantly characterized by sound teeth followed by caries involving the pulp chamber. From the study we conclude that CAST index is a hopeful index for epidemiological surveys.

Conflict of Interest: The authors declare there is no conflict of interest

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Antibacterial Activity of Silver Nanoparticles Mediated *Aloe vera* with Neem Against Dental Pathogens

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Abstract

Background : When left unchecked, dental pathogens cause chronic diseases like periodontitis and dental caries that lead to the irreversible loss of tooth structure. However, with proper prophylactic measures, we can inhibit the excessive proliferation of pathogenic oral flora. The aim of this study was to examine the plausible antibacterial potential of silver nanoparticles synthesized using neem and *Aloe vera* against four dental pathogens - *Streptococcus mutans*, *Staphylococcus aureus* and the *Enterococcus* and *Pseudomonas* species.

Materials and Method: Leaves of *Azadirachta indica* and *Aloe vera* were made into a filtered herbal formulation. A metallic solution of silver nitrate was added to it and the conjunction was kept in an orbital shaker for the synthesis of nanoparticles. After centrifugation, the resultant pellet was powdered. The agar well diffusion method was used to determine the antibacterial efficacy of Ag-NPs. Fresh bacterial suspensions of *Staphylococcus aureus*, *Streptococcus mutans*, the *Enterococcus* and the *Pseudomonas* species were dispersed on the surface of Muller-Hinton agar containing plates. Ag-NP concentrations of (25, 50 & 100) µl were incorporated into the wells and the plates were then incubated at 37°C for 24 hours. Antibiotics were used as a positive control. The zone of inhibition was recorded for each plate.

Results: A colour change was observed after the synthesis of Ag-NPs. The prepared particles were then characterised by a peak seen at 425 nm in UV-vis-spectroscopy. The zone of inhibition increased in size with an increase in Ag-NP concentration. They increased in the order of: *Staphylococcus aureus*, the *Enterococcus* species, *Streptococcus mutans* and the *Pseudomonas* species - with *Staphylococcus aureus* being the smallest and the *Pseudomonas* species being the largest.

Conclusion: Ag-NPs synthesized using neem and *Aloe vera* is an effective antibacterial agent against *Streptococcus mutans* and the *Pseudomonas* species. It is eco-friendly, rapid, easy to synthesize and effective. These Ag-NPs are a non-toxic solution for multiple-drug resistant bacteria.

Keywords: *Silver nanoparticles, Neem, Aloe vera, Antibacterial, Dental pathogens*

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Introduction

With the growing demand for better products, science encompasses the need for utilizing the benefits of nanotechnology and nanomaterials. Its use allows specific solutions to be tailored based on its modifiable size-dependant physical and chemical properties in various fields. Nanoparticles have been effectively exploited as an industrial catalyst, in functional

nanocomposites, in food packaging, for improving texture, for nutrient delivery, in waste water treatment, as pollutant scavengers, in cancer therapy, to reduce pesticides, in tissue engineering [1] and as fluorescent biological labels [2]. It is also being weighed as a possible solution for neurodegenerative disorders such as Alzheimer's, Parkinson's and others [3].

It is a well-established fact that silver has a relatively low toxicity, thus greatly increasing its potential of being used in medicine and health-care [4]. One amongst its many beneficial properties is its antibacterial efficacy.

Interestingly, it was found that bacteria killed by silver showed significant anti-bacterial activity against a *viable* population of the same bacterium. This is because the killed bacteria act as a reservoir for silver and promotes further bactericidal activity. Thus, it exhibits a desirably long lasting and persistent biocidal effect. This subsequently prevents bacterial re-colonization and proliferation [5].

With the intension of harnessing the benefits of silver, nanoparticles were synthesized using silver nitrate. This was mediated by a herbal formulation of *Azadirachta indica* (Neem) and *Aloe vera*. Although silver nanoparticles can be conventionally synthesized by employing physical and chemical methods, biosynthesis proves to be a better alternative as it does not involve the use of hazardous chemicals and it is simple, high yielding, cost-effective, rapid and non-toxic [6,7]. Biologically synthesized silver nanoparticles also exhibit high stability and solubility [8].

Both Neem and *Aloe vera* have been used for centuries in Ayurvedic, Unani and Siddha medicine [9]. Neem is considered to be the cynosure of modern medicine owing to its vast number of biologically active compounds. Its constituents exhibit anti-inflammatory, antifungal, antiviral, antibacterial, antihyperglycemic, antioxidant and antimalarial properties [10]. *Aloe vera* is frequently used in the fields of dermatology and cosmetology, but controlled trials are needed to confirm its safety and actual efficiency. It promotes wound healing, has antiseptic and anti-inflammatory properties, is a potential laxative and can be used as an anti-aging substance [11].

As of 2015, it was estimated that about 2.3 billion people have dental caries in their permanent teeth [12]. Their occurrence in both children as well as adults is only on the rise as of recent years [13]. It is well-established that the incidence of dental caries only increases with age despite having widespread access to free dental care [14-16]. Also, once the tooth structure is lost, it cannot be regenerated.

Thus, it is important to devise preventive measures against dental pathogens such as *Streptococcus mutans*, *Streptococcus* oralis, *Streptococcus sanguis*, *Streptococcus sobrinus*, the *Pseudomonas* species, *Streptococcus mitis* and also cross-infectious bacteria like *Staphylococcus aureus* [17]. The *Enterococcus* species has also been associated to dental caries, periodontitis, endodontic infections and peri-implantitis [18, 19]. Adopting dental prophylaxis as our objective, we have attempted to synthesize antibacterial nanoparticles from silver nitrate using a herbal formulation of neem and *Aloe vera*, against *Streptococcus mutans*, *Staphylococcus aureus* and the *Enterococcus* and *Pseudomonas* species.

Materials and Method

Preparation of the plant extract

This study was approved by the institutional review board with the number SDC/2018/23 Leaves of *Azadirachta indica* and *Aloe vera* were freshly collected from Chennai in the month of November, 2018 and were thoroughly washed 3-4 times in distilled water. They were then shade-dried for 7-14 days. The well dried leaves were powdered using a mortar and a pestle and was stored in air tight containers. Later, 1 g of the powdered *Azadirachta indica* was dissolved in distilled water and was boiled for 5-10 minutes at (60-70) °C and the same was done using the powdered *Aloe vera*. The two solutions were then filtered using Whatman No. 1 filter papers. Finally, the filtered plant extracts were collected and stored at 4°C for further use.

Synthesis of nanoparticles

1 millimolar of silver nitrate was dissolved in 90 mL of double distilled water. The plant extracts of *A. indica* and *A. vera* were added to this metal solution and was then made into a formulation of 100 mL. Its colour change was visually observed and photographs were taken for systematic recording. The formulation was later kept in a magnetic stirrer/orbital shaker for the synthesis of its nanoparticles.

Characterization of the synthesised silver nanoparticles

Primarily, the synthesis of silver nanoparticles (Ag-

NPs) is characterised by using UV-vis-spectroscopy: 3 mL of the formulation was taken in a cuvette and was scanned in a UV-vis-spectrometer under 300 nm to 700 nm of wavelength. The results were recorded for its graphical analysis.

Preparation of silver nanoparticle powder

The Ag-NP solution was centrifuged in a refrigerated centrifuge (Lark). The centrifugation was done at around 8000 rpm for a duration of 10 minutes and the resultant pellet was collected and washed with distilled water twice. The final pellet was purified and dried at 60°C. In the end, the Ag-NP powder was collected and stored in an air tight tube (Eppendorf tube).

Study of antibacterial activity of Ag-NPs against dental pathogens

The agar well diffusion method was used to determine the antibacterial efficacy of Ag-NPs. Different concentrations of Ag-NPs were tested against *Staphylococcus aureus*, *Streptococcus mutans*, the *Enterococcus* and the *Pseudomonas* species. The fresh bacterial suspension was dispersed on the surface of Muller-Hinton agar containing plates. Ag-NP concentrations of (25, 50 & 100) µl were incorporated into the wells and the plates were then incubated at 37°C for 24 hours. Antibiotics were used as a positive control. The zone of inhibition was recorded for each plate.

Results and Discussion

Visual observation

A colour change was visually observed after the synthesis of nanoparticles. The extract had turned a dark brown from its initial green colour (Figure 1). This colour change from green to dark brown preliminarily confirms the presence of Ag-NPs.

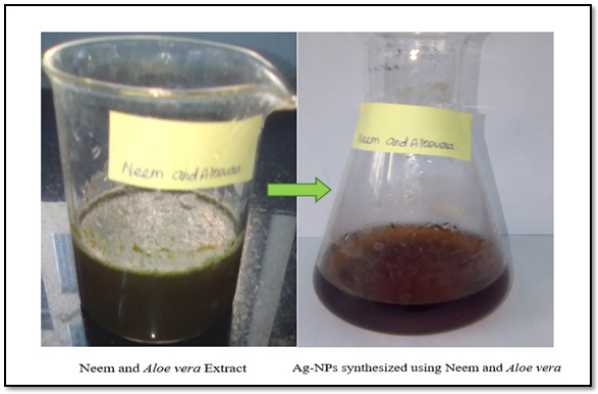


Figure 1: Visual observation

UV-vis spectroscopy

The bio-reduction of pure $AgNO_3$ to Ag-NPs was characterised by using UV-vis-spectroscopy (Figure 2). This was carried out to oversee the formation and stability of the silver nanoparticles. It was done using a UV-vis-spectrometer in the range of 300 – 700 nm of wavelength. The peak was noted at 425 nm.

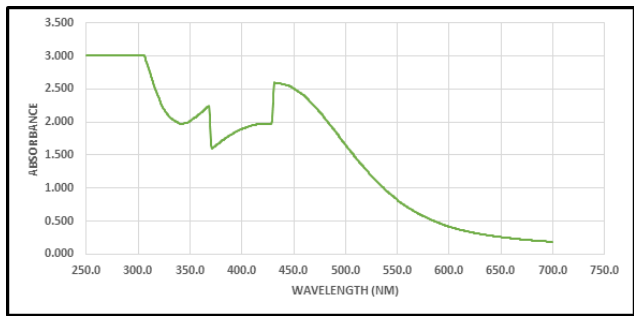


Figure 2: UV-vis spectroscopic analysis

Anti-bacterial activity

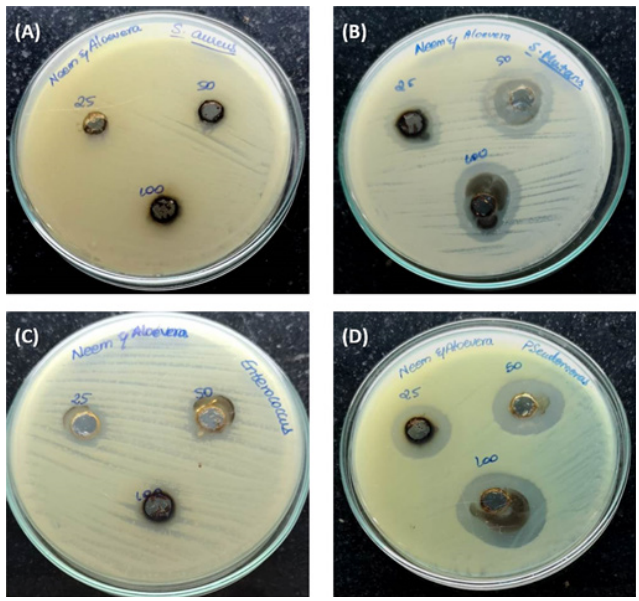


Figure 3: Antibacterial activity of silver nanoparticles: *(A)* *Staphylococcus aureus* - Effect of Ag-NPs on *Staphylococcus aureus* (B) *Streptococcus mutans* - Effect of Ag-NPs on *Streptococcus mutans* with a moderately sized Zone of Inhibition (C) *Enterococcus* species - Effect of Ag-NPs on *Enterococcus* species with its Zone of Inhibition (D) *Pseudomonas* species - Effect of Ag-NPs on *Pseudomonas* species with a highly apparent Zone of Inhibition

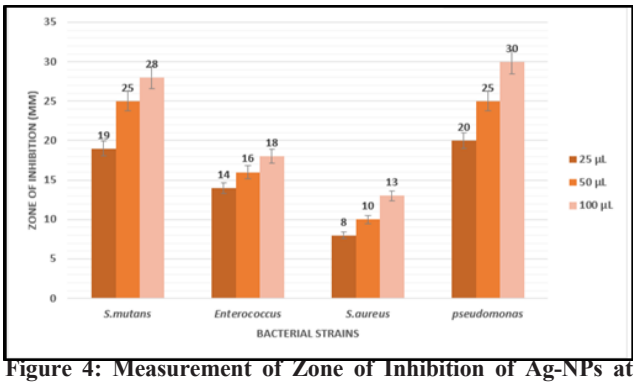


Figure 4: Measurement of Zone of Inhibition of Ag-NPs at different concentrations

As inferred from Figure 3, the zone of inhibition for all four bacterial colonies increase in size with an increase in the concentration of Ag-NPs (Figure 4)

Staphylococcus aureus – A gram-positive, round-shaped bacterium that is very commonly associated with hospital-acquired infections [20]. The colony shows a 13 mm zone of inhibition with 100 µl of Ag-NPs as seen in Figure 4. Out of the four colonies, this has the smallest zone of inhibition, and is thus the least responsive to Ag-NPs (Figure 3A).

Streptococcus mutans – A gram-positive coccus that is commonly found in the oral cavity and is an established cause for dental decay and periodontal diseases [21]. The plate shows a 28 mm zone of inhibition with 100 µl of Ag-NPs as seen in Figure 4. Out of the four colonies, this has the second largest zone of inhibition (Figure 3B). Thus, Ag-NPs have a very good anti-bacterial action against *Streptococcus mutans*.

***Enterococcus* species** – They are gram-positive cocci that often occur in pairs and have been associated to dental caries, periodontitis, endodontic infections and peri-implantitis [18,19]. Here, the colony shows a zone of inhibition of 18 mm with 100 µl of Ag-NPs as seen in Figure 4. Out of the four colonies, this has the third largest zone of inhibition (Figure 3C).

***Pseudomonas* species** – They are rod-shaped gram-negative bacteria. They have an excellent ability to thrive even in harsh conditions due to their tough cell walls which contain porins. They are also resistant to most antibiotics due to the action of multi-drug efflux pumps, which pump out certain antibiotics before they can act on the bacterium. Here, the colony shows a zone of inhibition of 30 mm with 100 µl of Ag-NPs as seen in Figure 4. Out of the four colonies, this has the largest and most prominent zone of inhibition (Figure 3D). Thus, Ag-NPs have an excellent anti-bacterial action against the *Pseudomonas* species.

From the above results, it is clear that Ag-NPs synthesized using Neem and *Aloe vera* have a good bactericidal effect on the *Pseudomonas* species and *Streptococcus mutans* when compared to the *Enterococcus* species and *Staphylococcus aureus*.

Since the Pseudomonas species was the only gram-negative bacteria amongst the four bacterial colonies, a conclusion cannot be drawn regarding whether silver nanoparticles are more effective against gram-positive or gram-negative bacteria.

Due to the complex mode of action of Ag-NPs, it is difficult for pathogens to build effective resistance against silver [22]. Thus, it can also be used as an anti-bacterial agent against bacteria that show multiple-drug resistance.

Conclusion

Through the results of our study we have concluded that silver nanoparticles synthesized using neem and *Aloe vera* possess an evident antibacterial efficacy against dental pathogens, especially against the *Pseudomonas* species and *Streptococcus mutans*. It is eco-friendly, rapid, easy to synthesize and effective against bacteria that show multiple-drug resistance. Thus, Ag-NPs could possibly be used as a non-toxic alternative for conventional antibiotics.

Conflict of Interest: There is no conflict of interest.

Source of Funding: The funding for this article is self-sourced.

Ethical Clearance: Ethical Clearance for the study was obtained from Saveetha Dental College institutional Review board with number **SDC/IHEC/17-18/009**

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Awareness, Knowledge, Attitude and Practices of E-Cigarettes among Undergraduate Dental Students

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Abstract

Background: The electronic cigarette (e-cigarette), first developed in China in 2003, is a battery-powered nicotine delivery device that provides inhaled doses of vaporized nicotine solution and is designed to look and feel like a traditional cigarette.Electronic cigarettes have garnered much attention among the public in recent years due to rising sales and contentious harm-reduction debates.

Aim: The study aims at assessing the awareness, knowledge, attitude and practices of E-cigarettes among undergraduate dental students.

Materials and Method : A cross sectional study was conducted amongundergraduate dental students in Chennai. Following convenience non-randomized sampling of 150 dental students were selected. A self administrated questionnaire was distributed and descriptive data in terms of frequency and percentage were analysed using SPSS software.

Results: Dental students who received questionnaire were returned the completely filled forms. Of these 75 (50%) were males and 75 (50%) were females. The age group of the study subjects ranged from 18-23 years with majority of study subjects in 22-24 years. The awareness about E-cigarettes among study subjects were yes (73.3%), No (22.7%). The study subjects perception about composition of e-cigarettes were nicotine (16.7%), diethyl glycol/propyl (10.7%), glycerol (3.3%), all of the above (38%), unaware (31.3%).Out of 150 study subjects, 64% of subjects mentioned that e-cigarettes help to quit smoking where as No (10%), unaware (26%).

Conclusion: It can be concluded that majority of the dental students were well aware of e-cigarettes, but most of them lack the knowledge on composition of e-liquid, working mechanism, health related risk and also lack in attitudes of the dental students towards e-cigarettes.

Keywords: *Nicotine, Frequency, Awareness, E-liquid, Health.*

Introduction

Smoking is responsible for 100 million deaths world-wide [1]. A large number of oral diseases and conditions such as staining of teeth and restorations, halitosis, impaired wound healing, periodontal diseases, failure of implants and surgical treatments, acute necrotising ulcerative gingivitis and life-threatening precancerous and cancerous lesions are attributed to smoking[2,3,4,5]. There are long lists of known risks of smoking cigarettes. Cigarette smoke contains over 4000 chemicals, many of which are serious carcinogens like arsenic or volatile organic compounds. These compounds cause serious cardiovascular and respiratory disease, including lung cancer, currently leading to the death of one out of every 10 adults worldwide[6,7]. These health risks have

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led to the development of materials that may assist people in smoking cessation, one of which is electronic cigarettes.E cigarettes have existed for a long period of time, as they were first patented in 1965 by HA Gilbert as a device that looked like a conventional cigarette but did not contain the carcinogens of tobacco, designed to replace the use of Conventional cigarettes. The idea of the EC did not gain momentum until a second patent of the modern EC was taken out by H Lik in 2003 [6,7,8].

Electronic cigarettes are the devices that are used recreationally or as smoking cessation tools, and have become increasingly popular in recent years. Electronic cigarettes are battery-operated products that can deliver a nicotine- containing aerosol, mistakenly termed by many as 'vapour,' to users by heating a chemical concoction known as the e-liquid (composed of propylene glycol and/or glycerol, varying levels of nicotine, and flavouring agents)[9]. Unlike conventional cigarettes, these products do not contain tobacco nor produce combustion products such as smoke and tar[10].

E-cigarettes are manufactured to mimic the sensory feeling of using a conventional cigarette. A user generally presses a switch to initiate a heating process of the e-liquid solution and inhales from a mouthpiece the aerosol produced, which is visible as fine mist or vapour.E-cigarettes have continued to evolve ever since they first penetrated the market, a prototypical product has the following basic parts: a cartridge, which contains the e-liquid; a battery, which provides the power to heat and aerosolize the e- liquid; the heating elements (atomiser, heating coil, and wick), which produce the aerosol; and a light which is used as an indicator [11]. Nowadays, a wide variety of e-cigarette brands is easily accessible in retail and online shops [12].

Electronic cigarettes have surged in popularity with an increase in awareness of product, rise in Internet search queries and growth in sales. The major contributor to the enormous sales of these products is the frequent use of the marketing claims. These include: e-cigarettes are healthier and cleaner than conventional cigarettes; e-cigarettes are smoking cessation aids; and the aerosols emitted are safe for people who are exposed, among others.[9].The youth are of particular concern with regard to the rising popularity for E-cigarettes. The battery, on the other hand, can allow the user to heat the e-liquid at higher voltages, hence producing more aerosol. The variations in battery output voltage and unit circuitry have been found contribute to the formation of toxicants in the aerosol emitted[13].

The amount of nicotine present in the e-liquid is chose by users depending on their wish to use. Nicotine is usually offered by stores at concentrations from 0 to 18 milligrams per millilitre (mg/mL), though some may reach levels as high as 20, 24, or 36 mg/mL.A typical conventional cigarette contains 1 milligram nicotine, and a puff from an e-cigarette usually yields 0-35 micrograms of the drug [14]. Therefore, it should take around 30 puffs to achieve the same amount of nicotine contained in a conventional cigarette. By designing the E cigarettes to appear and work like a conventional cigarettes, the ergonomics appeal to the psychological aspect ofaddiction to smoking. In addition, the optional nicotine content satisfies the physiological aspect of smoking addiction. These factors make it more likely that people will give up smoking for this "safer" device. However, the question remains as to how much safer electronic cigarettes are than conventional cigarettes , if at all[15].

The concentrations of nicotine in these products can put people at risk for accidental overdose. Nicotine has both muscarinic (salivation, vomiting, diarrhoea, and bronchial constriction) and nicotinic (fasciculations, hypertension, tachycardia, and muscle cramps) effects. Treatment of these toxic effects is largely supportive. Exposure to the primary ingredient of the e-liquid, propylene glycol, is generally considered safe, but this chemical can cause irritation to the upper and lower respiratory tract. When heated, it produces acetaldehyde and formaldehyde which are both toxic [16].

Materials and Method

Study design: A cross sectional survey.

Study area: Saveetha dental college, Chennai.

Study population:A list of 100 dental students were selected for this questionnaire study using convenience non- randomized sampling. A self administrated questionnaire was distributed to the selected number of dental students.

Eligibility Criteria:

Inclusion criteria

- Dental students who were willing to participate were included in this study

- Undergraduate second, third, fourth year and interns were included in this study

Exclusion criteria

- Dental students who were not willing to participate were excluded from this study.
- Undergraduate first year students were not included in this study.

Ethical clearance:

- Prior to the start of the study ethical clearance was obtained from institutional ethics committee, Saveetha University.
- Verbal/oral consent was obtained from the study participants.
- The anonymity of the participants was maintained.

Scheduling:

- Data collection was scheduled in the month of January 2018

Sample size:

N= 150 (95% power @ 5% alpha)

Sampling:

- A list of dental students who willing to participate was obtained. Following conveniencenon-randomized sampling of 150 dental students were selected.

Survey instrument:

A pre tested, structured and self administrated questionnaire was adapted. The survey tool consisted of several parts. The first section collected demographic information of the participants such as age, gender and year of study.

The second part of questionnaire consisted of questions to assess the participant's level of knowledge, awareness and attitude towards the electronic cigarettes among study participants. An opportunity was given in the questionnaire to openly specify the answers for a question regarding socio economic status plays in using e cigarettes.

Participants knowledge was gathered about aware, different kinds of E cigarettes available at markets, composition, smoking quitting aids, functions, effects on health, side effects etc. One of the factors that is responsible for someone attitude and behavior is knowledge. Knowledge can be described as level of understanding of an individual towards facts, information, skills and many more.

Survey methodology:

After a brief introduction on the purpose and intent of the study, the questionnaire were distributed to the dentists and filled questionnaire were collected. Only filled forms were considered for analysis.

Statistical analysis:

- Data collected was entered in Microsoft Excel spreadsheet and descriptive data in terms of frequency and percentage were analysed using SPSS software (version 17.0).

Results

Dental students who received questionnaire were returned the completely filled forms. Of these 75 (50%) were males and 75 (50%) were females. The age group of the study subjects ranged from 18-23 years with majority of study subjects in 22-24 years (refer to table 1).

The awareness about E-cigarettes among study subjects were yes (77.3%), No (22.7%) (refer to figure 1). The study subjects who aware of e-cigarettes were came across friends (33.6%), internet (63%), mass media (3.4%). Table 2 shows study subjects perception about composition of e-liquid in 3-cigarettes were nicotine (16.7%), diethyl glycol/propyl (10.7%), glycerol (3.3%), all of the above (38%), unaware (31.3%). Out of 150 study subjects, 64% of subjects mentioned that e-cigarettes help to quit smoking where as No (10%), unaware (26%) (refer to figure 2).

Table 3 shows the study subjects perception about e-cigarettes function were product that delivers a nicotine containing aerosol (49.3%), product that delivers nicotine as smoke (8.7%), does not delivers nicotine (3.3%) and unaware (26%). 82.6% of study subjects thinks that nicotine use could lead to cancer where as No (2%) and unaware (15.3%) (refer to figure 4). Out of 150 study subjects, 71.3% of them thinks e-cigarettes were almost less harmful to health when comparing to conventional

cigarettes whereas disagree (6%) and unaware (22.7%) (refer to figure 3).

Out of 150 study subjects, 40% of subjects thinks e-cigarettes have side effects only on oral cavity whereas disagree (34.7%) and unaware (25.3%). 74.7% of study subjects thinks socio economic status plays an important role in using e-cigarettes and No (25.3%). Most of them mentioned that e-cigarettes were costly, low economic status people unawareness about e-cigarettes and they might think it is harmful to use electronic products for smoking.

Table 1 : Distribution of study subjects according to age and gender

Age group (in years)	Gender				Total	
	Male		Female			
	n	%	n	%	N	%
18-20	16	23.8	24	28.9	40	26.7
21-22	23	34.3	28	33.7	51	34
23-24	28	41.8	31	37.3	59	39.3
Total	67	100	83	100	150	100

Table 2: Dental students perception about the composition of e-liquid in e-cigarettes.

Composition	Percentage (%)
Nicotine	16.7
Diethyl glycol/propyl	10.7
Glycerol	3.3
All of the above	38
Unaware	31.3

Table 3: Dental students knowledge on working mechanism of e-cigarettes

Mechanism	Percentage (%)
Product that delivers nicotine aerosol	49.3
Product that delivers nicotine as smoke	8.7
Does not deliver nicotine	3.3
Unaware	26

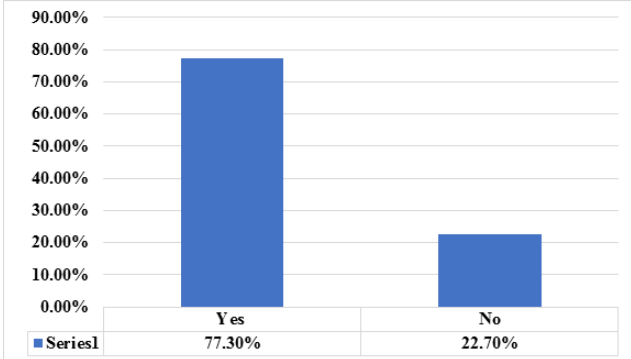


Figure 1: Awareness about E-cigarettes among dental students

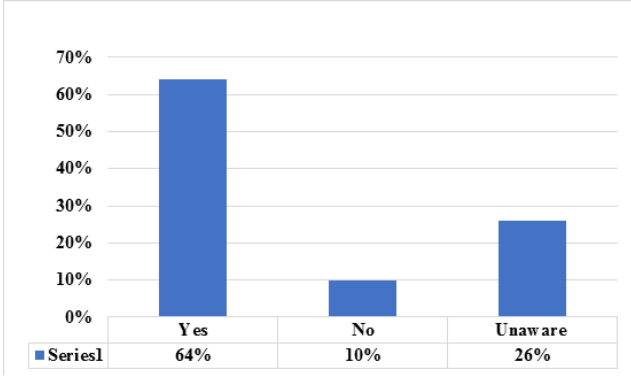


Figure 2: Dental students attitude on E-cigarettes help in smoking cessation

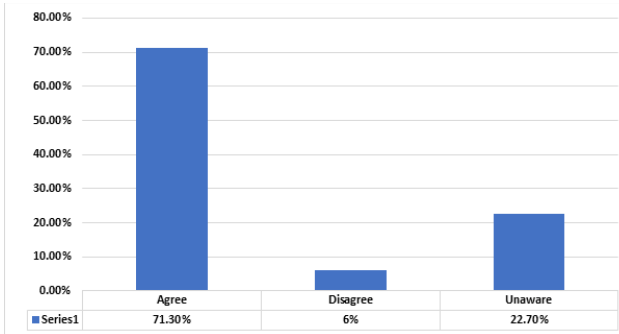


Figure 3: Dental students knowledge on E-cigarettes are less harmful than conventional cigarettes

Discussion

In this study 73.3% of the study subjects were aware of e-cigarettes. Most of all the students reported that they had heard about e- cigarettes, indicating a high level of awareness. Similarly, in other study conducted in Malaysia found that95% of respondents were aware of e-cigarette[17].73.3% of study subjects who were aware of E-cigarettes where got knowledge about e-cigarettes through friends(33.6%), internet (62.9) and mass media (3.4). 51.3% of the study subjects were aware of the different kinds of e-cigarettes available at market.

The surveyed study subjects were requested to indicate which of the following components present in e-liquid, 38% had given accurate answer regarding composition, whereas 31.3% were unaware of the composition of e-liquid of e-cigarettes. This shows that the study subjects who were aware of composition were more or less equal to the study subjects who does not know about composition of e-liquid.

The study subjects response for smoking cessation were 64% students agreed that e-cigarettes help in quitting smoking whereas 10% disagreed and 26% unaware of the condition that e-cigarettes help in smoking cessation. These results when compared with Awan KH 2016[18], more than two-thirds of the students reported that e- cigarettes could aid smoking cessation. Out of 150 study subjects, 49.3% were aware of the working mechanism of e-cigarettes where as 50.6% were unaware of the mechanism.

Results of the present study indicate that 71.3% of the respondents reported that e-cigarettes were less harmful to health when comparing to conventional or traditional cigarettes whereas 6% disagreed and 22.7% unaware. These results when compared with Awan KH 2016 [18], More than half of the students who were aware of e-cigarettes believed that e-cigarettes are less dangerous than traditional cigarettes, with the highest percentage (63.3%). In other studies such as Sutfin EL et al 2013[19], 17% agreed that e-cigarettes as harmful as conventional cigarettes. Ambrose BK et al 2014 [20], 30.6% agreed that e-cigarettes were less harmful than traditional or conventional cigarettes.Gallus S et al 2014 [21], 65% believe that e- cigarettes are less harmful than traditional cigarettes.

Conclusion

Based on the findings of the present study, it can be concluded that majority of the dental students were well aware of e-cigarettes, but most of them lack the knowledge on composition of e-liquid, working mechanism, health related risk and also lack in attitudes of the dental students towards e-cigarettes.

Conflict of Interest: Nil

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Can Probiotics Prevents Dental Caries -A Review

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Abstract

In recent years, bacteria known as probiotics have been added to various foods because of their beneficial effects for human health. However, the main field of research has been in the gastrointestinal tract.But, in the past few years probiotics have also been investigated in the oral health perspectives.The mechanism of action of probiotics is related to their ability to compete with pathogenic microorganisms for adhesion sites, to antagonize these pathogens or to modulate the host's immune response. The potential application of probiotics for oral health has recently attracted the attention of several teams of researchers. Although only a few clinical studies have been conducted so far, the results to date suggest that probiotics could be useful in preventing and treating oral infections, including dental caries, periodontal disease and halitosis. This review article summarizes themechanism of action and currently available data on the potential benefits of probiotics for oral health.

Keywords: *probiotics, lactobacillus species, dental caries, streptococcus mutans.*

Introduction

The role of diet in well-being and overall health is universally acknowledged. With the evolution of the science of nutrition, research is now directed towards improving the understanding of specific physiologic effects of the diet beyond its nutritional effect. Bulgarians lived longer with healthy, pain free and disease free lives, Dr.Metnikofftook a notice of this and wondered what would be the reason? Then in early 1900's he stated that their diet consisted of yogurt, sour dough, bread and butter milk. He paved way for probiotics by discovering that fermented foods contained beneficial bacteria which are cable of digesting putrescence foods and releasing by products that are nutritious and distroythe foul odors in the human body[1].He worked at the Pasteur Institute in Paris and had discovered Lactobacillus bulgaricus, a strain and introduced them into commercial production of sour milk products in European countries[2]. He provided his last few years of life for the study of Lactic acid producing bacteria as a means of increasing human longevity.In this aspect, probiotics are the subject of intense and widespread research in food and nutritional science[3].

The term probiotic, is derived from the Greek language, meaning "for life". Probiotics was first used by Lilly and Stillwell in 1965 were the first person to described probiotics as "substances secreted by one microorganism which stimulates the growth of another" and they coined the term antibioticfor probiotics. It can be defined as living microbes, or as food ingredients containing living microbes, that beneficially influence the health of the host when used in adequate numbers. As adopted by the International Scientific Association for probiotics and prebiotics, "Live microorganisms, which when administered in adequate amounts, confer beneficial effect on the health of the host[4].

The human gut contains 10 times more bacteria than cells elsewhere in the human body. Studies says that there are numerous microflora consists of 400 known bacterial species that are responsible for metabolic activity and are important for human health[5]. Those friendly bacteria which fight against the pathogens from causing disease were termed Probiotics. This ecosystem

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gets disrupted when exposed to toxics in the form of polluted water and food as well as injudicious use of antibiotics. Antibiotic resistance, with the emergence of multiple resistant strains, is an increasingly important global problem. This causes destruction of beneficial bacteria, leaving resistant ones, pathogenic[6].

Of late, it has been realized by health care professionals and prompted them to seek alternative therapeutic options. Use of beneficial bacteria was found to be an alternative nutritional therapy, the probiotics, which stimulate health– promoting indigenous flora and reverting back the change[7].“Viable microbial food supplements which beneficially influence the health of human.” Which was widely accepted definition of Guarner et al[8]. These bacteria must belong to the natural flora of body in order to resist gastric secretion and survive during intestinal transit. They must adhere to the intestinal mucosa and must have the ability to inhibit pathogens present in gut[9-11].The important source of probiotics is the bacteria in yogourt and fermented milk products.Such major probiotics which belong to the genera Lactobacillus, streptococcus,Bifidobacterium and Propionibacterium. Many clinical studies have already put froth the significant use of certain probiotics in the treatment of systemic and infectious diseases such as acute diarrhea and Crohn disease.Some other studies have shown importance of probiotic applications in the treatment of cardiovascular disease, urogenital infections, oro-pharyngeal infections and cancers[12-14]. This Review article emphasizes on role of probiotics in preventing dental caries and periodontal diseases.

Prebiotics, synbiotics

Gibson and Roberfroidcoined the term ‘prebiotic’,known as a non digestible food ingredient that gives benefits to host by stimulating growth of selective beneficial bacteria or a group of bacteria for human health[15].prebiotic are diatary carbohydrates such as oligosaccharides of glucose and fructose, and inulin. They are indigestable substance which escapes digestion in upper gastrointestinal tract and enters the gut for altering the bacterial composition along with existing microbial population of the gut.

When a bacterial stains contains both probiotics and prebiotic are termed as synbiotic. This term came in to application for the product in which the prebiotic compound selectively favors the probiotic compound[16].

Dental caries formation

Keyes stated,there are three prerequisites for dental caries development, they are tooth, plaque and food substrate [17]. According to tooth the caries development varies for each tooth depending upon its morphology, varying organic and inorganic composition, position and location which will eventually leads to plaque retention. Caries does not develop with out the bacteria and food substrate. The bacteria requires acidogenicenvironment for destruction of mineralized enamel. Of this bacterial species streptococcus mutants, a gram positive acidophillic bacteria associated with initiation of dental caries. They ferment the food substrate that is dietary saccharides along with production of lactic acid which in turn *s.*mutans produces glycosyltranferaseactivity to extra cellular glucans that will attach to enamel. Colonization of bacteria occurs in smooth surface of enamel and causing demineralization of hydroxyapatite crystals. In the absence of sugar foods S.mutansproduces intracellular polysaccharide that gives acidic end products. Microbes such as lactobacillus which are non adhesive bacteria produces different type of acids that contribute to caries progression once the initial demineralization has caused by S.mutans , once a notch is created lactobacillus increases the time of progression of dental caries.Caries does not occurs in a single day, it takes time to progress depending upon the modifying factors like quantity and quality of saliva, time taken by bacteria to access the substrate at the plaque enamel interface,use of protective factors like fluorides, variations in food substrate depending on the availablity and location of residencies.

Enamel, dentin and cementumconsists of an inorganic component (approximately 86%-45% respectively) and an organic component (approximately 4%-30% respectively) remaining are water.Dental plaque and oral fluids contains calcium and phosphate ions, these ions maintain the PH of oral environment. These minerals maintain the oral environment saturated , under or supersaturated. Demineralization occurs when environment is undersaturated, remineralization occurs when it is supersaturated. Critical PH for tooth destruction varies from 5.0-5.7 , while optimal PH is 7, this optimal PH tent to decrease immediately after consumption of fermentable substrate just below the critical value. This fall in PH will be counteracted by the buffering effect of saliva and it will bring mineral ions to the oral environment. Hence addition of minerals is always beneficial by increasing the degree of saturation.

Saliva plays an important role in prevention of dental caries, saliva containing n number of microbes including lactobacillus species which are non adherents to tooth and mucosa, hence this proves that saliva containing lactobacillus and probiotic containing lactobacillus species helps in preventing dental caries formation. We must realise that any induced changes in the oral environment will be counteracted by the oral hemoeostasis[18].

Mechanism of probiotics

Probiotics act as an antagonist to some pathogens through the production of antimicrobial substances like organic acid, hydrogen peroxide's and bacteriocins[19]. They mainly works on gastrointestinal tract by modifying PH level of the gut or regulation of oxidation-reduction changes in the gut, they fight against pathogen by competing for receptor site in mucosa for nutrition and growth factors, stimulate immunological cells that is non specificimmunity, modulate humoral and cellular immune responseand their by produces lactase, and modifies immune system through several molecular mechanisms[20].

In oral environment probiotics shows almost the same mechanism of action as in gastrointestinal tract. They involve in production of antimicrobial substances like organic acids, hydrogen peroxide and bacteriocins, binding to the oral cavity there by competes with pathogens for receptor site. They metabolize the substrates for available nutrition, also act as immuno modulator, stimulate non specific immunity, modulates humoral and cellular immune response, modifying oral environment by modificationof oxidation reduction potential and PH level of saliva[21].

Probiotics modification

Dental caries consists of increasing number of acidogenic and acid tolerating species, such as streptococcus mutans, lactobacillus species ,bifidobacteria, non mutant streptococci, actinomycetes species , propionibacterium species, veillonella species and Atopobium species so on. Probiotic contains several beneficial microbes that act against those microbes present in dental caries.

Studies have shown different methods to reduce cariogenic bacteria, earlier studies used bacteriocin expressing bacteria or bacteriocin like inhibitory substances (BLIS) that mainly prevents the growth of cariogenic bacteria.Other motheds are selecting suitable antagonist against relevent bacteria, also selecting probiotics bacteria and food substrate that colonaise on surface of teeth causing supragingival plaque.Using a recombinant strain of S.mutans expressing urease, shows a promising results in reduction of cariogenicity of plaque in an animal. This method of genetically modified probiotics with effective properties against bacteria was called as designer probiotics. One of the important recombinant method that is a recombinant strain of lactobacillus that expresses antibodies which target the major receptor of S.mutans that enable to reduce both the count of S.mutansand dental caries score in an animal[22].

Probiotics in food products

There are numerous organisms that can be classified as probiotics. Genera of lactobacillus and bifidobacterium are the most common probiotic strains. There are several probiotic strains that belongs to lactobacillus species, includes L.acidophilus, L.casei, L.johansonii, L.rhamnosus, L.gasseri, and L.reuteri. And the Bifidobacterium genera includes B.bifidum, B.longum andB.infantis.

Products that contains probiotics are

- Food beverages (fruit juices)
- Prebiotic fibres
- Inoculated in dairy products such as milk, yogurt, and milk containing drinks
- Non dairy products (dietary supplements, dried cells packaged)

Probiotics are administered for oral health by different means of vehicles such as lozenges, straw, tablets, yoghurt, cheese, rinse solution, capsule, liquid and yogurt drink[23].

Recently , a probiotic mouthwash product containing three naturally presenting species of oral streptococcus strains, S. oralis KJ3sm, S.uberis KJ2sm and S.rattus JH145, that afffects the dental caries pathogens S.mutants in saliva and periodontal pathogens P.gingivalisandcampylobacter rectus in subgingival plaque[24].

Action of probiotics in dental caries

Probiotics works in three main steps, attachment,

adhesion and oral colonization[25]. Adhesion of probiotics to oral surfaces is an important issue for the prolonged effect of the microorganisms. There are several adhesion mechanisms, adhesion systems using saliva-coated hydroxyapatite, and hydroxyapatite coated with buffers, proteinsare the important two methodof adhesion.Lactobacillus are most commonly used strains found in oral cavity, this was first used in research in the year 1984 by hull and his coworkers. Caries risk was reduced by producing a growth inhibitory substance against Streptococcus sobrinuswith help of probiotics called lactobacillus rhamnosus GG, ATCC [26].This was isolated from human intestinal flora and was given with the names of its discoverers, Sherwood Gorbach and Barry Goldin. Streptococcus salivarius strains was found to be excellent member of oral probiotics, as they are the important member of tongue micro biota of healthy persons and they colonies early in the oral surfaces[27]. The abundant strains of oral lactobacilli shows inhibitory effects against S.mutans, Aggregatibacteractinomycetemcomitans, Porphyromonasgingivalis and Prevotellaintermedia,and also they have capacity to tolerate environment side effects [28].

Action of probiotics in periodontal diseases

Probiotics has a capacity to alter the salivary pellicle. Formation of salivary pellicle is the first step in plaque formation which eventually leads to periodontitis. Orally administered probiotics can also benefits chronic periodontitis. Periodontal pathogens are recognized by antagonistic interactions. Studies shows decreased rate of bleeding gums and reduction in gingivitis with the help of L.reuteri[29].

Conclusion

The oral cavity with a well-maintained balance of species and species interactions may be a potential source for health-promoting probiotic bacteria. Probiotics play an important role in combating issues with overuse of antibiotics and antimicrobial resistance. Further studies are required to understand the ability of probiotic bacteria to survive, grow, and have a therapeutic effect when used for treatment or when added to foods, to fix the doses and schedules of administration of probiotics. Hence, randomized controlled trials and systematic studies are needed to find out the best probiotic strains and means of their administration in different oral health conditions and oral health promotion. With fast evolving technology and integration of biophysics with molecular biology, designer probiotics pose huge opportunity to treat diseases in a natural and non-invasive way.

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Burkitt's lymphoma- A review on Epidemiology, Clinical Presentation, Diagnosis and its Management

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Abstract

Burkitt's lymphoma is a highly aggressive B-cell non-Hodgkin lymphoma and is the fastest growing human tumour. The disease is associated with Epstein-Barr virus and was one of the first tumours shown to have a chromosomal translocation that activates an oncogene (c-MYC). Burkitt's lymphoma is the most common childhood cancer in areas where malaria is holoendemic. The incidence is very high in immunosuppressed patients in non-endemic areas, especially when associated with HIV infection. Outcome with intensive chemotherapy has improved and is now excellent in children, but the prognosis is poor in elderly adults. The success of intensive treatment relies on good supportive care. The therapy offered in oncology units in low-income countries is not as aggressive as in centres in high-income countries and outcomes are less successful. Adjuvant monoclonal antibody therapy with rituximab shows promise for improved outcomes and reduced toxic effects in the future.

Key Words: *Burkitt's lymphoma, Malaria, Histopathology, Prognostic Markers, Tumours*

Introduction

Burkitt's lymphoma has had an important role in the understanding of tumorigenesis. It was the first human tumour to be associated with a virus [1] one of the first tumours shown to have a chromosomal translocation that activates an oncogene [2, 3] and the first lymphoma reported to be associated with HIV infection [4]. Burkitt's lymphoma is the fastest growing human tumour, with a cell doubling time of 24–48 h, and was the first childhood tumour to respond to chemotherapy alone [5]. It is the most common childhood cancer in areas where malaria is holoendemic eg: equatorial Africa, Brazil, and Papua New Guinea. The so-called Burkitt's lymphoma belt stretches across central Africa 15° either side of the equator where the climate is hot and wet (more than 50 cm annual rainfall). The epidemiological maps of malaria and Burkitt's lymphoma overlap [5–7].

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Early in the 20th century, Sir Albert Cook, a missionary doctor in Uganda, and other medical staff working in west, east, and central Africa noted the high frequency of jaw tumours and childhood lymphomas [8–10]. In 1958, Denis Burkitt, an Irish surgeon working in Uganda, reported cases of children presenting with rapidly growing jaw or abdominal tumours [11]. Burkitt suggested that these tumours were round-cell sarcoma. However, in 1960 George O'Connor, a pathologist, concluded that the cancer was of lymphoma lineage [12]. Meanwhile, Burkitt travelled through eastern and central Africa to map the tumour spread and found records of affected children in all the malarial areas of the region [13].

Epidemiology

The distribution of endemic Burkitt's lymphoma across Africa and Papua New Guinea corresponds to areas of holoendemic malaria and the early acquisition of EBV [13, 14–20]. The annual incidence has been estimated at 40–50 per million children younger than 18 years [21]. In these high-risk areas endemic Burkitt's lymphoma comprises about half of all childhood cancer diagnoses

and up to 90% of lymphoma diagnoses. Incidence peaks at age 6 years and the disease is twice as common in boys as in girls. Sporadic Burkitt's lymphoma occurs most commonly in children aged 3–12 years (median 6–8 years) and is 3·5 times more common in boys than in girls [22,23].

Immunodeficiency-associated Burkitt's lymphoma occurs at an incidence of 22 per 100 000 person-years in the USA [24].

Cofactors

Epstein-Barr virus

Several observations suggest a direct causative role for EBV in endemic Burkitt's lymphoma. For example, EBV is consistently present in these tumours; [25] infection of malignant B cells precedes tumorigenesis; [26] EBV induces immortalisation of B cells in culture; and very high EBV antibody titres are recorded in children before development of the disease [27]. However, the underlying mechanism linking EBV infection of B cells to the emergence of malignancy remains undiscovered.

Malaria

In Africa, pronounced seasonal, temporal, and spatial variations in the incidence of Burkitt's lymphoma have long been linked to the prevalence of malaria,[28,29] and in 2008, direct evidence of a link between malaria, EBV, and endemic Burkitt's lymphoma emerged [30,31]. Two epidemiological studies showed that the risk of Burkitt's lymphoma was greatest in people with the highest titres of antibodies against both EBV and Plasmodium falciparum[32].

HIV infection

Burkitt's lymphoma occurs in HIV-infected patients with high CD4 T-cell numbers, which suggests that immunosuppression is not in itself the cause of the malignancy. HIV-infected patients with Burkitt's lymphoma have high serum concentrations of soluble CD30 and CD23— markers of B-cell activation—before emergence of lymphoma [33–35]. Patients with chronic HIV viraemia, even if on antiretroviral therapy, have a higher risk of developing HIV-associated lymphomas than those with un measureable viral loads [36, 37]. The enzyme has been detected in peripheral lymphocytes in HIV-infected patients with lymphoma, but not in HIV-positive patients without the malignancy, nor in healthy controls [38].

Other Possible Cofactors

Arboviruses and schistosome parasites have both been suggested as causative cofactors of endemic Burkitt's lymphoma, although evidence is sparse. The plants Euphorbiae tirucalli and Jatropha curcas are common in areas where the endemic type of the disease occurs. The milky sap of these plants contains dipterene esters that can activate latent EBV and induce rearrangements of chromosomes in about 10% of exposed EBV-infected B cells [39-41].

Clinical Presentation

Patients with endemic Burkitt's lymphoma most frequently present with jaw or periorbital swelling, or abdominal involvement (of retroperitoneal tissue, gut, ovary, or kidney) [42]. 15% present with sudden paraplegia and incontinence. Infiltration of bone marrow is rare. Jaw involvement is common in young children (peak ages of incidence 3–7 years) [43].

Histopathology and Immunocytochemistry

The cells are always of B-cell lineage (CD20 positive and CD79a positive). CD10 and Bcl-6 are commonly coexpressed, but the cells are generally negative for Bcl-2. There is a scarcity of T cells in the background [44]. Epstein-Barr-encoded RNA can be identified by fluorescence in-situ hybridisation. Classification is difficult when the cells have the morphology of diffuse large B-cell lymphoma but the genetic and immunophenotypic features of Burkitt's lymphoma. Some of these cases are now classified as "B-cell lymphoma, unclassifiable, with features between diffuse large B-cell lymphoma and BL [Burkitt's lymphoma]" [45]. However, distinct molecular changes in Burkitt's lymphoma could provide a more reliable diagnosis.

Diagnosis

High-Income Countries

Diagnosis of Burkitt's lymphoma should be confirmed by microscopy and immunocytological analysis. The recommended approach is to remove and examine the most accessible disease-containing tissue. This sample could be a superficial lymph node or malignant pleural fluid. Excision biopsy of a lymph node is preferable to fine-needle aspiration, which does not provide sufficient tissue for all the investigations required. In some cases a laparotomy or laparoscopy is necessary to obtain tissue.

The radiograph should be done before any anaesthetic is given, to look for mediastinal lymph nodes with or without pleural effusions. After confirmation of the diagnosis, bilateral bone-marrow aspirates, trephine cores, and cerebrospinal fluid should be examined for the presence of malignant cells [46].

Management

High-Income Countries

Treatment of Burkitt's lymphoma in most centres is guided by the FAB LMB study (cooperative study between the Children's Cancer Group and the UK Children's Cancer Study Group) [47,48] or Berlin–Frankfurt–Munster protocols.

Management of Burkitt's lymphoma can be divided into three broad groups of patients. Children with localised disease that has been completely removed surgically need only two cycles of moderately intensive chemotherapy such as cyclophosphamide, vincristine, prednisolone, and doxorubicin. Children with residual or stage III disease need at least four cycles of dose-intensive chemotherapy, such as two cycles of cyclophosphamide, vincristine, prednisolone, doxorubicin, and high-dose methotrexate, followed by two cycles of cytarabine and high-dose methotrexate with concurrent intrathecal treatment. Children with CNS or bone-marrow involvement are given similar treatment to the second group, but receive up to eight courses of dose-intensive treatment. This therapy typically involves two courses of cyclophosphamide, vincristine, prednisolone, doxorubicin, and high-dose methotrexate followed by two courses of high and low doses of cytarabine, and etoposide) and four courses of maintenance with varying combinations of vincristine, prednisolone, high-dose methotrexate, cyclophosphamide, doxorubicin, cytarabine, and etoposide. Intrathecal therapy is given alongside systemic chemotherapy.

The use of rituximab (anti-CD20) in primary therapy has been assessed, and some small single-centre studies report encouraging results. [49]. Data are awaited from a Children's Oncology Group pilot study on toxic effects (ANHL01P1) in which rituximab was given to patients with stage III and IV Burkitt's lymphoma. The next UK trial will randomise the use of rituximab for stage III and IV patients.

Low-Income Countries

Therapy needs to be modified in accordance with local conditions to avoid unacceptable treatment-related mortality. The intensity of treatment is determined by the amount of available supportive care, a child's tolerance of chemotherapy, and the extent of comorbidities. In Malawi, for example, the treatment for Burkitt's lymphoma of all stages is intravenous cyclophosphamide (40 mg/kg on day 1 and oral cyclophosphamide 60 mg/kg on days 8, 18, and 28). Intrathecal hydrocortisone (12·5 mg) and methotrexate (12·5 mg) are given with each treatment cycle. The cost of this 28-day treatment is less than US$50.88 Previous attempts to use intensive treatments with high-dose methotrexate resulted in unacceptably high treatment-related mortality (11 of 42 participants) [50].

Conclusion

In low-income countries better diagnostic testing is needed. When only morphology is available, tumours are probably incorrectly classified as Burkitt's lymphoma. Additionally, a high standard of supportive care and medical infrastructure is necessary to deliver the most effective therapy. New, effective, and inexpensive therapies are needed for low-income countries. In the 1980s Guy de Thé described Burkitt's lymphoma as "the Rosetta stone of cancer". This description remains true now. In attempting to understand Burkitt's lymphoma, much is still to be learnt about how all cancers develop, grow, and are treated.

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Prevalence of Malocclusion and its relationship with Dental caries among 12-15 years old school children of Chandigarh, India

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Abstract

Background: Malocclusion has a negative impact on the oral health-related quality of life and has all been associated with an unacceptable dental appearance. Dental caries is a common complication of malocclusion. Epidemiological data on malocclusion and dental caries is of interest for dental public health programs, clinical treatment, screening for treatment priority and resource planning. Therefore the objective of the present study is to determine the prevalence of malocclusion and its relationship with dental caries among 12 to 15year Old School Children of Chandigarh, India.

Method: The present study was conducted among 1368 school going children of Chandigarh in the age group of 12 to 15years. The subjects were selected from four randomly selected schools of Chandigarh. Dentition status was assessed using the DMFT index by Klein, Palmer, Knutson, and Malocclusion were quantified based on the presence or absence of dentofacial anomalies which was recorded in a structured format.

Results: Prevalence of malocclusion and dental caries in the present study was found to be 28.9% and 31.4%. A significant negative correlation was observed between Malocclusion and Dental caries among subjects having Normal occlusion and Malocclusion.

Conclusion: Prevalence of malocclusion and dental caries was greater among older than younger children Results from the present study revealed that Normal occlusion and malocclusion had no or weak significant effect on overall dental caries.

Key words: *Dental caries, Malocclusion, School Children.*

Introduction

Oro-facial region is a noticeable and significant concerned area because it draws the most attention from other people in interpersonal communications and is the predominant source of vocal, physical, and emotional communication.(1)

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Malocclusion is "any deviation from normal occlusion of teeth". The teeth are in abnormal position in relationship to the basal bone of maxillary and mandibular alveolar process, to the adjacent contra lateral and opposing dentition. According to Angle "occlusion is the normal relation of the occlusal inclined planes of the teeth when the jaws are closed".(2)

Even though malocclusion is not life threatening, it is considered to be a dental public health issue as it compromises the oral health and also can lead to social and psychological disorders.(3) It is the second most common dental disorder in children and young adults next to dental caries.(4) Therefore, it has been reported that the prevalence range from a value as low as 19.6%

(Miglani DC, Chennai 1961) to as high as 90% (Sidhu SS, Delhi) among Indian children.[5]

Dental caries is a usual complication of malocclusion. Due to the presence of maloccluded teeth, it is difficult for the patients to maintain good oral hygiene which in turn results in increased plaque accumulation on the teeth surfaces and hence more susceptible for dental caries.[6] Prevalence studies on dental caries in India have shown a results ranging from 31.5% to 89%.[7-11]

School years ranges from period of childhood to adolescence. These are sensitive stages in people's lives where persistent significant oral health related behaviours, as well as knowledge and attitudes, are being developed. Children are particularly more amenable during this period and the earlier the habits are deep rooted, the long lasting, the impact .[12]

According to World Health Organization (WHO), the main oral diseases should be subjected to periodic epidemiological surveys. The epidemiological data on malocclusion and dental caries is of interest for dental public health screening programs, orthodontic treatment services, and resource planning.[13]

The present study which was conducted as a part of the extensive screening, a joint initiative of Saveetha University and Times of India, to assess the Prevalence of malocclusion and its relationship with Dental caries among school children aged 12 - 15 years in Chandigarh, India. Therefore the null hypothesis of the present study will be Prevalence of malocclusion and dental caries does not exist among 12 - 15 year old school children of Chandigarh, India and there exist no relationship between malocclusion and dental caries among the study subjects.

Materials and Method

Study design, Study area: The present study was a cross-sectional study conducted as a part of the extensive screening- India Smile Campaign to create awareness about oral health among school children in India. There are 29 states and 7 union territories in India. On a map, India was divided in to North, South, East, West and Central. A total of 16 places and 79 schools were selected from all the zones which includes 21 schools from North, 41 schools from South, 4 schools from East, 9 schools from West and 4 schools from Central. Out of 79 schools, four schools were randomly selected from Chandigarh city.

The ethical clearance for the study was obtained from the institutional Ethics Committee (SRB reference No: SRB/SDMDS12ORT15). School permissions were obtained from The Educational Department, Chandigarh. Written Group informed consent was obtained from the Headmasters of the school. Data Collection was scheduled in the month of November 2014.

Training and calibration of examiners:

Examiners were calibrated through a set of clinical guidance prior to the initiation of the study and were assisted by a recorder. Inter-examiner reliability was calculated by examining a group of 20 school children and the re- examination was carried out atleast 30 minutes after the initial examination and hence a kappa statistical value of 0.78 was derived which denoted considerable level of agreement between the investigators.

Clinical Examination:

The examination of school children was carried out in school premises based on ADA type III guidelines using disposable mouth mirror, dental explorer and torch light. The school children were seated comfortably on an ordinary chair with adequate back rest. Clinical examination involved dental caries assessment and malocclusion.

Assessment of Dental caries was done using DMFT index designed by Henry Klein, Carole.E.Palmer & Knutson.J.W for permanent dentition and Malocclusion was quantified based on presence or absence of dentofacial anomalies which was recorded on a structured format.

Statistical Analysis

Data was analyzed using SPSS software (IBM SPSS Statistics, Version 20.0, Armonk, NY: IBM Corp.). Descriptive data was expressed in terms of Frequency and Percentage. Inferential statistics such as One-way ANOVA were used to compare the mean Mean DMFT according to age groups. Malocclusion and Dental caries relationship was estimated using Spearman Correlation coefficient. Statistical significance was set at a value of $p<0.05$.

Results

It is apparent from Table 1 that Malocclusion was found to be highly prevalent at 13 years of age both in males 83(6.0%) and females 64(4.7%). Out of 845 males,

606(44.3%) had normal occlusion and 239(17.4%) had malocclusion and among 523 female subjects, 366(26.8%) had normal occlusion and 157(11.5%) had malocclusion. Mean DMFT score was observed to be more at 15 years of age both in males (1.02±1.70) and females (1.29±1.64) (refer Table 2). Table 3 shows the comparison of mean DMFT score according to age. The mean DMFT score was found to be significant statistically ($p<0.001$) using One way ANOVA test. Table 4 depicts the Correlation between Malocclusion and Dental caries among subjects having Normal occlusion and Malocclusion. A significant negative correlation was observed among the study subjects using Spearman correlation coefficient. Figure 1 depicts Scatter plot of Malocclusion Vs Mean DMFT score. An Inverse linear relation was observed between malocclusion and dental caries suggestive of negative correlation coefficient using spearman correlation coefficient.

Table 1: Prevalence of Malocclusion among the study subjects according to age and gender

Gender	Age (years)	N	Occlusion	
			Normal occlusion	Malocclusion
Male	**12**	279	201(14.7%)	78(5.7%)
	13	320	237(17.3%)	83(6.0%)
	14	178	120(8.8%)	58(4.2%)
	15	68	48(3.5%)	20(1.5%)
	Total	845	606(44.3%)	239(17.4%)
Female	**12**	180	131(9.6%)	49(3.6%)
	13	230	166(12.1%)	64(4.7%)
	14	79	49(3.6%)	30(2.2%)
	15	34	20(1.5%)	14(1.0%)
	Total	523	366(26.8%)	157(11.5%)

Table 2: Mean Dental caries experience based on age and gender

Gender	Age in years	N	Mean±SD
Male	12	279	0.64±1.24
	13	320	0.55±1.21
	14	178	0.88±1.48
	15	68	1.02±1.70
	Total	845	0.69±1.33
Female	12	180	0.58±1.11
	13	230	0.77±1.44
	14	79	0.98±1.40
	15	34	1.29±1.64
	Total	523	0.77±1.35

Table 3: Comparison of mean DMFT score according to age using One way ANOVA

Age in years	N	Mean±SD	F value	P value
12	459	0.62±1.19	6.128	P<0.001
13	550	0.65±1.31		
14	257	0.91±1.46		
15	102	1.11±1.67		
Total	1368	0.72±1.34		

One way ANOVA, significance level p<0.05

Table 4: Correlation between Malocclusion and Dental caries among subjects having Normal occlusion and Malocclusion

Occlusion	N	DMFT Mean±SD	Spearman rho	P value
Normal occlusion	845	0.79±1.38	-0.101	P<0.001
Malocclusion	523	0.56±1.23		
Total	1368	0.72±1.34		

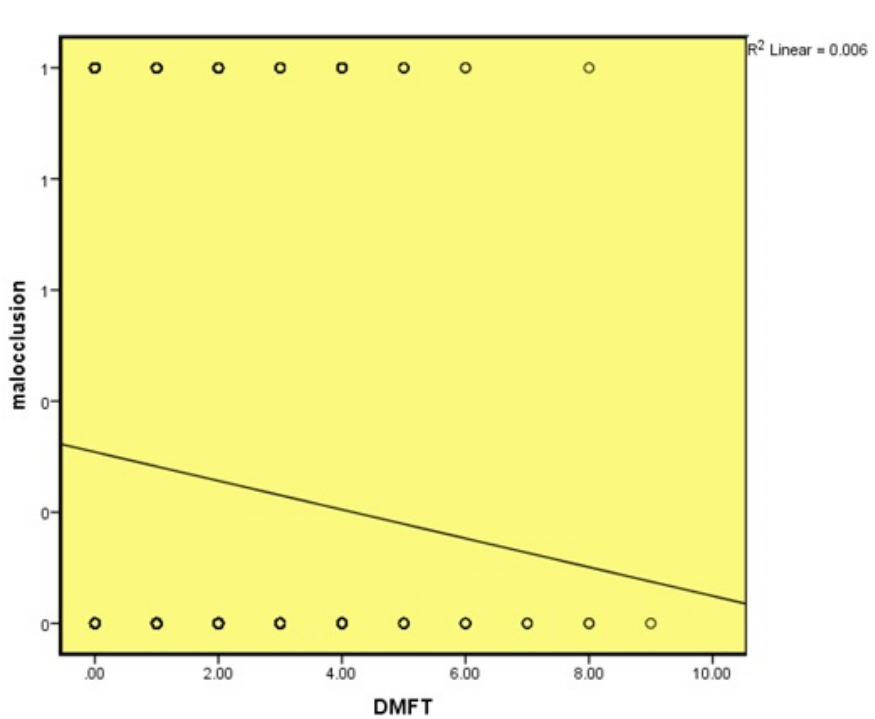


Figure 1: Scatter plot of Malocclusion Vs Mean DMFT score.

Discussion

The present study reported a malocclusion prevalence of 28.9% and was consistent with prevalence observed by Gaikwad SS et al(14) which was 26.8% conducted among 12 to 15 years old children and Otuyemi OD et al (15) showed a prevalence of 22.6% among 12 to 18 year old Nigerian secondary school children.

On the contrary, a increased prevalence of malocclusion of 71.5% was stated by Hemapriya S (16) among 12 and 15 years old rural school children in Kancheepuram district which mainly attributes to the ignorance about the deleterious effects of malocclusion and its effect on oral health related quality of life.

The reason for less prevalence of malocclusion in this study is mainly due to the awareness and positive attitude of parents towards dental procedures and interceptive orthodontic treatment at early stage of life.

Deepak Chauhan et al (17) reported very low prevalence of malocclusion (8.0%) among 9-and 12-year-old school children. This varied range could be attributed to study setting, access to dental care, knowledge and attitude of people towards preventive and interceptive orthodontic care.

Decrease in prevalence of malocclusion according to age in the present study is found to be analogous to that reported by Sudhanshu Sanadhya et al [(18)]and Estioko LJ.[(19)] Knutson stated a reasonable explanation that the transient malocclusion can be corrected with age, since the child outgrows adverse oral habits and dental relationships are returned to normal.[(19)]

Caries prevalence in the present study was observed to be 31.4% which is less than the reported caries prevalence of India (i.e. 53.8%) in National Oral Health Survey.[(20)] Wide variation of caries prevalence in this age group was observed. In a study conducted by Malvania *et al.* (2014),[(21)] a caries prevalence of 17.15% was observed.

Lower caries prevalence in the present study is mainly due to the fact that majority of the primary teeth are shedded and premolars are not present in the oral cavity long enough for dental caries process to set in.

Mean DMFT was slightly higher among females (0.77±1.35) as compared to males (0.69±1.33) This is in consistent with the findings of Shailee *et al.* (2012).[(22)] This is attributed to the fact that girls have the habit of consuming snacks between meals due to their increased time of indoor stay in comparison to the boys who spend more time on outdoor activities. The other plausible explanation could be that tooth eruption occurs earlier among girls than boys, which means that their teeth have been exposed to oral microflora for longer duration than boys of the same age. [(23)]

In the current study, significant negative correlation was obtained between Malocclusion and Dental caries among subjects having Normal occlusion and Malocclusion. Similar findings were reported in an epidemiological survey carried out by Stahl F.[(24)] On the contrary, significant relation was observed between increased DMFT score and orthodontic treatment needs in a study done by Col Prasanna Kumar et al.[1] This difference might be related to study setting and study population. Therefore, the null hypothesis for this present epidemiological survey has been rejected.

Conclusion

The following conclusion were drawn from the present study

1) Dental caries and malocclusion was highly prevalent among older school children.

2) Malocclusion was highly prevalent among males than females whereas dental caries was slightly higher in female subjects than male subjects.

3) Normal occlusion and malocclusion had no significant effect on dental caries.

Conflict of Interest: Nil

Ethical Clearance: Ethical clearance was obtained from the institutional Ethics Committee, Saveetha University

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In vitro cytotoxic Effects of Copper Nanoparticles Synthesized from Avocado Seed Extract

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Abstract

Background : The present work mainly deals with the study pertaining to the synthesis, characterization and evaluation of copper nanoparticles using avocado. The copper nanoparticles were synthesized by using a rapid, single step and completely green synthesis method.

Materials and Method: The synthesized copper nanoparticles were characterized by using various instrumental techniques such as ultraviolet-visible spectroscopy (UV-vis), Fourier Transform Infrared Spectroscopy (FTIR) TEM (Transmission Electron Microscope). The synthesized copper nanoparticles were found to be spherical in shape with average diameter of 35.6 nm. The synthesized nanoparticle solution is primarily characterized by using UV-vis-spectroscopy, 3mL of the solution is taken in cuvette and scanned in double beam UV-vis spectrophotometer from 300 nm to 700 nm wavelength.

Results: In the UV-vis spectrum, a single, strong and broad surface plasmon resonance (SPR) peak was observed at 420 nm that confirmed the synthesis of AgNPs. Transmission electron microscope result showed 2-6 nm difference.

Conclusion: The present study shows that aqueous seeds extract of *Avocado* can be used efficiently for the synthesis of copper nanoparticles at room temperature. The synthesized copper nanoparticles were found to be stable at room temperature. The green synthesized method is convenient, eco-friendly and can be applied in various applications and the use of *Avocado* has added advantages that the plant has many medicinal properties.

Keywords: *Green synthesis, nano-medicine, avocado, cytotoxicity.*

Introduction

Copper is used as a magical element, as it possesses antimicrobial, anti-inflammatory, and angiogenic properties it is used in the treatment of skin injuries, most importantly wound healing [1-3]. Nanotechnology, in the present century has its own importance in several fields owing to its properties such as its ability to modify the structure of molecules at the atomic level as they show superior optical, electronic, magnetic, thermal and sensing functionalities [4,5]. Copper oxide nanoparticles, with a band gap of 2.1 eV, is of much importance in the current days owing to its intrinsic properties and its applications in several fields such as photochemical catalysis, biosensing and electrochemical sensor, gas sensor, and solar energy conversion [6,7]. They also possess several other unique properties such as high specific surface area, good electrocatalytic activity and promotes electron transport reactions at a lower overpotential. In the study conducted by Rajeshwari Sivaraj et al., copper oxide nanoparticles were synthesized by biological method using aqueous extract of *Acalypha indica* seeds and was characterised by TEM analysis which showed that the copper oxide nanoparticles established best antimicrobial and anti-cancer activity and the characterization of copper oxide nanoparticles was done by using UV visible spectroscopy, X-ray diffraction assay (XRD), FT-IR, Scanning Electron

Microscope (SEM), TEM and Energy-dispersive X-ray spectroscopy (EDX) analysis and was found out that the synthesized particles were spherical in nature and the particle size was in the range of 26-30 nm [8]. The wound healing capacity of copper oxide nanoparticles was shown in the study conducted by Mradul Tiwari et al., where the antimicrobial activity of copper oxide nanoparticles and copper sulphate were compared against Escherichia coli, Bacillus subtilis, Pseudomonas aeruginosa and Staphylococcus aureus by agar diffusion and broth dilution methods. There are several routes to synthesize copper oxide nanoparticles, such as sonochemical, microwave irradiations, alkoxide based route, sol-gel technique, one step solid state reaction at room temperature and electrochemical methods. Several studies have shown that biosynthesis of metallic nanoparticles is more useful for its biological application [9,10]. In this present investigation, we have used *Aloe vera* and *Azadirachta indica* based herbal formulations and synthesized copper oxide nanoparticles using these plant extracts. The synthesised nanoparticles was characterised using UV-vis spectrophotometer and TEM.

Materials and Method

Preparation of plant extract

Avocado seeds were collected from Chennai. The collected seeds were washed 3-4 times using distilled water. Then dried it in shade for 7-14 days (Figure 1). The well dried seeds were made into a powder by using mortar and pestle. The collected powder was stored in an air tight container. 1g of avocado powder was dissolved in distilled water and boiled for 5-10 minutes at 60-70 degree Celsius. The solution was filtered by using Whatman no.1 filter paper. The filtered extract was collected and stored at 4 degree Celsius for further use.

Synthesis of Copper nanoparticles

1 milli molar of copper acetate dissolved in 80 ml of double distilled water. The extracts of avocado seed added with the metal solution and was made into 100 mL solution. The color change was observed visually and photographed. The solution is kept in magnetic stirrer for nanoparticles synthesis.

Characterization of copper nanoparticles

The synthesized nanoparticles solution is preliminarily characterized by using UV-vis spectroscopy. 3 mL of the solution is taken in the cuvette and scanned in double beam UV-vis spectrophotometer from 300 nm to 700 nm wavelength. The results were recorded for the graphical analysis.

Preparation of nanoparticles powder

The nanoparticles solution is centrifuged using lark refrigerated centrifuge. The copper oxide nanoparticles solution is centrifuged at 8000 rpm for 10 minutes and the pellet is collected and washed with distilled water twice. The final purified pellet is collected and dried at 100-150 degree Celsius and finally the nanoparticles powder is collected and stored in an airtight eppendorf tube.



Figure 1: Avacado seeds

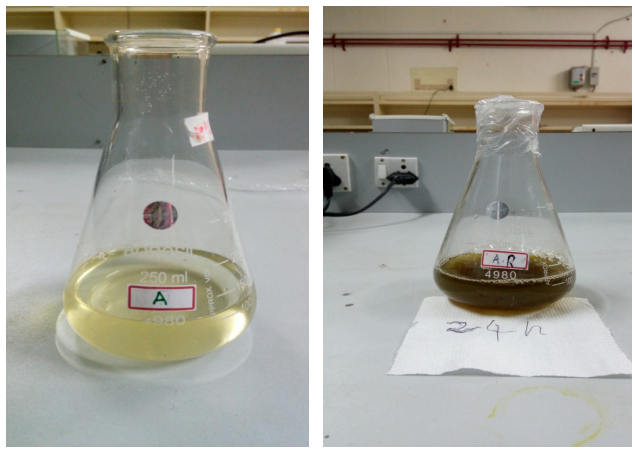


Figure 2: Visual observation

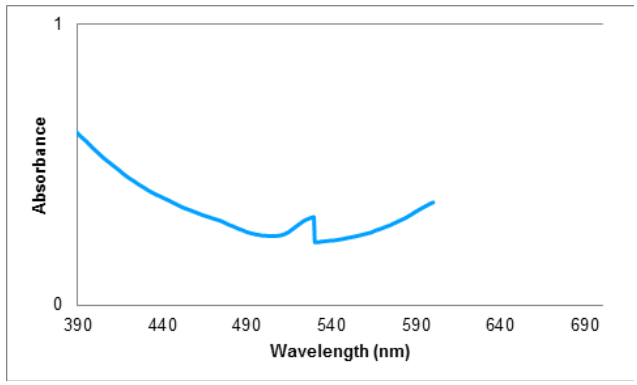


Figure 3: UV-vis Spectroscopy



Figure 4: Cytotoxic effect

Results and Discussion

Visual observation

UV-vis spectroscopy

The copper oxide nanoparticles showed strong peak at 520 nm confirms the copper nanoparticles synthesis. This may be due to the surface plasmon band of Cu colloids formation of non-oxidized CuNPs [11].

Cytotoxicity

CuO nanoparticles exhibited free radical scavenging activity that increased in 1 h, which is relatively higher in comparison with other metal oxide nanoparticles. The cytotoxic activity of the nanoparticles was found to increase in a dose-dependent manner.

When the copper oxide nanoparticles extracted from avocado seeds were injected into the culture containing shrimp larvae it was observed that it can inhibit the growth of the cells, which means that they also have the potential to inhibit the growth of normal human cell, since its growth pattern resembles that of shrimp larvae. So this can be also applied to carcinogenic cells as carcinogenic cell is also a normal cell with increased metabolic and rapid division. Thus, we come to a conclusion that it can also be used to cure cancer, as this method is purely natural and lesser side effects compared to the artificial chemical drugs and other therapy which has major side effects in the body. Thus, we conclude by saying that copper nanoparticles synthesized from avocado seed extract have high cytotoxic effects.

Conclusion

The present study shows that aqueous seeds extract of avocado can be used efficiently for the synthesis of copper nanoparticles at room temperature. The synthesized copper nanoparticles were found to be stable at room temperature. Formation of copper nanoparticles was confirmed by UV-vis spectroscopy. The sharpening of the peaks from powder diffraction study clearly indicates that the particles were spherical in nature. The green-synthesized method is convenient, eco-friendly and can be applied in various applications and the use of *Avocado* has added advantages that the plant has many medicinal properties

Conflict of interest: Authors declare no conflict of interest

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Ethical Clearance: Ethical Clearance for the study was obtained from review board of Saveetha Dental College.(SDC/IHEC/17-18/018)

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Anatomical Variations and Morphometry of Foramen Spinosum in Dry Adult Human Skulls-A Forensic Study

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Abstract

Background: Foramen spinosum is an important opening on the infratemporal surface of the greater wing of sphenoid bone and lies posterior to the foramen ovale. It transmits the middle menengial vessels and nervous spinosum. It can be identified both from the interior and exterior of the skull base.

Aim: To Understand the anatomy and Morphometry of the foramen spinosum in different skulls of South Indian population and to determine the exact range of measurement, the variations, asymmetry and inequality of size seen in foramen spinosum

Materials and method: Thirty dry skulls were examined for the foramen spinosum in the middle cranial fossa and at the extra cranial view at the skull base. The type of foramen spinosum will be classified according to its shape. The data were recorded and tabulated.

Results: The mean length of foramen spinosum was 2.534±0.610mm and the mean width was 2.36±0.57mm.

Conclusion: The study showed variations in the size and shape and irregularity affecting the margins of the foramen spinosum.

***Key words**: Foramen Spinosum, Middle Cranial Fossa, Middle Menengial Artery*

Introduction

The study of the skull and its foramen is of great importance to anatomists, anthropologists, forensic experts and clinicians. The size and measurements of the foramina and variations in the same are clinically significant keeping in mind the delicate neurovascular structures that transverse them. The parameters include frequency of occurrence, dimensions, bilateral symmetry and variations seen.

The foramen spinosum is an important landmark in skull base situated in the middle cranial fossa. It can be identified both from the exterior and interior of the skull base. It lies posterolateral to the foramen ovale and transmits the middle menengial vessels and nervous spinosum. The perfect ring shaped formation of the foramen is observed by the 8th month after birth and latest by 7 years after birth. The foramen is very small compared to foramen ovale and is usually round in shape.

The present study aims at determining the exact range of measurements, the variations, asymmetry and inequality of size seen in the foramen spinosum in the South Indian skulls in the Anatomy Lab of Saveetha Dental College.

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Materials and Method

Thirty dry skulls were examined for the foramen spinosum in the middle cranial fossa and at the extra cranial view at the skull base. The type of foramen spinosum was classified according to its shape. The diameter was also measured along with the total area. The measurements were taken with the help of vernier calipers and a metal scale.

Results

The mean length of foramen spinosum was 2.534±0.610mm and the mean width was 2.36±0.57mm. (Table 1) On the individual sides, mean length on the right side was 2.55±0.61mm, mean width was 2.36±0.55 and the mean area was 4.98±1.66mm^2. On the left side, the mean length was 2.52±0.36mm, the mean width was 2.36±0.57mm, and the mean area was 4.91±1.703mm^2. (Table 2) The maximum length on the right side was 3.52mm, maximum width was 3.22mm and the maximum area was 8.55mm^2. The maximum length on the left side was 3.26mm, maximum width was 3.42mm and the maximum area was 8.04mm^2. In 6.66% of the skulls, the foramen was oval. In 90% of the skulls, the foramen was round and in 3.33% of the skulls, the foramen was absent. (Table 3) In 100% of the skulls, the foramen was singly placed.

Table 1:Length of the foramen

Class Interval	Right	Left
< 2.00	3	3
2.01 - 2.50	6	7
2.51-3.00	15	14
>3.00	5	5
Absent/Incomplete	1	1

Table 2:Width of the foramen

Class Interval	Right	Left
< 2.00	3	3
2.01 - 2.50	14	15
2.51-3.00	10	9
>3.00	2	2
Absent/Incomplete	1	1

Table 3: Area of the foramen

Class Interval	Right	Left
<3.00	3	3
3.01 - 4.00	1	1
4.01 - 5.00	11	12
5.01-6.00	9	8
6.01-7.00	1	2
>7.00	4	3
Absent/Incomplete	1	1

Discussions

In the present study, considerable variations in the morphometry of the foramen spinosum can be observed. The characteristics of the foramen were observed both from the extracranial view of the skull base and the middle cranial fossa. The difference between the mean lengths and widths of the foramen spinosum on the left and right sides of male and female skulls is not statistically very significant.

In a study conducted by Anju L *et al* on 35 dry adult skulls, the foramen spinosum was a permanent feature on the right side of the skull but on the left side it was absent in 2 skulls. The maximum length of the foramen spinosum was 4.5mm and the minimum was 2mm. The maximum width of the foramen spinosum was 2.5mm and the minimum was 1mm [1-2]. In the study conducted by Lanprai K *et al* on 103 Thai adult dry skulls, the foramen spinosum was found on both sides of the extracranial view for only 57.3% of the skulls, whereas a unilateral foramen was seen in 52.4% of the skulls [3-5]. In a study conducted by Namita A and Rajendra S, only 4% of their skulls observed showed confluence of the foramen ovale with the foramen spinosum – both unilaterally on the left side [5-11]. In the study conducted by Kulkarni S *et al*, the length of the foramen spinosum was ranging from 2mm to 4mm [9]. Thus these results are comparable with those obtained in the present study. Foramen spinosum is utilized as a landmark for various procedures involving the middle cranial fossa, the bilateral duplication of the foramen may be disorienting to the surgeon. Thus a thorough knowledge in variations of Foramen spinosum in our Indian population will be of help to the surgeon while performing cranial surgeries.

Conclusions

Variations in the size and shape and irregularity affecting the margins of the foramen spinosum as observed in the study can be attributed to the abnormality during ossification of the sphenoid from initial to final stage of ring formation. Persistence of such morphology can be due to variation in the course of structures passing through this foramen. This is of great clinical importance, and recognition of this variation is worthwhile as it can interfere during approach to middle cranial fossa for diagnosis of various vascular diseases and for the safe surgery for trigeminal neuralgia.

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Prevalence and Length of Anterior Loop of Inferior Alveolar Nerve

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Abstract

Background: Interforaminal region of mandible is often related to neurovascular complications during surgical procedures such as implant placement and during harvesting bone graft. This is due to anatomic variations such as the anterior looping of inferior alveolar nerve and the lingual vessels. Cone Beam Computed tomography (CBCT) is an imaging modality with which such anatomical variants can be visualized and necessary modifications can be made during pre – surgical phase of implant placement. This study aims at identifying the prevalence and the length of anterior loop of inferior alveolar nerve using CBCT.

Materials and Method: 50 patients scanned using Sirona Orthophos XG device for the purpose of implant placement were included in this retrospective study. Using the device's software, the inferior alveolar nerve was traced and marked in each included CBCT volume. The length of the anterior loop was measured with AutoCAD 2018 software using the reconstructed 3D model of the scan.

Results: Of the 50 selected CBCT volumes, 33 volumes had anterior looping of inferior alveolar nerve. The mean length of the loop observed in the selected patients was 0.42 ± 0.40 mm on the left side and 0.42 ± 0.31 mm on the right side. For males, the mean length of the loop was 0.42 mm on the left side and 0.42 mm on the right side. For females, the mean length was 0.40mm on the left side and 0.45mm on the right side.

Conclusion: The anterior loop of inferior alveolar nerve is quite common in south Indian population. The looping has to be assessed before implant placement in the anterior mandibular region so as to identify and prevent neurovascular complications.

***Key words**: Implant placement, Interforaminal region, CBCT Imaging, Anterior Loop, Inferior Alveolar Nerve.*

Introduction

The anterior mandibular region, commonly known as the interforaminal region, is frequently associated with neurosensory and vascular complications during implant placement and other surgical procedures like bone graft harvesting. The major cause of neuropathic complications, such as paresthesia of lower lip and chin region, is due to the damage of the inferior alveolar nerve, particularly the anterior loop. The inferior alveolar nerve, a branch of the posterior division of the mandibular nerve divides into the mental and incisive branches. After division of the incisive branch, the main branch moves anteriorly and curves back to form a '8 – like' shape when viewed on a coronal section of a radiograph before exiting through the mental foramen [1]. The anterior loop of inferior alveolar nerve is frequently

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encountered in patients as an anatomical variant. During pre – operative radiographic examination for analysis of bone width and height for implant placement, the presence of anterior loop of mental foramen should to be examined.

Panoramic radiography was initially used for the diagnosis of anterior loop [2,3]. Potential for identification of anterior loop with panoramic radiography was suggested [2,4,5]. With the advent of Cone Beam Computed Tomography (CBCT), many studies have shown that CBCT is a superior imaging modality when compared to panoramic radiography [6–9] . It is preferred for pre – surgical planning for implant placement [10–13] ¨CBCT image quality is proven to be comparable or superior to CT for the evaluation of maxillofacial region. CBCT is also demonstrated to have high precision, accuracy and reliability for the detection of anterior loop of inferior alveolar nerve with low cost and lower radiation exposure when compared to CT [14]

A 'safe distance' or 'safe margin' for implant placement in the interforaminal region has been proposed in the presence of anterior loop [15,16]. A margin of 4 to 5 mm from the anterior loop or 21mm from the genial tubercle is suggested to enable complications – free implant placement in the anterior mandible.

The present study aims to assess the prevalence and length of anterior loop of inferior alveolar nerve in south Indian population using CBCT.

Material and Method

The CBCT volumes of 50 randomly selected subjects (25 females and 25 males) who underwent CBCT for implant assessment consisting of 100 quadrants were inspected retrospectively for the presence of anterior loop of inferior alveolar nerve. All the patients were scanned using Sirona Orthophos (85 KVp, 10 – 14 mA, 5s). The inclusion criteria was all partially edentulous patients between 18-50 years who underwent CBCT examination for pre – surgical assessment for implant placement. The exclusion criteria was patients under 18 years of age, orthodontic patients, unclear mandibular canals or under diagnostic CBCT volumes and pathologies in the line of mandibular canals.

For the selected scan volumes, nerve tracing was done using the device's software (GALILEOS viewer). The screenshot of 3D reconstruction obtained from the software was imported into AutoCAD 2018. The mental foramen was traced. Two parallel lines were drawn at the anterior point of mental foramen and anterior point of anterior loop (Figure 1). The distance between the lines were measured for all the 100 quadrants and tabulated.

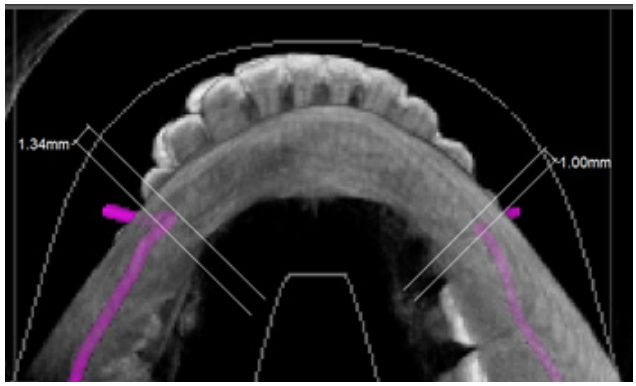


Figure 1 Measurements of anterior loop length using AutoCAD 2018

Results

Of the 100 quadrants evaluated for the prevalence of anterior loop, 62 quadrants exhibited looping of inferior alveolar nerve. 27 patients (12 females and 20 males) showed bilateral looping and 5 patients (3 females and 2 males) showed unilateral looping. The mean length of loop was 0.42 ± 0.40 mm on the left side and 0.42 ± 0.31 mm on the right side. In females the mean length was 0.41 mm on the left side and 0.48 mm on the right side. In males the mean length was 0.43 mm on the left side and 0.44 mm on the right side.

The minimum length of the loop in females was 0.14 mm on the left side and 0.15mm on the right side. The minimum length of the loop in males was 0.12 mm on the left side and 0.48 mm on the right side. The maximum length of the loop in females was 1.34 mm on the left side and 1 mm on the right side. The maximum length of the loop in males was 1.5 mm on the left side and 1.44 mm on the right side. The results are summarized in Table 1.

Table 1: Prevalence of anterior loop

Location	Presence/ Absence
Right	Present - 32 Absent - 1
Left	Present - 29 Absent - 4
Bilateral	Present – 28 Absent - 22

Discussion

Meticulous research has been done to evaluate the configuration of inferior alveolar nerve canal in the mandible [17,18]. These studies have used various methods for analysis of position of mandibular canal which includes cadaver examination and radiographic methods. Panoramic radiography is the most commonly used diagnostic modality for the localization of mandibular canal because of its availability and cost factors. As panoramic radiographs are linear measurements of a three dimensional structure such as mandible, the radiographs are not precise enough for the diagnosis of accurate location of the canal.

Cone Beam Computed Tomography (CBCT) was introduced in the year 2000. Before the emergence of CBCT, panoramic radiography was widely used for pre – operative assessment along with another intraoral imaging modality that was used to supplement the preliminary information provided by the panoramic radiograph. It provides detailed 3D images rather than 2D images from panoramic radiograph. This allows the physician to examine structures as thin slices in different planes and for exact localization and configuration of the mandibular canal. Anatomic variations in the mandible such as the anterior loop, lingual foramen can be better visualized in CBCT thereby preventing encounters of such variations during surgery [17]. Studies have shown that for accurate identification of the anterior loop CBCT is a better imaging modality when compared to panoramic radiography [2,3,5,6]. Comparative studies between CBCT and other 3D imaging modalities such as the conventional CT, spiral CT and MDCT [19–21].

The American Academy of Oral and Maxillofacial Radiology (AAOMR) recommends the use of CBCT for pre – surgical cross – sectional assessment only for potential implant sites [22]. The AAOMR also advocates the use of CBCT imaging as the current method of cross – sectional imaging as it provides greatest diagnostic yield at an acceptable radiation risk. However, the decision to carry out CBCT examination is based on the professional judgement of the clinician. Use of small FOV for examination is suggested so as to prevent excess radiation exposure than that is required.

The incidence and length of anterior loop of IAN has been widely researched in varied populations. Numerous studies have been done for estimating the frequency of occurrence of mental loop in Iranian, Malaysian, Chinese, Thai and Indian population [1,23–27]. These studies report various methods of measuring the length of the loop. They have recorded a prevalence between 32% and 94%. In the present study, the overall prevalence was 66%. The average length of the loop as reported in literature is between 0.4 to 6 mm. A maximum length of the loop ranges from 9 mm to 11 mm [28–30]. In this study, the length of mental loop range between 0 to 1.5 mm. Some studies have considered and reported measurements above 3 mm only as mental loop [24]. Variations in the sample population, methods and soft wares used for measuring have also lead to the difference in the reported lengths of the loop. Most of the studies reported methods of measurement in the reconstructed panoramic view of CBCT volumes. In the present study, reconstructed 3D model generated by the device's software was used. Also, the methods of measurement used in this study is comparatively simpler to the other studies.

Previous studies have analyzed the correlation of the anterior loop with age, sex and side[2,31] and found loop of IAN was more in males than females. In this study males had the maximum length of the length of the loop on both sides coinciding with established results.

Safety margin is the distance anterior to the loop on which implant placement is considered safe. Researchers suggest a safety margin between 3 to 6 mm from the anterior most point of the loop [15]. Placing implants 6 mm anterior to the loop leaves less space in the interforaminal area for patients requiring multiple implants such as in implant – supported complete dentures. In cases where a maximum of 9 to 11 mm loop has been reported, following the 6 mm rule still leads to damage of the nerve. Accurate estimation of the length of the mental loop can prevent injury and complications associated with nerve injury.

Conclusion

The major limitation of this study is the sample size. Due to the smaller sample size, the exact prevalence of the anterior loop could not be assessed in the general population based on the results of this study. For better assessment of prevalence, more samples should be chosen from multiple centers rather than a single center. Also, the tracing of the nerve and the measurements were done by a single observer. If the samples were reviewed by multiple examiners, the reliability estimation of the measurements could have been better. Although the method using for measuring is simpler than the other

studies, its sensitivity in exact estimation of loop has not been established. Further research is needed such that it overcomes all the above mentioned limitations and to validate a generalized safety margin for implant placement in the anterior mandible.

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A Comprehensive Review on Oral Aphthous Ulcer

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Abstract

Mouth ulcer is a very common and painful condition, which is categorized as aphthous stomatitis. It is most commonly seen in early childhood and adolescence. These ulcers are small round with circumscribed margins with yellow floor. They are pearl coloured flakes in the mouth or inside the lips. These are oral mucosal lesions and these ulcers are commonly called as Recurrent Aphthous Stomatitis (RAS). There are also different types of ulcers like minor ulcers which are not very large in size and heal within 7-14 days, major ulcers heal slowly which can extend up to weeks or months and the third one is herpetiform ulcer which is multiple pinpoint ulcers that heal within a month. Some reason for the occurrence of ulcers could be stress, trauma, stopping smoking, menstruation and food allergy. Sometimes it could also be due to deficiency of iron, vitamin B12. In children aphthae occurs also due to periodic or high fever, pharyngitis and cervical adenitis.

Key Words: *Aphthous ulcer, minor ulcer, major ulcer, herpetiform*

Introduction

Aphthous ulcer is also called as recurrent aphthous stomatitis or canker sores. It is usually indicated by a redness and swelling or white colour lesion. It is also associated with bleeding in adverse conditions. Severe aphthous ulcer can lead to difficulty in eating [1]. There can be several reasons for the occurrence of aphthous ulcer like stress, nutritional deficiency, genetic and hormonal disturbances [1-3]. These painful lesions usually occur at irregular intervals but have the same sequence of events in every cycle [4]. There are three types of aphthous ulcer such as minor, major and herpetiform. The most common of all is the minor ulcer with an approximate of 80-85% of population [5-8]. The exact etiology and pathophysiology of aphthous ulcer is not yet discovered [9]. Use of tobacco can be said as one of the cause of aphthous ulcer, as it causes injury or chronic irritation to the oral tissues [10]. Many disease are associate with mouth ulcer like gastrointestinal diseases, Behçet's syndrome, vitamin deficiencies, cyclic neutropenia, Reiter syndrome, hematological disorders, Magic syndrome, PFAPA (periodic fever, aphthous pharyngitis and cervical adenopathy), Sweet syndrome etc [11,12].

Minor ulcers take short time to heal and are small in size. Major ulcers take long time to heal and often lead to scarring. Herpetiform are multiple pinpoint ulcers which heal within a month and are usually found on the tongue.

Definition

Aphthous ulcer is the most common and painful condition which occurs in the oral mucosa. It is basically the breaching of the oral epithelium exposing the nerve endings in the underlying lamina propria. Due to this severe pain is experienced along with soreness, swellings and redness.

Description

Aphthous ulcer is small, round or ovoid ulcers having margins around. They are yellow or grayish in colour. It usually occur only the areas where the skin is not tightly bound to the bone like the inside of lips or cheeks and the dorsum of tongue. The three different types of aphthous ulcers are classified based on the difference of their shape, size, duration and scarring.

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These are as follows

Minor ulcer is a mild aphthous ulcer whose size varies from 8-10 mm. It is found mostly in non keratinised mucosal surfaces like buccal mucosa, labial mucosa and the floor of the mouth. These will heal in a short period of time like 10-14 days. There may be burning sensation prior to the appearance of the lesion. These do not lead to scar while they cure.

Major ulcer is a rare condition affecting only 10-15% of the population. Its size will reach upto 1cm in diameter. The areas commonly affected by major ulcer are the lips, soft palate and fauces. Sometimes the dorsum of the tongue and gingiva will also be affected [13]. It will last for 6 weeks. This will also lead to scarring.

Herpetiform ulcer is characterized by small multiple ulcers 100 in number. They are 2-3mm diameter. These are small in size and combine to form a large irregular ulcer. These ulcers last for 10-14 days. These are common in women. These usually do not form scars.

Aphthous ulcer can affect the genitals of males and females. It is more common in females than in males. It usually occurs during adolescences or childhood. The aphthous ulcer in the genitals is called as Non Sexually Acquired Genital Ulceration.

Herpes Simplex is an infection. Depending on their position these can be classified as oral herpes or genital herpes. Oral herpes is the sores around the mouth or face. Genital herpes affects the genitals mainly. This is a sexually transmitted disease (STD). Herpes simplex is of two types - HSV-1: This type occurs usually around the mouth and can be transmitted to the genitals during oral sex.

HSV-2: This is mainly on the genitals. It is spread through sexual contact and skin to skin contact. It is a very common and contagious disease.

Associated Factors

The exact etiological reason for the occurrence of aphthous ulcer has not been found yet. But it is s considered to run in the family. In present date it is thought to be caused by the disturbance in the immune system, which will react against the protein of the mucosal tissue. Sodium lauryl sulphate is a detergent found in toothpastes that also cause the growth of ulcer in some individuals [14]. Apart from these some of the associated factors leading to ulcers are nutritional deficiency, trauma, drugs, and hormonal changes.

Nutritional deficiency

Deficiency in vitamin B12 and iron can lead to decrease in the thickness of the oral mucosa. As the thickness reduces there is maximum chance of it to get worn out and cause lesions.

Genetics

Ulcers due to genetic reasons develop at an early age and are severe in condition. This is seen in 40% of the population [15]. These will be seen at an early stage of life and causes a lot of discomforts.

Trauma

Injury in the oral mucosa due to brushing, disturbances due to teeth etc will also lead to ulcer in the mouth [16]. These reasons will lead to opening of the wound and hence expose the nerve endings leading to lesions. Trauma is basically here referred to as the abberations of the oral mucosa.

Drugs

Many drugs are considered to induce the growth of ulcers in the mouth. Drugs like propionic acid, diclofenac, piroxicam, phenobarbital, sodium hypochloride, phenindione, gold salts and nicorandil [17].

Hormonal changes

Hormonal changes in women are also associated to ulcers. During menstruation or in the luteal phase of menstrual cycle there are high chances of ulceration [18]. Also by the use of contraceptive pills there is a change in the hormonal levels.

Smoking

In contrary to the causes of ulcers, smoking helps in protection against aphthous ulcers. Smoking is usually considered to be hazardous to health and cause many oral and skin related problems but it has been found out to be protective in function in this case.

It has been found that the smokers have increased keratinization of the oral mucosa. This increase protects the oral mucosa from any kind of infection. It has been assumed that the absorbed constituents from the cigarette lead to increase in keratinization. However hyperkeratosis is considered as premalignant [19]. Even though smoking is one factor which is protective against

ulcers, it is cancerous.

Treatment

Several tests can be done to diagnose aphthous ulcer like blood test for blood count, B12, iron. The general treatments taken are use of protective pastes forming a layer on the ulcer reducing irritation and exposure of one of which is Amlexanox paste, avoiding stress, proper intake of vitamins and minerals and antibacterial mouthwash to avoid secondary infection, ignore food stuffs that aggravate ulcers. Benzydamine hydrochloride mouthwash can also be used for treating ulcers.

Topical steroids are also commonly used to treat aphthous ulcer. These include the dexamethasone ointment or to their lesion 3 times daily after meals for 5 days. Topical steroids are usually in the form of paste, cream or lotions, often triamcinolone is in pastes.

Nowadays Low Level Laser Therapy (LLT) is used to treat the aphthous ulcer as it is a fast pain relieving and heals fast. It has fewer side effects than the medicine taken for the treatment of ulcer. It is also cost-effective. It is one of the most appropriate treatments for minor ulcers.

Topical drugs and systemic drugs are used for the treatment of ulcers. Topical drugs are used to treat when the outbreaks are continuous and pain with minor aphthae. The drugs are amlexanox or topical corticosteroids such as triamcinolone acetonide are used to prevent the formation of lesions.

Systemic drugs are used when the outbreak is constant and aggressive with major aphthae and intense pain. Different drugs like colchicine, dapsone, clofazimine and the most commonly used systemic corticosteroids such as prednisone and immune modulators such as thalidomide.

Prognosis

Ulcer can range from minor to a deep one. It causes a lot of discomfort while eating, swallowing which will lead to loss of appetite and weight loss. These do not cause oral cancer or any infection. Aphthous ulcer can usually last for several years before spontaneously disappearing in later life [20].

Conclusion

Aphthous ulcer is a very painful condition which is given least importance but if left unattended can cause severe pain and impact on the quality of life. The duration of a specific ulcer might range from few days to few weeks or sometimes even can last for months. The exact cause of ulcer is unclear. LLLT is a safe, effective and fast way to get rid of ulcers. Topical drugs and systemic drugs are used as treatment.

Conflict of Interest: Nil

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Physicochemical Profile of Acacia Catechu Bark Extract – An Invitro Study

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Abstract

Introduction: *Acacia catechu* has a great importance due to its medicinal properties. It is a historical plant; widely used in traditional medicine especially in Asia. The bark of this plant is strong antioxidant, astringent, anti-inflammatory, anti-bacterial and antifungal in nature. It is used as mouthwash for mouth, gum, sore throat, gingivitis, dental and oral infections. It is also helpful in numerous women related problems. It also has abundant anti-microbial properties. This study aims at evaluating the physicochemical profile of *Acacia catechu* bark extract in order to make optimum use of the extract for therapeutic purposes.

Materials and Method: The plant material of *Acacia catechu* was shade dried at a temperature range of 20° to 30° C for about 2 weeks. The dried sample was then powdered in a grinding mill. The obtained powder was used for physico chemical analysis and for extraction using solvents.

Results: Ash value was found to be 12.7%. Acid insoluble & soluble content of the plant material was found to 1.67 & 6.26 %. The percentage weight of loss on drying or moisture content was found to be 7.245%. Extractive values found, are tabulated for different solvent systems. Ethanol 95 % showed 2.436 %.

Conclusion: *Acacia catechu* was characterized on the basis of the physicochemical parameters. The present work will, thus, provide helpful information on the quality of these herbal materials to ensure genuineness, safety and efficacy prior incorporation in pharmaceutical formulations.

Keywords: *Acacia catechu, solubility, applications*

Introduction

For centuries, plants and plant products have been used for treating various ailments. Several medicinal trees and their products are still widely used by the traditional medical practitioners for curing various diseases in their day to day practice. Various parts of the plants such as roots, stems, bark, gum, leaves, fruits, seeds and flowers are used for medicinal purposes.[1]

Acacia catechu belongs to family *Fabaceae* which is also called pea family or legume family due to presence of single chambered legume in all species of this family. *Acacia catechu willd* is a small to moderate sized plant widely distributed throughout Asia. The main origin of this plant is Pakistan, India, Thailand and Bangladesh. It contains polyphenolic components, tannins, alkaloids, carbohydrates, flavonoids and seeds of this plant are good sources of protein.[2] Various parts of the of the plant leaves, bark, heartwood possess diverse pharmacological actions for management of various disorders. The pharmacological activities in various parts of the plant has been extensively studied. The plant extract has been

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reported reported to have anti-pyretic, anti-inflammatory, anti-diarrhoeal, hypoglycaemic, hepatoprotective, anti-oxidant and anti-microbial activites including anti caries and anti plaque activity.[3] Bark of Acacia catechu contain alkaloids and many other very potent active components which shows anti-microbial activity so management of wounds and burns it also acts as a disinfectant which reduces the chance of infection at the site of the wound.[4]

The increasing search for therapeutic agents derived from plant species is justified by the emergence of diseases, yet without proper treatment, and the growth of scientific knowledge about the herbal medicines as important treatment alternatives. Therefore, the quality and safety of herbal preparations are also of great concern.[5] To ensure the standard of research on herbal medicines, the quality of the plant materials or preparations is of utmost importance. With the ever increasing use of herbal medicines and the global expansion of the herbal medicines market, safety has become a concern for both health authorities and the public in many countries. Microbial contamination of medicinal herbal plants can be influenced by environmental factors such as temperature, humidity and extent of rainfall during pre-harvesting and post-harvesting periods, handling practices and the storage conditions of crude and processed medicinal-plant materials. The presence of microbial contaminant in non sterile pharmaceutical products can reduce or even inactivate the therapeutic activity of the products and has the potential to adversely affect patients taking the medicines.[6]

The Indian system of medicine, mainly comprising of Ayurveda, Siddha and Unani, is one of the oldest holistic management system with thoroughly documented remedies. Ayurveda, a part of cultural heritage of India, is widely respected for its uniqueness and global acceptance as it offers natural ways to treat diseases and promote healthcare.[7] Unfortunately, standardization and quality control have remained grey areas in the preparation of Ayurvedic medicines. Till date, most of the ayurvedic formulations are lacking in their defined quality control parameters and method of its evaluation.[8] On this background, standardization is an important step for the establishment of a consistent biological activity, a consistent chemical profile, or simply a quality assurance program for production and manufacturing of a herbal drug.[9]

In order to improve the purity and safety of the products, observation of basic hygiene during preparation, standardization of some physical characteristic such as moisture content, pH and microbiological contamination levels are desirable.

Hence this study aims at evaluating the physicochemical profile of *Acacia catechu* bark extract in order to make optimum use of the extract for therapeutic purposes.

Materials and Method

Plant collection and extract preparation:

Acacia catechu bark (ACB) was collected during the month of December 2015 from Hosur, Tamil Nadu, India, authenticated by Green Chem Lab, Bengaluru, Karnataka, India. Barks were shade dried and was milled to fine powder. This bark powder was passed through 100 mesh sieve, and 2.5 kg of powdered ACB were extracted with 10 L of ethanolic, at 65°C, for 1 h. After 1 h of extraction, the extract were filtered and collected. The marc, an insoluble residue was extracted repeatedly with 10 L of ethanolic, twice. The extract was evaporated in a Buchi rotary evaporator (Switzerland) at 65°C, to obtain 150 g of powder extract. The w/w yield of the prepared extract was 6%.

Chemicals:

3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium Bromide (MTT), dimethyl sulfoxide (DMSO) was purchased from Sigma Chemical Co. India. The other chemicals used in this study were purchased locally and were of analytical grade.

Physicochemical analysis:

The plant material of *Acacia catechu* was shade dried at a temperature range of 20° to 30° C for about 2 weeks. The dried sample was then powdered in a grinding mill. The obtained powder was used for physico chemical analysis and for extraction using solvents.

Determination of Moisture (Loss on drying):

Procedure:

➢ Weighed about 1.5g of the powdered drug into a tarred porcelain dish.

➢ Dried it in the oven at 100°C or 105°C.

Cooled in desiccators and the loss in weight was recorded as moisture

Determination of Total ash value:

About 2gm of powdered drug was weighed accurately into a tarred silica crucible. Incinerated at 450°C in a muffle furnace until free from carbon. The crucible was cooled and weighed. Percentage of total ash was calculated with reference to air-dried substance. Determination of total ash value formula:

Total ash value of the sample = 100 (Z-X)

---------- %

Y

X= weight of empty dish

Y= weight of the drug taken

Z= weight of the dish + ash (after complete incineration).

Determination Acid Insoluble ash:

Ash obtained from the total ash was boiled with 25ml of 2N HCl for a few minutes. Filtered through an ash less filter paper. The filter paper was transferred into a tarred silica crucible. Incinerated at 450°C in a muffle furnace until free from carbon. The crucible was cooled and weighed. Percentage of acid insoluble ash was calculated with reference to air-dried substance.

Determination of Water soluble ash:

Ash obtained from the total ash was boiled with 25 ml of distilled water for a few minutes and filtered through an ash less filter paper. The filter paper was transferred into a tarred silica crucible. Incinerated at 450°C in a muffle furnace until free from carbon. The crucible was cooled and weighed. The percentage of water-soluble ash was calculated with reference to air-dried substance.[10-15]

Results

Table 1: Physicochemical analysis of *Acacia catechu* bark extract.

S.No.	Physiocochemical parameters	% W/W
1)	Ash value	
	Total ash % w/w	12.7
	Acid insoluble ash % w/w	1.67
	Water soluble ash % w/w	6.26
2)	Extractive value % w/w	
	Ethanol 95%	2.436
3)	Loss on drying	7.245

Physicochemical analysis of *Acacia catechu* bark:

The authentication of the plant material was proved through the physicochemical characteristics of the plant material. The results for physicochemical parameters are shown in the table 1.

Ash value is an important quantitative tool used to determine the authenticity and purity of drug. It was found to be 12.7%. Acid insoluble & soluble content of the plant material was found to 1.67 & 6.26 %. The percentage weight of loss on drying or moisture content was found to be 7.245%.The less value of moisture content could prevent bacterial, fungal or yeast. Extractive values found, are tabulated for different solvent systems. Ethanol 95 % showed 2.436 %.

Discussion

Herbal preparations like herbal medicines, herbal teas, herbal oils etc. may be having the plant material as the starting material. Now a days in developing countries, large number of people are unable to afford pharmaceutical drugs and they continue to use their own systems of indigenous medicine that are mainly plant based, because of their safely comparing to

that of synthetic drugs. According to World Health Organization (WHO); traditional, complementary, alternative, or non-conventional medicines are used by 70–95% of global population particularly in developing countries for their healthcare.[16]

Standardization is the code of conduct in order to ensure the consistent efficacy that manufacturers should use to ensure consistency of their products. The quality of herbal drugs is the sum of all factors which contribute directly or indirectly to the safety, effectiveness and acceptability of the product.[17,18]

Hence it is essential to develop scientific and clinical search to investigate the safety, quality and efficacy of these herbal therapies.

Established preliminary and physicochemical standards give important information for further investigations and facilitate the identification of formulations in routine industrial production. The test for percentage of moisture content (loss on drying) determines both water and volatile matter. Total ash measures the amount of materials remaining after ignition. Acid insoluble ash measures the amount of silica present especially, sand and siliceous matter. Extractive values are useful for evaluation consistency of nature and amount of chemical constituents present in drug.[19]

Considering the importance of these physicochemical parameters, *Acacia catechu* was characterised by evaluating water soluble extractive, ethanol soluble extractive, total ash content, acid insoluble ash and loss on drying at 105 °C.

Conclusion

Acacia catechu was characterized on the basis of the physicochemical parameters. The analytical specifications were established for the product with respect to quality based raw materials.[20] This study may serve as standard reference and the standard operating procedures to be adopted for quality control analysis of various *Acacia catechu* formulations.

The present work will, thus, provide helpful information on the quality of these herbal materials to ensure genuineness, safety and efficacy prior incorporation in pharmaceutical formulations.

Ethical Clearance- NA

Source of Funding- Self

Conflict of Interest - Nil

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Insilico Interaction of Selected Five Indole Alkaloids Against Oral Carcinoma Drug Targets

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Abstract

Aim: The aim is to study the interaction of Indole alkaloids against 2 oral carcinoma drug target by insilico docking using iGemdock tool.

Background: In this generation, technology has become so advanced that we are able to now achieve what was believed 20 years ago to be impossible. One such advancement is the in silico interactions. It is a virtual screening which enables us to bind two compounds and check the affinity of the binding. This helps us to first screen the activity of the two compounds before money, time and energy is spent in manually performing the activity and then arriving at a failure. We will be able to concentrate on the compounds which show us positive results in the in silico interactions, thus helping us in conserving time, expenditure and energy.

Materials & Method: The Oral carcinoma drug targets were identified by literature search and its 3D structure was downloaded from RCSB PDB (Protein Data Bank), which is a crystallographic database for the three-dimensional structural data of large biological molecules.

Results: From the above analysis it shows that ajmalicine shows good interaction with both the receptors also shows best fitness energy.

Keywords : *Indole alkaloids ,Oral carcinoma,Drug target, Insilico docking ,Medication*

Introduction

Indole subordinates have the exceptional property of mirroring the structure of peptides and to tie reversibly to enzymes, which give enormous chances to find novel medications with various methods of activity [1]

Among the advanced scourges, oral malignancy is the second most basic reason for death [2]. In creating nations, oral malignancy is one of the main ten most basic reasons for death [3]. India has one of the most astounding pervasiveness of oral tumor on the planet. As per WHO, 40% of the analyzed oral growths over the world happens in India, Pakistan, Bangladesh and Srilanka .[4] WHO additionally evaluated that 90% of Indian guys who were determined to have oral tumor were ascribed to tobacco directin. Most complex diseases are caused by a complicated interplay of various biological processed and dysfunctional systems. However, traditional drug discovery paradigm , the single drug , single target has limitations in many aspects of the complex disease.[5]Compared to single drug treatments, it is evident that drug combinations have a number of advantages such as increase of therapeutic effects, reduction of drug dosage and decrease of toxicity and side effects.[6]However unexpected adverse ffects may also occur due to drug interactions (DDIs) resulting from various processes. Significant attention to overall phenotypic effects of drug interacations is necessary to discover drug combinations with increased therapeutic effects and reduced adverse effects.[7]

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The protein–ligand docking problem is the prediction of a ligand conformation and orientation relative to the active site of a target protein. A computer-aided docking process, identifying the lead compounds by minimizing the energy of intermolecular interactions, is an important approach for structure-based drug designs.[8]Using a com- puter method to find a solution to a protein–ligand docking problem involves two critical elements: a good scoring function and an efficient algorithm for searching conforma- tion and orientation spaces.[9,10]

Materials and Method

Target Identification And Retrival:

The Oral carcinoma drug targets were identified by literature search and its 3D structure was downloaded from RCSB PDB (Protein Data Bank), which is a crystallographic database for the three-dimensional structural data of large biological molecules, such as proteins and nucleic acids. The data, was typically obtained by X-ray crystallography, NMR spectroscopy, or, increasingly, cryo-electron microscopy. The PDB ID of the targets are as follows,

Results & Discussion

Active Site Residues:

Residues showing Bonded interaction: HIS 198, ARG 61, GLY 199, ARG 10

Residues showing Non Bonded interaction: GLY 89, ASN 17, HIS 11

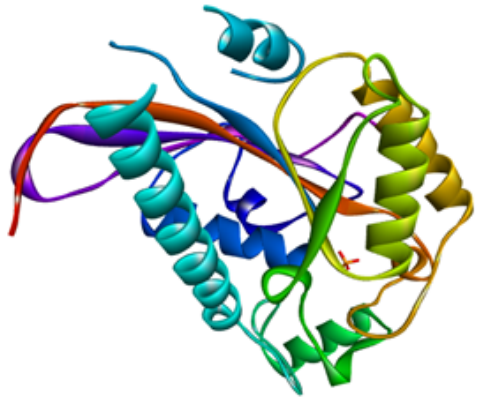


Fig 1 : PDB ID: 3DCY (Crystal Structure a TP53-induced glycolysis and apoptosis regulator protein)

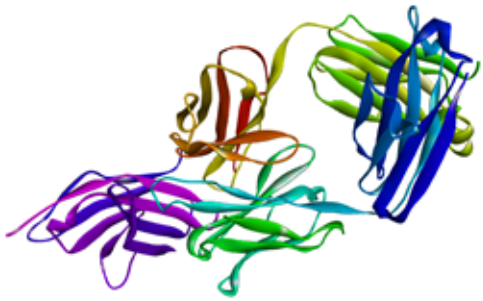
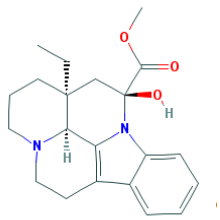
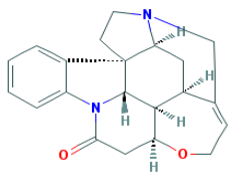


Fig 2 : PDB ID: 5GGV (CTLA-4 in complex with tremelimumab Fab)

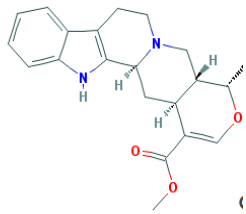
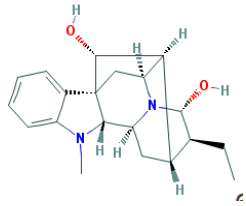
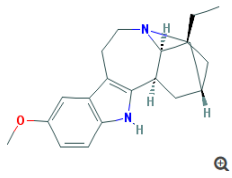
Ligand Retrival:

The indole alkaloids with anticancer property were identified by literature search and their 3D structure was

Table 1 : The list of Indole alkaloids and its structures are as follows,

PUBCHEM ID	COMPOUND NAME	STRUCTURE
15376	Vincamine	
441071	Strychnine	

Cont... **Table 1 : The list of Indole alkaloids and its structures are as follows,**

441975	ajmalicine	
6100671	ajmaline	
197060	Ibogaine	

Docking:

The docking was carried out using iGEMDOCKv2.1, a Graphical-Automatic Drug Design System for Docking, Screening and Post-Analysis. Fitness is the total energy of a predicted pose in the binding site. The empirical scoring function of iGEMDOCK is estimates as:

Fitness = vdW + Hbond + Elec

Here, the vdW term is van der Waal energy. Hbond and Elect terms are hydrogen bonding energy and electro statistic energy, respectively.

To start docking protein file and ligand file was prepared. The active site was defined using "by bounded ligand" in case of cocrystal structure and "by current file" in case of non-cocrystal structure. The igemdock accepts ligand in mol2 format, so the ligands were converted from sdf to mol2 format.

Results and Discussion

Interaction Table 2:

PDB ID	COMPOUND	ENERGY	VDW	HBOND	ELEC
3DCY	Vincamine	-69.0957	-59.617	-9.47872	0
	strychnine	-66.7736	-61.9882	-4.78542	0
	ajmalicine	-74.8065	-67.898	-6.90847	0
	ajmaline	-67.211	-55.5155	-11.6955	0
	Ibogaine	-69.2264	-65.7264	-3.5	0
5GGV	Vincamine	-87.0853	-70.3446	-16.7407	0
	strychnine	-80.785	-78.285	-2.5	0
	ajmalicine	-88.5663	-81.5663	-7	0
	ajmaline	-75.0363	-67.7515	-7.28482	0
	Ibogaine	-89.9196	-80.423	-9.49655	0

- Docked Structure of TP53-induced glycolysis and apoptosis regulator protein with Indole alkaloids shown in figure 4

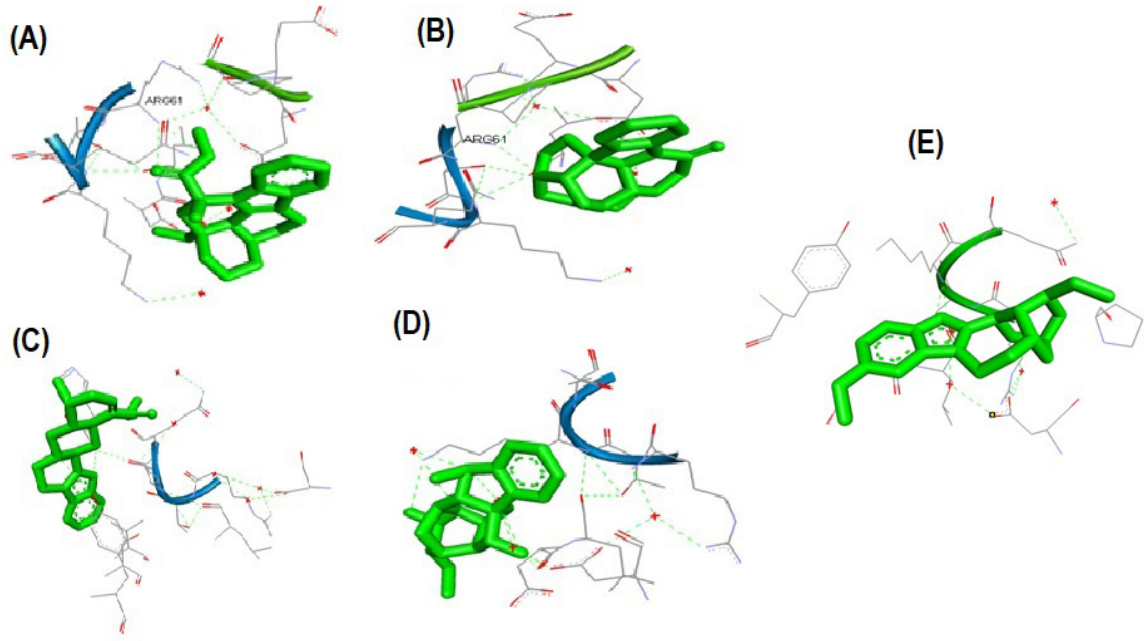


Fig 4:Protein docked with (A) Vincamine, (B) Strychnine, (C) Ajmalicine (D)Ajmaline (E) Ibogaine

- Docked Structure of CTLA-4 in complex with tremelimumab Fab with Indole alkaloids shown in figure 5.

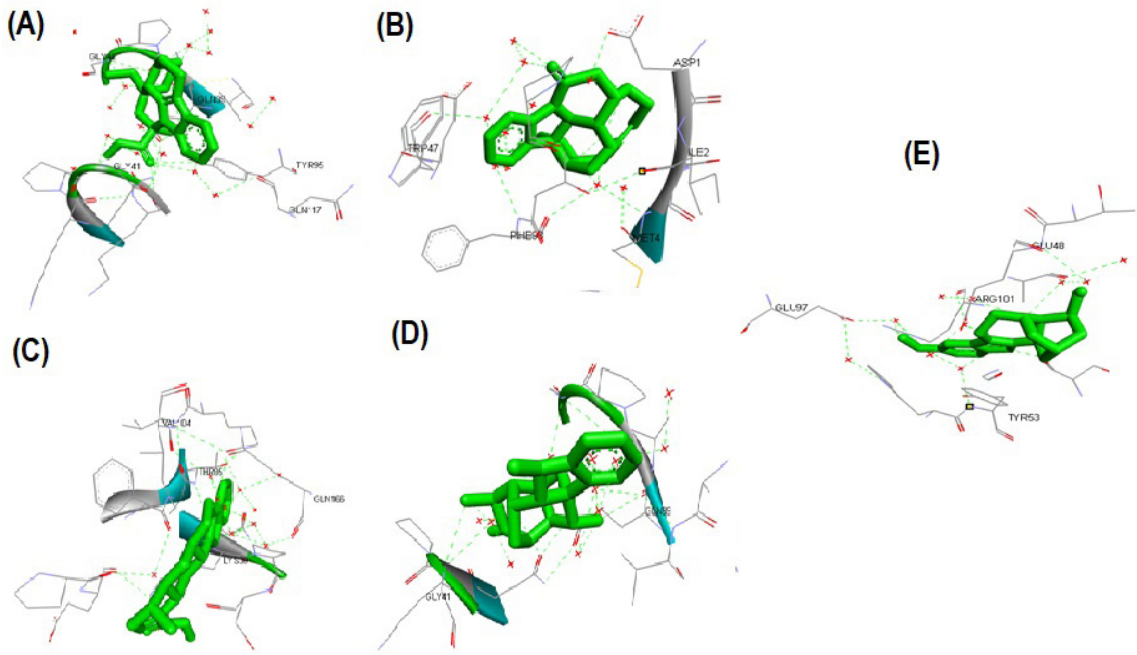


Fig 5 :Protein docked (A) Vincamine, (B) Strychnine, (C) Ajmalicine (D)Ajmaline (E) Ibogaine

Conclusion

From the above analysis it shows that ajmalicine shows good interaction with both the receptors also shows best fitness energy.

Ethical Clearance- NA

Source of Funding- Self

Conflict of Interest - Nil

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COX2 Inhibitory activity of *Abutilon indicum –An Invitro Study*

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Abstract

Aim : To analyse the COX2 inhibitory activity of *Abutilon indicum.*

Objective : The main objective of this study is to analyse the COX2 inhibitory activity of *Abutilon indicum*

Background : Prostaglandins are important mediators of the body's response to pain and inflammation, and are formed from essential fatty acids found in cell membranes. This reaction is catalysed by cyclooxygenase, a membrane associated enzyme in two isoforms- COX-1 and COX-2. *Abutilon indicum* ,commonly known as the Indian mallow is well known for its therapeutic values and further study of its COX-2 inhibitory activity is beneficial.

Conclusion : Medicinal plants and shrubs which have little or no side effects have to be further investigated. Further study on its COX-2 inhibition will increase its therapeutic value also as an anti-inflammatory with added benefits .

Keywords: *Ethnomedicinal, anti-arthritic, COX2 Inhibition, medicinal uses, Prostaglandin*

Introduction

Prostaglandins (PGs) are hormone-like bioactive substances mediating autocrine and paracrine signalling over the short distances and are involved in many physiological and pathological processes. They act via high-affinity G protein-coupled receptors: four EP receptors for PGE2 termed EP1-EP4, IP receptor for prostacyclin, DP receptor for PGD2, FP receptor for PGF2α. These receptors are linked to the different signal transduction pathways [1] .In addition, peroxisome proliferator-activated receptors (PPAR) have been identified as novel intracellular PG receptors [2] . Once a prostanoid is formed, it exits the cell and then interacts with G protein-coupled receptors, either on the parent cell or on closely neighbouring cells to modulate the second messenger levels [3] .Although their tissue distribution depends on the cellular enzymatic material, prostanoids are involved in a very broad range of physiological and pathophysiological responses [4] .Despite the wide use of NSAIDs over the last century, their mechanism of action was not fully understood until 1971 when Vane identified their molecular target, the COX enzyme. In the early 1990s, a second isoform (COX-2) was discovered, distinct from the first one, then renamed COX-1. COX-1 and COX-2 are isoenzymes [5] .

Abutilon indicum (Linn.) Sweet (Malvaceae) is a shrub distributed throughout India, SriLanka, topical regions of America and Malaysia [6] . It is known as Atibala in Sanskrit. It grows as weeds that are found abundant in wastelands and seashores.

Various parts of the plant like leaves, roots, seeds and seed oil are widely used by various tribal

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communities and forest dwellers for the treatment of variety of ailments [7].

From the ancient times, leaves of A.indicum are used for piles, toothache. Decoction of A.indicum leaves is used in catarrhal bilious diarrhoea, bronchitis, gonorrhoea, fevers and in ammation of bladder [8] .The decoction is prescribed as a mouthwash in various cases of tender gums and toothache. Bark of A.indicum is used in strangury and urinary complaints and is valued as a diuretic. Seeds are used as tonic [9] .

A recent study suggests that the aqueous alcoholic extract of A. indicum aerial parts contains promising antibacterial substances which are having activity against E. faecalis. E. faecalis being one of the major threats for root canal failure during endodontic treatment which is beneficial to dentists [10] .

Thus, the plant's COX2 inhibitory activity can be studied and further used for added benefits as medicinal plants have lesser side effects than other allopathy medicines .

Materials and Method

Plant materials-

Abutilon indicum extract used in the study were obtained from Green Chem Herbal extracts and formulations,Bengaluru,India.

Chemicals used-

DMEM, FBS,pioglitazone were obtained from Sigma Aldrich.co.India .All the other chemicals used in the study were up to analytical grade.

Assay for Screening of Cyclooxygenase (COX) Inhibition

The COX Inhibitor Screening Assay directly measures $PGF_{2\alpha}$ by stannous chloride reduction of COX-derived PGH_2 produced in the COX reaction. The reaction system consists of reaction buffer, haem, enzyme and plant extract pre-incubated at 37 ˚C for twenty minutes with background and enzyme controls. The reaction was initiated with the addition of arachidonic acid and incubated for two minutes at 37 °C. The reaction was stopped with addition of saturated stannous chloride solution and five minutes at room temperature. The prostaglandins are quantified by EIA. An aliquot of these reactions were added to the pre - coated plates in triplicates together with AChE tracer and antiserum and incubated for 18hours at room temperature on an orbital shaker. The plate was then finally developed with Ellman's Reagent and kept on an orbital shaker in the dark at room temperature for 60 minutes. The absorbance was read at 420 nm. The data was plotted as %B/B0 (Standard Bound / Maximum Bound) versus log concentration using a 4-parameter logistic curve fit. The concentration of each sample was determined from a standard curve with appropriate dilutions and used to calculate the percent inhibition as per the formula given below:

Percent Inhibition (%) = (Activity of Control – Activity of Test)/ Activity of Control x 100

The percent inhibition was plotted against the inhibitor concentration to determine the IC_{50} value (concentration at which there was 50% inhibition) [11] .

Result

As illustrated in figure 1, different concentrations (15.625, 31.25, 62.5, 125, 250, 500, 1000µg/ml) of *Abutilon indicum* extract was evaluated for the inhibitory effect on the activity of COX. The plant extracts exhibited potent inhibition of the COX – 2 enzyme. Concentration based inhibition was observed against COX – 2 activity. The IC_{50} was found to be 116.6µg/ml. Maximum inhibition was found to be 95.33% at 1000µg/ml represented in figure 1.

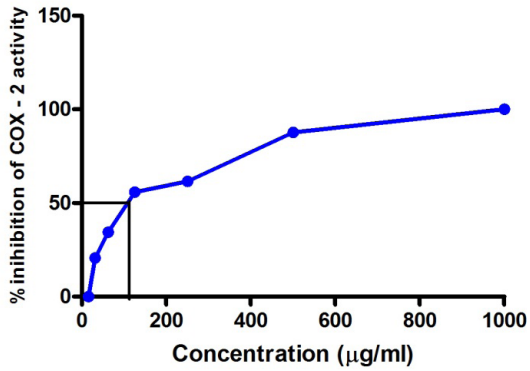


Figure 1:COX2 inhibitory assay

Discussion

Malvaceae family encompasses approximately 244 genera with 4225 species of herbs, shrubs and trees [12] .Around 22 genera of the family are reported from India, many of which have ethnomedicinal value e.g., *Abutilon indicum,* Gossypium herbaceum, Hibiscus mutabilis, Hibiscus sabdariffa, Hibiscus rosa-sinensis, and several others [13]

Phytoconstituents isolated from Malvaceae members belonging to categories such as flavonoids, phenolics, acids, and polysaccharides exhibit therapeutic activities.

More than 15 phenolics have been identified in A. indicum [14] and out of these, eugenol was shown to possess analgesic activity [15] while syringic acid and methyl caffeate were reported to be cytotoxic .

Aqueous and alcohol extracts of leaf of A. indicum promoted insulin production in moderately diabetic rats [16] .

In a study by Vallabh et al, the plant extract of A. indicum has been tested in vitro for anti arthritic activity which showed a dose dependant effect on protein denaturation, membrane stabilisation and inhibition of proteinases. The herbal extract exhibited more potent analgesic activity than acetyl salicylic acid, a well-established analgesic drug, for arthritis [17]

In another study conducted by Pingale et al ,the Acute toxicity of dried powder of aerial parts as well as fresh juice of leaves of A. indicum was measured in Swiss mice. Administration of either of the above plant material did not show any significant effect on body weight [18] .Acute oral toxicity of the aqueous extract and aqueous suspension of the ethanolic extract of A. indicum leaves was measured in Swiss albino mice. These were found to be safe at dose of 4000 mg/kg and 2000 mg/kg respectively and did not show mortality in mice. Therefore it proves that Abutilon indicum being a natural plant doesn't have much toxic effect unlike its counterparts .A firm proof that A.indicum extract shows anti-inflammatory property is a study conducted by Surendra Sharma and Naveen Goyal with the root extract on Carrageenan induced rat paw oedema model[19].

Proteinases have been implicated in arthritic reactions. Neutrophils are known to be a rich source of proteinases which carry in their lysosomal granules many neutral serine proteinases. It was previously reported that leucocyte proteinases play an important

role in the development of tissue damage during inflammatory reactions and significant level of protection was provided by proteinase inhibitors. In a study done by Vallabh.D and Varsha.M , *Abutilon indicum* exhibited significant anti- proteinase activity [20] .

In the present study , as illustrated in Fig 1 ,Different concentrations of Abutilon indicum extract was evaluated for the inhibitory effect on the activity of COX. Concentration based inhibition was observed against COX – 2 activity. The IC_{50} was found to be 116.6µg/ml. Maximum inhibition was found to be 95.33% at 1000µg/ml.

Conclusion

Medicinal plants and shrubs which have little or no side effects have to be further investigated. Selective COX2 inhibitors are used to treat pulpal pain because after long-term use, non-selective NSAIDs increase the risk of developing peptic ulcer disease, GI bleeding and renal toxicity .The primary purported safety advantages of COX- 2 inhibitors over non- selective NSAIDs are related to their theoretical lack of associated gastropathy [20].Since *Abutilon indicum* shows the aforementioned benefits. Further study as seen in figure 1 was done and proved on its COX-2 inhibition to increase its therapeutic value also as an anti-inflammatory with added benefits . mortality in patients on whom OPMDs are not treated.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Ethical clearance was obtained from Institutional Ethical Committee Review Board, Saveetha Dental College & Hospital – SDC/IHEC/18-19/026.

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Glucose Uptake Potential in L6 Myotubes by *Ficus racemosa*

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Abstract

Introduction: *Ficus racemosa* is widely used in ayurvedic medicine in India, mostly as fruits and bark decoction to treat uncontrolled diabetes, the objective of this study is to study the uptake of glucose in L6 myotubes by *Ficus racemosa.*

Background: Diabetes is a common metabolic disease characterized by abnormally high plasma glucose levels, leasing to major complications, such as diabetic neuropathy, retinopathy and cardiovascular disease. Presently available oral hypoglycaemic agents exhibit several side effects. Therefore, there is a need for more effective oral antihyperglycemic agent, particularly those that normalize both insulin and glucose levels.

Method: Cell culture: L6, a mono layer myoblast culture (obtained from NCCS, Pune-Passageno-19) was cultured in the DMEM. In vitro glucose uptake activity: Glucose uptake assay was followed by the methodology of (Gupta et al)

Result: It was observed from the results that *Ficus racemosa* extract at different concentrations exhibited substantial degree of glucose uptake in skeletal muscle cells, which was compared with that of Standard Metformin. A maximum glucose uptake of 53% was observed for ficus 30mg/ml, whereas metformin exhibited 61% of glucose uptake. The IC50 of ficus extract and metformin was found to be 2.57mg/ml and 1.79mg/ml respectively.

Conclusion: From the study that was conducted above it can be concluded that *Ficus racemosa* had a better glucose uptake compared to the with that of Standard Metformin used by diabetic patients.

Keyword: *Ficus racemose, glucose, l6 myotube, uptake, myoblast.*

Introduction

Diabetes mellitus is a group of metabolic disorders - defects in insulin secretion, or insulin action. [1] The chronic diabetes mellitus (DM) and uncontrolled diabetes lead to many diabetic complications such as diabetic cardiomyopathy, nephropathy, neuropathy, etc .The number of people with diagnosed diabetes is expected to increase by 55% between 2015 and 2040 to reach 642 million people, with the majority of cases in low- and middle-income countries Diabetes is fast gaining the status of a potential epidemic in India with more than 62 million diabetic individuals currently diagnosed with the disease [2,3] In 2000, India (31.7 million) topped the world with the highest number of people with diabetes mellitus followed by China (20.8 million) with the United States (17.7 million) in second and third place respectively. Rough estimates show that the prevalence of diabetes in rural populations is one-quarter that of urban population for India and other Indian sub-continent countries such as Bangladesh, Nepal,

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Bhutan, and Sri Lanka [4,5] Insulin resistance is defined as a reduced responsiveness of insulin on a target cell or a whole organ [6], Insulin resistance is not only the major pathophysiological condition of type 2 diabetes (non-insulin-dependent diabetes mellitus) [6] but also present in type 1 diabetes (insulin-dependent diabetes mellitus) [7]. Impaired glucose uptake in skeletal muscle is present in insulin resistance diabetes. [8] The rate-limiting step in muscle glucose uptake is the transmembrane transport of glucose mediated by glucose transporter 4(GLUT4). GLUT4, a protein stored in intracellular vesicles, plays a pivotal role in regulating insulin-stimulated glucose transport into skeletal muscle and adipose tissue [9,10] The insulin-signalling pathway is one of the key pathways responsible for blood glucose regulation. When binding to its receptor, insulin triggers the autophosphorylation of the insulin receptor and insulin receptor substrates (IRS). The conditional depletion of GLUT4 caused insulin resistance and chronic hyperglycaemia [11]This activates several signaling cascades, leading to biological responses such as glucose uptake into the cell and glycogen synthesis. The plant kingdom represents a largely unexplored reservoir of biologically active compounds. Growing epidemiological studies suggests that the consumption of fruits, vegetables and few medicinal herbs decreases the incidence of diabetes.

Materials and Method

Cell culture

L6, a mono layer myoblsst culture (obtained from NCCS, Pune-Passageno-19) was cultured in the DMEM with 10% foetal bovine serum (FBS) and supplemented with penicillin (120 units/ml) streptomycin (75 microgram/ml) gentamicin (160 microgram/ml) and amphotericin B (3 microgram/ml) in 5% CO2 environment. From differentiation, the L6 cells were transferred to DMEMwith 2% FBS for 4 days, post confluence.

In vitro glucose uptake activity

This invitro study was conducted by using ethanolic extract of *Ficus racemose* which was obtained from Green Chem Herbal Extracts and Formulations, Bengaluru

Glucose uptake assay that was performed in the article published by (Gupta et al,2009) was performed.

L6 myoblasts grown in 48 -well plate was subjected to glucose uptake as reported. When semi confluent monolayer was formed, the culture was renewed with the respective differentiation media. After attaining complete differentiation, the differentiated cells were incubated with KRP + 0.2% BSA FOR 18 h at 37ºC in the CO2 incubator. After 18h, the media was discarded and the cells were washed with KRP buffer once. The cells were treated with metformin and ficus extract of different concentration (0.01,0.03,0.1,0.3,1,3,10 and 30 mg/ml) and added 2-deoxy glucose (1mM), incubated for half an hour. The supernatant was collected for glucose estimation and glucose uptake was terminated by washing the cells thrice with 1ml ice-cold KRP buffer. Cells were subsequently lysed by freezing and thawing thrice. Cell 1ysate was collected for glucose estimation. Glucose uptake was calculated as the difference between the initial and final glucose content in the incubated medium by **GODPOD** method as follows: Mix 10µl of sample and 1ml of reagent, incubate for 25 min at 15-25□C or `10 min at 37□C. Measure the absorbance of the standard (A standard) and the sample (A sample) against the reagent blank within 60 min, the time interval from sample addition to media was discarded and cells were washed with KRP buffer once. The cells were treated with Metformin and ficus extract of different concentration (0.01,0.03,0.1,0.3,1,3,10 and 30 mg/ml) and added 2 – deoxy glucose (1mM), incubated for half an hour. The supernatant was collected for glucose estimation and glucose uptake was calculated as the difference between the initial and final glucose content in the incubated medium by **GODPOD** method as follows : Mix 10µl of sample and 1ml of reagent, incubate for 25 min at 15-25□C or `10 min at 37□C. Measure the absorbance of the standard (A standard) and the sample (A sample) against the reagent blank within 60 min, the time interval from sample addition to read time must be exactly the same for standard control and sample. All treatments were performed in triplicate with two replicates.

Results

Postprandial blood glucose level is known to be regulated by glucose uptake, a rate limiting step for glucose metabolism. In the present study, we used differentiated L6 myotubes because it was previously established that glucose uptake was higher in differentiated cells than in undifferentiated one, which is probably due to the presence of glucose transporter-4 (GLUT4) in their expression. The positive controls chosen for glucose uptake due to their anti - diabetic

activity was Metformin, as it is known specifically for the affirmative effect on the translocation of GLUT4 to the cell surface thereby promoting glucose uptake. The concentrations of the tested extracts that enhanced glucose uptake in cells by 50% (IC50) were determined by a linear regression analysis between the % glucose uptake against the extract concentrations by using the Graph pad prism.

It was observed from the results that *ficus racemosa* extract at different concentrations exhibited substantial degree of glucose uptake in skeletal muscle cells, which was compared with that of Standard Metformin. A maximum glucose uptake of 53% was observed for ficus 30mg/ml, whereas metformin exhibited 61% of glucose uptake as depicted in fig:1. The IC50 of ficus extract and metformin was found to be 2.57mg/ml and 1.79mg/ml respectively.

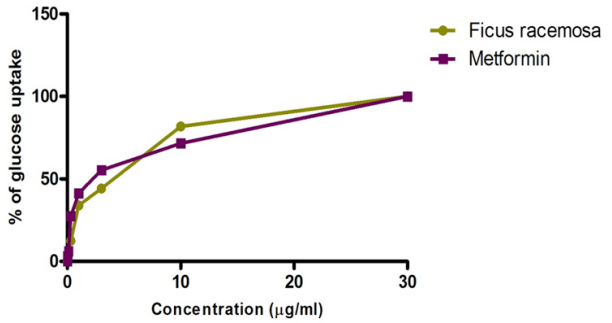


FIG:1 Glucose uptake of *Ficus Racemosa*

Discussion

Diabetes mellitus is regarded as a non-curable but controllable disease. Progressive nature of the disease necessitates constant reassessment of glycaemic control in people with diabetes and appropriate adjustment of therapeutic regimens .[12,13] α-amylase catalyses the hydrolysis of α-1,4-glucosidic linkages of starch, glycogen, and various oligosaccharides and simplifies the availability of sugars for the intestinal absorption. Inhibition of this enzyme activity in the digestive tract of humans is considered to be effective to control diabetes by diminishing the absorption of glucose decomposed from starch by this enzyme.[14,15] Diabetic patients however cannot control their postprandial blood glucose efficiently due to the insufficient insulin secretion or response, which results in postprandial hyperglycaemia and it is an important contributing factor for diabetic complications .[16]

L6 myotubes is a well-established skeletal muscle model for studying glucose uptake process and it is one of the key insulin targeted tissues in maintaining whole body glucose homeostasis, through the stimulation of glucose uptake mediated by GLUT4 translocation .[17] Skeletal muscle is one of the key insulin targeted tissue in maintaining whole body glucose homeostasis, through the stimulation of glucose uptake mediated by GLUT4 translocation.[18]Plant derived natural compounds have established a platform for developing new drug synthesis with fewer side effects .[19] Plants have been used by men from prehistoric times to get rid of suffering &curing ailments. [25]The folk medicines of almost around the world rely chiefly on herbal medicine even today. The studies conducted by (Cavalheira jbc et al) and (Shepherd pr et al) suggested that through an intracellular cascade reaction, insulin stimulates translocation of glucose transporters (GLUTs) into the cell membrane of the cells responsive to this hormone with subsequent internalization of glucose molecules [20,21] this can be compared with our study as well . In fact, considering all the effects of insulin on glucose metabolism, the regulation of GLUT4 trafficking and consequently glucose uptake is the most important of them .[22]

In addition, the study conducted by (Rothman dl et al) said that glucose transport is the key step in insulin-regulated glucose metabolism, including glycolysis, glycogen synthesis and lipogenesis, and it is clear that a dysfunction in this process in muscle and adipose tissue represent an important defect in the insulin action.[23] Natural products play a major role in the development of drugs for the treatment of human disease.[24] From the study that was conducted above It was observed from the results that *Ficus racemosa* extract at different concentrations exhibited substantial degree of glucose uptake in skeletal muscle cells, which was compared with that of Standard Metformin. A maximum glucose uptake of 53% was observed for Ficus 30mg/ml, whereas metformin exhibited 61% of glucose uptake as depicted in fig:1. The IC50 of Ficus extract and metformin was found to be 2.57mg/ml and 1.79mg/ml respectively.

Conclusion

From the study that was conducted above it could be concluded that *Ficus racemosa* had a better glucose uptake compared to the with that of Standard Metformin used by diabetic patients.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Ethical clearance was obtained from Institutional Ethical Committee Review Board, Saveetha Dental College & Hospital – SDC/IHEC/18-19/027.

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Seed Germination Assay of Hemisdesmus Indicus Ethanolic Root Extract An Invitro Analysis

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Abstract

To investigate seed germination assay of hemidesmus indicus ethanolic root extract by an invitro study.It is a slender, laticiferous, twining, sometimes prostrate or semi-erect shrub. Roots are woody and aromatic. The stem is numerous, slender, terete, thickened at the nodes. The leaves are opposite, short-petioled, very variable, elliptic-oblong to linear- lanceolate. The flowers are greenish outside, purplish inside, crowded in sub-sessile axillary cyme.Seed germination study is an novel cost effective method in tissue culture techniques .

Keywords *: Seed Germination ,Hemidismus Indicus ,Ethanolic root ,Novel technique*

Introduction

Hemidesmus indicus R. Br. (Family - Asclepiadaceae), commonly known as 'Indian sarsaparilla', is a well known drug in Ayurveda. The taxonomic description are perennial prostrate or twining shrub; root-stock woody, thick, rigid, cylindrical; bark brownish corky, marked with longitudinal furrows and transverse fissures, with aromatic smell. Stems woody, slender, thickened at the nodes. Leaves opposite, petiolate, much variable, linear to broadly lanceolate, acute or ovate, entire, smooth, shining, dark green, later variegated with white above. Flowers in racemes or cymes in opposite axils, small, green outside, purple within corolla tubula. Fruit of two follicles, long, slender, tapering, spreading. Seeds with silvery white coma. According to Ayurveda, root is cooling, aphrodisiac, antipyretic, alexiteric, antidiarrhoeal, astringent to bowels and useful in treatment of fevers, foul body odour, asthma, bronchitis, blood disorders, leucorrhoea, dysentery, diarrhoea, thirst, burning sensation, piles, eye troubles, epileptic fits, poisoning, rat bites etc. According to Unani system of medicine, root and stem are laxative, diaphoretic, diuretic and useful in treatment of syphilis and leucoderma. Isolation of nine pregnane glycosides viz. desinine,[1] indicine, hemidine,[2] indicusin,[3] hemidescine, emidine,[4]medidesmine, hemisine, and emicine [5] from H. indicus have been reported along with certain important triterpenoids (including alpha-amyrin, beta-amyrin, lupeol, lupanone, hexadecanoic acid) and 3-hydroxy-4-methoxy benzaldehyde.[6]

Roots of *H. indicus* are considered to be tonic and diuretic. Roots are useful in hemicrania, joint pains and syphilis whereas stem is good in treatment of brain, lever and kidney related diseases. It is also useful in treatment of urinary discharges, uterine complaints, paralysis, cough, asthma etc. Various classical formulae include an infusion or decoction of root or powdered root mixed with cow's milk that give benefits in cases of scanty and highly colored urine and in those of gravel and strangury .[7,8] Root decoction helps in skin diseases, syphilis, elephantiasis, loss of sensation, hemiplegia, loss of appetite, blood purification and for kidney and urinary disorders .[9]

Pharmacologically, the herb is mildly immuno-suppressant. The aqueous, alcoholic and steam distilled fractions of the crushed roots had no significant diuretic

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activity. The 50% ethanolic extract of the whole plant did not exhibit any effect on respiration, normal blood pressure and also on vasopressor response to adrenaline and depressor response to acetylalcholine and histamine in experimental animals. The extract also had no antispasmodic effect on guinea pig ileum. It is shown to possess antinociceptive, antioxidant, renoprotective, and hepatoprotective activity .[10-12]

Germination is affected by intrinsic (species and seed size) and environmental (temperature and water availability) factors; however, the seed germination of species adapted to dry environments and cultivars selected for drought tolerance are less affected by low substrate than those adapted to wet environments or classified as drought-sensitive. Seed germination is a key component of pathogenicity of obligate parasitic weeds. This step is controlled allelochemically in the rhizosphere. After a short conditioning period under sufficient warm and wet conditions, seed germination is triggered by stimulant molecules which are released by the roots of neighboring host plants. Many secondary metabolites were identified as germination stimulants. Most of them corresponds to strigolactones (SLs) [13] but isothiocyanates [14,15], dehydrocostus lactone [16] peagol, peagoldione [17] chalcones, peapolyphenols [18], soyasapogenol B and trans-22-dehydrocampesterol [19]have been also identified as stimulants. This experiment is financially cheap, easy to conduct, and the results are highly reproducible.

The toxicity of herbal extracts can be evaluated through many methods. Assays against cell lines enables the identification of toxic effects of plant extract under study .Phytotoxicity deals with temporary or permanent damage in plants that includes damage of seed germination , elongation of root length. To evaluate the phytotoxicity, study was conducted in *Hemidesmus Indicus* root extract against the seed germination of *Raphanus sativus*.

Evaluation of Germination of Seeds:

Seeds of *Raphanus saticus*, procured from the local market, are sterilized with 0.1% Mercuric chloride and then washed with water. The damaged seeds are to be rejected. About 20 seeds are subjected to 5 ml of the nanoparticle solution synthesized. The soaking of seeds is to be maintained for about 2 hours, after which rinsing of seeds is to be performed. This is to be followed by placing the seeds over filter paper as the support, in a petriplate. The seeds should be spaced from each other so that growth of one seed does not cross over the other. Moisture has to be retained in the filter paper always. A positive control of seeds soaked in water is to be maintained for reference.

The experiment, is performed in triplicates, is to be left undisturbed for 3-5 days, after which, the germination of the seeds is noted. The germination rate of the seed is calculated upon applying statistics.

SG Gs Gc

SG = (Gs – Gc) / Gc

Gs: Seed germination rate

Gc: Average number of germinated seeds in the sample (in %): Average number of germinated seeds in the control (in %)

The indices are designed in such a way that their values can vary from −1 (maximum phytotoxicity) to >0. In addition, if there is a reduction of 50% in the variable studied (SG) in relation to the blank control, it is considered as a measurement of potential chronic toxicity, which denotes the long-term influence of the nanoparticles on the plants. The following scale indicates the stimulation of the seed growth in the presence of the nanoparticles.

(a) 0 to −0.25: low toxicity

(b) 0.25 to −0.5: moderate toxicity

(c) 0.5 to −0.75: high toxicity

(d) 0.75 to −1: very high toxicity

Table 1 : Germination of seeds of *Raphanus Saticus*

Sample	Cucumbers sativis	Raphanus sativus	Zea mays
HI extract	60	50	35
Ac bark	40	60	35
Control	85	75	55

Discussion

The influence of stem aqueous extract on seed germination and seedling growth was observed and compared. The inhibition of seed germination and

seedling growth was dose-dependent. Table 1 shows the effect of different concentrations of stem extract (SE) on seed germination at low concentration were efficient to interfere with germination and radicle length. The SE significantly reduced % germination over control.

Conclusion

Seed germination is a novel technique for analysis of phytotoxicity. In this study its clearly evident that the hemidesmus Root ethanolic extract is safer when tested invitro and shows no toxicity .

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Ethical clearance was obtained from Institutional Ethical Committee Review Board, Saveetha Dental College & Hospital – SDC/IHEC/18-19/028.

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Knowledge, Awareness and Practice Regarding Drug Abuse among Teenagers between the Age Group of 14 –19 Years: A Questionnaire Survey

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Abstract

Introduction: Drug abuse is an extreme desire to obtain and use increasing amounts of one or more substances. Drug abuse indicates the following risk factors for developing drug abuse problems include poor relationships with parents, inadequate supervision over adolescent activities, poor achievement in schools and so on.

Materials & Method: An online survey comprising 17 questions was administered to the participants of age group 14-19.The results are statistically analysed.

Results and Discussion: From the survey conducted, it is analysed that 67%of the adolescents have attended many drug awareness programmes.45%of them say that alcoholism and drug addiction are genetically inherited.

Conclusion: The abuse of alcohol and drugs has resulted in significant morbidity and mortality among adolescents worldwide.School-based health centers should have the capacity to counsel students who are in need of such treatment plans and connect students to available community resources.

Keywords: *Drug abuse, poor relationship, marijuana, health centre ,community*

Introduction

Adolescence is a critical stage in the life-course and can be considered the most transformative period in the individual's life. The use of substances among adolescents is a public health concern and has been studied extensively in many parts of the world. Substance Abuse and Mental Health Services Administration's data for 2012 from the US showed that approximately 173,654 subjects aged above 12 years used tobacco products, 111,239 used marijuana and hashish and 78,034 used illicit drugs other than marijuana and hashish in their lifetime. Several studies from other countries reported that teenagers were found to be involved in substance use at an early age, approximately between 11 and 14 years. Studies have identified many factors that increase the risk for substance use such as experimental curiosity, peer and family influence, lack of parental supervision and personality problems. [1] On the other hand, factors that were found to prevent substance abuse included functional family communication, effective family socialisation and the ability to notice early warning signs for substance use. [3,4]Religiosity has also been considered by many studies as an important protective factor against drug use, preventing individuals from using drugs even

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if they live in perilous environments.

It is considered a brain disease because drugs change the brain .[2] They change its structure and how it works. These brain changes can be long – lasting and lead to the harmful behaviours seen in people who abuse drugs. In all countries illegal drug economy plays a prominent role in national decisions .[5]Various countries have taken measures at society level to change knowledge and attitude of the society toward illegal drugs.[6 -8]

Knowledge and attitude toward this problem and it's easy access to such drugs and the nature of the abused drug are among other effective factors.[9] Drug abuse as a psychological, social, biological issue in adolescents is one of the most critical issues for countries nowadays.[10] This problem involves new chemical drugs besides traditional ones.[11]

The most common age range of drug abusers in the world is 18 to 25 years .[12] Lots of students are at these ages and drug abuse rise has been proved in them.[13]Among illicit abused drugs, marijuana with consumption of 3.8% is the most common abused drug in the world [14]. Race, gender, social class, religion and government rules, availability persuading or pressure of friends, education and job stress and curiosity are the most common reasons of drug abuse among general population .[15,16]

Prevention of substance abuse among adolescents requires awareness of characteristics that place youth at risk and targeting risk factors that are modifiable. Many studies have attempted to identify risk factors associated with adolescent drug and alcohol usage.

Materials and Method

A cross sectional survey was created.Totally 100 participants took part in the survey.The questionnaire comprising 17 questions was administered to the participants through survey planet link.Many questions are mostly knowledge and awareness based. The responses are collected from them and the results are statistically analysed.

Results and Discussion

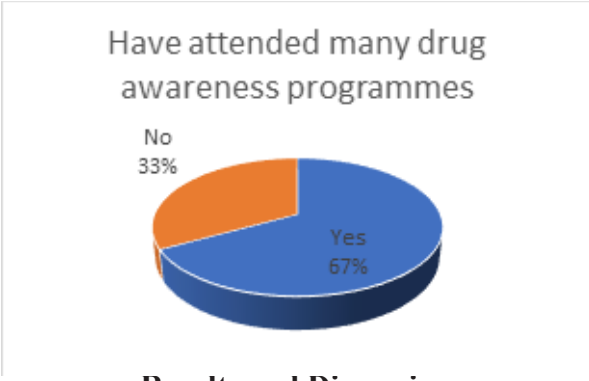


Fig:1 Drug awareness program

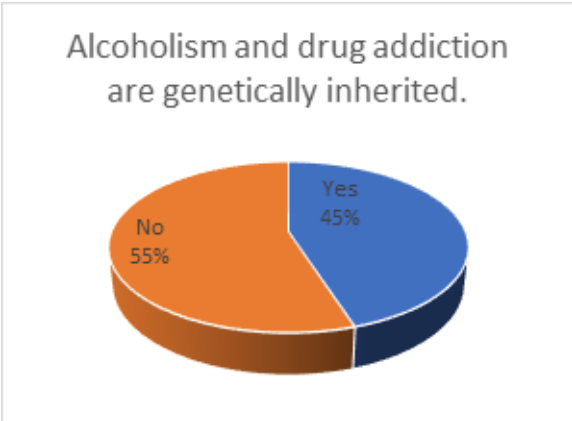
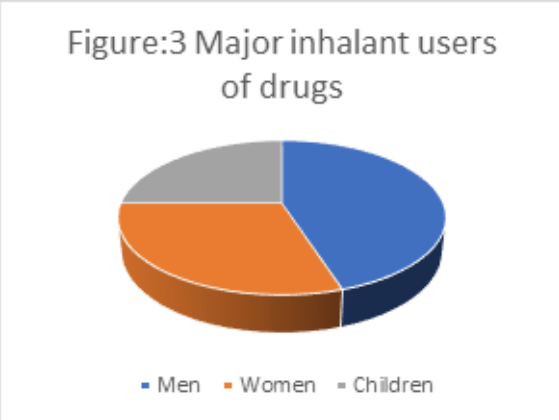
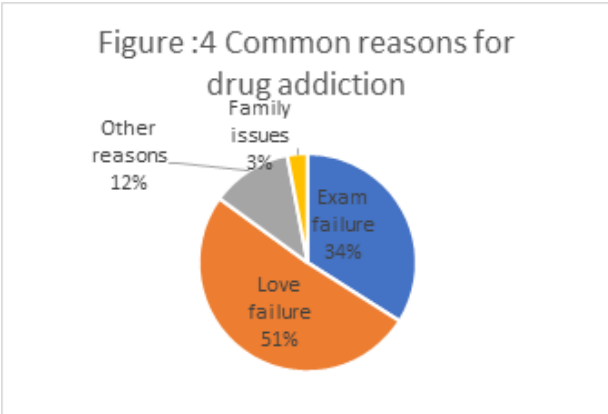


Fig 2 : Drug addiction





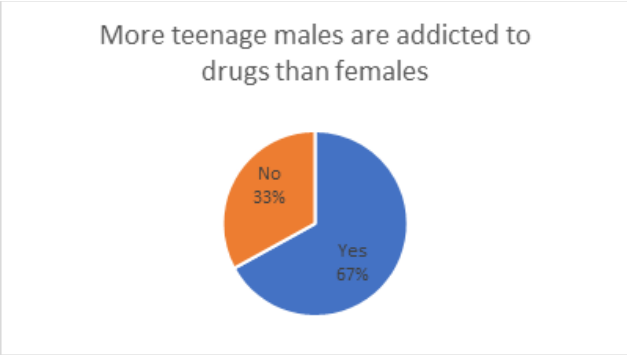


Figure:5 More teenage males are addicted to drugs than females

From the survey conducted, it is analysed that 67%of the adolescents have attended many drug awareness programmes.45%of them say that alcoholism and drug addiction are genetically inherited.Many of them say that men are the most inhalant users of drugs.67% of the participants say that more teenage males are addicted to drugs than females.51%of the participants say that love failure is the common cause for drug addiction.34% of them said that exam failure is the common cause for love failure.

The abuse of alcohol and illicit and prescription drugs continues to be a major health problem internationally. We live in a world where addiction is as much a trend as a disease. Statistics show that death by overdose has been steadily increasing since the early 2000's. By raising drug abuse awareness and backing it with irrefutable facts, we can fight this statistic through the implementation of prevention programs for impressionable kids and teens. For those of you currently struggling with a substance abuse problem, it isn't too late. There is hope for individuals who are already consumed by the cycle of addiction through methods used in addiction treatment. School-based health centers should have the capacity to counsel students who are in need of such treatment plans and connect students to available community resources. [17,18] Schools are appropriate settings for drug prevention programs for 3 reasons: (1) prevention must focus on children before their beliefs and expectations about substance abuse are established; (2) schools offer the most systematic way of reaching young people; and (3) schools can promote a broad spectrum of drug-related educational policies. Resources for the preparation of teachers, counselors, and other school personnel may be a valuable adjunct. Educators are challenged to make the facts about drug abuse meaningful to children and adolescents without enticing them to try drugs. There are many curricula designed for school use that have been proven to be effective and are delivered to students in ways that are interesting, interactive, and developmentally appropriate. Although many program approaches are available, some effective programs focus on enhancing students' problem-solving skills or aiding them to evaluate the influence of the media. Other effective programs help improve students' self-esteem, reduce stress and anxiety, or increase activities. These skills are taught by using a combination of methods including demonstration, practice, feedback, and praise.

Conclusion

The study findings would suggest that multifactorial prevention programmes that address social norms, gender role and image, and incorporate drug policy, religion, family and school would be more effective and would have better protective outcomes.

The abuse of alcohol and drugs has resulted in significant morbidity and mortality among adolescents worldwide. Many of these youth will lose their lives to drugs and alcohol and a significant number are likely to grow up to become problem drug users. Although, the substance abuse problem is complex and large in magnitude, there is a substantial amount of evidence-based research available to physicians community leaders and schools to implement interventions that can decrease adolescent substance abuse rates. Because this issue is not peculiar to any one community or culture, we recognize that individual interventions may not be universally effective.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Ethical clearance was obtained from Institutional Ethical Committee Review Board, Saveetha Dental College & Hospital – SDC/IHEC/17-18/029.

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Antibacterial Activity of Taxifolin Isolated from Acacia Catechu Leaf Extract – An *Invitro Study*

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Abstract

Aim: To evaluate Anti-Microbial Activity of taxifolin isolated from Acacia catechu leaf extract against *Streptococcus mutans* and *Lactobacillus acidophilus*

Objectives: The study is to determine the antimicrobial activity of taxifolin isolated *Acacia catechu* leaf extract against *Streptococcus mutans* and *Lactobacillus acidophilus*

Background : An anti microbial is a agent that kills or inhibits the growth of micro organism such as bacteria and fungi. *Acacia catechu* also commonly called *Mimosa catechu*, is a deciduous, thorny tree which grows up to 15 m (50 ft) in height. *Acacia catechu* traditionally used for curing many diseases and commonly for mother and child healthcare. Taxifolin is the main constituent of Acacia catechu which possesses antifungal, antiviral, antibacterial, anti-inflammatory and anti-oxidant activity.

Reason: This study is to evaluate the anti microbial activity of *Acacia catechu* against micro organisms such as *Streptococcus mutans* and *Lactobacillus acidophilus*. This may help in development of health products without artificial chemical agent.

Keywords: *Antimicrobial,herbal,antibacterial,Acacia, S.mutans, L.acidophilus*

Introduction

Plants have been used as medicine throughout the world for centuries. The development of bacterial resistance to presently available antibiotics has necessitated the search for new antibacterial agents .[1,2]Anti microbial activity of certain plants has a significant effect over various microorganisms.

An antimicrobial is an agent that kills microorganism or inhibits their growth. Anti microbial agents play a major role in maintaining good health. Antimicrobial resistance is threatening the management of infections such as pneumonia, tuberculosis, malaria, and AIDS. So it is important to develop Antimicrobial resistant which is achieved by various anti microbial agent. One such antimicrobial agent is taxifolin which is isolated from many trees such as Acacia catechu, conifers like the Siberian larch, *Larix sibirica* in Russia, and Chinese yew .[3]

Acacia catechu commonly known as catechu is a medicinal plant used for varied purposes . The bark of this plant is strong antioxidant astringent, anti-inflammatory, anti-bacterial and antifungal in nature [4]. The extract of this plant is used to treat sore throats and diarrhoea, also useful in high blood pressure, dysentery, colitis, gastric problems, bronchial asthma, cough, leucorrhoea and leprosy [5,6]It is used as mouthwash for mouth, gum, sore throat, gingivitis, dental and oral infections. The study is done to assess the anti microbial activity of taxifolin isolated from *Acacia catechu* against *Streptococcus mutans* and *Lactobacillus acidophilus*

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Taxifolin is a flavanonol, a type of flavonoid. They are isolated from many tress. Once such tree is Acacia catechu [7] Taxifolin is an anti cancer drug. By inhibiting the fatty acid synthase in cancer cells, they are able to prevent the growth and spread of cancer cells. The capacity of taxifolin to stimulate fibril formation and promote stabilization of fibrillar forms of collagen can be used in medicine.

Streptococcus mutans and Lactobacillus acidophilus is the most important microbe present in the oral cavity. They are one of the major reason for the dental caries. They are gram positive bacteria [8,9] The lactobacilli and streptococci are major genera of the category of bacteria generally referred to as the lactic acid bacteria, so it is no surprise that microbial species within these genera have been proposed as specific agents of the acid production that is primary to the dental caries process .[10]

The study is done to assess the anti microbial activity of taxifolin isolated from *Acacia catechu* against *Streptococcus mutans* and *Lactobacillus acidophilus*

Drugs

Taxifolin was purchased from Sigma-Aldrich, India.

Acacia catechu – obtained from green chemical herbal extracts and formulation, Bengaluru.

Test microorganism

Streptococcus mutans - ATCC 25175 *Lactobacillus acidophilus* - ATCC 4356 from Himedia, Mumbai.

Materials and methods

Antibacterial activity

Active cultures for screening their susceptibility were prepared by transferring loop full of cells from stock cultures to test tubes containing Mueller Hilton Broth and were incubated at 37˚C for 24 hours .[22,23]

Disc diffusion method

Onto the plates containing sterile Mueller Hinton Agar, 0.1mL of the bacterial culture was swabbed uniformly. Different concentrations of the sample were loaded prior a day on 5 mm sterile discs. These discs were placed on the bacteria inoculated plates. The plates were incubated at 37˚C for 24 hours. After incubation period, the diameter of inhibition zones formed around the discs was measured in millimeter. The study was performed in duplicates for all the samples.

Results

Taxifolin –Antibacterial activity

Table1 – shows antibacterial activity of taxifolin against *S. mutans* and *L.acidophilus*

Concentration (mg/ml)	Streptococcus mutans			Lactobacillus acidophilus		
	Zone of inhibition (in mm)			Zone of inhibition (in mm)		
	Plate 1	Plate 2	Average	Plate 1	Plate 2	Average
1.5	18	16	17	7	7	7
2.0	19	17	18	7	8	7.5
2.5	22	24	23	13	16	14.5

Control

Table 2 shows antibacterial activity of chlorhexidine

Concentration (mg/ml)	Chlorhexidine		
	Zone of inhibition (in mm)		
	Plate 1	Plate 2	Average
1.5	24	26	25
2.0	25	20	22.5
2.5	24	22	23

The antibacterial activity of the Taxifolin from Acacia catechu leaf were tested against *S. mutans* and *L.acidophilus* using the disc diffusion method. as shown from Table 1, Three different concentration 1.5mg/ml ,2mg/ml ,2.5mg /ml were used in the study. Taxifolin inhibits Streptococcus mutants significantly when compared to Lactobacillus acidophilus. Chlorhexidine is gold standard drug for maintain oral hygiene with its antibacterial effect. The Taxifolin showed moderate antibacterial efficacy against *S. mutans & L.acidophilus* when compared to the control chlorhexidine.

Discussion

Taxifolin which is isolated from *Acacia catechu* has various medical properties. Various studies have been done to disclose the medical property of taxifolin. Taxifolin has been found as anti cancer drug. The therapeutic promise of dihydroquercetin(taxifolin) in major inflammatory disease states such as cancer was recently reviewed by Farid Menaa et al.[11,12] Further studies are done and the results says that Taxifolin and possibly other flavonoids with a similar molecular structure may act as "enhancers" in combination with Andro to treat prostate cancer which was done by Zhong Rong Zhan at al[13].

Taxifolin is said to have a dose-dependent effect on inhibiting the ovarian cancer cells.It also has a strong correlation between the antiproliferative effects of DHQ derivatives on murine skin fibroblasts and human breast cancer cells.[14] They are used positively to treat patient infected with strains of methicillinresistant S. aureus (MRSA).[15] They increase the efficacy of certain antibiotics such as ceftazidime and levofloxacin.

A study was done at 2011 by Anitha Roy et al [16] and found that Heart wood of *Acacia catechu* is said to have anti fungal activity.The results obtained were the higher concentration of the extract showed good antifungal activity against all the fungal strains tested and the the lower concentration showed very weak or no activities.

Acacia catechu thus have various medical property.[17] Studies were done in 2010 to assess the Antimicrobial activity of the *Acacia catechu* against organism causing dental caries. The results were *Acacia catechu* willd is proved to be a potent Antimicrobial agent against Dental infections like Dental caries caused primarily by *Streptococcus mutans* which is similar to our result.

Another study was done by Lakshmi et al to evaluation of antibacterial activity of heartwood extract of *Acacia catechu* willd. The results says that The antibacterial activity of the extracts (Ethanolic and Aqueous) at different concentrations was determined by measuring the zone of inhibition. [18]The ethanolic extract was more effective against *Staphylococcus aureus* with a zone of inhibition of 24 mm diameter (at conc200 g.) and was least effective against *Pseudomonas aeruginosa and Bacillus subtilis* with zone of inhibition of 10mm (at conc. 200 g.) and 11mm (at conc. 200 g.) respectively. Among the other bacterial species studied E.coli showed a zone of inhibition of 19mm diameter (at conc. 200 g.) and *Klebsiella pnuemoniae* showed inhibition zone of 16mm diameter (at conc. 200 g.). They concluded that the *Acacia catechu* willd heart wood extracts has got antibacterial activity

Mohan Lal Saini et al performed a study on the Antimicrobial property of *Acacia* species. The results concluded that *A.nilotica* (pods) and *A.catechu* (bark) were reported to be most active against different bacterial and fungal strains. The mathanolic extract of *A. nilotica* (pods) showed highest activity against *E.coli,* S. aureus and *A.niger*, whereas *A. catechu* exhibited its prominent activity against *S.aureus* and *C.albicans* [19,20] However, the hexane extract of A. nilotica was also found most active against *S.typhi*. In whole antimicrobial experiment, *Acacia Jacquemonti* was reported with weakest or no activity.

There is increasing evidence to support that the plants of genus *Acacia* are relatively high in bioactive secondary compound and are thus likely to hold promise for drug discovery. Secondary compounds in *Acacia* are important for a variety of functions, chief among these are Anticancer (triterpenoid and saponins), diuretic (glucosides), natriuretic (glucosides), important nutraceutical (polysaccaride and gum) anti-digestive disorder (saponins, tannins and flavanoids), anti-oxidant (polyphenols), antiplasmodial (treptamine, tannins, organic acids and saponins [21]

As the above discussion says that *Acacia catechu* has high medical value. One such property is anti microbial activity. Various studies reported the anti bacterial activity of the plant. They showed a great response against streptococcus mutants and lactobacillus acidophilus. These two organisms plays a major role in the dental caries. The anti bacterial activity of Acacia catechu is positivity high against *S.mutans* than the later

L.acidophilus. Acacia catechu showed less activity on these organisms when compared to chlorhexidin but the former is a herbal drug with no side effects.

Conclusion

Taxifolin isolated from *Acacia catechu* leaf was found to be effective as antibacterial against different bacterial pathogens, providing the scientific basis for its traditional application in Indian folk medicine against many Oro dental infections. Further studies should be done to find out the active compound responsible for antibacterial effects and other necessary pharmacological studies to use in modern drugs developments.

mortality in patients on whom OPMDs are not treated.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Ethical clearance was obtained from Institutional Ethical Committee Review Board, Saveetha Dental College & Hospital – SDC/IHEC/18-19/030.

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Awareness of Cataract among Females – A Questionnaire Study

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Abstract

Background: Cataracts are the most common cause of vision loss in people over age 40 and is the principal cause of blindness in the world. A cataract is a clouding of the lens in the eye leading to a decrease in vision. Clumps of protein in lens clouds the lens and reduces the sharpness of the image reaching the retina, It can affect one or both eyes. Often it develops slowly. Most cataracts are related to aging. Knowledge regarding cataract can help in early diagnosis and can prevent further complications like blindness.

Aim: A questionnaire based study to know the awareness of cataract among female patients visiting Saveetha Dental College and Hospitals from 40-50 age group.

Materials and Method: Questionnaire regarding the knowledge regarding cataract was distributed to the female patients aged 40-50yrs who agreed to participate in the study. The results were tabulated.

Results: The overall knowledge and awareness of cataract among female patients is poor. The study found poor understanding of the definition, risk factors, signs, symptoms, and treatment of cataract.

Conclusion: The study identified lacunae in awareness of cataract among female patients. The basic knowledge in early identification and treatment of cataract can prevent most of the complications.

Keywords: *Awareness, cataract, blindness, females*

Introduction

Cataract is opacity, or clouding, of the lens of the eye. The lens of an eye is normally clear and when the lens becomes cloudy or is pacified, it is diagnosed as cataract. Human lens allow light to pass through to the back of your eye, helping you to see sharp images. If parts of the lens become cloudy (opaque), light cannot pass through the cloudy patches. But as we age, some of the protein may clump together and start to cloud a small area of the lens. Over time, the cataract may grow larger and cloud more of the lens, making it harder to see. As less light is able to pass through the lens, vision may become blurry or cloudy. The cloudier the lens becomes, the more sight will be affected. Cataracts develop slowly to cause loss of vision, and can render the person completely blind if it is left untreated.(1)Senile cataracts (cataracts that develop in the elderly due to the ageing process) usually start with initial opacity in the lens, followed by swelling of the lens, and then shrinkage of the lens resulting in a complete loss of transparency. (2) Symptoms may include faded colours,blurry vision, halos around light, trouble with bright lights, and trouble seeing at night.(3) This may result in individual having difficulty in driving, reading, or recognizing faces.(4) Poor vision may also result in an increased risk of falling and depression.(5)Cataracts are the cause of half of blindness and 33% of visual impairment worldwide.(6,7) Some forms of cataracts may also occur due to trauma, radiation exposure, be present from birth, or occur following eye surgery for other problems.(3,8) Most of the

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complications of cataract can be prevented if diagnosed at a much earlier stage, since the awareness among the population is not adequate, there is an urgent need in educating the general population with regards to early diagnosis and prevention. The study aimed to estimate the knowledge among the female patients regarding cataract and its complications.

Materials and Method

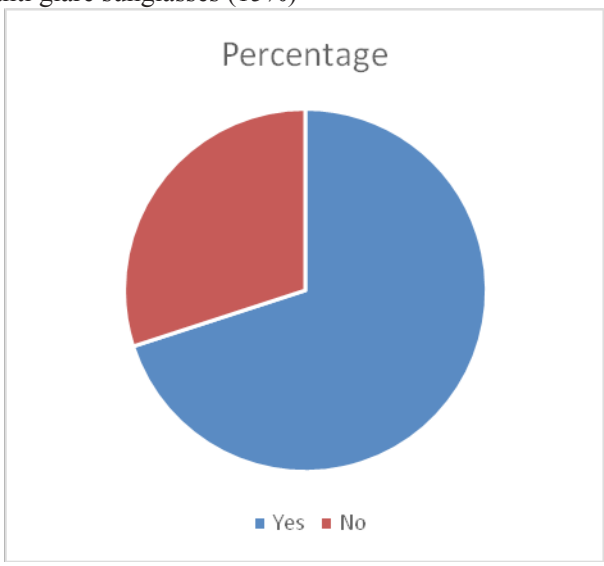
A questionnaire based study was conducted among 50 female patients visiting Saveetha Dental College and Hospitals from 40-50 age group. The questionnaire tested the basic knowledge about cataract. The questions were simple and direct. Females were chosen because as women live longer than men, they are more likely to be affected by conditions such as cataracts.[1] Females of 40-50 age group is selected because aging is the main cause of cataract and many eye problems begin around the age of 40. Awareness of cataract will help them as well as motivate others to seek treatment if they have visual problems due to cataract.

Questionnarie and Study Design

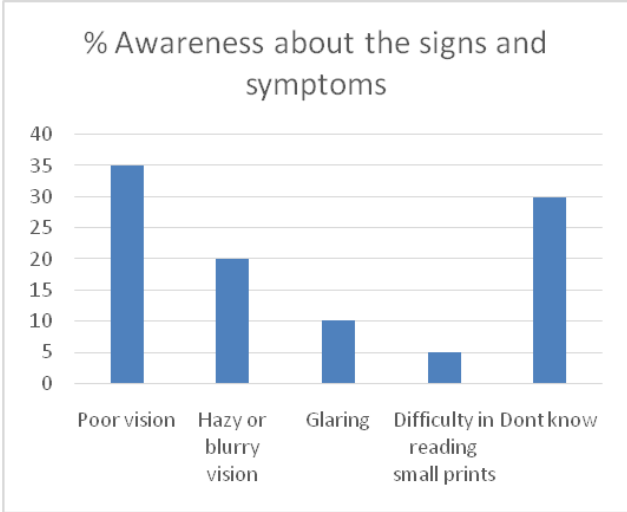
Informed consent was obtained prior inclusion in the study. The patients were interviewed by a single examiner. The questionnaire was administered in local language (Tamil) and the details were recorded. It included the commonly etiology, signs and symptoms, management protocol for cataract. The source of information and the investigations for cataract was also recorded.

Results

From our study, 65% were aware about the causes of cataract in which aging (40%) was the most common cause of cataract followed by trauma (20%) and clumping of protein in the lens.(Graph 1) The study showed that 70% were aware about the signs and symptoms of cataract, for which poor vision (35%) was the most common sign of cataract followed by hazy or blurry vision (20%), glaring (10%) and difficulty on reading small prints (5%).(Graph 2) From our study, 50% of the female patients were aware about the investigation of cataract, from which visual acuity (30%) was the most common way to investigate cataract followed by Opthalmoscopy (15%) and Tonometry (5%).Most of the respondents 53.5% were aware about the treatment of cataract, for which magnifying glasses (22.5%) was the most preferred treatment followed by surgery (16%) and anti glare sunglasses (15%)



Graph 1: Shows the awareness among 50 female patients, 70% of the them were aware of cataract.



Graph 2: Response when asked about signs and symptoms of cataract

Discussion

The knowledge and awareness of cataract among female patients is not adequate. The study found poor understanding of the definition, risk factors, signs, symptoms, and treatment of cataract.The incidence and prevalence of age related cataract is increasing worldwide.[2-5] In developing countries the lack of awareness of cataract and the treatment options available is one of important factor for the increased prevalence of cataract. Among 50% female patients, do not know the test to investigate cataract whereas 30% of them responded that visual acuity test can be the test. In one study it has been estimated that in India alone 3.8 million people become blind from cataract each year.[(9)] Among 50 female patients, 46.5% of them are not

aware regarding the treatment of cataract. In developing countries like India, studies have shown that incidence of cataract is high and occurs earlier in life.[10,11]

Cataracts are very common, especially among people in the age group of 40 and older.[10] Among the estimated amount of population with blindness the world today, 64% are female.[7] This is because in many countries women live longer than men and are at greater risk of blindness from causes related to age.[1] It is clear that there is a gap between the population and health-care providers, which limits the role of public health and eye education. It is thought that misconception of eye disease and limiting it to the "eye sight" is an important factor that decreases population desire for eye follow-up and education.[11]

Moustafa S Magliyah et al believed that eye education is away from media and commercial focuses with the exception of television adverts for glasses, contact lenses, or laser eye treatment.[12] In conclusion, our data suggest that there is an urgent need for health education in the study population in order to increase their level of awareness and knowledge about common diseases. This is particularly important in a developing country such as India, with considerable investment in tertiary eye care. Increasing the awareness and knowledge of common eye diseases could lead to an increase in understanding and acceptance of the importance of routine eye examination for early detection and treatment of such conditions, thereby reducing visual impairment and cost of eye care. Carol H et al mentioned that these data could help to develop effective health education and information programmes to reduce visual impairment among the population.[13]

Conclusion

The overall awareness of cataract among female patients aged 40-50 is 59.6%. Around 40.4% of the female patients are not aware of cataract, mainly with regards to investigation and treatment. It is recommended to develop a targeted public health awareness raising campaign around eye health and the importance of attending regular site test. The program should be developed and delivered in partnership with the community, engaging key health professionals to work with the community to promote eye health message and provide public education about common eye diseases. Therefore, efforts should be made to increase the knowledge and awareness of the general public about the disease.

Conflict of Interest: The authors declare there is no conflict of interest

Source of Funding: Self

Ethical Clearence:

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Assessment of Diagnostic Accuracy of Intraoral Digital Radiography When Compared to Cone-Beam Computed Tomography for Assessment of Vertical Defect Depth in Grade 2 Furcation Defects

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Abstract

Background: Periodontal disease is a chronic inflammatory condition resulting in attachment loss and alveolar bone loss. This destruction progresses apically exposing the furcation of multirooted teeth. Although we routinely employ conventional two-dimensional (2D) radiographs for diagnosing bone levels in periodontal disease, inaccuracy caused due to overlap of structures makes diagnosis almost impossible.

Aim: To assess the diagnostic accuracy of digital intraoral radiography technique when compared to the cone beam computed tomography in detecting vertical defect depth in grade 2 furcation defects.

Materials and Method: A total of 41 grade 2 furcations including 21 buccal and 20 lingual furcations were included. Vertical defect depth was assessed using IOPA and CBCT and then compared.

Results: There was a variation between the IOPA measurements and the CBCT measurements of vertical defect depth. The variation ranged from 0.04 to 5.9 mm. The mean variation between the 2 groups was found to be 1.77 ± 1.39. The mean VDD measured in CBCT was 2.85 ± 1.58 and the mean VDD measured in IOPA was 2.85 ± 1.74.

Conclusion: IOPA is not an accurate method to measure vertical defect depth in grade 2 furcation defects as compared to CBCT.

Key Words: *Furcation, Periodontitis, Intrabony defect, Multirooted teeth*

Introduction

Periodontal disease is an inflammatory condition primarily infectious in nature perpetuating attachment loss and alveolar bone loss. This destruction progresses apically exposing the furcation of multirooted teeth causing irreversible bone loss in interradicular area.(1)

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Limited accessibility through furcation entrances combined with complex anatomy and morphology of molar teeth pose complications like plaque accumulation, difficulty in effective instrumentation and oral self-care leads to it having poorer prognosis than the teeth without furcation defects.(2) A thorough knowledge of furcation anatomy and precise assessment of its degree is important for accurate assessment of the etiological factors, diagnosis, prognosis and treatment of involved teeth.

Although we routinely employ conventional two-dimensional (2D) radiographs for diagnosing bone levels in periodontal disease, inaccuracy caused due to overlap of structures makes diagnosis almost impossible. These 2D radiographs generate images with tooth roots

superimposed on region of interest, thus obscuring furcation defects.[3]

More recently, limitations of 2D radiographs can be overcome by the use of cone-beam computed tomography (CBCT) imaging technique, which provides 3D volumetric images with multiplanar reconstruction in axial, coronal and sagittal planes without magnification. CBCT collects high-resolution 3D data at lower cost and reduced radiation doses than conventional Computed Tomography (CT). Hence, this study is aimed to assess the diagnostic accuracy of digital intraoral radiography technique when compared to the cone beam computed tomography (CBCT) in detecting vertical defect depth in grade 2 furcation defects.

Materials and Method

Patients between age group of 25-59 years (mean age 39.96 ± 10.92) reporting to the Department of Periodontics, Saveetha dental College, Chennai, India were considered for the study. Patients clinically and radiographically diagnosed with chronic periodontitis based AAP criteria with a horizontal pocket depth of ≥3 mm in buccal or lingual aspect of atleast one mandibular molar with Grade 2 furcation defect were included in the study. Mandibular third molars, teeth with furcation caries, teeth indicated for extraction and teeth with Grade 1, Grade 3 or Grade 4 furcation defects were also excluded from the study. Thirty patients with 4 sites who complied with the above inclusion and exclusion criteria were recruited for the study. Informed consent was obtained from all participants before the study. The study period was from January 2016 to December 2017. Ethical clearance for the study was obtained from the Institutional Ethics Committee.

Probing pocket depth was measured using UNC 15 (Hu-Friedy, Chicago, IL, USA) probe at baseline. Furcation defect was measured at two sites (Buccal and Lingual) using Nabers Periodontal Probe and UNC 15. Grading of furcation was done according to Glickman's classification system. All the clinical parameters were assessed by a single calibrated examiner.

Intraoral periapical radiograph (IOPA) was taken on the selected mandibular molar using film positioner to standardise the distance and angulation of the cone from the film. The film was super imposed with a counting grid to standardise the magnification and to help measure the radiolucency. The linear number of grids at (number of rows of grids) vertically in the radiolucency at the furcation defect is counted. Radiographic defect depth measurements were evaluated according to the "absolute technique" on Digital radiographs, where a partially radiolucent grid is either completely excluded or included.[4]

CBCT measurements were performed by measuring the deepest vertical depth of the furcation defects at the specified furcation entrance. The furcation entrance served as anatomical starting point for measurements. The measuring tool provided within the Kodak software (Galilios Galexis viewer) was used for the measurements. CBCT measurements were analyzed in tangential sections that made the vertical depth of the defect most visible and easily measurable. The different sections were aligned using the furcation entrance as anatomical landmark. Back and forth scrolling in the tangential planes allowed to identify and measure the deepest vertical extent of bone loss.

These measurements were then recorded and compared to intraoral periapical radiograph measurements.

Statistical analysis

SPSS software was used for the statistical analysis.

Paired t test was used to compare the Vertical Defect Depths (VDDs) of all the defects measured in CBCTs and in IOPAs.

The VDDs measured in CBCTs was taken as the gold standard and the variation of the VDDs measured in IOPAs from that of the CBCT was calculated by taking the difference of both the values in each defect. One sample t test was used to assess the significance of the mean variation between the 2 groups.

Results

In the present study, a total of 41 grade 2 furcations including 21 buccal and 20 lingual furcations were included. There was a variation between the IOPA measurements and the CBCT measurements of vertical defect depth. The variation ranged from 0.04 to 5.9 mm. The mean variation between the 2 groups was found to be 1.77±1.39. The variation was significant at a p value of 0.00. IOPAs of 48.78% of the defects overestimated the defect depths and 51.22% of the defects underestimated the defect depths when compared to measurements made in CBCT. (Table 1) The mean VDD measured in CBCT was 2.85±1.58 and the mean VDD measured in IOPA

was 2.85±1.74. The difference was not significant at a *p* value of 1. (Table 2).

Table 1: Comparison of vertical defect depths measured in IOPA and CBCT

IOPA	CBCT	Variation
4	3.03	0.97
3	1.78	1.22
0	1.94	1.94
3	3.33	0.33
1	1.63	0.63
5	5.09	0.09
0	2.96	2.96
0	1.04	1.04
3	3.72	0.72
2	3.33	1.33
3	4.47	1.47
0	4.13	4.13
2	7.9	5.9
2	2.48	0.48
1	3.29	2.29
7	4.16	2.84
3	7.2	4.2
1	2.94	1.94
3	1.69	1.31
1	3.1	2.1
2	2.48	0.48
7	2.22	4.78
3	2.71	0.29
4	0.32	3.68
6	2.88	3.12
4	1.3	2.7
4	3.25	0.75
1	2.57	1.57
2	0.93	1.07
4	3.22	0.78
3	3.26	0.26
5	3.54	1.46
4	2	2
3	1.63	1.37
3	1.98	1.02
3	2.95	0.05
3	5.33	2.33
2	0.94	1.06
3	2.29	0.71
2	0.84	1.16
5	1.06	3.94

Table 2: Comparison between the vertical defect depths of the furcation defects measured in CBCT and IOPA.

	N	Vertical defect depth (VDD) (M ± SD)	p value	Difference in VDD (IOPA – CBCT)	P value
IOPA	41	2.85 ± 1.74	1.00	1.77 ± 1.39	0.00
CBCT	41	2.85 ± 1.58			

Conflict of Interest: The authors declare that there is no conflict of interest

Source of Funding: Self

Ethical Clearance: Ethical clearance was obtained from Institutional Ethical Committee of Saveetha Dental College and Hospitals

Discussion

This study aims to assess the accuracy of IOPA in measuring the vertical defect depth in grade 2 furcation defects when compared to CBCT.

In the present study, the mean variation of the IOPA when compared to CBCT was found to be 1.77±1.39. The variation between the VDDs measured IOPA and CBCT was significant at a *p* value of 0.00. A study

by Ashwinirani et al[5] where IOPA and intra surgical measurements of intrabony defect depths were compared and the variation was found to be between 1.5 to 2.5 mm.This variation in VDDs measured in IOPA and CBCT could be due to the defect being unappreciable in a 2 dimensional radiographic modality like IOPA due to overlapping of buccal and lingual cortex. The variation may also be due to the use of absolute technique[4] where the partially radiolucent grids were excluded, while measuring the VDDs in IOPA, whereas VDD in CBCT was measured from end to end to its decimal point and hence more accurate.

In the present study, IOPAs of 48.78% of the defects overestimated the defect depths and 51.22% of the defects underestimated the defect depths when compared to measurements made in CBCT. But a study by Ashwinirani et al[5] stated that IOPA consistently underestimates alveolar bone loss when compared to intra surgical measurements. The present study assessed the accuracy of IOPA in furcation defects whereas the previous study assessed the intrabony defects which could be the reason for the difference in the results.

In the present study, the mean of the VDD measurement in CBCT was 2.85±1.58 and the mean in IOPA was 2.85±1.74. There was no statistically significant difference between them. This should not be misinterpreted as no variation because the mean values are misleading as in almost half of the sites, IOPA tended to overestimate the CBCT measurements which gave a negative value whereas in the rest half, it underestimated the CBCT measurements. Hence, even though the variation between the groups is 1.77±1.39, the mean VDDs measured in IOPA and CBCT were almost same.

A prevalence study by Larato et al[6] has reported that buccal furcations are more prevalent than lingual furcations among the furcation defects mandibular molars. But, in the present study, the defects distributions were almost equal such as 21 buccal furcations and 20 lingual furcations.

Mootha et al[7] in their study, compared direct intraoperative ridge measurements (DIRM) using vernier calipers to measurements taken by alveolar ridge mapping (RM), Computed Tomography (CT) and Cone-Beam Computed Tomography (CBCT) for measuring alveolar bone dimensions prior to implant placement and concluded that detailed three-dimensional information of the surgical site prior to implant placement can only be obtained from a CT or CBCT. A study by Bagis et al[8]tunnel, and fenestration concluded that, CBCT has the highest sensitivity and diagnostic accuracy for detecting various periodontal defects among the radiographic modalities examined. Hence, in the present study, CBCT was held as the standard to assess the accuracy of IOPA in measuring the vertical defect depth in grade 2 furcation defects.

The strength of the study lies in the fact that the measurements of the IOPA was compared with that of the CBCT, which is the most accurate non invasive radiographic diagnostic method. Hence, it is as good as intra surgical measurements without having to surgically enter the site. In the present study, we did not subcategorize and evaluate the mandibular furcations into its buccal and lingual involvement sites. The accuracy greatly varies between the sites, due to superimposition, causing difficulty in assessing the defect sites. Hence, we do not know if the variation of IOPAs in measuring the VDD is more in buccal or lingual defects from the present study. Further studies are required to validate the most accurate radiographic method in measuring furcation defects.

Conclusion

IOPA is not an accurate method to measure vertical defect depth in grade 2 furcation defects as compared to CBCT.

Conflict of Interest: The authors declare that there is no conflict of interest

Source of Funding: Self

Ethical Clearance: SDC/IHEC/19-20/033

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Considerations for Management of Candida – Associated Leukoplakia

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Abstract

Oral candidiasis is the most frequently encountered white lesions of the oral cavity of fungal etiology. It usually presents with a curdy white scrapable lesion that leaves an inflamed, bleeding area when scrapped off. Oral leukoplakia, the commonest oral potentially malignant lesion is caused by the use of tobacco. The management strategies for oral leukoplakia and candidiasis are contrasting. Many studies have shown the presence of invasion of candida species in premalignant lesions which includes oral leukoplakia. This article reviews the clinicopathological diagnosis of leukoplakia super imposed with candidiasis and the management of such lesions.

Keywords: *Chronic hyperplastic candidiasis, candidal leukoplakia, candida – associated leukoplakia, candidiasis, oral leukoplakia*

Introduction

Candidiasis is a common opportunistic infection of the oral cavity usually seen in extremities of age – infants and geriatric patients and in immunocompromised patients [1]. Leukoplakia is considered to be most common potentially malignant lesion of the oral cavity [2]. Candidiasis and leukoplakia are two different entities that require treatment individually. The presence of candida species in oral premalignant lesions have been frequently researched as it is implicated in its malignant transformation [3,4]

Candidiasis and Leukoplakia

Candidiasis is caused by Candida species which is an endogenous commensal. The occurrence of oral candidiasis is often a sign of impaired immune mechanisms of the body. Candida Albicans is the most common species of candida associated with candidiasis. However, other species like C. glabrata and C. tropicalis are other non albicans related to the disease[5] The ability of the candida species to infiltrate and invade the mucosal surfaces of the host is facilitated by the presence of epithelial changes that are induced by premalignant lesions. One such lesion is oral leukoplakia [3,4,6,7].

Oral potentially malignant disorders (OPMD) is defined as any lesion or condition of oral mucosa that has a potential for malignant transformation. The term OPMDs was recommended by Working group of WHO in 2005 [8]. Leukoplakia is a potentially malignant disorders whose definitions have been modified regularly. The WHO defined oral leukoplakia as 'a white patch or plaque that cannot be characterized clinically and pathologically as any other disease'. In 1984, an addition of 'oral leukoplakia is not associated with any physical or chemical causative agent except the use of tobacco' was made. In 1986, a description of 'a predominantly white lesion of the oral mucosa that cannot be characterized as any other definable disease' which was later modified as 'any other definable lesion' in 1997. In 2005, WHO changed the definition to 'a white plaque of questionable risk having excluded known diseases or disorders that

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carry no increased risk of cancer' [9] [10].

Candida plays an important role in malignant transformation potential of the existing OPMD [11] . It induces carcinogenesis by elaborating nitrosamines that activate proto – oncogenes. Oral malignancies are always preceded by premalignant lesions of which leukoplakia is predominant. Many studies have been done to evaluate the presence of candida species in oral leukoplakia and to assess the change in malignant transformation potential of the lesion [3–5,9,12].

The fact that leukoplakia is infected with species of candida was first reported by Cernea et al and Jepson and Winther in 1965. The term 'candidal leukoplakia' was introduced by Lehner in 1967. Candidal leukoplakia and chronic hyperplastic candidiasis were used synonymously until mid -1980s. Chronic hyperplastic candidiasis is the term used by some authors to describe candidiasis of skin and other mucosa in patients with endocrine and immune defects. Histopathologically, chronic hyperplastic candidiasis is used when specimens show hyperkeratosis, epidermal hyperplasia and fungal hyphae invading the superficial layers of mucosa [6] . The hyperplasia of the epithelium has been postulated as a protective response of the host to candidal infection [13]. Recently, some authors refer candidal leukoplakia as 'candida – associated leukoplakia'[7,9].

Clinical Presentation

Based on the clinical presentation, oral leukoplakia is divided into categories and subcategories. Categories include homogenous and non – homogenous types. Non – homogenous type is further sub – classified into nodular, speckled and verrucous leukoplakia. Proliferative verrucous leukoplakia is a type of verrucous leukoplakia. Non – homogenous lesions have a much higher risk of malignant transformation potential when compared to homogenous counterparts. Presence of candida has been frequently seen in non – homogenous leukoplakia.

Candida associated leukoplakia appears as well demarcated, palpable, raised, small whitish areas to large opaque plaques that cannot be rubbed off. Smooth homogenous areas of the lesion are often confused with homogenous leukoplakia. Some areas of the lesion can be interspersed with erythematous areas and these lesions are referred to as specked leukoplakia [6,14] . The lesions are often evident in the retrocommissural area, extending from the commissure of the lip and into the buccal mucosa.

Diagnosis

A provisional diagnosis of leukoplakia is primarily based on the clinical presentation of the lesion. As the definition of leukoplakia suggests 'excluding known diseases or disorders', any other white lesion with corresponding diagnostic features have to be excluded based on etiology, anatomical site or sub – site and extent of the lesion [9,15,16]. One of the prevalent white lesion to be excluded is candidiasis. Other lesions that have to be excluded for provisional diagnosis of leukoplakia are [10]:

1. White sponge nevus
2. Frictional keratosis
3. Morsicatio buccarum
4. Chemical injury
5. Leukoedema
6. Plaque type lichen planus
7. Lichenoid reaction
8. Discoid lupus erythematosus
9. Hairy leukoplakia
10. Leukokeratosis nicotina palate

Some authors suggests therapeutic diagnosis by inferring that lesions which regress with antifungal treatment are chronic hyperplastic candidiasis and those which remain are candidal leukoplakia or candida – associated leukoplakia [9,13,17].

The gold standard for the diagnosis of OPMDs is biopsy. The proposed diagnostic protocol suggests taking biopsy for lesions that do not respond to treatment given to eliminate possible etiology [9,10,15].

For diagnosis of candida associated leukoplakia, smear and swab of the lesion are simple chairside procedures that are used to detect budding yeasts and fungal hyphae. However, these procedures are not conclusive of Candida species. The specimen can be cultured in Sabouraud's agar and incubated for the assessment of fungal growth. The tissue specimens taken by incisional or excisional biopsy can be stained using Periodic – Acid –Schiff stain or Gomori's methanamine silver stain for detection of candida invading the epithelial layers.

Use of Certainty factor (C – factor) for diagnosis of leukoplakia was suggested by Brouns et al[9] .

1. Certainty factor 1 was assigned to provisional diagnosis of lesions suspected of leukoplakia.

2. When negative response is elicited for initial elimination of suspected etiological factors that include smoking and infection with candida, certainty factor 2 is given.

3. Certainty factor 3 is designated to lesions whose histopathological examination of incisional biopsy specimen does not show a definable lesion.

4. In cases when complete excision of the lesion is performed, certainty factor 4 is given for the evidence obtained from the histological specimen.

The risk factors that are associated with malignant transformation of leukoplakia are [15,18] :

1. Female gender
2. Longer duration
3. Idiopathic leukoplakia
4. Size> 200 mm^2
5. Non – homogenous type
6. Presence of invasive Candida
7. Presence of epithelial dysplasia
8. DNA aneuploidy
9. History of previous head and neck carcinoma

These factors are known to affect the treatment outcome of leukoplakia.

Management

The treatment of candida associated leukoplakia includes use of antifungal drugs, either topical or systemic depending upon the severity of the lesion and by surgical management.

The most commonly used antifungal drugs include [19,20] :

Topical medications

1. Nystatin suspension (100,000 units/mL) swished 4 – 5 times a day

2. Clotrimazole troches (10 mg) dissolved in the mouth 4 – 5 times day, for 7 – 10 days.

3. Miconazole gel over the denture wearing surface, every 8 hours, for 7 – 14 days

Dentures should be soaked in 3% sodium hypochlorite diluted in water (1:10) or chlorhexidine digluconate 0.12%. Patients should be advised against wearing dentures overnight.

Systemic therapy with fluconazole 100–200 mg daily for 7 days.

Newer antifungal drugs have also been used in cases of candidiasis caused by fluconazole resistant candida species [21].

Such lesions have been named as chronic hyperplastic candidiasis refractory to systemic antifungal therapy or candidal leukoplakia.

Other modality of treatment for candida associated leukoplakia is by surgical management. Surgical management includes cold-knife surgery, laser therapy, and cryosurgery. It is recommended if associated with epithelial dysplasia. This assures reduction in the malignant transformation potential of the lesion [22].

Conclusion

All potentially malignant lesions suspected of superficial candidiasis should be investigated for candidal infection. Removal of risk factors including candida is essential before a biopsy is performed. If candidal hyphae are detected, antifungal therapy should be given for a period of 2 – 4 weeks and biopsy should be performed only when the lesions fail to respond to the treatment. Following accepted guidelines and protocols for the treatment of oral potentially malignant lesions can result in better treatment and prognosis of the lesion. Preventing malignant transformation of OPMDs is crucial as it helps in reduction of morbidity and mortality in patients on whom OPMDs are not treated.

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Source of Funding: Self

Ethical Clearance: prior to the start of the study ethical clearance was obtained from Institutional ethical committee

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Comparative Evaluation of Maleic acid and EDTA as a Desmearing Agent - An In-Vitro Study

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Abstract

Aim: To compare the desmearing effect of 7% maleic acid with 17% EDTA on intra-radicular smear layer removal using Scanning Electron Microscopy (SEM).

Materials and Method: Fifteen maxillary incisors were collected and decoronated. Each tooth was randomly split into 3 groups, each assigned to saline, 17% EDTA and 7% Maleic acid respectively and irrigated. Each tooth was split into halves and subjected to scanning electron microscopy for evaluation of smear layer removal.

Results: Average grading for saline was 5.16 and that of EDTA was 2.32 and Maleic acid was 3.16. Maleic acid was significantly better than saline. But maleic acid was significantly not as effective as EDTA on the smear layer removal.

Conclusion: This study proves that Maleic acid though better than saline fell short in comparison to EDTA in terms of smear layer removal. This difference in desmearing effect was significant.

Keywords: *Maleic acid, root canal irrigant, surface roughness, scanning electron microscopy*

Introduction

The primary objective of endodontic treatment is the achievement of a clean environment in the root canal and minimize the risk for unsuccessful treatment outcomes [(1)]. Because of the complex root canal anatomy, irrigants supplement the mechanical preparation of canal [(2)] . An amorphous irregular smear layer covering the radicular dentinal surfaces and plugging the dentinal tubules occurs during mechanical preparation of the root canal [(3,4)]. An ideal irrigant should be capable of penetrating and disinfecting the entire root canal system by removing both organic components which includes necrotic and non-necrotic pulpal tissue, predentin and microorganisms and inorganic components like mineral content of the dentinal tubules which form the smear layer [(5,6)]. In addition, the irrigant should mechanically flush the loose debris while also lubricating canals during biomechanical preparation, and have low tissue toxicity [(7,8)]. The role the irrigant plays is a vital role in the ideal preparation of the dentinal surface for bonding [(9)]. Root canal instrumentation and irrigation cannot fully eradicate endodontic infection [(10)] as bacteria can propagate to lateral canals, apical deltas and dentin tubules which are areas of difficult access [(11)]. This can hinder the elimination of infection from the root canal system that is vital for maintaining an environment favourable for the healing of apical periodontitis [(12)]. Persistence of microorganisms after treatment is the main cause of failure in endodontic therapy [(13)]. Mechanical and chemical effects that the irrigant solution possesses are crucial during irrigation. Mechanical effects are generated by the flow and backflow of irrigant solutions in the root canal [(14)].

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Root canal preparation alters the biological, mechanical and chemical properties of the radicular dentine. The changes in mechanical properties of dentine due to irrigants are because of the changes in the chemical and structural composition of the surface of radicular dentinal thereby changing its permeability and solubility characteristics, and hence affecting the adhesion of materials to dentin surfaces [15,16]. These changes will affect the long-term integrity of the tooth structure [17]. Irrigants can also change other surface properties of dentin like wettability and the dentin and restorative material interaction [18]. Wettability is strongly dependent on chemical composition, roughness and hydration state and could be influenced by tubule density [19]. And it is a crucial factor which might influence the adhesion [20]. Roughness is an important factor in adhesion [21].

Ethylenediamine-tetra-acetic acid (EDTA) is a calcium chelating agent that is being used in endodontic treatment routinely for the removal of smear layer [22]. The removal of organic and inorganic debris has been successfully demonstrated on using a combination of sodium hypochlorite (2.5%–5%) and EDTA (10%–17%) [23,24]. A final irrigation of the root canal with EDTA has proven the ability to open up the dentinal tubules thereby increasing the number of lateral canals to be filled consequently by the sealer [25].

Maleic acid has been used in adhesive dentistry as an acid conditioner [26]. Maleic acid is a mild organic acid and it has been found to remove smear layer from the root canal surface [27]. A study by Ballal et al. has shown that 7% maleic acid performed better than using EDTA on smear layer removal from the apical third of the root canal [28].

In this study we assess the surface roughness of root canal dentin on using maleic acid as an irrigant.

Materials and Method

15 single rooted teeth was collected from Saveetha Dental College and Hospital for this study.

- **Sample preparation**

Diamond disc was used to decoronate the teeth at the level of the CEJ and apical third is also cut using a diamond disc. Teeth are randomly divided into 3 groups and each group is assigned to a specific irritant, Saline, 17% EDTA and 7% Maleic acid respectively. Cleaning and shaping was done using hand files and between each file each tooth was irrigated with their respective irrigant. Apical preparation was done till size 50 and step back preparation done till size 80. Further enlargement of the canals were done using Gates Glidden drills till size 5. Chisel and mallet was used to section the tooth longitudinally into 2 halves after grooving using diamond disc. Sectioned teeth were then immersed in their respective irrigant for 30 minutes and washed in distilled water and dried.

- **Scanning Electron Microscopy**

Samples were mounted on metallic stubs followed by gold sputtering and placed in a vacuum chamber. The samples were then subjected to scanning electron microscopy at 2000x and 3000x magnifications to check for the presence or absence of smear layer and graded based on study by Jeerphat et al and the results tabulated.

- **Data analysis**

Data tabulated and subjected to statistical analysis and significance calculated at $p<0.05$.

Results

The resultant images were graded according to scoring system summarised in table 1 based on a previous study [29].

Table 1: Smear layer scoring criteria

SCORE	CRITERIA
SCORE 0	No smear layer and smear plug; no smear layer of the root canal. All dentinal tubules were cleaned and opened.
SCORE 1	No smear layer but mild smear plug; no smear layer of root canals, small amount of smear plug in some dentinal tubules.

Cont... **Table 1: Smear layer scoring criteria**

SCORE 2	No smear layer but moderate smear plug; no smear layer of root canals. Most of the dentinal tubules had smear plug.
SCORE 3	Moderate smear layer; moderate smear layer covered the surface of the root canals; only few dentinal tubules were opened
SCORE 4	Heavy smear layer; complete root canal wall covered by homogenous smear layer and no opening of dentinal tubules
SCORE 5	Heavy smear layer; complete root canal wall covered by a heavy non-homogenous smear layer and no opening of dentinal tubules

Grading of the images obtained by SEM were tabulated and average values calculated at 2000x and 3000x. the resultant data was subjected to statistical analysis,

Average grading for saline was 5.16 and that of EDTA was 2.32 and Maleic acid was 3.16.

The statistical analysis of the resultant data is summarised in table 2,3.

Table 2: Kruskal-Wallis test among test groups

Group	N	Mean Rank
17% EDTA	5	7.90
7% MALEIC ACID	5	17.30
SALINE	5	21.70

Table 4: Mann-Whitney test among test group and saline

Group	N	Mean Rank	Sum of Ranks
7% Maleic Acid	5	3.70	18.50
Saline	5	7.30	36.50

According to Kruskal-Wallis test EDTA was significantly better than Maleic acid. However Maleic acid was significantly better than saline. This was further confirmed by Mann-Whitney test which showed that Maleic acid was indeed better than saline.

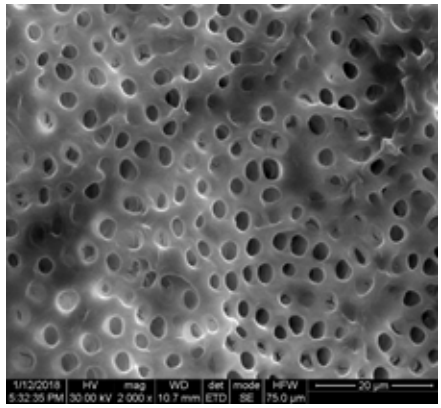


Fig 1: SEM image of sample irrigated with EDTA at 2000x

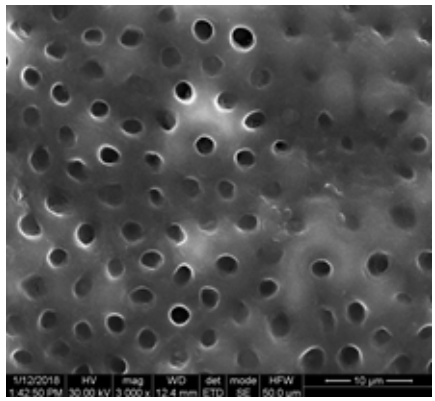


Fig2: SEM image of sample irrigated with EDTA at 3000x

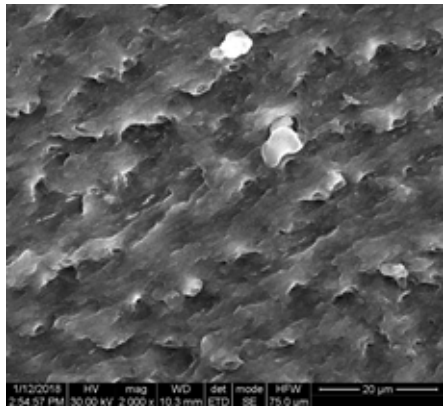


Fig 3: SEM image of sample irrigated with saline at 2000x

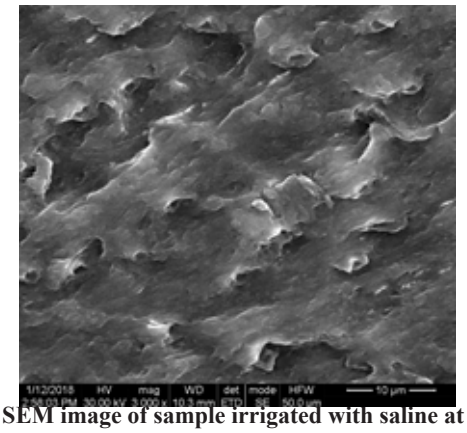


Fig 4: SEM image of sample irrigated with saline at 3000x

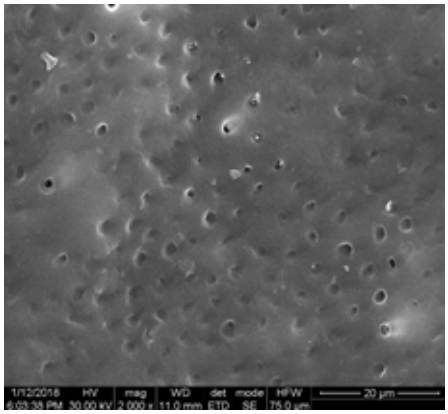


Fig 5: SEM image of sample irrigated with Maleic acid at 2000x

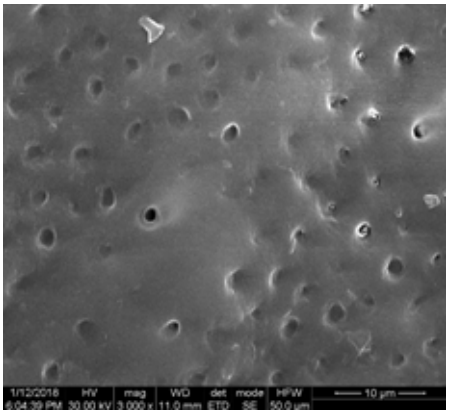


Fig 6:SEM image of sample irrigated with Maleic acid at 3000x

Discussion

The complex root canal system, prevalence of various types of root canals, the effect of irrigants and the irrigant protocols on the dentinal surface needs to be assessed [30,31]. Because of the patency of the dentinal tubules, the surface of the dentine is rendered porous. However, quite infrequently, they may also be found to be sclerosed. The features of the dentinal tubules such as their presence, their density and their diameter differ in regards to their relation with the corono-apical site of the tooth as well as with age and insult [30,31]. The density of the dentinal tubules along with their direction appears to be erratic and non-uniform in the apical regions of the roots, provided the presence of the tubules is established. The root canal system can serve the necrotic tissue remnants as a nutrient source to any remaining microorganisms [32].

Microorganisms and their by-products are found to be contained in the layer of material which comprises of both organic and inorganic substances, produced as a result of preparing the root canal in the biomechanical way. In said layer of material, a larger proportion is composed of mineralised collagen matrix, whose particles tend to be on the smaller side of the spectrum. This layer is spread to cover the cut surface of the dentin in all its entirety which results in the formation of what is known as the smear layer. Any openings of the dentinal tubules and also any depressions in the canal wall, if present, are cloaked and covered by debris, which is evidenced at an ultrastructural level as sludge-like material that is neither organised nor regular [33,34]. As a matter of fact however, the presence of such a smear layer has long been postulated to provide an avenue for possible leakage while also being a favourable source of substrate enabling bacterial growth and their ingress. Upon obturation of the canals, the frequency of penetration by bacteria was diligently studied and that frequency was shown to be significantly much higher when the smear layer was present as opposed to the bacterial penetration in the absence of such a smear layer [35,36]. In addition to this, the penetration of gutta-percha into the tubules as well as the adhesion and penetration of the sealers of root canal into the dentinal tubules may be interfered by the smear layer, which would ultimately lead to microleakage [37,38]. In order to remove tissue debris and microorganisms, irrigating solutions were employed which also facilitated the prevention of formation of dentine mud produced during the process of instrumentation since that can block the root canal. They also have the added benefit of removing the smear layer while also increasing the efficiency of cutting. This is done by decreasing the chance for fracture of the instruments. An irrigant for root canal is said to be ideal if it is compatible biologically, is able to successfully remove both organic and inorganic substrates chemically, is antibacterial, demonstrates good wetting of the surface, is proven to have not any adverse effects on the structure of the tooth that remains and also enables easy usage and is effective within the

parameters of the clinical therapy. Conversely, all these aforementioned criteria have not been met even by a single agent [39]. Hence the sequential use of organic and inorganic solvents has been recommended for successful irrigation of the root canal system [40]. Newer methods wherein photodynamic therapy and irrigants used in combination have a better effect in disinfecting the canals, even in cases of endodontic failure [41]. Current methods of smear layer removal include chemical, ultrasonic and laser techniques, none of which are totally effective or have received universal acceptance [42,43].

Nevertheless, through time, introduction of a wide array of irrigants has taken place each of which catering to specific predetermined actions such as chelation, capacity of dissolution, antibacterial action and substantivity to name a few. In more recent formulations are found combinations of detergent, acid and antibiotic while also focussing on the reduction of the surface tension which enables the achieving of a better penetration into the tubules [44,45,46].

Therefore, so as to achieve a ideal preparation of the dentinal surface, usage of irrigants can be employed in a sequence with the importance being levied to the volume of irrigation, time of exposure and mode of delivery. In recent times, with the use of high-resolution computed tomography, the proportion of the surface of dentine in the root canal that is planed by the instruments during the biomechanical preparation has been quantified and an observation has been made that about 35-53% of the surface of the root canal was left uninstrumented [47,48]. Over and above its flushing action, the debridement of the uninstrumented walls of the canal constitute the primary role of the irrigant solution. A result to this effect can be accomplished by an irrigant that is adept in the dissolving of organic tissues and also by exercising an appropriate method for its delivery to the surfaces that are uninstrumented. The modification of the chemical and structural composition of the radicular surface of the dentine results in changes in mechanical properties of the dentine. This thereby changes its permeability and solubility characteristics, hence affecting the adhesion of materials to the surfaces of the dentine [49,50]. The requirement for optimum adhesion is intimate contact between the adhesive material and the substrate which would enable molecular attraction and further permit chemical adhesion or penetration for micromechanical surface interlocking. An imperative feature is adhesion as it helps in the effective sealing of the canal as well as preventing at the dentin-sealer interface and at the interface with the obturating material by the root canal sealers [45]. Studies also show that the interaction between the resin sealer to the dentin collagen is invariably affected by irrigation protocols and it consequently influences the bond strength of sealers [51]. In this study saline, 17% EDTA and 7% maleic acid were used as irrigants to check their effect on intra-radicular dentin.

Straight single-rooted maxillary incisors were selected for this study with root length of approximately around 20-22 mm and minimal root curvature of 5 degrees or lesser. The samples were selected in such a way according to Schneider in order to maintain standardization and avoid an atomic variation [52]. Standardized step back technique was followed for root canal preparation using hand files up to k- file size 50 reaching full working length which helps the irrigants penetrate till the apical third. This lowers the bacterial content and dentinal debris to a greater extent on comparison with smaller preparation [52]. Since wider canals help in greater penetration of the irrigants, the canals were further enlarged with gates glidden drills in this study.

With regard to the study at hand, common-practice saline did not prove to alter the surface of dentine with any noteworthy significance, though they can be used for their actions of flushing and lubrication. Maximum efficiency was exhibited by 17% EDTA comparatively for cleaning the surface of the dentine. Although in another study EDTA demonstrated loss of intertubular and peritubular dentin as a consequence of erosion in some areas [53]. One study reported that maleic acid was more effective than EDTA in smear layer removal although apical preparation was done till ISO size 40. This could be attributed to the high surface tension of 17% EDTA (0.0783 N/m) on comparison with that of 7% maleic acid (0.06345 N/m). The efficiency of EDTA decreases over a time as there is a decrease in pH. But maleic acid being highly acidic ,has a greater demineralizing effect in a shorter period of time [54]. The irrigating needle was introduced 1 mm short of working length for all the samples [55]. even though it is difficult to standardize due to the control of fluid flow rate during syringe needle irrigation [56].

EDTA on reaction with the calcium ions in dentine, forms soluble calcium chelates. The efficiency of a chelating agent such as EDTA depends on various factors such as application time, pH, concentration, and amount of the solution [57]. The relationship between the

application time and the concentration of the chelating agent is said to be important because it was found that higher concentrations of solutions applied for a long periods can cause roughness of dentin surface [58]. EDTA has been reported to decalcify dentin to a depth of 20–30 μm in 5 min [59]. A 1-min application of 17% EDTA combined with ultrasonics is efficient for smear layer and debris removal in the apical region of the root canal [60]. EDTA performed significantly better than NaCl and NaOCl in smear layer removal and dentinal tubule opening [61]. Hasheminia et al., showed that 17% EDTA applied for one min was more effective than erbium-yttrium aluminium garnet (Er:YAG) laser in smear layer removal [62]. Calt and Serper's investigated 1 and 10 min application time of 17% EDTA and concluded that 17% EDTA in 1 min application time is effective and avoids harmful consequences like excessive erosion, widening of dentinal tubule openings and deterioration of the dentin surface [63]. Maleic acid has been reported to be a mild organic acid used as an acid conditioner in adhesive dentistry [64]. Ballal et al. reported that final irrigation with 7% maleic acid for 1 min was more efficient than 17% EDTA in the removal of smear layer from the apical third of the root canal system [64]. Studies have reported that maleic acid when administered at a concentration higher than 7% caused damage to the inter-tubular dentin and that concentration of 7% was adequate in removing the smear layer [65]. Thus in this study a concentration of 17% EDTA and 7% Maleic acid was used.

Methods available for smear layer evaluation other than the conventional SEM are digital image analysis, micro-computed tomography, atomic force microscopy, environmental SEM, and co-site optical microscopy (66). Reduced potential evaluator bias, reduced time requirement, and other parameters like density and average diameter of dentinal tubules can be measured when using digital image analysis. SEM was chosen in this study as it is a commonly available device for evaluating the smear layer (67).

Studies have shown that though the apical preparation was performed till ISO size no. 40, EDTA was not able to remove smear layer as effectively as 7% maleic acid [68]. EDTA is a chelating agent that is effective at a neutral pH and hence it is independent of the higher concentration of hydrogen ion to cause decalcification. A fall in pH in the dentin is because of the exchange of calcium by hydrogen and thus in turn is responsible for the reduced effectiveness of EDTA over time [69]. It has been reported in a study by Paqué et al. that the apical third of root canal the dentin is sclerosed and this will invariably minimise the action of EDTA [69]. Studies have stated a reduced mineral and non-collagenous protein (NCP) content of the dentin by EDTA followed by a lower degree of decalcification effect in the apical part of the root canal system by EDTA [70]. Studies show that 7% maleic acid has demonstrated better smear layer removing ability in the apical third than 17% EDTA and 18% etidronic acid. This is in agreement with several studies that have claimed EDTA to be effective in the coronal and middle thirds for smear layer removal but not in the apical third [71].

Even though in this study, 7% Maleic acid was inefficacious in removal of the smear layer when compared to EDTA. This was in contrast to other studies who investigated the effects of 7% maleic acid and EDTA on the removal of smear layer and found comparable results between the irrigants. The choice and use of the appropriate and most efficient irrigating agent, however, requires better understanding of their action. Moreover, smear layer removal is controversial and not the only factor affecting root canal therapy (72).

Conclusion

This study shows that 7% maleic acid is not an effective desmearing agent even though it has been reported otherwise in many studies. Hence it can be used as a final flush irrigant along with EDTA as EDTA's effect decreases over long duration and due to its improved efficacy of smear layer removal at the apical third of the root canal system. As this present study was done in vitro, the results obtained do not necessarily represent the actions of the tested irrigants in situ as the presence of blood, tissue remnants, and various other factors can affect the actions of the tested irrigants on the root canal system. Effective cleaning of the root canal system becomes more difficult as curved canal proves to be more challenging than straight canals. The needle can penetrate deeper in the single-rooted premolar tooth because it possesses wider canals. Therefore, in posterior teeth with narrow canals the results can vary. Further long-term clinical studies are necessary to confirm these results and evaluate their relevance to treatment outcome.

Conflict of Interest: Nil

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Antimicrobial Activity of Silver Nanoparticles Synthesized Using Marine Brown Seaweed *Spatoglossum Asperum* Against Oral Pathogens

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Abstract

Background : Green synthesis of nanoparticles using plant extract, bacteria, fungi and enzymes are eco-friendly and cost effective which do not need high pressure, energy, temperature and toxic chemicals for its synthesis protocol.

Materials and Method: In this report, we used the extract of marine brown algae *Spatoglossum asperum* to synthesize silver nanoparticles and were characterized using UV-visible spectrophotometer, TEM, XRD and FTIR and were also tested for their antimicrobial activity.

Results : These biosynthesized silver nanoparticles exhibited potent antimicrobial activity against oral pathogens namely, *Streptococcus mutans*, *Enterococcus faecalis*, *Pseudomonas aeruginosa* and *Candida albicans* and can be developed as a novel medicine against pathogenic oral diseases.

Conclusion : With increasing demand in advancements in diagnosis and treatment modalities, green synthesis of silver nanoparticles using marine brown algae *Spatoglossum asperum* has potent antimicrobial action have wider applications in dentistry.

Keywords: *Spatoglossum asperum, Silver nanoparticles, Marine algae, Green synthesis, Antimicrobial activity*

Introduction

Nanomedicine is an emerging field of research which incorporates the application of nanotechnology in medicine. It involves the use of nanoscale materials, such as biocompatible nanoparticles. Biological synthesis of metallic nanoparticles is more demanding and an emerging approach in the field of nanomedicine. A wide variety of biological resources have been used for the synthesis of silver nanoparticles such as fungus, bacteria, plants and marine algae [1-5]. As a natural material, silver is known to be safe to human and it has been shown that it produces little-to-no allergic reactions when tested for curing various diseases [6]. The silver nanoparticles have been reported to show better wound healing capacity with no scarring when tested using an animal model [7]. Silver impregnated medical devices like surgical masks and implantable devices show significant antimicrobial efficacy [8]. Green synthesis of silver nanoparticles by algae extract has more advantages than other biological resources such as bacteria and fungi because it eliminates the cell culture maintaining process and also it is more suitable for large scale production of silver nanoparticles [9]. The biological evaluation of marine algae belonging to Dictyotales has shown antibacterial, antiviral and cytotoxic activities [10]. The genus Spatoglossum are widely distributed in tropical to temperate regions [11]. *Spatoglossum asperum* are rich in protein content,

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polyunsaturated fatty acids, vitamin C, niacin, folic acid, vitamin E and macro mineral (i.e., Na, K, Ca and Mg) contents [12]. The methanolic extract of *S. asperum* has shown high antibacterial activity against gram positive bacteria, namely, *Bacillus cereus, Bacillus subtilis, Staphylococcus aureus* and gram negative bacteria, namely, *Klebsiella pneumonia, Pseudomonas aeruginosa, Salmonella typhi* [13]. In this study, we used very low cost and medicinally significant marine brown seaweed *S. asperum* for the biosynthesis of silver nanoparticles. The synthesized silver nanoparticles were characterized using UV-visible spectrophotometer, TEM, XRD and FTIR. Antimicrobial activities of the medicinally valid algae mediated nanoparticles were also examined.

Materials and Method

The algae *S. asperum* was collected from Mandapam coastal area in South India. 0.25g of dried *S. asperum* powder transferred into 25 mL of double-distilled deionized water in a 250 mL Erlenmeyer flask and boiled the mixture for 5 minutes. This process extracted the components of the algae into water. Whatman filter paper was used for the filtration of boiled material to remove any suspended particles. Finally, a clear filtrate was obtained and used for the metal nanoparticle synthesis.

Biosynthesis of silver nanoparticles (AgNPs) using leaf extract 1 mM of $AgNO_3$

The aqueous extract of *S. asperum* was used for the bioreduction process. For the biosynthesis of AgNPs, 10 mL of aqueous extract was carefully added to 90 mL of 1 mM of aqueous $AgNO_3$ solution in 250 mL Erlenmeyer flasks. The flasks containing the extract was incubated in a shaker. The color changes in the reaction mixture was observed continuously at various periods of time by double beam UV-vis spectrophotometer at different wavelength region from 350 to 550 nm. The biosynthesized silver nanoparticles were centrifuged at 8000 rpm for 10 min and nanoparticles were collected.

Characterization of prepared nanoparticles

The synthesized nanoparticles were optically measured using double beam UV –vis spectrophotometer at different wavelength range of 350 to 550 nm. Morphological characterization of prepared nanoparticles was done using Transmission Electron Microscope (TEM). Crystalline nature of the nanoparticles was determined by X-ray diffraction assay (XRD). The functional groups of synthesized nanoparticles were analysed by Fourier Transform Infrared Spectroscopy (FTIR).

Antimicrobial Activity

The silver nanoparticles synthesized using *S. asperum* was tested for antimicrobial activity by agar well diffusion method against pathogenic bacteria *S. mutans*, *E. faecalis* and *P. aeruginosa*. The pure culture of the bacterium was subcultured on Mueller Hinton agar. Wells of 9 mm diameter were made on Muller Hinton agar plates using gel puncture and each strain was uniformly swabbed onto the individual plates using sterile cotton swabs. Using a sterile micropipette, a standard antibacterial agent was loaded on one well and three different concentration of silver nanoparticles sample solutions (25 µl, 50 µl and 100 µl) were poured onto three other wells on all plates. The isolates of *C. albicans* were subcultured onto Rose Bengal agar. A standard antifungal disc (voriconazole) was placed on the agar plate and then nanoparticles sample solutions (25 µl, 50 µl and 100 µl) were poured onto three other wells on the plate. After incubation at 37°C for 24 hours, the different levels of zone of inhibition of bacteria were observed and measured.

Results and Discussion

Visual identification

The present study shows the synthesis of silver nanoparticles by using marine algae *S. asperum*. The color changes in the reaction mixture was observed continuously at various periods of incubation time. The silver nitrate was reduced into silver nanoparticles visually identified by color change (Figure 1). The color of the solution was changed to brown color at 1 h incubation time. The intensity of brown color raised with increase in incubation time. The color was changed to dark brown after 24 h of incubation. There was no color change observed after 24 h which indicated that the silver nanoparticles synthesis process was completed. Green synthesis of silver nanoparticles using marine brown algae *Turbinaria conoides* also showed dark brown colour after1 h of incubation [14].

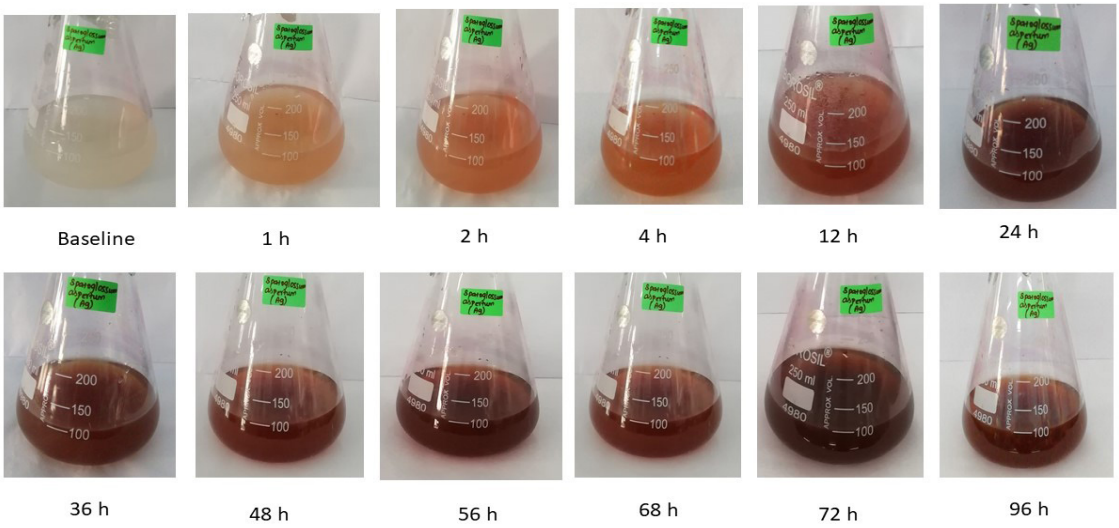


Figure 1: Reduction of silver ions to silver nanoparticles visually identified by color change at various periods of incubation time

UV-vis spectrophotometer analysis

UV-vis spectroscopy analysis depends on the arising of color in the reaction due to the excitation of surface plasmon resonance band in a reaction mixture at different wavelength regions from 350 to 550 nm and was recorded at various time periods. Figure 2 shows the UV absorption spectra of the synthesized silver nanoparticles using the extract of marine algae *S. asperum.* The spectrum clearly shows that the absorbance steadily increased with increase in incubation time. The plasmon resonance band for silver nanoparticles was peak positioned at 430 nm. Synthesis of silver nanoparticles using marine brown seaweed *Padina tetrastromatica* showed high absorption at 460 nm [15].

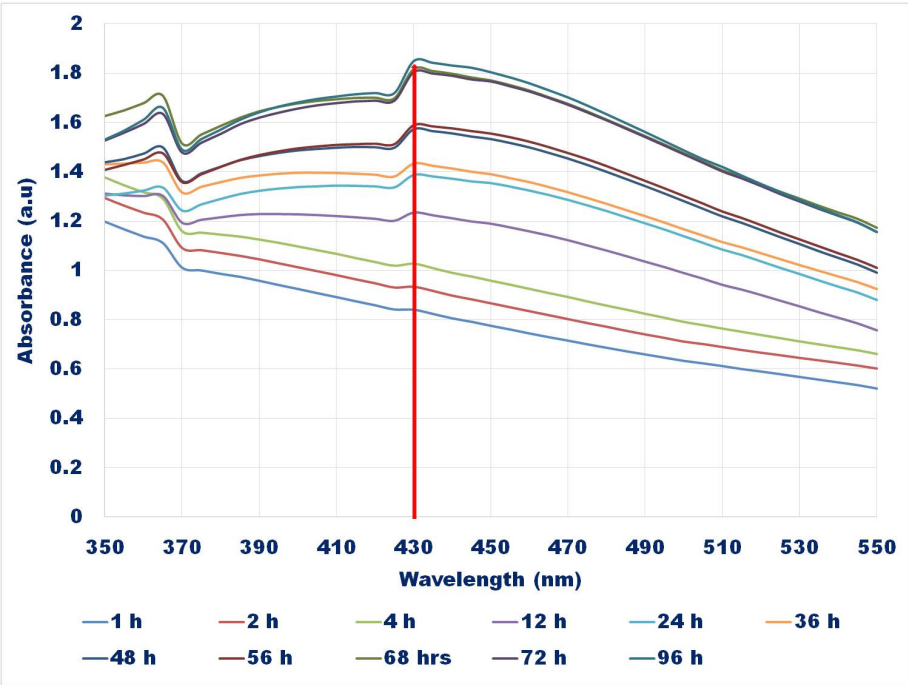
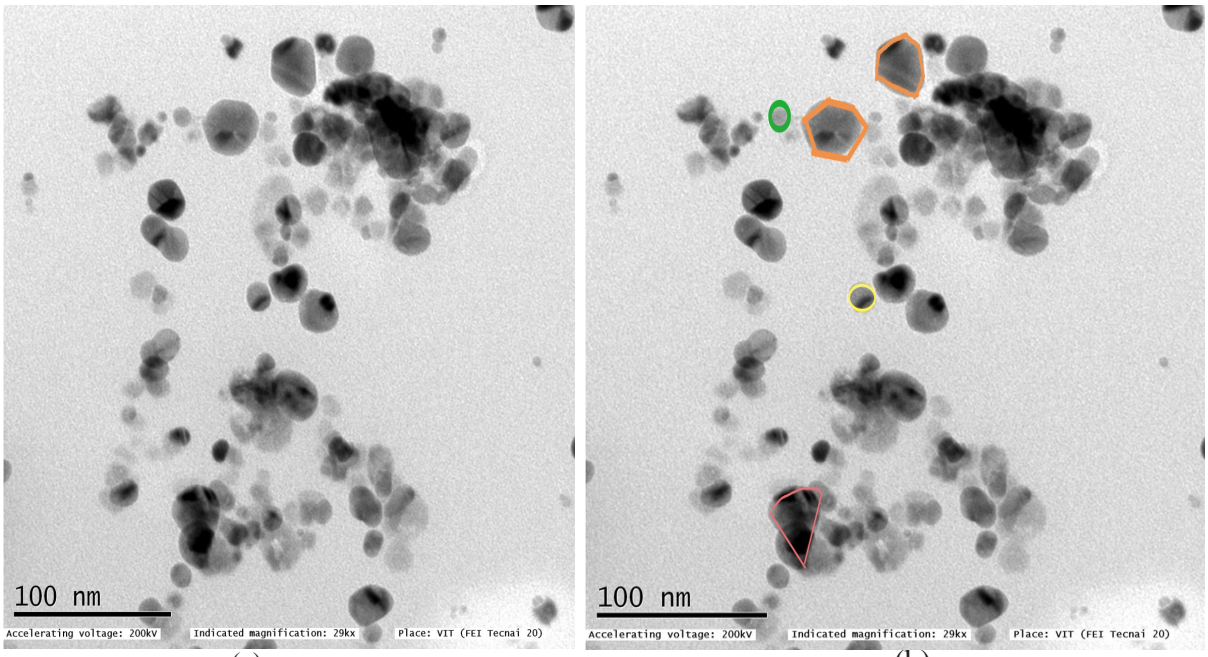


Figure 2: UV Spectroscopic analyses of silver nanoparticles synthesized from extract of *Spatoglossum asperum* recorded as function of time.

Transmission Electron Microscopy

The structure of the AgNPs of *S. asperum* was studied under TEM which has shown that particles are mostly hexagonal and spherical in shape, whereas some showed triangular and ellipsoidal shapes as well (Figure 3). The morphology of the AgNPs was highly variable with the size range of 10 - 35 nm. The silver nanoparticles synthesized from marine macro-algae namely, *P. capillacae, J. rubins, U. faciata* and *C. sinusa* were predominantly spherical in shape [16].



(a) (b)

Figure 3: TEM image of AgNPs synthesized using *S. asperum* (a) TEM image at 100 nm scale bar (b) outline of shapes highlighted

X-ray diffraction analysis

XRD is an analytical technique in which a beam of X-rays is projected onto the crystal and the incident beam is scattered by the atoms which lead to the formation of diffraction patterns. This interference observed determine its crystalline nature. Figure 4 shows the XRD pattern with peaks corresponding to the planes (1 1 1), (2 2 0) and (3 1 1). The result reveals that the silver nanoparticles synthesized using *S. asperum* are crystalline in nature. The XRD patterns of AgNPs synthesized using marine alga *Padina tetrastromatica* and *Turbinaria conoides* formed peaks assigned to (1 1 1), (2 0 0) and (2 2 0) which has also determined its crystalline nature [14, 15].

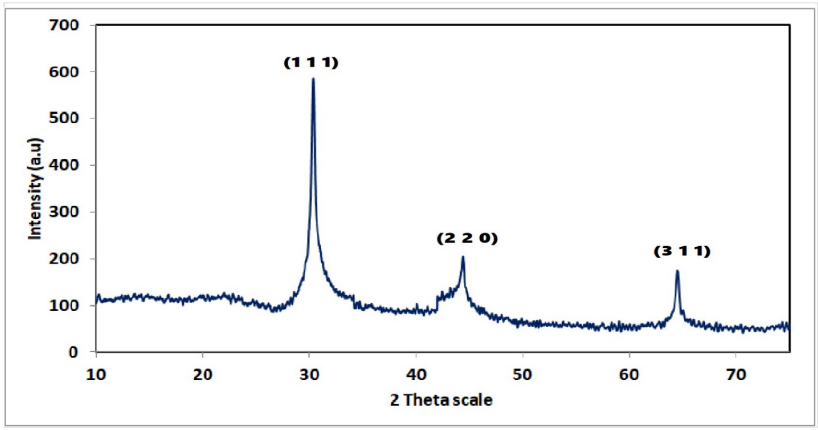


Figure 4: XRD analysis of biosynthesized silver nanoparticles using *S. asperum*

Fourier Transform Infrared Spectroscopy

S. asperum are rich in protein content, polyunsaturated fatty acids, vitamin C, niacin, folic acid, vitamin E and macro mineral (i.e., Na, K, Ca and Mg) contents [12]. FTIR was used to identify the biomolecules in *S. asperum* responsible for the silver ions reduction and stabilization of reduced silver ions (Figure 5). FT-IR transmittance show peaks at 3409.53 cm^{-1} which correspond to the chemical groups of hydrogen bonded O-H stretch of phenols and alcohols, at 2922.59 cm^{-1} which correspond to the chemical groups of hydrogen bonded O-H stretch of carboxylic acids, at 2853.17 and 1628.59 cm^{-1} which correspond to the chemical groups of C=O stretch of ketones and aldehydes, at 1382.71 cm^{-1} which correspond to the chemical groups of N=O bend of nitro groups, at 1115.62 and 1035.59 cm^{-1} which correspond to the chemical groups of C-O stretch of esters. The functional groups of AgNPs synthesized using fucoidan extracted from seaweed *Padina tetrastromatica* were found to have weak bands at 2982, 2653 and 2334 cm^{-1} which indicated the presence of O-H stretching carboxylic acid group [17].

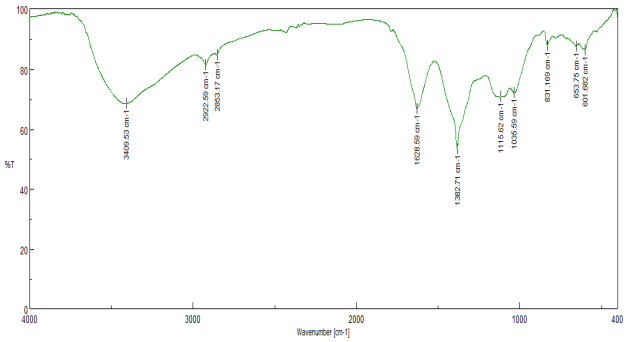


Figure 5: FTIR shows the functional groups associated with silver nanoparticles synthesized from extract of *S. asperum*

Antimicrobial activity of silver nanoparticles against oral pathogens

The antimicrobial activity of AgNPs of *S. asperum* assayed by well diffusion method against oral pathogens showed minimum inhibitory concentrations at different concentrations. Table 1 shows the inhibition of bacterial growth in various concentrations of biosynthesized AgNPs of *S. asperum*. The antimicrobial activity of the silver nanoparticles increased as the concentration has increased. The antimicrobial potential of silver nanoparticles synthesized using *S. asperum* was evaluated according to their zone of inhibition and the results were compared with the activity of the standard antimicrobial agent. The antibacterial activity of AgNPs against gram positive *S. mutans* showed zone of inhibition of 16.16±0.31 at the concentration of 100µl. The antibacterial activity was high against *E. faecalis* and *P. aeruginosa* at the concentration of 50 µl. These results indicate that AgNPs of *S. asperum* were assuring as an antibacterial agent against the pathogens employed. Some researchers have reported that the positively charged AgNPs accumulate on negatively charged bacterial cell membrane to bring about structural alterations in the membrane. This leads to cell death due to uncontrolled transportation through the membrane Various mechanisms attribute to its antimicrobial activity such as generation of reactive oxygen species and bacterial protein denaturation [18].

Table 1: Antimicrobial activity of AgNPs against oral pathogens

Oral pathogens	Zone of inhibition (mm)			
	25 µl	50 µl	100 µl	Ab
S. mutans	16.15±0.40	16.16±0.31	14.03±0.41	26±0.21
E. faecalis	18.03±0.34	18.95±0.23	16.88±0.42	19.14±0.26
P. auruginosa	16.15±0.21	17.92±0.26	17.16±0.23	16.19±0.33
C. albicans	8.99±0.50	11.07±0.19	11.85±0.26	29.87±018

Conclusion

The present study has demonstrated an eco-friendly and cost-effective synthesis of silver nanoparticles using marine brown alga *S. asperum*. AgNPs synthesis was initially identified by stable dark brown colour and the surface plasmon resonance was peak positioned at 430 nm. The shape of these AgNPs were mostly hexagonal and spherical in shape with size range of 10-35 nm as examined by TEM. The crystalline nature was clearly determined in the XRD pattern and the functional groups responsible for reduction of silver ions were identified by FTIR. These AgNPs showed potent antimicrobial activity against oral pathogens assuring its effective therapeutic application in several infectious diseases. In future the green synthesized silver nanoparticles may be used as a coating material for antiseptic dressing materials and suture materials which can aid in wound healing.

Conflict of Interest: The authors declare that there is no conflict of interest

Source of Funding: Self

Ethical Clearance: Ethical clearance was obtained from Institutional Ethical Committee of Saveetha Dental College and Hospitals (SDC/IHEC/036)

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Fluctuating Asymmetry of Dermatoglyphics and DNA Polymorphism in Breast Cancer Population

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Abstract

Fluctuating asymmetry of dermatoglyphics can be represented as a biomarker of genetic instability of DNA. The difference in the dermatoglyphic pattern between right and left hands may express the existence of defective gene and the developmental stress of an individual. Thereby Fluctuating asymmetry of dermatoglyphics can be used to screen population with defective gene causing Breast cancer. To investigate this hypothesis the present study has taken an attempt to prove the genetic basis of asymmetry of dermal ridges by analyzing its association with specific DNA repair genetic variants in breast cancer.

Method: The cross-sectional study is being conducted among 150 females in three groups, each comprising of 50 participants. The distinct variables of dermatoglyphics are Fluctuating Asymmetry (FA) of Finger Rindge Count Thumb, Index, Middle, Ring, and Little finger, Fluctuating asymmetry of A-B Ridge count, ATD angle and Main Line Index. All the dermatoglyphic parameters are assessed individually for its association with the Single Nucleotide Polymorphism status of four DNA repair genetic variants namely XRCC1 Arg194Trp, XRCC3Thr241Met, ERCC4Arg 415Gln, and ERCC5 Asp1104His. The frequencies of appearance of all the genotype for each distinctive dermatoglyphic variables are analyzed. The statistical procedure used to analyze the frequency of association is odds ratio and relative risk ratio.

Results: The relative risk is about 2 to 4 times for dermatoglyphic variable FA thumb, FA ring and FA A-B Ridge Count with statistical significance for XRCC1 Arg194Trp and ERCC4 Arg 415Gln variant allele in breast cancer, XRCC1 Arg194Trp and ERCC4 Arg 415Gln and ERCC5 Asp1104His in high risk group in their dominant model.

Conclusion: Results confirms that the Fluctuating Asymmetry of dermatoglyphics can be recommended and used as an effective biomarker of genetic instability in breast cancer.

Keywords*: Dermatoglyphics, Fluctuating Asymmetry, DNA repair gene, Single Nucleotide Polymorphism, Genetic Instability, Breast Cancer*

Introduction & Background

Breast cancer is a complex disease which is expressed as a result of genetic instability. The genetic instability may be due to inheritance which accounts for about 5% - 10% or due to environmental disturbance during development in the womb or may be due to lifetime acquired factors. Fluctuating asymmetry is a concept in dermatoglyphics which is aided to reflect the genetic instability and the environmental disturbance during development. The bilateral asymmetry of dermal ridge patterns, the pattern size, and number of tri-radii reflects the instability of DNA. The stability of DNA repair genes acts as a backbone in maintaining the stability of other genes involved in the process of carcinogenesis. Any instability of DNA repair gene

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results in aggravating the process of carcinogenesis. Oxidative stress causes DNA damage which becomes the initial step in carcinogenesis. Studies suggest that environmental factors, high psychological stress and lack of balanced nutrition raise the Reactive Oxygen Species (ROS) level. This gene - environment interactions play a vital role in the development of breast cancer. The normal cell function is maintained by the effective DNA repair proteins, consequently any deficiency in its function may result in irrevocable harm. Maintaining the level of Oxidative stress proteins and the DNA repair protein protects the normal cells from destructing effects of Reactive Oxygen Species [1-4]. The specific areas of dermal ridges of palm is said to reflect the stability of genes. The Fluctuating asymmetry of dermal ridge can be represented as a biomarker of genomic instability of DNA and the developmental environmental stress of an individual. To investigate this hypothesis the present study has taken an attempt to prove the genetic basis of dermal ridges by analysing its association with specific DNA repair genetic variants in breast cancer.

Material and Methods

The cross-sectional study is being conducted among 150 females in three groups, each comprising of 50 participants. The participants are age matched between 35-60 years. The study commenced after getting approval from the Institutional Human Ethical Committee. The participants are given detailed explanation about the procedure and their co-operation and willingness is obtained with an informed consent. The participants are grouped based on selection criteria. Group-I includes females diagnosed histopathologically for breast cancer as their primary site of carcinoma. Group-II includes females who are categorized as high risk for breast cancer based on their family history for breast cancer (mother, sister or daughter) or any two criteria based on their endogenous exposure to estrogen which includes Menstrual history (early menarche below 12 years, late menopause above 50 years) Parity status (first full term pregnancy (FFTP) above 30 years of age, Nulliparity), Personal history of fibro-adenoma, obesity, hormone replacement therapy (HRT). Group-III includes healthy females.

The data for dermatoglyphic analysis is collected using digital photography and the different variables are analyzed using computer. After detailed analysis of various quantitative parameters presenting Fluctuating Asymmetry of dermal ridge patterns, distinct variables are selected as an outcome measure to assess its association with single nucleotide polymorphism (SNP) status of four DNA repair genes. The DNA repair variants namely XRCC1 Arg194Trp, XRCC3Thr241Met, ERCC4 Arg415Gln, ERCC5 Asp1104His are analyzed for the study population. The data collection procedure includes collection of 3ml of peripheral blood in EDTA coated test tubes through venipuncture. The procedure includes extraction of DNA, followed by amplification of specific gene segments using Polymerase Chain Reaction and identification of polymorphism using Restriction Fragment Length Polymorphism. Their frequency of appearance of all genotypes namely homozygous wild, heterozygous mutant and homozygous mutant genotypes are assessed and the frequency of breast cancer and high-risk population are compared with control group. The distinct variables of FA of dermal ridges are Fluctuating Asymmetry (FA) of Finger Ridge Count of Thumb, Index, Middle, Ring, and Little finger, FA A-B Ridge Count, FA of ATD angle, FA of Main Line Index. All the dermal ridge parameters are analyzed individually for its association with all the four SNPs. The frequencies of appearance of all the genotype for each distinctive dermal ridge variables are analyzed.

Findings

The statistical procedure used to analyze the frequency of association between Fluctuating Asymmetry and Variant Allele of DNA Repair Gene is odds ratio, relative risk and the level of significance using P- value. The Fluctuating Asymmetry of Finger Ridge Count of thumb, ring finger, A-B ridge count and main line index are associated with significant difference with XRCC1 Arg194Trp, ERCC4 Arg415Gln, and ERCC5 Asp1104His in their homozygous wild and heterozygous mutant type. FA Index is associated with significant difference with XRCC1 Arg194Trp, XRCC 3 Thr241Met, ERCC4 Arg 415, Gln, ERCC5 Asp1104His in their homozygous wild and heterozygous mutant type, ERCC5 Asp1104His is associated with homozygous mutant type. FA middle finger is associated with significant difference with XRCC1 Arg194Trp, XRCC 3Thr 241Met ERCC4 Arg 415 Gln, ERCC5 Asp1104His in their homozygous wild and heterozygous mutant type, XRCC1 Arg194Trp and ERCC5 Asp1104His are associated with homozygous mutant type. FA little finger and ATD Angle are associated with significant difference with XRCC1 Arg194Trp, XRCC 3Thr 241Met ERCC4 Arg 415 Gln, and ERCC5 Asp1104His

in their homozygous wild and heterozygous mutant type (Ref- Fig-I & Table-1).

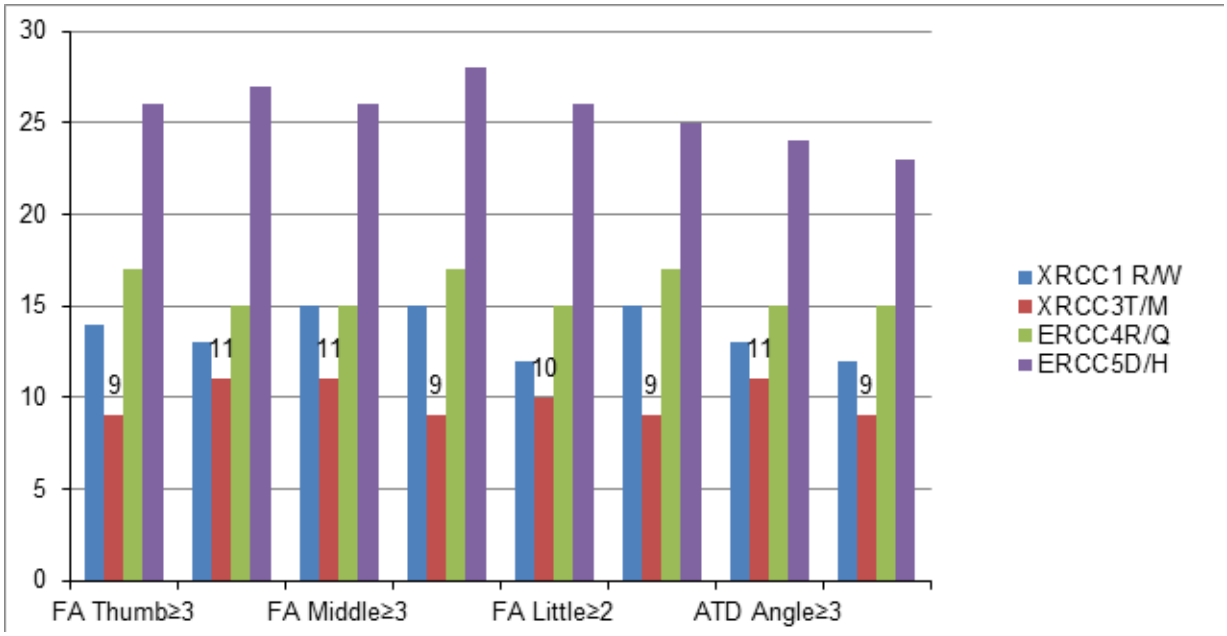


Figure-1: Fluctuating Asymmetry of Pattern Frequency Association with Variant Allele of DNA Repair Gene.

*Statistically significant

Table –1: Association between Fluctuating Asymmetry and Polymorphism Status

Gene &Codon	Genotype		Negative and Positive pattern Frequency							
			Thumb	Index finger	Middle Finger	Ring Finger	Little finger	A-B Ridge Count	ATD Angle	MLI
XRCC1 R194W	R/R	OR (CI at 95%)	7.36(2.60-20.7)	6.90(2.6-17.7)	18.59(5.2-65.5)	14.3(4.0-50.4)	4.75(1.91-11.7)	12.5(3.5-43.79)	7.4(2.90-19.2)	2.8(1.1-6.9)
		P Value	0.0002	0.0001	0.0001	0.0001	0.0008	0.0001	0.0001	0.02
	R/W	OR (CI at 95%)	0.14(0.05-0.41)	0.15(0.06-0.40)	0.05(0.01-0.20)	0.07(0.02-0.2)	0.22(0.09-0.56)	0.08(0.02-0.29)	0.1(0.05-0.37)	0.37(0.15-0.9)
		P Value	0.0003	0.0001	0.0001	0.0001	0.001	0.0001	0.0001	0.03
	W/W	OR (CI at 95%)	0.27(0.01-6.80)	0.1(0.007-4.88)	0.22(0.009-5.62)	0.2(0.01-6.8)	0.21(0.008-5.4)	0.30(0.01-7.57)	0.1(0.007-4.6)	0.3(0.01-8.2)
		P Value	0.428	0.32	**0.0001**	0.42	0.355	0.46	0.303	0.49
XRCC3 T241W	T/T	OR (CI at 95%)	1.50(0.65-3.42)	5.97(2.40-14.80)	4.02(1.67-9.66)	2.15(0.92-4.9)	2.83(1.22-6.60)	1.57(0.68-3.59)	3.55(1.51-8.3)	1.19(0.52-2.7)
		P Value	0.33	**0.0001**	**0.001**	0.07	**0.01**	0.271	**0.003**	0.67
	T/M	OR (CI at 95%)	0.65(0.272-1.57)	0.18(0.07-0.48)	0.22(0.08-0.57)	0.53(0.22-1.2)	0.33(0.13-0.82)	0.60(0.25-1.47)	0.21(0.08-0.5)	0.67(0.27-1.6)
		P Value	0.34	**0.0005**	**0.001**	0.16	**0.01**	0.27	**0.001**	0.37
	M/M	OR (CI at 95%)	0.82(0.113-6.016)	0.190(0.01-1.87)	0.67(0.09-4.94)	0.26(0.02-2.6)	0.65(0.09-4.81)	0.92(0.12-6.71)	1.7(0.17-16.8)	3.0(0.31-30.3)
		P Value	0.84	0.15	0.70	0.25	0.68	0.93	0.64	0.33

Cont... **Table –1: Association between Fluctuating Asymmetry and Polymorphism Status**

ERCC4 R415Q	R/R	OR (CI at 95%)	15.3(5.05-46.85)	9.31(3.80-22.79)	9.30(3.69-23.4)	15.3(5.0-46.8)	7.83(3.2-19.04)	13.2(4.35-40.0)	8.3(3.49-19.8)	5.4(2.20-13.5)
		P Value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0003
	R/Q	OR (CI at 95%)	0.08(0.027-0.25)	0.14(0.05-0.35)	0.14(0.05-0.35)	0.08(0.02-0.2)	0.16(0.06-0.41)	0.09(0.03-0.29)	0.132(0.05-0.3)	0.23(0.09-0.5)
		P Value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.001
	Q/Q	OR (CI at 95%)	0.08(0.004-1.64)	0.06(0.003-1.16)	0.07(0.003-1.35)	.08(.004-1.6)	0.069(0.003-1.3)	0.09(0.005-1.8)	0.17(0.01-1.7)	0.1(0.005-1.9)
		P Value	0.1033	0.06	0.07	0.10	0.07	0.11	0.14	0.13
ERCC5 D1104H	D/D	OR (CI at 95%)	16.95(7.01-41.00)	67.4(23.06-197.3)	26.2(10.47-65.56)	34.4(12.1-97.5)	28.1(11.1-71.0)	11.3(4.9-26.31)	20(8.47-47.1)	4.47(2.14-9.3)
		P Value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
	D/H	OR (CI at 95%)	0.08(0.03-0.19)	0.02(0.009-0.06)	0.05(0.02-0.13)	0.04(0.01-0.1)	0.05(0.02-0.12)	0.11(0.05-0.26)	0.06(0.02-0.1)	0.39(1.17-0.8)
		P Value	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.02
	H/H	OR (CI at 95%)	0.07(0.003-1.28)	0.04(0.002-0.91)	0.05(0.003-1.057)	0.07(0.003-1)	0.05(0.003-1.0)	0.07(0.004-1.4)	0.13(0.01-1.2)	0.65(0.10-4.0)
		P Value	0.07	**0.04**	**0.05**	0.07	**0.05**	0.08	0.07	0.65

RR – Risk ratio, OR- Odds ratio

The Relative risk (RR) for FA thumb is 2 for ERCC4 Arg 415 Gln in both breast cancer and high-risk group with statistical significance. The XRCC1 Arg194Trp and ERCC5 Asp1104His though not statistically significant, the RR is 2 and 4 for breast cancer and high risk respectively. The RR for FA ring is 2 for XRCC1 Arg194Trp and ERCC5 Asp1104His in breast cancer group with statistical significance. The FA Ring finger though statistically not significant the RR for ERCC5 Asp1104His is 9 in breast cancer group. The RR for XRCC 3Thr 241Met is <1 with significant difference in breast cancer population. The RR for ring finger is 2 for XRCC1 Arg194Trp, ERCC4 Arg 415 Gln, and ERCC5 Asp1104His for high risk group with significant difference. The RR for A-B RC is 2 for XRCC1 Arg194Trp and ERCC4 Arg 415 Gln with significant difference for breast cancer population and though not statistically significant the RR is 9 for ERCC5 Asp1104His in breast cancer group. The RR for A-B RC in high risk population is 3 for XRCC1 Arg194Trp and ERCC5 Asp1104His and 4 for ERCC4 Arg 415 Gln with significant difference (Ref –Table -2).

Table – 2: Risk Ratio and Odds Ratio of Polymorphism (Dominant Model) In Breast Cancer and High Risk Population with Distinct FA of Dermatoglyphic Pattern

Dermatoglyphic Variables	**Groups**	**RR/OR/ P – value**	**XRCC1 Arg194Trp**	**XRCC3 Thr214Met**	**ERCC4 Arg415Gln**	**ERCC5 Asp1104His**
FA Thumb	Breast cancer	RR(95% CI)	2(1.03-2.08)	1(0.48-1.49)	2(1.10-2.22)	4(1.73-8.02)
		OR(95% CI)	4(0.83-22.02)	0.61(0.12-1.91)	6(1.08-28.17	42(7.25-243)
		P Value	0.06	0.67	0.05	6.99
	High risk	RR(95% CI)	1.3(0.89-1.98)	1(0.69-1.79)	2(1.30-2.68)	1.4(0.96-2.13)
		OR(95% CI)	3(0.5-14.2)	1.4(0.31-6.25)	15(1.77-126.6)	3(0.83-11.44)
		P Value	0.29	0.73	0.003	0.12

Cont... **Table – 2: Risk Ratio and Odds Ratio of Polymorphism (Dominant Model) In Breast Cancer and High Risk Population with Distinct FA of Dermatoglyphic Pattern**

FA Ring Finger	Breast cancer	RR(95% CI)	2(1.35-2.86)	0.37(0.11-1.26)	2(1.42-3.16)	9(2.49-34.8)
		OR(95% CI)	14.5(1.71-123.04)	0.16(0.02-0.96)	19(2.24-160.6)	126(16.26-976.3)
		P Value	**0.003**	**0.04**	**0.0001**	1.76
	High risk	RR(95% CI)	2(1.19-2.45)	1.2(0.74-1.97)	2(1.24-2.77)	2.4(1.55-3.85)
		OR(95% CI)	8(0.94-70.4)	2(0.38-7.5)	8(1.54-40.9)	28.5(3.35-242.1)
		P Value	**0.03**	0.71	**0.01**	**0.0001**
FA A-B RC	Breast cancer	RR(95% CI)	2(1.35-2.86)	0.6(0.23-1.46)	2(1.42-3.16)	9(2.49-34.8)
		OR(95% CI)	14.52(1.71-123.0)	0.33(0.06-1.59)	19(2.24-160.6)	126(16.26-976.3)
		P Value	**0.003**	0.23	**0.0001**	1.76
	High risk	RR(95% CI)	3(1.63-4.52)	1.5(0.79-2.82)	4(1.97-7)	3(1.48-5.49)
		OR(95% CI)	18.69(2.13-163.6)	2.2(0.54-9.25)	23(4.23-122.09)	8(2.19-29.53)
		P Value	**0.0001**	0.3	**0.0001**	**0.001**

During early pregnancy the intrauterine growth disturbances caused by both genetic and environmental factors may be accompanied by abnormal dermatoglyphics. The dermatoglyphics can be used to strengthen the diagnostic procedure and screen population for the diagnosis. Evidences suggest that the dermatoglyphic traits reflect the prenatal development. Developmental noise is reflected in dermatoglyphic traits as asymmetry in the ridge configuration. Presence of 10 digital whorls is associated in women having multiple spontaneous abortions. Babler 1978 reported in a prenatal study of fetus that spontaneous abortuses free of gross or chromosomal defects and no confirmed indication of any abnormality has increased frequency of arches than normal. Suzumori 1980 reported the development of ridge is delayed by more than two weeks in chromosomal disorders. The ridge depth is suggested to be associated with ridge pattern. The spontaneous abortuses are found to have reduced ridge depth compared to normal. Increased fluctuating asymmetry reflects imbalance in developmental homeostasis at molecular, chromosomal and epigenetic level. The dermatoglyphic traits are suggested to contain more developmental information. Whorl pattern presented to have increased depth compared to the arch pattern which is associated with less ridge depth. Dermatoglyphics is the living history of prenatal development. A cross-sectional study conducted in oral carcinoma suggested that palmar dermatoglyphics has immense clinical significance to isolate the population at risk for developing oral carcinoma. They reported increased frequency of arches and reduced frequency of whorls in oral carcinoma [5-11].

Fluctuating Asymmetry is one of the important concepts in Dermatoglyphics. Number of studies reported the association between Dermatoglyphics and breast cancer, but only very few studies reported the association between FA of dermal ridge pattern and breast cancer [12]. The concept of genomic instability is one of the important causes for carcinogenesis of breast cancer. The instability of gene is present within the DNA, but it may not be expressed. Only when it is stimulated by the lifetime acquired factors like poor life style habitations, lack of exercise, sedentary life, obesity, and increased exposure to estrogen which is called as hormone based life events the genomic instability is expressed resulting in carcinogenesis [13]. FA is a factor reflecting the genomic instability which is still under research. It is suggested that there can be a common genomic instability causing Breast cancer and reflecting in FA of dermal ridges. Breast cancer is expressed only after the process of carcinogenesis, but FA of dermal ridges is formed in the womb and it remains unchanged forever [14]. So ever before the visible tumor appears, and even before the carcinogenesis begins, through the FA of dermal ridges one can be screened as high risk or not possibly, and so the preventive measures and early therapeutic strategies can be introduced. The relative risk is about 2 to 4 times for dermatoglyphic variable FA thumb, FA ring and FA

A-B RC with statistical significance for XRCC1 and ERCC4 variant allele in breast cancer, XRCC1, ERCC4 and ERCC5 in high risk group in their dominant model.

Thus, the FA can be used as a powerful tool to screen the high-risk population for breast cancer and aid in early therapeutic measures. To investigate this hypothesis the association of FA of dermal ridge pattern and various SNPs are analyzed. On observation, the single nucleotide polymorphisms rs1799782, rs1800067 and rs17655 are associated significantly with FA thumb, index, middle, ring and little finger, A-B ridge count, ATD angle and main line index. SNPs rs 1799782 is observed to be associated with FA middle finger in homozygous mutant type and rs17655 is observed to be associated with FA middle and little finger in homozygous mutant type. SNP XRCC3 rs 861539 is observed to be associated with FA index, middle, little and ATD angle.

Conclusion

The results of the present study confirmed the involvement of XRCC1 Arg194Trp, ERCC4 Arg 415 Gln, and ERCC5 Asp1104His in breast cancer particularly in population with distinct dermal ridge pattern. The study confirmed the involvement of distinct Fluctuating Asymmetry of dermal ridge variables in breast cancer and its association with DNA Repair genetic variants which reflects its instability. It can be suggested the FA of dermal ridges can be used as an effective biomarker of genomic instability in breast cancer. Thus, the study aimed to investigate the genetic background of association between breast cancer and distinct palm ridge pattern. It can be suggested that the Fluctuating asymmetry of dermal ridge patterns can be used as a biomarker of specific DNA Repair gene polymorphism there by reflecting the genetic instability and can serve as a mass screening procedure.

Conflict of Interest – Nil

Source of Funding – Self

Ethical Clearance - Institutional Human Ethical Committee, Saveetha Institute of medical and technical sciences Chennai, Tamilnadu. - IHEC No-06/10/2012, Dated -09th October 2012.

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Teratogenic Potential of Drugs Used – A Systematic Review to Aid in Evidence Based Practice And Decision Making

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Abstract

Drugs taken during pregnancy can have positive as well as negative effects on the developing embryo. Many drugs are prescribed by the doctor for the benefits of the foetus like the multivitamin supplements which reduce the risks of cardiovascular defects; oral clefts and urinary tract defects in their infants.Some drugs can also have many complicated effects on the foetus. Mother suffering from diseases and the medications taken for the treatment of such diseases during pregnancy will lead to abnormal changes in the baby. Anticonvulsant drugs have been known to be one of the most commonly used drugs which is unavoidable and hence the harmful effect of the drug on the foetus. The drugs which are known to cause harmful effects on the foetus are phenobarbital, phenytoin, carbamazepine, tetracycline, thalidomide, warfarin. The complications of the drugs do not only depend on the type of drug taken but also on the the dosage, gestation time, number of times the drug taken and various other factors.This review addresses some of the routinely used drugs on their teratogenic effects.

Keywords: *Teratogenic drugs, Embroyo, foetus*

Introduction

Pregnant women face many health complications like diabetes mellitus, hypertension, or psychiatric disorders or other unavoidable diseases which require medical treatment.Various drugs are prescribed during pregnancy for the proper development of the foetus and the nutritional benefits of the mother. Drug-induced birth defects(teratogenesis) represent unique adverse drug reactions. Teratogenicity is defined as the permanent abnormality in the function and structure of an organism due to its exposure to drugs during the embryonic developmental stages[1]. Therefore, the drugs administered during pregnancy have to be carefully weighed to prevent any abnormal affect on the mother, the growing foetus and also the risks during breast-feeding. The frequently used drugs during pregnancy which are known to treat the different symptoms of pregnancy also have detrimental effects on the developing foetus. Drugsused for epilepsy and cancer are known to cause the highest teratogenicity[2]. This review addresses some of the inevitable drugs even used today which have teratogenicity in pregnant women.

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History

In the 1930s, a study was done by feeding the pregnant pigs with a diet deficient of vitamin A which showed teratogenicity[3]. A study was done on the experimental animals on the biological molecules like the amino acid mimic azaserine and its susceptibility to the mammalian embryos to toxicity from xenobiotics[4]. The experiment results after the use of aminopterin in 1950s led to abortion and in cases where abortion was not seen showed malformed children[5]. In the early 1960s the teratogenic effect of thalidomide was increasingly understood[6].

Stages of drug induced teratogenicity

All drugs administered during pregnancy do not lead to teratogenicity. The teratogenic effect of any

drug depends on various factors.The first factor is the genotype of the conceptus meaning the variation in the phenotype of the affected infant causes teratogenicity which is not seen in all the infants exposed to the drug. The infants who are not affected shows that these infants are susceptible to it. The exposure of the drug during different developmental stages of the embryo defines the extent of the malformation or the deformity. This is the second factor. In the initial stage, that is the stage after fertilization and before implantation is less affected by the drug. The mechanism of action of the drug on the developing embryo is the third factor. The initiation of the effect of the drug refers to the mechanism of action. The radiations can initiate the mutation of the genes or the mitotic interference or the enzyme inhibition. The access of the drug to the developing embryo from the mother's body is the fourth factor. The drugs given to the mother need to undergo metabolic processes. The factors which determine the reaching of the drug to the embryo include the dose of the drug taken by the mother, the physical properties, the route of entry, the absorption into the systemic circulation and the transfer through the placenta.The dosage of the drug is the fifth and important factor. The drug dose if exceeded the normal will cause harmful effects on the foetus[7].

The most commonly affecting drugs are phenobarbital, phenytoin, carbamazepine, tetracycline, thalidomide, and warfarin. Newer drugs for anti epilepsy like Lamotrigine, Topiramate, Levetiracetam are also known to cause teratogenic effects. Synthetic retinoids similar to vitamin A is said to cause teretogenecity. The antipsychotic drugs like olanzapine, quetiapine, risperidone, aripiprazole are also known to cause teratogenicity. Methotrexate is an antimetabolite and an antifolate drug causing birth defects.The chemotherapeutic agents like cisplatin, cyclophosphamide, mitomycin C and procarbazine drug causing teratogenicity.Isotritoin is used in case of severe acne and recently it has been identified for its harmful effect on the foetus. Enalapril is used commonly for hypertension, chronic heart failure and in diabetic nephropathy, it is also known to cause teratogenic effects[2].

The psychopharmacological medications used during pregnancy are more prevalent to cause harmful effects on the baby. Thalidomide has been found to be the most perfect drug for the treatment of morning sickness in pregnant women [8]. Various studies done on thalidomide stated that this drug caused deformity in the formation of the limbs in the infants by inducing oxidative stress and apoptosis and inhibiting angiogenesis[9-13]. The blood vessels in the limbs of the thalidomide affected infants are immature when compared to the blood vessels of the other body parts[10]. It has been stated that the recovery of the thalidomide induced deformities but the efficacy and the description for this was not given in an informative manner [11].

Valproate and carbamazepine are widely associated to cause congenital abnormalities [14].

Phenytoin is the most commonly used anticonvulsant drug. It was reported to cause the craniofacial dysmorphia, limb defects, developmental defects and facial abnormalities like short nose with anteverted nostril, long philtrum and bowed lips. These risks have been concluded after several studies, both prospective and retrospective[15,16].

Benzodiazepines are known to cause abnormalities in the foetus. There has been noted flaccidity, respiratory and feeding difficulties in children who are born to mothers who take these drugs during the late pregnancy. The use of diazepam in women suffering from convulsions is said to cause these defects in their child along with hypothermia and hypotonia[17,18].

Lithium has been widely used as a first line treatment in cases of bipolar disorders and also in cases of depression and mania[19]. Lithium is also said to be a good mood-stabilizer and protective to women who are at high risk of relapse during the postpartum period[20-22]. However some studies have reported to show cardiogenecity and Ebstein's anomaly in the children of the mothers who have been reported to be taking lithium during pregnancy [23-27].

Warfarin has been widely used as an oral anticoagulant which inhibits the synthesis of vitamin-k dependent clotting factors. For many years the use of oral anticoagulants has known to cause foetal loss and neonatal bleeding [28,29]. But it has also led to discovery of its cause to form congenital deformities. These have been noted to show the deformed facial features with mental retardation[30,31].Since the discovery of anticoagulants it has been used for the treatment of thromboembolism which occurs in the second and third trimester of pregnancy[32]. Becker*et al.* had reported of the use of warfarin by the mother led to the "ectopic nasal lacrimal duct orifice" in the child[33]. The exposure of the foetus to vitamin k antagonist will lead to Conradi's

syndrome which includes a combination of hypoplastic nose, stippling of the epiphyses and skeletal and ocular abnormalities. The use of the drug especially during the early pregnancy leads to this condition [30,31].

The treatments for cancer has increased over the recent times so much that it has increased the survival rates of the cancer patients. The main treatment for cancer includes the radiotherapy and chemotherapy which are known to be the potential cause of mutation of genes and genotoxicity which further leads to the development of secondary cancers and also lead the predispose survivors to various nonmalignant diseases[34]. There has been alot of use of anticancer drugs for the treatment of cancer. Cisplatin is one of the anticancer drugs said to cause dwarfism and many severe birth defects[35].

Conclusion

The drugs which had been used for the benefits of the mother and foetus have now been discovered to cause various harmful effects on the child with least or no harm to the mother. The effects on the foetus can range from deformities due to the improper development of the organs or improper functioning of the organs. The effect of the drug on the foetus is mainly dependent on the dosage of the drug, the stage of development at which the drug is given and the various other factors. Hence any drugs taken during pregnancy have to be taken with utmost care. Not all drugs taken during pregnancy cause teratogenicity. The drugs to be used during pregnancy should be prescribed by a physician expert in this field and a proper dose and use of the drug should also be given proper information.

Conflict of Interest: The authors declare there is no conflict of interest

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Teratogenic Drugs A Clinical Review

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The psychopharmacological medications used during pregnancy are more prevalent to cause harmful effects on the baby. Thalidomide has been found to be the most perfect drug for the treatment of morning sickness in pregnant women [8]. Various studies done on thalidomide stated that this drug caused deformity in the formation of the limbs in the infants by inducing oxidative stress and apoptosis and inhibiting angiogenesis[9-13]. The blood vessels in the limbs of the thalidomide affected infants are immature when compared to the blood vessels of the other body parts[10]. It has been stated that the recovery of the thalidomide induced deformities but the efficacy and the description for this was not given in an informative manner [11].

Valproate and carbamazepine are widely associated to cause congenital abnormalities [14].

Phenytoin is the most commonly used anticonvulsant drug. It was reported to cause the craniofacial dysmorphia, limb defects, developmental defects and facial abnormalities like short nose with anteverted nostril, long philtrum and bowed lips. These risks have been concluded after several studies, both prospective and retrospective[15,16].

Benzodiazepines are known to cause abnormalities in the foetus. There has been noted flaccidity, respiratory and feeding difficulties in children who are born to mothers who take these drugs during the late pregnancy. The use of diazepam in women suffering from convulsions is said to cause these defects in their child along with hypothermia and hypotonia[17,18].

Lithium has been widely used as a first line treatment in cases of bipolar disorders and also in cases of depression and mania[19]. Lithium is also said to be a good mood-stabilizer and protective to women who are at high risk of relapse during the postpartum period[20-22]. However some studies have reported to show cardiogenecity and Ebstein's anomaly in the children of the mothers who have been reported to be taking lithium during pregnancy [23-27].

Warfarin has been widely used as an oral anticoagulant which inhibits the synthesis of vitamin-k dependent clotting factors. For many years the use of oral anticoagulants has known to cause foetal loss and neonatal bleeding [28,29]. But it has also led to discovery of its cause to form congenital deformities. These have been noted to show the deformed facial features with mental retardation[30,31].Since the discovery of anticoagulants it has been used for the treatment of thromboembolism which occurs in the second and third

trimester of pregnancy[32]. Becker*et al.* had reported of the use of warfarin by the mother led to the "ectopic nasal lacrimal duct orifice" in the child[33]. The exposure of the foetus to vitamin k antagonist will lead to Conradi's syndrome which includes a combination of hypoplastic nose, stippling of the epiphyses and skeletal and ocular abnormalities. The use of the drug especially during the early pregnancy leads to this condition [30,31].

The treatments for cancer has increased over the recent times so much that it has increased the survival rates of the cancer patients. The main treatment for cancer includes the radiotherapy and chemotherapy which are known to be the potential cause of mutation of genes and genotoxicity which further leads to the development of secondary cancers and also lead the predispose survivors to various nonmalignant diseases[34]. There has been alot of use of anticancer drugs for the treatment of cancer. Cisplatin is one of the anticancer drugs said to cause dwarfism and many severe birth defects[35].

Conclusion

The drugs which had been used for the benefits of the mother and foetus have now been discovered to cause various harmful effects on the child with least or no harm to the mother. The effects on the foetus can range from deformities due to the improper development of the organs or improper functioning of the organs. The effect of the drug on the foetus is mainly dependent on the dosage of the drug, the stage of development at which the drug is given and the various other factors. Hence any drugs taken during pregnancy have to be taken with utmost care. Not all drugs taken during pregnancy cause teratogenicity. The drugs to be used during pregnancy should be prescribed by a physician expert in this field and a proper dose and use of the drug should also be given proper information.

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Nicotine Replacement Therapy for Smoking Cessation- An Overview

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Abstract

Tobacco products are products made of leaf tobacco and contain the highly addictive ingredient, nicotine. Tobacco use is one of the main risk factors for cancer, cardiovascular diseases and lung diseases. Nicotine replacement therapy (NRT) help the tobacco users to quit the usage of tobacco products. They provide nicotine to the tobacco users thus temporarily replace much of the nicotine from cigarettes to decrease motivation to smoke and nicotine withdrawal symptoms, thus easing the transition from cigarette smoking to complete abstinence. Tobacco users may quit tobacco without using NRT, but most of those who attempt quitting do not succeed on the first try. NRT only deals with the physical dependence. It's not meant to be the only thing you use to help you quit smoking. Nicotine replacement therapy along with behavioral counselling help the persons who find difficult to quit the habit. Hence, a review was done about the different types of nicotine replacement therapies.

Key Words: *nicotine, patches, gum, lozenges, tobacco use*

Introduction

Smoking is a major public health concern particularly in young adults between the ages of 13 and 25 years. Most initiation of cigarette smoking occurs by the age of 21 years. Tobacco use is the largest preventable risk factor for morbidity and mortality. Nicotine is a stimulant and potent para sympathomimetic alkaloid that is naturally produced in the nightshade family of plants and used for the treatment of tobacco use disorders as a smoking cessation aid and nicotine dependence for the relief of withdrawal symptoms. (1) Nicotine is highly addictive. It is one of the most commonly abused drugs. An average cigarette yields about 2 mg of absorbed nicotine; huge amounts can be harmful. Nicotine induces both behavioral stimulation and anxiety in animals. Nicotine craving involves drug-reinforced behavior, compulsive use, and relapse following abstinence. (2) Nicotine withdrawal symptoms include depressed mood, stress, anxiety, irritability, difficulty concentrating, and sleep disturbances. (3) Mild nicotine withdrawal symptoms are measurable in unrestricted smokers, who experience normal moods only as their blood nicotine levels peak, with each cigarette. On quitting, withdrawal symptoms worsen sharply, then gradually improve to a normal state. Tobacco use is often incorrectly perceived to be solely a personal choice. This is contradicted by the fact that when fully aware of the health impact, most tobacco users want to quit but find it difficult to stop due to the addictiveness of nicotine. (4)

Nicotine replacement therapy (NRT) aims to reduce motivation to consume tobacco and the physiological and psychomotor withdrawal symptoms through delivery of nicotine. (5, 6) This review aims to summarize literature on various modes of nicotine replacement therapy methods currently used to treat nicotine dependence.

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Effect of Tobacco on Health

Tobacco use has a great impact on general health and is a primary cause of many oral diseases and adverse oral conditions. [7] Tobacco is a risk factor for oral cancer, oral cancer recurrence, adult periodontal diseases, and congenital defects such as cleft lip and palate in children whose mother smokes during pregnancy. [7, 8]

Tobacco smoke is a toxic mix of more than 7,000 chemicals. When these chemicals get deep into body's tissues, they cause damage. Over time, the damage can lead to disease. The chemicals in tobacco smoke reach lungs quickly when inhaled, then from the lungs to the blood and through the arteries, the chemicals are carried to tissues in all parts of body. [9]

Tobacco Use and Nicotine

Nicotine is a neuroendocrine stimulant and depressant, addicting drug. [10] Addiction to nicotine changes the chemical balance in the brain. Addiction keeps people smoking even when they want to quit. [9] There is considerable evidence suggesting that former smokers have smaller risks of tobacco related oral diseases than current smokers. [11]

Tobacco dependence is a chronic condition that often requires repeated intervention. Except in the presence of contraindications, these should be used with all patients who are attempting to quit smoking. [12]

Mechanism of Action of Nicotine

Nicotine acts by stimulation of neural nicotinic acetylcholine receptors (NAChRs) in the ventral tegmental area of the brain. This causes release of dopamine in the nucleus accumbens, which lead to reduction in nicotine withdrawal symptoms in regular smokers who abstain from smoking. [13] NRT may also provide a coping mechanism, making tobacco products less rewarding. It does not completely wipe out the symptoms of withdrawal because none of the available nicotine delivery systems give the fast and great levels of arterial nicotine achieved when cigarette smoke is inhaled. [14]All the available medicinal nicotine products rely on systemic venous absorption and do not therefore achieve such rapid systemic arterial delivery. [15] It takes a few seconds for large doses of nicotine from a cigarette to reach the brain; medicinal products achieve lower levels over a period of minutes for nasal spray or oral products such as gum, inhalator, sublingual tablet, or lozenge and it takes hours for transdermal patches. [16]

Replacement Therapy Delivery System

The US Food and Drug Administration (FDA) has approved 5 forms of nicotine replacement therapy (NRT) which includes patch, gum, nasal spray, inhalers and lozenges. [17]

Nicotine Patch- Transdermal Patches

Nicotine patches are applied to the skin and deliver nicotine through the skin at a relatively steady rate. [18] The transdermal patches are available in the different concentrations based on the usage of the nicotine. Dosage depends on the frequency and the amount of usage of nicotine. [19]

The 16-hour patch works well for the persons who are a light-to-average smoker. It's less likely to cause side effects. But it doesn't deliver nicotine during the night, so it may not be right if the person have early morning withdrawal symptoms. [20] It was stated that the 24-hour nicotine patch provides a steady dose of nicotine and helps with early morning withdrawal, but there may be more side effects. [21]

Depending on body size and smoking habits, most smokers should start using a full-strength patch (15-22 mg of nicotine) daily for 4 weeks, and then use a patch with decreased strength (5-14 mg of nicotine) for another 4 weeks. The patch is changed every day. It should be put on in the morning on a clean, dry area of the skin without much hair. It should be placed below the neck and above the waist – for instance, on the upper arm or chest. The FDA has approved using the patch for a total of 3 to 5 months. [15]

The most frequently reported side effects are local skin reactions. [22] Moving the site of patch application daily as instructed can reduce the incidence of skin reactions to the patch. Sleep disturbances have also been commonly reported with 24-hour patches

Nicotine Gum

Nicotine gum is a type of chewing gum that provides nicotine to the body. The nicotine is delivered to the bloodstream via absorption by the tissues of the mouth. Nicotine content of the gum is usually either 2 or 4 mg, roughly the nicotine content of one sixth to one third of a cigarette, with the appropriate content and dosage depending on the smoking habits of the user.

Nicotex, Nicorette, Nicogum, Nicotinell and Zonnic are the common brands of nicotine gum. [23]After a few weeks or months, the number of doses per day is reduced gradually until it is no longer required. [24] Acidic beverages have been shown to interfere with buccal absorption of nicotine; therefore, patients should avoid acidic beverages (eg, soda, coffee, beer) for 15 minutes before and during chewing gum. [25]

Nicotine Lozenge

The lozenge is available in 2mg and 4mg formulations. Instructions for use and dosing are similar to nicotine gum, but the lozenge is not chewed; it dissolves in the mouth over approximately 30 minutes with some variation across individuals. As with nicotine gum, nicotine from the lozenge is absorbed slowly through the buccal mucosa and delivered into systemic circulation. [24] The lozenge provides an alternative to the gum for persons who need intermittent and controllable nicotine dosing, but who do not find gum chewing acceptable. The amount of nicotine absorbed per lozenge appears to be somewhat higher than that delivered by gum. [26] The recommended dose is 1 lozenge every 1 to 2 hours for 6 weeks, then 1 lozenge every 2 to 4 hours for weeks 7 to 9, and finally, 1 lozenge every 4 to 8 hours for weeks 10 to 12. The lozenge makers also recommended. [27] The side effects usually includes hiccups, nausea, trouble during sleep, fast heart rate etc,

Nasal Inhaler

The nicotine inhaler comprises thin plastic tube with a nicotine cartridge inside. Unlike other inhalers, which deliver most of the medicine to the lungs, the nicotine inhaler delivers most of the nicotine vapor to the mouth where it's absorbed into the bloodstream. Nicotine inhalers are the FDA-approved nicotine replacement method that's most like smoking a cigarette, which some smokers find helpful. [18]

It consists of a mouthpiece and a plastic cartridge containing nicotine. The vapour inhaler was designed to satisfy behavioral aspects of smoking, namely, the hand-to-mouth ritual, while delivering nicotine to reduce physiological withdrawal symptoms produced by tobacco withdrawal. It is important to note that although termed an "inhaler" the majority of nicotine is delivered into the oral cavity (36%) and in the oesophagus and stomach (36%). Very little nicotine is delivered to the lung (4%). Each inhaler cartridge contains 10mg nicotine, of which up to 4 mg can be delivered and 2 mg can be absorbed following frequent "puffing". [28]

Recent Advances

E-Cigarettes or Electronic Nicotine Delivery System (Ends)

ENDS are devices whose function is to vaporize and deliver chemical mixture typically composed of nicotine to the lungs of the user. E Cigarettes contains an electronic vaporization system, electronic controls, rechargeable batteries, and cartridges of the liquid that is vaporized. [21] The liquid usually contains glycerol, propylene glycol, water, nicotine and a variety of flavors that the user can choose. Nicotine content differs among products, ranging between 0 and 34 mg/mL, but recent studies have found discrepancies between labelled and measured nicotine content. E-cigarettes are becoming a preferred substitute for nicotine delivery among many smokers because of their realistic look, feel, and taste compared to traditional cigarettes. [29] The current evidence suggests that ENDS are an effective smoking cessation tool, but more research is needed to confirm its long-term effectiveness and safety. [30]

Nicotine Vaccine

Nicotine vaccines represent a new approach to the treatment of nicotine dependence and are currently under investigation. Because nicotine is a small molecule and an incomplete antigen, it is linked to a carrier protein order to stimulate the necessary immune response. Nicotine-based vaccines can prime the immune system to recognize nicotine as foreign and to mount an immune response against the drug. In doing so, vaccines may reduce the amounts of nicotine delivery. A potential drawback of vaccines to treat tobacco dependence is the fact that smokers will often compensate for decreases in the actions of nicotine, as would be expected when a vaccine decreases concentrations of nicotine penetrating into brain tissues, by increasing their tobacco consumption to overcome this effect. [31]

Patient Compliance with NRT

Most of NRT users discontinue treatment prematurely. Misinformation about NRT is a common cause of poor compliance. Several causes of poor compliance with NRT identified; Concerns about safety, addictiveness of NRT, lack of confidence in efficacy, side effects, cost, relapse and 'Should be able to quit on my own'. It was identified that one of the most common

reasons for poor compliance with NRT is because it is effective. When craving and withdrawal are well controlled through treatment, patients may mistakenly believe that the treatment is no longer necessary. These beliefs undermine the effectiveness of NRT. This can be tackled majorly by providing scientific information by health professionals to the patients undergoing NRT. [18]

Conclusion

Nicotine addiction is the major factor preventing smoking cessation and long-term abstinence. Today, several nicotine medications are available in different doses, forms and flavors and their use has been suggested for all tobacco consumers who do not have contraindications. The choice of NRT product should normally be guided by the patient's preference and it is been reported that, all of the commercially available forms of NRT increase their chances of successfully stopping smoking. These new modalities require more quality research to bring it from bench to bedside. Considering the potential capacity of NRT, it's essential for health professionals to become familiar with all forms of NRT to be able to explain the questions and needs of tobacco users who are interested in quitting the tobacco habit.

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Papillary Reconstruction Using Sub Epithelial Connective Tissue Graft - A Case Report

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Abstract

The shape of an interdental papilla play an important role in esthetics. Interdental papilla may be lost due to various reasons such as periodontitis, pathological migration or even as a result of periodontal therapy. This results in formation of black triangle between the teeth causing esthetic concerns. The spaces created also tends to cause food accumulation and further bone loss. Several techniques for papilla reconstruction have been proposed. This case report attempts to report a case of papillary reconstruction procedure done by the Hans and Takei technique, that resulted in good outcome in 6 months.

Key Words: *Interdental papilla, Esthetics, Black triangle, Reconstruction*

Introduction

Interdental papilla (IDP) is the part of gingiva that occupies the embrasure under the contact point of two teeth. The shape of an interdental papilla play an important role in esthetics.

IDP may be lost due to various reasons such as periodontitis, pathological migration or even as a result of periodontal therapy. The papilla tends to lose its pyramidal shape and become blunt thus causing black triangles between the teeth causing esthetic concerns. The spaces created also tends to cause food accumulation and further bone loss. Papillary reconstruction procedures are the most unpredictable surgeries of all periodontal surgeries that are done in anattempt to restore the lost papillary structure and close the black spaces.

Several techniques for papilla reconstruction have been proposed. Cortellini et al[(1)] provided a modified papilla preservation flap technique with releasing incisions in the papilla thus allowing placement of barrier membrane beneath the papilla to prevent it from getting collapsed from its new position. Azzi et al[(2)] described various techniques to gain access to the papillary area.

All the techniques that involved releasing incisions cause hindrance in blood supply. Connective tissue grafts, bone grafts and barrier membranes require adequate vascular area to surrounding recipient in order for it to be taken up and heal in an uneventful manner. The importance of vascular supply in the event of grafting is highlighted by Miller.[(3)]

Releasing incisions also cause tissue morbidity, scarring and even further recession in some cases. In the case of thin gingival biotype, it may even cause severe impairment in healing. Releasing incisions may also cause tenting, and poses a high risk of graft exposure and membrane exposure.

Procedures that give more predictable outcomes were found to have adequate blood supply to the recipient tissues.[(4)] Studies have shown that, tunnelling techniques that don't require releasing incisions, although technique sensitive provide predictable post-surgical outcomes and better wound healing.[(5)] This case report attempts to report a case of papillary reconstruction procedure done by the Hans and Takei[(6)] technique, that resulted in good outcome in 6 months.

CASE REPORT

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A 30 year old systemically healthy male, came to the outpatient department with complaint of deposits all over his teeth. He also reported bleeding gums, food lodgement between his upper central incisors. On examination, generalised bleeding on probing, presence of subgingival calculus and general lack of oral hygiene was evident. He was also found to have midline diastema with respect to 11, 21 and class 3 papillary loss in the same region. A probing pocket depth of 6 mm was present at the interdental area. Radiographic examination revealed mild horizontal bone loss in the area and an interdental crater was suspected. He was diagnosed with generalised chronic gingivitis with localised chronic periodontitis with respect to 11, 12. A full mouth scaling and root planning and flap surgery with respect to 11, 21 region was planned. SRP was done in 2 sittings at an interval of 1 week.

Flap surgery

Sulcular incision was given from 22 distal to 12 distal region. An envelope flap was reflected. Due to the presence of midline diastema, a papilla preservation flap was raised. After thorough debridement, the interdental area was found to have a crater like bone loss. A compromised osseous reshaping was done. The flap was sutured back in place. Direct loop suture was used in the remaining areas. At 1 week post op, suture was removed. At 4 weeks of recall visit, probing depth was 3 mm. He was found to have blunt papilla with black triangle in relation to 11, 21. A papillary reconstruction procedure was planned due to his aesthetic concern.

Preparation of the preoperative site

The classification system for loss of papillary height by Nordland and Tarnow[7] helps in determining the amount of graft volume required.

The diastema was closed by composite build up to create a contact point such that the distance from the contact point to the crest of the papilla was kept at 5 mm.

The interdental papilla was anesthetized using Lignocaine with adrenaline. A thorough manual root planning was done at the exposed cemental surfaces. The patient was instructed to do a preprocedural oral rinse with chlorhexidine digluconate solution for 30 seconds.

Papilla reconstruction procedure

A partial thickness semilunar incision was given from the distal line angle of 11 to the distal line angle of 21 at 6–10 mm apical from the gingival margin extending into the alveolar mucosa using 15C blade.

Sulcular incisions were placed at the mesial half of the two adjacent teeth to relieve the connective tissue from the root surface. The connective tissue graft was harvested from the palate and the donor site was sutured back with 3-0 black silk suture. The graft was trimmed according to the requirements at the recipient site. It was then tucked in through the semilunar incision and pushed coronally to the interdental site and provide bulk. Then the flap was stabilized with 5-0 vicryl sutures and a horizontal mattress suture was given.

The patient was put on analgesics and 0.2% chlorhexidine digluconate mouthwash twice daily for 2 weeks was advised with no mechanical cleaning of the surgically treated interproximal areas.

Post operative follow up

At 1 week post op, healing was found to be satisfactory. The patient was recalled and reviewed at regular intervals. Complete reconstruction of the IDP was achieved after 6 months.



Figure 1:Persistent pocket after SRP



Figure 2:Immediate post op after open flap debridement with compromised osseous reshaping

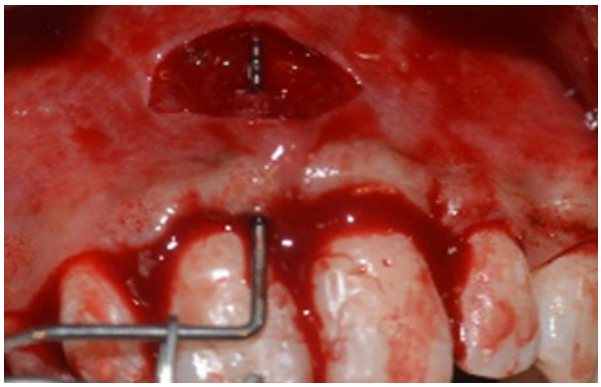


Figure 3:Bridge flap raised

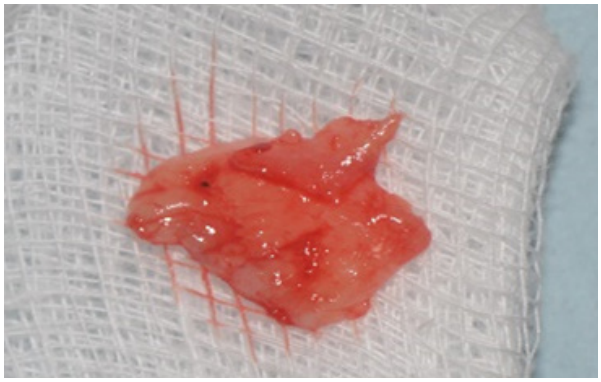


Figure 4:Connective tissue graft (CTG) procured



Figure 5:CTG tucked inside



Figure 6: 6 months post op

Discussion

The IDP depends on various factors such as crestal bone height, contact area and dimensions of the interproximal space.[8]

When the distance between the bone crest and contact point is <5 mm, surgical interventions to reconstruct the IDP is predictable.[9] When it is >5 mm a restorative or orthodontic closure is indicated before surgical interventions.

Most techniques include horizontal incisions.[10] This cuts off the vascular supply that arises from the connective tissue to the IDP.[11] This report describes a procedure where horizontal incision is avoided to preserve vascularity to the site and improve postoperative outcome.

This technique described by Han and Takei[6] provides good vascular supply to the connective tissue graft avoiding necrosis. The procedure was done after a diastema closure with composite build up thus reducing the distance from the crest of the papilla to the contact point, to provide good papilla integrity.

Conclusion

This report shows a successfully treated case due to proper planning and evaluation of tissues that are required for predictable outcomes in papilla reconstruction techniques.

Conflict of Interest: The authors declare that there is no conflict of interest

Source of Funding: Self

Ethical Clearance: Ethical clearance was obtained from Institutional Ethical Committee of Saveetha Dental College and Hospitals (SDC/IHEC/040)

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A Gender Specific Comparative Study of Oral Self Care and Oral Health Attitude between Dental Undergraduate and Post Graduate Students

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Abstract

Background: Oral health constitutes an important determinant of overall health and well-being, yet oral diseases remain among the most prevalent problems in our society. Dental school students' knowledge, beliefs and attitudes about dental health greatly determine the oral health care level of their future patients.

Aim: The purpose of this study was to compare the oral self care practices among dental undergraduate and postgraduate male and female students.

Methods: A study questionnaire consisting of 14 questions was formulated and distributed to 200 dental students for this cross sectional study, out of which 166 questionnaires were returned after completion. The students consisted of 82 postgraduate females, 12 postgraduate males, 42 undergraduate females and 30 undergraduate males. The questionnaire comprised of questions to assess the aptitude on oral health, self care practices, presence of deleterious habits and frequency of dental visit.

Result: There was no significant difference in dental health, oral self care and dental visits neither between the post graduate and undergraduate dental students nor between the male students and female dental students. However, there was a significantly higher number of smokers with relatively greater frequency and longer duration among postgraduate male dental students compared to other groups, followed by the undergraduate male dental students. Also there was a higher number of smokers in males than in female dental students.

Conclusion: The number of years in dental education does not influence the attitude and behavior among the dental students with respect to oral self care practices. However their age and gender influences their intensity of deleterious habits.

Key Words: *Oral health, Smoking, Mouthwash, Dental floss*

Introduction

Self care is the best health care. Oral self care goes a long way in maintaining the oral health of the population in general as well as in the success of the treatment of dental patients.

In order to motivate the patients, it's imperative for a dentist to have a healthy set of dentition and to follow good oral self care himself. A dentist with a good oral self care practice can motivate the patient more efficiently and will be willing to instil the practice among his patients. Further, the dentist serves as a role model for his patients to follow.

As already established, dental education plays a major role in oral hygiene. Innumerable studies have

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proved that good health education leads to better motivation among patients to maintain the oral health. [1] So the oral self care practices and aptitudes among dentists are a topic of interest.

Education on dental diseases get refined and advanced when the dentist enters his/her post graduate level, so a question arises if there is improvement in oral self care practices in postgraduate dental students in comparison to undergraduate dental students.

Gender specific studies on the oral self care practices among under and post graduate dental students in India are not carried out to the best of our knowledge.

Thus, the aim of this study was to compare and assess the oral self care practices among dental undergraduate and postgraduate male and female students.

Materials and Method

This cross sectional questionnaire survey was conducted in Saveetha Dental College. The research protocol was approved by the Institutional Review Board. The questionnaire consisted of 14 questions (8 dichotomous questions, 5 multiple choice questions and 4 open ended questions). The questions were aimed to assess the aptitude on oral health, self care practices, presence of deleterious habits and frequency of dental visit. 200 questionnaire forms were distributed randomly among both undergraduate and postgraduate students of both genders. The aim of the study was explained. Only voluntary students were included. Participant confidentiality was maintained. Basic demographic details were obtained. Students were asked to fill out the forms individually and return. 166 forms were returned after complete filling. The data was collected, segregated and percentage calculation was done.

Results

The participants were found to consist of 82 postgraduate females, 12 postgraduate males, 42 undergraduate females and 30 undergraduate males based on their demographic details.

Colour of teeth

A majority of both post graduate and undergraduate males and females were found to be concerned about their color of the teeth. (Table 1)

Bad breath

A majority of both post graduate and undergraduate males and females were found to be concerned about their bad breath. (Table 1)

Bleeding gums

A minority of the post graduate and undergraduate males and females were found to have bleeding gums while a marginally higher number of students in postgraduates were found to have bleeding gums. (Table 1)

Teeth health

A major portion of the students were generally satisfied with their oral health whereas marginally higher number of undergraduates were found to be not satisfied with their oral health. (Table 1)

Frequency of tooth brushing

More number of postgraduate males brushes twice a day followed by undergraduate females, postgraduate females and undergraduate males. The rest brushes once a day. A negligible number of undergraduate females brushes thrice a day. (Table 2)

Type of toothpaste

Most students prefer paste form while a marginal number of females preferred gel form and a noticeable increase in the number of post graduate males preferred medicated toothpaste. (Table 2)

Type of tooth brush

A majority of both post graduate and undergraduate males and females preferred manual over powered toothbrushes. (Table 2)

Regular usage flossing

A major portion of the students did not floss regularly. Undergraduate males were found to be the least followed by postgraduate females, post graduate males and undergraduate females. (Table 2)

Frequency of flossing

Almost all of them had a low frequency of using floss. (Table 3)

Regular usage of mouthwash

More than half of the students do not regularly use mouthwash and there was no significant difference

between groups. (Table 3)

Frequency of mouthwash usage

All the students had insufficient frequency of mouthwash usage. (Table 3)

Smokers

There were smokers only among males and among them more number of smokers (50%) existed in postgraduates. (Table 3)

Frequency of smoking

A majority never smoked while a minority among postgraduate males smoked everyday, every weak and during socialising. A minority among undergraduate males smoked everyday. (Table 4)

Duration of smoking

Around 30% of postgraduate males smoke for more than 5 years while the rest smoke for less than 5 years whereas all undergraduate males smoke for less than 5 years. (Table 4)

Dental visit

Almost all the students in both postgraduate and undergraduate levels irrespective of genders have visited a dentist before. (Table 4)

Frequency of dental visit

There is invariable equal distribution in frequency among all students irrespective of being an undergraduate or a post graduate male or female. (Table 4)

Table 1: Comparison of oral health characteristics

Units – Percentage (%)

	Color of Teeth		Bad Breath		Bleeding Gums		Teeth Health	
	Yes	No	Yes	No	Yes	No	Yes	No
Postgraduate Males	100	0	100	0	16.7	83.3	100	0
Postgraduate Females	92.7	7.3	95.1	4.9	12.2	87.8	90.2	9.8
Undergraduate Males	100	0	100	0	0	100	80	20
Undergraduate Females	95	95.2	95.2	4.8	4.8	95.2	71.4	28.6

Table 2: Comparison of brushing and flossing characteristics

Units – Percentage (%)

	Frequency of Brushing			Type of Toothpaste			Type of Tooth Brush		Regular Flossing	
	Once	Twice	Thrice	Gel Form	Paste Form	Medicated	Manual	Powered	Yes	No
Postgraduate Males	16.7	83.3	0	0	83.3	16.7	100	0	33.3	66.7
Postgraduate Females	41.4	56.1	0	17.1	80.5	2.4	97.6	2.4	26.8	73.2
Undergraduate Males	60	40	0	0	100	0	93.3	6.7	13.3	86.7
Undergraduate Females	28.6	66.7	4.8	9.5	85.7	4.8	95.2	4.8	28.6	71.4

Table 3: Comparison of frequency of flossing, usage of mouthwash and smoking characteristics

Units – Percentage (%)

	Frequency of Flossing		**Regular Usage of Mouthwash**		**Frequency of Mouthwash Usage**		**Smoker**	
	<10 times a week	>10 times a week	Yes	No	<10 times a week	>10 times a week	Yes	No
Postgraduate Males	100	0	33.3	66.7	100	0	50	50
Postgraduate Females	95.1	7.3	24.4	75.6	87.8	12.2	0	100
Undergraduate Males	100	0	26.7	73.3	100	0	20	80
Undergraduate Females	100	0	25	75	90	10	0	100

Table 4: Comparison of frequency and duration of smoking and dental visit characteristics

Units – Percentage (%)

	Frequency of Smoking						**Duration of Smoking**		**Dental Visit**		**Frequency of Dental Visit**		
	Never	**When Socializing**	**Everyday**	**Once a week**	**Once a month**	**Once a year**	**<5 years**	**>5 years**	**Yes**	**Never**	**Once in 6 months**	**Once in a year**	**During dental pain**
Postgraduate Males	50	16.7	16.7	16.7	0	0	66.7	33.3	100	0	33.3	33.3	33.3
Postgraduate Females	100	0	0	0	0	0	100	0	90.2	9.8	36.6	29.3	31.7
Undergraduate Males	86.7	0	13.3	0	0	0	100	0	100	0	40	26.7	33.3
Undergraduate Females	100	0	0	0	0	0	100	0	90	10	30	30	40

Discussion

The participants were found to consist of 82 postgraduate females, 12 postgraduate males, 42 undergraduate females and 30 undergraduate males based on their demographic details.

A majority of both post graduate and undergraduate males and females were found to be concerned about their color of the teeth. A majority of both post graduate and undergraduate males and females were found to be concerned about their bad breath. A minority of the post graduate and undergraduate males and females were found to have bleeding gums while a marginally higher number of students in postgraduates were found to have bleeding gums.

A major portion of the students were generally satisfied with their oral health whereas marginally higher number of undergraduates were found not satisfied with their oral health. Polychronopoulou A et al[2] showed contradicting results during the years of university study, the score variation and favorable attitudes/ behavior

toward oral health appear to reflect the variation in the student's educational training experience. Iwuala SO et al[3] proved that the distribution of participant's responses to the statement "I would rate the state of my oral health as excellent." Among the respondents, 16.5% (*n* = 18) strongly agreed, 41.3% (*n* = 45) agreed, 22.9% (*n* = 25) were neutral and the remaining 12.8% (*n* = 12) disagreed with the statement.

More number of postgraduate males brushes twice a day followed by undergraduate females, postgraduate females and undergraduate males in that order. The rest brushes once a day. A negligible number of undergraduate females brushes thrice a day. Bashiru BO et al[4] reported that brushing habits of the study population were at least once a day (90%), 8.1% twice a day and 1.9% more than twice a day. Regarding knowledge on oral hygiene practice, approximately 60% of students knew that they have to brush the teeth twice daily, 31% knew that there is a need to visit the dentist twice a year and only 18% knew what was dental floss. Naveenkumar PG et al[5] in a similar study observed that a majority practiced toothbrushing twice a day (69.47%).

In the present study, most of the students preferred paste form while a marginal number of females preferred gel form and a noticeable increase in the number of post graduate males preferred medicated toothpaste. A majority of both post graduate and undergraduate males and females preferred manual over powered toothbrushes. Naveenkumar PG et al[5] in a similar study stated that merely, 2.1% used the electric toothbrush.

A major portion of the students did not floss regularly. Undergraduate males had the least number of flossers followed by postgraduate females, post graduate males and undergraduate females in that order and almost all of them had a low frequency of using floss. More than half of the students do not regularly use mouthwash and there was no significant difference between groups. All the students had insuffecient frequency of mouthwash usage.

This echoed the result by Bashiru BO et al[4] which showed very less people using other oral hygeine aids. Also Iwuala SO et al[3] proved that with regards to the oral cleaning aids, toothbrush with toothpaste either alone or in combination with other cleaning aids was used by almost all (99.1%); one respondent used only chewing stick. The combination of toothbrush, toothpaste and chewing stick was used by 12.8% (*n* = 14) of the respondents. 1 respondent (0.9%) reported using mouthwash in addition to toothbrush and toothpaste. 22 (20.2%) respondents reported using dental floss regularly.

There were smokers only among males and among them more number of smokers (50%) existed in postgraduates. A majority never smoked while a minority among postgraduate males smoked everyday, every weak and during socialising. A minority among undergraduate males smoked everyday. Around 30 % of postgraduate males smoke for more than 5 years while the rest smoke for less than 5 years whereas all undergraduate males smoke for less than 5 years.

Almost all the students in both postgraduate and undergraduate levels irrespective of genders have visited a dentist before. A study by Bashiru BO et al[4] reported that most of the students had never visited the dentist (71.6%). Rest of the study population visited dentist as a result of dental pain (18.1%), extraction (8.1%) and hole in the tooth (2.2%). According to Iwuala SO et al[3] nearly 70% (*n* = 76) reported a history of dental attendance. Of these, 51.3% (*n* = 39) reported dental pain as the reason for their dental visit while 25% (*n* = 19) indicated their dental visit was for a routine check-up. Other reasons included professional dental cleaning 8.9% (*n* = 7), dentures 1.3% (*n* = 1), tooth fracture1.3% (*n* = 1), dental cosmetics 1.3% (*n* = 1) and halitosis 1.3% (*n* = 1).

The present study showed female dominance. Naveenkumar PG et al[5] and many other similar studies throughout the world showed female dominance. It is because prevalence of female students among dental colleges is high.

Not only for the Indian dental students, but overall for those from different countries, it can be summarized that improvement is required in the areas of increasing the frequency of toothbrushing, use of mouthwash and interdental aids, regularizing the dentist visit for routine checkup and taking treatment for dental problems.

Conclusion

There was no significant difference in dental health, oral self care and dental visits neither between the post graduate and undergraduate dental students nor between the male students and female dental students. However, there was a significantly higher number of smokers with relatively greater frequency and longer duration

among postgraduate male dental students compared to other groups, followed by the undergraduate male dental students. Also there was a higher number of smokers in males than in females dental students.

Conflict of Interest: The authors declare that there is no conflict of interest

Source of Funding: Self

Ethical Clearance: SDC/IHEC/19-20/041

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Analysis and Assessment of YouTube Uploads as a Source of Information for Oral Sub Mucous Fibrosis

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Abstract

Aim: Social media is becoming one of the most popular sources of information among the general public. YouTube being the most popular is one of the key sources of medical information. This study aims to assess the overall quality of information of Oral Sub mucous Fibrosis presented on YouTube.

Methodology: The study analysed 100 YouTube videos using search terms 1) oral sub mucous fibrosis, 2) OSMF, 3) oral sub mucous fibrosis diagnosis, 4) oral sub mucous fibrosis symptoms, 5) oral sub mucous fibrosis treatment. A quality assessment checklist was prepared and two individuals scored each video independently based on information present. Videos were grouped into poor, moderate and excellent quality based on scores.

Result: After viewing 100 videos with information about OSMF awareness to general public,90%(n=90) of the videos available on YouTube are not helpful for patients seeking information regarding OSMF. 51%(n=51) of videos are completely irrelevant, depicting scarcity of useful videos. Among 10%(n=10) relevant videos (Awareness 3%, Educational 7%) videos, only 2%(n=2) was with excellent quality of information,4%(n=4) moderate quality,4%(n=4) showing the poor quality of videos available. Among the 10% useful videos, 5%(n=5) videos were uploaded by health care units and organisations and 1%(n=1) videos by universities and 4%(n=4) by private health care professionals.

Conclusion: The present study shows there is lack of information presented on YouTube regarding OSMF and also the available useful videos are of poor quality. However, YouTube could serve as a valuable platform for communicating, hence there is high need to upload good educational videos to create awareness and further guide patients with OSMF.

Keywords: *Oral sub mucous fibrosis, YouTube, areca nut, social media*

Introduction

Oral Squamous cell carcinoma is a major cause of morbidity and mortality in the Indian subcontinent.[1] Tobacco and betel quid chewing are the major contributory factors for high incidence of oral carcinomas in India.[2] Oral submucous fibrosis is a potentially malignant disorder characterized by fibrosis of connective tissues in oral cavity caused by chewing of Areca nut. The habit being most popular in Asian countries, OSMF is more prevalent in India, Bangladesh, Srilanka and China with 0.4% prevalence in Indian rural areas. [3] Malignant transformation of OSMF to squamous cell carcinoma is in the range between 2% and 8%.[4]

The etiology of OSMF is the consistent use of Betel nut used by 600 million people worldwide, yet is unknown to most Western physicians.[5] The major areca nut alkaloids include Arecoline, Arecaidine, Guyacoline and Guacine and important flavonoid components

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are tannins and catechins. These alkaloids undergo nitrosation and give rise to N-nitrosamine, which have cytotoxic effect on cells.[6] The betel quid is placed in the buccal vestibule for about 15 minutes to an hour and repeated 5 to 6 times a day which forms a constant contact between the mixture and oral mucosa. The alkaloids from the quid are absorbed into the mucosa and undergoes metabolism resulting in quantitative and qualitative alterations of collagen deposition within the sub epithelial layer of the oral mucosa leading to fibrosis.[7] Commercially existing arecanuts and tobacco have shown a higher severity in clinical grading.[8]

The signs and symptoms of OSMF includes progressive inability to open mouth, marble like pallor of mucosa, development of fibrous bands, xerostomia, masticatory problems, speech, burning sensation, increased salivation, nasal tonality to voice, recurrent ulcers, pain in ears, shrunken uvula and stiffening of lips.[9] It is clinically classified in three stages, stomatitis, fibrosis and sequelae of OSMF.[10] Diagnosis is by clinical and histological means. Histopathological investigations are characterized by epithelial atrophy with loss of rete ridges and hyalinization of the lamina propria and the underlying muscle. Treatment plan mainly includes quitting of betel chewing, oral hygiene, good health education, forgoing hot fluids, alcohol. Medical therapy includes Antioxidants, hydrocortisone tablets and hyaluronidase as intra lesional injections, pentoxifylline, Interferon gamma and surgery.[11]

Internet has become a popular source for health care information[12] with YouTube the most popular. Along with various fields like sports, entertainment and news general public also looks information on health care. YouTube has an estimated one billion unique views per month and six million hours of video watched monthly. The health information obtained through YouTube can have a substantial impact on the patient-physician relationship and mutual trust. Eighty-five percent of physicians have experienced patient have brought up information they obtained through various websites over the Internet[13,14]. Given the popularity of YouTube, several studies have assessed the quality of information in YouTube videos related to health conditions and behaviours, including immunizations[15], prostate cancer[16], kidney stone disease[17], cardiopulmonary resuscitation[18], paediatric tumors[19], inflammatory bowel disease[20] and epilepsy[21]. Therefore, the aim of this study was to assess the quality of selected videos uploaded on YouTube regarding OSMF.

Methodology

A YouTube search was performed for videos related to OSMF. Following search terms were used 1) oral submucous fibrosis, 2) OSMF, 3) oral submucous fibrosis diagnosis, 4) oral submucous fibrosis symptoms, 5) oral submucous fibrosis treatment. The standard YouTube filter were applied displaying videos by relevance. Videos providing awareness and educational videos were included. Awareness videos are explaining issues and impart knowledge to people so that they can make their own decisions. Educational videos are teaching videos and are merely descriptive.

Non-educational, surgical videos, patient review, Non English, videos without audio and subtitles, Duplicate videos, and irrelevant videos were excluded (Figure 1). Videos on same topic with 2 parts were considered as one. The following information for each video was recorded 1) date of upload, 2) number of views, 3) number of likes and dislikes, 4) URL. The first 100 videos were included assuming people would not search in further. Source of upload are categorised into health care units and organisations, universities, private health care professionals, TV channels. There was no instituitional review board approval required for the present study.

Interaction index was evaluated based on viewers interaction with videos.

$$\frac{\text{Number of likes-Number of dislikes}}{\text{total number of views}} \times 100\%$$

Viewing Rate

$$\frac{\text{Number of views}}{\text{Number of days since upload}} \times 100\%$$

Content of videos were evaluated based on etiology, pathogenesis, signs and symptoms, prevention and management. In order to assess the videos, grading system similar to Ulrich Koller et al[22] was used with expert opinions. Two independent observers assessed all the videos using the scoring criteria and each video was independently given a score. Scores were based on the amount of information presented and average of scores of both individuals were considered. Videos were

considered of good quality if they provided high amount of accurate information, depending on weighting of items, 0.5 points were given for each mentioned item in checklist. (Table1). Usefulness score was calculated, they were categorized as slightly useful for scores 1-3, moderately useful for scores 4-7 and very useful for scores 8-10.

Statistical Analysis

Descriptive statistics were performed. Video length, Interaction index, Viewing rate, Usefulness videos were determined. To compare variables between groups Mann Whitney test is applied. Data entry and analysis were done using the data SPSS Statistics for Windows, Version 23.0 is used. Significance level is $\alpha = 0.05$.

Result

Applying the search term "oral submucous fibrosis" resulted in 1,090 results comprising of 915 individual videos, 92 playlists and 22 channels. Of all the videos presented only first 100 videos were analyzed in this study assuming viewers would not search in further. Analysing the videos according to search terms it was found that the search terms "oral submucous fibrosis, oral submucus fibrosis symptoms, oral submucus fibrosis diagnosis and oral sub mucus fibrosis treatment" resulted in same 1090 videos in a different order, which are taken into consideration After viewing 100 videos, 3%(n=3) were videos aiming to create awareness, 7%(n=7) of videos were educational videos with good information, 14%(n=14) demonstrated laser therapy, 5%(n=5) demonstrated intra lesional injections, 13%(n=13) videos were surgical videos explaining OSMF from surgical aspect, 1%(n=1) of videos uploaded by private professionals on patient review post treatment, 2%(n=2) videos explaining histopathology of OSMF, 3%(n=3) of videos in Hindi. and 51% of videos completely irrelevant. Among them awareness (videos aiming to create public awareness) and educational videos (videos with information like etiology, signs and symptoms,prevention,management) were taken into consideration for scoring criteria(10%).

In these 10 relevant videos mean number of views was 9912, mean number of likes was 307 and dislikes was 81. (Figure 2) shows the flow chart of various categories of videos found. 90 videos being irrelevant (not useful for general public).

Characteristics of the videos

Analysing those 10 relevant videos it was found that only 7%(n=7) videos had OSMF defined, 7%(n=7) videos mentioned the etiology with only one videos explaining about areca nut in detail. Only 5%(n=5) videos explained the pathogenesis, and only 3%(n=3) videos explained the signs and symptoms which the general public must be aware of. Diagnosis of OSMF was explained in 7%(n=7) videos, with only 1%(n=1) video having good treatment information. Figure 3, shows the Bar diagram demonstrating number of videos, which contained information in each category. A Vast majority of videos lack the basic general information on oral sub mucous fibrosis.

Out of 100, 90%(n=90) of videos were found to be non useful for general public seeking information on OSMF. Only the educational and awareness videos were taken into consideration for scoring. As scoring of videos were based on the information they contained. Each video was given an overall score as shown in the (figure 4).

The scoring showed among 10%(n=10) videos, 2%(n=2) videos was very useful with score of 8 and 10, 4%(n=4) videos moderately useful with score of 4.5, 6, 6.5 and 7, 4%(n=4) videos slightly useful with scores of 2.5, 2.5, 1 and 1.

Among the 10%(n=10) useful videos, 5%(n=5) videos were uploaded by health care units and organisations and 1%(n=1) videos by universities and 4%(n=4) by private health care professionals.

Viewing rate for awareness videos was (25.6min+_30.0) and educational videos was (12.3min+_10.4) ($p>0.05$) showing higher viewers for awareness videos. People prefer watching awareness videos for quality of information presented. Mean usefulness score was (7.7+_2.0) for awareness videos and (3.1+_2.4) ($p<0.05$) for educational videos which explains the fact of higher viewing rate for awareness videos. Therefore, viewers found public awareness videos more useful and it has a higher viewing rate. Viewers interaction with videos were positive, mean interaction index score for awareness video was (0.88% +_0.97) and educational video were (0.70%+_0.64) ($p>0.05$). The mean length of awareness video was (5.50 +_1.4) was comparable to (3.7+_2.1)($p>0.05$).Table 1

Table 1: awareness regarding descriptive videos among study subjects

Score 0 = not useful, score 1-3 slightly useful, score 4-7 = moderately useful, scores 8-10 = very useful.

Variables Awareness		**Group**		**p-value**
		Educational		
Interaction index	Mean	.8750	0.724	
	Std. Dev	.9744	.6953	
	Median	.5230	.6396	
	1st Quartile	.1255	.6885	
	3rd Quartile	1.9764	.1471 1.2435	
Video length				0.116
	Mean	5.50	3.74	
	Std. Dev	1.40	2.10	
	Median	5.15	3.00	
	1st Quartile	5.11	2.58	
	3rd Quartile	6.41	3.04	
Viewing rate				0.655
	Mean	25.572	12.316	
	Std. Dev	29.757	10.353	
	Median	10.680	9.100	
	1st Quartile	6.200	7.360	
	3rd Quartile	59.835	15.660	
Usefulness				0.049
	Mean	7.67	3.10	
	Std. Dev	2.08	2.38	
	Median	7.00	2.50	
	1st Quartile	6.00	1.00	
	3rd Quartile	10.00	4.50	



Figure 1 : Figure showing the exclusion criteria



Figure 2: Flow chart demonstrating various categories of videos found.

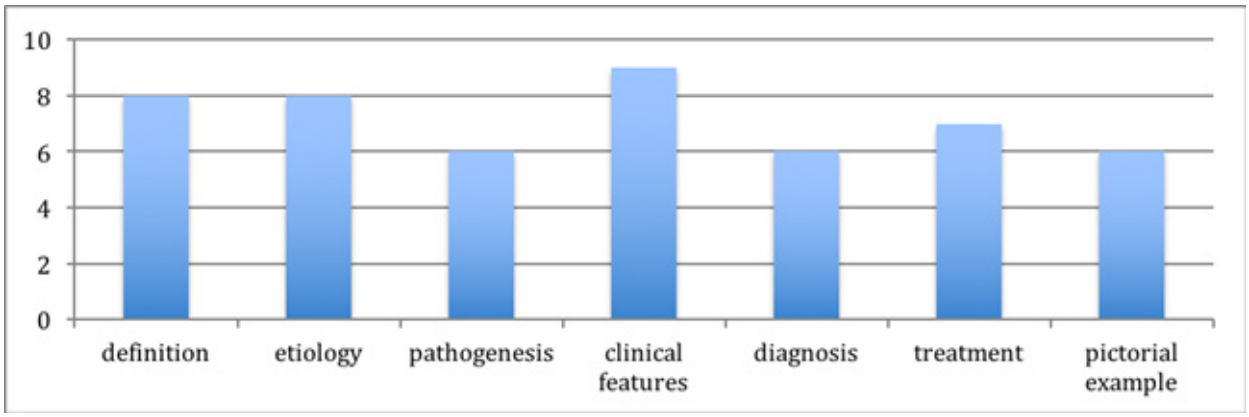


Figure 3: Bar diagram demonstrating number of videos which contained information in each category.

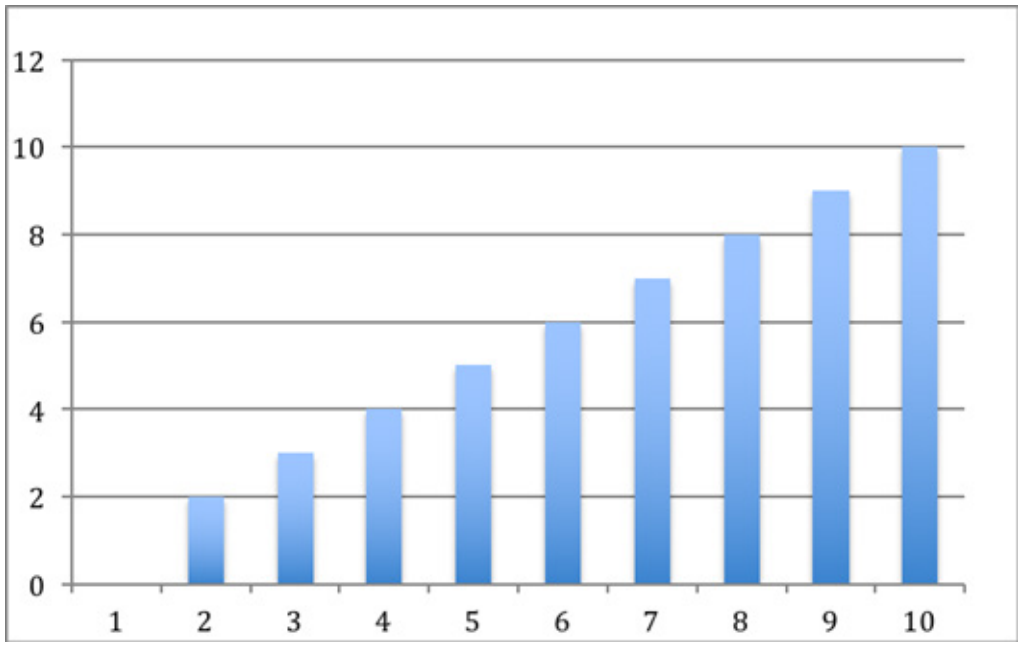


Figure 4: Bar diagram demonstrating scoring of 10 videos

Discussion

In this fast moving world patients increasingly access YouTube for medical information in order to play a more active role in personal health care decisions. As YouTube is non peer reviewed platform, physicians and patients should be aware of the variable quality of information and different sources of health information. The quality of YouTube information has already been evaluated for different medical specialties such as urology, otorhinolaryngology and orthopedic fields. More youngsters fall into the prey of chewing pan and

in turn get addicted, leading to potentially malignant disorders like OSMF without knowing the risk of them transforming into oral cancer. Hence increased public awareness is required projecting the consequences of potentially malignant disorders like OSMF, thus helping the patients to quit the habit at once. YouTube is a social media, and the quality concerning the Oral sub mucous fibrosis in Youtube has not been previously studied. To the best of our knowledge, this is the first study that has analyzed and assessed the content and quality of uploaded videos about OSMF.

The signs and symptoms of OSMF appear gradually with vesicle, ulceration, blanching and restricted mouth opening. For patients it may be confusing and in curiosity may asses YouTube to gather information.

The present study is relevant for physicians and patients alike. It demonstrates lack of information about OSMF on YouTube and also the poor information quality of present videos.

In this study initially when 100 videos were to be taken into consideration and scoring, later only 10 videos were found to be eligible to fit into the relevant category depicting the lack of information on OSMF. Most of the videos were irrelevant due to language discrepancies or irrelevant topic. The majority of information present demonstrates the surgeries done by private surgeons, which is not useful for patients seeking for information about the disease. Few videos present were patient reviews post treatment and few videos demonstrated clinically how the lesion looks with either no audio or poor information quality. These videos maybe useful for patients searching for visual examination of lesion but does not provide the general information about OSMF.

Among the relevant 10% of videos, there was only 2 videos with excellent quality (8-10) points . The video contained maximum features with respect to the checklist (Table 1). 4 videos were of average quality (4-7) points, 4 videos were of poor quality (1-3) points. It was found that among the relevant videos information on diagnosis and pathogenesis was least. Information regarding etiology being Arecanut chewing was also average. All possible treatment mentioned in checklist was mentioned only in one video showing poor treatment information also.

Mean viewing rate, useful score, interaction index, video length were more for awareness video though less in number, compared to educational video, suggesting the need for uploading good public awareness videos with all informations, rather than teaching videos that gives merely descriptive information that may be useful only for dentists and oral medicine specialists.

The present study demonstrates that there are insufficient videos online on YouTube about OSMF and the present videos do not provide sufficient information. Since OSMF occurs from early age as 20, YouTube must provide enough awareness about arecanut being the causative agent for OSMF and its possible consequences. This might be helpful for younger generation to create awareness on its harmful effects. Only 5 videos had accurate information about arecanut being the etiologic factor. Patient might assess YouTube to self diagnose when facing the signs and symptoms, but the quality of diagnosis was found to be poor. Patients also try to find the various treatment options available to them through YouTube. This study showed that there are very few videos providing good quality of information about them. Apart from lack of videos available, the available videos provide a very narrow information therefore very less information reaching to general public. Consequently, YouTube is not helpful for patients seeking information on OSMF. Our study is a good example of what future videos could be uploaded.

Similar results were obtained by a study conducted by Ulrich Kohler et. al who concluded YouTube provided insufficient information on diagnosis and treatment possibilities of Hip Arthritis[22]. Another study on quality of information present on YouTube about Distal radius fracture immobilization was conducted by Abdulah Addar et . al also concluded scarcity of good information and need to promote high-quality educational videos[23]. Craig Hansen et al study showed the YouTube video content they reviewed did not adequately reflect what is known about the safety of use of medicines in pregnancy[24]. Nancy Gupta et al conducted a study on assessment of YouTube information and colonoscopy and concluded patients searching for information regarding colonoscopy on YouTube will be presented with overall poor quality and non peer reviewed content. The study highlights the need on YouTube for evidence based, easy to understand videos addressing various aspects of colonoscopy, possibly sponsored by professional medical societies[13]. On the contrary Sood A et. Al, found that YouTube had sufficient information on kidney stone disease and may influence patient's attitude positively[24].

We acknowledge the limitations in our study: there were no validated tools to asses the quality of information therefore we followed the MacLeod et al and Ulrich Koller et al, a new quality assessment checklist was prepared. The grading scale had excellent inter and intra observer reliability demonstrating high consistency of grading scale. Only English language were analyzed in this study. Knowledge available on YouTube is constantly evolving, yet the present situation of only 10% of relevant videos shows the poor quality.

Conclusion

OSMF being one of the commonly occurring pre cancerous condition which leads to malignancy requires special attention. Occurrence of OSMF is more prevalent in younger age group as peer influence by friends and colleagues are key factors to acquire the habit of pan chewing. Social platforms like YouTube, google and Facebook can play key role in creating awareness about the consequences and harmful effects of pan. The present assessment of YouTube videos demonstrates that information regarding Oral sub mucous fibrosis is overall insufficient. Along with scarcity of useful videos the present available videos also are of poor quality. Use of YouTube for seeking information is going to grow rapidly within next few years and videos are going to become primary source of information. Therefore, there is high need to upload videos with good quality information to further guide patients. The medical communities can use this opportunity to define gold standards for comprehensive and innovative evidence based educational videos on OSMF.

Conflict of Interest: The authors declare that there is no conflict of interest

Source of Funding: Self

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CBCT Analysis of Maxillary Canine Impactions- A Cross Sectional Study

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Abstract

Aim : To study the positions and angulations of Maxillary canine impactions.

Materials and Method: The CBCTs of 30 patients who reported with Maxillary canine impactions to the outpatient department of Saveetha Dental College was assessed. The impactions were assessed based on the following variables: Age, Gender, Type of impaction – Buccal/Palatal/In arch, Unilateral or bilateral, Canine angulation, Vertical height, Erikson and Kurol root resorption, Power and Short's Vertical position .

Results: The p-value generated for Vertical height was 0.0167<0.05 indicating a statistically significant vertical height, while that for canine angulation was 0.374>0.05, indicating a statistical insignificance.

Conclusion: From this study,it was observed that an angulation exceeding 31 degree of the impacted canine decreased the chances of eruption. Also the vertical height of the canine was a factor in determining the impaction of canines.

Keywords: *Cone Beam Computed Tomography, Maxillary canine impactions, angulation, Vertical height, root resorption.*

Introduction

An impacted tooth can be defined as one whose eruption is considerably delayed, and for which there is sufficient clinical and radiographic evidence that eruption will not take place (Thilander and Jakobsson, 1968).[1] The most common impactions in almost all populations are the maxillary and mandibular third molars. This is followed by Maxillary canines whose incidence of impactions vary among different populations. There are many reasons attributable to the impaction of Maxillary canines.the eruptive pathway of Maxillary canines which is not only the longest but also the most torturous of all. The path starts from its site of formation lateral to the piriform fossa to its final position in the arch. crowding, dilaceration, abnormal position of tooth bud, cystic formations, iatrogenic positioning of adjacent tooth into canine's pathway.[2] Timely intervention of these impactions prevents the occurrence of resorption of roots of adjacent tooth and cystic transformation. Surgical and orthodontic treatment interventions can bring the impacted tooth to a normal position in the arch. However, before intervention the clinician largely depends on diagnostic aids to study the positions and angulations of these impactions. This is because there are various factors like the position of impaction, surgical accessibility, prognosis of the interventions both on the impacted tooth and adjacent teeth that decide the type of treatment to be provided.[3]

Initially the conventional diagnostic aids such as Panoramic radiograph and Orthopantomographs were used for the diagnosis of Canine impactions. However, these aids had a major disadvantage in that they were 2 – dimensional. But a 3-dimensional positional analysis of

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the impactions was required. So diagnostic aids such as Computed Tomography (CT) and Cone Beam Computed Tomography (CBCT), came into usage for assessing the positions of Maxillary canine impactions. Further, two important indices were developed for the assessment of canine impactions. They are the Erikson and Kurol's root resorption index and the Power and Short's vertical position index.

Thus, the current study was aimed at studying the positions and angulations of impacted Maxillary canines using CBCT and based on the indices by Erikson & Kurol and Power & Short. [4,5]

Materials and Method

The CBCT scan's of 30 patients who reported with Maxillary canine impactions to the outpatient department of Saveetha Dental College were accessed after approval from the Institutional Ethics committee. Of the 30 scans, 24 were selected based on the following inclusion and exclusion criteria.The inclusion criteria was - Age group between 15 – 60 years, Both genders, Patients with Maxillary canine impactions, and Patients with unilateral or bilateral impactions in the maxillary arch. The exclusion criteria was - Mandibular canine impactions, Resorbed canine impactions, and Age below 15 years and above 60 years. This yielded a total of 24 scans with 33 Maxillary canine impactions. Informed consent was obtained from the patients and the study was approved by the institutional ethical committee.

The impactions were assessed based on the following variables:

- Age
- Gender
- Type of impaction – Buccal / Palatal / In arch
- Unilateral or Bilateral.
- Canine angulation
- Vertical height
- Erikson and Kurol root resorption
- Power and Short's vertical position

The Canine angulation was measured between the long axis of canine and the mid Sagittal plane. The Vertical height was measured as the length of the perpendicular drawn between the deepest concavity in the canine and a line connecting incisal edges to premolars. Erikson and Kurol root resorption index can be explained as folllows:

1. No resorption – Intact root surfaces except for loss of cementum
2. Slight resorption – Upto half of the dentin thickness to the pulp
3. Moderate resorption – Half way to the pulp or more ; the pulp is covered with dentin
4. Severe resorption – The pulp is exposed

The Power and Short's Vertical position is as follows:

Stage 0 – No overlap

Stage 1 - <1/2 incisor root width

Stage 2 - >1/2 incisor root width

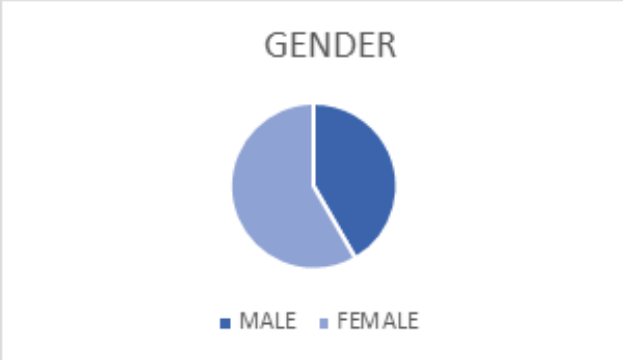
Stage 3 – Complete overlap and beyond

Results

The recorded measurements for each variable was subjected to statistical analysis. Of the 24 participants, 10 were Male and 14 were Female.(Fig 1) The type of impactions was calculated as 9 bilateral, 8 unilateral left and 7 unilateral right impactions.This gave a total of 33 impactions of which 6 were in arch, 9 were palatal and 18 were buccal impactions. (Fig 2)

Erikson and Kurol root resorption observed in 34 scans, that 15 impactions had no root resorption, 5 had mild resorption and another 5 had Moderate resorption while Severe resorption was recorded in 9 impactions. (Fig 3) Power and Short's Vertical position- there was Stage 1 overlap in 2 impactions, Stage 2 in 1 impaction, Stage 3 and no overlap in 11and 21 respectively. (Fig 4)

The vertical height and canine angulation measurements were subjected to ANOVA. The p-value generated for vertical height was $0.0167 < 0.05$ indicating a statistically significant vertical height, while that for canine angulation was $0.374 > 0.05$, indicating a statistical insignificance.



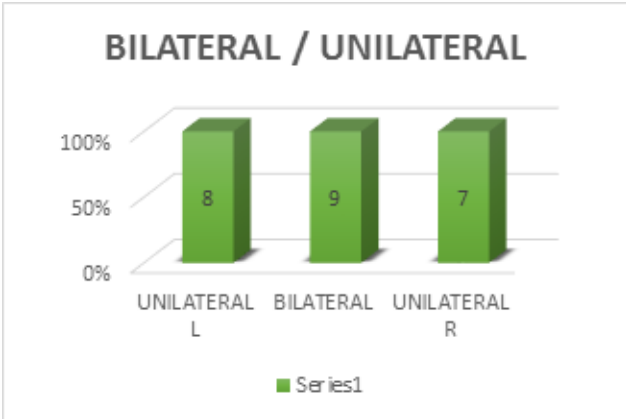


Fig 1: Distribution of genders among the sample

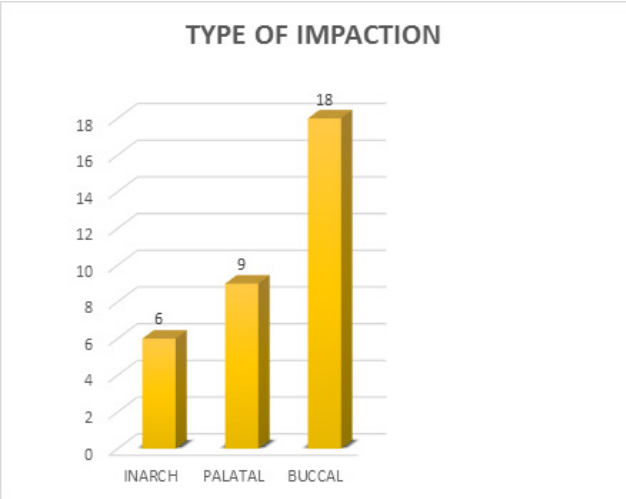


Fig 2: Distribution of types of impaction among the sample

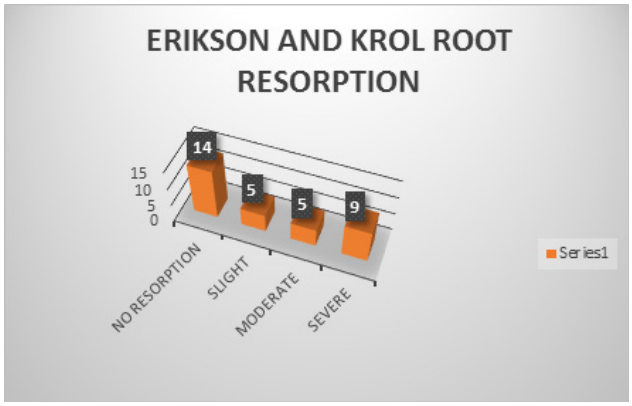


Fig 3: Grading of resorption in the sample

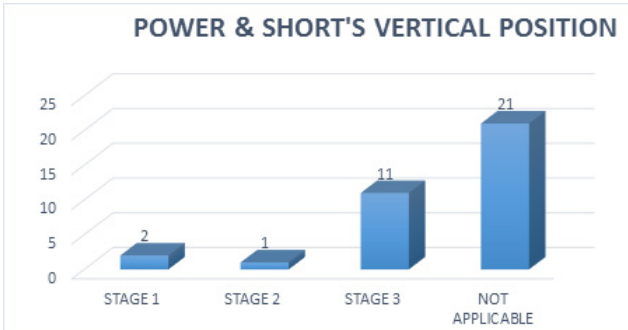


Fig 4: Vertical position of impaction in the sample

Discussion

Impaction can be defined as failure of tooth eruption at its appropriate site in the dental arch, within its normal period of growth.[6] Impacted tooth / teeth are one of the most frequently encountered problems in dentistry. The most common impactions being mandibular third molar, Maxillary third molar, Maxillary canine, Mandibular premolar, Maxillary premolar, Mandibular Canine, Maxillary central incisor, and Maxillary lateral incisors in the decreasing order of their frequency of occurrence. The etiological factors for an impaction can be classified as local and systemic factors. Systemic factors includes febrile illness, endocrine disorders such as hypo- or hyperthyroidism, and irradiation. Local factors that impede with normal tooth eruption can be the arch length tooth material discrepancy, prolonged retention of predecessor, abnormal position of tooth bud, ankylosis, alveolar cleft, cystic or neoplastic transformation, dilaceration, idiopathic and iatrogenic factors.[7]

The incidence of Maxillary canine impactions is around 0.8-2.8%.[8] Many reasons have been proposed for the incidence of Maxillary canine impactions. But to understand these, one must have thorough knowledge about the normal eruption pathway of a Maxillary canine. Initially the eruptive pathway of canine was popularly known as the Broadbent phenomenon which also causes a transient midline diastema. This has further been clearly explained by J. Coulter and A. Richardson in their article.[9] Accordingly, movement of the eruptive canine occurs in 3 different planes during different time periods. Between 7 and 13 years, there is posterior movement and vertical movement between 5 and 13 years. Lateral movement occurred in a palatal direction for upto 2 years before eruption. This was followed by movement in the buccal direction in the year before eruption, year of eruption and the year after eruption. Any impedance during these movements can be one of the reasons for inarch, palatal and buccal

impactions respectively. However, this study was done using Lateral and Posterior – Anterior Cephalometrics, which are 2-dimensional imaging systems. An exact object localization is difficult to achieve using these systems of imaging. Hence, 3-dimensional imaging systems are used currently for studying impactions. One of the most preferred imaging technology particularly for the maxillofacial region is the CBCT imaging – Cone Beam Computed Tomography. CBCT helps in accurate localization of ectopically erupting tooth and for assessing the location and extent of root resorption of adjacent teeth, in this case, the Maxillary lateral incisors.[10] Hence, this was the imaging of choice in our current study. CBCT also helps in the accurate localization of the type of impaction I.e., inarch, palatal or buccal. In the current study, of the 33 impactions studied, 6 were inarch, 9 were palatal and 18 were buccal. There are several research works that reveal the possible theories behind buccal and palatal impaction of Maxillary canines. Buccally displaced canines are thought to arise as a result of crowding and arch length tooth material discrepancy. For palatal canine impactions there are various schools of thought, explaining the etiology. Of these, there are 2 most accepted theories – 'guidance' theory and 'genetic' theory. According to guidance theory, the root of Maxillary lateral incisor serves as a guide for the eruption of canine, but in its absence or hypoplasia, this is hampered. Hence, the canine is palatal disolaced due to the lack of a proper eruptive guide. According to the genetic theory, a complex of genetically determined tooth anomalies together with developmental disturbances to the dental lamina lead to a palatal position of the Maxillary canine.[11, 12] However, according to Yan et al., the relative rate lower of migration in the vertical and transverse directions is also a critical factor for palatally placed canines. The results of Yan et al's study have revealed that a faster migration rate in the occlusal than in the mesiopalatal direction lead to a normal canine eruption inspite of the presence of lateral incisor anomalies, whereas, a faster migration rate in the mesiopalatal than in the occlusal direction, interfered with the eruption of canines even in the absence of lateral incisor anomalies.[13]

In the current study, two important indices were chosen to determine the positions and angulations of the impacted canines, namely, the Power and Short Vertical position index & Erikson and Kurol root resorption index.

The Power and Short Vertical position was used to determine the amount of horizontal overlap of the impacted teeth to the adjacent lateral and central incisors. This was done in 3 stages as mentioned previously. Around 58.3% of the impactions had no overlap, while Stage 3 overlap was seen in 30.5% of the impactions. According to Power and Short, a horizontal overlap of more than half the incisor root width has a poor prognosis of returning to the original position.[5] Also, when the canine angulation to the midline exceeds 31 degree the chances of eruption decrease.[14] In our study, more than 85% of the impactions had angulations that exceeded 31 degrees, which can also be held as a cause for their failure to erupt.

The pressure of the impacted canines on the roots of lateral incisors lead to their resorption. This is partly influenced by the position of canine, wherein a more mesially positioned canine stands greater chances of resorbing the root of lateral incisor. Also the root development of canine is also an attributable factor as it is related to its eruption and migration. [6,15,16] Based on the extent of root resorption, this was staged by Erikson and Kurol into 3 stages. Around 27.3% of the study population had Severe resorption (involving the pulp). The results are comparable to that of Walker, Erikson and Mah, incisor resorption adjacent to the deciduous canines was seen in 66.7% of laterals and 11.1% of the central incisors. [17]

Comparing the vertical height and canine angulation, vertical height was more significant in the current study. This is an indicator that the vertical height of the impacted canine plays a vital role in determining its eruption and prognosis. This goes in accordance with the results of Sajnani and King, according to whom the vertical distance of the tip of Maxillary canine from the occlusal plane is a good predictor of canine impaction.[18]

In the future more such studies need to be carried out on Maxillary impacted canines using advanced diagnostic aids like CBCT, as this can change the course of treatment to a more successful pathway. [19,20]

Conclusion

The study reveals that an angulation exceeding 31 degree of the impacted canine decreased the chances of eruption and a good prognosis. Further, the vertical height of the canine is a factor of higher significance than the canine angulation, in determining the eruption of impacted canines. More such studies need to be

initiated in the future with larger sample size to support the results.

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Micronutrient Levels in Saliva of Chronic Periodontitis Patients Pre and Post Non-Surgical Periodontal Therapy

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Abstract

Background: Saliva, being the major fluid of the oral cavity is composed of various ions, electrolytes, enzymes, micronutrients and microorganisms which contribute to the homeostatic environment of the oral cavity. The micronutrients of the saliva attribute to the nature of the saliva by influencing the pH or by altering the oral microflora. The disturbance in micronutrient status and increased oxidative stress may favor periodontal disease progression. Therefore, the aim of this study was to evaluate the micronutrient levels in saliva in patients with chronic periodontitis pre and post non-surgical periodontal therapy.

Keywords: *biomarker, saliva, prognosis, periodontitis, non-surgical management*

Aim: The aim of this study was to evaluate the micronutrient levels in saliva in patients with chronic periodontitis pre and post non-surgical periodontal therapy.

Materials and Method: The study comprised of 30 patients divided into 2 groups. Group 1 consisted of 15 patients with chronic periodontitis and group 2 consisted of 15 healthy individuals. Phase 1 therapy was done for all subjects. Micronutrient levels (zinc, magnesium and copper) and clinical parameters such as gingival index, pocket depth and clinical attachment loss were evaluated at baseline and 1 month after periodontal therapy.

Results: The results of the study showed that on comparing baseline parameters between the test and control group, there is a marked decrease in micronutrient level of Zinc in the test group when compared with the control group and a marked increase in micronutrient level of Copper in the test group when compared with the control group. On comparing the effect of non-surgical therapy on micronutrient levels in the test group, our results showed improvement in the micronutrient levels. Compared with baseline, the levels of copper showed a decrease after treatment and the levels of zinc showed an increase in response to treatment.

Keywords *Micronutrients, Salivary micronutrients, Periodontitis, Zinc, Copper*

Introduction

The integrity of body tissues mainly depends on the adequate source of both macro and micro nutrients available to the host. Additionally, they are also essential for the better functioning of the various biochemical processes operating within a human system.[1,2] Changes in life style and diet alterations plays a major in altering the macro and micro nutrient levels with the human body. A chronic deficiency of one or more nutrients may produce pathological alterations leading the tissue loss resistant to injuries.[3]

Nutrients can be classified either as macro or micro depending on their requirements.[4] The micronutrients mainly include vitamins and minerals and adequate

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amount required are to be taken in diet for the performance of biochemical functions. Minerals like iron, zinc, copper, iodine, selenium, chromium etc have been found to be essential to perform various biological activities.[5]

Several studies have shown that there is an alteration in the level of these nutrients in disease conditions like Diabetes Mellitus, rheumatoid arthritis, obesity, cardiovascular disease.[6-8] A study by Frithof L[9] has shown that decreased serum zinc levels might be related to increased alveolar bone resorption. Similarly, a study by Enwonwu[10] has shown that malnutrition which usually involves concomitant deficiencies of macro and micro nutrients has the potential to adversely influence the prognosis of periodontal infections.

Saliva, being a vital fluid in the body, has various functions which includes protection and integrity maintenance of oral mucosal health through lubrication, buffering action, antibacterial and antiviral activity, and food digestion.[11] Recent proteomic studies have identified and characterized more than 1000 salivary proteins and peptides. Most of these are commonly found in plasma and some are solely produced and secreted by salivary glands having no correlation with blood levels.[12] Saliva also contains electrolytes, immunoglobulins, metabolites, enzymes, hormones and vitamins.[13,14]

Progress in salivary diagnostics are more likely to depend upon establishing clinical utility of macromolecules and low molecular weight components. In this regard, salivary variations observed in specific pathological conditions have been compared with blood or other body fluids.[15-19]

Materials and Method

30 subjects were enrolled in the study. The study was approved by the University Ethical Committee (SRB/ MDS/ PERIO/18-19/0043). Convenient sampling was done. Subjects who visited Saveetha Dental College for treatment were include in the study. Written informed consent was obtained from each participant. They were allocated to groups based on the diagnosis. Group 1 consisted of healthy individuals and group 2 consisted of patients with chronic periodontitis. Each patient of group 2 received scaling and root planning. Periodontal parameters as probing depth and attachment loss were recorded at baseline and1 month.

Inclusion Criteria

1. Patients diagnosed clinically as having chronic periodontitis according to the American Academy of periodontics criteria 1999

2. Patients aged between 28-70 years

3. Periodontal probing depth of ≥ 4mm

Exclusion Criteria

1. Patients with history of any systemic diseases like diabetes mellitus, cardiac problems etc.

2. Patients with previous history of hospitalization/ surgery in the past one year

3. Pregnant or lactating women

4. Patients with an history of antibiotic, anti-inflammatory drug intake in the past 6 months

5. Patients on treatment with steroids

6. Patients with congenital abnormalities were also excluded from the study.

Sample collection: Unstimulated saliva was collected from subjects in both groups at baseline. Group 2 subjects who underwent scaling and root planing were recalled after 1 month and saliva was collected. Salivary micronutrients such as Zinc and copper were analysed using a digital analyser.

Statistical analysis: Statistical analysis was done using SPSS v20. Comparison between the two groups at baseline was done using independent T test and comparison between baseline and 1 month was done using Paired T test.

Results

Table 1 shows intergroup comparison between healthy and periodontitis group. This reveals a statistically significant differences among all clinical parameters such as bleeding on probing, probing depth and clinical attachment levels. Similarly, a statistically significant difference was found on comparing the levels of Zn and Cu between healthy and periodontitis group. (p value – 0.00)

On comparing the clinical parameters among chronic periodontitis patients, pre and post non-surgical periodontal therapy, a statistically significant difference

was seen with a p value of <0.05. (Table 2) The salivary micronutrient levels were also found to show a statistically significant difference comparing pre and post levels (p value – 0.00)

Comparison between healthy and post-treatment levels also revealed a statistically significant difference on all clinical and bio-chemical parameters suggesting that non-surgical periodontal therapy may not be sufficient to revert the disease state to health. (Table 3) Additional surgical therapy with long term follow up period might be necessary to prevent disease progression and establish periodontal health.

Correlation of clinical parameters with Zn was statistically significant in relation to probing depth of healthy individuals, clinical attachment levels at baseline of chronic periodontitis patients and post-operative bleeding on probing of chronic periodontitis patients. (Table 4) However, correlation of copper levels was statistically significant only in relation to the baseline clinical attachment levels of chronic periodontitis patients.

Table 5 shows correlation of Zinc and Copper levels. A negative correlation was found between zinc and copper levels of group 1(Graph 1). Correlation of zinc and copper levels of group 2 revealed a weak positive correlation (Graph 2). Correlation of Zinc and Copper levels of Group 3 also showed a negative correlation and is represented in graph 3.

The results of the study showed that on comparing baseline parameters between the test and control group, there is a marked decrease in micronutrient level of Zinc in the test group when compared with the control group and a marked increase in micronutrient level of Copper in the test group when compared with the control group. On comparing the effect of non-surgical therapy on micronutrient levels in the test group, our results showed improvement in the micronutrient levels. Compared with baseline, the levels of copper showed a decrease after treatment and the levels of zinc showed an increase in response to treatment.

Table 1: Comparison of clinical and biochemical parameters among healthy and chronic periodontitis patients (Independent T Test)

Parameters	Group 1 (healthy)	Group 2 (periodontitis)	P value
Bleeding on probing	0.08±0.14	1.71±0.29	0.00*
Probing Depth (PD) mm	2.15±0.36	4.57±0.52	0.00*
Clinical Attachment Level (CAL) mm	0	5.93±0.70	0.00*
Zinc (Zn)	72.78±2.83	63.04±2.31	0.00*
Copper (Cu)	74.97±1.23	88.14±2.09	0.00*

P value significant at <0.05

Table 2: Comparison of clinical and biochemical parameters among chronic periodontitis patients before and after non-surgical periodontal therapy (Paired T Test)

Parameters	Group 2 (baseline)	Group 3 (post-operative)	P value
Bleeding on probing	1.71±0.29	1.36±0.21	0.000*
Probing Depth (PD) mm	4.57±0.52	4.16±0.59	0.032*
Clinical Attachment Level (CAL) mm	5.93±0.70	5.64±0.78	0.015*
Zinc (Zn)	63.04±2.31	76.33±2.00	0.000*
Copper (Cu)	88.14±2.09	80.51±2.66	0.000*

P value significant at <0.05

Table 3: Comparison of clinical and biochemical parameters among healthy and chronic periodontitis patients after non-surgical periodontal therapy (Independent T Test)

Parameters	Group 1 (baseline)	Group 3 (post-operative)	P value
Bleeding on probing	0.08±0.14	1.36±0.21	0.00*
Probing Depth (PD) mm	2.15±0.36	4.16±0.59	0.00*
Clinical Attachment Level (CAL) mm	0	5.64±0.78	0.00*
Zinc (Zn)	72.78±2.83	76.33±2.00	0.00*
Copper (Cu)	74.97±1.23	80.51±2.66	0.00*

P value significant at <0.05

Table 4: Correlation of clinical parameters with biochemical parameters (Pearson's Correlation)

Parameters r value		Zinc		Copper	
		p value	r value	p value	
Group 1 (Healthy)	Bleeding on probing	-0.393	0.147	-0.144	0.608
	Probing Depth (PD) mm	-0.934	0.000*	-0.122	0.664
Group 2 (baseline)	Bleeding on probing	0.1	0.724	0.504	0.055
	Probing Depth (PD) mm	0.294	0.897	-0.257	0.354
	Clinical Attachment Level (CAL) mm	-0.597	0.019*	0.521	0.047*
Group 3 (post-operative)	Bleeding on probing	0.590	0.020*	0.348	0.204
	Probing Depth (PD) mm	0.079	0.781	0.510	0.328
	Clinical Attachment Level (CAL) mm	-0.495	0.061	0.052	0.230

P value significant at <0.05

Table 5: Correlation of zinc and copper levels (Pearson's Correlation)

Groups	Correlation test	Values
Group 1	r value	-0.097
	p value	0.731
Group 2	r value	0.040
	p value	0.888
Group 3	r value	-0.240
	p value	0.388

P value significant at <0.05

Discussion

Micronutrients such as Zn and Cu play an important role to maintain adequate immune response as well as to combat oxidative stress. When malnourished individuals are exposed to infections, the host responds not only by mounting appropriate specific and nonspecific immune responses but also by initiating a well-characterized series of metabolic adjustments.20 Inflammatory stimuli from dental plaque promote release of reactive free radicals and also exhibit metabolic changes that are modulated by potent soluble mediators known as cytokines. Many studies have assessed the levels of micronutrients in patients with periodontitis.21,22 However, ours is the first study to explore the effect of nonsurgical periodontal therapy on the level of micronutrients and compare the pre and post values.

Cross sectional studies done by Grossi et al. have shown that diabetic subjects were twice as likely as nondiabetic subjects to have clinical attachment loss.23 In another cross sectional study done by Bridges et al., it was found that Diabetes Mellitus affected all periodontal parameters. The improvement in all the clinical parameters in this study was similar to a study done by Rodrigues et al.24 Deficiency of Zn, Mg, and Cu increases the susceptibility to infection, impairs the function of neutrophils and macrophages, and reduces the antibody-mediated, cell-mediated, phagocytic and delayed type of hypersensitivity reactions and depletion of antioxidants. A study by Freeland et al. also showed that serum copper levels were increased in individuals with chronic periodontitis25.

Turnlund and associates reported immune function and antioxidant status can be modulated by increased serum concentration of copper. Studies on animal models have shown that increased serum copper levels reduce several aspects of immune response, including neutrophil numbers, lymphocyte proliferation, and antigen-specific antibody production.26 It has also been reported that elevated serum copper levels alter collagen metabolism and hence can promote periodontitis.27 Frithiof et al. and Tulin et al. in separate studies found decreased serum zinc levels in individuals with periodontitis when compared to healthy controls.28,2[9]

The present study shows that non-surgical therapy improves the micronutrient levels in patients with chronic periodontitis. This study is limited primarily by its short follow up period, which prevents the establishment of a temporal relationship between micronutrients and periodontitis. Another limitation is that salivary concentrations are perhaps not the best index of micronutrient levels in periodontal tissues. More longitudinal studies with a larger sample size should be carried out to have a better understanding of the interrelationship between micronutrient imbalance and chronic disease processes like periodontitis.

Conclusion

In the last decades, the impact of micronutrients on human physiology has begun to be elucidated. Imbalance in zinc and copper levels are evident in patient with chronic periodontitis. Non-surgical therapy improves the micronutrient levels on patients with chronic periodontitis. However, more longitudinal studies with a larger sample size and longer follow up period should be carried out to have a better understanding of the interrelationship between micronutrient imbalance and chronic disease processes like periodontitis.

Conflict of Interest: The authors declare that there is no conflict of interest

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Antioxidant and Antifungal Activity of Bacteria Mediated Silver Nanoparticles Using *Rhizobium* sp

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Abstract

Background: The silver nanoparticles (AgNPs) have a significant range of application in the field of biomedical technology. This can be subjected in agriculture by biological synthesis method using microbes which may inhibit disease-causing pathogens in agriculture, typically it confused on management of pathogens.

Materials and Method: In this present investigation, *Rhizobium* sp. was isolated from cultivable soil sample for the synthesis of AgNPs. The synthesized silver nanoparticles were characterized using UV-Visible spectroscopy, Scanning electron microscopy shows regular circular shape of AgNPs followed by energy dispersive X-ray (EDX) spectrometers confirms the presences of elemental composition of materials. Transmission electron microscopy was done for the structural analysis and the surface study of synthesized AgNPs was studies by Atomic forced microscopy.

Results: The surface plasmon resonances at 425 nm confirm the AgNPs formation and morphology of the nanoparticles are polydispersed with 25–70 nm in size confirmed by the microscopic techniques. The synthesized silver nanoparticles were examined against disease-causing fungal pathogens such as *Aspergillus niger*, *Candida albicans*, and *Aspergillus fumigatus* in which *Candida Albicans* showed a maximum zone of inhibition of 15 mm at 75 µL of AgNPs.

Conclusion: Finally, the silver nanoparticles were used to perform free radicals scavenging activity.

Keywords: *Antifungal activity, Antioxidant activity, Biosynthesis, Rhizobium sp, Silver nanoparticles.*

Introduction

Nanotechnology exhibits fabulous characteristic features based on their properties such as size, morphology and other size-dependent properties [1]. Application of nanoparticles is hasty impetus due to their chemical, optical and mechanical properties. Some of the noble metals like palladium, silver, platinum, and gold have a wide range of material behavior along the atomic to bulk transition [2]. Among these noble metals, silver has a wide range of applications in making of jewels, dental alloy and health additive in traditional Chinese and Indian Ayurvedic medicine [3]. Silver nanoparticles exhibit tremendous applications in drug delivery, wound healing, sensor applications, cosmetics, textile industry and also used an antimicrobial agent in paints [4]. Silver nanoparticles have huge application in the field of medical sciences due to its antimicrobial property against *Staphylococcus aureus, Escherichia coli, Bacillus subtilis, Klebsiella mobilis,* and *Pseudomonas* [5]. The metal nanoparticles are extensively used in biomedical and bio-electrochemical applications due to their extraordinary electro-catalytic activity [6]. The

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metals are poor in catalytic activity when used in huge quantities but exhibit excellent catalytic activity [7]. While using in nanometer level due to their relatively high surface area to volume ratio property [8]. The significance of nanotechnology is to produce nanoparticles without affecting the environment and to reduce the cost to an acceptable level [9]. Some of the microbes have the ability to grow in high drought, acid as well as saline conditions or rapid change in the environment which can cause beneficial effects for both nature and mankind. Among these categories, most of the microbes come under *Rhizobium* sp. The *Rhizobium* sp has mutualization between plant and soil,which will cause infection to the root of the plant which helps in nitrogen fixation. This process helps the crops to fix soil and fertile soil [10]. In this present investigation, the potential activity on antioxidant and antifungal of AgNPs using *Rhizobium sp* were demonstrated.

Materialsand Method

The chemicals used, $AgNO_3$, nutrient agar, mueller-hinton agar, ascorbic acid (1%) and were purchased from Hi-media Laboratories Pvt. Ltd, Mumbai, India. DPPH from Sigma-Aldrich and the fungal cultures *Aspergillus niger*, *Aspergillus flavus*, *Aspergillus fumigates* were collected from Vellore Institute of Technology, School of Bio Sciences and Technology (SBST), Vellore, Tamil Nadu, India.

2.1 Isolation of the bacteria

The cultivable soil sample was collected in peanut field in the month of November from Karnampet Village, Vellore District, Tamil Nadu, India. 1 g of soil sample was serially diluted and spread on nutrient agar plates aseptically. The plates were incubated at 37°C for 48 h. [11, 12].

2.2 Biosynthesis of silver nanoparticles

The isolates were identified in terms of gram straining and biochemical characterization according to Bergey's Manual of Determinative Bacteriology (Holt *et al*., 1994) in which most of the isolates were gram negative. The selected culture was subcultured once in 15 days for further use. The selected strain was inoculated in freshly prepared nutrient broth and incubated for 24 h. 1 mM $AgNO_3$ was added to the bacterial culture after 24 h followed by the characterization of the biosynthesized AgNPs [13].

2.3 Characterization of nanoparticles

The reduction of silver ions to silver nanoparticles produced by cell-free supernatant of the bacterial isolate was spectrometrically identified using UV-Vis spectrophotometer at wavelength between 360 on electron microscopy (TEM) analysis the topological studies of the synthesized AgNPs. The nano-size range from 10-100 nm thickness of sample can be captured using Transmissis was studied using Scanning electron microscopy (SEM), Energy Dispersive X-ray spectroscopy (EDX) which is used to find out the elemental analysis of AgNPs [14.]

The atomic arrangement and the physical properties of AgNps were characterized by Atomic Force Microscopy (AFM). Finally, antioxidant activity and antifungal activity was performed to examine the potency of the AgNPs synthesized from *Rhizobium sp.* The antifungal activity of silver nanoparticles against *Candida albicans, Aspergillus flavus and Aspergillus fumigates* was done.

2.4 Antioxidant activity

The antioxidant is the substance which reduces the damage of oxidative stress by balancing the production and neutralization of reactive oxidative species (Paulkumar *et al*., 2013). The free radical scavenging activity of DPPH was evaluated for AgNPs synthesized from Rhizobium sp. 50 µl of the silver nanoparticles dissolved in methanol, which yield to 100 µg/ml in each reaction mixture, this was mixed with 1 ml of 0.1 mM DPPH in methanol solution and 450 µl of 50 mM Tris-HCl buffer (pH 7.4) and ascorbic acid was used as control. Incubation was done at room temperature for 30 min; the reduction in the number of DPPH free radicals was measured, by reading the absorbance at 517 nm. The percent inhibition was calculated from the following equation;

% Inhibition = (Absorbance of control – Absorbance of test sample/Absorbance of control) 100

2.5 Antifungal activity

Antifungal agents are the compound or chemical group which has the property to destroy or to inhibit the growth of fungal pathogens. In this activity some of the pathogenic fungal strains are selected as the test organisms such as *Aspergillus niger*, *Candida albicans*, and *Aspergillus fumigatus* and the control is used as

the common existing drug fluconazole. Potato dextrose agar was prepared and poured on to the sterile Petri plates. After that 0.1 ml of the above-mentioned fungal spores were aseptically spread using the sterile cotton swabs. Spherical shape wells of about 5 mm were made and added with 25 µl, 50 µl and 75 µl of synthesized silver nanoparticles. The plates were incubated at room temperature for 24-48 hrs. After incubation period, the zones of inhibition were measured. The statistical analysis of standard error was calculated using triplicates of experiments (n=3) [15].

Result and Discussion

Generally, microorganisms play a vital role in the bioremediation for the removal of heavy metals, but now a days nanobiotechnology were used in the field of biomedical such as nanocarriers in drug delivery systems and reducing agents for the development of new drugs [16]. Based on the previous studies, the synthesized silver nanoparticles using *Rhizobium* sp was analyzed by UV-vis spectroscopic which demonstrate the synthesized pattern by absorbance spectrum and was confirmed by SEM, EDX, TEM and AFM which gives the clear size, the shape of the synthesized AgNPs and also other elements like secondary metabolites synthesized by microbes. The characterization results reveal the confirmation of the AgNps further it was used for the activity studies which include DPPH assay to evaluate the antioxidant activity and antifungal activity against disease-causing fungal strains

3.1 UV spectrophotometry

The light absorption pattern of the cell-free filtrate was monitored in the range of 360-560 nm using UV-vis spectroscopy and was done for 24 h [16]. Initially, for the 2 h and 6 h, there was no rise in the spectrum but at 12 h, the absorbance peak raises at 410 nm. The maximum absorption is directly proportional to the total amount of the surface Plasmon resonance. This maximum surface area shows the higher absorption at a particular wave length for the compound A clear high absorption spectrum was observed at 420 nm which was taken at 24 h Z. [17] that confirms the AgNPs and gradually decreases in the spectrum.

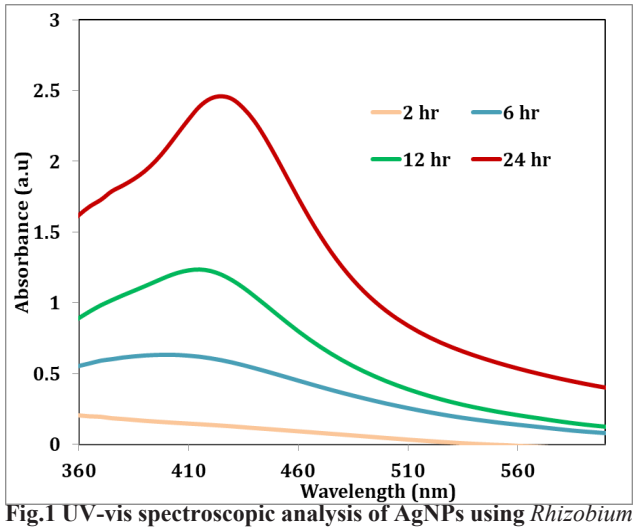


Fig.1 UV-vis spectroscopic analysis of AgNPs using *Rhizobium* sp

3.2 Scanning Electron Microscopy Analysis

The SEM image clearly indicates the particles are predominantly spherical in shape and aggregates into larger particles with no well-defined morphology. The biomolecules present in the surface of nanoparticles leads to agglomeration structure. Analysis through energy dispersive X-ray (EDX) spectrometers confirmed the presence of an elemental silver signal of the silver nanoparticles [18]. The vertical axis displays the number of x-ray counts whilst the horizontal axis displays energy in keV. The EDX spectrum (Figure 2) observed a strong signal from the silver atoms in the nanoparticles at 3 keV and a weak signal from slightly above the basal line are from microbial extracts. This analysis revealed that the nanostructures formed were solely of silver.

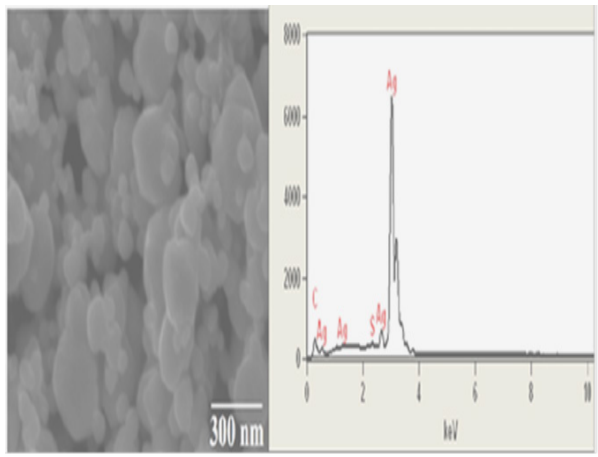


Fig. 2: SEM and EDX spectrum images of AgNPs synthesized using *Rhizobium* sp

3.3 Transmission electron microscopy Analysis

The Transmission electron microscopic (TEM)

image shows the synthesized AgNPs with variable size and shape but most of them are spherical in nature and few are irregular in shape (figure 3). The size of the particle ranged from 5 to 25 nm**.** Majority of the AgNPs were scattered with circular in shape and few of them showing aggregates with various shapes, this is responsible for the synthesis of silver nanoparticle [19].

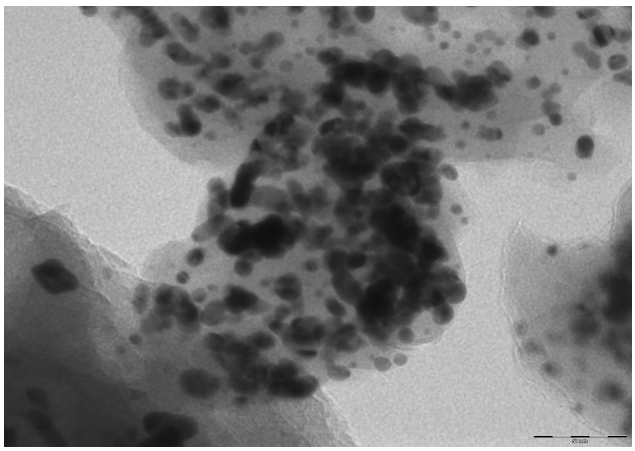


Fig.3: TEM images of AgNPs synthesized using *Rhizobium* sp

3.4 Atomic Force Microscopy Analysis

The morphology and the surface roughness of synthesized AgNPs was monitored using atomic force microscopy (Figure 4). The enhancement of the synthesized AgNPs is proportional to the tangled particle size [20]. The AgNPs are interacting together and form aggregates which are shown in the micrograph and the 3D images as white patches, these aggregates were increased the size of the nanoparticles and shows the surface roughness which might be the presence of secondary metabolites produced by *Rhizobium* sp.

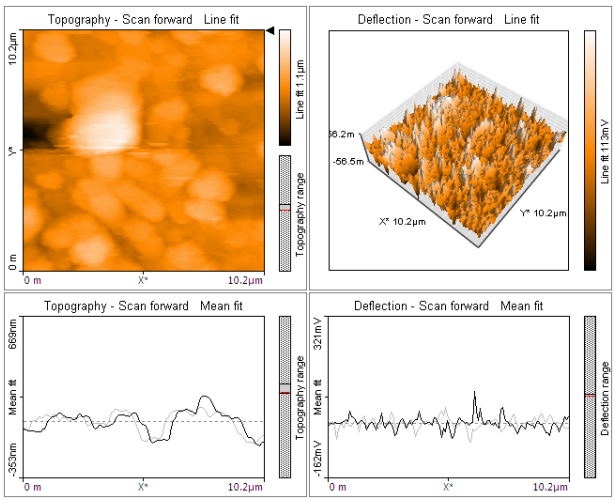


Fig.4: AFM images of AgNPs synthesized using *Rhizobium* sp

3.5 Antifungal activity

Nowadays fungal strain are more resistance against many drugs and which results in high existence of pathogenic organisms [21]. To overcome this predicaments, researchers have came with the biologically synthesized nanoparticles as therapeutic agents. So in this investigation the AgNPs synthesized using *Rhizobium* sp shows a higher zone of inhibition 15 mm for *Candida albicans* as test strain when a higher concentration of AgNPs is added at a concentration of 75µL. And for the strain, *Aspergillus flavus* shows the least zone of inhibition around 6.50±0.29 for 25 µL concentration.

Table:1 Antifungal activity of *Aspergillus niger, Candida albicans*, and *Aspergillus fumigates*

Fungal Strain	Zone of inhibition (mm in diameter)		
	25 µL	**50 µL**	**75 µL**
Candida albicans	011.00±0.00	13.00±0.00	15.00±0.00
Aspergillus flavus	6.50±0.29	8.17±0.17	11.00±0.58
Aspergillus fumigatus	10.67±0.33	11.80±0.20	12.00±0.00

The test strain *Aspergillus fumigates* shows the gradual increase in the zone of inhibition but not at the extreme; generally it describes that the particular concentration range the zone of inhibition occur not like other strains which will increase the ZOI when the concentration of nanoparticles increases (Table 1). From the above study, it was confirmed that the synthesized silver nanoparticles from *Rhizobium* sp have a potent antifungal activity against disease-causing fungal pathogens.

3.6 Antioxidant activity

The free radical scavenging activity of the synthesized AgNPs using *Rhizobium* sp was studied by its ability to reduce the DPPH, which is stable free radical (Figure 5). Any molecule which donates an electron or hydrogen to DPPH, it reacts and which results in a change of color [22]. As the concentration increases, there is a gradual fall in the absorbance and no dramatic change when compared to the standard curve of AgNPs . Hence, this result confirms the effect of the antioxidant activity of synthesized AgNPs using *Rhizobium* sp.

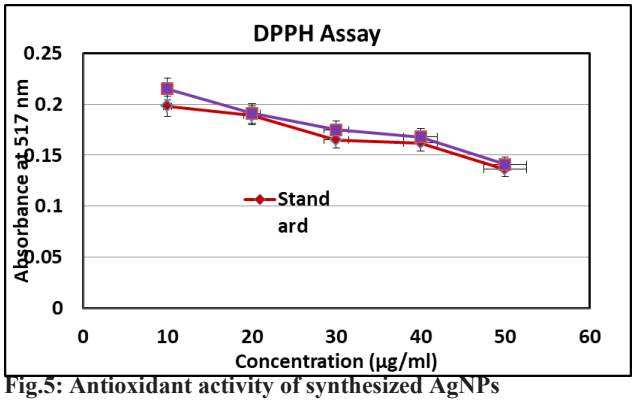


Fig.5: Antioxidant activity of synthesized AgNPs

Conclusion

In this study, the silver nanoparticle synthesized using *Rhizobium sp* were characterized and the potency of synthesized silver nanoparticle was found to possess effective antifungal activities against fungal pathogens. The silver nanoparticles showing good antioxidant results may use as a biomedicine and related to modern medicine preparations. In future, the synthesized nanoparticles can also be used for bio fertilizers for the enhancement of disease free crops production.

Ethical Clearance- SDC/IHEC/19-20/046

Source of Funding- Self

Conflict of Interest - Nil

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Glycine Max Seed Mediated Synthesis and Characterization of Zinc Oxide Nanoparticles and its Antifungal Activity Against Pathogenic Fungal Strains

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Abstract

Background: Among the metal nanoparticles Zinc oxide nanoparticles have more applications in many areas, including biomedical, materials science, and environmental technology. Soybean is one of the important commercial crops due to the presence of protein, oil, carbohydrates, minerals, saponins and isoflavonoids such as genistein and daidzein.

Materials and Merhod: In this present study we synthesis the Zinc oxide nanoparticles by using *glycine max seed* extract. We examine the size and morphology of synthesized Zinc oxide nanoparticles by using UV-visSpectrophotometer, X-ray Diffraction (XRD).

Results: Herein, the Zinc oxide nanoparticles were synthesized by using seed extracts of *glycine max* with in 6h and the size of the Zinc oxide nanoparticles ranges from 70-90 and predominantly spherical shapes with crystalline nature. Elemental analysis of Zinc oxide nanoparticles was characterized by EDX.

Conclusion: The synthesized Zinc oxide nanoparticles from *glycine max* exhibit excellent antimicrobial activity against different clinically isolated fungi such as *Aspergillus flavis*, *Aspergillusniger*, *Candida albicans*, and *Fusarium* sp.

Keywords: *Zinc oxide nanoparticles; Green synthesis; antifungal; Microscopy*

Introduction

The zinc oxide is an inorganic compound with the molecular formula Zno and nearly insolouble in water and appears as a white powder. The zinc oxide nanoparticles were synthesized using zinc acetate, zinc nitrate and zinc sulphate [1,2]. It is widely used as an additive in numerous materials and product include glass, cement, rubber, lubricants, paints, fire retardants and food additives etc. Zinc oxide play on important role in controlling of microbial growth and apoptosis [3, 4]. The excess zinc may cause cell death due to apoptosis or necrosis, zinc also reduces oxidative stress in cells. In the ever expanding field of nanomaterial research, metal nanoparticle receivedparticular attention due to their wide application in catalysis, electronics, sensing, photonics, environmental cleanup, imaging, and drug delivery [5, 6]. ZnO probably has the richest family of nanostructures among all materials, both in structures and in properties. The nanostructures could have novel applications in optoelectronics, sensors, transducers and biomedical sciences [7, 8].

Glycine max, commonly known as soybean in North America or soya bean, is a species of legume native to East Asia, widely grown for its edible bean which has

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numerous uses. The plant, classed as an oilseed rather than a pulse by the UN Food and Agriculture Organization, produces significantly more protein per acre than most other uses of land. Fat-free (defatted) soybean meal is a significant and cheap source of protein for animal feeds and many packaged meals. For example, soybean products, such as textured vegetable protein (TVP), are ingredients in many meat and dairy substitutes. The beans contain significant amounts of phytic acid, dietary minerals and B vitamins. Soy vegetable oil, used in food and industrial applications, is another product of processing the soybean crop. Traditional non-fermented food uses of soybeans include soy milk from which tofu and tofu skin are made. Fermented soy foods include soy sauce, fermented bean paste, natto and tempeh [9], The glycine max used in many commercial applications in various forms such as soybean oil (seed contains 18-19% oil), soybean meal, livestock fees, (rich in omega-3 fatty acids), widely used for food for Human consumption, soy based infant's formula contains rich nutrition for human development, growth and reproduction and it is avery good alternate for meat in the form of butter, *Coffee substitute* [10], used for the manufacturing of brand of votka [11, 12]. In this present study we prepared the *Glycine max* extract and screened for phytochemical constituents. The synthesis the Zinc oxide nanoparticles by using *Glycine max* seed extract and its examined for the characterization using UV-vis spectrophotometer, X-ray Diffraction (XRD), Scanning Electron Microscope (SEM), Energy Dispersive X-ray analysis and Fourier Transform Infra-Red Spectrophotometer (FT-IR). Finally the nanoparticles were tested for antifungal activity against fungal strains *Aspergillus fumigatus*, *Aspergillus niger*, *Candida albicans*, and *Fusarium* sp.

Materials and Method

Plant mediated synthesis of Zinc oxide nanoparticles

Collection of plant materials

Glycine max seeds were collected from Villupuram surrounding Area.

Preparation of seed extract

Aqueous extract were prepared from freshly collected glycine max seeds. 10 g of fresh glycine max seedss were surface sterilized using Tween 20 and double distilled water. Then the seeds were grind and dispersed in 100 ml distilled water and boiled for 15 min at 60 °C. After that, the solution was filtered through Whatmann No1 filter paper and stored at 4°C in refrigerator for further studies.

Phytochemical Analysis of Secondary Metabolites

Phytochemical analysis tests were done to find the presence of the active chemical constituents such as alkaloid, glycosides, terpenoids and steroids, flavonoids, reducing sugars, triterpenes, phenolic compounds and tannins by the following procedure.

Synthesis of ZnO NPs

The synthesis of ZnO NPs using soybean was performed according to the method of Nouroozi and Farzaneh. In brief, freshly extracted 50 ml soybean seed extract of (5 mg ml−1) were prepared in mixed milli-Q (MQ) water and mixed drop-wise into 50 ml of aqueous zinc acetate [Zn(CH3COOH)2C2H2O] solution. In order to maintain the pH 12, 2.0 mol□dm−3 sodium hydroxide was used which resulted in a pale white aqueous solution. This was then placed in a magnetic stirrer for 2 hrs. The pale white precipitate was then taken out and washed over and over again with distilled water followed by ethanol to get free of the impurities. Then a pale white powder of zinc oxide nanoparticles was obtained after drying at 60˚C in oven over night to give yield of 96.7%. Graphical representation of the procedure.

Characterization studies

The reduction of Zinc oxide ions was monitored by using double beam UV-vis spectrophotometer (Perkin Elmer, Singapore) of the reaction medium in the wavelength range of 300-700 nm with 1000 mm quartz cell. The resolution of the UV-vis spectrophotometer was 1 nm. The UV-vis spectra of resulting solution were recorded. The graph of wavelength on X-axis and absorbance on Y-axis was plotted. The obtained Zinc oxide nanoparticle was purified by repeated centrifugation at 15,000 rpm for 15 min. Then the colloidal form of pellet was collected and dried at 100°C. After heat drying of the purified Zinc oxide nanoparticle structures and compositions were analyzed by XRD (Philips PW 1830). The morphology and size of the Zinc oxide nanoparticles was found by Scanning Electron Microscope (Philip model CM 200). Elemental analysis of Zinc oxide was carried out by EDAX (Philips XL-30).

Antimicrobial activity of biosynthesized Zinc oxide nanoparticles

Antifungal Assay of Zinc oxide Nanoparticles

Clinical Fungal Pathogens.

The three fungal pathogenicstrains used in the present study were isolated from clinicalsamples and identified from Microlabs, Vellore District,India, which were *Aspergillus fumigatus, Aspergillus niger*, *Candida albicans*,and *Fusarium* sp.

Assay of Antifungal Activity.

The antifungal activity ofgreen synthesized Zinc oxidenanoparticles against various fungal strains was assayed by Agar well diffusion method. The fungicidal effect of the Zinc oxide nanoparticles could be assessed by the formation of zone around the well. 90ml of sterilized Sabouraud Dextrose Agar medium was poured into three sterilized Petri dishes. The fungal strains were grown in RoseBengal agar and their spores weremixed into the 10mL sterile distilled water and swapped on the agar.Three wells of 5mm diameter were prepared and loaded with Zinc oxide nanoparticles at different concentrations (30,60,90,150 □L). The plates loaded with the fungal and Zinc oxide nanoparticles were incubated at 37°C. The antifungal activities against the fungal strains were confirmed by forming the zone around the wells and measured after 24 hrs of incubation. The zone of inhibition was expressed in mm diameter. The experiments were repeated three times to find the standard deviation and standard error

Results and Discussion

Phytochemical screening of Secondary metabolites:

Table 1: Phytochemical screening of Secondary metabolites

Particulars	Aqueous	Chloroform	Acetone	Ethanol
Alkaloids	-	+	+	+
Tannins	-	+	-	-
Saponins	-	+	+	+
Glycosides	-	-	-	-
Flavonids	-	+	+	+
Protein	-	+	+	+
Sugars	+	+	-	+
Phenol	-	+	+	+

Cont... **Table 1: Phytochemical screening of Secondary metabolites**

Steroids	-	-	-	+	
Terpenoids	-	+	+	+	

(+) = Present , (-) = Absent

Visual Analysis

Zinc oxide nanoparticles formation was primarily identified by color change visually. Medically important plants have high phytochemicals which is involved in the reduction of Zinc oxide ions to Zinc oxide nanoparticles. When the seed extracts are exposed to Zinc acetate solution the biosynthesis of nanoparticles started within few minutes is identified by colour change. Reduction silver ion to Zinc oxide r nanoparticles was visually identified by color change from yellow to brown in the aqueous solution of reaction mixture at 1 hr incubation time (Figure 1).Intensity of brown colour increases while increasing the incubation time. It may be due to the excitation of surface plasmon resonance effect of Zinc oxide nanoparticles. Previously, increasing colour intensity with in 30 min was observed using leaf extract of *Acalypha indica* [13]. The colour intensity is directly proportional to incubation time. After 24 h, dark brown color and precipitation forms indicate completion of reaction.

UV–visible spectroscopy analysis

UV–visible spectroscopy is one of the most widely used techniques for structural characterization of nanoparticles. The biosynthesized SNPs were measuredby UV–visible spectroscopy at different time intervals to study the change in light absorption and increase in intensity (Figure 1 right). The absorption spectrum was recorded for the sample in the range of 280 - 420 nm. The spectrum showed the absorbance peak at 340 nm corresponding to the characteristic band of zinc oxide nanoparticles.This indicates the presence of Zinc oxide NPs, which is due to the excitation of surface plasmons. After 36 h, no further increase in intensity was recorded, indicating the complete reduction in Zinc oxide ions

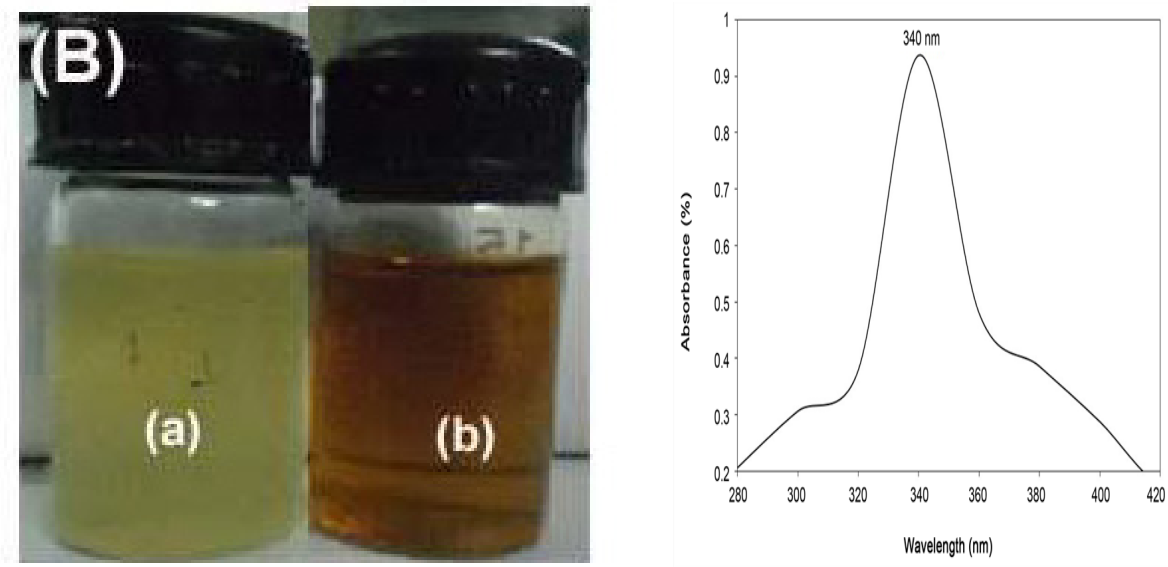


Figure 1: Visual observation and UV-vis spectra of synthesis of zinc oxide nanoparticles by seed extract of glycine max .

X-ray Diffraction Analysis

Crystalline size and structure of the Zinc oxide nanoparticles were determined by XRD in the whole spectrum of 2θvalues ranging from 20-80. The green synthesis of Zinc oxide nanostructure by employing seed extract of *glcine max* was further demonstrated and confirmed by thecharacteristic peaks observed in the XRD image (Figure 2) the peak found at 2 theta scale of 29.01 indicates the zinc oxide nanoparticles, while other diffraction peak shows much weak. A comparison of ourXRD spectrum with the standard confirmed that the zinc particles formed in ourexperiments were in the form of nanocrystals. A few unassigned peaks were also observed that suggest the crystallization of bio-organic phase occurson the surface of the zinc nanoparticles. Similar results was obtainedby using plant systems [14]

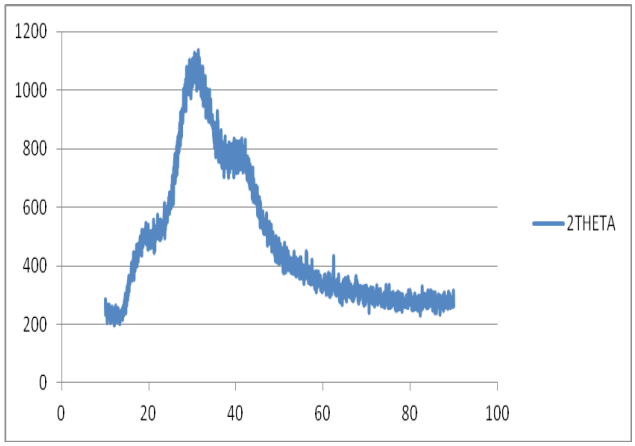


Figure 2: XRD spectrum of synthesized Zincoxide nanoparticles

Scanning Electron Microscope

The surface morphology and size of the zinc oxide nanoparticles was identified byScanning Electron Microscope. SEM image had shown shape and size of the Zinc oxide nanoparticles synthesized by using seed extract of *Glycine max* (Figure 3). Figure 8 shows individual Zinc oxide nanoparticles as well as number of aggregates synthesized using seed extract of *Glycine max*The spherical and rod shaped nanoparticles are present with so many agglomerations was formed due to reducing agent we used. 70 – 90 nm sized nanoparticles are synthesized using seed extracts. The reducing we used is seed extract have more number of protein molecules may responsible for the agglomeration of nanoparticles in the SEM image**.**

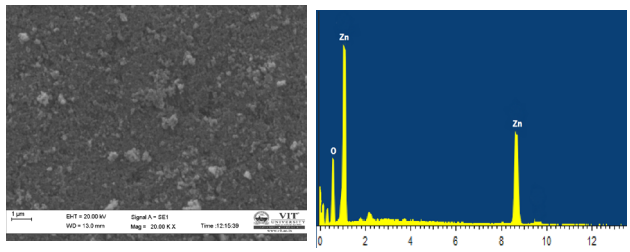


Figure 3: SEM and EDX image of synthesized Zinc oxide nanoparticles

Similar result was reported by using *orange peel* extract (Rajeshkumar *et al*., 2018)and by using *plant* leaves (Santhoshkumar *et al*., 2017).The surface of theaggregates is rough. Similarly aggregation of nanoparticles was earlier reported by Santhoshkumar *et al*., (2017) by using the plant extract.

Energy Dispersive X-ray analysis

Analysis through Energy dispersive X-ray (EDX) spectrometers confirms thepresence of elemental zinc and oxygen in the solution (Figure 3 right). The *Energy-dispersive X*-rayspectroscopy shows the elements of zinc and oxygen indicates the presence of zinc oxide nanoparticles in the prepares nanoparticles powder from seed extracts.

Antifungal activity

The antifungal activity of green synthesized Zinc oxide nanoparticles against pathogenic fungus are *A.niger, A. flavu, Candida albicans,* and *Fusarium spp* was investigated by well diffusion method. Synthesized Zinc oxide nanoparticles showed high inhibition zone against all the pathogenic fungus at different concentration of Zinc oxidenanoparticles (Figure 4 and Table 2). As increasing the concentration of Zinc oxide nanoparticles the zone of inhibition against fungi also increased. Maximum zone of inhibition was found to be *Fusarium sp* (18.43±0.54 mm), *Candida albicans* (22.70±0.51 mm), *Aspergillus niger* (14.03±0.20 mm), *Aspergillus flavus* (19.57±0.23 mm) and minimum inhibition zone was found to be *Aspergillus niger* (13.37±0.20mm) at the 90 µl concentration of Zinc oxide nanoparticles solution. The minimum inhibition concentration is 90µL/ ml. *Aspergillus sp* have more pathogenic and virulence, it produces mycotoxins and aflatoxin. Toxin segregation was controlled and decreased while treating with Zinc oxide nanoparticles. Similarly, Govindaraju et al reported the inhibitory action of Zinc oxide nanoparticles against *A. niger* and *A. flavus* are 14.8 mm and 15.2 mm, respectively at 100 µl concentration. Prasad et al studied the antimicrobial

activity of Zinc oxide nanoparticles against *C. albicans* was found to be 10 mm of inhibition. In this study, synthesized Zinc oxide nanoparticles from algae are toxic to multi drug resistant microorganisms. It shows that they have great potential in biomedical applications.

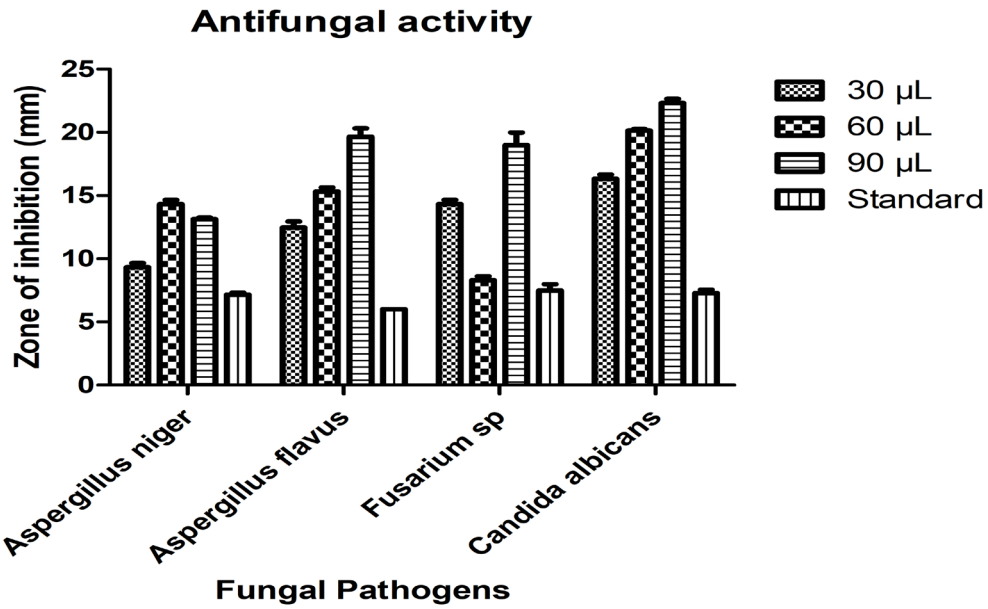


Figure: 4 Antifungal activity of green synthesized Zinc oxide nanoparticles

Table 2: Zone of inhibition against pathogenic fungi using synthesized Zinc oxide nanoparticles by agar well diffusion method

S.No.		Aspergillus niger	Aspergillus flavus	Fusarium sp	Candida albicans
1.	30 µL	09.27±0.15	12.37±0.19	14.60±0.46	16.50±0.36
2.	60 µL	14.03±0.09	15.93±0.18	08.57±0.30	20.03±0.49
3.	90 µL	13.37±0.20	19.57±0.23	18.43±0.54	22.70±0.51
4.	Standard	7.5±0.03	6.5±0.12	7.5±0.15	8±0.18

±Standard deviation

Conclusion

The obtained zinc oxide nanoparticles were measured for its maximum absorbance using UV-Vis spectrophotometry. The optical property of zinc oxide nanoparticles was determined via ultraviolet and visible absorption spectroscopy in the range of 280 - 420 nm. Structure of zinc oxide nanoparticles was analyzed by using X-Ray Diffraction (XRD) analysis. Particle size of synthesized nanoparticles was obtained by Dynamic light scattering analysis (DLS) and stability of the nanoparticles was checked by zeta potential measurement. External morphology i.e. shape of the nanoparticles were characterized by Scanning Electron Microscope (SEM). Elemental analysis was obtained from energy dispersive X-ray diffraction (EDX), which was attached with SEM. This manuscript focuses on the formation of biocompatible zinc oxide nanoparticles by plants material. Green methods of synthesis of ZnoNPs shows more compatible, eco-friendly, low cost and less time consumes process.

Ethical Clearance- NA

Source of Funding- DST-FIST for providing instrument facilities

Conflict of Interest - Nil

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Evaluation of Methylcellulose Gel as A Vehicle for Metronidazole Compared to Commercially Available Topical Metronidazole Gel - An In Vitro Study

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Abstract

Background: The pathogenesis of the periodontal disease is primarily due to the gram-negative bacteria found in the plaque. Adjunctive to the routine mechanical debridement, use of systemic and local antimicrobials for reduction and eradication of specific periodontal pathogens have also been used for quite some time. Various locally delivered therapeutic drugs have been used. The success of the locally delivered therapeutic drugs are determined by the usage of vehicles.

Aim: The purpose of this study was to evaluate the efficacy of carboxy methyl cellulose gel as a vehicle for metronidazole when compared to commercially available Metrogyl® DG gel in an in vitro condition.

Methods: 20 patients with chronic periodontitis were selected and subgingival plaque samples were collected using curettes and then subjected to anaerobic culture. The samples were inoculated on Brucella Blood Agar (BBA) plates by streaking the plate with the swab sticks within 12 hours from sample collection. A well with a diameter of 8 mm is punched and 100 µm of the 1.5% metronidazole with the 2 different vehicles ((methyl cellulose gel, Metrogyl® DG gel) were introduced into the wells. These plates were kept in an an anaerobic jar along with an aero gas pack and incubated at 37°C for 48 hours to 72 hours. The antimicrobial activity was quantitatively assessed by the presence or absence of inhibition zone and zone diameter.

Result: It was found that anaerobic bacteria found in subgingival plaque, showed sensitivity to the drug released from both the vehicles. The inhibition zone diameter present around methylcellolose gel + metronidazole was 23.85±1.73 mm and that around Metrogyl® was 14.4±1.76 mm.

Conclusion: Methylcellulose gel is a more effective vehicle than commercially available vehicles in releasing metronidazole for use in subgingival delivery in the management of chronic periodontitis.

Key Words: *Methylcellulose, Metronidazole, Periodontitis, Anaerobes*

Introduction

Periodontitis is an inflammatory disease of the soft and hard tissues surrounding the teeth leading to its destruction. The pathogenesis of the disease is due to the predominantly gram-negative bacteria found in the plaque, which often leads to host mediated inflammatory response with release of inflammatory mediators causing destruction of periodontal tissues. Adjunctive to the routine mechanical debridement, use of systemic and local antimicrobials for reduction and eradication of specific periodontal pathogens have also been used for quite some time.[1–4] Various locally delivered therapeutic drugs have been used. The success of the locally delivered therapeutic drugs are determined by the usage of vehicles. Metronidazole, an antibiotic of nitroimidazole family are widely used as local drug

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delivery against anaerobic periodontal pathogens.[5]

Efficiency of these drugs depends on a great extent on the vehicle used in local drug delivery.[6] Extensive research has been carried out to identify the most efficient vehicle for drug release.[7–9]Yet, the need for adequate accumulation of drugs at a target site has not always been met.

Carboxymethyl cellulose (CMC) or cellulose gum is a cellulose derivative with carboxymethyl groups bound to some of the hydroxyl groups of the glycopyranose monomers that make up the cellulose.[10]CMC was proven to be nontoxic as well as biodegradable and can be used for drug delivery.

Methylcellulose gel has been used extensively as a drug vehicle in pharmaceutical and topical applications and is generally recognized as safe by the Food and Drug Administration.[11] However, it has not been well characterized as a vehicle for drug delivery into closed tissue compartments.[6]

Hence, the present study was aimed to evaluate the efficacy of carboxy methyl cellulose gel as a vehicle for metronidazole when compared to commercially available Metrogyl® DG gel in an in vitro condition.

Materials and Method

20 patients with chronic periodontitis were selected. After removal of supragingival plaque, subgingival plaque sample was collected from the selected patients. Plaque was collected using curettes and then transported to the microbiological lab in swab sticks following precautions of asepsis.

For anaerobic culture, the samples were inoculated on Brucella Blood Agar (BBA) plates by streaking the plate with the swab sticks within 12 hours from sample collection. A well with a diameter of 8 mm is punched aseptically with a sterile cork borer or a tip into the agar medium.

For the formulation of the test vehicle (methyl cellulose gel), 500 mg methyl cellulose powder and 300mg ground metronidazole (Flagyl®) were weighed in a microweighing machine. 20 ml of distilled water was taken in a beaker. It was heated to a temperature of 60°C in a waterbath. The metronidazole (MTZ) was added to the water. It was continuously stirred in a magnetic stirrer as the methylcellulose gel was added slowly in increments. The temperature was left to gradually cool down. Stirring was done till the desirable consistency is attained. 1.5% MTZ gel is thus prepared.

The control vehicle used was a commercially available metronidazole gel, Metrogyl® DG gel. It is used as an oral topical gel. It contains 1.5% w/v metronidazole, 0.5% chlorhexidine gluconate as a preservative in a water soluble gel base.

A volume of 100 μm of the 1.5% MTZ with the 2 different vehicles were introduced into the wells. These plates were kept in an an anaerobic jar along with an aero gas pack and incubated at 37°C for 48 hours to 72 hours. Antimicrobial activity was evaluated by measuring and recording the diameter of inhibition zone and compared against the control well.

The antimicrobial activity of the extracts and their potency was quantitatively assessed by the presence or absence of inhibition zone and zone diameter.

Results

Greenish black colonies were found throughout the streaks in the blood agar.

It was found that anaerobic bacteria found in subgingival plaque, showed sensitivity to the drug released from both the vehicles. The inhibition zone diameter present around methylcellolose gel + metronidazole was 23.85±1.73 mm and that around Metrogyl® was 14.4±1.76 mm.(Table 1)

However, a few resistant strains were found near the outer margin of the inhibition zone around the methylcellolose gel + metronidazole well.

Table 1: Zone of inhibition in each agar plate in both the groups

Patient No.	Methylcellulose gel	Commercially available gel
1	25	16
2	26	14
3	23	16
4	21	14
5	23	16
6	26	15
7	25	17
8	23	13

Cont... **Table 1: Zone of inhibition in each agar plate in both the groups**

9	21	12
10	22	17
11	23	12
12	25	17
13	23	15
14	25	14
15	24	12
16	26	15
17	25	13
18	24	12
19	21	13
20	26	15
Mean (mm)	23.85±1.73	14.4±1.76

Discussion

The significance of vehicles in drug delivery has been well established over the years. Thus the present study was aimed to study the drug release in 2 different vehicles for the release of metronidazole.

In-situ gel formulations is a very recent novel trend that delivers drugs in a liquid form.[12] They also achieve sustained release of the drug. Although different polymer-based delivery systems have been invented, they haven't been able to form gels after delivery to the subgingival site. In-situ gels, are the water soluble polymers that is found to have this property. This has been of great interest in recent times. They are easily applied in a liquid form, after absorption it forms gel like consistency at the target site. In this way, they help to prolong the release of the drug. Hence this study employed methylcellulose gel, an in-situ gel as a vehicle and compared it against a water soluble vehicle found in a commercially available oral topical metronidazole gel.

Metronidazole is a very common broad spectrum antibiotic. It is effective against a range of periodontal pathogens. Since periodontal pathogens are predominantly anaerobic, metronidazole is commonly used in the treatment of chronic periodontitis.[3] Hence, the present study employed the use of metronidazole as its drug of choice.

20 patients with chronic periodontitis with the presence of subgingival plaque and calculus were employed. Thus, a comprehensive collection of subgingival pathogens have been obtained. This has lead to good amount of colony formations.

Brucella Blood Agar is an enriched non-selective agar medium. It is intended for the isolation, quantification and partial identification of obligate anaerobic bacteria from clinical specimens. This explains the use of the mentioned agar plate for use as a culture medium for the present study.

In the present study, well method has been used. This is because of the high flowability and high diffusion rate of the methylcellulose gel.

The inhibition zone diameter present around methylcellolose gel + metronidazole was 23.85±1.73 mm and that around Metrogyl® was 14.4±1.76 mm. This may be due to methylcellulose (MC) having been proven to be able to show good water solubility in water at low temperatures. MC molecules are bonded to the water molecules through hydrogen bonding. These bonds surround the methyl groups.[13] Thus, a cage-like water structure is formed. This is why there is less intermolecular hydrogen bonding between MC molecules. This, in turn, causes higher gelation temperature at low concentration.[14] Thus, the more efficient drug release at the methylcellolose gel + metronidazole well compared to the commercial gel is justified.

Some resistant strains were found in the inhibition zone around the methylcellulose gel + metronidazole well. This is in accordance with the findings by Serrano et al[15] who has shown that all the periodontal strains were resistant to metronidazole due to indiscriminate use of the antibiotic.

The strength of this study lies in the fact that it employs two in-situ delivery systems, which has spawned greater attention among scientists in the last 30 years. Thus comparing its efficacy in an in vitro condition, provides aa useful tool to understand the drug releasing capacity of different water soluble gels.

But, this study does not test the sustainability of the drug release. Hence, we do not know if methylcellulose is better than the commercial vehicle in terms of its drug releasing property over a prolonged duration of time.

Further studies are required to study the rate of dispersion of drugs over a long period of time.

Conclusion

Methylcellulose gel is a more effective vehicle than commercially available vehicles in releasing metronidazole for use in subgingival delivery in the management of chronic periodontitis.

Conflict of Interest: The authors declare that there is no conflict of interest

Source of Funding: Self

Ethical Clearance

Ethical clearance was obtained from Institutional Ethical Committee of Saveetha Dental College and Hospitals (SDC/IHEC/19-20/048)

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Titreated Case of Oral Lichen Planus: 18 Months Follow Up Report

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Abstract

Oral Lichen planus (OLP) is a common chronic immunological inflammatory mucocutaneous disorder. The different etiological factors considered for OLP are genetic background, dental materials, drugs, infectious agent, autoimmunity, immunodeficiency, food allergy, stress, habits, trauma, diabetes, hypertension, malignant neoplasm. The treatment goal is 2-fold, that is, alleviation of symptoms and monitoring of dysplastic changes. This case report attempts to report a case of oral lichen planus, successfully treated with 18 months follow up.

Key Words: *Lichen Planus, Autoimmunity, Immunodeficiency, Desmoglein*

Introduction

Oral Lichen planus (OLP) is a common chronic immunological inflammatory mucocutaneous disorder that varies in appearance from keratotic to erythematous and ulcerative.[1] It is a common disorder that affects stratified squamous epithelium exclusively. It is seen worldwide, mostly in the fifth to sixth decades of life and is twice as common in women than in men. The oral manifestations include the red and white components of lesion which can be part of following textures – Reticular, Papular, Plaque-like, Erythematous/Atrophic. The history of OLP dates back to 1869, when Erasmus Wilson[2] first delineated and named the disease. About 1-2% of world population suffer from OLP. 1.5% of Indians suffer from this disorder, age range of occurrence is 30–70 years, with female predilection (Male:Female-1:1.4).[3] The different etiological factors considered for OLP are genetic background, dental materials, drugs, infectious agent, autoimmunity, immunodeficiency, food allergy, stress, habits, trauma, diabetes, hypertension, malignant neoplasm, and bowel diseases.[4)] The pathogenesis is thought of from four mechanism: antigen specific cell mediated immune response (heat shock proteins, CD4+ T helper cells, CD8+ cytotoxic T cells), nonspecific mechanism (epithelial basement membrane, mast cells, chemokines, matrix metalloproteinases), autoimmune response, humoral immunity (circulating autoantibodies to desmoglein 1 and 3).[5]

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Case Report

A 50 year old Indian female patient reported to the Department of Periodontics with a complaint of burning sensation of gums and inability to eat foods from the past 1 month. Burning sensation was gradual in onset, continuous in nature, aggravated on eating spicy foods and no relieving factors. Patient had no relevant medical and dental history. She was not associated with any extra-oral lesions. On intra oral examination, there was found to be gingival desquamation, characterized by diffuse reddish discolorations with isolated white patches in marginal gingiva, attached gingiva and interdental papilla with respect to 24, 25, 26, 34, 35, 36, 44, 45, 46. (Figure 1, 2, 3) An OPG was taken which showed no abnormality in hard tissues and an incisional biopsy at the site of 24, 25 gingival region was done and the specimen was sent for histopathological examination.

The histopathological section showed parakeratinized stratified squamous epithelium of

variable thickness with foci of basal cell degeneration with subjacent subepithelial band of lymphocytic infiltrate. The underlying connective tissue stroma showed moderate vascularity along with chronic inflammatory cell infiltrate and evidence of haemorrhage. (Figure 4) Correlating with clinical findings, it was suggestive of Lichen Planus.

The final diagnosis was Oral Lichen Planus of the gingiva with respect to 24, 25, 26, 34, 35, 36, 44, 45, 46

Management

Oral prophylaxis was done. Oral retinoid supplements for 15 days was prescribed; topical anesthetic was advised before food to relieve burning sensation. Topical antibiotic and corticosteroids (Kenalog) was prescribed. Regular follow up and review was done.

Outcome

A completely healed, pale pink, firm and resilient gingival tissue was found during 18 months follow up. (Figure 5) Patient reported complete relief from burning sensation.

Figures



Figure 1: Gingival desquamation in 24, 25, 26 region



Figure 2: Gingival desquamation in 34, 35, 36 region



Figure 3: Gingival desquamation in 44, 45, 46 region



Figure 4: Histopathological findings under 10x magnification

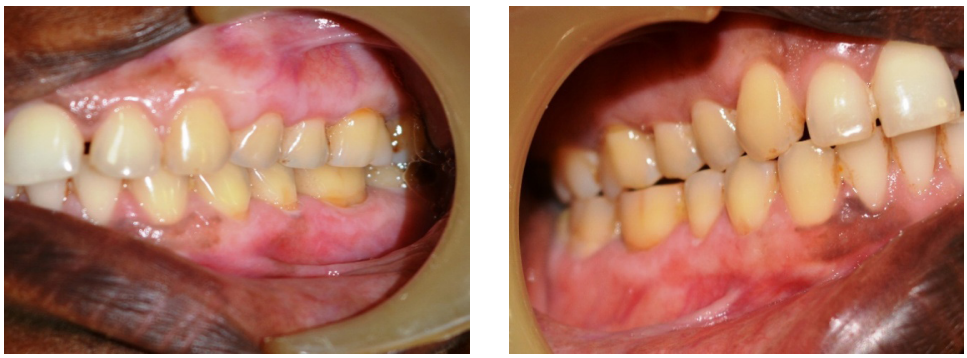


Figure 5: 18 months follow up 24, 25, 26, 34, 35, 36, 44, 45, 46 region

Discussion

To date no cure for OLP or dermal counterpart has been discovered. The treatment goal is 2-fold, that is, alleviation of symptoms and monitoring of dysplastic changes.[6] Corticosteroids have shown to be predictable and effective medications for controlling signs and symptoms.[7] Triamcinolone acetonide 0.1% in orabase showed better results than cyclosporine,[8] Pimecrolimus 1% cream,[9] Betamethasone oral minipulse therapy, Fluocinoloneacetonide 0.1% orabase,[10] in the treatment of OLP. In lesions recalcitrant to topical therapy, intralesional corticosteroids can be effective, often triamcinolone acetonide 5 mg/ml combined with local anesthetic.[11] Retinoids are useful and are frequently used in combination with topical steroids as adjuvant therapy.[12]Apart from these, other treatment modalities are Dapsone 100 mg once daily for 3 months, PUVA (Psoralen and ultraviolet A) therapy, Azathioprine 150 mg/day, Levamisole 150 mg/day for 3 consecutive days in 1 week, Thalidomide 200 mg/day or topical 1% paste, Griseofulvin. Griseofulvin have reported to be effective in treatment of OLP in various case reports in literature, unfortunately randomized control studies are lacking in this aspect.[12] The possible premalignant character of OLP is subject of controversy and ongoing debate in literature, but the range of malignant transformation is reported to be between 0.4% and 5% over period of observation from 0.5 to 20 years.

Conclusion

The term OLP is a heterogeneous group of patients afflicted with mucosal disease, identifying and eliminating multifactorial agents associated with the disease is essential. Relief can be achieved in most of patients with topical steroids alone or in combination with other immunomodulatory topical agents. Infrequently, patients require prolonged use of systemic medications. Patient should also be kept under long-term follow up due to malignant tendency of OLP. All treatments are nonspecific and directed at eliminating inflammation and therefore are partially successful.

Conflict of Interest: The authors declare that there is no conflict of interest

Source of Funding: Self

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Comparison of Effectiveness of COE PAK and Barricaid with Respect to Wound Healing and Patient Satisfaction

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Abstract

Background: Periodontal dressing is a physical barrier placed post operatively to cover and protect the surface of surgical wound created by periodontal therapy. Conventional periodontal dressings set chemically, requires manual kneading and are not very esthetic in terms of colour. Visible light cure periodontal surgical dressing, Barricaid®, is a single- component, light-activated periodontal dressing, tinted pink with a translucent character.

Aim: To assess the effectiveness of 2 different periodontal dressings (Coe-pak®, Barricaid®) after periodontal flap surgeries with respect to wound healing and patient satisfaction

Materials and Method: The study was conducted in 16 surgical sites (8 matched pairs) among 8 systemically healthy adults aged between 18 – 55 (mean age 31.68±11.11) requiring open flap debridement. Smokers were excluded from the study. Informed consent was obtained. All sites were randomly allocated to 2 different groups with 8 sites in each group. Flap surgery was done and either COE PAK or Barricaid was used. Parameters such as color, consistency, VAS score, healing index and post operative discomfort were recorded 1 week post operatively.

Results: The data showed favourable results in parameters such as in color, consistency, VAS score, healing index and post operative bleeding towards the use of Barricaid ® group, and in parameters such as post operative ease in mastication and facial swelling towards the use of COE PAK® group. But, the difference was not statistically significant in any of the clinical parameters.

Conclusion: It can be concluded that there was no statistically significant difference between the 2 periodontal dressings (COE PAK ®, Barricaid ®) in terms of wound healing and patient satisfaction.

Key Words: *Periodontitis, Periodontal Dressings, Coe-Pak, Barricaid, Wound Healing*

Introduction

Periodontal surgeries are used for various needs such as pocket elimination, regeneration of defects, reshaping of bony contours, other esthetic and prosthetic concern. Such surgeries usually lead to post operative pain, bleeding, inflammation and general discomfort. Many dentists prefer the use of some form of protection protect it from further stress.[1] Such protection are periodontal dressings that cover the wound area from stress, irritation, food, contamination and thus assist healing and reduce pain. [2]

The first periodontal dressing, Wondrpak, was introduced by Ward in 1923.[3]The earliest periodontal packs were based on zinc oxide eugenol systems. However, it was found to have various side effects such as irritation and tissue morbidity. Later, non-eugenol packs were discovered.[4]COE-PAK was one such pack, but it was found to have disadvantages such as, difficult manipulation and poor esthetic appearance.[5]"container-

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Barricaid is a recently developed visible light curing periodontal dressing material, based on a polyether urethane dimethacrylate resin.[6] It has superior properties such as, easy manipulation, pleasing esthetic appearance, better surface smoothness, interdental retention and mechanical stability. Additionally, it gives the dentist complete control over its setting time.

The aim of the present study was to assess the relative efficiency of 2 different periodontal dressings (Coe-pak®, Barricaid®) after various periodontal flap surgeries with respect to wound healing and patient satisfaction.

Materials and Method

The study was conducted in 16 sites (8 matched pairs) among 8 systemically healthy adults aged between 18-55 requiring different periodontal surgical procedures. All the patients visited the outpatient department of Saveetha dental college, Chennai. The study was approved by the scientific review board of Saveetha dental college. Patients with systemic conditions were excluded from the study. Informed consent was obtained. They were randomly allocated to 2 different groups (Group 1-COE PAK, Group 2-Barricaid) with 8 sites in each group. The following parameters were noted in the performa of the study: 1. demographic details 2 chief complaint 3. drug history 4. past medical history 5. past dental history. Probing depth, bleeding index (Muhlemann and Son, 1971) and plaque index (Sillness and Loe, 1964) was assessed on the day of surgery. Flap surgery was done under local anaesthesia (2% lignocaine). Conventional scalpel was used in all procedures. Either COE PAK or Barricaid was used according to the group in which the patient was allocated to. Following parameters were recorded 1 week post operatively: 1. Colour of gingiva (reddish pink/pale pink) 2. Consistencyof the gingiva (firm and resilient/swollen and edematous) 3.early healing index (Watchell et al 2005) (Score 0 - 5) 4.VAS scorefor pain (By Scott and Huskinson 1979) (Score 0 - 10). The patients were asked questions on their postoperative discomfort on the first 3 days after surgery and the following symptoms noted: bleeding (Yes/No), ease of nutrition (Yes/No) and facial swelling (Yes/No)

Method of using COE PAK

A spatula and a glass slabwas used. Equal lengths of paste from catalyst and base tubes was extruded. It was spatulated for 30-45 seconds or until the mix had a uniform color. The mixed pastes were immersed in saline till it loses its tackiness. The fingers were lightly lubricated with a thin film of saline. Using fingers the mixed pastes are formed into a cylindrical shape.It was placed against the teeth and gums in the operative area and muscle moulded.(Figure 1)

Method of using Barricaid

Using a sterile, dry gauze, the buccal or lingual tooth surfaces adjacent to the surgical sitewas dried. The tip from the disposable syringe was removed. The material was dispensed at the juncture of the cervical one-third of the teeth and the margin of the surgical site. It wascontoured with a wet gloved fingers and muscle moulded.Excess material was removed. It was exposed to a visible light-curing unit for 30 seconds per tooth per side. Exposure was repeated, until the entire dressing was cured. Excess material was added if needed and cured in increments.(Figure 2)

Statistical methods

The data was analysed using SPSS software(Statistical Presentation System Software, 1999, SPSS Inc, New York, version 10.0). Chi - square test was done to compare the percentage of difference incolor, consistency, post operative bleeding, ease of nutrition and facial swelling among the 2 groups. Student t test was used to compare the mean VAS scores and healing index between the 2 groups.

Results

All the patients completed the study. There were no drop outs in the follow up. There were no adverse reactions observed.

Generally, it was found that both the barricade and COE PAK groups had a predominantly positive wound healing and patient response. It was found that a greater percentage of sites showed the more favourable response in all the parameters in both the groups. However, when the differences between the two groups were compared, the difference was not found to be statistically significant.

On comparison between the 2 groups, all the sites (100%) in the Barricade showed pale pink gingival color whereas only 75% of the sites showed the same in the COE PAK group (Table 1). In terms of gingival consistency, barricade group was again found to show firm and resilient consistency in all the sites (100%) whereas only 62.5% of the sites showed the same in the COE PAK group (Table 1). On comparison of early

healing index score between the two groups, there was a lesser mean score (1.25 ± 0.46) in the barricade group than in the COE PAK group (1.5 ± 0.54) (Table 2).On comparison of VAS scores for pain assessment between the two groups, there was a lesser mean score (1.75 ± 0.89) in the barricade group than in the COE PAK group (2.5 ± 0.76) (Table 2). In terms of post operative bleeding, no patient reported its presence in the barricade group, whereas 25% of the patients reported its presence in the COE PAK group (Table 3).

There was a greater percentage of patients who reported ease of post operative mastication in the COE PAK group (87.5%) than in the Barricade group (37.5%) (Table 3). In terms of post operative swelling, there was a marginally greater percentage (12.5%) of patients reporting presence of swelling in the Barricaid group, whereas no patient reported swelling in the COE PAK group.(Table 4)

However, none of the above comparisons between the groups, showed statistically significant difference.

To summarize, when the results were compared between the groups, it was found that, favourable results were found in parameters such as in color, consistency, VAS score, healing index and post operative bleeding towards the use of Barricaid® group and in parameters such as post operative ease in mastication and facial swelling towards the use of COE PAK® group. But, the difference was not statistically significant in any of the clinical parameters.



Figure 1: Appearance of COE PACK



Figure 2: Appearance of Barricaid

Table 1: Comparison between the groups in terms of colour and consistency

Group		Colour		Total	*p*-value	Consistency		Total	*p*-value
		Reddish pink	Pale pink			Firm & resilient	Swollen & edematous		
COE PAK	Count	2	6	8	0.467	5	3	8	0.200
	% within group	25%	75%	100%		62.5%	37.5%	100%	
Barricaid	Count	0	8	8		8	0	8	
	% within group	0%	100%	100%		100%	0%	100%	

Table 2: Comparison between the groups in terms of VAS score for pain assessment and early wound healing index

	Group	**n**	**Mean**	**Std. Deviation**	**p-value**
VAS Score	COE PAK	8	2.50	.756	0.090
	Barricaid	8	1.75	.886	
Early wound healing index	COE PAK	8	1.50	.535	0.334
	Barricaid	8	1.25	.463	

Table 3: Comparison between the groups in terms of post-operative bleeding and ease of mastication

Group		**Bleeding**		**Total**	***p*-value**	**Ease of mastication**		**Total**	***p*-value**
		Yes	**No**			**Yes**	**No**		
COE PAK	**Count**	**2**	**6**	**8**	0.467	7	1	8	0.119
	% within group	25%	75%	100%		87.5%	12.5%	100%	
Barricaid	Count	0	8	8		3	5	8	
	% within group	0%	100%	100%		37.5%	62.5%	100%	

Table 4: Comparison between the groups in terms of post-operative facial swelling

Group		**Facial Swelling**		**Total**	***p*-value**
		Yes	**No**		
COE PAK	Count	0	8	8	1.000
	% within group	0%	100%	100%	
Barricaid	Count	1	7	8	
	% within group	12.5%	87.5%	100%	

Discussion

Use of periodontal dressings have always been controversial. There are different schools of thoughts in whether or not to use a periodontal dressing. COE PAK is the most widely used periodontal pack and is considered a standard to which other dressing materials can be compared. It is a non eugenol pack. When comparing the efficiency of newer dressing materials, it is always wise to compare it against the established dressing material.[5]"container-title":"Journal of Clinical Periodontology","page":"188-193","volume":"23","issue":"3 Pt 1","source":"PubMed","abstract":"2 periodontal dressings, Coe-pak and RD8 (a product under development Barricaid® is a light cure periodontal dressing with superior esthetics and offers complete control over its setting time. It is based on polyether urethane dimethacrylate resin. Histological studies by Alpar et al[7] and Gilbert et al[8] with the extracts and solid specimens of polymerised Barricaid® have proven its biocompatibility. Hence, the present study is aimed to compare the light cure dressing Barricaid against the age old dressing, COE PAK in wound healing and patient accceptibility.

There was a predominantly healthy gingiva in both the groups as determined by gingival color and consistency. This may be attributed to the reduction of inflammation that usually follows after a periodontal flap surgery. Selvig KA et al[9] has reported that slight redness at the site of suture after surgery is not uncommon. This may provide justification for the marginal percentage of sites that reported gingival redness and edematousness. Also, the protection offered at the wound site by the periodontal dressing may have led to decreased tissue irritation. No untoward reactions was found in any of the groups.

There was good wound healing and less pain perception, as determined using the VAS score and early wound healing index. Amler MH et al[10] and Farina R et al[11] have reported that epithelialization from the peripheral gingival margins starts within 24 hours and becomes complete after 1-5 weeks in relation to socket width and local traumatic factors, smoking, tooth location and concomitant extraction of adjacent teeth. This may explain the superior wound closure in both the groups after 1 week. Also, the periodontal dressing protect the wound site from salivary contamination leading to faster wound healing. The less perception of pain in both the groups may be attributed to the analgesics prescribed for the first 3 days. Also, the wound closure provided by the periodontal dressings may have contributed to the psychological satisfaction of the patients leading to reduced perception of pain.

There was less post operative bleeding in both the groups. Tan WC et al[12] has reported that light bleeding is common for the first few hours after surgery but it may occur after hours or continue for 2-3 days. This may explain the lesser percentage of patients who reported presence of post operative bleeding. Less post operative swelling was also reported in both the groups. Tan WC et al[12] and Yao J et al[13] reported that soft tissue painless swelling usually occurs at the surgical site from the second day. This explains the few number of patients who reported swelling. The less number may be attributed to care taken to cause less tissue trauma duringthe procedures. Greater ease of mastication was reported in both the groups. This may be due to the splinting effect that hardened periodontal dressings provide, that reduces mobility and tenderness.

Thus, the above findings indicate that, both the dressings provide equally good wound healing properties and patient comfort. Hence, either of the two dressings can be used depending on the clinician's convenience.

Conclusion

It can be concluded that there was no statistically significant difference between the 2 periodontal dressings (COE PAK®, Barricaid®) in terms of wound healing and patient satisfaction.

Conflict of Interest: The authors declare that there is no conflict of interest

Source of Funding: Self

Ethical Clearance: Ethical clearance was obtained from Institutional Ethical Committee of Saveetha Dental College and Hospitals (SDC/IHEC/19-20/050)

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Assessment of Precipitate Formation on Interaction of Chlorhexidine with Sodium Hypochlorite, Neem, Aloevera and Garlic: An *in vitro* Study

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Abstract

Introduction: Irrigants play an important role in debridement and disinfection of root canal space. Precipitate formed from combination of irrigants during root canal treatment may affect the properties of intracanal medicaments and adaptation of obturated materials to the root canal walls.

Aim: To check for precipitate formation from various irrigant combinations and to weigh the amount of precipitate formed.

Methods and Material: Five different irrigants namely 2% CHX gluconate, 3% NaOCl, 5% Neem, 5% Aloevera, and 5% Garlic were taken in different test tubes. 1mL each of two different irrigants were mixed in 10 test tubes and observed for 2 min for formation of any precipitate and the formed precipitate was weighed.

Results: 1mL 2% CHX +1mL 3% NaOCl and 1mL 2% CHX + 1mL 5% Neem showed precipitate formation immediately. Through statistical analysis it was observed that more amount of precipitate was seen in 1mL 2% CHX + 1mL 5% Neem followed by 1mL 2% CHX + 1mL 3% NaOCl.

Conclusion: Precipitate formation is seen more with the 2% CHX-5% Neem when compared with the control group (2% CHX-3% NaOCl).

Key words: *Aloevera, Chlorhexidine, Garlic, Neem, Precipitate, Sodium hypochlorite*

Introduction

Microorganisms are the main aetiological cause for pulpal and periapical pathology. Mechanical instrumentation may not be enough to remove microorganisms and necrotic tissue from root canal space because of its complex anatomy[1].Therefore irrigation is necessary with mechanical instrumentation to disinfect root canal space.

No irrigants so far possess all ideal properties so irrigants can be used in combination to achieve maximum benefits. Even though certain combinations proved to be synergistic, some combination of irrigants form precipitate which blocks dentinal tubules and compromises the seal of obturated canal[2]. Precipitate is formed from acid-base reaction which occurs when irrigants are combined together[3].

Most commonly used conventional irrigants during root canal treatment are sodium hypochlorite (NaOCl) and chlorhexidine (CHX). NaOCl shows both antimicrobial and tissue dissolving properties. CHX

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is well known for its prolonged antimicrobial activity due to its substantivity[4]. Since it lacks tissue dissolving capacity it can be used in combination with NaOCl. However it has been suggested that Sodium hypochlorite and Chlorhexidine shouldn't be mixed within root canal space, as it produces reddish brown precipitate which may cause discolouration of dentin structures[5].

Increasing microbial resistance towards commonly used drugs and side effects, prompted researchers to find herbal alternatives. Natural irrigants like Neem, Aloevera and garlic are used because of their known antimicrobial effect and biocompatibility. Neem showed its biological effect mainly due to its active component nimbidin and other isolated components such as nimbin, nimbinin, nimbidinin, nimbolide, and nimbidic acid[6]. Aloevera shows both good anti-bacterial and anti-fungal activity due to constituents of alloins and barbadoins[7]. The main active component of garlic is allicin which destroys the cell wall and cell membrane of root canal bacteria and can be used as an irrigant alternative to NaOCl. Concentrated garlic (95%) extract contains 34% allicin,44% total thiosulfinates and 20% vinyldithins[8].

In this study, we have used Neem, Aloevera and Garlic as herbal irrigants. These herbal irrigants were mixed with most commonly used irrigants such as CHX and NaOCl and evaluated for any precipitate formation before being tried as root canal irrigants. Therefore the aim of this study is to check whether the combination of herbal irrigants with CHX and NaOCl forms precipitate and to weigh the amount of precipitate formed.The null hypothesis of this present study is that any irrigant mixed with Chlorhexidine will form a precipitate.

Material and Methods

The study was carried out in biochemistry laboratory. Five different types of irrigants namely 2% CHX gluconate (STEDMAN PHARMACEUTICALS PVT LTD) 3% NaOCl (VENSONS INDIA), 5% Neem, 5% Aloevera, and 5% Garlic were used in this study.

Neem, Aloevera and Garlic extracts were supplied in the form of powder which were readily soluble in water. These extract dilutions were prepared in 5% concentration by 5 grams of powder in 100ml of distilled water and kept for 24hrs. These solutions were filtered using Whatman's filter paper No1. These five irrigants were grouped into 10 of various combinations [Table 1]. Sample size selected for each group is 10. In a test tube, 1ml each of two irrigants was added and were observed for 2 min for precipitate formation [Figure 1 and Figure 2]. The formed precipitate was filtered; air dried and weighed using weighing electronic balance. The data obtained were statistically analyzed using One-way ANOVA test.

Results

Group 2 containing 1 ml 2% CHX + 1 ml 5% Neem and Group 1 containing 1 ml 2% CHX + 1 ml 3% NaOCl showed precipitate formation immediately

Group 1 containing 2% CHX + 3% NaOCl showed reddish brown precipitate whereas Group 2 containing 2% CHX + 5% Neem showed greenish precipitate.

Oneway Anova test revealed more amount of precipitate was seen in 1ml 2% CHX + 1ml 5% Neem with mean weight 11.80 followed by 1ml 2% CHX + 1ml 3% NaOCl with mean weight 4.400. [Table 2 and Graph 1]

Table - 1

Group 1 (Positive control)	1ml 2% CHX + 1ml 3% NaOCl
Group 2	1ml 2% CHX + 1ml 5% Neem
Group 3	1ml 2% CHX + 1ml 5% Aloevera
Group 4	1ml 2% CHX + 1ml 5% Garlic
Group 5	1ml 3% NaOCl + 1ml 5% Neem
Group 6	1ml 3% NaOCl + 1ml 5% Aloevera
Group 7	1ml 3% NaOCl + 1ml 5% Garlic
Group 8	1ml 5% Neem + 1ml 5% Aloevera
Group 9	1ml 5% Neem + 1ml 5% Garlic
Group 10	1ml 5% Aloevera + 1ml 5% Garlic

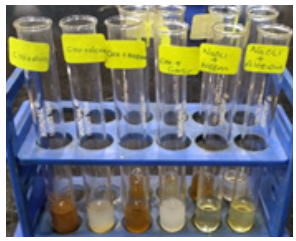


Figure -1

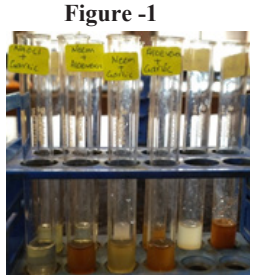
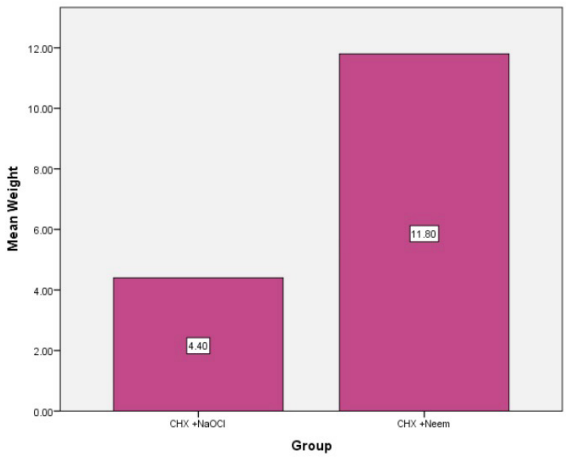


Figure - 2



Graph - 1

Discussion

Successful endodontic treatment is achieved by using both mechanical instrumentation and antimicrobial chemical agents. This is due to complex anatomy of root canal. These chemical agents used for irrigation helps in removing tissue debris, microbes, and also helps in removal of smear layer during root canal preparation[9]. While selecting any irrigating solution or medication, one should know its mechanism of action on predominant bacteria. The knowledge about chemical and biological dynamics of antimicrobial irrigants or medications along with interrelation between micro-organism and host constitutes the first step in endodontic treatment.

No single irrigant possesses all ideal properties for the success of endodontic treatment. So, there is a need for combination of irrigants to enhance their antimicrobial effect. However, there are chances of precipitate formation that will hinder their antimicrobial effect and could compromise dentin permeability, the intracanal medication diffusion and obturation sealing [10].

In this study, Sodium hypochlorite (NaOCl) and Chlorhexidine (CHX) formed a reddish-brown precipitate. This brownish floculates formed due to the presence of Ca, Fe, and Mg that are easily oxidized, which is confirmed in another study by analyzing the metals from this association in different concentrations by atomic absorption spectrophotometer[11]. The precipitate formed is an insoluble neutral salt formed by the acid-base reaction between NaOCl and CHX. Chlorhexidine has the ability to donate protons since it is a dicationic acid (pH 5.5-6.0) whereas NaOCl is alkaline being able to accept protons from the dicationic CHX. This exchange between protons led to formation of insoluble and neutral substance called precipitate[12]. Some studies have detected the presence of a toxic compound called para-chloroaniline (PCA) on interaction of chlorhexidine with sodium hypochlorite[13-17]. In contrary to these studies some studies failed to detect presence of para-chloroaniline (PCA) in precipitate [18,19]. Para-chloroaniline (PCA) is produced by the hydrolysis of CHX as a function of time, alkaline environment (High pH) and heat[20].

Recently, in our previous study, it was demonstrated that a combination of CHX with NaOCl/neem/tulsi, not only formed a precipitate each but also contained PCA as well[21]. The HPLC analysis showed the percentage dry weight of PCA as 14.00 ppm (CHX + NaOCl), 10.57 ppm (CHX + neem) and 9.00 ppm (CHX + tulsi).

According to International Agency for Research on Cancer (IARC), para-chloroaniline (PCA) is used as an intermediate block in the manufacture of dyes, pigments, agricultural chemicals and pharmaceuticals. PCA is a persistent environmental degradation product of some herbicides and fungicides which presents potential long-term toxicity and carcinogenicity in rats and mice and can cause methemoglobinemia. PCA is found to induce DNA damage in bacteria. Kacmar et al. evaluated PCA metabolite of herbicide monolinuron for its toxic and immunotoxic effects in peripheral blood of leukocyte suspension of 5 sheep by using a migration-inhibition test where toxic and immunotoxic effects were recorded at concentration from 1.0 – 0.1 mg/ mL^{-1} and 0.01-0.001 mg/ mL^{-1} respectively[22]. Future studies should determine the concentrations of PCA generated from 0.1%-2% concentrations of CHX. There is sufficient evidence in experimental animals for the carcinogenicity of PCA but inadequate evidence to prove its carcinogenicity in humans. However, The International Agency for Research on Cancer (IARC, 2006) classified PCA in their 2B group which is a potential carcinogenic to human[23].

Krishnamurthy and Sudhakaran (2010) showed that precipitate formation can be prevented by using intermediate flushing with absolute alcohol, citric acid and saline.

In our study, we used herbal extracts since there are limited studies regarding interaction of Chlorhexidine (CHX) with herbal extracts.

Phytochemical screening of neem revealed that it contains alkaloids, steroids, flavonoids, tannins,

saponins and amino acid[24]. Greenish precipitate may be due to interaction of steroids with Chlorhexidine

Phytochemical screening of Aloevera revealed the presence of saponins, glycosides, flavonoids, alkaloids, tannins, proteins but failed to detect the presence of steroids and cardiac glycosides[25]. Interestingly, there was no precipitate formed on interaction of Chlorhexidine with Aloevera. This may be due to the absence of steroids in aloevera.

Phytochemical screening of Garlic (Allium sativum) showed the presence of flavonoids, alkaloids, saponins, tannins and cardiac glycosides although steroids were not detected[26]. Absence of steroids in garlic may be one of the reasons for not forming precipitate with Chlorhexidine (CHX). In our study, null hypothesis was rejected because chlorhexidine didn't form precipitate when used along with aloevera and garlic.

Furthermore, studies need to be done to check for the presence of toxic compound called para-Chloroaniline (PCA) in greenish precipitate formed on interaction of Chlorhexidine with neem.

Conclusion

Considering the results of our study, we can conclude that chlorhexidine forms precipitate with sodium hypochlorite (reddish brown precipitate) and neem (greenish precipitate). It indicates that ingredients in chlorhexidine (CHX) are responsible for precipitate formation. Further it should be noted that herbal extracts like aloevera and garlic on combination didn't form precipitate and also with sodium hypochlorite.

Conflict of Interest: The authors declare there is no conflict of interest.

Source of Funding: Self

Ethical Clearance: The ethical clearance was obtained from Review board of Saveetha Dental College. (SDC/IHEC/19-20/051)

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Comparison of Coca Cola and Diet Coca Cola on the Surface Enamel Roughness

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Abstract

Aim: To assess the effect of coca cola and diet coca cola on surface enamel roughness.

Materials and Method: In this vitro study, there were 8 teeth extracted and these specimens were prepared with 4 teeth immersed with coca cola and 4 teeth in diet Coca Cola of 40ml at room temperature for 5 minutes each. The enamel micro hardness of enamel was tested using Vickers hardness test. On each specimen, one indentation of 100 μm were made using a load of 25 gf for 5 s in a micro durometer and it was done as a single-blind test and the final results were further compared using t-test.

Results: There has been considerable reduction in enamel hardness when the teeth are dipped in coca cola and slight and negligible reduction in hardness when dipped in diet coca cola. Mean Difference in Coca Cola - 84.05 and DIET Coca Cola - 16.725. All the teeth except those exposed to Coca Cola showed a statistically significant decrease in the surface VHN ($p < 0.05$).

Conclusion: The results of this study showed significant reduction in the enamel hardness after treating with coca cola, whereas very minimal reduction in enamel hardness when treated with diet coca cola.

Keywords: *Coca Cola, Vickers hardness test. Surface roughness, micro hardness, statistically significant.*

Introduction

The hardest substance in the body is enamel, and it protects the teeth. However, it is vulnerable to demineralisation from acids produced by certain bacteria that colonise the tooth surface with digested carbohydrates. If this process proceeds, it may eventually lead to carious lesions on enamel and dentin. Another source of acid comes from foods and beverages that also can lead to demineralisation of the enamel. Tooth enamel contains billions of crystals of hydroxyapatite that are packed in prisms winding from enamel-dentin border to the tooth surface.

Tooth gets damaged under the influence of various factors including infective and non-infective [1, 2]. The soft drinks and carbonated drinks comes under non-infective source of tooth damage.

Dental erosion is known as "an irreversible loss of dental hard tissue due to acidic process without involvement of microorganisms."[3] Another way to classify dental erosion are extrinsic or intrinsic factors. Extrinsic erosion is due to exogenous acids. One of the main causes of extrinsic erosion is consumption of carbonated beverages, citric juices, high-energy drinks, and candies. Most of these drinks have low pH, or acidic

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in nature. [4, 5, 6]

Soft drink consumption has increased exponentially over the past 20 years. In these years, there is an increased consumption of soft drinks by adolescents. [7, 8] The commercial sale has also been increased over the past years [9] Enamel solubility is pH dependent. The critical pH of enamel is 5.5, any lower pH will cause erosion, especially if the tooth is exposed to the enamel over a long period of time. The sum of titratable acidity of acidic drinks is more important than the pH alone as it indicates the concentration of damaging hydrogen ions present to interact with the tooth surface.[10]

The final erosive capacity of food and drink depends on the chemical factors, such as; pH, titratable acidity, amount of calcium and phosphate, biological factors, such as; salivary flow rate, buffering capacity, pellicle formation, tooth composition, and soft-tissue structure and behavioural factors, such as; eating and drinking habits. [11] Hence a study was conducted to compare the surface micro-hardness of the tooth after exposure to carbonated soft drinks.

Materials and Method

An in vitro study was conducted on 8 healthy permanent premolar teeth that were extracted for orthodontic reasons. The teeth that were included in the study did not have any caries, enamel defects, erosion, or cracks according to clinical examination. The extracted teeth that did not meet the inclusion criteria were excluded from the study. These teeth were stored in containers, filled with tap water and were kept at room temperature. The surfaces of the teeth were polished and evaluated for the presence of any enamel defects.

Extracted permanent teeth was randomly subdivided into two groups of four teeth, the one group immersed in Coca cola and the other group in Diet cola. These specimens were prepared with 4 teeth immersed with coca cola and 4 teeth in diet Coca Cola of 40ml at room temperature for 5 minutes each. The enamel micro hardness of enamel was tested using Vickers hardness test. The micro vickers hardness is tested on the enamel portion of the teeth after cutting, moulding and polishing the same in quick set acrylic mound. One specimen per tooth crown was prepared by cutting the labial surface with a double-sided steel disc, followed by smoothening with diamond tips. On each specimen, one indentation of 100 μm were made using a load of 25 gf for 5 s in a micro durometer and it was done as a single-blind test and the final results were further compared using t-test.

Findings

Results showed that micro hardness reduction was greater after immersion in Coca-Cola than after immersion in diet cola. In table 1, comparison of before and after treatment with diet coca cola, the calculated t value is smaller than critical value (3, 165<3.182), so the means are not significantly difference between the reading of diet coca cola and water. In table 2, comparison of before and after treatment with coca cola, the calculated t exceeds the critical value (48.5193>3.182), so the means are significantly different. In table 3, there has been considerable reduction in Hardness when the teeth are dipped in Coca Cola and slight and negligible reduction in Hardness when dipped in DIET Coca Cola. Mean Difference in Coca Cola - 84.05 and DIET Coca Cola - 16.725. All the teeth except those exposed to Coca Cola showed a statistically significant decrease in the surface VHN ($p < 0.05$).

Table 1: Micro-hardness of teeth before and after immersion in Coca cola

Micro vickers hardness in Hvo.1 (as polished condition)	Micro vickers hardness in Hvo.1 (after 5 minutes dip in Coca cola)
322.3	242.4
324.6	241.2
335.2	246.9
329.4	244.8

Table 2: Micro-hardness of teeth before and after immersion in diet Coca cola

Micro vickers hardness in Hvo.1 (as polished condition)	Micro vickers hardness in Hvo.1 (after dip in 5 minutes diet Coca cola)
327.6	323.9
338.6	322.8
335.7	306.2
328.0	310.1

Table 3: Comparison of micro hardness of teeth after immersion in Coca cola and diet cola

Values	Coca cola	Diet coca cola
Mean	315.75	243.825
Variance	79.75	6.4425
Standard deviation	8.9303	2.5382
n	4	4
t	3.165	48.5193
Degree of freedom	3	3
Critical value	3.182	3.182

Discussion

Over the last few decades, there was an increased prevalence of erosion due to increased consumption of fruit juices and soft drinks. Soft drinks has been marketed directed at the younger generation by relating these beverages with acceptance of the peer group. Also these soft drinks have also been marketed as healthy and linked to celebrities. Erosion is linked to high intake, frequency and method of consumption of acidic beverages. Excessive exposure of the tooth structure with acidic food leads to loss of dental hard tissues. [12]

Certain beverages induce demineralisation and hence therefore affecting the hardness of tooth structure. Surface demineralization and remineralization processes have an important role for mineralized tissues, such as teeth and bone. Enamel softened by erosion is likely to be more susceptible to abrasion and attrition. [13]

The frequency of acidic food or carbonated drinks consumption is an important factor in the cause of dental erosion compared to that of quantity, resulting in demineralization of hard tissues. The erosive factors are derived from their acid content, which is mainly citric acid and carbonic acid. Meurman et al also proved that the strong decalcifying properties of isotonic drinks also lead to loss of enamel. [14]

In a study done by Annapurna Kannan et al it was said that there was no sex predilection in the consumption level, quantity, type, frequency of intake and favourite brand of soft drinks. The presence of erosion was more apparent in individuals who consume soft drinks than those individuals who did not. The study findings reported that there exists a significant difference in the amount of erosion experienced by the study participants varied with the type of soft drink consumed. It was also said that the study subjects who preferred carbonated soft drinks had an increased erosion when compared to those who consumed non-carbonated soft drinks. Those who consumed both carbonated and non-carbonated drinks had a relatively lesser erosion than those who consumed only carbonated drinks. [15]

In the present study, there has been considerable reduction in enamel hardness when the teeth were immersed in Coca Cola and slight reduction in hardness when immersed in DIET Coca Cola. This is similar to the conducted by Wongkhantee S et al.,where it was reported that the softening effect on enamel by cola was significantly higher than the sports drink . [16] Also in a study done by Tadakamadla J et al., carbonated drinks were observed to have more enamel dissolution than fruit juices and the justification was explained as the viscosity of a drink, together with contact angle and surface tension, determines its ability to penetrate a capillary space such as pores in enamel. [17]

Soft drinks contain acidulants such as citric, phosphoric, tartaric, malic, and other organic acids. These acids exhibit buffering capacity and can maintain the local pH at the tooth surface below the threshold value. Carbonated drinks supplemented with refined carbohydrates and the additives may be contributing factors to tooth demineralisation. [18]

In another study, the data showed that Coca-Cola contains phosphoric acid, compared to citric acid, phosphoric acid is stronger. [19] Phosphoric acid causes an etched zone which is permanently lost from the tooth surface. [20] Whereas, citric acid acts as a chelator by binding to the calcium from enamel or dentine, therefore increasing the degree of demineralization. [21, 22]

In another study, the presence of fluoride was also noted as it is believed to play a negative role against decay and it promotes remineralisation and inhibits demineralisation by deposition in the form of CaF2. [23] Hydroxyapatite (HAP) gives rise to the fluor apatite Ca10(PO4)F2, when the hydroxyl ions are substituted by the fluoride ions. The presence of fluoride ions in the lattice allows it to resist the acid challenge. [24]

Any beverage or food with intrinsically lower pH [25], including carbonated drinks may cause decay. The severity of the erosive potential is thought to be related to pH, titratable acidity, buffering capacity and calcium chelating property of the beverages. [26]

The presence of various acids can explain the differences in the erosive potential of Coca-Cola and citric fruits. According to information from the manufacturers, Coca-Cola contains phosphoric acid, whereas citric fruits contain citric acid. Compared to citric acid, phosphoric acid is stronger [27]. The effect of phosphoric acid results in an etched area which might be permanently lost from the tooth surface [28]. On the other hand, citric acid may act as a chelator capable of binding the calcium from enamel or dentin, thus increasing the degree of under saturation and favouring demineralization.

Conclusion

The results of this study showed significant reduction in the enamel hardness after treating with coca cola, whereas very minimal reduction in enamel hardness when treated with diet coca cola. It is duty of dental care professionals to educate patients about the harmful effects of soft drinks on oral health as well as general health and to advise them to choose a low erosive soft drink, such as a non-carbonated soft drink to alleviate dental erosion.

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Relationship Between Obesity and Periodontal Diseases - A Short Study

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Abstract

Background: Obesity has been described as one of the most neglected public health problems, affecting both developed and developing countries. The prevalence of obesity has increased substantially in the last few decades. Obesity has been suggested to be a risk factor for periodontitis.

Aim: The aim of this study was to assess any possible relationship between obesity and periodontal diseases in patients attending Saveetha Dental College.

Materials and Method: This study was conducted on patients in Saveetha Dental College, Chennai. Both male and female patients were included in the study. The body mass index was calculated for each patient along with the Russell's periodontal index. Statistical Analysis was done.

Results: More than half of the study participants were obese. An association between obesity and periodontal disease was found. The obese subjects were found to have destructive periodontal disease.

Conclusion: It was found from the study that there exists a relation between obesity and periodontal disease. It is the duty of the dental professionals to create awareness among the patients about the relationship of oral health and general health.

Keywords: *obesity, periodontitis, oral care, over weight*

Introduction

According to the World Health Organization (WHO), obesity is the fastest-growing and most significant health hazard in developing and also in developed countries. [1, 2] Obesity has been described as one of the most neglected public health problems, affecting both developed and developing countries. The prevalence of obesity has increased substantially in the last few decades. In 2014, the World Health Organization (WHO) estimated that around 600 million adults worldwide were obese and a further increase is expected in the future due to increased consumption of high-calorie diets and a sedentary lifestyle. [3] Obesity is usually defined as body mass index (BMI = kg/m2).

Specifically, overweight is defined as a BMI between 25.0-29.9 kg/m2 and obesity is defined as a BMI of ≥ 30.0 kg/m2 . The exception is found in Asian regions, where overweight is defined as BMI ≥ 23 kg/ m2. [3] Obesity is a chronic metabolic disease that predisposes to a variety of comorbidities including arterial hypertension, type 2 diabetes mellitus, atherosclerosis and cardiovascular diseases. Obesity has been associated with many serious, life–treating medical conditions. Besides being a risk factor for cardiovascular diseases, type II diabetes and certain cancers, obesity has also been suggested to be risk factor for periodontitis. [4, 5]

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Periodontal disease is an infectious and inflammatory disorder of tooth-supporting structures resulting from the interaction between pathogenic bacteria and the host immune response. [2] Human periodontal disease is associated with a complex microbiota containing Actinobacillus actinomycetemcomitans, Porphyromonas gingivalis and other periodontopathic bacteria. These microorganisms are unique to the oral cavity and they may disseminate to other body sites. However, systemically healthy individuals seem to be at low risk of getting acute non-oral diseases from direct infections by periodontal pathogenic microorganisms. Its been reported that periodontal infections as a risk factor for chronic medical disorders, including cardiovascular disease, cerebrovascular accidents and low-birth-weight infants. [6] Maternal periodontal disease has been linked to low birth weight, preterm birth, and preterm low birth weight.[7].Activation of the host immune system, primarily for protective purposes, eventually leads to destruction of tissues through the synthesis and release of cytokines, proinflammatory mediators and metalloproteinases [8]. It is known that obesity has several harmful biological effects that might be related to the pathogenesis of periodontitis. [9] Adipose tissue releases proinflammatory cytokines and hormones globally referred to as adipocytokines, which induce inflammatory processes and oxidative stress disorders, generating a similar pathophysiology between the both diseases. [4]

Although some studies have shown an association between obesity and periodontal disease in different populations, there have been only few studies documented in literature, in this part of southern India. Hence, an attempt was made to explore the relationship between obesity and periodontitis among the patients. The aim of the current study was to investigate whether there were associations between obesity and periodontal status in population aged 28 yrs and above.

Materials and Method

A comparative study was conducted among participants attending Outpatient Department of Saveetha Dental College and Hospitals in Chennai. The study was carried out under the guidance of the Department of Public Health Dentistry. A pilot study was conducted among 50 participants aged 28 years and above. Exclusion criteria for all subjects included: periodontal or antibiotic therapy ; any systemic condition which might have influenced the course of periodontal disease or treatment for example patients with diabetes and cardiovascular disease; any systemic condition which needed antibiotic coverage for regular periodontal procedures. Obesity was measured by calculating body mass index (BMI). Data were collected through oral examination by one of the author. Patients were asked to take off their footwear. Height was measured using wall-mounted height rods and recorded in centimeters, then converted to meters and weight was measured in kilograms using a mechanical scale.

The BMI is calculated by dividing the body weight (in kilograms) by the height (in meters) squared (BMI = weight/ height2). The BMI measured was categorized using the World Health Organization: normal weight (<24.9 kg/m2), overweight (25-29.9 kg/m2) and obese (>30 kg/m2).

Russell's periodontal index was used to check the periodontal status. Periodontal Pocket was determined by inserting the tip of the probe into the pocket along the longitudinal axis of the tooth and measuring the distance from the gingival margin to the depth of the pocket. All the teeth present were examined. The scoring values were 0, 1, 2, 4, 6, 8. The scoring criteria was[10]

0-Negative: There is neither overt inflammation in the investing tissues nor loss of function due to destruction of supporting tissue.

1-Mild gingivitis: There is an overt area of inflammation in the free gingiva, which does not circumscribe the tooth.

2-Gingivitis: Inflammation completely circumscribed the tooth but there is no apparent break in the epithelial attachment.

4-Used only when radiographs are available.

6-Gingivitis with pocket formation: The epithelial attachment has been broken and there is a pocket. There is no interference with normal masticatory function, the tooth is firm in its socket and has not drifted.

8-Advanced destruction with loss of masticatory function: The tooth may be loose; may have drifted; may sound dull on percussion with a metallic instrument;

may be depressible in its socket.

The Periodontal Index score per individual is obtained by adding all the individual scores and dividing by the number of teeth present or examined and interpreting the clinical condition into the following:[10]

0-0.2- Clinically normal supportive tissues

0.3-0.9- Simple gingivitis

1.0-1.9- Beginning destructive periodontitis

2.0-4.9- Established destructive periodontal diseases

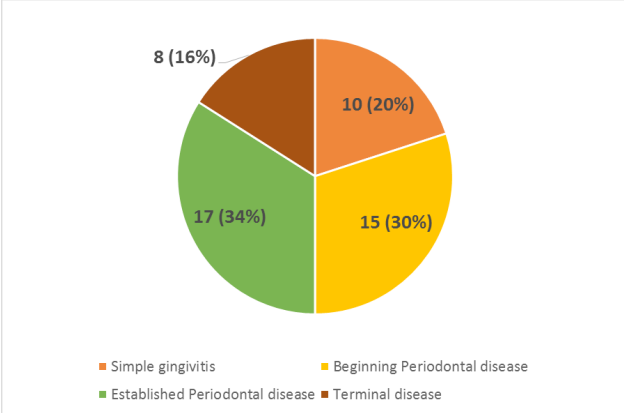
5.0-8.0- Terminal disease. [10]

Data collected were entered and descriptive statistics tabulated. Chi-square test was used to assess the relation between BMI and periodontal health status of the study participants.

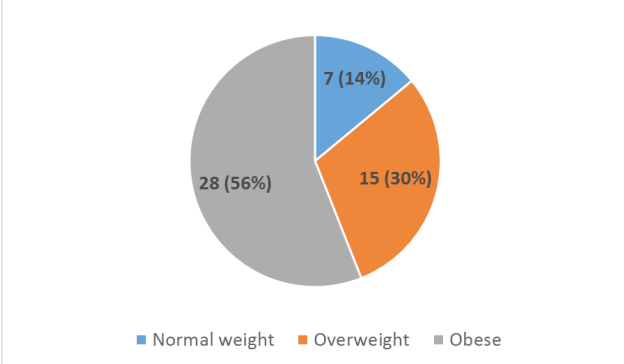
Findings

A total of 50 subjects were evaluated including 25 males and 25 females. The age of patients was in the range of 28-65. Out of these, 14% subjects had normal BMI (18.5-24.9 kg/m2), 30% were overweight (25-29.9 kg/m2) and 56% were obese (>30 kg/m2). (Graph 1) The mean BMI was 30 and it was higher in females (31%) and in males (29%). Russells Periodontal index showed that 20% subjects had simple gingivitis, 30% had beginning destructive periodontal disease, 34% had established destructive periodontal disease and 16% had terminal disease. (Graph 2)

Simple gingivitis was found to be common among study subjects with normal weight when compared with obese study subjects. The obese subjects were found to have destructive periodontal disease when compared with study participants with normal weight and overweight. This difference was found to be statistically significant.



Graph 1: Distribution of BMI of study participants



Graph 2: Distribution of periodontal health status of study participants

Table 1: Relationship of BMI and periodontal disease among study participants

		Periodontal health condition of the participants				P value
		Simple gingivitis	Beginning destructive pdl disease	Established destructive pdl disease	Terminal disease	
BMI of the study participants	Normal	7 (70%)	0.0%	0.0%	0.0%	< 0.001
	Overweight	3 (30%)	7 (46.7%)	5(29.4%)	0.0%	
	Obese	0.0%	8 (53.3%)	12(70.6%)	8 (100%)	

Discussion

The present study was done to assess the relationship of obesity and overweight with oral health among outpatients attending a dental college.

It was found from the study results that there exists a relation between the person's body weight and the periodontal health. The results of this study showed that obesity was associated with periodontitis but much lower than normal weight. The relationship of obesity was found to be much higher in individuals with established periodontal disease than in the study participants with beginning periodontal disease. This was in keeping with a number of studies which have suggested that obesity is associated with oral diseases, particularly periodontitis [11]. Obesity is a complex disease, and its relationship with oral status has been realised by the scientific community in the recent years. Previous studies found a strong association between obesity and periodontal disease. The relationship between obesity and periodontal disease was first reported in 1977, when histopathological changes in the periodontium in hereditary obese Zucker rats was observed by Perlstein et al. [12].

In case of periodontitis with periodontal pockets of 5 mm or deeper, BMI increases[8]. In this study, the obese subjects had beginning destructive periodontal disease and establishes destructive periodontal disease. The overweight and healthy subjects had simple gingivitis. This analysis showed a positive association between BMI and periodontal pockets (5 mm or more). This finding could be interpreted that body weight has an effect on the extent of periodontal infection among subjects with periodontal infection.

Saito et al did a study among 241 healthy Japanese individuals and showed, for the first time, an association between obesity and periodontal disease in humans. In addition, studies have indicated that the fat distribution pattern plays an important role in the association with periodontitis [13,14]. Study done by Saito et al concluded that obesity is associated with deep periodontal pockets and is independent of glucose tolerance status. National Health and Nutrition Examination Survey (NHANES III) data reported that BMI was positively correlated with the severity of periodontal attachment loss; they found that this relationship is modulated by insulin resistance[15].

Some of the reviewed studies analysed proinflammatory molecules in serum, in an attempt to find a possible causal mechanism relating obesity to periodontal disease and it was reported inflammatory process was the possible cause. In obese individuals, adipocytes secrete proinflammatory cytokines such as TNF-α and IL-6, which stimulate the hepatic production of acute phase reactants such as C-reactive protein and cause alterations in the host's immune response – increasing the susceptibility to bacterial infection[16]. TNF-α is one of the first proinflammatory cytokines induced by the periodontal pathogens. TNF-α stimulates osteoclast formation, inducing alveolar bone destruction and connective tissue degradation contributing to the onset of periodontal problems [17]. It is therefore believed that TNF-α mainly contributes to the early stages in the development of periodontal disease in obese individuals, not to the worsening and/or progression of already established periodontal diseases.

Blood vessels of periodontium in obese individuals have thickenings on the most inner walls, which is a symptom of decreased blood flow. It is considered that this could be the effect of action of the PAI-1 –adipokine, the level of which is markedly increased in visceral fat in obese individuals[16]. The reduction of blood flow in periodontal vessels is one of the pathogenic mechanisms of the development of periodontal disease[19].

Age has also been considered as a risk factor for periodontitis and has been observed that the prevalence and severity of periodontitis increase with age, probably as a consequence of the longer exposure of the periodontal tissues to bacterial plaque[20].

Also some studies indicate that males are at a greater risk of developing periodontitis than females, while other articles suggest that females may be more vulnerable to periodontitis, due to hormonal fluctuations that increase gingival inflammation which is in accord with the results of this study[21, 22]. Though there exists statistical significance in the present study, the study was conducted as a pilot study and it has to be conducted among the study population with increased sample size.

Conclusion

The study concluded that the periodontal disease

was related with obese persons when compared with persons with normal weight. Dentists must be aware of the increasing numbers of obese persons and of the significance of obesity as a multiple-risk factor syndrome for overall and oral health. This could affect the delivery of dental care in future. Dentists should counsel obese persons regarding the possible oral complications of obesity with periodontal risk assessment on a regular basis.

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Anticariogenic Activity of Fresh *Aloe Vera* Gel Mediated Copper Oxide Nanoparticles

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Abstract

Background: Biosynthesis of metallic nanoparticles for its medical applications has become a major focus in nanotechnology in the recent years. *Aloe vera* has a wide spectrum of medicinal applications due to its anti-inflammatory, antimicrobial, anticancer and wound healing properties. Copper oxide nanoparticles have effective antimicrobial action against a wide range of pathogens and also dug resistant bacteria.

Materials and method: In the present study, *Aloe vera* gel is used to synthesize copper oxide nanoparticles and were characterized using UV-visible spectrophotometry and FT-IR. The anticariogenic activity of oral pathogens namely, *Staphylococcus. aureus, Streptococcus mutans, Enterococcus faecalis*, *Pseudomonas sp*, were also tested

Results: UV absorption spectra of the synthesized nanoparticles revealed an intense surface plasmon resonance between 250 and 300. The functional groups in the copper oxide nanoparticles were determined by FT-IR and these also shown to have potent anticariogenic activity.

Conclusion: Copper oxide nanoparticles synthesized using *Aloe vera* gel shown to have an excellent anticariogenic activity and has a wide array of dental applications.

Keywords: *Copper oxide nanoparticles, Aloe vera, green synthesis, anticariogenic*

Introduction

Recent advances in the field of science & technology, particularly nanotechnology, have led to a new conception of synthesizing nanosized particles of desired size and shape [1, 2]. CuO is a P-type semiconductor material with a narrow band gap of 1.2ev. Last few years, it is receiving a lot of attention for its multifaceted properties and prospective use as gas sensors, solar cells, lithium ion batteries, miscellaneous catalysts & antibacterial agents. Besides, CuO nanoparticles are stable, robust & have a longer shelf life compared to organic, antimicrobial agents [3-6].

Copper oxide nanoparticle is the elementary member of the Cu compounds that divulge a range of potential physical properties and is much inexpensive than silver oxide. It can be assorted easily with polymers to render the composites with distinctive physio-chemical properties. Also, these nanoparticles have high surface areas & atypical crystalline structures to give copper oxide nanoparticles with antimicrobial activity that is dose dependent [7].

In the present study, *Aloe vera* plant is used for the green synthesis of CuONPs as it contains 75 potentially active constituents which have been reported to

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possess immunomodulators, anti-inflammatory, anti-parasitic and wound or burn healing properties [8]. Though there are reports on the antibacterial activity of CuONPs against selected human pathogens[5], no studies are available for anticariogenic activity of fresh *Aloe vera* gel mediated CuONPs so far.

Metal nanoparticles and other nanoparticles are being integrated with polymers (such as dental composite) or coated onto surfaces which obtained the potential applications within the oral cavity [9,10]. This is why the present study stands remarkable as it deals with green synthesis of CuONPs employing *Aloe vera* gel extract and testing their efficiency as anticariogenic agents against oral pathogens such as *S. aureus, S. mutans, E. faecalis*, *Pseudomonas sp*, which are reported to be responsible for causing tooth caries (tooth decay) and nosocomial infections.

Materials and Method

All the chemical reagents (analytical grade) were purchased from sigma-aldrich chemicals, India. The oral pathogens were isolated from the dental outpatients in Saveetha Dental College and Hospitals, Poonamallee, Chennai, Tamil Nadu. Oral pathogens namely *S. aureus, S. mutans, Pseudomonas sp, E. faecalis* were identified using a biochemical assay and these pathogens were maintained in the respective medium.

Synthesis of copper oxide nanoparticles



Figure 1: Synthesis of fresh *Aloe vera* gel mediated Copper oxide nanoparticles.

Aloe vera leaves were collected from Nanobiomedicine Laboratory, Department of Pharmacology, Saveetha Dental College, Saveetha Institute Medical and Technical Sciences, Chennai. *Aloe vera* leaves were washed with tap water and about 10g of fresh *Aloe vera* gel was taken out from the leaves and then boiled with 100mL of de-ionized water for 5 minutes at 60°C-80°C. The product was then filtered using Whatman no. 1 filter paper and stored in refrigerator for further investigations. (Figure 1) 4mM copper sulphate solution was prepared using 40 mL de-ionized water and 10 mL of fresh *Aloe vera* gel extract was added. The mixture of this solution was kept under constant stirring using magnetic stirrer at 450 rpm and orbital shaker at 65 rpm for 48 hrs. After this process, the synthesized fresh *Aloe vera* gel mediated copper nanoparticle solution was centrifuged at 10000 rpm for 10 minutes. The pellet obtained was washed twice with de-ionized water and dried at 80°C for 1 hour. Finally, the dried powder was stored in properly labelled eppendorf and used for further studies.

Characterization of copper oxide nanoparticles

UV-vis spectrophotometer (uv-2450 Shimadzu) was used to determine the optical property of copper oxide nanoparticles in 250-650 nm wavelength range. The functional groups in the copper oxide nanoparticles were analysed by Fourier Transform Infrared (FT-IR) Spectroscopy (Perkin Elmer 1725X).

Determination of anticariogenic activity of copper oxide nanoparticles

The antimicrobial activity was determined by well diffusion method. The Mueller Hinton agar plates were prepared and each plate was swabbed with four different dental pathogens such as *S. mutans, S. aureus, Pseudomonas sp, E. feacalis*. A gel puncture was used to cut four wells on each petriplates. To the first three wells, copper oxide nanoparticles was added in different concentration range of 40µL, 80µL and 120µL respectively. The effects were compared with that of the standard antibiotic (Amoxicillin) at a concentration of 10 µg/mL. The plates were incubated at 37°C for 24hours. The assessment of the antimicrobial activity was based on the measurement of the diameter of the inhibition zone formed around the well and the mean values were recorded.

Results and Discussion

UV- visible spectrometry

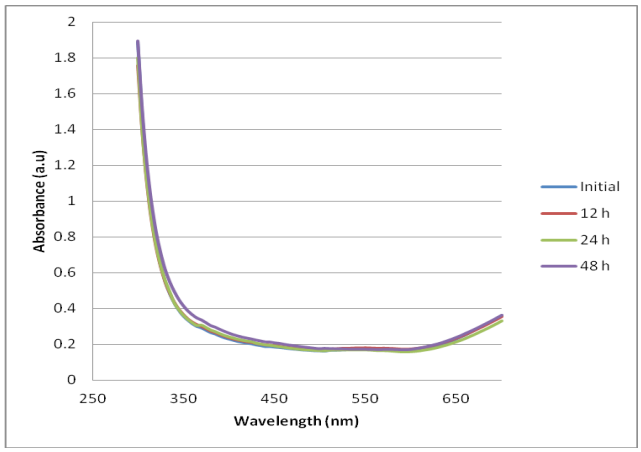


Figure 2 : UV spectroscopic analysis of fresh *Aloe vera* gel mediated copper oxide nanoparticles

Figure 2 shows the UV-visible absorption spectrum of fresh *Aloe vera* gel mediated copper oxide nanoparticles. An intense surface plasmon resonance between 250-300 nm in the UV-vis spectrum clearly reveals the formation of copper oxide nanoparticles.

Fourier Transform Infrared Spectrometry

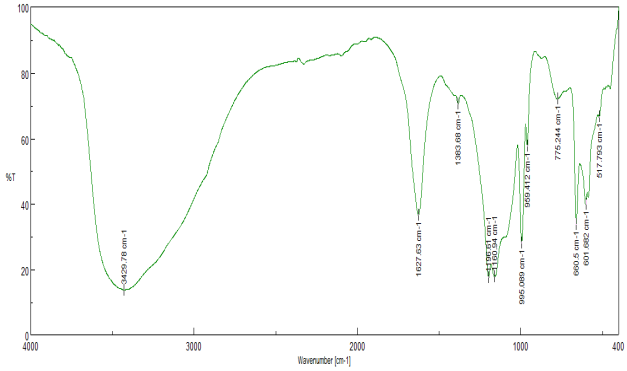


Figure 3: FT-IR spectrum of fresh *Aloe vera* gel mediated copper oxide nanoparticles.

FT-IR spectra of green synthesized copper oxide nanoparticles is shown in figure 2. The spectrum showed band at 517 cm^{-1} indicated the formation of CuO nanostructures. The bands at 601.682 and 660.5 cm^{-1} corresponds to the vibrational modes of CuO nanostructures. The bands at 1383.68 and 1627.63 cm^{-1} refer to C=O stretch and N-H bending mode. The bands at 1160.94 and 1196.61 cm^{-1} corresponding to C-O-C stretch was also obtained. The synthesized copper oxide nanoparticles shows peak at 3429.78 cm^{-1} which corresponds to phosphorus compounds.

Anticariogenic activity

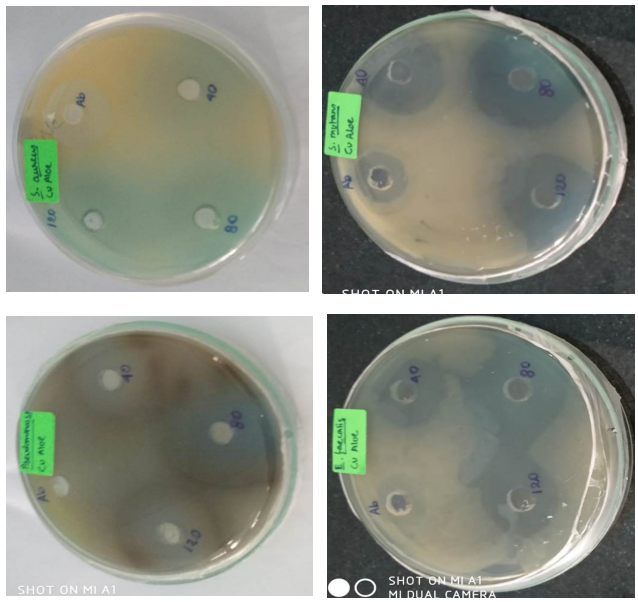


Figure 4: Anticariogenic activity of Fresh *Aloe vera* gel mediated copper oxide nanoparticles against oral pathogens.

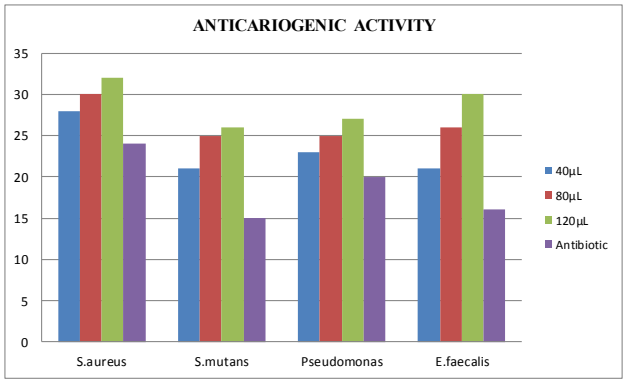


Figure 5: Histogram of anticariogenic activity of CuNPs which showed that *S. aureus* was the most sensitive bacterium followed by *E. faecalis, Pseudomonas sp and S. mutans.*

Figure 5 shows maximum zone of inhibition obtained in gram positive bacteria *S. aureus* with a zone diameter of 32±1mm a concentration of 120 µL and lowest zone of inhibition was observed in *S. mutans* with a zone diameter of 26±1mm at same concentration.

Maximum zone of inhibition obtained in gram negative bacteria *E. faecalis* with a zone diameter of 30±1mm at a concentration of 120 µL and lowest zone of inhibition was observed in *Pseudomonas sp* with a zone diameter of 27±1mm at same concentration. The results revealed that *Aloe vera* gel mediated copper oxide nanoparticles show effective anticariogenic activity.

Conclusion

The present study reported that copper oxide nanoparticles can be synthesized in a simple method using *Aloe vera* gel extract. Fresh *Aloe vera* gel mediated copper oxide nanoparticles showed excellent anticariogenic activity. The explored biosynthetic preparation of copper oxide nanoparticles has potent applications in biomedical and biotechnological applications with numerous advantages such as cost effectiveness and pharmaceutical applications as well as for large scale commercial productions. Further research on this study assign possible applications in dental field which will be efficient to cure dental pathosis.

Conflict of Interest: The authors declare there is no conflict of interest.

Source of Funding: Self

Ethical Clearance: Ethical Clearance was obtained from the Saveetha Dental College institutional board (SDC/IHEC/19-20/059)

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Dental Anxiety among Children Regarding Different Dental Treatment- Modified Child Dental Anxiety Scale (MCDAS)-A Cross Sectional Study

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Abstarct

Aim: To understand the levels of anxiety among children for various dental procedures using MCDAS

Materials And Method: The study was conducted in Saveetha dental college, Chennai with 100 outpatient children who reported to the clinics. They were given a questionnaire to fill with the help of Modified Child Anxiety Scale- Faces Version. The results were then tabulated and calculated

Results: The results showed that children are more anxious about getting injections or having their tooth extracted. On the other end of the spectrum, they appear more composed when the dentist merely cleans their teeth. The results show a decrease in anxiety levels with age.

Conclusion: The MCDAS is a reliable parameter to measure the anxiety levels in children. The study also showed increased levels of fear during invasive procedures such as extraction and getting injections.

Key Words: *Dental Anxiety, MCDAS, Children, Phobia*

Introduction

Dental fear usually refers to a normal unpleasant emotional reaction which is specific to threatening stimuli occurring in situations associated with dental treatment, while dental anxiety is just an unreasonable negative emotional state experienced by patients. Dental fear and anxiety (which is dental fear and anxiety, DFA) are major problems for a wide proportion of children and adolescents. The incidence rate can vary between countries by 5-20% where in some cases can be called as a dental phobia due to its extreme nature [1, 2,3]. Children and adolescents with DFA are often uncooperative and restless during dental visits, thus rendering treatment difficult or impossible [3] . Such behavior compromises the treatment outcome and can create occupational stress among dental staff, and is often a cause of disconnection between dental professionals and patients or their parents [4]. Due to their anxiety or fear, the children and adolescents may try even possible means to avoid or delay the treatment. This negative behavior correlates to non-attending patterns, which leads to irregular attendance to eventual drop out. This deteriorates their oral heath [4,5,6]. This can also have greater effects on a child's sleep, daily life and can leave a mark on one's normal functioning [7,8]. This can also interfere with their dental visits as an adult [9,10]. Thus, Pinpointing dental anxiety at a young age can help the individual gain a more positive outlook towards dentists.

Previous studies into dental anxiety drew predominantly upon quantitative instruments such as questionnaires [3]. These instruments are however largely based on the individual professionals' presumptions and may not capture the entire spectrum of the individual's perceptions and views [11]. These quantitative methods will focus mostly statistics and does not go deeper into

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uncovering complex mechanisms. Qualitative research is considered an important complement to quantitative methods, especially for an in depth understanding of the human behaviors.

Self-reported measures are commonly used in the assessment of dental anxiety. One significant advantage of self-report measures is the ease of administration, especially in larger case trials, i.e. taking a relatively shorter period of time to complete. They can also assess the response to different aspects of the dental experience in a comparatively shorter duration of time. Corah's Dental Anxiety Scale (CDAS) is one of the most popularly used methods of dental anxiety assessment in adults. When applied to children the wordings of the CDAS is considered too complex and the need for modified or simpler versions of the scale came up [11, 12, 13, 14]. As a result of this, Wong et al [15] came about the Modified Child Dental Anxiety Scale (MCDAS) based on CDAS. The MCDAS includes eight questions to assess the dental anxiety about varied dental procedures. The scale includes a question about local anesthetic, and other dental procedures that commonly stress out the children, such as extraction, dental general anesthesia (DGA), and restorations or 'fillings'[16].

A five-point scale is used to assess dental anxiety with scores from 'relaxed/not worried' (scored as 1) to 'very worried' (scored as 5). The total scores on the MCDAS range from 5 (little or no dental anxiety) to 40 (extreme dental anxiety). The MCDAS has been used and experimented in 8- to 15-yearolds and has been shown to be a reasonable and comparatively reliant measure of child dental anxiety exhibiting good internal consistency and validity according to literature [16, 17,18]. Normative data are available for both English [16] and Greek–Cypriot school children [17]. Although the MCDAS has shown increased rates of success and reliability in comparison to the Children's Fear Survey Schedule-Dental Subscale [CFSS-DS] [16] and other dental scales, Buchanan [18] reported an improved completion rate and accepatbility with the Smiley Faces Program (SFP) which is a computer based face version of the dental anxiety scale; when compared to the previously popularly used CFSS-DS and the MCDAS, which suggests that numeric rating scales are too difficult for anxious or younger children to understand and complete . A numeric rating scale or heavily worded rating scale is usually understood by children who are capable of good cognitive functioning; however, under the potentially anxiety-provoking environment of the dental situation the child may regress and experience a lowering of their cognitive ability [19]. With a reduction in cognitive functioning the MCDAS may be even more difficult for the regressed child to understand due to its dependence on understanding of the various parameters. An important disadvantage of self-report measures and other scales with a numeric rating scale is their unsuitability in the assessment of dental anxiety in the very young, uneducated children and children who are unfamiliar with the given language. In order to overcome these potential difficulties a pictorial version with faces of the MCDAS was developed for use in 7- to 9-year-old children (or even younger individuals), substituting pictorial response scales for the original worded response scale [20].

Very limited information is available for the reliability and validity of the pictorial modification of the CDAS. Other assessments adopting a faces approach include the Facial Image Scale (FIS), the Dental Anxiety 5 Scale and a computerized Smiley Faces Program (SFP). The Facial Image Scale[18] has been validated in the assessment of anxiety in children immediately prior to entering the various dental procedures. The limitation was that it only used a single construct which makes it difficult. The DA5 is a dental anxiety scale designed specifically for use with 5-year-old children [21] where in the responses are noted using a four item face rating scale. Some evidence has been presented for the reliability and validity of the DA5; however, its application is limited to younger children (especially around 5 years of age) . More recently, a four-item computerized SFP has shown good reliability and criterion validity[18] however, this method is very likely to be limited by the fact that the needs to be an access to computer equipment, which is not financially possible in all cases. Therefore, there will always remain a need for a simple and valid method of assessing dental anxiety in the young and/or nervous child. The MCDAS appears to be a comparatively useful measure of dental anxiety in this regard. It is, however, limited by the level of cognitive functioning required by the child to complete the numeric rating scale. It would seem reasonable that the inclusion of faces, based on the above literature, to correspond to the like scale could be useful in assessing dental anxiety in the young as well as the anxious older child. Therefore, there is a need to modify the MCDAS with the addition of a faces analogue scale while anchored above the original numeric form to allow for any decrease in age adequate functioning,

understanding related and cognitive function.

Similar studies have been conducted in the Iranian [22] and Kuwaiti[23] population. To the author's knowledge, no information on this topic is available for a south Indian population.

Thus, the aim of the study understand the levels of anxiety among children for various dental procedures using MCDAS in the South Indian population.

Materials and Methods

A total of 100 children who visited Saveetha Dental College and Hospitals, a private institute in South India, were selected using Random sequence generator from the whole list of patients reported. Each children were shown the MCDAS-faces version and asked to mark their responses. Verbal parental consent was procured prior to the interaction.

Inclusion Criteria:

1. Age of 5-18

2. South Indian ethnicity

3. Children who are not physically or mentally challenged

4. No disclosed learning difficulty

Exclusion Criteria:

1. Other ethnicity.

2. Uncooperative children

3. Children with no prior dental visit history

The participants' gender, age, source of referral and reason for visiting the dentist were recorded. They were then categorized into age groups 5-10 and 10-15. The responses from the questionnaire with response using faces was tabulated and compared.

Results

The results for visiting a dentist showed increased levels of fear the younger age group(35.19%) compared to the older age group (19.57%). The similar pattern was seen in response to the question of having their teeth looked at wherein increased levels of fear was seen in younger age group(24.07%) compared to the older age group (10.87%). The results for having teeth polished or cleaned showed increased levels of fear the younger age group (24.07%) compared to the older age group (10.39%). However, the opposite response was noted for the question about getting injections where in the older age group was more anxious (69.57%) than the younger age group (28.26%) and also for getting the tooth pulled out (64.81% as compared to 82.61%). The results for getting a filling showed increased levels of fear the younger age group(35.19%) compared to the older age group (28.26 %).

Table 1 shows the response to the question if children are afraid of visiting the dentist

Responses	Age Group: 5-10	Age group : 11-15
1	24.01%	14.81%
2	5.56%	3.70%
3	9.26%	11.12%
4	25.92%	16.67%
5	35.19%	53.70%

Table 2 shows the responses to question on having the teeth looked at

Responses	Age Group: 5-10	Age group: 11-15
1	37.04%	50%
2	9.26%	15.22%
3	7.41%	4.35%
4	22.22%	30.43%
5	24.07%	19.57%

Table 3 shows the responses to the question having your teeth scraped and polished

Responses	Age Groups: 5-10	Age Groups: 11-15
1	37.04%	47.83%
2	14.81%	13.04%

3	12.96%	10.87%
4	16.67%	10.87%
5	18.59%	17.39%

Table 4 shows the response to the question of receiving an injection

Responses	Age Groups: 5-10	Age group: 11-15
1	14.81%	10.87%
2	3.70%	2.17%
3	11.12%	13.04%
4	16.7%	4.35%
5	53.70%	60.57%

Table 5 shows the response to the question of having a filling

Responses	Age Groups: 5-10	Age groups: 11-15
1	18.52%	32.61%
2	14.81%	10.87%
3	7.41%	15.22%
4	24.07%	13.04%
5	35.19%	28.26%

Table 6 shows the response to having the tooth pulled out

Responses	Age Group: 5-10	Age Group: 11-15
1	11.11%	8.70%
2	5.56%	4.35%
3	7.41%	2.17%
4	11.11%	2.17%
5	64.81%	82.61%

Discussion

Dental fear in children has continued to produce numerous interests in pediatric dentistry. This is owing to the fact that there are possibilities of associated complications. It causes stress for many dentists who should manage such children particularly those who have associated behavioral problems. Additionally, the chair time needed to manage these children is lengthy and some specialized training is also required in successful management of these children. None the less, to efficiently manage this problem, it is essential to determine its prevalence in a population to facilitate scheduling of public health services.

On the other hand, tools are required to assist diagnosing its presence and the severity in individuals to help modify individual treatment. At last, there is also a need for tools which can measure treatment required and successes of management. This would be facilitated with monitoring and assessing treatment outcomes.

When asked about visiting the dentist, a remarkable percent of them reported to be anxious (35.19% for younger children and 19.57%). This stands parallel to the research of Honkala S et al[23]who reported a third of the girls and 6% of boys reported being very much afraid of visiting a dentist. This could stem from the fear of the unknown, negative experiances shared by peers or siblings, the fear of invading their personal space, feeling helpless and constrained, lack of trust, fear of pain and even personal previous dental experience. Thus, communication and establishing a good rapport with the child is important to build a foundation of trust and comfort.

When asked about getting their teeth looked at, 24.07% of young children and 10.87% of older children reported feeling anxious. This could stem from invasion of their personal space and feeling restrained in the dental chair. It could also stem from having unknown instruments placed in their mouth for examination. In such cases, a prior explanation will help alleviate the fear of routine examinations.

The results to having their teeth cleaning and polished showed the lowest levels of anxiety (18.52% in young children and 17.39% in older children). This starts in accordance to Honkala S et al' research as well. This could be due to their association of cleaning with brushing which is a routine activity and not painful, excitement for a cleaner set of teeth and their understanding of the procedure when explained.

The results to having injection showed, as expected, a very high levels of anxiety (53.70% in young children and 69.57% in older children). This stands in accordance with Honkala et al who concluded the same. The trypanophobia could arise from negative life

experiences or previous trauma brought on by a specific object or situation, relatives who've had phobias (which may be suggesting genetic or learned behavior), a sensitive, inhibitive, or negative temperament, learning about negative information or experiences. This can be managed by not showing the syringe to the child, being honest about the pain levels but not entirely graphic, substituting anesthesia to simpler words for easy communication, keeping or removing the parental figure from the vicinity based on the reaction. By rewarding the child after the procedure, the dentist ensures a positive reinforcement and brings about a more positive outlook towards dental visits.

When asked about getting fillings, there was a high level of anxiety as well (35.19% in younger individuals and 28.26% in older individuals). This can be attributed to the invasion of personal spaces, loud sounds from the aerator and compressor, prolonged mouth opening time or uncomfortable mouth opening, and in some cases sensitivity and pain as well.

The highest levels of anxiety was associated with dental extraction (64.81% in young children and 82.61% in older children). This is primarily due to involvement of the administration of local anesthesia with a syringe. The other reasons include the inability of the child to differentiate between pain and pressure, the visual pressure of seeing blood, negative experiences as shared by friends and siblings and their own experience with post-operative pain or negative experiences. Thus, to limit this fear, faster, atraumatic extractions should be performed.

Conclusion

Despite the complexity and time constrains, the researches for over nearly 60 years have focused almost exclusively on the endpoints of the paradigm; that is, normative research has tried to identify fear stimuli. Virtually all of the variables between, observable and inferred, have been left unexplored and intact, leaving one with little understanding of fear processes in children. Future research will do well to follow the present literature's hints and look more closely at the unexplored areas identified, such as the possible adaptive values of children's fears, fear-prevention strategies, cognitive self-control variables, and other developmental and influencing factors. In short, we must recognize and test far more complex paradigms of the fear process. And finally, we clearly must identify the ways to counteract this fear in the individuals by a personalized and targeted approach.

In conclusion, our study proved that:

1. Younger children are generally more anxious than older children.

2. The highest anxiety levels were reported with getting a tooth pulled out followed by receiving an injection.

3. The lowest anxiety levels were reported with having their teeth cleaned and looked at.

4. MCDAS(faces) is s valid tool for anxiety assessment in the South Indian population.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Ethical clearance was obtained from Institutional Ethical Committee Review Board, Saveetha Dental College & Hospital – SDC/IHEC/18-19/060.

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Surface Analysis of Citric Acid and EDTA on Root Canal Dentin- An In Vitro Study

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Abstract

Aim: To analyse the effect of 10% citric acid and 17% EDTA in removing the smear layer on root canal dentin using scanning electron microscope

Materials and method: 15 Single rooted extracted teeth were decoronated and randomnly divided into 3 groups based on the irrigant used, 10% citric acid, 17% EDTA and saline. Root canals were enlarged till size 80 K file and Gates glidden drill No 5 with the respective irrigant. Longitudinally teeth were split into two halves. Final irrigation with their respective irrigant for 30 minutes, washed in distilled water and dried. Samples were examined under scanning electron microscope and photographs were taken at 2000x and 3000x magnification. Images were scored based on the presence of smear layer. Scores were statistically analysed by kruskal wallis test and Mann-Whitney test and considered to be significant when $p<0.05$

Results: Kruskal- wallis and Mann- Whitney test between the test samples show that there is a significant difference between the effect of saline and Citric acid. The difference between citric acid and EDTA is minimal ($p= 0.008$).

Conclusion: This study can be concluded that the use of 10% citric acid could be a good alternative to EDTA as a root canal irrigant because of the similar desmearing properties. Citric acid has added advantages like less cytotoxicity, anti microbial property and the weakening of root canal dentin is less.

Keywords: *Citric acid, EDTA, root canal irrigation, smear layer*

Introduction

Dental caries is one of the most prevalent diseases leading to demineralisation of the teeth. The microbes infiltrate into dentin and the vitality of the pulp is affected [1] .Microbes in the root canal play a significant role in pathogenesis of periapical periodontitis [2, 3] .There is a high possibility for teeth to have extra root canals. These extra root canals must be identified and cleaned to prevent root canal failure [4] . The primary goal of three dimensional cleaning and shaping is to obtain complete debridement of root canal and to achieve a successful outcome of the root canal treatment [5] . The formation of smear layer due to mechanical instrumentation of the root canal might prevent the penetration of intracanal medicaments into the dentinal tubules, disinfection of intracanal dentin and it also impairs the adherence of the obturating material to the dentinal tubules to create a proper tight seal by reducing the coronal and microleakage of the sealers used in root canal treatment [6, 7, 8] . Hence, the treatment should not limit to the removal of remnants of pulp and root canal widening [9] . It is recommended to remove the smear layer as it may consist of a mixture of organic components like

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microbes and their products, pulp tissue, necrotic debris as well as the inorganic components such as mineral content of dentin [10, 11].

Several methods like ultrasonics, lasers and organic acids are employed in removing smear layer but the most commonly used method is by using chelating agents during irrigation or it is used in combination with other irrigants having tissue dissolving properties [12]. The principal cause of failure of endodontic treatment is due to the presence of persistent infection in the root canals which impairs the periapical area healing [13] .An ideal irrigant should be capable of removing the organic and inorganic components of the smear layer and also be capable of penetrating and disinfecting the entire root canal system. Irrigant should also be able to clear the loose debris in the canal during cleaning and shaping of root canal [14] .Irrigant can change the surface properties of the dentin like wettability and also enhance the bonding between the dentin and restorative material [15]. These irrigants should also be compatible with the periodontal tissues and it should not heal with the healing of the periodontal tissues after root canal treatment [16, 17].

Ethylenediaminetetraacetic acid (EDTA) is a calcium chelating agent which is commonly used in endodontics for the removal of smear layer [18]. Studies state that final rinse of EDTA can open up the dentinal tubules and increases the number of lateral canals that will eventually get filled by the sealer [19] .Various studies have shown that a combination of EDTA and sodium hypochlorite is effective in removal of organic and inorganic components of the smear layer [20, 21] .But some reports show that the use of sodium hypochlorite and EDTA can cause dental erosion in the root canal wall [22, 23].

Citric acid is a cleansing and decalcifying solution. Citric acid is a chelating agent which forms a non-ionic soluble chelate when it reacts with the metal ions [24]. Few studies have reported that the effects of citric acid on removal of smear layer were similar to EDTA [24, 25] . Also citric acid is less cytotoxically irritable to tissue when compared to EDTA [26].

The principle aim of this study is to compare and evaluate the effectiveness of 10% citric acid, 17% EDTA as root canal irrigant to remove smear layer following biomechanical preparation of the root canal

Materials and Method

Sample collection and preparation

15 Single rooted, non carious, anterior extracted teeth with straight roots were collected from Saveetha dental college and hospitals. The soft deposits on the teeth were removed by ultrasonic scaling at a very low speed and the teeth were stored in distilled water. Diamond disc was used to de-coronate the teeth at the level of cemento enamel junction and the apical third of teeth was also cut to achieve a standardised root length. The samples were randomly divided into three experimental groups based on the irrigant used. Three groups were 17% EDTA, 10% Citric acid and saline respectively. Root canals were enlarged using stainless steel hand instruments till size 80 K file and Gates glidden drill No 5. The canals were irrigated with their respective irrigant throughout the root canal preparation. Final irrigation was done by immersing each sample in their respective irrigant for 30 minutes, washed in distilled water and dried with sterile paper points. Longitudinal grooves were made on the buccal and palatal/ lingual surfaces of all the roots by using a diamond disc at a slow speed and care was taken to not penetrate the root canal. Chisel and mallet was used to split the tooth into two halves.

Scanning electron microscopy

Samples were mounted on metal stubs and gold sputtering was done using ion sputter. These samples were placed in vaccum chamber and examined under scanning electron microscope to observe the smear layer. Several photographs were taken at 2000x and 3000x magnification to analyse the surface of the root canal walls.

Image scoring

The images were graded by an independent examiner unaware of the experimental groups to which the sample belonged.

Images were scored according to the scoring system below. [27]

Score 0 - No smear layer and smear plug; no smear layer of the root canals. All dentinal tubules were cleaned and opened.

Score 1 - No smear layer but mild smear plug; no smear layer of the root canals, small amount of smear

plug in some dentinal tubules.

Score 2 - No smear layer but moderate smear plug; no smear layer of the root canals. . Most of the dentinal tubules had smear plug.

Score 3 - Moderate smear layer; moderate smear layer covered the surface of the root canals; only few dentinal tubules were opened

Score 4 - Heavy smear layer; complete root canal wall covered by a homogenous smear layer and no opening dentinal tubule

Score 5- Heavy smear layer; complete root canal wall covered by a heavy non-homogenous smear layer and no opening dentinal tubule

Data analysis

The scores were tabulated, mean and standard deviation was calculated. The data of the scores were compared within the groups to evaluate the effect on smear layer removal. It was statistically analysed by kruskal Wallis test and Mann-Whitney test. It was considered to be statistically significant when $p < 0.05$.

Results

Table 1: Mean and standard deviation of scores for all the test samples

Sample	N	Mean	Std. Deviation	Std. error	95% Confidence Interval for Mean		Maximum	Minimum
					Lower Bound	Upper bound		
Saline	5	3.96	1.1437	0.5115	2.5399	5.3801	2	5
17% EDTA	5	1.32	1.3971	0.6248	-0.4148	3.0548	0	3.6
10% Citric acid	5	1.48	0.3033	0.1356	1.1033	1.8566	1.2	3

Table 2: Kruskal-Wallis Test for the samples

GROUP	N	Mean rank
17% EDTA	5	7.90
10% Citric acid	5	9.70
Saline	5	21.70
Chi square- 14.162		P = 0.007

In Mann- Whitney test, there is no significant difference between EDTA and citric acid but there is a marked significant difference between saline and citric acid

Table 3: Mann- Whitney Test for the samples

GROUP	N	Mean Rank	Sum of ranks
17% EDTA	5	3.20	16.00
10% Citric acid	5	3.10	15.50
saline	5	7.90	39.50
		P= 0.008	

Kruskal- Wallis test between the test samples show that there is a significant difference between the effect of saline and Citric acid. The difference between citric acid and EDTA is minimal.

Examination of dentinal surface of root canal in 10% citric acid shows absence of smear layer and mild smear plug along the complete length of the canals.

Examination of dentinal surface of root canal in 17% EDTA shows absence of smear layer and smear plug along the complete length of the canals. The dentinal tubules were clearly visible in most of the samples.

The examination of the dentinal surface of root canals in saline (control group) shows the presence of heavy smear layer along the complete length of the root canals. The dentinal tubules were not even visible in few samples.

Discussion

Presence of non homogenous structure like smear layer on root canal walls may disintegrate leading to the formation of voids between the obturating material and the root canal wall [28] . Various methods like micro-radiographic assessments, micro hardness analysis, atomic force microscopy, spectrometry studies and scanning electron microscopic studies are employed to check the efficacy of various root canal irrigants used to demineralise, remove smear layer and soften the root dentine during endodontic [29, 30, 31]. . The de-smearing efficacy of the chelating agents and acids depends on pH of the solution, time of application, diffusion into the dentine, concentration of solution [32, 33] . Uzunoğlu et al. reported that the irrigation procedures affect the fracture resistances of root endodontically treated teeth [34]. Ideally, after the irrigation during endodontic treatment, mechanical properties of dentin like composition, hardness and strength should be minimal and it should not be affected in any negative aspect. But, the use of EDTA and sodium hypochlorite causes dissolution of dentin at the peri-tubular and inter-tubular areas [35].

Citric acid is shown to be effective when the pH values are between 0.8–1.9. [36] . Wayman et al. reported that use of 10% citric acid as root canal irrigant is effective in removal of smear layer [37]. Chan et al. stated that increase in the acidity of citric acid will show an increase in the cell death. 10% citric acid was employed in this study because of its better biocompatibility and it does not weaken the root canal dentin [38]. . Citric acid solution have strong antimicrobial activity against facultative and obligate anaerobes like *P. anaerobicus, E. lentum, V. parvula, F. nucleatum, A. naeslundii, B. bifidum, P. avidum* [39].

EDTA at 17% concentration with neutral pH is more commonly used as an irrigant in root canal treatment [40] .Patterson stated that 3% and 10% EDTA solutions showed antibacterial effect again streptococcus and staphylococcus .Exposure of 0.03% EDTA on soft tissue causes minimal tissue damage and increase in concentration of EDTA will further increase the degree of inflammation .Studies have stated that 15% and 17% EDTA is toxic in invitro studies [41] . EDTA is more cytotoxic when compared to citric acid [42] .

In this study, 10% citric acid completely removed the smear layer. The effect of 17% EDTA is superior to the effect of 10% citric acid. Tugba et al. stated that 2.25% citric acid was effective in removal of smear layer but it causes erosion of the root canal dentin [43] . Perez et al. stated that 15% EDTA and 15% citric acid causes root dentine decalcification, especially during the first 5 minutes of action and also the efficacy of these solutions were significantly high [44] . Di lenerda stated that there was a negligible difference in the de-smearing properties of EDTA and citric acid [45] .Mohammed et al. stated that de-smearing capability of MTAD (mixture of tetracycline isomer, an and a detergent) is better than citric acid near the apex of the root canal probably due to reduction in root canal diameter which impairs of the flow of irrigant in that area [46] .But the substantivity of the solution can be altered when it is used along with sodium hypochloride and it also has a weakening action on dentinal tubules [47, 48] . Yogendra et al. stated that 10% citric acid is more effective than 17% EDTA in demineralisation of root canal dentin [49] . Study by Miriam states that there was no significant difference between the effect of 10% citric acid and 17% EDTA on old and young root canal dentin [50] .

In this study, 17% EDTA is found to be superior when compared to the effect of 10% citric acid on root canal dentin. But this difference is negligible when compared to the effect of control group (saline).

Conclusion

This study can be concluded that the use of 10% citric acid could be a good alternative to 17% EDTA as

a root canal irrigant because of the similar desmearing properties. Citric acid has added advantages like less cytotoxicity, anti microbial property and the weakening of root canal dentin is less.

Conflict of Interest: Nil

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Comparing the Clinical Accuracy of Orientation Jaw Relation Recorded with Various Commercially Available Facebows - An in Vivo Study

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Abstract

Articulators and facebow are an integral part of prosthodontics therapy that ensures accurate reproduction of the patients maxillomandibular relationship. Facebow has been regarded as as indispensable accessory of semi adjustable articulators for transferring the maxillary relation to the articulator. Facebows are of two basic types. They are Arbitary and the Kinematic facebow. Arbitrary facebows are popular, their level of accuracy has always been a topic of debate for reasons such as variable anterior reference points, operator variability and arbitrary posterior point of reference. There are numerous studies that have evaluated the accuracy of a facebow. The present study aims to the study and compare the clinical accuracy of orientation jaw relation recorded with various commercially available facebows.

Key words: *Factor, jaw relation, occlusion, arbitrary face bow, Kinematic face bow*

Introduction

Face bow is defined as "A caliper that serves to record the spatial relationship of the maxillary dental arch to some anatomical reference points and to transfer this relationship to an articulator. This procedure ensures that the cast of the maxillary dental arch is oriented in an equal or at least comparable distance to the hinge of the articulator as are the natural maxillary teeth to the assumed "axis of rotation" of the temperomandibular joint"(GPT-8)[1].

Articulators and facebows are an integral part of prosthodontics therapy that ensures accurate reproduction of the patients maxillomandibular relationship in a laboratory setting. Facebow has been regarded as an indispensable accessory of semi adjustable articulators for transferring the maxillary relation to the articulator.[2]

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Facebows are of two types, Arbitrary and Kinematic facebow. Arbitrary facebows could be classified as the facia and earpiece type. They orient the relationship of the maxilla to an arbitrary hinge axis[3] demonstrated that an arbitrary facebow orients the maxilla to the hinge axis with a 5mm degree of error. Kinematic facebow orients the jaw to the actual hinge axis with a 2mm degree of error. However, Arbitrary face bows are commonly used because of its ease of use and minimal demand for chair time.

Although, Arbitrary facebows are popular, their level of accuracy has always been a topic of debate due to variable anterior reference points, operator variability and arbitrary posterior point of reference. There are numerous studies that have evaluated the accuracy of a facebow. These studies have either evaluated a particular system for its accuracy in transferring the angle of the plane of occlusion or anteroposterior relationship of maxilla to the hinge of the articulator. Many studies have used Cephalometric analysis as a reliable method to verify whether the maxillary relationship transfer made by a facebow in closest as it is present in the human skull. The limitation of Lateral Cephalograms is that it only aids in accessing the transfer in a two dimensional

manner. Cone Beam Computed Tomography (CBCT) has been widely used in dentistry for three dimensional Implant Surgical planning. However, there is no study that has analysed and compared currently popular five articulators and facebow systems for the accuracy of transferring anteroposterior relationship of the maxilla to the hinge of the articulator using CBCT.

The present study aims at study and compare the clinical accuracy of orientation jaw relation recorded with various commercially available facebows.

Materials and Method

A controlled cohort study as Randomised control trial is not possible due to limitation in blinding or randomising the subjects and the operator.Three participants were chosen CBCT was taken and the intercondylar distance (ICD) is measured. ICD more than 125 is labeled as large, more than 110 and less than 124 was labeled as medium, more than 90 and less than 109 was labeled as small. Power and sample size was calculated using G Power version 3.0.10 software based on a closely related study that evaluated similar parameters. The ad hoc power calculation revealed that a sample of six repeated transfers were required to eliminate the statistical probability of errors in facebow transfer.

Groups

A total of five articulator facebow systems were evaluated in this study. Each system was evaluated for accuracy in three subjects in order to evaluate the accuracy of the facebow, each transfer was repeated 6 times. Hence, the sample size for each group was 6 with the total of 18 data points .A written consent was obtained from the subjects prior to commencement of the study

The armamentarium include indelible pencil, normal pencil, permanent marker, divider, rubber bowl, plaster mixing spatula, impression trays, type III Dental stone, plaster of paris, bite registration paste, Artex facebow and Articulator system, Denar facebow and Articulator system, Hanau facebow and Articulator system, Stratos facebow and Articulator system, Whipmix facebow and Articulator system and CBCT.

Artex facebow and Articulator system:

The participants were positioned as according to the protocol. The bite fork was positioned at the midline of the maxillary arch and indexed in place with the blue mousse bite registration paste. The participant was asked to bite on cotton rolls to stabilise the bite fork against the mandibular teeth. The nasal bar was locked and stabilised in the preferred position using the nasion set screw. The three dimensional universal joint was attached to the bite fork with the connecting screw which was locked by turning the toggle lever. Then the universal joint was detached from the facebow and transferred to the transfer platform and secured in position using bite registration paste. Later, the magnetic table was detached along with the bite fork and positioned in the articulator. The maxillary model was positioned over the bite registration paste and mounted using low expansion type III dental stone. Once the stone had set , The distance between the medial pole off the condylar element to the marking made on the distobuccal cusp of the last molar(Molar Condylar Distance MCD) was measured and calibrated over a ruler in millimetres.

Denar facebow and Articulator system:

The participants were positioned in a similar way and the bite fork was indexed to the maxillary cast as described before. The bite fork was inserted to the participants mouth and stabilised against mandibular teeth with cotton rolls. The anterior reference points were marked approximately 43mm superior to the incisal tip of the maxillary central incisor with the help of the reference plane indicator. The locking screws of the "U" shaped frame were unfastened and adjusted to fit into the external auditory meatus. The frame was positioned parallel to the patients Frankforts horizontal plane. The centre of the face was verified with the participant's midline. Later, the set screw number was unfastened and the bite plate was aligned in position. The vertical bar was also secured tight. Finally, the vertical assembly along with the bite fork was alone removed with the "U" shaped frame and transferred to the articulator with the help of the transfer jig, which was placed in the place of the incisal guide table. The vertical portion of the transfer assembly was secured tight with the help of the set screws. Following which, the model was positioned over the bite fork index and mounted as described before and the MCD measurement was made as described previously.

Hanau facebow and Articulator system:

The participants were positioned as per standard protocol. The bite fork was indexed over the midline of the maxillary model. Inserted in the patient's mouth and stabilised against the mandibular teeth with cotton rolls. The anterior reference points. Orbitale was marked with the marker pen after palpation of the infra orbital rim. Following which, the self centering "U" shaped spring frame was opened wide and positioned into the EAM. The "U" shaped frame was positioned parallel to the Frankfort's plane with the help of the orbital indicator levelled at the orbital off the subject. The bite fork was attached to the "U" frame with the transfer assembly and locked in place by sequentially tightening the numbered thumbscrews. Finally, the entire facebow assembly was carefully removed from the participant and positioned on the articulator. The bite fork stabilised with the maxillary cast support. The maxillary model was positioned and mounted as described before and the MCD was measured as described previously.

Stratos facebow and Articulator system:

The participants were positioned as per the standard protocol mentioned above. The universal transfer bow system (UTS) BD frame was aligned properly in the EMA to the comfort of the participant. The adjustable nose piece was positioned according to the reference point and locked with the help of a universal lock. Participant was instructed to bite and hold the device in position and the width setting screw was tightened. The bite fork was later, attached to the face bow with the registration joint. It was aligned in horizontal positions and the joint was locked tight with the tommy screw. Finally, the facebow was transferred to the articulator and held in position with the help of adjustable support pins. The maxillary model was mounted and the MCD measurement was made as previously mentioned.

Whipmix facebow and Articulator system:

The participants were positioned as per standard protocol. The "U" shaped frame was oriented in the external auditory meatus and the nasion relator was positioned at the glabelle. The thumb nuts were secured in the desired position. The horizontal screw was tightened first, followed by the vertical screw. The relationship was transferred to the articular and the maxillary model was mounted. The MCD was measured as described previously.

CBCT:

The participant setup was done according to the instructions for the Cone beam computed tomography machine. The parameters were adjusted according to the participants skull size. Head restrained was used to stabilise the head. The participants mid plane was oriented to the vertical laser beam of the machine. The time taken for the scan varies from 14 to 18 seconds. The multiplanar reformatted image of CBCT helps to view the images in axial, coronal, sagittal planes . SIRONA ORHTOPHOS XG was the CBCT machine used for this study. The MCD measurement was made with the help of the CBCT software by the radiologist. And the results were submitted in the form of report.

Statistical Calculation SPSS Software version 20 was used. The values obtained followed a normal distribution and so were analysed with parametric test(One way ANOVA). Post hoc Bonferronni test was applied to compare intergroup variability. A blinded observer performed data analysis. The MCD data were collected in standard proformas.

Results

The findings of this study reject the null hypothesis H0 and support the alternate hypothesis Ha and are presented in the following sections:

Demar and Artex facebow articulator systems have the least variation in subjects with large ICD(Table 1). Although, the Hanau and Stratos facebow showed negative variation in subjects with large ICD these facebows offered the most accurate facebow transfer. The Whipmix facebow appears to be least accurate. Hanau and Stratos facebow articulator system showed negative variation in subject with medium ICD these facebows offered the most accurate facebow transfer (Table 2). The Whipmix facebow appears to be least accurate.Stratos and Hanau facebow articulator systems have the least variation in subjects with small ICD (Table 3). The Denar facebow appears to be least accurate.(One way ANOVA, post hoc Bonferronni test).

Hanau and Stratos facebow articulator systems have the least variation in subjects with small and large ICD. Although , the Hanau and Stratos facebows showed negative variation in subject with medium ICD, these facebows offered the most accurate facebow transfer. The Whipmix facebow appears to be the least accurate.

Comparison of Variation in MCD across the five facebows(Table 4): The Hanau and Stratos facebows had the least variations in MCD P<0.001.(One way ANOVA, post hoc Bonferronni test).

Table 1: Comparison of patients with large ICD using various face bow

Group	Mean ± SD	Significance
Artex	0.9033 ± 0.04082	P<0.000
Denar	0.7617 ± 0.23752	
Hanau	-0.2933 ± 0.15513	
Stratos	-0.5550 ± 0.11726	
Whipmix	1.5617 ± 0.14634	

Table 2: Comparison of patients with medium ICD using various face bow

Group	Mean ± SD	Significance
Artex	0.6167 ± 0.02582	P<0.000
Denar	1.1850 ± 0.02881	
Hanau	-0.1967 ± 0.04082	
Stratos	-0.1133 ± 0.22862	
Whipmix	1.2250 ± 0.07918	

Table 3: Comparison of patients with small ICD using various face bow

Group	Mean ± SD	Significance
Artex	0.2067 ± 0.14720	P<0.000
Denar	1.2667 ± 0.14024	
Hanau	0.0500 ± 0.13038	
Stratos	0.0083 ± 0.32003	
Whipmix	0.9417 ± 0.28534	

Table 4 : Comparison of MCD in various Facebows

Group	MCD difference in mm Mean ± SD	Significance
Artex	0.58 ± 0.30	P<0.000
Denar	1.07 ± 0.27	
Hanau	-0.15 ± 0.18	
Stratos	-0.23 ± 0.33	
Whipmix	1.25 ± 0.31	

Discussion

According to the results of the present study, Hanau and Stratos facebow articular systems have the least variations in MCD P<0.001(One way ANOVA, Post hoc Bonferronni test).The following factors could have confounded the results of this study.

Accuracy and reliability of CBCT imaging:

The advent of CBCT has offered promising results for multiplanar imaging in the field of dentistry[4]. This study demands the need for an accurate three dimensional imaging system. Various studies evaluated the reliability and accuracy of dental measurements recorded with CBCT.[4] One such study reported that CBCT is a reliable tool for linear measurements of structures closely associated with dentofacial imaging.[5,6]

Repeatability of bitework positioning/facebow transfer:

Numerous studies have evaluated the accuracy of facebow transfer and its implications in clinical outcome[7], since the transfer done using an arbitary facebow is based on variable reference points, its credibility as always been a topic of debate[7,8], although, this instrument has been reported to transfer the maxillary relationship to the inch of the articulator as truly as possible to that present in human skull.[9]

Bitefork carries the valuable information of the occlusal contours and the plane of maxillary in both horizontal and vertical plane.[10] Even a mild shift from the patient's facial midline during the placement of the bitefork can cause an error in orienting the maxilla accurately.[11] To avoid repeatability bias all the facebow transfers were done by a single operator, the procedure was subjected for six times with each facebow system for every participant and the mean was obtained, the bite was recorded only once for every system and the same bite was used for repeated transfer.

One of the main reasons is because of the improper locking of the thumbscrews could lead to minor movement of the bite fork and ultimately an error in facebow transfer.

Dimensional Stability of the Bite record :

There are various materials available for bite registration such as,waxes, Vinyl polysiloxane (VPS) material in paste or injectable forms. Not all materials satisfy the criteria for an ideal bite record . A study by millstein and HSU evaluated most popular and commercially available bite registration VPS materials and reported that blue moose was one among the highly accurate and dimensionally stable materials. Hence, the blue moose bite registration paste, was used as it satisfied the primary need of the bite record to be rigid and stable.

Errors in mounting the model:

Model plaster has reported to produce inaccuracy when used for mounting the models in the articulator[12] are the studies that have concluded that low dentrite mounting stones produces minimum setting expansion. In this study, Kalabai ultra articular mounting stone was used for mounting the maxillary models to the articulator.

Intercondylar distance:

One another confounder bias would be the distance between both the condyles.In a subject with small ICD Hanau and Stratos facebow systems showed less variation in the MCD value obtained from CBCT imaging. In a subject with medium ICD Artex and Whipmix facebow lesser variation in the MCD value obtained from CBCT imaging. In a subject with larger ICD Denar and the Artex facebow systems showed lesser variations in the MCD value obtained from CBCT imaging. While calculating cumulatively Hanau and Stratos showed less variation in the MCD value obtained from CBCT compared to other facebow systems.

Operator bias:

Operator bias could have occurred in this study if the MCD measured from CBCT were made prior to the MCD measurement made following facebow transfer. MCD measurements from CBCT could have influenced the operator to measure the MCD on the articulated models with a bias. This bias was prevented in the study by measuring the MCD from the articulator models first. Additionally the operator was not involved in measuring the MCD from CBCT but merely collected the reports from the radiologist and entered them in the proforma for further analysis.

Conclusion

Hanau and Stratos facebow articulator systems

appear to be significantly more accurate compared with the Artex, Denar and Whipmix facebow articulator systems and so can be considered as the system of choice to fabricate complex dental restorations.**Conflict of Interest: Nil**

Source of Funding: Self

Ethical Clearance: Obtained from the Institutional Human Ethical Committee of Saveetha Dental College and Hospitals. (SDC/IHEC/17-18/070)

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Effervescent Denture Cleansing Granules Using Clove Oil and Analysis of Its *In Vitro* Antimicrobial Activity

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Abstract

Introduction: Prosthetic complete dentures are commonly used by elderly people. These dentures on exposure to the oral environment forms biofilms. This harbours microorganisms and cause bacterial and fungal infections in the oral mucosa. Also cleansing the denture itself is a task for the elderly people. Any solution which clears the adhered component would help them better. Hence effervecense is a better choice to remove the biofilm.

Aim: To prepare effervescent denture cleansing granules with clove oil and to evaluate its antibacterial activity.

Materials and method: The effervescent granules were prepared from citric acid, tartaric acid and sodium bicarbonate in a ratio of 1: 2: 3. Different concentrations of essential oil were mixed with sodium bicarbonate initially. The citric acid crystals were initially powered and then mixed with tartaric acid .Both these powders were mixed using geometric dilution, further sieved and packed in air tight glass container. The prepared clove effervescent denture cleansing granules were tested against *Streptococcus mutants and Enterococcus faecalis* after dissolving in sterile water. The fresh bacterial suspension was dispersed on the surface of nutrient agar plates. Different concentration of clove effervescent denture cleansing solution (50, 100 and 150 µL) was incorporated into the wells and the plates were incubated at 37°C for 24 h. Zone of inhibition was recorded in each plate. Similarly the antifungal activity was evaluated using rose Bengal agar medium after inoculating with *Candida albicans* and incorporating the prepared effervescent denture cleansing solution.

Result: Clove mediated effervescent granules showed a dose dependent antibacterial activity against the tested microorganism with a maximum effect on *Streptococcus mutans* followed by *Enterococcus faecalis*. The different concentration showed similar inhibition in case of *C.albicans*.

Conclusion: The prepared clove mediated effervescent denture cleansing granules were found to be effective against *S.mutans*, *E. faecalis* and *C. albicans* . Hence it may be used for routine cleansing of denture to protect the denture users from infections such as denture stomatitis.

Key words: *Clove oil, effervescent granules, Denture Cleanser, Denture stomatitis*

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Introduction

Recent fast development of dentistry has restored the aesthetic, phonetic and masticatory functions of an individual with prosthetic complete dentures whenever there is a need for complete denture especially in elderly and physically challenged people. It is natural that these

dentures acquire biofilm from the oral environment as they are exposed to variety of food materials and fluids[1]. These bacterial adherence or biofilm formation in the denture can ultimately lead to infections with *candida* as well as *Streptococcus mutans*. Denture stomatitis is often reported in many complete denture users[2-5]. Though more than 60% of the healthy adult have *C. albicans* as a common component of oral bacteria[6]. Hence, denture cleansing that includes removal of *Candida* from its surface is necessary to protect the denture users from denture stomatitis. The normal cleansing solutions may have cleansing ability but a preparation with components which directly have an effect on the infective microorganism may be of great reputation to avoid or prevent infection with prosthetic complete dentures.

Studies have reported the use of plants and seeds as raw materials for manufacturing soaking solutions for their antimicrobial activity[7] .Denture cleansers have chemical or abrasive action. Chemical cleansers include alkaline hypochlorites, alkaline peroxides and dilute acids. Hypochlorites have ability to dissolve organic matrix upon which tartar forms. Alkaline peroxide based powder and tablets when dissolved in water becomes alkaline solution of hydrogen peroxide. The liberation of bubbles of oxygen from this solution exerts a mechanical cleaning effect[8]. The search for alternative products continues as commercially available chemicals have undesirable side-effects though these agents can alter oral microbiota. Hence, natural phytochemicals isolated from plants are considered as good alternatives. Moreover, literature shows that commercially available mouthwashes with essential oils are preferred to those containing chlorhexidine for long-term control of plaque and mild- to-moderate gingivitis[9]

Spoorthi Banavar Ravi *et al*. has recommended the use of *Mangifera indica* and eucalyptus

in oral rinses, dentifrices, cavity liners, and varnishes to improve oral hygiene and cleanliness because of their antibacterial activity against *S.mutans*[10] .In the present study, clove oil is used for the preparation of effervescent denture cleansing granules. Clove extract from *Syzygium aromaticum*, (family *Myrtaceae*) is reported to have good antibacterial effect on *S.mutans*[11,12] .Clove oil contains eugenol ,β-cariofileno ,α-humulen, β-pinene, limonene, farnesol, benzaldehyde, 2-heptanone and ethyl hexanoate[13]. Since the clove oil is known for its antibacterial effect, in this study, its antibacterial effect was evaluated after preparing clove oil based effervescent denture cleansing granules.

Materials and Method

Preparation of Effervescent Denture cleansing granules with Clove oil:

The components such as citric acid, tartaric acid and sodium bicarbonate are taken in a ratio of 1: 2: 3. The citric acid crystals are initially powered and then mixed with tartaric acid. Different concentrations of essential oil were mixed with sodium bicarbonate initially. Both the powders are combined using geometric dilution which is further sieved and packed in air tight airtight containers for use.[figure 1]

Antibacterial activity of Clove oil mediated effervescent Denture cleansing solution

Agar well diffusion method was used to determine the antibacterial activity of clove oil mediated effervescent denture cleansing granules[14]. Different concentrations of the prepared clove effervescent denture cleansing solution was tested against *Streptococcus mutants and Enterococcus faecalis* The fresh bacterial suspension was dispersed on the surface of nutrient agar plates. Different concentration of clove effervescent denture cleansing solution (50, 100 and 150 µL) was incorporated into the wells and the plates were incubated at 37°C for 24 h. Zone of inhibition was recorded in each plate. [Figure 2]

Antifungal activity

Antifungal activity of clove oil mediated effervescent denture cleansing granules was also evaluated using agar well diffusion method. Different concentrations of the prepared clove effervescent denture cleansing solution were tested against *C.albicans*. The fresh fungal suspension was dispersed on the surface of rose bengal agar plates. Different concentration of clove effervescent denture cleansing solution was incorporated into the wells and the plates were incubated at 37°C for 48 h. Zone of inhibition was recorded in each plate. [Figure 3]

Result and Discussion



Figure 1: Schematic representation of the preparation of Effervescent Denture cleansing granule with Clove oil

Antibacterial activity

The antibacterial activity of clove oil based effervescent cleansing granules showed very good zone of inhibition against the oral pathogens *E. faecalis* and *S. mutants*. The preparation showed a dose dependent inhibitory effect on both the tested organism with significant effect on *S. mutans* at the highest concentration used.(Figure 2, Figure 3).

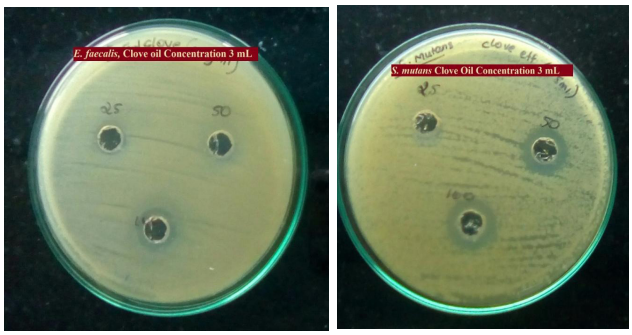


Figure 2: Antibacterial activity of effervescent oil against *Enterococcus faecalis and Streptococcus mutants*

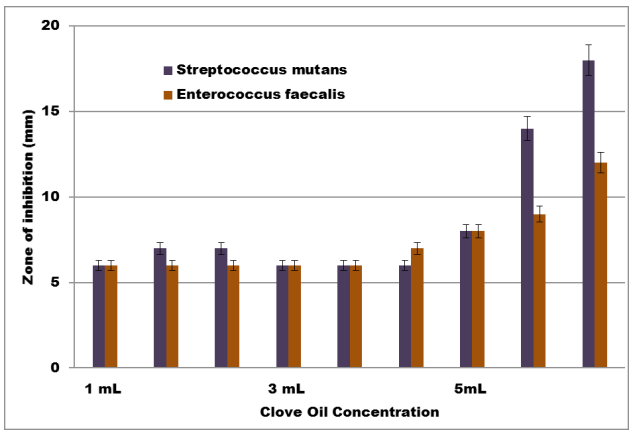


Figure 3: Graph for Zone of inhibition

Antifungal activity of Effervescent oil against *Candida albicans*

In this study three different concentrations of clove oil effervescent granules were tested against *C albicans*. The antifungal activity activity was similar in all the three preparations. The figure 4 clearly shows the concentration of clove oil concentration will not influence the inhibition of fungal growth.

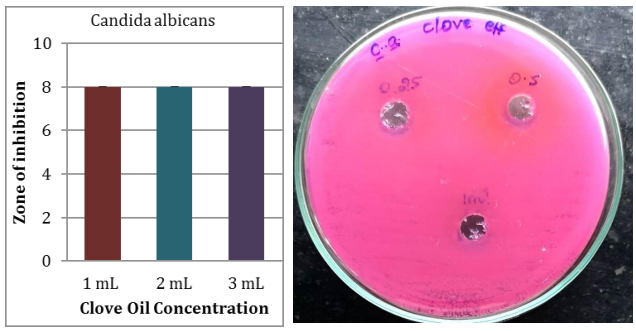


Figure 4: Antifungal activity of clove oil effervescent against *Candida albicans*

The choice of ingredients for effervescent granules depends upon the need of the preparation which should dissolves readily in water. Effervescence granules can be prepared by incorporating an acid and a base so that the base will release carbon dioxide in presence of water upon reaction with acid. Processes like wet granulation, dry granulation or fusion method can be used for the preparation[15].

Antibiotics, plant and herb derived compounds, mouth washes, tooth pastes, gels, varnishes, and the caries vaccines are used for years together for the prevention of dental caries[16] .To preserve oral health and to maintain the prosthetic devices, there is a need to improve the properties of the hygiene products with antimicrobial activity[17]. The effervescent denture cleansing granules with clove oil was prepared by direct dry granulation method. The essential oil clove is used because of its known antimicrobial activity.

The methanolic extract of clove is reported to have activity against *S. mutans* PTCC 1683and S. salivarius PTCC 1448 with zones of inhibition ranging from 14 to 24 mm[18].Clove oil is also effective against *E faecalis* and *Candida albicans*[19]. The evaluation of the prepared granule against the *S.mutans*. *E. faecalis* and *Candida albicans* showed good antimicrobial effect in the present study. Since, prosthetic denture users are often infected by these micro-organisms, the formulation of clove mediated effervescent denture cleansing preparation

will be highly effective to get rid of infections caused by such organisms including denture stomatitis.

Conclusion

The prepared, clove mediated effervescent denture cleansing granules were found to be effective against *S. mutans*. *E. faecalis* and *C. albicans.* Hence, these effervescent granules may be recommended for regular denture cleansing as it can have a good mouth feel because of the good flavour of clove oil and its antimicrobial effect and thereby prevent infections such as denture stomatitis in denture users.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: The study has been approved by the Institutional Human Ethical Committee, Saveetha Dental College and Hospital. (SDC/IHEC/18-19/071)

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Effect of Dill Oil Mediated Effervescent Denture Cleansing Granules Against *C.albicans* and Other Oral Pathogens *S. mutans* and *E. Faecalis*

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Abstract

Aim: To evaluate the antibacterial activity of dill oil mediated effervescent denture cleansing granules .

Materials and Method: The components such as citric acid, tartaric acid and sodium bicarbonate were taken in a ratio of 1: 2: 3 to prepare the effervescent granules by dry method. The citric acid crystals were powered first and then mixed with tartaric acid. Dill oil was mixed with sodium bicarbonate initially. Both the powders were mixed using geometric dilution, further sieved and packed in air tight containers. Different concentrations of the prepared dill effervescent denture cleansing solution was tested against *Streptococcus mutants* and *Enterococcus faecalis* and *Candida albicans* in their respective medium and the zone of inhibition was was recorded after incubation over night at 37^0 c.

Result: The effervescent granules prepared with dill oil showed good antibacterial activity against the tested microorganism such as *Streptococcus mutans*, *Enterococcus faecalis* and *Candida albicans.*

Conclusion: The effervescent denture cleansing granules prepared with dill oil were found to be effective against *S.mutans*, *E. faecalis* and *Candida albicans* . Hence it may be used for routine cleansing of denture to protect the denture users from infections such as denture stomatitis.

Key words: *dill oil, effervescent granules, Denture Cleanser, Denture stomatitis*

Introduction

The overall health, especially among older individuals is very important. Hence, denture care and mucosal tissues of the edentulous mouth is a must[1]. Replacing missing teeth helps individuals to overcome the social stigma and enable the individual to enjoy the quality of life. The missing teeth among many individuals are replaced with a complete denture and removable partial denture. Reports show that around 50% of individuals are wearing complete dentures and 13% removable partial dentures. The most common inflammatory condition that affects denture wearers is denture stomatitis. The pathogenesis of denture stomatitis shows microbial plaque on tissue surface of dentures[2]. The dental prostheses create a favorable microenvironment for the candida organisms to thrive[3]. *Candida albicans* is the most commonly implicated microorganisms in denture stomatitis. Around 65% of complete denture wearers are predisposed to candida infection. It may be due to inadequate hygiene, decreased saliva flow under the denture surfaces or enhanced adherence of candida to the acrylic, ill-fitting appliances[4]. Though, denture

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stomatitis can be treated with antifungals agents such as miconazole, nystatin, and fluconazole, recurrence is very common[5] . *Streptococcus mutans* is considered as a chief and pioneer micro-organism for most of the dental infections whereas *Enterococcus faecalis* is the most isolated or detected species from oral infections. There are evidences that denture stomatitis as an outcome of multispecies biofilms that may include *Streptococcus mutans* and *Staphylococcus aureus*[6] *Streptococcus* spp collaborates with *Candida* spp in the etiology and pathogenesis of denture stomatitis. *Streptococcus mutans* is a frequent member of acrylic dentures surfaces. However, proper denture cleansing can prevent such infections. Hence, effervescent denture cleansers formulated with natural essential may be a better option to remove such causative organisms. In this study the effect of Dil oil mediated effervescent denture cleansing granules were evaluated against *C.albicans* , *S.mutans* and *E.faecalis*.

Dil oil is obtained from *Anethum graveolens* seed. *Anethum graveolens* L. is a popular aromatic herb belonging to the family *apiaceae*. It has antimicrobial, antiinflammatory, analgesic, gastric mucosal protective and anti-secretory, smooth muscle relaxant and hyperlipidaemic activity. The seed contains constituents such as carvone, d-limonene α-phellandrene, myristicin. The seed also coumarins, flavonoids, phenolic acids and steroids[7-9].

As dill oil is having antimicrobial activity, in this study, a dill mediated effervescent denture cleansing granules was prepared and evaluated further for its antimicrobial activity against *C.albicans, S.mutans* and *E.faecalis*.

Materials and Method

Preparation of Effervescent Denture cleansing granules with Dill oil:

The components such as citric acid, tartaric acid and sodium bicarbonate are taken in a ratio of 1: 2: 3. The citric acid crystals are initially powered and then mixed with tartaric acid. Different concentrations of essential oil were mixed with sodium bicarbonate initially. Both the powders were combined using geometric dilution which was further sieved and packed in air tight containers for use. [Figure 1]

Antibacterial activity of Dill oil mediated effervescent Denture cleansing solution

Agar well diffusion method was used to determine the antibacterial activity of dill effervescent oil[10]. Different concentrations of prepared dill effervescent denture cleansing solution was tested against *Streptococcus mutans and Enterococcus faecalis.* The fresh bacterial suspension was dispersed on the surface of nutrient agar plates. Different concentration of dill effervescent denture cleansing solution (50, 100 and 150 µL) was incorporated into the wells and the plates were incubated at 37°C for 24 h. Zone of inhibition was recorded in each plate. [Figure 2]

Antifungal activity:

Antifungal activity of dill oil mediated effervescent denture cleansing granules was tested against *Candida albicans* using agar well diffusion method. Different concentrations of the prepared dill effervescent denture cleansing granules were used after dissolving it in sterile water. The fresh fungal suspension was dispersed on the surface of rose bengal agar plates. Different concentration of dill effervescent denture cleansing solution was incorporated into the wells and the plates were incubated at 37°C for 48 h[11]. Zone of inhibition in each plate was recorded.

Result and Discussion

The antibacterial activity of dill oil based effervescent cleansing granules showed good zone of inhibition against the oral pathogens especially to *S. mutants* compared to *E. faecalis* at the low concentration used whereas *C.albicans* showed a higher zone of inhibition at the maximum dose used in the study (figure 2 and 3).

The tested organisms are related to dental infections. *C. albicans* is the fungi species most frequently found in denture biofilm. *S. mutans* was chosen for its role as a primary oral biofilm and *E. faecalis* is associated with apical periodontitis and endodontic infections[12].

Denture cleansers are highly useful to individuals with partial or complete dentures for their missing tooth. Since improperly cleaned dentures on continuous use can end up in denture stomatitis with susceptible microorganism, regular and proper cleaning of dentures are mandatory. However, the currently available cleansers have many disadvantages. Therefore cleansers

with natural ingredients may aid in good and complete removal of the causative organisms of oral infections with less side effects.

In a cross-sectional study with eighty-four geriatric denture wearers recruited from geriatric denture wearers, there was a 54% prevalence for at least one denture-related mucosal lesion such Angular cheilitis, traumatic ulcers and denture stomatitis[4].

Though there are reports showing high prevalence of denture stomatitis (65%) among geriatric denture wearers, study by Mubarak *et al* this percentage decreased significantly 3.33% due to proper patient education and maintenance of good oral hygiene[13]. Plant extracts and essential oils are known for their antibacterial and antifungal activity [14-18].Hence denture cleansing with appropriate agent is mandatory to protect the denture wearers from oral infections.

Conclusion

The present study has proved that dill mediated effervescent denture cleansing granules have good antimicrobial activity. Hence, it may be used for proper and regular denture cleansing to protect the users from oral infections and denture stomatitis.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: The study has been approved by the Institutional Human Ethical Committee, Saveetha Dental College and Hospital. (SDC/IHEC/18-19/072)

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Evaluation of Faculty Performance on Introduction of Continuous Annual Faculty Evaluation Score (CAFE)

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Abstract

Faculty development programme is a protocol followed by every institution for the betterment of the faculty. However, it's not been standardised. This can be achieved only by assessing the faculty performance in a 360 degree way..Performance evaluation of faculty members is a challenge for the management. Any growing institution incorporates new innovations that becomes a task for the faculty. Hence, it is essential to have a standard and integrated appraisal system. It identifies strengths and weaknesses of teachers on all aspects, such as academic responsibilities, research profile, student evaluation, publications, acquiring research grants etc. Continuous Annual Faculty Evaluation was introduced to develop an inclusive and dynamic system of evaluation addressing all the activities and responsibilities of faculty members. After the introduction of CAFÉ system, the overall performance of the faculties showed a significant increase. This article describes in detail the performance of the faculty in all aspects after introducing CAFÉ.

Key Words: *Faculty performance, CAFE, evaluation*

Introduction

Evaluations are used as a diagnostic feedback tool for faculty improvement and teaching effectiveness. Faculty evaluation is considered to be one of the most important objectives for any academic institution. It identifies strength and weakness of faculty on all aspects, such as academic responsibilities, research profile, student evaluation, publications, acquiring research grants, patents etc. This information may also be used by higher authorities of the institute to form appropriate teams of faculty members for different academic and administrative activities of the institute. A criterion-referenced system that appraises faculty members according to a set of transparent standards that encourages professional development is preferable to a system that rank-orders faculty on a particular set of items.[1] The purpose of faculty performance evaluation includes, to assess and promote excellence in the teaching-learning process, to meet the educational needs of students, to provide a constructive framework for evaluating faculty performance by identifying areas of strength and areas for improvement in classroom instruction and service to the institution and to provide a basis for professional growth and development. [2,3]

If there are no fixed standards of evaluation, then it may create negative impact in the performance of the faculty and in turn, the organization. Hence, it is necessary to set the right standards to evaluate the performance of the faculties.[4] It is essential to have an unbiased performance evaluation to measure faculty contribution to the institution. Effective monitoring should also include giving timely feedback, reviewing the performance according to predetermined standards and timely recognition of the accomplishments, that motivates the employee to perform better each day. [5]

Traditional methods like ranking method, graphic rating scale method, forced choice distribution method, behavioural checklist method etc. are not in use these days. There are many other modern techniques such as 90 degree,180 degree,360 degree, 720 degree, balanced scorecard, mixed standard scale, paired comparison,

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mixed standard scale, electronic performance monitoring, confidential reports etc,[5,6,7,8] 90 degree is the most basic form of appraisal, where the appraiser gives their evaluation of the faculty. There is no self-evaluation and its one way. 180 degree appraisal process involves the appraise completing a self-evaluation form. The employee rates him/herself and gives feedback on their own performance. The self-appraisal is discussed and agreed with the appraiser during an appraisal review meeting. 360 degree appraisal involves 4 groups of people. The appraiser/manager, the appraise (self-appraisal) plus feedback gathered from peers and subordinates or customers/clients. 720 degree appraisal is basically a 360 degree appraisal performed twice.[9] A second 360 degree is performed at a timely interval and compared against the results of the first 360 degree appraisal. These methods have their own advantages and shortcomings. Depending upon the needs of an organization, a performance appraisal method needs to be selected.

Faculty evaluation has been conducted in Saveetha Dental College and Hospitals for more than 25 years. Its purpose is to provide feedback to the faculty to help them improve their teaching skills, to provide information for promotion and merit, and to identify problems in teaching. Various evaluation techniques from traditional methods to modern techniques like 180 degree and 360 degree evaluation were followed. But all these methods have its own pros and cons. We formulated a customised evaluation system based on our curricular requirement. Continuous Annual Faculty Evaluation (CAFE) an evaluation system addressing all the activities and responsibilities of faculty members. After the introduction of CAFÉ system, the overall performance of the faculties showed a significant increase. This article describes in detail the performance of the faculty in all aspects after introducing CAFÉ.

Methodology

This study was set out to empirically study the faculty performance. It was conducted in Saveetha Dental College and hospitals, Chennai. All the teaching faculty members were part of the study. CAFE was introduced during the year 2017 to facilitate self-improvement by identifying specific behaviours and relative strengths and weaknesses that can be modified or further developed. It is calculated based on various criteria like academic performance indicator score (API), event organizer, event management, punctuality and workaholic, students performance in the university exam, conference motivation, student ranking and research grants. The scores were collected from the faculty affairs office and comparison of results were done before and after introduction of CAFÉ among faculty member

Result and Discussion

In a competitive world of education it is essential to train students in a holistic way. An effective teaching and learning environment is essential both inside and outside the classroom. They expect effective lecturers to help raise the level of students' motivation to learn so that students' academic and non-academic achievements can be further enhanced.[10,11] This would significantly contribute to the satisfaction of students in learning which would contribute to institutional growth also. Faculty members are currently facing an increasing demands to be creative and effective teachers, successful investigators, and productive clinicians. These pressures are mainly due to contemporary curriculum development, competition in the health care institutions, and from the limited resources for research.

Details of CAFÉ criteria were collected from faculty affairs office for the year 2016, when CAFÉ system was not introduced and scores were calculated. These scores were compared with the scores of the year 2017, after the introduction of CAFÉ system**.**

API score [Academic performance indicator]

API score is the index of the research activities of the faculty which includes participation, paper/ poster presentation in national / International conferences and seminars, guest lectures given, scientific sessions chaired, National/International awards won, number of research projects guided and publications in various indexed journals etc. Each criteria has different scores, for example participation in international conference carries a score of 10 and paper/poster participation in international conference carries 30 points. So if a faculty has participated in N number of conference their score will be 10 times the number of conference attended (NX10). Likewise scores are calculated for other criteria also. Figure 2 shows the average API score of all faculties during the year 2016 before introduction of CAFÉ and 2017 after introduction. The average API of all faculties taken during the year 2017 shows a double fold increase when compared with 2016 showing increased interest of

the faculty in research activities.

Event organizing and Management

Organising a seminar or conference is an effective way that provides an opportunity to share and exchange knowledge with other experts. It creates a platform for discussion pertaining to the current problems or issues and hearing about other ideas on the same topic. Participants can share their insights and thoughts on how to resolve the problem, which can offer a fresh perspective when dealing with the problem. Conferences also helps to share learning and best practice from experts. Faculty organising conference, seminar or workshops and faculty who help in the management of the event are given points. The Chief organiser gets 500 points and top five faculty who actively help in organising the event are chosen by the chief organiser and they are given points ranging from 500 to 100. This has led faulty to organise more number of conferences, seminars and workshops. The Figure 3 shows the average scores of chief organiser of the event and an average scores of faculty who played a key role in Event management. The data shows a marked increase in the 2017 when compared to average scores of 2016.

Punctuality and Workaholic

Reliable, consistent attendance is a requirement and essential function of all faculty positions. Faculty are expected to be punctual and dependable in order to meet the needs of their department and the College. When they are absent or tardy, work and service are interrupted and an additional burden is placed on colleagues. Attendance and reliability are important factors in evaluating individual performance. The average in time and total working hours of each faculty was calculated and the scores are given to most punctual and workaholic faculty for which they are also given awards and rewards. After including this criteria in CAFÉ score calculation, there was a significant difference in the average in time and total working hours. The figure 4 shows the average in time of faculties during the year 2016 was 8.27 AM which reduced to 8.17 in 2017 and the average of total working hours increased to 1380 hours per annum during the year 2017 form 1305 hours in the year 2016.

Student's performance in the university exam

Effective teachers use their pedagogical skills and enable students to comprehend the content, perform better, and increase their achievement. The evaluations of superiors, peers and students, when taken together with exam scores, present a more complete teacher profile. Faculties are given scores based on number of distinctions taken by the student in their respective subjects. Analysing and comparing the results of student, during the years 2016 and 2017, the number student with distinction is found to be more in 2017 when compared to 2016.

Conference motivation

Conferences and seminars offers opportunity for the students to mix and mingle, form new relationships and strengthen existing ones. By attending other presentations, the student will learn from others and improve their own skills and knowledge in their field. Students are motivated to attend conferences or seminars and also to present papers/posters, which helps to learn new ideas and approaches to make them more effective and efficient at work. For motivating students to participate in conferences the faculties are given points. This has shown a marked increase in the number of students participating in various conferences in the year 2017 compared to 2016.

Student ranking

One suitable method to measure teaching effectiveness is students' evaluation of faculty performance, which is often carried out at the end of the semester or at the end of a course/programme in most institutions of learning. Student opinion continues to be a major factor in the evaluation of teacher effectiveness.[12] Most higher education faculty believe that the teaching-learning process is an active, ever-changing interaction between the student, teacher, and environment (input and process within context) that should be focused on a particular outcome. It is therefore reasonable to expect students to make important contributions to this system and it is imperative that teachers be receptive to student feedback. In CAFÉ system of evaluation, the faculty members are ranked by the students on online ranking system.

Research grants

Research Grants are designed to support scientists and clinicians (investigators) by funding proposals in basic and clinical research in the field of reproductive medicine. It is a competitive process, in which potential

research projects are evaluated and only the most promising receive funding. Such processes, which are run by government, corporations or foundations. Faculty members are given scores based on the grant they have for their research proposal. Honest feedback can help the employee better understand his/her strengths and motivate him/her toward improvement.

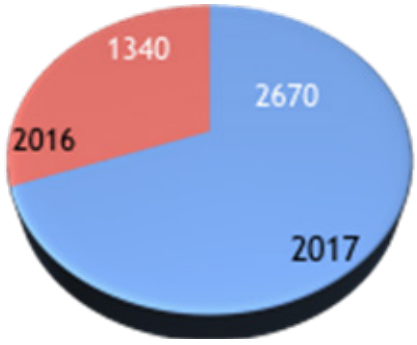


Fig 1:Average CAFE score - 2016 and 2017

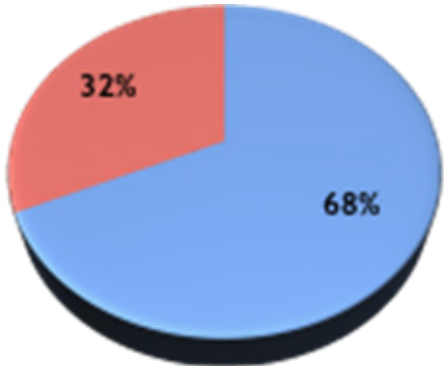


FIg 2: Average API score- 2016 and 2017

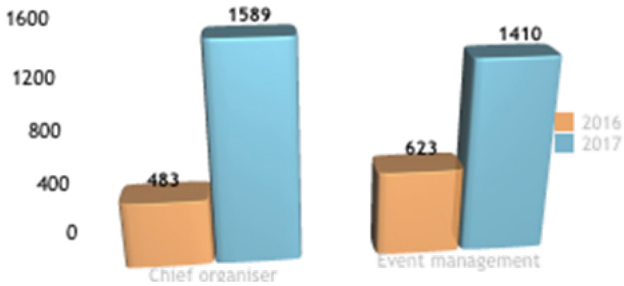


Fig 3: Average score of event organiser &management

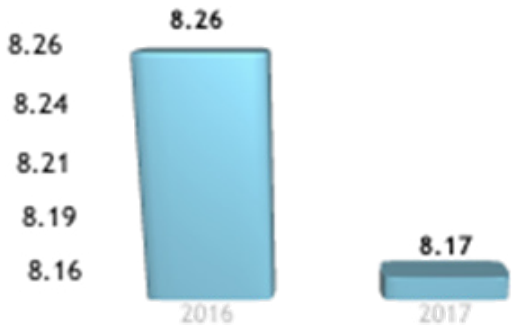


Fig 4:Average Intime

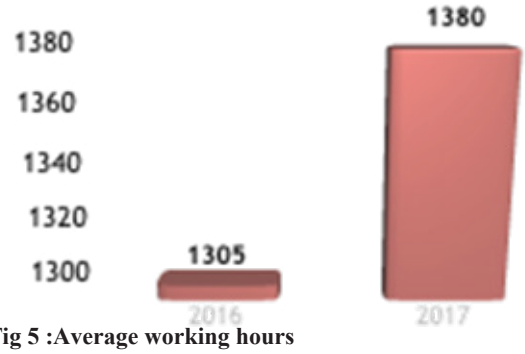


Fig 5 :Average working hours

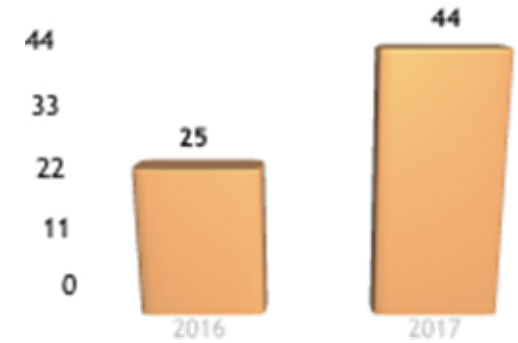


Fig 6:Percentage of distinction

Conclusion

In a competitive world of education today in most educational institutions demand for effective teaching and learning to take place, both inside and outside the classroom. They expect effective lecturers to help raise the level of students' motivation to learn so that students' academic and non-academic achievements can be further enhanced. This would significantly contribute to the satisfaction of students in learning which in turn affects the image of the learning institution. Faculty members are currently faced with increasing demands to be creative and effective teachers, successful investigators, and productive clinicians. These pressures are mainly due to contemporary curriculum development, competition in the health care institutions, and from the limited resources for research.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: The study has been approved by the Institutional Human Ethical Committee, Saveetha Dental College and Hospital. (SDC/IHEC/18-19/073)

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Activity of Coconut Oil Mediated Effervescent Granules as a Denture Cleanser Against*C.albicans*, S.mutans and *E.faecalis*

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Abstract

Aim: To prepare and evaluate the antibacterial activity of Coconut oilmediated effervescent denture cleansing granules.

Materials and Method: The components such as citric acid, tartaric acid and sodium bicarbonate were taken in a ratio of 1: 2: 3 to prepare the effervescent granules by dry method. The citric acid crystals were powered first and then mixed with tartaric acid. Coconut oil was mixed with sodium bicarbonate initially. Both the powders were mixed using geometric dilution, further sieved and packed in air tight containers. Different concentrations of the prepared Coconut oil effervescent denture cleansing solution was tested against *Streptococcus mutans*and*Enterococcus faecalis*and *Candida albicans*in their respective medium and the zone of inhibition was recorded after incubation overnight at 37^0 c.

Result: The effervescent granules prepared usingCoconut oil showed good dose dependent antimicrobial activity against the tested microorganism such as *Streptococcus mutans*, *Enterococcus faecalis*and *Candida albicans.*

Conclusion: The effervescent denture cleansing granules prepared with Coconut oil were found to be active against *S.mutans*, *E. faecalis* and *Candida albicans*at higher concentrations. Hence it may be used for routine cleansing of denture to protect the denture users from infections such as denture stomatitis.

Key words*: Coconut oil, effervescent granules, Denture Cleanser, Denture stomatitis*

Introduction

Denture care is indispensable for maintaining general oral health.Unsatisfactory hygiene can make way to the formation of biofilms and cause oral infections such as denture stomatitis. Several methods are available such as brushing the dentures with toothpaste and toothbrush, Regular usageof acrylic resins used for fabrication of complete denture are composed of PMMA(Polymethyl methacrylate), a material with a low level of hardness and this material is prone to minute damages by vigorous brushing and these scratches can be a breeding ground for oral pathogens1.

The antibacterial agents that are currently used for treatment of oral health problems are reported to cause several side effects such as diarrhea, vomiting and so on. Increasing bacterial resistance to the drugs is also a major concern and there is a need to explore new therapeutic agents and conduct further investigations on traditional medicines obtained from various plant sources2. Hence, a novel denture cleanser that causes minimum damage to the resinous surface is needed. Oils extracted from plants such as coconut oil, gingelly oil andpatchouli oil

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has proven to be the best for oil pulling .They are active against several oral pathogens and thereby reduce the accumulation of dental plague but their role as a denture cleanser is an area yet to be explored.

Coconut oil ,an important edible oil,has been used in the food industry for many years and is normally termed or classified as a lauric oil, a tropical oil, or a confectionery fat3. It contains about 90% of saturated fats predominantly triglycerides with 85.5% of saturated fatty acids, 5.8% of mono-saturated fatty acids and 0% of Cholesterol4. Coconut oil is of high medicinal and therapeutic uses. It is said to have antibacterial activity, antiviral activity and in dentistry coconut oil is said to have anticaries activity. Oil pulling with coconut oil reduces the risk of caries and slows the accumulation of dental plaque 5. Coconut oil facilitates absorption of calcium by the body and also helps to stop tooth decay6. Further it is said to have anti-inflammatory properties. It shows soothing effect on skin rashes and reduces inflammation due to rashes or contact with foreign substances. It is very effective in curing and relieving bruises and small cuts.

As coconut oil is having antimicrobial activity, in this study, coconut oil mediated effervescent denture cleansing granules were prepared and evaluated further for its antimicrobial activity against *C.albicans, S.mutans* and *E.faecalis*

Materials and Method

Preparation of Effervescent Denture cleansing granules with Dill oil:

The components such as citric acid, tartaric acid and sodium bicarbonate were taken in a ratio of 1: 2: 3. The citric acid crystals were initially powered and then mixed with tartaric acid. Different concentrations of essential oil were mixed with sodium bicarbonate initially. Both the powders were combined using geometric dilution which was further sieved and packed in airtight containers for use. [Figure 1]

Antibacterial activity of coconut oil mediated effervescent Denture cleansing solution

Agar well diffusion method was used to determine the antibacterial activity of coconut effervescent oil[7]. Different concentrations of the prepared coconut oil mediated effervescent denture cleansing solution was tested against *Streptococcus mutans and Enterococcus faecalis.* The fresh bacterial suspension was dispersed on the surface of nutrient agar plates. 0.25, 0.5 and 1.0 mL of the denture cleansing solution was incorporated into the wells and the plates were incubated at 37°C for 24 h. Zone of inhibition was recorded in each plate. [Figure 2]

Antifungal activity:

Antifungal activity of coconut oil mediated effervescent denture cleansing granules was tested against *Candida albicans* using agar well diffusion method. Different concentrations of the prepared coconut oil mediated effervescent denture cleansing granules were used after dissolving it in sterile water. The fresh fungal suspension was dispersed on the surface of rose bengal agar plates. 0.25, 0.5 and 1.0 mL of freshly prepared denture cleaning solution was incorporated into the wells and the plates were incubated at 37°C for 48 h[8]. Zone of inhibition in each plate was recorded.

Result and Discussion

The antibacterial activity of coconut oil based effervescent cleansing granules showed good zone of inhibition against the oral pathogens especially to *S. mutants* and*E. faecalis* at the higher concentrations used(figure 2 and 3) . It also showed a higher zone of inhibition at the maximum concentration used in the study against *C.albicans* (figure 4 and 5).

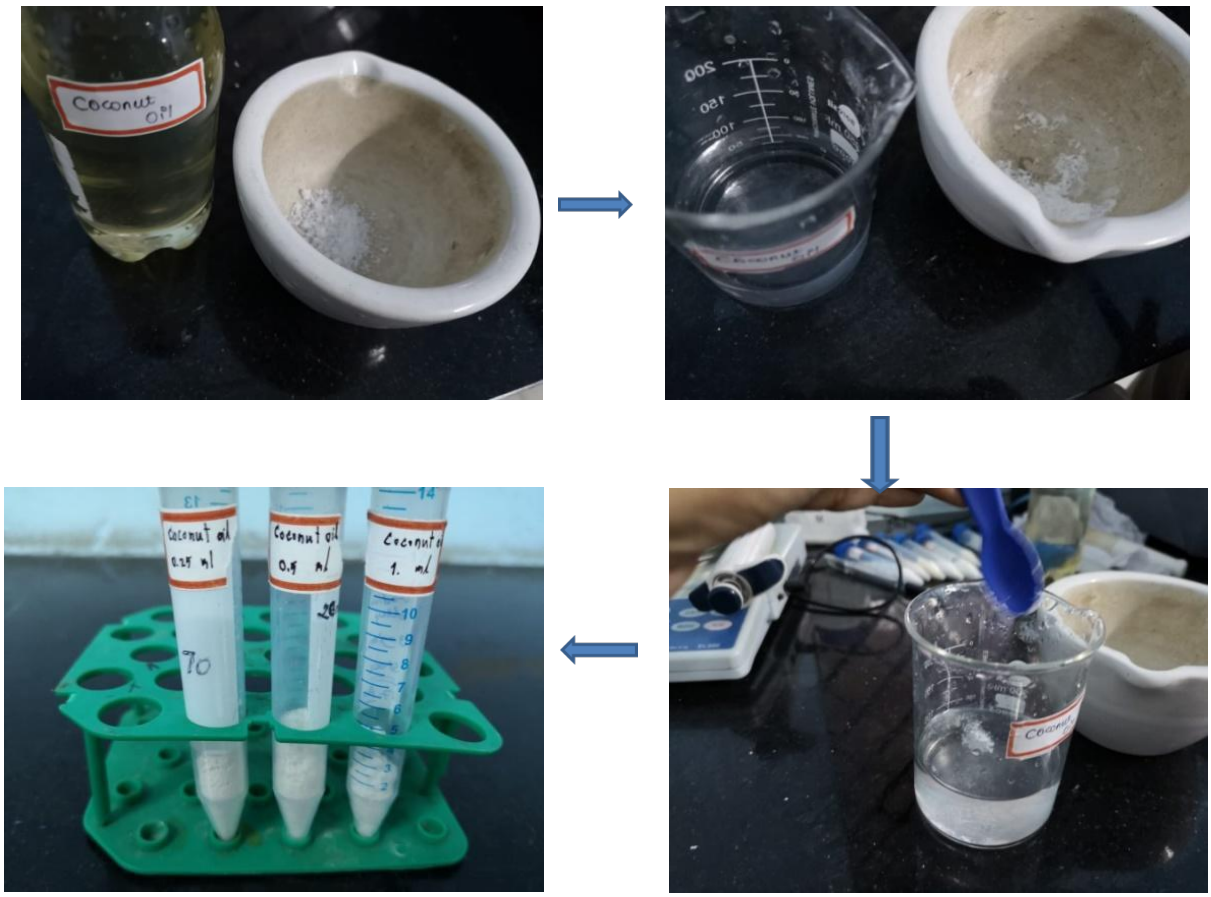
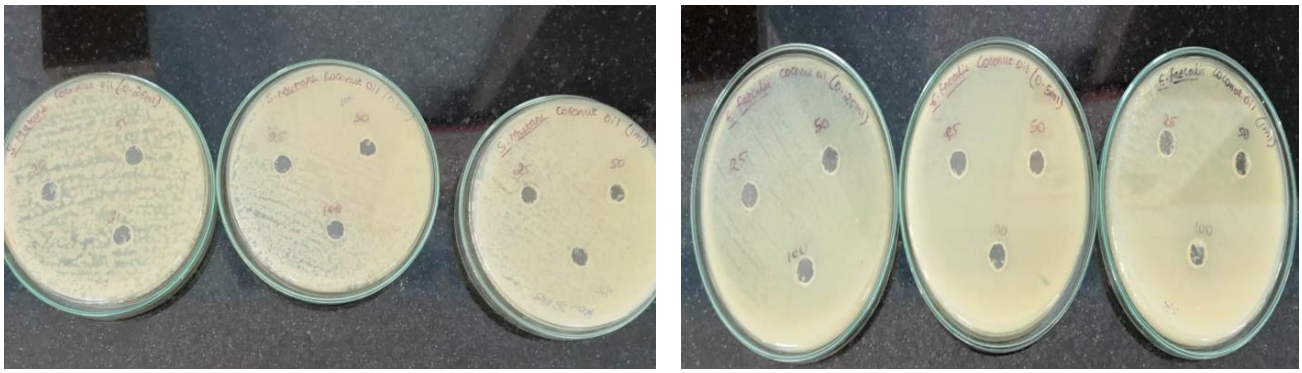


Figure 1: Schematic representation of the preparation of Effervescent Denture cleansing granule with coconut oil



(a) (b)

Figure 2: Antibacterial activity of effervescent oil against *Streptococcus mutans*(a)and *Enterococcus faecalis*

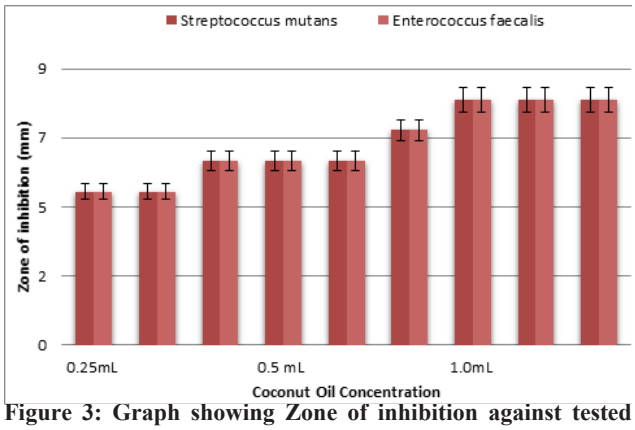


Figure 3: Graph showing Zone of inhibition against tested microorganism



Figure 4: Antifungal activity ofCoconut effervescent oil against *Candida albicans*

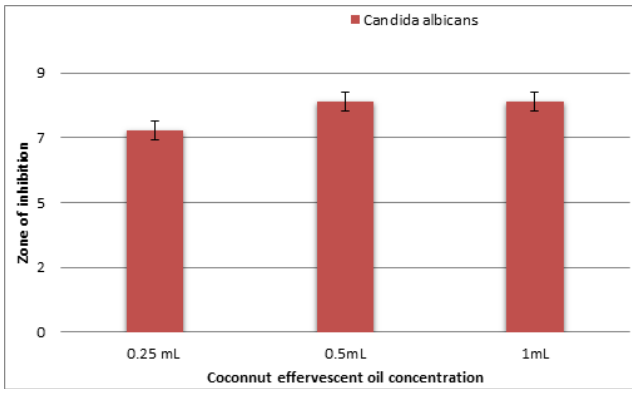


Figure 5: Graph showing Zone of inhibition against tested *Candida albicans*

The Patients with partial or complete denture still remains with a drawback of not being devoid of microbial flora because of poor maintenance which ends up with concomitant infectious states like stomatitis where irregular and improper cleaning becomes a major issue. Azole antifungal agents and their derivatives continue to dominate as the drugs of choice for treating Candidal infections by topical applications or as oral drugs 9,10. The denture cleansers currently available are not able to provide sufficient support. Natural products can be an alternative to synthetic chemical substances and the interest in medicinal plants as a source of antimicrobial agents11,12. Hence, preparations with natural compounds pose to have marked effects in terms of eradicating the primary causative organism associated with dentures.

Removable dentures can injure oral tissues and the use of dentures is associated with a high frequency of oral mucosal lesions [13,14]. Coconut oil is known to possess long chain fatty acids, dietary bioactive compounds, polyphenols, lauric acid which is known to have antioxidant property[15], this study exhibited a marked antimicrobial activity especially against*C. albicans* species. The lack of knowledge and awareness of the importance of the denture hygiene; created barriers to regular and preventive dental care of denture wearers the duration of use, dietary limitations, maintenance, storage methods and follow-up visits are also to be taken care of.

Conclusion

It is mandatory to maintain the cleanliness of partial or complete dentures like natural tooth to avoid oral infections and other health conditions. The denture cleansers currently available are not able to provide sufficient support. Natural products can be a template to synthetic chemical substances. Hence natural edible oils with antimicrobial activity such as coconut oil may be used as a denture cleansing agent in appropriate concentration to get rid of infecting microorganisms.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: The study has been approved by the Institutional Human Ethical Committee, Saveetha Dental College and Hospital. (SDC/IHEC/18-19/074)

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Effect of Oregano Oil Mediated Effervescent Denture Cleansing Granules Against Oral Pathogens

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Abstract

Aim: To evaluate the antimicrobial activity of oregano oil mediated effervescent denture cleansing granules.

Materials and Method: Effervescent granules were prepared using citric acid, tartaric acid and sodium bicarbonate in a ratio of 1: 2: 3 by dry method. The citric acid crystals were powdered first and then mixed with tartaric acid. Oregano Oil was mixed with sodium bicarbonate and incorporated with the acid by geometric dilution. It was then sieved and packed in airtight containers. Different concentrations of the prepared oregano effervescent denture cleansing solution was tested against *Streptococcus mutans* and*Enterococcus faecalis* and *Candida albicans* and the zone of inhibition was measured.

Result: The effervescent granules prepared with oregano oil showed good antimicrobial activity against the tested microorganisms such as *Streptococcus mutans*, *Enterococcus faecalis and Candida albicans.*

Conclusion: The effervescent denture cleansing granules prepared with oregano oil were found to be active against the test organisms especially against *E faecalis.*Hence it may be used for routine cleansing of denture to protect the denture users from infections such as denture stomatitis.

Key words: *OREGANO oil, effervescent granules, Denture Cleanser, Denture stomatitis*

Introduction

The trait of denture fitting surface, occlusal relations, denture age and hygiene are key factors contributing to the incidence of oral mucosal lesions concomitant with denture use[1].The overall health, especially among geriatric patients is very important. Hence, denture care and mucosal tissues of the edentulous mouth is must[2] .Regular Maintenance of denture is recognized as a vital part of oral hygiene for denture wearers. Dentures predispose the wearer to denture stomatitis[3]. Studies report prevalence of denture stomatitis among denture wearers as 15% to over 70% in various population samples. Etiological factors also include poor denture hygiene, continual and nighttime wearing of removable dentures, accumulation of denture plaque with bacterial and yeast contamination of denture surface[4]. All these factors contribute to increase the capability of *Candida albicans* to colonize both the denture and oral mucosal surfaces, though antifungal treatment can eradicate C.*albicans* contamination and relieve stomatitis symptoms. Early identification of the lesion is essential to assure rational therapy[5]. Evidences show that denture stomatitis is an outcome of multispecies biofilms and*Streptococcus mutans and Enterococcus faecalis* is considered as the primary micro-organism isolated or detected species from oral infections[6]. However, proper denture cleansing can prevent such infections. Hence, effervescent denture cleansers formulated with natural essential oils may be a better option to remove

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such causative organisms. In this study the effect of Oregano oil mediated effervescent denture cleansing granules were evaluated against *C.albicans*, *S.mutans* and *E.faecalis*.

Oregano is generally recognized for their antimicrobial properties. Recent investigations have demonstrated it has potent antioxidant, anti-inflammatory, anti-diabetic and cancer suppressor properties[7]. The main components identified from oregano oil are carvacrol and thymol, which are responsible for the characteristic anti odor, antimicrobial, and antioxidant activity. These substances as antibacterial agents make the cell membrane permeable due to its impregnation in the hydrophobic domains, this effect is higher against gram positive bacteria[8]

As oregano oil is having antimicrobial activity, in this study, oregano oil mediated effervescent denture cleansing granules were prepared and evaluated further for its antimicrobial activity against *C.albicans, S.mutans* and *E.faecalis*.

Materials and Method

Preparation of Effervescent Denture cleansing granules with Oregano oil:

The components such as citric acid, tartaric acid and sodium bicarbonate are taken in a ratio of 1: 2: 3. The citric acid crystals were initially powered and then mixed with tartaric acid. Different concentrations of essential oil were mixed with sodium bicarbonate initially. Both the powders were combined using geometric dilution which was further sieved and packed in airtight containers for use. [Figure 1]

Antibacterial activity of Oregano oil mediated effervescent Denture cleansing solution

Agar well diffusion method was used to determine the antibacterial activity of oregano effervescent oil[9]. The freshly prepared oregano effervescent denture cleansing solution was tested against *Streptococcus mutans and Enterococcus faecalis*. The fresh bacterial suspension was dispersed on the surface of nutrient agar plates. 25, 50 and 100 µL of oregano denture cleansing solution was incorporated into the wells and the plates were incubated at 37°C for 24 h. Zone of inhibition was recorded in each plate. [Figure 2]

Antifungal activity:

Antifungal activity of oregano oil mediated effervescent denture cleansing granules was tested against *Candida albicans* using agar well diffusion method. Different concentrations of the prepared oregano oil effervescent denture cleansing granules were used after dissolving it in sterile water. The fresh fungal suspension was dispersed on the surface of rose bengal agar plates.The oregano oil mediated effervescent denture cleansing solution was incorporated into the wells and the plates were incubated at 37°C for 48 h [10]. Zone of inhibition in each plate was recorded.

Result and Discussion

The antibacterial activity of oregano oil based effervescent cleansing granules showed good zone of inhibition against the oral pathogens especially against *E. faecalis compared* to other microorganisms.All the tested organisms such as *C.albicans,S. mutans andE. faecalis* showed a higher zone of inhibition at the maximum dose used in the study (figure 2 and 3).

The tested organisms are related to dental infections. *C. albicans* is the fungi species most frequently found in denture biofilm. *S. mutans* was chosen for its role as a primary oral biofilm and *E. faecalis* is associated with apical periodontitis and endodontic infections[11].

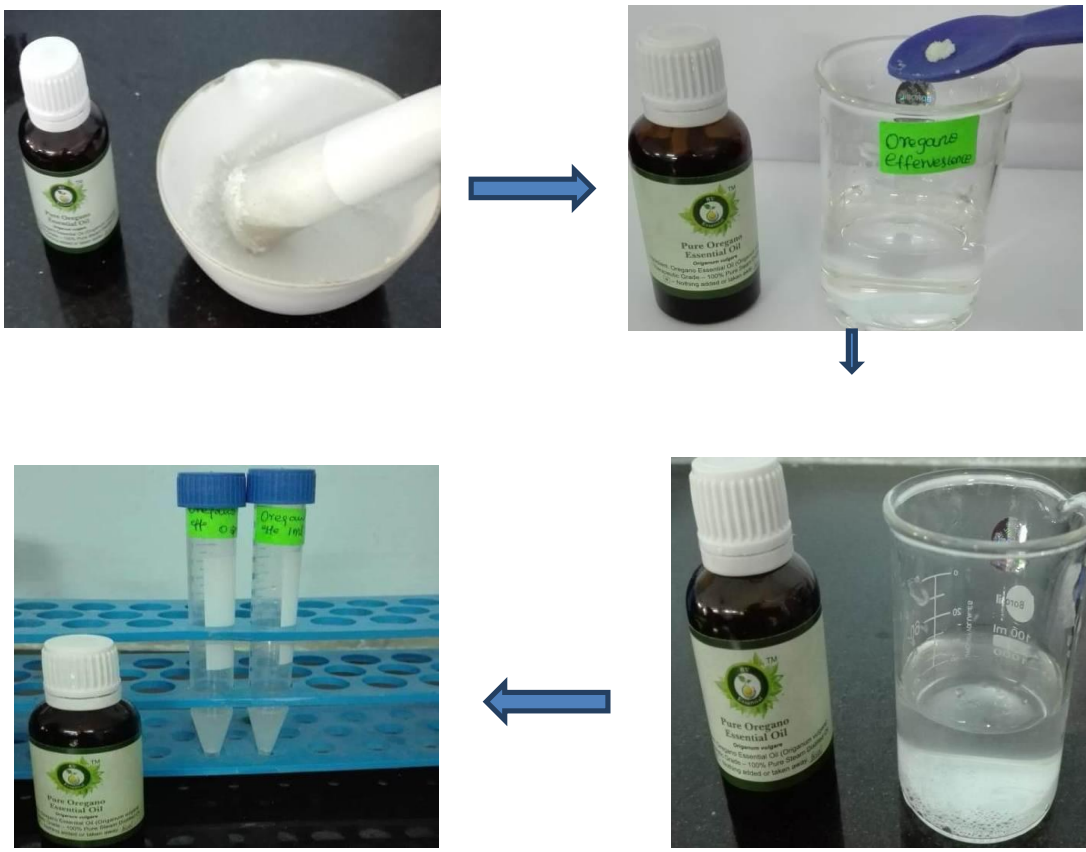
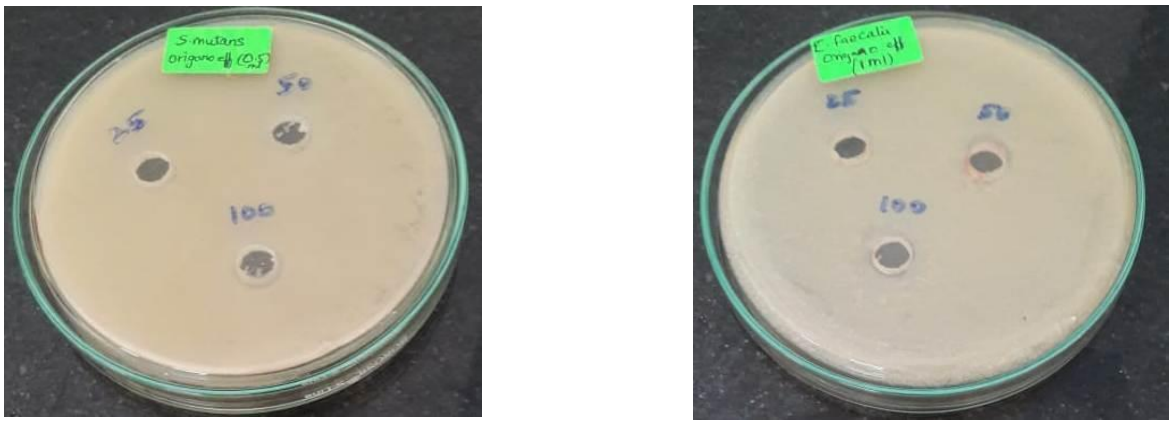


Figure 1: Schematic representation of the preparation of Effervescent Denture cleansing granule with oregano oil



(a) (b)

Figure 2: Antibacterial activity of effervescent oil against *Streptococcus mutans*(a)and *Enterococcus faecalis*

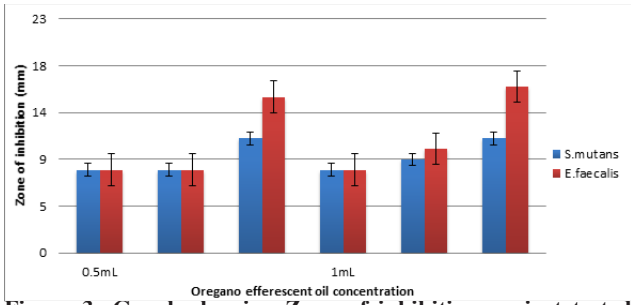


Figure 3: Graph showing Zone of inhibition against tested microorganism

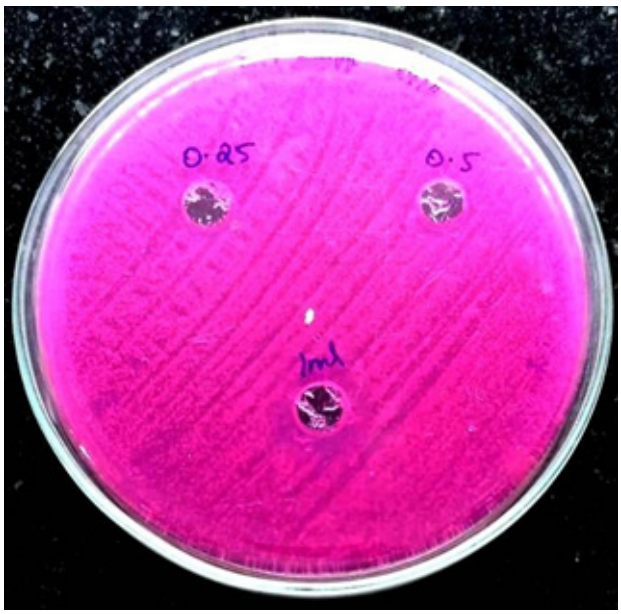


Figure 4: Antifungal activity of Oreganoeffervescent oil against *Candida albicans*

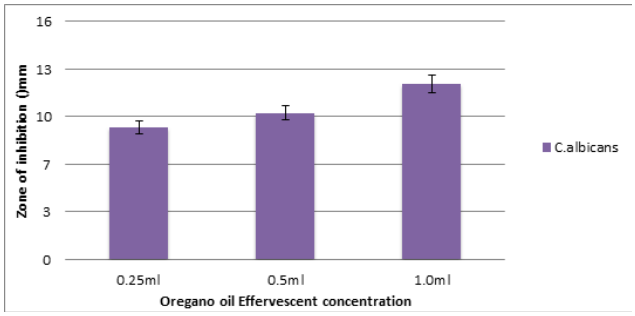


Figure 5: Graph showing Zone of inhibition

Denture cleansers with natural active ingredients are highly useful to individuals on partial or complete dentures. Routine denture management is mandatory to avoid susceptible microbial attack. Therefore cleansers with natural ingredients may aid good and complete eradication of the causative organisms of oral infections with lesser side effects.Several reports suggest that natural essential oils have good antimicrobial activity[12]. The Present study also suggests that the oregano effervescent cleansing solution containing micelle suspensions of bioactive compounds like terpenoids, carvacrol that may be responsible for the anti microbial activity.

The pathogenesis, clinical presentation, and management strategies of candida-associated denture stomatitis is commonly encountered in dental practice[13]. Though there are reports showing high prevalence of denture stomatitis (65%) among denture wearers, this percentage decreased significantly 3.33% due to proper patient education and maintenance of good oral hygiene[14]. Plant extracts are well established for its antimicrobial effect [15-18]. Hence, plant extracts may be incorporated for the preparation of denture cleansers.

Conclusion

The present study has proved that oregano oil mediated effervescent denture cleansing granules have good antimicrobial activity especially against *E .faecalis*. Hence, it may be used for regular denture cleansing to protect the users from oral infections and denture stomatitis.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: The study has been approved by the Institutional Human Ethical Committee, Saveetha Dental College and Hospital. (SDC/IHEC/18-19/075)

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Rehabilitation of a Dentition with Attrition – A Case Report

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Abstract

Worn-out teeth are a common finding in routine dental practice. Tooth wear results in discomfort during mastication, poor aesthetics and reduced vertical dimension[1]. Cases of generalized attrition usually require full mouth rehabilitation with crowns and bridges to restore function, aesthetics and self-esteem of the patient. The following case report describes the complete oral rehabilitation of a patient with mutilated dentition and reduced vertical dimension resulting from attrition. A detailed treatment plan was chalked out involving restorations and endodontic therapy followed by crowns and bridges along with institution of optimal oral hygiene measures.

Key words: *Attrition, FMR, Easthetic rehabilitation*

Introduction

Cases of generalized attrition usually require a combined approach involving endodontic procedures, periodontal and prosthodontic therapy to provide optimal dental care. There are a multitude of reasons and consequences resulting from the loss of dental hard tissue[2]. A common complaint from geriatric patients is the attrition of their teeth which causes difficulty in mastication and a depressed/collapsed lower facial appearance. Severe attrition leads to reduced vertical dimension of occlusion, loss of teeth and other potential problems related to unfavourable neuromuscular coordination of the stomatognathic system. Understanding vertical dimension and how and when it should be altered is a situation commonly faced by the clinician. It involves a number of prosthodontic considerations such as analysis of the existing occlusion and occlusal plane, availability of freeway space, size and location of edentulous areas, position and condition of the teeth in each arch, neuromuscular co-ordination and adaptation threshold of the patient. For all the complications resulting from attrition, the condition itself is simply a consequence of an underlying cause such as a deranged temporomandibular joint, CR-CO discrepancy, Gastric reflux disorder, occupational habits, and so forth[1].

This clinical report describes the aesthetic and functional rehabilitation of a patient with severe attrition. Complete oral rehabilitation was successfully done by integrating concepts of fixed prosthodontics supported by valid scientific literature[3].

Case Report

A 54-year-old female reported to the Department of Prosthodontics, Saveetha dental college, Chennai with a chief complaint of difficulty in chewing food and sensitivity to hot and cold food substances. History taking revealed no significant medical history or the usage of medications for disorders nor any symptoms of temporomandibular joint disorders. Intraoral examination **(Fig.1 – 3)** revealed a partial edentulous mandible which was classified as a Kennedy's Class 3 situation with missing 36, 37, 46 & 47 in the left and right sides respectively. Third molars (38 and 48) were present but exhibited a flat occlusal surface indicating severe attrition. The maxillary molars had supra erupted into the edentulous space due to the lack of opposing teeth. Clinical inspection also revealed generalised attrition in the remaining natural dentition. The anterior

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teeth had were worn flat incisally due to the loss of posterior support. The patient had been provided with a removable partial denture 6 years earlier which she had neglected to use. The patient reported that she had been using her anterior teeth for mastication which had resulted in attrition of her remaining natural dentition. The lack of posterior teeth along with the patient's neglect to use her removable partial denture had resulted in severe wear of her remaining teeth. The condition was explained in detail to the patient along with possible treatment options. The patient was apprehensive about dental implants and requested a treatment plan which precluded their usage. The patient volunteered to undergo full mouth rehabilitation using tooth supported crowns and bridges for which informed consent was obtained.

Treatment Procedure

The Periodontal status of the supra-erupted maxillary molars were evaluated and deemed to possess a good prognosis. Endodontic therapy was performed for the maxillary molars to enable reduction of the occlusal surface and restore plane of occlusion. Primary impressions were made using irreversible hydrocolloid (Tulip, Cavex Inc., Holland) and models were made using type 3 gypsum. A face bow record made with the Quickmount recording system (Whipmix Corp, USA) was used to mount the upper model to a semi-adjustable articulator (Whipmix 8500 series Articulator; Whip Mix Corp., Louisville, USA). The vertical dimension at rest was determined by measuring the distance between two points marked at the nose and the chin using a caliper with the patient's lips at rest position. The vertical dimension of occlusion (VDO) was measured and the freeway space was found to be 3mm greater than the normal maximal limit (4mm). A Lucia jig was made using autopolymerising resin to verify centric relation position without posterior interferences and the centric relation position was recorded with bite registration addition silicone material. The vertical dimension at occlusion was increased by 4mm using the jig itself and verified using calipers again prior to recording the centric relation position. A Michigan splint was fabricated to optimize occlusal contacts at the restored vertical dimension[4] in accordance with the mutually protected occlusal scheme. The splint was designed to offer bilateral contacts of all posterior teeth in centric relation (CR) and no posterior tooth contact during excursive movements. The occlusal contacts were verified intraorally at centric and eccentric position using 40 micron articulating paper. The patient was instructed to wear the splint for the entire duration of the day except during mealtimes and sleep. The adaptation of patient to the restored VDO position was evaluated during 1-month trial period. The patient exhibited no signs of muscle tenderness or temporomandibular discomfort on palpation.

A wax up **(Fig.4a&b)** was completed on the articulated models at the restored VDO position and an index made over the waxed up models using addition silicone material in putty consistency. The patient's teeth were prepared **(Fig.5a&b)** to receive porcelain fused to metal (PFM) crowns and bridges with shoulder margins. Crown lengthening using an Nd:YAG laser was performed for the mandibular third molars to obtain sufficient crown height[5]. The maxillary third molars were left unprepared and were planned to be removed following completion of full mouth restorations. Provisional restorations were provided for the patient using the index and Bis-Acryl resin (ProTemp, 3M ESPE, USA) and cemented using non-eugenol temporary luting cement (Tempbond NE, 3M ESPE, USA).

The patient used the provisional restorations for a period of 2 weeks and reported no discomfort in terms of oral function. The provisional restorations were removed and the teeth were cleansed of the luting cement using a rubber cup and polishing paste. Gingival retraction (Ultrapak, Ultradent, USA) was done using the double cord method and master impressions **(Fig.6a&b)** were made using hydrophilic vinyl polysiloxane material (Aquasil, Dentsply, USA) with the two stage putty-wash method[6].

The provisional restorations were replaced intraorally on the right side quadrants and an interocclusal record was made of the left side using bite registration paste (ExaBite, GC America). The same procedure was repeated for obtaining an interocclusal record of the right side quadrant. A facebow record **(Fig.7)** was made (Quickmount, Whipmix Corp, USA) and used to mount the upper model to the semi-adjustable articulator (Whipmix 8500 series Articulator; Whip Mix Corp., Louisville, USA). The lower model was mounted using the interocclusal records and metal copings were fabricated **(Fig.8a&b)**.

The metal copings were verified for marginal fit

intra-orally using a sharp tined explorer. Definitive restorations were provided for the patient during the subsequent visit. The occlusal contacts were verified at the centric and eccentric positions using 40 micron articulating paper and were found to be in accordance with the mutually protected occlusal scheme. The crowns and bridges were cemented using type 1 GIC luting cement **(Fig.9)**. Impressions were made using alginate material and a night guard splint was delivered to the patient. The patient reported at 1 week and 1 month post-cementation and presented with no symptoms and signs of discomfort.



Fig.1: Intraoral - FrontalDiscussion



Fig.2: Intraoral – Right side



Fig.3: Intraoral – Left side





Fig.4a& b: Wax – up at restored vertical dimension





Fig.5a& b: Tooth preparation for Maxillary and Mandibular arches





Fig.6a& b: Master impressions of Maxillary & Mandibular arches

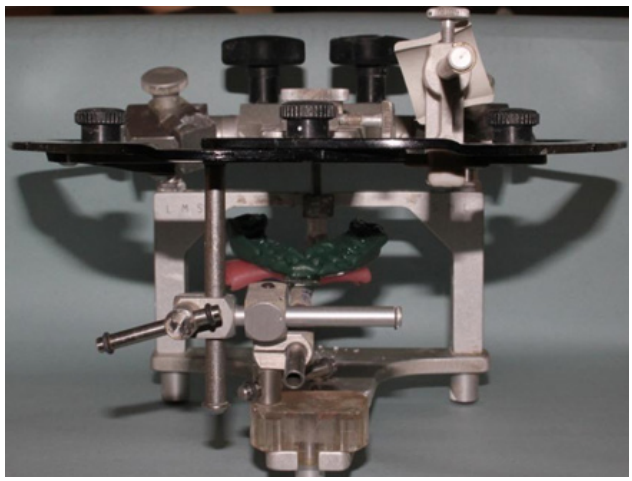


Fig.7 Facebow transfer following tooth preparation





Fig.8a& b: Metal copings for Maxillary & Mandibular arches



Fig.9: Definitive restorations

The lack of awareness on maintenance of oral hygiene and on replacement of missing teeth is a contributory factor for many individuals with a mutilated dentition requiring full mouth rehabilitation [7] [8]. The individual in this case had not been observing proper oral hygiene measures which resulted in a weakened periodontium around her mandibular molars. The molars were extracted since they had a poor prognosis but the patient had refused to replace her missing teeth citing poor socioeconomic status as a reason. The patient had been using her remaining dentition for mastication which had resulted in increased wear on the occlusal surfaces of her natural teeth. The maxillary molars had also supra-erupted into the edentulous space due to the lack of opposing occluding units. The resulting attrition had proceeded to such an extent that vertical dimension was reduced and the patient experienced sensitivity on intake of hot and cold food substances[9]. This symptomatology had induced the patient to seek professional care for her condition. This entire cycle could have been avoided if the dental practitioner. The patient was counseled on the maintenance of oral hygiene which she followed stringently following her full mouth rehabilitation. Awareness on dental hygiene measures and review visits to clinicians should be enhanced for the general populace to improve their understanding on the importance of preventive dental care[10]. Most patients are not aware of the consequences of dental hygiene negligence and seek dental care only after a painful episode. A common reason to refuse comprehensive dental care is the lack of financial support. However, the costs of treating the complications are higher manifold which should be conveyed to the patient at the time of treatment planning. In this case, a four unit bridge for replacing her missing teeth on either side along with non-surgical periodontal prophylaxis would have cost the patient much less than a Michigan splint and full mouth restorations together.

Loss of vertical dimension was observed in this case with visibly reduced lower facial height. The difference between VD at rest and occlusion was observed to greater than the average range of the freeway space. Hence the decision was made to restore the lost amount of vertical height with the new restorations [4] [11] . There was no passive eruption by the remaining natural dentition to compensate the reduced vertical height. This situation provided adequate interarch space to fabricate a splint and the following restorations without inducing any form of discomfort. The VD and CR was optimized through the use of the Michigan splint which was customized to obtain occlusal contacts according to the mutually protected occlusal scheme. The patient displayed no signs or symptoms of discomfort which drastically brought down the treatment duration from a period of 3 months with the splint to a single month. Provisional restorations were designed at the restored VD which enabled us to visualize the patient's facial appearance and smile aesthetics. The patient was provided an adaptation period of 2 weeks with the provisional restorations following which she reported satisfactory oral function and appearance.

A minimal crown height of 4mm is required for crowns to be retained on teeth and to function in a predictable manner. Crown lengthening to obtain sufficient crown height should be considered in cases of short clinical crowns[12] [13]. The advent of lasers in soft tissue contouring procedures drastically reduces the duration of healing and improves accessibility to deep marginal finish lines[14].

The occlusal scheme for fixed crowns and bridges should be mutually protected occlusion. This scheme dictates that the posterior teeth contact only in centric relation and should be separated during protrusion and lateral excursive movements. The use of a customized incisal table is required in cases where vertical dimension of the planned prostheses is the same as that of the patient's existing VD. For the case mentioned in this report, the provision of incisal guidance was made easier by the increased interarch space. The wax-up made for provisional restorations displayed sufficient posterior separation during excursive movements in the articulator. The provisional restorations were subsequently verified to possess the same occlusal contacts in centric and eccentric positions intraorally[15] [16]. An index was made of the incisal table with the incisal rod in centric and eccentric positions and sent to the dental laboratory

along with the impressions to replicate the occlusal scheme provided in the provisional restorations. The definitive restorations were cemented after confirmation of the desired occlusal scheme intraorally[17].

Conclusion

Oral health education and motivation to maintain oral hygiene should be actively promoted to improve awareness of the general populace on the common conditions resulting from negligence of oral health. Tooth wear should be recognized as a complication resulting from a multitude of factors and exacerbated by a negligent attitude to professional care. The causes of this condition should be identified and treated along with the resulting clinical condition to prevent further complications. Cases resulting from generalized attrition and requiring full mouth rehabilitation should be managed using scientifically proven procedures to achieve predictable long term results.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: The study has been approved by the Institutional Human Ethical Committee, Saveetha Dental College and Hospital. (SDC/IHEC/19-20/076)

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Knowledge, Attitude and Practice Towards Evidence based Practice among Medical and Dental Students

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Abstract

Aim: Evidence based medicine can be used to increase the confidence and overall outcome of the treatment offered to the patients. Hence the study was conducted to assess the knowledge, attitude and practice among medical and dental students towards evidence based medicine and dentistry.

Materials and Method: A questionnaire based study was conducted among dental and medical students in Chennai to assess the importance and the need for evidence based medicine. A total of 50 dental and medical students each was included in the study. Data was collected and descriptive statistics was done.

Results: It was found from the study that about 7% of the medical students used PubMed journal as a referral in their daily practice while 6% of the dental students used PubMed journal as a referral in their daily practice. About 8% of the medical students understood the terms used in study while 6% of the dental students understood the terms used in studies. 41% of the medical students and 38% of the dental students were welcoming to practising evidence based medicine

Conclusion: Medical and dental students almost have the same amount of knowledge when it came towards understanding and practising evidence based medicine. Though the study participants reported that they were aware of PubMed and Cochrane only few of them used them in decision making. EBD approach empowers clinicians to question and consider the use of the current best evidence in decision-making on the management of individual patients.

***Keywords**: Evidence based medicine, medical curriculum, dental curriculum, journals*

Introduction

Evidence-based medicine (EBM) is the new prototype of amalgamating the superlative external clinical affirmation with an individual's clinical proficiency and the involvement of patient's preferences and choices in the decision process [(1)]. Three components of EBD are evidence, clinical expertise, and patient preferences and needs. [(2)] This entire process clinches that both the practitioner and patients are benefitted. Hence it is the usage of literature studies to increase the productivity with which the clinical outcome is obtained. It requires a great deal of dedication from the researchers part to conduct clinical studies and to formulate results in an unbiased manner to ensure that these trials when they turn up positive they can be utilised by the practitioners on patients on a day to day basis. In an era of digital world, where everybody seeks validation and authentication, it has become very essential to provide the same in the medical field. This is where evidence based medicine plays a very important role as they serve as a means of documentation that is authenticated after being performed clinically or by conduction surveys and

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seeking option of their fellow colleagues or professionals from other departments when and where needed. It is hence used judiciously as the best evidence that can offer the best treatments to the patients [3].

As nothing in the world is stable so is the field of medicine. In the fast moving universe where proven facts also keeps changing, the quest for more knowledge is at its peak which can be solved only by conducting more and more studies which inevitably results in adding up more evidence based studies in the field of medicine. However a practitioner should always keep in mind to not blindly follow whatever is inscribed as each and every patient's problem and condition in the field of medicine is always different and the doctor has to consider even the emotional status of the patient before suggesting or carrying out a treatment on the patient. Competent physicians however use both their clinical experience with the best external evidence that is available there by bring out the best of the both [4].

Evidence based dentistry serves to decrease the variation in opinion between dental professionals in the diagnosis, prognosis, treatment outcomes and cost of care for patient with similar diseases and it depends on four different factors namely quality of science underlying clinical evidence, quality in making clinical decisions, variations in the level of clinical skill and large and increasing volume of literature. [5]

In spite of so many researches being conducted if the practitioner fails to be updated with what is going on currently due to his or her busy schedule, the use of so many such studies being conducted and proven becomes invalid. In a study conducted by Masaic et.al. where the author states that 19 articles is to be read by a general practitioner[3], which however due to lack of time and busy schedule of the practice now becomes very difficult most of the time. Lack of time hence serves as a hurdle for the practitioners to keep in touch with what is happening in and around them in depth. At the end of the day the goal to be achieved is to offer whatever is best for the patient to them.

As the saying goes in medical or dental field, more than experience more better the quality of care provided which however in reality is inversely proportional [6], where satisfaction of the patient becomes the prime motto of health care provider [7]. In this fast moving world where sophistication's are no exception to the medical field it is important from the side of the practice now to keep in touch with the new evolution that is happening around them and this comes through constant literature reading. Hence the aim of this study is to assess the knowledge, attitude and practice of dental and medical students towards evidence based medicine and dentistry.

Materials and Method

A cross sectional study was conducted in a medical and dental college. A total of 50 dental and medical students each from 3rd year to internship was included. Convenient sampling methodology was followed. All the other students were excluded.

Group I: Medical students from 3rd year to internship

Group II: Dental students from 3rd year to internship

Pre-tested, validated, self-administered closed ended questionnaire previously used to assess knowledge, attitude towards practice of evidence based dentistry. The questionnaire was prepared using the questions used in the study conducted by Amira Abdel-Kareem et.al and Parul Rawat et.al. [1, 8] The questions were split into following sections namely: demographic details, questions related to knowledge of evidence based practice, questions for attitude and practise towards EBP. Filled questionnaires were collected. Only completely filled forms were considered for analysis. The data collected was analysed and frequency distribution was done.

Findings

The study was done among 50 dental and medical students from third year to internship to assess the knowledge, attitude regarding evidence based practice.

Awareness towards evidence-based practice

About 14% of the medical students were aware of PubMed journal, and 7% of the medical students used PubMed journal as a referral in their daily practice while 1% of the dental students were unaware of PubMed journal, 8% of the dental students were aware of PubMed journal, while 6% used PubMed journals as reference in their daily practise. About 14% of the medical students were aware of Cochrane journal and 36% of the medical students read Cochrane journals while 2% of the dental students were unaware of Cochrane journal, 18% of the dental students were aware of Cochrane journals and

30% of the dental students read from Cochrane journal. (Figure 1 and 2) About 20% of the medical students were aware British Medical journal and 30% of the medical students read from British Medical journal while 2% of the Dental students were unaware about British Medical journal, 16% of the Dental students were aware about British Medical journal and 32% of the dental students read from British Medical journal. About 42% of the medical students were unaware about the Center for disease control and prevention journal, 7% of the medical students were aware about Center for disease control and prevention journal, 1% of the medical students use Center for disease control and prevention journal in their daily practice while 38% of the dental students were unaware about Center for disease control and prevention journal, 9% of the dental students were aware about Center for disease control and prevention journal and 3% of the dental students used Center for disease control and prevention journal as a referral in their daily practice. 48% of the medical students were unaware about Eastern Mediterranean health journal, 1% of the medical students were aware about Eastern Mediterranean health journal 1% of the medical students read about Eastern Mediterranean health journal while 43% of the Dental students were unaware about Eastern Mediterranean health journal, 4% of the Dental students were aware about Eastern Mediterranean health journal, 3% of the Dental students read about Eastern Mediterranean health journal. The results also showed that the students don't use any other journals apart from the mentioned ones in their practice for referral.

Knowledge regarding key terms in evidence-based practice

The results showed that 28%, 14%, 8% of the medical students felt they found the presence of relative risk, systemic reviews, odds ratio, meta-analysis type of design, and necessity if confidence interval not helpful, helpful and understanding while 37%, 7%, 6% of the dental students felt they found the presence of relative risk, systemic reviews, odds ratio, meta-analysis type of design, and necessity if confidence interval not helpful, helpful and understanding.

Attitude toward evidence-based practice

It was found that 41% of the medical students and 38% of the dental students were welcoming to practising evidence based medicine. (Figure 3) 46% of medical and dental students said they feel evidence based medicine is essential in their daily practise and they follow in their day to day life. However 48% of both medical and dental students felt lack of World Wide Web access and journal could be a cause for lack in practising evidence based medicine.

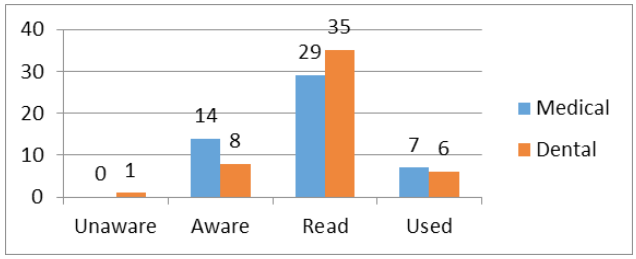


Figure 1: Distribution of respondents based on the responses related to PubMed journal

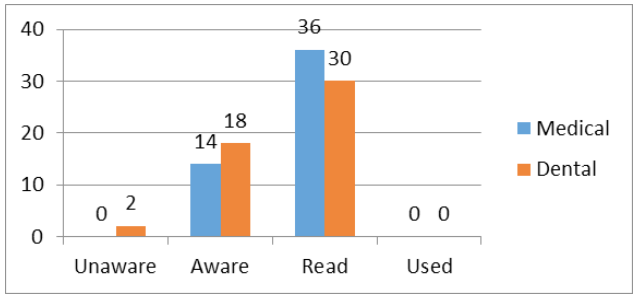


Figure 2: Distribution of respondents based on the responses related to Cochrane journal

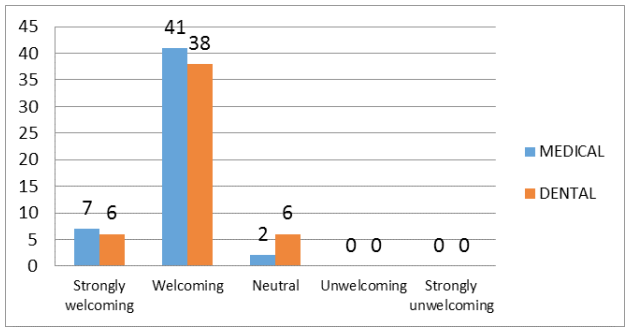


Figure 3: Attitude of study participants towards practising evidence based medicine

Discussion

The practice of dentistry is becoming more complex and challenging. Changing socio-economic patterns, knowledgeable health care consumers, rapid technical advances and the information 'explosion' all place greater demands on clinical decision making [9]. The American Dental Association defined Evidence Based Dentistry as an approach to oral healthcare that requires the judicious integration of systematic assessment of clinically relevant scientific evidence relating to the patients oral and medical conditions and history, with the dentists clinical expertise and the patients treatment

needs and preferences [10].

To provide the best treatment to the patients it is not just sufficient to completely cover up a set of books but also important from a practitioner's point of view to keep themselves updated about the changes and the new advancements in the field of medicine. This will not just help in offering a better treatment to the patients but also will aid towards a correct diagnosis. The best place to keep oneself updated is through Internet or journal books. However the practice of evidence based medicine should begin the moment they enter medical school. The institute plays a major role in deciding how the future doctors will shape up and should begin as early as possible in their curriculum (11). This will ensure that a good teamwork is also attained at the ground level which is again essential in practising evidence based medicine (12) as the presence of peers practising will motivate the others to practice it too.

A study conducted in Saudi comparing the knowledge of evidence based medicine among the medical and dental students has shown that dental students have more knowledge towards evidence based medicine compared to the medical students which is attributed to the curriculum that is followed (13). It was reported in a study that the overall general knowledge of the respondents to EBP is substandard to the competency standards that minimally call for skills in critically appraising the evidence. (14)

Less than half of the study participants were interested to practise evidence based medicine in the current study. This is similar to the study conducted by Bhate PM et al, among dentists in Davangere city, Karnataka. (15)

From the present study it can be concluded that the medical and dental students have almost the same amount of knowledge when it comes to evidence based medicine. Only few of the study participants in the present study used Evidence based approach. It was stated in a study that despite being familiar with the EBD approach and having access to evidence-based specialized sites such as Cochrane library, students did not use this approach in their diagnostic and therapeutic procedures (16)

Evidence-based practice is recognised as a foundational element of healthcare professional education. The effective development and implementation of professional education to facilitate EBP remains a major and immediate challenge. (17)

In the present study only 2 % of respondents were unaware of Pubmed journals whereas in a study it was reported that 10% of respondents were unaware of Pubmed journals. (18, 19)

The limitations of the present study was that it was cross-sectional survey and hence the responses were participants self-report, also the frequency of use in solving the clinical problems were not recorded. Further studies with larger sample size are needed to assess the attitude, knowledge about evidence based practice.

Conclusion

Medical and dental students almost have the same amount of knowledge when it came towards understanding and practising evidence based medicine. EBP and its related concepts to be included into the curricula of the medical and dental institutions so that students are taught the concepts at an undergraduate level as well as they learn how to put this application into daily clinical practice. Therefore, the importance of evidence-based dentistry as well as the skills needed to apply it in practice need to be developed.

Conflicts of Interest – The authors declare there is no conflict of interest

Source of funding - Self

Ethical Clearance- SRB/SDBDS/INTERN/18-19/0152

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Knowledge about Consumer Protection Act and Informed Consent among Dental Students

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Abstract

Background: Doctor and patient's relationship is always based on trust and confidence. In today's world patients have become more aware of their right-legal literacy. The dental profession requires knowledge and skill which serves the individuals. It's the responsibility of the dental health professional to provide accurate health services to the patients and the society.

Aim: To assess the knowledge about consumer protection act and informed consent among dental students.

Materials And Method: A total of 198 dental students were taken into study. A questionnaire consisting of 18 questions was framed and was circulated using online survey link. The results were tabulated and analysed.

Results: About 8% of the students have told immigrants does not require consent form and 39% have said both verbal and thumbprint as consent for illiterate people. At about 11% have said they are not aware about professional indemnity insurance. While 39% have said both verbal and thumbprint as consent for illiterate people.

Conclusion : The results showed that the dental students had an average knowledge on CPA and informed consent while their knowledge was below average about professional indemnity insurance.Majority had awareness regarding CPA but practice of taking consent and utilisation of professional indemnity insurance among dental students were less than adequate.

Keywords: *Informed consent, consumer protection act, indemnity insurance, dentists, legal literacy*

Introduction

The relation between the doctor and patient relies on faith and confidence. There is an increasing awareness among public about medical negligence in Asian countries. Institutes and hospitals are increasingly facing complaints relating to facilities, standards of skilled ability and appropriateness of therapeutic and diagnostic method. [1, 2]

On 24th December, 1986, the government of India, to secure the interest of the patron, enacted a comprehensive legislation, the 'Consumer Protection Act, 1986' brought up as 'The Act'. It was later changed and the amendments came into impact on March 15th, 2003. [3] It absolutely was an act to produce higher protection of the interests of the customers and for that purpose to make provisions for institution of consumer councils and alternative authorities for the settlement of consumers. [4]

Informed consent is the process by which the treating health-care provider discloses appropriate information to a competent patient so that the patient may make a

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voluntary choice to accept or refuse treatment. [5]

Consent may be a voluntary acceptance or agreement of what's planned or done by another person. Not taking consent is taken into account as deficiency in Medical Services below the Section 2 (i) of the consumer Protection Act. Consent may be a basic and established principle within the Indian Law. Everyone has the right to work out what shall be done to his/her body. Self-defence of the body (under IPC Section 96–102, 104, and 106) provides right to the protection of bodily integrity against invasion by others. [2, 5, 6]

At present, the extent of knowledge given to the patients regarding an informed consent (IC) will vary in practice among dental practitioners. Patients are exacting higher services and a lot of information concerning their treatment set up in health-care disputes between each of them range from inadequate and inappropriate treatments to serious issues of dental malpractice and neglect. [7] The Indian Dental Association introduced the first professional indemnity insurance Legal liability arising from errors on the A part of Registered Dental Practitioners whereas rendering professional service is covered by this insurance. [8]

Doctors practicing ethically and honestly should not have any reason for fear. Civil law, criminal law or consumer law, can only set the outer limits of acceptable conduct i.e. minimum standards of professional care and skill. The acceptable limit of professional conduct is to be decide by the profession itself. [9, 10]

The term "indemnity" means that compensation or to compensate. The principle of indemnity is strictly determined in liability insurances. These insurances are designed to produce the insured person protection against the financial consequences of legal liability. This policy is supposed for professionals to cover liability falling on them as a results of errors and omissions committed by them while rendering professional service. The indemnity applies solely to the claim arising out of bodily injury and/or death of any patient caused by or speculated are caused by error, omission or negligence in professional service accomplished or that ought to are rendered by the insured or the assistants or the team of individuals used by the insured. [9, 11, 12]

Studies showed that the awareness of the consumer protection act has increased [4, 13] and utilization of the professional indemnity insurance was less and related to higher age, year of practice, and gender. [4, 13]

In this current era of consumer satisfaction, dentists are facing legal challenges from discontented patients. With this ever-changing situation, doctors need to adapt to matters and should face such legal tangles. Hence a study was done to assess the awareness about the Consumer Protection Act (CPA) and informed consent among dental students.

Materials and Method

A cross-sectional study was conducted among dental students. A total of 198 dental students were included in the study.

An online survey link was created which had pre-tested structured questionnaire, comprising of multiple choice questions, to assess their knowledge about consumer protection act and informed consent among dental students.

Questionnaire consisted of 18 multiple choice questions. The students received a full explanation on how to fill in the questionnaire. It was made sure that all the questions were attempted. On the basis of the responses received through questionnaires, the data obtained were analysed by using statistical data. The total number and percentage were calculated and it was then analysed.

Results

A cross sectional study was carried among dental students to assess the knowledge about consumer protection act and informed consent. About 84% of the respondents were aware of consumer protection act. About 58% of the students said that a doctor can sue a patient with respect to payment or service. About 18% of the students have told they didn't know when and to whom the consent form is not required. (Table 1)

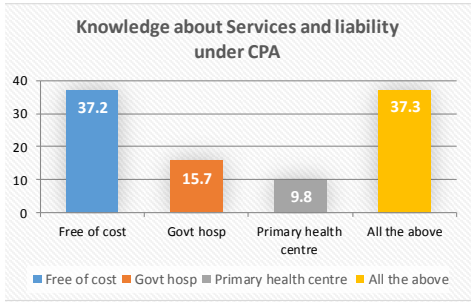


Figure 1: Distribution of study participants based on their knowledge about liability of services in CPA

About 37% have said services done under free of cost are not covered under CPA (Figure 1)

About 74% of the study participants said it was necessary to obtain informed consent for clinical examination and routine radiography. (Table 2)

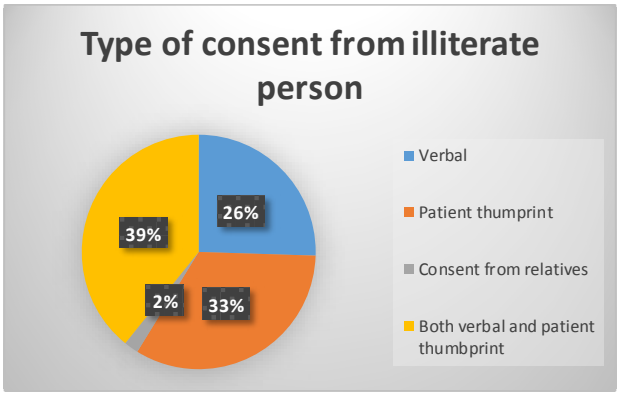


Figure 2: Distribution of study participants based on their knowledge about types of informed consent that to be obtained from illiterate person

About 33% of the respondents have said patient thumbprint can be considered as consent for illiterate people. (Figure 2)

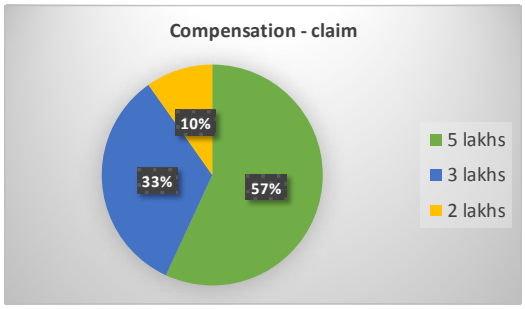


Figure3: Distribution of study participants based on their knowledge about compensation claim

For the question, the amount that can be claimed as compensation under district forum, about 57% have said can claim up to 5 lakhs and 10% have said can claim up to 2 lakhs. (Figure 3)

About 52 % have told only dental and medical professionals are covered under PII while 7% and 2% have said engineers, architects, solicitors and chattered accountant were covered under PII. About 11% have said they are not aware. About 28% have said all of them are covered under PII. About 36% didn't know about the services not covered under PII, while 27% have told that criminal acts are covered, 7% said civil claims and performance under GA unless in hospitals are the services not covered under PII, 16% have said performance by dentist under GA unless in hospitals are not covered under PII, 3% have said group policies are not covered under GA.

Table1: Knowledge about consumer protection act among dental students

S.no	Questions	Options	Students Responses (N)	Students Responses %
1.	A complaint filed by a consumer should be decided within how many days from date of notice issued to the opposite party	90 days	69	35%
		60 days	75	38%
		120 days	34	17%
		100 days	20	10%
2.	Location of consumer forum in your area	Aware	71	36%
		Unaware	127	64%
3.	The hospital and the doctor is liable for negligence of its employee in case of govt or private hospital	Yes	131	66%
		No	36	18%
		Don't know	51	26%
4.	Every health professional should maintain his/her patient records for a minimum of	3 years	83	42%
		5 years	75	38%
		2 years	12	6%
		Don't know	28	14%
5.	In a mishap of a minor case, beneficiaries are both patient parents/guardian	Yes	107	54%
		No	36	18%
		Don't know	55	28%

Table 2: Knowledge about consent form among dental students

S.no	Questions	Options	Students Responses (N)	Students Responses %
1.	Situation where consent may not be obtained	Child	79	40%
		Disabled individuals	16	8%
		Immigrants	16	8%
		All of the above	51	26%
		Don't know	36	18%
2.	Do you provide a copy of consent form to the patient	Willingly	103	52%
		Ask for a reason	67	34%
		Refuse	28	14%
3.	Is it necessary to obtain informed consent for clinical examination and routine radiography	Yes	147	74%
		No	35	18%
		Don't know	16	8%
4.	Consent is invalid when	Given under 12 years of age	119	60%
		Given above 12 years of age	47	24%
		Don't know	32	16%

Discussion

Awareness about medical and dental negligence among public is growing in India. With this changing scenario, health care professionals have to adapt to the situation and may have to face such legal tangles, which is intangible and disturbing sometimes. It is mandatory that all health care professionals including dentists should be aware of the medico legal aspects of the field. [14, 15]

In 1986, the Indian Parliament passed CPA to protect, safeguard and preserve the interest of consumers. Before the amendment of this Act, civil courts and the Indian Contract Act handled the cases against dentists. But it was more time-consuming and the other disadvantage of the latter was cost efficiency. [1]

Patient's rights have always been a subject of debate around the world. Countries worldwide are legalizing patient's rights. However, awareness among health professionals about such laws is observed to be varied. [16, 17, 18, 19] About 86% of the respondents were aware about Consumer protection act in this study whereas in a study did by Sikka et al 69.6% reported that they were aware about CPA. [16]

The indemnity applies only to the claim arising out of bodily injury and/or death of any patient caused by or alleged to have been caused by error, omission or negligence in professional service rendered or which should have been rendered by the insured or the assistants or the team of people employed by the insured. An important level of protection against outcome of litigation would be to go for Insurance cover. Profession indemnity insurance, not only meets the claim of compensation awarded against health professional or hospital but also gives a sense of mental security that even if some negligence is proved the insurance company will take care of it. Professional Indemnity Insurance cover became available for doctors and medical establishments only from December, 1991. [12]

In the present study, 65% dental students were aware about professional indemnity insurance, which was higher than the study done among dental practitioners in Mumbai city. [13]

Professional indemnity insurance was associated to age, year of practice, and gender. The utilization of

professional indemnity insurance was significantly related to the educational standards of dental practitioners. Knowledge of CPAs and practice of IC showed a positive correlation that better knowledge leads to better practice. [13]

About 64% of them were unaware about the location of consumer forum in their locality. It is necessary or in need to know about the consumer forum in his/her locality to verify about the status of their own private practice. About 8% have told that consent cannot be obtained if their immigrants. The dentist should be aware about the protocol for getting consent for immigrants as it may differ from the normal procedures. The current study showed 33% have agreed that they had sufficient knowledge about verbal consent while Gupta et al. had stated that only 68.6% of the dentists had satisfactory knowledge about verbal consent. According to the results of this study, verbal consent and patient thumbprint was the favourable method to obtain informed consent. [5]

In the present study, 74% of the study participants stated that obtaining informed consent was necessary. This is in accordance with the study conducted by Priyanka Goel et al where approximately 80% of the dental professionals take consent from the patients prior to the start of any procedure. [20]

In a study conducted by Sumanth.et.al said any patient suffering from symptoms as a result of treatment received from dental professionals, a claim for compensation could be carried out. [21] In the present study, it was seen that few participants were aware of the compensation that could be claimed by the consumers.

In the present study it was reported that 42% of the respondents knew that CPA was not applicable when free treatment provided. This is similar to the study did by Radhika et al, 46.9% knew that a charitable hospital that provides free treatment to all patients does not fall within the ambit of CPA. [22]

Conclusion

The results of the study showed that there was no adequate knowledge on consumer protection act and informed consent. We must upgrade our knowledge on consumer protection act at all levels of our profession and change our attitude by inculcating a practice to spread the message of consumer protection act for delivering quality dental care.

Conflicts of Interest – the authors declare there is no conflict of interest

Source of Funding - Self

Ethical Clearance- SRB/SDBDS/FINAL/18-19/0124

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Assessment of Depression and Attitude Towards Missing Teeth Replacement in Geriatric Patients

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Abstract

Aim: To assess depression and attitude towards replacement of missing teeth in Geriatric patients attending a dental college.

Materials and Method: The study was conducted in a private dental college, Chennai. For this study, 100 geriatric patients was randomly selected. Geriatric patients with physical and mental disabilities were excluded for the study and those above 60 years or above were included for the study. Two sets of questionnaires were used for the study - One was the Geriatric Depression Scale (GDS) and the other was a questionnaire based on attitude towards replacement of missing teeth. All the data were collected, analysed and frequency distribution of the data was calculated.

Results: From this study, it was found that 63% of the old aged participants were leading a depressed life and around 61.2% of them were not interested in replacement of missing tooth/teeth. Out of which, 45.6% of them showed lack of interest towards the same which indicates the fact that depression indirectly affects their attitude to address their needs such as replacement of missing tooth/teeth.

Conclusion: The above study clearly states a relation between depression and replacement of missing tooth/teeth in geriatric patients. The clinical significance of this study is that it is essential to create awareness regarding depression and old age and importance of replacement of missing tooth/teeth among the general public. It is necessary to educate the society regarding the various replacement techniques.

Key words: *Geriatric, Depression, Patients, Replacement, Teeth.*

Introduction

Depression is one of the most common psychological problems faced in old age.[1]According to the World Health Organization (WHO), depression can be defined as "a common mental disorder, characterized by persistent sadness and a loss of interest in activities that you normally enjoy, accompanied by an inability to carry out daily activities, for at least two weeks"[2]. Depression has a detrimental effect on the individual's mental health. And this becomes a serious health concern especially in geriatric patients[3-5]. It may also provoke suicidal thoughts. Therefore, have a higher risk of mortality[6-8]. Depression is usually higher or more prevalent among old age patients living in isolation, away from their families such as those living in old age homes. Some of the common symptoms of depression among old age patients are:- Feeling of persistent sadness, decline in daily activities, loss of appetite, loss of weight, insomnia, difficulty in socializing, persistent feeling of tiredness, reduced level of self-respect and self-confidence and increased fear towards death [6,9,10-13].

Teeth are important for a variety of functions such as speech, mastication, aesthetics which in turn will

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have an impact on self-respect and self-confidence. All the above mentioned are applicable to old age patients as well. And missing tooth/teeth is one of the common intra-oral findings among geriatric patients. Irrespective of age, replacement of missing tooth/teeth is/are important. Oral health also influences general health. Though there is a wide array of options for replacement of missing tooth/teeth, the attitude of geriatric patients towards replacement of missing teeth is what makes the process of treatment planning difficult and challenging for dentists[5]. With increasing age, the need and attitude towards replacement of missing teeth may change and this change may vary among different individuals. This attitude is usually affected by a wide number of factors such as: Time, Age, Function, Aesthetics, Gender, Depression, etc.

Out of the above mentioned factors, the most uncommon factor is depression. It is not a part of the aging process. It makes them to lose interest in everything including the prosthesis for replacement of their missing teeth even if this has a negative impact on their day to day activities such as speech, mastication, etc. Eventually, they lose their appetite which may cause imbalance in their metabolism. This in turn may lead to various diseases in these patients. Hence, this study is focused to assess the relation between depression and attitude towards replacement of missing teeth in geriatric patients in South India.

Materials and Method

The study was conducted in Saveetha Dental College and Hospitals, Chennai. For this study, hundred geriatric patients were randomly selected. Two sets of questionnaires were used for the study. Geriatric Depression Scale (GDS) was used to assess the depression and a questionnaire was used to assess the attitude towards replacement of missing teeth among the study participants.

Inclusion criteria

- Geriatric patients above 60 years or above
- Single or multiple missing teeth

Exclusion criteria

- Patients under 60 years
- Geriatric patients with physical and mental disabilities
- Systemic complications

Questionnaire

As already mentioned above, two sets of questionnaires were used for the study - One was the Geriatric Depression Scale (GDS) and the other was a questionnaire based on attitude towards replacement of missing teeth. Both the questionnaires were multiple choice questions. Apart from these demographic details such as name, age and gender were also collected. The Geriatric Depression Scale (GDS) Short Form was used for the study which consisted of 15 questions. It is usually used to identify depression in older people who are in hospitals or old age care homes[14]. The answers that are in bold indicate depression. A Score of 1 point is given for each bolded answer. A score less than 5 points is suggestive of depression and should warrant a follow-up comprehensive assessment. A score less than 10 points is almost always indicative of depression[15]. The second set of questionnaire was to assess the attitude towards replacement of missing teeth. It consisted of 10 multiple choice questions.

Results

The questionnaires from the participants were collected, the results were tabulated and analyzed statistically. From the Geriatric Depression Scale, out of 100 geriatric patients, it was found almost 75% of them were not happy with their life. Only 25% of them reported to be leading a happy and satisfied life. About 68.7% of the patients have dropped many of their activities and interests. Life feels very empty for 59.2% of the geriatrics. About 66.7% of them often get bored and have none to share their feelings with. Most of them (66.7%) are not in good spirits or in a happy mood. A majority of the participants (62%) are anxious about their future and are in fear thinking whether something bad would happen to them. The old aged patients also reported a feeling of helplessness (56.9%). Around 60% of them prefer to stay at home and dislike going out. Only 12% of them feel happy to be alive. About 66.7% of them feel they are worthless to others. Almost 68% feel unlucky or have a thought that others are better off than themselves.

According to the questionnaire handed over to evaluate the attitude of replacement of missing teeth,

almost 66.7% of them were not even aware of a missing tooth/ teeth. Around 86.7% of the patients did not replace their missing tooth/teeth. Among those who did not replace the missing tooth/teeth the duration of edentulousness recorded for several years is 55.6%, few years is 22.2, few months is 7.9%, and few weeks is 1%. Most of the geriatric patients of the study, which accounts to 61.2% of them felt there was no need or in other words were not interested to replace the missing tooth/teeth. (Figure 1) The reason for the above response was due to time (5.2%), high cost (10.2%), age (0.2%) and lack of interest (45.6%). (Figure 2) But 38.8% of the participants felt replacement of missing tooth/teeth is/are vital because it improves their speech (10.6), improves mastication (14.3) and improves their aesthetics (13.9%). Almost 86.6% felt replacement of missing tooth/teeth boosts up their confidence and changes the way they are treated in the society. Almost 75% were not aware of the various treatment modalities available for the replacement of missing tooth/teeth. About 80% of the population feel artificial teeth cannot replace the function of the missing tooth/teeth. Out of the remaining 20% of the geriatrics, 18.6% of them preferred fixed prosthesis whereas only 1.4% preferred removal over fixed prosthesis. From all of the above an average of 63% of the participants are under depression.

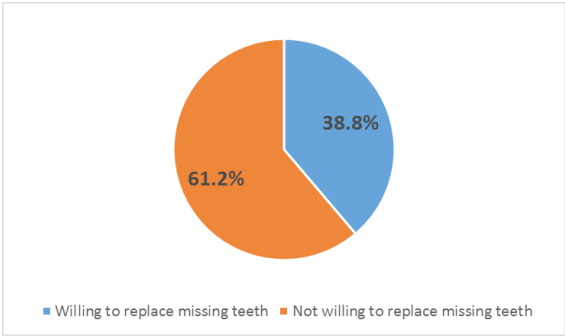


Figure 1: Distribution of study participants based on their willingness to replace the missing teeth

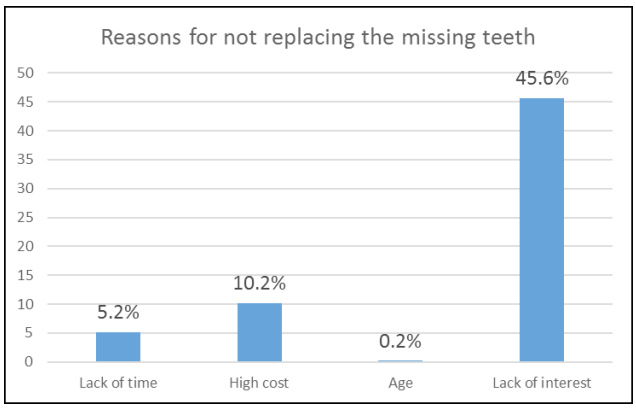


Figure 2: Distribution of study participants based on their reasons for not replacing the missing teeth

Discussion

Old age and depression

Old age can be defined as the last or end stage of normal human life[15]. It is a period, secondary to childhood, which requires care and affection. If people belonging to this stage, called as old aged or geriatric individuals if not given the required care and attention, they may often fall into a state of depression. According to WHO, depression can be defined as a mental disorder which is characterized by sadness, loss of interest in daily activity, feelings of guilt or low self-worth, disturbed sleep or appetite, tired feeling, and lack of concentration [5,16].Depression continues to be considered as a major health issue worldwide[5,17,18]. The various types of depression are as follows[19]:- Major Depressive Disorder (MDD), Persistent Depressive Disorder, Bipolar Disorder, Postpartum Depression, Premenstrual Dysphoric Disorder (PMDD), Seasonal Affective Disorder (SAD) and Atypical Depression. It can result in a lot of other complications such as sleep disorders, addiction towards drugs and alcoholic drinks, complicate or worsen critical health problems such as heart attack, etc[20]. It is usually common for geriatric individuals to be affected with depression due to lack of adequate care and affection from their loved ones or society. From this study, it was found that 75% of the geriatric individuals were under depression. A similar study conducted by Kohli S et al concluded that 29.8% of the 104 participants were under depression[5].

Need for replacement of missing teeth

With age, it is quite natural to lose teeth. But proper replacement is required to restore the function of the lost tooth/teeth. Geriatric patients suffering from depression may usually neglect the need to replace their missing teeth/tooth. From the study, it was found that 66.7% of the geriatric individuals were not even aware of a missing tooth/teeth. Some geriatric patients may be genuinely interested in replacement of missing tooth/ teeth but may quickly loose interest if the procedures for replacement are time taking or very expensive. Around 14.3% showed lack of interest towards replacement of missing tooth/teeth due to time, 14.3% refused due to high cost and 7.1% due to factors associated with age such fatigue, weakness, etc. Sometimes, the lack of interest towards replacement of missing tooth/teeth might be due to the inadequate knowledge regarding

the prosthodontic treatments or replacement techniques. They may not be aware of the consequences of no or delayed replacement of missing teeth. The consequences of not replacing the missing tooth/teeth over long time are explained briefly below: [21, 22]

Teeth, Tongue and the oral musculature play a vital role in speech. Loss of multiple teeth will make it hard for the patients to pronoun the words clearly thus, affecting their speech. In geriatric patients, this disturbance in speech will make it difficult for others to address their needs.

It is essential for humans to have a balanced, nutritious diet. With age, importance to health and nutrition increases. Teeth play the most critical role in mastication which in turn will help in proper digestion. Therefore, lack of replacement of missing toot/teeth may affect the mastication process leading to digestion problems in elderly patients hence, making them loose their appetite which ultimately affects their health.

When missing tooth/teeth are not replaced for a period of several months to years, the bone around the missing teeth gradually tends to undergo atrophy. This may even affect the treatment planning for prosthodontics treatments.

Normally, with age, the appearance drastically changes and loss of teeth will even more worsen the existing scenario. It will result in hollowing of cheek resulting in wrinkles, drooping of the smile line, sinking of the lips, etc.

All of the above factors, such as inability to masticate resulting in loss of appetite, atrophy of bone, negative impact on esthetics will all together affect their self-confidence which will eventually lead them to fall into depression which in turn will have a major impact on their life expectancy.

Various replacement techniques

Basically, replacement treatment or techniques are classified into fixed, removable, semi-fixed prosthesis. In my knowledge, some of the most common prosthesis used among geriatric patients are fixed partial dentures, implants, overdentures, complete dentures, temporary partially dentures, etc. Hence, from the above stanzas, it is well evident that it is necessary for geriatric individuals to replace missing teeth/tooth and depression which is a common mental disorder among these individuals may affect their interest towards the same.

From this study, it was found that 63% of the old aged participants were leading a depressed life and around 61.2% of them were not interested in replacement of missing tooth/teeth. Out of which, 45.6% of them showed lack of interest towards the same which indicates the fact that depression indirectly affects their attitude to address their needs such as replacement of missing tooth/teeth. A similar study conducted by Kohli S, et.al aimed at finding out the relation between depression and dentition among geriatric patients in Malaysia, showed a statistical significance between depression and dentition[5]. In a study done to evaluate the attitude towards replacement of missing teeth among patients in Karnataka, expressed that most of them were not aware about various treatment modalities with respect to replacement of missing teeth and lacked knowledge regarding the same[23].

Conclusion

The above study clearly states a significant relation between depression and replacement of missing tooth/teeth in geriatric patients. The clinical significance of this study is that it is essential to create awareness regarding depression and old age and importance of replacement of missing tooth/teeth among the general public. It is necessary to educate the society regarding the various replacement techniques. At the same time, it is important for dentists to realize the prevalence of depression among geriatric patients which will enable them to provide better care, shorter waiting/treatment duration, hence, encouraging more and more aged patients to opt for replacement of missing teeth which in turn will bring about a significant impact in their life.

Conflicts of Interest – The authors declare there is no conflict of interest

Source of Funding - Self

Ethical Clearance- SRB/SDBDS/INTERN/18-19/0167

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Knowledge and Attitude Among Dentist Regarding CPP-ACP as a Preventive Tool

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Abstract

Background: Dental caries is a dynamic process that occurs due to the dental plaque that is present on the tooth surface, causing demineralization. To prevent greater destruction of tooth surfaces, remineralization can be done. CPP-ACP acts as a remineralizing agent

Aim: To assess the knowledge and attitude among the dentists regarding CPP-ACP as a preventive tool.

Material and Method: 120 dentists were included in the questionnaire survey. The questionnaire contains 17 close-ended questions. The questions were based on the knowledge, attitude and practice among dentist on usage of CPP-ACP containing products as a caries preventive tool.

Result: Among the 120 dentists, 83 were postgraduates and 37 were undergraduates. The postgraduate practitioners (80%) had better knowledge about the basics of CPP-ACP than the undergraduate practitioners (40%).

Conclusion: The postgraduate practitioners have better knowledge than undergraduate practitioners. Most of the dentists are unaware about CPP-ACP in most of the aspects.

Keywords: *CPP-ACP, Remineralization, Pediatric dentistry.*

Introduction

Dental caries is a dynamic process that occurs due to the dental plaque that is present on the tooth surface, causing disturbance in the equilibrium resulting in loss of mineral from the tooth surface[1]. It forms as the result of a process where the mineral constituents of the tooth, principally the calcium and phosphate, are demineralized by organic acids that are produced by bacteria which are lodged in the biofilm adhering to the tooth surface. The destruction starts from the first atomic level of demineralization, through the initial enamel followed by dentinal involvement, to eventual cavitation[2]. Calcium and phosphate are lost from the subsurface enamel, which eventually aids in the formation of subsurface lesion. At this early stage, the caries lesion is reversible via a remineralization process involving the diffusion of calcium and phosphate ions into the subsurface lesion to restore the lost molecular structure.

Casein, a bovine milk phosphor-protein that interacts with calcium and phosphate and is a form of the natural food component. Its technical name is casein phosphor-peptides-amorphous calcium phosphate, or CPP-ACP. The concept of using CPP-ACP as a remineralizing agent was introduced in 1998[3] use of casein as caries prevention was developed in the early 1980s[4]. The mechanism of anticariogenicity in casein phosphopeptides is that, as

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colloidal calcium phosphate complexes are in colloidal form, they considerably increase the calcium phosphate levels in plaque, intensify remineralization and lessening enamel demineralization[5]. In recent years casein phosphopeptide-amorphous calcium phosphate (CPP-ACP) nanocomplexes have also been demonstrated to have anticariogenic properties in both laboratory animal and human in situ experiments[6-13]. To the knowledge of the authors there is very sparse literature regarding the knowledge of CPP-ACP among dentists. Hence, the study was conducted to assess the knowledge, attitude and practice among dentists regarding CPP-ACP as a caries preventive tool.

Materials And Method

A pilot study was carried out prior to the main study. The study protocol was approved and received ethical approval (STP/SDMDS15PED2b) from institutional review board of Saveetha Dental College. A computerized questionnaire survey of general dental practitioners in Chennai was carried out to investigate the knowledge about CPP-ACP. A questionnaire in English was framed and piloted by sending it to 20 general dental practitioners. The questionnaire was based on the knowledge about CPP-ACP among dentists. According to the replies, the questionnaire was modified by adding few questions. The modified questionnaire was sent to all registered general dental practitioners (n=120) including private practitioners and those working in institutions. The survey was done online and questionnaire was sent to around 210 dentists whose mail id was known. The demographic details were collected to check the qualification, specialty, years of experience. The questionnaire consisted of 19 questions concerning to the knowledge about CPP-ACP which includes the available forms, remineralization ability, effectiveness along with fluoride and reduction in the streptococcus mutans count. The collected data were entered in excel sheet and analyzed using the statistical package SPSS version 16. Simple descriptive statistics were used together with Chi-square (χ^2) test. The chosen level of significance was set at $P < 0.05$. Unanswered questions were treated as missing values.

Results

The qualification details are described in table 1. Of the 120-questionnaire that was sent, the response was at a rate of 100%.

Out of the 120 dentists, 58 dentists (59.2%) knew the abbreviation of CPP-ACP was Casein phosphopeptide amorphous calcium phosphate, while 28 dentists (29%) gave the wrong answer and 12 dentists (11.8%) did not know what CPP-ACP was. 80 dentists (69%) knew that CPP-ACP works on the remineralization and 27 dentists (23.2%) were wrong about the mode of action by CPP-ACP and 9 dentists (7.8%) don't know. 55 dentists (47.8%) knew that both calcium and phosphate were the ideal ion for caries prevention while 42 dentists (36.5%) and 14 dentists (12.2%) think calcium and phosphate were separately the ideal icon for remineralization and 4 dentists (3.5%) don't know. 74 dentists (64.3%) knew remineralization occurs only in enamel lesion while 20 dentists (17.4%) and 14 dentists (12.2%) think it helps in dentinal lesion and both enamel and dentinal lesion respectively and 7 dentists (6.1%) don't know. 94 dentists (82.5%) knew that CPP-ACP helps in reversal of white spot lesion, 7 dentists (6.1%) say that CPP-ACP do not help in reversal of white spot lesion and 13 dentists (11.4%) are not aware about the reversal mechanism of white spot lesion by CPP-ACP.

Out of 120 dentists 48 dentists (41.7%) knew CPP-ACP can reduce the levels of streptococcus mutans and 44 dentists (38.6%) knew that it doesn't reduce the levels of lactobacillus count. 83 dentist (72.2%) knew that CPP-ACP can be used in orthodontic decalcification. 85 dentists (74.6%) knew that CPP-ACP is effective along with fluoride. 87 dentists and 80 dentists (70.2%) knew that CPP-ACP had synergistic remineralization and counteracts the action of acid in case of erosion respectively. 47 dentists (41.2%) were aware that CPP-ACP should not be used in children with lactose intolerance.

The knowledge about CPP-ACP among undergraduate and postgraduate practitioners were evaluated. The Postgraduate practitioners had better knowledge about the basics of CPP-ACP than the undergraduate practitioners. There was better knowledge about CPP-ACP among the Paedodontists and Endodontists than any other specialties. To evaluate the basic knowledge about CPP-ACP the main important questions were considered as the key indicators for CPP-ACP (Table 1)

The attitude among the dentist towards CPP-ACP was above average. The use of CPP-ACP was preferred by 68 dentists (82.4%) in their practice. 68 dentists (59.6%) were interested in attending upcoming CDE

programs on CPP-ACP as a preventive tool.

Discussion

The study was carried out to assess the knowledge of the dentist about CPP-ACP as a preventive tool, closed ended questionnaire is more effective. This study highlighted that dentists are unaware of the importance of CPP-ACP as a preventive tool. The knowledge about CPP-ACP among the participation as a prevention of dental caries was found to be poor.

Longbottom, stated that Ideal caries preventive restorative material should release calcium and phosphate in the oral environment[13], this proves that CPP-ACP is an ideal caries prevention material and helps in remineralization.

It has been proposed that the anticariogenic property is established by CPP-ACP as ACP is localized at the tooth surface which then reinforces the free calcium and phosphate ion activities, thereby helps to maintain a state of supersaturation to the enamel, so reducing the levels of demineralization and increases remineralization[6],

Kumar et al, in his study has proved great efficiency of CPP-ACP in remineralization of early enamel lesions[14], which is more effective when used after the use of toothpaste with fluoride (1100ppm) which shows that CPP-ACP helps in remineralization of enamel lesion and reversal of white spot lesion and proves to be more effective when used along with fluoride.

Schupbach P et al, proved that Casein phosphopeptide reduces the count of streptococcus mutans as it has the ability to integrate in the pellicle[15] which shows CPP-ACP has ability to reduce the Mutans count in the oral micro flora. Therefore, CPP-ACP can be expected to be effective in high-risk children who have not developed good oral hygiene habits.

Mazzaoui et al stated that CPP-ACP with fluoride produced synergistic potential for remineralization[16], which was unaware of most of the dentist about CPP-ACP.

Kariya et al, stated that when fluoride was added to the CCP-ACP the acid-resisting effect was improved[17] , which proves CPP-ACP along with fluoride is more effective and long standing.

The CPP-ACP have been incorporated into sugar-free chewing gums, fluoride varnish, and dental cream (GC corporation) and is commercially available as Tooth Mouse (Asia/Australia) and MI paste (USA) and the fluoride containing CPP-ACFP (with 900-ppm fluoride) as Tooth Mouse-plus and MI paste-plus and MI varnish (USA).

Conclusion

The post graduate practitioners have better knowledge than BDS practitioners. Most of the dentists are unaware about CPP-ACP in most of the aspects. CPP-ACP provides a new direction to preventive dentistry. It is safe. CPP-ACP is considered as the novel carrier for calcium, phosphate and fluoride ions and promote enamel remineralization. It can be used as an adjunctive treatment to fluoride therapy. It mainly is a non-invasive management of dental caries. CPP-ACP has higher remineralizing potential when used along with a fluoridated toothpaste than when used alone. CPP-ACP should be used as a topical coating after brushing the teeth with a fluoridated toothpaste by children who have a high caries risk.

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Dental Aesthetics, Self Awareness and Perception of Personal Dental Appearance in Young Adults

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Abstract

Background: Dental aesthetics,self awareness and perception of the personal appearance plays a vital role among young adults. Dental esthetics and appearance is important among young adult patients because judgment concerning their personal characteristics is influenced by their dental appearance in the absence of other information. Hence, it is very essential to seek Knowledge about the young adults awareness and perception of personal appearance to know about their expectations and provide treatment.

Aim: The aim of this study is to assess the dental aesthetics,self awareness and satisfaction with the dental appearance in young adults.

Materials and Method: A cross-sectional survey was conducted among 19 to 25 years old young adult patients reported to Saveetha dental college and Hospital, Chennai. Following simple random sampling 150 patients were selected. This survey was conducted from December 2015 to March 2016. A Self administered questionnaire was distributed and descriptive data in terms of frequency and percentage were analysed using SPSS software (Version 17.0).

Results: The study sample consisted of 150 subjects of which 73(48.7%) were males and 77 (51.3%%) were females. 65(43.3%) subjects were between 19 to 21years, 85(56.7%) were between 22 to 25years of age group. About 78.6% expected their teeth to be white. Maximum number of study participants (65.3%) considered that straight and beautiful teeth have significant impact on their general appearance and 63.3% responded that straight and beautiful teeth promotes better career opportunities. About 78% of the subjects were influenced by looking at the models in the magazine. Only 46.6% were willing for orthodontic treatment for correction of mal-aligned teeth.

Conclusion: Most of the participants in the present study were very much aware about the importance of straight, aligned and beautiful teeth have a significant impact on their general appearance and better career opportunities, but their willingness for orthodontic treatment is less.

Key words: *Self awareness, Dental esthetics, Dental appearance, Perceived need, young adults.*

Introduction

The concern over dental appearance is highly increased which has been observed during childhood and adolescence to early adulthood. The decision to start orthodontic treatment is primarily influenced by such concerns and psychosocial well-being[1]. Esthetics in dentistry aims to improve the patients' self-esteem and satisfaction regarding how beautiful and attractive they feel. However, patients and dental professionals may perceive the concept of esthetics differently instead, which may cause the dissatisfaction of the patient with the results of the treatment[2]. A "good dental appearance" has been shown to be related to a person's social and intellectual competence, peer group acceptance and

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hence related to a successful life outcomes than people with lower attractiveness[3,4].

Van der Geld et al [5]reminds us that the mouth is the center of the communication in the face, calling the attention of the interlocutor. Studies have analyzed the influence of the oral health of youngsters on the perceived quality of life, and have identified a significant impact of the dental esthetics on this outcome[6]. The Oral health quality of life by definition, includes the absence of negative impacts of oral conditions on social life, and a positive sense of dento-facial self confidence[7]. The individuals with malaligned teeth might develop feelings of shame about their dental alignment, and may feel shy in social contacts, and that facial appearance related body self concept might be affected [8]. Therefore, there exists an inter-relation ship between physical attractiveness and social success, higher self esteem[9].

Facial features may be viewed differently in different races and what is considered as pleasing in one race might not be so in another race[10].The perception of beauty not only is an individual preference, but also might have cultural and ethnic biases[11-13]. Therefore, physical attractiveness plays animportant function towards social interaction which in turn influences the impression of an individual's social skill[14,15].

The dental appearance satisfaction is influenced by gingival architecture, tooth color, size, shape, strength and arrangements[16-18].It has been shown that persons exhibiting raised private self-consciousness have a better knowledge of their own personality, and have a more distinctive concept of their personal values[19]. It has been recognized that dissatisfaction with dental appearance is broadly related to the severity of the occlusal irregularities, there are differences in the recognition and evaluation of the dental features[14,20]. Due to this reason, professional opinions regarding evaluation of facial esthetics may not coincide with the perceptions and expectations of patients[21,22]. Hence, the relationship between professionally assessed and self-perceived treatment need is of interest to providers of orthodontic services.

Based on the self- regulation theory of self- awareness [23], in day today life, maximum attention of an individual has been directed towards the environment, and patient's behavior is mostly automatic and habitual without an awareness of personal appearance or emotions. Some people might perceive their own physical appearance as less perfect than that of attractive appearances portrayed in the movies and magazines. This may prove discouraging and upsetting[24].

Any deviation from the normal may result in feeling of insecurity related to appearance, poor social interaction and comparison of self with others, all of these may negatively affect the quality of life of the individual[25]. The aesthetic impact of smile can be divided into 4 specific areas: Gingival aesthetics, facial aesthetics, microesthetics, and macroesthetics[26]. The objective of orthodontic treatment is to improve dental occlusion, which, could result in a good functioning and aesthetically pleasing dentition in harmony with the face[27].

Individuals who are aware of their malocclusion may focus more on it and may even develop anxieties and psychological disturbances. As a result there is increased private self-consciousness that may predispose to self-criticism and dissatisfaction which manifests as low dental self-confidence[28].

Therefore, the purpose of this present study aimed to investigate the dental aesthetics, self-awareness and perception of personal dental appearance in young adults.

Material and Method

*Study design:*A cross sectional study

Study area: Saveetha dental college and hospital, Chennai

Study population: Following simple random sampling 150 young adults in the age group of 19 to 25 years old were selected. A self-administered questionnaire were distributed to the selected number of patients reported to the hospital.

Ethical clearance:

A)Prior to the start of the study ethical clearance was obtained from the institutional ethics committee, saveetha university.

B)Written informed consent was obtained from the study participants.

C)The anonymity of the participants was maintained.

Scheduling:

Data collection was scheduled from december to

march 2016.

Sample size:

N= 150 (95% power @ 5% alpha). Based on the study done by Ulrich Klages[29].

Survey instrument:

The survey tool consisted of several parts. The first section collected demographic information of the participants such as name,age, gender, address, occupation, highest level of education, income.

The second part of the questionnaire consisted of 10 questions to assess the participant's levels of knowledge towards dental aesthetics, self-awareness and perception of personal dental appearance

Survey methodology:

After a brief introduction on the purpose and intent of the study with the help of patient information sheet. Questionnaires were distributed to the participants and filled questionnaires were collected. Only completely filled forms were considered for analysis.

Statistical analysis:

Data was entered in microsoft excel spreadsheet and descriptive data in terms of frequency and percentage were analysed using spss software (version 17.0).

Results

The study sample consisted of 150 subjects of which 73(48.7%) were males and 77 (51.3%%) were females (refer Figure 1). 65(43.3%) subjects were between 19 to 21years, 85(56.7%) were between 22 to 25years of age group (Table 1).

About 55.3% of the study participants were self confident about smiling and 65.3% admire their smile in the mirror. 78% of the subjects were influenced by looking at the models in the magazine. About 78.6% expected their teeth to be white. 61.3% of the study subjects were satisfied with their shape of the teeth. About 60.6% of the respondents perceived healthy teeth is important for appearance. Maximum number of study participants (65.3%) considered that straight and beautiful teeth have significant impact on their general appearance and 63.3% responded that straight and beautiful teeth promotes better career opportunities. Only 46.6% were willing for orthodontic treatment for correction of mal-aligned teeth (Table 2).

Table 1:- Distribution of study subjects according to Age and Gender

Age group (in years)	Gender				Total	
	Male		Female		N	%
	n	%	n	%		
19-21	27	18	38	25.3	65	43.3
22-25	46	30.7	39	26	85	56.7
Total	73	48.7%	77	51.3%	150	100%

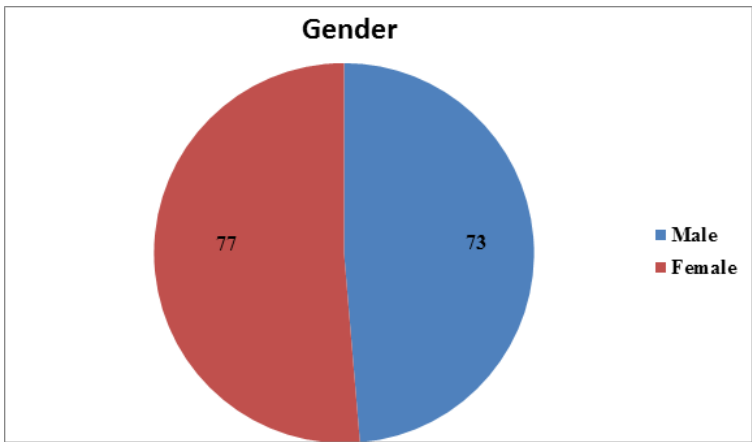


Figure 1: Gender wise distribution of study subjects

Table 2:- Distribution of study subjects by questions and score

Questions	Yes n(%)		Total N(%)
	Female(77)	Males(73)	
self-confident about smiling	43(55.8%)	40(54.7%)	83(55.3%)
Look at models in the magazine	62(80.5%)	55(75.3%)	117(78%)
Admire their smile in the mirror	50(64.9%)	48(65.7%)	98(65.3%)
Expecting their teeth to be white	61(79.2%)	57(78%)	118(78.6%)
Satisfied with their shape ofthe teeth.	51(66.2%)	41(56.1%)	92(61.3%)
Healthy teeth is important for appearance.	50(64.9%)	41(56.1%)	91(60.6%)
Expectsorthodontic treatment.	49(66.6%)	21(28.7%)	70(46.6%)
Straight and beautiful teeth promote dental health.	50(64.9%)	37(50.6%)	87(58%)
Straight andbeautiful teeth promote career.	52(67.5%)	43(58.9%)	95(63.3%)
Straight and beautiful teeth have significant effect on yourgeneral appearance.	51(66.2%)	47(64.3%)	98(65.3%)

Discussion

According to WHO, a good oral health is not only the absence of disease and dysfunction but it also includes its influence on person's social life and Dento-facial self-confidence[30].

Self-awareness and Self-evaluated dental appearance is increasingly receiving attention because of its influence on dental care and patient-oriented healthcare delivery-favored trend[31]. On the other hand, subjects exhibiting raised public-self awareness tend to focus on the social impact of their own behavior and appearance, and might be more vulnerable to feelings of shame and negative self-regard when they register minor deviations of their own physical appearance from the ideal norm[29].

Therefore, Self-perception of the dentofacial region exhibits an significant predictor for the global, competence, affect, academic and physical domains of self-concept[32].

Shaw (1981) stated that decrease in satisfaction with dental appearance is associated with increasing age[33]. In the present study under discussion, since the majority of patients were adolescents aged 22-25years, the high demand for enhancement in facialesthetics may be associated with the psychological changes experienced by teenagers[34]

In our study, 55.3% of their adults are self-confident about smiling in which 55.8% are females and 54.7% are males. This clearly shows that majority of therespondents were satisfied with their smile, this was in accordance with the study conducted by ShaistaAfroz et al[35]among dental students.It is apparent from the present study that 78% of adults wish that they had a pretty smile as the models in which 66.2% are females and 56.1% are males.65.3% admire their smile in the mirror. This data shows that more than half of the respondents were satisfied to see theirteeth in the mirror ; basically this explains the self-awareness and satisfaction of the

individuals. When they observe themselves in the mirror they become more self-aware[35,36].

A study done on the finalists of a beauty pageant for two years also reveals that about 80% of them felt the need to improve the appearance of their mouth and 28% felt that the teeth detracted from their smile[37]. Therefore, this study also shows that 60.6% of the adults feel that healthy teeth is important for appearance in which 64.9% are females and 56.1% are males. 58% feel that straight and beautiful teeth promote dental health in which 64.9% are females and 50.6% are males.63.3% feel that straight and beautiful teeth promote career in which 67.5% are females and 58.9% are males and 65.3% feel that straight and beautiful teeth have significant effect on their general appearance in which 66.2% are females and 64.3% are males. The results of the present study showed that improved dental appearance undoubtedly increases the general appearance as well as the career opportunities. On the other hand, only 46.6% expects orthodontic treatment in which 66.6% are females and 28.7% are males.This may be due to the fact that, most of the patients were unaware the orthodontic treatment modalities and its long term benefits on facial and dental appearance.

Conclusion

A positive esthetic self-perception was observed in young adults when it comes to their smile. The young adults are very much concerned about their dental appearance. Most of the participants in the present study were very much aware about the importance of straight, aligned and beautiful teeth have a significant impact on their general appearance and better career opportunities, but their willingness for orthodontic treatment is less. Hence, it is the role of practicing orthodontists to educate and motivate the patients about the importance of placing braces and they should build interpersonal rapport with the patients.

Conflict of Interest: Nil

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Knowledge, Awareness and Risk factors for Hypertension among Non-Medical Studentsin Chennai- A Cross-sectional survey

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Abstract

Background: Hypertension also known as high blood pressure or arterial hypertension is a chronic medical condition in which the blood pressure in the arteries is elevated. Hypertension is one among the silent killer diseases worldwide and is a major risk factor for many other diseases like cardiovascular diseases, stroke, renal diseases, and many other. Increasing the knowledge, awareness, and control of risk factors associated with hypertension will reduce the morbidity and mortality. Therefore the aim of this study is to assess the level of Knowledge, Awareness and Risk factors for Hypertension among Non-Medical Adults in chennai

Materials and Method: A cross-sectional survey was conducted among non-medical students of Saveetha University, Chennai. A two stage simple random sampling was performed. In the first stage, three colleges (Saveetha school of law, saveetha school of management, saveetha engineering) were selected.Following simple random sampling 150 non-medical students were selected. A Self-administered questionnaire was distributed to all the selected participants and descriptive data in terms of frequency and percentage were analyzed using SPSS software (Version 17.0).

Results: In the present study, only 34% of the participants were aware that males are prone for hypertension and only 4%were aware that diabetes is the major risk factor for hypertension. 41% of people have knowledge about hypertension and 59% of people do not have knowledge on hypertension.

Conclusion: To conclude, very few participants have sufficient knowledge and awareness about the etiology and risk factor associated with hypertension. Hence, considerable education is needed to increase awareness in modern concepts of particularly about risk factors and warning signs.

Key Words: *Knowledge, Awareness, Hypertension, Non-Medical Students, Cross- Sectional Survey*

Introduction

Hypertension is becoming an important public health problem worldwide. A recent report on the global burden of hypertension indicates that nearly 1 billion adults (more than a quarter of the world's population) had hypertension in 2000, and this is predicted to increase to 1.56 billion by 2025[1]. Subjects with hypertension are known to have a two-fold higher risk of developing coronary artery disease (CAD), four times higher risk of congestive heart failure and seven times higher risk of cerebrovascular disease and stroke compared to normotensive subjects[2]. Hypertension has been identified as one of the leading risk factors for mortality, and is ranked third as a cause of disability-adjusted life-years[3]. Existing data suggests that the prevalence of hypertension has remained stable or has decreased in economically developed countries during the past decade, while it has increased in developing countries[4].

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According to WHO, in 2008, an estimated 36 million of the 57 million worldwide deaths were due to non-communicable diseases (NCD). These diseases included primarily cardiovascular diseases, cancers, chronic respiratory diseases and diabetes, including approximately 9 million deaths before the age of 60, with nearly 80% of these deaths occurring in developing countries [5]. Hypertension had a prevalence of 26.4% in the worldwide adult population in 2000 (26.6% in men and 26.1% in women). The total number of hypertensive adults was 972 million: 333 million were in more economically developed countries, and 639 million were in less economically developed countries [6]. Furthermore, hypertension is one of the leading causes of premature death worldwide, accounting for 7.6 million deaths in 2001 [7]. The number of adults with hypertension in 2025 was predicted to increase by 60% to a total of 1.56 billion adults [6]. Hypertension is the most common chronic disease with sudden onset, and it is called the "silent killer" because it progressively and permanently damages organs. Hypertension causes several heart, brain and kidney diseases, resulting in severe and life-threatening complications, as well as death [8].

The 8th Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High BP (JNC-8) reports that Hypertension affects 1 billion people worldwide A 55 year normotensive person has up to a 90% lifetime risk of developing hypertension and it is the number one reason listed for office visits and also causes or contributes to 457,000 admissions per year and a leading cause/contributor to death (myocardial infarction, stroke, vascular disease) [9,10].Worldwide analysis of global burden of hypertension revealed that 25% of the adults are suffering from hypertension and 9.2% of total deaths as a result of hypertension related events[11]. The number of hypertensive patients with has been increased from 600 million cases in 1980 to 1 billion in 2008; over 40 percent of adults were known to have hypertension [12]. Also, it was suggested that, by 2025,1.54 billion adults will suffer from hypertension [13].

The chief risks of developing cardiovascular diseases are same including smoking, overuse of caffeine, heredity factors, stress induced, age, unhealthy lifestyle habits and inappropriate or inadequate nutrition leading to obesity, diabetes, hypertension, hyperlipidemia[14]. Therefore, it is very essential to control hypertension by minimize the factors associated with hypertension. Rates reported for hypertension control were disappointing [15], which were suggested to be 13 to 56 percent around the world[16,17,18,19]. The knowledge and awareness are important component to control hypertension, which is relative to lower rates of ceasing interventions, following the interventions behavior and better disease control.

A proper and systematic assessment and understanding of risk and predisposing factors is particularly helpful in the area of chronic conditions such as hypertension, for which prevention and control requires a lifelong adoption of healthy lifestyle. Although hypertension characteristically occurs in middle age or old age, the changes are induced in the Cardiovascular System (CVS) since adolescence as a result of adoption of sedentary life style behavior in young age leading to hazardous impact in later years. Hence, Most of the students were unaware and ignorant about healthy dietary guidelines and consumption of food high in fats, sugar and sodium with minimal intake of fruits and vegetables [20]. A cross sectional study which was conducted in Hyderabad between the ages of 14–18 years assessing the risk factor of Cardiovascular diseases in adolescence, reported that unhealthy dietary habits were found in 31% of students while 29% of students didn't take part in anyphysical activity[21]. Awareness of the early warning signs and symptoms of CVD is a key to eliminate sudden cardiac death[22].

Medical students have a clear knowledge and awareness regarding hypertension and its risk factors , but there has been inadequate information and studies towards hypertension among non-medical students of chennai, the aim of this study is to assess the To assess the level of Knowledge, Awareness and Risk factors for Hypertension among Non-Medical students in Chennai.

Materials and Method

*Study design:*A cross sectional study

*Study area:*Saveetha School of law, Saveetha School of management, Saveetha engineering college, Chennai.

Study population: A two stage simple random sampling was performed. In the first stage, three colleges (Saveetha school of law, saveetha school of management, saveetha engineering) were selected. Following simple random sampling 150 non-medical students were selected.

Ethical clearance:

A)Prior to the start of the study ethical clearance was obtained from the institutional ethics committee, Saveetha University.

B)Written informed consent was obtained from the study participants.

C)The anonymity of the participants was maintained.

Scheduling:

Data collection was scheduled from November 2015 to January 2016.

Sample size:

N= 150 (95% power @ 5% alpha). Based on the study done by Marium Mustaqeem et al[15].

Survey instrument:

The survey tool consisted of several parts. The first section collected demographic information of the participants such as name, age, gender, address, occupation, highest level of education, income.

The second part of the questionnaire consisted of 10 questions to assess the participant's level of Knowledge, Awareness and Risk factors for Hypertension among Non-Medical students.

Survey methodology:

After a brief introduction on the purpose and intent of the study with the help of patient information sheet. Questionnaires were distributed to the participants and filled questionnaires were collected. Only completely filled forms were considered for analysis.

Statistical analysis:

Data was entered in Microsoft excel spreadsheet and descriptive data in terms of frequency and percentage were analyzed using SPSS software (version 17.0).

Results

Figure 1 shows the awareness about the risk factors for hypertension where majority of the study participants reported that stress (35%) is the main risk factor which leads to hypertension followed by obesity (26%). It is relevant from the figure 2 that 34% of the participants reported that males are more prone for hypertension than females and 36% of the participants answered that both the gender are prone for hypertension. Figure 3 shows that 50% of people feel that high cholesterol level affect BP.11% of people have said that kidney problems cause hypertension.36% of people feel that diabetes mellitus is one of the causes of hypertension.46% of people said that high salt intake causes hypertension.22% people presume that fried items causes hypertension.25% of people said that headache is the major symptom of hypertension.38% of people feel that dizziness as a major symptom of hypertension.22% of people think that fatigue as a major symptom of hypertension. Figure 4 depicts the awareness about signs and symptoms of hypertension where 25% of people said that headache is the major symptom of hypertension.38% of people feel that dizziness as a major symptom of hypertension.22% of people think that fatigue as a major symptom of hypertension.

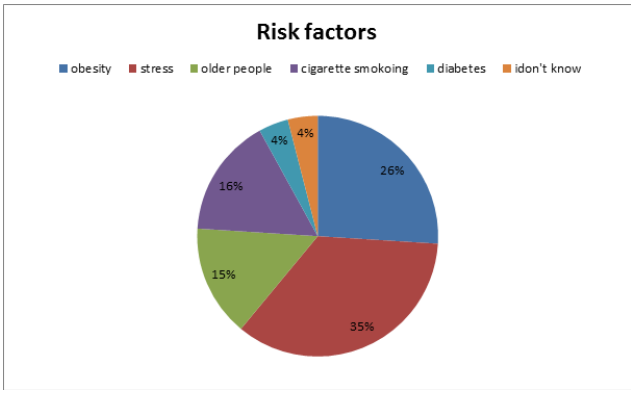


Figure 1: AWARENESS ABOUT RISK FACTORS OF HYPERTENSION

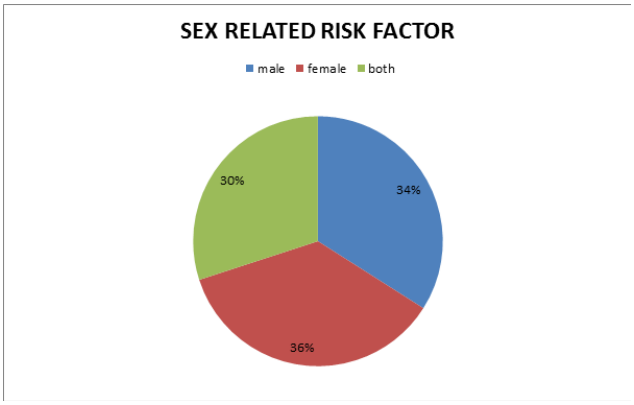


Figure 2: Sex related Risk factor

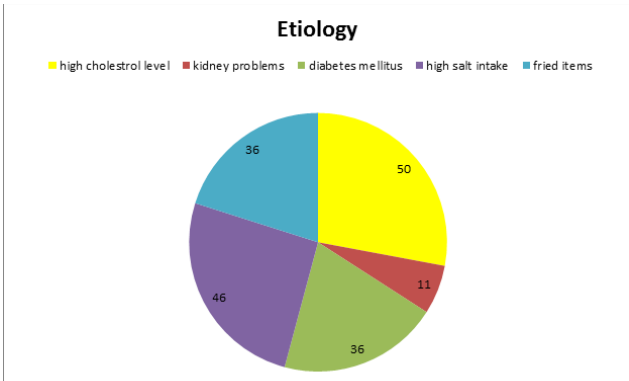


Figure 3: AWARENESS ABOUT THE ETIOLOGY OF HYPERTENSION.

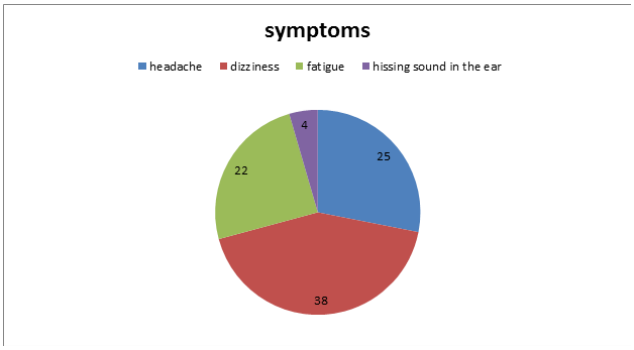


Figure 4: AWARENESS ABOUT SIGNS AND SYMPTOMS OF HYPERTENSION.

Discussion

Hypertension is one of the major risk factors for cardiovascular diseases and an important cause of morbidity and mortality accounting for a large proportion of coronary heart diseases[23]. It is one of the non-communicable diseases imposing a double a double burden on the developing countries already combating the challenges of existing problems with infectious diseases[24,25,26].

Hypertension is a rapidly emerging disease worldwide and contributes highly to morbidity and mortality. Risk factors not only include obesity, sedentary lifestyle, and age but also genetics and environmental factors contribute to it. Hypertension is usually asymptomatic and the patient presents to the hospital with one of the complications especially in developing countries where very minimal importance and minimal resources are allocated to noncommunicable diseases.

A study showed that 80% of deaths that result from noncommunicable diseases occur in the developing world [27]. Another study has predicted an increase of 80% in the number of hypertensives by 2025 [28]. Studies from South Africa have shown that obesity and hypertension are the most prevalent cardiovascular risk factor [29]. As a result, the most common presentation with chronic heart failure is due to hypertensive heart disease [30]. By 2030, 85% of the 23 million cardiovascular deaths projected will be in low and middle income countries [31].

In Cameroon, 29.7% of all participants in a study had hypertension [32] while it was a staggering 47% among females in South Africa [33]. Treatment of those who were known to have hypertension was a mere 10% in Cameroon [34] . Out of those using medicines, only between 0.4% and16.8% had optimal control [33,34]. In another study conducted in Cameroon, 47.5% of people had hypertension, from which only 31.7% were aware of their status [36]. A study done in Kilimanjaro showed prevalence of hypertension to be 30% in males and 28.6% in females of which under 20% of the patient with hypertension were aware of their status. Only 10% were on medication and less than 1% had optimal controlled blood pressure [34].

Conclusion

Hypertension is a repeatedly elevated blood pressure and the symptoms occur suddenly which requires immediate hospitalization. Considerable education is needed to increase awareness in modern concepts of particularly about risk factors and warning signs. Home readings of blood pressure tend to be better correlated with both the extent of target organ damage and the risk of future mortality than are readings taken in the physician's office. Many machines are now available for the purposes that are convenient, inexpensive and relatively accurate. The ultimate goal in treatment of the hypertension patient is to achieve the maximum reduction in the long-term total risk of cardiovascular morbidity and mortality.

Conflict of Interest: Nil

Ethical Clearance: Ethical clearance wasobtained from the institutional Ethics Committee, Saveetha University (SDC/IHEC/087)

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Bleaching Efficacy of Carbamide Peroxide, Fluoridated Carbamide Peroxide against Nanohydroxyapatite reinforced Carbamide Peroxide- An In Vitro Study

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Abstract

Aim: This study was conducted to comparatively evaluate the bleaching efficacy of Carbamide Peroxide, Fluoridated Carbamide Peroxide and Nanohydroxyapatite reinforced Carbamide Peroxide

Material and Methodology: An in-vitro experimental study was carried out on 18 sound human maxillary fully erupted

Premolars extracted stored in phosphate buffer saline solution (PBS). They were segregated in to

3 Groups (Group I , Group II and Group II) consisting of 6 samples in each group. Their UV transmission wavelengths between 380-780 were determined using Spectrophotometer. The samples of the three groups were subjected to bleaching treatments with 10% Carbamide Peroxide, Fluoridated Carbamide Peroxide and Nanohydroxyapatite reinforced Carbamide Peroxide respectively. Spectrophotometric analysis was carried out and data were tabulated in Microsoft Excel for transferred to SPSS for analysis.

Results: It was observed that the bleaching procedure significantly changes the enamel translucency, making it opaquer. It was found in our study that Fluoridated Carbamide Peroxide has a superior bleaching efficacy showing a mean value of 0.4±0.88 prior treatment which increased to 3.3±2.32 post treatment with the bleaching agent than Nanohydroxyapatite reinforced Carbamide Peroxide. The efficacy of 10% carbamide peroxide was found to have least efficacy. The study showed that the mean value of samples in group III was the highest (3.3±2.32) followed by group II (1.9±0.43) and group I (1.7±2.26).

Conclusion: Fluoridated Carbamide Peroxide had superior bleaching effect compared with Nanohydroxyapatite reinforced Carbamide Peroxide.10% carbamide peroxide was found to have the least efficacy than other combinations

Keywords: *Nanohydroxyapatite, Fluoridated Carbamide Peroxide, Human extracted premolars, Teeth bleaching, Invitro trial*

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Introduction

Dental caries is the most common oral diseases affecting a majority of the community. It is caused as a result of unbalance between remineralization and demineralization process. Hence control of demineralization and addition of effective remineralization agents is the key to preventive dental programmes [1].

Technological advancements in today's world have led to evidence based dental researches involving nanotechnology in Dentistry for widening the accuracy of diagnosis and novel treatment modalities.

The terminology 'Nanotechnology' is derived from the Greek word "Nanos", meaning dwarf and was introduced by Norio Taniguchi in 1974. Present-day Nanotechnological research falls under two approaches namely the bottoms-up and the top-down. The first deals with the creation and development of new 'intelligent' materials or devices while the latter deals with the enhancement of existing materials [2, 3].

Hydroxyapatite is a biomaterial that forms the bulk of human teeth and is responsible for production of white appearance. It is the main source for calcium and phosphate [4]. It was first proposed to synthesize for its reparative activities by NASA when astronauts lost mineral content in their teeth and bones in the absence of gravity as it is a major constituent with proven biocompatibility. It was first replaced in fluoridated dentifrices in Europe [5,6].

It is well known for its remineralization capacity, desensitizing ability in addition to role of bone growth stimulator due to the fact that its exhibits direct actions on osteoblasts without emergence of inflammation and toxicity. It also detection and destruction of cancer cells It also contributes to protection of dental implant surfaces by protecting it against oxidative processes by reduction of roughness offering aiding in preventing plaque accumulation. It is also popularly regarded for its guided tissue, nerve and pulpal regenerative features and its uniqueness in tissue engineering [7].

Nanohydroxyapatite has unique characteristics such as solubility, higher surface energy, and more biological activity than larger particles compared to hydroxyapatite [8,9]. Esthetic concern among the general public is increasing now a days as they wish to enhance the appearance of theirsmiles and has led to great demand for treatment of discolored teeth such as bleaching, laminates, veneers, microabrasion, and porcelain jacket crowns.

At home vital tooth bleaching is gaining popularity and is well accepted owing to its effectiveness, least cost, and invasiveness. This is also due to another fact that external bleaching techniques do not create the need for teeth preparation so that sound dental structures are untouched with reduced or zero chairside time and minimal gingival irritation and pulpal involvement comparatively [10].

The American Dental Association has declared a seal of 10±1% concentration of

Carbamide peroxide as at home whitening agent with assured safety. However, bleaching with

10% carbamide peroxide is found to reduce mineral content of dental tissues leading to alteration in the structural, chemical, and mechanical properties. It may also cause loss of micro hardness. Increased susceptibility to erosion, sensitivity reduced fracture stability or decreased abrasion resistance and promotion of dental caries formation may be the consequences of bleaching [11].

In order to improvise the above pitfalls, a whitening system that also fights decay which is of a higher value than the one that only whitens teeth evolved using fluorides during or after bleaching [12].

The most commonly remineralizing material used in dentistry is fluorine [13, 14]. However its disadvantages include fluorosis, respiratory and digestive disorders on chronic exposure [15, 16]. It does not have the ability to remineralize demineralized dental lesions and moreover each unit of fluoroapatite is composed of calcium and phosphate in addition to fluoride [17].Thus, there is a need to replace fluoride with other substances to repair demineralization lesions for which different compounds could be tried. Evidence based dental research has led to the finding that addition of fluoride does not interrupt with the whitening producing capability despite exhibition of remineralizing effect.

Numerous studies have been carried out so far among dental practitioners and students to evaluate the prevalence, knowledge, attitude and practice regarding various aspects in different fields to apply the results in practical ways which is the need of the hour [22-29].

Lack of adequate information exists regarding the exact potential of new dental materials when used in combinations. With the emergence of success rate on using nanohydroxyaoatite in the field of dentistry, this study is conducted with an aim to conduct a qualitative assessment in detecting the role of nanohydroxyapatite powder incorporation in to carbamide peroxide and fluoridated carbamide peroxide.The findings of this study would pave way to the formulation of Bleaching

agents with better remineralizing agent that will be beneficial to the community since functional and esthetic concerns would be addressed simultaneously

Materials and methods: Study design:

An in-vitro experimental study on sound human maxillary fully erupted Premolars extracted for periodontally compromised reasons and therapeutically for orthodontic treatment purpose.

Sample size estimation:

The sample size N=18 was estimated based on the study done by Roza Haghgoo et al (2016) using

G power 3.1[30] Sample size was estimated to be 6 per group (95% power and 5% α error)

Sample Collection

Sound human maxillary fully erupted Premolars extracted for periodontally compromised reasons and therapeutically for orthodontic treatment purpose were collected from the department of Oral surgery, Saveetha dental college, Chennai. They were microscopically examined for caries and other possible microcracks or defects.

Sample Selection: It was based on the below criteria

Inclusion criteria:

➢ Extracted sound human maxillary premolar.

Exclusion criteria:

➢ Conservatively restored tooth

➢ Endodontically and treated teeth.

➢ Teeth affected with fluorosis

➢ Teeth with enamel defects

➢ Teeth affected with wasting diseases such as attrition, abrasion and erosion,abfraction

➢ Fractured teeth

The specimen that were not fulfilling the inclusion criteria were rejected while those fulfilling the criteria were subjected to storage.

Ethical Clearance: Ethical clearance was obtained from the Ethics committee, Saveetha Institute of Medical and Technical Sciences.

Sample Storage: The extracted sound fully erupted human maxillary premolars were stored in phosphate buffer saline solution (PBS).

Group Segregation: The total 8 teeth were randomly assigned to three experimental groups consisting of 6 samples in each (Group I , Group II and Group III)

Armamentarium:

➢ Extracted sound human maxillary premolar

➢ Chemical balance

➢ Micro pipette

➢ Measuring flask

➢ Glass beaker

➢ Separating funnel

➢ Magnetic stirrer

➢ Magnetic bead

➢ Calcium hydroxide powder

➢ Orthophosphoric acid (88%)

➢ Deionised water

➢ Calcium chloride

➢ Sodium phosphate

➢ Acetic acid

➢ Potassiun hydroxide

➢ Hard tissue microtome

➢ pH meter

➢ Centrifuge

➢ Hot air oven

➢ Disposable centrifuge tubes

➢ Test tubes and conical flask

➢ Surgical gloves

➢ Mouth mask

Methodology

Preparation of Nano hydroxyapatite reinforced Carbamideperoxide:

It was prepared using the following chemicals: 1.5 mM calcium chloride, 0.9mM sodium phosphate and 0.15 M potassium chloride which had a pH of 7.152 ml of distilled water was taken and 0.1665 gm of calcium chloride, 0.108 gm of sodium hydrogen phosphate and 11.25 gm of potassium chloride was added to it. It was further reinforced with 10% Carbamideperoxide.



N=18 (Extract Sound Human Teeth)

↓

Storage in phosphate buffer saline solution (PBS).

↓

Determination of UV Transmission Wavelengths Values in Percentage

↓

Random Assignment of samples in to three groups with six in each

Group-I **Group -II** **Group -III**



Intervention to Bleaching Treatment

I II III

10% Carbamide Peroxide

Nanohydroxyapatite reinforced Carbamide Peroxide

Fluoridated Carbamide Peroxide



Placement in Cuvette of SpectroPhotometer

↓

Observation and Recording of UV Transmission Wavelengths Values in Percentage

↓

Data Analysis



Results

Table 1 : Table 1 shows the mean with standard deviation of wavelength values obtained using UV-Spectrophotometer among the three groups between pre and post bleach treatment.

Groups		N	Mean	Std. Deviation	p VALUE
Pre Bleach Treatment	Group-I	6	8.5	18.4	0. 327
	Group-II	6	0.3	0.2	
	Group-III	6	0.4	0.8	
Post Bleach Treatment	Group-I	6	1.7	2.2	0.248
	Group-II	6	1.9	0.4	
	Group-III	6	3.3	2.3	

*Kruskal Wallis Test

Table 2 : Table 2 shows the comparison of mean with standard deviation of wavelength values obtained using UV-Spectrophotometer during pre and post bleaching analysis.

Groups	Sanitization	Mean±SD	Wilcoxon Signed Ranks Test	p-Value
Group-I	Pre Bleach Treatment	8.5±18.43	39	1
	Post Bleach Treatment	1.7±2.26		
Group-II	Pre Bleach Treatment	0.31±0.24	21	.004
	Post Bleach Treatment	1.9±0.43		
Group-III	Pre Bleach Treatment	0.4±0.88	23.5	.012*
	Post Bleach Treatment	3.3±2.32		

*Wilcoxon Signed Ranks Test

*Wilcoxon Signed Ranks Test

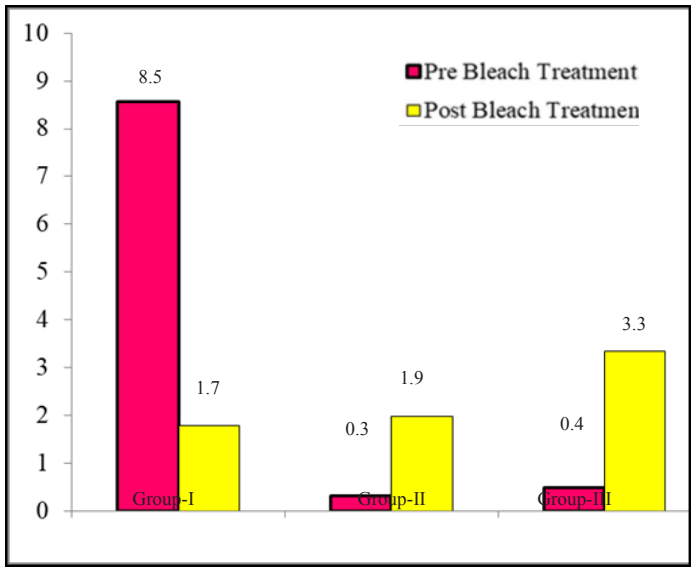


Figure 1: Figure 1 shows the mean differences in wavelength between pre and post bleaching treatments among the three groups.

Figure 1 shows that the study showed that the mean value of group III (3.3±2.32) and II (1.9±0.43) had a significantly higher mean depth than group I (1.7±2.26). It also shows that the mean value in Group III (3.3±2.32) is the highest followed by Group II (1.9±0.43) and Group I (1.7±2.26).

Discussion

Individual with discolored teeth may have a psychological impact that drives them to dentists for esthetic treatments. They seek such procedures for pleasing appearances that enhance their self- esteem and confidence. There is an increased emphasis on beauty and health and cosmetic dentistry has been thrust to the forefront of many practices.

Carbamide peroxide is an unstable compound, which breaks down into hydrogen peroxide and urea. Hydrogen peroxide is a strong oxidizing agent which can result in a change into a lighter spectrum of the compound.

Varying concentrations of carbamide peroxide ranging from 2-30% have been tried as bleaching agent [34]. However, 10% is considered as the standard. Despite its most common side effects like tooth sensitivity and gingival irritation, Lima et al found that no toxic effects were observed after the successive application of 10 percent carbamide peroxide [31].

Most of the clinical studies done to evaluate the efficacy of tooth whitening agents were using shade guides. It is a method that is a highly subjective one and variables such as observer's experience, eye fatigue, ambient light conditions, and the background against which a tooth is compared may lead to inconsistencies [32]. More particularly, there are numerous existing literatures that have attempted to quantify tooth colour changes by using the Vita shade tab system or a colorimeter [33]. The disadvantage of using it includes the requirement of technique sensitivity plus need for a flat surface respectively. In addition, small increments of change that could perhaps be measured by instruments such as a colorimeter would not necessarily indicate a clinically significant result. Moreover, there are very few studies using spectrophotometer [34-36].

In a clinical study, Brantley et al. used 10 percent carbamide peroxide to bleach traumatized discolored primary teeth which coincides with the result of study done by Ho and Goerig et al and reported effective bleaching outcomes after only two weeks [37,38]. In a study conducted by Ganesh et al. it was found that teeth bleached using 10 percent carbamide peroxide reached the original shade only after 21 days [39].

There are studies that have reported satisfactory bleaching outcomes in shorter duration. When

Perrine et al used 10 percent carbamide peroxide intracoronally for whitening discolored permanent teeth and found that only 65 percent of the teeth returned to their original shade after14 days [40].

To overcome these problems, an attempt was made to quantify the degree of whitening achieved using spectrophotometric assessment of tooth shade and so it was selected as a colour measurement approach in the current study.

It was determined in our study that the bleaching effect was produced on using all the three different bleaching agents namely 10% carbamide peroxide, Fluoridated Carbamide Peroxide and Nanohydroxyapatite reinforced Carbamide Peroxide.

It was found in our study that Fluoridated Carbamide Peroxide has a superior bleaching efficacy showing a mean value of 0.4±0.88 prior treatment which increased to 3.3±2.32 post treatment with the bleaching agent than Nanohydroxyapatite reinforced Carbamide Peroxide. The efficacy of 10% carbamide peroxide was found to have least efficacy. All the above finding showed statistical significance as well.

The variation in the duration of application between the earlier studies and the present one could be related to the severity of tooth discoloration.

Limitations

The study has measured only the short-term effect of the whitening agent

Conclusion

The evidence presented in this study suggests the following conclusion

➢ 10% carbamide peroxide, Fluoridated Carbamide Peroxide and Nanohydroxyapatite reinforced Carbamide Peroxide have immediate whitening effect on human teeth.

➢ Fluoridated Carbamide Peroxide has superior

bleaching effect which compared with

Nanohydroxyapatite reinforced Carbamide Peroxide and also 10% carbamide peroxide.

➢ 10% carbamide peroxide is found to have least efficacy than other combinations

Clinical Signficance

As cosmetic dentistry is a growing field, knowledge regarding the best bleaching agents available in the markets is essential for dentists and this study would help gain clarity on the same so that the right dental material for optimal effect could be used. This inturn would enable individuals boost their self-esteem and confidence that will result in an improved pshycological impact.

Recommendation

➢ There is a need for creation of awareness among dentists about various bleaching agents

➢ Further extensive studies are required in which the wavelengths of the samples must be subsequently measured to determine the longevity of the post bleaching treatment effect.

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Factors Influencing the Implementation of Dental Insurance in India-A Theoretical Review

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Abstract

Oral health is an integral portion of overall general health. Oral diseases qualify as a global and major public health problem owing to their high prevalence and incidence in all regions of the world. Oral health in India is usually not considered as an issue with priority by the public health sector. The main hindrance that deprives people of availing services is the high cost. The year 1929 is considered remarkable as birth of modern health insurance took place. Though India has accomplished a lot in terms of General Health Insurance, achievements are not made as far as comprehensive dental insurance system is concerned which is virtually nonexistent. Increasing awareness about various available modalities for dental care among public necessitates dental coverage which still remains a large untapped market. Effective dental insurance system will help people get minimum essential dental treatments at affordable prices. It reduces global economic burden of oral diseases. This creates awareness regarding preventive and prophylactic procedures percolating at the grass root levels which further enables to instill positive dental attitude. Hence it is a good tool for oral health promotion as well. A state of enormous transition exists in the oral healthcare delivery system of India. The biggest challenge of the present time is the need for dental health providers to serve the rural population with care and also understanding the insurance sector.. A better apprehension regarding dental insurance in India is needed to gain clarity. This review was carried out with an aim to explore the factors associated with its operation.

Keywords: *Health Insurance, Dental insurance, India, Dental health insurance companies, Dental health insurance Schemes, Benefits of dental insurance.*

Introduction

Dental caries, fracture of teeth as a result of trauma, malocclusion, gingivitis and periodontitis are the common dental problems. Dental diseases causes tooth pain, infection or dysfunction that limits the necessary ingestion of energetic foods, affecting the growth, learning, communication skills and recreational activities.People suffering from poor oral health are more likely to have more restricted- activity days than those who are unaffected. Poor oral health is commonly associated with many systemic diseases [1-4].Numerous studies have been carried out so far to various aspects in different fields expecting ethics to be followed which is the need of the hour [5-11]. Dental Insurance still remains a large untapped market. Hence this review is done for better apprehension and further exploration.

Importance of Oral Health

Oral health is an integral portion of overall general health. Dental care is a significant part of today's modern life. Good oral health is required for mastication, speech and pleasing appearance since a great healthy smile instills self-confidence in an individual which is essential for accomplishments in life. Thus oral health affects one's esthetics, communication, biologic, psychological and social projection.

Factors affecting Oral Health Condition

Variations in numerous factors like gender, age, races, genetic pattern, geographical locations, dietary habits, nutritional status, hygiene practice, exposure to stress, personal habits including smoking and alcohol consumption and so on are linked to a wide range of dental problems forming common responsible risk

factors for dental problems

Factors associated with access to oral health care services

Lack of knowledge on the consequences of delayed treatment and available modalities, ignorance, poverty, preoccupation, financial constraints, inaccessibility to dentists, inappropriate guidance and care, self-medication, fear, anxiety, misinterpretation and misconception about effects of dental treatment and dissatisfaction with the quality of oral health care services are the prohibitive reasons from dentistry [12, 13].

Oral Health in India

Oral diseases qualify as a global and major public health problem owing to their high prevalence and incidence in all regions of the world.

India is no exception and due to its enormous population size with large percentage below the poverty line, the absolute burden of oral diseases is immense [14].

People living in developing countries like India, especially those belonging to lower socio- economic status has lacunae in awareness regarding oral healthcare which is mirrored in their practice of oral hygiene habits and reflected on oral health status[15].Oral diseases hence creates burden mainly onsuch disadvantaged population groups of society [16].

Oral health in India is usually not considered as an issue with priority by the public health sector. Despite the fact that oral diseases are largely preventable, oral healthcare is still remains as an area which is neglected with least concern [17].

Current scenario of health system in India

Health service is one of the human basic and social rights of an individual. It is the responsibility of health care system to address the needs of respective population without discrimination.

It is the duty of every respective Government for active participation in provision and increment of appropriate necessary facilities for further approaches with to healthcare system so that health for all is achieved.

India is the largest democracy and the second most populated country in the world with more than

70% of Indians residing in rural areas and 26.1% is below poverty level [18]. Their low educational levels results in unemployment and is indicative of poor socio economic conditions. Scarce income is a significant factor associated with less frequencies of dental visit [19].

Apart from religious and ethnic disparities, the level of payment to dental professionals is a prominent factor responsible for utilization of oral health care services [20-23].

Despite the fact that the overall funding level allocated for healthcare is nationally higher, the

Government's funding is found to be lower in comparison with other emerging nations [24].Private health market bridges the gap between the requirements of the people and offerings of the Government dominating the health care delivery segment as it is rapidly progressive. However, the National Urban Health Mission scheme was proposed by the Central Government to improve affordability and accessibility of health care services. Despite the efforts in provision of many health programs to the poor by various State Governments during the Five years plan, lack of resources especially insufficient basic facilities in remote areas hinders the equal degree of health services rendered to the needy persons irrespective of caste, sex, creed and so on[25] .

The main hindrance that deprives people of availing services is the high cost. Increase in the demand for health services by the public, incorporation of rapidly progressive technological advancements in health profession that is ever growing, general inflation characterized by adequate and enhanced quality of services may be the reasons for elevated health expenditures. Majority of the population visit dentists occasionally for curative services while utilization of dental care for preventive procedures remains low with least priority given by majority of the population even for restorative due to financial constraints.

Thus the avoidable and unfair differences in health statuses of populations have to be resolved by addressing the issue called health inequalities at the earliest. One of the strategies to overcome is getting acclimatized to adoption of appropriate insurance system so that a large segment of the population is affordable for dental procedures.

Statistics regarding oral health status and awareness among India

According to the National Oral Health Survey of India (2002-03), the prevalence of periodontal diseases was 57.0%, 67.7%, 89.6% and 79.9% in the age groups 12, 15, 35-44 and 65-74 years, respectively [9]. The standardized age for incidence of oral cancer in India is 12.6% per 100,000 populations, 0.5 in the age range of 65-74 years. It is estimated that 19% of Indians are toothless [26].

According to a survey by the Indian Market Research Bureau (IMRB), around 60–90% of school children and nearly 85-90% of adults have dental cavities and nearly half of Indians do not use toothbrush and toothpaste. It also revealed that 34% believed that brushing once a day was more than enough and only 28 % brushed their teeth twice a day. The same study revealed that about 65% of people had no clue that eating habits could cause dental problems. It was also found that only 47 percent of total treatments received are by dentists while more than 50% having dental problems prefer to take advice from chemists and general practitioners, or use home remedies. People in rural areas still use their fingers, brick powder or neem sticks for brushing teeth.

Health insurance

Health insurance in India is a growing segment of India's economy. Numerous achievements are accomplished in India in terms of General health insurance.

An introduction to dental insurance

It is a kind of contract between and a client and an insurance company. It is designed in order to pay costs associated with dental procedures. It ma y n ot co ve r th e t otal c ost of t he bill. Most plan s t yp ic all y co ve r b etw e en 5 0 and 80 p e rc ent of th e cost of sp eci fi c dent al se rvi ces .

Is dental insurance worth the cost?

Even though some policies which restrict coverage for cosmetic procedures, majority of the dental plans do not bar coverage for procedures involving pre-existing oral health conditions which is contrary to health insurance. Owing to increasing literacy status among population introduction of effective dental insurance system will help people get minimum essential dental treatments at affordable prices.

Need for Dental Insurance

Most of the dental problems are preventable. Gone are the days when people visited dental professionals only for emergencies suffering pain .Dental insurance system reduces global economic burden of oral diseases. It increases the frequency of visits. This creates awareness regarding preventive and prophylactic procedures percolating at the grass root levels which further enables to instill positive dental attitude. Hence it is a good tool for oral health promotion as well.

Ideal dental insurance scheme

It must give freedom to choose dentist permitting patients to control treatment decisions and opt for appointment schedules according to individual needs based on convenience covering diagnostic, preventive and emergency treatments without limitations including referral.

Types of dental insurance plans around the World

Indemnity is a type of dental insurance that permits an individual to visit any dentist of choice who accepts it. The insurance company receives a premium every month end from its clients and this amount reimburses the dentist for the services rendered. Indemnity plans limits the amount of services covered within a given.

Preferred Provider Organization dental plan is a type of dental insurance in which a dental professional signs a contract with company to agree for provision of service according to their scheduled fee. The advantage is that patients are required to pay to a group of dentists at a deeply discounted rate which offers them substantial savings as long as he/she stays in their network. The disadvantage of this plan is payment of greater share of the fee-for-service by patients who chooses to visit a dentist who is not designated as a "preferred provider".

Dental Health Maintenance Organization is a type of dental insurance in which clients are assigned to dentists in a network for receiving benefits. It is an example of insurance based on capitation plan. The dentist is paid on per person basis rather than for actual treatment provided. Participating dentists receive a fixed monthly fee based on the number of patients assigned to them. Monthly premiums options, free preventive or routine care, selection of dentist from an approved network of

dentists are the advantages of this system.

Dental discount plan has several advantages over traditional dental insurance plans. The most important is that coverage is applicable with no exclusions for pre-existing conditions. The benefits for the patient include obtaining immediate coverage without meeting any waiting period.

A direct reimbursement plan is a self-funded benefit plan. An employer pays for dental care with own funds instead of paying premiums to an insurance company or third party administrator. A receipt detailing the services rendered is handed over to the patient who pays the full amount directly to the dentist who receives it later.

Review of the process involved in dental insurance

The dental insurance process involves three parties namely patient, dental professional and insurance provider who is the carrier involved. The primary commitment of dental service providers is discussion and provision of required standard treatments. Most of the dentists are associated with administrative assistants whose role is a key partner working with carriers to help patients make the best use of their benefits. Carriers are in the form of dental service corporation and constitute third party administrator who select the benefits, levels of coverage, payment model, and administer the program. The beneficiaries may also be employers who belong to associations or unions headed and represented by an individual whose responsibility is the purchase of comprehensive treatments at the lowest price.

Effective communication and sharing of information among the above personnel involved in the process are requisites to succeed in dental insurance system.

Various dental coverage's offered

- Preventive dental plans cover dental consultation, radiographs, scaling, topical fluoride and pits and fissure sealant application.
- Basic or restorative dental plans include insurance benefits involving operative dental surgery with root canal treatments and simple extractions as well
- There is one another category which provides similar advantage for crowns, implants, prosthetic procedures and complex surgeries.

Exclusions under dental policies

Dental procedures which are not covered by insurance include porcelain veneers due to the cosmetic nature of this procedure. However, they may be covered by dental discount plan. It also does not cover for teeth whitening procedure for removal of stains or discoloration. Similarly insurance is not offered when the dentist performs a composite restoration to correct a space between teeth by bonding to close the gap.

Health Insurance in India

The first marketed health insurance was Mediclaim in 1986. Health insurance in India is a growing segment of India's economy. Financial coverage is available for health expenditures at both individual and family levels.

Dental Health Insurance in India

Dental Insurance is not very popular and is usually integrated with general health insurance schemes in India since they supplement each other in case of accident or injury. Comprehensive dental insurance is non-existent.

The Indian dental insurance sector is almost in its nascent stages as presently only a handful of dental plans are available [27]. Despite stability in the Indian economy with the advent of 21st century, prospects of dental insurance is still unexplored.

The major form of payment towards dental treatments is fee for service which has replaced the traditional dental insurance system in which premium was paid on monthly basis and then deductible was met and then the company accounting for treatment costs.

Presently, limited financial coverage for few dental procedures is available India. There are some common features of various insurance companies in India.

A plan called stand-alone covers expenses only for extraction of permanent grossly decayed teeth and periodontitis and provides reimbursement within fixed period.

The other plan is coverage offered by companies under General health insurance plans. This is more particularly provided only for treatments involving hospitalization beyond 24 hours or life threatening situations with an added advantage that claim could be obtained for cost of medicines and hospitalization apart

from dental expenses with tax benefits.

The benefit of another plan called fee for service dental insurance coverage is payment of discounted service to any dentist of choice licensed by the insurance company.

The awareness among Indian population regarding oral health is increasing creating a need for dental coverage to overcome high expenditures towards healthcare due to propagation of technologies used in the field with elevation in general price.

Dental Insurance Schemes in India

Pepsodent Dental Insurance in partnership with New India Assurance launched by Hindustan Lever (HLL) in 2002 offered their consumers of their toothpastes on every purchase Rs.1, 000 worth of free dental against expenses for the extraction of permanent tooth due to severe caries and periodontitis including cost of medication. The disadvantage of this scheme was that claim was applicable for those up to 50 years without coverage for esthetic and rehabilitation procedures post-trauma. This scheme was not successful on a long run and hence discontinued.

ICICI Lombard Dental Insurance plan included coverage for all up to 65 years on OPD basis for all treatments except cosmetic procedures like bleaching and those involving orthodontics, prosthodontics until Rs.9, 500.

Apollo DKV Health Insurance offers coverage for all dental treatment on similar basis up to a maximum of Rs.5, 000 but with a waiting period of 3 years.

Few Dental insurance providing companies

Apollo Munich Maxima Health plan covers dental treatment and injury but the hospitalization cost is excluded. Bharti Axa Smart Health plan covers any dental injury while the policy holder suffers from any kind of accident. LIC Health Protection Plus provides coverage to all dental expenses. Chola MS Travel Insurance covers damage to the dental health of the policy holder while on any travel route.

International Scenario

The policy framework in US ensures that dental procedures are reachable to the lower income generating people. In United Kingdom, treatment facilities are being provided under the jurisdiction of safety and health services are one of the most cost efficient procedures in the world. Community dental Service forms an essential part of health promotion scheme in UK. Special concern is being shown for oral care of old aged people, handicapped and the poor by various target groups have been formed in Sweden and a similar scenario exists in Norway as well. Complete dental care is being provided to the individuals aged less than 19 years of age without charges under its policy of National Dental Insurance in Netherlands. The government of Brazil included oral health care mission in Family Health Program in 2000 as an initiative to benefit more of its population. Services are rendered collectively by the public and private practitioners in most of the most of the Latin countries.

Benefits of dental insurance in India

Oral health care workers are in a position to reach every class and village across the country. Dental insurance will enable create awareness which will serve to pass on the benefits of longevity of teeth across the society. It could contribute to a massive reduction.

Problems concerned with ineffective insurance systems

A review by Bennett, Cresse et al indicates that several community-based insurance schemes suffer from poor design and management. It fails to include the poorest-of-the poor with low membership and requires extensive financial support. Sustainability and replication of such schemes are the other issues related to it [28].

Strategies to be adopted

Effective utilization of services is a concept of expressing the enhanced interaction extent between the service provider and the people for whom it is indented.

Preservation, restoration and promotion of public health with equitable distribution is the prime duty of every healthcare provider .Hence health professionals, policy makers and insurance organizations must work communally so that different strategies could be adopted to address various influencers of social disparities to resolve and result in fair distribution of services through a suitable planning .

Formulation of universal care system can create an effective health sector for which existing inequalities in approaching the delivery system needs to be resolved.

Provision of a framework for actions across multiple sectors for human development with the most suitable use of resources must be adhered. Recognition of close links with development sectors and appropriate responsiveness to the challenges of global health transition and placement of the framework for sustainable development at a central position should be given concentration.

A thorough understanding of the barriers is thus essential for appropriate planning and consequence of improving access should be elimination of economic, systemic, social, cultural and behavioral barriers to use health services [29].Provision of "appropriate services in the right place and at the right time" is the true meaning of creating good access to health services which is the need of the hour [30].

It is estimated that nearly 85% of Indians residing in rural areas are served by 15% of all the country's dentists. Successful dental insurance system is feasible only when there is equal distribution of dentists between urban and rural areas so that there is accessibility and more the awareness more will be the effect of such a move.

Therefore it is important to educate and motivate people. Medical and dental insurance should also be made compulsory in which case each individual of India can enjoy it's benefits in his/her fullest health.

Limitations of dental plans

Coverage may not extend to your every dental need as it varies for every individual. Dental plan has limitations such as the number of times one can receive consultation and procedures each year with age restrictions as well. In addition, some procedures may not be covered under plan, which is referred to as exclusion.

An instance is a sit ua tion in whi ch th e in sur an ce co mpa n y s to ps p a yin g for fl uori d e tre atm ent when the protocol for better caries prevention in children is by topical application of fluoride twice a year. A n othe r su ch ci rc umst an ce would b e c hoosi n g lar ge filli n g f or w hic h insur an ce ma y o ff er r eimbu rs eme nt wh en t he d ent al p ro fe ssion a ls r ec ommen d a c ro w ns or o nla y th at ar e u nco ver ed und e r d ent al pl ans.

Claims settlement being a key service parameter for its reach hence speedy settlement of claims should be organized minimizing long waiting periods.

Insurance Fraud

t is estimated that approximately Rs.600-Rs.800 crores incurred on fraudulent claims annually is lost in Healthcare Industry of the country. Hence in order to make Insurance a viable sector, it is essential to concentrate on elimination of fake claims.

Actions like misrepresentation of treatment, fees, date of service delivery and billing for those which are not rendered for financial benefits whether deliberate or unintentional constitute fraud and those involved are liable to legal prosecution. Any act aimed at making profit from an Insurance contract constitute "Insurance fraud".

A culture of ethics where it becomes difficult to commit fraud has to be created by appropriately using indicators for detection like careful examining documents of doubtful nature, un-witnessed and not promptly reported cases.

Peer Review for Dispute Resolution

Many plans provide a peer review mechanism through which disputes between third parties, patients and dentists can be resolved, eliminating many costly court cases. The role of peer reviewing is immense ensuring fairness, consideration for every case with thorough examination of records, treatment procedures and results so that most disputes can be resolved satisfactorily for all parties.

Conclusion

Dentistry faces serious problems regarding accessibility of its services to all of India but the major missing link is the absence of a primary health care approach and affordability for utilizing oral healthcare services. A state of enormous transition exists in the oral healthcare delivery system of India. The biggest challenge of the present time is the need for dental health providers to serve the rural population with care and also understanding the insurance sector. There is a lack of an organized system for implementation and monitoring of dental insurance system.

Dental insurance can be used as an essential part of the oral health programmes to provide a better guidance tool for the dentists and a better oral health care to all, especially to the weaker sections of the society.

Oral physicians should forward and promote dental health insurance in the country by becoming a bridge between the insurance companies and the patients so that dental treatment becomes accessible to one and all.

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Knowledge Attitude and Practice Regarding Informed Consent Among Dental Professionals in Chennai

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Abstract

Introduction: Dentistry, being one of the healing professions, has an obligation to society that its members will stick on to high ethical standards of conduct. In India, studies done to assess whether the dental practitioners adhere to ethics in their line of work are very meager.

The consent is integral as it enables in mutual communication to establish a good dentist-patient rapport that enables maintenance of dental patient record which is legal evidence that documents professional care provided to the patient. Informed consent is an essential tool of standard ethical dental practice.

Materials and Method: A cross-sectional survey was conducted among private dental practitioners in Chennai City. A self- administered structured questionnaire consisting of 21 items was used to assess their knowledge, attitude and practice regarding informed consent. The response format was based on a 2-point Likert scale. Descriptive statistics using frequency and percentage, inferential statistics using Pearson's Chi-square test to check the level of significance and association between variables, Pearson's correlation were utilized for statistical analysis.

Results: The mean scores for knowledge and attitude were 8.83 ± 1.635 and 3.28 ± 0.734 respectively. Analysis revealed that qualification and years of experience was statistically significant among both dependent variables ($p \leq 0.05$). Statistically significant differences were found in the mean knowledge and practice scores among graduate dentists and specialists.

Conclusion: A significant association between the knowledge and practice scores was observed, implying that with an increase in knowledge, there was also an increase in the practices of ethics among study population.

Keywords: *Awareness, Perception, Dental ethics, Informed consent, Registered dentists.*

Introduction

Hospitals and their managements are increasingly facing complaints regarding the facilities, standards of professional competence, and the appropriateness of their therapeutic and diagnostic methods [1]. Informed consent is an essential tool of standard ethical medical practice. A dentist-patient relationship can only work if there is good communication between them [3]. The patient's comfort is more vital to the acceptance of any intervention [2]. A major component of quality of health care is patient satisfaction [3]. Patient management is one of the key components in any health profession especially in one as professional as dentistry. The consent is integral as it enables in mutual communication to establish a good dentist-patient rapport. The dental patient record is legal evidence that documents professional care

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provided to the patient [4]. It is the process of sharing information with patients that is essential to their ability to make rational choices among multiple options in their perceived best interest [5]. There is an important need to implement educational instruction in research ethics with special emphasis on informed consent as well [6]. There was paternalism in the oral health care delivery system of India over the last few decades. Presently, the patient's autonomy is considered significant in the contribution of planning treatment. Internet has replaced physicians as the primary or first source of information about a disease leading to an imbalance in the maintenance between patient's autonomy and doctor's beneficence often causes conflicts. Numerous studies have been carried out among dental practitioners and dental students so far to evaluate knowledge, attitude and practice regarding various aspects in different fields expecting ethics to be followed which is the need of the hour [7-11]. Many studies have revealed that majority of the dentists consider obtaining consent from the patient is important but they do not take in practice.

Lacunae in previous original researches are that the identification of reasons for not using informed consent among dental professionals for every patient on regular basis/routinely in practice is not revealed. This study will be revealing factors influencing or hindering the usage of consent in reality which lacked in the previous researches and thereby leading to formulations of strategies accordingly, that could easily be adopted in order to increase optimal usage of the consent form preserving autonomy of the patient and safeguarding the dentist from medico-legal issues as well aiding to carry out standardized ethical dental practice.

To the best of knowledge such study is not been conducted in South India, hence the aim of this study is to assess the knowledge , attitude and practice regarding informed consent among dental professionals in Chennai and aid in formulations for an effective usage of consent form.

Number of Key words mentioned: 5

Materials and Methodology

Study design

Descriptive cross-sectional study

Study area

Chennai, the capital city of Tamil Nadu is the selected area for conducting this study. Tamil Nadu in India has a diverse population of around 67.86 million (as of 2012) [12]. Chennai is said to be India's health capital providing health care through various government and private hospitals and a place with everyday advancements in medical research where healthcare professionals are the most respected and trusted.

Crowding of registered dental practitioners in metropolitan cities leads to unhealthy competition and commercialization. The latter leads to violating the code of conduct put forth by the state dental councils and many of the norms are openly flouted and rules randomly bent [8]. In order to see the awareness of standard ethical dental practice in Chennai, this population was selected.

Study population

There are 19680 private dental practitioners in Tamil Nadu and 7016 dental professionals in Chennai City [13]. Dental practitioners are selected by simple random sampling constituted the study population.

Inclusion criteria

Registered dental practitioners in Chennai were included.

Exclusion criteria

Dental practitioners who were not willing to participate were not included.

Approval and informed consent

Ethical clearance was obtained from Institutional ethics committee, Saveetha University.

An approval was granted (STP/SD MDS17PHD02) and study protocol was reviewed.

The anonymity of the participants was maintained.

Scheduling

Scheduling data collection was scheduled in the month of July 2017.

Sample size

Sample size was calculated based on the study done by Vivek V. Gupta et al; 2014, N=192 (using the sample size formula $Z\alpha^2$ PQ/ L^2.

Sample calculation

Formula:

$$N = \frac{Z\alpha^2 PQ}{L^2}$$

$P = 66.7$

$Q = 100\text{-}66.7 = 33.3$

$Z\alpha^2 = 3.84$

$L = 10\%$ of power

$$N = \frac{3.84 \times 66.7 \times 33.3}{(6.67)^2}$$

$$= \frac{8,529.06}{44.48}$$

N = 191.75

Sampling

Dental practitioners were randomly selected in Chennai, Tamil Nadu. The study was conducted for a period of two months and four to five dental practitioners were be involved each day.

Questionnaire

A questionnaire, designed to obtain dental professionals' knowledge, attitudes and practices towards informed consent, consisted of three sections. Section I solicited general demographic and professional background information. Section II comprised 11 questions to collect information about knowledge regarding informed consent. Section III consisted of 4 questions that aimed to assess the attitude towards the use of informed consent. Section IV comprised 7 questions that aimed to assess their practice of informed consent. The participant's responses for Sections II, III, and IV were recorded using Likert scale.

Pretesting of questionnaire

A self-administered structured questionnaire consisting of 21 items was developed and tested among a convenience sample of 10 dentists, who were interviewed to gain feedback on the overall acceptability of the questionnaire in terms of length and language clarity. Based on their feedback, the questionnaire did not require any corrections. Cronbach coefficient was found to be 0.5, which showed an internal reliability of the questionnaire and the split validity was found to be 0.65.

Methodology

The list of private practicing dentists from local sources (local Tamil Nadu Dental website). Among the total 192 dental practitioners, a pilot study was conducted on 10 dental practitioners. These were later excluded from the main study and the final sample size was arrived at 192. On the predecided days, there was a visit to the private clinics, according to area distribution, for getting the questionnaire filled. Questionnaires were distributed among all dentists (n = 192) who were requested to fill in the form. Their acceptance to rate each item of the questionnaire choosing the most appropriate response was considered as obtaining consent from them. There was revisit to the clinics after two days to collect the filled questionnaires. One hundred percent response rates were achieved by two follow-ups.

Statistical method used

Descriptive statistics using frequency and percentage was used. Inferential statistics using Pearson's Chi-square test was done to check the level of significance and association between variables. Correlation was done using Pearson's correlation. P value of < 0.05 was said to be significant.

Results

Table 1: Distribution of study subjects according to Age and Qualification

Age	BDS	MDS	Total	
			N	%
<40	51	118	169	88
40-50	0	18	18	9.4
>50	1	4	5	2.6

Table 1 depicts the distribution of study subjects according to age and qualification .Among the 192 study subjects, 169(2.6%) study subjects were aged less than 40 years, 18(9.4%) study subjects were aged 40-50 years and 5(2.6%) were aged >50 years. It also shows that 52(27.1%) study subjects were undergraduates and 140(72.9%) study subjects were postgraduates.

Table 2: Association between knowledge regarding informed consent and age among

Knowledge	Age in years					
	<40		40-50		>50	
	n	%	n	%	n	%
Poor	6	3.1	2	1	0	0
Fair	50	26	2	1	2	1
Good	113	58.9	14	7.3	3	1.6
Total	169	88	18	9.4	5	2.6

x^2 -5.009 df-4 p<0.005

x^2 -5.009 df-4 p<0.005

Table 2 depicts the association between knowledge regarding informed consent and age among dental professionals .Among the <40 age group, 113(58.9%) had good knowledge, 50(26%) had fair knowledge and 6(3.1%) had poor knowledge. Among the 40-50 age group, 14(7.3%) had good knowledge, 2(1%) had fair knowledge and 2(1%) had poor knowledge. Among the >50 age group,

3(1.6%) had good knowledge, 2(1%) had fair knowledge.

Table 3: Association between knowledge regarding informed consent and qualification among dental professionals.

Knowledge	Course			
	BDS		MDS	
	n	%	n	%
Poor	0	0	8	4.2
Fair	20	10.4	34	17.7
Good	32	16.7	98	51
Total	52	27.1	140	72.9

x^2 -6.082 df-2 p<0.005

Table 3 depicts the association between knowledge regarding informed consent and qualification among dental professionals. Among 52 BDS graduates 32(16.7%) had good knowledge, 20(10.4%) had fair knowledge. Among 140 MDS graduates, 98(51%) had good knowledge, 34(17.7%) had fair knowledge and 8 (4.2%) had poor knowledge.

Table 4: Association between knowledge regarding informed consent and institutional attachment among dental professionals.

Level of knowledge	Institutional Attachment			
	Yes		No	
	n	%	n	%
Poor	7	3.6	1	0.5
Fair	34	17.7	20	10.4
Good	112	58.3	18	9.4
Total	153	79.7	39	20.3

x^2 -12.991 df-2 p<0.005

Table 4 depicts the association between knowledge regarding informed consent and institutional attachment among dental professionals. Out of 192 study population, 153 of them were attached to a dental institution. Among the 153 dental faculties 112(58.3%) had good knowledge, 34(17.7%) had fair knowledge and 7(3.6%) had poor knowledge. Among 39 dental surgeons who

were not associated with dental institutions, 18(9.4%) had good knowledge, 20(10.4%) had fair knowledge and 1(0.5%) had poor knowledge.

Table 5: Association between Attitude regarding dental professionals. informed consent and age among dental professionals.

Attitude	Age in years					
	<40		40-50		>50	
	n	%	n	%	n	%
Positive	148	77	15	7.9	5	2.6
Negative	21	10.9	3	1.6	0	0
Total	169	88	18	9.4	5	2.6

x^2 -8.745 df-4 p<0.005

x^2 -8.745 df-4 p<0.005

Table 5 depicts the association between attitude regarding informed consent and age among dental professionals .Among the <40 age group, 69(35.9%) had good attitude, 79(41.1%) had fair attitude and

21(10.9%) had poor attitude. Among the 40-50 age group, 12(6.3%) had good attitude, 3(1.6%) had fair attitude and 3(1.6%) had poor attitude. Among the >50 age group,1(0.5%) had good attitude,4(2.1%) had fair attitude.

Table 6: Association between Attitude regarding informed consent and qualification among dental professionals.

Attitude	Course			
	BDS		MDS	
	n	%	n	%
Positive	47	24.5	121	63.1
Negative	5	2.6	19	9.9
Total	52	27.1	140	72.9

x^2 -4.800 df-2p<0.005

Table 6 depicts the association between attitude regarding informed consent and qualification among dental professionals .Among the 52 BDS Graduates 47(24.5%) had positive attitude and 5(2.6%) had negative attitude. Among the 140 MDS Graduates, 121(63.1%) had positive attitude and 19(9.9%) had poor attitude.

Level of Attitude	Institutional Attachment			
	Yes		No	
	n	%	n	%
Positive	134	69.8	34	17.8
Negative	19	9.9	5	2.6
Total	153	79.7	39	20.3

x^2 -3.112 df-2 p<0.005

Table 7 depicts the association between attitude regarding informed consent and institutional attachment among dental professionals. Out of 192 study population, 153 of them were attached to a dental institution. Among the 153 dental faculties 134(69.8%) had positive attitude and 19(9.9%) had poor attitude. Among 39 dental surgeons who were not associated with dental institutions, 34(17.8%) had positive attitude and 5(2.6%) had negative attitude.

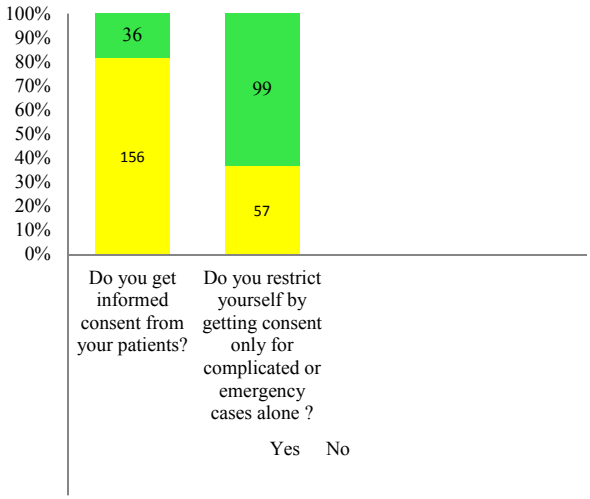


Figure 1: Distribution of study subjects based on the practice regarding informed consent.

Figure 1 shows the distribution of study subjects according to the practice regarding informed consent. Among the 192 study subjects, 156(81.3%) study subjects are getting informed consent from patients and 36(18.8%) had not been getting informed consent from patients. It also shows that

57(29.7%)of the dental professionals restrict themselves from getting informed consent for complicated or emergency cases and 99(51.6%) were not restricting by getting informed consent for complicated or emergency cases as well.

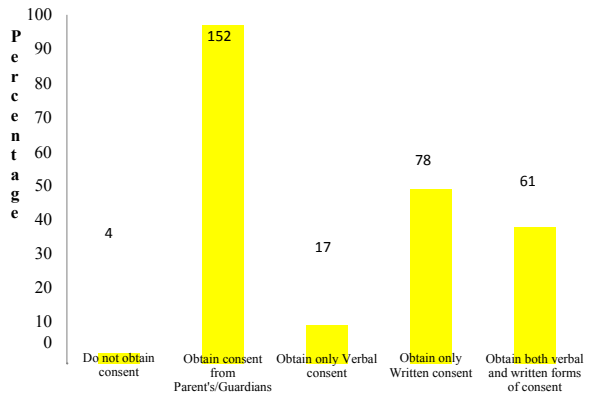


Figure 2: Distribution of study subjects based on the response and mode utilized for obtaining informed consent from disabled persons, minors and general population respectively.

Figure 2 shows the distribution of study subjects according to the practice followed for obtaining informed consent from disabled persons, minors and the mode of informed consent obtained in practice. Among the 192 study subjects, 156 dentals surgeons received informed consent and out of them 152(97.4%) were getting informed consent from the parents or guardians of minors, special children and disabled adults. It also shows that 4(2.6%) of them did not obtain for such differently abled population at all. It depicts 156 dentals surgeons got informed consent and out of them

17(10.9%) were getting verbal informed consent, 78(40.6%) obtained written consent and

61(39.1%)got both verbal and written informed consent.

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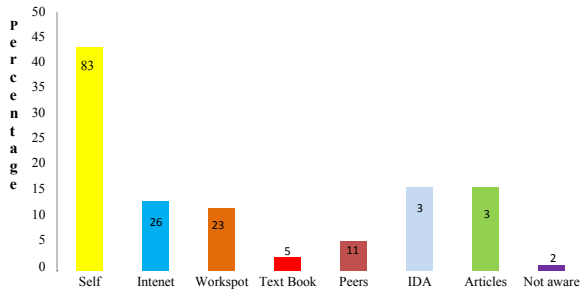


Figure 3: Distribution of study subjects on the basis from where the design of the informed consent was obtained.

Figure 3 shows the distribution of study subjects based on the mode of informed consent obtained in practice. Among the 192 study subjects, 156 dentals surgeons obtained informed consent and out of them 83(43.2%) used self-framed informed consents, 26(13.5%) obtained the design from internet,

23(12%) got from their work spot, 5(2.6%) used the format from standard text books, 11(5.7%) were utilizing the one received from their peers or colleagues. Nearly 3(16%) obtained the design of informed consent from Indian Dental Association and published articles while 2(1%) of them were not aware of the information regarding designing of the informed consents they had been using.

Discussion

Informed consent is the educational process which focuses on patient's absolute right to understand their status and proposed treatment plan. It is necessary for every examination and surgical procedure in health sector. In this cross-sectional descriptive study carried among dental surgeons in Chennai, a self-administered questionnaire comprising of 21 questions to investigate the knowledge, attitude and practices of dental professionals in matters relating to informed consent were explored.

The reputation of being a dentist comes with a responsibility to society and to fellow affiliates of profession to carry out one's professional activities in a highly ethical manner[14,15] .Hence age, professional experience, qualification are the factors which influence the outcome of this study.

Three parameters are found as a result of conducting this study. Levels of knowledge, attitude among registered dental practitioners are assessed followed by obtaining information regarding usage of informed consent in practice.

The information obtained suggested that among the 192 study subjects, 130(67.7%) had good knowledge, 54(28.1%) had fair knowledge and 8(4.2%) had poor knowledge of the informed consent. This suggested that at least the significance of informed consent has been included in the academic curriculum. It shows that a qualified dentist know the importance of informed consent in their dental practice. This result is in agreement with studies that emphasize the importance of informed consent in dental practices[16] .

The dentist should explain the risks and side effects associated with any of the treatment procedures, which have to be conveyed prudently. In the present study only 17(10.9%) were getting verbal informed consent.

The written form of informed consent is recommended in almost all of the studies carried out on this topic [17-19]. A patient giving oral informed consent may change his stance in case of any legal complication. Therefore the oral informed consent only has ethical value but written informed consent carries legal value as well [20].78(40.6%) obtained written consent alone while 61(39.1%) obtained both verbal and written informed consent in this study.

About 32(16.7%) BDS and 98(51%) MDS graduates had good knowledge about informed consent. The reason could be because of the fact that, specialists are exposed to additional ethical training during their postgraduate studies.

In current study, by attitude only, 82(42.7%) and 86(44.8%) had good and fair attitudes respectively. Nearly 24(12.4%) had poor attitude and did not consider informed consent to be an essential step in the dental care services. However to examine, treat, manage or operate upon patient without consent is assault in law, even if it is beneficial and done in good faith.

In this study, there was a wider gap of 36(18.8%) who still did not obtain informed consent as a routine protocol. This could probably be due to hurry, lack of time or negligence on the part of the dental professionals.

It is also very important that patient or parents in case of minors should completely understand what they are consenting for. Interestingly in this study, importance of informed consent was not uniformly realized for all procedures since 57(29.7%)of the dental professionals restricted themselves from getting informed consent only for complicated or emergency cases and 4(2.6%) of them did not obtain for such differently abled population at all. As the degree of invasiveness decreases they do not bother to take the consent from the patient. This result is in contrary to many studies which emphasize that informed consent should be taken in all cases without the degree of invasiveness [21-22].

In recent years there have been an increased number of petitions being filed in the courts regarding medical negligence, which in turn might be the reason for taking consent from patients [23].

It can also be discussed that in a survey there is always a chance that whether or not the respondent answer the questions truthfully, either they give the answer that they feel will please the researcher or give what they think is right even if it is not what they do on daily basis so this possibility must be considered.

It is an important medico legal concern in improper consent and withholding of complete information from the patients and also been the subject of judicial scrutiny. It is important to bear in mind patients informed consent is a part of patient's general right and has legal and ethical values. It should be based on information that patients can easily understand [24].

Conclusion

A significant association between the knowledge and practice scores was observed, implying that with an increase in knowledge, there was also an increase in the practices of ethics among study population.

Financial support and sponsorship: Self

Conflicts of Interest: Nil

Ethical Clearance: Ethical Clearance has been obtained for this article through Institutuional Human Ethical Committee (SDC/IHEC/ 093)

Recommendations

Emphasis should be given on undergraduate and post-graduate curriculum about informed consent for the dental students. It is also essential for dentists to protect themselves from civil litigation and even criminal proceedings for any malpractice. All dentists should incorporate informed consent into their regular dental practice for all cases.

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Effectiveness of Oral Health Education Given in Private Dental Institutions in Chennai

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Abstract

Introduction: Oral health is an integral part of general health. Despite the fact most of the oral diseases are preventable; least priority is given for oral care among public. As knowledge is considered to be an essential prerequisite for related behavior and educational intervention is easy in administration logical at community level for promotion, this study was conducted to evaluate the impact of oral health education.

Materials and Method: The used questionnaire in this cross-sectional survey consisted of 12 items to obtain data through telephonic interview. The study was conducted among 100 people who had received oral health education counseling during their dental visit. They were selected from the records management system in a private dental institution in Chennai city. Descriptive statistics using frequency and percentage and inferential statistics using Pearson's Chi-square test to check the level of significance and association between variables were utilized for statistical analysis.

ResultsThe mean age was found to be 35.6±12.303. Most of them were aged 21-40 years perceived the intervention to have a moderate impact developed greater expected behavior as a result of counseling. Males were higher in proportion than females. However, the practice of oral hygiene post intervention was greater among women. Higher proportions in different age groups perceived moderate impact. No matter whatever was the educational status of the individuals, oral health education created desirable behavior for healthy oral cavity.

Conclusion: Effective educational interventions with motivation contribute to positive behavior change.

Keywords: *Effectiveness, Oral health education, Oral health promotion, Program, Impact*

Introduction

Oral diseases qualify as major public health problem owing to their high prevalence and incidence in all regions of the world .The World Health Organization in 2003 indicated that the focus of Oral Health Education (OHE) actions should be on behaviors and conditions that promote oral health or that decreases the risk of oral diseases; health promotion at school should encourage daily tooth brushing, supervised tooth brushing, use of fluoride, and promotion of good nutrition, among other strategies[1,2].

India is no exception and due to its large population size, the absolute burden of oral diseases is immense[3]. People living in developing countries, and concomitantly, of lower socio- economic status have a lacunae in oral health awareness mirrored in their practice of oral hygiene habits[4].

There is stagnation in providing dental public health services and inadequate resources especially financial

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constraints. Most of the oral problems are preventable.

Health education has emerged as one of the fundamental approaches in primary prevention [5]. Education is an essential part of health services. Among the many different approaches to the prevention of dental diseases, the most cost-effective method is health education [6].

Educational intervention is easy in administration logical at community level for promotion of health when limited resources exist. It not only improves the physical health but also ensures broadening the mindset of closeted society as well. Health education can bring about changes in life styles and risk factors of diseases [7].

Oral health is an integral part of general health. Poor oral health is commonly associated with many systemic diseases [8-11]. According to the World Health Organization, many factors like nutritional status, hygiene, stress, smoking and alcohol habits etc. are linked to a wide range of oral diseases forming the fundamental basis of the common risk factor approach to prevent the oral diseases [12]. Among these, oral hygiene is the most significant factor in terms of prevention of oral disease, accessible to personal control.

Oral hygiene which is a modifiable risk factor of oral problems affects one's esthetics, communication, biologic, psychological and social projection. Oral hygiene which is a modifiable risk factor of oral problems affects one's esthetics, communication, biologic, psychological and social projection. Inability to maintain proper oral hygiene practices lead to increase in the prevalence of dental diseases.

Oral health knowledge is considered to be an essential prerequisite for oral health related behavior [13]. The oral health literacy status deserves recognition as an important determinant of oral health. It is mandatory to enhance the knowledge and instill a positive attitude of the population regarding prevention of diseases in order to achieve successful community programs

The role of Public Health dentists is imperative since they bridge the gap between various sections of people and health sector. Dentists with good communicating skills are in a unique position serving as role models to educate inculcating minds to adopt healthy lifestyle.

The dental health messages should be practical, informal and culturally sensitive [14].Thus Oral health education is not only directed at reducing disease and injury to the teeth and their supporting structures rather it influences on general health and promotes a feeling of well – being[15].

Numerous studies have been carried out among dental practitioners and dental students so far to evaluate knowledge, attitude and practice regarding various aspects in different fields excepting the impact of health education which is the need of the hour for better apprehension to adopt the appropriate principles for an effective oral health educational intervention [16-22]. Until and unless, the impact of a program on the targeted population is not determined, the success of the program cannot be assessed. Keeping this in mind, the present study was undertaken with an aim to determine the impact of oral hygiene education program on oral health status of individuals in Chennai.

Number of key words mentioned: 5

Materials and Methodology

Study design

Descriptive cross-sectional study

Study area

India, the second largest in Asia and the seventh largest most populous country has a diverse population of around 1.3 billion. Tamil Nadu in India has a diverse population of around 67.86 million (as of 2012) [23]. Chennai covers an area 32, 8263 of Tamil Nadu .Hence the capital city of Tamil Nadu is the selected area for conducting this study.

Chennai is said to be India's health capital providing health care through various government and private hospitals and a place with everyday advancements in medical research where healthcare professionals are the most respected and trusted. There are nearly 13 dental institutions in Chennai [24].

In today world of stress with hectic work schedule for decent living, care and importance for one's own health is not taken leading to delayed diagnosis. As far as oral health is concerned, lack of knowledge and ignorance among population is still the reason for increase in prevalence of oral diseases. In order to see the effectiveness or impact of oral health education counseling given by dental professionals at private hospitals in Chennai, this population was selected.

Study population

Those who received oral health education counseling over the past 4 years selected by simple random sampling constituted the study population.

Inclusion criteria

People given oral health counseling in Chennai who gave verbal consent to take part in the study were included.

Exclusion criteria

Patients who were not willing to participate were not included.

Approval and informed consent

Ethical clearance was obtained from Institutional ethics committee, Saveetha University.

· An approval was granted and study protocol was reviewed.

· The anonymity of the participants was maintained.

Scheduling

Scheduling data collection was scheduled in the month of December 2017.

Sample size

Sample size was calculated using N power software based on values obtained from similar studies and rounded off to 100 for convenience.

Sample calculation

Hypothesis Testing for Single Proportion

Hypothesis Testing for Single Proportion

Population Proportion Po = .91

Sample Proportion Pa = .98

Power (%) = 80

Alpha Error (%) = 5

Sided = 2

Sample size (n) = 94

Alpha Error(%)	Power(%)	Sample Size(n)
1	70	134
	80	150
	90	172
5	70	82
	80	94
	90	112
10	70	60
	80	70
	90	86

Population Proportion Po = .91

Sample Proportion Pa = .98

N = 100

Sampling

Patients who were given oral health education counseling during their visit to dentists over the past 4 years were randomly selected from the records management system maintained in a leading dental college and hospital at Chennai. The study was conducted for a period of one month and 4-7 study participants were involved each day.

Questionnaire

A questionnaire designed was used to obtain information among oral health education recipients. It was framed consisting of 12 questions consisting of few sections to analyze how the counseling is given followed by its impact in reality.

Pretesting of questionnaire

A self-administered structured questionnaire consisting of 12 items was developed and tested among a convenience sample of 10 dentists, who were interviewed to gain feedback on the overall acceptability of the questionnaire in terms of length and language clarity. Based on their feedback, the questionnaire did not require any corrections.

Methodology

The list of patients who had received health education was collected from the record management system maintained at a private dental institution in Chennai Among the total 100 study participants; a pilot study was conducted on 10 recipients of counseling. These were later excluded in the main study and the final sample size was arrived at 100. On the pre-decided days, there were telephonic conversations to patients who had undergone oral health education counseling over the past four years, for getting the questionnaire filled. Questions were explained to the study participants until they could understand it with clarity (N = 100) .They were requested to give response after listening carefully the options. Their acceptance to answer each item of the questionnaire choosing the most appropriate response was considered as obtaining consent from them. One hundred percent response rates were achieved by two follow-ups. **Statistical method used**

Descriptive statistics using frequency and percentage was used. Inferential statistics using

Pearson's Chi-square test was done to check and association between variables.

Result

Table 1: Distribution of study subjects according their age.

Age	n	%
≤20	5	5
21-40	59	59
41-60	32	32
>60	4	4
Total(N)	100	100

Table 1 depicts the distribution of study subjects according to age. It shows that among the 100 study subjects, 5(5%) study subjects were aged 20 years or lesser, 59(59%) study subjects were aged within 21-40 years and 32(32%) were aged between 41-60 years. It also shows that 4(4%) study subjects were 60 years or above.

Table 2: Distribution of study subjects based on the gender of study participants.

Gender	n	%
Male	59	59
Female	41	41
Total (N)	100	100

Table 2 depicts the distribution of study participants based on their gender. It shows that among the 100 study subjects, majority of them i.e. 59(59%) of them were males and 41(41%) were females.

Table 3: Distribution of study subjects based on educational qualification of study subjects.

Educational status	n	%
No formal education	2	2
Primary school	2	2
Middle school	27	27
Higher Secondary school	13	13
Graduate	56	56
Total(N)	100	100

Table 3 depicts the distribution of study subjects according to their educational status. It shows that among the 100 study subjects, 2(2%) of them did not undergone formal education. Nearly

2(2%) of them had done only primary schooling while 27% had attended middle school. Around

13% of them had finished their higher secondary education and 56(56%) were graduates. consumption demonstration

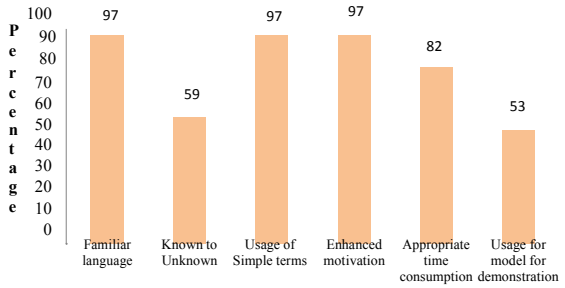


Figure 4: Distribution of study subjects based on how health education counseling was given.

Figure 4 depicts the distribution of study subjects based on the health education counseling was given. It shows that 97% of our study participants have accepted that oral health education was delivered in a language that they could apprehend and majority of them comprising 59% were informed facts about oral hygiene maintenance at the commencement of counseling session which they were aware earlier. However 41% of them were given instructions from unknown content. Around 97% perceive that the oral hygiene instructions were given by dentists using simple words and found it interesting while 3% have reported that jargons were utilized finding the counseling session not that appealing. Out of the total 100 people for whom health education was given, 82% of felt that it was given within appropriate time. Approximately 18% of them recognized it that either time consuming or less period was used making it ineffective. About

53% of the patients who had received oral health education were demonstrated the correct tooth brushing technique using mannequin of oral cavity while 47% of them were not shown.

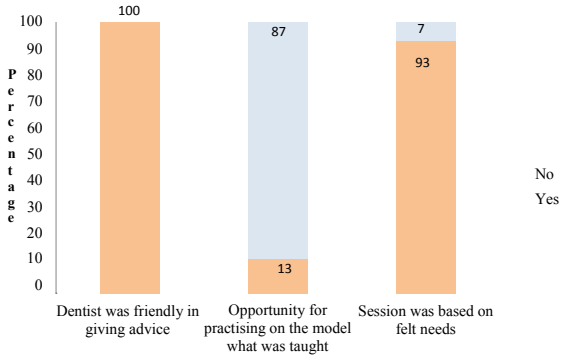


Figure 5: Distribution of study subjects based on approaches carried out by the dentist in conducting oral health education.

Figure 5 depicts the distribution of study subjects based on approaches carried out by the dentist in conducting oral health education. It shows that health education was given in a friendly manner by all the dentists who taught them. Most of them consisting 87% were not given opportunity to practice on the teeth model the technique after it was taught. Merely 13% were given chance to do after instructions were told and showed. Among the 100 participants, despite the fact that 7% of them perceive that were not helped with guidance for what they really wanted, nearly 93% of them were found to be satisfied for receiving oral health awareness counseling because they feel it is really given according to their felt needs.

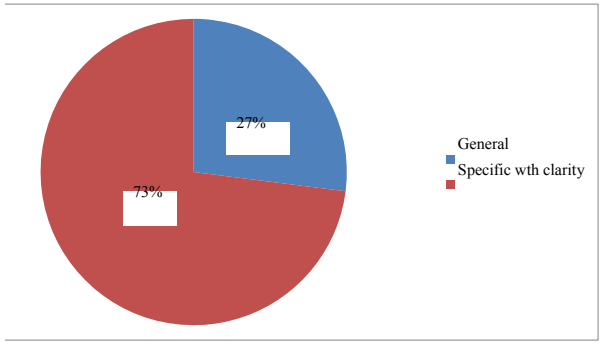


Figure 6: Distribution based on the type of information delivered through oral health education counseling a perceived by those received.

Figure 6 shows the distribution based on the type of information delivered through oral health education counseling a perceived by those received. Out of the total 100 for whom health education was given nearly 73% of them were provided with specific oral hygiene tips with clarity while 27% had received general

instructions.

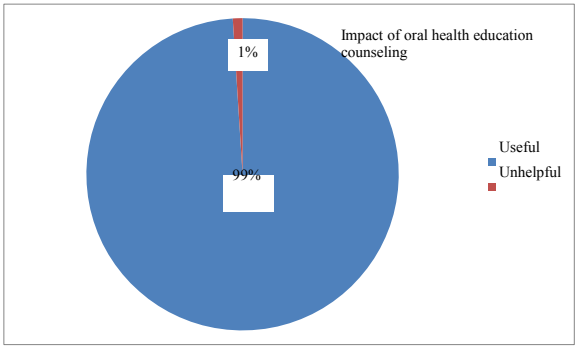


Figure 7: Distribution of study subjects based on efficacy of oral health education as perceived.

Figure 7 shows the distribution of study subjects based on efficacy of oral health education as perceived. Around 99% of the study participants found the health education counseling given by dentists very useful for maintenance of oral care. However 1% felt that the given instructions were not helpful to them overall.

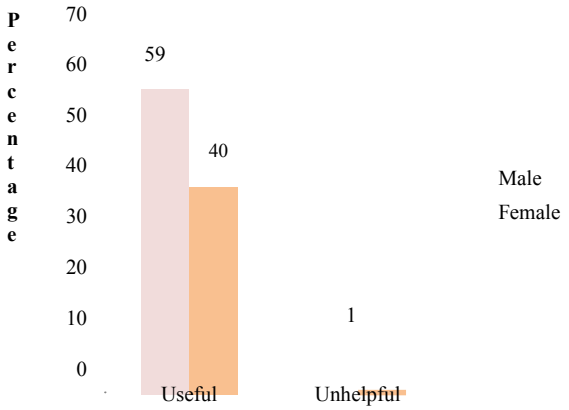


Figure 8: Distribution of study participants based on gender and their perception regarding efficacy oral health counseling.

Figure 8 depicts the distribution of study participants based on gender and their perception regarding efficacy oral health counseling. It shows that nearly 59% male found the information beneficial while 40% of the female study subjects felt the same and around 1% of them perceived the oral health education counseling session to be unhelpful.

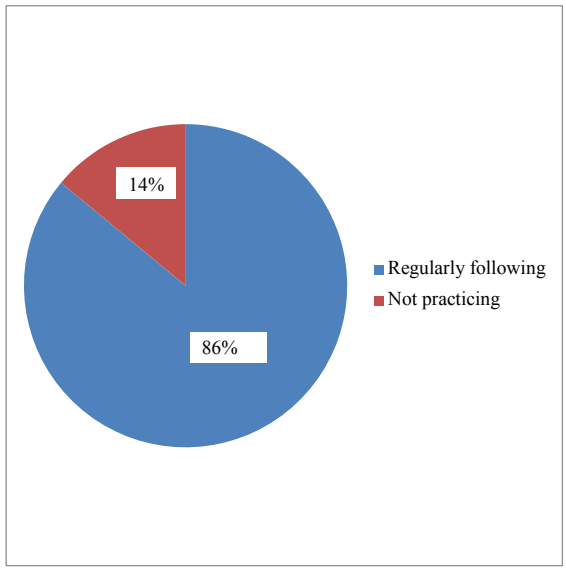


Figure 9: Distribution of study subjects based on effectiveness of oral health education as perceived.

Figure 9 shows the distribution of study subjects based on effectiveness of oral health education as perceived. Among the 100 study subjects, 86% of them follow the oral hygiene instructions in reality. The health education counseling is ineffective to 14% of the 100 participants.

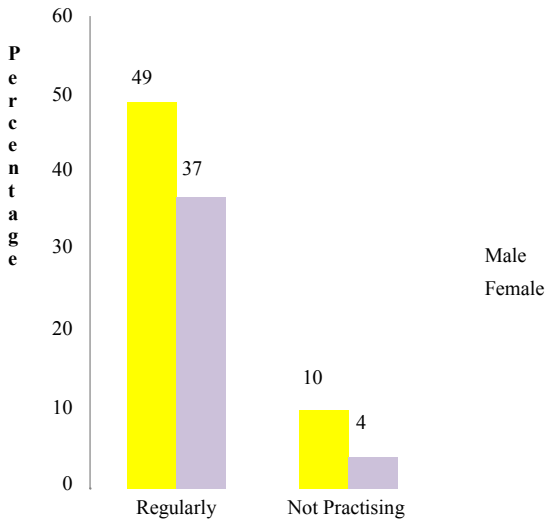


Figure 10: Distribution of study subjects depicting the impact of health education

Figure 10 depicts the distribution of study subjects representing the impact of health education. It shows that 49% male follow the oral hygiene instructions regularly while 10% do not. It also shows that 37% and only 4% of female study participants maintain oral hygiene as advised by the dentist and do not adhere to it respectively.

Table 4.1: Association between perceived impact level of educational intervention and age

Perceived impact of oral health education	Age in years								Total
	≤20		21-40		41-60		>60		
	n	%	n	%	n	%	n	%	N
Adequate	0	0	5	8.5	0	0	0	0	5
Moderate	5	100	44	74.6	29	90.6	4	100	82
Inadequate	0	0	10	16.9	3	9.4	0	0	13
Total	5		59		32		4		100

x^2 -6.718, df=6, p=0.348

Table 4.1 depicts the association between perceived impact level of educational intervention and age. It shows that among the 100 study participants, 5% of them aged twenty years and below felt that the given health education counseling was moderate. Among the majority of 59%, nearly

44(74.6%) aged between 21-40 years, of them found the session moderately effective while

5(8.5%) perceived to have an adequate impact. About 10(16.9%) of them found it inadequate. Around 29(90.6%)aged 41-60 years and all those aged 60 years and above found the program to have moderate impact as well. It was inadequate for very meager of them constituting 3(9.4%) who were 41-60 years old.

Table 4.2: Association between oral health behavior and educational intervention according to age

Age	Oral hygiene Practice behaviour				Total
	Positive		Negative		
	n	%	n	%	N
≤20	4	80	1	20	5
21-40	49	83.1	10	16.9	59
41-60	29	90.6	3	9.4	32
>60	4	100	0	0	4
Total	86		14		100

x^2=1.795, df=3, p=0.616

Table 4.2 depicts the association between oral health behavior and educational intervention according to age. It shows that majority of them 49(83.1%) of the study subjects in the age group

21-40 years had been following the instructed oral hygiene instructions post educational intervention while only 10(16.9%) did not adopt good oral hygiene practice. Around 29(90.6%) aged 41-60 had also improved oral hygiene maintenance while 3(9.4%) did not .It also shows that all of them who are 60 years and above had change in oral health behavior after counseling. It is clear that 4(80%) young adults developed positive desirable behavior after oral health education.

Table 4.3: Association between perceived impact levels of educational intervention according to gender.

Perceived impact of oral health education	Gender				Total
	Male		Female		
	n	%	n	%	N
Adequate	3	5.1	2	4.9	5
Moderate	47	79.7	35	85.4	82
Inadequate	9	15.3	4	9.8	13
Total	59		41		100

x^2=0.661, df=2, p=0.719

Table 4.3 depicts the association between perceived impact levels of educational intervention according to gender**.** It shows that shows that 47(79.7%) and 35(85.4%) of males and females perceived that dental education generated in them a moderate impact while 3(5.1%) and 2(4.9%) found it adequate respectively. However, around 9(15.3%) males and 4(9.8%) found it to be inadequate. This table also shows that both male and female felt moderate impact was the outcome of oral education counseling. It also shows that the expectation or satisfaction level for adequacy of the program is higher among females comparatively.

Table 4.4: Association between oral health behavior and educational intervention according to gender

Gender	Oral hygiene Practice behavior				Total
	Positive		Negative		
	n	%	n	%	N
Male	49	83.1	10	16.9	59
Female	37	90.2	4	9.8	41
Total	86		14		100

x^2=1.040, df=1, p=0.308

Table 4.4 depicts the association between oral health behavior and educational intervention according to gender**.** It shows around 86% of the study participants have developed positive oral health behavior while 14% never did .Among 59 males,49(83.1%) men and out of 41 females,37(90.2%) were following oral hygiene instructions. However 10(16.9%) and 4(9.8%) of men and women still had negative behavior towards oral health respectively.

Table 4.5: Association between perceived impact level of educational intervention and educational status

Perceived impact of oral health education	Educational status										Total
	No formal education		Primary school		Middle school		Higher Secondary school		Graduation		
	n	%	n	%	n	%	n	%	n	%	N
Adequate	0	0	0	0	2	11.1	0	0	3	5.4	5
Moderate	2	100	2	100	22	81.5	12	92.3	44	78.6	82
Inadequate	0	0	0	0	3	7.4	1	7.7	9	16.1	13
Total	2		2		27		13		56		100

x^2=2.867, df=8, p=0.942

Table 4.5 depicts the association between perceived impact level of educational intervention and educational status. It shows that 2(100%) who did not receive formal education and those with an educational qualification till primary level, 22(81.5%) who had attended middle school,

12(92.3%) who had completed higher secondary level of education and 44(78.6%) of graduates felt the impacted was moderate. Nearly 2(11.1%) and 3(5.4%) of them done with their middle schooling and graduation felt that dental education was adequate and around 3(7.4%) of them with 9(16.1%) graduates found it inadequate.

Table 4.6: Association between oral health behavior and educational intervention according to educational status

Educational status	Oral hygiene Practice behaviour			
	Positive		Negative	
	n	%	n	%
No formal education	2	100	0	0
Primary school	2	100	0	0
Middle school	26	96.3	1	3.7
Higher Secondary school	11	84.6	2	15.4
Graduation	45	80.4	11	19.6

x^2=4.530, df=4, p=0.339

Table 4.6 depicts the association between oral health behavior and educational intervention according to educational status. It shows that among the 100 study participants, about 2(100%) did not have formal education and possessed minimum qualification till primary level. It was observed that they had positive oral health behavior. Around 26(96.3%) of them who had educational qualification till middle school level had good oral hygiene practices post counseling while only 1(3.7%) had not showed any improvement at all. It also shows that 11(84.6%) who were qualified until higher secondary level followed oral hygiene routinely post session while and 2 (15.4%) did not. Most of the graduates 45(80.45%) had improved oral health behavior after knowledge was inculcated through educational intervention while there was no difference in 11(9.6%) even with highest educational qualification of all in this study.

Figure 11: Association between perceived impact of oral health education and oral health behaviour.

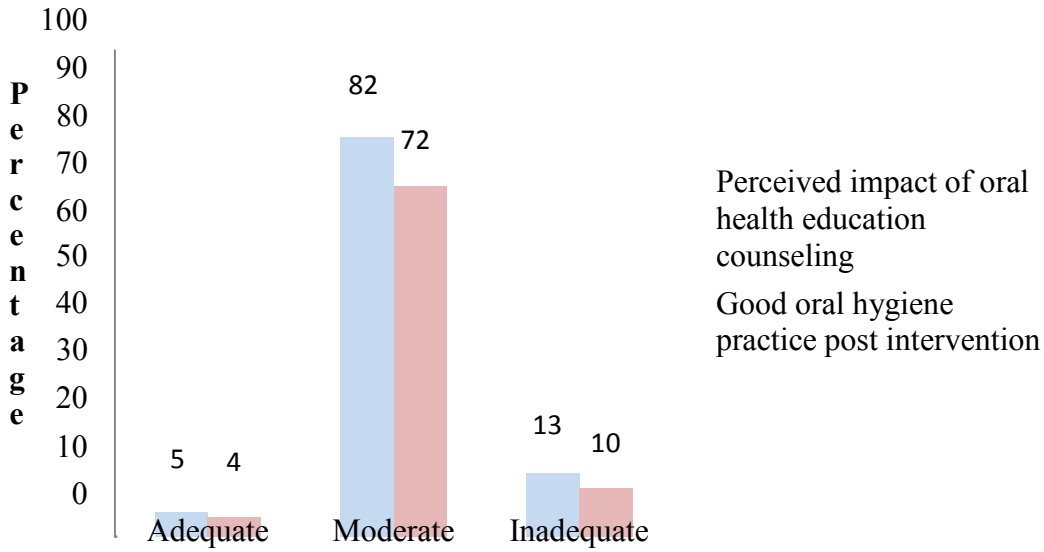


Figure 11 depicts the association between perceived impact of oral health education and oral health behavior. It shows that out of study participants who had perceived that the educational intervention generated positive and adequate impact in them, about 4(80%) of them followed oral hygiene practice in reality. However, among 82 subjects who strongly believed that the oral health education counseling created in them a moderate impact, nearly 72(87.8%) of them followed taught oral health instructions. Though 13 persons found that the received counseling was inadequate to impose impact, around 10(76.9%) of them adopted good oral hygiene practices post intervention.

In our study around 97% of the have agreed that oral health education was given in a language that they could apprehend by almost all the dentists in a friendly manner. Nearly 59% of them were taught by discussing facts about oral cavity and hygiene maintenance at the start of counseling session which was already known to them and were familiar. However 41% of them were given instructions from unknown content. It is perceived by 97% of the people who had received health education that the instructions by dentists were given using simple words .The same percentage of study subjects found it interesting. However 3% have reported that professional words were utilized finding the counseling session not that appealing. Approximately 82% of felt that oral health education was delivered within appropriate time and

18% of them recognized it to be either time consuming or suggested that less period was used making it ineffective. Among the 100 participants, despite the fact that 7% of them perceive that were not helped with guidance for what they really wanted, nearly 93% of them were found to be satisfied for receiving oral health awareness counseling because they feel it is really given according to their felt needs. About 53% of the patients who had received oral health education were demonstrated the correct tooth brushing technique using mannequin of oral cavity while

47% of them were not shown. However, most of them consisting 87% were not given opportunity to practice on the teeth model the technique after it was taught. Merely 13% were given chance to do after instructions were explanation and demo. Out of the total 100 for whom health education was given nearly 73% of them were provided with specific oral hygiene tips with clarity while 27% had received general instructions. Around 99% of the study participants found the health education counseling given by dentists very useful for maintenance of oral care. However 1% felt that the given instructions were not helpful to them overall. Nearly 59% male found the information beneficial while 40% of the female study subjects felt the same and around 1% of them perceived the oral health education counseling session to be unhelpful. It is estimated that only 86% of them follow the oral hygiene instructions in reality. The health education counseling is ineffective to 14% of the 100 participants. Though majority of the men found oral heath advice from their dentists useful comparatively, only 49% male follow the oral hygiene instructions regularly while 10% do not. It also identified that 37% and only 4% of female study participants maintain oral hygiene as advised by the dentist and do not adhere to it respectively.

The factors that influenced the outcome of this study included age, gender and educational qualification. Most of them were aged 21-40 years perceived the intervention to have a moderate impact developed greater expected behavior as a result of counseling. Males were higher in proportion than females. However, the practice of oral hygiene post intervention was greater among women. Higher proportions in different age groups perceived moderate impact. No matter whatever was the educational status of the individuals, oral health education created desirable behavior for healthy oral cavity.

Thus the above three factor and various modes and approaches utilized for counseling which are discussed above have influenced the outcome of the study.

There are different styles of learning and various characteristics of perceiving information upon which the effectiveness of health education depends [25]. Knowledge is a pre- requisite for bringing about a change in behavior playing a key determinant role.

Oral health education is a prearranged package of information delivery with activities for learning and experiences which are intended to proportion of oral health [26].Providing information indicated that educational intervention could improve all aspects of oral health maintenance in a study conducted by Solhi et al [27].

It is found in a study that a strategy called information persuasion adopted in oral health education programs in accordance to communication-behavior change model has a positive influence on knowledge and attitude of individuals [28].Another study has even led to the finding that a person's behavior could be changed by health messages through educational materials [29]. Gained knowledge of expected behavior has resulted in an increase in the use of oral hygiene aids and its maintenance [30-38].

The target of educational intervention comprises of strategies to change the personal behavior of individuals from damaging factors of health to promotion [39–41].

Conclusion

The outcome of this study supports the use of educational intervention to inculcate appropriate behavior for prevention of oral diseases. Oral health education is effective only when it is given with simple terms making it interesting. Satisfaction level of females is more than that of males. Specific instructions delivered to receivers are better understandable.

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Conflicts of Interest: Nil

Ethical Clearance: Ethical Clearance has been obtained for this article through Institutuional Human Ethical Committee (SDC/IHEC/ 094)

Limitations: At the time of data collection, as the researcher was directly involved in telephonic conversations there are chances that a favorable response could have been obtained. Another possibility is that the study participants answering with socially acceptable responses.

Recommendations

Few dentists need to be taught that oral hygiene counseling could be effective only when delivered in a language that the receiver is able to comprehend. Dental institutions must incorporate principles of health education in curriculum and train dental students to acquire effective communication skills. Awareness among dentists should be created by conducting lot of continuing dental Education Programs regarding the delivery of valuable content based on felt needs of the patient within suitable time using appropriate means. Concern should be taken while teaching oral health tips until females are satisfied realizing significance of oral care and males are motivated to adopt in reality what is was taught.

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Assessment of Oral Health Status for Formulation of Draft Oral Health Policy for the Residents of Chennai City, Tamil Nadu – A Pilot Study

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Abstract

Backgroud: Oral Health is a fundamental human right. It is an integral portion reflecting the status of overall general health. Poor oral health is commonly associated with many systemic diseases. Oral diseases qualify as a major public health problem at global level owing to its high prevalence. India is no exception and due to its large population size, the absolute burden of oral diseases is immense. Oral health is not usually considered as a matter of concern and given priority in most of the developing countries.

Aim: To assess the status of oral health of residents in Chennai for formulating a draft oral health policy.

Materials and Method: A cross-sectional survey was carried out using convenient sampling methodology. Data were collected according to the World Health Organization oral health assessment criteria 2013. The data tested for significance using statistical software packages, SPSS Software version 17.0.Frequency tables were computed. Chi square test was done to test whether the difference in the various parameters is statistically significant.

Results: Out of 318 males, 117(36.79%) require scaling and 250 (78.61%) of them need restorative treatments. Extraction is indicated for 27 (8.49%).Prosthetic treatment is recommended for nearly 50 (15.72%) of them. It also shows that out of 282 females, around 178 members comprising of 63.12% require scaling,220 (63.12%) need restorative treatments while extraction is indicated for 78(27.65%) of them and 50(15.72) women were recommended prosthetic treatments.

Conclusion: The study population was characterized by high prevalence of dental caries.

Keywords: *Oral Diseases, Prevalence, Residents, Oral Health Status, Oral Health Policy*

Introduction

Oral Health is a fundamental human right. It is an integral portion reflecting the status of overall general health. Poor oral health is commonly associated with many systemic diseases [1-4]. Complication of dental caries, malocclusion, periodontal diseases or oral cancer diminishes the quality of life of individuals causing orofacial discomfort, pain and loss of teeth.

Oral diseases qualify as a major public health problem at global level owing to its high prevalence. India is no exception and due to its large population size, the absolute burden of oral diseases is immense [5]. Oral health is not usually considered as a matter of concern and given priority in most of the developing countries .

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Despite the fact that oral diseases are largely preventable, oral healthcare still remains as an area which is neglected [6]. People belonging to lower socio-economic status have lacunae in oral health awareness which is mirrored in their practice of oral hygiene habits [7]. Oral diseases hence creates burden mainly on such disadvantaged population groups of society [8].

However intake of junk foods and carbonated drinks at frequent intervals with sedentary lifestyle currently contributes to oral diseases as well. Lack of knowledge on the consequences of delayed treatment and available modalities, ignorance, poverty, preoccupation, financial constraints, inaccessibility to dentists, inappropriate guidance and care, self-medication are the factors that affect dental care.

Other reasons for the same include fear, anxiety, misinterpretation and misconception about effects of dental treatment and dissatisfaction with the quality of oral health care services [9, 10].

In addition to variations in numerous factors like gender, age, races, geographical locations, accessibility to oral health care services and dietary habits responsible for oral diseases, the World Health Organization has affirmed that nutritional status, hygiene, stress, smoking and alcohol habits and so on are linked to a wide range of dental problems and forms the fundamental basis of the common risk factor approach to prevent oral diseases. [11].

Among these, oral hygiene is the most significant factor in terms of prevention of oral disease, accessible to personal control. Hence it is a modifiable risk factor of oral problems affecting one's esthetics, communication, biologic, psychological and social projection. It is highly influential through effecting counseling sessions.

Health is one of the basic human and social rights of an individual. It is the duty of every respective Government to provide oral health service and increase health care awareness [12]. Effective utilization of services is a concept of expressing the enhanced interaction extent between the service provider and the people for whom it is intended [13].

The role of Public Health dentists is imperative since they play a crucial role in bridging the gap between various sections of people and health sector. Dentists with good communicating skills are in a unique position serving as role models to educate inculcating minds to adopt healthy lifestyle.

Preservation, restoration and promotion of public health with equitable distribution is the prime duty of every healthcare provider .Hence health professionals, policy makers and insurance organizations must work communally so that different strategies could be adopted to address various influencers of social disparities to resolve and result in fair distribution of services through a suitable planning.

Provision of "appropriate services in the right place and at the right time" is the true meaning of creating good access to health services [14]. Several studies done in different parts of India have revealed high prevalence of dental problems necessitating the creation of appropriate National Oral Health Policy [15-21].

Early detection is the key to the practice of minimally invasive dentistry and assessment of oral health status is essential to plan programs focusing appropriate treatment procedures followed by preventive services and effective health education counseling to improve oral hygiene practices.

Numerous studies have been carried out so far among dental practitioners and students to evaluate the prevalence, knowledge, attitude and practice regarding various aspects in different fields to apply the results in practical ways which is the need of the hour [22-26]. Hence this study is conducted with an aim to assess the oral health status and formulate draft oral health policy for the residents of Chennai city, TamilNadu. Hence this study is conducted with an aim to assess the oral health status and formulate draft oral health policy for the residents of Chennai city, TamilNadu.

Materials and Method

Study Design

A cross sectional study

Study Area

Chennai is the capital of Tamil Nadu State of India. It is the 4th largest metropolitan city with a population of about 46, 81, 087 people according to 2011 census report.

Study population

The study population comprised of the Residents of Chennai City.

Inclusion criteria

- All the residents who were willing to participate in the study
- All the residents who were present on the day of examination

Exclusion criteria

- Terminally ill and mentally compromised residents in Chennai
- Residents of Chennai city who were unavailable even after three visits.

Approval and Informed Consent

- Ethical approval was obtained from the Institutional Scientific Review Board of Saveetha University.
- Informed consent from the residents of Chennai was obtained prior study.

Sample Size Calculation

The sample size was calculated using the formula

$$N = \frac{Z\alpha^2 PQ}{L^2}$$

$Z\alpha^2 = 3.84$

P=40

Q=100-40=60

L=10% of 40=4

$$N = \frac{3.84 \times 40 \times 60}{4^2}$$

N=576

The sample size was approximated to **600. Sampling Methodology**

Convenience sampling was done to include the residents of Chennai

Survey Instrument

A survey performa was prepared with the help of WHO Oral Health Assessment Form (2013).It was used to collect information about patients' demographic data, oral health status and oral health needs.

Armamentarium

1. Mouth mirror
2. Explorer (No.5)
3. Tweezers
4. Kidney Tray
5. Sterilized cotton
6. Disposable gloves
7. Disposable mask and head cap

Sterilization and Infection control

Instruments used for oral examination were sterilized using an autoclave at 121^{o} for 15 minutes a

15lbs pressure.

Survey Methodology

After a brief introduction on the purpose of the study, oral examination was conducted by a single examiner who had been trained through a series of clinical training sessions at the Department of Public Health Dentistry, Saveetha Dental College, Chennai.

Demographic information was collected followed by clinical examination. Completed filled forms were considered for analysis.

Based on the treatment needs, draft oral health policy was framed for the residents of Chennai.

Clinical Examination

A single examiner conducted intraoral examination under torch light using mouth mirror, explorer (No.5) and assessed the oral health status and treatment needs. One dental surgeon assisted the examiner in recording the findings on the performa.

Statistical Analysis

The data collected was analyzed and tested for significance using statistical software packages, SPSS Software version 17.0.

Frequency tables were computed. Chi square test was done to test whether the difference in the various parameters is statistically significant. For all the tests ($p<0.05$) is considered statistically significant.

Results

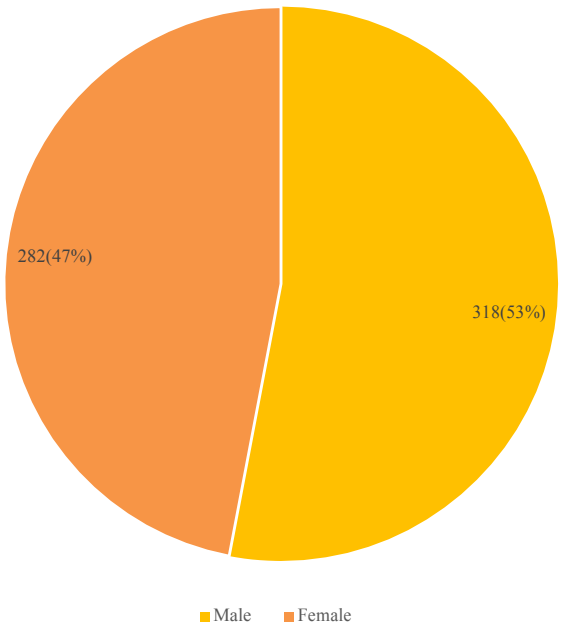


Figure 1: Distribution of study subjects according to Gender

Figure 1 depicts the distribution of study subjects according to their gender. Among the 600 study participants, 318(53%) of them were males and 282(47%) were females.

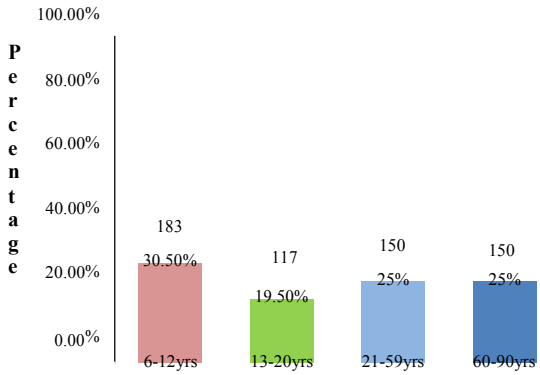


Figure 2: Distribution of study subjects according to Age

Figure 2 depicts the distribution of study subjects according to age. Among the 600 study subjects, 183 (30.50%) were between 6-12 years, 117 (19.50%) were belonging to age group in the range 13-20 years while 150 (25%) were of the age 21-59 years and 60-90 years.

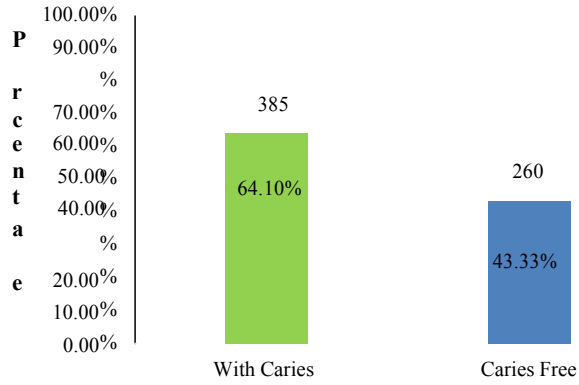


Figure 3: Distribution of study subjects according dental caries status

Figure 3 depicts the distribution of study subjects according to dental caries status. Among the 600 study subjects, 385(64.10%) are found to have dental carious lesions and 260 (43.33%) are detected to be caries free.

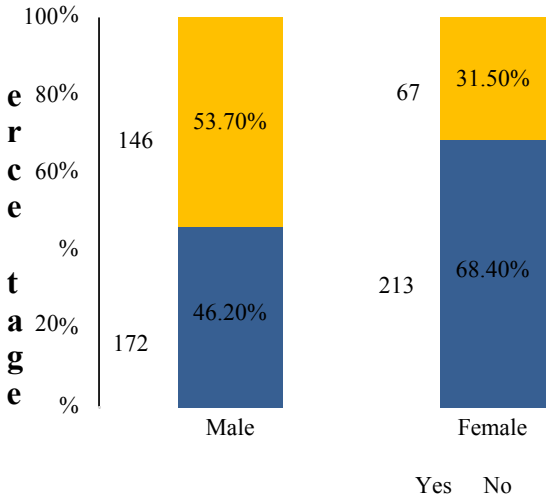


Figure 4: Distribution of study subjects based on dental caries status and gender

Figure 4 depicts the distribution of study subjects according to dental caries status and gender. Among the 600 study subjects, majority of the males comprising 172(46.20%) and 213(68.4%) among females were found to have dental carious lesions.

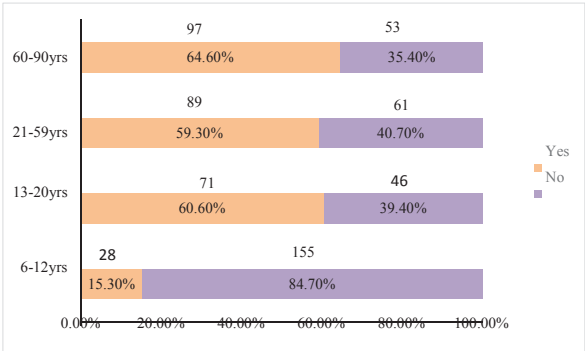


Figure 5: Distribution of study subjects requiring scaling based on age groups

Figure 5 depicts the distribution of study subjects requiring oral prophylaxis based on age groups. Among the 600 study subjects, 28(15.30%) of them belonging to 6-12 years, 71 (60.6%) of the individuals belonging to 13-20 years, 89(59.3%) of them between 21-59 years old and

97(64.6%) of them between 60-90 years were suffering from chronic generalized gingivitis and hence require scaling.

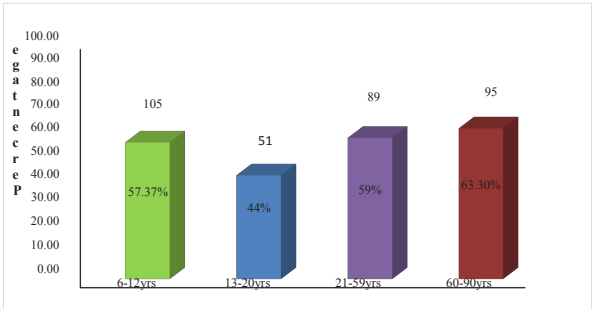


Figure 6: Distribution of study subjects requiring dental restorations based on age groups

Figure 6 depicts the distribution of study subjects requiring dental restorations based on age groups. Among the 600 study subjects, 105 (57.37 %) of them belonging to 6-12 years, 51 (44%) of the individuals belonging to 13-20 years, 89(59%) of them between 21-59 years old and

95(63.30%) of them between 60-90 years were suffering from dental carious lesions and thus require restorative treatments. Among the 600 study subjects, majority of the males comprising 53.7% and 68.4% among females were found to have dental carious lesions.

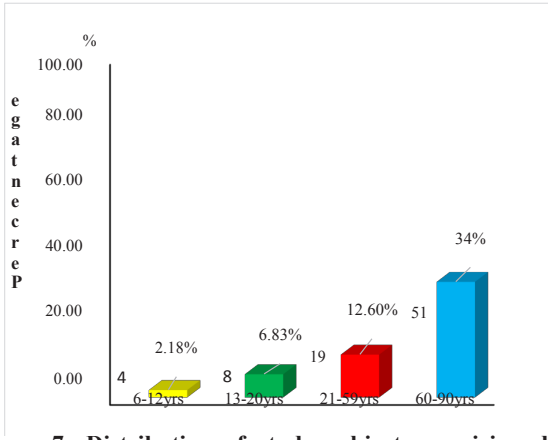


Figure 7: Distribution of study subjects requiring dental extraction based on age groups

Figure 7 depicts the distribution of study subjects requiring dental extractions based on age groups. Among the 600 study subjects,4(2.18%) of them belonging to 6-12 years, 8(6.83%) of the individuals belonging to 19(13-20 years), 51(12.6%) of them between 21-59 years old and 34% of them between 60-90 years were having root stumps and grossly decayed teeth and thus require extraction.

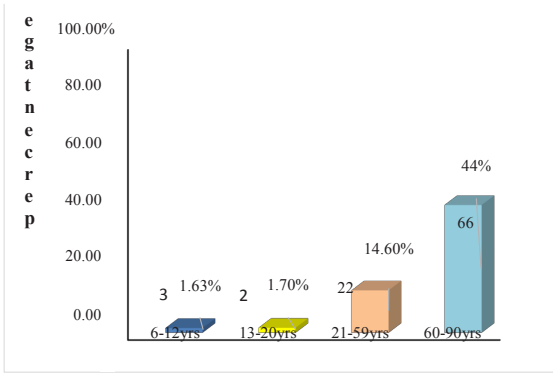


Figure 8: Distribution of study subjects requiring dental prosthetic treatment based on age groups

Figure 8 depicts the distribution of study subjects requiring dental prosthetic treatment based on age groups. Among the 600 study subjects, 3(1.63%) of them belonging to 6-12 years, 2(1.7%) of the individuals belonging to 13-20 years, 22(14.6%) of them between 21-59 years old and 66(44%) of them between 60-90 years were diagnosed to be partially edentulous thus require prosthetic treatments.

Table 1: Distribution of study subjects based on treatment needs according to gender

Gender	**Oral Prophylaxis**		**Restoration**		**Extraction**		Prosthesis	
	n	%	n	%	n	%	N	%
Male	117	36.79	250	78.61	27	8.49	50	15.72
Female	178	63.12	220	78.01	78	27.65	66	23.40

Table 1 shows the distribution of study subjects based on treatment needs according to gender. It shows that out of 318 males, 117(36.79%) require scaling and 250 (78.61%) of them need restorative treatments. Extraction is indicated for 27 (8.49%).Prosthetic treatment is recommended for nearly 50 (15.72%) of them. It also shows that out of 282 females, around 178 members comprising of 63.12% require scaling,220 (63.12%) need restorative treatments while extraction is indicated for 78(27.65%) of them and 50(15.72) women were recommended prosthetic treatments.

Oral Prophylaxis Restoration Extraction

Prosthesis

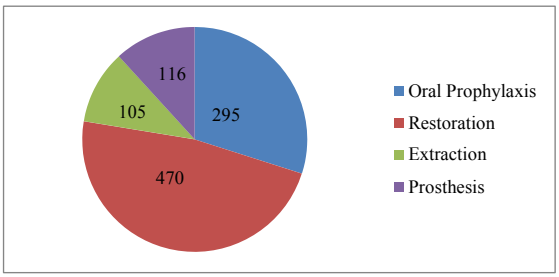


Figure 8: Distribution of study subjects based on treatment needs

Figure 8 depicts the distribution of study subjects based on treatment needs. It shows that restorative needs is the highest followed by scaling. Around 116 (39.12%) of them require rehabilitative treatments while 105(36.14%) need dental extractions.

Discussion

In our study, majority of the males comprising 318(53.7%) and 282(68.4%) among females were diagnosed to have dental carious lesions. This is in accordance with the finding that females had higher level of caries than males at both the ages in a previous study conducted by Fotedar Shailee et al in Shimla city, Himachal Pradesh [27]. It was found in the study that the prevalence of dental caries was 32.6% among population belonging to 12 years but in our study,105(57.37%) belonging to 6-12 years are affected. The same study also reveals that 42.2% of 15 years old individuals had the same dental problem while 51(44%) belonging to 13-20 years are detected with it in the current study. This shows that the prevalence of dental caries among population belonging to both categories is comparatively in higher proportion at Chennai City.

Around 95(63.30%) of the population belonging to 60-90 years affected with dental caries was found to be the highest in the present study. This shows that most of the residents in Chennai neglect oral health care as age increases as well.

In a similar study conducted by Saurabh P et al in 2016 at Maharashtra, about 336 (53.8%) participants were with the presence of calculus and this was found to be highest in the 12-15 years old and pockets were seen to be highest in 35-44 years old[28]. This is in contrast to our study in which the major proportion 97(64.6%) affected with calculus and pockets belong to geriatric group. However, the percentage of people affected with gingival and periodontal problems 295(49.1%) in our study in Chennai remains lower than in Pune. This survey reported levels of gingival bleeding and calculus and high scores of advanced periodontal symptoms. These conditions are preventable, primarily through proper oral hygiene practices.

In a study conducted by B. K. Sujatha et al in 2016 at Bangalore, 42% of subjects belonging to

65–74 year-old were edentulous while 66(44%) of them between 60-90 years in our study were diagnosed to be partially edentulous indicating that importance and priority for functional efficiency is not given priority among geriatric population in Chennai and there are no

appropriate policies in TamilNadu as in Bangalore to meet the rehabilitative treatment needs of elderly people [29].

Shaheen *et al* in their study found that (64.0%) of the elderly study participants had oral mucosal lesions. Surprisingly, no oral mucosal lesions were found in our study in any age group [30].

In spite of its tremendous, potential manpower resource and growing economy, India stands behind in terms of education, standard of living and in particular health [31]. Over decades, health in India is gaining less importance and oral health, the least [32].

The Government of India put a step forward to enhance the healthcare system by introducing National Health Policy (1983) which was reformed to lay down a new policy structure for the speedy achievement of the public health goals in 2002[33] and in 2015[34] However, to reduce the morbidity of the oral-related diseases, no much work has been done till date [35].

National oral health policy was conscripted by the Indian Dental Association (IDA) in 1986 and was accepted as an integral part of National Health Policy (NHP) by the Central Council of Health and Family Welfare in one of its conferences in the year 1995.

As recommended by WHO, health for all is possible only when every country spends 5% of gross national product (GNP) for healthcare but India is spending only 3% [36]. Health expenditure by the Government of India is amongst the lowest in the world where as that by the private sector is one of the highest [37].

This study aimed at framing a draft sustainable oral health policy for the natives of TamilNadu taking in to account the oral health status findings of residents in Chennai.

Conclusion

The present study demonstrated that residents in Chennai City suffer from high prevalence of dental caries and treatment needs as well as poor oral hygiene and gingival health status.

Good oral health is an essential to improve individual overall health and well-being. Implementation of suitable oral health programs at early age would help in improving preventive dental behavior, attitude and also minimizes the impact or cost of the treatment if intercepted at the right time.

It is high time that the responsibilities of oral healthcare of citizens are to be in the hands of governments. All the queries in attaining oral health for all can be answered by oral health policy. The TamilNadu State Government needs to set up a committee by involving dental professionals to plan for reduction of the oral disease burden of the State in a more comprehensive and practical approach. Political, social, organizational (both government and nongovernmental), professional dedication and support are needed to make oral health of this country comparable with general health.

Financial support and sponsorship: Self

Conflicts of Interest: Nil

Ethical Clearance: Ethical Clearance has been obtained for this article through Institutuional Human Ethical Committee (SDC/IHEC/ 095)

Future Scope

1. The Community Dentistry Department at all colleges in TamilNadu can unite to carry out periodic field practice areas under rotation basis in harmony with the institution in proximity. The TamilNadu State Government can support by offering sponsorship for dental materials and mobile dental vans that can be used to reach rural areas of the state thus reducing the difficulty in accessing oral health service for those belonging to the underserved sections of the community who are basically unaffordable.

2. Dentist to population ratio of 1:10 271 which is less than that recommended by WHO for rising nations (1:7500) [38] .This has to be considered seriously by the State Government by increasing job opportunities to deserving dental graduates at all Primary health Centers across the State.

3. Private practitioners in TamilNadu can be involved to ensure regular school oral health services by giving area wise responsibility in an urban set up with communal support and appropriate legislations.

4. The Dental curriculum should highlight and reinforce the importance of budding dentist's role and responsibilities in treating people without discrimination thus creating a positive attitude in serving people with low socio-economic background.

5. As oral health is an essential component for systemic well-being, all the medical and paramedical professionals belonging to both the Government and Private sectors in TamilNadu should be taught to diagnose basic oral disease by making oral examination mandatory as a part of general examination. This should be followed by timely referrals to dentist that will further help in timely interception of advanced oral diseases in the community.

6. Health insurances must persuade the coverage of dental treatments. Dental insurance can appreciably manage the increasing costs of oral healthcare and it can eliminate many reasons for neglecting oral health.

7. Smoking cessation counseling can be merged into other public health programs like tuberculosis, HIV/AIDS, family planning and maternal health programs to reduce mortality due to oral cancer.

8. Reduction of tax for oral hygiene products thus making it affordable to all.

9. Joint ventures adopting innovative oral health promotion strategies by Government, private and Nongovernmental organizations can help overcome disparities in the delivery of oral health service between rural and urban areas.

10. The State Government can help by periodic distribution of free fluoridated tooth paste and brushes to all the Government School Children.

11. Geriatric dental programs should be concentrated as a part of geriatric medicine specialty. Provisions of free dentures for all the needy senior citizens of the state can help the geriatric population by enabling functional efficiency. The rehabilitation program will also improve their quality of life.

12. The Tamil State Government can take initiatives with adequate fund allocation for oral health programs and set an example being a role model for other states.

Limitations

Study was carried out on small number of population and purposive sampling technique was used so, generalizability cannot be done.

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Impact of Professional Health Education on Dental Plaque Status and Comparative Evaluation of Effliciency between V-BEAT and Routine Toothbrush

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Abstract

Background: Toothbrush is the widely used personal and the most cost effective oral hygiene maintenance aid. Hence it must be appropriately selected.

Aim: To determine if professional health education or following brushing technique after reading instructions given by the manufacturer has an impact on dental plaque levels.

Method: The present trial was examiner blind, randomized and two visit study with 100 volunteers. The total sample consisted of 100 subjects and they were equally divided in to 4 groups. Group I were given health Education and instructed to use V-Beat Toothbrush. Group II were taught health education and instructed to use normal toothbrush. Group III and IV were instructed to use V-Beat and normal toothbrushes respectively. Participants were assessed for dental plaque status according to Turesky's Gilmore modification of Quigley-Hein plaque index using two-tone disclosing agent at baseline and first visit (7 days) which were subjected to comparisons. Data were entered in Excel and transferred to SPSS (Version 23) and correlation between and within the groups were determined for analysis.

Results: Group-I was found to be statistically significant than other groups compared in the study. On comparing Group-I and IV, least correlation was shown. However, greater significance was observed in Group-I. Further Comparisons of Groups I & II with III & IV led to the finding that significant difference was observed in the groups to which health education was given.

Conclusion: Health education intervention followed by usage of V-Beat tooth brush was most effective in reducing plaque.

***Key words**: Dental plaque, Oral health education, Plaque scores, toothbrush design, toothbrush selection*

Introduction

Oral diseases qualify as major public health problem owing to their high occurrence and incidence in all regions of the world. Oral health status is an integral part reflecting the overall well-being of an individual. As both are interlinked, oral hygiene maintenance is a requisite for a healthy living.

According to the World Health Organization, many factors like nutritional status, hygiene, stress, smoking and alcohol habits etc. are linked to a wide range of oral diseases forming the fundamental basis of the common risk factor approach to prevent the oral diseases [1]. Among these, oral hygiene is the most significant factor in terms of prevention of oral disease, accessible to personal control. Oral hygiene is a modifiable risk factor of oral

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problems that affects one's esthetics, communication, biologic, psychological and social projection.

Dental plaque is considered as the possible causative agent for formation of dental caries and bleeding gums which leads to periodontal diseases when it is not intervened at the right time. It was first identified by Loe et al in 1965 and it was demonstrated that there was development of gingivitis within a 10 days of stopping oral hygiene practices. It was noted that gingivitis was reversible when patients resumed their oral hygiene procedures. This proves that inadequate plaque removal on daily is the prime reason for development of common dental diseases and oral hygiene practice plays a significant role in prevention.

Mechanical plaque control method is well known for its effectiveness. Oral hygiene is maintained by various techniques like tooth brushing, tongue cleaning, flossing, and mouth rinsing with disinfectant mouth washes. Among these, toothbrush is the widely used personal oral hygiene aid. It was Mr. William Addis in 1780 from England who discovered manual toothbrush and was first introduced in China as early as 1600 B.C.

Improper tooth brushing causes gingival alterations. Acute lacerations are characterized by scuffled epithelial surface, punctate lesions that appear as red pinpoint spots and diffuse redness and denuded attached gingiva. Chronic alterations are found to appear as recession, changes in contour. It may also be manifested as rolled, bulbous, hard firm marginal gingiva in 'piled up' or festoon shape or with gingival cleft which would ultimately lead to periodontitis.

Researchers examined oral health status of individuals who had not performed tooth brushing and concluded that inflammation and exudate were present in the gingival tissues [2] after 4 days. However it subsided within 7 days at once the habit was resumed. Salzer et al suggested that tooth brushing once per day is an adequate measure to prevent the development of inter-dental caries [3].In a study of tooth brushing frequencies, tooth brushing at 48- hour intervals prevented gingivitis[4].

The above findings suggest us that optimal manual tooth brushing technique for an ideal duration is essential for the prevention of oral diseases. However high prevalence of oral diseases recorded may be attributed to the fact that inappropriate and inadequate oral hygiene practice which is common among the public due to lack of knowledge and motivation.

The World Health Organization in 2003 indicated that the focus of oral health education actions should be on behaviors and conditions that promote oral health or that decrease the risk of oral diseases; health promotion at school should encourage daily tooth brushing, supervised tooth brushing, use of fluoride, and promotion of good nutrition, among other strategies [5, 6].

Health education is an essential part of health services and has emerged as one of the fundamental approaches in primary prevention [7].It is found to be the most cost-effective method in comparison with other adopted methodologies [8]. Educational intervention is also easy in administration and logical at community level for health promotion when limited resources exist. It not only improves the physical health but also ensures broadening the mindset of closeted society as well enabling them to bring about life styles changes with avoidance to exposure of risk factors responsible for diseases [9].

Oral health knowledge is considered to be an essential prerequisite for oral health related behavior [10].The oral health literacy status deserves recognition as an important determinant of oral health.

An essential element in a preventive dental program, for both the individual and the group, is a well-organized plaque control program [11, 12]. Comprehensive home oral hygiene is the core of preventive regimen for which enhancement of knowledge is mandatory followed by instillation of positive attitude in order to achieve successful programs [13].

The role of Public Health dentists is imperative since they bridge the gap between various sections of people and health sector and all dental professionals should emphasize the need to take precautionary measures for maintaining good oral health with adequate reinforcement which is a requisite for inculcating a habit on long term [14].

Audio-visual education aids are found to be effective in improving learning skills of individuals. The uniqueness of this study is that it will reveal the existence of correlation in the psychological impact on receiving professional advice and using an audio assisted aid with adoption of precise oral hygiene practice.

This study would help educate the public on choosing the rightly designed toothbrush out of numerous different ones available in market.

Numerous studies have been carried out so far among dental practitioners and students to evaluate the prevalence, knowledge, attitude and practice regarding various aspects in different fields to apply the results in practical ways which is the need of the hour [15-19].

The aim of this study was to determine if professional health education or following brushing technique after reading instructions given by the manufacture has an impact on dental plaque levels and to compare the evaluation of efficiency between routine toothbrush and V-BEAT toothbrush available in markets with a sound producing attachment to guide as audio aid for brushing technique in relation to plaque removing efficacy over a couple of weeks timeline.

Materials and Methodology

Study Methodology: The present trial was examiner blind, randomized and three visit study with volunteers using either of the two types of tooth brushes. Participants were randomly selected from a Management college at Chennai.

Study Period: This study commenced in December 2018 and took place for a period of 1 week.

Study Place: Chennai

Sample Size Estimation: The sample size was evaluated by using G-power Software and values from a study conducted by Vandana K La et al [20].

Sample Size (N) for rounded off to 100

Inclusion Criteria

➢ Students who had minimum 24 natural teeth with scorable buccal and lingual surfaces on indexed teeth (16, 21, 24, 36, 41, and 44).

➢ Students who were available to attend both the visits.

➢ Students having a minimal plaque score of 1

Exclusion Criteria

➢ Students having active caries lesions and periodontal diseases requiring treatment

➢ Students who were under periodontal, prosthetic and active orthodontic treatment

➢ Students who had systemic debilitating condition.

Materials Used:

➢ Teeth Model

➢ V-Beat Magic Tooth Brush

➢ Colgate Dentifrice with active Salt

➢ Colgate Soft Bristles tooth Brush

➢ Head cap

➢ Mouth mask

➢ Gloves

➢ Ears buds

➢ Two tone Disclosing agent

➢ Cheek Retractor

➢ Mouth Mirror

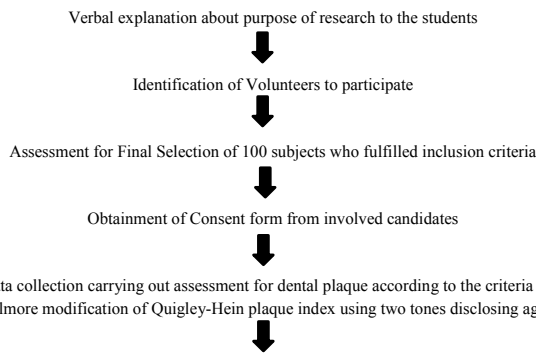
➢ Torch Light

➢ Tray Sheets

➢ Disposing bin

Clinical evaluation: A single examiner evaluated all the subjects for plaque assessment using Turesky-modified Quigley–Hein index from six index teeth (16, 21, 24, 36, 41, and 44) under artificial light.

Flowchart of Adopted Methodology



The total 100 subjects were divided equally in to four groups namely Group- I: Health Education+ V-Beat Toothbrush, Group- II: Health education+ Normal toothbrush, Group- III: V-Beat Toothbrush, Group- IV: Normal toothbrush

⬇

Standardized dentifrice was distributed to all in both the groups

⬇

Coding was done by Recording Clerk for the two types of toothbrushes

⬇

The two differently coded brushes were equally distributed for the four Groups

⬇

Group I and II was taught Modified Tooth Brushing Technique using Model

⬇

Groups I and III were informed that manual vertical stoke produces sound

⬇

Instruction was reinforced to use the given dentifrice and randomly allotted toothbrush for the next 7 days for both groups

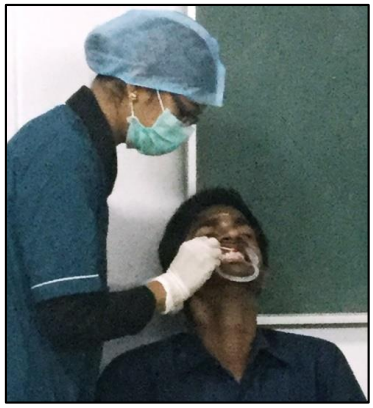
Pictorial Representation:



(a)Armamentarium and arrangement of sample kit prior commencement of the study



(b)Verbal Explanation regarding the research was given to a group of students for identification of volunteers



(c)Assessment for baseline dental plaque according to the criteria of Turesky's Gilmore modification of Quigley-Hein plaque index using two tones disclosing agent.



(d) Demonstration of Modified Tooth Brushing Technique using Model to individuals belonging to Group-I



(e). Assessment for dental plaque on the 7th day or first follow-up according to the criteria of Turesky's Gilmore modification of Quigley-Hein plaque index using two tones disclosing agent.

Statistical analysis

Data was entered on to Microsoft Excel and statistically analyzed using statistical package for social sciences (SPSS), 23.0. In order to find whether all the 4 groups are efficient F-Test was used. One-way Anova was used to find the interrelationship between groups.

Results:

Table 1: Distribution of Study Subjects based on their demographic details

Groups	Number of Subjects		Age
	Male	Female	Mean
Health Education+ V-Beat Toothbrush	14	9	24
Health education+ Normal toothbrush	16	6	23
V-Beat Toothbrush	17	7	23
Normal toothbrush	21	10	24

Table 2: Dental Plaque scores assessed using Modified Quigley-Hein plaque index of the study subjects

Groups	N	Plaque Score Mean	
		Baseline	After 7 days
Health Education+ V-Beat Toothbrush	25	0.51	0.3
Health education+ Normal toothbrush	25	0.41	0.42
V-Beat Toothbrush	25	0.60	0.44
Normal toothbrush	25	0.66	0.40

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Table 3 shows One-way ANOVA to find the interrelationship between and within groups

Groups	Variance
Health Education+ V-Beat Toothbrush	0.18
Health education+ Normal toothbrush	0.18
V-Beat Toothbrush	017
Normal toothbrush	0.066

Table 3 shows one way ANOVA to find the interrelationship between and within groups. It reveals that P-value with 0.056 between the groups appears to be statistically significant.

Discussion

Tooth Brushing is the most regular oral hygiene habit performed by common man which is relatively inexpensive comparatively to the cost of dental treatment procedures. The selection of an important oral hygiene aid starts with appropriate selection of the type or design based on which different purposes depend upon.

It is however regarded complicated since, many factors such as duration of tooth brushing; manual dexterity, motivation, the frequency of tooth brushing and the novelty effect influence the results.

Knowledge is a pre-requisite for bringing about a change in behavior playing a key determinant role in influencing the attitude as well. Providing information indicated that educational intervention could improve all aspects of oral health maintenance in a study conducted by Solhi et al [21].

Although several workshops and reviews have consistently concluded that there is no superior design of manual tooth brush, yet different companies are coming out with different designs, each claiming superiority, backed by the results of their own clinical research team. Further, gained knowledge of expected behavior has resulted in an increase in the use of oral hygiene aids and its maintenance [22].

A commercially available toothbrush named V-BEAT with a novel bead device attached capable of producing sound on vertical manual stokes thus aiding in audio effect to guide the general public for modified brushing technique was considered for evaluation in this study. The purpose of conducting this study

was to compare the evaluation of efficiency between V-BEAT and routine manual toothbrush in relation to plaque removing efficacy and also determine the role of professional dental health education with it.

TMQHPI was used in our study to determine the plaque accumulation and it is a well-established index in clinical trials assessing the efficacy of tooth brush in plaque control [23].

Out of the total 100 subjects , Group I and II were demonstrated modified Bass method of brushing at the initial visit, professionally educated regarding other oral hygiene measures for maintenance and were instructed to use the V-Beat and Normal toothbrush with the given standard dentifrice. The same was carried out to Groups III and IV respectively without health education intervention delivered prior.

Comparisons with previous literatures are not feasible owing to the uniqueness of this study taking health education intervention and such an audio assisted device as oral hygiene aid in to consideration. A difference appreciable between the recorded baseline plaque scores and those observed during follow-up in all the four groups could be due to Hawthorne effect. It was found that Group I was found to be statistically significant than other groups from which an inference that the combined effect of health education and V-BEAT has a better plaque removal effect.

Conclusion

Health education intervention followed by usage of V-Beat tooth brush was most effective in reducing plaque.

Financial support and sponsorship: Self

Conflicts of Interest: Nil

Ethical Clearance: Ethical Clearance has been obtained for this article through Institutuional Human Ethical Committee (SDC/IHEC/ 097)

Limitation: Study carried out for a short period on a relatively smaller population may be the reasons for decreased reliability of the derived conclusion.

Future Scope and Public Health Relevance:

This study shows that professional health education and guidance of dentists in choosing the right toothbrush plays a significant role in inculcating a good oral hygiene practice among the public. This inturn also helps the community to protect themselves from oral diseases by adopting the most cost effective and efficient ways.

Recommendations: Similar study on a larger population with extensive duration is recommended for increased reliability of results.

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Volume of the Brain Tumour Regions with Hybrid Segmentation

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Abstract

MR imaging gives the normal and abnormal anatomy of the brain. MR imaging plays a vital role in diagnosis, localization, quantifying the volume of the tumour and in treatment planning for the radiologists. In this we propose a method for segmentation of tumour regions of brain from a two dimensional (2D) cross sectional magnetic resonance (MR) images. In this an active contour segmentation algorithm is done regions. It uses the hybrid technique of intensity and fuzziness to segment the tumour region. The Flair MR image is used to estimate the whole region of the tumour. The MR images have a complex intensity which will not be able to give a proper segmentation if a single method is used. The segmentation is done without any training dataset. From the segmented results, the Radiologists can find the intensity of whole tumour. This method shows the significant improvement in segmentation compared to manual segmentation.

Keywords*: Active conyour, Brain Tumour, FCM, Magnetic Resonance Imaging, 3D reconstruction*

Introduction

Automatic or semi-automatic image segmentation techniques of medical images are considered to provide significant improvement in turnaround times and cost-effectiveness of applying such techniques in an actual medical environment. Segmentation of medical images inherently becomes a difficult problem because of the variations in image modalities due to scanning parameters variations and biological variations.

MRI is the preferred method of brain tumour diagnosis and prediction of tumour growth rate. However brain tumours and the edema caused by it cause the image to be diffused with the background with poor contrast making it hard to localize a tumour using MRI images.

The main objective of brain tumour detection is to detect and identify the regions of the tumour, namely active tumour tissue, necrotic tissue, and edema. Glioblastomas tumours are notably harder because of their infiltrative nature, and their borders are fuzzy. By using more than one modality, like T1, T2, and MRI Flair, the contrast between modalities is used to distinguish the tumour tissue.

Related Works

The structure of the brain is very complicated. MR images have high soft tissue contrast . Magnetic resonance imaging or MRI is a valid medical imaging technique for diagnosis and therapy of brain tumours. Hence segmentation is necessary for detecting tumours and its effects such as the surrounding edema and necrotic tissue. Segmentation of MRI images of brain tumours has been the focus of many works. However, the segmentation task is hard in this case because of the complex nature of MRI image intensities.

Clustering, thresholding, and other simple image processing techniques are not very effective. For detecting the regions of a tumour, it is hard to find threshold values as the intensity distribution in the image of a tumour and surrounding brain tissue is very complicated. Thresholding methods have to be applied in combination with other methods [1]. A common and straightforward region-based technique proposed is region growing [2]. In this technique, a pixel or few pixels inside the region of interest is selected as seed pixel to initialize the growing. This process terminates when no new pixel can be added to the region. Even though

this technique is less computation-intensive and fast, region growing techniques have limited accuracy when it comes to segmentation because of the partial volume effect [3]. At the edges of different types of tissue, the intensity difference is blurred because of this partial volume effect. Segmentation using statistical properties of tissue classes was proposed [4]. Segmentation was observed to be better using a fuzzy fusion framework by combining fuzzy knowledge and seeded region growing [5]. Using unsupervised FCM clustering algorithm as a segmentation technique to derive clinically relevant anatomical and pathological information, a Brain tumour was segmented into tissue classes, including active cells, edema, and necrotic tissues [6]. In [7] level set method while segmenting the image, bias field correction was found. They found that the bias field is used for the intensity in homogeneity correction.

For actual clinical application, segmentation performance has to be very high.

Liu et al. propose constructing the region of interest as a rectangular volume, using fuzzy connected framework for segmentation to identify the tumour region from the first and last slice [8].In Shen's FCM algorithm, neighbourhood attraction is based on the relative location and features of adjacent pixels [9]. Deformable models such as active contour are more robust to deal with the biological differences between different tissues. The snake model can find object contours well if initialization is done correctly [10] [11] [12], but with the consideration that snakes or active contours can lead to missing boundaries if the initialization is not proper. Hence it is not sufficient to use such deformable models alone.

Different level set methods [LSM] are found in energy minimization approaches that are used in segmenting an object. Level set methods used in image segmentation is classified as edge-based models or region based models. The image gradient information is used in edge based models, whereas the region descriptors are used in region-based models for the propagation of active contour. Pratondo [13] et al. used the region growing algorithm in which the initial seed is selected using the global threshold and by comparing the neighbourhood pixel intensity with the global threshold. Yang et al. used the different level set functions that are used in the segmentation [14-16]. Mukherjee et al. [17] used known basis functions to do region based segmentation in the presence of noise. Bastan [18] used local continuity and smoothness cues provided by strong edges to grow weak edges or missing edges.

Li [19] used a fuzzy active contour model where the edge and local information are combined. The active contour uses fuzzy energy as motivation power. In Alaa's [20] weighted level sets, the weighing energy forces using logical edge features are used to reduce the leakage along contours. Zarpalas [21] used the blending of image information. Ortiz [22] suggested an improved brain MRI segmentation method using self-organizing maps and entropy gradient clustering. Agus pratondo [23] et.al used gradient information and probability scores from a standard classifier to construct the edge stopping function for medical image segmentation. Several hybrid models have been implemented to make use of both local (edge based) and global region-based segmentation[24]. Segmentation using multiphase approach is useful in the study of anatomical tissue variations [25]. Much work has been developed on Multiphase contours with complex formulation but with reduced complexity [26, 27].In this work, we have proposed an algorithm where region-based active contouring is followed by a distance-based fuzzy contouring method to segment the tumour region.

Proposed Work

The purpose of this work is to develop a semi-automated segmentation method to be applied on a variety of MRI images to segment the tumour regions. A region based snake is used to segment the whole tumour region from a MRI slice. It is followed by using fuzzy segmentation on the segmented region, to segment the tumour region more effectively compared to other methods. The segmented FLAIR image contains the edema region. At the end of the procedure, the volume of the fuzzy connected object was found as the FLAIR volume.

Region Based Snake Models

In a simple snake model by Kass, the contour is obtained from the changes in grey levels at the edges present in the image. Another type of active contour model is the region based snake model represented by Chan and Vese.

A common type of region based snake model where the grey level values of a pixel is represented as a Gaussian distribution with variance σ^2. The model

also states that the pixels have two different mean grey values, μ_0 if a pixel is part of the background and μ_1 if it is considered to be inside the object. So, for an image I if ext(u) is all the pixels x on the outside of the contour given by u, and int(u) all the pixels inside the contour u, the snake problem is equivalent to the the optimization of the functional enquation (1),

This model can be viewed as computing snake using the Mumford-Shah model. The objective is to minimize the above functional with respect to the two distinct optimal mean grey values μ_0, μ_1 and the contour u. So if there is have a given active contour u, the optimal mean grey levels are basically the mean intensity of the image on the outside and the inside of the contour. The user supplies an initial contour. Gradient descent is applied on E with that supplied contour.

Applying the Chan-Vese model which has a piecewise constant form, we obtain the gradient descent equations of the desired active contour. Gradient descent ensures that the snake gradually changes shape such that the energy function decreases steadily. Another property of the region based snake given by E is that the contour always moves perpendicular to itself as the gradient descent evolves. The name active contour basically signifies that the snake gradually changes shape.

Region Based Snake Model with Anchor Points followed by Improved Fuzzy Segmentation

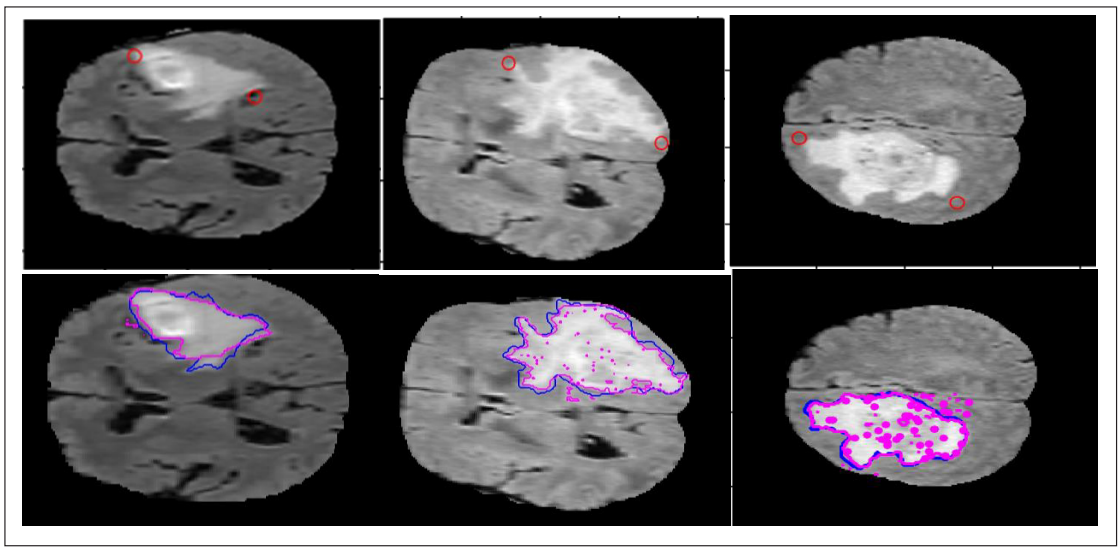


Figure 1: Examples from BRATS data,Top row shows the original flair image with anchor points of the whole tumour region. Bottom row shows the tumour regions as annotated from individual experts (blue lines) and the segmentation with the proposed algorithm (magenta lines), shows the flair image with outlines of whole tumour region.

We compute a region based snake model to obtain the required contour by completing a rectangle using two fixed anchor points as diagonal. By choosing mean grey levels $\mu_0 = 0$ and $\mu_1 = 1$, inside the snake and outside the snake respectively, we apply the Mumford-Shah model. The user initializes the snake, for example using a previous solution from a simple method.

The objective is to minimize the snake energy by changing the snake. We apply gradient descent iteratively on the partial differential equation. The termination condition is when the change in the solution is less than a predetermined tolerance between two iterations.

The similarity measurement $d^2 (x_j, y_i)$ is used to find the membership value of the FCM. The $d^2 (x_j, y_i)$ value is the difference between the intensity of a pixel and the cluster center. In the fuzzy algorithm, the neighbourhood attraction exist between the neighbouring pixels. The neighbourhood attraction depends on the spatial position and the intensities of the pixel. According to Shan Shen in his IFCM , the initialization of the membership is inherited from FCM.

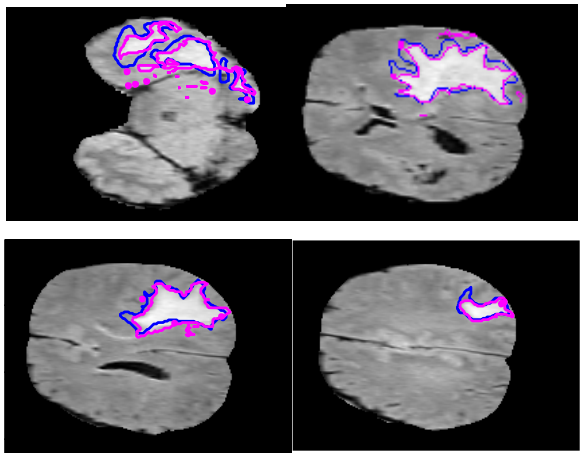


Figure 2: Sample slices of segmentation results obtained by the proposed method on the BRATS2012 HG-0008 dataset with whole tumour region annotated by expert in blue and by the proposed method in magenta.

In our proposed work, the initialization of the membership is not created randomly but inherited from Active contour region. The algorithm is:

1. The number of clusters and the degree of fuzziness is determined.

2. The cluster centers u_{ij} are initialized.

3. Calculate the improved similarity measurement $d^2(x_j,y_i)$.

4. Update u_{ij} with $d^2(x_j,y_i)$.

5. Compare u_{ij} and $u_{ij}^{(l-1)}$, If $\| u_{ij} - u_{ij}^{(l-1)} \|$ is less than the required threshold then stop otherwise go to step 2 and repeat.

Results and Discussions

The proposed method has been tested on a sequence of MR images. The MR images are taken from **BRATS 2012** database. The segmentation of the tumour region has been studied here. The whole tumour region was detected with the help of region based active contour region and followed by fuzzy C means algorithm. The image taken is a FLAIR MR image from the dataset. All the images are co-registered. The dataset contains the ground truth with segmentation labels. We worked with 2D slices of the MRI volumes.T2-weighted FLAIR image with 2D axial acquisitions used. Each image is $1mm^3$ resolution. The region is again segmented with the fuzzy c-means.

Figure 1 shows the segmentation results from the BRATS dataset on sample 2D slices. The top row shows the original FLAIR MR slices and the bottom row shows the segmented MR slices with blue lines representing expert outline and magenta line with the proposed algorithm.

Most common measures to report segmentation overlap results in brain tumour segmentation are Dice overlap(D), Jaccard index. The tumour region Jaccard index, Dice, Sensitivity and Specificity are computed between two label sets A and B is given as in equation (2),(3) ,(4)and (5).

$$Jaccard\ index = \frac{s(A \cap B)}{s(A \cup B)} \quad (2)$$

$$Dice(P,T) = \frac{|PP \cap TP|}{(|PP|+|TP|)/2} \quad (3)$$

$$Sensitivity = \frac{|PP \cap TP|}{|TP|} \quad (4)$$

$$Specificity(P,T) = \frac{|PN \cap TN|}{|TN|} \quad (5)$$

Where PP represents the predicted positive and PN represents predicted negative, then TP and TN represents the true positive and true negative from the ground truth. The 15 high grade tumour has been taken from the database and the complete tumour region is segmented from the image. The segmented region's dice score , Jaccard index, sensitivity and specificity are obtained. With BRATS 2012 dataset, it is possible to compare the algorithm's robustness.

Table I presents Dice overlap results of whole tumour segmentation for the tumours for which ground truth is available. This method is faster because the region to be processed is very limited compared to the normal fuzzy segmentation, where it has to process the whole image. The average dice score is reduced due to challenging case 5.The Dice score of whole tumour region is comparable with the other methods presented by Menze[28].

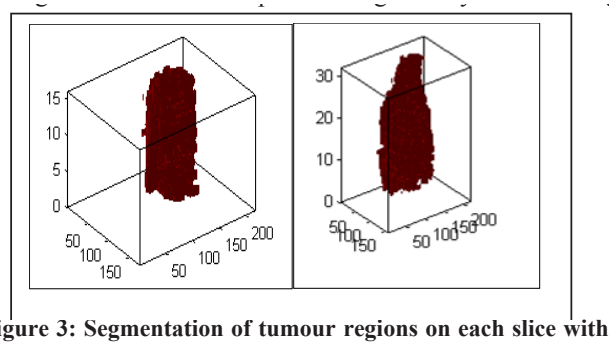


Figure 3: Segmentation of tumour regions on each slice with the proposed algorithm and 3D visualization of the tumour regions.

When compared with the dice scores of the whole tumour region as reported by different authors is given by Menze, this method has a better result. The sample slices of the tumour segmented with the proposed algorithm for the real dataset HG -0008 from BRATS 2012 are shown in Figure 2.The ground truth from the database is represented in blue colour and the magenta lines represent the segmentation with the proposed algorithm. From the figure it is clear that the proposed method follows the region more closely the tumour region than the ground truth.

Table1: Results on BRATS 2012 database by the proposed method

Real Data Case	Dice	Jaccard Coeff	Sensitivity	Specificity
HG-0001	0.8917	0.8046	0.8420	0.9971
HG-0002	0.5932	0.4217	0.4829	0.9974
HG-0003	0.8290	0.7079	0.7366	0.9962
HG-0003	0.8290	0.7079	0.7366	0.9962
HG-0004	0.8179	0.6919	0.6938	0.9998
HG-0005	0.0418	0.0214	0.9672	0.0018
HG-0006	0.6381	0.4686	0.6678	0.9948
HG-0007	0.8604	0.7550	0.8219	0.9895
HG-0008	0.9057	0.8277	0.8665	0.9937
HG-0009	0.8673	0.7657	0.8321	0.9897
HG-0010	0.7796	0.6388	0.6716	0.9989
HG-0011	0.7780	0.6367	0.6420	0.9996
HG-0012	0.7639	0.6180	0.8462	0.9994
HG-0013	0.8738	0.7758	0.8761	0.9981
HG-0014	0.8722	0.7734	0.8977	0.9856
HG-0015	0.7679	0.6233	0.8841	0.9607
Average	0.7520	0.6353	0.7819	0.9268

This result is comparable with other methods reported by Menze in the semi-automatic segmentation methods. Figure 3 displays the 3D visualization of the segmented region of the tumour for the real dataset HG -0003 and HG-0008 from BRATS 2012 database. The volume of the tumour can be found from the no of pixels in each tumour region.

Conclusion

In this, we presented an interactive brain tumour segmentation algorithm based on region-based active contour and fuzzy c-means algorithm. This hybrid segmentation technique achieves high performance. As indicated, we have used the FLAIR images for segmentation of the whole tumour region. The proposed method include simple interaction over the slices and less sensitivity to the initialization.This method works well for those imaging modalities where the lesions have high contrast over the healthy tissues. This segmentation method is faster than other methods. In future work, this method may be applied to the different modalities to segment different regions of the tumour. The main

limitation of this method is that user initiative is needed for setting the anchor points. The interaction time of the user is a few seconds and the typical computation time vary between 3 minutes to 15 minutes depending on the volume of the tumour.

Ethical Clearance: Taken from Saveetha School of Engineering, Chennai

Source of Funding: Self

Conflict of Interest: Nil

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Multi Sensor Approach in Structural Health Monitoring of Buildings

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Abstract

Structural Monitoring of buildings has a notable impact to the safety of the population. By continuously monitoring the health of the structure we may reduce the risk factor of facing the damage and provide safety for the population. Structural health monitoring is effectively carried out by placing multiple sensors for acquiring timely information. The main objective is to develop a structural monitoring and indication system based on wireless sensor network (WSN). The system continuously monitors the acceleration, vibration and the overload experienced by the building and indicates the concerned authority in case of severe damage. Furthermore, it has fire and gas alarm function which will set 'OFF' the power supply within the building. Using PIC16F877A, NRF24L01, GSM, the wireless communication between the nodes and PC monitoring is carried out which implements the control. This will help the maintenance and safety of the building. The system will be simulated and tested for its capabilities.

Index Terms— *WSN, accelerometer, vibration sensor, load cell, gas sensor, relay, GSM.*

Introduction

Structural health monitoring is estimating the state of a structure, or detecting the changes in structure that may affect its performance. Due to the absence of pre-existing model for the building stability, monitoring the structural health of historical heritage buildings may be a daunting task. Initially the assessment of integrity of such structures was manually carried out by experts. But manual monitoring is time consuming and the result may not be accurate.

The development of innovative results for the structural monitoring is originated from the large number of big buildings in the world. In [1] the factors which could affect the health status of buildings are analyzed with rational and objective performance issue assessment of structural and non-structural components. Seismic events are the major causes of structural damage and failure, which represents a serious danger for the population. For high risk environments like schools or public buildings the availability of an early warning system for the early detection of structural failures would be a primary interest.A framework for synergy between SHM and earthquake early warning for enhanced seismic protection of a target structure is being proposed by the authors in [2].

Early warning system can be defined as a multifunction system, containing sensors, signal processing and communication services aimed to provide timely information that is necessary to prepare resources and response actions for the minimization of the impact of the fore coming threat [3].The importance of early warning system in structural monitoring results in the timely measure of anomalous deformations and solicitations which could compromise the structural integrity and the cause of injury for people. The concept of distributed multi sensor approach system has significantly increased with the availability of wireless sensor networks (WSNs) which overcome problems related to wirings and network topologies.

In [4] a survey on wireless systems for the health monitoring of large structures is being discussed. An effective SHM system has been designed in [5]. It is based on the incorporation of several sensors and hardware mechanism in a modular structural design. Efforts have been made to reduce the volume of data to be transmitted, reliability and sustainability of

infrastructure is maintained. However, in the aspect of the power budget analysis, a critical issue to allow a battery power supply, has not been considered.Based on Wireless Sensor Networks (WSNs) provides a wide approach to SHM of buildings [6], [7] to provide a real-time, pervasive, low-cost, non intrusive and highly flexible data collection and analysis.

Related works

Structural health monitoring is not a new conception. Earlier structures were monitored manually. Later manual monitoring was replaced by conventional methods using sensors [10], [11] to reduce the time and to improve the accuracy. The predictable scheme uses PCs wired to piezoelectric accelerometers. But this method may disturb the normal operation as wires have to run all over the structure. This method also has other drawbacks as the cost of apparatus is high, installation due to wiring and maintenance is very expensive.

Data Acquisition System (DAQ) was used to monitor each sensor. The DAQ method is used to sample the real time physical conditions such as temperature, gas pressure, light intensity, etc. into digital numeric values. The sensors are connected to the PC serially through RS232 resulting in high cost, scarce monitoring frequency, and there is high possibility of error due to vague positioning [19]. During data collection, great effort should be made to gather data from a significant amount of recognizing spots [18].

Linear Variable Differential Transformer (LVDT) device was used to measure the relative displacement. LVDT method requires wiring of the sites that is under observation, which is highly impractical due to cost and architectural constraints. If timely prevention system is not implemented in the Buildings it may result in loss of Human lives due to disaster, gas leakage/ blast in the home.

To monitor the buildings with intermittently to preserve them from decline and to acquire more accurate restoration to fix the damages caused due to natural marvels we go for a multi sensory approach using WSN. This method uses a peripheral sensor system with wireless sensor nodes working together in common with each other, and a remote presentation infrastructure for data visualization and feedback acquisition. This can be achieved by using load cell, triaxial MEMS accelerometer sensor, inclinometer, strain gauge, temperature and humidity sensor, gas sensor and a relay circuit.

The use of Wireless Sensor Networks allows a spreading surveillance over the site of interest to lessen the potential damages caused by natural phenomena [12], [15]. In contrast to conventional approaches, our application allows for prevalent and non offensive observing, and offers precise feedback.

Multi sensor Approach

A schematic diagram of the developed system for structural health monitoring is shown in Figure. 1.

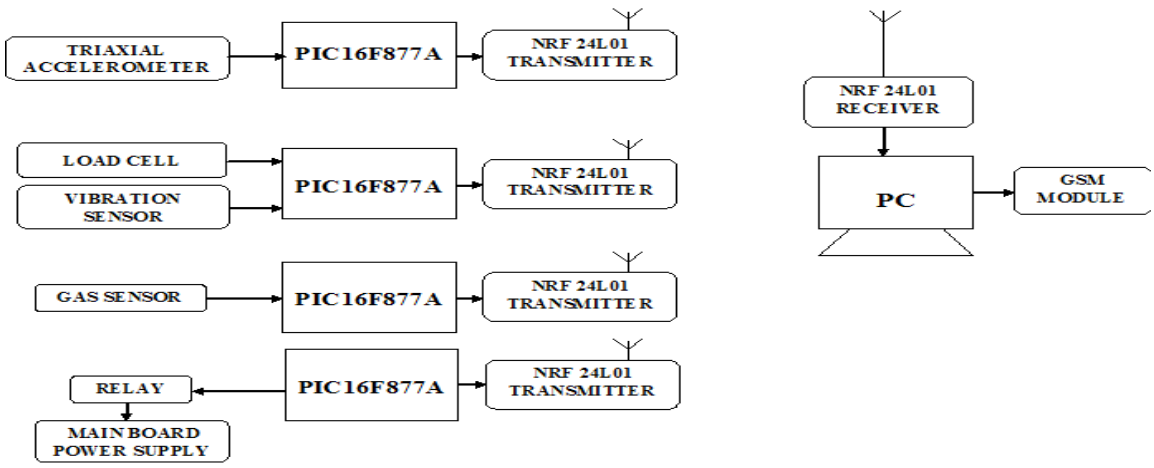


Figure 1: Block diagram of the developed integrated sensor warning system for structural health monitoring.

A. Triaxial Accelerometer

The triaxial accelerometer ADXL335 is used to sense the acceleration and change in position with resolution, of about ± 3g and 0.004º with a bandwidth of 1.6KHZ. The accelerometer sensors are placed along the beam during the initial stage of construction.The accelerometer is interfaced to the single PIC16F877A board. The high frequency data is collectively gathered from the node and continuously monitored on the PC with the help of NRF24L01.

B. Vibration Sensor

The SW-420 vibration sensor is used to sense the vibration experienced by the building. The sensor measure vibration based on the piezoelectric effect. The voltage across the crystal is created when the high impedance charge is produced when force is applied to the crystal.

C. Load Cell

The load cell is used to sense the load withstanding capacity of the building. The load cell which we use is strain gauge type. Four strain gauges are glued to the load cell which is placed along the surface of the beam. For the site under construction the strain load cell are mounted on the re-bar and then encased in concrete, which are used to measure the shrinkage and the strain on the structure. The nodes embedded by load cell similarly carry sensors for assessing vibration. The load cell and vibration sensors are interfaced with the PIC 16F877A.

D. PIC16F877A

PIC 16F877A is a 40-pin 8-Bit CMOS FLASH Microcontroller from Microchip. 5V power supply is given to this microcontroller. Its module consists of the capacitor of 22pF and the frequency range is 20MHZ.

E. Gas Sensor

The MQ5 sensor is used to sense the gas leakage. The MQ5 sensor uses Tin Oxide (Sn) Semiconductor as the sensing element which has low conductivity of clean air. The standard detecting condition is 20ºC and the resistance value of MQ-5 should be above20KΩ.

F. Relay

A Relay is connected to PIC16F877A, which senses the reading from MQ-5 and switches off the main supply if the gas is sensed. An Electromechanical relays are made of a coil, an armature mechanical, and electrical contacts. When the coil is energized, the induced magnetic field moves the armature that opens or closes the contacts. The ULN2803 consists of eight Darlington transistors with collective emitters and integral overpowering diodes for inductive loads. Each Darlington features a peak load current rating of 600mA and in offset state it can withstand at least 50V. For higher current competency the outputs may be in parallel. ULN2803A has a 2.7kW input resistor.The triaxial MEMS accelerometer sensor connected to PIC16F877A act as single node which is placed at the defected area. The load cell and vibration sensor connected to PIC16F877A act as second node. The gas sensor and relay interfaced with another PIC act as third node. NRF24L01 is connected to the each node through which data are sent to the PC. NRF24L01 is worldwide wireless standard that deals with WPAN (Wireless personal area networking). It operates at 2.4GHz ISM band. NRF24L01 tends to be more reliable and easy to use. It has ultra low power consumption.

The received data are continuously monitored in the PC and if the data sensed is above the critical value, then the indication is sent through SMS to the concerned authorities using GSM module. GSM (Global System for Mobile) TTL -Modem is SIM900 Quad-band GSM/GPRS device, occupied on frequencies 850 MHZ, 900 MHZ. It can be easy to use as a plug in GSM Modem and very compressed in size. It is intended with 3.3V and 5V DC TTL interfacing motherboard, which permits the user to interface directly with 3.3V Microcontrollers (ARM, ARM Cortex XX, etc.). The baud rate is configurable from 9600-115200 bps. It has internal TCP/IP stack to empower user to connect with internet through GPRS feature. It is well suited for SMS as well as DATA transfer applications in mobile phone to mobile phone interface.The modem can be interfaced with a Microcontroller using USART (Universal Synchronous Asynchronous Receiver and Transmitter).

Simulation Results

Simulation is done using Proteus software. Proteus combines the ISIS schematic capture and PCB layout programs. It is integrated and easy to use suite of tools for design. Simple drag and drop operations constitute a significant part of editing. The coding is being done in MPLAB IDE software for PIC16F877A.

Initially the simulation was developed for each sensor node and the readings were monitored individually for each sensor.

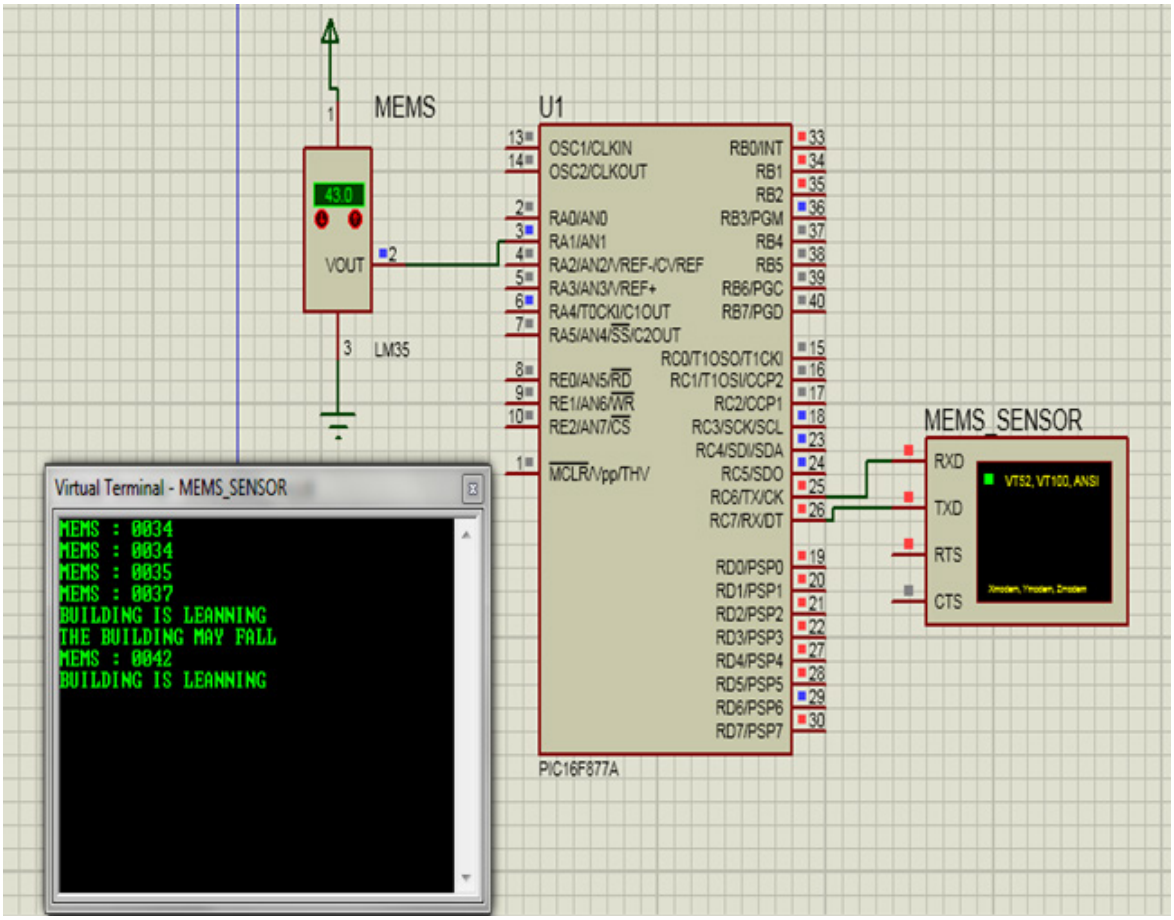


Figure 2. (a) Simulated response of node 1

(b) Hardware setup for node 1(Accelerometer).

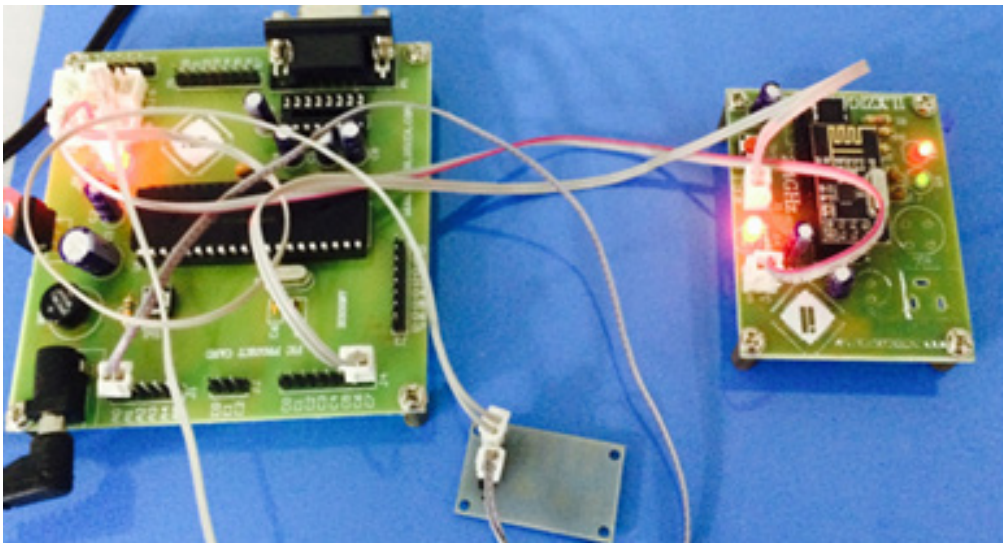


Figure 2(a) shows the MEMS accelerometer on a single PIC16F877A board and the collective display of the readings. Figure 2 (b) Shows the hardware setup for node 1. When the readings are within the threshold values mentioned in the coding, the current digital values are displayed indicating as “NORMAL”. If it is beyond the threshold value “WARNING” indication is displayed.The threshold values for normal condition mentioned for each sensor is shown in Table 1.

Table 1: Threshold Values of Each Sensor

Sensors used	Threshold values
Mems Accelerometer	X: 20- 30 Y: 20- 30
Gas Sensor	Below 20
Load Cell	Below 40

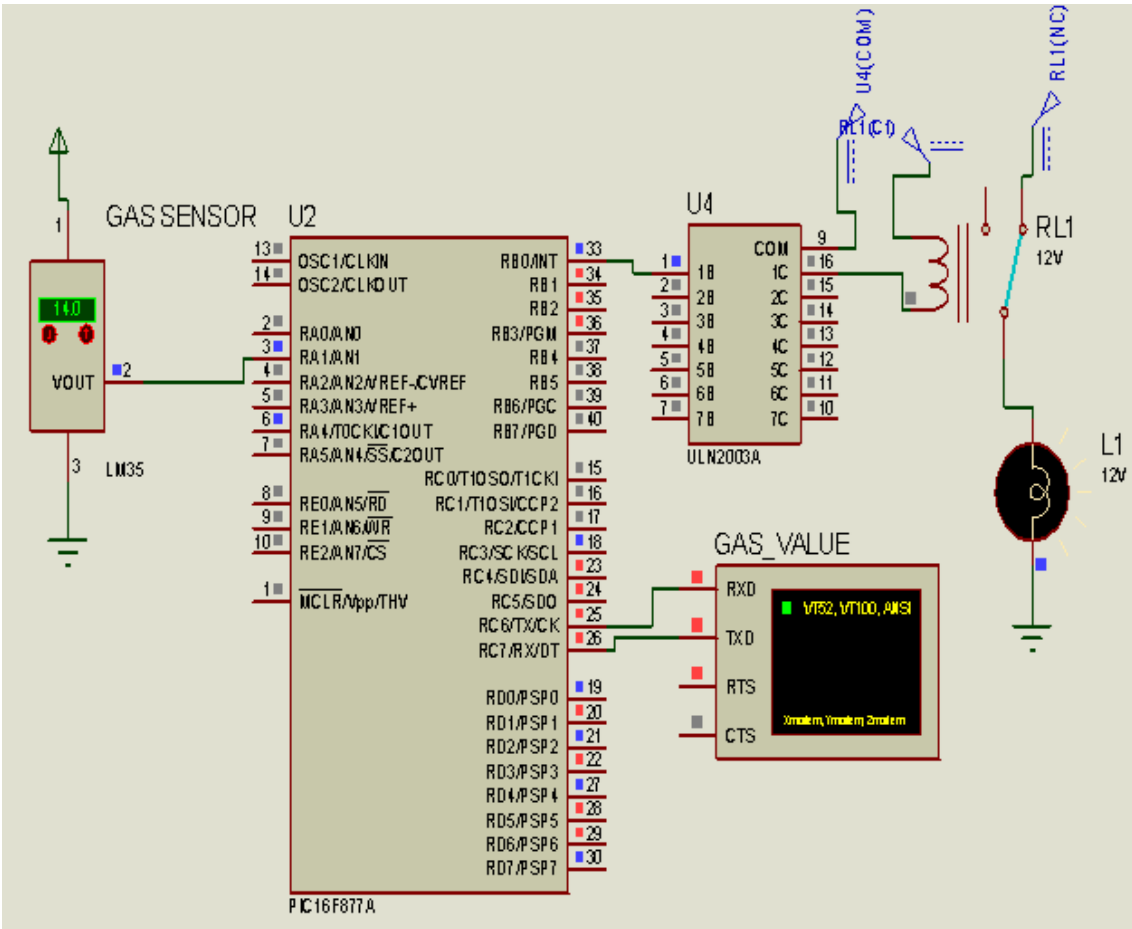
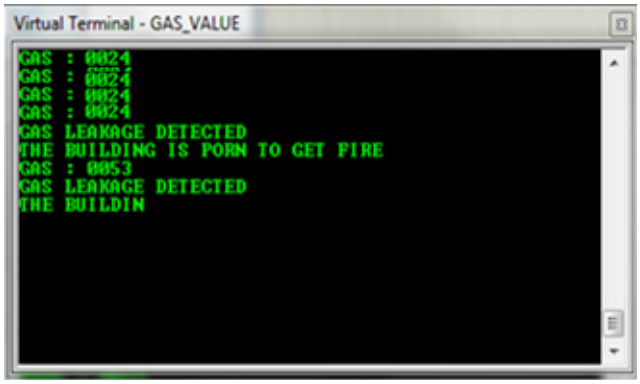
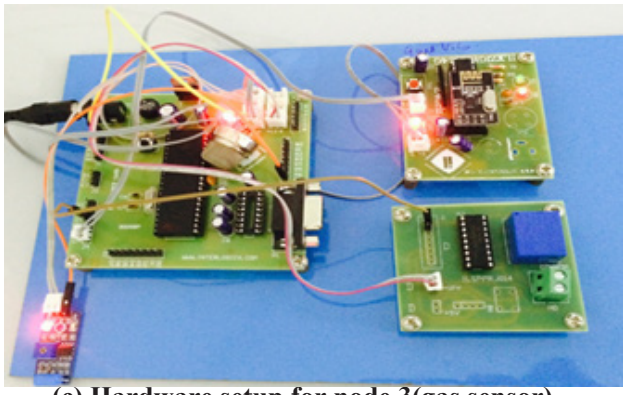


Figure 3: (a) Simulated response for node 3



(b) Virtual Terminal for node 3(gas sensor).



(c) Hardware setup for node 3(gas sensor).

Figure 3(a) shows the simulated response of integration of gas sensor and relay to PIC16F877A. If the gas sensor value exceeds 20 then the relay put out the supply and the bulb goes OFF. Figure 3(b) shows the virtual terminal for transfer of data from the node 3 to the PC through NRF24L01. Figure 3(c) shows the hardware setup for node 3 containing the gas sensor and vibration sensor. The GSM and the NRF24L01 are connected to the PC which acts as the receiver node which collects the data from the 3 nodes and are continuously monitored in the PC. In case of variation a message is sent to the concern owner.

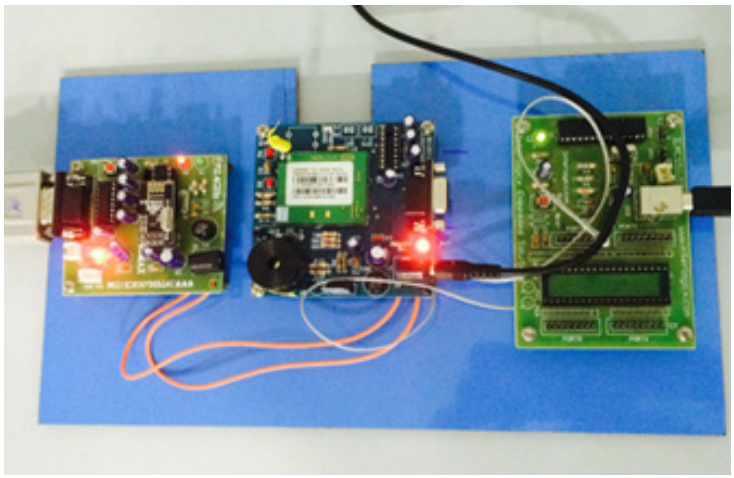
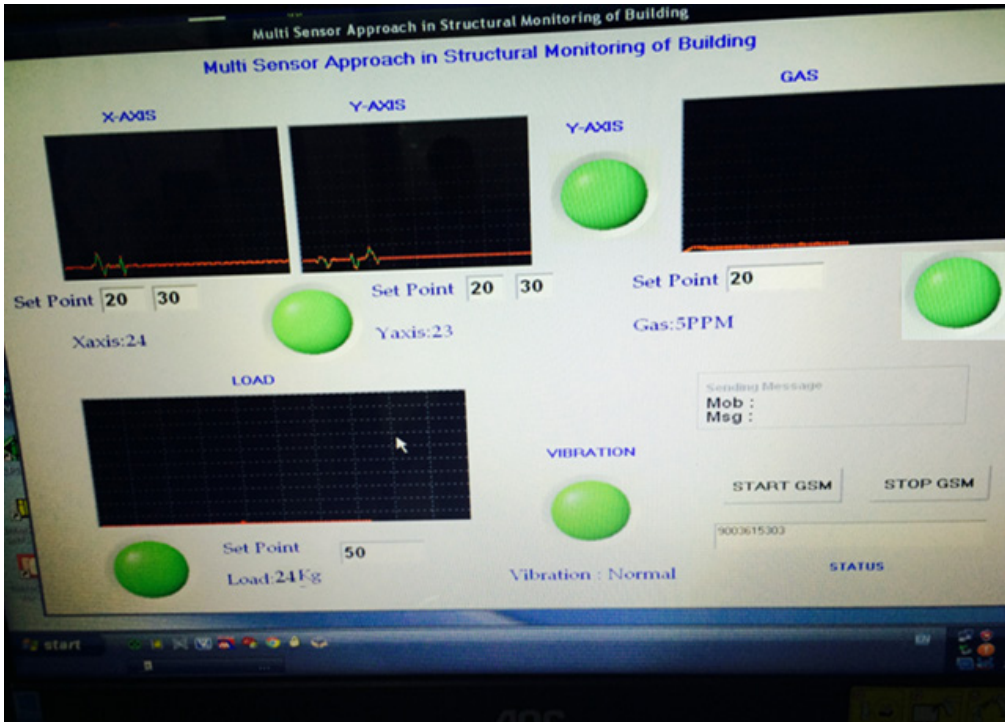
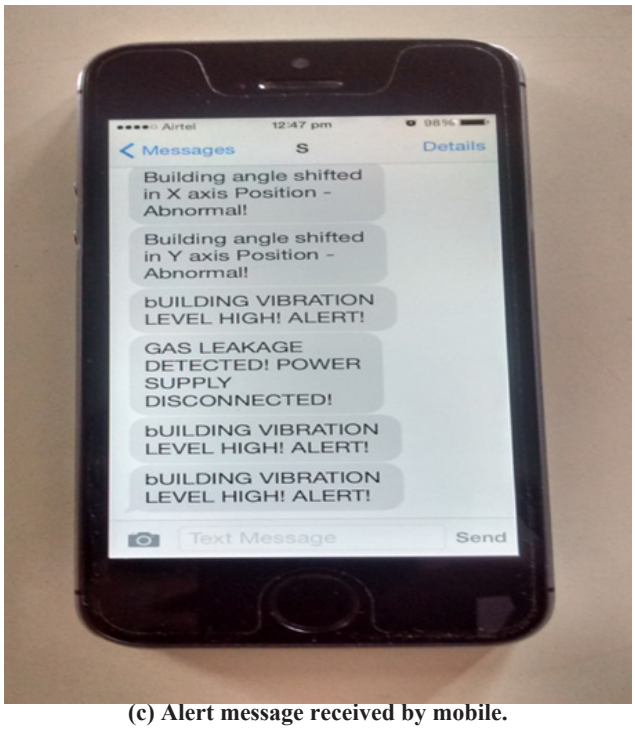


Figure 4. (a) :Hardware setup for GSM and NRF24L01 at receiver side.



(b) Monitoring system using PC.



(c) Alert message received by mobile.

Figure 4(a) shows the hardware setup for GSM and NRF24L01connected to the PC. Figure 4(b) shows the monitoring system in PC. Figure 4(c) shows the alert message to the mobile.

Conclusion

This work proposes a multi sensor approach for structural health monitoring of buildings to protect the historical heritage buildings and for the safety of the population. The proposed work involves the detection of position, vibration, overload and gas leakage in the building. The data are transmitted from each sensor node and are displayed on the PC along with the receiver through NRF24L01. If the changes are said to occur during natural phenomena or architectural constraints, then the warning indicates to the mobile through GSM. The simulation work with multiple sensors has been developed and the future work may be done on the real time implementation of the hardware.

Ethical Clearance: Taken from Saveetha School of Engineering, Chennai

Source of Funding: Self

Conflict of Interest: Nil

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Performance Evaluation of Various Filtering Techniques for Retinal Fundus Images

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Abstract

De-noising of the Retinal Fundus images is a necessary pre-processing step in diabetic retinopathy, glaucoma, cardiovascular diseases treatment. This step guarantees ample quality for the Computer-Aided Diagnosing (CAD) systems. For the detection of haemorrhages, well known by the type lesions in diabetic retinopathy early identification is very useful. This paper presents an evaluation strategy for various de-noising filters, which have been affected by salt & pepper noise. In general, the Retinal Fundus images are mostly affected by salt&pepper noise and speckle noises. We have considered the salt & pepper noise for the evaluation approach, 50% of the salt & pepper noise have been added into the Retinal Fundus images. Then the noise has been removed by using various filters like Mean, Median, Weiner, Gaussian, and Adaptive Median Filters. The performance of the above filters is compared on the basis of the parameters like MSE, PSNR, and SNR. This paper concludes that among the filters evaluated, Gaussian filter is the best for removing noises in retinal fundus images and thereby it contributes well for diabetic retinopathy, glaucoma, cardiovascular disease to guarantee ample quality for the Computer-Aided Diagnosing (CAD) systems.

Keywords: *Salt & pepper Noise, MSE, PSNR, SNR, Adaptive, Mean, Median, Gaussian Filtering*

Introduction

Loss of vision would be a significant problem for specific ailments like retinal haemorrhages, glaucoma, hypertension, and diabetic retinopathy if they were not treated at the earlier stages. Hence, the analysis of retinal image is an evolution and a sophisticated scheme in current ophthalmology. In this regard, the noisy Retinal Fundus images have to be essentially restored, and this step will be the pre-processing step in any of the image analysis approaches. Retinal imaging has become a major tool in medical imaging technology to its capability to extract several knowledge that is utilized in examining numerous eye diseases , especially in particular diseases like haemorrhages.

Differing types of noise throughout its acquisition and transmission section usually corrupt digital pictures like Retinal Fundus image measure. Such degradation negatively influences the recital of the many image process techniques and CAD system performance for that a pre-processing module to filter the pictures is usually needed [1-2]. That accuracy of disease detection depends on the standard of non-inheritable Retinal Fundus image as some times it contains uneven illumination, blurry and reedy areas.

So, Illumination equalisation and noise removal are needed to boost the image quality and increase CAD system accuracy. Noise in a picture is undesirable to us because it disrupts and degrades the standard of the image. Noise removal is usually a tough task since edge preservation once the intensity of the discontinuous noise within the original image is high [3].

Here **adaptive** median be **higher** compared to **different** preprocessing **ways**, **as a result of** it, median filter have higher PSNR **value** and lower MSE **value** in **three** diabetic retinopathy retinal **pictures**, [4-5] , at **hormone replacement therapy database** and [6] used the median filter for noise removed in **Retinal Fundus** retinal **pictures**.

However, the authors in [7] planned de-noising methodology that is based on adaptive frame averaging

approach. It is a technique for modifying or enhancing a picture via smoothing, sharping, and de-blurring. Image process operations enforced with filtering embrace smoothing, sharpening, and the edge improvements. Noise removal is one amongst the most important considerations within the field of computer vision and image processing. Pictures are usually corrupted by impulsive noise because of noisy sensors or channel transmission errors or faulty storage hardware [8]. The goal of removing impulsive noise is fundamentally to quell the noise additionally on conserve the integrity of edges, and accurate data. In the digital image-processing field, two applications of great importance are noise filtering and image enhancement.

In Retinal Fundus image, initiative was to evaluate the noise within the image, then to estimate noise kind. Salt pepper noise is that the main noise that affects the retinal image. In salt pepper noise, random prevalence of black and white pixel occur [9].

The organization of this paper is as follows. In Section two, the materials and methods that contain the filter types have been introduced very well. In Section three, result analysis is presented and in the final section experimental results and the conclusion have been presented.

Materials and Method

Database:

The DRIVE database is an open free online available database that enables comparative studies on segmentation of blood vessels in retinal pictures. The analysis community is invited to check their algorithms on this information and share the results with alternative researchers through this internet site. On this page, directions are often found on downloading the information and uploading results, and therefore the results of different methods are often inspected. The screening population consisted of four hundred diabetic subjects between 25-90 years archaic. Forty images are at random hand-picked, thirty three don't show any sign of diabetic retinopathy and seven show signs of delicate early diabetic retinopathy. Every image has been JPEG compressed.

Eight bits per colour plane at 768 by 584 pixels have captured every image. The FOV of every image is circular with a diameter of roughly 540 pixels. For this information, the photographs are cropped round the FOV. For every image, a mask image is as long as delineates the FOV.

Different Types of Filters Used to Remove Noises:

Salt & pepper Noise:

The image that's low in quality, has bright and dark pixels presence in it that causes noise in it, together remarked as Salt Pepper noise. Black and white dots **seem within the** image [9]. **Because of** sharp and **sudden** changes of image signal, the noise arises. Dead pixels, **digitizer** errors, bit errors in transmission, etc. **are** caused **because of** the presence of Salt Pepper noise **within the** image.

Filters:

Median Filter:

Median filters help to reduce random noise, particularly once the noise amplitude probability density has massive tails and periodic patterns. The median filtering methodology is accomplished by sliding a window over the image. The filtered image is obtained by inserting the median of the values at intervals the input window, at the center position of that window; thereby the output image is obtained. The median is that the most chance reckoner of location within the case of the Laplacian noise distribution. As an edge is crossed, one aspect or the opposite dominates the window, and the output switches sharply between the values. Thus, the edge isn't blurred. The disadvantages of such filters are that within the presence of tiny signal-to-noise ratios they have a tendency to interrupt image edges and turn out false noise edges. The other disadvantage is that they cannot suppress medium-tailed (Gaussian) noise distributions.

Algorithmic median filters were shown to be a lot of economical than those of the non-recursive kind. Helpful particular categories of median filters are the separable median filters. These filters are significantly straightforward to implement, by performing a continuous operation over the rows and columns of the image.

Median Filtering looks nearly customized for Removal of Salt & pepper Noise. The Median of a collection is that the Middle value once they are sorted in

ascending order. If there are an even number of values, the Median is that the Mean of the center 2 which is discussed in equation (1). A median Filter is an Example of a Non-Linear Spatial Filter [10].

$$(x,y)=\{g(s,t)\},s,t\in Sxy \quad (1)$$

Let S xy represents a set of rectangular sub image with window size (m x n) centered at (x, y).

Mean Filter:

The idea of mean filtering is to switch every picture element in an image with the mean (`average') worth of its neighbours, as well as itself. The mean filtering has the impact of eliminating pixel values that are untypical of their surroundings. Mean filtering is sometimes thought of as a convolution filter. Like alternative convolutions, it's based mostly around a kernel, that represents the form and size of the neighbourhood to be sampled once hard the mean. Usually a 3×3 sq. kernel is employed, though larger kernels (e.g. 5×5 squares) can be used for additional severe smoothing. Computing the natural convolution of a picture with this kernel carries out the mean filtering method.

Weiner Filter:

This filtering technique relies on a statistical approach to filter the noise. Typical filters are designed for needed frequency response, and Weiner filter is that the exemplar for this sort of approach. This filtering technique approaches filtering from a unique angle. Before starting with this method, one ought to have the data of the spectral properties of the first signal and the noise present in the image. One seeks the LTI filter (Linearity and Time-Invariance) whose outcome is nearer to the first signal present within the image as realizable. Wiener filter may be a technique that performs the best trading between inverse filtering and noise smoothing. It removes the blurring and additive noise present within the image and it's conjointly very best in relevancy.

Gaussian:

A Gaussian filter is a linear filter. It is usually used to blur the image or to reduce noise. In this technique, the average value of the surrounding pixel or neighbouring pixels replaces the noisy pixel present in the image which is based on Gaussian distribution. The value of the sigma or the variance affect inversely to the filtering, smaller values of sigma means more frequencies are suppressed and vice versa.

Adaptive Median:

The adaptive Median Filter performs spatial filtering to preserve detail and smooth non-impulsive noise. The most advantage to the current adaptative against the median filtering is that perennial applications of this adaptative Median Filter don't erode away edges or different tiny structure within the image.

Method

Error Analysis

The image quality assessment based on picture element (pixel) distinction methodology has been done by calculative PSNR, SNR and MSE values. These are the error metrics, which are used to compare pictures.

Mean square Error (MSE): It is the additive square error between the initial image and the noise noisy image. The lower the amount of MSE, lower the error in equation (2).

$$MSE = \frac{\sum M_i N[I_1(M.N)-I_2(M.N)]^2}{M.N} \quad (2)$$

Here M and N are the no of rows and columns within the input image severally. Hence, to gauge PSNR first MSE worth ought to be calculated.

Peak Signal to Noise Ratio (PSNR) and signal to noise ratio (SNR) are mathematical measure for image quality assessment between original image and noise value-added image. It shows the measure of peak error which is explained equation (3).

$$PSNR=10\log_{10}\frac{R^2}{MSE} \quad (3)$$

Here R is maximum fluctuation in input image data. PSNR measures the peak error

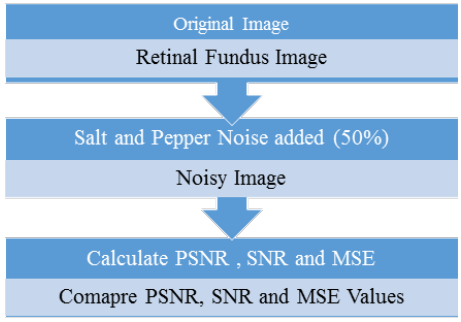


Figure 1: Image Quality estimation block diagram

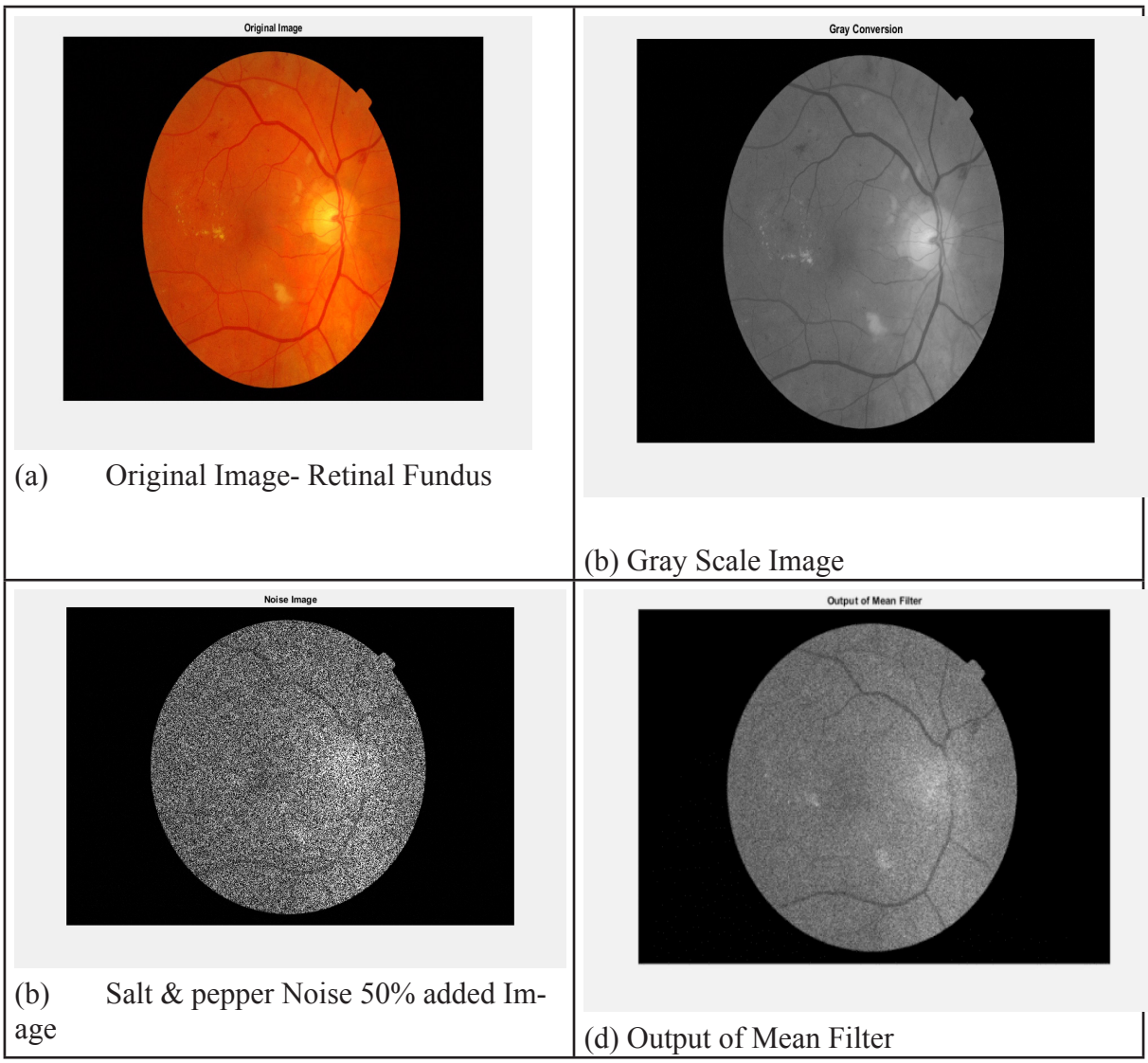
Figure 1 expresses the image quality estimation block diagram for Retinal Fundus Images The implementation of the proposed method is as follows:

- Initialize the filter and generate variable correlation coefficient values based on speckle noises added in the original medical image.
- MSE = (sum(sum(err .* err)))/(M * N)
- SNR = 10*log10((1/M*N)*sum(sum(A*B))/(MSE))
- PSNR = 10*log10(255*255/MSE)
- Compare the values of MSE, SNR,PSNR
-
- Repeat the previous steps for retinal fundus images and then compare the performance of filters.

4. Results and Conclusion:

In this paper, Salt & Pepper noise has been added to the Retinal Fundus image. 50% value of the noise has been added for the images. Various filtering techniques linear (Gaussian, Mean), Non-linear Filtering (Median), adaptive Median filtering [10], Weiner Filtering are explained to the images with noise. The output images are presented below. At the end, MSE, PSNR and SNR parameters have been used to analyze the performance of filters. Figure 2 are discussed about De-noising using Mean Filter.

Mean Filter



(a) Original Image- Retinal Fundus

(b) Gray Scale Image

(b) Salt & pepper Noise 50% added Image

(d) Output of Mean Filter

Figure 2: De-noising using Mean Filter

Median Filter

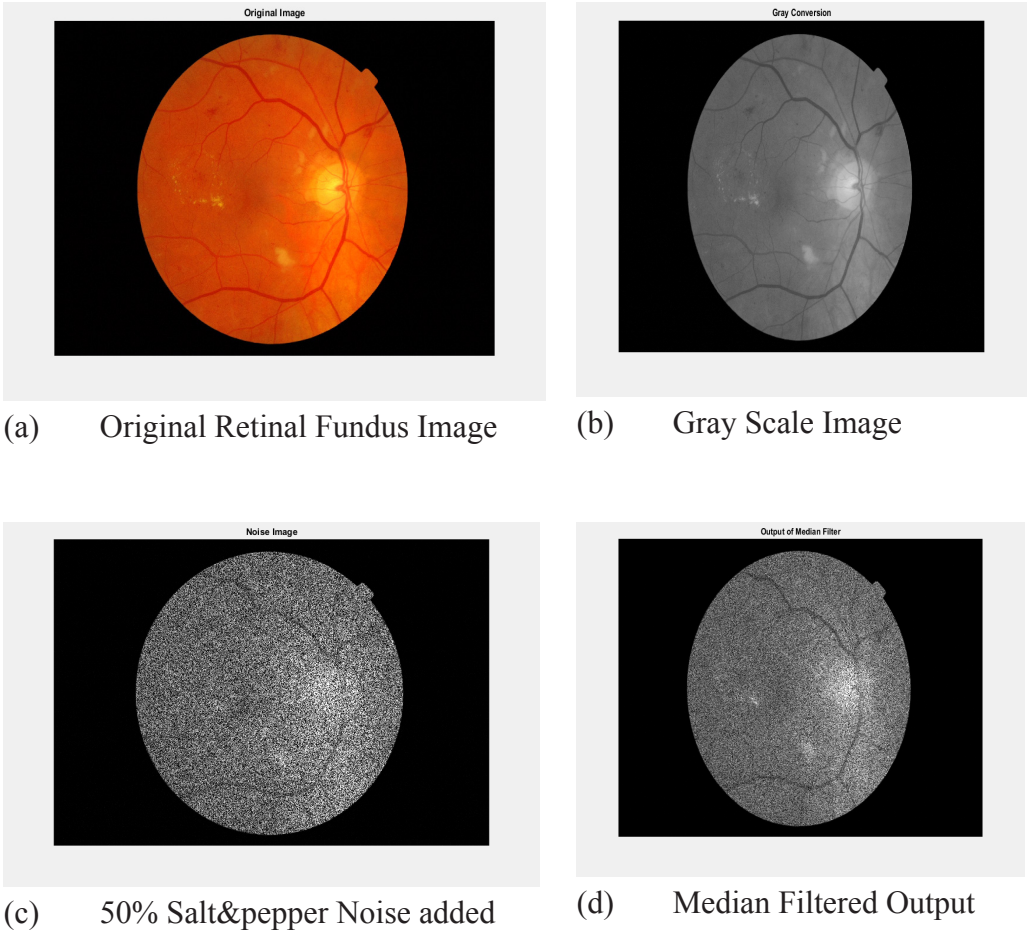


Figure 3: De-noising using Median Filter

Figure 3 explain about Figure 3(a) Original Retinal Fundus Image, Figure 3(a (b) Grey Scale Image, Figure 3 (c) 50% Salt & pepper Noise added Image, and Figure 3 (d) Filtered Output.

Wiener Filter

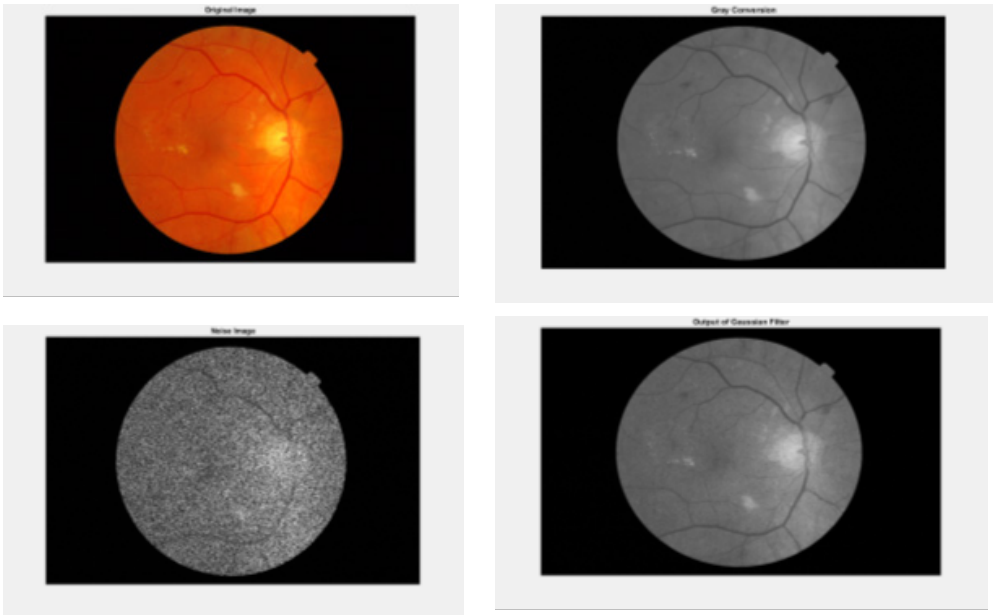


Figure 4: De-noising using Weiner Filter

Figure 4 elaborates about De-noising using Weiner Filter Figure 4. (a) Original Retinal Fundus Image, Figure 4 (b) Grey Scale Image, Figure 4 (c) 50% Salt & pepper Noise added Image, and Figure 4.3 (d) Filtered Output.

Gaussian Filter

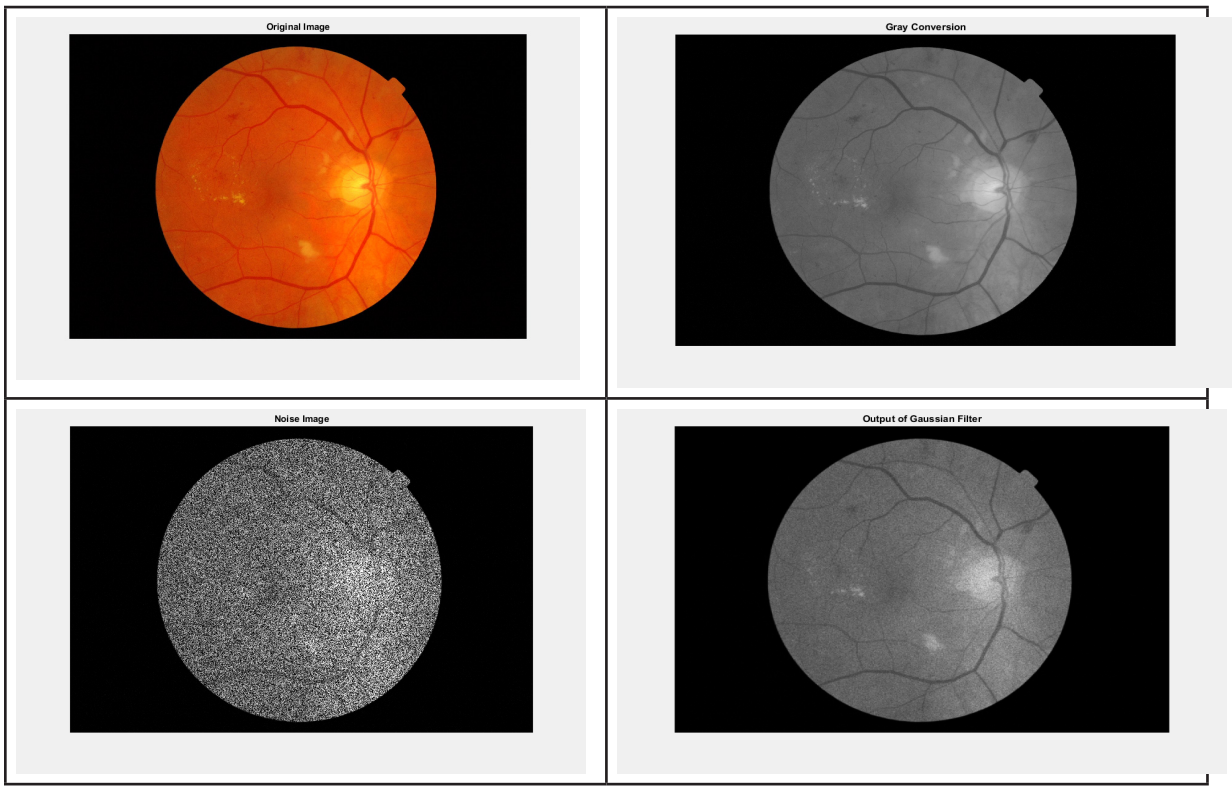
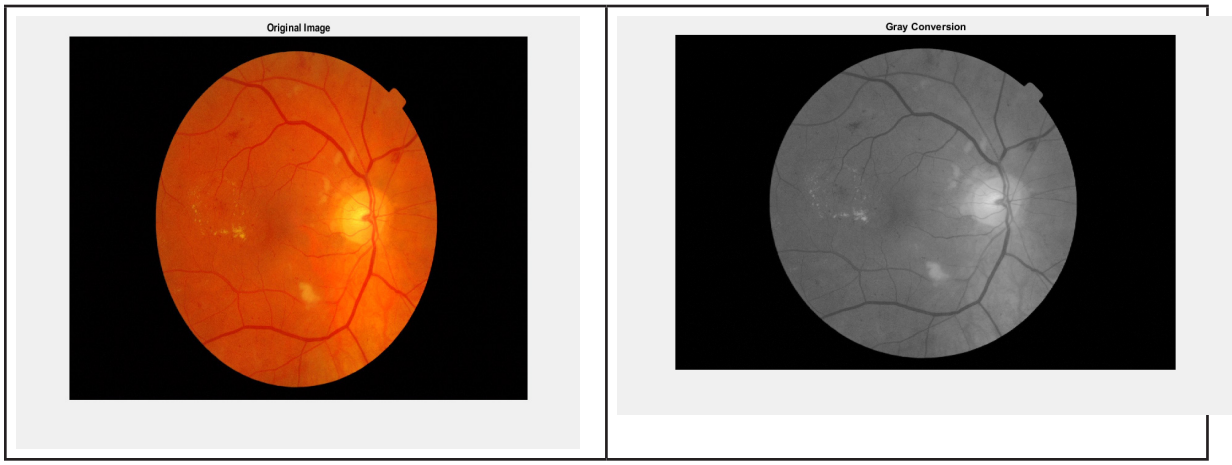


Figure 5: De-noising using Gaussian Filter

Figure 5 explains about De-noising using Gaussian Filter in Figure 5 (a) Original Retinal Fundus Image, Figure 5(b) Grey Scale Image, Figure 5 (c) 50% Salt & pepper Noise added Image, Figure 5 (d) Filtered Output

Adaptive Median Filter



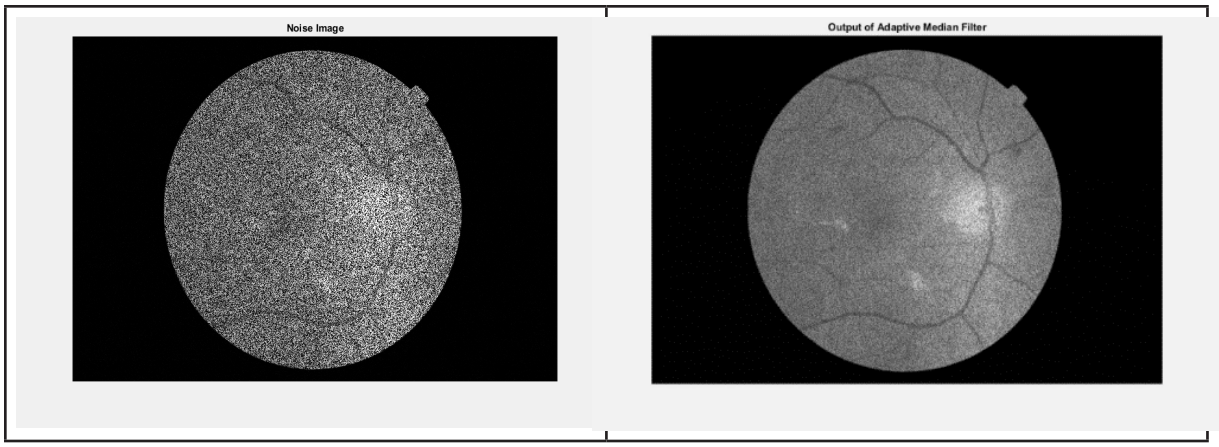


Figure 6: De-noising using Adaptive Median

Figure 6 elaborates about De-noising using Adaptive Median in Figure 6(a) Original Retinal Fundus Image, Figure 6(b) Grey Scale Image, Figure 6 (c) 50% Salt & pepper Noise added Image, Figure 6(d) Filtered Output

Table 1: Performance Evaluation

Filter Name	MSE	SNR	PSNR
Mean	0.0044	79.8085	71.6849
Median	0.0114	75.6968	67.5623
Weiner	0.0030	81.4747	73.3324
Gaussian	4.2895e-04	89.9462	81.8067
Adaptive Median	0.0051	79.2149	71.0732

The Figure shows the input Retinal Fundus images which are then converted to gray scale. Upon the conversion salt & pepper, noise has been added to the gray scale image. Then Mean, Median, Weiner, Gaussian, Adaptive Median Filters have been used for noise deduction and the obtained output is shown the figures above. The Table 1 gives the performance evaluation of the filters by using parameters MSE, SNR, PSNR. For Salt & pepper, noise in the case of Retinal Fundus images

Conclusion

This paper presents an evaluation strategy for various de-noising filters, which have been affected by salt & pepper noise. In general, the Retinal Fundus images are mostly affected by salt&pepper noise and speckle noises. We have considered the salt & pepper noise for the evaluation approach, 50% of the salt & pepper noise have been added into the Retinal Fundus images. Then the noise has been removed by using various filters like Mean, Median, Weiner, Gaussian, and Adaptive Median Filters. The tabulation gives the performance evaluation of the filters by using parameters MSE, SNR, PSNR. For Salt & pepper, noise in the case of Retinal Fundus images in case of haemorrhages, disease the Gaussian filter is giving better performance. Depending upon the PSNR measurement, we conclude that the Gaussian filter gives better performance than other filtering technique in haemorrhage disease images.

Ethical Clearance: Taken from Saveetha Engineering College, Chennai

Source of Funding: Self

Conflict of Interest: Nil

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Skin Disease Detection Using Artificial Neural Network

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Abstract

Most of the health issues on human body is notified through the skin. In this paper, we proposed a framework which identifies the skin infections by using Artificial Neural Network technique. This framework effectively recognizes different types of dermatological skin illnesses. It comprises of three stages. They are, picture fixing, articulating stage, locating the stage. Strategies like shifting, partition, highlight mining, picture pre-preparing and edge identification are important. This paper introduces an overview of different skin sickness. A thorough report of various skin infections is studied.

Keywords *- Pre-processing, Edge detection, Filtering, Image processing, Skin diseases, ANN.*

Introduction

Dermatology is the part of prescription that manages skin, hair and nails in the most extensive sense. A dermatologist identifies dermatological and corrective ailments of the skin. Identification of infections is critical in this day and age situation in light of the fact that the plagues of skin ailments cause extreme misfortunes to individuals everywhere throughout the world. Particularly in creating nations there is a requirement for robotized symptomatic framework that would diminish manual endeavours and time utilization of dermatologists and patients[1]. We proposed a framework that would help the patients just as specialists to analyse the sickness to recognize the ailments of the skin by simply giving the picture of the influenced zone of skin. Not the same as the current identification frameworks depending on help vector machines or fluffy rationale systems, our discovery framework utilizes highlights removed from info picture of skin through picture preparing calculations alongside feed forward back engendering neural system for grouping and location reason. Hypersensitivities, aggravations, hereditary structure, and specific sicknesses and insusceptible framework related sway on human's day by day life, wreck certainty of a individual, stop their development, and swing to wretchedness. The most noticeably bad circumstance is that, it can even slaughter. It's a major issue that issues can create dermatitis, hives, and other skin issues. A considerable lot of the skin maladies, for example, skin inflammation, alopecia, ringworm, dermatitis likewise influence your look[2]. Skin can likewise produce numerous sorts of tumours. Picture preparing is utilized to distinguish these illnesses by utilizing different strategies like division, separating, include extraction and so on. To get an improved picture or to get significant data from a picture, it is important to change over a picture into advanced structure and afterward perform capacities onto that picture[3]. It is a piece of flag preparing. The info is a picture and it might be a video, a photo and yield is likewise another picture having same qualities as info picture. Generally Image Processing models take input tests as 2-D signals and after that they apply fixed flag preparing strategies to them. It is generally utilized innovation now days and it has different applications in the territory of business. It is another exploration region inside building and software engineering as well. The scope of skin illnesses is wide. Skin illness doesn't simply harm the skin[4]. The most noticeably bad circumstance is that, it can even slaughter. It's a major issue that should be controlled, so it is important to take skin infections all around genuinely and distinguish it at a beginning period and avoid it from spreading. Identification of an infection relies on numerous factors like which parameters are considered for sickness recognition[5]. Right off the bat, take a picture, apply channels to evacuate clamour from the picture, section the picture to remove important data, include extraction is done based on info parameters and after that arrange the illnesses by utilizing fitting

classifier. Skin infections are visit illnesses to each individual and different sort of diseases are winding up continuous. Skin maladies can without much of a stretch exchange from human to human so there is a need to control it their underlying stage to counteract it from spreading. This paper displays an execution of a skin ailments finding framework which causes client to recognize human skin ailments and gives restorative medicines opportune.

Methodology

Here, the proposed technique gives the solution for six common skin diseases. So, the patient can infer prior knowledge before going to the doctor. This can also be used in rural areas where dermatologist or specialist for skin diseases is not available. This gives the non – invasive method of skin diseases detection. Here, the patient should post the image to the consultant or to this technique. Form the image itself the further analysis is taking place. Therefore the patient no need to go to hospital in person for consultation and no need to spend time for consultant appointment. And also no piercing required. The Flow chart of detection process are described in Figure 1.

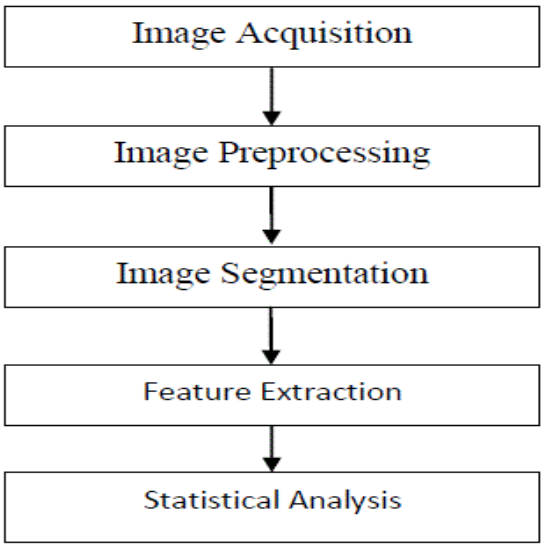


Figure 1: Flow chart of detection process

The flow chart gives the method or steps to be followed in the detection of skin diseases. The data is collected from the picture. The picture may be a video or photo that elaborated in Figure 2.

Block Diagram

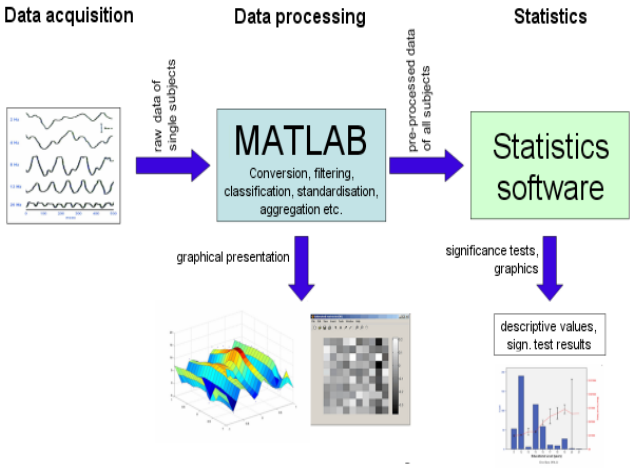


Figure 2: Processing of image

The system Pattern acknowledgment basically starts from the requirement for computerized machine acknowledgment of signs, pictures and questions or any choice based methodology, based on the arrangement of highlights. The objective of Pattern acknowledgment is to foresee the right dimension relating to given list of capabilities dependent on a superior learning acquired through preparing. The example acknowledgment can surely knew by thinking about a precedent: the person will while not a lot of a stretch distinguish the sexual orientation passionate about the face whereas machine can't, that the purpose is to arrange the machine by considering completely different highlights as: outward look, facial bone structure, hair length et al which discussed in Figure 3.



Figure 3: Skin patch

In the wake of preparing, the machine can without much of a stretch distinguish the required class the new test object has a place. From this above precedent, it is

very clear that the core of example acknowledgment framework is include extraction and characterization. The example acknowledgment framework for this arrangement task is given by the flowchart; as appeared in Here, the proposed Pattern acknowledgment framework is created with the assistance of 55 quantities of refined cell pictures.

Existing System

In the main stage, the picture is prepared by applying calculations like dark scale transformation, RGB to HSV transformation, mass location and the highlights are removed from the intrigued areas of skin image .First, we grey scale the picture, at that point obscure it. From that point forward, the HSV esteems are determined from the picture. In the wake of blurring the picture we use Blob discovery technique. Blob location is a strategy that goes for recognizing districts in a picture that contrast in properties like brilliance or shading, contrasted with encompassing areas which mentioned in Figure 4.

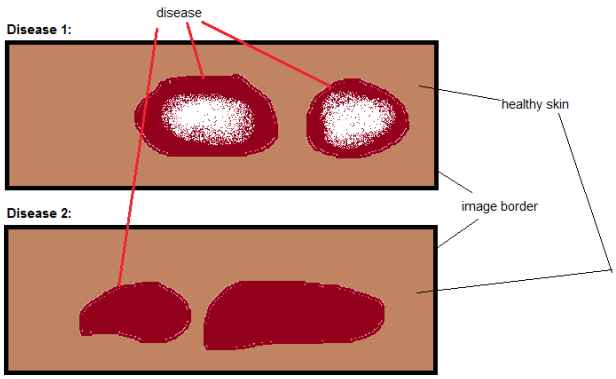


Figure 4: Identification using image processing technique

The qualities that we get in mass location is the square of intrigue (it contains square shape co-ordinates). After this we select square shape from the first picture from the directions of mass location and get their HSV esteems which were determined previously. These highlights are connected as contributions to the Artificial Neural Network Algorithm.

Proposed Technique

In this paper we proposed a framework which works in three stages. The principal stage incorporates preparing the skin picture that is contaminated with ailment to get considerable highlights like normal shading code of the district, the second stage is the preparation stage which is utilized to prepare the neural system for recognizing the dermatological maladies and the organize. Here we have introduced a total compositional plan of our framework in a nutshell

Discussion

Artificial Neural Network (ANN) is a computational model. Neural Network encourages in evaluating the most financially savvy and perfect techniques for coming to at arrangements while characterizing processing capacities or disseminations. ANNs have three layers that are Inter connected. The primary layer comprises of information neurons. Those neurons send information on to the second layer, which in turn sends the yield to neurons of the third layer. There are diverse kinds of Neural Networks, for example, Feedback, Feed-forward, Back proliferation, Classification-Prediction, and so forth. In our system, Neural Networks are utilized in the programmed discovery of skin illnesses by utilizing Back proliferation calculation. Neural system is picked as an identification device because of its outstanding strategy as an effective classifier. Fake Neural Network Algorithm contains two phases– preparing and testing stage and discovery stage. In preparing stage these highlights are prepared to the database utilizing back spread algorithm. The preparing and testing forms are among the critical strides in building up an exact procedure show utilizing ANNs. The dataset for preparing and testing forms comprises of two sections; the preparation highlights set which are utilized to prepare the neural arrange demonstrate. While a testing highlights sets are utilized to confirm the exactness of the prepared utilizing the BP arrange. In the preparation part, association loads were constantly refreshed until they achieved the characterized cycle number/reasonable blunder. In discovery stage the highlights of info picture whose ailment is to be perceived are contrasted and the includes in database utilizing Artificial Neural Network.

Pros And Cons

These sicknesses are extremely destructive, particularly if not controlled at a beginning period. Skin infections not just harm the skin. It can affect an individual's everyday life, pulverize certainty of an individual, hang their development, and swing to misery. Some of the time, numerous individuals attempt to treat these sensitivities by utilizing their very own treatment. Be that as it may, if these techniques are not proper for that kind of skin illness then it would make it progressively hurtful. This paper displays a usage of

a skin maladies analysis framework which encourages client to identify human skin maladies and gives medicinal medications auspicious. For this reason, client should transfer an ailment influenced skin picture to our framework to the side effects of the skin.

Conclusion

Thus, our technique is very easy for the implementation and it can be used by all types of peoples. Here, the disease is detected from the data set which is collected from the 2D photo or video. Then it is processed and compared with huge amount of pictures of different types of diseases and finally it is predicted. In this present work it was done with six types of diseases. In future it can be extended to all types of diseases.

Ethical Clearance: Taken from Saveetha School of Engineering, Chennai

Source of Funding: Self

Conflict of Interest: Nil

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A Survey of Efficient Speckle Reduction Techniques for Ultrasound Images

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Abstract

In this paper an exhaustive study of despeckling techniques used for ultrasound images that are available in the literature is carried out. Noise removal from Ultrasound images still remains a challenging task for the image processing experts. The huge amount of research papers published in this area stands as a testimony to it. Generally there's no unified approach for the removal of noises in US images. In this paper different types of most prominent existing speckle noise reduction techniques both in Spatial or Space domain and Frequency or Transform domain are discussed and compared.

Keywords: *Ultrasound images, Speckle noise.*

Introduction

The Ultrasound imaging always gets highest priority for rectification of diseases compared to the other methods such as X-ray, CAT scans and NMRI. It is mostly preferred due to its special facts of non-invasiveness, leverage of non ionising radiation and also has an efficient cost. Even though the ultrasound mechanism is quiet efficient in terms of imaging the image quality detoriates on encountering the backscattered echo signals known as Speckles. Speckle noises are changes which have a negative impact on the contrast of an ultrasound image. Speckle noises are viewed as results of random variation in the endurance of the back scattered waves utilises cheap and non-ionising radiation. The medical ultrasonograhpy has a meagre image quality detoriates on encountering the backscattered echo signals called Speckle. These noises is a variation which is responsible due to random variation in the potency of the back scattered wave of the tissues in the body. Speckle noise poses a great obstacle in the analysis and the diagnosis of the ultrasound report. These noises also prohibit the level of effective use in the processing of images and analysis design which are fragmentation and feature extraction. Hence, these noises must be formatted without influencing vital image characters for enhancement of diagnosis.

Speckle Noise and Its Reduction

The variation in the contrast of picture leads to the noise. It originates from random variations in the potency of the reflected and scattered waves from objects and is viewed widely in Radar and Ultrasound (US) imaging. It is a multiplicative noise, having a granular pattern. Ultrasound and SAR mark the inherent presence of speckle disturbances in images. These noise are always seen as a major hurdle during the analyses and diagnosis of the ultrasound image by the sinologist, it is also known for restricting the employment of formats for processing the image and analysis algorithm i.e., fragmentation and characteristic extraction.

Speckle Reduction Techniques

The Speckle Reduction can be either in Space and Frequency Domain. In Transform Domain the Speckle noise reduction can be either by Partial Differential equation based diffusion and Fuzzy Logic which discussed in Figure 1.

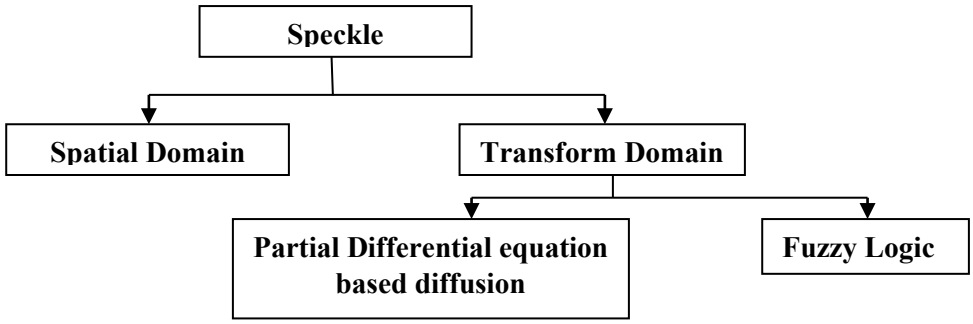


Figure 1: Classification of Speckle Reduction Techniques

Spatial Domain Filtering of Speckle Noise

It is a domain where the digital image is defined by its spatial coordinates of its pixels where filtering is based upon the local statistics in a motion window. Some of the space domain filters for despeckling are adaptive filters like Lee, Kuan, Frost and Gabor.

[3] Author used statistical method to define a noise model and applied local statistics noise filtering algorithm to a set of SAR images. The main disadvantage is it to avoid the speckle disturbances in regions nearer to the brim and lines. [4] Author used an adaptive method in which the image reflectivity is estimated by convolving the observed image with the impulse response of the SAR image. It has no user defined parameters.

The author [5] uses generalization of Lee filter procured by employing minimum mean square error calculation on the multiplicative model. It is poor in edge preservation. The author [6] used the method evident on heat equation and performs well in homogenous region with edge conservation for images distorted by additive noise. Performance degrades for the multiplicative speckle noise. It [7] uses a diffusion coefficient is formulated evident on the ratio of local standard deviation to mean employing four nearest neighbour window. Smoothening of the edges and structural content occurs in this format. It uses a noise mitigation method based on homomorphic denoising and non-Gaussian format of the wavelets coefficients is modelled. This advanced is computationally costly, as it requires the lineage of allocation parametric values.

Transform Domain Filtering for Speckle Noise

It is a domain where the digital cast is explains by crumblement down its spatial frequencies. The image is Fourier transmute, quadruple with the percolate function and then re-change into the spatial demesne. Some of the transfigurate sphere filters for speckle noise are WAVELET metamorphose, CURVELET transform, and RIDGELET transform.

SVM Partial Differential Equation (PDE) Based Diffusion for Speckle Noise Reduction:

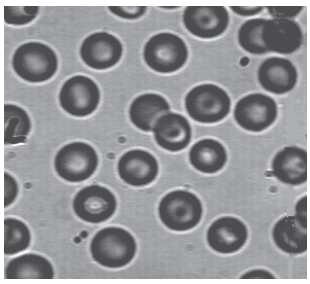
Smoothing of the image can be achieved by brightness diffusing, in the similar way heat diffuses; hence PDE is formulated for smoothing. Diffusion takes place only in the direction of gradient. Diffusion across strong edges is inhibited when the magnitude of gradient is large.

Some of the examples of PDE based filters are AD, SRAD, CED, DPAD, OSRAD and Fourth order PDE. Another fast emerging area recently for speckle denoising is through non linear partial differential equation. Some of the diffusion methods are anisotropic diffusion, Speckle reducing anisotropic diffusion (SRAD) and fractional order anisotropic diffusion.

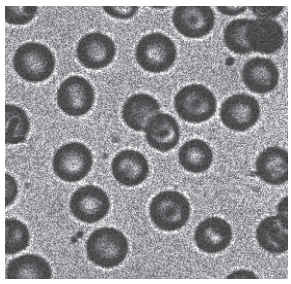
Speckle Noise Reduction Using Fuzzy Logic

This method logic has already been established in many fields including the processing segment of the image and has excelled very well. It has the capability to take into account the input that is approximate rather than fixed. Due to fuzziness in quality motive by speckle noise in the ultrasound appearance have, Due to fuzziness in quality motive by speckle noise in the ultrasound appearance have, wandering keenness and fences. The ultimate inference drawn is based on the vague, ambiguous non precise or disturbed noisy input is fuzzy logic which discussed in Figure 2.

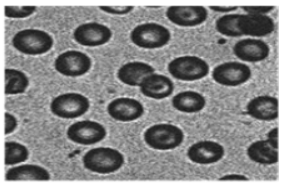
Study of Existing Filters



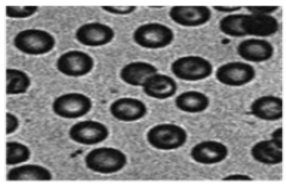
Original Image



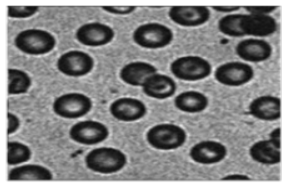
Noisy Image



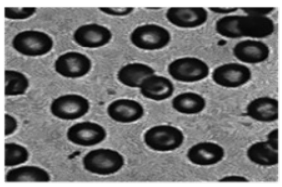
Lee



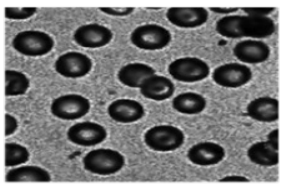
Frost



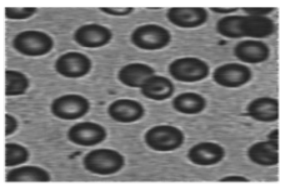
Kuan



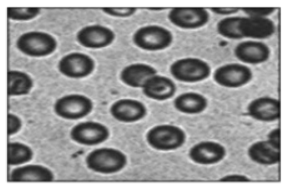
NLM



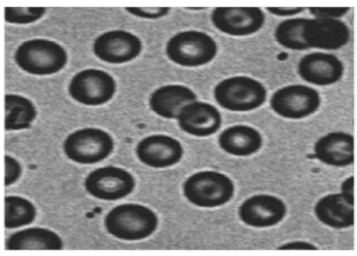
PMAD



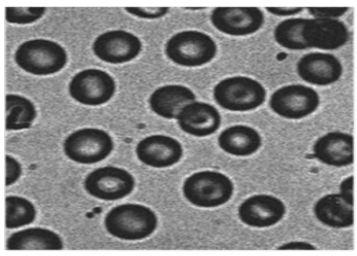
4th order PDE



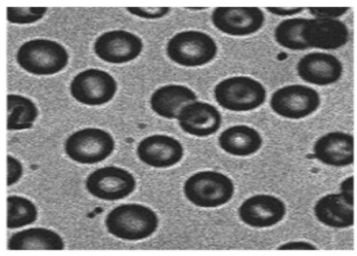
Sticks+ PDE



SWT with PSO algorithm



SWT with POSO algorithm



DWT with POSO algorithm

Figure 2: Study of Existing Filters

Results of Simulated Filters:

Table 3: Simulation result with various Filers

Filter	Mean	MSE	PSNR (dB)	ENL	SSI	Elapsed Time(Sec)
Lee	110.72	202.44	25.05	0.0456	0.9038	0.2431
Frost	110.84	408.43	22.04	0.0452	0.9082	11.30
Kuan	110.27	267.41	23.90	0.0473	0.8877	19.87
Non Local Means	108.85	387.56	22.30	0.0437	0.9235	99.13
PMAD	110.73	886.49	17.07	0.0506	0.8585	0.96
Fourth Order PDE	110.73	1721.2	16.00	0.0399	1.2296	5.14
Sticks and Fourth Order PDE	128.08	2461.2	14.23	0.0331	1.3499	5.65
DWT with POSA	110.92	394.74	22.16	0.0441	0.9255	4.809
SWT with POSA	110.94	236.50	24.392	0.0446	0.9259	8.52
SWT with PSO	443.73	100.57	28.10	0.0027	3.7082	10.04

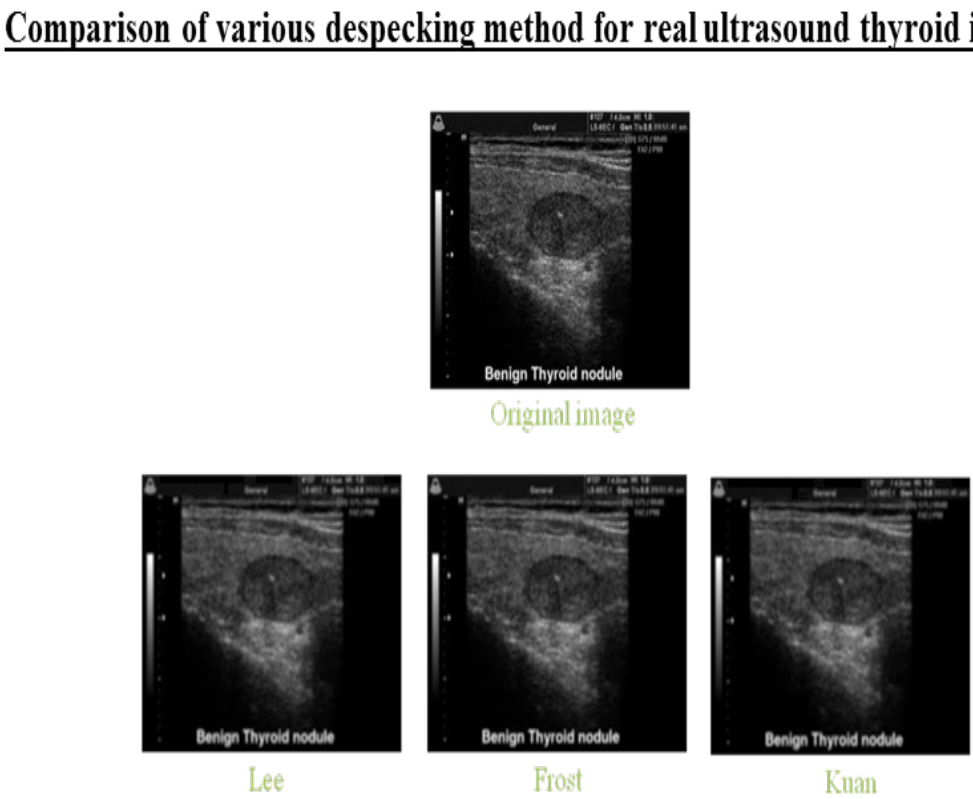


Figure 3: Speckle Reduction Techniques For Ultrasound Images

This study both spatial and transformed domain despeckling techniques have been studied for Speckle noise cutting in Ultrasound images which discussed in Figure 3. An exhaustive study shows that SWT with PSO technique has yielded better result which details are given in Table 3

Conclusion

In this study both spatial and transformed domain despeckling techniques have been studied for Speckle

noise cutting in Ultrasound images. An exhaustive study shows that SWT with PSO technique has yielded better result. It is also found that in Partial Scram Optimization technique has led to a dramatic increase in the PSNR and decrease in MSE.

Ethical Clearance: Taken from Saveetha School of Engineering, Saveetha Institute of Medical and Technical Sciences, Chennai

Source of Funding: Self

Conflict of interest: Nil

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A Recent Survey on Radiomics: Proceedings and Applications for Lung Cancer Detection

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Abstract

Lung cancer is the primary reason for mortalities among cancer-affected persons worldwide. We are living in a decade of emerging personalized and targeted medicine. With the help of the current advancements in the imaging hardware's, in terms of quality, sensitivity and resolution, and the computing capabilities of the vast amount of data made personalized medicine possible. Non-invasive diagnosis is often required to detect lung cancer before actual clinical treatment started. Here come the latest radiomics proceedings using the advanced imaging technologies and high throughput computing capabilities aid the radiologists to diagnosis the lung cancer at a primitive stage. This paper, we survey the latest published scientific literature on Computer-Aided Decision Support Systems (CAD), which uses the radiomics proceedings to prognosis lung cancer.

Keywords: *Radiomics, Biomarkers, Computed Tomography, Lung Cancer, Image Features, Image processing.*

Introduction

The term Radiomics means for extracting large amounts of advanced quantitative imaging features and analyzing it with the help of sophisticated computing systems (CAD). For analysis of these vast amounts of imaging features obtained from CT, MRI, and PET, Various image processing tools used. Specific disease biomarkers identified during the analysis and training of the image processing models. Primitive detection or prognosis is much essential, and that can significantly improve the survival rate of cancer-affected persons because the primitive stages are often curable. Radiomics workflow involves steps, each with its challenges [1]. Steps in the workflow are shown in Figure 1.

In this paper, we reviewed some of the latest published scientific literatures which report the use of Radiomics process to prognosis the lung cancer. We examined the published works of literature in terms of various assessing parameters mentioned in Julia Lai-Kwon et al. [2]. In addition to prognosis and diagnosis, radiomics produce "imaging biomarkers." We devised an evaluation scheme for the papers we evaluated here according to the following criterion, (a) imaging modalities used, (b) biomarker/genetic information identified, (c) segmentation algorithms used, (d) classification algorithms used, (e) feature selection/ extraction, (f) model building, (g) training the built models, (h) evaluating the performance of the developed models, (i) optimization of the developed models, (j) results and discussions.

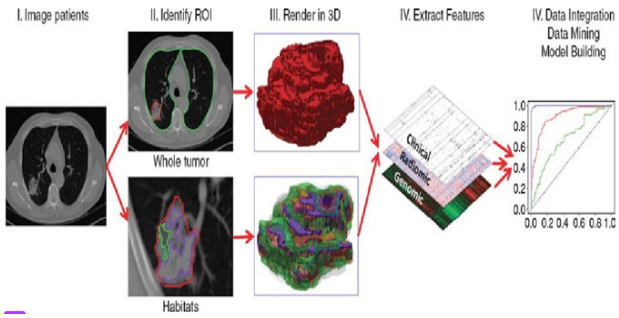


Figure 1: Workflow diagram shows the process of radiomics and the use of radiomics in computer Aided Decision (CAD) support systems[3].

Literature Review

[4]studied the fatal cause of lung cancer among patients who identified as actual positive cases of lung cancer. They further elaborated about the statistics of lung cancer affected patients with mortality rates.

Survival rates for stage IV lung cancer patients are merely 2%. Whereas the patients who are diagnosed very primitive in stage I of the disease has a 50% survival rate. Hence prognosis or primitive detection and diagnosis of lung cancer is crucial for patients. Diagnosis and primitive detection of lung cancer using CT scan place an excessive burden on radiologists since the number of slices from the CT scan to be examined for lung nodule detection is enormous. CAD systems have two stages. In the first stage detection of hundreds of lung nodules from the CT scans using double thresholds, morphological operations, and multiple selective enhancement filters as some of the techniques. Stage 2 involves the reduction of false-positive detection.

For this proposed scheme, the sample dataset obtained from LIDC (Lung Image Database consortium). The received dataset from the National Cancer Institute,1010 patient CT scan images from various hospitals are present in the dataset. Tri-linear interpolation is applied to obtain isotropic voxel of all 1mm resolution.

Lung segmentation is done by an algorithm developed by Tan is used to generate a pulmonary field. Nodule detection utilized the multi-scale nodule and vessel enhancement filters developed by Li et al. [5-8]In the final stage of the CAD system, the scheme extracted 979 features for each nodule candidates to eliminate the false positive detections. Detection of the nodule depends upon the shape features of the nodules. Figure 2 displays the outline schema of the CAD system.

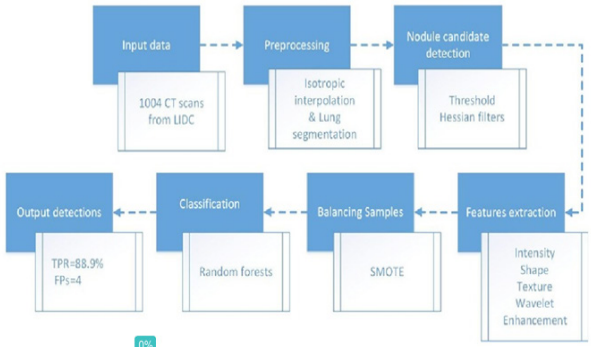


Figure 2. Schema of the CAD System

Tested on LIDC data sets of the proposed model. The datasets contain 1010 CT scans of the chest from different hospitals. Patients with various configurations and orientations are examined using the CT scanners from different manufacturers models. All 1010 scans were included, but some errors occurred in six cases. With four false positive results per scan in the test set, the proposed system achieved 88.9% sensitivity.

[9]We are living in an era of personalized and targeted medicine for patient care. To utilize the potential of modern advanced medical imaging technologies, a higher number of advanced imaging biomarkers are needed. Those biomarkers reflect the whole biology [10] of the tumour. In this work, a large number of Radiomics features obtained from CT scans along with demographics and pathology related data of the patients considered.

Two radiomic features for the forecast of Lung cancer survival are considered in this study i) External value of 1/3 of the tumour, reflecting the microenvironment of the tumour ii) Size zone variance represented intratumor heterogeneity. Prognostic performance for survival, they used three models: (i) clinicopathological data. (ii) selected Radiomics features. (iii) clinicopathological data and selected Radiomics features

Approximately half of the selected radiomics were prognosis for the survival of lung cancer. In particular, in this study[11] – [13] both independently predicted overall survival, the maximum value for the outer 1/3 of the cancer reflecting the tumor microenvironment and zone variance, which is an intratumor heterogeneity. In addition it increases the performance of discrimination and the net benefits of the clinical decision by integrating certain radiomics and clinical variables.

The pronostic performance among the three models is summarized in Table 1 for survival. The level of discrimination improved (C-index 50.772) as compared to only clinicopathological variables (C-index 50.737) with 31 selected radiomics features integrated with the clinicopathological variables.

Table 1: shows prediction models performance, including radiomics and clinicopathological variables

Prediction model	C-Index	95% CI
Radiomics features	0.628	0.550–0.706
Clinicopathological variables	0.737	0.659–0.815
Clinicopathological variables 1 radiomics features	0.772	0.694–0.850

Abbreviation: CI, confidence interval.

The results of this work show that a radiomic perspective on lung adenocarcinoma allows full potential of medical imagery to be exercised. In clinical oncology, it plays a more important role.

[13] This work mainly concentrates on primitive detection and prognosis of the vulnerable patients for recurrence of lung cancer. Radiomic textures such as Gabor, Haralick, Law, Laplace, and CoLlAGe were extracted from the whole of the digitized H&E slide tissue pictures on an initial detection set of 50 patients on CT scans and on intranuclear pathology features, specifically, Shape, Cell Cluster Graph and Global Graph features. In conjunction with machine learning algorithms the first predictive radiomic and pathomic functions were combined to forecast classification. The raptomic classification performance is estimated on a Cleveland Clinic training set (n=50) and was independently validated on images taken from the open cancer genome atlas (TCGA) (n=43) dataset. A5-year recurrence-free Survival (RFS) (AUC 0.78; p<0.005), when compared to Radiomic (AUC 0.74; p<0.01), and Pathomic (AUC 0.67; p<0.05), were clearly forecasted in the radiographic forecasts model using Linear Discriminant Analysis (lDA) classifier in conjunction with two radiomics and two pathomic shape features only.

This work is the first attempt to combine radiomic and pathomic features within a single classifier for predicting recurrence in primitive-stage NSCLC. A flowchart illustrating the various modules comprising the RaPtomic classifier

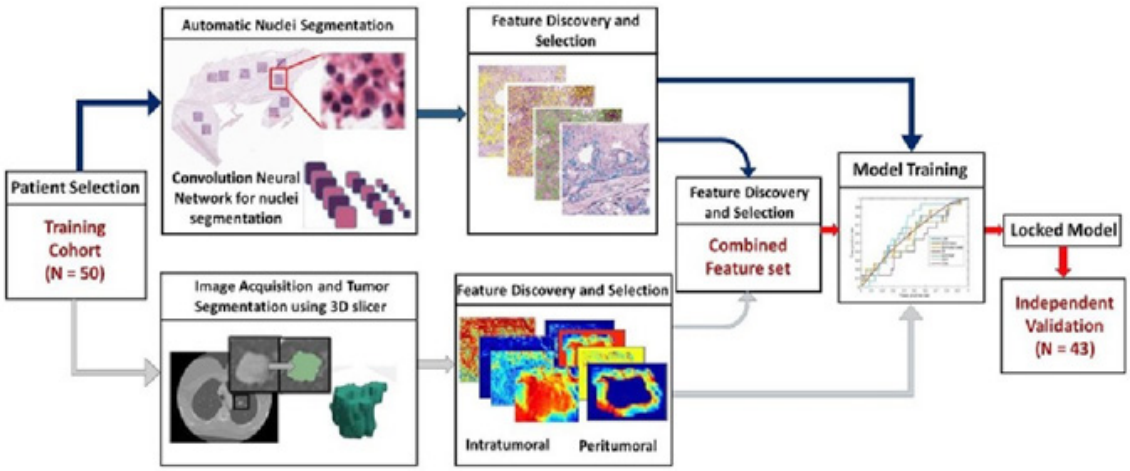


Figure 3: Workflow illustrating the procedure of training and validation of Radiomic, Pathomic, and RaPtomic classifier for distinguishing primitive versus no/late recurrence in primitive-stage lung cancer.

Linear Discriminant Analysis (LDA) classifier yielded an AUC 0.79 and accuracy of 70% on the training cohort and AUC of 0.74 and accuracy of 69% on validation cohort for discriminating primitive versus no/late disease recurrence. Kaplan Meier curves analysis was used to correlate recurrence-free survival (RFS) of the patients predicted by the model. The patients predicted as recurrent by the classifier had statistically worse disease-free survival with p<0.001 by log-rank test.

This study presented a combined radiomoic and pathomic prognostic classifier to predict the risk of recurrence of NSCLC in primitive-stage. The features derived from both pre-surgical CT scans as well as digitized H&E surgically resected tissue image [14]. Our integrated approach (RaPtomics) was found to be more prognostic of disease recurrence compared to either pathomic or radiomic features alone. [15] This paper analyses the nature of lung cancer in the US as the primary cause of mortality among cancer affected peoples. The overall survival rate of a lung cancer patient for five years is only 17.7% in the later stage. Authors take a novel method to aid decision making of the radiologists, which involves the fusion of in-depth features extracted from the CT scans of suspected patients with the classical radiomics features. Deep Learning is utilized to extract the detailed features from the CT Scans of the data set obtained from the National lung Screening Trial (NLST). Here three different pre-

tutelage CNN models are used to extract the in-depth features from the CT scan images. The extracted deep features are given to five different classifiers.

Four ways were devised for the authors to improve the CNN classifiers predictability. Included in camera photos are the CNN classifiers. The classification input is taken from CT scans of patients suspected of lung cancer and has now been found to be benign. In the first place, they examine whether the classification of the camera images using the in-depth functions derived by the CNN system can produce similar or improved results in comparison with standard radiomic features such as textures, shape and size. To monitor this features, each tutelage is based on the même data containing all color channels, extracted from three slightly different deep neural tutentive networks. Second, we speculated that the combination of standard radiomics and profound characteristics improves the solution to classification. You did not try to find the right amount of trainings features. Thirdly, because the images on the lung-nodule have been in the gray scale of nature, after examining the images on the classification, the authors analyzed the effects on the camera icon on the images of nodules by different color-channels (red / green / blue) of the CNN network tutoring. Three different architectures have been tried to gradually minimize the number of weights. While more weight can make classification systems more complex, they can overpower or train poorly with small data, and only small networks can not provide good precise data, so the spread of three classifiers. Efficiency and AUC measured on invisible data.

The authors created CNN architectures which combine deep learning with transfer learning with 76% accuracy (AUC 0.87) from Architecture 3. The authors developed the architecture. They used their own pre-tutoring CNN Architecture 3, to extract 1024-sized features from the pool of max size— layer 3. The three methods are presented here with three different approaches and results. The accuracy of 68,77 percent (AUC 0.62) was achieved by using only the in-depth features of the newly designed CNN. The accuracy was received at 76.37 per cent (AUC 0.75) when new details merged with the standard radiomics. 3. The combination of the new in-depth features and standard radiomics features. In addition, the most comprehensive features derived from the recently constructed and preserved CNN architectures were 76.79 percent (AUC 0.78), the total accuracy achieved. This precision shows that this is the best performance with radioma features compared to the previously obtained results.

Three interpretations are provided in this work that were used in future research. They recommend an effortless, production-oriented CNN architecture with less useful parameters for smaller (medical) datasets. First, they recommend. Secondly, they showed the characteristics that have been acquired by transmission from all CNN canals. Pre-tutoring of a large body of camera images is better than extracting features on any single channel. Thirdly, a new feature was created by combining quantitative elements with in-depth features which improved classification performance.

[16] have developed a new approach to detect and diagnose primitive Lung Cancer, known as Deep Radiomics. Lung cancer is the leading cause of death due to cancer, with a 5 year survival rate of 18 percent dysfunctional. In this study, the method of diagnosis of lung cancer was Low dose Computed Tomography (LDCT). The LDCT pictures of the identified nodules are used in this piece. By increasing the image of the real nodule, more images are produced to train a small CNN.

The authors analyze various texture images derived from an original image in this study. Imaging Textures provide useful data and statistics on the color intensities, structure, shape, size, and appearance of areas of interest to an image for spatial arrangement. During the author's study the NLST (National Pulmonary Screening Test) image data set was identified. NLST images are pre-processed to obtain texture images. The most frequently diagnosed cancer of the lung world is 13.3% of all cancer. The survival rate for lung cancer is 17.7% for five years. In the United States, lung cancer has been classified as Lung Small Cell Cancer (SCLC) and Lung Non-Small Cell Cancer (NSCLC). NSCLC (non-small-cell lung cancer), as compared to small-cell lung cancer, tends to expand and grow slowly. Using low-dose computed tomography, NLST is displayed and screened. Classification and categorisation profound learning.From this, 125 3D Law's features are selected using the Relief-F feature selection algorithm. Out of the 125 3D Law's feature images best 10 Law's features are chosen as an input to train the 11 layers of the CNN using Relief-F feature selection algorithm. Training image data set are obtained from NLST that taken for three years. In the beginning -year baseline screening T0, CT scan made, and in the subsequent years, follow

up scans are received, in the second year T1, and the third year T2.

Selected image data set from baseline scanning and subsequent follow up scanning are further divided into two cohorts. Cohort1 is called a training cohort, which contains 85 SDLC cases and 176 positive controls nodule. Cohort2 includes 85 SDLC cases and 152 positive nodule controls. The CNN architecture the authors devised in their previous work is used in their current work. The training of the 11 layers of the CNN is from the ten different Law's texture images, a maximum accuracy of 73% and AUC of 0.82 were found from L5E5L5 images. Classifiers of two distinct subsets are used to ensemble prediction by averaging the results. Predictions of CNN from cohort2 using the ten selected Law's feature Image gives an accuracy of 78.9% and AUC of 0.87. Predictions of the second subset using ten selected Law's specified images along with the predictions from original models give an accuracy of 79.32 and AUC of 0.81. The authors found that L5E5L5 Law's feature image has given the best classification accuracy of 73% for a single feature. Using the packaging approach, the authors further obtained an accuracy of 79.32 and AUC of 0.88. By combining the test prediction of CNN's from the ten different Law's feature images with a single obtained image. Table 2 discusses about comparative study for exisitng technique.

Table 2: Comparative Study for Recent Technique

Author/ Year	Imaging Modality Used	Imaging Biomarkers or Genetic Information Identified	Segmentation Algorithms Used	Classification Algorithms Used	Feature Selection and Extraction	Model Building	Data Set used to Train the Model	Statistical Evaluation done?	Optimi-zation of the Built Model is done?
Jingchen Ma et al. Aug' 2017.	Spiral Computed Tomography	Intra-Tumour Heterogeneity, Multi frequency Information	Nodular Selective Enhancement Filter	Random Forest	Coiflet 1 Wavelet	Not Built	LIDC-IDRI	Yes	No Info
Geewon Lee et al. Jul' 2018	Serial Axial Conventional Computed Tomography	Max Value of the Outer 1/3 of tumour, Size zone variance	No Info	No Info	Statistical methods	3 models Built	Authors Institutional Database	Yes	No Info
Pranjal Vaidya et al. mar' 2018	Helical Computed Tomography	Pathomic Features	No Info	Linear Discriminant Analysis	No Info	3 models Built	Clive land Hospital	Yes	No Info
Rahul Paul et al. Mar' 2018	Low Dose Computed Tomography	Not Used	Definiens Software Suite	3 Layers of CNNs and MATLAB's MATCONVNET	Definiens Software Suite	3 CNN Models Built	LDCT and NLST	Yes	No Info
Rahul Paul et al. Mar' 2019	Low Dose Computed Tomography	Not Used	Definiens Software Suite	3 Layers of CNNs and MATLAB's MATCONVNET	Definiens Software Suite	3 CNN Models Built	LDCT and NLST	Yes	No Info

Abbreviations:

LIDC- Lung Image Database Consortium

LDCT- Low Dose Computed Tomography

NLST- National Lung Screening Trial

Conclusion

We reviewed some of the recent scientific literature

on primitive lung cancer detection or prognosis using Radiomics proceedings. Found that this is a promising modality for the efficient prognosis of non-invasive non-small cell lung cancer. Among the reviewed literature, we find that there is no standardized proceedings or procedures available for the use of Radiomics Technology. More research needs in these emerging Radiomics procedures for practical use. Targeted or personal medicine requires more advanced non-invasive prognostic techniques for successful treatment, Radiomics may fill the gap which exists now. More advanced classification, segmentation, feature extraction, and deep learning algorithms help us to use the Radiomics Proceedings to prognosis lung cancer efficiently.

Ethical Clearance: Taken from Saveetha Engineering College, Chennai

Source of Funding: Self

Conflict of interest: Nil

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Brain Image Classification Using Dual Tree M-Band Wavelet Transforms and Support Vector Machine

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Abstract

Human brain is an important organ of humans, and it is the center of the nervous system. Brain tumor causes more damage to humans, and the cause is still unknown. Hence, an early diagnosis system for a brain tumor is required. In this paper, an efficient method is presented for brain image classification using Dual Tree M-band Wavelet Transform (DTMWT). The system uses Magnetic Resonance Imaging (MRI) images of brain. REpository of Molecular BRAin Neoplasia DaTa (REMBRANDT) database is used for MRI brain image classification. DTMWT uses the Hilbert pair of wavelet for decomposition. A predefined number of DTMWT sub-band coefficients are selected and directly fed to the Support Vector Machine (SVM) classifier. Results show that DTMWT and SVM classifier provides 86% accuracy, 79% sensitivity and 93% specificity for MRI brain image classification system.

Keywords: *MRI, DTMWT, Sub band, Coefficient selection, SVM classifier, Classification.*

Introduction

Brain is the most complex and largest organ in our body. The abnormal cell in the tissues of the brain is known as brain tumor. Different wavelet analysis of MRI brain images using SVM classifier is discussed in [1]. SVM is one of the state-of-art learning methods used for the classification. The multiclass classification and binary tasks are performed by SVM classifier. An approach for brain tumor detection is discussed in [2]. At first, anisotropic filtering is used for removing the noises in MRI brain images. Then, SVM classifier is used to detect the tumor region, and morphological operations are used for separating the detected tumor regions from the normal region.

MRI brain image classification system by image mining algorithm is presented in [3]. Gray Level Co-occurrence Matrix (GLCM) based features are extracted. A hybrid approach based on SVM with Radial Basis kernel Function (RBF) and K-Nearest Neighbor (KNN) is used for classification. A technique for the detection of brain tumor is discussed in [4] using SVM classifier. The pre-processing step includes noise removal, gray level conversion of brain images and edge detection. Then, SVM classifier is used to find the tumor segmented area.

A comparative study between SVM and Artificial Neural Network (ANN) classifier for brain image classification is discussed in [5]. Initially, features of brain images are extracted by GLCM. Then, SVM and ANN classifier are used for the classification. Brain tumor detection using SVM classifier is discussed in [6]. At first, MRI brain images are pre-processed to remove noises. Then, the features are extracted from k-means clustering and fuzzy c-means clustering approaches. Finally, SVM is used for classification.

The hybrid classifier approach using SVM and KNN classifier is discussed in [7] for brain cancer classification. The preprocessing step involves the conversion of an image to grayscale and noise removal. Then the features are extracted and a hybrid classifier based on SVM and KNN are used for the classification. The primary approach for robust classification of brain tumor using KNN and SVM is discussed in [8]. At first, preprocessing stage is used for noise removal. Texture and intensity based features are extracted from the brain images. Then, the feature space is reduced by applying principal component analysis. Finally, the classification is made by SVM classifier.

Brain image classification by SVM with RBF is discussed in [9]. The input brain images are decomposed by the Discrete Wavelet Transform (DWT). Then, kernel Principal Component Analysis (PCA) is used to reduce the wavelet features. The brain tumor classification using Meta heuristic method and SVM is discussed in [10]. Features of MRI brain images are extracted by GLCM, and the dominant features are selected by simulated annealing. Then SVM classifier is used.

SVM and KNN based MRI brain image classification is discussed in [11]. Initially, the preprocessing step is applied for MRI brain images to remove noise. The texture, color and shape are used as features. Then, classification is made by SVM classifier. Segmentation and classification of brain tumor using DWT, GLCM and gabour wavelet are discussed in [12]. At first, the preprocessing is made by ostu's thresholding for noise removal. DWT features, gabour features and GLCM features are extracted, and PCA is used to reduce the feature space. Finally, SVM classifier is used for classification.

In this paper, an efficient method is presented for MRI brain image classification using DTMWT and SVM classifier. The paper is organized as follows: Section 2 describes the materials and methods of the MRI brain classification system. Section 3 gives the performance of the MRI brain classification system in terms of classification accuracy. The last section concludes the MRI brain image classification system.

Materials and Method

Classification of MRI brain images using DTMWT and SVM classifier is presented. It consists of DTMWT decomposition, feature selection and classification stages. In the feature extraction stage, MRI brain images are decomposed by DTMWT which produces low and high-frequency subbands. The subband coefficients are selected using t-test for the classification.

DTMWT Decomposition

Let us consider, the one-dimensional image belongs to the space as $P^2(K)$. The multiresolution M-band is defined by one scaling function $\psi_0 \in P^2(K)$ and *(M-1)* mother wavelets $\Psi_m \in P^2(K), m \in \{1,.....M-1\}$. The wavelets are obtained by one-dimensional dual tree decomposition by two-dimensional separable methods. In two-dimensional wavelet decomposition the two bases are used in $P^2(K^2)$ for the corresponding 2D separable wavelets from the dual wavelet basis functions. DTMWT is used in many pattern recognition approaches such as microarray data analysis [13] and person recognition [14].

The MRI brain images are decomposed by DTMWT. It produces lower and higher frequency subbands. As the dimension of DTMWT sub-bands is very high, feature selection approach is employed to reduce the feature space.

Feature Selection

From the DTMWT sub-band coefficients, informative coefficients are selected by a statistical approach named t-test. According to the rank of the features, DTMWT coefficients are selected. From the vast number of DTMWT coefficients, the first 25 top-ranked coefficients are selected to evaluate the system. Similarly, 50 and 75 top ranked coefficients are selected for further evaluation.

SVM Classification

SVM classifier is an effective machine learning algorithm. It is used in many classification systems such as ECG classification [15] and glaucoma classification [16]. SVM classification is based on the kernels and constructs the hyperplane between the two classes for the purpose of the classification. SVM training includes convex quadratic optimization. The solutions are unique and global. The convergence of other learning algorithms is avoided. Let the training set of image in class A be $\{A_1, A_2, A_3, ...A_n\}$, where $A \subset R^n$ the mapping function is ψ then $\psi : A \to F$ is the feature space. The equation is:

$$\min\left[\frac{1}{2}\|A\|^2 + \frac{1}{\nu}\sum_{n=1}^{l}\xi_k - p\right] \quad (1)$$

where $A.\Psi \geq p - \xi$, let $k = 1, 2, ...n$ and $\xi_k \geq 0$ .The ξ be the slack variable, p is the bias and k is the number of samples. In this study, SVM classifier performs the operation with the selected DTMWT coefficients and produces the output classification whether the given image is normal or abnormal.

Results and Discussion

A set of 50 brain images for both normal and abnormal categories are selected from the REMBRANDT

database [17-18] for performance evaluation. The size of images is 256x256 pixels. Figure 1 shows the brain images of abnormal and normal categories.

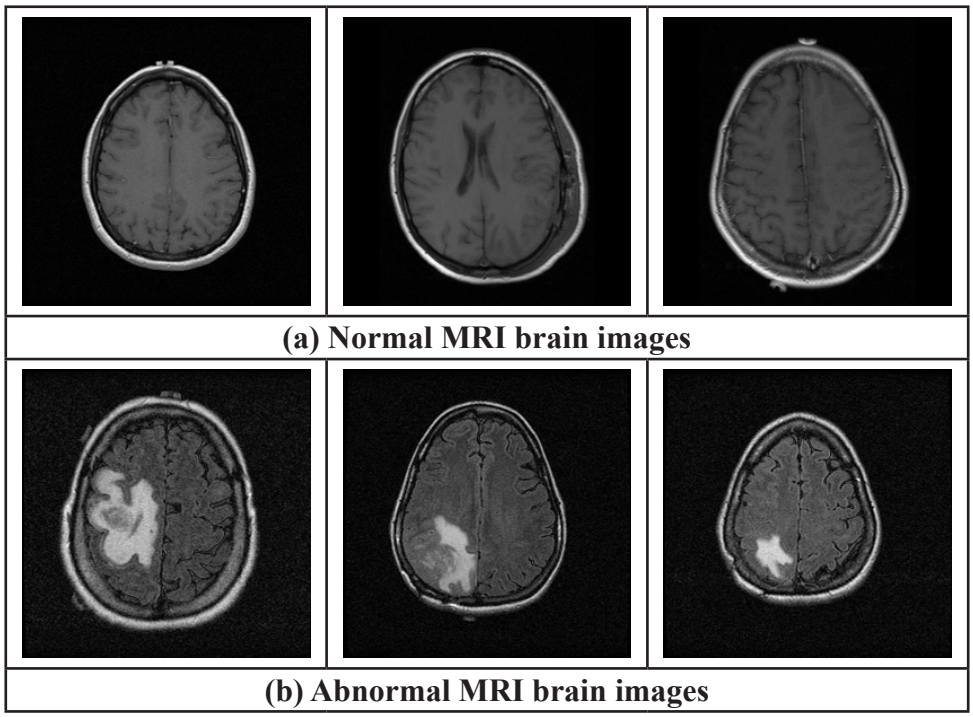


Figure 1 Sample normal and abnormal MRI brain images

Table 1 shows the obtained classification accuracy (Acc), Sensitivity (Sens) and Specificity (Spec) by the selected DTMWT coefficients (25-coefficients, 50-coefficients, 75-coefficients) using SVM classifier at 1 to 5 levels of DTMWT.

Table 1 Classification accuracies by the selected DTMWT coefficients using SVM classifier at 5 levels

Level	25-Coefficients			50-coefficients			75-Coefficients		
	Acc (%)	Sens (%)	Spec (%)	Acc (%)	Sens (%)	Spec (%)	Acc (%)	Sens (%)	Spec (%)
1	53.5	97	100	68	96	40	77	94	60
2	84.5	92	77	84.5	97	72	85	95	75
3	74	99	49	76.5	98	55	77	95	59
4	68	98	38	70	96	44	85.5	91	80
5	78.5	94	63	60.5	98	23	86	93	79

From Table 1 it is observed that the feature set which contains 75-coefficients produces the highest accuracy of 86% at 5th level of DTMWT decomposition. Also, it is observed that the other feature sets (50 and 75 coefficients) produce 84.5%. It is also observed that sensitivity is 99% at 25-coefficient in 3rd level of DTMWT decomposition, specificity is 100% in 25-coefficients at 1st level of DTMWT decomposition.

It is observed from the above confusion matrix that among 100 abnormal images, 93 images are correctly classified while using 75-coefficients extracted at 5th level of DTMWT decomposition. Also, it is noted that maximum area of the ROC curve in Figure 2 is 0.86. Table 2 shows the comparative analysis with different classifiers using DTMWT decomposition at 5 levels.

Table 2 Comparative analysis with different classifier using DTMWT decomposition at 5 levels

DTMWT Levels	Accuracy (%)		
	KNN	Naïve Bayes	SVM
1	70	72	77
2	81	83	85
3	72	74	77
4	79	81	86
5	82	84	86

It is observed from the Table 2 that the maximum accuracy of 86% is obtained by SVM classifier whereas Naïve Bayes and KNN provide 84% and 82% respectively.

Conclusion

An efficient method is presented in this paper for MRI brain image classification. It uses DTMWT algorithm for feature extraction and SVM for classification. According to the rank of the features by t-test, 25-coefficients, 50-coefficients, 75-coefficients are selected as features from the DTMWT sub-band coefficients. These selected coefficients are the input for the classification. SVM classifier is applied for the selected features at 1 to 5 levels of DTMWT decomposition. Results show that the feature set with 75-coefficients produces better classification accuracy when compared with other feature sets.

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Determinants of Self-Medication Practices in Urban Area of Kancheepuram District, Tamil Nadu

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Abstract

The idea of self-prescription has increased all inclusive acknowledgment as it urges a person to treat minor disease with successful and straightforward cures . It is even elevated in order to have self-confidence in preventive, therapeudic and rehabilitative consideration. Self-medicine can conceivably progress nicely and furthermore hurt the individuals. This is particularly huge in those nations where physician recommended medications are accessible over-the-counter (OTC) because of absence of requirement of guidelines . An enhanced danger of intensifying of existing ailment pathology just as danger of collaborations between doctor prescribed prescription and concealed dynamic elements of OTC medications are constantly present with self-medicine.

***Keywords**: medication, OTC, urban*

Introduction

Self-medicine or non-solution of medication is a person's therapeutic conduct towards self-care that can do potential health and furthermore be harmful1.The utilization of meds without earlier restorative meeting in regards to sign, measurement, and span of treatment is alluded to as self-drug. In the greater part of the ailment scenes; selfmedication is the primary alternative which makes it a typical practice worldwide[1].

In the course of recent years there has been a push-back against the paternalistic model of wellbeing, towards a more individual driven methodology including self-care and capable self-prescription with nonprescription (or over-the-counter, OTC) medications. Dependable utilization of self-care items includes utilizing the correct item for the correct sign (ailment) at the opportune time and in the correct manner. This incorporates both self-prescription utilizing self-care items for treating regular medical issues and the utilization of self-care items to help lessen the danger of ailment. Self-drug is a generally drilled part of self-care. The test and open door for government specialists, human services experts and suppliers of self-medicine items is to have a suitable system set up for capable self-medication[2].

The idea of self-prescription has increased all inclusive acknowledgment as it urges a person to treat minor disease with successful and straightforward cures . It is even elevated in order to have self-confidence in preventive, therapeudic and rehabilitative consideration. Self-medicine can conceivably progress nicely and furthermore hurt the individuals. This is particularly huge in those nations where physician recommended medications are accessible over-the-counter (OTC) because of absence of requirement of guidelines . An enhanced danger of intensifying of existing ailment pathology just as danger of collaborations between doctor prescribed prescription and concealed dynamic elements of OTC medications are constantly present with self-medicine[3]

In the creating nations like Pakistan, India, Bangladesh and Nepal, the pace of self-drug is high. Over half individuals are ingesting medications without a specialist's recommendation. So as to handle this

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issue, the administrations of all the creating nations have proclaimed rules to avert self prescription . Every single medication that is enrolled to the concerned medication specialists must be carefully checked available to be purchased and solution. Wellbeing division and medication administrative authority ought to pursue the WHO rules for medication medicine and dispensing[9].

In view of this foundation, the present examination was completed to discover the Determinants of Self prescription in Urban region of Kancheepuram region in TamilNadu.

Materials & Method

Study Area:

The study was conducted in **Anakaputhur,** anUrban field practice area of Sree Balaji Medical College and Hospital in Kancheepuram district, Tamil Nadu.

Study design:

A Community based cross sectional descriptive study

Study Period:

The study was conducted between June 2017 to May 2018.

Study Participants:

According to the 2011 census, Anakaputhur urban field practice area had a total population of 48,050 of which 24,158 were males , 23,892 were females . Total number of houses in Anakaputhur is 12,146. The study was done among adolescent and adults 15 years and above residing in the study area permanently at the time of the study.

Inclusion criteria:

All participants who were 15 years and above[3] and willing to participate in the study were selected

Exclusion criteria:

Those who were not willing to participate in the study were excluded.

Psychiatric patients,pregnent mother,severly ill patients were excluded from the study.

Study area:

Kancheepuram locale is one among the 32 areas of Tamil Nadu. As indicated by the enumeration of India 2011,Kancheepuram region covers a territory of 4433sq. km with a populace of 39.98 lakhs involving 20.12 lakhs guys and 19.8 lakhs females. Kancheepuram, the sanctuary town is the central station of the region for regulatory reasons, the area has been separated into 4 income divisions including 11 taluks with 1137 income towns.

Anakaputhur is a Municipality city in the area of Kancheepuram, Tamil Nadu. It is isolated into 18 wards for which races are held like clockwork. The examination was directed in Anakaputhur which is the urban field practice territory of Department of Community Medicine of Sree Balaji Medical College and Hospital (SBMCH), situated a ways off of 7 kilometers from the foundation with a zone covering around 16 sq. Kilometers.

Sample size:

Sample size was calculated based on the study done by " Pushpa R Wijesinghe" in the year 2013 in Sri lanka which recorded the prevalence of self medication practice of 34%.[4] Using this study prevalence as reference the sample size was calculated by using $4pq / [L]^2$formula

Adding 10% refusal rate the sample size obtained is 394 which is rounded up to 400. The sample collected during the study period was 424.

Sampling method:

Anakaputhur had a total population of 48,050 as per 2011 census. As per the data available in the UHTC register There were total of eighteen wards in Anakaputhur. The number of households 12146. The sampling technique followed for this study was systematic random sampling technique.

K = sample size in our study

N = Total no of households = 12146

n = sample size = 424

$K = N / n = 12146 / 424 = 28^{th}$. Every 28^{th} house were selected.

The name and address of the person was noted and was visited for the data collection. If the person

corresponding to the number did not give informed consent or absent ,the next number was chosen and the next person was selected and interviewed. Likewise, 424 participants who gave informed consent and willingly participated in the study were identified.

Study tools:

A pre-tested structured questionnaire was used as a study tool to interview the study participants. The questionnaire was prepared in English and Tamil. It was conducted by face to face interview by the investigator himself and the responses were recorded in the questionnaire. The questionnaire consisted of 6 sections relating to the details like socio-demographic characteristics, personal history and self-medication details

Ethical approval:

The study was approved by Institutional Ethical Review Committee of Sree Balaji Medical college and hospital , Chennai .

Informed consent:

The details and purpose of the study and the confidentiality of their identity were explained to each and every participant those who were willing to participate in the study were required to sign the informed consent, after which they were included in the study . the informed consent was in Tamil ,the local language of the study participants.

Statistical Analysis:

Data entry was done and analysed using SPSS software version 22

Findings

Table 1: Back ground characteristics of study participants.

Sl.no	Variables	Frequency N=424	Percentage %
1	Age Groups		
	< 20 Years	10	2.4
	21-30 Years	70	16.5
	31-40 Years	92	21.7
	41-50 Years	66	15.6
	51-60 Years	84	19.8
	61-70 Years	82	19.3
	>70 Years	20	4.7
2	Sex		
	Male	144	34
	Female	280	66
3	Education		
	Illiterate	170	33
	Primary School	192	45.3
	Secondary School	36	8.5
	Higher Secondary School	56	13.2
4	Occupation		
	Professional	18	4.2
	Skilled	38	9
	Semi Skilled	142	33.5
	Unskilled	26	6.1
	Housewife	170	40.1
	Unemployed	30	7.1
5	Per Capita Income		
	Upper class	16	3.8

Cont.... **Table 1: Back ground characteristics of study participants.**

	Upper middle class	126	29.7
	Middle class	194	45.8
	Lower middle class	82	19.3
	Lower class	6	1.4
6	MARITAL STATUS		
	Married	408	96.2
	Unmarried	16	3.8
7	NO. OF FAMILY MEMBERS		
	≤ 4 members	336	79.2
	> 4 members	88	20.8
8	RELIGION		
	Hindu	368	86.8
	Christian	32	7.5
	Muslim	24	5.7

Age distribution:

The current study involves 424 study populations. In this study majority of the participant were female 66% (n=280) and 34% (n=144) of them were male. The study population belong to the age group of 20 to 70 years. About 21.7% (n=92) of them were between 31-40 years, 19.8 % (n=84)of them 51-60 years and 19.3% (n=82) of them belonged to 61-70 years. A minimum of 2.4% (n=10) of the population below 20 years and 4.7%(n=20) of them were above70 years of age.

Majority66% (n=280) of the study population were female and 34% (n=144) of them were male .Majority 45.3%(n=192) of them have completed primary school education , 33% (n= 170) of them were illiterate, 13.2% (n=56) have completed higher secondary education and 8.5% (n=36) have completed secondary school education. Majority of the study population 40.1% (n=170) was a home maker. 33.5%(n=142) of them was semiskilled worker. 9% (n=38) was skilled worker, 7.1% (n=30) was unemployed. A minimum of 4.2% (n=18) was professional by occupation.

Majority of the study population 45.8% (n=194) belonged to middle class. About 29.7% (n=126) Of them were upper middle class. About 19.3% (n=82) of them belonged to lower middle class. A minimal study population 1.4% (n=6) belonged to lower middle class.

About 96.2% (n=408) of the study population were married and a remaining of 3.8% (n=16) were unmarried. Majority 79.2% (n=336)of the study population the family had 4 members and below. About 20.8% (n=88) of them had more than 4 members in the family. Majority 86.8% (n=368) of the study population belonged to Hindu religion. About 7.5% (n=32) of them belonged to Christian and remaining 5.7% (n=24) of them belonged to Muslim religion.

Table2: **Prevalence of self-medication among the study participants**

Sl.no	Variables	Frequency N=424	Percentage %
3	TREATMENT FOR ILLNESS		
	Home remedy	24	5.7
	Sought medical care	146	34.4
	Self-medication	254	59.9

Among the study population majority 59.9% (n=254) of the study population followed over the counter medication for their treatment remedy.

Table 3: **Association between socio-demographic character and Self Medication**

Sl.no	Variables	Self medication		Total	Chi square value	Odds ratio	P value
		Present	Absent				
1	AGE GROUPS				15.0		0.035*
	< 20 years	2	8	10			
	21-30 years	36	34	70			
	31-40 years	56	36	92			
	41-50 years	38	28	66			
	51-60 years	52	32	84			
	61-70 years	54	28	82			
	>70 years	10	4	14		-	
2	SEX						
	Male	84	60	144	0.224	0.90 (0.60-1.36)	0.636
	Female	170	110	280			
3.	EDUCATION						
	Illiterate	108	32	140	31.9		0.000*
	Primary school	106	86	192			
	Secondary school	12	24	36			
	Higher secondary school	28	28	56		-	
4.	OCCUPATION						

	Professional	6	12	18			
	Skilled	16	22	38			
	Semi skilled	88	54	142			
	Unskilled	24	2	26	21.9		0.001*
	Housewife	102	68	170			
	Unemployed	18	12	30		-	
5.	PERCAPITA INCOME						
	Upper class	4	12	16			
	Upper middle class	68	58	126			
	Middle class	110	84	194			
	Lowermiddleclass	66	16	82	29.3		0.000*
	Lower class	6	0	6		-	
6.	MARITAL STATUS						
	Married	254	154	408			
	Unmarried	0	16	16	24.8	-	0.000*
7.	RELIGION						
	Hindu	218	150	368			
	Christian	18	14	32	2.5	-	0.283
	Muslim	18	6	24			
8.	TOBACCO USE						
	Yes	30	16	46			
	No	224	154	378	0.6061	1.28 (0.67-2.44)	0.436
9.	ALCOHOL USE						
	Yes	28	12	40		1.63 (0.80-3.30)	
	No	226	158	384	1.873		0.171

(p value <0.05 significant at 95% CI)

Table 3 shows that there is an association present between age groups and self medication were the p value is 0.035. There is an association present between occupation and subjects on self medication p=0.001. An association present between education and self medication, per capita income and self medication and marital status and self medication with a p value 0.000. No statistical significant association was found between other factors like tobacco use and alcohol use with self medication.

Discussion

The present study is a cross sectional study , carried out in an urban field practicing area (Anakaputhur) of

Sree Balaji Medical college and hospital, Kanchepuram district Tamil Nadu to determine the prevalence of self medication among people residing in an urban community. The current study shows a maximum participant were female 66% and remaining 34% were male. This is similar to a study done by Kalaivani Annadurai et al. Nellikuppam Village, Kancheepuram District, Tamil Nadu (2017) where 73.13% of the participants where female . Saba HI et al. Bengaluru, Karnataka,2016 67.64% .

The current study shows a positive association between age and self medication practice (p=0.035) similar to Osemene & Lamikanra (p= 0.001)

A positive association present between education and self medication practice (p=0.000), similar to a study done by Xiaosheng HYPERLINK "https://www.ncbi.nlm.nih.gov/pubmed/?term=Lei%20X%5BAuthor%5D&cauthor=true&cauthor_uid=29300318" Lei[5] (p=o.o4), Naz Mohammed Ahmed (p=0.001)

A positive association present between occupation and self medication (p=0.001), similar to a study done by KalaiselviHYPERLINK "https://www.ncbi.nlm.nih.gov/pubmed/?term=Selvaraj%20K%5BAuthor%5D&cauthor=true&cauthor_uid=24551585" Selvaraj[6](p=0.003)

A positive association present between socio economic class and self medication (p=0.000), similar to study done by Naz Mohammed Ahmed (p= 0.004)

A positive association present between marital status and self medication practice (p=0.000)

Conclusion

Due to lack of information self medication can cause hazardous effects such as antibiotic resistance, skin problem, hypersensitivity and allergy. Hence, developing country like India where we have poor economic status, education status as well as poor health care facilities.The People have less knowledge[7] regarding risks associated with their self-medication. We are on the edge of sword whether to promote self-medication or not. Hence it is recommended that holistic approach should be taken to prevent this problem, which includes proper awareness and education regarding the self-medication and strictness regarding pharmaceutical advertising. Dispensing modes in the needs to be improved through proper education, strict regulatory and managerial strategies to make health care easily accessible and cost-effective.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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A Study on Clinical Features and Dermatopathology of Palmar Lesions

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Abstract

Palmar lesions may occur alone or along with involvement of soles and other areas. The most common conditions of palmar lesions are Psoriasis, Eczema, Dermatophytosis, Verruca vulgaris, Syphilis and Seasonal exfoliation. Other conditions over the palms include Druginduced, Callosities, Keratoderma and Heloma.Skin biopsies were obtained from the enrolled patients. We examined H&E-stained sections of the skinbiopsies of palmar lesions to observe the histopathologicalstudy where it was seen that in the active lesions, Parakeratosis was more uniform,Munromicroabscesses were larger and more numerous which concludes that psoriasis is the commonest palmar lesion.we conclude that the commonest palmar lesion is Psoriasis over the palms and Dermatopathology has a verysignificant role in concluding the diagnosis and Clinicopathological correlation is always the best to aid in the finaldiagnosis which helps in the proper and further managementof the patient.

Objectives: The aim of the study is to conclude the observational study of clinical and histopathological findings in 100 patients with palmar lesions attending dermatology department at Sree Balaji Medical College and Hospital .[5]

Place of Study: Skin OPD, Sree Balaji medical college and hospital, Chennai.

Study Design: Observational study. [8]

Key words: *palmar lesions, histopathology, psoriasis vulgaris*

Introduction

Palmar lesions may occur alone or along withinvolvement of soles and other areas. The most commonconditions of palmar lesions are Psoriasis, Eczema,Dermatophytosis,Verruca vulgaris, Syphilis and Seasonal exfoliation. Other conditions over the palms include Druginduced, Callosities, Keratoderma and Heloma. Skin biopsies were obtained from the enrolled patients. We examinedH&E-stained sections of the skinbiopsies of palmar lesions to observe the histopathological study.[1]

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Findings

Primary palmar lesions

Primary skin lesions of palms commonly seen aremacules, plaques, patch, nodule, vesicle, wheals, pustules and bulla.[2]

Secondary palmar lesions:

It is mainly "Palmar erythema" which is a symptom of many different conditions. Its appearance is often the firstsign of an underlying medical concern. About 23 percent ofpeople who have cirrhosis of the liver also experiencepalmar erythema.[4] The disparity between the present study and recognized histopathological features in a well developed lesion of psoriasis (i.e. absenceof uniform parakeratosis, presence of normal stratum granulosum and normal thickness of suprapapillary plate insome specimens and lower incidence of

Munromicroabscesses) can be explained on the basis ofbiopsies of patients from different lesions. Therefore, in our study, a skin biopsy isperfomed owing to different palmar lesions for histopathological examination, inorder to get a properdiagnosis, to know the most common palmar lesionand also to correlate clinically for better treatment.[3]

Conclusion

In our study we concluded that,

1. The commonest palmar lesion observed was PsoriasisVulgaris.

2. Histopathology was really useful in our studies to aidin the final diagnosis.

3. The authors hypothesized that the nonspecifichistologic findings could represent both a samplingerror on the part of the clinician taking the biopsy, inparticular, choosing excoriated lesions that correspondto a later stage of the disease, or the pathology, in sampling the lesion for histology,considering appropriate a progressive cutting of thetissue block.

4. Male preponderance with psoriasis Vulgaris was seenas the highest number among palmar lesions and alsoproven through histopathology.[6]

5. Most commonly affected age group was middle age.

6. We also had a few cases where the histopathologyfindings were different from the clinical diagnosis.Most of the confusion arised between eczema andpsoriasis where biopsy was done for histopathological examination to conclude the final diagnosis.

Thus we conclude that the commonest palmar lesion isPsoriasis over the palms and Dermatopathology has a very significant role in concluding the diagnosis and Clinico pathological correlation is always the best to aid in the finaldiagnosis which helps in the proper and further management of the patient.[7]

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Common Dermatoses with Palmar Lesions

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Abstract

Palmar lesions may occur alone or along with involvement of soles and other areas. The most common conditions of palmar lesions are Psoriasis, Eczema, Dermatophytosis, Verruca vulgaris, Syphilis and Seasonal exfoliation. Other conditions over the palms include Drug induced, Callosities, Keratoderma and Heloma. Skin biopsies were obtained from the enrolled patients. We examined H&E-stained sections of the skin biopsies of palmar lesions to observe the histopathological study where it was seen that in the active lesions, parakeratosis was more uniform, Munromicroabscesses were larger and more numerous which concludes that psoriasis is the commonest palmar lesion.

Objectives: The aim of the study is to to observe clinical and histopathological findings in 100 patients with palmar lesions attending dermatology department at Sree Balaji Medical College and Hospital .[2]

Place of Study: Skin OPD, Sree balaji medical college and hospital Chennai.

Study Design: Observational study.

Materials and Method: This observational and histopathological study was carried out at Department of Dermatology, Skin Outpatient, of Department Sree Balaji Medical College and Hospital Medical Science and Research Centre, Chennai. The study included 100 palmar lesions of various patients, attending OPD of Sree Balaji Medical College and Hospital Medical Science and Research Centre, Chennai . Diagnosis of various palmar lesions was made after history taking and detailed clinical examination.[7]

Key words: *common palmar dermatoses, dermatopatghology,psoriasis*

Introduction

Palmar lesions may occur alone or along with involvement of soles and other areas. The most common conditions of palmar lesions are Psoriasis, Eczema,Dermatophytosis, Verruca vulgaris, Syphilis and Seasonal exfoliation. Other conditions over the palms include Drug induced, Callosities, Keratoderma and Heloma. Skin biopsies were obtained from the enrolled patients. We examined H&E-stained sections of the skin biopsies of palmar lesions to observe the histopathological study. [3]

Primary palmar lesions:

Primary skin lesions of palms commonly seen are macules, plaques, patch, nodule, vesicle, wheals, pustule and bulla.[8]

Secondary palmar lesions:

It is mainly "Palmar er ythema" whic h is a symptom of many different conditions. Its appearance is often the first sign of an underlying medical concern. About 23 percent of people who have cirrhosis of the liver also experiencepalmar erythema.[1]

Other possibilities includes:

- Skin conditions, such as atopic dermatitis, eczema, and psoriasis.
- Viral or bacterial infections, such as Rocky Mountain spotted fever, coxsackievirus (hand, foot, and mouth disease), and syphilis.
- Chronic Obstructive Pulmonary Disease, Pregnancy.

- Brain Tumors that are malignant or have metastasized.

Findings

Symptoms of palmar lesion:

1. General ised redness of the palms.

2. Itching.

3. Increased sweating.

4. Warmth in the palmar region.

5. Inflammation of the skin without pain or itching.

6. Blanching and mottl ing.

Therefore, in our study, a skin biopsy is perfomed owing to different palmar lesions for

histopathological examination, inorder to get a proper diagnosis, to know the most common palmar lesion and also to correlate clinically for better treatment.5

Conclusion

Subtle clinical differences exist between palmar lesions, which needs to be picked up by keen observation and histopathological examination. This helps us to arrive at the diagnosis. In our dermatopathological study, it was seen that in the active lesions, parakeratosis was more uniform,.Munromicroabscesses were larger and more numerous which concludes that psoriasis is the commonest palmar lesion.[7]

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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A Comparitive Study of Serum Zinc Level in Male and Female of Febrile Seizure Patients

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Abstract

A seizure is a temporary occurrence of signs and manifestations coming about because of strange over the top neuronal movement in the cerebrum. Roughly 30% of patients who have a first afebrile seizure later epilepsy(1).Febrile seizure are the most widely recognized type of seizures, it is 2 creases most regular in young men than in young ladies. The system of febrile seizure have multi factorial etiology, febrile seizure happens with fever (temperature>380C) and without side effects of CNS diseases. Anyway , now and again these seizure connote major basic fiery, or metabolic disarranges of the cerebrum, for example, meningitis, encephalitis, intense stroke, or mind tumor.

Objective: Febrile seizures are the most well-known sort of seizures saw in the pediatric age bunch . looking at the examination among male and female of the kid with basic febrile seizure.

Aim: The point of the present forthcoming , case-control study was to decide if there was any adjustments in serum zinc level in male and female kids with febrile spasm.

Method: Hundred youngsters matured a half year to 5 years were separated into two gatherings: bunch A, 50 male kids with febrile seizure, and gathering B, 50 female kids with febrile spasm.

Serum zinc levels for the two gatherings were assessed by nuclear ingestion spectrophotometry(AAS). The information were dissected to look at zinc level among the two gatherings utilizing suitable measurable instruments utilizing SPSS 13

Findings: serum zinc level in febrile seizure of boys children were 54% effected and girl children were 46% effected. Mean value in male children was 68.92mcg/dl, and female children was 69.03 mcg/dl . Serum zinc level of group A & group are statistically not significant.

Conclusion: Among children with febrile convulsions 46% were females 54% were males. Male children are slightly higher than girls.

***Key words**: Serum Zinc, Febrile children, Male children, Female children .*

Introduction

A seizure is a temporary occurrence of signs and manifestations coming about because of strange over the top neuronal movement in the cerebrum. Roughly 30% of patients who have a first afebrile seizure later epilepsy(1).Febrile seizure are the most widely recognized type of seizures, it is 2 creases most regular in young men than in young ladies. The system of febrile seizure have multi factorial etiology, febrile seizure happens with fever (temperature>380C) and without side effects of CNS diseases. Anyway , now and again these seizure connote major basic fiery, or metabolic disarranges of the cerebrum, for example,

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meningitis, encephalitis, intense stroke, or mind tumor. A ridiculous seizure is one that isn't an intense symptomatic seizure. Remote symptomatic seizure is one that is viewed as auxiliary to removed cerebrum damage, for example, old stroke. Reflex seizures are generally encouraged by a tactile upgrade such as glimmering lights.Infants and youngsters have more opportunity to have seizures than grown-ups. This mirrors the more prominent neuronal volatility at specific ages as the excitatory glutamate framework and inhibitory GABA framework don't generally adjust one another. This outcomes in a propensity to display symptomatic seizures identified with high fever, contaminations, minor asphyxia, medicine, microbes poisons and biochemical aggravations like hyponatremia, hypernatremia, hypocalcemia etc.(1)

Materials & Method

Febrile seizure happens in 3% to 5% of paediatric age group from 6 months to 5 years [(2).] The most incidence occurs at 18 months of age and low incidences after 6 months of age or after 3 years of age. Febrile seizures arepredominantly generalized and convulsive nature, even though roughly 5% of cases have non convulsive character with cyanosis and unconsciousness [(3)]. It is most commonly seen in the Asian population , out of which Indian children contributes about 5% to 10% of total paediatric population. Febrile seizure incidence peaks by November-January , equivalent to the high incidence of viral upper respiratory infection (URI) and the next peak of incidence is during the 6^{Th} to 8^{th} month(June to August) of the year, when common viral gastrointestinal illnesses occur.[(4)]

Age of Onset

The beginning of febrile seizures for the most part pursues a chime molded example. 94% happen inside the initial 3 years old and 6% following 3 years old. Around one half shows up during second year of existence with pinnacle rate between 18-24 months. Regardless of whether Febrile seizures exist before a half year of age may expand the odds of genuine contaminations like bacterial meningitis. Febrile seizure after 5years of age ought to be overseen mindfully on the grounds that generous causes are less regular in more seasoned youngsters.

Sources of zinc [(5)]

Zinc substance of nourishment fluctuates broadly. Generally excellent wellsprings of zinc are red meat and ocean nourishments. Other great creature sources are poultry, pork and dairy items. Entire grains what's more, vegetables speak to great plant wellsprings of zinc. Poor zinc sources are leafy foods refined grains.

Febrile Seizures-Morbidity And Mortality

The mortality related with febrile seizure is amazingly low. No passings were accounted for from the National Collaborative Perinatal Project(29) or on the other hand the British Cohort Study (30). These ventures couldn't discover any proof of perpetual engine deficiencies after febrile seizures. A ongoing investigation from Taiwan (31) notwithstanding looking at insight and conduct, additionally found no distinction in memory between kids with febrile seizures including complex seizure. These investigations recommend safeguarding of memory is because of limbic inception of febrile seizure.

Method

Hundred kids matured a half year to 5 years were isolated into two gatherings: bunch A, 50 male kids with febrile spasm, and gathering B, 50 female youngsters with febrile seizure. All patients in febrile seizure gathering (first episode of single summed up febrile seizure enduring for < 15 minutes and fever gathering were experiencing viral disease

Youngsters who had mental impediment, atypical spasm, central seizure, interminable maladies, hunger, focal sensory system contamination, pneumonia, urinary tract disease, and other bacterial contaminations, the runs, hemolysis or nearby contamination were barred from study. one milliliter of fringe blood was gathered in an acid-propylene tube inside 12 hours after admission to medical clinic. All examples were centrifuged and serum was safeguarded in -80°c. serum zinc was assessed by nuclear retention spectrophotometry in cell, atomic research focus associated to the staff of essential sciences. the task was endorsed by the logical warning and moral board of trustees . Composed educated assent structures were marked by the guardians before incorporating the kids in the investigation. Serum zinc levels for the two gatherings were assessed by nuclear retention spectrophotometry(AAS). The information

were investigated to think about zinc level among the two gatherings utilizing proper measurable devices utilizing SPSS 13

Table 1: Demographic data and serum zinc level in febrile seizure children in comparison with male and female groups

Groups	% of effected children	mean (sd) serum zinc level (mcg/dl)
Febrile convulsion in Males	54	68.92
Febrile convulsion in Females	46	69.03

Findings

Demographic data is shown in table 1.

Percentage of boys are effected were 54%

The mean serum zinc level in male children with febrile convulsion was 68.92 mcg/dl.

The mean serum zinc level in female children with febrile convulsion was 81.03 mcg/dl.

Reagents

1.Glycerol Diluent: 50ml of reagent grade glycerol was diluted to 1000 ml with deionised water.

2. Standard Solution of Zinc: Zinc metal 0.5g exactly was dissolved in minimal volume of (1+1) Hcl. Then the solution was diluted to 1 litre with 1% Hcl with concentration of 500µg/ml.

3. Working standard of zinc: 80µl of stock solution was diluted to100 ml of deionised water.

4. Sample preparation: Serum sample was diluted 10 times with deionised water and analysed.

Discussion

- The serum zinc level was significantly lower in patients who suffered from simple febrile seizure .compared to patients who had normal children.
- The mean serum zinc levels were 68.92 mcg/dl, 69.03 mcg/dl in children with febrile convulsion and febrile children..
- Serum zinc level in febrile seizure of boys children were 54% effected and girl children were 46% effected. Serum zinc level of group A & group B were statistically not significant.
- Zinc, as a major element of some enzymes, has an important role in some tissues like central nervous system and can affect some inhibitory mechanisms of CNS (8).

Conclusion

- Lower serum zinc levels can predispose children aged 6 months to 6 years to simple febrile seizure.
- Among children with febrile convulsions 46% were females 54% were males. Male children are slightly higher than girls.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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A Prognostic Study of Diagnostic Laparoscopy in Chronic Abdominal Pain at SBMCH

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Abstract

Diagnostic laparoscopy likewise causes the specialist to choose whether any careful administration is obligatory and furthermore to evoke the indications of inoperability if there should arise an occurrence of dispersed illnesses, for example, progressed malignancy, tuberculosisetc in which the prodromal side effects might be interminable stomach torment.

This investigation is for the most part intended to feature the criticalness of laparoscopy in diagnosing the etiology of ceaseless stomach torment , sway on the treatment and on post-usable pain relief. It additionally communicates indicative and remedial estimation of laparoscopy in ceaseless stomach torment which is a most incapacitating ailment.

Keywords: *Laproscopy, ailments,diagnosis*

Introduction

Incessant stomach torment is a typical protest which is hard to oversee by both doctor and specialist. It is the fourth regular reason for constant torment disorder by and large populace. worldwide. Although patients with ceaseless guts torment experience various clinical and radiological demonstrative stir up, distinct finding still stays a test to the surgeon. [1]This influences the patients both physically and mentally. With the presentation of the symptomatic laparoscopy new instruments has been added as far as anyone is concerned. Laparoscopy can recognize strange discoveries and improve result in lion's share of the patients with incessant stomach pain. Diagnostic laparoscopy likewise causes the specialist to choose whether any careful administration is obligatory and furthermore to evoke the indications of inoperability if there should arise an occurrence of dispersed illnesses, for example, progressed malignancy,tuberculosisetc in which the prodromal side effects might be interminable stomach torment.[2]

This investigation is for the most part intended to feature the criticalness of laparoscopy in diagnosing the etiology of ceaseless stomach torment , sway on the treatment and on post-usable painrelief. It additionally communicates indicative and remedial estimation of laparoscopy in ceaseless stomach torment which is a most incapacitating ailment.[3]

Aims & Objectives

- To correlate the laparoscopic findings with clinical and radiographic findings in all patients with chronic non-specific abdominal pain.
- Tofindthe various unrevealed aetiology for chronic abdominal pain.
- To assess the extent of the disease
- To analyse the accuracy and efficacy of diagnostic laparoscopy in chronic abdominal pain.

Materials & Method

This investigation was led in patients gave stomach torment over 3 months whose conclusion was far fetched

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or couldn't be made by our directing physical, research center and imagingmodalities.[4]

Between MARCH 2017 and OCTOBER 2018, an all out number of 105 back to back patients with ceaseless stomach torment were taken a crack at this planned engaging cross-sectional investigation.

They were enrolled from the outpatient facility of General Surgery Department in SreeBalajiMedical College& Hospital, Chennai in the above said study period.

Inclusion criteria

- Age between 15 and65
- Both males andfemales
- Abdominal pain more than 3months

Exclusion criteria

- Known abdominal malignancypatient
- Known psychiatricpatient

Observation & Results

Findings	Percentage
Thickened appendix	44 (42%)
Adhesions	22 (21%)
Enlarge mesentric nodes	14 (13%)
Ovarian cyst	9(8%)
Koch's abdomen	3(3%)
Neoplasia	3 (3%)
Hernia	3 (3%)
Others	3(3%)
No abnoramality	4 (4%)

Findings

We found that appendicular pathology is the leading cause for chronic abdominal pain of unrevealed etiology and it is about 42%, followed by adhesions in about21%.[1]

Laparoscopic appendicectomy was done in all the patients with appendicular pathology like inflamed, thickened appendix and localized adhesion with caceum and abdominal wall. All the histopathological reports of appendix specimen showed chronic inflammation.

Post operatively they recovered without any complication and all of them were pain free in the follow up of 1 month.

Adhesion was found in 21% (n=22) , out of that 22 patients 13 patients had the history of previous surgery. Seven patients underwent LSCS(pfannensteel scar) and other 6 had omental adhesions in midline scar. Omentum was adherent to the anterior abdominal wall in the scar region.Laparoscopic adhesiolysis was performed in all patients successfully.[3]

Other 9 patients who didn't have the history of surgery, had the adhesion of omentum to the anterior abdominal wall with interbowel loop adhesions, laparoscopic adhesiolysis was done in that patients successfully.Koch's abdomen was diagnosed in 3% (n=3). Intra operative findings were multiple tubercles over the peritoneum, bowel and omentum. In one case we found that flimsy adhesion between the bowel loops and anterior abdominal wall. In all three cases minimal ascitic fluid was present. Omental and peritoneal biopsy

was taken, ascitic fluid was also sent for biochemical analysis. The results confirm the tuberculous abdomen. They all were started anti tuberculous drug post operatively.Malignancy was diagnosed in (n=3) 3% of the patient. One patient had ileo-caecal junction growth and laparoscopic right hemicolectomy was performed. Adnexal mass was found in two patients and hence salphingo-oopherectomy was performed in those two patients.3% (n=3) of the patients had ventral hernia and underwent hernioplasty . All three patients had small defect in the paraumbical region with omentum adherent to it. Mesh repair was done in all the three cases.

Mean operating time for diagnostic laparoscopy alone is 30 minutes but it combined with therapeutic procedures it was 70 + 30 minutes

Conclusion

Appendicular pathology was the common cause of diagnostic laparoscopy in our local general populationThe role of diagnostic laparoscopy in chronic abdominal pain is tremendous which increases our knowledge about various underlying abdominal disorders[1].Diagnostic laparoscopy can identify abnormal findings and improve the outcome in patients with chronic abdominal pain. However, it should be considered only after a complete diagnostic evaluation has been carried out. It allows effective surgical treatment of many conditions encountered at the time of diagnostic laparoscopy hence intervension can be done simultaneously. It is a safe and effective tool to establish the etiology of chronic abdominal pain and allows for appropriate interventions.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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A Study on Age and Sex Demogrpahics in Unstable Pelvic Fractures

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Abstract

Breaks and wounds of the pelvic ring, which could conceivably be related with serious injury, are inconsistent and represent just 2 to 8% of all cracks experienced in orthopedic injury. Be that as it may, in the poly-damaged patients with other framework wounds, the event of pelvic ring damage is a lot higher, being seen in as much of the time as 20 to 25% of cases .

Breaks of the pelvic ring in the youthful people frequently happen as an outcome of high-vitality injury, for example, vehicle or cruiser mishap and from tumbles from extraordinary statures. In the older, they are typically brought about by a low-vitality injury, and are most ordinarily because of a tumble from standing stature, containing fundamentally because of bone porosity.

In all the youthful patients with pelvic ring breaks or wounds because of the high-vitality injury, they ought to be at first evaluated by a multi-disciplinary group, since they regularly have different organ wounds and are liable to major inner dying. Seeping in this kind of damage is progressively extreme when related with flimsy pelvic breaks. Thusly, older patients with cracks because of minor injury for the most part don't build up these numerous deadly entanglements.

Keywords*: pelvic ring, cracks, high-vitality*

Introduction

Generally, an extensive number of concentrates identified with the consideration and prompt or late inconveniences of this kind of wounds have been distributed. These inexorably illuminate and direct the experts engaged with convention the executives of such care, portraying the significance and seriousness of the damage, particularly in the poly-damaged.[3]

Understanding the life structures of the pelvic ring is fundamental for exact determination and treatment. A foundational approach considering the component of damage, physical assessment and radiographic appraisal is terrifically essential to rapidly distinguish shaky pelvic disturbances and their related wounds .The pelvis is a ring like structure, confined pubic rami break on plain radiographs are strange and should warrant cautious assessment for back pelvic interruption with 3D CT imaging.[7] Computed tomographic checking is hence a compelling technique for inspecting the pelvis. Hemorrhagic stun can happen in about 10% of pelvic ring wounds. Prompt acknowledgment and treatment of this dangerous condition is basic in crisis the board. Notwithstanding liquid revival and blood transfusion, circumferential wrapping, angiographic embolization, laprotomy with pelvic pressing, and outer obsession are each of the a piece of a significant life sparing subordinates in the setting of such hemo-dynamic shakiness [2].

Soundness is accomplished by the capacity of the osseo-ligamentous structures of the pelvis to withstand physiologic worries without anomalous twisting. The supporting pelvic tendons, including the back and

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foremost sacroiliac, ilio-lumbar, sacro-spinous, and sacro-tuberous tendons, assume a significant job in pelvic adjustment. One should be comfortable with the ligamentous life systems and the bio-mechanics significant to understanding pelvic ring interruptions. The Young and Burgess order framework is a precise methodology for deciphering pelvic ring interruptions and surveying security based on basic power vectors that make unsurprising examples. This framework likewise accommodates an algorithmic way to deal with deciphering pictures and sorts wounds as anterio-back pressure, parallel pressure (steady and flimsy variation), vertical shear or any such joined. Opening and shutting of the pelvis from rotational powers result in antero-back and horizontal pressure wounds. In the vertical shear wounds, there is a cephalad uprooting of the hemipelvis. Learning of these damage examples prompts brief distinguishing proof and analysis of other inconspicuous wounds and their related entanglements by suitable imaging, so the orthopedic specialist can apply restorative powers for brief pelvic adjustment. [4]

Patients who support these wounds fall into two classes, viz; survivors and non-survivors. In non-survivors, mortality is of a bimodal appropriation. Early passing is normally a result of discharge or related mind damage. Late demise is normally a direct result of overpowering sepsis and additionally multi-organ disappointment. Survivors regularly experience long haul medicinal and financial ramifications of breaks of the pelvis. These incorporate emotional well-being issues, incessant torment, pelvic obliquity, leg length or rotational inconsistency, variations from the norm of the stride, urological and sexual brokenness and long haul joblessness. [5]

Among patients with various wounds, in light of gruff injury, upto 5 to 16% support wounds to the pelvic ring, bringing about a death rate as high as 11 to 54% that is basically because of hemorrhagic stun. Hence, it is essential to control the related discharge while dealing with these complex pelvic cracks. In most injury units, the underlying administration of a pelvic crack depends on the rules of Advanced Trauma Life Support (ATLS) framework created by the American College of Surgeons (ACS) Committee on Trauma. These rules don't contain information or an agreement on a conclusive pelvic adjustment methodology.[14] In principle, the decrease and adjustment of the pelvic ring can diminish seeping from the crack site as a decrease of pelvic volume has been appeared to lessen the degree of drain from such wounds by their tamponade impact. The sooner that the draining is managed, the more prominent are the opportunity of staying away from the "deadly group of three" of hypothermia, coagulopathy and acidosis optional to the hypotension or hypoperfusion of tissues. Early pelvic adjustment by outside mechanical pressure (EMC) with various gadgets, for example, C-braces, outer fixators, and sheets, can lessen pelvic volume and control discharge. In any case, the utilization of C-braces and outside fixators are intrusive, requires orthopeadic mastery and brief accessibility, however this limits access to the midriff for investigation, consequent nursing care, quiet situating and skin insurance. Normal non-intrusive strategies for pelvic adjustment incorporate sheet wrapping and pelvic folios.[6]

The present transient examination will plan to dissect the clinical, radiological and practical results in patients with flimsy pelvic cracks (Tile characterization B and C), treated by careful adjustment. The outcomes will be abridged by assessing them by the Cole et al; pelvic result scale toward the finish of 7 months.

Aim and objectives of the study

The aim of this study is to analyze the age and sex of the patients with unstable pelvic fractures who are managed by surgical interventions.[4]

Material and Method

Ours is a prospective study involving 21 cases of unstable pelvic injuries (Tile type B and C) managed surgicallypatients who were hemo-dynamically stable were primarily take up for definitive procedures.

These patients presented in the Casuality of SREE BALAJI MEDICAL COLLEGE AND HOSPITAL, Chromepet,Chennai, during the period from March 2017 to Feb 2018 (duration 12 months) .

Inclusion Criteria:

i) Both male and female patients in the age group 21 to 35 years were included.

ii) Pelvic injuries only conforming to Tile Type B and C alone were included.

iii) Cases with other major associated closed injuries were included.

Exclusion Criteria:

i) Patients not conforming to the above age group were excluded.

ii) Patients with open abdominal and crush injuries of the pelvis were excluded.

iii) Patient failing anaesthetic fitness and those with life threatening head and chest injuries were excluded.[6]

iv) Tile type A fractures.

A detailed clinical examination and radiological assessment was done in all patients by means of which the injury pattern and stability of the injured pelvis was ascertained. A 3D CT reconstruction imaging for all cases conforming to tile B and C variants , prior to surgical intervention.

Findings

Age and sex demographics:

Age in years	Male 'n' (%age)	Female 'n' (%age)	Total 'n'	%age
21-25	4	1	5	23.80%
26-30	4	0	4	19.04%
31-35	4	2	6	28.50%
36-40	1	2	3	14.33%
41-45	2	1	3	14.33%
TOTAL	15 (71.43%)	6 (28.57%)	21	100%

The average age in our study was 28 years (range: 21 to 35 years). There was a male preponderance in our study with a male to female ratio of 4:1

Sex distribution :

Discussion

Conventional orthopaedic wisdom is that patients who survive disruption of the pelvic ring eventually had few late musculo-skeletal problems . But studies on the natural history of the pelvic ring injuries proved that the unstable types had high mortality in the acute stage and chronic morbidity in the long term. Despite aggressive resuscitation including application of external fixators, the mortality of 10-20% remain unchanged. This led to clinical trials on internal fixation and several studies have shown that early open reduction and stable internal fixation improves the chances of survival and more importantly, reduces the incidence of late musculo-skeletal morbidity.

Twenty one patients with unstable pelvic fractures were treated surgically and analyzed with minimum follow-up of 7 months (range 7-19 months). The following observations were made. 28.50% of our patients belonged to the age group of 31-35 followed by 21-25 years (23.80 %) and 26-30 years (19.04%).Nearly 50% of our patients were less than 30 years of age. The male to female patient ratio was 5:2.

Conclusion

The mean age of the patient in our study was 32.8 years (range: 21 to 45 years) which is in close comparison to the Sunny Brook Medical Centre series which had a mean age of 30.9 years. Cole et al; reported an average age of 32 years. Sunil et al; reported on 78 cases with an average age of 29.99 years (range 10-65). There was extreme male preponderance in our series with 71.43 % of male patients. The sunny Brook medical centre study reported only slight male dominance with 55%. Cole et al reported a male preponderance with 56.25%.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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A Study on Dermatoglyphic Pattern in Palmar Lesions

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Abstract

Aim: To study dermatoglyphic pattern in palmar lesions

Place of Study: Skin opd ,sreebalaji medical college and hospital Chennai.

Patients and Method: A total of 100 patients with different hand dermatitis pattern were included in the study.

All patients were subjected to

1.Complete history

2.Dermatological examination

3.Finger print pattern of all the patients

4.Informed consent

Key words: *dermatoglyphic pattern, Finger print pattern*

Introduction

History

Since 1823 researchers have found that fingerprints and inborn knowledge are connected. Through numerous restorative sorts of research it is discovered that fingerprints are shaped during the thirteenth to nineteenth pre-birth week. The neocortexis created during a similar period. Numerous examinations incorporate hereditary qualities, embryology, dermatoglyphics and neural sciences with different insight. In studies, fingerprints of mentally handicapped individuals are not quite the same as that of typical people .Scientific acknowledgment of dermatoglyphics was made some time before the principal composed record concerning them. Developed, in 1684 introduced before the Royal Society of London, a report of his perceptions on patterns of the fingers and palms2

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Embryogenesis

Dermal edge separation happens right off the bat in fetal improvement. The subsequent edge setup isgenetically decided and affected by ecological powers. There is a lack of information concerningthedeveloping component that decides extreme epidermal edge designs.3

The embryogenesis of the papillary edges has been contemplated widely. Ongoing electron minute investigations have illuminated the formative instrument in charge of edge arrangement. Penrose and Ohara(1973) acquainted electron infinitesimal examination with explore the formative instruments in charge of edge arrangement.4

Materials & Method

1. **Fingers**

a. Fingertip patternconfigurations

b. DermatoglyphicLandmarks.

2. PALM

a. Palmar Patternconfigurations.

- Thenarand first interdigitalarea(Th/I)
- 2,3,4 interdigitalareas(I2,I3,I4)
- Hypothenararea(Hyp)

A. PALMAR LANDMARKS

Fingertip Patternconfigurations

Galton in 1892, divided fingertip pattern into threegroups.

- Arches
- Loops
- Whorls

Findings

Fingerprints are the mirror to a person's uniqueness. The skin is made out of three anatomical layers of dermal tissue cells. These are epidermis, dermis and hypodermis. The edge surface or volar cells, as theyare essentially called, have morphology that suits their functionality.The edge examples have been extensively ordered into five kinds, specifically, curve, rose curve, whorl, ulnar and spiral circle . [6]

An individual can have any of the above in any of the fingers. In any case, larger part of fingerprints found in populace study demonstrates that 70 percent of the prints are circles, 20 – 25 percent being whorls while just 5 to 10 percent countasarch or rose curve designs.[7]

The fingerprints can be either a circle, a whorl or anarch.Aloop isdefined bya design where edges start from a side, ascent towards the centre and return back to the side where they began from.

Circles for the most part have one delta and can either open towards the thumb or the little finger. [1]

They are the most every now and again happening edge designs, happening in around 60 percent of fingerprints. A whorl is the following most as often as possible happening sort of edge design. A whorl is characterized by two deltas and one focal round center. The center may have various examples. It might be winding, concentric circles, vertically compressed circles or even of the state of eye of a peacock quill. [8]

The edges start from one end, rise and hover towards the centre and go down towards the opposite end. Each example characterizes a diverse sort of cortical overlap around the particular cerebrum flap the finger is related with. Consequently, the phenotypic cosmetics gets modified from man to man, finger to finger.[9]

Psoriasis is portrayed by very much outlined shiny white layered papules and plaques. It happens in 1%to 3% of the populace The disease is lifelong and portrayed by constant, intermittent intensifications, and reductions that are genuinely and physically incapacitating. Psoriasis of the palms and fingertips is portrayed by red plaques with thick dark colored scale and might be undefined from incessant skin inflammation or tinea.

The lamellar scales are more follower than those on different pieces of the body, and just their expulsion will uncover the rosy fiery base. There might break and agonizing gaps and dying. The malady is transmitted hereditarily, and ecological variables can likewise accelerate the disease. The outcomes demonstrated dermatoglyphic changes that included papillary examples escalated at the expense of circles and bends.

Other eminent discoveries of the study incorporate an expansion in the ATD point esteem, a–b check in boys, the nearness of extra triradii, unusual endings of the principle palm lines alongside a decreased C line, and nonappearance of C triradiusin patients with protected exogenous adiposity. Comparable discoveries were seen in the relatives of the main degree of kinship.

Conclusion

The present investigation was embraced to analyze the dermatoglyphic changes in various types of hand dermatitis. The accompanying ends were made toward the finish of the study.

1.It is closed from our examination that distinctions saw between psoriasis patients and in different conditions might be the consequence of a genetic abnormality or the impact of some intrauterine ecological variables.

2.It is recommended that an investigation of dermatoglyphic patterns in psoriasis patients and their families may be rewarding on the grounds that example

design can serve as an help to determination and may demonstrate an expanded propensity to create the disease.

3.Thepalmar example forces were expanded in both genders, while the computerized example powers were expanded in guys and diminished in females.

4.TFRCwas expanded in guys and diminished in female patients. In the two cases and controls, TFRC was morein guys than females.

5. A-b tally demonstrated a noteworthy decrease in both genders.

6. Greatest atdangle demonstrated no significant changes.

7.Abnormal flexion wrinkle was not experienced in our examination.

8.Weconclude that dermatoglyphic pattern can be utilized as an essential analytic apparatus to analyze, different dermatological conditions.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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A Study on Functional Outcome of Surgical Mangement in Unstable Pelvic Fractures

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Abstract

Cracks and wounds of the pelvic ring, which might be related with serious injury, are rare and represent just 2 to 8% of all breaks experienced in orthopedic injury. Be that as it may, in the poly-damaged patients with other framework wounds, the event of pelvic ring damage is a lot higher, being seen in as often as possible as 20 to 25% of cases .

Breaks of the pelvic ring in the youthful people frequently happen as a result of high-vitality injury, for example, vehicle or cruiser mishap and from tumbles from incredible statures. In the old, they are normally brought about by a low-vitality injury, and are most generally because of a tumble from standing tallness, containing for the most part because of bone porosity.

In all the youthful patients with pelvic ring breaks or wounds because of the high-vitality injury, they ought to be at first evaluated by a multi-disciplinary group, since they frequently have various organ wounds and are liable to major inside dying. Seeping in this sort of damage is increasingly extreme when related with unsteady pelvic breaks. Thus, older patients with cracks because of minor injury by and large don't build up these numerous deadly confusions.

Keywords: *poly-damaged patients, high-vitality injury, pelvic ring damage*

Introduction

Recently, a significant number of concentrates identified with the consideration and quick or late inconveniences of this sort of wounds have been distributed. These inexorably educate and direct the experts associated with convention the executives of such care, portraying the significance and seriousness of the damage, particularly in the poly-damaged.

Understanding the life systems of the pelvic ring is basic for precise analysis and treatment. A fundamental methodology considering the system of damage, physical assessment and radiographic appraisal is exceptionally imperative to rapidly distinguish temperamental pelvic interruptions and their related wounds .The pelvis is a ring like structure, separated pubic rami crack on plain radiographs are unordinary and should warrant cautious assessment for back pelvic disturbance with 3D CT imaging.[7] Computed tomographic checking is along these lines a powerful technique for looking at the pelvis. Hemorrhagic stun can happen in about 10% of pelvic ring wounds. Quick acknowledgment and treatment of this dangerous condition is basic in crisis the executives. Notwithstanding liquid revival and blood transfusion, circumferential wrapping, angiographic embolization, laprotomy with pelvic pressing, and outside obsession are every one of the a piece of a significant life sparing subordinates in the setting of such hemo-dynamic unsteadiness .

Soundness is accomplished by the capacity of the osseo-ligamentous structures of the pelvis to withstand physiologic worries without irregular misshapening. The

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supporting pelvic tendons, including the back and front sacroiliac, ilio-lumbar, sacro-spinous, and sacro-tuberous tendons, assume a pivotal job in pelvic adjustment. One should be comfortable with the ligamentous life systems and the bio-mechanics applicable to understanding pelvic ring disturbances. The Young and Burgess order framework is a methodical methodology for translating pelvic ring interruptions and surveying strength based on central power vectors that make unsurprising examples. This framework additionally accommodates an algorithmic way to deal with translating pictures and classifies wounds as anterio-back pressure, horizontal pressure (steady and precarious variation), vertical shear or any such consolidated. Opening and shutting of the pelvis from rotational powers result in antero-back and horizontal pressure wounds. In the vertical shear wounds, there is a cephalad removal of the hemipelvis. Learning of these damage examples prompts brief recognizable proof and conclusion of other unpretentious wounds and their related complexities by suitable imaging, so the orthopedic specialist can apply restorative powers for brief pelvic adjustment.[1]

Patients who continue these wounds fall into two classifications, viz; survivors and non-survivors. In non-survivors, mortality is of a bimodal dispersion. Early demise is ordinarily a direct result of drain or related cerebrum damage. Late demise is normally a result of overpowering sepsis and additionally multi-organ disappointment. Survivors habitually experience long haul medicinal and financial ramifications of breaks of the pelvis. These incorporate emotional well-being issues, interminable agony, pelvic obliquity, leg length or rotational inconsistency, variations from the norm of the walk, urological and sexual brokenness and long haul joblessness. [2]

Among patients with various wounds, due to dull injury, upto 5 to 16% continue wounds to the pelvic ring, bringing about a death rate as high as 11 to 54% that is fundamentally because of hemorrhagic stun. In this manner, it is essential to control the related drain while dealing with these complex pelvic cracks. In most injury units, the underlying administration of a pelvic break depends on the rules of Advanced Trauma Life Support (ATLS) framework created by the American College of Surgeons (ACS) Committee on Trauma. These rules don't contain information or an accord on an authoritative pelvic adjustment methodology.[14] In principle, the decrease and adjustment of the pelvic ring can diminish seeping from the crack site as a decrease of pelvic volume has been appeared to lessen the degree of drain from such wounds by their tamponade impact. The sooner that the draining is managed, the more prominent are the opportunity of staying away from the "deadly ternion" of hypothermia, coagulopathy and acidosis auxiliary to the hypotension or hypoperfusion of tissues. Early pelvic adjustment by outer mechanical pressure (EMC) with various gadgets, for example, C-clips, outside fixators, and sheets, can lessen pelvic volume and control discharge. Be that as it may, the utilization of C-clasps and outer fixators are intrusive, requires orthopeadic aptitude and brief accessibility, yet this limits access to the mid-region for investigation, ensuing nursing care, persistent situating and skin security. Basic non-intrusive techniques for pelvic adjustment incorporate sheet wrapping and pelvic fasteners.

The present momentary examination will mean to break down the clinical, radiological and utilitarian results in patients with shaky pelvic cracks (Tile characterization B and C), treated by careful adjustment. The outcomes will be abridged by assessing them by the Cole et al; pelvic result scale toward the finish of 7 months.[3]

Aim and Objectives of the Study

The aim of this study is to analyze the results and functional outcome of the patients with unstable pelvic fractures who are managed by surgical interventions.

In this study, the mechanism of different types of unstable injuries are studied followed by the clinico-radiological assessment of patients and their management by primary definitive internal or primary external fixation followed by definitive open reduction and internal fixation. We will then, analyze the outcome of these injuries following surgical management by using Col et al; scoring system for pelvic injury at 7 months post surgery.[4]

Material and Method

Ours is a prospective study involving 21 cases of unstable pelvic injuries (Tile type B and C) managed surgicallypatients who were hemo-dynamically stable were primarily take up for definitive procedures.

These patients presented in the Casuality of SREE BALAJI MEDICAL COLLEGE AND HOSPITAL,

Chromepet,Chennai, during the period from March 2017 to Feb 2018 (duration 12 months) .[5]

Inclusion Criteria:

iv) Both male and female patients in the age group 21 to 35 years were included.

v) Pelvic injuries only conforming to Tile Type B and C alone were included.

vi) Cases with other major associated closed injuries were included.[6]

Exclusion Criteria:

i) Patients not conforming to the above age group were excluded.

ii) Patients with open abdominal and crush injuries of the pelvis were excluded.

iii) Patient failing anaesthetic fitness and those with life threatening head and chest injuries were excluded.

iv) Tile type A fractures.

Table 1: Cole Et Al; Pelvic Outcome Scale

Category	Description	Points
Functional pain	Pain secondary to physical activity	Max: 5 points
	None	5
	Pain only with strenuous activity	4
	Mild pain with stair climbing,lifting,moving, or other moderately strenuous activities.	3
	Moderate pain with start up of activities and intermittent radicular pain.	2
	Pain with sitting or standing longer than 1 hour, requires frequent position changes .	1
	Chronic severe pain regardless of activity.	0
Subjective pain	Average of resting and ambulation scores on a scale of 1 (no pain) to 10 (severe pain)	Max: 4 points
	1-2 points	4
	3-4 points	3
	5-6 points	2
	7-8 points	1
	9 - 10 points	0
Narcotic uses	Narcotic use > 12 weeks post-operatively	Max: 1 point.
	No	1
	Yes	0
Activity status	Ability to resume previous work, household or recreational activities	Max: 10 points
	Without limitations	10
	With some discomfort	8
	With limitations such as tires more easily or cannot lift as much as before injury	6
	With marked limitation requiring change in work status to part time, sedentary, or with restrictions; requires assistance with household activities or avoids strenuous recreational activities	4
	Unable to resume any previous work, household, or recreational activities; canot drive and requires assistance with stairs or with shopping	2
	Unable to resume any previous work household, or recreational activities; requires assistance with activities of daily living	0

Cont... **Table 1: Cole Et Al; Pelvic Outcome Scale**

Physical examinataion	GAIT	Max: 4 points
	Normal	4
	Antalgic gait	3
	Requires assistive device (cane) .	2
	Requires assistive device (walker, occasionally use wheelchair).	1
	Nonambulatory.	0
	Tredelenberg	Max: 1 point
	Negetive.	1
	Positive	0
	Tenderness	Max: 2 points
	No sacral or pubic tenderness .	2
	Mild Sacral or pubic tenderness .	1
	Moderate Sacral and pubic tenderness .	0
	Lower extremity muscle group strength , Flexion / Extension	Max: 1 point.
	Bilateral hip flexion and extension = 5/5	1
	Hip flexion or extension < 5/5	0
	Abduction / Adduction	Max: 1 point.
	Bilateral hip abduction and adduction = 5/5	1
	Hip abduction and adduction < 5/5	0
	Range of motion	Max: 1 point.
	Normal hip and trunk range of motion	1
	< 200 difference in hip internal or external rotation when compared with contralateral side	0
Pelvic radiograph (AP, pelvic inlet and outlet views)	Posterior (normal sacroiliac joint space = 4mm)	Max: 6 points.
	Displacement <0.5 cm without sacroiliac joint reactive changes	6
	Displacement <0.5 cm with sacroiliac joint reactive changes	5
	Displacement >0.5 cm and <1cm	4
	Displacement >1 cm	2
	Non-union	0
	anterior (normal pubic symphysis space = .5cm)	Max: 4 point.
	Displacement <0.5 cm without pain	4
	Displacement <0.5 cm with some pain	3
	Displacement >0.5 cm and <1cm	2
	Displacement >1.0 cm and <2.0cm	1
	Displacement >2.0 cm	0
TOTAL MAXIMUM SCORABLE POINTS		40

Table 2: Score Garding of Cole et al

GRADE	COLE et al: SCORE'S
EXCELLENT	36-40
GOOD	31-35
FAIR	26-30
POOR	<26(25& Below)

Findings

Table 2: Score Grading in Accordance With Cole Et Al;

Grade	Type of fracture (Tile)	No: of patients '*n*'	Total '*n*'	%age
Excellent	B1	4	4	19.04
Good	B1/B2/B3/C1	2/6/1/3	12	57.14
Fair	C1/C2	2/2	4	19.04
Poor	C3	1	1	4.78
Total	**---**	**21**	**21**	**100%**

Table 3: **COLE et al ; Functional outcome detailed scoring table:**

Grade	Excellent 'n'(%age)	Good 'n'(%age)	Fair 'n'(%age)	Poor 'n'(%age)	TOTAL 'n'(%age)
B1	4	2	--	--	6 (28.57%)
B2	--	6	--	--	6 (28.57%)
B3	--	1	--	--	1 (4.76%)
C1	--	3	2	--	5 (23.81%)
C2	--	--	2	--	2 (9.53%)
C3	--			1	1 (4.76%)
TOTAL	**4** (19.05%)	**12** (57.14%)	**4** (19.05%)	**1** (4.76%)	21 (100%)

Score grading of Cole et al;

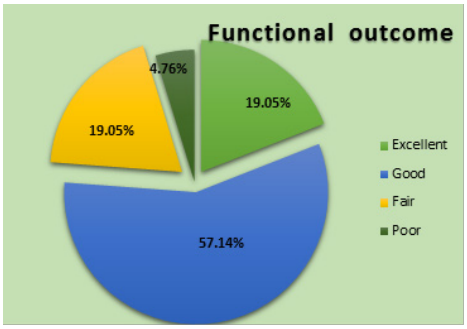


Fig: 1

Discussion

In our series of 21 patients whose functional outcomes were evaluated at the end of 7 months post-operatively, 19.05% (*n* =4) had excellent , 57.14 (*n* = 12) had good, 19.05% (*n* = 4) had fair and 4.76% (*n* = 1) had poor outcome., as evaluated by the cole et al; scoring system.

Thus ,in our series the Tile B1 fractures, all had excellent to good outcome. Tornetta et al; reported on 29 patients operated with a single symphyseal plate. They

also had reported 96% excellent results and four cases of hardware failure. Webb et al; in his series of 14 cases treated with a two holed plate fixation encouraged early mobilization of his patients and concluded that single plating allows some normal motion to take place at the symphysis pubis. However McGowan et al; and Schied in their studies concluded that two plates at 90^0 would give excellent stability, especially to the unstable pelvis. Our outcomes did not support the view that dual plate is mandated.

Conclusion

Anatomic decrease and inner obsession of unsteady pelvic wounds gives amazing solidness, takes into account early portability with great practical result. Deferred interior obsession was not related with expanded peri-employable bleakness. These cases accomplish preferred decreases over those that are gotten with outer obsession alone. Deferring the obsession, nonetheless, expanded the trouble of getting anatomic decrease in specific cases. Indeed, even deferred inside obsession may yield similarly great useful result in patients where close to anatomic decrease could be gotten.

Intense administration of unsteady pelvic wounds is without a doubt a difficult assignment. Systems of safe inner obsession are requesting, yet useful results are fulfilling. Consistent devotion to progress is and should be the objective of the pelvic orthopedic specialists.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Alopecia Areata An Over View

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Absrtact

Introduction: Alopecia areata is a typical ceaseless immune system provocative ailment that includes hair follicles, portrayed by male pattern baldness on the scalp and additionally body without scarring. Clinically, the sickness exhibits as smooth, inconsistent balding with different examples - diffuse or reticulate alopecia, ophiasis, ophiasisinversus, alopecia totalis (loss of hair all the scalp), or alopecia universalis (loss of hair everywhere throughout the body). Clinical conclusion of AA is made dependent on common example of male pattern baldness and the nearness of trademark outcry mark hair in microscopy. Intrusive (punch biopsy) procedures are regularly required sometimes where the clinical finding isn't straight advance . Biopsy indicates peribulbar lymphocytic invades in a "swarm of honey bee design" which is normal for the intense phase of the illness.

Materials and Method : Study Design: Cross sectional study

Study Area: Skin Outpatient Department, Sree Balaji Medical College and Hospital

Study Population: All patients with hair loss, attending skin OPD, who are clinically diagnosed as Alopecia Areata

Study Method: Observational study

Sample Size: 30

Result: Clinically, the sickness shows as smooth, sketchy balding with different patterns.Dermoscopy is valuable for determination of AA clinically by the nearness of cadaverized hairs (dark dabs), circle hair, coudablity hair, shout mark hairs (decreasing hairs), broken hairs, yellow spots and grouped short vellus hairs in the male pattern baldness territories.

Key words: *Alopecia areata, OPD, Dermoscopy*

Introduction

Alopecia areata is a typical ceaseless immune system fiery and non-startling sickness which includes hair follicles. It is described by male pattern baldness on the scalp as well as any place the hair is available on the body.1 The possibility of happening is 2% in their lifetime of an individual.2The shot of happening is 40% higher in more youthful people matured underneath 30years.

Clinically, Alopecia areata is separated into inconsistent alopecia, diffuse alopecia, reticulate alopecia, ophiasis, ophiasis inverses(loss of hair in the state of wave) alopecia totalis or alopecia universalis (loss all things considered) and perinevoid.4 Most normally around 3% to 30% of patients shows nail changes(diffuse fine nail setting, longitudinal ridging, slight and weak finger and toenails, and trachyonychia).3

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Since it is an immune system issue, unexpected hair regrowth may happen whenever inside the time of hair loss.1The invulnerable framework is a noteworthy player, with T cells and a breakdown of the physiological resistant benefit (IP) of the hair follicle (HF)5plays a basic job in the pathophysiology of alopecia areata.6-8 The HF speaks to a site of relative IP, on the grounds that characterized districts of its epithelium (swell, bulb) don't express MHC class I and class II atoms, and in light of the fact that various immunoinhibitory cytokines and neuropeptides make an immunoinhibitory milieu.5, 9 Even the few intraepithelial Langerhans cells found inside the HF epithelium beneath its undifferentiated cell locale, the lump, are immunologically disabled, as they neglect to express MHC class II.10 This breakdown of insusceptible benefit (IP) of the hair follicle is a reason for autoimmunity to happen, is a generally acknowledged theory.11 This IP breakdown, which can most viably be prompted by IFN-γ or substance P probably prompts changes in the quality and amount of the conveyed what needs be antigen collection, rendering HFs, which currently ectopically express MHC class I-displayed autoantigens, helpless against hostile to self-safe reactivity. [3]

Clinical finding of Alopecia areata depends on the regular example of balding, and the nearness of trademark shout mark hair in microscopy. Now and again, if clinical highlights are not the unmistakable obtrusive technique (punch biopsy) may should be utilized for conclusion. The dermoscopic strategy has been proposed as a choice to keep away from punch biopsy, particularly in immature young ladies and kids, in which agreeableness of punch biopsy might be low. Numerous ongoing investigations have investigated the utility of noninvasive finding dermoscopy in the determination of Alopecia Areata. Aside from these stream cytometry-based estimation of different incendiary markers like IFN-γ, IL-13, IL-9, IL-17, and IL-22 cytokines in CD4+and CD8+ T cells have been utilized to enhance or affirm the clinical conclusion. Inducible co-stimulator particle (ICOS) and HLA-DR, which are utilized to characterize mid- and long-term T-cell enactment are likewise proposed as potential analytic markers in Alopecia areata.[12]



A localised patch of alopecia areata



Small patches, merging andforming a larger patch.



Ophiasis



Sisaipho

Figure: 1 Pattern of hair loss in Alopecia Areata

Discussion

Alopecia Areata

Alopecia areata is a typical ceaseless immune system provocative and non-unnerving sickness which includes hair follicles, portrayed by male pattern baldness on the scalp as well as other bristly districts of the body.1 The detailed shot of event is 2% in their lifetime of an individual,2 with a lot higher likelihood in more youthful people matured beneath 30years.1-3Depending on the ethnic foundation and the overall provincial distinction, the predominance of alopecia areata (AA) changes from 0.1 to 0.2%, with a determined lifetime danger of 2%. Ongoing examinations on creature models have proposed breakdown of hair follicle safe benefit in relationship with improved MHC class I articulation and organ-explicit immune system responses against hair follicle autoantigens prompted by NKG2D+ cytotoxic CD8+ T cells as the plausible instrument for the advancement of Alopecia areata.

Materials & Method

Types Alopecia areata: There are many clinical types of alopecia areata.

- Patchy Alopecia
- Diffuse Alopecia
- Reticulate Alopecia
- Ophiasis
- OphiasisInversus (loss of hair in the shape of the wave)
- Alopecia totalis or alopecia universalis (loss of all hairs)
- Perinevoid

Common Symptoms:

Patients are mostly asymptomatic even though some symptoms are seen

- Pruritus
- Pain
- Burning sensation may precede hair loss
- Nail changes (diffuse fine nail pitting, longitudinal ridging, thin and brittle finger and toenails, and trachyonychia).3

Etiopathogenesis: It is essential to understand the physiology of hair growth, for understanding the pathophysiological mechanisms underlying alopecia areata. Hair growth and maintenance depends on 3 phases of the hair cycle,

- Anagen (active growth phase),
- Catagen (involution phase), and
- Telogen (resting phase).

Length of the hair for the most part relies upon the anagen stage. In solid people, hair sheds out after the resting stage when the new hair anagen development begins (exogen). In alopecia areata patients, hair shedding happens even before the anagen begins (kenogen). It is commonly a confusion of hair cycling, in this way it is viewed as a condition of kenogen.[7]

Pandemics of AA announced from shelters and schools pointed towards irresistible etiology. It was seen that AA happening in monozygotic twins and solid family ancestry for some ages in groups of AA people demonstrates that AA can be acquired. Stress is considered as one of the triggers, yet controlled investigations didn't affirm this.[14]

As of late the agreement is more for immune system etiology. AA is viewed as an immune system ailment, because of its relationship with other immune system illnesses like thyroid sickness, iron deficiency, diabetes mellitus, vitiligo, and psoriasis. Hair follicle-explicit antibodies are expanded in fringe blood of AA patients, particularly to keratin 16 and trichohyalin. It is accepted that hair follicle is an insusceptible special site. In solid hair follicle epithelium, real histocompatibility complex (MHC) class I and II particles are not communicated, and TGF-β, IGF-1, and α-MSH are increasingly communicated. This insusceptible benefit is fell in AA by the nearness of expanded MHC I and II buildings, diminished immunosuppressive atoms, and higher articulation of bond particles (ICAM-2 and ELAM-1) in the perivascular and peribulbar hair follicular epithelium, prompting perifollicular inflammation.[10]

Clinical findings

The most widely recognized clinical appearance

of alopecia areata is patches of balding. They might be single or different patches. Little fixes may spread and frame bigger patches. The scalp is the most widely recognized site (90%), however it might happen at any piece of the body.10 It can be arranged relying upon the degree and example of balding. 1

It tends to be sketchy AA, in which there are discrete patches of male pattern baldness may exhibit in shifting number in the influenced piece of the body. Alopecia totalis may influence the whole scalp and body hair, for example, eyebrows, eyelashes, whiskers, axillary hair and pubic hair. Alopecia universalis (AU) includes the absolute body hair. The example of balding can be reticular, ophiasis, and sisaipho. Ophiasis (snake-like) is a band-like AA along the back occipital and transient edges. Sisaipho, additionally called as ophiasisinversus, presents with alopecia including the frontal, fleeting, and parietal scalp yet saves hair along the scalp outskirts, mirroring androgenetic alopecia. Intense diffuse and all out alopecia, another variation, which is as of late depicted. Some surprising sorts of AA are, perinevoid alopecia, in which alopecia patches are available around the nevi.26 Sometimes it might happen in straight conveyance too.

The outside of AA patches is smooth and typical skin shading with no skin modifications, for example, scaling and follicular changes. Once in a while, it very well may be patchy.2

Trademark 'exclamatory imprint hairs' are seen either inside or at the fringe of the patches.21 White hairs are saved including just pigmented hair causing abrupt brightening of hair in beginning stages. In constant cases, the white hair is additionally lost. For the most part, AA patients are asymptomatic, and once in a while pruritus, torment andss consuming sensation may go before hair loss.21 The analysis is for the most part clinical and doesn't cause trouble commonly.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Age and Sex Distribution of Patients of Giddiness with Significant Findings on MRI

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Abstract

Energy is a vague side effect or feeling that incorporates sensations, for example, faintness, discombobulation, vertigo and unevenness. The reason for the examination was to assess the job of attractive reverberation imaging (MRI) in diagnosing the reason for energy in symptomatic patients with age and sex dispersion of patients of happiness with noteworthy discoveries on MRI. An imminent companion study was directed in 106 patients who gave happiness. X-ray outputs of these patients were investigated, and we presumed that MRI can effectively exhibit the huge discoveries which cause energy.

Keywords: *Brain, Giddiness, Magnetic Resonance Imaging*

Introduction

Happiness is experimentally named as "dazedness" which means impedance in spatial observation and steadiness as characterized in Dorland's Medical Dictionary. Energy is accounted for in around 20–30% of the populace eventually in the year 20091.[1] Various pieces of the body are required for keeping up equalization including the internal ear, eyes, muscles, skeleton and the sensory system, so any confusion or sickness in these frameworks can show as what is generally alluded to as giddiness[2]. Regular physiological reasons for energy incorporate deficient blood supply to the cerebrum because of an unexpected fall in circulatory strain or blood vessel blockage, misfortune or bending of vision or obvious signals, issue of the internal ear, twisting of mind/apprehensive capacity by meds, for example, anticonvulsants and sedatives[2]. Differential analyses of numerous conditions are related with happiness. The most widely recognized causes are as per the following: 40% fringe vestibular brokenness, 10% focal sensory system sore, 15% mental issue, 25% presyncope/ dysequilibrium, and 10% vague giddiness3. Conditions that frequently present as energy or have happiness as a side effect include: kind paroxysmal positional vertigo, Meniere's ailment, vestibular neuronitis, labyrinthitis, otitis media, mind tumor, acoustic neuroma, incessant movement infection, Ramsay Hunt disorder, headache, numerous sclerosis, pregnancy, low circulatory strain (hypotension), low blood oxygen content (hypoxemia), myocardial localized necrosis, iron insufficiency (paleness), low glucose (hypoglycemia), hormonal changes (e.g., thyroid ailment, feminine cycle, pregnancy), alarm issue, hyperventilation, tension, sadness, age-decreased visual, equalization and impression of spatial direction abilities[1-3] . Happiness is a typical introducing manifestation in drug and otorhinolaryngology outpatient offices. Most patients with happiness regularly experience issues portraying their side effects, along these lines deciding the reason can be testing. A proof based methodology utilizing learning of key history, physical assessment and radiologic discoveries for the reasons for energy can help set up an analysis and think about suitable medicines much of the time. At the point when the manifestation is hard-headed to meds, patients are constantly alluded for attractive reverberation imaging contemplates (MRI) of Brain. Attractive reverberation imaging (MRI) has been appeared to can possibly analyze or to decide out conditions that present as happiness. X-ray has better goals than different cross-sectional imaging methods

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like figured tomography for representation of back fossa of cerebrum where most focal sensory system illness that causes happiness are available. The points of this examination were to record the discoveries in patients who experienced MRI cerebrum for happiness as the exhibiting side effect and to dissect the affectability and explicitness of MRI in diagnosing the reason for energy.[4]

Aims & Objectives of the Study

The objective of the study wasto evaluate the age and sex distribution of patients of giddiness with significant findings on MRI

Materials and Method

The study was conducted in 106 patients who presented with complaint of giddiness (dizziness, vertigo, light headedness, imbalance) and referred for MRI to the Department of Radio Diagnosis. Majority of the referred cases were those who complaint of giddiness with neurologic signs and symptoms, risk factors for cerebrovascular disease, or progressive unilateral hearing loss.

Inclusion Criteria

- Patients with complaint of giddiness.
- Patients willing to undergo this study.

Exclusion Criteria

- Patients not willing to undergo this study
- Pregnancy
- Claustrophobic patients

Clinical assessment was done including detailed history, physical examination and laboratory investigations for the causes of giddiness.[7]

Subsequent MRI was done. For contrast enhancement, imaging was performed following intravenous injection of 0.1 mmol/kg of gadolinium.

Results and Observation

Table 1: Age distribution of the patients

Age in years	Number	%
0-20	6	5.66%
21-40	34	32.08%
41-60	35	33.02%
61-80	28	26.42%
81-100	3	2.83%
Mean +/- SD	49.2 +/- 18.6	

In the study group, majority of the cases ie., 33 % belong to the age group 41-60 years, 32 % belong to the age group 21- 40 years, 5.6 % belong to the age group 0-20, 2.8 % belong to the age group 81-100 years.

Chart 1:Age distribution of the patients

Chart 2: SEX distribution of the patients

Among the total cases, 58 (45%) were males and 48(55%) were females out of which significant MRI findings were found in 50 males and 38 females.

Findings

MRI findings in patients complaining of giddiness

MRI scans of 106 patients were analyzed and total 171 findings were seen that are known to cause giddiness. Out of 106 cases the most common finding on MRI was cerebral small vessel ischemic changes found in 45(26.3%) scans. 27(15.7%) scans had cerebral atrophy, 25(14.6%) patients had PCA territory infarct, 8(4.6%) scans had semicircular canal dehiscence, 8(4.6%) patients had mastoiditis and 5(2.9%) scans had CP angle tumors.

Other findings that were found includes intracranial hemorrhage found in 6(3.5%) scans, SOL found in 5(2.9%) scans, venous sinus thrombosis in 5(2.9%) scans and benign intracranial hypertension in 2(1.1%) scans. Overlap of findings in same scan was noted in many cases.[5]

Discussion

Giddiness is a common symptom which affects about 30% of people over the age of 65.[4] Benign paroxysmal positional vertigo, acute vestibular neuronitis, and Meniere's disease cause most cases of

giddiness; however, physicians must consider other causes including cerebrovascular disease, semicircular canal dehiscence, migraine, psychological disease, perilymphatic fistulas, multiple sclerosis, and intracranial neoplasms. In these patients MRI scan is done to look for the cerebrum, cerebellum as well as for cerebello-pontine angle lesions and the internal auditory meatus.

A descriptive cohort study was conducted on patients who present with complaint of giddiness (vertigo, light headedness, presyncope, and disequilibrium). In the present study 106 patients who presented with giddiness underwent MRI brain. MRI showed high sensitivity to visualize findings that were clinically significant and consistent with giddiness. We found that approximately 83% of scans had positive findings and 17% scans were normal. Kalsotra et al studied the findings on magnetic resonance imaging in patients with giddiness by evaluating MRI scans of 62 patients and reported 54.84% MRI scans as normal[5].

In the present study, most common finding was small vessel ischemic changes in 26.3% of the scans. In 2010 Papanikolaou et al. studied findings on MRI scans of patients presenting with audiovestibular symptoms. Subcortical white matter hyperintensive foci has been reported in 44% cases by Papanikolaou et al[6].

In present study the second most common finding was cerebral atrophy in 15.7%. Papanikolaou et al reported atrophy in 5.5% cases[6] while Kalsotra et al reported it in 3.22%[5].

Another significant and prevalent finding was posterior cerebral territory infarct in 14.6% scans and non-posterior cerebral territory infarct in 7.6% scans. Zoya Irfan Khan et al conducted retrospective study and analyzed MRI brain scans of 500 patients who presented with giddiness and reported acute infarcts in 8.4% cases[7].

In the present study semicircular dehiscence was seen in 8 (4.6%) scans which significantly attributes to giddiness. P. Browaeys et al. found that MR imaging has a sensitivity of 100% to depict semicircular canal dehiscence (SCD).

Mastoiditis was seen in 4.6% scans compared to 3% cases reported by Papanikolaou et al in his study.

In the present study CP angle tumors were visualized on MRI in 5(2.9%) scans.

Other findings include intracranial hemorrhage in 6(3.5%) scans, SOL in 5(2.9%) scans, venous sinus thrombosis in 5(2.9%) scans, benign intracranial hypertension in 2(1.1%) scans, meningoencephalitis in 1 scan (0.58%), hypoxic ischemic encephalopathy in 1 scan (0.58%), vertebral artery stenosis/occlusion in 1 scan (0.58%), vertebral artery stenosis/occlusion in 1 scan (0.58%) and vertebrobasilar dolichoectasia compressing over the midbrain in 1 scan (0.58%).

In the present study 45% were males and 55% were females out of which significant MRI findings were found in 50 males and 38 females.

Study conducted by Zoya Irfan Khan et al included 57.6% females and 42.4% males with age ranging between 36 to 74 years were found[7].

Current study comprised of patients between 6-94 years of age with mean age of 49.2 years. Majority of the cases i.e. 65% were in the age group of 21-60 years.

Conclusion

MRI has high sensitivity and can successfully demonstrate the significant findings which cause giddiness. Out of 106 cases, 83 % (88) of the cases had significant MRI findings that are known to cause giddiness and 17 % (18) of the cases had normal MRI scan.

Most common finding was small vessel ischemic changes and cerebral atrophy in these patients. PCA and non-PCA territory infarcts were among the other predominant findings.

Spectrum of other findings included semicircular canal dehiscence, mastoiditis, CP angle tumors, intracranial hemorrhage, SOL, venous sinus thrombosis, benign intracranial hypertension, meningoencephalitis, hypoxic ischemic encephalopathy vertebral artery stenosis/occlusion, vertebral artery stenosis/occlusion and vertebrobasilar dolichoectasia compressing over the midbrain.

Male predominance was noted in the study group.

Majority of the cases ie., 33 % belong to the age group 41-60 years, 32 % belong to the age group 21- 40 years with the mean age of 49.2 years.

MRI is a costly investigation, so it should be used

judiciously in such patients after obtaining detailed history and physical examination who do not respond to routine medications.

Summary

Giddiness is a common presenting complaint of patients. MRI scan of these patients is done to look for possible treatable definitive cause.

Out of 106 MRI scans, 83 % of the cases had significant MRI findings that are known to cause giddiness and 17 % of the cases had normal MRI scan.

Most common finding was small vessel ischemic changes in 26.3% of the scans. Spectrum of other findings included cerebral atrophy, PCA & non-PCA territory infarcts.

MRI is a highly sensitive investigation to find out the cause of giddiness. Its benefit weighs more than its cost. So the patients with persistent giddiness must undergo MRI brain to find the cause and for further appropriate management.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Evaluation and Description of Colorectal Pathologies Using CT Colonoscopy

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Abstract

CT colonoscopy is a newer submodality of imaging in Computed tomography specifically being used for colorectal evaluation. The aim of work is to evaluate and describe the role of CT colonoscopy for various colorectal pathologies in patients with lower GI symptoms.

Subject and methods: Our study included 50 patients with lower GI sypmtoms; 16 had inflammatory bowel disease , 6 of them had colorectal malignancy, 7 had polyps, 8 had hemorrhoid. All patients were subjected to CT colonoscopy examination and results were compared to conventional colonoscopy and documented by histopathology in all cases to determine the efficacy of CT colonoscopy.

Results: The results in our study showed that CT colonoscopy is a considerably efficient modality in evaluation colonic pathologies. when compared to conventional colonoscopy and further helps in delineating the locoregional extent of the lesion-n.

Keywords: *CT colonoscopy, submodality, malignancy*

Introduction

In recent times, computed tomographic (CT) colonoscopy, a new cross-sectional technique for imaging of the colon, emerged. CT colonoscopy has potential advantages over colonoscopy and double-contrast barium enema examination: multiplanar capabilities, detection of enhancing lesions that make the distinction between fecal residue and true lesion possible, and ante- and retrograde virtual colonoscopy.[7]

CT colonoscopy generates a large number of source images, which have to be read carefully for filling defects and wall thickness and, if intravenous contrast material is used, enhancing lesions. An important post-processing technique is multiplanar reformatting , which allows the viewer to see potential lesions in an orientation other than that of the source images

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Virtual colonoscopy is a new method of imaging the colon in which thin-section, helical computed tomography (CT) is used to generate high-resolution, two-dimensional axial images. Three-dimensional images of the colon, simulating those obtained with conventional colonoscopy, are then reconstructed off-line. Studies suggest that this technique may be an attractive alternative to existing screening tests for colorectal cancer, since it is relatively safe and minimally invasive.[3]

Materials and Method

Sample size : 50 cases

Inclusion criteria : All patients with lower GI symptoms were included (Age group > 20 years)

Exclusion criteria: Asymptomatic individuals ; Children and pregnant women.

Methods: All patients will be subjected to CT colonoscopy and followed up by conventional colonoscopy.

Imaging protocols and Procedure :

Patients of the inclusion criteria were referred from the department of gastroenterology and after overnight fasting on empty stomach CT colonoscopy is done using HITACHI ECLOS 8 SLICE SCANNER. Patient was placed in supine position and manual insufflations of colon was done4

Scanning parameters:

All patients were examined in cranio-caudal direction starting from the level of the diaphragmatic cupola down to the anus.

Slice thickness 2.5 mm, Pitch factor 2:1 Milli ampere 200 mAs,

Kilo volt 120 to 150 kv, matrix 512 · 512.

Range for scanning time 20 to 30 s,

Field of view Full Reconstruction interval 1.25 mm.

The colon was insufflated by gentle squeezing of the BP cuff using room air, until the patients stated they were full or ~15 to 20 manual compressions. The adequacy of air insufflations was evaluated with a CT scout view , with more air insufflated if required. Bowel distension with air till cecum was considered adequate. Now the patient is made to lie down prone and scout view taken to look for if additional air insufflations was necessary. When air insufflations is satisfactory then image acquisition in prone position is done.5

Data Analysis

All the data acquired from the examination including the scanograms supine and prone acquisitions were transferred to work station unit

Findings

Table 1 – Age vs. Sex

Age group	Male	Female	Total
21-30	02	01	03
31-40	13	02	15
41-50	09	05	14
51-60	15	03	18
Total	39	11	50

Table shows that the majority of the male patients were under the age group of 51-60 (38.46%), whereas female patients were more in age group 41-50 years (45.45%).

The virtual colonoscopy/ CT findings showed incidences of various conditions in the cases, where maximum findings were of Inflammatory Bowel disease (32%), followed by Hemorrhoids (16%). The incidence of Polyp findings were 14%,Colorectal malignancies were 12% and rest cases showed no significant findings.[7]

Table 2 – CT findings

CT findings	No. of cases	Percentage
Inflammatory Bowel Syndrome	16	32%
Hemorrhoids	08	16%
Polyp	07	14%
Malignancy	06	12%
Normal	13	26%
Total	50	100

The conventional colonoscopy findings showed incidences of various conditions in the cases, where maximum findings were of Inflammatory Bowel disease (32%), followed by Hemorrhoids (20%). The incidence of Polyp findings were 18%, Adenocarcinomas (malignancy) were 12% and rest cases showed no significant findings.[4]

Table 3 – Conventional Colonoscopy findings

Colonoscopy findings	No. of cases	Percentage
Inflammatory Bowel Syndrome	16	32%
Hemorrhoids	10	20%
Polyp	09	18%
Malignancy	06	12%
Normal	09	18%
Total	50	100%

Table 4– Distribution of Extra-colonic finding

Findings	No. of cases
Ascites	02
Hepatic metastasis	01
Renal calculi	05
Renal cortical cyst	02
Inguinal Hernia	03
Lumbar spondylosis	02
GB wall thickening	01
Cholelithiasis	01
Cirrhosis and Portal hypertension	01
Hiatal Hernia	01

Table 5 – Results for CT colonoscopy in detection of various incidences

Incidence	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
Inflammatory Bowel Disease	100	100	100	100
Hemorrhoids	80	100	100	95.24
Polyp	77.78	100	100	95.35
Carcinoma (malignancy)	100	100	100	100

Table 6 – Age wise distribution of IBD and malignancy for CT findings

Age group	IBD (n=16)	Carcinoma (n=6)
21-30	0 (0%)	2 (33.33%)
31-40	3 (18.75%)	2 (33.33%)
41-50	6 (37.5%)	1 (16.66%)
51-60	7 (43.75%)	1 (16.66%)
Total	16 (100%)	6 (100%)

Age wise distribution of malignancies shows 66.6% of the cases were less than 40 years of age. Inflammatory bowel disease showed predominance in age group more than 40 with 81.25% of cases more than 40 years of age.

Discussion

This study was conducted in 50 patients with lower GI symptoms who were referred to the department of radiodiagnosis.

Among the 50 patients in our study, 37 patients had pathologies on CT colonoscopy with the most common being inflammatory bowel disease found in 32 % of the patients included in the study

In a study by Ayman osama et al, more prevalent lesions were found in sigmoid colon accounting for 46.4% of lesions, while 10.7% were seen in the rectum, 3.5% in the descending colon, 3.5% in the splenic flexure, 10.7% in the transverse colon, 3.5% in the hepatic flexure, 10.7

% in the ascending colon and 10.7% in the cecum.

Similarly in our study lesions were more prevalent in the sigmoid colon accounting for 40.5% of the lesions, while 27.1 % of the lesions were seen in the rectum and colon, 16.2% lesions in descending colon, 10.8% in transverse colon, 2.7% each in ascending colon and cecum[1].

Riss S et al in his prospective study among 976 patients found out the incidence of hemorrhoids was 38.93%, which is higher compared to our study. Our study indicates 20% incidence of hemorrhoids.[2]

In another cross sectional study conducted by Najar F. A. et al among 1800 patients the incidence of hemorrhoids was 9.08 % which is lower compared to the 20% incidence in our study.

Most of the literature dictates that colorectal polyps are more common in males compared to females. This was confirmed in our study that a predominant male population was involved with 3.5:1 male to female ratio. This result matches with that of Van Gelder et al study[3]

All the cases of malignancies were further evaluated for the presence of pericolonic / perirectal fat stranding and peri rectal lymphnodes , in which all the 6 cases showed the involvement of the perirectal fat stranding and peri rectal lymph nodes. Further staging by evaluation of the fat plane between the rectum and the bladder, between the rectum and the prostate were also done. Hepatic metastases in a patient with colorectal malignancy was also detected

Extracolonic findings are the incidental findings found in the axial CT images during the evaluation of the colon. This is an advantage over the conventional colonoscopy in which there is no role for extracolonic evaluation.

Michel et al in his study of prospective comparision of thin low dose multi detector row CT colonography and conventional colonoscopy among 296 patients 13.2 % had extracolonic findings (13.2%), varying in nature including aneurysmal dilatation of the aorta, vertebral changes, hemangiomas in the liver and pancreatic pseudocysts, leiomyomas of the uterus, mature teratomas in female patients and, in one case, a urothelial cell carcinoma was detected[4]. In our study the 19 out of 50 patients had extracolonic findings (38%), which were hepatic metastases in 1 patient , ascites in 2 cases, renal calculi in 5 cases, renal cortical cysts in 2 cases, inguinal hernia and lumbar spondylosis each in 2 cases; Gall bladder wall thickening and cholelithaisis in 1 case each; hiatal hernia in 1 case and 1 case of cirrhosis with portal hypertension.

In a study among 35 patients , ayman et al has described that 76% of the cases with malignancy were above the age of 40 and 60 % were above 50 %[1]. Jarmillo et al. has described that the incidence of colorectal cancer rises sharply after the age of 40, and 90% of cases occur over the age of 50[5]. This has been correlated by Halligan et al[6].But in our study 66.66% of the cases with colorectal cancer were detected in age group less than 40 years of age which is indicating a shift in the incidence of colorectal malignancies.

White TJ1 et al in their for prospective trial of 150 patients concluded that virtual colonoscopy was an effective and safe method for evaluating the bowel and was the investigation of choice amongst patients surveyed[7]

In our study only four patients (8%) complained of abdominal discomfort. It was also found only verbal reassurance was sufficient in these patients and the study could be completed without any sedatives or analgesics. Ayman osama et al in his study has described ~ 20% (7 patients out of 35) felt discomfort and similar to our study no patient needed sedatives or analgesic.[1]

Conclusion

CT Colonoscopy is an excellent, minimally invasive method of investigation of lower GI pathologies. In addition to the detection of the lesion CT colonoscopy can evaluate the locoregional extent of the lesion and gives us the information about any extracolonic incidental findings which may help the clinicians to provide further management to the patients. The main advantage with CT colonoscopy is it is minimally invasive has better patient acceptability and less inconveniency. The main disadvantage of CT colonoscopy is the radiation exposure to the patient and the inability to detect he histopathological nature of the lesion for which conventional colonoscopy suits better.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Evaluation of Self-Medication Practices in Urban Area of Kancheepuram District, Tamil Nadu

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Abstract

Self medicine is wide spread in India, on account of demonstrating compassion towards their evil relatives or companions, human services administrations not effectively accessible extraordinarily in provincial territories, destitution, ignorance, doubts, too many medication commercials given by pharmaceutical companies3, and simple access to prescriptions from pharmacies on the grounds that full time drug specialist isn't accessible, drug store keep running without drug specialists and normal medications can be accomplished from kirana shops (other than drug store).

Keywords: *destitution, pharmacies, pharmaceutical companies*

Introduction

Self-medicine is for the most part called as 'non-solution' or 'over the counter'(OTC) meds and can be effectively acquired without a doctor remedy from the retail drug stores and some from non-drug store retail outlets. It is exceptionally normal in creating nations. The patients analyze their very own sickness and purchase a particular medication from therapeutic shops to treat it. Individual self sedate themselves by taking pretty much than the suggested portion/recurrence of medication organization and length of treatment of medications. It has been seen that individuals utilize either past solutions or non doctor prescribed medications for self medicine [1].

Self medicine is wide spread in India2, on account of demonstrating compassion towards their evil relatives or companions, human services administrations not effectively accessible extraordinarily in provincial territories, destitution, ignorance, doubts, too many medication commercials given by pharmaceutical companies[3], and simple access to prescriptions from pharmacies4 on the grounds that full time drug specialist isn't accessible, drug store keep running without drug specialists and normal medications can be accomplished from kirana shops (other than drug store). [2]

It is normal for a patient with milder ailment, for example, fever, cold/hack, looseness of the bowels, acid reflux or wound contamination and so on, to get guidance(like a social insurance proficient) from their own companions, relatives or some time from outsiders in regards to pharmaceuticals extraordinarily about booked prescriptions like anti-infection agents, NSAIDs1 and so on.. In India, Schedule H (physician endorsed medications) and Schedule H 1 (anti-toxins and other confined meds) can be sold by a legitimately qualified enrolled drug endless supply of substantial remedy according to Drug and Cosmetics Act of 1943.

A larger part of the populace when they become sick, don't counsel with the social insurance experts particularly in rustic or little urban communities In India. Be that as it may, they do counsel legitimately to the drug store or potentially retail medication store and can undoubtedly get prescriptions for themselves[5].

Serious issues identified with self−medication are5wastage of assets, Increased opposition of pathogens and Causes genuine wellbeing risks, for example, unfavorable response and delayed anguish.[3]

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Antimicrobial opposition is a present issue world−wide especially in creating nations where anti-infection agents are accessible with no medicine. Subsequently, the administration should find a way to control dependable self−medication. This should be possible by making accessibility of safe medications alongside legitimate directions about its utilization and if in need counselling a physician. In India, it is extremely normal to see self−medication practice and which is developing test to social insurance providers[10]

In light of this foundation, the present investigation was done to assess Self medicine rehearses in Urban territory of Kancheepuram locale in TamilNadu.

Methodology:

Study Area:

The study was conducted in **Anakaputhur,** an Urban field practice area of Sree Balaji Medical College and Hospital in Kancheepuram district, Tamil Nadu.

Study design:

A Community based cross sectional descriptive study

Study Period:

The study was conducted between June 2017 to May 2018.

Study Participants:

According to the 2011 census, Anakaputhur urban field practice area had a total population of 48,050 of which 24,158 were males , 23,892 were females . Total number of houses in Anakaputhur is 12,146. The study was done among adolescent and adults 15 years and above residing in the study area permanently at the time of the study.

Inclusion criteria:

All participants who were 15 years and above[6] and willing to participate in the study were selected

Exclusion criteria:

Those who were not willing to participate in the study were excluded.

Psychiatric patients, pregnent mother, severly ill patients were excluded from the study.

Study area:

Kancheepuram locale is one among the 32 areas of Tamil Nadu. As per the evaluation of India 2011,Kancheepuram locale covers a zone of 4433sq. km with a populace of 39.98 lakhs involving 20.12 lakhs guys and 19.8 lakhs females. Kancheepuram, the sanctuary town is the base camp of the locale for regulatory reasons, the region has been isolated into 4 income divisions containing 11 taluks with 1137 income towns. [4]

Anakaputhur is a Municipality city in the area of Kancheepuram, Tamil Nadu. It is isolated into 18 wards for which races are held at regular intervals. The investigation was led in Anakaputhur which is the urban field practice region of Department of Community Medicine of Sree Balaji Medical College and Hospital (SBMCH), situated a ways off of 7 kilometers from the organization with a territory covering roughly 16 sq. Kilometers.[8]

Sample size:

Sample size was calculated based on the study done by " Pushpa R Wijesinghe" in the year 2013 in Sri lanka which recorded the prevalence of self medication practice of 34%.[7] Using this study prevalence as reference the sample size was calculated by using 4pq / [L] [8] formula

Adding 10% refusal rate the sample size obtained is 394 which is rounded up to 400. The sample collected during the study period was 424.[10]

Sampling method:

Anakaputhur had a total population of 48,050 as per 2011 census. As per the data available in the UHTC register There were total of eighteen wards in Anakaputhur. The number of households 12146. The sampling technique followed for this study was systematic random sampling technique.

K = sample size in our study

N = Total no of households = 12146

n = sample size = 424

K = N / n = 12146 / 424 = 28^{th}. Every 28^{th} house were selected.

The name and address of the person was noted and was visited for the data collection. If the person corresponding to the number did not give informed consent or absent ,the next number was chosen and the next person was selected and interviewed. Likewise, 424 participants who gave informed consent and willingly participated in the study were identified.

Study tools:

A pre-tested structured questionnaire was used as a study tool to interview the study participants. The questionnaire was prepared in English and Tamil. It was conducted by face to face interview by the investigator himself and the responses were recorded in the questionnaire.

The questionnaire consisted of 6 sections relating to the details like socio-demographic characteristics, personal history and self-medication details,

Ethical approval: The study was approved by Institutional Ethical Review Committee of Sree Balaji Medical college and hospital , Chennai .

Informed consent: The details and purpose of the study and the confidentiality of their identity were explained to each and every participant those who were willing to participate in the study were required to sign the informed consent, after which they were included in the study . the informed consent was in Tamil ,the local language of the study participants.

Statistical Analysis

Data entry was done and analysed using SPSS software version 22

Findings:

Table1: **Prevalence of self-medication among the study participants**

Sl.no	Variables	Frequency N=424	Percentage %
3	TREATMENT FOR ILLNESS		
	Home remedy	24	5.7
	Sought medical care	146	34.4
	Self-medication	254	59.9

Table 2:Variables Related to over the counter medication

Sl.no	Variables	Frequency N=254	Percentage %
1	MODEOF GETTING OVER THECOUNTER MEDICATION		
	By telling the complaints	224	88.2
	By telling the names of the drugs	30	11.8
2	NUMBER OFDAYS DOSES BOUGHT		
	One	192	75.4
	Two	60	23.8
	Three	02	0.8
3	CHECKING EXPIRY DATE		
	Yes	12	4.7
	No	246	95.3

About 88.2% (n=224) of the study population obtained over the counter medicine by telling their complains to the pharmacist. A minimal of 11.8% (n=30) of them obtained medicine by telling the drugs name.

Majority of the study population 75.4% (n=192) obtained a single dose for their illness and 23.8% (n=60) of the study population obtained a single dose and 0.8% (n=2) of them obtained three doses for their illness.

Only 4.7% (n=60) of the study population checked for the expiry date while 95.3% (n=246)majority of the study population were not on the habit of checking the expiry date.

Table 3 : Common illness for which self medication used

Sl.no	Variables	Freq-Uency	Percen-Tage %
1.	Head ache	100	39.4
2.	Minor injuries	02	0.8
3.	Abdominal pain	08	3.1
4.	Fever	46	18.1
5.	Allergy	10	3.9
6.	Body pain	42	16.5
7.	URI	22	8.7
8.	Acidity	18	7.1
9.	Throat pain	02	0.8
10.	Wheezing	02	0.8
11.	Knee pain	02	0.8

About 39.4% (n=100) of the study population used self medication for head ache. About 18.1% (n=46) of them used for fever,16.5% (n=42)of them used for body pain, 8.7% (n=22) used for URI , 7.1% (n=18) for acidity and 3.1% (n=08) for abdominal pain,0.8% (n=02) for throat pain, wheezing, knee pain and head ache.

Table 4:Variables related to self medication

Sl.no	Variables	Frequency N=254	Percen-tage %
1	NOTGONEFORSELF MEDICATION		
	Illness less than 1 week	208	81.9
	Gender	02	0.8
	Paediatric	40	15.7
	Chronic illnesses	04	1.6
2	FACED PROBLEM DUETOSELF MEDICATION		
	Yes	32	12.6
	No	222	87.4
3	Advice self medication to others		
	Yes	38	9.0
	No	386	91
4	Harmful effects of self medication		
	Drug reaction	06	1.4
	Delay in care seeking	96	22.6
	Delay in diagnosis	248	58.5
	No expert opinion	74	17.5
5	Steps to be taken to stop self medications		
	Rules and regulations	12	2.8
	Ban	56	13.2
	Awareness	146	34.4
	Availability	210	49.5

Table 6 shows the side effects faced. About 12.6% (n=32) have faced the consequence of self medication, while 87% (n=222) have not faced any complication. Among the total study population (n=424) about 9% (n=38) revealed that they would advice self medication to others where as majority of them 91% (n=386) revealed that they would not advice self medication to others.

Harmful effects of self medication . 58.5% (n=248) revealed that Delay in diagnosis. 22.6% (n=96)Delay in care seeking. 17.5% (n=74)No expert opinion. (1.4% n=06) Drug reaction Steps to be taken to stop self medications 49.5% (n=210) Availability 34.4% (n=146) Awareness. 13.2%(n= 56)ban.2.8% (n=12) Rules and regulations

Discussion

The present study is a cross sectional study , carried out in an urban field practicing area (Anakaputhur) of Sree Balaji Medical college and hospital, Kanchepuram district Tamil Nadu to evaluate the self medication practices among people residing in an urban community. The study was conducted for a period of six months. Data were obtained by administering the questionnaire to the participant by interview method. The collected data were analysed using SPSS software version.

Over all the self-medication in the current study is59.9%. This prevalence is comparable with the studies conducted by Khan et al 2014 was 54.9% and Kalaivani Annadurai [9]et al in Puducherry 2014 was 53.43%. T Aqeel[1] et al in Pakistan 2014 was 61.2%. The Prevalence of self medication is 59.9% , in that 47.2% of them got drug from previous prescription , 26.8% got drugs from pharmacy by telling their complaints, 17.3% advise from friends ,relatives and neighbour and remaining 8.7% from advertisements, internet ect . This is similar to a study done by Balamurugan .E[10] et al 21.5% of them got drug from previous prescription, 21% got drugs from pharmacy by telling their complaints ,12.5% advice from friends and remaining 5.5% from advertisements, internet etc. in another study done by Yogendra Keche[11] et al 64.32% of them god drug from previous prescription, 23% got drug from pharmacy by telling their complaints, 5.63% advice from friends ,and remaining 7.04% from advertisement and internet and Dr Pragatika Dadhich[13] et al, 45.26% got drug from previous prescription, 33.68% got drug from pharmacy by telling their complaints, 14.73% advice from friends , and remaining 6.31% advertisement and internet.

About 39.4% of the study participant took self medication for head ache and 16.5% for body ache similar to a study done by Yogendra Keche[11] et al 33.3%, 40.5% Shyambsunder keshari[6] et al ,35% by Balamurugan [10]E et al.

Conclusion

Health professionals have to spend some extra time in educating patients regarding the same. Improved knowledge and understanding about self-medication may result in rationale use and thus limit emerging microbial resistance issues. The adverse consequences of such practices should always be emphasized to the community and steps to curb it. Rampant irrational use of antimicrobials without medical guidance may result in greater probability of inappropriate, incorrect, or undue therapy, missed diagnosis, delays in appropriate treatment, pathogen resistance and increased morbidity. This study focused on the self−medication of allopathic drugs, their uses, its safety and reason for using it. At a pharmacy shop level, prescription monitoring and sales volume comparison should become a routine part of inspection and audit by drug regulatory authorities. The potential benefits of this trend, with the increasing empowerment of patients, are many. Nevertheless, developments in self medication will need to be carefully managed if these benefits are to be maximised and the potential risks kept to a miminum. Greater collaboration between doctors and pharmacists will be critical and joint training on over the counter medicines will be very helpful [12]

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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A Study of Airtraq Optical Laryngoscope for Intubation in Adult Surgical Patients, A Prospective Randomized Controlled Study

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Abstract

Objectives: To ponder the intubating conditions in grown-up careful patients utilizing airtraq optical laryngoscope without hardly lifting a finger of intubation, time taken for intubation, aviation route injury and hemodynamic reaction to laryngoscopy.

Place of Study: Aneasthesia Department, Sree Balaji Medical College and hospital, Chromepet, Chennai.

Period of Study: August 2016 to February 2018(18 months).

Study Design: Cross sectional analytical study.

Materials & Method: The investigation was a Single focus, forthcoming, randomized, open mark, interventional controlled study. After acquiring institutional moral advisory group endorsement. 30 patients (test size) are posted for elective medical procedure requiring general anesthesia (Recruitment) with fulfilling consideration criteria were airtraqwho were decided on general medical procedure intubated with airtraqoptical laryngoscope tried out the examination in the wake of acquiring educated assent from the patients and relatives[5]

Results : Our study proved that Airtraq intubation helps the patients with good glottis view and it has less duration and less airway trauma. The intubation time and intubation difficulty score is more stable.

Conclusion : Our study concludes that endotracheal intubation is easier with Airtraq as it provide good glottis view. In addition to that Airtraq have less intubation duration, less hemodynamic response for intubation and less Airway trauma. Airtraqlaryngoscope significantly improve the view of glottic opening and facilitates fast, easy and reliable intubation.Airtraq reduce the need of more sophisticated and complex airway instrument like flexible fibreoptic bronchoscope to a particular extent.

Keywords: *anesthesia, airtraqoptical laryngoscope*

Introduction

Tracheal intubation utilizing a laryngoscope is considered as a best quality level of aviation route the board during organization of general anesthesia and furthermore in basic consideration settings due to its few focal points including

- Isolation of respiratory tract from Gastro intestinal framework and subsequently negligible danger of desire.
- Allows conveyance of oxygen and soporific gases by means of positive weight ventilation without expansion of stomach.
- Access to tracheobronchial tree for pneumonic

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lavage and medication administration(e.g. breathed in bronchodilators).

- Improved access to head and neck medical procedures.

Airway management is important for anaesthesia because adverse respiratory events are responsible for 75% of ASA closed claims. Of these failed ventilation is the main culprit(38%), followed by faulty placement of endotracheal tube in esophagus (17%) and difficult intubation(18%). Approximately 600 patients die each year in the developed world from complications due to airway management and also in the underdeveloped world is much grimmer.[1]

MATERIALS &METHODS :

This study was done in SreeBalaji Medical College & Hospital, Chennai at Department of Anaesthesiolgy and Critical Care from August 2016 to February 2018. It was a Single centre, prospective, randomized,open label, interventional controlled study. After obtaining institutional ethical committee approval.30 patients (sample size) are posted for elective surgery requiring general anaesthesia (Recruitment) with satisfying inclusion criteria were enrolled in the study after obtaining informed consent from the patients and relatives.[2]

Group A -30 Patients –airtraq optical laryngoscope

INCLUSION CRITERIA

- ASA 1 & 2 patients
- Age 18-65 years, both sexes
- Elective surgical cases requiring GA
- MPC 1,2,&3 patients

EXCLUSION CRITERIA

- Severe CVS,RS, hepatic, renal disease patients
- Any valvular, conduction abnormality, IHD, Hypertensive patients
- Patients on antihypertensive drugs or beta blockers
- Anticipated difficult airway patients
- BMI more than 40
- Patient refusal

MATERIAL

- Airtraq optical laryngoscope adult size

Findings :

Table 1: Comparision of IDS

Total Intubation Difficulty Score	GROUP A	
	No	%
0	25	83.3
1	0	0
2	3	10.0
3	2	6.7
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
Total	30	100

- All the patients in airtraq group intubated in single attempt, in macintosh group 3 patients out of 30 intubated in 2nd attempt .(N1)[6]
- All the patients in both groups intubated by single operaters. No need supplementary operaters (N2)
- All patients in airtraq group intubated without using additional techniques.

All the patients in airtraq group intubated in single attempt, in macintosh group 3 patients out of 30 intubated in 2nd attempt .(N1)

- All the patients in both groups intubated by single operaters. No need supplementary operaters (N2)
- All patients in airtraq group intubated without using additional techniques.[8]

In the Airtraq group 90 % of patients had CL1 and 10% of patients had a CL grade of 2 .

No patient in the Airtraq group had a CL grade of 3 or 4.

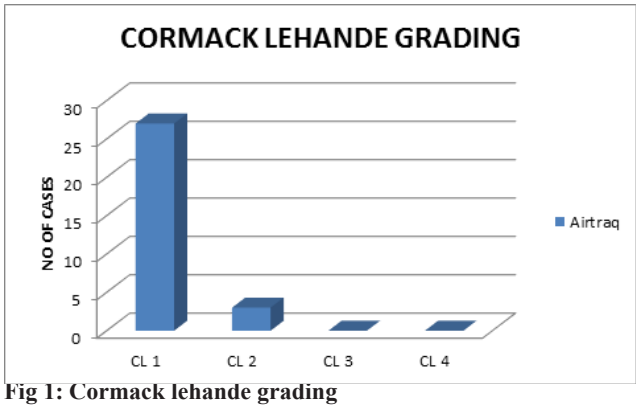


Fig 1: Cormack lehande grading

Table 2: Duration of Intubation

Parameter assessed	Group	N	Mean	S.D
Intubation time	Airtraq	30	15.93	2.55

Mean duration of intubation with the Airtraq group was 15.93 secs

Discussion

Expert airway management is an essential skill for anesthesiologist. Difficult endotracheal intubation is mostly caused by difficult direct laryngoscopy with impaired view of vocal cords. Despite all the information currently available, no single factor reliably predict these difficulties. Unfortunately many difficult intubations are not be recognized until after induction of anaesthesia. Unexpected difficult intubation lead to critical situation, especially who are difficult to ventilate by mask, who are at risk for gastric regurgitation and patients with limited cardiopulmonary reserves.When a person in supine position and head in the neutral position, the laryngeal axis is almost horizontal.The pharyngeal axis is 30-45˚ from the horizontal axis and the oral axis almost perpendicular to the laryngeal axis. For a successful direct laryngoscopy for the exposure of the glottis opening, the oral, pharyngeal and laryngeal axes alignment is required. Elevation of the head about 10cm with pads below the occiput aligns the laryngaeal and pharyngeal axes. Conventional macintosh laryngoscopy fails to get desired laryngeal view in patients with difficult airway like short neck, anteriorly placed larynx, small jaw, MPC 3 & MPC 4 patients, cervical spine immobilization needed patients etc. But reports said that airtraq have shown improvement in laryngeal view and ease of intubation in normal and difficult airway patients.

The advantages of airtraq optical laryngoscope from the available literatures are(24)

1. Airtraq does not need alignment of the axes to improve intubating condition because the axis of airtraq is curved and the image is transmitted through lenses and mirrors.

2. Airtaq is useful in patients with altered airway and magill's position contraindicated patients.

3. The displayed anatomy is magnified in proximal viewfinder.

4. The anatomical structure and anomalies are easily viewed with help of airtraq.

5. Airtraqassociated with less hemodynamic changes due to less manipulation of the airway and only clockwise or anticlockwise movement and upwards ordownwards movement was required, not the lifting movement as in macintosh laryngoscope.

6. Airtraq significantly reduces the duration of intubation.

7. A clip on wireless video system is also available in airtraq which allows viewing on an external screen. It is also useful for teaching purposes.

8. Shortens the endotracheal intubation learning curve in novice personnel.

9. Channel loading type of video laryngoscope example Airtraq optimal laryngoscope provides perfect visualization of larynx yet may result in failure of endotracheal intubation(17).

10. When insufficient visualization occurs the airtraq may be used to open an airway path. Insert Fibreoptic bronchoscope with an endotracheal tube either in channel or ext to the device and direct it towards the epiglottis(17)

11. We too have employed this combined technique in both adult and paediatric patients in difficult airway(3,36,43,44).

12. Many compared the degree of cervical spine movement in laryngoscope performed using airtraq and conventional macintosh laryngoscope. Although

significant movement of cervical spine from baseline wasnoted during all procedure($p<0.05$),cervical spine extension with airtraq was 29% less than measured during macintosh laryngoscopy between occiput and c4 and 44% less at the c3/c4 motion segment. Anterior deviation of the vertebral bodies from baseline were 32%,35%,38% and 40% less at the atlass,c2,c3 and c4 vertebrae respectively during airtraq laryngoscopy($p<0.01$)(45).

13. Some study also demonstrated that laryngoscopy using the airtraq laryngoscope involves less movement of cervical spine compared to conventional procedure using macintosh laryngoscope(45).

14. Videolaryngoscope are new intubating device which provide an indirect view of the upper airway in difficult airway management, they improves Cormack-lehane grade and achieve the same or a higher intubation success rate in less time compared with direct laryngoscope(46).

It was generally easy to insert the airtraq in to the oral cavity, to obtain a full view of the laryngeal aperture and to intubate the endotracheal tube into the trachea without majorcomplication. In airtraq the endotracheal tube can be attached to the side of the blade and the tip of the ET tube is visible on the proximal viewfinder. Once laryngeal aperture was positioned in the centre of the proximal viewfinder, it was easy to introduce the ET tube into the trachea.[4]

Eventhough we have a good view of glottis there was difficulty in negotiating the ET tube into the trachea, that result in prolonged intubation. The back and up maneuver or clockwise or anticlockwise movement of airtraq was needed to introduce the ET tube into the trachea.

The above findings suggest that the airtraq laryngoscopy produce less stimulation of heart rate and blood pressure during endotracheal intubation comparison with the macintosh laryngoscopy. These results show that airtraq provides good glottic view, without the need of alignment of pharyngeal, laryngeal and tracheal axes and less force required to lift during laryngoscopy. These results are similar to christen H Maharaj's study (14).

My study results show that airtraq have less intubation difficulty score, less Cormack and Lehane score, less intubation duration, less Airway trauma and less hemodynamic response for intubation. These results are similar to Christen H Maharaj's study

Summary

In our study Airtraq laryngoscopy had less intubation difficulty score Airtraq had less Cormack and Lehane grading, less intubation duration, less airway trauma and less hemodynamic response for intubation.[8]

Conclusion

Our study concludes that endotracheal intubation is easier with Airtraq as it provide good glottis view. In addition to that Airtraq have less intubation duration, less hemodynamic response for intubation and less Airway trauma.

Airtraqlaryngoscope significantly improve the view of glottic opening and facilitates fast, easy and reliable intubation.Airtraq reduce the need of more sophisticated and complex airway instrument like flexible fibreoptic bronchoscope to a particular extent.It can also be useful in routine anaesthesia management, in critical care, anticipated, unanticipated airway situations.Due to less hemodynamic response for laryngoscopy for airtraq may have advantage in clinical situation like coronary artery disease or cardiac arrhythmias and neuro surgery patients.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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A Study of Injection 0.75% Ropivacaine for its Duration of Anaesthesia / Analgesia in Transversus Abdominis Plane Block for Unilateral Inguinal Hernia Repair Under Ultrasound Guidance

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Abstract

Objectives: The point of the examination is to assess transversus abdominis plane square for postoperative absence of pain in patients experiencing inguinal hernia fix medical procedure with the dose of 0.75 % Ropivacaine& to quantify the hour of first solicitation for salvage absence of pain.

Place of Study: Aneasthesia Department, SreeBalajiMedical College and hospital, Chromepet, Chennai.

Period of Study: August 2016 to February 2018(18 months).

Study Design: Cross sectional analytical study.

Materials and Method: All patients who underwent unilateral inguinal hernioplasty surgery who were given 0.75% ropivacaine injection are included in the study, after explaining the nature of the study and obtaining informed consent for participating in the study. They are classified into different age group categories. P value < 0.05 was considered as statistically significant**.**

Results : The attempt to explore the efficacy of 0.75% ropivacaine in ultrasound guided - transversus abdominis plane block in patients undergoing unilateral inguinal hernioplasty under spinal anaesthesia found that th duration of analgesia was reasonable with the dosage of 0.75% ropivacaine. The vital parameters were well maintained among the patients throughout the study period. There were no complications like local anaesthetic toxicity noted among the patients and the drug was proved to be effective.

Conclusion : About 15 ml of 0.75 % ropivacaine for transverse abdominis plane block produces satisfactory and comparable sensory block, related to duration, analgesia and VAS score . The haemodynamics were stable in both the groups. The lower CNS and cardio toxicity of ropivacaine may help in reducing the risk to the patients. The clinical correlation in duration, dose of analgesia and VAS score among the patients, when injected in required volume for TAP block under ultrasound guidance. Ropivacaine has a potentially improved safety profile when compared to any other similar drug. Hence it may offer an advantage .

Keywords: *Ropivacaine, transversus abdominis*

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Introduction

The stomach divider frames a noteworthy wellspring of agony following stomach medical procedure.[5] Indeed, even a little medical procedure like inguinal herniorrhaphy might be trailed by danger of ceaseless torment in around 5-10% patients with critical impact

on every day exercises if postoperative absense of pain isn't dealt with. The standard pattern is to endorse a narcotic or a NSAID for postoperative absense of pain. The narcotics have number of symptoms like respiratory gloom, emesis, decrease in gut motility, sedation and so on. NSAIDS hav e certain reactions like hemostasis modification, renal brokenness, gastrointestinal discharge, and so forth. Nonetheless, in local pain relieving method, drugs have fringe site of activity and subsequently negligible fundamental symptoms. Consequently local soporific strategy has increased wide spread significance in postoperative absense of pain routine. [1]

Transversus Abdominis Plane (TAP) square is one of such provincial squares. It gives absense of pain after lower stomach medical procedure especially where parietal divider torment structures real part of agony. It is doctor's obligation to safeguard the patients from careful agony by the most conceivable mean. Presently postoperative torment control is commonly best overseen by anaesthesiologists, since they offer territorial soporific systems just as pharmacological ability in analgesics. [6]

Inguinal hernia fix medical procedure is one of the most widely recognized medical procedure performed when all is said in done populace. Postoperative absense of pain is fundamental to give solace and rebuilding of capacities like breathing, hack, development and co mmunication adequately. Utilization of narcotics and NSAIDS can bring about huge unfavorable impacts.

Different systems like rectus abdominis sheath square, paravertebral square, ilioinguinal/ilio - hypogastric square, neighborhood analgesic penetration and so forth are likewise tes ted. However, these have hindrances as they are difficult to perform, don't give satisfactory absense of pain, don't create long enough pain relieving length and so forth. The most recent pattern is the act of at least two pain relieving approach at the same time called multimodal absense of pain. It can create better agony control, lessen the individual portion of the specialist and in this manner brings down cost, low reaction and increasingly remedial security. Over late years, Transversus Abdominis Plane (TAP) square turned into a piece of multimodal absense of pain. [8]

TAP is a neuro fascial plane between the Internal Oblique (IO) and Transversus Abdominis (TA) muscle of the stomach divider through which every single tangible nerve supply the parietal peritoneum, skin and muscles of foremost stomach divider. Along these lines, it is a novel way to deal with square these tangible nerves by infusing nearby sedative inside the Transversus Abdominis Plane (TAP), named as TAP square .1 Because the tactile afferent nerves keep running between the muscular strength, these nerves can be blocked and postoperative torment can be overseen. This has been seen as a viable strategy in colon medical procedure, cesarean segment with midline entry point and prostatectomy and it is additionally compelling in overseeing torment following inguinal hernia medical procedures. TAP square was first depicted by Rafi et al in 2001 and was additionally created and tried by McDonnell et al in 2004.1[0]

Materials & Method

The purpose of our study was to evaluate effectiveness of TAP block to provide effective postoperative analgesia in patients undergoing inguinal hernia repair surgery with 0.75 % ropivacaine injection.

Patients receiving USG -TAP block at the end of surgery with 20 ml Inj. Ropivacaine 0.75% -20 patients.

Pre-anaesthetic check -up was done.

Inclusion & exclusion criteria were as follows;

Inclusion criteria

i. Male & Female patients giving written and info rmed consent for the study

ii . ASA grade I & II.

iii . All patients of age group 20 to 65 years of age.

iv **.** Patients undergoing unilateral inguinal hernia surgeryunder spinal anaesthesia .

Exclusion criteria

1. Patient refusal

2. Bleeding disorders

3. Allergy to local anaesthetics

4 . Mental disorders

5. Morbid obesity

6. Abnormal liver function tests

7. Infection at local site of block

8. Hemodynamic instability

9. Contraindications for spinal anaesthesia

10. Any anatomical deformity at site of block

11. ASA III & above

Patient details including Age, Sex, Weight, ASA grading were noted.

Thorough History taken and Clinical Examination done.

Materials Required

1. Ultrasound machine with a linear transducer (7 -13 MHz)

2. Sterile gloves

3. Ultrasound probe cover

4. Antiseptic solution for skin disinfection

5. ultrasound gel

6. 23-gauge spinal needle

7. 20ml syringe with injection tubing

Consent

Those patients who qualify as per the selection criteria were explained regarding surgical procedure, anaesthesia procedure & drugs to be used in their vernacular language[7]

A written informed consent was obtained in each case in their vernacular language. All patients were explained the concept of V.A.S score and their V.A.S scores were assessed accordingly.

Methodology

After Ethical Committee approval, we investigated forty patients undergoing unilateral inguinal hernioplasty. The patients were randomized and allotted to two groups by computer generated tables to undergo TAP block with ropivacaine(n =20) [GROUP B] versus ropivacaine (n = 20) [GROUP R].[8-10]

Written informed consent was taken on previous day and all the patients were explained visual analogue scale Patient preparation for spinal anaesthesia and TAP block was done so as to maintain all aseptic conditions.

On the Day of Surgery

Consent and fasting status were confirmed. In the operation theatre, standard monitoring including ECG, non -invasive BP, pulse oximeter were attached. Peripheral line w as taken with 18G IV cannula.[11-12]

As per the institutional protocol, patients were premedicated with intravenous ranitidine and intravenous ondansetron. All patients received standardized spinal anaesthesia with 0.75% ropivacaine 3.5 ml in sitting position. Level of analgesia achieved noted. Block assessed by pin prick method. Patients monitored intraoperatively. Hypotension was taken as fall in systolic blood pressure>20% 0f base line and treated with incremental doses of mepheneteramine 6mg and bolus of 200 ml ringer lactate. Bradycardia was taken as heart rate <50 bpm & treated accordingly with intravenous atropine 0.6mg. No analgesic or sedation was given to patient intraoperatively.

Intra operative monitoring:

- Vitals were monitored at 5,10,15,30,45,60,75, 90,120… mints till the end of surgery.
- Pulse, Blood Pressure, SPO 2 monitored and recorded.
- Any complications like bradycardia, hypotension were observed.
- At the end of surgery, Petits triangle was identified on the side of surgery and USG guided TAP block performed .

Summary

Table 1 : Postoperative Mean Visual Analogous Scale (Vas) At Different Time Interval In Each Group

TIME	MEAN VAS SCORE
INTERVAL	GROUP R
0 min	0.00
30 min	0.05 ± 0.6

Cont... **Table 1 : Postoperative Mean Visual Analogous Scale (Vas) At Different Time Interval In Each Group**

60 min	0.35 ± 0.3	
2 hr	0.34 ± 0.6	
4 hr		
	1.59 ± 0.9	
6 hr	2.32 ± 1.4	
8 hr	3.72 ± 1.8	
12 hr	4.16 ± 1.4	
18 hr	4.69 ± 1.3	
24 hr	4.89 ± 0.8	

Post-Operative Rescue Analgesic (Ra)

Requirement:

Table 2: Time For First Rescue Analgesia In Minutes

Rescue	Group R
Analgesia Need	(N = 20)
Time to first request	308.87 ± 12.2
for RA (min)	

RA: rescue analgesia (diclofenac 75 mg/ dose)

First dose of rescue analgesia required in group R was 308.87 min

Table 3: Mean Dose of Rescue Analgesic Required in 24 Hours Post Operatively

Rescue Analgesic	Group R
NEED	(n = 20)
Mean 24 hr RA	75.14 ±
(diclofenac sodium)	
requirement (mg)	0.68

Total dose of diclofenac consumption in group R it was 75.14 ± 0.68 mg

Findings

Elective inguinal hernia repair is one of the most common surgical procedures performed. A good postoperative analgesic regimen is critically important to improve postoperative outcome. Adequate postoperative analgesia facilitates earlier patient mobilization and earlier fulfilment of discharge criteria from postoperative wards. Pain after inguinal hernia repair is more pronounced in the first two postoperative days. The pain is aggravated during mobilisation or coughing. Patients undergoing inguinal hernia repair commonly receive intravenous opioids for postoperative analgesia. With the advent of truncal nerve blocks there seem to be an alternative to epidural analgesia to provide postoperative pain relief. However, failure rate is high in truncal nerve blocks in anatomic landmark based approaches. Our study population had immediate pain relief by TAP block in the post-operative period with several implications in recovery of these patients, such as VAS score, reduced side effects of opioids and analgesics and better quality of analgesia. The VAS Score of our study group at various time intervals was stable. The time for rescue analgesia in our study for whom USG -guided TAP block was given, the time interval for requirement of first dose of rescue analgesia was prolonged in the case of 0.5 % ropivacaine group [mean analgesic duration – 308.87 ± 12.2 min. This correlates with studies of PATEL et al., who found that there was a 34% reduction in oral narcotic dosing in patients who received a TAP block. They also observed decreased opioid usage and hence the decreased side effects of it like pruritus, vomiting and nausea. This block also facilitates early ambulation, no urinary retention, and a more active state of the patient. The vital parameters such as heart rate, systolic

and diastolic blood pressures and the oxygen saturation were stable and there was no complications noted.

Results

A prospective, randomized study was designed to explore the efficacy of 0.75% ropivacaine in ultrasound guided - transversus abdominis plane block in patients undergoing unilateral inguinal hernioplasty under spinal anaesthesia. Based on the analysis the results are given below:

Ø There was no statistically significant difference in demographic profiles when ropivacaine is injected.

Ø The duration of analgesia was statistically insignificant with the dosage of 0.75% ropivacaine.

Ø The vital parameters were well maintained among the patients throughout the study period.

Ø There was no failure of TAP block among all patients who had a post -operative pain relief for 6 -10 hours.

Ø Patient satisfaction was good.

Ø There was no adverse reactions or side effects among the patients.

Ø There were no complications like local anaesthetic toxicity noted among the patients.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Ki-67 Proliferative Marker in Thyroid Lesions

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Abstract

Introduction: Approximately 5 percent of thyroid cancers happen in all thyroid nodules, regardless of their size. PTC is the most prevalent type of thyroid cancer in all thyroid cancers. Although it is hard to distinguish PTC from benign papillary hyperplasia of the thyroid gland on the basis of its morphology, it is essential to distinguish benign ones from malignant ones for early therapy and better patient management. Although the diagnostic and prognostic values of Ki-67/MIB-1 in thyroid cancer stay uncertain, it has been noted that Ki-67/MIB-1 has an impact.

Materials and Method: 60 gross samples have been taken for research. These biopsy samples were regularly fixed in 10% formalin and processed in paraffin wax. Five micron dense parts were sliced and drawn for research and hematoxylin and eosin staining of the parts was performed. Histopathological examination of these segments has been carried out. The immunohistochemistry survey using Ki-67 monoclonal antibody as a proliferation marker was conducted in 60 cases. The current survey was conducted to determine the function of ki-67 in distinct kinds of neoplastic and non-neoplastic thyroid lesions.[1]

Results : Mean Ki67 LI values in our research were 14.12±2.29,61.42±3.77 and 34.90±3.49 and 18.60±1.96 for PTC, FTC, FTA and NG, respectively. In this research, numerous group comparisons were made using the Bonferroni post-hoc test, and Ki-67 values were discovered to be statistically important among all thyroid lesions.[2]

Conclusion: Although the Ki-67 marker is costly, it was discovered to be very simple to conduct and to get better outcomes. It is therefore found that the Ki-67 marker is suggested to be used in instances of dubious capsular and/or vascular invasion and follicular lesions with questionable nuclear characteristics.

Key Words: *Ki-67, FTC,PTC,FA,NG,Ki-67 LI*

Introduction

Thyroid carcinoma, which accounts for about 1% of all cancers, is the most prevalent malignancy among all endocrine organs.(1) Approximately 5% of all endocrine diseases happen as thyroid tumors among all thyroid nodules, regardless of their size.(2) Of all thyroid cancers, PTC is discovered to be the most prevalent type of thyroid cancer. Although it is discovered that it is hard to distinguish PTC from benign papillary hyperplasia of the thyroid gland on the basis of their morphology, it is essential to distinguish benign from malignant for early and better therapy.Patient management. Histomorphologic examination of slides that are regularly stained by Haematoxylin and Eosin (H&E) is presently used as a normal diagnosis. [6]This has been recorded in literature that inter-observer or intra-observer disagreements in the diagnosis of follicular and papillary thyroid lesions.(3) A big amount of molecular changes in thyroid cancer have been documented in latest years in the distinction between malignant and benign thyroid lesions. Among these markers, Ki67 and cytokeratin-19 (CK-19), galectin-3 and TG have been most frequently used in thyroid pathology. Although the diagnosis and prognosis of Ki-67/MIB-1 in thyroid cancer remains uncertain, it has been noted that Ki-67/MIB-1 has an

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impact on clinical development and prognosis in cancers with increasing proof. (6)Ki-67, which is deemed to be a nuclear antigen, is expressed in all cell nucleus, except in the G0 phase. MIB-1 acts as a monoclonal antibody and rises against Ki-67.(6) Ki-67 has been studied in many cancers in latest years, including cervical cancer, pulmonary cancer, breast cancer and thyroid cancer.(7) It has been revealed that Ki-67 has also been identified as an significant and autonomous prognostic factor in patients with thyroid cancer in many studies.[1]

Materials and Method

This research was conducted at the Department of Pathology, SreeBalaji Medical College & Hospital, Bharath University. during my study period of 17 months that is between February 2017 to July 2018. Out of the 78 thyroid specimens which were received for histopathological examination following initial cytological evaluation by fine needle aspiration cytology, 60 gross specimens were taken for study. These biopsy samples were regularly fixed in 10% formalin and processed in paraffin wax. Sections of 5 microns dense were cut and taken for the study and hematoxylin and eosin staining of sections was done. Histopathologicalexamination of these sections were done. Immunohistochemical study using Ki-67 monoclonal antibody as a proliferation marker was done in 60 cases.[9-10]

Results

The current research comprises of 60 thyroid mass instances. which were removed surgically and were sent for the Histopathological Examination to our department (Department of Pathology, SBMCH). All these specimens were received from the Department of Surgery, SBMCH. These 60 cases include 22(36.67%) Non-neoplastic lesions of Thyroid which include Nodular Goitre, MNG, Nodular Goitre with papillary hyperplasia,10(16.67%) benign neoplasms of Thyroid which include 8 cases of follicular adenoma and 2 cases of hurthle cell adenoma and 28 malignant thyroid lesions, including 25 (41.67 per cent) instances of thyroid papillary carcinoma and 3 (5 per cent) cases of thyroid follicular carcinoma.[10]

Ki 67 Labelling Index

Ki-67 immunohistochemistry staining was performed in all instances of Nodular colloid goitre, follicular adenoma, follicular carcinoma and papillary carcinoma. An region was chosen to assess the labeling index (LI).LI was expressed as a proportion by estimating brown nuclear reactivity (as shown in fig:1-4) (strongly stained cells) per 100 follicular epithelial cells. The mean values of Ki-67 in separate thyroid lesions are shown in Table-1 and Chart-1.[5] In this research, we discovered that with the mean values, follicular adenoma with follicular carcinoma and papillary carcinoma can also be differentiated. All of the lesions of thyroid, non-neoplastic, benign and malignant lesions can be differentiated.The highest Ki-67 LI was seen in Follicular thyroid carcinoma (52.67%) followed by Follicular Adenoma (21.60%). Surprisingly in this study, Papillary thyroid carcinoma has shown lower Ki-67 LI (12.48%) when compared to FTC and FA. Least Ki-67 LI was seen in nodular colloid goitre.[4]

Table -1

DIAGNOSIS	KI 67 LI %(MEAN ± SD)
NODULAR COLLOID GOITRE	5.18 ± 1.99
FOLLICULAR/HURTHLE CELL ADENOMA	21.60 ± 6.17
FOLLICULAR CARCINOMA	52.67 ± 9.86
PAPILLARY CARCINOMA	12.48 ± 3.75

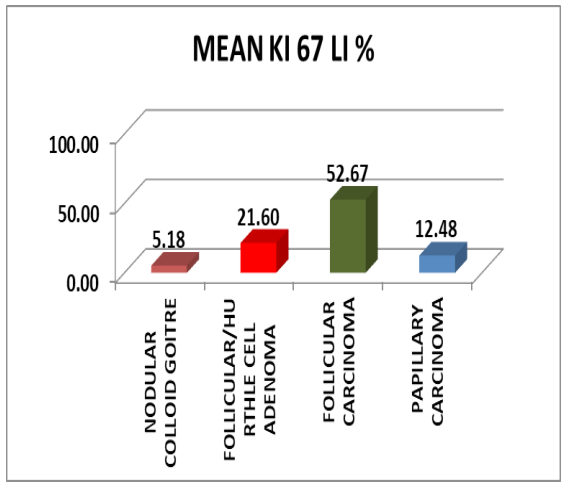


Chart-1

Table 2 Multiple comparison was done for KI-67 LI among Thyroid lesions

Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.
Ki 67 Li %	Nodular Colloid Goitre	Follicular/Hurthle Cell Adenoma	-16.41818*	1.57792	.000
		Follicular Carcinoma	-47.48485*	2.54635	.000
		Papillary Carcinoma	-7.29818*	1.20945	.000
	Follicular/Hurthle Cell Adenoma	Nodular Colloid Goitre	16.41818*	1.57792	.000
		Follicular Carcinoma	-31.06667*	2.72352	.000
		Papillary Carcinoma	9.12000*	1.54805	.000
	Follicular Carcinoma	Nodular Colloid Goitre	47.48485*	2.54635	.000
		Follicular/Hurthle Cell Adenoma	31.06667*	2.72352	.000
		Papillary Carcinoma	40.18667*	2.52795	.000
	Papillary Carcinoma	Nodular Colloid Goitre	7.29818*	1.20945	.000
		Follicular/Hurthle Cell Adenoma	-9.12000*	1.54805	.000
		Follicular Carcinoma	-40.18667*	2.52795	.000

*p<0.05 is taken as significant.

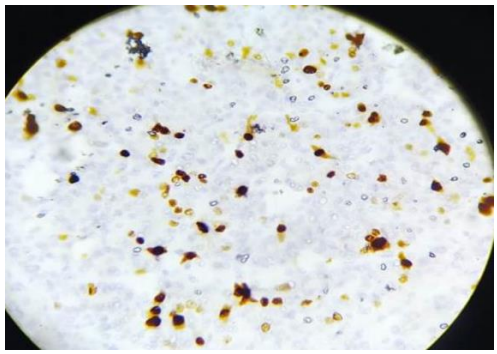


Fig: 1: FTC, showing highest nuclear positivity with highly significant brownish staining than FA, PTC, under

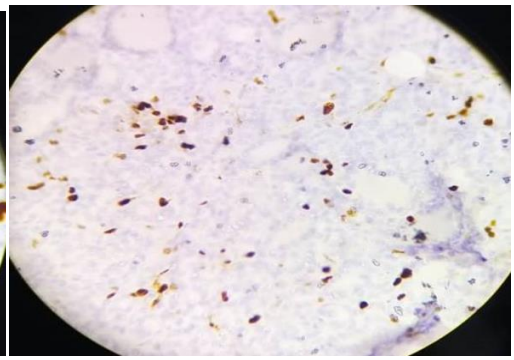


Fig:2: FA, showing moderate and significant nuclear positivity with higher brownish staining than PTC, under 40x.

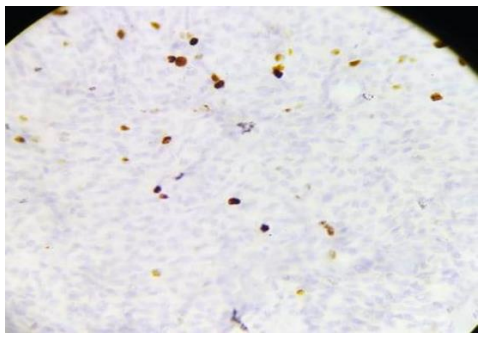


Fig:3: PTC, showing mild significant nuclear positivity with brownish staining more than

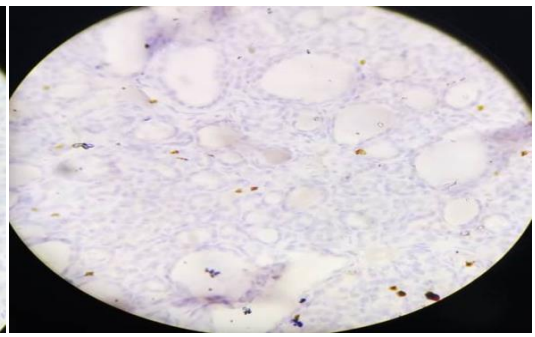


Fig:4: NG, showing least nuclear positivity with brown staining here and

As shown in the table-2, intergroup comparison for Ki-67 LI was done among different lesions of thyroid for statistical analysis, which were divided by using post hoc Bonferroni test. The value was found to be statistically significant among all the thyroid lesions. ($p<0.05$).[7]

Findings

More and more efforts have been made over the last century to discover extra requirements for precise diagnosis of thyroid nodules. Simple and low-cost antibody tests may be used in most laboratories if they have been shown to be effective in routine thyroid nodule assessments.[8] There is an urgent need for accurate and repeatable IHC markers to differentiate between benign thyroid nodules and malignant lesions. A number of research have been attempted to classify different biomarkers for thyroid carcinoma on the grounds of their gene expression profiles to date. The present research identified the use of Ki-67 in differentiating benign and malignant thyroid lesions. Ki-67 Labeling Index: Ki-67 as a marker for cell proliferation is correlated with biological and prognostic aggressiveness in separate tumors. As Ki-67 LI expression is usually found to be small in thyroid carcinoma, with the exception of anaplastic and badly distinguished carcinoma, restricted use of Ki67 was seen in the differential diagnosis of thyroid nodules. Mean Ki67 LI values in our study were 14.12± 2.29, 61.42±3.77 and 34.90±3.49 and 18.60±1.96 for PTC, FTC, FTA and NG respectively. (as shown in Table-1, Chart-1).Our results were shown in accordance with Mar et al., (2006)(9) and indicated in his research that mean Ki67index was 2.07±1.65 for FTC and 1.78±0.92 for FTA. Similarly, Sofiadis et al. Sofiadis et al., (2009)(10) also revealed that the mean Ki67 index was 2.9 for PTC, 3.5 for FTC and 1.6 for FTA in his study. Pujani M et al. (2010)(11) [8]also reported in his research that the mean Ki-67 Labelling Index rose progressively from multinodular goitre to follicular adenoma, papillary carcinoma, and was the highest in undifferentiated carcinoma. Erickson et al. 11(1998)(12) The largest values were noted for the Ki-67 Labelling Index in anaplastic carcinoma followed by follicular and

papillary carcinoma. Although anaplastic and poorly distinguished carcinomas were not included in this research, high Ki67 LI was found compared to those found in the literature for benign and malignant tumors. However, in contrast to our research, Saiz et al (2002) (13) was researched.It was found in his study that the highest expression by all these markers including Ki-67 was found in malignant tumours particularly in papillary carcinoma whereas in our study least expression of Ki-67 was seen in PTC when compared to FTC and FA.

In the present study, multiple groups comparison was done by post hoc Bonferroni test, Ki-67 values were found to be statistically significant among all the thyroid lesions. ($p<0.01$) as shown in table-2 .

The outcome was consistent with H.A. Aiad et al.,2012(14) indicated in his research that Ki-67 showed a substantial statistical distinction between FTC and FTA ($p<0.0001$). However, he did not discover a statistically significant distinction between PTC and Nodular colloid goitre.

Conclusion

Many studies had proved that higher expression of Ki-67 showed poor prognosis with poor survival or high mortality in patients of thyroid cancer.In current study,[8] Ki67 labelling index is It was discovered to be helpful in the differentiation between FTC and FTA and between FTC and PTC. Ki67 LI, too, was found significantly useful in differentiating PTC from FTA. Although Ki-67 marker is expensive but was found very easy to perform and get better results. Therefore, Ki-67 marker is suggested to use In instances of dubious capsular and/or vascular invasion and follicular lesions with questionable nuclear characteristics. However, with only restricted instances of 60 thyroid lesions, a further bigger research is required to verify this. associationof thismarker in thyroid lesions in the routine pathological practice.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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To Compare the Side Effect Profile of Azithromycin Pulse Therapy with Doxycycline in Acne Vulgaris Treatment: An Open Labelled, Randomised , Parallel Group, Hospital based Study

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Abstract

Background: Skin break out vulgaris is a typical dermatological issue with multifactorial etiology . There exists both topical and fundamental treatment for skin break out This examination was led to look at the reaction profile of oral azithromycin beat treatment with oral doxycycline in the treatment of skin break out vulgaris . Techniques: This randomized controlled preliminary was led in the Dermatology division of Sree balaji therapeutic school and emergency clinic from March 2016 to March 2017. Patients of age (15–40 years) having any evaluation of skin inflammation vulgaris were incorporated into the study.200 patients were haphazardly isolated into two gatherings. Patients in first gathering were given azithromycin 500 mg day by day before feast for 3 sequential days in seven days for 3 months while patients in second gathering were given doxycycline 100 mg day by day after dinners for 2 months. Patients were followed up in the wake of taking treatment for 2 months to see the reactions of each medication. Symptoms were thought about Results: Gastrointestinal and dermatological reactions were progressively regular with doxycycline when contrasted with azithromycin. Conclusion:Aziyhromycin is a superior choice for treatment of skin break out vulgaris when contrasted with doxycycline regarding symptoms.

Keywords: *Acne vulgaris, acne therapy**,** Doxycycline, Azithromycin,.*

Introduction

Skin break out vulgaris is characterized as an incessant , incendiary illness of pilosebaceous unit , showing by and large in teenagers with pleomorphic injuries like comedones, papules, knobs and sores and these may prompt scaring[1]. It is a multifactorial infection influenzed by hormonal, hereditary, microbiological and immunological elements. However, it is profoundly predominant among pre-adult age gathering, it can influence all age bunches [2].

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Material & Method

This is an open label , prospective, single centred , randomized, comparative study conducted to evaluate the side effect profile of oral Azithromycin Pulse Therapy -5oo mg once daily for three consecutive days in a week with oral doxycycline 100mg once daily for 8 weeks in patients with acne vulgaris. This study enrolled 200 patients. Patients who visited the Department of Dermatology, at Sree Balaji Medical College and Hospital, Chennai Tamil Nadu, with the complaints of pimples (acne), were the source of samples in the present study. The study duration was for 2 months and study period was from March 2016 to March 2017. The study protocol was reviewed and approved by the Institutional Ethics Committee and all trial participants have been informed about the study procedures and written informed consent was obtained.

Subjects :

Inclusion criteria :

- Both male and female patients
- Age between 15 to 40 years
- Patient with all grades of acne (Grade I to IV according to Indian author acne classification)

Methodology

All 200 study subjects , who fulfilled the study criteria were selected from 248 patients . They were then randomized into two groups in 1:1 ratio with the help of a statistical software SPSS version 23 . Each study group consists of 100 participants.

Initial assessment of acne vulgaris was carried out based on the simple grading system followed by Indian dermatologists in their routine clinical practice[1]

Laboratory Investigations :

The following laboratory investigations were done during screening i.e. baseline visit ('0'weeks), at 4th week and at 8th week. Blood Biochemistry :Complete blood count ,Random blood sugar,Renal function test,Liver function test.

Adverse Event Reporting :

All the adverse events observed / complained by the study participants were reported in the case report form along with the other information in relation to the study medication. Any drastic change in the laboratory parameters from the initial screening values were also considered as adverse event and documented in the case report form.

Study End Points :

Primary outcome measure :

To compare the safety and side effect profile of oral azithromycin and oral doxycycline by marking the adverse effects during the treatment phase.

Statistical Analysis : Data analysis was done using Statistical Package for the Social Sciences (SPSS) version 23 .

- All continuous variables were compared using t-test.
- Qualitative variables were compared using chi-2 test.

Observation and Results

A total of 248 patients were screened for this study , out of which 48 patients were excluded . Among the 48 patients , 10 patients refused to participate and 38 patients didn't meet the inclusion criteria of our study. The selected 200 patients were randomised into two groups and the treatment was started as and when they reported to the hospital. All of them continued the study , and there was no discontinuation or withdrawl due to adverse events. All statistical analysis was done in SPSS version 23 and intent to treat principle is employed for analysis . Results were distributed in age, sex, treatment comparison and adverse event profile. The overall results of this study is shown below :p value (Probability that the result is true) of < 0.05 was considered as statistically significant after assuming all the rules of statistical tests.Regarding demographic characteristics there is no significant difference between the two treatment groups.

Adverse Event Profile

Gastrointestinal and dermatological side effects are the common side effects noted among the study subjects.

Gastrointestinal side effects

Table - 1 : Frequency of gastro-intestinal side effects in study

	No side effects	GIT side effects	p value
Azithromycin (100 patients)	80	20 (20%)	< 0.001*
Doxycycline (100 patients)	54	46 (46%)	

p value - significant

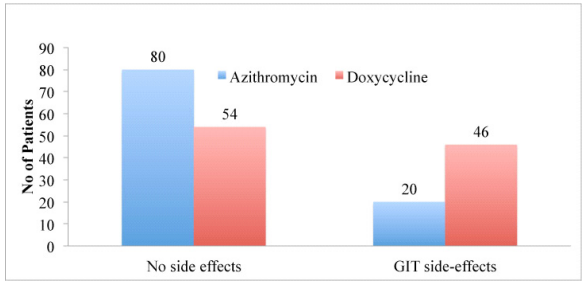


Figure -1: Gastro-intestinal side effects in Azithromycin and Doxycycline treatment groups

Vomiting, nausea, gastritis and diarrhoea are the common gastro intestinal side effects observed during the trial period. The side effects were mild and manageable in both the groups . Overall gastrointestinal side effects in azithromycin and doxycycline groupare 20% and 46% respectively. Comparison of gastrointestinal side effects between azithromycin and doxycycline treatment groups showed that the doxycycline caused more gastrointestinal side effects compared to the azithromycin treatment (p value = 0.001).

Dermatological side effects

Table -2: Frequency of dermatologic side effects in study

	No side effects	Dermatological side effects	p value
Azithromycin (100 patients)	100	0 (0%)	< 0.001*
Doxycycline (100 patients)	76	24(46%)	

p value - significant

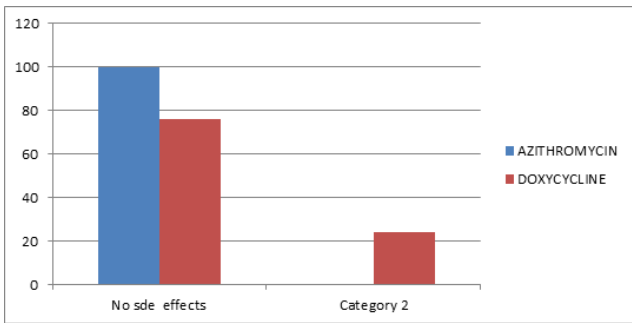


Figure -2: Dermatologic side effects in Azithromycin and Doxycycline treatment groups

Photosensitivity, pigmentation and rashes are the commondermatological side effects that found in response to the treatment during trial period. The side effects were mild and manageable. Overall dermatological side effects in azithromycin and doxycycline groups are 0% and 24% respectively. This indicates that the azithromycin treatment group did not show any dermatological side effects and only doxycycline group showed the side effects.

Effect of treatments on vitals

Table -3: The frequency of normal and abnormal liver function tests in Azithromycin and Doxycycline treatment groups

	Normal LFT	Abnormal LFT	p-value
Azithromycin (100 patients)	100	0 (0%)	0.007
Doxycycline (100 patients)	93	7(7%)	
Over all (200 patients)	193	7(3.5 %)	

p- value not significant

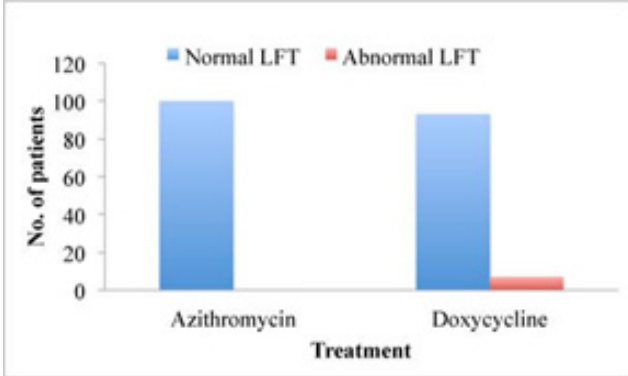


Figure 3: Distribution of normal and abnormal liver function tests in Azithromycin and Doxycycline treatment group

Analysis of complete blood count (CBC) at baseline and the end of first month and second month revealed that there are no major changes in the CBC of the patients. However in the doxycycline group about 7% of the patients show abnormal liver function . The azithromycin treatment group has not shown any abnormality in the liver function

Findings

Acne vulgaris is a common dermatological problem. The choice of proper treatment is determined by the severity and extent of acne . Systemic antibiotics have been the mainstay of treatment for moderate to severe acne vulgaris. The anti propionibacterium property found in antibiotics are able to inhibit the bacterial colonisation of pilosebaceous glands and prevent further inflammation. The efficacy and possible side effects of various oral

antibiotics has been the subject of numerous studies for atleast the last twenty years in an effort to understand, which products are likely to produce better efficacy with least possible side effects. The new emerging problem is antibiotics resistance to propionibacterium . There has been a constant increase in search of safe medications to overcome the side effects and resistance of existing formulations for the treatment of acne vulgaris. The tetracycline class of antibiotics should be considered first-line therapy in moderate to severe acne, except when contraindicated due to side effects[10]. Macrolides like azithromycin are effective alternatives for the treatment of acne. Its extensive distribution in the tissues allows pulse – dose regimen recommendation for increased compliance [11]..Therefore, this study was being conducted to assess the side effect profile of oral azithromycin pulse therapy with doxycycline therapy in the treatment of acne vulgaris.In the current study which included 200 patients, the minimum age of the study population was 15 and the maximum age was 40. The maximum numbers of patients were in the adolescent age group 26 -30 yrs which included 54 patients. The mean age of the study subjects was 26.7 ± 6.2 yrs. In our study , 44% were males and 56% were females which shows increased incidence of the disease among females

The results of our study are based on the acne patients whose demographic characteristics and grading at baseline are not statistically significant between the two groups , therefore comparison of the results between the two groups was more precises. At the follow up visits the acne grades were significantly reduced in both the groups compared to the baseline indicates that both drugs are effective in treating acne vulgaris. Doxycycline group showed (46%) gastrointestinal and (24%) dermatological side effects while azithromycin regime showed (20%) gastrointestinal and (0%) dermatological side . Hence compared to azithromycin , doxycycline showed more side effects and the values were also statistically significant . Further abnormal liver function was noted in about 7% of patients in doxycycline treated group.

Several studies have evaluated the efficacy and side effects of azithromycin and doxycycline for the treatment of acne. In Croatian patients with acne vulgaris when treated with azithromycin and minocycline showed satisfactory clinical response [15]. These drugs did not show significant differences in their clinical efficacy and tolerability [15]. Oral doses of 250 mg of azithromycin per day for 3 days in a week for 4 weeks showed good response in reducing the acne lesions compared to other antibiotics such as doxycycline , tetracycline and minocycline [7]. Pakistani acne patients treated with azithromycin 500 mg thrice weekly for 12 weeks, showed remarkable improvement in 82.9% patients. However, heartburn and nausea, were reported in 11.4% of patients[16].

Comparison of three dosage regimens (A- total dose 4.5g of azithromycin in 7 weeks; B- total dose 6.0 g in 10 weeks; and C- total dose 7.5 g in 13 weeks) for assessing the efficacy and safety of azithromycin treatment revealed that 6.0 g of Azithromycin in 10 weeks seems to be a promising agent with few side effects and good patient compliance in Crotians [17]. An open-label, non-comparative study in Italian acne patients azithromycin, 500mg thrice weekly for 8 weeks, appears to be a safe and effective for adolescents, with excellent patient compliance [9]. Another study in Italian showed that the Azithromycin, 500 mg thrice weekly for 12 weeks, is a safe and effective treatment for moderate acne vulgaris with excellent patient compliance [12]. Diarrhoea and abdominal pain are the few side effects observed in this study [12].An open, multicentric, non-comparative study in Brazilian acne patients, three monthly pulses of azithromycin 500mg for 3 consecutive days is safe, well tolerated, effective and promotes increased patient adhesion to the treatment [10]. In the present study gastrointestinal and dermatological side effects were found in doxycycline group, but in azithromycin group only gastrointestinal side effects were noted.Turkish acne patients treated with the azithromycin and doxycycline antibiotics revealed that there is no significant difference in the efficacy between these treatment groups. However, both treatment groups showed some side effects. The side effects of Azithromycin and doxycycline are diarrhoea and photosensitivity respectively[18].

Several lines of evidence revealed that the doxycycline is associated with an array of side effects. Pruritic dermatitis comprised of pink polygonal papules with some confluence into plaques that developed on the dorsal aspect of the hands and forearms in a sun-exposed pattern has been reported in acne vulgaris patient treated with doxycycline for the last 7 months[19]. Conventional acne treatment with doxycycline has triggered the development of characteristic lesions of AF represents a subtype called “pseudo – AF” [86]. Doxycycline -

induced acute pancreatitis (DIAP) was reported in an Indian adult female acne vulgaris patient who received the usual therapeutic dose for a week [21]. Similarly azithromycin in combination with other drugs showed superior efficacy in treating the acne vulgaris. Further, combination of azithromycin and levamisole is effective than azithromycin alone in decreasing of inflammatory lesions especially in nodulocystic form of acne with fewer side effects [14].

Though doxycycline was found to be better than azithromycin pulse therapy in reducing acne severity , gastrointestinal, dermatological and other side effects were higher with doxycycline and the results were also statistically significant . Our study also had some limitations . First, there was no blindness for the drugs that used in the study, which may present the possibility of interpretative bias in the study outcome. Second, study was conducted in a single geographic location, which may influence the generalizability of the study finding

Conclusion

Our study shows that both azithromycin and doxycycline are efficient in reducing acne vulgaris . However in terms of side effect profile comparison , azithromycin pulse therapy is better than doxycycline.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Role of MRV in Cerebral Venous Sinus Thrombosis

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Abstract

Cerebral sinus thrombosis (CVST) is a correspondingly phenomenal neurological issue with a sweeping extent of signs that makes early assurance and estimate hard. Imaging expect a key activity in the finding of CVST. Quick and sensible helpful treatment is fundamental as cerebrum parenchymal changes and venous thrombus advancement are maybe reversible. The purpose of this paper is to assert that MRV in mix with MRI can adequately break down CVST.

Keywords: *Cerebral sinus thrombosis, parenchymal changes*

Introduction

Cerebral venous sinus thrombosis happens when blood bunches structure in the brains of venous sinuses. This keeps blood from spilling out of the brain. Therefore, platelets may separate and gap blood into mind tissues, molding a channel. This chain of occasions is portion of a stroke that may happen in adults and children. It oftentimes impacts energetic to–modestly matured patients and even more commonly females, especially between the ages of 20 and 35, on account of pregnancy, puerperium and oral deterrent use. Although it has been acknowledged for more than 100 years, it is only in latest years that an ante-mortem has frequently been diagnosed. This is due in part to increased knowledge among physicians and neurologists, and in part to impr. improved non – invasive imaging techniques such as MRI and MRV.[2]

CVST is a problematic sickness as a result of its variability in clinical signs and indications. It is much of the time unrecognized at the primary talk. All age social events may be influenced. Tremendous sinuses, for instance, the upper sagittal sinus, are practically from time to time secured. Expansive protection course inside the cerebral venous structure enables for a liberal level of compensation in the early times of thrombus improvement.

The broad use of neuroimaging now allows early investigation and has completely changed our understanding into this sickness. CVST is more common than as of late associated shows with a wide range with clinical presentations, unlimited causes, and regularly a productive outcome with a low demise rate.

Aeitology

Numerous circumstances may trigger or predispose to CVST, and more than one cause is often discovered in the individual patient. The main difference can be created between infective and non-infective causes. Infectious causes have decreased and have been liable for only 8 percent of instances in latest series. Systemic circumstances such as connective tissue diseases, other granulomatous or inflammatory disorders and malignancies are most prevalent among non-infective causes.

The most prevalent causes and risk factors connected with CVST may be categorized or grouped as genetic causes, including antithrombin deficiency, protein C and protein S deficiency, factor V Leiden, antiphospholipid antibody, and acquired causes..

Acquired circumstances include nephritis syndrome, pregnancy and pueperium. Infections such as otitis, mastoiditis, sinusitis and meningitis also increase the

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risk factor for CVST. Other causes include vascular collagen disease, such as systemic lupus erythematosus, sarcoidosis, and behcet syndrome. Hematological conditions such as polycythemia, leukemia and sickle cell disease, paroxysomal nocturnal hemoglobinuria, TTP. Use of drugs like oral contraceptives and tamoxifen. And other mechanical causes include trauma and neurosurgery. Other causes: dehydration and cancer. Apart from the above, there may be other causes such as local penetrating septic head injury, intracranial disease (abscess, emphyem, meningitis), systemic causes such as septicemia, endocarditis, typhoid, tuberculosis. Non-infective cause including local head injury, neurosurgery, stroke and hemorrhage, space-saving idiopathic intracranial hypertension. [5]

Materials and Method

A prospective study of 100 instances was conducted at our Radio Diagnostic Department. Patients with recognized CVST were treated with MRI using a 1.5 T MRI (Hitachi Aperto) medical system. The age group of the patient varies from 11 to 70 years. The average age of the patient was 32.3 years. Patients with recognized instances of CVST and clinically suspected cases of intracranial vascular lesions linked to MRI brain with MR Venography.

Multi-sequential studies have been conducted in coronal, sagittal and axial segments. The patient underwent MRV, which included the use of the 2D TOF method / sequence. The intracranial venous system was researched after a standarized reconstruction using a peak projection intensity.

In our examination, the cut thickness for the 2DTOF procedure was 3 mm with a remote factor of 33 percent, while the 2D TOF framework was improved by picking a sagittal cut course stamped barely towards coronal and center headings. The test time for 2DTOF in our assessment was 7 minutes and 20 seconds. Usually, it is alluring to set the thickness of the cut as meager as could be normal considering the present situation, customarily in the solicitation for 1.0 to 1.5 mm, in order to vanquish the control of the 2DTOF methodology, anyway this would have diminished the thickness of the cut. Checking time to 10 mm and was thusly not grasped in this assessment. The nearness of unquestionable intracranial venous structures was evaluated against the establishment of their sign power, consistency and size of the conspicuous structures in three specific MRV frameworks. In this manner, the characteristics were assigned to all of them in obvious strategies.[7]

Findings

The research involves 100 patients with CVST with a broad range of symptoms. The information has been assimilated for more than one year. Of the 100 patients, 64 per cent were female and the remaining 36% were male. Although CVST is extremely variable, we found 62 percent of instances with superior sagittal sinus thrombosis in our research. Right transverse sinus thrombosis was 54% followed by left transverse sinus thrombosis at 42%. Cortical venous thrombosis was discovered to be more prevalent in 38% of cases. Hypoplastic left transverse sinus (LTS) was discovered to be more prevalent in 72% of cases (Table 9) among other brain sinuses. Followed by Superior Sagittal Sinuses (SSS) 36% and Right Transverse Sinuses (RTS) 34%.

Table 1: Distribution of patients with CVST depending on sinuses involved

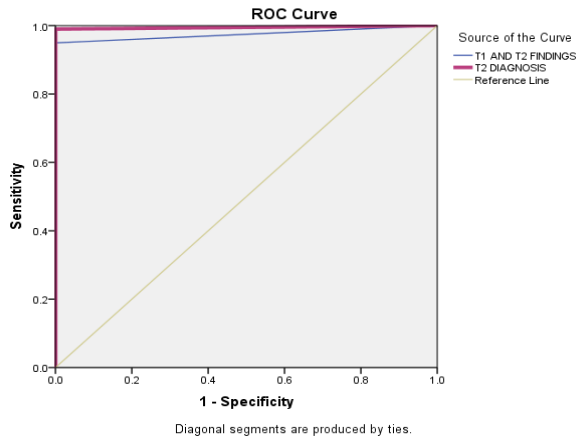
Sinuses Involved	No.of Patients	Percen-Tage
Superior sagittal sinus	62	62.0%
Right transverse sinus	54	54.0%
Right sigmoid sinus	51	51.0%
Left transverse sinus	42	42.0%
Left sigmoid sinus	39	39.0%
Straight sinus	46	46.0%
Internal cerebral vein	26	26.0%
Cortical vein	38	38.0%

Table 2: Displays the detection of MRV, T2 * and T1 & T2 thrombus cases. It can be noted that MRV detected 100% of the instances and is therefore considered to be the gold standard in the CVST inquiry.

Method	Number of cases
Detected by MRV	100
Detected by T1, T2	94
Detected by T2*	98

Table 2: shows the area under the curve signifying that MRV with T2* can accurately diagnose CVST.

Method	Using ROC curve
	Area under the curve
Detection by MRV and T1 & T2	0.975
Detection by MRV and T2*	0.995



Discussion

Although CVST can happen at any era (from neonates to elderly people), it is most frequently seen in young people. Almost 80 percent of patients are younger than 50 years of age. The most prevalent and early clinical presentation in this research was headache followed by convulsion, troubled consciousness, weakness of one limb, blurred vision, and papilladema.

In our research, 100 patients with cerebral venous sinus thrombosis were analyzed with the assistance of MRI and MRV. It was usually noted that the age group of 21-40 was relatively more susceptible to CVST. And, it was also noted that the incidence was higher in the case of females compared to males. This is due to the reality that females are subjected to predisposing factors such as pregnancy, oral contraceptives and puerperium. Studies in the female population during pregnancy and puerperium have shown that CVST may happen at any time, but the danger appears to be greatest during the first 2 weeks of puerperium.

More than 90% of instances involved dural venous sinus. Of these, 62% of reported instances predominate in superior sagittal sinus. Cortical venous system thrombosis has been seen in 38% of instances, inner cerebral venous thrombosis has been seen in 26% of instances. Two distinct parenchymal modifications have been observed–hemorrhagic infarction and non-hemorrhagic infarction. Parenchymal modifications may be secondary to cytotoxic oedema, vasogenic oedema, or intracranial hemorrhage. Vasogenic and cytotoxic oedema models may coexist.

MRI characteristics in our in our investigation have been noted as parenchymal changes and unpredictable banner in thrombosed veins and sinuses in both T1 and T2. In association with blooming in SWI, these progressions are found as hemorrhagic dead tissue, non-hemorrhagic limited putrefaction and edema. Substitution of sign opening of sinuses or bizarre sign power was the most generally perceived MRI results. It exhibited three specific examples, first hypertension in T1 and isotension in T2 (early subacute stage), second hypertension in both T1 and T2 (late subacute stage). Third was hypotense in both T1 and T2 at a consistent point. Finally, MRV was resolved to have an improper sign in both T1 and T2.

The primary MRV findings in our research were non-visualizationof occluded veins or sinuses due to lack of signal and defect in flow. Diffusion weighted imaging (DWI) can detect changes in water diffusion connected with cell dysfunction and can be used to identify ischemic brain lesions within the first few hours of stroke onset. The use of DWI in the diagnosis of acute arterial stroke is well founded. It indicates an early reduction and a late boost or normalization of the obvious coefficient of diffusion. DWI can be used to discriminate between distinct kinds of edema, to evaluate tissue viability, to detect subclinical defects, to provide early diagnosis time-saving data and to facilitate diagnosis.

CT scan with or without contrast injection is generally the first inquiry conducted. It is highly helpful to rule out many circumstances that may mimic CVT.

Direct signs of CVST-Delta sign: non-contrast CT scan a thick triangle seen inside the sinus. This sign is recorded in 20% of patients and will take approximately 1-2 weeks to vanish. Empty (inverse) delta sign: appears after contrast injection and reflects the opacification of the collateral vein in the SSS. However, it is not present when CT is conducted within the first five days of initiation of symptoms or more than two months later. 25 per cent-75 per cent of instances in the literature show an empty delta sign. Cord sign: visible on the CT plain.

Indirect signs of CVT-Represents thrombosed cortical veins. Genuine separation improvement of falx and tentorium: is accessible in 20% of events. It indicates venous equalization or hyperemia of the duramater. It may be connected with extended transcerebral medullar veins.

CT Venography-Bolus mixture of separation material offers a shocking anatomical detail of the huge and shallow intracranial venous system. Reported 95% affectability with Multiplanar Reformatted (MPR) pictures stood out from Digital Subtraction Angiography (DSA) as the reference standard. The declared favorable circumstances of CT venography stood out from MR imaging advancement are the snappy verifying of picture (lessening of moti). The aim of this study was to introduce the radiological features of venous sinus thrombosis and cerebral venous thrombosis, as well as to identify the most delicate imaging techniques. Several techniques are accessible for MRI picture veins, including contrast-enhanced andnon-contrast-enhanced pulse sequences.

MRV can be part into amazing blood and diminish blood techniques on the grounds of non-separate use. Splendid blood is an inexorably normal and strong strategy. Breathtaking blood NCE MRV heartbeat groupings are period of-flight (TOF) progressions, mastermind separate (PC) groupings, and enduring state free precession (SSFP) groupings.

Parenchymal varieties from the standard Parenchymal wounds are better addressed and more consistently perceived in MR imaging than in CT. Parenchymal changes may be assistant to cytotoxic edema, vasogenic edema, or intracranial channel. Vasogenic and cytotoxic oedema models may exist together. In context on the variable thought of the parenchymal varieties from the standard that may occur in cerebral venous thrombosis, the use of the term venous confined rot in association with these bruises should be dampened, as this term proposes irreversibility. As opposed to vein ischemic states, an extensive parcel of the parenchymal varieties from the standard assistant to venous obstruction are reversible. Regardless of the way that parenchymal changes may occur in cerebrum districts,

Instead of standard MR pictures, Diffusion Weighted Imaging (DWI) MR pictures can perceive vasogenic and cytotoxic edema. Cytotoxic edema is portrayed by a by and large diminished scattering. Vasogenic edema, with improved interstitial water, demonstrates overhauled scattering.

Withdrawn cortical venous thrombosis-Isolated CVT is a comparably remarkable substance; under 20 models have been recorded in imaging composing. Regular parenchymal results are locale of focal cortical edema or release that may be dubious. The finding of a flanking thrombosic venous structure may be the most express sign of this contamination. In CT pictures, this finding was suggested as the “line sign;” in MR pictures, it was insinuated as the “hyperintense vein sign.” Blooming old rarities in thrombosed veins can be a very pleasing development to GRE pictures.

False-negative instances of MRI-False-negative events of MRI are the aftereffect of a propagation of basic sign power (standard cerebrum tissue or standard circulatory system) by thrombosed dural sinuses. Exactly when gadolinium-containing contrast masters are directed, thrombus is predicted to realize a filling insufficiency inside the venous sinus. In any case, occasionally, the distinction overhauled T1-weighted pictures of DST in endless stages may in like manner show homogeneous multifaceted nature improvement of the thrombosed dural sinus in light of the nearness of thin coordinates in the thrombus, making it hard to isolate from the authorized dural sinus.

False-positive MRI cases-False-positive MRI events are found thusly resonation MR progressions when the sign intensity of the dural sinus reproduces that of the thrombus. The essential driver are moderate stream, in-plane stream, and in-cut ponders that reason the ordinary loss of stream void inside the dural sinus.

False-positive cases on MR Venography-It is associated with 9% of false positive rate. Anatomical causes of false-positive results may lead from differences in the size of dural sinuses, hypoplastic / aplastic dural sinuses, and anatomical structures that generate filling defects, i.e. arachnoid granulations. Flow-related artifacts and those particular to multiple MR venography techniques can also cause signal loss that simulate thrombus.

False-negative cases for MR Venography-This is gotten together with 24 percent of the counterfeit negative rate. Sign created by hyperintense thrombus on unenhanced T1-weighted pictures may duplicate the movement of TOF MR angiography inside the dural sinus and trigger a false-negative finding.

Subarachnoid channel (SAH) related with cerebral venous thrombosis has rarely been recorded as a hard copy. The accurate purpose behind SAH related with CVST isn't known. Venous hemorrhagic dead tissue may be committed for discretionary break in subarachnoid spaces and may trigger SAH. Dural sinus thrombosis with discretionary venous hypertension may incite SAH in subarachnoid space inferable from break of a fragile, thin walled cortical vein.

With spine-echo sequences, flowing blood typically generates a signal void; stationary blood on the thrombus has been found to generate greater signal intensity. This phenomenon is not completely accurate, however, as a range of flow-related artefacts may occasionally give rise to an enhanced intraluminal flow signal that may mimic the thrombus. Spin-echo MR pictures for CVST identification yield variable outcomes, demonstrating some degree of reliance on the era of the thrombus.

Conclusion

CVST is a possibly deadly disorder which, if properly acknowledged and handled, has outstanding prognosis. MRI and MRV are the finest diagnostic modalities for CVST. CVST is diagnosed with a mixture of hypertensive T1 and T2 signals from the sinus connected with a deficiency seen on the MR venogram in the suitable clinical environment. MRV in combination with MRI (T2*) is both delicate and specific enough to provide the finest non-invasive technique for the diagnosis of cerebral venous thrombosis.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Serum Hepcidin as a Marker of Anemia in Chronic Kidney Disease

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Abstract

Background: In CKD, there is a dynamic and tenacious loss of renal capacity which at last leads on to end organize renal malady (ESRD). Sickliness is a typical confusion of CKD and creates before ESRD. Hepcidin is known to be the focal controller of iron homeostasis in the body. It is up-controlled by aggravation and downregulated by iron deficiency. Past work has demonstrated that serum hepcidin levels were expanded in patients with CKD. Comprehension of hepcidin hormone and its job in iron digestion could prompt new treatments for CKD-related frailty. It is conceivable that expanded hepcidin fixations may cause iron-confined erythropoiesis additionally in CKD-related pallor.

Aim and Objectives: The aim of the study is to estimate the levels of hepcidin in CKD patients and to check the correlation of hepcidin to anemia in chronic kidney disease.

Method: This cross-sectional investigation was led at the Department of Biochemistry, Central Laboratory, Sree Balaji Medical College and Hospital, Chromepet, Chennai during January 2017 - June 2018 among 50 patients of incessant kidney sickness in the age gathering of 18-60 years. The blood tests were gathered utilizing vacutainer framework. Tests for serum hepcidin, urea and creatinine were gathered in red bested plain vacuum tube. The examples were centrifuged at 3000 rpm for 15 minutes. The examples were then prepared, and qualities were gotten. The information were examined utilizing SPSS bundle.

Results: The mean values of s. Hepcidin and s. ferritin were found to be increased in the study population. The mean values of s. Iron, s. TIBC, s. Transferrin levels and hemoglobin were lower in the study population.

Conclusion: Hepcidin levels are elevated in CKD and hepcidin is a predictor of iron stores since it correlated well with the markers of iron status, serum iron and ferritin levels.

Keywords: *Chronic Kidney Disease (CKD), Hepcidin*

Introduction

Incessant kidney infection (CKD) alludes to an irreversible dynamic weakening in renal capacity. CKD has turned into an around the world, constant, non-transmittable infection pestilence with antagonistic results of renal disappointment, cardiovascular sickness and unexpected passing. [1-3]

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Hepcidin, a little cysteine rich liver-determined peptide hormone, is a key controller of fundamental iron homeostasis. Hepcidin has advanced as a plausible middle person of iron deficiency of interminable infection and irritation.

Past examinations have demonstrated that serum hepcidin levels were expanded in patients with incessant kidney infection. Expanded serum hepcidin levels may add to the improvement and seriousness of iron deficiency and the protection from erythropoiesis-animating agents1. The digestion of hepcidin is significantly changed in interminable kidney illness (CKD). What little information are accessible around there are

uncertain. Henceforth in the present investigation, the serum level of hepcidin was assessed in patients with CKD and the connection between serum hepcidin and iron deficiency were broke down.[6,7,8]

Aim:

The aim of the present study was to estimate the levels of serum hepcidin in patients with chronic kidney disease and to check the correlation of hepcidin to anemia in chronic kidney disease.

The objectives of the present study were to:

- Estimate serum hepcidin levels in patients with chronic kidney disease.

- Determine whether hepcidin levels correlated to markers of anemia in chronic kidney disease.

Materials and Method

This cross-sectional study was conducted in the Department of Biochemistry, Sree Balaji Medical College and Hospital, Chromepet, Chennai during the period of January 2017 – June 2018 among 50 patients of chronic kidney disease visiting the Nephrology outpatient services in the age group of 18-60 years. Age, gender, duration of chronic kidney disease, general history and medications and blood pressure were recorded. The study was explained to the participants and informed consent was obtained from them before taking the blood sample. After obtaining informed consent, 5 ml of blood was collected from each participant, from a peripheral vein under aseptic precautions in specific vacutainers. Plain tube for hepcidin, iron, ferritinand TIBC and EDTA tube for hemoglobin were used. Transferrin saturation value was obtained by calculation.Blood collected in the plain tube was allowed to clot, then each tube was centrifuged for 10 minutes at 3500 rpm within 2 hours of blood collection to separate serum. Serum sample was used for the estimation of all parameters. Hepcidin was estimated by competitive ELISA kit (Enzyme Linked Immuno Sorbent Assay). Estimation of serum ferritin was done by chemiluminescence assay in Siemens, ADVIA Centaur CP Immunoassay system.Serum iron and TIBC were measured by colorimetry in Biosystems semi-automatic analyser BTS-350. Hemoglobin was estimated by colorimetry in automated hematology analyser, Mindray BC 5380. Transferrin saturation was estimated as the percentage of serum iron to TIBC ratio, as shown below: [10-12]

Transferrin saturation = (Serum iron/ TIBC) *100

Data was categorised based on demographics (Age and Gender). All the results obtained were statistically analyzed using SPSS software version 16.0. Shapiro-Wilk test was used to test for normality of the data. Mean and standard deviation were used to represent normally distributed data. Median and interquartile ranges were used to represent data which were not normally distributed. Bivariate correlation analyses were done using Pearson correlation to correlate hepcidin with other parameters. The results of statistical analysis were arranged in tabular form and were plotted in graphs.

- **Inclusion Criteria:**

- Known cases of chronic kidney disease on conservative management in the age group 18-60 years

- **Exclusion Criteria:**

– Age group less than 18 years and greater than 60 years

– Pregnancy

– Any malignancy

– Pre-existing liver disease

– Active inflammatory disease

Findings

Table 1: Descriptive statistics of the study group

Parameters	N	Mean	Std. Deviation	Mean Rank
S.Hepcidin (ng/ml)	50	149.484400	47.5399263	75.50
S.Iron (mg/ml)	50	67.371200	23.9093768	28.90

Cont... **Table 1: Descriptive statistics of the study group**

TIBC (mg/ml)	50	236.964600	41.0666226	29.24
Transferrin Saturation (%)	50	28.454000	8.0481764	42.66
S.Ferritin (mg/dl)	50	187.757400	93.1905705	75.22
Hemoglobin (g/dl)	50	7.324	1.213	25.74

Kruskal-Wallis Test was used to test the statistical significance of hepcidin and other parameters among the study group. The mean values of s. Hepcidin and s. ferritin were found to be increased in the study population.The mean values of s. Iron, s. TIBC, s. Transferrin levels and hemoglobin were lower in the study population.

Table 2: Pearson's correlation between hepcidin and other parameters among CKD cases

Variables		**S. Hepcidin**
S. Ferritin	R Value	0.907
	P Value	0.000
S. Iron	R Value	-.490
	P Value	0.000
S. Tibc	R Value	-.627
	P Value	0.000
S. Transferrin	R Value	-0.491
	P Value	0.070
S. Hemoglobin	R Value	-0.724
	P Value	0.000

**. Correlation is significant at the 0.01 level (2-tailed).

The mean value of s. hepcidin had strong positive correlation with the mean values of s. ferritinwith r-value> 0.7.

The mean value of s. hepcidin had moderate negative correlation with s. iron, s. TIBC and transferrin saturation with r-value between 0.4 and 0.7.

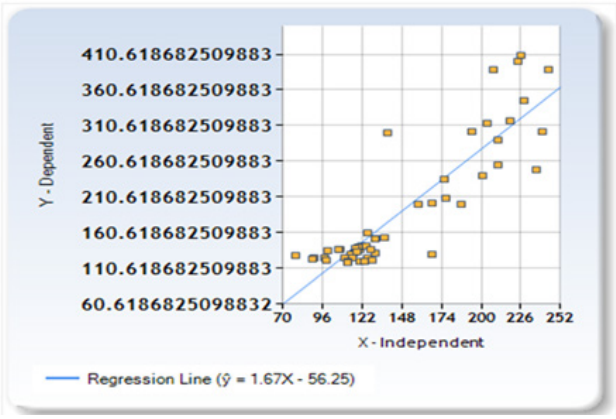


Figure 1 : Scatter plot with linear regression of hepcidin vs ferritin

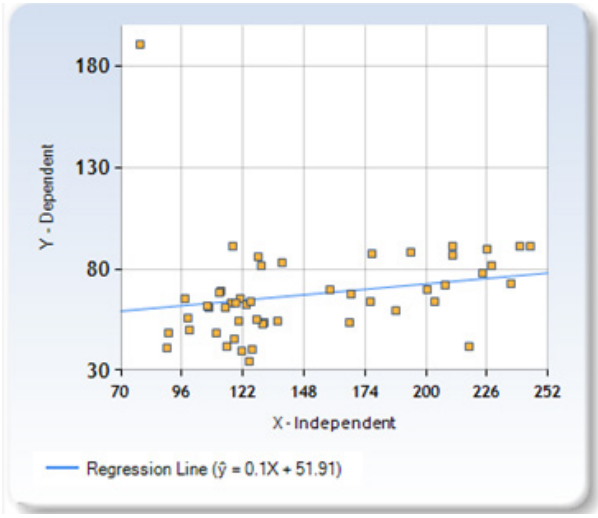


Figure 2 : Scatter plot with linear regression of hepcidin vs iron

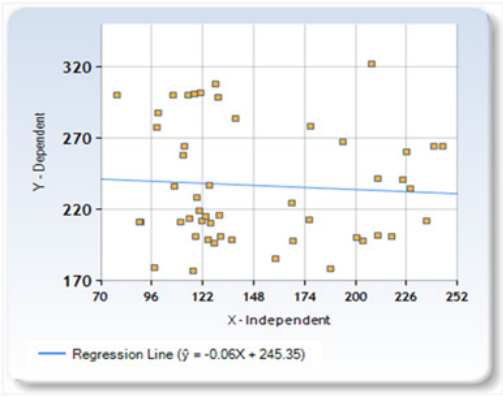


Figure 3 : Scatter plot with linear regression of hepcidin vs tibc

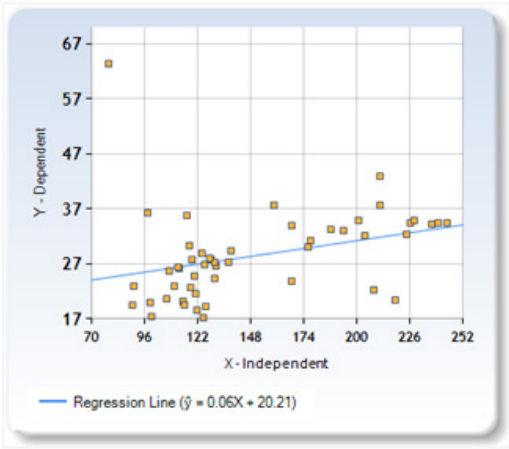


Figure 4 : Scatter plot with linear regression of hepcidin vs transferrin saturation

Discussion

Sickliness is a noteworthy co-horribleness in patients with CKD. Iron insufficiency and frailty of irritation are the most widely recognized reasons for weakness in CKD. In any case, in spite of the announced high and disturbing commonness of pallor in CKD bringing about critical co-horribleness, paleness is regularly untreated or treated inappropriately in clinical practice. The explanation behind this is mostly in the trouble associated with deciding the etiology of iron deficiency in this condition which is essential in giving the correct treatment. Hepcidin is the ace controller of fundamental iron homeostasis1 and assumes a key job in paleness related with irritation. Physiologically, hepcidin hindrance happens in instances of sickliness, iron lack or hypoxia. In fiery conditions, levels of genius provocative cytokines are increased2. It is conceivable that expanded hepcidin fixations may cause iron-limited erythropoiesis in CKD-related weakness. [13]

In the present investigation, an aggregate of 50 CKD subjects were contemplated. Hepcidin levels were fundamentally higher in patients with CKD. Serum ferritin was seen as raised in CKD cases. Serum iron, TIBC, transferrin immersion and hemoglobin were diminished among the investigation populace.

In the present examination, serum hepcidin focuses were seen as altogether expanded in patients with CKD [Mean esteem: 149.484 ± 47.539 ng/mL]. Serum hepcidin levels were seen as expanding with the movement of CKD. These discoveries are as per the investigation of Tarek et al3, which detailed an expansion in serum hepcidin levels in all phases of CKD among 54 CKD patients under traditionalist administration and 40 CKD patients under hemodialysis. [15]

Hepcidin is cleared from the body by the kidneys. The expansion in hepcidin seen in CKD is because of its decreased renal freedom related with the crumbling renal capacity. Contingent upon the harm of kidney, the end of hepcidin is constrained and prompts the expansion in its serum level. Another explanation could be the ceaseless fiery province of CKD which invigorates hepcidin generation. Uremia is a condition of increased provocative enactment. Hepcidin blend is initiated in the liver as a reaction to IL-6 incitement and it communicates its action by diminishing the assimilation of dietary iron and keeps iron discharge from macrophages. Raised serum hepcidin levels intervene iron-limited erythropoiesis and add to initiating pallor in CKD patients. Momentary increments in serum hepcidin levels debilitate the arrival of capacity iron, and long haul increments in serum hepcidin levels bring about iron inadequacy. High serum hepcidin levels cause iron bar and pallor in constant sickness. Ceaseless kidney malady patients with pallor have been found to have raised serum hepcidin levels, and the high hepcidin levels are probably going to add to sickliness in CKD and to ESA hypo-responsiveness. [17]

S. Iron, TIBC and transferrin immersion were seen as diminished in CKD gathering contrasted with controls. Among the CKD cases, the mean estimation of S. Iron was seen to be 67.371 ± 23.909 mg/dl. Hepcidin and iron had a moderate negative connection with r-esteem being - 0.490 and p esteem < 0.001 in this examination. These discoveries were like that of Gupta et al4 who watched a negative connection among's iron and hepcidin among his investigation populace of 107

CKD patients. Diagnosing iron inadequacy in CKD is rendered troublesome within the sight of uraemia and irritation which are both seen in CKD. [16]

In the present examination, the mean estimation of S. TIBC was 236.964 ± 41.066 µg/dl in CKD patients. TIBC had a moderate negative connection with hepcidin, with r worth being - 0.627 and p esteem < 0.001 which are reliable with the discoveries of Esin Avci et al5. He watched a moderate negative relationship among's hepcidin and TIBC among hemodialysis patients. Nonetheless, he watched no relationship among's hepcidin and TIBC among non-dialysis CKD patients which stands out from this investigation. The mean an incentive for transferrin immersion in this investigation was 28.454 ± 8.048 % in CKD patients. No association of hepcidin and transferrin immersion was discovered (r esteem = - 0.491 and p esteem =0.070), yet there was an immediate relationship among's transferrin and hepcidin in the investigation done by Marijha et al6 among 104 CKD patients.

Iron and ferritin are considered as markers of iron status. Despite the fact that ferritin is a marker of body iron stores, it additionally increments in intense irritation and thusly turns out to be less significant as a pointer of iron status during aggravation seen in CKD. In this examination, hepcidin and ferritin were altogether higher in constant kidney illness patients contrasted with control subjects. The mean estimation of ferritin was 69.762± 24.182 mg/dl in control gathering while for the CKD bunch it was 187.757 ± 93.19 mg/dl. Likewise, Malyszko et al7 found that in his examination on patients with ceaseless renal disappointment and hemodialyzed patients, that serum ferritin and hepcidin were altogether higher than in the sound volunteers. There was a solid positive connection among's ferritin and hepcidin among the CKD cases (r = 0.907, p< 0.001) which is as per the investigation of Mercadal et al8. He watched a positive relationship among's hepcidin and ferritin in his examination among 199 non-dialysed non-transplanted patients with CKD stages [1-5].

The incessant fiery province of CKD is because of the interminable lopsidedness among prooxidant and cell reinforcement factors. Oxidative pressure prompts insulin obstruction by diminishing disguise of insulin9 and expanded ferritin blend. Utilitarian iron insufficiency is available in certain patients with constant renal disappointment, on traditionalist treatment and on dialysis, which is described by the nearness of sufficient iron stores with serum ferritin level either typical or raised. Moreover, provocative iron square happens among these patients generally because of a hidden fiery state. The fiery square alongside utilitarian iron insufficiency cause raised ferritin level6. Hepcidin level of the two examination bunches in the present investigation was identified with ferritin that concurs with the aftereffects of Peters et al10, who uncovered that serum ferritin fixation was a noteworthy indicator of hepcidin-25 levels in CKD by methods for various relapse investigation. Comparative connection among's ferritin and hepcidin was accounted for by Dallalio et al11, in sickly patients experiencing indicative bone marrow assessment. Notwithstanding, Malyszko et al5 couldn't locate a critical relationship among's hepcidin and ferritin in his investigation populace of patients with constant renal disappointment on traditionalist treatment and on hemodialysis. Diminished degrees of serum ferritin or transferrin immersion (TSAT) are available in many patients with CKD.

The mean estimation of hemoglobin in CKD was 7.324 ± 1.213 gm/dl. Indeed, even hemoglobin had solid negative connection with hepcidin with r esteem as - 0.724 and p= <0.001. These discoveries are steady with those of Karthik et al10 and furthermore with the discoveries of Uehata et al12. Karthik et al13 watched a solid negative connection among's hepcidin and hemoglobin among 52 end organize renal illness patients while Uehata et al12 watched comparable a moderate negative relationship among's hemoglobin and hepcidin among 505 non-dialysis CKD patients not getting parenteral iron treatment. This discovering appears differently in relation to that of Kuragano et al14 who watched a solid positive connection among's hemoglobin and hepcidin in non-dialysis CKD patients and among support hemodialysis patients.

Frailty among the present investigation populace could be either because of iron inadequacy or weakness of interminable infection. Iron insufficiency sickliness could create in CKD because of diminished iron ingestion as a piece of uremic disorder, loss of RBCs and iron as a piece of uremic disorder, or because of dialysis related blood and iron misfortune. With the information accessible, it is hard to separate between iron inadequacy pallor and weakness of interminable illness. Estimating solvent transferrin receptor-log ferritin proportion (sTfR/ log ferritin proportion) would be valuable to separate

between the two conditions. Despite the fact that solvent transferrin receptor articulation is demonstrated to be adversely influenced by aggravation, the sTfR/log ferritin proportion is considered as a precise pointer of body iron stores within the sight of inflammation15.

Conclusion

The present study suggests that hepcidin levels are elevated in CKD and hepcidin is a predictor of iron stores since it correlated well with the markers of iron status, serum iron and ferritin levels. This increase in hepcidin levels reflects both the renal impairment leading to reduced renal clearance of hepcidin. These findings highlight the close relationship between hepcidin and anemia in CKD.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Serum Hepcidin Levels in Chronic Kidney Disease

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Abstract

Background: In CKD, the dynamic and tenacious loss of renal capacity which eventually leads on to end arrange renal malady (ESRD). Iron deficiency is a typical entanglement of CKD and creates before ESRD. Hepcidinis considered as the headliner of iron homeostasis in the body. It is up-managed by aggravation and downregulated by pallor. Past work has demonstrated that serum hepcidin levels were expanded in patients with CKD. This was astounding as these patients had a constant incendiary state and concurrent iron deficiency. It is conceivable that expanded hepcidin focuses may cause iron-confined erythropoiesis likewise in CKD-related weakness.

Aim and Objectives: The aim of the study is to estimate the levels of serum hepcidin in patients with chronic kidney disease.

Methods: This cross-sectional examination was directed at the Department of Biochemistry, Central Laboratory, Sree Balaji Medical College and Hospital, Chromepet, Chennai during January 2017 - June 2018 among 50 patients of incessant kidney illness in the age gathering of 18-60 years. The blood tests were gathered utilizing vacutainer framework. Tests for serum hepcidin, urea and creatinine were gathered in red bested plain vacuum tube. The examples were centrifuged at 3000 rpm for 15 minutes. The examples were then processed,and qualities were gotten. The information were investigated utilizing SPSS bundle.

Results: In CKD patients, serum hepcidin levels are found to be elevated and found to be positively correlating with serum urea and creatinine values.

Conclusion: Serum hepcidin levels are elevated in CKD patients which could be responsible for the iron restricted erythropoiesis and resistance to erythropoietin stimulating agents in CKD.

Keywords: *Chronic Kidney Disease (CKD), Hepcidin*

Introduction

CKD has turned into an around the world, ceaseless, non-transmittable sickness pestilence with unfriendly results of renal disappointment, cardiovascular malady and unexpected passing. In created nations, it influences 10-15% of grown-up all inclusive community.

The disclosure of hepcidin and its capacities has prompted a superior comprehension of iron digestion issue in CKD. Hepcidin, a little cysteine rich liver-inferred peptide hormone, is a key controller of foundational iron homeostasis. Hepcidin has advanced as a likely middle person of iron deficiency of incessant malady and aggravation.

Past work has demonstrated that serum hepcidin levels were expanded in patients with interminable kidney malady. The digestion of hepcidin is significantly modified in incessant kidney illness (CKD). What little information are accessible here are uncertain. Thus in the present examination, the serum level of hepcidin was assessed in patients with CKD and the connection between serum hepcidin and CKD wasanalysed.

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Aim

The aim of the study was to estimate serum hepcidin levels in patients with chronic kidney disease.

Materials and Methods

This cross-sectional study was conducted in the Department of Biochemistry, Sree Balaji Medical College and Hospital, Chromepet, Chennai during the period of January 2017 – June 2018 among 50 patients of chronic kidney disease visiting the Nephrology outpatient services in the age group of 18-60 years. Age, gender, duration of chronic kidney disease, general history and medications and blood pressure were recorded. The study was explained to the participants and informed consent was obtained from them before taking the blood sample. After obtaining informed consent, 5 ml of blood was collected from each participant, from a peripheral vein under aseptic precautions in specific vacutainers. Plain tubes for hepcidin, urea and creatinine were used. Blood samples collected were used for the estimation of serum levels of hepcidin, urea and creatinine. Blood collected in the plain tube was allowed to clot, then each tube was centrifuged for 10 minutes at 3500 rpm within 2 hours of blood collection to separate serum. Serum sample was used for the estimation of all parameters. Serum urea was analysed by Urease GLDH-UV method and creatinine by modified Jaffe's kinetic method by Mindray BS390fully automated analyser. Hepcidin was estimated by competitive ELISA kit (Enzyme Linked Immuno Sorbent Assay).Data was categorised based on demographics (Age and Gender).

All the results obtained were statistically analyzed using SPSS software version 16.0. Shapiro-Wilk test was used to test for normality of the data. Mean and standard deviation were used to represent normally distributed data. Median and interquartile ranges were used to represent data which were not normally distributed. Bivariate correlation analyses were done using Pearson correlation to correlate hepcidin with other parameters. The results of statistical analysis were arranged in tabular form and were plotted in graphs.

- **Inclusion Criteria:**

-Known cases of chronic kidney disease on conservative management in the age group 18-60 years

- **Exclusion Criteria:**

– Age group less than 18 years and greater than 60 years

– Pregnancy

– Any malignancy

– Pre-existing liver disease

– Active inflammatory disease

FINDINGS:

TABLE 1: DESCRIPTIVE STATISTICS OF THE STUDY GROUP

Parameters	N	Mean	Std. Deviation	Mean Rank
S.Hepcidin (ng/ml)	50	149.484400	47.5399263	75.50
S.Urea (mg/dl)	50	93.9800	32.87670	75.50
S.Creatinine (mg/dl)	50	8.578000	3.8869373	75.50

Kruskal-Wallis Test was used to test the statistical significance of hepcidin and other parameters among the study group. The mean values of s. Hepcidin, s. Urea and s. Creatinine levels were found to be increased in the study population.

Table 2: Pearson's correlation between hepcidin and other parameters among ckd cases

Variables		S. Hepcidin
S. Urea	r value	0.403
	p value	0.000
S. Creatinine	r value	0.843
	p value	0.000

**. Correlation is significant at the 0.01 level (2-tailed).

The mean value of s. hepcidin was found to have strong positive correlation with the mean values of s. creatinine with r-value> 0.7 and a moderate positive correlation with s. urea with r- value between 0.4 and 0.7.

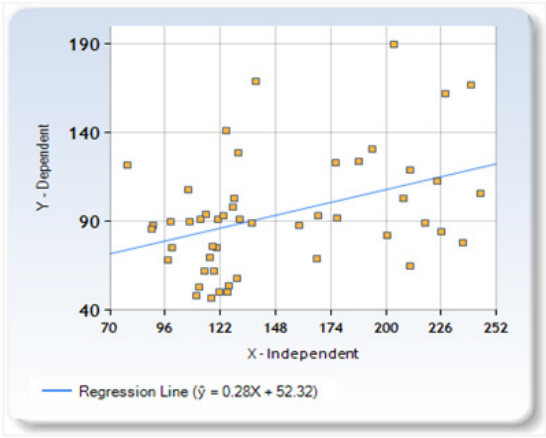


Figure 1 : Scatter plot with linear regression of hepcidin vs creatinine

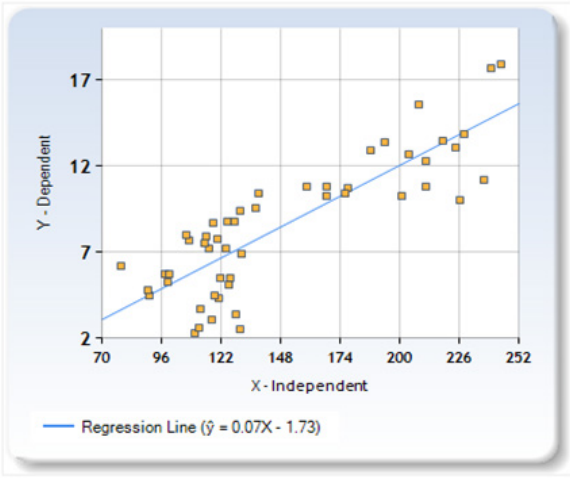


Figure 2 : Scatter Plot With Linear Regression Of Hepcidin Vs Urea

Discussion

Anemia is a significant co-morbidity in patients with CKD. Iron deficiency and anemia of inflammation are the most common causes of anemia in CKD. However, despite the reported high and alarming prevalence of anemia in CKD resulting in significant co-morbidity, anemia is often untreated or treated improperly in clinical practice. The reason for this is mainly in the difficulty involved in determining the etiology of anemia in this condition which is vital in providing the right treatment. Hepcidin is the master regulator of systemic iron homeostasis[1] and plays a key role in anemia associated with inflammation. Physiologically, hepcidin inhibition occurs in cases of anemia, iron deficiency or hypoxia. In inflammatory conditions, levels of pro-inflammatory cytokines are increased[2]. It is plausible that increased hepcidin concentrations may cause iron-restricted erythropoiesis in CKD-associated anemia[3].

In the present study, a total of 50 subjects who were diagnosed to have chronic kidney were studied. Hepcidin levels were significantly higher in patients with CKD patients. Serum urea and creatinine were found to be elevated in CKD cases.

S. urea and S. creatinine were found to be elevated in the CKD patients. The mean value of S. urea and S. creatinine were 93.98 ± 32.876 mg/dl and 8.578 ± 3.88 mg/dl respectively. Both parameters were found to have significant positive correlation with hepcidin with $p<0.001$. These parameters are known to increase with the progression of CKD[4].

In the present study, serum hepcidin concentrations were found to be significantly increased in patients with CKD [Mean value: 149.484 ± 47.539 ng/mL]. Serum hepcidin levels were found to be increasing with the progression of CKD. This finding is supported further by the highly significant positive correlation observed between serum hepcidin and creatinine in CKD cases ($r= 0.8437$, $p<0.001$). These findings are in accordance with the study of Tarek et al[5], which reported an increase in serum hepcidin levels in all stages of CKD among 54 CKD patients under conservative management and 40 CKD patients under hemodialysis.

Hepcidin is cleared from the body by the kidneys. The increase in hepcidin seen in CKD is due to its reduced renal clearance associated with the deteriorating renal function. Depending on the damage of kidney, the elimination of hepcidin is limited and leads to the increase in its serum level[6]. Another reason could be the chronic inflammatory state of CKD which stimulates hepcidin production. Uremia is a state of heightened inflammatory activation. Hepcidin synthesis is induced in the liver as a response to IL-6 stimulation and it expresses its activity by decreasing the absorption of dietary iron and prevents iron release from macrophages. Elevated serum hepcidin levels mediate iron-restricted erythropoiesis and contribute to inducing anemia in CKD patients[7,8,9]. Short-term increases in serum hepcidin levels impair the release of storage iron, and long-term increases in serum hepcidin levels result in iron deficiency. High serum hepcidin levels cause iron blockade and anemia in chronic disease[10]. Chronic kidney disease patients with anemia have been found to have elevated serum hepcidin levels, and the

high hepcidin levels are likely to contribute to anemia in CKD and to ESA hypo-responsiveness[11,12].

Conclusion

Hepcidin is a positive acute phase reactant synthesised in liver. Its levels are found to be increased in inflammation and decreased in iron deficiency anemia. CKD is characterised by both anemia and inflammation. Hepcidin plays a key role in the pathogenesis of anemia of inflammation associated with CKD.It was observed that serum hepcidin levels are increased in CKD. Hence, it appears that hepcidin could be a prognostic marker in the clinical outcome of CKD especially in the progression of CKD.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Serum Zinc Level in Children with Febrile Convulsion in Comparison with Normal Children

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Abstract

Objective: Febrile seizure is the most well-known issue in youth with great visualization. There are various speculations about synapses and follow component, (for example, zinc) changes in the serum, which can have a job in pathogenesis of febrile seizure.

Aim: The point of the present imminent investigative case-control study was to decide if there was any adjustments in serum zinc level in kids with febrile spasm during seizure.

Methods: One Hundred youngsters matured a half year to 5 years were separated into two gatherings: bunch A, 50 kids with febrile seizure, and gathering B, 50 ordinary kids.

Serum zinc levels for the two gatherings were evaluated by nuclear assimilation spectrophotometry(AAS). The information were broke down to look at zinc level among the two gatherings utilizing suitable measurable instruments utilizing SPSS 13

Findings: Serum zinc levels of groups A, and B had a mean value of 62.93mg/l, 91.88 mg/l respectively. Serum zinc level of group A was lower than the other group ($P<0.0001$).

Conclusion: The serum zinc levels are diminished in youngsters with febrile seizure spasms, therefore demonstrating that zinc hardship assumes a noteworthy job in pathogenesis of febrile seizures.

***Key words**: Zinc, Febrile convulsion, Normal children*

Introduction

Febrile spasm is one of the most well-known reasons for hospitalization of youngsters in pediatric ward that happens in kids between 5 months and 6 years old. The pathogenesis of this condition is as yet obscure. The vast majority of the seizures in kids are incited by physical issue starting outside the mind, for example, high fever, disease, syncope, head injury, hypoxia, or poisons. Short of what 33% of seizures happening at an interim more prominent than 24 hours apart.[(1)]

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Very nearly three decades back, Livingston saw that Children with febrile seizures fared superior to youngsters with epileptic spasms not activated by fever, the guess was progressively ideal and they were bound to be neurologically normal(3). In any case, a few hypotheses, for example, hereditary premise, decrease of serum just as cerebrospinal liquid (CSF) zinc and magnesium level and low Gamma amino butyric corrosive (GABA) have been proposed[2,3].

Zinc is known to assume a control job in the invulnerable framework, and zinc- inadequate people experience expanded vulnerability to an assortment of pathogens. Zinc additionally works as a cancer prevention agent and can balance out films. Zinc regulates the fondness of synapses, for example, glutamate to their receptors and encourages the inhibitory impact of calcium on N- methyl-D-aspartate receptors and

along these lines counteracts the excitatory neuronal discharge[4].

Subjects and Method

This spellbinding investigation was led during April 2017 to walk 2018. The material utilized in this examination were corrosive propylene washed test tube , IV cannula, scalp vein set, test cylinder stand, axis, serum gathering test cylinders and cooler.

The examination included 100 youngsters between a half year to 5 years old of both genders (50 with febrile seizure and 50 typical people). Febrile kids were taken as control.

All patients in febrile seizure gathering (first episode of single summed up febrile seizure enduring for < 15 minutes and fever gathering were experiencing viral contamination

Kids who had mental impediment, atypical spasm, central seizure, incessant sicknesses, unhealthiness, focal sensory system contamination, pneumonia, urinary tract disease, and other bacterial diseases, looseness of the bowels, hemolysis or nearby contamination were avoided from study.

One milliliter of fringe blood was gathered in an acid-propylene tube inside 12 hours after admission to emergency clinic. All examples were centrifuged and serum was protected in -80°C.

Serum zinc was evaluated by Atomic Absorption Spectrophotometry in Cellular, Molecular Research Center associated to the Faculty of Basic Sciences.

The task was affirmed by the logical warning and moral board of trustees. Composed educated assent structures were marked by the guardians before incorporating the youngsters in the investigation

Table1: Demographic data and serum zinc level in febrile seizure children in comparison with normal groups

Groups	Mean(Sd) Age(Year)	Mean (Sd) Serum Zinc Level (Mcg/Dl)
FEBRILE CONVULSIONS	1.8	62.93
Normal GROUP	3.2	91.88

Findings

Demographic data is shown in table 1.

The mean age of serum zinc level in febrile convulsion was 1.8 years.

The mean age of serum zinc level in normal children was 3.2 years

The mean serum zinc level in children with febrile convulsion was 42.9 mcg/dl.

The mean serum zinc level in children with normal child was 91.88 mcg/dl.

Discussion

The serum zinc level was altogether lower in patients who experienced straightforward febrile seizure .contrasted and typical kids.

The mean period of febrile seizure was 20 months in this investigation . Lynette et al detailed a mean age of year and a half and every single other investigation revealed mean period of beginning somewhere in the range of 20 and 25 months.

The mean serum zinc levels were 62.93 mcg/dl, 91.88 mcg/dl in youngsters with febrile spasm and typical kids. Kids with febrile seizure have factually critical low serum zinc levels when contrasted and ordinary kids.

In one examination by Papierkowski et al in Poland that was performed on 33 patients matured 8 months to 5 years of age incorporating 18 patients for the situation bunch with febrile seizure and 15 solid people in the control gathering, serum and CSF zinc and magnesium levels were assessed. It was seen that cases had fundamentally lower levels of serum and CSF zinc and magnesium contrasted with controls [5]. As per Burhanoglu et al from Turkey, low degrees of serum and CSF zinc levels were found in patients with febrile spasm [6]

Another Amiri et al from Ghazvin medical clinic that was performed on 60 patients which 30 patients with febrile seizure for the situation gathering and others in the control gathering. Serum zinc, selenium and copper levels were assessed. It was uncovered that serum zinc and selenium levels were altogether lower in kids with febrile spasm [7]

Zinc, as a noteworthy component of certain compounds, has a significant job in certain tissues like focal sensory system and can influence some inhibitory instruments of CNS [8].

Conclusion

- Lower serum zinc levels can predispose children aged 6 months to 6 years to simple febrile seizure.

- It is suggested that zinc supplementation be considered in patients who are at risk of febrile seizure.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Serum Zinc Level in Children with Febrile Convulsions in Comparison with Febrile Children without Convulsions

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Abstract

Objective: Febrile seizures are the most widely recognized kind of seizures saw in

the pediatric age bunch There are various theories about synapses and follow component, (for example, zinc) changes in serum, which can have a job in pathogenesis of febrile spasm.

Aim: The point of the present forthcoming , case-control study was to decide if there was any adjustments in serum zinc level in youngsters with febrile spasm during seizure and febrile patients without seizures.

Methods: Kids matured a half year to 5 years were isolated into two gatherings: bunch A, 100 youngsters with febrile spasm, and gathering B, 100 febrile kids without seizures.

Serum zinc levels for the two gatherings were assessed by nuclear retention spectrophotometry(AAS). The information were examined to analyze zinc level among the two gatherings utilizing proper factual instruments utilizing SPSS 13

Findings: Serum zinc levels of groups A, and B had a mean value of 64.92mg/l, 81.03 mg/l respectively. Serum zinc level of group A was lower than the other group ($P<0.0001$).

Conclusion: The serum zinc levels are diminished in kids with febrile seizure spasms, in this way demonstrating zinc hardship assumes a noteworthy job in pathogenesis of febrile spasms.

***Key words**: Serum Zinc, Febrile seizure, Febrile children*

Introduction

A seizure is a paroxysmal time constrained change in engine movement as well as conduct that outcomes from anomalous electrical action in the cerebrum (1). Seizures are basic in pediatric age gathering and happen in roughly 10% of youngsters (1).Febrile seizure are the most well-known type of seizures and are twice as regular in young men as in young ladies .The component basic febrile seizure have multi factorial etiology, Febrile seizure happens with fever (temperature>380C) and without side effects of CNS contaminations. Most seizures in kids are incited by physical disarranges starting outside the mind, for example, high fever , contamination, syncope, head injury, hypoxia, or poisons. Short of what 33% of seizures in youngsters are brought about by epilepsy, a condition characterized as at least two ridiculous seizures happening at an interim more noteworthy than 24hrs apart.(2) is one of the most widely recognized sort of seizure happening in youngsters between 5 months and 6 years old, representing 30% of all seizures in children.(3,4) Febrile seizure can be isolated into two classes, one is straightforward febrile seizure and second one is intricate febrile seizure. Straightforward febrile seizure is separated , brief and

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summed up (5).Complex febrile seizure is unified with central beginning, one that happens more than once during a febrile disease, or one that last more than 10 to 15 minutes(6). Formative postponement and more youthful age are related with delayed febrile seizure.(7) As opposed to straightforward febrile seizure, complex febrile seizures are delayed (>15 minutes), central and happen more than once in 24 hours.[8]

Materials & Method

This distinct examination was directed during April 2017 to walk 2018. The material utilized in this investigation were corrosive propylene washed test tube , IV cannula, scalp vein set, test cylinder stand, axis, serum gathering test cylinders and cooler.

The examination included 200 kids between a half year to 5 years old of both genders (100 with febrile seizure and 100 febrile patients without seizure). Febrile youngsters were taken as control.

All patients in febrile seizure gathering (first episode of single summed up febrile seizure continuing for < 15 minutes and fever gathering were experiencing viral disease

Kids who had mental impediment, atypical spasm, central seizure, incessant ailments, lack of healthy sustenance, focal sensory system disease, pneumonia, urinary tract contamination, and other bacterial diseases, looseness of the bowels, hemolysis or nearby disease were barred from study. one milliliter of fringe blood was gathered in an acid-propylene tube inside 12 hours after admission to medical clinic. All examples were centrifuged and serum was saved in -80°c. serum zinc was evaluated by nuclear retention spectrophotometry in cell, atomic research focus partnered to the workforce of fundamental sciences. the task was endorsed by the logical warning and moral board of trustees . Composed educated assent structures were marked by the guardians before incorporating the kids in the examination.

Table: Demographic data and serum zinc level in febrile seizure children in comparison with fever and seizure groups

GROUPS	MEAN(SD) AGE(YEAR)	MEAN (SD) SERUM ZINC LEVEL (Mcg/dl)
FEBRILE CONVULSIONS	2.1	64.92
Fever GROUP	2.6	81.03

Findings

Demographic data is shown in table 1.

The mean age of serum zinc level in febrile convulsion was 2.1 years.

The mean age of serum zinc level in febrile children was 2.6 years

The mean serum zinc level in children with febrile convulsion was 64.92 mcg/dl.

The mean serum zinc level in children with febrile children was 81.03 mcg/dl.

Discussion

The serum zinc level was essentially lower in patients who experienced straightforward febrile seizure .contrasted with patients who had typical youngsters.

The mean time of febrile seizure was 25 months in this investigation . Lynette et al revealed a mean age of year and a half and every other investigation detailed mean time of beginning somewhere in the range of 20 and 25 months.

The mean serum zinc levels were 64.92 mcg/dl, 81.03 mcg/dl in kids with febrile seizure and febrile youngsters. Youngsters with febrile seizure have measurably noteworthy low serum zinc levels when contrasted and febrile kids.

In one investigation by Papierkowski et al in Poland that was performed on 33 patients matured 8 months to 5 years of age incorporating 18 patients for the situation bunch with febrile seizure and 15 solid people in the control gathering, serum and CSF zinc and magnesium levels were assessed. It was seen that cases had altogether lower levels of serum and CSF zinc and magnesium contrasted with controls [5]. As per Burhanoglu et al from Turkey, low degrees of serum and CSF zinc levels were

found in patients with febrile seizure ([6])

Another Amiri et al from Ghazvin clinic that was performed on 60 patients which 30 patients with febrile seizure for the situation gathering and others in the control gathering. Serum zinc, selenium and copper levels were assessed. It was uncovered that serum zinc and selenium levels were altogether lower in youngsters with febrile seizure [(7)]

Zinc, as a noteworthy component of certain proteins, has a significant job in certain tissues like focal sensory system and can influence some inhibitory instruments of CNS [(8).]

Conclusion

Lower serum zinc levels can predispose children aged 6 months to 6 years to simple febrile seizure. It is suggested that zinc supplementation be considered in patients who are at risk of febrile seizure.

This study shows decreased serum zinc level is a significant predisposing factor for febrile convulsions.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Sex Distribution of Padindiabetic Patients

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Abstract

Atherosclerosis, notwithstanding being an illness of lipid gathering, likewise speaks to an incessant provocative procedure [(1).] Specialists have guessed that incendiary markers, for example, high-affectability C-responsive protein (hsCRP) may give an adjunctive strategy to worldwide appraisal of cardiovascular hazard [(2-4).] On the side of this theory, a few huge scale point of view epidemiological investigations have demonstrated that plasma levels of has CRP are a solid autonomous indicator of danger of future fringe blood vessel sickness, Myocardial localized necrosis, stroke and vascular passing among people without known cardiovascular ailment [(4-14).]Based partially on these information, high-affectability examines for CRP have befome accessible in standard clinical research centers. Notwithstanding, clinical utilization of hsCRP testing will depend on showing of autonomous prescient worth, yet in addition on exhibit that expansion of hsCRP testing to customary screening techniques improves vascular malady chance expectation. Moreover, utilization of hsCRP as an instrument to aid worldwide hazard appraisal requires information of populace conveyance of hsCRP, clinical attributes of hsCRP assessment, and size of danger of future Peripheral vascular illness that can be normal at each degree of hsCRP. There is a positive relationship between hsCRP levels and T2DM among grown-up rural occupants of South India. This affiliation was free of age, sex, BMI, WC, and WHR, recommending that raised hazard for T2DM probably won't be constrained to stoutness alone in this populace. Comparable perceptions have been made in past investigations [(15, 16).] Raised hsCRP levels much of the time group with entrenched hazard components of T2DM, for example, weight and insulin resistance[(17).] Higher HbA1c levels were seen in all the South Indian subjects with an expansion in hsCRP levels. Likewise, as observed by numerous relapse examination, HbA2c was the significant determinant of hsCRP level in controls. Prior examinations have additionally demonstrated the relationship of raised hsCRP levels with obesity[(18)] and insulin resistance[(19)] in North Indian young people and South Indian grown-ups, separately. Relationship of expanding hsCRP levels with expanding fasting insulin, C-peptide, and HOMA-IR features concurrence of subclinical irritation and insulin opposition. There is likewise adequate proof to recommend that hsCRP might be related with an expanding danger of future cardiovascular occasions in generally solid individuals[(20).] The aftereffects of the investigation feature the relationship of irritation, as estimated by hsCRP, with T2DM in the rural South Indian populace, free of weight. Corpulence and glycemic controls were distinguished as the real corresponds of hsCRP levels, proposing that the two may have an autonomous impact of foundational aggravation in this populace.

Key Words: *T2DM, PAD, hsCRP, subclinical irritation, insulin opposition*

Introduction

Aim of the Study: The aim of the study was to determine the sex ratio for peripheral arterial disease among patients with type 2 diabetes at Sree Balaji Medical College and Hospital.

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Results

A total of 100 diabetic patients (cases) and 100 non-diabetic controls participated in the study. All the 100 cases had more than five year type 2 diabetes history. Clinical history of fringe vasculopathy was inspired utilizing Edinburgh claudication poll and Ankle Brachial

Index was measured for all .

The difference between diabetic and non-diabetic women in the prevalence of PAD was measurably significant (p=0.0478), where as the same in men was not statistically significant(p=0.2939). Also, PAD was more common in women both diabetic and non diabetic. This is an important observation when the fact was that a number of these women were passive smokers as their spouses where smoking.

Table 1: Sex distribution of PAD in Diabetic and NonDiabetic

	Diabetic	**NonDM**	**Total**	**P**
	N=100	N=100	N=200	
	(ABI<0.9)	(ABI<0.9)	(ABI<0.9)	
Women	78(13)	64(3)	142(16)	0.0478 (S)
Men	22(3)	36(1)	58(4)	0.2939 (NS)

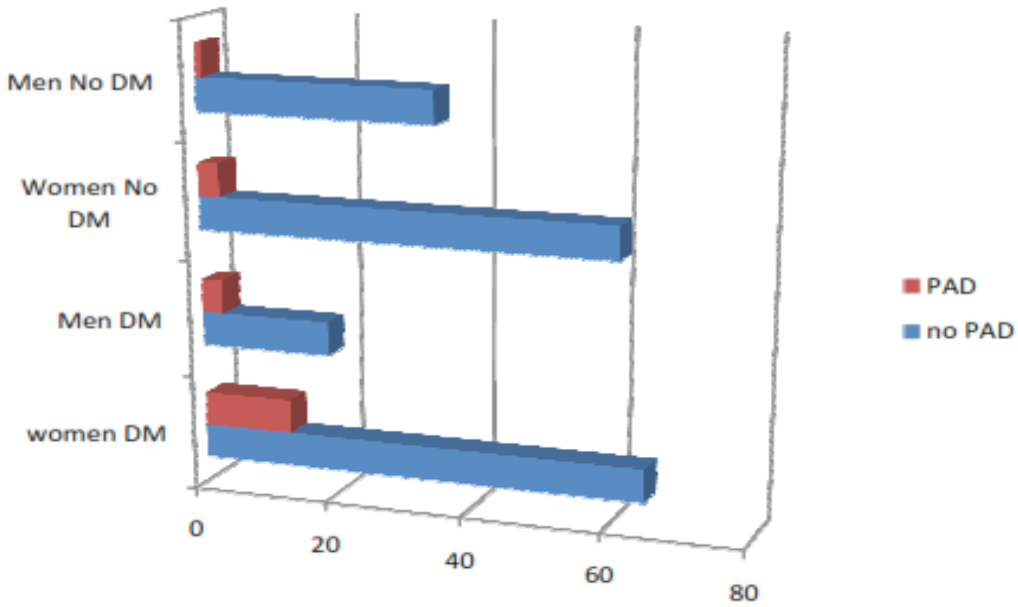


Chart 1:Sex distribution of PAD in Diabetic and Non Diabetic

Table Relationship of passive smoking with PAD in women

Women	**PAD NoDM**	**PAD DM**	**NoPAD DM**	**NoPAD No DM**	**Total**
Passive Smoking	2	9	27	28	66
No smoking	1	4	38	33	76
Total	3	13	65	61	142

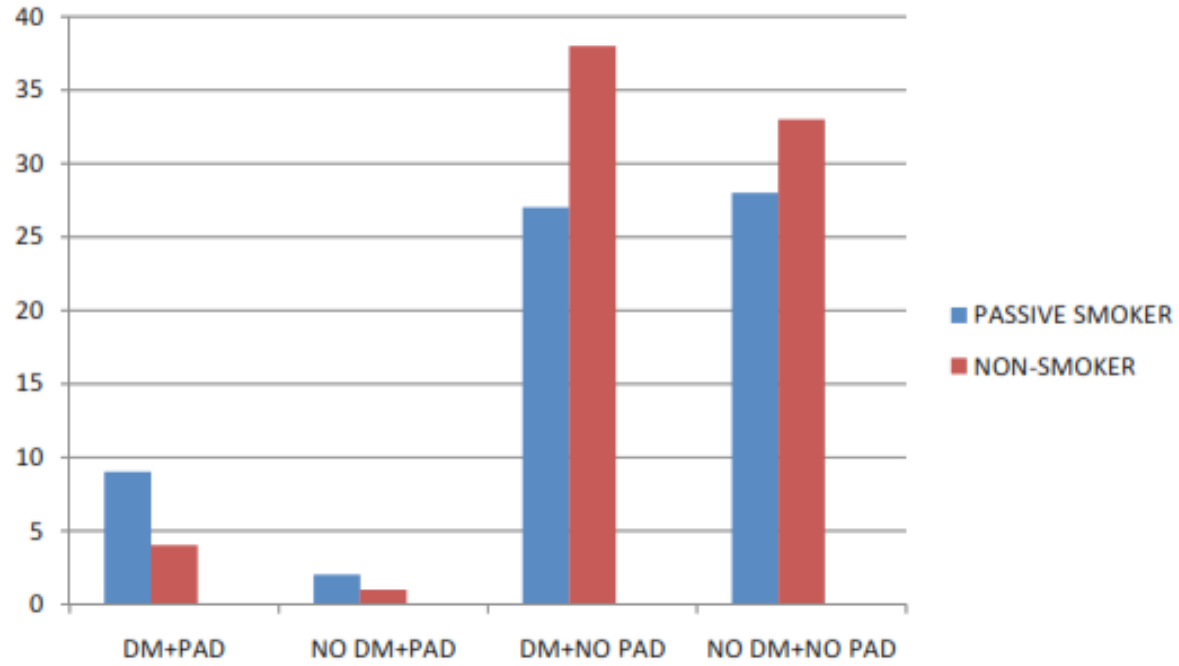


Chart 2: Relationship of passive smoking with PAD in women

Discussion

In our study all patients with evidence of any significant vascular illness were barred.

Yet another study of peripheral artery disease in diabetes reported 12.6% incidence of asymptomatic PAD. An examination in South Indian ladies with type2 diabetes[9], asymptomatic PAD was reported in 19% of diabetic women when compared non-diabetic ladies of comparative age gathering. In our study also there were more women included and the incidence of peripheral arterial disease was significantly more in females.

REGICOR investigators demonstrated a 4.5% prevalence of peripheral arterial disease in general population adults.

As per a study by Elizabeth Selvin and Thomas P Erlinger, peripheral arterial disease prevalence in adults more than 40 years in the USA was 4.3% (95% CI 3.1% to 5.5%),which translates to ≈ 5million persons (95%CI4to7million). Theprevalencewas14.5% (95%CI

10.8% to 18.2%) in older, over 70 years. Dark race/ethnicity(OR2.83,95% CI1.48to5.42) active smoking(OR4.46,

95% CI 2.25 to 8.84), diabetes (OR 2.71, 95% CI 1.03 to 7.12), hypertension (OR1.75,95%CI0.97to3.13),hypercholesterolemia(OR

1.68,95%CI1.09 to 2.57),and low kidney function (OR2.00,95%CI1.08to3.70) were positively associated with prevalent PAD in age and sex adjusted multivariate examination.

Sex difference was variable in published literature. In view by HigginsandHiggins,41 in women 45 to 93 years of age had a 3% to 29% (over this range of 5 decades) commonness of fringe blood vessel disease. But, it was evident that peripheral arterial disease was common in diabetic women. Most of these studies were done with cohort including smokers also. More men than women were smokers and hence, naturally men had higher occurrence of peripheral arterial disease. We excluded all smokers, both men and women and found that women had higher frequency of peripheral arterial disease in both diabetic and non diabetic populations, which was probably related to passive smoking as shown by the analysis.

Allison et al, showed that the prevalence of peripheral arterial disease increased with age for both men and women. More than just definitions, any atherosclerotic ailment had higher event, i.e., increase in the population "burden" of these diseases (defined as the total number of individuals who have the disease).

Age, the most traditional risk factor for peripheral arterial illness was seen to increase incidence. However in our study, diabetic population was more youthful than control population ($p<0.001$)

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Assessment of Socio-Demographic Characteristics and Immunization Status of Under-Five Children in An Urban Area of Kancheepuram District

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Abstract

The nutritional status of the children of a country has a direct bearing on its development. Giving a child a solid nutritional start has a positive impact on his/her physical, mental and social development . A child's nutritional future begins before its conception itself .It begins with the mother's nutritional status prior to pregnancy. A chronically-undernourished mother is likely to give birth to an underweight baby, who may be stunted as a child and in turn give birth to a malnourished baby. The sampling method applied to choose the required study population was Systematic Random Sampling. There were 4565 children under 5 years of age in the study area as per the records of UHTC. The list of under five children in this locality which is the sampling frame was obtained from UHTC on the basis of geographical order

***Keywords**: UHTC, Systematic Random Sampling*

Introduction

Pandit Jawaharlal Nehru, the First Prime Minister of India once said, "The children of today will make the India of tomorrow. The way we bring them up will determine the future of the country"..[1] Therefore it is important to concentrate on the nutritional status of the mother in order to break this vicious cycle of malnutrition. Eliminating malnutrition in mothers can reduce disabilities in their infants by almost one third.[1] Immunizing the child against vaccine preventable diseases improves their immune status and thereby reduces Infant morbidity and mortality. There is a need to assess the socio-demographic characteristics and immunization coverage of under five children in Tamil Nadu along with their feeding practices so that data regarding various factors that determine malnutrition could be obtained. Based on the results obtained from this study various measures could be formulated for preventing malnutrition in children as well as improving their health status.

Aim: The main aim of the present study is to assess the socio-demographic characteristics and immunization coverage of under-five children in an urban area of kancheepuram district in Tamil Nadu.

Objectives:

1. To assess the socio-demographic characteristics of under-five children .

2. To assess the immunization coverage of under-five children .

Materials and Method

Study design:

The present study is a community based cross-sectional , descriptive study conducted in an urban area of Kancheepuram district, Tamilnadu.

Study area and study population:

Kancheepuram district is one among the 32 districts of Tamilnadu. According to the Census of India 2011,

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Kancheepuram district covers an area of 4433 Sq.km. The population of Kancheepuram district is 39.98 lakhs comprising of 20.12 lakh males and 19.8 lakh females.[2] The study area identified for the present study is the field practice area of the Urban Health Training Centre located in Anakaputhur, which is attached to Sree Balaji Medical College and Hospital.

Anakaputhur is a Municipality city in the district of Kancheepuram, Tamilnadu. According to the 2011 Census, the total population of Anakaputhur is 48,050 of which 24,158 were males and 23,892 were females.[2] The study population identified were children below 5 years of age, residing in the Anakaputhur area, permanently at the time of the study. There were 4565 children under 5 years of age listed by the UHTC in the study area. They form the sampling frame for the study.

Study period:

The study was carried out from August 2017 to March 2018.

Sample size:

The sample size was calculated based on a previous study conducted by S.K.Senthilkumar in Coimbatore district in the year 2014.[3] The prevalence of underweight among children under 5 years of age was found to be 41.3%.[3] This prevalence of 41.3% was taken as the reference value for the sample size calculation for this study.

The sample size was calculated using the formula:

$N = Z_{1-\alpha/2}^2 pq / [L]\ 2$

Where, p = Prevalence of disease/ event (referred value)

q = 100 – p

Confidence level = 95%

Significance level (**α**) = 100- Confidence level = 100- 95 = 5%

Reliability Coefficient at that level ($Z_{1-\alpha/2}$) = 1.96

L =Relative precision, which is assigned as 10% of p (10% of 41.3 = 4.13) for this study

Substituting it in the formula,

[$Z_{1-\alpha/2}$ = 1.96, p= 41.3% , q = 58.7%, L = 4.13]

$$N = \frac{1.96 \times 1.96 \times 41.3 \times 58.7}{4.13 \times 4.13} = 546$$

Adding 10% non-response rate to the above obtained sample size , the final sample size was calculated to be 600.

Sampling method:

The sampling method applied to choose the required study population was Systematic Random Sampling. There were 4565 children under 5 years of age in the study area as per the records of UHTC. The list of under five children in this locality which is the sampling frame was obtained from UHTC on the basis of geographical order. Since the sample size calculated was 600, the sample interval (K) was calculated as given below.

K = N/n

Where N= total size of population

n = sample size

K = 4565/600 = 7.6

Every 8th child was selected from the list of children in the sampling frame. If a child or mother from the list was not able to be contacted for more than 2 visits they were excluded and the study was carried out till the required sample size was reached.

Inclusion criteria:

Children belonging to the age group below 5 years of age residing permanently with their families in Anakaputhur area whose mother consented for the study were included.

Exclusion criteria:

Children whose mother was not willing to participate in the study; children who were not able to be contacted even after 2 visits and children with severe illnesses were excluded from the study.

Study tool:

Data was collected through a pre tested semi-

structured questionnaire. The questionnaire consisted of the following sections:

Section I: Socio-demographic characteristics of the study population which included age, sex, religion, family type , family size, mother's educational status, mother's occupation and socio-economic status of the family based on modified Kuppuswamy classification[33].

Section II: Anthropometric measurements of the children which included height, weight and mid arm circumference of the child.

Section III: Information regarding feeding practices of the children which included adoption of exclusive breastfeeding, duration of breastfeeding, time of initiation of breastfeeding, type of breastfeeding, reason for not giving exclusive breastfeeding, practice of giving prelacteal feeds and time of initiation of weaning foods.

Section IV: Information regarding immunization status, gestational age, type of delivery, availment of Anganwadi services , antenatal services, history of acute respiratory tract infection and acute diarrhoeal disease in the child ; presence of anaemia and dental caries in the child and dietary pattern in the child .

Anthropometric measurements were recorded which included height of the child, weight of the child and mid arm circumference of the child. The interview was conducted by the investigator himself and their responses were recorded in the questionnaire. The physical instruments used in the study included a weighing scale, infantometer and a non-stretchable inch tape.

Length/Height: Length was measured in children less than 2 years old using an infantometer, with the child placed straight and supine on the horizontal board and the Frankfurt plane of the head kept perpendicular to the horizontal with the help of an assistant; length was recorded between the headpiece and the footpiece. A non-stretchable tape was used to measure the height of the children above 2 years of age , where the children were made to stand erect, with the heels, buttocks, shoulders and the head touching the wall, and the value was recorded to the nearest cm

Mid-arm circumference: A non-stretchable tape was used for measuring mid-arm circumference. The measurement was taken at the midpoint of the upper left arm, between the acromion process and the tip of the olecranon. After locating the midpoint, the left arm was extended so that it was placed loosely by the side, with the palm facing inwards. The tape was wrapped gently but firmly around the arm at the midpoint. Measurements were taken to the nearest millimetre.

Weight: Children who were able to stand independently were weighed using a weighing scale with a bare minimum of clothes and without shoes, with the weighing scale kept on a firm even surface and zero checked before each weighing. Weight was recorded to the nearest 0.1 kg. In children who were not able to stand independently, mother was weighed with and without the child and the difference was used as the child's weight.

Ethical approval:

The study was approved by Institutional Ethical Committee of Sree Balaji Medical College and Hospital , Ref. No.002/SBMC/IHEC/2017/964 .

Informed consent:

The details and the purpose of the study were explained to the mothers of the study participants. The informed consent was in Tamil language and consent was obtained before starting the interview .

Operational definitions:

- **Socio-economic status**: Socio-economic status was classified based on modified Kuppuswamy socio-economic status scale 2017 into five classes namely-upper class, upper middle class, lower middle class, upper lower class and lower class.[4]

- **A fully immunised child**: According to WHO , a child is fully immunised with all basic vaccinations if the child by one year of age, has received Bacillus Calmette-Guerin (BCG) vaccine at birth; three doses each of polio and pentavalent vaccines at 6,10 and 14 weeks of age ; and a vaccination against measles at 9 months of age.[5] If the child, by the age of one year, had missed even a single dose of the above said vaccines, the child will be termed as partially immunised and if the child had not received any vaccine, then the child will be termed unvaccinated.

- **Preterm**: According to WHO, preterm is defined as babies born alive before 37 completed weeks of gestation.[6]

- **Term**: Babies born alive from 37 completed

weeks to less than 42 completed weeks of gestation.[6]

- **Post term**: Babies born alive at 42 completed weeks or anytime thereafter of gestation.[6]

- **Low birth weight (LBW):** Low birth weight (LBW) is defined by the World Health Organization (WHO) as weight at birth less than 2500g irrespective of the gestational age.[6]

- **Underweight**: weight for age < –2 standard deviations (SD) of the WHO Child Growth Standards median[7]

- **Stunting**: height for age < –2 SD of the WHO Child Growth Standards median[7]

- **Wasting**: weight for height < –2 SD of the WHO Child Growth Standards median[7]

- **Overweight**: weight for height > +2 SD of the WHO Child Growth Standards median[7]

- **Mid arm circumference**: In children between the age group 1 and 5 years of age, mid arm circumference of more than 13.5 cm denotes normal nutritional status, mid arm circumference between 12.5 and 13.5 cm denotes mild to moderate malnutrition and mid arm circumference below 12.5 cm denotes severe malnutrition.[8]

Statistical Analysis

Data entry was done in Microsoft Office Excel 2007. Data analysis was done using Statistical Package for Social Sciences (SPSS), version 22. Results were presented using descriptive and analytical statistics. The descriptive statistics were presented as frequency distribution and percentage. The analytical statistics used were Chi-square test and Odds ratio. P value < 0.05 was considered as statistically significant value.

Findings

The present cross-sectional study was carried out in the field practice area of Urban Health Training Centre (UHTC) of Sree Balaji Medical College and Hospital, located in Anakaputhur area of Kancheepuram district. The results of the study are shown below using tables and figures.

Table no.1: Background information of mother and children.

S. no.	Socio-demographic variable	Frequency (N=600)	Percentage (%)
1.	Age of the child		
	0 – 6 months	140	23.3
	7 – 12 months	85	14.2
	13 – 60 months	375	62.5
2.	Gender		
	Male	324	54
	Female	276	46
3.	Religion		
	Hindu	558	93
	Muslim	26	4.3
	Christian	16	2.7
4.	Educational status of mother		
	Equal to or below higher secondary school	389	64.8

Cont... **Table no.1: Background information of mother and children.**

	Above higher secondary school	211	35.2
5.	Occupation of mother		
	Home-maker	516	86
	Working woman	84	14
6.	Socio-economic status according to modified Kuppuswamy socio-economic status scale 2017		
	Upper class	66	11
	Upper middle class	55	9.2
	Lower middle class	82	13.7
	Upper lower class	397	66.2
	Lower class	0	0
7.	Type of family		
	Nuclear family	330	55
	Joint family	270	45
8.	Size of family		
	Less than or equal to four	284	47.3
	Above four	316	52.7

As per table no.1, total number of children who participated in this cross-sectional study was 600 out of which 23.3% of children belonged to the age group 0 to 6 months , 14.2% of children belonged to the age group 7 to 12 months and 62.5% of children belonged to age group 13 to 60 months.Among the children who participated in this study , 54% of them were males and 46% of them were females. In this study, majority of children (93%) belonged to Hindu religion, followed by Muslims (4.3%) and Christians (2.7%).Majority of mothers (64.8%) have an educational qualification of equal to or below higher secondary school and the remaining 35.2% of mothers have an educational qualification of above higher secondary school. Majority of women (86%) were Home-makers while the remaining 14% were working women. Majority of the study population (66.2%) belonged to upper lower class followed by 22.8% of the study population belonging to middle class and 11% of the study population belonged to upper class(according to modified Kuppuswamy socio-economic status scale 2017).More than half of the study participants (55%) belonged to nuclear family while 45% of study participants belonged to joint family. Nearly half of the children (47.3%) belonged to a family size of equal to or less than four members while 52.7% of children belonged to a family size of more than four members.

Table no.2: Frequency distribution of immunization status of the study population

S.no.	Immunization status	Frequency (N=600)	Percentage (%)
1.	Fully immunised	566	94.3
2.	Partially immunised	34	5.7
	Total	600	100

Table no.2 shows, majority of children (94.3%) were fully immunised while only 5.7% were partially

immunised.

Discussion

The results obtained from the current cross-sectional study are compared with other similar studies done in India and abroad and the resultant findings are discussed below.

Socio-demographic characteristics of the study population:

The **maternal illiteracy rate** in the present study was only 1.3% which is significantly lower than the other studies that were done in India , which included the following: the study done by Venkateshiva B. Reddy et al in the Sugali tribe of Chittoor district in Andhra Pradesh, which showed a maternal illiteracy rate of 47%[9] ; the study done by Pujitha Sriram Padmanabhan in tribal children of Yercaud region in Tamil Nadu , which showed a maternal illiteracy rate of 25.5%[10] ; the study done by S.K.Senthilkumar in the tribal community of Coimbatore district in Tamil Nadu , which showed a maternal illiteracy rate of 42.2% [11] and the study done by Dinesh .P.V in rural preschool children of Sullia taluk of Karnataka, which showed a maternal illiteracy rate of 22.43%.[12]

The reason for lower maternal illiteracy rate in the present study when compared to the other studies done in India could be due to the difference in study settings: the present study was conducted in an urban area whereas the studies done by Venkateshiva B.Reddy[9], Pujitha Sriram Padmanabhan[10] and S.K.Senthilkumar[11] were conducted in tribal areas and the study done by Dinesh.P.V[12] was conducted in a rural area.

The maternal illiteracy rate in the present study was significantly lower than the study done by Sachin Singh Yadav et al titled, " An Epidemiological study of malnutrition among under five children of rural and urban Haryana", in the year 2012, which showed a maternal illiteracy rate of 16%.[13] The lower maternal illiteracy rate in the present study when compared to the study done by Sachin Singh Yadav et al[13] could be due to the following reasons: time period during which the study was undertaken- the study done by Sachin Singh Yadav et al was conducted five years back in 2012 when compared to the present study and another reason for lower maternal illiteracy rate in the present study could be due to the increased thrust given by Government of Tamil Nadu for improving the female literacy rate in the State.

Similarly the proportion of mothers who had an educational qualification of above higher secondary school level in the present study was higher (35.2%) when compared to the studies done by Venkateshiva B.Reddy et al[9] , Pujitha Sriram Padmanabhan[10], Dinesh P.V.[12] and Sachin Singh Yadav et al[13] , in which the proportion of mothers who had an educational qualification of above higher secondary school level was 5.2%, 9.1%, 18.5% and 12.9% respectively.

These factors highlight a better maternal literacy rate in the present study when compared to other studies done in India.

In the present study , majority of participants, that is, 66.2% of participants belonged to a **lower socio-economic status** which is comparable to the findings of the study done by Sachin Singh Yadav et al , in which the proportion of the study participants who belonged to lower socio-economic status was 65.5%.[13] The proportion of the study population belonging to lower socio-economic status was lower (66.2%) in the present study when compared to the findings of the study done by S.K.Senthilkumar in a tribal community of Coimbatore district, which showed the proportion of study population belonging to lower socio-economic status to be 83%.[11] This finding could be due to difference in the study settings – the present study was done in an urban area whereas the study done by S.K.Senthilkumar was conducted in a tribal area.[11]

Immunization rate:

In the present study , majority of children , that is, 94.3% of children were fully immunised which is comparable to the findings of the following studies: in the study done by Priyanka.R. the prevalence of children who were fully immunised was found to be 91.1%[14] and in the study done by S.K.Senthilkumar the prevalence of children who were fully immunised was found to be 90.8%.[11] The prevalence of children who were fully immunised in the present study was higher (90.8%) when compared to the NFHS-4 National data , which showed the prevalence of children who were fully immunised to be 63.9% in urban areas.[3]

This could be due to better availability of health care services and better maternal literacy status in the present study.

Conclusion

The present cross-sectional study assessed the nutritional status and feeding practices of under-five children along with its influencing factors in Anakaputhur area of Kancheepuram district, Tamil Nadu.

The findings in the present study were encouraging. Most of the mothers were literates (98.7%).Even though the maternal literacy rate in the present study was higher (98.7%) than other studies done in India, it is interesting to note that only 35.2% of mothers had an educational qualification of above higher secondary level and the remaining 64.8% of mothers in the present study had an educational qualification of equal to or below higher secondary level .

In the present study, more than two third of the study participants (66.2%) belonged to a lower socio-economic status. Majority of children (94.3%) were fully immunized.

Recommendations

From observing the findings of the current study, following recommendations are made:

1. In spite of Tamil Nadu Government's effort to increase the educational level of females, only 35.2% of mothers in the present study had an educational qualification of above higher secondary level and the remaining 64.8% of mothers in the present study had an educational qualification of equal to or below higher secondary level . Therefore all the agencies, both public and private, that are concerned with the improvement of educational status of women , should work in a coordinated way and undertake effective measures that would encourage all the girls to study up to at least higher secondary level and furthermore increase their enrolment in undergraduate programmes.

2. To improve the socio-economic status of the mothers, Tamil Nadu Government should undertake various steps to increase the female employment rate ; to make workplace environment (both in private and public institutions) conducive for breastfeeding by allocating separate rooms for nursing mothers to breastfeed their child with privacy; provision of maternity leave at all private institutions; increase the wages/salary of the working women and provide social security measures like medical insurance schemes.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Sonological Evaluation of the Clinically Negative Axilla in Women with Breast Cancer

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Abstract

The prognosis of breast carcinoma is dramatically altered by the presence of axillary lymph nodes. Hence, great importance is now given to axillary staging, One of the baseline investigations done for the axilla is sonology , to identify suspicious nodes.It is also part of the triad of triple assessment.This study aims to identify the common suspicious features of axillary nodes.40 patients with breast cancer and with clinically node negative axilla were taken up for the study ,and ultrasound of the axilla was done for them. On correlation of specific sonological characteristics with US-FNAC, the feature most predictive of malignancy was the absence of fatty hilum (34 cases) Hypoechoic cortex was the second best predictor(32 cases),followed by L/D ratio(31 cases). The ability of ultra sonogram to detect more suspicious lymph nodes increased with increasing tumour size.

With Westernization, and development of previously backward countries, one of the drawbacks is the rise of breast cancer, due to the life style,and unhealthy diet.Studies show that 1 in 8 women develop breast cancer during their life time.Of these, early detection and aggressive treatment can help cure them completely.A factor which dramatically changes the prognosis of the patient is the presence or absence of ipsilateral axillary nodal metastasis[1].This can be evaluated radiologically by sonology.

Keywords*: sonology , US-FNAC, nodal metastasis*

Introduction

Aim: This study aims to identify the commonest features of malignancy detected radiologically in axillary lymph nodes in patients with breast cancer.

Materials and Method: 40 patients who attended the OPD or IPD of the department of General Surgery, with biopsy proven breast cancer but clinically negative axilla were taken up for the study. A sonological study of the axilla was done for all of them, and the common features of malignancy noted were listed out in order of frequency.

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Lymph nodes were evaluated for specific sonological characteristics like L/D ratio, presence or absence of fatty hilum and for echogenicity and for any morphological changes in cortex (notching, distortion)[10]

Results

On correlation of specific sonological characteristics with US-FNAC, the feature most predictive of malignancy was the absence of fatty hilum (34 cases) Hypoechoic cortex was the second best predictor(32 cases),followed by L/D ratio(31 cases). [1]

The ability of ultra sonogram to detect more suspicious lymph nodes increased with increasing tumour size.

Occurrence of absent fatty hilum seen in 34/40 patients (85%)

Occurrence of hypoechoic cortex seen in 32/40 patients (80%)

Hypoechoic cortex was seen in 32/40 patients (80%)

Alteration in L/D ratio (longitudinal axis/diameter ratio) was seen in 31 cases (77.5%)

Findings

A thorough knowledge of complete anatomy of breast and adjacent structures makes surgery easy to perform and gives patient the best management.Mammary glands are modified sweat glands seen only in mammals, and theydevelop along the milk line[2]. Awareness of this is essential to identify extramammarybreast lesions. This line extends from the axillary region to inguinal region. The mature breast extends between 2nd to 6th ribs in vertical plane, and from the side of sternum to anterior or mid axillary line horizontally. The tail of Spence extends into axillary pad of fat. The central nipple and areola have an important role intumor pathology. They can be involved in central lesions of major ducts, incancerization of ducts, and can extend upwards, leading to Paget's disease. Carcinoma involving the breast, being a major disease of the ducts, involvement of nipple, nipple retraction, and eczematous lesions are all clinical manifestations ofthe disease[2].

Mammary glands have a distinctive architecture consisting of parenchymal andstromal elements. It is considered a modified sweat gland and is made up of parenchyma which consists of the ducts and lobules. Tumors arising from these have a characteristic histological pattern and clinical progress[3]. However, knowledge of continuity of both these structures makes one understand how both these lesions can occur together. Numerous continual cyclic changes take place in them under the influence of endogenous hormones. Various types of involutionary changes are also taking place, with additional changes occurring during pregnancy and lactation. All these factors increase the susceptibility of the epithelium to abnormal proliferative changes increasing with age since any unrest epithelium is associated with tendency to malignant transformation. "Unrest soil is the seat for malignancy". Breast is thus common site for malignancy and is more common inolder age groups.[4]

The supportive stroma of breast contains the blood vessels, lymphatics and is having a major role in tumor biology. Blood vessels affect the growth of tumor byway of supplying blood and supporting angiogenesis. On the other hand insufficient blood supply leads to infarcts. Lymphatics cause secondary spread. Desmoplastic reaction acts as local barriers[4]. Inflammatory have major role in immunological response, thus govern the growth of tumors.[3]

The arterial supply is from lateral thoracic artery (arising from second part of subclavian artery), and lateral branches of 2nd, 3rd and 4th intercostals arteries,which are to be remembered during surgery. Venous drainage on the other hand is more significant in relation to spread of tumors. The axillary vein must be skeletonized during axillary dissection.2nd to 6th intercostals nerves supply the breast and are divided during surgery. However preservation of long thoracic nerve, thoracodorsal nerve and intercostobrachial nerves are important during surgery[5].

Knowledge of the lymphatic drainage of the breast is only too important sincelike all carcinomas, breast carcinoma first spreads by lymphatics.

There are 5 sets of axillary nodes draining the breast:

1. Anterior group (Pectoral group): these are situated along the lateral thoracicvein under the anterior axillary fold mainly in the 3rd rib. From here thelymph drains primarily into the central group.

2. Posterior group (Subscapular group): these lie along the posterior axillaryfold in relation to the subscapular vessels. Lymph drains from here mainlyinto central and supraclavicular nodes.

3. Lateral group (Axillary vein group): they lie along the upper part ofhumerous in relation to axillary vein.

4. Central group: These are situated in the fat of the upper part of the axilla.Lymph drains from here into the supraclavicular nodes. This nodal group isoften palpable in metastatic disease.

5. Apical group (Subclavicular group): They are constant in position boundedbelow by 1st intercostal space, behind by the axillary vein and in front by thecostocorocoid membrane[6.]

In evaluation of the axilla,the following are suspicious features seen on ultrasound:Suspicious :

A.	Size of more than about 10mm;
B.	The absence of a fatty hilum;
C.	Hypoechoic echoes internally;
D.	Rounded shape;
E.	sharply demarcated borders when compared to the surrounding fatty tissue;
F.	Aymmetric cortical thickening or eccentric lobulations of hypoechoic cortical rim7.

Benign:

If the lymph node showed Longitudinal axis/Diameter (L/D) ratio >1.5, with fatty hilum present and hyperechoic cortex

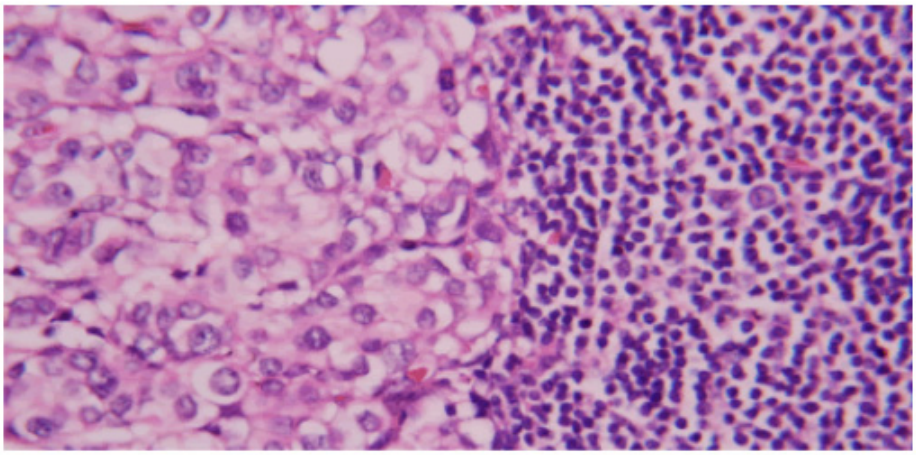


Fig 1.HISTOLOGY - METASTATIC NESTS IN AXILLARY LYMPH NODE

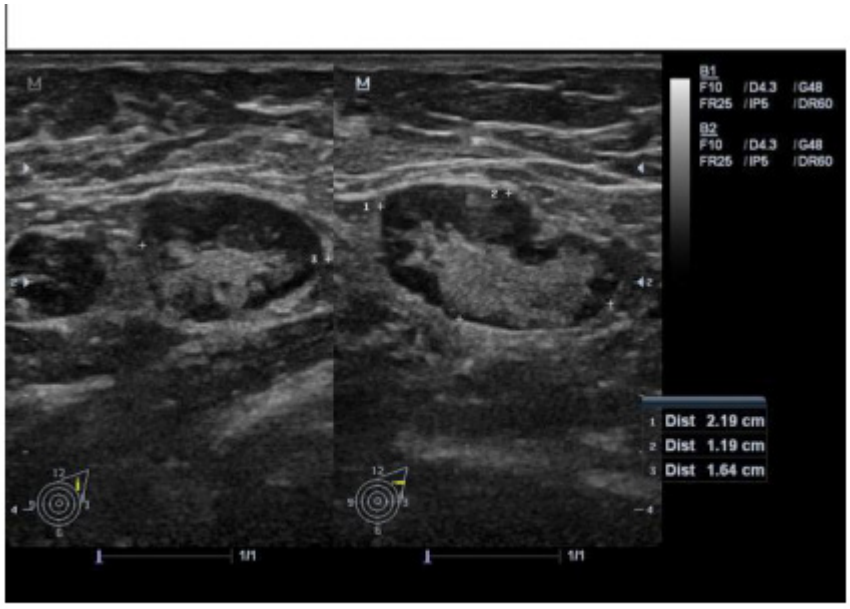


Fig 2.SONOGRAM OF AXILLA SHOWING A SUSPICIOUS NODE

Conclusion

On correlation of specific sonological characteristics with US-FNAC, the feature most predictive of malignancy was the absence of fatty hilum (34 cases) Hypoechoic cortex was the second best predictor(32 cases),followed by L/D ratio(31 cases).

The ability of ultrasonogram to detect more suspicious lymph nodes increased with increasing tumour size.

In conclusion, only those patients who showed benign or indeterminate features of lymph nodes on ultrasound and on patholoical evaluation of suspicious lymph node will require SLNB as the staging procedure[8].

Rest of the patients who show definite features of lymph node involvement on ultrasound may undergo ALND directly as a part of primary breast surgery, thus saving time and expense and also avoiding the morbidities associated with SLNB.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Specificity and Sensitivity of Ultrasound and Mri in the Diagnosis of Unicornuate Uterus

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Abstract

On MR pictures, the unicornuate uterus is effectively analyzed. X-ray has a high delicate tissue differentiate which gives magnificent picture quality for dependable location and portrayal of pathology in the female pelvis. The symptomatic yield of all the pelvic MRI assessments significantly depends on the cautious arranging of imaging planes utilized. The standard convention for pelvic imaging contains unenhanced Tl - and T2-weighted arrangements. Pelvic life systems is all around pictured on T2 weighted picture (T2WI) .MRI pictures should be gotten in at any rate two opposite planes for satisfactory assessment of the objective organs.

Keywords: *female pelvis, symptomatic yield*

Introduction

A **unicornuate uterus** is a less common type of congenital uterine anomaly, and it carries a mild risk of infertility and miscarriage.

Epidemiology

It is viewed as the less regular sort contrasted with different kinds of uterine irregularities(10 % of every single uterine oddity). It is named a class II Mullerian channel abnormality, as per the American Fertility Society.

Unicornuate uterus is the less basic kind of uterine inconsistency related with conceptive disappointment (12.5 %).

Pathology

Unicornuate uterus is considered because of disappointment of one Müllerian conduit to prolong while the different grows regularly. The embryologic transcendence of the unicornuate uterus tbe on the privilege has not been clarified. It could possibly have a simple horn.

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Radiographic features

General

- the external uterine fundal contour may be smooth and deviated to one side.
- In less number of patients a rudimentary horn is noted.

Findings

Hysterosalpingogram

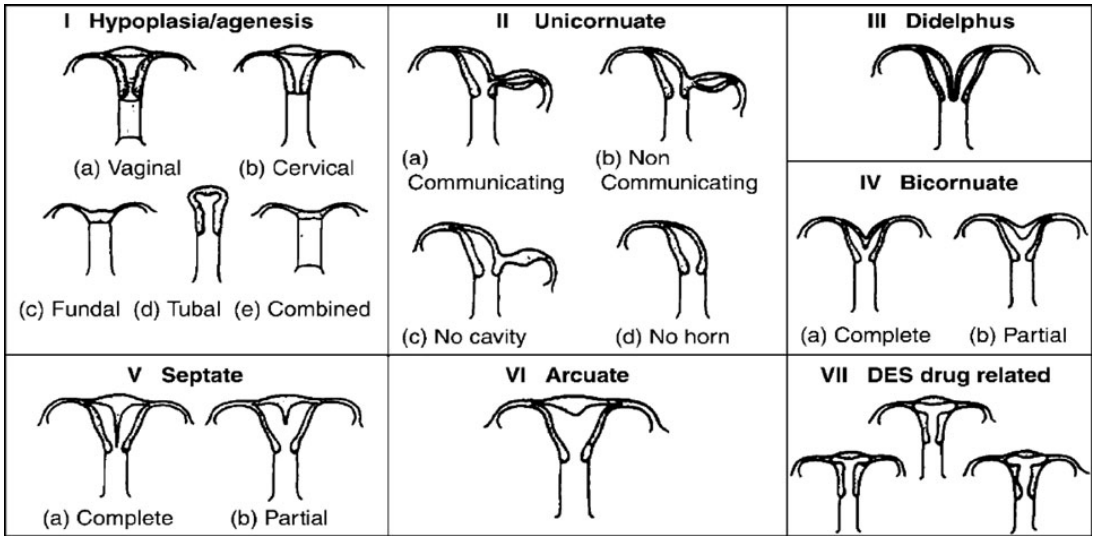
1. The endometrial pit ordinarily accept a fusiform (banana type) shape (aside from sort a where there may a little cavitation filling imperfection), decreasing at the summit and depleting into a solitary Fallopian tube. The uterus is for the most part moved off the midline.

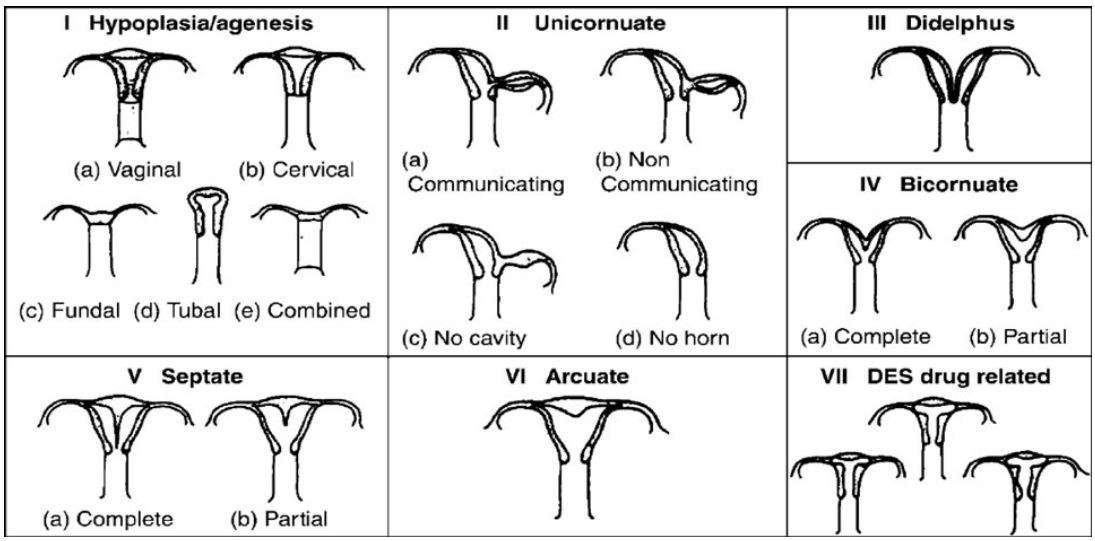
2. Ultrasound

It is very difficult to detect a unicornuate uterus on ultrasound. The uterus may be seen tapering to one side.

MRI

- The uterus may appear curved and elongated :





banana-shaped external uterine contour

- The uterus may show a reduced volume
- The uterus may show asymmetric configuration
- A normal myometrial zonal anatomy is seen

MRI is considered the current imaging modality of choice.

On MR pictures, the unicornuate uterus is effectively analyzed. X-ray has a high delicate tissue differentiate which gives magnificent picture quality for dependable location and portrayal of pathology in the female pelvis. The symptomatic yield of all the pelvic MRI assessments significantly depends on the cautious arranging of imaging planes utilized. The standard convention for pelvic imaging contains unenhanced Tl - and T2-weighted arrangements. Pelvic life systems is all around pictured on T2 weighted picture (T2WI) .MRI pictures should be gotten in at any rate two opposite planes for satisfactory assessment of the objective organs.

Treatment and prognosis

Of the Müllerian duct anomalies, a unicornuate uterus is considered to have the second worst obstetric outcome (worst with a septate uterus).

Spontaneous abortion rates are reported to range from 41-62%. Reported premature birth rates range from 10-20%. Fetal survival rate is ~40% (range 38-57%).

Differential diagnosis

- Bicornuate bicollis
  - two cervical canals
  - cannulation of only one of these canals may

mimic unicornuate uterus on a hysterosalpingogram

Discussion

Morphology, thickness and vascularity of the endometrium, just as the state of the uterine cavity influence the implantation pace of the developing lives. The danger of unconstrained premature delivery at the primary trimester in patient with unicornuate uterus is 28-45% [(1).] High commonness of uterine irregularities among ladies with repetitive premature birth had been recorded by a few specialists [(2, 3).]

Precise finding in patient with repetitive premature birth is so significant in light of the fact that the sorts of oddities decide the treatment. Sometimes, careful treatment may diminish drastically the danger of repetitive premature birth [(4).] Hysteroscopy is a method that can't be supplanted due to remedial reason. Moreover, it could assess the intrauterine depression which can't be acquired from ultrasounds. Then again, hysteroscopy is the highest quality level demonstrative procedure for endometrial pit variations from the norm, uncovering an uneven fallopian tube which isn't perceived in HSG or ultrasound assessment [(5).] As indicated by the consequence of 2DUS in the Moini et al study in 2013, clearly determination of different septate uterus isn't pointedly separate [(6).] Subsequently MRI is done in all instances of suspected septate uterus to affirm the analysis.

In our examination, after ultrasound, ladies with septate uterus were submitted to MRI, which is viewed as the most significant technique to identify uterine septum.

Conclusion

Though Ultrasound is the primary investigation which is easily available , cheap and non- radiation to screen and detect uterine anomalies with expert hands, Magnetic Resonance Imaging is more specific and sensitive for detection of Unicornuate Uterus than Ultrasound

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Spectrum of MRI Findings in Patients of Giddiness

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Abstract

Energy is a vague side effect or feeling that incorporates sensations, for example, faintness, wooziness, vertigo and unevenness. The reason for the examination was to assess the job of attractive reverberation imaging (MRI) in diagnosing the reason for happiness in symptomatic patients. A planned companion study was directed in 106 patients who gave happiness. X-ray sweeps of these patients were dissected, and we reasoned that MRI can effectively exhibit the noteworthy discoveries which cause happiness.

Keywords: *Brain, giddiness, Magnetic resonance imaging*

Introduction

Happiness is logically named as "discombobulation" which means disability in spatial recognition and soundness as characterized in Dorland's Medical Dictionary. Happiness is accounted for in around 20–30% of the populace sooner or later in the year 20091. Different pieces of the body are required for keeping up equalization including the inward ear, eyes, muscles, skeleton and the sensory system, so any turmoil or malady in these frameworks can show as what is generally alluded to as giddiness2. Regular physiological reasons for energy incorporate insufficient blood supply to the cerebrum because of an abrupt fall in circulatory strain or blood vessel blockage, misfortune or mutilation of vision or viewable signs, issue of the inward ear, bending of mind/apprehensive capacity by drugs, for example, anticonvulsants and sedatives2. Differential judgments of numerous conditions are related with happiness. The most widely recognized causes are as per the following: 40% fringe vestibular brokenness, 10% focal sensory system sore, 15% mental issue, 25% presyncope/dysequilibrium, and 10% vague giddiness3. Conditions that regularly present as happiness or have energy as a side effect include: considerate paroxysmal positional vertigo, Meniere's ailment, vestibular neuronitis, labyrinthitis, otitis media, mind tumor, acoustic neuroma, incessant movement ailment, Ramsay Hunt disorder, headache, different sclerosis, pregnancy, low pulse (hypotension), low blood oxygen content (hypoxemia), myocardial localized necrosis, iron inadequacy (frailty), low glucose (hypoglycemia), hormonal changes (e.g., thyroid malady, monthly cycle, pregnancy), alarm issue, hyperventilation, nervousness, gloom, age-reduced visual, parity and view of spatial direction abilities1-3 . Energy is a typical displaying manifestation in prescription and otorhinolaryngology outpatient offices. Most patients with happiness frequently experience issues portraying their side effects, subsequently deciding the reason can be testing. A proof based methodology utilizing learning of key history, physical assessment and radiologic discoveries for the reasons for energy can help build up a determination and think about fitting medications much of the time. At the point when the manifestation is headstrong to prescriptions, patients are constantly alluded for attractive reverberation imaging considers (MRI) of Brain. Attractive reverberation imaging (MRI) has been appeared to can possibly analyze or to decide out conditions that present as happiness. X-ray has better goals than different cross-sectional imaging procedures like figured tomography for perception of back fossa of mind where most focal sensory system ailment that causes happiness are available. The points of this examination were to record the discoveries in

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patients who experienced MRI mind for happiness as the exhibiting manifestation and to break down the affectability and particularity of MRI in diagnosing the reason for energy.[2]

Aims & Objectives of the Study

The objective of the study wasto evaluate the role of magnetic resonance imaging and spectrum of findings seen on MRI inpatients complaining of giddiness.

Materials and Method

The study was conducted in 106 patients who presented with complaint of giddiness (dizziness, vertigo, light headedness, imbalance) and referred for MRI to the Department of Radio Diagnosis. Majority of the referred cases were those who complaint of giddiness with neurologic signs and symptoms, risk factors for cerebrovascular disease, or progressive unilateral hearing loss. [4]

Inclusion Criteria

- Patients with complaint of giddiness.
- Patients willing to undergo this study.

Exclusion Criteria

- Patients not willing to undergo this study
- Pregnancy
- Claustrophobic patients

Clinical assessment was done including detailed history, physical examination and laboratory investigations for the causes of giddiness.

Subsequent MRI was done. For contrast enhancement, imaging was performed following intravenous injection of 0.1 mmol/kg of gadolinium.

Results and Observation

Table 1: Distribution of MRI findings in patients complaining of giddiness

S. No.	MRI Findings	No. of Cases	Percentage
1.	Semi-circular canal dehiscence	8	4.68%
2.	CP angle tumors	5	2.92%
3.	Mastoiditis	8	4.68%
4.	Posterior cerebral territory infarct	25	14.62%
5.	Cerebral atrophy	27	15.79%
6.	Small vessel ischemic changes	45	26.32%
7.	Venous sinus thrombosis	5	2.92%
8.	Vertebral artery stenosis/occlusion	1	0.58%
9.	Vertebrobasilar dolichoectasia	1	0.58%
10.	Benign intracranial hypertension	2	1.17%
11.	SOL (Space occupying lesion)	5	2.92%
12.	Intracranial hemorrhage	6	3.51%
13.	Non PCA territory infarct	13	7.60%
14.	Meningoencephalitis	1	0.58%
15.	Hypoxic ischemic encephalopathy	1	0.58%
16.	Normal	18	10.53%
	Total	106	100

MRI scans of 106 patients were analyzed and total 171 findings were seen that are known to cause giddiness. Out of 106 cases the most common finding on MRI was cerebral small vessel ischemic changes found in 45(26.3%) scans. 27(15.7%) scans had cerebral atrophy, 25(14.6%) patients had PCA territory infarct, 8(4.6%) scans had semicircular canal dehiscence, 8(4.6%) patients had mastoiditis and 5(2.9%) scans had CP angle tumors.

Other findings that were found includes intracranial haemorrhage found in 6(3.5%) scans, SOL found in 5(2.9%) scans, venous sinus thrombosis in 5(2.9%) scans and benign intracranial hypertension in 2(1.1%) scans. Overlap of findings in same scan was noted in many cases.[6]

Chart1: Distribution of MRI findings in patients complaining of giddiness

Chart 2: Number of patients with significant MRI findings VS Normal scan

Among the study group, 83 % (88) of the cases had significant MRI findings that are known to cause giddiness and 17 % (18) of the cases had normal MRI scan.

Out of 18 normal scans, 11 patients were clinically diagnosed as BPPV, cause of giddiness in 3 patients was psychological, 2 patients had orthostatic hypotension and after taking detailed history 2 patients were diagnosed with drug induced vertigo[10].

Findings

Giddiness is a common symptom which affects about 30% of people over the age of 65.[4] Benign paroxysmal positional vertigo, acute vestibular neuronitis, and Meniere's disease cause most cases of giddiness; however, physicians must consider other causes including cerebrovascular disease, semicircular canal dehiscence, migraine, psychological disease, perilymphatic fistulas, multiple sclerosis, and intracranial neoplasms. In these patients MRI scan is done to look for the cerebrum, cerebellum as well as for cerebello-pontine angle lesions and the internal auditory meatus.[6]

A descriptive cohort study was conducted on patients who present with complaint of giddiness (vertigo, light headedness, presyncope, and disequilibrium). In the present study 106 patients who presented with giddiness underwent MRI brain. MRI showed high sensitivity to visualize findings that were clinically significant and consistent with giddiness. We found that approximately 83% of scans had positive findings and 17% scans were normal. Kalsotra et al studied the findings on magnetic resonance imaging in patients with giddiness by evaluating MRI scans of 62 patients and reported 54.84% MRI scans as normal[5].

In the present study, most common finding was small vessel ischemic changes in 26.3% of the scans. In 2010 Papanikolaou et al. studied findings on MRI scans of patients presenting with audiovestibular symptoms. Subcortical white matter hyperintensive foci has been reported in 44% cases by Papanikolaou et al[6].

In present study the second most common finding was cerebral atrophy in 15.7%. Papanikolaou et al reported atrophy in 5.5% cases[6] while Kalsotra et al reported it in 3.22%[5].

Another significant and prevalent finding was posterior cerebral territory infarct in 14.6% scans and non-posterior cerebral territory infarct in 7.6% scans. Zoya Irfan Khan et al conducted retrospective study and analyzed MRI brain scans of 500 patients who presented with giddiness and reported acute infarcts in 8.4% cases[7].

In the present study semicircular dehiscence was seen in 8 (4.6%) scans which significantly attributes to giddiness. P. Browaeys et al. found that MR imaging has a sensitivity of 100% to depict semicircular canal dehiscence (SCD).

Mastoiditis was seen in 4.6% scans compared to 3% cases reported by Papanikolaou et al in his study.

In the present study CP angle tumors were visualized on MRI in 5(2.9%) scans.

Other findings include intracranial hemorrhage in 6(3.5%) scans, SOL in 5(2.9%) scans, venous sinus thrombosis in 5(2.9%) scans, benign intracranial hypertension in 2(1.1%) scans, meningoencephalitis in 1 scan (0.58%), hypoxic ischemic encephalopathy in 1 scan (0.58%), vertebral artery stenosis/occlusion in 1 scan (0.58%), vertebral artery stenosis/occlusion in 1 scan (0.58%) and vertebrobasilar dolichoectasia compressing over the midbrain in 1 scan (0.58%).

In the present study 45% were males and 55% were females out of which significant MRI findings were found in 50 males and 38 females.

Study conducted by Zoya Irfan Khan et al included 57.6% females and 42.4% males with age ranging between 36 to 74 years were found[7].

Current study comprised of patients between 6-94 years of age with mean age of 49.2 years. Majority of the cases i.e. 65% were in the age group of 21-60 years.

White matter hyperintensities and its progression, present in the MRIs of older people have been associated with hypertension and evidence suggests that WMHs occur because of arteriosclerosis within the wall of the arteriole.[8-11] Large arterial and small vessel disease of the cerebral circulation share risk factors, (e.g., hypertension, diabetes) and may coexist in individuals. People with uncontrolled and untreated hypertension had significantly greater white matter lesion progression than people with uncontrolled but treated hypertension.

In the present study 40 (37.7%) patients were known hypertensive. Out of 45 scans with small vessel ischemic changes (white matter hyperintensities) on MRI, 27 patients were hypertensive i.e. 60% of the cases with WMH were hypertensive. Out of 25 scans with PCA territory infarct on MRI, 15 patients were hypertensive i.e. 60% of the cases with PCA territory infarct were hypertensive. Out of 13 scans with non-PCA territory infarct on MRI, 10 patients were hypertensive i.e. ~ 77 % of the non-PCA territory infarct cases were hypertensive.

Conclusion

MRI has high sensitivity and can successfully demonstrate the significant findings which cause giddiness. Out of 106 cases, 83 % (88) of the cases had significant MRI findings that are known to cause giddiness and 17 % (18) of the cases had normal MRI scan.

Most common finding was small vessel ischemic changes and cerebral atrophy in these patients. PCA and non-PCA territory infarcts were among the other predominant findings.

Spectrum of other findings included semicircular canal dehiscence, mastoiditis, CP angle tumors, intracranial hemorrhage, SOL, venous sinus thrombosis, benign intracranial hypertension, meningoencephalitis, hypoxic ischemic encephalopathy vertebral artery stenosis/occlusion, vertebral artery stenosis/occlusion and vertebrobasilar dolichoectasia compressing over the midbrain.

Summary

Giddiness is a common presenting complaint of patients. MRI scan of these patients is done to look for possible treatable definitive cause. Out of 106 MRI scans, 83 % of the cases had significant MRI findings that are known to cause giddiness and 17 % of the cases had normal MRI scan. Most common finding was small vessel ischemic changes in 26.3% of the scans. Spectrum of other findings included cerebral atrophy, PCA & non-PCA territory infarcts.

MRI is a highly sensitive investigation to find out the cause of giddiness. Its benefit weighs more than its cost. So the patients with persistent giddiness must undergo MRI brain to find the cause and for further appropriate management.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Prevalence of Self-Medication Practices in Urban Area of Kancheepuram District, Tamil Nadu

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Abstract

Self-medication a worldwide problem[3] is common in developing countries like India and is an age old practice[2]. WHO has promoted practice of self-medication for effective and quick relief of symptoms without medical consultation, to reduce burden on health care services, which are often understaffed and inaccessible in rural and remote areas[2] In developed countries, the medicines which are available only on prescription of a medical practitioner are easily available over the counter in developing countries. Hence Self medication has become an important health issues in developing countries like India[4-7].

Keywords: *Medication, WHO, Self care*

Introduction

Self-medication or non-prescription of drug is an individual's medical behaviour towards self care that can do potential wellness and also be harmful[1] "Self-care practices in the form of self medication is nearly universal among every individual.About 75 percent or more of health care is undertaken without professional intervention. How ever without self-care, any system of health care would be swamped .The most crucial limitations in self-care functioning starts from the motivation, knowledge, custom and competence of the individual[2].

Self-medication a worldwide problem[3] is common in developing countries like India and is an age old practice[2]. WHO has promoted practice of self-medication for effective and quick relief of symptoms without medical consultation, to reduce burden on health care services, which are often understaffed and inaccessible in rural and remote areas[2] In developed countries, the medicines which are available only on prescription of a medical practitioner are easily available over the counter in developing countries. Hence Self medication has become an important health issues in developing countries like India[4-7].

Improper practice of self-medication due to **deficiency in knowledge** can lead to side effects especially in physiological conditions like lactation and pregnancy, and in extreme vulnerable ages, such as children and old age people[1].

Based on this background, the present study was carried out to find out the prevalence of Self medication in Urban area of Kancheepuram district in TamilNadu.

Materials & Method

Study Area:

The study was conducted in **Anakaputhur,** anUrban field practice area of Sree Balaji Medical College and Hospital in Kancheepuram district, Tamil Nadu.

Study design:

A Community based cross sectional descriptive study

Study Period:

The study was conducted between June 2017 to May 2018.

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Study Participants:

According to the 2011 census, Anakaputhur urban field practice area had a total population of 48,050 of which 24,158 were males , 23,892 were females . Total number of houses in Anakaputhur is 12,146. The study was done among adolescent and adults 15 years and above residing in the study area permanently at the time of the study.

Inclusion criteria:

All participants who were 15 years and above[8] and willing to participate in the study were selected

Exclusion criteria:

Those who were not willing to participate in the study were excluded.

Psychiatric patients,pregnent mother,severly ill patients were excluded from the study.

Study area:

Kancheepuram district is one among the 32 districts of Tamil Nadu. According to the census of India 2011,Kancheepuram district covers an area of 4433sq. km with a population of 39.98 lakhs comprising of 20.12 lakhs males and 19.8 lakhs females. Kancheepuram, the temple town is the headquarters of the district for administrative reasons, the district has been divided into 4 revenue divisions comprising of 11 taluks with 1137 revenue villages.

Anakaputhur is a Municipality city in the district of Kancheepuram, Tamil Nadu. It is divided into 18 wards for which elections are held every 5 years. The study was conducted in Anakaputhur which is the urban field practise area of Department of Community Medicine of Sree Balaji Medical College and Hospital (SBMCH), located at a distance of 7 kilometers from the institution with an area covering approximately 16 sq. Kilometers.

Sample size:

Sample size was calculated based on the study done by " Pushpa R Wijesinghe" in the year 2013 in Sri lanka which recorded the prevalence of self medication practice of 34%. Using this study prevalence as reference the sample size was calculated by using $4pq / [L]^2$formula

Adding 10% refusal rate the sample size obtained is 394 which is rounded up to 400. The sample collected during the study period was 424.

Sampling method:

Anakaputhur had a total population of 48,050 as per 2011 census. As per the data available in the UHTC register There were total of eighteen wards in Anakaputhur. The number of households 12146. The sampling technique followed for this study was systematic random sampling technique.

K = sample size in our study

N = Total no of households = 12146

n = sample size = 424

$K = N / n = 12146 / 424 = 28^{th}$. Every 28^{th} house were selected.

The name and address of the person was noted and was visited for the data collection. If the person corresponding to the number did not give informed consent or absent ,the next number was chosen and the next person was selected and interviewed. Likewise, 424 participants who gave informed consent and willingly participated in the study were identified.

Study tools:

A pre-tested structured questionnaire was used as a study tool to interview the study participants. The questionnaire was prepared in English and Tamil. It was conducted by face to face interview by the investigator himself and the responses were recorded in the questionnaire.

The questionnaire consisted of 6 sections relating to the details like socio-demographic characteristics, personal history and self-medication details,

Ethical approval:

The study was approved by Institutional Ethical Review Committee of Sree Balaji Medical college and hospital , Chennai .

Informed consent:

The details and purpose of the study and the confidentiality of their identity were explained to each and every participant those who were willing to participate in the study were required to sign the informed consent, after which they were included in the study . the informed consent was in Tamil ,the local

language of the study participants.

Statistical Analysis:

Data entry was done and analysed using SPSS software version 22

Findings

Table 1: Back ground characteristics of study participants.

Sl.no	Variables	Frequency N=424	Percentage %
1	AGE GROUPS		
	< 20 years	10	2.4
	21-30 years	70	16.5
	31-40 years	92	21.7
	41-50 years	66	15.6
	51-60 years	84	19.8
	61-70 years	82	19.3
	>70 years	20	4.7
2	SEX		
	Male	144	34
	Female	280	66
3	EDUCATION		
	Illiterate	170	33
	Primary school	192	45.3
	Secondary school	36	8.5
	Higher secondary school	56	13.2
4	OCCUPATION		
	Professional	18	4.2
	Skilled	38	9
	Semi skilled	142	33.5
	Unskilled	26	6.1
	Housewife	170	40.1
	Unemployed	30	7.1
5	PER CAPITA INCOME		
	Upper class	16	3.8
	Upper middle class	126	29.7
	Middle class	194	45.8
	Lower middle class	82	19.3
	Lower class	6	1.4
6	MARITAL STATUS		
	Married	408	96.2
	Unmarried	16	3.8
7	NO. OF FAMILY MEMBERS		
	≤ 4 members	336	79.2
	> 4 members	88	20.8
8	RELIGION		
	Hindu	368	86.8
	Christian	32	7.5
	Muslim	24	5.7

Age distribution:

The current study involves 424 study populations. In this study majority of the participant were female 66% (n=280) and 34% (n=144) of them were male. The study population belong to the age group of 20 to 70 years. About 21.7% (n=92) of them were between 31-40 years, 19.8 % (n=84)of them 51-60 years and 19.3% (n=82) of them belonged to 61-70 years. A minimum of 2.4% (n=10) of the population below 20 years and 4.7%(n=20) of them were above70 years of age.

Majority66% (n=280) of the study population were female and 34% (n=144) of them were male .Majority 45.3%(n=192) of them have completed primary school education , 33% (n= 170) of them were illiterate, 13.2% (n=56) have completed higher secondary education and 8.5% (n=36) have completed secondary school education. Majority of the study population 40.1% (n=170) was a home maker. 33.5%(n=142) of them was semiskilled worker. 9% (n=38) was skilled worker, 7.1% (n=30) was unemployed. A minimum of 4.2% (n=18) was professional by occupation.

Majority of the study population 45.8% (n=194) belonged to middle class. About 29.7% (n=126) Of them were upper middle class. About 19.3% (n=82) of them belonged to lower middle class. A minimal study population 1.4% (n=6) belonged to lower middle class.

About 96.2% (n=408) of the study population were married and a remaining of 3.8% (n=16) were unmarried. Majority 79.2% (n=336)of the study population the family had 4 members and below. About 20.8% (n=88) of them had more than 4 members in the family. Majority 86.8% (n=368) of the study population belonged to Hindu religion. About 7.5% (n=32) of them belonged to Christian and remaining 5.7% (n=24) of them belonged to Muslim religion.

Table2: **Prevalence of self-medication among the study participants**

Sl.no	Variables	Frequency N=424	Percen-Tage %
3	Treatment For Illness		
	Home remedy	24	5.7
	Sought medical care	146	34.4
	Self-medication	254	59.9

Among the study population majority 59.9% (n=254) of the study population followed over the counter medication for their treatment remedy.

Discussion

The present study is a cross sectional study , carried out in an urban field practicing area (Anakaputhur) of Sree Balaji Medical college and hospital, Kanchepuram district Tamil Nadu to determine the prevalence of self medication among people residing in an urban community

In the current study the age distributions of the study participant were between19 to 85 years with the mean age 47. Similar studies conducted by Kalaivani Annadurai et al. Nellikuppam Village, Kancheepuram District, Tamil Nadu (2017) which recorded mean age is 36.43years. In another study done by Saba HI et al. in Bengaluru, the age of the participants ranges from 15 to 60 years and above and the mean age is 37.8years. Ahmad et al. in his study done in Uttar Pradesh 18 to 60 and above. A study done by M. HYPERLINK "https://www.ncbi.nlm.nih.gov/pubmed/?term=Afridi%20MI%5BAuthor%5D&cauthor=true& cauthor_uid=26649022"IqbalHYPERLINK "https://www.ncbi.nlm.nih.gov/pubmed/?term=Afridi%20MI%5BAuthor%5D & cauthor= true& cauthor_uid=26649022"HYPERLINK "https://www.ncbi.nlm.nih.gov/pubmed/?term=Afridi%20MI%5BAuthor%5D&cauthor= true&cauthor_uid=26649022"Afridi, in Pakistan the study participants were 18 years and above[12]and the mean age is 33.49 years

The current study shows a maximum participant were female 66% and remaining 34% were male. This is similar to a study done by Kalaivani Annadurai et al. Nellikuppam Village, Kancheepuram District, Tamil Nadu (2017) where 73.13% of the participants where female . Saba HI et al.[11] Bengaluru, Karnataka,2016 67.64% .

Majority of the study population in the present study belongs to (86.8%) Hindu religion which is similar to study done by Kalaivani Annadurai et al in Nellikuppam Village, Kancheepuram District, Tamil Nadu (2017) where 92% of participants were Hindus. In a study done by Saba HI et al[11] in Barabanki 97.0%belonged to hindu religion.

In the presence study , 33% were illiterate, which is similar to the study done by Shyam sunder keshari et in Barabanki 2014, In which 38.7% of the study participants were illetrate

Over all the prevalence of selfmedication in the current study is59.9%. This prevalence is comparable with the studies conducted by Khan et al 2014 was 54.9% and Kalaivani Annadurai [7]et al in Puducherry 2014 was 53.43%. T Aqeel[1] et al in Pakistan 2014 was 61.2%.

Conclusion

In today's sophisticated medical world, self-medication is a double edged sword it is an alarming concept and its usage is increasing day by day[9]. Its usage would be safe, till the consumer who are using it, have sufficient knowledge[10] about its dose, time of intake, side effect on over dose Self-medication thus is a global phenomenon and a potential contributor to human pathogen resistance to antibiotics. Self-medication thus is a global phenomenon and a potential contributor to human pathogen resistance to antibiotics.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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A Study on Socio Demographic Profile of the Prisoners Lodged in Central Prison, Chennai

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Abstract

Wrongdoing is a man-made idea. Wrongdoing and its connection to different socio-statistic variables has been subject of discussion since days of yore. Wrongdoing is wide spread, different in nature and expanding in recurrence. The pace of wrongdoing is relentlessly expanding step by step everywhere throughout the world, India being no exemption. [1] Crime and its connection to different socio statistic and financial elements decide the idea of wrongdoing. It is a subject of changing frames of mind after some time inside a given society, and worldwide and national contrasts between the social orders. For instance, murder might be generally unlawful, aside from now and again of war, yet will-completely finishing the life of an in critical condition individual might be lawfully allowed in certain nations, yet is a wrongdoing of homicide in others. In the foreword to the 2002 World Report on Violence and Health, Nelson Mandela expresses, "The twentieth century will be recognized as a century set apart by viciousness, envy, vengeance, strength, and sexuality (for example assault) which are the all inclusive human behaviors.2

Keywords: *Crime, Nelson Mandela expresses*

Introduction

Social essentialness of both work and wrongdoing change significantly over the existence course. The connection among work and criminal conduct at various life-course stages influences the idea of wrongdoing. Joblessness is one of the social elements engaged with production of wrongdoing and conviction. Likewise when an individual is perpetrating a wrongdoing and getting detained he loses the employment and gaining, which influences the family's financial condition.[3]

There have been different research studies looking at the connection between financial status and captures and disciplines. At any rate financial status is freely viewed as a hazard factor. There are different research studies setting up the causal connection between financial status and capture. Elizabeth Brown and Mike Males, creators of "Ages or Poverty Level Best Predict Criminal Arrest and Homicide Rates?" found that "neediness level is an essentially bigger indicator of capture and manslaughter hazard than age. They explicitly took a gander at the information interfacing age to capture and afterward contrasted that with accessible information related with financial status.[4]

Wrongdoing is a result specifically compelling. A significant part of the wrongdoing in the nation can be credited to the issues and issues hurled by the ramifications of advancement hardships of the advantages and products of improvement interests by and large prompted variations bringing about the culpability and unrest.[5]

Indian culture has been going through intense and central changes in the wake of industrialization, westernization and urbanization, both in the structures, financial and social circles which not just delivered a changed physical condition and another type of monetary association yet in addition influenced the social request, solidarity, human direct and thought. Wrongdoing, which

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is one social wickedness, which majors consequences for human relations, happens because of the absence of social solace and the general state. Handling wrongdoing can be accomplished uniquely from a multidisciplinary point of view, to feature every one of its highlights. One can stress the aversion arrangements to battle against debasement at the social level, the building up of blame, the correct positioning of the offense or, much more intricately, think about the types of fear based oppression appearance. Challenges in conceptualizing wrongdoing get from its different indications, both for foundations and people, with significant impacts and results on the financial, social and lawful sense. The etiological and causal view of wrongdoing requires the mastery of criminal disposition determination.[6]

Understanding the decent variety of the interior causes, by considering singular human instinct and outer causes pointed towards social, monetary, legitimate or political elements, is fundamental to catch the causal determinism of wrongdoing. Thus, the consideration is centered around the monetary benchmarks, instruction or populace thickness appropriation in urban and rustic areas.[6]

It is hard to land at a fair appraisal of the wrongdoing issue an evaluation that assesses the numerous different expenses and advantages of the significant social changes that have additionally made wrongdoing a conspicuous national issue. For arranging any counteractive action and control techniques, in regards to wrongdoing and to lessen viciousness and different types of wrongdoing, the information of socio-statistic variables and crimes ought to be understood.[6]

The Living conditions in each jail and united foundation implied for the care, care, treatment and recovery of guilty parties will be good with human poise in all angles, for example, settlement, cleanliness, sanitation, nourishment, garments, and restorative offices.

Congestion exacerbates condition for detainees. According to information of 2015 by National Criminal Records Bureau (NCRB), detainment facilities of India having an absolute limit of 3,66,781 while genuine number of detainees living in penitentiaries was 4,19,623.7

Consequently we have chosen to do an examination on jail populace to investigate the components and determinants of wrongdoing and the wellbeing status of the detainees which were not investigated much in Tamil Nadu prior.

Aim and Objectives

To study the socio demographic profile of the life convicts lodged in the central prison Puzhal, Chennai.

Materials & Method

A study conducted by Vinod kumar and UshaDatria among prisoners in central prison kota, Rajasthan in 2013 has found that the prevalence of psychiatric morbidities among them to be about 33%.[8]This prevalence was taken as the reference value for calculating the sample size for this study. The sample size was calculated using the formulaN = 4 PQ/ [L] 2

The sample size calculated was 353.76, by adding 10% for non-response rate (353.76+35.3) and the final sample size derived was 388 which was finally rounded off to 400. [N = 400]

Stratified random sampling (proportional stratified random sampling) technique was used to identify the study subjects. A pretested structured questionnaire was used as study stool for data collection. The questionnaire was prepared in English and translated to Tamil.

The data analysis was done using descriptive and analytical statistics. Data was entered in Microsoft excel and data analysis were done using the SPSS software, version 22. The descriptive statistics analysed were presented as frequency distribution and percentage.

The descriptive data were presented in the forms of tables (frequency and percentage) and figures.

Results and Discussion

Table 1: Socio demographic profile of the study participants.

S/No	Characteristics	Frequency (N=400)	Percentage
1	Age Group		
	Less than 30	44	11.0
	31-40	131	32.8
	41-50	138	34.5
	51-60	64	16.0
	More than 61	23	5.8
2	Place of Residence		
	Urban	230	57.5
	Rural	170	42.5

Cont... **Table 1: Socio demographic profile of the study participants.**

3	Type of Family		
	Nuclear	224	56.0
	Three generation	140	35.0
	Joint	36	9.0
4	Religion		
	Hindu	317	79.3
	Christian	32	8.0
	Muslim	43	10.8
	Others	8	2.0
6	Marital status		
	Single	113	28.3
	Married	211	52.8
	Divorcee	20	5.0
	Separated	56	14.0
7	Education		
	Professional	1	0.3
	Graduate	19	4.8
	Diploma	18	4.5
	High school	60	15.0
	Middle school	212	53.0
	Primary school	59	14.8
	Illiterate	31	7.8
8	Occupation		
	Profession	3	8.0
	Semi-profession	7	1.8
	Clerical	6	1.5
	Skilled	45	11.3
	Semiskilled	169	42.3
	Unskilled	165	41.3
	Unemployed	5	1.3
9	Socio-economic status (B.G.Prasad Classification)		
	Upper class	66	16.5
	Upper middle class	76	19.0
	Middle class	117	29.3
	Lower middle class	85	21.3
	Lower class	56	14.0

Table 1 demonstrates the sociodemographic profile of the examination members, which incorporates age, spot of habitation, sort of family, religion, conjugal status, training and occupation. About 67.3% (269) of the investigation members have a place with the age gathering of 31-50 years, the old populace i.e over 60 years is around 5.8%.

The greater part (57.5%) of the members were dwelling in urban regions. Around 56% (224) of them were from atomic kind of family and just 9% (36) were from joint family. Dominant part (79.3%) of the examination populace has a place with Hindu religion. Almost 28.3% (113) of the examination members were as yet unmarried as a result of their more drawn out span of detainment, 5% (20) were divorced people and 14% (56) were isolated.

About 90% of the examination members were from the school level (not exactly the higher auxiliary level); also, 89% of them were from the incompetent class of occupation. As indicated by B.G Prasad Socioeconomic status grouping almost 29.3% (117) of the members have a place with white collar class, 21.3% (85) and 14% (56) of the investigation populace has a place with lower center and lower class separately and about 16.5% (66) of them has a place with upper financial status.

Comparative outcomes were found in an investigation done by Fotedar S et al at Kanda model prison, Shimla which additionally demonstrated the mean age of the populace were 40.8 years and 56.5% of the examination populace has a place with the middle age gathering of 36-50 years of age.9

The investigations done by Kumar V, Daria U and Shrestha G et al demonstrated that around 43% in every examination the investigation members were from urban foundation.

Comparative outcomes were found in the examination done by Shrestha G et al in Regional jail in Nepal, demonstrated that 21.5% of the members were ignorant, and in the investigation done by Reddy S et al, demonstrated that 86% of the investigation members were instructed not exactly secondary school level.10,11

Conclusion

Though the diseases were reported alarmingly high among the prisoners, when compared to general population shows that, health of the prisoners still continues to be a neglected health care. This may be due to undetected, under-detected and under-treated of the illness in the prisoners since they are a neglected group.

Informed Consent: Obtained in Local language

Ethical approval: Obtained in Instituitional ethical committee

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Crouzon Syndrome – A Case Report

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Abstract

Crouzon disorder was first detailed by a French neurosurgeon in the year 1912. Crouzon disorder is an uncommon hereditary issue. It is acquired as an autosomal predominant attribute. The sutures in the human skull meld after the total development of the cerebrum, however on the off chance that any of these sutures close rashly, it might then meddle with the development of the mind. Crouzon disorder is described by craniosynostosis, with related dentofacial oddities. This report depicts the different clinical and radiological highlights in a multi year old male kid, with specific reference to the trademark discoveries of this disorder.

Keywords: *Crouzon syndrome, craniosynostosis, brachycephaly.*

Introduction

Crouzon disorder has a frequency of around 1 out of 25,000 births all around [1]. It is a type of craniosynostosis and establishes 4.8% of all instances of craniosynostoses [2]. Crouzon disorder is because of untimely combination of the coronal sutures and this outcomes in brachycephaly. The sickness is related with dentofacial irregularities [3]. The differential determination of Crouzon disorder incorporates Apert disorder, Chotzen and Carpenter disorder. Crouzon disorder is recognizable from the different craniosynostosis disorders by the absence of irregularities in the hand and foot [4].

Case Report

A multi year old male kid gave history of irregular shape the head and facial appearance. There was history intermittent migraine. On assessment the kid had brachycephaly, frontal bossing, unmistakable eyeballs and hypoplasia of the maxilla. X-beam skull sidelong view demonstrated beaten silver appearance showing raised intracranial weight brought about by melded sutures. X-ray cerebrum demonstrated diminishing of the cerebral cortex with combination of the privilege and left coronal sutures with a shallow orbital fossa. Crouzon disorder was analyzed dependent on clinical and radiological discoveries. Since the youngster had indications of raised intracranial weight, she was alluded to the neurosurgery group. Craniectomy was done to discharge the coronal sutures. This would give satisfactory cranial volume to permit ordinary cerebrum development. On follow up the youngster was without manifestation with no cerebral pain and improvement in the facial appearance.

Findings

With the approach of sub-atomic hereditary examinations, the quality for Crouzon disorder is restricted to the fibroblast development factor receptor II quality (FGFR 2) at the chromosomal locus 10q 25.3-q26 [5,6]. Early pre-birth conclusion testing for (FGFR 2) quality in the fetal DNA alongside pre-birth ultrasonogram may help in giving hereditary advising [7]. A late conclusion of Crouzon disorder may bring about different intricacies like flawed mental health, mental hindrance and facial deformations [8].

Conclusion

An understanding of these abnormalities and the associated problems is necessary to diagnose and treat this syndrome at an early age to prevent complications.

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Acute Phenytoin Intoxication In A 4-Year Old Mimicking Viral Meningo-Encephalitis

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Abstract

We report here the instance of a 4-year-old female preschooler who introduced to the division of Pediatrics, SreeBalaji Medical College and Hospital, Chennai with summed up tonic-clonic seizures and history of spewing, fractiousness and dysarthria of brief span. On assessment she was seen as responsive just to difficult upgrade, had terminal neck solidness and reciprocal extensor plantars. In perspective on her clinical introduction, an underlying determination of viral meningo-encephalitis was made in the crisis room and the youngster treated appropriately. On consequent exchange to the emergency unit), (the guardians uncovered extra history of a senior kin taking phenytoin for seizures. In this way, a doubt of intense phenytoin lethality was made and phenytoin levels sent for affirmation. Her serum phenytoin level was 80 µgm/mL (typical: 10–20). The kid was overseen moderately and released following 5 days of hospitalization. We announced this case to feature the unordinary introduction of this uncommon inebriation.

Keywords: *phenytoin, unordinary introduction, spewing*

Introduction

Phenytoin is a usually recommended anticonvulsant used to treat most sorts of seizure issue and status epilepticus, except for nonattendance seizures. Phenytoin digestion is portion subordinate. End pursues first-request energy at low medication fixations, and zero-request energy at higher medication focuses which conveys an extraordinary danger of portion related poisonous quality that is a significant issue in crisis medicine.1 Its wide pharmacokinetic changeability and restricted remedial range regularly prompts harmfulness which may have fluctuated indications. The highlights of intense harming are not quite the same as that of chronic.1 We report the one of a kind instance of a youngster who gave highlights of intense phenytoin harmfulness mirroring meningo-encephalitis.[1]

Case Presentation

A 4-year-old female youngster exhibited to the Department of Pediatrics in our emergency clinic, with objections of two scenes of summed up tonic-clonic seizures related with up-moving of eye balls and foaming going on for 10 min pursued by a postictal loss of awareness of 20 min. The guardians additionally gave history of retching, quick eye developments, hypotonia, fractiousness, dysarthria and dysphagia of 4-days span. The manifestations were noted by the mother after the kid woke up from rest. There was no history of fever, looseness of the bowels, hack, cold, injury, hound nibble, poison presentation or medication consumption imminent at affirmation. Previous history was non-contributory. The youngster wasborn out of a non-consanguineous marriage, and was fourth in the birth request. Her advancement was proper for her age. Her hemodynamics were steady with a pulse of 98/min, respiratory pace of 26/min and circulatory strain of 96/60 mm Hg.[2] Neurologic assessment uncovered a Glasgow Coma Scale score of 9, fractiousness, terminal neck firmness, flat nystagmus, diminished engine control, ordinary knee and misrepresented lower leg yanks respectively. Rest of the fundamental assessment was typical. In perspective on the above clinical range, at first, a temporary finding of viral meningo-encephalitis was made in the crisis room. Be that as it may, on ensuing exchange to the ICU (after 5 h) the guardians educated us that the senior kin (a 6-year-old kid) was

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taking phenytoin syrup at 5 mg/kg/day. Along these lines, a doubt of phenytoin inebriation was made and serum phenytoin levels sent likewise for affirmation.

Investigations:

Her initial investigations revealed normal blood glucose levels (random blood sugar −108 mg/dL), normal complete blood count, normal blood bio-chemistry (serum electrolytes, liver function tests, kidney function tests), normal arterial blood gases, electrocardiogram and chest x-ray. Her cerebrospinal fluid was acellular, with protein of 96 mg/dL and sugar of 88 mg/dL. The serum phenytoin levels sent on suspicion of acute phenytoin toxicity was 80 μg/mL (normal 10–20 μg/mL).[3]

Treatment:

The child was managed conservatively and closely monitored for side effects of the drug, especially cardiovascular and neurological. For her seizures, she was given midazolam, and loading and maintenance doses of valproate, as in our unit we often start valproate as first-line agent for generalizedtonic-clonic convulsions.[4] No antibiotics were used. The child started showing signs of improvement from day 2 of admission, vomiting and hypotonia resolved, motor power and consciousness improved by day 3. She was able to walk by day 4 of stay although ataxia, tremors and nystagmus persisted with diminished severity. Her repeat serum levels prior to discharge had dropped to 24 μg/mL.

Outcome And Follow-Up:

The child was discharged after 5 days of ICU stay after she made complete recovery. At discharge, only mild dysarthria persisted. Repeat phenytoin levels after 1 week of discharge showed no traces of the drug. A MRI of the brain has been planned forthe child after a gap of 6 months, as cerebellar atrophy may be a late complication in such cases.[5]

Findings

Phenytoin is hydroxylated and changed over to the para isomer of 5-hydroxy-phenyl-5-phenylhydantoin (p-HPPH) in the liver and is discharged as the glucuronide conjugate of p-HPPH in the pee. This is a saturable procedure. The time when immersion happens is erratic and shifts among people. When soaked, the serum phenytoin fixation ascends in a curvilinear way. This is the reason little additions in portion can cause an enormous increment in the serum phenytoin level in numerous patients. The limited helpful file, the wide between individual changeability in the pace of phenytoin digestion and leeway, and the immersion (zero-request) pharmacokinetics of phenytoin are in charge of the watched portion related toxicity.[6]

This case was irregular as there was no history of phenytoin consumption imminent at affirmation. The case could have effectively been missed as meningo-encephalitis, and the kid could have been begun on phenytoin for seizures which could have prompted further harm. This viably focuses at the significance of history taking, with expanded level of doubt towards phenytoin poisonous quality, given the wide range of clinical introductions of phenytoin lethality. Phenytoin poisonous quality happens much of the time with the standard focal sensory system introduction of nystagmus, ataxia, slurred discourse, diminished coordination and seizures. Cardiovascular poisonous quality has been related with the intravenous type of phenytoin, however has not been seen with the oral form.[2] This could likely be the purpose behind nonappearance of highlights of cardiovascular danger found in our patient. As phenytoin is a known hepatic compound inducer, it might influence the digestion and serum convergences of thyroid hormones and cause highlights of hypothyroidism.3–5 Gastrointestinal variations from the norm related with phenytoin harmfulness have not been recorded in the writing. Be that as it may, gastrointestinal irregularities have been related with hypothyroidism[6 7] which may happen optionally in these cases.[7]

Intense phenytoin danger is known to show with such an assorted cluster of neurological signs and side effects that, a high list of clinical doubt, combined with estimation of serum phenytoin levels are basic to clarify its range. The most successive neurological discoveries detailed incorporate nystagmus (95%), ataxia (88%), torpidity (22%) and seizures (19%), which were all found in the kid. Less normally, development issue, ophthalmoplegia, opsoclonus, cerebellar decay, reversible central neurological deficiencies present as difficulties of intense phenytoin inebriation from time to time.8 In grown-ups, the soonest indication of inebriation is nystagmus (level >20 μg/mL) trailed by dysarthria and ataxia (level >30 μg/mL). On the off chance that the level transcends 40 μg/mL lethargy may occur.9 Seizures have been accounted for at levels >30 μg/mL.10 It is vital in kids that the standard dangerous reactions, for example, nystagmus, happen at elevated

levels just, while ataxia may go before the former.9 Chronic phenytoin poisonous quality may copy different neurological issue, as cerebellar and brainstem sores, or subarachnoid haemorrhage,11 however there have been cases announced of cerebellar decay following intense overdose of phenytoin, in the light of which such a probability must be remembered in patients of intense phenytoin toxicity.[12]

The backbone of treatment for a patient with phenytoin inebriation is strong consideration. Treatment incorporates looking after vital functions, the executives of queasiness and heaving, and anticipation of wounds because of perplexity and ataxia. There is no antitoxin, and there is no proof that any strategy for gastrointestinal purification or upgraded end improves result. Actuated charcoal ought to be considered if the patient introduces early; notwithstanding, the job of different portion initiated charcoal is disputable. Exploratory investigations have demonstrated expanded leeway rates, however this impact has not been converted into clinical advantage. There is no proof that any intrusive technique for upgraded end, (for example, plasmapheresis, hemodialysis, or hemoperfusion) gives any benefit.[13] Seizures because of phenytoin inebriation are overseen by phenytoin withdrawal,[14] benzodiazepines can be utilized for controlling continuous seizures.[13]

Conclusion

Acute phenytoin intoxication may mimic acute viral meningo-encephalitis in children.

- There is no antidote.
- Seizures are best managed by drug withdrawal, benzodiazepines.
- Patient should be kept under follow-up to look for neurological complications like cerebellar atrophy.
- Parents should be educated time and again about the importance of prevention of such injuries as these are best prevented.

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Conflict of Interest - Nil

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Evaluation of Anemia in Pregnant Mothers in Correlation with Anthropometry Measures in Tertiary Care Hospital

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Abstract

Introduction: In creating nations, maternal paleness during pregnancy has been accounted for to build the danger of the ominous fetal result. As indicated by the standard set somewhere around WHO, paleness in pregnancy is available when the hemoglobin fixation in the fringe blood is 11gm/100ml or less. Measure of iron moved to the baby is unaffected regardless of whether the mother experiences iron inadequacy pallor, yet the occurrence of low birth weight babies and pre 6 develop births are normal.

Aim of the Study: To correlate anthropometry measures with anemia in pregnant mothers.

Materials and Method: The examination was directed in the Department of Pediatrics and Department of Obstetrics and Gynecology at Sree Balaji Medical College and Hospital, Chennai from April 2017 to March 2018.100 term singleton neonates and their moms satisfying the consideration and prohibition criteria. A careful physical assessment of the neonate including anthropometry (Weight, Length, Head Circumference, and Chest Circumference) was finished.

Results: By using the Pearson correlation there is no relationship between the mother's Hb value and Baby's Head circumference where r value was -0.033 which was not statistically significant $p>0.05$. This shows that the baby's Head circumference values were not correlated with mother's Hb value. There is no relationship between the mother's Hb value and Baby's Length's. p value was 0.06 which was not statistically significant $p>0.05$. This shows that the baby's Length was not correlated with mother's Hb value.The baby's chest circumference was also not correlated with mother's Hb value.

Conclusion: The birth weight, head perimeter, chest outline, mid-arm circumference, and crown-heel length were fundamentally low in babies destined to ladies with moderate and extreme pallor in contrast with newborn children destined to non-pallid ladies. The development hindering impact of maternal iron deficiency was more on fetal birth weight and mid-arm outline than on other anthropometric lists.

Keywords**:** *Birth Weight, Anemic Mothers, Hemoglobin Level, Cord Blood Sample.*

Introduction

In the creating nations, sickliness is one of the significant general medical issues in all the age gatherings. Of these, the most helpless gathering is pregnant ladies. There are different reasons for pallor in pregnant women1. Among the different causes, wholesome frailty is the commonest one, especially in creating nations like India. In South-East-Asia locale, over 70% of pregnant ladies experience the ill effects of nourishing pallor.2Iron-inadequacy weakness is the commonest nourishing paleness influencing pregnant ladies. It might predate origination, frequently bothered by pregnancy and conveyance. 3One of the essential points of antenatal consideration is to anticipate and treat frailty during pregnancy since the wellbeing of work and

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the puerperal state, and the conveyance of a sound infant and Neuro-Developmental result relies on the condition of the patient's hematological reserve.4Even however normal iron supplementation is routinely suggested by the medicinal services frameworks in our nation, this guidance is frequently disregarded making the pregnant ladies lacking in iron stores. The exchange of iron from the pregnant ladies to the hatchling **happens** over the placenta against a fixation gradient.5Iron from the mother is the main hotspot for the baby; it is extremely clear that the iron status of the mother will influence the iron status of the neonate. Different examinations have been directed till now, to explore the connection between the mother and the neonate as to the iron status6

Materials and Method

The study was conducted in the Department of Pediatrics and Department of Obstetrics and Gynecology at Sree Balaji Medical College and Hospital, Chennai from April 2017 to March 2018.100 term singleton neonates and their mothers fulfilling the inclusion and exclusion criteria. A thorough physical examination of the neonate including anthropometry (Weight, Length, Head Circumference, and Chest Circumference) was done**.**

Results

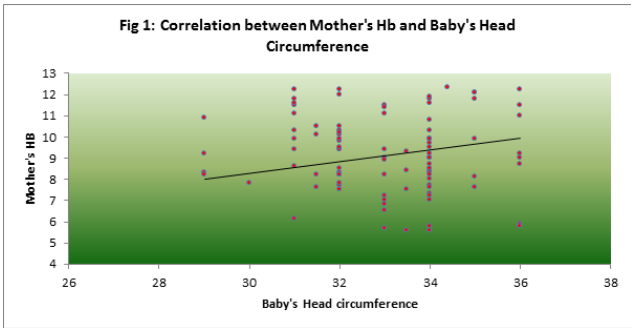


Fig 1 Correlation of Mother's Hb with Anthropometry of the Baby

By using the Pearson correlation there is no relationship between the mother's Hb value and Baby's Head circumference where r value was -0.033 which was not statistically significant p>0.05. This shows that the baby's Head circumference values were not correlated with mother's Hb value.

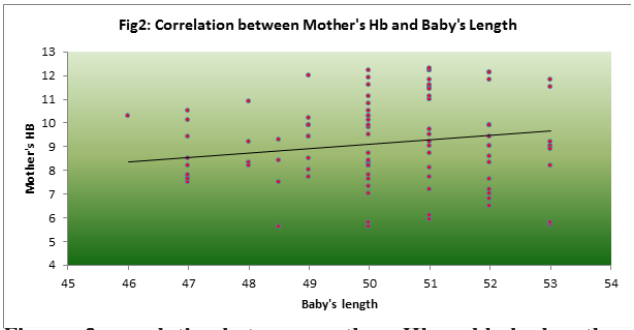


Figure: 2 correlation between mothers Hb and baby length

By using the Pearson correlation there is no relationship between the mother's Hb value and Baby's Length. The value was 0.06 which was not statistically significant p>0.05. This shows that the baby's Length was not correlated with mother's Hb value.

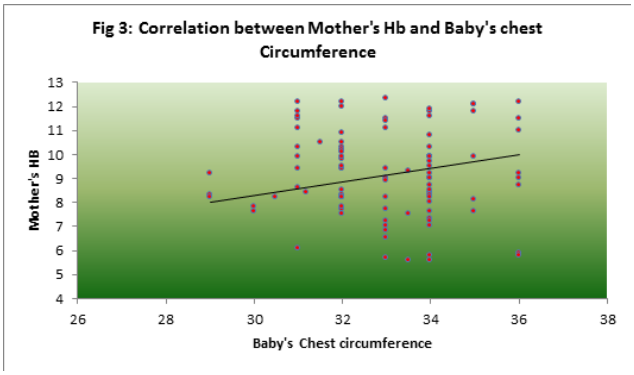


Figure: 3 Correlation Between Mothers Hb and Babys Chest Circumference

By using the Pearson correlation there is no relationship between the mother's Hb value and Baby's chest circumference r value was -0.05 which was not statistically significant p>0.05. This shows that the baby's chest circumference was not correlated with mother's Hb value.

Findings

Iron is effectively moved from the pregnant ladies to the embryo. In ladies with iron-lack, there is up regulation of certain proteins moving iron in the placenta. This guarantees a sufficient inventory of iron to the developing fetus7. This clarifies higher iron and ferritin esteems in the line blood, contrasted with the maternal blood, even in moms with extreme iron-lack. In any case, the straight connections of iron and ferritin levels of the string blood with the maternal hemoglobin, iron and ferritin levels demonstrate that the embryo collects iron in direct extent to the levels accessible in the mother. In this way it appears to be placental iron vehicle instruments are not intact, and in cases with serious paleness these systems may fall flat, prompting a lacking

iron stockpile to the baby.8Among 100 moms 9(9%) moms were in serious iron deficiency, 61(61%) were in gentle paleness, (10 %) were in moderate weakness and 20(20%) moms were typical. This information demonstrates that 80% of the pregnant moms were pale. Pregnant ladies with hemoglobin levels more noteworthy than 11 g/dl, which is viewed as typical, brought forth neonates with ordinary weight, while pregnant ladies with lower hemoglobin levels (< 9 g/dl), who were viewed as weak brought forth low birth weight babies. [9] Risk factors for LBW are numerous and differed. Statistic hazard elements incorporate youthful maternal age, primiparity, and low training. Maternal healthful status both previously and during pregnancy is a well-perceived determinant of birth results. Just two markers, specifically maternal pre-pregnancy weight list and weight gain during pregnancy have indicated predictable positive relationship with newborn child birth weight. 10Reports from created and creating nations demonstrate that maternal anthropometric estimations are related with birth outcome. This was as per Mavalankar et al who demonstrated that moms with iron lack paleness had a 3 times more serious danger of bringing forth babies with low birth weight. 11Another study has announced that the birth weight, head periphery, chest outline, mid-arm boundary, and crown-heel length were essentially lower in newborn children destined to frail mothers.12For assessing the impact of maternal iron lack on neonates, some neonatal parameters like birth weight, length, head circuit, and chest perimeter were considered as development indices. 13,14Pregnant ladies who got iron enhancements have been accounted for to have heavier infants by Neggers Yet al. The present examination showsa factually critical relationship between's maternal hemoglobin the neonatal birth weight. there was no factually huge relationship of head perimeter, length and chest boundary with the maternal hemoglobin levels.15In the investigation by Osrin D, et al. they have detailed a noteworthy relationship between's the neonatal head outline and the maternal frailty. Be that as it may, they didn't report any relationship between's the birth weight and maternal anemia16

Conclusion

The birth weight, head boundary, chest circuit, mid-arm circumference, and crown-heel length were altogether low in babies destined to ladies with moderate and extreme iron deficiency in contrast with newborn children destined to non-pale ladies. The development hindering impact of maternal iron deficiency was more on fetal birth weight and mid-arm perimeter than on other anthropometric records.

Acknowledgment: The author would like to thank the whole team at the NICU, Department of OG, Paediatrics Department's Clinical and Experimental Research Centre of Sree Balaji medical college and research center for helping with data collection and laboratory analyses.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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A Various Etiologies of Intestinal Obstruction – A Case Series

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Abstract

Background: Gut hindrance stays one of the most well-known intra-stomach issues looked by general specialists in their training whether brought about by hernia, neoplasm, bonds or identified with biochemical unsettling influences intestinal impediment of either the little or huge gut keeps on being a noteworthy reason for horribleness and mortality. To distinguish and break down the different etiologies of patients with intense intestinal obstacle.

Objective: To analyse the various etiologies of intestinal obstruction.

Materials and Method : The investigation was led in Sree Balaji Medical College and Hospital, Chennai over a time of 19 months in all patients conceded with intestinal deterrent independent of age gathering.

Results: The examination gathering comprised of 50 instances of intense intestinal block in all the age group. The commonest reason for intestinal hindrance in the grown-ups in this investigation arrangement was deterred Hernia (42%) trailed by post operative adhesions(30%).

Conclusion: The investigation gathering comprised of 50 instances of intense intestinal impediment in all the age group. The commonest reason for intestinal block in the grown-ups in this examination arrangement was discouraged Hernia (42%) trailed by post operativeadhesions(30%).

Key words: *intestinal obstruction, hernia, postoperative adhesions.*

Introduction

Entrail hindrance stays one of the most widely recognized intra-stomach issues looked by general specialists in their training whether brought about by hernia, neoplasm, grips or identified with biochemical unsettling influences intestinal impediment of either the little or huge gut keeps on being a noteworthy cause of bleakness and mortality[1]. They represent 12% to 16% of careful affirmations for intense stomach objections. Indications of intense intestinal check can run from a genuinely decent appearance with just slight stomach inconvenience and distension to a condition of hypovolemic or septic stun (or both) requiring a crisis activity. The demise because of intense intestinal impediment is diminishing with better comprehension of pathophysiology, improvement in analytic strategies, liquid and electrolyte amendment, much powerful enemy of microbials and learning of concentrated consideration[2]. The majority of the mortalities happen in older people who look for late treatment and related prior maladies like, diabetes mellitus, cardiovascular sicknesses or respiratory disease. Early analysis of obstacle, legitimate system during medical procedure and escalated postoperative treatment convey a thankful outcome.

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Materials and Method

The examination was led in Sree Balaji Medical College and Hospital, Chennai over a time of 19monthsin all patients conceded with intestinal

hindrance independent of age gathering[3]. Study structure - Prospective observational study. Patients who were having sub acute intestinal obstacle treated moderately were prohibited from the examination, and just those instances of intense intestinal hindrance which were overseen precisely were concentrated to set up the pathology of intestinal deterrent with a mean to know the method of introduction, physical discoveries, radiological and hematological discoveries, usable discoveries and result of intense intestinal obstruction. After the affirmation of the patient, clinical information were recorded according to Proforma[4]. The determination essentially dependent on clinical assessment and regularly bolstered by hematological and radiological assessments.

Findings

Table 1: Causes of intestinal obstruction in adults

Clinical condition	Number of cases	Percentage
Obstructed hernia	21	42
Postoperative Adhesions	15	30
Volvulus	2	4
TB abdomen	2	4
Malignancy	7	14
Intussusception	2	4
Mesenteric ischaemia	1	2
Total	50	100

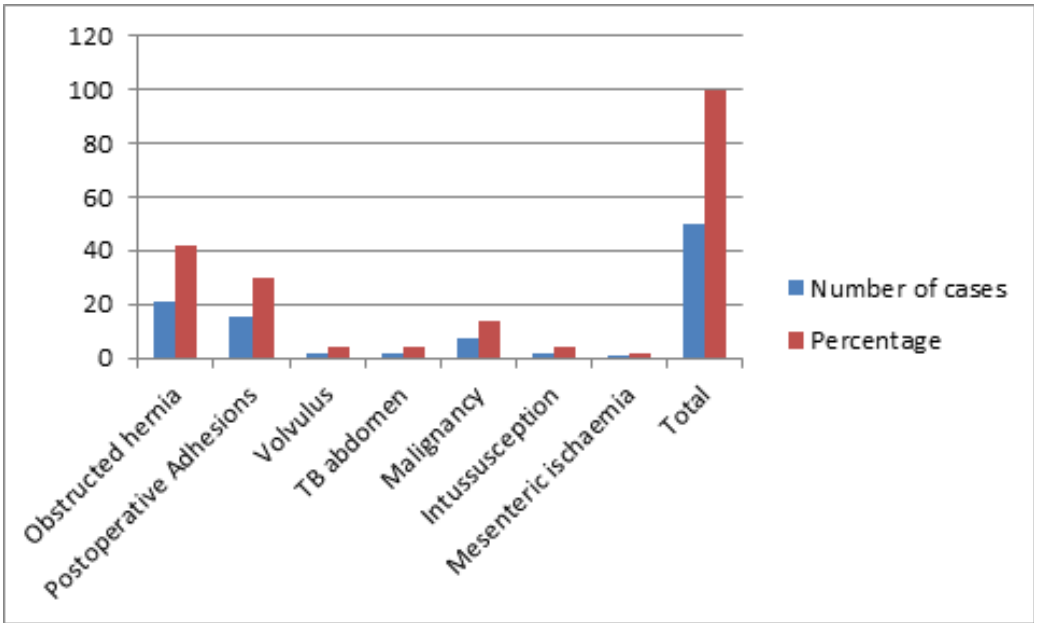


Figure 1: Causes of intestinal obstruction in adults

The most widely recognized reason for intestinal deterrent in our examination was Obstructed hernia. The following normal was Postoperative Adhesions. Different conditions incorporate harm, tuberculosis, intussusception, volvulus, mesenteric ischaemia in dropping recurrence[5].

Discussion

In our clinical examination occurrence of intense intestinal obstacle is 0.95% of complete careful cases[6]. In SouvikAdhikari et al. arrangement occurrence was 9.87% of absolute careful cases. In Bhargava Anderson's

arrangement rate was 3% of all out careful cases. The commonest cause was seen as blocked/strangulated hernia, trailed by post usable attachments, threat, intussusception, volvulus, tuberculosis and mesenteric ischaemia[7]. In creating nations like India, the commonest cause used to be hindered/strangulated hernia.

Table 2: Comparison of etiology with other studies

Cause	Souvik Adhikari	Jahangir	Arshad M. Malik	Cole GJ	Brooks And 48 Buttler	Playforth49 1970	Present Study
Hernia	36%	34%	19%	35%	25%	23%	42%
Adhesions	16%	49%	41%	10%	23%	54%	30%
Volvulus	6%	5%	4%	3%	1%	3%	4%
Tuberculosis	14%	1%	24%	3%	-	-	4%
Malignancy	17%	3%	2%	9%	5%	9%	14%
Intussusception	2%	6%	-	12%	18%	5%	4%
Mes.Ischaemia / Miscellaneous	9%	2%	10%	-	-	6%	2%

In the present examination, hindered/strangulated hernia is the commonest reason for intestinal check, which is equivalent with the other investigation bunches Souvik Adhikari et al[9]. Rate of impeded/strangulated hernia is more in the creating nations. It might be on the grounds that the ignorance of open, the inaccessibility of careful offices in the outskirts for the hernia fix, the hernias are not treated early[8].

Conclusion

Etiology – P esteem 0.001(<0.05), thus the level of individuals with deterred hernia, post operation grips, volvulus, TB stomach area and intussusception have higher fix rates when determined early , when contrasted with have harm and mesenteric ischemia which has lower fix rates and the thing that matters is measurably noteworthy[10].

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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Evaluation of Non Immune Mediated Thrombocytopenia in Children at Tertiary Health Care Center, Chennai

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Abstract

Thrombocytopenia is characterized as platelet check < 1.5 lakhs/cumm. It might result from either diminished generation or expanded sequestration/devastation of platelets. Pulverization of platelets can be either resistant or non invulnerable interceded.

DITP is the improvement of medication subordinate Abs against new epitopes of platelet glycol proteins created by their cooperation with the medication. TTP/HUS is moderately a remarkable perilous state of Thrombocytopenia11.In this planned examination, Dengue cases were seen as the most widely recognized reasons for thrombocytopenia among other non safe purposes of thrombocytopenia.

Aims and Objectives: To assess non insusceptible reasons for thrombocytopenia in kids with investigation of clinical profile and research center parameters in kids with thrombocytopenia.

Keywords – *Platelets, Glyco protiens, TTP/HUS, epitopes*

Introduction

Thrombocytopenia is characterized as platelet tally < 1.5 lakhs/cumm.

It is the commonest platelet variation from the norm saw in clinical practice with various clinical articulation[1]. It might result from either diminished generation or expanded sequestration/demolition of platelets1. Pulverization of platelets can be either resistant or non safe intervened.

Various components may contribute being developed of thrombocytopenia as found in essential invulnerable thrombocytopenia and hepatitis C infection contamination. Cautious assessment of the fringe blood smear is the best implies for narrowing the differential conclusion.

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The present investigation centers around the assessment of non invulnerable reasons for thrombocytopenia in youngsters between 0-14 years who were affirmed with thrombocytopenia in tertiary medicinal services focus, Chennai[2].

Taking a careful medicinal history and Physical assessment can give significant data and extraordinarily encourage determination.

In the event that the etiology of the thrombocytopenia is hazy, a BM suction or biopsy ought to be performed to discount an essential BM disorder2.

Non Immune reasons for thrombocytopenia can be following:

Contaminations like Malaria, dengue, septicemia, subacute bacterial endocarditis.

Heart valves, Thrombotic microangiopathies (TTP, HUS), DIC, Kasabach Merrit Syndrome, HIV, Post transfusion purpura.

Materials and Method

This planned examination was led in the Sree Balaji

medicinal school and medical clinic from April 2018 to October 2018. This examination included 70 subjects (kids) who exhibited to the hematology office and medicinal OP branches of Sree Balaji Medical College and emergency clinic[3].

This investigation included kids showing to the hematology division and medicinal OP offices who were found to have thrombocytopenia[4], with platelet tally under 150 x 109/L in whom complete clinical and lab parameters were accessible.

Fringe venous blood was gathered for lab examinations like CBC, ESR, PT, aPTT, fibrinogen estimation, and for D-dimer levels .

Fringe blood smears were recolored by Leishman's stain. For hemoparasite representation, Giemsa stain was utilized.

For malaria: slender film was produced using EDTA blood and recolored with Leishman's stain at pH 7.2. (Giemsa stain can likewise be utilized). Direct representation: 0.02 ml EDTA blood was weakened with 2 ml of weakening liquid pursued by accusing the Neubaur's assembly of the liquid and number of platelet was checked[5].

Bone marrow study

Bone marrow suction was taken from posteriosuperior iliac peak . Smears were recolored with Leishman's stain[6]. Bone marrow trephine biopsy was performed in pertinent cases and H and E recolored paraffin areas were inspected.

Findings

Table 1: Diagnosis associated with thrombocytopenia

S.no	Diagnosis	No. of cases %
1	Dengue	39 (55.71%)
2	Malaria	15 (21.42%)
3	Septicemia	7 (10%)
4	HIV infection	4 (5.71%)
5	Drug induced	3 (4.28%)
6	DIC	2 (2.85%)
	Total	70 (100%)

Dengue cases were found to be the most common causes of thrombocytopenia in our study.

Discussion

Non immune causes of platelet destruction

Malaria:

The conjectured components are coagulation aggravations, sequestration in spleen, immune response intervened platelet demolition and oxidative pressure[3,4,5]

Dengue: DENV could directly or indirectly affect bone marrow progenitor cells by inhibiting the proliferative capacity of hematopoietic cells and the peripheral destruction of platelets[6].

Sepsis: This is usually multifactorial in etiology; related to associated DIC, nonspecific immune destruction of platelets, excessive consumption, marrow suppression, and drugs[7].

Thrombocytopenia is common in patients who are admitted to the ICU with severe sepsis and septic shock[8].

HIV: Chronic thrombocytopenia is a common hematological disorder in HIV patients. Pathophysiology includes accelerated peripheral platelet destruction and decreased (ineffective) production of platelets from the infected megakaryocytes[7].

DIC: Thrombocytopenia is almost common in patients with DIC due to activation of the clotting mechanism[9]. DIC is a systemic process caused by generation of thrombin.Etiological factors may include amniotic fluid embolism, abruptio placentae, trauma, snake bite, leukemias especially AML-M3.

Drug induced thrombocytopenia (DITP): The pathophysiologic mechanism of DITP is the development of drug-dependent Abs against new epitopes of platelet glycoproteins generated by their interaction with the drug. Patients with DITP usually present with moderate to severe thrombocytopenia and the thrombocytopenia usually resolves in around one week after drug withdrawal[10].

TTP / HUS is relatively an uncommon life threatening condition of Thrombocytopenia[11].

Out of 70 cases of non immune causes of thrombocytopenia in children , 39 cases were positive for Dengue IgG and IgM.

Bone marrow showed few megakaryocytic bare nuclei and haemophagocytosis.

we had 15 cases of malaria, in that 11 cases of P. vivax (Fig. 1) and 4 cases of P. falciparum infestation presented with thrombocytopenia, the pathogenesis of thrombocytopenia probably due to

a) splenic sequestration with increased macrophage activity.

b) activation of platelets by fragmented red cells resulting in DIC.

c) Chloroquine and Quinine also sometimes can cause thrombocytopenia.

In this study, 7 septicemia cases, 4 HIV patients were included. 3 cases of drug induced thrombocytopenia cases with typical history of drug intake were included in our study. We had 2 cases of DIC in our study.

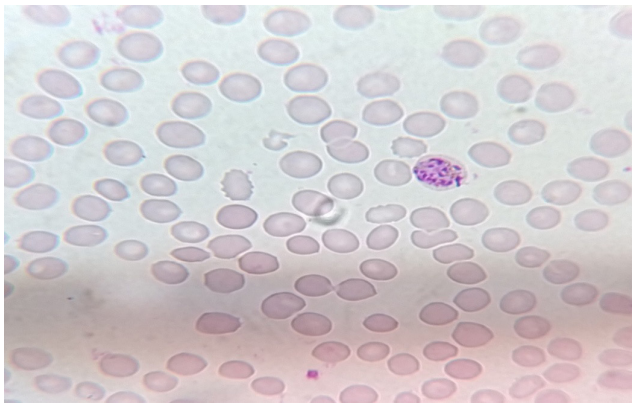


Figure. 1 Photomicrograph of peripheral blood smear showing Schizont phase of plasmodium vivax in a patient with malaria, background shows decreased number of platelets. (*Leishman 100x***)**

Conclusion

In the wake of assessing all non resistant intervened thrombocytopenia cases in youngsters, it is presumed that Dengue cases were seen as the most widely recognized reasons for thrombocytopenia in our examination.

At whatever point thrombocytopenia is identified, further examinations must be accomplished for explicit conclusion in the majority of the cases with the goal that suitable treatment can be given.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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Assessment of the Functional Outcome of Proximal Femoral Nailing in Unstable Trochanteric Fractures

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Abstract

Objectives: The aim of the present study is to assess the functional outcome of proximal femoral nailing in patients who have sustained unstable trochanteric fracture.

Place of Study: Department of Orthopaedics, Sree Balaji Medical College and Hospital, Chromepet, Chennai.

Period of Study: The study began in March 2017 and went on till February 2018 (a total recruitment period of 12 months).

Study Design: Prospective study.

Materials and Method: Both male and female patients, in the age social occasion of 46 to 65 years, who had proceeded with a shaky trochanteric break (AO-OTA 2.2, 2.3, 3.1, 3.2 and 3.3) were joined into the assessment. Patients with removed trochanteric split, open and masochist breaks were rejected. The patients were followed up for a base time of 7 months (mean 12.6; region 7 to 19 months). The cases were considered dependent on arrangement of harm, plan and treatment with Proximal femoral nail and assessed for their valuable outcome using HArris Hip Score.

Results: In our assessment which included 42 patients, the general valuable outcome assessed by the Harris Hip Score around the completion of seven months was extraordinary in 38.09% (n=16) of the patients, incredible in 33.33% (n=14), sensible in 21.42% (n=9) and poor results were seen in 7.16% (n=3) of the patients.

Conclusion: We therefore reason that, osteosynthesis utilizing a PFN, utilized in precarious trochanteric breaks, gives incredible adjustment, less mechanical complexities and good practical outcomes. It is along these lines a perfect embed for precisely overseeing unsteady between trochanteric cracks.

Keywords: *trochanteric split, osteosynthesis*

Introduction

The socioeconomics of total populace are evolving. A greater amount of the older individuals are living in the creating nations. By and by around three-fifths of the hip break happen in Asia which, it is anticipated that will turn out to be very nearly one-half continuously 2050. Between trochanteric cracks are one of the most widely recognized breaks of the hip happening both in the youthful grown-ups, because of high vitality injury and in the older, because of low vitality injury due to osteoporosis1. Issues of these cracks are: (a) they are related with significant horribleness and mortality, (b) mal-association is normal, (c) embed disappointment like cut-out of head and entrance into hip is a confusion,

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(d) it is an incredible money related weight to the family and, (e) it is most usually connected with medicinal co-morbidities like diabetes and hypertension.

Non-employable preservationist the board which was done before had brought about an expanded horribleness, just as inconveniences like mal-association with varus and outer pivot disfigurement bringing about a short appendage stride, non-association and a high pace of mortality because of confusion of long prostration and immobilization which brought about intricacies like decubitus ulcers, profound vein thrombosis, urinary tract diseases, contracture of the joint, orthostatic pneumonia and renal calculi2. The objective of the treatment in between trochanteric cracks is the rebuilding of the patient to their pre-damage practical and mobile status at the soonest. Different obsession gadgets have been advanced to treat these cracks by inner obsession, in this way expanding patient solace, encourage nursing care, decline medical clinic remain and thus to anticipate inconveniences of delayed supineness. It is a widespread decree to treat between trochanteric breaks with stable inward obsession as right on time as could reasonably be expected. [2]

Materials and Method

The present study has been a prospective study, involving patients who had sustained unstable inter-trochanteric fractures. The study began in March 2017 and went on till February 2018 (a total recruitment period of 12 months). The study concluded in September 2018, so that there was a minimum follow-up of 7 months (mean 12.6; range 7 to 19 months).

Inclusion Criteria:

- Only unstable trochanteric fractures were included (AO-OTA 2.2, 2.3, 3.1, 3.2 and 3.3).
- Only fractures seen within 15 days of injury were included.
- Both male and female patients, in the age group of 46 to 65 years were included in the study.

Exclusion Criteria:

- Patients with displaced trochanteric fracture not conforming to the above parameters were excluded.
- Open and pathological fractures were excluded.
- Inability to walk independently, prior to fracture due to pre-existing stroke or CVA were excluded.

Follow Up Period:

Minimum period of 7 months (mean 12.6; range 7 to 19 months).

The cases were studied on the basis of mechanism of injury, classification and treatment with Proximal femoral nail along with their functional outcomes with their residual complications, if any.

Positioning:

The patient is positioned supine on the traction table. The ipsi-lateral arm was placed in an arm sling. The trunk was angled 15 degrees towards the unaffected side. The unaffected limb was flexed, abducted and externally rotated for providing enough space for positioning of the image intensifier. The affected lower limb was held in traction and adduction in the foot piece. Reduction was achieved by traction (dis-engaging the fracture fragments) and internally rotating the limb while maintaining traction and confirming with the image-intensifier view.

Entry Point:

Reduction of the fracture was essential before making the entry point. After confirming the anatomical reduction, entry point is made with a bone awl over the tip of greater trochanter

Guide Wire Insertion And Reaming

A 3.2mm guide wire was inserted and driven into the distal fragment. Proximal reaming was done with a 15 mm cannulated awl upto 7 cm distally in order to accommodate the proximal portion of the nail. Distal reaming was done with an increment of 1 mm more than the predicted diameter of the nail planned to be used[6].

Distal Targeting:

Distal targeting was done with distal targeting guide and drill sleeves using 4.0mm drill bit. In case of using a long nail, the distal locking was done through a free hand technique, under C-arm guidance.

Follow-Up:

- Patients were evaluated clinically and

radiologically bi-weekly for the first 2 months and then, once monthly there-after until signs of radiological and clinical union appear.

- Clinical union was assessed as being absence of pain and tenderness upon full weight-bearing.

Clinical Assessment Included the Folowing Parameters:

1. Gait, 2. Pain,3. Deformity, 4. Shortening, 5. Range of movements,6. Ability to sit cross-legged, 7. Ability to squat, 8.Be able to return to pre-injury occupational status.

Table 1: Clinical assessment included the folowing parameters

S.no.	CATEGORY	SCORE ACHIEVED
1.	Excellent	100-90
2.	Good	89-80
3.	Fair	79-70
4.	Poor	<70

Findings

Table 2: Sex Distribution:

SEX	No. of Patients 'n'	%age
Male	16	38.10
Female	26	61.90
TOTAL	42	100

Table 3: Time elapsed between injury and surgery:

Time Interval (In Days)	No. of Patients 'N'	% Age
0 – 2	6	14.28
3 – 5	7	16.66
6 – 8	5	11.90
9 – 12	12	28.58
13 – 15	12	28.58
TOTAL	42	100

Table 4: Fracture pattern distrbution:

AO CLASSIFICATION	No. of Patients 'n'	% age
Type A2.2	7	16.66
Type A2.3	14	33.33
Type A3.1	16	38.01
Type A3.2	-	-
Type A3.3	5	12.00
TOTAL	42	100

Table 5: Harris Hip Score[9]:

FUNCTIONAL OUTCOME	At the end of 6 months	
	No. of Patients 'n'	%age
Excellent	16	38.09
Good	14	33.33
Fair	9	21.42
Poor	3	7.16
TOTAL	42	100

As per our inclusion criteria, 42 patients were recruited for surgical fixation of unstable trochanteric fractures. Of these 42 patients, approximately 28% of the patients were of the age group of 46 to 50 years, 26% of the patients were between 51 to 55 years, 26% were between 56 to 60 years and 19% were between the age of 61 to 65 years. We had a total of 38.10% (n=16) male and 61.90% (n=26) female patients, with a male to female ratio of 2 : 3.2, thus indicating a female preponderance.

Discussion

The successful treatment of inter-trochanteric fractures depends on many factors[10]; the age of the patient, the patient's general health, the time elapsed from trauma to treatment, concurrent medical treatment

and the stability of fixation[11]. The appropriate method and the ideal implant used for these fractures are still debated with proponents of the various approaches and each claiming their advantages over others. Many internal fixation devices have been recommended for the treatment of these fractures, including extra-medullary and intra-medullary implants.

In the present study, the male to female ratio was 2 : 3.2, hence indicating a female preponderance in our study. This is in tandem with those reported by Pajarinen J et al;[25,26] and Dousa P et al;[27]. The mean duration between the injury and procedure was 8.7 days (range 0-15 days).

All of our patients could partially weight bear by the end of 2 weeks. None of the patients used any walking aid beyond 3 weeks. Pajarinen et al.[25] reiterated the ability to early weight bear with PFN.

The average time for fracture union in our study was 16.4 weeks (range: 12–20 weeks). In a meta-analysis, Kaplan et al;[28] presented a mean time taken to achieve consolidation of four months, independent of the device used. On the other hand, Bridle et al; reported that consolidation occurred after an average of six months. According to Crawford et al the consolidation rate found among patients treated with a cephalo-medullary nail was 89%. In the present study, consolidation was observed in all the patients after 5 months. Patients were followed up for an average period of 8.58 months and the results were analyzed by using the Harris hip scoring system at the end of 6 months post-surgery. Among these patients, union occurred in all patients with no case of non-union. Malunion occurs in one case with implant failure. The mean Harris hip score was 88.75 at 6 months. The score was excellent in 16 patients, good in 14 patients, fair in 9 patients and poor in 3 patients. The results are comparable to other international studies done in the same method.

Schipper et al; found a mean score of 66.80 (standard deviation = 17.94) with a proximal femoral nail of PFN type after one year. According to Pajarinen et al patients who underwent osteosynthesis with a cephalo-medullary nail, in unstable trochanteric fractures, presented a significantly faster return to their previous level of walking.

Herrera et al;[32] reported on a study involving 250 patients treated with the PFN and Gamma nail cephalo-medullary nails, in which around 50% of the patients had recovered their previous walking capacity, one year after the surgery. In the present study, we assessed the recovery of walking ability over the course of time. The greatest evolution in the quality of walking occurred over the first three months after the operation, such that all of our patients were walking without the help of any walking aid.

Conclusion

With the demographics of the world population changing, more and more elderly persons are sustaining osteoporotic fractures. Among them, displaced and unstable trochanteric fractures are in significant numbers. The development of implant designs to address these unstable fractures of the proximal femur, have got refined. This has significantly improved the surgical outcomes in managing these problematic fractures. The proximal femoral nail, which was the implant used in this study, has established its distinct superiority in the instances of surgically managing displaced and unstable trochanteric fractures. Its unique advantages are that it is amenable to closed reduction which preserves the fracture hematoma. There is less surgical insult. It enables early rehabilitation and early return to pre-injury activity status. We hereby conclude that, osteosynthesis using a PFN, used in unstable trochanteric fractures gives excellent stabilization, fewer mechanical complications and satisfactory functional results. It is thus an ideal implant for surgically managing unstable inter-trochanteric fractures.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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Hearing Assessment in Myringoplasty

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Abstract

Myringoplasty is the surgery to reestablish the conference misfortune and destroy the center ear pathology in incessant suppurative otitis media. It is of two kind's tubotympanic and atticoantral type. An imminent report was done among 50 patients of CSOM. Patients chose on criteria of tubotympanic type, unadulterated conductive hearing misfortune, great cochlear save and great Eustachian cylinder capacity were considered for this examination

Keywords *– Myringoplasty, hearing misfortune*

Introduction

Incessant otitis media (COM) is characterized as interminable aggravation of mucoperiosteal covering of part or entire of the center ear split. It is ordered into two sorts, mucosal and squamous, of which mucosal sort is described by discontinuous mucoid or mucopurulent release through a punctured tympanic membrane. It is the significant general medical issue in youngsters and adults1.Tympanic film holes can prompt repetitive ear contaminations and hearing misfortune, in India there is a general absence of consciousness of the ailment and furthermore with respect to the difficulties of the illness[1].

From seventeenth to nineteenth century a few endeavors at shutting tympanic film punctures were made utilizing prosthetic materials like paper fix and closing up agents.Surgical fix of tympanic layer was first endeavored by Banzer (1640) with pig'sbladder1. In1878 Berthold conceived the term myringoplasty 2, 3 . In 1952, Wullstein officially reported 3, 4 a procedure of shutting puncturing. That time he utilized split thickness skin unite 3, 4.After Wullstein 5 and Zollner 6introduced tympanoplasty in mid 1950s, overlay join was being utilized in all medical procedures. The article "tympanoplasty as an activity to improve hearing in interminable otitis media and its outcomes" by Wullstein had arranged the field for the activity to be performed with an objective to improve hearing and shield the center ear from the outside condition 5. Spilt thickness and full thickness skin unite were being utilized at that timeframe, however join dermatitis, desquamation, with poor long haul results made specialists scan for exchange uniting materials. Channel skin pedicle unions had been utilized by Sooy in 1956 6. House and Sheehy 7, 8 and Plester 9 started utilizing trench skin as free overlay join autonomously of one another in 1958[2].

There are a few factor referenced in writing that may influence careful outcomes, including age, aperture size and site, the status of inverse ear, the sort of join , latent status and procedure utilized overlay or underlay.

Myringoplasty is a surgery to keep repetitive release from the center ear and to reestablish hearing system in patients with otitis media, by shutting the tympanic film puncturing utilizing distinctive kind of join. The temporalis belt or conchal ligament unite structures a platform for the developing epithelium to close the puncturing[3].

This examination concentrated on myringoplasty and investigations of audiometric example of hearing misfortune in CSOM patients experiencing pre usable hearing appraisal and post employable hearing improvement among the examination populace. Achievement is evaluated by hearing improvement via Air-Bone hole to inside 20db and join take-up.

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Materials and Methodology

Just 50 patients were taken in this present examination. 50 patients incorporated into this examination are Tubotympanic illness. Criteria for determination of patients of both protected and dangerous sort of incessant suppurative otitis media with great cochlear save and great Eustachian cylinder capacity were chosen Patients were rejected from the investigation. Rejection criteria included as any complexities of CSOM Patients, hypertension, diabetes mellitus, great cochlear save, threat, hearing loss of sensorineural sort or blended sort.

All patients chose are who introduced in ENT opd with signs and side effects proposing CSOM. Itemized history and complete assessment were taken. Patient experienced pre employable audiogram and assessment under magnifying lens improved imagine the tympanic film aperture i.e., puncturing size, area of the aperture, Tympanosclerosis, plausibility of envisioning all the puncturing fringes and nearness or nonappearance of incendiary mucosa in the center ear. Routine examinations were sent for pre sedative wellness. Radiological evaluation were finished by doing by X-beam Mastoids and C.T. Output to know the nearness and degree of Cholesteatoma. DNE (indicative nasal endoscopy) to check the nasal condition and evaluate the correct working of the Eustachian tube.

Unadulterated tone Audiogram is done in all investigation populace, the accompanying frequencies including: 250, 500, 1000, 2000 Hz in all the examination populace had taken for surgery, which gave an appraisal of the level of hearing misfortune and its sort preoperatively. Midpoints of hearing misfortune were determined (air conduction edge) among three frequencies were: 500, 1000 and 2000 Hz. These frequencies were chosen since they speak to discourse recurrence range and rise of edge in these frequencies will be clinically noteworthy. Unadulterated tone audiometry had been utilized for appraisal of hearing level in this investigation[4]. Just unadulterated conductive kind of hearing misfortune patients are taken into study. Maico mama 52 clinical analytic two channel audiometer furnished with sound confirmation space for audiological evaluation utilized in this investigation. Air conduction earphone utilized as standard with concealing done if the Interaural bone hole was in excess of 40 dB. Patient was clarified about the system and satisfactory time was taken for testing.

The medical procedure is performed under general anesthesia utilizing a magnifying instrument. Endoscopic underlay method was utilized for all aperture. Temporalis sash unite was utilized in all cases. Post usable period is uneventful. Mastoid dressing has been finished. IV anti-microbials, analgesics, acid neutralizers were given. On seventh day unite suture has been finished. Postoperative audiogram was done following 12 weeks to evaluate the improvement of hearing and the accomplishment of the medical procedure[5].

As per the Japan Clinical Otology Committee for count of the meeting improvement (Tai, 1998) 2. Every one of the outcomes are classified and dissected and contrasted and other standard investigations.

Observation

The study population was 50 patients were followed for 24 months with detailed history of age, sex, size of perforation, pre op and post op air bone gap and improvement were noted.

Age:

Most of the patients selected were among 20-50 years,majority of the cases were among 20-30 years, the mean age was 24.3 years. With females 24 (48%) and males 26 (52%) in the study population. Of the 50 patients, 21 patients had left ear disease (46.2%) and 29 patients had right ear disease (63.8%).

Table 1: Age Distribution (50 Patients)

S.no	Age group	No. of cases	Percentage
I	0-20	0	0
II	20-30	30	66
III	30-40	15	33
IV	40-50	5	11

Size of the perforation and audiological benefits

In our study out of 50 patients who underwent myringoplasty,4(8 %)patients had small perforation and 22(44%) patient had medium and rest 26(52%) patient had subtotal perforation. patients with subtotal perforation has shown hearing improvement with best outcome in term of graft success followed by medium. Overall we had a p value of 0.001[6].

Table 2: Number and size of perforation and audiology benifits

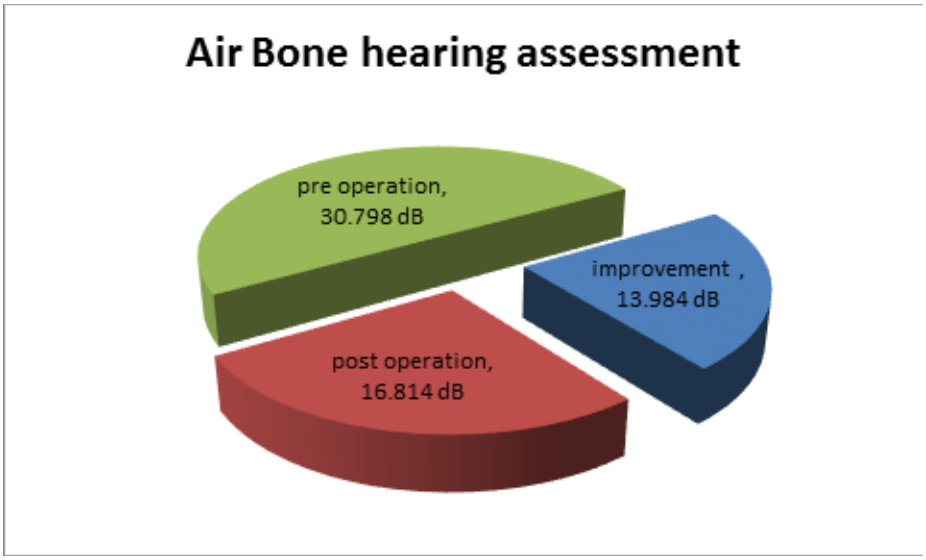
Size	Number of Patients	Mean Preop Ac Threshold	Mean Postop Ac Threshold	Percent	Valid Precent	Cumulative Percent
SMALL	4	34.15	23.45	44.0	44.0	44.0
MEDIUM	22	36.99	22.77	8.0	8.0	52.0
SUBTOTAL	26	37.53	23.17	48.0	48.0	100.0

Air- Bone gap improvement:

In our study, mean preoperative air bone gap was 30.798dB and mean postoperative air bone gap was 16.814dB. Hearing improvement was around 13.984 with p value 0.001 which is statistically significant.

Table 3: pre op and post operative air bone hearing assessment

AB GAP	MEAN	U CRIT	STD DEV	Z - SCORE	P – VALUE
PRE OP POST OP IMPROVEMENT	30.798dB 16.814dB 13.984dB	1013.8 968.69	143.272	8.4524	0.001



Findings

The present study showed that there is Sno sex predilection for the CSOM. Out of 50 cases, 20–30 years age group people were high (80%) indicating the fact that CSOM is mainly the middle ear infection which tends to occur more in early decades of life and resolves to leave permanent perforations with conductive hearing loss in many cases. The mean age was 24.3 years.

In the present study of 50 cases were of tubotympanic type. The findings were correlating with other studies [3, 4].

In our study more hearing loss found in subtotal perforation, Yung [5] found similar central perforation had greatest loss compared to other sites of perforation. He found 43 dB HL in the series of big central and posterior central perforation as well. An antero-inferior perforation have less hearing loss than antero-inferior perforation[7].

Ramani and Ahmad [6] had also found similar findings in their study that "It is seen that the difference in hearing losses between antero and postero-inferior perforations, is appreciable only at the lower frequencies".

In our study, mean preoperative air bone gap was 30.798dB and mean postoperative air bone gap was 16.814dB. Hearing improvement was around 13.984 with p value 0.001 which is statistically significant. Many studies on Tympanoplasty have found place in the literature with varying success rates [7-12]. Rizer's showed the same results. Myringoplasty shows successful results in hearing improvement.

Conclusion

Myringoplasty is most successful procedure for hearing improvement and eradication of middle ear pathology in CSOM. Success of the surgery depends upon size of the perforation. Smaller the perforation more the success rate.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Histomorphological Study of Lesions of Upper Respiratory Tract

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Abstract

The nasal cavity and paranasal sinuses are collectively called as sinonasal tract. The sinonasal tract and nasopharynx form a functional unit and affected by a wide range of non -neoplastic and neoplastic lesions . Mechanical trauma, exposure to chemical agents, allergens and infectious agents results in formation of various tumour like conditions and neoplastic lesions .Histopathological diagnosis is mandatory for treatment and prognosis of sinonasal and nasopharyngeal lesions

Keywords: *paranasal sinuses, neoplastic lesions*

Introduction

The nasal cavity, paranasal sinuses, pharynx and larynx though in continuity form a complex system of upper respiratory tract, this region is endowed with a variety of elements such as epithelial, glandular, lymphoid, cartilage,and bone and is also exposed to a variety of infections,tumour like and true neoplastic conditions.

The nasal cavity and paranasal sinuses are collectively called as sinonasal tract. The sinonasal tract and nasopharynx form a functional unit and affected by a wide range of non -neoplastic and neoplastic lesions [1] . Mechanical trauma,exposure to chemical agents, allergens and infectious agentsresults in formation of various tumour like conditions and neoplastic lesions. The lesions present as mucosal thickenings or polypoidal masses with epistaxis or obstruction, making it difficult to differentiate non neoplastic lesions from neoplastic masses on clinical examination. Histopathological diagnosis is mandatory for treatment and prognosis of sinonasal and nasopharyngeal lesions.

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Aims and Objectives

1. To study the Histomorphological lesions of upper respiratory tract in SBMCH from the period October 2016 - September 2018.

2. To study age, sex and site wise distribution of lesions of upper respiratory tract.

Materials and Method

This study is a prospective study on Histomorphological lesions of upper respiratory tract, conducted in the Department of Pathology, Sree BalajiMedical College Hospital and Research Centre, Chennaiduring the period, October 2016 to September 2018. A total of 5233 cases were submitted to the Department of Pathology, SBMCH between the period of October 2016and September 2018 for histopathological examination.

Detailed history regarding age, sex, sit e, type of procedure done were obtained for all the upper respiratory tract cases reported during the period of study from surgicalpathology records. Haematoxylin and Eosin stained 5 µm thick sections of the paraffin tissue blocks of al l the specimens were reviewed. The following clinical and pathological parameters were evaluated: Age, gender, siteand type of lesion. And for malignant neoplastic lesions age, sex, site, tumour type and grade were assessed.

**author designation updated in 2024

Findings

In the study period of 24 months from October 2016 to September 2018, a total of 5233 specimens were received in the department of Pathology, Sree Balaji Medical College and Hospital for histopathological examination. Totalnumber of URT specimens received were 186 cases (3.6%)(Table1).

Total number of upper respiratory tract specimens received were 186 cases of which malignant lesions accounted for 38 cases with a percentage of 20.4%. Of the remaining, 14 were benign cases (7.5%) and non-neoplastic cases were 129 (69.4%) (Table-2, Chart 1).

Non neoplastic lesions were the most commonly occurring lesion(69.4%) in URT followed by malignant lesions accounting for 20.4% of cases (Table 2)

Upper respiratory tract lesion were more common in the age group of 20 -40 years which accounted for about 55 % of cases. Benign lesions were common in 2nd and 3rd decade whereas malignant lesions were common in 6th decade (Table 3)

Table 1. Site Wise Distribution of Lesions of Upper Respiratory Tract

Site	Frequency	Percentage [%]
Nasal cavity & PNS	105	56.5
Pharynx	48	25.8
Larynx	33	17.7
Total	186	100

Upper respiratory tract lesions occurred more commonly in nasal cavity and paranasal sinuses(56.5%) followed by pharynx(25.8%) and larynx(17.7%) (Table 5)

Table 2: Histological Diagnosis of Non-Neoplastic Lesions

Histological diagnosis	Frequency	Percentage [%]
Non allergic polyp	29	22.4
Allergic polyp	46	35.6
Antrochoanal polyp	15	11.6
Rhinosporidiosis	08	6.1
Fungal infections	06	4.6
RLH	01	0.7
ATH	15	11.6
AMP	01	0.7
BVCP	06	4.6
FVLP	02	1.4
Tuberculosis	01	0.7
Total	129	100

Of the non neoplastic lesions polyp (Fig1)(69.6%) was the most common lesion occurring in this region followed by adenotonsillar hypertrophy (11.6%, rhinosporidiosis (Fig 2 (6.1%)and fungal infections (4.6%) (Table 6)

Table 3: Histological Diagnosis of Benign Lesions

Histological diagnosis	Frequency	Percentage [%]
Inverted papilloma	07	50
Capillary Hemangioma	05	35.8
Benign Osteoma	01	7.1
Neurofibroma	01	7.1
Total	14	100

Inverted papilloma was the most common lesion accounting for 50% of cases followed by capillary hemangioma (Fig 4) (35.8%) (Table7)

Table 4: Histological Diagnosis of Malignant Lesions

Histological Diagnosis	Frequency	Percentage [%]
SCC	31	81.7
Nasopharyngeal Undifferentiated Carcinoma	03	7.9
Lymphoepithelial Carcinoma	01	2.6
Mucoepidermoid Carcinoma	01	2.6
Epithelial Myoepithelial Carcinoma	01	2.6
Hodgkin's Lymphoma	01	2.6
Total	38	100

Of the malignant lesions SCC (Fig5) the most common malignancy accounting for about 81.7% of cases followed by undifferentiated carcinoma of nasopharynx accounting for 7.9% (Table8)

Discussion

The histopathological spectrum of lesions of URT is complex and display a wide range of neoplastic and non neoplastic types. Clinical features with advanced imaging technique correlation gives a probable diagnosis, however histopathological examination for categorisation of these lesions is essential for proper management. Non neoplastic lesions comprise majority of URT lesions followed by malignancy. Neoplasms constitute approximately 3% of head and neck tumours [6]

In head and neck tumors, squamous cell carcinoma remains the most common malignancy which has a great impact not only on patient survival, but also on the speech, swallowing and better well being of the patient.

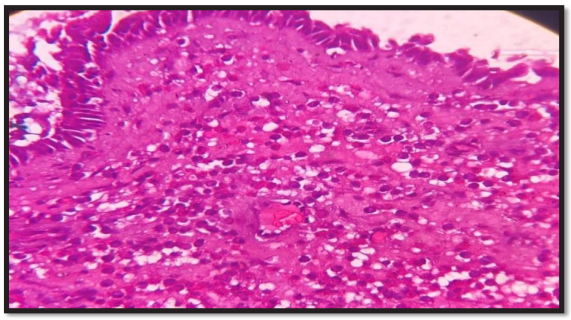


Fig 1: H&E Picture of Allergic Polyp -40x magnification

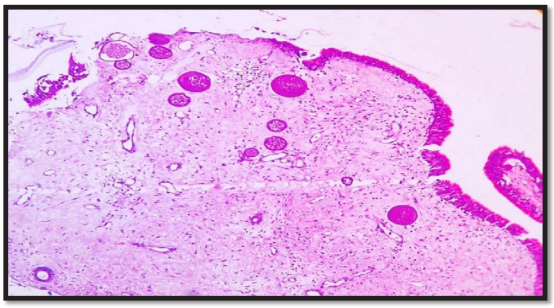


Fig 2 : H&E Picture of Rhinosporidiosis – 10x magnification

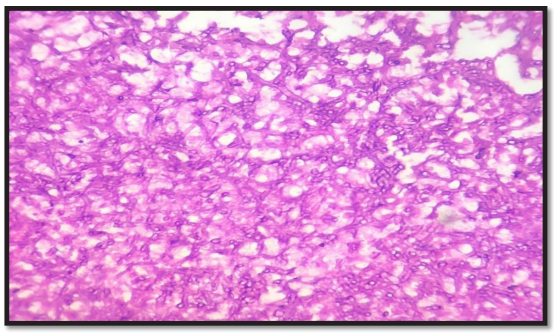


Fig 3: H&E Picture of Aspergillosis – 10x magnification

In the current study histomorphological study of lesions of upper respiratory tract was done.

The total number of specimens received in SBMCH from October 2016- September 2018 was 5233, out of which 186 (3.6%) specimens were from upper respiratory tract and out of which 129(69.4%) were non neoplastic, 14(7.5%) were benign,5(2.7%) were premalignant and 38 (20.4%) cases were malignant.

The non neoplastic lesions were more common in URT (69.4%), this was in concordance with Shaila N shah et al[7] who also observed that non neoplastic lesions were the most common in this region (70%). The non neoplastic lesions were common in 2nd and 3rd decade which is in concordance with studies by Khan N et al [5], Shaila N shah et al [7]. Nasal polyps (69.8%) and nasal cavity (69.9%) are the commonest type and site of lesion in this study and this also goes by the observation in studies by Khan N et al (82%,74%), Shaila et all (70%,69%) respectively.

Of the benign neoplastic lesions inverted papilloma (50%) was the most common lesion followed by capillary lobular hemangioma (35.8%) in this study, which is slightly higher than the results observed by Bhattacharya J et al[8], where the incidence was 29.4% for both inverted papilloma and capillary hemagioma . Both non neoplastic and benign lesions showed male predominance with a ratio of 1.1:1 and 2.4:1 respectively. This was in concordance with the studies conducted by Khan et al, Bhattacharya J et al.

Of the malignant lesions SCC was the most common tumour accounting for 81.7% of malignant cases followed by undifferentiated nasopharyngeal carcinoma. Men were commonly affected than women. The most common age group affected by malignancy is 6th and 7th decade.

Conclusion

This study shows that in Sree Balaji Medical College and Hospital the non-neoplastic lesions are the most commonly occurring lesions of upper respiratory tract followed by malignancy. And the most common malignant lesion observed is SCC. The malignant lesions occur in the age group of 60-70 years and men were more commonly affected. Therefore definite diagnosis of the benign and malignant lesions should be made on histopathological examination along with clinical history and imaging findings which will help the surgeons in providing appropriate surgical intervention for the patient.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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Consequence of Early Versus Late Cord Clamping on Neonatal Outcome

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Abstract

To examine the consequence of early versus delayed cord clamping on maternal and neonatal outcome. As part of the effective leadership of the third phase of labor in the advanced globe, ECC has become daily exercise without academic evaluation of its prospective effect on the health and growth of a newborn. In addition, ECC is thought to considerably reduce the danger of PPH as part of the active management of the third level of labor.

Because many effective leadership procedures include ECC, some suggest that DCC may boost the danger of PPH. On the contrary, in order to induce numerous neonatal benefits, the recent protocol proposed by WHO to manage the third stage of labor replaced the ECC by DCC.

Despite these extensive evidence, though, there are variations in the view and exercise of late cord clamping. This is not far-fetched as there are still concerns of postpartum haemorrhage maternal danger and neonatal jaundice risk

Objective: 1. Compare early cell clamping on neonatal results to determine the impacts of postponed cell clamping.

2. Primary results were intrapartum maternal blood loss evaluation, 72 hours after conception, neonatal packed cell volume and serum bilirubin.

Study Design: This was a potential, consent was obtained under the category of inclusion criteria.

Study population: Women who delivered a term infant (≥ 37 completed weeks of gestation) by normal vaginal delivery at Sree Balaji Medical college and hospital.

Keywords*: maternal, neonatal, PPH, labor, cord clamping*

Introduction

• Umbilical cable clamping and slicing is one of the most distinctive components of the birth process; however, its ideal timing is contentious yet to be obviously defined with the benefits and disadvantages of the distinct timing methods.

• Clamping and slicing of the umbilical line is essential because it prevents the loss of maternal oxygen and allows the baby to be removed for resuscitation from the family.

• The newborn child may obtain significant blood transfusion from the placenta within the first few minutes of birth. A word born 10 cm below the uterus stage raises its blood volume by an average of 32 percent during the first three minutes of existence.[1-7]

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The 2015 ILCOR systematic study and several systematic studies revealed that improved placental transfusion by delayed cord clamping is correlated with lower prevalence of anemia, hypotension, respiratory distress syndrome, enterocolitis necrotizing, premature retinopathy and any grade of intraventricular hemorrhage.

Methodology

- Data collection technique adopted in the study was structured questionnaire .
- Maternal data such as gravida, parity , labour details , post partum blood loss and neonatal data such as gestational age, birth weight, Apgar scores, serum Hb and bilurubin were recorded.[10-19]
- Clearance for study was obtained from Institutional Human Ethical Committee (IHEC/795/2016)
- An informed consent was obtained from patients.
- Maternal blood sample (ante- partum – Hb & PCV and post-partum Hb & PCV) was collected through aseptic technique and was analysed. [20-27]

Findings

Table 1. Baseline description of neonates

Characteristics	ECC (n=100)	DCC (n=100)
Sex		
Male	47	46
Female	53	54
Estimated Fetal Weight (gm):		
Mean ± SD	2847.9 ± 280.32	2852.28 ± 259.04
Birth weight(gm):		
<2500 gm	07	04
2500 – 3000gm	55	61
3000 – 3999 gm	38	35

The mean birth weight in ECC babies was 2847.9 ± 28 grams and DCC babies was 2852.28 ± 25 grams. [28-34]

Table 2 Baseline characteristics of neonates

Characteristic	ECC(n=100)	DCC(n=100)
Gestational age (completed weeks): Mean ± SD	38.47 ± 0.87	38.61 ± 0.7
37 weeks	17	05
38 weeks	27	36
39 weeks	48	52
40 weeks	08	07
APGAR score at 1 min		
Median (IQ 75th – 25th)	9(9,8)	9(9,8)
APGAR score at 5 min		
Median (IQ 75th – 25th)	9(9,8)	9(9,8)

The mean gestational age in ECC group was 38.47 ± 0.87 weeks and DCC group was 38.61 ± 0.7 weeks.

75% babies were in the group between 38-39 weeks in ECC arm and 88% babies were in the group between 38-39 weeks in DCC arm.

The APGAR score at one minute and 5th minute were similar in both study arms.[35-39]

Table 3. Hematological parameters on day 3 among two study groups

Laboratory parameter	ECC (n=100)	DCC (n=100)	p value
Maternal Hemoglobin (gm/dl) Mean ± SD	10.61± 0.93	10.52 ± 0.79	0.465
Maternal PCV (%) Mean ± SD	31.01 ± 2.74	32.96 ± 2.37	0.496

There was a tendency towards greater original hematocrit in the DCC cluster compared to the ECC group in the current research, but there was no statistically significant distinction between the two populations.

Other comparable studies[12,13] showed that the original average hematocrit in the DCC category was greater than the statistically significant ECC group-[40-47]

Table 4: Relationship between DCC and ECC Groups Regarding the Neonatal Investigations(Day 3)

Laboratory parameter	ECC (n=100)	DCC (n=100)	p value
Neonatal Hb (g/dL) 14-18 >18 Mean ± S.D	 40 60 17.53 ± 1.85	 44 56 18.27 ± 1.72	 0.043*
HCT (%) < 50 51-60 > 60 Mean ± S.D	 32 50 18 52.59 ± 6.83	 18 55 27 54.84 ± 5.16	 0.001*

Looking at the main result measurements of neonatal packed cell quantity, proof indicates a significant rise in packed cell size among DCC organizations compared to ECC cluster. This research verified the same with average PCV of 54.43 ± 6.83 and 59.84 ± 5.16 for the research weapons A and B respectively, and this was statistically important (P<0.001).[48-54]

The bar diagram above, depicts the split in neonatal hematocrit among ECC and DCC group with PCV < 50 – (32 vs 18) , 50-60 – (5- vs 55) and > 60 (18 vs 27).

Table 5: Neonatal Hyperbilirubinemia in the study population

	ECC (n=100)	DCC (n=100)	p value
Neonates requiring phototherapy in the first week of life	60	70	0.04*
Normal Low risk below 40th percentile (≤13 mg/dl)	39	33	
Low intermediate risk from 40th and < 75th percentile (13.1-15.2 mg/dl)	38	42	0.001*
High intermediate risk 75th - < 95th percentile (15.3- 17.2 mg/dl)	19	17	
High risk above 95th percentile (17.3and more mg/dl)	04	08	
Serum Bilirubin on Day 3 mg/dl (Mean ± SD)	13.01 ± 60	13.96 ± 56	0.032*
Treatment			
Observation	40	30	
SSPT	33	35	0.097
DSPT	27	35	

The incidence of hyperbilirubinemia between two groups was significant (as evidenced : by p value of 0.032).

The highest bilirubin observed was 17 mg/dl in the ECC group and 19.3 mg/dl in the DCC group.

The mean bilirubin values observed in ECC vs DCC was 13.01 vs 13.96 mg/dl.

Table 6. Polycythemia in the study population

Laboratory parameter	ECC (n=100)	DCC (n=100)	p value
Polycythemia			
Yes	02	04	0.657
No	98	96	

In our study, 2 neonates had hematocrit greater than 65% in the ECC group.

There were 4 neonates with polycythemia in the DCC group, none of the neonates required exchange transfusion in either of the groups.

Discussion

Umbilical cord clamping is one of the most distinctive processes during childbirth, but the ideal timing is quite contentious and still needs to be obviously defined[1,2]. There is evidence of neonatal advantages and prospective minimal risk if postponed to allow placenta transfusion without damage to the mother.[1-7] This research obviously indicated that late clamping of the umbilical cord is useful rather than detrimental without enhanced parental or neonatal danger.

Several writers, including WHO, RCOG and ACOG, have suggested late cable clamping for all newborns with easily accessible phototherapy facilities, as it offers higher advantages for the child than the low danger of neonates. [1, 6, 7, 12].

In our study, among the DCC group, 46 (46%) were male babies and 54 (54%) were female babies. In ECC group, 47 (47%) were boy babies and 53 (53%) were girl babies. The difference in the proportion of neonate's gender between study group was statistically not significant (P value 0.887).

The mean birth weight of DCC group was 2852.28 ± 0.7 gram and ECC group was 2847,9 ± 0.87 gram, and the mean difference between two groups was statistically not significant (P value 0.210). Among the DCC group, 4 (4%) babies had <2500gm, 61 (61%) babies had 2500-2999 gm and 35 (35%) babies had 3000-3999 gm. Among the ECC group, 7 (7%) babies had <2500gm, 55 (55%) babies had 2500-2999 gm and 38 (38%) babies had 3000-3999 gm. The difference in the proportion of neonate's birth weight between study group was statistically not significant (P value 0.909).

Conclusion

This research demonstrates that DCC increases children ' filled cell size at 72 hours of birth, which stayed greater in the DCC category relative to the ECC group, with no important parental danger of postpartum hemorrhage and neonatal hyperbilirubinaemia. Furthermore, it can be stated, based on the results of this research, that DCC did not boost the likelihood of third-stage labor or the need for manual labor. It also revealed that neonatal hemoglobin, hematocrit, and RBCs have increased significantly. Additionally, although the average total bilirubin concentration in the DCC cluster was considerably greater, but still at a small medium danger (below 75th percentile) that did not involve huge action, late cable clamping could considerably enhance neonates ' intra-natal care without damaging impacts on the mom.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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Histopathological Study of Lesions of Nasal Cavity and Paranasal Sinus

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Abstract

Sores including the nasal hole and paranasal sinuses are intricate and the most regularly happening in the upper respiratory tract. Nasal indications are one of the most widely recognized explanations behind which the patients look for restorative exhortation. Upper aviation routes are associated with an assortment of non neoplastic and neoplastic ailments. It is hard to recognize clinically and thus it is fundamental that all masses expelled from nose and paranasal sinuses ought to be submitted for histopathological assessment. In the present study an attempt is made to find out the incidence of various lesions of nasal cavity and paranasal sinuses .The polyps comprise the majority of lesions followed by malignant lesions.

Key words: *Nasal cavity, PNS*

Introduction

The nasal cavity and paranasal sinuses form functional unit of nose1 and is principally involved in filtering, humidifying and adjusting the temperature of inspired air [1].As the nose occupies a prominent anatomical position on the face, early diagnosis and treatment of any scarring or ulcerative lesion is important[2]

The nose and paranasal sinuses are exposed to a variety of infective and other factors[3].Tumors of nose are usually uncommon. Malignant tumors account for 0.2% to 0.8% of total malignancies and only 3% of all malignant tumors of upper aerodigestive tract[4]

Aims and Objectives

The study was undertaken with the following aims and

Objectives

• To study the incidence of various lesions of nasal cavity, and paranasal sinuses.

• To study age, sex and site wise distribution of lesions of nasal cavity and paranasl sinus.

• To compare the results with the available data.

Material and Method

The present study is done on the lesions of nasal cavity and paranasal sinuses examined in outdoor patient department or admitted to Otorhinolaryngology department and sent for histopathological examination to department of pathology in SreeBalaji Medical college and Hospital, Chennai

The clinical history was obtained from the department of otorhinolaryngology and after grossing all the sections were studied by routine paraffin sectioning and Haematoxylin and eosin stain.

Findings

Majority of lesions of nasal cavity and paranasal sinuses occured in the 3rd decade (30%) followed by 2nd decade(25%).The non neoplastic lesions were the most commonly occurring lesions of nasal cavity and paranasal

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sinuses accounting for 85% of cases. Benign neoplasms comprise 11% of cases and malignant neoplasms comprise 3 % of cases. Men were more commonly affected by non neoplastic lesions than women. The most common non neoplastic region encountered in this region was nasal polyp accounting for 69%.

Type of lesion	**No. of cases**	**Percen-tage(%)**
Non neoplastic	90	85.7
Benign	12	11.4
Malignant	03	2.9
Total	105	100

Most of the benign neoplasms occurred in the 3rd and 4th decade ,while most of the malignant neoplasms occurred in 6th decade of life. Inverted papilloma was the most common benign neoplastic lesion accounting for 50 % of cases followed by lobular capillary hemangioma. Menwere more commonly affected than women. Of the malignant lesion undifferentiated carcinoma of nasal cavity was the most common maliganant lesion followed by a lymphoepithelial carcinoma.

Majority of lesions occurred in nasal cavity(83%) followed by paranasal sinuses(17%) .Majority of polyps occured in nasal cavity (78%) followed by paranasal sinuses(22%).Of the non neoplastic lesion inflammatory allergic polyp was the most common followed by rhinosporidiosis and fungal infections like mucormycosis and aspergillosis

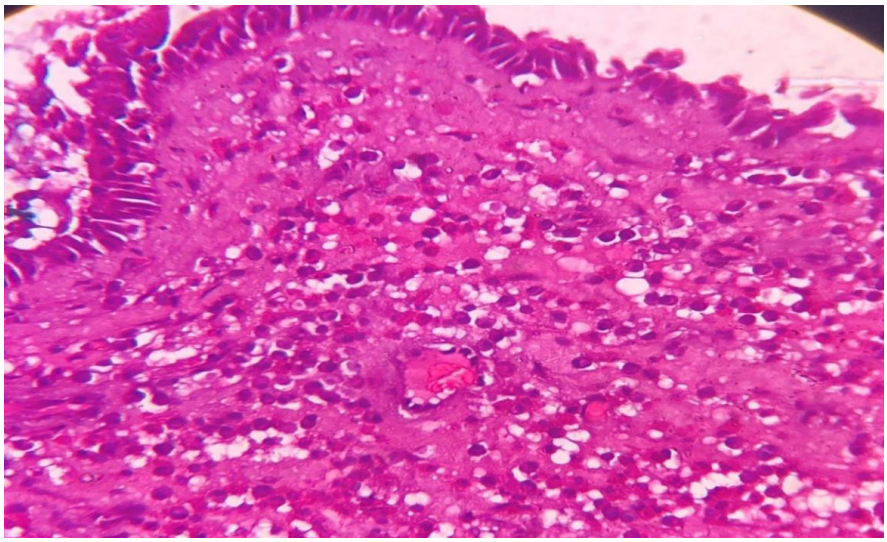


Fig 1: H&E Picture of Allergic Polyp -40x magnification showing respiratory epithelium enclosing an inflammatory lesion composed of eosinophils, plasma cells and lymphocytes.

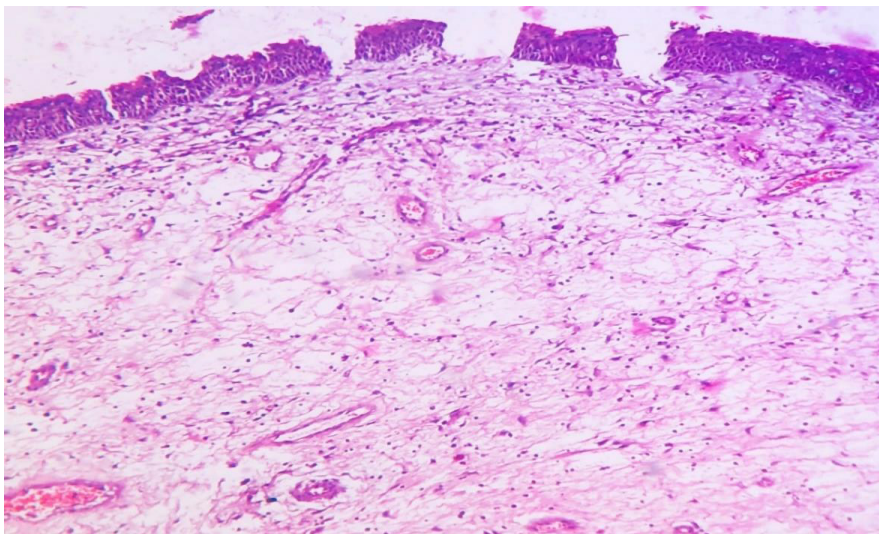


Fig 2:H&E Picture of Antrochoanal Polyp -10x magnification

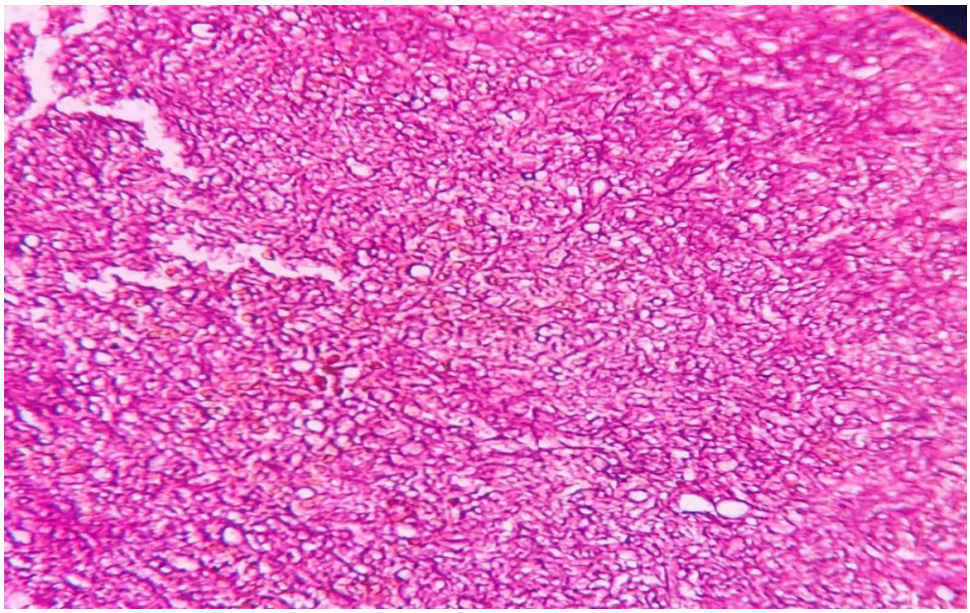


Fig 3: H&E Picture of Mucormycosis - 10x magnification showing fungal septate fungal hyphae

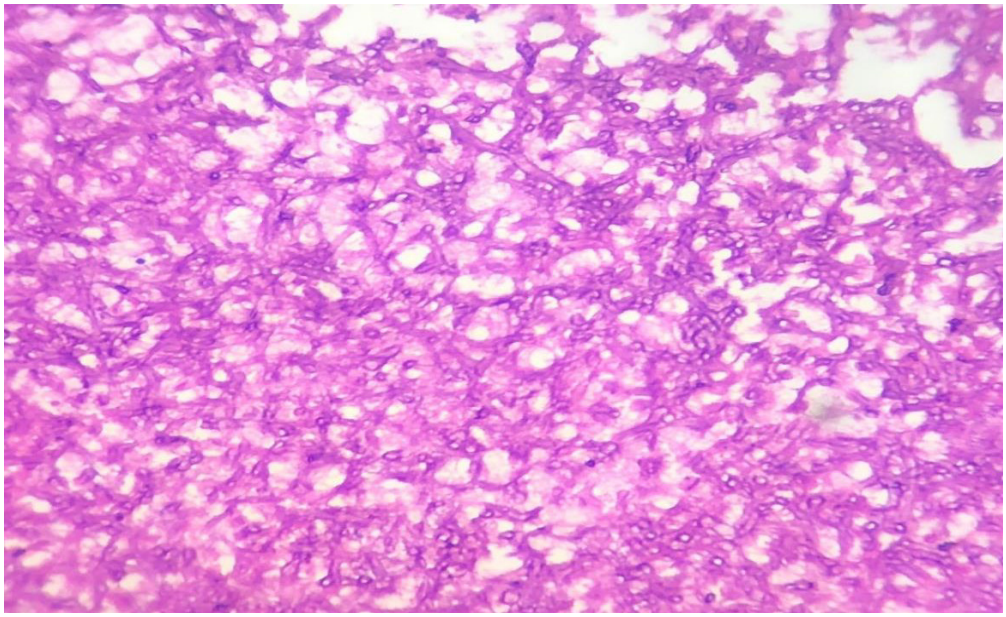


Fig 4: H&E Picture of Aspergillosis – 10x magnification showing fungal hyphae with acute angle branching.

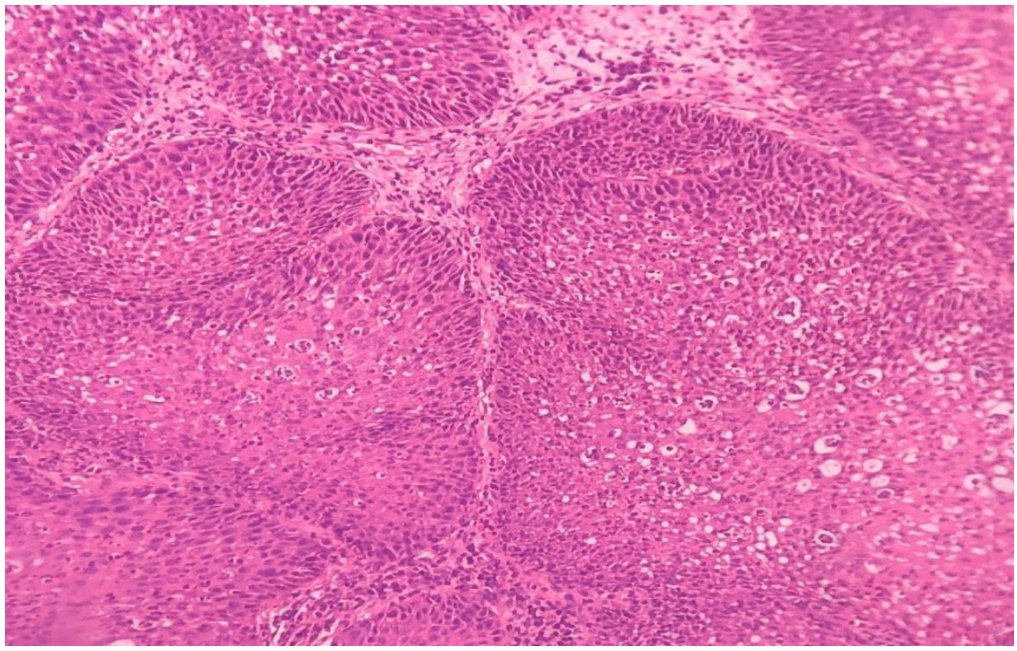


Fig 5:H&E Picture of Inverted Papilloma 0f Nose 40x magnification

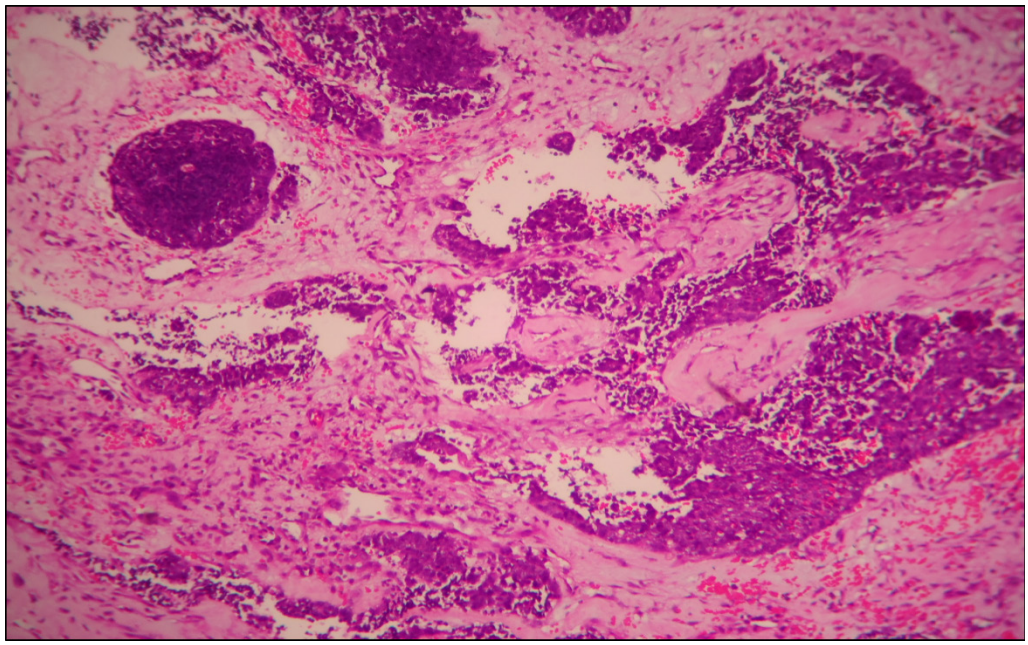


Fig 6:H&E picture of lymphoepithelial carcinoma -10x showing sheets and islands of tumour cells surrounded by lymphocytes.

Discussion

Sinonasal masses were more typical in male than female with a proportion of 1.6:1 in our examination which was in concordance with Zafar et al.showing male prevalence of 1.7:1 .The second and fourth many years of life are the most defenseless period for improvement of sinonasal masses. Bakari et al5 had detailed a pinnacle rate of 33 years, while for Zafar et al [6] the mean period of introduction was 22.5 years. What's more, in our examination it was 25.6 years.

Malignancies have been accounted for commonly after the fourth decade of life.Non-neoplastic sores shaped 85.7 % of the absolute instances of nasal depression and paranasal sinus in our investigation.

Zafar U et al6 which had non-neoplastic sores of 89 %. Nasal polyps are the most widely recognized sores of the nasal cavity. The rate of nasal polyp was 69% which

was in concordance with concentrates by Tondon et al7 (64%) and Anjali et al 3(62.5%)

Reversed papillomas are relatively uncommon, yet this morphological variation is the most generally experienced sore of all sinonasalneoplasms.Inverted papilloma (Fig.5) shaped half of all kindhearted neoplastic masses in our examination, which was higher than the investigation done by Humayun et al1 who detailed 33.33% and higher from the discoveries of Bakari et al7who announced as 14.5% among all the sinonasal masses.

Malignancies of nasal cavity are uncommon in our examination we got two instances of undifferentiated nasal depression tumor and an instance of lymphoepithelialcarcinoma .

Conclusion

Threat ought to be separated from non-dangerous sores .With the assistance of exhibiting highlights, symptomatology a hypothetical conclusion might be made however histopathology and immune histo chemistry is required for the authoritative finding which would help in fitting treatment for the patient.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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Evaluation of Incidence of Postapartum Urinary Retention in Vaginal Delivery

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Abstract

Postnatal nervousness urinary help (PUR) is a customary consequence of bladder brokenness after vaginal development. Partitioned bladder discharging may slant to bladder brokenness at a later time of life. The motivation behind this appraisal is to assess the repeat of PPUR . The PVRBV of ladies who passed on vaginally was evaluated after the key unconstrained micturition with a versatile bladder-filtering gadget. A PVRVB>150ml were depicted as cases and PVRBV<150ml were portrayed as controls. The occasion of postnatal tension pee support in ladies with vaginal vehicle in this assessment is 9.1% Results Of 220 included ladies, 200 were controls and 20 were cases. Episiotomy,instrumental delivery,prolonged term of second time of work are peril elements of PPUR, while age and value were not seen as fundamental by precise assessment. Early confirmation of postnatal tension urinary help instantly may reduce the danger of bladder hurt. Thusly, no patients ought to be left over 6 hours without voiding after vaginal development.

Keywords: *PVRBV, Episiotomy, micturition*

Introduction

Urinary upkeep is the shortcoming to immovably void pee. Unprecedented urinary upkeep is the abrupt and reliably anguishing powerlessness to void paying little notice to having a full bladder. Patients with urinary help can give total nonattendance of voiding, lacking bladder discharging, or flood incontinence. Ensnarements combine contamination, unending voiding troubles and renal disappointment. Postnatal uneasiness urinary upkeep (PUR) is a typical and bewildering disorder in ladies during the short postnatal misery time period. It has been dynamically depicted as part or a large portion of the going with: frightening beginning of excruciating or straightforward shortcoming to void the bladder more than 12 h, requiring catheterization with launch of a volume practically identical to, or more noteworthy than beyond what many would consider possible. Remarkable postnatal misery urinary help, as depicted out in the Calgary Health Region's Policy and Procedures, was portrayed as the essential for at any rate one catheterization inside the hidden 24 h postnatal sadness, for in any occasion one of the going with reasons: (I) quiet has not voided inside 6 h postnatal tension; (ii) tolerant voids every now and then in unassuming sums; (iii) tireless needs to void at any rate can't void; or (iv) if, under any conditions, the patient was coordinated for an extent of 500 ml yield inside the fundamental 24 h postnatal nervousness. PUR has been planned into covert and clear structures. The in camouflage structure can be seen by raised post-void holding up estimations, either with ultrasound checking or with catheterization. Ladies with post-void additional volumes of 150 mL or more and no indications of urinary help are in this portrayal. Clinically clear postnatal discouragement urinary upkeep implies the failure to void after vehicle. Evaluated frequencies ranges from 0.05%-37.0%

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Materials &Method

This is a best in class report done in Sree Balaji Medical College and Hospitals combines 220 ladies who had vaginal development . Following the basic

micturition after vaginal vehicle a transabdominal ultrasound was done to survey postvoid additional bladder volume. The transducer was orchestrated in the midline on the most critical reason for the symphysis pubis to get the longitudinal and transverse compass of the bladder. The most extricated up extensiveness in the transverse compass in cm (D1), the anteroposterior partition across over in longitudinal yield in cm (D2) and the cephalocaudal estimation in the longitudinal broadness in cm (D3) were recorded. Assessed PVRBV was constrained by utilizing the condition D1×D2×D3×0.7. Ladies with postvoidal remaining bladder volume more than 150ml were taken as cases and under 150ml were taken as controls.

For the majority of the patients age, decency, length of second time of work, episiotmy and instrumental development were gathered and after that a quantifiable assessment was performed with the above components to isolate the danger factors for Postpartum pee upkeep. Quantitative segments are managed by chi-square and relentless factors with free 'T' test. These two tests are utilized to discover the 'P' respect.

Results

Table 1

	No of patients	**Percentage**
Cases	20(with PPUR)	9.1%
Controls	200(without PPUR)	90.9%
Total	220	100%

Table 2.Characteristics of patients with or without postpartum urinary retention

	PPUR(+)	**PPUR(-)**	**P value**
AGE	26.60±3.21	26.03±3.09	0.7
PARITY Primi Multi	 9.8% 8.2%	 90.2% 91.8%	0.81
INSTRUMENTAL DELIVERY - +	 3.5% 28%	 96.5% 72%	0.001
EPISIOTOMY Given Not given	 16.1% 1%	 83.9% 99%	0.001
DURATION OF 2ND STAGE OF LABOR	111.4±43.01	67.56±33.36	<0.01

Of a total of 220, 20(9.1%) patients had postpartum urinary retention and remaining 200(90.9%) patients were controls.

In table 2 Chi-square test showed two factors(episiotomy and instrumental delivery)were significant, whereas parity is not found to be significant. P value of other two factors(age and duration of 2nd stage of labour) were calculated by independent T test, showed duration of 2nd stage of labour was found to be significant whereas age factor is not that much significant[9].

Discussion

The pace of postnatal uneasiness urinary upkeep in this appraisal is seen as 9.1%. In the assessments including ladies post vaginal birth (checking instrumental birth), the revealed pace of unquestionable (symptomatic) PUR continued running from 0% (Hée et al, 1992) to 11.4% (Ramsa[1] and Torbet, 1993). The evaluation by Hée et al (1992) had somewhat model size of 51 and, in this way, didn't experience any ladies incapable to void. Two observational appraisals proclaimed 0.7% as the pace of symptomatic PUR post vaginal birth (Pramanick

et al, 2014; Andolf et a[2], 1994), regardless, the bladder was assessed at six hours by catheter and unquestionably the beginning stage if requiring a catheter, freely. Six observational assessments announced an occasion between 0.3% (Kekre et al[11], 2011) and 1.9% (Ajenifuja et al, 2013). All evaluations used somewhat shifting ramifications of PUR. Three study examines with enormous model sizes went from 0.2% (Teo et al[5], 2007) to 0.8% (Pifarotti et al[4], 2014), in like way with moving definitions. Musselwhite et al[6](2007) in their review study proclaimed an occasion of 4.7%. Ching-Chung et al{9} (2002), Yip et al[3](1997) and Burkhart et al (1965) in their observational evaluations revealed an occasion some spot in the extent of 4% and 4.9% of PUR post vaginal birth[11].

Conclusion

At whatever point regulated quickly and fittingly, the vast majority of patients with PPUR as a rule come back to commonplace bladder work at the hour of discharge from restorative facility. Regardless, frustration in finding and the officials of PPUR can without quite a bit of a stretch result in whole deal bladder brokenness requiring deferred catheterization. Thusly, wary perception of postnatal depression patients and usage of direct bladder care standards can confine the threat of enduring bladder harm, particularly in those with a high-danger intrapartum course.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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Postpartum Voiding Dysfunction in Vaginal Delivery: Identifying the Risk Factors

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Abstract

Objective: To assess the risk factors for postpartum urinary retention after vaginal delivery.

Material and Method: Of 220 ladies with a vaginal conveyance, 20 (9.1%) ladies who had baby blues urinary maintenance were cases, and 200 (91.1%) ladies who didn't were controls. Baby blues urinary maintenance was characterized as the nearness of postvoid leftover bladder volume ≥150 mL or the powerlessness to void inside 6 hours after vaginal conveyance. Strategic relapse investigation distinguished hazard factors for urinary maintenance.

Results: Drawn out span of the second phase of work , nearness of episiotomy, perineal tear, instrumental conveyance and birth weight of >3.8 kg for the infant were found as hazard factors for baby blues urinary maintenance after vaginal conveyance.

Conclusion: Baby blues urinary maintenance after vaginal conveyance is a generally regular condition. Attention to hazard components may enable us to avoid potential risk against this difficulty.

Keywords: *Bladder, vaginal delivery, risk factors, urinary retention*

Introduction

Baby blues urinary maintenance (PUR) is a troubling occasion, the frequency of which extents from 1.7% to 17.9%. Physiologic changes during pregnancy, utilization of provincial absense of pain, instrumental conveyance, perineal injury, nulliparity, and delayed work have been hypothesized as the reasons for PUR. Based on basic side effects, PUR has been characterized as a "nonappearance of unconstrained micturition following 6 hours of vaginal conveyance" or "no unconstrained micturition after evacuation of inhabiting catheter after lower fragment cesarean segment". Baby blues urinary maintenance has been characterized into secret and obvious maintenance. Ladies with a postvoid remaining bladder volume (PVRBV) of in excess of 150 mL, recognized by ultrasound screening or by catheterization, without side effects of urinary maintenance are delegated having secret urinary maintenance. Plain urinary maintenance alludes to the powerlessness to void within the sight of signs and side effects of urinary maintenance. In most obstetric units, estimation of the PVRBV by ultrasound output is utilized as a noninvasive technique to recognize urinary maintenance. [1]

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Materials and Method

The present investigation was completed in the Department of Obstetrics and Gynecology, Sree Balaji Medical College and Hospitals among the baby blues ladies who deliverd vaginally. [2]

Women who were not capable void inside 6 hours after vaginal transport were appointed having evident PUR. Covert support was portrayed as a PVBRV of more than 150 mL without urinary symptoms. Part

data—including age, uniformity, length of second period of work, birth weight>3.8kg,episiotomy,perineal tear and instrumental transport were bankrupt down and taken a gander at between those women who had PUR and the people who didn't. Authentic assessment was performed. Connection between the categoric variables was reviewed by methods for chi square test. Steady factors were poor somewhere near self-governing T test. A univariate assessment was performed and factors that were basically associated with PUR were destitute down through bivariate determined backslide. P=0.05 was seen as quantifiably important[3]

Findings

TABLE 1: Obstetric risk factors

	PPUR(+)	**PPUR(-)**	**P value**
AGE	**26.60±3.21**	**26.03±3.09**	**0.7**
PARITY Primi Multi	 12 8	 110 90	0.81
INSTRUMENTAL DELIVERY - +	 6 14	 164 36	0.001
PERINEAL TEAR - +	 6 14	 121 79	0.001
EPISIOTOMY Given Not given	 19 1	 99 101	0.001
DURATION OF 2ND STAGE OF LABOR	111.4±43.01	67.56±33.36	<0.01
BIRTH WEIGHT	3.42±0.5	2.94±0.48	0.01

TABLE 2: logistic regression analysis of risk factors for PPUR

	OR	**CI**	**P**
INSTRUMENTAL DELIVERY	**5.542**	**1.9-16.2**	**<0.02**
PERINEAL TEAR	**2.142**	**0.705-6.507**	**.17**
EPISIOTOMY	**0.109**	**0.013-0.898**	**<0.01**

Of a sum of 220 ladies with vaginal delivery,20(9.1%) patients had baby blues urinary retention:18(90%) had undercover retention(aymptomatic) and 2 (10%)had plain maintenance. Staying 200(90.9%) patients were controls.[4]

Quantitative factors caluculated utilizing chi square test: instrumental conveyance, episiotomy and perineal tear were seen as huge with P esteem 0.001,whereas equality isn't measurably critical in the present examination. Anyway the constant factors was determined utilizing free T test: the mean birth weight of infant for cases was fundamentally heavier than the controls and the mean length of the second phase of work was essentially longer in cases when contrasted with controls .The mean period of ladies with and without baby blues pee maintenance was not seen as factually huge[5].

No distinctions were found between these gatherings as far as age and equality.

In table 2 Logistic relapse investigation was carried on to recognize free hazard factors. Utilizing the three noteworthy elements distinguished by univariate examination, we found that solitary instrumental conveyance and episiotomy were altogether free hazard elements of baby blues urinary maintenance. Though perineal tear was not seen as noteworthy.

Discussion

In our investigation, PPUR after vaginal conveyance was found as a moderately regular event, with a rate of 9.1% (20/200). In the writing, the occurrence of PPUR differs broadly .

In the writing, a wide range of obstetrical hazard components have been considered for the pathogenesis of PPUR. The frequency of PPUR has been seen as higher in primigravidae than in multigravidae in the investigation led via Carley et al[1]. In the present investigation, in any case, equality was not a hazard factor for PPUR. A high frequency of PPUR was accounted for in patients with territorial anesthesia (Liang CC et al)[3] and instrument-helped vaginal conveyance (Yip SK et al[2]). Be that as it may, in our investigation, there were no ladies who had territorial absense of pain. Instrumental conveyance is related with a higher occurrence of PUR, particularly unmistakable retention.In the present examination, ladies who had an instrumental conveyance were increasingly inclined to create PUR (28%), which causes neurologic impingement, bringing about baby blues pee maintenance. In a review examination of 11,108 vaginal conveyances by Pifarotti et al[4], PPUR was distinguished in 105 ladies, and fundal weight during the second phase of work was a significant hazard factor for the improvement of PPUR. In our present investigation, none of the patients were given fundal weight, though all different elements that are huge in the present examination were discovered huge to study led by Pifarotti et al[4]

We recognized that a drawn out second phase of work and conveyance of macrosomic infant were the hazard variables related with the event of PPUR. So also, Kekre et al [5] revealed that the lengths of the first and second phases of work were straightforwardly identified with baby blues pee leftover volume, and work span ≥700 min was likewise connected with a more prominent rate of PPUR. It is conceivable that mechanical quality applied to the pelvic muscle floor during delayed second phase of work, notwithstanding the ascent in stomach weight with a macrosomic child, may add to pelvic and pudendal nerve harm, bringing about neurologic disability of micturition and, along these lines, urinary maintenance. In our examination prolonged second phase of work was seen as factually huge, while other 2 phases of work were not incorporated into the present investigation.

Conclusion

All in all, PPUR is a moderately basic condition that can make irreversible harm bladder work. Longer second phase of work, conveyance of a macrosomic infant, the nearness of perineal gashes, episiotomy and instrumental conveyance are huge hazard factors for the improvement of PPUR. Attention to hazard elements may enable the obstetrician to avoid this complexity.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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Evaluation of Incidence and Risk Factors of Postpartum Urinary Retention in Women with Vaginal Delivery

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Abstract

Objective : To assess the frequency and to survey the hazard factors for baby blues urinary maintenance in ladies with vaginal conveyance.

Material and Method: Of 220 ladies with a vaginal conveyance, 20 (9.1%) ladies who had baby blues urinary maintenance were cases, and 200 (91.1%) ladies who didn't were controls. Baby blues urinary maintenance was characterized as the nearness of postvoid lingering bladder volume ≥150 mL (clandestine or clear maintenance) or the powerlessness to void inside 6 hours after vaginal conveyance. Measurable investigation recognized hazard factors for urinary maintenance.

Results : The frequency of baby blues urinary maintenance in vaginal conveyance among 220 ladies is 9.1%.Prolonged term of the second phase of work , nearness of episiotomy, perineal tear, instrumental conveyance and birth weight of >3.8 kg for the infant were found as hazard factors for baby blues urinary maintenance after vaginal conveyance.

Conclusion : Baby blues urinary maintenance after vaginal conveyance is a moderately regular condition. Cautious observation of baby blues patients and implementation of basic bladder care rules can limit the danger of changeless bladder brokenness from happening. Consequently, attention to the hazard elements and inconveniences of baby blues urinary maintenance is required.

Keywords: *clandestine, bladder brokenness, episiotomy*

Introduction

Baby blues urinary maintenance is the failure to void after conveyance with a painful(usually) palpable or percussable bladder and the requirement for catheterisation to acquire alleviation.

Evaluated rates go from 0.05%-37.0%

There are two types of urinary retention that can affect women in the postpartum period:

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Overt Retention refers to the inability to void spontaneously within 6 hours of vaginal birth or removal of indwelling catheter.

Covert Retention Alludes to expanded post void remaining volumes of >150ml and no manifestations of urinary maintenance.

"Lager" first depicted voiding trouble, repetitive diseases and sphincteric in coordination in 1915.

The present term "useless voiding" (DV) was first utilized by Allen in 1977. This term has therefore been received by a few institutionalization archives.

The International Continence Society (ICS) expresses that: 'Typical voiding is accomplished by a deliberately started consistent detrusor withdrawal that prompts total bladder discharging inside an ordinary time range and without check'.

Urinary maintenance is probably going to be multifactorial, including physiological, neurological and mechanical procedures in the baby blues period. This can prompt durable voiding troubles, intermittent urinary tract diseases and seldom debilitated renal capacity.

As it is practically imposssible to foresee which patient will create baby blues urinary maintenance, all patients on the baby blues ward ought to be viewed as at high hazard.

The point of the present examination was to identify the rate of baby blues urinary maintenance in ladies who had ordinary vaginal conveyance and to decide the components adding to baby blues urinary maintenance.

Materials & Method

220 patients who conveyed vaginally going to SreeBalaji Medical College and Hospital are incorporated into the investigation. Ladies who were not able micturate inside 6 hours after vaginal conveyance were incorporated and known as obvious cases.All members gave educated assent for the examination. For the rest of the patients, following the principal micturition in the baby blues period a transabdominal ultrasound was done to assess postvoid lingering bladder volume. The transducer was situated in the midline on the highest point of the symphysis pubis to get the longitudinal and transverse sweep of the bladder. The most stretched out distance across in the transverse output in cm (D1), the anteroposterior measurement in longitudinal sweep in cm (D2) and the cephalocaudal width in the longitudinal sweep in cm (D3) were recorded. Assessed PVRBV was determined by utilizing the recipe D1×D2×D3×0.7

Ladies in whom the postvoid leftover bladder volume is more than 150ml yet are asymptomatic were characterized as clandestine cases and ladies who were not able void inside 6 hours following vaginal conveyance with a bladder volume more than 500ml were characterized as plain cases. Ladies who had an expected postvoid remaining bladder volume under 150 ml were characterized as controls.

For all members, maternal and neonatal statistic qualities, for example, age, equality, birth weight of infant, length of the second phase of labor(duration >120 mins inprimigravida and term >60mins in multigravida were taken as a drawn out period),perineal cut, episiotomy, and instrumental conveyances were gathered and afterward a factual investigation was performed with the above factors to break down the hazard factors for Postpartum pee maintenance.

Quantitative factors are given as number(percentage) and a factual correlation was completed by chi-square. Consistent factors with typical conveyance are introduced as mean±standard deviation and autonomous 'T' test is utilized to discover the 'P' esteem. A univariate investigation was performed and factors that were essentially connected with baby blues urinary maintenance were broke down by means of multivariate strategic relapse. The chances proportion was evaluated at 95% certainty interims. P<0.05 was considered factually huge.

Findings

	No of patients	**Percentage**
Cases	20(with PPUR)	9.1%
Controls	200(without PPUR)	90.9%
Total	220	100%

Table 1. Characteristics of patients with or without postpartum urinary retention

	PPUR(+)	**PPUR(-)**	**P value**
AGE	26.60±3.21	26.03±3.09	0.7
PARITY Primi Multi	 12(9.8%) 8(8.2%)	 110(90.2%) 90(91.8%)	0.81

Cont... **Table 1. Characteristics of patients with or without postpartum urinary retention**

INSTRUMENTAL DELIVERY - +	 6(3.5%) 14(28%)	 164(96.5%) 36(72%)	0.001
PERINEAL TEAR - +	 6(4.7%) 14(15.1%)	 121(95.3%) 79(84.9%)	0.001
EPISIOTOMY Given Not given	 19(16.1%) 1(1%)	 99(83.9%) 101(99%)	0.001
DURATION OF 2ND STAGE OF LABOR	111.4±43.01	67.56±33.36	<0.01
BIRTH WEIGHT	3.42±0.5	2.94±0.48	0.01

Table 2.Factors affecting the development of postpartum urinary retention (bivariate logistic regression)

	OR	**CI**	**P**
Instrumental Delivery	**5.542**	**1.9-16.2**	**<0.02**
Perineal Tear	**2.142**	**0.705-6.507**	**.17**
Episiotomy	**0.109**	**0.013-0.898**	**<0.01**

Of a sum of 220 ladies enrolled in the present study,20(9.1%) patients had baby blues urinary retention:18(90%) had secret retention(aymptomatic) and 2 (10%)had unmistakable maintenance. Staying 200(90.9%) patients were controls.[5]

Information in regards to conveyance attributes for ladies with and without baby blues urinary maintenance are appeared in table 1.Chi-square test demonstrated three factors(parity, instrumental conveyance, perineal tear and episiotomy) of which instrumental conveyance perineal tear and episiotomy were factually noteworthy with "p" estimation of 0.001.

Anyway the mean birth weight of infant for cases was fundamentally heavier than the controls(3.42±0.5 kilograms versus 2.94±0.48 kilograms,p=0.01) and the mean length of the second phase of work was essentially longer in cases when contrasted with controls (111.4±43.01 in minutes versus 67.56±33.36 in minutes,p<0.01).The mean period of ladies with and without baby blues pee maintenance was not seen as factually significant(26.60±3.21 vs26.03±3.09,p=0.7). Hence these 3 persistent variables(Age,Birth weight of infant and Duration of second phase of work) are determined utilizing INDEPENDENT "T" test.

No distinctions were found between these gatherings as far as age and equality.

In table 2 Logistic relapse investigation was carried on to recognize autonomous hazard factors.Using the three huge factors(instrumental delivery,perineal tear and episiotomy) distinguished by univariate examinations, we found that solitary instrumental conveyance and episiotomy were fundamentally free hazard variables of baby blues urinary retention(OR 5.542,95% CI 1.9-16.2, p<0.02 as well as 0.109,95% CI 0.013-0.898, p<0.01 separately). While perinealtear(OR 2.142 95% CI 0.705-6.507,p=0.17)was not saw as noteworthy[3].

Discussion

In our investigation, baby blues pee maintenance after vaginal conveyance was found as a

generally regular event, with a rate of 9.1%(20/220). In the writing, the rate of baby blues pee maintenance shifts broadly. Be that as it may, the evaluated rate is probably going to be more, since most cases regularly stay unanticipated. In the investigations including ladies post vaginal birth (counting instrumental birth), the announced occurrence of plain (symptomatic) PUR extended from 0% (Hée et al, 1992) to 11.4% (Ramsay[1] and Torbet, 1993). Six observational investigations announced a frequency between 0.3% (Kekre et al{10}, 2011) and 1.9% (Ajenifuja et al, 2013). All investigations utilized somewhat changing meanings of PUR. Three review thinks about with huge example sizes went from 0.2% (Teo et al, 2007) to 0.8% (Pifarotti et al, 2014), additionally with changing definitions. Musselwhite et al (2007) in their review study detailed a rate of 4.7%. Ching-Chung et al [7] (2002), Yip et al{3} (1997) and Burkhart et al (1965) in their observational investigations announced a rate somewhere in the range of 4% and 4.9% of PUR post vaginal birth. They all had slight varieties in the meaning of PUR. Lee et al. detailed a rate of 14.1% in an examination did at the Tsan Yuk Hospital from 1 to 30 April 1996, which included 256 patients who had conveyed vaginally. They utilized remaining pee volume surpassing 200 mL as meaning of PUR on post-conveyance day 2. The rate of 9.1% distinguished in this investigation is not as much as that of Lee et al. furthermore, this may have been because of variety in definition utilized. We utilized a volume of 150 mL, while they utilized 200 mL. It could likewise be because of racial contrasts and in 1999 Lee et al in their observational investigation detailed a higher rate of 5.8% post vaginal birth additionally utilizing varying meanings of PUR. . Plain maintenance is effectively distinguished by the signs and indications; be that as it may, secret maintenance is perceived uniquely by ultrasound or by catheterization on the grounds that influenced ladies are aymptomatic. [4]

In the present investigation themean time of ladies with PUR was like that of the controls. Similar to the case in different investigations, there was no huge relationship among age and Post partum pee maintenance .

For a situation control study, Carley et al[5] reported that PUR was more typical in primigravida than in multigravida (P<0.001) and that primigravida had a higher pace of instrumental conveyance than the controls (47.1% versus 12.4%; P<0.001). Primigravida were likewise bound to get episiotomy (P=0.001). Nulliparity has been accounted for to be a significant hazard factor for PUR. For instance, Liang et al.found that 78.1% of ladies with PUR were primigravida, contrasted and just 45% of ladies with no maintenance. In the present investigation, nonetheless, there was no relationship among equality and PUR (P=0.81).

Instrumental conveyance is related with a higher frequency of PUR, particularly unmistakable retention. In the present investigation, ladies who had an instrumental conveyance were increasingly inclined to create PUR (28%), which causes neurologic impingement, bringing about baby blues pee maintenance. Instrumental conveyance can bring about harm to the fringe nerves, pelvic musculature, and sphincter urethrae, and can likewise cause debilitated micturition reflex. In spite of the fact that episiotomy has seen as related with increasedincidence of PUR, the equivalent was seen as huge in the present study(p=0.001). The agony brought about by episiotomy can cause reflex urethral fit, which may result in PUR[2].

Birth trench wounds and serious perineal gash increment thechances of urinary maintenance. Liang et al.reported a significantlyhigher frequency of PUR in ladies with birth trench wounds: 41.2%,compared with 7.1% in controls (P<0.001).Glavind and Bjørk distinguished baby blues voiding brokenness in 12/1649 ladies (0.7%). Instrumental conveyance was performed in 33% of the maintenance gathering, contrasted and 8% of the all out populace. Butt-centric sphincter damage and huge perineal tears were available in 33% and 42% of the maintenance bunch individually, contrasted and 1% and 4% of the all out gathering. Thus in Ramsay andTorbett's investigation, unusual voiding parameters were found in 74% of ladies after forceps conveyance. Irregular parameters were additionally recognized in 35% of ladies who had perineal tears sutured, contrasted and 16% of ladies with an unblemished perineum. In the present examination, perineal tear was seen as critical utilizing chi-square formula(p=0.001) while, information investigation by strategic relapse perineal tear was not seen as significant(OR 2.142 95% CI 0.705-6.507,p=0.17).

In an investigation of 691 parturients, Yip et al.found that, on baby blues day 1, the frequency of plain maintenance was 4.9% and thatof secret maintenance was 9.7%, giving a general rate of 14.6%. Themean span of the second phase of work was longer in the maintenance gathering (P<0.001). Instrumental conveyance was related witha higher occurrence of obvious or

undercover urinary maintenance (P<0.001). Thesame was valid for multiparity (P<0.05),and episiotomy (P<0.05). Undercover urinary maintenance was self-limitingand didn't require intercession. However, in our present examination equality isn't seen as that critical though other threefactors(duration of second phase of labour,episiotomy and instrumental conveyance) were measurably huge.[1]

In a review examination of 11,108 vaginal conveyances by Pifarotti et al, PPUR was identified in 105 ladies, and primi parity(p<0.001), delayed second phase of labor(p<0.03),instrumental delivery(p<0.001) and episiotmy(medio horizontal p<0.001,midline episiotomy-p<0.03) were noteworthy and with strategic relapse he found instrumental conveyance was a free hazard factor for baby blues pee maintenance among every one of the variables. On contrasting and our examination every other factor with the exception of equality was huge. Thus in our examination the mean span of work among ladies with PUR was essentially longer than among ladies without PUR: (111.4±43.01 in minutes versus 67.56±33.36 in minutes,p<0.01), instrumental conveyance and episiotomy are the 2 autonomous hazard factors which was seen as noteworthy by calculated relapse investigation.

So also, Kekre et al. detailed that the more drawn out span of labour(379 minutes in patients with baby blues pee maintenance) was related with a more noteworthy frequency of PPUR. It is conceivable that mechanical quality applied to the pelvic muscle floor during delayed second phase of work, notwithstanding the ascent in stomach weight with a macrosomic child, may add to pelvic and pudendal nerve harm, bringing about neurologic debilitation of micturition and, hence, urinary maintenance.

In the present investigation, the mean length of work among ladies with PUR was altogether longer than among ladies without PUR: (111.4±43.01 in minutes versus 67.56±33.36 in minutes,p<0.01).

Consequences of the present investigation are likewise in concurrence with the examination done by SabriCavkaytar{15}, expressed that drawn out length of second phase of labour,presence of episiotomy,presence of perineal tear,birth weight >4000gms in infant were found as a free hazard factors that contribute baby blues urinary maintenance. Same elements were critical in our present investigation. In extra instrumental conveyance was likewise seen as an autonomous factor in the present investigation.

Conclusion

The frequency of baby blues pee maintenance in ladies with vaginal conveyance in this examination is 9.1%. Clear maintenance can without much of a stretch be identified with the signs and manifestations. While, secretive maintenance can be identified uniquely by transabdominal ultrasonogram as the patients are asymptomatic. Age and equality were not fundamentally identified with baby blues urinary maintenance. Ladies who had an instrumental conveyance and episiotomy were progressively inclined to create baby blues pee maintenance. Drawn out length of second phase of work and birth weight of infant more than 3.8kg were huge among ladies with PUR than among ladies without PUR. None of the ladies in the examination picked epidural analgesia(an significant factor which assumes a noteworthy job in baby blues urinary maintenance more in primiparity), accordingly the impact of such factor couldn't be investigated. Bladder filtering is required and advantageous in prompt baby blues period to analyze baby blues pee maintenance by estimating the postvoid leftover bladder volume. Early analysis of baby blues urinary maintenance immediately may decrease the danger of bladder harm. Henceforth, no patients ought to be left over 6 hours without voiding after vaginal conveyance.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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Isolation and Identification of Klebsiella Species from Various Clinical Samples at a Tertiary Care Hospital, South India

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Abstract

Different Klebsiella species may be responsible for different type of infections, and may also differ with the site of infections. K. pneumoniae subspecies pneumoniae is the most common hospital acquired pathogens causing urinary tract infection, wound infections, meningitis, abscesses, lung infections and stated to cause sepsis and death of newborn in the intensive care unit. They account for about 75% to 80% of all Klebsiella species. Much more rarely encountered species are K. pneumoniae subspecies ozaenae and K. pneumoniae subspecies rhinoscleromatis, which have been retained as separate species because of their association with specific diseases. Taxonomically, these two species are regarded as subspecies of K. Pneumoniae based on DNA-DNA hybridization data. Klebsiella oxytoca is another well- established species, accounting for 13% to 25% of isolates. K. oxytoca is normally isolated from environmental sources.

Keywords – *Pneumonia, DNA, Lung Infections*

Introduction

Enterobacteriaceae are a large, assorted group of gram negative bacilli commonly colonizing gastrointestinal tract and most notably associated with human infections. Few genera are recognized as environmental habitats or colonizer of animals. The term "Enterobacteriaceae" was first put forward by Rahn in 1937, which comprises of organisms that share subsequent properties. The Enterobacteriaceae Family embraces seven tribes, of which Klebsiella fits into fifth tribe. The genus Klebsiella is the second most common organism among Enterobacteriaceae family next to E. coli, which is a gram negative, lactose fermenting, non-motile, rod shaped, facultative anaerobic bacilli. They are the common causative agents of both nosocomial and community acquired infections. Klebsiella is the second commonest cause of nosocomial bacteremia and lethal sepsis in pediatric wards especially in premature infants and intensive care units (ICU), and often causes neonatal sepsis. Klebsiella spp. cause 3 – 8 % of all nosocomial infections and are widely recognized as important pathogens in urinary tract infections, pneumonia, wound, soft tissue and blood stream infections (BSI) (1). The genus Klebsiella are the bacterial pathogens most often found associated with infections in healthcare settings and infections may be endogenous or acquired through direct contact with an infected host. The Enterobacteriaceae Family embraces seven tribes, of which Klebsiella fits into fifth tribe. The genus Klebsiella is the second most common organism among Enterobacteriaceae family next to E. coli, which is a gram negative, lactose fermenting, non-motile, rod shaped, facultative anaerobic bacilli. They are the common causative agents of both nosocomial and community acquired infections[1].

Different Klebsiella species may be responsible for different type of infections, and may also differ with the site of infections. K. pneumoniae subspecies pneumoniae is the most common hospital acquired pathogens causing urinary tract infection, wound infections, meningitis, abscesses, lung infections and stated to cause sepsis and death of newborn in the intensive care unit.

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They account for about 75% to 80% of all Klebsiella species. Much more rarely encountered species are K. pneumoniae subspecies ozaenae and K. pneumoniae subspecies rhinoscleromatis, which have been retained as separate species because of their association with specific diseases. Taxonomically, these two species are regarded as subspecies of K. Pneumoniae based on DNA-DNA hybridization data.Klebsiella oxytoca is another well- established species, accounting for 13% to 25% of isolates. K. oxytoca is normally isolated from environmental sources.

Clinical manifestations by Klebsiella species may range from colonization of the skin and mucous membrane to serious infection leading to substantial morbidity and mortality. The ability of this organism to spread rapidly often leads to nosocomial outbreaks. Since 1982, strains that produce ESBL have been evolving.Epidemic and endemic nosocomial infection caused by Klebsiella species are a leading cause of high morbidity and mortality[2].

Materials and Method

The study was conducted in central diagnostic laboratory, Department of Microbiology for a period of one year (Jan 2017 to Dec 2017) at Sree Balaji Medical College and Hospital. Overall 980 non repetitive clinical samples (wound/pus, urine, sputum and blood) received and processed from General surgical wards. Out of which, 189 were isolated and identified as klebsiella by Gram staining, culture morphology on to MacConkey Agar, Blood agar and Nutrient agar plates and biochemical tests[4].

Microscopic appearance:

The isolated colonies from MacConkey agar and Blood agar was picked up for gram staining and motility.

Gram staining reveals short, thick rods of 0.3 to 1.5 by 0.5 to 5.0 µ, gram negative bacilli arranged in singles and pairs (Fig 4)

Colony morphology on agar medium:

On Nutrient agar colonies are circular, 2-3mm in diameter, dome shaped, mucoid (due to capsular polysaccharides), Greyish-white, translucent-opaque.

On MacConkey agar colonies are circular, 2-3 mm diameter, convex, mucoid, pink color due to (lactose fermentation), opaque.

On blood agar the colonies are similar to nutrient agar with no haemolysis.

Biochemical tests:

Tube catalase test

Indole production test (Kovac's reagent)

Methyl red test

Voges proskaeur test

Citrate utilization test on simmon's citrate utilization media

Urease production test on christensen's media

Sugar fermentation test (glucose, lactose, sucrose, mannitol, mannose)

Triple sugar iron media

Decarboxylation of arginine, lysine (Moller's method)

Table 1:Preliminary tests for Enterobacteriaceae groups:

S.No	Name of the test	Results for Klebsiella
1	Catalase	Positive
2	Oxidase	Negative
3	Nitrate reduction	Positive
4	Hanging drop	Non motile

Table 2: Biochemical test used in identification of Klebsiella species are indicated in the chart below

S.NO	Biochemical test	Klebsiella pneumoniae	K.oxytoca
1	Indole production test	–	+
2	Methyl red test	_	_
3	Voges-proskeaur test	+	+
4	Citrate utilization test	+	+
5	Urease production test	+	+
6	Triple sugar iron	A/A	A/A
7	GAS	+	+

Cont... **Table 2: Biochemical test used in identification of Klebsiella species are indicated in the chart below**

8	Arginine decarboxylase	+	+
9	Lysine decarboxylase	+	+

Results

Table 3: Samplewise distribution of Klebsiella isolates:

S.no	Sample Type	Total Number	Klebsiella Isolates
1.	Urine	398	51(27%)
2.	Wound/Pus	502	94(50%)
3.	Sputum	48	26(14%)
4.	Blood	32	18(9%)
	Total	980	189(100%)

From a total of 980 various clinical samples, 189 isolates were Klebsiella, of which maximum isolates were from wound (50%), followed by urine (27%), sputum (14%) and blood (9%).

Table 4: Percentage of Klebsiella species isolated

Total Klebsiella Isolates	Klebsiella Pneumoniae	Klebsiella Oxytoca
189(100%)	155(82%)	34(18%)

Out of 189 Klebsiella isolates, 82% were Klebsiella pneumoniae followed by Klebsiella oxytoca which constituted 18%.

Table 5: Genderwise distribution of Klebsiella:

Total Klebsiella Isolates	Male Patients	Female Patients
189	123(65%)	66(35%)

Out of 189 Klebsiella isolates,123 were males (65%) and 66were female patients(35%).

Table 6:Agewise distribution of Klebsiella infection:

S.no	Age In Years	Number of Samples	Klebsiella Isolates
1.	15-30	113	32(17%)
2.	31-45	265	44(23%)
3.	46-60	230	47(25%)
4.	>60	372	66(35%)
Total		980	189(100%)

Out of 189 Klebsiella isolates, maximum isolates were obtained from the age group of >60 years (35%) followed by 46-60 years (25%), 31-45 years (23%) and15-30 years (17%).

Findings

Total number of samples taken in this study during the one-year period (Jan-Dec2017) is 980. The samples consisted of urine, wound/pus, sputum and blood from inpatients of General surgical wards at Sree Balaji medical college and hospital, Chrompet, Chennai, south India.

In this study, under proper aseptic conditions samples were collected, sent and processed in the microbiology section of central diagnostic laboratory. Organisms were identified based on culture characteristics, gram staining, motility test, and biochemical reactions. Out of the 980 samples, 189(19.8%) Klebsiella species were isolated. In a previous study by Saurav chakraborthy et al., 24% of Klebsiella were isolated from various clinical samples[7]. Jesmin Akter et al., in their study done at south eastern part of Bangladesh reported isolation of 19.72% of Klebsiella species, which was similar to our study[8].

This study shows that, out of 189 Klebsiella isolates from various clinical samples, maximum isolates were from wound/pus samples 94(50%), followed by urine 51(27%), sputum 26(14%) and blood 18(9%). Sunil Kumar biradar et al., at Karnataka isolated 50% of Klebsiella from wound, followed by 21% from urine, 18% from sputum and 7% from blood (9). A study by Asha et al., isolated 48% and 28% of Klebsiella species from wound and urine samples respectively [10] which was similar to the present study.

In this study, highest prevalence of Klebsiella isolates were obtained from the age group of >60 years (35%) followed by 46-60 years (25%), 31-45 years (23%) and the least from 15-30 years (17%). A similar study done by Namratha et al., isolated highest number of Klebsiella species in patient aged above 60 years (30%) followed by 45-60 years (25%), 31-45 years (22%) and 16% in patients aged 16-30 years. Various risk factors like diabetic mellitus, hypertension, steroid therapy, smoking and alcoholism were associated with Klebsiella infections in their study.

In this study, Klebsiella was isolated from 65% of males and 35% of females of ratio 1.8:1. A similar study done by Sunil kumar et al., isolated 62% from male and 38% from female with male and female ratio of 1.7:1[9]. Frequency of male is more than female which could be due to exposure to outside working environment.

Out of 189 Klebsiella isolates, 155(82%) were Klebsiella pneumoniae and 34(18%) were Klebsiella oxytoca. Thosar et al., at Amaravati isolated 86% of Klebsiella pneumoniae and 13% of Klebsiella oxytoca. A similar study done by Namratha et al.,found 79% being Klebsiella pneumoniae and 21% Klebsiella oxytoca.

Conclusion

In our present study, klebsiella species were most commonly encountered from wound samples of both gender among which maximum isolates were klebsiella pneumoniae than klebsiella oxytoca. This increase in klebsiella isolates in wound samples would be due to risk factors like diabetic mellitus, immunocompromised patients etc. Appropriate antibiotic policy should be followed in reference to CLSI guidelines for empirical therapy.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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Study on Carcinomas of Breast with Special Reference to Expressions of Vascular Endothelial Growth Factor (VEGF)

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Abstract

Introduction: Bosom carcinoma is the most widely recognized malignant growth analyzed in ladies on the planet. The frequency of bosom carcinoma is additionally in an expansion in India and is presently the second most regularly analyzed carcinoma in ladies after cervical cancer. Albeit intrusive carcinoma of bosom was clinically viewed as a solitary substance before, histological and atomic investigation have shown that it is a heterogeneous ailment, made out of morphologically and hereditarily particular elements with various sub-atomic profiles, conduct and reaction to therapy(2).

A relationship between HER-2/neu over expression and VEGF articulation could fortify the theory dependent on preclinical proof that expanded VEGF articulation might be an after effect of HER-2/neu over expression and may add to the forceful phenotype of HER-2/neu over expressing bosom disease cells. This would give a method of reasoning to consolidated remedial methodologies focusing on both VEGF and HER-2/neu. The essential point of the present investigation was to decide potential relationship between articulations of HER-2/neu and VEGF in bosom carcinoma

Materials and Method

The present examination was done in the Department of Pathology, SBMCH, with endorsement from institutional morals panel. It included 30 instances of essential carcinoma bosom, affirmed by biopsy3.

Findingss

Table-1: Distribution of cases in relation to clinicopathological parameters

Clinicopathological Parameters		No.	%
Age (in years)	≤ 50	19	63.3
	> 50	11	36.7
Laterality	Right	14	46.7
	Left	16	53.3

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Cont... **Table-1: Distribution of cases in relation to clinicopathological parameters**

Tumor size	T1 (<2cm)	1	3.3
	T2 (2-5cm)	21	70
	T3 (>5cm)	8	26.7
Histological type	Invasive carcinoma of no special type	24	80
	Invasive lobular carcinoma	2	6.7
	Mucinous carcinoma	2	6.7
	Metaplastic carcinoma of no special type	1	3.3
	Invasive papillary carcinoma	1	3.3
Histological grade	I	4	13.3
	II	14	46.7
	III	12	40
AJCC staging	I	0	0
	II	18	60
	III	12	40
	IV	0	0
Lymph node metastasis	Present	19	63.3
	Absent	11	36.7
HER2 neu	Positive	15	50
	Negative	15	50
VEGF	Positive	21	70
	Negative	9	30

Table 2 : Association between HER-2/neu and VEGF expressions :

HER2/neu	**No. of cases**	**VEGF**	
		Positive (%)	**Negative (%)**
Positive	15	15 (100%)	0 (0%)
Negative	15	6 (40%)	9 (60%)

HER2/neu positivity completely matches with VEGF positivity. Chi square test of independence also reveals a significant association between the two factors[1] ($p = 0.014$). Out of 15 negative cases of HER2/neu, 9 are in agreement with VEGF expression (60%), whereas 6 are in disagreement (40%). This observation leads to a firm indication that HER2/neu positivity has a strong association with VEGF positivity and also majority of HER2/neu negative cases are in agreement with VEGF expression[5].

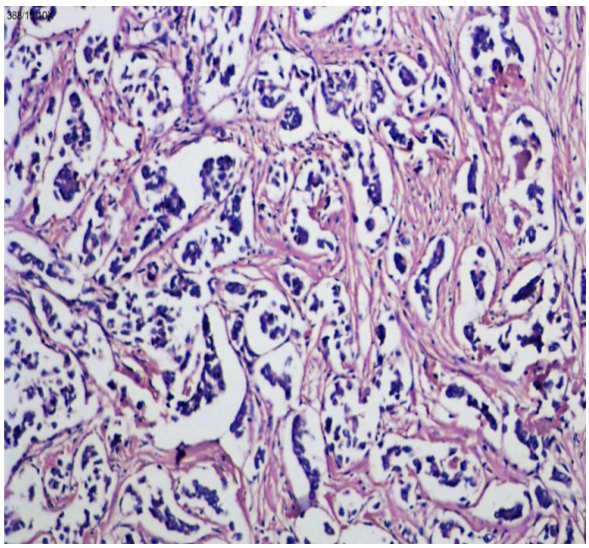


Fig 1 - Invasive Breast Carcinoma of No Special Type (H & E, 10X)

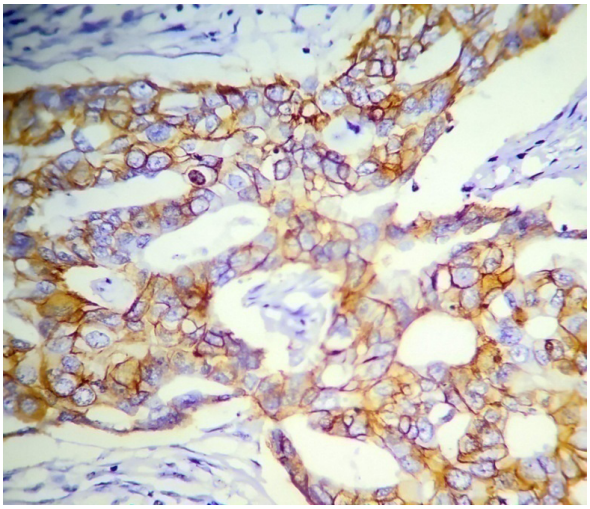


Fig 2 - Invasive Breast Carcinoma of No Special Type, showing positivity for HER2/neu (HER2/neu, 40X)

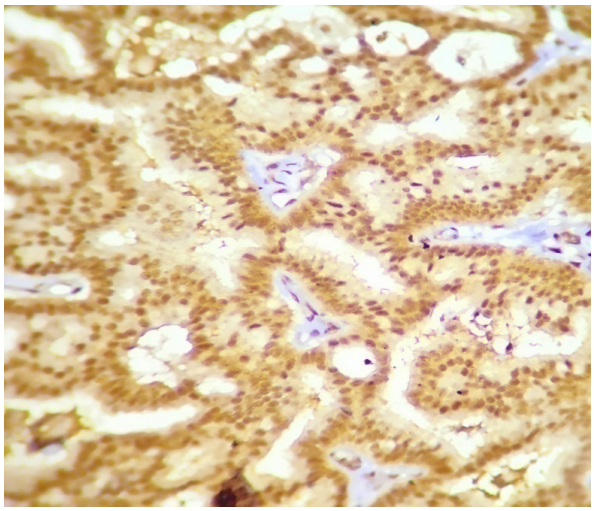


Fig 3 - Invasive Breast Carcinoma of No Special Type, showing positivity for VEGF (VEGF, 40X)

Discussion

Most of the clinical information relating to the association between HER-2/neu over-expression and VEGF expression in breast cancer, demonstrate a positive association between the 2 factors among massive series of primary breast cancer patients(3,4,5,6,7). Kimberly et al(8) during a study of 425 patients with pathologic process breast cancer incontestible a major direct correlation between HER-2/neu over-expression and mean microvessel density (MVD). However, in distinction to most of the studies, they found important lower levels of VEGF expression in HER-2/neu amplified tumours. The authors attributed this finding to the actual fact that higher quantity of growth in HER-2/neu amplified tumorus could result in less growth drive and successively decrease the assembly of VEGF. They additionally urged that this finding could also be explained by the quality of VEGF regulation. this study in primary breast cancer patients, however, supports the observation that HER-2/neu over-expression is related to VEGF expression[8].

Conclusion

The current study provides clinical proof that HER-2/neu over-expression is related to expression of VEGF in breast malignant neoplastic disease, suggesting that VEGF could partially mediate the aggressive composition of breast malignant neoplastic disease that over-expresses HER-2/neu[1]. These knowledge in addition support the employment of combination therapies directed against each HER-2/neu and VEGF for treatment of breast malignant neoplastic disease patients United Nations agency exhibit HER-2/neu over-expression. However, this study enclosed little variety of cases, therefore any studies with larger sample size square measure required during this space to conclude associate association between HER-2/neu and VEGF in breast malignant neoplastic disease[9].

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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Clinicopathological Spectrum of Breast Carcinoma Cases in Sree Balaji Medical College and Hospital

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Abstract

Carcinoma is a major health issue worldwide. Approximately 10 million people are diagnosed with carcinoma and more than 6 million people die of the disease every year.(1) Breast cancer is by far the most common of all cancers diagnosed in women in the world. The incidence of breast cancer has risen in India (22.9%). The age-standardized mortality rate for breast cancer in India is found to be 11.1/100,000 whereas globally it is 12.5/100,000, according to International Agency for Research on Cancer report in 2008.(2) Breast cancer cases in India are expected to increase by 26% by 2020.(3) Among the Indian women, cancer cervix and breast carcinoma account for 60% of the total cases, of which the incidence of breast carcinoma is 10.4%. A study conducted by WHO (1999) (4) revealed that Chennai accounts for the highest incidence among all the leading centres in India i.e around 26/1, 00,000 women. The mean age of occurrence is approximately 42 years.(1,5)

Keywords: *breast cancer, WHO, carcinoma, International Agency for Research on Cancer*

Introduction

Carcinoma is a major health issue worldwide. Approximately 10 million people are diagnosed with carcinoma and more than 6 million people die of the disease every year.(1) Breast cancer is by far the most common of all cancers diagnosed in women in the world. The incidence of breast cancer has risen in India (22.9%). The age-standardized mortality rate for breast cancer in India is found to be 11.1/100,000 whereas globally it is 12.5/100,000, according to International Agency for Research on Cancer report in 2008.(2) Breast cancer cases in India are expected to increase by 26% by 2020.(3) Among the Indian women, cancer cervix and breast carcinoma account for 60% of the total cases, of which the incidence of breast carcinoma is 10.4%. A study conducted by WHO (1999) (4) revealed that Chennai accounts for the highest incidence among all the leading centres in India i.e around 26/1, 00,000 women. The mean age of occurrence is approximately 42 years.(1,5)

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Materials and Method

The present study was done in the Department of Pathology, SBMCH, with approval from institutional ethics committee. It included 30 cases of primary carcinoma breast, confirmed by biopsy.

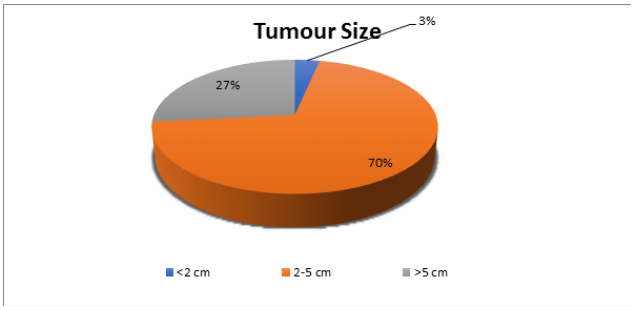
Findings

Clinicopathologic profile of the cases :

The **T2 lesions** (ranging between the size of 2-5cm) accounted for 70% of cases, while **T3** (>5cm in size) **and T1 lesions** (<2 cm in size) accounted for 26.7% and 3.3% of cases, respectively. (Table 2 & Graph 2)

Table1 : Size Wise Distribution of the Tumours

Tumour Size	Percentage	Frequency
T1 (<2 cm)	3.3%	1
T2 (2-5 cm)	70.0%	21
T3 (>5 cm)	26.7%	8
Total	100.0%	30



Graph 1 : Size Wise Distribution of the Tumours

Out of the total 30 studied cases, Invasive carcinoma of no special type (Fig-1), was the commonest **histologic type** accounting for 80% (24/30) cases[2]. There were two cases each of Invasive lobular carcinoma (Fig-2) and mucinous carcinoma (Fig-3) and one case each of metaplastic carcinoma of no special type (Fig-4) and invasive papillary carcinoma (Fig-5). (Table 3 and Graph 3)

Table 2 : Distribution of cases according to histological diagnosis

Histological Diagnosis	Percentage	Frequency
Invasive carcinoma of no special type	80.0%	24
Invasive Lobular Carcinoma	6.7%	2
Mucinous Carcinoma	6.7%	2
Metaplastic Carcinoma of No Special Type	3.3%	1
Invasive Papillary Carcinoma	3.3%	1
Total	100.0%	30

Regarding the **histologic grades** of the tumours, in this study 13.3% were grade I, 40% belonged to grade II and 46.7% were grade III tumours. (Table 4) Since grade I tumours were very few in numbers, grade I and grade II tumours could also be clubbed together as low grade tumours and grade III were treated as high grade tumours[3]. Hence, low grade tumours made up 53.3% (16 out of 30) whereas high grade tumours made up 46.7% (14 out of 30) of the 30 cases, which were included in this study.60% of the cases included in this study showed **AJCC stage II** tumours and 40% of the cases showed **AJCC stage III** tumours. None of the tumours belonged to stage I and stage IV.

Lymph node metastasis was seen in 63.3% cases while 36.7% cases were negative for it.

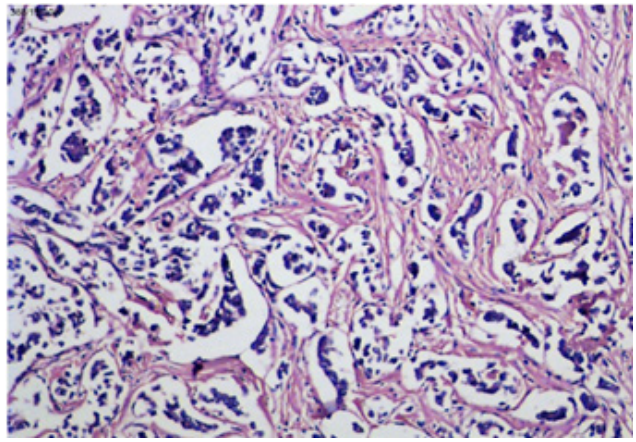


Fig 1 - Invasive Breast Carcinoma of No Special Type (H & E, 10X)

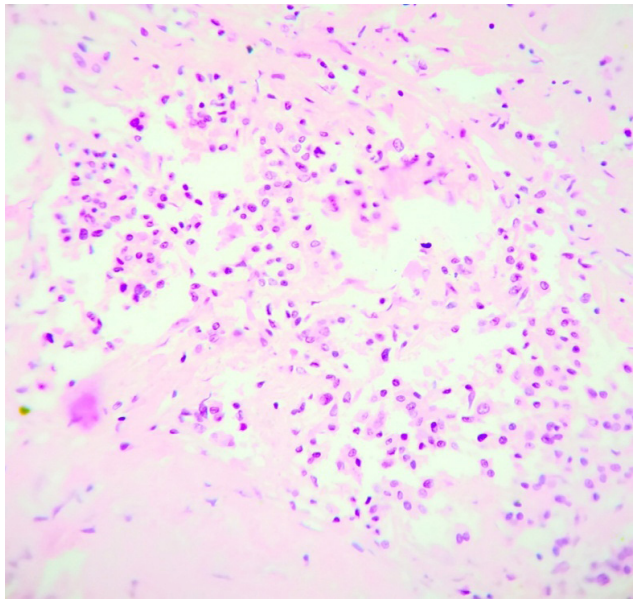


Fig 2 – Invasive Lobular carcinoma (H & E, 10X)

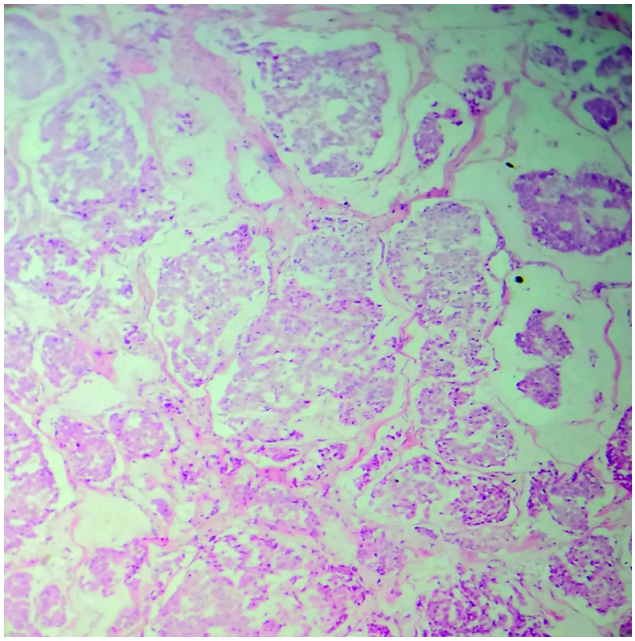


Fig 3 – Mucinous carcinoma (H & E, 10X)

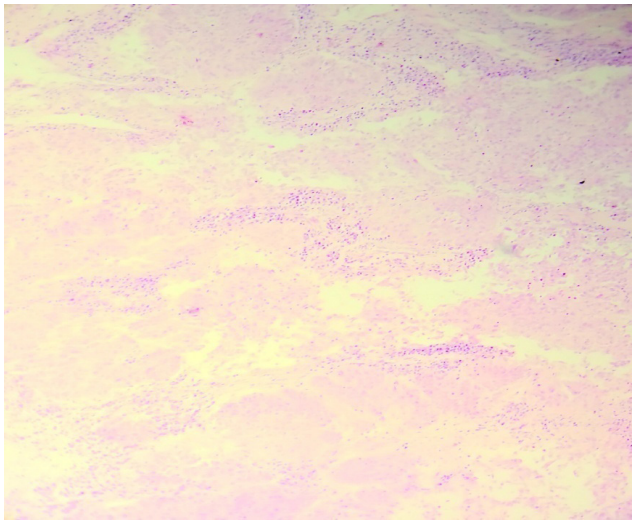


Fig 4 – Metaplastic carcinoma of no special type (H & E, 10X)

Discussion

The mean age of patients in our study group was observed to be 47.5 years which was comparable to the mean age of patients in the studies conducted by Xiaowei Ye et al (49.86 years), En-Qi Qiao et al (51 years) and Wentao Yang et al (51.9 years). The mean age in the study conducted by Konecny et al (58years) was however significantly higher than that in the present study. 63.3% of patients in our study were <=50 years while 36.7% of patients were >50 years compared to 49% (<50 years) and 51 % (>50 years) and 51 %(< 50 years) and 49 % (>50 years) of patients in the study conducted by En-Qi Qiao et al and Xiaowei Ye et al [4] respectively.

Table 3: Comparative analysis of Age Distribution in Breast carcinoma cases

Study	<=50 years	>50 years	Mean Age
Xiaowei et al (2010)	51%	49%	49.86 years
En – Qi Qiao et al (2013)	49%	51%	51 years
Wentao Yang et al (2002)	-	-	51.8 years
Konecny et al (2004)	-	-	58 years
Present Study	63.3%	36.7%	47.5 years

As far as the tumour size is concerned, T2 lesions (2-5 cm in size) were the most common (70%) in our study. This finding was in agreement with the studies conducted by Wentao Yang et al (62.6% of T2 lesions) and Konecny et al (51% of T2 lesions). However, T1 lesions were found to be the majority in the works of En-Qi Qiao et al (56%), Xiaowei Ye et al (42%) and Linderholm et al (57%).

Table 4 : Comparative analysis of Tumour Size Distribution in Breast carcinoma cases

Study	Most predominant tumour size	Percentage (%)
Xiaowei et al (2010)	T1	42
Linderholm et al (2004)	T1	57
Konecny et al (2004)	T2	51
En – Qi Qiao et al (2013)	T1	56
Wentao Yang et al (2002)	T2	62.6
Present Study	T2	70

Out of the total 30 cases studied, Invasive carcinoma of no special type was the commonest histological type accounting for 80% (24/30) cases. It was also the most common histological type in the studies conducted by Xiaowei Ye et al and Linderholm et al[5], where it accounted for 73.5% and 87.5% of cases respectively.

Table 5 : Comparative analysis of Distribution of Histological types in Breast carcinoma cases

Study	Commonest histological type	Percentage (%)
Xiaowei et al (2010)	Invasive carcinoma of no special type	73.5
Linderholm et al (2004)	Invasive carcinoma of no special type	87.5
Present Study	Invasive carcinoma of no special type	80

Regarding the histologic grade of the tumours, our study showed that 13.3% were in grade I, 40% were in grade II and 46.7% were in grade III. Due to few numbers of grade I cases, grade I and grade II tumours were clubbed together into low grade tumours (53.3%) and grade III tumours (46.7%) were taken as high grade tumours. The distribution of tumours among low grade and high grade was comparable to the findings of Xiaowei Ye et al (60% and 40%), Linderholm et al (60% and 40%) and Konecny et al (60.4% and 39.6%). En-Qi Qiao et al also had reported more cases in the low grade category (72%).

Table 6 : Comparative analysis of Distribution of Breast carcinoma cases according to histological grades

Study	Most predominant histological grade	Percentage (%)
Xiaowei et al (2010)	Low Grade	60
Linderholm et al (2004)	Low Grade	60
Konecny et al (2004)	Low Grade	60.4
En – Qi Qiao et al (2013)	Low Grade	72
Present Study	Low Grade	53.3

In our study, 63.3% cases were node positive which is comparable to the findings of Wentao Yang et al (61.7% node positive cases). The studies belonging to Xiaowei Ye et al, Linderholm et al, Konecny et al and En-Qi Qiao et al had 34%, 42%, 51.7% and 82% of node positive cases, respectively.

Table 7 : Comparative analysis of Lymph node metastasis status in Breast carcinoma cases

Study	Percentage of Lymph Node positive cases
Xiaowei et al (2010)	34
Linderholm et al (2004)	42
Konecny et al (2004)	51.7
En – Qi Qiao et al (2013)	82
Wentao Yang et al (2002)	61.7
Present Study	63.3

Conclusion

In the present study, 40% of the breast carcinoma cases belonged each to the age groups of 35-45 years and 45-55 years. The mean age of patients was found to be 47.5 years. The largest dimension in 70% of the breast tumours was between the range of 2-5cm (T2). Among the various histological variants in breast carcinoma, Invasive carcinoma of no special type, constituted 80% of the cases. The predominant grade among the breast carcinoma cases was Grade III, which accounted for 46.7% of the cases. As far as the AJCC staging of the breast carcinoma cases in concerned, majority belonged to AJCC stage II (60% cases). Among the 30 cases, lymph nodal metastasis was found in 63.3% cases.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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Expression of Ki – 67 AND Bcl – 2 in Endometrial Hyperplasia

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Abstract

Prolonged oestrogen exposure can induce exaggerated endometrial proliferation (hyperplasia), which is an important precursor of endometrial carcinoma[1]. This investigation uncovered that both HER2/neu cynicism and energy were similarly pervasive in both the wide age gatherings (<=50 years and >50 years). It demonstrated that HER2/neu energy was similarly circulated between T1, T2 and T3 sores of bosom carcinoma. Dominant part of the instances of obtrusive ductal carcinoma of no extraordinary kind were sure for Her 2/neu. None of the other histological sorts indicated HER2/neu inspiration. Thinking about the little quantities of instances of obtrusive lobular carcinoma, mucinous carcinoma, metaplastic carcinoma of no unique kind and intrusive papillary carcinoma, the nearness or nonappearance of relationship of HER2/neu articulation with the histologic sort can't be finished up. The present examination showed higher indication of HER2/neu energy in evaluation II, trailed by evaluation I and grade III cases. It likewise indicated more instances of AJCC arrange II tumors being sure for HER2/neu than AJCC organize III tumors. The present examination had no tumors of AJCC stages I and IV. HER2/neu inspiration has additionally been seen as related with positive lymph hub metastatsis status than negative lymph hub metastasis status.

Keywords: *mucinous carcinoma, metaplastic carcinoma*

Introduction

The significance of unopposed estrogen incitement for the advancement of endometrial hyperplasia and therefore adenocarcinoma is all around recorded. Be that as it may, the histogenetic components for the advancement of various endometrial injuries, for example, hyperplasia, polyps, and adenocarcinoma have not been completely described to date.

This investigation is pointed in deciding the degree of expansion and apoptosis in the endometrial tissue since the awkwardness between them frames the premise of carcinogenesis. The proliferative action in the endometrium is broke down utilizing the immunohistochemical marker – Ki – 67 and the apoptotic action is resolved utilizing the immunohistochemical marker – Bcl – 2.

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Material and Method

This forthcoming, cross-sectional investigation, was done in the Department of Pathology, Sree Balaji Medical College and Hospital, Chromepet, Chennai, from March 2017 toJune 2018.The examination material included 50 endometrial biopsysamples and endometrium from the TAH and BSO specimens received by the Department of Pathology. Of the 50 examples, 30 examples were endometrial hyperplasia, and 20 examples were ordinary endometrial tissue.

Immuno histo chemistry was performed on every one of the examples utilizing Bcl-2 as an essential antigen, Ki – 67 and poly HRP as an optional unit. Antigen recovery was finished by utilizing microwave in Tris-EDTA cushion at pH 9. Re coloring was performed with DAB as chromogen.

Bcl2 inspiration will be demonstrated by cytoplasmic positivity in glandular and stromal cells. Yet, in my study, only the positive cells in the glandular epithelium

were considered. A segment from tonsil demonstrates higher grade positivity and was utilized as a control for dissecting the intensity.

The quantity of cells positive for Bcl - 2 werecounted in 100 epithelial cells and rehashed in 10 HPFs, andthen communicated as a rate. The power of the stainingin the positive epithelial cells is evaluated as:

Evaluation 1 - Mild

Evaluation 2 - Moderate

Evaluation 3 - Strong

Evaluation 4 - Very solid

The positive articulation of Ki-67 was characterized as nearness of darker yellow granules in cell cores or in both cell cores and cytomembrane. An area from tonsil was utilized as control for Ki – 67 articulation.

Since the force was seen as uniform in every one of the cells, just inspiration is determined. The positive cores were included in 100 epithelial cells and rehashed in 10 HPFs, and the all out number of positive cells was communicated as a level of 1000. At that point they are reviewed as pursues dependent on their energy:

1 - 25 % - Grade 1

26 - 50 % - Grade 2

51 - 75 % - Grade 3

76 - 100 % - Grade 4.

Findings

Bcl-2 scoring in this investigation was limited to the epithelialcompartment. The recoloring was for the most part uneven,with transcendence at the fringe edge of the epithelialcell cytoplasm. Periodically the stainingwas perinuclear and granular.

Proliferative endometrium indicated energy for Bcl - 2with fluctuating forces yet all cases were certain, where as only 50 % of cases demonstrated inspiration for Bcl-2 in the secretory endometrium. Indeed, even the mean rate of positive cells in secretory endometrium was low accounting only 11 %. The mean level of positive cells in the glandular epithelium of proliferative endometrium wasmore - 64.2 %.

Table 1: Mean Percentage of Positivie Cells for Bcl- 2 Andki- 67 in Various Histologic Groups

S. No.	Histologic group	Sample size	Bcl – 2	Ki – 67
1	Proliferative Endometrium	10	64.2	29.80
2	Secretory Endometrium	10	11	3.6
3	Hyperplasia without atypia	15	48.4	25.53
4	Atypical Hyperplasia	15	29.6	32.4

The expression of Bcl – 2 and Ki – 67 in various endometrial samples were graded according to the method described above and their distribution is summarized in the tables 2 and 3

Table 2: Expression of Ki – 67 and Bcl – 2 in Normal Cyclical Endometrium

Grade	Proliferative Endometrium (n = 10)		Secretory Endometrium (n = 10)	
	Bcl – 2	Ki -67	Bcl - 2	Ki -67
1	4	1	4	10
2	2	9	1	-
3	3	-	-	-
4	1	-	-	-

Table 3: Expression of Ki – 67 and Bcl – 2 in Normal Cyclical Endometrium

Grade	Hyperplasia without atypia (n = 15)		Atypical Hyperplasia (n = 15)	
	Bcl – 2	Ki -67	Bcl – 2	Ki -67
1	5	8	6	6
2	4	6	6	7
3	5	1	1	2
4	1	-	-	-

Discussion

The scoring for Bcl-2 was limited to the positive cells in the epithelial compartment. The cells recolored uneven, generally in the fringe edge of the epithelial cell cytoplasm. A few cells indicated perinuclear and granular recoloring in the cytoplasm.

Proliferative endometrium demonstrated inspiration for bcl-2 with fluctuating powers however all cases were sure, though just 50 % of cases indicated energy for Bcl-2 in the secretory endometrium. Indeed, even the mean level of positive cells in secretory endometrium was low bookkeeping just 11 %. The mean level of positive cells in the glandular epithelium of proliferative endometrium was more - 64.2 %.

With the beginning of secretory movement, bcl-2 epithelial energy was confined to the basal bits of the endometrium, vanishing in the late piece of this stage. The evaluation went from 0 to 2. Cells indicating secretory vacuoles were negative, while cells as yet demonstrating proliferative action were bcl-2 positive. The example of recoloring inside the phones was granular or in clusters. As pre-decidualization changes happened, discontinuous stromal inspiration (lymphocytes) was seen around the organs.

At the point when broke down with the articles which concentrated the Bcl-2 articulation in ordinary endometrium, for example, Gompel et al2, X J Tao et al[3], Mertens H J MM et al[4], Morsi et al[5] and T. E. Vaskivuo et al6, my outcomes were reliable with these investigations.

The proliferative movement was high in proliferative endometrium with a normal of 29.80% and most reduced in secretory endometrium with a mean level of 3.6 %. This example was likewise seen in the investigations by G. T. Gurda[7] et al, Morsi[5] et al, Mertens4 et al, Risberg8 et al and Vaskivou[6] et al.

In my examination, Bcl – 2 was discovered positive in each of the 15 instances of HWA, the mean level of positive cells communicating Bcl – 2 was 48.4 % in different evaluations of force. (Evaluation 1 to review 4). While in the 15 instances of atypical hyperplasia, 2 cases were negative for Bcl – 2 and the mean level of positive cells was 29.6 % in evaluation 0 to review 3. At the point when contrasted and the statement of Bcl – 2 in proliferative endometrium (64.2 %), it is seen that the declaration of Bcl - 2 exhibits diminished Bcl-2 articulation with a pattern from ordinary endometrium (most noteworthy articulation), through hyperplasia without atypia to atypical hyperplasia (least articulation).

Comparative pattern of Bcl-2 in the hyperplastic endometrium was seen in studies directed by Vaskivuo6 et al, Risberg [8] et al and Mitselou [9]et al where Bcl-2 articulation was most elevated in ordinary endometrium than the hyperplasias. Concentrates by Morsi5 et al, Kokawa[10] et al and Nunobiki11 et al noted Bcl-2 articulation to be higher in non-atypical hyperplasias contrasted and atypical hyperplasias.

Ki – 67 was discovered positive in all the 30 instances of hyperplasia with a 25.53 % and 32.4 % as mean level of inspiration in hyperplasia without atypia and atypical hyperplasia separately. The energy changed from 7 % to 54 % in non-atypical hyperplasia gathering and 18 % to 64 % in atypical hyperplasia gathering.

The outflow of the Ki – 67 is the most elevated in atypical hyperplasia (32.4 %), trailed by, proliferative endometrium (29.80 %), hyperplasia without atypia (25.53%) and is least in secretory endometrium (3.6 %).

Morsi5 et al, Gurda7 et al and Nunobiki11 et al in their investigations additionally watched a stepwise expanded articulation of Ki – 67 from ordinary, basic or complex hyperplasia with or without atypia to endometrial adenocarcinoma.

Conclusion

The finding of diminished bcl-2 articulation in atypical hyperplasia recommends a conceivable job for bcl-2 in advancing the threatening change of hyperplastic cells. When atomic atypia was watched, bcl-2 articulation was hard to recognize. What's more, it has been appeared in different examinations that Bcl-2 overexpression assumes a significant job in epithelial tumor advancement.

Bcl – 2 articulation is diminishing from hyperplasia without atypia to atypical hyperplasia, and Ki - 67 articulation is expanding from hyperplasia without atypia to atypical hyperplasia. This infers there is diminished apoptosis and expanded proliferative movement when the hyperplasia advances towards atypia.Hence Bcl – 2 and Ki - 67 may have some utility as a marker of EH movement and subsequently to endometrial carcinoma.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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Ki – 67 Expression in Endometrial Hyperplasia

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Abstarct

An excess of estrogen relative to progestin, if sufficiently prolonged or marked, can induce exaggerated endometrial proliferation (hyperplasia), which is an important precursor of endometrial carcinoma.[1] The importance of unopposed estrogen stimulation for the development of endometrial hyperplasia and subsequently adenocarcinoma is well documented. However, the histogenetic mechanisms for the development of different endometrial lesions such as hyperplasia, polyps, and adenocarcinoma have not been fully characterized to date. This study is aimed at determining the expression of the proliferation marker – Ki-67 in endometrial hyperplasia.

Keywords: *endometrial carcinoma, proliferation marker – Ki-67*

Introduction

The proliferative activity of a cell is determined by Ki-67 antigen. This monoclonal antibody was derived by immunizing mice with Hodgkins lymphoma cells. This is named after the city of origin, Kiel which is located in Germany. Ki-67 is predominantly present in the nuclear matrix and is expressed in all active phases of the cell cycle such as G1, S, G2 and M phase. It is absent in the G0 phase of the cell cycle, which are in the resting phase, and undetectable during the DNA repair process. It is particularly detected in the nucleus during the interphase stage of the cell division. Ki67 is involved in the regulation and maintenance of cell division. Expression of this nuclear antigen by a cell denotes that particular cell is the active phase of the cell cycle.

Ki-67 is observed in proliferative endometrium, postmenopausal endometrium and in complex hyperplasia. Secretory endometrium showed decreased expression of both the markers. It is also very helpful in distinguishing endometroid endometrial carcinoma from primary clear cell or serous carcinomas. MIB-1 is the antibody against different epitope of the similar proliferating antigen.

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Materials and Method

This prospective, cross-sectional study, was done in the Department of Pathology, Sree Balaji Medical College and Hospital, Chromepet, Chennai, from March 2017 to June 2018. The study material included 50 endometrial biopsy samples and endometrium from the TAH & BSO specimens received by the Department of Pathology. Of the 50 samples, 30 samples were endometrial hyperplasia, and 20 samples were normal endometrial tissue.

Immunohistochemistry was performed on all the samples using Ki - 67 as a primary antigen (Dako Laboratories) and poly HRP as a secondary kit. Antigen retrieval was done by using microwave in Tris-EDTA buffer at pH 9. Staining was performed with DAB as chromogen.

The positive expression of Ki-67 was defined as presence of brown-yellow granules in cell nuclei or in both cell nuclei and cytomembrane. A section from tonsil was used as control for Ki – 67 expression.

Since the intensity was found to be uniform in all the cells, only positivity is calculated. The positive nuclei were counted in 100 epithelial cells and repeated

in 10 HPFs, and the total number of positive cells was expressed as a percentage of 1000. Then they are graded as follows based on their positivity:

1 - 25 % - Grade 1

26 - 50 % - Grade 2

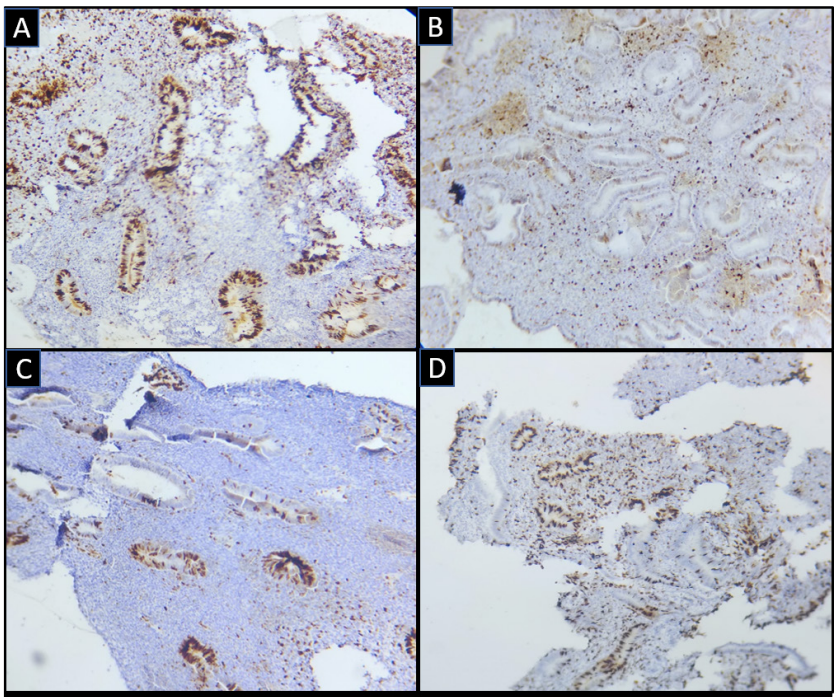
51 - 75 % - Grade 3

76 to 100 % - Grade 4.

Findings

S. No.	Histologic Group	n*	Ki – 67 Positivity Grade				Negative	Mean %**
			Grade 1	Grade 2	Grade 3	Grade 4		
1	Proliferative Endometrium	10	1	9	-	-	-	29.80
2	Secretory Endometrium	10	10	-	-	-	-	3.6
3	Hyperplasia without atypia	15	8	6	1	-	-	25.53
4	Atypical Hyperplasia	15	6	7	2	-	-	32.4

The mean percentage of Ki – 67 positive cells was the highest in the atypical hyperplasia with 32.4 %, followed by the proliferative endometrium group – 29.80 %, 25.53 % in hyperplasia without atypia group and a minimal 3.6 % in the secretory endometrial samples.



(A) PROLIFERATIVE ENDOMETRIUM (Ki - 67, 100 X MAGNIFICATION) GLANDS SHOWING HIGHER GRADE OF NUCLEAR POSITIVITY IN THIS FIELD (B) SECRETORY ENDOMETRIUM (Ki – 67, 100X MAGNIFICATION) ONLY FEW CELLS IN THE GLANDS ARE NUCLER POSITIVE FOR Ki – 67 (C) HYPERPLASIA WITHOUT ATYPIA (Ki - 67 400X MAGNIFICATION), MORE THAN 50 % OF GLANDULAR EPITHELIUM SHOWS NUCLEAR POSITIVITY FOR Ki - 67 IN THIS FIELD (D) ATYPICAL HYPERPLASIA (Ki – 67, 100X AGNIFICATION), ENDOMETRIAL GLANDS SHOWING < 50 % NUCLEAR POSITIVITY FOR Ki – 67 IN THIS FIELD

Discussion

The proliferative activity was high in proliferative endometrium with an average of 29.80% and lowest in secretory endometrium with a mean percentage of 3.6 %.

G. T. Gurda[2] et al analysed 11 cases of proliferative endometrium and 19 cases of secretory endometrium for Ki – 67 expression and in their study, 56 % ± 22 % for PE and 2.6 % ± 3.8 % for SE.

In the study by Morsi[3] et al, the Ki – 67 expression in PE was 29.7 % and in SE, it was 2.5 %. Morsi et al included 18 cases of proliferative endometrium and 19 cases of secretory endometrium in his study.

A study by Helena Mertens[4] et al in 2002 analysing expression of both Bcl - 2 and Ki – 67 in 30 cyclical endometrial samples also showed a similar pattern of increased Ki – 67 expression in PE and decreased in SE.

Similar pattern of Ki – 67 expression in the glandular epithelium was observed in the studies by Risberg[5] et al and Vaskivou[6] et al.

Ki – 67 was found positive in all the 30 cases of hyperplasia with a 25.53 % and 32.4 % as mean percentage of positivity in hyperplasia without atypia and atypical hyperplasia respectively. The positivity varied from 7 % to 54 % in non-atypical hyperplasia group and 18 % to 64 % in atypical hyperplasia group.

The expression of the Ki – 67 is the highest in atypical hyperplasia (32.4 %), followed by, proliferative endometrium (29.80 %), hyperplasia without atypia (25.53%) and is lowest in secretory endometrium (3.6 %).

Morsi[3] et al and Nunobiki[7] et al in their studies observed stepwise increased expression of Ki – 67 from normal, simple or complex hyperplasia with or without atypia to endometrial adenocarcinoma.

Morsi[3] et al studied 107 cases which included 18 cases of proliferative endometrium, 19 secretory endometrium, 15 postmenopausal endometrium, 6 cases of disordered proliferative endometrium, 12 cases of simple hyperplasia, 8 complex hyperplasia, and 29 endometrial adenocarcinomas for expression of Bcl – 2, Ki -67 and M 30. In his study, strong reactivity was seen in cases of simple hyperplasia (with a mean percentage of 21.8%), in cases of complex hyperplasia (with a mean percentage of 19.8%), and in cases of disordered proliferative endometria (mean percentage of 19.5%).

Gurda[2] et al analysed 104 cases of endometrial lesions for Ki – 67 and in his study and the mean percentage of Ki – 67 positivity was 0.8% in SEM, 11% in nonatypical hyperplasia, 33% in atypical hyperplasia, and 73% in carcinoma.

Thus, my study values corelates with the above studies.

Conclusion

Ki - 67 being a proliferative marker is expressed more in proliferative phase than in the secretory phase. Ki - 67 expression is increasing from hyperplasia without atypia to atypical hyperplasia. This implies that there is increased proliferative activity when the hyperplasia progresses towards atypia. It is also proved to further increase in transformation towardsendometroid carcinoma. Hence Ki - 67 can be used as a marker to determine the progression of endometrial hyperplasia to carcinoma.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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KI-67 Expression in Scc of Upper Respiratory Tract

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Abstract

The nasal cavity, paranasal sinuses, pharynx and larynx though in continuity form a complex system of upper respiratory tract, this region is endowed with a variety of elements such as epithelial, glandular, lymphoid, cartilage,

and bone and is also exposed to a variety of infections, tumour like and true neoplastic conditions. Squamous cell carcinoma (SCC) of the upper respiratory tract ranks as the sixth leading cause of cancer worldwide (1). This represents about 4% of all cancers.In this study ki-67 expression in various histological grades of SCC of upper respiratory tract was done which showed ki 67 index was increasing with decreasing differentiation of the tuour.

Key words: *SCC, Ki-67,Upper respiratory tract*

Introduction

The nasal cavity, paranasal sinuses, pharynx and larynx though in continuity form a complex system of upperrespiratory tract, this region is endowed with a variety ofelements such as epithelial, glandular, lymphoid, cartilage,

and bone and is also exposed to a variety of infections,tumour like and true neoplastic conditions. Squamous cell carcinoma (SCC) of the upper respiratory tract ranks as the sixth leading cause of cancer worldwide(1). This represents about 4% of all cancers(2).This includes a heterogenous group of neoplasms arisingfrom regions like oral cavity, nasopharynx, oropharynx,hypopharynx and larynx, excluding the neoplasms arising from salivary glands(3) . Among the oral and upper respiratory tract malignancies, squamous cell carcinoma comprises more than 90%.

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Aims and Objectives

1.To stuyage,sex and site wise distribution of lesions of upper respiratory tract

2.To study ki 67 expression in various histological grades of SCC of upper respiratory tract

Materials and Method

This study is a prospective study on ki 67 expression in SCC of the upper respiratory tract, conducted in the Department of Pathology, SreeBalajiMedical College Hospital and Research Centre, Chennai during the period, October 2016 to September 2018. Squamous cell carcinomas reported in this

region irrespective of the age, sex and the procedure done were included for the study.

Observation and Results

Among the 31 cases of upper respiratory tract squamous cell carcinoma, the commonest occurrence of SCC was seen in age group above 60 years (Table 1)

Table 1: Site Wise Distribution of SCC

Site	Frequency	Percentage (%)
Nasal Cavity	0	0
Nasopharynx	05	16.1
Hypopharynx	15	48.4
Larynx	11	35.5
Total	31	100

Table 2: Histological Grading of Upper Respiratory Tract SCC

Grade	Frequency	Percentage (%)
Well Differentiated	07	22.6
Moderately Differentiated	20	64.5
Poorly Differentiated	04	12.9
Total	31	100

Among 31 cases of upper respiratory tract SCC, 20 cases (64.5%) were reported as moderately differentiated, 07cases (22.6) were well differentiated and 04 cases (12.9) were poorly differentiated grade SCC (Table 3, Chart 2).

Results of Ki 67 expression

All the cases of SCC of upper respiratory tract that included 07 cases of well differentiated grade, 20 cases of moderately differentiated grade and 04 cases of poorly differentiated grade were subjected to Ki 67 proliferative index study.

Positive Ki67 staining was observed as brown granular nuclear staining. Cytoplasmic staining is considered negative. To get the Ki67 index, most positive area of tumour was selected avoiding foci of inflammation. The number of positive nuclei was counted in 1000 tumour cells in a high power magnification (x400 magnification). The histological grade of the tumour was compared with the Ki 67 proliferative index of the tumour.

Table 3: Ki 67 Expression in Different Grades of SCC

Grade	No. Of Cases	Ki 67 Expression In Percentage (RANGE)
Well Differentiated	07	10-30%
Moderately Differentiated	20	31-50%
Poorly Differentiated	04	>51%

Well differentiated carcinomas showed Ki 67 expression in the range of 10 -30%, the lowest percentage expressed by a well differentiated carcinoma was 12% by SCC of pyriform fossa. Predominant group was moderately differentiated which showed a range of 31- 50%. Poorly differentiated carcinoma showed Ki 67 % above 51%.The highest value expressed was 65% by poorly differentiated SCC of tonsil.

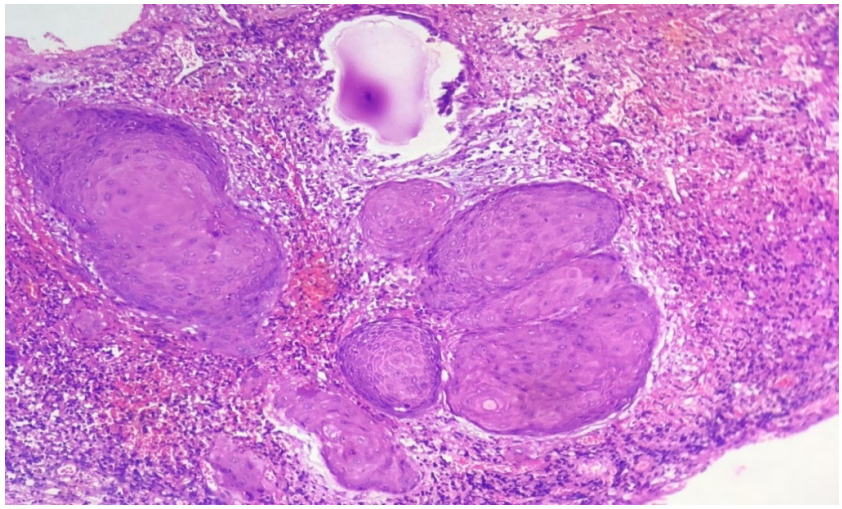


Fig1:H&E Picture of Well Differentiated SCC 10x Magnification

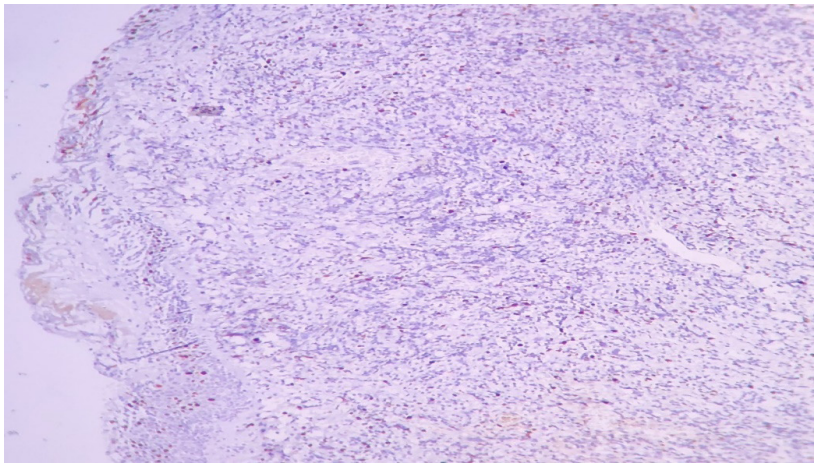


Fig2: Ki 67 expression of Well Differentiated SCC 10x magnification

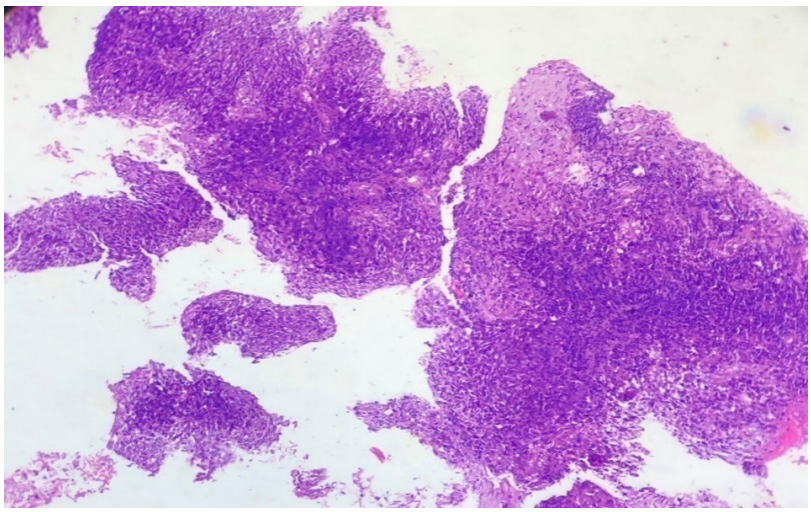


Fig 3: H&E Picture of Moderately Differentiated SCC 10x magnification

Discussion

Of the malignant lesions SCC was the most common tumour accounting for 81.7% of malignant lesions in the study period. In this study, the age group of upper respiratory tract SCC ranged from fourth decade to eighth decade. The highest incidence of SCC was observed between sixth and seventh decade in 18 cases (58.06%). This was followed by seventh and eighth decade in 07 cases (22.6%). This value was in concordance with the study by **Kajanti M et al (4)**who showed the mean age of 60 years.In this study, out of 31 cases, the maximum occurrence of tumour was noted in males, 26 cases (83.9%). In females, 05 cases (16.1%) were reported. This was in concordance with the study conducted by **American Cancer Society** which also showed male predominance in upper respiratory tract SCC.

In this study, it was observed that the site of distribution was maximum in hypopharynx. A total of 15 cases (48.4%) were reported in hypopharynx, followed by 11cases (35.5%) in larynx and nasopharynx 05 cases (16.1%).

This distribution was compared with the study conducted by **Silver C E et al (5)**In their study, the distribution was noted as glottis 26%, hypopharynx 10%, supraglottis 35% and nasopharynx 2% of cases.

On observing the data analysed in the study period, it was also found that the incidence of pyriform sinus SCC was more common in males compared to females. Totally 15 cases of SCC were noted from pyriform sinus region and it

was common in males compared to females. A similar male predominance was observed with pyriform sinus SCC in the study conducted by **Driscoll W G et al(6)**

In the current study, out of 31 cases maximum cases were found to be moderately differentiated grade amounting to 64.5%, followed by well differentiated grade (22.6%) and poorly differentiated grade (12.9%). This varied when compared to a study conducted by**HulyaSimsek et al**[7]where maximum upper respiratory tract malignancy was reported as poorly differentiated SCC (35.9%) followed by moderately differentiated SCC (33.7%) (Table-20).

Immunohistochemical Study of SCC Of URT:

Ki 67 study of SCC showed that proliferative index increases with decreasing differentiation of tumour ie well differentiated SCC showed Ki 67 index of < 30 % and poorly differentiated showed Ki 67 index > 50 %.This was in concordance with the study conducted by **Liu et al**[8]. **Masafumioya et al**[9] studied Ki 67 proliferative index in metastasising intramucosal gastric carcinomas which showed mean value of > 50 % in poorly differentiated carcinoma with lymph node invasion and < 20 % in well differentiated carcinoma**. Liu et al**[8] suggested that Ki67 expression was significantly higher in tumors with lymph node metastases and correlatedwith pathological stage.

Conclusion

In this study, the Ki 67 proliferative index was high in poorly differentiated SCC, which shows that Ki 67 percentage increases by the decreasing differentiation of the tumour and hence it could be used to assess the accurate histological grade of the tumour in conjunction with the routine H & E slides. It could also be used as a prognostic factor as like in breast, prostate etc. Ki 67 proliferative index study of the tumour helps in better understanding of the tumour behaviour so as to provide appropriate treatment and thereby increasing the survival rate of the patient.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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Prosepective Study of Conchal Cartilage and Temporalis Graft in Myringoplasty

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Abstarct

To compare, access and analyze the results of graft uptake using Conchal and Temporalis graft in patients undergoing myringoplasty. In our study there are 50 patients in which 25 patients underwent myringoplasty using Conchal cartilage as Group A and 25 patients underwent surgery using temporalis fascia as Group B. The success of this study is assessed by graft uptake between 12-24 weeks.

Keywords *– Myringoplasty, Cartilage*

Introduction

Chronic suppurative otitis media is the most common otorhinolaryngology problems and one of the major health problems around the world. Chronic otitis media (COM) is defined as chronic inflammation of mucoperiosteal lining of part or whole of the middle ear cleft. It has been recognized since prehistoric times. It is classified into two types, mucosal and squamous, of which mucosal type is characterized by intermittent mucoid or mucopurulent discharge through a perforated tympanic membrane. It is the major public health problem in children and adults1. Incidence of Chronic Otitis Media is higher in developing countries because of poor socioeconomic standards, poor nutrition. Prevalence of chronic suppurative otitis media in developing countries is around 72 cases per 1000 inhabitants and in the world is over 20 million. In India, prevalence of chronic suppurative otitis media is approximately 2%.1 From seventeenth to nineteenth century several attempts at closing tympanic membrane perforations were made using prosthetic materials like paper patch and cauterizing agents. Surgical repair of tympanic membrane was first attempted by Banzer (1640) with pig'sbladder1. In1878 Berthold devised the term myringoplasty 2, 3 . In 1952, Wullstein formally announced 3, 4 a technique of closing perforation. That time he used split thickness skin graft 3, 4.After Wullstein 5 and Zollner 6introduced tympanoplasty in early 1950s, overlay graft was being used in all surgeries. In our study surgery done under endoscope using underlay technique. Grafts used are temporalis graft and Conchal cartilage. Temporalis fascia shows certain complication like retraction, cholesteatoma formation and graft lateralization. Cartilage shows better results than fascia with advantage of higher mechical stability.

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Method

The entire study group underwent myringoplasty by endoscopic method. The technique used is underlay by using either temporalis graft as Group A or Conchal graft as Group B. patients selected were among age group of 20-40 years without any complication. Detailed history and clinical examination were taken for all patients. Routine investigations were done for pre anaesthetic fitness. Informed consent was taken for the study. Under aseptic precaution, preanaesthetic medication was given. In Group A Temporalis fascia is obtained from incision over temporal region graft obtained and suturing done. In Group B Conchal cartilage is obtained by incision on the Conchal region of about 12mm and suturing done with 3-0 ethilon. Graft harvested was tucked under the remnant tympanic membrane as an underlay technique and complete hemostasis is achieved. Gelfoam soaked

with ciprofloxacin is placed in the External auditory canal. Mastoid dressing is done. Post operative period is uneventful. IV antibiotics, analagesic, anatacids were given. Skin suture is removed after 7th Post operative day. Patient is followed for the period of 3-6 months. Graft uptake status is evaluated. Residual perforation or graft lateralization is taken as failure.

Findings

Age:

Age in Years	No of Patients	Percentage
20-30	28/30	93%
31-40	11/15	73.33%
41-50	3/5	60%

Graft uptake in relation to age group in which most of the age group is between 20-30 years and with success rate of 93% and failure rate of about 7%. The mean age is 24.87%.

Preoperative Hearing Loss:

Preoperative A-B gap	Temporalis fascia	Conchal cartilage	Total	%
20-30	2	3	5	10
31-40	18	20	38	76
41-50	5	2	7	14

Majority of patients shows mild to moderate hearing loss. 10% of them had air-bone gap upto 20db.76% of them had air- bone gap 31-40db.14% of them had air-bone gap 41-50db.

Postoperative Hearing Loss:

Postoperative A-B Gap	Temporalis Fascia	Conchal Cartilage	Total	%
<20	19	14	33	66
21-30	5	9	14	28
31-40	1	2	3	6

In the postoperative hearing analysis,66% of the patients showed air-bone gap upto 20Db.20% of the patients showed air-bone gap in range of 21-30db..6% of the patients showed air-bone gap in range of 31-40db..19 patients operated with temporalis fascia showed air-bone gap <20 db.14 patients operated with Conchal cartilage showed air-bone gap <20 db.

Hearing Improvement:

Hearing at 3 months, 35 out of 40 patients showed improvement in hearing (77.5%). Out of these patients, 24 out of 25 patients were operated using temporalis fascia showed improvement in hearing i.e. (96%) and 22 out of 25 patients were operated using Conchal cartilage showed improvement in hearing i.e. (88%).

Mean Change In Hearing Levels In Db	Temporalis Fascia Group A	Conchal Cartilage Group B	Total	Percentage
No Change Or Worsen	3	5	8	16%
1-15	18	17	35	70%
16-30	4	3	7	14%
>30	3	5	8	16%

Graft Success Rate:

Type of Graft	Total No of Cases	Uptake	Failure	%
Temporalis Graft	25	24	1	96
Conchal Cartilage	25	22	3	88

Out of 50 patients 25 underwent temporalis fascia shows success rate of about 96%. Meanwhile 25 patients underwent Conchal cartilage shows 88% success rate.

Disscusion

Prospective study of about 50 patients between then age group 20-50 years, who admitted in ENT opd. This entire group of patients suffered from Chronic suppurative otitis media tubotympanic type. Most of the cases belong to small to moderate hearing loss. All patients underwent myringoplasty 25 patients used temporalis fascia and 25 patients used Conchal cartilage. Postoperatively cases were followed for 3 months.

There are materials for closure of TM perforation like skin, perichondrium, vein, temporalis cartilage, Conchal cartilage, dura. Advantage of temporalis fascia:

1. Easily available.
2. Adequate amount of graft is obtained.
3. Thickness similar to tympanic membrane.
4. Basal metabolic rate is low.

Disadvantage of temporalis fascia:

1. Then oxygen and the metabolic requirement increases and the graft may fail, if it is not denuded properly of the muscles,
2. Adequate graft maybe difficult to obtain in revision cases.
3. Graft retraction.
4. Graft medialization.

Cartilage graft is characterized by its resistance to resorption, retraction and negative pressure in middle ear.[9,10].

Advantages of tragal cartilage perichondrium

(1) Easily available in operative field.

(2) Easy to shaped.

(3) No extra cost.

(4) Large graft can be harvested from tragus and concha.

(5) It has its own blood supply.

Graft uptake in relation to age group in which most of the age group is between 20-30 years and with success rate of 93% and failure rate of about 7%. The mean age is 24.87%.Hearing improvement in different type of graft used temporalis fascia shows 96% improvement and Conchal cartilage shows 88% improvement after 3 months post operatively. Palva et al (1987) in their study of 165 cases of myringoplasty, showed 96% improvement. Gibb AG, Chang SK(1982) in their study showed 91.4% for dry temporalis fascia and 87.9% for Conchal cartilage. Majority of patients shows mild to moderate hearing loss. 10% of them had air-bone gap upto 20db.76% of them had air- bone gap 31-40db.14% of them had air-bone gap 41-50db. In the postoperative

hearing analysis,66% of the patients showed air-bone gap upto 20db.20% of the patients showed air-bone gap in range of 21-30db.6% of the patients showed air-bone gap in range of 31-40db.19 patients operated with temporalis fascia showed air-bone gap <20 db.14 patients operated with Conchal cartilage showed air-bone gap <20 db. Same results given by rakesh who shows the about 80% cases operated with temporalis fascia showed hearing improvement, while similar percentage (75%) of cases that were operated using Conchal cartilage.

Jyoti P. Dabhalkar (2007)[6]reported hearing result in total 50 patients, temporalis fascia group improved in76% while tragal perichondrium group achieved 75% hearing gain. This study also compares well with Sunita Chhapola, Inita Matta (2011)[8] whose postoperative hearing assessed after 6 months of surgery, with temporalis fascia graft showed air bone gap of less than 10dB in 82% of patients and more than 10dB in 18% patients, air bone gap closure with tragal perichondrium was less than 10 dB in 78% patients and more than 10dB in 22% of patients. The patient population attending our hospital was also from low socioeconomic status, many had poor personal hygiene and poor nutritional status[7]. These were probably some of the factors which contribute to graft rejection.

Conclusion

Myringoplasty is the most effective method for control of Chronic suppurative disease and hearing improvement. Both Conchal cartilage and temporalis fascia are excellent graft materials for closure of perforation for graft uptake and hearing uptake. But graft uptake is slightly better in temporalis graft placement. Temporalis graft shows better hearing improvement. Conchal cartilage appears to be a better alternative to temporalis fascia as a graft. Temporalis fascia is the ideal graft material.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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To Estimate and Compare Serumlipoprotein (a)Value in Hypothyroid Patients and Healthy Control

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Abstract

This investigation is taken up to gauge and look at the degree of serumLp(a) in hypothyroid patients and in solid controls.A aggregate of 50hypothyroid patients inside matured gathering 20-60 years and aggregate of 50 sound controls inside 20-60 years were joined up with the examination subsequent to taking composed assent. Thyroid profile andLp(a) were estimated by CLIA and resistant turbidemetric technique individually. Information gathered was dissected utilizing Stata variant 14.1 programming. Result demonstrates an expanded degree of Lp(a) among hypothyroid patients when contrasted with solid controls.

Key Words: *Hypothyroid, Lipoprotein (a), healthy controls*

Introduction

Lipoprotein (an) is LDL like molecule shaped by the relationship of exceptionally polymorphic glycosylated apolipoprotein (a) through a disulphide bond with apolipoprotein B100[1] the exemplary protein moiety of LDL. [2]It was found by Kare Berg in 1963 [3]Genetic variety of the Lp(a) qualities is the principle determinant of Lp(a) serum levels yet non hereditary elements could likewise influence its focus. A few examinations have demonstrated the impact of eating routine, medications and hormones on Lp(a) levels. A few creators think about Lp (an) as a free hazard factor for coronary and cerebrum corridor atherosclerosis in Caucasian, Chinese, African and Indian populace. Lp(a) focuses (announced as ≥300 mg/L or ≥30 mg/dL) and the danger of enduring coronary occasions, fringe vein sickness, cerebrovascular malady, and the early advancement of atherosclerosis in kids and adolescents [4,5] .In a nutshell it is said that the atherogenic impact of Lp(a) is because of the cholesterol conveyance to the site of damage or to the endothelial cells, obstructing of plasmin age, endothelial cell tweak, smooth muscle cell expansion and angiogenesis[6].

Hypothyroidism is related with different metabolic variations from the norm, because of the impacts of thyroid hormones on about all major metabolic pathways. It causes unhinging of wide scope of parameters in lipid profile, hemodynamic changes, endothelial brokenness, coagulation unsettling influences, hormonal and metabolic changes, prompting different quantitative and additionally subjective changes of triglycerides, phospholipids, cholesterol, and lipoproteins including LDL-Cholesterol, HDL-Cholesterol, lipoprotein (an), apolipoprotein A1, and apolipoprotein B. The present investigation was intended to decide the Lp(a) levels among the hypothyroid patient and sound control and to look at the equivalent.

Materials and Method

The example size of this examination incorporates 100 subjects including 50 hypothyroid patients and 50 solid controlreporting to Medicine OPD, Sree Balaji Medical College and Hospital, Chromepet, were joined up with the investigation.

Subsequent to acquiring educated assent from patient, a detail history was taken trailed by research center examination as under:

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- Estimation of Lp(a) by immuno-turbidimetry
- Estimation of serum FT3,FT4,TSH by Chemiluminescent immunoassay.

The information was entered in programming utilizing Stata 14.1 rendition, where mean, standard deviation, connection coefficient and rate were determined and results were gotten.

Findings

Table 1:Descriptive statistics of case and control.

	Group	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]		t-value
FT3							
	Test	2.420	0.075	0.527	2.272	2.568	-7.44**
	Control	3.479	0.121	0.858	3.238	3.720	
FT4							
	Test	0.841	0.026	0.187	0.788	0.893	-8.38**
	Control	1.639	0.092	0.647	1.458	1.821	
TSH							
	Test	35.715	3.558	25.156	28.656	42.775	9.29**
	Control	2.633	0.142	1.001	2.352	2.914	
Lp(a)							
	Test	23.120	1.714	12.118	19.720	26.520	10.24**
	Control	4.780	0.522	3.691	3.744	5.816	

Table 2: Lp (a) levels in test samples:

Lp(a) level category	Freq.	Percent
<=15	18	36
15 - 30	19	38
30 - 45	11	22
45 - 60	2	4
Total	50	100

Table 3: Lp(a) levels in control samples:

Lp(a) level category	Freq.	Percent
<=15	50	100
Total	50	100

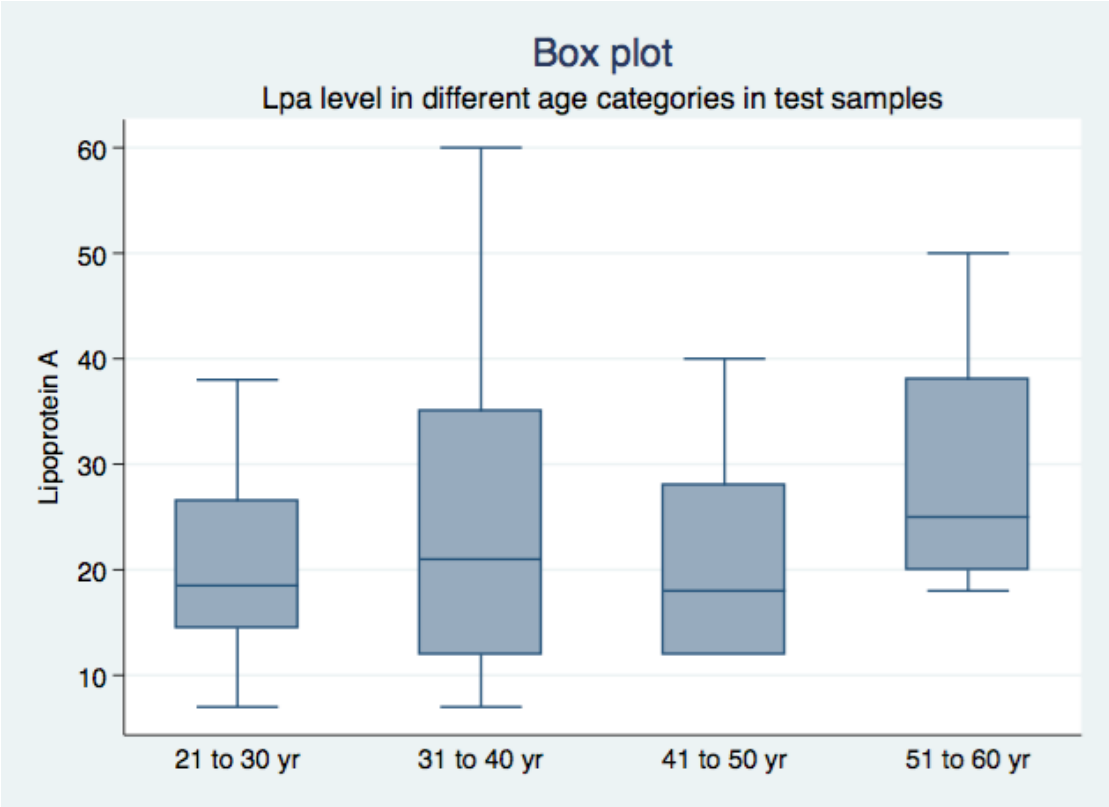


Figure 1: Box plot showing median, quartiles, and whiskers of Lp (a) levels in different age groups in test samples.

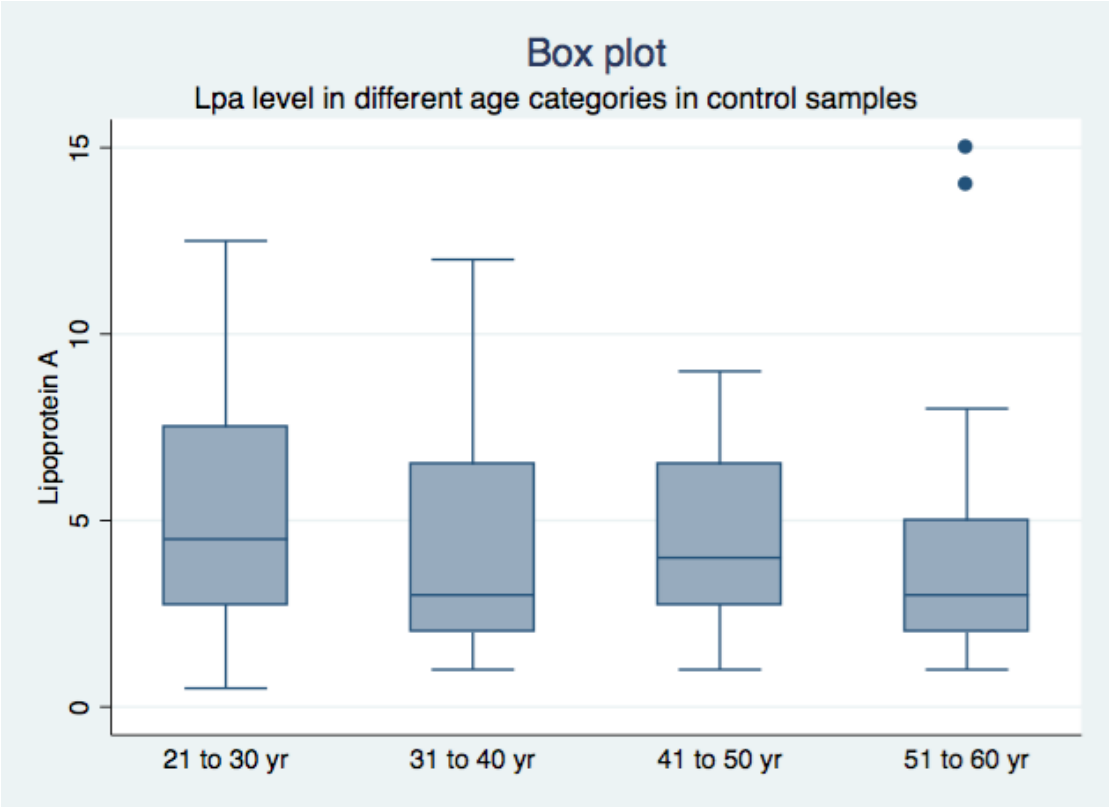


Figure 2: Box plot showing median, quartiles, and whiskers of Lp (a) levels in different age groups in control samples.

Discussion

This investigation was done on known instances of hypothyroidism, andhealthy people taken as controls. Between the investigation gathering, serum Lp(a) were fundamentally expanded in hypothyroid patients when contrasted with controls. Serum Lp(a) levels among hypothyroid patients (23.120±12.118) were altogether higher than control subjects (4.780±3.691) with t-esteem = 10.2375 ($p < 0.001$). It was additionally seen that serum Lp(a) levels were altogether expanded in all age gatherings and in the two sexual orientations of hypothyroid patients when contrasted with control, which recommended the impact of thyroid hormones on Lp(a) metabolism.The potential relationship among Lp(a) and thyroid capacity status in the overall public may be viewed as a significant perspective for cardiovascular hazard expectation and counteractive action. This theory was bolstered by De Bruin et al [7] who showed a practically ideal relationship between's free thyroxine file and Lp(a).

Cristina Hernandez et.al have expressed that serum Lp(a) level is reliant more on the pace of blend than on its catabolic rate[8]

In hypothyroid state, there is an expansion of LDL-C and apo B levels, which might be utilized in the Lp(a) synthesis[9] and furthermore there is diminished pace of catabolism of LDL. Since Lp(a) is comprised by apo(a) and LDL, decline in the catabolism of LDL will be normally considered the degree of Lp(a). Additionally, it has been investigated that Lp(a) is catabolized by a similar receptor by which LDL is catabolized. Henceforth Lp(a) having a similar receptor as LDL for its catabolism will be normally expanded in light of the fact that it has been found by Cristina Hernandez et al.,[8] that LDL has a higher fondness for the receptor than Lp(a). Henceforth when LDL level is expanded in Hypothyroidism it even more will contend with Lp(a) for the receptor.

Conclusion

The consequences of this investigation give abundant proof that the degrees of Serum Lp(a) are expanded in hypothyroid patients when contrasted with solid controls. As a result of this examination, a prescribed screening can be encouraged to hypothyroid patients to gauge Lp(a) level which may aid early treatment and keep them from creating cardiovascular maladies.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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To Evaluate the Role of MRV in Normal Variants of Cerebral Venous Sinuses

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Abstract

MR Venography is a generally utilized non obtrusive imaging procedure to analyze cerebral dural sinus thrombosis and other intracranial venous normalities. There are numerous ordinary variations and antiques that happen during MRV study reenacting filling surrenders that impersonates CVST causing analytic traps. Anatomical variations incorporate hypoplastic sinuses, atretic sinuses, deviated venous sinuses and atypical veins. The point of the examination is to describe the ordinary variations of cerebral dural venous sinuses on MR Venogram.

Keywords – *MRV, Hypoplastic Sinuses.*

Introduction

The variations and antiques on MRV happen regularly, hence a steady imaging example ought to be pursued[1]. There areas now and again correspond with locales where CVST is likewise normal and may cause indicative troubles. Transverse sinus stream holes are a typical event in MRV and discovered all the more much of the time on non-prevailing exchange sinus. These variations and curios can be potential traps in the MRV analysis of CVST particularly where there is no supporting imaging highlights, for example, mind infarcts. It is significant for the radiologists to know f pertinent MRI attributes to maintain a strategic distance from distortion of these variations and antiquities as CVST[2]. Source picture ought to be painstakingly considered alongside the MRV so as to precisely assess the variations of cerebral dural sinus and this will diminish the potential analytic mistakes.

The two procedures used to picture the venous life systems in MR Venography are time-off – light (TOF) and stage differentiate (PC) methods. TOF relies upon the excitation of blood in one cut of the body and identifying it in another. It separates moving blood from the stationary tissues. The entrance of the energized blood into an imaged cut relies upon the T1, speed and bearing of the stream. Stage differentiation relies upon the stage change of moving protons in the blood. The information from moving protons is upgraded by subtracting information gained twice utilizing positive and negative angles.

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Materials and Method

An imminent investigation of 100 cases was performed at our division of radio conclusion. Patients with known CVST were exposed to MRI by utilizing 1.5 T MRI (Hitachi Aperto) therapeutic framework[3]. The age gathering of the patient ranges between 11 – 70 years. Mean age of the patient was taken as 32.3 years. Patients with known instances of CVST and clinically associated cases with intracranial vascular injuries, who were alluded for MRI mind with MR Venography.

Multi-successive examination in coronal, sagittal and hub areas were taken. Patient experienced MRV which included utilization of technique/grouping 2D TOF. Intracranial venous framework were considered after standared remaking were readied utilizing most extreme force projection.

In our examination the cut thickness for 2DTOF strategy was 3mm with far off factor 33%, 2D TOF

procedure was advanced by picking a sagittal cut direction titled somewhat towards coronal and hub bearings. Assessment time for 2DTOF in our examination was 7 minutes 20 seconds. As a rule, it is alluring to set the cut thickness as little as would be prudent, regularly on request of 1.0 to 1.5mm to defeat restriction of 2DTOF strategy yet that would have expanded the hour of sweep to 10mm and in this manner was not embraced in this examination[5]. The presence of different intracranial venous structure was surveyed in setting of their sign power, consistency and degree of measurement of the structures unmistakable on three distinctive MRV strategies. In like manner, values were relegated to every one of them in various strategies.

Findings

In our study, 72% of our patients had hypoplastic left transverse sinuses involved followed by superior sagittal sinuses (36%). Right transverse sinus were involved in 34%.

Table 1: Distribution of patient with normal cerebral venous sinus variants

Sinuses Involved	No.of Cases With Hypoplastic Venous Sinus	Percentage
Sss	36	36.0%
Lts	72	72.0%
Rts	34	34.0%
Lss	28	28.0%
Rss	15	15.0%

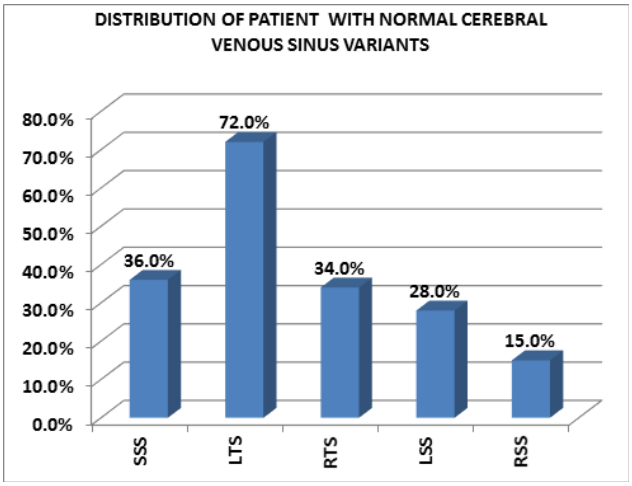


Chart 1: Bar diagram showing distribution of patients with normal cerebral venous sinus variants

Arachnoid granulations most much of the time happen in parasagittal area with unrivaled sagittal sinus and transverse sinus being the most well-known area[6]. Granulation regularly happens beside the passage of shallow depleting cortical vein into a sinus. So it imitates a thrombus in the cerebral venous framework which is misdiagnosed as thrombus. In our examination we discovered 12 cases having arachnoid granulation impersonating thrombus.

Table 2: Detection of arachnoid granulation mimicking venous sinus thrombosis (n=100)

	Detection on MRV
Arachnoid Granulation Mimicking Thrombosis	12
Occlusion of Venous Sinus by Thrombosis	62

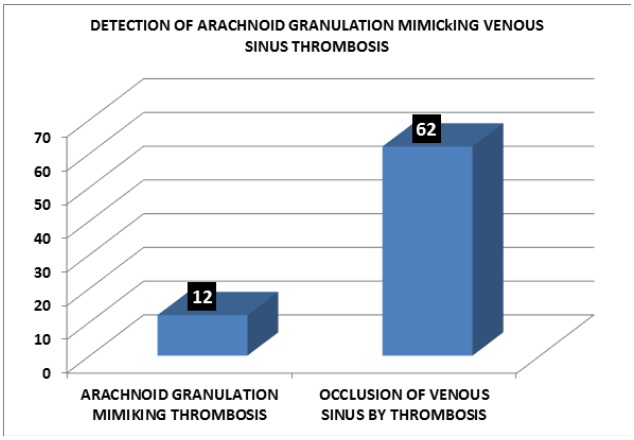


Chart 2: In 12% of cases arachnoid granulation was mimicking the thrombosis. In 62% of cases venous sinuses were occluded by thrombosis

Discussion

Cerebral venous framework is made out of shallow and profound channels. The shallow framework comprises of prevalent and sub-par sagittal sinuses alongside the shallow cortical veins. The profound framework comprises of profound cerebral veins, vein of galen, the straight sinus, the transverse and sigmoid sinuses. The course of action of cortical vein is exceptionally factor.

They can be partitioned into three gatherings, the front sinus, the lateroventral gathering depleting into the

parallel sinus, and mediodorsal gathering depleting into prevalent sagittal sinus[7]. There are numerous anastamotic channels which are similarly factor. The more steady pieces of anastamotic system are the vein of Labbe, which interface the center cerebral vein to horizontal sinus and incredible vein of Trolard, associating the center cerebral veins into the prevalent sagittal sinus.

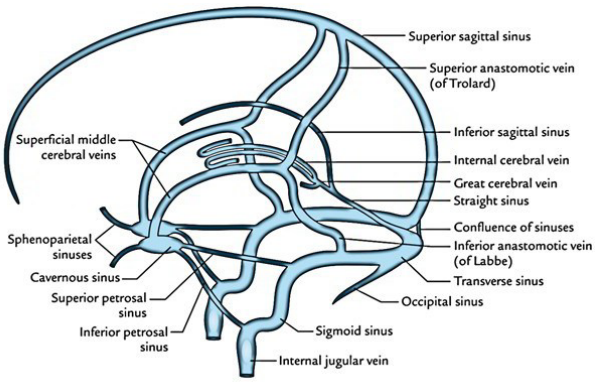


Diagram 1: Shows superficial and deep venous sinuses

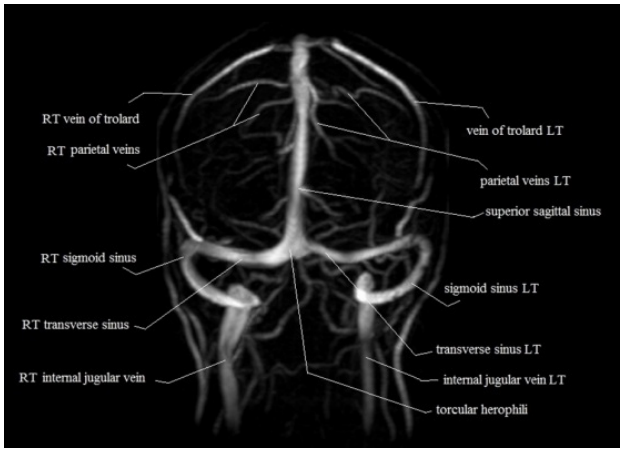


Diagram 2: Radiological anatomy of cerebral venous sinuses

The unrivaled sagittal sinus (SSS) starts at foramen cecum anteriorly and keeps running along the inward surface of calvarium in the mid sagittal plain to the inside occipital projection .The front part is tight and might be totally missing. The SSS channel the shallow surface of

cerebral side of the equator by means of the cortical veins. At the interior occipital bulge, the SSS joins the straight sinus and partitions into the two transverse sinuses running along the side[4]. The conjunction of sinuses at the inward occipital projection is known as the trocula of herophili. The spans of parallel sinuses are frequently hilter kilter with the left transverse sinus being littler (or even missing) than the correct one .The transverse sinuses keep running forward to turn into the sigmoid sinuses which into the inward juglar veins.

There are various anatomic varieties that might be confused as sinus impediment. The profound cerebral veins are a higher priority than shallow veins from the angiographic perspective. Three veins join simply behind the entomb ventricular foramen of monro to frame inner cerebral vein including the choroid vein, septal vein and thalamostriate vein. The choroid vein keeps running from the choroid plexus of the parallel ventricle[7]. The septal vein keeps running from the locale of septum pellucidum in the front horn of parallel ventricle and thalamostriate vein runs anteriorly in the floor of sidelong ventricle in the thalamostriate groove between the thalamus and lentiform core. The purpose of association of these veins is called venous point.

The inner cerebral vein of each side runs posteriorly in the top of the third ventricle and join underneath the splenium of corpus callosum to shape more prominent cerebral vein. The inward cerebral veins, which exist in 2mm in the midline, are the most significant profound veins since they can be utilized to analyze midline move. The cerebral vein of Galen is a short thick vein that passes postero - superiorly behind the splenium of corpus callosum in quadrigeminal storage. It gets the basal veins and back fossa veins and depletes to the foremost finish of straight sinus where it joins with the second rate sagittal sinus.

The Basal Vein of Rosenthal (BVR) starts at the foremost punctured substance by association of front cerebral vein, center cerebral vein and striate vein .The basal vein on each side goes around the midbrain to join incredible cerebral vein. Blood from profound white matter of the cerebral side of the equator and from basal ganglia, is depleted by inner cerebral vein. What's more, the basal vein of Rosenthal, which join to shape the extraordinary vein of Galen that channels into straight sinus. Except for wide variety of basal vein, the profound venous framework is fairly steady when contrasted with shallow venous framework. Consequently their thrombus is anything but difficult to perceive.

Conclusion

Hypoplastic left transverse sinus is the most widely recognized anatomical variety in our examination. Also, MRV is considered as the best methodology in diagnosing anatomical variations. So it is fundamental for the radiologist to be comfortable with their MRV qualities and life structures so they are not misconstrued as Cerebral Venous Sinus Thrombosis.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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Ultrasound Mediated Brachial Plexus Block (Supraclavicular)

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Abstract

Background: Upper limb processes are frequently performed alone or in conjunction with general anesthesia under brachial plexus block. Either method–mistaken; heart stimulator (NS)-guided or mri (US)-guided method can perform the brachial plexus block. But since the last century, the advent of ultrasound has dramatically revolutionized the puncture methods. Direct visualization for distribution regions of medicines is suggested for effective and secure blocking rather than targeting the nerves straight. The purpose of this paper is to evaluate the various ultrasound-guided solutions to the brachial plexus block.

Method: This study was done on 20 patients who fit under inclusion criteria . Written informed consent to be taken from all patients.

Results: Ultrasound guided block had shorter execution time (p = < 0.002), faster onset of sensory block in minutes (p= <0.032), faster onset of motor block (p =< 0.000), lesser number of needle attempts (p = < 0.000).

Conclusions: USG guided brachial plexus block had lesser needle attempts , faster execution time , and faster onset of motor and sensory block and lesser or no complication

Key words: *Brachial plexus block; Ultrasound, heart stimulator, anesthesia*

Introduction

Traditionally, regional blocks were carried out using anatomical sights, stimulation of the nerves. Blind blocks generally producing severe complications that depend exclusively on anatomical landmarks[1-3]. The nerve stimulation method has been recognized as the gold standard for identifying nerves in national blocks over the previous centuries, but it does not guarantee an appropriate nerve block amount. By immediate puncture, it poses a danger of damage to nerve systems.

Ultrasound visualization of anatomical constructions guarantees block security by ideal needle placement of superior performance. The use of ultrasound for nerve blocks was first recorded in 1978 by La Grange and peers who used a Doppler ultrasound fluid stream sensor to perform supraclavicular brachial plexus blocks[4]. The first documented use of immediate sonographic visualization for regional anesthesia was released by Stephan Kapral et al in 1994. However, drastic advancement has been produced in the last ten years.

Materials and Method

This analysis was performed in the orthopaedic surgery theatre, SreeBalaji Medical College and Hospital, Chennai after obtaining institutional ethical committee approval.

Inclusion Criteria

The following criteria were taken for including the patients in this study.

- Elective surgical patients posted for surgery from middle one third of arm, forearm and hand

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surgeries.

- ASA Status I , II and III
- Age between 18 and 60 years
- Weight >50 kg

Exclusion Criteria

- Patient refusal
- Coagulopathies
- Local infections / Sepsis
- Pregnancy/lactating women
- Peripheral neuropathy
- Allergy to local anaesthetics

Materials

1. Sterile tray for regional blocks
2. Drugs for the block

- 0.5% bupivacaine
- 2 % plain lignocaine

3. 23G Quinke spinal needle

4. The ultrasound machine which we used for our study was GE LOGIQ e machine

5.Equipments and drugs for resuscitation

Pre Operative Preparation

Patients were evaluated pre-operatively and the patient was described the operation. Informed approval has been acquired in writing. They have been evaluated with special regard to any contraindications[5].

Medication Pre: Tab. 150 mg ranitidine 2 hours prior to surgery with water sips.

Conduct of Anaesthesia: Monitors such as pulse oximeter, non-invasive blood pressure and ECG were linked and basis scores collected at the patient's arrival in the working room. In the opposite side, an intravenous entry was acquired.

Supraclavicular Brachial Plexus Block by the Subclavian Perivascular Technique[3]

Patients were placed with the face bent away from the body to be shielded and adduced by the ipsilateral force. The neck was prepared with povidone iodine solution and draped with sterile towels.

Landmarks:

The essential landmarks to be identified are

- Cricoid cartilage
- Interscalene groove
- Clavicle midpoint
- Subclavian artery

Supraclavicular blocks in the USG group were performed similarly using a 7.5 - 10MHZ ultrasonic scanning head . After sterile draping and local skin infiltration the probe is placed lateral to the larynx visualising the carotid artery and internal jugular vein. Sterile gel is used between the probe and the skin surface. The nerve buildings in the interscalene tube become noticeable as the sample is shifted sideways. The tool is then shifted to a supraclavicular location from the interscalene location. The subclavic artery is visualized and Doppler color is verified. Then the full brachial plexus is visualized close the artery[6].

The 23G Quinke needle is entered by an IN plane approach. The local anaesthetic solution is then injected after careful aspiration and is seen encircling the trunks. If the local anaesthetic does not spread in the right direction the needle can be redirected accordingly.

Evaluation of The Block:

- The following comments were produced:• Monitoring of vital indications; heart rate, non-invasive blood pressure, saturation of nitrogen and sedation rating was assessed every minute for the first 5 minutes and every 5 minutes thereafter until the end of the operation. They were recorded at 0, 1, 2, 5, 10, 15, 30 minutes and every 30 minutes later for statistical reasons.

- The block implementation period was described as the period between the introduction of the first button at the start of the block and its withdrawal.

• Patients were assessed for the initiation of sensory and engine blockade every minute immediately after medication administration.

• Sensory block assessed in the skin dermatomesC4-T2 by heat feeling using alcohol soaked cotton.

• Loss of forearm flexion expansion, thumb and second digit pinch and ear and third digit pinch were evaluated for the onset of engine blockade.

• The block drop was done as a block drop even after 20 minutes.

• Analgesic failure was managed with General anaesthesia as appropriate .

• Patient received supplemental O2 and intravenous fluids throughout the procedure[7,8]

• Local poisonous anesthetic responses were noted, including subjective and objective manifestations such as circumoral numbness, tinnitus, twitching, seizures, etc.

• Technical complications such as intravascular injection, intrathecal or epidural injection and pneumothorax[9] have been noted.

All the information were analyzed statistically. Block execution time, starting time for engine and sensory blockade and analyzing the achievement level and estimating the statistical significance. Statistically important was regarded a "P" value less than or equivalent to 0.05.

Findings and Discussion

Groups	Block execution time in minutes	Onset of sensory block in minutes	Onset of motor block in minutes	No of needle attempts
A	5.1	3.6	6.1	1.2

Ultrasound guided block had shorter execution time (p = < 0.002), faster onset of sensory block in minutes (p= <0.032), faster onset of motor block (p =< 0.000), lesser number of needle attempts (p = < 0.000).

Conclusion

During the supraclavicular brachial plexus blockade it was found that

• The block execution time for ultrasound guided block was much shorter .

• The number of needle attempts to localise the nerve was minimal with ultrasound.

• The time taken for the onset of motor and sensory blockade was faster in the Ultrasound group.

• The success rate was higher with the use of ultrasound guided blockade.

• No complications were seen in the two groups.

It is therefore concluded that the use of ultrasound in the supraclavicular brachial plexus block is clinically helpful for precise nerve location and to minimize the amount of needle tries, as well as statistical and clinical evidence.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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Examination of Displaced Acetabular Fractures in Adults Treated qith Open Reduction and Internal Fixation

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Abstract

Background: The occurrence of acetabular fractures is growing at a fast pace globally owing to increased crashes in train and highway traffic and high-speed injuries. The incidence of acetabular fractures is growing at a fast pace globally owing to increased crashes in train and highway traffic and high-speed injuries.

Method: Included in the research were 30 individuals between 18 and 60 years of age with locked displaced acetabular bones. Depending on the type of fracture, a single surgical approach such as the Kocher-Langenbeck, the ilio-inguinal, and the extended ilio-femoral approach was selected, with the expectation that fracture reduction and fixation could be fully accomplished by the one approach.

Results: Of the 30 individuals, 12 were between the ages of 21-30 and 10 were between the ages of 31-40 and most were men engaged in road traffic accidents. The right-hand predominance was seen in 22 (73.33 percent) and left-sided injuries in 8 (26.66 percent). Fractures of the posterior wall were observed in 5 instances, while in 4 instances the transverse was observed. In 8 patients, combinations of both were observed. In more than 56 percent of studies, the results were outstanding and satisfactory in more than 30 percent of them.

Conclusions: For a stronger knowledge of long-term outcomes, the current research requires further follow-up.

Keywords: *Acetabular fractures, Open reduction, Internal fixation, Kocher-Langenbeck approach.*

Introduction

The incidence of acetabular fractures is growing at a fast pace globally owing to increased crashes in train and highway traffic and high-speed injuries. Other kinds of wounds such as height loss, mine crashes also lead to these injuries ‘ increased incidence. Often these fractures are linked to other life-threatening wounds.

While some fracture models may not take surgery to be adequate, those with hip dysfunction, hip incongruity, or fracture displacement in the acetabulum’s superior weight-bearing region should generally be controlled with open decrease and internal fixation. Acetabular fractures are often linked to life-threatening various traumatic injuries that can often be missed3. Extremity fractures, head injuries, neck, abdomen and wounds to the pelvic membrane are often correlated with acetabular fractures4. In the leadership of acetabular fractures, computed tomography has demonstrated invaluable. 3D reconstruction enables to further define the model of fracture, particularly for inexperienced surgeons5. The results of open decrease and internal fixation of acetabular fractures had been highlighted in the past by a variety of research. Our current research aims to report the results of surgically resolved acetabular fractures in the brief and long term.

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Materials and Method

The Department of Orthopedics at Sree Balaji Medical College and Hospital, Chromepet, Chennai, performed this prospective study during the span from August 2016 to July 2018. 30 Judet-and Letournel-specific individuals aged between 18 and 60 years with locked displaced acetabular fractures were included in the research[11,12].

The research excluded patients with compound defects, skeletally immature patients, patients with pathological injuries and patients with surgical contraindications. Together with the cultural context, demographic patient information were observed on entry. Also observed were clinical assessments such as the complexity of the fracture, other comorbid conditions connected with wounds and structural accidents. For all patients after entry, antero-posterior and 450 oblique view (Judet opinions) of the pelvis were acquired[1,2].

Before planning for fixation of acetabular fracture, a proper preoperative planning is very much essential[3]. Timing of surgery is very crucial for good outcome. Before 3 weeks of injury, acetabular fixation is probable to result in excellent anatomical decrease and clinical results[13,14]. For fixing all kinds of fractures, no single strategy is optimal. A single surgical approach is generally selected with the expectation that the fracture reduction and fixation can be completely performed through the one approach. The Kocher-Langenbeck, the ilioinguinal[4], and the expanded iliofemoral method are the most frequently used surgical methods to the acetabulum.

Findings

Of the 30 clients, 12 were between the ages of 21-30 and 10 were between the ages of 31-40, claiming that this sort of accident was linked to the age group at danger for road traffic accidents[5]. The incidence average age was 32.5 years. The era was 18 years for the oldest clients and 60 years for the oldest person (Figure 1).

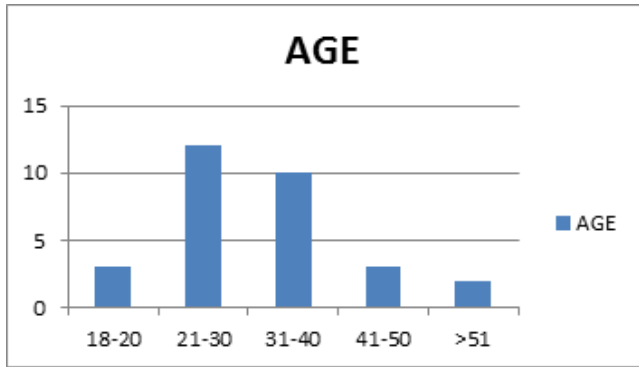


Figure 1: Age wise distribution of patients.

Table 1: Type of fracture

Type of fracture	No of cases
Posterior wall	5
Posterior column	2
Transverse	4
T Shaped	2
Transverse + Posterior wall	8
Posterior column + Posterior wall	7
Both column	2
Total	**30**

Males were more prevalent among those impacted (90 percent), likely not females (10 percent) owing to their job style. With 25 (83.33%) instances and 5 (16.66%) owing to falling height, RTA was the most prevalent source of injuries.

The right-hand predominance was seen in 22 (73, 33 percent) and left-handed defects in 8 (26.66 percent). Fractures of the posterior wall were observed in 5 instances, while in 4 instances transverse was observed. In 8 patients, a mixture of both was seen (Table 1). Of the 19 clients with dislocation[6], 14 were decreased within 12 hours while 5 patients reported decrease within 12 hours of the 11 clients without dislocation. (Figure 2-4).

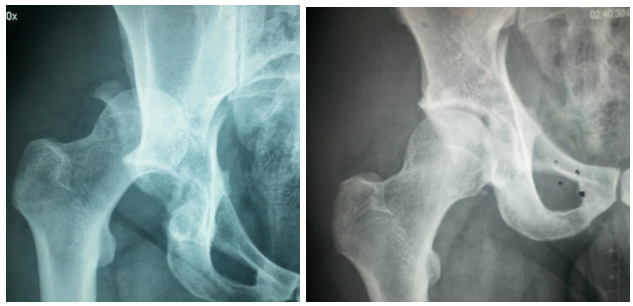


Figure 2 a: Before surgery, 2 b: After reduction

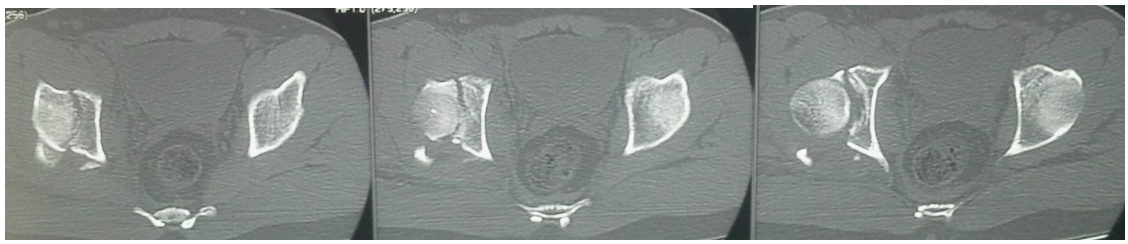


Figure 3: CT scan.

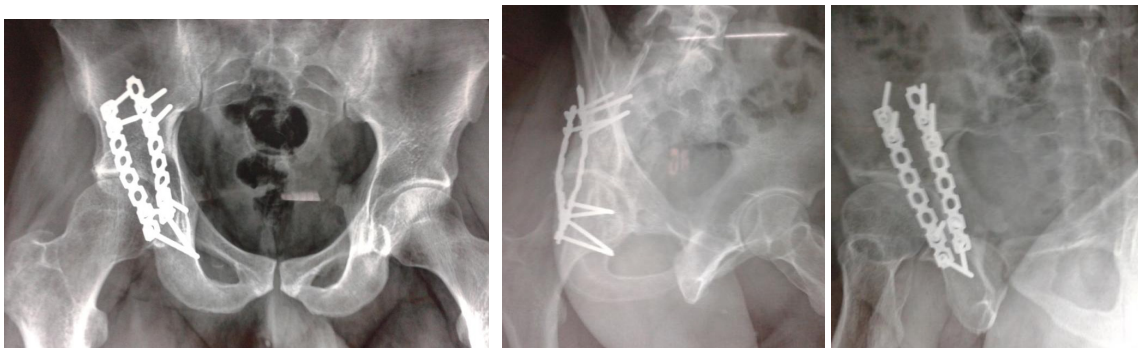


Figure 4: At 1 year of follow-up.



Figure 5: Mobility after surgery.

22 (73.33%) patients suffered related wounds with 14 (63.63%) instances of ipsi-lateral extremity injury (Figure 2-5). Post op, there were hardly any complications, except for one patient who acquired an infection and received treatment[7].

Eighteen patients had reduced fracture anatomically (0-1 mm) according to the Matta requirements. 17 of them had great results under the altered Merle D'Aubigne and Postel Clinical Grading systems, 9 of which had good results, as was the case with the Matta Radiological Score (Table 2).

Table 2: Outcomes of surgery by different criteria.

outcome	No of patients	percentage
Matta's Criteria – reduction of fracture		
Anatomic (0-1mm)	18	60%
Imperfect (2-3mm)	10	33.33%
Poor (0.3mm)	2	6.67%
Modified Merle D' Aubigne and Postel Clinical Grading system		
Excellent	17	56.67%
Good	9	30%
Fair	2	6.67%
Poor	2	6.67%
Matta Radiological Scoring system		
Excellent	17	56.67%
Good	9	30%
Fair	2	6.67%
Poor	2	6.67%

Discussion

Acetabular fractures are serious wounds and can be a complicated surgical issue. Judet and Letournel6 provided the biggest input to a stronger knowledge of acetabular fractures, their classification, fracture structure, and surgical therapy[10].

Yet, regardless of the therapy technique, they have the capacity for a bad results. The contributing variables may include incomplete decrease, acetabulum or femur osteochondral abnormalities at the moment of injury, osteoarthritis, femoral head AVN, heterotropic osification, sciatic tract disease, and infection7. It is recognized that the model of fracture, marginal impact and residual displacement of > 2 mm are correlated with arthritis growth. Non-operational therapy has become a rare occurrence for acetabular fractures. Open decrease and inner fixation is now a popular option procedure as it allows the patient to be mobilized soon.

Road traffic crash is the primary source of an acetabular fracture. RTA accounted for 83.3% of instances in our research, with the remainder falling from height. This was comparable to a retrospective research conducted by Almeida et al in which 60 out of 76 instances were due to RTA and a meta-analysis conducted by Giannoudis et al in which RTA was found in more than 80% of cases[8,9].

Conclusion

There is an growing incidence of acetabular fractures due to the enhanced frequency of road traffic accidents and high-speed injuries with the most impacted older men. With excellent surgical technique, the incidence of heterotopic ossification may be decreased; after surgery, indomethacin and irradiation may not be needed. There is a connection in most instances between fracture decrease and clinical and radiological results. In order to better understand the long-term outcomes, our research requires further follow-up.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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Functional Outcome Analysis of Open Reduction and Internal Fixation of Complex Acetabular Fractures

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Abstarct

Over the last 20 years, Improvements in automobile safety, prehospital care, resuscitation, and transport as well as standardized protocols for treatment have all contributed to improved survival after severe pelvic injuries. Only 10% of the pelvic disruptions involve acetabulum. Posterior wall fractures are most common, comprising 24% of acetabular fractures. The primary cause in younger individuals is high-energy trauma. Acetabular fractures generally occur in conjunction with other fractures. The treatment of acetabular fractures is an enigmatic area of orthopaedics that is being continually refined. It involves a definite learning curve [1].

Keywords – *Conjunction, Acetabular Fractures*

Introduction

Acetabular fractures are generally associated with other injuries of the pelvis and lower limbs which may influence treatment options, surgical approach and clinical outcomes. Patient age, fracture stability, the presence of comorbidities and osteoporosis, combined with surgeon experience also influence treatment options.

The goals of the treatment should be anatomic reconstruction of articular surface and early mobilisation. This goal can be achieved only when acetabulum is adequately exposed and rigid internal fixation is done. Displaced fractures of the pelvis that involve the acetabulum are difficult to treat. With closed methods, it is difficult, if not impossible, to restore the articular surfaces completely and obtain sufficient stability for early motion of the hip.

The treatment of simple fractures of acetabulum is well known and studied. Treatment of complex Acetabular fracture is difficult as it involves both the column of the acetabulum, For reduction and fixation, both columns have to manipulated and fixed.

The purpose of this study is to analyse the results and functional outcome of open reduction and internal fixation of fracture involving both acetabular columns (Complex Acetabular Fractures) with the use of Kocher Langenbeck , ilioinguinal or both approaches .

Materials and Method

This is a prospective study done to assess the functional and outcome of complex acetabular fractures treated by open reduction and internal fixation in 20 patients over a period of two and half years from July 2016 - December 2018 at Our Institute, Sree Balaji medical college and hospital, Chromepet, Chennai.

Inclusion criteria:

1. Age greater than or equal to 18 years ,

2. Closed fractures,

3. Complex acetabular fractures including Transverse fractures, Transverse with posterior wall fracture, T Type fracture, Anterior column or wall with posterior hemitransverse fracture, Both column fractures.

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Exclusion criteria:

1. Open injuries,

2. simple fractures,

3. fracture greater than 3 weeks old ,

4. patient operated within last six months.

Patients were put on skeletal traction.

In our study , on receiving the patients in emergency room, general assessment and resuscitation was done . After stabilization of vital parameters, complete skeletal survey and associated injuries especially vascular and nerve injuries was assessed. Radiological assessment was done with anteroposterior, judet views of acetabulum and computed tomography with 3-d reconstruction of acetabulum if needed.

Closed reduction was done in dislocated patients under i.v sedation and skeletal traction was applied in all patients. Patients were operated between 5 to 10 days based on Damage Control Orthopaedics.

After completing clinical and radiological examination pre operative planning regarding approach and implant to be used was made on basis of fracture type, displacement and associated injuries.

Surgical exposure was decided preoperatively based on fracture displacement. Kocher Langen-beck approach was used for posterior fractures and anterior ilio-inguinal approach was used for anterior fractures . After reducing and fixing one column the reduction of other column was assessed by image intensifier and need for exposing the other column was made.

After exposure reduction poses the challenge. Reduction cant be achieved easily as in any long bones and maneuvers are not the same . In posterior approach, schanz pins was placed in trochanter, ischial tuberosity and iliac crest for simultaneous manipulation . Various reduction clamps are available to facilitate reduction and holding. In anterior approach a farabeuf clamp or a schanz pin was placed in iliac crest to manipulate and reduce. Matta‘s Quadrangular clamp of various sizes and with offsets and Picador ball spike pusher are very important instruments in Acetabular surgery. Reduction was fixed with lag screws whenever possible. Lagging was done with 4mm cancellous screws or 3.5 mm cortical screw with washer. 3.5mm Reconstruction plates are used as neutralisation plate .

All patients were given pre operative antibiotics and post operatively for 5 days. Drain removal done on 2nd post operative day . Suture removal was done on post operative day 12 to 14. Indomethecin[2] 25mg TDS was prescribed orally for 6 weeks from next day after surgery. Low molecular weight heparin was given for 7 days when anterior approach is used as DVT prophylaxis.

Passive mobilization was started on post operative day 2. Active movements started gradually in accordance with pain. Weight bearing was allowed as the fracture consolidates mostly on the 3rd or 4th month.

Radiological and functional examination was done on monthly review for first 6 months and third monthly there- after.

Patients in our study were analysed by the Matta‘s radiographic assessment post operatively and modified Merle d‘ Aubigné and postel Hip Score at each follow up.

Functional Outcome :

Modified Merle‘d Aubigné And Postel Grading System :

Pain :

None - 6

Slight or intermittent -5

After walking but resolves -4

Moderately severe but patient is able to walk -3

Severe, prevents walking -2

Walking

Normal -6

No cane but slight limp -5

Long distance with cane or crutch -4

Limited even with support -3

Very limited -2

Unable to walk -1

Range of motion*

95-100% -6

80-94% -5

70-79% -4

60-69% -3

50-59% -2

<50% -1

Clinical score

Excellent -18

Good -17,16,15

Fair 13 or 14

Poor <13

*The range of motion is expressed as the percentage value for the normal hip. This is calculated by obtaining a total of the ranges, in degrees, of flexion-extension, abduction, adduction, external rotation, and internal rotation for the injured hip and dividing it by the total for the normal hip.

Post operative Radiological assessment :

Matta's criteria:

Anatomic reduction <1mm;

Imperfect 1–3mm;

Poor >3mm.

Results

Table1 :Fracture Distribution

Fracture type (Judet and Letournal)	No. of Patients	Percentage
Transverse	7	35%
Transverse with posterior wall	4	20%
Anterior column with posterior hemi-transverse	2	10%
T type	4	20%
Both column	3	15%

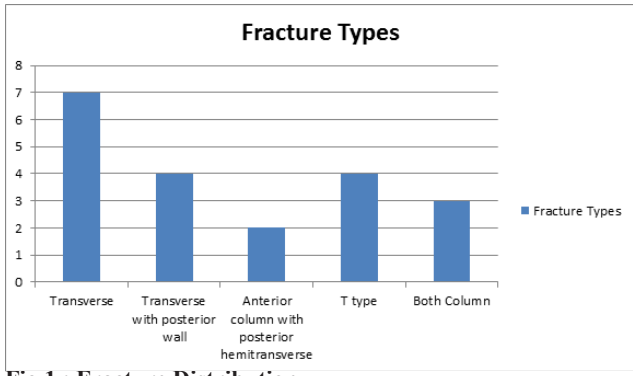


Fig 1 : Fracture Distribution

Surgical Approaches :

Table 2: Surgical procedure

Procedure	No.of Patients
Kocher Langenbeck Approach	14
Ilioinguinal Approach	3
Ilioinguinal approach Followed by Kocher langenbeck Approach	1
Kocher Langenbeck Approach followed by ilioinguinal approach	2

Radiologic assessment was done post operatively by Matta's criteria and Functional status of the patient was assessed by Modified Merle'd Aubinge and Postel score .

Twenty patients with complex acetabular fractures were treated surgically and analysed with average follow up of 10.5 months ranging from 6 months to 2 ½ years .

75% belong to less than 40 years. 35% patients belong to 4th decade followed by 3rd decade (25%). Males dominated our study group with a ratio of 9: 1. Road traffic accidents contributed to the injury in 80% of our patients and rest sustained by fall from height. Transverse fracture was the most common type in our study (7 cases). Anterior column with posterior hemitransverse was least common type (2 cases).

Eight patients had associated skeletal injuries. One patient had sciatic nerve injury and one patient had urethral injury. Most of the patient were operated by Kocher langen-beck approach (17 Patients). Three patients was operated by ilioinguinal approach. Three patients was operated by combined approach. In contrast to pelvic injuries, all patients were hemo-dynamically stable at the time of admission.



Figure1 : Before surgery

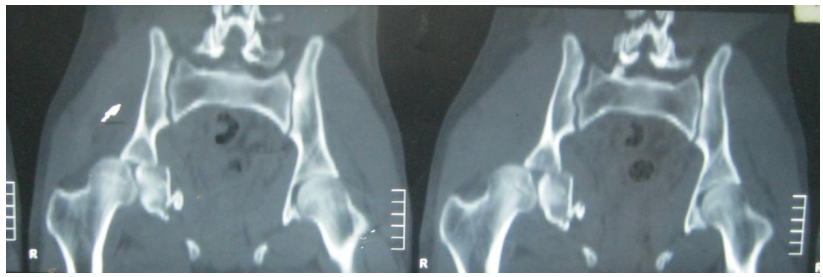


Figure 2 : CT scan.

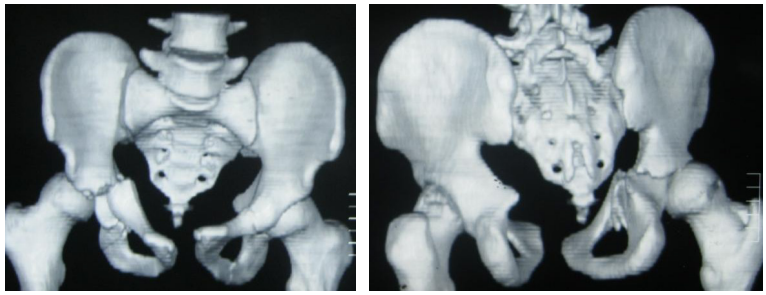


Figure 3: 3D - CT scan

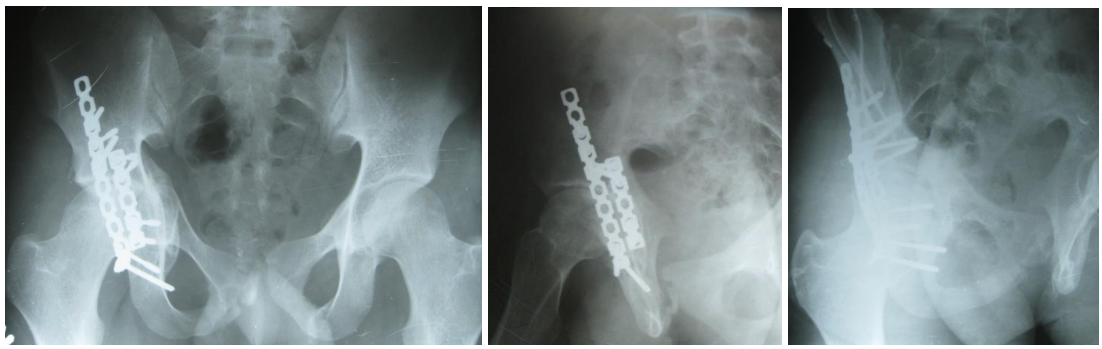


Figure 4: At 1 year of follow-up.



Figure 5: Mobility after surgery & Scar.

In our study the average surgical time delay was 6 days ranging from 5 to 11 days. The average surgical time was 127 minutes ranging from 60 minutes to 4 hours.

Four patients have encountered operative complications. One patient operated by ilioinguinal approach had superficial infection which settled with antibiotics. One patient had a deep circumflex vein tear managed by ligation following which he developed DVT that resolved with heparin. One patient was found have intra-articular screw after being operated via anterior approach. One patient operated by posterior Kocher langenbeck approach developed sciatic nerve palsy.

No patient had sacroiliac disruption or pubic diastasis. No patient died during treatment or follow up.

According to Matta's criteria, 6 patients had anatomic reduction, 7 patients had satisfactory reduction and 7 patients had poor reduction (>3mm gap). The mean score in anatomically reduced fractures was 15.1 , in imperfect reduction is 15.8 and in poorly reduced fracture is 14.5. Out of 18 patients, four patients had excellent , eight patient had good , five patient had fair and 1 patient had a poor results. 60% patient are having near normal life and 94% patient are having satisfactory result in our study. Function outcome score for the patients ranged from 10 to 18 (Maximum Score- 18).

The poor result (Score-10) in one patient was due to Avascular necrosis of femoral head . Patient had transverse with posterior wall fracture operated by posterior Kocher Langenbeck approach. Total hip replacement was done for this patient at 8 months after surgery.

There are seven patients with transverse fracture . one was lost to follow up. All patients with transverse fracture had excellent or good result except one patient who had fair result due to associated multiple skeletal injuries in lower limb .

Two patients with both column fracture was operated by anterior Ilioinguinal approach and one patient had excellent and other had good result. Associated posterior wall fracture had reduced the outcome score.

T type fracture , Anterior column with posterior hemitransverse and Transverse with posterior wall fracture had reduced outcome score than other two types.

Findings and Discussion

The treatment of simple acetabular fractures has been studied in detail and there has not been much of change over time. The options for treatment of complex acetabular fractures are wide and are continuously refined over time. The treatment of complex acetabular fracture is difficult because it involves both the columns and reduction of the both by single or double approach is must.

The mean age group in our study was 35.4 years which is comparable with Swiontkowski et al[3] on complex acetabular fracture. Males predominated as in other studies[3] . Road traffic accident forms the major mode of injury .

The highlight of open reduction and internal fixation is anatomic reduction, rigid fixation and early mobilization which will keep the joint functional as described by Matta[4] . Pennal et al[5] reported that the quality of the clinical result depends directly on the quality of the reduction that was achieved when open reduction and internal fixation were performed . In our study , there is decreased mean functional score (14.5) in the fracture group with poor reduction compared to rest (Anatomical Reduction 15.1 and Imperfect reduction -15.8).

Management of displaced acetabular fracture requires adequate exposure with minimal morbidity. An ideal approach would allow visualisation of both columns and the joint surface with minimal complications. We used only two non extensile approaches - Posterior Kocher Langenbeck approach and anterior Ilioinguinal approach.

We used single approach in most of the patients except in 3 patients . With this single approach we are able to get 65% of satisfactory reduction and 94% of favorable result in short term. According to Tile , even with best hands depending on the type and complexity of fracture , anatomic reduction can be obtained in 70% cases of acetabular fractures . In our study we included only complex fractures and we were able to get satisfactory reduction in 65% patients.

H. J. Kreder et al listed factors influencing the outcome[6]- degree of initial displacement, damage to the superior weight bearing dome or femoral head, degree of hip joint instability caused by posterior wall fracture, adequacy of open or closed reduction and late complications like AVN, heterotrophic ossification, chondrolysis or nerve injuries are assessed. In our study associated posterior wall fracture has reduced the functional outcome .

Giannoudis et al[7] in his meta-analysis reported 5.6 % of AVN in posterior approaches . In our study , We had a case of avascular necrosis of femoral head leading to poor outcome (5%) . Patient came with AVN at 8 month follow up for whom total hip replacement was done .

Extensile approaches around the hip joint have reported a high rate of complications. Alonso et al. reported 53% incidence of heterotopic ossification with Triradiate approach and 86% incidence with the use of Extended iliofemoral approach. No case of heterotopic ossification has been encountered till date in our study . Heterotopic ossification was reported as high as 20% in non extensile approaches used for complex fractures accoording to Jiong Jiong Guo, et al .We used Indomethacin for patients for 6 weeks as prophylaxis for heterotopic ossification.

Giannoudis et al[7] reported 8% of iatrogenic sciatic nerve palsy in posterior approaches. In Our Study ,We report one case of sciatic nerve palsy in posterior approach (5.8%) . Swiontkowski et al[3] also showed 8.3 % iatrogenic sciatic nerve palsy in his study. one case of DVT in anterior ilioinguinal approach .We had a case of intra articular screw penetration in anterior approach, but the patient was asymptomatic and had excellent functional outcome.

The complication rate is very low when compared to Matta[8] and Swiontkowski studies[3].

The non-extensile approaches which we advocated have operating time and average blood loss which are similar to those reported by others (Matta et al 1986;Goulet and Bray 1988 ; Reinert et al 1988 ; Routt and Swiontkowski 1990 ; Helfet et al 1992).

The mean functionl outcome score is 15.4 ranging from 10 to 18 (Maximum—18). The least score is seen in a patient with transverse with posterior hemitransverse fracture operated by Kocher langenbeck approach and developed Avacular necrosis of femoral head .

According to Marwin M Tile, Transverse has the best and T Type and anterior column and posterior hemi transverse fracture has worst prognosis. In our study Transverse fractures and both column fractures showed better results. T Type and anterior column with posterior hemi transverse had reduced outcome.

Even though our study comprised of small group of 20 patients with good pre operative planning , use of non extensile approaches and early rehabilitation , we have been able to produce 94 % good to satisfactory result according to modified Merle d Aubigne and Postel scoring systems. However, further follow up is needed to comment on long term outcome.

Conclusion

From our study , We conclude that Complex acetabular fractures treated by open reduction and internal fixation have a satisfactory functional outcome .

Use of non extensile approaches itself is sufficient to produce adequate fracture reduction with reduced complications.

Every chance of reducing the fragments anatomically, fixing rigidly and mobilizing early must be done for better function which is not possible by conservative means.

Treatment of acetabular fractures is a challenging task for any orthopaedic surgeon. With definite learning curve , proper pre operative planning , non extensile exposure , accurate reduction , rigid fixation and early rehabilitation , it is possible to produce a improved outcome.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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Analysing the p16INK4a Stained Uterine Cervical Biopsy Specimen Histopathological Findings

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Abstract

Human papilloma virus(HPV) is an epitheliotropic virus and usually a cause for Carcinoma cervix. Human papilloma virus being one of the most common cancer causing rganismin women worldwide.An immune histochemical analysis with pI6NK4a was performed in formalin- fixed, paraffin embedded samples of 50 cases.The aim of the study was to analyse the p16ink4a stained uterine cervical biopsy specimen histopathological findings. The p16INK4a immune expression was evaluated in all the cases and correlated with the histopathological findings.

Keywords: *Human papilloma virus, epitheliotropic, pI6NK4a*

Introduction

Cervical cancer is one of the most common carcinoma prevalent.by 13% of all the women affected cancers.(1)Cervical Intraepithelial neoplasia (CIN), which is described by abnormal growth/dysplasia of squamous cells in the surface epithelium of cervix is a premalignant condition.(2) Human papilloma virus is the most important causative organism in the development of cervical cancer[5]. They are transmitting sexually especially the high risk HPV types – 16,18,33; 16 and 18 mainly and then chronic infection causing CIN.(3,4) HPV 16 and 18 are the main sub types of papilloma virus causing cervical cancer and the other types are 45, 31,33,45,51,52,58 and 35.There are also other around 200 various subtypes. And if in cases which are left untreated, few cases develop cervical cancerbut only after a long standing period usually within 5 to 10 years which persistent infection may be causing it. HPV being detected in all cases of cervical dysplasia and neoplasia cases, is a crucial factor.(5)

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Materials and Method

A cross sectional hospital basedstudy of 50 cases was followed in the Department of Pathology in collaboration with the Department of Obstretics and Gynaecology, SreeBalaji Medical College and Hospital (SBMCH), Chromepet.

The study was constructed for a period of two years starting from November 2016 to October 2018[6].

Study Population And Inclusion Criteria

- Both cone and punch biopsy are included.
- All the cervical biopsy specimens received in the department of Pathology within 2 years of the study period were included in the study.
- Patient irrespective of any age group undergoing cervical biopsy were included in the study.
- Patient who have consented for the study.

Exclusion Criteria

- Patient already treated
- Patients not consenting for the study(7)

Working Definition

- More than 10% nuclear stained epithelial cells

by p16INK 4a – p16 positive

- Less than 10% nuclear stained epithelial cells by p16INK 4a – p16 negative

Brief clinical information with regards to age, sex, etc.of the patient and clinical findings and diagnosis and any other relevant information received from the case file of the patient was recorded in the proforma for the study.

Slides prepared after formalin fixation were sent for immunohistochemistry and then for light microscopy examination .(8)

Findings

The p16INK4a immunoexpression was evaluated in all the cases and correlated with the histopathological findings[3]. The p16INK4a immunoexpression was evaluated in all the cases and correlated with the histopathological findings. Out of the premalignant conditions, 4 cases of CIN I was encountered in our study which was considered to be negative as it showed focal weak staining of less than 10% of the epithelial cells.

Table 1: Distribution OfHistomorphological Features In Infiltrating Non Keratinizing Squamous Cell Carcinoma in This Study.

Sl no.	Histomorphology	Number of cases
1.	Small cell morphology	0
2.	Large cell morphology	2
3.	Cell keratinization	0
4.	Mitotic figures	2
5.	Nuclear pleomorphism	2
6.	Keratin pearls	1
7.	Atypical mitotic figures	2

Table 2: Distribution of histomorphological features in premalignant conditionsin this study.

Sl no.	Histomorphology	Number of cases
1.	Koilocytic changes	13
2.	Increased nuclear cytoplasmic ratio	1

***Cont...* Table 2: Distribution of histomorphological features in premalignant conditionsin this study.**

3.	Increased mitosis	1
4.	Inflammatory infiltrate	9
5.	Papillomatosis of the squamous epithelium	2
6.	Hyperplasia	15
7.	Nuclear atypia	4
8.	Hyperkeratosis	2

Table 3: Distribution of histomorphological features in benign conditions in this study.

Sl no.	Histomorphology	Number of cases
1.	Dysplasia	2
2.	Hyperplasia	2
3.	Nabothian cyst	2
4.	Metaplasia	1
5.	Hyalinizedstroma	1
6.	Intact basement membrane	1

Table 4: Distribution of histomorphological features in inflammatory conditions in this study.

Sl no.	Histomorphology	Number of cases
1.	Lymphocytic infliltrate	13
2.	Neutrophilic infiltrate	11
3.	Squamous metaplasia	3
4.	Ulceration/Erosion	6
5.	Nabothian cyst	2
6.	Basal cell hyperplasia	5
7.	Endocervical hyperplasia	11
8.	Ectocervical hyperplasia	5
9.	Branching glands	3
10.	Mucous retention cyst	1

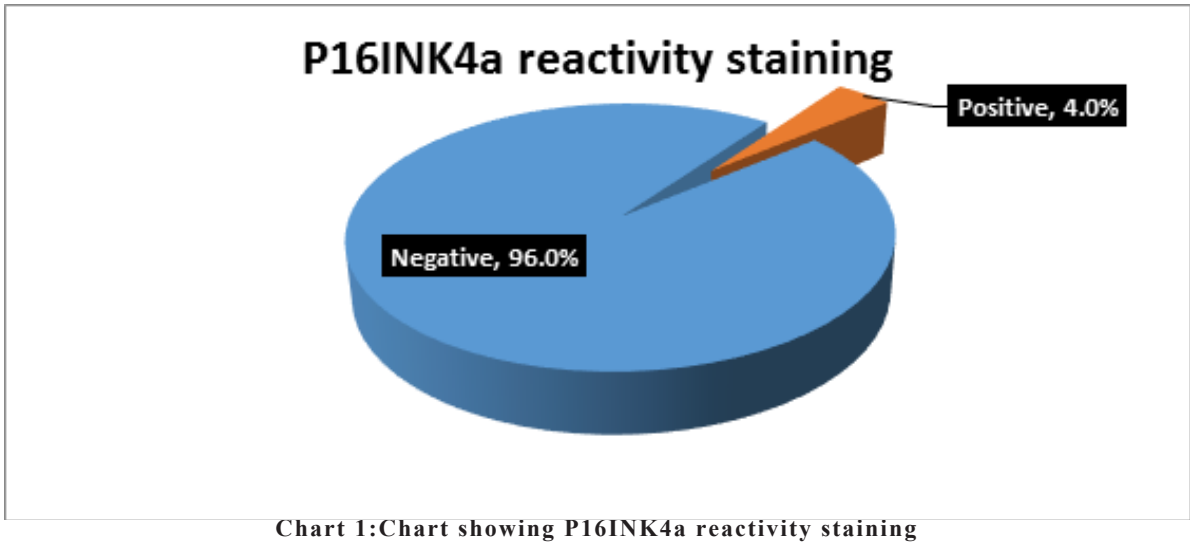
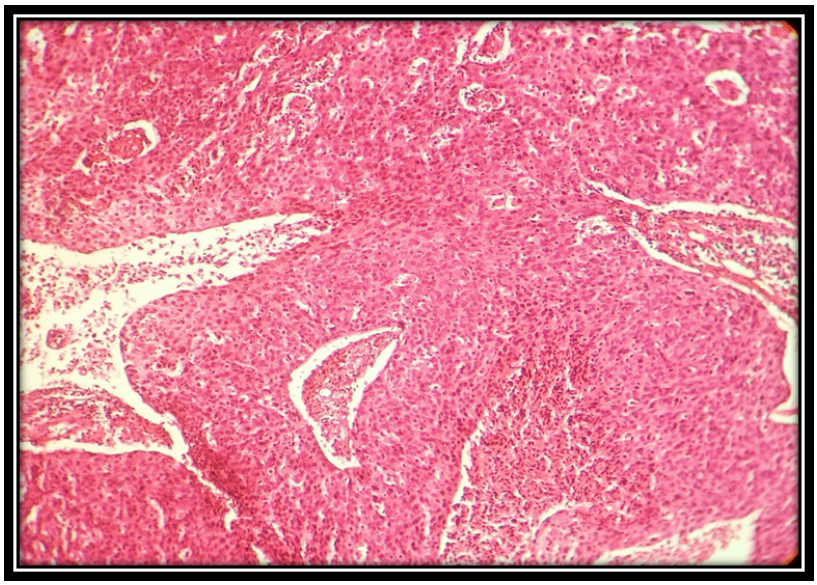
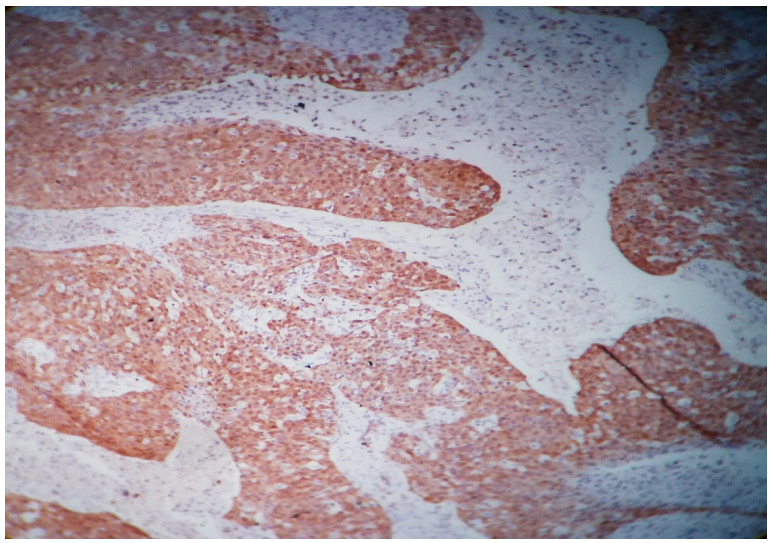


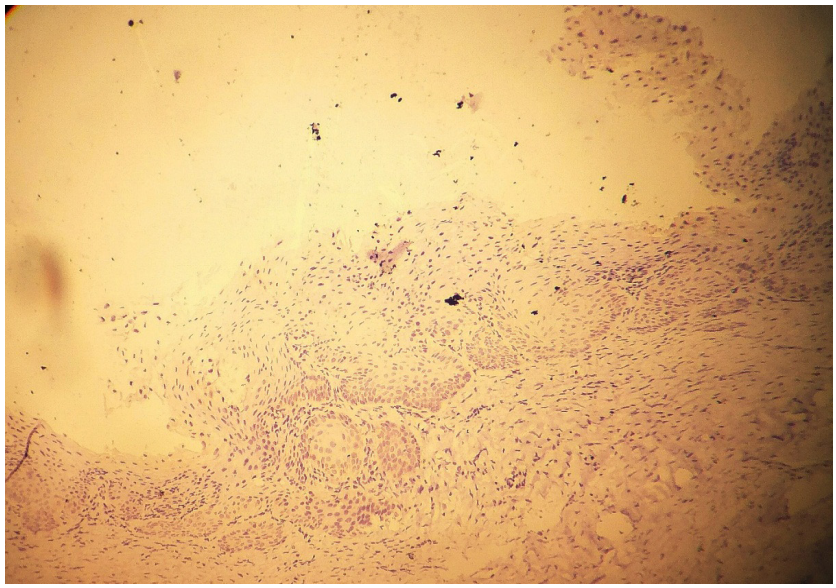
Chart 1:Chart showing P16INK4a reactivity staining



Picture1: Infiltrating non keratinizing squamous cell carcinoma H&E 40xmagnification



Picture2:P16INK4a Positive in low power 10xmagnification



Picture2:Dysplastic epithelium CIN I IHC (P16INK4A) negative 10x magnification

Discussion

This study is to find out the correlation of p16INK4a immunohistochemical expression on various histological lesions received in our department. It has been observed that most of the cases received were those of inflammatory lesions mainly chronic cervicitis with or without papillary hyperplasia and/or squamous metaplasia. These lesions had inflammatory cell infiltration with few having Nabothian cyst. Some of the lesions had papillary hyperplasia of the endocervix and few had squamous metaplasia.It was expected that few premalignant lesions may take up the stains but it also showed negative IHC results. Hence, they were considered to be p16INK4a negative.

Sano et al (6) conducted a study on the expression status of the p16INK4a protein associated with HPV oncogenic potential in cervical and genital lesions. To clarify the relationship between p16 overexpression and HPV infection incervical carcinogenesis, immune histochemical analysis of p16INK4a and detection of HPV by in situ hybridization and polymerase chain reaction were doneon 139 formalin fixed and paraffin embedded samples of cervical and genital condylomatous and neoplastic lesions. Marked overexpression of p16INK4a protein, i.e. diffuse and strong immunostaining was observed in all cervical cancers and preneoplastic lesions with infection by high and intermediate risk HPVs i.e. subtypes 16,18,31,33,52 and 58.Here in our case also only the carcinoma cases took up the stain[7] .Volgareva G et al(7) in their study "Protein p16INK4a as a marker of dysplastic and neoplastic alterations in cervical epithelial cells" found that in control samples which consisted of vaginal smears of healthy women and biopsy samples of cervical ectopia were negative for p16 INK4a. Overexpression of p16INK4a was detected in samples of cervical dysplasia (CINs) and carcinomas, which is similar to our study only for the carcinoma cases.

Conclusions

Many studies have shown that human papilloma virus (HPV) infection plays an important role in cervical carcinogenesis. HPV infection has been detected in almost all preneoplastic and neoplastic lesions of the cervix and is a significant factor in nearly all cases of cervical cancer. Early detection and treatment are the key to reduction in morbidity and mortality due to cancer. This study of p16INK4a expression on cervical biopsy specimen showed that those with inflammatory cervical histology, benign lesions of the cervix along with premalignant lesions of the cervix are negative for p16INK4a. And all of the malignant lesions were p16INK4a positive.Hence, the p16INK4a immunoreactivity may be used for the diagnosis of neoplastic lesions of the cervix[8].

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Evaluation of the Clinical History with It's Features with the Histological Findings with P16ink4a Stained Cervical Biopsy

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Abstract

Dysplasia or neoplasis of the cervix is caused by human papillomavirus (HPV) infection of low or high oncogenic risk type. This cross sectional study on our college SREE BALAJI MEDICAL COLLEGE & HOSPITAL is to evaluate the clinical history with it's features with the histological findings with P16INK4a stained cervical biopsy. This is a study done on 50 sample size with a brief clinical information with regards to age, sex, etc.of the patient and clinical findings and diagnosis and any other relevant information received from the case file of the patient was recorded in the proforma for the study.

Keywords: *Dysplasia, HPV, Oncogenic*

Introduction

Human papilloma virus is an important role covering cervical carcinogenesis and one of the most common forms of cancer. Immunostaining of p16 INK 4a overexpression allowed specific and accurate negligible cases of CIN or cervical dysplasia in biopsy which allow improvement of diagnosis of cervical cancer.(11)P16INK inhibits the cyclin dependent kinase by preventing the phosphorylation of RB (hypophosphorylated form); pRB binds to transcription factors, it loses the G1/S check – point controller. RB gene in cervical dysplasia is inactivated as a HPV E7 proteinexpression.(11).E6-E6 inhibits the function of p53 indicated DNA damage and apoptosis pathway. E6 retarget E6- AP to induce ubiquitination and rapidproteosomal degradation of p53 which is a protein controlling the response to cellular stress including DNA damage and viral infection. HPV E6 can also activate telomerase n TERT transcription also. .(7,8)

E7- E7 inhibits the function of tumour suppress pRB mediated cell cycle regulation pathway and inactivation of the pRB and p53 tumour suppressor pathways and expression of the catalytic telomerase subunit hTERT constitute the process causing overexpression of the CDK inhibitor. P16INK 4a process through negative feedback control to check the cell proliferation through regulation of CDK4 and 6. Hence P16INK 4a is overexpressed in HPV mediated cervical cancer.(7,8,9)

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Aim

Evaluation Of The Clinical History With It's Features With The Histological Findings With P16ink4a Stained Cervical Biopsy

Materials & Method

A hospital based cross sectional studydesign was followed. The study was carried out in the Department of Pathology in collaboration with the Department of Obstretics and Gynaecology, SreeBalaji Medical College and Hospital (SBMCH), Chromepet. The study was constructed for a period of two years starting from November 2016 to October 2018.

Study Population and Inclusion Criteria

•Both cone and punch biopsy are included.

•All the cervical biopsy specimens received in the department of Pathology within 2 years of the study period were included in the study.

•Patient irrespective of any age group undergoing

cervical biopsy were included in the study.

•Patient who have consented for the study.

Exclusion Criteria

•Patient already treated

•Patients not consenting for the study

Study Variables

•Age, religion, p16INK 4a expression

Working Definition

•More than 10% nuclear stained epithelial cells by p16INK 4a – p16 positive

•Less than 10% nuclear stained epithelial cells by p16INK 4a – p16 negative

WORKING TOOLS- Pretest proforma, light microscope, microtome, H&E stain and p16(G175-405) mouse monoclonal antibody kit

Brief clinical information with regards to age, sex, etc.of the patient and clinical findings and diagnosis and any other relevant information received from the case file of the patient was recorded in the proforma for the study.

Findings

The present study on the histomorphology of cervical specimens and their relationship with the immune histochemical expression of p16INK4a was conducted in the department of Pathology in collaboration with Obstretics and Gynaecology department, Sree Balaji Medical College and Hospital, Chennai, Tamil Nadu. A total of 50 cases were studied and the diagnosis are shown in Table. Out of the 50 cases, maximum are inflammatory conditions i.e. 26(52%), mainly chronic cervicitis which comprises 15(30%) cases and malignancies/carcinoma accounted for 2(4%) cases. Premalignant conditions consisting Low grade Squamous Intraepithelial Lesion and Cervical Intraepithelial Neoplasia accounted for 18(36%) cases. Benign conditions accounted for 4(8%).

The age of the patients in the study as shown in the Table 8 ranged from 21 years to 61 years and above. The malignant lesions seen were in the age group of 41 to 60 years. Premalignant conditions were seen highest in the age group of 41 to 50 years. Benign conditions were evenly distributed in women with age more 30 years. Inflammatory conditions occurred more in the age group of 31 to 50 years.

Out of the 50 cases, there were 2(4%) malignant cases in the study and both are infiltrating non keratinizing squamous cell carcinoma.

Table 1: Distribution of cases and their percentages.

Sl no.	Diagnosis	Number of cases	Percentage
A)CARCINOMA/MALIGNANT CONDITIONS:			
1.	Infiltrating non keratinized squamous cell carcinoma	2	4%
B)PREMALIGNANT CONDITIONS:			
1.	Low grade squamous cell carcinoma	14	24%
2.	Cervical intraepithelial neoplasia	4	8%
C)BENIGN CONDITIONS:			
1.	Dysplastic squamous epithelial cells	2	4%
2.	Endometrial hyperplasia with Nabothian cyst	2	4%
D)INFLAMMATORY CONDITIONS:			
1.	Chronic endocervicitis with Non Specific Reactive Changes in squamous epithelium	1	2%
2.	Chronic non specific cervicitis	2	4%
3.	Chronic cervicitis	15	30%
4.	Chronic papillary cervicitis	3	6%
5.	Chronic papillary endocervicitis with LSIL	3	6%
6.	Non specificendocervicitis	1	2%
7.	Chronic papillary cervicitis with non reactive cervicitis	1	2%
Total		**50**	**100%**

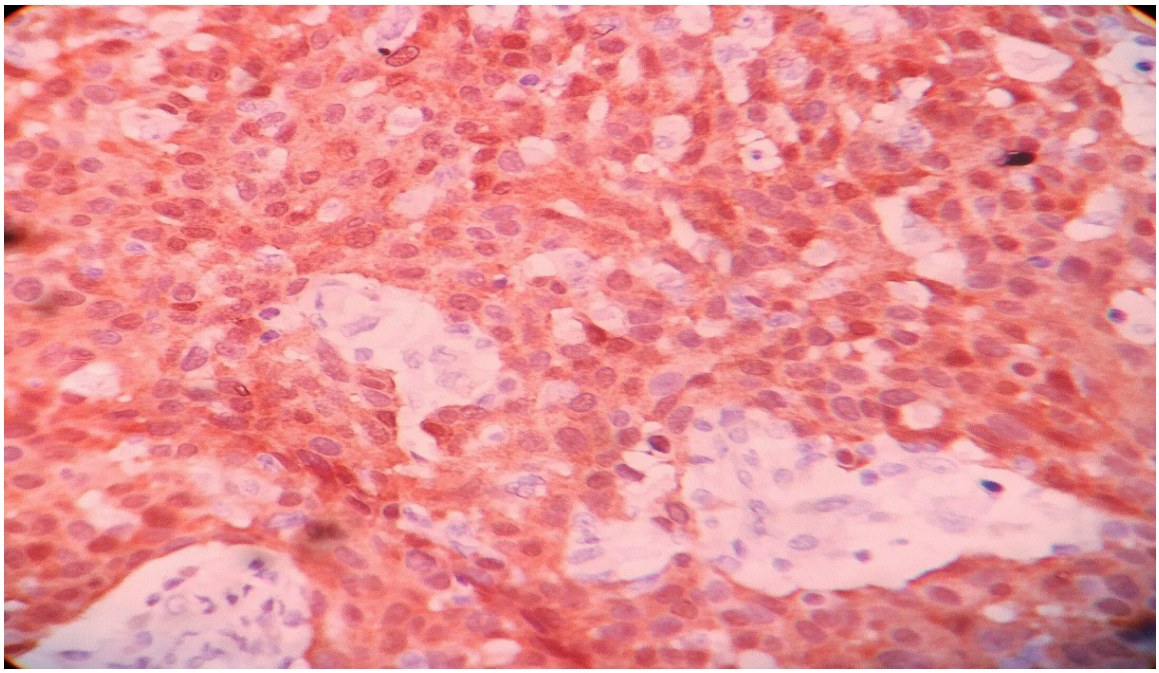


Figure 1: P16INK4a Positive in high power 40x magnification

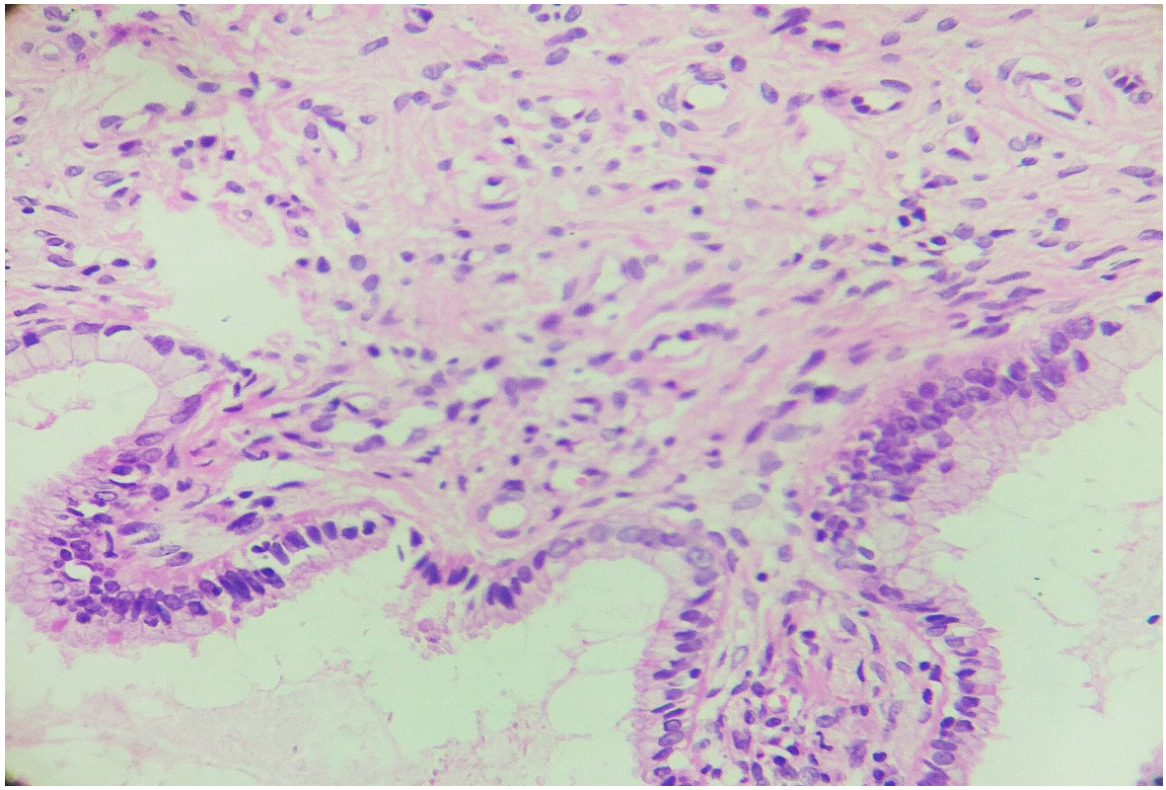


Figure 2: Chronic papillary endocervicitis H&E 40x magnification

Table 2: AGE wise distribution of the cases.

Age	Carcinoma/malignant conditions	Premalignant conditions	Benign conditions	Inflammatory conditions	TOTAL
21-30	.	2		1	3(6%)
31-40		4	1	10	15(30%)
41-50	1	7	1	10	19(38%)
51-60	1	4	1	4	10(20%)
>61		1	1	1	3(6%)
TOTAL	2(4%)	18(38%)	4(8%)	26(52%)	50(100%)

Table 3: Expression of p16ink4a in cervical tissue with different histolopathological diagnosis.

Sl no.	Diagnosis	No of cases	p16INK4a reactivity
1.	Carcinoma	2	2/2(100%)
2.	Premalignant conditions	18	0/18(0%)
3.	Benign conditions	4	0/4(0%)
4.	Inflammatory conditions	26	0/26(0%)

The p16INK4a immune expression was evaluated in all the cases and correlated with the histopathological findings. The result for the p16INK4a scoring was done using a semi quantitative scoring method as shown in the table 13. All premalignant conditions benign and inflammatory showed no expression of p16INK4a staining. The dysplastic and neoplastic cells show moderate to strong diffuse to strong cytoplasmic as well as nuclear staining. In the malignant condition considered to be p16INK4a positive, there was diffuse and strong nuclear as well cytoplasmic staining in more than 10% of the epithelial cells but the nuclear staining was considered to be significant in account of the positivity.

Out of the premalignant conditions, 4 cases of CIN I was encountered in our study which was considered to be negative as it showed focal weak staining of less than 10% of the epithelial cells. While correlating with different histopathological lesions with p16INK4a expressions in malignant lesions as shown in the table 15.

Statistical analysis using Chi-square test, it was seen that high statistical significance (p=0.0008) was found between p16INK4a and the different categories of the lesions.[8]

Statistical analysis using Chi-square test, it was seen that high statistical significance (p=0.0008) was found between p16INK4a and the different categories of the lesions.

Table4: Association of P16INK4a reactivity with different types of sample (n=50) using chi-square test

Samples	P16INK4a reactivity		p-value
	Positive	Negative	
Others	0(0%)	48(100%)	0.0008
Malignant	2(100%)	0(0%)	

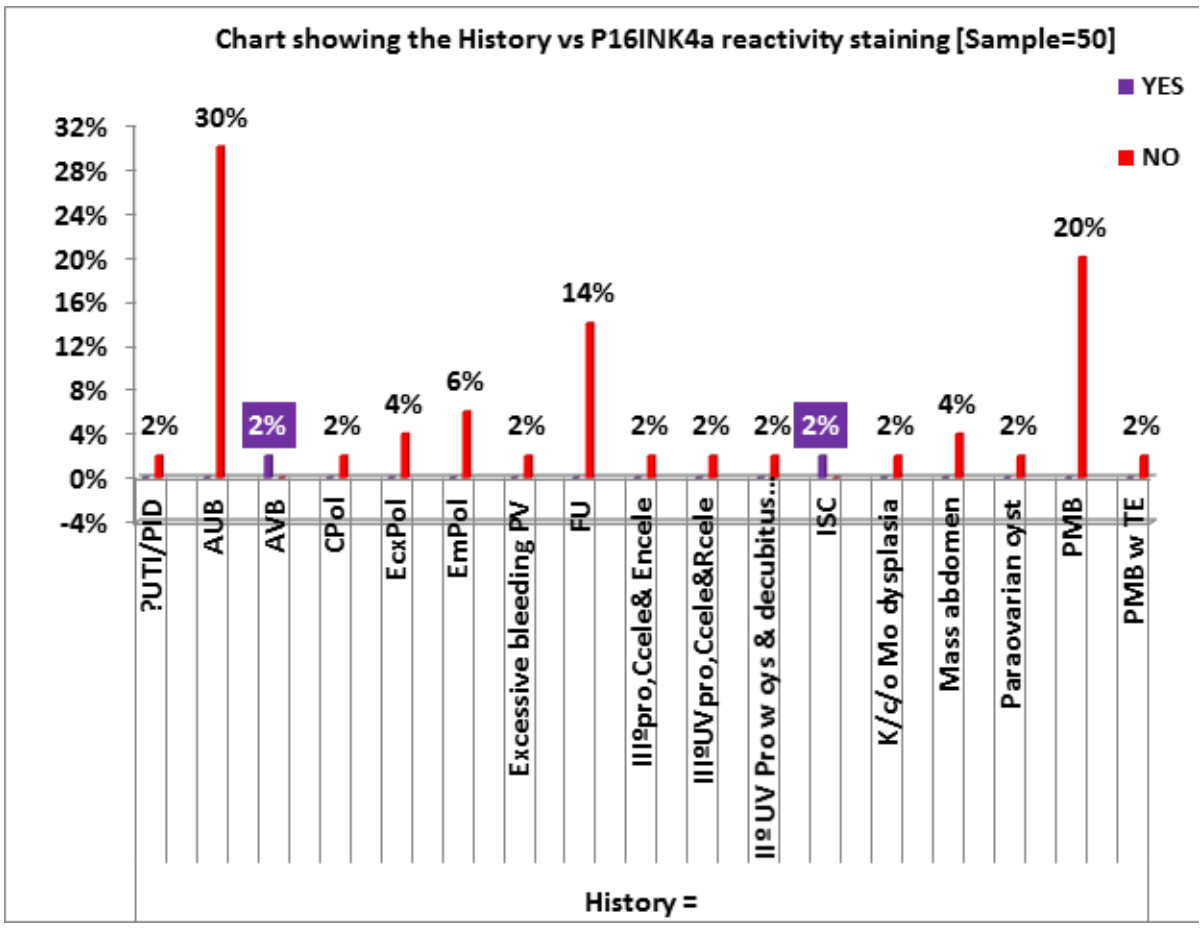


Fig 3: showing the history vs P16INK4a reactivity staining.

Discussion

This study attempts to find out the correlation of p16INK4a immunohistochemical expression on various histological lesions received in our department.(7)

Munoz et al(4) finds out of 26 inflammatory conditions (mainly chronic cervicitis and its variants).In this study done, non specific chronic cervicitis showed no expression of p16INK4a.

Wang et al (64) conducted a study on p16INK4a and p14ARF expression pattern by immunohistochemistry in human papilloma virus related cervical neoplasia. Serially andconsecutive biopsies representing normal cervical epithelium to cervical intraepithelial neoplasia and/or invasive cervical cancer were stained. The positive rates of these markers were significantly highest in cervical intraepithelial neoplasia and in squamous cell carcinomabut in my study only 2 cases i.e both in filtrating non keratinizing Squamous Cell Carcinoma were P16INK4a positive.

Klaes et al (25) study of p16INK4a in cervical biopsy specimens, showed no significant p16INK4a immunoreactivity in inflammatory lesions which is similar to my study.

Conclusion

Hypoplastic left transverse sinus is the most widely recognized anatomical variety in our examination. Also, MRV is considered as the best methodology in diagnosing anatomical variations. So it is fundamental for the radiologist to be comfortable with their MRV qualities and life structures so they are not misconstrued as Cerebral Venous Sinus Thrombosis.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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Steroids for Nasal Polyposis and its Impact on Quality of Life

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Abstract

Nasal polyposis is an incessant incendiary infection including the nasal and paranasal sinuses mucosa . Nasal polyposis has been related with various foundational and respiratory ailments, for example, cystic fibrosis, ciliary motility issue , rhinitis, and asthma

The management of nasal polyposis has been a topic of debate for many decades. Most authors agree on the fact that management of nasal polyposis should primarily be based on a

medical therapy and has to resort to surgery only in refractory cases . Treatment with oral or topical steroids has been shown to relieve symptoms, reduce polyp size, and reduce recurrence rates after surgery.

Keywords*: Nasal polyposis, ciliary motility issue, rhinitis*

Introduction

Nasal polyposis is by all accounts a minor infection because of simple determination by endoscopy .But patient will encounter nasal polyposis to be a disagreeable sickness in view of its the effect on patients' consistently action, work profitability, and generally Quality of Life (QoL), To precisely evaluate the weight of malady, different ailment explicit QoL surveys were planned over the previous years. These polls center around symptomatology and how they influence patients' general QoL[1].

Visual simple scale (VAS) is a psychometric estimation instrument generally utilized in the Rhinology field and measure seriousness of side effects. It speaks to a flat line of 10 cm with word grapples at each end speaking to the extraordinary emotions. Patients are told to demonstrate the point on hold that best relates to their status for the specific trademark being assessed. Notwithstanding its high affectability, unwavering quality and reproducibility, VAS is easy to use by patients and it doesn't require preparing, making VAS an exceptionally important device for ordinary clinical practice, yet in addition for genuine investigations .(1-2)

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Aim

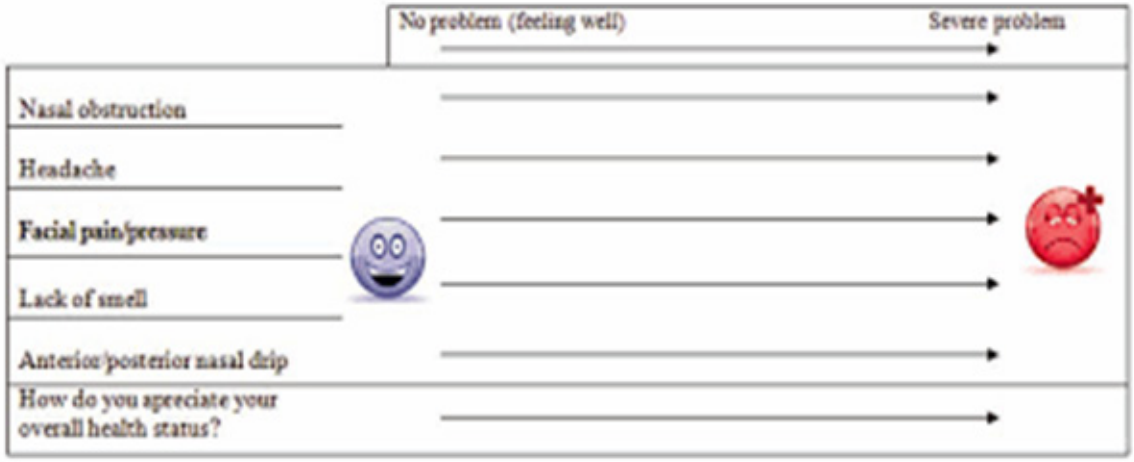
To evaluate the Quality of Life (QoL) outcome after steroid therapy using Visual Analogue Scale

Materials and Method

The present prospective study to assess the impact of nasal polyposis on Quality of Life(QoL) was conducted in the department of Otorhinolaryngology of Sree Balaji Medical College and Hospital , Chennai.The study period was from February 2017 to September 2018 .(4-6)

The study population was the 50 patients who presented to outpatient room of department of otorhinolaryngology with complaints of nasal obstruction , nasal discharge , headache , anosmia , allergic symptoms. Study group included patients aged between 18-60 . To avoid the influence on therapeutic effectiveness, the patients with bronchial asthma and aspirin sensitivity were excluded. All the patients were evaluated and diagnosis confirmed by Diagnostic Nasal Endoscopy and Computed Tomography(7,8)

All the patients under study population were given oral corticosteroid (deflacortisone) at a daily dosage of 18mg (6 mg tds) for 3 weeks and intranasal steroid spray (fluticasone propionate) at a daily dosage of 160 mcg(80 mcg bd) in each nasal cavity for 8 weeks . All patients were assessed and symptomatology was documented according to Visual Analogue Scale (VAS) before and after steroid therapy.[10,11]



Data were documented using IBM SPSS version 22 was used for statistical analysis. P value < 0.05 was considered statistically significant.[4-7]

Findings

In the present study 50 patients were evaluated and data documented. Protocol for medical management were followed for all patients. Diagnostic Nasal Endoscopic findings were documented before and after medical therapy

Post treatment was considered as essential result variable. Pre treatment was considered as essential illustrative variable.[6,7]

Downright results were thought about between study gatherings utilizing Mcnemar Chi square. P esteem < 0.05 was considered measurably huge. IBM SPSS adaptation 22 was utilized for factual analysis.IBM SPSS rendition 22 was utilized for measurable examination.

- Pre-treatment observations

Table 1: Descriptive analysis of pre-treatment symptoms in study population (N=50)

Parameter	Mean ± SD	Median	Min	Max	95% C.I	
					Lower	Upper
Nasal obstruction	6.72 ± 0.83	7.00	5.00	8.00	6.48	6.96
Hyposmia	5.86 ± 0.99	5.50	5.00	8.00	5.58	6.14
Nasal discharge	6.22 ± 0.86	6.00	5.00	8.00	5.97	6.47
Sneezing	6.06 ± 0.84	6.00	5.00	8.00	5.82	6.30
Facial pain or headache	5.54 ± 0.81	5.00	5.00	8.00	5.31	5.77
Total VAS	30.4 ± 2.84	30.50	25.00	39.00	29.59	31.21

The mean nasal observation was 6.72 ± 0.83 in the study population. Range between was 5 to 8 (95% CI 6.48 to 6.96). The mean hyposmia was 5.86 ± 0.99 in the study population. Range between was 5 to 8 (95% CI 5.58 to 6.14). The mean nasal discharge was 6.22 ± 0.86 in the study population. Range between was 5 to 8 (95% CI 5.97 to 6.47). The mean sneezing was 6.06 ± 0.84 in the study population. Range between was 5 to 8 (95% CI 5.82 to 6.30). The mean facial pain or headache was 5.54 ± 0.81 in the study population. Range between was 5 to 8 (95% CI 5.31 to 5.77). The mean total VAS was 30.4 ± 2.84 in the study population. Range between was 25 to 39 (95% CI 29.59 to 31.21). [14,15]

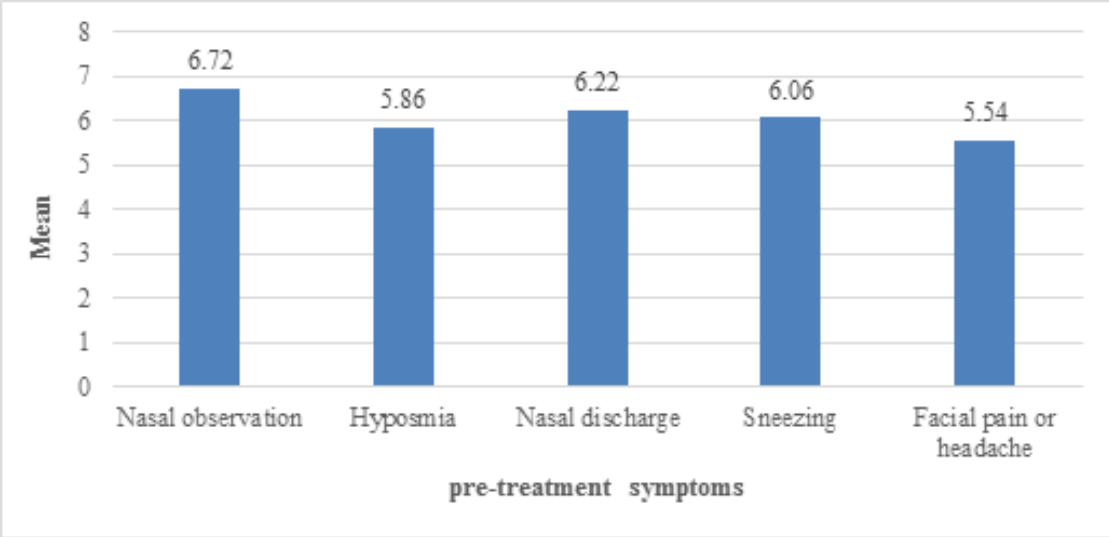


Chart 1: Bar chart of descriptive analysis of pre-treatment symptoms in study population (N=50)

- Post – treatment obervations

Table 2: Descriptive analysis of post treatment symptoms in study population (N=50)

Post treatment symptoms	Mean ± SD	Median	Min	Max	95% C.I	
					Lower	Upper
Nasal obstruction	1.82 ± 1.17	2.00	0.00	4.00	1.49	2.15
Hyposmia	1.42 ± 0.73	1.00	0.00	3.00	1.21	1.63
Nasal discharge	1.24 ± 0.63	1.00	0.00	3.00	1.06	1.42
Sneezing	2.1 ± 0.54	2.00	1.00	3.00	1.95	2.25
Facial or headache	1.1 ± 0.3	1.00	1.00	2.00	1.01	1.19
Total VAS	7.68 ± 2.62	7.50	2.00	14.00	6.93	8.43

The mean nasal observation was 1.82 ± 1.17in the study population. Range between was 0 to 4 (95% CI 1.49 to 2.15). The mean hyposmia was 1.42 ± 0.73in the study population. Range between was 0 to 3 (95% CI 1.21 to 1.63). The mean nasal discharge was 1.24 ± 0.63in the study population. Range between was 0 to 3 (95% CI 1.06 to 1.42). The mean sneezing was 2.1 ± 0.54in the study population. Range between was 1 to 3 (95% CI 1.95 to 2.25). The mean facial pain or headache was 1.1 ± 0.3in the study population. Range between was 1 to 2 (95% CI 1.01 to 1.19). The mean total VAS was 7.68 ± 2.62in the study population. Range between was 2 to 14 (95% CI 6.93 to 8.43).

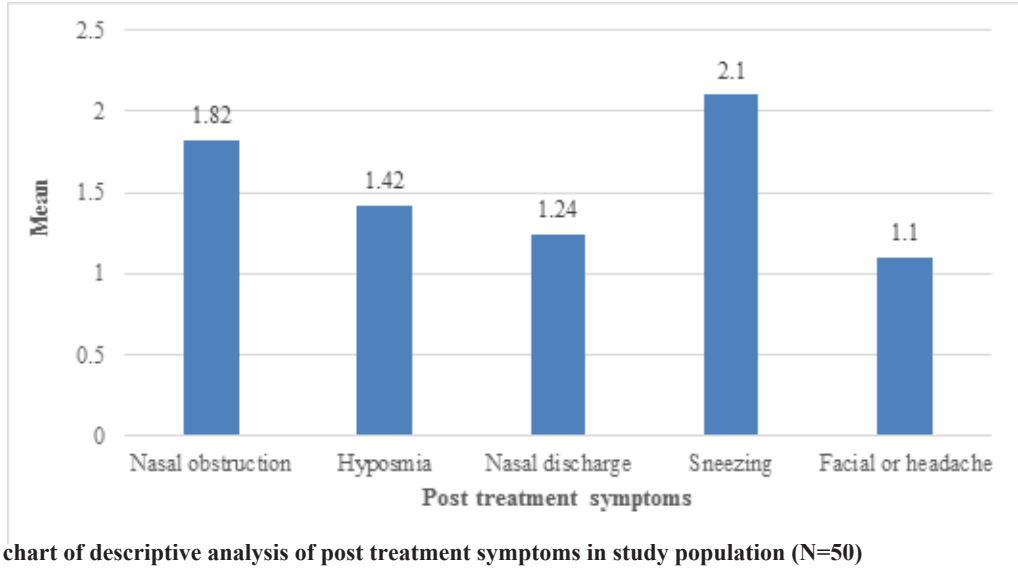


Chart 2: Bar chart of descriptive analysis of post treatment symptoms in study population (N=50)

- Comparison of results

Table 3: Comparison of pre and post treatment symptoms (N=50)

Symptoms	Pre treatment	Post treatment	Wilcoxon signed test P value
Nasal obstruction (Median (IQR))	7(6 to 7)	2 (1 to 3)	<0.001
Hyposmia (Median (IQR))	5 (5.50 to 7)	1 (1 to 2)	<0.001
Nasal discharge(Median (IQR))	6 (6 to 7)	1 (1 to 2)	<0.001
Sneezing (Median (IQR))	6 (5to 7)	2 (2 to 2)	<0.001
Facial pain (Median (IQR))	5 (5to 6)	1 (1 to 1)	<0.001
Total score VAS (Median (IQR))	30.50(28 to 32)	7.50 (6 to 10)	<0.001

Among the study population, the median nasal obstruction was 7(IQR 6 to 7) of pre-treatment and 2 (IQR 1 to 3)of post treatment. The difference in between pre and post treatment nasal obstruction was statistically significant (p value<0.001).Among the study population, the median hyposmia was 5 (IQR 5.50 to 7) of pre-treatment and 1 (IQR 1 to 2)of post treatment. The difference in between pre and post treatment hyposmia was statistically significant (p value<0.001).Among the study population, the median nasal discharge was 6 (IQR 6 to 7) of pre-treatment and 1 (IQR 1 to 2) ofpost treatment. The difference in betweenpre and post treatment nasal discharge was statistically significant (p value<0.001).Among the study population, the median sneezing was 6 (IQR 5to 7) of pre-treatment and 2 (IQR 2 to 2)of post treatment. The difference in between pre and post treatment sneezing was statistically significant (p value<0.001).Among the study population, the median facial pain was 5 (IQR 5to 6) of pre-treatment and 1 (IQR 1 to 1)of post treatment. The difference in between pre and post treatment facial pain was statistically significant (p value<0.001).Among the study population, the median total score was 30.50 (IQR 28 to 32) of pre-treatment and 7.50 (IQR 6 to 10)ofpost treatment. The difference in between pre and post treatment total score was statistically significant (p value<0.001).

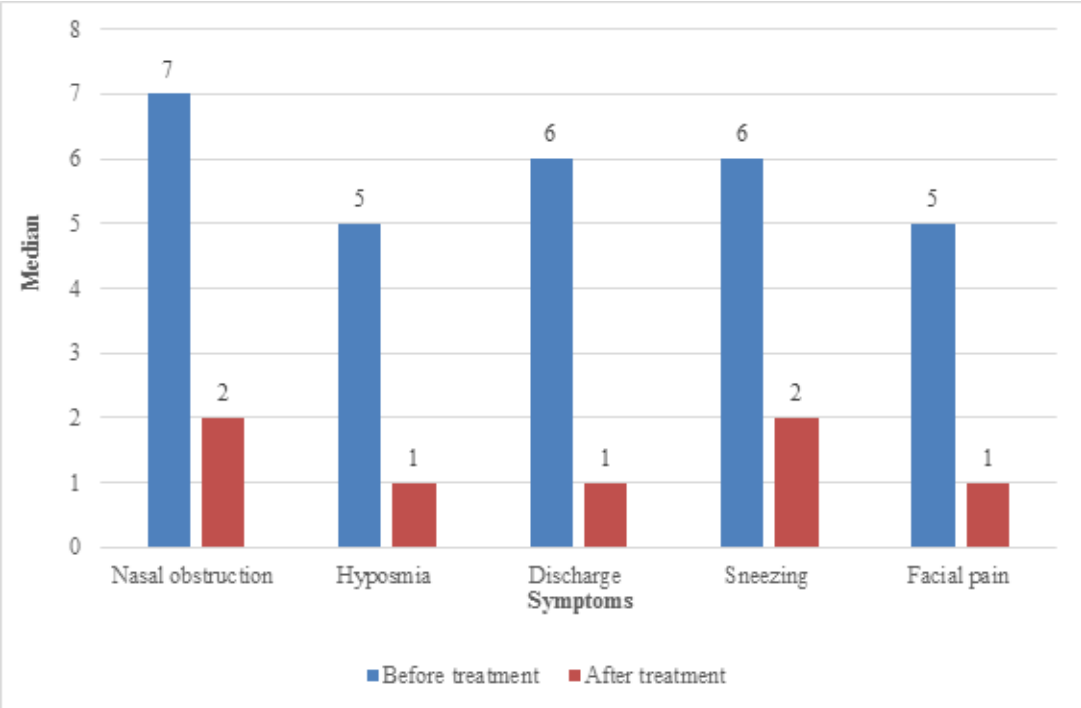


Chart 3: Bar chart of comparison of pre and post treatment symptoms (N=50)

Discussion

The evaluation of nasal polyposis is presently a lack of valid specific instruments to measure QOL. This study has been developed to highlight the effects of treatment of NP on QOL. Our study includes 50 patients aged between 18-60 years .All patients with nasal polyposis grade 1 or 2 according to the Lund and Kennedy grading were treated with the same regime for 8 weeks .

Radenne et al. exhibited that intranasal steroids improved the indications and the QoL in patients with NP especially in body torment, general prosperity, hugeness, social working, and mental health spaces. Van Camp and Clement showed an unquestionable improvement in nasal symptoms especially for nasal hindrance and loss of the sentiment of smell. In the latest decade, intranasal steroids have gotten affirmation as an elective treatment of restorative method for NP. Holmberg et al. shown that intranasal fluticasone or beclomethasone are persuading in lessening nasal signs when wandered from fake treatment. Joined oral and intranasal steroids seem, by all accounts, to be incredible to treat NP by improving the sentiment of smell, nasal obstacle, and other nasal symptoms .Jankowski and Bodino showed that nasal square was an important protesting of NP patients and the suffering cure of olfactory brokenness can be practiced through the blend of nasalization and low part of nasal steroids

Conclusion

The supportive practicality was overviewed dependent on the modification of the most constantly experienced clinical symptoms in nasal polyposis .In the present assessment results relied upon visual straightforward scale and three reactions of nasal polyposis rise above over all the others; the nasal snag , nasal discharge , sneezing records were separately recorded as 7.00 , 6.00 , 6.00 repectively. The other clinical issue (i.e., front and back rhinorrhea, and facial anguish) were generously less nonstop or possibly less discomforting. With steroid treatment nasal block , nasal discharge , wheezing records were diminished to .00 , 1.00, 2.00 separately. The total VAS score lessened from 30.5 to 7.50 which makes the p regard under .001. This quantifiable data examination shows the improvement in Quality of Life of patients with nasal polyposis on steroid treatment.

All things considered, these results suggest that NP significantly influences QoL, the treatment with a short-course of oral steroids exceptionally improve the QoL of patients with nasal

Post treatment was considered as essential result variable. Pre treatment was considered as essential illustrative variable.

All out results were thought about between study gatherings utilizing Mcnemar Chi square. P esteem < 0.05 was considered measurably noteworthy. IBM SPSS rendition 22 was utilized for factual analysis.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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The Role of Computed Tomography in Evaluation of Nasal Polyposis

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Abstract

Plain film radiography was once the imaging modality of choice for assessment of sinonasal cavity. But they are of no value in the diagnosis of nasal polyps although they may confirm opacification of the sinuses. However, these standard views provide only limited display of Plain radiographs have now been replaced by CT (Computed Tomography) for the evaluation of sinonasal pathology. CT provides excellent bone detail and accurate soft tissue details. CT is used routinely to evaluate thee extent of the inflammatory disease and to assess important anatomical landmarks like anterior ethmoid cells, middle turbinate, osteomeatal complex, upper two thirds of nasal cavity and frontal recess area which plays key roles in the pathogenesis of sinonasal polyps. CT is universally accepted as the gold standard investigation for anatomical evaluation of paranasal sinus disease.

Keywords: *ethmoid cells, osteomeatal complex, opacification*

Introduction

The nose and paranasal sinuses are vital structures which are affected by a number of inflammatory as well as benign or malignant neoplastic conditions[7]. Millions of people suffer from inflammatory disease of paranasal sinus in India and all over the world. Sinonasal polyps are lesions that arise from the mucosa of the nasal cavity or the paranasal sinuses. The prevalence of Nasal Polypois(NP) in general population is measured to be around 4 % with a preponderance among males and patients older than 20. [4-5]

Etiology of NP is indefinite. Most theories consider polyps as an outcome of chronic inflammation and therefore conditions leading to chronic inflammation in the sinonasal mucosa can lead to nasal polyps.[8] Anatomical factors also plays a vital role in the etiology of NP as nasal polyps are mainly situated in the middle meatus and they arise from the mucous membrane at the outlets from the paranasal sinuses. Due to unknown etiology, treatment options vary and no one treatment has been found to be universally acceptable. Common medical conditions associated with polyps are non-allergic asthma, aspirin intolerance and cystic fibrosis, ciliary motility disorders.[1-3]

Their main presenting symptom is nasal obstruction, watery rhinorrhea, mucopurulent postnasal drip,. Hyposmia and anosmia, head ache or facial pain. Diagnosis of NP is made by rhinoscopy: anterior and posterior. The diagnosis is often simpler if a probe is used for gentle palpation as polyps are insensitive [Probe test]. [6-8]

Radiologic evaluation has been relied upon in the diagnosis of paranasal sinus pathology for many years. Plain radiographs of the paranasal sinuses.

Aim

This study aimed to show the importance of CT scan in evaluation of extent of disease in patients with sinonasal polyposis and its changes with medical management.

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Materials and Method

The present prospective study was conducted in the department of Otorhinolaryngology of Sree Balaji Medical College and Hospital , Chennai.The study period was from February 2017 to September 2018 .

The study population was the 50 patients who presented to outpatient room of department of otorhinolaryngology with complaints of nasal obstruction , nasal discharge , headache , anosmia , allergic symptoms. Study group included patients aged between 18-60 . To avoid the influence on therapeutic effectiveness, the patients with bronchial asthma and aspirin sensitivity were excluded. All the patients were evaluated and diagnosis confirmed by Diagnostic Nasal Endoscopy and Computed Tomography. All scans were done using 3 mm thickness coronal planes. An assessment was then carried out to evaluate the anatomical variations and extent of disease in the CT scan of paranasal sinuses. CT scans were evaluated according to Lund–Mackay scoring system[13].

All the patients under study population were given oral corticosteroid (deflacortisone) at a daily dosage of 18mg (6 mg tds) for 3 weeks and intranasal steroid spray (fluticasone propionate) at a daily dosage of 160 mcg(80 mcg bd) in each nasal cavity for 8 weeks.[12]

Computed Tomography of paranasal sinuses were repeated at the completion of medical treatment. Again all scans were done using 3 mm coronal sections and were evaluated using Lund and Mackay scoring system [10] .

Data were documented using IBM SPSS version 22 was used for statistical analysis. P value < 0.05 was considered statistically significant.[10]

Findings

In the present study 50 patients were evaluated and data documented. Protocol for medical management were followed for all patients. CT paranasal sinus were taken for all patients before and after medical therapy and evaluated according to Lund and Macka scoring system and data were documented.

Post treatment was considered as primary outcome variable. Pre treatment was considered as primary explanatory variable.

Categorical outcomes were compared between study groups using Mcnemar Chi square. P value < 0.05 was considered statistically significant. IBM SPSS version 22 was used for statistical analysis.IBM SPSS version 22 was used for statistical analysis.

Table1: Pre-treatment Status of CT scan finding according to Lund MacKay staging

Sinus	Grade 0	Grade 1	Grade 2
Anterior ethmoid	0 (0%)	6 (12%)	44 (88%)
Posterior ethmoid	3 (6%)	20 (40%)	27 (54%)
Maxillary	9 (18%)	25 (50%)	16 (32%)
Sphenoid	20 (40%)	24 (48%)	6 (12%)

Among the people with anterior ethmoid sinus, 6 (12%) participants had grade 1 and 44 (88%) participants had grade 2. Among the people with posterior ethmoid sinus, 3 (6%) participants had grade 0, 20 (40%) participants had grade 1 and 27 (54%) participants had grade 2. Among the people with maxillary sinus, 9 (18%) participants had grade 0, 25 (50%) participants had grade 1 and 16 (32%) participants had grade 2. Among the people with sphenoid sinus, 20 (40%) participants had grade 0, 25 (50%) participants had grade 1 and 6 (12%) participants had grade 2.[4,6]

Table 2 : Post-treatment Status of CT scan finding according to Lund MacKay staging

Sinus	Grade 0	Grade 1	Grade 2
Anterior ethmoid	9 (18%)	26 (52%)	15 (30%)
Posterior ethmoid	12 (24%)	25 (50%)	13 (26%)
Maxillary	23 (46%)	17 (34%)	10 (20%)
Sphenoid	33 (66%)	13 (26%)	4 (8%)

Among the people with anterior ethmoid sinus, 9 (18%) participants had grade 1, 26 (52%) participants had grade 1 and 15 (30%) participants had grade 2. Among the people with posterior ethmoid sinus, 12 (24%) participants had grade 0, 25 (50%) participants had grade 1 and 13 (26%) participants had grade 2. Among the people with maxillary sinus, 23 (46%) participants

had grade 0, 17 (34%) participants had grade 1 and 10 (20%) participants had grade 2. Among the people with sphenoid sinus, 33 (66%) participants had grade 0, 13 (60%) participants hade grade 1 and 4 (8%) participants had grade 2.[4-6]

Table 3 : Comparison of CT scan status of anterior ethmoid grade pre and post treatment(N=50)[2,5]

Pre-treatmentanterior ethmoid grade	Post treatment ANT ethmoid grade		
	Grade0	Grade1	Grade
Grade1(6)	6 (100%)	0 (0%)	0 (0%)
Grade2(44)	3 (6.8%)	26 (59.1%)	15 (34.1%)

**No statistical test was applied- due to 0 subjects in the cells.*

Out of 6 patients with Grade 1 polyp , all 6 patients became grade 0 with treatment. While out of 44 patients with grade 2 polyp , 26 and 3 patients became grade 1 and grade 0 respectively and 5 patients remained grade 2.[1,3]

Table 4: Comparison of CT scan status of posterior ethmoid grade pre and post treatment(N=50)

Pre-treatment-posterior ethmoid grade	Post treatment Post ethmoid grade			McNemar P-value
	Grade 0	Grade 1	Grade 2	
Grade0(3)	3 (100%)	0 (0%)	0 (0%)	<0.001
Grade1(20)	9 (45%)	11 (55%)	0 (0%)	
Grade2(27)	0 (0%)	14 (51.9%)	13 (48.1%)	

**No statistical test was applied- due to 0 subjects in the cells.*

All 3 patients with grade 0 remained the same.Out of 20 patients with Grade 1 polyp , 9 patients became grade 0 and 11 patients remained as grade 1 with treatment. While out of 27 patients with grade 2 polyp , 14 patients became grade 1 and 13 patients remained grade 2

Table 5: Comparison of CT scan status of OMC pre and post treatment(N=50)

Pre-treatment OMC grade	Post treatment OMC grade		McNemar P-value
	Grade 0	Grade 2	
Grade0(16)	16 (100%)	0 (0%)	0.001
Grade2(34)	12 (35.3%)	22 (64.7%)	

**No statistical test was applied- due to 0 subjects in the cells.*

All 16 patients with grade 0 remained the same. While out of 34 patients with grade 2 polyp , 12 patients became grade 0 and 22 patients remained grade 2

Table 6: Comparison of CT scan status of maxillary sinus pre and post treatment(N=50)

Pre-treatment-maxillary grade	Post treatment maxillary grade			McNemar P-value
	Grade 0	Grade 1	Grade 2	
Grade0(9)	9 (100%)	0 (0%)	0 (0%)	<0.001
Grade1(25)	14 (56%)	11 (44%)	0 (0%)	
Grade2(16)	0 (0%)	6 (37.5%)	10 (62.5%)	

**No statistical test was applied- due to 0 subjects in the cells.*

All 9 patients with grade 0 remained the same.Out of 25 patients with Grade 1 polyp , 14 patients became grade 0 and 11 patients remained as grade 1 with treatment. While out of 16 patients with grade 2 polyp , 6 patients became grade 1 and 10 patients remained grade 2

*No statistical test was applied- due to 0 subjects in the cells.

All 20 patients with grade 0 remained the same. Out of 24 patients with Grade 1 polyp , 14 patients

became grade 0 and 10 patients remained as grade 1 with treatment. While out of 6 patients with grade 2 polyp , 2 patients became grade 1 and 4 patients remained grade 2

Discussion

Nasal polyps has a notable impact on the quality of life. Nasal polyps typically present in adults with slight male preponderance and more common among fourth decade age group.

The normal functioning of the nasal and sinus mucosa depend primarily on the ventilation and drainage. Anatomical factors plays a vital role in initiation of this inflammatory cascade of the sinonasal pathway and thus ultimately resulting in obstruction of the sinonasal pathway

According to Mackay and Lund, the ostiomeatal complex acts a drainage pathway for maxillary, anterior ethmoids and frontal sinuses. Any obstruction thus increases the propensity of impairment of mucociliary clearance. Secretions may then be retained at the site, creating the potential for infection even without ostial closure.

Most common sinus involved was anterior ethmoid followed by, maxillary sinus , posterior ethmoid, frontal and sphenoid sinuses. Present study correlates well with studies done by Suthar et al., \ Chaitanya CS et al., Kushwah APS et al., In all the studies sphenoid was least involved, which is also observed in the present study.. Among the study population most commonly involved sinus was anterior ethmoid (88%) followed by posterior ethmoid (54%)

With respect to anterior ethmoid sinus ,out of 6 patients with Grade 1 polyp , all 6 patients became grade 0 with treatment. While out of 44 patients with grade 2 polyp , 26 and 3 patients became grade 1 and grade 0 respectively and 5 patients remained grade 2. These observations were purely based on assessment of extent of disease in computed tomography.A value less than 0.001 shows the significant improvement of disease with medical management.

With respect to posterior ethmoid sinus ,All 3 patients with grade 0 remained the same.Out of 20 patients with Grade 1 polyp , 9 patients became grade 0 and 11 patients remained as grade 1 with treatment. While out of 27 patients with grade 2 polyp , 14 patients became grade 1 and 13 patients remained grade 2. These observations were purely based on assessment of extent of disease in computed tomography.A value less than 0.001 shows the significant improvement of disease with medical management.

With respect to osteomeatal complex ,All 16 patients with grade 0 remained the same. While out of 34 patients with grade 2 polyp , 12 patients became grade 0 and 22 patients remained grade 2. These observations were purely based on assessment of extent of disease in computed tomography. A value less than 0.001 shows the significant improvement of disease with medical management.

With respect to maxillary sinus, All 9 patients with grade 0 remained the same. Out of 25 patients with Grade 1 polyp , 14 patients became grade 0 and 11 patients remained as grade 1 with treatment. While out of 16 patients with grade 2 polyp , 6 patients became grade 1 and 10 patients remained grade 2. These observations were purely based on assessment of extent of disease in computed tomography. A value less than 0.001 shows the significant improvement of disease with medical management.

With respect to sphenoid sinus, all 20 patients with grade 0 remained the same.Out of 24 patients with Grade 1 polyp , 14 patients became grade 0 and 10 patients remained as grade 1 with treatment. While out of 6 patients with grade 2 polyp , 2 patients became grade 1 and 4 patients remained grade 2. These observations were purely based on assessment of extent of disease in computed tomography. A value less than 0.001 shows the significant improvement of disease with medical management.

So to conclude Computed Tomography not only helps in diagnosis , but also aids to assess the progress of disease during treatment. From our study it was concluded that anterior ethmoid sinus were the most common paranasal sinus involved followed by posterior ethmoid and maxillary sinuses. Sphenoid sinus were the least involved sinus. Anterior ethmoids and posterior ethmoids showed better response with medical management comparing to the results observed at OMC , maxillary sinus , sphenoid sinus in post treatment CT PNS. Thus computed Tomography helps to assess the treatment response also.[11-13]

Conclusion

To conclude CT of the nose and paranasal sinuses

is still the ideal imaging method to investigate nasal and paranasal sinus diseases with a high sensitivity signifying the importance of radiological assessment in all cases of nasal polyposis. It not only helps in diagnosis , but also to assess the progress of disease during treatment. From our study it was concluded that anterior ethmoid sinus were the most common paranasal sinus involved followed by posterior ethmoid and maxillary sinuses. Sphenoid sinus were the least involved sinus. Anterior ethmoids and posterior ethmoids showed better response with medical management comparing to the results observed at OMC , maxillary sinus , sphenoid sinus in post treatment CT PNS. Thus computed Tomography helps to assess the treatment response also. Radiology proves to be indispensable in cases of nasal polyps as it provide a road map to the endoscopic surgeon and warns one of any existing or impending complications.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Comparison between Conventional Gastric Adenocarcinoma and EBV Assocated Gastric Carcinoma

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Abstract

Epstein Barr Virus (EBV or Human herpesvirus 4) belongs to the genus Lymphocryptoviridae, the gamma 1 subtype of the Subfamily Gamma herpes viridae and is one of the most common viruses in humans. It is present in all populations, infecting more than 95% of all individuals within the first four decades of life.In developing countries,infections occur very early in life with no specific characteristics other than the general symptoms of acute viremia. In developed countries however, the infection is usually delayed until adolescence or early childhood years where it causes infectious mononucleosis, a benign self-limiting lymphoproliferative disorder [1].Though the infection with EBV is benign in the acute stages and latent in the chronic phase in the vast majority of people,the virus has been demonstrated to be involved in the development of many malignancies with the list of such malignancies progressively increasing. The first association was with the endemic Burkitt's lymphoma[1]. Subsequently, other lymphomas(subtypes of Hodgkin's and non-hodgkin's lymphomas)are also known to be associated with EBV infection. Epithelial malignancies such as lymphoepitheliomas of nasopharynx and stomach are included in the list of EBV associated tumors. Tumors arise as a result of genetic and epigenetic alterations produced by the virus, which transforms the normal cell into an immortalized proliferating cell [2].Since Burke et al first detected EBV in undifferentiated lymphoepithelioma like gastric cancer in 1990,many researches are undertaken to prove the same [3].EBV expresses latent membrane protein which can be detected immune histochemically. Our study is aimed at detecting the EBV expression in gastric carcinoma cells.

Keywords: *lymphoepitheliomas, EBV, Lymphocryptoviridae, acute viremia*

Introduction

Epstein Barr virus(EBV),also called Human Herpes Virus 4 (HHV-4), is a member of the Herpesviridae family.It is ubiquitous in nature and infects more than 90% of adult population worldwide.Primary infection normally occurs in childhood or early adulthood through salivary contact.Majority of children are asymptomatic,but some adolescents and young adults can develop infectious mononucleosis with harmless clinical manifestations[4]. EBV is composed of a linear double-stranded DNA genome surrounded by an icosahedral nucleocapsid which encodes about 85 genes.

EBV is divided into 2 major types,EBV-1/EBV-A and EBV-2/EBV-B.Worldwide EBV-1/EBV-A is the most frequent type while EBV-2/EBV-B is more characteristic in Africa .

Gastric Carcinoma:

Epidemiology:

Gastric cancer (GC) is the sixth most common malignancy in both sexes worldwide with nearly one million new cases estimated in 2012 (952.000 cases). The incidence rates are twice higher in males than in females. Nevertheless, age standardized rates (ASR) show that carcinoma of stomach is the fourth most frequent in men and the sixth in women. Despite a significant reduction of incidence and mortality rates

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over the past few decades, GC still remains the third leading cause of death by cancer. Approximately, 8% of cancer-related mortality in world is attributed to tumors of stomach[2]. It is a major health problem with a distinct distribution according to geographical areas, socio-economic conditions and ethnic diversity. More than 70% of total cases occur in developing regions being the Eastern Asia (half cases in China), Eastern Europe and Latin America the areas with the highest age-standardized incidence rates. In contrast, the lowest incidence rates are observed in United States, Australia and some North European countries

Classification:

Gastric tumors are classified anatomically and histologically. Anatomically, GC is divided into proximal and distal tumors depending on their localization of stomach. Proximal tumors are found in cardia region whereas distal carcinomas are often located in the antrum/ pyloric region. Histologically, tumors of stomach show high heterogeneity at both architectural and cytological level that makes it difficult for the establishment of well-defined classification system. Some classifications have been established to classify the histologic pattern of gastric adenocarcinomas: Ming, Carneiro and Goseki, but the most commonly used are those of World Health Organization (WHO) and Lauren [5].

Lauren's classification is an essential system in gastric cancer history that over time have contributed to describe an association with several environmental factors, incidence trends and etiology. According to this classification, the two major histologic subtypes are intestinal and diffuse adenocarcinomas. The other types are classified to indeterminate type, when carcinoma is too undifferentiated and co-exist histological features, or uncommon variants . The relative frequencies are approximately 54% for intestinal type, 32% for the diffuse type and 15% for the indeterminate type.

Lymphoepithelioma-like carcinomas or medullary carcinomas are described by WHO as an uncommon subtype but are not represented in the Lauren's classification. This specific tumor, which is characterized by uniform proliferation of cancer cells throughout the lymphoid stroma, represents about 4% of all gastric carcinomas and more than approximately 80% of cases have EBV-infected cells .

Material and Method

Source of Data:

This prospective study was carried out inthe Department of Pathology, Sree Balaji Medical College and Hospital, with the help of Department of Medical Gastroenterology, Sree Balaji Medical College and Hospital, duringOctober 2016 to September 2018. A total of 43 cases suspected with gastric malignancy were taken for the study. Out of which, only 30 were proven to be malignant.So, only these 30 cases were included in the study.

Inclusion Criteria:

All cases of gastric malignancy detected by histopathology irrespective of age were included for study.

Exclusion Criteria:

Those with poor clinical data were excluded from thestudy. Proven cases of gastric malignancy due to the non-availability of the blocks(blocks that were taken for treatment purpose and and second opinion)were excluded from the study.

Method of Data Collection:

Out of the 43 cases, 32 cases were proven to be malignant,out of which 30 cases had adequate clinical data were included in the study.Those materials were processed and sections were cut at 5 microns. Hematoxylin and eosin staining of sections wasdone. Histopathological examination of these sections weredone.

LMP-1 immunohistochemical marker was used to demonstrate EBV in tissue sections.

IHC Markers Used

Latent membrane protein-1 (CS1-4 antibody) was used in all the gastric carcinoma cases. Section of nasopharyngeal carcinoma was taken as control for LMP-1. Immunostaining was scored on the basis of positive tumor cells and the relative immunostaining intensity. Five consecutive microscopic fields were analyzed.

Findings

This study was conducted in Sree Balaji medical college, Chennai, India. A total of 30 gastric carcinoma

diagnosed over a period from 2016-2018 was selected. Out of which, 19 patients were male (63%), and 11 patients were female (37%) with a sex ratio of 2:1. The mean age of patients was 58 years (range 29 years to 80 years).

Common Symptoms

Table-1 : Common Symptoms

Common Symptoms	Percentage
Upper abdominal pain (Epigastric pain)	59%
Loss of weight	31%
Nausea and vomiting	5%
Loss of appetite (cachexia)	3%
GI Bleeding (Malena)	2%

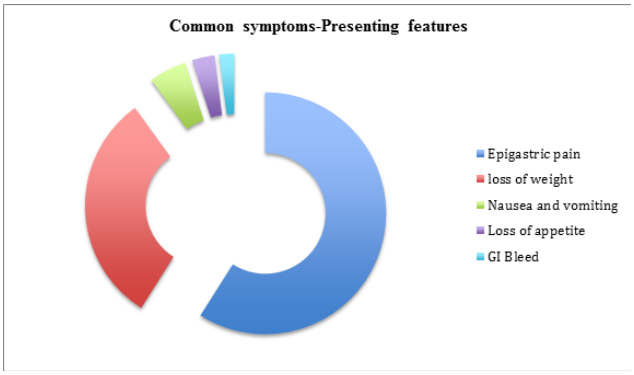


Chart 1: Common Symptoms

Pathological Features Tumour Location

In 18 (60%) cases, the tumor was located in antrum/ pylorus. In 4 (13%) cases the tumor was found in body of the stomach, and in 8 (27%) cases in the fundus/cardia of the stomach.

Table – 2: Tumor Location

Location	No. of cases
Antrum/pylorus	18
Body of the stomach	4
Fundus/cardia of the stomach	8
Total	30

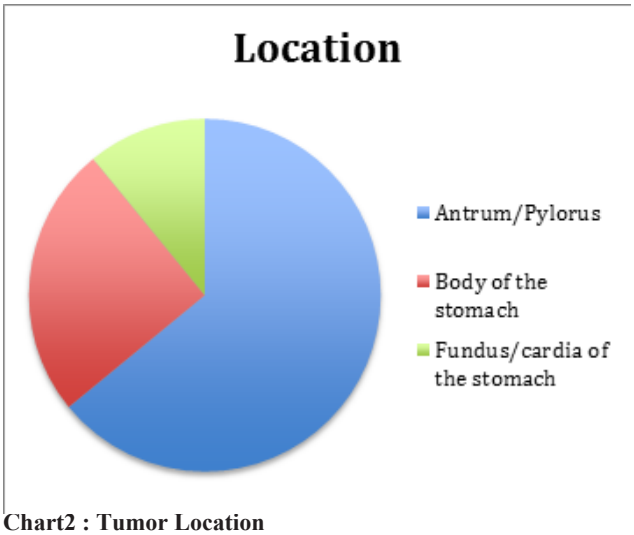


Chart2 : Tumor Location

Tumour Type Who 2012 Classification

According to the WHO classification, of the 30 cases of gastric carcinomas, 17 were classified as tubular adenocarcinoma, 8 cases as poorly cohesive carcinoma, 5 were mixed adenocarcinoma and 1 case was diagnosed to be carcinoma with lymphoid stroma.

Table- 3 : Tumor Type According to who 2010 Classification

Types	No. of cases
Tubular adenocarcinoma	17
Poorly cohesive carcinomas	08
Mixed adenocarcinomas	04
Carcinoma with lymphoid stroma	01
Total	30

According to Lauren Classification

Based on Lauren classification of gastric carcinoma, 23 were intestinal type carcinomas, 4 were diffuse type carcinomas, 2 were indeterminate type and 1 was lymphoepithelioma like carcinoma.

EBV Immunohistochemistry Results

Table 4: EBV Expression In Different Histological

TYPES (Based on WHO 2010 Classification)

HISTOLOGICAL TYPES	EBV EXPRESSION
Tubular adenocarcinoma type	0
Poorly cohesive adenocarcinoma type	**01**
Mixed adenocarcinoma type	0
Carcinoma with lymphoid stroma	**01**
TOTAL	**02**

TABLE-5 : Based on Lauren classification

HISTOLOGICAL TYPE	EBV EXPRESSION
Intestinal type adenocarcinoma	01
Diffuse type adenocarcinoma	0
Indeterminate type adenocarcinoma	0
Lymphoepithelioma like carcinoma	01
TOTAL	02

Out of 30 gastric carcinoma cases, 02 showed EBV expression. Both these patients were male and aged above 65 years.

Latent membrane protein -1 expression in tumor cells , studied using anti LMP-1 antibody immunohistochemistry was assessed using a scoring system based on the percentage of positive cells and the intensity of staining (commonly used in nasopharyngeal carcinomas).

Scoring Method

- 0 - none seen in the section
- 1 - presence of rare positive cells but not exceeding 25%
- 2 -26 to 50% positive cells
- 3 -51 to 75% positive cells
- 4 -76 to 100% positive cells

IMMUNOSTAINING INTENSITY

- 0 -none
- 1 -weak
- 2 -moderate
- 3 -intense

TABLE-6: Details of LMP1 Positive Cases

S.NO.	AGE/SEX	HPE (WHO)	HPE (LAUREN)	SITE	EBV (LMP-1)
1.	80/M	Carcinoma with lymphoid stroma	Lymphoepithelioma like carcinoma	Fundus/Cardia	Positive
2.	77/M	Poorly cohesive adenocarcinoma	Intestinal type carcinoma	Fundus/ Cardia	Positive

TABLE-7 : LMP-1 Immunohistochemistry Scoring

AGE/SEX	TUMOR GRADE	STAINING INTENSITY (A)	PERCENTAGE OF LMP-1 POSITIVE CELLS (B)	TOTAL SCORE (A + B)
80/M	Undifferentiated carcinoma	WEAK TO MODERATE (2)	Positive cells not exceeding 25% (1)	2 + 1 (3)
77/M	Poorly differentiated carcinoma	MODERATE (2)	Positive cells not exceeding 25% (1)	2 + 1 (3)

Both the LMP-1 positive cases in our study were observed to have a score of 3.

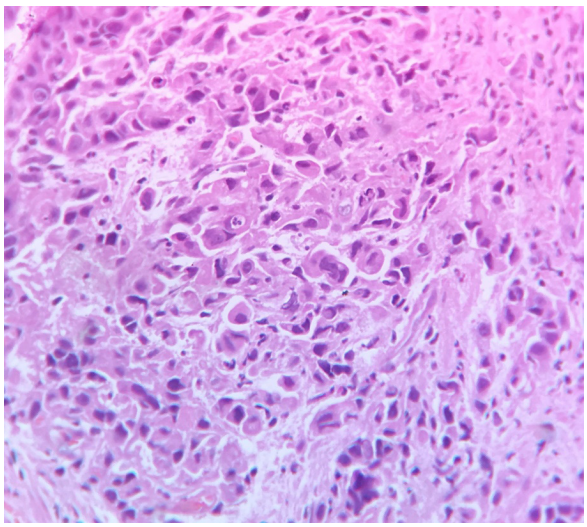


Figure 1 Shows Poorly Cohesive Type Adenocarcinoma

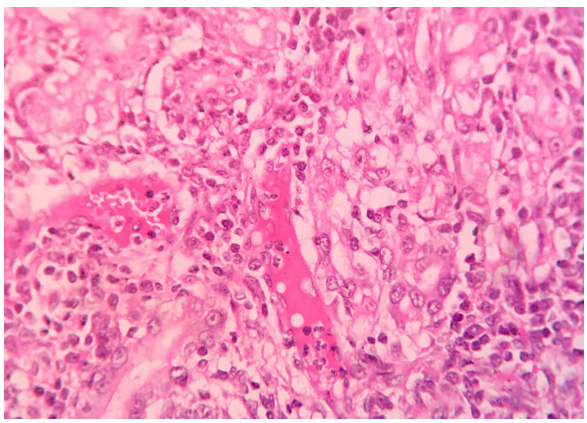


FIGURE 2 SHOWS CARCINOMA WITH LYMPHOID STROMA

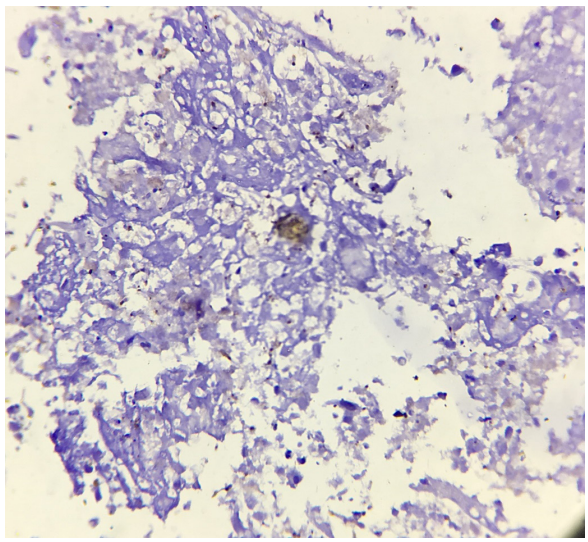


FIGURE 3- LMP 1 IMMUNOSTAINING (MODERATE INTENSITY)

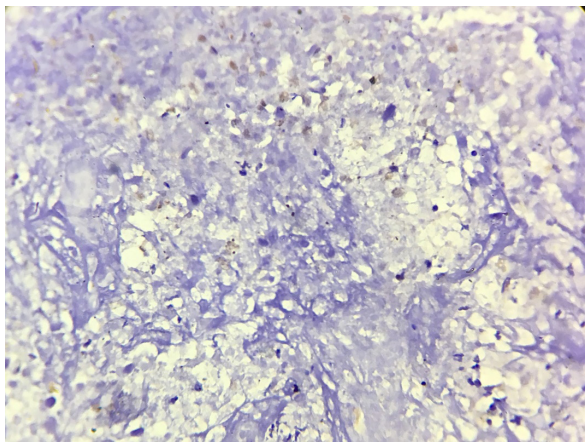


FIGURE 4- LMP 1 IMMUNOSTAINING (WEAKLY POSITIVE)

Discussion

Gastric carcinoma is a serious public health problem worldwide with high rates of mortality. GLOBOCON 2012 statistical data revealed about 951,600 newly diagnosed gastric cancer cases.In 2012 deaths due to gastric carcinoma worldwide was around 720,000 [7].

The symptoms and sign of the stomach cancer are often reported late when the disease is already in advanced stages and 5-year survival is less than 30% in developed countries and around 20% in developing countries.This indicates the need for an early diagnosis and treatment strategies to

improve the survival. The present study assess the age distribution, sex distribution, relationship between EBV and sporadic Indian GC and the role of latent membrane protein -1 in GC detection.

In general, our study showed male predominance accounting 64 % of all GC cases and the mean age was of 58 years old suggesting that gastric cancer appear more often in older individuals. These finding are in agreement with literature which also has described the occurrence of gastric carcinomas in male and older patients .

Most of the patients in this study,presented with upper abdominal pain (62.5%) and loss of weight(30%). Others (7.5%) presented with nausea,vomiting and upper GI bleed.Out of 30 cases, 17 were tubular adenocarcinoma, 8 were poorly differentiated carcinoma, 5 were mixed carcinoma and 1 was carcinoma with lymphoid stroma (according to WHO classification).23 were intestinal type carcinoma, 04 were diffuse type carcinoma, 02 were indeterminate type carcinoma and 1 was lymphoepithelioma like carcinoma (according to Lauren's classification).

Over past the 30 years, there have been described a new subset of gastric cancer, EBVaGC. In fact, about 10% of all GC have been associated with EBV infection however, the role of EBV in gastric carcinogenesis remains unclear . Recently, two studies suggested a new classification based on molecular features of gastric tumors and in these classifications arise a new four subtypes of gastric cancers: tumors positive for Epstein–Barr Virus, microsatellite unstable tumours, genomically stable tumors and tumors with chromosomal instability . To confirm, the association of EBV in a given tumor, the virus must be detected with in the tumor cells.

As per literature LMP-1 potentiates a variety of signaling pathways including the nuclear factor kb, Mitogen activated protein kinase,and phosphotidylinositol 3 –Kinase Alt pathways and involved is angiogenesis which is a key step in tumor growth, invasion and metastasis So the presence of EBV in gastric carcinoma cells can be confirmed by the presence of LMP-1 staining.

Immunohistochemistry was done with latent membrane protein- 1 and it was found that LMP-1 was positive in 2 out of 30 gastric carcinoma cases.This study showed that the prevalence of EBV in gastric tumors is of 6.6%. These findings are in agreement with previous studies. Studies have demonstrated that high EBV-positive rate has been found in low-incidence area and low EBV-positive rate has been found in a high gastric-cancer incidence area. Sousa, et al. (2008) in a systematic review demonstrated that North of America (region with low prevalence in GC) has shown an association between EBV and GC of 12.9%; conversely, in regions with a high risk for GC (Asia), it was demonstrated that EBVaGCs accounted only 7.99% of all gastric cancers.

The same relationship is verified in our study since we observed a low prevalence of EBVaGC (6.6%), a considered country with high incidence of GC. Considering other risk factors for GC development, we found that male predominance is also a strong characteristic of EBVaGC.

Regarding age distribution of patients with EBVaGC, it is yet little understood. In present study EBV-positive cases were observed in patients over than 65 years.Regarding the tumor location, we observed that in our study there was a high predominance of gastric tumors in the distal region (60%). Curiously, this is the anatomic location with lower prevalence of EBV. As previously reported, the presence of EBV has been mostly associated to body, and cardia region of stomach. Hence, our results which also showed a higher prevalence of EBVaGc in proximal regions, may explain the lower prevalence of EBVaGC in our study.

Histology-specific analysis of EBVaGC using Lauren's classification has shown controversial data. Chang et. al. (2001) and Corvalan et. al. (2001) demonstrated a strong EBV association with diffuse types, however Yoshiwara et. al. (2005) described an equal proportion between intestinal and diffuse types. In our study, EBVaGC was only found in intestinal-types

and lymphoepithelioma like carcinoma types without any case reported to diffuse-type.

Regarding the lymphoepithelioma-like carcinomas (LLCs) it was observed that all samples showed positivity for EBV. These findings are in agreement with literature which has described that more than 80% of LLCs are associated with EBV infection. Despite the low frequency of LLCs (about 4% of all gastric carcinomas), the pathologists should distinguish this subset of gastric cancer because it has been demonstrated that patients have a better prognosis when compared with other types of gastric cancer [8].

Available literature on EBV positive gastric carcinomas have not used the scoring system, generally employed in nasopharyngeal carcinomas. However, we attempted to use the scoring system and it was observed, that the scores were low, which is in consistent with the literature studies on nasopharyngeal carcinomas, which have also shown low scores in older age group and high scores in younger age group.

Abdel Majiid Khabir et al observed in his study that no biopsy is completely devoid of LMP-1 positive cells and he also suggested the use of S12 antibody which is more sensitive in staining tissue section than CS1-4 antibody. In this present study we used CS1-4 antibody for detecting the presence of EBV in tissue sections.

Despite the limitations of LMP-1, its simplicity, applicability to paraffin sections and its use as an indicator of progressiveness of the tumor has made it an attractive ancillary method for early diagnosis of EBV associated gastric carcinoma .

Conclusion

Hence our study justifies the role of EBV in the oncogenesis of gastric carcinoma. More elaborate and extensive studies are warranted to further emphasize this theory. Days would not be far off for a targeted therapy and an effective vaccine for EBV that would prevent primary infection or modulate its course leading to the reduction in the incidence of EBV associated gastric carcinoma, similar to the reduction of cervical cancer and hepatoma after HPV vaccine and hepatitis vaccine.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Proximal Femoral Nailing in Unstable Trochanteric Fractures -Demographic Study (Age, Sex and Mode of Injury)

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Abstract

Objectives: The aim of this study is proximal femoral nailing in unstable trochanteric fractures – Demographic study (Age, Sex and mode of injury)

Place of Study: Sree Balaji medical college and hospital, Chrompet, Chennai.

Period of Study: The study began in March 2017 and went on till February 2018 (a total recruitment period of 12 months).

Study Design: Prospective study.

Materials and Method: The present study has been a prospective study, involving patients who had sustained unstable inter-trochanteric fractures. The study began in March 2017 and went on till February 2018 (a total recruitment period of 12 months). The study concluded in September 2018, so that there was a minimum follow-up of 7 months (mean 12.6; range 7 to 19 months).

Inclusion Criteria:

- Only unstable trochanteric fractures were included (AO-OTA 2.2, 2.3, 3.1, 3.2 and 3.3).
- Only fractures seen within 15 days of injury were included.
- Both male and female patients, in the age group of 46 to 65 years were included in the study.

Exclusion Criteria:

- Patients with displaced trochanteric fracture not conforming to the above parameters were excluded.
- Open and pathological fractures were excluded.
- Inability to walk independently, prior to fracture due to pre-existing stroke or CVA were excluded.

Follow Up Period: Minimum period of 7 months (mean 12.6; range 7 to 19 months).

Results and Conclusion: As per our study of 42 patients, approximately 28% of the patients were of the age group of 46 to 50 years, 26% of the patients were between 51 to 55 years, 26% were between 56 to 60 years and 19% were between the age of 61 to 65 years. We had a total of 38.10% (n=16) male and 61.90% (n=26) female patients, with a male to female ratio of 2 : 3.2, thus indicating a female preponderance.

Approximately, 88.10 % of the patients had sustained injury by accidental fall from standing height while, 11.90 % were injured by high energy road traffic accidents.

Keywords: *proximal femoral, trochanteric fractures, female preponderance*

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Introduction

The demographics of world population are changing. More of the elderly people are living in the developing countries. Presently about three-fifths of the hip fracture occur in Asia which, it is predicted that will become almost one-half by the year 2050. Inter-trochanteric fractures are one of the most common fractures of the

hip occurring both in the young adults, as a result of high energy trauma and in the elderly, as a result of low energy trauma due to osteoporosis[1]. Problems of these fractures are: (a) they are associated with substantial morbidity and mortality, (b) mal-union is common, (c) implant failure like cut-out of head and penetration into hip is a complication, (d) it is a great financial burden to the family and, (e) it is most commonly associated with medical co-morbidities like diabetes and hypertension.[1-3]

These fractures are 3 to 4 times more common in the elderly women who are osteoporotic, in whom trivial trauma is by far the most common mode of injury[2,3]. These patients become confined to home and become dependent for their activities of daily living on others. One-half of these fractures that occur in the aged around the hip joint are of the trochanteric type and one-half of these are of the unstable variant.

Non-operative conservative management which was done earlier had resulted in an increased morbidity, as well as complications like mal-union with varus and external rotation deformity resulting in a short limb gait, non-union and a high rate of mortality due to complication of long recumbency and immobilisation which resulted in complications like decubitus ulcers, deep vein thrombosis, urinary tract infections, contracture of the joint, orthostatic pneumonia and renal calculi[2]. The goal of the treatment in inter-trochanteric fractures is the restoration of the patient to his or her pre-injury functional and ambulatory status at the earliest. Various fixation devices have been evolved to treat these fractures by internal fixation, thereby increasing patient comfort, facilitate nursing care, decrease hospital stay and hence to prevent complications of prolonged recumbency. It is a universal dictum to treat inter-trochanteric fractures with stable internal fixation as early as possible.[4-9]

Materials And Method

The present study has been a prospective study, involving patients who had sustained unstable inter-trochanteric fractures. The study began in March 2017 and went on till February 2018 (a total recruitment period of 12 months). The study concluded in September 2018, so that there was a minimum follow-up of 7 months (mean 12.6; range 7 to 19 months). [10-14]

Inclusion Criteria

- Only unstable trochanteric fractures were included (AO-OTA 2.2, 2.3, 3.1, 3.2 and 3.3).
- Only fractures seen within 15 days of injury were included.
- Both male and female patients, in the age group of 46 to 65 years were included in the study.

Exclusion Criteria:

- Patients with displaced trochanteric fracture not conforming to the above parameters were excluded.
- Open and pathological fractures were excluded.
- Inability to walk independently, prior to fracture due to pre-existing stroke or CVA were excluded.[15-19]

Follow Up Period:

Minimum period of 7 months (mean 12.6; range 7 to 19 months).

Findings

Table 1: Time elapsed between injury and surgery:

Time Interval (In Days)	No. of Patients 'N'	% Age
0 – 2	6	14.28
3 – 5	7	16.66
6 – 8	5	11.90
9 – 12	12	28.58
13 – 15	12	28.58
Total	**42**	**100**

Table 2: Fracture Pattern Distrbution:

AO CLASSIFICATION	No. of Patients 'n'	%age
Type A2.2	7	16.66
Type A2.3	14	33.33
Type A3.1	16	38.01
Type A3.2	-	-
Type A3.3	5	12.00
TOTAL	42	100

Table 3: Types of PFN Used:

PROXIMAL FEMORAL NAIL CHARACTERISTICS	**No. of patients 'n'**	**% age**
Long PFN 135 degree	9	21.42
Short PFN 135 degree	24	57.16
Short PFN 130 degree	9	21.42
TOTAL	**42**	**100**

Table 4: Intra-Operating Time: (Incision to Closure).

Operating Time (In Min)	**No. of Patients 'N'**	**%Age**
< 45	16	33.33
45 – 60	7	16.66
61 – 75	9	21.42
76 – 90	10	23.80
Total	42	100

As per our inclusion criteria, 42 patients were recruited for surgical fixation of unstable trochanteric fractures. Of these 42 patients, approximately 28% of the patients were of the age group of 46 to 50 years, 26% of the patients were between 51 to 55 years, 26% were between 56 to 60 years and 19% were between the age of 61 to 65 years. We had a total of 38.10% (n=16) male and 61.90% (n=26) female patients, with a male to female ratio of 2 : 3.2, thus indicating a female preponderance. [18]

Approximately, 88.10 % of the patients had sustained injury by accidental fall from standing height while, 11.90 % were injured by high energy road traffic accidents. The average time interval between the injury and surgery was 8.7 days (range of 0-15days). Among the 42 cases treated surgically, 49.99 % were of A2 type and 50.01 % were of the A3 type. Thus in our series, the fracture pattern distribution was found to be equal. The average operating time was 58 minutes (range 45 to 90 minutes). The type of implant used was a short PFN 135 degree in 57.16% (n=24). In 21.42% (n=9) the long PFN and the short PFN 130 degree was used).

Discussion

The fruitful treatment of between trochanteric cracks relies upon numerous variables ; the age of the patient, the patient's general wellbeing, the time passed from injury to treatment, simultaneous medicinal treatment and the security of obsession. The proper technique and the perfect embed utilized for these breaks are still bantered with defenders of the different methodologies and each asserting their points of interest over others. Numerous interior obsession gadgets have been suggested for the treatment of these cracks, including extra-medullary and intra-medullary inserts. [16]

The dynamic hip screw has remained the embed of decision for more than four decades due to its good outcomes and a moderately low pace of non-association and disappointment. It accommodates controlled pressure at the crack site. The utilization of DHS had been upheld by their profile mechanical properties which had been ventured to improve the mending of breaks. Notwithstanding, the DHS requires a moderately bigger introduction, more tissue dealing with and close to anatomical decrease, all of which builds the horribleness, the likelihood of a disease and a noteworthy blood misfortune. The probability of varus breakdown and the failure of the embed to get by until crack association were its fundamental disadvantages. The side-plate and screws weaken the bone mechanically. The common causes of this fixation failure were unstable trochanteric fractures, osteoporosis, a lack of anatomical reduction, failure of the fixation device and incorrect placement of the lag screw in the femoral head.

The PFN system, developed by AO/ASIF, has some major bio-mechanical innovations to overcome the previously mentioned limitations of the Gamma nail.

Addition of the 6.5 mm anti-rotation hip screw has helped to reduce the incidence of implant cut-out and the rotation of the cervico- cephalic fragment. In this respect, it should be borne in mind that the lag screw must be adjusted to the calcar, taking into account the need to place the de-rotational hip screw. The smaller diameter and the fluting of the tip of the nail, is especially designed in-order to reduce stress forces below the implant and thereby reducing the incidence of low-energy fracture at the tip. The PFN nail has been shown to prevent the fractures of the femoral shaft by having a smaller distal shaft diameter which reduces stress concentration at the tip. Intramedullary implants for internal fixation of the proximal femur withstands a higher static and a several-fold higher cyclical loading than does a DHS type of implant. The implant temporarily compensates for the function of the medial column.

In A1 and A2 breaks hub stacking prompts crack impaction, while in A3 cracks such impaction doesn't happen, and average removal of the distal section of the break will undoubtedly happen because of the precariousness factor. Because of its position near the weight-bearing hub the anxieties that are created on the intra-medullary inserts are irrelevant. The PFN embed likewise goes about as a brace in counteracting the medialization of the pole. Bio-mechanically, compared to a laterally fixed side plate, the Intra-medullary nail decreases the bending force on the hip joint by 25 to 30%. This has the advantage in the elderly age group in-order to make them weight bear earlier. The entry portal of the PFN through the trochanter limits the surgical insult to the tendinous hip abductor musculature only, unlike those nails which require entry through the pyriformis fossa. Compared to Gamma nail, the additional anti-rotation screw placed in the femoral neck avoids rotation of the cervico-cephalic fragments during weight bearing. The stabilizing and the compression screws of the PFN adequately compress the fracture, leaving between them a bone block for further revision should the need arise.

In our study of 42 patients with unstable intertrochanteric fracture, the average age incidence was 56.72 years. This is in contrast to higher age group as reported in the western literatures. Our study results are comparable with those of R. C. Gupta et al; Mohanty SP et al; and of that reported by G.S. Kulkarni et al;. Majority of cases occurred in older individuals as the average life expectancy of an Indian is 10 years less than western standards and malnutrition and osteoporosis go hand in hand.

In the present study, the male to female ratio was 2 : 3.2, hence indicating a female preponderance in our study. This is in tandem with those reported by Pajarinen J et al; and Dousa P et al;. The system of damage was incidental fall in 88.10% patients and 11.90% street car crash in 5 patients. None of the patient had any related wounds. The mean length between the damage and strategy was 8.7 days (go 0-15 days). The normal working time was evaluated as 54 minutes (range 40 to 85 minutes), which is in close concordance with the study by Dousa P. et al[98]; and Parker MJ et al ;. The average X-ray exposure including the time necessary for reduction of fracture was 3.4 minutes (range 1 to 8 minutes).

Conclusion

With the demographics of the world population changing, more and more elderly persons are sustaining osteoporotic fractures. Among them, displaced and unstable trochanteric fractures are in significant numbers. The development of implant designs to address these unstable fractures of the proximal femur, have got refined. This has significantly improved the surgical outcomes in managing these problematic fractures. The proximal femoral nail, which was the implant used in this study, has established its distinct superiority in the instances of surgically managing displaced and unstable trochanteric fractures. Its unique advantages are that it is amenable to closed reduction which preserves the fracture hematoma. There is less surgical insult. It enables early rehabilitation and early return to pre-injury activity status. We therefore infer that, osteosynthesis utilizing a PFN, utilized in shaky trochanteric cracks, brings about a low pace of clinical entanglements, gives phenomenal adjustment, less mechanical inconveniences and good useful outcomes. It is along these lines a perfect embed for precisely overseeing shaky between trochanteric breaks.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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To Study Dermoscopic Findings in Alopecia Areata

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Abstract

Introduction: Alopecia areata is a common chronic autoimmune inflammatory disease that involves hair follicles, characterized by hair loss on the scalp and/or body without scarring. Clinically, the disease presents as smooth, patchy hair loss with various patterns - diffuse or reticulate alopecia, ophiasis, ophiasisinversus, alopecia totalis (loss of hair all the scalp), or alopecia universalis (loss of hair all over the body). Clinical diagnosis of AA is made based on typical pattern of hair loss and the presence of characteristic exclamation mark hair in microscopy. Invasive (punch biopsy) techniques are often required in some cases where the clinical diagnosis is not straight forward .Biopsy shows peribulbar lymphocytic infiltrates in a "swarm of bee pattern" which is characteristic of the acute stage of the disease.

Dermoscopy is an imaging instrument that immensely magnifies surface features of skin lesions. It works on the principle of illumination and transillumination of skin with different light sources and studying it with a high magnification lens. Dry dermoscopy was done with heine delta 20 dermoscope which was followed by wet dermoscopy. Liquid paraffin was used as the immersion media. It is a noninvasive, repeatable, recordable bedside investigation.

Materials and Method

Study Design: Cross sectional study

Study Area: Skin Outpatient Despartment

SreeBalaji Medical College and Hospital

Study Population: All patients with hair loss, attending skin OPD, who are clinically diagnosed as Alopecia Areata

Study Method: Observational study

Sample Size: 30

Result: Clinically, the disease presents as smooth, patchy hair loss with various patterns**.**Dermoscopy is useful for diagnosis of AA clinically by the presence of cadaverized hairs (black dots), circle hair, coudablity hair, exclamation mark hairs (tapering hairs), broken hairs, yellow dots and clustered short vellus hairs in the hair loss areas. The results wear tabulated.

Keywords: *dermoscope, Alopecia areata, Liquid paraffin, , exclamation mark hairs*

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Introduction

Alopecia areata is a common chronic autoimmune inflammatory and non-scary disease which involves hair follicles. It is characterized by hair loss on the scalp and/or wherever the hair is present on the body.[1] The chance

of occurring is 2% in their lifetime of an individual.[2] The chance of occurring is 40% higher in younger individuals aged below 30years.[1-3]

Clinically, Alopecia areata is differentiated into patchy alopecia, diffuse alopecia, reticulate alopecia, ophiasis, ophiasis inverses(loss of hair in the shape of wave) alopecia totalis or alopecia universalis (loss of all hairs) and perinevoid.[4] Most commonly around 3% to 30% of patients shows nail changes(diffuse fine nail pitting, longitudinal ridging, thin and brittle finger and toenails, and trachyonychia).[3] Since it is an autoimmune disorder, sudden hair regrowth may occur at any time within the year of hair loss.[1] The immune system is a major player, with T cells and a collapse of the physiological immune privilege (IP) of the hair follicle (HF) [5]plays a critical role in the pathophysiology of alopecia areata.[6-8] The HF represents a site of relative IP, because defined regions of its epithelium (bulge, bulb) do not express MHC class I and class II molecules, and because a number of immunoinhibitory cytokines and neuropeptides create an immunoinhibitory milieu.[5, 9] Even the few intraepithelial Langerhans cells found within the HF epithelium below its stem cell region, the bulge, are immunologically impaired, as they fail to express MHC class II.[10] This collapse of immune privilege (IP) of the hair follicle is a cause for autoimmunity to occur, is a widely accepted theory.[11] This IP collapse, which can most effectively be induced by IFN-γ or substance P presumably leads to changes in the quality and quantity of the expressed self-antigen repertoire, rendering HFs, which now ectopically express MHC class I-presented autoantigens, vulnerable to anti-self-immune reactivity.

Clinical diagnosis of Alopecia areata is based on the typical pattern of hair loss, and the presence of characteristic exclamation mark hair in microscopy. In some cases, if clinical features are not the clear invasive method (punch biopsy) may need to be used for diagnosis. The dermoscopic method has been proposed as an alternative to avoid punch biopsy, especially in adolescent girls and children, in which acceptability of punch biopsy may be very low. Many recent studies have explored the utility of noninvasive diagnosis dermoscopy in the diagnosis of Alopecia Areata. Apart from these flow cytometry-based measurement of various inflammatory markers like IFN-γ, IL-13, IL-9, IL-17, and IL-22 cytokines in $CD4^+$and $CD8^+$ T cells have been used to supplement or confirm the clinical diagnosis. Inducible co-stimulator molecule (ICOS) and HLA-DR, which are used to define mid- and long-term T-cell activation are also proposed as potential diagnostic markers in Alopecia areata.[15]

Dermoscopy

Dermoscopy is a non-invasive imaging technique which shows the magnified lesions on the surface of the skin. Skin surface microscopy for pigmented lesions was initially described in the first half of the 20th century based on earlier work done on colposcopy for visualisation of the cervical region. A couple of decades later, the use of oil-immersion fluid as an interface to improve skin surface visualisation and the use of the same for the diagnosis of pigmented lesions was described. Large dedicated dermoscopic devices were first used in the late 1980s, and hand-held devices started to be developed for the same in the early 1990s.

Dermoscopy is usually performed with Heine Delta 20 dermoscope, which usually have a magnification of around ×10 to ×20. The same can be used to take photographs by connecting them to a wide variety of cameras. Dermoscopyworked with the principle of illumination and transillumination of skin with different light sources and observed under the high magnifying lens. Most of the light is scattered due to the reflective property of the stratum cornium. In order to overcome this problem, fluid (liquid paraffin) medium is used as an interface, and a transparent glass contact plate is used for clear vision. Use of cross-polarized light is another method for this purpose. Both the methods allow looking at the clear image of a deeper section of the skin. Advanced dermoscopes are also increasingly available with polarised light allowing contact and non-contact dermoscopy.

The usual findings in dermoscopy assessment of patchy Alopecia areata include exclamation mark hairs and proximal tapering hairs.[17] Even though there are studies assessing the utility of dermoscopy in Alopecia areata, the correlation of dermoscopic features with the severity of disease has not been looked into by many previous studies on AA. Elucidation of dermoscopic features that are highly correlated with severe disease could help in developing dermoscopic predictors of severe disease or poor prognosis.[3] The scarcity of studies on the subject is even more conspicuous on the Indian population. Hence there is a strong need to conduct studies evaluating the correlation between dermoscopy and clinical findings. This may enhance the quality of available evidence on the subject and

may aid in evidence-based clinical practice. This is even more essential in resource-poor settings like India, where facilities for advanced and invasive interventions may not be accessible to a large section of the affected patients. Hence the present study was conducted to fill this knowledge gap.



Image 1: Vellus hair and Broken hair



Image 2: Vellus hair

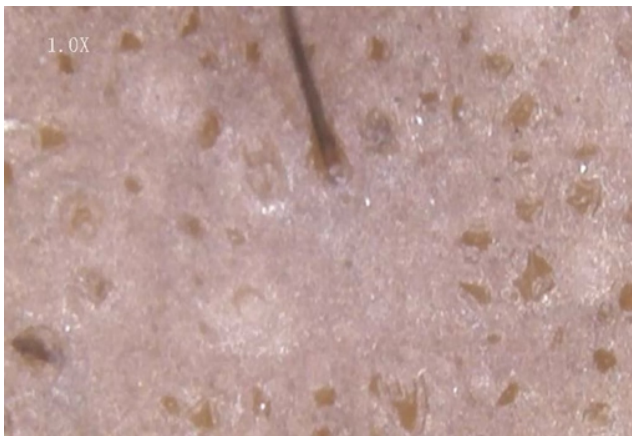


Image 3: Yellow dots

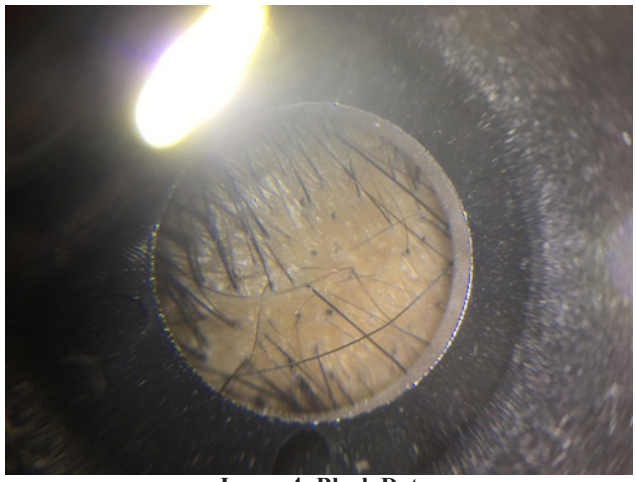


Image 4: Black Dots



Image 5: Broken hair

Findings and Discussions

Our study results show that the mean age was 25.1 ± 11.75 in the study population, the minimum age was 3 and the maximum age was 46 in the study population (95% CI 20.63 to 29.57). Senior, S.C, at al said that the mean age was 26.2 years which is close to our results A similar results are seen in case-control study, conducted by Park, J., et al and Shim, WH., et al. among alopecia patients and reported ,the mean age was 34.0±18.2 and 30 years respectively which is higher than our results.

Our study results shown that, 5 (16.7%) participants were aged up to 9 years, 2 (6.4%) participants were aged 10 to 19 years, 10 (33.30%) participants were aged 20 to 29 years, 10 (33.30%) participants were 30 to 39 years and 3 (10%) participants were 40 and above among our results it is seen that 90% of the study people belong to age below 40 years only 10% belongs to above 40years similar results were shown in Sharma, V K., et al in his prospective, hospital-based study among 808 patients and concluded that 88% of the study population belonged to below 40years of age which is similar to our results

Our study results showed that 18 (60%) participantsweremale remaining 12 (40%) participants were female participants. Similar results were seen in Sharma, V K. et al. [23]in his prospective, hospital-based study and noticed that chance of development of alopecia areata in males having a risk of 2 folds more than females whereas Shim, WH., et al. noticed that development of alopecia areata is more often to females than males

Whereas 14 (46.70%) participants had single patch, 9 (30%) participants had multiple patches, totally 76.70% were reported with patches, which is less than 50 per cent in the study conducted by Park, J., et al[37], 33%, in the same study reported 2.8% of the study population were reported with ophiasis which is similar to our results with 3 (10%) participants ,similarly alopecia universalis (7%), diffuse which is double than our results with (3.30%), 3 (10%) of participants Senila, S.C, at al reported that 68.8% of the study population were reported with patches and similarly 8 patients (25%) had alopecia universalis.

Our results concluded that 24 (80%) participantshad no nail involvement and 6 (20%) participants had Some nail involvement. Similar results were noticed in Sharma, V K., et al in his perspective, the hospital-based study reveals that 20% of the study population developed in nails .Among the study population, 10 (33.30%) participantshad yellow dots which is one of the symptoms and are reported as a specific finding of Alopecia areta. Similar results are seen in a study conducted by Park, J et al. among 327 patients and reported 34.6% of the study population which is close to our results whereas Shim, WH. et al. [14] in his study concluded that 60% of his study population had yellow dots which is double than our report and reported 80% in a prospective study to evaluate various dermoscopic patterns by Guttikonda, A et al.[50]

Black dots are believed to be remnants of hair shafts arising from tapering hairs Among the study population, 11 (36.70%) participantshad black dots whereas Park, J., et al reported as 50.5% which is higher that1.5times than our results whereas Shim, WH., et al. reported 42% of the study population have black dots, and 58% were reported by Guttikonda, A et al. with their team contribution. Broken hair is one of the symptoms for alopecia areata, and Our study results show that 15 (50%) participantshad broken hair where a Park, J., et al and Guttikonda, A et al. also concluded that 44.4% and 56% of the study population were reported with broken hair respectively. Shim, WH., et al. reported only 2% of patients to have broken hair which is very less than compared to others.

Among the study population, 11 (36.70%) participantshad short vellus hair whereas Park, J., et al and Shim WH et al. reported 59.8% and 48% respectively which is slightly higher than ours, whereas Guttikonda, A et al.[50] reported 66% that seems to be double than our reports. Among the study population, 7 (23.30%) participants had exclamation mark hairs', could be observed with the naked eye; however, their characteristic feature of the hair shaft towards the hair follicle is more readily perceived with dermoscopy. Under the dermoscopy which is one of the major findings for the diagnosis of alopecia areata a similar study was conducted by a Park, J., et al and revealed that 41% of his study population was reported with Exclamatory mark hair.

Conclusion

In the current study, the average age of the study population was 25.1 ± 11.75, which was ranging between 3 to 46 years. But the majority of the study participants were in their second decade and third decade of life. There was a slight male preponderance, as 60% of the participants were male.

Among the study population, 14 (46.70%) participantshad a single patch, 9(30%) participants had multiple patches, 3 (10%) participants had diffuse, 3 (10%) participants had ophiasis, and 1 (3.30%) participant had alopecia universalist

- Among the study popuslation, 21 (70%) participantshad S0, no hair loss, 7 (23.30%) participants had S1, <25% hair loss, 1 (3.30%) participant had S3, 51-75% hair loss and 1 (3.30%) participant had S5, 100% hair loss.

- The proportion of subjects showing B1 (Somebody hair loss) was 6.70%, and 20% had some nail involvement.

- The mean duration of disease was 4.45 ± 11.75 months in the study population, the minimum two months, and the maximum 12 months in the study population.

- Among the study population, 12 (40%) participantshad scalp occipital present. And 18 (60%) participants who never had scalp occipital.

• Among the study population, 16 (53.30%) participantshad parietal, and 14 (46.70%) participants who never had parietal.

• Among the study population, 10 (33.30%) participantshad vertex, 50% of the participantshad temporal, 8 (26.70%) participantshad a frontal distribution of the disease.

• Among the study population, 10 (33.30%) participantshad yellow dots and 20 (66.70%) participants who never had yellow dots.

• Among the study population, 11 (36.70%) participantshad black dots and 19 (63.30%) participants who never had black dots.

• Among the study population, 50% of the participantshad broken hair.

• Among the study population, 11 (36.70%) participantshad short vellus hairs, and 19 (63.30%) participants had no short vellus hairs.

• Among the study population, 7 (23.30%) participantshad exclamatory mark hair.

• Among the study population, 16 (53.30%) participantshad a good response, 9 (30%) participantshad a minimal response and 5 (16.70%) participants had a poor response to treatment.

• In people with yellow dots group, 5 (23.8%) participants never had S0, 3 (42.9%) participants had S1, 1 (100%) participant had S3, and 1 (100%) participant had S5 (100% hair loss).

• Among the block dots group, 7 (33.3%) participants never had S0, no hair loss, 3 (42.9%) participants had S1, <25% hair loss and 1 (100%) participant had S5, 100% hair loss.

• Among the broken hairs group, 9 (42.9%) participants never had S0, no hair loss, 5 (71.4%) participants had S1, <25% hair loss and 1 (100%) participant had S3, 51-75% hair loss.

• Among the short vellushairs group, 6 (28.6%) participants never had S0 (no hair loss), and 5 (71.4%) participants had S1 (<25% hair loss), Among the exclamatory markhairs group, 5 (23.8%) participants never had S0 (no hair loss) and 2 (28.6%) participants had S1 (<25% hair loss).

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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A Study on Ocular Problems among Automobile Workers in Chennai

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Abstract

The report, entitled 'The Prevention of Occupational Diseases', gave for the World Day for Safety and Health at Work, the International Labor Organization said that in spite of the way that word related ailments kill 6 fold the number of people, mishaps draw in more prominent consideration. Of the evaluated 2.34 million yearly business related passings, most by far – around 2.02 million – are because of business related infections. This speaks to an every day normal of 5,500 passings. The ILO likewise assesses that 160 million instances of non-lethal business related diseases and 317 million non-deadly word related mishaps happen yearly. This implies, at regular intervals, 1 out of 151 specialists kicks the bucket with a business related accident.

Keywords – *Labor Organization, Occupational Diseases*

Introduction

Engine vehicles have turned out to be fundamental piece of the present life. Vehicles assembling, fix and upkeep need has prompted the development of an enormous areas, supposed car businesses. These are formal large size enterprises where as there are small and medium size enterprise, which includes workshops and service stations. Automobile industries are labor-intensive sector, and its size of enterprise, number of workers and job characterization vary considerably.(1-3)

The automobile sector is providing occupation to number of peoples. Occupation is the main source of income for many families to meet the needs and to lead a happy life. And occupational health is essentially a preventive medicine. Occupational health should aim at the promotion and maintenance of highest degree of physical, mental and social well being of workers in all occupation.(5,6)

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Utilizes of any age are working routinely in the car parts. From wellbeing and security perspective, this is one of the intense divisions to tract and directs. Hundreds and thousands of dangers and risks go unnoticed. Basic word related dangers, for example, physical, ergonomic, natural and substance are found in engine vehicle assembling and fix laborers exercises, because of overwhelming hardware, oil fills/oils, high utilization of solvents, smoke, particulate issue and different toxins. These dangers become increasingly basic when there is an absence of mindfulness, controls measures and execution of wellbeing and security rules and regulations.1 And these perils additionally can cause antagonistic fundamental wellbeing impacts like respiratory sicknesses, intense wounds, eyes wounds, hearing misfortune, spinal pain, and musculoskeletal disorders.

The worldwide car fix and upkeep administrations enterprises worth is nearly $306 billion.4 The Indian car secondary selling is presently evaluated at Rs33000 cr. contributing 2.3% of India's GDP.5 The extra parts and post-deal administration including makers, merchants retailers, specialist co-ops like carports are everywhere scale developing business sector for Indian economy. (9,10) The portion of car administrations showcase in India is evaluated $10 billion.6 The car ventures area as of now having representatives an expected labor

of 78,77702 and expanding at the pace of 12% per annum. The size of car industry showcase in India, It is evaluated at 8-10billion USD. It is evaluated that half of this segment is unorganized.7 This industry division is increasingly common in rustic zones with less office and absence of information about wellbeing measures as contrast with urban regions.

The report, entitled 'The Prevention of Occupational Diseases', gave for the World Day for Safety and Health at Work, the International Labor Organization said that in spite of the way that word related ailments kill 6 fold the number of peo¬ple, mishaps draw in more prominent consideration. Of the evaluated 2.34 million yearly business related passings, most by far – around 2.02 million – are because of business related infections. This speaks to an every day normal of 5,500 passings. The ILO likewise assesses that 160 million instances of non-lethal business related dis¬eases and 317 million non-deadly word related mishaps happen yearly. This implies, at regular intervals, 1 out of 151 specialists kicks the bucket with a business related accident.(4)

Aim and Objective

- To assess the ocular problems among the automobile workers in the study area.
- To study the association between occupational hazards and ocular problems among the automobile workers.

Materials and Method

Study area

This study was conducted in a automobile industry in Chennai.

Study population

The automobile mechanics were the study population.

Study period

The study was carried out from June 1st2017 – March 31st2018

Sample size

N=310

Sample size was calculated based on a previous study conducted by **Selvi thangaraj.**

Inclusion criteria

The inclusion criteria for the study were the workers who had automobile mechanic work experience for more than 10 years and those who were willing to participate in the study.

Exclusion criteria

The automobile workers those who didn't give consent to participate in the study, were excluded from the study.

Sampling method

Stratified random sampling (proportional stratified random sampling) technique was used to identify the study subjects.

Study tool

A pretested structured questionnaire was used as study stool for data collection, by interviewing the study participants. The questionnaire was prepared in English and orally translated to local language (Tamil) while conducting the interview. The interview was conducted by the investigator himself and their responses were recorded in the questionnaire.

Data collection period

Data was collected from the study participants for a period of 3 months from 2ndNovember 2017 to 31st January 2018.

Statistical Analysis

Data was entered in Microsoft excel and analysed using the software SPSS, version 22 software.

Findings

Socio-statistic attributes of the examination members

Table 1 shows the socio-demographic details of the study participants. Among the study participants, nearly 167 (53.9%) of them belonged to the age group of 51-60 years followed by 129 (41.6%) of them belonged to age group of 41-50 years and only 14 (4.5%) them belonged to the age group of 31-40 years. Around 275 (88.7%) of the participants were hindus, 26 (8.4%) were Christians and 9 (2.9%) were muslims. Majority of the participants

were from urban 219 (70.6%) and 91(29.4%) were from rural. Among the study participants 151 (48.7%) had an education up to high school, 85 (27.4%) of them were graduates and 6 (1.9%) had an education only up to primary school. As per Modified BG Prasad Socio Economic Status Classification, 214 (69%) of the study participants belong to upper class, 48 (15.5%) of them belonged to upper middle class, and only 6 (1.9%) of them belonged to lower middle class.

Table 1: Socio-demographic characteristics of the study participants

S.No	Social Demographic Characteristics		Frequency (N=310)	Percentage (%)
1	Age	31-40 Years	14	4.5
		41-50 Years	129	41.6
		51-60 Years	167	53.9
2	Religion	Hindu	275	88.7
		Muslim	9	2.9
		Christian	26	8.4
3	Residence	Urban	219	70.6
		Rural	91	29.4
4	Education	Primary school	6	1.9
		Middle School	7	2.3
		High School	151	48.7
		Diploma	61	19.7
		Graduate/Postgraduate	85	27.4
5	Socio Economic Status	Upper Class	214	69.0
		Upper Middle Class	48	15.5
		Middle Class	42	13.5
		Lower Middle Class	6	1.9

Occupational hazard of the study participants

Table 2 shows the occupational hazard of the study participants. Among the study participants 12 (3.9%) were exposed to chemicals, 298 (96.1%) were not exposed to chemicals. Majority of the study participants 269 (86.8%) were working with machinery tools, 41(13.2%) were not working with machinery tools. Among the study participants 205 (66.1%) were working in both day and night shift and 105 (33.9%)

were working only in day shift.

Table 2: Occupational hazard of the study participants

S.No	Occupational hazard		Frequency (N=310)	Percentage (%)
1	Exposure to chemicals	Yes	12	3.9
		No	298	96.1
2	Working with machinery tools	Yes	269	86.8
		No	41	13.2
3	Working shift	Day And Night	205	66.1
		Day	105	33.9

Ocular disorders

Table 3 shows the prevalence of ocular problems among the workers. Among the workers participated in the study 130 (41.9%) did not have any ocular problem, 131 (42.3%) had defective vision, 26 (8.4%) had headache and 23 (7.4%) had watering of eyes.

Table 3: Ocular disorders

Ocular	Frequency (N=310)	Percentage (%)
Normal	130	41.9
Defective Vision	131	42.3
Headache	26	8.4
Watering Of Eyes	23	7.4

Association between occupational hazards and ocular problem

Table 4 shows the association between occupational hazard and ocular problem. There was no statistical significance between occupational hazard and ocular problem (P > 0.05).

Table 4: Association between occupational hazards and ocular problem

S.No	Occupational Hazard	N=310	Ocular problem		Odds ratio	95% CI	Chi square	P Value
			n=180	%				
1	Exposure to chemicals							
	Yes	12	6	50	0.713	0.22-2.26	0.333	0.564
	N0	298	174	58.4				
2	Working with machinery tools							
	Yes	269	157	58.4	1.097	0.56-2.12	0.075	0.784
	No	41	23	56.1				
3	Not using personal protection equipment							
	Yes	92	50	54.3	0.806	0.493-1.31	0.742	0.389
	No	218	130	59.6				
4	Working Shift							
	Day and night	205	121	59.1	1.123	0.69-1.807	0.229	0.632
	Day	105	59	56.1				

Discussion

Age

In this study majority of the study participants i.e. 53.9% belonged to 51-58 years of age, 41.6% belonged to 41-50 years of age and 4.5% belonged to 31-40 years of age. In a study by Selvi thangaraj et al only 18% of the workers were more than 40 years of age.[9] And in a study by Johnson OE et al also only 20.5% of the workers were more than 40 years of age.[10] This age difference may be due do in our study we have taken only the workers who had work experience more than 10 years.

Religion

In this study most of the study participants 88.7% were hindus, 8.4% were Christians and 9 (2.9%) were muslims. In a study by Selvi thangaraj et al most of the workers 88% were Muslims and only 12% were Hindus.[9]

Resident

In this study majority of the study participants were from urban 70.6%, this is because the truck manufacturing company is situated in urban Chennai and most of the workers were also residing in the urban Chennai.

Education

In this study 48.7% study participants had an education up to high school, 27.4% of the were graduates, 1.9% had an education only up to primary school and no illiterates. In a study by Kamble MS et al 1.9 % had primary school education which is similar to our study.[11] In a study by Selvi thangaraj 19.3% of the workers were illiterate which is in contrary to our study this is due to our study area.[9] In our study area (truck manufacturing company) only the workers who had at least primary education, were given the appointment to work in the company.

Socio economic status

In this study As per Modified BG Prasad Socio Economic Status Classification, 69% of the study participants belonged to upper class, 15.5% of them belonged to upper middle class, and only 1.9% of them belonged to lower middle class. In a study by kamble MS et al 12.8%, 36%, 45.5%, 5% and 0.7% of the workers

belonged to upper class, upper middle class, middle class, lower middle class and lower class respectively. In this study most of the study participants belonged to upper class, this due to that all the workers are getting a monthly income of 55000 which is high when to other automobile units.

Ocular

In this study most of the workers were elder (more than 40 years of age) which causes age related ocular problem and refractive error. The prevalence of ocular disorder is 58.1% in the present study. In the study done by Kamble MS et al in Pune among workers in automobile industry, they reported 45.7% had ocular disorder.[10] Were as in a study done by Vyas H et al 16% had ocular disorder. In a study done by Selvi thangaraj et al 14% had eye problems.

Conclusion

Among the study participants 3.9% were exposed to chemicals, 86.8% were working with machinery tools, 66.1% are working in both day and night shift, 70.3% were using any one PPE. Among the study participants 58.1% had ocular problem and none of the occupational hazards is associated with ocular problem. From the findings of the study, it can be concluded that the prevalence of ocularar problem and occupational hazards are high in the study area. These ocular problems among the automobile workers will reduce only if all the gaps are identified and intensive interventions are done.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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A Study on Oral Cavity Problems among Automobile Workers in Chennai

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Abstract

Motor vehicles have become essential part of today's life. Vehicles manufacturing, repair and maintenance need has led to the emergence of a large sectors, so called automobile industries. These are formal large size enterprises where as there are small and medium size enterprise, which includes workshops and service stations. Automobile industries are labor-intensive sector, and its size of enterprise, number of workers and job characterization vary considerably. Employs of all ages are working routinely in the automobile sectors. From health and safety point of view, this is one of the tough sectors to tract and supervises. Hundreds and thousands of risks and hazards go unnoticed. Common occupational hazards such as physical, ergonomic, biological and chemical are found in motor vehicle manufacturing and repair workers activities, due to heavy machinery, petroleum fuels/ oils, high use of solvents, smoke, particulate matter and various other pollutants. These hazards become more critical when there is a lack of awareness, controls measures and implementation of health and safety rules and regulations.[1] And these hazards also can cause adverse systemic health effects like respiratory ailments, acute injuries, eyes injuries, hearing loss, backache, and musculoskeletal disorders.[2]

Keywords: *musculoskeletal disorders, acute injuries, heavy machinery*

Introduction

The worldwide car fix and support administrations ventures worth is nearly $306 billion.4 The Indian car post-retail is right now assessed at Rs33000 cr. contributing 2.3% of India's GDP.5 The extra parts and post-deal administration including makers, wholesalers retailers, specialist organizations like carports are everywhere scale developing business sector for Indian economy. The portion of car administrations advertise in India is evaluated $10 billion.6

The report, entitled 'The Prevention of Occupational Diseases', gave for the World Day for Safety and Health at Work, the International Labor Organization said that in spite of the way that word related infections kill 6 fold the number of people, mishaps pull in more noteworthy consideration. Of the evaluated 2.34 million yearly business related passings, by far most – roughly 2.02 million – are because of business related infections. This speaks to a day by day normal of 5,500 passings. The ILO likewise appraises that 160 million instances of non-lethal business related dis¬eases and 317 million non-deadly word related mishaps happen yearly. This implies, like clockwork, 1 out of 151 laborers bites the dust with a business related accident.(1-3)

The car ventures area as of now having workers an expected labor of 78,77702 and expanding at the pace of 12% per annum. The size of car industry advertise in India,(5) It is evaluated at 8-10billion USD. It is assessed that half of this division is unorganized.7 This industry segment is increasingly predominant in country regions with less office and absence of information about security measures as contrast with urban areas.

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Aim and Objective

• To assess the oral cavity problems among the automobile workers in the study area.

• To study the association between occupational hazards and oral cavity problems among the automobile workers.

MATERIALS AND METHODS

Study area:

This study was conducted in a automobile industry in Chennai.

Study population:

The automobile mechanics were the study population.

Study period:

The study was carried out from June 1st2017 – March 31st2018

Sample size:

N=310

Sample size was calculated based on a previous study conducted by **Selvi thangaraj.**

Inclusion criteria:

The inclusion criteria for the study were the workers who had automobile mechanic work experience for more than 10 years and those who were willing to participate in the study.[6,7]

Exclusion criteria:

The automobile workers those who didn't give consent to participate in the study, were excluded from the study.

Sampling method:

Stratified random sampling (proportional stratified random sampling) technique was used to identify the study subjects.

Study tool:

A pretested structured questionnaire was used as study stool for data collection, by interviewing the study participants. The questionnaire was prepared in English and orally translated to local language (Tamil) while conducting the interview. The interview was conducted by the investigator himself and their responses were recorded in the questionnaire. [8]

Data collection period:

Data was collected from the study participants for a period of 3 months from 2ndNovember 2017 to 31st January 2018

Statistical analysis:

. Data was entered in Microsoft excel and analysed using the software SPSS, version 22 software.

Findings

Table 1: Socio-demographic characteristics of the study participants

S.No	Social Demographic		Frequency	Percentage
1	Age	31-40 Years	14	4.5
		41-50 Years	129	41.6
		51-60 Years	167	53.9
2	Religion	Hindu	275	88.7
		Muslim	9	2.9
		Christian	26	8.4

Cont ... **Table 1: Socio-demographic characteristics of the study participants**

3	Residence	Urban	219	70.6
		Rural	91	29.4
4	Education	Primary school	6	1.9
		Middle School	7	2.3
		High School	151	48.7
		Diploma	61	19.7
		Graduate/Postgraduate	85	27.4
5	Socio Economic Status	Upper Class	214	69.0
		Upper Middle Class	48	15.5
		Middle Class	42	13.5
		Lower Middle Class	6	1.9

Occupational hazard of the study participants

Table 2 shows the occupational hazard of the study participants. Among the study participants 12 (3.9%) were exposed to chemicals, 298 (96.1%) were not exposed to chemicals. Majority of the study participants 269 (86.8%) were working with machinery tools, 41(13.2%) were not working with machinery tools. Among the study participants 205 (66.1%) were working in both day and night shift and 105 (33.9%) were working only in day shift.[10]

Table 2: Occupational hazard of the study participants

S.No	Occupational hazard		Frequency (N=310)	Percentage (%)
1	Exposure to chemicals	Yes	12	3.9
		No	298	96.1
2	Working with machinery tools	Yes	269	86.8
		No	41	13.2
3	Working shift	Day And Night	205	66.1
		Day	105	33.9

Oral cavity disorders

Table 3 shows the prevalence oral cavity problems among the workers. Among the workers participated in the study 210 (67.7%) did not have any oral cavity problem, 51 (16.5%) had toothache, 49 (15.8%) had mouth ulcer.

Table 3: Oral cavity disorders

Oral Cavity	Frequency (N=310)	Percentage (%)
Normal	210	67.7
Mouth Ulcer	49	15.8
Toothache	51	16.5

Association between occupational hazards and oral cavity problem

Table 4 shows the association between occupational hazard and oral cavity problem. There was no statistical significance between occupational hazard and oral cavity problem (P > 0.05).

Table 4: Association between occupational hazards and oral cavity problem

S.No	Occupational Hazard	N=310	Oral cavity problem		Odds ratio	95% CI	Chi square	P Value
			n=100	%				
1	Exposure to chemicals							
	Yes	12	2	16.7	0.408	0.08-1.89	0.746	0.388
	No	298	98	32.8				
2	Working with machinery tools							
	Yes	269	86	32	0.906	0.45-1.81	0.077	0.781
	No	41	14	34.1				
3	Not using personal protection equipment							
	Yes	92	34	36.9	1.350	0.8-2.25	1.322	0.250
	No	218	66	30.3				
4	Working Shift							
	Day and night	205	66	32.2	0.992	0.6-1.64	0.001	0.974
	Day	105	34	32.3				

Discussion

Age

In this study majority of the study participants i.e. 53.9% belonged to 51-58 years of age, 41.6% belonged to 41-50 years of age and 4.5% belonged to 31-40 years of age. In a study by Selvi thangaraj et al only 18% of the workers were more than 40 years of age.[9] And in a study by Johnson OE et al also only 20.5% of the workers were more than 40 years of age.[10] This age difference may be due do in our study we have taken only the workers who had work experience more than 10 years.

Religion

In this study most of the study participants 88.7% were hindus, 8.4% were Christians and 9 (2.9%) were muslims. In a study by Selvi thangaraj et al most of the workers 88% were Muslims and only 12% were Hindus.[9]

Resident

In this study majority of the study participants were from urban 70.6%, this is because the truck manufacturing company is situated in urban Chennai and most of the workers were also residing in the urban Chennai.

Education

In this study 48.7% study participants had an education up to high school, 27.4% of the were graduates, 1.9% had an education only up to primary school and no illiterates. In a study by Kamble MS et al 1.9 % had primary school education which is similar to our study.[11] In a study by Selvi thangaraj 19.3% of the workers were illiterate which is in contrary to our study this is due to our study area.[9] In our study area (truck manufacturing company) only the workers who had at least primary education, were given the appointment to work in the company.

Socio economic status

In this study As per Modified BG Prasad Socio Economic Status Classification, 69% of the study participants belonged to upper class, 15.5% of them belonged to upper middle class, and only 1.9% of them belonged to lower middle class. In a study by kamble MS et al 12.8%, 36%, 45.5%, 5% and 0.7% of the workers belonged to upper class, upper middle class, middle class, lower middle class and lower class respectively.[11] In this study most of the study participants belonged to upper class, this due to that all the workers are getting a monthly income of 55000 which is high when to other automobile units.

Oral Cavity

In this study workers were having habit of tobacco chewing which leads to oral cavity problems. The prevalence of oral cavity problems is 32.3% in the present study which was high to the finding in the study done by Kamble MS et al in Pune among workers in automobile industry; they reported 17.9 % had oral cavity problems.[11]

Conclusion

Among the study participants 3.9% were exposed to chemicals, 86.8% were working with machinery tools, 66.1% are working in both day and night shift, 70.3% were using any one PPE. Among the study participants 32.3% had ocular problem and none of the occupational hazards is associated with ocular problem. From the findings of the study, it can be concluded that the prevalence of oral cavity problem and occupational hazards are high in the study area. This oral cavity problem among the automobile workers will reduce only if all the gaps are identified and intensive interventions are done.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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A Study on Genito Urinary Problems among Automobile Workers in Chennai

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Abstract

The automobile sector is providing occupation to number of peoples. Occupation is the main source of income for many families to meet the needs and to lead a happy life. And occupational health is essentially a preventive medicine. Occupational health should aim at the promotion and maintenance of highest degree of physical, mental and social well being of workers in all occupation.

Keywords: *Occupational health, automobile sector*

Introduction

Engine vehicles have turned out to be fundamental piece of the present life. Vehicles assembling, fix and support need has prompted the rise of a huge segments, supposed car ventures. These are formal enormous size ventures where as there are little and medium size undertaking, which incorporates workshops and administration stations. Vehicle ventures are work concentrated segment, and its size of big business, number of laborers and occupation portrayal change impressively. Utilizes of any age are working routinely in the car areas. From wellbeing and security perspective, this is one of the intense divisions to tract and oversees. Hundreds and thousands of dangers and perils go unnoticed. Basic word related perils, for example, physical, ergonomic, natural and compound are found in engine vehicle assembling and fix laborers exercises, because of overwhelming hardware, oil powers/oils, high utilization of solvents, smoke, particulate issue and different toxins. These perils become increasingly basic when there is an absence of mindfulness, controls measures and usage of wellbeing and security rules and regulations.2 And these dangers likewise can cause unfavorable foundational wellbeing impacts like respiratory illnesses, intense wounds, eyes wounds, hearing misfortune, spinal pain, and musculoskeletal disorders.(3)

The worldwide car fix and upkeep administrations businesses worth is nearly $306 billion.4 The Indian car post-retail is at present assessed at Rs33000 cr. contributing 2.3% of India's GDP.5 The extra parts and post-deal administration including producers, wholesalers retailers, specialist co-ops like carports are everywhere scale developing business sector for Indian economy. The portion of car administrations showcase in India is assessed $10 billion.6 The car businesses area at present having workers an expected labor of 78,77702 and expanding at the pace of 12% per annum. The size of car industry showcase in India, It is evaluated at 8-10billion USD. It is evaluated that half of this part is unorganized.7 This industry segment is progressively common in rustic territories with less office and absence of information about security measures as contrast with urban regions.

The report, entitled 'The Prevention of Occupational Diseases', gave for the World Day for Safety and Health at Work, the International Labor Organization said that regardless of the way that word related ailments kill 6 fold the number of people, mishaps pull in more noteworthy consideration. Of the evaluated 2.34 million yearly business related passings, most by far – around 2.02 million – are because of business related illnesses.

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This speaks to a day by day normal of 5,500 passings. The ILO additionally assesses that 160 million instances of non-lethal business related diseases and 317 million non-deadly word related mishaps happen every year. This implies, at regular intervals, 1 out of 151 specialists bites the dust with a business related accident.(8)

Aim and Objective

- To assess the genito urinary problems among the automobile workers in the study area.
- To study the association between occupational hazards and genitor urinary problems among the automobile workers.

Materials and Method

Study area:

This study was conducted in a automobile industry in Chennai.

Study population:

The automobile mechanics were the study population.

Study period:

The study was carried out from June 1st2017 – March 31st2018

Sample size:

N=310

Sample size was calculated based on a previous study conducted by **Selvi thangaraj.**

Inclusion criteria:

The inclusion criteria for the study were the workers who had automobile mechanic work experience for more than 10 years and those who were willing to participate in the study.

Exclusion criteria:

The automobile workers those who didn't give consent to participate in the study, were excluded from the study.

Sampling method:

Stratified random sampling (proportional stratified random sampling) technique was used to identify the study subjects.

Study tool:

A pretested structured questionnaire was used as study stool for data collection, by interviewing the study participants. The questionnaire was prepared in English and orally translated to local language (Tamil) while conducting the interview. The interview was conducted by the investigator himself and their responses were recorded in the questionnaire.

Data collection period:

Data was collected from the study participants for a period of 3 months from 2ndNovember 2017 to 31st January 2018

Statistical analysis:

Data was entered in Microsoft excel and analysed using the software SPSS, version 22 software.

FINDINGS

Socio-demographic characteristics of the study participants

Table 1 shows the socio-demographic details of the study participants. Among the study participants, nearly 167 (53.9%) of them belonged to the age group of 51-60 years followed by 129 (41.6%) of them belonged to age group of 41-50 years and only 14 (4.5%) them belonged to the age group of 31-40 years. Around 275 (88.7%) of the participants were hindus, 26 (8.4%) were Christians and 9 (2.9%) were muslims. Majority of the participants were from urban 219 (70.6%) and 91(29.4%) were from rural. Among the study participants 151 (48.7%) had an education up to high school, 85 (27.4%) of them were graduates and 6 (1.9%) had an education only up to primary school. As per Modified BG Prasad Socio Economic Status Classification, 214 (69%) of the study participants belong to upper class, 48 (15.5%) of them belonged to upper middle class, and only 6 (1.9%) of them belonged to lower middle class. (1,2)

Table 1: Socio-demographic characteristics of the study participants

S.No	Social Demographic Characteristics		Frequency (N=310)	Percentage (%)
1	Age	31-40 Years	14	4.5
		41-50 Years	129	41.6
		51-60 Years	167	53.9
2	Religion	Hindu	275	88.7
		Muslim	9	2.9
		Christian	26	8.4
3	Residence	Urban	219	70.6
		Rural	91	29.4
4	Education	Primary school	6	1.9
		Middle School	7	2.3
		High School	151	48.7
		Diploma	61	19.7
		Graduate/Postgraduate	85	27.4
5	Socio Economic Status	Upper Class	214	69.0
		Upper Middle Class	48	15.5
		Middle Class	42	13.5
		Lower Middle Class	6	1.9

Occupational hazard of the study participants

Table 2 shows the occupational hazard of the study participants. Among the study participants 12 (3.9%) were exposed to chemicals, 298 (96.1%) were not exposed to chemicals. Majority of the study participants 269 (86.8%) were working with machinery tools, 41(13.2%) were not working with machinery tools. Among the study participants 205 (66.1%) were working in both day and night shift and 105 (33.9%) were working only in day shift.[8]

Table 2: Occupational hazard of the study participants

S.No	Occupational hazard		Frequency (N=310)	Percentage (%)
1	Exposure to chemicals	Yes	12	3.9
		No	298	96.1
2	Working with machinery tools	Yes	269	86.8
		No	41	13.2
3	Working shift	Day And Night	205	66.1
		Day	105	33.9

Genito urinary disorders

Table 3 shows the prevalence genitor-urinary problems among the workers. Among the workers participated in the study 267 (86.1%) did not have any genito-urinary problems, 35 (11.3%) had burning micturation, 5 (1.6%) had benign prostate hyperplasia and 3 (1%) had calculus.

Table 3: Genito-urinary system disorders

Genito Urinary System	Frequency (N=310)	Percentage (%)
Normal	267	86.1
Burning micturation	35	11.3
Benign prostate hyperplasia	5	1.6
Calculus	3	1

Association between occupational hazards and genito urinary problem

Table 4 shows the association between occupational hazard and genito urinary problem. There was no statistical significance between occupational hazard and genito urinary problem ($P > 0.05$).

Table 4: Association between occupational hazards and genitor urinary problem

S.No	Occupational Hazard	N=310	Genito urinary Problem		Odds ratio	95% CI	Chi square	P Value
			n=43	%				
1	Exposure to chemicals							
	Yes	12	2	16.6	1.25	0.26-5.92	0.082	0.775
	No	298	41	13.8				
2	Working with machinery tools							
	Yes	269	37	13.7	0.930	0.36-2.36	0.023	0.879
	No	41	6	14.6				
3	Not using personal protection equipment							
	Yes	92	8	8.7	0.498	0.22-1.12	2.933	0.087
	No	218	35	16.1				
4	Working Shift							
	Day and night	205	29	14.1	1.071	0.53-2.127	0.038	0.845
	Day	105	14	13.3				

Discussion

Age

In this study majority of the study participants i.e. 53.9% belonged to 51-58 years of age, 41.6% belonged to 41-50 years of age and 4.5% belonged to 31-40 years of age. In a study by Selvi thangaraj et al only 18% of the workers were more than 40 years of age.9 And in a study by Johnson OE et al also only 20.5% of the workers were more than 40 years of age.10 This age difference may be due do in our study we have taken only the workers who had work experience more than 10 years.

Religion

In this study most of the study participants 88.7% were hindus, 8.4% were Christians and 9 (2.9%) were muslims. In a study by Selvi thangaraj et al most of the workers 88% were Muslims and only 12% were Hindus.[9]

Resident

In this study majority of the study participants were from urban 70.6%, this is because the truck manufacturing company is situated in urban Chennai and most of the workers were also residing in the urban Chennai.

Education

In this study 48.7% study participants had an education up to high school, 27.4% of the were graduates, 1.9% had an education only up to primary school and no illiterates. In a study by Kamble MS et al 1.9 % had primary school education which is similar to our study.[11] In a study by Selvi thangaraj 19.3% of the workers were illiterate which is in contrary to our study

this is due to our study area.[9] In our study area (truck manufacturing company) only the workers who had at least primary education, were given the appointment to work in the company.

Socio economic status

In this study As per Modified BG Prasad Socio Economic Status Classification, 69% of the study participants belonged to upper class, 15.5% of them belonged to upper middle class, and only 1.9% of them belonged to lower middle class. In a study by kamble MS et al 12.8%, 36%, 45.5%, 5% and 0.7% of the workers belonged to upper class, upper middle class, middle class, lower middle class and lower class respectively.[11] In this study most of the study participants belonged to upper class, this due to that all the workers are getting a monthly income of 55000 which is high when to other automobile units.

Genito urinary system

In the present study the prevalence of genito urinary problem among the study participants is 13.9% which is due to socio demographic risks factors such age, diet, and personal habits. A 10 years follow up study among automobile repair workers in The Netherlands, to assess cause specific mortality done by Eva S Hansen showed an increased mortality due to urinary tract cancer.[12]

Conclusion

Among the study participants 3.9% were exposed to chemicals, 86.8% were working with machinery tools, 66.1% are working in both day and night shift, 70.3% were using any one PPE. Among the study participants 13.9% had genitor urinary problem and none of the occupational hazards is associated with genito urinary problem. From the findings of the study, it can be concluded that the prevalence of genito urinary problem and occupational hazards are high in the study area. This genito urinary problems among the automobile workers will reduce only if all the gaps are identified and intensive interventions are done.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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A Study on Maternal Zinc and Cord Blood Zinc Levels in Aga and SGA

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Abstract

Zinc insufficiency is one of the most well-known micronutrient inadequacies in creating nations. Maternal zinc lack is related with fetal development hindrance and other antagonistic fetal results. The examination expected to decide string blood zinc level between the term SGA and AGA babies. Strategies: This is an imminent cross-sectional investigation led in 50 terms SGA infants and their moms and 50 term AGA children and their moms. Maternal and line blood tests were taken at conveyance and zinc was assessed by endpoint nitro PAPS color restricting colorimetric technique. Results: It was discovered that line blood zinc levels were low in term SGA babies when contrasted with term AGA babies. There was likewise low maternal zinc levels in the term SGA babies when contrasted with moms of term AGA babies. In AGA 0.431 with the P VALUE of 0.002 demonstrates a noteworthy connection between's maternal zinc and string blood zinc levels.in SGA 0.472 with the P VALUE of 0.001 demonstrates a huge relationship between's maternal zinc and line blood zinc levels.Conclusion: Our investigation reasoned that Maternal and Cord blood zinc level lack can likewise one of the reasons for low birth weight babies.significantcorrelationof maternal zinc and line blood zinc levels are seen in AGA

Keywords: *Zinc, Maternal Blood, Cord Blood, Appropriate Gestation Age,[AGA] small gestation age [SGA]*

Introduction

Over 20% of people are zinc inadequate worldwide, especially in creating nations. Zinc is needed for the development of the oocyte and the embryo. Acrodermatitis enteropathica is an acquired insufficiency of the zinc transporter protein ZIP4 bringing about insufficient zinc absorption.[1] Zinc manages the outflow of metallothionein, which has different capacities, for example, intracellular compartmentalization and cell reinforcement work. In this manner zinc inadequacy brings about debilitated development and advancement, and disturbance of regenerative and insusceptible capacity. Severe zinc deficiency can result in neural tube defects and other congenital malformations.[2]Low birth weight babies are at a higher risk from zinc deficiency and its impacts. Amending zinc insufficiency by satisfactory zinc supplementation will improve weight increase, straight development, cerebrum function, and development.[3]Zinc assumes a significant job in early advancement, both pre-birth and postnatal. Accordingly its fundamental organic chemistry, physiology and its digestion inthe maternal-placental unit and in the neonate must be talked about to investigate its impacts on the neonate.By dynamic vehicle, zinc is retained from the duodenum. Zinc homeostasis is kept up by both take-up and endogenous discharge by the ZIP family (1-5) and ZnT family transporters6. ZIP-4 is a transporter that is communicated at the luminal side of enterocytes through the little and internal organs. Zinc is sent out from enterocytes into the entryway blood by zinc transporters 1&2.More than 20% of people are zinc insufficient around the world, particularly in creating nations. Zinc is required for the advancement of the oocyte and the fetus. Acrodermatitis enteropathica is

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an acquired insufficiency of the zinc transporter protein ZIP4 bringing about deficient zinc absorption[4]

Materials and Method

The investigation included 50 term-little for gestational age neonates and their moms and 50 term-suitable for gestational age neonates and their moms who fulfill the consideration and prohibition criteria. Point by point maternal history was takenand exhaustive physical assessment of the neonate was finished. Birth weight was plotted against gestational age in Lubchenco development graphs to evaluate on the off chance that they are little for gestational age or fitting for gestational age. Subsequent to acquiring educated assent from the guardians, string blood test for serum zinc was gathered from term-SGA and term-AGA children and 2ml of blood from the fringe vein of their moms following conveyance was gathered individually for serum zinc level estimation and sent to our focal research center.

STASTICAL ANALYSIS: The information was entered in exceed expectations sheet and investigated utilizing SPSS (Version 16). Graphic measurements with mean, standard deviation and extent (%) was determined for quantitative factors. To test the speculation ANOVA, Z test and Chi-Square test was utilized. ap-value<0.05 was considered as factually critical.

Findings

Table– 1 Correlation of maternal zinc and cord blood zinc levels in aga

		MATERNAL ZINC	CORD ZINC
MATERNAL ZINC	Pearson Correlation	1	.431**
	Sig. (2-tailed)		**.002**
	N	50	50
CORD BLOOD ZINC	Pearson Correlation	.431**	1
	Sig. (2-tailed)	**.002**	
	N	50	50

**Correlation is significant at the 0.01 level

Correlation coefficient - "value" – 0.431 with the P VALUE of 0.002 shows a significant correlation between maternal zinc and cord blood zinc levels.

Table-2 Correlation of maternal zinc and cord blood zinc levels in sga

		MATERNAL ZINC	CORD ZINC
MATERNAL ZINC	Pearson Correlation	1	.472**
	Sig. (2-tailed)		**.001**
	N	50	50
CORD BLOOD ZINC	Pearson Correlation	.472**	1
	Sig. (2-tailed)	**.001**	
	N	50	50

**.Correlation is significant at the 0.01 level.Correlation coefficient - "value" – 0.472 with the P VALUE of 0.001 shows a significant correlation between maternal zinc and cord blood zinc levels.

Discussion

Newborn child death pace of India is 41 for every 1000 live births as per NFHS 4 (2015-2016) which is for the most part contributed by the high neonatal death pace of 32 for each 1000 live births. India contributes around 25% of the world's neonatal passings. One-fourth of the world's all out death happens in India.Low birth weight including preterm represents around 60-80% of the complete neonatal demise. The occurrence of low birth weight babies in India is 28%. One of the most significant reasons for low birth weight in India is maternal malnutrition. Children with low birth weight are at extensive danger of morbidity.[5] Long term impacts of birth weight influence the perinatal period as well as youth and adulthood. Hence our examination is interestingly with their study Keen CL, F et al contemplated the correlation of term SGA and term AGA with rope blood zinc levels (p-esteem 0.021) and maternal zinc levels (p-esteem - <0.017) indicates importance and this finding is in concurrence with our investigation. [6]Our study results are in accordance with those of numerous examinations led in various pieces of the world demonstrating a positive relationship between maternal zinc status and birth weight. Roungsipragarnet al perceived that the pace of zinc insufficiency was essentially higher in LBW infants and their moms when contrasted with term NBW neonates and their mothers. [7] Sandstead HH et al. discovered a noteworthy positive relationship between serum zinc level and birth weight. [8]In our examination both the term AGA and term SGA gatherings were tantamount in the subjective information like maternal age (p>0.05), equality of mother (p>0.05), method of conveyance (p>0.05), and sex of the child (p>0.05) and was not measurably critical while in an investigation of Sarkar B. et al indicated higher the equality of mother the lower their serum zinc levels which is negating our study.[9,10]

Conclusion: Our study concluded that Maternal and Cord blood zinc level deficiency can also one of the causes of low birth weight babies. significant correlation of maternal zinc and cord blood zinc levels are observed in AGA

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Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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A Study on Maternal Blood Zinc Level – Aga Vs Sga in Tertiary Care Hospital in Chennai

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Abstract

Introduction: Zinc deficiency is one of the most common micronutrient deficiencies in developing countries. Maternal zinc deficiency is associated with fetal growth retardation and other adverse fetal outcomes. The study aimed to determine cord blood zinc level between the term SGA and AGA babies. **Methods:** This is a prospective cross-sectional study conducted in 50 terms SGA babies and their mothers and 50 term AGA babies and their mothers.Maternal and cord blood samples were taken at delivery and zinc was estimated by endpoint nitro PAPS dye binding colorimetric method.

Results: It was found that cord blood zinc levels were low in term SGA babies when compared to term AGA babies. There was also low maternal zinc levels in the term SGA babies when compared to mothers of term AGA babies.

Conclusion: Our study concluded that Maternal and Cord blood zinc level deficiency can also one of the causes of low birth weight babies.

Keywords: *Zinc,maternal blood, appropriate gestation age,[AGA] small gestation age [SGA]*

Introduction

A trace element is an element that constitutes less than 0.01%of the total body weight. They play a vital role in metabolic processes as they are components of many enzymesystems. Trace element deficiencies are being reported in humans and they have deleterious effects on the health, growth, and development.In trace elements, zinc stands second in order of importance next to iron. It also stands second next to iron in order of abundance in the human body[1]. Zinc plays an important role in early development, both prenatal and postnatal. Thus its basic biochemistry, physiology and its metabolism inthe maternal-placental unit and in the neonate have to be discussed to analyze its effects on the neonate.By active transport, zinc is absorbed from the duodenum.Zinc homeostasis is maintained by both uptake and endogenous secretion by the ZIP family [1-5] and ZnT family transporters6. ZIP-4 is a transporter that is expressed at the luminal side of enterocytes through the small and large intestines.[2] Zinc is exported from enterocytes into the portal blood by zinc transporters 1&2.More than 20% of individuals are zinc deficient worldwide,especially in developing countries. Zinc is needed for the development of the oocyte and the embryo. Acrodermatitisenteropathica is an inherited deficiency of the zinc carrier protein ZIP4 resulting in inadequate zinc absorption. Zinc regulates the expression of metallothionein, which has multiple functions such as intracellular compartmentalization and antioxidant function. Thus zinc deficiency results in impaired growth and development, and disruption of reproductive and immune function. Severe zinc deficiency can result in neural tube defects and other congenital malformations[3]

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Materials and Method

The study included 50 term-small for gestational age neonates and their mothers and 50 term- appropriate for gestational age neonates and their mothers who satisfy the inclusion and exclusion criteria. Detailed maternal history was takenand thorough physical examination of the neonate was done. Birth weight was plotted against gestational age in Lubchenco growth charts to assess if they are small for gestational age or appropriate for gestational age. After obtaining informed consent from the parents, cord blood sample for serum zinc was collected from term-SGA and term-AGA babies and 2ml of blood from the peripheral vein of their mothers immediately after delivery was collected respectively for serum zinc level estimation and sent to our central laboratory.(1,2)

Stastical Analysis

The data was entered in excel sheet and analyzed using SPSS (Version 16). Descriptive statistics with mean, standard deviation and proportion (%) was calculated for quantitative variables. To test the hypothesis ANOVA, Z test and Chi-Square test was used. ap-value<0.05 was considered as statistically significant(7)

Findings

Table- 1 Maternal Age – AGA Vs SGA

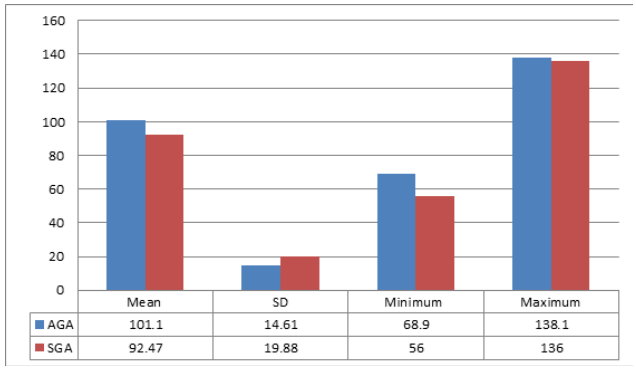
	AGA	SGA
Mean	24.22	23.88
SD	4.258	3.858
Minimum	17	17
Maximum	34	35

The mean maternal age in AGA was 24.22 and in SGA was 23.88.The above tabular column shows that there is no statistical significance in the maternal age between AGA and SGA groups. P VALUE= 0.677

The primiparous mother was 46% and 58% in AGA and SGA respectively,whereas in multiparous it was 54% and 42% in AGA and SGA respectively.The above results show that there is no statistical significance in the parity of mother between AGA and SGA groups. P-VALUE = 0.229

Table- 2 Parity – AGA Vs SGA Table- 2 Parity – AGA Vs SGA

	AGA	SGA	Total
Primi	23 (46%)	29 (58%)	52
Multi	27 (54%)	21 (42%)	48
Total	50 (100%)	50 (100%)	100



Graph : 1 Maternal Blood Zinc Level – AGA Vs SGA

The mean maternal zinc level in AGA and SGA were 101.1 and 92.47 respectively.The results show that there is a statistical significance in the maternal zinc between AGA and SGA groups.In Figure 1, The minimum and maximum levels of maternal zinc among AGA group were 68.9 and 138.1 whereas the values of minimum and maximum levels in the SGA group was 56 and 136. (3)

Discussion

Birthweight isthevital factor of perinatal and neonatal outcome. Anew born baby weighingless than 2.5 kg at birth irrespective of the gestationalageistermedasa low birth weight baby. Low birth weight babie scan beterm SGA orpretermbabies. While a lot of importance is being given to protein and energy deficits, micronutrients other than iron are often forgotten. It has been argued that micronutrient deficiency during pregnancy can lead to LBW. [4]In particular zinc deficiency is associated with abnormal conditions during pregnancy including congenital malformation (anencephaly) and abortion. Though zinc is needed only in small quantity, they have several vital functions in our human body. As their requirements are small, their adequacy have to be checked carefully and moreover many of the trace elements have interactions with each other.[5] Thus their needs have to be adequately met with a concern

over their interactions and toxicity. Among several micronutrients, iron stands first whose importance have been extensively studied andpracticed. Next lies zinc whose importance is slowly brought in to light by several research trials and studies.Hence this study of serum zinc levels in the cord blood of term SGA babies & their mothers and term AGA babies & their mothers was done.In our study, The mean maternal age in AGA was 24.22 and in SGA was 23.88 Which shows that there is no statistical significance in the maternal age between AGA and SGA groups.[6] In a study the maternal age of the control and cases were comparable.The average age of controls was 27.54 and that of cases was 27.5. Thus the two groups were well matched in this study.Thus the mean maternal age in the two groups were comparable similar to the study conducted by BenjaminWet al. [7] In our study The primiparous mother was 46% and 58% in AGA and SGA respectively,whereas in multiparous it was 54% and 42% in AGA and SGA respectively which shows that there is no statistical significance in the parity of mother between AGA and SGA groups which was similar to the study done by Christine A et al. [8]In our study, The LSCS were 42% and NVD was 58% in our study which was not similar to a study conducted by RonaldEet alwere the LSCS were 54% and NVD was 46%.[9,10]

Conclusion

It was found that cord blood zinc levels were low in term SGA babies when compared to term AGA babies. There was also low maternal zinc levels in the term SGA babies when compared to mothers of term AGA babies.

Acknowledgment

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Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Distribution of Hypertensive Patients Associated with Development of Open Angle Glaucoma

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Abstract

Glaucoma is a condition influencing in excess of 60 million individuals overall prompting irreversible vision misfortune. Glaucoma is a dynamic multifactorial optic neuropathy described by optic nerve harm, visual field misfortune and intra visual weight (IOP) which is a modifiable hazard factor. The Mechanical impact of raised IOP on optic nerve head (ONH) is viewed as the most inferable reason for this condition [1]. Nonetheless, a few vascular factors, for example, fundamental hypertension, atherosclerosis, vasospasm and so on., have additionally been ensnared as potential hazard factors that are fit for expanding the danger of open-edge glaucoma (OAG) [2].

Key Words – *Glaucoma, Optic Nerve Head, Open Edge glaucoma*

Introduction

American Heart Association depicts Systemic hypertension as Systolic blood weights ≥140 mm Hg and Diastolic blood weights ≥90 mm Hg. Long haul hypertension can prompt different conditions, for example, coronary supply route infection, stroke, cardiovascular breakdown, fringe vascular illness and constant kidney ailment alongside glaucoma and vision misfortune.

Past examinations done at Baltimore [3], Bolzano [4], Southern Arizona [5], and Rotterdam [6] and an as of late distributed planned investigations in Barbados [7] have demonstrated that lower diastolic perfusion weight (DPP), characterized as diastolic circulatory strain (DBP) less IOP, is an autonomous hazard factor for creating open-point glaucoma (OAG).

The vascular speculation of OAG states that a low pulse (BP) in respect to IOP can prompt low mean visual perfusion weight (MOPP), subsequently impeding perfusion of the ONH with resultant glaucomatous measuring and visual field misfortune. Appraisal of the diurnal vacillations in IOP and MOPP is, along these lines, clinically applicable in glaucoma patients.

Glaucoma is viewed as an optic neuropathy that outcomes in vision misfortune, and it will in general stay asymptomatic until cutting edge stages have been come to. It is assessed that more than 76 million individuals will have glaucoma in 2020 expanding to 111.8 million of every 2040. Essential open-point glaucoma (POAG) is the most well-known type of glaucoma and speaks to roughly 60%–70% of all cases [8]. The most widely recognized hazard factor known is a raised intraocular weight.

Foundational hypertension has been identified with expanded intraocular weight (IOP) and a higher danger of POAG [9]. Despite the fact that the physiopathology of glaucoma is as yet not totally comprehended, IOP remains the principle modifiable hazard factor which is credited towards its direct mechanical impact on the optic nerve head (ONH). Other than the mechanical changes because of the ascent of intraocular weight (IOP) and a few other vascular factors, for example, fundamental hypertension, atherosclerosis and vasospasm have additionally been involved as hazard factors in open point glaucoma (OAG). All things considered, proof

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recommends that harm to the optic nerve axons happens due to microvascular damage and low perfusion [10]. Among vascular variables related with glaucoma, circulatory strain (BP) is the most contemplated, on the grounds that it is identified with microvascular blood stream and IOP, the two principle components that decide the visual perfusion weight (OPP). Visual blood stream is determined by mean visual perfusion weight (MOPP), expectedly characterized as the contrast between mean blood vessel pulse (MAP) and IOP. Concerning the set up job of vascular dysregulation in the pathogenesis of glaucoma, the connection among MOPP and the advancement and movement of glaucoma is fundamental alongside the heap factors that impact OPP, IOP, and MAP. [10].

Materials and Method

Patient in the age group of 40-60 years with essential hypertension presenting to the Ophthalmology outpatient department of Sree Balaji medical college, Chennai – 600 044.

Study Design: Cross-sectional study

Study Period: March 2017 to October 2018.

Study Place: Ophthalmology outpatient department of Sree Balaji medical college, Chromepet, Chennai – 600 044.

Sample Size:100 patients

Information Collection Method:

Educated assent was gotten from all investigation members. A total clinical and visual assessment was done to every single qualified member.

Clinical Procedures and Operational Definitions

In the wake of getting the educated assent, the members experienced a total ophthalmic assessment. One estimation of IOP were acquired by Goldmann applanation tonometry.

Furthermore, a questioner controlled poll was utilized to get statistic, visual, and medicinal chronicles. Members were solicited whether they had a history from glaucoma.

Measurement of Blood Pressure (BP)

BP was estimated by irregular zero sphygmomanometer with the member in the sitting position. Two continuous estimations of systolic and diastolic BP were gotten, and the normal was utilized in the examination. Hypertension was characterized as systolic BP ≥140 mm Hg and additionally diastolic BP (DBP) ≥90 mm Hg as well as present antihypertension treatment. Marginal hypertension was characterized as SBP somewhere in the range of 120 and 140 and additionally DBP somewhere in the range of 80 and 90. Hypotension was characterized as SBP ≤90 and additionally DBP ≤60. Mean blood vessel BP (MABP) was characterized as ⅓SBP + ⅔DBP. Systolic, diastolic, and mean PPs were characterized as systolic, or diastolic or mean blood vessel circulatory strain less IOP, separately.

Findings

Total of 100 individuals who met the selection criteria among the 250 screened, of which, the mean age of the participants was 52 years, minimum and maximum age is 40 and 60 years.

Table-1: Distribution of Glaucoma

Glaucoma Status	Frequency	Percent
Present	54	53.5
Absent	46	46.5
Total	100	100.0

Among the total population 54% had glaucoma.

Table-2: Distribution of POAG

POAG Status		Frequency	Percent
	Present	53	53.5
	Absent	47	46.5
	Total	100	100.0

Distribution of POAG was also 53% among these study population

Table-3: Distribution of BP*OPP*IOP

Descriptive Statistics					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
SBP	99	15	160	134.76	17.510
DBP	99	70	95	82.43	4.710
OPP	99	38	60	49.29	5.648
IOP	100	12	20	15.70	1.224

The above table shows the mean value of the SBP,DBO,OPP and IOP of the study participants.

Discussion

Glaucoma is a multifactorial infection. The pathogenesis of optic nerve harm in glaucoma is credited to a mix of components. Other than the mechanical changes because of the ascent of intraocular weight (IOP), a few vascular factors, for example, fundamental hypertension, atherosclerosis and vasospasm have likewise been embroiled as hazard factors in open edge glaucoma (OAG). A fall in perfusion weight at the optic circle might be brought about by hypotension, vasospasm or intense blood misfortune.

Direct estimation of visual blood stream could bring about various results. Besides, there are inescapable estimation mistakes during evaluation of BP and IOP and furthermore the sizes of estimation contrast (IOP esteems are in the scope of 10-30 mm Hg while BP qualities surmised 100 mm Hg).

Over the last few decades, a variety of OAG risk factors have been identified, including structural properties of the eye such as cupping of the optic disc, myopia, and central corneal thickness; ocular blood flow properties such as ocular perfusion pressure, vascular dysregulation and hemorrhages in the optic disc; and systemic conditions such as systemic blood pressure and diabetes. The mechanisms by which these factors may contribute to OAG pathophysiology are still largely unknown, and this hinders the development of more successful therapeutic approaches for OAG. In particular, it remains unclear which of these factors are causes or consequences of the disease and whether combinations of different factors yield similar risk for OAG.

Conclusion

Along these lines, we need to reevaluate the general effect of this analytic parameter just as its connection to intraocular weight.

The creators not just affirmed the job of visual perfusion weight as a significant hazard factor for the advancement and movement of glaucoma yet besides brought up that this parameter consummately consolidates the vascular and mechanical parts of glaucoma. In perspective on the way that both IOP and BP decide the OPP, the physiological reaction to diminished BP was relied upon to cause impacts on visual BF like those brought about by expanded IOP [11].

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Appropriation of Ocular Perfusion Pressureand its Relationship in Development of Open-Angle Glaucoma

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Abstract

A few clinical investigations have additionally demonstrated that non-physiologic nighttime BP and more extensive circadian vacillation in mean visual perfusion weight (MOPP) are altogether connected with the advancement and movement of OAG [2]. Nonetheless, in Asian populace, the connection between perfusion weight and glaucoma has not been all around recorded [3]. It is known through numerous investigations that BP and IOP change impressively in whites, blacks, and Asians [4], and consequently it is hypothesized that the conveyance and determinants of perfusion weight and its association with glaucoma would be diverse among the Asian population[5].

Keywords: *glaucoma, visual perfusion weight*

Introduction

Glaucoma is a dynamic multifactorial optic neuropathy described by optic nerve harm, visual field misfortune and intra visual weight (IOP) which is a modifiable hazard factor. The Mechanical impact of raised IOP on optic nerve head (ONH) is viewed as the most inferable reason for this condition [1].

Mean visual perfusion weight (MOPP), which can be characterized as the distinction between mean blood vessel circulatory strain (MAP) and IOP is utilized to assess the visual blood stream. In the ongoing occasions, the job of vascular dysregulation has increased tremendous noticeable quality in the pathogenesis of glaucoma, and thus the connection among MOPP and the advancement and movement of glaucoma has turned out to be basic, alongside the bunch factors that impact OPP, IOP, and MAP. The vascular speculation of POAG states that a low pulse (BP) in respect to IOP can prompt low mean visual perfusion weight (MOPP), in this manner debilitating vascular autoregulation of the ONH with resultant glaucomatous measuring and visual field misfortune and thus evaluation of the diurnal varieties in IOP and MOPP is, in this way, clinically important in glaucoma patients.

Visual perfusion weight (OPP) can be characterized as the contrast between mean blood vessel weight (MAP) in the ophthalmic corridor and IOP. Tissue perfusion is basic to keeping up retinal capacity as it doesn't store glucose and furthermore the changing IOP in the eyes depends upon vascular auto guideline to remunerate this. Albeit high intraocular weight was viewed as the most significant hazard factor being developed of well glaucoma, anyway even without high IOP, numerous patients still show movement of glaucoma. This illuminates the way that in certain patients, visual perfusion weight (circulatory strain – intraocular weight) might be a sole significant factor as intraocular weight alone. Along these lines, fundamental hypertension is viewed as being defensive against glaucoma. Epidemiological examinations done in the past have uncertain outcomes about the previously mentioned reality. An elective hypothesis expresses that hypertension may not secure against raised intraocular weight, disregarding expanding visual perfusion weight is that morphological changes to the vasculature and autoregulatory disappointment optional to delayed

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hypertension prompts poor retinal and optic nerve head blood supply [6].

OPP is characterized as the distinction between blood vessel weight and venous weight, which is equivalent to or somewhat more noteworthy than IOP [7]. Robotically, diminished visual blood stream might be auxiliary to raised IOP or potentially decreased BP, or it could be the outcome of an essential affront to the visual vasculature, for example, vasospasm and additionally flawed vascular auto-guideline [7]. Moreover, the Barbados Eye Study demonstrated that people with the most reduced 20% of DPP were 3.3-times bound to create glaucoma [8]. In a subgroup of patients from the Barbados Eye Study pursued for a long time, lower OPPs and lower systolic BPs were again distinguished as hazard factors [9]. In an alternate report, low mean visual perfusion weight (<42 mmHg), systolic perfusion weight (<101 mmHg) and DPP (<55 mmHg) were altogether demonstrated to be hazard factors for the advancement of glaucoma, with relative dangers of 3.1, 2.6 and 3.2, individually [10]. The Egna-Neumarkt Study announced a 4.5% expansion in glaucoma commonness in patients with DPPs <50 mmHg contrasted and patients with DPPs ≥66 mmHg [11]. Regardless of the way that these examinations are from differing populaces, they all found that diminished DPP is a significant hazard factor for the improvement of glaucoma. A few examinations explored the vascular hazard factors in the pathogenesis of glaucoma, with BP and OPP being the most considered. The vascular theory depends on the presumption that irregular perfusion and the consequent ischemia of the ONH assume a noteworthy job in the loss of RGCs.

Visual perfusion weight can be thought of as the weight at which blood enters the eye. Scientifically, OPP is characterized as the blood vessel BP short IOP. Both of these determinants are dynamic natural parameters. Intraocular weight changes for the duration of the day and from everyday. Pulse is considerably increasingly factor, with noteworthy changes all through each heart cycle. During every heartbeat, foundational BP ascends to a pinnacle, the systolic BP, and after that drops to a trough, the diastolic BP. In this manner, OPP is additionally a unique parameter, fluctuating as both BP and IOP shift.

Glaucoma is viewed as an optic neuropathy that outcomes in vision misfortune, and it will in general stay asymptomatic until cutting edge stages have been come to. It is assessed that more than 76 million individuals will have glaucoma in 2020 expanding to 111.8 million out of 2040. Essential open-point glaucoma (POAG) is the most widely recognized type of glaucoma and speaks to around 60%–70% of all cases [14]. The most well-known hazard factor known is a raised intraocular weight.

Glaucoma is one of the main sources of visual impairment all inclusive. Expanding proof demonstrates that the sickness is optional to optic nerve head hypo perfusion and autonomic brokenness. Visual perfusion weight, speaking to visual blood stream, is a key factor that ought to be assessed in the administration of glaucoma. Visual perfusion weight is liable to impact by a bunch of components, and its figuring has been ordinarily improved as the distinction between mean blood vessel circulatory strain and intraocular weight. Regardless, the immediate impact of different factors on circulatory strain and intraocular weight ought not be ignored. Remembering the provincial commonness of ordinary strain glaucoma, we survey the writing and condense the patho physiology of glaucoma, meaning of visual perfusion weight, connection between visual perfusion weight and glaucoma improvement and movement, and key factors that impact visual perfusion weight. A fall in perfusion weight at the optic plate might be brought about by hypotension, vasospasm or intense blood misfortune. Visual perfusion weight is a gauge for the neighborhood intraocular blood stream, determined as contrast between the target esteems for the diastolic or systolic foundational pulse (BP) and IOP.

Mean OPP (MPP) = 2/3 [diastolic BP + 1/3 (systolic BP – diastolic BP)] – IOP

Systolic OPP (SPP) = Systolic BP – IOP

Diastolic OPP (DPP) = Diastolic BP – IOP

A low mean ocular perfusion pressure (MOPP) can impair perfusion of optic nerve head leading to glaucomatous cupping and visual field loss. As MOPP engulfs both systemic BP and IOP, it could be used to evaluate the presence and evolution of OAG better. Previous research showed that a possible connection between ocular perfusion pressure and open-angle glaucoma (OAG) has been hypothesized. The etiology of primary open-angle glaucoma (OAG) remains in doubt, despite extensive research.

Materials and Method

Patient in the age group of 40-60 years presenting to the Ophthalmology outpatient department of Sree Balaji medical college, Chennai – 600 044.

Study Design: Cross-sectional study

Study Period: March 2017 to October 2018.

Study Place: Ophthalmology outpatient department of Sree Balaji medical college, Chromepet, Chennai – 600 044.

Sample Size:100 patients

Data Collection Method

Informed consent was obtained from all study participants. A complete clinical and ocular examination was done to all eligible participants.

Mean Ocular Perfusion Pressure (MOPP) was calculated using standardized formula.

1. MOPP = 2/3 (MAP) - IOP

2. Mean arterial pressure (MAP) = DBP+1/3 (SBP-DBP).

Optic Disc Evaluation was done using +90D lens.

Field charting was done when there is abnormal optic disc changes or when C:D ratio is raised.

Correlation of ocular perfusion pressure with vision, cup disc changes and field changes was studied.

Eye pressure is measured in millimeters of mercury (mmHg). Normal eye pressure ranges from 12-22 mmHg, and eye pressure of greater than 22 mmHg is considered higher than normal. When the IOP is higher than normal but the person does not show signs of glaucoma, this is referred to as ocular hypertension.

Findings

Total of 100 individuals who met the selection criteria among the 250 screened, of which, the mean age of the participants was 52 years, minimum and maximum age is 40 and 60 years.

Table-1: OPP * POAG

Age Present	POAG		Total	
	Absent			
40-45	17	9	26	**Spearman Correlation 0.510**
46-50	14	18	32	
51-55	13	7	20	
56-60	9	12	21	
Total	54	46	100	

While comparing the OPP with OAG, there was significant correlation observed.

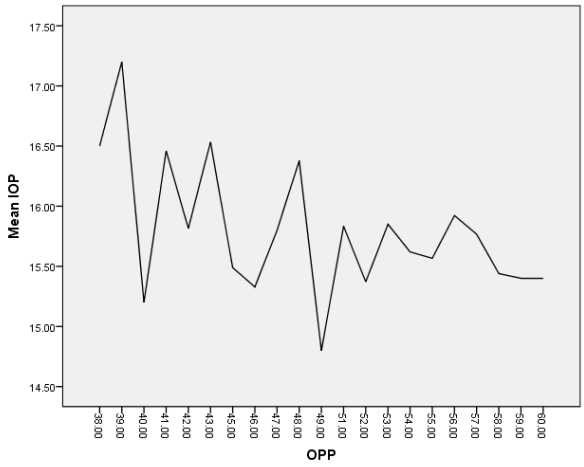
Table-2: OPP * Glaucoma

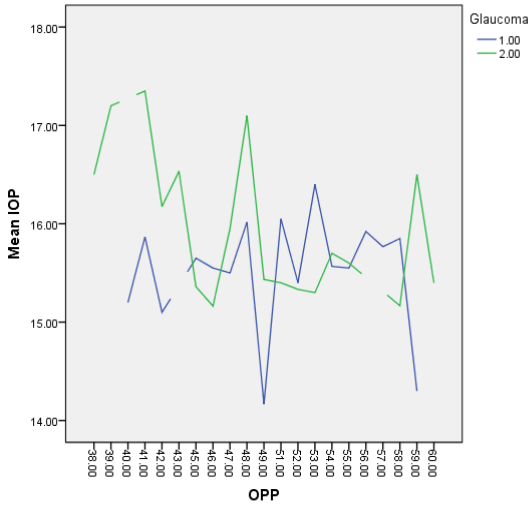
Age Present	Glaucoma		Total		
	Absent				
40-45	10	16	26	**Spearman Correlation 0.040**	**p-value 0.035**
46-50	16	16	32		
51-55	12	8	20		
56-60	15	6	21		
Total	53	46	99		

Though the OPP and Glaucoma was highly statistically significant, it was negatively correlated with Glaucoma.

Table-3: OPP * IOP

Age >15	IOP			Total		
	15-18	<18				
40-45	4	19	3	26	Spearman Correlation -0.068	p-value 0.134
46-50	10	20	2	32		
51-55	5	14	1	20		
56-60	7	13	1	21		
Total	26	66	7	99		





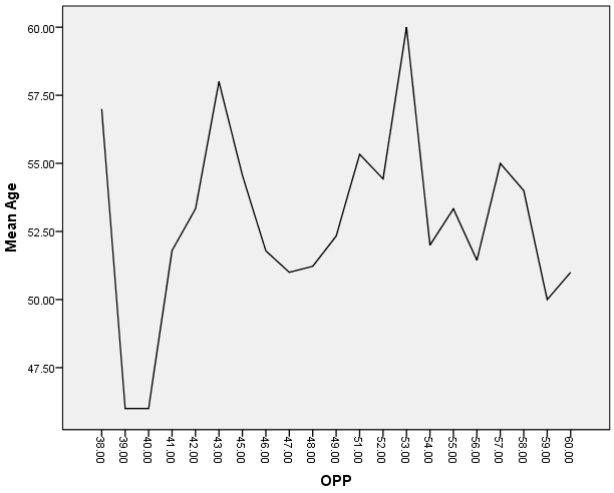
The above graph shows that there is no association with glaucoma status and Mean IOP and OPP.

Table-4: Distribution of BP*OPP*IOP

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
SBP	99	15	160	134.76	17.510
DBP	99	70	95	82.43	4.710
OPP	99	38	60	49.29	5.648
IOP	100	12	20	15.70	1.224

The above table shows the mean value of the SBP,DBO,OPP and IOP of the study participants.

Age Vs OPP



The above graph shows that the OPP was increased if the age increased.

Discussion

Low DOPP has been unequivocally connected with expanded pervasiveness of glaucoma. In the Barbados eye study [15], low DOPP (< 55 mm Hg) was a hazard factor for improvement of glaucoma, with a general danger of 3.2. Following 9 years of further development, it was demonstrated that people with the most minimal 20% of DOPP were 2.2 occasions bound to create glaucoma, despite the fact that pattern BP didn't anticipate OAG chance. In another Caucasian-based examination, the Baltimore Eye Survey found a 6-overlay expanded OAG predominance in subjects with low diastolic perfusion weight (< 30 mm Hg) [16]. Essentially, the Egna-Neumarkt Study [11] revealed a 4.5% expansion in glaucoma pervasiveness in patients with DOPP of < 50 mm Hg contrasted and those with DOPP of ≥ 66 mm Hg. In Proyecto VER, Quigley et al [17] additionally affirmed a 4-overlay increment in OAG pervasiveness at DOPP of < 50 mm Hg. In this way, a low DOPP has been unequivocally connected with OAG commonness in different populace based epidemiological investigations. Actually, the connection among SOPP and pervasiveness of OAG is less predictable. In the wake of modifying for OAG hazard factors, the Blue Mountains Eye Study [18] found an expanded commonness of 10% with every 10 mmHg increment in SOPP. However, in the Barbados Eye Study [8], patients with lower SOPP (< 101.3 mmHg) had 2.6 occasions expanded relative danger of creating OAG. The questionable proof partner SOPP with glaucoma pervasiveness prompts the hypothesis that low DOPP might be increasingly significant in the improvement of glaucoma and is as per the idea that most tissue perfusion happens during diastole. Further information are expected to assess whether the atherosclerotic hazard in high SBP genuinely adds to vascular deficiency of the ONH.

Conclusion

Visual perfusion weight and glaucoma movement Age is a key factor in glaucoma movement. As revealed in the Early Manifest Glaucoma Trial [19], after populace based follow-up for a long time, more seasoned patients had an expanded and quicker movement than more youthful patients. In the Collaborative Initial Glaucoma Treatment Study [20], the relative hazard expanded by 35% for consistently, while in the Advanced Glaucoma Intervention Study [21]. It is hypothesized that with maturing, vessels experience atherosclerosis, bringing about expanded sheer pressure, and bargain of narrow stream and supplement trade [22]. Since OPP is gotten from IOP and BP, their particular association with glaucoma movement is essential. As to, relationship between higher IOP with glaucoma movement have been reliably appeared in major clinical preliminaries in the previous decades. Patients with higher mean IOP during follow-up were bound to advance [23], while IOP decrease was altogether viable in postponing glaucoma movement., The Advanced Glaucoma Intervention Study (AGIS): The Canadian Glaucoma Study found up to a 19% expansion in movement per mm Hg increment in IOP, while the Advanced Glaucoma Intervention Study [24] (The Advanced Glaucoma Intervention Study (AGIS): found a lower pattern IOP (< 18 mm Hg) to be related with diminished visual field movement. The Early Manifest Glaucoma [25] showed a 12% to 13% expanded hazard per mm Hg increment in IOP, and demonstrated the centrality of an underlying decrease in IOP for forecast in glaucoma movement, where every mm Hg decline in IOP from pattern was related with a 8% decline in dangers proportion. As to, its circadian musicality must be considered. On the off chance that low perfusion weight and visual blood stream are embroiled in glaucoma harm, these conditions could likewise influence the movement of built up OAG. Despite the fact that not all investigations are steady, vascular components have been ensnared in the clinical course of glaucoma patients. Besides, circadian change of the mean visual perfusion weight was reliably identified

with infection seriousness in ordinary pressure OAG.

Long haul movement information (as long as 11 years) were given as of late by the Early Manifest Glaucoma Trial, a randomized clinical preliminary assessing the job of quick treatment, when contrasted with no underlying treatment, on glaucoma movement. The new outcomes demonstrate that patients with low systolic perfusion weight at pattern advanced quicker than their partners. The examination additionally assessed elements for movement independently for patients with higher versus, lower IOP at benchmark, as characterized by a middle split. A huge HR of 1.55 for low visual perfusion weight was seen in patients with higher benchmark IOP. This discovering parallels the aftereffects of some pervasiveness thinks about, where the affiliation was watched distinctly in patients with 'high pressure' glaucoma.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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A Study on Life Style Habits of the Life Convicts Lodged in Central Prison, Chennai

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Abstract

Wrongdoing is a man-made idea. Wrongdoing and its connection to different socio-statistic elements has been subject of discussion since days of yore. Wrongdoing is wide spread, assorted in nature and expanding in recurrence. The pace of wrongdoing is consistently expanding step by step everywhere throughout the world, India being no exemption. 1 Crime and its connection to different socio statistic and financial elements decide the idea of wrongdoing

Keywords - *Crime , Wrongdoing*

Introduction

It is a subject of changing mentalities after some time inside a given society, and universal and national contrasts between the social orders. For instance, murder might be generally unlawful, aside from now and again of war, however will-completely finishing the life of a critically ill individual might be legitimately allowed in certain nations, yet is a wrongdoing of homicide in others. In the foreword to the 2002 World Report on Violence and Health, Nelson Mandela expresses, "The twentieth century will be recognized as a century set apart by viciousness, envy, vengeance, predominance, and sexuality (for example assault) which are the all inclusive human behaviors.[2]

Social significance of both work and crime change dramatically over the life course. The relationship between employment and criminal behavior at different life-course stages affects the nature of crime. Unemployment is one of the social factors involved in creation of crime and conviction. Also when a person is committing a crime and getting imprisoned he loses the job and earning, which affects the family's economic condition.[3]

There have been multiple research studies examining the relationship between socioeconomic status and arrests and punishments. Anyways socioeconomic status is independently considered a risk factor. There are multiple research studies establishing the causal link between socioeconomic status and arrest. Elizabeth Brown and Mike Males, authors of "Does Age or Poverty Level Best Predict Criminal Arrest and Homicide Rates?" found that "poverty level is a significantly larger predictor of arrest and homicide risk than age. They specifically looked at the data connecting age to arrest and then compared that to available data associated with socioeconomic status.[4]

Crime is an outcome of particular interest. Much of the crime in the country can be attributed to the issues and problems thrown up by the implications of development deprivations of the benefits and fruits of development pursuits generally led to disparities resulting in the criminality and unrest.[5]

Indian society has been passing through drastic and fundamental changes in the wake of industrialization, westernization and urbanization, both in the structures, socio-economic and cultural spheres which not only produced a changed physical environment and a new form of economic organization but also affected the social order, solidarity, human conduct and thought.

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Crime, which is one social evil, which does major effects on human relations, occurs due to the lack of social comfort and the general state. Tackling crime can be achieved only from a multidisciplinary perspective, to highlight all its features. One can emphasize the prevention policies to fight against corruption at the social level, the establishing of guilt, the proper ranking of the offence or, even more elaborately, consider the forms of terrorism manifestation. Difficulties in conceptualizing crime derive from its various manifestations, both for institutions and individuals, with profound effects and consequences on the economic, social and legal sense. The etiological and causal perception of crime requires the expertise of criminal attitude determination.[6]

Understanding the decent variety of the inner causes, by considering singular human instinct and outside causes pointed towards social, monetary, legitimate or political variables, is fundamental to catch the causal determinism of wrongdoing. Thus, the consideration is centered around the financial models, training or populace thickness dissemination in urban and provincial areas.

It is hard to land at a decent evaluation of the wrongdoing issue an appraisal that assesses the numerous different expenses and advantages of the significant social changes that have additionally made wrongdoing a noticeable national issue. For arranging any counteractive action and control techniques, with respect to wrongdoing and to diminish brutality and different types of wrongdoing, the information of socio-statistic elements and crimes ought to be understood.

The Living conditions in each jail and partnered foundation implied for the authority, care, treatment and restoration of wrongdoers will be perfect with human respect in all angles, for example, settlement, cleanliness, sanitation, nourishment, dress, and medicinal offices.

Congestion aggravates condition for detainees. According to information of 2015 by National Criminal Records Bureau (NCRB), penitentiaries of India having a complete limit of 3,66,781 while real number of detainees living in jails was 4,19,623.7

Hence we have decided to do a study on prison population to explore the factors and determinants of crime and the health status of the prisoners which were not explored much in Tamil Nadu earlier.

AIM AND OBJECTIVES

To study the life style habits of the prisoners lodged in the central prison Puzhal, Chennai.

Materials and Method

A study conducted by Vinod kumar and UshaDatria among prisoners in central prison kota, Rajasthan in 2013 has found that the prevalence of psychiatric morbidities among them to be about 33%.[8]This prevalence was taken as the reference value for calculating the sample size for this study. The sample size was calculated using the formulaN = 4 PQ/ [L] 2

The sample size calculated was 353.76, by adding 10% for non-response rate (353.76+35.3) and the final sample size derived was 388 which was finally rounded off to 400. [N = 400]

Stratified random sampling (proportional stratified random sampling) technique was used to identify the study subjects. A pretested structured questionnaire was used as study stool for data collection. The questionnaire was prepared in English and translated to Tamil.

The data analysis was done using descriptive and analytical statistics. Data was entered in Microsoft excel and data analysis were done using the SPSS software, version 22. The descriptive statistics analysed were presented as frequency distribution and percentage. The descriptive data were presented in the forms of tables (frequency and percentage) and figures.

FINDINGS AND DISCUSSION

Table 1 : Life style habits of the study population

Sl.no	Characteristics	Frequency (N=400)	Percentage
1	**Diet**		
	Vegetarian	20	5.0
	Non-vegetarian	380	95.0
2	**Smoking status**		
	Smoker	279	69.7
	Non smoker	121	30.3
3	**Alcohol status**		
	Consume Alcohol	285	71.2
	Does not Consume alcohol	115	28.8
4	**Chewable tobacco**		
	Tobacco chewer	251	62.7
	Non chewer	149	37.3
5	**Brushing Behaviour**		
	Twice daily	68	17.0
	Once in a day	252	63.0
	Once in two days	80	20.0

Table 4 shows the personal lifestyle habits of the study participants, 95% of the participants were non-vegetarians. Nearly 69.7% (279) were known smokers,71.2% (285) were known alcoholic and 62.7% (251) were tobacco chewers. About 20% (80) of the participants were brushing once in 2 days and 17% (68) were brushing twice in a day.

Nearly 69.7% of the study population were known smokers and 62.7% were chewing tobacco in this study, similar results shown in the studies done by Reddy S et al in a central prison, Bangalore which showed that 87.5% of the inmates were smokers.[9] Similarly, the study done by Torwane et al in Central prison, Bhopal showed that 66.4% of the study population had the habit of tobacco consumption.[10] The study done by Abdu Z et al in Jimma town prison, South West Ethiopia showed that 46% of the study population were smokers.[12] This study shows 71% of the study population were consumed alcohol, while a study done by Abdu Z et al showed that only 21% of the inmates were alcoholic.[11]

From the above findings it is evident that the prevalence of alcohol consumption and smoking were increasing steadily and this may be due the adoption of abusive life style habits among the young and middle age group.

This study shows that 80% of the study population were brushing regularly once or twice in a day and 20% were brushing once in two days. Similar results were shown in a study done by Naghibi Sistani et al with 18% of the inmate were brushing once in two days.[12] This is a reflection of the oral hygiene practices among the prison inmates.

Conclusion

Though the diseases were reported alarmingly

high among the prisoners, when compared to general population shows that, health of the prisoners still continues to be a neglected health care. This may be due to undetected, under-detected and under-treated of the illness in the prisoners since they are a neglected group.

Informed Consent: Obtained in Local language

Ethical approval: Obtained in Instituitional ethical committee

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Study of Prevalence of Non-alcoholic Fatty Liver Disease In Already Diagnosed Metabolic Syndrome Patients in Selected South Indian Population

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Abstract

Background: Metabolic syndrome is a cluster of risk factors that increases the probability for developing cardiovascular disease, diabetes mellitus and chronic kidney disease. Non-alcoholic fatty liver disease is emerging as a major heath burden and is considered as the most common liver disease affecting large number of people and its prevalence is rising. It occurs in significant proportion of people who do not take alcohol.

Aim: It aims in studying the prevalence of non-alcoholic fatty liver disease in already diagnosed metabolic syndrome patients.

Method: A total of 100 metabolic syndrome patients were selected for study over a period of 1year. The patients were selected based on the metabolic syndrome criteria as given by National Cholesterol Education Program (NCEP) adult Treatment Panel III (ATP III). General demographic data were taken and biochemical parameters were estimated by standard guideline.When the criteria for Met syndrome has been fulfilled USG abdomen were taken for these patients.

Results: Out of 100 cases, 34 patients had USG evidence of fatty liver and out of them 18 had grade 1, 14 had grade 2 and 2 had grade 3 fatty liver. Age of the participants ranged from 20-60 yearswhere average age of the patients was 41.36 with standard deviation 7.170. BMI, waist circumference, triglyceride, fasting insulin, HOMAIR are found to be significant while HDL is not significant.

Conclusion: Non-alcoholic fatty liver disease is related with metabolic syndrome which is both the cause and also the consequences in the study population. Increased prevalence of all the metabolic factors and changes are seen in biochemical markers in Non-alcoholic fatty liver cases. Early diagnosis and treatment will help in preventing the complications.

Key words: *Metabolic syndrome, cardiovascular disease, Non-alcoholic fatty liver disease*

Introduction

Non-alcoholic fatty liver disease is considered as the most common liver diseasewhichranges from asymptomatic to simple steatosis, steatohepatitis, advanced fibrosis, cirrhosis and even hepatocellular cancer. Because of the increasing prevalence of obesity & aging, it has become a serious health issue [1-3]. NAFLD is strongly related with the metabolic syndrome risk factors and is seen in those individuals who meet the criteria of metabolic syndrome. On the other hand, metabolic syndrome is a group of risk factors that adversely affect the health. The chance of developing diabetes mellitus, cardiovascular disease, non-alcoholic fatty liver disease, non-alcoholic

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steatohepatitis, cirrhosis, cerebrovascular disease and chronic kidney disease are high in this particular group of people.According to National Cholesterol Education Program (NCEP) Adult Treatment Panel III (ATP III), JAMA 2001, it introduced clinical criteria in which the metabolic syndrome is identified by the presence of three or more of the five abnormalities [4]:

Abdominal obesity (waist circumference >35 inches in women, >40 inches in men), Triglycerides ≥150 mg/dl, High-density lipoprotein cholesterol (<50 mg/dl in women or <40 mg/dl in men), Blood pressure ≥130/≥85 mmHg, Fasting blood glucose ≥ 110mg/dl

In 2005, the International Diabetes Federation (IDF) proposed a definition which represents the modifications of ATP III and WHO guidelines showing visceral obesity as the main factor of the syndrome [5]. IDF definition of the metabolic syndrome: Central obesity (waist circumference) in Caucasian >94 cm in men, >80 cm in women plus at least 2 of the following: Triglycerides >150.5mg/dl or specific treatment for lipid abnormality, HDL-cholesterol <34.8mg/dl in men, <42.5mg/dl in women or specific treatment for lipid abnormality, RR >130 systolic or >85 mm Hg diastolic or treatment of previously diagnosed hypertension, Fasting glucose >100.8 mg/dl or previously diagnosed type 2 diabetes or IGT. Studies have found out the age dependence of metabolic syndrome; it increases with increase in age [6, 7].One of the risk factors is Non-alcoholic fatty liver disease which usually goes undetected or the other co morbid factors takes precedence over this because they are more life threatening hence importance of NAFLD is to be discussed below.

Epidemiology

Globally, NAFLD is estimated as 6.3%-33% of the general population. Ludwig introduced the term Non Alcoholic Fatty Liver Disease (NAFLD) and Non Alcoholic Steato Hepatitis (NASH). It is influenced by age, sex affecting all racial and ethnic groups in the world. As age progresses, its prevalence also increases and is seen more commonly in 40-49 years. Non-alcoholic fatty liver disease contributes 10 to 24 percent of the general population in different countries. The prevalence rises to 57.5% [8] to 74% [9,10] in obese persons.Asmentioned, NAFLD has different stages. Roughly about 10% of NAFLD patients progresses to more severe form, NASH. It is much higher in diabetic and obese individuals as NAFLD in 60%-75% and NASH in 20%-25%.Fatty Liver is a condition of hepatic steatosis detected by abdominal ultrasound scan which is caused by many risk factors and the spectrum of disease may progress from mild to liver fibrosis and cirrhosis [13]. Lipids especially triacylglycerol accumulate excessively in the liver which results in fatty liver. It is considered as the most common liver abnormality among asymptomatic subjects associated with deranged liver function tests .

The risk factors for the development of NAFLD are age, Central obesity, Type 2 Diabetes Mellitus, hyperlipidaemia, Hypertension, Wide Waist circumference, Hypertriglyceridemia, Hypercholesterolemia, hyperuricemia, Low levels of high density lipoprotein (HDL) cholesterol, Family history of steatohepatitis, Cardiovascular disease, High fat diet, Sedentary lifestyle. Pathogenesis is the progression from simple steatosis to steatohepatitis and to advanced fibrosis results from two distinct factors. First is the insulin resistance which leads to the accumulation of fat within hepatocytes and second is the mitochondrial reactive oxygen species which causes peroxidation of lipids, Fas ligand and cytokine induction.

Method And Materials

The study explained to the participants and before taking the blood sample, informed consent were taken from them.Sample size as 100 metabolic syndrome patients.

Inclusion criteria: Age group of 20-50 years who are willing to participate, both genders equally (50- F, 50-M), Non alcoholics, No critical illness.

Exclusion criteria: Alcoholics, Chronic hepatitis, Cirrhosis, Steroid use, Pregnancy. With the help of ROC analysis, the patients are grouped as very high risk, high risk and moderate risk groups. Grading of Fatty liver was done based on the criteria accepted by American Gastroenterological Association.

- Grade I: Increased liver echogenicity with obvious periportal and diaphragmatic echogenicity.
- Grade II: Increased liverechogenicity with periportal echogenicity, without obscuration of the stomach.
- Grade III: Increased liver echogenicity with periportal echogenicity and obscuration of the stomach.

Findings

In this cross-sectional observational study, 100 individuals were selected based on the criteria for metabolic syndrome and their history, general anthropometric measurements, biochemical parameters and USG findings were all studied and is enumerated below.

Distribution of Fatty Liver

Table 1:-Frequency distribution of Fatty Liver

Fatty Liver	Frequency	Percent
Grade 1	18	52.9%
Grade 2	14	41.2%
Grade 3	2	5.9%

Out of 34 fatty liver cases totally identified among 100 patients, almost 52.9% of the cases have grade 1 fatty liver and 41.2% of the cases have grade 2 fatty liver. Only two cases (5.9%) with grade 3 fatty liver were also noted.

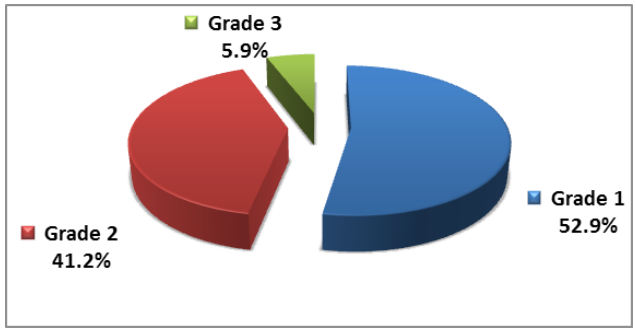


Fig 1:- Distribution of Fatty Liver

By ROC analysis, the patients are demarked into 3 groups as very high risk, high risk and moderate risk groups.

Comparison of BMI between Groups

Table 2:- Comparison of BMI

Group	Mean	SE	Range	p - value
Very High Risk	33.90	0.990	23.0 - 45.2	0.000
High Risk	27.51	0.695	23.0 - 33.5	
Moderate Risk	23.72	0.125	22.0 - 24.9	

Here the p-value is <0.05 so, the difference in BMI between groups is significant different. The table reveals that BMI is significantly higher in very high risk (33.90 ± 0.990) and significantly lower in moderate risk (23.72 ± 0.125) compared to high risk (27.51 ± 0.695).

Comparison of Waist Circumference between Groups

Table 3:- Comparison of Waist Circumference between Groups

Group	Mean	SE	Range	p – value
Very High Risk	100.6	1.591	83.5 - 117.2	0.000
High Risk	96.12	1.841	85.0 - 112.5	
Moderate Risk	83.96	0.153	82.0 - 85.0	

Here the p-value <0.05; the difference in waist circumference between groups is significant. The table reveals that waist circumference is significantly higher in very high risk (100.6 ± 1.591) and significantly lower in moderate risk (83.96 ± 0.153) compared to high risk (96.12 ± 1.841).

Comparison of TGL between Groups

Table 4:- Comparison of TGL between Groups

Group	Mean	SE	Range	p – value
Very High Risk	263.9	13.70	152 - 500	0.000
High Risk	202.1	6.531	158 - 333	
Moderate Risk	183.7	7.650	152 - 332	

Here the p-value <0.05; the difference in TGL between groups is significant. The table reveals that TGL is significantly higher in very high risk (263.9 ± 13.70) compared to high risk (202.1 ± 6.531) and moderate risk (183.7 ± 7.650).

Comparison of HDL between Groups

Table 5:- Comparison of HDL between Groups

Group	Mean	SE	Range	p – value
Very High Risk	43.09	1.533	30 - 60	0.267
High Risk	40.44	0.996	30 - 52	
Moderate Risk	42.53	1.088	30 - 52	

Here the p-value >0.05; the difference in HDL between groups is not significant. The table reveals that HDL is almost same in very high risk (43.09 ± 1.533), high risk (40.44 ± 0.996) and moderate risk (42.53 ± 1.088).

Comparison of Fasting Insulin between Groups

Table 6:- Comparison of Fasting Insulin between Groups

Group	Mean	SE	Range	p - value
Very High Risk	11.69	0.485	7.0 - 17.0	0.000
High Risk	9.656	0.246	5.8 - 12.9	
Moderate Risk	7.020	0.241	3.8 - 10.0	

Here the p-value <0.05; the difference in fasting insulin between groups is significant. The table reveals that fasting insulin is significantly higher in very high risk (11.69 ± 0.485) and significantly lower in moderate risk (7.020 ± 0.241) compared to high risk (9.656 ± 0.246).

Comparison of HOMAIR between Groups

Table 7:- Comparison of HOMAIR between Groups

Group	Mean	SE	Range	p – value
Very High Risk	4.009	0.165	2.5 - 6.0	0.000
High Risk	2.897	0.050	2.2 - 3.5	
Moderate Risk	2.080	0.043	1.8 - 2.7	

Here the p-value <0.05; the difference in HOMAIR between groups is significant. The table reveals that HOMAIR is significantly higher in very high risk (4.009 ± 0.165) and significantly lower in moderate risk (2.080 ± 0.043) compared to high risk (2.897 ± 0.050).

Discussion

The metabolic syndrome has become one of the more prevalent diseases in Asian countries and with increased incidence of obesity and insulin resistance especially among Indian population we have found a rise in NAFLD due to metabolic syndrome excluding other causes. NAFLD has been recognized as the common liver disease causing morbidity and mortality. It progresses from simple steatosis to steatohepatitis to cirrhosis and hepatic failure. The main pathophysiology being insulin resistance producing steatosis and mitochondrial reactive oxygen species increasing lipid peroxidation leading to increased hepatic damage [16] which have increased undetected liver disease in these patients.In our study with 100 patients diagnosed with metabolic syndrome we found that 34 patients had USG evidence of fatty liver and out of them 18 had grade 1, 14 had grade 2 and 2 had grade 3 fatty liver.Obesity, one of the most important risk factor is associated with fatty liver [17] is commonly observed in developed countries. Diabetes mellitus along with obesity, hyperlipidaemia and hypertension are the main manifestations of metabolic syndrome associated with insulin resistance [18].Metabolic syndrome is a group of metabolic abnormalities which have high chance of having diabetes mellitus, cardiovascular disease, NAFLD, NASH, cirrhosis and cerebrovascular disease. Different examinations have researched that advancement of NAFLD and MS go deliver hand. Others studies managing comparable cases like in 2018, Pardhe et al set up a relationship between's metabolic disorder and biochemical changes among non-alcoholic greasy liver malady patients in a tertiary consideration emergency clinic of Nepal. An aggregate of 429 (219 NAFLD and 210 control) subjects were chosen and was presumed that there is an expanded predominance of metabolic disorder parts and noteworthy changes seen in biochemical markers in NAFLD patients

In 2006, Peter Latimar L Andrada et al projected a similar study to determine the prevalence of MS among patients with non-alcoholic fatty liver disease. It is a case series of patients with NAFLD diagnosed by ultrasonography .

RoliAgrawal et al in 2009analysed a group of 129 patients of cross sectional study to find out the association between non-alcoholic fatty liver disorder and obesity, which is the important risk factor for metabolic syndrome. It was concluded that there is a positive correlation with obesity

A review article on hypertension and the metabolic syndrome by Lea Duvnjak et al [(1)] in 2008 elaborated that Insulin resistance and central obesity are considered the main factors involved in the pathogenesis of the metabolic syndrome. Hypertension is associated with the metabolic syndrome.

Most of the cases of NAFLD are asymptomatic. Hepatomegaly,being the commonest physical finding. The underlying pathogenesis is the insulin resistance which leads to the triglyceride accumulation within hepatocytes and the mitochondrial reactive oxygen species which cause lipid peroxidation and cytokine induction.

Limitations ofthe Study:

- In this study as the sample size is limited therefore for a better understanding a large population can be included.

- Liver biopsy is the gold standard for predicting Non Alcoholic Fatty Liver disease which was not done in this study as it is a major invasive procedure.

Conclusion

Non-alcoholic greasy liver infection is connected with metabolic disorder which is both the reason and furthermore the results in the examination population. There is an expanded pervasiveness of the considerable number of variables of metabolic disorder and changes are seen in biochemical markers in Non-alcoholic greasy liver cases.Ultrasound greasy liver record is a modest, straightforward and exact locator of danger of metabolic disorder. Most instances of NAFLD are asymptomatic. So, frequent checking, timely diagnosis and treatment helps in delaying the complications and prevents cardiac disease as its relation with MS is frequent.

Informed Consent: Obtained in Local language

Ethical approval: Obtained in Instituitional ethical committee

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Study of Lipid Profile in Metabolic Syndrome Patients

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Abstract

Background: Metabolic syndrome is a group of metabolic abnormalities in which the chance of developing cardiovascular disease, diabetes mellitus, chronic kidney disease are high.

Aim: It aims at studying the lipid abnormalities in metabolic syndrome patients.

Method: Total of 100 metabolic syndrome patients were selected for study over a period of 1year. These patients were selected based on the criteria for metabolic syndrome as established by National Cholesterol Education Program (NCEP) adult Treatment Panel III (ATP III). Demographic data were taken and biochemical parameters were estimated by standard guideline.

Results: Total cholesterol is significantly higher in very high risk (272.1 ± 8.591) compared to high risk (241.2 ± 3.901) and moderate risk (231.5 ± 4.498).TGL is significantly higher in very high risk (263.9 ± 13.70) compared to high risk (202.1 ± 6.531) and moderate risk (183.7 ± 7.650).HDL is almost same in very high risk (43.09 ± 1.533), high risk (40.44 ± 0.996) and moderate risk (42.53 ± 1.088). LDL is significantly higher in very high risk (177.9 ± 4.255) and high risk (169.4 ± 3.190) compared to moderate risk (155.7 ± 3.098). VLDL is significantly higher in very high risk (52.78 ± 2.739) compared to high risk (40.43 ± 1.306) and moderate risk (36.73 ± 1.530).CHO: HDL is significantly higher in very high risk (6.648 ± 0.366) compared to moderate risk (5.560 ± 0.207). High risk (6.060 ± 0.156) is not significantly different from very high risk and moderate risk.Thus, TC, TGL, LDL, VLDL, and CHO:HDL is significant as p value < 0.05 while HDL did not have any significance as p value > 0.05

Conclusion: In this study, high prevalence of dyslipidaemia is seen. So, timely diagnosis and treatment will help in detecting dyslipidaemia patients in future.

Key words: *Dyslipidaemia, Lipid profile, NCEP, Metabolic syndrome.*

Introduction

The term metabolic syndrome (MS) also known as "syndrome X", "insulin resistance syndrome" was only coined in the 1950s and commonly used in the late 1970s. It is a group of risk factors that adversely affect the health. The chance of developing diabetes mellitus, cardiovascular disease, non-alcoholic fatty liver disease, non-alcoholic steatohepatitis, cirrhosis, cerebrovascular disease and chronic kidney disease are high in these particular groups of people. The prevalence of metabolic syndrome is approximated as 17%-25% in general population [1, 2] and 59% to 61% in people with diabetes mellitus [1,3]. Researchers have shown a higher incidence of the metabolic syndrome in men [4, 5] than in women, while in some other studies, it shows the reverse of it [6]. Studies have found out the age dependence of metabolic syndrome; it increases with increase in age [4, 7].

According to National Cholesterol Education Program (NCEP) Adult Treatment Panel III (ATP III), JAMA 2001, it introduced clinical criteria in which the metabolic syndrome is identified by the presence of three or more of the five abnormalities [8]:

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Abdominal obesity (waist circumference >35 inches in women, >40 inches in men), Triglycerides ≥150 mg/dl, High-density lipoprotein cholesterol (<50 mg/dl in women or<40 mg/dl in men), Blood pressure ≥130/≥85 mmHg, Fasting blood glucose ≥ 110mg/dl

In 2005, the International Diabetes Federation (IDF) proposed a definition which represents the modifications of ATP III and WHO guidelines showing visceral obesity as the main factor of the syndrome [7].

Metabolic risk factors contributing are abdominal obesity, dyslipidemia, hypertension, elevated plasma glucose, pro-thrombotic state and pro-inflammatory state Dyslipidaemia characterized by increase TGL and decrease HDL leads to cardiovascular complications. It is seen in 20-80% of NAFLD patients [14] and the leading cause of deaths. Several studies were done, Matteoni et al found mortality rate of 36% among 132 patients and was due to cardiac complications

Aim: Study of lipid profile in metabolic syndrome patients.

Method and Materials

This study was conducted in the Department of Biochemistry, Sree Balaji Medical College and Hospital, Chromepet, Chennai during the period of December 2016 – December 2017 among 100 patients with metabolic syndrome attaining outpatient and inpatient services of the Department of General Medicine. The study explained to the participants and before taking the blood sample, informed consent were taken from them. These patients were selected based on the criteria for metabolic syndrome as established by National Cholesterol Education Program (NCEP) Adult Treatment Panel III (ATP III).

Inclusion criteria:

- Patients between age group of 20-50 years who are willing to participate.
- 100 patients with metabolic syndrome
- Both genders equally (50- F,50- M)

Exclusion criteria: Chronic hepatitis, Cirrhosis, Steroid use, Pregnancy, Malignancy

General history, medical and family history were also noted. In these patients general demographic data like history, age, gender, waist circumference and blood pressure were recorded.The laboratory investigations done: blood sugar (fasting and post prandial), total cholesterol, triglyceride, HDL, LDL, VLDL. All the Biochemical Investigations were done using BS390 fully automated analyser.

Findings and Discussion

ROC Analysis

On performing receiver operative characteristics analysis with the above set criteria we noticed the patients getting demarked into 3 risk categories: Moderate Risk, High Riskand Very High Risk

The frequency of distribution was 30 moderate risk cases, 36 high risk cases and 34 very high risk cases.

Here the p-value <0.05; the difference in waist circumference between groups is significant. The table reveals that waist circumference is significantly higher in very high risk (100.6 ± 1.591) and significantly lower in moderate risk (83.96 ± 0.153) compared to high risk (96.12 ± 1.841).

Here the p-value <0.05; the difference in systolic blood pressure between groups is significant. The table reveals that systolic blood pressure is significantly higher in very high risk (147.2 ± 1.241) compared to high risk (140.4 ± 0.851) and moderate risk (141.5 ± 1.178).

Table 1:- Comparison of FBS between Groups

Group	Mean	SE	Range	p - value
Very High Risk	141.6	5.159	100 - 244	0.001
High Risk	123.2	2.658	100 - 180	
Moderate Risk	123.6	3.764	100 - 200	

Here the p-value <0.05; the difference in FBS between groups is significant. The table reveals that FBS is significantly higher in very high risk (141.6 ± 5.159) compared to high risk (123.2 ± 2.658) and moderate risk (123.6 ± 3.764).

Table 2:- Comparison of PPBS between Groups

Group	Mean	SE	Range	p – value
Very High Risk	196.9	9.137	130 - 309	0.272
High Risk	197.8	9.163	103 - 308	
Moderate Risk	178.0	10.20	103 - 304	

Here the p-value >0.05; the difference in PPBS between groups is not significant. The table reveals that PPBS is almost same in very high risk (196.9 ± 9.137), high risk (197.8 ± 9.163) and moderate risk (178.0 ± 10.20).

Table 3:- Comparison of Total Cholesterol between Groups

Group	Mean	SE	Range	p – value
Very High Risk	272.1	8.591	200 - 420	0.000
High Risk	241.2	3.901	201 - 300	
Moderate Risk	231.5	4.498	200 - 300	

Here the p-value <0.05; the difference in total cholesterol between groups is significant. The table reveals that total cholesterol is significantly higher in very high risk (272.1 ± 8.591) compared to high risk (241.2 ± 3.901) and moderate risk (231.5 ± 4.498).

Table 4:- Comparison of TGL between Groups

Group	Mean	SE	Range	p – value
Very High Risk	263.9	13.70	152 - 500	0.000
High Risk	202.1	6.531	158 - 333	
Moderate Risk	183.7	7.650	152 - 332	

Here the p-value <0.05; the difference in TGL between groups is significant. The table reveals that TGL is significantly higher in very high risk (263.9 ± 13.70) compared to high risk (202.1 ± 6.531) and moderate risk (183.7 ± 7.650).

Table 5:- Comparison of HDL between Groups

Group	Mean	SE	Range	p – value
Very High Risk	43.09	1.533	30 - 60	0.267
High Risk	40.44	0.996	30 - 52	
Moderate Risk	42.53	1.088	30 - 52	

Here the p-value >0.05; the difference in HDL between groups is not significant. The table reveals that HDL is almost same in very high risk (43.09 ± 1.533), high risk (40.44 ± 0.996) and moderate risk (42.53 ± 1.088).

Table 6:- Comparison of LDL between Groups

Group	Mean	SE	Range	p – value
Very High Risk	177.9	4.255	120 - 220	0.000
High Risk	169.4	3.190	134 - 200	
Moderate Risk	155.7	3.098	132 - 200	

Here the p-value <0.05; the difference in LDL between groups is significant. The table reveals that LDL is significantly higher in very high risk (177.9 ± 4.255) and high risk (169.4 ± 3.190) compared to moderate risk (155.7 ± 3.098).

Here the p-value is less than the significance level 0.05; the difference in VLDL between groups is significant. That is, there is a significant difference in VLDL between groups. The table reveals that VLDL is significantly higher in very high risk (52.78 ± 2.739) compared to high risk (40.43 ± 1.306) and moderate risk (36.73 ± 1.530).

Here the p-value < 0.05; the difference in CHO:HDL between groups is significant. The table reveals that CHO:HDL is significantly higher in very high risk (6.648 ± 0.366) compared to moderate risk (5.560 ± 0.207). High risk (6.060 ± 0.156) is not significantly different from very high risk and moderate risk.

Discussion

The metabolic syndrome has become one of the more prevalent diseases in Asian countries.In our study with 100 patients diagnosed with metabolic syndrome, WC is significantly higher in very high risk (100.6 ± 1.591) and significantly lower in moderate risk (83.96 ± 0.153) compared to high risk (96.12 ± 1.841). The total cholesterol is significantly higher in very high risk (272.1 ± 8.591) compared to high risk (241.2 ± 3.901) and moderate risk (231.5 ± 4.498). TGL is also significantly higher in very high risk (263.9 ± 13.70) compared to high risk (202.1 ± 6.531) and moderate risk (183.7 ± 7.650). HDL between groups is not significant. It is almost same in very high risk (43.09 ± 1.533), high risk (40.44 ± 0.996) and moderate risk (42.53 ± 1.088). On the other hand, LDL is significantly higher in very high risk group (177.9 ± 4.255) and high risk (169.4 ± 3.190) compared to moderate risk (155.7 ± 3.098). VLDL is significantly higher in very high risk (52.78 ± 2.739) compared to high risk (40.43 ± 1.306) and moderate risk (36.73 ± 1.530). CHO:HDL is significantly higher in very high risk (6.648 ± 0.366) compared to moderate risk (5.560 ± 0.207). High risk (6.060 ± 0.156) is not significantly different from very high risk and moderate risk.

Thus, TC, TGL, LDL, VLDLand CHO:HDL is significant while HDL did not have any significance.A study done by Dhumal Uttareshvar Mahaling et al [5] to detect and do a comparison of serum lipid abnormalities in patients with different grades of non-alcoholic fatty liver diagnosed by ultrasonography. A total of 70 NAFLD cases (30 males and 40 females) taken and their lipid profile compared. It was found that, out of 70 cases, grade I NAFLD as 47.15%, grade II of 42.85% and grade III of 10%. Serum TG, TC, LDL and VLDL levels were raised and low serum HDL levels were seen in 62.85%.

An original article by AbhijitSen et al [6] in 2013, conducted a cross sectional study to assess the BMI and lipid profile of NAFLD patients. A total of 385 NAFLD subjects included where the demographic and lipid profile as total cholesterol, triglycerides, HDL, LDL, VLDL recorded. TC and TG were found to be higher in grade III and similarly for HDL and VLDL. But LDL was similar in all grades of NAFLD patients.

A similar study by Khem Raj Bhusal et al was conducted on studying the lipid abnormalities in different grades by ultrasound. A total of 100 NAFLD patients (67 males and 37 females) were included in the study where mild NAFLD was found in 83%, moderate in 17% n severe none. Similarly, TC, TG, LDL were raised and HDL decreased. It was concluded that prevalence of dyslipidemia was high in NAFLD patients. So, early detection with ultrasonography is useful in these patients.

Bashu Dev Pardhe et al [19] shows the bidirectional and mutual linkage of high density lipoprotein when compared to controls, which was significantly less as compared to the controls. Likewise another study was carried out by Agarwal et al. and Uttareshvar et al who reported that there was an increase in TC, TGL, LDL-C,

VLDL-C but decrease in HDL-C levels indicating the possible atherogenic dyslipidaemia

The uptake of fatty acids in the liver causes accumulation of fat especially triglyceride, liver toxicity and the inflammatory cytokines, tumour necrosis factor causes non-alcoholic fatty liver disease and also fatty liver with mild to moderate elevation of liver enzymes[7].

Conclusion

The study showed patients with dyslipidaemia. There is positive correlation of obesity, waist circumference, systolic blood pressure, fasting plasma glucose, total cholesterol, triglyceride, LDL, VLDL and negative correlation with HDL-C.Dyslipidaemia is a common condition associated with non-alcoholic fatty liver disease. So, early detection, frequent checking, identifying and treating dyslipidaemia is important to prevent any cardiovascular and cerebrovascular disease.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Study of Prevalence of Thyroid Lesions of Patients Coming to Department of Pathology, SBMCH

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Abstract

Introduction: Thyroid cancer is the most common endocrine neoplasm. It is well documented that the incidence of thyroid cancer is higher in women than in men and its incidence is growing at a global level. As the pathology of thyroid is complex, which comprises a benign element (that can coexist with other pathologies), and also a malignant element which has a devastating impact on the patient.Reports have shown that the patients' age when being diagnosed, sex, tumour size, lymph node, distant metastases and pathologic differentiation of the cancer are the risk factors of prognosis in thyroid cancer.

Materials & Method: The present study consists of 60 cases of thyroid masses which were removed surgically and were sent for the Histopathological Examination to our department (Department of Pathology, SBMCH). All these specimens were received from the Department of Surgery, SBMCH.The present study highlighted the prevalence of thyroid lesions among patients coming to our department of pathology, SBMCH.

Results: The prevalence of thyroid specimens coming to our department from all the departments is 2.70%, out of the specimens from the surgery department, the prevalence of thyroid specimens is 6.68%.The ratio between M:F is 1 : 4.5.The mean age group in which thyroid lesions are seen most commonly is 40-49 years followed by 30-39 years and the mean age is 43.08 years.

Conclusion: Among the distribution of thyroid lesions, the prevalence of papillary carcinoma cases were reported as more common which were of 41.67% in this study followed by nodular colloid goitre of 36.67%. Follicular Adenoma cases were reported as 16.67%. Follicular carcinoma cases were reported as least prevalence of 5 %.

Key Words: *Prevalence, Thyroid cancer, Age & Sex Incidence.*

Introduction

The thyroid is a significant endocrine organ, which assumes a noteworthy job in the elements of practically all typical metabolic procedures. As the pathology of thyroid is unpredictable, which contains a favorable component (that can coincide with different pathologies), and furthermore a dangerous component which devastatingly affects the patient.(1) Stress is seen as activating element for the immune system thyroid pathology. Thyroid nodules which are more commonly encountered during routine medical care and their prevalence increases with age, with the average of 4−7% in adult population.(2)It has been documented that 90 people were diagnosed with thyroid cancer out of 1,00,000 people and among these patients, 6.8 people were died in china. It has also been reported that 1,980 people died of the disease in 2016 and it has been estimated that there will be 64,300 new patients of thyroid cancer in USA.(3)Reports have shown that the patients' age when being diagnosed, sex, tumour size, lymph node, distant metastases and

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pathologic differentiation of the cancer are the risk factors of prognosis in thyroid cancer.Thyroid cancer is the most common endocrine neoplasm. It is all around recorded that the rate of thyroid malignant growth is higher in ladies than in men and its rate is developing at a worldwide level.(4)However, men by and large go to the doctor in a further developed phase of infection, exhibiting extra-thyroidal augmentation, subsequently prompting an increasingly held guess on both endurance and repeat pace of the disease.The fundamental driver for increment in number of new thyroid malignant growth cases in the most recent decade are: radiation (ionizing radiation), natural components, hereditary elements, better access of the populace to wellbeing administrations with expanded addressability, and the improvement of restorative imaging with early discovery of any adjustments in the thyroid organ.

Materials & Method

The present study consists of 60 cases of thyroid masses which were removed surgically and were sent for the Histopathological Examination to our department (Department of Pathology, SBMCH). All these specimens were received from the Department of Surgery, SBMCH. These 60 cases include 22(36.67%) Non-neoplastic lesions of Thyroid which include Nodular Goitre, MNG, Nodular Goitre with papillary hyperplasia,10(16.67%) benign neoplasms of Thyroid which include 8 cases of Follicular Adenoma and 2 cases of Hurthle cell adenoma and 28 Malignant lesions of Thyroid which include 25(41.67%) cases of Papillary carcinoma of Thyroid and 3 (5%) cases of Follicular carcinoma of Thyroid.The present study highlighted the prevalence of thyroid lesions among patients coming to our department of pathology,SBMCH.[4-6]

Findings

During 17 months study period, total of 2893 biopsy specimens were received in our department for histopathological examination. Among these cases, a total of 1172 cases were received from surgery department, out of which 78 cases were thyroid specimens. The prevalence of thyroid specimens coming to our department from all the departments is 2.70%, out of the specimens from the surgery department, the prevalence of thyroid specimens is 6.68%.

Prevalence of Thyroid Lesions

Table-1: Year-Wise Distribution of Thyroid Lesions

Year	Total no. of Biopsy specimens received	Total no. of specimens received from surgery department	Total no. of Thyroid specimens received	% of Thyroid Cases among total biopsy specimens	% of Thyroid cases among cases received from surgery dept.
01-03-2017 to 31-12-2017	1705	676	48	2.82 %	7.1%
01-01-2018 To 31-07-2018	1188	496	30	2.52%	6.05%
Total (17 months)	2893	1172	78	2.70%	6.65%

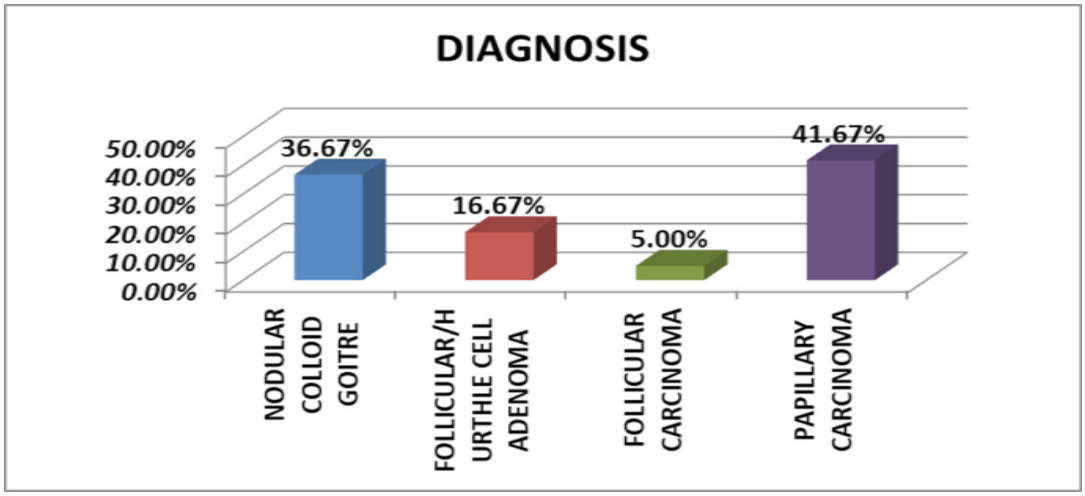
Histopathological Evaluation of Thyroid Lesions

The histopathological diagnosis was done for all the 78 thyroid cases, out of them 60 cases were taken for study by excluding few Non-neoplastic lesions like inflammatory lesions as mentioned earlier and their distribution in the current study was shown in Table:2 and chart:1.

Table 2: Distribution of Thyroid Lesions among 60 Cases

Diagnosis			No. of Cases	% of Cases
Non-Neoplastic		Nodular Colloid Goitre	22	36.67%
Benign Hurthle Cell Adenoma (2)		Follicular Adenoma (8)	10	16.67%
Malignant	Follicular Carcinoma	Oncocytic (1)	3	5.00%
	Papillary Carcinoma	Follicular (10)	25	41.67%
		Classic (6)		
		Oncocytic (4)		
		Solid (2)		
		Micropapillary (3)		
Total			60	100.00%

Among the distribution of thyroid lesions, the prevalence of papillary carcinoma of thyroid cases were reported as more common which were of 41.67% in this study followed by nodular colloid goitre of 36.67%. Follicular carcinoma was of least prevalence of 5%. No medullary carcinoma and anaplastic carcinoma cases were received during this study period.[1-3]



SEX INCIDENCE:

The sex incidence of thyroid lesions were shown in table-3 and chart-2:

TABLE -3

Sex	Cases	
	No.	**%**
Male	11	18.33%
Female	49	81.67%
Total	60	100%

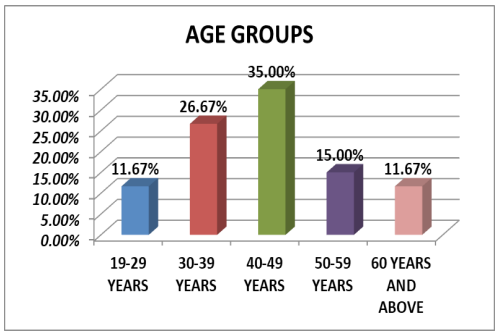
The sex prevalence is seen as Female preponderance in this study. Out of 60 cases studied, 11(18.33%) were Male and 49 (81.67%) were Female as shown in table-3 & chart-2. The ratio between M:F is 1 : 4.5.

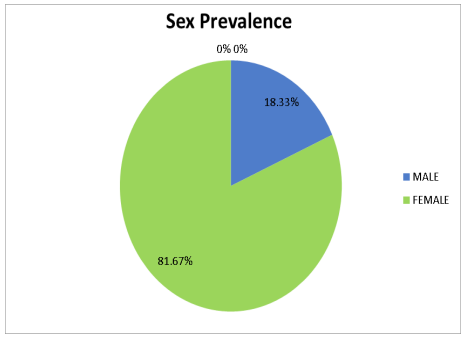
Age Incidence:

Table :4

AGE GROUPS	NO. OF CASES	PERCENTAGE
19-29 YEARS	7	11.67%
30-39 YEARS	16	26.67%
40-49 YEARS	21	35.00%
50-59 YEARS	9	15.00%
60 YEARS AND ABOVE	7	11.67%
Total	60	100.00%
Mean Age	43.08 Years	

The mean age group in which thyroid lesions are seen most commonly is 40-49 years followed by 30-39 years and the mean age is 43.08 years.





Discussion

The prevalence of thyroid nodules mostly depends on the method that is used for detecting the nodules.

An average worldwide prevalence of thyroid nodules, by palpation is estimated as 4−7% in iodine-sufficient regions, by USG imaging is up to 35−70%, and at autopsy from 50% to over 80%.[5]With current diagnostic methods of clinically evident thyroid nodules, the risk of malignancy in all nodules is between 5% and 15%, whereas 15−20% are estimated to be benign adenomas and the rest are adenomatous nodules.[5]Current practice considers as goitre to be a benign disease with no need for routine follow-up. Worldwide, thyroid cancer is the 18th most common cancer type among both genders, 9thin women and 21st in men, but it is the most common endocrine cancer.In a review, Nixon and Simo[6] estimated the incidence of MNG to be approximately 10% in the population when screened by USG. The risk of occult cancer was estimated to be up to 10−35% in these occult MNGs. On the other hand, in a large meta-analysis study, it was stated that the risk of thyroid cancer was less frequent in MNG than in a single nodule, in which the prevalence of thyroid cancer was estimated as 5%.The National Cancer Institute Surveillance Epidemiology and End Results (SEER) programme has reported increased incidence rates of thyroid cancer in both genders, since 1980 in the United States. Similar findings, especially increased incidence of papillary subtypes in women, had been reported in almost all continents: Europe, the Americas, Asia and Oceania. [7]The WHO changed their histological classification of PTC according to nuclear features in 1988, which led to a shift of many carcinomas from FTC to FVPTC and to reduced FTC cases. FVPTC is predominantly comprised of a follicular architecture, with the majority of cells containing nuclei of pseudo inclusions and grooves.[8]Increased incidence of thyroid cancer, especially PTC, may be due to the supplementation of iodine in food products, which is linked to autoimmune thyroiditis and again to PTC. Additionally, increased use of bioaccumulating polybrominated diphenyl ethers (PBDEs), which are used as fire retardant coating matter in textiles and furniture, had altered thyroid hormone homeostasis and caused thyroid dysfunction and tumorigenesis.[8]Increased exposure to external radiation, either therapeutic or accidental radiation, can also cause thyroid cancer especially PTC and females are known to be more susceptible to it.[9]

Risk Factors: The improvement of the various subgroups of thyroid malignant growths is impacted for the most part by natural, hereditary and hormonal elements and sometimes by the cooperation among them. Among the natural elements, ionizing radiation is the best-settled reason for thyroid carcinoma. Ron et al (10), found in a pooled-examination with 58000 uncovered people, 61000 unexposed, 700 thyroid carcinoma, and 3 million man years, a critical portion hazard for presentation during youth, in view of five companions and two case-control studies.In ladies, the hazard for thyroid carcinoma is roughly 3-crease more when contrasted with men. This could be a direct result of an impact of estrogen and/or different variables related with pregnancy, as the frequency of thyroid disease is nearly the equivalent for the two sexual orientations before adolescence and after the female menopause. [7]

Occurrence of thyroid lesions:60 net examples were taken for the present studystudy which were gotten for histopathological assessment after beginning cytological assessment by FNAC (fine needle yearning cytology) in our division of pathology, SreeBalaji Medical College, Chennai. In present examination Non-neoplastic sores represents 22 cases and neoplastic injuries represents 38cases. The proportion between non-neoplastic and neoplastic thyroid sores in this investigation is 1:1.72.

Incidence of Non-neoplastic and Neoplastic thyroid lesions in this study and correlation with other studies is tabulated in table number -5.

TABLE-5: Comparative study of Incidence with other studies

SL.No.	Series	Non-Neoplastic	Neoplastic	Ratio
1.	Slowinska-Klencka et al. (11)	22	78	1: 3.54
2.	H.A.Aiad et al(12)	27	53	1: 1.97
3.	Solymosi et al (13)	17	34	1: 2
4.	Pujani et al (14)	50	50	1: 1
5.	Present study	22	38	1: 1.72

In present study and also correlation studies showed incidence of malignant lesions higher than benign lesions.

Age Incidence

In the present study the mean age of presentation is 43.08 years which correlates with the literature of various authors and tabulated in table number – 6.

SL.No.	Studies	Mean Age
1.	H.A.Aiad et al[12]	44.17 years
2.	Hossain M I et al [15]	38.21 years
3.	Martin et al [16]	39.5 years
4.	Prakash HM et al [17]	35.67 years
5.	Present study	43.08 years

Table-6: Comparative study of mean age with other studies

Sex Incidence: In this study, majority of them were females. Female to male ratio of 4.5:1 and correlates with observation of other studies as indicated in table number-7.

Conclusion

In present study Non-neoplastic lesions accounts for 22 cases and neoplastic lesions accounts for 38 cases. The ratio between non-neoplastic and neoplastic thyroid lesions in this study is 1:1.72.The prevalence of thyroid specimens coming to our department from all the departments is 2.70%, out of the specimens from the surgery department, the prevalence of thyroid specimens is 6.68%.Among the distribution of thyroid lesions, the prevalence of papillary carcinoma cases were reported as more common which were of 41.67% in this study followed by nodular colloid goitre of 36.67%. Follicular Adenoma cases were reported as 16.67%. Follicular carcinoma cases were reported as least prevalence of 5 %.A total of 60 patients belonging to the age group of 19-70 years with the mean age of 43.08 years, were subjected to histopathological study of thyroid lesions. Female patients were of 81.67% and male patients were of 18.33% and with female to male ratio was of 4.5 :1.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Study of Role of Agnor in Thyroid Lesions

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Abstract

Introduction: Thyroid cancer is the most common endocrine neoplasm. Different proliferation markers such as Ki67, proliferating cell nuclear antigen (PCNA) and argyrophilicnucleolar organizer regions (AgNORs) have been examined and observed their importance in thyroid tumours. It has also been reported that like other markers, AgNORs are also related to the rate of cell proliferative activity. As it is also found useful in distinction, it can also be used in distinguishing different lesions.

Materials & Method: 60 gross specimens were taken for study. These biopsy specimens were routinely fixed in 10% formalin and processed in paraffin wax. 5 microns thick Sections were cut and taken for the study and hematoxylin and eosin staining of sections was done. Histopathologicalexamination of these sections were done. Special stain (AgNOR Stain) procedure was also done in 60 cases.

Results: The present study showed that mean mAgNOR in case of nodular goitre was 1.59 (SD ± 0.13) with a range of 1.4–1.75, in benign lesions i.e.; Follicular Adenoma/Hurthle cell Adenoma was 3.63(SD ±0.41) with a range of 2.9 – 4.05, in malignant lesions i.e.; in papillary carcinoma was 2.77 (SD ± 0.56) with a range of 1.5 – 4.05 and in follicular carcinoma was 4.92 (SD± 0.27) with a range of 4.68 – 5.21.

Conclusion: Our study concluded that mAgNOR count and pAgNOR values can differentiate follicular adenoma and papillary carcinoma and also can differentiate non-neoplastic, benign and malignant lesions of thyroid.

***Key Words**: mAgNOR, pAgNOR, PTC, FTC,FA,NG, H&E*

Introduction

Thyroid cancer is the most common endocrine neoplasm. It is well documented that the incidence of thyroid cancer is higher in women than in men and its incidence is growing at a global level.[(1)]Based on histopathology, thyroid carcinomas are classified into follicular thyroid cancer (FTC), papillary thyroid cancer (PTC), medullary thyroid cancer (MTC), anaplastic thyroid cancer and poorly differentiated thyroid cancer. [(2)]So far, there is no developed global screening program to detect thyroid cancer. Although there is increased incidence, the mortality caused by this cancer is seen low. [(1)]The diagnosis of thyroid cancer is often based on magnetic resonance imaging, ultrasound, computed tomography, fine needle aspiration and radionuclide imaging. Although various methods are well applied in clinics, patients often have poor outcome.Different proliferation markers such as Ki67, proliferating cell nuclear antigen (PCNA)and argyrophilicnucleolar organizer regions (AgNORs) have been examined and observed their importance in thyroid tumours. The nucleolar organizer regions (NORs) which are DNA segments, that encode ribosomal RNA.[(3)] NORs are associated with some nucleolar proteins which are usually called as AgNOR proteins or AgNORs, that are stained black with silver methods.[(4)]It has also been reported that likeother markers, AgNORs are also related to the rate of cell proliferative activity[(5)]. As it is also found useful in distinction, it can also be used in distinguishing different lesions.[(6)]In a study by Pich et

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al. 1995[7], explained that this AgNORs can be easily detected by a very simple silver staining technique which is called as AgNOR method,

Materials & Method

A total of 60 cases were included in this study and according to WHO guidelines,[8] all these cases were diagnosed. The cases included were: 25 PTC (in which 12 were of classic variant, 7 were of follicular variant, 2 were of solid variant, 4 were of oncocytic variant), 3 FTC (in which 2 were of oncocytic variant), 10 benign neoplasms (in which 8 were follicular micro and macroadenoma, 2 were hurthle cell adenoma), 22 nodular goitres (NG).Out of the 78 thyroid specimens which were received for histopathological examination following initial cytological evaluation by fine needle aspiration cytology, 60 gross specimens were taken for study. These biopsy specimens were routinely fixed in 10% formalin and processed in paraffin wax. 5 microns thick Sections were cut and taken for the study and hematoxylin and eosin staining of sections was done. Histopathological examination of these sections were done. Special stain (AgNOR Stain) procedure was also done in 60 cases.

AgNOR staining :[9]AgNOR staining was performed by adopting both previous and also modified procedures. In previous methods counter stain (Neutral red) was used. But in this study, neutral red counter stain was not used.

Preparation of solutions:

Solution A: This solution was prepared by dissolving 500 mg gelatin powder in 25 ml deionized water at 37 degrees C and then 250 micro L formic acid was added. Continuous shaking for about 10 min at 37 degrees C was sufficient to dissolve the gelatin and a clear solution was obtained.

Solution B: It was prepared with silver nitrate and deionized water.

Working solution:This was prepared by mixing one part by volume of solution A with two parts by volume of solution B and it was filtered through filter paper into plastic bottle. As it degrades immediately, it was used immediately.

AgNOR staining procedure: TheAgNOR strategy was adjusted from the examination as referenced before and furthermore from the investigation which was depicted by Crocker and Nar.(10)4 microns thick areas were taken for each case.Deparaffinized in xylene. Hydrated through diminishing evaluations of ethanol to twofold refined deionized water. The segments were then responded with newly arranged silver colloidal arrangement (that contains one section by volume of 2% gelatin in 1% formic corrosive and two sections by volume of half watery silver nitrate arrangement) in a shut Coplin container for 35 min at room temperature, guaranteeing a dull domain all through the response time. The silver colloidal arrangement was washed with twofold refined deionized water. The segments were then treated with 10% sodium thiosulphate for 5 mins.And washed in twofold refined deionized water. Dehydrated through expanding evaluations of ethanol. Cleared in xylene, and mounted..

AgNORs Quantitative Analysis:From the selected areas, an average of 5–10 microscopic fields, were analysed from each case, at magnification 100x(Under oil immersion) (Fig.1-4). 100 nuclei were analysed in each case, whole nuclei were taken as actual lesion. Each overlapped and fragmented nuclei were counted and taken as 1.

Findings

AgNORCOUNT:

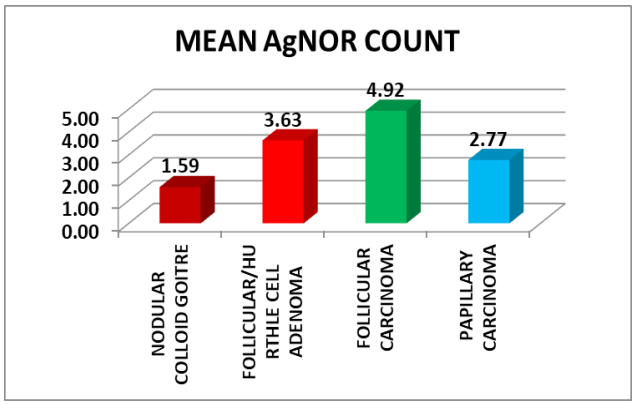
TheAgNOR staining and enumeration was done on 60 cases. The AgNORs appeared as black dots in a pale-yellow stained nucleus (as shown in the fig:1 -4) and mAgNOR (mean AgNOR count) and pAgNOR (percentage of cells with at least five distinct AgNORs within one nuclei) values were counted in different thyroid lesions which are shown in Table-1 and Chart -1.

Table-1

Diagnosis	mAgNOR (MEAN±SD)	PAgNOR (%)
Nodular Colloid Goitre	1.59 ± 0.13	2
Follicular/Hurthle Cell Adenoma	3.63 ± 0.41	14
Follicular Carcinoma	4.92 ± 0.27	22
Papillary Carcinoma	2.77 ± 0.56	9

In present study, it was observed that AgNOR dots were large, regular and very less in the nuclei of nodular colloid goitre, whereas AgNOR dots were numerous in no. Which were irregular and in bizarre clusters are seen in Follicular carcinoma when compared to Follicular Adenoma in which AgNOR dots were slightly irregular, very few in clusters and slightly lesser in number. Whereas papillary carcinoma showed no clusters but slightly irregular and more lesser in number when compared to Follicular Adenoma but higher than nodular colloid goitre.The highest mean AgNOR was noted in Follicular Thyroid Carcinoma as 4.92 ±0.27 followed by Follicular Adenoma as 3.63±0.41. The pAgNOR also showed higher values in FTC (22%) as compared to FA (14%) as shown in Table-1 and Chart-1.

Chart-1



Discussion

The technique for examination of AgNOR is utilized for routine appraisals of velocity of cell multiplication (Ofner et al., 1992;(11)Trere, 2000;(12)Canet et al., 2001(5). The consequences of estimations of AgNOR are essentially affected by a few components, for example, the recoloring technique that incorporates brooding time &temperature and the strategy for assessment that is by manual checking versus picture investigation (Trere, 2000).(12)The silver-recoloring procedure has been applied by utilizing different states of recoloring in the previous years. The quantitative investigation has been constrained to make it simple for surveying the highlights and to assess without picture examination, predominantly to those that depict the quantity of AgNOR dabs in the core. Limited application of AgNOR counting in the diagnosis of thyroid follicular lesions mainly because of their overlapping of score which were observed and reported in adenomas and carcinomas by some investigators like Nairn et al., 1988,[13]Zaczek et al., 1996[14]. It was also considered that this method is to be used only as one of some additional techniques, that facilitates the final diagnosis by some other investigators such as Solymosi et al.,1996,[15],Cor et al.,1999,[16],Mehrotra et al.,1998, 2002;[17],Lewy-Trenda et al and Bienkiewicz et al, 1999[18]. To evaluate the importance of AgNORs in differentiating Non-neoplastic, benign and malignant lesions of the thyroid, the present study was conducted. For the routine evaluation of cell kinetics for prognostic purposes,the use of interphase AgNOR quantification appears to be very interesting and promising method.It is the only method which permits the information to be obtained on the rapidity of cell proliferation in routinely processed samples. The method that can be more frequently used and involves in the evaluation of the sample directly under the light microscope by counting the number of interphase AgNORs per cell. The sections at very high magnification (100 x oil immersion level) should be focussed and AgNOR dots can be seen and are visible as black dots inside the nucleus. It was found that in follicular carcinoma, numerous AgNOR dots can be seen followed by follicular adenoma and least no. of dots can be seen in Nodular colloid goitre. The present study showed that mean mAgNOR in case of nodular goitre was 1.59 (SD ± 0.13) with a range of 1.4–1.75, in benign lesions i.e.; Follicular Adenoma/Hurthle cell Adenoma was 3.63(SD ±0.41) with a range of 2.9 – 4.05, in malignant lesions i.e.; in papillary carcinoma was 2.77 (SD ± 0.56) with a range of 1.5 – 4.05 and in follicular carcinoma was 4.92 (SD± 0.27) with a range of 4.68 – 5.21. (as shown in table-1, chart-1). Although overlapping in range values were seen in both follicular adenoma and Papillary carcinoma, with the mean mAgNORvalues we can suggest that mAgNOR count can differentiate follicular adenoma and papillary carcinoma. It also can differentiate Non-neoplastic, benign and malignant lesions of thyroid. Here we considered <8% for nodular colloid goiter, 8-14% for kindhearted and >14% for threatening sores. Be that as it may, Papillary carcinoma indicated less pAgNOR as 9%. (as appeared in table-1, outline 1)This outcome is in concordance with Mourad et al[21,22] who expressed in his examination that pAgNOR that is > 8% demonstrates high proliferative movement and the dangerous injuries indicated high proliferative action with a middle of 11%.Both Mean mAgNOR and pAgNOR qualities have indicated noteworthy contrasts in our stud. Malignant lesions usually show high proliferative activity. The present study showed that mean pAgNOR in case of

nodular goitre was 2% with a range of 0-5%, in benign lesions i.e.; Follicular Adenoma/Hurthle cell Adenoma was 14% with a range of 8-18%, in malignant lesions i.e.; in papillary carcinoma was 9% with a range of 4-15% and in follicular carcinoma was 22% with a range of 20-25%. Here we considered <8% for nodular colloid goiter, 8-14% for kindhearted and >14% for threatening sores. Be that as it may, Papillary carcinoma indicated less pAgNOR as 9%. (as appeared in table-1, outline 1) This outcome is in concordance with Mourad et al.(21,22) who expressed in his examination that pAgNOR that is > 8% demonstrates high proliferative movement and the dangerous injuries indicated high proliferative action with a middle of 11%.Both Mean mAgNOR and pAgNOR qualities have indicated noteworthy contrasts in our study. It is also found that especially pAgNOR values are revealed less overlapping between histologically proven benign and malignant thyroid lesions and these are in concordant with other studies which are done by Ansari et al.(23) and Hossain M I et al.(24)Our results regarding pAgNOR were concordant with Ruschoff et al. (1996). In an investigation which was done uniquely by Ruschoff et al. (1993)(25) who has expressed that the assurance of AgNOR score that incorporates the level of cells with at any rate five AgNORs inside one nucleolus can be utilized for the separation of amiable and threatening follicular injuries. Slowinska-Klencka et al.,(26) Bukhari et al.(27).In present study, morphology was described as numerous, irregular bizarre clusters of AgNOR dots in nuclei were seen in follicular carcinoma followed by follicular adenoma and papillary carcinoma. Least no. of dots, regular and large dots in nuclei were seen in Nodular colloid goitre. (as shown in fig: 1-4).

Conclusion

Although overlapping in range values were seen in both follicular adenoma and Papillary carcinoma, with the mean mAgNOR values and pAgNOR values, still it can be suggested that mAgNOR count and pAgNOR values can differentiate follicular adenoma and papillary carcinoma and also can differentiate non-neoplastic, benign and malignant lesions of thyroid.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Study of Thrombocytopenia in Adults Due to Decreased Production

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Abstract

Thrombocytopenia is defined as platelet count < 1.5 lakhs/cumm. It may result from either decreased production or increased sequestration/destruction of platelets. In the present study maximum number of patients were in the age group 20-39 years, and males were more commonly affected than females. Leukemia cases were found to be the most common causes of decreased production of platelets leading to thrombocytopenia in our study. Inherited Platelet Disorders caused by a variety of genetic defects affecting platelet production, function or both.

Aims and Objectives: To study thrombocytopenia due to decreased production of platelets in adults with study of clinical profile and laboratory parameters in adults with thrombocytopenia.

Keywords - *Disorders, Platelet Disorders*

Introduction

Thrombocytopenia is defined as platelet count < 1.5 lakhs/cumm.

It may result from either decreased production or increased sequestration/destruction of platelets[1]. Destruction of platelets can be either immune or non immune mediated. Despite the number and diversity of disorders that may be associated aetiologically, thrombocytopenia mainly results from four processes – artifactual thrombocytopenia, deficient platelet production, accelerated destruction and abnormal distribution or pooling of platelets within the body.

Thorough medical history taken , physical examination done in all patients who were included in our study.Numerous mechanisms may contribute in development of thrombocytopenia as seen in primary immune thrombocytopenia & hepatitis C virus infection. Careful examination of the peripheral blood smear is the best means for narrowing the differential diagnosis.

The present study focuses on the study of thrombocytopenia due to decreased production of platelets in adults between 18- 70 years who were confirmed with thrombocytopenia.

Taking a thorough medical history and Physical examination can provide valuable information and greatly facilitate diagnosis.

If the etiology of the thrombocytopenia is unclear, a BM aspirate or biopsy should be performed to rule out a primary BM disorder[2].

Materials and Method

This prospective study was conducted in the Sree Balaji medical college and hospital from May 2018 to October 2018. This study included 50 subjects who presented to the hematology department and medical OP departments of Sree Balaji Medical College and hospital.

This study included adults presenting to the hematology department and medical OP departments who were found to have thrombocytopenia, with platelet

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count less than 150 x 10^9 /L in whom complete clinical and laboratory parameters were available[2].

Peripheral venous blood was collected for laboratory investigations like CBC, ESR, PT, aPTT, fibrinogen estimation, and for D-dimer levels .Peripheral blood smears were stained by Leishman's stain. For hemoparasite visualization, Giemsa stain was used.

Findings

Table 1: Age distribution of cases of thrombocytopenia.

Age (years)	No. of cases	Percentage
20 - 39	26	52%
40 – 59	18	36%
60 – 79	6	12%
Total	50	100%

In the present study maximum number of patients were in the age group 20-39 years (26 cases, ie.,52 %). (Table.1)

Table .2 Sex distribution of cases of thrombocytopenia.

Sex	No. of cases	percentage
Male	34	68%
Female	16	32%
Total	50	100%

In our study maximum number of patients presenting with thrombocytopenia were males (68%). (Table .2)

Table 3: Diagnosis associated with thrombocytopenia

S.no	Diagnosis	No. of cases %
1	Megaloblastic anemia	12 (24%)
2	Leukemia	15 (30%)
3	HIV infection	9 (18%)
4	Aplastic anemia	8 (16%)
5	MDS	6 (12%)
	Total	50 (100%)

Leukemia cases were found to be the most common causes of decreased production of platelets leading to thrombocytopenia in our study. (Table.3)

Discussion

I. Decreased production of platelets in bone marrow can be due to

1) Marrow infiltrative disorders like **Hematological malignancies** (Leukemias, Lymphoma, Myeloma), **Metastatic carcinomas** (carcinomas of the breast, lung, and prostate. Bone Marrow trephine biopsy is preferred to detect these tumours).

Thrombocytopenia in hematological malignancies are clonal proliferations of the malignant hematopoietic stem cells characterized by the accumulation of blasts principally in the marrow at the cost of impaired production of normal blood cells[3,4].

Non neoplastic conditions causing secondary myelofibrosis with consequent cytopenias including thrombocytopenia are autoimmune disorders like SLE, Rheumatoid arthritis and Sjogrens syndrome[5], granulomatous disorders of marrow including viral, bacterial, fungal, rickettsial and toxoplasmosis[6] and storage disorders including Gaucher's disease and Niemann Pick disease.Common viral infections include HIV infection,[7] and CMV infection causing lymphohistiocytic infiltration of the marrow.

Ineffective haematopoiesis : Marrow hyperplasia with ineffective haematopoesis include myelodysplastic syndromes and vitamin B12 deficiency anaemias. Myelodysplastic syndromes are clonal stem cell disorders characterized by cytopenias in combination with a hypercellular marrow that frequently exhibits dysplastic changes in any of the three haematopoietic cell lineages[8].

Thrombocytopenia is seen in approximately 50% of patients and occurs in combination with other cytopenias[9]. In megaloblastic anaemia thrombocytopenia is due to ineffective megakaryopoiesis and there is a moderate reduction in platelet count rarely < 40 X 10^9 / L. Dysplastic morphologic features observed in megakaryocytic series of MDS in Peripheral blood: Large, vacuolated, or hypogranular platelets.

In Bone marrow: Small mononuclear forms (micromegakaryocytes).

Large forms with multiple small, rounded nuclei.

Forms with hypolobated nuclei.

Forms with hyperchromic nuclei and scant cytoplasm[10].

Hypoplastic anaemia: Hypoplastic disorders affecting marrow mainly include aplastic Anaemia which is characterized by diminished or absent hematopoietic precursors in the marrow, most often due to injury to the hematopoietic stem cells[10,11]. Bone marrow biopsy of Non severe (moderate) AA usually has a cellularity less than age-appropriate cellularity, often <50% in children and <30% in adults, while severe and very severe AA have a cellularity <25%. typical bone marrow biopsy shows profound hypocellularity with decreased trilineage hematopoiesis.

Megakaryocytes in AA are within normal limits morphologically, but because of the low number of megakaryocytes, the evaluation of megakaryocytic dysplasia may be difficult[10].

In paroxysmal nocturnal hemoglobinuria, platelets activated by complement proteins followed by thrombus formation and consumption of platelets.

Heriditary thrombocytopenia:

Inherited Platelet Disorders caused by a variety of genetic defects affecting platelet production, function or both. Also may present as isolated thrombocytopenia or as part of a syndrome. Patients typically present with mucocutaneous bleeding or menorrhagia. Careful clinical history intake, including family history of bleeding tendency, and detailed physical examination to assess for any associated physical anomalies are essential in establishing a suspicion of an inherited platelet disorder and distinguishing these from acquired causes of thrombocytopenia. Flow cytometric evaluation can be used to evaluate platelet surface glycoprotein expression[10].Bernard Soulier syndrome associated with deficiency of platelet GP Ib α / 1bβ /1X / V receptor.

15 cases of leukemia were found in our study (fig .1,AML-M4), (fig.2, CLL), 8 cases of Aplastic anemia (fig.3),12 cases of megaloblastic anemia, 9 cases of HIV and 6 cases of myelodysplastic syndrome were found in our study.

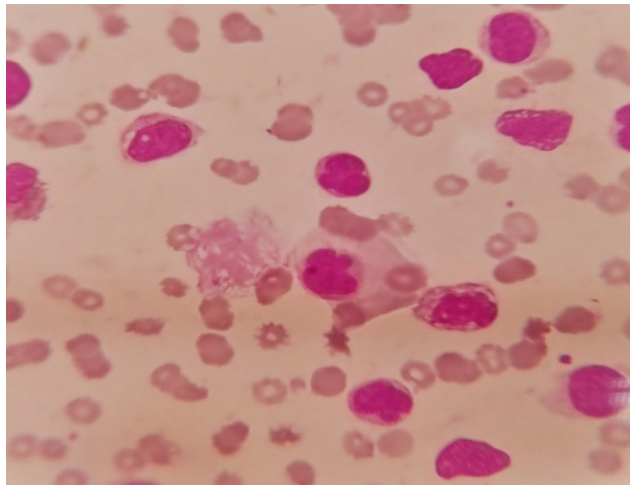


Figure 1. Photomicrograph of peripheral blood smear showing monoblasts with abundant vacuolated cytoplasm and prominent nucleoli background showing reduced number of platelets in a case of AML-M4 (*Leishman 100x*)

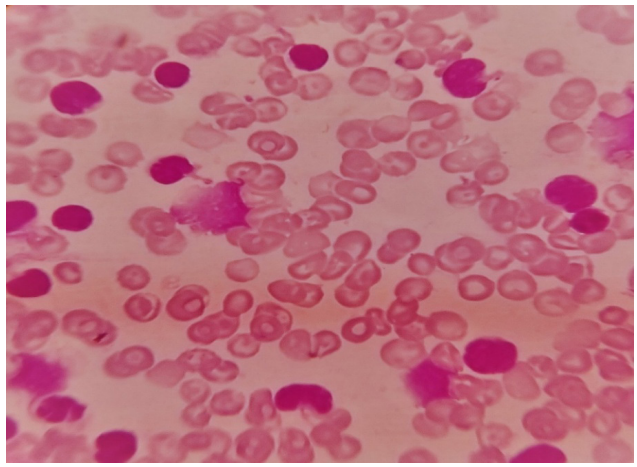


Figure 2. Photomicrograph of peripheral blood smear showing increased number of mature lymphocytes and smudge cells background showing reduced number of platelets in a case of CLL (*Leishman 100x*)

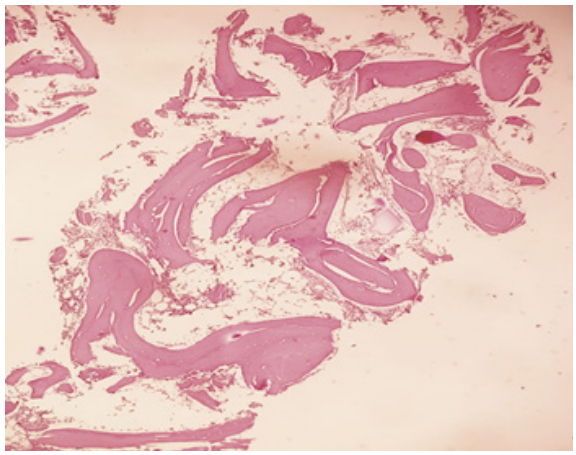


Figure.3 Photomicrograph of hypocellular bone marrow biopsy showing 15% cellularity in same case of Aplastic anemia (H & E 10x)

Conclusion

Age group between 20-39 years were most commonly affected with thrombocytopenia than other age groups. Males were more commonly affected with thrombocytopenia than females in our study. After evaluating all cases of thrombocytopenia with decreased production of platelets, it is concluded that leukemia was the most common cause of thrombocytopenia in our study. Whenever thrombocytopenia is detected, further investigations has to be done for specific diagnosis in the most of the cases so that appropriate treatment can be given.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest – Nil

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Study to Determine the Potential Risk Categories and Risk Factors for Developing Steatohepatitis in NAFLD Cases with Metabolic Syndrome

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Abstract

Background:NAFLD is considered as the most common liver disease affecting large number of people. Metabolic syndrome is a group of metabolic abnormalities in which the chance of developing cardiovascular disease, diabetes mellitus, chronic kidney disease are high.

Aim: It aims to determine the potential risk categories and risk factors for developing steatohepatitis in NAFLD cases with metabolic syndrome.

Method: Total of 100 metabolic syndrome patients were selected for study over a period of 1year. These patients were selected based on the criteria for metabolic syndrome as established by National Cholesterol Education Program (NCEP) adult Treatment Panel III (ATP III). Demographic data were taken and biochemical parameters were estimated by standard guideline.

Results: BMI, waist circumference, systolic blood pressure, PPBS, fasting insulin, HOMAIR, total cholesterol, TGL, HDL, LDL, VLDL and CHO:HDL are $p<0.05$; and affecting steatohepatitis.HDL is significantly lower in steatohepatitis cases compared to non-steatohepatitis cases. Diastolic blood pressure, FBS and HbA1c are not affecting steatohepatitis as the corresponding p-values are greater than the significance level.

Conclusion: There is positive correlation of obesity, waist circumference, blood pressure, insulin resistance, triglyceride, fasting glucose, LDL, VLDL and negative correlation with HDL-C.

Key words: *Dyslipidaemia, Lipid profile, NCEP, Metabolic syndrome.*

Introduction

Metabolic syndrome also known as "syndrome X", "insulin resistance syndrome" is a group of risk factors that adversely affect the health where the chance of developing diabetes mellitus, cardiovascular disease, non-alcoholic fatty liver disease, non-alcoholic steatohepatitis, cirrhosis, cerebrovascular disease and chronic kidney disease are high in these particular group of people.According to National Cholesterol Education Program (NCEP) Adult Treatment Panel III (ATP III), JAMA 2001, it introduced clinical criteria in which the metabolic syndrome is identified by the presence of three or more of the five abnormalities [1]:

- Abdominal obesity (waist circumference >35 inches in women, >40inches in men)
- fasting serum triglycerides (>150 mg/dl)
- fasting serum high density lipoprotein cholesterol HDL-C (<50 mg/ dl in women or<40 mg/dl

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in men,)

- Blood pressure greater than or equal to 130/85mmHg

- Fasting serum glucose greater than or equal to 110mg/dl.

Non-alcoholic fatty liver disease ranges from asymptomatic to simple steatosis, steatohepatitis, advanced fibrosis, cirrhosis and even hepatocellular cancer. Obesity, Type 2 diabetes and hyperlipidaemia are associated for the development of non-alcoholic fatty liver disease [2-10] and the increased trend has also been seen in Asian countries.Most subjects with NAFLD are usually asymptomatic, but fatigue and abdominal discomfort may be reported in right upper quadrant [11].

Aim: Study to determine the potential risk categories and risk factors for developing Steatohepatitis in nafld cases with Metabolic Syndrome.

Materials and Method

This study was conducted in the Department of Biochemistry, Sree Balaji Medical College and Hospital, Chromepet, Chennai during the period of December 2016 – July 2018 among 100 patients with metabolic syndrome attaining outpatient and inpatient services of the Department of General Medicine.The study explained to the participants and before taking the blood sample, informed consent were taken from them.

Inclusion criteria: Age group of 20-50 years who are willing to participate,100 patients with Metabolic syndrome, Both genders equally (50- F, 50- M), non-alcoholics, no critical illness

Exclusion criteria: Alcoholics, Chronic hepatitis, Cirrhosis, Steroid use, Pregnancy, Malignancy

General history, medical and family history, demographic data like age, gender, waist circumference and blood pressure were recorded. The laboratory investigations like Fasting and post prandial blood sugar, HbA1c, fasting insulin, HOMAIR, total cholesterol, triglyceride, HDL, LDL, VLDL. All the Biochemical Investigations were done using BS390 fully automated analyser.

Findings

Table 1 :- Factors affecting Steatohepatitis

Factors affecting Steatohepatitis

Parameters	Non-steatohepatitis	Steatohepatitis	p - value
BMI	32.24 ± 0.823	43.50 ± 0.643	0.000
Waist Circumference	98.23 ± 1.444	114.5 ± 0.988	0.000
Systolic BP	145.1 ± 1.000	159.6 ± 0.980	0.000
Diastolic BP	88.69 ± 0.764	90.40 ± 1.327	0.383
FBS	138.9 ± 5.593	157.0 ± 12.39	0.219
PPBS	187.7 ± 8.982	250.4 ± 23.85	0.013
HbA1c	7.420 ± 0.231	8.404 ± 0.614	0.117
Fasting Insulin	11.13 ± 0.477	14.96 ± 0.911	0.003
HOMAIR	3.717 ± 0.128	5.700 ± 0.158	0.000
Total Cholesterol	260.2 ± 6.795	341.2 ± 29.47	0.000
TGL	243.3 ± 9.437	383.6 ± 52.05	0.000
HDL	44.79 ± 1.585	33.20 ± 1.068	0.005
LDL	173.8 ± 4.479	201.6 ± 6.046	0.018
VLDL	48.66 ± 1.887	76.72 ± 10.41	0.000
CHO:HDL	6.023 ± 0.269	10.27 ± 0.842	0.000

Here the p-value corresponding to BMI, waist circumference, systolic blood pressure, PPBS, fasting insulin, HOMAIR, total cholesterol, TGL, HDL, LDL, VLDL and CHO:HDL are $p<0.05$; and affecting steatohepatitis. These factors are significantly higher in steatohepatitis cases compared to non-steatohepatitis cases. HDL is significantly lower in steatohepatitis cases compared to non-steatohepatitis cases. Diastolic blood pressure, FBS and HbA1c are not affecting steatohepatitis as the corresponding p-values are greater than the significance level. Diastolic blood pressure, FBS and HbA1c are almost same in both steatohepatitis and non-steatohepatitis cases.

ROC Analysis:

On performing receiver operative characteristics analysis with the above set criteria we noticed the patients getting demarked into 3 risk categories:

- Moderate Risk
- High Risk
- Very High Risk

The frequency of distribution was 30 moderate risk cases, 36 high risk cases and 34 very high risk cases

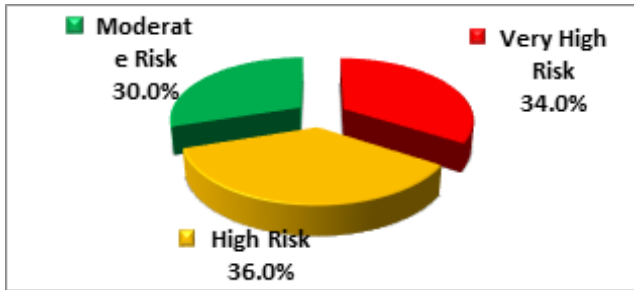


Fig. 1:- Distribution of risk groups

ROC analysis

Table 2:- Risk factors cut off value, significance, sensitivity, specificity and accuracy for moderate risk

Parameters	AUC (95% CI)	p - value	Cut-off	Sensitivity	Specificity	Accuracy
BMI	1.00 (1.00 - 1.00)	0.000	37.60	5 (100.0%)	27 (93.1%)	32 (94.1%)
Waist Circumference	1.00 (1.00 - 1.00)	0.000	108.3	5 (100.0%)	27 (93.1%)	32 (94.1%)
Systolic BP	1.00 (1.00 - 1.00)	0.000	153.0	5 (100.0%)	29 (100.0%)	34 (100.0%)
Diastolic BP	0.69 (0.44 - 0.94)	0.181	89.00	4 (80.0%)	13 (44.8%)	17 (50.0%)
FBS	0.77 (0.58 - 0.96)	0.058	139.5	4 (80.0%)	21 (72.4%)	25 (73.5%)
PPBS	0.83 (0.68 - 0.98)	0.020	199.0	5 (100.0%)	20 (69.0%)	25 (73.5%)
HbA1c	0.77 (0.59 - 0.95)	0.058	7.150	5 (100.0%)	16 (55.2%)	21 (61.8%)
Fasting Insulin	0.87 (0.72 - 1.00)	0.010	11.30	5 (100.0%)	18 (62.1%)	23 (67.6%)
HOMAIR	1.00 (1.00 - 1.00)	0.000	4.750	5 (100.0%)	27 (93.1%)	32 (94.1%)
Total Cholesterol	0.84 (0.65 - 1.00)	0.016	267.0	5 (100.0%)	15 (51.7%)	20 (58.8%)
TGL	0.80 (0.57 - 1.00)	0.032	269.0	4 (80.0%)	18 (62.1%)	22 (64.7%)
HDL	0.88 (0.76 - 1.00)	0.007	33.50	3 (60.0%)	25 (86.2%)	28 (82.4%)
LDL	0.87 (0.73 - 1.00)	0.009	187.0	5 (100.0%)	19 (65.5%)	24 (70.6%)
VLDL	0.80 (0.57 - 1.00)	0.032	53.80	4 (80.0%)	18 (62.1%)	22 (64.7%)
CHO:HDL	0.99 (0.95 - 1.00)	0.001	8.520	5 (100.0%)	28 (96.6%)	33 (97.1%)

Table 3:- Risk factors cut off value, significance, sensitivity, specificity and accuracy for high risk

Parameters	AUC (95% CI)	p - value	Cut-off	Sensitivity	Specificity	Accuracy
BMI	1.00 (1.00 - 1.00)	0.000	38.05	5 (100.0%)	28 (96.6%)	33 (97.1%)
Waist Circumference	1.00 (1.00 - 1.00)	0.000	109.9	5 (100.0%)	28 (96.6%)	33 (97.1%)
Systolic BP	1.00 (1.00 - 1.00)	0.000	153.0	5 (100.0%)	29 (100.0%)	34 (100.0%)
Diastolic BP	0.69 (0.44 - 0.94)	0.181	91.00	2 (40.0%)	26 (44.8%)	28 (82.4%)
FBS	0.77 (0.58 - 0.96)	0.058	146.5	3 (60.0%)	24 (82.8%)	27 (79.4%)
PPBS	0.83 (0.68 - 0.98)	0.020	234.0	3 (60.0%)	24 (82.8%)	27 (79.4%)
HbA1c	0.77 (0.59 - 0.95)	0.058	7.210	4 (80.0%)	17 (58.6%)	21 (61.8%)
Fasting Insulin	0.87 (0.72 - 1.00)	0.010	14.10	4 (80.0%)	24 (82.8%)	28 (82.4%)
HOMAIR	1.00 (1.00 - 1.00)	0.000	4.850	5 (100.0%)	28 (96.6%)	33 (97.1%)
Total Cholesterol	0.84 (0.65 - 1.00)	0.016	281.0	4 (80.0%)	19 (65.5%)	23 (67.6%)
TGL	0.80 (0.57 - 1.00)	0.032	287.0	3 (60.0%)	24 (82.8%)	27 (79.4%)
HDL	0.88 (0.76 - 1.00)	0.007	35.50	4 (80.0%)	23 (79.3%)	27 (79.4%)
LDL	0.87 (0.73 - 1.00)	0.009	189.0	4 (80.0%)	21 (72.4%)	25 (73.5%)
VLDL	0.80 (0.57 - 1.00)	0.032	57.40	3 (60.0%)	24 (82.8%)	27 (79.4%)
CHO:HDL	0.99 (0.95 - 1.00)	0.001	8.520	5 (100.0%)	28 (96.6%)	33 (97.1%)

Table 4:- Risk factors cut off value, significance, sensitivity, specificity and accuracy for very high risk

Parameters	AUC (95% CI)	p - value	Cut-off	Sensitivity	Specificity	Accuracy
BMI	1.00 (1.00 - 1.00)	0.000	40.05	5 (100.0%)	29 (100.0%)	34 (100.0%)
Waist Circumference	1.00 (1.00 - 1.00)	0.000	111.1	5 (100.0%)	29 (100.0%)	34 (100.0%)
Systolic BP	1.00 (1.00 - 1.00)	0.000	153.0	5 (100.0%)	29 (100.0%)	34 (100.0%)
Diastolic BP	0.69 (0.44 - 0.94)	0.181	91.00	2 (40.0%)	26 (44.8%)	28 (82.4%)
FBS	0.77 (0.58 - 0.96)	0.058	146.5	3 (60.0%)	24 (82.8%)	27 (79.4%)
PPBS	0.83 (0.68 - 0.98)	0.020	234.0	3 (60.0%)	24 (82.8%)	27 (79.4%)
HbA1c	0.77 (0.59 - 0.95)	0.058	7.210	3 (60.0%)	24 (82.8%)	27 (79.4%)

Cont ... **Table 4:- Risk factors cut off value, significance, sensitivity, specificity and accuracy for very high risk**

Fasting Insulin	0.87 (0.72 - 1.00)	0.010	15.10	3 (60.0%)	26 (89.7%)	29 (85.3%)
HOMAIR	1.00 (1.00 - 1.00)	0.000	5.000	5 (100.0%)	29 (100.0%)	34 (100.0%)
Total Cholesterol	0.84 (0.65 - 1.00)	0.016	337.5	3 (60.0%)	29 (100.0%)	32 (94.1%)
TGL	0.80 (0.57 - 1.00)	0.032	354.5	3 (60.0%)	29 (100.0%)	32 (94.1%)
HDL	0.88 (0.76 - 1.00)	0.007	37.00	5 (100.0%)	22 (75.9%)	27 (79.4%)
LDL	0.87 (0.73 - 1.00)	0.009	199.0	3 (60.0%)	26 (89.7%)	29 (85.3%)
VLDL	0.80 (0.57 - 1.00)	0.032	70.90	3 (60.0%)	29 (100.0%)	32 (94.1%)
CHO:HDL	0.99 (0.95 - 1.00)	0.001	8.520	5 (100.0%)	28 (96.6%)	33 (97.1%)

From the above ROC analysis we can understand that there are certain factors which have more significant relation with predicting the risk for steatohepatitis in NAFLD and other factors are less significant and some no acceptable significance.

- The factors which are highly significant with p<0.01 CI 99% are BMI,WC, Systolic BP, Fasting Insulin, HOMAIR, HDL, LDL, CHO:HDL ratio
- The factors which are significant with p<0.05 CI 95% are PPBS,TC, TGL,VLDL
- For all 3 categories, these 3 ROC analyses again shows that diastolic blood pressure, FBS and HbA1c are not affecting steatohepatitis as the corresponding p-values are greater than the significance level.

Based on these findings we have deduced 3 levels of risk categories with significant sensitivity, specificity and accuracy factors. The potential risk factors identified were those study parameters which showed 100% sensitivity and/or 100% specificity and /or 100% accuracy.

- Systolic BP – 100% sensitivity, 100% specificity, 100% accuracy in all 3 categories. The other factors showed significant differences among the different categories.

Very High Risk

Sensitivity, specificity and accuracy relation with group

- BMI, WC, HOMA IR 100% sensitive, 100% specific, 100% accuracy
- TC, TGL, VLDL 100% specificity
- CHO:HDL, HDL 100% sensitivity

Statistical significance:

- BMI, WC, Systolic BP, HOMAIR, HDL, LDL, CHO:HDL with p < 0.01, CI 99%
- PPBS, TC, TGL, VLDL with p < 0.05, CI 95%

High Risk

Sensitivity, specificity and accuracy relation with group

- BMI, WC, HOMAIR, CHO:HDL 100% sensitive
- No factor is 100% specific to detect high risk

Statistical significance:

- BMI, WC, Systolic BP, Fasting Insulin, HOMAIR, HDL, LDL, CHO:HDL with p < 0.01, CI 99%
- PPBS, TC, TGL, VLDL with p < 0.05, CI 95%

MODERATE RISK

Sensitivity, specificity and accuracy relation with group

BMI, WC, PPBS, HbA1C, Fasting Insulin, HOMAIR,TC, LDLand CHO: HDLare 100% sensitive

- No factors are specific in detecting moderate risk

Statistical significance:

- Highly significant – BMI, WC, Systolic BP, Fasting Insulin, HOMAIR, HDL, LDL, CHO:HDL with $p < 0.01$, CI 99%
- PPBS, TC, TGL, VLDL with $p < 0.05$, CI 95%

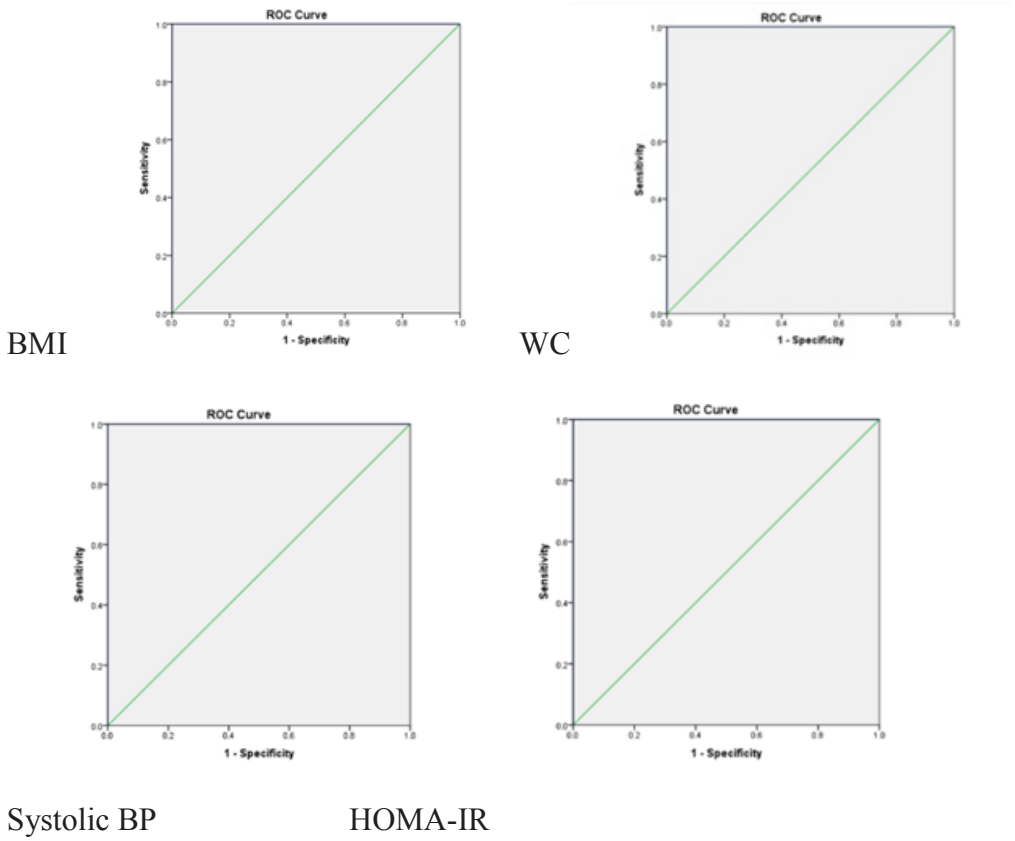


Figure 2:ROC graph for BMI,WC,Systolic BP and HOMAIR

Discussion

Obesity, one of the most important risk factor is associated with fatty liver [12] is commonly observed in developed countries. Diabetes mellitus along with obesity, hyperlipidaemia and hypertension are the main manifestations of metabolic syndrome associated with insulin resistance [13]. In our study, BMI is significantly higher in very high risk (33.90 ± 0.990) and significantly lower in moderate risk (23.72 ± 0.125) compared to high risk (27.51 ± 0.695) proving the increase of obesity among our population also which may be due to causes like westernisation of diet, sedentary lifestyle etc.

Waist circumference and BMI are two important parameters of obesity. Distribution of body fat is more important than total body fat in obesity-related diseases. Visceral fat shows a better predictor of steatosis than subcutaneous fat which is also associated with severity of NAFLD [14]. Waist circumference is considered as a marker of visceral fat tightly related with triglyceride content, hepatic inflammation and fibrosis. In our study, WC is significantly higher in very high risk (100.6 ± 1.591) and significantly lower in moderate risk (83.96 ± 0.153) compared to high risk (96.12 ± 1.841). Shou-Wu Lee et al[15] in a study, show the positive correlation between the obese parameters and NAFLD. Higher BMI and higher waist circumference has additional risk factor for NAFLD with BMI showing increase positive correlation. Another study having 250 NAFLD and 240 non NAFLD shows waist circumference as effective factor for non-alcoholic fatty liver disease [16]

Hypertension or prehypertension is associated with NAFLD which is the main cause of chronic liver diseases and abnormal liver function. In our study, systolic blood pressure is significantly higher in very high risk (147.2 ± 1.241) compared to high risk (140.4 ± 0.851) and moderate risk (141.5 ± 1.178). Systolic BP is 100% sensitivity, 100% specificity, 100% accuracy in all 3 categories while there is no significant difference in diastolic blood pressure between groups. Ong JP et al in their study relate that NAFLD patients are at increased risk of having elevated BP with liver related and overall mortality [17]. Another study from Finland reported that high ambulatory BP are associated with higher risk of prevalent NAFLD in middle aged adults. Hepatic fat accumulation and high blood pressure together increase the risk for cardiovascular diseases [18].

Insulin resistance is the hallmark of MS and was the laboratory finding associated with the presence of non-alcoholic fatty liver disease irrespective of fat distribution, BMI and glucose tolerance as shown by Marchesini et al [19]. In our study HOMAIR was significantly higher in very high risk (4.009 ± 0.165) and significantly lower in moderate risk (2.080 ± 0.043) compared to high risk (2.897 ± 0.050). Kaushal Madan et al [100] found in his study mean HOMA – IR of 2.6 ± 1.3 and IR in 80% of study population with reference to liver function test profile of patients, increased SGOT (≥40 IU/Lt) and SGPT (≥42 Kg/Lt) and observed in majority of patients (98.4 with mean 76.05 ± 41.74 and 97.6% with mean 100.31 ± 43.74 respectively).

In 2017, Zhi-Chao Yao et al [20]published an original article about the association of Non-alcoholic fatty liver disease and increased risk of hypertension and prehypertension. The study demonstrates NAFLD as a risk factor for hypertension and prehypertension, so careful monitoring of blood pressure of patients with NAFLD is recommended.

In 2011, a study done by Mona A. Hegazya et al [20] to show the correlation between different grades of NAFLD by liver ultrasound scan and homeostasis model assessment insulin resistance (HOMA-IR) and in predicting its severity. 57 obese, non-diabetic aged around 18-57 years taken. The study shows HOMAIR having positive correlation with the severity of fatty liver and also NAFLD have positive association with insulin resistance expressed by HOMAIR.

Conclusion

High range in anthropometric parameters like BMI, BP, WC, Insulin resistance are associated with greater risk of developing NAFLD. There is positive correlation of obesity, waist circumference, blood pressure, insulin resistance, triglyceride, fasting glucose, LDL, VLDL and negative correlation with HDL-C.Therefore knowledge about the potential risk factors and new preventive, diagnostic and management protocols for NAFLD should be among the priorities for the treatment of metabolic syndrome patients.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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A Study on Risk Factors of Nocturnal Enuresis in Children

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Abstract

Objectives: The aim of the study is to assess the risk factors of children presenting with nocturnal enuresis.

Place of Study: Paediatric OPD Sree Balaji Medical College and Hospital.

Period of Study: July 2017 to June 2018 (12 months).

Materials and Method: Detailed history of each child who presented to the OPD with complaints of nocturnal enuresis were included in the study. A detailed history was taken and complete physical examination was done.

A printed Proforma was handed over to the patient attender and clearly explained. Followed by that the patient filled the Proforma and returned it. Later on the urine was collected in aseptical conditions and sent for various urine analysis.(1,2)

The data collection technique adopted in this study is a structured questionnaire on the evaluation of nocturnal enuresis in children from 5 years of age 12 years of age who presented to the Pediatric OPD for 1 year at Sree Medical College and Hospital. Detailed history obtained from the parents.(4)

Results: Enuresis was found to be common among younger children and its frequency decreases with increasing age. The prevalence of Enuresis among 5 – 12 year olds is reported as between 1.4 to 28% in most studies.

Primary enuresis formed 84% of cases while secondary 16%. Since the present study is a Hospital based study, the age at presentation does not reflect the true prevalence. In the present study we see more children in the older age group than community based studies. This could be because of the fact that, this is a hospital based study and parents in general don't view enuresis a problem in younger children and seek medical attention only if it persists for long.(3)

Conclusion: In the study found that enuresis is a common childhood illness which at time presence as a single symptom but presentation might be multifactorial having a psychological burden. Primary and Secondary enuresis so many similarities while the few differences presence.(5)

Keywords: *nocturnal enuresis, Primary enuresis, common childhood illness*

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Introduction

DSM IV meaning of enuresis was utilized for characterizing an instance of enuresis for example

- Repeated automatic or deliberate voiding during the day or night in garments or in bed.

• At least 2 such occasions for each week for in any event 3 back to back months or the nearness of clinically critical trouble in social, scholarly or other significant regions of working[1].

• Chronological period of in any event 5 years or more.

Materials and Method

This descriptive observational study was conducted in the Institute of Social Paediatrics, Govt. Stanley Hospital, Chennai. All children between the ages of 5 to 12 who presented to the OPD with the complaint (As a primary one or one of the many) of bedwetting constituted the study material[2].

Detailed history of each child fulfilling above mentioned criteria was recorded in a preformed proforma and complete neurological examination was done.

Findings

An aggregate of 51 patients with enuresis introduced during the investigation time frame. No parent or youngster wouldn't take part in the examination[3]. There were 30 males (58%) and 21 females (42%). Of the 51 children who were enuretic, 48 had only nocturnal enuresis (94%).No strict daytime enuresis was recorded. Combined daytime and nocturnal enuresis accounted for only 3 cases (6%). 84% of cases were primary (n=43) while only 16 % were secondary (n=8).

The mean age at presentation was 8.75 years for all cases, for Males being 9.27 years and for females 8 yrs.

There were 30 males and 21 females. Though males were higher in proportion among primary enuresis it was not statistically significant.

Family history was present in 21 cases (41.18%). Majority of these children had history of enuresis in one parent (35 %) and 1 child had a sibling who was enuretic and 2 other children had both parents who were enuretic.

Children were assessed for arousability by Sleep arousal score (SAS). A score of 1 to 8 was assigned. Children who had a score of 1-3 were classified as easy to arouse, 4-5 as moderate and 6- 8 as difficult to arouse[4].

More than half (52 %) were found to have difficulty in arousability.

Discussion

The risk factors of nocturnal enuresis is constituted by various factors such as family history, age group, socio economic status and difficult sleep arousability. A detailed history of the patients along with the parents and physical examination usually prevents further investigations. Appropriate diagnosis for the reason precipitating nocturnal enuresis is essential in order to provide the right treatment option.

Nocturnal enuresis which is usually caused by social factors should always be treated along with family support[5].

Conclusion

Nocturnal enuresis is a common condition that can affect a child's self-esteem. Reassurance and minimizing the number of investigations are critical to address parent's concerns.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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A Study on Clinical Profile and Risk Factors of Nocturnal Enuresis in Children

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Abstract

Objectives: The aim of the study is to assess the clinical profile and risk factors of children presenting with nocturnal enuresis.

Place of Study Paediatric OPD Sree Balaji Medical College and Hospital.

Period of Study: July 2017 to June 2018 (12 months).

Materials and Method: This descriptive observational study was conducted in the Institute of Social Paediatrics, Govt. Stanley Hospital, Chennai. All children between the ages of 5 to 12 who presented to the OPD with the complaint (As a primary one or one of the many) of bedwetting constituted the study material.

Detailed history of each child who presented to the OPD with complaints of nocturnal enuresis were included in the study. A detailed history was taken and complete physical examination was done. Later on the urine was collected in a septical conditions and sent for various urine analysis.

The data collection technique adopted in this study is a structured questionnaire on the evaluation of nocturnal enuresis in children from 5 years of age 12 years of age who presented to the Pediatric OPD for 1 year at Sree Medical College and Hospital. Detailed history obtained from the parents.

Results: There was close closeness in the clinical Introductions of the 2 gatherings. The normal nearness of daytime voiding side effects in patients with both PNE and SNE recommends that daytime voiding propensities may impact the accomplishment of evening time self-restraint. The similarities in Primary and Secondary enuresis are also reflected in the study by Robson et al19 who concluded that they likely share a common pathogenesis.

Conclusion: The major significant differences between the patients whom we report with Primary Enuresis and those with Secondary Enuresis are storage symptoms, cystitis symptoms and sleep disordered breathing which were more common in secondary enuresis ($P < 0.05$) and Low income which was more significantly associated with primary enuresis ($P < 0.05$).

Keywords: *bedwetting, nocturnal enuresis, structured questionnaire, primary enuresis, secondary enuresis*

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Introduction

Nighttime enuresis can be principally named essential and optional enuresis. Essential and auxiliary enuresis have for the most part been viewed as discrete elements with an alternate pathogenesis. For Most patients with essential enuresis the pathogenesis is

viewed as identified with the issue with excitement, overproduction of pee around evening time, a little nighttime bladder limit, or a blend of these components. The basic revealed reasons for SNE incorporate UTI, stoppage, ask disorder/broken voiding, mental pressure, diabetes, and obstructive rest apnea. An aggregate of 43 (84.3 %) of the patients whom we surveyed had PNE. This extent is like that seen in different examinations.

Materials and Method

A prospective study was plan on children with complaints the various risk factors of enuresis were assessed using different modalities. The risk factors which were assessed are sleep disordered breathing, documented UTI and other associated symptoms like day time symptoms, storage symptoms, bladder over activity and low bladder capacity.

Functional Bladder capacity was assessed using Frequency – volume charts as per ICCS guidelines. Maximal voided volume was noted and if it was within 65 % to 130 % of expected bladder capacity, the child was designated as having Normal Bladder capacity.(1)

- Expected Bladder capacity was calculated using the formula
- Estimated Bladder capacity = (Age in Years x 30) + 30 in ml
- Comparison of Primary Enuretics with Secondary Enuretics:

Findings

The mean age at presentation was 8.75 years for all cases, for Males being 9.27 years and for females 8 yrs.

There were 30 males and 21 females. Though males were higher in proportion among primary enuresis it was not statistically significant.

Family history was present in 21 cases (41.18%). Majority of these children had history of enuresis in one parent (35 %) and 1 child had a sibling who was enuretic and 2 other children had both parents who were enuretic.

Children were assessed for arousability by Sleep arousal score (SAS). A score of 1 to 8 was assigned. Children who had a score of 1-3 were classified as easy to arouse, 4-5 as moderate and 6- 8 as difficult to arouse. (2)

More than half (52 %) were found to have difficulty in arousability.

Functional Bladder capacity was assessed using Frequency – volume charts as per ICCS guidelines. Maximal voided volume was noted and if it was within 65 % to 130 % of expected bladder capacity, the child was designated as having Normal Bladder capacity.

- Expected Bladder capacity was calculated using the formula
- Estimated Bladder capacity = (Age in Years x 30) + 30 in ml

Storage symptoms like increased day time frequency, daytime incontinence and nocturia were significantly more associated with secondary enuresis than primary (P = 0.0224)

Symptoms of bladder over activity like urgency and urge incontinence were the commonest daytime symptoms in enuresis (51 %, n= 21), there was not any significant difference between Primary and secondary enuresis. (P =0.4759)(3)

Symptoms of cystitis like dysuria, Lower abdominal pain, Hematuria were present in 5 cases though documented UTI was present only in 2 cases and cystitis symptoms were more in Secondary Enuresis which was also statistically significant. (P= 0.0132)

Arousability was assessed using a sleep arousal score and children were classified into easily/Moderate/ Difficult to arouse. Difficult to arouse were 52.9 % of study population.

Discussion

When compared both primary and secondary enuresis were similar in presentation except in storage symptoms, Cystitis symptoms and symptoms of sleep disordered breathing which were significantly higher in Secondary enuresis and low income which was more significant in primary enuresis.(4)

Conclusion

Nocturnal enuresis in children as well as adults can be detrimental for their overall development and well-being. Although the pathophysiology is unclear, NE is associated with a high arousal threshold and fragmented sleep, often associated with PLMD. Appropriate

diagnosis for the reason precipitating NE is essential in order to provide the right treatment option.[5]

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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A Study on Clinical Profile of Nocturnal Enuresis in Children

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Abstract

Objectives: The aim of the study is to assess the clinical profile of children presenting with nocturnal enuresis.

Place of Study: Paediatric OPD Sree Balaji Medical College and Hospital.

Period of Study: July 2017 to June 2018 (12 months).

Materials and Method: Detailed history of each child who presented to the OPD with complaints of nocturnal enuresis were included in the study. A detailed history was taken and complete physical examination was done. Later on the urine was collected in aseptical conditions and sent for various urine analysis.

The data collection technique adopted in this study is a structured questionnaire on the evaluation of nocturnal enuresis in children from 5 years of age 12 years of age who presented to the Pediatric OPD for 1 year at Sree Medical College and Hospital. Detailed history obtained from the parents.

Results: Enuresis was found to be common among younger children and its frequency decreases with increasing age. The prevalence of Enuresis among 5 – 12 year olds is reported as between 1.4 to 28% in most studies. Primary enuresis formed 84% of cases while secondary 16%. Since the present study is a Hospital based study, the age at presentation does not reflect the true prevalence.

In the present study we see more children in the older age group than community based studies. This could be because of the fact that, this is a hospital based study and parents in general don't view enuresis a problem in younger children and seek medical attention only if it persists for long.

Conclusion: In the study found that enuresis is a common childhood illness which at time presence as a single symptom but presentation might be multifactorial having a psychological burden. Primary and Secondary enuresis so many similarities while the few differences presence.

Keywords: *childhood illness, nocturnal enuresis, urine analysis, psychological burden*

Introduction

Enuresis alludes to the tirelessness of wrong voiding of pee past the time of foreseen bladder control. The improvement of bladder control is a multidimensional procedure that requires tactile attention to bladder completion by the youngster, limit with respect to capacity of pee, deliberate control of the bladder sphincter, mental want for control, and a positive preparing knowledge. Diurnal enuresis is automatic spilling of pee during waking hours. Nighttime enuresis. Alludes to automatic section of pee during rest and is delegated essential or auxiliary(1).

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Materials and Method

A prospective study was plan on children with complaints of bedwetting at night. Children between 5 years to 12 years of age who satisfy the below criteria

are to be selected for the study.[2]

Inclusion Criteria

The cases which were included in the study are the Children satisfying the following category. DSM IV meaning of enuresis was utilized for characterizing an instance of enuresis for example [3]

- Repeated automatic or purposeful voiding during the day or night in garments or in bed.
- At least 2 such occasions for every week for at any rate 3 continuous months or the nearness of clinically huge trouble in social, scholarly or other significant territories of working.
- Chronological period of at any rate 5 years or more.[4]

Exclusion Criteria

- Children less than 5 years of age.
- Children more than 12 years of age.
- Children with developmental delay.
- Children with cerebral palsy
- Children manifesting any neurological disorder.
- When parents did not give consent for the study.

Findings

A total of 51 children with nocturnal enuresis were included in the study. . There were 30 males (58%) and 21 females (42%). Eighty four % of cases were primary (n=43) while only 16 % were secondary (n=8).[5]

Storage symptoms like increased day time frequency, daytime incontinence and nocturia were significantly more associated with secondary enuresis than primary (P = 0.0224).

Symptoms of bladder over activity like urgency and urge incontinence were the commonest daytime symptoms in enuresis (51 %, n= 21), there was not any significant difference between Primary and secondary enuresis. (P =0.4759).

Symptoms of cystitis like dysuria, Lower abdominal pain, Hematuria were present in 5 cases though documented UTI was present only in 2 cases and cystitis symptoms were more in Secondary Enuresis which was also statistically significant. (P= 0.0132).

Discussion

Enuresis is common among younger children and its frequency decreases with increasing age. The prevalence of Enuresis among 5 – 12 year olds is reported as between 1.4 to 28% in most studies.

Primary enuresis formed 84 % of cases while secondary 16%.

Conclusion

The present study assessed and evaluated clinical profile of nocturnal enuresis in children from 5 to 12 years visiting Pediatric out patient department Sree Balaji Medical College & Hospital we have observed that the clinical profile of nocturnal enuresis is usually multifactorial and as many associated symptoms like increased day time frequency, urgency and lower abdominal pain.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Role of 3Dct in Fractures Around the Knee Joint

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Abstract

The knee joint is complex joint and is the commonly injured joint now a days because of increased traffic accident, and sports related injuries. As it is a superficial joint it is more exposed to external forces, hence this joint easily gets injured. Knee joint fracture involves one or multiple fractures, which involves patella, tibia and femur Fractures around the knee are often complex injuries that present to the surgeon with numerous potential complications importance of an affirmative diagnosis lies in the fact that it helps to opt for most effective treatment a negative radiograph is not reliable to rule out fracture MDCT is a fast and accurate is a fast and accurate examination to evaluate fracture adequately. 3D CT is an excellent modality for evaluation of the knee joint as it helps in better demonstration of fracture fragments and extent of fracture in complex anatomical location.Fracture of the tibial plateau is seen frequently in knee trauma units and poses major threats to the structure and function of the knee joint. Tibial plateau fractures are complex injuries to treat due to their articular involvement and associated disruption of ligamentous structures in the knee. Spiral CT 3D reconstructions give a better and more accurate demonstration of the tibial plateau fracture and allows a more precise pre-operative surgical plan.(1)

***Keyword**: 3DCT, knee joint injuries , Tibial plateau fracture*

Introduction

Cracks of the tibial level are among the most provoking breaks in orthopedics to treat. To forestall posttraumatic osteoarthritis and to re establish ideal joint capacity, the congruency of the articular surface, the dependability, and the right burden appropriation should be restored(2).

To accomplish this objective, an exact preoperative arranging is basic. Notwithstanding the customary plain radiographs, the CT output is progressively utilized. In any case, constrained investigations are accessible that report extra estimation of a CT scan(3-5). Thinking about the extra heap of radiation to the patient and costs, a CT output should possibly be utilized when legitimized by the clinical benefits(6).

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With this intra-and interobserver study, the estimation of the CT filter notwithstanding plain radiographs for the grouping of tibial level cracks as per Schatzker and the preoperative treatment plan was examined. Late advances in modernized tomography have decreased information securing and recreation times so three-dimensional CT pictures of knee wounds might be financially and immediately produced. 3DCT was made a decision about better than multiplanar two-dimensional CT in showing the spatial connections of crack sections in mind boggling and mid knee injury. 3D CT empowers an unmistakable view of degree of real break line and coming about removal of parts. So this new methodology licenses preoperative investigation and careful arranging when contrasted with other regular radiography for treatment of knee cracks(4)

Materials and Method

Source of data: all patients referred from orthopaedics and casualty department of sreebalaji medical college.

Duration of study:- Aug 2016 to Oct 2018

Sample size:- 50.

Inclusion criteria:- (i) All the patients presenting with knee fracture following trauma having positive plain radiograph findings. (ii) Patients suspected of fractures clinically with subtle or negative plain radiograph.

Exclusion criteria:- (i) Pregnant females, pediatric age group, patients with prosthesis and patients with unstable vital parameters especially in trauma settings. (ii) Patients presenting with acute bleed, seizure and shock.

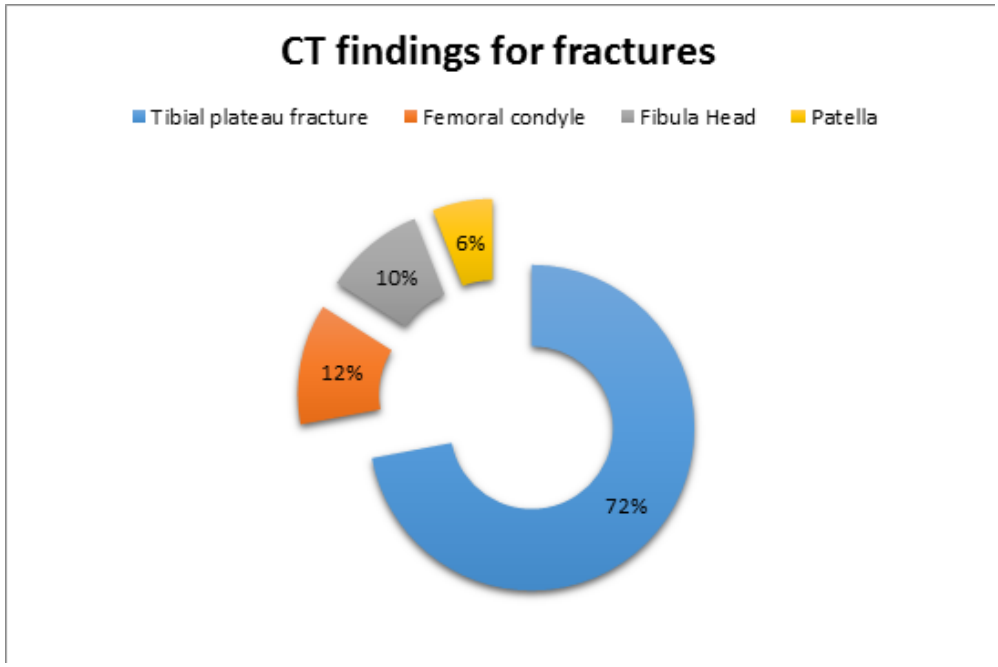
Method

All patients will be subjected to CT imaging of knee joint with 3D reconstruction. The CT were images were obtained with Hitachi Eclos 8 Slice Scanner. Images were processed on a PC , using commercially available software. The processed images included sagittal and coronal 3D reformatted images. The evaluation began with 2D transverse CT images, followed by a 3D reconstruction view. The patients were placed in supine position with the feet forward. The maximum course range of the table is sufficient to allow an examination starting from the top of the pelvis to the foot on the side to be operated. Knees series include the entire knee joint (10 cm above and below the joint) (7)

Findings and Discussion

The results obtained by for the knee joint fractures undertaken by 3D reconstruction in CT for the different bones were identified maximum 72% for Tibial plateau fracture in about 36 cases. Whereas, identification of injury for other bones viz., Femoral condyle, Fibula Head and Patella were 12%, 10% and 6%, respectively.

CT findings for fracture	No. of cases	%
Tibial plateau fracture	36	72%
Femoral condyle	06	12%
Fibula Head	05	10%
Patella	03	6%
Total	50	100%



Discussion

Mustonen et al [7] in his study series of 409 patients found that 356 patients had knee fracture A total of 451 fractures were found in all anatomic regions: distal femur (n=49), proximal tibia (n-307), patella (n=23), and proximal fibula (n=72). In our study tibial plateau fracture were found to be most common fracture around knee joint seen in 36 patients (72%), to be followed by femoral condyle in 6 patients (12%) and fibula and patella fracture seen in 5 and 3 patients respectively

Amani Mohamed in his study of with fractures of tibial plateau [8] concluded that MDCT is advised for the accurate classification of tibial plateau fractures and so the management decision as concurred in our study.

Conclusion

Incidence of tibial plateau fracture is highest among knee joint fractures. Most cases of musculo skeletal trauma require MPR or 3D Imaging. As there is no additional scanning or radiation involved in the reconstruction of images, 3D VR images and MPR is a valuable tool for the radiologist interpreting knee plateaufractures. MPR and 3D VR pictures help better assessment of breaks distinguished on hub pictures. 3D recreation is helpful to survey hard engineering in huge comminuted, dislodged, and complex breaks including numerous planes For the situation of complex cracks, and permit a sufficient representation and simple understanding of the crack sections and, their relationship to each other. This is extremely useful when settling on the most appropriate preoperative making arrangements for every patient.[8]

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Efficacy of Metformin Monotherapy 1Gm in Newly Diagnosed Type 2 Diabetes Mellitus- A Prospective Open Label Study

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Abstract

Aim and Objectives: Diabetes mellitus is a chronic crippling cellular disorder that causes serious disruption and malfunction of biological enzymes causing to chronic hyperglycemia, resulting to micro and macro arterial abnormalities.The occurrence of diabetes is rising rapidly, leads to an increase in death and mortality in India. The main objective of treatment for type 2 diabetes mellitus (T2DM) is to attain and preserve excellent glycemic control and to decrease the mortality and threat of microvascular and macrovascular problems..Metformin is the first-line and most usually prescribed anti-hyperglycaemic drug in patients with type 2 diabetes. It may be used as monotherapy or in conjunction with many other oral anti-hyperglycaemic drugs or insulin.

Materials and Method: In this study a total of 50 patients who fulfilled the eligibility criteria were enrolled. And they were subjected to trial medication tablet metformin 500mg twice daily and patients baseline line investigations fasting blood glucose and postprandial blood glucose were collected and they advised to followup for 3months and 6 months and any adverse events during the study period were reported and it was recorded and managed appropriately**. Results: B**aseline FBS and PPBS baseline values expressed as Mean±SD were 138.06±17.12 mg/dl and 223.12±30.63 mg/dl respectively. After 6 months of metformin therapy, FBS and PPBS were 91.64±10.55 mg/dl and 133.88±7.99 mg/dl respectively.

Conclusion: The current study summates that metformin 1gm monotherapy in newly diagonosed type 2 diabetes mellitus showed effective gylcemic control for period of six months and this proves that metformin is a effective and gold standard antidiabetic agent and thereby reducing macro and micro complications at the initial stage of disease.

Key words: *diabetes mellitus, micro & macrovascular complications, glycemic control.*

Introduction

Diabetes mellitus of this sort recently incorporated non-insulin-subordinate diabetes, or grown-up beginning diabetes[6]. It is a term utilized for people who have relative (instead of outright) insulin insufficiency. Individuals with this kind of diabetes habitually are impervious to the activity of insulin[1 2 3]. At least at first, and regularly all through their lifetime, these people needn't bother with insulin treatment to endure. This type of diabetes is every now and again undiscovered for a long time on the grounds that the hyperglycaemia is regularly not serious enough to incite recognizable side effects of diabetes. By the by, such patients are at expanded danger of creating full scale vascular and smaller scale vascular confusions[4-8.]While patients with this type of diabetes may have insulin levels that seem typical or raised, the high blood glucose levels in these diabetic patients would be relied upon to result in considerably higher insulin esteems had their beta-cell capacity been ordinary . Hence, insulin emission is flawed and lacking to make up for the insulin obstruction[4].

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Then again, a few people have basically typical insulin activity however uniquely debilitated insulin discharge. Insulin affectability might be expanded by weight decrease, expanded physical action, as well as pharmacological treatment of hyperglycaemia yet isn't reestablished to typical Metformin has turned out to be one of the most generally utilized medications in the treatment of sort 2 diabetes mellitus[5]. Metformin, other than hypoglycemic movement, has been taken with eating routine and exercise changes to avoid diabetes in individuals who are at high hazard for getting to be diabetic.Metformin (a biguanide subordinate), by monitoring blood glucose level reductions these entanglements. Metformin works by reestablishing the body's reaction to insulin. It diminishes hepatic glsucose creation (HGP) and intestinal glucose retention.[9]

Materials and Method

'Efficacy Of Metformin Monotherapy 1gm In Newly Diagnosed Type 2 Diabetes Mellitus- A Prospective Open Label Study"

This study was conducted in SreeBalaji Medical College and Hospital, Chennai during the period from November 2017 to April 2018 in accordance with declaration of Helsinki and ICH GCP guidelines3. The study protocol was reviewed and approved by the Institutional Ethics Committee and all trial participants have been informed about the study procedures and written informed consent was obtained.

Inclusion criteria

a. Newly diagnosed Type-2 DM

b. Patients started on metformin monotherapy.

Exclusion criteria

a. Patients on statin and aspirin therapy

b. Patients on insulin/other oral hypoglycemic agents

c. Any infective, inflammatory, allergic disorders, cardiovascular disorders, malignancy

d. Patients with trauma due to surgery, burns, fractures

e. History of alcohol and/or smoking

f. Pregnant/lactating women

Withdrawal criteria

- Adverse event which warrants withdrawal of subject.
- Non-compliance with procedures.
- Withdrawal of consent for participation in the study by the subject.
- Failure of the study drug to produce the desired effect.

Study Procedure

The study "Efficacy Of Metformin Monotherapy 1gm In Newly Diagnosed Type 2 Diabetes Mellitus- A Prospective Open Label Study" was started after obtaining approval from the Institutional Ethics Committee of SreeBalaji Medical College and Hospital[7]. Voluntary written informed consent was taken from all the study participants after explaining the clinical study protocol in detail about the risk and benefit. They were given adequate time to decide for their participation. Confidentiality was maintained and patient's identity was not revealed in the source document[2]. The informed consent was available in English as well as local language (Tamil).All the 50 patients who fulfilled the Eligibility criteria was advised to take the study drug Tablet Metformin 500mg twice daily one in the morning and one in night. The study Drug was given free of cost to the patients and they were given assurance that any withdrawal from the study would not affect their future treatment in the same hospital. Baseline laboratory investigations were done before study and repeated after 3 months and 6 months of treatment.The baseline features like demographic data, general, systemic and local examination were carefully noted in the case report form. Contact numbers of the investigators and emergency physician were provided to all the study participants for any queries during the study period and for reporting of any adverse events.There were three scheduled visits during the study- baseline visit, 3rd month and 6th month (end of the study visit)

Study population

A total of 50 patients with newly diagnosed type 2 DM were included in the study. Both sexes were included in study . Study data was documented and patients were assessed periodically.

Drug dosage

Tablet Metformin 500 mg twice daily, one in the morning and one in the night were advised to the study participants.

Adverse Event Reporting

.All the unfavorable occasions watched/whined by the examination members were accounted for the situation report structure alongside the other data about the seriousness, for example, gentle, moderate or extreme and any connection to the investigation drug[1].

Laboratory Investigations

A baseline investigation protocol was followed before starting the study, the following investigations were performed at the begining of the study and were repeated at 3months and 6 months[8].

Blood Biochemistry

- fasting blood sugar (FBS)
- post prandial blood sugar (PPBS)

End points

Primary endpoints

Efficacy Of Metformin Monotherapy 1gm In Newly Diagnosed Type 2 Diabetes Mellitus- A Prospective Open Label Study"

Secondary endpoints

To evaluate the tolerability of metformin in type 2 diabetes mellitus

Findings and Suggestions

FBS and PPBS baseline values expressed as Mean±SD were 138.06±17.12 mg/dl and 223.12±30.63 mg/dl respectively. After 3 months of metformin therapy, FBS and PPBS were 104.24±16.63 mg/dl and 184.84±26.9 mg/dl respectively. After 6 months of metformin therapy, FBS and PPBS were 91.64±10.55 mg/dl and 133.88±7.99 mg/dl respectively. Treatment with Metformin showed effective reduction in FBS and PPBS values comparatively between FBS and PPBS baseline values and FBS and PPBS values at sixth month were statistically significant (P<0.05). [Table 1 and Figure 1 and 2]

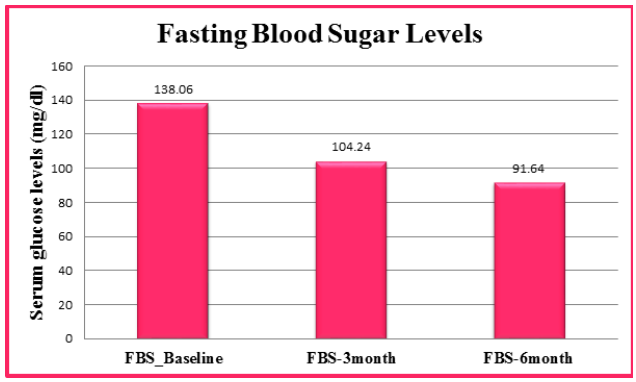


Figure 1: Comparison of FBS between Baseline and Post-treatment (6month).

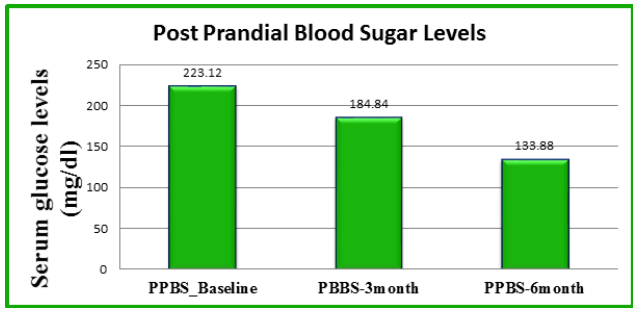


Figure 2: Comparison of PPBS between Baseline and Post-treatment (6month).

Table 1: Comparison of lab parameters between baseline and after treatment

S.No	Para-meter	N	Metformin (n=50)	
			Baseline (1month)	End of The Study (6month)
1	FBS	50	138.06 ± 17.12	91.64 ± 10.55 *
2	PPBS	50	223.12 ± 30.63	133.88 ± 7.99 *

ALUES EXPRESSED IN MEAN ± STD. DEVIATION, * REPRESENTS P<0.05.

Conclusion

The present study shows that metformin monotherapy in newly diagnosed diabetes patients showed effective glycemic control and this shows the efficacy of metformin as sole antidiabetic agent and thereby effective glycemic control will ultimately reduce

the disease complications.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Neurostimulation Guided Brachial Plexus Block (Supraclavicular)

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Abstract

Background: Upper limb processes are frequently performed under brachial plexus block alone or in conjunction with local anesthesia. Brachial plexus block can be conducted by any of the methods–blind; directed nerve stimulator (NS) or ultrasound (US)-guided. Over the last centuries, the evoked potentials method has been recognized as the gold standard for nerve detection in the area.

Method: This study was done on 20 patients who fit under inclusion criteria . Written informed consent to be taken from all patients.

Results: Neurostimulation block had shorter execution time, faster on sent of motor and sensory blockade with lesser needle attempts

Conclusions: Neurostimulation guided brachial plexus block had lesser needle attempts , faster execution time , and faster onset of motor and sensory block and lesser complication

Key words: *Brachial plexus block, neurostimulation, sensory blockade, local anesthesia, Upper limb processes*

Introduction

Traditionally, regional blocks have been conducted use anatomical landmarks, nerve stimulation. Blind blocks that depend exclusively on anatomical landmarks generally cause severe side effects[1].Over the previous centuries; the neural stimulation method has been recognized as the gold standard for nerve detection in regional blocks[2-4]. However, it does not guarantee an appropriate amount of nerve blocks. It holds the danger of damage to nerve systems by specific puncture.

Materials and Method

This study was established out in the orthopaedic surgery theatre, SreeBalaji Medical College and Hospital, Chennai after obtaining institutional ethical committee approval.

Inclusion Criteria:

The following criteria were taken for including the patients

in this study.[5]

- Elective surgical patients posted for surgery from middle one third of arm, forearm and hand surgeries.
- ASA Status I , II and III
- Age between 18 and 60 years
- Weight >50 kg

Exclusion Criteria[6]:

- Patient refusal
- Coagulopathies
- Local infections / Sepsis

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- H/o significant neurological, psychiatric, neuromuscular, cardiovascular, pulmonary, renal or hepatic disease
- Pregnancy/lactating women
- Peripheral neuropathy
- Allergy to local anaesthetics

MATERIALS:

1. Sterile tray for regional blocks
2. Drugs for the block
- 0.5% bupivacaine
- 2 % plain lignocaine

3. 23G Quinke spinal needle

4. The ultrasound machine which we used for our study was GE LOGIQ e machine

5.Equipment and drugs for medical intervention

6. Equipment and drugs for transformation to general anaesthesia in case of block failure[7]

Pre Operative Preparation:

Patients were pre-operatively evaluated and the procedure was explained to the patient. Written informed consent was obtained. They were assessed with particular attention to any contraindications.[8]

Pre Medication:

Tab. ranitidine 150mg 2 hours before medical procedure with tastes of water**.**

Lead of Anesthesia:

On appearance of the patient in the working room, screens like heartbeat oximeter, non intrusive circulatory strain and ECG were associated and standard qualities were recorded. An intravenous access was acquired in the contrary arm

Supraclavicular Brachial Plexus Block by the Subclavian Perivascular Technique[3]

Patients were positioned supine with the head turned away from the side to be blocked and the ipsilateral arm adducted. The neck was prepared with povidone iodine solution and draped with sterile towels.

Landmarks:

The essential landmarks to be identified are

- Cricoid cartilage
- Interscalene groove
- Clavicle midpoint
- Subclavian artery

Under strict aseptic precautions standing by the side of the patient, the interscalene groove was palpated with the index finger, reversing the hands for the opposite side. Patient placed supine with head turned away from the side to be blocked and ipsilateral arm adducted, the interscalene groove and the midpoint of clavicle identified. After local infiltrations of 1 ml of 2% lignocaine intradermally in the interscalene groove 1 to 1.5 cm above the clavicle, a 22G, 5cm short bevelled unipolar insulated needle connected to a nerve locator is directed caudally towards the ipsilateral nipple and posteriorly. End point in a nerve stimulator is a motor response with an output lower than 0.6mA. To avoid intra vascular injection aspiration was done every 3-5 ml of study drug injected

Assessment of the Block:

The accompanying perceptions were made:

Vital signs observing; pulse, non intrusive circulatory strain, oxygen immersion and sedation score were estimated each moment for the main 5minutes and at regular intervals from that point until the finish of medical procedure. For measurable purposes, they were recorded at 0, 1, 2, 5, 10, 15, 30 minutes and at regular intervals from that point**.**Block execution time was defined as the interval between the first needle insertion and its removal at the end of the block.

• Immediately following the administration of the medicine, patients were assessed every second for the start of sensory and engine blockade.

Sensory square assessed by temperature sensation utilizing ether absorbed cotton the skin dermatomes C4-T2.

• Onset of engine barricade was surveyed by misfortune offorearm flexion expansion, thumb and second digit squeeze and thumb and fifth digit squeeze.

•Failure of the square to be set up even after 20

minutes was taken as square disappointment.

- Analgesic failure was managed with General anaesthesia as appropriate .

- After confirmation that the block has taken up, surgery was started.

- Patient received supplemental O2 and intravenous fluids throughout the procedure

Local soporific poisonous responses including abstract and target signs like circumoral deadness, tinnitus, jerking, spasms, and so on., were watched[9].

- Entanglements related with the framework like intravascular imbuement, intrathecal or epidural mixture and pneumothorax were viewed.

Every one of the information were exposed to measurable investigation. Square execution time, beginning time for engine and tactile barricade, and the achievement rate were broke down and the measurable hugeness assessed. A "P" esteem not exactly or equivalent to 0.05 was considered factually critical.

Findings and Suggestions

Groups	Block execution time in minutes	Onset of sensory block in minutes	Onset of motor block in minutes	No of Needle Attempts
B	9	6.1	8.7	2.2

Conclusion

During the supraclavicular brachial plexus blockade it was found that

- The block execution time for neurostimulation guided block was much shorter .

- The number of needle attempts to localise the nerve was minimal with neurostimulation..

- The time taken for the onset of motor and sensory blockade was faster in the neurostimulation group.

- The success rate was higher with the use of neurostimulation guided blockade.

- No complications were seen in the two groups.

Therefore, it is inferred that neurostimulation use Clinically, supraclavicular brachial plexus block is helpful for precise nerve localization and minimizes the amount of needle attempts.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Occurrence of Euthyroid Sick Syndrome in Acute Myocardial Infarction and their Prognostic Significance

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Abstract

Background : Depression of the thyroid hormone system may happen in otherwise euthyroid patients in serious acute illness of any cause. In this situation, called Euthyroid Disease Syndrome, the standard feed-back regulation of the metabolism of the thyroid is changed.[11-13]**Aims :** 1. To find out the occurrence of EUTHYROID SICK SYNDROME in ACUTE MYOCARDIAL INFARCTION patients admitted to intensive care unit in SREE BALAJI HOSPITAL , CHENNAI and its prognostic significance. **Material and Method:** This study was conducted in the Intensive care unit,SREE BALAJI MEDICAL COLLEGE AND HOSPITAL , Chennai in collaboration with Dept of internal medicine, Dept of Cardiology and Dept of biochemistry. It was a prospective study done during the period from April 2017 to March 2018 . 100 patients with history, clinical features suggestive of myocardial infarction were selected irrespective of age and sex . **Results :** In our study 42 of MI patients had Euthyroid sick syndrome. So occurrence of Euthyroid sick syndrome in our patients was 42% , p value was 0.258. So occurrence of Euthyroid sick positivity rate was not statistically significant. This implies that occurrence of Euthyroid sick positivity rate may vary In which the occurrence of Euthyroid sick syndrome among death patients was 100%. **Conclusions** : The presence of Euthyroid sick syndrome in Acute myocardial infarction patients may contribute to the elaboration of an AMI severity index.

Key words*: Myocardial infarction , Euthyroid sick syndrome*

Introduction

Euthyroid disease syndrome can be defined as abnormal results from thyroid function tests that happen in non-thyroid disease settings (NTI) without pre-existing hypothalamic-pituitary or thyroid dysfunction.11-13 Decreased serum complete triiodothyronine (T3) is the most prevalent thyroid function ailment in patients with acute illness14 This can be detected within 2 hours of the beginning of severe physical stress.15 As the severity of the disease progresses, there is a gradual growth of complicated syndrome connected with low concentrations of T3 and thyroxine (T4).16,17The concentrations of thyroid stimulating hormone (TSH) remain unchanged or mildly decreased.. Conversion of pro-hormone (Thyroxine, T4) to active form is reduced owing to reduced peripheral activity of 5'-deiodinase and enhanced manufacturing of inverse T3 (rT3) metabolites. These modifications in thyroid hormones may be partially mediated by cytokines or other inflammatory mediators., Acting at the hypothalamus and pituitary levels, the thyroid gland, and the hepatic deiodinase system, as well as at the linking of thyroxine to thyroid globulin (TBG). It remains uncertain how much the hormone reaction in Euthyroid Disease Syndrome is component of an adaptive response that reduces the energy demands of tissues in the face of systemic disease. Or a maladaptive reaction that induces harmful tissue hypothyroidism. As a result, the use of thyroid hormone treatment in Euthyroid disease syndrome is contentious. Recovery from inherent acute illness is associated with the demise of thyroid defects. Altered levels of thyroid hormones have also been revealed in starvation,10 acute

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and chronic medical conditions,29-31 acute myocardial infarction4 , bone marrow transplantation,8 surgery,9 trauma,22 and, in reality, these modifications can be seen in any serious systemic disease.18,19.

Euthyroid disease syndrome has also been established in acute myocardial infarction and has been postulated as a connection between the severity of cardiac harm and the degree of increase in thyroid hormones..4 The objective of this research is to identify the incidence of Euthyroid disease syndrome in patients with Acute myocardial infarction and to assess whether the existence of Euthyroid disease syndrome in these patients has any prognostic importance in assessing the seriousness of AMI.

Material & Method

This study was conducted in the Intensive care unit,SREE BALAJI MEDICAL COLLEGE AND HOSPITAL , Chennai in collaboration with Dept of internal medicine, Dept of Cardiology and Dept of biochemistry. It was a prospective study done during the period from April 2017 to March 2018 . 100 patients with history, clinical features suggestive of myocardial infarction were selected irrespective of age and sex .

Inclusion Criteria

1. Myocardial infarction patients admitted to the Intensive care unit.

Exclusion Criteria

1. Patients with past or present history of thyroid dysfunction.

2. Patients taking drugs that will affect thyroid function.

3. Patients with chronic renal failure.

4. Patients with decompensated liver disease.

5. Patients with thyroid function test suggestive of primary Hypothyroidism or Hyperthyroidism.

Study Population

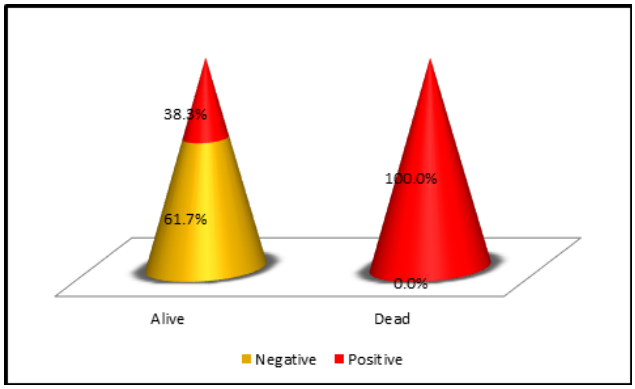
A total of 124 patients were enrolled for the study from the patients admitted to Intensive care unit in Sree Balaji Hospital from the period April 2017 to march 2018. 24 patients were excluded as per exclusion criteria. The remaining 100 patients, who satisfied all the inclusion criteria were selected for the study and followed for one week. Written consent was obtained from all patients participating in the study. All patients were subjected to a detailed clinical history and thorough physical examination as per proforma. The complicated cases identified by KILLIP classification criteria and ejection fraction. The serum of patients was analysed for thyroid function tests at day 1 (T3,T4,TSH) and in euthyroid sick positive patients repeat thyroid function tests was done at day 7 to confirm the reversal of hormone status. Day 1samples were obtained before reperfusion therapy. Echocardiography was done during hospital stay. All patients underwent CBC, Blood sugar, Serum Na, Urea, Creatinine, LFT, Fasting lipid profile, Thyroid function tests, ECG,Troponin I, ECHO.

Laboratory Tests

All patients underwent CBC, Blood sugar, Serum Na, Urea, Creatinine, LFT, Fasting lipid profile, Thyroid function tests, ECG, Trop I and ECHO. The serum of patients was analysed for thyroid function tests at day 1 (totalT3, total T4, TSH) and in sick euthyroid positive patients repeat thyroid function tests done at day 7 to confirm the reversal of hormone status. The thyroid function test was done by ELISA method. All samples were obtained before reperfusion therapy. Echocardiography was done during hospital stay.

Results

Our study shows that of 42% acute myocardial infarction patients had Euthyroid sick syndrome positivity. The commonest abnormalities is found to be a low level of total T3 as demonstrated in our study where 71% of the patients had low level total T3. The next most common abnormalities is found to be both low level of total T3 &total T4(24%) As the severity of the illness increases Euthyroid sick syndrome positivity rate was increased. In our study patients who presented with (KILLIP 1 the Euthyroid sick syndrome occurrence was 28.6%, in KILLIP 2 was 55.9%, in KILLIP 3 was 50% and KILLIP 4 was 100%). Patients presented with LVEF<50 the positivity of Euthyroid sick syndrome was 56.9% and patients presented with LVEF>50 was 26.5%) .



			ESS		Total
			Negative	Positive	
Status	Alive	Count	58	36	94
		%	61.7%	38.3%	100.0%
	Dead	Count	0	6	6
		%	0.0%	100.0%	100.0%
Total		Count	58	42	100
		%	58.0%	42.0%	100.0%

Discussion

In our study 42 of MI patients had Euthyroid sick syndrome. So occurrence of Euthyroid sick syndrome in our patients was 42% , p value was 0.258. So occurrence of Euthyroid sick positivity rate was not statistically significant. This implies that occurrence of Euthyroid sick positivity rate may vary. In our study patients who presented with LVEF<50 the occurrence of Euthyroid sick syndrome was 56.9% and patients who presented with LVEF>50 was 26.5%. In our study 56.9% of Euthyroid sick positive patients are in LVEF<50 But 43.1% of Euthyroid sick negative patients only in this group. This observation was statistically significant with p value of 0.002** . In Hallstrom A et al[7] . J Am Coll Cardiol. 1995 May;25(6):1250-7.study concluded that low left ventricular ejection fraction are strongly associated with morbidity and mortality after acute myocardial infarction .Euthyroid sick positive patients are high likelihood to have LVEF<50. So the Euthyroid sick syndrome positivity predicts the high mortality and morbidity than negative individuals in acute myocardial infarction.In our study the decrease of MeanT3level, Mean T4 level between the two groups of patients who presented with LVEF <50 and LVEF>50 was observed. P values of which were 0.001, 0.0005 respectively which was statistically significant. In Medha Rajappa and S.K. Sen et al Biomedical Research 2005; 16 (1): 15-18 study observed that extent of decrease of Mean T3 level ,Mean T4 level, Mean TSH level It was more important in patients in Group I (LVEF < 50%) with a diagnosis than that in Group II.So analysing from various studies our study also observed that when the severity increased as evidenced by low LVEF more suppression of thyroid hormone level occurs.

Conclusion

From the above observations it is inferred that Decrease in T3 is inverse to the intensity of cardiac harm and may have a probable diagnostic value.. These changes in the thyroid hormone status return to normal once the patient recovers from the critical illness. Though these patients have abnormalities in the thyroid hormone status they are clinically euthyroid. The thyroid hormone system is quickly controlled in acute myocardial infarction. This can be useful during acute ischemia. The Euthyroid sick syndrome positivity rate is comparative to the sternness of cardiac damage (as evidenced by KILLIP class and Ejection fraction) and may have a possible prognostic value. Thus Euthyroid sick syndrome positivity may underwrite to the embellishment of an AMI cruelty index. The role of thyroid hormone replacement as a method for treatment of Euthyroid sick syndrome is still controversial and there are no proper studies to recommend , further studies are required for recommendation . Treatment of underlying condition is the treatment of choice.

Conflict of Interest: No

Source of Funding : Self

Ethical Clearance: Nil

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Occurrence of Euthyroid Sick Syndrome in Acute Myocardial Infarction and their Duration of ICU Stay

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Abstract

Background: Depression of the thyroid hormone system may happen in otherwise euthyroid patients in serious acute illness of any cause. In this condition, called Euthyroid Disease Syndrome, the standard feed-back control of the homeostasis of the thyroid is changed.[11-13]**Aims :** 1. To find out the occurrence of EUTHYROID SICK SYNDROME in ACUTE MYOCARDIAL INFARCTION patients admitted to intensive care unit in SREE BALAJI HOSPITAL , CHENNAI and its prognostic significance.**Material and Method :** This study was conducted in the Intensive care unit,SREE BALAJI MEDICAL COLLEGE AND HOSPITAL , Chennai in collaboration with Dept of internal medicine, Dept of Cardiology and Dept of biochemistry. It was a prospective study done during the period from April 2017 to March 2018 . 100 patients with history, clinical features suggestive of myocardial infarction were selected irrespective of age and sex . **Results :** In our study 42 of MI patients had Euthyroid sick syndrome. So occurrence of Euthyroid sick syndrome in our patients was 42% , p value was 0.258. So occurrence of Euthyroid sick positivity rate was not statistically significant. This implies that occurrence of Euthyroid sick positivity rate may vary In which the **Conclusions** : The presence of Euthyroid sick syndrome in Acute myocardial infarction patients may contribute to the expansion of an AMI sternness index

Key words*: Myocardial infarction, Euthyroid sick syndrome*

Introduction

Euthyroid disease syndrome can be defined as abnormal results from thyroid function tests that happen in non-thyroid disease settings (NTI) without pre-existing hypothalamic-pituitary or thyroid dysfunction.11-13 Decreased serum complete triiodothyronine (T3) is the most prevalent thyroid function ailment in patients with acute illness[14] . [14] This can be detected within 2 hours of the beginning of severe physical stress.[15] As the severity of the disease progresses, there is a gradual growth of complicated syndrome connected with low concentrations of T3 and thyroxine (T4).[16,17] The concentrations of thyroid stimulating hormone (TSH) remain unchanged or mildly decreased.. Conversion of pro-hormone (Thyroxine, T4) to active form is reduced owing to reduced peripheral activity of 5'-deiodinase and enhanced manufacturing of inverse T3 (rT3) metabolites. These modifications in thyroid hormones may be partially mediated by cytokines or other inflammatory mediators., Acting at the hypothalamus and pituitary levels, the thyroid gland, and the hepatic deiodinase system, as well as at the linking of thyroxine to thyroid globulin (TBG). It remains uncertain how much the hormone reaction in Euthyroid Disease Syndrome is component of an adaptive response that reduces the energy demands of tissues in the face of systemic disease. Or a maladaptive reaction that induces harmful tissue hypothyroidism. As a result, the use of thyroid hormone treatment in Euthyroid disease syndrome is contentious. Recovery from inherent acute illness is associated with the demise of thyroid defects. Altered levels of thyroid hormones have also been revealed in starvation,[10] acute and chronic medical conditions,[29-31]acute myocardial infarction[4] , bone marrow transplantation[8] surgery,[9]] trauma, [22] and, in reality, these modifications can be seen

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in any serious systemic disease[18,19].

Euthyroid disease syndrome has also been established in acute myocardial infarction and has been postulated as a connection between the severity of cardiac harm and the degree of increase in thyroid hormones. [4] The objective of this research is to identify the incidence of Euthyroid disease syndrome in patients with Acute myocardial infarction and to assess whether the existence of Euthyroid disease syndrome in these patients has any prognostic importance in assessing the seriousness of AMI.

Material & Method

This study was conducted in the Intensive care unit,SREE BALAJI MEDICAL COLLEGE AND HOSPITAL , Chennai in collaboration with Dept of internal medicine, Dept of Cardiology and Dept of biochemistry. It was a prospective study done during the period from April 2017 to March 2018 . 100 patients with history, clinical features suggestive of myocardial infarction were selected irrespective of age and sex .

Inclusion Criteria

1. Patients with myocardial infarction admitted to the Intensive Care Unit.

Exclusion Criteria

6. Patients with past or present history of thyroid dysfunction.

7. Patients taking drugs that will affect thyroid function.

8. Patients with chronic renal failure.

9. Patients with decompensated liver disease.

10. Patients with thyroid function test suggestive of primary Hypothyroidism or Hyperthyroidism.

Study Population

A total of 124 patients were enrolled for the study from the patients admitted to Intensive care unit in Sree Balaji Hospital from the period April 2017 to march 2018.

24 patients were excluded as per exclusion criteria. The remaining 100 patients, who satisfied all the inclusion criteria were selected for the study and followed for one week. Written consent was obtained from all patients participating in the study.

All patients were subjected to a detailed clinical history and thorough physical examination as per proforma. The complicated cases identified by KILLIP classification criteria and ejection fraction.

The serum of patients was analysed for thyroid function tests at day 1 (T3,T4,TSH) and in euthyroid sick positive patients repeat thyroid function tests was done at day 7 to confirm the reversal of hormone status. Day 1samples were obtained before reperfusion therapy. Echocardiography was done during hospital stay.

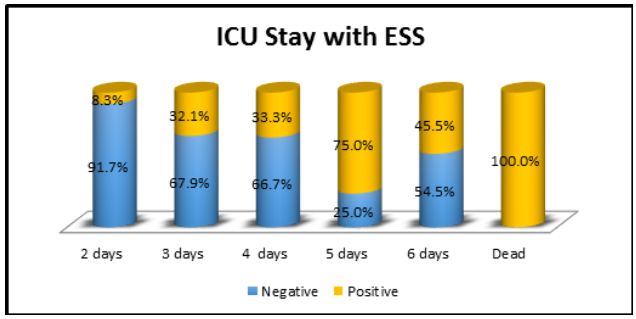
All patients underwent CBC, Blood sugar, Serum Na, Urea, Creatinine, LFT, Fasting lipid profile, Thyroid function tests, ECG,Troponin I, ECHO.

Laboratory Tests

All patients underwent CBC, Blood sugar, Serum Na, Urea, Creatinine, LFT, Fasting lipid profile, Thyroid function tests, ECG, Trop I and ECHO. The serum of patients was analysed for thyroid function tests at day 1 (totalT3, total T4, TSH) and in sick euthyroid positive patients repeat thyroid function tests done at day 7 to confirm the reversal of hormone status. The thyroid function test was done by ELISA method. All samples were obtained before reperfusion therapy. Echocardiography was done during hospital stay.

Results

Our study shows that of 42% acute myocardial infarction patients had Euthyroid sick syndrome positivity. In our study in Euthyroid sick positive patients mean ICU stay duration was 4.39 days compare to Euthyroid sick syndrome negative patients in whom mean ICU stay duration was 3.45 days with p value of 0.005** so this observation was statistically significant.



			ESS		Total
			Negative	Positive	
ICU stay	2 days	Count	11	1	12
		%	91.7%	8.3%	100.0%
	3 days	Count	19	9	28
		%	67.9%	32.1%	100.0%
	4 days	Count	18	9	27
		%	66.7%	33.3%	100.0%
	5 days	Count	4	12	16
		%	25.0%	75.0%	100.0%
	6 days	Count	6	5	11
		%	54.5%	45.5%	100.0%
	Dead	Count	0	6	6
		%	0.0%	100.0%	100.0%
Total		Count	58	42	100
		%	58.0%	42.0%	100.0%

Discussion

In our study 42 of MI patients had Euthyroid sick syndrome. So occurrence of Euthyroid sick syndrome in our patients was 42% , p value was 0.258. So occurrence of Euthyroid sick positivity rate was not statistically significant. This implies that occurrence of Euthyroid sick positivity rate may vary. In our study in Euthyroid sick positive patients mean ICU stay duration was 4.39 days compare to Euthyroid sick syndrome negative patients in whom mean ICU stay duration was 3.45 days with p value of 0.005** so this observation was statistically significant. This implies that Euthyroid sick positive patients have high morbidity.

Conclusion

From the above observations it is inferred that Decrease in T3 is inverse to the intensity of cardiac harm and may have a probable diagnostic value.. These changes in the thyroid hormone status return to normal once the patient recovers from the critical illness. Though these patients have abnormalities in the thyroid hormone status they are clinically euthyroid. The thyroid hormone system is quickly controlled in acute myocardial infarction. This can be useful during acute ischemia. The Euthyroid sick syndrome positivity rate is comparative to the sternness of cardiac damage (as evidenced by KILLIP class and Ejection fraction) and may have a possible prognostic value. Thus Euthyroid sick syndrome positivity may underwrite to the embellishment of an AMI cruelty index. The role of thyroid hormone replacement as a method for treatment of Euthyroid sick syndrome is still controversial and there are no proper studies to recommend , further studies are required for recommendation . Treatment of underlying condition is the treatment of choice.

Conflict of Interest: No

Source of Funding : Self

Ethical Clearance: Nil

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Occurrence of Euthyroid Sick Syndrome in Acute Myocardial Infarction and Their Relation to Type of Myocardial Infarction

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Abstract

Depression of the thyroid hormone system may happen in otherwise euthyroid patients in serious acute illness of any cause. In this condition, called Euthyroid Disease Syndrome, the standard feed-back control of the homeostasis of the thyroid is changed.[11-13] To find out the occurrence of EUTHYROID SICK SYNDROME in ACUTE MYOCARDIAL INFARCTION patients admitted to intensive care unit in SREE BALAJI HOSPITAL , CHENNAI and its prognostic significance. This study was conducted in the Intensive care unit,SREE BALAJI MEDICAL COLLEGE AND HOSPITAL , Chennai in collaboration with Dept of internal medicine, Dept of Cardiology and Dept of biochemistry. It was a prospective study done during the period from April 2017 to March 2018 . 100 patients with history, clinical features suggestive of myocardial infarction were selected irrespective of age and sex . In our study STEMI were 52 patients and NSTEMI were 52 patients, among which the occurrence of Euthyroid sick syndrome among STEMI was 46.2% and NSTEMI was 37.5%. p value was 0.381 which is statistically insignificant. To our knowledge no study compared between STEMI and NSTEMI.In our study AWMI were 56 patients , IWMI were 38 patients and Other MI were 6 patients among which occurrence of Euthyroid sick syndrome in AWMI patients was 32.1%, in IWMI patients was 47.4% and in OTHERS it was 100% .p value was 0.004 that was statistically significant. Previous studies also showed similar results.The presence of Euthyroid sick syndrome in Acute myocardial infarction patients may contribute to the elaboration of an AMI severity index.

***Key words**: Myocardial infarction ,Euthyroid sick syndrome*

Introduction

Euthyroid disease syndrome can be defined as abnormal results from thyroid function tests that happen in non-thyroid disease settings (NTI) without pre-existing hypothalamic-pituitary or thyroid dysfunction.11-13 Decreased serum complete triiodothyronine (T3) is the most prevalent thyroid function ailment in patients with acute illness[14] This can be detected within 2 hours of the beginning of severe physical stress.[15] As the severity of the disease progresses, there is a gradual growth of complicated syndrome connected with low concentrations of T3 and thyroxine (T4).[16,17]The concentrations of thyroid stimulating hormone (TSH) remain unchanged or mildly decreased.. Conversion of pro-hormone (Thyroxine, T4) to active form is reduced owing to reduced peripheral activity of 5'-deiodinase and enhanced manufacturing of inverse T3 (rT3) metabolites. These modifications in thyroid hormones may be partially mediated by cytokines or other inflammatory mediators., Acting at the hypothalamus and pituitary levels, the thyroid gland, and the hepatic deiodinase system, as well as at the linking of thyroxine to thyroid globulin (TBG). It remains uncertain how much the hormone reaction in Euthyroid Disease Syndrome is component of an adaptive response that reduces the energy demands of tissues in the face of systemic disease.

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Or a maladaptive reaction that induces harmful tissue hypothyroidism. As a result, the use of thyroid hormone treatment in Euthyroid disease syndrome is contentious. Recovery from inherent acute illness is associated with the demise of thyroid defects. Altered levels of thyroid hormones have also been revealed in starvation,[10] acute and chronic medical conditions,[29-31] acute myocardial infarction[4], bone marrow transplantation,[8] surgery,[9] trauma,[22] and, in reality, these modifications can be seen in any serious systemic disease.[18,19.]

Euthyroid disease syndrome has also been established in acute myocardial infarction and has been postulated as a connection between the severity of cardiac harm and the degree of increase in thyroid hormones..[4] The objective of this research is to identify the incidence of Euthyroid disease syndrome in patients with Acute myocardial infarction and to assess whether the existence of Euthyroid disease syndrome in these patients has any prognostic importance in assessing the seriousness of AMI.

Material & Method

This study was conducted in the Intensive care unit,SREE BALAJI MEDICAL COLLEGE AND HOSPITAL , Chennai in collaboration with Dept of internal medicine, Dept of Cardiology and Dept of biochemistry. It was a prospective study done during the period from April 2017 to March 2018 . 100 patients with history, clinical features suggestive of myocardial infarction were selected irrespective of age and sex .

Inclusion Criteria

1. Myocardial infarction patients admitted to the Intensive care unit.

Exclusion Criteria

11. Patients with past or present history of thyroid dysfunction.

12. Patients taking drugs that will affect thyroid function.

13. Patients with chronic renal failure.

14. Patients with decompensated liver disease.

15. Patients with thyroid function test suggestive of primary Hypothyroidism or Hyperthyroidism.

Study Population

A total of 124 patients were enrolled for the study from the patients admitted to Intensive care unit in SreeBalaji Hospital from the period April 2017 to march 2018.

24 patients were excluded as per exclusion criteria. The remaining 100 patients, who satisfied all the inclusion criteria were selected for the study and followed for one week. Written consent was obtained from all patients participating in the study.

All patients were subjected to a detailed clinical history and thorough physical examination as per proforma. The complicated cases identified by KILLIP classification criteria and ejection fraction.

The serum of patients was analysed for thyroid function tests at day 1 (T3,T4,TSH) and in euthyroid sick positive patients repeat thyroid function tests was done at day 7 to confirm the reversal of hormone status. Day 1samples were obtained before reperfusion therapy. Echocardiography was done during hospital stay.

All patients underwent CBC, Blood sugar, Serum Na, Urea, Creatinine, LFT, Fasting lipid profile, Thyroid function tests, ECG,Troponin I, ECHO.

Laboratory Tests

All patients underwent CBC, Blood sugar, Serum Na, Urea, Creatinine, LFT, Fasting lipid profile, Thyroid function tests, ECG, Trop I and ECHO. The serum of patients was analysed for thyroid function tests at day 1 (totalT3, total T4, TSH) and in sick euthyroid positive patients repeat thyroid function tests done at day 7 to confirm the reversal of hormone status. The thyroid function test was done by ELISA method. All samples were obtained before reperfusion therapy. Echocardiography was done during hospital stay.

Findings

Our study shows that of 42% acute myocardial infarction patients had Euthyroid sick syndrome positivity. In our study STEMI were 52 patients and NSTEMI were 52 patients, among which the occurrence of Euthyroid sick syndrome among STEMI was 46.2% and NSTEMI was 37.5%. p value was 0.381 which is statistically insignificant. To our knowledge no study compared between STEMI and NSTEMI.

In our study AWMI were 56 patients , IWMI were 38 patients and Other MI were 6 patients among which occurrence of Euthyroid sick syndrome in AWMI patients was 32.1%, in IWMI patients was 47.4% and in OTHERS it was 100% .p value was 0.004 that was statistically significant. Previous studies also showed similar results.

			ESS		Total
			Negative	Positive	
Diagnosis	AWMI	Count	38	18	56
		%	67.9%	32.1%	100.0%
	IWMI	Count	20	18	38
		%	52.6%	47.4%	100.0%
	Others	Count	0	6	6
		%	0.0%	100.0%	100.0%
Total		Count	58	42	100
		%	58.0%	42.0%	100.0%

Discussion

In our study 42 of MI patients had Euthyroid sick syndrome. So occurrence of Euthyroid sick syndrome in our patients was 42% , p value was 0.258. So occurrence of Euthyroid sick positivity rate was not statistically significant. This implies that occurrence of Euthyroid sick positivity rate may vary. Our study shows that of 42% acute myocardial infarction patients had Euthyroid sick syndrome positivity. In our study STEMI were 52 patients and NSTEMI were 52 patients, among which the occurrence of Euthyroid sick syndrome among STEMI was 46.2% and NSTEMI was 37.5%. p value was 0.381 which is statistically insignificant. To our knowledge no study compared between STEMI and NSTEMI.In our study AWMI were 56 patients , IWMI were 38 patients and Other MI were 6 patients among which occurrence of Euthyroid sick syndrome in AWMI patients was 32.1%, in IWMI patients was 47.4% and in OTHERS it was 100% .p value was 0.004 that was statistically significant. Previous studies also showed similar results.In our study patients who presented with LVEF<50 the occurrence of Euthyroid sick syndrome was 56.9% and patients who presented with LVEF>50 was 26.5%. In our study 56.9% of Euthyroid sick positive patients are in LVEF<50 But 43.1% of Euthyroid sick negative patients only in this group. This observation was statistically significant with p value of 0.002** . In Hallstrom A et al[7] . J Am CollCardiol. 1995 May;25(6):1250-7.study concluded that low left ventricular ejection fraction are strongly associated with morbidity and mortality after acute myocardial infarction .Euthyroid sick positive patients are high likelihood to have LVEF<50. So the Euthyroid sick syndrome positivity predicts the high mortality and morbidity than negative individuals in acute myocardial infarction.In our study the decrease of MeanT3level, Mean T4 level between the two groups of patients who presented with LVEF <50 and LVEF>50 was observed. P values of which were 0.001, 0.0005 respectively which was statistically significant. In Medha Rajappa and S.K. Sen et al Biomedical Research 2005; 16 (1): 15-18 study observed that extent of decrease of Mean T3 level ,Mean T4 level, Mean TSH level was more significant in patients in group I (with LVEF < 50%), who have a worse prognosis than those in group II. So analysing from various studies our study also observed that when the severity increased as evidenced by low LVEF more suppression of thyroid hormone level occurs.

Conclusion

From the above observations it is inferred that Decrease in T3 is inverse to the intensity of cardiac harm and may have a probable diagnostic value.. These changes in the thyroid hormone status return to normal once the patient recovers from the critical illness. Though these patients have abnormalities in the thyroid hormone status they are clinically euthyroid. The thyroid hormone system is quickly controlled in acute myocardial infarction. This can be useful during acute ischemia. The Euthyroid sick syndrome positivity rate is comparative to the sternness of cardiac damage (as evidenced by KILLIP class and Ejection fraction) and may have a possible prognostic value. Thus Euthyroid sick syndrome positivity may underwrite to the embellishment of an AMI cruelty index. The role of thyroid hormone replacement as a method for treatment of Euthyroid sick syndrome is still controversial and there are no proper studies to recommend , further studies are required for recommendation . Treatment of underlying condition is the treatment of choice.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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A Various Outcomes of A Patients with Acute Intestinal Obstruction – A Case Series

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Abstract

Background: Bowel distortion continues the most common intra-abdominal problems experienced by primary care doctors in their career, whether caused by hernia, neoplasm, conductance or associated with physiological disorders, continues a important cause of disease risk due to small or big intestinal invasion... To identify and analyse the various outcomesin a patients with acute intestinal obstruction. **Objective**: To analyse the various outcomes in a patients with acute intestinal obstruction. **Materials and methods** : The study was conducted in SreeBalaji Medical College and Hospital, Chennai over a period of 19months in all patients admitted with intestinal obstruction irrespective of age group. **Results**: Bowel distortion persists one of utmost important prevalent intra-abdominal issues encountered by general surgeons in their profession, either provoked by hernia, neoplasm, conductivity or linked to biochemical disorders, tiny or large intestine intrusion tends to be significant cause of morbidity and mortality.**Conclusion:**Achievement in the therapy of acute intestinal obstruction relies mainly on early diagnosis, careful monitoring and treatment of the pathological consequences of infection, even more than the cause itself..There is no statistically significant difference between cure rates and death rates due to various surgeries, probably because our sample size was too small. P value 2.0(>0.05).

Key words: *intestinal obstruction, peritonitis,septicemia.*

Introduction

Bowel intrusion continues some of the most predominant intra-stomach issues experienced by general specialists in their calling, regardless of whether prompted by hernia, neoplasm, bond or connected to biochemical unsettling influences[1], intestinal obstacle of the small or digestive organ stays to be a noteworthy reason for dismalness and mortality[3]. They apply for 12 to 16 percent of careful confirmations for extreme stomach issues[2]. Qualities of intense intestinal deterrent can differ from a moderately fair look with just slight stomach agony and distension to a condition of hypovolemic or septic stun[4] (or both) requesting crisis medical procedure[9]. Passing inferable from intense intestinal block diminishes with better learning of pathophysiology[5], improved symptomatic strategies, liquid and electrolyte.,A lot of powerful anti-microbials and understanding of intensive care[6-8]. Most deaths happen in elderly people who seek late therapy and related pre-existing illnesses such as diabetes mellitus, heart illness or respiratory disease[10]. Early diagnosis of obstruction, adequate technique during surgery and intensive postoperative therapy are very welcome[11].

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Materials and Method

The study was conducted in SreeBalaji Medical College and Hospital, Chennai over a period of 19months in all patients admitted with intestinal obstruction irrespective of age group. Study design - Prospective observational studyPatients who had prudently processed subacute intestinal obstruction were removed from the examination and just those cases of intense intestinal

check that had been carefully controlled were inquired about to decide the pathology of intestinal deterrent so as to comprehend the kind of execution, physical outcomes, radiological and hematological outcomes., Operational outcomes and consequence of intense intestinal block. Clinical information were registered as per Proforma after admission of the patient. Disorder is primarily based on clinical investigation and is sometimes endorsed by haematological and radiological tests.

Finding

Table 1: Postoperative complications

Postoperative complications	Number of cases
WI	2
RTI	2
Wound dehiscence	-
Faecal fistula	-
Septicaemia	5

Mortality

Table 2: Mortality

Mortality	Number of cases	Percentage
Cured	43	86
Dead	7	14

In the current research of 50 instances, approximately 7 patients died as a proportion of 14 per cent. Most of fatalities because of inconveniences, for example, septicemia, peritonitis, respiratory disease. In the present study 7 persons died during postoperative period. The analysis of cause of death is shown below.

Table 3: Death Causes

Age and sex	Symptoms prior to admission	Operative Findings	Operative procedure	Cause of Death
55/F	3 days	Carcinoma sigmoid colon	Resection and anastamosis	Septicaemic Shock
72/M	8 days	Carcinoma Rectum	Hartman's Procedure	RTI
65/M	5 days	Mesenteric Ischaemic	Resection anastamosis	Septicaemic Shock
45/M	3 days	Carcinoma Caecum	Resection and anastamosis	RTI
58/F	5 days	Carcinoma ovary with sigmoid colon Infiltration	Transverse loop colostomy	Septicaemic Shock
63/M	3 days	Carcinoma Rectum	Hartman's Procedure	Septicaemia
55/M	4 days	Carcinoma Colon	Resection and anastamosis	Septicaemia

Table 4: Follow-up status

Follow-up	Follow-up status		
complications	**One month**	**3rd Month**	**6th Month**
A. Wound infection	1	Nil	Nil
B. Septicemia	Nil	Nil	Nil
C. Enterocutaneous Fistula	Nil	Nil	Nil
D. Prolonged ileus	Nil	Nil	Nil
E. Fever	2	3	Nil
F. Respiratory infection	2	1	Nil
G. Death	Nil	Nil	Nil
H. Recurrent obstruction	Nil	Nil	Nil

Discussion

In our clinical research, the prevalence of acute intestinal obstruction is 0.95% of complete surgical instances. The recurrence of SouvikAdhikari et al. in arrangement was 9.87 percent of complete careful occurrences. The occurrence of Bhargava Anderson arrangement was 3% of complete careful occasions. In the present investigation gathering of 50 examples, variations from the norm, for example, septicemia 5 cases, pneumonic tract disease 2 cases, twisted damage in two cases. Septicemia was increasingly confused in occasions of danger and one instance of mesenteric ischaemia where sepsis was available right now of affirmation, and for these occurrences, intestinal medical procedures were performed which were not well arranged. In two examples, one with blocked inguinal hernia and one with carcinoma rectum, the patients had past comorbid COPD conditions because of respiratory tract contamination.

The death rate in our examination is 14 percent, for example 7 out of 50 examples. Of these 6 occurrences, one was because of harm and one was because of mesenteric ischaemia. that have occurred during various studies have been tabulated as follows.

Table5: Morality rate in various studies

Studies	Year	No. of cases Studied	Mortality
Present study	2014	50	14%
Souvik Adhikari44	2005	367	7.35%
Safian Matsu Moto50	1975	171	19%
Jahangir-Sarwar Khan45	2001	100	7%
Ramachandran CS51	1982	417	12.7%

The death level in this research is much like the Ramachandran CS et al. inquire about, however is higher contrasted with the SouvikAdhikari et al., Jahangir et al. contemplates.

Out of 7 examples, 6 were because of danger. Since the danger was higher in the more established gathering and the ill-equipped intestinal medical procedure performed on the patient brought about septicemia. furthermore, brought about death. Two patients were ceaseless smoker who endured respiratory tract contamination and died. As an outcome, most fatalities were because of danger, which had a significant impact in the consequences of the ailment. Mortality in intestinal impediment is higher in patients who advance suffocation and intestinal gangrene, including the individuals who arrive at the emergency clinic following 3 days.. With these, the age of the patient, the general ailment of the patient, the length of the infections. Operational processes have a strong role to play in both advancement and mortality.

Conclusion

Success in the treatment Acute intestinal obstacle depends fundamentally on early finding, cautious administration and treatment of the neurotic results of deterrent, as much as the hazard individually.There is no statistically significant difference between cure rates and death rates due to various surgeries, probably because our sample size was too small. P value 2.0(>0.05).

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Comparision of Pre-Operative & Post-Operative Pain Grading after Diagnostic Laparoscopy in Patients Presenting with Chronic Abdominal Pain at SBMCH

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Abstract

To evaluate the diagnostic and therapeutic value of laparoscopy in chronic abdominal pain. Tofindthe various unrevealed aetiology for chronic abdominal pain.To assess the extent of the diseaseTo analyse the accuracy and efficacy of diagnostic laparoscopy in chronic abdominal pain.

Keywords: *Pre-operative & Post-operative, chronic abdominal pain.*

Introduction

Chronic abdominal pain is a common complaint which is difficult to manage by both physician and surgeon. It is the 4th frequent cause of chronic pain syndrome in general population worldwide. Although patients with chronic abdomen pain undergo numerous clinical & radiological diagnostic work up, definite diagnosis still remains a challenge to the surgeon. This affects the patients both physically and psychologically[1]

With the introduction of the diagnostic laparoscopy new tools has been added to our knowledge. Laparoscopy can identify abnormal findings and improve outcome in majority of the patients with chronic abdominal painDiagnostic laparoscopy also helps the surgeon to decide whether any surgical management is mandatory and also to elicit the signs of inoperability in case of disseminated diseases such as advanced malignancy,tuberculosis[2] etc in which the prodromal symptoms may be chronic abdominal pain[3]. This study is mainly designed to highlight the significance of laparoscopy in diagnosing the etiology of chronic abdominal pain , impact on the treatment and on post-operative painrelief[4 5]

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Materials & Method

This study was conducted in patients presented with abdominal pain more than 3 months whose diagnosis was doubtful or could not be made by our routing physical, laboratory and imagingmodalities.Between MARCH 2017 and OCTOBER 2018, a total number of 105 consecutive patients with chronic abdominal pain were enrolled in this prospective descriptive cross-sectional study.They were recruited from the outpatient clinic of General Surgery Department in Sree Balaji Medical College & Hospital, Chennai in the above said study period.

Inclusion criteria

- Age between 15 and65
- Both males andfemale
- Abdominal pain more than 3months

Exclusion criteria

- Known abdominal malignancypatient
- Known psychiatricpatient

Findings

Table – 1 Findings

Findings	Percentage
Thickened appendix	44 (42%)
Adhesions	22 (21%)
Enlarge mesentric nodes	14 (13%)
Ovarian cyst	9(8%)
Koch's abdomen	3(3%)
Neoplasia	3 (3%)
Hernia	3 (3%)
Others	3(3%)
No abnoramality	4 (4%)

PRE OP PAIN GRADING

Table – 2 Pre Op Grading

Grading	Percentage
Mild	14(13%)
Moderate	78 (74 %)
Severe	12 (12%)
Very severe	1(1%)

Most of the patient had moderate pain which accounts for 74% (n=78)

POST OP PAIN RELIEF

Table – 3 Post OP Pain Relief

Duration	Positive out come	Negative out come
After 1 month	80 %	20%
After 3 month	90 %	10%

Discussion

All patients were observed in the immediate post operative period for pain perception and amount of analgesic were needed to treat. All of them had the follow up in 1st month and 3 rd months. Verbal Rating Scale for pain perception were analysed. At the end of 1st month 80% patients got complete pain relief and at 3rd month 90% got complete pain relief. In the remaining 10% patient there were no changes in pain grading, it may be because of the diseasenature.

Conclusion

The role of diagnostic laparoscopy in chronic abdominal pain is tremendous which increases our knowledge about various underlying abdominal disorders.Diagnostic laparoscopy can identify abnormal findings and improve the outcome in patients with chronic abdominal pain. However, it should be considered only after a complete diagnostic evaluation has been carried out.It allows effective surgical treatment of many conditions encountered at the time of diagnostic laparoscopy hence intervension can be done simultaneously. It is a safe and effective tool to establish the etiology of chronic abdominal pain and allows for appropriate interventions.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Comparison of Fine Needle Aspiration Cytology with Histopathology in Thyroid Swellings & its Diagnostic Accuracy

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Abstract

To observe the correlation of FNAC and histopathology in various thyroid swellings.Solitary nodular goitre, Multi nodular goitre Suspected malignancy of thyroid, Malignancy of thyroid and to study its diagnostics accuracy.

Key words: *Cytology, Histopathology*

Introduction

Thyroid gland is unique among endocrine organs. It is the largest endocrine gland in the body and the first to develop in fetal life. A thyroid nodule is either palpable clinically or ultrasound detected[1-8]. A multitude of diagnostic tests like ultrasound, thyroid nuclear scan, fine needle aspiration cytology (FNAC) and many more are available to evaluate a thyroid swelling[9-14]. Final diagnosis requires morphological examination of lesions for which requires FNAC and histopathological examination (HPE) becomes mandatory tests.

Materials and Method

This study includes the patients who were operated for solitary and multinodular thyroid disease, suspicious malignant disease and malignant disease. All cases were studied in detail with detailed clinical examination and investigations. Cases with hard thyroid swelling, male sex, fixity to surrounding structures, nerve involvement and cold nodules are studied in detail to rule out malignancy. Cases with cystic swellings are not aspirated they were subjected to surgery to rule out papillary carcinoma.It is a prospective study done between April 2017 to September 2018 done in Department of General Surgery, Sree Balaji Medial college & hospital Department of Pathology, SreeBalaji Medical College& hospital.

Equipment's for FNAC: -

- FNA gun or 10cc syringe
- 22 to 24 gauze needle
- Syringe holder
- Glass slides
- Alcohol
- Fixative
- Gauze pad
- Adhesive bandage

Procedure: -

Initial examination should be with patient in upright position but FNAC done in supine position. Place a pillow under the neck. Ask the patient to keep still and to refrain from swallowing. Perform 2 to 4 aspiration in same session. Depending on the size of the thyroid swelling use different angles and change in point of entry. Cells are placed and prelabelled in dry glass slides. Some are immediately placed in 70% alcohol while others are air dried. The stain used is papanicolaou or wrights stain. Skilled pathologist can accurately diagnose thyroid lesions.

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Group I -Benign

All patients whose clinical examination showed features of solitary or multinodaluar thyroid disease with preoperative FANC as nodule, colloid, adenomatous goitre.

Group II- Suspicious Malignancy

Solitary nodular or multinodulargoitre with pre-operative FNAC showing suspicious of malignancy/ suspicious of follicular neoplasm

Group Iii – Maliganancy

- Hard swelling
- Pre-operative FNAC showing malignancy
- H/o recent voice change
- H/o difficulty in breathing or swallowing
- Fixity to surrounding structures.
- Lymph node enlargement (secondary from thyroid nodule).

All 60 patients underwent surgery. Final histopathology report obtained for all patients.

Findings

During the study period we had 60 patients who presented with thyroid swelling who underwent FNAC followed by surgery and final histopathology y] report was obtained for all. The comparison between FNAC report and histopathology report were present which was studied in detail. Based on the FNAC the 60 patients were divided into three groups. GROUP-1 benign, GROUP-2 suspicious of malignancy & GROUP-3 proven malignancy. There was less discordance in group-1 when compared to group-2 which had more discordance. the group-3 had no discordance. The incidence of different types of diagnosis for thyroid swelling is reported in Table 1 and figure 1. The incidence of different types of thyroid diagnosis as per HPE is reported in table 2 & figure 2. The comparison table of FNAC and HPE is reported in table 3. The correlation & discordance between FNAC and histopathology has been reported infigure 3 & 4.

Table-1: Incidence as Per FNAC

Diagonsis – Cytological	No. of Cases
Nodular Colloid Goitre	50
Papillary Carcinoma	3
Suspicious of Follicular Carcinoma	6
Medullary Carcinoma	1

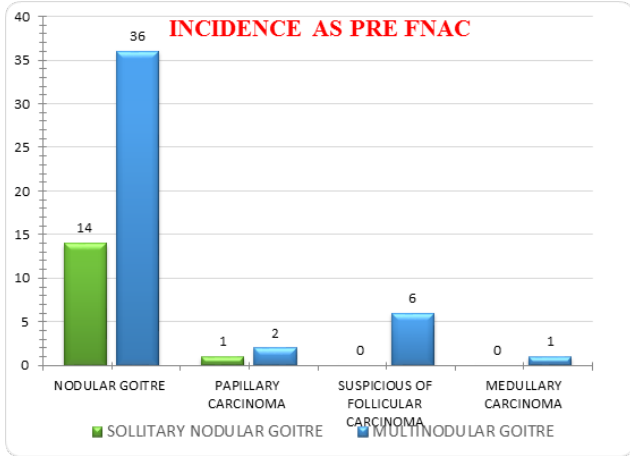


Figure-1 Incidence as Per FNAC

Table- 2: Incidence as per histopathology report

Diagonsis- Histopathological	No. of Cases	Precentage
Nodular Colloid Goitre	42	70%
Papillary Carcinoma	7	11.6%
Follicular Carcinoma	2	3.3%
Medullary Carcinoma	1	1.6%
Follicular Adenoma	7	11.6%
Hashimotos Thyroiditis	1	1.6%

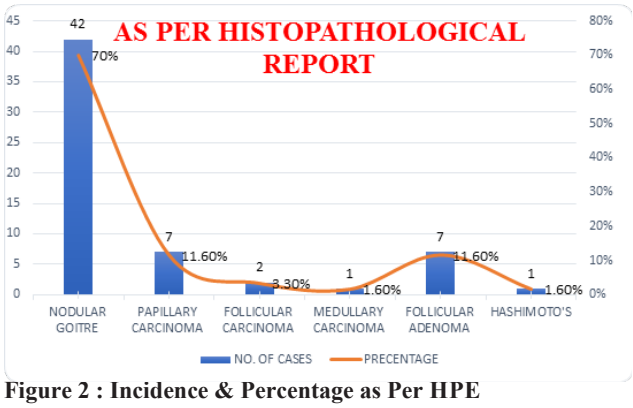


Figure 2 : Incidence & Percentage as Per HPE

TABLE- 3: Diagnosis of thyroid swelling in FNAC & Histopathology

Diagnosis	Fnac	Histopathology
Nodular Colloid Goitre	50	42
Papillary Carcinoma	3	7
Suspicious of Maliganancy	6	-
Follicular Carcinoma	-	2
Medullary Carcinoma	1	1
Follicular Adenoma	-	7
Hashimotos Thyroiditis	-	1

Group I - Benign

Number of benign disorder diagnosed by pre-operative FNAC = 50

Correlated with HPE = 42

Percentage of correlation = 84%

Discordance in biopsy =8

Percentage of Discordance = 16%

Group II – Suspicious of Malignancy

Number of Pre-operative FNAC diagnosed as suspicious of malignancy = 6

Correlated with Biopsy -3

Percentage of correlation - 50%

Discordance in Biopsy = 3

Percentage of discordance - 50%

Group III – Maliganant

Number of Pre-operative FNAC diagnosed as malignant = 4

Correlated with Biopsy = 4 cases

Percentage of correlation – 100%

Percentage of discordance – 0%

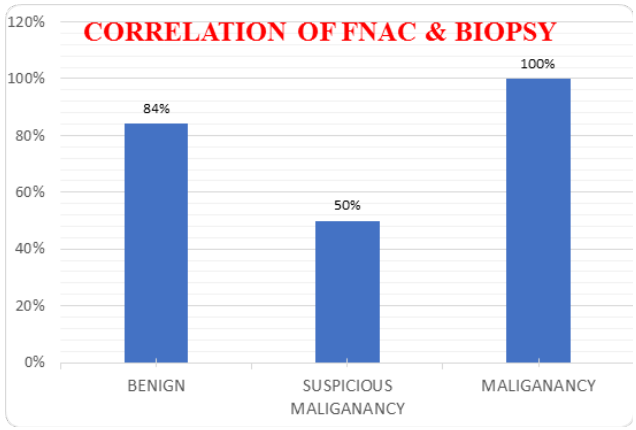


Figure – 3: Correlation FNAC & Biopsy

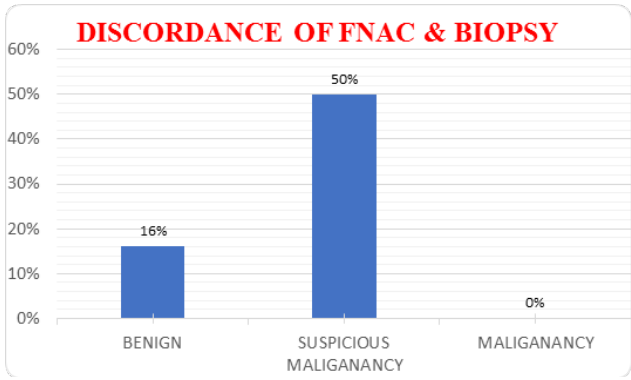


Figure – 4: Discordance of FNAC & Biopsy

Discussion

FNAC is simple to conduct and secure with a minimal infection rate. Care must be taken to achieve an appropriate specimen-most writers suggest between 3 and 6 expectations. A suitable sample includes at least 6 groups of 10 to 15 excellently-preserved cellsThey are classified as benign, indeterminate or suspicious and malignant. The treatment of papillary thyroid carcinoma by FNAC on the basis of distinctive nuclear alterations is reliable and accurate, with tolerance and accuracy reaching 100%.In our study among 60 cases, 3 cases are reported as papillary carcinoma in FNAC. But after HPE report 7 cases are diagnosed as papillary carcinoma. So the discrepancy of 4 cases, the FNAC diagnosis of 4 cases were one as suspected follicular carcinoma and 3 cases were nodular colloid goitre

type. In case of follicular neoplasm, the sensitivity of FNAC is about 90% and specificity less than 50% this limits the usefulness of FNAC. Tpoimmuno chemistry with monoclonal antibody (MO Ab 47) improves the accuracy of FNAC for follicular lesions. It increases sensitivity to 100%specificity to 70%B.Mundasad, P.C. pyper 2006 *et al*[15] conducted a study on Accuracy of FNAC in diagnosis of thyroid swellings. In their study among 144 patients - FNAC revealed 94% benign, 6% malignant 4% suspicions. 13% inadequate, 4% indeterminate. But histopathology showed 82% benign, 18% malignancy. In their research, the survey rate was 13 per cent insufficient. The most significant variables include the understanding of the vacuum cleaner and the requirements used to identify a suitable sample.Published dates suggest inadequate sample ranges between 9 to 31% in their study false negative rate is 23% i.e. FNAC negative for cancer but histology positive for cancer. According to AACE/AME team on thyroid knobs Endocrpract 2006:124 63-102 the normal false negative rate is 5% their rules to limit false negative outcomes are. (9) Aspirate different knob destinations, Aspirate numerous knob locales in MNG, follow up cytologically kind knobs, Submit pimple liquid for assessment, Review contemplates with experienced cytopathologist

Conculsion

In conclusion, FNAC is simple, safe, and cost effective but HPE remains final diagnostic tool. Because FNAC cannot differentiate between adenoma and carcinoma in follicular and hurthle cell lesions. The suspicious results in FNAC prove to be an area of uncertainty often resolved by diagnostic surgical resection. In case of Multinodular goitre even if the preoperative FNAC is negative it does not exclude with certainty the possibility of a carcinoma because the error in sampling the right area is greater. Such evaluation may lead to non-radical operation and the need of a second surgery or radio therapy.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Efficacy of Autologous Platelet Rich Plasma Injection in Lateral Epicondylitis and Plantar Fasciitis

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Abstract

The aim of the study is to find out the efficacy of autologous platelet rich plasma injection in lateral epicondylitis and plantar fasciitis. The treatment and complete cure from chronic enthasopathies like tennis elbow, plantar fasciitis, has always been ranked among the most difficult and frustrating problem for both patients and treating doctors. Tennis elbow or lateral epicondylitis has been described as a degenerative tendonopathy of extensor carpi radialis brevis muscle. The most common pathogenesis is repetitive micro trauma of muscle from overuse resulting in tendinosis of ECRB with or without involvement of extensor digitorum communis muscle. Various forms of conservative treatments are available for tennis elbow and the outcome of these treatments varies in patient to patient. Plantar fasciitis is also known as heel tennis, because the plantar fascia is constantly stretched at the attachment over calcaneal tuberosity. Repeated micro trauma makes this disease difficult for conservative treatment. Surgical options like plantar fascia release were practiced but devastating complications will occur since plantar fascia is a supporting structure for maintain the longitudinal arch of the foot.

Key words: *Platelet rich plasma, lateral epicondylitis, and plantar fasciitis.*

Introduction

Platelet rich plasma (PRP)injections are widely studied for treating various musculoskeletal disorders due to its increased healing properties.[1]The contains growth factors such as Platelet-Derived Growth Factor, Insulin-Like Growth Factor, Transforming Growth Factor, Epidermal Growth Factor (EGF), Vascular Endothelial Growth Factor (VEGF), Fibroblast growth factor. Interaction of this growth with differentiation factors, and the adhesive protein factors such as fibronectin and vitronectin are responsible for the healing response promoting the regenerative process of chemotaxis, self proliferation, tissues debries, angiogenesis, extra cellular matrix formation, osteoid production and collagen synthesis, which enhance the healing rate in chronic tendinopathies.[2]This methodology of treating chronic tendinopathies has general importance as this form a connecting approach between conservative management as well as surgical management.[3]

The incidence of lateral epicondylitis is 4-7 per 1000 per year in general population,and35-54 years age group are commonly involved.[4] Lateral epicondylitis occurs due to overuse of the wrist extensors or supinator muscle with may be incriminating. In lateral epicondylitis the muscle involved is Extensor carpi radialis brevis.[5]Various methods have been advocated for the treatment of lateral epicondylitis rest, physiotherapy, activity modification, bracing, nonsteroidal anti-inflammatory drugs, and injections.[6] Surgery is also an option for patients who have persistent symptoms despite continued efforts at conservative treatment.[7]Thecommon cause of heel pain is plantar fasciitis which affect 10% of the general population.The age group of 40 -70years most commonly occurs.[8] It tends to occur more often in women, middle aged, military recruits, athletes and the obese persons.[9]The inflammation is due to repeated trauma from overuse or injury. The degeneration occurs

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at origin of the plantar fascia at the medial tuberosity of the calcaneum.[10]Various methods have been advocated for treating this condition like rest, non-steroidal anti inflammatory drugs, night splints, keeping appropriate wedge on shoe, soft heel pad, plantar stretching exercises, ultrasound massage to heel, extracorporeal shock wave therapy (ESWT), local corticosteroid injections, and operative treatments.[11]Platelet rich plasma helps in healing both lateral epicondylitis and plantar fasciitis following which recurrence rate was found to be low.

Materials and Method

The present sample size of 80 patients were analysed prospectively by injecting platelet rich plasma for conditions such as lateral epicondylitis and plantar fasciitis. The study was conducted in sreebalaji medical college and hospital from March 2017 to March 2018with afollow up period of 3 months duration.

Inclusion criteria:

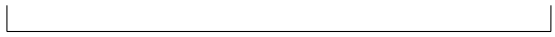
1. Plantar fasciitis diagnosed patients.
2. Lateral epicondylitis diagnosed patient.
3. Patients should have minimum three months duration of symptoms.
4. Patients should undergo conservative treatment for a minimum period of three months.
5. Pain score more than seven at the time of injection.
6. Local steroid injection in the last 2 months.
7. Both male and female
8. Age group above 20 years.

Exclusion criteria:

1. Lateral epicondylitis and plantar fasciitis of less than three months duration.
2. Pain scores less than seven.
3. Patients without any trial of conservative treatment.
4. Recent local steroid injection.
5. Patients suffering from other causes like rheumatoid arthritis, Sero negative spondylo arthritis .
6. Infection or ulcer at the injection site.
7. Patients less than 20 years.
8. Cancer.
9. Women in lactation and pregnancy

Pain assessment:

Visual Analogue Scale (VAS):



No pain ***Worst Possible Pain***

Method of preparation of platelet rich plasma:

Initially a venous puncture is done and specific volume of autologous bloodis collected from the patient (10ml of venous blood sample) into a tube containing an anticoagulant (sterile sodium citrated tubes) At 1800 rotations/minute (rpm) for 15 mins centrifugation takes place separating plasma from packed red blood cells. The top layer consists of plasma and bottom layer consists of red blood cell. The plasma is shifted to a sterile tube following which the packed cell layer is discarded. The second centrifugation takes place at 3500 rpm for 10 min which yields concentrated platelet layer after extraction of platelet poor plasma.

Injection technique:

Patient in supine position and palpate most tenderness point and marked using skin marker. The area was prepared and draped for injection. Initially,a local blockof lignocaine is infiltrated subcutaneously. Under proper aseptic precaution a 21-g needle is used to inject, 1ml platelet rich plasma is injected over the maximum tenderness while the remaining platelet rich plasma is injected into the surrounding tissue. (figure 1 and 2)

Follow Up:

Patients were followed up for 3 months. Follow ups was done at 1st, 2ndand 3rdmonth. Patients were assessed subjectively using the visual analogue score.

Findings

SPS software system was used to do statistical analysis by comparing the results.

Patients were analysed for pain relief subjectively at 1st 2nd and 3rdmonth post injection therapy and there pain is tabulated using visual analogue score (VAS) (pain score).

Table 1: Comparison of VAS with age groups in lateral epicondylitis:

VAS Score	Age Group				Total
	20-29	30-39	40-49	50-59	
Excellent	7 (100)	10 (66.6)	7 (70)	2 (25)	26 (65)
Good	0	5 (33.34)	3 (30)	6 (75)	14 (35)
Fair	0	0	0	0	0
Total	7 (100)	15 (100)	10 (100)	8 (100)	40 (100)
Chi sq	9.524		P value	0.023*	

Table 2: Comparison of VAS score with age in Plantar Fascitis:

VAS Score	Age Group				Total
	20-29	30-39	40-49	50-59	
Excellent	2 (100)	8 (100)	11 (55)	10 (100)	31 (77.5)
Good	0	0	9 (45)	0	9 (22.5)
Fair	0	0	0	0	0
Total	2 (100)	8 (100)	20 (100)	10 (100)	40 (100)
Chi sq	11.613		P value	0.009*	

*-Significant ($p<0.05$)

Mean Pain Score:

Pain score was assessed at the time of injection. The mean pain score of all the patients was 8.5. The mean pain score at 1,2,3 months was 4.825%, 3.3125%, and 1.935% respectively. When individually analyzed mean pain score for lateral epicondylitis at 0, 1,2,3 months was 8.55%, 4.725%, 3.25%, 1.9% respectively. Similarlymean pain score for plantar fasciitis at 0,1,2,3 months was 8.45%,4.925%,3.375%,1.925% respectively.

Table 3: Mean pain score:

Patient	Mean pain score at the time of injection	Mean pain score at 1stmonth	Mean pain score at 2ndmonth	Mean pain score at 3rdmonth
Total (80)	8.5%	4.825%	3.3125%	1.935%
Lateral epicondylitis(40)	8.55%	4.725%	3.25%	1.9%
Plantar fasciitis(40)	8.45%	4.925%	3.375%	1.925%

Result

The mean difference between in VAS scoring system at the time of presentation was 8.5%, and there was gradual and significant improvement in VAS scoring system of both lateral epicondylitis and plantar fasciitis. Which showed as 4.825% at 1st month, 3.3125% at 2nd month, and 1.935% at 3rd month respectively.

Discussion

The growing trend in using platelet rich plasma injection for condition like plantar fasciitis and lateral epicondylitis had significantly improved in last decade. The steep rise in use of platelet rich plasma is because of good functional outcome of this modality.

We have taken up this study to evaluate the efficacy of platelet rich plasma in lateral epicondylitis and plantar fasciitis. We selected a sample size of 80 patients who were suffering from lateral epicondylitis and plantar fasciitis. The number of patients were divided into 40(100%) for plantar fasciitis and 40(100%)for Lateral epicondylitis. Out of which the sex distribution which was attributed to lateral epicondylitis was 22 males (55%) and 18 females (45%) and plantar fasciitis was 15 males (37.5%) and 25 females(62.5%).

Comparison of VAS score at each age group for lateral epicondylitis had a significant difference in their functional outcome at the end of mean follow up period of 3 months. The p value was 0.023.Which was found to be significant.

Similarly comparison of VAS score at each group for plantar fasciitis had a significant difference at the end of mean follow up period of 3 months. The P value was 0.009.Which was found to be significant.

The comparison of these groups for lateral epicondylitis and plantar fasciitis at different age groups had shown significant difference in their outcome at the end of 3 months. Therefore usage of platelet rich plasma injection for lateral epicondylitis and plantar fasciitis has show significant outcome due to its healing properties.

The mean VAS score system shows significant difference in pain varying from time of injections till the end of 3rd month. Initial VAS score was (8.5%),at the end of one month(4.825%), two months(3.312%) and three months were (1.935%)respectively. This shows significant outcome of improvement in lateral epicondylitis and plantar fasciitis

In our study,there were certain limitations such as multiple scoring technique, volume of patient, and long term followup study needs to be done for knowing the better outcome of platelet rich plasma injection.

Conclusion

In conclusion, we consider that platelet rich plasma injection for lateral epicondylitis and plantar fasciitis hasserved as an effective tool in management of these conditions.The significant difference in P value in different age groups had shown a proportionate improvement due to platelet rich plasma injection in varying age groups. Hence this type of management decreases the progressiveness for surgical management of lateral epicondylitis and plantar fasciitis.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Functional Consequence of Antegrad Unreamed Humeral Interlocking Nailing in Adults

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Abstract

Dislocations of the humerus shaft account for roughly 1% of all lacerations handled. The method of interconnecting nails reflects a newer strategy to the therapy of glenoid broken bones.The aim is to prospectively study the "functional outcome of antegrade intramedullary interlocking nailing in fracture shaft of humerus" at the Department Of Orthopaedics in Sree Balaji Medical College and Hospital chrompet Chennai. The recruitment period of this study shall be from March 2017 to February 2018 (12 months). The follow-up period shall be for a minimum period of 7 months (range: 7 to 19 months).Radiological union, practical outcome and problems have been evaluated. By the end of 6 months, the Union rate was 97.14 per cent. According to Rodriguez-Merchan EC, of the 35 patients evaluated, 17 had an outstanding functional rating, 14 had a good rating, 3 had a reasonable rating and 1 had a bad rating. There was 1 instance of non-union,1 case of superficial infection,1case of post-operative radial nerve palsy and 1 case of stiffness of shoulder. Unreamed glenoid interlocking nails are an efficient means of fixing severe humeral fractures.

Keywords- *Glenoid, orthopaedics, Dislocations, fractures, Glenoid broken bones.*

Introduction

Fractures of the humerus shaft account for approximately 1% of all fractures handled [1]. Previously, injuries in the humeral shaft were classified as fracture location, fragment pattern, associated soft tissue injury and bone quality. This fracture was addressed by a fixed reduction & casting with / without casting strengthening and by an open reduction & internal fixing using dynamics. Compression Many authors recorded the basic good outcome regarding the obsession of the compression plate [2,3,4], which is still regarded to be the gold standard for the informant therapy of acute humeral shaft fractures. Although plate fixation occurred in a high level of bonding, it includes comprehensive soft tissue extraction, significant injury to the radial nerve, and bad infatuation to the nerve.The bone of the osteoporotic. Many kinds of later flexible nails have been used [5,6]. The advantages of intramedullary nailing are restricted surgical visibility, stronger biomechanical obsession, restricted soft tissue disturbance, and early mobilization of neighboring joints..

The procedure of interlocking nailing speaks to the more up to date approach of the treatment of humeral breaks. Interlocking nailing additionally maintains a strategic distance from intricacies like absence of rotational control, movement of nail and prerequisite of strengthening bracing[7,8]. The Seidel nail was the main nail to be tried clinically. In the end a few nail frameworks advanced [3,7,9,10,11].The investigations distributed by Cox MA[7] and Crates J[10] association rates were 87.9% and 94.5% individually in antegrade interlocking nailing. Antegrade interlocking nailing has a higher pace of shoulder stiffness[7]. The undreamed intramedullary nail has its own particular hypothetical points of interest like taking out the odds of iatrogenic cracks, saving of cortical blood supply and disposing of the harm to rotator sleeve.The point of this examination was to assess the utilitarian result after antegrade undreamed interlocking nailing in break shaft of humerus, the association rate

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and the reasons for poor result.

Materials and Method

The aim is to prospectively study the "functional outcome of antegrade intramedullary interlocking nailing in fracture shaft of humerus" at the Department Of Orthopaedics in Sree Balaji Medical College and Hospital chrompet Chennai. The recruitment period of this study shall be from March 2017 to February 2018 (12 months). The follow-up period shall be for a minimum period of 7 months (range: 7 to 19 months). Radiological union, functional outcome and complications were assessed.Every one of the nails were embedded antegrade through a passage indicate simply average more noteworthy tuberosity. Reaming was not done to stay away from harm to spiral nerve and to diminish harm to the rotator sleeve. Every one of these breaks were fixed utilizing a widespread humeral nail of 6.7 mm width and of proper length determined intraoperatively. Distal locking was done anteroposteriorly by freehand procedure utilizing picture increase. Proximal locking was finished utilizing the dance. Rotator sleeve was fixed in all cases.In 35 patients the worked appendage was immobilized for 2 days and dynamic helped shoulder assembly was begun from third postoperative day.We followed up 35 patients for least of year and a half postoperatively.Radiological association was characterized as the nearness of spanning callus of there cortices in two symmetrical views(7). Deferred association was characterized as disappointment of crack association to happen by 4 months. Non association was characterized as disappointment of crack association by a half year or proof of obsession failure(3).The useful result was surveyed utilizing Rodriguez-Merchan EC criteria(10). The scope of developments was estimated by a solitary spectator utilizing a goniometer.

Grading	**Elbow Rom**	**Shoulder Rom**	**Pain**	**Disability**
Excellent	Extention 5 Flexion 130	Full Rom	None	None
Good	Extention 15 Flexion 120	<10% Loss Of Total Rom	Occasional	Minimum
Fair	Extension 30 Flexion 110	10-30% Loss	With Activity	Moderate
Poor	Extension 40 Flexion 90	>30% Loss	Variable	Severe

The stiffness of the shoulder was described in accordance with the requirements of Benjamin Shaffer(12) and Douglas(13).

History of damage or dull injury or medical procedure with beginning of firmness that practically confines the utilization of furthest point.

2) An assessment with constrained with restricted shoulder movement a particular way, multidirectional or all around.

3) Radiograph with ordinary cartilaginous joint space.

4) Range of movement of shoulder that was under 90% of the range when unaffected contralateral shoulder.

Findings and Discussions

Findings of our study (2017-2018) can be summarized as follows:

(a) Our male to female ratio, in the sampled age group of 31 to 55 years, was 5:2. Hence there was a clear male dominance in the sampled total of n=35 patients. On critical analysis of this, while the male preponderance dropped when we move up the age scale, many female recruits had joined the study beyond age 46 to 55 years. Thus this bimodal model is as distinctly reflected in our

study too.

(b) Right sided injuries predominated at 77.14% (n=27) in our study.

(c) In the younger age group of 31 to 45 RTA was the predominant mode of injury. As we move up the age scale from 46 to 55 years, trivial fall constituted the majority of recruits, who also happened to be females.

(d) As per the 2018 AO-OTA adult diaphyseal classification system adopted in our study, type 12 B 3 constituted 40% (n=14) cases, followed closely by type 12 B 2 at 31.42 % (n=11).

(e) Our average injury to surgery time lapse was at 5.9 days (range : 0 to 11 days). From surgery to discharge our time of hospitalization was at 14.7 days (range : 8 to 19 days)

(f) 34.29 % (n=12) cases in our series of 35 cases, had an associated skeletal injury.

(g) Our average time for bone union in 97.14% (n=34) cases was 16.8 weeks (range : 12 to 21 weeks). We encountered 2.86% (n = 1) cases of non-union in a 55 year old female, who had hysterectomy done at age of 38 years for DUB at 6 months and was appropriately subjected to LCP with bone grafting which united in 5.3 months. This particular case type 12 B 3 AO-OTA grade at index fixation.

(h) Of the total complications that we encountered, 8.58 % (n=3) were minor complications like; superficial wound infection, shoulder impingement and radial nerve palsy. All resolved without affecting the final clinical or functional outcome. We did encounter a 2.86% (n = 1) of major complications of non-union, as described earlier and resolved with resurgery.

(i) Our functional and clinical outcomes by the rodriguez-merchan criteria was at 88.56 % (n=31) good to excellent, 8.56% (n = 3) of fair and 2.86 % (n=1) of poor result.

(j) The poor outcome (n = 1) as already detailed underwent plate osteo-synthesis with bone grafting and achieved union at 5.3 months post re-surgery and had a fair outcome as per rodriguez-merchan criteria.

Conclusions

Unreamed humeral interlocking nails are an efficient means of fixing severe humeral fractures.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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To Study Clinical Manifestaion of Hyperandrogenism in Adult Male with Acne

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Abstract

To study clinical manifestation of hyper and rogenism in adult male with acne.30 patients were included in the study. Informed consent was obtained from all patients. we were looking for clinical manifestation of hyperandrogenism in male above 18 years of age. Among 30 patients 21 patients had acanthosis nigricans, 20 had alopecia, 22 had seborrhea. To conclude, male patients above 18 years of age with acne were presented with clinical manifestation of hyperandrogenism.

Keywords- *Clinical Manifestation, Seborrhea*

Introduction

Acne is more a disease of late childhood and adolescence, despite the reality that it may continue, recur or start in adulthood[1-5]. Although acne has been recorded in some of the more healthy kids as young as 8 years of age and even sooner in those with unusual virilization or precocious puberty, most instances happen between 14 and 19 years of age.Four central point assume a significant job in the pathogenesis of skin break out vulgaris[6-8]: (1). Hyperplasia of sebaceous organs, (2). Expanded sebum generation, (3). Hyperkeratinization of pilosebaceous conduits and (4). Propionibacterium acnes colonization and periglandular dermal aggravation[9-12].

Androgens animate the creation of sebum, the development of the sebaceous organs and hyperkeratinization. Clinical manifestations of hyperandrogenism are acanthosis nigricans, alopecia, seborrhea.

Materials and Method

Study Design: Cross sectional study.

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Study Area: Skin Outpatient Department, Sree BalajiMedical College and Hospital

Study Population: All male patients ageabove 18 attending skin OPD, who are clinically diagnosed with acne vulgaris.

Study Method: Investigational study.

sample size : 30

Inclusion criteria:

1. Males aged above 18 years with acne 2. Consenting for thestudy.

3. 3. Good health in particular 4. No usual consumption of drugs (except for acne treatment)

4. 5. consenting forinvestigation

Exclusion criteria:

1. Known case of Diabetes Mellitus Type 1 or Type2

2. Patients impacted by other dermatological illnesses or therapy of other endocrine diseases

3. Not consenting for thestudy

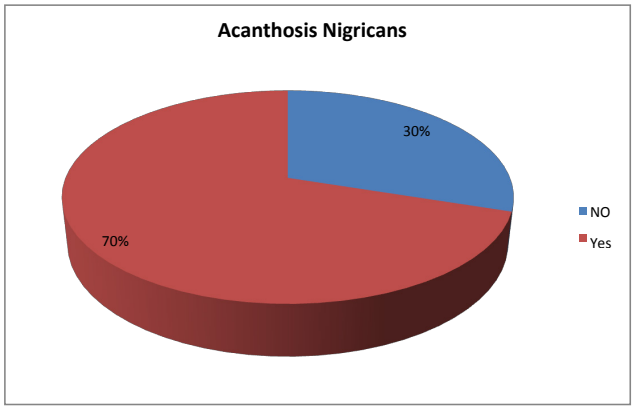
4. Patient not willing for the investigations 5. Patients receiving psychotropicdrugs

Findings

ACANTHOSIS NIGRICANS (N=30)

Acanthosis nigricansis Described by dark, velvety discoloration of body folds and creases. The impacted skin may become thicker.Thesewere observed in 21 patients which are around 70%, absent in 9 patients which were30%.

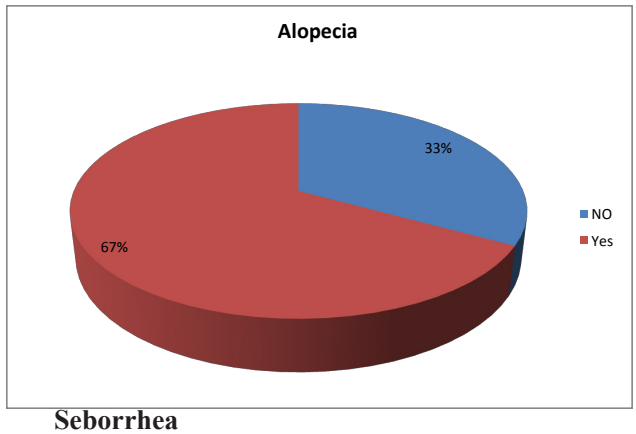
Acanthosis_Nigricans	Frequency	Percentage
NO	9	30.0%
Yes	21	70.0%
Total	30	100.0%



Alopecia

Alopecia It can be located at the front and the top of the head as in the prevalent masculine pattern of baldness. It might be patchy, as in a disease called alopecia aerata..In ourstudy 66.7%, and 33.3% Patients had noalopecia.

Alopecia	Frequency	Percentage
NO	10	33.3%
Yes	20	66.7%
Total	30	100.0%



Seborrhea

Chronic autoimmune disease of the skin, defined by aggregation of scales (fatty). Itchy yellow crusted plaques may be present. Seborrhea has a prevalent effect on the scalp. Other locations include the face, ears, eyebrows and eyelids, umbilical, and genitalia..In our 22 patients (73.3%) had seborrhea and 8 patients (26.7) seborrhea isabsent.

Seborrhea	Frequency	Percentage
NO	8	26.7%
Yes	22	73.3%
Total	30	100.0%

Discussion

It is observed that hyperandrogenism occurs in men. The manifestations are usually in the form of patterned alopecia, Acanthosis nigricans, and acne. The name APAAN (acne, patterned alopecia, acanthosis nigricans) syndrome is suggested for this presentation in men

The pathogenetic procedure of skin inflammation seems to start with androgenic hormonal incitement of pilosebaceous units, the thickness of pilosebaceous units is most noteworthy on the face and scalp (400 – 800 organs/cm2) and least on the furthest points (50 organs/cm2). Before the degrees of flowing androgens increments, pilosebaceous units comprise of delicate, fine, unpigmented vellus hair and little sebaceous organs. Circulating androgens bind to androgen receptors that are localizedto thebasallayeroftheouterroot–sheathkeratinocytesofthehair follicle and to sebaceous glands.“In sexualareas, such as the axilla, pilosebaceous units begin to differentiate into large terminal hair follicles. In sebaceous areas, such as the face, pilosebaceous units become sebaceous follicles while the hair remains vellus

. Without circulating androgens, the sebaceous glands remain small. The gonads and adrenals produce the majority of circulating androgens. During the period of prepubertal, adrenal androgens appear to be the major determinant of sebaceous gland activity." In the two young men and young ladies, plasma groupings of the adrenal androgens dihydroepiandrosterone (DHEA) and dihydroepiandrosterone sulfate (DHEAS)'' regularly start to increment at adrenarche, or adrenal adolescence, which commonly happens at about age 8 years, and keep on ascending through pubescence. Conditions like adrenal hyperplasia or polycystic ovary malady are related with hyperandrogenism.

Conclusion

Among 30 patients 21 patients had acanthosis nigricans, 20 had alopecia, 22 had seborrhea. To conclude, male patients above 18 years of age with acne were presented with clinical manifestation of hyperandrogenism.

Ethical Clearance- No ethical clearance was necessary for this research work

Source of Funding- Self funded project

Conflict of Interest - Nil

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Malignancy in Solitary Thyroid Nodules: A Study on Incidence & Evaluation of Risk

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Abstract

Thyroid swellings or nodule can present as both mutlinodular and solitary nodular goitre. A discrete swelling in an otherwise impalpable gland is termed as solitary nodule of thyroid.Prevalence ranges from 4% to 10% in general adult and 0.2 to 1.5% in children.The study was done SreeBalaji Medical College & Hospital from June 2017 to October 2018 in the department of Generalsurgery.incidence of carcinoma in solitary nodular goitre (6.66%) is more than multinodular goitre (20%).the peak age incidence of solitary nodular goitre is 30-40 years.It is found from this sequence that 6.66 per cent of the solitary thyroid nodules are benign with females.

***Key words**: Thyroid Nodules, Evaluation, Risk.*

Introduction

Thyroid nodule is a palpable clinically orradiologicallyover the gland. There is a elevated risk of STN malignancy compared to various nodules. So, for this, the solitary thyroid nodules must be handled with elevated suspicion.[1-3] Solitary thyroid nodules (STNs) happen in 4-7% of the population with thyroid swelling. They are more prevalent in women (6.4%) than men.(1.5%).Preoperative treatment of thyroid nodules to distinguish benign from malignant nodules is essential to prevent unnecessary surgery and associated issues.[4-7]

Material and Method

A survey was conducted on 60 patients admitted and operated for the SreeBalaji Medical College solitary thyroid nodule during the period from June 2017 to October 2018 in the Department of General Operations.. All the patients underwent both FNAC & post-operative Histopathology for the final diagnosis. It is prospective study.[3-5]

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Findings

In our research of 60 patients, 7 were male and 53 were female. Solitary thyroid Nodule noted in 15 instances (Male 1-Female 14) Multinodular goitre in 45 instances (Male-6, Female-39).The incidence of SNG & MNG in malr& female have been shown in table-1. The age incidence of SNG & MNG has been shown in table 2. [11-12] incidence of malignancy in SNG in shown in table 3

Table-1: Sex Incidence

Sex	Solitary Nodular Goiter	Multinodular Goitre
Female	14	39
Male	1	6

Table-2: Age Incidence

Age Limit	Solitary Nodular Goitre	Multinodular Goitre
21-30	0	2
31-40	6	14
41-50	4	15
51-60	4	25
61-70	1	4

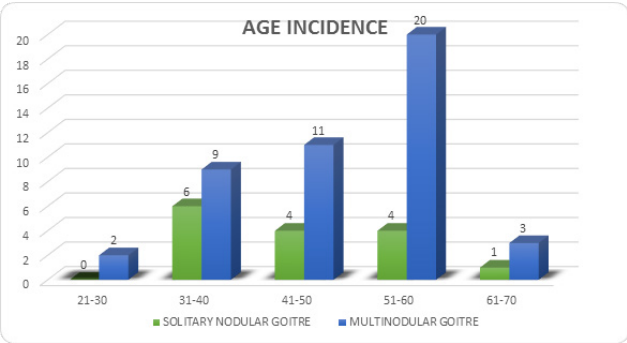


Fig 2: Age Incidence

Table- 3: Incidence of Malignancy in SNG

Type of Maliganancy	Solitary Nodular Goitre
Papillary Carcinoma	1
Follicular Carcinoma	0
Medullary Carcinoma	0

Table-4: Percentage of Maliganancy in SNG & MNG

	Solitary Nodular Goitre	Multinodular Goitre
Percentage of Maliganancy	6.66%	20%

Discussion

FNAC is anything but difficult to perform and safe with least confusion rate. Care must be taken to get a sufficient example most creators prescribe between 3 to 6 goals is required. Good example contains at any rate 6 gatherings of 10 to 15 very much protected cells. They are sorted by their appearance to generous, vague or suspicious and harmful. The conclusion of papillary thyroid carcinoma by FNAC based on trademark atomic changes is solid and precise with affectability and particularity both moving toward 100%.

Oliver H beechar*set al* stated that goitres were frequently seen in women however, the incidence of carcinoma in man is greater than in women. In our study among 60 cases, the incidence of carcinoma in Male (1.6%) is greater than in female (15%). This is in accordance with various published reports. Fenn A.S *et al*1976 found that there was no great sex predominance in the incidence of malignancy. [20]According to Dr. C. Suryaprakash Rao et al, – Andhra Pradhesh – Adenoma thyroid was the most prevalent benign lesion, and papillary carcinoma was the most prevalent malevolent lesion.Prof. R.L Gupta Delhi analyses 370 cases of solitary nodule. In his study, about 38.7%. OF HPE report was different from FNAC. His study showed the fact that FNAC is not full proof and surgery with HPE report remain the only method of confirmation.

As Per Hossein gharib and papini et al. [8] nodule size does not predict pathology. The following characteristics have been noted to be correlated with an enhanced danger of disease in the thyroid nodule.

H/o of childhood head and neck radiation

Family H/o of PTC, MTC, or MEN 2 (multiple endocrine neoplasia)

Age 20 or >70 yrs

Male sex

Abnormal cervical adenopathy

Fixed nodule

Vocal cord paralysis.

They concluded that risk of cancer is not significantly higher for solitary nodular than for glands with multiple nodules. But in our study the incidence of carcinoma in solitary nodular goitre (6.66%) is more than multinodular goitre (20%).

According to koh and cole WH *et al,* the incidence of carcinoma in MNG Varies from 7% to 17% [11]. In our study the incidence of carcinoma in MNG is 20%.

Conclusion

Results have been contrasted and available writing has been disclosed beforehand. Singular thyroid knobs have been seen in highly minor cases of cautious confirmations with the age frequency of the third century. There are no instances under 10 years of age. Papillary carcinoma is the most common malignancies observed, accounting for 80% of all malignancies. Further reviews are anticipated to explore the rationale for this suitable cause and prevention for papillary carcinoma

Ethical Clearance- No ethical clearance was necessary for this research work

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Conflict of Interest - Nil

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Antimicrobial Activity and Surface Characterization of a Denture Relining Material Coated with *Reynoutria Elliptica* Extract

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Abstract

Background/Objectives: The purpose of this study was to evaluate the antimicrobial effect and surface characterization of a denture relining material coated with *Reynoutria elliptica* extract.

Methods/Statistical Analysis: A denture relining disk was coated with coating resin containing *Reynoutria elliptica* extract. Extracts of coated specimens were analyzed to determine polyphenol content, and also incubated with *S. mutans* and *C. albicans* for 48 h. The coated surfaces were evaluated for microhardness, contact angle, and color characteristics. Cell viability was confirmed by performing MTT assay according to ISO 10993-5. All data were checked with one-way ANOVA followed by the Tukey's multiple comparison test (p=0.05).

Findings: The antimicrobial activity of experimental groups was significantly higher than control group on both *S. mutans* and *C. albicans*. Extracts analysis revealed that the level of polyphenol released from the experimental groups increased with increasing proportion of added *Reynoutria elliptica* extract. The surface microhardness, $\triangle E^*$ values, and cell viability were not significantly different between experimental groups and control group. The contact angle test revealed that the experimental groups exhibited more hydrophilic surface than the control group.

Improvements/Applications: Coating materials containing *Reynoutria elliptica* extract can be used as antimicrobial dental materials, with no deterioration of surface characteristics and biocompatibility.

Keywords:*Antimicrobial activity, Reynoutria elliptica extract, Coating resin, Microhardness, Contact angle, Cell viability*

Introduction

The adherence of pathogenic microorganisms on removable denture is associated to diseases like denture stomatitis and aspiration pneumonia[1]. Especially, microorganisms like *Candida albicans* and *Streptococcus mutans*, which easily adhere and form biofilms on liner material such as poly(methyl methacrylate) (PMMA) acrylic resin and poly (ethyl methacrylate) (PEMA)[2].

Cleaning of dentures and oral health care are effective methods for assuring oral hygiene and healthful living, and are especially effective in inhibiting denture stomatitis and aspiration pneumonia[3]. Furthermore, mechanical washing of denture surfaces is effective in defensing infections[4]. However, from the perspective of denture wears, mechanical cleaning can present a physical handicap for keeping dentures clean without roughening the surface[5-6].

Applying the polymer coating to the denture material have proved beneficial for stain resistance, mechanical

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and chemical properties[7]. Previous studies has been focused on the invention of antimicrobial coating materials or the synthesis of chemicals with antimicrobial activity[8-9]. Modification of denture materials to enhance their antimicrobial activity could reduce colonization by pathogenic oral microorganisms[10-11].

*Reynoutria elliptica*extract has high antimicrobial activity. It has shown potent inhibition of *Streptococcus mutans*, equivalent to that of *Helicobacter pylori*[12-13]. In addition, *Reynoutria elliptica* extract have been used in combination with numerous products for antimicrobial applications. *Streptococcus mutans* plays asignificant role as a colonizer in denture plaque formation and is actively attached to the acrylic resin surface. *Candida albicans* is also found in denture plaque[3, 14].

Modification of denture materials or surface is effective in preventing oral diseases, including denture stomatitis. In some case, denture base resin combined with antimicrobial agents like chlorhexidine was used. However, the release of these agents has cytotoxic effects on human gingival fibroblast[15].

In this study, we have tried to develop denture coating materials containing *Reynoutria elliptica* extract as a natural material for preventing stomatitis from oral pathogenic microorganisms. The aim of this study was to evaluate its antimicrobial effect against two types of oral microorganisms and characterize the surface of denture relining material coated with *Reynoutria elliptica* extract. The null hypotheses were that the application of a coating material containing *Reynoutria elliptica* extract would not produce significant differences in the antimicrobial activity and surface characterizations compared to the application of a coating resin without *Reynoutria elliptica* extract.

Method

A mold, 1.0 ± 0.1 mm in thickness and 10.0 ± 0.1 mm in diameter, was filled with the denture relining material (Tokuyama Rebase II, TOKUYAMA, Japan). The denture relining material in the mold was cured as per the manufacturer's recommendation. Then, the cured denture relining disk was carefully separated from the mold.

Reynoutria elliptica was obtained from an herbal shop in Korea. 500 g of *Reynoutria elliptica* was pulverized, added to 5 L of 70% methanol solution, and extracted at25 °C for 48 h. This extract was collected through filter paper #2 (Whatman, UK). The filtered extract was evaporated and concentrated on a vacuum evaporator (ETELA, Japan), and was prepared in powder form using a freeze dryer device (Ilshin Lab, Korea).

To make the experimental coating resins, a coating solution (Plaquit, Dreve, Germany) containing *Reynoutria elliptica* extract powder was prepared as the following groups (weight of *Reynoutria elliptica* extract powder/volume of coating resins): 200 μg/mL (RE 200), 400 μg /mL (RE 400), 600 μg /mL (RE 600), and control group (RE 0).

10 μL of experimental coating resins were spread on the cured denture relining disk and polymerized for 10 min using the Visio Beta Vario unit (3M ESPE, USA).

To confirm the antimicrobial activity against two types of oral microorganisms, the *Streptococcus mutans* (ATCC 25175) and *Candida albicans* (ATCC 10231) were selected as antimicrobial strains. According to the ISO 10993-12[16], the coated experimental specimen was extracted using PBS (Gibco, Life Technologies, Roskilde, Denmark) for 24 h at 37 ℃. After extraction, the extracts were mixed with the bacterial culture fluid at 1:1 ratio and incubating at 37 °C for 48 h. Antimicrobial activity was estimated based on the OD values in each well using an ELISA reader (Epoch, BioTeck, Winooski, VT, USA) at 600 nm.

To confirm the polyphenol contents of extracts, the test samples were extracted using distilled water (DW) for 7 days at 37 ℃ according to ISO 10993-12[16]. 50 μL of the extracts solution and 50 μL of Folin Denis reagent were added to 650 μL of DW, and allowed to react at 25 °C for 3 min. 100 μL of 10% Na_2CO_3 solution and 150 μL of DW were added to the reacted solution to make the final volume to 1 mL. These pretreated extracts were kept for 1 h at 37 °C in dark environment. The absorbance was subsequently analyzed by using a UV/VIS Spectrometer (X-ma 1200 Spectrophotometer, Human, Korea) at 725 nm.

A microhardness tester (DMH-2, Matsuzawa Seiki Co., Tokyo, Japan) was used to measure the Vickers Hardness Number (VHN) of the coated surface. Indentations were made by using a diamond indenter with 0.09 MPa load for 20 s of dwell time.

Contact angle was determinedwith a contact angle measuring device (Phoenix 300, SEO, Korea). A micro syringe was used to place a 5 μL droplet of DW on

the materials' surfaces, and the contact angles were examined after 3 s.

The color of the coated experimental specimens was evaluated using a spectrophotometer (Lamba20, Perkin Elmer, Orwalk, CT, USA). The color difference (ΔE) was calculated by following equation $\Delta E^* = \sqrt{(\Delta L^*)^2 + (\Delta a^*)^2 + (\Delta b^*)^2}$ to compare the values before and after the coating treatment.

To confirm the cell viability, test samples were extracted in cell culture medium with serum for 24 h at 37 ℃. MTT assay was performed according to ISO 10993-5[17]. The L929 cells (1×10^5 cells/mL) were seeded into a 96-well plate (SPL, Pochen-Si, Gyeonggi-Do, Korea) and incubated in a humidified incubator at 37 ℃ in 5% CO_2 for 26 h. 100 μL sample extracts were dispensed on to the cell, and incubated for one day. The extracts solution was removed and refilled with 50 μL of MTT solution. After incubation of the cell with MTT solution for 3 h, the MTT solution was removed and each well was filled with 100 μL isopropanol. The absorbance was detectedwith an ELISA reader (Epoch, BioTek, Winooski, VT, USA) at 570 nm. Cell viability was estimated using the following equation: Cell viability (%) = ($OD_{\text{treated cell}}/OD_{\text{negative cell}}$) × 100

All test results were checked using one-way ANOVA (IBM SPSS statistics 23, IBM Co., USA) followed by Tukey's multiple comparison test. All the significant levels were fixed at 0.05.

Result and Discussion

As shown in [Table 1], the antimicrobial activity of the experimental groups showed a significant effect on both *Streptococcus mutans* and *Candida albicans* compared to the control group ($p<0.05$). The level of polyphenol released from the experimental coating materials increased as the proportion of added *Reynoutria elliptica* extract increased ($p<0.05$).

The surface microhardness and color characteristics between the experimental groups and the control group were not significantly different ($p>0.05$). The contact angles were not significantly different between RE 200, RE 400, and RE 600 ($p>0.05$). However, these experimental groups exhibited a more hydrophilic surface than that of the control group ($p<0.05$). The results of the cell viability test showed that there was no significant difference between the experimental groups and the control group ($p>0.05$).

Table 1. Microhardness, contact angle, color characteristics, polyphenol content, antimicrobial activity, and cell viability for each group (mean ± S.D.)

Group		RE 0	RE 200	RE 400	RE 600
Microhardness(VHN)		25.5 ± 1.3a	22.3 ± 3.1a	25.6 ± 4.4a	25.6 ± 2.1a
Contact angle(°)		73.5 ± 5.4a	65.2 ± 7.1b	67.0 ± 7.1b	64.0 ± 3.2b
Color (△E*)		0.6 ± 0.3a	0.5 ± 0.2a	0.6 ±0.3a	0.6 ± 0.2a
Polyphenol content (μg/mL)		–	6.7 ± 2.8a	42.1 ± 3.9b	195.0 ± 7.2c
Antimicrobial activity (OD)	S. mutans	0.8 ± 0.2a	0.5 ± 0.1b	0.5 ± 0.1b	0.4 ± 0.1b
	C. albicans	0.9 ± 0.0a	0.7 ± 0.2b	0.8 ± 0.2b	0.7 ± 0.3b
Cell viability (%)		107.0 ± 4.2a	109.2 ± 7.6a	108.7 ± 2.8a	116.6 ± 1.4a

*The same lowercase letter implies no difference in values between groups ($p>0.05$).

Discussion

In our study, the effects of a denture relining material coated with a coating resin containing *Reynoutria elliptica* extract on the microbial activity, and mechanical and physicochemical properties were evaluated. Most plant extracts have been used for various purposes because of their proven safety. Additionally, it is currently being used as an ingredient in oral hygiene materials[13].

The inhibition of microbial activity indicates a reduction in reproduction and pathogenesis. Herein, *Streptococcus mutans* and *Candida albicans*, which are the known colonizers of denture plaque and strongly adhere to denture base materials, are evaluated[3, 14]. In this study, the experimental groups show significant antimicrobial effects on both *Streptococcus mutans* and *Candida albicans* compared to the control group ($p<0.05$), as listed in [Table 1]. These results indicate that a denture relining material coated with coating resins containing *Reynoutria elliptica* extract inhibits the activity of oral pathogenic microorganisms. Antimicrobial activity results show an increasing tendency with an increasing mass fraction of the *Reynoutria elliptica* extract, which results from the antimicrobial activity of the *Reynoutria elliptica* extract that increases with an increase in the polyphenol content. Phenolic metabolites are widely distributed in plants and exhibit various biological activities such as antimicrobial effects. Antimicrobial agents are also generally known to be related to phenolic compounds[18]. Therefore, the released *Reynoutria elliptica* extract from the coating material containing phenolic compounds may contribute to the inhibition of microbial activity.

Surface hardness is related to wear resistance and is the most common mechanical property indicator for prosthetic materials[19]. Our results imply that *Reynoutria elliptica* extract components do not have any effect on the surface hardness of the coating resin.

A major factor in the retention of a denture is the force associated with the wetting of the denture and oral mucosal. It has been recommended that enhancements in denture retention can be obtained by making the surface more wettable[20]. Thus, wetting measurements of a surface can provide an implication of the degree of denture retention. The contact angles for RE 200, RE 400, and RE 600 are not significantly different. However, the experimental groups exhibit more hydrophilic surfaces than the control group ($p<0.05$). It is possible that the components of *Reynoutria elliptica* extract improve the wettability of the coating resin.

The spectrophotometer used in our study can speedily measure the intensity of transmitted light reflected by the specimens as well as chrominance, with high accuracy and reproducibility[7]. The surface color characteristics between the experimental and control groups are not significantly different ($p>0.05$). Therefore, it was confirmed that the *Reynoutria elliptica* extract components do not exhibit any effects on the color of the coating resin surface.

Large areas of the oral mucosa can be exposed to toxic or irritating ingredients while wearing dentures[21]. Cell viability tests are studied to estimate the biological response of mammalian cells using *in vitro* biological parameters[17]. The results of the cell viability test show no significant difference between the experimental and control groups ($p>0.05$). This implies that the *Reynoutria elliptica* extract components do not have any side effect on the cell viability.

Based on the above results, we partially reject the null hypothesis stating that the application of the coating material containing *Reynoutria elliptica* extract does not result in significant differences in the antimicrobial activity and surface characterizations compared to the group without *Reynoutria elliptica* extract.

In this study, the antimicrobial effect of the coating resin containing *Reynoutria elliptica* on the surface of denture relining material against *Streptococcus mutans* and *Candida albicans* lasts for few days. However, it is necessary to investigate the long-term antimicrobial action, as well as the mechanical and physiochemical properties of this new material. Nevertheless, based on the above results, coating resins containing *Reynoutria elliptica* extract can be used as new dental materials with antimicrobial effects by employing natural extracts.

Conclusion

Denture relining material coated with coating resin containing *Reynoutria elliptica* extract showed antimicrobial effect against two types of oral microorganisms, namely, *Streptococcus mutans* and *Candida albicans*, with no deterioration of surface microhardness, color characteristics, and biocompatibility. Wettability was improved by introducing *Reynoutria elliptica* extract. Finally, the addition of *Reynoutria elliptica* extract, used in small

amount of 200 μg have minor influence on polyphenol release profiles of coating resin containing *Reynoutria elliptica* extract, but still sufficient to conduce the antimicrobial dental material with no negative side effects on biocompatibility.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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The Effect of Simulation-based SBAR Education Programs of Nursing Students

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Abstract

Background: The aim of this study was to analyze the effects of an education that uses simulation-based SBAR on nursing students' communication clarity, self-leadership, patient safety attitudes and safety care performance.

Method:The research was based on a pre-post design with a nonequivalent control group. Sixty students attending the clinical nursing practice course at S Nursing College in South Korea participated in the study. The experimental group consisting of 30 participants (n=30) underwent a simulation-based SBAR education program, which included a 60-minute lecture and a 120-minute SBAR practice. To analyze the program's effects, paired sample t-test and t-test analyses were performed.

Findings: As a result, after the program, the intervention group showed a significant increase in communications clarity scores (t=-2.49, p=0.020), self-leadership scores (t=11.75, p=0.001), patient safety attitude scores (t=5.12, p=.027), and safety care performance scores (t=7.85, p=0.007) compared with the control group. Therefore, it can be concluded that the application of the SBAR program education can reduce various conflicts caused by communication errors and contribute to reducing patient safety problems.

Applications: In addition, the findings suggest that training nurses in standardized communication skills and developing and using structured checklists are required to ensure patient safety.

Keywords: *Nursing, Communication, Leadership, Attitude, Patientsafety*

Introduction

Recently, the quality of medical care for patients has increased because of developments in the medical field. The World Health Organization (WHO) has shared the outcomes of the Patient Safety 2030 report, highlighting the importance of patient safety and the need for international cooperation, with particular emphasis on improving health care to improve patient safety and quality of care[1]. According to the Joint Commission International (JCI), "…effective communication between health care providers, patients and their families is essential for patient safety and quality care[2]." Errors in medical orders and test results include problems caused by incorrect letters, telephone calls, mispronounced words or phrases, hospital noise, unfamiliar drug names, and medical terminology unfamiliar to patients and fellow caregivers[3]. In particular, improper communication can lead to erroneous operations, delays in treatment, patient falls, and drug accidents. According to a 2016 study, in the several preceding years, communication failures at US medical institutions resulted in many deaths and severe financial costs[4].

To reduce communication problems, the JCI recommends that health service providers use standardized tools. Today, many medical institutions use SBAR. In SBAR, S, or situation, reports the name, department, patient's name, and current problem faced by the person reporting the situation. B, or background, describes the patient's background, such as their diagnosis, date of their admission to the hospital, and medical history. A, or assessment, presents an

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assessment of the patient's symptoms, vital signs, medications, and status of their oxygen therapy. Finally, R, or recommendation, provides a way for healthcare providers to follow up on patient problems[5]. SBAR ensures that patient information is fully exchanged between healthcare providers, which are essential for ensuring that quality of medical care is kept up by maintaining patient safety and continuity of medical treatment[6]. According to the survey standard proposed by the Korean Institute for Healthcare Accreditation, medical institutions must be provided with regulations for accurate communication between medical personnel, and it is reported that they are increasingly interested[7].

According to a recent study in South Korea, Nursing students often have difficulty in reporting patient conditions because they found it difficult to apply theoretical knowledge in practice and communication. Despite having enough clinical data, the students lacked the capacity to transmit the information effectively, leading to the communication issues[8-9]. SBAR techniques provide an efficient way of communicating, as they make minimal patient information concise and easy to communicate[10]. Therefore, it is very important that nursing students have effective communication skills, and they need to undergo practical training courses to develop such abilities [9].In South Korea, research on nurses' methods, efficiency, conversation contents, and tool development were conducted[11]. However, South Korea is still early in the process of introducing SBAR communications, and there are not enough studies to confirm the effectiveness of the method.

Nursing students often experience stress because they are unable to express their opinions early in their careers after graduation. Their stress can also be attributed to poor communication skills, which negatively affect their performance and create problems at work [12]. To solve this problem, nurses need to communicate in a standardized way and be able to assert themselves, or express their opinions appropriately. Their lack of self-assertion makes effective communication and cooperation difficult for both the nurses and medical service providers[13]. These problems may affect patient safety, so it is necessary to develop their communication by including relevant skills in the curriculum [14]. Simulation training has been reported to be more effective for improving student participation and nursing interventions than observation-based practices that were developed from clinical backgrounds. Trainings related to communication education include role play, simulation training using SBAR techniques, debriefing, and nursing record writing[15]. Accordingly, it is necessary to apply SBAR techniques in trainings at nursing colleges, so that medical professionals can improve their communications skills and become experienced in problem-solving processes.

Method

The participants were 60 senior nursing students enrolled in S nursing college from G city. Survey was conducted with subject group of 60 nursing student living along in Southern cities S and from June 1 to 30, 2018.

The communication clarity measurement tool, which was originally developed by[16] and modified by [8], was used to measure communication clarity. To measure self-leadership, we used a version of the self-leadership scale developed by Manz[17] and modified and supplemented by Kyung-Hee Cho [18]. attitude toward patient safety and safety care performance tools were developed by Madigosky et al. [19]. Jung Hye Park and MyungHwaPark[20] modified and supplemented the tools.

To develop the scenario, the clinical scenarios used by the Laerdal Medical Corporation and the National League for Nursing were revised, and SBAR components such as patient's symptoms, clinical results, and doctor's prescriptions were included. The experiment group was provided with SBAR theory education, practice, and simulation process steps. The SBAR theory education was based on the contents included in the Institute for Healthcare Improvement's (IHI) SBAR Toolkit and SBAR Training Scenarios tools [21]. To help students understand SBAR, we watched videos and acted out roleplaying scenarios to confirm the importance of communication. The control group was given handouts that contained the basic communication contents required for patient safety, and they then autonomously learned it and performed the requirements as a simulation process step. The process of application by the experimental and control groups is as follows.

The experimental group also underwent SBAR lectures for 60 minutes and practice for 120 minutes. The control group was provided with self-learning modules that would take about 60 minutes to complete. Later, they were given a basic information book on patient safety, and they would also undergo a group discussion and presentation module for 120 minutes.

The collected data used SPSS/win 20.0 Program. To test the hypotheses, the differences in variables before and after the intervention in each group was analyzed using paired t-test and differences of dependent variables between two groups after the intervention were analyzed with a t-test .

Result and Discussion

1. Homogeneity of General Characteristics, Dependent Variables

A total of 60 participants, 30 in intervention group and 30 in control group and the results are shown in [Table 1, Table 2].

Table1. Homogeneity Test of General Characteristics between Two Group

Variables N (%)		**Int. (n=30)**	**Cont. (n=30)**	**χ^2**	**p**
		N (%)			
Gender	Male	6 (20.0%)	8 (26.7%)	.22	.728
	Female	24 (80.0%)	22 (73.3%)		
Age	22 years old	4 (13.4%)	3 (10.0%)	3.74	.152
	23 years old	10 (33.3%)	8 (26.7%)		
	>24 years old	16 (53.3%)	19 (63.3%)		
Religion	Yes	23 (76.7%)	21 (70.0%)	.35	.761
	No	7 (23.3%)	9 (30.0%)		
Nursing Satisfaction	Satisfied	22 (73.3%)	18 (60.0%)	.29	.733
	Usual	8 (26.7%)	12 (40.0%)		

The experimental group participating in the simulation based SBAR training program compared to control group in communication clarity(=-2.49, p=.020), self-leadership(t=11.75, p=.001), attitude of patient safety(t=5.12, p=.027), safety care performance (t=7.85, p=.007) were significantly higher.

Table 2. Differences of the Outcome Variables between the Two Group

Variables	**Int. (n=30)**	**Cont. (n=30)**	**t**	**P(*)**
	M±SD	M±SD		
Communication clarity	3.58±0.59	3.34±0.52	-2.49	.020
Self-leadership	3.77±0.41	3.47±0.43	11.75	.001
Attitude of patient safety	3.63±0.55	3.34±0.72	5.12	.027
Safety care performance	3.93±0.47	3.480.55	7.85	.007

Int.=intervention group; Cont.=control group, *: p<0.05

Discussion

The aim of this study was to examine the effects of SBAR the communication skills, self-leadership, patient safety attitudes, and safety nursing performance of 4th grade nursing students experiencing clinical practice.

First, the clarity of communication increased in both the intervention and control groups, and it was significantly higher in the experimental group (t=-2.49, p=0.020).

We observed that the clarity of communications was significantly higher among students who had received training through SBAR techniques and team-based training. This includes training with the example of the patient with dyspnea, premature nursing[22], basic nursing, and acute renal failure[15], and the findings are consistent with the results of the study. The hypotheses of this study are supported by our findings, which show increased awareness of effective communication and cooperation among students after education in SBAR techniques[23]. This suggests that the use of standardized tools has a positive effect on improving the quality of communication. In this study, it is thought that SBAR-related theoretical lectures and videos before simulation training, provision of the learning goal with the example of patient with dyspnea, and debriefing after the simulation training contributed to the clarity of the students' communication. In addition, we found that the use of SBAR in clinical practice requires extensive training, so it is necessary to develop and apply various scenarios during the students' education.

Second, self-leadership was significantly higher in the intervention group than in the control group (t=11.75, p=0.001). Although different from the study's design, nurses are targeted[24] for the training. Self-leadership after SBAR theoretical training, SBAR practice (through watching videos and practice in reporting cases such as hypoglycemia difficulties and chest pain), the effectiveness of SBAR application significantly improved from 3.17 to 3.43, which consistent with our hypothesis. Previous studies related to the application of SBAR are insufficient and difficult to compare with the team training modules for doctors and nurses[25]. In the study of the relationship between communication and self-leadership[26], communication ability was found to have a significant influence on self-leadership. Further, training in communication and debriefing for problem solving among team members in theoretical education and simulation training for SBAR had a positive effect on self-leadership. This shows that communication and self-leadership interact with each other. Therefore, various education programs should use SBAR techniques to improve self-leadership.

Third, attitudes toward patient safety increased in the intervention group after education but decreased in the control group. There was a significant increase in the experimental group's measurements (t=5.12, p=0.027). Although the study design and the tools are different, after attending lectures for 30 minutes, video training for 12 minutes, scenario writing for 30 minutes, and role play for 20 minutes, the attitude of nurses and doctors toward patient safety was significantly elevated after the training, which supports the hypotheses of this study. Indeed, nursing students' attitude scores toward patient safety were higher with higher satisfaction with majors [27], and attitude scores were improved overall in students who were educated about patient safety within the curriculum[28]. In this study, the experimental group showed significantly higher attitude scores for patient safety than the control group because the experience in simulation exercises positively influenced communications with the patient and the importance of patient safety. Further, to develop nurses with attitudes of patient safety as a top priority, a variety of practical training should be included in curriculum design and operation.

Fourth, the safety nursing ability of the intervention group increased beyond that of the pre-education group. However, the control group's scores decreased, and the increase was more significant in the experimental group (t=7.85, p=0.007). Although it is difficult to compare, in the study of safety nursing performance of nursing college students[28], the score was lower than the average of 4.32 however, students demonstrated high competence in performance, patient identification, correct hand hygiene, infection control, and fall prevention. In this study, accurate patient identification, diagnosis, history confirmation, and current status were reported to the physician during the simulation based on the asthma patient scenario. Particularly, by practicing the nursing interventions that are difficult to deal with in the field, such as discussing the necessary nursing interventions, we observed that they have helped solving patient problems by improving self-confidence.

Conclusion

Through this study, we confirmed that applying simulation training using SBAR techniques to nursing

students is effective in improving communication clarity, self-leadership, attitude toward patient safety, and safety nursing performance. In particular, nurses who play a central role in communication should be able to accurately report health problems for patient safety and express their opinions clearly and confidently. Therefore, it is necessary to continuously apply SBAR techniques in the simulation exercise. Further studies to verify the impacts of SBAR techniques are needed

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Study of Change of Character of Nursing Students through Team-Based Learning (TBL) Humanities Class

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Abstract

Background/Objectives: The object of the research is to find the change of character of nursing students who have taken the team-based learning humanities class.

Methods/Statistical analysis: Character scale of Lee at al. was measured against 97 sophomore students from one nursing school, and the total hours of class were 30 hours.Paired t-test was used to compare the level of character before and after TBL.

Findings:The score of character increased from 4.58 to 4.71 ($p<0.1$). If you take a look at differences of the three subareas of character, the area of knowing factor increased from 4.65 to 4.77 ($p<.03$), the area of feeling factor increased from 4.75 to 4.87 ($p<.0.7$), and the area of behaving factor increased from 4.06 to 4.25 ($p<.00$).

Improvements/Applications: We suggest a development of convergent educational program that helps supporting behavioral character and recurring research of internal and external reasons that effect character and effect of application of character enhancement program.

Keywords:*TBL, Humanities class, Character, Change, Nursing Students, Convergence*

Introduction

Korea has become a popular country that gives great taste and impression to everywhere in the world through K-pop and K-food. However, Korea ranked the 1stin the suicide rate ranking among OECD countries. In happiness ranking UN presented in 2016, Korea ranked 58th which is a lower rank. From the ranking provided by Reputation Institute in 2017, Korea ranked 35th out of 50 countries[1]. People who suffer from social maladjustment and depression are continuously increasing in society. To solve the societal problems, comprehensive understanding and discussion on elements of character such as not only personality, temperament, motivation but also knowledge, value, attitude, and behavior are required. And the completion of character is required through learning from a willful decision. As a result, Character Education Promotion Act was passed in the country as character education is essential to develop potential and value of students. Character education has become mandatory and has been exercised since July 2015[2].

Humans are required to show his or her talent with responsibilityand consciousness, and character education is a much more important curriculum than acquiring major related knowledge and skills. On the other hand, college students in these days prefer eating and drinking by themselves and have become more self-oriented. In addition, due to stress of getting job and competition, they have become lack in consideration, empathy, and responsibility to others[3]. Especially, nursing students do not have much opportunity to learn or train character development education because of their heavy school works and clinical training. Therefore, The Korean Nurses Association suggests to implement character related educational curriculum to help nursing students to reach essential capabilities. It is considered that school curriculum that enhances character education is extremely required to make nursing students to become

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professional nurses[4].

Character lets human knows and what is right and loves what is right. Moreover, it makes human to behave what is right. In addition, attitude toward others such as consideration, diligence, respect others are desirable minds for nurses who will have to nurse and encounter diverse patients[5]. Character education is not a teaching what is right and what is not. It is a life-long learning process to become a right human[1]. Lickona[6], a famous scholar of theory of character education, defined characteras a complicated concept that encompasses moral conception, feeling, and behavior and demonstrated that these elements do not function separately but they influence each other in various ways and they can be cultivated through acquired learning.

Research on character of nursing students has started from the research that suggested need of character education in 2012 to the developmentof classical reading program, the research looked for application possibility, and the research looked for factors related to character and relationship[4, 7-11]. Since there has been no research that nursing professor actually processed classes related to humanities, this research intends to find out change of character of nursing students through team discussion activities by TBL.

Method

The research was conducted against 97 nursing students in the secondary grade of one school who were taking humanities classes and had agreed to the survey and the research. The participants were calculated using G*power 3.1 program with a setting of effect size of 0.5, power function of 0.95, and significance level of 0.05. Since the minimum sample number was 45, it is considered that the sample number of this study was satisfied.

Character was measured by Barom character scale for college students developed by Lee et al[12]. There are total 60 questionnaires and three sub-areas: knowing factor, feeling factor, and behaving factor. Knowing factor has 23 questionnaires: 4 for moral awareness, 7 for knowing moral value, 3 for moral reasoning, 3 for reflectivedecision making, 3 for self-understanding, and 3 for awareness of self-initiated life. Feeling factor is composed of 25 questionnaires: 5 for conscience, 4 for self-respect, 5 for empathy, 4 for loving the god, 2 for self-control, and 5 for community spirit. Behaving factor has 12 questionnaires including 7 for will and competence and 5 for habit. Each questionnaire is 6 points Likert scale, and higher score means higher in level of character. At the time of tool development, Cronbach's α was .96. The pre-survey Cronbach's α was .95, and the post-survey Cronbach's α was .97.

The research was conducted against students who took "Encountering humanities" through 15 weeks of 2 hours per week, which is total 30 hours of classes. 16 teams were composed of 6 to 7 students. The class was consist of a lecture of topics by professor and presentation and Q&A on TBL activity and discussion on each week topic. Classes were conducted on 10 sub chapters by choosing 「Pathos of distance」[1] as a text. TBL activity was conducted by choosing topics that are related to class. By alternating classic reading classes conducted by liberal arts course, students are guided to connect understanding and feeling of the work to their own experiences and to find themselves and newly compose the meaning of life by self-reflecting and meeting with others. In addition, students are guided to imagine from birth to death and had time to reflect on own aspects on nurse as a job, good nurse, and good nursing.

The collected data were analyzed using SPSS Statistics 18.0[13] and the significance level was set at .05. The descriptive statistics such as mean and standard deviation were used for continuous variables. Paired t-test was used to compare the level of character before and after TBL.

For ethical consideration, the purpose of the study, anonymity of data, and confidentiality were explained, and students were asked to participate the survey voluntarily. Moreover, the explanation that any student could withdraw from the study at his own will anytime and the collected data would be only used for the study was explained.

Result

The research target was divided by gender and admission background. Female students were 89 (91.8%), and male students were 8 (8.2%). Admission students were 52 (53.6%), and transfer students were 45 (46.4%). Before the beginning of the class, students scored 4.52 (maximum 6) for character, 4.57 for knowing factor (maximum 6), 4.68 for feeling factor, and 3.98 for behaving factor. After the termination of the class, students scored 4.74 (maximum 6) for character, 4.78 for knowing factor, 4.89 for feeling factor, 4.34 for behaving factor. There were statistically significant

difference in every areas(table 1).

Table 1. The comparison of character of nursing students (N=97)

Categories		**M**	**SD**	**t**	**p**
Knowing factor	Before	4.57	.50	5.041	.000
	After	4.78	.56		
Feeling factor	Before	4.68	.49	4.768	.000
	After	4.89	.55		
Behaving factor	Before	3.98	.61	6.175	.000
	After	4.34	.77		
Character	Before	4.52	.48	5.282	.000
	After	4.74	.56		

The result of character level of subareas of knowing, feeling, and behaving is as follows (table 2). In knowing factor, the average of moral awareness increased from 4.78 (maximum 6) to 4.98, and it was statistically significant (p=.001). The average of knowing moral value increased from 4.55 (maximum 6) to 4.70, and it was statistically significant (p=.007). The average of moral reasoning increased from 4.79 (maximum 6) to 5.05, and it was statistically significant (p=.001). The average of reflective decision making increased from 4.79 (max 6) to 4.96, and it was statistically significant (p=.02). The average of self-understanding increased from 4.46 (max 6) to 4.66, and it was statistically significant (p=.008). The average of awarenessof self-initiated life increased from 4.15 (max 6) to 4.39, and it was statistically significant (p=.011). In feeling factor, the average of conscience increased from 4.92 (maximum 6) to 5.09, and it was statistically significant (p=.011). The average of self-respect increased from 4.25 (maximum 6) to 4.51, and it was statistically significant (p=.000). The average of empathyincreased from 4.81 (maximum 6) to 5.02, and it was statistically significant (p=.001). The average of loving the god increased from 5.09 (maximum 6) to 5.28, and it was statistically significant (p=.001). The average of self-control increased from 4.26 (maximum 6) to 4.48, and it was statistically significant (p=.004). The average of community spirit increased from 4.52 (maximum 6) to 4.73, and it was statisticallysignificant (p=.000). In behaving factor, the average of will and competence increased from 4.17 (max 6) to 4.45, and it was statistically significant (p=.000). The average of habit increased from 3.71 (maximum 6) to 4.18, and it was statistically significant (p=.000).

Table 2. The comparison of knowing, feeling and behaving factor

Categories			**M**	**SD**	**t**	**p**
Knowing factor	Moral awareness	Before	4.78	.60	3.497	.001
		After	4.98	.62		
	Knowing moral value	Before	4.55	.62	2.755	.007
		After	4.70	.70		
	Moral reasoning	Before	4.79	.76	3.347	.001
		After	5.05	.67		
	Reflective decision making	Before	4.79	.71	2.370	.020
		After	4.96	.66		
	Self-understanding	Before	4.46	.74	2.705	.008
		After	4.66	.79		
	Awareness of self-initiated life	Before	4.15	.89	3.208	.011
		After	4.39	.96		

Cont... **Table 2. The comparison of knowing, feeling and behaving factor**

Feeling factor	Conscience	Before	4.92	.63	2.597	.011
		After	5.09	.67		
	Self-respect	Before	4.25	.77	3.635	.000
		After	4.51	.92		
	Empathy	Before	4.81	.59	3.385	.001
		After	5.02	.65		
	Loving the good	Before	5.09	.73	3.381	.001
		After	5.28	.73		
	Self-control	Before	4.26	.86	2.911	.004
		After	4.48	.93		
	Community spirit	Before	4.52	.55	4.039	.000
		After	4.73	.65		
Behaving factor	Will and competence	Before	4.17	.64	4.920	.000
		After	4.45	.79		
	Habit	Before	3.71	.76	5.585	.000
		After	4.18	.90		

After checking difference between gender and admission background, the post average of male students was 4.41 (maximum 6), and the post average of female students was 4.77 (maximum 6). The post average of admission from high school is 4.75 (maximum 6), and the post average of transfer student was 4.73. All of them did not have statistically significant differences (Table 3).

Table 3: Difference of Character according to sex and admission background

Variables		N	M	SD	t	p
Sex	Male	8	4.41	.43	3.146	.08
	Female	89	4.77	.57		
Admission background	admission from high school	52	4.75	.55	0.033	.86
	transfer to another college and transfer after graduation of college	45	4.73	.59		

Discussion

The research was conducted to find out change on character of nursing students through TBL based humanities class. The level of character of students was 4.52 (maximum 6) before the class and 4.74 (maximum 6) after the class and it was statistically significant(p=.000). In comparison with research that used similar tool, the average of character from the research of Koo &Ryu[4] against third and fourth year students was 4.71 (maximum 6) and it was similar to post average. The research of Sim&Bang[9] against first year students was 4.42, and it was lower than the pre average of the research. The research of Lee &Kwak[14] against all students had average of 4.32, which was far lower. Although the research was conducted against only second year nursing students in one school, it is

considered that the research somewhat represents the level of whole second year nursing students. The averages of each factor demonstrate that the feeling factor was the highest and the behaving factor was the lowest in the pre-survey, and the order was the same in the post-survey. This is the same result as previous studies[4, 9, 14], and we can know that students still lack in skills taking action rather than just thinking. Therefore, participation of volunteering and medical volunteering for vulnerable people are absolutely required. The character education of nursing students should include behavioral access to improve vulnerable moral behavior and habits as well as cognitive access that encompasses self, others and decision making by implicating external social environment and relationship with others. The goal of character education is becoming the real, righteous person, which is a life-time process[1]. Aristoteles[15] emphasized that "development and learning in teenager are not sufficient, and one should continuously behave after he or she becomes adult. In addition, it should be a habit." Erikson[1] also noted that character is not completed in teenage age but it is continuously developed and changed through adult and old age. The character education of ours should not only be education during students but also be education of life time. The research of Lee &Nam[16] stated that there is a difference of character between genders and the character of male is higher than that of female. However, the character of female was higher for this research, and there was not statistically significant difference. The character of the male students was a bit higher for the research of Sim&Bang[9], but there was not statistically significant difference. Since the differences between genders were found in other results, it is considered that the gender variance should be examined in later researches. It was predicted that the character of transfer students would be higher than the character of regular admission students, but there was no difference in the averages. Because there was no difference between grades in the research of Lee &Kwak[14], it is regarded that the research on a larger population is required.

Conclusion

The research was conducted against the secondary grade of nursing students to find out change in character of students through the humanities class based on TBL. As a result of the research, the level of character was increased from the average of 4.52±.48 (maximum 6) to 4.74±.56 ($p<.000$). For the differences in 3 factors of character, knowing factor changed from 4.57±.50 (max 6) to 4.78±.56($p<.000$), feeling factor changed from 4.68±.49 to 4.89±.55($p<.000$), and behaving factor changed from 3.97±.61 to 4.34±.77($p<.000$). They all increased by significant amount statistically.

It is suggested that comprehensive education program that helps improving deficient behavioral character should be developed by helping nursing students build right behavior and constructive habit including feeling, knowing, and behavioral character. In addition, recurring research on variance check and effect of application of character improvement program through recurring research on internal and external factors that affect character of nursing students is proposed

Ethical Clearance: Not required

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Conflict of Interest: Nil

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A Longitudinal Analysis on Ethical Values of Nursing Students

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Abstract

Background/Objectives: The object of the research is to navigate how ethical value and ethical sensitivity of nursing students have changed over the course of 4 years of education.

Methods/Statistical analysis: The first data was collected from 200 nursing students of two schools that were marked for convenience before the regular nursing ethics course began. The additional data were collected on the end of May of 2016, 2017 and 2018. Average and standard deviation of the collected data were calculated, and repeated ANOVA was used for finding change of difference by school year.

Findings: The result of the research demonstrates that there is a significant difference of change of ethical value by school year ($F=184.30$, $p<.000$). There is also a significant difference of change of ethical sensitivity by school year ($F=2.704$, $p<.045$). We expected ethical value and ethical sensitivity would change positively as the school year went up, but there was reluctance on the changes by school year.

Improvements/Applications: : I suggest the ethical courses to develop various teaching procedures and education contents such as AI, VR, AR, and others in order to positively change ethical value and ethical sensitivity of students.

Keywords: *Longitudinal Analysis, Ethical Value, Ethical Sensitivity, Nursing Students, Convergence.*

Introduction

Due to the scientific development, life have become an objection of selection by artificial control and possibility of genetic manipulation. People treat other things more important than the meaning of life in some situations[1]. These changes have brought changes in belief of human and value of life so that there is a limit to apply the existing ethical standard and rule. Therefore, new morality and ethical remedy are in need[2]. In order to deal with many ethical problems brought by AI (Artificial Intelligence), Big Data, genetic technology, and AR (Artificial Reality) of the 4th industrial revolution, an ethical education that cultivates understanding, autonomy, and value judgment about human should be early learned[3]. Especially, the development of medical technology have brought ethical problems such as human life extension, genetic therapy, artificial intercession, and life-saving treatment, and it demands right ethical decision making skill to nurses. As a nurse is required to provide nursing to meet each patient's demand, nursing itself is a study based on morality[4]. Since the ethical value of nursing students becomes a basis to solve ethical problems that are directly related to nursing, building right ethical value is extremely important to nursing students[5]. As a result, nursing school tries to help nursing students to solve ethical dilemma they face and establish their value as well as define broad meaning of morality so that they can become professionals of life science[6]. Ethical value recognition skill and ethical sensitivity that help nurses making ethical decision make them to choose ethical value primarily and take ethical action. Rest[7] defines ethical sensitivity as a skill that allows people to recognize ethical problems in given situations and understand how the result of behavior effects welfare of others. In addition, it is a first factor that helps an individual to make a decision. He also states that a person who is morally sensitive considers ethical recognition, value, and principle that impose

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ethical meaning on specific situations, as important. Han[8] demonstrated that the level of ethical judgment of nurse are usually developed in school, especially during college. They make decisions based on value they have built in school. Therefore, nursing of future professional nurses are decided by ethical value of nursing students. As nursing have significant impact on development of professional nurses and health of people, ethical establishment of nursing students is extremely important. As the fact that ethical value are varied by grades in the prior researches[9,10,11] on changes in ethical value of nursing students was found, longitudinal study or time-series research that finds how their value changes during school is suggested. In addition, nursing students are able to experience diverse ethical problems that they can face in practice through diverse ethical education program and clinical training such as discussion, role play, and watching related video[9]. Because it was considered that nursing students would not only learn professional knowledge and skill but also change in ethical value and ethical sensitivity through 4 years of education, the research was conducted to 1st year student who had not taken nursing ethical education and to see how their ethical value and sensitivity would change as they take 3 years of education.

Method

The research was conducted against 200 students from two schools in Gyeonggi-do and Chungcheong-do who had entered school in 2015. The first data was collected before regular program began and the total of 4 data were collected every time when the school ends in late May from 2016 to 2018 to measure ethical value and ethical sensitivity. Using G*power Win 3.1.9.2 program, the adequacy of the sample size was at least 81 after calculation of required participants from significance level of .05, power function of 1-β=.80, effect size of (f)=.15, and 4 repetitive measurement analysis of a single group.

Tool of Lee et al.[12]was used for ethical value. It was composed of 8 questionnaires of human-life area, 7 questionnaires of nurse-client relationship area, 7 questionnaires of nurse-nursing task relationship area, and 4 questionnaires of nurse-colleague relationship area. Regarding that absolute utilitarianism is 1 and absolute obligatory is 5, the higher score means that ethical value and value recognition are stubborn and positive.

In the study of Lee et al, the Cronbach's α was .71. Tool of Han et al.[13]was used for ethical sensitivity. It was composed of 5 questionnaires of patient-oriented care, 7 questionnaires of professional responsibility, 5 questionnaires of conflict, 6 questionnaires of moral meaning, and 4 questionnaires of benevolence. Total of 27 questionnaires are measured at 7 points. Higher score means higher ethical sensitivity a person has. In the study of Han et al., the Cronbach's α was .76. The reliability of the research is as follows in the table 1.

Table 1: Cronbach's alpha in instrument

Year	Ethical value Cronbach's alpha	Ethical sensitivity Cronbach's alpha
2015	.685	.790
2016	.675	.708
2017	.741	.855
2018	.658	.859

The collected data were analyzedusing SPSS Statistics version 18.0 program[14], and the significance level was set at .05. The general characteristic of the participants was calculated by frequency and percentage. To check ethical value and ethical sensitivity, statistical analysis like average and standard deviation were used. Change in different school year is analyzed by repeated ANOVA. In order to satisfy the basic assumption of repeated ANOVA, Mauchly's test of sphericity was first conducted. If the assumption was satisfied, an univariate analysis was conducted. If not, an univariate or multivariate test using Greenhouse-Geisser was conducted. Afterward, the difference in each time was analyzed through in-object effect test.

The research is certified by Baekseok University Institutional Review Board (BUIRB-201704-HR-005). The participants of the research were fully explained on purpose and procedure of the research. The survey was distributed to ones who had signed the agreement

Result

The general characteristic of the participants is as follows in the table 2. As the research was conducted against the same group for 4 years, there was a huge change in numbers of participants. In 2015, 192 out of 200 participated. However, the number of participants dropped to 163 (16% dropout rate) in 2016, 126 (23%

in dropout rate) in 2017, and 112 (12% in dropout rate) in 2018. Even though a small gift was given to a participantfor years, the dropout rate was high due to voluntary participation method, military of male students, leave of absence, and exclusion of insufficient data. In the data of final 4thyear students, the percentage of under 23 years old was 89.3%, female was 96.4%, no religion was 55.4%, first of sibling was 46.4%, second of sibling was 45.5%, and third of sibling was 8%. 49.1% were living in big city, 43.8% were living in medium-sized city, and 92.9% were living in city. 87.5% voluntarily chose nursing as major, and 75.9% were satisfied in the major.

The ethical value and ethical sensitivityby grades are as follows in the table 3. The change in ethical value was 3.51-2.71-3.37-3.31 (maximum 5), and there was statistically significantdifference (F=184.303, p<.000). All of the subareas had statistically significant differences: human-life area (F=74.515, p<.000), nurse-client relationship area (F=237.868, p<.000), nurse-nursing task relationship area (F=57.969, p<.000), and nurse-colleague relationship area (F=136.932, p<.000).The overall change in ethical sensitivity was 4.95-5.10-5.08-5.06 (maximum 7), and there was statistically significant difference (F=2.704, p<.045). For subareas, patient-oriented care (F=3.745, p=.011), professional responsibility (F=21.303, p<.000), moral meaning (F=7.896, p<.000) had statistically significant difference. However, there were no statistically significant differences in conflict (F=.082, p=.970) and benevolence (F=1.905, p=.128).

Table 2. General Characteristics of participants for 4 years

		2015			**2016**			**2017**			**2018**		
		N=192		**%**	**N=163**		**%**	**N=126**		**%**	**N=112**		**%**
Age		≤20	156	81.2	≤21	127	77.9	≤22	112	88.9	≤23	100	89.3
		≥21	36	18.8	≥22	36	22.1	≥23	14	11.1	≥24	12	10.7
Sex	Female	164		85.4	139		85.3	120		95.2	108		96.4
	Male	28		14.6	24		14.7	6		4.8	4		3.6
Religion	Yes	92		48.0	73		44.8	57		45.2	50		44.6
	No	100		52.0	90		55.2	69		54.8	62		55.4
Birth order	First	87		45.3	72		44.2	61		48.4	52		46.4
	Second	90		46.9	79		48.5	57		45.2	51		45.5
	Third and more	15		6.8	12		7.3	8		6.4	19		8.0
Growing place	Big city	93		48.4	73		44.8	63		50.0	55		49.1
	Small city	77		40.1	77		47.2	47		37.3	49		43.8
	Rural area	22		11.5	13		8.0	16		12.7	8		7.1
Major determinant	Self	164		85.5	148		90.8	112		88.9	98		87.5
	Other	28		14.5	15		9.2	14		11.1	14		12.5
Major satisfaction	Very satisfied	50		26.0	29		17.3	26		20.6	18		16.1
	Satisfied	89		46.4	99		60.7	68		54.0	67		59.8
	Moderate	46		24.0	29		17.8	31		24.6	26		23.2
	dissatisfied	7		3.6	6		3.7	1		.8	1		.9

Table 3. Changes in average of ethical value and ethical sensitivity for 4 years

Variables	1st year (2015)	2nd year(2016)	3rd year (2017)	4th year (2018)	F(p)
Total moral motivation	3.51±0.23	2.71±0.35	3.37±0.38	3.31±0.35	184.303(.000)
Human-life area	3.60±0.45	2.92±0.64	2.82±0.62	2.66±0.63	74.515(.000)
Nurse-patient relationship area	3.45±0.30	2.27±0.57	3.57±0.54	3.60±0.60	237.868(.000)
Nurse-nursing task relationship area	3.09±0.48	2.88±0.50	3.56±0.55	3.54±0.60	57.969(.000)
Nurse-colleague relationship area	3.94±0.52	2.81±0.46	3.85±0.64	3.75±0.67	136.932(.000)
Total moral sensitivity	4.95±0.45	5.10±0.44	5.08±0.55	5.06±0.57	2.704(.045)
Patient-oriented care	5.84±0.71	5.67±0.62	5.57±0.79	5.77±0.76	3.745(.011)
Professional responsibility	4.92±.0.52	5.45±0.58	5.25±0.66	5.33±0.69	21.303(.000)
Conflict	4.91±0.75	4.94±0.63	4.90±0.71	4.93±0.82	.082(.970)
Moral meaning	4.53±0.89	4.70±0.76	4.94±0.77	4.48±0.94	7.896(.000)
Benevolence	4.57±0.63	4.68±0.63	4.62±0.68	4.75±0.68	1.905(.128)

Discussion

The development of human ethics begins when people born in family and develops as they build relationship with friends in school years. Consequently, it helps college students to become important members of society as adults by helping them make right decisions and righteous behavior[15]. Especially, high quality of ethics and morality are required for nursing students who will deal with human life[16, 17]. According to the result that stated that college curriculum and experience of college life have a great impact on the development of ethics[18], the research was conducted to find out how ethical value and ethical sensitivity of nursing students change through 4 years of college curriculum.

As a result of the research, ethical value showed obligatory tendency for all 4 years, but there were many changes by school year. Comparing the average of 3.44 of Koo[10] and the average of 3.38 of Kwon[19] that examined ethical value of freshman, the results are similar. However, thinking of the reason why freshman who have not taken the regular course has the highest level of ethics, the first year is the period when nursing students are aware of the ideal role and duty of nurses as they enter school. Nevertheless, freshman students had gone through many chaos on ethical value as they experience diverse nursing theory and clinical training. In particular, the result that the score of human life area and nurse-patient relationship area dropped by large amount is similar to the preceding study [9, 10, 11, 20] in which the score of human life area was changed to utilitarianism. It is considered that social atmosphere, in which enforces life-expectancy law and demands legalization of pregnancy termination, and change in recognition of nursing students who demand professional relationship rather than sacrificing relationship between nurses and patients are factors that impact students. For the average of ethical sensitivity, the first year was the lowest and the second year was the highest. After their second year, it had a tendency to decrease. The average of the preceding research[10,18,21] was 5.0 − 5.10 (maximum 7) which is similar to the research. As the complicated ethical situation had given hard time making decisions to students, it is considered that various lecturing methods such as movie, book, and role play would help students building ethical sensitivity. In addition, ethical education should begin early and should be sustained to build an ethical basis. Therefore, ethical education should not only be a course of college but also be an opportunity to build characteristic and ethical reasoning skill by starting from elementary school. Moreover, educational

and political efforts are necessary so that people can build their ethical basis and provide specific life ethical education that fits to their social roles[6].

Conclusion

The study is a longitudinal study that aims to find out how ethical value and ethical sensitivity of nursing students change throughout the 4 years of education. As a result of the study, there were statistically significant difference in ethical value by different school years (F=184.30, p<.000). Also, there were statistically significant change in ethical sensitivity by different school years (F=2.704, p<.045). Because the study was conducted against only two nursing schools, there is a limit to generalize the result to all nursing students. As it was found that ethical value and ethical sensitivity change by school years from the study, it is suggested that diverse ethical education contents should be developed for more positive effects. In addition, as ethical education should begin early and needs to be sustained to build an ethical basis, it should not only be a college course of life ethical education but also be an opportunity to build the ethical basis, character, and reasoning skill on life ethics before college. An educational policy that helps people solidify ethical basis through sustainable education is necessary.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Factors Influencing Depression in Postmenopausal Women by Subjective Health Awareness

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Abstract

Background/Objectives: The purpose of this study was to identify factors affecting the depression of menopause women due to subjective health awareness.

Methods/Statistical Analysis: This study was a descriptive research study that analyzed the data of the National Health and Nutrition Survey for 2014-2017. Weights were assigned through the IBM SPSS 25.0 program to generate a composite sample plan file and analyzed.

Findings: There was a significant difference between groups in all general characteristics ($p < .05$). In postmenopausal women, age, exercise, and psychological factors were found to be major factors affecting depression.

Improvements/Applications: It is necessary to identify the extent to which depression is associated by dividing women into groups after menopause by age group instead of dividing them into one group.

Keywords: *Menopause, Middle age, Women, Depression, Subjective body Awareness*

Introduction

Menopause is a phenomenon that all women experience as a natural transition process,butMenopause is a physical change that permanently affects a woman's life[1].

These irreversible changes can alter women's lives and cause psychological and emotional problems. The prevalence of depression in men is 6.6%, compared with 13.7% in middle-aged women, more than twice that in men[2].

Depression also lowers the quality of life[3-4]. Women in menopausal transition stage have a four-fold increased risk of depression compared to premenopausal[5]. The depression of middle-aged women is a serious status, the problems are neglected and enlarged, finally missed opportunities for prevention and early treatment[6]. Previous studies have shown that subjective health status affects the elderly life expectancy of middle aged women[7]. Health behavior is very important when considering that a healthy life is a necessary factor for successful aging. Depression, which negatively affects health behaviors, ultimately affects successful, healthy aging.

Among the general characteristics of the previous studies, age, education level, religion, income, and marriage duration were reported as factors affecting depression in middle[1] - aged women. In addition, there was a statistically significant correlation between the intimacy of the couple and the symptoms of menopausal symptoms[8].

Health status perception and family economic status were found to be significant predictors of depression in middle-aged women[9]. In another study, the depression of middle-aged women was significantly lower with better health status, lower alcohol dependency, no experience of violence from spouse, higher life satisfaction and higher self-esteem[10].

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However, most studies were focused on individual factor analysis. In the elderly, the lower the subjective perception of health, the higher the depression[11]. In addition, subjective perception of health affects suicidal thought and it is reported that elderly people with the low subjective perception of health are more likely to commit suicide[12].

A study conducted on the elderly in relation to individuals' subjective health awareness and depression was reported. Older people placed more emphasis on the subjective aspect of recognizing the degree of difficulty they suffered from the disease than on the presence or absence of a real disease. Therefore, subjective health awareness was reported to be more closely related to depression[13].

There were a few studies of women's health awareness and depression after menopause. In the case of perimenopause women and in postmenopause, both groups were more depressed than normal, but there was no difference in depression. But there were differences in factors affecting it[14].

This study attempts to analyze the data of the reliable data, the National Health and Nutrition Survey, for the total number of menopause women and to understand the health problems of postmenopausal women.

Method

This is a descriptive research study that analyzes the data of the National Health and Nutrition Survey for 2014-2017.

This study was conducted on 5,615 postmenopausal women who clearly answered that they were natural menopause among the total of 31,207 subjects.

The National Health and Nutrition Survey was conducted after obtaining approval from the National Statistical Office and the Research Ethics Review Board (IRB) in the CDC.

The general characteristics are age, economic status, education level, number of family members, weight change and weight control for one year, marital status, health screening.

Influencing factors include age(yr), education level, number of family members, weight change, weight control, marital status, health screenings, activity limits, dietary level, hypertension, drinking status, sitting (hr/day), body mass index(kg/m^2), walking exercise (day/week), strength exercise(day/week), suicidal ideation, stress, subjective body awareness.

Logistic regression was used to determine the factors that influence to depression.

Result

1. General characteristics of the subjects

There was a significant difference between groups in all general characteristics ($p < .05$).

Subjects who perceived subjective health badly were older, had lower economic levels, had lower education levels, and had fewer families.

In addition, who answered that food was lacking, decreased weight, tried to gain weight, did not take a health check perceived subjective health bad.

Table 1. General Characteristics of Subjects

Characteristics		n(weight %) n(weight %)	Good (n=1,089)	Medium (n=2,886)	Bad (n=1,640)	x2(p)
			n(weight %)	n(weight %)		
Age(yr)	≤59	1,809(39.7)	433(23.5)	1,008(56.0)	368(20.5)	158.59 (<.001)
	60-69	1,878(29.9)	343(18.3)	1,014(55.1)	521(26.7)	
	≥70	1,931(30.4)	313(16.1)	864(45.8)	751(38.2)	
Economic status	Low	1,896(30.9)	261(14.2)	873(46.8)	760(39.0)	202.0 (<.001)
	Middle	2,607(47.1)	521(19.7)	1,422(56.4)	663(23.9)	
	High	1,087(22.0)	304(27.6)	579(53.1)	204(19.3)	

Cont... **Table 1. General Characteristics of Subjects**

Education level	≤Elementary school	2,913(47.5)	421(14.1)	1,410(49.7)	1,079(36.2)	315.33 (<.001)
	Middle school	907(16.9)	151(16.9)	507(56.1)	249(27.0)	
	High school	1,202(24.3)	307(25.8)	669(56.1)	226(18.1)	
	≥College	587(11.4)	209(34.4)	297(52.1)	81(13.5)	
Number of family members	1	1,128(15.9)	163(14.1)	520(46.4)	445(39.4)	85.79 (<.001)
	2-3	3,544(64.2)	702(19.6)	1,885(54.6)	955(25.8)	
	≥4	946(19.9)	224(24.4)	481(51.1)	240(24.5)	
Weight change	No change	3,856(69.1)	801(21.3)	2,025(53.2)	1,029(25.5)	43.14 (<.001)
	Weight loss	697(12.5)	95(14.1)	334(49.9)	268(36.1)	
	Weight gain	978(18.4)	180(18.1)	488(52.4)	310(29.4)	
Weight control	Reduction effort	2,040(38.2)	425(20.9)	1,061(53.5)	554(25.6)	87.84 (<.001)
	Maintenance effort	965(18.2)	227(24.7)	536(55.7)	202(19.6)	
	Increasing effort	965(4.9)	44(13.8)	125(45.5)	119(40.7)	
	No effort	288(4.9)	383(17.1)	1,133(51.3)	739(31.6)	
Marital status	With spouse	3,667(67.2)	758(21.1)	1,973(54.9)	934(24.0)	117.55 (<.001)
	Others	1,904(32.8)	320(16.6)	891(48.2)	692(35.1)	
Health screenings	Yes	3,964(70.5)	759(19.8)	2,082(53.2)	1,121(27.0)	75.66 (.046)
	No	1,644(29.5)	328(19.4)	799(51.2)	516(29.4)	
Activity Limits	Yes	809(13.7)	35(4.5)	263(33.7)	510(61.9)	3.56 (.047)
	No	4,806(86.3)	1,053(22.1)	2,633(55.6)	1,129(22.3)	
Dietary level	Various and sufficient amount	2,518(49.8)	578(23.1)	1,259(54.9)	579(22.0)	504.89 (<.001)
	Not varied but sufficient	2,321(44.8)	380(16.9)	1,184(52.3)	756(30.8)	
	Food shortage	291(5.3)	25(8.1)	97(34.5)	169(57.4)	

2.Factors influencing depression

A significant factorsinfluencing depression were age, activity limits, dietary level, walking exercise, suicidal ideation, stress, and subjective body awareness in those who perceived subjective health as good (p <.05).

A significant factorsinfluencing depression were age, weight control, marital status and activity limits, dietary level, BMI, walking exercise, strength exercise, suicidal ideation and subjective body awareness in those who perceived subjective health as medium(p<.05).

A significant factorsinfluencing depression were age, education level, number of family members, weight change, health screenings, dietary level, hypertension, drinking status, sitting , BMI, suicidalideation, stress, subjective body awareness in those who perceived subjective health as bad (p <.05). <Table 2>

Discussion

Weight is considered to have influenced subjective perception of health. In addition, depression was also higher in the group who perceived themselves as thin.

Nutrition related diseases or nutritional problems can be inferred that they can cause a person to perceive their health status as poor.

Among the general characteristics, those who said they lacked food in their diet are perceived to be worse at subjective health awareness. Unintentional weight loss in older people may be a response of disease or hidden illness[15-17]. Even if there is no disease, it could be weight loss due to muscle loss[18].

On the other hand, older people with stable weight have the advantage of not having to protect themselves from muscle loss[19]. Another reason is the risk of losing

weight due to dehydration by the elderly[20].

In fact, according to the Meta-analysis of weight loss and mortality among people aged 60 and older, male adults were not able to find any relation to weight loss and mortality, but in the case of female adults, weight loss was reported to increase mortality. However, intentional weight loss has reduced mortality[21]. Unintentional weight loss can be attributed to malnutrition caused by poor appetite[22].

The days of walking and the days of muscle exercise all belonged to a large category of exercise and showed different results.Exercise and physical activity are encouraged as interventions to lower depression[23]. In addition, in a study of middle-aged women, more respondents said they exercise in those who perceive subjective health conditions as good than those who did not exercise[24]. However, there have been similar results from previous studies.

In a study of factors related to depression experience in menopause women, there was no difference in the experience of depression between those who walk and those who do not[25]. These existing studies are partly consistent with the results of this study. On the other hand, light exercise and physical activity relieve depression, but strenuous physical activity increases depression rather than depression[26].

This study found that subjects who did not drink were more likely to be aware of subjective health as bad. Previous studies have reported that there were no differences in drinking due to subjective health conditions[24].

There have been many studies that confirmed the relevance of eating habits to menopause women, but none have been found to be related to drinking directly. It is also influenced by cultural attitudes toward alcohol consumption[27-28].

Young women's perceptions of drinking have changed a lot, women's drinking is not considered positive. Therefore, there may not be many clear studies of drinking.

In this study, it was found that depressive symptom experience according to the age of postmenopausal women was more depressed as the age was younger regardless of subjective health perception. Previous studies have shown that menopausal women have higher rates of depressive symptoms than women who have not had menopause and that depressive symptom experience increases with age. In another study, menopause women were reported to have a lower risk of experiencing depression as age increases[25]. And In the case of males, the number of reports of depression increases with age, but in females over 70 years of age, it is lower than that of females in their 60s[29].

Table 2. Factors Influencing Depression

Characteristics OR		Good(n=1,089)			Medium(n=2,886)			Bad(n=1,640)		
		95% CI	p	OR	95% CI	p	OR	95% CI	p	
Age(yr)	≤59	4.08	1.49-11.03	.006	0.87	0.47-1.58	.653	3.18	1.48-0.83	.003
	60-69	10.74	3.85-29.93	<.001	1.75	1.03-2.95	.035	1.65	1.0-2.72	.050
	≥70	1.0			1.0			1.0		
Education level	≤Elementary school	0.77	0.26-2.30	.643	0.89	0.39-2.02	.781	0.83	0.35-7.98	.688
	Middle school	2.53	0.75-8.54	.133	1.13	0.52-2.46	.474	0.89	0.33-2.36	.817
	High school	0.45	0.12-1.59	.215	0.62	0.27-1.39	.245	0.36	0.14-0.90	.030
	≥College	1.0			1.0			1.0		
Number of family members	1	2.45	0.49-12.20	.269	0.77	0.40-1.51	.458	1.37	0.67-2.80	.381
	2-3	2.41	0.61-9.45	.522	0.70	0.41-1.21	.208	2.29	1.23-4.27	.009
	≥4	1.0			1.0			1.0		
Weight change	No change	1.46	0.81-2.62	.203	1.12	0.69-1.82	.619	1.05	0.7-1.59	.797
	Weight loss	1.09	0.12-9.58	.936	0.89	0.49-1.60	.698	2.04	1.18-3.53	.011
	Weight gain	1.0			1.0			1.0		

Cont... **Table 2. Factors Influencing Depression**

Weight control	Reduction effort	1.06	0.46-2.44	.888	2.49	1.54-4.03	<.001	0.85	0.51-1.39	.516
	Maintenance effort	2.29	0.77-6.18	.133	2.72	1.60-4.61	<.001	0.58	0.32-1.04	.068
	Increasing effort	2.60	0.93-7.24	.067	1.15	0.43-3.04	.769	0.79	0.31-2.02	.629
	No effort	1.0			1.0			1.0		
Marital status	With spouse	0.87	0.26-2.89	.822	0.64	0.43-0.96	.034	0.71	0.45-1.14	.159
	Others	1.0			1.0			1.0		
Health screenings	Yes	0.95	0.32-2.77	.930	1.20	0.79-1.82	.387	1.74	1.09-2.79	.021
	No	1.0			1.0			1.0		
Activity Limits	Yes	11.55	3.45-38.68	<.001	2.90	1.64-5.10	<.001	3.18	1.95-5.18	<.001
	No	1.0			1.0			1.0		
Dietary level	Various and sufficient amount	0.03	0.01-0.21	.001	0.43	0.21-0.88	.021	1.92	1.07-3.44	.029
	Not varied but sufficient	0.05	0.01-0.27	.001	0.71	0.33-1.53	.391	1.59	0.86-2.95	.133
	Food shortage	1.0			1.0			1.0		
Hypertension	Yes	1.0			1.0			1.0		
	No	1.05	0.63-1.77	.826	1.02	0.66-1.57	.101	1.70	1.13-2.56	.011
Drinking status	Yes	1.0			1.0			1.0		
	No	1.22	0.45-3.26	.685	1.12	0.71-1.74	.616	2.03	1.17-3.51	.012
Sitting (hr/day)	≤4	0.69	0.15-3.22	.642	1.10	0.68-1.78	.682	1.30	0.72-2.35	.368
	5-8	1.43	0.44-4.86	.547	0.83	0.53-1.32	.452	1.79	1.16-2.76	.008
	≧9	1.0			1.0			1.0		
Body Mass Index (kg/m2)	<18.5	0.45	0.17-1.17	.102	0.42	0.24-0.73	.003	0.27	0.14-0.52	<.001
	18.5-24.9	0.42	0.15-1.15	.091	0.76	0.46-1.24	.276	0.26	0.14-0.48	<.001
	≥25	1.0			1.0			1.0		
Walking exercise (day/ week)	≤3	3.35	1.43-7.85	.006	0.57	0.38-0.84	.005	1.35	0.91-2.01	.129
	≧4	1.0			1.0			1.0		
Strength exercise(day/ week)	≤3	0.19	0.06-0.56	.003	17.28	3.61-82.50	<.001	0.52	0.22-1.19	.123
	≧4	1.0			1.0			1.0		
Suicidal ideation	Yes	18.96	5.31-67.73	<.001	9.84	5.58-17.35	<.001	6.19	3.57-10.71	<.001
	No	1.0			1.0			1.0		
Stress	A lot	6.97	2.78-17.43	<.001	5.50	3.75-8.04	<.001	7.93	5.08-12.38	<.001
	A little	1.0			1.0			1.0		
Subjective body awareness	Thin	4.28	1.47-12.48	.008	2.28	1.15-4.49	.017	6.02	2.60-13.93	<.001
	Normal	0.65	0.22-1.89	.433	1.17	0.75-1.83	.482	2.72	1.39-5.32	.004
	overweight	1.0			1.0			1.0		

Conclusion

The purpose of this study is to identify the influencing factors of depression according to how women perceive their health status. Repetitive studies are required using the post-menopausal duration as a mediator.

Research is needed because special programs for menopause women, who are about to be implemented into old age, need to be developed.

Ethical Clearance: Not required

Source of Funding: Nil

Conflict of Interest: Nil

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The Influence of Nursing Students' Self-Esteem on Depression: Mediation Effect of Rejection Sensitivity

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Abstract

Background/Objectives: The purpose of this study was to verify the mediating effects of rejection sensitivity on the relationship between self-esteem and depression of nursing students.

Methods/Statistical analysis: From May 30 to July 11, 2018, data of 381 nursing students at two universities were collected by convenience sampling and the results analyzed with SPSS 21.0. The degree to which the rejection sensitivity of nursing students is mediated by self-respect and depression was determined following the guidelines of Baron and Kenny, and the Sobel test was used to verify the statistical significance of the mediated effects.

Findings: A negative correlation was found between self-esteem and depression in nursing students, and rejection sensitivity and depression showed a positive correlation. Also, self-esteem and rejection sensitivity showed an amulet correlation. The results of a three-step regression to check whether rejection sensitivity mediated the relationship between perceived self-esteem and depression were statistically significant ($Z = -4.817$, $p < .001$).

Improvements/Applications: Depression in nursing students is an important emotion that can be transmitted to the patient. The results will be the basis for developing depression prevention programs for nursing students.

Keywords:*Nursing student, Self-esteem, Depression, Rejection sensitivity, Mediation effect.*

Introduction

Nursing departments conduct education courses to impart basic knowledge and skills for nurses to properly fulfill their mission as professional caregivers for sick patients. Nursingstudents complain of considerable academic stress due to the pressure in theoretical subjects of applying a relative evaluation method, and the tension or anxiety causedby practice at a strange clinical site[1-2].This has caused more than 40 percent of nursing students to show more than mild levels of depression and contemplate suicide[2-3].Depression is a significant impediment to nursing students' adaptation to school life[4], so it is necessary to consider from various angles how to provide adequate early assistance.Positive psychological tendencies such as the self-efficiency, optimism, hope, and resilience of nursing students serve to reduce depression[1]. Self-esteem, even among positive psychological tendencies, is an evaluative concept that respects and values itself[5] and is reported in studies as a personal preference that has a significant impact on depression[6-7].

University students who have been in the nuclear family for a long time before entering the examination-oriented education field have shown difficulties in adapting to the formation and continuity of the new relationship[8].

According to this study, which identified personality types as intermediaries affecting the self-respect and mental health of nursing students, extroverted tendencies were correlated with self-esteem, and introversion was highly related to mental health.Thus, individual

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personality traits are important for nursing students to pursue a healthy university life.Difficulties in school life including relationships with professors and interpersonal relationships with friends underlie differences in adapting to university life. Therefore, it is necessary to pay attention to the trends of our relationships with others so that we can maintain them positively[4-5, 10].

Rejection sensitivity is a cognitive and emotional process that can cause excessive reactions as it is proactive, anxious, and awake to rejection in various situations[11]. There is a tendency for it to play an important role in maintaining a close relationship with others. Since 2009 in Korea, research has focused on the rejection sensitivity of university students with regard to such issues as solving interpersonal problems and developing basic data or programs that can improve the quality of relationships[12-13]. According to earlier study results, the higher the level of performance instability among university students with a higher level of rejection sensitivity[12], the more auniversity student who tends to reject relationships with others may be unable to adequately display his abilities and potential and be highly prone to depression, frustration, and self-reliance[2,6]. In particular, as female college students' rejection sensitivity and performance anxiety were higher than those of male students[12].High rejection sensitivities can enhance depression by enhancing negative interpretations and memory biases concerning stressful situations[13]. In light of these facts, rejection sensitivity can be considered to have a considerable relationship with depression.Nurses should cooperate with patients or guardians and various professionals to provide proper treatment and care. Therefore, it is necessary to identify rejection sensitivity among nursing students so that proper interpersonal communication can be made in various situations before entering practice. However, there are few studies related to rejection sensitivity of nursing students.

Few studies have examined the relationship between self-esteem, rejection sensitivity, and depression among nursing students. In this study, the effect of self-esteem and rejection sensitivity of nursing students on depression is investigated and the role of rejection sensitivity is identified. The purpose of this study is to present basic data that can help reduce the level of depression among nursing students.

Method

This study applied a descriptive survey to identify the relationship between self-esteem, rejection sensitivity, and depression of nursing students.

This research involved 381 university students attending nursing departments in I and D. The G*Power 3.1.9.2 program was used to determine the necessary number of participants with a significance level of .05, an effect size of 0.15, and a power of 0.80, resulting in a minimum of 343 participants. The survey was distributed to 388 people in consideration of likely numbers of excluded participants, and 381 copies were used for the final analysis.

The research variables were measured by the following research tools.The Self Esteem Scale, created by Rosenberg[5] and developed by Jeon[14]. Cronbach's alpha was .88 in Rosenberg's version[5], and .870in this study.

The degree of rejection sensitivity was measured using a tool developed by Park and Yang[15].It comprises a total of 16 questions comprising four sub-factors, anticipated rage, anticipated anxiety, overreaction, and rejection perception. Cronbach's alpha was .91 in the original study and .917 in this study.

The CES-D (Center for Epidemiologic Studies Depression Scale), a measure of depression developed by Chon etc.[16]. Cronbach's alpha was .91 in the original study and .924 in this study.

Data were collected from May 30 to July 9, 2018. The participants were explained the purpose and method of the study and told that all the data were coded and anonymous.Participants were informed that they could stop the survey at any time and that there was no harm in agreeing to the survey. The surveys were distributed after those with a full understanding of this information signed written consent forms. When the survey was completed, a small number of products were provided to the participants.

The collected data were analyzed using the SPSS 22.0 statistics program. The general characteristics of the study participants, self-esteem, rejection sensitivity, and depression were determined by descriptive statistical methods.

The relationship between self-esteem, rejection sensitivity, and depression of the subject was analyzed using Pearson's correlation coefficients. Hierarchical regression was performed to determine the influence of

the self-respect and rejection sensitivity of nursing students on depression.

Finally, the degree to which the rejection sensitivity of nursing students is mediated by self-respect and depression was determined following the guidelines of Baron and Kenny[17]and the Sobel test was used to verify the statistical significance of the mediated effects.

Result and Discussion

1. General characteristics of the subjects

The demographic characteristics of the participants are shown in Table 1.

Table 1. General characteristics of participants

Characteristics	Categories	N(%) or Mean(SD)
Gender	Female	325(85.3)
	Male	56(14.7)
Age (years)	-	22.4(3.37)
Year of study	First	129(33.9)
	Second	102(26.8)
	Third	59(15.5)
	Fourth	91(23.9)
Religion	Yes	249(65.4)
	No	132(34.6)
Money per month	≤ 100,000	15(3.9)
	100,000−200,000	46(12.1)
	200,001−300,000	105(27.6)
	>300,000	215(56.4)
Short-term job	Yes	275(72.2)
	No	103(27.0)
	Missing	3(0.8)
Subjective healthy status	Severely unhealthy	3(0.8)
	Unhealthy	60(15.7)
	Moderate	144(37.8)
	Healthy	139(36.5)
	More healthy	35(9.2)

2.Level of self-Esteem, rejection sensitivity, and depression

The participants' average self-esteem score was 28.8 points, while the mean rejection sensitivity score was 42.2 points, which are normal. The participants' level of depression averaged 18.5 points as shown in Table 2.

Table 2.Levels of self-esteem, rejection sensitivity, and depression

Variables	Min.	Max.	Mean	SD	Item	
					Mean	SD
Self-esteem	10	40	28.8	5.0	2.9	.05
Rejection sensitivity	16	100	42.2	11.8	2.6	0.2
Depression	0	60	18.5	10.7	0.9	0.5

3. Correlation of self-esteem, rejection sensitivity, and depression

The results of correlation among self-esteem, rejection sensitivity, and depression are shown in Table 3.

Table 3. Correlations among self-esteem, rejection sensitivity, and depression

	1	2	3	4	5	6	7
1. Self-esteem	1						
2.Anticipated rage	−.026	1					
3.Anticipated anxiety	−.377**	.063	1				
4. Overreaction	−.387**	.082	.551**	1			
5.Rejection perception	−.307**	.071	.436**	.590**	1		
6.Rejection sensitivity	−.390**	.125*	.787**	.823**	.758**	1	
7. Depression	−.609**	−.067	.390**	.447**	.344**	.449**	1

**: p<0.01

4. Mediating effect of rejection sensitivity

The validity of the mediating effect was analyzed as follows.Self-esteem reduces rejection sensitivity (Hypothesis 1).Self-esteem reduces the level of depression (Hypothesis 2).Self-esteem reduces depression level by lowering the level of rejection sensitivity (Hypothesis 3).The results of the three-step hypothesis test are shown in Table 4.

In the first step, self-esteem was significantly predictive of rejection sensitivity. The results showed that self-esteem had a significant effect on rejection sensitivity (β = −. 390, p< .001).After verifying whether self-esteem significantly predicts depression in Step 2, self-esteem was shown to have a significant effect on depression (β = −.609, p< .001).

In the third step, the effects of self-esteem and rejection sensitivity on depression were examined, showing that both self-esteem and rejection sensitivity had significant effects on depression. The effect of self-esteem on depression was less than at the second stage (Stage 2: β = −.609, Stage 3: β = −.512). This suggests that rejection sensitivity has a partial mediating effect between self-esteem and depression.

Finally, the Sobel test was used to test the significance of the indirect effects of self-esteem on depression through rejection sensitivity (Sobel's t: Z

= −4.817, p< .001). Therefore, rejection sensitivity is partially mediated by the effect of self-esteem on depression, and the associated partial parametric model is shown in Table 5.

Table 5. Sobel test of the mediating effect of rejection sensitivity

Path	a(SEa)	b(SEb)	Z (p)
Self-esteem → Rejection sensitivity	−.92	.407	−6.265
→ Depression	−.112	−.042	(< .001)

Discussion

This study found that the mean score for self-esteem was 2.9 out of 4 points, which was lower than the 3.03 points found in a study by Lee[6] using the same measurement tool for nursing students, but higher than the 2.89 points found in a study by Jung and Shin[18], indicating that the difference in the mean scores between these studies was not large, but rather they had generally similar results.

In this study, the mean score for rejection sensitivity was found to be 2.6 out of 5 points. Since related studies using the same instrument are rare, this finding was compared with the results of a study of junior college students using the same instrument[19]in which the mean score for rejection sensitivity was 2.5 points. The difference in the mean scores for rejection sensitivity between the studies was not large. In addition, the score found this study was equivalent to 52% of the instrument's maximum total score, which was estimated to converge to a normal distribution. The mean score for depression was found to be 0.9 out of 3 points, equivalent to 30% of the instrument's maximum total score, and higher than the 0.61 points (20.3%) found in a study by Yoo[20] using the CES-D for nursing students, but lower than the 1.84 points (61.3%) in a study by Lim etc.[21]. The reasons for such a large difference in depression score between studies involving similar subjects can be inferred as follows. All three studies used the CES-D tool, but this study used the Integrated Korean adaptation of the CES-D[16], whereas the other studies used a different version of CES-D translated and modified by different researchers. Therefore, even if the questions are similar in context, the possibility cannot be ruled out of differences in mean scores in different adaptations. Therefore, further studies are needed to examine the agreement between various versions of the CES-D.

Table 4. Mediating effect of rejection sensitivity

Step	Independent variable	Dependent variable	Unstandardized		Standardized	t	p
			B	SE	β		
Step 1 (route A)	**Self-esteem**	**Rejection sensitivity**	**−.92**	**.112**	**−.39**	**−8.235**	**< .001**
	R2 = .150, F = 67.812						
Step 2 (route B)	Self-esteem	Depression	−1.303	.087	−.609	−14.958	< .001
	R2 = .370, F = 223.736						
Step 3 (Independent variable)	Self-esteem	Depression	−1.095	.091	−.512	−12.08	< .001
Step 3 (Parameter)	Rejection sensitivity		.226	.038	.25	5.893	< .001
	R2 = .421, F = 139.186						

The results of this study found that there were significant negative correlations among self-esteem, rejection sensitivity, and depression. Previous study[6] involving nursing college students have shown negative correlations between self-esteem and depression, supporting the results of this study.

Rejection sensitivity among college students is a concept that has recently emerged as an issue, and no related previous studies of similar participants could be found. However, one study of female college students[22] reported a positive correlation between rejection sensitivity and depression, supporting the results of this study.

This study investigated the mediating effect of rejection sensitivity on the relationship between self-esteem and depression among nursing students. The results showed that rejection sensitivity played a partial mediating role in the relationship between self-esteem and depression, and that self-esteem had a direct effect on depression. The results of this study are in line with previous studies showing that there was a significant positive correlation between self-esteem and interpersonal relations[6], that rejection sensitivity increased interpersonal anxiety[23], and that there was a significant negative correlation between interpersonal relations and depression[6]. The partial mediating role of rejection sensitivity found in this study not only confirmed the importance of addressing rejection sensitivity in depression as a way to improve depression among nursing students, but also suggested that self-esteem is still important. This study found that increasing self-esteem and lowering rejection sensitivity in nursing college students is a way to reduce depression more effectively. Therefore, cooperative efforts between nursing educators and nursing leaders are needed to change nursing students' depression more positively.

Conclusion

Depression of nursing students is an important variable for emotional management that can affect not only academic work but also transfer to patients as prospective nurses. This study found the mediating effect of rejection sensitivity in the relationship between self-esteem and depression among nursing college students. The results of this study are expected to be used as the basis for developing specific intervention programs designed to reduce the depression level of nursing students.

Ethical Clearance: Not required

Source of Funding: Nil

Conflict of Interest: Nil

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Comparison of knowledge and Performance after Cardiopulmonary Resuscitation Training at 3, 6, 9 Months

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Abstract

Purpose: Assuming that attitude education for basic cardiopulmonary resuscitation contributes to delaying the declining period, the purpose of this study was to determine retention of knowledge and performance after cardiopulmonary resuscitation (CPR) training.

Method: Total 90-minute training consisting of a 30-minute lecture, a 30-minute practice by non-feedback mannequin (Actar 911 Squadron™; Vital Signs, New Jersey, USA), and a 30-minute attitude education (such as prevention of brain damage progression; confidence in ability to perform correct compression; understanding of damage caused by compression; ability to overcome the patient's appearance of distress; awareness of exemption from liability; confidence in the subject's physical capacity; low probability of infection) was conducted with 256 undergraduate students at Eulji University in accordance with 2015 AHA guidelines for layperson adult CPR. A self-assessing Likert scale (1, not at all; 2, not really; 3, undecided; 4, somewhat; 5, very much) was used before and after basic CPR training in three-month intervals (total of five times: March, May and September 2015, and December 2015, February and June 2016) to assess knowledge (how much you know about CPR) and performance (how much you can do CPR). Repeated measures ANOVA were used at α=.05 (2-side) of type I error rate to determine change in knowledge and performance scores over time.

Findings: Statistically significant difference in knowledge (epsilon, .891) was found (p<.001), in which the Bonferroni method was applied as post hoc analysis. There was a difference in knowledge score between before-training and months three, six, and nine. However, no difference in knowledge scores between months three, six, and nine, implying that knowledge had been retained at least for nine months. Statistically significant difference in performance (epsilon, .831) was found (p<.001), in which the Bonferroni method was applied as post hoc analysis. There was difference in performance score between before-training and months three, six, and nine. However, no difference in performance score was found between months three, six, and nine, implying that performance had been retained at least for nine months.

Applications: It was determined that knowledge and performance have been retained at least for nine month after basic CPR training combined with attitude education. Knowledge and performance scores that have improved compared to that before training were consistently maintained after training. Results of this study show lengthier retention than other studies, suggesting that attitude education added to basic CPR training delays decline of knowledge and performance.

***Keywords**: attitude education, decline period, knowledge, performance, retention*

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Introduction

Re-certification of CPR is generally conducted in two-year intervals. However, knowledge and

performance start rapidly declining three to 12 months after training [1-3]. Retraining was conducted six-nine months after certification for retention of performance, resulting in improvement of chest compression and reduction in defibrillation time [4-8]. There is no clear instruction for retraining method and time for basic CPR re-certification. However, it is recommended for high potential group to provide basic CPR to provide opportunities of self-learning or training as frequent training improves performance and confidence of trainees.

The best mechanism for retention of basic CPR performance is unknown while being supplemented as needed. The best time and method of supplementation have not been determined. Thus, there is an unmet need to determine training methods, retraining intervals and retraining methods for prevention of decline. Repeated training via video materials facilitates improvement of knowledge, performance, and attitude of trainees. Attitude training has a positive effect on willing trainees [9-11]. Attitude training to encourage the will of trainees to provide basic CPR is expected to delay decline as is improving the training effect.The purpose of this study was to determine retention of knowledge and performance when attitude education was added to basic CPR training.[2]

Method

Total 90-minute training consisting of a 30-minute lecture, 30-minute practice by non-feedback mannequin (Actar 911 Squadron™; Vital Signs, New Jersey, USA), and 30-minute attitude education (such as prevention of brain damage progression; confidence in ability to perform correct compression; understanding of the damage caused by compression; ability to overcome the patient's appearance of distress; awareness of exemption from liability; confidence in the subject's physical capacity; low probability of infection) was conducted five times with 256 undergraduate students from five departments at Eulji University in accordance with 2015 AHA guidelines for layperson adult CPR. A self-assessing Likert scale (1, not at all; 2, not really; 3, undecided; 4, somewhat; 5, very much) was used before and after basic CPR training in three-month intervals (total of five times: March, May, and September 2015, and December 2015, February and June 2016) to assess knowledge (How much you know about CPR) and performance (How much you can do CPR). Participating students were provided sufficient time to think and provide consent for the investigation. They were allowed to withdraw their consent at any time, even after the investigation, with no penalty. There was no participant who withdrew consent, while there were 14, 42, and 40 non-respondents at months three, six, and nine, respectively.

Status of data collected was presented as frequency (%) for non-continuous variables as well as mean and standard deviation for continuous variables, by using SPSS 21.0 for Windows (IBM Inc, New York, USA). Repeated measures ANOVA were used at α=.05 (2-side) of type I error rate to determine change in knowledge, performance and attitude scores over time as seen in the table. [table 1].

Table 1. Number of Respondents over Time Intervals N=256

Major	Time intervals				
	Before class	After class	3 months later	6 months later	9 months later
Dental Hygiene	65	65	61	33	35
Radiology	51	51	49	49	49
Food Science	50	50	50	50	50
Optometry	50	50	42	42	42
Health Environmental	40	40	40	40	40
Overall	256	256	242	214	216

Result

Participants consisted of 193 females (75.4%) and 63 males (24.6%) at mean age 19.82 (71 [27.7%] at age ≤18 and 69 [27.0%] at age 19). Major distribution was presented as 65 (25.4%) in Dental Hygienics, 51 (19.9%) in Radiology, 50 (19.5%) in Food and Nutrition, 50 (19.5%) in Optical Science, and 40 (15.6%) in Health and Environment. Grade level distribution was presented as 88 (34.4) in the freshman year, 114 (44.5%) in the sophomore year, 44 (17.2%) in the junior year, and 10 (3.9%) in the senior year as seen in the table.[table 2]

Table 2. General Characteristics of Participants

N=256

Characteristic		**N(%)**
Gender	female	193(75.4)
	male	63(24.6)
Age	below 18	71(27.7)
	19	69(27.0)
	20	40(15.6)
	21	32(12.5)
	above 22	44(17.2)
	mean year(SD*)	19.82(1.851)
Major	Dental Hygiene	65(25.4)
	Radiology	51(19.9)
	Food Science	50(19.5)
	Optometry	50(19.5)
	Health Environmental	40(15.6)
Grade	freshman	88(34.4)
	sophomore	114(44.5)
	junior	44(17.2)
	senior	10(3.9)

*SD: standard deviation.

Data distribution by the self-assessing Likert scale was not homogeneous and failed to meet sphericity conditions by Mauchly and with ≥0.75 of epsilon; thus, was replaced by Huynh Feldt that is generally used for violation of sphericity. Statistically significant difference in knowledge (epsilon, .891) was found (p<.001), in which the Bonferroni method was applied as post hoc analysis. There was a difference in the knowledge score between before-training and months three, six, and nine; however, no difference in knowledge scores between months three, six, and nine, implying that knowledge had been retained at least for nine months. Statistically significant difference in performance (epsilon, .831) was found (p<.001), in which the Bonferroni method was applied as post hoc analysis. There was a difference in the performance score between before-training and months three, six, and nine; however, no difference in the performance score was found between months three, six, and nine, implying that performance had been retained at least for nine months as seen in the table 3.[Table 3]

Table 3. Comparisons of Self-assessing Scores Over Time Intervals

	DOMAIN	
	Self-assessed score*	
	Knowledge	**Performance**
Before	2.70 (0.047)	2.46(0.060)
After	3.61** (0.048)	3.45**(0.052)
3 m. later	3.73** (0.042)	3.48**(0.047)
6 m. later	3.48** (0.042)	3.31**(0.045)
9 m. later	3.52** (0.046)	3.28** (0.050)
F	115.8	86.4
P	.000	.000

Mean(Standard Error)

*Likert scale 1, not at all; 2, not really; 3, undecided; 4, somewhat; 5, very much.

**statistically significant compared before lecture.

Discussion

It was determined that knowledge and performance had been retained at least for nine months after basic CPR training combined with attitude education. Knowledge and performance scores that had improved compared to that before training were consistently

maintained after training. Knowledge and performance scores decreased over time but was maintained to some degree by month nine; thus, may have been maintained by month 12. Provided that knowledge and performance after training are known to decline since months 3-12 [12-14], such retention is considered quite lengthy among other relevant studies. Added attitude education seemed to delay decline of knowledge and performance.

In other studies, some barrier variables have been determined [15-16] and an effort to reduce them was made by attitude education to enhance willingness variables [17]. However, in this study, 30 minutes of attitude education added was expected to extend training by retaining knowledge and performance for a considerable period, as well as positively influence willingness to engage in basic CPR training. Thus, attitude education to enhance willingness should be included in basic CPR training. As observed in studies that retained knowledge and performance by continuous training conducted with medical practitioners [18], training effect can be increased by training adjusted to the extended training cycle.

Considering increased willingness among study groups-formed by university students-[19]on attitude education, it is estimated that attitude education influences the retention period. However, 90 minutes of training lengthier than[20-21] and different from short frequent retaining sessions of recent trend may influence the retention period, must be well organized. Additionally, there is a possibility that the retention period increased as this study was conducted among health-related major students with a high level of learning ability compared to typical people.

Although this study used 30:2 conventional CPR in training, compression-only CPR training [22] that is simplified for convenience must be studied relative to if it extends the retention period of knowledge and performance.

Conclusions

In conclusions, there is a need to investigate the retention period using knowledge scores with theoretical test and performance scores as practical tests in future studies. Also, the effect of attitude education must be determined by randomized controlled trials, as this study was not a comparison with a control group in which attitude education was not provided.

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Source of Funding: Nil

Conflict of Interest: Nil

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Factors Related to Early Childhood Caries Using Infant Examination

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Abstract

Background/Objectives: The results of this study showed that dental caries increased with age. The target audience is the infants who visited the dental clinic of some university dental clinics in Korea. **Methods/ Statistical analysis**: The results of the analysis of the surveyed data are expressed as frequencies and percentages. Chi-square tests were used to examine the distribution trends and ECC correlations for each study group and questionnaire item. A total of 324 records of oral examinations of infants and children were analyzed.

Findings: Early childhood caries were 19.6% in 2 years old, 64.4% in 4 years old and 70.1% in 5 years old. As age increased, dental caries tended to increase.Differences in oral health perception among early childhood caries were significantly correlated with early childhood caries, experience of tooth pain in infants and young children, and caries perception of dental caries. Differences in oral health perception among early childhood caries were significantly correlated with early childhood caries, experience of tooth pain in infants and young children, and caries perception of dental caries. Early childhood caries 61.7% Early childhood caries was as high as 83.9% in the past month when a child has complained about toothache. For questions regarding the number of times children consume sugar and sticky snacks during the day, 49.6%, 47.1%, and 27.6% of the subjects at the first, second, and third examinations, respectively, consumed sugary snacks 2 - 3 times or more a day, and the difference was statistically significant.

Improvements/Applications: It is necessary to actively promote oral health checkups for infants and activate oral health services.Development of a program on oral health should be active for infants.

Keywords**:** *Dental caries, Dental visit, Early childhood caries, Infants, Toothache*

Introduction

Early childhood caries (ECC) refers to the presence of one or more caries in infant and toddler infants, a missing tooth in caries or a filled tooth[1]. Dental caries in infants and infants have problems such as toothache, difficulty in chewing, loose nipples, and infection.Early childhood caries can cause malocclusion and dental development of permanent teeth after growth, and can interfere with healthy growth by affecting growth[2]. Therefore, systematic oral health preventive care from infant to permanent tooth is very necessary.

During infant oral health screening, consultations regarding oral health awareness, oral health-related habits, and oral symptoms are conducted based on a questionnaire answered by the parents[3]. Then, tooth evaluations, oral hygiene screening and other examinations are performed. According to the results of the examination, parents are given instructions regarding necessary oral health education as well as follow-up recommendations and counseling[4-7].Parents' knowledge, awareness and attitude towards child oral health are closely related to the maintenance and

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promotion of oral health in children[8-9]. A number of previous studies have examined parents' perceptions of oral health, children's habits, and their association with dental caries[10-12]. However, no studies have been conducted using infant oral health examination screening.

The purpose of this study was to investigate the oral health awareness of the parents and the oral health habits of the children and to evaluate the association of these factors with ECC using infant oral examination questionnaires. Dental caries is a chronic infectious disease that involves a combination of time, fluoride, saliva, lifestyle, and socioeconomic factors.In order to establish an appropriate preventive strategy, evaluating individual caries risk factors and determining caries risks must be preceded, and in order for the caries risk assessment to be effective, risk factors including biological predisposition, prevention factors, and clinical screening elements must be included[13-15].

Therefore, it is necessary to make an effort for more accurate prediction of caries risk by establishing a relationship with caries occurrence by reflecting the biological factors causing dental caries. Recently, methods to identify S. mutans in saliva without bacterial culture process as well as the characteristics of saliva have been developed to help clinicians determine caries risk and apply it to medical care. According to the American Academy of Pediatric Caries for Early Childhood Caries5, early childhood caries is a unique pattern of caries associated with frequent or long consumption of liquids containing carbohydrates that can ferment, which is inadequate to reduce the risk of early caries. It was suggested that feeding practices should be suppressed. The American Academy of Pediatric Caries Policy on Early Childhood Caries: Don't go to sleep with a bottle, don't feed breast milk at night, drink it with a cup when you're close to 1 year old, weaning at 12-14 months Avoid repeated drinking of fermented carbohydrate-containing liquids into a bottle or no-spill training cup, oral hygiene if the first teeth erupt. Provide oral health counseling within 6 months and 12 months after eruption, and attempt to investigate and lower mutans streptococci levels in mothers or caregivers. However, 75.5% of the infants in this study had not visited the dentist since birth. In an analysis of the health screening program for infants and young children conducted in 2009[16], 76% of the infants aged 18 - 24 months had not visited the dentist since birth, which is similar to the results of this study. As age increased, the proportion of dental visits significantly increased.

In Korea, infant health checkups are conducted to systematically manage the physical growth and development of infants and young children according to the age of infants and to provide a health care program desirable to their caregivers.The purpose of this study was to investigate the oral health awareness of infants and toddlers by using the results of oral examinations and to investigate the relationship between infant and childhood caries.

Method

This study was approved by the Institutional Review Board (IRB) of OO University Dental Hospital (W1718/001-001). The target audience is the infants who visited the dental clinic of some university dental clinics in Korea. A total of 324 records of oral examinations of infants and children were analyzed. The subjects of the study were 143 first, 104 second, 77 third, and 324 oral examinations records of infants and toddlers were analyzed. For the consistency of the analysis results, three trained researchers conducted the analysis. The questionnaire for infants and toddlers was set as dental history, oral health perception items, and oral health habits. To ensure the consistency of the analysis results, one researcher conducted the entire analysis. The infant oral health examination questionnaire consists of questions related to dental history, oral health awareness, and oral health habits.Questions related to oral health habits are divided into sugar intake, oral hygiene, and fluorine use. The results were analyzed for each question and the results were analyzed. The correlation between the results of questionnaire preparation and dental caries was evaluated by checking the presence of caries.

Statistical analysis was performed using SPSS 24.0 (SPSS Inc. Chicago, IL, USA). The results of the analysis of the surveyed data are expressed as frequencies and percentages. Chi-square tests were used to examine the distribution trends and ECC correlations for each study group and questionnaire item. The significance level was set at a 0.05 probability level.

Result and Discussion

1. Early childhood caries differences according to age of infants

Early childhood caries were 19.6% in 2 years old, 64.4% in 4 years old and 70.1% in 5 years old. As age

increased, dental caries tended to increase. This was statistically significant [Table 1].

Table 1. Early childhood caries differences according to age of infants

	Years				
	2years	**4years**	**5years**	**X2**	**P**
ECC					
Yes	28(19.6)	67(64.4)	54(70.1)	72.455	0.000***
No	115(80.4)	37(35.6)	23(29.9)		

2.Differences in oral health perception among early childhood caries subjects

Differences in oral health perception among early childhood caries were significantly correlated with early childhood caries (p = 0.000), experience of tooth pain in infants and young children, and caries perception of dental caries (p = 0.000). In other words, early childhood caries (61.7% Early childhood caries was as high as 83.9% in the past month when a child has complained about toothache. Table 2 shows that early childhood caries (46.3%) were significantly higher when the caregiver recognized dental caries symptoms [Table 2].

Table 2. Differences in oral health perception among early childhood caries subjects

	Early Childhood Caries (ECC)			
	Yes	**No**	**X^2**	***P***
Dental visit				
Yes	92(61.7)	55(31.4)	29.842	0.000***
No	57(38.3)	120(68.6)		
Toothache				
Yes	125(83.9)	10(5.7)	9.255	0.002**
No	24(16.1)	165(94.3)		
Dental caries				
Yes	69(46.3)	13(7.4)	64.618	0.000***
No	48(32.2)	103(58.9)		
Not know	32(21.5)	59(33.7)		
Tooth-brushing frequency				
Favorable	126(84.6)	123(70.3)	9.222	0.102
Poor	23(15.4)	52(29.7)		

3.Questions related to sugar intake

For questions regarding the number of times children consume sugar and sticky snacks during the day, 49.6%, 47.1%, and 27.6% of the subjects at the first, second, and third examinations, respectively, consumed sugary snacks 2 - 3 times or more a day, and the difference was statistically significant (p = 0.005). On the question regarding the daily intake of carbonated beverages and

soft drinks, 18.3%, 7.7% and 6.5% of the respondents at the first, second and third answered that their children consumed more than 2 per day. The difference was statistically significant (p = 0.009) [Table 3].

Table 3.Questions related to sugar intake

	Years				
	2years	4years	5years	X2	P
Sticky snack					
0-1	71(50.4)	55(52.9)	55(72.4)	10.498	0.005*
2-3	70(49.6)	49(47.1)	21(27.6)		
Carbonated or soft drink					
0-1	116(81.7)	96(92.3)	72(93.5)	9.341	0.009*
2-3	26(18.3)	8(7.7)	5(6.5)		

4.Questions related to oral hygiene

For the question asking whether the parents or the child had learned to brush their teeth at a dental office or public health center, 80.4%, 68.3% and 45.5% of the first, second and third respondents answered no, respectively. Overall, uneducated rates were higher, but as age increased, educational experience increased. This difference was statistically significant (p = 0.000). For the question asking if the child's teeth were cleaned regularly, 83.9%, 88.5%, and 92.2% answered yes in the first, second, and third examinations. However, there was no statistical significance in the difference among the periods (p = 0.193). For the question regarding the number of brushings, fewer than two was considered inappropriate; inappropriate responses were given by 37.8%, 15.4%, and 6.5% parents in the first, second and third examinations, respectively. As age increased, the number of brushings tended to increase, and the difference was statistically significant (p = 0.000) [Table 4].

Table 4.Questions related to oral hygiene

2years		Years			X^2	p value
		4years	5years			
Tooth brushing instruction	Yes	28 (19.6)	33 (31.7)	42 (54.5)	28.219	0.000
	No	115 (80.4)	71 (68.3)	35 (45.5)		
Regular brushing	Yes	120 (83.9)	92 (88.5)	71 (92.2)	3.286	0.193
	No	23 (16.1)	12 (11.5)	6 (7.8)		
Tooth brushing Frequency	Favorable	89 (62.2)	88 (84.6)	72 (93.5)	32.697	0.000
	Poor	54 (37.8)	16 (15.4)	5 (6.5)		

5.Questions related to fluoride use

On the question asking whether the toothpaste the child uses included fluoride, inappropriate answers were yes for children younger than 2 years and no or don't know for children older than 2 years. A total of 45.5% of the respondents at the first examination, 35.6% at the second, and 20.8% at the third answered inappropriately. As the child's age increased, the appropriate use of

fluoride toothpaste was more appropriately, and the difference was statistically significant (p = 0.001). The percentages of patients who did not use the recommended amount of toothpaste were 61.5%, 39.4% and 33.8% at the first, second and third examinations, respectively. As the child's age increased, toothpaste usage became more appropriate; the difference among the groups was statistically significant (p = 0.000) [Table 5].

Table 5.Questions related to fluoride use

1st		Period			X^2	P value
		2nd	3rd			
Fluoride toothpaste	Favorable	78 (54.5)	67 (64.4)	61 (79.2)	13.207	0.001
	Poor	65 (45.5)	37 (35.6)	16 (20.8)		
Amount of toothpaste	Favorable	55 (38.5)	63 (60.6)	51 (66.2)	19.818	0.000
	Poor	88 (61.5)	41 (39.4)	26 (33.8)		

Conclusion

This study analyzed the questionnaires of the oral health screening program for infants and young children conducted in Korea as part of public oral health policy. The results of this study showed that the awareness of oral health of infants and children and the oral health habits of children were identified and the main factors affecting the occurrence of ECC were identified.

Previous research on general health checkups for infants and toddlers has been relatively widely published, but research on oral health checkups is insufficient. In this study, the research subjects are restricted to children and caries in some parts of Korea and there is a limit to generalization to other areas. This study has limitations in that the subjects were limited to children in the OO area and the number of subjects was low. However, this is the first study to analyze the responses to the infant oral health screening questionnaire used in the health screening project, which is included in the national policy. Through our analysis, we were able to understand parent's perceptions of their children's oral health and the child's oral habits and determine the factors related to the occurrence of ECC. More detailed investigations related to each question will be needed in the future. Although oral health screening for infants and children has been conducted since 2007, there is little data on the effectiveness of the system, and there is no national study. While there are many studies of infant health screening in pediatrics, there was no study of the use of infant health screening in pediatric dentistry. Therefore, it is necessary to actively promote oral health checkups for infants and young children and activate oral health services. In addition, the development of programs on oral health care education and methods should be activated by age and care for infants and caregivers.

Ethical Clearance: Not required

Source of Funding: Nil

Conflict of Interest: Nil

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Effects of a Mixed Herbal Extract on the Corpus Cavernosum of Male Rabbits

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Abstract

Background/Objectives: We aimed to estimate the effects of a mixed herbal extract(MT) of three natural products (FructusAmomi Amari, Eucommiae Cortex, and BombyxBatryticatus) on erectile dysfunction.

Methods/Statistical analysis: Male sexual function was investigated through experiments on the corpus cavernosum of male rabbits. Isolated corpus cavernosum strips were treated with the aqueous extract of MT (0.01–3.0 mg/mL) and with 1 mM calcium chloride (Ca2+) after pretreatment with MT in a Ca2+-free Krebs-Ringer solution. Strips were contracted by treatment with Nω-nitro-L-arginine (L-NNA), indomethacin (IM), and tetraethylammonium (TEA) before MT treatment.

Findings: MT resulted in a significant relaxation of the cavernous body strips to which the maximum contraction was applied by incubation with 3 mg/mL phenylephrine (PE). The relaxation effect of the extract on the cavernous body was not affected by pretreatment with IM or TEA, but was significantly inhibited by pretreatment with L-NNA. The extract significantly inhibited contraction changes increased by extracellular Ca2+ influx.

Improvements/Applications: From the above results, we determined MT exerted a relaxation effect on the corpus cavernosum through an increase in NO production via eNOS and by blocking extracellular Ca2+ influx.

Keywords:*FructusAmomi Amari, Eucommiae Cortex, BombyxBatryticatus, sexual function, Nitric Oxide (NO)*

Introduction

Very extensive physical and mental changes may arise from aging; one of the most noticeable physical changes results from the decrease in sex hormone levels. For women, as there is the clear definition for menopause, appropriate prevention and treatment have been investigated socially and medically. In contrast, for men, appropriate prevention and treatment have not been investigated as symptoms from decreased male hormone levels are not clear; in addition, it is not recognized by society as a disease. In 2005, the typical symptoms that men experience as they age and other symptoms accompanying decreased male hormone levels were collectively defined as the male menopause, heralding its recognition as a medical condition [1].

The symptoms of the male menopause arising from a decrease in male hormone levels affect mental, sexual, reproductive, and musculoskeletal function[2]. Sexual function symptoms, the most notable, can be divided further into reduced sex drive, erectile dysfunction, premature ejaculation, and other symptoms related to an individual's sex life. In particular, erectile dysfunction, the most common disease among middle-aged men

Erectile dysfunction refers to the inability to have or maintain an erection. In the 1970s, endothelium-derived relaxation factors were identified as the substances involved in penile erection; and in the late 1980s, these relaxation factors were identified as nitric oxide(NO), prostacyclin, and endothelium-derived hyperpolarizing factors (EDHF) [3-4].

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Prostacyclin is a substance with relaxing effects that is synthesized and released by cyclooxygenase and prostacyclin synthase from arachidonic acids in the endothelium[5]. The EDHFs activate the K+ pathway, cause hyperpolarization of the cell membrane, deactivate the voltage-sensitive Ca2+ pathway, reduce the Ca2+ concentration within the smooth muscle, and induce relaxation[6]. NO is synthesized and released by NO synthases from L-arginine in nonadrenergic and noncholinergic neurons and the endothelium in the corpus cavernosum. The released NO directly diffuses into smooth muscle cells, adheres to and revitalizes guanylatecyclase, and converts GTP into cGMP. The producedcGMP then activates protein kinase G (PKG). Moreover, the activated cGMP blocks the calcium pathway in the cell membrane, phosphorylates a particular protein that removes intracellular ionized calcium, reduces the overall intracellular calcium concentration, and relaxes the corpus cavernosum smooth muscles and the cavernosal artery[7]. As mentioned earlier, these three factors are derived from the endothelium and are involved in relaxing smooth muscles and blood vessels in the corpus cavernosum. Of these factors, NO was shown to be the most important as NO-cGMP action ultimately relaxes the corpus cavernosum and the cavernosal artery, fills the corpus cavernosum with blood, resulting in an erection.

FructusAmomi Amari has been reported to have relaxation effects in the corpus cavernosum and to improve osteoporosis and muscle atrophy caused by aging [8-9]. Eucommiae Cortex has also been reported to improving reproductive function and male osteoporosis caused by aging[10-11]. BombyxBatryticatus has been reported to have relaxation effects in the corpus cavernosum and to ameliorate depression caused by aging[12-13]. In addition, as a potential formlation to ameliorate the symptoms of the male menopause symptoms overall, Park et al. used an extract that mixed FructusAmomi Amari, Eucommiae Cortex, and BombyxBatryticatus in a particular ratio. By histochemical and immunohistochemical analyses, the authors reported that the extract exerted beneficial effects against depression, reduced reproductive function, decreased sexual function, and bone and muscle problems[2].

Therefore, we believe that the mixed herbal extract of FructusAmomi Amari, Eucommiae Cortex, and BombyxBatryticatus resulting in improved sexual function. Therefore, we conducted an organ bath study in male rabbits.

Method

The present study used New Zealand white male rabbits (Samtako, Korea) with a body weight of approximately 2.5 kg. The animals were acclimatized to the laboratory environment for 1 week with no restrictions on food or water prior to the start of any experiments.

The animal experiments were accomplished in accordance with the approval obtained from the Institutional Animal Care and Use Committee of Semyung University (smecac 18-12-04).

FructusAmomi Amari, BombyxBatryticatus, and Eucommiae Cortex were mixed in a 2:1:1 ratio. The mixture (MT, 400 g) was obtained 40.8 g of powder finally.

Each rabbit was anesthetized with urethane (0.6 g/kg; intravenous injection) and the penis was harvested. The harvested penis tissue was placed in a pH 7.4 modified Krebs-Ringer bicarbonate solution (KCl 4.9 mM, NaHCO3 15.8 mM, MgSO4 1.2 mM, CaCl2 2.8 mM, NaCl 125.4 mM, glucose 12.2 mM, KH2PO4 1.2 mM) and maintained at 4°C. The tunica albuginea and remaining fat around the penis was removed, and cut into 2×2×6 mm strips.

Mixed gas (95% O2 and 5% CO2) was provided from a peristaltic pump, and the modified Krebs-Ringer bicarbonate solution maintained at 37°C was injected into the organ bath (1.5 mL capacity) at a rate of 3 mL/min. One end of the penis strip was connected to the organ bath, and the other end was connected to the force transducer. Subsequently, by using a physiograph (PowerLab, Australia), the changes in tension were recorded.

Before experiments, the penis strips were stabilized for 1 hour in the above conditions, and the micromanipulator (Narishige N2, Japan) was used to apply the passive tension of 1.5 g. After they were stabilized again for 1 hour, the experiments were conducted. When the experiments were conducted successively, the strips were again stabilized for 1 hour before any other treatments were performed.

Phenylephrine (PE; 1 μM) was administered into the penis strips to cause contraction. The alteration in size was recorded after the administration of the mixed herbal extract of FructusAmomi Amari, Eucommiae Cortex, and BombyxBatryticatus at different concentrations

(0.01, 0.03, 0.1, 0.3, 1, and 3 mg/mL).

The penis strips were treated for 15 minutes each in 10 μM indomethacin (IM), tetraethylammonium (TEA), and Nω-nitro-L-arginine (L-NNA). PE (1 μM) was administered to induce contraction, and then the mixed herbal extract of FructusAmomi Amari, Eucommiae Cortex, and BombyxBatryticatus (0.1, 0.3, 1, and 3 mg/mL) was administered to compare the change in size when the IM, TEA, L-NNA, and MB pretreatments were not applied.

To test the effect of extracellular Ca2+ influx on the mechanism of action for the corpus cavernosum relaxation effect, the mixed herbal extract (3.0 mg/mL) was pretreated for 10 minutes in Ca2+-free solution. Then, 1 μM PE was administered to induce contraction; 1 mM Ca2+ was administered to compare the change in size in the absence of the mixed herbal extract pretreatment.

Result

1. The relaxation effect on the MT on of the corpus cavernosum

The penis strips were relaxed significantly by application of the MT extract at 3 mg/mL (Table 1, Fig. 1).

Table 1. The relaxation effect of the extract on the corpus cavernosum

Treatment	Contraction (g)	Relaxation (%)
PE	1.70±0.41	0
PE + MT 0.01	1.73±0.45	- 1.4±4.8
PE + MT 0.03	1.64±0.49	4.6±6.6
PE + MT 0.10	1.54±0.51	10.5± 9.5
PE + MT 0.30	1.50±0.51	13.4±8.9
PE + MT 1.00	1.37±0.44	20.7±7.3
PE + MT 3.00	0.80±0.39**	54.6±10.1

Values are the mean ± standard deviation (n=7). Changes in contraction caused by MT were expressed as the actual contraction size and the percentage of the maximum contraction in the presence of PE. ** $p<0.005$ compared with PE; MT, Mixed herbal extract (mg/mL).

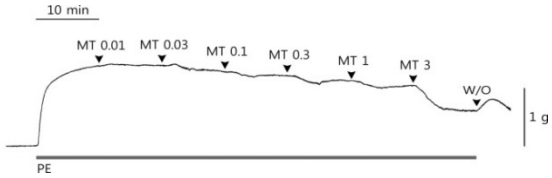


Figure 1. Graph showing the relaxation of the corpus cavernosum induced by the MT. W/O, change of bath medium for a solution to which no drug is applied or wash out.

2. The mechanism of action of the corpus cavernosum relaxation effect of MT

1) Changes in the relaxation effect of the extract on the corpus cavernosum induced by IM pretreatment

The comparison of the absence and presence of IM pretreatment revealed no significant differences in the relaxation (Table 2, Fig. 2).

Table 2. Changes in the relaxation effect on the corpus cavernosum induced by IM pretreatment

Treatment	No pretreatment		Pretreatment	
	Contraction (g)	Relaxation (%)	Contraction (g)	Relaxation (%)
PE	1.10±0.50	0	0.97±0.45	0
PE + MT 0.1	1.02±0.49	7.5±3.8	0.98±0.48	0.1±3.4
PE + MT 0.3	1.02±0.49	7.6±4.6	0.94±0.48	4.2±4.7
PE + MT 1.0	0.91±0.45	18.0±5.8	0.82±0.43	16.7±5.0
PE + MT 3.0	0.58±0.33*	48.8±7.4	0.49±0.28*	51.1±4.8

* $p<0.05$ compared with PE.

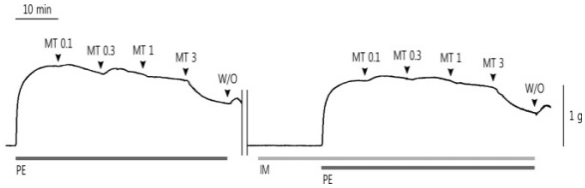


Figure 2. Graph of the changes in the relaxation effect on the corpus cavernosum induced by IM pretreatment

2) Changes in the relaxation effect on the corpus cavernosum induced by TEA pretreatment

The comparison of the absence and presence of TEA pretreated revealed no significant differences in the relaxation (Table 3, Fig. 3).

Table 3. Changes in the relaxation effect on the corpus cavernosum induced by TEA pretreatment

Treatment	Non-treatment of TEA		Treatment of TEA	
	Contraction (*g*)	Relaxation (%)	Contraction (*g*)	Relaxation (%)
PE	1.08±0.42	0	0.97±0.40	0
PE + MT 0.1	1.04±0.43	4.2±3.8	0.89±0.40	10.1±4.8
PE + MT 0.3	0.99±0.45	10.3±7.9	0.88±0.41	10.8±5.9
PE + MT 1.0	0.88±0.42	20.5±8.6	0.80±0.38	20.1±6.8
PE + MT 3.0	0.59±0.32*	47.9±9.9	0.52±0.27*	48.9±7.1

* $p<0.05$ compared with PE.

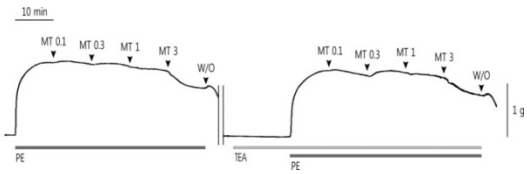


Figure 3. Graphs of the changes in the relaxation effect of the corpus cavernosum induced by TEA pretreatment

3) Changes in the relaxation effect on the corpus cavernosum induced by L-NNA pretreatment

The comparison of the absence and presence of L-NNA pretreatment revealed that L-NNA pretreatment significantly inhibited the relaxation (Table 4, Fig. 4).

Table 4. Changes in the relaxation effect on the corpus cavernosum induced by L-NNA pretreatment

Treatment	No pretreatment		Pretreatment	
	Contraction (g)	Relaxation (%)	Contraction (g)	Relaxation (%)
PE	1.40±0.41	0	1.38±0.43	0
PE + MT 0.1	1.38±0.43	1.7±3.3	1.43±0.47	- 2.6±5.0#
PE + MT 0.3	1.30±0.42	8.1±5.3	1.37±0.49	2.1±8.7#
PE + MT 1.0	1.13±0.37	20.1±5.6	1.28±0.44	8.6±6.4###
PE + MT 3.0	0.70±0.26***	50.5±7.0	0.84±0.31***	39.8±7.8###

*** $p<0.001$ compared with PE; ### $p<0.001$, # $p<0.05$ compared with PE+MT without L-NNA pretreatment.

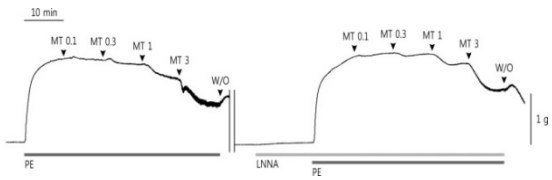


Figure 4. Graphs of the changes in the relaxation effect on the corpus cavernosum relaxation effect depending on L-NNA pretreatment

4) Changes in Ca2+-dependent contraction induced by pretreatment with MT

The extract significantly inhibited contraction changes increased by the extracellular Ca2+ influx (Table 5, Fig. 5).

Table 5. Changes in Ca2+-dependent contraction induced by pretreatment with extract

Treatment	Pretreatment with MT	Treatment with MT
	Contraction (g)	Contraction (g)
PE	0.54±0.15	0.12±0.04
PE + Ca	1.06±0.38	0.38±0.12##

p<0.005 compared with PE+Ca in the absence of MT pretreatment

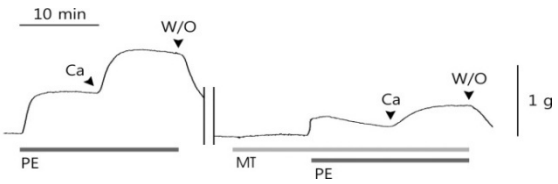


Figure 5. Graph of the changes in Ca2+-dependent contraction induced by pretreatment of the MT

Discussion

Sexual function can be measured mainly by erection. Erection is a phenomenon in which the smooth muscles and blood vessels in the corpus cavernosum are relaxed by a particular stimulus, and it is caused by the activity of endothelium-derived relaxing factors. The relaxation factors include endothelium-derived hyperpolarizing factors (EDHF), prostacyclin (PGI2), and nitric oxides (NOx). The problem with producing these factors increases the tension in smooth muscles and blood vessels in the corpus cavernosum or causes a disorder in the endogenous relaxation mechanism, which may lead to erectile dysfunction. Hence, if we understand the effect and mechanism of a particular drug on smooth muscles and blood vessels in the corpus cavernosum, this may help the development of an effective treatment for erectile dysfunction.

Hence, this author thought that the herbal extract that mixed FructusAmomi Amari, Eucommiae Cortex, and BombyxBatryticatus at a particular ratio, which has already been proven effective to protect the body, would be effective in the amelioration of erectile dysfunction caused by decreased male hormones. Therefore, we studied the effect and mechanism of the extract on the relaxation of the corpus cavernosum in male rabbits.

First, PE was administered to the penis strips to induce maximum contraction. The mixed herbal extract of FructusAmomi Amari, Eucommiae Cortex, and BombyxBatryticatus was administered at different concentrations. The results showed that the penis strips were relaxed significantly by 3 mg/mL extract, which confirmed the relaxation.

Next, an experiment was conducted to determine the mechanism through which the extract relaxed the corpus cavernosum.

In the presence and absence of IM, TEA of pretreatment, 3 mg/mL extract significantly relaxed the penis strips. The comparison revealed no significant difference in the relaxation effects of the extract on the corpus cavernosum.

IM is a substance that prevents prostacyclin production [5]. TEA is a KCa-channel blocker, which activates the K+ pathway and blocks the action of EDHFs that causes hyperpolarization of the cell membrane [6]. Therefore, the absence of no significant difference in the relaxaion effect on the corpus induced by IM and TEA treatment demonstrates that the extract is not involved in prostacyclin and EDHFs, which are the factors relaxing the corpus cavernosum.

In both non-pretreatment and pretreatment of L-NNA, 3 ㎎/㎖ of the mixed herbal extract significantly relaxed the penis strips. However, the comparison of non-pretreatment of L-NNA and pretreatment of L-NNA showed that pretreatment of L-NNA significantly inhibited the corpus cavernosum relaxation effect.

L-NNA is a substance that inhibits eNOS, an enzyme that converts L-arginine into NO through NO synthases in the corpus cavernosum endothelium [14]. As pretreatment with L-NNA significantly inhibited the relaxation effect, it was shown that since it occurred as NO production through eNOS was inhibited, the mixed herbal extract showed its relaxation effect as the extract was involved in NO production through eNOS.

Finally, in the Ca2+-free Krebs-Ringer solution, the mixed herbal extract significantly inhibited the increase of contraction due to the extracellular Ca2+ influx. This finding demonstrates the fact that the mixed herbal extract is involved in the mechanism that blocked

the extracellular Ca2+ influx and relaxed the corpus cavernosum.

According to the experiments that have been conducted so far, the mixed herbal extract increases NO production through eNOS, blocks the extracellular Ca2+ influx, and shows a relaxation effect on the corpus cavernosum.

Conclusion

The following are the conclusions:

1. The mixed herbal extract of FructusAmomi Amari, Eucommiae Cortex, and BombyxBatryticatus significantly relaxed the penis stripsat the concentration of 3 mg/mL.

2. The relaxation effect of the mixed herbal extract on the corpus cavernosum was not affected by pretreatment with IM, TEA, but was significantly inhibited by pretreatment with L-NNA.

3. The mixed herbal extract significantly inhibited contraction changes increased by the extracellular Ca2+ influx.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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A Study on the Effects of Eucommiae Cortex on Male Osteoporosis

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Abstract

Background/Objectives: To investigate the effects of Eucommiae Cortex on osteoporosis in males, we performed experiments using histochemical methods and dual energy X-ray absorptiometry (DEXA) in aged male mice.

Methods/Statistical analysis: Male ICR mice aged 8 weeks and 50 weeks were used. The extracts of Eucommiae Cortex (EC) were obtained 37.9g. 8-week-old ICR mice were used as controls. The aging group and Eucommiae Cortex group (EC group) included ICR mice aged 50 weeks. EC extract (0.51 g/kg) was dissolved in DW and administered once a day for 6 months.

Findings: EC treatment increased bone mineral density, decreased bone loss on X-ray examination, and increased the distribution of glycosaminoglycan in the bone matrix in dense femoral bone. In addition, EC increased osteopontin (OPN) and osteocalcin (OCN) positivity in osteoblasts, decreased 8-OHdG positivity related to oxidative stress as well as RANKL and MMP-3 positivity, and increased osteoprotegerin (OPG) positivity.

Improvements/Applications: EC reduces aging-induced bone loss and weakening of the bone matrix; inhibits osteoclast action and promotes osteoblast function; reduces degradation of osteoid tissue and oxidative stress in bone.

Keywords:*Eucommiae Cortex (EC), osteoporosis, osteocalcin (OCN), osteopontin (OPN), osteoprotegerin (OPG), Reaction of activation of nuclear factor kappa B ligand (RANKL)*

Introduction

Generally, males have more bone mass and larger skeletal size than females. In addition, men have less age-related bone loss than women because of more periosteal compensation and less endosteal uptake in men [1]. Most osteoporosis treatments and studies that have been carried out so far have focused on postmenopausal women since the age of osteoporosis onset and the rapid increase in the risk of fracture occur later in men than in women. However, the total fracture relaxation rate from the 40s to the 60s is higher in males [2], Approximately 60% of male osteoporosis is secondary osteoporosis with a risk factor that prevents the gaining of peak bone mass or causes abnormal bone loss. Especially, the incidence of osteoporosis is increasing, as the population ages. Therefore, it is necessary to identify the cause of osteoporosis in men and appropriately prevent and control it.

The strength of bone is established by the amount and the quality of bone. Factors affecting bone quality include bone structure, turnover rate, mineralization, and micro-damage. However, since there is no satisfactory index to assess bone quality as a whole, osteoporosis is diagnosed using bone mineral density(BMD) scan, which tests the amount of bone. Usually, BMD is tested using Dual-energy X-ray absorptiometry (DEXA).

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DEXA is a standard test for assessing BMD and can be applied to the WHO criteria for osteoporosis diagnosis based on T-score [3-4].

Eucommiae Cortex (EC) is a deciduous tree belonging to the EC family, the dried bark of Eucommia ulmoides Oliver. The cork layer is cut off from spring to summer and the tree bark is dried in the sun [5]. Various studies show that EC affects bone metabolism, but there are no studies on the effects on osteoporosis in men, nor on the mechanism of osteoporosis in men.

The object of this study was to investigate the effect of EC on male osteoporosis using histochemical methods and DEXA to measure bone mineral density in aged male mice.

Method

EC extract was dried using a lyophilizer to measure the weight of the powder (37.9 g).

The experimental group was classified into three groups. The control group used 8-week-old ICR mice without any treatment, and the Aging group and Eucommiae Cortex group (EC group) used 50-week-old ICR mice. In the aging group, 0.5 ml of DW was administered once a day for six months without any treatment, EC extract (0.51 g/kg) was dissolved in DW and administered once a day for six months in the EC group.This animal experiment was conducted under the approval of the Semyung University Animal Experiment Ethics Committee (SMECAE 18-12-04).

Bone loss was analyzed by x-ray absorptiometry (Inalyzer, Medikors, Seoul, Korea) after anesthesia with sodium pentobarbital.

The mice were sacrificed with ether, then fat and muscle were removed from around the femur and fixed with 10% neutral buffered formalin for 24 hours at 37°C. The fixed femurs were treated with decalcification solution (BBC, UK) for 12 hours after washing and embedding in paraffin using standard procedures to make 5-mm thick sections.

Safranin-O-fast green (S/F) staining was performed, followed by optical microscopy (BX51, Olympus, Japan).

Immunohistochemical staining using mouse anti-osteocalcin (OCN) and mouse anti-osteopontin (OPN) was performed to study the distribution of OCN and OPN produced in osteoblasts. First, the bone tissue sections were subjected to proteolysis in proteinase K (20 mg/mL) for five minutes and then were blocked for two hours in 10% normal goat serum. The cells were cultured in a moistened chamber at 4°C for 72 hours with mouse anti-OCN (Santa Cruz Biotech, 1:50) and mouse anti-OPN (abcam, 1:50). Then, the cells were incubated with a secondary antibody, biotinylated goat anti-mouse IgG1 (DAKO, 1: 100) at 37°C for 24 hours and then were responded with an avidin biotin complex kit (Vector Lab) at 37°C for 1 hour. After colorizing in tris-HCl buffer solution(0.05 M) containing HCl (0.01%, pH 7.4) and 3,3'-diaminobenzidine(0.05%), counterstaining was performed with hematoxylin.

Immunohistochemical staining was performed to observe changes in Reaction of activation of nuclear factor kappa B ligand (RANKL, Santa Cruz Biotech, 1:50) and osteoprotegerin (OPG, Santa Cruz Biotech, 1:50) which are involved in osteoporosis pathogenesis, and matrix metalloproteinase-3 (MMP-3, Santa Cruz Biotech, 1:50) involved in osteoid tissue degradation.

Immunohistochemical staining was performed to determine changes in 8-OHdG (1: 100, Santa Cruz Biotech, USA), which is involved in gene damage due to oxidative stress.

Result

1. Effect of EC on Bone Loss in the Femur

Bone loss was increased in the femurs of animals in the Aging group compared to that in the control group, but compared to that in aging group, decreased in the EC group (Figure 1). In addition, BMD, in the Aging group decreased compared to that in the control group, but compared to that in the Aging group increased by 40% in the EC group (Table 1).



Figure 1. Effect of EC on Bone Loss in the Femur. A, Control group; B, Aging group; C, Eucommiae Cortex group

Table 1.Results of bone mineral density (BMD) test by DEXA scan in the femur

Objective	Group		
	Control	Aging	EC
BMD	0.183 ± 0.005	0.092 ± 0.001	0.129 ± 0.003***

Values are means ± standard deviation (n = 8). $^{***}p <$ 0.001 compared with values in the Aging group; Image analysis for 20,000,000 pixels.

2. Effect of EC on Femoral Bone Matrix

Compared to that in the Aging group, in control group the distribution of GAG was decreased, but in the EC group, the distribution of GAG was increased compared to that in the Aging group(Figure 2).

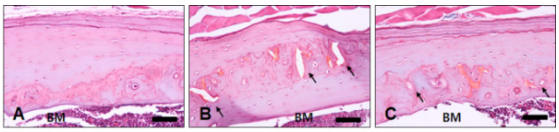


Figure 2. Effect of EC on femoral bone matrix. A, Control group; B, Aging group; C, Eucommiae Cortex group; BM, bone marrow; Arrow, positive reaction; Bar size, 50 μm.

3. Effect of EC on Osteoblast Activity

The OPN and OCN responses in the EC group were 128% and 146% higher than values in the aging group, respectively(Table 2, Figure 3).

Table 2. The Image Analysis for OPN and OCN in the mouse femurs

Objective	Group		
	Control	Aging	EC
OPN	65,686 ± 2,114	13,205 ± 642	30,168 ± 777***
OCN	75,463 ± 1,203	23,029 ± 1,056	56,722 ± 1,177***

Values are means ± standard deviation (n = 10). $^{***}p <$ 0.001 compared with values in the Aging group; Image analysis for 20,000,000 pixels.

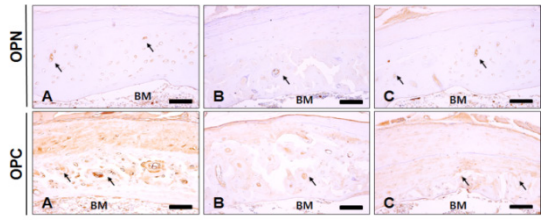


Figure 3. Effect of EC on osteoblast activity.

A, Control group; B, Aging group; C, Eucommiae Cortex group; OPN, osteopontin immunohistochemistry; OCN, osteocalcin immunohistochemistry; BM, bone marrow; Arrow, positive reaction; Bar size, 50 μm

4. Effect of EC on Osteoporosis Pathogenesis

RANKL positivity was falled off by 58% in the EC group, OPG positivity was increased by 120% in the EC group and MMP-3 positivity was decreased by 27% in the EC group compared to that in the aging group. OPG positivity was 120% higher in the EC group than that in the Aging group, and MMP-3 positivity was 27% lower in the EC group than that in the Aging group(Table 3, Figure 4).

Table 3. The Image Analysis for OPG, RANKL, MMP-3 in mouse femurs

Objective	Group		
	Control	Aging	EC
RANKL	8,773 ± 464	75,929 ± 829	32,220 ± 1,177***
OPG	63,698 ± 1,497	16,900 ± 912	37,145 ± 1,046***
MMP-3	5,811 ± 248	65,174 ± 1,482	47,328 ± 1,386***

Values are means ± standard deviation (n = 10). $^{***}p <$ 0.001 compared with values in the Aging group; Image analysis for 20,000,000 pixels..

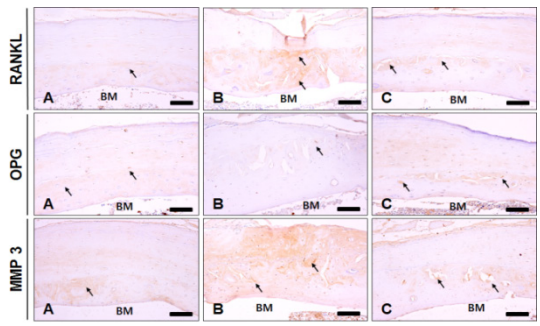


Figure 4. Effect of EC on Osteoporosis Pathogenesis.

A, Control group; B, Aging group; C, Eucommiae Cortex group; RANKL, RANKL immunohistochemistry; OPG, osteoprotegerin immunohistochemistry; MMP-3, MMP-3 immunohistochemistry; BM, bone marrow; Arrow, positive reaction; Bar size, 50 μm.

5. Effect of EC on Oxidative Stress of Femur

8-OHdG positivity, compared to that in the Aging group, was falled off by 42% in the EC group (Table 4, Figure 5).

Table 4. The Image Analysis for 8-OHdG Positive Reactions in mouse femurs

Objective	Group		
	Control	Aging	EC
8-OHdG	10,140 ± 586	74,974 ± 1,348	43,735 ± 1,549***

Values are means ± standard deviation (n = 10). ***$p <$ 0.001 compared with values in the Aging group; Image analysis for 20,000,000 pixels..

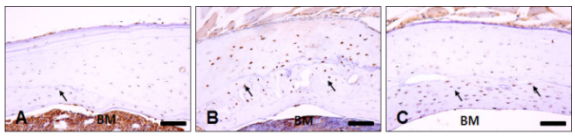


Figure 5. Effect of EC on oxidative stress in the femur. A, Control group; B, Aging group; C, Eucommiae Cortex group; BM, bone marrow; Arrow, positive reaction; Bar size, 50 μm.

Discussion

EC is an herbal medicine used to strengthen muscles and bones, and to stabilize fetuses [5]. Studies have already been accomplished on the effects of EC in bone. However, these studies have only been conducted in females, and the effect of EC on BMD on osteoporosis were reported, but there is no research on the mechanism.

In this study, we studied the effect and the mechanism of EC on male osteoporosis by using histochemical methods and DEXA, which is used as a representative bone mineral density assessment, in the femurs of aged male mice.

Bones are generally formed of dense bone of an outer layer and spongy bone of an inner layer. The dense bones are hard, thick, and placed where support is needed, such as the long bones or muscles of the legs. Bone continues to form and break down by the action of osteoblasts and osteoclasts, which make bones by forming osteoids, a mixture of collagen and other proteins to which enzymes and hydroxyapatite bind. Recent studies show that osteocalcin and osteonectin assist in the accumulation of calcified substrates. Osteoclasts are multinucleated cells that break down bones, releasing hydrogen ions from calcified substrates to dissolve crystals and secreting enzymes to break down bones [6-7]. At this time, a chemical called RANKL acts. RANKL is a factor that promotes the action of osteoclasts. It binds to RANK, a protein receptor on the surface of macrophage membranes, which induces macrophages to differentiate into osteoclasts and promotes bone resorption by inhibiting apoptosis. Thus, if only RANKL is present in the body, bone mass will continue to decrease as bone degradation and resorption are increased. However, bone mineral density, a measure of bone mass, remains constant in humans until an individual reaches their 50s. This is due to a factor that prevents osteoclasts from promoting bone resorption activity, called OPG. OPG binds to RANK first to prevent RANKL from binding to RANK receptors, thereby interfering with the action of RANKL. As such, osteoclasts break old bones down, and osteoblasts form new bones at the sites where they are degraded, and these events are controlled by OPG and RANKL [8-10].

First, as a result of DEXA test using X-ray absorptiometry, bone mineral density decreased by aging was increased by EC treatment, and decreased bone loss was also confirmed by X-ray test. In addition, the distribution of GAG, a polysaccharide contained in all connective tissues in the dense bone matrix of the femur, was increased by EC.

GAG restores cartilage damage by overcoming the load of articular cartilage, and has the effect of reducing pain and improving exercise capacity in patients with osteoarthritis [11]. Therefore, the results of the previous DEXA test and the present test results offer that EC improves male osteoporosis by reducing bone loss by aging and bone weakness.

Earlier, osteocalcin was mentioned as a substance that helps to accumulate calcified matrix in osteoblasts. OCN is known to be the most sensitive and specific marker for osteoblast activity. In other words, when osteoblast activity increases during bone remodeling, OCN levels in serum increase, which can be used as an indicator of bone formation, and OPN is known to enhance the adhesion and migration of cells involved in bone metabolism with bone tissue [12-13]. These positive

reactions of OPN and OCN were increased by EC, respectively. This means that EC improves osteoporosis in males by increasing osteoblast activity.

The results of this study showed that RANKL and MMP-3 positivity was decreased by EC treatment, and OPG positivity was increased. MMPs are important proteolytic enzymes involved in tissue destruction and tissue reorganization in various diseases such as chronic inflammatory disease, rheumatoid arthritis, skin disease, and cancer, among which MMP-3 regulates the activity of MMP-1 and degrades extracellular matrix [14-17]. In other words, it is thought that EC improves osteoporosis in males by suppressing osteoclast action, promoting osteoblast function, and reducing osteoclastic tissue degradation.

Finally, we examined the effect of EC on oxidative stress in bone. As one of the major products of DNA oxidation, 8-OHdG positivity [18], which is a measure of oxidative stress, was reduced upon administration of EC, suggesting that EC reduces oxidative stress in bone, thereby improving male osteoporosis.

These results suggest that EC reduces osteoclast-induced bone loss and weakening of bone matrix, inhibits osteoclast function, and promotes osteoblast function by increasing the production of OCN and OPN by osteoblasts, increasing OPG levels, decreasing RANKL and MMP-3 levels, and decreasing the degradation of bone tissue and oxidative stress in bone, thereby improving osteoporosis in males.

Conclusion

To study the effects of EC on osteoporosis in males, we extracted the femurs of aging male mice and conducted experiments using histochemical methods and DEXA, which is used as a representative bone mineral density test

EC reduces osteoclast-induced bone loss and weakening of bone matrix, inhibits osteoclast function, and promotes osteoblast function by increasing OCN and OPN production by osteoblasts, increasing OPG, and decreasing RANKL and MMP-3, and decreases the degradation of bone tissue and the oxidative stress in bone, thereby improving osteoporosis in males.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Association between Homeboundness and Depression in the Elderly Population According to Gender

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Abstract

Background/Objectives: According to the Korean National Statistics in 2017, suicide was ranked the 5th most common cause of death, and more than half of those who had committed suicide were 60 years of age or older. In this study we investigated the association of homeboundness and depression in the elderly population.

Methods/Statistical analysis: This study was conducted at the Korea National Institute of Health, using questionnaire data from personalized home-visit healthcare services to investigate the association of homeboundness and depression in the elderly according to gender. Data from 56,562 seniors 65 years of age or older who fully provided their answers regarding general characteristics, homeboundness, depression and regular exercise were ultimately selected for analysis in our study. SPSS ver. 18.0 program was used for all data analyses.

Findings: 1. Among subjects in the study, 13.3% were male and 16.2% were female homebound seniors. 2. In elderly males, mild depression was 1.882 times greater and severe depression was 2.919 times greater in homebound seniors compared to those who were not. In elderly females, mild depression was 1.556 times greater and severe depression was 2.540 times greater in homebound seniors compared to those who were not.

Improvements/Applications: Our study revealed a strong positive correlation between homeboundness and depression. Therefore, taking measures to prevent depression in homebound seniors is important, especially by promoting their social activities. Differences in gender with respect to homeboundness and depression should be taken into consideration when managing depression in these individuals.

Keywords: *elderly, homeboundness, depression, gender, Economic status*

Introduction

[3]According to the Korean National Statistics in 2017, suicide was ranked the 5th most common cause of death, and more than half of those who had committed suicide were 60 years of age or older [1]. Depression is known to be one of the leading causes of suicide [2]. In 2005, the Ministry of Health and Welfare reported that 80% of suicides in the elderly were due to depression [3].

Depressive disorders in the elderly can be treated in 60% of the cases, but they are often overlooked due to the lack of attention from seniors themselves as well as others around them[4]. Reportedly, depression is significantly less recognized than other chronic illnesses in the elderly 65 years of age or older [5]. This suggests that both public and individual awareness of depression is low, despite the fact that depression in the elderly increases the risk of suicide and ultimately the death rate.

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Homeboundness is a typical example of social isolation. Homeboundness is a state in which the boundaries of one's daily activities are confined to one's home, going outdoors less than once a week [6-7]. According to a study by Lee Su-ae and Lee Gyeong-mi [8], 23.6% of the elderly rarely went outdoors, and many of those homebound individuals suffered from depression [7-8]. A cohort study in Israel that followed-up homebound seniors for 5 years revealed a close association between homeboundness and depression, which can affect the death rate [9].

Homeboundness is an important issue when considering implementing future health policies, since homebound seniors are more susceptible to mental illnesses such as depression [10]. Studies from many countries classified different types of seclusion and analyzed factors affecting homeboundness[6,9-10], particularly the elderly population in Japan [11-14]. In Korea, however, although several studies have investigated the frequency of outdoor activities among the elderly in rural areas [8] and factors related to homeboundness among elderly women in local communities [7], studies that directly focus on the association between homeboundness and depression are lacking.

Since depression occurs in 4.3% of males and 9.1% of females (according to statistics in 2011) [6], gender differences need to be considered when investigating the association between homeboundness and depression.

In this study we investigated the association between homeboundness and depression in the elderly population according to gender using questionnaire data from personalized home-visit healthcare services in 2009, which was provided by the Korea Health Promotion Foundation (affiliated with the Ministry of Health and Welfare) and conducted by health centers across the country

Method

This study used questionnaire data from Gyeonggi-do's personalized home-visit healthcare services, which was conducted in order to provide healthcare service to residents in local communities. A total of 249,724 residents were provided with home-visit healthcare services from Gyeonggi-do health centers in 2009, of whom 108,203 were 65 years or older. Finally, data from 56,562 elderly people 65 years of age or older who fully provided answers regarding general characteristics, homeboundness, depression and regular exercise were selected for analysis in our study.

Any personal information included in the original data was removed, and the remaining information was provided by the Korea Health and Welfare Information Service (affiliated with the Ministry of Health and Welfare) and sanctioned by the Catholic University of Korea Institutional Review Board (MC12QIS10041).

General characteristics included gender, age, economic status, family type, smoking, drinking, regular exercise and subjective health. Regarding economic status, subjects in the near poverty group and recipients of government aid were classified as low-income.

Shinkai[13] defined "homeboundness" as answering "no" to the question "do you go outdoors at least once a week?" Since there is a question "do you go outdoors at least once a week?" among the 20 questions in the elderly assessment chart of personalized home-visit healthcare, individuals who answered "no" to this question were classified as "homebound" in accordance with Shinkai's definition.

To measure depression, we used the short form of the Geriatric Depression Scale, a 15-question scale that was simplified from the KGDS developed and standardized by GiBaek-seok[15]. On a scale from 0 to 15, a score of 0-4 was classified as normal, 5-9 as mild depression, and 10-15 as severe depression.

Result and Discussion

1. Characteristics of the subjects according to gender

Among 56,562 subjects 65 years of age or older, 15,389 (27.2%) were male and 41,173 (72.8%) were female.Homebound seniors consisted of 13.3% males and 16.2% females and the difference was statistically significant between the two genders ($p < .001$).

Among males, 33.8% had mild depression and 9.4% had severe depression; among females, 36.6% had mild depression and 10.9% had severe depression, differences that were statistically significant ($p < .001$) [Table 1].

2. Multiple regression analysis of risk factors for depression

In males, there was a significant association between mild depression and the following factors: economic status, family type, smoking, exercising, subjective

health and homeboundness. Mild depression was 1.882 times greater and severe depression was 2.919 times greater in homebound seniors (p< .001).

In females, there was a significant association between mild depression and the following factors: age, economic status, family type, smoking, drinking, exercising, subjective health and homeboundness. Mild depression was 1.566 times greater and severe depression was 2.540 times greater in homebound seniors (p< .001) [Table 3].

Discussion

This study used questionnaire data from personalized home-visit healthcare services to investigate the association between homeboundness and depression according to gender.

Depression was greater in homebound seniors. This correlates with Lee Jong-cheon's finding that living in seclusion without going outdoors has a significant effect on depression [16]. Shinkai et al. [12] also found that less outdoor activity leads to depression, and a study by Cohen-Mansfield et al. [9] revealed that homebound seniors are more susceptible to depression, and ultimately a higher death rate.

The effect of homeboundness on depression was found to be more significant in males than females, which is likely attributable to more socio-psychological factors that cause depression in females than in males. Additionally, since seniors who exercised at least once per week had less depression than those who did not, we think that promoting outdoor activity or exercising to homebound seniors at least once per week is important.

Table 1. Characteristics of the Subjects according to Gender

Variables	Categories	Male (%)	Female (%)	Total	χ2 or t	P
Age (yr)	65-74	3,617 (23.5)	8,314 (20.2)	11,931 (21.1)	180.304	< 0.001
	75-84	8,916 (57.9)	23,236 (56.4)	32,152 (56.8)		
	≥85	2,856 (18.6)	9,623 (23.4)	12,479 (22.1)		
	Mean ±SD	79.27 ±5.82	80.10 ±6.03	79.88 ±5.98	-14.980	< 0.001
Economicstatus	general	3,342 (21.7)	7,996 (19.4)	11,338 (20.0)	36.856	< 0.001
	low-income	12,047 (78.3)	33,177 (80.6)	45,224 (80.0)		
Family type	together	12,324 (80.1)	25,079 (60.9)	37,403 (66.1)	1838.225	< 0.001
	alone	3,065 (19.9)	16,094 (39.1)	19,159 (33.9)		
Smoking	no	5,051 (32.8)	37,093 (90.1)	42,144 (74.5)	19943.618	< 0.001
	yes	10,338 (67.2)	4,080 (9.9)	14,418 (25.5)		
Drinking	no	5,081 (33.0)	33,164 (80.5)	38.245 (67.6)	11557.653	< 0.001
	yes	10,308 (67.0)	8,009 (19.5)	18,317 (32.4)		
Regular exercise	no	6,993 (45.4)	23,362 (56.7)	30,355 (53.7)	575.202	< 0.001
	yes	8,396 (54.6)	17,811 (43.3)	26,207 (46.3)		
Subjective health	good	3,977 (25.8)	7,714 (18.7)	11,691 (20.7)	413.682	< 0.001
	average	7,558 (49.1)	20,677 (50.2)	28,235 (49.9)		
	poor	3,854 (25.0)	12,782 (31.0)	16,636 (29.4)		
Homeboundness	No	13,345 (86.7)	34,522 (83.8)	47,867 (84.6)	71.004	< 0.001
	Yes	2,044 (13.3)	6,651 (16.2)	8,695 (15.4)		
Depression	normal	8,740 (56.8)	20,949 (50.9)	29,689 (52.5)	163.004	< 0.001
	mild	5,201 (33.8)	15,518 (37.7)	20,719 (36.6)		
	severe	1,448 (9.4)	4,706 (11.4)	6,154 (10.9)		

Cont... **Table 2. Factors affecting depression according to gender**

Table 2. Factors affecting depression according to gender

Variables	Categories	Male				Female			
		Mild		Severe		Mild		Severe	
		OR	P	OR	P	OR	P	OR	P
age (yr)	65-74	1.00		1.00		1.00		1.00	
	75-84	1.005	0.917	0.972	0.722	1.082	0.007	0.955	0.328
	≥85	1.128	0.041	1.145	0.175	1.146	< 0.001	1.024	0.669
economic status	general	1.00		1.00		1.00		1.00	
	low-income	1.825	< 0.001	2.642	< 0.001	1.503	< 0.001	2.313	< 0.001
family type	together	1.00		1.00		1.00		1.00	
	alone	1.645	< 0.001	1.942	< 0.001	1.204	< 0.001	1.255	< 0.001
smoking	no	1.00		1.00		1.00		1.00	
	yes	1.254	< 0.001	1.399	< 0.001	1.223	< 0.001	1.579	< 0.001
drinking	no	1.00		1.00		1.00		1.00	
	yes	1.001	0.984	1.170	0.035	1.087	0.004	1.213	< 0.001
regular exercise	no	1.00		1.00		1.00		1.00	
	yes	0.649	< 0.001	0.608	< 0.001	0.695	< 0.001	0.585	< 0.001
subjective health	good	1.00		1.00		1.00		1.00	
	average	1.966	< 0.001	2.485	< 0.001	1.966	< 0.001	2.425	< 0.001
	poor	4.784	< 0.001	13.226	< 0.001	4.062	< 0.001	10.241	< 0.001
homeboundness	no	1.00		1.00		1.00		1.00	
	yes	1.882	< 0.001	2.919	< 0.001	1.566	< 0.001	2.540	< 0.001

In this study, in males, 33.8% had mild depression and 9.4% had severe depression, while in females. Overall, the depression scores were higher in females than in males. In a study, which investigated depression in the elderly using meta-analysis [8], a study whose subjects were both low and middle income seniors [17], and a study which observed seniors living in local communities, depression in females was always found to be greater than in males [16]. Likewise, a study whose subjects included seniors from rural areas [8], and a study who analyzed low-income seniors in local communities also revealed the same trend, elderly females displayed more cases of mild and severe depression than elderly males [18].

Additionally, the percentage of homebound seniors was 13.3% in males and 16.2% in females. In several studies, the percentage of homebound seniors was found to be higher in females than in males. In an American study, the percentages of homebound senior males and females were 3.9% and 14.7%, respectively [19], while a Japanese study reported 21.4% and 44.3%, respectively [11]. An Israeli study revealed the same trend [20]. Reportedly, old age, a low level of education and low income are associated with a higher rate of homeboundness[9], which could explain why there are more homebound female seniors than male seniors in Korea. Additionally, according to a study, encouraging any senior who can walk at least 5 meters by him/herself to participate in some type of activity is important [10]. This is a noteworthy point from a sociopsychological perspective, considering approximately 20% of such physically capable seniors are homebound. Therefore, we believe promoting social activity in seniors who are capable of walking at least 5 meters by themselves is important.

Other than homeboundness, factors such as old age, low income, living alone, smoking, drinking, exercising less than once a week and poor subjective health were shown to affect both mild and severe depression. In particular, severe depression was 13.226 times greater

in males with poor subjective health, and 10.241 times greater in females with poor subjective health, indicating a need for measures to promote subjective health in such individuals. Since many homebound seniors suffer from depression, we think emotional support is necessary to improve subjective health in the elderly who are physically incapable of outdoor activities.

The effect of homeboundness on mental health is an important consideration when implementing future health policies, since homebound seniors are more susceptible to mental illnesses such as depression [9,12,16]; an extensive study regarding this issue has yet to be conducted.

Based on the results of this study, we advise the following: First, since there is a significant association between homeboundness and depression, promoting social activity in homebound seniors by encouraging them to go outdoors at least once per week is important. Second, since homeboundness and depression were more prevalent in elderly females than in elderly males, such differences in gender should be taken into consideration while managing depression in these individuals. Third, preventative measures should be implemented for seniors who are at high risk of depression (e.g. living alone, low-income, or homebound).

Conclusion

The influence of homebound is very important, because homebound and mental problem showed a positive correlation. Our study showed a significant association between homeboundness and depression in the elderly 65 years of age or older. Preventing depression in homebound seniors is also important, specifically by promoting their social activities. Additionally, gender differences concerning homeboundness and depression should be considered when managing depression in these individuals.

Ethical Clearance: Not required

Source of Funding: Nil

Conflict of Interest: Nil

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The Study for Reform of the Korean Care Helpers National Licensing Examination

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Abstract

Background/Objectives: This study aims to propose subject reforms to the NLE for care helpers by including 'Support for Cognitively Stimulating Activities' for long-term care dementia beneficiaries as added work detail.

Methods/Statistical analysis: This study was carried out from August 1, 2016 to August 31, 2017. Study methods first deduced the operational status and problems of the current National Licensing Exam for caregivers. Second, focus group interviews and work detail analyses were conducted on a group of caregivers regarding the newly added service. Third, reforms regarding the subjects of the NLE were developed through public hearings and expert consultations.

Findings: : In July 2016, a system for long-term care institutions exclusively caring for dementia was introduced and the standard services of long-term care included 'Cognitively Stimulating Activities (CTA)' for home visited care among the standard services of long-term care. In doing so, 'Support for Cognitively Stimulating Activities (SCTA)' was added as a work detail for long-term care beneficiaries. Considering this, standard textbooks must be amended accordingly and additional content regarding the newly announced work detail of 'CTA' must be included in the curriculum.

Second, the results of analyzing the work detail regarding 'SCTA' upon surveying 245 caregivers uncovered implementation frequency, importance and acceptance-levels to be on average 3.22/5 points, 3.64/5 points and 2.32/3 points respectively. This reflects a positive level of 'importance' and 'acceptance' on the part of caregivers regarding the 'SCTA' work detail even under limiting circumstances whereby services are only being provided by caregivers who have completed professional training on dementia. In light of these findings, content on 'SCTA' must be included in the licensing examination for caregivers.

Improvements/Applications: First, the standard curriculum for care helpers must be revised. Second, the common standard textbook should be amended. Third, the Welfare of Older Persons Act should be amended.

Keywords: *Health Personnel, Certification, Aged, Long-Term Care, Care*

Introduction

The NLE for Care helpers was first implemented in August 2010 and studies on the work details of care helpers began to be undertaken to determine the basis by which the evaluation criteria of qualifications for the examination would be established [1]. As a result of this, the work detail of a care helper was categorized into 6 missions, 18 domains and work categories, and 64 work elements. Based on this, efforts were made to develop exam questions that consider these specifications regarding the work detail of a care helper.

[4]In addition, in 2013, studies were undertaken to review whether the subjects and questions found within the NLE for care helpers could be considered an

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acceptable means of measuring the necessary skills to implement work detail associated tasks on a practical level [2,3]. In light of this, the standards and bases for the NLE for care helpers were identified to secure appropriate levels of feasibility and thus the examination was administered a total of 22 times by July 2017[4].

The elderly population subject to receive long-term care was 6,995,652 in December 2016 out of a total population of 51,696,216, which constitutes 13.53% of the total population [5]. The prevalence of dementia among the elderly population was 9.8% of the total or 648 thousand individuals in 2015. This proportion is expected to rise to 10.4% or 840 thousand individuals by 2020 and 15.1% or 2.71 million individuals by 2050 [6]. According to a Regulatory Impact Analysis Report regarding the pre-announced legislation of a Partial Amendment (proposed) of the Enforcement Rule of the Welfare of Older Persons Act by the Ministry of Health and Welfare [7], approximately 50% of all long-term care beneficiaries as classified by the Long-Term Care Insurance System present symptoms of dementia and approximately 65.8% of elderly users of day-care facilities and 76.5% of day and nighttime care facilities present symptoms of dementia [8].

As part of a National Political Task in response to this rapid climb in dementia patients, a Fifth Long-Term Care Grade (special grade for dementia) was established for dementia patients [9].

The success of this system that entailed dementia exclusive treatment facilities beginning in July 2016, depends on the establishment of programs that train specialized personnel and provide appropriate services designed to lower the rate of cognitive decline [10].The training of specialized personnel capable of providing care for dementia patients is one of the most important factors that determine the quality of provided services [11].

However, despite 8 years having past since the implementation of the Long-Term Care Insurance System, there still is an extreme lack of specialized personnel capable of providing care for dementia patients and this has raised a need to establish short and long term solutions to address this issue.

In order for the NLE for care helpers to include appropriate subjects and questions that are capable of measuring the ability of a care helper to provide care on a practical level, there is a need to reinvestigate the work details of care helpers as they are actually being applied in practice. In light of this, amidst a rapidly changing environment, changes to the work details of care helpers must be analyzed and the NLE for care helpers must also be reviewed as to whether the work details of a care helper are adequately being evaluated within the examination. This in turn should lead to the proposal regarding the means of implementing amendments to the subjects found within the NLE as adequately reflecting the work details of a care helper.

Method

To identify the operational status and problems associated with the NLE and training curriculums for care helpers, this study undertook a literature review in addition to receiving expert consultations.

From the perspective of each phase, first, the necessity of reforms regarding the current NLE for care helpers was investigated. Second, the operational status and problems associated with the NLE for care helpers were identified through literature reviews and expert consultations. Third, a work detail analysis was run in regards to the changes made to the work details of care helpers. Fourth, reforms (proposed) of the licensing examination subjects that reflected the amended care helper work details were developed. Fifth, opinions were collected and organized through public hearings and consultative meetings with experts. Sixth, the means of implementing the finalized NLE for care helpers was developed.

To analyze the work details of long-term care beneficiaries support services for care helpers, the number of long-term care facilities, daytime care facilities and home care services available by each region - Seoul/Gyeonggi-do, Daejeon/Chungcheong-do and Gyeongsang-do - were taken into account to collect proportionate samples in which 100 samples each were collected from each of the three regional groups. Excluding inappropriate responses from 55 respondents, the study included a total of 245 survey results.

The research tools used in this study consisted of general features of the subjects and the work details of care helpers. Survey questions on general features included questions on gender, age, level of education and place of work. Survey questions on care helper work details included the 5 Cognitive Stimulation Activity related work details including preparations for the cognitive stimulation program, implementation of the cognitive

stimulation program, organization of items, evaluations and recording in which implementation frequency (5points), importance (5 points), and acceptance levels (3 points) were surveyed. The Cronbach's α of the survey results was calculated as being .946.

Data collection was undertaken between March 20 and April 28 in 2017. The purpose and subject of research and the method of research were delivered through an official notice to the concerned institutions and those institutions that expressed the intent to cooperate were selected. Upon doing so, a survey study agent handling each region who had been trained regarding the survey guidelines and items of caution visited the institution and distributed the surveys, which were then directly filled out by the participants themselves.

The collected data was statistically processed using SPSS 20.0 and was analyzed using descriptive statistics. More specifically, the general features of the subjects were analyzed with respect to frequency and percentages while the implementation frequency, importance and acceptance levels of the Cognitive Stimulation Activity of the care helpers were analyzed via averages and standard deviations.

Result and Discussion

First, the necessity of reforms regarding the current National Licensing Examination for care helpers was investigated. Considering that the work detail regarding SCSA was added following the work detail analysis of care helpers in 2010 there exist a need to add content regarding the Cognitive Stimulation Activity that was added as a work detail in the training curriculum prior to amending the standard textbook. There should also be questions regarding this work detail as a subject in the NLE. Second, a work detail analysis of the 'SCSA' was undertaken using care helpers as the subjects.

[Table 1] presents the results of the surveys. The survey results of the general characteristics indicated that women accounted for 98.8% of the respondents and that the age group between 50 and 59 was the largest at 48.1%. The largest group in terms offinal education was found to be middle school graduates or lower at 39.0%. The second largest group was found to be high school graduates at 38.6% and those with a vocational degree or higher were found to constitute 22.4%. In terms of the types of institutions, the percentage of subjects handling home care services working from a visited care center was 62.0%. The next highest percentage of subjects were those working in long term care facilities at 27.8% and daytime care facilities at 10.2%.

Table 1.General Features of the Subjects

(N=245, excluded empty responses)

Variables	Categories	N(%)
Gender	Female	242(98.8)
	Male	3(1.2)
Age (years)	≤ 70	7(3.0)
	60~69	68(28.9)
	50~59	113(48.1)
	40~49	38(16.2)
	≥ 39	9(3.8)
Final education	Vocational School or Higher	53(22.4)
	High school	91(38.6)
	Middle school or lower	92(39.0)
Institution Type	Long-term Care Facility	68(27.8)
	Visited Care Services	152(62.0)
	Daytime Care Services	25(10.2)

[Table 2] presents the results of the surveys. The implementation frequency of the Cognitive Stimulation Activity work detail for long-term care beneficiaries surveyed on a five-point scale presented an average of 3.22 points, which indicated, such activities to have been implemented at a 'more than average' level. The importance of the work detail analyzed on a five point scale presented an average of 3.64 points, which indicated, the work detail to be considered as being 'important.' The results of analyzing work detail acceptance levels on a 3 point scale presented an average of 2.32, which indicated a 'positive level of acceptance'. The care helper survey results indicated a high level of importance and acceptance of the services to support Cognitive Stimulation Activity. Considering this, it is recommended that content regarding such services become included in the licensing examination for care helpers.

Table 2. Long-Term Care Beneficiary Cognitive Stimulation Activity Support Work Detail

Implementation Frequency, Importance and Acceptance Level

Work	Element(s)	Implementation Frequency		Importance		Level of Acceptance	
		Mean	SD	Mean	SD	Mean	SD
Preparation of Cognitive Stimulation Program	Planning of Cognitive Stimulation Program	2.93	1.37	3.62	1.26	2.16	0.69
	Preparation of Textbook and Tool	2.91	1.37	3.58	1.24	2.17	0.72
Implementation of Cognitive Stimulation Program	Cognitive Training Workbook Activities	3.07	1.43	3.66	1.23	2.33	0.70
	Art Activities	3.07	1.41	3.67	1.25	2.32	0.70
	Recollection Activities	3.33	1.34	3.71	1.18	2.40	0.73
	Hand Exercises	3.48	1.29	3.74	1.89	2.45	0.70
	Cerebral Stimulation Activities Using Cognition Cards	3.07	1.44	3.61	1.23	2.32	0.76
	Diary Writing	2.58	1.40	3.11	1.33	2.09	0.76
	Sound Recognition Training	3.00	1.44	3.42	1.23	2.33	0.75
	Physical Activities	3.69	1.26	3.85	1.12	2.50	0.67
	Music Activities	3.24	1.49	3.60	1.29	2.32	0.74
	Daily Inspection Activities	3.49	1.47	3.74	1.23	2.44	0.69
Item Organization	Organization of Stationaries	3.58	1.37	3.76	1.21	2.38	0.71
Evaluation	Evaluation of Cognition Training Tool Application Effects	3.00	1.38	3.52	1.24	2.19	0.74
Record Keeping	Record of Provision of Long-Term Care Benefits	3.80	1.36	3.93	1.20	2.46	0.67
Total		3.22	1.39	3.64	1.28	2.32	0.72

Lastly, a means of implementing reforms on subjects included within the NLE for care helpers was developed. First, a standard by which examination questions can be centered on the work detail of a care helper was established. Through the analysis of work details and review activities undertaken above, the 'Cognitive Stimulation Activity Program' was found to be lacking in terms of its level of implementation during the activities of care helpers that provide care services to elderly individuals suffering from dementia. There were no content that dealt with such a work detail within the training curriculum for care helpers or the criteria through which the National examination questions were developed. This indicated a need for the training curriculum of care helpers to be amended and that the standard by which the NLE questions were developed also needed to be amended.

Discussion

When examining the development standards regarding the development of questions for the practical skills test subjects of the current NLE for Care helpers, the examination includes sections on specialized care safety techniques, a specific domain on 'cognitive stimulation' in the dementia care domain and a question on 'cognitive stimulation activity.' Despite this, this question has never actually been used in an actual test. Based on the results of this study, a question on 'Cognitive Stimulation Activity' must be developed and applied to verify the work detail skills of care helpers.

The questions should be developed especially with respect to the 10 cognitive stimulation programs currently under development by the Ministry of Health and Welfare and provided to long-term care beneficiaries through the National Health Insurance Corporation, which include cognitive training workbook activities, art activities, recollection activities, hand exercises, diary writing, sound recognition training, physical activities, musical activities, daily routine scheduling activities.

Conclusion

When examining the development standards regarding the development of questions for the practical skills test subjects of the current NLE for Care helpers, the examination includes sections on specialized care safety techniques, a specific domain on 'cognitive stimulation' in the dementia care domain and a question on 'cognitive stimulation activity.' Despite this, this question has never actually been used in an actual test. Based on the results of this study, a question on 'Cognitive Stimulation Activity' must be developed and applied to verify the work detail skills of care helpers.

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Ethical Clearance: Not required

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Conflict of Interest: Nil

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The Effect of Health Behavior, Depression and Stress on Metabolic Syndrome in Korean Adults

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Abstract

Background/Objectives:The prevalence of the metabolic syndrome is growing. The risk of developing cardio-cerebrovascular diseases is accelerated by metabolic syndrome. This research was to identify the determinants of the metabolic syndrome of Korean adults.

Methods/Statistical analysis: Data from the 7th Korean National Health Examination Survey (VII-1, 2016) was used to analyze 3,377 adults aged 19 to 64 years. The data were analyzed using complex sample analysis that considered stratification, clustering of variables and sampling weights using SPSS/WIN 22.0.

Findings: 32.0% of male and 18.5% of female were affected by metabolic syndrome. The factors related to the metabolic syndrome of both sexes were smoking status, frequency of having breakfast per week, age, body mass index (BMI). The frequency of binge drinking was related to the metabolic syndrome in male and psychological health such as stress and depression were not connected with the metabolic syndrome of Korean adults of both sexes.

Improvements/Applications:It needs to strengthen their right lifestyle to reduce the developing metabolic syndrome in Korean adults. It is required to identify gender differences between psychological health and metabolic syndrome.

Keywords: *Korean adult, Health behavior, Psychological health, Metabolic syndrome, KNHANES*

Introduction

Metabolic syndrome(MS) is closely related to the risk of cardiovascular disease. It raises 2 times of developing cardiovascular disease and 1.5 times of mortality[1]. Prevalence of MS was 20.3% of adults aged 19 and older, 27% of aged 30 and over, 37.7% of the elder over 65 in Korea [2]. Prevalence of MS corresponding to the increasing population of the elderly is steadily going to rise and early detection and management are of vital importance for the treatment of MS [3].

The cause of MS was not to identifyclearly but it was reported that genetic factors such as insulin resistance, socioeconomic and environmental factors interact with each other [4]. Lifestyle such as smoking, drinking, and exercise was one of the important factors related to MS. Smoking raises the levels of triglyceride and LDL cholesterol and it can increase the risk of cardiovascular disease [5]. Excessive drinking causes abdominal obese and elevation of blood pressure,[6] regular exercise reduces the risk factors of MS [7].

Recently, it was reported that psychological factors such as stress and depression are related to MS,[3,7]they lead to increasing the risk of MS, which get the worse a lifestyle of patients with the MS. Stress can increase the levels of blood pressure, blood sugar and triglyceride like components of MS and generate abdominal obese and insulin resistance [8]. Depression causes a rise in stress hormones and weight gain by lower physical activity and it is bound up with abdominal obese [7]. The prevalence of MS was high in person with symptoms and history of depression [3].

Until now, a lot of studies have been conducted about MS, most of the researches were related to the lifestyle of adults. While there are still many insufficient

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studies about the influence of psychological health on MS. Thus, the purpose of this research is to investigate the effects of lifestyle, depression, and stress on MS of Korean adults of both sexes,and to provide basic data for preventing metabolic syndrome of Korean adults.[5]

Method

Participants consisted of 3,377 Korean adults, 39.9%(n=1,348) in males and 60.1%(n=2,029) in females aged between 19-64 years old. Data from the 7th Korean National Health Examination Survey (VII-1, 2016)[9] were used.

Health behavior was assessed using smoking status, frequency of drinking and binge drinking, moderate exercise, frequency of breakfast per week, BMI, menopausal status.

Psychological health was measured as depression and stress. The Patient Health Questionnaire-9,[10] which consists of 9 items with a 4-point measure was used to evaluate depression. Stress was evaluated as 4 points scale of one item, "How much do you usually have feeling stress in daily life?"

Metabolic syndrome has used the standards recommended by abdominal obesity in Korea [11] and National Cholesterol Education Program-Adult Treatment Panel III (NCEP-ATP III) [12]. Metabolic syndrome was classified if it was more than 3 of the 5 components, including pharmacologic treatment

To analyze the data, complex sample analysis that considered stratification, clustering of variables and sampling weights was conducted using SPSS/WIN 22.0. The factors related to MS according to gender was conducted by Multiple logistic regression analysis.

Result

1. General characteristics of non-MS group and MS group

in male, age (x^2=132.18, p<.001), educational level (x^2=20.66, p<.001) marital status (x^2=44.56, p<.001), economic activity (x^2=9.19, p<.05), were significant differences in MS. In female, age (x^2=214.68, p<.001), economic status (x^2=17.06, p<.01), educational level (x^2=121.94, p<.001), marital status (x^2= 96.27, p<.001), menopausal status (x^2=148.22, p<.001), were significant differences in MS.

2. Health behaviors and psychological health of non-MS group and MS group

BMI (t=-3.45, p<.001), smoking status (x^2=8.84, p<.05), drinking frequency (x^2=22.18, p<.001), the frequency of binge drinking (x^2=31.10, p<.001)were significant differences in MS of male. In female, BMI (t=-4.57, p<.001), smoking status (x^2=11.01, p<.01), drinking frequency (x^2=14.14, p<.01), frequency of breakfast per week (x^2=16.12, p<.01) and menopause (x^2=148.22, p<.001)were significant differences in MS.

There was no significant difference between depression, stress and MS of both sexes.

3. Factors associated with MS

As described in table 1, smoking status (OR: 1.640, male/ OR: 2.591, female) frequency of breakfast per week (OR: .471, male/ OR: .542, female), age (OR: 1.114, male/ OR: 1.065, female), BMI (OR: 1.471, male/ OR: 1.466, female) were significant factors related to the MS. The frequency of binge drinking (OR: .442-.466) was related to the MS of male. MS of Korean adults was not connected with stress and depression.

Table 1. Multiple logistic regression analysis of factors associated with Metabolic Syndrome

Variables	Categories	Male						Female					
		B B	S.E S.E	p p	Exp(B) Exp(B)	95%CI		B B	S.E S.E	p p	Exp(B) Exp(B)	95%CI	
						Low	High					Low	High
Smoking	Current smoker	.495	.206	.018	1.640	1.092	2.465	.952	.396	.017	2.591	1.186	5.659
	Ex-smoker, Non-smoker	.000			1.000			.000			1.000		

Cont... **Table 1. Multiple logistic regression analysis of factors associated with Metabolic Syndrome**

Binge drinking	Never or < once a month	-.763	.314	.016	.466	.251	.867						
	Once a month	-.817	.306	.008	.442	.242	.807						
	Once a week	-.362	.272	.185	.696	.407	1.191						
	Almost every day	.000			1.000								
Frequency of breakfast (times/week)	5-7	-.753	.257	.004	.471	.284	.781	-.379	.271	.163	.684	.401	1.168
	1-4	-.368	.269	.173	.692	.407	1.177	-.613	.297	.041	.542	.301	.974
	0	.000			1.000			.000			1.000		
BMI (kg/m2)		.386	.038	p<.001	1.471	1.366	1.584	.383	.032	p<.001	1.466	1.377	1.561
Menopause	No							.048	.319	.880	1.049	.559	1.970
	Yes							.000			1.000		
Age		.108	.012	p<.001	1.114	1.089	1.139	.063	.018	p<.001	1.065	1.029	1.103
Depression		-.033	.035	.345	.968	.904	1.036	.026	.025	.290	1.027	.977	1.079
Stress	Low	-.224	.223	.317	.799	.514	1.243	.295	.251	.242	1.344	.818	2.207
	High	.000			1.000			.000			1.000		

Discussion

In this study, 32.0%(n=453) of male and 18.5% (n=409) of female had a MS. Study of Kim [13] on Korean workers aged between 30 and 64 used the same data (KNHANES VII-1, 2016) and the same classification criterion of MS reported that 37.3% of male and 21.0% of female. Compared with this study, the prevalence of MS was a bit lower in the present study. When considering the participants aged 20 and over, regardless of their work in the present research, the prevalence of MS for Korean adults showed a similar result. The prevalence of MS is reported in various ways according to classification criteria of MS and statistical analysis, it needs to unify a classification criterion of MS and apply the correct statistical analysis to get precise results of prevalence of MS.

The present study demonstrated that compared to the former smokers and non-smokers, current smokers were 1.64 times of male, 2.59 times of female more likely to develop MS. It coincided with the results of Bermudez et al. [14] which reported that current smokers were higher the chances of developing MS both males and females than non-smokersand current male smokers were much higher development of MS than former male smokers[15] and former smokers were not at high risk of MS compared to non-smokers [14]. Smoking is a global health issue and it is emerging as the main causes of various diseases and death. It requires to promote stop smoking to prevent the development of the MS.

The frequency of breakfast was identified as a significant factor related to MS in this study. The probability of getting MS is 2.3 times higher in men who do not eat breakfast than men who eat breakfast of 5-7 days per week, and 1.84 times in women than having breakfast of 1-4 days per week. This finding is in line with Odegaard et al. [16] that young adults, who eat breakfast daily and 4-5 days per week are less likely to have abdominal obesity, MS, and type 2 diabetes compared to

those who eat breakfast 0-3 days per week. The earlier studies [16-17] showed that the number of breakfast and habitually not eating breakfast were associated with sugar control problem, obesity and MS. Recently, daily breakfast consumption reduced gradually due to the busy life of today. It needs to emphasize the importance of having breakfast.

In this study, the more BMI increases, the more dangerous both sexes develop into MS.It is consistent with the studies that overweight or obese adult men and women were more vulnerable to MS than underweight or normal weight[18] and BMI is a predictor of MS of all ages, and those with BMI above 25 were more likely to have MS than those with BMI below 25[19]. Westernized eating habits are increasing the obesity population and obesity affects components of MS. It has been confirmed that maintaining the proper weight is important to prevent MS.

This study has shown age was a significant risk factor related to MS. This is in line with report [18] that both male and female were more likely to develop MS as their age increase. But, Lim et al. [20] indicated that MS increases dramatically after menopause in their 50s for women, while it increases consistently with age, and decreases slightly after 60s for men. One in three elderly people aged 65 or older contracts the MS,[2] and taking the growing elderly population into account, the likelihood of developing MS is expected to increase. Therefore, it is necessary to develop a strategy of long-term aspect for preventing MS and to reassess the possibility of MS by gender according to age.

This study found that men who had a daily binge drinking or 1 time per month were more likely to have MS than men who did not binge. Lee [21] reported that the MS of men was associated with frequency of excessive drinking. However, Santos et al [22] found that the prevalence of MS of male and female was not linked to alcohol consumption, or a proper amount of alcohol consumption may reduce the progression of MS of both sexes[23]. This discrepancy may be attributed to drinking pattern, drinking behavior among both sexes and drinking culture between countries.

The stress of this study was not a meaningful variable related to MS in both genders. It is not corresponding to an earlier study [24] which reported that psychological social stress of men and women affects the likelihood of progressing MS. In the present study, stress was measured with one question as the degree of stress in daily life. It is required to evaluate the development of MS related to a specific kind of stresses

The current study found that depression was not a significant factor for MS in adult men and women. But Akbaraly et al [25] suggested the symptoms of depression in both sexes were predicted by MS. The higher the score of depression symptoms in women, the higher the severity of the MS [26] and MS among urban Japanese men was linked with depression [27]. The relationship between depression and MS by gender was not consistent.

Conclusion

This study demonstrates that smoking, skipping breakfast, overweight and heavy drinking were risk factors for metabolic syndrome among Korean adults. Therefore, more attention should be paid to promote a lifestyle to prevent metabolic syndrome for adults. Also, it needs to continually identify gender differences between psychological health including stress and depression, and metabolic syndrome.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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A Prediction Model of Suicidal Ideation among Male Elderly Living Alone in Korea

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Abstract

Background: The rate of suicide has been of great concern in Korean society and is more problematic among elders living alone. Knowing the gender difference, the present study investigated factors influencing suicidal ideation among male elders living alone.

Method: A cross-sectional study was conducted using data on 2,295 male elders living alone from the Community Health Survey in 2013. Pearson's correlation analysis and path analysis were conducted using SPSS 25.0 and Amos 25.0.

Findings: Most variables showed statistically significant but week correlation with suicidal ideation. In the path model, examined factors explained 43.1% of suicidal ideation, 48.3% of psychological distress, and 53.2% of physical health. Psychological distress was the only factor with a statistically significant influence on suicidal ideation.

Conclusion: The present study revealed the importance of socioeconomic status among male elders and psychological distress had the biggest impact on suicidal ideation. Well-designed interventions to reduce psychological distress with effort to incorporate gender-specific factors may alleviate the risk of suicidal ideation among male elders living alone.

Keywords: *Elderly, Living alone, Prediction model, Community, Suicidal Ideation*

Introduction

Suicide is a serious concern in South Korea with the highest suicide rate among Organisation for Economic Co-operation and Development (OECD) countries. The problem is growing in that suicide was ranked the eighth leading cause of death in 2001, fourth in 2013, and fifth in 2015[1].Recently, Koreans have made efforts to reduce suicide rates. Since 2004, suicide prevention efforts have aligned with one of the seven mental health policies of the National Mental Health Plan in Korea[2]. In addition, in 2011, The Korean government adopted the Act for the Prevention of Suicide and the Creation of Culture of Respect for Life[2].

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Despites efforts, suicide has been become a serious issue, especially in the elderly population. Advancements in medicine have extended the life expectancy of human; however, this longevity has generated problems in other parts of society, including higher levels of depression, social isolation, and solitary death among older adults[3]. The aging population is viewed as a major contributor to this increased prevalence of suicide, which was a rather unique phenomenon in Korea compared with countries belonging to the OECD[4].

In addition to an extended lifetime, changing household types caused several problems including a rapid increase in the number of elders who live alone. In Korean culture in the past, siblings, mostly the first son, had responsibility to care for parents' later life[5]. The culture has now shifted and support from the family has gradually weakened; however, social benefits provided by the governments are insufficient to meet the needs of

elders. According to the interpersonal theory of suicide, suicidal ideation stems from thwarted belongingness, which can be explained as the perceived lack of social support and isolation due to the absence of a social network[6].

Gender differences exist in that female elders are more likely to self-report having suicidal ideation than male elders[7]. Moreover, female elders have a greater likelihood of participating in suicide-prevention programs, benefit from being a member of a social group, counseling, and health services[8]. In contrast, male elders are less likely to express their ideation of suicide and seek help and also pose a greater risk of actually attempting suicide[9]. These gender differences suggest the need for the investigation of factors affecting male elders' risk of suicide, especially among those live alone. Thus, tailored and distinctive interventions are needed for male elders living alone who live in poor surroundings with tenuous and fragile social networks, in contrast to those who live with their family[10].

Seeking ways to control the incidence of suicide is critical in Korea, as one of the world's fastest aging countries. It is essential to address suicide with male-specific factors. Comprehensive understanding of mechanisms leading to a high risk of suicide would help in identifying individuals or groups, attenuating the risk in this important phase of life and developing a safe environment in this aging society.

Method

Participants

This study is a secondary data analysis of data derived from the Korean Community Health Survey (KCHS). KCHS is a nationwide survey conducted by the Korean Center for Disease Control and Prevention. The survey has been conducted annually using computer-assisted personal interviewing methods with trained research assistants. In this study, data were obtained from the 2013 KCHS, including a total of 228,781 individuals aged ≥ 19; in the present analysis, I used data from 2,076 male elders living alone.

Variables

The dependent variable for risk of suicide was suicidal ideation. Suicidal ideation (yes, no) was defined as events when individuals had thoughts of committing suicide in the past year. Socioeconomic-status variables were education (uneducated, elementary school or more, middle school or more, high school or more, college or more), receipt of basic social security (non-, past, and present receiver), and private insurance (yes, no). Social environment variables were social environmental satisfaction (satisfied with seven factors including neighbors, neighborhood, surrounding nature, living environment, public transportation system, and medical services; not satisfied with any factor, 0 points ~ satisfied with all factors, 7 points) and social contact (frequency of social contact during the last 1 week). Physical and oral health (very healthy, 5 points ~ very unhealthy; 1 point) were defined as perceived level of physical and oral health. Psychological distress was level of stress (very high level of stress, 4 points ~ very low level of stress, 1 point) and depression (yes, no).

Statistical data-analysis

The Statistical Package for Social Science (SPSS, version 25) and Amos (version 24) were used for statistical data analysis. To examine differences between elders with and without suicidal ideation, I used t-tests and chi-square tests. There were two phases of data analysis in this study. In the first stage, to test the relationship among the variables, Pearson's correlation coefficient analysis was calculated for all variables. The structure of the model was confirmed through adoption of structural equation modeling and the model's goodness of fit was evaluated using fit indices including chi-square statistics, the good fitness index (GFI), the comparative fit index (CFI) and the root mean square error of approximation (RMSEA). A model was considered to have good fit at the level of 0.9 and above for CFI and GFI, and below .08 for RMSEA in this study.

Result

1. General characteristics of study participants

The general characteristics of male elders living alone who participated in this study appears in [Table 1]. The majority were undereducated with 11.7% uneducated; their mean age was 74.2 years old. Approximately 21.0% had suicidal ideation and 9.6% had depressive symptoms. Using a 5-point Likert-type scale, the mean scores of perceived level of stress and physical health were 2.7 and 1.9 respectively.

Table 1. General characteristics of study participants

Variables	Categories/ Range	N	%	M±SD
Education	Uneducated	268	11.7	
	Elementary school	879	38.3	
	Middle school	395	17.2	
	High school	483	21.0	
	College and above	270	11.8	
Receiving basicliving security	Yes	313	13.6	
	In the past	48	2.0	
	No	1934	84.3	
Private insurance	No	1834	80.0	
	Yes	461	20.1	
Suicidal Ideation	No	1812	79.0	
	Yes	483	21.0	
Depression	No	2074	90.3	
	Yes	221	9.6	
Age				74.2± 6.5
Social Contact	1-18			11.0± 4.0
Environmental Satisfaction	0-7			5.3 ± 1.7
Oral Health	1-5			2.2 ± 1.0
Physical health	1-5			2.7 ± 1.0
Stress	1-4			1.9 ± 0.8

2. Correlation matrix

The relationships among study variables were examined using Pearson's correlation analysis [Table 2]. All examined variables showed statistically significant correlations with suicidal ideation ($p < .01$).

3. Path analysis model

A path model was developed to test a hypothetical association with suicidal ideation. The fit indices of the path model [Figure 1] were GFI = .897 CFI = .999, AGFI = .959, NFI = .886 and RMSEA = .057. The fitness of the model was examined using fit indices with values shown in [Table 3]. The path model accounted for 48.3% of psychological distress, 53.2% of physical health, and 43.1% of suicidal ideation. In the path analysis, psychological health mediated the effect of social support and socioeconomic status on suicidal ideation. For physical health, socioeconomic status showed a statistically significant effect (direct effect = .707, total effect =.707). Social environment (direct effect = -246, total effect =-.302) and physical health (direct effect =

-.836, total effect =-.836) had a statistically significant affect for psychological distress. Only psychological health had statistically significant effects on suicidal ideation (direct effect = .754, total effect =.754).

Table 2. Correlations among study variables

Variables	1	2	3	4	5	6	7	8	9	10
1. Education	1									
2.Receivingbasic livingsecurity	.069**	1								
3. Insurance	.200*	.126**	1							
4. Environment Satisfaction	-.083**	.100**	-.015	1						
5. Social Contact	-.009	.215**	.101**	.301**	1					
6. Physical health	.189**	.142**	.158**	.086**	.120**	1				
7. Oral health	.164**	.134**	.116**	.062**	.086**	.297**	1			
8. Stress	-.052*	-.119**	-.036	-.155**	-.117**	-.272**	-.147**	1		
9. Depression	-.004	-.118**	.002	-.089**	-.104**	-.139**	-.121**	.273**	1	
10. Suicidal Ideation	-.089**	-.118**	-.060**	-.089**	-.138**	-.227**	-.159**	.318**	.350**	1

Table 3. Effects of variables in the conceptual model

Variables	Categories	C.R	P	SMC	Direct effect	Indirect effect	Total effect
Physical Health	Socio Economic Status	7.15	<.001	.532	.707	.000	.707
	Social Environment	1.22	.224		.066	.000	.066
Psychological Distress	Socio Economic Status	2.39	.017	.483	.411	-.591	-.180
	Social Environment	-3.75	<.001		-.246	-.055	-.302
	Physical Health	-4.82	<.001		-.836	.000	-.836
Suicidal Ideation	Socio Economic Status	-1.73	.084	.431	-.244	.050	-.193
	Social Environment	1.26	.206		.067	-.210	-.143
	Physical Health	1.50	.134		.263	-.630	-.367
	Psychological Distress	6.11	<.001		.754	.000	.754

Note. C.R = composite reliability, SMC = Squared Multiple Correlations.

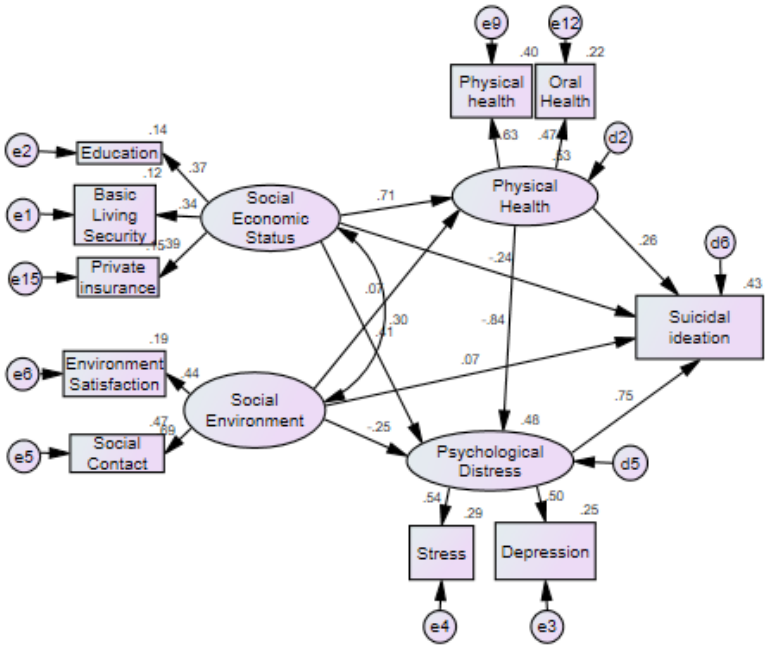


Figure1. Path diagram demonstrating the impact of socioeconomicstatus,socialenvironment,physical health, andpsychologicaldistress on the suicidalideation.

Discussion

The present study was conducted to reveal factors affecting suicidal ideation among male elders aged 65 and over who live alone. Using big data from a nationwide survey of the KCHS, I identified the multivariate relationships between variables and suicidal ideation. Factors considered included socioeconomic status, social support, physical health, and psychological health and their relationship to lead suicidal ideation.

Study findings indicated that psychological distress was the only factor showing a statistically significant affect on suicidal ideation, mediating all the other factors examined. A similar result was found in a previous study assessing factors on older adults' suicidal attempts; in that study, depression was the most salient factor[11]. These psychological-distress factors are more threatening for elders living alone as they lack the social resources to alleviate stress or depressive symptoms[12]. Knowing that male elders are far less likely to report their negative feelings or seek help[8], it is quite necessary to develop strategies to identify those with high potential to engage in risky behavior. We recommend implementing information and communication-technology interventions that provide various and easy ways to engage in social interaction without requiring active participation and involvement[13]. Assisting male elders to find the most suitable methods, aligned with their individual preferences, could effectively alleviate their social isolation.

Although physical health factors did not show a statistically significant affect, it had a stronger indirect affect on suicidal ideation than other factors by mediating psychological distress. In addition, socioeconomic status was an important predictor of physical health in the population of the current study. Living in a community may require some degree of higher socioeconomic status among male elders for health-related behaviors that determine physical health[14]. Especially elders without familial support need self-motivation for those behaviors because physical illness not only reduces motivation but also causes psychological distress.

Interestingly, when comparing with social-support factors, socioeconomic-status factors showed a much stronger affect on suicidal ideation directly and indirectly. This is in line with a previous study that showed the combination of living alone and poverty are strong predictors of suicidal ideation[15]. In addition previous research found gender differences between male and female older adults[8]. Similarly in Japan, although higher community involvement and individual relationship lowered the risk of psychological distress among female elders, this was not the case for male elders[16]. Studies emphasized that inactive engagement of male elders in preventative interventions suggests the

need for distinctive efforts for male elders. Considering the current study's findings, such efforts could associate older men with their particular interests to mitigate their low dependency on social support. Clearly, efforts are needed to reduce the incidences of suicide, primarily targeting elders living alone who live in poverty; thus, strategies should aim to improve security in their socioeconomic status.

Several limitations need to be considered in this present study. One is the cross-sectional design used. To clarify the causal relationship, longitudinal study designs like cohort study designs are more appropriate. Hence, I suggest future studies use a longitudinal study design to show a clear causal relationship between variables and suicidal ideation. In addition, using secondary data caused limitations in selecting variables to be included in this study. In this study, I examined present depressive symptom and suicidal ideation rather than intention to engage in risky behaviors such as self-harm. Additional study is needed on the relationships among variables that include individuals' intention to engage in risky behaviors.

Conclusion

Using big data with a nationally representative sample, the present study was able to suggest improvements for the future, based on intentions to prevent suicidal incidences for male elders living alone. Explanatory power was 43.1% for suicidal ideation, 53.2% for physical health, and 48.3% for psychological distress. Psychological distress was the most salient single mediating factor that led male elders living alone to consider suicidal ideation. Interventions to improve psychological distress with the incorporation of gender-specific factors can have a positive impact, reducing suicidal ideation in male elders living alone.

Ethical Clearance: Not required

Source of Funding: Nil

Conflict of Interest: Nil

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The Effect of an Oral Self-Care Intervention Program on the Oral Care of Diabetic Elderly

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Abstract

Background/Objectives: The purpose of the present study was to investigate the effect of a personalized oral self-care intervention program in diabetic elderly.

Methods/Statistical analysis:The study employed a non-equivalent quasi-experimental design with 10 participants in the intervention and control groups, respectively. An oral self-care intervention program was performed once per week for eight weeks from September 10 to December 19, 2018, and the effect of the program was measured by changes in subjective xerostomia, knowledge, self-efficacy, and oral self-care behavior.

Findings: After the program, the intervention group showed a significantly higher increase in knowledge ($P = 0.015$) and instances of brushing per day ($P = 0.005$) than the control group. There were no statistically significant differences in xerostomia and the use of oral care products ($P > 0.05$).

Improvements/Applications: The oral self-care intervention program for diabetic elderly was found to be useful in improving oral care, and the development of furtherstrategies for the improvement of the health of the elderly is necessary.

Keywords: *Diabetic elderly, Oral self-care intervention program, Subjective xerostomia, Knowledge, Oral self-care behavior*

Introduction

Due to the rapid aging of the South Korean population, elderly people aged over 65 years were 14.3% of the total population in 2018 and is expected to be 41.0% in 2060[1]. Consequently, promoting the health of the elderly is increasingly emphasized[2]. In addition, the prevalence of chronic diseases is continually increasing among the elderly[3]. In particular, diabetes was found to be the leading chronic disease, as three out of ten (29.8%) of the elderly aged 65 years or older were found to be diabetic[4].

Diabetes is considered to be a serious chronic disease and has been consistently ranked 5th–6thleading cause of deathsince 2007[5]. Diabetes is a metabolic disease characterized by hyperglycemia due to deficiencies in insulin secretion, insulin action, or the combination of both. It typicallycauses complications in the function of the eyes, kidneys, nerves, heart, and blood vessels through decreased infection resistance and delayed healing processes[6,7].

Many previous studies have reported that diabetes is associated with oral diseases, including periodontal disease, in patients. A previous study reported the existence of mutual influences between diabetes and periodontal disease, which repeat a vicious cycle in which diabetes exacerbates periodontal disease and then periodontal disease makes it difficult to control blood glucose[8]. Another study reported a higher prevalence of various oral complications in diabetic patients, including periodontitis, xerostomia, dental caries, oral Candida infection, oral cancer, and dysgeusia, through

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a systematic literature review[6]. Regarding American elderly aged 65 years or older, another study reported a higher incidence of permanent tooth loss and periodontal disease due to cavities in diabetic patients compared to the general elderly population[9].

Oral self-care is part of overall health self-care, which ranges from self-diagnosis, self-treatment, and self-prevention to seeking general and professional health management[10], and it is particularly important for diabetic patients. In diabetic patients 65 years or older, a relationship has been reported between oral care behavior and periodontal disease, as the risk of periodontal disease increases significantly in people with poor oral health awareness and infrequent brushing and who do not use interdental brushes [11]. That is, while diabetic patients are more prone to exposure to oral diseases than non-diabetic people, their recognition of the importance and proper performance of oral care may be lacking [12–14].

Some previous studies have identified factors influencing quality of life related to oral health among the general South Korean elderly population [2,15], and some studies have been conducted to improve oral function [16–18]; however, research on oral self-care interventions among diabetic patients is lacking.

Accordingly, the present study sought to investigate the effect of an oral self-care intervention program on knowledge and behavior related to oral self-care to provide basic data for the development of a personalized health-management program for diabetic elderly.

Method

1. Study design

As shown in [Table 1], this study used a nonequivalent control group pretest-posttest design to compare the performances of diabetic elderly in the experimental group who were treated with a personalized oral self-care intervention program to that of diabetic elderly in the control group who were not treated.

Table 1: Study design

Group	Pre-test	Intervention	Post-test
Intervention group	O1	X	O2
Control group	O1	-	O2

X=treatment; O=Measurement

2. Study Subjects

The population targeted by the present study was people with a history of diabetes living in Asan-si. The 10 experimental group participants were selected from participants in a metabolic syndrome prevention program offered by the healthy living center of the community health center of city A. These individuals understood the study's goals and agreed to participate. Ten elderly visitors to the senior citizen center of city A with diabetes were selected for the control group. The number of subjects calculated using the G*power 3.17 program for an effect size of 0.20 and power of 0.80 for both groups was 20, of which 10 were assigned to the experimental group and 10 to the control group. To ensure the ethical treatment of subjects, the study was reviewed and approved by the National Bioethics Committee of South Korea appointed by the Ministry of Health and Welfare.(IRB No. P01-201709-11-003)

3. Experimental treatments and data collection

For the intervention group,oral health practice and oral health education were conducted via a 40-minute oral care intervention program once a week for eight weeks from September 10 to December 19, 2018. The program consisted of oral health practice along with instruction in tooth brushing, using an interdental brush, using dental floss, and tongue brushing for self-care oral hygiene, and the participants were instructed to practice these activities every day. Participants in the control group would receive this training after the termination of the program. Factors related to oral health were measured through a survey and interviews before the oral care intervention program was conducted and after the eight weeks of experimental treatment. The same measurements were performed for the control group, which did not receive the experimental treatment

4. Measurement instruments

The instrument used in the present study consisted of four items concerning subjective mouth dryness, 15 items concerning oral self-care knowledge (OSCK), 15 items based on a self-efficacy scale for self-care (SESS), and five items assessing oral self-care behavior. Subjective mouth dryness[19] was measured using four items scored on a 3-point Likert scale (range = 4–12 points), with higher scores indicating higher oral discomfort. The reliability of the instrument measured via Cronbach's α was 0.77. The OSCK[20] consisted of items asking diabetic patients about periodontal disease,

mouth dryness, and oral care. Participants were asked to answer "Yes," "No," or "Do not know," and correct answers were given one point while incorrect and "Do not know" answers were given zero points. The reliability of this scale measured with Cronbach's α was 0.86. The SESS[21] assessed individuals' ability, with sufficient information and motivation, to effectively perform behavioral changes, and it was measured using an instrument developed by Kakudate et al. The instrument features three categories: dental examination, dental hygiene, and dietary habits and is scored on a 5-point Likert scale, with scores ranging from 1 point for "unconfident" to 5 points for "confident." Higher scores indicate higher self-efficacy. Cronbach's α at the time of development was 0.85, and Cronbach's α in the present study was 0.95. Oral self-care behavior[20] consisted of items related to improved oral health, including dietary habits, dental hygiene, and oral care, and Cronbach's α was 0.70.

5.Statistical analysis

The homogeneity of the dependent variables among the intervention and control groups was assessed via the Mann-Whitney Test using the SPSS program (IBM SPSS Statistics 23.0 for Windows, SPSS Inc., Chicago, USA). Both groups were determined to be homogeneous regarding the OSCK items as analyzed using a repeated measures ANOVA, while a significant difference was found regarding participants' SESS scores, as analyzed using ANCOVA with the initial value as a covariate. In addition, the Wilcoxon test was performed to identify changes in the oral health practices of the intervention group.

Results and Discussion

1. Analysis of homogeneity among participant groups

The homogeneity levels of dependent variables between the intervention and control groups are presented in [Table 2], which presents the homogeneity levels of oral self-care knowledge (Z = −.994, P = 0.320), subjective mouth dryness

(Z = −.781, P = 0.435), and oral self-care behavior (Z = −1.178, P = 0.247).

The difference in SESS (Z = −3.180, P = 0.001) between the intervention and control groups, however, was statistically significant, which indicates non-homogeneity between the two groups.

Table 2: Homogeneity of independent variables between intervention and control group

Variables	Intervention group (n=10)	Control group (n=10)	Z	P*
	M±SD	M±SD		
OSCK	10.30±2.79	8.50±3.78	-0.994	0.320
SESS	3.01±0.42	4.00±0.67	-3.180	0.001
Perceived dry mouth	5.10±1.10	6.20±2.53	-0.781	0.435
Oral Health Practice	2.87±0.33	3.33±0.91	-1.178	0.247
Three meals a day	3.90±0.32	4.20±1.32	-1.662	0.123
Water intake	3.20±0.79	3.70±1.57	-1.087	0.315
TBF / per day	2.70±0.67	3.80±0.79	-2.730	0.009
Oral care supplies	1.70±0.48	1.40±0.52	-1.314	0.280
OCSF / per week	1.57±1.27	2.40±3.31	-0.509	0.669

OSCK=oral self-care knowledge; SESS=self-efficacy scale for self-care; TBF=tooth brushing frequency; OCSF=oral care supplies frequency; * by Mann-Whitney Test

2. Comparison of changes in oral self-care behavior after attending the oral self-care program

[Table 3] presents the change in oral self-care behavior before and after the oral self-care intervention program. After the intervention, the increase in water intake (Z = −2.236, P = 0.025) and the instances of brushing per day (Z = −2810, P = 0.005) were statistically significant.

No statistically significant difference (P> 0.05) was found pre- and post-intervention regarding whether participants consumed three meals per day, the number of oral care products used by participants, and participants' weekly frequency of oral care product use.

Table 3: Comparison of changes in oral self-care

behavior after attending the oral self-care program (n = 10)

Variables	Pre	Post	Z	P*
	M±SD	M±SD		
Three meals a day	3.90±0.32	3.80±0.63	-0.577	0.564
Water intake	3.20±0.79	3.70±0.95	-2.236	0.025
Tooth brushing frequency / per day	2.70±0.67	3.78±0.67	-2.810	0.005
Oral care supplies	1.70±0.48	1.90±0.32	-1.414	0.157
Oral care supplies frequency / per week	1.57±1.27	3.00±2.52	-1.367	0.172

* by Wilcoxon Signed Ranks Test

3. The effect of the oral self-care intervention program on oral self-care knowledge

[Table 4] shows the results of the univariate analysis performed, as the sphericity assumption was met, and this analysis indicated a statistically significant difference (F = 5.86, P = 0.028) between the two groups regarding oral self-care knowledge. Though no significant difference existed between two points in time (F = 0.26, P = 0.620), a significant interaction effect was found between group and time (F = 7.38, P = 0.015), indicating that the oral self-care intervention program significantly affected changes in oral self-care knowledge over time.

This finding is consistent with that of Kim[20], who found significantly higher oral self-care knowledge and self-efficacy in an intervention group than in a comparison group after an oral self-care intervention program.

Table 4: Comparison of oral self-care knowledge

Variable M±SD		Pre	Post	Source	F	P*
		M±SD				
OSCK	Intervention group (n = 10)	10.30±1.05	12.10±1.10	Group	5.86	0.028
				Time	0.26	0.620
	Control group(n =10)	8.50±1.05	8.50±1.10	Group*Time	7.38	0.015

OSCK=oral self-care knowledge

* by two-way repeated measured ANOVA

4. The effect of oral self-care intervention program on the number of brushing

The results of an analysis of SESS and the instances of brushing per day showed significant differences in the homogeneity test as covariates, and these results are presented in [Table 5].

The effect of SESS on the instances of brushing per day post-intervention was nonsignificant (P = 0.859), but the effect of the instances of brushing per day pre-intervention on the instances of brushing per day post-intervention was significant (P < 0.001).

The effectiveness of the oral self-care intervention program in increasing the instances of brushing per day was confirmed because the estimation, in which the instances of brushing per day pre-intervention were controlled, of the intervention group (EM = 4.40) was significantly higher (F = 69.95, P < 0.001) than that of the control group (EM = 3.20).

This finding differs from that of Kim [20], who found a nonsignificant difference between a control and

intervention group regarding behavioral changes after an oral self-care intervention program, and the difference may be attributable to the direct education on oral hygiene management offered in the present study.

Table 5. Comparison of oral self-care knowledge between the intervention and control group

Variable EM±SE		Post	MD	Source	F	P*
TBF	Intervention group (n =10)	4.40±0.16	-1.23	Group	21.10	<0.001
				SESS_pre	0.032	0.859
	Control group (n =10)	3.20±0.15		TBF_pre	69.95	<0.001

SESS=self-efficacy scale for self-care; TBF=tooth brushing frequency

* by ANCOVA

Conclusion

The oral self-care intervention program was verified to be effective in increasing the oral self-care knowledge and the daily instances of brushing in diabetic elderly.

This study's results showed that the use of oral hygiene products somewhat increased post-intervention, but the difference between the two groups was not statistically significant. Since the use of interdental brushes and dental floss should be actively encouraged, as dental plaque cannot be sufficiently managed through brushing alone, methods that will promote the adoption of this behavior through further emphasizing the importance of interdental care must be developed to supplement the program.

The program examined in the present study was found to be valuable for the oral care of diabetic elderly, but further experimental research on factors influencing the effect of oral self-care programs on actual oral health is suggested.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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The Effects of Positive Thinking and Stress on the Ability for Interpersonal Relationship in Nursing Students

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Abstract

Background/Objectives: Interpersonal relationship ability is an important competency for nursing students. Therefore, there is need to explore and identify factors related to interpersonal relationship ability. This study was conducted to identify the influences of positive thinking and perceived stress on the ability for interpersonal relationship in nursing students.

Methods/Statistical analysis: Subjects consisted of 258 nursing students. The ability for interpersonal relationship was measured using the Relationship Change Scale (RCS). Positive thinking was evaluated with a tool consisting of 18 items. Stress was measured with the perceived stress scale (PSS).

Findings: The results of multiple regression analysis showed that positive thinking, perceived stress, and relationship with friends significantly predicted the ability for interpersonal relationships in nursing students, explaining 42.5% of variance.

Improvements/Applications: Interpersonal relationship programs to facilitate positive thinking and reduce stress are recommended to improve the ability for interpersonal relationship among nursing students.

Keywords: *Interpersonalrelationship, Positive thinking, Stress, Nursing students, Friends*

Introduction

College students experience various relationships as they encounter new university environments. During this period, students should develop the ability to form intimacy with others and build the foundations for mature interpersonal relations. Thus, the ability to establish accessible interpersonal relationships is important.

Due to the rigorous curriculum, excessive training, and stress of clinical practice, the stress level of nursing students is reported to be higher than that of general college students[1-2]. Stress may have a negative impact on the nursing students' success in forming interpersonal relationships[3]. However, interpersonal relations or role conflicts are rarely addressed in nursing education. Thus, the Introduction of a variety of interpersonal skill training programs is advised[4]. A lack of initiative to research and improve interpersonal relationship ability has been engendered by viewing interpersonal relationships as an individual tendency[5]. Although nurse-patient relationships and therapeutic communication are taught in the nursing curriculum, it is likely that more time will be required before improvements in interpersonal relations are manifested on the wards[6]. In some studies[7-8], interpersonal abilities of nursing college students have been deemed unsatisfactory for establishing and maintaining effective and therapeutic relationships with patients in the clinical practice setting. Therefore, it is necessary to identify the factors affecting interpersonal relationships of nursing students and address them in the context of educational training programs[8].

Although a study has reported[9] that stress of nursing college students is due to interpersonal relations, it is difficult to find in the literature, studies which examine the effects of stress on interpersonal relations. Positive thinking is known to reduce negative emotions such as anxiety, stress, and depression; thereby, it is also thought

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to affect interpersonal relationships directly or indirectly. According to [10], who researched life satisfaction of lifelong education participants, positive thinking was found to be significantly correlated with interpersonal skills; however, there are few studies analysing whether positive thinking influences interpersonal ability. The importance of interpersonal ability, in addition to nursing knowledge and nursing skills, has been emphasized within the field, thus research which could confirm the factors that influence interpersonal relationship would be of much significance. Therefore, this study was carried out to identify the level of interpersonal relationship ability of nursing students and to measure the effect of stress and positive thinking on the ability for interpersonal relationships.

Method

The subjects of this study were students who attended the nursing department of a university in G-gun. The survey was conducted from March 25, 2019 to April 5, 2019. The questionnaires were distributed to 270 peoples, and the data of 258 persons, excluding 12 missing cases, were analysed.

The level of ability for interpersonal relationship for participants was evaluated by the Relationship Change Scale (RCS). The RCS was developed by [11] and was subsequently translated to the Korean language by [12]. There are 25 questions with a 1 to 5 scale (1, very dissatisfactory; 5, very satisfactory) with the total score ranging from 25 to 125, the higher the score indicating higher satisfaction of one's interpersonal relationships. Positive thinking was measured by a tool developed by [13]. It is a 5-point scale consisting of 18 items. It is comprised of 2 sub-factors and 13 items – the 'subjective satisfaction' factor reflects the positive interpretation and overall satisfaction of life, and the 'goal seeking' factor reflects the effort to pursue and realize one's goal. Two negative questions were scored reversely; the higher the score, indicating higher positive thinking. Stress was measured by using the perceived stress scale (PSS) developed by [14] and translated by [15]. It is composed of 10 items with a 5-point Likert scale, and the possible scores range from 10 to 50. A higher total score indicates higher perceived stress.

Result

1. Ability for interpersonal relationship according to general characteristics

The relationship between general characteristics and ability for interpersonal relationship of subjects are summarized in [Table 1]. The ability for interpersonal relationship was significantly associated with selection motivation to study nursing, major satisfaction, economic status, health status, relationship with family members, relationship with friends, relationship with professors, and satisfaction with one's appearance.

Table 1. Ability of interpersonal relationship according to general characteristics (N=258)

Variables	Categories	n(%)	M±SD	t/F	*p*	Scheffe
Gender	Male	51(19.8)	94.41±14.02	0.56	.580	
	Female	207(80.2)	93.25±10.12			
Age (year)	≤ 19	59(22.9)	92.92±10.03	1.56	.211	
	20-24	184(71.3)	94.03±11.21			
	≥ 25	15(5.8)	89.00±11.16			
Grade	Grade 1	61(23.6)	93.98±11.32	2.46	.063	
	Grade 2	72(27.9)	92.44±10.57			
	Grade 3	61(23.6)	91.30±9.28			
	Grade 4	64(24.8)	96.25±12.15			
Selection motivation to study nursing	Aptitude or interest	116(45.0)	95.71±10.55	2.98	<.05	ns
	Advice of parents	37(14.3)	91.43±12.55			
	Job opportunity	92(35.7)	91.66±10.52			
	Academic score	13(5.0)	92.31±10.63			
Major satisfaction	Satisfied [a]	150 (58.1)	96.33±10.38	14.99	<.001	b, c<a
	Moderate[b]	96(37.2)	90.15±10.15			
	Unsatisfied[c]	12(4.7)	84.50±12.97			

Cont... **Table 1. Ability of interpersonal relationship according to general characteristics (N=258)**

Economic status	Good[a]	49(19.0)	98.53±11.90	6.84	<.01	b<a
	Moderate[b]	185(71.7)	92.15±9.98			
	Bad	24(9.3)	93.42±13.59			
Health status	Good [a]	130(50.4)	96.96±10.56	15.88	<.001	b, c<a
	Moderate[b]	98(38.0)	90.72±9.73			
	Bad[c]	30(11.6)	87.40±11.68			
Relationship with family members	Good [a]	208(80.6)	95.31±10.62	18.09	<.001	b, c<a
	Moderate[b]	44(17.1)	86.73±8.98			
	Bad[c]	6(2.3)	79.67±7.82			
Relationship with friends	Good [a]	209(81.0)	96.06±9.90	40.63	<.001	b, c<a
	Moderate[b]	46(17.8)	82.91±8.16			
	Bad[c]	3(1.2)	75.67±6.81			
Relationship with professors	Good [a]	139(53.9)	96.96±10.30	18.72	<.001	b<a
	Moderate[b]	117(45.3)	89.21±10.13			
	Bad	2(0.8)	102.00±21.21			
Satisfaction with appearance	Satisfied [a]	103(39.9)	98.36±10.38	24.73	<.001	b, c<a; c<b
	Moderate[b]	128(49.6)	91.38±9.51			
	Unsatisfied[c]	27(10.5)	84.85±11.52			

2.Level of ability for interpersonal relationship, positive thinking, and stress

As shown in [Table 2], the mean for ability for interpersonal relationship was 93.48, means for positive thinking and stress were 65.41 and 27.26; respectively.

Table 2. Means of ability for interpersonal relationship, positive thinking, and stress (N=258)

	M±SD	**Min.**	**Max.**
Ability of interpersonal relationship	93.48±10.98	65	122
Positive thinking	65.41±9.65	36	90
Stress	27.26±5.65	10	41

3.Correlations between variables

As shown in [Table 3], theability for interpersonal relationship was significantly and positively correlated with positive thinking (r=.537, p<.001) and negatively correlated with perceived stress (r=-.391, p<.001).

Table 3. Correlations of ability for interpersonal relationship, positive thinking, and stress (N=258)

	Ability of interpersonal relationship	**Positive thinking**	**Stress**
	r *(p)*	r *(p)*	r *(p)*
Ability of interpersonal relationship	1		
Positive thinking	.573 (<.001)	1	
Stress	-.391 (<.001)	.440 (<.001)	1

4.Predictors of ability for interpersonal relationship

[Table 4] presents the results of regression analysis of variables at two hierarchical steps. Eight variables were introduced in Model 1 and accounted for 25.4% of the variance in interpersonal relationship ability. In Model 2, positive thinking and perceived stress were included. These accounted for 42.5% of variance in interpersonal relationship ability.

Discussion

In the present study, the mean score of interpersonal abilities of subjects was 93.48, which was slightly higher than the means of 89.65 and 89.22 in studies by [16], and [8]; respectively. The mean found in this study was similar to 92.10 reported by [6]. The average (93.48) of subjects was 74.8% of the 125 score maximum, which was higher than mid-level, yet was not satisfactory. Therefore, the development of effective educational interventions to help nursing students improve interpersonal skills is a necessary addition to nursing education[8].

In the univariate analysis, there was a difference in interpersonal ability according to selection motivation to study nursing, major satisfaction, economic status, health status, relationship with family members, relationship with friends, relationship with professors, and satisfaction with appearance. [17] states that correction of distorted thoughts related to appearance and an increase in satisfaction of appearance would have a positive effect on interpersonal relationships in adolescents. A study[18] has shown that major satisfaction affected competence in interpersonal communication. The improvement of interpersonal communication is thought to improve interpersonal relationship ability. The mediating effect of communication competence on the relationship between degree of major satisfaction and interpersonal relationship ability are worth analysing in the future. Although subject population differed from that of this study, another report on dental hygiene students' satisfaction with clinical practice showed that admission motivation, major satisfaction, health status, and economic level were significantly related to interpersonal ability[19]. Therefore, identifying methods to further increase major satisfaction among nursing students after entering university may improve interpersonal relationship ability. The results of [6] showed that degree of interpersonal relationship differed according to age and grade. In this study, however, we found that age and grade were not related to the ability for interpersonal relationship. Unlike the findings of our study, [6] reported that economic status was not of significant influence. Repeat studies may help explain what factors led to the differing outcomes. Regression analysis showed that good friendships or relationships with professors influenced high interpersonal abilities. Particularly, good relationship with friends had a positive influence on interpersonal relationship ability even in Model 2 which added positive thinking and stress. [20] showed that the most influential factor for interpersonal relationships was social support. In this regard, friendship can be regarded as a form of social support. Thus, one could expect that better relationships with friends would engender higher levels of interpersonal ability, as social support increases. Therefore, students should be encouraged and facilitated in seeking active exchange with their peers and seniors through club activities and meetings.In the present study, hierarchical regression analysis was used to confirm that positive thinking and stress influenced the ability for interpersonal relationship. As the two variables were added, explanatory power of the variance in interpersonal relationship ability increased by 17.1%. [21] examined the relationship between diverse interpersonal conflict and self-rated health.

Table 4. Factors affecting ability for interpersonal relationship of nursing students (N=258)

Variables	Model 1			Model 2		
	β	t	*p*	β	t	*p*
Selection motivation to study nursing	.053	.974	.331	.012	.292	.770
Major satisfaction	.104	1.831	.068	-.041	-.924	.357
Economic status	.105	1.998	<.05	.058	1.430	.154
Health status	.121	2.231	<.05	.026	.625	.532
Relationship with family members	.052	.873	.384	.018	.384	.702
Relationship with friends	.297	4.771	<.001	.144	2.924	<.01
Relationship with professors	.114	2.037	<.05	.026	.592	.554

Cont... **Table 4. Factors affecting ability for interpersonal relationship of nursing students (N=258)**

Satisfaction with appearance	.188	3.446	<.01	-.024	-.534	.594
Positive thinking				.602	9.995	<.001
Stress				-.148	-2.850	<.01
R2	.274			.439		
Adjusted R2	.254			.425		
F	18.569			43.803		
p	<.001			<.001		

They considered that positive psychology factors such as positive thoughts, gratitude, and transcendence could reduce interpersonal conflict. The increase in tendency of positive thoughts and/or transcendence, saw decrease in the likelihood of conflict between friend or neighbour. These positive psychological factors can be fostered by personal and social interventions such aspsychological training programs. Research concerning the relationship between positive thinking and interpersonal abilities is very limited. [22] had developed a positive thinking training program which enables positive cognitive restructuring. She conducted the program eight times for 10 daughters-in-law and showed that it was effective in improving the relationship between daughter-in-law and mother-in-law. This effect is due to the positive cognitive training which helps subjects recognize the position of counterparts, to discuss and reduce problems, or to search out good aspects of the opposite party. This suggests that positive thinking may alleviate interpersonal conflict and improve interpersonal relationships. Those with high positive emotions are relatively more receptive to stressful situations[23]. Therefore, training which increases positive thinking may be an effective strategy to reduce stress and improve interpersonal relationship ability. Perceived stress was identified as a crucial factor in our study. In a study[24] analysing the effects of stress coping and interpersonal abilities on gambling in college students, there was a significant correlation between stress coping and interpersonal abilities. However, there has been no study showing that stress itself directly affects interpersonal relationships, thus direct comparisons were unable to be made with the results of this study. Depression due to stress may passively influence interpersonal activities. In cases of high stress, interpersonal problems act as a stress source leading to increased stress perception, and, in turn, diminishment of interpersonal relationships. Therefore, it would be beneficial for students who have difficulty with interpersonal relationships to practice relaxation and coping techniques. Also, students who are in stressful situations should be counseled to relieve stress and learn flexibility in social situations. In order to improve the ability for interpersonal relationship among nursing college students, it is necessary to explore variables that mediate negative effects of stress on interpersonal relationships. The results of this study provide the groundwork of basic data for the development of intervention plans to improve the interpersonal ability of nursing students who are in the preliminary stages of nursing education.

This study finds that positive thinking and perceived stress are the most important factors affecting interpersonal relationship ability, among variables tested. Therefore, the development and application of curricular or extra-curricular programs to enhance positive thinking for nursing students is highly recommended. In addition, we hope further research will proceed to evaluate the effects of such developed programs on nursing students.

Conclusion

We found that the main determinants of interpersonal relationship ability in nursing students were positive thinking and perceived stress. Therefore, interpersonal relationship programs that improve positive thinking are needed to decrease stress among students undergoing nursing education.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Effects of the Child -Woman Health Nursing Convergence-based Simulation Practice Program on the Critical thinking, Communication Competency, Learning Flow, Clinical Judgment for Nursing Students

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Abstract

Background/Objectives: This study was undertaken to determine effects of the child–woman health nursing convergence-based simulation practice program on the nursing student's the critical thinking, communication competency, learning flow, clinical judgment.

Methods/Statistical analysis: The data, self-reported questionnaires were given to 78 senior nursing students located in Cheonan city in Korea which were gathered during Mar. 2 to Aug. 31, 2018. The data were analyzed using paired *t*-test and correlation.

Findings: After the Child–Woman Health Nursing convergence-based simulation, it showed a significant difference in learning flow (t=-2.806, p<.05) and clinical judgment (t=-2.878, p<.05). A learning flow showed a positive correlation with communication competency and clinical judgment.

Improvements/Applications: The findings from this study are expected to provide a valuable baseline data to develop the curriculum in the convergence-based simulation practice program and strengthen the nursing clinical practices.

Keywords: *Nursing students, Convergence-based simulation practice program, Critical thinking, Communication competency, Learning flow, Clinical judgment*

Introduction

According to the rapid changes of knowledge and technology in medical environment, it is required diverse professional nursing skills. And, nursing student needs professional practice training, it is important to know the cognitive situations step by step, as a process of logical reasoning and contextual considerations with judgment to be an expert nurses, leads by a critical thinking in clinical setting. And, it requires nurse to solve problems and make crucial decisions in clinical situation related to health and illness, in other words clinical judgment[1].Nurses must develop clinical thinking, clinical judgment to evaluate salient information and respond in a concerned and involved manner in patient care situations[2]. A patient-centered care is based on therapeutic communications, nursing students must demonstrate[6]effective communication knowledge and skills prior to be graduated[3]. We focus on face-to-face with patient interacting for a comfortable rapport.

Simulation has become a major part of nursing department, because of evidence based of simulation helping students learn clinical situation. Faculties who teach in a caring-base nursing practice program has a clinical career that they use to integrate caring in high fidelity simulation[4], express interest in simulation are providing supervision for simulation to ensure quality experiences for students.

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In current nursing education research on simulation, focus is improvements in clinical judgment after simulation education[5]. Computer-based simulation in speech-language pathology clinical education provides a framework for integration. Faculty can also plan a roadmap for communication scenario, it is necessary to identify convergence-based simulation education effects.

Specially, it becomes a challenge to resolve faced by pediatric nursing to assisting all of family clinical nursing skill, including of childbearing, delivery, newborn-baby cares. In other words, It is difficult to participate in practical nursing experience of the birth process - newborn care because of decreasing the birth rate gradually in Korea. If the capability of pregnancy is lower, unpredictable progress of emergency labor and newborn's low APGAR score situation happened frequently[6].Computer-based simulation which used part-task training device can provide a diverse degree of real-world application, focusing on specific skills and human anatomy in nursing part, high-fidelity patient simulators can provide real physical inputs and interactivity[7]. A high-fidelitymanikin represents a patient withcorrect anatomy, patho-physiological andpharmacologicalresponses, and Justification about the value of use comparing high-fidelity simulation and traditional teaching strategies isnecessary[8].

Simulation-based learning is an educational curriculum to give nursing students a chance to simulate real clinical situations[9], and the simulation provides a unique learning method and setting a risk-free environment in which nursing students can integrate knowledge and practice without the fear of harming patient[10], which is beneficial when dealing with the emotional support of patient. Simulators comes true equipped of a variety features that support a experiences case by case situation, such features support educators abilities to create learning environments that address a variety of specific clinical situation[11].

The simulation practice program is a new education strategy designed to modify a diverse real-life situations, to provide the opportunity to perform a critical thinking, communication with patient, clinical judgment. Modern medical technology advances such as simulation are being widely used within nursing curricula, it is possible to provide students with patients who present with all of the diagnoses taught in the classroom[12].

Therefore, aims of this study determine effects of the child–womanhealth nursing convergence-based integrated simulation practice on the nursing student's the critical thinking, communication competency, learning flow and clinical judgment which enables to provide a valuable data strengthening the nursing clinical practices.

Method

The In this study, the child-woman health nursing convergence based simulation practice program was conducted by major subject's professors and reviewedby the clinical practice nurses. The program consists of two scenarios in which each of the situation a labor and newborn's care including ofAPGAR score assessing. As the tool to measure this study total 90 items were consisted: 35 of the critical thinking by Kwon[13], 15 of the communication competency by Hur[14], 29 of the learning flow by Kim[15], 11 of the clinical judgment by Ha[16]. Pre and Post simulation education program, participants received sufficient explanation for the study and carried out the self reported questionnaire after agreeing to it. Before data collection began, faculty participated in briefing-time incorporated into the curriculum and specifically simulation program.

The data was collected during the period of Mar.2 to Aug. 31 2018, with 78 Seniornursing students located inCheonan city in Korea.

Result and Discussion

1. General characteristics of the subjects

As shown in[Table 1]was that the general characteristics among 78 subjects in this study. Variables divided of gender, academic years, religion, character, experience of simulation class status, experience of other active learning class status. Mainly, simulation education program as the main subject in nursing curriculums needs experience of clinical practice. All of participants were senior nursing students.

Table 1. General Characteristics

(N=78)

Characteristics	Categories	N(%)
Gender	Female	66(84.8)
	Male	12(15.4)
Academic years	Senior	78(100)
Religion	None	36(46.2)
	Protestant	32(41.0)
	Catholic	10(12.8)
Character	Introversive	15(19.2)
	Extroversive	23(29.5)
	Moderate	40(51.3)
Experience of simulation class	Yes	7(9.0)
	No	71(91.0)
Experience of other active learning class	Yes	56(71.8)
	No	22(28.2)

2.Differences among Critical thinking, Communication competency, Learning flow, and Clinical judgment after Convergence-basedsimulation class

As shown in[Table 2]showed a significant difference in learning flow (t=-2.806, p<.05) and clinical judgment (t=-2.878, p<.05) after the convergence-based simulation practice, but communication competency and learning flow not showed a significant. Understanding subjects curricular priorities is fundamental to the design of clinical judgment[17], the Clinical Judgment Model was incorporated into the learning flow for students to patient care. The results clearly showed that concise definitions to guide a teaching strategies. If simulation educator acts to guide students to motivate a learning flow, clinical judgment developed synergic effects.

Table 2. Differences among Critical thinking, Communication competency, Learning flow,andClinical judgment after Convergence-basedsimulationpractice program (N=78)

Variables	Pre M±SD	Post M±SD	t(p)
Critical thinking	96.05 ±13.84	94.58 ±14.07	.729 (.468)
Communication competency	3.36 ±0.41	3.42 ±.041	-.979 (.331)
Learning flow	2.67 ±0.48	2.90 ±0.51	-2.806 (.005)
Clinical judgment	32.61 ±6.48	35.12 ±5.70	-2.878 (.005)

3.Correlation among Critical thinking, Communication competency, Learning flow, and Clinical judgment after Convergence-basedsimulation class.

As shown in [Table 3] indicated thatthe level of learning flow showed a positive correlation with communication competency and clinical judgment(r=.412, p<.001: r=.492, p<.001), but not shown else. As a result, Implementing communication competencies requires one's logical clinical judgment.

Table 3. Correlation among Critical thinking, Communication competency, Learning flow,and Clinical judgment after Convergence-based simulation practice program

(N=78)

Variables	C.T.	C.C.	L.F.	C.J.
C.T.	1			
C.C.	.824 (<.001)	1		
L.F.	.430 (<.001)	.412 (<.001)	1	
C.J.	.650 (<.001)	.604 (<.001)	.492 (<.001)	1

C.T.: Critical Thinking

C.C.: Communication Competency

L.F.: Learning Flow

C.J.: Clinical Judgment

Conclusion

Child–Woman Health Nursing Convergence-basedSimulation showed positive effects on thecritical thinking, communication competency, learning flow, clinical judgment for nursing. More specially, first, after the convergence-based simulation practice, it shows a significant difference in learning flow and clinical judgment. Second, the level of learning flow showed a positive correlation with communication competency and clinical judgment.

Additionally, these results reported that nursing student's clinical basic skills improved that the simulators have pulses chest rise, heart sounds, lung sound, coughing, crying as well as hiccup including Sim-baby and Sim-Ped. According to simulators monitors changing by educator's scenario makes nursing student immediate responses nursing process, it makes to be prepared an empowerment skillful nurse by simulated-based education.

It is point out that the discussion that clinical practicum score of child and maternity is replaced with simulation curriculum. One of the reasons, it appears that the lower the Korea's birth rates, the fewer practical opportunities nursing experience. Above all, the developed variety of scenario is necessary in simulation-based education, child-woman nursing area. Though costs of simulators will vary widely depending on purchasing costs, advanced technology will be provided educators with cooperation simulation research institute.

The challenge is to create an effective output according to simulation education. Successful simulation education output requires more proper simulation design and research for changing nursing curriculum. Teaching as part of simulation requires faculty to design current clinical-based scenario that set a learning educational environment in which students feel safe from uncomfortable and afraid with a new relationship, patient.

There were limitations of this study results that proceed theChild–Woman Health Nursing Convergence-basedSimulationPracticeProgram, except adult, management, senior of nursing. And students were limited in senior nursing students. The subjects will be expanded to the next study.

In this study, it is confirmed to provide a valuable baseline data to develop the curriculum in Convergence-basedsimulation practice program and strengthen the nursing clinical practices. We would also recommend.

Ethical Clearance: Not required

Source of Funding: Nil

Conflict of Interest: Nil

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Development of Career Counseling Program for Nursing University Students according to Adler's Theory

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Abstract

Background/Objectives: The aim of this study was to present counseling techniques and counseling step-by-step contents of career counseling to help nursing students decide their career based on Adler's theory

Methods/Statistical analysis: This study is a study on the development of a nursing student's career counseling program developed by Jeong EG(2009) based on Adler(1927) theory, which was reconstructed and verified by a researcher in accordance with the actual conditions of nursing students.

Findings: As a result of this study, which was analyzed according to Adler's theory, career counseling for nursing university students consisted of five stages. In detail, the entire consultation consists of a relationship formation period, lifestyle exploration period, self-reflection period, career exploration period and a decision making period. The career counseling programs presented in this study span eight semesters, from the first semester of the first year to the second semester of the fourth year. Therefore, counseling is conducted with two sessions in every semester, and a total of 16 sessions in four years.

The total is five stages and consists of 16 sessions.Adler emphasizes first understanding himself and then making career decisions. Therefore, by the 10th session is searched for lifestyle, self-reflection, and the 11-14th session are handled sequentially with a career investigation, and then the decision of course is dealt with in the 15-16th session to reach career decision making through psychological and practical preparation.

Improvements/Applications: This study will eventually have a positive impact on the career of nursing students.In the future, research is proposed to verify the effectiveness by applying career counseling programs.

Keywords:*Counseling, Program, Nursing, University, Student*

Introduction

University students need to develop their skills and expertise through their majors, while at the same time making preparations for efficient career choice and career decisions. Nursing university students also need sufficient career preparation for successful employment and post-employment adaptation [1]. Nursing students can be regarded as a career setting person who are guaranteed employment at the same time as they enter the university, but, in contrast to this perception, they fail to adapt to the clinical nursing after graduation, resulting in a high rate of early turnover [2].This is because there are many students majoring in nursing who have chosen their majors according to vague expectations of a high employment rate or recommendations from around them[3]. Although relevant research is gradually being carried out as a means of nursing students as they fail to adapt to clinical nursing after graduation and the rate of early turnover increases [4]. Research on career counseling for nursing students has not been conducted actively and it is difficult to effectively consult students due to lack of professional knowledge on counseling[5]. To solve these problems, it is necessary to develop and strengthen career counseling programs to clearly establish their career direction after university admission. Park IS and Han YJ said, the nursing student's career status has

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been shown to differ depending on gender, grades, and satisfaction with practice, and added, systematic career guidance and counseling are needed considering these factors. Systematic guidance requires a consultation stage based on theory and step-by-step guidance. There are several theories, such as psychoanalysis therapy for counseling, personal therapy, existential therapy, human-centered therapy, form therapy, real-life therapy, and family system therapy, but the different subjects, purposes, and methods of applying the theory to counseling and developing the program accordingly [6]. The issue of career, which is life itself and should be addressed in career counseling, should be explored in depth about oneself and helped establish and determine the meaning and goals of life, rather than focusing on aspects of interest or aptitude[7].In this regard, Adler's theory is suitable for career counseling as it explains how people make decisions on career paths by paying attention to life goals and lifestyles. Adler said that human life is determined by its own goals as it pioneered its own future[8]. Contrary to the component of general career counseling program is the type and search of jobs, the value of work and the search for human relationships, the consultation technique presented by Adler is staged step by step. These are the sequence of the trust-building relationship period, lifestyle and dynamic explore period including early memory and family structure, self-understanding period that positively accommodates oneself, and a re-establishment period that redefining the transition to a new direction. It also involves encouraging students emotionally and encouraging them to open themselves up during each consultation session.

Jeong EG created career development topics and components according to the concept of Adler's theory, and developed career counseling programs for male high school freshmen. Unlike previous career counseling programs, his research is highly meaningful in that it specifically suggests the course of career counseling based on Adler's theory. However, since Jeong EG has organized career counseling programs suitable for the development stage for male high school freshmen, it is limited to apply them to university students. Students majoring in nursing also undergo clinical practice and interview to get a job in the fourth grade. Therefore, nursing students get a job before graduation, so it is necessary to develop career counseling programs suitable for nursing students.

Thus, in this study, to help establish a clear career path for nursing students, it was reconstructed by the researcher based on a study that developed an Adler career counseling program for high school students.The results of this study will provide a step-by-step manual for career counseling for nursing students, which will eventually have a positive impact on the career of nursing students.The purpose of this study is to present counseling techniques and counseling step-by-step contents of career counseling to help nursing students decide their career based on Adler's theory.

Method

The design, period and procedure of this study are as follows. In order to secure the ethics of the research, the purpose and method of the research were fully explained to the students and the consent of the research was obtained during an on-site survey(method of interview, observation).

This study is a study on the development of a nursing student's career counseling program developed by Jeong EG based on Adler theory, which was reconstructed and verified by a researcher in accordance with the actual conditions of nursing students.The study was conducted for a total of seven months from January to August 2018.

First, a literature review (an analysis of relevant prior research), an on-site survey(method of interview, observation)was carried out to investigate the program's demands.

Second, the Adler career counseling program developed by Jeong EG was reorganized by the researcher in accordance with the actual conditions of the nursing university student.

Third, it was modified after expert review (consultation) and the program was identified.

Result and Discussion

In this study, the counseling technique and consultation step details of the nursing university students were presented in five stages in accordance with the actual conditions of the nursing university students, developed by Jeong EG divided the career counseling program into seven stages and organized 12 sessions a year for freshmen in high school. The difference between study of Jeong EG and this study is the duration, the subject, and the stages of the consultation. In this study, counseling was designed to be conducted for the entire four years from 1st to 4th grade, taking into account the actual conditions of nursing university

students, and is largely divided into five stages. Unlike a study by Jeong EG(2008), that needs to complete a high school counseling within a year, this study set the nursing university student counseling to begin with a relationship formation period without setting a life goal for the first counseling because it lasts for four years.

It has proven the effectiveness of counseling in applying Adler's theory. A study on the effect of Adler's career counseling on the maturity of career behavior in elementary school students showed that students who experienced career counseling programs based on Adler's theory have significantly increased career attitude. The study proved that elementary school juniors can improve their career identity by conducting career counseling through childhood memory and family composition[9]. In addition, a study on the effect of group counseling on the maturity of career behavior in elementary school students using Adler's theory also demonstrated that the planning, independence, and self-determination of life has all improved[10].

Therefore, in this study, the researcher attempted to study counseling using Adler's theory. As a result of this studycareer counseling for nursing university students consisted of five stages. The career counseling programs presented in this study span eight semesters, from the first semester of the first year to the second semester of the fourth year. Therefore, counseling is conducted with two sessions in every semester, and a total of 16 sessions in four years. At the beginning of every step, open-heart counseling techniques are used, and at the end of the stage, a counseling technique of encouragement is used. (Table 1).

Table 1. The stage and contents of career counseling for nursing students

Grade, Semester	Session	Stage	Contents
1, 1	1,2	Relationship formation period	Opening mind Introduction on career consultation program General characteristics Encouragement
1, 2	3,4	Lifestyle exploration period 1	Opening mind Initial first memory Parenting attitude Encouragement
2, 1	5,6	Lifestyle exploration period 2	Opening mind Parent and sibling personality advantages and disadvantages Emotional bond with family Encouragement
2, 2	7,8	Introspction period 1	Opening mind One's own personal strengths and weaknesses Method of overcome Personal weakness and inferiority complex Setting goals for life Encouragement
3, 1	9,10	Introspction period 2	Opening mind Role model One's favorite book,Motto. One's hobby,Special ability, aptitude Encouragement

Cont.... **Table 1. The stage and contents of career counseling for nursing students**

3, 2	11, 12	Career exploration period 1	Opening mind Hospital, ward that was good in clinical practice Decision-making method Job information and management file (career portpolio, job file) Encouragement
4, 1	13, 14	Career exploration period 2	Opening mind Parents' expectations, one's vision Setting the priority for the job Encouragement
4, 2	15, 16	Decision making period	Opening mind Modifing and establishing the goals of life Planning Social contribution Encouragement

1. Relationship formation period

As the first step in the conversation, Adler found the relationship building is important. In this study, therelationship formation period was set as the first stage of the consultation. And the contents of this stage include anIntroduction to the consultation program, the general and demographic characteristics of the students. To identify the general and demographic characteristics of a student, question about the origin of high school, age, residence, family structure, birth rank, family occupation, health condition, economic level, method of funding for tuition, and so on.

Above all, it is important to establish a mutual trust relationship at this stage. Relationship formation period is the first stage of the consultation, not the first step in understanding the problem of the students, but the first step in understanding and showing interest in their post-graduation goals and helping them open themselves up. It comforts students by starting to talk about weather, health conditions, and class schedules that are not relevant to the problem.

2. Lifestyle exploration period

Once the relationship is formed for career counseling, the second stage of the consultation is to explore the lifestyle so that the students can understand their beliefs, emotions, and to find out how the lifestyle is affecting the individual. Personal lifestyles are greatly influenced by the atmosphere of parents' values, and parenting attitudes when students were young. To do this, the professor can ask them about what kind of children they were and about their first memories of childhood. The professor inspires students to identify who the primary caregiver was, and the caregiver's attitude. Consistent or inconsistent parenting and nurturing attitudes are important clues for awareness of the main emotion among fear, anxiety, disappointment, longing, joy, happiness and so on.

If you ask what student's parents and brothers are like and what are their merits and demerits, you can find out what they think of their family members as usual, whether their relationship with their family members was compliant or rebellious. More directly, asking who is best in the family, who is the closest sibling, and who is most influenced by, will give you some insight into their relationship with family members and their emotional bond with them.

3. Self-reflection period

It is a step that allows students to reflect on their personality, inferiority complex and current state of mind in order to look inside more deeply after exploring lifestyle. It is also important to figure out the cause and extent of a student's inferiority complex during this period.

Adler saw the inferiority complex itself as a cause of improvement, not an anomaly. It is necessary to overcome the inferiority complex and to explore and

become more intrinsically self-aware. The professor encourages students to recognize that the student has the key to change and to focus on what they have.

Meanwhile, before entering the career exploration period, the professor asks the student who he or she likes and respects as a role model. This allows students to reflect on themselves what they admire and what aspects they are similar to and which are different from them. Ask students what books they like, what parts of the book and what phrases have affected their lives. People are attracted to books that show how to experience life problems similar to their problems because books usually contain life difficulties and ways to deal with. It encourages and emulates person's coping strategy.

4. Career exploration period

To explore the career path, professor has been encouraged to explore the student's lifestyle and to reflect on students. To explore the course in earnest, ask what childhood dreams and visions were based on student's own aptitude, lifestyle, personality, motto and how they have changed so far. In the career exploration period, professors can ask about the hospitals and wards that fit them during clinical practice.

It is very important to prioritize when making decisions to choose a job. Priority in selecting students' jobs can vary depending on salary, distance from home, atmosphere of work, parents' expectations, honor, power, promotion opportunities, comfort, service and dedication. It is important to have a deep understanding of themselves to set priorities. To this end, it is helpful to have job portfolios and job files written and kept. The documents included in the employment file include report cards, certificates, service and practical experience, self-Introduction letters, information for preparing for interviews, and various job information. And the professor identifies how prepared and independent the student is to make the decision. Students with clear goals set through career counseling programs will become aware of the meaning of campus life and have a strong motivation to achieve it and have an adaptive campus life.

5. Decision making period

Finally, it is time for students to make their own decisions about career paths. It is counseling to make them realize that the interpretation of life is in their own hands and that the true meaning of life can be found by contributing to society[11]. This stage involves modifying and establishing a student's life goals so far. Also, students need to consider the impact of their success on society and plan in detail how it will contribute. Human behavior is goal-oriented, so goals should be set well, with professors revealing why students are committed to their studies and letting them know that goals can be revised. Humans should be interested in each other, working together, and contributing. Because society and human beings can live happily and peacefully only when they are united. Therefore, professors encourage the student to ponder the impact of students' own success, purpose of life, meaning on others, communities, communities and countries.

Conclusion

This study was tried to develop career counseling program for nursing student's clear career choice. According to the study, Adler career counseling program developed by Jeong EG was presented in five stages in accordance with the actual conditions of the nursing student. The full consultation consisted of five stages: relationship formation period to form a trust relationship, lifestyle exploration period to investigate lifestyle, self-reflection period to have in-depth insight into themselves, career exploration period and decision-making period. The result of this study will be that by presenting the stage and step-by-step content of the consultation, it will eventually contribute to the nursing student's career satisfaction and the maintenance of a high employment rate. In the future, research is proposed to compare and verify the effectiveness of nursing university students by applying career

Ethical Clearance: Not required

Source of Funding: Nil

Conflict of Interest: Nil

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Factors Affecting the Positive Perception of Marriage of Unmarried Men and Women in South Korea

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Abstract

Background/Objectives: This study is a descriptive survey to identify the factors affecting the positive perception of marriage of unmarried men and women in South Korea.

Methods/Statistical analysis: Data survey was collected from 254 unmarried men and women in Korea and research tools used structured questionnaire that consisted of 7 general characteristics, 24 questions of types of love, 18 questions of sexual assertiveness, 24 questions of ambivalent sexism and 11 questions of the positive perception of marriage. Data were analyzed by descriptive statistics, t-test, ANOVA, Pearson's correlation and multiple stepwise regression analysis using SPSS 22.0 program.

Findings: The results showed that the variables affecting the marriage of Korean single men and women were complementary gender differentiation (B=.424), Eros (B=.152), Agape (B=.193), heterosexual hostility (B= -.173), and then the explanatory power of the three variables was 34.2%.

Improvements/Applications: Through this study, we intend to provide basic data for the national policies for the increase of marriage and fertility rate in South Korea by exploring the mindset and value system related to marriage of single men and women in South Korea.

Keywords: *Positive perception of marriage, complementary gender differentiation, type of love, hostile heterosexual hostility, fertility rate.*

Introduction

Marriage has a very important meaning not only for individuals or families, but also for society and the country. Marriage,in particular, plays a major role in inheriting culture, customs, language and values between generations through the birth and upbringing of children, as well as the combination of the two couples. However, as people's worldview and values change in modern society, the consciousness that marriage must be made is declining[1] and that unmarried men and women avoid marriage and childbirth[2]. In Korea, especially in the process of rapid socioeconomic development, as individualism and happinessism are accepted as important meaning of life, the marriage of unmarried men and women has changed into a negative trend, increasing the choice of non-marriage and later marriage[3].

The low fertility rates, coupled with a shrinking population, has led to a decrease in the economically active population, and has become a more dangerous national problem, linked to the social problem of an aging society. The reasons for the continuation of low fertility rate are a variety of factors, including socio-cultural factors, economic factors, and policy factors[4]. However, in previous research, the view of marriage has been shown to have a strong influence on the willingness to give birth, and the higher the positive marriage view, the higher the willingness to give birth[5,6]7. In order to unmarried men and women to form healthy families through marriage and to improve their willingness to give birth, it is necessary to examine the factors influencing their positive perception of marriage.

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Factors affecting single men and women's marriage so far have been identified such as demographic factors, family cohesion, parenting attitudes, adult attachment, and attitude toward having a child. This study focuses on the changing values of individuals and examines the love type, sexual assertiveness, and ambivalent sexism of single men and women to determine which of these factors affect the positive perception of marriage. The purpose of this study is to provide basic data on the establishment of a positive view of marriage for unmarried men and women and the policy for raising the will of childbirth.

Method

This study is a descriptive research study to identify the factors that influence the view of marriage of unmarried men and women. Data was collected from 254 unmarried men and women in Korea from May 1 to May 30, 2018, and research tools used structured questionnaire that consisted of 7 general characteristics, 24 questions of types of love, 18 questions of sexual self-assertion, 24 questions of ambivalent sexism and 11 questions of positive perception of marriage.

Based on [7]'s six types of love, the latest version of [8]'s scale, which was translated and used by [9], with a total of 24 questions including 4 questions per each type of love and with a Likert 5 points scale. The highest score was your type and in this study, the tool reliability Cronbach's α was found to be .86.

The sexual assertiveness scale used in this study was used with a tool developed by [10]. The scale consists of a total of 18 questions and 3 subfactors, with six questionsrejecting unwanted sexual contact, six questions preventing pregnancy and sexually transmitted diseases in sexual experience with a given partner, and six questions claiming desired sexual contact. The scale was graded on a Likert5-point scale.In this study, the tool reliability Cronbach 's α was found to be .84.

Based on the ambivalent sexism scale of [11],the Korean Multiple Sexism Inventory, which [12] was shortened and supplemented the K-ASI produced by [13], was used. The K-MI consists of 12 items that measure hostile sexism and 12 items that measure benevolent sexism. K-MSI consisted of 12 questions measuring hostile sexism, 12 questions measuring benevolent sexism and 24 questions in total. It consists of a Likert scale, higher scores mean higher sexism, and lower scores mean higher gender equality awareness.In this study, the tool reliability Cronbach 's α was found to be .94.

The measure of value on marriage used by [14] was modified and supplemented to the subject of the study, and 23 questions were analyzed for factor analysis, and 11 questions were selected for the positive perception of marriage and used as a scale of positive perception of marriage. It consists of a 5-point Likert scale, and the higher the score, the more positive perception of marriage is. In this study, the reliability of this was measured at Cronbach's α = .90.

Data were assessed by the average and standard deviation, t-test, ANOVA, Pearson correlation coefficients, and multiple regression using SPSS 22.0 program.

Result and Discussion

1. General characteristics of the subjects

The general characteristics of this study are shown in [Table 1]. This gender was 195 people (76.8 percent) and 59 people (23.2 percent), and their average age was 20.84±1.82. 112 respondents (44.1 percent) said they had a religion, 221 (including the present and past) had experience of Heterosexual relationship, and 131 (51.6 percent) had Intercourse experience. Sex-related knowledge acquisition channels accounted for 80 sex education programs (31.5%), mass media 78 people (30.7%), and friends (seniors) 77 people (30.3%). Most respondents answered 'Middle' at 183 (72%).

Table 1.General Characteristics

Variable	Categories	n	%
Gender	Male	59	23.2
	Female	195	76.8
Age		20.84(±1.82)	
Religious stats	Yes	112	44.1
	No	142	55.9

Cont... **Table 1.General Characteristics**

Heterosexual relationship experience	Yes, now	98	38.6
	Yes, past	123	48.4
	No	33	13.0
Intercourse experience	Yes	131	51.6
	No	123	48.4
Acquisition channel of Sex-related knowledge	Family	9	3.5
	Friends (Seniors)	77	30.3
	Sex education program	80	31.5
	Mass media	78	30.7
	Others	10	3.9
The economic level	High	39	15.4
	Middle	183	72.0
	Low	32	12.6

2. Descriptive Statistics for variables

The types of love, sexual assertiveness, ambivalent sexism, and positive perception of marriage of the subjects in this study are shown in [Table 2]. Types of love were followed by Eros (2.91±0.68), Pragma (2.78±0.79), Mania (2.75±074), Storge (2.60±0.83), Agape (2.50±0.81), and Ludus (2.33±0.60).

For sexual assertiveness, the average score of 18 items in 3 areas was 3.75 ± 0.55. In the subfactor of sexual assertiveness, the average of Reject to unwanted sexual behaviors was 3.94 points, Reject to unwanted sexual behaviors' average was 4.11 points, and Attempt to sexual behavior's average was 3.18 points.

Table 2. Descriptive Statistics for Variables

Variable		**Range**	**M±SD**	**Min**	**Max**
Type of Love Ludus Storge Mania Pragma Agape	Eros	1~5	2.91±0.68	1.00	5.00
	1~5	2.33±0.60	1.00	5.00	
	1~5	2.60±0.83	1.00	5.00	
	1~5	2.75±074	1.00	5.00	
	1~5	2.78±0.79	1.00	5.00	
	1~5	2.50±0.81	1.00	5.00	
Sexual assertiveness Pregnancy-STD preventions factors Attempt to sexual behavior	Reject to unwanted sexual behaviors	1~5	3.94±0.84	1.50	5.00
	1~5	4.11±0.86	1.17	5.00	
	1~5	3.18±0.49	1.17	4.78	
	Mean	1~5	3.75±0.55	1.28	4.78

Cont... **Table 2. Descriptive Statistics for Variables**

Ambivalent sexism	HS: Hostile sexism	Dominant paternalism (HP)	1~5	1.83±0.73	1.00	4.00
		Competitive gender differentiation (HD)	1~5	1.83±0.79	1.00	4.75
		Heterosexual hostility (HH)	1~5	1.86±0.84	1.00	4.50
		HS mean	1~5	1.84	1.00	4.25
	BS: Benevolent sexism	Protective paternalism (BP)	1~5	2.01±0.80	1.00	4.75
		Complementary gender differentiation (BD)	1~5	2.51±0.89	1.00	5.00
		Heterosexual intimacy (BH)	1~5	2.24±0.92	1.00	4.50
		BS mean	1~5	2.25	1.00	4.50
Positive perception of marriage		Positive perception of marriage	1~5	3.15±0.74	1.00	5.00

At the level of ambivalent sexism, the mean of hostile sexism was 1.84 points and the mean of benevolent sexism was 2.25, both lower than average. Complementary gender differentiation of BS (2.51) were the highest, followed by Heterosexual intimacy of BS (2.24) and Protective paternalism (2.01) of BS. Next, Heterosexual hostility of HS (1.86), and dominant paternalism of HS (1.83) and competitive gender differentiation of HS (1.83). The positive perception of marriage was 3.15 ± 0.74.

3. Positive perception of marriage according to the general characteristics.

As a result of analyzing whether there is a difference in positive perception of marriage according to the general characteristics of the study subjects, there was a statistically significant difference according to the acquisition channels of knowledge related to gender and gender as seen in [Table 3]. First, the gender ($t = 3.958$, $p < 0.001$) showed higher positive perception of marriage than the female (3.05), but no statistically significant depending on religion, Heterosexual relationship experience, Intercourse experience, and economic level. Sex-related knowledge acquisition channels ($t = 3.021$, $p = .019$) showed higher positive perception of marriage than mass media (2.98 points) in the case of friends or seniors (3.35 points).

4. Correlation among Main Variables

[Table 4] shows the result of analyzing the correlations among the main variables of this study. Positive perception of marriage of Korean unmarried women was positively correlated with all types of love (Eros: $r = .342$, Ludus: $r = .150$, Storge: $r = .255$, Mania: $r = .241$, Pragma; $r = .286$, Agape: $r = .348$; $p < 0.001$), negative correlation with sexual assertiveness ($r = -.211$, $p < .001$), and all subfactors of ambivalent sexism are positive correlations.

5. Factors affecting marriage values in unmarried men and women

To identify the factors affecting positive perception of marriage, the dependent variables of this study, the result of a stepwise multiple regression analysis using six types of love, sexual assertiveness, and six subfactors of ambivalentsexism, which are the main variables of this study, are shown in [Table 5].

As a result of multiple regression analysis, variables affecting the positive perception of marriage of unmarried men and women were complementary gender differentiation (B = .148), Eros (B = .152), Agape (.193), and heterosexual hostility (-. 173), and the explanatory power of these four variables was 34.2%.

Table 3. Positive perception of marriage according to the general characteristics.

Variable	Categories	The view of marriage		
		M±SD	T /F(p)	
Gender	Male		3.47±0.76	3.958(<.001) *
	Female		3.05±0.71	
Religion	Yes	3.08±0.73	3.23±0.75	1.604(.110)
	No			
Heterosexual relationship experience	Yes, now		3.15±0.78	1.269(.283)
	Yes, past only		3.19±0.75	
	No		2.96±0.51	
Intercourse experience	Yes		3.12±0.84	-0.473(.637)
	No		3.17±0.61	
Acquisition channel of Sex-related knowledge	Family a		3.10±0.65	3.021(.019)* b>d
	Friends (Seniors) b		3.35±0.64	
	Sex education program c		3.15±0.68	
	Mass media d		2.98±0.88	
	Others e		3.14±0.74	
The economic level	High		3.21±0.61	1.031(.358)
	Middle		3.11±0.76	
	Low		3.29±0.74	

*p<.05

Table 4. Correlation among Main Variables

Variables r(p)		Positive perception of marriage	Sexual asserti-veness Dominant paternalism	Ambivalent sexism					
				Competitive gender differentiation	Heterosexual hostility	Protect paternalism	Complementary gender differentiation	Heterosexual intimacy	
		r(p)	r(p)	r(p)	r(p)	r(p)	r(p)	r(p)	
Positive perception of Marriage		1	-.211**	.197**	.178**	.137*	.246***	.506***	.419***
Type of Love	Eros	.342***	-.199**	.076	.117	.113	.129*	.252***	.178**
	Ludus	.150*	-.279***	.303***	.315***	.330***	.377***	.209**	.229***
	Storge	.255***	-.124*	.157*	.154*	.175**	.114	.123	.140*
	Mania	.241***	-.129*	.149*	.151*	.188**	175**	.182**	.298***
	Pragma	.286***	-.182**	.172**	.163**	.159*	.287***	.228***	.355***
	Agape	.348***	-.374***	.348***	.332***	.329***	.335***	.270***	.380***
Sexual assertiveness		-.211**	1	-.565***	-.568***	-.503***	-.501***	-.396***	-.464***

Cont... **Table 4. Correlation among Main Variables**

Ambivalent Sexism	Dominant paternalism	.197**	-.565***	1	.907***	.813***	.586***	.493***	.557***
	Competitive gender differentiation	.178**	-.568***	.907***	1	.808***	.561***	.432***	.516***
	Heterosexual hostility	.137*	-503***	.813***	.808***	1	.547***	.486***	.546***
	Protect paternalism	.246***	-.501***	.586***	.561***	.547***	1	.573***	.661***
	Complementary gender differentiation	.506***	-.396***	.493***	.432***	.486***	.573***	1	.686***
	Heterosexual intimacy	.419***	-.464***	.557***	.516***	.546***	.661***	.686***	1

*p<.05, **p<.01, ***p<.001

Table 5. Factors affecting marriage values in unmarried men and women

Variable	B	S.E.	β	T	p	Adj. R2
Constant	1.478	.185		8.000	<.001	.
Complementary gender differentiation (Benevolent sexism)	.424	.050	.509	8.488	<.001	.253
Eros (Type of Love)	.152	.063	.141	2.414	.071	.300
Agape (Type of love)	.193	.055	.212	3.525	.001	.317
Heterosexual hostility	-.173	.053	-.196	-3.248	.001	.342
F(p) = 33.911(p<.001), Durbin-Watson = 1.881						

Discussion

The nation's current efforts to solve the serious low birthrate problem are being mainly aimed at married couples. However, in a situation where non-marriage and later marriage are increasing due to changes in individual values, it is necessary to identify the factors that affect the positive marriage attitude of single men and women, which is the biggest factor in the number of births, along with the existing solutions.The formation of primary values in adults can be said to be through interaction with parents at home. When you're in your 20s and experience social life and experience various sexual and sexist experiences, you're going through a change in values again. This study was conducted to confirm how the various gender-related values of single men and women of this time affected positive perception of marriage.

In a study on the relationship between quantitative gender discrimination and gender equality in Korean officialdom, hostile sexism (HS) has negative effects on gender equality, and benevolent sexism haspositive effects on gender equality. These results suggest that the subjects thought that men should protect women who were weak, that women complemented what men did not have, and that being intimately romantic with women would make gender equal[15].

Efforts are expected to be made as gender equality awareness, which can be seen as a reflection of the positive influence of complementary gender roles and the

negative influence of hostile heterosexuality and hasthe positive effect on the positive perception of marriage.

Conclusion

In this study, single men and women in South Korea have been shown to help create positive perception of marriage when awareness of complementary gender differentiation has been raised and heterosexual hostility has been reduced. Since the perception of gender equality, which reflects the positive influence on complementary gender differentiation and the negative influence on heterosexual hostility, may also be seen as having the positive influence on the positive perception of marriage, social measures and policies will be needed to take into account these values of single men and women. The purpose of this study is to provide basic data on policy preparation for improving fertility rate in Korea, which is becoming increasingly low by raising the positive perception of marriage for unmarried men and women. However, this study is based on convenience sampling of unmarried men and women in some parts of South Korea. Therefore, it is difficult to generalize the results of this study, and future repeated research and extension studies are needed.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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A Study on the Influence of Nursing College Student's Service Satisfaction on Moral and Psychological well-being

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Abstract

Background/Objectives The purpose of this study is to provide basic data for the development of sustainable service program for all nursing students by analyzing the relationship between service satisfaction, morality and psychological well - being.

Methods/Statistical analysis: This is a descriptive research study conducted from November to December 2018. Data collection was conducted among 216 college students who agreed to the research and completed the questionnaire. Data were analyzed using t-test, ANOVA and Scheffe post-test, and Pearson correlation coefficients were calculated using SPSS 24.0. The results of the study showed that the service satisfaction was positively correlated with morality and psychological well - being.

Findings: As a result of the study, psychological well - being showed a significant positive correlation with morality(r=.54 *p<.001*), and service satisfaction showed a significant positive correlation with morality(r=.55 *p<.001*) and psychological well - being(r=.40 *p<.001*). In the multiple regression analysis, four variables accounted for 35.5% of total service satisfaction (F = 29.06, p <.001). And among the four predictors, service participation period and service activity polarity are significant variables that explain service satisfaction. Groups with more than three years of service were found to have higher levels of service satisfaction than other groups.The level of service satisfaction was higher than those in which very active participation is actively participated, those in normal or passive participation, and those in very passive participation. And the groups actively participating in the service satisfaction level were higher than those that participated passively or very passively. In addition, the groups that participated very passively in the degree of service satisfaction were lower than those that participated very actively, actively participated and normally participated. The results of this study suggest that service satisfaction can have a positive impact on psychological well - being for personal growth and morality which can enhance social responsibility.

Improvements/Applications: Based on the results of this study, follow-up research is needed to develop various programs to improve service satisfaction and become a sustainable service at the entire lifetime level.

Keywords: *Nursing, college students, service satisfaction, morality, psychological well – being*

Introduction

The nation's rapid economic development has led to conflicts between classes and generations and the widening gap between the rich and the poor, posing a serious social problem. Volunteer activities of sharing and caring through voluntary participation of each member of society as well as pan-national efforts are desperately needed to solve these complex social problems. The move is seen as an important part of national policy and also as part of enhancing national competitiveness, recognizing its importance in social, economic, and educational settings in countries around the world, including the United States and Japan[1].

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In modern society, universities are highlighted by their service to society as well as their educational and research functions.The university recognized the importance of community service function to directly [8]or indirectly solve various problems in modern society as well as the education and research function of the university in terms of social awareness, and the government added community service to the evaluation items in 1995 in response to the demands of this era, thereby promoting community service practice and community service education[2].

The significance of volunteering is high in that students at universities that train talent can have opportunities for love, consideration and understanding of humans, and self-fulfillment through volunteering. In other words, volunteering is an activity that achieves the realization and self-realization of altruism by providing services based on the spirit of human respect and democracy through the prevention and resolution of social problems, voluntary participation in the public service of the nation and no pay[3]. The college-age period is an important time to link volunteer activitiesthat were reconstructed at universities based on the experience of elementary, middle and high schools to volunteer throughout their entire lives until adulthood[4].

Volunteer activities can be seen as a measure of the effectiveness of volunteer work and as an important factor in the participation and continuation of volunteer work[5].

Morality, meanwhile, is the ability to judge the right and wrong of human behavior, i.e. to determine which norms to decide on[6]. In a study on the relevance of university students' experience in volunteer activities and morality, there is a report that the level of morality is high in college students with experience in volunteer activities, and the longer the service period, and it has a positive effect on the development of morality[7,8]. However, there are not many studies that suggest that volunteer work has affected the morality of nursing students.

The ultimate goal is for all humans to live in pursuit of happiness. Quality life for this is a conscious, subjective and cognitive judgment, which defines as subjective life satisfaction or psychological well-being[9]. In the study of the relationship between sense of well-being and volunteerism, it is considered a measure of the condition of life as a result of human behavior. It has important implications as an indicator of how happy or satisfied a human life is[10].

A satisfaction study of overseas Taekwondo volunteers showed that satisfaction has a significant effect on the target consciousness, self-acceptance and environmental acceptance, all of which are subcomponents of psychological well-being[11]. In conclusion, volunteering provides not only a simple meaning of leisure activities, but also an opportunity to lead a fruitful life, thereby gaining the results of self-satisfaction and self-realization of the organization to which the volunteers belong, and has a positive effect on the psychological well-being of the volunteers[12].

This study aims to identify the relationship between service satisfaction and morality and psychological well-being among nursing college students and provide basic data on the development of sustainable service programs at the whole life level to help foster morality and enhance psychological well-being as prospective medical personnel.

Method

The study participants extracted nursing students from one university in C City from October 1 to October 30, 2018.The sample size of the study subjects was used using the G*Power 3.1 program, and the number of samples was calculated by entering a significant level of 0.05 for multiple regression analysis, a power of 0.8 and an effect size of 0.15. A total of 230 questionnaires were distributed and 216 questionnaires were finally used.

This study is a descriptive research study to investigate general characteristics, morality, service-related inadequacy and service-based status of nursing college students, and to identify factors that affect service-based status.

The data collected by the participants was explained to be used only for research purposes and may be withdrawn at any time if they do not wish to participate in the study, and was conducted after receiving written consent. Data collection took an average of 15 to 20 minutes.

The service satisfaction level is comprised of 18 questions using tools from Shin[13] and consists of a five-point scale from five points of 'very yes' to one point of 'not at all'. A higher score means a higher level of satisfaction with volunteer work, and Cronbach's alpha

in this study was .949.

Morality is a five-point scale from 'very yes' to 'not at all' using the tools of Seo[14] and consists of two sub-domain areas of altruism and social responsibility. Higher scores mean higher morality, and Cronbach's alpha in this study was .846.

The psychological well-being is made up of 31 questions using Kim[15] tools and consists of a five-point scale ranging from 'Very Yes' to 'Not at all'. The higher the score, the higher the psychological well-being. Cronbach's alpha in Kim's study was .923 and this study was .906.

The collected data was analyzed using the spss win 24.0 program. The demographic and social characteristics of the subjects and the characteristics of the service association used the error and percentage, mean and standard deviation. The difference in service satisfaction according to characteristics was analyzed by t-test and ANOVA, and the post-verification method was used by the Scheffe method. Volunteer satisfaction, morality and psychological well-being were obtained by means and standard deviation, and their correlation was verified using Pearson's correlation coefficiency. Factors affecting service satisfaction were analyzed by multiple return analysis.

Result and Discussion

1. General characteristics of the subjects

The age of the subjects was between 20-55 and 20.80 on average. Female students numbered 86.6 percent (187), and 53.7 percent (116) had religion. The service period was less than one month to one year (40.7 percent), and the service type was the highest (45.4 percent). 52.3% (113) were actively participating in volunteer activities, while 22.7% (49) were very *active (Table 1).*

Table 1: Characteristics of the subjects

Characteristics	**Categories**	**M±SD(Range) or n(%)**
Age(yrs)		20.80±3.70(19-55)
Gender	Female	187(86.6)
	Male	29(13.4)
Grade	1st	42(19.4)
	2nd	66(30.6)
	3rd	44(20.4)
	4th	64(29.6)
Religion	Yes	116(53.7)
	No	100(46.3)
Service participation period	< 1month	39(18.1)
	1month~ < 1year	88(40.7)
	1year~ < 3year	62(28.7)
	≥3year	27(12.5)
Volunteer activity details	hard service	98(45.4)
	Learning, Living Guide	48(22.2)
	household support	6(2.8)
	recreation	15(22.2)
	Awareness improvement promotion	7(3.2)
	Overseas volunteering	11(5.1)
	Other	31(14.4)
The active nature of volunteer work	very active	49(22.7)
	active	113(52.3)
	usually	40(18.5)
	passive	11(5.1)
	very passive	3(1.4)

2. The morality, psychological well-being, and service satisfaction of the subject

The morality, psychological well-being and service satisfaction scores of the subjects were 57.91, 110.07 and 65.84, respectively (Table 2).

Table 2: Descriptive Statistics of Major Variables

Variable	M±SD	Range
morality	57.91± 6.93	34- 80
psychological well-being	110.07±13.47	78-153
service satisfaction	65.84±10.71	22- 90

3. Differences according to demographic and service-related characteristics of service satisfaction

As a result of grasping the status of service according to demographic and social characteristics, there were significant differences depending on duration of participation (F=7.00, *p<.001*), and activism (F=10.87, *p<.001*).As a result of grasping the status of service according to demographic and social characteristics, there were significant differences depending on duration of participation (F=7.00, *p<.001*), and activism (F=10.87,*p<.001*).

Groups with three years or more were found to be more satisfied with their service than those with less than one month of service or a group from more than one year to less than three years. The groups that actively participate in the event had higher levels of service satisfaction compared to those that actively participate, usually participate, passively participate, and very passive participation. And the groups that actively participate showed higher levels of service satisfaction than those that participated passively or very passively, while those that participated very passively showed lower levels of service satisfaction than those that participated very actively, actively, and usually(Table 3).

Table 3: Differences in Service Satisfaction by Personal Characteristics

Characteristics	Categories	Service Satisfaction	
		M±SD	t/F(p) Scheffe
Gender	Female	65.85± 9.76	0.02(.977)
	Male	65.79±15.75	
Grade	1st	64.30± 9.41	1.70(.167)
	2nd	67.24± 8.47	
	3rd	63.43±11.68	
	4th	67.07±12.54	
Religion	Yes	66.97±10.26	1.66(.098)
	No	64.54±11.11	
Service participation period	< 1monthа	60.71±10.05	7.00(< .001) d>a,c
	1month~ < 1yearb	66.17± 9.81	
	1year~ < 3yearc	65.72± 9.69	
	≥3yeard	72.48±13.13	
Volunteer activity details	Hard service	65.61± 9.43	1.47(.188)
	Learning, Living Guide	68.58±10.14	
	Household support	60.16±11.40	
	Recreation	64.26± 6.29	
	Awareness improvement promotion	67.85±12.08	
	Overseas volunteering	68.63±14.57	
	Other	62.77±14.12	
The active nature of volunteer work	very active(a)	71.51±11.18	10.87(< .001) a>b,c,d,e b>d,e e<a,b,c
	active(b)	65.95± 9.95	
	usually(c)	62.20± 7.00	
	passive(d)	59.09± 8.98	
	very passive(e)	42.66±17.92	

4. Correlation among observed variables

Psychological well-being showed the results of a significant quantitative correlation with morality(r=.54 *p<.001*) and service satisfaction showed a significant quantitative correlation with morality(r=.55 *p<.001*) and psychological well-being(r=.40 *p<.001*) (Table 4).

Table 4: Correlations Among Observed Variables

	morality r(p)	**psychological well-being r(p)**
psychological well-being	.54(<.001)	
service satisfaction	.55(<.001)	.40(<.001)

5. Factors Affecting Service Satisfaction

Regression analysis was performed to identify the factors affecting the service satisfaction of the nursing student. Among the general characteristics, the regression model included the period of service participation, moral and psychological well-being that showed significant differences in service satisfaction, which showed a significant correlation between service activity polarity and service satisfaction. The tolerances of the regression model designed for this study were calculated between .66 and .61, with a range of 1.03-1.50 variance expansion factors. These findings mean that this regression model does not have a multi-pronged problem. The Durbin-Watson value, which was conducted to verify the independence of the residuals, was also found to be 2.01 without autocorrelation.

The multiple regression analysis showed that the four variables explained 35.5% of the total service satisfaction variables, and that the duration of service participation and service activity polarity among the four predictors were significant variables that explained service satisfaction.

Groups with more than three years of service were found to have higher levels of service satisfaction than those with less than one month of service or less than three years from more than a year of service. In addition, the level of service satisfaction was higher than that of those who actively participate, usually participate, or participate passively or very passively.

In addition, the groups actively participating were more likely to have a higher level of service satisfaction compared to those that participated more passively and more passively, and those that participated were less likely to have a higher level of service satisfaction than those that participated more actively, actively, and generally (Table 5).

Table 5: Factors Affecting Service Satisfaction

Variable	**β**	**t**	**p**
Morality	.430	6.333	.001
Psychological well-being	.129	1.941	.054
Service participation period	-.156	-2.772	.006
The active nature of volunteer work	.096	1.602	.111
R2=.355		F=29.06	p<.001

Discussion

This study was conducted to check the difference between the service satisfaction level of nursing college students according to the demographic and service experience characteristics, and to check the correlation between morality and psychological well-being.

Research shows that psychological well-being has a significant quantitative correlation with morality, and service satisfaction has a significant quantitative correlation with morality and psychological well-being. Kang's study[16]shows that volunteer satisfaction and psychological well-being have a static correlation, and that the longer the service period and the higher the service activity, the higher the level of service satisfaction, supporting this study.

In Yoon's study[17], the more participating time, the more active the attitude, the more satisfied the attitude, the more affecting the development of morality, so the duration of participation and attitude service satisfaction are important factors. Therefore, it is required to develop a program in which volunteer activities of current universities can maximize motivation and participation satisfaction of university students.

Conclusion

This paper studied the relationship between the nursing college student's service satisfaction, morality and psychological well-being. The purpose of this study is to demonstrate to nursing college students that they can enhance the moral and psychological well-being they should have as a prospective health care person by positively influencing their morality and psychological well-being when service satisfaction is high. Psychological well-being showed significant quantitative correlation with morality and service satisfaction showed significant quantitative correlation with morality and psychological well-being. And it turns out that the duration of service participation and active service activity are significant variables that explain service satisfaction level. When service participation period is more than 3 years and service participation is very active, service satisfaction was high. Therefore, it is necessary to develop volunteer programs that are active and sustainable throughout their lives.

Ethical Clearance: Not required

Source of Funding: Nil

Conflict of Interest: Nil

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Factors Influencing the Preparation of Manuals for Emotional Labor and the Provision of Programs Depending on Type of Trade in South Korea

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Abstract

Background/Objectives: This study investigated the factors which influence on emotional labor among those engaged in the customer service industry and the Preparation of Manuals for Emotional Labor and the provision of programs to solve problems.

Methods/Statistical analysis: Field surveys of the actual management of emotional labor were conducted on 585 high-risk businesses from January 2015 through June 2016 in south Korea. A total of 581 were analyzed, excluding four with missing values. SPSS ver. 23.0 program was used for all data analyses. Differences by trade were analyzed through chi-square test and ANOVA. Multiple regression analysis by variable was performed to identify the factors influencing the preparation of manuals and the provision of programs.

Findings: Findings show that big box stores ranked first in terms of the preparation of manuals and the provision of programs. Significantly impacting factors were designated staff and committee, budget, level of understanding of business reality, and organizational culture. They varied slightly depending on the trade they belong to.

Improvements/Applications: For a wider and better implementation, businesses need to offer not only support to individuals and organizations but budget. In addition, they need to understand the state of emotional labor among workers and their request in order to shape corporate culture that supports business owners, managers, and customers.

Keywords:*Emotional labor, Manuals, Programs, Organizational culture, Human resources and organization, Understanding of business reality*

Introduction

[9]After Hochschild's Emotional Labor (1983), experts and those working at civic groups in Korea started to raise the need for the management of emotional labor since the middle of the 2000s. This drew a broad attention from Koreans particularly when 'nut rage' became a social issue (a case where a daughter of the CEO of Korean Airline Co., Ltd. yelled to cabin crew while onboard a plane moving from a slot to taxi of New York and forced the pilot to change direction backwards to JFK airport on December 5, 2014). Since then, difficulties of emotional laborers were brought to light and attracted due attention from the public.

The customer service industry mostly forces those working in its field not to express their emotion and to wear guided facial expressions and bodily movement. This is why they are called as emotional laborer [1]. The trade largely consists of service-oriented businesses, including big box stores, hotels, department stores, clinics and hospitals, and bus, taxi and other public transportations.

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In 2000, Grandey suggested a model that explains emotional labor is not just a social phenomenon but an issue that affects individuals and organizations as a whole. The model insists that emotional labor decreases job satisfaction among individuals and causes damages to business performance and turnover [2].

The reason why emotional labor triggers such problems can be explained through emotional inconsistency. The emotional inconsistency is a state in which employees behave in different ways other than in what they really feel for various reasons, including sales growth pressures [3], improper conditions or customer's excessive request [4], and employee's characteristics [5]. These mismatches occur, going beyond the trade or occupation they are working in [6]. These emotional disparities frequently lead to individual's exhaustion [7] and emotional deviation [8]. In addition, they increase turnover rate [9] and encourage counter-productive behaviors [10], affecting organizations.

This study is to identify the current state of manuals prepared in workplaces and emotional labor programs delivered to those employees as well as the factors influencing them, in order to contribute for the protection of emotional laborers.

Method

This study used nationwide emotional labor management data provided by labor supervisors of the Ministry of Employment and Labor. The data is a result of survey done on high-risk workplaces of customer services from January 2015 to June 2016. Except the four with missing data, a total of 581workplaces were analyzed. Institutional Review Board (IRB: EU19-24) in South Korea.

Preparation of Manuals bears two survey questions: businesses have an internal manual that can control too excessive consumer's complaint, businesses provide a measure designed to cope with customer's violence or other violent behaviors (Perfect score is 2.).

Provision of Programs is made up with six questions: whether a comprehensive emotional labor management is drafted, a healing program for emotional laborer is provided, a health promotion program is offered to emotional laborers, a training course that helps emotional laborers control their work, emotional labor management project is evaluated, training program will continue (Perfect score is 6.).

Designated Staff and Committee carries three questions: businesses designated a person in charge or a department reserved for the protection of emotional laborers, businesses provided a person in charge of managing emotional laborer's health, emotional labor related issues are handled by occupational health and safety committee (Perfect score is 3.).

The budget required for emotional labor management consists of two questions: the budget for managing emotional laborers is allocated,participants in emotional labor training programs are incentivized (Perfect score is 2.).

The understanding of emotional labor in business reality consists of two questions: whether or not data about the level and frequency of excessive consumer complaint is recorded: the request of emotional labor management by employees is investigated (Perfect score is 2.).

The organizational culture consists of four questions: labor and management are collectively working on the management of emotional labor out of their own will, a business owner finds it necessary to manage emotional labor, managers have a plan to protect and support emotional laborers at a time of conflict between them and consumers, internal guideline for controlling excessive consumer complaint is prepared (Perfect score is 4.).

Result

1. Difference in variables by trade

With regard to the preparation of manuals, there were differences among trades. Big box stores scored 1.5 points out of 2, ranked first, and others marked 0.8 to 1. Regarding the provision of programs, the big box section scored 4.7 points out of 6, the highest, followed by hotels (3.1), medical institutions (2.7), others (2.5), andtransportation (2.2) [table 1].

2.Factors influencing manual preparation for emotional labor

The regression model for the preparation of manuals explained 49.7% in overall workplaces, exhibiting significant differences in designated staff and committee (β=0.113, p= 0.004), budget (β=0.202, p= <0.001), organizational culture (β = 0.438, p = <0.001), and understanding of business reality (β = 0.132, p = <0.001) [table 2].

3.Factors influencing on the activation of programs for emotional labor

The regression models for the provision of programs explained 70.4% in overall workplaces, displaying significant influence in designated staff and committee (β=0.266, p= <0.001), budget (β=0.294, p= <0.001), organizational culture (β = 0.264, p = <0.001), and understanding of business reality (β = 0.201, p = <0.001) [table 3].

Discussion

Previous studies suggested that an emotional labor manual should carry measures that can help emotional laborers handle excessive complaints and consumer's foul languages [9-10]. 87.2% of those working in the distribution sector experienced unpleasant languages, and 19.1% of them underwent sexual harassment from consumers [11]. In addition, 98.1% of nurses said they experienced violence (of verbal and physical as well as threat) from patients and their caregivers over the recent one year [12]. Considering this reality, the level of manual preparation in workplaces is low.

It is the time for the Korean government to come up with a comprehensive measure which all businesses should comply with [13]. In order to manage emotional labor in workplace, such a manual that can protect emotional laborers from black consumers should be prepared [14]. Several studies found that the provision of manuals, training, and healing program, all at a time, to those working at sales positions showed improvement in emotional labor intensity, depression, social approval, exhaustion, job satisfaction, and intention of turnover. Yet, the provision of training and healing program only ended in significantly lowered depression [15].

With regard to the preparation of manuals, there were differences among trades. These differences can be attributable to the phased adoption of the preparation. For instance, issues centered on emotional labor in the call center and the retail sector have been around in the Korean society longer than in other trades, including medical institutions – nurses - and transportation [16]. In the meantime, the hotel business is where emotional labor manuals were first discussed, and thus has reaped certain levels of achievement [17]. Regarding the provision of programs, transportation was the lowest because this sector was a small-scale one and frequently covered by one single laborer. The trade's features make it hard to provide such a program that aims at a group of people.

Designated staff and committee left significant influence on big box stores and hotels; budgeting impacted big box stores, hotels, transportation, and others, other than medical institutions. According to the theory of planning, arranging staff and committee is the first thing to do, and then comes budget allocation for the mission [18]. When working on the arrangement, it is desirable to designate a department or staff who will deal with customer complaints, and to secure budget for training and consultation, from the money needed for safety and health management [19].

Traditionally, the value of emotional labor has not been properly appreciated [20], so medical institutions in which skilled professionals, including doctors and nurses, work put focus on their expertise, instead of the labor[21]. Given that, the fact that understanding of business reality, particularly in the medical sector, leaves influence on the preparation of manuals can be construed as an important change that began to see nurse's care an emotional labor[22].

Table 1. Difference in general features and variables by trade

Item	Category	Big Box Store (N=167)	Hotel (N=76)	Hospital (N=149)	Transportation industry (N=98)	Others (N=91)	χ^2 or F	*p*
Numbers of workers	>50	6(3.6)	17(22.4)	3(2.0)	6(6.1)	41(45.1)	142.524	<0.001
	50-299	147(88.0)	47(61.8)	109(73.2)	75(76.5)	43(47.3)		
	≤300	14(8.4)	12(15.8)	37(24.8)	17(17.3)	7(7.7)		
	Mean (S.D.)	158.40 (106.70)^b	168.91 (153.86)	346.74 (744.41)^a	230.74 (231.11)	202.81 (616.70)	3.724	0.005 (a>b)
Designated staff and committee		2.16(0.87)^a	1.62(1.02)^{bc}	1.68(1.11)^b	1.34(1.05)^{bc}	1.23(0.97)^c	17.202	<0.001 (a>b>c)
Budget		1.27(0.73)^a	0.92(0.86)^{ab}	0.77(0.84)^b	0.83(0.90)^b	0.79(0.84)^b	9.466	<0.001 (a>b)
Understanding of emotional reality		1.43(0.71)^a	1.29(0.76)^{ab}	1.08(0.87)^b	0.97(0.88)^b	1.13(0.82)^{ab}	6.465	<0.001 (a>b)
Organizational culture		3.50(0.81)^a	2.29(1.20)^b	2.32(1.43)^b	2.35(1.57)^b	2.44(1.29)^b	25.197	<0.001 (a>b)
Preparation of manuals		1.50(0.68)^a	0.84(0.80)^b	0.81(0.84)	0.87(0.93)^b	1.00(0.86)^b	19.010	<0.001 (a>b)
Provision of programs		4.75(1.64)^a	3.08(2.13)^b	2.67(2.24)^b	2.24(2.31)^b	2.52(2.20)^b	33.391	<0.001 (a>b)

Table 2.Factors influencing manual preparation for emotional labor

Item	Big Box Store		Hotel		Hospital		Transportation industry		Others		Total	
	β*	*p*	β	*P*	B	*p*	β	*p*	β	*p*	β	*p*
Numbers of employees	-0.057	0.397	-0.013	0.885	0.056	0.372	-0.027	0.673	0.184	0.020	0.029	0.320
Designated staff and committee	0.190	0.019	0.315	0.006	0.028	0.739	0.129	0.126	0.117	0.241	0.113	0.004
Budgeting	0.071	0.019	0.436	<0.001	0.098	0.213	0.261	0.016	0.243	0.018	0.202	<0.001
Understanding of emotional reality	0.123	0.100	-0.186	0.086	0.236	0.004	0.191	0.058	0.294	0.004	0.132	0.001
Organizational culture	0.321	<0.001	0.176	0.131	0.388	<0.001	0.350	0.001	0.203	0.065	0.438	<0.001
Constant		0.818		0.739		0.190		0.150		0.715		0.014
R^2	0.282		0.468		0.473		0.672		0.521		0.502	
Adjusted R^2	0.259		0.430		0.454		0.654		0.493		0.497	
F	12.628		12.302		25.627		37.689		18.478		115.709	
p	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001	

* β= Standardized regression weights

Table 3. Factors influencing on the activation of programs for emotional labor

Item	Big Box Store		Hotel		Hospital		Transportation industry		Others		Total	
	β*	*p*	β	*P*	B	*p*	β	*p*	β	*p*	β	*p*
Numbers of employees	0.007	0.906	0.180	0.012	0.071	0.115	0.035	0.467	0.096	0.129	0.033	0.146
Designated staff and committee	0.303	<0.001	0.284	0.002	0.126	0.034	0.266	<0.001	0.353	<0.001	0.266	<0.001
Budgeting	0.177	0.007	0.333	<0.001	0.365	<0.001	0.334	<0.001	0.370	<0.001	0.294	<0.001
Understanding of emotional reality	0.145	0.017	0.264	0.002	0.259	<0.001	0.341	<0.001	0.175	0.034	0.201	<0.001
Organizational culture	0.321	<0.001	0.132	0.148	0.266	<0.001	0.086	0.253	0.117	0.184	0.264	<0.001
Constant		0.587		0.155		0.190				0.252		0.001
R2	0.492		0.676		0.734		0.814		0.689		0.706	
Adjusted R2	0.477		0.653		0.724		0.804		0.670		0.704	
F	31.238		29.213		78.782		80.599		37.606		276.577	
p	<0.001		<0.001		<0.001		<0.001		<0.001		<0.001	

* β= Standardized regression weights

Korea's organizational culture, a merit system designed to collectively pursue ultimate goals, has been said to have a component that encourages employees to develop themselves under a rational and cooperative atmosphere, and this is believed to positively influence inner elements of emotional labor[23]. In addition, innovative culture and relation-based organization culture reduced emotional labor[24].

Conclusion

Based on the findings, this study suggests the followings: First, in order to support emotional laborers and improve their health, manuals that can protect emotional laborers from consumer's violence and control excessive complaints in the face-to-face workplaces should be prepared. Second, provision of programs, including training for such laborers, should be regularly planned and continuously performed in

workplaces. Third, designated staff and organization should be provided so that the preparation of manuals and the provision of programs are conducted. In addition, for that purpose, budget should be allocated, and current state of emotional labor should be studied. Fourth, since each workplace shows different conditions from another, the labor and the management should autonomously manage emotional labor. Furthermore, business owners and managers should support such management efforts and shape organization culture that communicates with customers about those activities.

Ethical Clearance: Not required

Source of Funding: Nil

Conflict of Interest: Nil

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Relationship Between Hyperglycemia and Periodontal Symptoms in Korean Type 2 Diabetes Mellitus Patients Aged ≥ 50 Years

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Abstract

Background/Objectives: Diabetes mellitus is a disease that reduces quality of life and has a variety of oral manifestations. This study analyzed the relationship between the hemoglobin A1c level, an index that reflects the average blood glucose level over the preceding 2 to 3 months, and self-reported periodontal symptoms in individuals with type 2 diabetes mellitus.

Methods/Statistical analysis: The participants in this cross-sectional study were 156 patients aged ≥ 50 years who had type 2 diabetes mellitus. A questionnaire was used to investigate their general characteristics, oral health behaviors, and self-reported periodontal symptoms. The hemoglobin A1c test was conducted to assess the blood glucose level of the participants. The outcome variable was the number of self-reported periodontal symptoms. Independent t-tests and logistic regression analysis were performed for statistical analysis.

Findings: Self-reported periodontal symptoms differed significantly according to sex, average monthly income, frequency of tooth-brushing, recent dental check-ups and hemoglobin A1c level ($p < 0.05$). In the regression model adjusted for general characteristics and oral health behaviors, a higher hemoglobin A1c level was associated with a higher risk of periodontal symptoms ($p < 0.01$). The results of this investigation indicate that chronic hyperglycemia is associated with the development of periodontal symptoms.

Improvements/Applications: In future studies, additional risk factors for periodontal inflammation should be considered and the number of participants should be increased.

Keywords: *Diabetes mellitus, Hemoglobin A1c, Hyperglycemia, Oral health, Periodontal symptoms*

Introduction

Diabetes mellitus is a chronic disease characterized by hyperglycemia, which causes abnormal changes in the metabolism of carbohydrates, proteins, and lipids[1]. Diabetes mellitus is a growing health problem worldwide. In Korea, one in eight adults aged ≥ 30 years is affected by diabetes[2], and it remains difficult to control risk factors for the disease[3]. As diabetes mellitus causes a variety of life-threatening complications and reduces patient quality of life[4], all health professionals must be aware of practices for effective management of the disease.

There have been various reports on the chronic complications of diabetes mellitus, which include cardiovascular and kidney diseases[5]. Compared with healthy individuals, patients with diabetes mellitus exhibit more severe periodontal tissue destruction and a higher prevalence of dental caries[6,7]. The prevalence rates of tooth mobility and gingival recession are also higher in patients with diabetes mellitus[8]. Despite increasing evidence of a relationship between diabetes mellitus and oral health status, both health professionals and patients with the disease continue to exhibit a lack awareness of the importance of dental care[9].

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Previous studies of the oral manifestations of diabetes mellitus have generally used clinical *periodontal* parameters, such as pocket depth and periodontal attachment loss, to assess the participants' periodontal health status[10]. However, based on the definition of health of the World Health Organization, as well as from a quality of life perspective, patient-centered measures, such as self-reported health status, are particularly important. Moreover, the fasting plasma glucose test, which was primarily used to assess the blood glucose level of subjects in previous studies, can show large deviations depending on the timing of recent meals[11]. Recently, the American Diabetes Association (ADA) recommended the use of the hemoglobin A1c (HbA1c) test to screen for diabetes mellitus[1]. Therefore, there is a need to assess the HbA1c level, which can reflect long-term blood glucose management status and serves as a predictor of complications associated with diabetes mellitus[12].

Accordingly, the aim of this study was to investigate the relationship between HbA1c level and self-reported periodontal symptoms among patients with type 2 diabetes mellitus. The findings of the study can be used as reference data for improving the general health, oral health (including gingivalhealth), and h*ealth-related* quality of life of individuals with type 2 diabetes mellitus.

Method

Participants: This cross-sectional study was approved from the Ethics Committee of Gachon University (IRB NO. 1044396-201905-HR-080-01) and conducted in accordance with the World Medical Association Declaration of Helsinki. This study evaluated type 2 diabetes mellitus patients aged ≥ 50 years who visited one of two internal medicine clinics located in Gyeonggi Province; the clinics were selected using the convenience sampling method. An examiner visited the clinics and provided a detailed explanation of the study's purpose and process to the patients visiting the clinics. Among the patients who voluntarily agreed to participate in the study, the examiner obtained informed consent from those who did not meet any of the following exclusion criteria: 1) patients who had periodontal surgery within 6 months from the start date of the study; 2) patients with a body mass index of ≥ 25 kg/m^2; 3) patients who were diagnosed with degenerative diseases of their hands or shoulders; 4) patients who had cognitive disorders; 5) patients who were diagnosed with dementia; 6) patients who consumed more than one-half glass of alcohol per day; 7) patients who smoked ≥ 5 cigarettes each day; 8) patients who had xerostomia; 9) patients who had ≤ 20 remaining teeth.

Data were collected from 156 participants during the period from May 30, 2019 to June 15, 2019. G*Power software (ver. 3.1.9.2) was used to calculate the minimum sample size required for univariate analysis. When setting the significance level at 5%, power at 95%, and effect size at 0.30[13], the minimum sample size needed was 111 participants.

Measurements: We used a questionnaire to survey the general characteristics, oral health behaviors, and self-reported periodontal symptoms of the participants. A higher number of self-reported periodontal symptoms over the past 12 months was considered indicative of worse periodontal health status[14]. The HbA1c test was performed to assess the average blood glucose level over the preceding 2 to 3 months. Approximately 0.2 cc of blood was collected from the capillary vessel of the fifth *finger of the dominant hand;*the HbA1c level in the blood sample was immediately analyzed using the In2it™ analyzer (Bio-Rad Laboratories, CA, USA). Higher scores were considered indicative of worse blood glucose management. Participants with an HbA1c level of ≥ 7.0 were classified into the group with poorly controlled blood glucose. The average duration to complete the interview and the HbA1c test was 15 min.

Statistical analysis: The collected data were analyzed using SPSS for Windows software (ver. 25.0; IBM Corp., Armonk, NY, USA). Independent t-test were performed to analyze the differences in self-rated periodontal health status according to general characteristics, oral health behaviors, and HbA1c levels. In addition, multiple logistic regression analysis was performed to evaluate the influence of HbA1c level on self-reported periodontal symptoms;independent variables included all factors for which the P values were < 0.05 in the independent t-test. Values of $p < 0.05$ were considered statistically significant.

Result

1. Self-reported periodontal symptoms according to general characteristics

Analyses of differences in periodontal symptoms according to general characteristics revealed that men and participants with an average monthly income ≥ 1.51 million KRW had more self-rated periodontal symptoms

than their counterparts($p < 0.05$ for both)[Table 1].

Table 1. Self-reported Periodontal Symptoms According to General Patient Characteristics

Variables	N	Number of periodontal symptoms	
		Mean ± SD	t (P)
Sex			
Male	35	1.91 ± 1.68	2.390 (0.018)
Female	121	1.22 ± 1.45	
Age (years)			
≤ 64	67	1.54 ± 1.69	1.128 (0.261)
≥ 65	89	1.26 ± 1.39	
Average monthly income (million/ KRW)†			
≤ 1.50	88	0.93 ± 1.03	-3.224 (0.002)
≥ 1.51	54	1.80 ± 1.79	

†Divided by participants' median

2.Self-reported periodontal symptoms according to oral health behaviors and HbA1c level

Participants who brushed their teeth ≥ 3 times per day, and those who had undergone a periodical dental checkup within the past 2 years, had more self-rated periodontal symptoms than their counterparts ($p < 0.05$ for both). In addition, participants with poorly controlled blood glucose had more self-rated periodontal symptoms than participants with well-controlled blood glucose ($p < 0.05$)[Table 2].

Table 2. Self-reported Periodontal Symptoms According to Oral Health Behaviors and HbA1c Levels

Variables	N	Number of periodontal symptoms	
		Mean ± SD	t (P)
Frequency of tooth-brushing (per day)			
≤ 2	109	1.18 ± 1.30	-2.133 (0.037)
≥ 3	47	1.83 ± 1.89	
Tooth-brushing technique			
Non-rolling stroke	55	1.16 ± 1.22	-1.296 (0.197)
Rolling stroke	101	1.50 ± 1.66	
Recent dental check-ups (years)			
≤ 2	93	1.61 ± 1.68	-2.362 (0.019)
> 2	63	1.03 ± 1.19	
Use of interproximal cleaning devices			
No	137	1.35 ± 1.54	-0.609 (0.543)
Yes	19	1.58 ± 1.46	
Periodic dental scaling			
No	142	1.37 ± 1.54	-0.129 (0.898)
Yes	14	1.43 ± 1.39	
HbA1c level			
Good control (< 7.0)	91	1.16 ± 1.59	-2.083 (0.039)
Poor control (≥ 7.0)	65	1.68 ± 1.39	

3. Logistic regression model of the association between self-reported periodontal symptoms and HbA1c

The regression model, when adjusted for general characteristics, showed that higher HbA1c was associated with a higher risk of periodontal symptoms (p = 0.009). Self-rated periodontal health status differed according to sex (p = 0.006) and average monthly income (p = 0.051), showed a trend toward a significant association with history of recent dental check-ups (p = 0.071)[Table 3].

Table 3.The Association between Self-reported Periodontal Symptoms and HbA1c by Multiple Logistic Model

Variables	B	OR	CI	P*
Sex	-1.307	0.271	0.10-0.68	0.006
Average monthly income	0.990	2.691	0.99-7.28	0.051
Recent dental check-ups(yrs.)	0.791	2.205	0.93-5.20	0.071
Frequency of tooth-brushing	-0.396	0.673	0.25-1.76	0.420
Tooth-brushing technique	0.137	1.147	0.45-2.88	0.771
HbA1c	0.444	1.559	1.11-2.17	0.009

*By multiple logistic regression analysis adjusted for age.

Dependent variable (0 = with one or more periodontal symptoms, 1 = with two or more periodontal symptoms)

Sex (0 = male, 1 = female), average monthly income (0 = ≤1.50, 1 = ≥1.51), recent dental check-ups (years) (0 = > 2, 1 = ≤ 2), frequency of tooth-brushing (0 = ≤2, 1 = ≥3), tooth-brushing technique (0 = non-rolling stroke, 1 = rolling stroke), and HbA1c (continuous).

Discussion

There have been reports of an association of diabetes mellitus with abnormalities in several soft tissues, including the periodontium[15]. However, with regard to periodontal health, it is more meaningful to evaluate oral manifestations according to blood glucose level, rather than to consider only the prevalence of diabetes mellitus. Furthermore, patient-centered measures can provide important information that can be used to improve quality of life. Therefore, we hypothesized that a higher HbA1c level (an indicator of the average blood glucose level over the preceding 2 to 3 months) would be associated with a higher prevalence of self-perceived periodontal symptoms. The results of this study confirmed the presence of a positive correlation between HbA1c level and periodontal symptoms in patients with type 2 diabetes mellitus, even after adjustment for factors related to periodontal disease. This result is consistent with the findings of a prior study, in which patients with hyperglycemia had a higher prevalence of periodontal inflammation than non-diabetic individuals[16]. This study supports the result of another previous study, in which diabetes patients, despite having similar oral hygiene habits, had more dental biofilm and periodontal inflammation than healthy individuals[17]. In summary, the findings of the present study suggest that comprehensive monitoring of HbA1c can contribute to the prevention or early detection of periodontal symptoms. Hyperglycemia has previously been reported to be a critical risk factor for the development of vascular complications[9]. In particular, aggressive periodontitis has been identified as the sixth common complication in patients with type 2 diabetes mellitus[18], and several robust mechanisms have been proposed to explain the association between hyperglycemia and periodontal problems. High glucose conditions eventually accelerate periodontal tissue destruction by inducing a hyper-inflammatory response of the periodontal microbiota, as well as by inhibiting repair of damage due to inflammation[19,20]. Another study found that under high

glucose conditions, periodontal ligament fibroblasts did not respond adequately to mechanical deformation[21]. Therefore, patients with diabetes mellitus should be advised that failure to control blood glucose can lead to severe periodontal disease. Moreover, improving or eliminating periodontal inflammation can reduce fasting blood glucose[22]. Non-surgical periodontal therapy is reportedly effective for improving periodontal health and metabolic control, as reflected in HbA1c and triglyceride level[23]. Therefore, all health professionals should be aware that hyperglycemia is a valuable predictor of periodontal diseases; moreover, periodontal inflammation inhibits effective glycemic control. In addition, to promote optimal health status of patients with diabetes mellitus, an effective interdisciplinary communication system should be established promptly among all health professionals. Finally, based on the findings of the present study, we suggest that blood glucose level should be measured during assessments of the oral health status of patients with diabetes mellitus.

The study had several weaknesses. First, it used a cross-sectional design and thus could not identify causal relationships among variables. Second, when selecting the study participants, we only considered those with diabetes mellitus who had visited either of two clinics, and who were chosen using the convenience sampling method. Third, the primary aim of the study was to identify relationship between HbA1c and periodontal symptoms; thus, risk factors for periodontal disease were not explored comprehensively. In further studies using systematic designs and including more participants, various factors that affect periodontal disease should be considered. Despite these limitations, this study was significant in that the screening for HbA1c performed herein, as recently recommended by the ADA, showed that chronic hyperglycemia was associated with the development of periodontal symptoms that led to poor oral function and reduced quality of life.

Conclusion

In this study, we found that self-reported periodontal symptoms differed significantly according to sex, average monthly income, frequency of tooth-brushing, recent dental check-ups and hemoglobin A1c level. Furthermore, the study demonstrated a significant relationship between HbA1c level and self-reported periodontal symptoms,even after adjustment for general characteristics and oral health behaviors. These findings suggest that comprehensive monitoring of HbA1c can contribute to the prevention or early detection of periodontal symptoms. Therefore, medical personnel should strictly monitor blood glucose to delay the complications associated with diabetes mellitus and minimize the associated decline in quality of life. Moreover, dental professionals should regularly perform various interventions to improve oral hygiene status and prevent periodontal issuesin individuals with poorly controlled diabetes.

Ethical Clearance: Not required

Source of Funding: Nil

Conflict of Interest: Nil

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Affecting Factor of Nursing Professionalism among Nurses in Geriatric Hospitals

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Abstract

Background/Objectives: This study is a descriptive research that aims to identify the impacts of nursing competencies and role conflict of nurses in geriatric hospitals on nursing professionalism.

Methods/Statistical analysis: : Data was collected from 203 nurses working in geriatric hospitals and conducted descriptive statistical analysis, t-test, one -way ANOVA, Scheffe's test, correlation analysis, and regression analysis on the collected data using SPSS/WIN 23.0.

Findings: Nursing professionalism showed a statistically significant difference in age, education level, position, working pattern, and health status. While nursing professionalism and nursing competency showed a significantly positive correlation, nursing professionalism and role conflict did not have a significantly positive correlation. Nursing competency and education level were the most influential factors on nursing professionalism of the subject. The higher the nursing competency and education level were, the nursing professionalism increased as well.

Improvements/Applications It is necessary to continuously conduct research on nursing professionalism targeting at nurses in geriatric hospitals for identifying the influencing factors and develop positive nursing professionalism.

Keywords:*nurses in geriatric hospitals, nursing competency, role conflict, nursing professionalism*

Introduction

As the demand for long-term care services increases due to changes in disease patterns, such as the increasing prevalence of senile chronic diseases due to a rapidly aging society, the number of geriatric hospitals has increased rapidly, to 1,507 in 2017[1]. In addition, considering that most of the patients in geriatric hospitals are patients with complex, chronic illnesses who are highly dependent on the medical staff, the reality of the nursing staff in geriatric hospitals can have a significant impact on the quality of care provided to the patients[2]. Geriatric hospital nurses not only provide direct care for elderly patients but also provide daily care, observe emergency situations and safety accident risks, and provide general care that encompasses physical, mental, and spiritual aspects. In reality, practical nurses and care helpers assist in nursing and are also responsible for the work of doctors due to the lack of medical staff and the lack of education and supervision of nursing assistants[3] [4]. As such, geriatric hospital nurses are required to have a high level of nursing competency, such as more professional experience, extensive knowledge, skills, and values because of these newly added roles in addition to nursing and the delegation of ambiguous nursing actions[5].

Among the various difficulties experienced by geriatric hospital nurses, the problem of role conflict due to the difference in nursing service between geriatric hospitals and acute-care hospitals and the relationship with the health care providers is very serious. In particular, the practical nurses at geriatric hospitals often perform the same nursing service as the nurses, so

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conflicts occur due to the unclear and disorganized work distribution according to one's position[6]. They also have to repeatedly persuade, listen to the needs of and manage the excessive interference of patients' guardians, and sometimes are even the target of guardians' anger. In addition, they perform the work of doctors that is beyond their expertise as nurses because of the lack of medical staff, resulting in unclear liabilities in the event of legal problems[7]. Due to the unclear division and delegation of duties, the role conflict of geriatric hospital nurses leads to identity confusion[4].

Nurses are required to form a higher level of nursing professionalism to develop their roles as professionals with positive work values, professional knowledge, and technical and administrative skills as professionals[7]. Positive nursing professionalism can contribute to increasing the competitiveness of hospitals by reducing the intention of nurses to change jobs while providing high-quality care by increasing job satisfaction and nursing service performance[8]. There have been many previous studies on nursing competency, role conflict, and nursing professionalism in Korea, but only a few studies about nurses in geriatric hospitals. Recently, as the role conflict experienced by geriatric hospital nurses has gained attention, the need for positive nursing professionalism and nursing competency has been emphasized. Therefore, this study intends to examine the impact of nursing competency and role conflict on nursing professionalism for nurses working at geriatric hospitals, and thereby enhance the nursing competency of geriatric hospital nurses and resolve role conflicts, to provide basic data that will support the development of positive nursing professionalism.

The purpose of this study is to examine the effect of nursing competency and role conflict on nursing professionalism for geriatric hospital nurses.

Method

This study is a descriptive study to examine the effect of nursing competency and role conflict on nursing professionalism for geriatric hospital nurses.

The subjects were nurses working in geriatric hospitals with more than 150 beds in G metropolitan city. Data was collected from 203 nurses working in geriatric hospitals and conducted descriptive statistical analysis. Data collection was performed from June 15 to 30, 2017, and was approved by the N University Bioethics Review Committee in advance (1041478-2017-HR-007). The researcher provided information on the purpose of the study and questionnaire to the nursing department of each hospital and received approval to collect data.

Nursing competencystudy used the nursing competency tool developed by Kim[5].The tool for role conflict was prepared by the researcher based on the study of role conflict experience of geriatric hospital nurses carried out by Park & Yeom[6]. Nursing professionalism study used the nursing professionalism tool developed by Yun et al·[7]. The degree of nursing competency, role conflict, and nursing professionalism was obtained as the average and standard deviation.The t-test and one-way ANOVA were used for nursing competency, role conflict, and nursing professionalism according to general characteristics, and the Scheffe's test was used for post-hoc analysis.The correlation between nursing competency, role conflict, and nursing professionalism was analyzed using Pearson's correlation coefficient. Multiple linear regression analysis and stepwise multiple regression analysis were used for factors influencing nursing professionalism.

Result and Discussion

1. General characteristics of the subjects

The differences in nursing competency, role conflict, and nursing professionalism according to general characteristics are shown. Nursing competency showed statistically significant differences depending on age, position, shift pattern, hospital type, and health status. Role conflict showed statistically significant differences with changes in the shift pattern, the number of beds, and health status.

Nursing professionalism showed statistically significant differences related to age, final education, position, shift pattern, and health status. .

2.Correlation between nursing competency, role conflict, and nursing professionalism

The correlation between nursing competency, role conflict, and nursing professionalism is shown in [Table 1], and there was a positive correlation found between nursing professionalism and nursing competency ($r=.60$, $p<.001$). However, there was no statistically significant correlation between nursing professionalism and role conflict ($r=.05$, $p=.524$), or between nursing competency and role conflict ($r=.04$, $p=.563$).

Table 1. Correlation of nursing competency, role conflict and nursing professionalism (*N*=203)

	Nursing competency		Role conflict	Nursing professionalism
Nursing competency	1			
Role conflict	.04(.563)		1	
Nursing professionalism	.60(<.001)		.05(.524)	1

3. Factors influencing nursing professionalism

The factors that influence nursing professionalism are shown in [Table 2] A multiple linear regression analysis was performed to examine the influence of the general characteristics and nursing competency of geriatric hospital nurses on nursing professionalism. In particular, the analysis included age, final education, position, shift pattern, and health status, which showed statistically significant differences in nursing professionalism among the general characteristics.

It was found that 3 variables of the general characteristics (age, final education, health status) and nursing competency were significant variables influencing the subjects' nursing professionalism, and the explanatory power was 41.8% (F=35.60, *p*<.001). In other words, when the age is 30～40 years old, it was (β=-.132); 4-year university graduate nurse (β=.123); normal health (β=-.130); and nursing competency (β=.533). In particular, the characteristics associated with a reduction in the nursing professionalism of the subjects are age (30～40 years old) and health status (normal health). The characteristics associated with an increase in the subjects' nursing professionalism are 4-year university graduates and nursing competency.

Table 2. Factors of nursing professionalism (*N*=203)

	B	SE	β	t	p-값
Constant	1.641	0.213		7.689	<.001
Age(years) (30-39years, ref=Years〉30)	-0.147	0.062	-.132	-2.364	.019
Final education (University, ref=College(3years))	0.133	0.059	.123	0.257	.025
Health state (Regular,ref=Very healthy)	-0.159	0.069	-.130	-2.319	.021
Nursing competency	0.540	0.058	.533	9.358	<.001
	R^2=0.418, Adj-R^2=0.407, F=35.60, p<.001				

Discussion

This study is descriptive research that aimed to examine the effect of nursing competency and role conflict on nursing professionalism for geriatric hospital nurses. The study found that the nursing competency was 3.49, which was lower than the result of 3.80 in the study by Kim[9] and similar to the result of 3.47 in the study by Kim & Gu[10]. As was found in the previous study by Kim & Gu[10], more clinical practice experience leads to more clinical experience and knowledge, which results

in demonstrating professionalism and higher nursing competency, and the clinical practice experience of the subjects in this study was 9.73 years, compared to the average of 12.01 years in the study by Kim[9], which in turn influenced the results of this study. The degree of role conflict was 3.48 in this study, which was higher than the study by Sung[11], which compared the degree of role conflict between the nurses working in the intensive care unit (2.99) and general ward (2.88). This result is related to the emphasis on cooperative work with other professions such as practical nurses, care helpers, social workers, and physical therapists, the requirement for more responsibility and independence than general nurses in special circumstances, and the requirement of quick and accurate decisions in crisis situations[12]. In addition, the degree of nursing professionalism was 3.49, which is similar to the result of 3.48 in the study by Park & Kim[13] on the nursing professionalism of geriatric hospital nurses.

In this study, nursing competency and nursing professionalism showed a positive correlation. In the study of Han et al.[8], there was a significant positive correlation between nursing professionalism and nursing service performance, and nurses with more positive nursing professionalism were more satisfied with their job. The results were also high in performing nursing service to meet the needs of patients, which were similar to the results of this study. As there is a positive correlation between self-concept and nursing service performance in the process of performing nursing duties, positive values and attitudes are shown when confidently performing tasks with a professional self-concept. Currently, the geriatric hospitals in Korea do not have separate departments for specialized medical care, and as the number of patients with severe diseases increases, we can perceive the lack in competency and preparation to provide quality nursing care to those patients. Therefore, nurses who take care of elderly patients emphasize the need for nursing education considering the characteristics of the older adults, but about 73% of nurses report that they have not received nursing education for the elderly within the past year[14]. Unlike general hospitals, geriatric hospitals do not have a learning atmosphere within the nursing department, which requires self-reflection and efforts of nurses; to improve this situation, institutional support within the organization should be considered in various ways[6]. Meanwhile, there was no statistically significant correlation between role conflict and nursing professionalism found in this study, which is consistent with the findings of Yun et al.[7].

As nursing competency was the most influential factor in nursing professionalism, higher nursing competency led to higher nursing professionalism. In the study of Han et al.[8] about the factors influencing nursing professionalism, service performance ability, a similar concept to nursing competency, was reported as the first influencing factor of nursing professionalism, which supports the results of this study. In particular, the study considered that nursing professionalism was formed by performing nursing activities that demonstrate identity, professionalism, and autonomy among work performance abilities[8]. As nursing practice refers to all nursing activities that are intentionally performed to meet the demands of complex and diverse nursing subjects through a systematic approach in a medical situation, it is a professional practice that requires identity, professionalism, and autonomy. The study of Lee & Kim[4] reported that there was a perception that geriatric hospital nurses were incompetent and incapable, and that nurses went to geriatric hospitals because it was easy work. Geriatric hospital nurses serve an important role because they are not only directly responsible for nursing practice with professional nursing knowledge and skills[14], but also educate employees about infection control and manage nursing assistant staff[10]. However, out of 91 nursing actions at geriatric hospitals, nurses and nursing assistants work together within a wide range of nursing care, with the exception of the 3 actions of nursing diagnosis, setting goals for nursing, and preparing patient evaluation tables. In terms of direct nursing practice, nursing assistants perform as little as 40.2% to as much as 80.4%, so the elderly nursing performance status by nurses was very low[15]. Accordingly, the nursing competency level of geriatric hospital nurses was reported to be significantly lower than its perceived importance[10]. Therefore, in order to enhance the identity, professionalism, and autonomy of nursing, geriatric hospital nurses should actively participate in education and training for nursing level improvement and evidence-based practice to improve nursing competency, and with the support of policies and systems that can nurture the identity of nursing within the boundaries of the law, we can expect to form a positive nursing professionalism.

Conclusion

This study analyzed the effect of nursing

competency and role conflict on nursing professionalism for nurses working at geriatric hospitals. As a result, among nursing competency and general characteristics, age, final education, and health status were identified as significant factors influencing nursing professionalism. In a rapidly changing medical service environment, establishing a positive nursing professionalism for geriatric hospital nurses is very important in order to ensure effective nursing practice performance, provide high-quality nursing service, establish a position as a professional nurse, and ensure the stable operation of nursing staff in medical service organizations. To improve nursing professionalism, internal and external improvements are required to maximize nursing competency while conducting professional nursing practice. In addition, individual nurses should try to improve their professionalism in their nursing practice so that nurses can receive professional respect. Geriatric hospitals should also respect, consider, professionally recognize the field of nursing, and provide promotion opportunities and improve treatment. Management and attention are needed at the organizational level to strengthen professional education and consider the role and functions of nurses to encourage them to establish and improve a healthy and positive level of nursing professionalism for nurses working at geriatric hospitals. The results of this study indicate that nursing competency is the most influential factor in the nursing professionalism of geriatric hospital nurses. Therefore, continuous research is needed to develop programs and strategies to improve the nursing competency of geriatric hospital nurses and to establish interventions to understand the effects.

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An Analysis of the Need For Aid Tools in Dementia Patients: Focusing on the Normal Elderly, Dementia Patients, and Caregivers of Dementia Patients

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Abstract

Background/Objectives: The purpose of this study was analyze the subjects to understand dementia patients' level of need for aid tools that affect their daily activities, safety management, and cognitive function.

Methods/Statistical analysis: The current study recruited subjects through a community welfare center for the elderly. Fifty-seven normal elderly, thirteen dementia patients, and fifteen caregivers of dementia patients agreed to participate in the study. We were provided with explanations of each item and invited to ask questions. The questionnaires consisted of personal information, general health states, and supportive needs (daily life, safety management, cognitive function). The collected data underwent statistical processing using SPSS.

Findings: The first analysis was regarding the difference in preference for daily activity aids among the normal elderly, dementia patients, and caregivers of dementia patient groups. The normal elderly and dementia patients mostly preferred the automatic dispenser; however, the caregiver group displayed the highest preference for the medication calendar. In the area regarding tools for safety management, the night sensor was the most preferred in the three groups. In terms of aid tools for cognitive activities, the normal elderly mostly preferred the alarm clock, dementia patients selected the artificial intelligence speaker, and the caregivers chose the large-sized calendar and notebook.

Improvements/Applications: Instead of providing aids without conditions, they should be offered according to the level of need experienced by beneficiary. Also, systematic service of specialist will be required for the process.

Keywords: *Aid tool, Assistive device, Caregivers, Dementia patients, Elderly, Need*

Introduction

With the continuing global trend of population aging, the number of patients with dementia is increasing annually. There were forty-seven million people suffering from dementia in 2017, and the number is expected to increase to one hundred and thirty-one million by 2050[1]. Dementia, one of the most typical geriatric diseases, causes irreversible brain damage that restricts a person's cognitive, behavioral, and motor capacity[2]. Another feature of the disease is that it gradually deteriorates the patient's ability to independently carry out daily activities, which in turn adds to the psychological and economic burden of family members who care for the elderly with dementia[3].

In the end, this burden takes on the form of a socioeconomic problem. Statistics show that the nation-wide cost of treating dementia in Korea increased from 810 billion won in 2010 to 1 trillion and 448.3 billion won in 2015, exhibiting an increase of more than 600 billion won in just five years[4]. To cater to and fulfill the social and economic needs of patients with geriatric [1]diseases including dementia, the Korean government introduced the long-term care insurance program.

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All Korean citizens are required to sign up for the long-term care insurance: the program provides welfare benefits to the elderly aged sixty-five years or older or patients who are sixty-four years or younger with geriatric diseases, if they suffer from significant functional disorders and cannot independently carry out daily activities for six months or longer. Three types of welfare benefit services are provided through the long-term care insurance program: facility use benefits, in-home care benefits, and special cash benefits[5]. The welfare medical device salary service, which is one of the in-home services, is a service that lends or purchases equipment necessary for daily life or physical activity support to the elderly with long-term care insurance and who experience difficulty in daily life due to a decrease in mental and physical functions[6].

As the need for welfare equipment increases, concerns about the welfare service associated with these equipment are also emerging. Dementia patients and their caregivers are not aware of what tools to use and how to use them. Moreover, there is a lack of specialists and education on selection as well as proper use of welfare equipment[7]. Welfare equipment service professionals should evaluate the environment and capabilities of the target person, assist them in selecting the appropriate welfare tool, and train them on how to perform the intended task successfully, including training on how to manage and use the welfare tool[8].

Recently, research on the assistive devices for the elderly and handicapped have been carried out; however, there is insufficient research on the use of assistive devices for dementia patients and their caregivers. There was a review paper on assistive technology for the elderly with dementia in the community[9]. However, there was no questionnaire study to elaborate the needs of the subjects. Therefore, the purpose of this study is to investigate the need for assistive devices among dementia patients and their caregivers.

Method

1. *Subjects and Periods*

The current study was conducted on the normal elderly, dementia patients, and caregivers of dementia patients. The normal elderly who participated were aged sixty-five years or older and capable of independently executing daily activities without physical and mental difficulties. The dementia patients in this study were diagnosed as having mild dementia by psychiatric specialists according to the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders, the 5th edition) standards, and were able to communicate with others. The welfare medical device was targeted toward patients with dementia and those living in the community. Excluding the responses which included unanswered questions or unreliable answers, a total of eighty-five responses (fifty-seven from the normal elderly, thirteen from dementia patients, and fifteen from caregivers of dementia patients) were used for the analysis.

This study was conducted from June to August 2018, and the subjects were recruited via a welfare center for the elderly in a local community. In consideration of ethical aspects of the study, all the subjects received an explanation about the objectives and methods of the current study, verbally and in writing, and signed an agreement to participate. The normal elderly and caregivers of dementia patients were organized into groups of four or five. To ensure they completely understood the items in the questionnaire, they were provided with explanations of each item and invited to ask questions. The questionnaire was explained individually to study participants with mild dementia, and the researcher confirmed whether the patients sufficiently understood the items in the questionnaire. This study was approved by the Institutional Review Board of the Semyung University (IRB No. SMU-2019-06-004-01).

2.*Outcome Measures*

The questionnaires consisted of personal information, general health states, and supportive needs (daily life, safety management, cognitive function). Subsidiary aid tools for each area were provided, and the respondents were asked to indicate their demand for each aid tool and its importance on a five-point scale. The same questions were provided to the normal elderly, dementia patients, and caregivers of dementia patients.

Daily life aids include aprons, bath chairs, electric tooth brushes, automatic dispensers, and medication calendars. Safety management aids include safety handles, anti-slip mats, night sensors, wandering detection mats, and GPS wandering detectors. The cognitive aids include large-sized calendars, desk calendars, notebooks, alarm clocks, devices for cognitive activity (e.g., puzzles), smart taps for cognitive function, and artificial intelligence speakers.

3. *Statistical Analysis*

The collected data underwent statistical processing using SPSS Version 21.0. Frequency analysis was executed to understand the general characteristics of the respondents. To find out the average preference in each group of the normal elderly, dementia patients, and caregivers of dementia patients, mean analysis and ANOVA were conducted. The differences between the groups were analyzed via Scheffe test, a post-hoc analysis method. The statistical significance level was set at 0.05.

Result and Discussion

For general characteristics of the subjects, information about their age, gender, marital status, residence type, and religion were collected for each group. Because there were significant differences in terms of these characteristics due to the nature of the current study, no homogeneity test was conducted. The average age was the highest in the group of dementia patents, and all groups had a higher proportion of women. Details about this information can be found in [Table 1].

Table 1. General Characteristics

variable		**normal elderly (n=57)**	**dementia patients (n=13)**	**caregivers (n=15)**
Age		74.29±11.60*	77.46±4.45	61.80±11.09
Sex	Male	22(38.6)#	6(46.2)	3(20)
	Female	35(61.4)	7(53.8)	12(80)
Marriage	single	2(3.5)	0(0.0)	3(20)
	married	33(57.9)	8(61.5)	11(73.3)
	bereavement	22(38.6)	5(38.5)	1(6.7)
Type of Residence	alone	20(35.1)	5(38.5)	6(40)
	couple	32(56.1)	8(61.5)	3(20)
	With child	5(8.8)	0(0.0)	6(40)
religion	christian	10(17.5)	1(7.7)	6(40)
	catholic	9(15.8)	1(7.7)	0(0.0)
	buddhism	19(33.3)	8(61.5)	0(0.0)
	No religion	19(33.3)	3(23.1)	9(60)

*Mean±SD, #N(%)

The first analysis was regarding the difference in preference for daily activity aids among the normal elderly, dementia patients, and caregivers of dementia patient groups. The normal elderly and dementia patients mostly preferred the automatic dispenser; however, the caregiver group displayed the highest preference for the medication calendar. Preferences for the electric toothbrush and automatic dispenser were significantly different among the groups (p=0.00), with statistically significant differences exhibited between the normal elderly and caregivers, and between the dementia patients and caregivers [Table 2].

Table 2. Comparison of the Need for Daily Activity Aids

	normal elderly	dementia patients	caregivers	F	p
apron	3.18±1.61	2.46±1.61	2.80±1.66	1.16	0.32
bath chair	3.44±1.73	3.38±1.66	2.80±1.90	0.80	0.45
electric tooth brush	3.09±1.76##	3.77±1.59$$	1.00±0.00	13.23	0.00**
automatic dispenser	3.65±1.70#	4.31±1.18$	1.80±1.66	9.98	0.00**
medication calendar	3.58±1.78	3.92±1.38	4.20±1.66	0.87	0.42

**p<0.01,

#p<0.05(normal elderly × caregivers),

##p<0.01(normal elderly × caregivers),

$p<0.05(dementia patients× caregivers), $$p<0.01(dementia patients× caregivers),

In the area regarding tools for safety management, the night sensor was the most preferred in the three groups. However, the preferences for the safety handle (p=0.00) and the wandering detection mat (p=0.04) in each group were significantly different. For the safety handle, there were significant differences between the normal elderly and caregivers (p=0.00), and between the dementia patients and caregivers (p=0.03). Preferences for the wandering detection mat were significantly different between the normal elderly and dementia patients (p=0.04) [Table 3].

Table 3. Comparison of the Need for Safety Management Aids

	normal elderly	dementia patients	caregivers	F	p
safety handle	4.00±1.56##	3.85±1.34$	1.80±1.66	12.23	0.00**
anti-slip mat	3.95±1.59	3.62±1.45	3.40±1.68	0.82	0.45
night sensor	4.04±1.49	4.08±1.26	4.20±1.66	0.07	0.93
wandering detection mat	3.86±1.64†	2.54±1.61	3.40±2.03	3.26	0.04*
GPS wandering detector	3.88±1.62	3.00±1.96	3.40±2.03	1.54	0.22

*p<0.05, **p<0.01,

##p<0.01(normal elderly× caregivers), $p<0.05(dementia patients× caregivers),

†p<0.05(normal elderly× dementia patients),

In terms of aid tools for cognitive activities, the normal elderly mostly preferred the alarm clock, dementia patients selected the artificial intelligence speaker, and the caregivers chose the large-sized calendar and notebook. The groups displayed differences in their preferences for the desk calendar, device for cognitive activity, smart tap, and artificial intelligence speaker. The normal elderly and caregivers displayed significantly different preferences for the desk calendar, device for

cognitive activity, and smart tap, and dementia patients and caregivers had statistically significant differences in their preference for the artificial intelligence speaker [Table 4].

Table 4. Comparison of the Need for Cognitive Activity Aids

	normal elderly	dementia patients	caregivers	F	p
large-sized calendar	3.70±1.60	3.38±1.80	3.40±2.03	0.31	0.74
desk calendar	3.00±1.67##	2.08±1.26	1.00±0.00	11.76	0.00**
notebook	3.02±1.61	2.54±1.39	3.40±1.55	1.05	0.35
alarm clock	4.56±6.45	3.23±1.83	2.80±1.66	0.80	0.45
device for cognitive activity	3.54±1.63#	2.69±1.60	2.20±1.66	4.73	0.01*
smart tap	3.05±1.67#	3.30±1.60	1.80±1.66	3.91	0.02*
artificial intelligence speaker	3.25±1.66	4.46±1.20$	2.60±2.03	4.47	0.01*

* $p<0.05$, ** $p<0.01$,

# $p<0.05$(normal elderly× caregivers),

$p<0.01$(normal elderly× caregivers),

$ $p<0.05$(dementia patients× caregivers),

Discussion

The list of assistive technology aids itemized in the questionnaire for the current study referenced data from the U.K. and Ireland. A report by the University of Manchester describes the objectives of applying assistive technology as "enabling and empowering," "health and well-being," and "safety and independence." This structure can be used to categorize assistive technology aids into each area[10]. The Alzheimer's Society published a promotional booklet on assistive technology for dementia patients, providing easy explanations for the public. It classifies areas that employ assistive technology as daily activities, removal of risky environment factors to ensure safety, transportation safety, and telecare for monitoring dementia patients[11]. In addition, to establishing assistive technology categories for dementia patients, the current study referred to "Implementing Assistive Technology in Dementia are Services: A Guide for Practitioners" published by the Work Research Center in Ireland, which takes a more detailed view on the topic based on the life and safety of dementia patients[12].

The results of the current study indicate that each subject group displayed different levels of preference for various aid tools. In terms of daily activities, subjects in all groups mostly preferred the aid tool that provides assistance in medication management. More specifically, the normal elderly and dementia patients preferred the automatic dispenser while caregivers answered that they prefer the medication calendar. Such results may have been produced because the elderly respondents sought out assistance from digital technology in the belief that they would not be able to manage their medications by themselves; however, the caregivers presumed that it would be difficult for the elderly to use digital tools at all.

In terms of safety management aids, all three groups displayed the most preference for the night sensor. The safety handle was the item with the most varying preferences by the three groups: The normal elderly and dementia patients answered that the safety handle is essential in preventing them from falling; however, caregivers were of the opinion that this tool is unnecessary since dementia does not entail physical difficulties. However, falling is a crucial element that impacts the mobility of dementia patients, and systematic preparations are required to prevent falls in such a population[13].

As for the cognitive activity aid tools, the three groups displayed the most varying preference levels for the desk calendar. The elderly subjects made an effort to remember by writing down their schedules in the desk calendar; however, the caregivers responded that the calendar is not necessary at all because dementia

patients cannot practically remember the recorded events. In most questionnaire items, the caregivers were found to underestimate the functional capacity of dementia patients, and the dementia patients answered that they need many aid tools as they receive help from caregivers. Many negative emotions are generated by dementia, and the elderly experience subtle emotional changes with regards to this condition[14].

The limitation of the current study is that the number and features of the subject groups were different. On the other hand, however, this was the objective of this study. At the core of this study is the comparison among the opinions of the normal elderly who may suffer from dementia in the future, dementia patients, and caregivers of dementia patients, in terms of the need for aid tools. Another shortcoming is that only a quantitative analysis on the need was conducted. In future research, a qualitative analysis should be performed to facilitate the understanding of aid tools and their necessity, with a goal of seeking alternatives.

Conclusion

Worldwide, where dementia is a social problem, it is essential to apply appropriateancillary equipment to patients with dementia so that they can perform their daily activities safely and stably. Based on the results of the current study, different types of assistive tools should be provided depending on the features of the beneficiary. Instead of providing aids without conditions, they should be offered according to the level of need experienced by each beneficiary. Also, systematic service of professional manpower will be required for the process.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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The Effects of a Brain-Activating Dementia Prevention Program on the Elderly: Improving Cognitive Capacity, Depression, and Quality of Life

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Abstract

Background/Objectives: The objective of study is to implement a meta-cognitive program based on brain-activating rehabilitation for elderly people to investigate its effect on the subjects' cognitive functions, depression, and quality of life.

Methods/Statistical analysis: This study was carried out from September 2018 to December 2018 at the J Social Welfare Center in the Republic of Korea. Subjects included 18 community-dwelling elderly people over 65 years old. A total of thirteen intervention program sessions were provided, with one session per week and ninety minutes per session. Three assessment tools (CERAD-K, GDS-SF, SF-36) were used in the study. The collected data underwent statistical processing using SPSS.

Findings: A cognitive evaluation using CERAD-K revealed statistically significant differences for all items except for Construction Praxis. Depression testing using the GDS-SF and quality of life evaluation using the SF-36 also revealed statistically significant differences between pre-intervention and post-intervention tests.

Improvements/Applications: By re-establishing these cognitive activities, more efficient interventions will be made possible. More systematic methods to prevent against dementia will need to be implemented on a local community level.

Keywords: *Brain-Activating Program, Cognition, Dementia, Depression, Prevention, Quality of Life*

Introduction

The prevention of chronic diseases in the geriatric population is a key goal of clinical and public health programs. With an aging global population, the number of people suffering from dementia is also on the rise, which makes dementia prevention a crucial policy agenda[1]. Cognitive functions deteriorate as aging progresses. Cognitive functions refer to the entire process in which the human brain receives and stores information, and later retrieves and uses it. These functions are a set of abilities that enable people to think, judge, remember, and act, and they include the capacity to retain and learn information, solve problems, execute linguistic and motor activities, and recognize time and space. A decline in cognitive functions can lead to the experience of minor memory failures, which is considered a risk indicator for dementia[2].

In the last World Alzheimer Report, the global economic impact of Alzheimer's Disease (AD) and dementia was estimated to be $818 billion USD, with 47 million people suffering from AD, about 0.5% ^{2}of the global population[3]. Dementia, characterized by widespread progressive decline in cognitive and functional abilities and a wide range of challenging behavioral symptoms[4], is one of the major causes of disability and dependency among older people[5-6]. In particular, elderly patients with late-stage dementia are necessarily dependent on others to carry out parts or the entirety of their daily activities, putting significant cost

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and other burdens on their families and caregivers. As such, recent statistics show that people are most afraid of contracting dementia, compared to past surveys that showed people were most afraid of contracting cancer[7].

The 2016 American Psychiatric Association (APA) Practice Guidelines provide recommendations for the treatment of agitation or psychosis in patients with dementia, suggesting a comprehensive, person-centered, non-pharmacological approach[8]. A non-pharmacological approach for dementia treatment plays a crucial role in delaying the progress of the disease, as well as functional deterioration. Furthermore, efficient interaction between the patient, therapist, and the patient's family members is considered an important element that can impact the effectiveness of treatment[9]. The therapist identifies the person's intrinsic capacity and current level of function, assesses the requirements of the task or activity outlined in the goal, and helps devise a plan to overcome these problems using evidence-based rehabilitative methods. In more recent years, there has been a growing awareness that non-pharmacological treatments must take precedence over pharmacological treatments[10]. Therefore, this study implemented a non-pharmacological rehabilitation method that stimulates brain activation.

This brain-activating rehabilitation method is composed of five principles: first is allowing the patient to engage in enjoyable and comfortable activities in an acceptable atmosphere, and the second is to encourage empathetic two-way communication between the therapist and the patient, as well as between patients. Third, the therapist uses compliments to motivate the patient, and fourth, the therapist tries to offer the patient tasks involving social roles that the patient is capable of at his or her functional level. Lastly, the rehabilitation method demands maintaining the patient's dignity to induce errorless learning[9]. Until now, most non-pharmacological treatments have sought to make patients participate in activities and maintain their functionality, which makes them different from this proposed brain-activating rehabilitation method.

While the principles of brain-activating rehabilitation are definite, its methodology is not regulated. As such, previous studies have approached this method from diverse angles. A Japanese study provided reminiscence therapy to dementia patients and normal elderly people to provide brain-activating rehabilitation. As a result, the subjects' cognitive function increased, and the burdens experienced by the caregivers were reduced[11]. In addition, an enjoyable walking program based on brain-activating rehabilitation was provided to elderly people who were seventy years or older, which resulted in enhanced cognitive and physical functions, in addition to the observation that the subjects maintained their enjoyable walking regimen six months after the study[12]. However, because there is a lack of previous research that directly implements brain-activating rehabilitation in cognitive training, the current study sought to apply a meta-cognitive program based on brain-activating rehabilitation. Meta-cognition has been mainly used to enhance students' learning ability[13-14], but there is a dearth of studies that examine its effects on elderly people. As such, the objective of the current study is to implement a meta-cognitive program based on brain-activating rehabilitation for normal elderly people to investigate its effect on the subjects' cognitive functions, depression, and quality of life.

Method

1. *Subjects and Periods*

This study was carried out from September 2018 to December 2018 at the J City Social Welfare Center in the Republic of Korea. Subjects included 18 community-dwelling elderly people over 65 years old. The selection criteria included the ability to walk independently, not diagnosed with dementia, no cardiovascular disease relating to blood pressure or heart rate, and the ability to communicate and understand the study content. All participants read and signed the informed consent to participate in the experiment in according to the ethical principles of the Declaration of Helsinki. Among all participants, there were 5 men (27.8%) and 13 women (72.2%). The average age was 72.23±5.41 years old and the average of length of education was 9.13±4.18 years.

2. *Procedures*

At the beginning, all participants attended a collective orientation session that explained the objectives, process, and schedule of the study. Participants who expressed a wish to participate in this study and pledged not to miss the sessions were admitted as subjects. A total of ten intervention program sessions were provided, with one session per week and ninety minutes per session [Table 1].

Table 1. Schedule of integration program

Week	Meta memory improvement program	program based brain-activating rehabilitation
1	Order pictures	Hand massage
2	Create new words by changing syllables only	Activity reminiscence therapy(wedding)
3	Remember the location of the picture and paint it	Straw mosaic
4	Writing related words for each category	Introduction to our town
5	Writing common differences in pictures	Play the rummikub
6	Find a common first syllable	Create a block model
7	Drawing reminiscent of a given word	Coffee pot making
8	Make sentences with suggested words	Contextual Role Play
9	Expressing the sounds of each object in simple language	Mental calculation
10	Fill in the blanks in the conversation	Activity reminiscence therapy(travel)

The intervention was based on the use of brain activating rehabilitation principles. Among various programs based on the brain activating rehabilitation, the meta-cognitive program is a memory-based training method developed to improve memory and prevent dementia. By executing and monitoring information processing, meta-cognition fosters the ability to voluntarily regulate this cognitive process. Conceptually, it is the ability to recognize knowledge about one's own cognitive process and regulate it, as well as one's own supervision and control of thinking and learning activities[15-16]. Previous literature explains that the meta-cognitive training method is the process of obtaining knowledge about oneself, awareness about the knowledge used for cognition, and when and why certain strategies are used. Many scholars wrote that cognitive regulation includes planning, monitoring or regulation, and evaluating activities[16-17]. The author of this study purchased a manual by Meta Memory Health Center, available commercially in Korea, to be used in this study. Details include meetings, leisure, diversity, challenges, acceptance, sharing, making memories, and new beginnings. Although the program was conducted in a group, it was customized according to the subjects' level of awareness.

3. Outcome Measures

Evaluation was carried out in the same way before and after the intervention. Three assessment tools were used in the study. The subject's cognitive function was primarily tested with the Consortium to Establish a Registry for Alzheimer'sDisease (CERAD-K) Neuropsychological Assessment Battery. CERAD-K is the standardized assessment for the early diagnosis of dementia. It is easy to implement and takes about 30~40minutes. The test results were obtained using a scoring rubric standardized in consideration of the educational level and age of the patients. The test-retest reliability was found to be 0.63-0.87[18].

The Korean version of the Geriatric Depression Scale-Short Form (GDS-SF) can easily measure elderly people's depression levels and reflects the thoughts, emotions, cognition, and physical and social aspects, through which the overall phenomenon of depression can be understood[19]. To measure quality of life, we used the Short-Form Health Survey (SF-36), a tool developed by Ware and Sherbourne in 1992. The SF-36 has been translated into Korean, and its reliability and validity has been verified[20].

4. *Statistical Analysis*

The collected data underwent statistical processing using SPSS Version 21.0. The general characteristics of the subjects were measured using descriptive statistics. Paired t-tests were conducted for all variables to calculate the mean, standard deviation, and significance probability before and after the intervention. The statistical significance level was set at 0.05.

Result and Discussion

A cognitive evaluation using CERAD-K revealed statistically significant differences for all items except for Construction Praxis. Although the score for Construction Praxis increased, it did not prove statistically significant. Details about this information can be found in [Table 2].

Table 2. Comparison of CERAD-K for cognitive function by area in pre- and post-test

Variable	Pre-test	Post-test
Verbal Fluency test	4.1±2.1	6.1±3.1**
Modified Boston Naming test	5.4±3.1	6.9±3.1**
MMSE-KC	18.0±5.3	19.8±3.6**
Word List memory	7.2±4.3	8.9±4.3**
Constructional Praxis	5.4±1.8	6.1±3.1
Word List Recall	2.1±1.7	3.1±1.8*
Word List Recognition	3.5±2.2	4.2±1.7*
Constructional Recall	2.0±2.5	2.8±2.6*

*p<0.05, **p<0.01, MMSE-KC: MMSE in the Korean version of the CERAD assessment packet

Depression testing using the GDS-SF and quality of life evaluation using the SF-36 also revealed statistically significant differences between pre-intervention and post-intervention tests. The GDS score decreased from 12.1±4.6 to 5.0±3.1, indicating that depression was alleviated (p<0.01). The SF score increases from 48.8±15.2 to 57.1±10.8, which means an improvement in quality of life (p<0.05) [Table 3].

Table 3. Comparison of depression, quality of life by area in pre- and post-test

Variable	Pre-test	Post-test
GDS-SF	12.1±4.6	5.0±3.1**
SF-36	48.8±15.2	57.1±10.8*

*p<0.05, **p<0.01, GDS-SF: the Geriatric Depression Scale-Short Form, SF-36: the Short-Form Health Survey

Discussion

The meta-memory enhancement program that can fortify cognitive functions, which was provided in this study, was found to have a significant effect on the subjects' cognitive functions. These results are similar to those of a study that evaluated the effect of a memory-training program that used a memory enhancement self-efficacy program and efficacy resources[21]. The alignment between the results of this study and previous studies indicates that the integrated cognitive program increases the use of memory techniques, strategies, and aids for enhancing memory performance in elderly people at high risk of contracting dementia. This also shows that the program taught the subjects that memory is important in certain situations, in addition to motivating them to think that a good memory is crucial for the self[22].

There is prior documentation that brain-activating rehabilitation is effective in improving cognitive functions, the behavioral and psychological symptoms of dementia, and daily activities[9]. Furthermore, there are many other studies on reminiscence therapy, a typical example of brain-activating rehabilitation. A meta-analysis study that investigated the effect of reminiscence therapy on the cognitive functions and depression symptoms of elderly people with dementia looked at twelve randomized controlled trials and reported that the therapy had positive effects on both cognitive functions and depression symptoms[23]. Therefore, the previous literature supports the results of this study.

The limitation of this study is that a control group was not established, and the sample size was not large enough. It is, however, thought to be impossible to satisfy the above conditions, considering the nature of the intervention used in this study, which includes one-on-one customized programs for each subject, and that the program encourages motivation by interacting with the subjects. Furthermore, the current study attempted to enhance its objectivity and validity by using a manual published by a memory research center, but failed because there is no formalization of brain-activating rehabilitation and meta-cognitive programs. As such, it would be difficult to implement the program described in this study in future research. If this research expands in the future, it would do well to develop an intervention manual tailored to the characteristics of its subjects.

Conclusion

The current study investigated an intervention program for preventing dementia in the elderly people of a local community. After implementing a meta-cognitive program based on brain-activating rehabilitation, this study discovered that the program significantly enhanced the cognitive and psycho-social functions of its subjects. The current dementia prevention program is composed of line drawing, coloring, origami, and crafting

activities. By re-establishing these cognitive activities based on the principles of brain-activating rehabilitation, more efficient interventions will be made possible. If it is impossible to cure dementia with modern medicine, more systematic methods to prevent against dementia will need to be implemented on a local community level.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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The Effect of Participation of Clinical Dental Hygiene Care Program on the Level of Dental Fear in Some Adults

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Abstract

Background/Objectives: The purpose of this study was to investigate the effect of dental fear on oral health and to check whether dental fear can be controlled by participating in dental hygiene program.

Methods/Statistical analysis: The dental fear index was measured by the Dental Anxiety Scale, which was composed of 4 items. The lowest point was 0 point (very comfortable) and the highest point was 20 point (very terrifying) at the Dental Anxiety Scale. The changes in dental fear index before and after participating in the dental hygiene care program was measured using the McNemar's test and the significance level was set at 0.05.

Findings: This study was conducted on 91 subjects who participated in the dental hygiene care program conducted by the Department of Dental Hygiene at B University in Cheonan, South Korea. The mean age of the subjects was 24.5 years. Among the subjects, male participants were 44 (48.4%) and female participants were 47 (51.6%). The effect of dental hygiene care program by the dental hygienist on the characteristics of the subjects did not show any difference in dental phobia with the gender before the program, but it was confirmed that the dental fear was lowered slightly after the participation of dental hygiene care program. The effect of dental fear reduction by the dental hygiene care program was greater for women than for men. And, the more oral health education program was conducted in recent years, the greater the effect of dental fear reduction by the dental hygiene care program. The dental fear index was 8.98 before participating in the dental hygiene care program, but it decreased to 5.60 after participating. In conclusion, dental hygiene care program was found to effectively reduce dental fear.

Improvements/Applications: Dental hygiene care program could be effectively reduced dental fear of the subjects. Thus, dental hygienists should try to control their fear by understanding these characteristics of the patients.

Keywords: *Clinical dental hygiene care, Dental fear, Dental hygiene, Oral disease, Oral health education*

Introduction

Dental phobia refers to a patient's phobia for everything related to a dental practice or dentistry[1]. Patients with severe dental fear tend to avoid the situation or subject, which in turn results in avoidance of dental treatment [2,3]. For this reason, fear of dental hygiene may prevent early oral care by avoiding visits to dental clinics, which may cause deterioration of oral health so the dental medical personnel should make efforts to control patients' fear[3]. Therefore, dental health practitioner such as dental hygienists should train oral communication skills to prevent oral diseases of dental fear subjects, promote oral health, and perform oral health management that focuses on behavior control of the subjects[4].3

The main cause of dental phobia was pain in the process of dental treatment, and fear of dental treatment

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has been reported to be related to the attitudes of dentists and hygienists as well as pains experienced by patients in the past[5,6]. In addition, negative and physical effects in the treatment process cause dental phobia[7,8]. When sitting in the dental unit chair at the dental clinic, the patient's behavior was controlled by the dentist and the dental hygienist. In other words, even if the pain or discomfort occurs, the idea of not being able to do what they want will approach the patient with fear, and this fear causes psychological disturbances and affects the dental treatment. In this situation, the dentist and dental hygienist must be able to control the patient's anxiety by trying to communicate with the patient sufficiently[9]. The purpose of this study was to investigate the effect of dental fear on oral health and to check whether dental fear can be controlled by participating in dental hygiene program.

Method

This study was conducted on 91 subjects who participated in the dental hygiene care program conducted by the Department of Dental Hygiene at B University in Cheonan, South Korea.The totals of 91 subjects were included in the study and the mean age of the subjects was 24.5 years (19 to 31 years old). Among the subjects, male participants were 44 (48.4%) and female participants were 47 (51.6%).

All items were entered by computer such as gender, age, smoking status, and drinking status were examined. The items related to oral health were investigated in terms of subjective oral health status, subjective oral health care performance, past dental visit time, oral health education experience period, and negative experience of dental treatment.

The dental hygiene care program is an integrated dental preventive care program based on the theoretical framework called dental hygiene process. The dental hygiene process requires decision making and assumes that dental hygienists are responsible for identifying and resolving client problems within the scope of dental hygiene practice. The dental hygiene process involves dental hygiene diagnosis, assessment, planning, implementation and evaluation.So, the dental hygiene care programincluding oral health education, preventive care for tooth decay and periodontal disease is an integrated preventive dental treatment process provided by dental hygienists to improve the oral health status based on the subject's health-related information.

The dental fear index was measured by the Dental Anxiety Scale (DAS)[10], which was composed of 4 items.The questionnaire was composed to as follows: (1) How would you feel if you had to go to the dentist tomorrow? (2) How would you feel when you waited for your turn to be treated at the dentist's clinic? (3) How would you feel if the dentist was preparing a power drill for tooth decay that produced water, soundswhile sitting in a patient's dental unit chair? (4) How would you feel if a dental hygienist approached you and prepared your calculus removal device while you were waiting in the patient's dental unit chair for scaling? The lowest point was 0 point (very comfortable) and the highest point was 20 point (very terrifying). According to the distribution, dental fear index was categorized into 0 to 6 points as 'low', 7 to 15 points as 'normal', and 16 to 20 points as 'high'.

Data were analyzed using SPSS (Windows version 19, SPSS INC) program. McNemar's test was used to analyze differences in dental fear levels before and after participating in the dental hygiene care program according to general characteristics of the subjects and oral health related characteristics. The changes in dental fear index before and after participating in the dental hygiene program was measured using the corresponding sample T-test and the significance level was set at 0.05.

Result

General characteristics of the study subjects are shown in [Table 1]. A total of 91 subjects were surveyed. The average age was 24.5 years, with 44 males (48.4%) and 47 females (51.6%), respectively. People (36.3%) and 58 non-smokers (63.7%). As a result of drinking, 62 (68.1%) were drinking alcohol, and 29 (31.9%) were drinking alcohol.

The results of analyzing oral health-related characteristics of the study subjects are shown in [Table 2]. 49.4% of the subjects answered that their subjective oral health status was healthy, and 50.5% of the respondents said that they were not healthy. 52.7% answered that they were good at performing subjective oral health behaviors, and 47.3% said they were not. In the past, the most frequent visit to the dentist within 6 months was 27.5% and followed by 23.1% between 1 year and 2 years, 6 months to 1 year, and more than 2 years. In the case of experience of oral health education, 68.1% showed the highest level of not to participation to oral health education, and within 6 months, more than 2

years, 6 months ~ 1 year, 1 year ~ 2 years. Subjecthas negative experience were 28.0% and 71.9% had no experience.

Table 1. General characteristics of subjects

General Characteristics		**N**	**%**
Total		91	100.0
Gender	Male	44	48.4
	Female	47	51.6
Smoking	Yes	33	36.3
	No	58	63.7
Drinking	Yes	62	68.1
	No	29	31.9

As shown in [Table 3], the effect of dental hygiene management by the dental hygienist care program on the characteristics of the subjects did not show any difference in dental phobia with the gender before the program, but it was confirmed that the dental fear was lowered slightly after the dental hygiene care program. The effect of dental fear reduction by the dental hygiene care program was greater for women than for men.

Table 2. Oral health-related characteristics of research subjects

Oral health-related characteristics	**N**	**%**
Total	91	100.0
Subjective oral health status		
Healthy	44	49.4
Not healthy	45	50.5
Oral health behaviors		
Well performing properly	48	52.7
Not performing properly	43	47.3
Past dental clinic visit		
Not to visit	7	7.7
Within 6 months	25	27.5
6 months ~ 1 year	20	22.0
1 year ~ 2 years	21	23.1
Over 2 years	18	19.8
Participate in oral health education		
Not to participate	62	68.1
Within 6 months	18	19.7
6 months ~ 1 year	3	3.2
1 year ~ 2 years	1	1.0
Over 2 years	7	7.6
Negative experience at dental clinic		
Yes	25	28.0
No	64	71.9

Cont... **Table 2. Oral health-related characteristics of research subjects**

According to the oral health-related characteristics of the subjects, the reduction of dental fear by the dental hygiene care program is shown in [Table 4]. Although it did not appear the significant difference between before (baseline) and after (end-point) dental hygiene care program, it was found to be slightly lower of dental fear after the dental hygiene care program than before.

The effect of the dental hygiene care program on dental phobia is shown in [Table 5]. The dental fear index was 8.98 before participating in the dental hygiene care program, but it decreased to 5.60 after participating. As a result, the dental hygiene care program was found to effectively reduce dental fear of the subjects.

Discussion

Maintaining oral health is an important factor not only in physical health (or general health status) but also in overall quality of life. Diseases of the teeth and periodontium can cause pain as well as difficulty eating and can lead to diseases of other parts of the body.

Table 3. Reduction of dental fear by dental hygiene care program according to gender

	Dental fear at baseline			
	Low	**Normal**	**High**	**p-value**
Total	29(31.9)	32(35.2)	30(33.0)	-
Gender				
Male	13(27.7)	17(36.2)	17(36.2)	0.647
Female	16(36.4)	15(34.1)	13(29.5)	
Smoking				
Yes	13 (39.4)	10 (30.3)	10 (30,3)	0.502
No	16 (27.6)	22 (37.9)	20 (34.5)	
Drinking				
Yes	23 (37.1)	16 (25.8)	23(37.1)	0.023
No	6 (20.7)	16 (55.2)	7 (24.1)	
	Dental fear at end-point			
	Low	Normal	High	p-value
Total	47(53.4)	35(39.8)	6 (6.8)	-
Gender				
Male	18(39.1)	25(54.3)	3(6.5)	0.012
Female	29(69.0)	10(23.8)	3(7.1)	
Smoking				
Yes	20 (64.5)	9 (29.0)	2(6.5)	0.286
No	27(47.4)	26(45.6)	4(7.0)	
Drinking				
Yes	33 (55.0)	21 (35.0)	6 (10.0)	0.137
No	14 (50.0)	14 (50.0)	0 (0.0)	

*p-value was calculated by McNemar's test

Therefore, regular dental care and dental hygiene care are needed to prevent oral disease and promote oral health. However, patients with high level of dental fears may postpone dental treatment or avoid dental visits due to dental fears, which may cause a vicious cycle in oral health and may adversely affect oral health care[11].Therefore, this study was carried out with the expectation that the oral health education included in the dental hygiene care program could be more familiar with the dental clinic environment, and as the awareness level of the oral health care (or behavior) increased, the fear of dental treatment could be reduced. The effects of dental fear on oral health were investigated, and the participation of dental hygiene care program in some adults was able to control dental fear.

Table 4. Dental fear reduction by dental hygiene care program according to oral health characteristics

	Dental fear at baseline				**Dental fear at end-point**			
	Low	**Normal**	**High**	**p-value**	**Low**	**Normal**	**High**	**p-value**
Total	29(31.9)	32(35.2)	30(33.0)	-	47(53.4)	35(39.8)	6 (6.8)	-
Negative experience at dental clinic								
Yes	3(12.0)	9(36.0)	13(52.0)	0.022	11(45.8)	9(37.5)	4(16.7)	0.078
No	25(39.1)	22(34.4)	17(26.6)		36(56.2)	26(40.6)	2(3.1)	
Participate in oral health education								
Within 6 months	9(50.0)	6(33.3)	3(16.7)	0.054	14(82.4)	3(17.6)	0(0.0)	0.015
6 months ~ 1 year	0(0.0)	0(0.0)	3(100.0)		0(0.0)	2(66.7)	1(33.3)	
1 year ~ 2 years	0(0.0)	0(0.0)	1(100.0)		0(0.0)	1(100.0)	0(0.0)	
Over 2 years	3(42.9)	3(42.9)	1(14.3)		4(57.1)	3(42.9)	0(0.0)	

*p-value was calculated by McNemar's test

Table 5.Dental Fear Index before and after dental hygiene careprogram*(mean ± SD)*

Dental hygiene care program	**Dental Fear Index**	**p-value**
Baseline (before program)	8.98 ± 6.22	0.001
End-point (after program)	5.60 ± 4.79	

*p-value was calculated by paired samples t-test

The dental treatment using specific appliance produces certain sounds, smells, and has a sharp or sharp shape when used, so that a sense of dental fear can also be caused by hearing, smell and sight. So, playing soft music in the dental waiting room is known to be effective in reducing the dental fears of patients because it can mask some of the noises generated during dental treatments and stabilize the patients psychologically. In addition, the method of listening to music using headphones during dental treatment can effectively reduce the dental fear caused by sound.As described above visual stimuli may act as factors causing dental phobia[12]. When treating these patients, it is important to make sure that the dental instruments are not seen by the patients as much as possible.In order to reduce the odor generated from the materials used in dental treatment, it is a good idea to use a fragrance diffuser in the dental treatment room or to select a material that does not generate much odor.

In this study, subjects who had negative experiences in the past dental visits had higher dental fear than those who did not.It has been reported that dental fear is related to the treatment attitudes of dentists and hygienists as well as pains associated with treatments experienced by patients in the past.Negative experiences associated with dental clinics make dental fears worse and directly evade visits by dental clinic. This can interfere with the initial treatment of oral disease, which can deteriorate oral health, so dentists and dental hygienists should be concerned about the attitudes of their patients when providing dental treatment to their patients.In this study, 52% of the subjects who had negative dental experience had a high level of dental fear. However, after the dental hygiene care program ended, only 16.7% of the subjects had negative dental experience in the past had a high

level of dental fear. In addition, about 46% of them were found to have a low level of dental fear, which was significantly higher than the previous 12%. This suggests that the positive experience of dentistry influenced the level of dental fear caused by the past negative dental treatment experience, effectively controlling the level of dental fear.Therefore, dentists and dental hygienist should strive to experience positive dental care for their patients.

Conclusion

It was found that dental hygiene management program can effectively reduce dental fear of subjects. To reduce the dental fear, a more relaxed and stable atmosphere of dental care should be created in the dental clinic. Prevention care for dental disease should be actively carried out to reduce the dental treatment experience. Also, in oral health education, the importance of regular check-ups should be emphasized to reduce the fear of dental treatment. The dental hygiene care program was found to reduce fear of dental care and change perceptions so that the subjects could not be afraid of dental visits by recognizing the importance of oral health, prevention of oral disease and initial treatment. In the future, as dental medical personnel, dental hygienists should consider that dental fear patients are likely to fall into a vicious cycle in terms of oral health care, thus avoiding visits to dental clinics and thereby impeding the initial treatment or oral diseases. Thus, dental hygienists should try to control their fear by understanding these characteristics of the patients.

Ethical Clearance: Not required

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The Effects of Simulation-Based Education Program on Communication Ability, Problem Solving Ability and Critical Thinking among Nursing Students

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Abstract

Background/Objectives: This study was conducted to analyze the effect of simulation-based education program on communication ability, problem-solving ability and critical thinking among nursing students.

Methods/Statistical analysis: This study was one-group pretest-posttest design. 117 nursing students in G city, j provincewererecruited.In order to evaluate the achievement of nursing students, Structured questionnaires were used.Paired t-test and pearson'sorrelation was used for analysis.

Findings: After simulation-based education program, the participants had showed much improvement in communicationability, problem-solving ability, critical thinking.

Improvements/Applications: Judging from these findings, it should be required to develop simulation-based education program for nursing students.

Keywords: *Nursing students, simulation-based education, communication ability, problem solving ability, critical thinking*

Introduction

Cases where new nurses complain of difficulties[4] in adapting to clinical settings are increasing, leading to the limitation in securing nursing manpower in hospitals [1-3]. Therefore, reducing the difficulties of nursing students experienced in the process of new nurses through which nursing students are turned into nurses is essential for securing nursing manpower and improving the qualitative level of medical service, and to this end, the willingness to improve against structural problems in the field, such as 'bullying prevention', 'ensuring welfare', and 'insurance fee improvement', is also essential [2]. In addition, as the basis for such structural improvement, long-term interest in and capacity building for nursing students and nurses working in the field structures should precede.

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Communication ability is the ability to accuratelyconvey the feelings and thoughts of oneself and others through communication leading to mutual understanding[4] and is one of the core competencies for enhancing the effect of nursing intervention through effective relationship formation [4-5]. Critical thinking is a factor that affects communication as such so that it can be made rationally[4-5], which also importantly affects problem-solving ability [5]. Problem-solving ability is the ability to recognize problems and select the most appropriate one among potential alternatives to the problems, which can be said to be one of the core competencies required to accurately cope with unforeseen problem situations in the field [6]. Communication ability is an essential element required for effective exertion of the problem-solving ability as such [6]. That is, communication ability, problem-solving ability, and critical thinking can be said to be the influencing factors of each other.

Although the literature that studied the communication ability, problem-solving ability, and

critical thinking of nursing students together could be hardly found, studies on each of them have been conducted relatively steadily. In particular, as studies of the communication ability of nursing students, correlation studies related to communication ability [7-9], studies of influencing factors of communication ability [10-11], studies of communication types[12], studies of communication ability and critical thinking ability [4-6], experimental studies to see changes in communication ability according to teaching methods and educational contents[13-15], and studies to develop programs for the cultivation of communication ability could be identified[16-17].

Recently, simulation-based education programs, which are one of the major teaching and learning methods in nursing education, enable students to participate in the realistically reproduced field actively and critically with active and critical attitudes so that they can solve problems in nursing of subjects thereby enabling students to obtain diverseeducational effects such as professional accuracy and self-confidence in the process of being brought into their roles[14].Although previous studies that investigated the effects of the team-based learning (TBL) educational method on nursing students' communication ability, problem-solving ability, and critical thinking ability could be identified [6], studies that reported the effects of simulation-based education programs could not be identified. Therefore, this study aims to provide basic data for nursing students' capacity building by grasping the effects of simulation-based education programs on the communication ability, problem-solving ability, and critical thinking of nursing students.

Method

This study was one-group pretest-posttest design. The simulation practice education was applied to thesubject termed integrated simulation practice organized as a compulsory major subject in the second semester of the fourth grade (1 credit, 2 hours per week), and was operated for 2 hours per time over 15 weeks for 30 hours in total. 117 nursing studentswere recruited.Offer sufficient information about this study to them and select the students who agree to participation in this study. The data are collected from September to December, 2018. The researchers fully explained prior to participate on this study that in case of the students who feel the negative feelings while participating in the study, they could stop participation in immediately.

The communication ability was measured using the comprehensive interpersonal communication ability measurement tool (GICC-15) developed by Hur (2003) by modifying and supplementing the original tool [18]. The problem-solving ability was measured using a measurement tool modified and supplemented by Woo (2002) [19]. This questionnaire required the respondent to solve three unstructured questions and mark the answers on the questionnaire. Each problem-solving process consists of five steps: finding a problem, defining the problem, devising a problem solution, implementing the problem solution, and reviewing the problem solution. The critical thinking ability was measured using the critical thinking ability measuring tool developed by Yoon (2004) for nursing students [20]. The critical thinking ability measuring tool consists of comprising, intellectual passion/curiosity, prudence, self-confidence, system, intellectual fairness, sound skepticism and objectivity.

SPSS WIN 18.0 Version program is used for data analysis. General characteristic of the subject is used for frequency analysis and descriptive statistic, paired t-test and Pearson's correlationwas used for analysis.

Results and Discussion

1. Difference of Communication Ability after Intervention

After intervention with a simulation-based education program, the average score of communication ability increased by 3.5 points on average from 70.9 ± 9.6 before intervention to 74.4 ± 12.4 after intervention, and the difference was significant (t = -2.48, p = .015), indicating that the simulation-based education programs affected communication [Table 1].

Table 1.Difference of communication ability, after simulation-based education program(N=117)

Variables	Pre test M±SD	Post test M±SD	Paired Differences M±SD	t	p
CA	70.9 ±9.6	74.4 ±12.4	3.54 ±15.5	-2.48	.015**

CA: Communication ability

2. Difference of Problem-Solving Ability after Intervention

After the intervention with the simulation-based education program, the average score of problem-

solving ability increased by 2.7 points on average from 62.7 ± 6.47 before intervention to 69.8 ± 10.0 after intervention, and the difference was significant (t = -2.32, p = 0.02)). Among the subareas, significant differences appeared in finding problems (t = -.2.40, p = .018), defining the problems (t = -.2.24, p = .027), and implementing the solution (t = -.2.10 p = .038), while no significant difference appeared in devising problem solutions (t = -.1.06, p = .293) and reviewing problem solving (t = -.2.84, p = .403)[Table 2].

Table 2.Difference of problem-solving ability after simulation-based education program (N=117)

Variables	Pre test M±SD	Post test M±SD	Paired Differences M±SD	t	p
P-SA	67.1±6.47	69.8±10.0	2.66±12.4	-2.32	.022**
PF	14.93±2.27	15.79±2.91	.86±3.86	-.2.40	.018**
PD	16.27±1.96	16.93±2.44	.67±3.23	-2.24	.027**
PS	16.97±2.18	17.32±2.71	.35±3.58	-.1.06	.293
AS	16.12±1.88	16.80±2.68	.68±3.52	-.2.10	.038**
RV	15.46±3.36	16.38±2.43	.92±1.44	-.2.84	.403

P-SA: Problem-solving ability

PF: Problem finding

PD: problem defining

PS: problem solution

AS: Applying solution

RV: Reviewing

3. Difference of Critical Thinking after Intervention

After the intervention with the simulation-based education program, the mean score of critical thinking increased by 2.1 points from 59.2 ± 5.0 before intervention to 61.3 ± 5.4 after intervention, and the difference was significant (t = -3.01, p = .003) indicating that the simulation programs affected critical thinking. As for the subareas, significant differences appeared in objectivity (t = -2.89, p = .005), systematicity (t = -3.32, p = .001), and intellectual passion / curiosity (t = -2.87, p = .005) while no significant difference appeared in intellectualcompleteness (t = -1.81, p = .074), prudence (t = -1.75, p = .082), pursuit of truth (t = 1.17, p = .247), and reliability (t = -0.62, p = .537) [Table 3].

Table 3. Difference of critical thinking after simulation-based education program (N=117)

Variables	Pre test M±SD	Post test M±SD	Paired Differences M±SD	t	p
CT	59.2±5.0	61.3± 5.4	2.06±7.39	-3.01	.003***
IF	6.50±1.34	6.83±1.42	.33±1.94	-1.81	.074
PR	12.94±1.49	13.27±1.26	.33±2.0	-1.75	.082
OB	9.55±1.51	10.15±1.56	.60±2.24	-2.89	.005**
HS	12.08±1.38	11.89±1.22	1.88±1.75	1.17	.247
ST	5.98±1.09	6.44±1.11	.46±1.51	-3.32	.001***
IE/C	6.15±1.21	6.62±1.26	.48±1.80	-2.87	.005**
SC	6.03±0.85	6.09±0.67	.06±1.04	-0.62	.537

CT: Critical thinking

IF: Intellectual fairness

PR: Prudence

OB: Objectivity

HS: Healthy Skepticism

ST: Systematicity

IE/C: Intellectual eagerness/Curiosity

SC: Self Confidence

4. Correlation between Communication Ability, Problem-Solving and Critical Thinking

After the intervention with the simulation-based education program, the correlations between individual variables was examined and according to the results, communication ability and problem-solving ability (r = 692, p = .000), communication ability and critical thinking (r = .629, p = .000), and problem-solving ability and critical thinking (r = .679, p = .000) showed significant positive correlations[Table 4].

Table 4.Correlation between communication ability, problem solving ability, and critical thinking(N=117)

Variables	CA	P-SA	CT
CA	1		
P-SA	.692***(.000)	1	
CT	629***(.000)	.679***(.000)	1

Discussion

In this study, the simulation-based education programs affected communication ability. This is consistent with the study finding of Joo et al., who measured the effect of standardized patient simulation practice education using the same tool [21], and similar to the findings of a study conducted by of Kim & Kim, in which communication ability scores increased after application of team base learning(TBL) and the study findings of Park & Choi, who studied the effect of the SBAR communication education programs [6,13].

In this study, the simulation-based education programs affected problem solving ability, and among the subareas, significant differences appeared in finding problems, defining the problems, and implementing the solution. These results are consistent with those previous studies that measured the effects of problem-based simulations using the same tool [22-[23], and are in the same context with the findings of the previous study in which problem-solving ability scores increased after applying team base learning (TBL) [6]. However, there is a difference in the significance of each subareas[6,22-23], These differences are considered attributable to differences in the contents of class operation on professors in charge of the subject.

In this study, the simulation-based education programs affected Critical Thinking, and among the subareas, significant differences appeared in objectivity, systematicity and intellectual passion / curiosity. These results are consistent with the study findings of Joo et al. and Kim & Yu, who measured the effects of simulation-based teaching methods using the same tool [21,23], and are similar to the study findings of Park & Choi, who studied the effects of the SBAR communication education program [13]. In particular, although the study conducted by Kim & Kim has similarities to this study in the composition of the class operation, subjects applied, and the same effect measurement tool, the results are somewhat different[22]. This is considered attributable to individual differences among professors in charge of the classes and students who participated in the classes. The critical thinking, which is emphasized in nursing education, is a thinking process that can make rational decisions based on reasonable criteria [6], and personal dispositions and habits [13].

After the intervention with the simulation-based education program, there is significant correlations that means the higher the communication ability, the higher the problem-solving ability and critical thinking, and the higher the problem-solving ability, the higher the critical thinking. The study findings of Kim & Yu, who studied the effects of simulation-based nursing education on problem-solving processes could be said to be in the same context with the results of this study [23]. In addition, Lee & Chung, who studied the correlations between nursing students' critical thinking tendency, self-esteem, and communication ability, and Kim & Kim, who studied the effects of simulation practice on problem-solving ability, critical thinking, and learning satisfaction of nursing students support some of the results of this study [6,24]. Communication ability helps problem solving ability to be maximally exerted, problem-solving ability

should be considered along with critical thinking, and critical thinking helps communication to be smooth. Although these three variables are closely related to each other as such, studies of them are insufficient now. Therefore, additional studies are necessary.

Conclusion

This study was conducted to understand the communication ability, problem-solving ability, and critical thinking that are foundational competencies required for nursing students and the effects of simulation-based education programs as a teaching-learning method suitable for the building of the competencies and provide basic data for nursing students' competency building.

This study is a quasi-experimental study with single-group pre-postal design conducted with 4th grade nursing students in the 2nd semesters. The effects should be verified through an experimental group and a control group. In addition, since the effects in this study were measured on a one-off basis in the second semester of 4th grade, the necessity of studies of systems for competency building considering the level differences among grades should be presented. In recent years, diverse teaching-learning methods and educational means have been presented for nursing education. Smart education using various electronic devices, programs, and applications is gaining strength, and the converged forms of simulation-based education programs that introduced diverse educational means are also appearing. Therefore, this researcher would like to suggest studies to develop nursing education methods suitable for building certain competencies.

Ethical Clearance: Not required

Source of Funding: Nil

Conflict of Interest: Nil

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The Factors Affecting Satisfaction with College Life among Nursing School Students

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Abstract

Background/Objectives: To solve complex problems in clinical working place as professional nurses, nursing education is very important. This study is to analyze the factors affecting satisfaction with college life among nursing school students.

Methods/Statistical analysis: This research analyzed factors affecting satisfaction with college life using 112 nursing school students in S city as research objects. Specifically, this research examined self-resilience, communication capacity, and self-respect.

Findings: It was found that satisfaction with college life have significant relationship with self-resilience, communication capacity, and self-respect. Regression analysis showed that self-resilience and communication capacity significantly affect satisfaction with college life. Consequently, to raise satisfaction with college life, we should prepare ways to improve self-resilience and communication capacity.

Improvements/Applications: By examining factors affecting satisfaction with college life among nursing school students, it is hoped that the findings of this research will be the basis in leading to systematic policies in nursing school education.

Keywords: *Ego Resilience, Communication Skill, Self-esteem, College Life Satisfaction, Nursing Student*

Introduction[5]

To cultivate professional nurses who are equipped with sophisticated medical technology, and can efficiently solve complex problems of patients which occur frequently in clinical working places, it is very important to run educational programs to cultivate nurses who can solve such problems[1]. Given the same situation, beliefs of individuals and internal resources lead some nurses to overcome problems they are put in and perform their duties, and others to be in difficult situations caused by maladjustment in their college life[2]. In such nursing environment, as the ego resilience is the behavior, emotional and cognitive control skills that allow them to adapt to the environment and is the element that helps respond to the stress situation and the difficulties flexibly without being frustrated by the changing situation, it canplay the important role to adapt to the collage life[3]. If the ego resilience is high, Since the level that one is tense and endures in the environment depending on the situation, they can accept and respond to diverse demands flexibly in unfamiliar situation. Therefore, the person whose ego is resilient can adapt to new situation successfully by adjusting the level of tension and endurance by the new situation and reacting to the unfamiliar situation flexibly[4]. In addition, since the ego resilience provides the ultimate force to determine the area of activity by determining the motive, it can be considered as major factor to enhance the collage life satisfaction by inducing the active academic adjustment and by relieving the stress or get rid of withering[5] with the adaptability that is exerted when facing with unexpected event or un certainty. It is suggested as major variable for the problem solving process and clinical competence[6], and reported that it exerts the excellent problem solving ability in unexpected clinical situation[7].

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In the rapidly changing medical environment, since the efficient communication skill of the nurses helps to established the therapeutic relationship with the patients from diverse classes and to form the cooperative relationship with healthcare specialists, it is the essential skill to become professional nurse[1]. Nurses should make cooperative relationship with the patients, medical personnel and guardians for the health and welfare of the patients and for that, should exert the communication skill according to the situation[8]. Therefore, as the competence to make relationships with diverse people and to provide the nursing, the communication skill can be considered as core competence that should be held by nurses[9], and in case of nursing student having insufficient communication skill can fell the difficulty in the clinical training[10]. In addition, the self-esteem means that respects, consider and recognize themself worthwhile[11].

Nursing students face the clinical training in the state that they have difficulties in adapting to the department and collage life, and will encounter the greater difficulties in adapting to the collage life. Therefore, it is important to verify the adaptation estate of the nursing students to the collage life and to provide appropriate mediation for the adaptation[12].

Consequently, existing researches have dealt with self-resilience, communication capacity, self-respect and satisfaction with college life separately. In particular, there are not enough researches on the effects of those variables on satisfaction with college life. Accordingly, this research examined general characteristics of respondents, self-resilience, communication capacity, and self-respect, and tried to prepare basic data to prepare policies to improve satisfaction with college life among nursing school students.

Method

This research is descriptive survey research to examine the effects of self-resilience, communication capacity, and self-respect on satisfaction with college life among nursing school students.

The objects of this research are 112 nursing school students located in S city. The number of research objects were determined by G* power program, which indicates that, under the criteria of significance level .05, effect size .15, and power .95 in multiple regression analysis, the minimum number of sample is 109. 113 copies of the questionnaire were distributed, and 112 were collected (99.1%), satisfying the criteria of analysis.

This study is the research tool. First, the ego resilience score refers to the score measured with the tool that[14] translated, corrected complemented the ego resilience scale developed by[13]. It composed of total 14 questions based on 5 point-scale and the higher the total score is, the more greater the ability to return to the level controlled by individual after experiencing the stress. In this study, Cronbach'sα was .848. Second, communication skill score refers to the score measured with global interpersonal communication competence developed by[15]. This tool was composed of total 15 questions on the self-disclosure, taking another person's perspective, social tension relaxation, assertive, concentration, interaction management, expressiveness, bearing capacity, immediacy, efficiency, social relevance, logic, target detection and reactive power including 2 question on the noise control[10, 11]. The questions were measured with 5-point Likert scale and the higher the score, the higher the communication skill. Cronbach's α at the time of development was .72 and in this study, it was .87.

Third, collage life satisfaction score refers to the score measured with the measure tool of National Customer Satisfaction Index (NCSI) correct and complemented by[16]. This tool was composed of total 17 questions divided into 3 sub-factors of overall collage life, quality of education and administration and welfare satisfaction and measured with 5-point Likert scale. The higher the score, the higher the satisfaction.Cronbach's α in the research by Lee was .83 and in this study, it was.88.

Forth, self-esteem score refers to the score measured with the tool developed by[17] and corrected, complemented and translated by[18]. This tool measures with 5-point Likert scale and composed of total 10 questions: 5 questions on the positive self-esteem and 5 questions on the negative self-esteem. 1 point was granted to "Not at all" to 5 points to "Absolutely" and the higher the score, the higher the level of self-esteem level. For the negative questions, the score is converted in reverse. The reliability Cronbachα in this study was .86.

Data were collected from May 03, 2017 to May 15, 2017 and the self answering method through structured questionnaire was used. The researcher met and explained the purpose of study to the students

personally, obtained the consent and explained the objectives and the method to the students. After asking the consent to participating in the study to the subjects who expressed the participation voluntarily and received the written consent from them. The questionnaire survey took 10 - 15 minuted per subject and the subject read and answered the questionnaire personally. To protect the subjects ethically, the consent form was attached to the questionnaire and contained the purpose and contents of the study, spontaneity of the participation and the contents that the anonymity will be guaranteed and the subject can stop the participation anytime during the survey, they will not have any disadvantage by the interruption of participation and the collected data will not be used other than the purpose of the study. Considering the ethical aspect of the subject, the researcher explained them to the subject personally.

The collected data were analyzed using SPSS 20.0. The general characteristics of the participants were analyzed in real numbers and percentages

Result and Discussion

1. General characteristics of study subjects

The general characteristics of study subjects are as seen in [Table 1].

Table 1: General characteristics of study subjects (N=112)

Characteristics	Categories	n(%)
Age(years)	19-25	97(86.6)
	26-30	11(9.8)
	31-40	4(3.6)
Religion	Christian	35(31.3)
	Catholic	15(13.4)
	Buddhist	8(7.1)
	none,	54(48.2)
Major satisdaction	Satisfied	61(54.5)
	Usally	9(43.8)
	Unsatisfied	2(1.8)
Academic grades	Good	16(14.3)
	Fair	76(67.9)
	Poor	20(17.9)
Motive to select the nursing department	Considering the high school grad	18(16.1)
	It fits to my aptitude and hobby	34(30.4)
	It gives me good opportunity to be employed	33(29.5)
	Recommended by parents and teacher	19(17.0)
	To have better opportunity to go to overseas	3(2.7)
	To have service job	6(5.4)
Health condition	Very healthy	23(20.5)
	Healthy	52(46.4)
	Nomal	31(27.7)
	Unhealthy	6(5.4)

In the age, the age between 19 and 25 was 97 students(86.6%) occupying the most and in the religion, none, Christian, Catholic and Buddhist were occupied the most in order. In the major satisfaction, the subjects answered 'satisfied' were 61students(54.5%) occupying the most. In the academic grades, the subject answered 'Fair' were 76students(67.9%) the most. As motive of choosing nursing as their major, the item 'It fits to my aptitude and hobby' got the largest proportion. The motive to select the nursing department was shown in order of 'It fits to my aptitude and hobby', 'It gives me good opportunity to be employed', 'Recommended by parents and teacher', 'Considering the high school grade', 'To have service job', and 'To have better opportunity to go to overseas'. In the health condition, the subjects answered 'Healthy' were 52students(46.4%) the most.

2.Degree of the Variable of the Subject

The degree of the ego resilience, communication, self-esteem and the collage life satisfaction in this study are as shown in [Table 2].

Table 2: Degree of the Variable of the Subject(N=112)

Variables	M±SD	Min.	Max.
Ego resilience	3.49±**0.53**	2.14	5.00
Communication	3.77±**0.44**	2.67	5.00
Self-esteem	3.67±**0.57**	2.20	4.80
Collage life satisfaction	3.10±**0.55**	2.06	4.76

The score of the ego resilience, communication, self-esteem and the collage life satisfaction of the subjects were 3.49±0.53 points, 3.77±0.44 points, 3.67±0.57 points and 3.10±0.55 points, respectively.

3.Relationships among the Study Variable

The correlations among the variables in this study are as shown in [Table 3].

Table 3: Relationships among the Study Variable (N=112)

Variables	ER	CC	SE	CS
	r(p)	r(p)	r(p)	r(p)
ER	1	0.64 (<.001)	0.58 (<.001)	0.50 (<.001)
CC		1	0.61 (<.001)	0.54 (<.001)
SE			1	0.49 (<.001)
CS				1

The ego resilience of the subject showed the significant positive correlation with communication (r=.64, p<.001), self-esteem (r=.58, p<.001) and collage life satisfaction (r=.50, p<.001). The communication showed the significant positive correlation with the self-esteem (r=.61, p<.001) and collage life satisfaction (r=.54, p<.001), and the self-esteem showed the significant positive correlation with the collage life satisfaction (r=.49, p<.001).

4.Factors Influencing on Collage Life Satisfaction

To identify the factor having influence on the collage life satisfaction of the subject, the residence type, which showed the significant different out of the ego resilience, communication, self-esteem was analyzed. Since the tolerance to diagnose the multicollinearity among the variables was shown as 0.1 or more and the variance inflation factor was shown as 10 or less, there is no problem in the multicollinearity and as Durbin-Watson was 1.764 satisfying the independency of residual, it was confirmed that the basic assumption of regression analysis was satisfied.

In the analysis results, the regression model was significant (F=6.828, p<.001), it was shown that the communication (ß=.358, p=.009) and the ego resilience (ß=.185, p=.088) have significant influence on the collage life satisfaction and the explanatory power was 67.0% [Table 4].

Table 4: Factors Influencing Collage Life Satisfaction (N=112)

Variables	B	SE	ß	t	p	TI	VIF
(Constnat)	.713	.582		1.224	.224		
Ego resilience	.185	.107	.180	1.726	.088	.508	1.969
Communication	.358	.135	.288	2.650	.009	.466	2.145
Self-esteem	.163	.109	.169	1.499	.137	.435	2.300

Adj. R2=.67, F=6.828, p<.001, Durbin-Watson=1.764

Discussion

If the ego resilience enhancement program is developed and applied to nursing curriculum, it will contribute to enhancing the interpersonal relationship and the emotional control ability of the nursing students to perform the clinical training with diverse patients and families, for which the relatively low outcome was shown [19]. If the ego resilience is high, to control the stress situation, one would cope with the stress actively, which will help the collage student adapt to the study, society and collage environment well [21].

During the clinical training, the nursing students need the ability to solve the problem in the relationship with the patient and fellow students in diverse nursing situations and the communication skill in such situation is important[22]. Therefore, considering the characteristics of the practice-oriented nursing, the communication skill of the nursing student need to be improved by introducing diverse teaching methods[1].

The clinical training stress of the nursing student showed the significant positive correlation with the communication skill[23], and to enhance the communication skill of nursing student, the education of communication considering the role play, etc focusing on the experiencing the actual situation not the instructor-led education should be considered by investigating the demand of the subject[24].

The self-esteem is that respects and recognize oneself as worthwhile and has a correlation with the self-efficacy that can be considered as the belief on one's own ability to achieve the goal and the self-esteem and the self-efficacy of the nursing student were the significant factor having influence on the ego resilience[25]. The person having high ego resilience are known to have high self-confidence and self-esteem, and is stabilized emotionally and adapts well in the stress situation. Therefore, to enhance the ego resilience of the nursing student, the self-esteem should be enhanced.

Conclusion

This research was performed to examine the effects of self-resilience, communication capacity, and self-respect on satisfaction with college life, and to search for ways to improve satisfaction with college life among nursing school students.

In this study, the ego resilience showed the significant positive correlation with the communication, self-esteem and the collage life satisfaction.

Though there are some limits of this research, this research wants to suggest the followings.

First, to identify factors affecting satisfaction with college life of nursing school students, it is necessary to do researches including various factors.

Second, it is necessary to apply programs and systematic educational policies for nursing school students, and it is necessary to do researches and continuous management.

Finally, this research used nursing school students of one college. Thus, to get generalized results, it is necessary to expand the sample, and do repetitive researches.

Ethical Clearance: Not required

Source of Funding: Nil

Conflict of Interest: Nil

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Effects of Occupational Therapy using CO-OP on Activities of Daily Living and Balance Ability of People with Intellectual Disability using Day care Center

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Abstract

Background/Objectives: The purpose was to investigate the effects of occupational therapy using cognitive orientation to daily occupational performance (CO-OP) on activities of daily livings and balance for adults with intellectual disabilities using the daycarecenter.

Methods/Statistical analysis: From February to June in 2018, 10 people with intellectual disabilities who use the day care center in B city were enrolled. The occupational therapy was conducted for once a week for a total of 20 weeks. The Burg Balance Scale and Modified Barthel Index were assessed for physical balance and independence of activities of daily living before and after treatment.

Findings: occupational therapy using CO-OP showed significant improvement in total score of Modified Barthel Index and Berg Balance Scale for adults with intellectual disability.

Improvements/Applications: Occupational therapy based on CO-OP was effective in balancing the activities of daily living of adults with disabilities using day care center.

Keywords: *Activities of daily living, Balance, Cognitive orientation to daily occupational performance, Day care center, Intellectual disability, Occupational therapy*

Introduction

People with intellectual disabilities have deficits in cognitive functions such as problem solving, planning, judgment, learning, language, motor, and social abilities [1-4]. These deficiencies interfere with communication skills, social participation, academic or occupational functioning, and self-reliance in the home or community when engaging in daily activities and social activities. People with intellectual disabilities, unlike other people with disabilities, receive services from the facilities because they have considerable restriction on instrumental daily living and social life[5]. It is necessary for people with intellectual disability to provide activities that complement the deficiencies of cognitive, physical, and emotional development and enhance the ability of activities of daily living through various intervention[6].

Mild to moderate adults with intellectual disabilities can perform activities of daily living independently through continuous daily training, which requires continuous intervention and management. Despite the high demands for occupational therapy for people with intellectual disabilities, there is a lack of evidence on the effectiveness of occupational therapy. Level of the ID was found to be associated with ADL performance in people with ID [7]. physical fitness is also an aspect in the ability to perform ADL [8-11].

In Republic of Korea, major services for people with disability at the day care center include rehabilitation, field trips, hobbies, education, counseling, lunch and snack instruction. There are few daycare centers in the Republic of Korea that provide occupational therapy services.

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Adults with intellectual disabilities need task-oriented training that can be used functionally in everyday life. Cognitive orientation to daily occupational performance (CO-OP) approach, which focuses on activities and participation, not disability and impairment, focuses on improving occupation in their environment by developing strategies to enable activities and participation. The client-centered approach motivates clients to identify and learn skills that have purpose and meaning. Increasing motivation can improve motor learning and performance [12]. CO-OP approach is a new intervention that successfully modifies the environment based on exercise/learning theories. And it based on evidence, and focuses on performance. Also, it fulfills client need successfully. It is important to use problem solving strategies by the clients themselves which requires three skills: language, cognitive function, and reaction to behavior. The goal of CO-OP is to acquire skills and generalize through the use of cognitive strategies [13].

The purpose of this study was to investigate the effects of occupational therapy using CO-OP approach on daily activities and balance in young people with mild intellectual disabilities using day care center.

Method

The subjects were recruited from 3 daycare centers in B city in Republic of Korea. The subjects were 10 persons with intellectual disability. The researcher explained the purpose and method of the study to the participants, and the participants agreed to participate. Average age of participants was 23.2. The participants were 8 male and 2 female. The criteria for selecting participants were as follows. First, adults over 18, second, persons with intellectual disabilities according to disability, third, persons using day care centersand those who can understand and follow the contents of the researcher's instructions.

Ten adults with intellectual disability suing day care centers were selected. The evaluator conducted a Canadian Occupational Performance Measure to select participant' 2 target activities. As an intervention for participants, a cognitive strategy for target activities based on CO-OP was applied. Intervention was 60 minutes per session for a total of 20 weeks. Before and after intervention, the activities of daily living was assessed using the Modified Barthel Index (MBI) and balance was assessed using the Berg Balance Scale (BBS). The assessment was conducted before and after the intervention.

MBI is a tool for assessing the level of activities of daily livings by observing or interview. The assessment items were 10 of personal hygiene, bathing, eating, toilet treatment, climbing stairs, dressing, stool control, urine control, walking, and chair/bed movement. The higher the score from the minimum score of 0 to the maximum score of 100, the higher the independence of activities of daily living. The total scores are divided into four stages: full independence, partial independence, and full dependence, depending on the patient's level of function. MBI has an internal validity of .90, test-retest reliability of .90 and inter-tester reliability of .95 [14]. BBS consists of 14 items including sitting, standing, posture change, and so on. Evaluate the balance ability by asking the patient to do the items themselves. The score ranges from a minimum of 0 to a maximum of 4 for each item, with a total score of 56 for the 14 items. This test has an intra- and inter-measured reliability of r=0.99 and r=0.98, respectively, with high confidence and internal validity for assessing balance [15].

Through the Canadian Occupational Performance Measure, two activities of high importance but low performance and satisfaction were selected as target activities. The target activities of each participant were trained based the CO-OP approach. CO-OP approach focuses on the subjects and uses a self-guidance strategy that solves the task performance problem and improves work ability. The process of this strategy set client centered goal and then developed detailed plan accordingly. After executing the plan, the participants themselves check if modifications were needed. This is called 'Goal-Plan-Do-Check.' The data was analyzed by SPSS Version 20.0. The general characteristics of the subjects was analyzed by descriptive statistics such as frequency and percentage. In order to examine the effect of occupational therapy, the daily life activity and balance ability were measured and compared using the Wilcoxon signed rank test. The statistical significance level was .05.

Result and Discussion

1. Change in ADL

As seen in Figure 1, MBI total score was 69.2±**20.07 in pre-intervention, and 72.1±19.44 in post-intervention. There was a statistically significant improvement.**

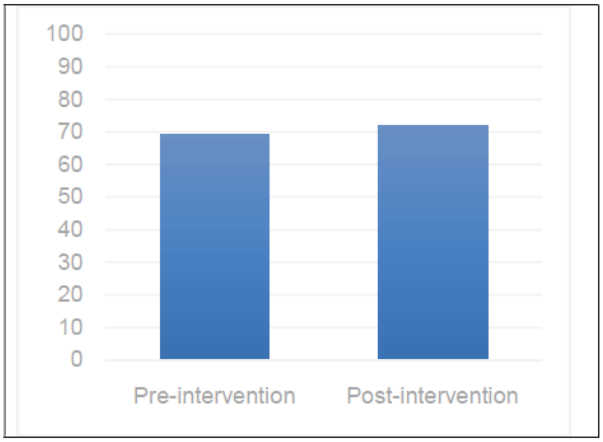


Figure 1. Modified Barthel Index

2.Change in balance

As seen in Figure 2, the result of BBS showed a statistically significant improvement from 43.7±13.17 to 47.7±12.84 (Table 1).

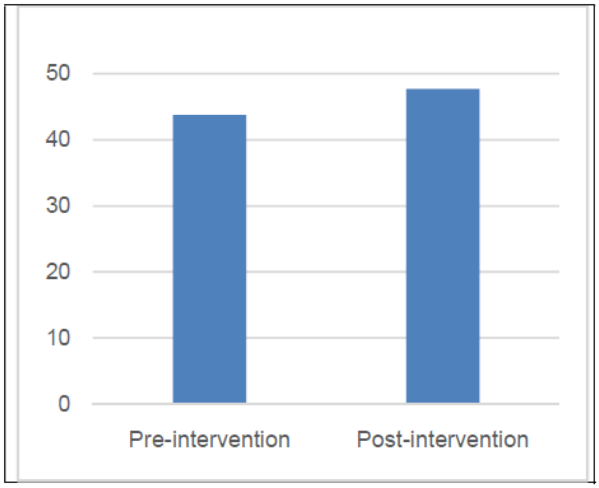


Figure 2. Berg Balance Scale

Table 1. Change of Modified Barthel Index and Berg Balance Scale

	Pre	Post	t
MBI BBS	69.2±20.07 43.7±13.17	72.1±19.44 47.7±12.84	-2.694* -2.000*

Discussion

For adults with intellectual disabilities, intellectual levels and physical abilities are important factors in determining ADL [16]. Not only does it increase the demand for care of caregiver [17], but also predicts the overall ADL degeneration. intellectual level and mobility level of the people with intellectual disability are the most important factors affecting the quality of life. A study of 480 adult with intellectual disabilities reported that 49.8% were completely independent, 8.1% were mildly dependent, 27.9% were moderately dependent, 11.9% were severely dependent, and 2.3% were completely dependent. To improve the quality of life for adults with intellectual disability in communities, we should provide appropriate services and intervention. As times change, evidence for community-based occupational therapy beyond medical institutions is required. Many adults with intellectual disability use day care centers and their rates are increasing. Adults with Mild to moderate intellectual disabilities can perform activities of daily living through continuous daily training, which requires continuous intervention and management. Especially, CO-OP approach, which focuses on activities and participation, focuses on improving occupation in their environment by developing strategies to enable activities and participation.Few studies have reported the effects of occupational therapy on adults with intellectual disabilities. As a result of previous studies, occupational therapy was found to be effective in improving daily activities. However, most of the previous studies were single subjects with 3 to 6 subjects. As a result of this study, occupational therapy using the CO-OP approach was found to be effective in the activities of daily living and balance of adults with intellectual disabilities. The CO-OP approach is applicable to subjects who are able to respond to cognition, language, and behavior. This was possible because the subjects were mild. It may be limited to apply to moderate and severe adult intellectual disabilities. In the early stages of intervention, CO-OP acquires motor skills for children with developmental coordination disorders. According to previous studies, CO-OP is not only effective for improving and maintaining motor performance skills of children with developmental coordination disorder and Asperger disorder, but also has recently been applied to children with cerebral palsy and brain injury[18] [19] [20] [21][22] [23] [24] [25] [26] [27]. In addition, since 2010, there have been increasing cases of applying CO-OP to adults, and it has been proved that it is effective in improving daily life functions mainly for stroke, brain injury, and the elderly [28] [29][30][31][32].This study is the first study to verify the effect of CO-OP in adult intellectual disabilities. In the future, it is necessary to verify the effectiveness in various aspects.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Relations on Communication Competence, Job Satisfaction and Nursing Performance of Clinical Nurse

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Abstract

Background/Objectives: The aim of this study was to identify the relationship among the Communication Competence, Job satisfaction and nursing performance of clinical nurses in Korea.

Methods/Statistical analysis: The 212 clinical nurses were participants who worked at general hospitals. The difference of job stress according to the general characteristics was performed by t-test, ANOVA test. Multiple regression analysis was executed to investigate factors that influence the job stress.

Findings: The result of this study, it was shown that communication skills 3.56 ± 0.44, job satisfaction 3.25 ± 0.60, and nursing job performance were 3.75 ± 0.53, total were 3.52 ± 0.43. According to general characteristics, the communication skills, job satisfaction, and nursing performance, all showed significant correlation for age, career, and didn't show the correlation for education.

Improvements/Applications: The nurses' communication skills enhancement will increase job satisfaction and job performance ability and have a positive effect on disease recovery and patient healing.

Keywords: *Communication Competence, Job satisfaction, Job Stress, Nursing Performance, Clinical Nurse, Korea.*

Introduction

Human beings form their relationships through communication from birth. In particular, communication regarding treatment plans and progress should be made in the medical institutions, establishing the relationship with medical staff and patients[1,2]. In this progress, good communication with each other based on precise decision making is very important.

The hospital organization consists of professionals in various fields who provide services with the common goals of the treatment of the disease and the recovery of the health for the subjects. Among them, nurses are a group which is more than 30% of the total hospital workforce and occupies a high proportion in the workforce structure[3,4]. Nurses play a central role in collaborative communication for work progress with caregivers, colleagues and other departments in addition to performing independent nursing services that supply direct medical service according to the request of the subject for 24 hours[5]. The communication executed by nurses in organic relationships with them reduces psychological anxiety and fear, providing emotional stability for the subjects, and this leads to decrease pain and drug use, it also affects symptomatic relief and physiological function enhancement[6]. On the other hand, as the result from poor communication is directly related to the subjects' health care and the problem of treatment and related to job performance, effective communication competence is one of the essential core abilities nurses should have[7].

Therefore, nurses need interpersonal skills for the subjects' emotional stability and recognition abilities of one's self and others to notice the subjects' psychological needs in the busy medical environment and also they need empathy abilities for communication skills improvement[8,9].

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Nurses play an intermediate role with the hospital's medical staff, establish the most direct and lasting relationship with patients who are medical consumers, and nurses are in the crucial position that can influence the medical consumer's perception. Thus, nurses' communication competence is one of the factors needed to enhance the efficiency of the hospital organization. Therefore, the purpose of this study is to apprehend the relationship between communication, job satisfaction and job performance of nurses working in general hospitals and to investigate factors which have an impact on the job stress of nurses.

Method

For the study, after explaining the purpose of the study and requesting consent to a total of 300 nurses working at general hospitals with more than 300 beds located in S city from March 2 to March 9, 2018, the questionnaires were distributed to them and answered in a self-filled method. 294 out of 300 questionnaires were collected and 212 questionnaires except for unsatisfactory responses were analyzed. The measuring tool of the nurse's communication type was a total of 18 questions which consisted of 6 questions of informational type, 6 questions of friendly type, and 6 questions of authoritative type. Cronbach's α = .88. Job satisfaction was a total of 39 questions and 7 sub-areas which were composed of 6 questions of professional positions, 3 questions of nurse-doctor relations, 7 questions of administration, 5 questions of autonomy, 5 questions of job requirements, 8 questions of interactions, and 4 questions of pay. Cronbach's α = .86. Job stress is a total of 38 questions and the high score means the job stress is high. Cronbach's α = .92.The data collected in the study were analyzed using the SPSS/WIN 21.0 program as follows. The difference of job stress according to the general characteristics of the subjects was performed by t-test, ANOVA test. The relationship between subject communication type, critical thinking tendency, job satisfaction, and job stress was analyzed by Pearson correlation coefficient.Multiple regression analysis was executed to investigate factors that influence the job stress of the subjects. The statistical significance level was set to .05.

Result and Discussion

The general characteristics of respondents are shown in the following [Table 1]. The age was the highest in the 20s as 55.7%, followed by 25.5% in the 30s and 18.9% in the 40s and above. Among them, 67.5% were single. As for the educational background, it was shown that 53.3% was the bachelor's degree, 40.6% was the professional bachelor's degree. Concerning the career, it was investigated that 43.9% was less than 3 years, and 42.0% was more than 7 years. As for the type of residence, it was shown that 64.6% was a residence with family. Regarding the position, general nurses were the highest at 73.6%, temporary nurses were 16.0%. As for the working department, it was shown that wards were the highest at 31.1%, intensive care units were 25.0%.

As for the occupations that nurses feel difficulty in communication, as presented in [Table 2], it was shown that specialists were the highest at 36.8% in the 1st priority, senior (junior) nurses were 27.8%, medical practitioners were 21.7%, clinical pathologists were 4.2%, nurse colleagues were 3.3%, others were 3.3%, and radiologists were 2.8%. In the 2nd priority, medical practitioners were 38.7%, senior (junior) nurses were 26.4%, specialists were 17.9%, nurse colleagues were 7.1%, clinical pathologists were 5.7%, radiologists were 2.4%, and others were 1.9%. Also, in the 3rd priority, it was shown that senior (junior) nurses were 21.7%, nurse colleagues were 20.8%, medical practitioners were 12.3%, specialists were 10.8%, radiologists were 8.0%, clinical pathologists were 8.0%.

Table 1. General characteristics of the subject

Variables	Division	N(%)
Gender	20s	118(55.7)
	30s	54(25.5)
	40s and above	40(18.9)
Marital status	Single	143(67.5)
	Married	69(32.5)
Education	Bachelor's degree	113(53.3)
	Professional bachelor's degree	86(40.6)
	Master's degree and higher	13(6.1)
Career	~3	93(43.9)
	7~	89(42.)
	4~6	30(14.2)
Residence	With family	137(64.6)
	Single	57(26.9)
	Others (brothers, relatives, etc.)	18(8.5)
Position	General nurse	156(73.6)
	Temporary nurse	34(16.)
	Nurse manager	18(8.5)
	Head nurse	4(1.9)

Cont... **Table 1. General characteristics of the subject**

Department	Ward	66(31.1)
	Intensive care unit	53(25.0)
	Other	48(22.6)
	Emergency room	16(7.5)
	Outpatient	16(7.5)
	Surgery recovery room	13(6.1)
	Total	212(100.0)

As [Table 3], in communication, job satisfaction, and job performance, it was shown that communication skills 3.56 ± 0.44, job satisfaction 3.25 ± 0.60, and nursing job performance were 3.75 ± 0.53, total were 3.52 ± 0.43.

As [Table 4], communication skills, job satisfaction, and nursing performance, according to general characteristics, all showed significant correlation with p-value <.05 for age, career, and didn't show the correlation for education.

Table 2. Occupations that nurses feel difficulty in communication N(%)

Variables	**Feel difficulty in communication**		
	1st priority	**2nd priority**	**3rd priority**
Specialist	78(36.8)	38(17.9)	23(10.8)
Senior(Junior) nurse	59(27.8)	56(26.4)	46(21.7)
Medical practitioner	46(21.7)	82(38.7)	26(12.3)
Clinical pathologist	9(4.2)	12(5.7)	17(8.0)
Nurse colleague	7(3.3)	15(7.1)	44(20.8)
Radiologist	6(2.8)	5(2.4)	17(8.0)
Other	7(3.3)	4(1.9)	39(18.4)

Table 3. Communication, job satisfaction, job performance

Variables	M±SD
Communication skills	3.56±0.44
Job satisfaction	3.25±0.60
Nursing job performance	3.75±0.53
Total	3.52±0.43

Table 4. Correlation of communication skill, job satisfaction, and performance according to general characteristics

Variables	**Communication skill**		**Job Satisfaction**		**Nursing performance**	
	r	p	r	p	r	p
Age	.292***	.000	.394***	.000	.354***	.000
Education	.092	.182	.027	.698	-.011	.870
Career	.221**	001	.314***	.000	.291***	.000
Position	-.006	.935	.177*	.010	.122	.078

*p<.05, **p<.01, ***p<.001

Table 5. Job satisfaction and job performance according to general characteristics

Variables	Communication skill		Job Satisfaction		Nursing performance	
	M±SD	p	M±SD	p	M±SD	p
Marital status						
Single	3.5±0.41	.000	3.1±0.49	.000	3.6±0.47	.000
Married	3.8±0.41		3.5±0.69		4.0±0.57	
Residence						
With family	3.6±0.43	.000	3.3±0.62	.014	3.8±0.57	.002
Single	3.4±0.43		3.1±0.53		3.6±0.43	
Department						
Ward	3.5±0.39	.000	3.2±0.53	.456	3.8±0.52	.039
ICU	3.4±0.36		3.2±0.42		3.7±0.44	
Recovery room	3.4±0.55		3.3±0.43		3.5±0.54	
ER	3.5±0.43		3.1±0.63		3.7±0.42	
Outpatient	3.8±0.49		3.5±0.64		3.9±0.58	
Other	3.8±0.46		3.2±0.81		3.9±0.60	

Job satisfaction and nursing performance according to general characteristics are the above [Table 5].

According to the marital status, when single, communication skill was 3.5 ± 0.41, job satisfaction was 3.1 ± 0.49, and nursing job performance was shown to be 3.6 ± 0.47, and when married, communication skill was 3.8 ± 0.41 job satisfaction was 3.5 ± 0.69, and nursing job performance was shown to be 4.0 ± 0.57. According to the residence type, when residence with family, communication skill was 3.6 ± 0.43, job satisfaction was 3.3 ± 0.62, and nursing job performance was shown to be 3.8 ± 0.57, and when single residence, communication skill was 3.4 ± 0.43, job satisfaction was 3.1 ± 0.53, and nursing job performance was shown to be 3.6 ± 0.43.

Discussion

As a hospital is an organization in which several professional occupations work together, cooperation between the various professions is an essential factor to provide effective, efficient, safe medical services[10-12]. As a result of the study, the 1st place occupation that nurses have difficulty in communication was a specialist who was shown to be the highest at 36.8%. It is believed that it is the same as the result of previous studies[2] in which the highest factor of job stress of clinical nurses was a conflict with a doctor.

The better the cooperative relationship between nurses and doctors, the higher the job satisfaction and the job holding intention of the nurses[13,14], and as it has an important impact on enhancing patient's results to increase consensus while interacting with each other in a stable cooperative relationship between nurses and doctors[15-18], Aninstitutional strategy for increasing plans of cooperation between doctors and nurses in the hospital should be arranged.

The result of the study that the next place occupation that nurses feel difficulty in communication was a senior(junior) nurse at 27.8% was shown to be similar to the result of the study that it was also high even to high position nurses from the nurses' perspective[19]. Although it is unavoidable that the clinical nurses experience conflict caused by communication while performing nursing work, the reality is to not be able to stop interacting with uncomfortable colleagues due to the nature of nursing work. This problem causes continuous stress and hinders job performance and ultimately leads to job dissatisfaction and job turnover. In the 3rd place, the medical practitioner was shown to be 21.7% and it is the expectable difficulty when considering that general hospitals are mostly doctor training hospitals. This is identical to the response result

that 75% of nurses had difficulty in communication with doctors in the result of the study which was investigated with 288 nurses and 118 doctors working in 4 general hospitals, regarding communication between nurses and medical practitioners[2,20].

As nurses are core personnel who plays a central role in nursing care in health care institutions, nurses' job performance should be enhanced in order to meet the subject's needs for good quality services. Excessive workloads cause job satisfaction to be lowered, which may result in less than the subject's expectations[21]. As the result of the study, the investigation result of the communication, job satisfaction, and job performance, it was shown that the communication skill was 3.56 ± 0.44 and job satisfaction was low at 3.25 ± 0.60. As excessive nursing workloads lead job satisfaction to be deteriorated and cause the subject's needs to be difficult to be met[22], the nursing workloads need to be presented with an appropriate level of work and should be standardized.

Communication skills showed a statistically significant positive correlation between job satisfaction and nursing job performance. This means that communication in the organization resolves interference between the members of the organization and reinforces work motivation and cohesiveness of the group.

Communication ability, job satisfaction, and nursing job performance, all showed a positive correlation with age and career. As nursing work is always dynamic with the most complex environments more than any occupation, this was similar to the study result that communication ability, job satisfaction, and nursing job performance have a positive correlation due to the accumulation of experience according to the increase of the age and career of nurses[23], and the study result that job independence owing to the accumulation of nurses' careers increase job satisfaction[24,25].

When analyzing the above results, the systematic communication program of hospital will lead a good communication in the hospital in the future, and it is regarded that the work efficiency between medical staff will be able to be increased by activating communication channels of nurses.

Conclusion

The nurses' communication skills enhancement will increase job satisfaction and job performance ability and have a positive effect on disease recovery and patient healing. Therefore, for this purpose, the programs related to communication are needed at the hospital and it is necessary to provide an environment in which the hospital's direction can be understood and contributed through positive discussion and directional presentation for organizational goal achievement of the nursing department. My proposal is that nursing department managers should actively accept suggestions from the entire nurse meetings and from the ward meetings for smooth communication between nurses, and the sessions of conversation, discussion meeting, etc. should be applied to communicate smoothly for the safety of the patients who are subjects through regular meetings with other occupations, in other words, doctors with whom nurses have difficulty in communication.

Ethical Clearance: Not required

Source of Funding: Nil

Conflict of Interest: Nil

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Associated Determinants of Successful Ageing among Older Koreans : from the 7th KNHANES

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Abstract

Background/Objectives: Ageing problems are rapidly increasing globally. But rare studies on preparing strategies are existed despite of increasing risks. We aimed to identify associated major factors of successful ageing.

Methods/Statistical analysis: Our study analysed the 7thKNHANES (Korea National Health and Nutrition Examination Survey Data) to find out associated determinants of successful aging, by general characteristics, socio-economic, healthy life style, mental and oral health factors. We analysed on 1,252 subjects to identify the associated major determinants of successful ageing with multiple- logisticregression by complex-sampling method.

Findings: Through multiple-logistic -regression it was showed that stress(OR 2.921; 95% CI: 2.081-4.098), chewing (OR 2.102; 95% CI: 1.645-2.687), gender (OR 1.759; 95% CI: 1.341-2.309), economic activity (OR 1.660; 95% CI:1.273-2.165), physical activity (OR 1.346; 95% CI:1.004-1.804), and education level (OR 1.830; 95% CI:1.139-2.939) were statistically connected with successful ageing. While, other associated factors of successful ageing such as the factors of presence of spouse, income, areas of residence, alcohol drinking were presented with having no relationship of successful ageing after adjustment.

Improvements/Applications: Specified and concrete strategies of public health interventions should be prepared by considering psychological, physical aspects such as stress management and oral health care as well as thinking of socio-economic factors of the elderly for the successful ageing in the Korean community.

Keywords: *Chewing ability, Economical activity, Education level, Gender, Successful ageing, Stress*

Introduction

Rapidly increasing elderly population of Korea is the most rising issue. Successful ageing of the elderly was well known to be closely associated with physical activity[1-2], which was affecting cognition and brain[1] as well as preventing of anxiety and depression[3]. Through the recent study of China, it was reported that mental health was a strong factor of causing the need for long term care supports and services among both in female and in male elderly[4]. Also, a combined exercise and nutrition intervention of the elderly was reported to be as important one to maintain and improve physical function as well as improving quality of life in Dutch's study[5]. And the patterns of healthy diet were reported to be associated with quality of life and better self-perceived health by Australia's study[6].

But it was reported that the prevalence of successful ageing was low by the cohort study of older people of Colombia[7]. And social participation, which was well known as the factor of successful aging, was reported to have beneficial effect of functional health of the elderly by recent China's study[8]. Moreover, social supports and economic constraints were found to be the major factors for the effectiveness of physical activity behaviors by recent US study[9].

In addition to those things, the well-designed and continuous intervention programs for successful ageing were found to be very beneficial for older adult's health

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as well as being delayed ageing[10]. And it was reported that healthy ageing nutrition index was modifiable factor of predicting longevity of older adults[11]. Especially, successful ageing and life satisfaction of older adults were reported to be having little attention of researchers[12]. And also, exercise was reported to be effective even to osteoarthritis patients[13] which was known to be very common disease in the older people.

Furthermore, the chronic diseases of the older people were reported to be caused of threatening their health which has complex relationship of repeat caring of informal care[14]. But the researches on the major determinants of successful ageing of older adults are very rare despite of getting great importance in the trend of entering into super-aged society.

Therefore, we investigated to examine on the associated major determinants of successful ageing among older people in Korea.Our data will provide the basic guidance on preparing evidence based and well-designed interventions for healthy and successful ageing.

Method

We used the representative national data of the 7th KNHANES (KOREA NATIONAL HEALTH and NUTRITION EXAMINATION SURVEY DATA) to find out associated determinants of successful aging, which was accounted for EQ-5D and satisfaction of life factors, by general characteristics data, socio-economic, healthy life style, mental health and oral health factors. The 7th KNHANES was performed from 2016 to 2018. Stratified sampling methods of two state were used. The data were surveyed and collected by the approval with Institutional Review Board of the Korea Centers for Disease Control and Prevention.

The gender, spouse, residence, education, economic activity, and income variables were used as demographic characteristics. Education level was divided as follows: under elementary, graduation of middle school, graduation of high school and over college. Smoking, alcohol drinking, breakfast, sleep time, and physical activity were as health related behaviors and life-style factors. The variable of psychological aspects was stress. The variable of oral health status was chewing difficult.

We analyzed 1252 participants aged ≥ 65 to identify the associated major determinants of successful ageing by complex sampling methods with multiple logistic regression using SPSS (ver. 21.0). The significance level of statistics was .05 ($p < .05$).

Result and Discussion

[Table 1] shows on the general demographic characteristics of the 1,252 study population. Under half of them were male (45.0%). About two thirds of them were under elementary educated participants (59.2%). A larger proportion of the participants were showed to be having spouse (66.2%) and resided in dong area (76.8%). Approximately one thirds of them were doing economic activity (31.8%). The proportion of income level was similar in 4 groups (low, middle-low, middle-high and high level). In the health behavior aspects, smoking (8.9%), drinking (35.4%), and doing physical activity (35.2%) were showed. In mental health behavior aspects, no stress group was reported to be 81.7% and abnormal sleep time group was over half of the participants (55.9%). And in oral health aspects, the participants with chewing difficulty (44.7%) was about under half of them.

Table 1. General characteristics of study subjects (N=1,252)

Variables	Division	N	%
Gender	Male	566	45.0
	Female	686	55.0
Spouse	Yes	847	66.2
	No	405	33.8
Residence	Eup/myeon	336	23.2
	Dong	916	76.8

Cont... **Table 1. General characteristics of study subjects (N=1,252)**

Education	Under elementary	749	59.2
	Middle	185	14.8
	High	199	15.6
	College	119	10.5
Economic Activity	Yes	410	31.8
	No	842	68.2
Income	Low	299	24.2
	Middle-low	319	25.3
	Middle-high	308	23.4
	High	326	27.1
Smoking	Yes	108	8.9
	No	1144	91.1
Drinking	Yes	443	35.4
	No	809	64.6
Breakfast	Yes	1214	96.8
	No	38	3.2
Sleep	Abnormal	687	55.9
	Normal	565	44.1
Physical Activity	Yes	431	35.2
	No	821	64.8
Stress	Yes	228	18.3
	No	1024	81.7
Chewing difficult	Yes	569	44.7
	No	683	55.3

[Table 2] depicts the affecting determinants of successful ageing of older adults. The strongest determinant of successful ageing was stress (OR3.98; 95% CI: 2.91-5.43). And the next determinants of successful ageing were higher education level, especially more than college educated group (OR2.87; 95%CI: 1.98-4.16), high school educated (OR 2.48; 95% CI:1.82-3.39), and gender (male) (OR 2.56; 95% CI: 2.05-3.19). And then last determinants of successful ageing were doing economic activity (OR1.82; 95%CI: 1.47-2.26), the presence of spouse (OR 1.71; 95%CI:1.34-2.19), doing physical activity (OR 1.67; 95%CI:1.30-2.15), highest income group (OR 1.59; 95%CI: 1.21-2.08), and living in urban area (dong compared to Eup/myeon area) (OR1.37; 95% CI: 1.06-1.77) in order.

Table 2. Major factors of successful ageing before adjustment

Variables	**Division**	**OR(95% CI)***	**p**
Gender	Female	Reference	
	Male	2.559(2.052-3.192)	<.001
Spouse	No	Reference	
	Yes	1.710(1.335-2.192)	<.001

Cont... **Table 2. Major factors of successful ageing before adjustment**

Residence	Eup/myeon	Reference	
	Dong	1.366(1.055-1.768)	.018
Education	elementary	Reference	
	Middle	1.650(1.214-2.245)	.510
	High	2.484(1.820-3.391)	.016
	College	2.866(1.977-4.155)	<.001
Economic Activity	No	Reference	
	Yes	1.822(1.467-2.263)	<.001
Income	Low	Reference	
	Middle-low	1.145(0.847-1.549)	.179
	Middle-high	1.290(0.982-1.695)	.023
	High	1.583(1.207-2.076)	.001
Smoking	Yes	Reference	
	No	1.029(0.688-1.539)	.889
Drinking	Yes	Reference	
	No	.549(0.425-0.709)	<.001
Breakfast	No	Reference	
	Yes	.815(0.425-1.564)	.536
Sleep	Abnormal	Reference	
	Normal	1.234(0.978-1.556)	.076
Physical activity	No	Reference	
	Yes	1.670(1.299-2.147)	<.001
Stress	Yes	Reference	
	No	3.976(2.911-5.431)	<.001
Chewing difficult	Yes	Reference	
	No	2.423(1.965-2.988)	<.001

*: OR: odds ratio, CI: Confidence interval, p<.05

[Table 3] explains the associated major determinants of successful ageing after adjustment. Through multiple-logistic regression it was showed that the strongest determinant of successful ageing was no stress (OR 2.92; 95%CI: 2.08-4.10) and good oral health (having no chewing difficulty) (OR 2.10; 95%CI: 1.65-2.69) factor after adjustment. And the next determinant of successful ageing was gender(male) (OR 1.76; 95%CI: 1.34-2.31), doing economic activity (OR 1.66; 95%CI: 1.27-2.17), doing physical activity (OR 1.35; 95%CI: 1.01-1.81), and higher education level, especially in middle school education (OR 1.24; 95%CI: 0.86-1.78) compared to under elementary school educated, were statistically connected with successful ageing.

Table 3. Associated major determinants of successful ageing after adjustment

Variables	**Division**	**OR(95% CI) ***	**p**
Gender	Female	Reference	
	Male	1.759(1.341-2.309)	<.001
Spouse	No	Reference	
	Yes	1.037(0.755-1.425)	.821
Residence	Eup/myeon	Reference	
	Dong	1.223(0.869-1.719)	.246
Education	elementary	Reference	
	Middle	1.238(0.860-1.781)	.833
	High	1.729(1.157-2.582)	.154
	College	1.830(1.139-2.939)	.013
Economic Activity	No	Reference	
	Yes	1.660(1.273-2.165)	<.001
Income	Low	Reference	
	Middle-low	.902(0.615-1.323)	.370
	Middle-high	1.015(0.702-1.467)	.131
	High	1.179(0.821-1.694)	.409
Smoking	Yes	Reference	
	No	1.230(0.754-2.009)	.405
Drinking	Yes	Reference	
	No	.835(0.605-1.152)	.270
Breakfast	No	Reference	
	Yes	.761(0.393-1.473)	.415
Sleep	Abnormal	Reference	
	Normal	1.077(0.808-1.436)	.609
Physical activity	No	Reference	
	Yes	1.346(1.004-1.804)	.047
Stress	Yes	Reference	
	No	2.921(2.081-4.098)	<.001
Chewing difficult	Yes	Reference	
	No	2.102(1.645-2.687)	<.001

*: OR: odds ratio, CI: Confidence interval, p<.05

Discussion

The major determinants of successful ageing were revealed as the factors of no stress, good chewing ability, gender(male), doing economic activity, doing physical activity, and higher education level in order through findings of our study analysis of the ongoing nationwide 7th Korea National Health and Nutrition Examination data.

Stress, the important psychological factor of mental health of the elderly, was found out to be as the major determinant factor of successful ageing in our study which have some consistent with other studies[3,4]. Chewing ability, the indicator of oral health, was the important determinant of successful ageing through our study and it was also considered as the indicator of getting nutrition contributing to mortality as well as disability of later life and survival prediction particularly in older adults[11] with reflecting general health status. Gender, which has known as the important variable, was also found out to be the determinant of successful ageing of our study and it was reported to have the distinct in doing physical activity related health behaviors by gender[9] and be the social determinant of cardiovascular cause of increasing mortality of the elderly by sex[15]. Doing economic activity, which was considered as social activities in light of broad concepts, was revealed as the determinant factor of successful ageing of our study and it was known of a key role of cognitive function[10] and lowering the risk of functional disability of the elderly[8]. Moreover, the association of social activities and the better cognitive function among the older people was identified as the key point role[16] and these findings were supporting our results in terms of active socio-economic activities despite of different study subjects. Physical activity which was well known as the key factor of general health, was also identified as the determinant factor of successful ageing and it was already suggested as the prevention of depression and anxiety[3] and also recommended as improving of health promotion in other studies[2,11-12]and contributing on quality of life[5]. And it was also reported that physical activity affects cognition and brain[1]. And the research on the association of exercise and osteoarthritis[13] was also supporting our findings even though the difference of study subjects and design.Education level, the higher education levelas the determinant factor of successful ageing, should be considered for both genders to delay the need for long term care supports and services[4]. In terms of acceptance and applying of important intervention information. Especially, in case of older people, it was reported that life-style recommendations were found to be remaining low state even though having much publicefforts[17] even though among the different subjects.

In terms of applying intervention aspects it was reported that encouraging exercise and physical activity for successful ageing was known to have much barriers according to another study[18] despite of being difference of subject age. And there were some important researches which were dealing with the effect of mindfulness based health education on health behaviors and the quality of life[19], and the research of the experimental ageing and the frailty as cohort research[20]for the successful ageing. And also, knowledge, attitudes and perceptions were found to be closely related with the cardiovascular risk[21]which was well known to be as the most prevalent disease worldwide leads to sudden death in older adults.

The strengths of our study have some points. First, we used the recent data of nationally representative one to have good reliability and validity through complex sampling methods. Second, we dealt with the most urgent and valuable problem, the major determinants of successful ageing in the context of rapidly going to the super-aged society. Third, to know about the determinant factors of successful ageing, we included the important variables such as mental health factor and oral health factor, which was well known for the predictor of general health. And the limitation of our study was that we did not more specified and classified the health risky behavior factors such as smoking and drinking.

But the findings of our study may be used to help to prepare the concrete strategies of public health and nursing professional fields in the view of remarkably super-ageing Korean elderly population.

Conclusion

Therefore, specified and concrete strategies of public health interventions should be urgently prepared by considering psychological, physical aspects such as stress management and oral health education as well as thinking of socio-economic factors of the elderly for the successful ageing in the Korean community.

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A Study on Attitude of Menstruation, Menstrual Discomfort and Coping Method in Female College Students

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Abstract

Background/Objectives:To provide positive experience of menstruation, which has a great effect on women's life, and provide basic data in menstrual management education.

Methods/Statistical analysis: Subject includes women in their 20s that were selected through convenience sampling. Major variables include Korean Menstrual Attitude Questionnaire, Menstrual Distress Questionnaire and coping style questionnaire. Collected data was processed on SPSS 22.0 for frequency analysis, descriptive statistics and Pearson correlation coefficient, and personal coping method in case of menstrual discomfort and motive for considering an alternative type were verified and analyzed through open-ended questions.

Findings: Average age of first menstruation in subjects was 12.64, and 70.3% experienced regular menstrual cycle. 45.6% had a menstrual cycle of 26-30 days, 78.1% had a menstrual period of 4-6 days, and 68.7% had normal blood loss. 69.2% used painkiller during menstruation, and 54.2% experienced discomfort in daily life due to menstruation. The average score of subject's menstruation attitude was 4.09±.49, which is slightly higher than the midpoint. Degree of discomfort before, during and after menstruation was 1.42±1.03, 2.03±1.04, and .92±.97 respectively, the highest during menstruation period, followed by before and after menstruation. In terms of subject's coping method, aggressive coping method was .99±.55, and passive coping method was 1.12±.76. Discomfort during menstruation and coping method, although weak, show significant positive correlation, and subject's coping method was higher as the premenstrual discomfort was higher ($r=.224$, $p<.001$), menstrual discomfort was higher ($r=.227$, $p<.001$), and intermenstrual discomfort was higher ($r=.186$, $p<.05$). 16.5% of subject tried tampons or menstrual cups as an alternative to sanitary napkins due to the discomfort caused by them.

Improvements/Applications: Nurses need to provide customized education on different alternatives in consideration of women's individual characteristics, so they can practice preventive coping method and self-manage menstrual discomfort.

Keywords:*Menstruation, Menstruation Attitude, Menstrual Discomfort, Coping Method, Female College Students, Premenstrual Syndrome (PMS)*

Introduction

Menstruation is an inevitable phenomenon in all women, and is a requirement that enables pregnancy and delivery. In modern society, the age of first menstruation is gradually lowered, and the period of lactation and pregnancy are decreasing due to low birth rate, which increases number of menstruations until menopause. Accordingly, period of menstrual discomfort is increasing, causing more women to have negative attitude towards menstruation. Women that had negative experiences of menstruation complained of severe premenstrual discomfort and symptoms[1], so it is important to provide other alternatives to relieve discomfort, so they can have positive experience of menstruation, which has a significant effect on women's

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life. Women in Korea tend to reduce the discomfort and pain by themselves that many cope with even severe premenstrual discomforts passively. As a result, the nursing intervention for subjects was very passive and limited.

Menstrual discomfort is accompanied by fatigue, headache and diarrhea, and is described as an intense squeezing pain in abdomen. Prevalence of such menstrual discomfort is the highest in university students (92%) [2], followed by high school students (76%) [3], and adult women (75%) [4], which shows that women in their 20s experienced menstrual discomfort the most. Menstrual discomfort is known to be caused by psychosocial factors, such as gender role, depression, menstrual attitude, stress and femininity, in addition to biomedical factors, such as hormone and neuroendocrine Imbalance. However, the correlation between safety of sanitary napkins, which are used for the convenience of women, and menstrual discomfort is being raised recently, it is difficult to find relevant studies that clarify the exact cause [5-6]. Sanitary napkin is a disposable female product that is used to absorb blood during menstruation, and is a daily essential that is used for a long period of time from the first menstruation to menopause. Examination of discomfort and aftereffect related to sanitary napkin has been handled very importantly and studied for the health of women. As sanitary napkin is in contact with the most sensitive and gentle part of women's body, the vulva, it should be produced in consideration of safety and health. However, in the survey of sanitary napkin usage and aftereffect, 66% experienced skin diseases and itchiness [7], and concerns are raised in terms of safety since 2005, as harmful substances such as dioxin and polyethylene were detected in the materials of sanitary napkin. Safety issue of female sanitary napkin recently became a social issue, and efforts are made to relieve fear pf sanitary napkins by releasing the result of harmful substance analysis for sanitary napkins manufactured in Korea, forming a sanitary pad assessment committee in August 2017, and opening the result of complete enumeration of sanitary napkin clearly. A complete result is not yet available for an interpretation, but most women are paying attention to other alternatives due to distrust and anxiety about reduced blood amount, worsened menstrual cramps and change of menstrual cycle. Based on the MFDS's survey on female sanitary product usage on 1028 fertile women between 10~60, result showed in the order of sanitary napkin, tampon, cotton pad and menstrual cup, and sanitary napkin was used the most for convenience. Usage rate of menstrual cup was low, but its awareness was 41.1%, showing that many women were interested in it. Women in 10~20s accounted for 61% of users, who evaluated it positively for 'economic benefit', 'environment protection' and 'prevention of skin allergy', and users in the 20s that complained about menstrual discomfort the most were gradually increasing. Unlike sanitary napkins, menstrual cup is not in direct contact with the vulva, so it prevents contact dermatitis, and wasn't detected of harmful substances that threaten women's health [8] that there is an increasing expectation as an alternative to sanitary napkin. This study aims to examine the menstrual attitude, perimenstrual discomfort and coping methods of women in their 20s, who make new attempts for their own safety, and verify the negative experience factors of menstruation. Also, by studying the motive and acquisition of alternative products other than sanitary napkin, it aims to provide basic data in menstrual management education that can contribute to menstrual discomfort management and menstrual product decision, as well as positive experiences of menstruation, which has a significant effect on women's life.

Method

This is a descriptive research conducted to determine the menstrual attitude, perimenstrual discomfort and coping method of women in the 20s, their motive of selecting alternatives other than sanitary napkin, and personal coping method for menstrual discomfort.

Subject includes women in the 20s, who are having menstruation, selected through convenience sampling. Selection criteria includes fertile women that are having menstruation, who experienced discomfort due to the use of sanitary napkin and consider other alternatives, or already are using alternatives. Number of subject was calculated as 120 using G*Power 3.1 program, with significance level=.05, statistical power=80% and effect size of .25. This study was conducted on 182 women.

Subject includes women in the 20s, who are having menstruation, selected through convenience sampling. Selection criteria includes fertile women that are having menstruation, who experienced discomfort due to the use of sanitary napkin and consider other alternatives, or already are using alternatives. Number of subject was calculated as 120 using G*Power 3.1 program, with significance level=.05, statistical power=80% and effect size of .25. This study was conducted on 182 women,

satisfying the criteria

To examine the structure of adult female's menstrual attitude, the Korean version of Menstrual Attitude Questionnaire [8] was used. This questionnaire consists of 33 questions in 5 factors, where factor 1 (1-12) was named 'menstruation that weakens daily activities', factor 2 (13-18) as 'menstruation that causes negative physiological and emotional changes, factor 3 (19-23) as 'menstruation as a natural phenomenon', factor 4 (24-28) as 'denial of effects of menstruation', and factor 5 as 'menstruation as a hassle'. This tool is a 7-point scale, from 'Highly disagree' at 1 point to 'Highly agree' at 7 points, and higher point signifies negative menstrual attitude. In terms of reliability of this tool, Cronbach's α was .95~.97 at the time of development, and the reliability of the tool in this study was Cronbach's α= .747.

In order to measure the symptoms periodically experienced in premenstrual, menstrual and intermenstrual periods, the Korean version of Menstrual Distress Questionnaire (MDQ) [9] was used. Premenstrual period refers to 7-day period prior to menstruation, menstrual period is from the first day of menstruation to the last day, and intermenstrual period refers to the remaining period excluding the previous two periods. MDQ consisted of 9 questions in behavioral change, 6 questions in negative emotion, 7 questions in lowered concentration, 6 questions in water retention, 5 questions in response of autonomic nervous system, 2 questions in awareness, 4 questions in control and 2 questions in other areas at the time of development, but after modification, it contained 37 questions in the Korean version. Each question is a 5-point scale from 'None' at 1 point to 'Very severe' at 5 points, and higher score signifies severe degree of menstrual discomfort. This tool can be used for premenstrual, menstrual and intermenstrual periods, and questions about premenstrual, menstrual and intermenstrual discomfort. In terms of the reliability of this tool, Cronbach's α was .96 at the time of adaptation, and in terms of the reliability of the tool in this study, Cronbach's α for premenstrual period was .967, menstrual period was .956 and intermenstrual period was .977.

In order to measure the process of coping to a specific stress, the Coping Style Scale, which was adapted into statements [10] was used. 39 questions were extracted in 5 factors, including problem-solving (15), emotional relief (6), seeking support (9), avoiding problem (4) and wishful thinking (5). Problem-solving and seeking support are considered aggressive coping style, and emotional coping, wishful coping and avoiding problem as passive coping style. Evaluation is on a 4-point scale (1 point for not using, 2 points for using, 3 points for using frequently, 4 points for using highly frequently), and higher point signifies more frequent use of specific coping method. The reliability of this tool in this study was Cronbach's α= .955.

Collected data was analyzed as follows using SPSS 22.0.

1)Descriptive statistics of Subject's general characteristics and research variables was analyzed through frequency analysis and descriptive analysis.

2)Correlation between menstrual discomfort due to menstrual attitude and coping method used Pearson correlation coefficient.

3)Personal coping method for menstrual discomfort, coping method for discomfort caused by use of sanitary napkin, and motive for considering alternatives were confirmed and analyzed through open-ended questions.

Result and Discussion

1. *Subject Characteristics*

Subject's general characteristics and menstrual characteristics are as follows. Age range of subjects that participated in the study is 18-29, and the average age is 19.86. 80.8% does not exercise, 62.6% had an average sleep time of 5-6 hours, 63.7% drank alcoholic beverage, 57.5% drank coffee, and 97.8% did not smoke. 34.6% had the family history of gynecological diseases.

Average age of first menstruation was 12.64, and 70.3% had a regular menstrual cycle. 45.6% had a menstrual cycle between 26-30 days, 78.1% had a menstrual period of 4-6 days, and 68.7% had normal blood loss. 69.2% used painkiller during menstruation, and 54.2% felt daily discomfort due to menstruation.

2.*Menstrual Attitude, Perimenstrual Discomfort, Coping Method*

Subject's average score of menstrual attitude was 4.09±.49, which is slightly higher than the midpoint. Degree of perimenstrual discomfort was 1.42±1.03 for premenstrual, 2.03±1.04 for menstrual, and .92±.97 intermenstrual period. Subject's coping method was

classified into 5 categories, which are problem-solving (.99±.55), seeking support (.84±.62), emotional coping (1.05±.75), avoiding problem (1.05±.73), and wishful thinking (1.25±.78). Aggressive coping style was .99±.55, and passive coping method was 1.12±.76 as shown in table 1.

Table 1. Attitude of Menstruation, Menstrual Discomfort, Coping Method of Subjects (n=182)

Variables		Item	Items M ±SD
Attitude of Menstruation		33	4.09±.49
	Menstruation as a Debilitating Event	12	4.52±.62
	Anticipation and Prediction of the Onset of Menstruation	6	4.04±.72
	Menstruation as a Natural Event	5	5.15±.91
	Denial of any Effect of Menstruation	5	2.49±1.13
	Menstruation as Bothersome Event	5	4.26±.72
Menstrual Discomfort		37	
	Premenstrual	37	1.42±1.03
	Menstrual	37	2.03±1.04
	Intermenstrual	37	0.92±.97
Coping Method		39	.98±.55
Coping Method Active	Problem-focused	15	.99±.55
	Social support seeking	6	.84±.62
Passive Coping Method	Emotional-focused	9	1.05±.75
	Avoidance coping	4	1.05±.73
	Wishful thinking	5	1.25±.78

3. *Personal Coping Method for Menstrual Discomfort*

When subjects were instructed to mark all coping methods that they use for menstrual discomfort, 69.2% (126) selected 'Take painkillers', 56.6% (103) selected 'Take a rest', and 40.7% (74) selected 'Warm the affected site'.

4.*Correlation of Menstrual Attitude, Menstrual Discomfort, and Coping Methods*

When subject's premenstrual discomfort was higher, menstrual discomfort was higher ($r=.695$, $p<.001$) and intermenstrual discomfort was higher as well ($r=.774$, $p<.001$), and when the menstrual discomfort was higher, intermenstrual discomfort was higher as well ($r=.583$, $p<.001$). Menstrual discomfort and coping method, although weak, show a significant positive correlation, and subject's coping method was higher when premenstrual discomfort was higher ($r=.224$, $p<.001$), menstrual discomfort was higher ($r=.227$, $p<.001$), and intermenstrual discomfort was higher ($r=.186$, $p<.05$) as shown in table 5.

5.*Motive for Considering Other Alternatives*

16.5% (n=30) of subjects have used tampons or menstrual cup as an alternative to sanitary napkin due to discomfort. The analysis of multiple responses on the motive to use alternatives to sanitary napkin included 'Use of sanitary napkin cause physical discomfort (itchiness, redness, swelling, rash, odor) by 28% (n=51), 'Harmful due to carcinogen' by 8% (n=14), and 'Makes noise when walking' by 1% (n=2).

Discussion

This study was conducted to provide positive menstrual experience and basic data for menstrual management education, which can contribute to menstrual discomfort management and decision of menstrual product by examining menstrual attitude, menstrual discomfort and coping methods of women in the 20s, verify the negative experience factors of menstrual, and study the motive and acquisition of alternatives to sanitary napkin.

Subject's menstrual attitude was 4.09±.49, which is slightly more negative than the average. Menstruation was a cumbersome phenomenon that affects daily life, and the factor that makes subject nervous because its start could not be predicted. Until now, menstruation was considered an inevitable phenomenon, but with increasing level of education in women and active social life, it was acknowledged as an inconvenient phenomenon. Therefore, individual's discomfort may

be examined to offer customized nursing intervention, so women can acknowledge menstruation positively, and if the problem arises from sanitary napkin, use of alternatives such as tampons or menstrual cup may be suggested as well.

54.2% of subjects experienced discomfort in daily life due to menstruation, 69.2% used painkillers due to menstruation, but premenstrual discomfort was 1.42±1.03, menstrual discomfort was 2.03±1.04, and intermenstrual discomfort was .92±.97, showing that the level of menstrual discomfort was not high. Also, in terms of coping method for menstrual discomfort, aggressive coping method was .99±.55, and passive coping method was 1.12±.76, which seems that subjects consider menstruation natural and the actual discomfort is not too severe that they take passive coping methods for menstrual discomfort. However, the attitude towards menstruation is negative, rather than the actual menstrual discomfort, that a transition education to convert the negative attitude positively is needed. Since negative attitude of menstruation may be reflected on menstrual symptoms, proper menstruation education and emotional support would be necessary.

In addition, whereas the number of students considering alternatives due to the discomfort caused by sanitary napkin was high, number of students actually using alternatives was low. Therefore, it is important to determine the actual reason why they do not use alternatives, and educate them on various alternatives, so they can manage menstrual discomfort.

In order to relieve menstrual discomfort, nurses need to understand the subject's characteristics and provide customized care. Also, rather than temporary methods, preventive coping methods must be provided in the education as well.

Conclusion

This research conducted to determine the menstrual attitude, perimenstrual discomfort and coping method of women in the 20s, their motive of selecting alternatives other than sanitary napkin, and personal coping method for menstrual discomfort.

Subjects' attitudes toward menstruation were negative, and they responded passive coping to menstrual discomfort. The most common way to deal with menstrual discomfort was to take painkillers. The higher the menstrual discomfort, the specific coping style was used.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Factors Affecting the Occurrence of Work-related Accidents during Night Shifts

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Abstract

Background/Objectives: To investigate the occurrence of work-related accidents during night shifts, the present study aimed to evaluate the status of night shifts and understand its impact on the occurrence of work-related accidents.

Methods/Statistical analysis: Data from the 5th Work Environment Survey conducted by the Institute of Occupational Safety and Health were used to analyze 4,424 night shift workers. The association between several variables and work-related accidents were analyzed using the chi-square test. Logistic regression analysis was used for all relevant variables to identify factors affecting the occurrence of work-related accidents.

Findings: The overall proportion of workers who experienced work-related accidents during their night shift was 2.2%. The factors affecting work-related accidents during the night shift were sleep disorder (OR = 2.221, $p = 0.001$), fatigue (OR = 4.932, $p < 0.001$), education (OR = 1.924, $p = 0.029$), exposure to emotional instability (OR = 1.898, $p = 0.021$), and noise (OR = 1.915, $p = 0.015$).

Improvements/Applications:It is necessary to consider various methods to reduce sleep disturbance and fatigue, in consideration of age and work environment, and improve education and awareness regarding work-related accidents during night shifts.

Keywords: *Night shift, Work-related accidents, Sleep disorder, Fatigue, Risk factors*

Introduction

In 2019, a worker in his 50's was discovered dead during his night shift in a manufacturing company[1]. It was difficult to identify the cause of his death because of his expertize, but the most viable hypothesis was that a primary accident resulted in a fall, which led to his death. This event triggered a debate on the safety of night workers.[6]

Night shifts cause changes in the natural human biorhythm and negatively affect human health. A prime example is sleep disturbance. As the night shift takes place during nighttime, at which time one should sleep, it induces fatigue, psychological fatigue, attention deficit, sensory defects, etc.[2,3]. Working despite health changes increases the likelihood of work-related errors, which may affect safety in the workplace[3,4]. This argument is in line with research findings on the higher risk of work-related accidents during night shifts. A series of recent work-related accidents in South Korea exemplify the increased frequency of accidents during night shifts.

In 2007, the International Agency for Research on Cancer classified night work in the "2A" causes ofcancer based on cohort studies[5]. Multiple studies asserted that night shifts affect not only physical conditions (e.g., cardiovascular diseases, digestive diseases, breast cancer) but also psychological conditions[6-8] because of an unstable biorhythm arising from insufficient sleep[9].

Unstable biorhythm caused by night work may deteriorate workers' health in terms of sleep and fatigue in hazardous working conditions, which entail extreme noise, machine handling, or height. The government

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of South Korea has recognized this issue and has implemented special health checkups to detect and prevent health problems in night workers since 2014. Article 259 of the Enforcement Regulations of the Occupational Safety and Health Standard included night work for a preventative operation on health injuries caused by stress. Also, it has been reported that unstable working conditions increase the likelihood of accidents[10]. This study identifies the factors affecting work-related accidents in workers engaged in working at least one night in a month to provide baseline data for activities for night work in industrial sites. This study analyzes the fifth Working Environment Survey conducted by the Occupational Safety and Health Research Institute to survey the current status of night shifts and determine the impact of night shifts on work-related accidents in order to build safe working environments.

Method

Research subjects and data collection

With reference to the contents of the European Working Conditions Survey conducted every 4–5 years since 1991, the Working Environment Survey has been designed and conducted by the Occupational Safety and Health Research Institute since 2006 to investigate the working environments of all workers in the country to identify the levels of exposure to hazard by occupation, industry, and employment type. This study refers to the data of the fifth Working Environment Survey in 2017 and analyzed 4,424 respondents (96.5%) after eliminating 157 nonrespondents (3.4%) of 4,581 respondents who were engaged in at least 2 hours of night work (from 10 PM to 5 AM) per month.

Research tools

Night shifts

The respondents were asked to write down answers to the question "Do you work for at least 2 hours from 10 PM to 5 AM." Excluding the respondents who did not work at least one night shift in a month, the respondents who worked at least one night shift were classified into 1 day, 2–3 days, and 4 days or more.

General and occupational characteristics of the respondents

Age and sex of the respondents were counted as general characteristics, and occupational category, number of workers in the workplace, and professional training by the company were designated as occupational characteristics.

The four occupational categories were office jobs, sales and services, mechanics, and simple labor. The industries were classified into manufacturing, construction, and others. The number of workers was divided into three groups: up to 50 individuals, 50–300 individuals, and 300 individuals or more. Professional training by the company was indicated by "yes or no" to the question of whether the respondent received a training or education session provided by or at the expense of the company for skill improvement during the past 12 months.

Occupational hazards

The occupational hazards of the participants were noise, psychological insecurity, and exposure at three levels: none, ¼ of the working hours, and ½ of the working hours.

Health complications of subjects

The health complications of the subjects were sleep disturbance and systematic fatigue. Regarding sleep disturbance, questions were asked on difficulty in sleeping, repeated waking up during sleep, and extreme fatigue and exhaustion. "Daily" was given 5 points, whereas "none" was given 1 point. The total points of the three questions were 15. Any point of 8 or above meant "no" sleep disturbance, and points of 7 or below meant "yes" The respondents were asked to answer yes or no to the question about any presence of systematic fatigue during the last 12 months.

Accidents

The presence of past accidents was investigated. For the question "any presence of health problems such as injury (accident) in the last 12 months," the respondents were asked to answer either "yes" or "no."

Analytical methods

Data from the 5th Work Environment Survey conducted by the Institute of Occupational Safety and Health were used to analyze 4,424 night shift workers. The chi-square test was used to analyze the differences between several variables and work-related accidents. Logistic regression analysis was used for all relevant variables to identify factors affecting the occurrence

of work-related accidents. As a result of the Hosmer–Lemeshow logistic regression test, the probability of significance was set at p =0.482, and the model was considered appropriate.

Result and Discussion

[Table 1]summarizes the characteristics of the participants. Of the total evaluated population, male and female workers comprised 66.9% and 33.1%, respectively, and those under 39 years comprised 26.7%, those between 40–49 years, 23.1%, and those over 50 years, 50.2%.

It was found that 2.2% of night shift workers (99 individuals) experienced accidents during the night shift, which is higher compared with other workers who experienced accidents (1.6%). Night shifts increase the likelihood of accidents in all workers, including those working on weekends.

Work-related accidents were associated with age (χ^2 = 7.91, p = 0.019), noise exposure (χ^2 = 31.06, p<0.001), emotional instability exposure (χ^2 = 62.43, p<0.001), sleep disorders (χ^2= 34.14, p<0.001), fatigue (χ^2 = 70.27, p<0.001) and number of night shifts (χ^2 = 11.58, p = 0.003) in the [Table 2].

[Table 3] summarizes the factors affecting accidents during night shifts. Sleep disturbance and systematic fatigue were found to be significant factors. With sleep disturbance or systematic fatigue, the likelihood of accidents is 2.221 times (95% CI: 1.398–3.528) or 4.723 times (95% CI: 2.986–7.500) higher, respectively.

Table 1. Differences according to subject characteristics and number of days (night shift) worked

Variable		Category	1 day	2-3 days	≥4 days	Total	χ2	p
General characteristics	Sex	Male	114 (68.7)	329 (72.8)	2,515 (66.1)	2,958 (66.9)	8.46	.015
		Female	52 (31.3)	123 (27.2)	1,291 (33.9)	1,466 (33.1)		
	Age	<39	59 (35.5)	148 (32.7)	972 (25.5)	1,179 (26.7)	29.44	<.001
		40–49	42 (25.3)	119 (26.3)	862 (22.6)	1,023 (23.1)		
		≥50	65 (39.2)	185 (40.9)	1,972 (51.8)	2,222 (50.2)		
Occupational characteristics	Type	Manufacturing	24 (14.5)	54 (11.9)	388 (10.2)	466 (10.5)	115.56	<.001
		Construction	19 (11.4)	34 (7.5)	62 (1.6)	115 (2.6)		
		Others	123 (74.1)	364 (80.5)	3,356 (88.2)	3,843 (86.9)		
	Size	<50	89 (53.6)	232 (51.3)	2,251 (59.1)	2,572 (58.1)	14.17	.007
		50–299	62 (37.3)	176 (38.9)	1,183 (31.1)	1,421 (32.1)		
		≥300	15 (9.0)	44 (9.7)	372 (9.8)	431 (9.7)		
	Education	No	119 (71.7)	308 (68.1)	2,946 (77.4)	3,373 (76.2)	21.11	<.001
		Yes	47 (28.3)	144 (31.9)	860 (22.6)	1,051 (23.8)		
Risk factors	Noise	No	118 (71.1)	342 (75.7)	2,942 (77.3)	3,402 (76.9)	12.40	.015
		1/4	15 (9.0)	57 (12.6)	435 (11.4)	507 (11.5)		
		≥1/2	33 (19.9)	53 (11.7)	429 (11.3)	515 (11.6)		
	Exposure to emotional instability	No	115 (69.3)	323 (71.5)	2,996 (78.7)	3,434 (77.6)	39.24	<.001
		1/4	19 (11.4)	75 (16.6)	517 (13.6)	611 (13.8)		
		≥1/2	32 (19.3)	54 (11.9)	293 (7.7)	379 (8.6)		
Health problems	Sleep disorder	No	140 (84.3)	376 (83.2)	3,311 (87.0)	3,827 (86.5)	5.71	.057
		Yes	26 (15.7)	76 (16.8)	495 (13.0)	597 (13.5)		
	Fatigue	No	118 (71.1)	313 (69.2)	2,514 (66.1)	2,945 (66.6)	4.97	.180
		Yes	48 (28.9)	139 (30.8)	1,292 (33.9)	1,479 (33.4)		

Discussion

If sleep disturbance occurs, the worker experiences mental and physical fatigue, attention deficit, and sensoryinsensitivity[2,3]. Continued sleep disturbance leads to increased fatigue, which results in systematic fatigue. Previous studies also reported that systematic fatigue reduces attention on the job and increases the likelihood of work-related errors to negatively affect safety in the workplace. Therefore, it is necessary to assign the workload and workers in a way to prevent continued fatigue in consideration of worker conditions (e.g., breaks).

With regard to accidents during working nights, 10% of the workers had an accident on the first day, 11.1% had an accident on the second day, and 78.8% of the workers experience an accident on the fourth day onward [Table2]. The longer the duration of the night shift, the more the sleep disturbance and fatigue increases. On the contrary, [Table 3] shows that the likelihood of accidents is 2.540-fold higher for 4 or more working nights in a month compared with that for 2–3 working nights in the same period. This result is noteworthy because all other variables are controlled. In other words, biorhythm is disrupted on the second working night, which increases sleep disturbance and systematic fatigue[11]. It is necessary to proactively manage sleep disturbance and systematic fatigue from the second working night onward.

The impact of the working environment is important in accidents during night shifts. [Table 3] shows that when exposure to noise continues for more than half of the total working hours, the likelihood of accidents increases 1.915-fold and when psychological insecurity continues for more than half of the total working hours,the likelihood increases 1.989-fold. These two figures are significant. If one continuously exposes to noise, discomfort and muscle tension increases, noise causes psychological insecurity as a major cause of accidents[12,13]. Psychological insecurity may be a result of hazardous working conditions, excessive workload, inappropriate intensity, or speed of the work. The likelihood of accidents increases if the worker is exposed to these conditions during the night shift.Various measures are needed to relieve psychological insecurity and reduce the likelihood of accident during night shifts, including reduction of hazards in the working environment, workload adjustment, and reduction in the work intensity.

Training has a significant impact on accidents during the night shift. Workers that did not receive any training had 1.974 times (95% CI: 1.070–3.459) higher likelihood of accidents compared with trained workers.

Table 2: Differences according to subject characteristics and work-related accidents occurring during the night shift

Variable		Category No	Work-related accidents Yes		χ^2	p
General characteristics	Sex	Male	2,890 (66.8)	68 (68.7)	0.15	.697
		Female	1,435 (33.2)	31 (31.3)		
	Age	<39	1,160 (26.8)	19 (19.2)	7.91	.019
		40–49	989 (22.9)	34 (34.3)		
		≥50	2,176 (50.3)	46 (46.5)		
Occupational characteristics	Type	Manufacturing	451 (10.4)	15 (15.2)	14.94	.001
		Construction	107 (2.5)	8 (8.1)		
		Others	3,767 (87.1)	76 (76.8)		
	Size	<50	2,523 (58.3)	49 (49.5)	3.37	.186
		50–299	1,384 (32.0)	37 (37.4)		
		≥300	418 (9.7)	13 (13.1)		
	Education	No	3,293 (76.1)	80 (80.8)	1.17	.280
		Yes	1,032 (23.9)	19 (19.2)		

Cont... **Table 2: Differences according to subject characteristics and work-related accidents occurring during the night shift**

Risk factors	Noise	No	3343 (77.3)	59 (59.6)	31.06	<.001
		1/4	496 (11.5)	11 (11.1)		
		≥1/2	486 (11.2)	29 (29.3)		
	Exposure to emotional instability	No	3,374 (78.0)	60 (60.6)	62.43	<.001
		1/4	595 (13.8)	16 (16.2)		
		≥1/2	356 (8.2)	23 (23.2)		
Health problems	Sleep disorder	No	3,761 (87.0)	66 (66.7)	34.14	<.001
		Yes	564 (13.0)	33 (33.3)		
	Fatigue	No	2,918 (67.5)	27 (27.3)	70.27	<.001
		Yes	1,407 (32.5)	72 (72.7)		
Night shifts	Number of night shifts	1	156 (3.6)	10 (10.1)	11.58	.003
		2-3	441 (10.2)	11 (11.1)		
		≥4	3,728 (86.2)	78 (78.8)		

Productivity is high if the worker is familiar with the machine in a workplace handling unfamiliar machinery[14], and if training is conducted on any change in the working content, the workplace had fewer accidents[15]. Among the workers who experienced accidents, 80.0% of workers (80 individuals) did not receive any training on skill improvement within the organization, whereas 19.2% (19 individuals) received such training. Professional development training sessions are needed to further develop expertise and confidence and supplement inadequacy in order to prevent accidents.

Conclusion

This study was conducted to build a safe working environment by identifying the factors affecting accidents during night shifts. Age, technical training provided by the company, exposure to noise and psychological insecurity, sleep disturbance, systematic fatigue, and number of working nights were determined as factors affecting work-related accidents of night shift workers.

It is necessary to consider various methods to reduce sleep disturbance and fatigue, in consideration of age and work environment, and improve education and awareness regarding work-related accidents during night shifts.That is, when working at night, it is necessary to reduce the work intensity rather than the day work, and to reduce the work tension by focusing on simpler work. Sleeping during the night shift makes the worker more comfortable and reduces fatigue to prevent accidents. When working at night, and opportunities for training in safety, reduces inevitably reduced. Workers working at night require a number of measures to increase their educationalopportunities.

Table 3: Factors affecting work-related accidents occurring during the night shift

Variable	Category	OR	95% CI	*p*
Sex	Male	1		
	Female	1.039	0.653–1.653	.872
Age	<39	1		
	40–49	1.864	1.032–3.368	.039
	≥50	1.17	0.659–2.075	.592
Type	Manufacturing	1		
	Construction	1.514	0.568–4.035	.407
	Others	0.777	0.395-1.528	.464
Size	<50	1		
	50–299	1.618	0.997–2.626	.051
	≥300	2.14	0.989-4.630	.053

Cont... **Table 2: Differences according to subject characteristics and work-related accidents occurring during the night shift**

Education	Yes	1		
	No	1.924	1.070–3.459	.029
Noise	No	1		
	1/4	0.974	0.496–1.912	.938
	≥1/2	1.915	1.133-3.236	.015
Exposure to emotional instability	No	1		
	1/4	1.114	0.623–1.993	.716
	≥1/2	1.898	1.100–3.272	.021
Sleep disorder	No	1		
	Yes	2.221	1.398–3.528	.001
Fatigue	No	1		
	Yes	4.732	2.986–7.500	<.001
Number of night shifts	≥4	1		
	1	1.098	0.564–2.135	.783
	2-3	2.540	1.213–5.321	.013

Ethical Clearance: Not required

Source of Funding: Nil

Conflict of Interest: Nil

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A Case Study on the Effects of Pelvic Exercise Using Virtual Reality on Balance and Gait of an Incomplete Spinal Cord Injury Patient

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Abstract

Background/Objectives: This study aimed to determine the effects of pelvic exercise using virtual reality on the balance and gait of an incomplete spinal cord injury patient.

Methods/Statistical analysis: A pelvic exercise program using virtual reality of three sessions a week, 30 minutes per session, for 12 weeks was run for a 62-year-old man diagnosed with incomplete spinal cord injury (ASIA D) caused by a fall. A balanced performance instrument (BT4) was used to evaluate balance and a wireless motion analyzer (iSEN) was used to evaluate gait; comparative analysis was made initially and 6 weeks and 12 weeks later.

Findings: Both the dynamic balance assessment and the static balance assessment showed positive changes for each time segment. The gait assessment found positive changes in each time segment.

Improvements/Applications: This study has confirmed that pelvic exercise using virtual reality is effective for improving balance and gait of an incomplete spinal cord injury patient.

Keywords: *Incomplete, SCI, Pelvic, Virtual reality, balance, gait*

Introduction

A person with spinal cord injury is defined as one whose trunk or extremities are completely or partly paralyzed because of spinal cord injury and whose sensorimotor functions have been lost or disabled [1]. The degree of functional loss depends on the location and degree of spinal cord injury. A universal type of complete spinal cord injury is to lose the sensorimotor functions completely under the injured spinal segment. An incomplete spinal cord injury refers to partial functional loss and is characterized by the existence of ascending and descending fiber for functional performance at other specific sites and of voluntary sensorimotor functions at Segment 3 or lower under the neurological level in relation to the lesion despite weakened sensorimotor functions [2,3]. Due to the difficulty with sensorimotor modulation, patients can suffer pain from nerve injury, urination and defecation function disorder and renal failure, difficulty in controlling paralyzed muscles and sensory loss under the injured site, and balance disorders[4].

For successful gait, spinal cord injury patients principally need to support the trunk with the lower extremities and have the ability to move the body in the intended direction, dynamic balance to control the body, and flexibility to move according to the environmental need and goal [5]. In addition, perfect timing, muscle strength, rhythm, and co-ordination learning are essential to gait, whose vital elements include movement of upper and lower extremities, position of feet, weight support, and pelvic movement [6]. The pelvis plays a crucial role in keeping the trunk upright and in restoring body balance in the case of instability [7].

With the recent development of computer game technology, there has been a tendency to make computer-using therapeutic task training programs and to facilitate

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therapy using such programs. Computer-using therapy allows people to fulfill specific tasks while enjoying the therapeutic process, be given somatosensory stimuli, and be more highly motivated to obtain treatment [8]. This may contribute to subsequent recovery from injury in the spinal cord through stimulation of the sensorimotor cortex along with intensive sensory pressure around the injured spinal cord. Also, it may serve as a good therapeutic tool by facilitating neuroplasticity of the injured spinal cord and reorganization the relevant neural circuit physiologically [9].

Therefore, this study aimed to determine the effects of pelvic exercise using virtual reality on balance and gait of an incomplete spinal cord injury patient.

Method

Table 1. Pelvic exercise with virtual reality

Order (time)	Detailed contents	Intensity
Warm-up(5min)	Upper and Lower limb, Trunk stretching	
Main Exercise(20min) (2min/program)	Program 1) Cave: Pelvic ant & post tilt Program 2) Fruit: Pelvic Rt & Lt tilt Program 3) Color: Pelvic ant & post + Rt & Lt tilt Program 4) Clock: Pelvic ant & post+ Rt & Lt tilt Program 5) Balance: Maintain pelvic position Program 6) V-goal: Go to target then back to home	1~4week: Easy 5~8week: Medium 9~12week: Hard Rest betweenProgram: 1min
Cool-down(5min)	Upper and Lower limb, Trunk stretching	

The subject was a 62-year-old man with a height of 176 cm and a weight of 66 kg. He was diagnosed with incomplete spinal cord injury (ASIA D) because of compression fracture in the fifth and sixth cervical vertebrae as a result of a fall in December 2017. Muscle strength was graded as F+/F+ for the upper extremities and as F/F for the lower extremities, with no specific restrictions on the range of motion.

Intervention was provided in 3 sessions a week, 30 minutes per session, for a total of 12 weeks. He was given treatment as generally provided in hospital, including physical therapy and occupational therapy. In addition, he was provided with a pelvic exercise program using virtual reality. For the exercise program using virtual reality, a game of leaning the pelvis forward, backward, to the right, and to the left in a Valedo system was employed. The therapist assisted the progress of the game and his movements. If he felt uncomfortable, the training was discontinued. An identical test was performed by the same rater before and 6 weeks and 12 weeks after the 12-week intervention. The exercise program is presented in Table 1.

A balanced performance instrument (BT4; Hur Lab, Kkoarla, Finland), was used to assess the patient's balance. BT4 has a sampling rate of 100 Hz and has a strain gauge on each vertex of the square. To assist the patient with posture, the position of feet was marked on a rectangular platform, four sensors were used to decide on the center of pressure, and Smart-suit Balance software (ver.1.4) was used to measure and analyze balance in terms of postural sway with time. The test protocol of Romberg 30s was used to assess static balance with open and closed eyes alternatively. The position of feet was marked on the platform and each foot was placed on "V" 15 degrees outward. He kept standing upright while keeping his eyes to the front. C90 area refers to the area (mm2) of COP movement at the center of pressure, and trace length refers to the distance (mm) of COP movement; the better the static balance, the smaller the area and the shorter the distance of movement. The test protocol of Limits of Stability (LOS) was used to assess dynamic balance. It has the same position of feet as the static balance assessment. The subject was asked to stand upright with feet kept on the platform and then to lean forward, backward, to the right, and to the left for eight seconds in order to obtain the maximum range of motion. Principal measurements can be presented in the maximum degree; the better the dynamic balance, the larger the range of motion [10,11].

A wireless motion analyzer (iSEN, STT Systems, Spain, 2016) was used to measure gait competence. This analyzer is composed of a three-axis gyroscope working at the maximum sampling rate of 400 Hz and ±2000 deg/s, a three-axis low noise accelerometer working at the sampling rate of 400 Hz and ±16 g, a triaxial magnetometer with the range of motion of ±1300 μT, and an air pressure sensor with the range of 300-1100 hPa. The protocol for gait analysis was used to analyze his gait. A total of five sensors were used in this study and one sensor was attached to each of the pelvis (S1), the 1/2 area of right and left femur, and the 1/2 area of the tibia. The measurement items included gait time, gait speed, cadence, and step length.

To observe changes in balance and gait of an incomplete spinal cord injury patient, BT4 and iSEN were used initially and 6 weeks and 12 weeks later for comparative analysis.

Result and Discussion

1. Balance assessment

The changes in balance following pelvic exercise using virtual reality as found by BT4 are presented in Table 2. The exercise program improved both static and dynamic balance, which is consistent with findings that a four-week intervention with a virtual reality system in an imaging room improved functional static balance in 13 patients diagnosed with paraplegia caused by spinal cord injury at the thoracic level [12] and that a 12-session virtual reality game program significantly improved standing balance in 6 incomplete spinal cord injury patients [13]. Also, the results of this study are similar to those findings that Nintendo Wii game training was effective in controlling sitting balance of ASIA A thoracic cord injury patients [14]; that participating in virtual reality game training for about 30-40 minutes improved dynamic balance of thoracic cord injury patients in a sitting posture [15]; and that six-week visual bio-feedback simulation training significantly improved the stability index, postural control, and fall risk index in 7 ASIA C and D incomplete spinal cord injury patients [16]. This study is also consistent with those reports that game-based virtual reality treatment motivated patients and improved their postural dynamic balance [17] and that virtual reality training using visual feedback was effective in improving postural control through an improvement in weight shift [18]. Such consistency is probably because stimulation of the sensorimotor cortex along with intensive sensory input around the injured spinal cord through visual and auditory feedback of the patient with a virtual reality system is effective in improving balance by curing the injured spinal cord. Also application of such a program using virtual reality is useful for controlling posture and balance and improving motor skills, recovering from injured physical functions, enhancing the motions of daily living, and improving the quality of life through interaction in family or society [19,20].

Table 2. Comparison of changes in Balance

			0wk	6wk	12wk
LOS	Forward(˚)		3.49	4.75	6.18
	Rearward(˚)		3.68	3.94	5.02
	Leftward(˚)		5.33	6.18	7.52
	Rightward(˚)		6.21	7.80	8.31
Romberg 30s	EO	C90(mm2)	268.88	170	151.79
		TL(mm)	315.210	259.400	234.88
	EC	C90(mm2)	475.51	328.18	238.18
		TL(mm)	742.1	528.59	492.41

LOS: Limit of stability, TL: Trace Length,
EO: Eye open, EC: Eye close

2. Gait assessment

The changes in gait following pelvic exercise using virtual reality as found by iSEN are presented in Table 3. This study found that gait time and speed, step length, and the gate rate were all improved. For incomplete spinal cord injury patients, there was a statistically significant increase in gait speed from 0.22 m/s before automatic gait training to 0.28 m/s after four-week training and to 0.31 m/s after eight-week training [6]. In a study on the effects of elastic resistance training on gait and balance of the elderly in an upper and lower extremity group and a lower extremity group [21], the training changed cadence and gait speed in both groups, with no inter-group difference. Several studies using elastic resistance exercise found that application of an exercise program significantly decreased TUG [22,23], which is consistent with the results of this study. There have been other reports also that are consistent with the results of this study. In one report, one-hour physical therapy using a weight supported treadmill with three incomplete spinal cord injury patients (thoracic, ASIA C and D) along with three-month treadmill gait training was effective in improving gait speed and gait endurance and in decreasing oxygen cost [24]. The treadmill gait training involved five sessions a week for 20 minutes a day (gradient 0%) and improved gait speed from 0.118 m/s to 0.318 m/s and gait endurance from 20.3 m/5min to 63.5 m/5min and decreased oxygen cost from 1.96 ml.kg-1'm-1 to 1.33 ml.kg-1'm-1. In another report, three-month treadmill gait training with three sessions a week for 1.5 hour a day (gradient 0%) along with 30% weight support and electric stimulation applied to muscles of the lower extremities to improve gait in nine chronic incomplete spinal cord injury patients improved over ground walking, increased gait speed and distance, and improved the lower extremity motor score from 15 to 18 [25]. As seen from the increased weight shift to the injured part in previous research [26], identical weight shift to both legs was enabled, contributing to movement of the legs.

Table 3. Comparison of changes in Gait

	0wk	6wk	12wk
Time(seconds)	24.150	22.850	21.920
Speed(m/s)	0.414	0.438	0.456
Step Length(m)	0.410	0.420	0.420
Cadence(step/min)	60.597	62.520	65.172

Conclusion

This study aimed to determine the effects of pelvic exercise using virtual reality on balance and gait of an incomplete spinal cord injury patient and suggest an efficient treatment method. The results of this study, the intervention improved both balance and gait of the patient, and it has been confirmed that pelvic exercise using virtual reality contributes to balance and gait of an incomplete spinal cord injury patient. Therefore, based on the results of this study, pelvic exercise using virtual reality could be suggested as an effective exercise method for improving balance and gait in patients with incomplete spinal cord injury. In future studies, comparative studies between subjects of various spinal cord injury levels and control groups should be secured.

Ethical Clearance: Not required

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Relationship between Water intake, Xerostomia, Halitosis, Stress and Salivary Cortisol in the Elderly

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Abstract

Background/Objectives: This study is a descriptive research conducted to identify the relationship between water intake, xerostomia, halitosis, stress and salivary cortisol in the elderly living in the community.

Methods/Statistical analysis: This study conducted on elderly people over 65 years old who live in the community. General characteristics were analyzed by frequency analysis and descriptive statistics. The data were analyzed using One-way ANOVA and t-test with the SPSS program. One-way ANOVA was used to determine the relationship between water intake, xerostomia, halitosis, stress and salivary cortisol. Independent t-test was used to determine the relationship between saliva cortisol and halitosis, stress.

Findings: The subjects were 21 males (42%) and 29 females (58%), the mean age was 75.3 years old. Among them, 13 (26%) were over 80 years old and 19 (38%) subjects have dentures.There were no statistically significant differences in water intake, xerostomia, halitosis, stress, and salivary cortisol. However, the relationship between salivary cortisol and halitosis and stress was found to be significant difference between salivary cortisol and halitosis.

Improvements/Applications: As a result of this study, we suggest to develop an intervention program to mitigates xerostomia in order to improve halitosis by stress factors in the elderly.

Keywords: *Elderly, Water Intake, Xerostomia, Halitosis, Salivary Cortisol*

Introduction

As life expectancy increases and the average life expectancy is extended due to the development of health technology and the improvement of the standard of living, the problem of the quality of life of old age is being emphasized. The life of elderly people in Korea is expressed as 'illness, 'economic difficulties' and 'solitude due to social isolation'. Korea's elderly population is over 14%, and overall attention and efforts are required for the elderly society[(1)]. Aging problems with aging arise from the physical, mental and psychosocial aspects.

Water is an indispensable material for life and health, an essential ingredient for maintaining blood volume, and plays an important role in nutrient supply and waste excretion in the body [(2)]. Healthy adults can control the body's water balance, but the elderly are difficult to control and are prone to dehydration. Elderly people are exposed to water deprivation more easily than other age groups due to aging of thirst, changes in body composition (increase in intracellular fluid ratio), and renal function[(2, 3).] Water accounts for about 55% of the elderly's weight, and hydration status is an important indicator of the health of the elderly[(4)]. Another cause of fluid intake is chronic disease, which is similar to the cause of decreased salivation.

Oral health, which is one of the important issues for the quality of life of the elderly, is directly related to whole-body health and is increasing interest. The most common oral problems in the elderly are decreased salivation, xerostomia and halitosis. The reduction of saliva secretion is the cause of oral problems in the

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elderly, and the saliva secretion of the elderly is about half of the adult daily saliva secretion, xerostomia and halitosis occurs. Chronic degenerative diseases of most elderly people take long-term medication and cause side effects such as decreased salivation and xerostomia. xerostomia is known as a major cause of halitosis[5, 6].

A previous study reported that there is a correlation between xerostomia and moisture knowledge and oral health quality of life[5]. In addition, about 70% of the elderly had less than 1,000mL of daily water intake, which was less than 1,800mL, which is the Korean standard of daily water intake.

In elderly, halitosis can negatively affect interpersonal relationship and social life, leading to stress[7, 8]. In particular oral tends to be neglected than other than other physical health care due to cost problems and discomfort in the dental process. Therefore, improving the oral health and improving the quality of life and relieving stress of the elderly are considered to be the tasks to be solved.

As described above, oral problems are linked to the quality of life for the elderly, and studies on saliva secretion, xerostomia and halitosis of the elderly are being conducted in Korea. Considering previous studies, salivary secretion in the elderly is associated with xerostomia and halitosis, but it is necessary to confirm the correlation between hydration status and xerostomia with physiological variables.It is also necessary to confirm the causal relationship between the willingness to drink water and knowledge about water in the elderly.

The purpose of this study is to identify the relationship between water intake, xerostomia, halitosis, and stress in the elderly, and to provide basic data on nursing interventions for the oral health of the elderly.

Method

This study is a cross-sectional narrative study conducted to identify common characteristics associated with water intake in elderly people living in the community and to determine the relationship between water intake and xerostomia, halitosis and stress and saliva cortisol.

This study was conducted on elderly people over 65 years old who live in the community. Subjects were selected who can communicate, understanding when reading or explaining questionnaires with no history of psychiatric diagnosis, and no doctor's diagnosis of water intake restrictions.The sample size of the study was 0.05 using the G * power program 3.1.6, and the effect size was 0.95 power of 0.95 power. The number of samples required was 45, but 56 were selected in consideration of the dropout rate.

The general characteristics consisted of information on the use of dentures to confirm gender, age and oral care.The question of water intake is, "How many glass of water you drink per day?" And what belongs to the water means bottled water, barley tea, corn tea, or cassia tora seed tea?The water intake standard was based on the liquid intake of sufficient water based on the Korean daily water intake standard suggested in 2015 Korean nutrient intake standard.The measurement of water intake was 1 glass = 200 mL, and both men and women used a sufficient daily intake of 1,000 mL[9]. The relationship with the variables was identified by dividing into three groups according to water intake. Group 1 consisted of 2 glasses or less, less than 50% of the daily intake criteria, group 2 consisted of 3-4 glasses, and group 3 consisted of 5 glasses or more, which satisfies daily intake.

For xerostomia, a tool was used, referring to questionnaires of Fox and Torres([10]).The instrument composition consists of 7 questions about xerostomia, 3 questions about xerostomia, and 10 questions. The higher the score, the higher the subjective xerostomia symptoms. In this study, Cronbach 's $\alpha = .75$.

For the measurement of stress, a tool which was developed, based on FILE(family Inventor of life and changes) was used[10]. The instrument composition consists of 22 items of stress measurement, 22 items of measure measures, and 44 items. The higher the score, the higher the subjective stress symptom.

To check the changes in stress hormones due to water intake, take a salivary sample in a sterilized tube at 8-10 am with fasting state for 8 hours. The collected sample was stored in -70 ℃ deep freezer, the supernatant was used after centrifugation for 15 minutes at 1,500g. Cortisol concentrations were measured using a salivary cortisol enzyme immunoassay kit (Salimetrics, MI, USA). Cortisol concentration in saliva was measured using a standard curve according to the manufacturer's instructions.

The data was collected after approval of the institutional bioethics committee of the researcher's university (approval number: 1041455-201806-HR-001-

01). The recruitment visited the local senior citizens' and health clinic, cooperated with the subjects, explained the purpose of the research and the progress of the research. The data collection period is from July 1 to August 15, 2018, and the subjects were visited and explained that they can withdraw the data at any time if they do not want, including data collection procedures, test items, inconveniences that may occur during blood collection. The questionnaire was asked to fill out the questionnaire on its own, and in case it was difficult to read or difficult to write, the researcher and the participating researchers assisted in reading and writing it for them. They were trained on how to use and precautions, and how to operate the equipment.

Collected data were analyzed using frequency analysis and descriptive statistics to determine the percentage, mean, and standard deviation of the general characteristics of subjects using SPSS / WIN 19.0 Program.The relationship between saliva cortisol, halitosis and stress was analyzed by independent t-test. To determine the relationship between halitosis, stress and salivary cortisol among three groups with different water intake, one-way ANOVA was used and sheffe test was performed by posttest. Reliability test of the tool was analyzed by Cronbach 's α.

Result and Discussion

1.General characteristics

[Table 1] shows the general characteristics of this study. The subjects were 21 males (42%) and 29 females (58%), the mean age was 75.3 years old. Among them, 13 (26%) were over 80 years old and 19 (38%) were dentures.

Table 1: General characteristics(N=50)

Variables	**Categories**	**n(%)**	**M(SD)**
Gender	Male	21(42.0)	-
	Female	29(58.0)	
Age	60~69	9(18.0)	75.3 (5.97)
	70~79	28(56.0)	
	≥ 80	13(26.0)	
Dentures	Y	19(38.0)	-
	N	31(62.0)	
Water intake (1 glass =200mL)	≤ 2 glasses	13(26.0)	3.6 (1.65)
	3~4 glasses	22(44.0)	
	5~6 glasses	12(24.0)	
	≥ 7 glasses	3(6.0)	

2. The level of xerostomia, halitosis

[Table 2] shows the results for xerostomia,average halitosis, peak and trough levels. Xerostomia was relatively low with an average of 3.1 (± 2.55) out of 10. Ten points of respondents who answered that they had all symptoms of xerostomia were 2%, and a score of 0 who answered that they had no symptoms of xerostomia was 16%.

Table 2. The level of xerostomia, halitosis (N=50)

Categories	Total score	M(SD)	Max(%)	Min(%)
Xerostomia	10	3.10(2.55)	10(2.0)	0(16)
Halitosis	-	55.82(17.60)	96(2)	14(2)

3. Difference in xerostomia, halitosis, stress and salivary cortisol between water intake of 3 groups

[Table 3] shows the results for xerostomia, halitosis, stress and salivary cortisol are shown in. The relationship between water intake, xerostomia, halitosis, stress and salivary cortisol was not statistically significant.

Table 3. Difference in xerostomia, halitosis, stress and salivary cortisol between water intake of 3 groups (N=50)

Categories	F	*p*
Xerostomia	1.61	.210
Halitosis	.320	.728
Stress	.176	.839
Salivary cortisol	2.30	.111

※ Group1: ≤3 glasses, Group2: ≥ 4 glasses, Group3: ≥ 5 glasses

4. Relationship between salivary cortisol and halitosis, stress

Cortisol hormone associated with stress is a glucocorticoid secreted by the adrenal cortex. [Table 4] shows the correlation between the cortisol hormone concentrations detected in saliva and halitosis and stress.There was a statistically significant difference between saliva cortisol hormone and halitosis (t = -2.06, p = .045), and there was no statistically significant difference between saliva cortisol hormone and stress (t = .15, p = .878). In other words, it was analyzed that the perception of stress and the physiological indicators of stress coincide, so that halitosis affects the stress of the elderly.

Table 4: Relationship between Salivary cortisol and Halitosis, Stress (N=50)

Categories	Halitosis		Stress	
	t	p	t	p
Salivary cortisol	-2.06	.045	.15	.878

Discussion

Water is a major component of more than 60% of the body and is recommended for all ages by setting a certain amount of water to be consumed per day. Maintaining the body's hydration status with proper water intake is essential for physiological function, and dehydration due to this lack of water has been reported to affect various cognitive impairments in the elderly[2].

The purpose of this study was to investigate the degree of water intake and to determine the relationship between halitosis, xerostomia, stress and stress hormones in the elderly living in the community. Seventy percent of the subject drink less than four glasses per day (800 mL), and 26% of them drink less than two glasses (400 mL). This is similar to the results of the research on the elderly of the community in previous studies, and it is not satisfied with the Korean nutrition intake standard. Therefore, measures to correct this should be prepared [11]. The average degree of halitosis was 55.82, which was slightly higher than the normal range, showing similar results to previous studies[5, 12].

The results showed that halitosis was not enough to identify the direct causal relationship between the effects of water intake on halitosis, xerostomia and stress.Preliminary findings suggest that a person with halitosis may have mental stress because he or she is concerned that the other person will be offended. It is also suggested that it should be considered as a social problem but not just a personal problem, because it can interfere with normal interpersonal relationships and

social life[5].

Conclusion

The aging of the population, one of the existing problems in our country, is a task to be solved together in the social aspect, not the efforts of individuals. As the life of the elderly grows longer, various systems are being prepared along with the interest in the quality of life of the elderly. Among various studies related to the healthy life of the elderly, there are also studies related to halitosis.

Halitosis symptoms are considered important because they can have a detrimental effect on the physical and mental health of an individual and can affect various personal and social problems including interpersonal relationships. Current studies have regarded variables such as stress as the cause of halitosis and only measured the relationship between halitosis and stress and xerostomia.

In this study, it was difficult to identify the significant relationship between water intake, halitosis, xerostomia, stress and salivary cortisol hormone in the elderly. However, salivary cortisol hormone, a physiological variable, was compared to confirm that halitosis is one of the stressors in the elderly. This study was the first to determine the correlation with halitosis by measuring the salivary cortisol hormone. As a result, it was confirmed that halitosis could cause an increase in stress hormone.

Based on these results, we suggest the development of an intervention program that can alleviate xerostomia, which is a cause of halitosis, in order to improve oral health affecting the quality of life of the elderly.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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The Effects of Applying Havruta Learning Method in Nursing Classes

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Abstract

Background/Objectives: The purpose of this study was to investigate the changes in core competencies by applying the self - directed Havruta learning method to nursing students.

Methods/Statistical analysis: We applied the Havruta learning method in the major subjects of 275 students in nursing college.After examining the general characteristics of the subjects, the author surveyed their debating skills, immersion level into learning and self-directed learning skills in advance and after the research. Then, the author analyzed the collected data in terms of frequency, percentage, and paired T-test by using the R program.

Findings: Compared to the prior state to the Havruta learning, third graders after the Havruta learning have seen an increase in the average value of critical thinking ability in the discussion ability evaluation.(p = 0.024). In the assessment of learning immersion level, the average values of clear goals, concrete feedback, action-aware matching, task concentration, control, loss of self-consciousness, modified time sense, and self-purpose experience have all increased.(p<0.05). In self-directed ability assessment, the average values of target setting, resource identification for learning, and basic self-management skills have all increased. (p <0.05). This suggests that Havruta learning method can improve critical thinking skills and nursing knowledge, skills, clinical treatment skills and problem solving skills to solve the target nursing problem, thus influencing the enhancement of knowledge, skills and attitudes required at the nursing field site.

Improvements/Applications: We suggest that the future study will be based on this research that adopts the Havruta-style class model in a wider variety of subjects.

Keywords: *Havruta learning, nursing, critical thinking ability, discussion ability, Self-directed Learning Ability, problem solving skill*

Introduction

At the heart of a successful class would be the class with learners. To this end, it requires, among other things, active participation by learners in classes[1].But when you look at actual college classes in Korea, there is still a lack of participation and interaction amonglearners[2]. The reason why various teaching methods are needed along with teaching methods is that today's society emphasizes diversity, and thus needs teaching methods that can promote diverse needs and creativity rather than teaching methods, which are necessary for a student to become a leader, not a passive target in class and a teacher to act as a facilitator[3].

The goal of the recent nursing education is to train competent nurses in terms of knowledge, skills and attitudes demanded in the field of nursing practice[4].The Korean Accreditation Board of Nursing Educationoffers seven key competences for nursing students: integrated application of nursing knowledge and manual skills, cooperative communication with professional workers, critical thinking ability to solve nursing problems, and leadership ability[4]. However, working-level nursing staff assess the lack of nursing skills in the new caregiver's nursing knowledge, skills, clinical treatment skills and problem-solving skills[5]. The traditional teaching methods used mainly in nursing education

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impose limitationon training nurses with basic work skills required in nursing field practice[6].7

In order to deal with these nursing site problems and changes in the educational paradigm, a self-directed and proactive teaching learning strategy, differentiated from the traditional nursing education method, should be introduced and transformed[7].

As a result of systematic consideration of the self-directed learning effects applied to health care personnel, self-directed learning has been reported as an efficient teaching method from the aspects of improving attitudes as well as knowledge and skills compared to traditionalteaching methods[8].

Havruta learning is a student activity-centered education method that develops the power to variously think, question, and debate in pairs as a method of education[3].Havruta learning is a self-directed learning method in which techniques of collaborative learning are used in the field through training as a way to improve both personality and academic ability[3]. In that respect, Havrutahas emerged as one of the most efficient methods of personality-education-oriented cooperation classes[9]. Because of the countless mutual questions, positive interactions through questions can occur actively at school sites[9].The purpose of Havruta is to develop the power of thought, thinking skills to describe it briefly. Rather than memorizing and letting students know, Havruta aims to stimulate the student's brain to improve his/her ability to think and develop insight and critical thinking skills[7].

The implications derived from these articles are as follows:First, the Havruta class is applied to a variety of subjects and is used in particular as a learning method that causes interaction of students, such as discussion and debate activities. However, the method has not been applied to a nursing department, so a study of the Havruta learning method is needed to suit the characteristics of nursingteaching courses.

Second, in order to encourage students to ask questions and debate, the professor should prepare carefully in selecting content,findingexploration questions, and preparing materials. This is because the professor's preparation can determine the success or failure of the Havruta class. Third, through the process of communication, listening and persuasion, students should be encouraged to take self-directed learning. Since the process of discussing the created meanings of each other is important, the professorsshould make students' own learning occur.Fourth, in order to create a class environment in which questions are actively asked, the lecturers not only provide studentswith opportunities for practice to familiarize themselves with discussions and exchange of opinions, but also create an acceptable atmosphere.

This study aims to lay the foundation for the practice of'active and cooperative learningclass'for learners at the class site by utilizing the Havruta learning method. Specifically, the author intends to apply the Havruta learning method at the classroom site to the nursing class in order to examine the changes in the nursing student's core competency.

Method

This study adopted one group pretest-posttest design and a quasi-experimental study to identify the changes in core competences before and after the application of the Havruta learning method of nursing students.The participants were second and third graders of a four-year nursing college located in C city, Chungcheongnam-do, South Korea who agreed to participate in the research in writing. During the data collection process, we explained the purpose of the research to the research subjects ethically, promised anonymity and confidentiality, and notified themthat they would not be requested to participate in the research if they did not want to.

The appliedcourse of the second-grade students in the Havruta class was 'health assessment and practice', and thethird-grade courses were 'regional nursing', 'adult nursing', 'nursing management' and 'child nursing'. Among thevarious models of the Havruta class, we applied the 'friend teaching Havruta' class. At the end of the professor's lecture, the students conducted a discussion in pairs and prepared a study activity log to teach each other by organizingunclear questions, making questions, and explaining the contents, sharing group questions and finding answers.

Through the questionnaire, the author investigated the general characteristics of the subjects and looked into theirdebating skills, learning immersion level, and self-directed learning abilities before and after the research.

The discussion ability test tool developed by Park[10] was modified and complemented by Jung[11], consisting of four questions from the 'communication skills'

element, three questions from the 'critical thinking ability' element,two questions from the 'predictive ability' element, and two questions from the 'listening ability' element (a total of 11 questions). The higher the score on the 5-point Likert scale when measuring debating skills, the higher the debate ability.

A measurement tool developed by Kim et al[12] was used for learning immersion. The tool was comprised of a total of 29 questions in nine sub-sections: Challenges-technical balance, clear objectives, specific feedback,behavior-perception consistency, task concentration, control sensation, self-conscious loss, transformed time sensation, self-purpose experience, etc. As a five-point Likert scale, the higher the score, the higher the learning immersion ability.

Measurement tools that incorporate cognitive, affective and behavioral characteristics developed by Lee et al[13].was used. Measuring instruments were comprised of a total of 21 questions in seven sub-categories: learningcourse management, learning result assessment, learning motivation, self-concept, persistence of learning activities,learning resource management, and the creation of learning environment. As a five-point Likert scale, the higher the score, the higher the self-directed learning ability.

The author analyzed the general characteristics of age, sex, etc. of the study subjects, and compared and analyzed the differences in terms of the discussion ability of each school year that was measured by the Havruta learningmethod, in addition to learning immersion level and self-directed learning ability that were assessed by the Paired T-test. We analyzed the statistical analysis of the study by using R(R version 3.5.1), with a significant level of 0.05.

Result and Discussion

1. General characteristics of the subjects

The general characteristics of the subjects are as shown in Table 1. Those aged between 20 and 25 accounted for 83.6%, 9.1% for male students and 90.9% for female students. There were 137 second graders, 138 third graders participated, and 60.4% of the students felt that the cause of their stresswas related to school record.

Table1. General characteristics of subjects

Variables	Categories	N(%)
Age (years)	< 20	24(8.7)
	20~25	230(83.6)
	26~30	10(3.6)
	> 30	11(4.0)
Gender	Male	25(9.1)
	Female	250(90.9)
School grade	2	137(49.8)
	3	138(50.2)
Religion	No	142(51.6)
	Yes	133(48.4)
School hours/minute	<30	126(45.8)
	30-59	38(13.8)
	60-120	59(21.5)
	>120	51(18.6)
Allowance (10,000 KRW/month)	No	43(15.6)
	<10	15(5.5)
	10-20	34(12.4)
	21-30	74(26.9)
	> 30	109(39.6)
Causes of stress	School record	166(60.4)
	School class	62(22.6)
	Career or employment	32(11.6)
	Family	11(4.0)

Numbers do not always show the same total because of missing values.

2.Discussionability

Before and after the Havruta learning, we looked at communication skills, critical thinking skills, predictive ability, and listening skills, which are sub-factors of measuring discussion ability[Table 2] to assess each grader's discussion ability. The sophomore student was statistically insignificant, although the average value of critical thinking and listening skills increased after learning compared to prior to the Havruta learning, and

the third grader showedstatistically significant as the average value of critical thinking ability increased.

3.Learning immersion level

In order to evaluate the learning immersion levelamong each grader before and after learning Havruta, the author explored challenge-technology balance, clear goals,specific feedback, action-perception matching, task concentration, sense of control, loss of self-consciousness, transformed time sense, and self-purpose experience [Table 3]. Compared to prior to the Havruta learning, the third-grade studentsshowed statistically significant, with increased average values of clear goals, concrete feedback, behavioral-intelligence matching, task concentration, sense of control, loss of self-consciousness, changed time sense, and self-purpose experience.

4.Self-directed Learning Ability

In order to evaluate the self-directed learning ability of each grader before and after Havruta learning, we explored the sub-factors of self-directed learning measurement: learning drive diagnosis, goal setting, resource identification for learning, basic self-management ability, choice of learning strategy, persistence of learning execution, efforts on outcomes and self-reflection[Table 4]. Compared to the prior state to the Havruta learning, third-grader showed the increased average value of basic self-management skills, setting goals, and identifying resources for learning, and they were statistically significant.

Discussion

The purpose of this study is to establish the foundation for realizing the 'active and cooperative learning' of learners at the class site, when there is no previous study applied to major courses in nursing college. As a result, we confirmed that there has been a positive change in the communication skills and critical thinking of nursing students through cooperative learning activities.Through dialogue, the Havruta learning method, in which students participate directly in a class, can foster not only the above effects but also an active sense of community. With this learning method, we can expect to cultivate the talent needed for a new society as a necessary capacity for nursing personnel. The author hopes that through this study, the university's discipline will be changed a little bit. In the classroom, there should be a lot of passion for students to learn on their own while the teacher becomes an inspiring educator, not just providing knowledge, and we dream that students can discover their visions in the teachers' lectures. Based on this study, we hope that future research will continue to attempt the Havruta-style class model in more diverse subjects.

Conclusion

Suggestions for follow-up research are as follows:

First, the continuous development of the Havruta class model should be made in various subjects. AppropriateHavruta classes applied to Korean college students who have grown up in the absence of a voluntary and creative debate culture cannot be developed just for one or two class application. Researchers will need to develop a more advanced class model by modifying and supplementing it based on the class model that they have tried in this study.Second, the Havruta learning method requires learners' active attention and intervention, which will ask professors to strengthen their expertise through various training or learning community activities for the efficient classes.

Table 2: Differences in discussion ability based on Havruta Learning

	Grade 2				Grade 3			
	Before M ± SD	After M ± SD	t	*p*	Before M ± SD	After M ± SD	t	*p*
Communication	11.32±2.00	11.38±2.38	-0.24	.808	11.52±1.85	11.37±1.95	0.66	.513
Critical thinking	9.04±2.45	9.44±2.30	-1.01	.315	9.45±2.25	9.98±2.20	-2.29	.024
Predict	5.56±1.21	5.33±1.14	0.33	.743	5.72±1.21	5.57±1.20	1.22	.226
Listening	5.63±0.93	5.82±0.91	-1.07	.288	5.68±1.04	5.75±1.09	-0.63	.528
Total score	31.54±3.98	31.96±3.56	-0.89	0.373	32.37±3.52	32.66±4.01	-0.82	.416

Table 3: Differences in learning immersion level based on Havruta Learning

	Grade2				Grade 3			
	Before M ± SD	After M ± SD	t	*p*	Before M ± SD	After M ± SD	t	*p*
Challenge- technology balance	9.79±2.25	10.24±2.25	-1.02	.311	10.24±2.24	10.79±2.46	-1.94	.054
Clear goals	10.30±2.39	10.3±2.62	0.47	.642	10.45±2.57	11.14±2.28	-2.28	.024
Specific feedback	8.55±2.20	8.64±1.99	0.51	.609	8.69±2.29	9.71±2.33	-3.55	.001
Action-perception matching	7.84±2.36	7.91±2.15	0.46	.650	7.95±2.42	8.51±2.50	-1.85	.066
Task concentration	7.86±2.40	8.03±2.35	0.43	.670	7.72±2.45	8.49±2.37	-2.55	.012
Sense of control	8.20±2.38	8.24±2.07	0.88	.382	8.17±2.07	8.90±2.31	-2.71	.008
Loss of self-consciousness	7.23±2.59	7.48±2.47	-0.35	.729	7.09±2.59	7.95±2.49	-2.59	.011
Transformed time sense	9.32±2.97	9.44±2.61	0.29	.772	9.03±2.55	9.93±2.65	-2.55	.012
Self-purpose experience	12.25±4.22	11.55±3.58	1.29	.199	12.2±4.22	13.49±4.59	-2.46	.015
Total score	81.28±17.98	81.78±14.63	0.55	.581	81.5±17.34	88.86±18.62	-3.16	.002

Table 4: Differences in Self-directed Learning Ability based on Havruta Learning

	Grade2				Grade 3			
	Before M ± SD	After M ± SD	t	*p*	Before M ± SD	After M ± SD	t	*p*
Learning drive diagnosis	30.99±5.12	31.83±4.16	-1.35	.180	31.11±4.61	32.19±5.42	-1.70	.092
Goal setting	16.53±4.01	16.55±3.84	-0.08	.938	16.68±3.79	17.91±3.76	-2.73	.007
Resource identification for learning	15.82±3.62	15.92±3.18	-0.12	.904	16.06±3.24	16.89±3.60	-2.06	.041
Basic self-management ability	16.82±3.01	17.19±2.43	-0.62	.537	17.15±2.75	17.80±2.31	-2.08	.040
Choice of learning strategy	17.17±3.25	17.36±2.52	-0.54	.590	17.32±3.05	17.63±3.21	-0.84	.400
Persistence of learning execution	15.63±2.34	15.73±2.02	0.52	.602	16.17±2.21	16.15±2.44	0.05	.960
Efforts on outcomes	15.37±2.19	15.55±1.66	-0.16	.871	15.79±2.08	15.86±2.35	-0.44	.660
Self-reflection	16.68±3.76	16.96±2.68	-0.50	.621	16.85±3.35	17.68±3.49	-1.96	.053
Total score	144.97±20.73	147.05±14.77	-0.61	.545	147.1±17.75	152.08±19.88	-2.10	.037

Ethical Clearance: Not required

Source of Funding: Nil

Conflict of Interest: Nil

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Nurses' Perception of Nursing Malpractice Liability Insurance

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Abstract

Background/Objectives: Hospital nurses' increased responsibility in exercising advanced nursing skills also brought about greater risk of error and liability. However, Korea still has no systems such as liability insurance to protect nurses from such risks. This study estimates nurses' perceptions of nursing care liability insurance and their willingness to pay (WTP) for nursing malpractice insurance.

Methods/Statistical analysis: This study estimates the WTP of 156 nurses from six hospitals in Seoul and the metropolitan area using the contingent valuation method with a regression model with the double-bounded dichotomous choice method.

Findings: The analysis results show that nurses' perceptions of the insurance ($p<0.037$) had a significant impact on their WTP the insurance premium. In other words, the higher the perceptions about the insurance (B=6,534.067) were, the higher the insurance premium to they were willing to pay. Participants who perceived that nursing malpractice insurance was necessary had a WTP of 22.12 USD as the insurance premium.

Improvements/Applications: The results pertaining to insurance premiums in this study can be utilized as baseline data to develop a nursing malpractice liability insurance system in Korea, and for the ultimate calculation of rational insurance premiums. This study provides basic data on the needs for nursing care liability insurance in Korea.

Keywords: *Insurance, negligence, malpractice,nurses,perception*

Introduction

Recently, the risk of malpractices in the nursing field in Korea has increased, setting precedents for assigning civil and criminal responsibilities. Nursing malpractice refers to damages caused to patients because of nurses not implementing the necessary due diligence practices in their daily work routines while providing patients with nursing care[1, 2]. Accidents due to nurses' negligence are very similar in nature to other medical accidents. Nurses' lack of knowledge and skills, carelessness, disregard for nursing ethics, and improper management cause such negligence. The Supreme Court of South Korea, too, applies a balanced standard theory in this regard[3]. The negligence is defined as a wrongdoing caused by irrational and careless attitudes, while a mistake is a special form of negligence, wherein a trained/educated expert violates the standards. To charge a nurse with the responsibility for an illegal act, the said nurse should have been in charge of implementing a nursing task or duty according to the nursing standards, damage should have occurred following the violation of that particular duty, and there should causality between the violation and damage[4]. An analysis of the precedents judged by the Supreme Court of Korea[5] and listed on the Comprehensive Legal Information Homepage shows that there were eight cases of nursing malpractice as per the Korea Nurse Practice Act for which casual relationships between negligence and damage were established.

Legally, nursing malpractice is a default on an obligation or an illegal act violating a treatment contract[6]. Therefore, nursing malpractice is filed as a damage claim suit against an illegal act or default on a

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medical obligation. Damage caused by the negligence of medical personnel during a medical act is called a nursing malpractice liability. This responsibility is essentially a civil liability, entailing legal responsibility for damage to another person's body or property by intention or negligence, and the liabilities for economic losses/damage include pecuniary damage, non-pecuniary damage, and other expenses[7].

In the early 2000, South Korea established a physicians' professional liability insurance system after reviewing similar systems of countries like the United States[8]. Recently, nurses have been recognized as having a higher risk of committing medical accidents owing to the increase in the number of tasks allotted to them and the risks inherent in these tasks. However, Korea has not developed a system for nursing malpractice liability insurance as yet. Doctors and nurses perform mutually cooperative tasks and the operational system, though divided, tends to be generalized. Thus, it is necessary to develop a reasonable negligence insurance system that applies specifically to nurses and excludes doctors[9].

Insurance is a reasonable and realistic method to prevent disputes or legal suits resulting from mistakes committed by professionals in the medical field. The concept of Willingness to Pay (WTP) has long been adopted as an analytical tool to find the maximum monetary value an individual is willing to pay to attain a good or avoid an undesirable outcome[10]. The contingent valuation method helps researchers to present a hypothetical scenario for a specific service to research subjects. The results of the contingent valuation method are used to estimate the WTP for that service[11]. Thus, it is necessary to check Korean nurses' WTP for nursing malpractice liability insurance as part of an overall nursing malpractice risk management plan. We propose to do the same using the contingent valuation method.

In this study, nursing malpractice liability insurance is a system in which an insurance company guarantees liabilities for damages to be borne when a nurse's work causes harm to a patient's body and/or property[12]. Operationally, nursing malpractice liability insurance refers to a type of professional indemnity liability insurance in which an insurance company financially compensates patients for civil and criminal liabilities due to a nursing malpractice that occurred in the process of nursing services provided to patients[13].

Method

We designed a survey in line with the contingent valuation method to estimate WTP and the premium for the nursing malpractice liability insurance. In doing so, we provide baseline data useful toward developing such a system. The contingent valuation method involves quantitative research to assess WTP and associated cost/payment by setting up a hypothetical scenario.

While selecting the subjects, we referred to Cohen[14]. Using the two-tailed test, 132 subjects were drawn with the following characteristics: moderate effect size=0.5, power=0.8, and type 1 error=0.05. Considering an elimination rate of 20%, the final sample number comprised 158 persons.

Before conducting the study, the ethical review was completed by obtaining the approval of the Institutional Review Board (IRB) at Hanyang University (HY-14-07-12). All participants were informed of the fact that they could exercise their free will and withdraw from the study at any time. They were requested to sign a form confirming their voluntary participation in the research. One copy was kept by the research participant, and the other, by the researchers.

Trained interviewers conducted face-to-face surveys with 156 nurses working in Seoul and the metropolitan area. The purposive sampling method was used with non-probability sampling. The survey was conducted for 30 days from January 10 to February 10, 2015. This study included 78 nurses in 3 hospitals providing comprehensive nursing services (referred to as "total nursing care service" by Korea Nursing Association) and 78 nurses at 3 other hospitals not providing comprehensive nursing services (26 persons were interviewed at each medical institution).

Notably, checking participants' indirect and direct nursing malpractice experiences allowed this study to assess the impacts of these nursing malpractice experiences on WTP and the premium amount for the nursing malpractice liability insurance. Before asking their WTP for the nursing malpractice liability insurance,separate descriptions were added to help the nurses understand what constitutes nursing malpractice. One of the questions in the survey doubled the annual coverage of the nursing malpractice liability insurance and suggested the maximum amount the respondents could pay as the premium. The final credibility assessment of this tool for the nursing malpractice

liability insurance was determined using Cronbach's α (the value was 0.869).

The premium for nursing malpractice liability insurance depends on the malpractice experience. Thus, various factors affect WTP. Using SPSS 18, we conduct a regression analysis of WTP according to nurses' direct experience with malpractice[15]. We also conduct a logistic regression analysis using dummy variables.

Result

1. Subjects' sociodemographic characteristics

[Table 1] presents the general sociodemographic characteristics of the participants in this study. None of the nurses reported serious health issues (i.e., none of them selected "very unhealthy"). There was no significant difference in sociodemographic characteristics between comprehensive hospitals providing comprehensive nursing service and the non-comprehensive hospitals which do not provide comprehensive nursing service ($p>0.05$).

Table 1. Sociodemographic characteristics (n=156)

Variable	Comprehensive, n (%)	Non-comprehensive, n (%)	x^2 or F	p
Age (years)			30.223	0.353
Under 25	28 (17.9)	17 (10.9)		
26-30	19 (12.2)	28 (17.9)		
31-35	12 (7.7)	10 (6.4)		
36-40	4 (2.6)	12 (7.7)		
41-45	10 (6.4)	7 (4.5)		
Over 46	5 (3.2)	4 (2.6)		
Marital status			1.400	0.237
Unmarried	55 (35.3)	48 (30.8)		
Married	23 (14.7)	30 (19.2)		
Current position			10.181	0.170
Staff nurses	71 (45.5)	57 (36.5)		
Charge nurses	3 (1.9)	13 (8.3)		
Head nurses	4 (2.6)	6 (3.8)		
Chief nurses	0 (0.0)	2 (1.3)		
Education			2.174	0.537
College	36 (23.1)	37 (23.7)		
RNBSN	8 (5.1)	11 (7.1)		
BSN	24 (15.4)	25 (16.0)		
Master's	10 (6.4)	5 (3.2)		
Monthly income (USD)			1.612	0.206
1,010-2,000	17 (10.9)	1 (0.6)		
2,010-3,000	48 (30.8)	51 (32.7)		
3,010-4,000	9 (5.8)	19 (12.2)		
4,010-5,000	2 (1.3)	6 (3.8)		
Over 5,010	2 (1.3)	1 (0.6)		

Cont... **Table 1. Sociodemographic characteristics (n=156)**

Health status (Subjective)			0.123	0.989
Normal	35 (22.4)	34 (21.8)		
Healthy	27 (17.3)	29 (18.6)		
Unhealthy	14 (9.0)	13 (8.3)		
Very healthy	2 (1.3)	2 (1.3)		
Very unhealthy	0 (0.0)	0 (0.0)		

RNBSN: Registered nurse bachelor of science in nursing

BSN: Bachelor of science in nursing

2.Logistic regression analysis of nurses' perception of nursing malpractice insurance

As [Table 2] shows, the demand for the necessity of a nursing malpractice liability insurance system was most affected by the position (1.303), with nurses at a higher position expressing a demand for such a system that is 3.7 times (exp B) higher than those at a lower position. The type of education level (-0.075), monthly income (0.021), and subjective health status (-0.055) did not affect nurses' demand for a nursing malpractice liability insurance system.

Table 2. The Factors affecting nurses' decision about the necessity of nursing malpractice liability insurance

Independent variable	**B**	**Standard error**	**p**	**Odds Ratio**	**95% Confidence interval**
Constant	0.375	1.217	0.739	1.455	
Implementation of comprehensive nursing service	1.139	0.364	0.002*	3.124	1.531-6.374
Age	-0.076	0.036	0.033*	0.927	0.865-0.994
Position	1.303	0.488	0.008*	3.679	1.414-9.570
Education	-0.075	0.099	0.446	0.927	0.764-1.126
Monthly income	0.021	0.325	0.948	1.021	0.540-1.932
Health status	-0.055	0.231	0.811	0.946	0.602-1.489

*$p<0.05$.

3. Contingent valuation and willingness to pay for nursing malpractice insurance

A positive answer ("Yes") means that the scheme is perceived to be more useful to respondents who want to subscribe to it by paying a certain prescribed amount compared to those who do not wish the same. In liability insurance, the premium to be paid is unilaterally determined by the insurance company, and the market price formed in a fully competitive market cannot be observed[16]. The nurses' willingness to pay premium toward the nursing malpractice liability insurance was checked as seen in [Figure 1]. First, the nurses were offered a sum of 20,000 won as a monthly premium. Those who responded that they were willing to pay were then asked if they would accept 40,000 won as the premium amount. Nurses who indicated their unwillingness to pay the hypothetical premium of 20,000 won were asked if they would agree to pay 10,000 won instead.

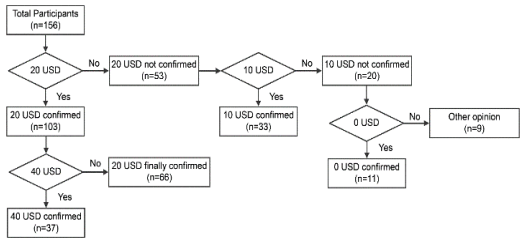


Figure 1. Interview scheme for the contingent valuation method

The amount offered the second time is twice that offered the first time if the response to the latter is "Yes," and half of the first offered amount if it is "No."

WTP was estimated with a regression model coupled with the double-bounded dichotomous choice method. The estimation was conducted after employing dummy variables. The results of the analysis of respondents' perceptions about nursing malpractice liability insurance [Table 3] show that nurses' perception about the insurance have a significant impact ($p<0.037$) on the premium payment; the more positive the perceptions about the system (B=6,534.067), the higher the liability insurance premium. Moreover, the explanation ability of the nursing malpractice liability insurance premium payment is 2%.

We consider the dummy regression model . Here, , is the estimated value of the insurance premium, while Xi refers to perceptions about the need for nursing malpractice liability insurance. The coefficient of regression is statistically significant at 0.05, and thus, the following formulae can be obtained by estimating the amount of nursing liability.

Perception about the nursing malpractice liability (necessary):

Perception about the nursing malpractice liability (unnecessary):

Therefore, the participants who perceived the necessity of insurance were willing to pay 22.12 USD as the premium, while those who perceived that it would be unnecessary reported a WTP of 15.59 USD.

Table 3. Estimation results of WTP using a regression model coupled with the double-bounded dichotomous choice method

Classification	*B*	Standard error	β	*t*	*p*
Constant	15,588.235	2,934.414		5.312	<0.001*
Perception about (need for) nursing malpractice liability insurance	6,534.067	3,108.682	0.167	2.102	0.037*

Adj. R^2=0.028, F=4.418 ($p<0.05$)
WTP: Willingness to pay.
*$p<0.05$.

Discussion

This study assessed nurses' perception and WTP with regard to nursing malpractices, which may occur in the process of caring for patients, through a nursing malpractice liability insurance system. Hanemann et al.[16] found that twice as many subjects indicated their willingness to subscribe to such a system compared to those who did not. This finding agrees with the result of this study; 89.1% of all nurses responded that a nursing malpractice liability insurance system is needed, and the necessity and intention to join were higher than the corresponding values estimated by the preceding studies[13, 16]. Our result of a logical regression analysis conducted to identify the factors affecting the perceptions regarding the need for the nursing malpractice insurance system indicate that the provision of comprehensive nursing services affects the need for such a system ($p<0.002$). Similarly, we believe that nurses' understanding about nursing malpractice liability insurance has increased, changing their perceptions. The results of this study with regard to reason for establishing a nursing malpractice liability insurance system, the coverage provided by such insurance, and the subjects who would bear the costs of the nursing malpractice liability insurance are similar to those of Kim et al.[13]. The results also point to changes in practice. Previously, the division of labour was vertical; doctors were primarily responsible for medical practices, whereas division of labour at hospitals has now become more horizontal, wherein nurses share certain medical responsibilities with the doctors. This increases their anxiety and can potentially lead to more disputes and malpractice cases. With the expansion of the comprehensive nursing service, nurses' moral responsibility and ethical awareness as professionals have increased. They look forward to the introduction of nursing malpractice liability insurance as a formal policy despite the fact that the scope of their duties and responsibilities are yet to be legally specified. Unfortunately, the issue of accountability remains unresolved as the demarcation of the roles of all team members is unclear.

Professional liability insurance covers attorneys' fees, settlement money, and compensation money, and there have been calls to extend this system to the nursing malpractice field[17]. Recently, infections are leading to frequent safety accidents in clinical practice. In this environment, the need for nursing care liability insurance, which can protect nurses from their mistakes, is increasing. However, there is no nursing liability

insurance to protect nurses in Korea. We believe that this study will help establish a strategy to protect both nurses and patients in the event of a mistake, and reduce nursing malpractice risk through its analysis of nurses' perceptions of nursing malpractice liability insurance.

Conclusion

This study was conducted to estimate hospital nurses' WTP toward nursing malpractice liability insurance. Data from focus group interviews and a survey questionnaire were used to estimate the nurses' WTP as well as the premium amount for the same. The findings also indicated that participants who responded that nursing malpractice liability insurance is necessary were willing to pay 22,122 won as insurance premium, while those who responded otherwise were willing to pay 15,588 won. Notably, the nurses were willing to subscribe to such an insurance policy should it become a reality. The abovementioned results lead us to propose the following.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Correlations of Mothers' Oral Health Knowledge and Verbal Oral Health Literacy with Children's Oral Health Behaviors in a Daycare Center

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Abstract

Background/Objectives: The aim of the study was to confirm the relation of subjective periodontal symptoms to objective periodontal index by comparing personal periodontal evaluation and actual oral health.

Methods/Statistical analysis:This study was conducted by receiving consents from parents with their children attending the childcare center attached to D. University in Busan. In this study, SPSS23was used to analyze data, and statistical significance was determined with the significance test at $P \leq 0.05$.

Findings: Mothers and children's brushing habits and tongue brushing had similar behavior patterns, but the quantity of toothpaste was slightly higher for mothers than for children. Of the mother's brushing behaviors, the more brushing per day, the higher score of oral health knowledge became, and as for brushing method, the score of oral health knowledge was a little higher when the rolling method and horizontal method were used than when the brushing method of mixing the vertical method with various methods was used, which was statistically significant. Children's brushing behaviors, brushing method, and tongue cleaning had a negative correlation, and children's brushing method and mother's oral health knowledge had a positive correlation.

Improvements/Applications: The mother's oral care behaviors have an impact on the formation of children's right habit and medium-to-long-term oral care, it is judged that it would be necessary to provide oral care education experience opportunity for mothers and make institutional preparation so that expert oral health activities can consistently be made for children in daycare centers and kindergartens.

Keywords: *Brushing behavior, Child, Mother, Oral health behavior, Oral health Literacy, Oral health knowledge.*

Introduction

In 5-6 years-old children age, good habits for oral care should be established to keep their teeth healthy during their lifetime, but they currently tend to escape from fosterers' care, along with changes in social phenomena related with rearing due to increasing the economic participation rate of women[1)]. Although the prevalence of 5 years old children's dental caries has been decreased in Korea, it is still higher than that of other OECD members[2)]. According to the preceding studies, the degree of the awareness about young children's oral health is the highest in mothers as compared to other guardians, and children's poor oral hygiene care leads to poor oral hygiene status in their growth[3,4)]. They play the most central role in the maintenance and promotion of family oral health, e.g. It was found that mother's knowledge and attitudes about oral health affects children's oral health[5)], mother's and children's oral health behaviors have a great correlation[6)] and the children of the mothers who experienced the use of dental institutions for the purpose of prevention had

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about seven times higher probability of brushing three or more times on average a day than mothers who did not experience that[7]. As proven in several preceding studies, it is considered an established theory that mother's oral health knowledge level or behavior affects children. The health literacy requires a minimal ability to enjoy abundant life, maintaining healthy body in the modern society, and it is applied to oral health[8,9]. The dental health literacy, one of many methods to enhance the oral health of mothers has a great effect on correct dental practices and behavior regarding oral health[10,11]. In many children of parents with low verbal oral health literacy, the first molar sealant is often absent[12]. Mothers' oral health knowledge, literacy, and behaviors can be important factors in the oral care of children[13,14]. Thus, this study would investigate the correlation in oral health behaviors between child and mother, investigating verbal oral health literacy according to mothers' oral health characteristics and several factors decisively affecting oral health management in preschoolers.

Materials and Method

Study Subjects

This study was conducted by receiving primary consents from parents with their children attending the childcare center attached to D university in Busan, after explaining the purpose of this study to teachers and secondary ones from children's legal representatives.

Research Method

Mother's oral health knowledge was composed of 30 questions in total, and for the percentage of correct answers, 1 point was given for a correct answer and 0 for a wrong answer. Verbal oral health literacy consisted To measure the verbal oral health literacy, the Rapid Estimate of Adult Literacy in Dentistry (REALD-99) was used after adaptation, revision[11] and Cronbach`α = .987.

Statistical Analysis Methods

In this study, SPSS (ver. 23.0 for windows, Chicago, IL. USA) was used to analyze data, and statistical significance was determined with the significance test at $P \leq 0.05$.Frequency analysis was conducted on the mother's general characteristics, oral health interest rate, the path of information collection, and oral health literacy, and independent samples t-test and one-way ANOVA were conducted on verbal oral health literacy and oral health knowledge according to the mother's general characteristics and brushing behaviors.

Result and Discussion

Distribution of responses of mother's verbal oral health literacy

In the degree of the mother's literacy on oral health-related terms in Table 1, the words with a high ratio of response, "I know" over 90% were toothpaste(98.6), toothbrush(98.6), and sugar(98.6), and the understanding of cavity(14.3), eruption(18.6), fistula(21.7), and imperfecta(24.3) was the lowest.

Table 1. Mother's verbal oral health literacy (Understanding of the oral health-related terms)

Question	N (%)	Question	N (%)	Question	N (%)
Genetics	48 (68.6)	Hospital visit	64 (91.4)	Toothpaste	69 (98.6)
Angina	35 (50.0)	Discoloration	68 (97.1)	Toothbrush	69 (98.6)
Imperfecta	17 (24.3)	Inlay	67 (95.7)	Sugar	69 (98.6)
Abscess	34 (48.6)	Amalgam	65 (92.9)	Tooth	65 (92.9)
Luxation of tooth	42 (60.0)	Resin	65 (92.9)	Agreement of treatment	68 (97.1)
Sedation	29 (41.4)	Implant	64 (91.4)	Pain	65 (92.9)
Repair	27 (38.6)	Halitosis	67 (95.7)	Dental caries	65 (92.9)
Endodontic treatment	64 (91.4)	Denture	66 (94.3)	Habit	67 (95.7)
Malalignment	55 (78.6)	Teeth Whitening	65 (62.9)	Medical expenses	65 (92.9)
Dentition	58 (82.9)	Bruxism	66 (94.3)	Uninsured benefits	65 (92.9)
Fistula	19 (21.7)	Oral hygiene	63 (90.0)	Calculus	65 (92.9)
Eruption	13 (18.6)	Crown	40 (57.1)	Smoke	65 (92.9)
Cavity	10 (14.3)	Permanent tooth	61 (87.1)	Earliest stage in the disease	65 (92.9)
Fracture	37 (52.9)	Deciduous tooth	65 (92.9)	Oral cavity	65 (92.9)
Hyperemia	52 (74.3)	Canine	65 (92.9)	Gum	65 (92.9)
Bite	65 (92.9)	Molar	65 (92.9)	Inflammation	65 (92.9)
Tooth extraction	64 (91.4)	Sealant	65 (92.9)	Hemorrhage	68 (97.1)
Sterilization	64 (91.4)	Fluoride	65 (92.9)	Gingiva	45 (64.3)
Trauma	62 (88.6)	Oral cleaners	68 (97.1)	Dental pulp	33 (47.1)
Filling	46 (65.7)	Dental floss	61 (87.1)	Dental plaque	34 (48.6)
Malocclusion	63 (90.0)	Interdental brush	51 (72.9)	Mouthguards	45 (64.3)
Infection	64 (91.4)	Tongue brush	68 (97.1)	Retainer	66 (94.3)

Mother's verbal oral health literacy and oral health knowledge according to their general characteristics

In Table 2, most many age were 36 to 39 years old(57.1%). By the level of education, those with a bachelor's degree were 78.6%. By income, most earned more than 5 million won a month(58.6%), and by occupation, most were professionals(54.3%).There was a significant difference in functional oral health literacy by the subjects' sociodemographic characteristics was drawn, different from the results of the preceding studies[15]. The higher incomes, the higher score of oral health knowledge were a statistically significant difference. It was similar to the result of Lee[16].

Mother's oral health interest rate and the path of information collection

In Table 3, most were "not interested"(57.1%).In the oral health knowledge learning route, got it from newspaper, TV, Internet were 45.7%. For oral health education experience, those with experience were 55.7%, while without experience were 44.3%.In the path of education, clinic and hospital reply was 41.9%. Mother's oral health interest was only 20.0%, and thosewith oral health education experience were only 44.3%. Thus, judging from the result of the preceding studies that guardian's oral health education experience degree is a factor affecting elementary school students'

oral health knowledge[17], it is noted that mother's oral health education experience degree affect children.

Table 2. Mother's verbal oral health literacy and oral health knowledge according to their generalcharacteristics

Variable	Contents	N (%)	Verbal literacy	t/F (p)	Oral health knowledge	t/F (p)
Age	<35 35~39 40≤	13 (18.6) 40 (57.1) 17 (24.3)	54.07±26.65 52.25±27.87 47.94±24.55	1.704 (.190)	25.00±2.23 24.80±1.89 25.47±1.54	.753 (.475)
Academic degree	Bachelor Post-graduate degree	55 (78.6) 15 (21.4)	52.00±27.54 49.80±25.89	.766 (.446)	25.07±1.89 24.73±1.86	.617 (.539)
Income	<400 400~499 500≤	15 (21.4) 14 (20.0) 41 (58.6)	52.86±28.46 53.87±24.29 50.24±21.46	.879 (.420)	24.40±1.84 27.67±1.97 26.19±1.86	1.994 (.035)
Occupation	Company employee Professional Housewife Etc.	20 (28.6) 38 (54.3) 8 (11.4) 4 (5.7)	52.85±21.95 50.50±27.85 54.75±24.97 48.25±20.07	.675 (.565)	25.45±1.84 24.89±1.85 24.75±2.17 24.25±1.50	.671 (.573)
Total		70 (100.0)	37.78±23.08		25.16±1.73	

Table 3. Mother's oral health interest rate and the path of information collection

Variable	Contents	N
Interest in oral health	Interested More or less interested Not interested	14 (20.0) 16 (22.9) 40 (57.1)
Oral health knowledge learning route	Family Education and medical institution Newspaper, TV, Internet	6 (8.6) 32 (45.7) 32 (45.7)
Experience of oral health education	Yes No	31 (44.3) 39 (55.7)
Oral health educationinstitution a	School Clinic and hospital Public health center Etc.	10 (32.3) 13 (41.9) 5 (16.1) 3 (9.7)
Total		70 (100.0)

[a] Answer Only if having oral health education experience

Distribution of response in oral health behaviors between mother and children

In Table 4, as for the quantity of toothpaste, most of them used 1/2 of the toothbrush head(68.6%), and as for brushing time, most of them brushed their teeth for 1 minute and 31 seconds to 2 minutes and 30 seconds (41.4%). As for the quantity of toothpaste, most children used 1/3 of the toothbrush head(57.1%). As for brushing time, most of them brushed their teeth for 30seconds to 1minute and 30seconds; 34.3%. As for the appropriate quantity of toothpaste in tooth brushing, 1/3 of the toothbrush head or the shape of a kidney bean is appropriate. However, the mothers responded that they used a more quantity of toothpaste while the children used it suitably. Thus, there was a conflicting result. The rolling method is an appropriate method, but the rolling method is not necessarily efficient for the removal of dental plaque in the oral cavity. Various factors act, and it is necessary to beconcerned about the method of finding and controlling the cause, of oral health behaviors, individually, if appropriate for the removal of dental plaque, with other methods, not with the rolling method.

Mother's verbal oral health literacy and oral health knowledge according to their brushing behaviors

As a result of a survey of the mother's brushing behavior, there was no difference in verbal oral health literacy according to that. Judging from the result of a study that mother's oral health management behaviors and verbal oral health information understanding affect preschoolers' oral health characteristics[18]., it is noted that the aspect or change of mother's oral health behaviors would affect children's oral health behaviors. Of the mother's brushing behaviors, the more brushing per day, the higher score of oral health knowledge became, and as for brushing method, the score of oral health knowledge was a little higher when the rolling method and horizontal method were used than when the brushing method of mixing the vertical method with various methods was used, which was statistically significant($p<.05$). This was similar to the result of Kim[19].Oral health knowledge degree was significantly higher according to the number of times of brushing, brushing method, and brushing education experience.

Table 4. Distribution of response according to mother and children's brushing behaviourN (%)

Variable	Contents	Mother	Children
Quantity of toothpaste	The whole of toothbrush head 1/2 of the toothbrush head 1/3 of the toothbrush head	6 (8.6) 48 (68.6) 16 (22.9)	1 (1.4) 29 (41.4) 40 (57.1)
Brushing time	30seconds-1minute 30seconds 1minute 31seconds-1minute 30 seconds More than 3minutes	18 (25.7) 29 (41.4) 23 (32.9)	30 (42.9) 24 (34.3) 16 (22.9)
Number of times of brushing per day	Less than 2 times 3 times More than 4 times	10 (14.3) 50 (71.4) 10 (14.3)	22 (31.4) 44 (62.9) 4 (5.7)
Tongue cleaning	Yes No	67 (95.7) 3 (4.3)	56 (80.0) 14 (20.0)
Brushing method	Rolling method Horizontal method Vertical method Mix	9 (12.9) 3 (4.3) 4 (5.7) 54 (77.1)	11 (15.7) 2 (2.9) 4 (5.7) 53 (75.7)
Total		70 (100.0)	70 (100.0)

Table 5. Mother's verbal oral health literacy and oral health knowledge according to their brushing behaviors

Variable	Contents	Verbal literacy	t/F (p)	Oral health knowledge	t/F (p)
Quantity of toothpaste	The whole of toothbrush head 1/2 of the toothbrush head 1/3 of the toothbrush head	25.50±21.94 41.18±23.27 32.19±25.86	1.889 (.159)	24.50±1.94 25.22±1.61 25.20±2.07	.468 (.629)
Brushing Time	30 seconds-1minute 30 seconds 1minute 31 seconds-2minute 30 seconds More than 3 minutes	37.00±25.23 40.51±24.34 34.95±24.92	.379 (.686)	24.67±2.00 25.39±1.68 25.15±1.57	1.106 (.367)
Number of times of brushing per day	Less than 2 times 3 times More than 4 times	28.00±29.60 39.30±22.48 40.00±23.92	1.054 (.354)	24.00±1.94 25.24±1.71 25.90±1.10	3.422 (.039)
Tongue cleaning	Yes No	38..10±22.91 30.67±21.39	.543 (.589)	25.09±1.73 26.67±1.15	-1.552 (.125)
Brushing method	Rolling method Horizontal method Vertical method Mix	32.00±24.80 50.00±22.15 23.50±24.79 39.13±23.08	1.042 (.380)	25.67±1.58 26.00±1.73 23.75±2.62 23.24±1.62	2.428 (.043)
Total		37.78±23.08		25.16±1.73	

[a] Duplicated response

Correlations of mother's verbal oral health literacy and oral health knowledge with children's brushing behaviors

The results of an analysis of the correlations of mother's verbal oral health literacy and oral health knowledge with children's brushing method, quantity of toothpaste,brushing time, the number of times of brushing per day, and tongue cleaning are like Table 6. Of children's brushing behaviors, brushing method and tongue cleaning had a negative correlation ($p<.008$), and children's brushing method and mother's oral health knowledge had a positive correlation ($p<.037$). Thus, these were statistically significant.

Table 6. Correlations of mother's verbal oral health literacy and oral health knowledge with children's brushing behaviors

Variable a	1	2	3	4	5	6	7
Brushing method	1						
Quantity of toothpaste	.045 (.711)	1					
Brushing Time	.176 (.145)	-.146 (.229)	1				
Number of times of brushing per day	-.082 (.499)	.001 (.991)	-.020 (.871)	1			

Cont... **Table 6. Correlations of mother's verbal oral health literacy and oral health knowledge with children's brushing behaviors**

Tongue cleaning	-.314 (.008)	.014 (.911)	.127 (.294)	-.155 (.200)	1		
Mother's oral health knowledge .461 (.037)		-.033 (.788)	.087 (.475)	.011 (.929)	-.109 (.371)	1	
Mother's oral health literacy	-.116 (.340)	.122 (.316)	-.181 (.134)	.137 (.258)	.137 (.258)	-.012 (.921)	1

[a] 1: Brushing method, 2: Quantity of toothpaste, 3: Brushing Time, 4: Number of times of brushing per day, 5: Tongue cleaning, 6: Mother's oral health knowledge, 7: Mother's oral health literacy

Conclusion

This study would understand correlations by checking the degree of mother's oral health knowledge and verbal oral health literacy and comparing mother and children's brushing behaviors. Childhood is a time when the right oral care habit is very important, and repeated education and interest in oral health are necessary. Thus, the mother's oral care behaviors have an impact on the formation of children's right habit. It was found that the correlations of children's brushing method and tongue cleaning with the mother's oral health knowledge were significant. In conclusion, for children's medium-to-long-term oral care, it is judged that it would be necessary to provide oral care education experience opportunity for mothers and make institutional preparation so that expert oral health activities can consistently be made for children in daycare centers and kindergartens

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Correlation between Pelvic Tilt Angle and Erector Spinae

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Abstract

Background/Objectives: The purpose of this study was to investigate the activity of the spinal muscles according to the pelvic tilt angle and to identify the muscles affecting the posture.

Methods/Statistical analysis:Thirty healthy young adults participated in this study. The muscle activity and pelvic tilting of the erector spinea were measured using electromyography and inertial sensor. One-way repeated ANOVA was used to compare muscle activity of each muscle according to pelvic tilting angle.

Findings: The muscle activity of the three muscles of the spine showed a significant difference between posterior tilting and anterior tilting of the pelvic ($p<0.05$). In other words, it showed higher muscle activity in anterior tiling. Iliocostalis lumborum showed lower muscle activity in the sitting position, although the range of motion of the pelvic was larger in the sitting position than in the standing position.

Improvements/Applications: Appropriate muscle activity of the iliocostalis lumborum in the sitting position should be considered for weight-bearing reduction of the lumbar spine and prevention of musculoskeletal disorders of the spine.

Keywords: *Pelvic tilting, Erector spinae, Iliocostalis thoracis, Iliocostalis lumborum, Longissimus thoracis, Muscle activation*

Introduction

With the development of industry, the sedentary lifestyle increased in modern society. These changes may cause many musculoskeletal disorders[1]. The sitting position causes pelvic posterior tilting rather than standing position and reverses the normal curve of the lumbar, resulting in increased intervertebral disk pressure. In the sitting position, the intervertebral disk pressure is three times higher than the standing position and seven times higher than the lying position[2]. Because the spine and pelvis are anatomically composed of a spine-pelvic complex, the position and angle of the pelvic have an important influence on the spine[3]. This is explained by Tully's bottom-up mechanism, which suggests that the tilting of the pelvis gradually affects the shape of the spine. Pelvic anterior tilt observed in the sagittal plane causes spinal lordosis, and pelvic posterior tilt causes spinal kyphosis. Likewise, asymmetrical pelvic tilt caused by conditions such as putting the wallet in one back pocket leads to the asymmetrical posture of erector spinae and spinal imbalance[4].

To sit in an upright position, balanced movement of the trunk muscle and enough range of motion for hip joint flexion are required. The upright sitting position is a flat position in which the pelvis is tilted backward and the anterior displacement of lumbar vertebrae[2]. Lowering the head or bending the trunk in a sitting posture places the line of gravity in front and presses the lumbar vertebrae to induce low back pain[5]. On the other hand, the sitting position with back too upright affects erector spinae and iliopsoas to maintain lumbar vertebrae curve, putting pressure and anterior shear force on lumbar vertebrae and increasing the spinal load that leads to low back pain[2,6]. The sitting position with weight on one-side causes side bending in lumbar vertebrae, and if such side bending is limited to one or two segments of lumbar vertebrae, it can put a greater load on lumbar vertebrae,

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causing low back pain. A weight-bearing on one side in a sitting position causes side bending of the lumbar vertebrae. When side bending is limited to one or two segments, the load on the lumbar vertebrae increases and causes pain. It also affects other segments and changes alignment[2,7,8].

Improper sitting posture increases the pressure of the lumbar vertebrae. As a result, decreased the strength and endurance of the muscles around the lumbar, decreased endurance, soft tissue damage, degenerative changes of the intervertebral disc and pain are caused[9]. Low back pain can be prevented by working in a proper sitting position[10]. One of the primary causes of low back pain is increased lumbar lordotic angle. Thus, pelvic tilt exercise is used for lumbar alignment of patients with chronic low back pain[11]. Pelvic anterior tilt position increases the lumbar lordotic angle, and pelvic posterior tilt position decreases lumbar lordotic angle[12-14].

In electromyography (EMG) studies of muscle activation according to pelvic tilting angle in standing position, erector spinae and multifidus activity was highest in a pelvic anterior tilt. Muscle activity of transverse abdominis was highest in a pelvic posterior tilt. These findings suggest that the muscles around the lumbar vertebrae are related to the pelvic tilt angle[15]. Because the lumbar vertebrae are structurally unstable, they require appropriate muscle contraction of the surrounding muscles[16]. Muscles that contribute to spine stability include multifidus, transverse abdominis, the bottom fiber of the internal oblique abdominal muscle, and the deep muscle of the erector spinae. Excessive activity of the muscle associated with the movement of the spine may cause spine instability and low back pain[17]. Previous studies have shown that transverse abdominis, multifidus, and erector spinae are involved in pelvic tilting. However, there are not many studies on deep muscles of erector spinae. Therefore, the purpose of this study was to investigate muscle activity of erector spinae (iliocostalis thoracis (IT), longissimus thoracis (LT), and iliocostalis lumborum (IL)) according to pelvic tilting angle in sitting and standing postures.

Method

Thirty healthy young adults were recruited to this study. The general characteristics of the subjects are shown in Table 1. Of the 30 subjects, 10 subjects with a pelvic tilting angle below the average were excluded from the study. Those with low back pain, history of surgery, inflammatory disease or degenerative arthritis were excluded from this study. Also, those who have difficulties in maintaining the sitting and standing position were excluded from the study. This study was approved by Sunmoon University Institutional Review Board (SM-201805-029-2).

Table 1. General characteristic of the subjects

Variables	Subjects
Age, year	22.14 ± 1.67
Height, cm	174.59 ± 4.28
Weight, kg	69.32 ± 10.59
Gender	male = 12, female = 8

Mean ± standard deviation

Micro-Electro-Mechanical Systems (MEMS) sensors (EBIMU24GV3, E2BOX, Seoul, Republic of Korea) were used to measure the pelvic tilting angle. The sensor consists of a three-axis accelerometer, a geomagnetic sensor, and a gyroscope. The sensor data was recorded at 40 Hz. The sensor was attached to the ASIS and joint angle values were calculated by setting three axes as a roll (Z-axis), yaw (Y-axis), and pitch (X-axis)[18]. A surface electromyogram (EMG) (Zero WIRE EMG, Italy, 2009) was used to measure erector spinae muscle activity during pelvic motion. Before attaching EMG electrodes, the area was disinfected with alcohol. EMG electrodes were attached to the three muscles. The electrode mounting positions are as follows; iliocostalis thoracis (exterior 3-4 cm of LT), iliocostalis lumborum (above the iliac crest in the horizontal of L4), and longissimus thoracis (between the spinous process of L1 and the vertical of PSIS) [Figure 1][19]. EMG analog signals collected from three channels were sent to MP150 system to be transformed into digital signals, and EMG software Myoresearch 1.06.44 software was used for signal analysis and data processing. The sampling rate was set at 2000Hz when measuring EMG, and frequency band-pass filter was set at 20~500Hz.

The subject was given a description of the pelvic neutral position, anterior tilting and posterior tilting in sitting and standing position. The maximum voluntary isometric contraction (MVIC) of the muscle was measured first in the prone position [Figure 2]. Muscle

activity of each muscle was measured in neutral, sitting, and standing positions after MVIC measurement. The measurement was performed for 3 seconds [Figure 3, Figure 4]. The muscle activity data was calculated as the root mean square (RMS) and the mean value for 3 seconds was used for data analysis. All data has been normalized as a percentage of MVIC. Of the 30 subjects, 10 subjects whose pelvic tilting angle was below average were excluded from the study, and the results of 20 subjects were used for data analysis.



Figure 1. Electrode attaching placement

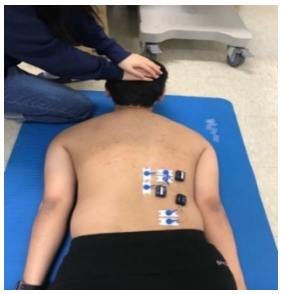


Figure 2. Maximum voluntary isometric contraction measurement

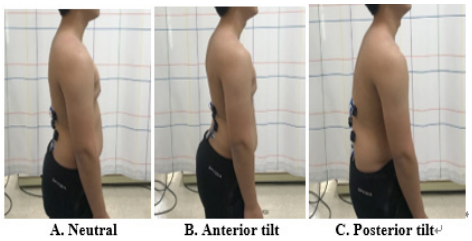


Figure 3. Pelvic motion in the standing position

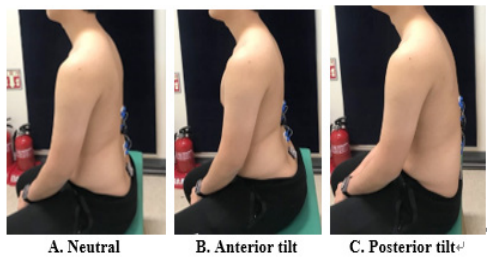


Figure 4. Pelvic motion in the sitting position

All data are expressed as mean and standard deviation. Shapiro-Wilk was used for normality test. One-way repeated ANOVA was used to compare muscle activation among IT, IL and LT. Bonferroni correction was used for post hoc comparison of the differences among each variable. Paired T-test was conducted to compare the differences pelvic tilting angle. The significance level was set at $p<0.05$. IBM SPSS/PC ver.20.0 for window program was used for statistical analysis.

Result

There was a significant difference in pelvic tilting angle between sitting and standing position ($p <0.05$) [Table 2]. In the standing and sitting positions, there was a significant difference in muscle activity of all three muscles of IT, LT and IL according to pelvic tilting angle ($p<0.05$) [Table 3, Figure 5]. All three muscles showed the highest muscle activity during pelvic anterior tilting in the standing position.

Table 2. The average pelvic tilting angle

	Anterior tilting	Posterior tilting
Standing	9.62 ± 3.86	4.02 ± 2.25
Sitting	12.19 ± 4.70	5.51 ± 3.2
p-value	0.024	0.016

Mean ± standard deviation

Table 3. Comparison of muscle activity according to pelvic tilting angle in standing and sitting positions

MVIC %	ST_A	ST_N	ST_P	SI_A	SI_N	SI_P	p
IT	21.06±2.36	5.54±1.42	7.21±1.35	19.20±2.44	5.64+1.12	6.47±1.74	0.000
LT	39.30±5.79	6.87±0.96	8.73±1.07	26.07±3.73	7.16+1.18	7.86±1.44	0.000
IL	35.65±5.02	15.57±3.49	17.02±3.92	16.17±3.76	8.02+1.96	9.61±1.92	0.000

Mean ± standard deviation

IT: Iliocostalis Thoracis, LT: Longissimus Thoracis, IL: Iliocostalis Lumborum

MVIC: Maximum Voluntary Isomeric Contraction

ST_N: Standing Neutral, ST_A: Standing Anterior tilting, ST_P: Standing Posterior tilting

SI_N: Sitting Neutral, SI_A: Sitting Anterior tilting, SI_P: Sitting Posterior tilting

Discussion

This study was performed to compare the muscle activity of the erector spinae (IT, LT, and IL) according to the pelvic tilting angle in sitting and standing positions. Three muscles showed the highest muscle activity during pelvic anterior tilting. Muscle activity during pelvic posterior tilting was higher than neutral position, however, lower than pelvic anterior tilting. The range of motion of the pelvic tilt angle was larger than the standing position. Posterior tilting at the two positions had a greater range of motion than anterior tilting. Muscle activation of IT and LT was highest in sitting position, and that of IL was not clearly shown. From the name 'erector', it can be known that erector spinae are vital muscles in holding the spine upright. The Erector spinae is activated for pelvic tilting motion and is also activated to maintain standing and sitting positions[20-22]. Thus, this study showed that muscle activation was highest in anterior tilting, and muscle activation was greater in posterior tilt than in neutral positions. In previous studies, the center of mass changes according to the trunk tilting angle, so the relationship between the center of mass and trunk muscles activity according to the trunk tilting angle was compared[23]. As a result, as the trunk tilting angle increased, the muscle activity of the trunk muscle increased. In this study, as the pelvic tilting angle increased in the sitting position, IL activity decreased. Therefore, it may be assumed that other muscles are used excessively than the muscles around the lumbar.

Tilting of the pelvis occurs due to changes in the couple-force between the abdominal muscle and hip extensors, spine muscle and hip flexors[24]. That is, the tilting angle of the pelvic is controlled by the surface muscles in the direction crossing each other[25]. The activities of muscles such as erector spinae, iliopsoas, sartorius, and rectus femoris are involved in anterior tilting. On the other hand, muscles such as external abdominal oblique, rectus abdominis, gluteus maximus, and hamstring are involved in posterior tilting. In lower cross syndrome (LCS) patients, pelvic anterior tiling is more common in sitting position because of the activation of larger hip flexors. Similarly, the pelvic posterior tilting angle may have been greater because more hamstring was activated in LCS. Muscle activity was low, even as the pelvic tilting angle increased. This may be due to LCS where hip flexors are used more than spine muscles. The muscle activity of LT was highest among erector spinae during pelvic anterior tilting, and IL muscle activity was highest during pelvic posterior tilting. Muscle activity was highest during pelvic anterior tilting in standing position. This study supports the argument that when the IL is appropriately activated in the sitting position, the compression of the intervertebral disc is reduced.

Conclusion

According to the results of this study, LT was most active during pelvic anterior tilting and IL was most active during pelvic posterior tilting in sitting and standing position. In addition, when compared to standing and sitting positions, muscle activity was higher in a pelvic tilt. An important point to note from this result is that muscle activity decreases in sitting position, as IL at the lumbar level is barely active during pelvic tilting. Although muscle activity decreases more in sitting position than in standing position, pelvic tilting angle was greater due to LCS. In standing position, muscle activity increased as activation is added during pelvic tilting to the already existing muscle activity of erector spinae. However, because lumbar spine is maintained for a long time, the angle rather decreased, and it was greater for pelvic tilting in sitting position. If IL is activated in the sitting position, weight load on the lumbar may be assumed to decrease.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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A Study on Change of Pennation Angle based on Gastrocnemius Stretching and Additional Muscle Exercise

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Abstract

Background/Objectives: The purpose of this study was to examine the changes of pennation angle based on gastrocnemius stretching and additional exercise and to identify the influence of exercise on stretching effects.

Methods/Statistical analysis: Thirty healthy adults (15 males and 15 females) participated in this study. Subjects performed stretching of the gastrocnemius and additional muscle exercises. The pennation angle of the muscle was measured before and after the intervention. A paired t-test was used to compare pre- and post-intervention and an independent t-test were used to compare between interventions.

Findings: As a result of gastrocnemius stretching, there was a significant difference between pre- and post-intervention ($p<0.05$). In addition, the results of stretching and additional muscle exercise showed significant differences in pre- and post-intervention ($p<0.05$). However, there was no significant difference between stretching intervention and stretching and additional exercise intervention ($p>0.05$).

Improvements/Applications: According to the results, the effect of stretching was not decreased even if stretching and exercise were applied together. Therefore, it is considered appropriate to perform stretching and exercise together.

Keywords: *Stretching, Muscle exercise, Gastrocnemius, Pennation angle, Flexibility*

Introduction

Calf muscles play an important role including human's basic movement control such as when standing up from a sitting position, lifting up the heel while walking, and maintaining balance while standing[1]. They assist plantar flexion of the ankle joint and the knee joint flexion. By lifting up the heel, it generates most of the momentum needed when walking or jumping. During walking, calf muscles work in the stance phase and help maintain balance. The activity of this muscle starts at the last 1/4 period of the swing phase[2]. In addition, the activation period of this muscle is greatly increased while jumping. Thus, this muscle is strong and thick in order to lift up the body and create momentum and acceleration during activities such as walking, jumping, running, leaping up, or trying to stand up with one's toes.

Stretching is an effective intervention method to increase the joint range of motion of shortened muscles[3]. It requires exercise that does not cause pain at least twice a week[4]. Stretching is often used clinically to increase the ankle joint range of motion and stimulate the somatic sense. Static stretching is the most common stretching technique that can be performed at home. Ballistic stretching, on the other hand, is a risk of tissue damage. Neurophysiologic stretching is safe and effective, however, difficult to perform on its own[5-7].

The muscle strength of lower limbs plays an important role in effective control over the center of the body, maintaining the balance, and enabling safe and efficient lower limb exercise[5]. Muscle strength refers to tension that is generated by muscle constriction

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and explained as the maximum strength that muscle can create against resistance[8]. Muscle-strengthening maintains and promotes work efficiency, endurance, and increases connective tissue tolerance of ligaments and muscles. In addition, it reduces the damage risk of joint loading, soft tissue during physical activity. In addition, it has the potential of healing the damaged soft tissue and promoting its recovering ability[9]. It has been reported that muscle-strengthening exercise makes the muscle strength by increasing the volume of muscle and that it has a lot of positive effects on metabolism, flexibility, and endurance due to the increase of blood flow rate [10].

Most of the muscles in our body are comprised with U-shaped muscles, and they are classified into semi U-shaped muscle, U-shaped muscle, and U-shaped muscle bundle based on the number of the fibers attached to the central tendon[2]. It has been observed that the U-shape angle increases as a result of training which is because this enables more fibers to be present on the cross-section, and this is related to the increase of the thickness and intensity of the muscle and the periosteum[11]. The process of estimating the U-shape angle includes estimating the direction of the bundle of fibers between aponeuroses[12]. Most people have the U-shape angle and the normal range is between 0° and 30°, which possibly reflects flexibility[13,14]. Flexibility refers to an ability of easy and smooth movement in single joint or multiple joints without any restriction or pain[15]. Along with joint integrity, the muscle length and the extensibility of soft tissue around the joint determine flexibility. Flexibility is related to the extensibility of each tendon that traverses the muscle and it is an ability that can be transformed and relaxed by extensibility. Not only the transforming ability of the connective tissue around the joint but also the arthrokinematics (the rolling and gliding ability over the facies articularis) influence the related range of motion and one's overall flexibility[9]. When the muscle is extended, there could be a change in the U-shape angle which can influence the muscle's ability to deliver the force. When the angle decreases, the length of the fiber bundle increases, and if the former increases, the latter decreases, which mean that the muscle length is increased during stretching[16,17].

Although gastrocnemius plays an important role in maintaining balance, the results of this muscle stretching study are not clear. Therefore, this study investigates the effect of exercise on stretching effect by measuring the change of the U-shape angle.

Method

Thirty healthy young adults (15 females and 15 males) participated in this study. The general characteristics of the subjects are shown in Table 1. Subjects were divided into stretching group (n=15) and stretching combined exercise group (n=15). Those with a history of knee and musculoskeletal disorders, history of surgery, or pain in the knee and ankle joints were excluded in this study. Subjects provided written consent before participating in the study. This study was conducted according to the protocol approved by the Institutional Review Board of Sun Moon University (SM-201804-027-1).

Table 1. General characteristic of the subjects

Sex	Male (n=15)	Female (n=15)
Age, year	21.53±2.35	21.33±1.82
Height, cm	176.62±4.42	161.29±5.12
Weight, kg	71.73±15.57	57.13±12.07

Real-time ultrasonography with a 7.5 MHz linear array transducer (ultrasonography, eZono 3000, Germany, 2011) was used to measure the U-shape angle and length of the gastrocnemius [Figure 1]. For measurement, the direction of the probe is set to the longitudinal axis direction [Figure 2]. The dominant leg of the subject was measured before and after the intervention. The dominant leg was defined as the preferred leg when kicking the ball.

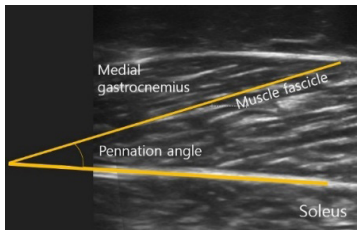


Figure 1. Pennation angle



Figure 2. Ultrasonography probe placement

For stretching the gastrocnemius (stretching group), the subjects were instructed to stand on the slant board with their feet spread out over the shoulder width. Subjects leaned back against the wall, straightened the back, looked straight ahead, and kept their feet aligned [Figure 3]. Stretching was performed on the slant board for 1 minute. Two repetitions were performed and a 30-second break between each performance stretch was provided. To perform a stretching combined exercise (stretching combined exercise group), subjects widened their feet to the shoulder width and lifted the heel by pressing the floor with their front feet [Figure 4]. It was repeated 10 times per set according to the metronome signal and 10 sets were performed. A 30-second break between each set was provided. After the strengthening exercise, subjects performed the same stretching as the stretching group. The subjects performed a stretching exercise and stretching combined exercise three times a week and performed for three weeks.

A paired t-test was used to compare before and after each intervention in the group. An independent t-test was also used for comparison between the two groups. SPSS version 20.0 program (IBM Corp, Armonk, NY) was used for statistical analysis. The statistical significance level was set at 0.05.



Figure 3. Stretching posture



Figure 4. Strengthening posture

Result

There was a significant difference in the stretching group pre- and post- the intervention. Similarly, the stretching combined exercise group showed significant differences in pre- and post the intervention [Table 2]. However, there was no significant difference between the two groups [Table 3].

Table 2. Difference between pre- and post- the intervention within the group

Intervention		Pennation angle (°)	p
Stretching	pre	18.64 ± 2.61	0.01
	post	15.84 ± 2.27	
Stretching combined exercise	pre	19.11 ± 1.81	0.01
	post	15.64 ± 1.68	

Table 3. Difference in pennation angle between two groups

Intervention	Mean	p
Stretching	2.81 ± 1.79	0.44
Stretching combined exercise	3.47 ± 1.29	

Discussion

The purpose of this study was to investigate the effect of muscle-strengthening on the stretching effect based on changes in U-shape angle when stretching and stretching with combined exercise. According to the results of this study, there was a significant difference in the U-shape angle within the stretching group and the stretching combined exercise group after intervention. However, there was no significant difference between groups.

The U-shape angle plays an important role in delivering force, and the lower the angle, the more the force is generated in each muscle. As the muscle is extended, there can be a change in the angle, and this delivers strength to the muscle, thereby influencing muscle activity. In case the tendon is transformed due to stretching, the accompanied U-shape angle can also increase[13]. Muscle tone refers to the resisting force against the muscle extension, that is, the stiffness of the muscle itself[18]. The increase in flexibility means a decrease in muscle tone. The decrease in the U-shape

angle means a decrease in muscle tone.

Stretching is an effective intervention method for increasing the joint range of motion and extension of the shortened muscles[3]. The effect of stretching can appear in various ways based on the application time and method, the effect of stretching can be varied depending on the application time and method. However, stretching more than 15 seconds is necessary for muscle relaxation and increased range of motion. Also, if the range of motion of the ankle joint is limited due to neurological damage, a longer period of the continuous static ankle stretching is required[6]. Based on the research that found out the length of the muscle increased significantly after maximum 2 minutes of stretching but there was no significant difference after more than 3 minutes of stretching[19], this study applied 2 minutes of stretching. Previous studies have shown that muscle length is significantly increased after 2 minutes of stretching. However, there was no difference between stretching for more than three minutes. Therefore, in this study, stretching was applied for 2 minutes. As a result, all the subjects had significantly reduced U-shape angle after the intervention.

Muscle-strengthening exercise and a warm-down program for 10 weeks (3 days/week) showed that muscle strength at the area of damage improved. However, it was found that there was no relationship between increased muscle strength and muscle tone[20]. The effects of muscle strength in groups with various ankylosis were investigated[21]. As a result, muscle training has been reported to increase muscle strength without an increase in ankylosis. In addition, it has been reported that there is no significant relationship between muscle strength and ankylosis in both agonist and antagonist muscles[18,22]. Muscle-strengthening exercise can increase or decrease the weight in various degrees during each body part exercise and also diversify the exercising areas, thereby strengthening the muscles of the damaged parts against gradual resistance, enhancing flexibility, and effectively contributing to the stabilization of the spine[23]. Muscle-strengthening exercises can be performed in a variety of ways, effectively contributing to increased muscle strength, improved flexibility, and stabilization of the spine[23]. This training program is considered to be able to contribute effectively to increasing muscle strength without an increase in ankylosis[9].

According to the results of this study, both the stretching group and the stretching combined exercise group showed a decrease in U-shape angle after the intervention (2.81, 3.46, respectively). This indicates an increase in the length of the muscle and degree of flexibility. This means that both interventions are effective in reducing the U-shape angle. Previous studies have shown that complex exercises are more effective for increasing aerobic capacity, endurance, flexibility, balance, and muscle strength than when performing one exercise[24,25]. In this study, performing additional muscle strength exercises during stretching may be considered to have no effect on the stretching effect. Therefore, additional strengthening is more effective than stretching alone to increase flexibility and muscle strength.

There are some limitations in this study. First, the intervention period of 3 weeks was relatively short. Second, because it was conducted for healthy young adults, it did not reflect the effects of various ages. Third, muscle strength was not measured. Fourth, there was difficulty in controlling each subject's individual life pattern. In further studies, it is necessary to find effective stretching 0s by applying interventions for a longer period of time. Further research is needed to find effective stretches at various ages. Also, a longer period of intervention should be performed.

Conclusion

In this study, the effect of stretching and stretching combined exercise on the change of U-shape angle of gastrocnemius was investigated. Both showed a significant increase in the U-shape angle, which means an increase in flexibility. However, there were no significant differences between the two interventions. In conclusion, additional muscle-strengthening did not affect the stretching effect of the gastrocnemius. Therefore, additional strengthening should be considered during stretching to increase muscle strength and flexibility.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Antioxidant and Whitening activity of Korean Mistletoe (*Viscum album Coloratum*) Extract

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Abstract

Background/Objectives: The purpose of the act was to verify the operability of the Korean Mistletoe extract as a functional material through antioxidant activity, cell toxicity in B16F10 melanoma cells, melanin production inhibiting function, and tyrosinase inhibiting effect.

Methods/Statistical analysis: After extracting the Korean mistletoe with 70% ethanol, the total polyphenol content, total flavonoid content, DPPH radical Scavenging Activity, cell toxicity in B16F10 melanoma cells, melanin production inhibitory and tyrosinase activity were measured.

Findings: The Korean Mistletoe extract was found to contain total polyphenols and total flavonoids, which are concentration-dependent. The excellent DPPH Radical Scavenging Activity effect was identified. the effect of tyrosinase in vitro was checked. No cell toxicity in B16F10 melanoma cells was present, and melanin production inhibits were identified.

Improvements/Applications: As the active antioxidant effect was confirmed through various methods of Korean mistletoe extract and whitening effect due to excellent antioxidant activity, it is believed that it may be a functional material.

Keywords: *Antioxidant, B16F10 Melanoma cell, DPPH, Korean Mistletoe, ROS, Tyrosinase*

Introduction

Reactive Oxygen Species (ROS) are formed continuously by several factors in the cell apoptosis process[1]. ROSs that are common in life include superoxide radical (O2-), hydroxyradical (OH-), hydrogenperoxide (H_2O_2), nitricoxide (NO). It is known to be deeply involved in the carcinogenesis process of forming cancer cells, as the protein lipid component of the cell is damaged by the increased formation in vivo, degraded by the damage to the intracellular constituent protein lipid content, and damaging the DNA in the cell[2]. In particular, it produces a rapid oxidation reaction with each component in the body, which degrades the function of the body, attacks normal cells, causes cancer, and causes organ necrosis[3]. It also promotes various diseases and aging by causing oxidative damage[4]. Several prior studies have shown that cell damage from the production of ROS is one of the most widely applied causes of aging[5]. Despite the antioxidant enzymes and vitamins C, E, and glutathione as a defense mechanism for free radicals, there are reports of aging due to increased in vivo attacks and decreased defense of free radicals, including age[6]. therefore, there is an increasing interest in natural antioxidants derived from vegetables, fruits, etc., which have the effect of increasing the in vivo antioxidant defense system or eliminating harmful free radicals[7]. Natural antioxidants are in the spotlight because they are known to have high stability and no side effects, but their antioxidant activity has been found to be lower than that of synthetic antioxidants. So the synthetic antioxidants, Butylated Hydroxy Anisole (BHA) and Butylated Hydroxy Toluene (BHT),

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were developed. However, problems with synthetic antioxidants are raised in safety issues, such as toxicity and carcinogen in the body, and reported results that cause mutation in biotic enzymes and fat and cause diseases in the body due to toxicity[8], which is strictly regulated by law. As a result, the interest in natural antioxidants with strong antioxidants while retaining the benefits of natural antioxidants is increasing, and research on natural antioxidants is actively conducted.

The Korean Mistletoe (*Viscum album Coloratum*) is a parasitic tree in Quercus, Celtis sinensis Persoon, Castanea crenata and Betula platyphylla trees. In Europe, anti-cancer activity was already recognized in the 1920s and is used as a raw material for medicines and functional foods such as tumor treatment, high blood pressure and hardening of arteries[9,10]. Research began late in Korea compared to Europe. However, with the recognition of its potential as a natural material, various studies are actively being conducted. the Korean Mistletoe contains alkaloid, which has a relatively high level of anti-cancer activity[11]. It contains selectin, the main ingredient of mistletoe, indicating strong anti-cancer activity and strong activity, and reports that it is effective in immunity enhancement, anti-cancer activity and cytotoxicity. In addition to the selectin, flavonoid, alkaloid, and viscotexin are known as the physiological active ingredients of the mistletoe[12].

Therefore, in this study, the effect of activating antioxidant by using Korean Mistletoe extract and the effect of inhibiting tyrosinase activity in test tubes was verified. the purpose of the Act was to provide basic data on basic physiological activity characteristics research by examining the possibility of Korean Mistletoe extract as a safe and effective functional material.

Materials and Method

1.Total Polyphenol Compound Content Measurement

Dissolve the final concentration of the specimen in distilled water to 1, 2.5, 5 and 10 mg/mL in each tube to dilute 400μL of the diluted specimen and 400μL of the Folin-Ciocalteu's phenol element to react 3 min. then, after mixing 400μL of 10% Na_2CO_3 and reacting 60 min in the darkroom, a supernatant of 200μL was taken on 96 well plate to measure absorbency at 760 nm. Caffeic acid was used as a standard substance (R^2=0.9818).

2.Total FlavonoidCompound Content Measurement

Korean Mistletoe extract 100μL, 10% alum nitrate 20μL, 1 M potassium acetate 20μL, ethanol 860μL, and 100μL of distilled water so that the final concentration is 1, 2.5, 5 and 10mg/mL. Leave at room temperature for 40 min, and then sink the suspended solids with a centrifuge for 200mL. Qercetin was used as areference material (R^2=0.988).

3.DPPH Radical Scavenging Activity

Radical degeneration of the Korean Mistletoe extract was measured using the Blois (1958) method[13]. After diluting the specimen with distilled water to the final concentration of 1, 2.5, 5 and 10 mg/mL, a mixture of 180μL of a 10 mM DPPH solution dissolved in 99% ethanol in 96 well plate and 20μL of a specimen solution was mixed to react 30 min at 37°C and then absorbency at 517 nm. Ascorbic acid was used as a reference material.

4.In vitro Tyrosinase Active Inhibitor Measurement

L-DOPA was used to check the tyrosinase active inhibitor effects of Korean Mistletoe extract. 25 mM L-DOPA dissolved in potassium phosphate buffer (0.5 M, pH 6.8) and 3000 units/mL of M-tyrosianse were prepared. After reacting 30 min at 37°C with diluted samples, tyrosinase, and L-DOPA, the absorbency was measured at 475 nm. A positive control used an extract of the Morus alba L.

5.Cell Survival rate Measurement

The cells 3×10^4 cells/well per well were attached to the 96 well plate to the incubator for 24 h. After 24 h, the specimen was treated by concentration and incubated at 37°C for 48 h. After 48 h, incubated for 3 h in 1% NR solution, and then processed 20 min of phosphate buffered saline (PBS) with 10% formaldehyde solution into each well. NR desorb solution was added to each well to extract NR in the cell and absorbance was measured at 540 nm using microplate reader (Synergy HT; BioTek Instruments, USA).

6.Melanin producing inhibitor Measurement

96 Attach 2×10^3 cells/well per well to the incubator for 24 h. After 24 h, it was replaced with α-MSH, which was treated at a concentration of 5% FBS and 100 nM and then the Korean Mistletoe extract was diluted for

each concentration to grow 72 h. the amount of melanin secreted in the well plate was measured at 405 nm using a microplate reader. 100 μg/mL of arbutin was used as a positive control.

7.Statistical Processing

Statistical processing was analyzed using the SPSS Window Version 17.0 (IBM, USA).

Result and Discussion

1.Total Polyphenol Content Results

Polyphenol-based substances are aromatic compounds with two or more phenolic hydroxyl (-OH) machines within a molecule that easily bind with proteins and giant molecules. the phenol compound, among other activities, has a function to suppress oxidation by giving hydrogen to alkylperoxy radical, alkyl radiated, and thus shows strong antioxidant activity[14,15].

In this study, the total polyphenol content was measured by diluting the Korean Mistletoe extract to a concentration of 1, 2.5, 5 and 10 mg/mL, and then using the caffeic acid as a standard curve. the results are shown in Figure 1. the test found that the total polyphenol content of the Korean Mistletoe extract was 22.77, 58.94, 99.39, 148.97 mg/g, which is high. the relationship between total polyphenol content and antioxidant activity is known to be largely correlated.

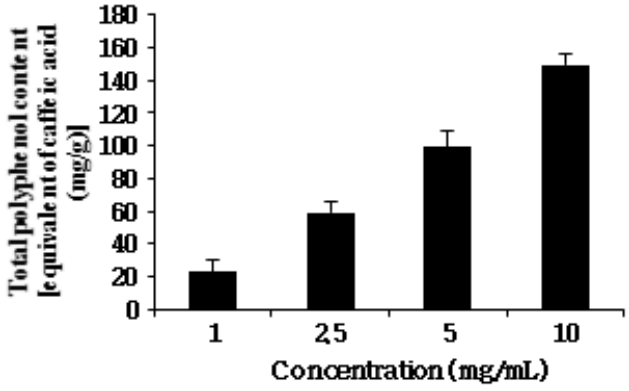


Figure 1. Total Polyphenol Contents of Korean Mistletoe Extract. It was confirmed that the total polyphenols content of the Korean mistletoe extract increased as the concentration increased.

2.Total Flavonoids Content Results

Flavonoids are phenolic compounds with the structure of C6-C3-C6 as the basic skeleton and benzø-pyrone. It collectively refers to about 4,000 compounds that make up the yellow of fruits or vegetables[16]. Flavonoids are mainly found in plant or plant-based foods and are a physiological active substance with various functionalities such as anti-oxidation, anti-cancer, anti-inflammatory, anti-bacterial, cholesterol-lowering, and breast cancer incidence[17]. In this study, the total flavonoid content was measured by diluting the Korean Mistletoe extract to a concentration of 1, 2.5, 5 and 10 mg/mL, and quercetin as a standard curve. the results are shown in Figure 2. the results showed that the total flavonoid content of the Korean Mistletoe extract was 8.3, 20.54, 38.96 and 76.48 mg/g. the total flavonoid content increased in concentration.

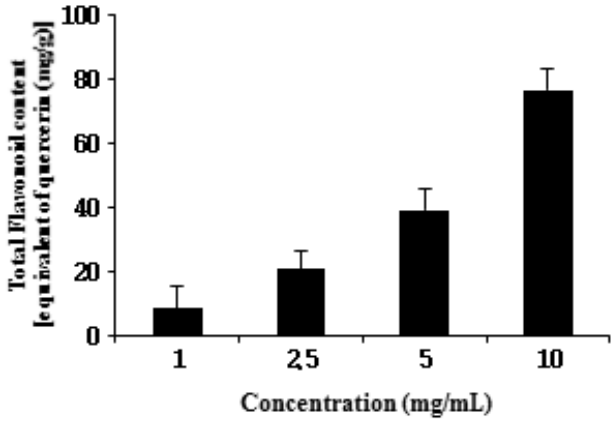


Figure 2. Total Flavonoid Contents of Korean Mistletoe Extract. It was confirmed that the total flavonoids content of the Korean mistletoe extract increased as the concentration increased.

3.DPPH Radical Scavenging Activity Results

In this study, the Korean Mistletoe extract was diluted to a concentration of 1, 2.5, 5 and 10 mg/mL to measure the DPPH radical scavenging. The results are shown in Figure 3. A DPPH radical scavenging of 95.9% was identified at a concentration of 1 mg/mL of the positive control Ascorbic acid. Korean Mistletoe extract were 49.93, 51.79, 59.78 and 70.73% confirming high DPPH radical scavenging. the previous study also reported the highest activity in 70% ethanol extract compared to 85.6% of L-ascorbic acid activity at a concentration of 1 mg/mL used as a positive control. It is also reported that an increase in the addition of mistletoe significantly increases the DPPH radical scavenging, which increases the antioxidant capacity[18].In addition, among the various antioxidants of mistletoe, the results were found to be relatively effective in the activity of radical erasing rather than lipid acid suppression. This study also confirmed that the mistletoe extract has a high antioxidant effect on ethanol extract. Several studies have identified the active effect of high DPPH radical

scavenging of Korean Mistletoe extract.

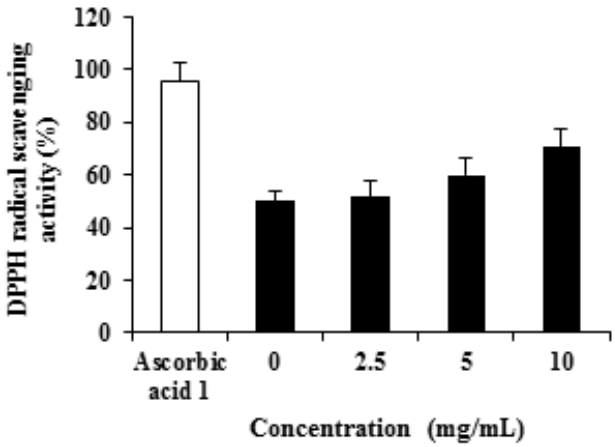


Figure 3. The DPPH radical Scavenging Activity of Korean Mistletoe Extract. Korean Mistletoe extracts showed more than 70% DPPH Radical Scavenging Activity at a concentration of 10 mg/mL.

4.In vitro Tyrosinase Active Inhibitor Measurement Results

Tyrosinase is an enzyme that plays an important role in melanin synthesis. Tyrosinase with tyrosine hyperxylate activity to switch to DOPA and DOPA osidase activity to oxidize DOPA into DOPA quinone is an enzyme involved in early reaction, a speed determination phase, in the melanin synthesis process[19].In this study, the effect of tyrosinase activity inhibition was measured using L-DOPA to dilute the Korean Mistletoe extract to a concentration of 1, 2.5, 5 and 10 mg/mL to determine if it affects tyrosinase activity in a test tube. the results are shown in Figure 4. the positive control was measured using a *Morue alba* L. extract known to be of good tyrosinase inhibitory activity. the results of the experiment showed that the effect of suppressing the activity of tyrosinase in vitro of Korean Mistletoe was 29.85, 28.13, 35.59, 41.04% of the Korean Mistletoe extract compared to Control 100%. In particular, significant tyrosinase-active inhibitory effects were identified at concentrations of 5 to 10 mg/mL ($p<.01$, $p<001$). the positive control, *Morue alba* L. extract, was identified as an active inhibitor effect of 29.85, 39.75, 49.93, and 54.09%, and the significant tyrosinase inhibitor effect was identified at concentrations of 2.5, 5 and 10 mg/mL. the *Morue alba* L. extract known to be excellent inhibition of tyrosinase activity and the Korean Mistletoe extract were found to have similar levels of active inhibitory effect. the Korean Mistletoe extract is believed to have an important adjustment step in the melanin synthesis process.

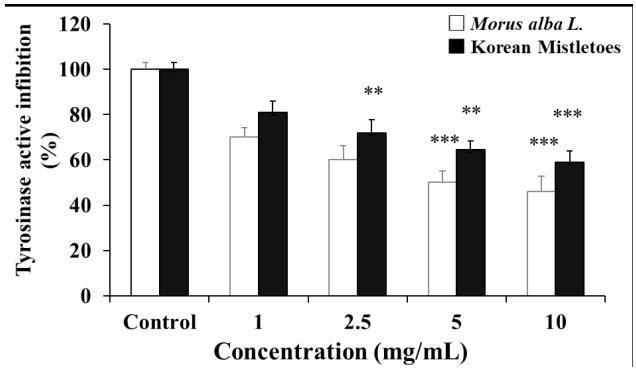


Figure 4. Effect of Korean Mistletoe Extract on Tyrosinase Inhibitor Activity. The Korean Mistletoe extract showed similar levels of tyrosinase inhibition to *Morue alba* L. extract, a positive control group.

5.Results of Survival rate in B16F10 Melanoma cell

The Korean Mistletoe extract was recognized for cell survival rate in the B16F10 melanoma cell, which produces melanin. the results are shown in Figure 5. Experiments have shown little cell toxicity to B16F10 melanoma cell.

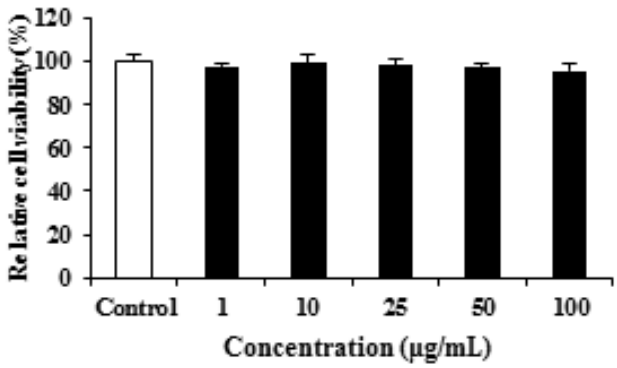


Figure 5. Cell Survival rate of Korean Mistletoe extract. The Korean Mistletoe extract has not been confirmed to be cell toxicity in B16F10 melanoma cells.

6.Melanin production inhibitor results

The results of a test of melanin biosynthesis in Korean Mistletoe extract were shown in Figure 6. It increased melanin production by processing a-MSH, which is known to promote melanin production compared to control. In the experiment, the positive control, albutin, decreased statistically significantly at 100 μg/mL concentrations ($p<0.001$). the concentration - dependent reduction effect of the Korean Mistletoe extract used in this experiment was identified. these results confirmed that the Korean Mistletoe extract used in this study directly affects the melanin biosynthesis process, and confirmed its potential for use as a substance that has little toxicity to cells and safely inhibits melanin

production.

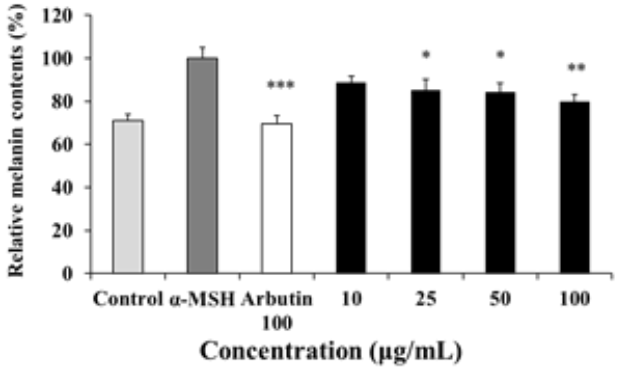


Figure 6. Effect of Melanin Production Inhibitor of Korean Mistletoe extract. The Korean Mistletoe extract showed the effect of controlling melanin production as concentration increased in B16F10 melanoma cells.

Conclusion

In this study, we tried to examine the effect of inhibiting tyrosinase activity, which indicates antioxidant activity, cytotoxicity, and whitening effect after extracting it with 70% ethanol using extracts from Korea. As a natural material, it was intended to provide basic data on basic physiological activation characteristics of Korean Mistletoe extract. In the experiment, the total polyphenol and total flavonoid content known to be an indicator of antioxidant activity were examined to confirm the concentration-dependent content. In particular, high content of 148.97 mg/g and 76.48 mg/g were identified at a concentration of 10 mg/mL of total polyphenols and total flavonoids. In the DPPH radical scavenging activity, the positive control ascorbic acid 95.9% and 49.93 were identified at a concentration of 1 mg/mL, and the concentration-dependent DPPH Radical Erasing activity was confirmed. these results confirmed that the total polyphenols and total flavonoids containing high extracts of Korean Mistletoe are active in decaying DPPH radical. To check whitening activity, the effect of suppressing the tyrosinase activity in the test tube was found to be 41.04% of the Korean Mistletoe extract and 54.09% of the epithelium extract compared to Control 100% at the concentration of 10 mg/mL. In summing up these results, the anti-oxidant activation effect of the Korean Mistletoe extract was verified through various experiments, and the excellent whitening activity effect was confirmed through the suppression of tyrosinase activity by inhibiting oxidation. Therefore, Korean Mistletoe extract is a natural material that can be used as a material with excellent antioxidant and whitening effects.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Heavy Metal Inspection of Essential Oils for Aromatherapy

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Abstract

Background/Objectives: 14 kinds of essential oils used for the analysis of heavy metals were selected from 3~5% pure grade aromatherapy essential oils.

Methods/Statistical analysis: As a selection criterion, the sample was divided into top note, middle note, and base note classified to be volatilized into the air. An amount of 0.2g of the selected analytical sample was taken and put into each sterile case to perform the experiment.

Findings: The results of the analysis of heavy metals (Antimony, Arsenic, Cadmium, Chromium, Copper, Iron, Lead, Magnesium, Nickel, Titanium, Zinc) on 14 kinds of essential oils were showed no Antimony, Arsenic, Cadmium, Zinc, Chromium, Copper, Nickel, Lead, Titanium and Barium in the top notes, middle notes and base notes. It is shown to be harmless to the human body.

Improvements/Applications: The purity of essential oils greatly affects the therapeutic value. Therefore, there is a need for regulations that identify the stages of purity, quality testing, manufacturing processes, sourcing, etc. of essential oils according to specified standards by international organizations.

Keywords: *Essential oil, Heavy metal, Aromatherapy, Top note, Middle note, Base note.*

Introduction

Numerous chemicals have been handled in the modern society due to the advancement of industrialization resulting in the spread of heavy metals in the soil, water, and air [1]. The spread of heavy metals in the modern society caused the increase of the plants detected with heavy metals in multiple areas in the world due to the limitation of their self-purification capacity which could absorb some extent of heavy metals [2]. Herbs among medicinally cultivated plants which affect the human health significantly can be polluted by heavy metals in a easiest way with polluted soil, water, air, and pesticides, herbicides, and so on that are used in the cultivation process [3]. If they are absorbed into the human body by intake of plants grown by this or administration, metal elements such as Aluminum, Lead, mercury, Cadmium, Arsenic, Chrome, and so on could affect the body negatively even with low concentration[3,4].

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In addition, unexcreted heavy metals with dangerous level remain in the body over years or decades to inhibit the normal function of the body as well as to affect the central nerve system, liver, lung, heart, kidney, and so on implicating fatal risk factors to cause chronic or acute diseases, therefore, consumers' distrust on the herbs and foods has been raised more and more [5]. Especially, aromatherapy which is an integrative medicine affects pulmonary system, digestive system, hormones, brain, and so on, upon application into the body such as lung, blood, and so on by diffusion, absorption, skin contact and so on using volatile high-concentrate essential oil extracted from the roots, stems, leaves, and fruits of natural plants [6]. Essential oil is eliminated completely by breathing, sweat, urine, and so on after passing liver or kidney in 3 to 9 hours from application, however, stability should be secured first since the treatment process of essential oil to be administered into the body for the application of aromatherapy [1,7].

Therapeutic properties of essential oil are determined by its active ingredients based on the conditions such as soil status of each plant, accurate altitude, and so on,

hence, clear international regulations are required on GC/MS, HPLC, sensory test, chirality, C-14, optical rotation and refractive index, certain gravity and microorganism test, and quality test [7,8].

However, 'therapeutic grades' are sometimes used for the marketing purposes that show the grades of oils certified from the institutions using standardized quality mediatory variances. International Organization for Standardization (ISO), which is an non-governmental organization founded in 1947, defined essential oil as the thing to be physically separated from water after mechanical processing of water, vapor, rind of tangerines or dry distillation of natural substances. Standardization of quality grades for essential oils were suggested by Fragrance Materials Association (FMA) and Association Française de Normalisation (AFNOR), while clear guideline on the heavy metal tests had not been established for the standards of quality differentiations [4,8,9]. For safe application of aromatherapy, it should be urgently prepared for the analysis of heavy metal contamination in the essential oils and supplementation of the systems on the clear standardization and grades to prevent from introduction of harmful chemicals in the processes of essential oil cultivation and its extraction.

Hence, this study aims to secure the scientific safety of essential oils which are used in aromatherapy by heavy metal analysis and to contribute the expansion of qualitative medical service with aromatherapy that can be safe pharmacologically and assist to save the medical cost upon providing data to the development of international standardization process for the quality grades of essential oils.

Method

In this study, 14 kinds of essential oils used for the analysis of heavy metals were selected from 3~5% pure grade aromatherapy essential oils. As a selection criterion, the sample was divided into top not(grapefruit-citrus paradise,eucalyptus-eucalyptus globulus,lemongrass-cymbopogon flexuosus, clove bud-eugenia caryophyllata, Petitgrain-citrus aurantium), middle note(lavender-lavandula angustifolia, ylang-ylang-cananga odorata, marjoram-thymus mastichina, geranium-petargonium graveolens, rosemary-rosmarinus officianlis), and base note(vetive-vetiveria zizanoides, sandalwood-santalum album) classified to be volatilized into the air. An amount of 0.2g of the selected analytical sample was taken and put into each sterile case to perform the experiment .

1. Experiment analysis equipment

ICP/wnd (Perkinelmer, Optima 5300 DV) was used in heavy metal analysis in this experiment.

-Type: ICP Optical Emission Spectrometer (ICP-OES)

- Brand: Perkin Elmer/ PE

- Model: Optima 5300 DV ICP-OES

- Usage: heavy metal analysis

2. Sample and reagent treatment method

In order to quantify the heavy metals contained in the essential oils, Antimony and Arsenic as the semimetal group elements, Cadmium and Zinc as the Zinc group elements, Chromium as the Chromium group element, Copper as the Monetary metal element, Iron and Nickel as the Iron group element, and Platinum group elements Twelve kinds of heavy metals such as Pb, Al, Titanium and Alkaline Earth elements, Barium and Magnesium, were detected twice and averaged[Table 1][Table 2][Table 3].

Table 1. Experimental process

Approximately 0.2 g of sample is placed in a survey 50 mL microwave digestion vessel.
HNO310mL
Start the microwave decomposition program. 1. Power : 1800W, ℃ : 180℃ Time: 20min heating. 2. Power : 1800W, ℃: 180℃ Time: 20minmaintain. 3. 20min cooling.
After cooling, place into 50mL volumetric flask and fill with purified water until mark.
No sample is added. Repeat the above procedure to prepare a blank test solution.
Measure with ICP-OES.

Table 2. Operational conditions of ICP-OES

Operational conditions of ICP-OES	
Parameter	Operational Conditions
Plasma gas flow	18L/min
Auxiliary gas flow	1.6L/min
Nebulizer gas flow	0.5L/min
RF power	1450watts
Viewing height	15mm
Plasma view	Axial
Read delay	90 seconds
Read parameters	Min 0.5 and max 2.0s
Peristaltic pump flow rate	1.0mL/min
Processing	Peak area
Calibration	6point
Spray Chamber	Baffled cyclonic
Nebulizer	MIRA Mist
Injector	Alumina 1.2 mm i.d.
Sample tubing	Solvent flex(0.76mm)
Drain tubing	Solvent flex(1.14mm)

Table 3. Measurement wavelength of element

Element	Measurement wavelength(nm)
Sb	206.836
As	188.979
Cd	228.802
Cr	267.716
Cu	327.393
Fe	238.204
Pb	220.353
Mg	285.213
Ni	231.604
Ti	334.94
Zn	206.2
Al	396.153
Ba	233.527

Result

The results of the analysis of heavy metals (Antimony, Arsenic, Cadmium, Chromium, Copper, Iron, Lead, Magnesium, Nickel, Titanium, Zinc) on 14 kinds of essential oils were as follow

1. Top note of essential oil.

Lemons, Grapefruits and Lemongrass in the top notes essential oil showed Antimony, Arsenic, Cadmium, Copper, Nickel, Titanium, Zinc, Aluminum, Barium and Lead less than 10 (mg / kg), and Iron was Grapefruits 39 (mg / kg), Eucalyptus 66 (mg / kg), Lemongrass 41 (mg / kg), Clove 51.5 (mg / kg), Petitgrain 51.5 (mg / kg) and Magnesium are Grapefruits 41.75 (mg / kg)), Eucalyptus 70.5 (mg / kg), Lemongrass 38.5 (mg / kg), Clove 80.5 (mg / kg), and Petitgrain 71 (mg / kg), respectively [Table 4].

Table 4. Top note of essential oil

Name of element	Kinds of essentials				
	Grapefruit	Eucalyptus	Lemon grass	Clove	Petitgr-ain
Sb	< 10	< 10	< 10	< 10	< 10
As	< 10	< 10	< 10	< 10	< 10
Cd	< 10	< 10	< 10	< 10	< 10
Cr	< 10	< 10	< 10	< 10	< 10
Cu	< 10	< 10	< 10	< 10	< 10
Fe	39	66	41	51.5	51.5
Pb	< 10	< 10	< 10	< 10	< 10
Mg	41.75	70.5	38.5	80.5	71
Ni	< 10	< 10	< 10	< 10	< 10
Ti	< 10	< 10	< 10	< 10	< 10
Zn	< 10	< 10	< 10	< 10	< 10
Al	< 10	< 10	< 10	< 10	< 10
Ba	< 10	< 10	< 10	< 10	< 10

2. Middle note of essential oil

Lavender, Ylang-ylang, Marjoram, Geranium, and Rosemary belonging to the middle notes essential oil showed Antimony, Arsenic, Cadmium, Copper, Nnickel, Titanium, Zinc, Aluminum, Barium, and Lead less than 10 (mg / kg). Iron was Lavender 51.21 (mg / kg), Ylang-ylang 21.8 (mg / kg), Marjoram 42.01 (mg / kg), Geranium 25.84 (mg / kg), Rosemary 59 (mg / kg) was detected, Magnesium was Lavender 234.5 (Mg / kg), Ylang-ylang 47 (mg / kg), Marjoram 29.65 (mg / kg), Geranium 46.12 (mg / kg), and Rosemary 36 (mg / kg) were detected [Table 5].

Table 5. Middle note of essential oil

Name of element	Kinds of essentials				
	Lavender	Ylang-ylang	Marjoram	Geranium	Rosemary
Sb	< 10	< 10	< 10	< 10	< 10
As	< 10	< 10	< 10	< 10	< 10
Cd	< 10	< 10	< 10	< 10	< 10
Cr	< 10	< 10	< 10	< 10	< 10
Cu	< 10	< 10	< 10	< 10	< 10
Fe	51.21	21.8	42.01	25.84	59
Pb	< 10	< 10	< 10	< 10	< 10
Mg	234.5	47	29.65	46.12	36
Ni	< 10	< 10	< 10	< 10	< 10
Ti	< 10	< 10	< 10	< 10	< 10
Zn	< 10	< 10	< 10	< 10	< 10
Al	< 10	< 10	< 10	< 10	< 10
Ba	< 10	< 10	< 10	< 10	< 10

3. Base note of essential oil

Vetiver, Sandalwood, Patchouil, and Cedarwood were included in the base notes of essential oil. Iron was Vetiver 30.5 (mg / kg), Sandalwood 58.43 (mg / kg), Patchouil 58.5 (mg / kg), Cedarwood 44.28 (mg / kg) were detected, and Magnesium is Vetiver 65 (mg / kg), Sandal Wood 83.5 (mg / kg), Patchouil 43.5 (mg / kg), Cedarwood 61.45 (mg / kg) were detected [Table 6].

Table 6. Base note of essential oil

Name of element	Kinds of essentials			
	Vetiver	Sandal wood	Patchouil	Cedarwood
Sb	< 10	< 10	< 10	< 10
As	< 10	< 10	< 10	< 10
Cd	< 10	< 10	< 10	< 10
Cr	< 10	< 10	< 10	< 10

Cont... **Table 6. Base note of essential oil**

Cu	< 10	< 10	< 10	< 10
Fe	30.5	58.43	58.5	44.28
Pb	< 10	< 10	< 10	< 10
Mg	65	83.5	43.5	61.45
Ni	< 10	< 10	< 10	< 10
Ti	< 10	< 10	< 10	< 10
Zn	< 10	< 10	< 10	< 10
Al	< 10	< 10	< 10	< 10
Ba	< 10	< 10	< 10	< 10

Discussion

Upon the results of heavy metal tests with essential oils, Antimony, Arsenic, Cadmium, Zinc, Chrome, Copper, Nickel, Lead, Titanium, and Barium were not detected in top, middle, and base notes, while Iron, Magnesium, and Aluminum were detected with small quantity which was the level of harmless to the human body. To be used as the therapeutic grades, essential oils should not contain any artificial ingredient, however, it is almost impossible practically not to be applied and accumulated with pesticides and chemicals in the processes of cultivation and harvest in the modern society [9]. World Health Organization reported the concentrations of cadmium and lead were 0.3ppm and 10ppm, respectively, in the dried plants which were used for raw materials of medicines, which reached the maximum allowable limits of toxic metals [10]. Despite minute quantity, toxic heavy metals may affect the functions of central nerve system, cardiovascular and digestive systems, lung, kidney, liver, endocrinological system and bones, negatively causing skin diseases, pediatric intellectual disability, adult dementia, insomnia, CNS disorders, neurological disorders, organ damages, renal diseases, liver diseases, brain damage, motor neuron disorder, atherosclerosis, cardiovascular diseases, and so on. In particular, toxic heavy metals such as mercury, lead, cadmium, arsenic, and so on may be harmful to the health in case of chronic exposure resulting in the increase of risks for multiple degenerative diseases and cancers [11,12]. Since essential oils are applied locally by respiration, diffusion, and skin, damaged or contaminated essential oils by synthetic chemicals may affect the physical and mental health badly [9,13]. Therefore, to enhance the quality value and sustain the purity of essential oils, strict international regulations are required to open not only for soil, climate, quality of seeds, distillation, harvesting and storage processes which can cause the changes of quality, but also the chemicals, cultivation and harvesting processes without pesticides, distillation process, and distribution process [14].

Conclusion

Upon the results of heavy metal tests with essential oils, Antimony, Arsenic, Cadmium, Zinc, Chrome, Copper, Nickel, Lead, Titanium, and Barium were not detected in top, middle, and base notes, whileIron, Magnesium, and Aluminum were detected with small quantity which was the level of harmless to the human body. When essential oils are applied to the human body, their absorptions are very fast to be distributed in the whole body, hence, the influences of minimum amount of heavy metals are very significant. Thus, strong international standard regulations are required to check the steps of essential oils including purity, quality tests, manufacturing processes, sourcing, and so on to apply aromatherapy safely which has been widely introduced globally.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Effects of Training of Activities of Daily Livings on Occupational Performance and Motivation in People with Intellectual Disability using Day Care Center

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Abstract

Background/Objectives: The purpose was to investigate the effects of training for activities of daily living on the performance and motivation in the people with intellectual disability using day care center.

Methods/Statistical analysis: This study is AB design in single subject study design. Three people with intellectual disabilities were given individual occupational therapy twice a week for 30 minutes, for a total of 6weeks. The occupational therapists conducted daily life activities training centered on the occupation that selected the caregiver through Canadian Occupational Performance Measure. The quality of the task performance was evaluated by Performance Quality Rating Scale (PQRS), and the level of effort and motivation during the activity was evaluated by the Pittsburgh Rehabilitation Participation Scale (PRPS).

Findings: Three adults with intellectual disability improved performance of activities of daily livings and motivation and effort level after ADL training.

Improvements/Applications: It should be evidence on effects of ADL training onoccupational performance and motivation level.

Keywords: *Activities of daily living, Day care center, Intellectual disability, Occupational therapy, Single subject design*

Introduction

Many adults with intellectual disability (ID) use day care centers and their rates are increasing [1]. Many studies have pointed out that people with ID do not receive professional services that meet their needs [2]. Adults with Mild to moderate ID can perform activities of daily living through continuous daily training, which requires continuous intervention and management. Research on occupational therapy has shown that lack of research on the effects of occupational therapy on independent activities of daily living (ADL) for adults with ID[3]. Previous study investigated the effects of occupational therapy interventions on ADL and perceptions of disability in six people with ID. Participants selected 2 daily life tasks for daily life training and developed intervention to solve problems [4]. Five of the six participants improved their quality of life activities after four weeks of intervention. Many studies have reported the effects of occupational therapy on children with ID, but the number of studies on adults with ID is insufficient. So, the purpose of this study was to investigate the effects of occupational therapy on ADL and level of motivation and effort for adults with ID.

Method

The participants of this study were 3 people with mild ID using day care center. Participant 1 (P1) was 23 years old man, participant 2 (P2) was 25 years old man, and participant 3 (P3) was 26 years old man. This study was conducted for about 2 months from October, 2018. At the preliminary stage, the researchers explained the purpose of the study to the caregivers and the subjects

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and agreed with them. The total number of assessments including baseline and intervention was 16 sessions. After the occupational therapist conducted the COPM with their caregivers, they set two activities with high importance but low performance and satisfaction as target activities. The target activities for P1 were to establish toilet training, to put on and take off the clothes for the toilet use, and the target activities for P2 were going alone to day care center from home and brushing the teeth himself. The target activities for P3 were buying some items in grocery store, and eating alone. This study is AB design in single subject study designs for 3 people with ID. The quality of performance of the two target activities was measured by PQRS and the evaluation of effort and motivation level was measured by PRPS. During the baseline period, a total of four times of assessment were performed until the data stabilized. The intervention period was a total of 12 sessions. Intervention was conducted for 30 minutes per session, twice a week for a total of 6 weeks, and PQRS and PRPS were conducted at every session.The intervention was based on the activities selected by conducting the COPM for the caregivers. Task adaptation, use of assistive devices (alarms, large ring on pants, etc.) and simplification of tasks (using credit cards instead of cash) and using environmental cue (using picture card, etc.) was conducted to improve performance of ADL. The main activity for P1 was to establish toilet training and to put on and take off the clothes for the toilet use. In order to use the independent toilet, which is the target activity of P1, we set the time for going tothe toilet during the day and kept it. Approximately the cycle was 2 hours. As soon as he arrived at the day care center, he was trained to go to the toilet at 10 pm, before 12 o'clock, and at 2 pm. The trousers were made to wear rubber banding pants so that they could easily put on and take off his pants. It continued in the order of holding and taking off the ring. The target activity for the participant 2 was going alone to day care center from home. The house and the center were 8 to 10 minutes on foot. It was familiar enough with the participants, but never without a caregiver. Participant was accompanied by a therapist fromthe center to the house, from home to the center, being instructed to go to the side the road to avoid the car. The therapist walked away from the participants slowly and continued until they did not feel anxiety. The other target activity for theparticipant 2 was brushing teeth independently. For P2 who refused to brush teeth, various mouth games were performed first. We first performed oral games such as blowing a balloon, blowing a pen, blowing a soap bubble, and reducing the sensitivity to contact with the mouth, and then introduced a weak powered toothbrush. Using a picture card, demonstration, and verbal instructions, the therapist instructed participants to brush their teeth in the order of the upper teeth molar, the upper teeth front teeth, the lower teeth molars, the lower front teeth, the palate, and the tongue. The target activity for the P3 was buying some items at supermarket, and eating alone. In order to achieve the first target activity, the therapist trained participant in order to create check a list of items to buy from the supermarket, to ask the clerk to look for items in the supermarket, to ask the clerk to look for items in the supermarket, and to pay by check card. After the intervention, he was able to purchase two or three items that were small and light. The target activity was to have dinner alone at home, but the activities were simplified for safety reasons, such as using a rice cooker or a gas range. They asked the caregiver to keep the rice and side dished for the participants in the lunch box. P3 took the lunch out of the fridge and ate it, then trained the empty lunch box to put it in the sink. COPM is a criterion-based measure of occupational performance and satisfaction. The score of COPM is from 1 to 10, and the higher the score, the higher the performance or satisfaction [5]. COPM is an evaluation tool that has high reliability and validity to measure performance and satisfaction on client centered occupation [6]. Quality of occupational performance was assessed by PQRS. PQRS is a simple tool to measure the quality of an individual's occupational performance through observations after the therapist has made operational definitions of the activities that the client has chosen. PQRS can be measured on a 10point scale from 1 point (cannot perform) to 10 points (can perform well). Test-retest reliability was 0.80 [7].Pittsburgh Rehabilitation Participation Scale (PRPS) was used to assess the level of effort and motivation during the activity. PRPS is an assessment tool for participation. The therapist is an assessment tool that monitors the subject's performance and gives a score on the level of effort and motivation during the activity. The score scale is a 5-point scale ranging from low (Poor: not participating in half of the session to a half or rejecting it) to excellent. Test-retest reliability was .91[8].

Result and Discussion

1. Change of Task Performance

The quality of performance of the target activities of

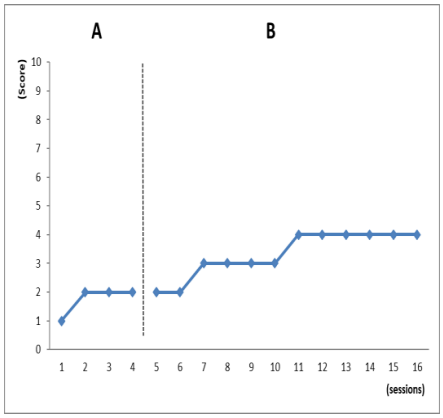
P1,2, and 3 was improved. PQRS of each subject is as follows. P1's baseline average score for Target activity 1was 2 points, and the average score was 3 points during the intervention period. The baseline average score for target activity 2 was 1, with an average score of 2.08 during the intervention period. The baseline average score for P2's target activity 1 was 1.75 and the average score during the intervention period was 3.33. The baseline average score for activity 1 was 1 point and the average score during the intervention period was 1.91. The baseline average score for target activity 1 of P3 was 1, and the mean score was 2.58 during the intervention period. The baseline average score for target activity 2 of P3 was 1.75 and the average score was 2.08 during the intervention period.

As shown Figure 1, the greatest improvement was going alone to day care center from home, which was the target activity of P2, and the buying of some items at the supermarket, which was the goal activity of P3. On the other hand, eating alone which was the goal activity of P3 showed the least improvement.

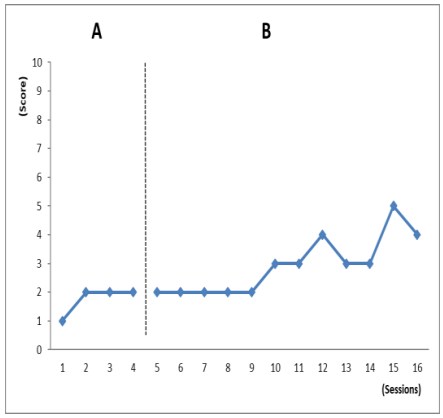
2.Change in level of effort and motivation

As shown Figure 2, during the intervention period, the level of effort and motivation of the participants' goal activities was improved than the baseline.

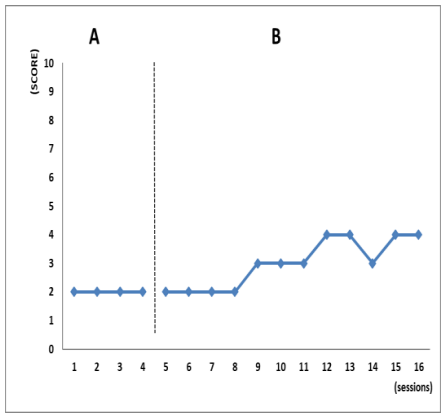
The PRPS scores for each participant were as follows. The baseline score for P1's target activity 1 was 3.25, improved to 4.08 during the intervention period, and the score for target activity 2 for P1 improved from an average of 1.75 points during the baseline to 2.58 during the intervention period. The baseline score for P2's target activity 1 was 1.75, improved to 2.91 during the intervention period, and the baseline score for P2's activity 2 increased from 2 points to 2.5 during the intervention period. The baseline score for target activity 1 of P3 was 1 point, the score during the intervention period was improved to 2.83, and the baseline score for target activity 2, which was 2 points, was improved to 3.75 during the intervention period. The activities that showed the greatest improvement were buying items at the supermarket which is the target activity of P3, and the activities which showed the least improvement were eating alone, which is the target activity of P2.

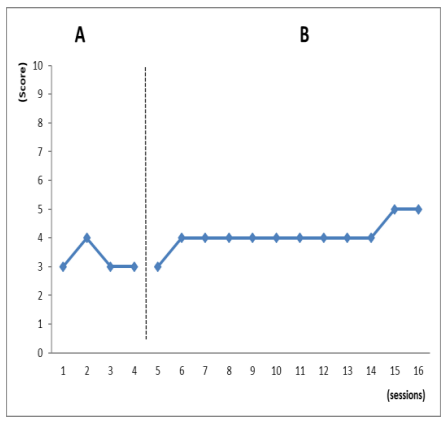


(a) Target activity 1 of P1

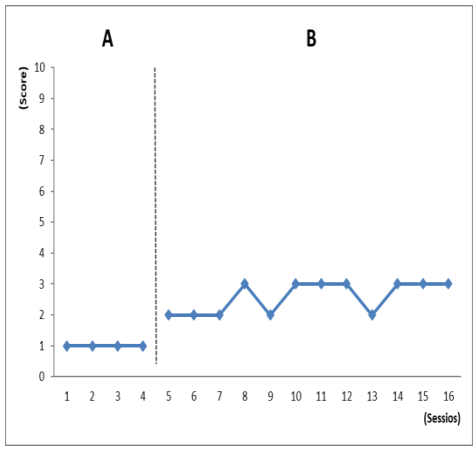


(b) Target activity 2 of P1

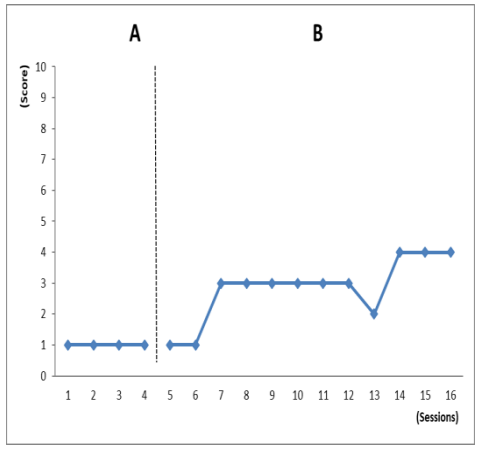




(c) Target activity 1 of P2



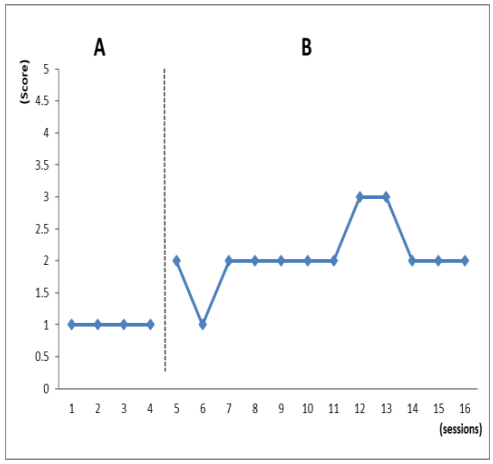
(d) Target activity 2 of P2



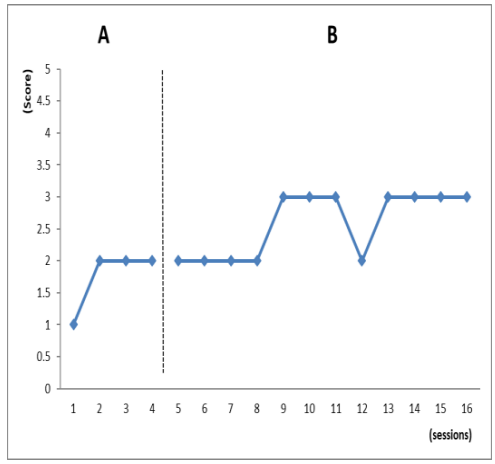
(e) Target activity 1 of P3

(f) Target activity 2 of P3

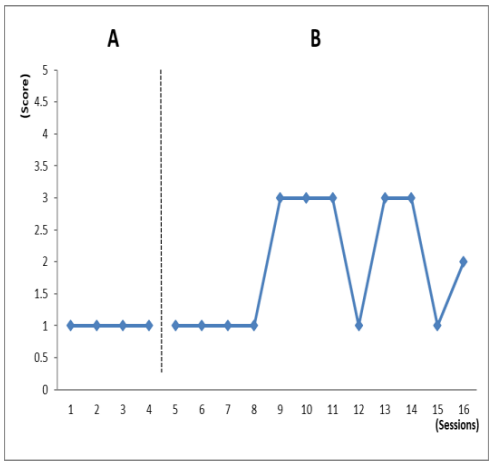
Figure 1. PQRS Scores



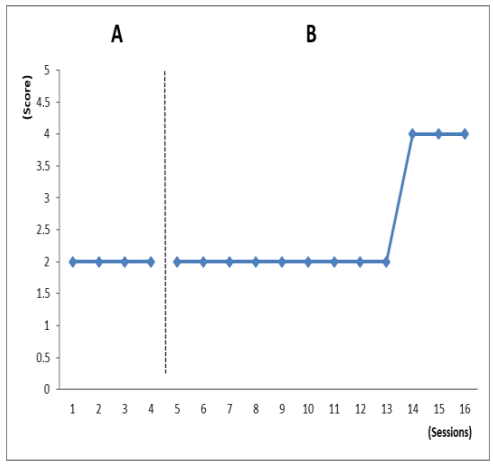
(a) Target activity 1 of P1



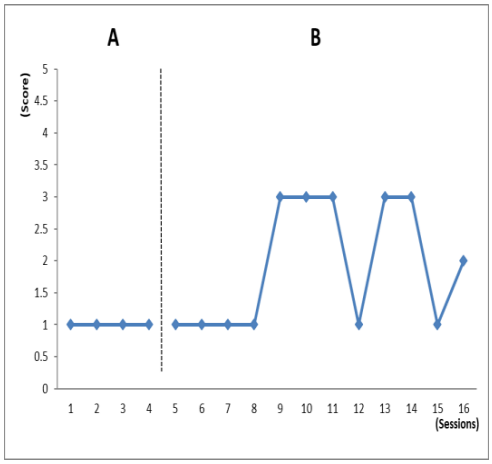
(b) Target activity 2 of P1



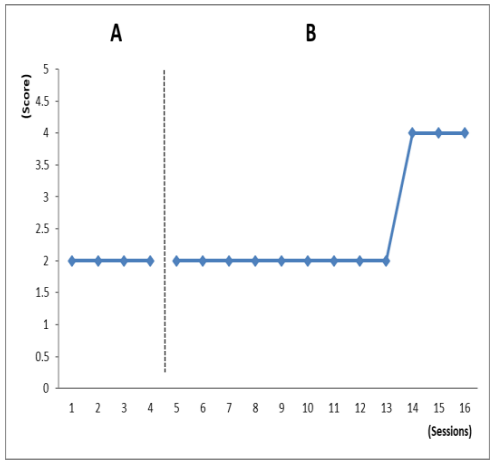
(c) Target activity 1 of P2



(d) Target activity 2 of P2



(c) Target activity 1 of P2



(d) Target activity 2 of P2

Figure 2. PRPS score

Discussion

People with ID must be provided with appropriate services for their life cycle. In particular, people with ID who have graduated from school and enter adulthood have a dramatically reduced chance for day services. A large number of adults with ID use day care, but they are more focused on getting care rather than providing personalized services. In study of day services for adults with ID in Ireland reported that the most noticeable change over the time from 2009 to 2014 is the increase in number of people attending care centers. The increase was largely accounted for by attendances who attends activation centers[9]. To achieve maximum independence through improved living skills, client centered occupation based occupational therapy is needed. So, the purpose of this study was to investigate the effects of client centered occupation based occupational therapy on task performance, motivation and effort level among three adults with ID using a day care center.

The target activities for P1 were to establish toilet training and to take off the pants for the toilet use, P2 were going alone to day care center and brushing the teeth himself. The activities for P3 were buying some items in grocery store, preparing and eating the dinner alone. Because the difficulty of each participant's target activity is different and individual characteristics, the effect was different. In particular, previous studies have reported that money management is a difficult skill for people with ID [10] [11], but in this study, the task performance, motivation and effort level of the purchase of goods related to money use were most improved.

In this study, P3 used a check card with a limited amount of money rather than paying directly with money. The goal of occupational therapy is to improve the performance of tasks that are meaningful and purposeful to the client [12]. To this end, environmental adjustment and compensation strategies are essential. Attaching loop on pants, using an electric toothbrushing, using alarm to remind time for toilet time, and using a lunch box were the same approaches.

Looking at the impact of client-centered occupational therapy on the performance, motivation, and level of effort of the three participants, going to the center which was target activity for P2, and purchasing items at supermarket which was target activity for P3 showed the highest improvements. The eating alone which was P3's target activity showed the lowest improvement. This was different from previous studies that personal care activities such as eating, dressing, and washing are generally easier to achieve than others [13]. This may be a result of reflecting the characteristics of the individual such as the will and motivation of the individual.

Even with ID, client-based occupational therapy is necessary because the level of ADL can vary according to various factors such as educational level, comorbid status, and environment[14]. One study reported that client-centered occupational therapy for three adults with ID improved treatment skills but did not improve motor skills and awareness of disability in all [3]. Another study[4] reported that the performance of ADL was improves by only five persons as a result of client-centered occupational therapy for six people with

intellectual disabilities.

In addition to the two previous studies, this study is also single-case design. Single case designs have been reported to be useful for examining clinical application. Although many studies have been conducted on children with ID, there is a lack of research on the effects of occupational therapy on adults with ID. It will be necessary to study the effect of occupational therapy on a large number of adults with ID.

CONCLUSION

Continuous intervention is needed to maximize the independence of ADL of people ID. Many people with ID at the day care center are not getting customized services. Three adults with intellectual disability received ADL training improved performance of activities of daily livings and motivation and effort level. ADL training was conducted with activities of high importance, low performance and satisfaction. This study will serve as a basis for providing training for ADL to people with ID using the day care center.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Evaluation of Accuracy of Stereotactic Body Radiotherapy Using 3D Moving Phantom

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Abstract

Background/Objectives: The objective of the present study was to use original data on respiration and tumor location coordinates saved during treatment period of patients who underwent body Radiotherpay to operate a 3D phantom for backward verification of the accuracy of stereotactic body radiotherapy.

Methods/Statistical analysis: The present study acquired original treatment data of 20 patients who underwent CyberKnife radiotherapy. Radiation was irradiated on the 3D phantom after applying external respiratory coordinates and tumor movement coordinate, which were original data from actual patients. The irradiated radiochemical film was scanned 24 hour later and assessment was made by γ-index values based on comparison of 2D dose distribution and radiotherapy plan.

Findings: The mean correlation error of entire treatment process of 20 patients was 1.26±073 (range: 0.47-1.98). The mean respiratory cycle of the patients during the entire treatment period was 3.77 sec (range: 1.90-5.39 sec). As an indicator of regularity of patient respiratory cycle, standard deviation of respiration during the entire treatment period was measured, the results of which showed minimum of 0.35 and maximum of 1.65. When the respiration and internal tumor movement of entire process after completion of treatment in 20 patients were applied to the 3D phantom for comparative analysis against the treatment plan, the mean pass rate of gamma-index values was 95.20±4.35% (range: 81.87% - 99.92%). Since the mean pass rate was ≥ 95%, accuracy of radiotherapy was confirmed by backward verification

Improvements/Applications: The significance of the present study can be found in the fact that it performed backward dose verification by reproducing respiratory and tumor coordinate after radiotherapy, using the same condition as before radiotherapy.

Keywords:*Stereotactic body radiotherapy, 3D moving phantom, γ-index value, CyberKnife, Respiratory cycle*

Introduction

According to 2017 data from Statistics Korea, cancer-related mortality accounts for 27.6% of all mortalities while showing an ever increasing trend. Along with the increase in the number of cancer patients, the role of radiotherapy has increased as well and effective radiotherapy would need to maximize the local tumor control rate by irradiating high radiation dose to the tumor while delivering minimum dose to surrounding normal organs. Currently, effectiveness of radiotherapy is being enhanced through application of various treatment techniques based on Image Guided Radiotherapy (IGRT), such as 3D Conformal Radiation Therapy(3D-CRT), Intensity Modulated Radiation Therapy(IMRT), Volumetric Arc Therapy(VMAT), Stereotactic Radiosurgery(SRS), and Stereotactic Body Radiation Therapy(SBRT) [1-4].

However, radiotherapy for tumor in parts of the body with significant amount of motion faces difficulties [1]with determining the target volume or predicting the exact location of the tumor. According to the ICRU Report 62, it is recommended that Planning Target Volume (PTV) be divided into Internal Margin(IM) and Setup Margin(SM) to be within the irradiation field

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with inclusion of all normal tissues within the range where movement of the organs is expected[5]. Moreover, American Association of Physicists in Medicine (AAPM) limits respiratory control or 4D-CT when tumor movement is ≥ 5 mm [6], while tumor control rate associated with radiotherapy is being improved by high-dose hypofractionated radiotherapy by 4D- radiotherapy, such as Respiratory Gated Radiotherapy(RGRT) and Cyberknife Synchrony that can compensate for moving organs due to respiration[7-9].

Calibration and pre-dose measurement of such complex and precise therapeutic techniques are very important processes, which are also essential processes for assuring accurate dose delivery, and International Commission of Radiological Units and Measurements(ICRU) recommends that the accuracy of radiation treatment dose should be within 5%. However, various variables, such as the condition of the patient, respiratory cycle, and treatment time, may cause the results in the actual treatment process to appear differently than the standardized pre-dose assessment results[10,11].

Accordingly, the objective of the present study was to use original data on respiration and tumor location coordinates saved during treatment period of patients who underwent body radiotherapy to operate a 3D phantom for backward verification of the accuracy of Stereotactic Body Radiotherapy(SBRT). The study also aimed to assess how variables, such as condition of the patient, respiratory cycle, and treatment time, are correlated with achieving accuracy of treatment[12].

Method

1. Subjects and acquisition of original data on tumor location coordinates

The present study acquired original treatment data of 20 patients who underwent CyberKnife radiotherapy (AccurayInc, Sunnyvale, CA).

Table 1. Information of patients who underwent SBRT

List		Pt (%)	Min	Max	Mean	SD
sex	M	9(45)				
	F	11(50)				
Site	Lung	10(50)				
	Liver	10(50)				
Age	30	2(10)				
	40	4(20)				
	50	7(35)				
	60	5(25)				
	70	2(10)				
			33	76	55.9	12.06
Tumor Volume(cc)			7.8	165.4	57.78	47.5
Total Dose(Gy)			36	60	48.05	7.85
Number of Beam			108	259	227	34.56
Treatment Time(min)			38	86	75.75	10.25
Total		20(100)				

[Table 1] shows the information about the patients who underwent SBRT, which included 10 patients with lung cancer and 10 patients with liver cancer. Their mean age was 55.9±12.06 years and there were 9 males and 11 females. The mean tumor volume (MTV) was 57.78±47.5 cc; mean prescribed dose (MPD) was 48.05±7.85 Gy; mean number of beams was 227±34.56; and mean treatment time was 75.75±10.25 sec.

The CyberKnife system employed in the present study uses an X-band linear accelerator to generate 6 MV X-ray with frequency of 9300 MHz. In addition, IGRT was performed using an orthogonal diagnostic X-ray generating device to calculate the tumor coordinates in real time by comparing to DRR images. The Synchrony respiratory tracking system is a system that delivers radiation to tumor in real time by 3D linear movement and prediction of tumor movement based on calculation of robot delay time by the movement tracking computer using modeling that simultaneously acquires external respiration (external marker) using LED and internal tumor movement (internal marker) using IGRT[13]. Among the original data of patients who completed SBRT, the present study saved and analyzed Markers. log files, representing external respiratory movement coordinates, and Modeler.log files, representing internal tumor movement. In addition, external respiratory coordinates and tumor coordinates were reproduced in the 3D phantom for irradiation applying the same conditions as the actual treatment for backward verification of 2D

dose assessment. Moreover, the deviation between the predicted spatial coordinates and actual internal tumor coordinates was assessed by correlation error, and as shown in Equation (1), it is calculated as square-root mean based on superior/inferior, left/right, and anterior/posterior deviations. Among the original data, MtsMain.log files were used to measure and analyze the correlation error for the entire treatment process.

$$\text{Correlation error} = \sqrt{(dev_{Sup-Inf})^2 + (dev_{Rt-Lt})^2 + (dev_{Ant-Post})^2} \quad \text{---- (1)}$$

2. Assessment of accuracy of SBRT using a 3D phantom

As shown in [Figure 1], the 3D phantom comprised 2 axes that independently reproduced movement coordinates of the external marker and movement coordinates of internal tumor. It was operated by transmitting log coordinates acquired every 0.1 s. For the assessment of dose accuracy, radiochemical film (Gafchromic EBT, Wayne NJ, USA) was inserted into a cube-shaped body sized 63.4 mm^3.

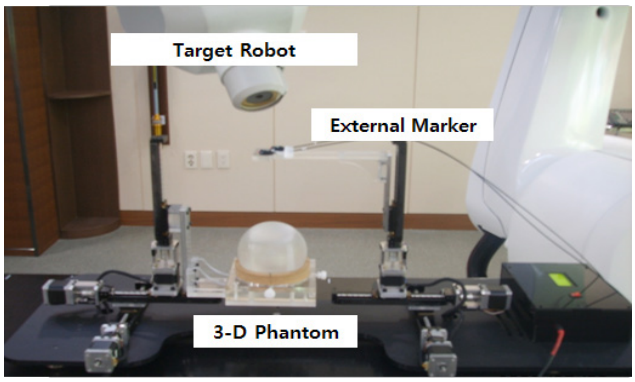


Figure 1. 3D phantom and CyberKnife treatment system used for backward verification of SBRT

To assess the accuracy of SBRT, CT scan was performed on the phantom to set a virtual target volume in the center and isocentric technique treatment plan was established by applying total bean number of 108, 5 Gy, and 20 mmφ cone. Radiation was irradiated on the 3D phantom after applying external respiratory coordinates (Markers.log) and tumor movement coordinate (Modeler.log), which were original data from actual patients.

[Figure 2] shows the process of delivering radiation according to the isocentric technique treatment plan designed by MultiPlan treatment planning system by applying original SBRT data to the 3D phantom.

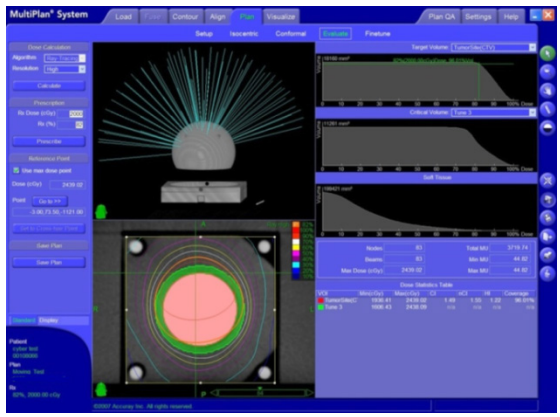


Figure 2.Dose distribution and isocentric technique treatment plan using radiotherapy planning system

The irradiated radiochemical film was scanned 24 h later and assessment was made by γ-index values based on comparison of 2D dose distribution and radiation treatment plan. Typically, γ-index value is based on a criterion of dose difference and DTA of 3% / 3 mm. where passing that criterion gives γ-index value of ≤ 1, whereas failing the criterion gives a value > 1. The γ-index values are calculated at all 2D points for calculation of the pass rate to make sure that it is within the allowable range[14,15].

[Figure 3] shows the dose distribution with calculation of γ-index values from scanning the Gafchromic EBT film after irradiating the 3D phantom that was operated after applying the respiratory and tumor coordinates of patients who underwent SBRT.

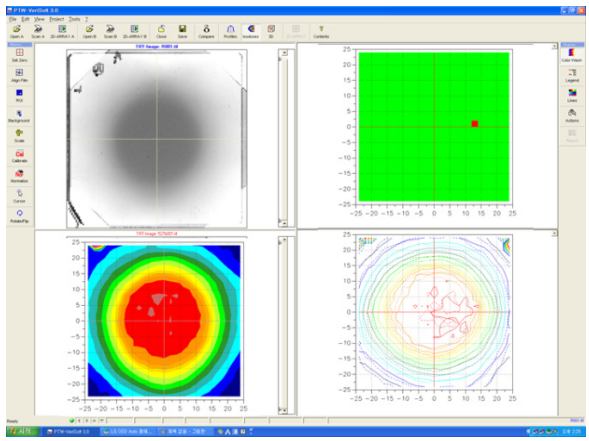


Figure 3. Measurement of γ-index values from scanning Gafchromic EBT film after irradiation applying the 3D phantom

Result and Discussion

[Table 2] shows the results of assessing correlation error and respiratory cycle based on analysis of original data of patients who underwent SBRT, along with γ-index values from using the 3D phantom.

The mean correlation error of entire treatment process of 20 patients was 1.26±073 (range: 0.47-1.98). The mean respiratory cycle of the patients during the entire treatment period was 3.77 s (range: 1.90-5.39 s). As an indicator of regularity of patient respiratory cycle, standard deviation of respiration during the entire treatment period was measured, the results of which showed minimum of 0.35 and maximum of 1.65. When the respiration and internal tumor movement of entire process after completion of treatment in 20 patients were applied to the 3D phantom for comparative analysis against the treatment plan, the mean pass rate of γ-index values was 95.20±4.35% (range: 81.87% - 99.92%). Since the mean pass rate was ≥ 95%, accuracy of radiotherapy was confirmed by backward verification.

Table 2. Correlation error, respiratory cycle, and γ-index value of 20 patients who underwent SBRT

Pt	Correlation error		Respiratory Cycle		Gamma-index(%)	
	Average (mm)	SD	Average (sec)	SD	passed	failed
1	1.29	0.71	3.18	0.47	97.72	2.28
2	0.47	0.57	1.90	0.35	99.92	0.08
3	0.75	0.32	3.91	0.83	98.97	1.03
4	1.04	0.62	3.81	0.76	96.98	3.02
5	0.82	0.44	3.37	1.62	95.67	4.33
6	1.74	0.87	4.53	1.65	88.17	11.83
7	1.90	0.71	2.67	0.99	93.29	6.71
8	1.98	0.88	3.29	0.46	95.65	4.35
9	1.54	1.22	5.39	1.45	92.33	7.67
10	1.57	1.18	3.52	0.53	96.46	3.54
11	1.13	0.77	3.11	1.42	95.25	4.75
12	1.41	0.80	4.06	1.10	95.55	4.45
13	1.51	1.18	5.20	1.40	81.87	18.13
14	0.97	0.54	4.23	0.90	98.64	1.36
15	0.95	0.56	4.46	0.78	99.13	0.87
16	1.12	0.75	4.45	1.33	96.47	3.53
17	1.18	0.76	2.98	0.61	97.39	2.61
18	0.94	0.34	3.17	0.38	98.15	1.85
19	1.49	0.78	4.43	1.28	88.67	11.33
20	1.47	0.68	3.73	0.80	97.73	2.27
Total	1.26	0.73	3.77	0.96	95.20	4.80

However, there were 5 patients with pass rate < 95% relative to dose difference and DTA of 3%/3 mm. [Table 3] shows the results of testing for significance after statistical processing for correlations between accuracy of SBRT and variables that could be checked during the treatment process, such as age of the patient, tumor volume size, treatment time, correlation error, respiratory error, and regularity of respiratory cycle. The results showed no correlation with age of the patient ($p<0.966$), tumor volume size ($p<0.756$), and treatment

time ($p<0.822$), while accuracy of treatment showed high correlation with correlation error analyzed using original data of treatment process ($p<0.011$) and regularity of respiration during the entire treatment period ($p<0.003$). In particular, it is believed that respiration and accuracy of treatment are considered to be the most important factors for assuring accuracy of SBRT. CyberKnife radiotherapy employs the method of real-time tracking of radiation beam based on prediction by the robot through modeling of respiration and tumor coordinates, and the present study confirmed that irregularity of respiration is an important variable that determines success or failure of treatment.

Table 3. Correlation analysis between γ-index value measured using the 3D phantom and various variables

Index	person correlation coefficient with gamma-index			
	mean	SD	r-value	p-value
Age	55.9 (years)	12.06	-0.01	**0.966**
Tumor Volume	57.78 (cc)	47.5	0.074	**0.756**
Treatment Time	75.75 (min)	10.25	0.054	**0.822**
Correlation error	1.26 (mm)	0.73	-0.558	**0.011***
Respiratory Cycle	3.77 (sec)	0.96	-0.636	**0.003***

Recently, SBRT for moving tumor is being used more often, and in addition, various studies are investigating calibration using a phantom. However, there are difficulties in reproducing the movement of tumor by linking it to the respiration of actual patients. The present study was meaningful in that it used CyberKnife respiration tracking system to acquire external and internal respiratory coordinates from the original data and conducted tests using a 3D phantom that can reproduce such coordinates, thereby conducting a dosimetric assessment on calibration after treatment. Moreover, the importance of regularity of respiration in treatment plan that compensates movement of organs was recognized.

Conclusion

The goal of radiotherapy to achieve local tumor controls by delivering accurate radiation dose to the tumor region, while also minimizing radiation hazard in normal tissues. Development of new equipment and techniques designed to increase such therapeutic ratio has allowed higher therapeutic effect by allowing accurate irradiation. Currently in the field of radiation treatment, there is high interest in SBRT, a therapeutic method that can deliver accurate dose to moving tumor with minimal damage to normal tissues. The significance of the present study can be found in the fact that it performed backward dose verification by reproducing respiratory and tumor coordinate after radiotherapy, using the same condition as before radiotherapy. The results showed mean pass rate of 95.2% relative to γ-index values. Moreover, correlation analysis on respiratory cycle, treatment time, and condition of the patient during SBRT showed that regularity of respiration was the biggest influencing factor. Based on these findings, treatment success or failure depending on respiration during SBRT should be made aware and more accurate treatment should be performed through practice. Since the present study used only CyberKnife that can identify respiratory and tumor coordinates, it is believed that the importance of regularity of respiration in patients could be made aware even for 4D- Radiotherapy or RGRT using Real-time Position Management™ (RPM) system.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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A Study on Perception of Nursing School Students on Long-Term Care Hospital

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Abstract

Background/Objectives: The aims of this research are to examine perceptions of nursing school students on long-term care hospitals, classify perceptions into different types, and describe characteristics of different types.

Methods/Statistical analysis: The applied methodology is Q method. 15 students in nursing department at A college were asked to evaluate 46 statements on long-term care hospitals. The collected data were analyzed using QUANL PC Program.

Findings: This research found out 3 factors in perceptions on long-term care hospital, which explained 42.28% of the total variation. It was found that explanatory power of the first factor was 20.71%, that of the second factor 14.19%, and that of the third factor 20.71%. Among the total respondents, 6 belonged to the first factor, 5 to the second factor, and 4 to the third factor. Those who belong to the same factor have similar perception on long-term care hospital. The perceptions of respondents were classified into 3 types: 'nurse consideration type', 'patient family-oriented type', and 'merits and demerits consideration type'.

Improvements/Applications: This study is intended to provide basic sources to understand perceptions of nursing school students on long-term care hospitals, and educating them.

Keywords:*Long-term care hospital, Nursing school students, Perception, Q methodology, Nurses.*

Introduction

The demand for public health and medical service for old patients has increased, and, with the change of family structure and growing number of women who have regular jobs, low birth rate and nuclear family phenomenon has become serious. Owing to the social changes such as increase of one-person household, the role and function of traditional family have been weakened. Family members who played important roles in caring old members of family can no longer play such roles because of the the change of family structure. And, the demand for long-term care hospitals has increased. Not only old patients with chronic diseases but those who need long-term recuperation and treatment for chronic diseases (dementia, paralysis, and terminal cancer, etc.) search for long-term care hospitals.

Accordingly, many long-term care hospitals are being built. According to the survey of the Health Insurance Review & Assessment Service, in 2004, the number of long-term care hospitals was only 109, but soared to 1,346 in 2015, over 10-fold increase in 10 years[1]. The number of patients in long-term care hospitals is about 140,000, 30% of all the patients hospitalized in all medical facilities. In the elderly medical system, convalescent hospital is located between acute care hospital and long-term care hospital[2], and is considered as the long-term living space place where old patients receive total care in the wide range from physical, mental, emotional, and even spiritual areas[3].

Nurses take the largest part in public health and medical care, and are core workers who have the closest contact with objects. In the rapidly changing public

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health and medical care environment, they should provide safe and high-quality care to objects within limited time[4]. Therefore, it is important to figure out perceptions of nurses and preliminary nurses.

Q method is what starts with the perspective of actor instead of the assumption of researcher, and it allows researcher to examine the characteristics of different types depending on the subjectivity structure of humans[5]. As perception of nursing school students on long-term care hospital is subjective experience of them, Q method is a proper method to identify types of perception of them on long-term care hospital.

Accordingly, this study aims to examine the subjective structures of perception of nursing school students on long-term care hospital, and provide basic data to develop educational programs differentiated to characteristics of various subjective types of nursing school students on long-term care hospital.

Method

1. Selection of Q Population and Q Sample

To extract comprehensive statement of nursing school students on effect of long-term care hospitals, this research examined domestic and foreign literature, open-ended questionnaire, and in-depth interview. Through such a process, this research produced Q population in 3 areas, and over 150 units. In addition, through examination of domestic and foreign literature, this research extracted over 80 Q population. Q samples were inspected and revised, and, finally, 46 samples were finally selected.

2. Q classification and data analysis method

Q classification method is to classify Q sample statements of respondents with forced normal distribution method, and, by this method, each individual makes voluntary definition on long-term care hospital[6]. This research collected data using Q card from 15 students of nursing department, 00 college. The time spent to complete Q classification by each respondent was 20-25 minutes. The distribution of Q samples was made by the method that each respondent was asked to respond to the statements chosen as Q samples. The range of responses is from strongly positive to strongly negative. The scale is 12-point one. Afterwards, the respondents who chose extreme points in the scale were interviewed.

Q factor analysis was done by Principle Component Factor Analysis (varimax). In choosing factors, the critical value was over Eigen value 1.0. The factors were selected based on Eigen value and total explained variation. Collected data were converted to scores on the 12-point scale on forced distributed card. Imposed converted scores were coded in the order of Q sample numbers, and they were processed with Principle Component Factor Analysis. Data were analyzed with the QUANL PC Program.

3. Ethical consideration on research objects

Research respondents agreed to participate in the survey by their own wills, and they were given explanation that they could stop answering the questions any time during the survey. To respect rights of respondents and protect their privacy, and individual information secret, all the data were treated without respondent names. They were encoded, and under Q sorting.

Result and Discussion

1. Characteristics of different types in perception on long-term care hospital

To classify perceptions of nursing school students on long-term care hospital into different types, this research described characteristics of different types focusing on statements belonging to the types [Table 1].

To analyze characteristics of each type of perception on long-term care hospital, the statements whose questions got z-scores over ±1.00 were given meanings. This research found that the number of those whose weights were over ±1.00 was 6 in Type Ⅰ, 5 in type Ⅱ, and 4 in type Ⅲ.

Table 1: Eigen Value, Variance, and Cumulative Percentage

	Type I	Type II	Type III
Eigen Value	4.1411	2.8373	1.4773
Variance(%)	.2071	.1419	.0739
Cumulative	.2071	.3489	.4228

2.Analysis of each type

- Nurse consideration type: The number of nurses belonging to Type □was 6. The statements to which

respondents answered very positively were 'Patient selects long-term care hospital with good environment' (Z=2.20); 'The number of nurses is not sufficient' (Z=1.48); 'It is possible to prevent dementia through efforts by long-term care hospital' (Z=1.44). The statements on which respondents were most negatively were as follows: 'We cannot trust long-term care hospital' (Z=-1.80); 'Long-term care hospital is more helpful to those who cannot lead daily life because of diseases' (Z=-1.69); 'In Long-term care hospital, role conflicts are increasing' (Z=-1.60).

The characteristics of respondents in Type Ⅰ can be summarized as follows: They perceive that long-term care hospital is inevitable in Korea which is characterized by low birth rate and the increase of the proportion of the elderly. They expect that, for nurses, the job opportunities in such hospitals will increase. They view that long-term care hospitals should provide patients with good environments and various programs, and that, nurses should improve their capacities. In their view, long-term care hospital plays more positive roles than its negative image the media give to people. In short, long-term care hospital has more merits than demerits. Accordingly, this research defines Type Ⅰ as nurse consideration type.

- Patient family-oriented type: 5 respondents belong to Type Ⅱ. The statements to which respondents who belong to Type Ⅱ were as follows: 'Patients choose long-term care hospital with good environment' (Z=2.06); 'It is necessary to develop various programs for old patients' (Z=2.01); 'Hospitalization of the elderly to long-term care hospital can satisfy demands of family members of them' (Z=1.41). Among the statements belonging to Type Ⅱ, what has the highest weight was statement 2 (0.8375). What made respondents agree most positively were statement 5 and statement 3. What made respondents respond most negatively were as follows: 'People trust long-term care hospital more than general hospital' (Z=-2.22); 'Long-term care hospital can help the elderly improve their quality of life' (Z=-2.07); 'Patients can get patient-oriented medical service in long-term care hospital' (Z=-1.53).

The characteristics of Type Ⅱ reveal the perceptions of respondents to long-term care hospitals on whether such hospitals treat patients as if they are family members. Respondents were asked to respond to statements from the position where they are caring old patients or have dementia patients. So, they focus on burdens family members should burden. Even if patients cannot receive treatment in long-term care hospitals as much as when they are cared by family members or in general hospital, they choose long-term care hospitals, because it can reduce burden of family members, and they consider some cautions when they choose a hospital. This research named Type □as 'Patient family-oriented type'.

- Merits and demerits consideration type: The number of respondents belonging to Type 3 is 4. The statements which got strong positive responses were as follows: 'Patients can get patient-oriented medical service in long-term care hospital' (Z=1.89); 'Such a hospital is more helpful to the elderly who cannot lead daily life because of diseases' (Z=1.74); 'Such a hospital is stronger in qualitative aspect than in quantitative aspect' (Z=1.58). What received the most negative responses from respondents were as follows: 'It is difficult to protect privacy in long-term care hospital' (Z=-1.72); 'Long-term care hospital can help patients receive long-term recuperating treatment' (Z=-1.69); ' Easy accessibility is important for patients to choose a long-term care hospital' (Z=-1.52).

Respondents belonging to Type Ⅲ perceive that long-term care hospital is inevitable today, and that we should think of the ways to improve such hospitals. They perceive that long-term care hospitals opened recently try to improve the public image of long-term care hospital, and revise the demerits of such hospitals, overcoming old management policies. With the increase of the number of long-term care hospitals, they perceive, old patients with chronic diseases can have good treatments. So, this research named Type Ⅲ as 'merits and demerits consideration type'.

Discussion

Type Ⅰ is 'nurse consideration type'. It is reported that patients with dementia in long-term care facilities have more desires which are not fulfilled than old patients in acute hospital or old people who visit primary care clinics[7-8]. Such a phenomenon seems to be caused by the fact that the treatments in long-term care facilities like the elderly-special hospital or nursing home are not given in response to the desires of patients, but by the seriousness of the disease or conveniences of nurse providers like nurses or assistant nurses. Such a problem is not the one which can be found only in Korea, but discovered also in foreign studies. Namely, it has been

pointed out that medical service in long-term care facilities are provided not based on individual desires of patients, but on physical and mental symptoms of patients, and management of disability[9]. Foreign studies reported that, due to shortages of personnel and economic resources, it is difficult for nursing providers in long-term care facilities to fulfill desires of patients, particularly, social and emotional desires of them[10]. According to a study[11], among the symptoms demential patients suffer, only 10% are from the disease, and the rest 90% are from quality of nursing they are provided with and the environment. Therefore, it is necessary to evaluate patient's desires, and reflect them in the care of patients, which can soothe the symptoms of patients or postpone aggravation of symptoms, and improve quality of life of them.

Type II is 'patient family-oriented type'. Accordingly, it is necessary for long-term care hospitals to prepare conditions where they can continue to communicate with patients and protectors of patients. Hardin[12], and Newbern & Lindsey[13] argued that it is important to maintain communications between the medical team and patients and with families of patients, and it is necessary to communicate with patients and with families of patients in deciding how to treat the patients. Recently, nursing philosophy is changing to patient-focused and patient's rights-respecting ways. In particular, family members of patients have more say in the treatment process. Thus, the medical team should try to understand emotion and complaints of patients and families of patients, and provide them with information and alternatives in the decision-making in treatment. Eustis et al [14] argued that, with the change of nursing philosophy, patients and families of patients will play the role of subjective decision-makers in medical and nursing places.

Type III is 'merits and demerits consideration type'. When the period of caring an old patient with dementia gets long, family members including the primary care-giver suffer physical fatigue, depression, powerlessness, tension, or anxiety, and reveal actions without self-control such as impatience and anger to patients[15-16].

The government intended to increase the number of credible long-term care hospitals by strengthening merits and revising flaws of them. Credibility is the most important factor for long-term care hospitals to respond to social and family demands in the age of aging population and spread of chronic diseases.

This kind of a study on perception can be used a basic sources for long-term care hospital supporting program which attracts attention recently. In addition, this study expects that, by suggesting the perceptual structure and characteristics of each type on the perception of nursing school students on long-term care hospital, the findings of this study will serve as basic data for educational programs.

Conclusion

This study is intended to provide basic data to adopt policies to activate programs to support long-term care hospitals by classifying perceptions of nursing school students on long-term care hospitals. It is expected that the classification of nursing school students into different types will help to develop educational programs considering characteristics of such types. This study suggests that there will be further studies on analysis of different types by choosing samples considering various factors, and qualitative studies to identify various factors affecting nursing cares of patients in long-term care hospitals.

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Source of Funding: Self

Conflict of Interest: Nil

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Related Determinants of Eye Disease, Cataract, Glaucoma and Macular Degeneration Among Adults of Korea: from the 7thKnhanes

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Abstract

Background/Objectives: Eye disease problems are rapidly increasing worldwide. But few studies have been performed despite of its importance. Our study was aimed to find out the major determinants of cataract, glaucoma and macular degeneration.

Methods/Statistical analysis: The 7thKnhanes(KOREA NATIONAL HEALTH and NUTRITION EXAMINATION SURVEY) data was used to identify the association of the major determinants of eye disease including cataract, glaucoma and macular degeneration. We used the national representative data. 4041 participants were involved and analyzed to find out affecting major determinants of eye diseases with multiple- logistic-regressions by complex-sampling-methods.

Findings: The prevalence of eye disease was 15.6%. The most affecting related determinant was ageing. Through analyzing with multiple-logistic-regression, our study showed that ageing of over 65 aged group (OR 44.96; 95%CI; 13.07-154.72) and 35-64 aged group (OR 4.58; 95%CI; 1.35-15.53) compared to 19-34 aged group were showed as the strongest determinant of eye disease significantly. And the next determinants were revealed as in no presence of spouse (OR 1.63; 95%CI; 1.27-2.10) and lowering education level,especially in under elementary educated group (OR 1.64; 95%CI; 1.15-2.34), poor oral health (chewing difficulty)(OR 1.43; 95%CI; 1.02-2.10 and in more getting stress group(OR1.39; 95%CI; 1.07-1.80) in order.

Improvements/Applications: Therefore, well designed public health interventions such as health education of the community including improving chewing ability and managing stress should be accomplished in the community basis of primary health care for the successful ageing as well as preventing eye diseases of Koreans.

Keywords:*Cataract, Glaucoma, Macular degeneration, Ageing, Spouse, Education level, Chewing, Stress*

Introduction

The prevalence of eye diseases such as glaucoma was remarkably high among the elderly and risk factors were related with older age[1-3]. And dietary intake of vitamins showed a beneficial association with eye disease such as glaucoma[4-5] and certain components of diet was reported to be related with the progression and incidence of glaucoma[6]. Furthermore, people with glaucoma was reported to be exposed to get the risk of Alzheimer's disease[7] which was known for losing memory and cognitive function cause of fatal change of personality and behavior[8]. And also, it was reported that chronic disease like glaucoma patients need more personalized care to manage[9].

And social and economic burdens as well as vast medical cost of eye disease were rapidly increasing. Despite of its growing importance, there are rare studies on their major determinants of eye disease such as cataract, glaucoma and macular degeneration. Therefore, we tried to investigate the determinants of eye diseases among Korean adults in the trend of rapidly ageing

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population.

Method

The 7thKnhanes data (KOREA NATIONAL HEALTH and NUTRITION EXAMINATION SURVEY) was used to identify the association of the major determinants of eye disease including cataract, glaucoma and macular degeneration with the data based on such as general characteristics (age, gender), socio-economic status(occupation, presence of spouse, income level, education level), health related behaviors(smoking, alcohol drinking, aerobic physical exercise, eating breakfast, sleep duration), dietary supplements and oral health factors (chewing problem) as well as psychological factor(stress level).

We used the national representative data with getting the approval of Institutional Review Board as well as collecting informed consents of all participants. 4041 participants were involved and analyzed to find out affecting major determinants of eye diseases with multiple- logistic-regressions by complex-sampling-methods using the package of SPSS (ver. 21.0).

Result and Discussion

[Table 1] reveals the general demographic and health-behavior characteristics of 4041 participants. The prevalence of eye disease like cataract, glaucoma and macular degeneration was 15.6%. 65 and over aged group was 28.9% and 35-64 aged group was 62.7%. Over half of the participants was female. The lowest education group (under elementary) was 24.5%. Having no spouse group was 16.1%. Drinking experience group was 87.0% and present smoking subjects were 38.0%. Approximately a quarter of the participants were not in good status of oral health with chewing difficulty and feeling much stress group. About half of them were showed as not having normal sleep time.

Table 1. General overall characteristics of the sample population including eye disease

Variables	Division	N	(%)
Age	Under 35	335	8.4
	35 ~ 64	2530	62.7
	65 and over	1176	28.9
Sex	Male	1622	40.0
	Female	2419	60.0
Education	Under elementary	996	24.5
	Middle	457	11.2
	High	1152	28.7
	More than college	1436	35.7
Income	Lowest	953	24.2
	Middle-low	1020	25.0
	Middle-high	1018	24.6
	Highest	1050	26.1
Spouse	No	625	16.1
	Yes	3416	83.9
Job	Owner	1271	30.8
	Office	2770	69.2
Activity	No	2355	57.5
	Yes	1686	42.5
Smoking	No	2504	62.0
	Yes	1537	38.0
Drinking	No	521	13.0
	Yes	3520	87.0
Stress	Low	3018	74.7
	High	1023	25.3
Breakfast Eating	No	408	10.4
	Yes	3633	89.6
Dietary supplement	No	2010	49.1
	Yes	2031	50.9
Sleeping	Abnormal	2166	54.0
	Normal	1875	46.0
Chewing	Very uncomfortable	226	5.7
	Uncomfortable	823	20.2
	Usual, average	693	17.3
	Uncomfortable	969	23.5
	Very comfortable	1330	33.2
Eye diseases	No	3419	84.4
	Yes	622	15.6
	Total	4041	100.0

Cont... **Table 1. General overall characteristics of the sample population including eye disease**

The odds of related determinants of eye disease according to variables are shown in [Table2]. The strongest determinant of eye disease was ageing, especially which the risk of eye disease was showed dramatically the highest in oldest aged group (65≤) and in 35-64 aged group compared to under 35 aged group. And the next major determinants of eye disease were investigated as lowering of education level, lowering of chewing ability, no presence of spouse, alcohol drinking, owner running business job compared to office job, no physical activity, gender(female) group and not having breakfast group in order.

Table 2. Association of the determinants of related eye disease

Variables	Division	OR(95% CI)*	p
Age	19-34	Reference	
	35 ~ 64	11.58(4.74-28.29)	<.001
	65 and over	142.53(58.86-345.17)	<.001
Sex	Male	Reference	
	Female	1.34(1.15-1.56)	<.001
Education level	More than college	Reference	
	Elementary	10.50(8.00-13.78)	<.001
	Middle school	4.38(3.28-5.85)	<.001
	High school	1.75(1.30-2.36)	<.001
Income	Lowest	0.99(0.76-1.27)	.910
	Middle-low	1.19(0.95-1.50)	.128
	Middle-high	0.98(0.77-1.24)	.839
	Highest	Reference	
Spouse	Yes-spouse	Reference	
	No-spouse	3.76(3.11-4.54)	<.001
Occupation	Office	Reference	
	Owner	2.64(2.19-3.18)	<.001
Smoking	No	Reference	
	Yes	1.18(1.00-1.40)	.050
Alcohol drinking	No	Reference	
	Yes	3.17(2.59-3.86)	<.001
Physical activity	Yes	Reference	
	No	1.62(1.38-1.91)	<.001
Stress	No	Reference	
	yes	1.12(0.93-1.36)	.240
Breakfast	No	Reference	
	Yes	0.33(0.20-0.48)	<.001
Sleep	Normal	Reference	
	Abnormal	1.07(0.92-1.24)	.357
Dietary Supplements	Yes	Reference	
	No	0.91(0.77-1.08)	.296
Oral Health (chewing problem)	Very uncomfortable	6.56(1.00-8.82)	<.001
	Uncomfortable	3.37(2.74-4.14)	<.001
	Average	1.47(1.12-1.93)	.006
	Comfortable	1.18(0.92-1.52)	.193
	Very comfortable	Reference	

*: OR: odds ratio, CI: Confidence interval, p<.05

[Table 3]shows the affecting major related determinants of eye disease like cataract, glaucoma and macular degeneration after adjustment. Through analyzing with multiple-logistic-regression, our study showed that ageing of over 65 aged group (OR 44.96; 95%CI; 13.07-154.72) and 35-64 aged group (OR 4.58; 95%CI; 1.35-15.53) compared to 19-34 aged group were showed as the strongest determinant of eye disease significantly. And the next determinants were revealed as in no presence of spouse (OR 1.63; 95%CI; 1.27-2.10) and lowering education level, especially in under elementary educated group (OR 1.64; 95%CI; 1.15-2.34) compared to more than college educated group. And then the last determinants of eye disease were in oral health group (very uncomfortable chewing status) (OR 1.43; 95%CI; 1.02-2.10), and in more getting stress group (OR 1.39; 95%CI; 1.07-1.80). Especially the association between chewing problem and eye disease was showed with getting the inversely correlated trend.

Table 3. Major affecting determinants of eye disease including cataract, glaucoma and macular degeneration

Variables	Division	OR(95% CI)	p
Age	19 ~≤34	Reference	
	35 ~≤64	4.58(1.35-15.53)	<.001
	over 65	44.96(13.07-154.72)	<.001
Gender	Male	Reference	
	Female	1.29(0.92-1.81	.144
Education	Under elementary	1.64(1.15-2.34)	.007
	Middle	1.34(0.92-1.94)	.124
	High	1.31(0.90-1.91)	.160
	College	Reference	
Income	Low	0.86(0.63-1.19)	.365
	Middle-low	1.21(0.87-1.70)	.261
	Middle-high	.96(0.71-1.30)	.785
	high	Reference	
Spouse	No	1.63(1.27-2.10)	<.001
	Yes	Reference	
occupation	Personal business	1.18(0.93-1.51)	.174
	Office	Reference	
Present Smoking	Yes	1.20(0.86-1.69)	.285
	No	Reference	
Alcohol Drinking	Yes	1.06(0.82-1.37)	.645
	No	Reference	
Aerobic physical activity	No	0.91(0.72-1.15)	.419
	Yes	Reference	
Stress	High	1.39(1.07-1.80)	.015
	Low	Reference	
Breakfast	No	0.90(0.57-1.44)	.670
	Yes	Reference	
Sleep time	Abnormal	0.97(0.81-1.17)	.773
	Normal	Reference	
Dietary supplement	No	0.93(0.75-1.14)	.467
	Yes	Reference	

Cont... **Table 3. Major affecting determinants of eye disease including cataract, glaucoma and macular degeneration**

Chewing problem	Very uncomfortable	1.43(1.02-2.00)	.037
	Uncomfortable	1.25(0.95-1.64)	.117
	Average	0.77(0.55-1.09)	.138
	Comfortable	0.85(0.63-1.15)	.286
	Very comfortable	Reference	

*: OR: odds ratio, CI: Confidence interval, p<.05

Discussion

Through our study analysis after adjustment, we found the strong correlation among the ageing, education level (getting lowering trend), the presence of spouse (having no spouse), oral health (lowering level of chewing ability), getting more stress, and the risk of eye diseases significantly.

Ageing identified as the strongest major remarkable determinant of eye diseases in our findings was supported by other studies which resulted in focusing on age and intra-ocular pressure especially in glaucoma of some physiological aspects[10-11] and physiologically and clinically supporting by another study[2].Another recent study of Denmark which the strong association of chronic inflammation and aged related macular degeneration was identified[12] and these results are partially supporting ours even though having the difference of sample subjects and study methods. By another study of Iran, which was identified that older age and high intra-ocular pressure were the major risk factors of glaucoma among adults[1], it was also having in consistency with our findings. Moreover, that central corneal thickness and endothelial cell density as the important protective and optical layer for normal anatomical and physical function were also investigated to be decreasing with regards to age of Pakistan's study[3] was also supporting our results. Educational level, which was found to be thesecond major determinant of eye disease in our study, was also identified as the risk factor especially in glaucoma patient by another one[13] and these findings were supporting ours. And according to another Malaysia's study, which they found the major affecting factors as age, education level in visual fields of glaucoma patients[14], was also supporting our findings in some aspect despite of the different sample population and methods. The presence of spouse, which was found to be the major determinant of eye disease through our study analysis, might be broadly explained in some aspect by another recent population-based study of Spain, identifying the association between loneliness and physical multi-morbidity[15].Oral health (level of chewing ability), identified as the strong and important determinant of eye disease in our study analysis, was well supported in some view of functional aspects of oral health in nutritional balance by another study dealing with the relationship between the role of diet and eye disease such as glaucoma[5-6]. Psychological stress, which was known to be related with eye disease especially among workers and females of another recent Korean study[16], was also found to be major determinant of eye diseases through our study. According to another population-based study, they found physical multi-morbidity was identified to be associated with anxiety, stressful life-events and depression among 16-44 aged group[15]and these findings were also enhancing our results even though directly not related with eye disease. The association of anxiety, depression and eye disease like cataract or glaucoma was also found to be correlated[13].Moreover, by another Taiwan's 13-year nationwide cohort study, it was reported that the significant association of normal tension glaucoma and the Alzheimer's disease[7]was identified and these results suggest that we might to deal with the eye disease clinically and public health management as well as considering psychological aspects. Especially it was reported that more personalized health care might be helpful to manage the chronic disease like glaucoma according to interventional cohort study of US[9].

On the other hand, to prevent eye diseases, it was reported that social support and increasing the capacity of resilience were investigated to improve quality of life especially in glaucoma patients[17]and these outcomes were also partially supported our results which more psychological stress was related with eye disease. According to another Korean study, niacin as the modifiable nutrient was identified to be strongly related

with normal tension glaucoma[5]which was known to have more common in Asians and leaded to vision loss as the neuro-degenerative progressive disease. Furthermore, individual's diet such as maintaining weight with normal range, avoiding excessive consumption of coffee, and increasing the vegetables and fruits eating was reported and found to have an impacting on the progress of glaucoma as well as intra-ocular pressure[6].

It was reported that retinal stress and oxidative stress induced by metabolic disturbance were physiologically and clinically identified to be linked with the retinal degeneration including age-related macular degeneration[18]and these finding was supporting in some aspects of our findings.

In gender aspects, particularly, the risk of eye disease was increased in our study even though having no significance after adjustment and these results were also supported by another study despite of different sample subjects and study methods[16]. In view of dietary supplements, that one, another study of Netherlands which they found the beneficial association of vitamin A and C in glaucoma[4] was not consistent with our findings that dietary supplements were not related with eye disease and that is thought to be due to study design and methods. In term of clinical and physiological aspects, there were some reports of dealing with eye disease in genetic aspects[19] and in physiological aspects by prospective study[20].

Conclusion

The strong valuable point of our study is that we used the recent nationwide representative data of the 7th KNHANES as possible as it might be generalized. Second, we dealt with the important determinant factors of eye diseases in the state of dramatically increasing of older people in Korea as well as growing in the worldwide. Third, we included the important variable of oral health as the indicator of good health and nutritional balance. And the limitation of our study was that we did not specify on the remarkable health behavior such as smoking and drinking.

Therefore, well designed public health interventions such as health education of the community including improving chewing ability and managing stress should be accomplished in the community basis of primary health care for the successful ageing as well as preventing eye diseases of Koreans.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Change of Histological Shape and Gene Expression of Thymosin β_4, c-Myc, Erb-B_2 and TGF-$\beta_1$byAcute Hepatotoxicity

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Abstract

Background/Objectives: The aim of this study was to evaluate the expression of TGF-β_1, C-Myc, Erb-B_2 and Thymosin-β_4 in acute hepatotoxicity.

Methods/Statistical analysis:The test method produced an acute hepatic model by oral administration to 10-week-old BALB/c using CCl_4 and studied changes in the gene expression of TGF-β_1, C-Myc, Erb-B_2, and Thymosin-β_4 through real-time PCR.

Findings: The results showed that the histological changes and the expression of Thymosin β_4, C-Myc, and TGF-β_1 gene were higher in liver injury than normal tissues.

Improvements/Applications: In addition to serological and systematic examination in the prevention and determination of liver function-related diseases, genetic expression by molecular diagnostic techniques of TGF-β_1, C-Myc and Thymosin-β_4 could be used as an aid in liver disease determination.

Keywords: *C-Myc, Masson trichrome, Hematoxylin, Erb-B_2, Thymosin-β_4*

Introduction

The recent development of medical technology has been accompanied by expectations of increased life expectancy. However, prolonged life expectancy for people exposed to various diseases can reduce the quality of life. In particular, modern humans are exposed to various liver diseases such as cirrhosis and liver cancer that are affected by alcohol, tobacco, and various stresses and greatly reduces the quality of our lives. The purpose of this study was to determine the changes in the expression of liver tissue damage by selected Thymosin-β_4, C-Myc, Erb-B_2 and TGF-$\beta_1$gene related to cancer development and tissue damage from a molecular pathological viewpoint. Thymosin-β_4 is involved in the initial process of neovascularization[1] and is known to be expressed in embryonic cell-specific differentiation and in brain development[2,3], in the process of making hair follicles[4], in cancer cells more so than in normal cells[1], and in cancer metastasis[5,6]. C-Myc (c-Myelocytomatosis oncogene) is as a transcription factor that influences genes involved in telomerase expression and cell proliferation and is reported to be amplified in leukemia, gastric cancer, and lung cancer[7].Erb-B_2 (erythroblasticleuemia virtual oncogene homolog 2) has been shown to amplify in 25% of ovarian and breast cancers and is reported as having poor survival prognosis[7].

In addition, Transforming growth factor-β_1 (TGF-β_1) is a gene involved in the regulation of cell proliferation, cell growth, cell death, and differentiation, and is known to be associated with the expression of type 1 collagen due to chronic and acute hepatocellular injury. This can be inferred that TGF-β_1 increase marks the inception of fibrosis[8].

Therefore, this study aims to evaluate the expression level of TGF-β_1, C-Myc, Erb-B_2 and Thymosin-β_4 an

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early stage of acute liver injury, usually through fibrosis and the development of cancer.[1]

Method

1. Animals and Administration

With a purpose to induce acute hepatotoxicity, 10-week-old male BALB / c mice with an average body weight of 20-25 g were administered by oral gavage a mixture of CCl_4(Aldrich, USA) and olive oil (Extra Virgin, ITali)2 volumes: 1 volume, 2ml / kg, using the experimental model Lee Jung-Il method[9]. The experiment was divided into two groups, the group that was injected with CCl_4 alone (n = 5) and control group (n = 5). Anesthesia and sacrifice were performed after 24 hours, and various tests were performed.

2.Hematologocal examination

The laboratory animals were anesthetized with Ether and sacrificed, and then the blood of 700 μl or more was collected from the heart using a syringe and used for blood component analysis.

3.Electron Microscopic Observation

Some liver tissues were cut and fixed to Glutaraldehyde and dehydrated at high concentrations (70% to 100%) at low concentrations using alcohol. Electro-staining was performed. Block was made using EPON 812 and etched using Ultramicrotome, followed by electro-staining with uranyl acetate.

4.Tissue Section Staining

After some liver tissues were removed from laboratory animals, the tissues were fixed in 10% formalin for 24 hours. Paraffin blocks were made in stages of dehydration, infiltration, and transparent processes, and then cut into 4 ~ 6 μm with microtome. Using the generated tissue slides, Hematoxylin& Eosin, Masson's Trichrome and Gomori Reticulum were stained.

5.Genetic Testing

After some liver tissues were removed from laboratory animals and stored at -70℃ for freezing, the tissues were used for real-time PCR for gene mRNA expression testing. Genetic analysis was conducted using the Kenneth method[10]. RNA extraction was conducted using Homogenizer, followed by RNA Prep Kit manufactured by company B. Reverse transcription was conducted using 20 μl RNA for 60 minutes at 42°C and reversed cDNA was amplified using real-time PCR equipment using AccupowerGreenstarqPCRpreMix Kit. This was followed by a total amplification of 40 times at 20 seconds at 95°C and 45 seconds at 56°C of a total mixture of 50 μl, including cDNA, primers and qPCR premix.

Result and Discussion

In normal liver tissue, the structure of mitochondria was morphologically normal, and there were no specific findings that are of significance related to the distribution of glycogen and lysosomes. However, in the acute hepatotoxic tissue treated with carbon tetrachloride, lysosomes were distributed around the central vein, and the state of the mitochondrial had been damaged severely, including the ridge structure of the intimate private membrane protruding inwardly. Furthermore, the enlargement of cellular void spaces was caused by damage to organelles[Figure 1].

Hematological tests were performed in both the hepatotoxic group and the control group. The mean was 41, the SD was 6.12, the MIN was 33, and the Max was 50 in group ingested D.W of ALT. The mean was 100, the SD was 14.8, the MIN was 77, and the Max was 116 in group ingested $CCl_4$of ALT. Compared to the control group, ALT was 100.7 U / l higher in the hepatotoxic group. The mean was 166, the SD was 7.6, the MIN was 159, and the Max was 177 in group ingested D.W of AST. The mean was 812, the SD was 62, the MIN was 768, and the Max was 922 in group ingested $CCl_4$of AST. Compared to the control group, AST was 812.9 U / l in the hepatotoxic group. However, ALP was not significantly different compared to the control groupThe mean was 81, the SD was 7.7, the MIN was 70, and the Max was 91 in group ingested D.W of ALP. The mean was 81, the SD was 9.6, the MIN was 70, and the Max was 89 in group ingested CCl4of ALP.

Compared to the control group, the H&E staining result of hepatotoxic group incurred severe tissue necrosis around the central vein as well as the enlargement of the nucleus and accumulating of moisture in the cytoplasm following cell damage resulted in ballooning, which is referred to as ballooning degeneration (→) phenomenon[Figure 2]. Cell bulging (swelling) accompanying ballooning degeneration caused the cells to grow, compressing the surrounding vessels, i.e., oyster-shaped liver vessels, and narrowing of the

vessels were observed in the hepatotoxic group when compared to the control group. In addition, fat vesicles (↓) generally observable in toxic substances and hypoxia damage appeared and low staining was visible due to cellular degeneration of the cells around the central vein and the liver[Figure 2].

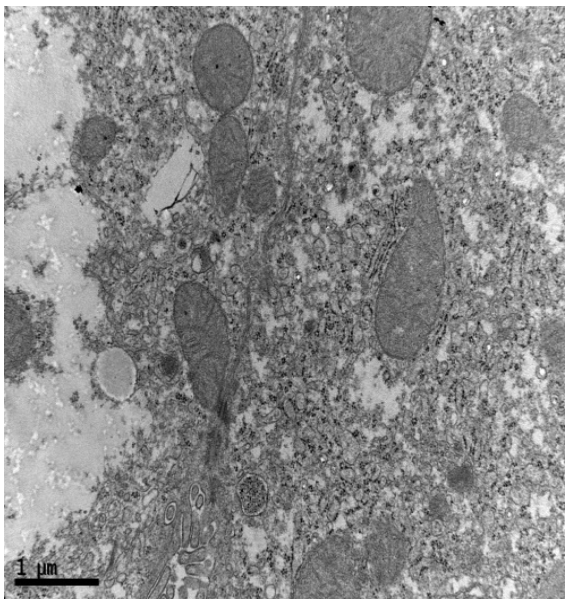


Figure 1. Shapes of acute liver toxic tissue in the group administered with CCl_4 in the Transmission Electron Microscope(x 10,000)

Compared to the control group, M.T(Masson's Trichrom) staining did not result in collagen fibers in the acute hepatotoxic group due to the short duration of administration of toxic substances when attempted to observe the deposition of collagen fibers around the central vein and liver lobules. However, the stainability due to cell damage around hepatic lobules was lower staining (↓) than that of normal tissues[Figure 3].

The reticulum staining of 10-week-old BALB/c mice did not show comparable retinal staining in the control and experimental groups. However, the cell staining caused by the toxic substances entering the portal vein resulted in the cell degeneration around the mesenchymal lobe, and when compared with surrounding tissues, the results were lower staining (↓) than surrounding tissues[Figure 4].

The β-actinCq value was 20.02, The Erb-B2Cq value was 32.77, The TGF-β1Cq value was 27.93, The c-MycCq value was 29.58, and The Thymosin-β_4Cq value was 23.39 in gene expression of control group. The β-actinCq value was 24.94, The Erb-B2Cq value was 36.74, The TGF-β1Cq value was 28.99, The c-MycCq value was 27.24, and The Thymosin-β_4Cq value was 24.97 in gene expression of CCl_4 group. The Cq values of the two groups were high in the Erb-B_2 gene Cq using β-actin value as the basis for comparison. When comparing the Cq values between two groups, the value of Erb-B_2 gene Cq was higher than the value of general gene Cq of 18-32, and the gene TGF-β_1 appeared to be lower in the control group. The gene C-Myc was higher in the control group as well as the gene Thymosin-β_4, which appeared to be lower in the control group. In comparing the gene expression between two groups, Erb-B_2 gene expression, which usually ranges between 18-32 CT in general expression studies, was out of this range and was thus shown that the expression was not very high[Table 1]. TGF-β_1 gene expression was higher in the acute hepatotoxic group than in the control group[Figure 5]. The C-Myc gene expression was also higher in the acute hepatotoxic group than in the control group[Figure 5]. The Thymosin-β_4 gene expression was higher in the acute hepatotoxic group than in the control group[Figure 5]. In comparing the expression of acute hepatotoxic genes in general, the expression of TGF-β_1, C-Myc and Thymosin-β_4 genes except Erb-B_2 gene was found to be higher in the acute hepatotoxic group than the control group.

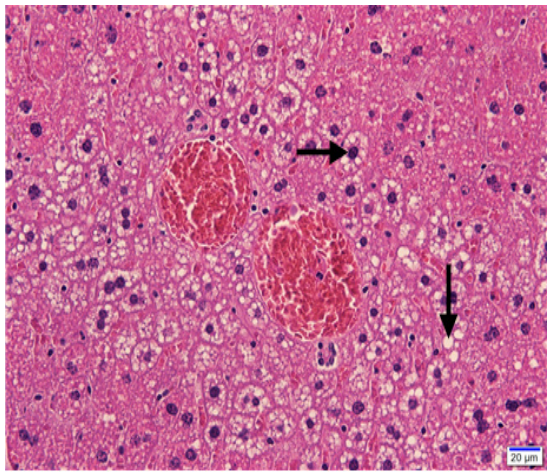


Figure 2. H&E stain of acute liver toxicity in the group administered with CCl_4

In summary, the above results show that hepatotoxic mechanism from carbon tetrachloride produced CCl_3, which is highly reactive by reductive dehalogenation reaction in P-450 enzyme system, and this radical combines with oxygen molecules to form Cl_3COO. Cl_3COO forms carbon-centered lipid radicals by removing hydrogen atoms from saturated fatty acids. These lipid radicals combine with oxygen molecules to form lipid peroxyl radicals to initiate

lipid peroxidation[11]. In this study, the weight loss of experimental animals was small when the hepatic injury was induced by carbon tetrachloride. However, when liver damage was induced by carbon tetrachloride in mice, the experimental results of lipid or water degeneration caused by an accumulation of lipid or water leading to liver hypertrophy[11] are similar to the results obtained in previous studies. In particular, TGF-β_1 is known to be a factor of hepatic fibrosis[11], and in this study, TGF-β_1 was found to increase during fibrosis. Furthermore, the serologically related enzymes of ALT, AST, and ALP increased during liver damage, and the elevated levels of serum ALT, AST, and ALP means damage to liver tissue and these results are consistent with the paper[12], which indicated this phenomenon to mean liver toxicity[12] and the study[13], which reported an increase in related enzymes. In other words, peroxidation of unsaturated fatty acids in the cell membrane destroys membrane structure and function and thereby inhibits liver protein synthesis and decreases the amount of glycogen in the liver and increases serum related enzyme efflux such as ALT and AST into the blood[13].

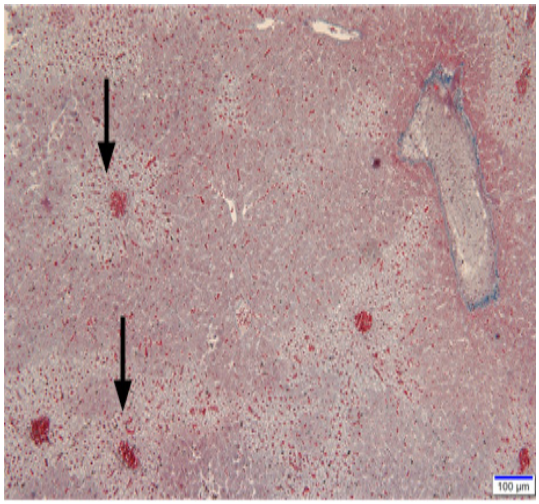


Figure 3. Masson's Trichrom stain of acute liver toxicity in the group administered with CCl_4

Figure 4. Reticular fiber stain of acute liver toxicity in the group administered with CCl_4

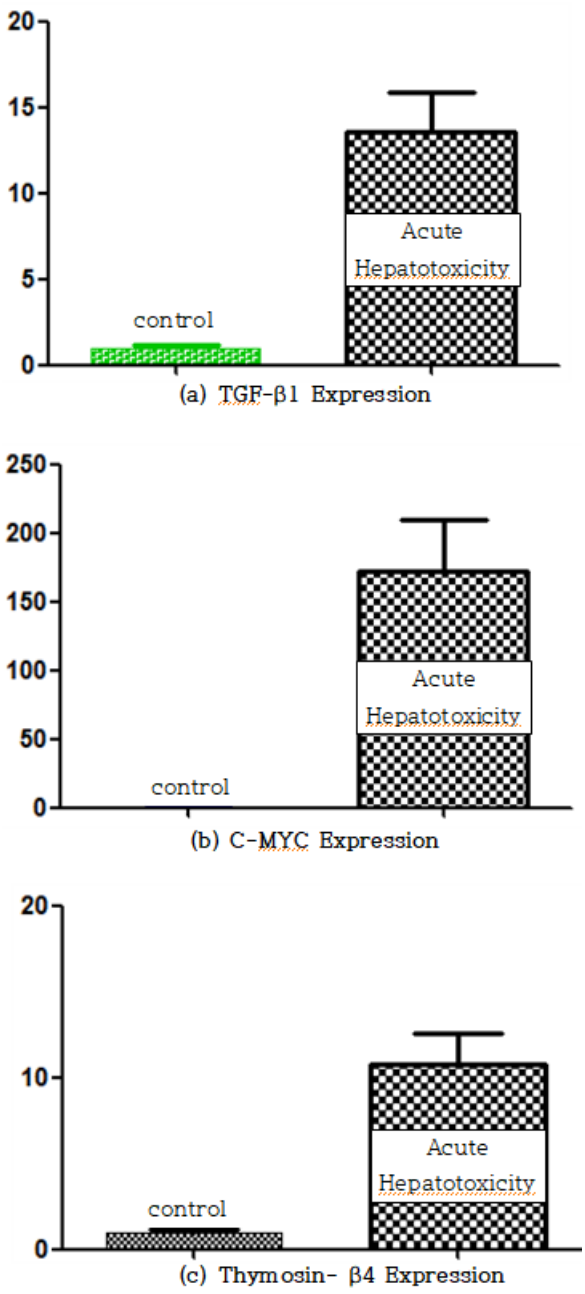


Figure 5. Gene expression in groups treated with CCl_4

Table 1.Relative expression of *β-actin, Erb-B*$_2$, TGF-β_1, C-Myc and Thymosin-β_4 gene

	β-actin	Erb-B2	ΔCt	ΔΔCt	Normalization (2-ΔΔCt)
Control	20.026	32.774	12.748	0	1
CCl4	24.948	36.748	11.8	-0.95	1.93
	β-actin	TGF-β1	ΔCt	ΔΔCt	Normalization (2-ΔΔCt)
Control	20.026	27.938	7.912	0	1
CCl4	24.948	28.992	4.044	-3.87	14.60
	β-actin	C-Myc	ΔCt	ΔΔCt	Normalization (2-ΔΔCt)
Control	20.026	29.588	9.562	0	1
CCl4	24.948	27.244	2.296	-7.27	153.92
	β-actin	Thymosin-β4	ΔCt	ΔΔCt	Normalization (2-ΔΔCt)
Control	20.026	23.394	3.368	0	1
CCl4	24.948	24.976	0.028	-3.34	10.13

Conclusion

The histological changes and gene expression Thymosin β_4, c-Myc and TGF-β_1 were observed to be higher in case of liver tissue injury than in normal tissues. Therefore, for use in disease prevention and determination of disease related to liver function, this study, together with serological and histological examinations, can be used as a supplementary data for determination of liver disease by examining the gene expression status of Thymosin β_4, C-Myc and TGF-β_1 using molecular diagnostic techniques.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Factors Associated with Psychological Well-being among Korean Nursing students

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Abstract

Background/Objectives: This study was designed to investigate the effects of resilience and interpersonal competence on psychological well-being among nursing students in Korea.

Methods/Statistical Analysis: A cross-sectional descriptive study was conducted. The 282 participants were recruited from nursing students in C-do, D city. The data analysis included descriptive statistics, Pearson's correlation coefficients, and multivariate analysis using SPSS 22.0. The two models extracted through hierarchical regression analysis were tested to determine the predictors of psychological well-being in nursing students.

Findings: The findings showed positive associations among resilience, interpersonal competence, and psychological well-being. In the first model, personal factors such as religion (**β** = −.12, p = .018), interpersonal relationship (**β** = −.20, p < .001), academic satisfaction (**β** = −.30, p < .001), normal personality (**β** = −.18, p = .001), and negative personality (**β** = −.23, p < .001) were significant and accounted for 30.1% of the variance. Finally, when general characteristics, resilience, and interpersonal competence were entered into the final model, religion (**β** = −.09, p = .043), interpersonal relationship(**β** = −.14, p = .005), academic satisfaction (**β** = −.17, p = .006), personality (**β** = −.18, p = .001), resilience (**β** = .24, p < .001), and interpersonal competence (**β** = .22, p < .001) were significant. This final model, which included both personal factors and main variables, accounted for 42.5% of the variance.

Improvements/Applications: Resilience and interpersonal competence are important factors in the psychological well-being of nursing students. Therefore, strategies should be developed to increase the psychological well-being of nursing students by improving resilience and interpersonal competence.

Keywords:*Nursing students, Resilience, Interpersonal competence, Psychological well-being*

Introduction

University students suffer more from emotional difficulties than students in childhood or adolescence due to heavy academic burden and career and employment problems[1-2]. In particular, nursing students seem to have stable academic lives due to the clarity of their career and high employment rate after graduation, but their levels of stress are increased due to the difficulties in interpersonal relationships, excessive study requirements, and burdens related to clinical practice[2-3]. Because of these problems, nursing students have had considerable difficulties in adapting to university life and report low psychological well-being[4].

Psychological well-being is a concept that includes autonomy, self-acceptance, positive interpersonal relationships, and control over one's environment, as well as an emotional attitude that grows with the purpose of life[5]. In other words, psychological well-being concerns the degree of happiness and satisfaction felt while functioning well in society based on one's strength, efforts, and growth[6]. Therefore, it has a strong influence on nursing students' adaptation to university

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life[7]. It is also an important factor in the personality and emotions of nursing students who will provide holistic nursing in various clinical fields[8]. Therefore, the psychological well-being of nursing students is very important to enable them to grow into psychologically healthy professional nurses.

Recent research has focused on resilience, emotional regulation, cognitive flexibility, interpersonal relationships, active coping style, and stress coping strategies as positive factors related to psychological well-being[9-10]. Resilience plays a role in coping with difficulties, adapting flexibly to stress, and maintaining psychological balance[11]. This flexible psychological response affects psychological well-being while reducing negative emotions and stress[11]. Nursing students with high resilience have been reported to have low clinical stress and reduced anxiety[12-13].

Recently, interpersonal competence has been studied as an important variable in understanding psychological well-being. Interpersonal relationships are relationships involving a small number of people, with particular emphasis on the relationship between two people, in terms of the universal psychological orientation of the individual[14]. The ability that is important when attempting to establish such relationships is interpersonal competence. Interpersonal competence refers to the ability to effectively establish and maintain relationships with others, an important ability for maintaining a socially pleasurable life that directly relates to individual growth, development, and mental health[15]. The lack of interpersonal competence has been reported to be associated with a longer duration of depressive emotions, as well as lower adaptive capacity to university life and interpersonal skills[16-17]. However, in previous studies, the psychological well-being of nursing students was mainly studied with respect to the relationship with other emotional qualities, such as academic resilience, self-esteem, and emotional intelligence[18-19]. There is a lack of research on resilience and interpersonal competence that can help improve psychological well-being.

Therefore, it should be useful to investigate the relationship between the degrees of resilience, interpersonal competence, and psychological well-being of nursing students. The purpose of this study was to identify the factors such as resilience and interpersonal competence associated with the psychological well-being of Korean nursing students.

Method

This descriptive cross-sectional study examined the effect of resilience and interpersonal competence on psychological well-being. The participants in this study were recruited from nursing students of D city, who voluntarily agreed to participate. A total of 282 subjects responded to a self-report questionnaire.

Resilience was measured using a scale of resilience for nursing students developed by Yang et al.[20]. This tool comprises 24 items scored on a five-point Likert scale. The reliability of the original resilience scale was shown by a Cronbach's alpha score of .84. In this study, the score was 0.92.Interpersonal competence was measured using the Interpersonal Competence Questionnaire (ICQ), which was developed by Buhrmester et al.[21] and translated and revised by Han and Lee[22]. The ICQ consists of 31 items across the five subdomains. Responses to this tool are scored on a five-point Likert scale. The reliability of the original ICQ was shown by a Cronbach's alpha score of .83. In this study, Cronbach's alpha = .84.Psychological well-being was measured with the Psychological Well-Being Scale (PWBS) developed by Ryff[5] and revised by Cho[24]. This instrument comprises six subdomains with a total of 18 items scored on a four-point Likert scale. In Cho's study, Cronbach's alpha = .80, and in this study, it has a value of .92.

Descriptive statistics and Pearson's correlation coefficients*r* were calculated and multivariate analysis performed using the IBM SPSS Statistics 22.0 program. Hierarchical multiple regression was conducted to determine the predictors of psychological well-being. The statistical significance level was set atα= 0.05.

Result

1. Sample Characteristics

General characteristics of this study's sample are summarized in [Table 1]. The study subjects consisted of 36 men (12.8%) and 246 women (87.2%). Their average age was 22.29 (± 3.82) years. Sophomores accounted for 43.3% of the total, and 76.2% of the subjects reported themselves as being without religion:67 (23.8%) had religious beliefs, while 215 (76.2%) had none. About 36% of them supported the nursing department with aptitude, and 67.7% of them were living alone. Most subjects answered that their economic level was intermediate (79.8%) and their interpersonal relationships were good

(51.1%) or usual (45.0%). Half of all students answered that they usually felt academic satisfaction (45.4%), and that their personality was positive (51.1%).

The mean scores of resilience (3.50± 0.51), interpersonal competence (3.42 ± 0.50), and psychological well-being (2.89 ± 0.39) are presented in [Table 1].

Table 1. General Characteristics and independent variable of Participants

Variables		n (%)or Mean(±)SD
Gender	Male Female	36 (12.8) 246 (87.2)
Age (yrs)	≤ 19 20-25 ≥ 26	22.29±3.82 23 (8.2) 234 (83.0) 25 (8.8)
Grade	Freshman Sophomore Junior Senior	53 (18.8) 112 (43.2) 51 (18.1) 56 (199)
Religious	Yes No	67 (23.8) 215 (76.2)
Motivation for Nursing	In aptitude Realistic reason Other	103 (36.5) 128 (45.4) 51 (18.1)
Economic level	High Medium Low	18 (6.4) 225 (79.8) 39 (13.8)
Living alone	Yes No	191 (67.7) 91 (32.3)
Interpersonal relationship	Good Usually Poor	144 (51.1) 127 (45.0) 11 (3.9)
Academic satisfaction	Satisfied Usually Dissatisfaction	71 (25.2) 128 (45.4) 83 (29.4)
Personality	Positive Usually Negative	144 (51.0) 126 (44.7) 12 (4.3)
Resilience		3.50(± 0.51)
Interpersonal competence		3.42(± 0.50)
Psychological well-being		2.89(± 0.39)

2. Correlations Between Resilience, Interpersonal competence, and Psychological well-being

The correlations (*r*-values) between resilience, interpersonal competence, and psychological well-being are shown in [Table 3]. Resilience was positively correlated with interpersonal competence (r = .52, p< .001) and psychological well-being (r = .51, p< .001). Moreover, interpersonal competence and psychological well-being were positively correlated (r = .48, p< .001).

3. Factors Associated with Psychological well-being

The results of the hierarchical regression model of the psychological well-being of nursing students are presented in [Table 4].

Table 2. Correlation among Resilience, Interpersonal competence, and Psychological well-being

Variables	**1**	**2**	**3**
1. Resilience	1		
2. Interpersonal competence	.52 (p<.001)	1	
3. Psychological well-being	.51 (p<.001)	.480 (p<.001)	1

Personal factors, including demographic information, were entered into Model 1, and the regression equations were significant (F = 14.43, p< .001). The explanatory power for psychological well-being was 30.1%. Religion (**β** = −.12, p = .018), "usual" in interpersonal relationship (**β** = −.16, p < .001), "dissatisfaction" in academic satisfaction (**β** = −.30, p < .001), "usual" in personality (**β** = −.18, p = .001), and "negative" in personality (**β** = .23, p < .001) were significant predictors of psychological well-being in this model.

Finally, resilience and interpersonal competence were entered into Model 2; therefore, Model 2 was significantly altered (F = 19.87, p<.001). Religion (**β** = −.09, p = .043), "usual" in interpersonal relationship (**β** = −.14, p = .005), "dissatisfaction" in academic satisfaction (**β** = −.17, p = .006), and "negative" in personality (**β** = −.18, p = .001) were observed to be strong predictors of psychological well-being. Moreover, resilience(**β** = .24, p < .001) and interpersonal competence (**β** = .22,

$p < .001$) were significant predictors in the last model, accounting for 42.5% of the variance.

Discussion

The personal characteristics influencing the psychological well-being of nursing students were found to be religion, interpersonal relationships, academic satisfaction, and personality. First, there was a significant relationship between religion and psychological well-being. In one study of clinical nurses[24], psychological well-being was higher among religious subjects than those who did not have religion, and there were also differences by type of religion. However, Jin and Kim[18] found no difference in psychological well-being by the type of religion. Second, academic satisfaction is a significant factor in psychological well-being. In Park and Hong's[25] and Jin and Kim's studies[18], the higher the satisfaction with one's major, the higher one's psychological well- being was found to be. This is because satisfaction withone's majoris of high importance to one's university career. However, there is a lack of research on the effects of academic satisfaction or religion on the psychological well-being of nursing students.

Table 3. Hierarchical Regression Models Examining the Association of Psychological well-being

Variables			B	β	SE	t	p	F (p)	R2
1	Constant		3.39		.09	36.81	<.001	14.43 (<.001)	.301
	Religion (ref. yes)	No	-0.11	-.12	.04	-2.38	.018		
	Interpersonal relationship (ref. good)	Usually	-0.16	-.20	.04	-3.72	<.001		
	Academic satisfaction (ref. satisfaction)	Dissatisfaction	-0.26	-.30	.05	-4.66	<.001		
	Personality (ref. positive)	usually	-0.14	-.18	.04	-3.32	.001		
		Negative	-0.46	-.23	.11	-3.99	<.001		
2	Constant		1.98		.20	9.91	<.001	19.87 (<.001)	.425
	Religion (ref. yes)	No	-0.08	-.09	.043	-2.03	.043		
	Interpersonal relationship (ref. good)	Usually	-0.11	-.14	.04	-2.85	.005		
	Academic satisfaction (ref. satisfaction)	Dissatisfaction	-0.15	-.17	.054	-2.78	.006		
	Personality (ref. positive)	Negative	-0.36	-.18	.106	-3.46	.001		
	resilience		0.18	.24	.04	4.36	<.001		
	interpersonal competence		0.17	.22	.04	3.85	<.001		

Third, interpersonal relationships and interpersonal competence are other variables affecting psychological well-being. Lee[17] showed that social connectedness was a factor influencing subjective well-being, and that interpersonal problems lowered subjective well-being. In addition, while there is no such study of nursing students, this is consistent with Jeong'sfinding[26] that higher interpersonal competence indicates higher psychological well-being in general university students. The effect of social support on psychological well-being is lowered by the buffer effect of college students, even if they experience strong life stress[27]. Since such people are highly likely to receive social support, it can be assumed that their psychological well-being increases. However, it is necessary to investigate the moderating or mediating effects of social support on the psychological well-being of nursing students. Finally, resilience was positively correlated with and showed a strong influence on psychological well-being. These results are consistent with Choi and Kim's finding[28] that the higher the resilience, the higher the psychological well-being. It is also consistent with the significant correlation between ego-resilience and psychological well-being in Park's study[25]. On the other hand, Lee et al.[19] reported that psychological well-being affected resilience. Thus, resilience and psychological well-being can be considered to have an interactional relationship. Nursing students have many negative emotions in their academic and clinical practice. In this situation, resilience can be considered as a buffer such that psychological well-being increases. Therefore, to improve the psychological well-being of nursing students, an intervention plan should be developed to increase their resilience.

Conclusion

The purpose of this study was to investigate the effects of resilience and interpersonal competence on psychological well-being, which are found to be important factors for nursing students. The results showed that resilience and interpersonal competence had a significant effect on psychological well-being. Therefore, in order to improve the psychological well-being of nursing students, it was confirmed that a personalized and systematic education and training program should be established to improve resilience and interpersonal competence. Based on the results of this study, we would like to make the following suggestions. First, a further study is needed to identify factors that affect the psychological well-being of nursing students. Second, in order to improve the psychological well-being of nursing students, research is needed to develop and apply individualized and systematic programs.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Effects of Resilience and Authentic Leadership on Job Embeddedness of Clinical Nurses in Korea

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Abstract

Background/Objectives: This study was designed to investigate the effects of resilience and authentic leadership on the job embeddedness of staff nurses in Korea.

Methods/Statistical analysis: A cross-sectional descriptive study was conducted. A total of 168 participants with more than 2 years of experience were recruited from staff nurses from a university hospital in D city, Korea. Data analysis included descriptive statistics, Pearson's correlation coefficients, and multivariate analysis using SPSS 22.0. Two models extracted during the hierarchical regression analysis were tested to determine the predictors of job embeddedness.

Findings: The results showed that job embeddedness had a significant positive correlation with resilience and authentic leadership of head nurses. There was also a significant positive correlation between resilience and head nurses' authentic leadership. In the first model, personal factors such as education level, days off as requested, nurse satisfaction, and salary satisfaction were found to be significant and accounted for 21.1% of the variance. In the second model, where personal factors, resilience, and authentic leadership were entered, nurse satisfaction, salary satisfaction, resilience, and authentic leadership were found to be significant. This final model, which included both personal factors and main variables, accounted for 30.2% of the variance.

Improvements/Applications: In order to increase the job embeddedness of staff nurses, hospitals should try to increase resilience on the personal level and improve the authentic leadership of head nurses.

Keywords: *Nurses, Resilience, Leadership, Job embeddedness, Regression*

Introduction

Skilled nurses are essential to meet the expectations of the recent increase inhealthcare services[1]. Moreover, the turnover rate of nurses at general hospitalsin Korea is very high at 25.6%[2]. High turnover rates can lead to the deterioration of the quality of medical care in hospitals and the economic loss entailed by the cost of training new nurses, in additionto the disruption of the careers of nurses through their personal experiences[3]. This results in a reduction in the quality of health services. Various studies have been conducted to addressthese problems[3-4].

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Job embeddedness refers to the degree to which an organization is rooted in relation to its duties, and is used in the opposite sense of turnover[5].Whereas turnover intent simply indicates whether the nurse intends to leave the organization, job embeddedness helps us better understand why nurses remain in the organization[5]. Nurses with a high degree of job embeddedness show low turnover intention even if job stress is high[4]. Therefore, it is necessary to examine the factors affecting the degree of job embeddedness.

Resilience is the socio-psychological ability of individuals to return or cope successfully despite adverse situations[6]. It is known that nurses with high resilience maintain high psychological well-being by flexibly coping with job stress[7]. It also affects burnout and has been found to affect caring behavior[7-8].

Therefore, this ability is essential for nurses who have to cope with various situations arising from interpersonal relationships with various people. A low resilience is apt to lead to stress and burnout[7,9], as well as reduced organizational commitment and organizational socialization, which ultimately causes the nurse to leave the job[9-10]. Thus, the degree of a nurse's resilience can be expected to affect job embeddedness.

Another factor that is expected to influence the organizational adaptability of nurses is the authentic leadership of their head nurse. An Authentic leader is one who works with organizational members while achieving positive self-development. Authentic leadership involves high self-awareness and relational transparency, a balanced process of information, positive psychological capacity to encourage internalized morality, and ethics[11]. In a previous study, the authentic leadership of the head nurse as perceived by new nurses improved the latter's self-efficacy and clinical performance[12]. In addition, it appears that nurses' emotional labor, burnout, and job satisfaction are related to the head nurse's authentic leadership[1,13]. However, there have been few studies of nurses' job embeddedness, and in particular, there have been few studies of the authentic leadership ofhead nurses.

Therefore, it should be useful to investigate the relationship between the degree of resilience, authentic leadership, and job embeddedness of staff nurses. The purpose of the current study was to identify how factors such as resilience and authentic leadership of head nurses affect the job embeddednessof staff nurses in Korea.

Method

This descriptive cross-sectional study examined the effect of resilience and authentic leadership on job embeddedness. The participants of this study were recruited from staff nurses with more than 2 years of work experience at a university hospital in D city, Korea who voluntarily agreed to participate. A total of 180 subjects responded to a self-report questionnaire; the response rate was 89.0%. Of these, 18 questionnaires were excluded from the analysis because of insufficient data. Thus, 162 questionnaire responses were analyzed in total.

Resilience was measured using the Korean version of the Connor-Davidson Resilience Scale (CD-RISC) which was developed by Connor and Davidson [14] and translated and revised by Baek et al. [15]. This tool consists of five subscales: tenacity, patience, optimism, support, and spirituality, with a total of 25 items scored on a 5-point Likert scale. Higher CD-RISC scores indicate greater resilience. In Baek et al.'s study [15], the reliability of the instrument was shown by a Cronbach's alpha score of .91. In this study, the score was .94. Authentic leadership was measured using the Authentic Leadership Questionnaire (ALQ), which was developed by Walumbwa, Avolio, Gardner, Wernsing, and Peterson [11] and revised by Song [16]. The ALQ consists of 16 items across four subdomains: self-awareness, transparency, balanced processing, and morality. Items are scored on a 5-point Likert scale; higher scores indicate higher authentic leadership. The original instrument had a Cronbach's alpha score of .79 and in this study the score was .94. Job embeddedness was measured using the Job EmbeddednessScale which was developed by Mitchell et al. [17] and translated and revised by Kim [18]. This instrument comprises three subdomains: fitness, connection, and regeneration. Items are scored on a 5-point Likert scale; higher scores indicate higher job embeddedness. The reliability in Kim's study [18] was shown by a value ofCronbach's alpha of .87, and in this study the score was .90.

The collected data were analyzed using the IBM SPSS WIN 22.0 program.

1) The general characteristics were analyzed using frequency, percentage, mean, and standard deviation.

2) Resilience, authentic leadership, and job embeddedness were analyzed using mean and standard deviation.

3) The correlations between the resilience, authentic leadership, and job embeddednesswere analyzed using Pearson's correlation coefficient.

4) Hierarchical multiple regression was conducted to examine the predictors of job embeddedness. Model 1 included personal factors such as age, marital status, educational level, employment career, type of work shift, days off as requested, nurse satisfaction, salary satisfaction, and experience rotation. Resilience and authentic leadership were then entered into Model 2 as predictors of job embeddedness. The statistical significance level was set at $\alpha = 0.05$.

All study procedures were approved by the C university hospital's Institutional Review Board (IRB No.DIRB-신20170620-022). Before the survey was

conducted, the participants were given all details of the study's purpose, procedure, benefits, potential harm to the participants, confidentiality, and participants' rights, and their written consent was obtained.

Result

1. Sample Characteristics

The study subjects' general characteristics are summarized in Table 1. The study subjects were aged in their 20s (80.4%), 30s (18.5%), and 40s and above (1.1%). Their average age was 27.2 (± 3.40) years and their average work experience at the hospital was 47.39 (± 35.08) months. About 63% of them had graduated from university, and 150 participants (89.3%) were single. Moreover, 164 (97.6%) were shift workers and 133 of them were able to rest on the days they wanted. Of the total, 30.4% were satisfied with their task, but only 1.8% were satisfied with their salary.

Table 1. General Characteristics of Participants

Variables		n (%)	Mean ± SD
Age (yrs)	20-29 30-39 ≥ 40	135(80.4%) 31(18.5%) 2(1.1%)	27.2±3.40
Marital state	Single Married	150(89.3%) 18(10.7%)	
Education level	College University ≥ Graduate school	53(31.5%) 106(63.1%) 9(5.4%)	
Employment career (month)	12-36 37-60 ≥ 61	80(47.6%) 46(27.4%) 42(25.0%)	47.39±35.08
Type of work shift	Shift Fixed	164(97.6%) 4(2.4%)	
Days off as requested	Yes No	133(79.2%) 35(20.8%)	
Nurse satisfaction	Not satisfied Moderate Satisfied	46(27.4%) 71(42.2%) 51(30.4%)	
Salary satisfaction	Not satisfied Moderate Satisfied	135(80.3%) 30(17.9%) 3(1.8%)	
Experience of rotation	Yes No	20(11.9%) 148(88.1%)	

2. Descriptive Statistics Concerning Resilience, Authentic leadership, and Job embeddedness

The mean scores for Resilience (3.18 ± 0.47), Authentic Leadership (3.79 ± 0.53), and Job Embeddedness (2.80 ± 0.53) are presented in Table 2.

Table 2. Resilience, Authentic leadership, and Job embeddedness

Variables	Mean	± SD	Min	Max	Range
Resilience	3.18	± 0.47	1.96	4.36	1-5
Authentic leadership	3.79	± 0.53	2.44	5.00	1-5
Job embed-edness	2.80	± 0.53	1.00	4.71	1-5

3. Correlations Between Resilience, Authentic leadership, and Job embeddedness

The correlation (*r)*-values between resilience, authentic leadership, and job embeddedness are shown in Table 3. Resilience was positively correlated with authentic leadership (r = .29, p< .001) and job embeddedness (r = .39, p< .001). Moreover, authentic leadership and job embeddedness were positively correlated (r = .30, p< .001).

Table 3. Correlation among Resilience, Authentic leadership, and Job embeddedness

Variables	1	2	3
1. Resilience	1		
2. Authentic leadership	.29 (p<.001)	1	
3. Job embeddedness	.39 (p<.001)	.30 (p<.001)	1

4. Factors Associated with Job embeddedness

The results of the hierarchical regression model for the job embeddedness of staff nurses are presented in Table 4.

Personal factors, including demographic information, were entered into Model 1, and the

regression equations were found to be significant (F = 5.95, p< .001). The explanatory power for job embeddedness was 21.1%. Education level (**β** = −.15, p = .035), days off as requested(**β** = .14 p = .037), nurse satisfaction (**β** = .26, p < .001), and salary satisfaction (**β** = .28, p <.001) were significant predictors of job embeddedness in this model.

When resilience and authentic leadership were added in Model 2, the regression equations were still significant (F = 7.55, p< .001). Nurse satisfaction (**β** = .15, p = .041) and salary satisfaction (**β** = .29, p < .001) remained as predictors. Additionally, resilience (**β** = .25, p = .001) and authentic leadership (**β** = .17, p = .016) were significant variables in Model 2, accounting for 30.2% of the variance in the other variables.

Table 4. Hierarchical Regression Models Examining the Association of Job embeddedness

Model		B	β	SE	t	*p*	R^2	F(*p*)
1	(Constant)	2.41			8.54	.000	.211	5.95 (<.001)
	Education level	-.14	-.15	.07	-2.12	.035		
	Rest on the desire date	.19	.14	.09	2.10	.037		
	Nurse satisfaction	.18	.26	.05	3.64	.000		
	Salary satisfaction	.33	.28	.08	3.91	.000		
2	(Constant)	.85			2.01		.302	7.55 (<.001)
	Nurse satisfaction	.10	.15	.05	2.06	.041		
	Salary satisfaction	.34	.29	.08	4.25	.000		
	Resilience	.28	.25	.08	3.32	.001		
	Authentic Leadership	.17	.17	.07	2.42	.016		

Discussion

This study was designed to evaluate the impact of resilience and authentic leadership of head nurses on the job embeddedness of staff nurses. The present results demonstrated significant positive correlations among resilience, authentic leadership, and job embeddedness.

In this study, among general characteristics, education level, whether or not days off may be obtained as requested, and satisfaction with nursing and salary were found to affect job embeddedness. In particular, nurse satisfaction and salary satisfaction were strong influencing factors. A previous study[4] found that the higher the degree of job satisfaction of nurses, the higher their degree of job embeddedness. It can be considered that salary is determined not by the value of money but by the subjective satisfaction of the nurse. However, there have been few studies of the effect of salary on job embeddedness. There have also been few studies of nurse salary standards and nurse salary satisfaction. Therefore, it is necessary to investigate the degree of satisfaction of nurses with their salaries, and it is necessary to try to increase the job satisfaction of nurses including these.

Nurses' resilience was a strong factor influencing job embeddedness. Resilience means the power to withstand difficult situations. In previous studies, job embeddedness was found to be negatively correlated with burnout and job stress[4,7,10]. In other words, resilience may be considered a moderating or mediating factor in the relationship between negative psychological factors such as fatigue, emotional labor or burnout, and job embeddedness. However, the present study is insufficient in addressing this question. Therefore, in future studies, it will be necessary to investigate the moderating or mediating effect of resilience between the negative psychological factors of nurses and job embeddedness.

In addition, the authentic leadership of the head nurse affects the job embeddedness of staff nurses. In

a previous study by Choi and Ahn[19], it was suggested that the authentic leadership of the head nurse affects nurses' job satisfaction and organizational commitment. This can be attributed to reducing turnover intention by increasing the job satisfaction of nurses. In addition, it can be considered that the authentic leadership of head nurses has been found to increase the occupational coping self-efficacy of staff nurses[20]. The authentic leadership of the head nurse can be thought of as affecting not only the work domain but also the psychological aspects of nursing, thereby enhancing nurses' intention to continue work. Therefore, we need a systematic education program that can improve authentic leadership in head nurses.

Conclusion

This study was attempted to identify the effects of resilience and authentic leadership on job embeddednessof clinical nurses. The results showed that resilience and authentic leadership had a significant effect on the job embeddedness of clinical nurses. Therefore, in order to improve the job embeddedness of clinical nurses, individualized and systematic education and training programs should be prepared to improve their resilience. There is also a need for ways to improve authentic leadership of head nurses. Based on the results of this study, we would like to make the following suggestions. First, further studies are needed to identify the psychological factors affecting the job embeddedness of clinical nurses. Second, interventional research is needed to develop and apply individualized and systematic programs to improve the job embeddedness of clinical nurses.

Ethical Clearance: Not required

Source of Funding: Nil

Conflict of Interest: Nil

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The Factors Affecting Unmet Medical Needs of the Elderly Aged more than 65 Years

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Abstract

Background/Objectives: This study identifies the unmet medical experiences in which the elderly older than 65 years old are not able to utilize appropriate medical service despite the medical need and analyze the factors that affect the unmet medical experiences.

Methods/Statistical analysis: The research used the Community Health Survey. We applied a weight so that this sample represents the Korean elderly older than 65. To test the relationship between the predisposing factors, enabling factors, and need factors of the subjects and their unmet medical experiences, we performed the chi-square test. In addition, we also performed a logistic regression analysis to identify the factors that affect unmet medical experiences. Collected data were analyzed using SAS 9.4 Version.

Findings: The results of this study show that a significant number of unmet medical experiences is occurring to an increasing number of elderly persons despite the improvement in the accessibility to medical services and the development of new medical technology. The factors affecting the elderly unmet medical experience are as follows. In the case of women, late-stage elderly, people in the low education level, those without spouses, those who perform financial activities, low-income persons, medical aid beneficiaries were more likely to have unmet medical experience. Also, if subjective health condition is perceived to be bad, those who currently smoke, those who drink, and those who are underweight were more likely to have unmet medical experience.

Improvements/Applications: We anticipate that the results of this study can be used to search for the direction of health and medical service policies for the elderly older than 65 years old in the future.

Keywords: *Elderly older than 65, Unmet medical experiences, Predisposing factors, Enabling factors, Need factors.*

Introduction

The proportion of the Korean population comprised of the elderly is increasing each year due to the improvement in the accessibility to medical service and the development of new medical technology. It is expected to increase from 13.1% in 2015 to 19.0% in 2024 and 40.0% in 2060[1]. This increase in the elderly population not only decreases the life expectancy and quality of life due to various geriatric diseases but also increase medical utilization and medical costs socioeconomically due to the high burden of the diseases[2].

Medical need is distinguished by the determining entity, and can be a medical need that a medical expert perceives as necessary to maintain one's health or medical need or desire perceived by oneself to maintain one's health[3]. The case of not suitably receiving medical care despite the need perceived by the subject is referred to as an unmet medical need[4], and all situations of experiencing an unmet medical [2]need are referred to

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as an unmet medical experience[5]. In other words, the phenomenon of the elderly not meeting their medical demands due to the increase in medical costs is referred to as unmet medical needs, and experiencing this is referred to as an unmet medical experience. The results of many studies showed that the proportion of the elderly experiencing unmet medical needs was high compared to other age groups. The rate of unmet medical needs of the Korean elderly was 16.7% (12.3% among males, 20.8% among females) in 2012, with a constant decrease in the last 5 years. This is two- to three-fold higher than the rate of unmet medical needs of the elderly in the 27 countries in the European Union(5.9% among males, 6.7% among females)[6-7].

The frequency of diseases in the elderly is higher than in other age groups due to the decline of physical functions and most elderly experience chronic diseases and geriatric diseases, thus resulting in high demand for medical care[7]. However, the anxiety toward medical utilization is increasing due to the decrease in income with the limitations of financial activities[8]. There are also obstacles to medical utilization due to the limited transportation methods, complex medical consultation process, and long wait-times[9]. Therefore, it is necessary to identify the unmet medical experiences of the elderly and the factors that are related to the search for methods to resolve them.

To date, variousstudies on unmet medical care of the elderly have been made.However, previous studies are a study which divided by income levels [10], a study on patients with chronic diseases [11], and a study which divided by regions [12].Previous studies had problems with representativeness because they focused their research on the unmet medical experiences of the elderly on a particular region or a limited and specific group of subjects. Additionally, research which used the Korean Health Panel and Survey of Living Conditions of Elderly Individuals had problems with representativeness due to the lack of the number of research subjects, despite allowing comprehensive analyses.Furthermore, they were conducted by defining the unmet medical experiences as limitations due to mostly financial reasons among unmet medical experiences. It is necessary to identify other related factors of unmet medical experiences by types other than financial reasons to put effort into improving them.

Therefore, in this study, we use a large-scale survey data from Community Health Survey to identify the unmet medical experiences in which the elderly older than 65 years old are not able to utilize appropriate medical service despite the medical need and analyze the factors that affect the unmet medical experiences.

Method

1. Research Subjects

For this research, we used the data from 5 years of Community Health Survey data from 2013 to 2017 that was conducted by the Centers for Disease Control and Prevention. Community Health Surveys have been conducted each year n adults older than 19 years old in 253 health clinics nationwide since 2008. To maintain the representativeness of the sample, the samples of 900 subjects, on average, from 253 regions are sampled and selected with the multistage probability sampling method for analyses. Data were collected through 1:1 interviews with a trained interviewer. 228,781 subjects were surveyed in 2013, 228,713 in 2014, 228,558 in 2015, 228,452 in 2016, and 228,381 in 2017. Among those, 60,592 were the elderly older than 65 years old in 2013, 60,602 in 2014, 63,929 in 2015, 64,223 in 2016, and 67,835 in 2017, for a total of 317,181 subjects selected as the subjects of this research.

2. Analysis Variables

Andersen modelwas applied.

2.1. Independent Variables

Predisposing factors are factors related to personal characteristics that exist before the onset of the disease. In this study, we selected sex, age, education level, household generation, spouse, and financial activities. Age was divided as early-stage elderly (65 to 74 years old) and late-stage elderly (75 years old or older) by 75 years old.

Enabling factors are factors related to the method that enables medical service utilization, such as income or the type of medical insurance. In this study, we selected the total monthly household income and whether subjects were medical aid beneficiaries.

Need factors refers to the level of disease that determines the use of medical services, and is the recognition of the existence of a disease or the possibility that a disease can exist. In this study, we used subjective health condition, current smoking, current alcohol consumption, the actual performance of moderate-level

physical activities, underweight (BMI<18.5), and obese (BMI≧25) as variables of analysis.

2.2. Dependent Variable

The dependent variable was unmet medical experiences. Subjects were asked "Did you have an experience of not being able to visit a medical center (excluding dental offices) when you wanted to in the last year?" Subjects who responded that they have even one experience to this item was defined as having had an unmet medical experience.

3. Data Collection and Analyses

We applied a weight so that this sample represents the Korean elderly older than 65. To test the relationship between the predisposing factors, enabling factors, and need factors of the subjects and their unmet medical experiences, we performed the chi-square test. In addition, we also performed a logistic regression analysis to identify the factors that affect unmet medical experiences. Collected data were analyzed using SAS 9.4 Version.

Result

1. Relationship between predisposing factors, enabling factors, and need factors and unmet medical experiences

The results of [Table1]showed that there were differences in the distribution of predisposing factors, enabling factors, and need factors between having had or not having had unmet medical experiences.

Table 1. Relationship between predisposing factors, enabling factors, and need factors and unmet medical experiences

Variable		Unmet(%)	Met (%)	χ^2	p-value
Predisposing factor					
Gender	Male	5.65	94.35	368.5	<.0001
	Female	9.65	90.35		
Age	65-74	6.74	93.26	175.0	<.0001
	<75	9.52	90.48		
Level ofeducation	None	13.13	86.87	1029.0	<.0001
	Elementary school	8.35	91.65		
	Middle	5.85	94.15		
	High school graduate or above	4.12	95.88		
Type of household	One generation	7.92	92.08	18.5	<.0001
	Two generation	8.24	91.76		
	Three generation	6.33	93.67		
Spouse	No	11.13	88.87	520.1	<.0001
	Yes	6.17	93.83		
Economic active	No	7.88	92.12	5.5	<.0001
	Yes	8.93	91.07		
Enabling factor					
Monthly household income(Won)	□100	11.57	88.43	846.9	<.0001
	101~200	6.42	93.58		
	201~300	4.99	95.01		
	300□	4.83	95.17		
Medical aid beneficiaries	No	6.82	86.86	515.2	<.0001
	Yes	16.93	83.07		
Need factor					
Subjective health	Bad	12.35	87.65	1333.7	<.0001
	Normal	5.46	94.54		
	Good	3.59	96.41		

Cont... **Table 1. Relationship between predisposing factors, enabling factors, and need factors and unmet medical experiences**

Current smoking	No	7.81	92.19	642.7	<.0001
	Yes	8.68	91.32		
Current drinking	No	7.46	92.54	37.8	<.0001
	Yes	8.83	91.17		
Moderate physical activity	No	7.90	92.10	0.1	0.8048
	Yes	7.79	92.21		
BMI	Underweight (BMI<18.5)	13.00	87.00	135.4	<.0001
	Normal	7.26	92.74		
	Obesity (BMI≧25)	7.40	92.60		

2. Factors that affect unmet medical experiences

For [Table 2] we performed a logistic regression analysis to identify factors that affect medical care.

Among predisposing factors, unmet medical experiences were 1.051-fold higher for women compared to men. For age, unmet medical experiences were 1.105-fold higher for those who are older than 75 compared to those who are between 65 and 74 years old. Unmet medical experiences were higher for those without spouse compared to those with a spouse.

Among enabling factors, it was found that unmet medical experiences were higher with lower monthly household income. Those who are not medical aid beneficiaries experienced 0.701-fold fewer unmet medical experiences compared to those who are medical aid beneficiaries.

For need factors, it was found that the unmet medical experiences were 3.038-fold higher for individuals with "bad" subjective health condition compared to individuals with "very good" subjective health condition. Current smokers had 1.375-fold more unmet medical experiences compared to non-smokers.

Table 2. Factors that affect unmet medical experiences

Variable		Exp(β) (OddsRatio)	p-value Lowest	95% confidence interval	
				Highest	
Predisposing factor					
Gender	Male				
	Female	1.501	<.0001	1.345	1.676
Age	65-74				
	<75	1.105	<.0001	1.011	1.208
Level of education	None				
	Elementary school	0.881	<.0001	0.798	0.892
	Middle	0.695	<.0001	0.621	0.811
	High school graduate or above	0.557	<.0001	0.599	0.697
Type of household	One generation				
	Two generation	1.012	<.0001	1.001	1.1999
	Three generation	1.101	<.0001	1.012	1.201
Spouse	No				
	Yes	0.775	<.0001	0.706	0.852
Economic active	No				
	Yes	1.463	<.0001	1.337	1.601
Enabling factor					

Cont... **Table 2. Factors that affect unmet medical experiences**

Monthly household income(10^4 Won)	≦100				
	101~200	0.718	<.0001	0.641	0.804
	201~300	0.587	<.0001	0.506	0.680
	300≦	0.567	<.0001	0.496	0.649
Medical aid beneficiaries	No				
	Yes	0.701	<.0001	0.814	0.951
Need factor					
Subjective health	Good				
	Normal	1.443	<.0001	1.236	1.684
	bad	3.038	<.0001	2.632	3.506
Current smoking	No				
	Yes	1.375	<.0001	1.182	1.599
Current drinking	No				
	Yes	1.110	<.0001	1.017	1.212
Moderate physical activity	No				
	Yes	1.224	<.0001	1.075	1.393
BMI	Underweight (BMI<18.5)				
	Normal	0.752	<.0001	0.673	0.840
	Obesity (BMI≧25)	0.767	<.0001	0.672	0.876

Discussion

Among predisposing factors, the unmet medical experiences were higher for women compared to men, for older people, and for people without spouses. This is the same as the results of previous studies[13]. A study[14] found that unmet medical experiences were high when subjects had spouses. Since this study was conducted on the elderly in poverty, it appears that the unmet medical experiences were high because the spouses themselves are a part of the elderly in poverty who do not physical, emotional, or financial freedom even if subjects have spouses. The unmet medical experiences were found to be high with decreasing education level. Education level affects the solving of health problems[15], so previous studies have also found that unmet medical experiences were high with lower education levels[12].

For enabling factors, the unmet medical experiences were found to be higher when the total household income was low, in line with the results of previous studies[11]. Although policies are being enacted to increase accessibility to medical care, it appears that people in low income levels are still having trouble from the perspective of accessibility to medical care. Research on the use of medical care of aid beneficiaries are being consistently conducted, and previous studies[2,16] show the same results as the results of our study in that the unmet medical experiences were found to be high among aid beneficiaries.

For need factors, our results that there were unmet medical experiences with a worse subjective health condition were in line with previous studies[13]. Subjective health condition is a simple subjective evaluation on one's own health condition, but it is known as an important predictive variable for mortality rate[17]. Therefore, consistent health management and social interest in the group with low subjective health condition are needed. The unmet medical experiences were also found to be high for those with poor health habits, such as currently smoking or drinking alcohol, in line with the results of previous studies[2].

We anticipate that the results of this study can be used to search for the direction of health and medical service policies for the elderly older than 65 years old in the future.

Conclusion

This signifies that we must identify ways to reduce unmet medical experiences by sex, and a plan is needed for the health management, medical service, and accessibility for the female elderly. Additionally, in terms of the types of medical insurance, it was found that the unmet medical experiences increased for medical

aid beneficiaries; this shows that a financial barrier still exists in actuality, despite the efforts of the Korean health insurance policy to increase the coverage. Toincrease the accessibility of medical care, discussion about the expansion of low-income medical aid for the elderly, a decrease of items that are not covered, and decrease of out-of-pocket costs of the medical aid beneficiaries must be made and medical services need to be improved. It was found that unmet medical experiences increase when the elderly perceive that their subjective health condition is not good. The opportunity to provide medical service to the elderly must be expanded and policies related to medical institutions must be strengthened to establish plans to improve medical services, such as a medical care reservation system provided by the medical institution, shortening of wait-times, and assistance with the hours of medical care.

In other words, to resolve the unmet medical needs in the period of old age, not only the government and regional medical and health policies for the elderly, but also the variability, accuracy, and approachability of medical information provided by the public health care institutions and private medical institutions must be actualized simultaneously.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Novel Approach on the Introduction of Clinical System for the Prevention of Heart Arrhythmia

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Abstract

Background/Objectives: The number of people with arrhythmia is increasing. The research is to develop a novel approach on the introduction of clinical system for the prevention of heart arrhythmia.

Methods/Statistical analysis: The derived data were carried out through question investigationfrom October 27through December 21, 2018. It is classified as 56people of the experimental group and 56 people of the control group. Fundamental contents of the respondents were analyzed by Chi-square test. Arrhythmia symptoms following experimental attempts were used as t-test. The arrhythmia status according to model attempt was analyzed as t-test.

Findings: The results of this paper are as follows. 1) An introvert in personality turned out to be 69.6% significantly higher in the experimental group than 33.9% of the control group. 2)In character, extroverts turned out to be 30.4% lower than 66.1% in the patient population(X^2=1.62, p<.05). 3) ln regard to p**sychological difficulties. 62.5%** of patients felt significantly more mental difficulties than 33.9% of control group(X^2=5.94, p<.05). 4) The heart palpitating symptoms were significantly higher the average of 39.85 points at patient population for the control group at 25.73 points on average(t=2.96, p=.02). 5) Theanxiety symptoms had decreased significantly the average(25.62±2.18) after the application thanthe average(43.70±0.63) before the attempt of the clinical system (t=4.57, p=.00). 6)Garlic intake has increased since seven days before it was consumed after the model attempt.7) The efficiency of the system has been shown efficient since it was applied.

Improvements/Applications:When clinical system is introduced, it is expected to contribute to the availability and effectiveness of the arrhythmia. Webelieve that recovery of arrhythmia requires diet and exercise.

Keywords: *Heart, Arrhythmia, Clinical system, Garlic, Palpitation symptoms*

Introduction

In order for muscles to contract, electricity must be generated. Irregular heartbeat caused by changes in this system or malfunction is called arrhythmia.An arrhythmia may or may not be a sign of a serious heart condition. The patient may or may not be aware. The normal heart rate for adults at rest is 60 to 80 beats per minute, and 60 to 100 beats per minute is called normal pulse.An arrhythmia is an abnormality in the number of heart beats or an abnormality in the rhythm, which can occur anywhere in the atrium and ventricle. Pulse is an important indicator of whether your heart is beating properly.In particular, arrhythmia may be a secondary symptom of cardiovascular disease such as myocardial infarction or heart failure, so it shouldbe observed more carefully[1].

Arrhythmia is important for regular examinations related to cardiovascular disease as data has been released that the number of people with arrhythmia in Korea is increasing every year. The number of arrhythmia due to heartfailure has increased by 6.48% everyyear from

145,000 in 2012 to 199,000 in 2017. The arrhythmia is dangerous because of sudden death.**In** the heart, there is an electrical transmission system that generates

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regular electricity and transmits electrical signals to the whole heart.The irregular heartbeat caused by changes in this system or by malfunctioning lights is called arrhythmia[1-2].

People should be careful when the temperature of the arrhythmia is higher than 10 degrees in the morning and evening. Recently, the number of people with arrhythmia is increasing rapidly in Korea.The risk of developing heart arrhythmia in smokers is twice as high as those who do not smoke. Cardiac arrhythmia is a significant decrease in quality of life, and serious health problems are at high risk of stroke.An irregular heartbeat is a common condition that occurs in one in four people over the age of 40[3-4] Therefore, the paper is to develop a new information system model to prevent cardiac arrhythmia.

Data Analysis

1.Aframework for mitigating arrhythmia

A framework for mitigating arrhythmia symptoms indicate in Figure 1. The development processis the next steps. 1) **Design of new clinical system**2) **Applying the system to the target and collecting data 3) Effectiveness 4) Analysis of data**inFigure 1**.The derived data were carried out through question investigation**from October27through December 21, 2018**. It is classified as 56people of experimental groupand 56people of the control group.**

2. Analysis

Fundamental contents of the subjects were analysedby Chi-square test.Arrhythmia symptoms following experimental attempts were used as t-test. T**he arrhythmia status according to model attemptwas analyzed as t-test. Also, t**-test was used for t**he attemptmethod for treating arrhythmia anda**dvantages of results for system attempts.

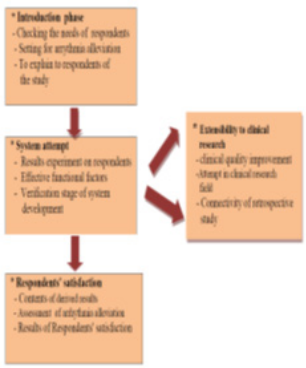


Figure 1. Aframework for mitigating arrhythmia symptoms

Result

1. Fundamental contents of the respondents

[Table 1] reveals the fundamental contents of the subjects. An introvert in personality turned out to be 69.6% significantly higher in the experimental group than 33.9% of the control group.In character, extroverts turned out to be 30.4% lower than 66.1% in the experimental group(X^2=1.62, p<.05). ln regard to p**sychological difficulties. 62.5**% of patients felt significantly more mental difficulties than 33.9% of control group(X^2=5.94, p<.05).

Table 1.Fundamental contents of subjects

Variables	**Experimental group.**	**Control group.**	**X^2**
Housemate			
Husband and wife	21(37.5)	16(28.6)	11.25
Children and couple	18(32.1)	22(39.3)	
Alone	7(12.5)	5(8.9)	
Others	10(17.9)	13(23.2)	
Age			
≤49	12(21.4)	9(16.1)	7.48
50-59	19(33.9)	27(48.2)	
≥60	25(44.6)	20(35.7)	
Personality			
Introvert	39(69.6)	19(33.9)	1.62*
Extrovert	17(30.4)	37(66.1)	
Psychological difficulties			
A lot of feeling	35(62.5)	19(33.9)	5.94*
A slight feeling	21(37.5)	37(66.1)	
Total	56(100.0)	56(100.0)	

***p<.05 **p<.01**

2. Arrhythmia symptoms following experimental attempts

[Table 2] indicates arrhythmia symptoms followingexperimental attempts.**The heart palpitating symptoms were significantly higherthe average of 39.85 points at experimental group for the control group at 25.73 points on average(t=2.96, p=.02).**

The**anxiety symptoms had decreased significantly the average(25.62**±2.18**) after the applicationthan the average(43.70**±0.63**) before the attempt of the clinical system (t=4.57, p=.00).**

Table2. Arrhythmia symptoms following experimental attempts

Items	Before	After	t	p
	Mean±S.D.	Mean±S.D		
Cardial throbbing	39.85±3.64	25.73±4.18	2.96	.02
Cardial stuffy	34.72±1.97	31.68±1.72	1.93	.58
Dyspnea	28.16±1.54	24.05±1.55	3.61	.73
Dizziness	42.52±4.19	28.74±3.83	1.85	.00
Short of breath	35.84±0.62	32.61±0.49	0.23	.61
Anxiety	43.70±0.63	25.62±2.18	4.57	.00
Strain of head back	41.95 ±4.26	29.58±3.74	1.32	.00
Leg edema	33.06±1.58	27.46±1.36	4.91	.24
Cold sweat	35.82±3.29	31.72±3.45	2.75	.51

3. Arrhythmia status according to model attempt

[Figure 2] revealsthe arrhythmia status according to model attempt. It was decreased significantly in the experimental group from 6 days after the model attempt than the control group. But 12 days later, the number of experimental group had increased again.

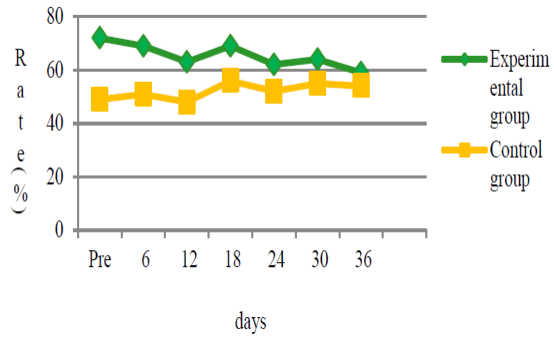


Figure 2. Arrhythmia status according to model attempt

4. Attempt methods for treating arrhythmia

[Figure 3] reveals the attempt method for treating arrhythmia. Garlic intake has increased since seven days before it was consumed after the model attempt. But twelve days later, the number had decreased again.

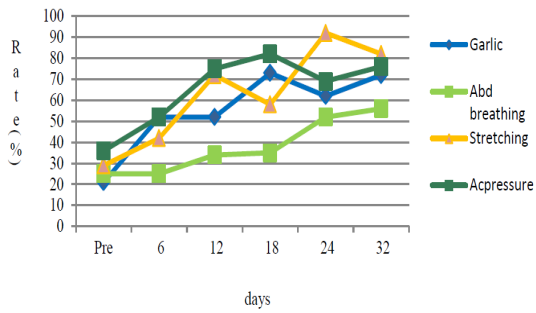


Figure 3. Attempt methods for treating arrhythmia

5. Advantages of results for system attempts

[Figure 4]indicated the advantages of the results for system attempts.**The efficiency of the system has been shownefficient since it was applied. But it has decreased temporarily since the 18th days and then increased againafter 24 days. Costs tended to increase after 8 days and then decrease after 13 days.**

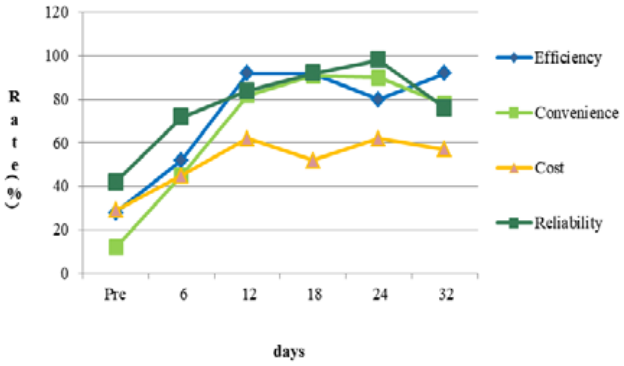


Figure 4. Advantages of results for system attempts

Discussion and Conclusion

This paper is to develop a new information system model to prevent heart arrthymia. As a result, an introvert in personality turned out to be significantly higher in the experimental group than the control group. This is similar to the results of the previous study of myocardial infarction[5-6]. According to a recent study, shy and introverted personality traits often develop heart disease or stroke. It acts as a source of stress on the new environment and the smooth flow of the heart. First of all, it is better to relax and treat yourself with foods that are good for arrhythmia.

Dizzinesswas significantly reduced after clinical attempt. This research is similar to the results of a positive study on angina pectoris[7-9]. The cause of dizziness cannot be prevented in a simple way because there are various causes.If dizziness occurs, the body sends a signal to notify other organs of abnormal condition. It is a good way to prevent dizziness by exercising steadily to keep your body healthy.Therefore, this study recommends that you take care of the accumulation of sodium in the body and manage the normal blood pressure.The system used in this study is expected to be helpful in treating dizziness symptoms.The state of the answer to the heart is less than the state of the application of the information system application.

The heart palpitating symptoms were significantly higherthe average of 39.85 points at experimental group for the control group at 25.73 points on average. This is consistent with the study of coronary heart disease derived from the preceding study[10-12]. Ifpatients find and correct the cause of the body, autonomic nerves will be adjusted, which will restore their control and improve your circulation. The parasympathetic nerve is delivered smoothly, and the pulse returns to normal in harmony with the sympathetic nerves. And then the heart is relaxed, breathing is cool, and their body is changing to a healthy. Thus, when clinical system is introduced, it is expected to contribute to the availability and effectiveness of the arrhythmia. Therefore, l believe that fast, perfectly safe recovery of arrhythmia requires diet and exercise.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Analysis of Experimental Data for Improving Bone Density in Osteoporosis Women Over the Age of 50

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Abstract

Background/Objectives: Osteoporosis is a skeletal disease that is fractured due to weakened bone strength. This paper is to analyze experimental data for improving bone density in osteoporosis women over the age of 50.Methods/Statistical analysis: The paper conducted by question investigation from March 20, to May 28, 2018. People who did not perform health practice. The demographic characteristics of the respondents were performed with X2-test. The condition of bone density before and after the act of living health was performed by t-test. The condition before and after the act of living health due to changes in lifestyle was carried out using t-test.

Findings: The data obtained are as next. 1) The number(63.5%) of patients with other diseases was significantly higher than that(42.3%) of the normal population(X^2=3.18, p<.05). 2) Respondents with regular exercise were significantly higher than non-exercise respondents(X^2=1.33, p<.05). 3) In case of jogging, bone density of osteoporosis is improved more after it than before the act of living health(t=-5.19, p<.001). 4)The condition of bone density is better after drinking milk than before drinking milk(t=-4.28, p<.01). 5) The test respondents after 16 days and then it increased again from 24 days. 6)The practice of living health has been shown to increase since one day in test respondents. However, the practice of living health has shown a tendency to decline since the 17 days. But the behavior of living health has increased again since the 25days. Living health activities have shown a continuing increase since 26 days..

Improvements/Applications: To prevent osteoporosis, it is effective to enjoy balanced food and exercise at the same time. The data will help improve the quality of medical care.

Keywords: *Bone, Density, Osteoporosis, Women, 50 years old*

Introduction

Osteoporosis is a skeletal disease that is fractured due to weakened bone strength. The bone density is highest in those in their 20s and 30s, and after that, the bone density is reduced a little. Particularly, the bone density decreases at a rapid rate for the first five years of menopause. Osteoporosis is a weakened condition and can be broken by small shocks. The biggest cause is hormone changes as age increases, and calcium and vitamin metabolism decreases and lack of exercise[1-3].

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Osteoporosis fracture is not enough to treat the fracture itself. Osteoporosis is a risk of retraction, so continuous efforts should be accompanied by medication and prevention of falls. Bones begin to become weak in their 40s and older, and as age increases, osteoporosis increases. In Australia, people get bone fracture every three to four minutes because of old age. Recently, there is a high rate of bone reduction among middle-aged people in their 40s and 50sIn Korea, 1 in 3 women aged 65 and 2 out of 3 women aged 70 have osteoporosis[4-5]. Gender is shown in [Figure 1].

Osteoporosis is a skeletal disease that is fractured due to weakened bone strength. Most of the time, there are no symptoms, but fractures can cause pain and vary depending on the area where the fracture occurs. Fractures can occur in all areas, but fractures frequently

occur, especially in wrist bones, vertebrae and femur[6-7]. If a person with a risk factor of osteoporosis suddenly complains of pain in the back or decreases in height, it is a spinal fracture. In addition to pain from fractures, several complications can arise.

A femur fracture must require surgery, and the mortality rate increases due to complications occurring before and after the surgery. In the case of spinal fractures, the height may be reduced and the waist may be loose, and in the case of thoracic fractures the lung capacity may be reduced. Osteoporosis fracture is not enough to treat the fracture itself[8-10].

Osteoporosis is a risk of retraction, so continuous efforts should be accompanied by medication and prevention of falls. Therefore, the paper is to analyze experimental data for improving bone density in osteoporosis women over the age of 50.

Materials and Method

1. Conceptual framework

The following research had established a method for strengthening bone density in osteoporosis patients. 1) strategies for bone density 2) experimental attempt 3) methods for treating osteoporosis. The conceptual frame process for improving bone density is indicated in Figure 2. This study designs and collects data for strengthening bone density in osteoporosis patients. The attempt was made to the participants after investigating the reliability. After checking the data, we are analyzing the results [Table 1].

2. Materials

The paper conducted by question investigation from March 20, to May 28, 2018.The investigation consisted of 52 people who performed the act of living health and 52 people who did not perform health practice.

3. Methods

The demographic characteristics of the subjects were performed with X2-test. The condition of bone density before and after the act of living health was performed by t-test. T-test was performed for changes in the condition of osteoporosis depending on the health performance status. The condition before and after the act of living health due to changes in lifestyle was carried out using t-test

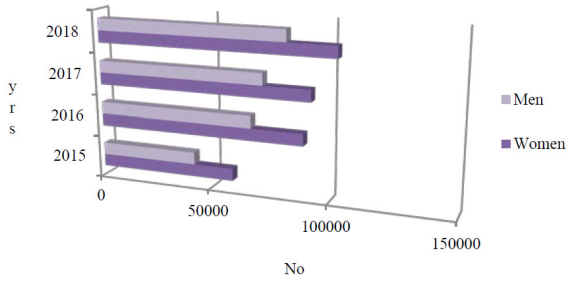


Figure 1.Osteoporosis incidence distribution by sex in Korea

Result

1.Social demographic characteristics of subjects

[Table 2] reveals social demographic characteristics of respondents. The number (63.5%) of patients with other diseases was significantly higher than that (42.3%) of the normal population(X^2=3.18, p<.05). Respondents with regular exercise were significantly higher than non-exercise respondents (X^2=1.33, p<.05).The population of patients drinking showed a significantly higher distribution than those who did not drink(X2=4.26, p<.05).

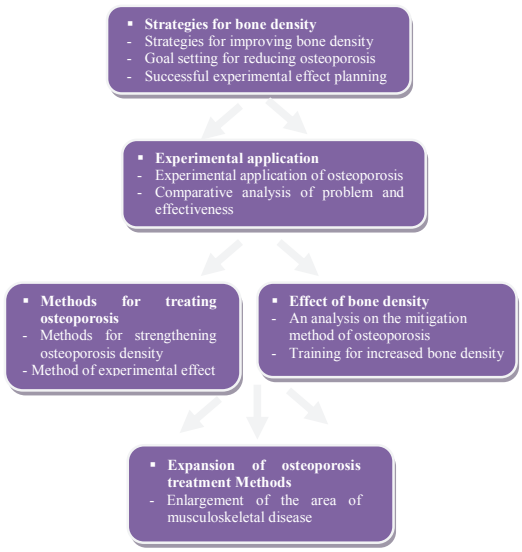


Figure 2. Construction of a method for strengthening bone density

Table 1.Training contents of osteoporosis

Division	Training contents
Causes of osteoporosis	■ Osteoporosis is a bone system condition in which bone strength is weakened and fractured easily. ■ Factors that determine the strength of a bone - bone quality, mineral quality of a bone -bone structure, micro-damage, amount of bone ■ As age increases, the amount of bone decreases gradually.
Outbreak of osteoporosis	■In women's cases, the decrease in female hormones caused by menopause leads to a sharp reduction in bone loss. ■When menopause occurs, the bones will be rapidly weakened within five to ten years. ■Men are much less likely to develop osteoporosis because they have no apparent menopause unlike women ■Men also develop osteoporosis because calcium intake decreases and bone generation decreases as they grow in age
Symptom mitigation method	■ Walking, climbing, gymnastics, and etc ■20 minutes of sunshine a day or more ■Taking vitamin D such as milk, tofu, eggs, etc. ■Reducing caffeine consumption and keeping food bland

Table 2. Social demographic characteristics of subjects

	Test. g. N(%)	**Normal g. N(%)**	**X^2**
Other diseases			
Yes	33(63.5)	22(42.3)	3.18*
No	19(36.5)	30(57.7)	
Age			
50-59	7(13.5)	11(21.2)	7.64
60-69	21(40.4)	24(46.2)	
≥70	24(46.2)	17(32.7)	
Sex			
Male	17(32.7)	22(42.3)	2.81
Women	35(67.3)	30(57.7)	
BMI (kg/m^2)			
<18.5	13(25.0)	17(32.7)	9.75
18.5-24.9	11(21.2)	9(17.3)	
≥25	28(53.8)	26(50.0)	

Cont... **Table 2. Social demographic characteristics of subjects**

Exercise status			
Exercise	13(25.0)	29(55.8)	1.33*
Non-exercise	39(75.0)	23(44.2)	
Drinking status			
Drinking alcohol	32(61.5)	17(32.7)	4.26*
Non drinking	20(38.5)	35(67.3)	
Smoking status			
Smoking	19(36.5)	14(26.9)	2.19
Non-smoking	33(63.5)	38(73.1)	
Total	52(100.0)	52(100.0)	

*P<.05

2. Condition of bone density before and after the act of living health

[Table 3] examined changes in the condition of bone density before and after the act of living health. In case of jogging, bone density of osteoporosis is improved more after it than before the act of living health(t=-5.19, p<.001). The condition of bone density is better after drinking milk than before drinking milk(t=-4.28, p<.01).

Table 3.Condition of bone density before and after the act of living health

items	**Before**	**After**	**T**
	Mean±S.D	**Mean±S.D**	
Jogging	27.18±3.62	40.52±2.74	-5.19**
Climbing the stairs	23.62±5.09	31.84±3.29	-2.41*
Knee bending & lifting	18.09±0.74	39.76±0.55	-3.87**
Gymnastics	21.54±3.52	45.38±2.67	-0.53**
Garlic intake	30.19±0.26	51.17±1.49	-2.6 -1.75**
Green vegetables	34.63±0.59	53.83±1.56	-3.47**
Eating tuna	16.29±2.36	32.61±0.28	-1.52**
Drinking milk	29.53±1.55	48.37±2.42	-4.28**
Sun shower	36.92±4.27	53.69±1.85	-0.64*
lngestion of eggs	33.78±0.49	3 37.42±0.53	-1.52
Alcoholdrinking	39.17±3.72	32.45±2.69	3.74

*P<.05 ** P<.01

3.Changing the condition of osteoporosis

[Figure 3] examined the changing the condition of osteoporosis. The test respondents had improved the condition of osteoporosis after the 8th days. But the condition of it decreased after 16 days and then it increased again from 24 days.

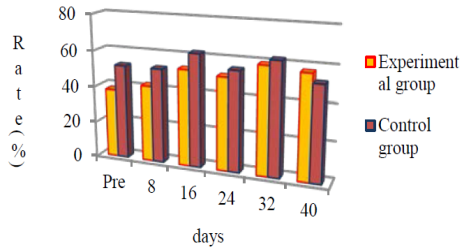


Figure 3. Changing the condition of osteoporosis

4. Condition of before and after the act of living health

[Figure 4]examined the condition of before and after the act of living health. The practice of living health has been shown to increase since one day in test respondents. However, the practice of living health has shown a tendency to decline since the 17thdays. But the behavior of living health has increased again since the 25th days. Living health activities have shown a continuing increase since 26thdays.

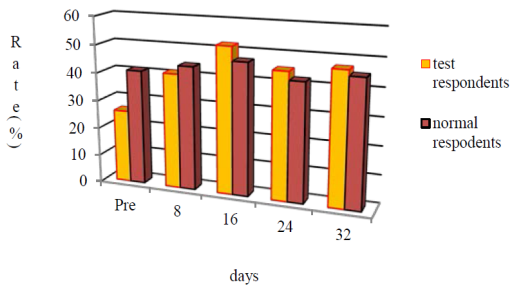


Figure 4.Conditionof before and after the act of living health

Discussion

The paper is to analyze new experimental effect for strengthening bone density in osteoporosis patients. As a result of this study, bone density in osteoporosis patients has been improved by knee-jerk reaction to regular act of living health every day after day. The finding was similar with the previous studies on the spinal stenosis[11-12]. In order to prevent osteoporosis, the types and amount of exercise that match the health status of the participants must be defined and followed. Climbing the stairs will be a useful tool for patients to strengthen bone density in osteoporosis patients. Therefore, the data will play important roles in the prevention and treatment of osteoporosis. Calcium and vitamin D are the most important nutrients for the health of bones

The condition of bone density is better after drinking milk than before drinking milk. This is similar to an arthritis thesis in a prior study[13-14].Bone density levels are diagnosed as osteoporosis from -2.5. Milk contains a lot of vitamin D, which prevents osteoporosis. Proper calcium and vitamin D are important to prevent osteoporosis. Osteoporosis fracture is not enough to treat the fracture itself. Osteoporosis fractures require continuous effort to prevent falls and to prevent eating habits because the risk of retraction increases. Thus, to prevent osteoporosis, it is effective to enjoy balanced food and exercise at the same time. We believe that the data produced will help improve the quality of medical care in the future.

Ethical Clearance: Not required

Source of Funding: Nil

Conflict of Interest: Nil

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Effect of Quality Management Initiative to Improve Patient Identification Behavior of Nurses

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Abstract

Background/Objectives: Patient identification (ID) errors occurring during medication administration process can be fatal. Thus, the aim of this study was to identify the effectiveness of a quality improvement (QI) project to improve the patient ID behavior of nurses during the medication administration process.

Methods/Statistical analysis: This study adopted a quasi-experimental design. More than a thousand nurses participated in the QI project at a university hospital in Seoul Korea. Eighty- six nurses (from 70 nursing units) were chosen as "Patient Safety (PS) Keepers" to take the lead in fostering medication safety. Ten strategies to improve nurses' compliance for patient ID were conducted. The patient ID behavior of nurses was quantified using mean ± SD values, and differences between the pre- and post-test scores were analyzed using the t-test.

Findings: The scores for patient ID behavior were significantly increased from 4.41 ± 0.49 in the pre-test group to 4.55 ± 0.51 (out of 5) in the post-test group ($t = -6.548$, $p < 0.001$). The patient ID behavior of nurses was improved by the implementation of strategies. This finding has implications for nurse training and for the development of strategies leading to nurses' behavioral changes during medication administration.

Improvements/Applications: After this QI project, nurses' patient ID behavior was designated as an annual performance indicator in this hospital. The PS keeper initiative is quite applicable in nursing departments and can be a useful strategy to encourage nurses to actively participate in QI.

Keywords: *medication administration, patient identification, patient safety, nurse, behavior*

Introduction

The purpose of this study was to identify the effectiveness of a quality improvement (QI) project to improve the patient ID behavior of nurses during the medication administration process.

In hospitals, while errors may take place in each step of the medication-use process—procuring the drug, prescribing, dispensing, administering, and monitoring patients, most errors occur at the prescribing and administration stages [1]. On average, a hospitalized patient is subject to one administration error per day [2]. During the administration process, nurses provide the last opportunity to prevent medication errors, with one study reporting that nurses prevent the majority (85%) of potential medication errors [3]. Nevertheless, nurses may not always be prepared to identify potential medication errors. An experimental study demonstrated that 39% of the participating nurses misidentified the patient and administered the medication to the incorrect patient [4].

The most common causes of these errors are communication challenges between medical personnel and patients [5]. When nurses are well informed about a patient, they reportedly often omit patient ID procedures, such as audibly stating the patient's full name [6]. According to a 2007 report published in the UK on serious impairments due to blood transfusions, the main cause of serious complications was failures in patient ID procedures at bedside, and the administration of an incorrect blood type [7]. Therefore, it is essential for nurses to identify patients correctly before administering

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medications or transfusions, even if a bar-code system is used. Practical guidance and evaluation criteria for patient ID must be developed to improve the quality of nursing [8].

"Improve the accuracy of patient identification" is the goal 1 of Hospital National Patient Safety Goals by the Joint Commission every year. The intent for this goal is two-fold: first, to reliably identify the individual as the person for whom the service or treatment is intended; second, to match the service or treatment to that individual. Using at least two patient identifiers are recommended when administering medications, blood, or blood components[9].

Hospitalized patients, they might respond to another's name because of disorientation or impaired hearing. Healthcare providers must check the ID of patients, using a formal protocol for patient ID, before administering any medical treatment, such as medications, transfusions, examinations, or surgery.

Patient identification (ID) errors occurring during medication administration can be fatal. However, many nurses do not comply with the patient ID principle presented by the Korea Institute for Healthcare Accreditation, audibly stating the patient's name and hospital registration number (HRN) and checking if the medication card matches the patient ID band's HRN. The patient ID process includes the series of steps that nurses conduct to ensure that the medication is given to the correct patient.

Moreover, one nurse on duty is responsible for more than 10 patients in Korea. It is easy to get confused with a patient for a nurse on duty because of many patients. Nurses should follow the protocol for patient ID prior to administering medications or transfusions. At this hospital, only 41% of the nurses reported in a 2012 QI survey that they always audibly identified patients, before administering medication. To improve the patient ID behavior of nurses, it would be advantageous to utilize the PS keepers (of fellow nurses) initiative to encourage implementation of the protocol.

Method

This study adopted a quasi-experimental design that identified the effectiveness of the PS keeper initiative, as a QI project of the nursing department at a 1,670-bed tertiary teaching hospital.

The present study was approved by the Institutional Review Board of the university (IRB No. 2013-19) at which the researcher was affiliated. The purpose and methods of the study were explained to each subject before the survey was administered. The questionnaire was only issued if the subject had agreed to participate. To ensure correct patient ID by nurses administering medications and transfusions, our QI team developed a protocol. Instead of limiting the project to one-sided education, the QI project also selected PS keepers to monitor and provide feedback during the study.

The QI team developed a measurement tool that included eight items: three items related to medications, and five, related to blood transfusions. A standard procedure was used to ensure the accurate ID of the patient, such as checking the patient's ID bracelet and name, along with the HRN on the medication, and audibly stating the patient's name and HRN when administering medication. The tool was scored on the following 5-point Likert scale: 1 = never, 2 = seldom, 3 = sometimes, 4 = usually, and 5 = always. A value of 0.80 for Cronbach's alpha confirmed the reliability of the instrument [10].

Eighty- six nurses were chosen as "PS Keepers" to take the lead in fostering medication safety at 70 nursing units except operating rooms, and then participated in a workshop April, 2013.

The team shared the importance of patient safety and discussed the need for improved patient ID. They also proposed strategies to improve the patient ID behavior of nurses.

The PS keeper nurses were expected to play an exemplary role in nursing units, by identifying patients according to a protocol. For example, before medication was administered, the nurse was supposed to ask the patient's name and HRN, to confirm verbally that the stated name and HRN match those on the ID band. The nurse was then required to confirm that the name and HRN of the medication card match those on the patient's ID band.

A pre-test was conducted from March 5 to March 15, 2013. It involved the direct involvement of nurses in the administration of medications and transfusions to patients using a tool for patient ID behavior. To investigate the effects of the QI project, a post-test was conducted, from September 9 to September 15, 2013. The pre- and post-tests were not conducted on an entirely

identical group of participants, owing to the turnover and rotation of nurses during the project.

The collected data were coded, and the general characteristics of the subjects were analyzed using descriptive statistics. Patient ID behavior was analyzed using means and standard deviations, and the differences between the pre- and post-test scores were analyzed using the t-test.

The specific activities are as follows: 1) Every even month, the PS keepers observed the patient ID behavior of their fellow nurses incognito, and reported the results to the QI committee under the nurses' real names. The PS keepers also participated in educating new nurses and encouraged them to identify patients correctly, according to the protocol. 2) In monthly meetings, the PS keepers discussed the degree of improvement and problems with nurse managers of the QI committee. 3) Every Monday all nursing staff campaigned by wearing a label marked "The day of correct patients" on the chest. 4) The committee held a poster contest for the attention of the nursing staff, and four were selected as outstanding work for correct patient ID. 5) Both winners and participants were awarded prizes, money, and pearl bracelets. Bracelets are meaningful because they are similar to ID bands. 6) Award-winning works were used for computer screen savers. 7) The contents of patient ID methods were added to education video material on admission. 8) A pictogram representing patient ID was designed and attached to every patient's bed. 9) Warning statement, "correct patient" was marked on the blood type tags hanging in IV poles. 10) The PS keepers uploaded comments praising colleagues to promote role models of patient ID through intranet.

As a part of QI activity, the complete survey (incognito monitoring) was conducted every two months for 4 monitoring sessions: Primary and Pre-Initiative in February, 2nd in April, 3rd in June, and 4th in August. PS keepers secretly observed that their fellow nurses' patient ID behavior were consistent with the given protocol, and reported the results to the committee under the nurses' real names. The results are as follow: the compliance rate of patient ID behavior for blood transfusion improved from pre-initiative 95.5% to 99.7%. But the compliance rate of patient ID behavior for medication in pre-initiative session was 68.9%, and it has since improved as the initiative progressed: 70.3% in April, 82.5% in June, and 89.3% in August. Overall, the compliance rate of patient ID behavior in medication administration improved by 20.4% [Figure 1].

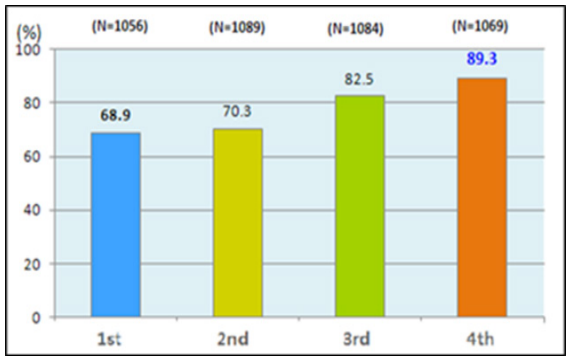


Figure 1. The compliance rate of patient ID behavior for medication over time period (70 nursing units, under incognito monitoring)

The compliance rates of patient ID behavior for medication were similar in adult wards, but relatively low in ER, Pediatric department, and ICU [Figure 2].



	Medical[1]	Surgical[2]	Ped[3]	Cancer[4]	ICU[5]	ER[6]	OPD[7]	PACU[8]	mean
1st N=1056	65.4	82.5	72.4	98.4	53.3	60	100	76.9	68.9
2nd N=1089	65.7	93.6	64.3	98.3	61.2	47.8	100	86.7	70.3
3rd N=1084	82.5	94.4	78.9	98.3	76.1	73.2	100	86.7	82.5
4th N=1069	88.2	98.5	88.9	91.7	91	65.4	100	93.3	89.3

Figure 2. The compliance rate of patient ID behavior for medication by nursing unit (70 nursing units, under incognito monitoring)

1) Medical units 2) Surgical units 3) Pediatric department 4) Cancer department 5) Intensive care unit 6) Emergency department 7) Outpatient injection rooms 8) Post anesthesia care units

Result

1. General characteristics of the subjects

Most participants were female (97.4% and 97.5% for the pre- and post-test, respectively). The mean ages of the participants were 28.68 and 28.95 years in the pre- and post-test groups, respectively. The mean total clinical employment duration was 62.67 and 67.17 months, and the mean present nursing unit employment duration was 28.19 and 30.75 months, in the pre- and post-test groups, respectively [Table 1].

Table 1. Characteristics of the study participants

		Pre-test group (N=1106)	Post-test group (N=1038)
Characteristics	Category	N (%) or mean±SD	N (%) or mean±SD
Gender	Female	1077 (97.4)	1012 (97.5)
	Male	29 (2.6)	25 (2.4)
	No answer	-	1 (0.1)
Age (years)		28.68±5.15	28.95±5.33
Education	College	303 (27.4)	279 (26.9)
	Bachelor	774 (70.0)	723 (69.7)
	Master's degree	26 (2.4)	24 (2.3)
	No answer	3 (0.2)	12 (1.2)
Total duration of clinical employment (months)		62.67±59.29	67.17±61.25
Duration of present nursing-unit employment (months)		28.19±26.72	30.75±27.17

2. Differences in patient ID behavior between the pre-test and post-test groups

The patient ID behavior of nurses was quantified using mean ± SD values, and differences between the pre-and post-test scores were analyzed using the t-test. The scores for patient ID behavior was significantly increased from 4.41 ± 0.49 in the pre-test group to 4.55 ± 0.51 (out of 5) in the post-test group ($t = –6.548$, $p < 0.001$) [Table 2].

Table 2.Differences in patient ID behavior between the pre-test and post-test groups

Group	Patient identification behavior	
	Mean ± SD	t (p)
Pretest (N =1106)	4.41±0.49	–6.548 (<.001)
Posttest (N =1038)	4.55±0.51	

Discussion

This study was designed to identify the effectiveness of a QI project to improve the patient ID behavior of nurses.

Westbrook and others[11] who observed nurses preparing and administering medication, reported the failure to confirm the patient's ID with the medication chart as the most frequent procedural failure, and in only 41.3% (n = 1762) of all the cases was the proper ID protocols followed. The 41.3% compliance with the patient ID protocol is almost consistent with 41% compliance found prior to the QI activity at this hospital.

Henneman and others[12] suggest that before performing a task, the simplest and most efficient way to verify the identity of a patient who is awake, is to ask the patient his or her name and date of birth, and confirm the stated information to the information on the patient's identity band and the task artifact. This procedure verifies the accuracy of the information on the identity band and matches the task artifact to the correct patient.

Based on these suggestions, this study conducted the PS keeper initiative QI project to enhance compliance with the protocol for patient ID. Thus, nurses were required to audibly state the patient name and HRN, compare the patient information with those on the ID band, and verify the ID band information against the name and record of medication. The effects of the QI project were investigated by evaluating the differences

in patient ID behavior, before and after the PS keeper initiative.

The results showed that the average score of patient ID behavior was significantly increased following the implementation of the PS keeper initiative. The findings by the self-reported questionnaire and by the incognito monitoring were in accordance. Therefore, this QI project was successful in improving and facilitating correct patient ID behavior in nurses.

Moreover, each PS keeper played an active role as a change agent, who led by example in practical, proper patient ID behavior, and monitored and encouraged fellow nurses to follow the protocol of patient ID for enhanced patient safety.

In an incognito survey of QI activities, the compliance rate of patient ID behavior was the lowest in the ER. This is similar to those reported by Henneman et al., [4] which shows that most emergency providers (92%) failed to verify patient identity, thus ordered medical tests on an incorrect patient when presented with an unexpected patient identity error. It is considered that the characteristics of each ward led to this result.

Leape et al.[3] found that, of identified 334 medication errors from 11 acute care wards, nurse medication administration errors (38%) were the second-largest category of medication errors following physician medication order errors (39%). A single patient can receive up to 18 doses of medication per day, and a nurse can administer as many as 50 medications per shift [13]. Therefore, emphasis on the importance of patient safety among all nurses, and guidance and encouragement in following the protocols for medication and transfusion services in practice are all necessary.

To improve patient safety and reduce the incidence of adverse events, efforts are needed to develop tools and change strategies that enable the redesign of care and support teams, and assist individual practitioners to identify and prevent adverse events [3]. In the present study, the development of the protocol for patient ID was equivalent to a redesign of the patient ID procedure, and PS keepers were considered change agents in the nursing units. Thus, the PS keeper initiative is quite applicable in nursing departments and can be a useful strategy to encourage nurses to actively participate in QI.

Conclusion

In conclusion, this study provides evidence that the nurse's patient ID behavior has become routine as a result of the QI project (PS keeper initiative, continuous incognito survey, and various organizational and cultural activities). It is very meaningful that the results by the self-reported questionnaire and by the incognito monitoring were in accordance.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Difference of Medial Elbow Joint Space According to Load and External Rotation Angle

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Abstract

Background/Objectives: The purpose of this study is to assess changes to the medial elbow joint space(MEJS) depending on grip contraction, valgus force and the angle of the glenohumeral joint external rotation(GHER).

Methods/Statistical analysis: Ultrasonography was used to investigate the spatial variation of MEJS according to the angle of GHER, valgus force and grip contraction. In this condition, each variable was set to grip and non-grip; GHER 90 and maximum; valgus force 0 lb, 1 lb and 2 lb. One-way repeated ANOVA was used to see change with weight, and independent-samples T-test was used to see changes with the angle of the GHER and valgus force.

Findings: The MEJS was the narrowest at GHER 90° x grip contraction x 0lb and the MEJS was the largest at GHER maximum x non-grip contraction x 2lb. There was no significant difference between GHER 90° and the GHER maximum, and it was significant between the grip contraction and non-grip contraction. GHER 90° × grip contraction and GHER 90° × non-grip contraction showed significant difference between 0lb and 2lb according to the weight and there was no significant difference in the rest. In the GHER maximum x non-grip contraction, there was a significant difference between the 0lb and 2lb and the 1lb and 2lb and there was no significant difference in the rest. There was no significant difference in GHER maximum x grip contraction.

Improvements/Applications: According to the results of this study, the prevention of ulnar collateral ligament(UCL) damage and the guidelines for exercise during overthrowing can be applied.

Keywords: *Medial elbow joint space, Valgus force, External rotation, Forearm &Finger flexor, Ulnar collateral ligament, Ultrasonography*

Introduction

The UCL provides the primary stability to valgus stress. This is composed of anterior, posterior, and oblique bundle. The anterior bundle provides the main restraint to valgus stress between 30º to 120º of elbow motion[1,2].And the UCL provides about 54% stability to the valgus torque[3]. In previous studies, the elbows loaded with valgus force was 34N. However, the problem is that during the pitching motion, the baseball player's elbow is loaded by more than 90N. In a recent study, 25% of major league baseball pitchers reported having undergone UCL reconstruction[4]. The maximum load is applied to the medial elbow at the maximum GHER and 90°of the elbow joint in throwing motion[5]. Flexion of the elbow 90°, external torque on the forearm to perform GHER test. In elbow 90° flexion, the GHER and the valgus movement of the elbow are in the same plane, and GHER measured at 90° of elbow flexion is affected by valgus laxity. Insufficiency to the UCL is a common injury of the pitcher, resulting in increased elbow valgus laxity[6].

The valgus force is a major cause of damage to the UCL. In addition, this force damages the flexor carpi ulnaris(FCU), the flexor digitorum superficialis(FDS)

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and the pronator teres[7,8]. In baseball, a lot of valgus force is given in the cocking phase. Valgus force is increased from overextension stress, whereas in the deceleration phase, the cocking phase to the acceleration phase is increased[9,10]. Youth players experience 28Nm and professional pitchers experience 64Nm. When the valgus force is given, to reduce instability in the elbow, 54% of the UCL's varus torque is used[11]. Also, the varus torque restricts medial elbow joint gapping through forearm and finger flexor[4].

The MEJS is the distance between the midportion of the trochlea of the humerus and the edge of the coronoid process of the ulna. Previous studies have shown a much wider spacing of the MEJS in the cocking phase where valgus stress is loaded than during the wind-up phase[12,13].The ultrasonography(US) is a useful tool for assessing the pathological condition of the elbow, such as medial elbow joint instability and UCL injury[14]. This method is sufficient to show sensitive changes in the spacing of the MEJS[15,16].

Atanda et al.(2016) performed stress ultrasound on the elbow of 102 youth and youth baseball pitchers.The width of the MEJS at rest and at 150N valgus stress was measured in 12-18-year-old subjects. Measurements were performed on both dominant and non-dominant arms. The results of this study show that the width of joint space is increased when stress is applied compared with resting time. And there is no difference between the dominant elbow and the non-dominant elbow[17]. Such previous studies have shown that the MEJS increases when valgus force is given during pitching. The effects of the forearm and finger flexors on valgus angle and the MEJS been demonstrated in several studies, but studies on the effects of valgus force on the wrist loading and the effects of the angle of the GHER are insufficient yet. Therefore, the purpose of this study is to assess changes to the MEJS depending on grip contraction, valgus force and the angle of the GHER.

Table 1. General characteristics (n=34)

Gender (male/female)	Male(n=17)	Female(n=17)
Age(years)	21.11±1.73	20.7±0.47
Height(cm)	174±4.61	162.82±4.05
Weight(kg)	68.47±9.99	55.24±4.7

mean ± standard deviation

Materials and Method

1. Subject

This study was one group multiple intervention comparison design and a single blinded study, cross-sectional study. The subjects were recruited undergraduate 38 students in S University, located in Asan, Chungnam province. There were instructed enough about the purpose and method of the research prior to the experiment. The total sample size of 34 was selected using G*Power 3.1. A total of 34(17 male and 17 female) people was selected in order to apply the standard of inclusion and exclusion. This research was performed under the approval of Institutional Review Board (IRB) in Sunmoon University(SM-201804-019-2).

2. Procedures

The subjects were placed supine on the bed with the shoulder in 90º of abduction; the elbow in 90º of flexion, as measured by a goniometer(Digital Absolute+Axis, 12-1027, USA, 2012)[Figure 2-A]. The ultrasonography(eZono3000, Germany, 2011, 7.5MHz, 3cm) was used to assess the MEJS[Figure 2-B].

Images were taken under 3*2*2(valgus force* grip contraction*GHER) different conditions. The MEJS was measured in the dominant arm. The subjects are required movements according to the presence of the grip contraction, the angle of the GHER, and the valgus force. In each condition, the subjects were set in which they performed a non-grip or a maximal grip contraction; the forearm and finger flexor contraction. The weight on the wrist was set to 0lb, 1lb and 2lb. After measuring the MEJS to each condition, they took a rest for 7 seconds in neutral position and continued the rest of the experiment with the same method.



[A][B]

Figure 2. Instrumentation.
[A] : Goniometer [B] : Ultrasonography.

A line was drawn from the most distal portion of the trochlea to the most proximal portion of the coronoid

process. This distance was recorded as the MEJS [Figure 3]. Ten participants were included in a pilot study to assess intrasession test-retest reliability.

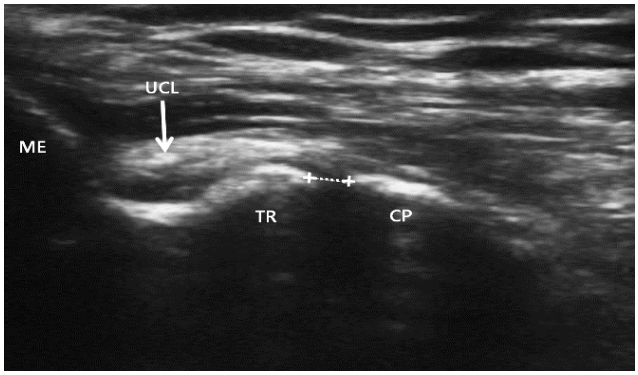


Figure 3. Ultrasonographic image of medial elbow.

Dotted line represents MEJS, ME, medial epicondyle; TR, trochlea; CP, coronoid process; UCL, ulnar collateral ligament.

Statistical Analyses

Statistical analysis of every measured value was calculated using SPSS/PC ver.18.0 for windows program. One-way repeated ANOVA was used to see change with weight, and independent-samples T-test was used to see changes with the angle of the GHER and valgus force. In addition, Scheffe method was used in post-hoc test in order to figure out the weight condition. The significance level was set to (p<.05) for statistical analysis.

Results

1.Comparison of changes in MEJS by weight

There was no significant difference between the 0lb and 1lb groups, 1lb and 2lb groups in the non-grip and GHER 90° group(p>.05). However, there was a significant difference between the 0lb and 2lb groups(p<.05). There was no significant difference between the 0lb and 1lb groups, 1lb and 2lb groups in the grip and GHER 90° group(p>.05). However, there was a significant difference between the 0lb and 2lb groups(p<.05).There was a significant difference between the 0lb and 2lb, 1lb and 2lb groups(p<.05).

2. Comparison of changes in MEJS by GHER

There was no significant difference between the grip types and 0lb, 1lb and 2lb group(p>.05).

Table 2. MEJSacross the 12 condition measured[a]

A	Maximal grip		t	Non-grip		t
GHER	90°	Max.		90°	Max.	
0	2.93±0.12	3.19±0.13	-1.45b	3.44±0.12	3.7±0.11	-1.61b
1lb	3.17±0.1	3.34±0.13	-1.00b	3.7±0.12	3.8±0.13	-.59b
2lb	3.35±0.12	3.55±0.13	-1.18b	3.95±0.11	4.23±0.12	-1.68b
F	3.41*	1.94	.	4.75*	5.38*	.

B	GHER 90°		t	GHER Maximum		t
Grip	Maximal grip	Non-grip.		Maximal grip	Non-grip.	
0	2.93±0.12	3.44±0.12	3.00	3.19±0.13	3.7±0.11	3.00
1lb	3.17±0.1	3.7±0.12	3.38	3.34±0.13	3.8±0.13	2.53
2lb	3.35±0.12	3.95±0.11	3.77	3.55±0.13	4.23±0.12	3.83
F	3.41*	1.94	.	4.753*	5.347*	.

[a] **Values expressed as millimeters (mean 6 SD).**

[b]Significant differences between groups; 90° and maximum of the GHER.

***Significant differences between groups; 0, 1lb and 2lb(p<.05).**

3. Comparison of changes according to presence or absence of grip

There was significant difference between 0, 1 and 2lb and GHER 90° group(p<.05).

4. The mean of each group

. In terms of the mean change in MEJS, when maximal grip x GHER 90° x 0lb, the smallest space was 2.93mm.It had the widest space of 4.23mm when it was non-grip x GHER maximal x 2lb.In addition, the mean space of the non-grip group was larger than the maximum grip group, the GHER maximum group was larger than the GHER 90° group, and the mean space of the 2 lb group was larger.

Discussion

The UCL is the primary inhibitor to valgus stress of an overhead athlete.The UCL injury is recorded as the cause of medial elbow pain among throwers. According to recent literatures, the factors that affect the elbow valgus force during throwing are largely divided into grip-contraction, GHER and weight on wrist. Because the motion of throwing is a complex cycle in which the kinetic chain–shoulder, elbow, wrist and hand[6,18,19].

But, as the quality of life in modern society improves, the increase of leisure time actively generated sports participation by citizens. Exercise is no longer just a unique area for athletes, and injuries resulting from it are also common for the general public. Because of this, our study was conducted on students.

Previous studies have demonstrated that a torque is generated at the UCLduring pitching that is higher than the torque that causes damage[20,21].MEJS significantly increases when a valgus load is applied to the elbow[4]. Wrist and finger flexors have demonstrated their ability to protect the MEJS and the UCL from damage in vitro, but these results are currently being studied in vivo[22]. In particular, TheFCU and the FDShave many influences on the MEJS[4]. In this study, the width of the MEJS was significantly different between the grip condition and the non-grip condition. Regardless of valgus force loading and angle of the GHER, wrist and finger flexors activity led to a decrease in MEJS in the grip conditions compared with non-grip conditions. Thus, hardening of the wrist flexor, particularly FCU, FDS, is considered important.

In this study, when looking at the valgus load by grip contraction and GHER conditions, there was a significant difference between 0lb and 2lb. This does not seem to affect the MEJS much if the weight does not differ by as much as 2lb. It is not resulting in a significant difference between 0lb and 1lb, 1lb and 2lb. Therefore, it is recommended that at least 2lb of difference be made if you want on see the change by the valgus force using weight. On the other hand, the comparison of weights with a GHER maximum angle and grip contraction does not appear to affect space and there is no significant different.

To our knowledge, when the shoulder is external rotated maximum, the valgus force applied to the elbow may anatomically exceed the normal range and lead to injury. Several studies suggest that have to do elbow flexion 90° in order for the GHER to affect elbow valgus force. The GHER and the valgus movement of the elbow are in the same plane, and the GHER measured at 90° of elbow flexion is affected by valgus laxity in elbow 90° flexion[4,7,9,11]. The mean value between the GHER 90° and maximum was different. The value of the GHER 90° was significantly lower than the maximum. However, the statistics showed no significant difference. The reason for this is that when the angle of the GHER is 90°, it is anatomically considered that the MEJS is already stretched enough. So, the elbow flexion 90° is only a device for viewing the maximum valgus force effect, but the relationship between the GHER 90° and maximum does not seem to affect it. Looking at this, if overhead exercise is performed, the magnitude of the impact on the MEJS at between the GHER 90° and maximum is not much different, so the player don't have to attention. However, if there is damage or instability at the UCL and the wrist flexor, so it is recommended to be carried out with caution.

Conclusion

The purpose of this study is to assess changes to the MEJS depending on grip contraction, valgus force and the angle of the GHER. The MEJS increases significantly when a valgus load of more than 2lb is applied to the elbow. The maximal contractions of the forearm and finger flexor muscles decrease the MEJS in healthy

participants. Activation of the forearm and fingers flexors is important to prevent injuries to the UCL and internal elbow joints. Furthermore, experiments with baseball players should be conducted to prevent injury. However, the GHER showed no significant difference between 90 and maximum. So, the GHER doesn't have to pay much attention to exercise.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Antimicrobial Effect and Physical Properties of *Paeonia Lactiflora* Coated on the Denture Base Resin

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Abstract

Background/Objectives: The purpose of this study was to coat an antimicrobial material on denture base resin. The antimicrobial activity, physical properties, and cytotoxicity of specimens were evaluated coating on Paeonialactiflora

Methods/Statistical analysis: In order to evaluate the physical change, microhardness, color difference, and contact angle measurements were conducted. The OD (optical density) values of *Streptococcus mutans* and *Candida albicans* were obtained to confirm the antibacterial activity. In addition, the MTT method was used to evaluate the cytotoxicity of the coating extract.

Findings: The physical properties of the denture base resin coated with the extract changed. Compared with the uncoated specimens, the hardness improved and the contact angle reduced, indicating a hydrophilic surface. The color change could not be confirmed by the color difference measurement. The Paeonialactiflora extract showed antimicrobial activity 48 h after exposure to *Streptococcus mutans* and *Candida albicans*. The extract did not show cytotoxicity.

Improvements/Applications: The antimicrobial activity of the denture base resin coated with Paeonialactiflora extracts was confirmed. In the future, various antibacterial substances from natural extracts should be developed.

Keywords**:** *Paeonialactiflora, Antimicrobial activity, Natural extract, Streptococcus mutans, Candida albicans*

Introduction

Owing to the rapid increase in the population of the elderly, Korea is considered an aging society. Oral health management has become a very important issue for elderly individuals[1]. Most elderly individuals who experience tooth loss wear their dentures in the oral cavity; if the dentures are mismanaged, bacterial growth occurs. Older people with dentures have poor oral hygiene and a high rate of pathogenic microbial infections. Inappropriate denture management among the elderly leads to systemic diseases caused by aspiration pneumonia and affects the mortality rate of the elderly[2]. Keeping dentures clean is important not only for maintaining an esthetic, odor-free appliance, but also for maintaining oral health. It is not sufficient even if the elderly try to clean dentures themselves; food residues or calculus and pigments deposited on the dentures can cause oral bacterial growth such as denture stomatitis[3]. The control of many bacteria has been studied for denture care, because they affect not only the oral cavity[3], but may also lead to systemic diseases[4].

In previous studies, the use of a denture cleanser was studied as a denture management method[5]. Recently, research on alternative materials has been carried out to overcome the disadvantages of existing antibacterial products. Effective antimicrobials have been developed to reduce side effects by using extracts

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that are widespread in nature[6]. In this study, extracts of the natural compound Paeonialactiflora were used. Studies revealed that Paeonialactiflora extracts contain polyphenols and flavonoids; the antibacterial activity of Paeonialactiflora against *Streptococcus mutans, Porphyromonas gingivalis*, and *Candida albicans* was also reported[7]. The purpose of this study was to investigate the antimicrobial activity and physical changes induced by coating Paeonialactiflora extract onto denture base materials, and to examine its effectiveness against *S. mutans* and *C. albicans*, which cause oral disease. The materials used in this study were jet dentures coated with Paeonialactiflora extracts.

Method

Paeonialactiflora was added to a 70% methanol solution and extracted at room temperature for 48 h. Primary filtration was performed using a filter paper (Filter paper # 2, Whatman, U.K.). There after, the mixture was concentrated by evaporation using a vacuum evaporator (Vacuum Evaporator, ETELA, Japan). Additionally, the specimens were prepared in powder form using a freeze dryer (Freeze Dryer, Ilshin Lab, Korea).

The specimens were prepared with denture resin (Jet denture, Lang, U.S.A) and denture Tokuyama Rebase II (TOKUYAMA, Japan), and coated with plaquit (Dreve, Germany).To prepare the specimens, a polyethylene film was placed on a slide glass. In a Teflon mold, the resin was mixed as instructed by the manufacturer, following which it was coated by the polyethylene film again and cured. Paeonialactiflora extract powder was dissolved in plaquit solution at concentrations of 200 μg / mL, 400 μg / mL, and 600 μg / mL on the prepared specimens, and 10 μL of the mixed solution was spread on the resin specimen. For 10 min at a wavelength of 380 nm (Visio Beta vario, 3M).

Tests were conducted to evaluate the change in hardness in the uncoated group and plaquit-coated group. The hardness test was performed with a micro hardness tester (Dmh-2; Matuzawa Seiki, Tokyo, Japan). A load of 0.09 MPa with a die pyramid indenter was placed for 20 s at a face angle of 130°, and each specimen was tested thrice.The contact angle was measured to determine the difference (if any) in the contact angle of the specimen coated with the extract. It was measured immediately after dropping 5 μL of distilled water in the specimens, using a contact angle measuring device (Phoenix 300, SEO, Korea). This was repeated three times for each experimental group.To confirm the color change in the coated specimen, we examined the color difference between the control and experimental groups. To determine the color difference, a white plate was used as a standard; the L *, a *, and b * values were obtained; and the color difference was measured using a spectrophotometer (CM-3500d; Minolta, Kyoto, Japan). The E value was calculated. Three measurements were performed per specimen.The polyphenol content was measured by immersing the specimen in distilled water and eluting it in a constant-temperature water bath at 37 °C for 7 days, for which 50 μL of the test solution was added to 650 μL of distilled water. Then, 50 μL of Folin Denis reagent was added and reacted at room temperature for 3 min. (UV / VIS Spectrometer, X-ma 1200 Spectrophotometer, Human, Korea). The standard curve was obtained by adding 100 μL of a saturated solution of Na_2CO_3 and reacting it in a constant-temperature bath (dark room) at 37 °C for 1 h. Subsequently, standard amounts of garlic acid (Sigma Aldrich, USA) were used to calculate the content of polyphenols.*Streptococcus mutans* were cultured in brain heart infusion (Becton Dickinson and Co., Sparks, MD, USA), and *Candida albicans* was cultured in yeast mold (Becton Dickinson and Co., Franklin Lakes, NJ, USA). After 24 h, they were used in the experiment. To analyze the growth inhibition effect of the experimental group, the medium dilution method was used. Immersed in 600 μL PBS and eluted for 24 h. The absorbance was measured at 600 nm using an ELISA reader (Epoch, BioTeck, Winooski, VT, USA) at 37 °C for 24 h and 48 h after mixing the bacterial culture and eluate in a 1: 1 ratio.The MTT assay method was applied to determine the cytotoxicity of the extracts. According to ISO 10993-5, the number of cells per well was adjusted to 1×10^4 and cultured for 24 h. Cells were loaded with the experimental material and incubated for 24 h. After 24 h, the eluates were removed and washed with 100 μL of DPBS (Gibco BRL, Life Technologies, NY, USA). After washing, 50 μL of 1 mg / mL MTT (3- [4,5-dimethylthiazol-2-yl]-2,5-diphenyltetrazolium bromide) (Sigma, UK) was added and incubated for 2 h. To dissolve the formed MTT formazan, 100 μL / well of isopropanol was added and the reaction was allowed to proceed for 20 min (Sigma, UK). The absorbance at 570 nm was measured with a spectrophotometer. The MTT reduction rate of the control group was normalized to 100%, and the result was obtained as a percentage.

Result And Discussion

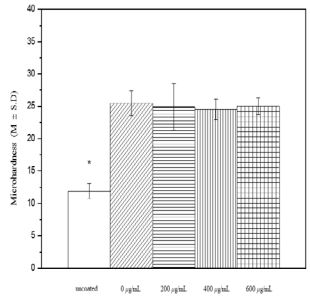


Figure1. Microhardness results

*The statistics significant difference by One-Way ANOVA ($p > 0.05$).

From the micro hardness test results [Figure 1], it can be concluded the hardness of the experimental group coated with the extract was significantly higher than that of the control group

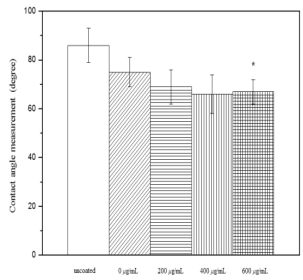


Figure 2. Contact angle measurement results

*The statistics significant difference by One-Way ANOVA ($p > 0.05$).

All experimental groups showed a decreased contact angle compared to that of the uncoated control group [Figure 2],it was evident that the coated surface was rendered hydrophilic. As the concentration increased, the contact angle decreased. In the experimental group, the 600μg/mL group in particular showed a statistically significant decrease.

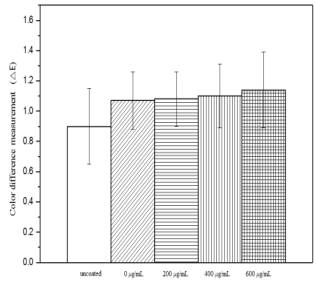


Figure 3. Color difference measurement results

In order to confirm the color change of the coated surface of the denture base resin, color difference measurements were performed, and the results were comparedwith those of the control group. There was no significant difference in the color of the experimental group compared to that of the uncoated control group [Figure 3].

Table 1. Contents of polyphenol in Paeonialactiflora

Group	Polyphenol (μg /mL)
200 μg/mL	5.64 ± 1.37^{a}
400 μg/mL	10.29 ± 1.84^{a}
600 μg/mL	11.00 ± 3.50^{b}

[ab]The difference letter indicates statistics significant difference by One-Way ANOVA($p > 0.05$).

Analysis of the polyphenol content of the Paeonialactiflora extract showed that it was present in the experimental group in concentrations of 200μg/mL, 400μg/mL, and 600μg/mL. The 600μg/mL group showed significantly higher polyphenol content than the other groups ($p < 0.05$)[Table 1].

Table 2. Antibacterial effect of *Streptococcus mutans*

Group	**OD (M ± S.D)**	
	24 h	**48 h**
0μg/mL	0.053 ± 0.003 a	0.612 ± 0.008 a
200μg/mL	0.049 ± 0.005 a	0.455 ± 0.071a,b
400μg/mL	0.047 ± 0.002 a	0.428 ± 0.021a,b
600μg/mL	0.047 ± 0.002 a	0.433 ± 0.050a,b

[ab]The difference letter indicates statistics significant

difference by One-Way ANOVA($p > 0.05$).

Table 3.Antibacterial effect of *Candida albicans*

Group	OD (M ± S.D)	
	24 h	48 h
0 μgmL	0.061 ± 0.001 a	0.884 ± 0.130 a
200 μg/mL	0.056 ± 0.003 a	0.818 ± 0.096 b
400 μg/mL	0.057 ± 0.004 a	0.837 ± 0.136 b
600 μg/mL	0.052 ± 0.003 a	0.825 ± 0.101 b

[ab]The difference letter indicates statistics significant difference by One-Way ANOVA($p > 0.05$).

The Paeonialactiflora extract was exposed to *S. mutans*[Table 2] and *C. albicans*[Table 3] to confirm its antimicrobial activity. There was no significant difference in the antimicrobial activity of the control and experimental groups, which were stored for 24 h after application of *S. mutans* and *C. albicans*. However, in the group to which the extract was applied for 48 h, the experimental group showed a significant decrease in bacteria compared to the control group.

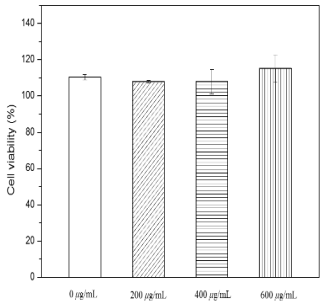


Figure 4. Cell viability ofPaeonialactiflora

The MTT assay was performed to confirm the cytotoxicity of the Paeonialactiflora extract [Figure 4].The extract showed a similar survival rate compared to the control, and it was confirmed that there is no cytotoxicity.

Discussion

There are two ways to keep dentures clean: physical and chemical. The physical method involves cleaning the denture surface using an ultrasonic cleaner, toothbrush, or toothpaste. The chemical method involves disinfecting the denture surface by immersing the denture in the chemical[8,9]. In the physical method, it is difficult for the elderly to remove bacteria from the denture surface with a toothbrush, as movements are difficult for them. On the other hand, the chemical method causes discoloration of the denture surface and corrosion of metal parts[10, 11].Therefore, this study aims to prevent the growth of bacteria through an antimicrobial coating on the denture surface. As a result of microhardness, the coated material affected the surface hardness of the denture base resins, and the physical properties were improved. Increasing the micro hardness of denture base resins may increase the using period of denture base resins. Previous studies have reported that the color change of a resin surface caused by the application of chemical disinfectants on denture base resins was a disadvantage[10]. Color difference was not observed in this study. Therefore, Paeonialactiflora was found to be suitable for use as a coating for denture base resins. For the polyphenol contents of specimens analysis, Previous studies have shown that Paeonialactiflora contains polyphenols and flavonoids. The polyphenol content was also high in this study. The extract product containing these polyphenols exhibited antioxidant activity. According to previous paper, substances with these antioxidant activities affect biological properties[12]. The reason the specimen exhibited antimicrobial activity is due to the surface being rendered hydrophilic, as well as the antioxidant content of the material. In a previous study, Paeonialactiflora was extracted from hexane extract, methanol, chloroform, and ethyl acetate to confirm the antimicrobial activity of *S. mutans, C. albicans*, and S *aureus*[9].

In this study, the antimicrobial activities of Paeonialactiflora extract against *S. mutans* and *C. albicans* were confirmed. The extract also showed antimicrobial activity against *S. epidermidis*[13]. Further research suggests that the Paeonialactiflora extract should be applied to various bacteria.

On the other hand, Previous studies also showed no cytotoxicity in a Paeonialactiflora extract, which is consistent with the results of this study. In another study, the extracts were effective in killing oral squamous cell carcinoma[13]. The application of Paeonialactiflora extract, which is toxic to cancer cells without showing cytotoxicity to normal cells, is expected in various fields.

Conclusion

The antibacterial activity of extracts of Paeonialactifloraagainst *S. mutans*and*C. albicans*was investigated. Compared with the control group, the

treatment groups showed lower absorbance, confirming the antibacterial activity.To confirm the physical changes in the surface of the denture base material caused by the antimicrobial coating, the contact angle was measured. The contact angle was lower in the treatment groups, and the surface of the specimen was more hydrophilic than in the control group. The microhardness of the experimental group was higher than that of the control group. The color difference test indicated that there was no difference in color between the control group and the experimental group. Moreover, the extract of Paeonialactiflora did not show cytotoxicity. The results of this study showed that the Paeonialactiflora extract had an antibacterial effect when used to coat the surface of dentures.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Integrative Literature Review on Resilience of Family with the Elderly Dementia

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Abstract

Background/Objectives: The dementia is rapidly growing. This study is to develop evidence of the intervention program for family with demented elderly patients and to suggest the direction of future research.

Methods/Statistical analysis: The integrative literature review was applied for 20 years since 2000. We evaluated the extracted data through literature search. 11 papers were confirmed. The concepts of 'quality of life' and 'satisfaction of life', which were not included in the main search term, were important as a positive concept. Three researchers analyzed the results after discussing the contents of the final analysis.

Findings: In qualitative studies, the center for dementia care provided positive change in family such as opening mind to dementia, help each other, changing pattern of life, and changing for better life. The process of family resilience with in-home patient was analyzed as four stages of confrontation, challenge, integration, and sublimation. The type of family resilience was analyzed as positive meaning seeking, rational mutual cooperation, passive reality accepting, and external resource dependent. The adapted family's the main caregivers were spouses, had good health condition, social resources, and religion. In quantitative studies, the factors affecting adjustment of family were family resilience and support burden, and life satisfaction of family were family resilience.

Improvements/Applications: This study provides the evidence of intervention program for family resilience with the demented elderly patients. Also, the result of this study suggests the future direction of the research.

Keywords: *Family resilience, Elderly dementia, Integrative literature review, Quality of life, adaptation*

Introduction

The number of patient with dementia which is called the most painful disease is rapidly growing ahead of its entry into the aging society. According to the Ministry of Health and Welfare, the number of dementia patients in Korea is over 700,000 as of 2017, and it is estimated to be 1 million by 2024[1]. The symptoms ofdementia are characterized by worsening as the disease progresses. In particular, family caregivers with dementia patients have a greater burden of care and nursing costs if they suffer from complicated symptoms such as cognitive dysfunction, psychiatric symptoms, and wandering symptoms[2].In order to meet these social needs, a long-term care insurance was introduced in 2008 and a day for overcoming with dementia was established. The centers for dementia care were established nationwide in 2018 in order to detect dementia early and overcome dementia[3], but 72% of the elderly patient with dementia cared by family[4]. In Korea, when a family member develops dementia, the family members have burden and pain by increasing stress, criticizing the behavior or the attitude between family members, and increasing conflict due to responsibility of the care[5],[6]. In addition, the severity

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of cognitive impairment, behavioral symptoms, and impaired function of daily living in patients with dementia also decreases the quality of life of family members[7]. The results of previous studies on the family members of the elderly patients with dementia were mostly focused on negative physical, and mentioned the family function is decreased by providing care[5].However, in 2012, Kim et al[8] mentioned that previous studies did not investigated the characters of the family with the elderly dementia patients which have ability of coping crisis situation positively. Therefore, the positive factors that decreasing family stress, and improving family relationship under crisis situation should be considered in studies. The resilience of family is a family capacity that can be successfully adapted when faced with stress by reducing the burden of family with dementia patients, improving adjustment and quality of life[9]. Although the resilience of family of the elderly patients with dementia has begun to be investigated, systematic studies on the resilience are still rare[8,10]. It is the time that shifting a paradigm of the elderly patients with dementia to identify the negative factors experienced by family members, to mediate the strategy, and to identify the positive factors of the family members. Exploring positive factors such as the resilience of family may be useful for developing various interventions to help adjustment of family of the elderly patients. Therefore, it is necessary to integrate various research results related to the resilience of family and to systematically and objectively evaluate the results of research to clearly establish the basis of nursing intervention.

The purpose of this study is to develop the evidence of the intervention for the family with the elderly dementia and to suggest the direction of future research by analyzing the resilience of family of the elderly patients with dementia by the integrated literature review method.

Method

This study is an integrative literature review for integrating study results regarding the resilience of family of the elderly patients with dementia for 20 years since 2000.This study is to investigate the literature on the resilience of family with the elderly dementia by using of Whittemore & Knafl[11].

Result

1. General characteristics of the studies

In this study, the characteristics of domestic studies on family resilience of dementia were analyzed. 5(45.5%) studies out of 11 studies were year before 2010, and since 2011, there have been 6(54.5%) studies. In academic field, 7(63.7%) studies were the field of nursing. Out of 7 nursing studies, 1(9.1%) is in general nursing, 3(27.3%) were published in the Korean Journal of Psychiatric/Adult Nursing each. In addition, there were 3(27.3%) elderly welfare studies, 1(9.1%) social welfare administration study. In study design, there were 4 (36.4%) qualitative research, 7(63.6%) quantitative research.

2.Analysis of qualitative research on family resilience of dementia patients

In this study, four qualitative domestic researches on the family resilience of dementia were presented. One of the four qualitative studies was the experience of the family of demented elderly using the care support of the center for dementia care and the other two were the experience of family resilience of dementia patients or in-home demented patients. A case study was conducted to propose an improvement plan for improving the family resilience of dementia patients.

The subjects of the qualitative research analyzed in this study were the wife, daughter, daughter-in-law, husband, son and grandchild daughter-in-law of the elderly with dementia. The number of subjects was 8 to 30. Among the papers analyzed in this study, the experience of the family resilience of in-home dementia did not conduct the interviews with the subjects themselves. The analysis was based on 31 handwritten records of families with demented patients participated in the “Dementia resilience Experience Contest” in 2011-2012 who agreed participation in this study. The duration of providing family care to dementia ranged from a minimum of 1 year to a maximum of 10 years.

The qualitative research results analyzed in this study are as follows. First, as a result of the experience of the demented family using the care support of the center for dementia care, the use of the center for dementia care became the driving force of the understanding of the dementia and the demented elderly. The use of the center for dementia care for the elderly with dementia was an experience that would lead to another world. The center

for dementia care is helpful to family as well by proving free time. Second, the analysis of the experiences of familyof demented patients with in-home dementia were analyzed through 31 handwritings, and the process of resilience was analyzed as four stages of confrontation, challenge, integration, and sublimation. Third, as a Q methodology based on in-depth interviews of the demented elderly family, the type of dementia family was analyzed as positive meaning seeking type, rational mutual cooperation type, passive reality accepting type, and external resource dependent type. Fourth, a study on the improvement of social welfare services for the improvement of family resilience of demented elderly has compared and analyzed the cases of demented elderly caregiving adjustment family and maladjustment family. As a result, the adapted family showed that the majority of the main caregivers were spouses, had good health condition, used social resources (Day Care Center), and had religion .

3. Analysis of quantitative research on family resilience of dementia patients

In this study, the number domestic study regarding family resilience with dementia patients was 7. Two were intervention studies and the other five were survey researches.The first study among the intervention studies by Bang et al. in 2016 consisted of the family resilience enhancement program applied to the main caregiver of the elderly dementia. It consists of contents to increase family belief system, organization type, and strengthen communication to increase family resilience. The time was about 1 hourper session. The session was conducted once a week and total 8 session. The program consisted of 20 minutes of education, 40 minutes of group activities. As a result, the experimental group with the program showed improved family resilience, adjustment, perceived health status compared to the control group. The second study by Song et al. in 2014 was a group counseling program named "Happiness plus program" that combined art, music, horticulture, and cognitive-behavioral therapy to improve the stress coping ability of caregiving families and to better care for the demented elderly after education.The program consisted of a total of 8 sessions. Prior to the start of the program, two hours of pre-education sessions were held on topics such as 'Dementia and proper nursing and coping'. The results of this study showed that the subjects who participated in the program had lowered their depression after the program.

The study by Kim et al. in 2009 was conducted to investigate the factors affecting the life satisfaction of family with the demented elderly. Among them, 37.7% were the daughter-in-law and 21.9% were the daughters. Also, 54.1% of subject provided care for the elderly with dementia for 4 ~ 9 hours per day, and the average hour for caregiving was 9.34 hours per day. As a result of this study, the factors affecting life satisfaction of family with the demented elderly were family resilience, and the explanatory power was 30.4%. The study by Lee in 2008 is a study on the adjustment of family with demented elderly. This study suggests the direction of adjustment through the analysis of correlation with family maladjustment using the family resiliency model.

The subjects were 52% of the daughters-in-law and 18% of the daughters. As a result of this study, the influencing factors on maladjustment of family with the elderly dementiawere incendiary communication, confident of problem solving ability, power of challenge in sense of family control power, social support. Through this, I-Message communication method is used to improve the family adaptability with demented elderly patient. Also, improving problem solving ability using community resources, improving the family power of challenge and control, and providing emotionalsupport through relationships with friends were necessary. The study by Yoo in 2007 was also conducted to investigate the factors influencing the family adjustment with demented elderly patient. The average age of the subjects was 53.42 years, and the duration of caregiving was less than 2 years (41.7%). As a result of this study, the factors affecting family adjustment with demented elderly patient were family resilience and family support, and the explanatory power was 23.4%.

Discussion

This study investigated the study regarding resilience of family with demented elderly patients since 2000 and conducted a integrative literature review on 11 studies. Among the 11 studies analyzed in this study, 63.7% of the studies were written in the field of nursing, and 63.6% of the studies were quantitative rather than qualitative. As a study method, survey research methodology using the survey was the highest with 45.5%. The results of this study are discussed in the following two aspects.

First, in order to search for the resilience of family with demented elderly patient studies, the main search terms were selected and 35 studies were searched.

However, based on the title and abstract of the studies, the research team selected the best studies for the purpose of this study and 11 studies were selected finally. In the present study, the family with demented elderly patients were more likely to experience depression, burden, and stress which were negative[12-14].According to the analysis of newspaper articles on dementia families from 1920 to 2014, there were four types such as suicide of family with dementia patient, murder of the demented family, suicide after murder, and co-suicide. It can be seen that the negative concept is dominant in the media as well as in the research. In recent years, however, the concept of resilience of family with demented elderly patient has been emphasized as the adjustment patterns of psychosocial and healthy family members demonstrate the flexibility of the family using various resources around them rather than the burden of the family members and the maladjustment[15]. In addition, in Korea, the third comprehensive plan for dementia managementwas announced in December 2015. This is because, unlike the first and second plans, the focus of support for patients and their families is emphasized. The vision of the tertiary plan is 'Implementation of a society in which dementia patients and their families can live comfortably and safely in their communities'.

The areas for this are community-oriented prevention of dementia, providing diagnosis, treatment, and care of dementia patients under comfortable and safe environment, and reducing the burden of care for the family members with dementia patients. At the same time, there was effort to improve the resilience of family with demented patient. In the future, the research for the family with demented elderly patients should also be based on a positive concept.

Second, in analyzing the type of research in this study, qualitative research was 36.4% and quantitative research was 63.6%. Five out of seven quantitative researches were conducted as survey research. It is based on Dickoff and James' four theories which were factor-isolating theory, factor-relating theory, situation-relating theory, and situation-producing theory[16]. The studies related with family with demented elderly patients so far have focused on factor-isolating theory that conceptualizing phenomena and classifying facts and events. Also, the studies have focused on factor-separation theory that identifies the relationship between named factors and concepts, and the contingency theory that predicts the exact cause and effect relation. However, there have been few researches on the situation-producing theory for prescribing specific situation to control the situation based on the predicted theory and to bring the definite goal or specific result.

Conclusion

This study investigated the study regarding resilience of family with demented elderly patients. There is not enough research and standardized measurement tools on the family resilience with demented elderly patients. Therefore, developing standardized measurement tools to measure the positive concept of family with demented elderly patients is necessary to promote family resilience, to develop intervention programs, and to start intervention studies for investigating the effect of family resilience.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Physical, Biological and Antimicrobial Properties of Polymethyl Methacrylate Coated with *Cnidium Officinale* Extract

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Abstract

Background/Objectives: This study was aimed to investigate the influence of *Cnidium officinale* (CO) extract coating on the physical, biological, and antimicrobial properties of polymethyl methacrylate (PMMA) surface.

Methods/Statistical analysis: PMMA was coated with CO extract of different concentrations and tested for physical properties such as microhardness, water contact angle, and color change, and cytotoxicity measured through MTT assay. Antimicrobial and antifungal activity was measured against *Streptococcus mutans* and *Candida albicans*. Polyphenol content in the extract was analyzed using a UV-vis spectrometer. The results were analyzed by one-way ANOVA followed by Tukey's test.

Findings: There were no significant differences in microhardness, contact angle, color change, and cell viability ($p > 0.05$) between control and CO-coated PMMA samples. However, the CO-coated groups showed significant reduction in *Streptococcus mutans* and *Candida albicans* ($p < 0.05$). CO significantly improved the antimicrobial effect of the denture, consistent with its polyphenol content.

Improvements/Applications: Our results indicate that coating PMMA resin with CO extract would be effective for ensuring good antimicrobial activity, while maintaining the advantages of PMMA.

Keywords:*Antimicrobial property, Biological property, Cnidium officinale, Extract, Physical property, Polymethyl methacrylate*

Introduction

Recently, with the entry of an aging society, the oral health care of the elderly has emerged as an important problem in dentistry. The use of dentures is increasing steadily among elderly people who have severe tooth loss[1]. Although polymethyl methacrylate (PMMA) has been generally used as a biomaterial in the dental fields for denture due to its physical and biological properties, and simple fabrication[2], its poor antimicrobial property still remains a shortcoming[3]. Many studies have been reported on stomatitis and denture surface bacterial proliferation in denture patients[2-3]. A plaque could easily form in the environment of the mouth, leading to the acceleration of oral infection and unfavorable odor[4]. Thus, attempts have been made to reduce infections by adding antimicrobial agents to PMMA[2]. However, the addition of antimicrobial agent has a number of problems in terms of physical and biological properties, such as changing surface, affecting cytotoxicity[1-5]. Therefore, in order to develop an antimicrobial PMMA, it is important to select and add an antimicrobial agent that does not cause side effects and does not deteriorate the physical and biological properties.

Antimicrobial agents using chemically synthesized materials are inexpensive, uniform in composition and can be mass-produced, but toxicity, carcinogenesis

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and mutagenesis in the human body are potential risks associated with it[6]. Therefore, natural products have been researched as a way to find alternative substances with antimicrobial propertiesand less side effects[7-8]. Natural organic matters have limitations in terms of composition or manufacturing conditions, but have the advantage of low residual toxicity and side effects[9]. Recently, studies on antioxidants to inhibit free radicals, which are closely related to the health of modern people, have been carried out for natural products[10]. Moreover, there has been increasing interest in oriental medicine with several studies on their antioxidant activity and safety

Cnidium officinale (CO), a Korean medicinal herb, has been used in Asia as a traditional medicine for long periods of time, including as painkillers, anti-inflammatory drugs, and treatment for menstrual irregularity[12]. In addition, CO exhibits various effects such as antibacterial, antifungal, vascularization, sedation, and analgesics[13-14]. Although it is known that CO has antimicrobial activities against various microorganisms such as bacteria and fungi, there is a lack of studies on its application in dental materials[15].

Therefore, in this study, we aimed to produce PMMA with improved antibacterial properties by observing the effects of surface coating PMMA with different concentrations of CO extract. Our null hypothesis states that (1) surface coating of PMMA would result in significant differences in physical properties, (2) biological properties, and (3) antimicrobial properties compared with uncoated PMMA and control.

Method

Four groups were fabricated using a teflon mould of diameter of 10 mm and a thickness of 1 mm. Commercially available PMMA (Tokuyama Rebase II,TOKYUAMA, Japan) was chosen as samples. Surface coating solution (Plaquit, Dreve, Germany) was prepared by mixing various concentrations (0, 200, 400, 600 ug/mL) of CO extract. After mixing PMMA, 10 uL of coating solution was spread on a PMMA sample by microbrush and then coated with a light curing machine (Visic Beta vario, 3M) for 10 min. Measurements were performed twice for each sample (n = 5).

Microhardness

The samples were prepared in a hardness tester (micro hardness tester, Dmh-2; Matuzawa Seiki, Tokyo, Japan) and a 200 g weight was applied for 10 s at different points of the samples. The major axis length of the pressed mark was measured to determine surface hardness. Two sites were measured at random for each specimen, and the mean value and standard deviation were obtained and compared.

Wettability

The wettability of samples was carried out using a contact angle analyzer and contact angle measurement software. A 20-uL droplet of distilled water was dropped on the sample surface, and examined after 3 s of contact (Phoenix. 300, Gyunggido, Korea).

Color change

A spectrophotometer (Lamba20, Perkin Elmer, Orwalk, CT, USA) was used to measure the color changes of the samples. The CIE L*a*b* color system is a three-dimensional uniform color space with axes L*, a* and b*, indicating the difference in distance from origin to color change. The L* values indicate brightness and extend from 0 (black) to 100 (white). The Lab values and color change (ΔE) were determined according to the CIE color coordinate system.

Cell cytotoxicity

The cytotoxicity was evaluated using the MTT assay according to ISO 10993-5 standards. L929 cells were seeded into a 96-well plate (SPL, Pochen-Si, Gyeonggi-Do, Korea) with a density of 1×10^5 cells/mL and cultured for 24 h. After removing the culture medium from the wells, 100 uL of the CO extract was added to each well. After 24 h, the culture medium was removed and replaced with 50 uL of MTT solution in phosphate-buffered saline. The MTT solution was discarded and 100 uL isopropanol was added to each well. The absorbance was then evaluated using an ELISA reader (Epoch, BioTek, Winooski, VT, USA) at 570 nm.

Microbial analysis

For microbial analysis, the growth inhibitory effect of the extract was analyzed. The strains used in the experiment were *S. mutans* (ATCC 25175), and *C. albicans* (ATCC 10231). *S. mutans* was cultured in brain heart infusion (Becton Dickinson and Co., MD, USA), and *C. albicans* in yeast mold (Becton Dickinson and Co., Franklin Lakes, NJ, USA). The samples were then extracted in 600 uL of PBS and incubated for 24 h. Bacterial culture fluid was diluted so that the OD600

value was 0.4-0.6. After mixing the solution and bacterial culture with 1:1 ratio, the mixture was incubated at 37 °C for 24 h and 48 h. Inhibitory effect of the extract was measured based on the optical density (OD) values in each well using an ELISA reader (Epoch, BioTeck, Winooski, VT, USA) at 600 nm.

Polyphenol contents

The polyphenol content was measured by immersing the specimen in distilled water (same as MTT elution method). Then, 50 uL of the sample solution was added to 650 uL of distilled water. Next, 50 uL of Folin Denis reagent was added and reacted at room temperature for 3 min, after which 100 uL of 10% Na_2CO_3 saturated solution was added and 150 uL of distilled water was used to adjust the final volume to 1 mL. After mixing and incubating the reaction for 1 h in a water bath at 37 °C (dark room), the absorbance was evaluated at 725 nm using a UV/VIS Spectrometer (X-ma 1200 Spectrophotometer, Human, Korea). The standard curve was calculated using the standard material gallic acid, and the polyphenol content was calculated.

Statistical analysis

The results obtained for the control and experimental materials were analyzed by one-way analysis of variance (IBM SPSS statistics 23, IBM Co., USA), followed by Tukey's test ($p<0.05$).

Result and Discussion

No significant differences were observed between the samples in terms of microhardness, wettability, and color change, except for the uncoated resin. In terms of cytotoxicity, no significant differences were observed between the samples [Figure 1]. Microbial analysis showed that the OD of the experimental samples containing CO significantly decreased at 48 h for both *S. mutans* and *C. albicans*[Figure 2]. This confirmed the presence of 200, 400, 600 ug/mL polyphenol in the experimental samples [Table 1].

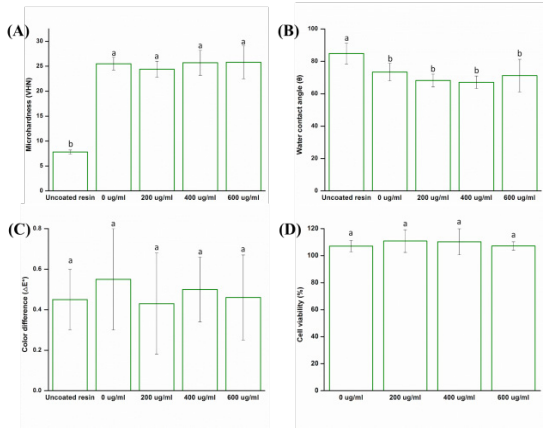


Figure 1. Comparison of (a) microhardness, (b) water contact angle, (c) color change and (d) cell cytotoxicity among different groups of samples.

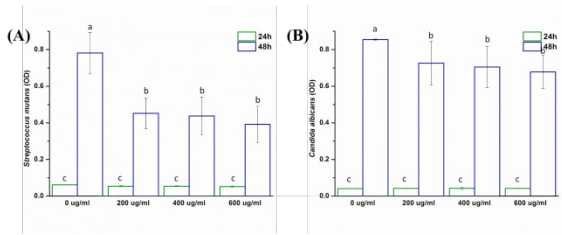


Figure 2. The results of the optical density (OD) of (a) *S. mutans* and (b) *C. albicans* among different groups of samples.

Table 1.Polyphenol contents of denture base resin containing *Cnidium officinale*

Group	Polyphenol (ug/mL)
200 ug/mL	22.71 ± 1.17
400 ug/mL	24.14 ± 1.17
600 ug/mL	24.14 ± 2.47

Discussion

PMMA is widely used in dentistry for positioning artificial teeth in the oral cavity and for correcting tooth position[2]. Bacteria or fungi on PMMA surface can cause various side effects, including oral thrush infections[4, 16]. Thus far, studies have tested PMMA coated with antibacterial agents, however, the release of these agents could have toxic effects or cause population shifts in normal oral flora[17]. Thus, in the current study, CO extract, which is a natural material, was used to coat the PMMA surface.

The physical properties of the coated PMMA were first evaluated. As shown in Figure 1A,only the uncoated resin group had a significantly lower surface hardness

than the other groups ($p< 0.05$), while the control, experimental groups did not show any significant difference in surface hardness ($p> 0.05$). Uncoated resin group had a significantly higher water contact angle [Figure 1B], while the control, experimental groups did not show a significant difference in wettability ($p< 0.05$). Furthermore, none of the groups showed significant difference in evaluation of color difference ($p> 0.05$) [Figure 1C]. Based on the above results, we rejected the first null hypothesis that surface coating of PMMA would result in significant differences in physical properties. Since denture coatings are in direct contact with oral mucosal tissues, cytotoxicity is very important. In terms of cell cytotoxicity [Figure 1D], all groups showed 100% cell viability, and there was no significant difference between the groups ($p > 0.05$). In accordance with ISO standard, over 70% cell viability is an indicator of cell cytotoxicity[18]. Thus, our second null hypothesis that surface coating of PMMA would result in significant differences in biological properties was also rejected.

Removable PMMA resin comes into contact with many microbial species in the oral cavity, causing unfavorable odors and accelerating oral bacterial and fungal infection[2]. In order for natural extract to be used as denture coating, it is necessary to verify the antibacterial and antifungal effects on the major bacteria found in the oral cavity and dentures. *S. mutans* is a representative caries-causing bacteria, and the acidic environment created by the organic acid formed during the process of glucose metabolism promotes the attachment of *C. albicans* to the oral mucosa and dentures[19-20]. In addition, the fact that most of the biofilms constituting the removable prostheses such as acrylic resin are composed of *S. mutans* and *C. albicans*, these two are the main pathogens in patients using denture. In microbial analysis [Figure 2], OD of both *S. mutans* and *C. albicans* was significantly decreased at 48 h in samples containing CO extract ($p< 0.05$). Therefore, our third null hypothesis stating that surface coating of PMMA would result in significant differences in antimicrobial properties compared with uncoated and control was accepted. The presence of the polyphenol contents within the experimental samples of 200, 400, 600 ug/ml was also confirmed [Table 1]. Phenolic compounds are one of metabolites widely distributed in plant systems, and they show antioxidant and antimicrobial activities. In general, antimicrobial agents are known to be related to phenolic compounds[21], and previous studies have reported that phenolic substances exhibit antimicrobial activity[22]. In this study, antimicrobial activity was also observed in the presence of phenolic substances. The result of this experiment is consistent with the high antimicrobial activity of phenolic substance-containing extract against bacteria and fungi, which are the most important microorganisms in the oral cavity[21].

Although our study indicates that surface coating with CO extract shows antimicrobial properties, without changing the desired physical and biological properties of PMMA, the mechanism of the antimicrobial properties remains unknown. In addition, our in vitro study has the limitation that the experimental period was too short; the long-term effects of the CO extract need to be evaluated. Further studies are also required to delineate the proportions of components and observe the effects over time.

Conclusion

Our study shows the surface coating of PMMA with COprovides antimicrobial effects, while maintaining the physical and biological properties of PMMA.

1. The microhardness, contact angle, and color change of the surface did not show significant differences between control and CO-coated PMMA samples ($p> 0.05$).

2. The cell viability did not show significant difference between control and CO-coated PMMA samples ($p> 0.05$).

3. The antimicrobial effect against *S. mutans* and *C. albicans* at 48 h showed significant difference between control and CO-coated PMMA samples ($p< 0.05$).

Thus, we conclude that CO has the potential to be used as a denture base resin. In addition, PMMA coated CO would be suitable for clinical practice.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Surface Characterization and Antimicrobial Efficacy of Denture Base Resin Coated with *Glycyrrhiza uralensis extract*

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Abstract

Background/Objectives: *Glycyrrhizauralensis* is known for its antibacterial properties. The purpose of this study were to analyze surface characteristics of denture base resin coated with *G. uralensis* to evaluate antimicrobial activity and cell cytotoxicity.

Methods/Statistical analysis: The powdered *G. uralensis* extract was dissolved in Plaquit solution and then applied to a denture base resin and cured with light. Microhardness, water contact angle, and color change analyses were performed to analyze the surface characteristics. Specimens were obtained from the coated surfaces and analyzed to determine the amount of polyphenol. Antimicrobial activity was evaluated against *S. mutans*and *C. albicans* and cytotoxicity was investigated using the MTT assay.

Findings: The surface coated with the *G. uralensis* extract maintained or improved the mechanical and physical properties of the specimens. The polyphenol content increased with the amount of *G. uralensis* coating. The antimicrobial activity of the specimens from the experimental group showed a significant effect on both *C. albicans* and *S. mutans* compared to that from control group. In addition, denture base resins coated with the *G. uralensis* extract were noncytotoxic, demonstrating their biocompatibility.

Improvements/Applications: Denture base resins coated with *G. uralensis* extracts can be used to develop antimicrobial denture base resins to prevent oral stomatitis.

***Keywords*:** *Glycyrrhizauralensis*, Antibacterial activity, *Streptococcus mutans*, *Candida albicans*, Denture base resin

Introduction

Bacteria residing in the oral cavity are responsible for various oral diseases[1]. Microorganisms, mainly as different species of bacteria, can create an oral biofilm or dental plaque, resulting in periodontal disease and dental caries. The attached of bacteria to the saliva on the teeth surfaces showed to be the first step in a formation of dental plaque. The collection of bacteria on the teeth surface is important stage in the development of dental diseases[2].

Oral diseases are caused that the accumulation and colonization of oral microorganisms, and adhesion is the first stage in the bacteria colonization process. *Streptococcus mutans (S. mutans)* and *Candida albicans (C. albicans)* are representative organisms involved in a variety of oral diseases. *S. mutans* is a Gram-positive coccus and facultatively anaerobic properties. Usually, S. mutans was found in the oral cavity and the cause of dental caries. *S. mutans*indicated have agreater ability to form biofilms than isolates of other bacteria species that accumulation the human oral cavity[3].*C. albicans* is a pathogenic yeast that has been showed as a predominant feature organism in the oral candidiasis.

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C. albicans usually showed in the oral, but *C. albicans is not* found to be a cause serious of oral disease[4-5].

A number of studies have been conducted on antibacterial efficacy against oral bacteria. Common antimicrobial agents have many side effects, leading to greater interest in the development of alternatives, such as using natural materials. Natural extracts have been used for hundreds of years in folk medicine. Many natural plant products have been successfullyutilized as antibacterial agents[6]. Many studies have been conducted to evaluate the antibaterial efficacy of various compounds, with much growing interest in natural extracts that do not produce resistant organisms.

Among natural extracts studied, *Glycyrrhizauralensis* is known to have antibacterial and anti-inflammatory properties. Previous studies have shown that *G. uralensis* exhibits antibacterial effect against Gram-positive bacteria (e.g., *P.acnes*and*B. subtilis)* and two Gram-negative bacteria (*E.coli* and *P.aeruginosa*)[7]. Additionally, it appears to be effective against *Helicobacter pylori*, the causative agent of gastric cancer[8], and to influence antibiotic resistance in organisms[9]. Various studies have reported the antimicrobial efficacy of *G. uralensis*; however, none of these have been conducted on the representative bacteria involved in oral diseases. Therefore, the purpose of our study is to evaluate the antimicrobial efficacy of a denture base resin coated with the powdered extract of *G. uralensis.*

Method

G. uralensis (500 g) was pulverized and extracted with a 70% methanol solution at room temperature for 48 h. The solution was filtered (filter paper #2, Whatman, U.K) and then concentrated by evaporation in a vacuum evaporator (ETELA, Japan). The concentrated extract was prepared in powder form with a freeze dryer (Freeze Dryer, Ilshin Lab, Korea).

Jet Denture (Lang, U.S.A) was used as the denture resin and Plaquit solution (Dreve, Germany) was used for coating with *G. uralensis* extract. Polyethylene film on a slide glass and then resin was mixed in a Teflon mold (10 × 10 × 0.1 mm) as instructed by the manufacturer. The extracted *G. uralensis* powder was mixed with 200 μg / mL, 400μg / mL, and 600 μg/ mL of Plaquit solution and stirred to dissolve. The mixture was spread on a resin specimen prepared with a micro brush, then the surface was coated and cured using a light curing machine (Visio Beta vario, 3M) for 10 min.A microhardness tester (Dmh-2; Matuzawa Seiki, Tokyo, Japan) was used to determine the hardness difference between the experimental and the control (uncoated and Plaquit-only coated) specimens. A 0.09 MPa load was applied to the surface of the specimen for 20 s using a pyramidal-shaped diamond indenter. To determine the contact angle of coated specimens, 5 μL of distilled water was dropped on the uncoated and Plaquit-only coated specimens, and the contact angle of these control specimens was measured using a contact angle measurement device (Phoenix 300, SEO, Korea). Chrominance measurements were conducted using with a spectrophotometer (CM-3500d; Minolta, Kyoto, Japan) to determine the color difference of the three groups of experimental and control (uncoated and Plaquit-only coated) groups. A white plate was set as the standard for color change; a*, b*and L* values of the specimens were obtained and ΔE * values were calculated. The polyphenol content was measured from a solution of the specimens immersed in distilled water and incubated for 7 d in a water bath at 37 °C. Next, 650 μL of distilled water was added to 50 μL of the specimen solution, followed by addition of 50 μL of Folin-Denis' reagent and reaction for 3 min. Afterward, 100 μL of 10% Na_2CO_3 saturated solution and then 150 μL of distilled water were added for a total volume of 1 mL. After incubation for 1 h, the absorbance was measured at 725 nm using a UV/vis spectrophotometer (X-ma 1200 Spectrophotometer, Human, Korea). The standard curve was calculated using a standard gallic acid solution (Sigma Aldrich, U.S.A). To analyse the growth inhibitory effect*, S. mutans*(ATCC 25175) were grown in a brain infusion medium (Becton Dickinson and Co., Sparks, MD, USA) and cultured for 24 h; *C. albicans*(ATCC 10231) were incubated in a yeast and mold medium and incubation for 24 h. The specimens were extracted in 600 μL of phosphate-buffered saline (PBS) for 24 h. The bacterial culture was diluted to an OD 600 of 0.4-0.6 and the absorbance was measured at 600 nm using an optical density reader (Epoch, BioTeck, Winooski, VT, USA) at 24 and 48 h after the eluate and bacterial culture were mixed in a 1:1 ratio. The MTT cytotoxicity test was conducted according to ISO 10993-5, in which the number of L929 cells per well was adjusted to a density of 1×10^4 cells/mL; 100 μL solution of cells were incubated with a dental base resin specimen for 24 h. The absorbance was measured on the UV-vis spectrophotometer and analysed at 570 nm.

Result and Discussion

1. Physical properties results

The microhardness of the coated, uncoated, and Plaquit-only coated specimens are listed in Table 1. Microhardness of the experimental group coated with the *G. uralensis* extract increased significantly from that of the uncoated group ($p < 0.05$). However, all coated specimens in the experimental group were not significantly different ($p > 0.05$). After establishing the microhardness of the specimens, contact angles were then investigated [Table 2]. The uncoated group had the largest contact angle (84.81° ± 6.52°), whereas the most concentrated 600 µg/m Lcoated group had a significantly lower contact angle (66.96° ± 4.68°) than that of any other experimental specimen ($p < 0.05$). These results demonstrate that the coated resin surface exhibits a hydrophilic character. The color change of the coated specimens was compared to that of the uncoated specimen [Table 3] whereby no significant difference between coated and uncoated specimens was observed ($p > 0.05$).

Table 1.Microhardness of denture base resins.

Group	Hardness (MPa)*
Uncoated resin	10.8 ± 1.2*
0 µg/mL	26.5 ± 1.7
200 µg/mL	27.1 ± 1.9
400 µg/mL	25.3 ± 1.9
600 µg/mL	25.1 ± 3.2

*Values are presented as mean ± standard deviation.

Table 2. Contact angles of denture base resins.

Group	Angle (Degrees)*
Uncoated resin	84.81 ± 6.52 [a]
0 µg/mL	73.45 ± 5.44 [a]
200 µg/mL	74.12 ± 4.78 [a]
400 µg/mL	71.45 ± 4.26[a]
600 µg/mL	66.96 ± 4.68[b]

*Values are presented as mean ± standard deviation.

[a,b]different superscript letters denote significant differences by one-way ANOVA.

Table 3.Color change of denture base resins.

Group	ΔE*
Uncoated resin	0.82 ± 0.37
0 µg/mL	1.05 ± 0.30
200 µg/mL	0.97 ± 0.40
400 µg/mL	0.94 ± 0.43
600 µg/mL	0.94 ± 0.46

*Values are presented as mean ± standard deviation.

2.Result of component analysis

The polyphenol content increases with increasing coating concentration [Table 4], however, there is no significant difference among the coated specimens in the experimental group ($p > 0.05$).

Table 4. Polyphenol content of denture base resins.

Group	Concentration (µg/mL)*
0 µg/mL	-
200 µg/mL	11.48 ± 2.97
400 µg/mL	12.43 ± 3.78
600 µg/mL	29.57 ± 26.94

*Values are presented as mean ± standard deviation.

3. Biological analysis effect results

Antimicrobial activity was evaluated by optical density (O.D), whereby a significant reduction of O.D was observed for specimens coated with the *G.uralensis* extract [Table 5] the 600µg/mL coated specimen exhibited the highest antimicrobial activity ($p < 0.05$) while the 0 µg/mLcoated specimen displayed the lowest antimicrobial activity against *S. mutans* and *C. albicans.* Figure 1 shows the cell viability results of the *in vitro* cytotoxicity test, indicating that there is no significant difference among the experimental group of *G. uralensis* coated denture base resins ($p > 0.05$).

Table 5. Optical density related to antimicrobial activity of denture base resins.

Group	Optical density (OD)*	
	S. mutans	***C. albicans***
0 µg/mL	0.612 ± 0.008 [a]	0.884 ± 0.130 [a]
200 µg/mL	0.410 ± 0.010 [a,b]	0.733 ± 0.121 [b]
400 µg/mL	0.412 ± 0.020 [a,b]	0.685 ± 0.248 [b]
600 µg/mL	0.389 ± 0.047 [b]	0.726 ± 0.088 [b]

*Values are presented as mean ± standard deviation.

[a,b]different superscript letters denote significant differences by one-way ANOVA.

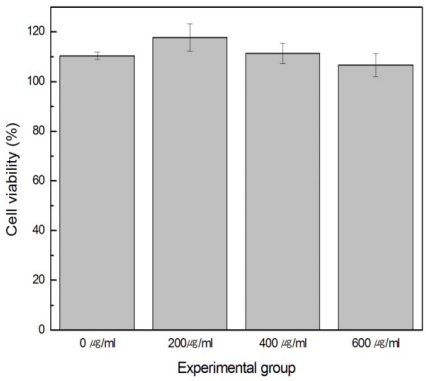


Figure 1. Cell viability of polymer base resins with *G. uralensis* extract powder coating

Discussion

These results demonstrate that microhardness of the surface increased upon coating with the extract. Hardness of the denture is an important factor because it affects abrasion resistance of the surface. Mechanical cleansing of dentures makes the surface rough and causes scratches, which can increase the attachment of microbial colonies while also being difficult to clean[10]. Thus, the denture base surface coated with the *G. uralensis* extract can likely improve the wear resistance. Hydrophobicity of the resin surface may interfere with denture retention and can promote adhesion of microorganisms, such as *C. albicans*, which is hydrophobic and adhereswell[11-12]. Coated surfaces were more hydrophilic than the uncoated surface and *C. albicans* could not adhere to the coated surface. The differences in the color change of denture base resins can be attributed to their composition. Thus, there should be no difference in the color of the specimens. The clinical remark of color difference has been quantified by the National Bureau of Standards (NBS) as NBS units expressed using the following formula: NBS unit = $\Delta E^* \times 0.92$ [13]. The color change of all denture resins was almost the clinically accepted range for color difference. The amount of polyphenol present in the specimens was determined because previous studies identified many phenolic compounds, such as liquiritin and isoliquiritin, which have shown inhibitory activity against bacterial growth[14-15]. *S. mutans* is the main pathogen that composes oral biofilms, while *C. albicans* is the most common microorganism to attach to the denture surface causing denture-related stomatitis, a disease characterized by inflammation and erythema of oral mucosa that is covered by the denture[16-17]. Therefore, many studies have been conducted to prevent both biofilm formation and attachment of *C. albicans*, as well asdevelopment of antimicrobial denture base resins[18-19].Recently, antimicrobial activity of natural extracts has been introduced for this purpose because increasing antimicrobial resistance has resulted in the need for alternative therapies using natural plant extracts. *G. uralensis* has been reported to exhibit antimicrobial activity against bacteria, including Gram-positive *S. mutans*, as well as antifungal activity toward *C. albicans*. Therefore, the *G. uralensis* extract may serve as an alternative antimicrobial therapy for oral dental caries, periodontal disease, and oral stomatitis[20-21].The cytotoxicity test provides insight into the biocompatibility of any dental or medical related materials. One concern in particular is the release of toxic substances from denture base resins, such as biocides, which may affect the oral mucosa[18]. Our results show that the *G. uralensis* extract does not exhibit a cytotoxic effect.

Conclusion

The denture base resin surface coated with the *G.uralensis* extract maintained or improved mechanical and physical properties of denture base resin. The *G. uralensis* extract coated resin also showed antimicrobial activity against *S. mutans* and *C. albicans*, while not exhibiting cytotoxic effects, as evidence of its biocompatibility. Therefore, denture base resins coated with powdered extracts of *G. uralensis* can be used for producing effective antimicrobial dentalmaterials.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Relationship between Critical Thinking Disposition, Self-efficacy, Self-esteem and Optimism of Nursing Students

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Abstract

Background/Objectives: This study wasconducted to understand the relationship between critical thinking tendency, self - efficacy, self - esteem and optimism of a students in nursing.

Methods/Statistical analysis: Data collection was conducted from March10 to September 30, 2018 for 258students of the nursing college.Analysis was performed using the SPSS 23.0 version program and analyzed by t-test, ANOVA, Scheffe-test and Pearson's correlation coefficient.

Findings: The subjects' scores of critical thinking disposition(F=10.194,ρ=.000, F=7.011,ρ=.001), self-efficacy(F=4.020, ρ=.008, F=3.750, ρ=.006),self-esteem(F=4.701, ρ=.003)and optimism(F=6.407,ρ=.000, F=7.011, ρ=.000) were different according to their major satisfaction and motivation for selecting majors. There was a significant positive correlation(ρ<.001) between self-esteem, self-efficacy, self-esteem and optimism.

Improvements/Applications: It is necessary to seek educational programs that raise critical thinking disposition, self-efficacy, self-esteem and optimism in order to increase the satisfaction of major in nursing students.

Keywords: *Critical Thinking Disposition, Self-efficacy, Self-esteem, Optimism, Nursing Students*

Introduction

Clinical practice classes at the nursing college are guided by applying the nursing process, and various teaching methods including critical thinking are required to apply the nursing process and strengthen the ability to practice[1]. In nursing education in Korea, performance-based curriculum is proposed to provide students with core competencies and suggeststhat critical competencies include critical thinking[2].These critical thinking means the personal tendency to think and uses the thought that makes a decision for the purpose of problem solving and decision making[1].Self-efficacy means a belief that an individual can successfully achieve the action required to produce an outcome[3].Self-esteem means respecting and favoring oneself and recognizing that I am a worthy being[4].Critical thinking disposition and self-efficacy have positive effects on students' ability to perform nursing process[5]. Self-esteem was positively related to students' ability to practice and practice[6]. Also, life stress and satisfaction of nursing college was a positive correlation between optimism[7].

Therefore, this was conducted to analyze the relationship between critical thinking disposition, self-efficacy, self-esteem and optimism of students in nursing. The purpose of this study is to provide a basis for developing a systematic education program by summarizing the concepts necessary for the nursing process.4

Method

1. Study Design

This study is a descriptive research for investigate the relationship degree of critical thinking disposition,

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self-efficacy, self-esteem and optimism of students in nursing. The subjects of the study were students who were second year students at a nursing college and who voluntarily agreed to participate in this study by listening to the explanation of the purpose of the study.Data collection was conducted from March10 to September 30, 2018 and a total of 258 surveys were collected and used in this study. The specific purpose of this study is as follows.

First, identify the general characteristics of the subjects.Second, the subjects' critical thinking disposition, self-efficacy, self-esteem and optimism. Third, the difference of critical thinking disposition, self-efficacy, self-esteem, and optimism according to the general characteristics of the subject.Fourth, analyze the relationship the critical thinking disposition, self-efficacy, self-esteem and optimism for the subjects.

2. Data Analysis Methods

All data were analysis using the statistics programfor SPSS version 23.0. The general characteristics of the subjects were analyzed by descriptive statistics. The t-test, ANOVA and Scheffe-test were used for the differences of critical thinking disposition, self-efficacy, self-esteem, and optimism according to general characteristics of subjectsPearson's correlation coefficient was used for the relationship the critical thinking disposition, self-efficacy, self-esteem, and optimism for the subjects.

3. Questionnaire

2.3.1.Critical Thinking Disposition

In order to measure the critical thinking disposition, the tool developed by Yoon[8] was used. A total of 27 items consist of seven areas of intellectual enthusiasm, curiosity, prudence, confidence, systematic, intellectual fairness, conferencing, and objectivity. The score is a Likert 5-point scale and the higher the score, the higher the critical thinking disposition. The reliability of the instrument were Cronbach's α = .84 in Yoon's study[8] and Cronbach's α = .87 in this study.

2.3.2.Self-efficacy

Self-efficacy was used to Lee, Schwarzer and Jerusalem[9] the development of a self-efficacy scale for the adaptation of tools Kim[10], which consists of a total of 10 questions. The score is a Likert 4-point scale and the higher the score, the higher the self-efficacy. The reliability of the instrument were Cronbach's α = .88 in Kim's study[10] and Cronbach's α = .89 in this study.

2.3.3.Self-esteem

Self-esteem was used as a measure of a Jeon[11] adapted for self-esteem of the tool Rogenberg[12].A total of 10 items were composed of 5 items of positive self-esteem and 5 items of negative self-esteem. The score is a Likert 4-point scale and the higher the score, the higher the self-esteem. The reliability of the instrument were Cronbach's α = .85 in Jeon'sstudy[11] and Cronbach's α = .82 in this study.

2.3.4.Optimism

For the optimality measure, we used Shin's[13] revised version of Revised Life Oriented Test (LOT-R) as modified byScheier, Carver and Bridges[14].This is a total of 10 questions, and the score is a Likert 5-point scale and the higher the score, the higher the optimism. The reliability of the instrument at the time of development was Cronbach's α = .78, Cronbach's α = .73 in the study of Shin[13] and Cronbach's α = .78 in this study.

Result and Discussion

1. General characteristics of the subjects

The general characteristics of the subjects were the same as[Table 1]. The subjects were a total of 258, whose average age was 21.1 years, of these, 94.6% (244 students) were female.Religion 'None' is 65.5% (169 students), Christian 23.6% (61 students) was followed. Satisfaction about the science of nursing's major was answered by students of 62.0% (160 students). Support motivation for the science of nursing's major was "self-selection" 60.9% (157 students), "others invitation"17.1% (44 students), "consider employment"15.5% (40students), "consider aptitude" 3.5% (9students), "consider grades"3.5% (8students).

Table 1.General Characteristics of the Subjects

Variables		**N(%)**
Average Age(year)		21.10±.65
Gender	Female	244(94.6)
	Male	14(5.4)
Religion	Christian	61(23.6)
	Buddhism	11(4.3)
	Catholic Christian	17(6.6)
	None	169(65.5)

Major Satisfaction	Very satisfied	38(14.7)
	Satisfied	122(47.3)
	Fairy satisfied	92(35.7)
	Very unsatisfied	6(2.3)
Selection of Major	Self-selection	157(60.9)
	Others invitation	44(17.1)
	Consider grades	8(3.1)
	Consider aptitude	9(3.5)
	Consider employment	40(15.5)
Total		258(100.0)

2.Degree of Critical Thinking Disposition, Self-efficacy, Self-esteem and Optimism

The subjects' critical thinking disposition, self-efficacy, self-esteem, and degree of optimism were the same as[Table 2]. The means of the critical thinking dispositionwas 96.88 (out of 135), the self-efficacy was 28.60 (out of 40), the self-esteem was 28.32 (out of 40) and optimism was 34.33 (out of 50)

Table 2. Degree of Critical Thinking Disposition, Self-efficacy, Self-esteem and Optimism

Variables	Min	Max	Mean±SD
Critical Thinking Disposition	78	122	96.88±9.18
Self-efficacy	18	61	28.60±4.21
Self-esteem	14	58	28.32±4.58
Optimism	20	58	34.33±4.67

3.Critical Thinking Disposition, Self-efficacy, Self-esteem and Optimism according to the General Characteristics of the Subject

Critical thinking disposition, self-efficacy, self-esteem and optimismaccording to the general characteristics of the subject are the same as [Table 3 and table 4].The critical thinking disposition was statistically significant according to the major satisfaction (F=10.194, ρ <.001) and motivation for selecting majors (F=7.011, ρ <.05).Students with high level of major satisfaction showed high scores on critical thinking disposition, and those who selected majors in consideration of aptitude showed high scores on critical thinking disposition.Self-efficacy was statistically significant according to the major satisfaction (F=4.020, ρ <.05) and motivation for selecting majors (F=3.750, ρ <.05). Students with high level of major satisfaction showed high self-efficacy and students who selected majors in consideration of aptitude showed high self-efficacy. Self-esteem was statistically significant according to the major satisfaction (F=4.701, ρ <.05). Self-esteem score was higher in students who had high level of major satisfaction.The optimism was statistically significant according to the major satisfaction (F=6.407, ρ <.001), motivation for selecting majors (F=7.011, ρ <.001).The students with high level of major satisfactionshowed high optimistic scores and those who selected majors considering their aptitudes showed high optimism.

4.Relationship between Critical Thinking Disposition, Self-efficacy, Self-esteem and Optimism

Relationship between critical thinking disposition, self-efficacy, self-esteem and optimism are the same as[Table 5].Critical thinking disposition, self-efficacy (r = .565, ρ <.001), self-esteem (r = .352, ρ <.001) and optimism (r = .375, ρ <.001) was statistically significant positive correlation. Self-efficacy, self-esteem(r=.501, ρ<.001) and optimism (r = .405, ρ <.001) was statistically significant positive correlation. Self-esteem and optimism (r = .574, ρ <.001) was statistically significant positive correlation.

Discussion

This study aims to identify the degree of critical thinking disposition, self-efficacy, self-esteem and optimism of students in nursing and try to understand the relationship between these concepts.The results of analysis of critical thinking disposition, self-efficacy, self-esteem and optimism according to general characteristics were as follows.

The general characteristics that showed significant difference from the critical thinking dispositionwere majors satisfaction and motivation for selecting majors. In other words, students with high level of major satisfaction and students who supported by considering their aptitude showed high critical thinking disposition, which is consistent with the results of previous studies[5,15,16].The general characteristics that showed significant difference in self-efficacy were students who applied with high major satisfaction and motivation for selecting majors to achieve major self-efficacywhich is consistent with the results of previous studies[5].

Also, the higher the self-efficacy, the higher thesatisfaction of the major. In other words, the choice of majors according to aptitude seems to increase self-efficacy and increase major satisfaction[17].The major characteristics of self-esteem were found to be general satisfaction, which showed that self-esteem was high for students with high majors.Features shown a significant difference in self-esteem is a major satisfaction was shown, it was a high-major satisfaction is higher self-esteem, which was consistent with the other results of studies about self-esteem[18].The factors that showed significant difference in optimism were major satisfaction and motivation for selecting majors. In other words, students with high major satisfaction and students who applied with majors according to aptitude showed high optimistic scores.In the previous study[19], optimism and major aptitude were found to have a significant effect on the feeling of happiness for nursing college students.In another study[20], it was found that those who are optimistic can better practice their efforts to be happy with optimistic expectations.As a result, this study shows that students who are highly satisfied with their majors and who have chosena major according to their aptitude are more optimistic.

Critical thinking disposition, self-efficacy, self-esteem and optimism was statistically significant positive correlation. Self-efficacy, self-esteem and optimism was statistically significant positive correlation. Also self-esteem and optimism was statistically significant positive correlation.

Conclusion

Based on the results of the above study, suggestions are as follows.

There was statistically significant difference between motivation for selecting majors and the major satisfaction of the nursing college students with the critical thinking disposition, self-esteem, self-efficacy and optimism.This suggests that there is a need to develop a curriculum or education programs that can enhance the critical thinking disposition, self-efficacy, self-esteem, and optimism in the curriculum of nursing college.here is also a need to continually study various concepts related to the nursing process in order to increase the satisfaction of the major

Table 3. Critical Thinking Disposition andSelf-efficacyaccording to the General Characteristics of the Subject

Variables	Critical Thinking Disposition		Self-efficacy	
	M±SD	t or F (ρ)	M±SD	t or F (ρ)
Gender		.127 (.899)		.676 (.500)
Female	96.89±9.14		28.64±4.26	
Male	96.57±10.23		27.86±3.11	
Religion		.526 (.665)		.570 (.635)
Christian	97.61±11.32		29.15±5.06	
Buddhism	94.45±6.73		28.45±2.51	
Catholic Christian	95.41±10.12		29.00±3.29	
None	95.92±8.37		28.60±4.21	
Major Satisfaction		10.194 (.000)** (a<b<c)***		4.020 (.008)*
Very satisfied	102.61±9.44c		30.03±3.57	
Satisfied	97.61±8.95b		28.94±4.75	
Fairy satisfied	96.67±9.75b		29.33±1.63	
Very unsatisfied	93.55±8.02a		27.50±3.51	
Selection of Major		7.011 (.001)* (a<b<c)***		3.750 (.006)* (a<b<c)***
Self-selection	97.26±9.15b		28.54±4.52b	
Others invitation	97.91±8.25b		28.18±2.78b	
Consider grades	98.63±6.59b		29.63±1.41b	
Consider aptitude	107.11±10.57c		33.56±6.69c	
Consider employment	91.58±7.69a		27.95±3.20a	

** ρ<.001, * ρ<.05

***Scheffe-test

Table 4:Self-esteem and Optimismaccording to the General Characteristics of the Subject

Variables	Self-esteem		Optimistic	
	M±SD	t or F (ρ)	M±SD	t or F (ρ)
Gender		.389 (.697)		.268 (.789)
Female	28.35±4.61		34.34±4.62	
Male	27.86±4.29		34.00±5.50	
Religion		1.538 (.205)		.794 (.498)
Christian	28.33±5.55		34.44±5.09	
Buddhism	30.82±9.55		34.09±3.63	
Catholic Christian	29.29±3.12		35.94±5.33	
None	28.32±4.58		34.14±4.43	
Major Satisfaction		4.701 (.003)*		6.407 (.000)** (a<b<c)***
Very satisfied	30.39±7.10		36.63±5.87c	
Satisfied	28.54±3.98		34.64±3.95b	
Fairy satisfied	28.32±4.58		34.33±4.66b	
Very unsatisfied	27.22±3.70		32.93±4.69a	
Selection of Major		2.121 (.079)		7.011 (.000)** (a<b<c)***
Self-selection	28.37±4.97		34.81±4.36b	
Others invitation	28.18±4.43		34.09±5.89b	
Consider grades	25.50±3.12		32.88±3.79a	
Consider aptitude	32.00±3.47		35.67±5.66c	
Consider employment	28.03±4.58		32.67±3.86a	

** **ρ<.001,** * **ρ<.05**

*** **Scheffe-test**

Table 5: Relationship between Critical Thinking Disposition, Self-efficacy, Self-esteem and Optimism

Variables	1.	2.	3.	4.
	r(ρ)	r(ρ)	r(ρ)	r(ρ)
1. Critical Thinking Disposition	1	.565**	.352**	.375**
2. Self-efficacy	.565**	1	.501**	.405**
3. Self-esteem	.352**	.501**	1	.574**
4. Optimism	.375**	.405**	.574**	1

** ρ<.001

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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The Influence Factors on the Stages of Exercise Behavior Change of Female Nursing University Students in Transtheoretical Model

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Abstract

Background/Objectives: The purpose of this study was to analyze the effects of exercise motivation, perceived benefits and perceived barriers on stages of exercise behavior change in female nursing students.

Methods/Statistical analysis:The subjects were female nursing students two universities including J university in C province and M university in K province, and they were 144 female nursing students who understood the purpose of the study and agreed to participate in the study. The data were analyzed using frequency, percentage, mean, standard deviation, t-test, X^2 test, and multiple logistic regression.

Findings: The exercise motivation factors of female nursing students were found to have a significant effect on exercise motivation (β=2.239, p<.001). In other words, subjects with changes in exercise behavior were 9.3 times higher in exercise motivation than subjects without changes in exercise behavior.

Improvements/Applications: In order to promote regular exercise of female nursing students, the provision of information and exercise promotion programs at the school level to strengthen exercise motivation are suggested..

Keywords: *Exercise, Behavior, Motivation, Benefits, Barriers.*

Introduction

Exercise not only prevents various diseases by providing positive effects on physiological and biochemical changes in the body, but also helps recovery and rehabilitation from diseases, and provides psychological and social benefits as well as physical effects. Along with interest in health, there is a growing awareness that exercise promotes good health and improves quality of life[1]. Exercise is a lifestyle that works when a certain period of time is maintained regularly, and voluntary effort and practice are needed to promote health through exercise [2].

According to the data from the Statistical Office[3], the practice rate of health maintenance for women in their 20s was lower than that of other age groups. In case of regular exercise, 25.1% of women aged 20~29 and 60.7% of women in their 60s practiced regular exercise, showing that the regular exercise practice rate of women in their 20s is very low. In addition, 76% of women in their 50s and over practiced regular checkups, while only 22.3% of women in their 20s practiced it. These results suggest that the health maintenance practice rate of female nursing students, such as regular exercise and regular health checkup, is very low, given that most of the female nursing students are in their 20s.

Health is a central motivation for life for nursing students learning health-related disciplines. In addition, in the future, as they will be in charge of health education for health promotion of many subjects and should be a model of desirable health promotion behavior practice, nursing students being aware of the importance of health and practicing health promotion activities are meaningful in helping national health

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promotion[4]. Nursing students can be expected to have a significant impact on the quality of health care as a key player in future healthcare delivery. In addition, nursing students, who will become nurses in the future, are prospective health care professionals who will work in the profession to achieve the ultimate goal of nursing to prevent diseases and maintain the health of subjects. Therefore, it is necessary to establish one's own healthy fitness level through exercise first[5]. Therefore, there is a need to find ways to promote the exercise of nursing students who require more active health maintenance, and the direction of intervention to promote systematic health maintenance and efficient health promotion[4].

Looking at the previous research on exercise continuation, attitudes and behaviors to participate in and sustain exercise can be influenced by an individual's internal choice, among which motivation is recognized as the most fundamental area that determines exercise participation[6]. Motivation factors play an important role in determining current and future exercise participation. This determines that the participant is the driving force that motivates them to play a role. People with high internal motivation in physical activity, exercise, and sports can continue to exercise even in the absence of compensation, and since they are able to fulfill their desires and tasks for their competence, they can lead to voluntary and active participation, which is why it is necessary to improve exercise motivation in university students.

Looking at recent research on stages of exercise behavior change [6-10] exercise motivation and social support [6,8,9], exercise self-efficacy [7,9], perceived health status [7-9], exercise gain and exercise loss [10] have been identified as major influencing factors of stages of exercise behavior.Therefore, by applying pan-theoretical model to nursing students, the study will analyze the convergent factors affecting each stage of change in exercise behavior and prepare the theoretical basis of nursing intervention for starting and continuing exercise.

Method

This study is a descriptive correlation study to investigate the factors affecting the stages of exercise behavior change of female nursing students.

The subjects of this study were female nursing students from two universities, J university in C province and M university in K province, and those who met the above criteria were sampled and the research purpose and objective were explained, and data collection was conducted on subjects who agreed to participate in the research.

Stages of exercise behavior change

The instrument used to measure stages of exercise behavior change in this study was a tool developed by Marcus et al.[11]that was adapted by Joe[12]. Based on these results, the precontemplation and contemplation stages that do not exercise were categorized into non-practice groups, and preparation stage, action stage, and maintenance stage are categorized into groups that practice exercise behavior.

Exercise motivation

An 18-item tool derived from the Intrinsic Motivation Questionnaires developed by McAuley et al.[13] edited by Choi [14] to use the three subfactors categorized into competence, effort, and pleasure was used. In the study by Choi[14], the reliability of the tool was Cronbach's α = .82 for competence, effort Cronbach's α = .69, pleasure was Cronbach's α = .85, and reliability in this study was Cronbach's α = .74.

Perceived barriers

8 of the 9 items developed by Lee[16] based on the tools of Sechrist et al.[2] and Steinhardt et al.[15] were used except for item 8 that was not related to the subject of this study. In the study by Lee[16], the reliability of the tool was Cronbach's α = .76 and in this study, Cronbach's α = .84.

Result

1. General characteristics of the subjects

The mean age of the subjects of this study was 21.83 years, and sophomore was the most common at 30.6%. 77.8% were non-religious subjects and 67.4% were normal BMI subjects. In the stages of exercise behavior change, 41.7% were in the contemplation stages, where they are not exercising but are motivated or willing[Table 1].

Table 1. General characteristics of subjects

Characteristics	Classification	n(%)	M±SD
Age			21.83±1.98
Grade	Freshman Sophomore Junior Senior	24(16.7) 44(30.6) 38(26.4) 38(26.4)	
Religion	Yes No	32(22.2) 112(77.8)	
Exercise stages	1 Stage(pre contemplation) 2 Stage(contemplation) 3 Stage(preparatory) 4 Stage(action) 5 Stage(maintenance)	27(18.8) 60(41.7) 39(27.1) 10(6.9) 8(5.6)	
BMI	Underweight Normal Overweight Moderate obesity Severe obesity	29(20.1) 97(67.4) 13(9.0) 5(3.5) 0(0)	

2.Exercise Motivation, Perceived Benefits and Perceived Barriers of Subjects

Exercise motivation showed average levels with 2.89 points, perceived benefits showed 2.97 points, and perceived barriers showed 2.39 points, showing above average levels [Table 2].

Table 2. Exercise Motivation, Perceived Benefits and Perceived Barrier of subjects

Variables	M±SD	Range
Exercise Motivation	2.89±.42	1~5
Perceived Benefits	2.97±.43	1~4
Perceived Barriers	2.39±.49	1~4

3. Differences in General Characteristics, Exercise Motivation, Perceived Benefits and Perceived Barriers According to Stages of Exercise Behavior Change

Looking at differences in general characteristics, exercise motivation was significantly different between exercise practice group and non-practice group (t=-5.33, p<.001), The exercise practice group scored higher on internal motivation than the non-practice group[Table 3].

Table 3. General characteristics, Exercise Motivation, Perceived Benefits and Perceived Barriers by Stages of Change of Exercise

Characteristics	Categories	Stages of exercise behavior change		X2 or t	p
		Group that did not exercise	Group that did exercise		
		n(%) or M±SD	n(%) or M±)SD		
Grade	Freshman Sophomore Junior Senior	15(17.2) 27(31.0) 28(32.2) 17(19.5)	9(15.8) 17(29.8) 1(17.5) 21(36.8)	6.76	.080
Religion	Yes No	18(20.7) 69(79.3)	14(24.6) 43(75.4)		
BMI	Underweight Normal Overweight Moderate obesity Severe obesity	10(17.5) 57(58.6) 7(7.9) 3(3.0) 0(0)	9(11.5) 40(38.4) 6(5.1) 2(2.0) 0(0)		
Exercise Motivation		2.75±.38	3.10±.40	-5.33	<.001
Perceived Benefits		2.91±.45	3.06±.36	-2.04	.042
Perceived Barriers		2.46±.48	2.29±.49	2.00	.047

4. Influencing Factors on the Stages of Change of Exercise in Subjects

The exercise motivation factor of female nursing students was found to have a significant effect (p<.001) on stages of exercise behavior change. The explanatory power of the dependent variables of the regression model was 23.8%, and the classification accuracy of the stages of exercise behavior change of the regression model was 69.4%.

Among the independent variables introduced into the regression model, exercise motivation was statistically significant, and perceived benefits and perceived barriers were not statistically significant. Thus, there was a change in exercise behavior among female nursing students with high exercise motivation. Analysis of the exercise behavior change of nursing students through odds ratio showed that subjects with changes in exercise behavior were 9.3 times higher in internal motivation than subjects without changes in exercise behavior[Table 4].

Table 4. Influencing Factors on the Stages of Change of Exercise in Subjects

	B	SE	Wals	OR	95% C.I	p
Exercise Motivation	2.239	.541	17.095	9.382	3.246~ 27.114	<.001
Perceived Benefits	.235	.498	.223	1.265	.476~3.361	.637
Perceived Barriers	-.412	.410	7.903	.662	.296~1.481	.315
-2 log likelihood	165.516					
X2	27.815(p<.001)					
Hosmer-Lemeshow	X2=6.22(df=8/p=.622)					
Model summary(R2)	.238					
Correct classification	69.4					

Discussion

The purpose of this study was to investigate the general characteristics, internal motivation, perceived benefits, and perceived barriers according to stages of exercise behavior change of female nursing students and to determine the factors that influence stages of exercise behavior change.

Looking at the stages of exercise behavior change, the most frequent was contemplation stage with 41.7% and next, the preparatory stage, which refers to current irregular exercise, was 27.1%. The precontemplation stage was 18.8%, the maintenance stage where regular exercise is done was 6.9%, and the action stage where regular exercise has started was 5.6%. In conclusion, 34% of the subjects practiced exercise irregularly, and 60.5% did not exercise. In the study by Lee et al.[6] on low back pain patients also showed that 75.9% exercised and 24.1% did not. In a study of elderly, Kim [7] found that 60% were exercising irregularly, but 40% were not exercising. A study by Lee et al.[8] of middle-aged women showed 75.1% of irregular exercisers and 24.9% of non-exercises, showing a higher ratio of exercise than in this study. Compared to other college students, this may be due to the accumulation of fatigue and lack of exercise time due to heavy learning volume and clinical practice. Therefore, custom interventions by stage according to the exercise behaviors to maintain and promote the health of nursing students who will be the nurses responsible for the future national health is needed.

The exercise motivation score of female nursing students was 2.89 points, which was moderate, and subjects with changes in exercise behavior were 9.3 times higher in exercise motivation than subjects without changes in exercise behavior. As a result, exercise motivation was the biggest influencer among subjects with changes in exercise behavior. Internal motivation is particularly important in exercise and has a strong correlation with exercise continuation because it is highly self-determining and has a positive effect on behavioral commitment and mental aspects[17,18]. Study by Lee[19] on middle-aged adults who exercise regularly showed that exercise motivation was an important factor in explaining middle-aged exercise continuation, which had a direct impact on middle-aged exercise continuation. As such, in order for female nursing students to continue their exercise, it is very important to have exercise motivation to drive exercise continuation.

The average score of perceived benefits of female nursing students was 2.97 points, and perceived benefits did not differ significantly in stages of exercise behavior change among female nursing students. In the study by Lee[20], As a result of analyzing the difference of perceived benefits according to the stages of exercise behavior change, there was a statistically significant difference in the mean between stages of exercise behavior change, and the higher the perceived profit, the higher the performance of health promotion and the results were different from this study. In Hwang and Chung[21], exercise benefit was also found to have the biggest influence on exercise performance. These findings suggest that female nursing students pursue health promotion activities with relatively low exercise barriers in other ways besides exercise such as sleep, rest, and vitamins to promote health promotion in difficult curriculum that requires both academic and clinical practice. Therefore, in order to improve perceived benefits, interventions such as the development and application of easily accessible exercise programs are likely to improve perceived benefits.

The perceived barriers had a mean score of 2.39 points, which was above average, and the perceived barriers showed no significant difference in the stages of exercise behavior change of female nursing students. This is different from the results of the study by Hwang and Chung[21], in which the subjects who regularly exercise perceived higher than the subjects who did not exercise regularly. Therefore, it is determined that it is important to promote the benefits of exercise through specific exercise programs and to minimize the factors that interfere with exercise continuation. In particular, for female nursing students, self-management by exercise promotes appearance satisfaction, and mental health is improved, and there are various advantages of relieving stress and tension. But despite these advantages, it is very difficult to perform these exercises regularly. Therefore, it is important to develop strategies for practicing consistent and regular exercise, taking into account the identified exercise motivation, perceived benefits, and perceived barriers as factors influencing the stages of exercise behavior change of female nursing students.

Conclusion

The study was conducted with the aim to identify the factors that influence the stages of exercise behavior change of female nursing students and to obtain the

basic data necessary to find ways to improve the exercise behavior of female nursing students.

As a result, exercise motivation was investigated as a factor affecting the stages of exercise behavior change of female nursing students. Based on these findings, it is suggested to develop and apply exercise and educational programs to provide information to enhance exercise motivation, which greatly affects exercise continuation, to improve the stages of exercise behavior change in female nursing students.

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Study on Subjectivity of Nursing Students toward Patient with Dementia

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Abstract

Background/Objectives: The purpose of this study is to identify the subjectivity toward the patient with dementia perceived by nursing students.

Methods/Statistical analysis: To describe the characteristics by type and to classify the patient with dementia, and Q methodology was applied. 18 nursing students of A University were asked to classify 47 statements about patients with dementia. Collected data were analyzed using QUANL PC program.

FindingsIn the results of this study, the perception of the nursing students toward the patient with dementia was classified to 3 factors. 3 factors were identified and explain 50.94% of whole variables. Factor 1 was 34.94%, factor 2 was 10.48% and factor 3 was 5.52%. As the factor 1 has 34.94% of explanation power, it can be considered the factor explaining the subjectivity of the nursing students' perception on the patient with dementia the most. Out of 18 subjects, the subjects belonged to factor 1 was 3, factor 2 was 9 and factor 3 was 6 subjects. The subjectivity type toward the patient with dementia was 'Nurse-oriented', 'Family of patent with dementia-oriented' and 'Future improvement-oriented.

Improvements/Applications: This study identified the perception of nurses in clinical field toward the patient with dementia and provides the basic data for education.

Keywords: *Dementia patients, Nursing student, Subjectivity, Q methodology, Nurses*

Introduction[1]

As the principal agent providing direct nursing service to the elderly with dementia in the field of healthcare, the positive attitude of nurses toward the elderly with dementia has influence on the quality of nursing[1], and the negative attitude affects the diagnosis, support, decision making, etc. degrading the quality of diverse services provided to elderly with dementia[2]. As the social demand for the nursing of elderly with dementia is increased, the nursing collage which cultivates and produces the professional nurses who perform or should perform the direct nursing in the field of healthcare are responsible for cultivating professionally trained nurses. In addition, Since the positive perception and the attitude have influence on the quality improvement of nursingand the negative perception or attitude toward the aged patients are likely to increase the possibility to avoid the aged patients[3], the importance of verifying the attitude of nursing students who will become nurse is greatly emphasized.

However, the research on the patient with dementia with the nursing students is not sufficient. So, Q methodology is the methodology that allows us to understand the characteristics of each type according to the structure of human subjectivity and is the methodology started from the perspective of the actor not the presumption of researcher[4]. Since the perception of the nursing student toward the patient with dementia is the unique subjective experience of the nursing students, Q methodology, which is the research method considering subjectivity of the subject is the research method appropriate to verify the type of perception of

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the nursing students toward the patient with dementia.

Therefore, this study was intended to provide the basic data in developing differentiated education program according to the characteristics by type of perception toward the patient with dementia as a student nurse before they go to nursing field that the nursing of patient with dementia is made successfully by identifying the subjectivity structure of the patient with dementia.

Method

1. Selection of Q Population and Q Sample

To draw the comprehensive statements for the effects on the patient with dementia from the students of nursing department, Q population was drawn through the related domestic and overseas literature review, open questionnaires, in-depth individual interviews, etc. Through such processes, 200 Q populations over 3 domains were drawn and in addition to them, total 100 Q populations were extracted by integrating the literatures collected through related domestic and overseas literature review. Final 48 samples having high power of discrimination were selected from the extracted Q samples through the review and correction procedure.

2. Q-sort and Data Analysis Method

Q-sort process is the process that the research subjects make voluntary definition of each individual toward the patient with dementia by classifying the statements of Q-sample with the forced normal distribution method[5]. The data were collected from 30 students of nursing department at OO University utilizing Q-card. The time taken to complete Q-sort by one research subject was mostly 30 ~ 45 minutes. For the distribution chart of Q-sample, the research subjects classified the statements selected as Q-sample from strong affirmation to strong negation according to their importance. Statement (Q1) about the patient with dementia was sorted on 12-Point scale. Then, the interview regarding the statements sorted at both ends was performed with the research subjects. For Q factor analysis, the principle component factor analysis (varimax) was used. The type was selected considering the results, total explanatory variable, etc. calculated by entering the number of factors based on Eigen value of 1.0 or more. Collected data were converted to score with the conversion score from 1 to 12 granted around the card distributed by force in Q-sample distribution chart. The conversion score granted was codified according to Q sample No. and treated with the principal component factor analysis by PC program. The data were analyzed using QUANL PC program.

3. Ethical consideration on research objects

Before starting the study, the subjects were explained that they could stop participating any time during the study after obtaining the voluntary consent. To respect the rights of the subject and to guarantee the privacy and personal information of the subject, all the information collected through this study were treated anonymously and codified and treated with Q sorting.

Result and Discussion

1. Characteristics by Type of Subjectivity toward Patient with Dementia

In the results of analyzing the subjectivity toward the patient with dementia, 3 factors were identified and explain 50.94% of whole variables. Factor 1 was 34.94%, factor 2 was 10.48% and factor 3 was 5.52%. As the factor 1 has 34.94% of explanation power, it can be considered the factor explaining the subjectivity of the nursing students' perception on the patient with dementia the most [Table 1]. Out of 30 subjects, the subjects belonged to factor 1 was 3, factor 2 was 9 and factor 3 was 6 subjects. The subjects belonged to each factor mean the group showing similar reaction toward the patient with dementia.

Table 1: Eigen Value, Variance, and Cumulative Percentage

	Type Ⅰ	Type Ⅱ	Type Ⅲ
Eigen Value	6.9884	2.0952	1.1050
Variance(%)	.3494	.1048	.0552
Cumulative	.3494	.4542	.5094

2.Analysis of each type

- Deliberation Type: The subject belonged to type 1 was 3 subjects. The statements that the subjects classified as type 1 showed strong affirmation were 'Since the patient with dementia is being increased continuously, the nurses having expertise and experience are needed (Z=2.08)', 'Supporting the patient with dementia increases the government expenditure (Z=1.64)' and 'More facilities related to dementia are needed (Z=1.46)'. The statements that the subjects of type 1 showed the

strong negation were 'It is the most desirable that the patient with dementia always lies down and stays alone (Z=-2.38)', 'The facilities for the patient with dementia are enough (Z=-1.94)', 'The acts like doubt, delusion, etc., of the patient with dementia should be corrected by pointing out that they are wrong (Z=-1.82).

The characteristic of type 1 is that they are thinking that in the Korean society where the low birth rate and aging are under progress rapidly, the chronic diseases of elderly would be increased, and particularly, the number of patient with dementia would be increased rapidly. They judged that accordingly, the demand for nurses and the nursing home would be increased. As the economic burden needed for taking care of patient with dementia would be increased, they thought that the expansion of nursing hospital that provides the proper treatment would be needed. In this context, they thought that the nurses would need to develop the ability to taking care of the patient with dementia. Therefore, type 1 was named as 'Nurse-oriented type.

- Family of Patient with Dementia Consideration Type: The subject belonged to type 2 were 9 subjects. The statements that the subjects of type 2 showed the strong affirmation were 'Caregiving of elderly with dementia by the increase of elderly with dementia is a serious social problem (Z=2.14)', 'There are lots of cases that the role of the caregiver of the patient with dementia is increased too much (Z=1.62)', 'The caregiving of patient with dementia within the family causes the conflict in the family relationship (Z=1.60)'. The statement that the subject of type 2 showed the strong negation was 'It is most desirable that the patient with dementia always lies down and stays alone (Z=-2.19)', 'The facilities for patient with dementia are enough (Z=-1.43)', 'Many patients with dementia are treated or protected in the hospital or facilities (Z=-1.42)'.

The characteristic of type 2 is that they thought about the patient with dementia assuming that the person who is close to them is or would be the patient with dementia. They worried that family having patient with dementia would have lots of economic burden, for which the conflict of family relation should be provoked. In this context, they thought that they should prepare for their golden life well and said that the program development for the pain suffered by family would be needed. In addition, they thought that the facilities to be able to accommodate the number of patients with dementia to be increase in future are required and the education and publicity about the patient with dementia are needed. Therefore the type was named as 'Family of patient with dementia consideration type'.

- Future Improvement Consideration Type: The subject belonged to type 2 were total 6 subjects. The statements that the subjects of type 3 showed the strong affirmation were "Caregivers of the patient with dementia need the caregiving education (Z=2.13)', 'Government should provide the protection service for the patient with dementia (Z=1.72)', 'Since the patient with dementia is being increased continuously, the nurses having expertise and experience are needed (Z=1.56)'. The statements that the subject of type 3 show the strong negation were 'It is the most desirable that the patient with dementia always lies down and stays alone (Z=-1.99)','Since the ability to think and to perceive of the patient with dementia is degrade, he(she) cannot do anything by him(her)self.(Z=-1.82)', 'Taking care of the patient with dementia, I cannot trust the caregiver. (Z=-1.53)'.

The subjects of type 3 thought that lots of social supports would be need in preparation of future that the patient with dementia will be increased. They thought that the education about caregiving of patient with dementia is needed and diverse program should be established under the support of government. In addition, they said that considering that the patients with dementia will be increased, the education on the patient with dementia for nurses, etc. will be needed. They though that leaving the patient with dementia alone without taking care of them is not desirable and as it is hard for the family to take the burden alone, the social support is needed. Therefore, type 3 was names as 'Future improvement consideration type'.

Discussion

The type 1 identified in this study was 'Nurse-oriented type'. As in the healthcare field, the main agent that provides the nursing service is the nurse, the positive attitude of the nurse toward the patient with dementia has influence on the quality of nursing[6], and the negative attitude has influence on the diagnosis, treatment, support, decision making, etc. degrading the quality of diverse services provided to the elderly with dementia[7]. The empirical study related to the knowledge and the attitude toward the elderly with dementia showed that the nurse's low job satisfaction and high burnout were because of negative attitude toward the patient with dementia and misunderstand of the problems related to

the behavior disorder of the patient with dementia[8]. Moreover, since the nursing students were reported to have more negative perception and attitude toward the elderly patient with dementia than those toward the general elderly patient[9], it is deemed that the nursing education to produce the profession manpower having expertise and positive attitude required for nursing service for elderly patient with dementia is needed.

Type 2 was 'Family of patient with dementia consideration type. As the patient with dementia is increased, the quality of life is degraded in the principal caregiver who are very close to patient with dementia by the stress by the caregiving together with the degradation of quality of life in the patient by diverse irreversible symptoms around cognitive and behavior disorder[10]. Actually, in case of family taking care of patient with dementia, the misunderstanding by the lack of information on the dementia degrades the quality of caregiving by affecting the caregiving burden of the family, it is necessary to provide the education program encompassing all of these elements[11].

Type 3 was 'Future improvement consideration type'. Considering that the patient with dementia will be increased rapidly for long-term, they think that the national and social supports are required. As it is judged that they have great economic burden in caregiving patient with dementia, they said that the establishment of policy to support the family of patient with dementia is important.

Our country has implemented the long-term care insurance service for aged from August, 2007 for the purpose of alleviating the burden on the family of the elderly having chronic diseases including dementia and of enhancing the quality of their life in the national level[12]. Since 22.5% of this service users used the facility protection service and about 52.5% used the in-home protection service, it was shown that the user of in-home protection service was more than double[13]. There is the aspect that the caregiving burden in the family of patient with dementia is alleviated by using in-house protection service but still the burden of family persists in the situation that the patient with dementia should be taken care for long time at home[13].

Such research on the subjectivity will be able to be used as the basic data for education of the subjects of patient with dementia, which recently become issue. In addition, it is expected to be utilized as basic data for differentiated education program development by suggesting the subjective structure on the perception of the nursing students as prospective healthcare provider toward the patient with dementia and the characteristics by type.

Conclusion

This study provides the basic data required to introduce or applying the policy to activate the future support system for patient with dementia by categorizing the subjectivity of the nursing students toward the patient with dementia. Since through this study, the perception type of the nursing students toward the patient with dementia was analyze and its characteristics were verified, it is expected that the education program would be developed considering the characteristics by each type. In addition, it is suggested that the additional research on the type analysis would be made by selecting the samples considering diverse factors and the qualitative research would be made to verify the diverse factors having influence on the nursing of patient with dementia.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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The Effect of Resilience and Nursing Professionalism on the College Life Adaptation of Nursing Students

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Abstract

Background/Objectives: This study explores resilience, nursing professionalism, and the college life adaptation of nursing students and identifies the factors that affect college life adaptation.

Methods/Statistical analysis: This study is a descriptive study identifying the effects of resilience and nursing professionalism on college life adaptation in nursing students. Data was collected from April to May 2017. Surveys were distributed to a total of 280 subjects. After excluding 40 incomplete surveys, a total of 240 surveys were used in the final analysis. The analyses were performed using the SPSS 24.0 program. Factors that affect the college life adaptation of nursing students were analyzed with multiple regression.

Findings: This study found that the mean resilience of the subjects was 3.64, the mean nursing professionalism was 3.88, and the mean college life adaptation was 3.22. There were statistically significant differences in the college life adaptation of the subjects by gender ($t=5.41$, $p=0.021$) and academic achievement level ($F=11.41$, $p<0.001$). Furthermore, college life adaptation showed a significant positive correlation with resilience ($r=.650$, $p<0.001$) and nursing professionalism ($r=.395$, $p<0.001$). Performing a multiple regression on the factors that affect college life adaptation showed that nursing professionalism ($\beta=.14$, $p=0.013$) and resilience ($\beta=.56$, $p=<0.001$) were significant factors. The regression explained 44% of the variance in college life adaptation.

Improvements/Applications: It was found that resilience and nursing professionalism affected the college life adaptation of nursing students. In particular, it is necessary to improve resilience to increase the college life adaptation of nursing students.

Keywords:*Nursing, Students, Resilience, Professionalism, Adaptation*

Introduction

Adapting well to college life can be said to be a major factor in successful college life, and academic, social, and psychological factors affect this college life adaptation[1]. College life adaptation is important because it also has a positive impact on adaptation and function in later adulthood. In particular, nursing students experience difficulty with college life adaptation due to academic burdens and stress with clinical practice[2]. Moreover, because some students choose their major at admission for a job, cases of terminating from school due to academic burdens and stress with clinical practice during the school year are not rare[3]. Due to these reasons, there have recently been studies attempting to identify the variables to improve the college life adaptation of nursing students[4]. [5]

Stress events that college students experience do not have the same impact on all students. Even if the same stress event is experienced, the response to the stress is generally different for each person, and the process of recovery also differs. The ability to control stress is deeply related to resilience[5], and resilience helps to positively adapt to adversity by providing the opportunity for students to prepare to overcome

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hardship[6]. Because people with high resilience have a good ability to control patience and tension in various situations[7], nursing students will also be able to respond to changing situations flexibly without panic and adapt successfully.

Nursing professionalism enables having a specific nursing philosophy and goals through a view of nursing as a professional job[8]. Because nursing professionalism forms the perspective of observing and interpreting nursing, having positive nursing professionalism is important. Nursing professionalism formed during college will have an impact on the development of nursing professionalism in practice[9]. Accordingly, it is thought that the nursing professionalism formed in nursing students will also have a positive impact on college life adaptation. Furthermore, as an essential philosophy for nursing students, it must be continuously explored and developed. However, research identifying the relationship between nursing professionalism and college life adaptation in nursing students is currently lacking. Thus, additional research is necessary. Therefore, this study examines resilience, nursing professionalism, and college life adaptation in college students and identify the factors that ultimately affect college life adaptation. Additionally, it provides basic data for the development of a program to help the college life adaptation of nursing students.

Method

1. Study design and sample size calculation

This is a descriptive study that examines the relationship among resilience, nursing professionalism, and college life adaptation in nursing students, identifying the factors that affect college life adaptation. The sample size was calculated using the G*power 3.1.9.2 program by entering an effect size of 0.09, significance level of 0.05, and power of 0.95 for regression analysis. The sample size of 250 was calculated using seven predictive factors (gender, grade, type of residence, monthly living expense, academic achievement level, resilience, and nursing professionalism). Surveys were distributed to a total of 280 subjects. After excluding 40 incomplete surveys, a total of 240 surveys were analyzed.

2. Measurement

Resilience was measured with an instrument developed for college students in Japan[10] that was revised and supplemented[11]. The resilience scale is comprised of a total of 16 items, and the subfactors are positive future orientation (5 items), emotion control (6 items), and diversity of interest (5 items). A higher score indicates a higher level of psychological resilience. The reliability of the revised and supplemented instrument had a Cronbach's α of .84.

Nursing professionalism was measured using an instrument for nursing professionalism[12] that was revised and supplemented[13]. The nursing professionalism scale is comprised of a total of 18 items: six on profession self-concept, five on social recognition, three on the professionalism of nursing, two on the role of the nursing area, and two on the autonomy of nursing. A higher score indicates a higher nursing professionalism. The reliability of the scale in this study had a Cronbach's α of .77.

College life adaptation was measured using the Student Adaptation to College Questionnaire *SACQ) [14] that was revised and supplemented[15]. College life adaptation is comprised of a total of 31 items: six on academic adaptation, five on social adaptation, 11 on personal-emotional adaptation, and nine on college environment adaptation. A higher score indicates a higher level of college life adaptation. The reliability of the scale in this study had a Cronbach's α of .90.

3. Data collection

Data collection occurred from April 10, 2017, to May 30, 2017. Two-hundred and eighty nursing students in D City, South Korea were the subjects. These subjects who understood the purpose and procedures of this study gave written consent and were able to read and respond to the surveys were selected. It was explained to the subjects that they could terminate their participation at any point if they desired and that there were no disadvantages to not participating in the study. Furthermore, it was explained that the collected data was anonymous, only used for research purposes, and destroyed after three years. Structured surveys were distributed to subjects who agreed to participate, and the surveys were collected immediately after completion. After collecting the surveys, the researcher codified them by only marking anonymized identification numbers, and the surveys were stored in the password-protected personal computer of the researcher.

4. Data collection

Collected data were analyzed using the SPSS 24.0

program. The general characteristics of the subjects were analyzed using means and standard deviations. The resilience, nursing professionalism, and college life adaptation of the subjects were analyzed using means and standard deviations, and the reliability of the tool was analyzed using Cronbach's α. Differences in the college life adaptation of the subjects by general characteristics were analyzed using independent t-tests and ANOVA, and the Scheffe test was used for post-hoc tests. The correlation among resilience, nursing professionalism, and college life adaption of the subjects was analyzed with Pearson's correlation coefficient. Finally, factors that affect college life adaptation were analyzed using multiple regression.

Result and Discussion

1. General characteristics of participants

The general characteristics of the subjects are as shown in [Table 1]. For the genders of the subjects, there were more female students (199; 82.9%) compared to male students. For grades, 1st grade was the most common at 69 subjects (28.8%). The most type of residence were 133 subjects in boarding houses or living alone (55.4%). The most common level of monthly living expense was 300-390,000 KRW at 118 subjects (49.2%), and the most common academic achievement level was "middle" at 119 subjects (49.6%).

Table 1. General characteristics of participants (n=240)

Variables	Category	n	%
Gender	Male	41	17.1
	Female	199	82.9
Grade	1st	69	28.8
	2nd	64	26.7
	3rd	47	19.6
	4th	60	25.0
Type of Residence	Own house (with family)	56	23.3
	Boarding house or living alone	133	55.4
	Dormitory	51	21.3
Living Expense (monthly)	<300,000	47	19.6
	300,000-390,000	118	49.2
	≥300,000	75	31.3
Academic Achievement Level	High	67	27.9
	Middle	119	49.6
	Low	54	22.5

2. Resilience, Nursing Professionalism, and College life Adaptation of students

The resilience, nursing professionalism, and college life adaptation of the subjects are as shown in [Table 2]. The mean score for the resilience of the subjects was 3.64. The mean score for nursing professionalism was 3.88. The mean score for college life adaptation was found to be 3.22.

3. The difference of College life Adaptation according to General Characteristics

The levels of college life adaptation by the general characteristics of the subjects are as shown in [Table 3]. The college life adaptation of the subjects showed statistically significant differences by gender (t=5.41, p=0.021), with male students having a higher level of college life adaptation compared to female students. Furthermore, there were statistically significant differences in college life adaptation by academic achievement level (F=11.41, p<0.001). Post-hoc tests showed that the level of college life adaptation was the highest if the academic achievement level was "High," followed by "middle" and "Low."The fact that the college life adaptation of male students is higher, although most nursing students are female students[5,

16] and the fact that the college life adaptation is higher if academic achievements are better[5] are in line with previous findings. In particular, male students adapting to college life better than female students can be thought of resulting from interest and effort in the field for the college life adaptation of male students, who are the minority. However, in the future, an effort to improve the college life adaption of female students, who comprise the majority of the nursing department, will also be necessary. Furthermore, because it was shown that low academic achievement levels were associated with difficulties with college life adaptation, plans to improve college life adaptation—by analyzing the cause for the low academic achievement levels and providing academic achievement improvement plans by academic styles—will be necessary.

Table 2. Resilience, Nursing Professionalism, and College life Adaptation of students (n=240)

Variables	Range (Min-Max)	Mean of Items (Mean±SD)
Resilience	2.00-4.90	3.64±0.45
Positive Future Orientation	1.20-5.00	3.73±0.65
Emotion Control	1.60-5.00	3.23±0.58
Diversity of Interest	2.00-5.00	3.66±0.60
Nursing Professionalism	2.50-5.00	3.88±0.44
Profession Self-Concept	2.50-5.00	3.94±0.47
Social Recognition	1.00-5.00	3.24±0.72
Professionalism of Nursing	2.00-5.00	4.00±0.57
Role of Nursing Area	1.00-5.00	4.03±0.67
Autonomy of Nursing	1.00-5.00	4.22±0.73
College life Adaptation	1.70-4.30	3.22±0.44
Academic Adaptation	2.17-4.33	3.29±0.39
Social Adaptation	1.80-5.00	3.77±0.66
College Environment Adaptation	1.45-4.64	3.11±0.61
Personal-Emotional Adaptation	1.78-4.11	2.99±0.36

Table 3.The difference of College life Adaptation according to General Characteristics (n=240)

Variables	Category	Mean±SD	t or F(p)	Scheffe
Gender	Male	3.36±0.52	5.41 (0.021)	
	Female	3.19±0.41		
Grade	1st	3.28±0.44	1.97 (0.119)	
	2nd	3.13±0.40		
	3rd	3.17±0.45		
	4th	3.29±0.44		

Cont... **Table 3.The difference of College life Adaptation according to General Characteristics**

(n=240)

Type of residence	Own house (with family)	3.24±0.43	0.14 (0.870)	
	Boarding house or living alone	3.21±0.44		
	Dormitory	3.24±0.45		
Living Expense (monthly)	<300,000	3.20±0.42	0.40 (0.669)	
	300,000-390,000	3.20±0.43		
	≥300,000	3.26±0.45		
Academic Achievement Level	Higha	3.39±0.39	11.41 (<0.001)	a>b>c
	Middleb	3.21±0.38		
	Lowc	3.02±0.52		

4. Correlation among Resilience, Nursing Professionalism, and College Life Adaptation

The relationships among resilience, nursing professionalism, and college life adaptation of the subjects are as shown in [Table 4]. College life adaptation of the subjects showed significant positive correlations with resilience (r=.650, p<0.001) and nursing professionalism (r=.395, p<0.001).

Table 4. Correlation among Resilience, Nursing Professionalism, and College Life Adaptation

(n=240)

Variables	**Resilience**	**Nursing Professio-nalism**	**College Life Adaptation**
	r(p)	**r(p)**	**r(p)**
Resilience	1		
Nursing Professionalism	.437** (<.001)	1	
College Life Adaptation	.650** (<.001)	.395** (<.001)	1

5. Influencing Factors in the College Life Adaptation of Subjects

The results of identifying the factors that affect the college life adaptation of subjects are as shown in [Table 5]. Multiple regression analyses were performed. Among general characteristics, academic achievement level was transformed into a dummy variable and entered as an independent variable. The results of testing the multicollinearity of the independent variables showed a Variation Inflation Factor (VIF) of 1.24-1.82. This is under the threshold of ten, and thus there was no multicollinearity problem. The Durbin-Watson index was 1.936, which means that the independence between the error terms was verified and there was no autocorrelation between the residual terms. Thus, it was suitable to perform a regression analysis, and the regression was significant (F=46.92, p=<0.001). The factors that affect college life adaptation were nursing professionalism (β=.14, p=0.013) and resilience (β=.56, p=<0.001). Of these, resilience was the factor that had the greatest impact. These variables explained 44% of the total.

Table 5. Influencing Factors in the College Life Adaptation of Subjects

(n=240)

Variable	B	SE	β	t	p	VIF
(Constant)	23.91	7.01		3.41	0.001	
Academic Achievement Level*(High) (Ref. Low)	3.35	1.97	.11	1.70	0.091	1.82
Academic Achievement Level*(Middle) (Ref. Low)	2.00	1.70	.07	1.18	0.241	1.67
Nursing Professionalism	0.28	0.11	.14	2.50	0.013	1.24
Resilience	0.98	0.10	.56	9.88	<0.001	1.37
R2=.44, AdjustedR2=.44, F=46.92, p=<0.001 Durbin-Waston's =1.936						
*Dummy variables; Ref.=Reference						

The abovementioned results are in line with the previous findings[17] that resilience is a major factor in college life adaptation. This may be the result of the attitude of viewing the future as positively affecting college life by overcoming the uncertainty and crises that occur during college. Additionally, because it was found that a higher level of resilience was associated with better college life adaptation, it will be necessary to promote various activities that can increase the level of resilience and develop programs.

In this study, the higher level of nursing professionalism perceived by nursing students was found to be associated with better college life adaptation, and it was found that nursing professionalism is a factor that affects college life adaptation. Another previous study[18] has also found a positive correlation between nursing professionalism and college life adaptation, supporting the results of this study. Because nursing professionalism plays the role of mediating between major satisfaction and college life adaptation[19] and positively promotes career preparation, continuous training during college is important. Therefore, various programs that guide the formation of positive nursing professionalism must be developed and implemented.

Combining the abovementioned results, resilience has a positive impact on not only college life adaptation, but also the establishment of nursing professionalism. Therefore, the development of a mediation program that can improve resilience in nursing students may ultimately play an important role in nursing students.

Conclusion

Based on the results of this study, it was found that the college life adaptation of the nursing students studied is affected by the resilience and nursing professionalism. In particular, because it was found that resilience was the factor with the greatest influence, it is necessary to develop programs that can enhance resilience to increase the levels of college life adaptation of nursing students. This study is significant in that it identified factors that can positively affect college life adaption of nursing students, who will lead the future of nursing, through this study.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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The Effect of Exercise-Induced Hyperthermia on the Achilles Tendon

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Abstract

Background/Objectives: An increase in the temperature of the tendon due to repetitive exercise may also be an important cause of injury.

Methods/Statistical analysis: Ten men participated and five fresh frozen cadavers in the thermographic study. The experimental subjects performed hopping exercises using their right leg only for 10 minutes; the core temperatures of both Achilles tendons were measured before the exercise, immediately after the exercise, and 10 and 20 minutes after the exercise..

Findings: The temperature of the skin surface above the right Achilles tendon engaging in the hopping exercise significantly and gradually increased ($\chi 2 = 27.120$, $p < .001$) as time passed. On the other hand, while the temperature of the skin surface above the resting left Achilles tendon decreased immediately after exercise before gradually increasing later, these changes were not statistically significant ($\chi 2 = .392$, $p = .564$). In the cadaveric study, the baseline core temperature of the Achilles tendon was 23.56±0.09℃. This temperature rose to 23.74±0.11℃ after 1000 cycles, 23.9±0.12℃ after 2000 cycles, 24.16±0.09℃ after 3000 cycles, 24.42±0.08℃ after 4000 cycles, and 24.72±0.15℃ after 5000 cycles, it was significantly increased ($r = 0.998$, $p < .001$).

Improvements/Applications: The Achilles tendon is a relatively avascular structure, both direct and indirect methods of measurement suggest that its core temperature rises during exercise. Therefore, it will be the basic data for applying appropriate intervention to exercise

Keywords: *Hysteresis, Achilles, Tendon, Exercise, Temperature*

Introduction

The Achilles tendon is the most commonly injured tendon of the lower limb[1]. Although most injuries occur due to trauma, degenerative changes in the tendon due to repetitive load-bearing, reduced blood flow, and the use of drugs such as steroids may also cause Achilles tendinopathy. Furthermore, cadaveric studies have suggested that chronic degenerative changes and reductions in blood supply are associated with Achilles tendon rupture, though the exact mechanism behind these relationships remains unknown.

An increase in the temperature of the tendon due to repetitive exercise may also be an important cause of injury[2]. Cadaveric studies suggest that chronic degenerative changes and reduction in blood supply are associated with Achilles tendon rupture, yet the exact mechanism behind these relationships remains unknown[3]. The Achilles tendon comprises of relatively avascular tissue that is composed primarily of type 1 collagen with viscoelastic properties [4, 5]. Because the tendon is not perfectly elastic, up to 10% of the energy stored during its repetitive contraction and relaxation is converted to heat, thereby increasing its temperature[6]. This change in temperature may eventually lead to cell death; according to Hall and Giaccia [7] cells begin

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to die when the core temperature of the tendon rises above 42.5°C. Furthermore, Birch, Wilson &Goodship [8] reported that more than 80% of the fibroblasts in a tendon died after exposure to a temperature of 45°C for 30 minutes. Hall and Roizin-Towle [9], suggested that degenerative changes in the tendon and reduced blood flow and pH after exercise contribute to increased sensitivity to heat. In an in vitro experiment, collagen was shown to be stable at temperatures of 36℃ or less but unstable at temperatures above 36℃ [10, 11]. Wilson and Goodship [12] used the superficial digital flexor tendon of a horse to show that hysteresis during exercise can cause the core temperature of the tendon to rise up to 43℃. Studies on the Achilles tendon in humans have found that the core temperature after exercise rises to more than 41℃ [13. 14]. However, existing reports have calculated the core temperature of the Achilles tendon using mathematical models rather than direct measurements. Thus, it remains unknown whether movement of the Achilles tendon itself causes its temperature to rise. To directly measure the change in temperature of the Achilles tendon in humans, a temperature gauge needle needs to be inserted into the tendon; however, this is a very invasive process in a living person. Fortunately, as the Achilles tendon lies directly beneath the epidermis, the use of infrared thermography to measure skin surface temperature should be able to capture any rises in the temperature of the tendon. This technique is advantageous as it is non-invasive and does not expose subjects to pain or radiation. Thus, the purpose of the current study was to use infrared thermography to approximate the core temperature of the Achilles tendon in experimental subjects who performed a hopping exercise. We also performed a cadaveric study in which we used a digital thermometer to measure the core temperature of the Achilles tendon after a series of similar exercises.

Method

Ethical considerations

All data used in the present study was collected according to the approved guidelines and screening procedures of Chung University, Seoul. All experiments were also approved by the Institutional Review Board [IRB No: C20111192 (642)] at Chung-Ang University.

Infrared thermography

Ten male subjects participated in this study. The average age of the participants was 27.6 ±1.34 years. The average height and weight of the participants were 174.2 ±0.02 cm and 68.1 ±2.83 kg, respectively. All subjects were physically active and had a normal ankle-brachial index (ABI) and toe-brachial index (TBI) (ABI: 1.03 ±0.02, TBI: 0.78 ±0.04). Subjects were excluded if they were a current smoker, displayed coldness in their hands and feet, had a history of perfusion disorder of the legs, or had diabetes, hypertension, or an autonomic nervous system disorder. After subjects put on a simple jogging suit consisting of short pants and a short-sleeved jersey (Figure 1-A), they were allowed to adapt to the ambient temperature of the room for 15 minutes. The temperature of the exercise room was about 24□, which differed from the room that contained the infrared thermography system. Subjects then hopped in place 1000 times on their right leg for about 10 minutes without a break. While hopping, subjects were not allowed to let their heels touch the ground so that the Achilles tendon could be given as much tension as possible. The infrared thermography images (IRIS-5000, Medicore, Korea) were taken on the back side of both legs before, immediately after, 10 minutes after, and 20 minutes after the hopping exercise (Figure 1-B). The regions of interest (ROIs) were the gastrocnemius muscle and the Achilles tendon.



Figure 1 (A). Participant wearing the jogging suit (B) Infrared thermograph measuring his posterior lower

Cadaveric study

Five freshly-frozen, non-paired, human cadaveric legs, from donors ranging in age from 48 to 77 years (mean = 59 years), were used for this study. All specimens had been amputated at the hip joint, were macroscopically intact, and showed no evidence of previous surgeries, preexisting arthritis, or ligamentous instability on clinical examination. The specimens were kept frozen at -20°C before testing and were thawed at room temperature for 24 hours before the experiment

began. We first identified an area 4 cm above the insertion of the Achilles tendon and marked the skin at that spot. Next, the leg position was set so that the ankle had a joint angle of 90 ±5 degrees and the knee had a joint angle of 180 ±5 degrees. In order to approximate the hopping exercise performed by live subjects, a Steinmann pin was inserted horizontally to pass through all of the metatarsal heads and was connected to a strong string for skeletal traction (Figure 2). We then mimicked a hopping movement by repeatedly pulling and releasing the string, while the pulling force was kept constant (at about 60 N) with a spring balance. The core temperature was obtained from the marked position (Figure 3) and was measured with a digital thermometer (TX10, Yokogawa, Japan). To determine the effect of exercise on the temperature of the Achilles tendon, we recorded the temperature before and immediately after 1000, 2000, 3000, 4000, and 5000 cycles of the pulling and releasing exercise.



Figure 2. A Steinmann pin for the hopping exercises in cadavers.



Figure 3. The core temperature of the marked position and a digital thermometer

Statistical analysis

All collected data were analyzed using SPSS 20.0 (SPSS Inc., Chicago, IL, USA). Descriptive statistics, including means, standard deviations, frequencies, and percentages, were used to analyze variables for the infrared thermography study. A Freidman test was also used to determine differences in Achilles tendon core temperatures at the time-points investigated (before, immediately after, 10 minutes after, and 20 minutes after the hopping exercise). Furthermore, the Wilcoxon test was used to analyze differences in temperature between the right and left legs, and the Friedman test was used to perform repeated measures analysis of variance between the right and left legs at the time-points above.

Result and Discussion

Infrared thermography

Table 1 summarize changes in the temperature of the skin surface above the Achilles tendon and gastrocnemius muscle immediately before, immediately after, 10 minutes after, and 20 minutes after the hopping exercise. The temperature of the skin surface above the right Achilles tendon engaging in the hopping exercise significantly and gradually increased ($\chi 2 = 27.120$, $p < .001$) as time passed. On the other hand, while the temperature of the skin surface above the resting left Achilles tendon decreased immediately after exercise before gradually increasing later, these changes were not statistically significant ($\chi 2 = .392$, $p = .564$).

Changes in the temperature of the skin surface above the right gastrocnemius muscle (where temperature increased immediately after exercise and continued to do so for 20 minutes) and left gastrocnemius muscle (where temperature decreased immediately after exercise before increasing again by 10 and 20 minutes) were not statistically significant (right: $\chi 2 = 6.000$, $p = .112$; left: $\chi 2 = 5.788$, $p = .115$). Lastly, changes in the temperature of the skin surface above the Achilles tendon was significantly different between the right and left legs immediately after exercise ($z = -2.023$, $p < .05$), 10 minutes after exercise ($z = -2.666$, $p < .01$), and 20 minutes after exercise ($z = -2.803$, $p < .01$).

Table 1.Comparison of skin temperatures before and after the hopping exercises

Position	Freidman Test ($\chi 2$)	pre-ex	Immediately after post-ex	10 min after post-ex	20 min after post-ex
RAT	27.120***	26.06±.89	26.08±.64	27.04±.28	27.59±.21
LAT	.392	25.80±.84	25.55±.74	25.48±.60	25.56±.77
Wilcoxon(Z score)	-1.483	-2.023	†-2.666	††-2.803	††-2.803
††RGCM	6.000	26.15±.93	26.25±.48	26.54±.40	27.56±.30
LGCM	5.788	26.63±.78	26.10±.02	26.48±.59	26.63±.77
Wilcoxon(Z score)	-1.887	-.051	-2.55	-2.50	-2.50

†RAT: Right Achilles tendon; LAT: Left Achilles tendon; RGCM: Right Gastrocnemius Muscle; LGCM: Left Gastrocnemius muscle, *p < 0.05, **p < 0.01, ***p < .001, between differences was calculated by Wilcoxon †p < 0.05, ††p < 0.01, †††p<.001

The core temperature of the Achilles tendon gradually increased as the number of hopping exercises increased. While the baseline core temperature of the Achilles tendon was 23.56±.089℃, this temperature rose to 23.74 ±.11℃ after 1000 cycles, 23.90 ±.12℃ after 2000 cycles, and 24.16 ±.89℃ after 3000 cycles, 24.42 ±.084℃ after 4000 cycles, and 24.7 ±.15℃ after 5000 cycles. The mean core temperature of the Achilles tendon was positively correlated with the number of hopping exercises (r = 0.998, p < .001; Figure 4.)

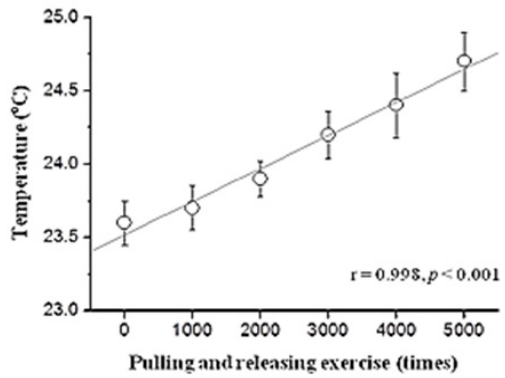


Figure 4. The mean core temperature of the Achilles tendon. (r=0.998, p<.001).

Discussion

This study was found that the temperature of the skin surface above the right Achilles tendon engaging in the hopping exercise rose significantly immediately after exercise. This is the first study in humans to show such a result. Similarly, our cadaveric study revealed that following pulling and releasing exercises, the core temperature of the Achilles tendon increased with the number of exercises performed. The temperature of the skin surface overlaying the right the gastrocnemius muscle also increased after exercise, though this change was not significant. Various factors may account for the patterns of temperature change seen in both the Achilles tendon and gastrocnemius muscle before and after exercise. The Achilles tendon has a viscoelastic structure with relatively low blood flow compared to other tissues [4, 5]. Due to the force applied to the Achilles tendon by repetitive hopping, hysteresis increases both the skin surface and core tendon temperatures [8, 12, 13, 14, 15] thus accounting for why the temperature continued to gradually increase 10 and 20 minutes after exercise. In a previous study, the Achilles tendon hysteresis value was reported to be about 17%, and the energy stored in the tendon during a single stance phase per meter of tendon was calculated to be 108 Jm-^{1}14[13] Using these values,

18 J of this stored energy should be converted to heat per stride. Therefore, in our study, the energy released as heat would have been about 18000 J after 1000 hopping exercises. This stored energy could then cause the temperature of the Achilles tendon to rise in both the thermography study and the cadaveric study. The relatively low temperature of the skin surface above the Achilles tendon compared to that of the gastrocnemius muscle may be also explained by blood flow. Blood flow in the gastrocnemius muscle is greater than blood flow in the Achilles tendon, leading to lower temperatures in the tendon. Indeed, Wilson & Goodship [12] noted that while the core temperature of the Achilles tendon during exercise rises to 43.3℃, but the temperature of the ambient region is about 5.4℃ lower. Therefore, it is possible that the skin surface temperature measured by infrared thermography may be lower than the real temperature rising in the core, resulting in overall lower temperatures recorded for the Achilles tendon than for the gastrocnemius muscle. The sympathetic nervous system is involved in the contraction and relaxation of the blood vessels of the skin [16. 17, 18]. During acute exercise, blood flow is redistributed from nonworking tissue, such as the skin, to active skeletal muscle through the actions of the sympathetic nervous system [19]. Infrared thermography may more accurately reflect the surface temperature than the core temperature. We found that a decrease in temperature occurred immediately after the hopping exercise on the surface of the leg at rest. However, the temperature of the Achilles tendon and gastrocnemius immediately after the hopping exercise did not decrease. As described above, the increase in temperature in the region of the Achilles tendon for the leg that performed the hopping exercise can be explained by hysteresis. The temperature in the region of the gastrocnemius in the leg that performed the hopping exercise did not change significantly after the hopping exercise. This can be explained by an increase in the core temperature due to the amount of blood flow [20]. Hall &Guyton [21] reported that systemic blood circulation increases during exercise; specifically, blood flow to the muscle becomes two to three times greater during exercise than at rest. The gastrocnemius in the leg that performed the hopping exercises may have been affected by the increased amount of blood flow during and after exercise. Thus, we may not have detected a significant change in the temperature of the gastrocnemius because the decreased surface temperature due to the sympathetic system was counterbalanced by the increase in the core temperature due to the systemic blood circulation.

Despite the insights provided by this study, it does have some limitations. Firstly, the sample size was not sufficient for an in-depth statistical analysis. Secondly, we could not determine the stored energy during hopping and the degree of hysteresis because we did not measure the change in the length of the Achilles tendon. However, this could be calculated with data from a previous study. Thirdly, although participants performed 1000 hopping exercises for about 10 minutes, they could not perform additional hopping due to physical deterioration and pain. Likewise, we could not perform more than 5000 hopping exercises in the cadaveric study due to physical deterioration of the samples. Nonetheless, we found a significant change in temperature of the Achilles tendon during exercise. Fourthly, we could not check the surface temperature of the Achilles tendon in the cadaveric study because there was no blood supply, and the sympathetic system differed from that of living humans. Finally, it is possible that the surface temperature measured by infrared thermography does not accurately reflect the core temperature [22]. However, we did measure the core temperature of the Achilles tendon in the cadaveric study using invasive methods, and the results were generally consistent with those measured in living humans through infrared thermography

Conclusion

In this study confirmed that the skin surface temperature and core temperature gradually increased over time through the experiments before and after hopping exercise with 10 men and one cadaver.Although the Achilles tendon is a relatively avascular structure, both direct and indirect methods of measurement suggest that its core temperature rises during exercise.The results of this study are meaningful as a basis for applying and mediating effective programs of exercise in the future..

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Relationship among Nunchi, Communication Skills and Critical Thinking Disposition in Nursing Students

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Abstract

Background/Objectives: This study was done to identify the relationship among Nunchi, Communication Skills, and Critical Thinking Disposition in nursing students.

Methods/Statistical analysis:The subjects of this study were second-year nursing students going to the four-year nursing school located in W city, who understood the purpose of this study and had voluntary participation. A self-report type survey was conducted targeting a total of 164 of nursing students in a city from Nov 26, 2018 to Nov 30, 2018.

Findings:As the results of the study, the relationship between the Nunchi and Critical Thinking Disposition (r=.64, p<.001), the Communication Skills and Critical Thinking Disposition (r=.71, p<.001), the Nunchi and Critical Thinking Disposition (r=.74, p<.001) showed a statistically significant positive correlation.

Improvements/Applications:Therefore, it is necessary to develop and improve nursing students' communication skills and critical thinking disposition as main competency factors of nursing education by activating a variety of case learning or simulation education.

Keywords: *Nunchi, Communication, Critical Thinking, Nursing, Students*

Introduction

Korean society is known to be collectivism based society[1]. In particular, the group of nurses, which needs to have close and cooperative relations with people in diverse fields in order to resolve the issue of health, should pay attention to patients or their colleagues in work relationship so as to find their intention and take a proper action. Such an action appears in the type of Nunchi in Korean society[2]. Nunchi means that one finds the other's mind (thinking, feeling, and atmosphere) or the mood of a situation, and takes a proper action[2]. Since nurses do their nursing behavior four sensitive patients, they can have Nunchi to deal with verbal or nonverbal expressions. Nunchi has positive and negative aspects[3]. According to the research by Kim and Yoo[4], nursing students with "burden aggravation Nunchi type", one of their recognition-coping behavior types for their first clinical practice, tried to "behave with Nunchi in a clinical practice period" and regarded "having Nunchi" as the most important coping behavior for their burden of practice. In addition, the group with a high level of Nunchi has higher self-esteem, subjective well-being, and interpersonal relationship than the group with a low level of Nunchi[2]. Nunchi has a correlation with interpersonal relationship, and Nunchi reduces depression or anxiety in the medium of self-esteem so that it influences psychological health[5] and clinical competency[6]. Given the results, nursing students should have clinical practice in their curriculum, and Nunchi or sense is a necessary factor for nursing students who need to quickly understand the other party's mind or situation and make a quick decision at hospital after their graduation. Most previous studies on Nunchi are related to counselling so that there is not much research on nursing students.

Lee[6] argued that nursing students' communication skills had a correlation with Nunchi, and most influenced clinical competency. It was said that communication skills had a positive relation with self-leadership[7]. It

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was said that the higher level of communication skills, the higher level of interpersonal skills[8]. However, nursing students' communication skills were in the level a little higher than the middle level[9].

Critical thinking disposition increases the critical thinking skills that help to find and objectify the nursing issue for a patient critically and resolve the issue creatively[10], is the most influential factor on problem-solving skills[11]. Given that, critical thinking disposition is one of important competency factors for nursing students who need to think and make a decision on the theoretical grounds. It was found that critical thinking disposition had positive correlations with communication skills, clinical competency, attitudes toward patient safety, professional self-concept, and major satisfaction, and that critical thinking disposition influenced basic nursing competency and critical thinking competency[12-17].

Method

1. Research Design

This descriptive correlational study is designed to find the relations between nursing students' Nunchi, communication skills and critical thinking disposition.

2. Subjects

The subjects of this study were second-year nursing students going to the four-year nursing school located in W city, who understood the purpose of this study and had voluntary participation.

3. Research Tools

1)Nunchi

This study made use of the Nunchi scale developed by Heo and Park[2].In the research by Heo and Park[2], Cronbach's α was .87, and in this study, Cronbach's α was .94.

2)Communication skills

This study applied GICC(Global Interpersonal Communication Competency Scale) which was developed by Hur[18] in the way of adding seven concepts to the eight communication competency construct concepts suggested by Rubin[19]'s Interpersonal Communication Competence Scale (ICC) and modifying and improving them. In the research by Hur[18], Cronbach's α was .72, and in this study, Cronbach's α was .88.

3)Critical thinking disposition

This study used critical thinking disposition scale developed by Yoon[20]. In the research by Yoon[20], Cronbach's α was .84, and in this study, Cronbach's α was .91.

4. Data collection

Data had been collected from Nov 26, 2018 to Nov 30, 2018.

5. Data analysis

Data analysis methods were SPSS 23.0 programs.

Result

1. Characteristics of the subjects

The general characteristics ofnursing students are shown in [Table 1].

Table 1. Characteristics of the subjects (N=164)

Characteristics	Categories	N (%)
Satisfaction onnursing major	Satisfied	81 (49.4)
	Neutral	80 (48.8)
	Dissatisfied	3 (1.8)
Academicachievement (grade)	≥4.0	32 (19.5)
	2.9-3.9	114 (69.5)
	≤3.0	18 (11.0)
Health status	Healthy	90 (54.9)
	Usually	61 (37.2)
	Not healthy	13 (7.9)
Friendship	Good	83 (50.6)
	Usually	67 (40.9)
	Poor	14 (8.5)
Personality	Extroverted	34 (20.7)
	Usually	88 (53.7)
	Introverted	42 (25.6)

2. Nunchi, communication skills and critical thinking disposition of the nursing students

The Nunchi, communication skills and critical

thinking disposition of the nursing students are shown in [Table 2].

Table 2. Nunchi, communication skills and critical thinking disposition of the nursing students (N=164)

Variables (range)	M±SD
Nunchi (1-5)	3.84±0.61
Nunchi situation-grasp	3.84±0.63
Nunchi situation-action	3.83±0.69
Communication skills (1-5)	3.55±0.51
Critical thinking disposition (1-5)	3.53±0.43
Intellectual passion/curiosity	3.44±0.61
Prudence	3.27±0.47
Self-confidence	3.47±0.57
Systematicity	3.44±0.59
Intellectual fairness	3.75±0.58
Healthy skepticism	3.56±0.60
Objectivity	3.84±0.57

3.Relationship of nursing students' Nunchi, communication skills and critical thinking disposition

The Relationship of nursing students' Nunchi, communication skills and critical thinking disposition is shown in [Table 3].

Table 3. Relationship of nursing students' Nunchi, communication skills and critical thinking disposition (N=164)

	Communication skills r(p)	Critical thinking disposition r(p)
Nunchi	.74 (<.001)	.64 (<.001)
Communication skills		.71 (<.001)

Discussion

Nunchi of the study subjects scored 3.84 out of 5 points. In terms of the sub categories of Nunchi, Nunchi-understanding factor scored 3.84, and Nunchi-behavior factor 3.83. This result was similar to the result of the study by Lee[6] who used the same scale. In both studies on nursing students, Nunchi scored the points higher than middle points. In the research on general university students by Heo[5], their Nunchi situation-understanding factor scored 3.71 on average and their Nunchi situation-behavior factor scored 2.27, the points which were very low. Given the result, nursing students' Nunchi score seems to be relatively very high. General departments have most theory classes. On contrary, before experiencing hospital practice, nursing students have the in-school practice course that reflects various teaching methods (flipped learning, problem-based learning, team-based learning, case learning, etc.) on the basis of such subjects as basic nursing practice, health assessment practice, and anatomy practice and clinical cases and thereby learn cooperation and consideration in the course and learn Nunchi in the relationship established in clinical practice, and therefore their Nunchi-understanding or behavior influencing interpersonal relationship[2,5] is more developed.Accordingly, it is necessary to develop a variety of programs that help nursing students naturally learn and positively develop Nunchi in their curriculum.

In this study, nursing students' communication skills scored 3.55 out of five full points, which were somewhat higher than the result (3.60) of the research Lee[6] and the result (3.62) of the research by Lee and Kim[12] which used the same scale. The different seemed to be made because the subjects of the previous studies were students who already experienced clinical practice, and the subjects of this study were second-year students who had yet to experience clinical practice. According to the research on convergence communication training program for first-year nursing students by Jeong and Seo[21] and Kim and Yoon[22], their communication skills and interpersonal relationship improved. The communication course of interpersonal relationship and communication based on group activities improved communication self-efficacy[23]. Given the results, it was found that interpersonal relationship and communication skills, which are main skills of professional workers, are influenced by training and a relevant course. Therefore, it is necessary to develop a variety of communication training programs and courses.

In this study, nursing students' critical thinking disposition scored 3.53 out of five full points, which were somewhat higher than the result (3.46) of the research by Lee and Kim[12] who used the same scale. In this study, the sub categories with high points were objectivity

and intellectual fairness, and in the research by Lee and Kim[12], they were intellectual fairness and objectivity. In this study, the sub categories with low points were systematicity and prudence, and in the research by Lee and Kim[12], they were prudence and systematicity. Therefore, the two studies had consistent results. These results seem to be drawn because nursing students are familiar with such words as mistake acceptance, critical thinking, theoretical ground, validity, and explanation and consider them important in their school curriculum in terms of the characteristics of nursing school and specialties of hospital that accepts no mistakes, but they are unfamiliar with logical or systematic problem-solving skills. In order to cope with diverse situations appropriately in the medical environment based on theoretical grounds, it is required to have critical thinking. Critical thinking disposition is an essential factor for qualitative nursing and professional responsibility in nursing practice. Many experts on nursing focus on learning design and strategic development for improving nursing students' critical thinking[24], and get them involved in nursing education performance index. Given the result that critical thinking disposition is the largest influential factor on professional self-concept of nursing, and problem-solving skills[11,25], it is necessary to apply a variety of teaching methods for finding and raising individuals' potential thinking disposition in curriculum in order to raise their critical thinking.

In this study, there were positive correlations between nursing students' Nunchi and communication skills, between Nunchi and critical thinking disposition, and between communication skills and critical thinking disposition. This result is consistent with the results of relevant studies: the positive correlation between communication skills and Nunchi[6], and the strong positive correlation between critical thinking disposition and communication skills[12]. According to the analysis on previous studies, there were significant positive correlations between Nunchi and communication skills[6], between communication skills and problem-solving skills, between critical thinking disposition and problem-solving skills, and between critical thinking disposition and communication skills[12]. Given the results, it is considered that there is a correlation between Nunchi which is the individual personality of taking a proper action in a situation, and critical thinking disposition of judging one's self-control for solving a problem.It is very important to establish the environment for making the educational culture to improve Nunchi helping for interpersonal relationship and environmental adaptation and critical thinking disposition which is the main competency of nursing students and most influence problem-solving skills[25].Therefore, by activating a variety of case learning or simulation education in curriculum, it is necessary to help to develop and improve students' individual dispositions.

Conclusion

It is necessary to develop and improve nursing students' communication skills and critical thinking disposition as main competency factors of nursing education by activating a variety of case learning or simulation education. In addition, it is good to find a method of improving their Nunchi for understanding a situation and taking a proper action through cooperative learning, team projects, group studies, and various activities. This study has a limitation in generalizing its results, since the subjects were second-year nursing students of one university in one city. It is necessary to develop a program for improving nursing students' main competency through repeated research, and to conduct in-depth research on practical tasks through convergent approach.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Effect of Combined Exercise on Bone Related Factors, Cardiovascular Function and Hemodynamic Change in Emerging Adulthood

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Abstract

Background/Objectives:Rapid economic growth and development of medical, scientific technology, measuring equipment, and IT & AI technology in 21st century have enabled modern people to live rich and convenient lives but due to the decrease of physical activity, they may cause multiple health problems. The purpose of this study is to find out which influence of the participation to regular physical activity will impact on bone related factors, cardiovascular function, and hemodynamic variables of university students who are in early adulthood

Methods/Statistical analysis: The 19 subjects who are in early adulthood and participated to healthcare program, we made them to perform the combined exercise. Bone related factors, cardiovascular function, and hemodynamic variables according to the combined exercise during 10 weeks were measured and analyzed by comparison. Comparison of related variables before and after combined exercise was verified by paired t-test. Also, the correlation between variables was validated through Pearson correlation analysis.

Findings: After participating to the combined exercise, bone related factors, cardiovascular function and hemodynamic variablesshowed positive changes for each. In addition, bone related factors and cardiorespiratory function showed relations of positive and reverse correlations, cardiovascular function and hemodynamic variables showed a relation of reverse correlation, and bone related factors and hemodynamic variables showed a trend of reverse correlation. Measurement analysis has indicated that participating in combined exercise in early adulthood had a positive effect on bone related factors, cardiovascular function and hemodynamics factors.

Improvements/Applications: In conclusion, university students who are in early adulthood should form a healthy lifestyle which participates regularly to exercise program for health promotion and prevention care while should deal with various types of stresses well.

Keywords*: Combined exercise, T-Score, Z-Score, Maximal oxygen consumption, Physical efficiency index, RPP, PWV*

Introduction

Health life closely related to lifestyle becomes more worst as lack of exercise increases in all age groups and[6] causes various problems of social pathologies. As university students who soon enter the early adulthood from adolescence experience the important period to avoid from the control of parents and to take responsibility for themselves, the lifestyles in this period have close relations with the health in middle ages and elderly people. Therefore, it is very important to encourage university students in the early adulthood to practice healthy life and make them to solidly form the healthy lifestyle[1,2].

In particular, as the better life quality can be enjoyed through the reinforcement of functional ability according

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to the increase of age, it is very important to make the university students who are in the early adulthood to have the recognition to the importance of exercise based on the right health knowledge[3].

Also, it is a trend that the occurrence of osteopenia which is frequently occurred to the old ages has increased even to youths before the middle ages who are in lack of exercise. Therefore, in order to maximize and maintain the bone density, active maintenance and prevention are important during the period of university student when bone density is formed and is the best developed, In addition, the importance of exercise is emphasized[4].

As stress may trigger the cause of cardiovascular disease, it is reported that the people who have more tension have more risk factors to degrade cardiovascular function. Therefore, the proper control to this is needed. In particular, it is reported that hemodynamic variables meaning blood circulation related factors are closely related to cardiovascular disease. Under such context, the efficient exercise therapy method are widely recommended to return early to their daily lives through the improvement of cardiovascular function[5].

When generalizing many studies which have been performed before, it is reported that the increase of physical activity amount and regular participation of exercise increase the bone density, improve the autonomic nervous system, improve cardiovascular functions such as cardiac output and maximum oxygen consumption, positively change hemodynamic variables such as heart rate and systolic pressure, improve the human immunity, improve the body functions, and reduce various prevalence rates and death rates[6~8].

However, the subjects of most studies are the youths, the adulthood, the senescence, the disabled but the study about the early adulthood who are threatened to their health conditions due to multiple stresses according to the change of rapid environment is not satisfactory.

Therefore, this study intends to define which influence combined treatment exercise impacts on bone related factors, cardiovascular functions, and hemodynamic variables subjecting to university students who are in the early adulthood and have close relation with healthy lives during the mid-adulthood and the old aged.

Materials and Method

1. Subjects

The subjects of this study are 30 male university students who agreed to voluntary participation by sympathizing to the intent of the study of health care program applicants from N university. In order to enable all subjects to understand and practice the behavior patterns which can impact on the result during this test period, we educated them and received test agreements from them. Also, the subjects who have not faithfully implemented the exercise program during 10 weeks of test period were removed from this test and final test subjects were 19(22.43±1.01yrs, 173.30±3.96cm, 74.07±5.1kg).

2. Experimental procedure & Design

This study implemented the combined exercise for 10 weeks in the frequency of 3 times a weekafter implementing the preliminary exercise for 1 week. The development process of exercise were divided into warming up, main exercise (swimmingfor Monday & Friday, resistance exercise for Wednesday) and cooling down (5 to 10 minutes) respectively. For aerobic exercise, swimming was implemented for 40 – 50 minutes per each time with level 11 – 12 of RPE for 1 – 5 weeks and level 13 – 14 for 6 – 10 weeks based on RPE according to the recommendations of ACSM[9]. Resistance exercises (behind squat, sit-up, bench press, full-up, arm curl, up-right low, triceps extension, shoulder press, power clean, dumbbell) were implemented for 3 sets per each as 10 times a set with 60 % level of 1-RM for 1 – 5 weeks and 70% level of 1-RM for 6~10weeks according to the recommendations of Kraemer et al.[10]Bone related factor which is one of dependent variables used the average value by calculating each after measuring right calcaneal (ankle) area 2 times using SONOST 2000 equipment.Cardiovascularfunction was measured using physical fitness diagnosis system by Korea Institute of Sport Science and O_2run. Physical Efficiency Index is a method of elevating exercise with 30 times per minute at a platform with 50 cm of height and subjects should stand erect after going up to the platform. In addition, for hemodynamic variables, blood pressure was measured using IHB and PWV 3.0 which is the measuring equipment using PWV (pulse wave velocity) after attaching the sensor was used. Rate Pressure Product which is myocardial oxygen consumption was measured by multiplying heart rate to systolic pressure.

3. Statistical analysis

The measured value obtained from this study calculates average and standard deviation to each

measuring item using SPSS Ver.21.0 Program. Comparison of related variables before and after combined exercise was verified by paired t-test. Also, the correlation between variables was validated through Pearson correlation analysis. All statistical significance level was set as=.05.

Results and Discussion

As suggested in Table 1, bone related factors, cardiovascular function factors and hemodynamics factors after participating to the combined exercise showed a significant change after exercise participation, respectively. Also, to bone related factors (BQI, T-Score, Z-Score) and cardiovascularfunction factors(CO, VO_2max, PEI) after participating to the combined exercise, the relation of positive correlation was significantly indicated and to resting heart rate, the relation of inverse correlation was significantly indicated. In addition, cardiovascular function factors (CO, VO_2max, PEI) significantly indicated the relation of inverse correlation with hemodynamic variables (BP, RPP and PWV). Also, it is indicated that the trend of inverse correlation was shown between bone related factors and hemodynamic variables.

Table 1.Dependent Variables according to combined exercise

	BQI	T-Score	Z-Score	HRrest	CO	VO2max	PEI	SBP	DBP	RPP	RFPWV	LFPWV
0 week	112.48 ±15.79	0.70 ±0.05	0.71 ±0.06	69.64 ±7.58	5121.62 ±686.48	35.29 ±4.24	102.47 ±9.04	123.86 ±9.58	79.71 ±8.73	86.42 ±12.77	387.42 ±59.84	354.59 ±78.58
10 week	113.83 ±14.91	0.79 ±0.08	0.81 ±0.04	67.65 ±4.93	5150.13 ±594.72	38.02 ±4.08	98.81 ±9.50	118.78 ±4.49	77.14 ±7.3	80.37 ±6.73	355.42 ±60.41	328.61 ±77.16
t-value	3.769**	1.981*	2.66**	1.85	1.9631*	9.776**	6.686**	2.814**	4.105**	2.600**	12.982**	13.192**

Values are means ± SEM, * p<.05, ** p<.01, BOI; bone quality index, HRrest; rest heart rate, CO(ml/min); cardiac output, VO_2max(ml/kg/min); maximal oxygen consumption, PEI; physical efficiency index, SBP(mmHg); systolic blood pressure, DBP(mmHg); diastolic blood pressure, RPP(mmHg.bpm×10^2); rate pressure product, RFPWV(ms); right foot pulse wave velocity, LFPWV(ms); left foot pulse wave velocity

Discussion

Development of scientific technology & medical practice in modern society, interests to the health, and improvement of living standard provided comfortable and abundant lives with the coming of with the coming of the age of 100. In particular, during the early adulthood when the basic physical fitness is nearly completed, only improving health related physical fitness by forming healthy habit can be lead to lifelong health. Like this, university students who are in the early adulthood do more behaviors which will rather damage the health than behaviors of health promotion due to periodical characteristics and environmental factors[11].

Osteoporosis is commonly considered as a geriatric disease occurred due to decrease of bone mass from 40's. But, after 20's when forming the maximum bone mass, bone loss is occurred as age increases and osteoporosis which is occurred in high frequency during the old age is reported frequently even to the young age group due to the lifestyle disease such as lack of exercise[12]. Recently, it is reported that arterial stiffness which is used as an index reflecting the functional characteristics of artery while is closely related with cardiovascular disease shows high correlation with osteoporosis[13].The ACSM[9] pointed the most important element to prevent the risk of osteoporosis as the maximum bone mass in the adolescence and the early adulthood, and Rizzoli et al.[14] pointed that high bone density in the childhood and the adolescence is the decisive factor to bone health of adult. This study shows a trend matching with preceding researches by bringing the positive changes

of bone related factors after the regular participation of combined treatment exercise. Such result is considered that the increase of muscle mass according to regular physical activity, continuous stimulation to bone, the change of bone mass, activating promotion of osteoblast, prevention of decrease of bone loss, and the increase of bone strength acted complementarily[15,16].

Scribbans et al.[17] indicated that as maximum oxygen consumption of cardiovascularfunction is used helpfully even as health scale of the public as an index of continuous exercise performance ability, it becomes a decisive factor to long-term physical activity as well as can be maintained and promoted by regular physical activity. In particular, physical efficiency index is an item to recognize the degree of stress given to the heart during the exercise and to expect cardiorespiratory function through recovery period heart rate response. It is reported through cross-sectional study that aerobics exercise ability and cardiorespiratory function have positive correlation[18,19]. This study shows a trend matching with preceding researches by bringing the positive changes of cardiorespiratory function related factors after the regular participation of combined treatment exercise. Such result is considered to be indicated by combining the improvement of autonomic nervous system function, the decrease of sympathetic stimulation, the increase of parasympathetic stimulation, the increase of blood flow, the increase of left ventricular end diastolic volume, and the increase of myocardial contractility after participating to regular physical activity[20].

Hemodynamcis is an influence of physical phenomenon of blood going to blood vessel and inside of it on local blood flow and blood pressure and can be measured by blood pressure, myocardial oxygen consumption, arterial pulse wave velocity. Rate pressure product which is widely used to indirectly measure myocardial oxygen consumption can be an index to evaluate myocardial oxygen consumption during the exercise as well as the rest, and is widely used as its usefulness has been proven clinically[21]. In addition, arterial PWV is used as a major index of arterial stiffness which can predict the degenerative change of blood vessel and the risk of cardiovascular disease as a non-invasive method to measure the elasticity of blood vessel. In particular, it is reported that as arterial stiffness which arterial PWV becomes faster becomes severe, the decrease of bone mass is promoted[22].It is reported that regular participation of exercise brings a positive change to hemodynamic variables[23]. In particular, Sîrbu et al.[24] reported the decrease of PWV after performing the combined exercise subjecting to the young university students. This study has brought the significant change to hemodynamic variables after the combined treatment exercise. Such result is considered that regular physical activity acted complexly on the increase of blood vessel elasticity, the increase of blood flow into skeletal muscle, and the increase of myocardial energy efficiency[25].

Conclusion

As shown in the above, in early adulthood, it is important to understand the importance of exercise participation and physical activity for proper lifestyle and health promotion.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Relationship among Sleep Quality, Fatigue, Resilience, and Nursing Performance Ability in Shift Work Nurses

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Abstract

Background/Objectives: The purpose of this study was to investigate the relationship between sleep quality, fatigue, resilience and nursing performance ability of shift work nurses.

Methods/Statistical analysis: Data were collected for 10 days from September 10 to 19, 2018, among 197 clinical nurses employed by a general hospital having more than 300 beds in Seoul and Gyeonggi-do. Data analysis methods were SPSS 23.0 programs.

Findings: The sleep quality score of shift work nurses was 8.03, Fatigue 4.29, Resilience 2.36, Nursing Performance Ability 3.53. Statistically significant correlation was found between sleep quality and fatigue (r=.430, p<.001), sleep quality and resilience (r=-.293, p<.001), fatigue and resilience (r=-.262, p<.001), and resilience and nursing performance ability (r=.544, p<.001) in shift work nurses.

Improvements/Applications: This study is meaningful in the suggestion that it is necessary to increase shift work nurses' sleep quality and reduce their fatigue in order to improve their nursing performance ability, and to develop a desirable work type model.

Keywords: *Sleep, Fatigue, Resilience, Performance, Nurse*

Introduction

Sufficient sleep improves health and safety, whereas a lack of sleep causes fatigue, drowsiness, failure of memory and concentration, nervousness, and tension, which influence activities of daily living[1]. Shift work generates a pattern of irregular sleep and disturbs biorhythm. For this reason, shift workers have more fatigue than non-shift workers and frequent shift work causes a lack of sleep and fatigue accumulation which negatively influence psychological wellbeing and healthy lifestyles[2]. Nurses' health is a critical factor for accuracy of nursing and safety of patients. Nurses' lack of sleep made by their shift work is likely to increase the risk of hospital accidents directly related to patients, including medication error, malfunction of medical devices, and the error of patient analysis[3], and has very significant relations with nurses' personal health issues, such as increased sensitivity to infection, emotional changes, and physical pains[4].

Fatigue is considered to be a warning response to a health change. Shift work nurses had more fatigue and physical subjective symptoms than non-shift work nurses[3,5]. Sleep quality had correlations with fatigue and neurocognitive function[6].

In previous studies according to which resilience influenced nursing performance ability[7], and job engagement, burnout, job stress, and organizational commitment[8-9], resilience was analyzed in association with social influential factors related to jobs, rather than individual personalities. However, resilience of shift work nurses seems to influence individual personalities such as fatigue or sleep quality.

In the research on nurses' nursing performance ability, Jo and Sung[7] reported that resilience had a

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positive correlation with nursing performance ability and resilience was an important predictive factor of nursing. The factors influencing shift work nurses' nursing performance ability vary so that it is necessary to conduct more studies in consideration of physical, psychological, social, and occupational characteristics.

Therefore, this study tries to analyze the relations between shift work nurses' sleep quality, fatigue, resilience and nursing performance ability and to provide a fundamental material for developing a nursing intervention strategy to improve shift work nurses' nursing performance ability.

Method

1. Research Design

This descriptive survey research is designed to find the relations between shift work nurses' sleep quality, fatigue, resilience and nursing performance ability.

2. Subjects

The subjects of this study were 197 nurses working at general wards of small and medium general hospitals with more than 300 wards in Seoul and Gyeonggi-do, who understood the purpose of this study and agreed on their participation.

3. Research Tools

1) Sleep quality

This study used the scale which was made by Cho et al[10] in the way of translating Pittsburgh Sleep Quality Index (PSQI) developed by Buysse et al[11]. The tool has a total of 18 items in the range of 0-21 points. In this study, Cronbach's α was .82.

2) Fatigue

This study used the scale which was made by Chung and Song[12] in the way of translating Fatigue Severity Scale (FSS). The 7-point scale consists of 9 items. The higher the points, the more fatigue. Based on the medium value '4 points', the study subjects were classified into fatigue group and non-fatigue group. In this study, Cronbach's α was .91.

3)Resilience

This study used Korean Resilience Scale (K-CD-RISC) of Baek[13]. The tool has 25 items in the scale of 5 points. In this study, Cronbach's α was .94.

4)Nursing performance ability

This study used the items for evaluating abilities and attitudes in the nurse performance assessment scale developed by Park et al[14]. The tool has 22 items in the 5-point Likert scale. In this study, Cronbach's α was .96.

4.Data collection

Data had been collected for 10 days from Sep. 10 to 19, 2018. All data and personal information collected for research are based on the principle of anonymity and are confidential. Therefore, with the use of codes only, information on each one of subjects was identified.

5. Data analysis

Data analysis methods were SPSS 23.0 programs.

Result

1. Characteristics of the subjects

The general characteristics of shift work nurses are shown in[Table 1]. With regard to age, 48.7% (the largest) accounted for those in their 20s. Regarding to career years, 44.7% (the largest) worked less than 5 years. With regard to work intensity, 61.4% replied that work intensity was in a high level. Regarding how many times they work at night during one month, 86.8% (the largest) worked five times and more. In terms of fatigue, 65.5% of fatigue group had four points or higher. 77.2% replied that they had low sleep quality (six points or higher).

2. Sleep quality, fatigue, resilience and nursing performance ability of the shift work nurses

The sleep quality, fatigue, resilience and nursing performance ability of shift work nurses are shown in [Table 2]. The study subjects' sleep quality scored 8.03 out of 21 full points; their fatigue 4.29 out of 7 full points; their resilience 2.36 points out of 4 full points; and their nursing performance ability 3.53 out of 5 full points.

Table 2.Sleep quality, fatigue, resilience and nursing performance ability of the shift work nurses

(N=197)

Variables (range)	M±SD
Sleep quality(0-21)	8.03±3.37
Fatigue (1-7)	4.29±1.16
Resilience (0-4)	2.36±0.58
Nursing performance ability (1-5)	3.53±0.54

3. Relationship of Shift work nurses' sleep quality, fatigue, resilience and nursing performance ability

The relationship between sleep quality, fatigue, resilience and nursing performance ability of shift work nurses is shown in [Table 3]. As a result, sleep quality had a positive correlation with fatigue (r=.430, p<.001), sleep quality had a negative correlation with resilience (r=-.293, p<.001), fatigue had a negative correlation with resilience (r=-.262, p<.001). Resilience had a positive correlation with nursing performance ability (r=.544, p<.001).

Table 3. Relationship of Shift work nurses' sleep quality, fatigue, resilience and nursing performance ability(N=197)

	Fatigue r(p)	Resilience r(p)	Nursing performance ability r(p)
Sleep quality	.430 (.000)	-.293 (.000)	-.120 (.093)
Fatigue		-.262 (.000)	-.080 (.261)
Resilience			.544 (.000)

Discussion

In this study, sleep quality scored 8.03 out of 21 full points, which are far higher than the diagnosis criterion (five points) of general sleep disorder and mean bad sleep quality. The score was higher than the result (7.46 points) of the research by Jung and Kang[6]. Therefore, it is fair to say that shift work nurses' sleep quality is bad overall. It is necessary to introduce a one-week based work type, expand night-work-only nurse system, develop a desirable shift work model, make customized consulting for a work type in small and medium hospitals, and conduct various approaches.

The study subjects' fatigue scored 4.29 out of 7 full points, which were higher on the basis of the medium value '4 points'. The score was similar to the result (4.44 points) of the research by Jung and Kang[6]. Shift work disturbs work biorhythm and causes fatigue so that it can reduce work adaptation and job commitment. That can influence nursing performance ability and patient safety. In order for shift work nurses to have enough rest, it is necessary to help them secure a sufficient rest time and actively operate healing programs for their hobby.

The study subjects' resilience scored 2.36 out of 4 full points, which were in the middle level and were higher than the result (2.12 points) of the research on ICU nurses of university hospitals by Park and Lee[15]. Kim, Oh and Park[16] reported that the higher the resilience, the lower the job stress and the higher job satisfaction. In order to improve clinical nurses' resilience, it is necessary to develop and apply a customized psychological program, resilience promotion program for training them to have positive and pleasant attitudes.

The study subjects' nursing performance ability scored 3.53 out of 5 full points, which was lower than the 4.0 score of Kim, Song and Lee[17] for the university hospital nurse using the same tool. That seemed to be because of the different work conditions of the nurses working at university hospitals and small & medium general hospitals where there are different work systems and organizational members.

The study subjects' sleep quality had a positive correlation with their fatigue. This result was consistent with the result of the research by Jung and Kang[6]. Nurses can have a changed shift work type even in 1-2 days so that they have difficult with physical adaptation. As a result, it is possible to lower sleep quality and negatively influence their fatigue at work. Therefore, it is necessary to introduce a flexible work type and night-work-only nurse system, give a reward to night work nurses, and take other measures. There were negative correlations between sleep quality and resilience and between fatigue and resilience. Since there is no research on the relations between the two variables, it is hard to compare them directly. In the research by Lee, Kwon and Cho[18], the more work stress, the lower sleep quality. In the research by Kang and Lim[8], resilience influenced stress

and burnout. Given the results, resilience is the internal ability to overcome stress situations well and therefore it is necessary to come up with various intervention methods, including emotional control program and healing program for shift work nurses.

Resilience had a positive correlation with nursing performance ability. This result was consistent with the result of the research by Jo and Sung[7]. In order to improve nurses' nursing performance ability, hospitals and nursing organizations need to recognize the importance of resilience and develop an education program that reflects individual personalities, work characteristics and work intensity. Given the result that chief nurses' leadership influences the improvement in nursing performance ability, it is necessary to improve an organizational culture to exert servant leadership. In addition, it is necessary to find a method of improving resilience and nursing performance ability in consideration of individual personalities, and conduct a wide range of research to develop a variety of practical, realistic, and professional methods.

Conclusion

In this study, the relations between the study subjects' sleep quality, fatigue, resilience and nursing performance ability were analyzed. As a result, there were positive correlations between sleep quality and fatigue and between resilience and nursing performance ability, and there were negative correlations between sleep quality and resilience and between fatigue and resilience. This study is meaningful in the suggestion that it is necessary to increase shift work nurses' sleep quality and reduce their fatigue in order to improve their nursing performance ability, and to develop a desirable work type model. This study is limited to the nurses working at some small and medium general hospitals so that it is difficult to generalize its results. Therefore, it will be necessary to conduct follow-up research in consideration of nurses' internal ability, a hospital size, and regions.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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The Effect of Balance Capability on Cold Application of the Soles

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Abstract

Background/Objectives: The purpose of this study was to investigate the effect of cold application of the sole on the balance capability.

Methods/Statistical analysis: Participants selected for a particular standard (n=49) applied cold packs and hot packs for 10 minutes at intervals of 2 weeks. The subjects measured the temperature of the three distinct parts of the foot sole and carried out a dynamic balance test using the stability limit test program of Bio-rescue.

Findings: The areas of limits of stability after the cold pack application has significantly decreased in directions of forward, backward, right and left. However, the areas after the hot pack application did not have significant differences in all directions. These results show that the dynamic balance capability decreases when cold applied to the sole. However, since the change of the moving area due to the hot application is not significant, it is difficult to say that it affects the dynamic ability when the hot application is performed.

Improvements/Applications: The results of this study showed that there is a difference in the balance sensory ability of the central nervous system according to the temperature change.

Keywords: *Foot, Cold application, Temperature, Balance, Bio-rescue*

Introduction

The body has a balance capability when the center of gravity of the body is stably positioned inside the base[1].The body can become unbalanced and unstable during activity in various unpredictable environments, and impairment of balance capacity limits the function of healthy persons[2-3]. In particular, dynamic balance capability plays a key role in maintaining balance and controlling posture, which is important in preventing walking and falls[3-4]. The proprioception of the body sensory system is the greatest sensation that influences balance control, and many sensory information is input to the body, especially through the foot[5-6].In addition, feet are in contact with the ground to maintain balance with weight and help to perform daily activities[7].Sensory degradation of the skin can affect the sense of inherent water solubility, especially at cold temperatures, slowing the sensation of feet and varying the level of threshold at which pressure and vibration are felt[8].It is also known that 10 minutes of cold use causes local insensitivity and that after cold application, there is an anesthetic effect for a certain period of time[9].On the other hand, hot application helps relieve muscle tone by increasing blood pressure, and by providing sufficient oxygen to muscles, it reduces muscle cramps and increases tissue elasticity[10-12].So far, studies have been limited mainly to changes in sole temperature and sensory changes, such as the sensory thresholds that are affected by these factors and those that affect the sensory change of the soles. On the other hand, there are insufficient studies on the effects of temperature changes on the sole, sensory elements that transmit them, and the balance sense of the central nervous system. Therefore, in this study, we

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want to find out how the sensory changes of the feet can change the functional role of the feet through changes in temperature of foot sole, and in particular, these effects on the balancing capacity associated with the central nervous system, to find out the effective temperature application for balanced training.

Method

The subjects of this study were 49 students who meet the following conditions for the students who are fully enrolled in OO University and fully understood and agreed on the contents of the experiment[Table 1].

Table 1. Physical characteristics of Subjects

Issue	**Mean±SD**
Age(years)	21.0±1.4[a]
Body weight(kg)	62.5±12.4
Height(cm)	167.0±8.8
BMI(kg/m²)	22.3±3.2
Difference in length of Both legs(cm)	0.3±0.2

[a)]Mean±SD

The temperature inside the laboratory was kept at 25 °C and subjects were asked to wear short sleeves and shorts. Experiments cold application and hot application were conducted at intervals of two weeks to exclude each other's effects.

We measured the sole temperature before and after the application of cold and hot in a stable state with bare feet. In each experiment using cold and hot, the balance of room temperature was measured once through the limits of stability test using Bio-rescue, and the ice pack and hot pack were applied to the soles of the foot and the temperature was measured once to observe the changes in the balance capability[Figure 1].

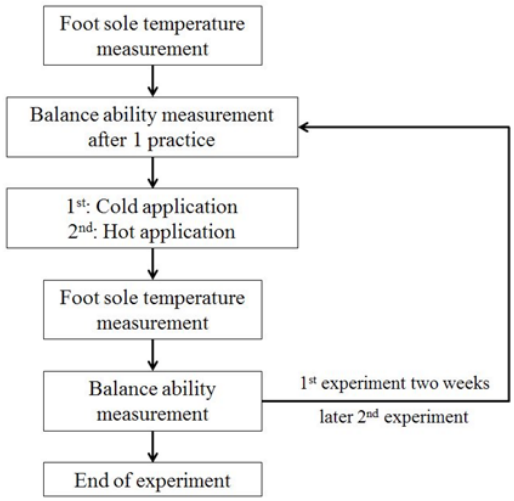


Figure 1. Experimental diagram

The subject was instructed to sit comfortably in a chair with a backrest and to closely contact the sole of the foot with a pack placed under the foot. The time was equally applied to the sole for 10 min.

Measurements of dynamic equilibrium capacities were made using the stability limit test program of Bio-rescue and using a pressure platform(PEDISTAR ELETE 2015, RM Ingenierie, France).

One of the measurement programs of Bio-Rescue, stability limit test, is to measure the maximum limit that the subject can actively move in the standing position to maintain stability. It is judged that the larger the area of the figure made by connecting the point when the maximum weight is moved, the better the balance capability.

An infrared radiation thermometer(DT8380H 2017, Sunche, China) was used to measure skin temperature. The measurement was made by placing the infrared sensor at the first metatarsal head, the 5th metatarsal head, and the heel bone, which are the three anatomical parts of the sole of the foot.

The data collected in this study are statistical program SPSS ver. 25.0, and different analytical techniques were applied according to the purpose. First, the analysis of pre- and post-exercise differences was performed using the corresponding sample T-test. The differences between groups after exercise were analyzed using one-way ANOVA. Statistical significance was set at $p < 0.05$.

Result and Discussion

In the case of cold application, the temperature after application of all three parts of the sole was significantly decreased (p<0.001). In the case of the hot application, all the temperatures of the three parts of the sole were significantly increased (p<0.001)[Table 2].

Table 2.Comparison of the temperature application

	Area	Before /After	Temperature (°C)	T value	p
Cold Pack (Rt)	1st Metatarsal Head	Before	28.476±2.289	39.575	0.000*
		After	14.269±1.785		
	5th Metatarsal Head	Before	27.871±2.360	37.549	0.000*
		After	14.198±2.025		
	Calcaneus	Before	27.314±2.099	29.494	0.000*
		After	14.586±2.203		
Cold Pack (Lt)	1st Metatarsal Head	Before	28.400±2.302a	42.378	0.000*
		After	14.729±1.605		
	5th Metatarsal Head	Before	28.096±2.429	37.974	0.000*
		After	14.322±1.894		
	Calcaneus	Before	27.212±2.114	32.932	0.000*
		After	14.333±1.967		
Hot Pack (Rt)	1st Metatarsal Head	Before	27.820±2.327	-27.732	0.000*
		After	40.198±2.024		
	5th Metatarsal Head	Before	27.308±2.389	-30.593	0.000*
		After	39.196±1.655		
	Calcaneus	Before	26.482±2.456	-27.456	0.000*
		After	38.171±1.967		
Hot Pack (Lt)	1st Metatarsal Head	Before	27.933±2.277	-29.464	0.000*
		After	39.169±1.371		
	5th Metatarsal Head	Before	27.455±2.450	-29.518	0.000*
		After	39.118±1.239		
	Calcaneus	Before	26.890±2.412	-27.812	0.000*
		After	38.067±1.538		

[a]MEAN±SD

(*p < 0.001)

In the case of the cold application, the size of the forward movement area before and after was p <0.001. In the case of the hot application, the size of the forward movement area before and after was not significantly different (p> 0.001). In the case of the cold application, the size of the backward movement area before and after was p <0.001. In the case of the hot application, the size of the posterior movement area before and after was not significantly different (p> 0.001). In the case of the cold application, the size of the right moving area before and after was p <0.001. In the case of hot application, the size of the right movement area before and after was not significantly different (p> 0.001). In the case of the cold application, the size of left movement area before and after was p <0.001. In the case of the hot application, the size of the left movement area before and after was not significantly different (p> 0.001). In the case of the cold application, the size of the total moving area before and after the experiment was p<0.001. In the case of the got application, the total moving area size before and after was not significantly different from p<0.001[Table 3].

Table 3. Comparison of moving area

		Forward	Backward	Right	Left	All directions
Cold Pack	Before (mm^2)	4970.388±2111.288a	2710.510±1026.490	3887.959±1426.499	3793.061±1517.982	7680.980±2853.117
	After (mm^2)	3803.612±1652.256	2306.429±1080.353	3082.184±1244.417	3027.857±1380.500	6110.020±2518.231
	T value	5.729	3.835	6.155	5.362	6.285
	P	0.000*	0.000*	0.000*	0.000*	0.000*
Hot Pack	Before (mm^2)	4785.980±2514.083	2634.347±1514.167	3628.429±1884.007	3786.408±1895.467	7433.755±3703.786
	After (mm^2)	4706.020±2312.871	2542.510±1275.847	3515.816±1744.731	3723.286±1690.405	7260.898±3335.555
	T value	0.435	0.810	0.856	0.414	0.658
	P	0.666	0.422	0.395	0.681	0.514

[a]MEAN±SD

(*p <0.001)

The results of the comparison of the difference in area size between the two groups of cold application and on application showed a significant difference in p <0.05 in all areas (Figure 2).

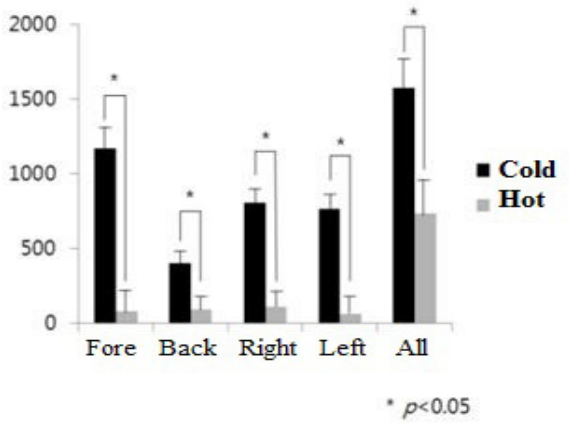


Figure 2. Difference of moving area before and after application of temperature between groups

Conclusion

The purpose of this study was to investigate the change of balance capability after cold application and hot application of the sole for two weeks for Eulji university students in their twenties. The experiment was applied cold and hot to the sole, and after a certain period of time, the temperature difference before and after application was measured and the balance change was examined.

This experiment assumed that the balance capability would be improved when applying hot, but there was no significant difference in balance capability. In this experiment, because the hot pack was applied for 10 minutes, the application effect gradually decreased and the balance capability did not show any significant difference.

However, it showed significant decrease of moving area in forward, backward, right, and left moving area compared to hot applied group in cold application. This is due to the fact that the mechanical sensation level is changed by continuous cooling and cold application causes fatigue more rapidly by interfering with the recovery rate. This experiment was carried out for two weeks between the cold and warm experiments to reduce the influence of the proficiency test that might occur in the stability limit test using Bio-rescue. In addition, before the balance measurement for each experiment, practice measurement was performed in order to become familiar with the Bio-rescue measurement method.

This study was conducted in healthy adults with normal balance capability, so it is difficult to generalize to patients with nervous system and musculo-skeletal system which have a decrease in balance capability. In addition, the subjects were not able to provide a psychological sense of security because the surrounding noise and the movement of people around them did not rule out the influence of the balance capability measurement.

In conclusion, the purpose of this study was to investigate the effects of sole cold application and hot application on dynamic balance capability in 49 college students in their 20s. After applying the temperature to the ice pack and the hot pack, the subjects measured the dynamic balance capability through the limits of stability test using Bio-rescue.

The results of the dynamic balance test were compared before and after the application of temperature, and it was confirmed that the moving area before and after cold application was significantly decreased and the moving area before and after application was not significantly different. The mean of the posterior and posterior area differences were compared by forward, backward, right, left, and all, and it was confirmed that the mean of the posterior and posterior area differences of the cold applied group was statistically significantly lower than the whole applied group.

As a result, it can be seen that the cold application of the sole brings down the dynamic balance capability, and since the change of the moving area according to the hot application is not significant, the effect of the hot application on the dynamic balance capability It is difficult to see it.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Path Analysis of Social Pre-Parental Role of Unmarried Men and Women

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Abstract

Background/Objectives: Based on previous studies, this study is to derive a hypothesized model of the causal relationship between variables affecting the social pre-parental role and clarify the path fitness and effect.

Methods/Statistical analysis: Data from 287 unmarried men and women on Oct/1~Dec/31/2018. Independent t-test and ANOVA for social pre-parental role in general characteristics, Scheffe's test for post-verification, Pearson correlation coefficient for observed variables, maximum likelihood for parameter estimation of the model, CFA for validity of latent variable, $\chi 2$, $\chi 2$/df, RMSEA, SRMR, GFI, AGFI, CFI, NFI and TLI for fitness, and bootstrapping for direct effect, indirect effect, and statistical significance of total effect.

Findings: All six pathways presented in the hypothesis model of the study were significant. The $\chi 2$ was not fitted as 45.668 (p<.001) but the $\chi 2$/df was fitted as 2.686. Absolute fit indices all met the recommended level (RMR=.005, RMSEA=.077, GFI=.963, AGFI=.921), and the incremental fit index was also fit (NFI=.966, TLI=.964, CFI=.978). The variables affecting social pre-parent role were the experience of pre-parent education (β=.115, p=.035), pre-parent related knowledge (β=.157, p=.004), and need for pre-parent education (β=.384, p<.001), and the explanatory power was 23.7%. The most influential variable on the social pre-parental role was the need for pre-parent education (β=.384, p<.001), followed by pre-parent related knowledge (β=.211, p=.009), and experience of pre-parent education (β=.194, p=.030). The need for pre-parent education had a direct impact on the social pre-parental role. Experience of pre-parent education and pre-parent related knowledge had a direct impact on the social pre-parental role and indirectly through the need for pre-parent education.

Improvements/Applications: Raising the need is necessary for pre-parent education for the improvement of the social pre-parental role. A Motivational program is needed for recognition of the need precedes the need itself.

Keywords: *Experience of education, Knowledge, Need for education, Social pre-parental role, Unmarried men and women.*

Introduction

In the past, there was an opportunity to learn how to become a parent, both directly and indirectly, by living together, nurturing a child, and watching the child grow up[1]. But at present, the nuclear family has reduced the opportunity to receive knowledge and information about the parental role from parents' generation, learn childcare and family relationships, and prepare mentally for the parental role[2]. It is not easy to play a proper parent role without learning because of a lack of understanding about child development, how to raise children, family relationships, communication skills, etc.[3]. If the parents become parents without learning about the desired parenthood, these lack of understanding makes it hard to play a proper parent role[3]. Due to this, there is no

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confidence in the role of the parents because of the confusion of the value of parenting, and the parenting attitude is often inconsistent[4].

Adolescents and young parents need preparation to be ready for the role of married couples and parents before they get married[5]. Parental role education is a more active and effective approach to pre-parents in a preventive way rather than a therapeutic way for people who already are parents[6]Prepared couples or parents can fulfill their roles satisfactorily, adapt roles and solve problems easily[7], which is why it is necessary to examine the awareness of the social pre-parental role of unmarried men and women who can be married.7

Most pre-parent education only emphasizes the desirable parental role of child development, and unable to accurately grasp the awareness of pre-parent education of the times is pointed out to be a limitation[8]. Therefore, to develop a differentiated pre-parent education program, it will be meaningful to check parent-related knowledge, the experience of pre-parent education, the need for education, and awareness of the social pre-parental role of unmarried men and women, and analyze how these variables influence social pre-parental role.

Method

This study was designed to derive a hypothesized model of the causal relationship between variables of unmarried men and women who will later become pre-parents, and the variables affecting social pre-parental role. It is also a covariance path analysis to identify the fitness and the effect of the hypothesis model.

This model consists of variables predicted to be influential factors based on previous studies related to the social pre-parent role. The model was derived from the hypothesis that the experience of pre-parent education and knowledge influenced the educational need, and this influenced the pre-parental role.

The subjects were 287 unmarried men and women aged between 20-30 in G-do from Oct/1~Dec/31/2018. They were from culture centers, churches, and universities, and they understood the purpose of the study and agreed to participate. In the structural equation model, the size of the sample is at least 10 times the free parameter[9] and the ideal recommended size requires 150~400 samples. So, considering the dropout rate of the data, 290 copies were collected, and 287 copies were used for analysis with the exception of 3 copies which had insufficient responses.

The usage of the instruments in this study was all approved by both instrument developers and editors/ revisors.

Based on questions used in previous studies[10], the questions asking characteristics of the subjects were 12, including gender, age, birth order, dating experience, the experience of caring a child, thought of marriage, marriageable age, etc. Pre-parent education and knowledge are tools used in Kim's[11] research. Pre-parent experience was measured by 5-points likert scale of 40 questions, with a higher score meaning more experience and knowledge. The reliability was not measured during development and Cronbach's α=. 97 in this study.

Pre-parent related knowledge was measured by 20 questions answered 'yes', 'no', or 'do not know', with 1 point if correct, 0 point if wrong or do not know. The higher the score, the higher the level of knowledge. The reliability KR 20 was not measured during development and KR 20=.75 in this study.

Need for pre-parent education was measured by 40-question questionnaire originally from Oh[12] and edited and revised by Lee[13]. The questions ask self-understanding, spouse selection and marriage, pregnancy and childbirth, nurture, family relationship and parental role, etc. Each item has a 4-point likert scale, meaning higher the score, the higher the need for education. Cronbach α=.96 in Oh[12]'s study, Cronbach α=.97 in Lee[13]'s, Cronbach α =.97 in this study. For sub-domains, 'self-understanding', 'spouse selection and marriage', 'pregnancy and childbirth', 'nurture', and 'family relationship and parental role, etc', Cronbach α=.90, 88, 91, 93, 93.

Social pre-parental role awareness was measured with Shin[3]'s social parental role and attitude measuring tool reconstructed to a 23question scale by Yeo[14]. Each item has a 5-point likert scale, meaning higher the score, the higher the level of awareness of social pre-parental role. Cronbach's α=.90 in Yeo[14]'s study, Cronbach's α=.73 in this study.

The collected data were analyzed using SPSS-WIN 25.0 and AMOS 18.0.

Mean, standard deviation, skewness, and kurtosis

were obtained from the experience of pre-parent education, pre-parent related knowledge, the need for pre-parent education, and the social pre-parental role awareness. For verifying the difference of social pre-parental role according to characteristics, independent t-test and ANOVA were used, and Scheffe's test for the post-test. For understanding the relationships between variables, Pearson correlation coefficients were calculated. The parameter estimation of the hypothesis model was analyzed using Maximum likelihood, and CFA was performed to confirm the validity of the latent variables analysis. The evaluation of the fitness of the model was done using $\chi 2$, $\chi 2$/df, Root Mean Squared Error of Approximation(RMSEA), Standardized Root Mean Square Residual(SRMR), Goodness of Fit Index(GFI), AGFI(Adjusted Goodness Fit Index), Comparative Fit Index(CFI), Normed Fit Index(NFI), and Turker-Lewis Index(TLI)[26]. For direct effect, indirect effect, and statistical significance of the total effect, bootstrapping was done.

Result and Discussion

Descriptive statistics are shown in Table 1. Experience of pre-parent education was 3.28±0.84 points (out of 5). Pre-parent related knowledge was 14.48±3.46 points (out of 20). Need for pre-parent education was high with 3.48±0.40 points (out of 4). Social pre-parental role was 3.69±0.34 points (out of 5). The variables used in the study can be assumed to be normal distributions for the skewness of the variables was -1.14 ~ 0.20 within ±2, and the kurtosis was -1.30 ~ 3.37 within ±4.

The difference in social pre-parental role according to characteristics is shown in Table 2. There was a statistically significant difference in the items of gender, the experience of caring a child, the thought of marriage, consideration when choosing a spouse, childbirth plan, desired gender of the child, and person in charge of childcare (p<.05). Specifically, gender was higher in women than men(t=-2.32, p=.021), the experience of caring a child was higher in 'yes' than 'no'(t=2.71, p=.007), the thought of marriage was higher in 'will do' than 'will not do' and 'never thought of it'(F=5.54, p=.004), consideration when choosing a spouse was higher in 'family background' than 'physical condition such as appearance'(F=2.73, p=.014), childbirth plan was higher in 'will give birth' than 'will not give birth'(F=8.71, p<.001), desired gender of child was higher in 'no preference' and 'daughter' than 'son'(F=9.98, p<.001), and person in charge of childcare was higher in 'the couple jointly' than 'father'(F=3.70, p=.012).

Table 1. The difference in social pre-parental role according to characteristics (N=287)

Variable		Range	Min	Max	Mean±SD	Skew	Kurt
Experience of pre-parent education		1-5	1.00	5.00	3.28±.84	-.58	.59
Pre-parent related knowledge		0-20	3	20	14.48±3.46	-1.14	1.47
Need of pre-parent education	Self-understanding	1-4	2.00	4.00	3.39±.47	-.17	-.63
	Choosing your spouse and marriage	1-4	2.00	4.00	3.44±.45	-.33	-.57
	Pregnancy and birth	1-4	2.13	4.00	3.53±.43	-.45	-.59
	Nurture	1-4	2.50	4.00	3.52±.42	-.29	-1.30
	Family relationship and parent role	1-4	1.14	4.00	3.49±.49	-1.12	3.37
	Total	1-4	2.18	4.00	3.48±.40	-.32	-.57
Recognition of social pre-parent role		1-5	2.96	4.65	3.69±.34	.20	.25

Table 2. The difference in social pre-parental role according to characteristics (N=287)

Variable		n Mean±SD	Recognition of social pre-parent role			
			t/F	p	Scheffe	
Gender	Male	46	3.59±.36	-2.32	.021	
	Female	241	3.71±.33			
Age (year)	≦20	193	3.69±.33	1.60	.205	
	21-25	80	3.73±.37			
	≧26	14	3.56±.27			
Birth order	1st	118	3.71±.39	.97	.406	
	2nd	113	3.69±.28			
	≧3rd	31	3.69±.32			
	Single	25	3.59±.34			
The opposite sex friends dating experience	Yes	240	3.69±.34	.08	.934	
	No	47	3.69±.32			
experience of caring a child	Yes	142	3.75±.37	2.71	.007	
	No	145	3.64±.30			
Thought of marriag	Will do[a]	169	3.75±.34	5.54	.004	a>b,c
	Will not do[b]	86	3.61±.34			
	Never thought of it[c]	32	3.61±.24			
Consideration when choosing a spouse	Physical condition such asappearance[a]	22	3.47±.30	2.73	.014	f>a
	Economic ability[b]	58	3.65±.37			
	Religion[c]	21	3.66±.23			
	Trust and love[d]	69	3.72±.33			
	Personality[e]	81	3.74±.29			
	Family background[f]	17	3.84±.51			
	Etc[g]	19	3.65±.30			
Childbirth plan	Will give birth[a]	153	3.76±.36	8.71	<.001	a>b
	Will not give birth[b]	61	3.55±.29			
	Never thought of it[c]	73	3.67±.30			
Why it is so difficult to have children?	Economic burden	179	3.70±.35	.73	.573	
	Stress of mind and body	57	3.67±.34			
	Interferes with a couple'stime	12	3.59±.27			
	Interfere with self-realization	30	3.71±.26			
	Etc	9	3.83±.35			
Desired number of children	1st	69	3.74±.40	1.24	.295	
	2nd	163	3.66±.31			
	≧3rd	45	3.73±.32			
	Will be adopted	10	3.71±.34			
Desired gender of the child	No preference[a]	192	3.72±.34	9.98	<.001	a,c>b
	Son[b]	13	3.30±.29			
	Daughter[c]	82	3.70±.30			
Person in charge of childcare	Mother[a]	8	3.47±.12	3.70	.012	c>b
	Father[b]	6	3.37±.57			
	The couple jointly[c]	244	3.71±.33			
	Anyone in your family who can[d]	29	3.63±.31			

The analysis of the relationship between variables is shown in Table 3. The social pre-parental role was positively related to the awareness of pre-parent education(r=.256, p<.001), pre-parent related knowledge(r=.242, p<.001), and the need for pre-parent education(r=.383, p<.001), respectively. The correlation coefficient between awareness of pre-parent education, pre-parent related knowledge, and the need for pre-parent education was .185~.231, also positively correlated.

Table 3. Correlation among the research Variables (N=287)

(1)		Need of pre-parent education								
		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
(1) Experience of pre-parent education		1								
(2) Pre-parent related knowledge		.231 (<.001)	1							
Need of pre-parent education	(3) Self-understanding	.213 (<.001)	.185 (.002)	1						
	(4) Choosing your spouse and marriage	.162 (.006)	.209 (<.001)	.737 (<.001)	1					
	(5) Pregnancy and birth	.157 (.008)	.206 (<.001)	.704 (<.001)	.738 (<.001)	1				
	(6) Nurture	.153 (.010)	.208 (<.001)	.704 (<.001)	.737 (<.001)	.820 (<.001)	1			
	(7) Family relationship and parent role	.159 (.007)	.219 (<.001)	.691 (<.001)	.740 (<.001)	.774 (<.001)	.808 (<.001)	1		
	(8) Total	.185 (.002)	.230 (<.001)	.841 (<.001)	.875 (<.001)	.907 (<.001)	.932 (<.001)	.901 (<.001)	1	
(9) Recognition of social pre-parent role		.256 (<.001)	.242 (<.001)	.487 (<.001)	.346 (<.001)	.366 (<.001)	.374 (<.001)	.383 (<.001)	.431 (<.001)	1

All six pathways presented in the hypothesis model were significant[Figure 1]. The $\chi 2$ was found to be inadequate($\chi 2$=45.668, p<.001), but the normalized $\chi 2$ was fit as 2.686. The absolute fit indices all met the recommended level(RMR=.005, RMSEA=.077, GFI=.963, AGFI=.921), and the incremental fit indices also met the level(NFI=.966, TLI=.964, CFI=.978).

The analysis of the path presented shown in Table 4. The variables affecting the social pre-parental role were the experience of pre-parent education(β=.115, p=.035), pre-parent related knowledge(β=.157, p=.004), and the need for pre-parent education(β=.384, p<.001). The explanatory power was 23.7%.

Table 5 shows the direct, indirect, and total effects of the variables on the social pre-parental role in this model. The most influential variable in the social pre-parental role was the need for pre-parent education(β=.384,p<.001), followed by pre-parent related knowledge(β=.211, p=.009), and the experience of pre-parent education(β=.194, p=.030). The need for pre-parent education had a direct impact on the social pre-parental role.

The experience of pre-parent education and pre-parent related knowledge had a direct impact on the social pre-parent role, and indirectly through the need for pre-parent education.

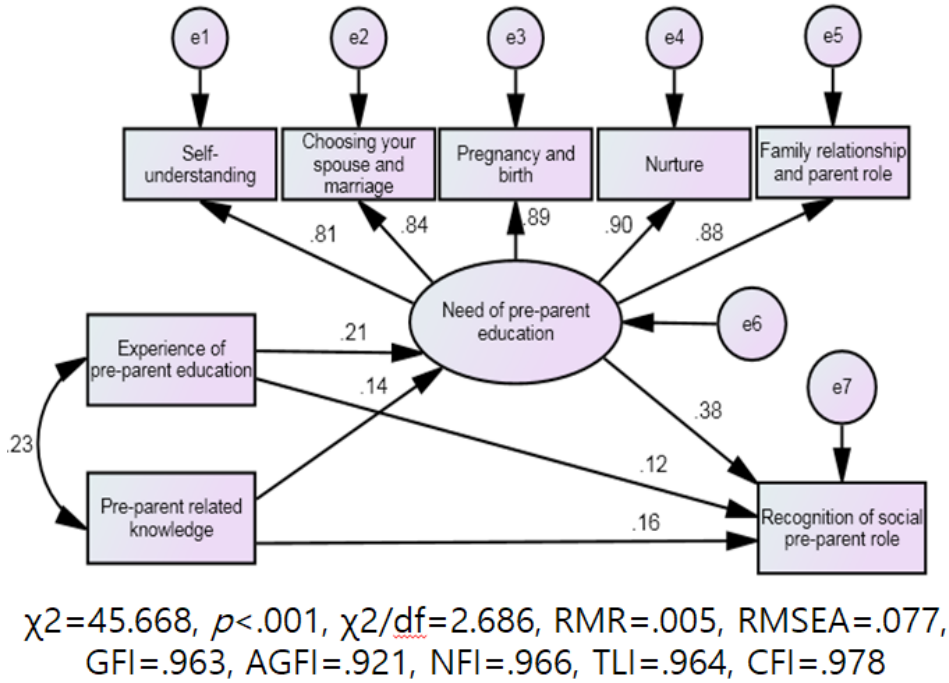


Figure 1. Final model with parameter estimate

Table 4. Standard Estimate of the Hypothetical Model (N=287)

Endogenous variables	Exogenous variables	Unstandardized estimates	Standard Error	Standardized estimates	CR	p	SMC
Need of pre-parent education	Experience of pre-parent education	.092	.028	.205	3.360	<.001	.075
	Pre-parent related knowledge	.308	.133	.141	2.323	.020	
Recognition of social pre-parent role	Experience of pre-parent education	.046	.022	.115	2.106	.035	.237
	Pre-parent related knowledge	.306	.105	.157	2.902	.004	
	Need of pre-parent education	.342	.052	.384	6.590	<.001	

Table 5. Effect of Predictive Variables on Endogenous Variables (N=287)

Endogenous variables	Exogenous variables	Direct Effects	Indirect Effects	Total Effects
Need of pre-parent education	Experience of pre-parent education	.205(<.001)	-	.205(<.001)
	Pre-parent related knowledge	.141(.020)	-	.141(.020)
Recognition of social pre-parent role	Experience of pre-parent education	.115(.035)	.079(.007)	.194(.030)
	Pre-parent related knowledge	.157(.004)	.054(.035)	.211(.009)
	Need of pre-parent education	.384(<.001)	-	.384(<.001)

Conclusion

In this study, a hypothesized model of the causal relationship between pre-parent related knowledge, the experience of pre-parent education, and the need for pre-parent education of unmarried men and women who will later become pre-parents was derived. Also, path analysis was performed to verify the model's fitness and effect. The most influential variable in the social pre-parental role was the need for pre-parent education. There was a correlation between pre-parent related knowledge and the experience of pre-parent education. They had a direct impact on the social pre-parental role, and also indirectly through the need for pre-parent education.

The results of this study are expected to be used as basic data for the development of pre-parental role enhancement programs for unmarried men and women. For enhancing the social pre-parental role, the need for pre-parent education needs to be raised first. The recognition of the need for education must precede the need itself, so a motivational program must be constructed and its effect verified. Also, for the enhancement of the social pre-parent role, the pre-parent related knowledge and the experience of pre-parent education, which had a direct impact, need to be provided. They had indirect influence through the need for education, therefore a study considering the contents of raising awareness of the need for pre-parent education and providing related knowledge.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Effects of Planck Exercise on the Cranio-vertebral Angle, Round shoulder Postureand Forward Head Posture

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Abstract

Objectives: The purpose of this study is to investigate the effect of flank exercise, using various supporting surfaces, on the distance between bottom peaks, cranio-vertebral angle(CVA), and rounded shoulder posture.

Methods: Thirty normal adults in their 20s from A city S University participate in the experiment. They are randomly divided into 2 groups: a stable ground plank exercise group (n=15) and an unstable ground plank exercise group (n=15). The experiment was carried out three times per week for four weeks. Measurement methods were to measure the CVA and the round shoulder in the right lying posture using a goniometer and Vernier calipers, respectively.

Result: There was a significant difference ($p < .05$) between head and spine angle before and after exercise in the unstable surface group, but no significant difference between the stable and unstable surface groups. There was a significant difference in the round shoulder posture in the unstable surface group between pre and post exercise ($p < .05$), but there was no significant difference between the stable and unstable plank groups.

Conclusion: The plank exercise on an unstable support surface is suggested to be effective in correcting the round shoulder posture and CVA.

Keywords*: Unstable support surface, plank exercise, Cranio-vertebral angle, Rounded shoulder, Forward head posture*

Introduction

Recently, problems with posture due to long term use of computers and smartphones have been rapidly increasing, and this characteristic alignment is known to increase forward head postures or round shoulder positions[1]. Mal alignment due to bad habits in adolescence was found to have the greatest effect on the shoulders and neck, and the monthly incidence is increasing from 11.5% to 29%[2].

Forward head posture increases head bending. It occurs when the head is placed forward from the shoulder in the coronal plane, and the compensatory over extension of the upper and lower neck joints shortens the posterior muscles of the head and neck, causing the superior cervical bone to protrude relatively forward. It is defined as being face upward[3].

The rounded shoulder posture is compared with the body's gravity line. The acromion is forwarded and the scapula is elevated. The scapula is protracted with inferior rotation and anterior tilt due to an increase in the curvature of the lower cervical bone and an increase in the kyphosis of the upper thoracic[4-5]. Long-term forward head posture causes upper cross syndrome, weakening of muscles such as rhomboid, serratus anterior, and lower trapezius. Pectoralis major, pectoralis minor, upper trapezius, and levator scapula may stiffen, causing one or more of the complex structures, such as the head, neck, and shoulder, or causing pain and dysfunction

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in the neck and shoulder areas due to imbalance in the surrounding muscles[6-7].

The rounded shoulder posture requires strengthening of muscles such as the lower trapezius and serratus anterior to restore weakness and range of motion[8]. The closed chain exercise, mainly performed for this purpose, causes simultaneous contraction of various muscles through mechanical compression of the joints, which not only stimulates the concentric receptors but also helps maintain the dynamic stability and posture of the joints by increasing strength and endurance[9-10].

A popular exercise is the plank. The plank is performed to stabilize the core muscles and improve core strength[11]. The plank position is to bend the elbow 90 degrees from the prone position and maintain the head, shoulders, spine, pelvis, knee, and ankles in a straight posture[12].

Core refers to the waist, pelvis, and hip complexes, and core stabilization refers to the interaction of passive and active structures with neuro modulation that contribute to core stability[13]. Core stabilization exercises enhance neuromuscular control, muscle strength, and endurance, helping to maintain dynamic stability between the spine and the trunk[14].

Several different methods are used to study core stabilization exercises, depending on variables such as posture, tools, and the ground[15].Utilizing tools and unstable surfaces has the advantage of increasing muscle action required to maintain postural stability[16]. When the unstable support surface was applied to the upper and lower limbs, it was more effective when applied to the lower limbs. Although there have been studies on the stabilization of the core using various support surfaces, those analyzing this effect on the upper limb are limited[12].

The purpose of this study is to measure the acromion to floor distance and cranio-vertebral angle (CVA) changes in 20-year-old adults by applying plank motion on various grounds . This study also provides basic data on an exercise program effective for round shoulder correction.

Materials and Method

1. Subjects and experiment periods

A total of 30 adults in their 20s from A City S University were selected for this study from June 20, 2018 to July 30, 2018 and 15 participants were randomly assigned to the general mat exercise group and balance pad exercise group. The general mat exercise group was set to perform exercise on a stable ground and the balance pad exercise group was set to perform on an unstable ground. All research subjects received the research agreement before proceeding with the experiment. This study included subjects whose separation between the peak and the floor was more than 2.5 cm in supine posture and head spine angle was above 53° in the upright posture. Exclusion criteria included subjects with spondylarthrosis, those with psychological and neurological lesions, and other diseases that may affect the experiment. The general characteristics of the subjects are as follows [Table 1].

Table 1. General characteristics of the subjects

	Stableground (n=15)	Unstable ground(n=15)	p
Age (years)	21.07±.70*	21.00±.65	.790
Height (cm)	173.93±2.58	173.73±2.09	.817
Weight (kg)	73.86±1.68	74.03±1.69	.598

* mean ± standard deviation

2. Measurement

2.1. The CVA

The CVA, used to measure forward head postures, defines the angle at which the line connecting C7 and tragus forms a horizontal line. Subjects with a forward head posture showed a smaller CVA, indicating increased bends in the lower cervical[17].

Subjects were in a neutral posture from a straight posture, and their eyes looked at the eyes of the other person, and the CVA was measured using the goniometer with C7 as the axis[18-19].

2.1.Round shoulder posture

The straight down method used to measure the distance between the table floor and the peak was used. This method has been used only to measure the length of the pectoralis minor, but has good reliability in asymptomatic or asymptomatic shoulders for assessment of the position of the shoulder blades relative to the round shoulder posture[20].

Subject was placed on the table in a relaxed supine position, with both arms in a neutral position right next to the rib cage, and a vernier caliper was used to measure the round shoulders.

3. Intervention

The subjects were randomly assigned to each group and classified into 15 exercise groups on the stable ground and 15 exercise groups on the unstable ground. The exercise for each group consisted of 5 minutes warm up, 20 minutes plank, 5 minutes cool down. When complaining of pain or discomfort, a 1 minute rest period was provided. A total of 30 minutes of exercise was performed three times a week for a total of four weeks. The experiment was conducted by three physical therapists with more than three years of clinical experience along with six assistants.

The first plank exercise involved lifting the trunk, pelvis, and legs with the forearm and toes in the prone position, keeping the head, back, hips, and lower legs in a straight line.

The second bracing plank exercise was performed in the same manner as the plank exercise while generating abdominal tension in the prone position. The abdominis should be kept constant during exercise.

The third hollowing plank exercise is performed in the same manner as the plank movement after gently pulling the abdominal spine in the prone position. Abdominis should be kept hollowing continuously during exercise[21].

The stable surface exercise was performed on a general mat, and the unstable support surface exercise group used a 33 x 5 cm balance pad to provide an unstable support surface to the upper arm.

4. Analysis

In this study, the Shapiro-Wilk test was conducted to determine the standard normal deviation between subjects. The Wilcoxon signed rank test was used to examine the two groups before and after the exercise, and the Mann-Whitney U test was performed to determine the variation in the differences between the groups. The significance level (α) for verifying statistical significance was 0.05.

Results

1. Change in the CVA

The CVA in the stability group increased from 44.53 ± 1.92 degrees before exercise to 44.86 ± 1.73 degrees after exercise, but there was no statistically significant difference. The CVA in the unstable support exercise group increased from 45.26 ± 2.31 degrees before exercise to 45.73 ± 1.91 degrees after exercise ($p < 0.05$). There was no significant difference in CVA between the two groups [Table 2].

Table 2. Change in the CVA

	Stable ground(n=15)	Unstable ground(n=15)	z	p
Pre	44.53±1.92*	45.26±2.31	-.787	.431
post	44.86±1.73	45.73±1.91	-1.253	.210
z	-1.890	-2.070		
p	.059	.038		

unit: º

* mean ± standard deviation

2. Round shoulder posture change

Stable ground exercise group decreased from 8.40 ± 1.45 cm before exercise to 8.20 ± 1.15 cm after exercise, but there was no statistical difference. The unstable support group showed a statistically significant difference from 8.47 ± 1.19 cm before exercise to 7.53 ± 1.13 cm after exercise ($p < 0.05$). The change in the round shoulder posture between the two groups showed no significant difference [Table 3].

Table 3. Round shoulder posture change

	Stable ground(n=15)	Unstable ground(n=15)	Z	p
pre	8.40±1.45 *	8.47±1.19	-.397	.691
post	8.20±1.15	7.53±1.13	-.254	.800
z	-1.732	-2.000		
p	.083	.046		

unit: cm

* mean ± standard deviation

Discussion

Several undesirable symptoms related to the neck are seen due to lack of exercise, hectic lifestyle, fatigue due to overload on the neck, and working with an incorrect posture. As the active use of smartphones at various ages increases, the number of people experiencing the Turtle Neck Syndrome increases each year[22].

Prolonged incorrect posture can lead to muscle grinding and muscular imbalances, reduce the effectiveness of muscle, and create mechanical stress, causing pain[23].

In this study, we tried to identify which exercise is more effective for accurate postural alignment by applying the plank motion for 4 weeks on stable and unstable support grounds.

In a previous study by Krawczky et al., 39 healthy adults underwent pilates base exercise and compared the immediate effects of several angles, pain, and postural alignment on the sagittal plane before and after the experiment. After 1 exercise set, a statistically significant difference in the increase of the head horizontal angle, spine alignment, and reduction of thoracic kyphosis($p<.05$) was seen, and after 16 exercise sets, significant differences in head horizontal angle, kyphosis, lordosis, and hip joint angle($p< .05$) were seen[24]. Another study on the effects of pilates on forward head postures in adults was conducted. In this study, the women who had a forward head posture were compared with the pilates group in general. The CVA, range of motion, pain, and neck disability index showed significant differences in the visual analog scale, cervical dysfunction index, and CVA($p<.05$). EMG showed significant differences in the sternocleidomastoid muscle($p<.05$)[25]. In another pilates applied neck function study, pilates-based exercise was performed by 13 patients aged 37-59 years for 6 weeks, which significantly improved neck function. Pilates, which improved stability by focusing on posture perception, had an effect on chronic neck pain[26].

The results of this study are similar to those of Cruz-Ferreira et al., who found that the effect of kyphosis was decreased in adults with forward head postures[27]. Plank exercise positively affects postural changes due to compensatory actions in the lumbar spine and cervical spine because it increases stabilization of the pelvis, reduces kyphosis, and at the same time affects the load on the spine and trunk muscles in the upright position by stiffening the thoracic spine. In conclusion, it is thought to have a positive effect on function[28]. There was also a statistically significant increase in the pilates training group compared with the cervical stabilization group in the comparison of cranio-vertebral group during cervical alignment test ($p <.05$). This is consistent with previous studies, which found that greater the CVA, lower the kyphosis.

These results suggest that the preoperative CVA was increased from 54.39 to 58.32 degrees and kyphosis was reduced by increasing the thickness of the middle trapezius and rhomboid[29]. Further studies are warranted to investigate the relationship between CVA and middle trapezius and rhomboid muscle thickness and to study the application of unstable support to the arms and legs.

Conclusion

The purpose of this study was to identify the most effective ground for the round shoulder position and CVA when planking is performed on different grounds. In conclusion, the unstable ground using the balance pad showed the largest change in the round shoulder posture and CVA.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Sang-Ho Lee and Won-Jong Yu are contributed equally this work.

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Normative Study of Attention Tests in a Computerized Comprehensive Neurocognitive Function Test in Adults

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Abstract

Background/Objectives: The purpose of this study is to construct standardized data through a computerized neurocognitive function test.

Methods/Statistical analysis: This study involved 180 adults aged 20 to 79 years. All subjects were evaluated with six attention test sub-domains of a computerized neurocognitive function test. The attention tests consisted of a visual continuity performance test (VCPT), auditory continuous performance test (ACPT), visual vigilance test (VVT), auditory vigilance test (AVT), trail-making test (TMT), and stroop test (ST). For statistical analysis, independent t test and Pearson correlation analysis were performed.

Findings: There was no significant attention difference between the sexes ($p > .05$). Correlation analysis showed that attentiveness decreased significantly with age ($p < .05$). We have presented the reference values of six attention tests according to the age group.

Improvements/Applications: The reference value data for the six computerized neurocognitive function attention test sub-domains may be helpful for distinguishing attention problems in clinical practice.

Keywords: *Cognition, Attention, Normative study, Computerized neurocognitive function test, Elderly*

Introduction

In Korea, the proportion of elderly people in society exceeded 7% in 2001, and it is estimated that in 2026, with the proportion of elderly people reaching 20%, Korea will have a super-aged society[1]. Elderly people with impaired cognitive function have an increased risk of progression to mild cognitive impairment or dementia[2]. It is important that early diagnosis and evaluation of cognitive function increase. This is because from the viewpoint of prevention, current health conditions affect future health[3].

Neurophysiological and neuropsychological measurements provide additional information for screening and clinical evaluation, health and disease monitoring, and therapeutic evaluation[4]. Clinical tools for assessing cognitive function are often used to assess various domains that may be linked to a particular disease [5].

In general, cognitive domains are categorized as attention, memory, language, calculation ability, constructive ability, perception - motor coordination ability, and problem solving ability[6]. Attention is the process of filtering out irrelevant information from incoming information and accepting only necessary information into working memory. Working memory and attention are closely related [7]. Attention deficits lead to limitations in daily life, occupation, leisure, and participation in social activities [8].

The purpose of various types of neurocognitive function tests is to systematize quantitative and objective information on neurocognitive abnormalities[9]. Although

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these tests facilitate the use of clinical assessment and detail the features of the cognitive domain, information on the normative data of the battery, which covers the entire cognitive domain, is somewhat lacking [10].

Neurocognitive function tests are widely recognized as a sophisticated method for detecting neurocognitive impairments due to central nervous system damage or disease [11]. If a neurocognitive function test is performed on a large population, the measurement accuracy may be affected by the physical strength of the evaluator and deteriorate as the evaluator becomes fatigued.

Recently, computerized neurocognitive function tests have been developed. The advantages of computerized evaluation include the accurate measurement of reaction time, ability to manage data, speed of analysis process, and time savings [12]. It is efficient in many respects to be able to integrate various types of assessments into the computer software and to identify the level of the subject without needing evaluators. In order to objectively and quantitatively evaluate each area of cognitive function, a standardized examination with proven validity, reliability, and validation procedure is required, and the standard for interpretation of results should be provided. However, objective information about standardized values is very limited [13].

Therefore, our objective was to construct standardized data for attention tests in a computerized neurocognitive function test.

Method

The present study was conducted on 180 adults aged 20 to 79 years using the convenience sampling method. The subjects did not have cognitive impairment, problems in daily life, or physical health issues. All subjects participated in an experiment after providing written consent for voluntary participation. The subject group consisted of 89 males (49.4%) and 91 females (50.6%). The age of the participants was 49.37 ± 17.42 years. Subjects were recruited by age group of 30 each persons from 20s to 70s. The subjects' six attention tests scores are shown in Table 1.

Table 1. General characteristics of the subjects

		Participants(n=180)
Sex, n (%)	Male	89 (49.4)
	Female	91(50.6)
Age (year)a		49.37±17.42
Accuracy(score)	VCPT	96.39±3.87
	ACPT	94.46±3.66
	VVT	96.76±3.82
	AVT	97.17±3.41
	ST	95.61±5.28
Response time(second)	VCPT	0.71±0.37
	ACPT	0.60±0.28
	VVT	0.76±0.35
	AVT	0.99±0.38
	ST	1.55±0.78
	TMT	0.95±0.53

Footnotes. amean±SD, VCPT: Visual Continuity Performance Test; ACPT: Auditory Continuous Performance Test; VVT: Visual Vigilance Test; AVT: Auditory Visual Vigilance Test; ST: Stroop Test; TMT: Trail-Making Test.

The subjects were measured with a computerized neurocognitive function test (CNTest, cybermedic. Co., Korea). This test consists of 18 subtests in four categories: attention, memory, sensory and motor coordination, and problem solving ability using a touch screen based computer.The attention tests were the visual continuous performance test (VCPT), auditory continuous performance test (ACPT), visual vigilance test (VVT), auditory vigilance test (AVT), trail-making test (TMT), and word-color (WC).

The collected all data were analyzed using the SPSS 22 (Statistical Package for the Social Sciences version 22). The general characteristics of the subjects were confirmed by frequency analysis. Differences based on age or sex for each of the six types of attention tests were analyzed with an independent t test. Correlation analysis was used to identify relationships between the six concentration tests and age. For the standardization,

values of the 10th, 25th, 50th, 75th, and 90th quintiles were derived. The statistical significance was set at .05.

Result and Discussion

1. Comparison of accuracy and response time of attention test between male and female

There was no significant difference between attention and sex (p>.05) [Table 2].

2. Correlation relationships between age and accuracy and response time of attention test

Correlation analysis showed that attentiveness decreased significantly with age (p< .05) [Table 3].

Table 2. Comparison of accuracy and response time of attention test between male and female

Mean±SD		Male (n=89)	Female (n=91)	t	P
		Mean±SD			
Age (year)		49.84±17.58	48.90±17.35	.362	.718
Accuracy (score)	VCPT	96.43±4.04	96.35±3.72	.130	.897
	ACPT	95.48±3.95	97.41±3.35	-1.338	.183
	VVT	96.49±4.13	97.01±3.49	-.907	.366
	AVT	96.92±3.73	97.42±3.06	-.977	.330
	ST	95.33±5.81	95.88±4.72	-.702	.484
Response time (second)	VCPT	0.71±0.36	0.70±0.38	.104	.918
	ACPT	0.61±0.24	0.60±0.31	.287	.775
	VVT	0.76±0.34	0.77±0.36	-.054	.957
	AVT	1.00±0.28	0.99±0.46	.131	.896
	ST	1.52±0.67	1.58±0.88	-.553	.581
	TMT	1.00±0.57	0.90±0.50	1.203	.230

Footnotes. VCPT: Visual Continuity Performance Test; ACPT: Auditory Continuous Performance Test; VVT: Visual Vigilance Test; AVT: Auditory Visual Vigilance Test; ST: Stroop Test; TMT: Trail-Making Test.

Table 3. Correlation relationships between age and accuracy and response time of attention test

	Accuracy					**Response time**					
	VCPT	ACPT	VVT	AVT	ST	VCPT	ACPT	VVT	AVT	ST	TMT
Age	-.575**	-.548**	-.674**	-.665**	-.737**	.626**	.624**	.645**	.653**	.748**	.488**

Footnotes. Values is expressed as correlation coefficient, *:p<.05, **:p<.01, VCPT: Visual Continuity Performance Test; ACPT: Auditory Continuous Performance Test; VVT: Visual Vigilance Test; AVT: Auditory Visual Vigilance Test; ST: Stroop Test; TMT: Trail-Making Test.

3. References values of accuracy and response time for the six sub-domains of attention test

The reference values of six attention tests according to the age group are given in [Table 4] and [Table 5].

Table 4. Accuracy references values for the six sub-domains of attention test

	Age (years)	Mean	SD	Percentiles				
				10	25	50	75	90
VCPT (score)	20-29	98.67	1.95	96.00	97.00	100.00	100.00	100.00
	30-39	98.57	1.98	96.00	97.00	100.00	100.00	100.00
	40-49	97.97	2.48	94.00	95.75	99.00	100.00	100.00
	50-59	95.80	3.85	90.00	93.75	97.00	99.00	100.00
	60-69	95.17	3.92	89.00	92.00	96.50	98.25	100.00
	70-79	92.17	3.92	86.00	89.00	93.50	95.25	97.00
ACPT (score)	20-29	99.07	1.76	97.00	98.00	100.00	100.00	100.00
	30-39	98.87	1.76	97.00	98.00	100.00	100.00	100.00
	40-49	98.60	2.14	94.20	99.00	99.00	100.00	100.00
	50-59	97.47	2.78	92.00	95.00	98.00	100.00	100.00
	60-69	96.87	2.93	92.00	94.00	97.00	100.00	100.00
	70-79	93.87	2.93	89.00	91.00	94.00	97.00	98.00
VVT (score)	20-29	99.13	1.70	96.00	99.50	100.00	100.00	100.00
	30-39	99.03	1.67	96.00	98.75	100.00	100.00	100.00
	40-49	98.90	1.81	95.20	99.00	99.00	100.00	100.00
	50-59	96.93	2.90	92.10	94.00	98.00	99.25	100.00
	60-69	94.77	3.66	88.20	92.75	94.50	98.00	99.90
	70-79	91.77	3.66	85.20	89.75	91.50	95.00	96.90
AVT (score)	20-29	99.47	0.90	98.00	98.00	100.00	100.00	100.00
	30-39	99.37	0.93	98.00	98.00	100.00	100.00	100.00
	40-49	98.93	1.44	97.00	98.75	99.00	100.00	100.00
	50-59	96.60	3.33	92.00	94.75	98.00	99.00	100.00
	60-69	95.83	3.28	91.00	92.00	96.00	98.50	100.00
	70-79	92.83	3.28	89.00	90.00	93.00	95.50	97.00
ST (score)	20-29	99.93	0.37	100.00	100.00	100.00	100.00	100.00
	30-39	99.83	0.46	99.00	100.00	100.00	100.00	100.00
	40-49	98.63	0.85	98.00	98.00	98.00	99.00	100.00
	50-59	93.90	4.35	88.00	90.75	95.75	98.90	100.00
	60-69	92.17	4.84	84.00	88.00	93.50	96.00	97.90
	70-79	89.17	4.84	81.00	85.00	90.50	93.00	94.90

Footnotes. VCPT: Visual Continuity Performance Test; ACPT: Auditory Continuous Performance Test; VVT: Visual Vigilance Test; AVT: Auditory Visual Vigilance Test; ST: Stroop Test

Table 5. Response time references values for the six sub-domains of attention test

	Age (years)	Mean	SD	Percentiles				
				10	25	50	75	90
VCPT (second)	20-29	0.42	0.16	0.21	0.30	0.43	0.51	0.73
	30-39	0.44	0.16	0.22	0.32	0.45	0.53	0.75
	40-49	0.58	0.14	0.40	0.47	0.59	0.67	0.80
	50-59	0.79	0.24	0.61	0.68	0.80	0.88	1.01
	60-69	0.94	0.45	0.40	0.56	0.88	1.31	1.67
	70-79	1.06	0.39	0.50	0.67	1.00	1.43	1.77
ACPT (second)	20-29	0.37	0.11	0.24	0.31	0.35	0.42	0.54
	30-39	0.38	0.12	0.24	0.32	0.37	0.42	0.57
	40-49	0.53	0.14	0.37	0.43	0.51	0.59	0.80
	50-59	0.74	0.26	0.58	0.60	0.71	0.79	1.00
	60-69	0.85	0.31	0.50	0.65	0.78	0.99	1.37
	70-79	0.97	0.35	0.62	0.75	0.87	1.13	1.53
VVT (second)	20-29	0.38	0.25	0.12	0.20	0.30	0.46	0.79
	30-39	0.39	0.25	0.14	0.21	0.31	0.48	0.77
	40-49	0.59	0.30	0.23	0.35	0.55	0.83	1.07
	50-59	0.80	0.30	0.44	0.56	0.76	1.04	1.28
	60-69	1.11	0.53	0.56	0.77	1.23	1.76	2.65
	70-79	1.30	0.83	0.60	0.79	0.91	1.96	2.88
AVT (second)	20-29	0.63	0.18	0.40	0.51	0.62	0.77	0.83
	30-39	0.72	0.19	0.51	0.57	0.70	0.87	0.94
	40-49	0.83	0.20	0.47	0.77	0.86	0.94	1.11
	50-59	1.04	0.22	0.68	0.98	1.07	1.15	1.32
	60-69	1.18	0.40	0.71	0.99	1.14	1.38	1.74
	70-79	1.45	0.41	0.99	1.21	1.42	1.67	2.00
ST (second)	20-29	0.94	0.13	0.78	0.86	0.94	1.00	1.13
	30-39	0.94	0.17	0.76	0.85	0.95	1.03	1.13
	40-49	1.09	0.22	0.72	1.03	1.14	1.22	1.28
	50-59	1.70	0.32	1.33	1.64	1.75	1.83	1.91
	60-69	2.09	0.80	1.58	1.76	2.06	2.33	3.15
	70-79	2.55	0.80	1.63	2.04	2.52	2.79	3.61
TMT (second)	20-29	0.73	0.51	0.41	0.44	0.53	0.76	1.11
	30-39	0.73	0.53	0.43	0.46	0.53	0.75	1.13
	40-49	0.91	0.35	0.57	0.63	0.78	0.96	1.21
	50-59	1.02	0.34	0.76	0.92	0.97	1.02	1.54
	60-69	1.18	0.55	0.83	0.98	1.26	1.49	1.99
	70-79	1.44	0.55	0.97	1.07	1.46	1.75	2.25

Footnotes. VCPT: Visual Continuity Performance Test; ACPT: Auditory Continuous Performance Test; VVT: Visual Vigilance Test; AVT: Auditory Visual Vigilance Test; ST: Stroop Test; TMT: Trail-Making Test.

Discussion

Cognitive function is closely related to health and aging[14], and attention is an important component of cognitive function. Attention reduction is one of the major clinical manifestations of brain impairments such as stroke, traumatic brain injury, and dementia as well as psychiatric disorders such as schizophrenia and mood disorders[15-16]. Recently, tests using computerized equipment have been developed. We conducted age-specific standardization studies for six attention tests from a computerized neurocognitive function test.

The results showed that there was no difference in attention between males and females. Attention is dominant in the prefrontal cortex of the brain, which is also associated with higher cognitive function[17]. In this study, we found that the older the subject, the longer the response time and the lower the accuracy. In previous research, it has been reported that errors in attention tasks increase with age[14]. Merritt et al. [18] found that there was no difference in gender-specific attention among adults, and our study obtained the same results.

The continuous performance test and the vigilance test are intended to assess sustained attention [19-20]. The trail-making test evaluates working memory, inhibition and interference control, and visiomotor abilities [21]. The stroop test examines executive function [22]. The results of these six attention tests with age-specific standardization through a computerized neurocognitive function test are presented. These reference values can be used as an indicator for distinguishing between what is normal and abnormal for a given age.

In this study, reference values were determined through age-specific standardization, but the following limitations should be considered. Six attention tests were repeatedly done, and this can lead to learning effects in evaluating the reaction rate during the experiment. We randomly performed a sequence of six attention tests to prevent learning effects. In addition, 30 people were recruited for each age group, but the size of the sample was not very large. Another limitation is that the experiment was conducted in a specific region of Korea.

Conclusion

The purpose of this study was to construct standardized data through a computerized neurocognitive function test. No significant difference between attention and sex were found. Correlation analysis showed that attentiveness decreased with age. The accuracy and response time for the six attention test showed that the reference value changed with age. The normative data from the current study may be used to assess the subject's current level of attention. Reference value data for the six attention test sub-domains of the computerized neurocognitive function test may be helpful in distinguishing attention problems in clinical practice.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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A Study on the Enhancement of Male Reproduction Function due to Eucommiae Cortex

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Abstract

Background/Objectives: This study aimed to investigate whether Eucommiae Cortex ameliorated the age-related decline in male reproductive function.

Methods/Statistical analysis: Eucommiae Cortex (EC) extract was prepared by using a rotary evaporator and a freeze dryer. Experimental animals were spreaded into three groups: the control group, the aged group (AE group), and the EC-treated group. Mice in the EC group received a daily administration of 0.51 g/kg in distilled water for 6 months. After 6 months of treatment, histochemical and immunohistochemical analyses were used to examine.

Findings: EC extract increased sperm production, the number, apoptosis of Sertoli cells, differentiation of spermatogonia in the seminiferous tubules. Moreover, EC increased androgen receptor revelation in Sertoli cells and 17β-Hydroxysteroid dehydrogenase(17β-HSD) expression in Leydig cells, and reduced positive staining for 8-hydroxy-2' -deoxyguanosine (8-OHdG) in the seminiferous tubules, caspase-3 in Leydig cells, and histone deacetylase 1(HDAC1) in Sertoli cells.

Improvements/Applications: The results suggested the following actions for EC: enhancement of spermatogenesis; improvement of testosterone production; regulation of oxidative stress. EC appears to ameliorate the age-related decline in male reproductive function.

Keywords: *Eucommiae Cortex(EC), reproductive function, spermatogenesis, testosterone, oxidative stress*

Introduction

Male reproductive functions are controlled by the testes. They are enclosed by the tunica vaginalis, surrounding the outer membrane, and the tunica albuginea, which forms an inner capsule that contains 250–300 lobules. Each lobule consists of four seminiferous tubules in the shape of a coil, in which sperm is made.

The seminiferous tubules consist of an outer wall made of smooth muscle, an inner wall of epithelial cells known as Sertoli cells, and a basal membrane between these walls. In the space between the seminiferous tubules, interstitial cells called Leydig cells are present. Leydig cells indirectly help sperm maturation through the secretion of testosterone, while Sertoli cells provide the sperm with the necessary nutrition and directly regulate sperm growth[1]. Therefore, observation of the morphological changes in the seminiferous tubules, Leydig cells, and Sertoli cells, which make up the testes, is very important for the understanding of male reproductive function.

A representative male sex hormone is testosterone, a steroid hormone that regulates male reproductive function[2]. Testosterone level decreases by 1%–2% each year after 40 years of age, resulting in a variety of symptoms, including sexual dysfunction, reduced bone density, physical symptoms such as cardiorespiratory depression and fatigue, and mental symptoms such as

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depression[3-5]. Testosterone is secreted from Leydig cells in the testes, so testicular or male reproductive function can be measured by the reduction of testosterone.

Therefore, to analyze the use of EC on male reproductive function, histochemical and immunohistochemical studies were performed on the testes of 50-week-old mice treated with EC extract, and the results were compared with 50-week-old mice that did not receive the EC extract.

Method

Eucommiae Cortex (EC; 300 g) was lyzed in 2000 mL distilled water and for 2 hours, heated. The extract was enriched ingredient under reduced pressure by using a rotary evaporator (Eyela, Japan), and desiccated by using a freeze dryer. A total of 37.9g(12.6 %) of powder was prepared.

Three groups of mice were used in this experiment: normal (8-week-old male ICR mice) mice (control group); aged mice (AE group), comprising 50-week-old male ICR mice; and EC-treated 50-week-old male mice (EC group). All animal experiments were accomplished in proportion to the protocols approved by Semyung University IACUC (smecae 18-12-04).

The control group received no treatment. The AE and EC groups received daily administrations of 0.5 mL distilled and EC extract (0.51 g/kg body weight) dissolved in water, respectively, for 6 months.

ICR mice were anesthetized with ether, the lower abdomen was excised, and the testes were removed. After the nearby fat was removed, the testicular tissues were removed and locked in NBF(10%) at laboratory temperature. The locked tissues were set up in paraffin by conventional methods and then sliced into 5 μm sections.

Masson's trichrome staining was used to visualize changes in the seminiferous tubules in the testes. First, for 1 hour, the sample was treated with Bouin's solution at 50℃–60℃; subsequently, In 70% ethanol, picric acid was eliminated. The nuclei were stained, for 10 minutes, with Weigert's iron hematoxylin and then treated for 15 minutes, with phosphomolybdic-phosphotungstic acid and Biebrich scarlet-acid fuchsin, successively. For 5 minutes, treated with aniline blue, after that, the sample was made an observation by using an optical microscope.

The testis sections were proteolyzed for 5 minutes in proteinase K and then non-particular binding to the sections was screened by incubation for 2 hours in normal goat serum(10%). The samples were stained in a humidified chamber at 4℃ for 72 hours with the following primary antibodies: mouse anti-BrdU, mouse anti-R, mouse anti-17β-HSD, mouse anti-8-OhdG, mouse anti-caspase-3, and mouse anti-HDAC1. All antibodies were used at 1:100 dilution and sourced from Santa Cruz Biotechnology, USA. The samples were then cultured with the secondary antibody, biotinylated goat anti-mouse IgG (1:100, DAKO, USA), for 24 hours at 37℃, and then stained for 1 hour by using an avidin-biotin complex kit (Vector Lab, USA) at laboratory temperature. The samples were blocked in 0.05 M Tris-HCl buffer (pH 7.4) containing 0.01% HCl and 0.05% 3,3'-diaminobenzidine (DAB). Hematoxylin was applied as a contrast stain.

The TUNEL (terminal deoxynucleotide transferase-mediated dUTP-biotin nick-end labeling) assay was conducted using an in situ apoptosis detection kit (Apoptag, Intergen, USA) to observe apoptotic changes in the testes. The tissue sections were first proteolyzed for 5 minutes by the application of proteinase K and then treated for 20 seconds with equilibration buffer. Then, the sections blocked with working-strength TdT enzyme (TdT enzyme: reaction buffer = 1:2) were treated at 37℃ in a moistened chamber for 1 hour and washed for 10 minutes with a working-strength stop/wash buffer. Then the sections were blocked by culture for 1 hour with anti-digoxigenin-peroxidase and stained with DAB. Methyl green was applied as a contrast stain, and the resulting sections were observed by using optical microscopy.

One-way ANOVA was used to verify significant differences ($p<0.05$). The immunohistochemistry and TUNEL assay results were quantified as the mean ± standard deviation by using Image-Pro Plus image analysis software. The selected area in each section was photographed at ×200 magnification and analyzed for positive pixels/20,000,000 pixels. Immunohistochemical staining was analyzed by using SPSS.

Result

1. Spermatogenesis

1) Sperm and Sertoli cells in seminiferous tubules

In the AE group, spermatogenesis decreased, and the number of Sertoli cells was lower than in the control group. In contrast, spermatogenesis and the number of

Sertoli cells were increased in the EC group compared with the AE group.(figure 1a)

2) Spermatogonia differentiation in the seminiferous tubules

In the AE group, the number BrdU-positive spermatogonia in the basal part of the tubule was 69% lower than in the control group, and 100% upper in the EC group than in the AE group. (figure 1b)

3) Apoptosis of Sertoli cells

In the AE group, the number of apoptotic Sertoli cells in the seminiferous tubules was 1,104%; higher than in the control group, and in the EC group, 27% lower than in the AE group. (figure 1c)

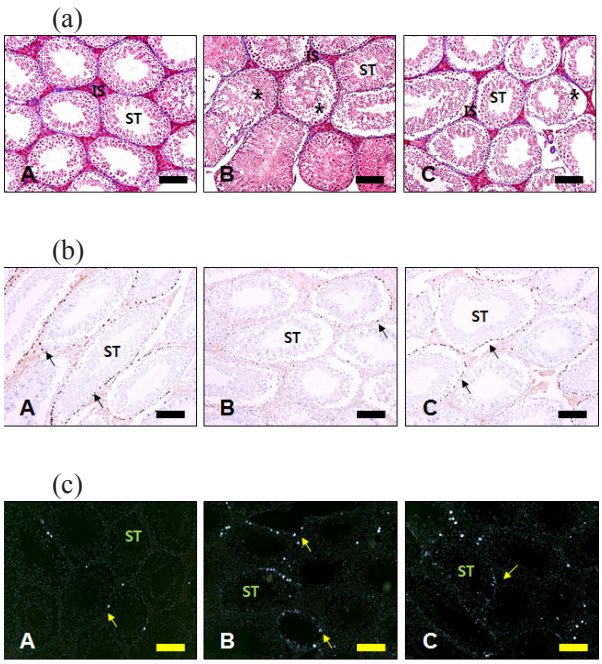


Figure 1. (a) Sperm and Sertoli cells in seminiferous tubules. (b) Differentiation in the spermatogonia in the seminiferous tubules. (c) Apoptosis of Sertoli cells in the seminiferous tubules.

A, Control mice; B, Aged mice; C, Eucommiae Cortex-treated aged mice; ST, seminiferous tubule; IS, interstitial space. Scale bar = 100 µm. The arrows indicate positive reactions; asterisks indicate the atrophied region in the seminiferous tubules.

2. Effect on production of male hormones

1) AR revelation in Sertoli cells

In the AE group, AR-positive reactions in Sertoli cells were 70% lower than in the control group, and in the EC group, were 40% higher than in the AE group. (figure 2a)

2) 17β-HSD expression in Leydig cells

In the testicular Leydig cells from mice in the AE group, 17β-HSD-positive reactions were decreased by 62% compared with the control group, and in the EC group, were 64% higher than in the AE group.(figure 2b)

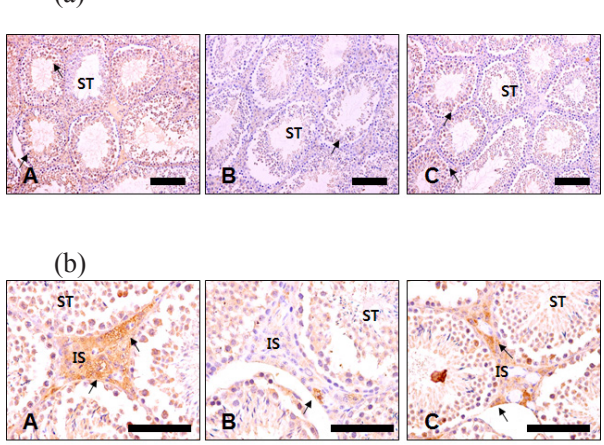


Figure 2. (a) Androgen receptor expression in Sertoli cells. (b) 17β-HSD-positive reactions in Leydig cells. A, Control mice; B, Aged mice; C, Eucommiae Cortex-treated aged mice; ST, seminiferous tubule. The arrows indicate positive reactions. Scale bar =. 100 µm.

3. Modulation of oxidative stress

1) Effect on oxidative stress

In the AE group, the number of 8-OhdG-positive sperm was increased by 557% in the lumen of the seminiferous tubules compared with the control group, and in the EC group, was 36% lower than in the AE group.(figure 3a)

2) Effect of oxidative stress on apoptosis

In the AE group, caspase-3-positive reactions in Leydig cells of the seminiferous tubules were increased by 342% comparison with the control group, and were reduced by 33% in the EC group compared with the AE group.(figure 3b)

3) Effect of oxidative stress on the activity of Sertoli cells

In the AE group, HDAC1-positive reactions were increased by 1,209% comparison with the control group, and were reduced by 33% in the EC group compared with the AE group.(figure 3c)

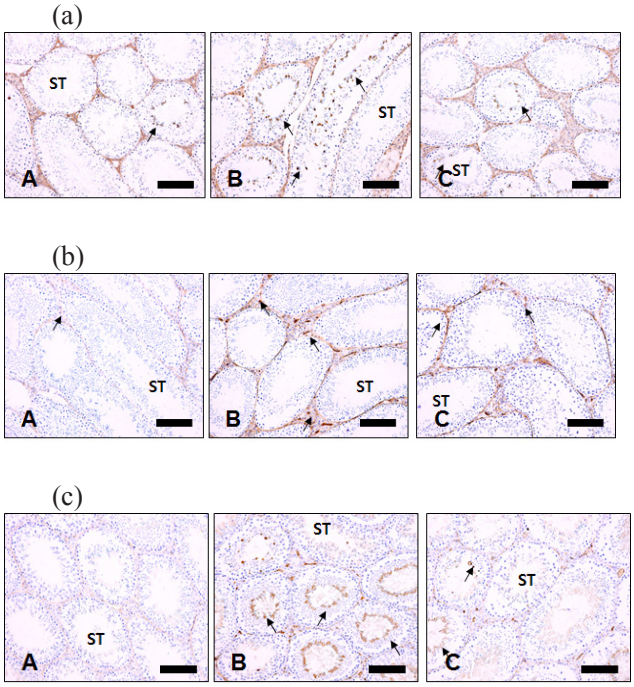


Figure 3. (a) Oxidative stress reactions. (b) Apoptosis due to oxidative stress. (c) Effect of oxidative stress on the activity of Sertoli cells.A, Control mice; B, Aged mice; C, Eucommiae Cortex-treated aged mice; ST, seminiferous tubule. The arrows indicate positive reactions. Scale bar = 100 μm.

Discussion

To investigate the decline in male reproductive function due to aging, experiments were performed on 8-week-old (control) and 50-week-old (aged) male ICR mice. EC, which is reported to exert a relaxation effect on the corpus cavernum, was tested for its ability to ameliorate the decline in male reproductive function. To this end, tests were conducted on the testicles of aged mice that were administered EC over a period of 6 months, and the results were compared with those aged mice that were not administered EC. The analyses included histochemical and immunohistochemical experiments.

First, the sperm, Sertoli cells, and spermatogonia in the seminiferous tubules were observed to determine the effect of EC on sperm production. EC treatment increased spermatogenesis and the differentiation of Sertoli cells and spermatogonia, and decreased apoptosis of Sertoli cells in aged mice.

The increase in spermatogenesis in the seminiferous tubules and the increased division of the spermatogonia indicate that EC increased spermatogenesis; this was confirmed by the enhanced number of Sertoli cells and reduced number of apoptotic Sertoli cells. Overall, EC enhanced spermatogenesis in the testicles, which is normally reduced in old mice.

Testosterone is an important male hormone that is ultimately produced by 17β-HSD from DHEA [6]. Androgen receptors (AR) are necessary to maintain the physiologically active state of testosterone and exert actions on the human body. Thus, the role of testosterone can be defined by the presence and activity level of AR in the human body [7].

The experiments on the effect of EC on testosterone production, which is a key element in male reproductive function and the maintenance of sexual function, revealed that the expression of AR and 17β-HSD was increased by EC treatment in Leydig cells and Sertoli cells, respectively. In other words, testosterone secretion from the Leydig cells increased; subsequently, this hormone enhanced the function of Sertoli cells, which is to induce spermatogenesis. This suggested that EC increased the production and action of testosterone in the testes, thereby ameliorating the loss of male reproductive function due to aging.

8-OHdG is involved in DNA damage to nuclei and mitochondria, an important mechanism of oxidative stress [8-9], and caspase-3 is the first important factor in apoptosis [10]. Histone deacetylase (HDAC) reduces DNA transcription levels in cells [11].

Therefore, to make an observation the uses of EC on oxidative stress on the testes, the presence of these proteins was compared in control, aged, and EC-treated aged mice. EC was found to reduce 8-OHdG-positive reactions in the lumen of seminiferous tubules, caspase-3-positive reactions in Leydig cells, and HDAC1-positive reactions in Sertoli cells. These results confirmed that EC reduced oxidative stress in cells in the seminiferous tubules, reduced apoptosis of the Leydig cells that induce testosterone secretion, and increased the production of Sertoli cells that are involved in spermatogenesis through an increase in DNA transcription. Essentially, EC was shown to ameliorate the age-related decline in male reproductive function by controlling oxidative stress in the testes.

Collectively, EC increased spermatogenesis in the testes by increasing division of spermatozoa, Sertoli cells, and spermatogonia; increased testosterone production and function; and controlled oxidative stress by reducing oxidative stress in the seminiferous tubule and the number of apoptotic Leydig cells; and

increased production of Sertoli cells. Consequently, EC ameliorated the decline in male reproductive function due to aging.

Conclusion

The following results were obtained by using histochemical and immunohistochemical methods to figure out the uses of EC on the age-related decline in male reproductive function:

EC increased spermatogonia and Sertoli cells in the seminiferous tubules. EC increased spermatogonia differentiation, and reduced apoptotic Sertoli cells. EC also increased AR revalation in Sertoli cells and 17β-HSD-positive reactions in Leydig cells. EC reduced 8-OHdG-positive response in the seminiferous tubules, caspase-3-positive response in Leydig cells, HDAC1-positive response in Sertoli cells.

The outcomes of this study present that EC ameliorates the reduction in male reproductive function due to aging by: 1) enhancing spermatogenesis in the testes by increasing the differentiation of sperm cells, Sertoli cells, and spermatogonia in the seminiferous tubules; 2) increasing testosterone production and function; and 3) controlling oxidative stress through a reduction in oxidative stress, apoptotic Leydig cells, and an enhancement in production of Sertoli cells.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Beneficial Effects of Alpiniae Oxyphyllae Fructus (AOF)on Male Reproductive Function

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Abstract

Background/Objectives: The object of this study is to establish whether Alpiniae Oxyphyllae Fructus (AOF) will also have an effect on reduced male reproductive function.

Methods/Statistical analysis: The experimental groups comprised of (1) a control group consisting of 8-week-old Institute of Cancer Research(ICR) male mice, and two aging groups consisting of 50-week-old ICR male mice (2) without or with (3) AOF treatment. The AOF group was treated with AOF (0.54 g/kg/day) for 6 months. After 6 months, histochemistry and immunohistochemistry analyses were performed on tissue sections from the testis, and images were analyzed using Image-Pro analysis software.

Findings: AOF increased the distribution of Sertoli cells and spermatids, increased mitochondrial cell division in seminiferous tubules, and decreased the apoptotic cell death of Sertoli cells. Androgen receptor(AR) positive response in Sertoli cells and 17β-Hydroxysteroid dehydrogenase (17β-HSD) positive response, a testosterone-converting enzyme, in Leydig cell, significantly increased in number. In seminiferous tubules, 8-OHdG, caspase-3, and HDAC1 expression decreased.

Improvements/Applications: In this study analyzing the ability of AOF to improve male reproductive function, AOF was able to improve sperm production, increase testosterone production and action, decrease oxidative stress.

Keywords: *Alpiniae Oxyphyllae Fructus (AOF), reproductive function, spermatogenesis, testosterone, oxidative stress*

Introduction

Aging rather refers to a process in which an aging body, regardless of diagnoses of any diseases/illnesses, undergoes an overall decline in physical vigor, as well as deterioration in all physiological functions. As a result, aging-related symptoms include decreased cellular ability to synthesize proteins, compromised immune functioning, lower bone density, declining muscle strength and mass, and decreased sexual and reproductive function [1-3]. Of these, decreased sexual function is marked by erectile dysfunction, a characteristic of male aging, for which extensive research has been conducted to provide effective treatment. Contrastingly, decreased reproductive function in aging males do not manifest in a clear fashion. Therefore, research in this area remains sparse. Although studies have reported the effects of aging on the metabolism of the testes, which act as a major role in male reproductive function, and the secretion of serum testosterone [4-6], as well as on sperm production, serum gonadotropin concentrations, and Leydig cell numbers [7-8], they only confirmed isolated decreases in aging-induced reproductive functioning. The findings thus failed to investigate the underlying mechanisms.

This study speculated that Alpiniae Oxyphyllae Fructus (AOF) can be beneficial for the treatment of aging-induced, decreased male reproductive function, as the effects of this herb have been demonstrated to improve male sexual functioning, and age-related osteoporosis and muscular atrophy [9-10]. The testes were

thus selected as the focal point of this investigation. Experiments were conducted using histochemistry and immunohistochemistry test methods.

Method

Powdered AOF extracts of 17.09 g (17.6%) were generated.

A total of 27 animals were used for the experiments. The animal experiments were approved by the institutional animal care and use committee (IACUC) at Semyung University (smecae 18-12-04) before their implementation

They were divided into 3 test groups, with 9 allocated in each: (1) the control group ("Control Group"); (2) the aging-elicited group (AE Group); and (3) the AOF-administered group (AOF Group). The Control Group comprised of 8-week-old ICR male mice receiving no treatment, while the AE Group and AOF Group consisted of 50-week-old ICR male mice. The AE Group received no treatment except for 10 ml distilled water every day for 180 days. The AOF Group was provided AOF extracts (0.54 g/kg) dissolved in 10 ml distilled water once a day for 180 days

Institute of Cancer Research(ICR) mice were place under anesthesia using ether. An incision was place in the lower abdomen, and the testes were extracted. After removing the fat around the testicle, the testicular tissue was fixed in 10% Neutral Buffered Formalin (NBF) at 37℃ for 24 h. The fixed tissue was paraffin-embedded using the conventional method and serial sections were prepared, each measuring 5 μm in thickness.

Masson's trichrome staining was performed to tent changes in the seminiferous tubules of the testes. The samples were first fastened in Bouin's solution for 1 h at 50-60 ℃. Next, they were subjected to picric acid removal using ethanol(70%). The nucleus was stained with Weigert iron hematoxylin solution for 10 min. The tissue sections were then treated with phosphomolybdic-phosphotungstic acid solutions and Biebrich scarlet-acid Fuchsin reagent for 15 min. This was followed by a 5 min aniline blue treatment before observing the tissue section on an optical microscope (BX50, Olympus, Japan).

The testicular sections were subjected to a 5 min proteolysis reaction with 20 μg/ml proteinase K and cultured with 10% normal goat serum (blocking serum) for 2 h. The sections were placed in a 4℃ humidified chamber after the addition of primary antibodies: 1:100 mouse anti-BrdU (Santa Cruz Biotech), 1:100 mouse anti-AR (Santa Cruz Biotech), 1:100 mouse anti-17β-HSD (Santa Cruz Biotech), 1:100 mouse anti-8-OhdG (Santa Cruz Biotech), 1:100 mouse anti-caspase-3 (Santa Cruz Biotech), and 1:100 mouse anti-HDAC1 (Santa Cruz Biotech), for a total of 3 days. This was followed by incubation with the secondary antibodies: 1:100 biotinylated goat anti-mouse IgG (DAKO), for a 24 h link at room temperature; and the avidin biotin complex kit (Vector Lab) was used at room temperature for an hour-long reaction. The sections were then stained with 0.01% HCl and tris-HCl buffer solutions (0.05 M, pH 7.4) with 0.05% 3,3'-diaminobenzidine (DAB), and counterstained with hematoxylin.

Observation of apoptosis (cell death) inside the testes was conducted using terminal deoxynucleotidyl transferase-mediated dUTP-biotin nick-end labelling (TUNEL) assay using an in-situ apoptosis detection kit (ApopTag, Intergen, USA). First, the tissue sections were subjected to proteolysis for 5 min in proteinase K, and washed, for 20 s, with equilibration buffers. This was followed by treatment with TdT enzyme and cultured in a humidified chamber (37℃) for 1 h, after which the stop/wash buffer, for 10 min, was added. The sections were treated for 1 h with anti-digoxigenin-peroxidase, followed by DAB treatment. Methyl green counterstaining and observation via optical microscopy ensued in succession.

Result

1. Changes in the distribution of sperm and Sertoli cells

In the AOF Group, a significantly larger number of Sertoli cells and sperm distribution was observed compared to that of the AE Group(Figure 1).

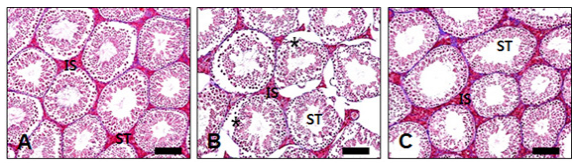


Figure 1.Changes in the distribution of sperm and Sertoli cells. A, Control Group; B, Aging-elicited Group; C, Alpiniae Oxyphyllae Fructus Group. ST, seminiferous tubule; IS, interstitial space; *, atrophied region in seminiferous tubule. Bar size, 100 μm.

2. Changes in spermatogonium cell division

AOF Group indicated a significant (67%) increase in the number of spermatogonium cells that reacted positively to BrdU compared to that of AE Group. (Figure 2)

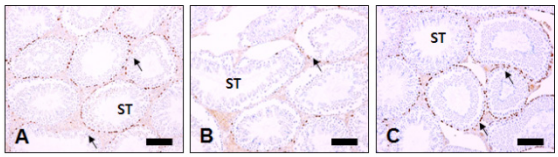


Figure 2. Changes in spermatogonium cell division. A, Control Group; B, Aging-elicited Group; C, Alpiniae Oxyphyllae Fructus Group. ST, seminiferous tubule; arrow, positive reaction. Bar size, 100 µm.

3. Changes in Sertoli cell apoptosis

The AOF Group compared to the AE Group reported a significant (32%) decrease(Figure 3).

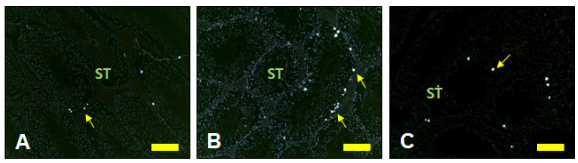


Figure 3. Changes in Sertoli cell apoptosis. A, Control Group; B, Aging-elicited Group; C, Alpiniae Oxyphyllae Fructus Group. ST, seminiferous tubule; arrow, positive reaction. Bar size, 100 µm.

4. Changes in Sertoli cell activation

In the AOF Group, the number increased significantly (39%) relative to the AE Group. (Figure 4)

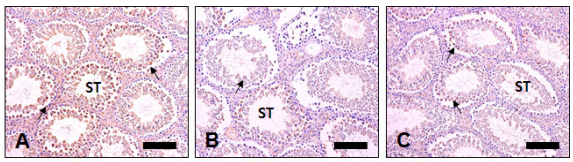


Figure 4. Changes in Sertoli cell activation. A, Control group; B, Aging-elicited group; C, Alpiniae Oxyphyllae Fructus group. ST, seminiferous tubule; arrow, positive reaction. Bar size, 100 µm.

5. Changes in testosterone production in Leydig cells

In AE Group, Leydig (interstitial) cells that were 17β-HSD-positive decreased by 63% when compared to Control Group, whereas the interstitial cells in the AOF Group increased significantly by 62% compared to the AE Group(Figure 5).

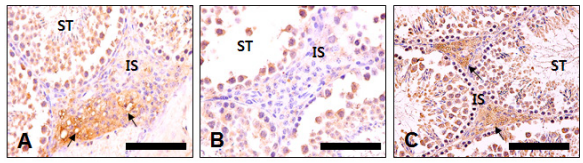


Figure 5. Changes in testosterone production in Leydig cells. A, Control Group; B, Aging-elicited Group; C, Alpiniae Oxyphyllae Fructus Group. ST, seminiferous tubule; IS, interstitial space; arrow, positive reaction. Bar size, 100 µm.

6. Effect of AOF on mediating oxidative stress-induced damage

The AOF Group had a significant (29%) decrease in the number of sperm cells relative to the AE Group(Figure 6a)

7. Apoptosis resulting from oxidative stress

In AE Group, Sertoli cells in the seminiferous tubules that had reacted positively to caspase-3 increased by 330% compared with Control Group, whereas AOF Group showed a significant 29% decrease compared with AE Group(Figure 6b).

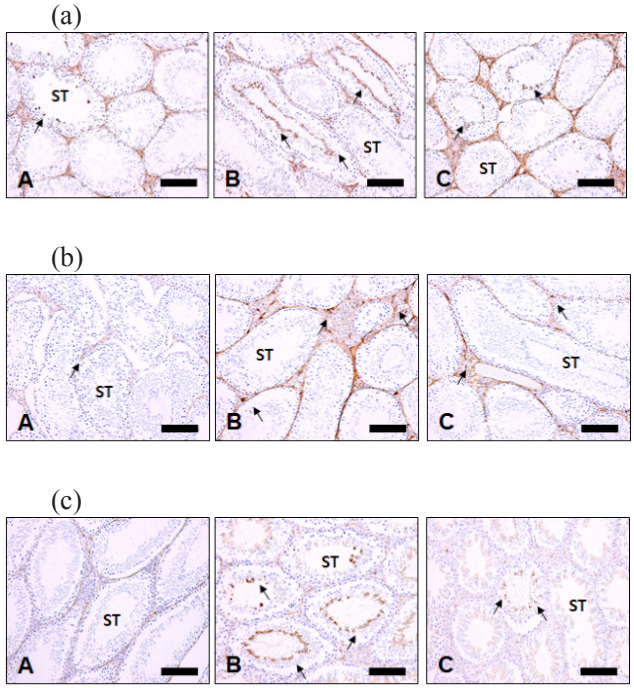


Figure 6. (a) AOF's effects of mediating oxidative stress-induced damage. (b) Apoptosis resulting from oxidative stress. (c) Activation of Sertoli cells in seminiferous tubules as a result of oxidative stress regulation.A, Control Group; B, Aging-elicited Group; C, Alpiniae Oxyphyllae Fructus Group. ST, seminiferous tubule; arrow, positive reaction. Bar size, 100 µm.

8. Activation of Sertoli cells in seminiferous tubules as a result of oxidative stress regulation

Related to the Control Group, Sertoli cells in the AE Group that reacted positively to HDAC1 in the tubules increased by 999%, whereas those in the AOF Group decreased significantly by 32% compared to the AE Group(Figure 6c).

Discussion

This study targeted to examine the effects of AOF on the improvement of lower reproductive function in aging males, and analyzed using histochemical and immunohistochemiscal methods to establish the effect of AOF on production of sperm, male hormone, and regulation of oxidative stress.

The AOF Group, relative to the AE Group, consisted of significantly many Sertoli cells and increased sperm production. In addition, changes in spermatogonium division in the basilar membrane of seminiferous tubules were observed, indicating that the AOF Group had relatively more spermatogonia relative to the AE Group. A TUNEL assay was performed to observe apoptotic cell death of Sertoli cells also revealed that the AOF Group had a significantly decreased number of Sertoli cells died by apoptosis. These findings show that AOF increases spermatogonia division in the seminiferous tubule basement (membrane) and stimulates the production of sperm. AOF also reduces apoptosis of Sertoli cells that provide nutrients for sperm production and increases the number of the cells, thereby improving sperm production previously compromised by the aging processes.

Testosterone is involved in the growth of secondary sexual characteristics and genitalia in males as well as in the production of sperm. Converted from dehydroepiandrosterone (DHEA), produced testosterone requires an enzyme called 17β-HSD in the final stage of the conversion. Completed testosterone in turn requires a receptor, called androgen receptor (AR), to function inside the body [11].

The results showed that AR-positive Sertoli cells had multiplied more in the AOF Group than in the AE Group. Additionally, 17β-HSD antibodies were used to measure any changes occurring in the production of testosterone in Leydig (interstitial) cells. Leydig cells expressing 17β-HSD were observed in larger numbers in the AOF Group than the AE Group. This indicates that AOF increases testosterone production in Leydig cells, and testosterone activates Sertoli cells, thereby improving aging-induced, decreased reproductive function.

The results showed that compared to that of the AE Group, the AOF Group had decreased 8-OHdG positive cells. In terms of oxidative stress-induced apoptosis, Sertoli cells that reacted positively to caspase-3 antibodies in the seminiferous tubules decreased in the AOF Group compared to the AE Group. 8-Hydroxydeoxyguanosine (8-OHdG) is an ROS-converted derivative of a nucleic acid called deoxyguanosine. 8-OHdG is a byproduct of damaged nitrogenous bases (component of DNA), resulting from DNA exposure to ROS and the resulting oxidation [12]. In contrast, caspase-3 is known as the most important factor involved in apoptosis [13]. Therefore, because treatment with AOF decreased 8-OHdG and caspase-3 positive Sertoli cells in the seminiferous tubules, this suggests a role for AOF in oxidative stress reduction generated in the testes.

The next phase of the experiments was to observe oxidative stress regulation. The findings showed that the AOF Group had more HDAC1-positive Sertoli cells than the AE Group. Histone deacetylases (HDAC) are an enzyme group that removes the acetyl group from histone proteins. Once rid of the acetyl group, histone proteins bind to DNA with greater efficiency and draw it to their surface, thus inhibiting the expression of genes in the DNA at that binding site [14]. Therefore, the decreased number of HDAC1-positive Sertoli cells suggests that an AOF-enabled reduction of gene damage from oxidative stress increased the activation of Sertoli cells in the seminiferous tubules.

In summary, AOF improved aging-induced lower male reproductive function by: increasing spermatogonium division in the seminiferous tubule basement (membrane); and decreasing the apoptotic cell death of Sertoli cells and increasing their quantity, thereby stimulating sperm production that was previously compromised by aging processes. AOF also activated Sertoli cells by elevating testosterone production and increasing AR in Leydig cells, reduced oxidative stress in the testes, and decreased oxidative stress-induced gene damage, thus increasing Sertoli cell activation in the seminiferous tubules.

Conclusion

This study targeted to examine the effects of AOF

on the improvement of male reproductive function that are compromised by aging. Our study revealed the following: AOF increased the distribution of Sertoli cells, sperm production, and spermatogonium division in the seminiferous tubule basement (membrane), decreased the apoptosis of Sertoli cells. AOF increased AR positive, 17β-HSD in Leydig cells. AOF decreased 8-OHdG positive cells, caspase-3 positive cells, HDAC1 positive cells.

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Conflict of Interest: Nil

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The Relationship between Resilience and Self-Identity: A Latent Growth Model

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Abstract

Background/Objectives: Thisstudy utilizes longitudinal data from the KCYPS to examine the relationship between resilience and self-identity in the transition period from elementary school to secondary school.

Methods/Statistical analysis: Participants were 2,002 children. The hypothesized model was examined by structural equation modeling (SEM).

Findings: The results showed that the intercept and the slope of children's resilience will affect positive self- identity fit the observed data well ($\chi^2_{df=30}$= 537.10, p= 0.00, TLI= 0.95, CFI= 0.97, RMSEA= 0.08). Children's resilience in 4th grade subsequently affected the formation of children's self-identity.; there was a significant individual variation in these changes over time.

Improvements/Applications: These results indicate the effect children's resilience may have on their self-identity over time and offer evidence-based practice guidelines for setting self-identity. In this study, however, environmental factors (e.g. Family's and teachers' support) affecting self-resilience and self-identity were not taken into account. Therefore, multiple approaches to identify the developmental trajectories of self-resilience and self-identity would be needed.

Keywords: *Resilience, Self-identity, Latent growth model, Children,Adolescents, KCYPS*

Introduction

In the transition from childhood to adolescence, children are in the conflict between identity formation and role confusion and try to resolve it. They become interested in 'who I am' and 'who I am meant to be; they are in confusion as they were neither a child nor an adult. They get to form a sense of self-identity in this process. A researcher suggested the formation of self-identity as a developmental task in adolescence [1]. Adolescents with a higher sense of identity are not only motivated and confident, but also less likely to be depressive. Conversely, adolescents with a lower sense of identity are more likely to be helpless, confused, and disoriented; They cannot set a purpose in life, and they even fail to launch and subsequently are likely to remain in their parents' homes into early adulthood. Self-identity is 'the self as reflexively understood by the person in terms of her or his biography'[2]. The cores in the formation of self-identity is awareness and mindfulness about one's values, beliefs and prejudices. The process of discovering, challenging and reconstructing the self has been often so confusing and awful that children could get lower self-esteem. If they could manage and get over the problem in forming self-identity, however, they could achieve personal well-being. Self-identity is reported to be not only related to current life satisfaction [3], social development [4], but also closely[8] related to subsequent development [2-3]. Therefore, it is necessary to look at how the self-identity in adolescence relates to the psychological characteristics in childhood. Children who are confused by the formation of self-identity are often less conscious of self and in lower self-esteem and find it difficult to overcome the adversity [4].

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Research and policy concerning ego-resilience have increased rapidly during the last decade [5]. Researchers commonly defined resilience as 'the individual's adaptive response to adversity', stress-resistant personality traits' and 'the ability to bounce back'[6]. Therefore, the key of ego-resilience is that people have the ability to react and adjust themselves positively to their circumstances when something goes wrong [7]; ego-resilience was considered as a process that occurred often due to childhood adversity but also from the protective factors of a family [8]. It was also argued that ego-resilience is not something we have, but something we make [7]. The studies also explored the normative assumption of ego-resilience as 'found', 'made', 'unfinished'[5].

Ego-resilience has been considered as an individualized, integrated valuable asset to promotewellbeing and self-identity [8-9]. Ego-resilience showed a statistically significant difference in peer relationship and support, self - identity, and cultural acceptance [10]. Children with high ego-resilience are relatively stable trajectories of continuous healthy adjustment following [1,3]. Children with ego-resilience are likely to have various life skills and knowledge gained from previous stressor as well as their increased ability to control negative emotion [2]. Some studies described resilience as an innate self-righting mechanism and showed a relationship with self-identity [11].

Despite the growing body of literature focusing on the relationship between ego-resilience and self-identity, this work has been limited to cross-sectional studies. Therefore, this study examined the longitudinal relationship between ego-resilience and self-identity

Hypothesis 1: There is a change in child's ego-resilience over time. And there is within-person variability in an individual's level of ego-resilience.

Hypothesis 2: Change in child's ego-resilience is positively related to changes in self-identity.

Materials and Method

Toanalyze the longitudinal relationship between children's resilience and self-identity, a longitudinal research design was used.

This is a longitudinal study designed to examine the developmental changes of children's resilience and self-identity in Korea. Participants were 2,002children who were 1039 males (51.9%) and 963 females (48.1%). Participants ranged in age from 12- to 14-years old (M = 12.98; SD = 0.17) in the 7thgrade. Participants were surveyed from the 7th grade through the 4th and the 6thgrade respectively, which belonged to the 1st elementary school cohort panel of the Korean Children and Youth Panel Survey (KCYPS). This study used the data collected by the KCYPS from 2013 through 2016. To be included in this study, children should have all information at 3-time points: the 4th grade; the6thgrade; the 7thgrade.

Tomeasure children's resilience, Self–Resilience Scale was used [12]. Self–Resilience Scale was originally developed by Block andKremen [13], however, it was translated and revised by Yoo and Shim [12]. It was composed of 14 items asking about the degree of self-resilience (e.g., "I am a very energetic person.") The items were based on a 4 point Likert scale. Self-resilience was reverse coded. A higher score meant a higher level of self-resilience. The Cronbach's α in the 4th, the 6th, and the7thgrade was 0.90, 0.89, .089 each.

Children's self-identity was measured bySelf–Identity Scale which was developed in a previous study [14]. It was composed of 8 items asking about the degree of self-identity (e.g., "I have a clear goal of life.") The items were based on a 4 point Likert scale. Self-identity was reverse coded. A higher score meant a higher level of self-identity. The Cronbach's α in the 6th, and the7th grade was 0.64, 0.67 each.

This study used LGM to model developmental changein self-resilience and self-identity among children.Contrast with traditional methods, LGM has advantages for setting dynamic models with assessing developmentalchange [15]. The LGM could assess both the nature of the mean-level changes across the measurement points and the individual variation in the initial level. In this study, the initial mean level andthe linear change of self-resilience scores were estimated. In Model 1, the Latent Growth Model (LGM) was initially defined considering only three measurement time points. Then, to analyze the association of self-identity, a conditional model was compared with an unconditional model.The parameters of the LGM models were estimated utilizing maximum-likelihood. Goodness-of-fit was evaluated using the $\chi 2$ statistics as well as the following descriptive indices: Comparative Fit Index (CFI) and Root Mean Square Error of Approximation [16].The collected data were analyzed with PSAW 18.0 and AMOS statistical program.

Results

1. General characteristics

Thecharacteristics of the participants in the 4th, 6th, and7th gradeare shown in [Table 1]. Of the participants, 51.9% were boys and 48.1% were girls in the 7th grade. Children were 9-11 years old (*M* = 9.97; *SD* = 0.21) in the 4th grade and they were12- to 14-years old (*M* = 12.98; *SD* = 0.17) in the 7thgrade.

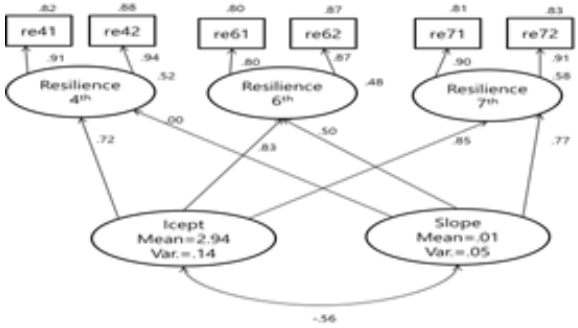


Figure 1. Unconditional linear model: resilience

Table 1.General Characteristics (N=2,002)

Variable	4th			6th			7th		
	Min	**Max**	**Mean±SD**	**Min**	**Max**	**Mean±SD**	**Min**	**Max**	**Mean±SD**
Height	120	166	141.35±6.67	130	178	155.25±7.21	135	182	161.06±7.25
Weight	20	74	36.17±7.46	25	95	46.52±9.48	25	100	51.22±10.35
Subjective health status	1	4	3.40±0.55	1	4	3.39±0.56	1	4	3.32±0.56
Satisfaction of Academic achievement	1	4	3.21±0.64	1	4	3.11±0.64	1	4	2.76±0.77
Family Income (million won)	1.8	400	48.60± 25.77	3.0	300	50.94± 24.51	3.0	330.	52.81± 25.25

2. Correlation between resilience and self-identity

There was a statistically significant correlation between resilience in the 4th, 6th, and 7th grade and self- identity in the 6th and 7th grade (see Table 2).



Figure 2. Conditional linear model (hypothesized latent growth model)

Table 2. Correlation between resilience and self- identity

	Resilience 6th	Resilience 7th	Self-identity 6th	Self-identity 7th
Resilience 4th	0.36**	0.27**	0.30**	0.25**
Resilience 6th	1	0.46**	0.52**	0.32**
Resilience 7th		1	0.35**	0.50**
Self-identity 6th			1	0.48**

** p <.01

3.Interrelation between resilience and self-identity growth model

A latent growth model was estimated for the three measures of resilience, and unconditional linear model (see Figure 1) was shown in [Table 3].

Table 3. Fit-index of model

Model	χ2	p	df	TLI	CFI	RMSEA
NoChange model	209.4	0.00	13	0.96	0.98	0.09
Unconditional linear model	178.11	0.00	10	0.96	0.98	0.09
Conditional linear model	537.10	0.00	30	0.95	0.97	0.08

The research model (see Figure 2, [Table 4]) assuming that the intercept and the slope of children's resilience will affect positive self- identity fit the observed data well ($\chi^2_{df=30}$= 537.10, p=0.00, TLI=0.95, CFI=0.97, RMSEA=0.08). This result shows that the longitudinal relationship between children's resilience and self-identity and there was a significant individual variation in these developmental trajectories.

Table 4. Parameter estimates of the hypothesized latent growth model

path			β	b	S.E.	C.R.
icept	→	6th self-identity	0.88***	0.83	0.04	17.26
slope	→	6th self-identity	0.34.***	0.62	0.14	4.20
6th self-identity	→	7th self-identity	0.43*	0.46	0.14	3.19
icept	→	7th self-identity	0.34*	0.34	0.15	2.21
slope	→	7th self-identity	0.60***	1.17	0.25	4.70

Discussion

The longitudinal relationship between children's resilience and self-identitywasinvestigated in this study. First, thefinding showed that the average growth trajectory for self-resilience revealed significant levels in the 4th grade. The estimate of the slope was not significantly different from zero. This indicated that the children's resilience average slope was not constant. Previous studies concerning the developmental trajectory of self-resilience was mostly conducted on people who experienced trauma or external stress [17-18]. The studies reported that resilience as an adaptive response to adversity was manifested in three different ways: recovery, sustainability, and growth [19].Recovery indicated that people couldmakeanyadjustments and go back to their pre-stress level of functioning; Sustainabilityindicated that people couldendure and continue forward without stressor. Growth indicated that people could get additional gains and advancement after getting over the adversity [19-20]. The reasons

that the rate of increase or decrease in children's self-resilience was not constantin this study, possibly due to the uncontrolled experience of children's previous events. Another reason was that the concept of resilience was varied; The definition of self-resilience in this study focused on how well children could get over difficulties in actual everyday life rather than a great difficulty and traumas to overcome. The term 'resilience'in the past several decades focused on chronic adversity [21], was recently broadened to encompass positive adaptation and adjustmentlabeled minimal-impact resilience [22]. The further researches concerning the developmental trajectory of children with minimal-impact resilience, in this regard, was continuously conducted.

However, the examination of the variance components of the latent factors revealed that intercept latent factors showed a significant individual differences in 4th grade; this result indicated that there were significant individual difference in self–resilience. As a child's self-resilience has a significant effect on the children's emotional and social competence [4,23], active efforts of significant others (e.g. Parents, teachers, and peers, so on) will be needed to enhance their self-resilience. Second, both the initial level and the slope of children's self-resilience influenced positively on children's self-identity. These results are consistentwith the previous studies that children with high resilience are relatively stable trajectories of continuous healthy adjustment following [1,3].These results suggested that children with resilience were likely to continue to form a positive self -identity, and positive self-identity also tended to encourage continued resilience.Self-identity refers 'who I am', 'What I can do', which is an important developmental task in adolescence [1]. Given that self-identity, which is formed from middle childhood through adolescence, is also closely related to later healthy development and adaptation, the self-resilience of childhood is of greater importance. Taken together, these results confirmed children's resilience couldeffect on their self-identity over time and offer evidence-based practice guidelines for setting self-identity. In this study, however, environmental factors (e.g.Families and teachers' support) affecting self-resilience and self-identity were not taken into account. Therefore, multiple approaches to identify the developmental trajectories of self-resilience and self-identity would be needed.

Conclusion

This studyutilizes longitudinal data from the KCYPS to examine the relationship between resilience and self-identity in the transition period from elementary school to secondary school. Participants were 2,002 children. The hypothesized model was examined by structural equation modeling (SEM). The results showed that the intercept and the slope of children's resilience will affect positive self- identity fit the observed data well ($\chi^2_{df=30}$= 537.10, p=0.00, TLI=0.95, CFI=0.97, RMSEA=0.08). This result shows that the longitudinal relationship between children's resilience and self-identity and there was a significant individual variation in these developmental trajectories. These foundings highlights the children's resilience may effect on their self-identity over time and offer evidence-based practical guidelines for setting self-identity. In this study, however, environmental factors (e.g. Family's and teachers' support) affecting self-resilience and self-identity were not taken into account. Therefore, multiple approaches to identify the developmental trajectories of self-resilience and self-identity would be needed.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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A Comparison of Angle of Active Knee Extension During Various Modified Contract–Relax PNF Technique : A Cross-Over Study

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Abstract

Background/Objectives: The aim of this study was to determine the effect of various modified contract-relax PNF techniques on the immediate change of angle of active knee extension (AKE).

Methods/Statistical analysis: Thirty healthy adults participated in this study. Before intervention, all subjects measured the AKE angle. After the measurements, the subjects received a randomized order of traditional contract-relaxation (TCR), modified contract-relax 1 (MCR 1), and modified contract-relax 2 (MCR 2) at day intervals. TCR contracted right knee flexors, MCR 1 contracted left biceps, and MCR 2 co-contracted right knee flexors and contraction of left biceps. Measurements of AKE angle were evaluated immediately after three techniques trial.

Findings: Three contract-relax PNF techniques showed significant improvement compared to AKE angle of baseline. There was no significant difference between MCR 2 and MCR 1, but there was a significant difference from TCR in AKE angle. MCR 1 showed no significant difference from TCR in AKE angle.

Improvements/Applications: These findings demonstrate that contract-relax PNF techniques can have a greater immediate effect as the concentration of muscle co-contraction.

Keywords: *PNF, Contract-Relax, Active Knee Extension, Stretching*

Introduction

Among Proprioceptive neuromuscular facilitation PNF stretching techniques, the contract-relax (CR) technique, the antagonist-contract (AC) technique using antagonistic muscle contraction, and contract relax-antagonist contract (CRAC) technique, the combination of the above two techniques, are widely used, and their positive effects have been reported [1-2].

The contract-relax stretching technique is one of methods performed most frequently among PNF stretching techniques [3]. To perform the contract-relax technique, the joint of the target muscle is lengthened to its end range, and the subject contracts the target muscle isometrically against the therapist's resistance[4-5].

Another opinion about the effects of contract-relax technique is that when the spontaneous contraction of the target muscle occurs just before muscle stretching, it generally reduces the reflex components of muscle contraction, facilitates relaxation, and increases the length of muscle, thereby increasing range of motion [6]. Some researchers, however, don't agree about this PNF stretching technique mechanism [4-10].

Magnusson et al. [11] reported that in comparison between the contract-relax technique and the static stretching, passive torque and the maximum joint angle

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were greater, without difference in sEMG activity, in the group of contraction-relax technique. Mitchell et al. [7] showed that change in perception about stretching performed after the contract-relax technique occurred; however, a mechanism through which the PNF stretching technique changes perception about muscle stretching has not been known.

The hamstring is a muscle that engages in the extension of the hip joint during the stance phase and works in controlling the speed reduction of tibia during the swing phase [12]. The hamstring injury occurs most frequently among sports injuries, and stretching exercise is a method recommended for preventing such injuries [13-14]. Although some questions have been raised about the preventive effects of stretching techniques [15], the flexibility of hamstrings is considered clinically important as a condition necessary for the rehabilitation, body shape management, and muscle force maintenance of osteoarthritis patients [15-17].

Recently, a small number of studies that found the effects of muscle contraction unrelated to hamstrings by appling the contract-relax technique (modified contract-relax technique) were reported [8-9]. Azeveo et al. [8] reported that the contract-relax technique, which conducted the isometrical contraction of the left biceps brachii, (modified contract-relax technique) and the traditional contract-relax technique significantly improved the angle of active knee extension of the right side; however, there was no significant difference between the two techniques. Recently, Moon [9] distinguished the modified contract-relax technique from the traditional contract-relax technique by subdivided the modified contract-relax technique further. He made classification into techniques performing isometric contraction to the right and left biceps brachii and the right and left finger flexors, and reported that the contract-relax technique performing contraction to the left biceps brachii (modified contract-relax technique) showed a two times higher rate of improvement in the angle of active knee extension of the right side than the traditional contract-relax technique. It is thought that the results of the two studies disagreed with each other because muscles not targeted in the modified contract-relax technique were different.

Therefore, this study aims to find out what effects various modified contract-relax techniques can have on the immediate change in the angle of active knee extension.

Method

Healthy 30 adults participated in this study. The criteria for subject selection were those whose dominant side was the right, who had no orthopedic history of low back disease, neurological disorder, and rheumatism [8], and those whose angle of active knee extension was greater than 15 degrees with the right hip joint bent at a 90-degree angle [18]. And those who experienced hamstring injury within one year from the experiment or did exercise related to hamstrings periodically were excluded [19]. All the subjects who participated in the study were educated so that they might understand the experiment procedure fully, and the research was performed after their informed consent was obtained. As for the gender of the subjects, 18 males were 18, and females were 12. The subjects were 26.27±4.08 in age, 169.60±7.17cm in height, and 63.50±11.36kg in weight. Their body mass index was 21.94±2.64kg/m^2 [Table 1].

Table 1. General characteristics of the subjects

		Participants(n=30)
Sex, n (%)	Male	20 (66.7)
	Female	10(33.3)
Age (year)a		26.27±4.08
Height (cm)a		169.60±7.17
Weight (kg)a		63.50±11.36
Body mass index(kg/m2)a		21.94±2.64

Footnotes. amean±SD.

A digital goniometer was used to measure the extension degree of the right knee joint. As for the measuring methods, after the subject assumed the supine position, the anterior superior iliac spines (ASISs) of both sides and the left femur were fastened with a belt. After then, the subject was asked to bend the hip joint at a 90-degree angle, and the movement of the femur was restricted by using strong board and bar so that it might be fixed as far as possible. In this posture, the angles of active knee extension for all the subjects were measured. The measurement of angle was conducted by an inspector who did not know the purpose of this study. The inspector measured the angles after marking the subjects' tibiae. The measurement was conducted three times, and mean values were used as statistical data. The previous study reported angle measurement at ICC = 0.96 for intra-rater reliability [19].

All the 30 subjects who participated in this study were subjected to experiments at the same space. The researcher did not disclose specific effects of each therapy technique to any of the subjects. Prior to the application of various contract-relax techniques, all the subjects' baseline active knee extension angles were measured.

After baseline measurement, the subjects underwent the traditional contract-relax technique, the modified contract-relax technique 1, and the modified contract-relax technique 2 in random order at an interval of one day. The above performance was repeated three times in total. Therefore, the time spent for the contract-relax technique was made to be 30 seconds. This performance time is similar to previous studies [8-9].

The modified contract-relax technique 1 and the modified contract-relax technique 2 were performed basically in a similar way as the basic procedure of the traditional contract-relax technique; however, the number of their target muscles was made different. As for the modified contract-relax technique 1, the subject in a supine position was instructed to spread the left shoulder joint at a 45-degree angle and bend the elbow joint at a 90-degree angle, and then was made to perform the maximal isometric contraction of the left biceps brachii for six seconds. Then, the subject was instructed to relax for four seconds. The time for the performance of the modified contract-relax technique 1 was also made to be 30 seconds [8].

As for the modified contract-relax technique 2, two inspectors performed it together so that the right knee flexor and the left biceps brachi might be contracted simultaneously in the same was as the above. The angle of active ankle extension was measured by using the three techniques, and was assessed immediately.

All the data collected were analyzed, using SPSS 22.Comparison of active knee extension angles among various contract-relax techniques were made, using the repeated measure ANOVA. Post-hoc test was conducted, using the Bonferroni method. The statistical significance level was set to 0.05.

Result and Discussion

1. Angle of active knee extension in various contract–relax technique

As a result of research, significant differences in the angle of active knee extension were found according to various contract-relax techniques (F=37.946, p<0.05) [Table 2]

Table 2.Angle of active knee extension in various contract–relax technique (N=30)

	Baseline	TCR	MCR1	MCR2	F	P
	Mean±SD	Mean±SD	Mean±SD	Mean±SD		
AKE (˚)	35.52 ± 8.08	28.82 ± 6.40	26.38 ± 6.10	24.96 ± 5.43	37.946	<0.001***

Footnotes. *:p<0.05, **:p<0.01, ***:p<0.001, AKE:Active knee extension angle, TCR: Traditional contract-relax, MCR1: Contract-relax with maximal isometric contraction of left biceps brachi, MCR2: Contract-relax with maximal isometric co-contraction of left biceps brachi and wrist flexors.

2.Post-hoc test of active knee extension angle in various contract–relax technique

In the post-hoc test, the angle of active knee extension before intervention showed significant changes, compared with the traditional contract-relax technique, the modified contract-relax technique 1, and the modified contract-relax technique 2. That is, the three techniques showed significant improvement in the angle of active knee extension, compared with before intervention (p<0.05). The traditional contract-relax technique showed no significant difference in the angle of active knee extension from the modified contract-relax technique 1 (p>0.05), but showed significant difference in it from the modified contract-relax technique 2 (p<0.05). That is, the modified contract-relax technique 2 showed significantly great improvement, compared with the traditional contract-relax technique (p>0.05). The modified contract-relax technique 1 and the modified contract-relax technique 2 showed no significant difference in the angle of active knee extension (p>0.05) [Table 3].

Table 3. Post-hoc test of active knee extension angle in various contract–relax technique (N=30)

AKE (°)		Formula	Change value	p
			Mean±SD	
Baseline	TCR	TCR –Baseline	6.70 ± 3.09	<0.001***
	MCR1	MCR1 - Baseline	9.14 ± 5.14	<0.001***
	MCR2	MCR2 - Baseline	10.56 ± 5.32	<0.001***
TCR	Baseline	Baseline –TCR	-6.70 ± 3.09	<0.001***
	MCR1	MCR1 –TCR	2.43 ± 3.83	0.179
	MCR2	MCR2 –TCR	3.86 ± 3.72	<0.001***
MCR1	Baseline	Baseline - MCR1	-9.14 ± 5.14	0.005**
	TCR	TCR –MCR1	-2.43 ± 3.83	0.179
	MCR2	MCR2 –MCR1	1.43 ± 1.23	0.134
MCR2	Baseline	Baseline - MCR2	-10.56 ± 5.32	<0.001***
	TCR	TCR –MCR2	-3.86 ± 3.72	0.005**
	MCR1	MCR1 –MCR2	-1.43 ± 1.23	0.134

Footnotes. *: $p<0.05$, **: $p<0.01$, ***: $p<0.001$, AKE: Active knee extension angle, TCR: Traditional contract-relax, MCR1: Contract-relax with maximal isometric contraction of left biceps brachi, MCR2: Contract-relax with maximal isometric co-contraction of left biceps brachi and wrist flexors.

Discussion

The specific results and discussion of this study have been suggested in three large categories.

First, in this study, the traditional contract-relax technique showed significant improvement in the angle of active knee extension, compared with that measured at baseline. This result agrees with findings of previous studies[20]. Azevedo et al. [8] also revealed that the traditional contract-relax technique showed improvement by seven degrees more than the non-treatment control group. In our study as well, the traditional contract-relax technique showed improvement greater by 6.7 degrees than the baseline value, and thus an amount of change similar to the previous study could be identified.

Second, there was no significant difference between the traditional contract-relax technique and the modified contract-relax technique 1. This is a similar result to that of Azevedo et al. [8]. Youdas et al. [21] reported that the flexibility of hamstrings decreased more among males than females. Therefore, the differences in the angle of active knee extension found in the three studies may be ascribed to the differences in their subjects' gender.

Third, the modified contract-relax technique 2 showed no significant difference in the angle of active knee extension from the technique 1, but significantly improved the angle of active knee extension compared with the traditional contract-relax technique. Therefore, given that there was no significant difference between the technique 1 and the traditional contract-relax technique, it may be deemed that the technique 2 created a little greater effects than the technique 1. Rosenstiel and Keefe [22] stated that emotions and sensory response caused by pain could be aroused by another specific event. That is, they described that the method of distracting attention by pain-coping strategies might be recommended. Jensen et al. [23] also suggested several methods of distracting attention in order to change the chronic pain patient's degree of pain perception and self-efficacy.

The duration of the stretching technique performed by this study was set to 30 seconds, drawing upon Feland et al. [24] dealing with previous PNF stretching techniques. According to systematic review in Decoster et al. [25], they report that the most efficient stretching duration of repetition and sustaining for the immediate effect of stretching is 30 seconds.

The limitations of this study are as follows: First, the small number of subjects makes generalization difficult. Second, muscles subjected to maximal isometric contraction are knee flexor and biceps trachii, and results on the two muscles only can be obtained. Third, experiments were conducted with healthy adults, and the immediate effects of stretching techniques were identified.

Conclusion

The findings of this study suggest that the flexibility of hamstrings can increase according as the degree of simultaneous muscle contraction increases.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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Effects of Repetitive Arm Cycling Exercise on Post-Stroke Upper Limb Function and Satisfaction: A Preliminary Study

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Abstract

Background/Objectives: The aim of this preliminary study was investigated the effect of repetitive arm cycling exercise on upper extremity function and satisfaction in patients with acute stroke.

Methods/Statistical analysis: Twenty patients with stroke were participated in present study. All subjects randomly assigned to two groups either the experimental group (n=10) or control group (n=10). The both group conducted the exercise during 30 min/day, three a week, for four weeks. The outcome measures were the FMA (Fugl-Meyer Assessment), MMT (Manual Muscles Test) of shoulder, elbow, wrist joint, and VASS (Visual Analog Satisfaction Scale) was evaluated exercise satisfaction of subjects after intervention.

Findings: Two groups showed a significant improvements in FMA, strength of shoulder, elbow, wrist after intervention ($p<.05$). In comparison of change score between both group, experimental group was significantly improved than control group in strength of elbow ($p<.05$). The satisfaction of experimental group was significant higher than control group ($p<.05$).

Improvements/Applications: We suggest that repetitive arm cycling exercise can have positive effects of the improvements of upper extremity strength and satisfaction than self-exercise in patients with acute stroke.

Keywords: *Cycling, Exercise, Stroke, Upper Limb, Arm*

Introduction

Post-stroke diverse symptoms cause reduction in social participation and quality of life among guardians as well as patients [1-2]. Particularly, the weakened function of upper extremity among physical dysfunctions has bad effects on self-help functions that are essential in daily life [3]. The post-stroke recovery of upper extremity is slower than lower limb, and thus the period of starting the rehabilitation of upper extremity should be recommended earlier than other bodily regions [4].

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As for effective interventions that improve upper extremity function, mirror therapy [5], task oriented training [6], biofeedback [7], motor imagery training) [8], non-paretic upper extremity constraint-induced movement therapy [9], and functional electrical stimulation [10] have been introduced. The above interventions, however, can take great effects only when a therapist trains a patient one-on-one [11].

To facilitate post-stroke recovery, patients come to perform self-exercise in addition to the existing rehabilitation therapy in various environments such as a ward [12-14]. In the area of rehabilitation, studies on improving the physical function of stroke patients by introducing robots have been reported continuously [15-18].

Recently, Park et al. [19] compared effects on patients with stroke between task-oriented training and upper extremity cycling exercise using RECK MOTOmed viva2, which were conducted for three weeks in addition to universal rehabilitation therapy. However, 30% of the subjects included in this study were patients with subacute or chronic stroke, and thus effects on patients with acute stroke could not be identified. Therefore, this pilot study aims to find out the effects of upper extremity cycling repetitive exercise on the upper extremity function and satisfaction of acute stroke patients.

Method

This study was carried out with 20 stroke patients who received occupational therapy at a general hospital. Criteria for the selection of research subjects were as follows: first, one who was diagnosed with stroke by a specialist, second, one whose stroke occurred within one month, third, one who obtained a score of 21 points or more from the Korea mini-mental status examination and can follow instructions of stage 3 or above, fourth, one whose manual muscle test of the paretic shoulder shows the result of fair or below, and fifth, one who can sit down unaided. Criteria for exclusion were as follows: first, one who has serious contracture on both upper extremities, second, one who has a visual problem such as hemispatial neglect or anopia, and third, one who has apraxia. The researcher fully explained the subjects about this study, and carried out experiments after obtaining their informed consent.

We carried out the Fugl-Meyer assessment in order to identify the upper extremity function of the subjects [20-21], and performed the manual muscle test of shoulder joint, elbow joint, and wrist joint in order to check the muscle force of their upper extremities [22]. After intervention, the visual analog satisfaction scale was used to measure satisfaction with exercise among the experimental group and the control group [23].

The two groups were given the same universal rehabilitation therapy according to a treatment schedule for four weeks. The two groups performed exercise additionally in the same way for 30 minutes a day, three times a week, for four weeks. The experimental group carried out active exercise, active assistive exercise, and passive upper extremity cycling exercise, while the control group performed self-exercise using books. As for the self-exercise performed by the control group, a program was created and applied on the basis of previous studies [24-25]. An occupational therapist in charge conducted the education of the control group about self-exercise, and encouraged and supervised them so that they might do self-exercise three times a week.

The upper extremity cycling repetitive exercise carried out in this study was performed with a portable electric upper limbs exercise machine (Q Health PUL, Cybermedic, Korea). This exercise machine was designed so that a patient in a ward or a treatment room could to passive or active exercise for the recovery of upper extremity or motor function. The portable electric upper extremity exercise machine is easily carried like its name suggests, and is divided into the handle-type one and the millstone-type one. As for the handle-type one, cycling exercise appears vertically to the ground, while as for the millstone-type one, cycling exercise appear at a level with the ground. In this electric upper extremity exercise machine, it is possible to set speed, resistance, time, and direction, and after the completion of exercise, speed, resistance, distance, exercise time, and exercise amount are displayed. The speed of pedal rotation may be adjusted between 1 rpm and 60 rpm, and ergo resistance exercise is available in 20 steps. Further, its design allows functional electrical stimulation and biofeedback training using application. This study did not apply the functional electrical stimulation and the biofeedback training, in order to identify only the effects of electric upper extremity exercise machine.

Collected data was analyzed with SPSS 22. For the two groups, general characteristics, upper extremity muscular strength and the Fugl-Meyer assessment before intervention were confirmed by the Mann-Whitney U test and the chi-squared test. The Fugl-Meyer assessment of the experimental group and the control group before and after intervention and the changes of upper extremity muscular strength were analyzed with the Wilcoxon signed-rank test. The statistical significance level of this study was set to .05.

Result and Discussion

1. General characteristics

Before intervention, there was no significant difference between the two groups in the general characteristics of subjects, the Fugl-Meyer assessment, and the muscular strength of shoulder, elbow and wrist ($p>.05$) [Table 1] [Table 2].

Table 1. General characteristics

	Experimental group (n=10)	Control group (n=10)	p
Age (year)	59.80±7.91	58.20±8.51	.739
Gender, n(%)			
Male	6(60)	4(40)	.371
Female	4(40)	6(60)	
Lesion side, n(%)			
Right	6(60)	4(40)	.371
Left	4(40)	6(60)	
Lesion location, n(%)			
Supratentorial	6(60)	7(70)	.639
Infratentorial	4(40)	3(30)	
Stroke type			
Ischemic	8(80.0)	9(90)	.531
Hemorrhagic	2(20.0)	1(10)	
Onset duration (days)	10.20±6.29	9.90±5.78	.939
K-MMSE	23.70±2.26	24.40±3.10	.789

Footnotes. Value are mean±SD or n(%). K-MMSE: Korean Mini-Mental State Examination.

Table 2. Comparisons of upper limb function of subjects before intervention

Mean±SD		Experimental group (n=10)	Control group (n=10)	p
		Mean±SD		
FMA total		25.20± 6.58	24.50± 6.70	.939
Shoulder/elbow/forearm		15.40± 4.14	15.30± 3.80	.791
Wrist		4.10±0.74	3.90±1.20	.904
Hand		4.00±2.36	3.80±1.99	.786
Coordination & speed		1.70±0.82	1.50±0.71	.518
MMT	Shoulder	2.00±0.00	2.00±0.00	1.000
	Elbow	2.20±0.42	2.50±0.53	.470
	Wrist	1.80±0.42	1.70±0.48	.615

Footnotes. FMA: Fugl-Meyer Assessment; MMT: Manual Muscle Test

2. Changes of upper limb function within groups

In the changes of upper extremity function in group, the experimental group and the control group showed significant improvement in all dependent variables (p<.05) [Table 3].

Table 3. Changes of upper limb function within groups

Before Mean±SD		Experimental group (n=10)			Control group (n=10)		
		After Mean±SD	p	Before Mean±SD	After Mean±SD	p	
FMA total		25.20±6.58	37.40±5.93	.005**	24.50±6.70	34.70±6.13	.005**
Shoulder/elbow/forearm		15.40±4.14	20.20±4.49	.005**	15.30±3.80	18.90±4.56	.005**
Wrist		4.10±0.74	7.30±1.25	.007**	3.90±1.20	6.60±1.43	.005**
Hand		4.00±2.36	6.30±1.70	.007**	3.80±1.99	5.90±1.10	.018*
Coordination & speed		1.70±0.82	3.60±0.97	.004**	1.50±0.71	3.30±1.06	.007**
MMT	Shoulder	2.00±0.00	2.90±0.74	.014*	2.00±0.00	2.30±0.48	.041*
	Elbow	2.20±0.42	3.30±0.48	.005**	2.50±0.53	2.90±0.57	.047*
	Wrist	1.80±0.42	2.40±0.52	.004**	1.70±0.48	2.20±0.42	.032*

Footnotes. *:p<0.05, **:p<0.01, FMA: Fugl-Meyer Assessment; MMT: Manual Muscle Test.

3. Comparison of change values of upper limb function between two groups

In the comparison of changes in upper extremity function between the two groups, the experimental group showed greater improvement in elbow muscular strength than the control group (p<.05). In other dependent variables, there was no significant difference between the two groups (p>.05) [Table 4].

4. Comparison of satisfaction of exercise between two groups after intervention

The post-intervention comparison of satisfaction with exercise between the two groups showed significantly higher satisfaction among the experimental group than the control group (p<.05) [Table 5].

Discussion

As a result, both experimental group and control group showed significant improvement in upper extremity functions including upper extremity muscular force at all assessments. This is deemed to be attributed to the fact that the subjects consisted of patients with acute stroke that occurred within one month. Park et al. [19], where approximately 70% of subject stroke patients were at acute stage, also showed significant improvement in both groups between before and after 3-week intervention. The

Table 4. Comparison of change values of upper limb function between two groups

Change score Mean±SD		Experimental group (n=10) Change score Mean±SD	Control group (n=10)	p
FMA total		12.20±3.01	10.20±3.68	.237
Shoulder/elbow/ forearm		4.80±1.62	3.60±1.26	.083
Wrist		3.20±1.62	2.70±1.25	.371
Hand		2.30±1.77	2.10±2.13	.669
Coordination & speed		1.90±0.74	1.80±1.23	.692
MMT	Shoulder	0.90±0.74	0.30±0.48	.054
	Elbow	1.10±0.57	0.40±0.70	.028*
	Wrist	0.60±0.52	0.50±0.71	.551

Footnotes. *: p<0.05, **: p<0.01, FMA: Fugl-Meyer Assessment; MMT: Manual Muscle Test.

Table 5. Comparison of satisfaction of exercise between two groups after intervention

	Experimental group (n=10)	Control group (n=10)	p
	Mean±SD	Mean±SD	
VASS	8.10±0.88	6.60±1.35	.013*

Footnotes. *: p<0.05, VASS: Visual Analog Satisfaction Scale.

Findings are similar to those of this study. Nakayama et al. [26] reported that 80% of post-stroke upper extremity recovery occurs within three weeks after outbreak, and 95% within three months. Given that the average outbreak period of patients who participated in this study was 10.05 days, it is judged that relatively much neurological recovery appeared.

In the comparison of changes between the two groups, the upper extremity cycling repetitive exercise showed significantly higher improvement in the muscular force of elbow joint as well as satisfaction with exercise than self-exercise. That is, it was found that the additional upper extremity cycling repetitive exercise for 4 weeks, three times a week, 30 minutes a day can lend positive assistance to the improvement in muscular force than in functional improvement, and give more user satisfaction, compared with self-exercise.

The results showed difference only in muscular strength. These findings can be explained by previous studies. Diserens et al. [17] administered RECK MOTOmed viva2 to chronic stroke patients for three weeks. As a result, they reported that their range of motion increased at shoulder joint and elbow joint. Also, Asanuma & Keller [27] reports that a specific repetitive movement can help functional recovery because it enhances the efficiency of synaptic connection. However, given that there was no difference in upper extremity function between the two groups, it is judged that it is somewhat unreasonable to expect greater functional improvement from mere 4-week training.

In this study, the upper extremity cycling repetitive exercise was applied for improvement in the movement of subjects' shoulder, elbow and in their muscular force, by operating the machine in active, active assistive, and passive mode. Compared with the therapist's performance with manual therapy, when such automated machinery is used, the occupational therapist has no physical burden, and can set resistance to exercise, speed, and repetition frequency.

Since improvement in satisfaction can facilitate motivation for rehabilitation further and habituate patients to exercise, it will be conducive to the promotion of a patient's health.

Although this pilot study confirmed the advantage of upper extremity cycling repetitive exercise, its several limitations cannot be ignored. First, the sample size was small. Second, since the subjects included in the study were only patients with acute stroke, there is no knowing whether the exercise is effective for patients with subacute or chronic stroke. Lastly, the research period was relatively short, and follow-up was not conducted to find how long the effects of exercise continued.

Conclusion

These findings suggest that in case of having to administer additional exercise, together with universal rehabilitation therapy, to patients with acute stroke, the use of upper extremity cycling repetitive exercise can have more positive results than self-exercise.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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A Study on Effect of Massage Therapy on Physical Changes

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Abstract

Background/Objectives: This meta-analysis focused on the papers on the massage in field of cosmetology published in the Korean journals from 2008 to 2017 and aims to present the effects of massage on the physical change in an objective way.

Methods/Statistical analysis: The data used in analysis were from papers on massage published in Korean journals from 2008 to 2017 and CMA (Comprehensive Meta-Analysis) version 2 was used in meta-analysis.

Findings: The results of analysis of the effect of massage therapy on the physical changes using a total of 72 papers showed that the total effect size of the massage on physiological and physical variables was -.583, a median effect size, and statistically significant. The effect sizes by age groups were -.037, a medium one in 20s; -.947, a large one in 30-40s; -.789, a medium one in 40-65 years old and -.732, a medium one without significance in 65 years old or older. The effect sizes by types of massage were -.359, -.603, -.572, and -.654 in Swedish, meridian, Ayurveda, and Thai massages, respectively and the statistical significance was observed only in meridian and Ayurveda ones. The effect sizes in fascia massage and cranial sacral therapy were -1.878 and -2.403, large ones.

Improvements/Applications: This meta-analysis aims to present academic criteria for the cosmetology education field and a program that can be used in the field by analyzing the effectiveness of the massage on physical changes.

Keywords: *Massage Therapy, Physical Change, Meta-analysis, Effectiveness, Cosmetology.*

Introduction

Massage, one of the health-promoting methods of correcting and healing the physical deformations by applying a mechanical stimulus [2], has been used as a natural habit since ancient times along with human activity [1]. The massage techniques in the various forms have been developed and advanced around the world and are used to alleviate and treat various symptoms in various fields such as medical, cosmetology, nursing, and psychology [3].

The massage methods most commonly used in Korea include Swedish massage, meridian massage, and manual lymphatic drainage (MLD) [2]. Swedish massage developed by the Swedish doctor Pehr Henrik Ling is the most widely used massage method in the world and allows blood to return smoothly to the heart by applying pressure in the opposite direction of the bones and muscles and the gentle massage from the peripheral area to central area is a principle. In The MLD developed by Dr. Emil Vodder, a pressure of 30-40 mmHg is applied to massage lymphatic vessels to promote lymphatic absorption of connective tissue [5], to reduce excess fluid in the body, and to eliminate toxins [6]. The meridian massage based on the theory of oriental medicine is known to deliver the flow of energy flowing on the body surface [2] and to maximize the flow of energy in the human body [7]. In addition, numerous massage techniques, including myofascia relaxation massage, Thai massage, Ayurveda massage, and cranial sacral therapy, has been studied continuously and their effects has been proved.

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The studies on massage have been steadily increasing in the domestic cosmetology field since 2000 and ss the cosmetology education institutions have achieved a global level, studies with academic supports have been continuously accumulated [8]. For the previous Korean studies on massage, Han (2010) reported that the Chuna Massage was effective in reducing weight, abdominal circumference, and BMI in middle-aged women and Choi (2012) observed reduction in body fat mass, body fat percentage, and weight in 29 female college students who received 12 times of meridian massage. In addition, Ryu (2017) reported that the effect of back massage using the Swedish massage on autonomic nervous system stability was demonstrated in 20 women in their 30s who received ten times of the massage and Jeong (2016) reported that cranial sacral therapy for menopausal women led to alleviation of menopausal symptoms and reduced depression. These findings confirm that massage has a positive effect on physiological, psychological and pathological aspects.

This study, in this context, intended to provide a systematic conclusion about the effect of massage. Meta-analysis has the advantage of systematically analyzing existing results, presenting objective results [7], and generalizing studies conducted in different conditions [9]. Recent meta-analysis for the studies on the effects of massage include Ryu(2018) on hand therapy and psychological variables, Park (2016) on the effect of massage on obesity management, Park (2019) on the lavender aromatherapy on pain, and Kim(2018) on the effects of skin care program on skin improvement. The results of these analyzes suggest academic criteria for the effects of massage therapy that can be used in the field as well as in educational institutions. The variables related to the massage treatment effect can be classified into physical, physiological and psychological ones [7]. The purpose of this study was to present a systematic theory of the effects of massage on the body by, following Jeong(2013), assigning the effects of obesity and constipation control to physiological variables and muscle strength, endurance, range of motion(ROM), and capacity to perform daily activities to physical ones.

Method

CAM 2.0 version (Comprehensive Meta-Analysis 2.0 version) was used for meta-analysis and the selection of studies are as follows:

The primary search was performed from January 20, 2018 to January 27, 2018. The academic research information service (http://www.riss.kr) provided by Korea Education & Research Information Service was used and the Korean Journals were searched with the "*Massage"* and "*Manual therapy*" as keywords. A total of 702 papers were searched, and 73 papers in the field of cosmetology were selected based on the title and abstract. A total of 17 papers were included in final analysis after excepting for 39 studies that is far from the purpose of this study, seven papers that were not genuine massage therapy, two papers with inappropriate statistics, and eight papers with subjects with different characteristics.

The selection criteria, in this study, were determined by referring to Lee (2017)'s study. In meta-analysis studies, it is important to present clear criteria for the selection of papers in order to prevent the selection bias that researchers may make in review [10]. The Criteria for the selection of papers used in this study are as follows. Cosmetology paper published through journal since 2008, Quantitative study based on experimental research. Study subjects were adults, no patients. Massage as independent variable and effect on the physiological and physical change as dependent variables. Only the paper that can calculate the effect size were selected.

This study analyzed the effect size by age group and massage method. Massage methods include Swedish massage, meridian massage, fascia massage, Ayurveda massage, Thai massage, and cranial sacral therapy that used in papers analyzed in this study. The age group was classified into 20s, 30-40s, 40-65s, and 65s based on life cycle theory. In addition, the dependent variables to examine the effects on the body were divided into physiological and physical ones. The categorization process of dependent variables is shown in Table 1.

Table 1: Categorization of Dependent Variables

Categorization	Dependent Variables in analyzed Papers
Physiological Variables	Obesity Control Effect – Weight, BMI, Body Fat mass, Lean Body Mass, Waist Circumference, Hip Circumference
	Constipation Control Effect – Number of Defecation
Physical Variables	Muscle Mass, Endurance, Capacity to Perform Daily Activity, ROM

The characteristics of selected papers were coded using Excel, and the program used for meta-analysis was CMA2 (Comprehensive Meta-Analysis version 2). Since there were differences in the treatment methods and samples among papers, the random effect model [10] was used in analysis. The effect sizes were interpreted following Cohen(1988)'s proposition: under .20 small; .20-.80 medium; over .80 large.

Result and Discussion

1. Total Effect size on Physical Change

The total effect size of the massage on physiological and physical variables was -.583, a median effect size, and statistically significant (Table 2).

Table 2: Total Effect Size on Physical Change

Number Studies 72					
Point estimate	**Standard error**	**Lower limit**	**Upper limit**	**Z-value**	**P-value**
-.583	.097	-.773	-.394	-6.031	.000

2.Effect Size by Age Groups

Table 3 shows the effect size of massage therapy by age groups. The effect size in 20s analyzed for 35 individual papers were -.037, a median effect size and 30-40s with -0.947, a large one. The effect size in 40-65 years old analyzed for 26 individual papers were -.789, a median effect size and over 65 years old with -0.732, a medium one with no significance. For those 65 years or older, the number of studies were just three, requiring caution in interpreting the results. The results of the analysis showed that massage therapy was effective in 30-40 and 40-65 age groups. There was no Korean study on massage comparing the effects by age. It is considered, therefore, that the large effect size in 40-64 years old reported in Ryu(2018) that analyzed the effect of cosmetology manual therapy on physical factors is consistent with that in this study [8].

Table 3: Effect Size by Age Groups

Age	Number Studies	Point estimate	Standard error	Lower limit	Upper limit	Z-value	P-value
20s	35	-.337	.125	-.583	-.091	-2.685	.007
30-40s	8	-.947	.137	-1.215	-.679	-6.917	.000
40-65 years old	26	-.789	.173	-1.129	-.450	-.450	.000
65 years or older	3	-.732	.928	-2.551	1.087	1.087	.430

3. Effect Size by Type of Massage

Table 4 shows the effect size by massage types. The effect size in Swedish massage analyzed for 15 individual papers were -.359, a median effect size without statistical significance. The effect size in meridian massage analyzed for 36 individual papers were -.603, a median effect size and that in Ayurveda massage analyzed for six individual papers was -.572, a median one and that in Thai massage was -.654, a median one without statistical significance. The effect sizes in fascia massage and cranial sacral therapy were -1.878 and -2.403, respectively, with just one paper, requiring caution in interpreting the results. Although the results of this study showed that all massage methods had positive effects on the changes in physiology and body composition, the studies applying Swedish and Thai massages were not statistically significant. This is similar to the results of Choi (2012), on the change of body composition by applying meridian and Swedish massages, that the meridian massage was most effective though there were physical changes regardless of the type of massage.

Table 4: Effect Size of each Massage Method

Type	Number Studies	Point estimate	Standard error	Lower limit	Upper limit	Z-value	P-value
Swedish	15	-.359	.213	-.776	.058	-1.689	.091
Meridian	36	-.603	.123	-.844	-.363	-4.925	.000
Facia	1	-1.878	.539	-2.934	-.823	-3.487	.000
Ayurvedic	6	-.572	.701	-1.947	.802	-.816	.414
Thai	13	-.654	.115	-.878	-.429	-5.707	.000
CST	1	-2.403	.360	-3.108	-1.697	-6.676	.000

4. Effect Size of Dependent Variables

Table 5 shows the effect size of dependent variables. The physiological variables representing effect on obesity and constipations controls had effect size of -.715, a median one. The physical variables representing muscle mass, ROM, and capacity to perform daily activity had effect size of -.084, small one without statistical significance. These results suggest that the massage may be applied usefully in obesity control programs since it is an effective therapy for obesity control such as weight, BMI, and waist circumference.

Table 5: Effect Size of Dependent Variables

Variables	Number Studies	Point estimate	Standard error	Lower limit	Upper limit	Z-value	P-value
Physiological	56	-.715	.100	-.910	-.519	-7.167	.000
Physical	16	-.084	.240	-.554	.336	-.351	.726

5. Effect Size of Types of Massage on Dependent Variables

Table 6 shows the effect of type of massage on each dependent variable. The effect sizes of Swedish massage on the physiological and physical variables were -.790 and .358, respectively, medium ones, while only former was statistically significant. The effect sizes of meridian massage on the physiological and physical variables were -.609 and -.419, respectively, medium ones, while only former was statistically significant. The effect size of fascia massage on the physiological variables was -1.878, a large ones, however, requiring caution in interpretation since the data were from only one paper. The effect size of Ayurveda Massage on the physiological and physical variables were -2.125 and .878, respectively, large ones, and statistically significant. The effect size of Thai massage on the physiological variables was -.817, a large one. These results showed that the Swedish, meridian, and Ayurveda massages had no significant effect on physical variables, which was considered to affect the significance of total effect size of these variables. However, according to a statement issued by the American Statistical Association (ASA) in 2016, "statistical significance is not an important index of effect size or results, and it has no meaning that the probability for a given hypothesis to be true is 95% [13]. If the null hypothesis is true and all other assumptions are valid, the probability of obtaining extreme results beyond observed one is 5%." In this context, it is considered that the effect of massage on the physical variables had effect size over medium one, though it was not statistically significant, therefore, had positive effects on muscle mass, ROM, and capacity to perform daily activities.

Table 6: Shows the effect of massage types on each dependent variable.

Types of Massage on Dependent Variables	Number Studies	Point estimate	Standard error	Lower limit	Upper limit	Z-value	P-value
S-physiological	9	-.790	.231	-1.243	-.338	-3.423	.001
S-physical	6	.358	.365	-.358	1.073	.980	.327
M-physiological	30	-.609	.144	-.893	-.326	-4.220	.000
M-physical	7	-.419	.250	-.909	.070	-1.679	.093
F-physiological	1	-1.878	.539	-2.934	-.823	-3.487	.000
A-physiological	4	-2.125	1.136	-4.352	.102	-1.870	.061
A-physical	1	.878	.444	.002	1.743	1.965	.049
T-physiological	13	-.817	.174	-1.158	-.476	-4.695	.000

S: Swedish
M: Meridian
F: Fascia
A: Ayurveda
T: Thai

Conclusion

The conclusions based on the results of this meta-analysis are as follows:

First, the total effect size of massage on physical change was -.583, a medium one, indicating that the massage is effective for physical change.

Second, the effect sizes by age groups were -.037, a medium one in 20s; -.947, a large one in 30-40s; -.789, a medium one in 40-65 years old; and -.732, a medium one without significance in 65 years old or older. The data for the oldest group were from only three papers, thus requiring caution in the interpretation.

Third, the effect sizes by types of massage were -.359, -.603, -.572, and -.654 in Swedish, meridian, Ayurveda, and Thai massages, respectively and the statistical significance was observed only in meridian and Ayurveda ones. The effect sizes in fascia massage and cranial sacral therapy were -1.878 and -2.403, large ones, however they were from only one paper, necessitating further studies on this type of massages.

Fourth, for the effect size of dependent variables, the physiological variables had effect size of -.715, a median one and the physical variables had effect size of -.084, a small one without statistical significance. These results suggest that the massage may be applied usefully in obesity control programs.

Fifth, For the effect of type of massage on each dependent variable, The effect sizes of Swedish massage on the physiological and physical variables were -.790 and .358, respectively, medium ones, while only former was statistically significant. The effect sizes of meridian massage on the physiological and physical variables were -.609 and -.419, respectively, medium ones, while only former was statistically significant. The effect size of fascia massage on the physiological variables was -1.878, a large ones, however, requiring caution in interpretation since the data were from only one paper. These results showed that the massage had more large effect on physiological variables compared those on physical ones in which massage had negative effect without significance. It is considered that the massage had some values enough to have positive effects on obesity control, constipation control, increase in muscle mass, and improvement in ROM.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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A Study on the Resident Radiation Protection Methodology from the Nuclear Emergency: Focused on the Disaster Vulnerable Population

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Abstract

Background: Despite the continuing improvement of the radiological emergency preparedness plan (REPP) after the Fukushima nuclear accident, increase in disaster vulnerable population (DVP) due to the transition to aging society renders the preparedness for nuclear disasters more difficult. The present study aims to examine major issues of REPP and propose an improvement direction considering DVP.

Materials and Method: This study focused on the issues of REPP established by the central and local governments and on resident-protection measures, in particular. Technical measures such as technological measures for nuclear facilities and environmental radiation monitoring are described in detail.

Results: According to the analytical results, major issues of REPP include inconsistency in the range of emergency planning zone (EPZ) between local governments, lack of cooperation, lack of budget for radiation emergency preparedness, and the effectiveness of resident evacuation plan and education and/or training on radiation emergency preparedness. Furthermore, there is a lack of consideration for DVP in the preparation, response, and recovery processes for nuclear disasters.

Conclusion: Considering the increase in DVP in the future, the REPP should be supplemented in terms of the resident evacuation plan, education and training on radiation emergency preparedness, preparation of shelters and relief supplies, and preparedness for the prolongation of a nuclear disaster.

Keywords: *radiological emergency preparedness plan, aging society, disaster vulnerable population, nuclear disaster*

Introduction

Since the Fukushima nuclear accident on March 11, 2011, the South Korean government has expanded the emergency planning zone (EPZ) and has drastically increased the potassium Iodide (KI), thyroid protective medicine, as well as Ca-DTPA, Zn- DTPA, and Prussian Blue, which are decorporation drugs to treat internal radionuclide contamination. The government has further revised local government manuals for on-site action. Nevertheless, these improvements have not relieved the anxiety of citizens. Particularly, since the 5.8 magnitude earthquake in Gyeongju in September 2016 and the 5.4 magnitude earthquake in Pohang on November 15, 2017, majority of South Koreans have been increasingly concerned that the Korean Peninsula is no longer safe due to earthquakes; accordingly, social interest in radiation emergency preparedness measures has significantly increased. For instance, this insecurity has led to demands by groups opposing operation and construction of new nuclear power plants on early decommissioning of Wolsong nuclear power plant in Gyeongju and has strengthened measures for radiation emergency preparedness [1]. One of the reasons for the continuing controversy over the Radiation Emergency Preparedness Plan (REPP) of the central and local governments is

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that the revision process does not sufficiently reflect the demands of activist groups. Under this circumstance, there is a growing need for collaborative disaster governance for government officials, expert groups, and activist groups seeking solutions [2]. The increase indisaster vulnerable population(DVP) has been making it difficult to establish and implement the entire REPP, and the legitimacy of the REPP is very likely to weaken due to insufficient DVP protection measures. The United Nations (UN) classifies societies as aging society with 7% or higher of the population aged 65 or older with respect to the total population, aged society with 14% or higher, and super-aged society with 20% or higher. According to the Ministry of the Interior and Safety (MOIS), as of late August 2017, the population aged 65 or higher was 7,257,288, exceeding 14% of the total population 51,753,820 [3]. The case of Futaba Hospital, where the elderly were unable to quickly evacuate due to radioactive contamination, appropriately illustrates the possibility of tragic disasters that could be caused by the combination of nuclear disaster and aging [6].

Research Background

Disasters such as East Japan Earthquake, Hurricane Katrinahave shown that damages tend to be severe in DVPs such as elderly people [4,5,7,8]. First, the elderly have difficulty in rapidly moving and evacuating because their physical functioning is deteriorated [9]. Second, psychosocial characteristics of the elderly further affect disaster response. In particular, it is reported that elderly people tend to refuse to evacuate even if emergency evacuation warnings are issued [9,10]. For instance, after the Fukushima nuclear accident, some elderly people were more concerned about separation from the place where they lived and the livestock they raised due to migration than about the exposure to radioactive spills. [11] Third, the economic vulnerability of the elderly restrains disaster responses. Thus, understanding the characteristics of DVPs in terms of physical, cognitive, psychological, and socioeconomic aspects is crucial in establishing appropriate protective measures. In the case of elderly people, many of them have chronic diseases [9,12]. Furthermore, it is necessary to differently treat the elderly in terms of relief shelters and relief supplies [4,5,12,13]. While the elderly tend to recover relatively quickly from psychological damages such as anxiety and depression due to disasters, they are more sensitive to economic and physical damage, thereby recovering slowly [9,10,12]. Higher the perception of risk, higher is the probability of evacuation, and evacuation is a social process involved at the family level while sharing the identification of situations with other family members and acquaintances [13,14]. In the case of nuclear disasters, it is highly likely that a significantly high portion of the population would follow official evacuation recommendations and a large number of citizens living in areas where evacuation orders have not been issued by the government due to lack of needs, would voluntarily evacuate [15,16,17]. Many people would determine evacuation routes considering family-level movements and evacuate to a place other than a government designated settlement or shelter [13,16]. For instance, after the Fukushima nuclear accident, the evacuation period for the affected residents was prolonged, resulting in various problems such as lack of daily necessities, restrictions on the use of medical services, and unemployment. [8]The residential period of elderly people at shelters became prolonged, resulting in more difficulty managing their health and chronic diseases due to further decrease in physical activity [8]. Programs wherein evacuees can participate, such as small group activities, were provided in temporary residential areas, many of the aged victims had suffered from mental damage due to the community's destruction [8,11]. Due to identification of responsibility for disasters, related litigations, delays in restoration, and social conflict, a corrosive community where the number of conflict-related relationship increases prevails rather than a therapeutic community where cooperative relationship increases [2, 18].

Materials and Method

This study focused on the issues of REPP established by the central and local governments and on resident-protection measures, in particular. Technical measures such as technological measures for nuclear facilities and environmental radiation monitoring are described in detail. It also focuses on the necessity for differentiated disaster response measures required for DVP in seeking the improvement direction for the REPP. This study aims to seek the improvement direction of REPP after dividing the differentiated measures for DVP into physical, cognitive, psychological, and socioeconomic aspects. However, the scope of review was limited to the differentiated measures for DVP that mainly focused on elderly people.

Major Issues in Resident-Protection Measures

Regarding the REPP of the Republic of Korea, since the Act on measures for the Protection of nuclear

facilities, etc. and Prevention of Nuclear disasters (APPRD) was established in 2003, some residents living near the NPP and some activist groups raised complaints about the scope of the EPZ and the effectiveness of the disaster drill. Accordingly, the Nuclear Safety and Security Commission (NSSC) established the "First National Radiation Emergency Preparedness Plan (2015 ~ 2019)" in 2015, and the NSSC has used it as a plan for the nuclear disaster field of the National Safety Management Plan [19]. First, the EPZ was subdivided into the Precautionary Action Zone (PAZ) and the Urgent Protective Action Planning Zone (UPZ), and its range was extended to an NPP radius of 20–30 km from 8–10 km [19]. Second, radiation emergency preparedness drills have been strengthened, and storage range of KI has been expanded [20]. The storage range for thyroid protective medicine was expanded from an NPP radius of 16 km to a radius of 30 km, and the EPZ of HANARO, which is one of research reactors, was newly added into the storage targets. Major changes are summarized in Table 1.

Table 1. Major modifications after expansion of EPZ

Division		**Before revision**	**After revision**	
EPZ range	**NPP**		**Division**	**Range**
		8~10km (single zone)	PAZ	3~5km
			UPZ	20~30km
	research reactor	approximately 0.8km	1~1.8km	
Local government in charge of EPZ	Municipal	7	8	
	County	8	21	
Population within EPZ		approximately 100,000	approximately 2,000,000	
Installation range for alarming facility		2km	PAZ	
Storage range for thyroid protective medicine		16km	30km	
		1~1.8km		
Subject of pre-impact evacuation		pre-impact evacuation, excluded	Residents in PAZ	
Drills	Coordinated drill	Once/five years	Annually	
	Joint drill	Once/four years for each NPP site	Once/two years for each NPP site	
	Field-intensive drill	N/A	Resident protection drill	Once/year for each local government
			Emergency medical treatment drill	Once or more/year
			Environmental exploration drill	Once or more/year

Some have argued that the different ranges of EPZs depending on the region should be unified and expanded to an NPP radius of 30 km [21,22]. As shown in Table 2, the current EPZ is controversial because the ranges depend on the local government based on the same nuclear power plant. For example, in the case of Kori NPP EPZ, Busan Metropolitan City has a radius of 20–22 km, while South Gyeongsang Province and Ulsan Metropolitan City have 20–24 km and 24–30 km, respectively [23].It is the government's view that measures that comprehensively consider weather, terrain, road network, population distribution, and the like are more effective than the uniform rage of EPZ with 30 km [20]. For this reason, some have argued that the EPZ should be extended to 30 km as in Ulsan Metropolitan City [24].

Second, the necessity for a municipal-level REPP has been raised, based on cooperation between local governments. As shown in the case of the Fukushima nuclear accident, because radioactive leaks can occur as far as 30 km depending on weather conditions, local cooperation is essential. However, to establish a more effective REPP, there are many evaluations that the independent REPP of each local government is insufficient [19,25]. For example, shelters of the Gyeongju are typically designated as a facility within 30 km,

and there are no shelters outside 40 km [26]. As shown in Table 2, budgets are still small with large regional variations [28]. Fourth, questions have been posed about the effectiveness of REPP including resident evacuation plan, and education and training on radiation emergency preparedness. Fifth, there are many criticisms that the education and training on radiation emergency preparedness are not effective. Other strongly opposes that pre-distribution is better because KI is effective in ingestion at least 15 minutes before internal exposure due to radioactive iodine [30].

Improvement Direction of REPP in Consideration of DVP

Busan Metropolitan City has been opposing to the expansion of the radioactive emergency planning area due to the difficulty of planning and implementation, the increase in costs, and the damaged image as a dangerous city [31]. Second, in consideration of DVP, the resident evacuation plan should be developed in more detail. For instance, although UljuCounty identified the current status on the elderly living alone, staff members at the social welfare department and the public health center are supposed to coordinate the sequential evacuation without any further detailed action plan [32]. Third, it is necessary to strengthen the education and training program on radiation emergency preparedness in consideration of DVP, and further increase the related staff and budget. Fourth, considering the increase in DVP, it is necessary to prepare appropriate shelters and relief supplies. Only six years after the Fukushima nuclear accident, attempts have been made to dismantle the evacuation zone, while only 10% of the evacuees are reporting their intention to return [33,34].

Conclusion

The REPP should be reviewed in multifaceted manner including evacuation scenarios, education and training on radiation emergency preparedness, shelters and relief supplies, temporary residence facilities, and improvement measures should be sought by reflecting the physical, cognitive, psychological, and socioeconomic vulnerabilities. Regarding the current issue of REPP, the central and local governments, nuclear power operators, and activist groups should collaborate to find solutions, enabling the effective REPP to overcome the actual condition of unprecedently dense population near the.

Ethical Clearance: Not required

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Conflict of Interest: Nil

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The Effect of Employee Silence on Organisational Commitment and Turnover Intention of the Public Sports Organisation in South Korea

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Abstract

Background/Objectives: This study aims at identifying the relationship among employee silence, organisational commitment and turnover intention in the public sports organisation in South Korea.

Methods/Statistical analysis: 272 employees working for the public sports organisations in Korea were sampled using stratified random sampling, and instruments for questionnaires were developed by previously validated scales. Frequency analysis, confirmatory factor analysis, correlation analysis and structural equation model were conducted via SPSS 21.0 and AMOS 20.0.

Findings: First, acquiescent and prosocial silence significantly affected organisational commitment. Second, acquiescent and prosocial silence had a positive and significant effect on turnover intention. Lastly, there was a positive and significant relationship between organisational commitment and turnover intention. This implied that acquiescent silence with the work torpor and dissatisfaction could cause low attachment toward the organisation, which finally leads to weakening organisational competitiveness and effectiveness. Moreover, prosocial silence based on cooperative and altruistic had a significant effect on organisational commitment, but ironically positively affected turnover intention as well.

Improvements/Applications: It would be essential to carry out further studies adding a variety of attitudinal and behavioural variables to see what kinds of silence can affect the individual and organisation.

Keywords: *Public sports organisation, Employee silence, Organisational commitment, Turnover intention, Employee*

Introduction

The role of public sport is being emphasized since it is spreading as avitaltool for improving the value of welfare and the quality of life of the people in South Korea. Accordingly, public sports organisations have become increasingly important along with a great attention to sport. The public sports organisations perform various roles and missions.Basically, the organisations pursue to provide the people with healthy welfare through sports services. Also, the organisations try to not only carry out friendly customerservice, but also pursue publicness and even profitability.

However, such diverse roles and goals might put a lot of pressure on employees within the organisation. In particular, the Korean public sports organisations traditionally seem to have inflexible and hierarchical culture inside the them. In particular, the organisations must follow bureaucratic organisational culture since they are directly managed or commissioned by the central or local government. Moreover, the organisations have a responsibility for satisfying the needs and expectations of diverse types of the people.

This could cause a sense of insecurity and dissatisfaction of the employees. In this situation,the employees are forced to become insensitive or cynical, which finally deteriorates the organisational

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productivity[1]. If this situation persists, the employees would refrain from pronouncing their thoughts and notion for the organisation, maintaining their organisational life in a self-defensive manner[2]. This phenomenon is called employee silence where personal opinions, such as improvements and ideas, are not expressed in the job[3]. Also, the employee silence appears in three forms, such as acquiescent, defensive and prosocial silence[4]. Acquiescent silence indicates a state of abandonment or resignation to change a certain circumstance, while defensive silence is an act of avoiding negative consequences of one's speech[5]. Prosocial silence refers to silence about information acquired to prevent damage to the organisation[5]. This prosocial silence differs from the first two forms of silence in that it is self-silencing for the organisation by altruism or cooperative motivation[6].

Silence could turn into a different kind of psychological and behavioural attitudes. More importantly, this silence is likely to be transferred to groups and even the entire organisation. In order to understand the positive and negative attitude of the employee caused by employee silence, organisational commitment and turnover intention are necessary to be examined. In particular, turnover intention could lead to the withdrawal from the organisation for a number of reasons, so that it is no longer possible to manage the organisation. Thus, turnover intention is a critical variable which needs to be addressed in terms of organisational management. Previous study has focused on acquiescent and defensive silence, and reported that continuous employee silence could cause negative organisational attitudes[7-8].

In spite of existing studies, there has been little studies on silence culture within sports organisations. Moreover, it would be important to investigate the silence culture of the public sports organisations which have an unusual characteristic based on a large number of non-regular employees. Therefore, this study aims at exploring the relationship among employee silence, organisational commitment and turnover intention of the public sports organisation in Korea. This study is expected to identify the form of employee silence in the public sports organisation, and find out ways to increase employee engagement for more efficient organisational management and productivity.

Method

A survey was conducted by stratified random sampling among probability sampling techniques to analyse data. The data were collected from 300 employees who work for the public sports organisations in Seoul, Gyeonggi Province and Chungcheongnam Province, South Korea in 2018. After removing 28 cases of incomplete or faithless questionnaires, 272 were used for the study. As table 1 indicates, 177 (65%) were male and 95 (35%)

Table 1. Demographic profile of the respondents

Variable	Categories	Frequency	%
Gender	Male	177	65.1
	Female	95	34.9
Age	Less than 40	172	63.2
	More than 40	100	36.8
Status	Regular worker	157	57.7
	Non-regular worker	115	42.3
Marital status	Single	98	36
	Married	174	64
Education	College or below	65	23.9
	University or equivalent	176	64.7
	Graduate school or equivalent	31	11.4
Job field	Management	15	5.5
	Administration	107	39.4
	Coaching	96	38.6
	Customer service	45	16.5

were female. 172 (63.2%) were less than 40 years old, and 100 (36.8%) were more than 40 years. In addition, the majority of the respondents were regular worker (58%), married (64%), administration and coaching position (78%) and university graduates (65%).

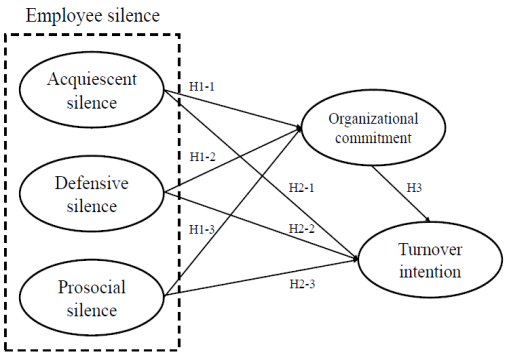


Figure 1. Conceptual model

Figure 1. Conceptual model

As shown in figure 1, a conceptual model of this study is as follow.All items were answered on a five-point Likert-type scale, and instruments to measure data were mainly adapted from previously validated scales. In addition, all items for content validity were examined by 3 experts who are middle administrators in the public sports organisation, a PhD researcher and a professor in the field of sport management. In this study, organisational silence consisted of 3 types of silence, including acquiescent silence, defensive silence and prosocial silence (e.g., 'I don't suggest my idea because I don't want to get involved in my workplace') developed by a previous study[5]. Organisational commitment included 5 items (e.g., 'I want to keep working in my workplace') revised from the relevant study[5]. Turnover intention was comprised of 4 items (e.g., 'I often want to leave my workplace') adopted from an existing study[9].

Table 2. Results of the CFA

Variable	Construct		Estimates	S.E.	t-value	p	CR	AVE
Employee silence	Acquiescent silence	I don't suggest my idea because I don't want to get involved in the workplace	.740				.836	.659
		I don't suggest a good idea to leave the workplace	.713	.080	10.519	.001		
		I don't suggest a way to improve my role and operation system because I don't want to get involved in the workplace	.817	.088	11.442	.001		
	Defensive silence	I deliberately omit information in consideration of my embarrassing situation	.698				.815	.661
		I don't suggest a way to improve my role and operation system in consideration of my embarrassing situation	.881	.117	9.957	.001		
		I am afraid of negative feedback and don't offer a solution to the problem	.687	.126	10.763	.001		
	Prosocial silence	I protect the information which my team has acquired for the benefit of the workplace	.597				.831	.672
		I don't disclose information which might harm my workplace	.915	.122	10.702	.001		
		I properly protect my team's confidential information for the workplace	.905	.118	10.713	.001		
Organisational commitment	I want to keep working in my workplace		.687				.833	.666
	I feel an attachment to my workplace		.932	.103	13.664	.001		
	My workplace is meaningful for me		.922	.104	13.569	.001		
	I feel a sense of belonging to my workplace		.790	.100	11.911	.001		
	I am committed to my work		.530	.100	8.235	.001		
Turnover intention	I often want to leave my workplace		.769				.853	.647
	I am willing to change my job within the same field		.900	.052	14.551	.001		
	I will quit if it gets worse than before		.768	.048	19.3997	.001		
	I will leave immediately if circumstances are possible		.898	.051	14.556	.001		

$\chi 2$ =313.058 (df =125p<001), SRMR=.066, RMSEA=.075, TLI=.918, CFI=.933

*** All t-value were significantly loaded at p<.001

For the study, frequency analysis, Confirmatory Factor Analysis (CFA), correlation analysis and Structural

Equation Model (SEM) were conducted by using SPSS 21.0 and AMOS 20.0.As shown in table 2, the overall validity and fit did not seem acceptable,$\chi^2(df)$ = 313.058 (df=125, p<.001). Nevertheless, CFI = .933, TLI = .918, RMSEA = .075 and SRMR = .066 exceeded fit index suggested by a previous study[10], and therefore overall validity and fit could be regarded as a good model for the study. Moreover, t-value ranged from 8.235 to 19.397, which seems to be acceptable for test. AVE values for convergent validity ranged from .647 to .672, which exceeds the acceptable standard[11]. Meanwhile, the values for construct reliability (CR) ranged from .815 to .853, which exceeds recommended.60 level[12].

Table 3. Correlation analysis

Variable	(1)	(2)	(3)	(4)	(5)
Acquiescent silence(1)	659a)				
Defensive silence(2)	.486**	661a)			
Prosocial silence(3)	-.143*	-.068**	672a)		
Organisational commitment(4)	-.413**	-.235**	.435**	666a)	
Turnover intention(5)	.360**	.316*	.012	-.361**	647a)

*p < .05, **p < .01 a) = AVE

Meanwhile, table 3 indicates the factor correlations among the variables. There were both positive and negative correlations between the variables, r = -.413 to .486. This represents reasonable figures, which means that discriminant validity in the study was verified[13].

Result and Discussion

1. Results

In order to investigate the relationship among employee silence, organisational commitment and turnover intention, path coefficient analysis was conducted. As shown in table 4, acquiescent and prosocial silence affected organisational commitment, respectively, β=-.331, p < .001 and β =.310, p < .001. Acquiescent and prosocial silence influenced turnover intention, respectively, β=.239, p < .05 and β =.279, p < .01. However, defensive silence did not have a significant effect on turnover intention as well as organisational commitment, respectively, β= -.036, p > .05 and β =.173, p > .05. Lastly, organisational commitment significantly affected turnover intention, β=-.560, p < .001.

2. Discussion

The aim of this study is to examine the relationship among employee silence, organisational commitment and turnover intention in the public sports organisation in Korea.

First, acquiescent silence had a negative and significant effect on organisational commitment, butpositively affected turnover intention. In other words, acquiescent silence has an adverse impact on the organisation. This finding supports previous studies[14-15]. They argued that acquiescent silence reduces organisational commitment since employees are unwilling to put in an effort into their job for a feeling of disengagement and low self-efficacy. This negatively leads to their work torpor and dissatisfaction, which finally leaves the workplace[16-17]. Thus, acquiescent silence based on the resignation could cause a lack of attachment toward the organisation, leading to weakening organisational competitiveness and effectiveness. In Korea, it is true that there exists a silent atmosphere in the organisation unless it is a sensitive issue or problem, and further the gap caused by employees' position and status has created the silence culture. For this reason, it is assumed that acquiescent silence tends to be more prominent compared to other types of silence in Korea.

Second, prosocial silence positively affected organisational commitment and turnover intention. It can be inferred that prosocial silence contributes to organisational commitment because of cooperative and altruistic attitudes and mind[4]. Also, it is assumed that prosocial silence is mainly based on a concern for others through which employees finally pursue to help others and share the duties in the organisation. Although silence is motived by the discretionary behavior, however, it is likely to cause the decline of the organisational effectiveness in the end. Thus, the employees who possess prosocial silence seem to have an ambivalent attitude which not only concentrates on their work, but also change their jobs. In other words, it might be a kind of a false action that they show sacrifice, attachment and even dedication for the organisation, and also consider turnover for themselves at the same time. In Korea, non-regular employees are under unstable employment, and even there is invisible discrimination within the organisation. In particular, the public sports organisations in Korea have their own vertical and hierarchical culture due to the employees' major and male-oriented organisational culture. Therefore, such a dual attitude of the employees seems inevitable to sustain stable work within the organisation for a while.

Table 4. Results of the hypothesis testing

H	Path	β	S.E	T-value	p	Testing
H1-1	Acquiescent silence → Organisational commitment	-.331	.079	-4.208***	.000	Accept
H1-2	Defensive silence → Organisational commitment	-.036	.081	-.437	.662	Reject
H1-3	Prosocial silence → Organisational commitment	.310	.064	4.839***	.000	Accept
H2-1	Acquiescent silence → Turnover intention	.239	.112	2.137*	.033	Accept
H2-2	Defensive silence → Turnover intention	.173	.115	1.508	.132	Reject
H2-3	Prosocial silence → Turnover intention	.279	.088	3.176**	.001	Accept
H3	Organisational commitment → Turnover intention	-.560	.110	-5.101***	.000	Accept

***p<.001, **p<.01, *p<.05

Lastly, organisational commitment had a negative and significant effect on turnover intention. This result has also been demonstrated in a number of previous studies. Thus, it is likely that employees with a high level of psychological and emotional attachment concentrate on achieving organisational goals and interests, and stay with the organisation.

Conclusion

The study investigated the relationship between employee silence, organisational commitment and turnover intention in the public sports organisations in Korea. In terms of a practical aspect, the findings implied that silence can be a critical factor, which directly influences organisational effectiveness. Actually, the employee silence is a common choice of the employees, due to concern for others and manager's fear of negative response within the organisation. This in turn lead to the inefficiencies in many aspects. Any organisations cannot achieve creative outcomes through cooperation if they block the exchange of ideas among the employees. In order to deal with the issue, the organisations should improve their culture and belief by motivating and activating communication with each other for the sake of productive working relationship and further customer-oriented operation.

In terms of a theoretical aspect, further study would be necessary to identify various factors that can cause a variety of silence to employees. In addition, apart from other types of silence, it would be important to look at various characteristics of the prosocial silence since it can show both positive and negative outcomes within the organisation. Given that this study only aimed for the types of silence of the public sports organisations, moreover, further study should be conducted to contribute to creating the improved organisational environment and culture through comparative studies with the average companies which possess a more flexible organisational culture. Lastly, it would be essential to carry out further studies which adds a variety of attitudinal and

behavioural variables in order to see how various types of silence affect the individual and organisational levels.

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Source of Funding: Self

Conflict of Interest: Nil

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A Study on Development of Nursing Curriculum Customized to the Clinical Field

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Abstract

Background/Objectives: The purpose of this study is to carry out the basic survey to develop the field-oriented curriculum around the basic nursing practice subjects of nursing department.

Methods/Statistical analysis: This research is a descriptive survey research to devise a way to improve site-customized curriculum by analyzing performance of core basic nursing techniques among students, professors, and clinical workers in the basic nursing practice course.

Findings: Frequency of performance correlates positively with confidence and accuracy, and confidence correlates positively with accuracy. Importance has a significant correlation with confidence and accuracy, and confidence has a significant positive correlation with accuracy. To achieve educational goals, it is necessary to select curriculum depending on elements constituting the curriculum.

Improvements/Applications: Through the improvement of field-tailored nursing education, it's expected that the quality of nursing will be improved through the promotion of practical skills and low skills for nursing college students.

Keywords:*Curriculum, Customized, Nursing student, University, Clinical Field*

Introduction

Curriculum, Latin for "currerere," means "run" or "run" and refers to a series of daily places or movements. This means 'run' in teaching, or 'study' in teaching, or a curriculum that trains students for a certain period of time. Education process development is the activity of establishing a comprehensive plan for teaching methods, educational evaluation, and educational operation to effectively communicate education contents as a whole plan of systematically organized education in order to achieve educational goals[1]. That is, to achieve the educational goals met the demand of society and the learner, it should be selected and organized according to the educational perspective and should be selected according to the components of educational process. Therefore, the development of curriculum can considered as wide range of concept encompassing from the theoretical background to process of plan, design, assessment and the operation of curriculum. In addition, the curriculum is the concept reflected with the education policy according to the educational theory in that ages, country, society and demand of the ages. It includes the objective, contents, method and evaluation procedure, etc. of the subjects and is the plan having correlation[2].

The ultimate goal of the nursing is to cultivate the profession nurse having the skills demanded by the society. For the characteristics of practical study as nursing, the nursing education has characteristics of vocational education and has a basic purpose of cultivating the manpower having specific skills. In addition, nursing practice is the process to improve the problem solving ability by integrating the theory and practice and applying to actual patient and the experience of integration and coordination that can access to the patient holistically and generally should be given to the student. Therefore, in the clinical training, to perceive the patients in general and to solve the nursing problems,

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the individual knowledge acquired from various subjects of theory should be able to be integrated and applied[3].

The practice education of basic nursing education is the subject that the nursing skills, the core and basic practical skills that the nurses should acquire is learned[4]. More than 70.0% of the nursing students practice the clinical training around the non-invasive basic nursing such as observation of vital sign, etc[5]. Such clinical training causes the lack of clinical skill in nursing student and leads to the degradation of clinical skill in new nurse after graduation[6]. When the nursing students acquire the basic nursing skill through the basic practice room training and engage in the clinical training based on the self-confidence, the effect of clinical training is increased and the positive effect will be made in the nursing of patient after graduation. In that sense, in the practice education of basic nursing, diverse and systematic practice education to enhance the learning satisfaction of the students should be made[7].

Nursing educator should make effort for the nursing students to enhance the basic nursing skills and to acquire the positive value on the nursing in the aspects that the basic nursing practice has important effect on the life and the attitude of the nursing students as a professional nurse and the basic nursing skills are the foundation of all the nursing actions[8]. Because of the characteristics of the basic nursing practice subjects that the nursing students experience in the initiation stage of nursing, since the nursing student experience the basic nursing practice before forming the sufficient knowledge and the solid belief in the nursing, they often have negative experience such as tension, difficulties, fear, anxiety, burden, apprehension, etc[9]. Therefore, the nursing education needs to establish the goal to cultivate the core skills to be cultivated as a results of education as the center of education and to improve the method to achieve such goal, particularly, the improvement focusing on the practice education. To do that, the goal and the level to be achieved in the classroom and the goal and the level to be achieved in the nursing practice education should be suggested establishing the core basic nursing skills as the goal of basic nursing education and the nursing practice education should be organized in order to achieve such goals effectively[3].

Nursing practice education is the process to improve the problem solving ability by integrating the theory and the practice and applying them to the actual patients and should grant the experience of integration and coordination that the students can access to the patient holistically and generally[3]. The field instructors, nurses, head nurses should guide and support the students through the establishment of goals cleared stated and understood so that the students can have learning experience required to achieve that[3].

This research tried to find ways to help nursing school students adjust themselves to clinical sites, and perform nursing jobs well. Nursing practice education integrates theory and practices, and applies them in patients in various conditions, and helps students to improve problem-solving capabilities and approach patients as total and whole beings. Nursing science as practical science should escape from knowledge-delivering education in classroom, and try to educate students as professional nurses equipped with capacities required in clinical sites. Accordingly, this research was performed with the site leader of Basic Nursing practice course to reflect demands of students and professor and the opinions of the site.

Method

This study is the descriptive survey. It study to draw the improvement measures for field-oriented curriculum by performing the survey related to the core basic nursing skills of the student, professors and field instructors and analyzing the degree of clinical practice skill.

To reflect the demand and the needs of the field, the survey and the analysis of the demands were performed through the 203 junior and senior students, 13 professors of this university and 84 field instructors.

The purpose of this study is to carry out the basic survey to develop the field-oriented curriculum around the basic nursing practice subjects of nursing department. The specific objectives for that are as follows. First, to analyze the core basic nursing skills of the basic nursing practice subject for student, professors and filed instructor. Second, to identify the degree of clinical practice skills of the student that the student, professors and the field instructors consider.

This study is theresearch tool. First, the survey on the core basic nursing skills of the students is to identify the degree for the performance frequency, self-confidence and accuracy of the core basic nursing skills that the junior and senior students feel. The subjects can answer the questions from 0 to 10 points and the higher the score the higher the performance

frequency, self-confidence and accuracy of the student. Second, the survey on the core basic nursing skills of the professors is to identify the degree of the student's importance, self-confidence and accuracy of the core basic nursing skills that the professor feels. The subjects can answer the questions from 0 to 10 points and the higher the score the higher the performance frequency, self-confidence and accuracy of the student felt by professor.Third, the survey on the core basic nursing skills of the field instructors is to identify the degree of the student's importance and accuracy of the core basic nursing skills that the field instructors feels. The subjects can answer the questions from 0 to 10 points and the higher the score the higher the performance frequency, self-confidence and accuracy of the student. Forth, the clinical practice ability measurement tool is the nursing practice ability measurement tool developed by Soon, et al.[13] to identify the basic nursing practice ability of general nursing regardless their area based on the core nursing skill-oriented nursing practice educational goal suggested by Kim[3]. It is composed of 5 questions for information gathering, 24 questions for basic nursing performance, 4 questions for communication skill, 6 questions for critical thinking, 9 questions for education and leadership, 11 question for management skill and 5 questions for professional job development attitude and practice skill covering 7 core skill categories and 64 nursing practices. The performance skill for each question was measured with 4-point scale granting 1 point for "Not at all" and 4 points to "I can do it very well" and the higher the score the higher the clinical practice ability. The Cronbach α, the reliability of the entire tools in the research conducted with RN-BSN students by Soon et. al.[10] was .82.

Data were collected from October 01, 2018 to October 15, 2018 using structured questionnaires. To collect the data, the consent of junior and senior students and professors was obtained before starting the survey. In case of field instructors, the permission of the manager was obtained after explaining the purpose and intent of the survey, and the questionnaire was distributed and the subjects were asked to answer. The subjects were explained that their answers were kept as secret, they could stop participating anytime during the survey and they would not have any disadvantage from that. They were explained that the data would be disposed after certain period after terminating the research and would not be used other than the research. 10 minutes were taken to answer the questionnaire.

The collected data were processed statistically using SPSS/WIN 20.0 program according the purpose of this study.For the general characteristics, the data were analyzed with descriptive statistics using real number, percentage, average and standard deviation. The correlation among the variables of the subjects was analyzed using Pearson's correlation coefficients.

Result and Discussion

1. General characteristics of Students

General characteristics of the students are as shown in [Table 1].

The age of junior students was 112 students (100%) and 22.25 years old and the age of the senior students was 91 students (100%) and 23.23 years old.

In the junior students, 73 students (65.2%) had the highest degree of satisfaction with their major in nursing, while 81 students (72.3%) were 'Normal' in clinical practice satisfaction. For the needs of core basic nursing skills in the nursing department, 109 students (97.3%) said "necessary" was needed. While 63 students (56.3%) said "reflects well" for the degree of field demand reflection.

In the senior students, 61 students (67.0%) had the highest degree of satisfaction with their major in nursing, while 60 students (65.9%) were 'Normal' in clinical practice satisfaction. For the needs of core basic nursing skills in the nursing department, 89 students (97.8%) said "necessary" was needed. While 74 students (81.3%) said "reflects well" for the degree of field demand reflection.

Table 1: General characteristics of Students (N=203)

Characteristics	Categories	Junior students (n=112)	Senior students (n=91)
		n(%)	n(%)
Age(years)		112(100)	91(100)
	M±SD	22.25±1.15	23.23±1.96
Gender	Male	9(8)	4(4.4)
	Female	103(92)	87(95.6)
Major satisfaction	Unsatisfaction	16(14.3)	10(11.0)
	Normal	73(65.2)	61(67.0)
	Satisfaction	23(20.5)	20(22.0)
Clinical practice satisfaction	Unsatisfaction	8(7.1)	8(8.8)
	Normal	81(72.3)	60(65.9)
	Satisfaction	23(20.5)	23(25.3)
Needs of core basic nursing skills	Necessary	109(97.3)	89(97.8)
	Not Necessary	3(2.7)	2(2.2)
Degree of field demand reflection	Reflect Well	63(56.3)	74(81.3)
	Not Reflect Well	13(11.6)	3(3.3)
	Don't Know	36(32.1)	14(15.4)

2. General characteristics of professors and Field Instructors

The general characteristics of the professors and the field instructors are as shown in [Table 2].

The professor was 47.33 years old and the field Instructors was 42.4 years old.

In the gender of the professors, the female occupied the most, and the clinical career was 16 years and the career as professors was 5 years. For the needs of core basic nursing skills in the nursing department, 8 professors (61.6 percent) said "necessary" was needed. While 10 professors (76.9 percent) said "reflects well" for the degree of field demand reflection.

In the gender of the field instructors, the female (97.6%) was more than the male (2.4%), and the clinical career was 16 years. For the needs of core basic nursing skills in the nursing department, 84 field instructors (100.0 percent) said "necessary" was needed. While 48 field instructors (57.1 percent) said "reflects well" for the degree of field demand reflection.

Table 2: General characteristics of professors and field instructors (N=97)

Characteristics	Categories	Professors (n=13)	Field Instructors (n=84)
		n(%)	n(%)
Age(years)		13(100)	84(100)
	M±SD	47.33±5.70	42.4±8.23
Gender	Male	0(0)	2(2.4)
	Female	13(100)	82(97.6)

Cont ... **Table 2: General characteristics of professors and field instructors (N=97)**

Work experience(year)	Clinical	16	16
	Professor	5	-
Needs of core basic nursing skills in the nursing department,	Necessary	5(38.4)	84(100)
	Not Necessary	8(61.6)	0(0)
Degree of field demand reflection	Reflect Well	10(76.9)	48(57.1)
	Not Reflect Well	2(15.4)	8(9.5)
	Don't Know	1(7.7)	28(33.3)

3. Correlation among Variables of Core Basic Nursing Skills of Students

The correlation among the variables of the core basic nursing skill of the student are as shown in **[Table 3].**

The performance frequency has positive correlation with the self-confidence (r=.68, p<.001). The accuracy (r=.72, p<.001), and the self-confidence has positive correlation with the accuracy (r=.78, p<.001).

Table 3: Correlation among Variables of Core Basic Nursing Skills of Students (N=203)

Variables	P	S	A
	r(p)	r(p)	r(p)
P	1	.68(<.001)	.72(<.001)
S		1	.78(<.001)
A			1

P: Performance frequency, S:Self-confidence

A:Accuracy

4. Correlation among Variables of Core Basic Nursing Skills of professors and Field Instructors

The importance has significant correlation with the self-confidence (r=-.02, p=.914) and accuracy (r=-.05, p=.831), and the self-confidence has significant positive correlation with the accuracy (r=.82, p<.001)**[Table 4].**.

Table 4: Correlation among Variables of Core Basic Nursing Skills of professors and Field Instructors (N=97)

Variables	I	S	A
	r(p)	r(p)	r(p)
I	1	-.02(.914)	-.05(.831)
S		1	.82(<.001)
A			1

I:Importance, S:Self-confidence, A: Accuracy

Conclusion

To achieve the purpose of education that meets social needs and learners' needs, it is suggested that the continuous site can be explored and analyzed in the environment. Through the improvement of field-tailored nursing education, it is expected that the quality of nursing will be improved through the promotion of practical skills and low skills for nursing college students. In addition, we hope that through field-centered education, we will improve the satisfaction of students and industries and become a reliable university that trains people with skills to meet the needs of the field.

Nursing science education is constituted of closely related training and curriculum through clinical site training. But, depending on the situations and characteristics of hospitals, training environment and nursing works can vary. By doing this research with the leader of the clinical site where nursing school students of C College do training and are employed, it was possible to analyze merits and demerits of the students. This research expects that by revising basic curriculum by adopting opinions of the site leader, this research helps students improve their training adaptability, and efficiently perform nursing works when they are employed.

It is expected that the site-customized nursing science education will generate nurses with site adaptability, and helps nurses improve their nursing quality through promotion of practical and adaptive capabilities. It is also expected that the site-customized nursing science education will improve satisfaction with clinical site of students, leading to the development of the nursing school as reliable nursing college.

This research expects that it can contribute to production of nurses equipped with site adaptability through improvement of nursing curriculum and contribute to improvement of nursing quality when

nursing students get jobs after graduation through improvement of practical capacities and adaptive capacities.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Changes in Balance and Proprioceptive Sensation According to Trampoline Exercise Posture and Resting Time

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Abstract

Background/Objectives: Trampolines are rehabilitative methods that can enhance one's ability to stimulate and balance inherent capacities, which have a significant effect on sensory organs, nervous system, and physical strength.

Methods/Statistical analysis:In this study, 45 healthy subjects were recruited. Subjects were randomly assigned to walking, tiptoeing, or jumping groups. Each group of trampoline interventions was performed for 10 minutes. In all three groups, balance and proprioceptive sensory tests were performed before exercise, immediately after exercise, and 5 and 10 minutes after exercise.

Findings: There was a significant difference in SI data between pre- and post-intervention ($p<0.05$). According to the SI results in the NO condition, the stability was reduced immediately after exercise and restored after 5 minutes in all groups ($p<0.05$). According to SI results in NC condition, there was a significant difference between immediately after exercise and after 5 minutes in all groups ($p<0.05$).

Improvements/Applications:Trampolines are effective for posture stability. A rest time of 5 minutes is required to restore posture stability after trampoline exercise.

Keywords:*Trampoline, Weight distribution index, Proprioception, Joint position sense, Stability index*

Introduction

Trampoline is a training device for the balance that makes the neuromuscular system more tightly integrated[1]. Movements on the trampoline improve physical factors such as trunk stability, muscle coordination response, and range of motion[2]. In addition, it is a rehabilitation method that stimulates proprioception and maintains balance ability[3]. The trampoline has a remarkable influence on sensory organs, nervous system, and physical strength[4]. It has an unstable support base that not only helps to recover the proprioception and joint position sense (JPS), but also improves physical functions such as balance, reaction velocity, space perception, and body perception. It is also effective for motivation because it can induce the interest of the participant in the exercise. The trampoline exercise can rebound due to the spring and perform various actions through the rebound. This exercise improves instantaneous judgment and flexibility by performing the movements that are not easy on the ground and helps to improve balance and sense of direction. Jumping with trampoline improves muscle strength, speed of joint movement, and coordination[5].

Balance is defined as the ability to maintain the center of gravity within the base of support (BOS)[6]. The static balance can be defined as a function of maintaining the support base with control of the posture or minimal movement. Factors such as perceptual adjustment, vestibular systems, sense of sight, and information intensity obtained from sensory responses influence balance ability[7]. In the static stance, humans usually make upright stance close to the vertical array. If sway is expected to occur, typically, the balance is controlled by placing the center of mass (COM) on the body at the edge of the BOS[8]. The vestibular organ assists in performing the coordination among eye, head, and body in space,

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controlling posture. The vestibular interacts with visual sense and somatosensory[9]. Vestibular rehabilitation focuses on improving postural stability by maximizing and promoting the remaining vestibular function, as well as using visual and somatosensory cues [10]. Visual signals compose an extra vestibular signal that replaces the lack of vestibular information in daily life[11]. When additional visual feedback is achieved by controlling consciously the center of the pressure displacement underneath the feet during standing, the contribution of the visual control to the balance is greatly increased[12]. It has been found that the subject cannot reduce the amplitude of the sway when using visual feedback[12]. The proprioception is able to recognize the position of body and joints and to perform the exercise by collecting and integrating various data coming from the peripheral parts of the human body. It also reduces errors that occur during a movement through feedback and reflex mechanism[13]. Recent studies suggest that trampoline exercise consists of a multi-component approach that affects many physical factors such as balance, flexibility, strength, body stability, muscle coordination response, the amplitude of joint movement, and spatial integration[3]. To perform such movements as hopping or jumping on a trampoline, more experience should be provided so that a patient doesn't fall while moving on the stable surface in the home[14]. Furthermore, trampoline exercise improves mobility and activities in daily lives[15].

These previous studies suggest that the various movements on the trampoline provide more experiences and relatively more difficult movements produce various results of the movements. However, these previous studies did not investigate the various exercise methods of trampoline and changes with rest time. Therefore, this study was conducted to investigate the changes of balance ability and proprioception according to various trampoline exercise and resting time.

Method

Forty-five healthy adults participated in this study. In this study, a randomly turn allocation method was applied to each subject. The students were randomly divided into the walking group (WG, n = 15), calf raise group (CRG, n = 15) and jumping group (JG, n = 15) using a random number generator [Table 1]. This study was approved by Sunmoon University Institutional Review Board (SM-201805-032-2).

Table 1. General characteristic of the subjects

Variables	WG	CRG	JG
Age, year	21.27 ± 1.28	21.60 ± 1.68	22.20 ± 1.74
Height, cm	161.79 ± 8.69	170.07 ±8.82	169.87 ± 7.50
Weight, kg	56.05 ± 9.54	65.56 ± 11.85	64.85 ± 11.09
Sex	Male = 3, Female = 12	Male = 9, Female = 6	Male = 9, Female = 6

Mean ± standard deviation

WG: Walking Group, CRG: Calf Raise Group, JG: Jumping Group

Balance ability and proprioception were measured pre-test and immediately after exercise, 5 minutes after exercise, 10 minutes, and 15 minutes after exercise. TETRAX (Sunlight Inc., Ramat Gan, ISRAEL) was used to measure balance ability and the test was performed under normal base-open eyes (NO) and normal base-close eyes (NC) conditions. Each measurement was performed for 32 seconds [Figure 1]. The stability index (SI) measures the sway of the posture and shows the overall degree of stability. The weight distribution index (WDI) means the degree of weight exerted on the four-foot plates.

The proprioception of the subject was measured using JPS [Figure 2]. Subjects were asked to sit on an isokinetic dynamometer (CSMI, CSMI solutions, USA, 2010) chair. JPS used passive positioning and active repositioning for the target angle. The target angle was set at 45°. The subject closed eyes and wore headphones to reduce the effects of other senses. The subject was asked to remember the target angle for 5 seconds. The target angle was actively reproduced by the subjects. Absolute error values between the target angle and repositioning angle were obtained for data analysis. Three tests were performed and mean values were used.

The procedure consists of three stages: (1) pre-exercise test, (2) exercise performance, and (3) post-exercise test (5 minutes, 10 minutes, and 15 minutes). As a first, a pre-exercise balance test and a proprioception test are performed on all subjects. Second, participants perform the exercise for 10 minutes with their assigned postures. The CRG repeatedly performs the exercise in which subjects take a rest for 2 seconds after

maintaining the posture (lift the heel) for 6 seconds. The JG repeatedly performs the exercise in which subjects take a rest after jumping according to BPM 100 speed. The elapse of break time is divided into three steps: 5 minutes, 10 minutes, and 15 minutes. The post-exercise test was performed in the same way as the pre-exercise test.



Figure 1. Balance test



Figure 2. Proprioception (joint position sense) test

All statistical analyses were performed using the SPSS 20.0 version program. Descriptive statistics were used to assess general characteristics. Mauchly's test of sphericity was used for the homogeneity test of the measurement variables among groups. Repeated measure ANOVA was used to test the effects depending on each exercise type on each group. If it was recognized that there was a significant difference, lysergic acid diethylamide (LSD) post-test was performed. The level of all statistical significance (□) was set at 0.05.

Result

There was a significant difference in SI data between pre- and post-intervention ($p<0.05$) [Table 2]. There was no significant difference between the mean SI, WDI, and proprioception between the groups ($p> 0.05$). According to the SI results in the NO condition, the stability was reduced immediately after exercise and restored after 5 minutes in all groups ($p<0.05$) [Figure 3]. According to SI results in NC condition, there was a significant difference between immediately after exercise and after 5 minutes in all groups ($p<0.05$) [Figure 4].

Table 2. Change of stability index according to condition and elapsed time in three groups

		Before exercise	Immediately after exercise	After 5 minutes	After 10 minutes	After 15 minutes
NO	WG	13.40	*14.67	*14.13	13.81	12.87
	CRG	15.22	*18.31	*15.18	15.41	16.02
	JG	14.46	*17.77	*15.10	15.69	14.61
NC	WG	16.50	17.24	*15.44	15.26	15.44
	CRG	18.30	21.09	*16.99	16.42	16.27
	JG	21.21	21.49	*18.01	17.62	16.03

NO: Normal base, Open eyes, NC: Normal base, Close eyes, WG: Walking Group, CRG: Calf Raise Group, JG: Jumping Group

* Indicates that there is a significant difference from the previous test result.

Discussion

This study was conducted to investigate the effects of the trampoline exercise intervention on proprioception, SI, and WDI according to the time-lapse. According to the results of this study, trampoline exercises did not affect proprioception and WDI. There was a significant difference between the pre-test and immediately after the intervention, and immediately after the intervention and 5 minutes after the intervention in NO condition. With NC condition, there was a significant difference only between the time of exercise and 5 minutes after exercise.

According to our results, trampolines affect SI. Previous studies have also reported that trampoline exercise is effective in maintaining and enhancing posture stability[1,3]. In the elderly, it was argued that the mini-trampoline training intervention had the effect of improving balance ability. Therefore, exercise with trampolines with unstable surfaces is considered to be an appropriate exercise to increase stability[2].

Although vision is not an essential element in standing posture control, it is still reported to contribute positively to posture control[16]. There was a claim that the vestibular system was not important in postural recovery when the surface transversed horizontally[17]. However, it has been suggested that the damaged vestibular system and vision can cause a reaction to false visual information because it has many effects on postural control[14]. When the visual sensory input is removed, the balance ability declines[18]. Instability of patients with neurological problems is due to inappropriate interaction among the three sensory inputs that provide direction to the posture control system. Patients who inappropriately rely on visual information react to unnecessary balance with recognized balance loss and their postures become unstable[19]. In our study, postural stability in eye open condition was reduced immediately after exercise. However, there was no change in the stability with the eyes-closed condition. Thus, this may be due to trampoline exercise confusing the visual system.

Trampoline exercise also influences muscle strengthening[20]. During the measurement of the joint position sense, the amount of relative error may not be significant, since the subject may try to produce force rather than accuracy. Our study also showed that the joint position sense did not improve within 15 minutes.

A weak correlation between weight-bearing and stability has been reported in stroke patients[21]. Their study also measured balance with two index – stability and weight distribution index – and although there was a significant difference in stability, the difference in weight distribution index was not significant.

Immediately after the trampoline movement, the balance ability measured in the eyes open condition is presumed to be due to the confusing of the visual system resulting in increased SI. On the other hand, after 5 minutes, SI decreased again. In the eyes closed condition balance test immediately after exercise, it is presumed that the change of SI is less due to blocking the visual information. It is also assumed that after 5 minutes the confusion is blocked and the SI is reduced. This means that at least 5 minutes of rest after exercise is required to reduce SI. Further studies are necessary to explain why there is a significant difference in SI between immediately after exercise and 5 minutes after exercise.

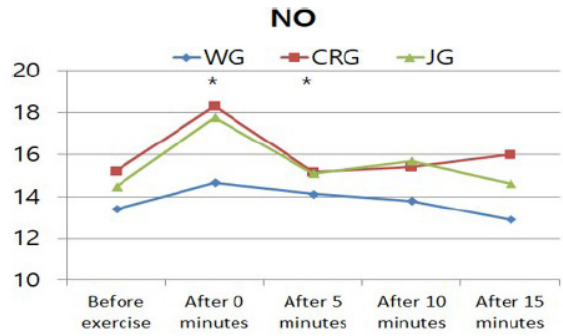


Figure 3. Change of stability index according to elapsed time in three groups (normal base and open eyes)

(* Indicates that there is a significant difference from the previous test result.)

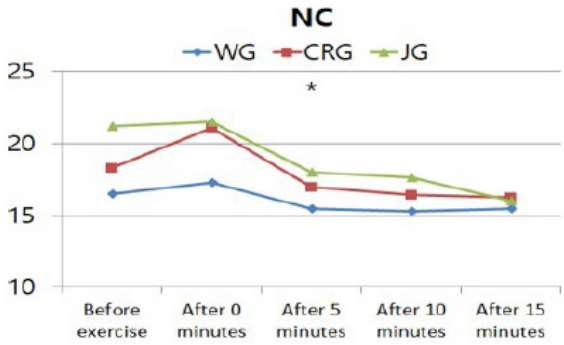


Figure 4. Change of stability index according to elapsed time in three groups (normal base and close eyes)

(* Indicates that there is a significant difference from the previous test result.)

This study has several limitations. First, there was no standard for jumping height during trampoline jump exercises. Second, the maximum rest time after exercise was 15 minutes. Therefore, the change was not confirmed after 15 minutes. Third, as the balance ability measurement uses two conditions (NC, NO), there is a possibility that the learning effect is affected by one condition and other conditions.

Conclusion

The trampoline movement used in this study did not affect proprioception and WDI. All three groups (walking, calf raise, and jumping) showed significant changes in SI after trampoline exercise. It is suggested that trampoline exercise is an effective intervention method for posture stability. However, there was no significant difference between the three groups. Since the trampoline exercises confuse the visual system, it is assumed that a rest time of at least 5 minutes is required to restore posture stability.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Emotion Classification from EEG Brain Signal using Weighted Stacking of Ensemble Classifiers

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Abstract

Electroencephalogram (EEG) is very small amount of electrical signal generated in human brain due to the firing of neurons. Because of this signal information passes through our brain and a human being acts accordingly. These signals are very useful for analysis of various things that are happening in our brain. It can be used for any disease identification in brain, designing brain computer interface, emotion detection etc. In this paper we are going to consider the case of emotion detection by classification of EEG brain signals. For classification Machine Learning techniques are used. But alone one technique is not enough to provide results with high accuracy. Hence an ensemble of classifiers has been used by the help of weighted stacking approach. Through different experimental evaluations it has been proved that the proposed technique outperforms compared to simple machine learning classifier.

Keywords: *Electroencephalogram; Emotion Classification; Stacked Ensemble Classification*

Introduction

The role of the EEG brain signal is for the purpose of human brain investigation[1]. The biomedical signals are highly time varying and there exists a correlation with the signals. The primary objective of this signal is to provide electro-physiological activity for accessibility of the scalp. The detection of the pattern in the EEG signal is considered as one of the most important diagnostic process for neurological diseases. Emotions are one of the crucial parameters for expression evaluation. Identification of emotion in a human being is a difficult task as it is highly dependent on the evaluator. The emotion detection is biased as it depends on the state of the mind of the evaluator. The effect of human emotion affects the body reactions which are very difficult to control. They are like body temperature, heart rate or some other physiological changes. EEG signals are highly used for the identification or detection of the human emotional state[2]. In this research study, focus has been imparted between the emotion state of the human through EEG signal. Ensemble classification is need for EEG signal for the emotion detection. Weighted stacking approach is used along with the ensembling classifier technique for the purpose.

In this paper, the section is divided as follows: section 2 provides an overview about the previous related study based on EEG signal, section 3 provides an insight about the model and the techniques used on this research work follow by section 4 that discusses about the result found and the last section talks about the conclusion.

Related Work

EEG feature extraction and classification is one of the most crucial phase. Many studies related to this along with the emotion detection is have come into existence. Some of them are stated below.

Li et al. [3], proposed a high-resolution time frequency analysis where they stated that the components of the frequency changes over time and hence they went ahead for proposing a short-time Fourier transform for calculation the spectrum density using the sliding window concept. Similarly, another method was proposed by Yi et al.[4], were the classification of EEG signals were

done by a statistical method called approximate entropy method. Keeping the emotion into account, an emotional classifier was proposed by Jatupaiboon et al.[5] were two kinds of emotion were taken into consideration: happy and unhappy. The EEG signals were recorded and techniques like SVM and power spectrum density feature were used for emotion recognition.

Similarly, an IAPS method was used for emotion stimuli where higher order crossing, spectra and spectrum features where detected by Jenke et al. [6]. They used a Quadratic Discriminative Analysis (QDA) for classifying emotions like anger, sadness, happiness etc. Li et al. [7] proposed an emotion recognition algorithm for classifying different types of human expression using fractal dimension, and higher order crossing features that are later classified by SVM. Yoon et al.[8] proposed a classifier based on the probability aspect where perceptron convergence mechanism is used for emotion classification. Chakladar et al. [9] developed and proposed an algorithm based on the movement of cursor for reaching the target specified in a nominal time frame. Similarly, for developing a human machine interaction system like brain computer interface an emotion recognition system was developed using different machine learning algorithm by Nie et al.[10].

Proposed Model and Techniques Used

Emotion classification in human brain is a very complicated task, as it is the god's most complicated creation in this world. But researchers are trying to analyse this classification task by the help of EEG brain signal collected from human brain by an invasive medical technique. Through this invasive technique there is no internal surgery is required, but just by keeping electrodes on the scalp we can collect the EEG brain signals. There are mainly two ways available through which we can classify emotions. First, emotions can be described as discrete and fundamentally different constructs. Second, we can characterise emotions on a dimensional basis in grouping. So, in this work we have considered the second way to classify the emotions. Again, the dimensional representation of emotions can be two or three dimensional but two-dimensional representation is the most efficient way which has been adopted in our work. Figure 1 explains the working procedure of a stacked ensemble approach. In this approach in each level of stacking there are different weights given to decide the estimator performance. There are mainly two levels for stacking is done using three first level models and then use these predictions as features for 2nd level prediction. Figure 2 describes the overall architecture of our proposed model at a bigger level. First the EEG signal are used for feature extraction and then it passes through a stacked ensemble classifier to classify the emotions.

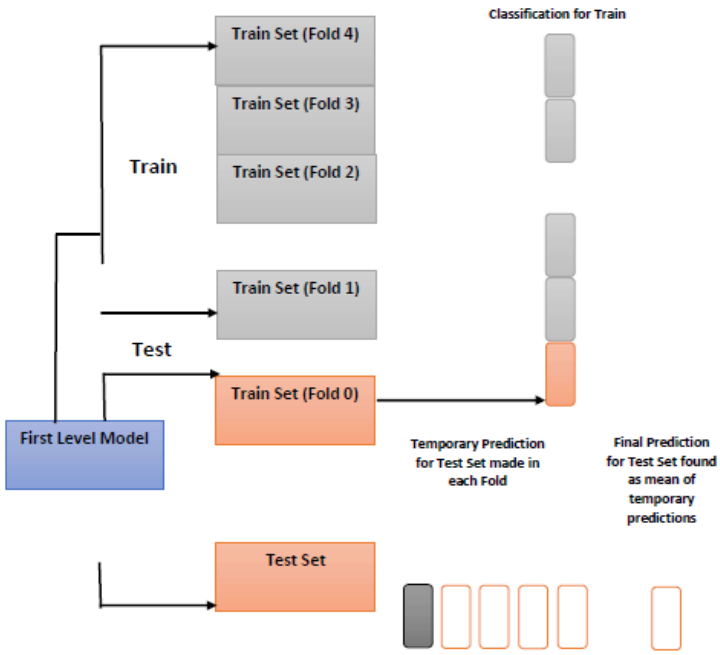


Figure 1: Working model for First level and one-fold Stacking procedure in ensemble learning

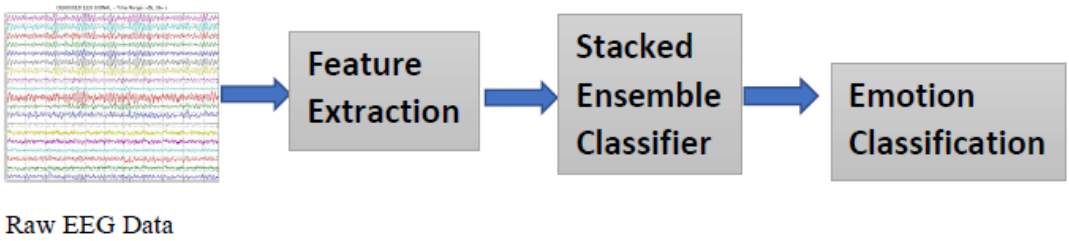


Figure 2: Architecture of proposed emotion classification model

Results and Discussion

1. Dataset Description

In this work for all experimental evaluations we have used the very popular DEAP dataset for emotion classification. It consists of EEG signals for 32 participants when they were watching 40 examples of 1-minute long music videos. The signals are collected by using electrodes placed on scalp using 10-20 electrode placement technique. In this work we have used pre-processed DEAP dataset. The dataset is constructed with a python numpy array with number of trials with number of channels and finally with data for each 32 subjects. There is another data file also constructed for labels discretised in the range of 1.0 to 9.0. These discretised values are decided based on the bi-dimensional classification of emotions, basically valence and arousal.

2. Experimental Setup

In this paper all, the experimental works have been performed by using python environment in windows platform and with a hardware support of intel core i5, 8th generation processor and 8GB RAM. There are few basic python libraries are used like numpy, scipy, scikit-learn, pywt, matplotlib, visdom server and vecstack etc. To visualise the outputs at one place visdom server has been used. By using this we can see all our outputs at one place in a browser window.

3. Result Analysis

All the experiments have been carried out using the pre-processed DEAP dataset. The machine learning algorithms have been applied for solving two class problem of emotion recognition. The two classes are valence and arousal. There are mainly three machine learning classification algorithms have been used Multi-layer perceptron neural network (MLPNN), Random Forest and K-Nearest Neighbour algorithm. These algorithms are used for comparison with our proposed stacked ensemble technique. The different measurement metrics used for comparison are overall accuracy, specificity, sensitivity and f1-score. All the measurements are done in percentage. Table 1 explains the different measurement metrics used for comparison of different machine learning techniques with our proposed stacked ensemble technique.

Table 1: Result analysis for different Machine Learning algorithms along with proposed technique

Performance Measures	MLPNN	Random Forest	K-Nearest Neighbour	Stacking with SVM
Accuracy	92%	95%	88%	98%
Specificity	91%	94%	86%	95%
Sensitivity	92%	93%	89%	97%
F1-score	94%	96%	90%	99%

Figure 2 describes the bar plot representation of different measurement metrics used to compare the performance of different techniques. In the figure blue colour represents MLPNN, green colour represents RF, black colour represents KNN and red colour represents stacked SVM approach. From the figure it can be clearly visualised that the proposed approach having highest values for all measurement metrics. Hence the proposed technique outperforms all the other techniques in classification of emotions for a two-class problem.

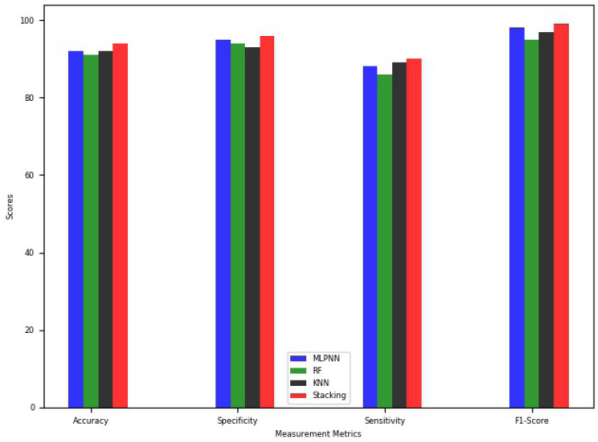


Figure 3: Graphical representation of different measurement metrics for different techniques

Conclusion

Brain signal that is EEG signal is the only way to analyse a human brain with high accuracy without any internal intervention in human brain. These signals could be analysed to classify the emotions of a person with great accuracy. In this work we tried to enhance the performance of machine learning algorithm to classify the emotions in human brain in two different classes that are valence and arousal. There are many machine learning-based classification algorithms are available but we have chosen mainly MLPNN, RF and KNN to compare the performance of our proposed algorithm. The proposed stacked SVM algorithm outperforms all other techniques.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: Nil

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Evaluate the Efficacy of C Arm in Measuring the Range of Dynamic Movement in Temporo-Mandibular Joint

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Abstract

Introduction: The commonest clinical conditions for imaging referral are the temporo-mandibular joint (TMJ) disorders or dysfunctions followed by pathologies specific to the bone and the joints. Various noninvasive and invasive imaging modalities are available to image TMJ. Application of C-arm technology to study the dynamics of TMJ is unique of its kind as this is the only modality where TMJ can be studied in motion. The basic objective of the study to evaluate the efficacy of c arm in measuring the range of dynamic movement.

Methodology: This case control study was conducted among 35 cases having TMJ pathologies and 35 healthy controls in Department of oral medicine during April-December 2018. The inter-incisal distance and the condylar distance was measured using c arm.

Results: The mean inter-incisal distance (controls: 46.5 ± 12.3 mm vs cases: 32.1 ± 10.9 mm) as well as mean condylar distance (controls: 16.8 ± 5.4 mm vs cases: 10.8 ± 3.9mm) were significantly lower amongst cases as compared to controls. The inter-incisal distance as well as the condylar distance was found to be significant between cases and controls amongst both the genders

Conclusion: The programming of c ram in dental use mostly in TMJ needs to evaluate with respect to adjusting the image clarity contrast sharpness and preventing the overlapping of the adjacent structures. In this study, we got a significant result when we compared the overall inter-incisal distance and condylar distance between healthy and diseased individuals.

Key words: *Temporo-mandibular joint, inter-incisal distance, condylar distance, c arm*

Introduction

The TMJ is complex structure considered as a ginglymo-diarthrodial synovial joint that allows motion in one plane (backward and forward) as well as gliding and translational motion. [1] The articular surface is formed by mandibular condyle inferiorly, glenoid fossae superiorly and articular surface of the temporal bone.[2] The mandibular condylar process is around 15-20 mm wide transversely and 8-10 mm wide in the antero-posteriorly.

The articular surface is covered by fibrocartilage instead of hyaline cartilage which lies between the condyle and glenoid fossae.[1] Rotational movement occurs primarily in the inferior joint space, against the inferior surface of the articular disc. Pure rotation, without translation can be created by guided manual manipulation and will allow for up to 25 mm of inter-incisal opening. Translation, or sliding movements of the joint, occurs primarily in the superior joint space, as the superior surface of the disc slides against the articular tubercle.[2]

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The opening and closing of the jaw is performed by muscles of mastication (medial and lateral pterygoids, masseter, and temporalis) in addition to other accessory muscles. [3-5]

Temporo-mandibular Joint (TMJ) pain is relatively common in general population with a prevalence of 16-59% reporting symptoms and 33-86% exhibiting clinical signs.[6] Only about 25% of the cases seek medical attention.[7] In clinical practices, the commonest clinical conditions for imaging referral are the TMJ disorders or dysfunctions followed by pathologies specific to the bone and the joints.

Various noninvasive and invasive imaging modalities are available to image TMJ. The noninvasive modules are CT, MRI, USG, CBCT, 3D C – arm CT and other conventional methods while various invasive modalities are arthrography, arthroscopy etc. The limitations of conventional radiography and various Tempromandibular Joint (TMJ) projections to evaluate the soft tissue components of TMJ have been replaced with advanced imaging techniques like Ultrasound, Computed Tomography, Magnetic Resonance Imaging, Cone Beam Computed Tomography and Nuclide Imaging. Within a span of 30 years the technological advances in imaging has gained rapid momentum expanding the arena for diagnosing the TMJ disorders. [8]

C arm was first discovered in 1955 which is an innovative imaging technique composed of flat panel detectors it generates 2D CT like images. In maxillofacial area the c arm is used in root canal treatment, implant dentistry and in maxillofacial trauma.[9] C-arm comprises a generator (X-ray source) and an image intensifier or flat-panel detector, which was discovered by Ziehm in 2006.[10] The insight into the latest procedure guided imaging like C-arm into various medical specialities and its extension into dentistry cannot be undermined. Application of C-arm technology to study the dynamics of TMJ is unique of its kind as this is the only modality where TMJ can be studied in motion and provides an excellent insight into the biomechanics of the most unique joint in the body. The basic objective of the study to evaluate the efficacy of c arm in measuring the range of dynamic movement

Methodology

This is a case-control study conducted in Department of oral medicine and radiology in Institute of Dental Sciences, Bhubaneswar situated in the eastern part of India. The cases were patients diagnosed with TMJ pathologies. The inclusion criteria for cases were patients with a complaint of persistent pain in TMJ region for a duration of 1-2 years or less and those willing to participate. Individuals contraindicated for radiation exposure like pregnancy or patients treated for head and neck cancers were excluded from the study. Patients without TMJ pathologies were taken as controls. A total of 35 cases and 35 controls were included in the study, during the duration of April- December 2018. Matching was done using age and gender criteria.

C arm with a specification of 14 KHz, 1.9KW, 40-120KV, 8.0-250 mA with a fluoroscopy rate of one image per second. Patient were positioned supine with head tilted at 30° from the mid sagittal plane and forming an angle of 10° upwards & Frankfurt Horizontal plane being perpendicular to the floor. The Interincisal distance for each sample was measured (mesio-incisal angle of upper central incisor to the mesio-incisal angle of lower central incisor) and condylar distance (most superior point of articular eminence to most superior aspect of convexity of condyle). The maximum permissible dose was 0.05Sy/year.

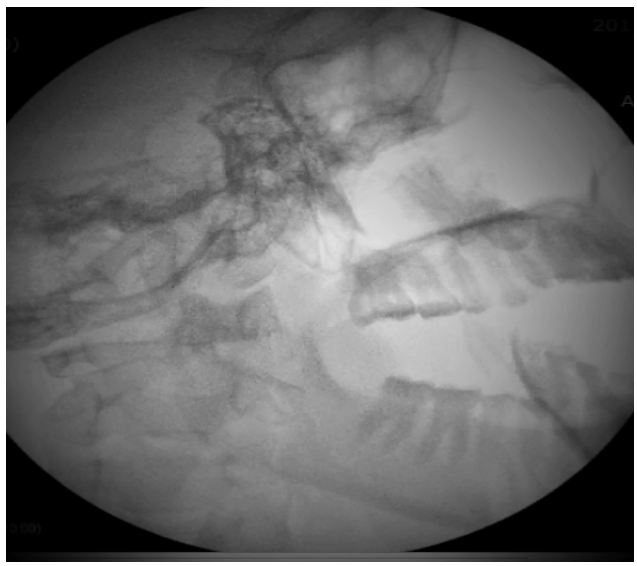


Figure 1. Sectional image of C- arm (Normal TMJ)

Various factors like demographic factors, degree of TMJ pain, jaw dislocation, partially locked jaw, inter-incisal distance, deviation of mandible while opening, TMJ movement on opening were assessed.

The data was entered in Microsoft excel and was analysed using SPSS version 20.0. The qualitative data was represented with mean and standard deviation while the quantitative data was represented with mean

and standard deviation. The difference between two proportions was calculated using chi-square test while the difference between two means amongst two groups was calculated using unpaired t test. P value less than 0.05 was considered to be statistically significant.

Results

This case-control study was conducted to assess the efficacy of C arm in measuring the range of dynamic movement.

Table 1: Comparison of demographic factors among cases and controls

Variables	Cases (n=35)	Controls (n=35)	P value
Age in years	43.34 ± 7.28	42.98 ± 8.96	0.770
Gender (M:F)	24: 11	24: 11	1.000

There was no significant difference observed in age and gender among both cases as well as controls.

Table 2: Comparison of inter-incisal distance and Condylar distance between cases and controls

Variables	Groups	Mean ± SD in mm	T test	P value
Inter-incisal distance	Controls (n=35)	46.5 ± 12.3	5.183	0.0001
	Cases (n=35)	32.1 ± 10.9		
Distance condyle	Controls (n=35)	16.8 ± 5.4	5.328	0.0001
	Cases (n=35)	10.8 ± 3.9		

As per the table 2, the mean inter-incisal distance (controls: 46.5 ± 12.3 mm vs cases: 32.1 ± 10.9 mm) as well as mean condylar distance (controls: 16.8 ± 5.4 mm vs cases: 10.8 ± 3.9mm) were significantly lower amongst cases as compared to controls. The range for inter-incisal distance were 40-71 mm while for intercondylar distance 8- 21 mm.

Table 3: Comparison of inter-incisal distance and Condylar distance between males and females amongst cases and controls

Variables	Groups	Mean ± SD in mm	T test	P value
Females				
Inter-incisal distance	Controls (n=11)	41.8 ± 11.9	2.733	0.012
	Cases (n=11)	29.2 ± 9.6		
Distance condyle	Controls (n=11)	13.4 ± 4.6	2.301	0.032
	Cases (n=11)	9.8 ± 3.3		
Males				
Inter-incisal distance	Controls (n=24)	48.6 ± 12.3	4.999	0.0001
	Cases (n=24)	33.4 ± 8.4		
Distance condyle	Controls (n=24)	18.3 ± 7.8	3.905	0.0003
	Cases (n=24)	11.2 ± 4.3		

As per table 3, the inter-incisal distance as well as the condylar distance was found to be significant between cases and controls amongst both the genders. But the mean distance between males were found to be higher as compared to females amongst both cases and controls.

Discussion

Mouth opening is one of the commonest word clinician use in day to day practices. Patients with Temporomandibular joint diseases often complain of restricted mouth opening. The major aim of the treatment is to restore the mouth opening to normal value from the diseased state. It is thus important to know the normal value as well as in the diseased state. So this study was conducted to evaluate the efficacy of C arm in measuring the range of dynamic movement at TMJ for mouth opening between both diseased and health patients and comparing them.

Interincisal distance and inter-condylar distances are affected by many factors which include age, gender, height and race etc. [11-16] In this study the inter-incisal distance for health individuals were 46.5 ± 12.3 mm which is almost equal to the nepalese populations 47 ± 1 mm. [17] Study conducted by Sohail A et al in UAE observed the inter incisal distance amongst males (59.74 ± 5.26 mm) subjects was higher as compared to female (46.50 + 3.32 mm). [18] Oginni FO conducted a study amongst Nigerian population observed the mean inter-incisal distance (MID) were 45.68 ± 6.7mm, 47.60 ± 7.73 mm, and 46.69 ± 7.29mm in the Southwest, Northwest, and combined groups, respectively which is similar as compared to our study. MID was significantly higher in both males than females, reached the peak at age 33 years in both the genders and, thereafter, decreased with increasing age. [18]

In this study the condylar distance among health individuals was observed to be 16.8 ± 5.4 mm. Study conducted by Haghighat A et al observed the **superior, posterior and anterior condylar distances were observed to be 2.28** ± 0.06mm, 1.91 ± 0.48 mm, 2.02 ± 0.48 mm wgich is similar to our study.[19] Study conducted by Rawi NHA et al in UAE observed that the condylar distance and condylar angle decreases significantly amongst TMJ diseased as compared to normal individuals. This is similar to our study findings.[20]

Conclusion

An ambitious pilot study sample size of 70 patients was considered with 35 diseases and 35 healthy individuals to evaluate the dynamic changes in TMJ using C arm. This machine has been widely used in gastroenterology, neurology and orthopaedics but no considerable work has been done in the field of temporomandibular joint in order to see the dynamic movement. The programming of c ram in dental use mostly in TMJ needs to evaluate with respect to adjusting the image clarity contrast sharpness and preventing the overlapping of the adjacent structures. In this study, we got a significant result when we compared the overall inter-incisal distance and condylar distance between healthy and diseased individuals. This is an eye opener for us and more researches are needed in future.

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Conflicts of Interest: There are no conflicts of interest.

Ethical approval: Taken

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Correlated Levels of Anti-Inflammatory Interleukins (IL-4 and IL-10) with Allergic Conjunctivitis (AC) in Iraqi Patients

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Abstract

Background Allergic conjunctivitis (AC) is caused by an allergic reaction, most common form was hypersensitivity reaction (type 1), that caused to perennial or seasonal AC. Current study was done in the Hospital of Ibn-AL-Hythem for eyes infections in Baghdad from September- August of 2018, one hundred and thirty-two serum were collected from allergic conjunctivitis patients after diagnostic by a specialist ophthalmologist according to have symptoms, who included 60 male and 72 female, with range age (15-51) years. Used the enzyme-linked immunosorbent assay (ELISA kit) from (Pepro-Tech Company , UK) for estimating levels of both Interleukins (IL-4 and IL- 10) in patients serum **Results** current study showed higher significant in age group (≥ 35 years) as percentage (57.6%) compare to age group (25- 35) as (28.1%) , also significantly higher in females (54.5%) than males (45.5%) , also level of IL – 4 in allergic conjunctivitis patients was (23.91± 2.09) compare to control (21.02± 2.99) ,so significantly increased levels of IL-10 in allergic conjunctivitis patients (14.99 ± 2.30) than control (11.10± 1.99).**conclusions** current study were **concluded** higher significant of allergic conjunctivitis Iraqi patients in age group (≥ 35 years), and the AC in females higher than males, as well as level of IL – 4 in allergic conjunctivitis patients were significant with control, and significantly increased levels of IL-10 in allergic conjunctivitis patients compare to control .

Keywords *: interleukins(IL-4; IL-10) ; allergic conjunctivitis(AC) ; Iraqi patients*

Introduction

Allergic conjunctivitis(AC) (or name as "allergic rhinoconjunctivitis," was most commonest allergic eye disorder, in the last decades in Iraqi patients , so allergic diseases were increased dramatically [(1)] Allergic eye usually are associated with others allergic conditions, such as dermatitis (atopic eczema) and allergic rhinitis (hay fever) , so th causing of eye allergies are similar to the allergic rhinitis (hay fever) and allergic asthma [(2)].

Allergic conjunctivitis is type of IgE-mediated hypersensitivity a wide term that recognised as 6 types including perennial allergic conjunctivitis (PAC); seasonal allergic conjunctivitis (SAC), contact lens-induced; atopic keratoconjunctivitis (AKC) drug-induced, and vernal keratoconjunctivitis (VKC)[(3)], However, both (VKC) and (AND) have pathophysiological and clinical pathophysiological characteristics completely different from (PAC) and (SAC), although some common markers of allergy[(4)]. AC common manifests as itchy, red eyes, or watering which included the symptoms of ocular symptom scores[(5)].

Cosmetics and Medication can play important role in causing of eye allergies , Any types of irritant, whether infectious, environmental, or manmade, can cause symptoms that consistent with an allergic of an eye , AC is caused by allergen-induced inflammatory response(AIIR), that allergen (such as animal dander ; pollen; and other environmental antigens[(6)]will be interacting with antibody (IgE bound to sensitized mast cells) causing clinical ocular allergic expression(COA). The pathogenesis of (AC) is predominantly an IgE-mediated hypersensitivity reaction. Activation of mast cells WHICH induces enhanced tear levels of the histamine; leukotrienes ;prostaglandins and tryptase, and this early response lasts clinically(20 minutes

–30 minutes) [2]. also, the degranulation of Mast cell to induces activated the vascular endothelial cells, that turn the expresses chemokines and adhesion molecules such as vascular cell adhesion molecules (VCAM) and intercellular adhesion molecules (ICAM) , so the other chemokines secreted [2] .

Many cytokines that derived from Th1, such as IL(2, 3) and IFN-γ, that mediates recruitment of the macrophages, while the cytokine that derived from Th2, such as IL (4 and 5), that participates in both chemotaxis and activation of the eosinophils[7], therefore aim of current study to assess levels of cytokine interleukin 10 (IL-10) and IL-4 in allergic conjunctivitis(AC) patients.

Material and Method

Sample collected :

Current study was done in the Hospital of Ibn-AL-Hythem for eyes infections in Baghdad from September - August of 2018. One hundred and thirty-two serum were collected from allergic conjunctivitis patients after diagnostic by a specialist ophthalmologist according to have symptoms such as Redness in inner eyelid or white of eye ; Itchy eyes; Blurred vision; Increased amount of tears ; and Swelling of the eyelid (fig.1) , who include 60 male and 72 female, with range age (15-51) years.

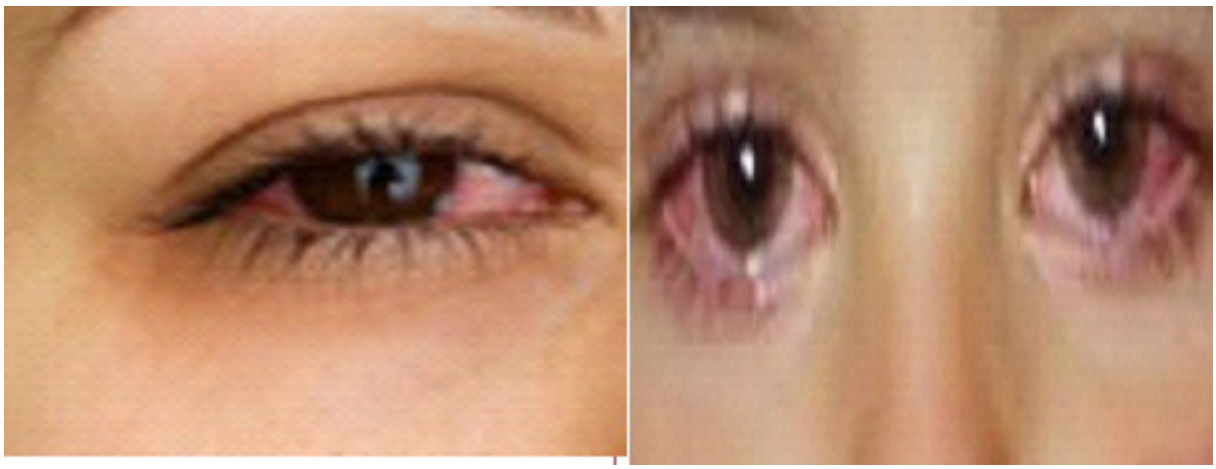


Figure (1): Symptoms of allergic conjunctivitis

Estimation levels of Interleukins (IL-4 and IL- 10) in patients serum

Used the enzyme-linked immunosorbent assay (ELISA kit) from (Pepro-Tech Company , UK) for estimating levels of both Interleukins (IL-4 and IL- 10) in patients serum according to the manufacturer's instructions.

Findings

Table (1): Distribution of allergic conjunctivitis patients according to age groups and gender

Age groups (years)	Patients		Control	
	No. = 132	%	No.= 50	%
≤ 25	19	14.3	12	24
25- 35	37	28.1	20	40
≥ 35	76	57.6	18	36
Total	132	100	50	100
Gender				
Male	60	45.5	25	50
Female	72	54.5	25	50
Total	132	100	50	100

Results in table (1) showed the range age of allergic conjunctivitis patients was (15-51) years, also Majority of allergic conjunctivitis patients within age groups of (≥ 35)years as percentage (57.6%) compare to age group (25- 35) as (28.1%) , also significantly higher in females (54.5%) than males (45.5%) . These results are shown in Figure(2 &3).

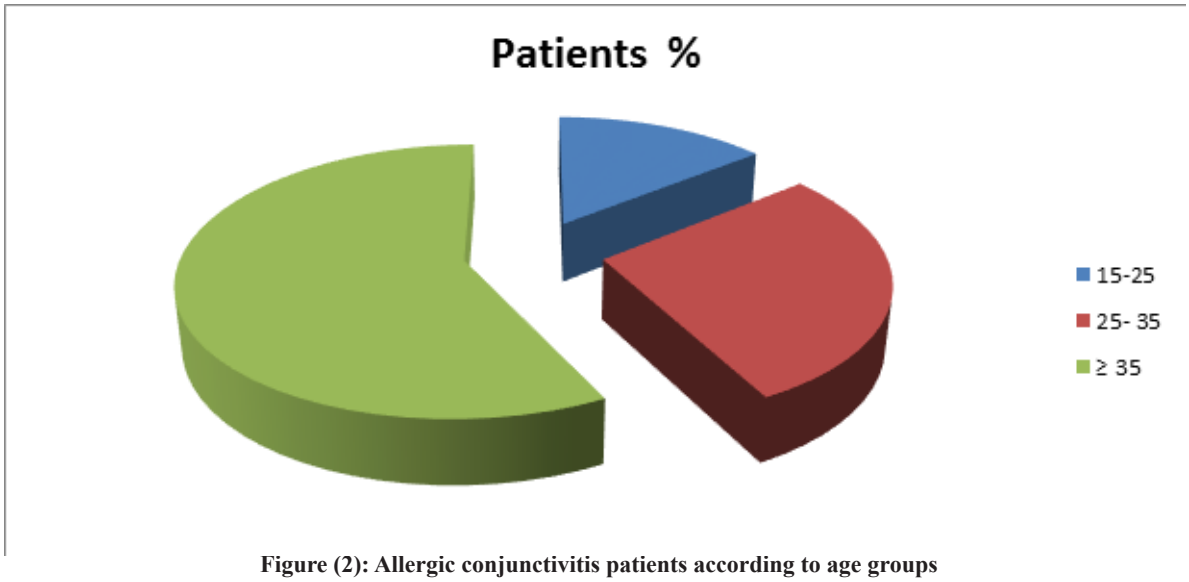


Figure (2): Allergic conjunctivitis patients according to age groups

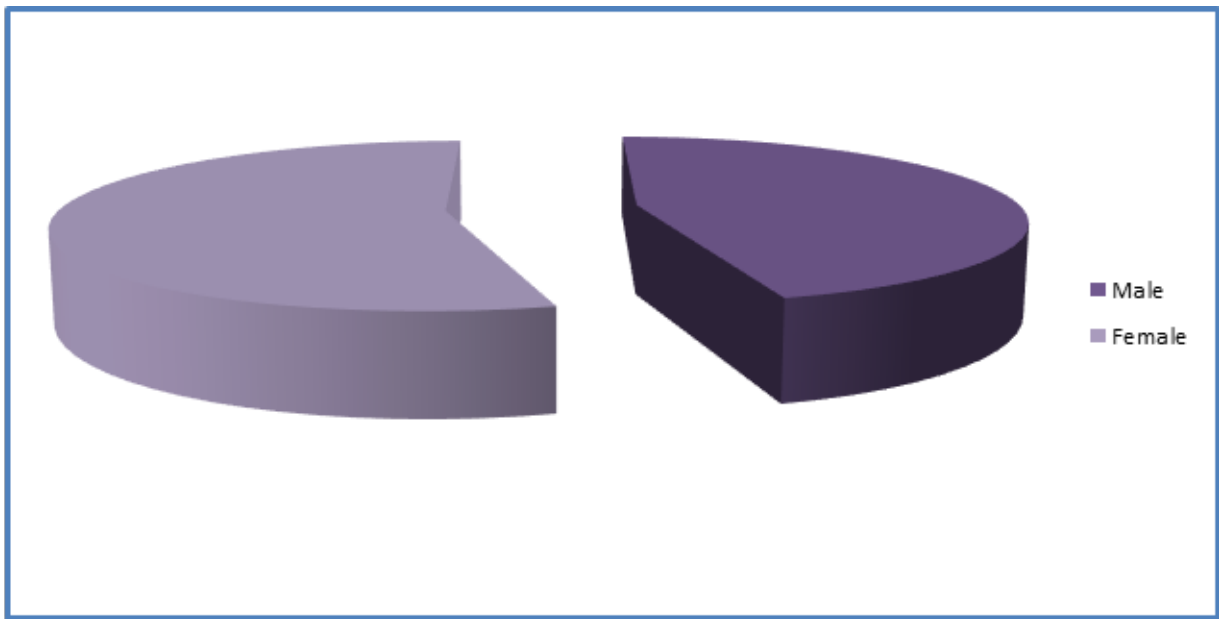


Figure (3): Allergic conjunctivitis patients according to gender

Table (2): comparative of interleukins Level (IL – 4 and IL – 10) in patients (Study group) and healthy (Control).

Levels of interleukins (pg/ ml)	Study group (M± S.D)	Control (M± S.D)	
IL - 4	23.91± 2.09	21.02± 2.99	No significant
IL - 10	14.99 ± 2.30	11.10± 1.99	significant

Results in table (2) showed the level of IL – 4 in allergic conjunctivitis patients was (23.91± 2.09) compare to control (21.02± 2.99) , so significantly increased levels of IL-10 in allergic conjunctivitis patients (14.99 ± 2.30) than control (11.10± 1.99),these results were shown in Fig.4.

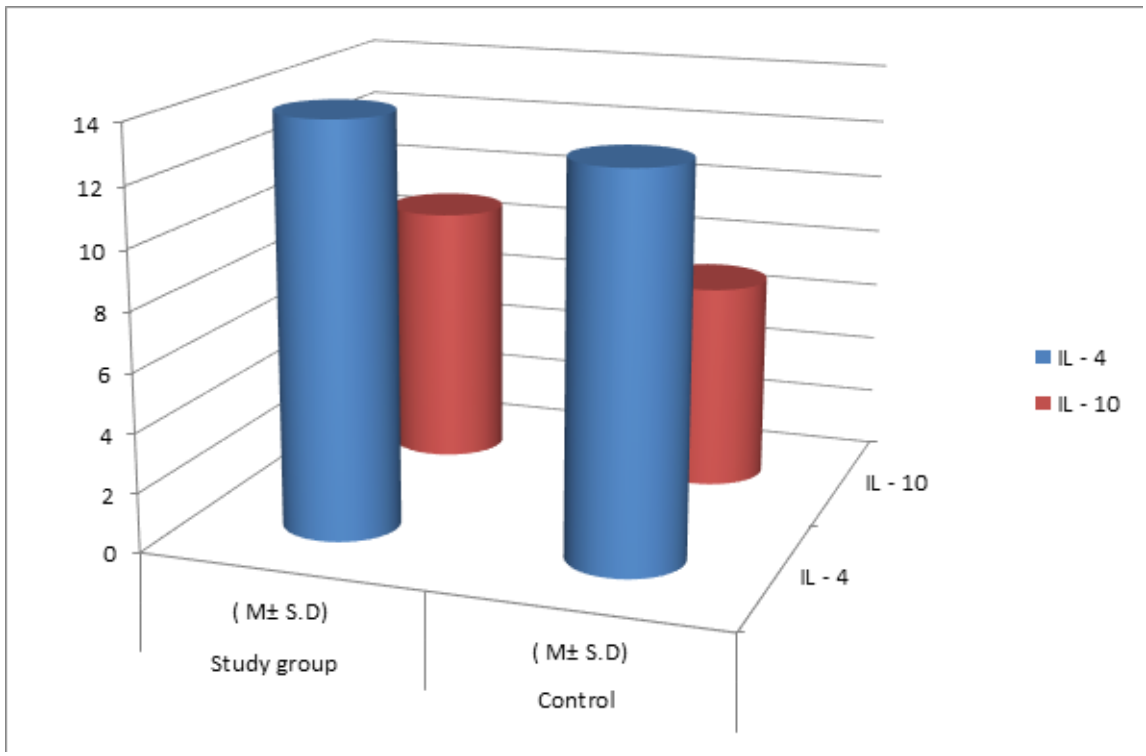


Figure (4): Comparative levels of interleukins (IL – 4 and 10) in allergic conjunctivitis patients and healthy.

Discussion

Current study showed more prevalence of allergic conjunctivitis patients in age group (≥ 35 years) as percentage (57.6%) compare to age group (25- 35) as (28.1%) , this similar results with Fasasi etal., 2014 who showed more prevalence of AC in age groups (17 -33) years as (43.6%), followed by ≥16 years as (42.3%)[8]. Ocular allergy is a higher prevalence in the western countries comparing to Africa and Asia[9]. Allergic conjunctivitis(AC) in (12–13) year old schoolchildren, was(19%)[10] , about (6–30) % of general population, who diagnoses with Allergic conjunctivitis[11], who represents ≥ 90% of all ocular allergies[12].

The current study showed the allergic conjunctivitis are commoner in females (54.5%) than males (45.5%). These results are consistent with the results of previous studies as[13;14;8] ,whilst differ with the results of researcher Hall and Shilio, 2005, who showed males more predominate than females[15].

Both Interleukin (4 and 10) are anti-inflammatory cytokines which mainly functions via suppressing the pro-inflammatory[16] .

During active the inflammatory of allergic eye diseases, the cytokines of T-helper cell (Th1 and Th2) were secretion and over expressed[17].cytokines of Th2 as interleukins (IL- 4; IL-5 ; IL- 9 ; IL -10 and IL-13) will promoting different elements of allergic inflammation as (isotype-switching from IgG1 ; propagation of the Th2 phenotype) to mobilization eosinophil ; maturation and activation mast cell and synthesis immunoglobulin (IgE), that important for allergy[18]

Interleukin (IL)-4 plays a very important role in inflammatory and fibrotic events in many human diseases[19], In Inflammation, such as post-cataract surgical or non-allergic cause slightly increased in production level of IL-4, but high produced level from IL-4 were related to allergic reactions[20], and increased level in the serum of allergic individuals[21], so IL-10 an anti-inflammatory cytokine (Th2-type cytokine) is secreting by different cell types as (B-cells ; T cells ;

macrophages and monocytes under various conditions of immune activation[22] .although IL-10 is been shown to suppress a broad range of inflammatory responses and is known to be an important factor in maintaining a balance of overall immune responses[23].Thus, used IL-10 in developed novel therapy for many human diseases such as autoimmune diseases and allergic responses[24] .

Conclusions

1. Significantly higher of allergic conjunctivitis patients in age group (≥ 35 years) , also significantly higher in females than males.

2. High level of IL – 4 in allergic conjunctivitis patients was (23.91± 2.09) compare to control ,so significantly increased levels of IL-10 in allergic conjunctivitis patients compare to control .

Conflict of Interest : None

Source of Funding : Self

Ethical Clearance : The sample taken after patient approval.

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The Role of Zinc Sulfate in Subchronic Cadmium Chloride Toxicosis in Male Mice

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Abstract

Aim: study sort of interaction between zinc sulfate and cadmium chloride. **Method:** sixty albino male mice divided equally into four groups as follows (Toxic dose of cadmium chloride 5mg/kg B.W (T1); Zinc sulfate 10mg/kg B.W (T2); their combined dosing (T3) and control group. (C) given D.W. At the end of the experiment, all the animal sacrified and their liver is dissected and prepared for histopathology also, another part of same liver submitted to homogenization process to determine the level of metallothionein 2 (MTII) and malondialdehyde (MDA). **Result:** histopathology of liver section revealed in the cadmium dosed group, a necrosis in hypatocyte, vascular degeneration, diffusion of mononuclear cell and neutrophill infiltration around dilated blood vessels, congestion of blood vessels around portal area and parenchyma, apoptosis of hepatocyte characterize by fragmented nuclei with irregular cytoplasm. While no lesion were recorded in liver section of zinc sulfate dosed group. In combined dosed group, liver section showed either no lesion or less severe lesion consisting of local aggregation of active macrophage and lymphocyte.Result of MTII in liver homogenate recorded highly significant increase in all treated group especially in combined dosed one that showed increase up to 3.3 times; while cadmium and zinc alone dosed group recorded increase 2.1 and 1.9 than control one. The result of MDA in liver homogenate showed highly significant increase level in cadmium toxic dosed group up to 17.8 times, while zinc sulfate group showed only 1.6 time increase than control and combined dosed group that showed no level differences. **Conclusion:** result of liver histopathology and MTII / MDA levels were indicative the protective role of zinc administration to overcome sub chronic cadmium toxicosis by increase their MTII binding protein that reduce the toxic effect or levels of cadmium induce cellular lipid peroxydation damage.

Key Ward: *MTII, MDA, Histopathology and liver homogenate.*

Introduction

Cadmium (Cd) is one of the most dangerous heavy metals, known to produce severe and multi-organ toxicity in humans [1,2]. It is released into the environment by mining, smelting operations, fuel combustion and other industrial process [3] Humans can be exposed to Cd and it can stimulate free radical production, resulting in oxidative deterioration of lipids, proteins, and DNA, manifesting as gross pathology of the liver, brain, and other organs in humans and animals [4]. The extremely long biological half life of cadmium essentially makes it a cumulative toxin, so long past exposures could still result in direct toxic effects of the residual metal [5] The body has limited capacity to respond to cadmium exposure, as the metal cannot undergo metabolic degradation to less toxic species and is only poorly excreted, making long-term storage a viable option for dealing with this toxic element. The long residence time of cadmium is in part attributable to metallothionein (MT), a metal-binding protein that is induced by cadmium and tightly binds the metal. Cadmium accumulates primarily in the liver and kidney where it is bound to MT, and it is felt that cadmium bound to MT is essentially detoxicated, at least temporarily, through this high affinity sequestration [6, 7]. Major detoxification mechanisms protecting the cell from Cd-induced damage is the direct binding of Cd2+ to metal chelators like Metallothionein (MT) is a ubiquitous low molecular weight (usually <10 kDa) protein with high cysteine content and has strong affinity for heavy metals [8].

The other way to induction (MT) is giving zinc which is an essential trace element play important roles in structure and function of proteins, metabolism of RNA and DNA, signal transduction, gene expression, and regulation of apoptosis [9]. It is required for the action of more than 200 metalloenzymes and more than 2000 Zn dependent transcription factors have been recognized [10]. Zinc has antioxidant properties and plays an important role in scavenging reactive oxygen species, and they also hypothesized that in the absence of zinc, the possibility of increased oxidative damage exists [11]. Several research showed that treatment with Zn during Cd exposure prevented or decreased the harmful effects of Cd [12]. Zn might reduce uptake of Cd by competing for a common transporter [13].

Moreover, zinc induced the synthesis of metallothionein in the liver, which caused Cd accumulation in the liver and delayed its transfer to the kidney. The zinc is a well-established antioxidants and it can protect against Cd-induced oxidative stress [14]

Method

In this study we used sixty adult albino mice weighted (30–32 g) that were divided into four groups of 15 for each group. They were administered the dosage daily orally at morning with overnight fasting by using gavages needle lasted for 45 days.

The first group of mice was (T1) administered cadmium chloride once a day at (5mg /kg B.W). The second group (T2) administered dose in the NOAEL range of zinc sulfate (10 mg/kg B.W) orally. The third group(T3) administered combination of both zinc sulfate (10 mg/kg B.W) and after four hours administered cadmium chloride(5mg /kg B.W) (1, 15). The forth group act as a control (C) and administered distilled water orally. At the end of sub chronic study all groups of animal sacrified surgically under anesthesia and their liver submitted to homogenization process to determine metallothionein 2 (MTII) and malon dialdehyde MDA level in liver, while another part of liver used for histopathological examination.

Findings

The table (1) showed a significant (P<0.01) increase in MTII level in liver homogenate of all treated groups after sub chronic dosing. The cadmium chloride group level increased by 2.17 times from the control group; while the zinc sulfate increase by 1.9 times that control one. The combined group showed the largest increase between all treated groups by triplicate level 3.3 times above the control level.

Table (1) Metallothionen II (MTII) level (ng/ml) in liver homogenate of mice groups dosed sub chronically with cadmium chloride and zinc sulfate and their combined:

Group n:15	**MT2 In liver Mean ± SE**
(T1)Cadmium Cloride 5mg/kg	8.17 ± 0.10 b
(T2)Zinc Sulfate 10mg/kg	7.32 ± 0.08 c
(T3)Cadmium and Zinc 5mg/kg+10mg/kg	12.74 ± 0.28a
(C)Control Distilled water	3.85 ± 0.12 d
LSD value	0.356 **
Means having different letters in same column differed significantly. ** (P<0.01).	

Table (2) listed that the level of MDA in liver homogenate showed higher significant increase (p>0.01) in cadmium chloride group with lowest increase but still significant in the zinc sulfate group while the MDA in liver seem to return to normal in the combined dosed group without significant difference from the control group.

Table (2) Malondialdehyde (MDA) level (nmol/g) in the liver of mice groups dosed sub chronically for 45 days with cadmium chloride , zinc sulfate and their combination :

Group n:15	MDA In liver Mean ± SE
(T1)Cadmium Chloride 5mg/kg	47.58 ± 0.19 a
(T2)Zinc Sulfate 10mg/kg	4.30 ± 0.18 b
(T3)Cadmium and Zinc 5mg/kg+10mg/kg	2.68 ± 0.24 c
(C)Control Distilled water	2.67 ± 0.19 c
LSD value	0.615 **
Means having different letters in same column differed significantly. ** (P<0.01).	

The result of histopathology showed in the control group normal liver section with no lesion in (fig.1 Section A)., while in cadmium group liver section showed infiltration of neutrophils and mononuclear cell around dilated and congested blood vessels (fig.1 Section B). There was a diffuse of mononuclear cells infiltration in liver parenchyma(fig.1 Section C) and in portal area(fig.1 Section D). A congested blood vessels and necrosis of hepatocytes seen in(fig.1 Section E).

Granulomatous inflammation were seen in the liver parenchyma in(fig.1 Section F). Also there were apoptotosis of hepatocytes characterized by dense nuclei chromatin with irregular cytoplasm in addition to fragmented nuclei (fig.1 Section G). Vacuolar degeneration and necrosis of hepatocytes also seen(fig.1 Section H). The zinc group showed normal liver section with no clear lesion at NOEAL dose (figure 9). The combined group showed normal liver cell with no clear lesion (fig.1 Section J)., while other tissue appeared with some granuloma consististing from local aggregation of active macrophages and lymphocytes (fig.1 Section D).

A- Section in the liver of control shows no clear lesions (H& E stain 40X)

B- Section in the liver of cadmium chloride group (T1) shows neutrophils and mononuclear infiltration around dilated blood vessels (H& E stain 40X)

C- Section in the liver of cadmium chloride group (T1)shows diffuse mononuclear infiltration in liver parenchyma (H& E stain 40X)

D- Section in the liver of cadmium chloride group (T1) shows diffuse mononuclear infiltration in portal area (H& E stain 40X)

E- Section in the liver of cadmium chloride group (T1) shows congested blood vessels with necrosis of hepatocytes (H& E stain 40X)

F- Section in the liver of cadmium chloride group (T1) shows granulomatous inflammation in the liver parenchyma (H& E stain 40X)

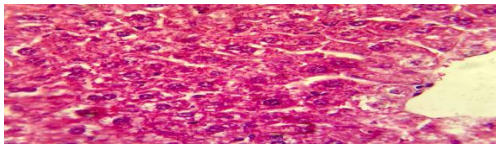
G- **Section in the liver of cadmium chloride group (T1)shows apoptotosis of hepatocytes characterized by dense nuclei chromatin of irregular cytoplasmic of hepatocytes in addition to fragments of nuclei (H& E stain 40X)**

H- Section in the liver of cadmium chloride group (T1) shows vacuolar degeneration and necrosis of hepatocytes (H * E stain 40X)

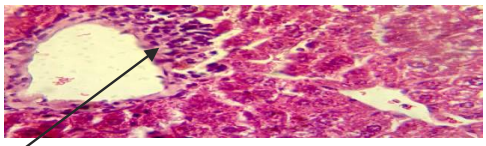
I- Section in the liver of the zinc sulfate group (T2) shows no clear lesions (H& E stain 40X)

J- Section in the liver of the combined dosing group (T3) shows no clear lesions (H& E stain 40X)

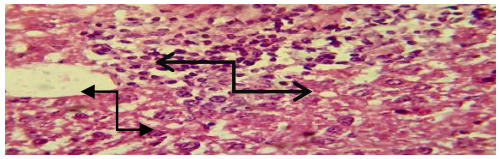
K- Section in the liver of combined group (T3) shows granuloma consisting from the local aggregation of active macrophages and lymphocytes (H& E stain 40X)



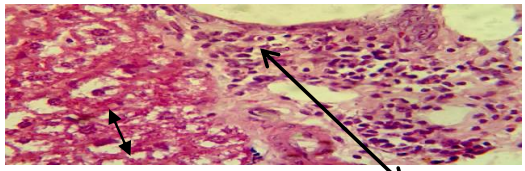
A- Section in the liver of control shows no clear lesions (H& E stain 40X)



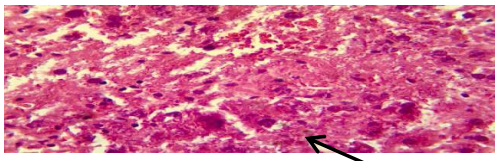
B- Section in the liver of cadmium chloride group (T1) shows neutrophils and mononuclear infiltration around dilated blood vessels (H& E stain 40X)

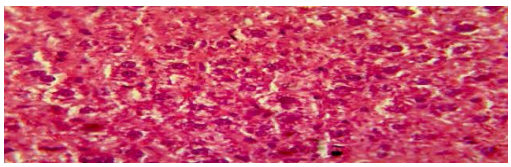


C- Section in the liver of cadmium chloride group (T1)shows diffuse mononuclear infiltration in liver parenchyma (H& E stain 40X)



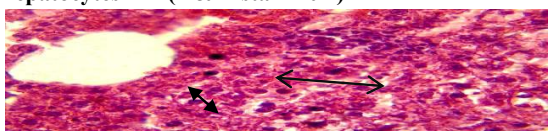
D- Section in the liver of cadmium chloride group (T1) shows diffuse mononuclear infiltration in portal area (H& E stain 40X)



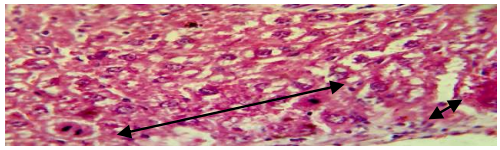


J- Section in the liver of the combined dosing group (T3) shows no clear lesions (H& E stain 40X)

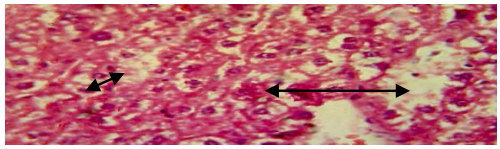
E- Section in the liver of cadmium chloride group (T1) shows congested blood vessels with necrosis of hepatocytes (H& E stain 40X)



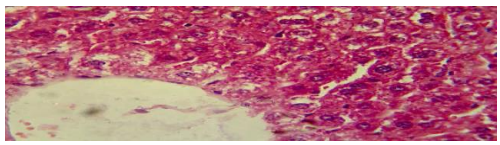
F- Section in the liver of cadmium chloride group (T1) shows granulomatous inflammation in the liver parenchyma (H& E stain 40X)



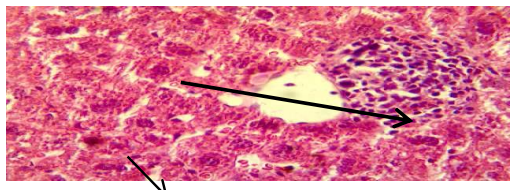
G- Section in the liver of cadmium chloride group (T1)shows apoptotosis of hepatocytes characterized by dense nuclei chromatin of irregular cytoplasmic of hepatocytes in addition to fragments of nuclei (H& E stain 40X)



H- Section in the liver of cadmium chloride group (T1) shows vacuolar degeneration and necrosis of hepatocytes (H * E stain 40X)



I- Section in the liver of the zinc sulfate group (T2) shows no clear lesions (H& E stain 40X)



K- Section in the liver of combined group (T3) shows granuloma consisting from the local aggregation of active macrophages and lymphocytes (H& E stain 40X)

Figure (1) Section in the liver

Discussion

The present study was designed and performed to study the interaction between zinc and cadmium and their combined dosing by performing dosing of them sub chronically for 45 days.

The hypothesis that Zn can protect tissue against Cd-induced tissue damage in adult mice and rats was established by our and several other previous studies [4, 16, and 17]. It is well known that many toxic effects of cadmium (Cd) action result from interactions with essential elements including zinc (Zn). These interactions can take place at different stages of absorption, distribution in the organism and excretion of both metals and at the stage of Zn biological functions. Exposure to Cd leads to disturbance in Zn level in the organism on the one hand, while dietary Zn intake has an important effect on Cd absorption, accumulation and toxicity on the other. The Zn status of the body is important in relation to development of Cd toxicity. Numerous data showed that increased Zn supply may reduce Cd absorption and accumulation and prevent or reduce the adverse actions of Cd, whereas Zn deficiency can intensify Cd accumulation and toxicity [18].

This is in accordance with the fact that the majority of Cd uptake occurs by a process associated with Zn transport, competing for common binding sites and membrane carriers like divalent metal transporter1 (DMT1) or luminal Zn transporter1 (ZTL1). Also, as oral treatment with Zn induces enhanced metallothionein (MT) synthesis in the liver [19].

Metallothionein is efficient intracellular small protein scavenger involved in intracellular detoxification via binding to cadmium. There was a significant increase of metallothionein concentration in all treated groups. The result of MT in sub chronic study indicate that MT level in liver homogenate increase by 2.12 times for Cd and two times for zinc alone group in comparison with control one but MT level in liver of the combined administered group showed higher increase of MT 3.3 times than control.

This could be attributed to the long time of exposure (45 day) that give opportunity for each metal to highly induce synthesis of MT in liver which possibly cause complete protection in Zn alone group while still in Cd a lone group which showed toxicity signs that increase with increase of administration period indicating that the induced MT were not enough to overcome the toxicity signs. And that in agreement with [19,20]. Binding and induction of metallothionein appears to play an important role in the physiologic regulation of zinc levels and, possibly, its reactivity to other legends [21].

The significant increase of the MDA level in sub chronic dosing in cadmium group might be due to increase of the oxidative stress and generation of the free radicals by cadmium. The cadmium group caused an increase of MDA level by 17.6 fold above control group while the combination group, the value of MDA returns to normal one. The reason of that was due to the role of zinc as antioxidant agent. It is well known that Zn is an essential component of the oxidant defense system with participation at multiple cellular levels and improved activity of antioxidant enzymes and as a result minimized oxidative damage [22].

Oxidative stress is considered an important mechanism of cadmium induced toxicity which might be due to the depletion and changes in the activity of antioxidant enzymes or reduced of glutathione (GSH) [23]. Another study recorded that the cadmium caused decreases in the activity and level of antioxidants system elements as well as vitamin C, E and glutathione content and leads to the production of oxygen reactive forms. Also by other route the cadmium toxicity generates free radicals by stimulating the synthesis of inflammatory mediators which in turn stimulates the generation and subsequent oxidative stress [24].

The liver is the primary target organ following systemic Cd exposure. The uptake of Cd into the liver is critical for the development of overall toxicity induced by heavy metal. Approximately half of Cd absorbed systemically is rapidly accumulated in the liver, which resulted in the reduced availability of Cd to such organs as the kidneys and testes, which are more sensitive to its toxic actions [25].

The hypatotoxicity involves two pathways, one for an initial injury produced from direct effects of the metal and the other for the subsequent injury produced by inflammation. Primary injury is produced by the binding of Cd to sulfhydryl groups on critical molecules in mitochondria, causing oxidative stress, the mitochondrial permeability transition, and decreased mitochondrial respiration.

Hepatocellular injury occurs because damage to endothelial cells disrupts the microcirculation and causes ischemia. Secondary injury from acute cadmium exposure is thought to occur from the activation kupffer cells and a complex series of interactive events with a large number of inflammatory and cytotoxic mediators[24].

The histopathological studies of the liver section in cadmium group showed mononuclear inflammatory cells infiltration of in the portal area, infiltration of neutrophils and mononuclear cell around dilated and congested blood vessels, congested blood vessels and necrosis of hepatocytes, which is a damage to membranes by severe, lysosomal enzymes enter the cytoplasm and digest the cell, and cellular contents leak out. That might happen due to oxidative stress and increase the tension on cells membrane lead to lake out of lysosomla content [26].

Histological alterations in liver tissues like degeneration of hepatocytes, vacuolization, congestion of hepatic tissues, subcapsular vacuolization, necrosis, were observed in the liver of mice exposed to Cd.

The initial lesion in the liver during the present study might be due to physiological changes that took place in the liver tissue in the process of trying to homeostatistically regulating and detoxifying the Cd metal during continuous exposure.

In hepatic tissue, the histological alterations noted during the sub chronic Cd exposure as focal necrosis, increased condense and fragment nucleus, cellular necrosis and ruptured hepatic tissue in Cd group. These findings are consistent with cadmium inducing greater hepatic alteration. Further, in this study identified alterations of the liver cells may be the result of diverse biochemical alteration in liver following the Cd toxicity that act as a signal of degenerative processes that suggests metabolic damage also [27].

In addition to above chances vacuolation of hepatocytes is also noted which is suggested to be associated with the inhibition of protein synthesis, energy depletion or a shift in Cd as a poisonous metal that promotes early oxidative stress and later contributes to the development of serious biochemical and pathological conditions because of its long retention in some tissues.

In the present work, the administration of Cd resulted in severe hepatocyte necrosis, fatty changes, degeneration signs and inflammatory cell infiltrations. These results are similar to those reported previously in the literature [28].

Conclusion

Zinc sulfate at low dose might act as antidote in case of cadmium toxicosis this was supported by the result of clinical physiological as well as the level of zinc and cadmium in liver.

Conflict of Interest: There was no conflict with this paper

Funding: Self

Ethical Clearness: This work done under the rule of ethics for management laboratory animals submitted by university of Baghdad - college of veterinary medicine.

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Correlation Between Glugometer and Laboratory Methods in Measuring Capillary and Venous Blood Glucose Levels in Type 2 Diabetic Patients

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Abstract

Objectives: The aim of the study was to investigate the correlation between levels of blood glucose in samples taken from patients with type 2 diabetes mellitus measured by instrument for self-monitoring of blood glucose (glucometer) and by laboratory methods (photometric method or enzymatic colorimetric method). **Method:** One hundred patients with type 2 diabetes mellitus (T2DM) who were attending a privet medical laboratory during the period December 2017 to March 2018 were participated in the present study. Among the participants, 46 were female with an age range of 40-80 years and a age mean of 53.10± 10.61 years .The male patients were 54 with an age range of 40-79 years and a age mean of 51.17± 9.74 years. Venous and capillary blood glucose levels were determined by laboratory methods and glucometer for each participant. **Finding :** The mean of photometric venous blood glucose (PVBG) was 163.88 ±107.06, Glucometric Venous Blood Glucose (GVBG) was 190.95 ±123.96 mg/dl, Photometric Capillary Blood Glucose (PCBG) was 171.53±116.52 mg/dl, and Glucometric Capillary Blood Glucose (GCBG) was 193.69±123.21 mg/dl. The obtained data was analyzed by Lin's concordance correlation coefficient. Concordance correlation coefficients (r_c) were 0.94 for PVBG vs GVBG and 0.97 for PCBG vs GCBG.***Conclusion:***

The results obtained in this study showed that the values of blood glucose level determined by glucometer are close to the values determined by laboratory methods. Moreover, a positive correlation coefficient showed strong association between capillary and venous glucose measurements.

Keywords: *glugometer; laboratory methods ; capillary ; venous; blood glucose ; type 2 diabetic patients*

Introduction

In a global report on diabetes, WHO has noticed an increase in both the prevalence of diabetes and the number of diabetic people. The report has emphasized the need of sufficient lifelong management and regular follow-up for diabetic patients so they can have healthier lives [1].

It is well known that diabetes is associated with complications such as blindness, cardiovascular disorders, limb amputation and nephropathy [2].

Reaching a reasonable glucose control in patients with diabetes depends on the availability of blood glucose (BG) level knowledge. To get this knowledge, patients may check their BG level at hospitals or privet medical laboratories where biochemical methods are applied to measure BG levels [3].

Regular self-monitoring of blood glucose (SMBG) by diabetic patients was recommended by clinical guidelines as a tool for self-management [4]. Self-monitoring of blood glucose has been considered as a fundamental part of self – management and diabetes care as it has many benefits .These benefits include the use of SMBG for the detection of serious hyperglycemia and as an advance notice to detect hypoglycemia. Moreover, real-time data can indicate the effects of life style, such as diet and physical activity, on blood glucose levels[5]

Rapid blood glucose determination has become a requirement for treatments and dose adjustments. Laboratory methods to measure plasma glucose levels are time consuming. Therefore, the use of glucometers has greatly increased [6].

Using glucometer device in SMBG makes it a process where Blood Glucose (BG) is checked by the patient himself. As an out-come of using glucometers, the patients are participating in the therapy process and hence they would have a better life quality [2]

Beside better glycemic management, the benefits of using glucometers include simple usage and operation and the need of one drop of blood. These benefits are not reduced by doubts regarding the precision and accuracy of the devices [2].

According to the international organization for standardization (ISO) acceptable error for a glucometer be within ± 15 mg/dl when laboratory glucose levels are <100 mg/dl; and the acceptable error should be within 15% for laboratory values ≥100mg/dl[6]

The present study was conducted to investigate the correlation between blood glucose concentrations determined by a glucometer and blood glucose levels obtained by laboratory method.

Materials and Method

Measurements were based on two types of blood samplings, venous blood sampling and finger-prick blood sampling. Blood glucose levels of samples collected by the later method of sampling were determined by glucometer and capillary laboratory method.

For the laboratory (photometric) blood glucose level measurements, a 3.5 ml of venous blood samples were collected from participants by applying the blood drawing at the median cubital vein, whenever possible, following normal protocol. A small portion of each sample was used to measure glucose concentration with glucometer. Sodium fluoride was used as glycolysis inhibitor. Blood samples were kept in an appropriate conditions and environments for subsequent analysis.

Capillary sampling from a finger was performed for each and every participant. The entry site was disinfected; the skin was punctured with a lancet. The first drop of blood was wiped away then a blood sample was collected with a capillary tube. A micro hematocrit centrifuge was used at 12000 rpm to separate serum.

The blood glucose levels were determined using an enzymatic colorimetric method according to the kit's protocol using a spectrophotometer .The kit type Linear (LINEAR CHEMICALS, SPAIN) was purchased from local markets.

Glucometric measurements of blood glucose level were performed using a Glucometer (ACCU-CHEK Active Mannheim, Germany). Glucometric measurements were applied for capillary blood glucose (GCBG) and for venous blood samples (GVBG).

Photometric measurements of blood glucose level were performed using a Uv/Visible Spectrophotometer (Type Apel – china). Photometric measurements were applied for capillary blood glucose (PCBG) and for venous blood samples (PVBG).

Finding

One hundred diabetic patients were participated in this study. In table 1 the statistical data of the participant are presented.

Table 1-Statistical data of the participant patients

	Female	**Male**	**Total**
Sample size	46	54	100
Age range, Years	40-80	40-79	40-80
Mean ± s.d*., years	53.10 ± 10.61	51.17 ± 9.74	± 10.16

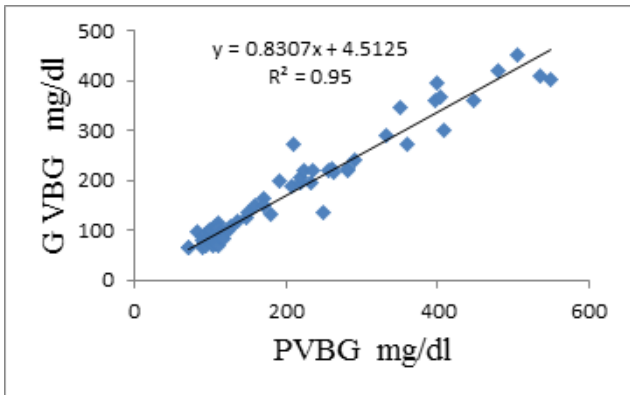
*standard deviation

The experimentally obtained blood glucose levels that were measured by glucometric and photometric techniques are summarized in table 2. The mean value of venous blood glucose level and capillary blood glucose level along side with standard deviation are given in table 2.

Table 2. Comparison of different glucose level determination methods. methods and the corresponding correlation coefficients

	Venous blood		Capillary blood	
	Glucometer	**Photometric**	**Glucometer**	**Photometric**
Mean Glucose level ± s.d. mg/dl	190.95 ±123.96	163.88 ±107.06	193.69 ± 123.21	171.53 ±116.52
Correlation coefficient ,R^2	GVBG vs PVBG		GCBG vs PCBG	
	0.95		0.992	
Concordance correlation coefficient, r_c	0.94		0.97	

To assess the strength of association between the glucose levels obtained by the two measurements methods, the linear correlation coefficient R^2 were determined from the linear plots of GVBG vs PVBG and GCBG vs PCBG which are shown in figure 1-a and figure 1-b respectively.



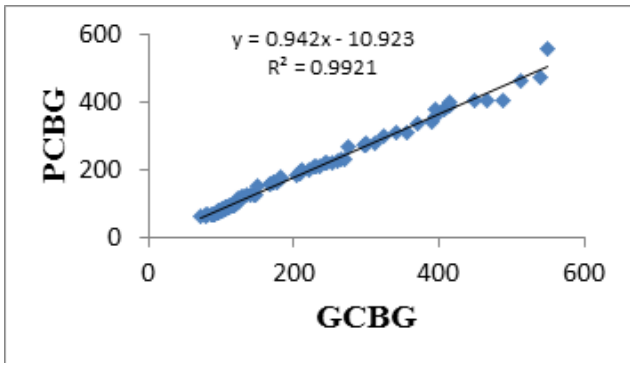


Figure 1- linear correlation plots of : a –PVBG vs GVBG and . b- PCBG vs GCBG

The values of the square of the correlation coefficient, R^2 are given in table 2 These values indicate a high association between glucometric and photometric methods used for blood glucose level measurements. The case of PCBG vs GCBG showed higher association, as the corresponding R^2 has a value of 0.992, in compression to PVBG vs GVBG case where R^2 has a value of 0.95.

The obtained data were further analyzed by the procedure which calculates Lin's Concordance correlation coefficient [7]. The procedure assumes that n observations Y_k and X_k are selected from a bivariate population. Here Y represents a measure from a candidate method and X represents the corresponding measure of the standard test or method, in the present study it is the photometric method. The degree of concordance (agreement) between the two measures is represented by the value of r_c which can be estimated from the formula :

$$r_c = \frac{2S_{XY}}{(Y-X)^2 + S^2_Y + S^2_X}$$

The statistic, r_c , is an index of how well a new test or measurement (Y) reproduces a standard test or measurement (X). It quantifies the agreement between these two measures of the same variable. The values of a correlation, r_c ranges from -1 to 1, with perfect positive agreement at 1[7].

Concordance correlation coefficient (r_c) analyses values are presented in table-2. Those values showed moderate agreement between GVBG and PVBG with r_c value of 0.94. A strong agreement was observed for the correlation between GCBG and PCBG as the corresponding r_c values was 0.97.

Conclusion

The results obtained in this study showed that the level of blood glucose determined by glucometer is close to the blood glucose level measured by laboratory methods. Moreover, a positive correlation coefficient showed strong association between glucometric and photometric methods.

The concordance correlation coefficient (r_c) showed a high agreement between laboratory methods and the use of glucometer.

Hence, from the obtained results of the current study it may be concluded that use of glucometer is benefiter for glucose self monitoring to asses the control of blood glucose level for diabetic patients.

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Conflict of Interest : Non conflict of interest with any side

Source of Funding : Self source

Ethical Clearance: Nil

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Effect of *Toxoplasma gondii* Infection on DNA Sequence among patients with Testicular Cancer

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Abstract

This study was conducted on 20 testicular cancer patients who visited the Al-Barraa privet Laboratory and Al- Sharika Labratory / Baghdad, with mean age of (27.77 ± 6.01) years. The ELISA technique was used to detect toxoplasmosis, and tumor biopsies were taken from 6 patients. The PCR amplifications of the "PIK3CA" gene were performed. The primers were used for exon 9 amplification. During the exon 9 PIK3CA gene amplification process, the first pair of the used primers included PIK3CA-9F-1, "5′- GTATTTGCTTTTTCTGTAAATCATCTG-3" and "PIK3CA-9R-1, 5′ CATGCTGAGATCAGCCAAATTC-3′′. The determination of PIK3CA genome was done by nested polymerase Chain Reaction using primers of PIK3CA gene with amplicon size 161bp. The "oligonucleotide" was tested at 0.05, 0.075 and 0.10 µmol/L concentrations, while ""LNA oligonucleotide" was tested at 0.075 and 0.0375 µmol/L concentrations for *PIK3CA* exon 9", which showed optimal detection for the *PIK3CA* exon 9 LNA mutation.

Key word: *Toxoplasma gondii, Testicular Cancer, DNA sequence.*

Introduction

Toxoplasmosis is a serious condition in which individuals are infected and may then suffer from cancer [1,2]. Toxoplasmosis can reach to most organs of the human body and the latest genetic change in some of these organs may result in carcinoma [3].Testicular cancer is the heterogeneous disorder which was historically shown to be challenge for classification [4]. High levels of their heterogeneity is explained by the emergence of pluripotent germ cell lines, and by long time interval when the oncogenic mutations assemble prior to the quickly invasion growth during or post puberty stage [5]. "TGCT originates from the aberrant arrested fetal gonocyte", which does not progress into "spermatogonium appropriately after birth". During puberty and childhood, this arrested gonocyte shows oncogenic adaptation, which then become germ cell neoplasia in situ (GCNIS) during childhood and adulthood, which then emerges as an invasive TGCT during young adulthood. During the early childhood, GCNIS can be identified histologically, but during the young childhood, it is challenging and difficult to be differentiated from the normal germ cells [6]. In general, histologic classification shows two subtypes of "TGCT", the "Seminoma and "Non-Seminoma" TGCTs. The seminoma is a homogenous cancer similar to the undifferentiated gonocytes, and accounts for about (55%) of the TGCTs, and its peak incidence occurs at the age group (35-39) year, while a "non-seminomatous germ cell tumor "(NSGCT)" constitutes about "(44%)" of the "TGCTs" and in general, they are more aggressive than seminomas, and diagnosed at younger ages "(25-29)" years. The heterogeneity of "NSGCT" composition reflects its dysregulation in differentiation into embryonic cancers, "choriocarcinomas, teratatomas and yolk sac tumors" [7]. The combined or mixed tumors are the tumors which contain both NSGCT and seminoma and classified as a NSGCT subtype. TGCT is usually defined as the curable model of cancer, which is has an exquisite susceptibility to chemotherapy, and has more than (95%) survival rate. Chemotherapeutical treatment of TGCT is usually associated with the morbidity and complications such as infertility, metabolic syndromes or cardiovascular diseases [8].

Materials and Method

In the current study, 20 testicular cancer patients were enrolled. The tumor biopsy specimens were taken from 6 patients, and the other 14 patients were analyzed

for *"PIK3CA"* mutations using PCR. *Elisa technique was used for detection of toxoplasmosis*. In the exon "9 PIK3CA" gene, the "prescreening for mutation detection was done by using direct DNA sequencing", as previously described. Further analysis was conducted on specimens with mobility shifts by the direct DNA sequencing on automated sequencing systems from ("ABI PRISMTM 3100 Genetic Analyzer, Applied Biosystems, Hitachi, Japan") using the "ABI PRISM Big Dye" Terminator version 1.1 Cycle Sequencing Ready Reaction Kit from (Applied Biosystems, Branchburg, NJ, USA).

Statistical analysis:

The Microsoft Office Excel 2007 and SPSS version 16 programs were used for data analysis. The numeric data were expressed as mean ± SEM (standard error of means). The P value (< 0.05) was considered as significant.

Results

Table (1) shows the distribution of testicular cancer according the age groups and residency of patients.

Table (1): Distribution of patients according to age groups and residency

Age groups	No=20))	100 %
(45-49)	5	25.0
(50-59)	5	25.0
(60-69)	6	30.0
(70-75)	4	20.0
Residency		
Rural	12	60.0
Urban	8	40.0

Table (2) "shows the mean toxoplasma (IgG) and (IgM) antibodies detected by ELISA technique".

Table (2): Mean toxoplasma (IgG) and (IgM) antibodies detected by ELISA technique

Disease	Mean IgM	Mean IgG
Toxoplasmosis	(0.48 ± 0.23)	(0.38± 0.20)

During the "exon" "9 PIK3CA" gene" amplification process, the first pair of the used primers included "PIK3CA-9F-1", "5′-GTATTTGCTTTT-TCTGTAAATCATCTG"-3′ and "PIK3CA-9R-1, 5′ CATGCTGAGATCAGCCAAATTC-3′" as shown in figure (1).

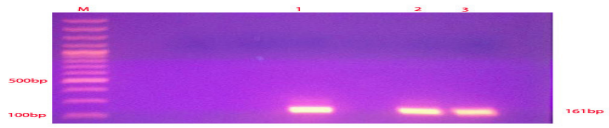


Figure (1): Determine of PIK3CA genome by nested polymerase Chain Reaction using primers of PIK3CA gene.

M: 100 bp DNA ladder (M). Lanes: (1-8) positive isolates (161 bp). At 2.5% agarose gel.

The Electrical current is equal to 60 volte at 30minutes.

Analysis of *PIK3CA* gene

The "oligonucleotid"e was tested at "0.05, 0.075" and "0.10 µmol/L" concentrations, while "LNA oligonucleotide" was tested at "0.075" and "0.0375" µmol/L concentrations for "*PIK3CA* exon 9", which showed optimal detection for mutation as seen in table (3).

Table (3): Polymerase Chain Reaction of *PIK3CA* Exon 9

"PIK3C4 Exon"	"Mutation"	"Nucleic acid"	"Sensitivity with" "LNA probe"
9	"E545K"	"GAC > AAG"	1.0%
	"E545D"	"GAG > GAT"	2.5%

Discussion

Testicular cancer is one of the most common condition observed in the elderly age. Involvement of *Toxoplasmosis* with this testicular histological change is controversial. Our study revealed that the (45-75) years age group is more infected with this disease. Epidemiology is one of the common conditions in Iraq and people suffering from this disease may suffer from other physical complications. This finding agreed with Jenna E. Boyd who found that there are many complications that may take place following the treatment of this malignant tumor [9].

Toxoplasmosis is an age-problem disease that affects most body parts causing apparent damages, and can be very serious causing malignant tumors [3]. Several body organs develop multiple impairments due to the migration of toxoplasma tachyzoites [10]. Thus, cancerous tumors can affect different parts in the body because of toxoplasmosis [11]. Several genetic mutations may take place due to the relationship between toxoplasmosis and various body organs and tissues accompanied by tissue alteration, which matches with the report of Ramakrishnan, Ch. *et al,* 2019, who demonstrated that *Toxoplasma* happens at the site of occupation to the body as a result of its interaction with the body tissues [12]. In our study, the genetic mutations were found in the gene E545K in Nucleic acid GAC > AAG and E545D gene in Nucleic acid GAG > GAT, in PIK3C4 *Exon* 9, where this genetic mutation occurred in this site of the genetic sequence of the DNA of the testicular tissue. Existence of *Toxoplasma gondii* at the affected site reinforced the genetic mutation in the testicular tissue. These findings agreed with Jun Zheng et al, 2019 who showed that A TCTP-like gene was detected in the genome of Toxoplasma [Toxoplasma gondiiTCTP (TgTCTP)], despite its unknown unknown function [13]. This means that the alteration in the epidermal tissue's genetic sequence is due to the existence of toxic toxoplasmosis precisely at the injury site, which can be attributed to the weak immune system of the infected individual, and thus leading to that malignant tumor.

Ethical Clearance: Taken from patients

Source of Funding : Self

Conflict of Interest : Non

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Correlated level of interleukin (IL_10) with Allergic Rhinitis and Effect Study of Steroid in its Levels

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Abstract

Background: the allergic rhinitis or hay fever, is the most common diseases or type of allergic, often associated with runny nose ; nasal congestion; sneezing ; sinus pressure and eye problems, that similar to cold, so in recent years allergic rhinitis increased in Iraqi population, because many important factors. The aims of the current study were to assessment (IL_10) in Patients serum and study the effect of Steroid in Its Levels.**Patients and method**: Patients' serums were collected form Salah Aldin General Hospital during period (November ,2018 - March, 2019) a total of 44 patients Suffering from Allergic rhinitis after diagnosis by physician ENT Specialist and control group included 32 (healthy person), the serum IL_10 levels that measured by theELISA (Beckmancompany, USA) according to the manufacturer's protocols (IL_10 ELISA kits), All samples are detected in duplicate. **Findings:** Mean of age ± Standard division was (29.17±7.65) compare to control 30.23±8.90 , high incidence allergic rhinitis in males 29(65.9%) than females 15(34.1%) , also in control group ;males18 (56.3 %)more than females14 (43.7 %); P<0.01. Also Results in of current study showed significant decreased levels of interleukin(10) in serum of Patients with allergic rhinitis as (8.21 ± 0.25), compare to control group (healthy persons) as(11.67 ± 0.33) differed significantly (P<0.01), but significant increased level of IL_10 (10.06 ± 0.23) in serum of Patients with allergic rhinitis who received gluococorticoid (steroid) Patients compare to Patients before received gluococorticoid (steroid), a differed significantly (P<0.01). **Conclusion:** high incidence Allergic Rhinitis in males than females. decreased level of (IL_10) in serum with allergic rhinitis but increased levels of IL -10 in Patients serum with allergic rhinitis who received gluococorticoid (steroid) Patients compare to Patients before received gluococorticoid (steroid).

Key words: *Patients ; Allergic Rhinitis ; Steroid ; IL10 Levels*

Introduction

The allergic rhinitis (AR), is a common disorder which is linked as strongly to conjunctivitis and asthma, nearly 500 million people in worldwide suffering from AR[(1)], so AR is I.g.E-mediated chronic inflammatory, which is considered a classic Th2-mediated disease[(2)]. the symptoms of allergic rhinitis asnasal obstruction ; nasal itching;sneezing as well as rhinorrhea.

Also the nasal and ocular symptoms directly related to the allergic process, as well as leads to sleepiness during the day and less the quality of live because of symptoms[(3)] .

Allergic rhinitis to development requires an interaction between: immune system ;environment factor as well asgenetic susceptibility. the Allergen inducing proliferation of Th-2 lymphocyte in patients with allergies with releasing of their characteristic combination of cytokines including interleukins IL(3; 4; 5 ; 9; and 13). These substances promoting producing the I.g.E and mast cell. Mucosal mast cells which producing the IL (4 ; 5 and 6) and tryptase proliferate in the allergic epithelium[(4)]

The importance of the Th2-type cells, (Th2) cytokines in both pathologies of allergic inflammation and the development the allergic sensitization and well established[(5)].The inflammatory response in the nasal mucosa in patients with allergic rhinitis, that challenging intranasally with the allergen including"immediate I.g.E-mediated mast cell response" and late-phase

response characterized by recruitment of basophiles; eosinophils[6].

Corticosteroids, one important type of steroid hormones, which taken as topical creams; nasal sprays ; pills as well as long-lasting injections. Glucocorticosteroids exert anti-inflammatory effects via at two pathways: transrepression pathway and transactivation pathway, so glucocorticosteroids exert regulatory functions by inducing regulatory cytokines and for khead box P3 (FoxP3) regulatory T-lymphocyte[7,8] .

Patients and methods:

Sample collection: Patients' serums were collected form Salah Aldin General Hospital during period (November ,2018- March, 2019) a total of 44 patients Suffering from Allergic rhinitis (A.R), with average age (29)years after diagnosis by physician ENT Specialist and control group included 32 healthy person who don't suffering from any infections(healthy persons) with average age (30) years.

Detection level of interleukin -10: levels of (L-10) were measuring by the ELISA (Beckman_USA) according to manufacturer's protocols (IL_10 ELISA kits), by pre-coated microtiter plate with an antibody specific to IL_10 , after then added the samples and standard to appropriate wells, then added to each wells in microtiter plate the biotin conjugated antibody and avidin conjugated to Horseradish peroxidase(HRP) and incubation, then adding TMBsubstrate solution for wells. terminated enzyme substrate reaction by adding sulphuric acid solution and by spectrophotometrically measure the colour change at a wavelength (450 nm). concentration of Interleukin-10 in serum of patients determine by compare O.D of samples with standard curve. All samples are detected in duplicate.

Data Analysis

The Statistical Analysis System- SAS (2012) [9] program was used to effect of difference groups in serum IL_10 in allergic rhinitis patients and effect of steroid in its levels. y.

Findings

Table 1: Demographic of the study groups (patients) and control group (healthy).

Variable	Patients	Control	p.value
Age (M ±S.D)year	29.17±7.65	30.23±8.90	P<0.01
Gender			
Males	29 (65.9 %)	18 (56.3 %)	P<0.01
Females	15 (34.1 %)	14 (43.7 %)	
Total	44 (100 %)	32 (100 %)	

Table (1) showed the mean of age ± Standard division was (29.17±7.65) compare to control (30.23±8.90), as well as results in this table showed high incidence allergic rhinitis in males 29(65.9%) than females 15(34.1%) ,also in control group the males18 (56.3 %) and the females14 (43.7 %) ; P<0.01.

Table 2. levels of IL_10 in serum of patients with control group .

Study groups	Level of IL_10 Mean of concentration ± SE (pg/ml)
patients with allergic rhinitis	8.21 ± 0.25
Control (healthy)	11.67 ± 0.33
P-value	0.0001
** (P<0.01)	

Results in table (2) showed significant level decreased of IL(10) in serum patients who have allergic rhinitis as (8.21 ± 0.25) , compare to control group (healthy persons) as(11.67 ± 0.33) differed significantly (P<0.01) (fig.1).

Table 3. Levels of (IL_10) in serum of patients with allergic rhinitis before and after received steroid

Study groups	Level of IL_10 Mean of concentration ± SE (pg/ml)
Patients before received steroid	8.21 ± 0.25
Patients after received steroid	10.06 ± 0.23
LSD value	0.761 **
P-value 0.0001	
** (P<0.01)	

Results in table (3) showed significant increased level of IL_10 (10.06 ± 0.23) in serum of Patients with allergic rhinitis who received gluococorticoid (steroid) Patients compare to Patients before received gluococorticoid (steroid), a differed significantly (P<0.01) (fig.1).

Discussion

Rhinitis is a common disorder is broadly defined as inflammation nasal mucosa. Current study showed high incidence Allergic Rhinitis in males than females,It affects more than 40% of the population of world[10]. The high incidence of new-onset AR was the youngest age group (20-29) years[11] .

Results in of current study showed significant decreased levels of IL_10 in patients serum with allergic rhinitis as (8.21 ± 0.25) , compare to control group (healthy persons) as(11.67 ± 0.33) differed significantly (P<0.01), but significant increased level of IL_10 (10.06 ± 0.23) in serum Patients who received gluococorticoid (steroid) Patients compare to Patients before received gluococorticoid (steroid), a differed significantly (P<0.01).

Whilst other studies, showed no significant difference was detected in Patients with allergic rhinitis and the control[12] .The efficacy of immune therapy for seasonal allergy rhinitis is confirmed but still not in perennial allergy rhinitis in UK, Immune therapy indicated: Evidence of I.g.E mediated disease ; Inability to avoid allergies ; Failure of drug therapy ; Compliance[13].IL10 decrease in Allergic rhinitis so there's reverse relation between IL10and I.g.E. IL10inhibits IL_2 and IL_5 production by $TH_1$and TH_2 , so it act as immune suppresser, and the IL10increase in patient received Glucocorticoid therapy (both act as immune suppressor), short course of oral prednisolone (20 mg) for (5) days are very effective for seasonal symptoms[13], administration of IL10 during allergic attack significantly reduced eosinophils and Mast cells as well as type2 cell helper that leading to decrease the inflammatory process, so it will reduced allergic rhinitis[13], as well as many previous studies showed significant increase in IL10 after immunotherapy [14]

The sodium cromoglycate or Cromolyn have the ability for educing sneezing; rhinorrhea and nasal itching , therefore a reasonable therapeutic option for patients, also anti-I.g.E antibody omalizumab has effective for asthma and seasonal allergic rhinitis[10]. So many studies appearance the relationship between cytokines with AR as IL-4 and IL-13[15].Corticosteroids are worked by decrease inflammation and suppress immune response[16] .

As well as therapy by glucocorticoid caused inducing the T-lymphocytes apoptosis in peripheral lymphoid organs and down-regulated adhesion molecules, and causing reduce the migrated T cells to the site of inflammation[17].

Conclusion

High incidence Allergic Rhinitis in males than females.

Decreased level of (IL_10) in serum of AR patients as but significant increased level of (IL_10) in serum of AR patients who received gluococorticoid (steroid) Patients compare to Patients before received gluococorticoid (steroid).

Recommendation :future study about consider IL_10 as a part of immunotherapy for patients with allergic rhinitis.

Ethical Clearance: from research ethic committee in Tikrit university/college of medicine

Source of Funding : Self

Conflict of Interest : None

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Association of Hyperuricemia with Knee Osteoarthritis and Generalized Osteoarthritis in Iraqi Patients

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Abstract

A number of 288 osteoarthritis patients involved in this study, their ages, sex, BMI .serum uric acid levels are recorded, knee joints x ray done for them, and classified into 5 grades (grade 0-grade4).serum uric acid level classified into 3 classes (low2.5.normal 2.5-6, high more than 6 mg\dl) establishing the diagnosis of knee degenerative arthritis according to criteria of ACR (American college of rheumatology. The aim of the stud was to find relation between serum uric acid level with knee osteoarthritis and generalized osteoarthritis in Iraqi patients . in this cross-sectional study, 288 patients involved their ages ranged from 45-90 years old mean age 67.5 years; female patients were 216 (75%). Mean age of females 62.5 years. Male patients 72 (25%). Mean age of males 67.5 years. The study shows highest rate of knee OA patients and generalized OA (76.21%,63.16 respectively) have normal level of uric acid ,while only low rate of knee OA patients and generalized OA(21.93%,31.58 respectively)have high level of uric acid which was NS (P=0.547) This cross sectional study conclude that there was no association between hyperurecemia and knee osteoarthritis nor generalized osteoarthritis

Key words: *hyperurecemia, knee OA, Generalized OA.*

Introduction

The risk of mobility and disability attributable to osteoarthritis (OA) alone is greater than any other medical condition among elderly [(1)]. The prevalence of OA that are symptomatic varies between 7 and 26% dependent on the site and definition of OA [(2)]. The burden of OA has been increasing in the past two decades worldwide and its prevalence is projected to be nearly double in the next decade [(3)]. Current treatment paradigms are limited to palliative measures broadly focused on analgesia and joint replacement for end stage disease. Gout is a crystal-induced arthritis caused by deposition of the monosodium uric acid crystal (MSU) related to long standing hyperuricemia. It is also a common inflammatory arthritis affecting around 5% of the middle-aged and elderly population worldwide [(1)]. The association of uric acid and OA has long been observed, and a pathological link between gout and OA has been hypothesized [(4)]. Aging and obesity are significant risk factors shared by both OA and gout, and may confound the association between both conditions[(5-7)]. Degenerative arthritis is the most well known joint arthritis worldwide[(1)]. The link with age, weight, gender and metabolic parts has been studied. [(3)]. These investigations demonstrated a relationship of degenerative arthritis with increase in body weight. A portion of these examinations represented serum uric acid and found no relationship among it and OA [(5)]. Davis *et al* explored a significant relationship among knee degenerative arthritis and uric acid yet a little one not achieving noteworthy level[(2)]. Sun Ye *et al* particularly explored serum uric acid association with osteoarthritis and presumed that albeit uric acid was related with generalized degenerative arthritis in patients experiencing hip substitution, there have been no relationship with knee degenerative arthritis or respective hip or knee degenerative arthritis[(8)]. Others revealed a relationship with degenerative of different joints[(9)]. While a study done in Saudi Arabia found a conceivable relationship among hyperurecemia and knee and generalized OA[(11)]. Suad A *et al* found a relationship between uric acid dimension and knee OA[(12)]. The aim of he current study was to explore the connection among serum uric acid and knee and generalized degenerative arthritis in Iraqi population.

Methodology

The present investigation included 288 patients seeing by rheumatologists in two noteworthy healing centers (Azadi Teaching Hospital and Kirkuk General Hospital) in Kirkuk city in the north of Iraq. Their age, sex, weight index (body mass index) (weight in kg separated by the square of length in meters), serum uric acid were recorded. Body mass index grouped by World health organization into following classes: Table 1.

Establishing a patient suffering from knee OA were according to 'The American College of Rheumatology criteria for diagnosis of rheumatic diseases' and these are:

- Knee pain.
- Osteophytes on X-ray.
- Crepitus on knee range of motion.
- Morning stiffness of short duration (<30 min).

Inclusion Criteria

Patients within the age group of 45-90 years of both sexes, who were suffering from primary Knee OA, were included in the study.

Exclusion Criteria

Patients aged less than 41 years and more than 90 years,

Pregnant women and those suffering from secondary OA,

Rheumatoid arthritis, Diabetes Mellitus, Renal insufficiency, Hepatic disease, gout or with any other systematic disease were excluded from the study.

Blood samples along with the radiographs of the knee joints were also taken. The presence of degenerative arthritis was defined as having stage 2 or more of the Kellgren-Lawrence grading system1957):13. Radiographic appearance of knee joints, the patients was categorized into four stages according to KL staging system (Kellgren and Lawrence.

Kellgren and Lawrence grading system for OA:

1-stage 0- Normal

2-Stage 1-Doubtful narrowing of the joint space and possible

Osteophytic lipping

3-Stage 2-absolute osteophytes and possible decreasing in joint space.

4-Stage 3-Moderate multiple osteophytes, definite narrowing of the joint space, some sclerosis and possible deformity of the bone contour

5-Stage 4- Large osteophytes with marked narrowing of the joint space, severe sclerosis and definite deformity of the bone contour.

Generalized degenerative arthritis was outlined as the coincidental presence of radiographic changes of knee and hand degenerative arthritis.

Laboratory investigations

Blood tests were permitted to cluster and after that centrifuged at3000 rpm for 30 minutes to get serum uric acid levels were evaluated by spectrophotometer strategy

The serum uric acid qualities were arranged into tertiles (low, normal. Abnormal states), (2, 5-6) mg\dl. Low less than 2.5 mg\dl while abnormal state more than 6 mg\dl.

Also, balanced for age, sex, knee OA and generalized OA, utilizing the Q square investigation strategy.

Findings

A number of 288 patients involved in this cross sectional study their ages ranged from (45-90) mean age 67.5 years; female patients were 216 (75%). Mean age of females 62.5. Male patients 72 (25%), mean age of males 67.5. the study shows highest rate of knee OA patients and generalized OA (76.21%,63.16 respectively) have normal level of uric acid ,while only low rate of knee OA patients and generalized OA(21.93%,31.58 respectively)have high level of uric acid which was NS (P=0.547), Table:2.

In this study we found that 6 female patients (2.78%) has low level of uric acid and 180 female patients (83.33%) have normal level .and 30 female patients (51.39) have high uric acid level. while 35 patients (48.61%) of male have an high level of uric acid and 35 male patients (48.61) have high level of uric and no

one of the have decreased level. The result was highly significant (P: 0.0001)(Table-3)

The study shows that the highest mean level of uric acid was observed in male patients comparing with females (6.087±0.190 V.S 4.577±0.81 mg/dl) with highly significant relation(Table-4).

In Table 5, there was no significant relation between knee O A and generalized O A regarding the sex and 94.44% of males have knee O A and 93.05% of female have knee O A. BMI ≤30was observed in 101 Knee OA (91.1%) and 9generalized OA (8.9%). BMI>30was in 178 knee OA (95.2%) and 9generalized OA (4.8%).P value=0.17 NS .table 6.

Table 1: Classification of body mass index (BMI) by WHO.

BMI	**Classification**
<18.5	underweight
18.5-24.9	normal
25.0-29.9	overweight
30.0-34.5	Obesity(class I)
35.0-39.9	Obesity(class II)
>40	Extreme obesity (class III)

Table 2. Relation of knee O A and generalized O A with uric acid level.

Sex	**No.**	**Uric acid level (mg /dl)**						***P.* value**
		Low		**Normal**		**High**		
		No.	**%**	**No.**	**%**	**No.**	**%**	
Knee O A	269	5	1.86	205	76.21	59	21.93	0.547 (non significant)
Generalized O A	19	1	5.26	12	63.16	6	31.58	

Table 3: Distribution of uric acid level in O A patients according to their sex.

Sex	**No.**	**Uric acid level (mg /dl)**						***P.* value**
		low		Normal		High		
		No.	%	No.	%	No.	%	
Male	72	0	0	37	51.39	35	48.61	0.0001 Highly significant (HS)
Female	216	6	2.78	180	83.33	30	13.89	

Table 4: Relation of uric acid mean level with sex

	Sex				*P.* value
	Male		Female		
	No.	Mean ± S.D	No.	Mean ± S.D	
Uric acid level (mg/dl)	72	6.087±0.190	216	4.577±0.81	0.001 (HS)

Table 5: Relation of O A status with sex

Sex	No.	Knee O A		Generalized O A		*P.* value
		No.	%	No.	%	
Male	72	68	94.44	4	5.56	0.918 Non significant
Female	216	201	93.05	15	6.95	

Table 6: shows the relation between BMI with knee OA and generalized OA.

BMI (kg/m^2)	No.	Knee O A		Generalized O A		*P.* value
		No.	%	No.	%	
≤ 30	101	92	91.1	9	8.9	0.17 (NS)
>30	187	178	95.2	9	4.8	

Discussion

In this cross sectional study we found no relationship among hyperurecemia and knee O A or generalized O A as reported before hand [3,5]. Additionally Palazzo al [6] discovered that the elements, including: diabetes mellitus, ischemic coronary illness, hypertension, physical action, conjugal status, serum uric acid, triglycerides, cholesterol and blood glucose levels) did not correspond to radiographic O A , Howard [10] inferred that (serum uric acid dimension not related with OA of knee in men). Iqbal et al [11] found in study (In all classes of knee OA serum uric acid was no significantly increased). We believed this no relationship between uric acid dimension and knee OA could be because of high serum uric corrosive in patient will prompt arrangement of uric acid crystals in the joint along these lines quicken the advancement of gouty joint inflammation which is an inflammatory arthritis, while knee OA is the most well-known type of non inflammatory joint diseases.

Different studies found a conceivable relationship among hyperurecemia and knee OA. Al-Arfaj *et al* [13], Anderson *et al* [14], Ding *et al* [15], in their studies presumed that serum uric focus and predominance of hyperurecemia are emphatically connected with OA of the knee in the female population. We additionally found a relationship between knee OA and obesity as announced already by Srikanth *et al* [16] noted positive associations of uric acid concentration with OA, but these associations became insignificant when body mass index (BMI) was controlled as confounder. On the other hand, uric acid levels at the highest tertile may be associated with OA. In a cross-sectional study, the highest serum uric acid tertile were associated with generalized OA in subjects who had undergone arthroplasty for hip OA, but not with those who had undergone arthroplasty for knee OA [1-2]. We found higher rate of knee OA among female patients as revealed beforehand by Srikanth *et al* [16] indicated that there is more serious hazard in females for common and episode knee and hand. There

was no connection between radiological evaluations of knee OA and serum uric acid dimension. Another cross-sectional study involving over 4,000 participants in China has shown that women with the highest tertile of uric acid showed the highest degree of radiographic features suggestive of knee OA after adjusted for various confounding risk factors including BMI [17]. Bevis *et al* [17] sowed in a multivariable logistic analysis model was applied to test the target associations after adjusting a number of potential confounding factors. Ma *et al* [18] he prevalence of OST was increased in the highest tertile of uric acid compared to the lowest in female subjects

Conclusion

This cross sectional study conclude that there was no association between hyperurecemia and knee degenerative arthritis nor generalized degenerative arthritis ,our suggestion for more studies to found a correlation of presence of uric acid crystals in synovial fluid of knee joints with degenerative arthritis .

Conflict of Interest: Non

Source of Findings: Self findings.

Ethical Clearance: This research was carried out with the help of my colleagues mentioned with me. The oral and paper approval of the patients in this study, which included the withdrawal of blood samples from them and laboratory tests.

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Relationship Serum Thyroid Stimulating Hormone with Body Mass Index in Patients with Thyroid Disorder

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Abstract

Hypothyroidism and hyperthyroidism have clear effects on body weight. In this study, we aimed to find the possible association between the serum thyroid stimulating hormone (TSH) and the body mass index (BMI). The weight, height and (TSH) were estimated for a total of (150) subjects whose ages ranged between (30-60) years during the period from March 2018 to July 2018. Participants were divided into three groups according to the BMI values: Normal weight (18.5-24.9Km/m^2), overweight (25-29.9Km/m^2) and obese (BMI $\geq$ 30Km/m^2). The normal value for TSH was (0.25-5µIU/ml). Levels of serum thyroid hormones were assayed by Chemiluminescence immunoassay at the laboratory of Baghdad teaching hospital/Baghdad. A significant difference ($P<0.001$) was found in our study between TSH value and increased BMI. Subjects with higher (BMI) had also higher TSH, and this trend continued from normal weight to obese individuals. The mean (TSH) for normal subjects was (0.7093±0.384 mIU\L), for overweight was (0.7316±0.7309 mIU\L) and for obese was (1.2752±0.8258 mIU\L). The mean serum (TSH) concentrations demonstrated a significant increasing trend with the increasing (BMI) ($p<0.01$). It can be concluded from these findings that mean serum TSH levels increased with increased BMI values. To confirm the relationship between thyroid hormone levels and BMI, further large scale studies are required.

***Key words**: Body mass index (BMI),Overweight; Obesity, Thyroid stimulating hormone (TSH).*

Introduction

Obesity has been increasingly identified as a main global raising health problem. Several previous studies were performed regarding the association between body mass measures including (BMI) and thyroid profile, but they were not fully understood. There was a continuous conflict between the majorities of studies on the results of this association. The BMI profile can be influenced by even a small alteration in the TSH values [1]. In euthyroid individuals, significant positive correlations are found between BMI and TSH values [2,3]. However, no findings were revealed by other studies to confirm the relationship between BMI and thyroid status [4]. The question that jumps into our minds is how to demonstrate the TSH level of people in regard to their BMI , and how to support and prove this association on scientific basis among our studied population. The major aim of our study is to show the relationship between BMI and TSH levels among healthy adult people whose TSH range between 0.4 mlIU and 10 mIU.

Thyroid gland is stimulated by a pituitary hormone called thyroid stimulating hormone, which is also known as (thyrotropin or thyrotropic hormone or TSH) to form thyrotoxin or (T4) and then triiodothyronine or (T3) that, in turn, stimulates most body tissue metabolisms [5]. TSH is a glycoprotein hormone, which is made and released by thyrotrope cells of the anterior pituitary gland to regulate thyroid's functions.

Thyroxin or (T4) is converted into triiodothyronine or (T3), the active hormone that plays a key role in stimulating metabolism. Nearly (80%) of T4 is converted into T3 in the liver and other organs, while (20%) is converted in thyroid gland itself [5]. There is a continuous secretion of TSH throughout the life, but it reaches its highest levels during the times of rapid development and growth. The thyrotropin releasing hormone or (THR) is

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produced by the hypothalamus, which is located in the brain base, and the pituitary gland, in turn, is stimulated by THR to produce TSH.

The hypothalamus also produces somatostatin hormone, which has an inverse effect on the production of TSH by pituitary gland, leading to a decrease or a reduction of its release.

The levels of serum T4 and T3 control and adjust the TSH production and release by the pituitary gland. When the levels of T4 and T3 are low, there is an increase in TSH production, whereas when the levels of T4 and T3 are high, there is a decrease in TSH production, which represents a negative feedback loop [6].

Tertiary or central disease or TSH to THR pathology may be indicated by any improper measuring of thyroid values e.g (low to normal TSH together with low to normal T4). Euthyroid sick syndrome is indicated by high reverse values of T3 (RT3) along with normal TSH and low and normal T4 and T3 levels, which may also be investigated for chronic sub-acute thyroiditis.

With a previous diagnosis of an auto immune thyroid disease, this may always be suspected to develop into SAT even when normal TSH exists, as no recovery has been yet found from autoimmune diseases.

It is necessary to state that the secretion of TSH is based on a pulsatile manner, in order to interpret the clinical laboratory results [6][7][8], leading to both ultradian and circadian rhythm of their serum levels [9].

[10] Showed that fine tuning between energy intake and consumption regulates the body weight. The factors which determine energy consumption involve: resting energy expenditure, no activity of exercise as well as the voluntary physical activity. T3 is responsible for about 30% of resting energy expenditure, and plays a key role in the homeostasis of temperature of human beings. The resting energy expenditure may also be affected by T3 via spontaneous motor activity regulation.

Subjects and methods

Our study was conducted on 150 adult subjects (59 males and 91 females). The study was performed in Baghdad teaching hospital / Baghdad city, during the period from March 2018 to July 2018. Serum thyroid stimulating hormone (TSH) was used to assess their thyroid disorders, and BMI was used to measure their body weights. Being an Iraqi adult was the only inclusion criteria for an individual to be enrolled, while exclusion criteria included any present or previous thyroid disorder, cigarette smoking, and chronic renal or hepatic diseases, taking drugs that change serum TSH levels such as metformin in addition to pregnancy. A data collection form was prepared including age, gender, height, weight as well as the laboratory results of TSH estimation. Before enrollment in the study, all participants were informed about its methods and objective. Written informed consents were taken from all persons who were told that their participation in the study is entirely voluntary. The weights in Kilograms) and the heights in meters were measured, while the participants were barefooted and putting on light clothing. The body mass index (BMI) was calculated by dividing the body weights in Kilograms by the heights in meters, and the grouping of the participants was done according to their BMI in the following form: Normal weight (18.5-24.9Km/m^2),overweight (25-29.9Km/m^2) and obese (BMI $\geq$ 30Km/m^2) [11].

Serum samples were analyzed immediately by Chemiluminescence immunoassay at the laboratory of Baghdad teaching hospital. Results of serum thyroid hormones of the participants were compared with their BMI grades. For data entry and statistical analysis of results, the statistical package of social science (SPSS version-22) program was applied, and the appropriateness of significance (ANOVA or chi square) were used for the descriptive statistics.

Findings

The current studied showed the correlation between the mean body mass index (BMI) and the mean serum (TSH) among the studied group. Table (1) indicated the distribution of gender percentage according to (BMI) among participants as follows: In the normal weight whose (BMI) ranged between (18.5-24.9Kg\$m^2$), the result of gender distribution was 11 males (18.64%) and 18 females (19.78%) , while in the overweight whose (BMI) ranged between (25-29.9 Kg\$m^2$), the result of gender distribution was 20 males (33.89%) and 23 females (25.27%), whereas in the obese group whose (BMI $\geq\geq$ 30 kg/m^2), the result of gender distribution was 28 males (47.45%) and 50 females (54.94%). It was shown that the obesity was significantly higher among females than male participants.

Table (2) and figure (1) showed the mean (TSH) values and the standard deviation (±±SD) for every (BMI) group. The mean serum (TSH) for the normal weight group was(0.7093 ±(0.7093 ± 0.384mIU\L)0.384mIU\L) , while for overweight group was (0.7316 ± 0.3709mIU\L), (0.7316 ± 0.3709mIU\L), and for obese group was(1.2752 ± 0.8258mIU\L)(1.2752 ± 0.8258mIU\L). The mean serum (TSH) concentrations revealed a significant increasing trend with the increasing (BMI) values (< 0.01).

Table (1): Distribution of body mass index (BMI) according to gender

BMI	Male (59)		Female (91)		Total	%
	N	%	N	%		
Normal weight (BMI: 18.5-24.9 kg/m^2)	11	18.64	18	19.78	29	19.33
Over weight (BMI: 25-29.9 kg/m^2)	20	33.89	23	25.27	43	28.66
obese (BMI ≥≥ 30 kg/m^2).	28	47.45	50	54.94	78	52

Table (2): Distribution of (TSH) according to (BMI)

BMI	N	TSH mean	Standard Deviation ±SD	P-value	
Normal weight	29	0.7093	± 0.3842	0.15	NS
Over weight	43	0.8612	± 0.3709	0.005	*
obese	78	1.2752	± 0.8258	0.001	**
Total	150				

NS:- non significant, *:-significant ≤ 0.05 , **:- highly significant ≤ 0.01.

A great deal of attention was given by medical researchers to the relationship between BMI and thyroid hormones in euthyroid adult people [12]. Thus, the aim of the current study was to measure serum thyroid hormone levels in Iraqi adults and correlates them with their (BMI). In this study, the results showed that the majority of participants fall within overweight (28.66%) and obese (52%) categories, and there was a highly significant obesity conditions in females than males.

These results were in agreement with the study of [13] who found a significant correlation between mean TSH levels and BMI. Our results demonstrated that serum TSH levels of the studied individuals recorded a highly significant trend with the increasing (BMI).

Other researchers such as [14] found no relationship between serum TSH levels and free thyroxin levels within the normal BMI range when they studied the effect of thyroid hormones on BMI. In contrast, other researchers such as [1] reported that thyroid function may be among those factors which function in conformity for body weight determination.

Chan *et al* [15] clarified the TSH-BMI relationship to be under the adipose tissue signal impacts, and they also indicated the possible significant effect of leptin on the central regulation of thyroid function via TRH. [16] Hypothesized that the positive association between serum TSH and leptin levels is also positively associated with the TSH-BMI relationship.

High triglyceride (TG) and low high density lipoprotein (HDL) levels were detected in subclinical hypothyroidism patients by [17].

Furthermore, [18] showed the presence of a positive relationship between (TSH) and (BMI), assuming the possibility of presence of other subclinical hypothyroidism condition, i.e elevated (TSH) concentrations, although the serum concentrations of the hormone are normal.

However, whether the verification of elevated serum TSH to be the cause of the influence is certainly confirmed or not, A. The [19, 20] observed that thyroid function disorders could be the primary and BMI alterations could be the secondary cause and vice versa.

The well-established receptor expression and the message transfer inside the adipocytes affirm the biological significance of the positive association between obesity and serum TSH levels. The possible existence of ''Hypothalamus-Pituitary-Adipocyte axis'' is proven when the expression of multiple pituitary hormone receptors is considered. In regard to downward regulation, the association between obesity and TSH levels may be stable. In addition, a system of feedback regulations may be necessary for this axis, therefore, the positive relationship between obesity and TSH may be reversely interpreted [21]. There is an association between weight gain and thyroid gland as thyroid gland releases hormones which help in metabolism regulation. This process controls the body utilizing of energy, when an individual may feel cold, tired or stagnant. Human's body is clogged by salt and water due to hypothyroidism, which in turn leads to body swelling [22, 23].

Conclusion

It can be concluded from this study that there was an elevation in the levels of mean serum TSH when the BMI increased. Additional large scale studies are recommended to confirm the correlation between thyroid hormone concentrations and BMI values in euthyroid adults.

Source of Funding: - Self

Ethical Clearance: Formal administrative approval was obtained from laboratory of Baghdad teaching hospital.

Conflict of Interest:-Non

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The Long Term Outcome of Graft Urethroplasty by Buccal Mucosa in Penile and Bulbar Stricture

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Abstract

Background Urethral stricture is widely prevalent disease and its management is a challenging surgery. Nosoleideal surgical procedure appropriate inevery situation. The Grafting by Buccal Mucosa (BMGurethroplasty) represents the most appropriate and widely used procedure torepairstricture of urethra. We disclosedtheextended followup thecasesof stricture of urethrathat managed by (BMG urethroplasty) aiming to determine the success rate, recurrence and complications rate. **Patients and Method** A study was orchestrated to prospectively followup a 39 patients with bulbar and proximal penile urethral stricture disease repaired by BMG urethroplasty. Retrograde urethrography done to confirm the diagnosis , measure the length and locate urethral strictures. Patient demographics, stricture aetiology and anatomy all were recorded. Follow up data in term of success and failure rate, and complication. **Results** thirty-nine patients (the mean age was 35.4 years) with urethral strictures disease diagnosed by urethrography of more than 3 cm in length(the mean ofstricture length was 5.34cm). 23, 7, and 9 patients had bulbar, penile and long combined (bulbar and penile) strictures respectively. Early peri- and post-operative complications occurred in 35% it was almost minor complications included scrotal swelling, minor hematoma, urinary infections, and urgency. 4 patients only developed re-stricture 2 of them had a failure. The most frequent major complications were a urethrocutaneousfistula. **Conclusion** Buccal mucosal graft urethroplasty appear to be a rightful and durable treatmentchoice for cases with urethral strictures, moreover it has a fewer major complications.

Keywords: *Buccal mucosal graft (BMGurethroplasty) Urethra, spongiofibrosis, stricture.*

Introduction

Urethral stricture is a most prevailing cause of snag of lower urinary tract in the males between 3rd and 5thdecade, carrying an evaluated overall prevalence of 0.5%. Stricture of urethra is an aberrantdiminished diameter of the urethra, that due to a varying degrees of spongiofibrosis, with 50% confined to the bulbar urethra, and 20% penile part[(1)]. We can broadly categorize the causes of strictures in urethra into trauma, infection and inflammation[(1)]. Sexually-transmitted diseases (mostly gonorrhea), result in chronic bacterial urethritis and responsible for up to 20% of cases, while 30% of urethral strictures are considered idiopathic [(2)]

The presenting features tend to be related to obstructive voiding symptoms, with a poor urinary stream, post void dripling and a perceivean incomplete evacuation of bladder, or symptoms of recurrent urinary tract infections [(3)]. Non-invasive investigative methods such as uroflowmetry, the results of which produces a pathognomonic curve with a prolonged voiding time and low-level flow, and ultrasound post-void residual measurements will demonstrate reduced bladder emptying.

Endoscopic visualisation via cystourethroscopy can identify the location of the stricture but provides minimal information on stricture length. Ultrasonography is useful in demonstrating depth of spongiofibrosis, whilst contrast studies such as retrograde urethrography and voiding cystourethrography accurately demonstrate the anatomical location and length of the stricture, which guides further treatment[(4)]

The Traditional management of urethral stricture was by direct visual urethrotomy, however the reported recurrence rates are as high as 60%.[(5)] Poor long-term

outcomes from these endoscopic methods have presented an opportunity for open reconstruction (urethroplasty) to develop[6]

Urethroplasty is a surgical operation that aimed to reconstruct or repair the urethra. Many surgical techniques used nowadays, but the most commonly practiced are anastomotic and augmentation urethroplasty, the latter using either buccal or lingual mucosal grafts [7]Differing types of autograft tissues have been described, with buccal or sublingual mucosal grafts (OMG),penile and scrotal skin [8], bladder mucosa, colonic mucosa[9] and tissue engineering of grafts [10].

First described by Humby in 1941[11], BMG urethroplasty is now widely used in contemporary practice. The donator area left for healing by the mean of secondary healing, whichmends successfully [12], but we don't achieve that an improvement in postoperative pain and oral intake that can be seen with primary closure [13].

Postoperative complications of urethroplasty include swelling and bruising around the wound, numbness or discomfort around the buccal mucosal graft donor site or spraying of urine (all up to 50% of patients). Less common complications include wound infection, erectile dysfunction (up to 10%), anastomotic leak and urinary fistula (around 2%).Stricture recurrence is a major complication, with reported rates of up to 14% for anastomotic and 42% for augmentation / substitution urethroplasty, after long-term (more than 10 years) follow-up [14]. However, through comparison with stricture recurrence rates in other treatments (up to 60% in urethrotomy[5]), it is apparent that urethroplasty offers superior results in terms of restricture.

Patients and Method

With this prospective study we aimed to follow 39 casesofproximal and bulbar penile stricture disease of urethra and to determine the long term result of their repair by using BMG urethroplasty which was conducted at Tikrit city from April 2007 to December 2018 with a followup duration mean of 28 months.

Pre-operative evaluation includes a detailed medical and surgical history as well asclinical examination aimed at detecting the etiological factors such as instrumentation, prostatectomy, urethral catheterization, TURP, trauma, and urethritis. Pre-operative evalution also include culture of urine, postvoiding residual volume of urine measured by ultrasonography, as well uroflowmeter to evaluate urine flow rate. Patients evaluated with a combined retrograde urethrography and micturatingcystourethrography. This helps the determine of the site, length, and multiplicity of the stricture (although thechoice of the surgical technique do not influenced by stricture causenor length).

The procedure done under general anesthesiathrough a midline perineal incision. Division of bulbocavernosus muscle through the midline exposes theanterior urethral corpus spongiosum, which is the part affected by spongiofibrosisand lead to narrowing of the urethra. The identification of the stricturedpartbegins at the tip of the catheterincerted within the urethra,whichincised dorsally. The incision then extended proximally distal to the end of the stricture until healthy spongiosal tissue is experienced. An adequate lengthgraft of buccal mucosa obtained from the interiorcheek just below the duct of Stensen's. Up to 10 cm in length and 3.5 width can be obtained, the extra length gained by extending the dissection into the tonsillar fossa posteriorly and to the lower lips anteriorly. Infusion of the buccal area with (1% lidocaine with 1:100,000 epinephrine to a volume of 5 to 10 cc) may help to reduce the hemorrhage as well as the graft will be elevated and adissection plane will be provided.

Tailoring of the graft to a proper size is done after defatting. The lumen of distal andproximal urethraare assessed. The graft fixed to the dorsum using few 4-0 vicryl sutures forsupport and reinforcement as well toocclude the dead space. Insertion of 18F silicone, or silicone coated Foley catheter through the urethra into the urinary bladder as a cast of healing and for drainage. Urethra is then rotated back to its position and the mucosal margin of the urethra sutured to the free margin of the graft. Drainage by suprapubic catheter is obsolete. Cover with antibioticsare continued until the catheter is removed usually after3-4 weeks. Three months later, after removal of catheter, flow rate and retrograde urethrography is done. Uroflowmetery with normal flow rate is regarded as a successful resultswhilecases with lowflow rate are referred to (Direct Visual Internal Urethrotomy(DVIU)), accepted voiding rate after onetrial of DVIU is regarded as a succeeded procedure . A recurrent weak stream after even this single trial of DVIU will be considered as failed treatment.

Results

A thirty ninecases of different age groups(the mean 35.4 years) with urethral strictures disease diagnosed by urethrography. Single session dorsal reconstruction of urethra usingBMG was performed toevery one of these cases with indwelling silicone Foley's catheter removed after 3-4 weeks with a mean followup time for themwas 28months(Fig. 1).

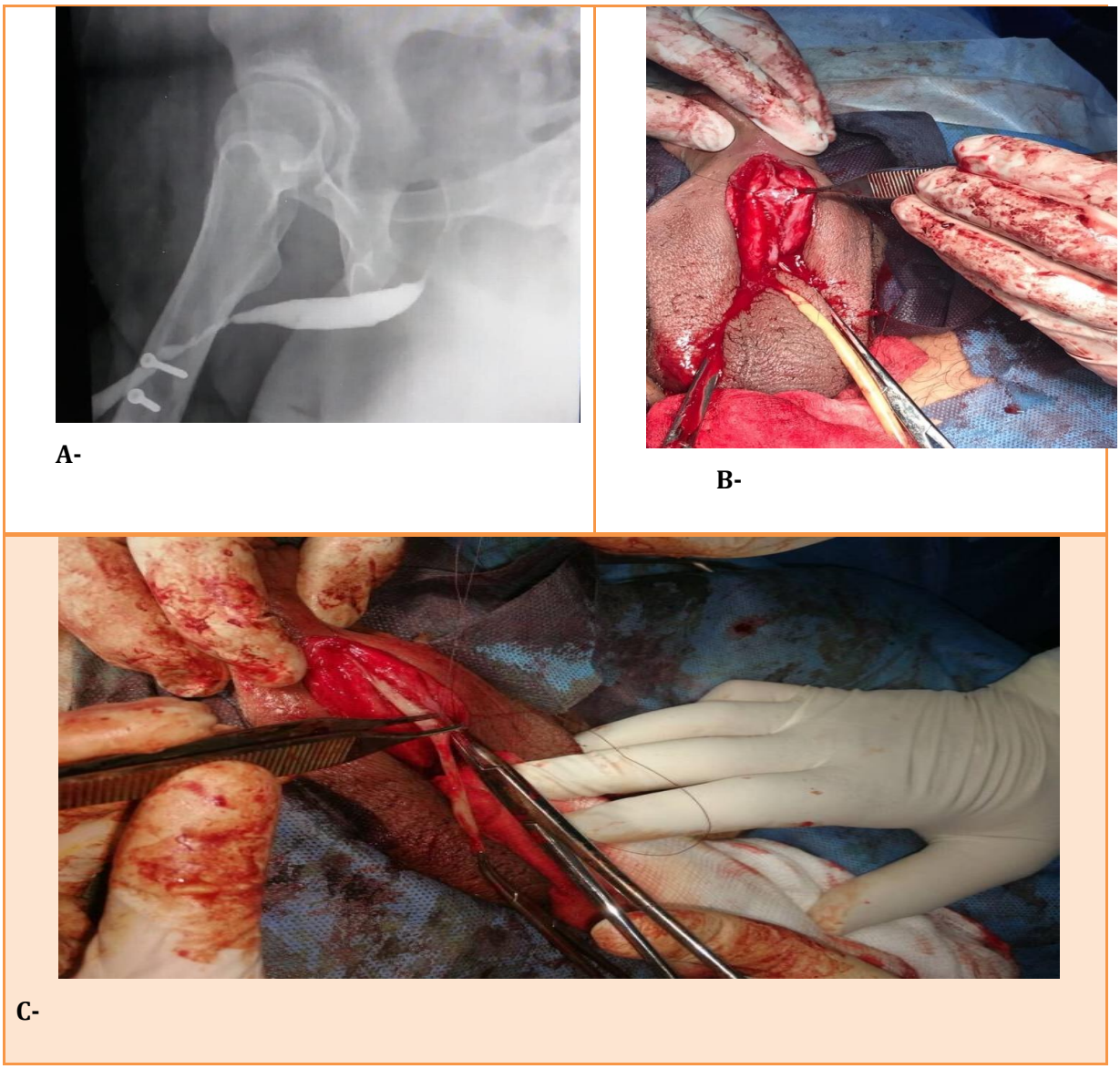


Figure (1): Single stage dorsal BMG reconstruction of urethral stricture. A) urethrography shows narrowing of the anterior part of urethra. B) Penoscrotal incision. C) Dissection of corpus spongiosum and fixation of graft.

Complication at the donator site occurred only in one of the cases with infection and ulcer that took up to one month to heal completely. Although swelling of the face, numbness and limitationofthe opening movement of the mouth are uncommon, though they are fade uneventfully. Early peri- and post-operative complications occurred in 35% it was almost minor complications included scrotal swelling, minor haematoma, urinary infections and urgency. 4 patients only developed stricture again at the site of operation 2 of them got good stream after a trial of DVIU, the other 2 patients did not responded and required another urethroplasty and regarded as a failure of the technique (failure rate 5.1%). The most frequent major complications were urethrocutaneous fistula that occur in 6 patients(15%) mainly those with involvement of penile urethra. Urinary infection

happened in 10 patients and responded well with good antibiotics directed by the results of urine culture. Erectile dysfunction and mild chordee noted in few patients. Improvement in the Peak urinary flow rates was dramatically noted postoperatively (range 18.2 to 24 ml/sec) as compared with preoperative data base of a range 0 to 9.3 ml/sec(see table 1 and 2) .

Table(1): complication of BMG

Complications	No.
Long term Recurrence 2	
Urethrocutaneous fistula	6
Wound of infection	4
Chordee	2
Erectile dysfunction	2
Facial Swelling	9
Numbness	7
Limitation in mouth opening	7

Table 2: Etiology behind strictured urethra.

Etiology	**No.**
Urethritis (infection)	9
Iatrogenic	8
Idiopathic	15
Injury (blunt)	5
Shell injury	2

Mean of the extent of the stricture, as spanned by preoperatively done RGU was 5.34 cm (all of it was more than 3 cm). Twenty three of cases sustained bulbar stricture, while only seven had proximal part of the penile urethra affected,meantime theinvolvement both areas synonymously was faced in 9 patients(table 3).

Table 3: the location of the strictured part of urethra.

Location	Number
bulbar	23
Bulbar-penile	9
penile	7

Discussion

Humby in 1941 was the first described graft urethroplasty using buccal mucosa.[15] Due to itsglowingfeatures that made it typical urethral deputy, as iteasilygleaned, easily handledsurgically , glabrous, moist environmentaccordance, and paramountearly ingrowth and uptake[16] . However, adisputation raised whether the graftpositionmust be ventrally or to the dorsum. The dorsal place is preferred by most of experts, however many trials shown that the dorsal place of grafthas a generous blood supply and back brace as theventralonlayplaced one. The rateof succeeds was of no significant difference according to Barbagli et al, who involved a fifty cases in their study and the graft was placed ventrally, dorsally or laterally on the urethral surface. The dorsal BMG on-layannounced a 85 and 100 %prosper rate[17].

In our present series, Dorsal BMG urethroplasty has a flourished succeed rate of 94.9 % with followupmeantime of 28months. Elliott SP et alseries published in the 2003 [18] who escortedsixtycases of buccal graft reconstruction with mean followup of forty seven months, announced a 97% prosper rate after single attempt of internal visual optical urethrotomy. These results underpinned by Kane CJ et al. [19] who reported disclose a 94.3 % successful results in their series with a mean followup of twenty five months postoperatively. Iselin & Webster published a study at1999 in which they accomplished29 dorsal on-lay graft urethroplasty, and describe a soaring early successfulresults reaches up to 97%, at a median followup of 19months, but they emphasize that a long time of followup is required as the succeeded urethroplasty operation is spaned in decades[20].

In general, complications of BMG urethroplasty are uncommon . Pitfalls occurred as a postoperative complications can happened in 2 areas, the donor area and the repair site in the strictured urethra.[21] Potentially buccal mucosal pick up site complications encompassed facial swelling, bleeding, discomfort and pain, numbness and paresthesia, limitationof movement in mouth opening and damage to the duct ofStensen. Facial edema and limitation in mouth opening are frequent, though they are selflimiting and usually resolved within a couple of months after operation[22]. Wood et al, reported that closure of the donator site was followed by awful complains and nasty pain, this

make him to suggest that this may be ameliorated by left open.[22]In contrast Dublin et al. announced that a preponderance of casesshowed a good responce with the primary suturing of the pickup site, and they disclose that restriction in mouth openingwas the most frequent long-term complaint, and occurred in 32% of cases, and half of this number hadnumbness. In general, the interior cheek pickup site for BMG appears to heal without long-term pitfallsregardless of management[21].

Complications of implantation site at perinium are asuncommon as donor site complications. Urethro-cutaneous fistula, re-stricture, local infections of perineal wounds or urethral anastomosis site , hematomas, and paresthesia of the skin, do sometimes occur. Fichtner*etal.*,[23] found in their study that an all-inclusiverate of complications was 25%. In general the complication rate in other study[24]was found to be 5.4%, of them 5.7% had a re-stricture rate while in our case series we faced ageneral complication rate of about 18.6 % which include urethrocutaneous fistulae, re-stricture, urinary tract and local wound infection.

Conclusion

Regardless of the etiology, length and site of urethral stricture disease, BMG urethroplasty seems to be the prime surgical procedure referred to its high rate succeed, low recurrence rate, as well as infrequent and short standing complications if compared with other techniques. It is picked up easily and unchallenging to be handled. It also resist infections and withstand the moist environment. We used graft urethroplasty with buccal mucosa victoriously for managinglong strictures in urethra, with fewer complications and few donator placerate of morbidity.

Acknowledgment: We would like to express our great appreciation all those who participated in this study, patients and hospital staff.

Ethical Clearance: from research ethic committee in Tikrit university/college of medicine

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Conflict of Interest: None

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Hardness and Roughness of Flexible Denture Base at Different Injection Time and Different Temperature

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Abstract

Most problems with heat cured acrylic are difficult to address, in recent time flexible dentures have become more popular, although the search for the ideal option is still on, so this study was conducted to study the effect of different temperature and different injection time to study the effect on the hardness and roughness of flexible denture. 60 specimens from metal pattern were prepared with dimension (60mm, 10mm, 3mm) length, width and thickness respectively. Specimens were allocated into two group;30 specimens for surface roughness measure(groupI)and 30 specimens for hardness measure(group II),these two group subdivided into three subgroups according to time of injection and temperature (10 specimens for each subgroup), group A: injection at (270◦C) in (14 min.) (control). group B: injection at(300◦C) in (10 min.) and group C: injection at (250◦C) in (24 min.). For hardness measure all specimens were tested by (shore D device DINISO electrometer). All specimens were tested for roughness measure by surface roughness tester (profilometer , digital) the result expressed in micrometer. Result showed there were no significant differences in hardness and roughness measures between both group B and group C with control group (A) P0.05. The max. mean value of roughness was recorded by group(A)which was the control group and group (B) recorded the min. mean value of roughness. While for the hardness the min. mean value was recorded by group(B),while group(C) recorded the max. mean value of hardness, however there were no significant different(P0.05) between three groups A, B and C both in hardness and roughness measures.

Key Words *:flexible acrylic hardness roughness injection temperatures*

Introduction

One of the most important needs for patients attending clinics to restore esthetics and/or function is the replacement of missing teeth, for replacing missing teeth many treatment modalities are available.

The choice between many treatment options is influenced by clinical, dentist and patient immanent factors[1].Excellent alternatives to conventionally methyl-methacrylate dentures are flexible denture, which not only provides excellent aesthetics and comfort, but also adapt to the constant movement in partially edentulous patients [2]. adapt well in the undercut areas and not cause sore spots. They also have almost no porosity and lower elastic modulus [3]. Furthermore, the aesthetic of removable partial denture with heat cured acrylic, may be compromised by the visibility of metal clasps [4], however, reported cases of intolerance to monomers present in acrylic materials among patients and medical staff have been increased[5,6].

The increase in processing temperature under pressure during polymerization of acrylic materials could result in a more complete polymerization reaction and thus producing a harder polymer network[7,8and9]**.** but no study concerning the effect of increase temperature on flexible acrylic material

Since the surface roughness is an important factor because rough denture surfaces can cause biofilm formation, fungus and bacteria have more propensity to adhere to rough surface so accumulation of microorganisms affect oral health [10] and the hardness test has been used for characteristic of the mechanical quality of polymer [11], so this study was performed to

evaluate the hardness and surface roughness of flexible denture material at different injection time and different temperature.

Material and Method

Flexible denture base material

The material was available in the form of granules in cartridges (Lingchen dental /china)as seen in(Fig.1) the cartridges contain thermoplastic grains are heated to plasticize the resin. All material were suited for the thermoplastic process (injection thermo press machine / china) by injection molding technique the resin material were injected under very high pressure.

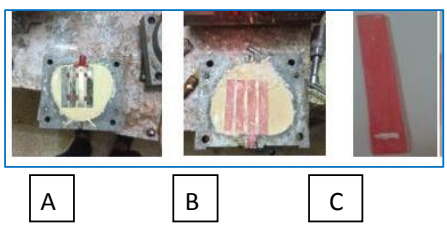


Fig. (1) sample of cartridges

Preparation of mould:

Total sample were 60 specimens all sample were prepared in the form rectangular metal shaped pattern according to ADA Specification NO.12(1999) [12] the dimension (65mm*10mm*2.5±0.1mm) length, width, thickness as seen in (Fig.2) were constructed to be used (30 samples) for indentation hardness and (30 samples) for surface roughness.

The preparation of mould was done by conventional procedures and the wax elimination was done by using boiling water, , after that flask was opened for cooling (at room temperature),the flexible denture base material was injected in the electrical furnace (injection thermo press machine Lingchen dental /china)according to manufacture instruction and study design ,then left to cool at room temperature. The conventional flasking, packing procedures were followed in the preparation of the specimens [13].



Fig(2) Flexible acrylic resin samples: A-Metal sample in the flask B-Wax sample in the flask C-Flexible acrylic sample

Distribution of the sample

60 specimens divided into two groups according to measuring test (30 specimens for each group), group I for surface roughness and group II for indentation hardness, both groups were subdivided into 3subgroups A, B and C(10 samples for each subgroup)according to injection time and temperature.

Group A: injection 10 samples at (270◦c) in (14min) (control that inject according to manifuctural instructions).

Group B: injection 10 samples at (300◦c) in (9 min).

Group C: injection 10 samples at (250◦c) in (24 min)

Finishing and Polishing: Take the specimen of flexible and remove grass of excess resin from the border by large acrylic burs until make specimen smoothing is. The polishing done by pumice with water and store it in the plastic container of water until needed.

Measurement of surface roughness:

The surface of the test specimen was analyzed with surface roughness tester (Profilometer-Digital, China, TR200)(Fig3) to study the micro geometry of the test surface. The diamond stylus of the profilometer was moved about 4mm across the surface of the acrylic specimen. According to the manufacture instructions of the device, the vertical displacement of the stylus is measured as the surface variations, usually measuring from 10 nm to 1mm ,the height position of diamond stylus is converted to a digital signal ,which is stored and displayed a(2mm) distance separated each reading and all measures were carried out by same researcher. three readings were recorded for each specimen and the mean value for each specimen was the average of three readings, all the specimens were examined after finishing & polishing. The results were expressed in micrometer.

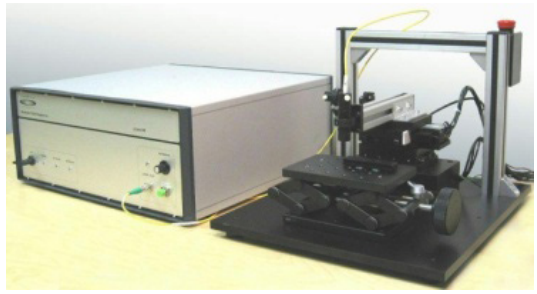


Figure (3) Profilometer device for measuring surface roughness Measurement of indentation hardness:

Shore hardness tester was use in this study for measuring the indentation or measuring the hardness of the specimens (DINISO 7619electrometer/Germany) (Fig4){according to ASTM D2240-03 standard}[14]. The Shore D hardness device was vertically placed over flat sample supported by flat, rigid base. The readings were taken after three second of stable contact over specimen, when indenter was pressed down quickly and firmly on, to record the maximum reading. The reading was taken directly from the reading scale The contact surface of the shore hardness tester must be parallel to the specimen support of the test stand to prevent error in measurements. The distance between the specimen surface and the indentor of the hardness tester to be 5-12 mm. During carrying out the test the contact was set period between the specimen and the indentor was 6 seconds. For each specimen, 5 points were marked with 6 mm distance between each other, the hardness value was calculated and the average of these five reading After the measurements were taken directly from the scale reading was calculated.



(A) (B)

Figure(4): (A)Shore D hardness test device,(B) specimen placed under the device

Findings

Surface Roughness Test (groupI)

Table (1): Descriptive data of groups of the surface roughness test

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Group (A) (control)	10	1.4582	.24401	.08627	1.2542	1.6622	1.08	1.65
Group (B)	10	1.3589	.67422	.23837	.7952	1.9225	.74	2.31
Group (C)	10	1.3686	.26251	.09281	1.1491	1.5881	1.13	1.74
Total	30	1.3952	.42371	.08649	1.2163	1.5741	.74	2.31

Table (1) show the descriptive of groups: mean, S.D,S.E, min., and max., values of the surface roughness of all groups. The max. mean value was (1.4582) recorded by group(A)which was the control group and group (B) recorded the min. mean value of surface roughness which was (1.3589)

Table (2) ; ANOVA test between groups of the surface roughness test

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.048	2	.024	.123	.885
Within	4.081	21	.194		
Groups Total	4.129	23			

In Table (2) shows the ANOVA test between groups, there were no significant differences between groups (n-sig) $p>0.05$.

Hardness Test (groupII)

Table(3) ; Descriptive data of groups of the hardness test

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Group (A) (control)	10	66.5000	.97395	.34434	65.6858	67.3142	65.20	68.20
Group (B)	10	66.4375	3.48299	1.23142	63.5256	69.3494	58.00	69.00
Group (C)	10	67.8000	.71714	.25355	67.2005	68.3995	66.60	68.60
Total	30	66.9125	2.13283	.43536	66.0119	67.8131	58.00	69.00

Table (3) show the descriptive of groups mean, S.D, S.E, max., and min. values of the hardness groups ..The min. mean value was (66.4375) recorded by group(B),while group(C) recorded the max. mean value of hardness which was (67.8000).

Table(4) : ANOVA test between groups of hardness test

	Sum of square Squares	Df	Mean Square	F	Sig.
Between groups	9.468	2	4.734	1.045	.369
Within groups	95.159	21	4.531		
Total	104.626	23			

Table(4) show the ANOVA test between groups ,there were no significant differences between groups (n-sig) p> 0.05

Discussion

Using flexible denture has increased drastically in the late decade. The excellent tissue friendly and good mechanical properties had open up a new clinical application in dentistry and since heat cured acrylic are hard material so they may be disturbing patients during use and an increasing rate of intolerance to monomers present in acrylic materials among medical staff and patients has been reported [5,6]. Furthermore, the aesthetic appearance of removable partial dentures with heat cured acrylic bases may be compromised by the visibility of metal clasps [4,15].While the flexibility of flexible allows retentive elements that match the color of the gums or teeth. Despite the sore formation in heat cured acrylic in comparison to flexible that not cause sore spot [16,17],the flexible denture appears to have a greater role to play in futures. Material (without chemical changes) is softened by heat and injected afterwards and partial dentures might be pressed in one piece including clasps, minor and major connectors, and denture bases [15]. The surface roughness is an important factor because many studies have shown there was a direct link between surface roughness, color stability and accumulation of

dental plaque as well as adherence of candida albicans [18,19]. Furthermore the irregularities of the surface act as a nucleation sites for corrosion[20]

Hardness has been widely used as a method of investigation factors that influence the degree of conversion of resin and for characterization of the mechanical quality of acrylic [21,22]. In this study both hardness and surface roughness measures of flexible denture base material were tested at different temperature and different injection time.

The result show that the all groups that injection at different temperature (300◦C), (250◦C) and different injection time (9min), (24min) respectively ,there were no significant difference between them (p>0.05) both in hardness and roughness measures when compared with control group that injection at (14min) in(270◦c) .

In this study, the injection molding system was used, its advantages that the resin is delivered in a cartridge that eliminates dosage errors, to ensure long term stability of the shape, reduced contraction, and mechanical resistance with aging. In addition, superior physical properties, more esthetic and comfortable for the patient[23] the increasing in surface roughness may be related to injection process, melted material during the injection will roll into sprue (smaller tube) until it reaches the mold cavities and during this flow movement a small nucleus will form and cause increase in the surface roughness.

For hardness the max. mean value recorded by the group(C). this might be due to higher crystallization of resin material at this time and temperature (the higher crystallinity in a flexible, the harder material will be) [24].

In acrylic material the increase in processing temperature under pressure during polymerization reaction produced a harder polymer network[9], this may related to complete polymerization reaction that occur in high temperature for optimum time which support the result in this study, in flexible material increased time with decreasing temperature lead to result that gave more hardness material as result by group C [that injected with increased time of injection and decreasing temperature (24min. in 250◦c)] and because of increase time of exposure to heat which produce greater degree of polymerization, however ,there were no significant differences between group C and group B(300◦c-9min.) this might be due to increasing the polymerization temperature lead to harder network that result in a hard material[9].

There were no previous studies found related on the properties of flexible material with changing in temperature and injection time ,in order to compare with this study. Search for ideal properties for flexible material is still on.

Conclusion

This study show hardness and surface roughness measures of flexible denture base material when tested at different temperature and different injection time(300◦c in 9 min, and 250◦c 24 min.),there were no significant differences P0.05 with control group that inject according to manifuctural instructions(270◦c in 14min).

Conflict of Interest: Non

Source of Funding: Self

Ethical Clearance: Non

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Prophylactic Antiepileptic Drugs for Intraparanchymal Hemorrhage Patients in Salah Al-Den General Hospital

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Abstract

Background: Intraparenchymal hemorrhage considers the most severe form of stroke and has a significant cause of death. There are many cases associated with seizures development. Risk factors for post-hemorrhagic stroke seizure are cortical involvement, large lesion (involving more than one lobe), lobar hemorrhage, and male sex. The post- hemorrhagic stroke seizures affect inversely on fatality rate, recovery period and neurological outcomes.the aim of the research is to assess the effect of depakin to prevent the incidence of seizure in patient with spontaneous non-traumatic, non-aneurysmal intraparenchymal hemorrhage (NTNA-IPH) and to evaluate the effect of depakine on the fatality rate. **Patients and method** the study involved 100 patients with a definite diagnosis of NTNA-IPH. Type of the study was prospective comparative, which done in Salah-Al-den general hospital. The duration period was 10 months. The cases were classified into two groups A and B, each one consist of 50 patients. Depakine in a dose of 400mg per day for 30 days was given for group A while group B didn't be given the drug, and this is a control group. The cases of each group were followed up for 6 months from the starting of attack and during follow up, patients were monitored for development of seizure. **Results** The study result represent 14.28% of patients taking depakine had been developed seizure (6 patients from total 42 patients) and about 34.10% of patients not taking depakine had been developed seizure (13 patients from total 38 patients) with a significant difference between the two groups. Partial seizures were represent about 13.75% of post-hemorrhagic stroke seizures, myoclonic seizures 5% and tonic clonic seizure 5% in total of both groups.The overall incidence of post-hemorrhagic stroke seizure in the total 80 patients was 23.75%. The study showed that fatality rate in patients receiving depakine was 12% while fatality rate in patients not receiving depakine was 24% with a significant difference between patients with depakine and patients without depakine. **Conclusion** of this study shows that NTNA-IPH founds most commonly between 45-71 years old. The incidence of seizures can be decreased by two-folds by using of depakine as a prophylactic drug in a patients with IPH and the use of depakine in the prophylaxis against post-hemorrhagic stroke seizure have a significant role in reducing the fatality rate and improving survival.

Keywords : *Prophylactic Antiepileptic Drugs ; Intraparanchymal Hemorrhage; Patients ; Salah Al-Den General Hospital.*

Introduction

Non traumatic intraparenchymal hemorrhage (IPH) is bleeding into the parenchyma of the brain that may extend into the ventricles and, in rare cases, the subarachnoid space [(1).] Each year, about 37,000 to 52,400 people in the United States have an IPH [(2).]IPH represent 10-15% of stroke and is associated with the highest fatality rate, about 38% of patients surviving the 12 months[(3).] The majority of surviving patients to hospital presentation, the prognosis remains poor, with 35% of patients dead was dying in the first seven days and 50% within thirty days.

The prevalence of seizures after ICH varies widely from less than 10% [(4,5)] to more than 20% [(6).] The prevalence of seizures after IPH depends on study design, diagnostic criteria, duration of follow-up, and the patient studied. Risk factors for post-hemorrhagic seizure were found to be IPH , SAH, cortical involvement , large

lesion (involving more than one lobe) and male sex[7]. Stroke is the commonest cause of seizures in the old patients [8].

IPH-related seizures classified as early and late-onset. Usually most of the early- seizures found in the first two weeks [9].Patients who had frontal lobe hemorrhage were high incidence to develop early as well as late onset seizures due to the presence of motor phenomena, early seizures may be result from cellular biochemical dysfunction and structural disruption, late seizures may be caused by gliosis and the development of meningocerebral cicatrices [10].

Patients and methods

Prospective study was done in salah-Alden general hospital through the period from beginning of December 2016 to end of July 2017. The patients were selected randomly from those who admitted to medical ward with IPH in all age groups and both sexes. The sample consist from100 patients with IPH. The patients involved in this study were divided into 2 part as follows:-

Group **A** consist of 50 patients with IPH who prescribed depakine in a dose of 400mg once daily for 30 days as a prophylactic drug and was follow up for 6 months to see whether seizure occurred or not during or after the attack of IPH and the follow up was by re-examination or by telephone number of the patient if he can't get coming to hospital.

Group **B** include 50 patients with IPH , who didn't be given depakine as control group, were follow up for 6 months to show whether seizure present or not. If the patient developed fit in this group, was treated by anti-epileptic drugs(AED).

(Questionnaires): Full and detailed history from the patient or witness (if consciousness is impaired) was taken regarding age, sex, address, past medical history, previous attack of IPH, drugs , previous attack of seizure or family history of seizure and whether seizure found or not before admitted to the hospital. If the patient had seizure, detailed history was taken about the seizure including time, single or recurrent, description of seizure (partial or generalized seizure) and how many times found.

Clinical examination: Patient with intraparanchymal hemorrhage through the period of study was admitted in the medical ward, neurological examination was done for every patients involved in this study. The examination included consciousness level, motor examination of upper and lower limbs, sensory examination, cranial nerve examination and examination of cerebellar signs.

Imaging study : Every patient admitted to the hospital with acute neurological features like focal signs, disturbances in the consciousness , new onset of epilepsy, etc, was sent for taking urgent native (CT) of the brain and the radiology report was made by the radiologist. The magnetic resonant angiography (MRA) was done in selected patients in whom SAH was very suggestive clinically. This was helped the study to identify and exclude aneurysmal hemorrhage or A-V malformations. According to the result of the CT study and MRA (if needed), the patient will be included in the study if the inclusion criteria met while those with exclusion criteria were excluded from the study.

Blood tests: Blood samples were taken from every case. Routine investigations were perform include complete blood count, renal and liver function tests, blood sugar and electrolytes to exclude metabolic causes of the neurological deficits in addition to bleeding time, prothrombin time and INR to exclude bleeding tendency as a cause.

Patient group & follow up: The number of patients involved in this study was 100 patients. The study started from the first of December 2016 until the end of July 2017 and every case was follow up for 6 months, so the patients selected at Decemer 2016 ,their follow up stopped at May 2017and so on. The cases were classified into two groups , group **A** and group **B**, in which group **A** patients were given depakine for 30 days and group **B** patients didn't be given the drug and each group were follow up for 6 months.

Statistical analysis and data management: The Statistical Package for Social Sciences (SPSS, version 18) was used for data entry and analysis. The associations between categorical variables and seizure occurrence during the study period were analyzed using Paired Student t test. The differences in seizure occurrence were compared between groups using Paired Student's t-test to compare means of numerical variables. P value of ≤ 0.05 was regarded as statistically significant.

Funding

Table (1) Age distribution in 100 patients with IPH.

Age/years	Number of Patients	Mean(years)	Percentage (%)
<45	20	**38.5**	20%
≥45	80	**62.4**	80%

One hundred cases were participated in the study. 56 patients were male and 44 patients were female.

Table (2) the frequency of seizures in group A and B.

Group	Number of patients	Patients develop fits	Patients not develop	Incidence of fit	P value
A	42	6	36	14.28%	
B	38	13	25	34.10%	
A+B	80	19	61	23.75%	

Eighty patients were aged over 45 years and the remainder 20 was under 45 years. Mean for aged group less than 45 was 38.5 years .The range of age was 33-45 years , while mean for aged group more than 45 was 62.4, the range is 52-78 years.

Group A : The number of patients was 42(after subtracting the dead number of patients and loss of them during follow up in this group) 6 patients (14.28%) from total 42 developed seizure in spite of taking a depakine . The patients in group **A** who didn't developed fits throughout the period were 36 cases (85.72%) and they are taking the treatment in regular period in its dose 400mg daily.

Group B: This group included 38 patients (after subtracting the dead number of patients in this group), the result show that 13 patients (34.10%)from 38 patients had developed seizures . The other remaining 25 cases (65.78%) didn't get seizures throughout the follow up. The incidence of seizures in both aged group were 23.75%, while the remainder 61 cases (76.25%) not develop seizures.

Table(3) Types of seizure seen in group A and group B

Groups	Total number of cases	Number of patients With fits	%	Partial seizure	%	Myoclonic seizure	%	Tonic clonic seizure	%
Group **A**	42	6	14.28	4	9.52	1	2.38	1	2.38
Group **B**	38	13	34.21	7	18.42	3	**7.89**	**3**	7.89
Total sample size A+B	80	19	23.75	11	13.75	4	**5**	**4**	**5**

The study result show that the most common type of fits in the acute stage of IPH was partial type, which was characterized by a focal movements in limbs or face which was described by the patients or the witness.

Group A Sixth patients (14.28%) from the 42 patients developed fits. four patient (9.52%) was partial seizure and one patient was myoclonic seizure (2.38%), and another one had tonic-clonic (2.38%).

Group B This group involved 38 patients, 13 patients (34.21%) had been developed fits. 7 patients (18.42%) developed partial fits and three patients (7.89%) developed myoclonic fits and another three patients (7.89%) were developed tonic clonic type. The incidence of partial seizures in the total number of both sample size was (13.75%), while incidence of myoclonic type was (5%) and tonic clonic type was (5%).

Table (4) Time of seizure incidence in groupA and group B.

Group	Total number	Number of fit patients	%	Number of fit cases<14 days	%	Number of fit cases>14 days	%
Group A	42	6	14.28	4	9.52	2	4.76
Group B	38	13	34.21	8	21.05	5	13.15
Total	80	19	23.75	12	15	7	8.75

Chi square =0.046; Correlation=0.049; P-value=0.08;Significant association

The result of this study show the following: the early seizure was defined as any seizure found in the first two weeks after the time of IPH, while late seizures was determined after 2 weeks, the result show as follow; the patients who take depakine developed early fits in a low incidence (9.52%) than those who didn't take the drug (21.05%). There was a significant difference in incidence of early and late seizure in group **A** and **B**.

Table (5)Distribution of death causes in group A and group B.

Causes of death	Total number cases Group A(50)	Fatality rate %	Total number cases Group B(50)	fatality rate %
Overall	6	12	12	24
Deep coma	3	6	4	8
Multiple bleeds	2	4	1	2
complications	1	2	3	6
Past attack(s)	-	-	2	4
Others eg.drugs	-	-	2	4

Group A consist from50 patients participate in the study, 6 patients died (12%) (4 during hospitalization and 2 after discharge) and another 2 patients(3%) were missed during follow up period of the study, the remaining was 42 patients. The died patients were those who were in deep coma (6%), who have multiple sites of bleeding on CT of brain (4%) and those who got complications e.g. aspiration pneumonia or bed sores is (2%).

Group B (50)patients included in this study, 12 patients died (24%) 7 during hospitalization and 5 after discharge. The died cases were those who have coma (8%) and those who have multiple sites of bleeding on CT of brain(2%) and those who got complications e.g. aspiration pneumonia or bed sores (6%), while those who have past attack and drugs history were (4%) for each one. The overall incidence fatality rate of both group were 18%. The study show that there is a significant difference in fatality rate between two groups {P value= -1,402(<0.05)S}.

Discussion

This study is used to prevent or decrease the attack of early and late post IPH seizures by using depakine. The results show, 80% of the IPH were above 45 years**,** this finding was approximately similar to the other studies [11] which showed 77.3% were between 50-79 years and this study utilized the same criteria of our study.

Our study represent 14.28% of those received prophylactic depakine developed seizures, this finding relatively agreement with study used same criteria and give prophylactic antiepileptic agent , showed that the frequency of post stroke seizures has been reported from 5-10% in the far West[12]. A slightly higher frequency i.e. 13% is reported from India [13].

Regarding time of fits,4 patient 9.52% (of total 6 patients with fits in group A) developed early seizure less than two weeks in IPH , who treated with depakine, when performed comparison with patients not received depakine in which 8 patients 21.05% (of total 13 patients with fits in this group) associated early seizure less than 2 weeks. Theirs is a significant difference between the two groups.

This result is agreement with study [13] which was show that prophylactic depakine used in IPH was associated with reduced early seizures (<two weeks) to 8.7%, as well as improved neurological deficits at 30 days. Whereas in a retrospective study [14, 15] of patients with IPH, prophylactic used of phenytoin was associated with an independent poor outcome at three months increased incidence of early and late seizures as compared with depakine, the reasons could be due to the high risk for adverse reactions of phenytoin such as sedation, intolerability and high risk of toxicity. moreover ,Phenytoin had a high incidence of cognitive disturbance [16] as compared with depakine and for these reasons present study didn't choice phenytoin.

Other study [17] result show the majority (92% n=90) of post IPH seizures were late type and only 9% were early seizures in cases using depakine.

Our study result show that in group A, 9.52% (4) patient from (6) patient were partial seizure , the other one patient (2.38%) was myoclonic and one (2.38%) had tonic clonic , while in control group patients the types as follows; 18.42% (7 patients) are partial, 7.89% (3 patients) were myoclonic and 7.89% (3 patient) were tonic clonic in type.

Our study result show a better outcome in IPH in states of giving prophylactic depakine regarding post-stroke seizure incidence and consistent results obtained by *Passero et al*.[18] reported that the administration of prophylactic anticonvulsants reduce the risk of acute seizures.

But in certain retrospective study [19] to assess the effect of prophylactic AED on outcomes, found that prophylactic AED use was associated with poor outcome, independent of other established predictors.

The analysis in this difference in two studies result from used type of drug, regarding our study , the drug used is depakine as a AED which is a good popular AED, free of major neurological side effects, low toxicity rates and good tolerability except for pregnancies, while the other study had been used the phenytoin that is known to be full of side effects like CNS depression, drug-induced toxicity especially elderly are highly susceptible to this effect and other effects and there is a study emphasized that phenytoin prophylaxis was also associated with poor outcome [20].

According the fatality rate, our study observed a low fatality rate in IPH patients taking depakine 12% than patients without depakine treatment 24% and the positive effect of prophylactic AED on fatality rate, these finding approximately similar to the study [21] that assessed the fatality rate of IPH in general without giving prophylactic AED, show result that the fatality rate six months after spontaneous intracerebral hemorrhage ranges from 23- 58%.

Conclusion

The non-traumatic non-aneurismal intraparanchymal hemorrhage occurs most commonly between 45-78 years.

The overall incidence of seizure is 23.75%.

The incidence of seizures can be reduced by administration of depakine as a prophylactic anticonvulsant in a patients with IPH.

Partial seizures are more common than other seizure types occurring.

The fatality rate after IPH is 24%.

The use of depakine as prophylaxis drug for IPH fits had a significant role in reducing the fatality rate and in improving survival.

Conflict of Interest: Nil

Source of Funding : Self

Ethical Clearance: Informed consent was obtained from all patient that participate in the study

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Comparison of Prophylactic Effect of (Metoclopramide Plus Dexamethasone) And (Ondansetron) in Female Patients Underwent Laparoscopic Gynecological Surgeries

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Abstract

Post-operative nausea and vomiting were common complicationsin laparoscopic gynecological surgeries. The study was done to evaluate the effectiveness ofondansetron againstcombination of metoclopramide plus dexamethasone in preventionof postoperative nausea and vomiting (PONV) in laparoscopicgynecological surgeries. Fifty ASAI and II consenting patients aged 20–50 years scheduled for laparoscopic gynecological surgeries wererandomlyallocated into two groups ; each group was received either intravenous ondansetron (4 mg) or intravenous metoclopramide (10 mg) plus dexamethasone (8 mg)before inductionof anesthesia. post operativenausea and vomiting then monitoredin period of 4 hours before discharging the patients. Nausea was seen in10 (40%) of patients of ondansetron groups as compared with 16 (64%) in metoclopramide plus dexamethasone .Nausea with blenching developed in 1 (4%) patients of ondansetron group as compared with 8 (32%) patients ofmetoclopramide group. The post operative nausea and vomiting in the ondansetron group was significantly minimum as compared with metoclopramide plus dexamethasone group as p value was 0.01, only 1 (4%) patient of metoclopramide plus dexamethasone group was develops less than 3 times vomiting and non of both groups were develop more than 3 times .Ondansetron was superior to metoclopramide plus dexamethasone in prophylaxis of post operative nausea and vomiting in patients undergoing gynecological laparoscopic surgeries.

Keywords: *Metoclopramide, nausea, ondansetron, vomiting*

Introduction

Postoperative nausea and vomiting, defined as nausea and/or vomiting that occurs within 24 hour after surgery, affects 20%-30% of patients [1][2], the etiology of PONV is thought to be multifactorial, involving individual, anesthetic, and surgical risk factors [3]

Nausea and vomiting are under control of the vomiting center which is found in the medulla. This center takes its stimulations from five primary afferent pathways which include:[4] The chemoreceptor triggering zone , The vagal mucosal pathway in the gastrointestinal tract ,Neuronal pathways from the vestibular system, Reflex afferent pathways from the cerebral cortex c2,3 and Midbrain afferents.

The activation of the vomiting center is done by stimulation of the muscarinic, dopaminergic, histaminergic or serotonergic receptors[5]

The Risk Factors for PONVare either patients , anesthetic or surgical causes; the Patient-specific factor which increase the risk of PONV are female gender [6]; no smoking habit[6]; history of previous PONV or history of motion sickness.[7] while Anesthetic factors aredue to use of volatile anesthetics[8]; nitrous oxide[9]; or postoperative opioids[10].

Surgical factorsincludes type of surgery and duration of surgery, where there is an increase in the PONV in 60 % of patients with each 30minute increase in the duration of the surgery .[7]

Aim of Study

Compare the effectiveness of prophylactic dose of Ondansetron versus (Metoclopramide plus

Dexamethasone)dose in prevention of postoperative nausea and vomiting in female patients undergoing Laparoscopic Gynecological Surgeries.

Material and Method

From September 2017 to September 2018 in the post anesthesia care unit (PACU) and surgical ward at the Baghdad Teaching Hospital, 50 female patients had (American Society of Anesthesiology (ASA) Grade I and II), aged (20-50) years old, weights (65-85)kg were undergoing gynecological laparoscopic surgery (diagnosed and therapeutic) that not exceeded 1hour.

The studied sampleswere divided in to two groups (group A and group B), 25 cases for each group. Group A was received ondansetron (4mg/2ml) I.Vwhile group B was receive dexamethasone (8mg/2ml) plus Metoclopramide (10mg/2ml) I.V.before induction of anesthesia.

Same standard anesthesia technique was used in all cases. Patients were monitored during anesthesia by continued noninvasive blood pressure (NIBP), electrocardiogram (ECG), and peripheral oxygen saturation (SpO2). General anesthesia was induced with Propofol (1.5-2)mg/kg, Ketamine 0.5mg/kg I.V and Rocuronium 0.6mg/kg was given to facilitate tracheal intubation which was done with an appropriate-sized endotracheal tube Midazolam 0.15 mg/kg I.V, and tramadol up to 100mg I.V. was given to patients ,Anesthesia was maintained with (0.7%) (inspired concentration) of halothane in oxygen.

At the end of the surgery, residual neuromuscular block was reversed by neostigmine (0.05 mg/kg) with atropine (0.02 mg/kg) I.V. Extubation was done and after achieving adequate recovery, then patients were transferred to the post-anesthesia care unit (PACU).

The first 4 hours post-operatively nausea and vomiting were assessed by trained nursing staff and the resident doctors, as a routine work in PACU and surgical ward.

The nausea and vomiting were assessed at 0.5 hour ,0.5 hour -1 hour,2 hours ,3 hours and 4 hours . and the intensity of vomiting was assessed by less than 3 times or more than 3 times vomiting

Findings

Table (1): Number and percent of patient with PONV in each group within first 4hr post-operatively.

Time	PONV	Group A	Group B
First 30 mints	Nausea	**1 (4%)**	**2 (8%)**
	Nausea and Belching	0 (0%)	0 (0%)
	Vomiting <3 time	0 (0%)	0 (0%)
	Vomiting >3 time	0 (0%)	0 (0%)
0.5-1hr	Nausea	**5 (20%)**	**8 (32%)**
	Nausea and Belching	**1 (4%)**	**4 (16%)**
	Vomiting <3 time	0 (0%)	0 (0%)
	Vomiting >3 time	0 (0%)	0 (0%)
After 2hrs	Nausea	**4 (16%)**	**5 (20%)**
	Nausea and Belching	0 (0%)	**3 (13%)**
	Vomiting <3 time	0 (0%)	0 (0%)
	Vomiting >3 time	0 (0%)	0 (0%)
After 3hrs	Nausea	0 (0%)	0 (0%)
	Nausea and Belching	0 (0%)	**1 (4%)**
	Vomiting <3 time	0 (0%)	0 (0%)
	Vomiting >3 time	0 (0%)	0 (0%)
After 4hrs	Nausea	0 (0%)	0 (0%)
	Nausea and Belching	0 (0%)	**1 (4%)**
	Vomiting <3 time	0 (0%)	**1 (4%)**
	Vomiting >3 time	0 (0%)	0 (0%)
Total		**11 (44%)**	**25 (100%)**

Group A :ondansetrone I.V.

Group B : Metoclopramide plus dexamethasone I.V.

Table (2) : Numbers and percent of patients with post-operative nausea and vomiting and need of antiemetic drug for each group.

Group	No.of Patient	Post-operative Nausea and Vomiting				
		Null	Nausea	Nausea and Belching	Need of anti-emetic drug Post-op.	No. of patient with complication
Group A	25	14 (56%)	10 (40%)	1 (4%)	0 (0%)	11 (44%)
Group B	25	0 (0%)	16 (64%)	8 (32%)	1 (4%)	25 (100%)
P-Value						**MCP<0.01 (HS)**

Group A :ondansetrone I.V.

Group B : Metoclopramide plus dexamethasone I.V.

Table (3) Numbers and percent of patients that not develop PONVand those needed to anti-emetic drug post-operatively in each group.

Type of Group	Patient without PONV	Need for anti-emetic drug post-op.
Group A	***14 (56%)***	0 (0%)
Group B	0 (0%)	***1 (4%)***

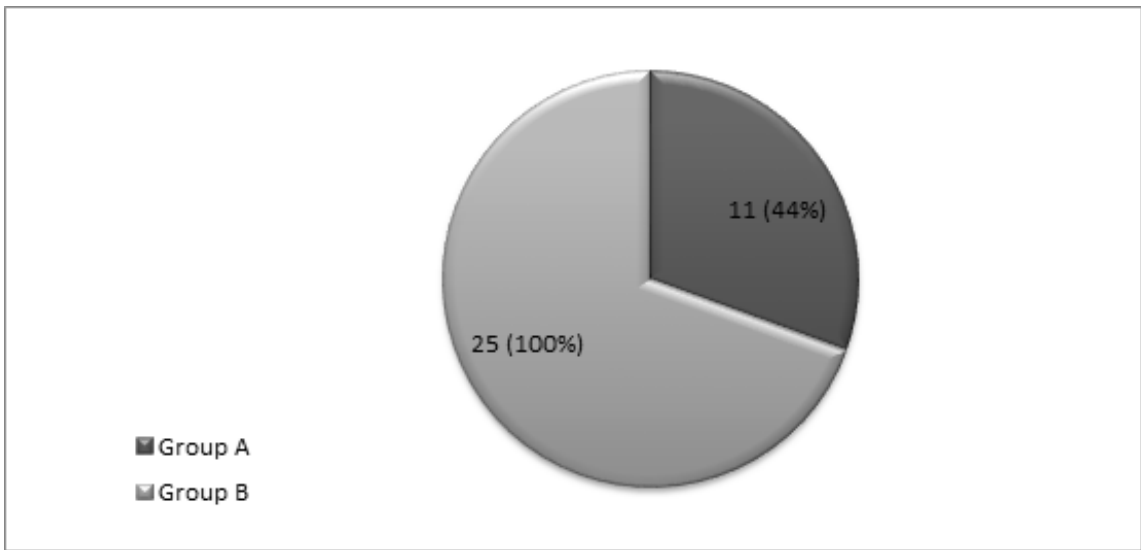
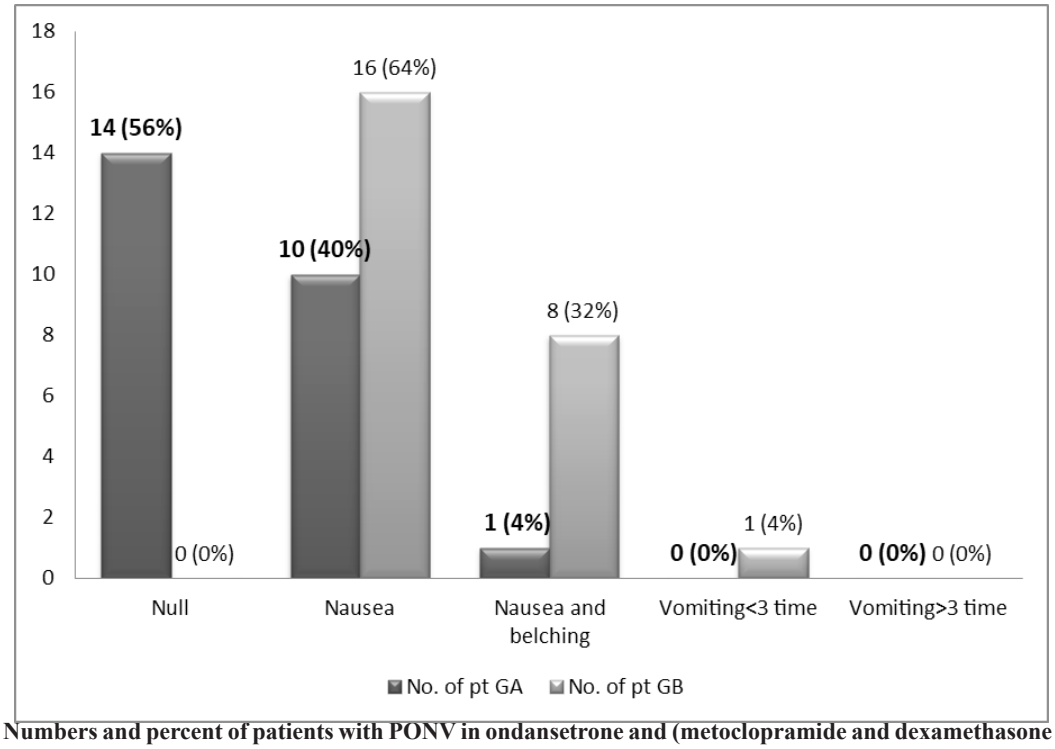


Figure (1): Numbers and percent of patients with PONV in ondansetrone and (metoclopramide and dexamethasone combination)



Figure(2): Numbers and percent of patients with PONV in ondansetrone and (metoclopramide and dexamethasone combination)

Discussion

In this clinical study, there were no significant differences between the two groups regarding the age and duration of surgery. during 4 hours period PONV was significantly minimum in ondansetron group as compared with metoclopramide plus dexamethasone combination group, p value was 0.01ondansetron group 11(44%) patients were developed PONV as compared with metoclopramide plus dexamethasone combination group in which all patients 25 (100%) were developed PONV . This high number of PONV was due to gender of patients (female) ,undergoing laparoscopic surgery and due to uses of volatile and opioid during operation.The patients with no PONV were 16 (56%) in ondansetron group while all patient with metoclopramide plus dexamethasone group had PONV.Patients with nausea only develops in 10 (40%) in ondansetron groups as compared with 16 (64%) in metoclopramide with dexamethasone combination .Nausea and blenching were developed in 1 (4%) patient in ondansetron group as compared with 8 (32%) in metoclopramide with dexamethasone combination group.The majority of patients were develop nausea with or without blenching in both groups , Only 1 patient (4%) develop vomiting after 4 hour of extubation of less than 3 times and treated with antiemetic .

The other studies that were compatible with our study :Tabari M et al.(Iran ,2014) in which they compare the ondansetron , metoclopramide and dexamethasone and shows that the ondansetron had the minimum incidances of PONV as compared with other groups [11]. When compare the Ondansetron with metoclopramide ,granisetron and dexamethasone and they showed that the Ondansetron had the minimum incidances of PONV as compared with metoclopramide but the granisetron had minimum as compared with ondansetron[12]. In Nigeria study conclude that ondansetron was more effective than metoclopramide in the prevention of nausea in patients undergoing elective day−case gynaecologicallaparoscopic procedures. Both metoclopramide and ondansetron were effective in the prevention of vomiting but ondansetron still offered superior prophylaxis. There were no significant side effects for both metoclopramide and ondansetron when used as prophylaxis.[13]. So results of Waqas *etal.,* they conclude that Ondansetron was more effective as compared to combined metoclopramide and dexamethasone, in the prevention of post-laparoscopic surgery nausea and vomiting[14]

Conclusion

We conclude that the ondansetron had better prophylactic antiemetic action than metoclopramide

Conflict of Interest: Nil

Source of Funding : Self

Ethical Clearance: Informed consent was obtained from all patient that participate in the study

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Effect of Silver Nano-Fillers and Aging on Tensile Strength of Heat Cured Acrylic

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Abstract

Background: Silver nanoparticles are attracting interest as antibacterial and antimicrobial agents as incorporating materials into PMMA denture resin, but the need for application without side effects on resin properties is essential.This study was oriented to investigate the addition of silver nano-fillers(AgNPs)and aging on tensile strength of acrylic resin polymerized by two techniques water bath and autoclave.

Materials and method: 120specimens made of heat-cured acrylic were divided into two main groups depending on curing methods water-bath and autoclave processing technique, and then each group was subdivided into experimental groups according to the addition of silver nano-fillers in two concentration(0.2% and 2%AgNPs)and control groups(0%AgNPs). Each subgroup was divided into 2groups according to the period of immersion in distilled water(1day and 1month)with(N= 10).The WDW200Esteel tensile strength tester was used for measuring the tensile strength for all groups.Data were statistically analyzed using One-way ANOVA-test and Independent t-test to detect the significant different among tested and control groups at significance level ($P \leq 0.05$).

Results: A highly significant decrease in tensile strength was observed with the addition of silver nanofillers to PMMA.According to curing methods, the results showed that there wasnon-significant difference of curing in water-bath and autoclave technique. In addition, by aging specimens for one month period, there was a highly significant decreasein the tensile strength of acrylic in all groups .

Conclusions: The addition of AgNPs to acrylic lead to reduction of its tensile strength.No change in the tensile strength by using autoclave method for acryliccuring. In addition, the prolong storage period was reduced tensile strength of the resin.

Keywords: *AgNPs, heat-cured acrylic, aging, autoclave, tensile strength.*

Introduction

The poly methyl-methacrylate was introduced by Wright in1937, from this period it considered as the main polymer for fabrication of denture base[1]. It is well-known that acrylic resins may act as a reservoir for microorganisms and contribute to re-infection in denture users;there was a demand for effective widely-spectrum antimicrobial resin materials in dentistry[2]. Therefore, more attention has been directed towards the AgNPs as incorporated particles into acrylic to improve its characteristics. The silver in nano-form is used to avoid the contamination or to make better various physical and mechanical properties of denture[3]. There are lot of researches on introducing nano-silver to acrylic. One of these studies allowed to obtain materials which show increased antifungal effectiveness in vitro tests[4],and relevant basic mechanical properties[5]. Hamedi-Radetal.,2014compared the conductive thermal,compressive strength, and tensile strength of the resinthat reinforced with nano-silver[6].A research has revealed the incorporation of AgNPs to the polymer powder was higher in thermal conductivity than that of the conventional polymer[7].Other study investigated there was improvement in viscoelastic properties of acrylic denture reinforced with AgNPs[8].Ghaaffari

and Hamadi Rad,2015studied the effect ofAgNPs on the tensile strength of PMMA[9].Furthermore, over the years, curing procedures have been modified with a view to improve the physical and mechanical properties of resin materials, the water bath processing technique has been the most conventional polymerization technique[10]. In spite of the advantages provided by this technique like the ease, simplicity and cost-effectiveness, a major disadvantage has been long processing time need[11]. The use of pressure cooker for denture polymerization was first reported in1976.The investigation by Indian researchers of the pressure cooker for curing resin was done and they revealed that itrequires less than 1hour for curing and utilizes conventional equipment[12].

On the other hands,variousstudies in which distilled water was used for aging[13,14].The flexural strength and bond strength of denture base and relined resins wereobserved after water immersion[15,16].AlsoJagger etal.,2000 studied the effect of 6months of storage in water at 37°C on heat polymerizing acrylic[17].

So this study was aimed to evaluate the effect of:

1.Incorporating 2% and 0.2%AgNPs into heat-cured acrylic denture-based material on the tensile strength of resins.

2.Two processing techniques: water-bath and autoclave on the tensile strength of heat-cured resins.

3.Immersion in distilled water in two periods(1day and 1month)on the tensile strength of heat-cured resins.

Materials and Method

A total of 120 specimens were prepared from heat-cured denture base resin,(Superacryl`plus, Modern Medical equipment, Czech Republic) which were divided into two groups according to processing technique:water bath and autoclave. Each onedivided into three groups according to AgNPs concentration:0%AgNPs,0.2%AgNPs,and2%AgNPs. The samples for each group were subdivided depending on the period of immersion in distilled waterfor 1day and 30days(N=10).The AgNPs(Silver Nano-powderproduct no.MKN-Ag-090,MK Nano,MKImpexCorp.,Lot no. 0729,Canada),silvernano-powderof 90nm particle size according to manufacturer instruction(Fig.1).

Sample preparation

The wax patterns(Polywax, Bilkim chemical company, Turkey)were constructed in form ofFlat dumbbell-shaped with dimensions**(80mm,9mm,3mm)** length,width,thickness respectively[18](Fig.2).

The mould preparation was utilized by placing the wax pattern after coating with separating medium in the lower portion of the flask within dental stone typeIV(Elite stone, Zhermack, Germany)that was mixed according to the manufacturer's instructions.The wax patterns were placed about 1/2 of their thickness. After that,the opening of the flask was carefully done and the patterns were removed from the mould**.**

Incorporation of silver nanoparticles:

For experimental specimens,AgNPs were added in two percentages(0.2%,2%) to the monomer through the extremely sonication of the fillers which had been well dispersed in the liquid by a probe of sonication equipment (Soniprep150, England)at 120W and 60KHzto split them into nano-crystals for 3minutes individually[19]. The monomer with AgNPs were mixed with acrylic powder immediately to reduce the possibility of particle aggregation and separation.

The proportion of acrylic mixing was 10g: 4.4ml(P/L)according to the manufacturer's instruction and left to stand until a dough stage was reached. An electronic balance with 0.0001g accuracy (StaroiusBP 30155, Germany)was used to measure the weight of materials of this study.

Packing and Curing

The dough stage of the mixture was packed in the mould after lining with a separating medium and become ready for curing by **water-bath technique**,the curing was done byplacing theconventional brass metal flask (Broden,Sweden)in water bath (Memmert, Germany) and processed by heating at 74°C for an hour and a half.The temperature was increased to the boiling point for 30 minutes[20].Then, the metal flask was allowed to cool at room temperature for 30minutes, followed by complete cooling of the metal flask for 15 minutes before deflasking. For curing by **autoclave processing technique**,it was carried out by placing the clamped flask in a fully automatic autoclave(QD, England)and processed by the preprogrammed cycles (121ºC/210KPa,30min). Before placing the clamped flask inside the autoclave, the autoclave must be leveled and filled with distilled water. Then, the clamped flask

placed in the tray and pushed inside the chamber, then closed and secured the door. The autoclave operated and started heating the water, then the temperature and pressure were raised till its reached(121ºC and 210KPa) respectively. When the temperature reached(121ºC), temperature and pressure held automatically at(121ºC and 210KPa) respectively for 30min[21], then automatically exhausted the steam and the programmed cycle was finished, then removed the clamped flask.Then the flask was opened and the specimens were removed from the stone mould, smoothing and polishing in conventional way with continuously cooled with water to avoid overheating which may lead to the distortion of the specimens[20].

Half of the specimenswere soaked indistilled waterfor 1day.While other half immersed in distilled water 30days in incubator(Gallenbamp, England) at 37±1ºC and the water changed daily within the mentioned period[13].

Testing Procedures

The acrylic specimens were utilized to measure the tensile strength(Fig.3),that was achieved by using(**WDW200E steel tensile strength tester with tensile strength testing machine)(**Fig.4). Each specimen was positioned on bending fixture, consisting of 2 parallel supports(50mm)apart, the full scale load was(50g),and the load applied with cross head speed 5mm/min by rod placed centrally making deflection until fracture occurred and the force were recorded in Newton.

The tensile strength values were calculated by following equation:

Tensile strength=F/A[18].

***F* =force at failure(Newton).**

***A*=Minimum cross sectional area(mm).**

Data was analyzed by Statistical Package for Social Science (SPSS) version #21(SPSS, Chicago, Illinois, USA).Descriptive statisticsand inferential statistics: One-way ANOVA-test and Independent t-test were used to detect significant differences between tested and control groups at a significance level($P \leq 0.05$).

Results

Descriptive statistics of tensile strength values of the groups without the addition of AgNPs group showed higher mean values than the experimental groups with addition of 0.2%, 2% AgNPs.The tensile strength for those ofone day immersion in distilled water showed higher mean values thanthose immersed for thirty days (Table1, Fig.5).

For comparing the effect of silver nano-filler addition on the tensile strength of the heat cured acrylic, One-way ANOVA-test showed there was a highly significant different between the tested groups(Table2). Further analysis by LSD-test was showed there was a highly significant different between the control group and experimental groups(Table3).

In comparison, the effect of curing technique the Independent t-test was showed there were non-significant differences in the tensile strength between the water bath groups and autoclave groups**(**Table4**).**

Furthermore, the means values of the tensile strength of the acrylic resin depending on the time of immersion in distilled water were compared using the Independent t-test which showed that there were highly significant differences among the study groups(Table5)**.**

Table1: Descriptive statistics of tensile strength(N/mm²)for all study groups.

Study Groups			N	Mean	SD	Minimum	Maximum
Water bath	0%AgNPs	1day	10	48.112	2.5578	42.325	50.567
		30days	10	44.365	1.2853	42.520	45.932
	0.2%AgNPs	1day	10	45.820	1.2958	43.976	47.356
		30days	10	41.928	1.3539	40.257	44.050
	2%AgNPs	1day	10	42.722	2.8872	37.268	45.907
		30days	10	39.722	1.5263	35.910	41.181
Autoclave	0%AgNPs	1day	10	46.297	1.1601	44.358	47.184
		30days	10	43.122	1.5407	39.520	44.955
	0.2%AgNPs	1day	10	44.728	1.0435	43.069	46.499
		30days	10	40.981	0.8876	39.296	42.266
	2%AgNPs	1day	10	40.875	1.2130	38.065	42.156
		30days	10	38.638	0.8136	37.332	40.013

Fig. 5:Bar chart showed tensile strength test for all groups.

Table 2:O-way ANOVA-Test comarison the tensile strength between groups according to addition of different concentration of AgNPs.

			F-test	P-value	Sig
Water bath	1day	0%AgNPs&0.2%AgNPs&2%AgNPs	13.257	0.000	HS
	30days	0%AgNPs&0.2%AgNPs&2%AgNPs	27.827	0.000	HS
Autoclave	1day	0%AgNPs&0.2%AgNPs&2%AgNPs	59.448	0.000	HS
	30days	0%AgNPs&0.2%AgNPs&2%AgNPs	39.451	0.000	HS

HS: highly significant at P≤0.01.

Table 3: LSD-test for comparison between thegroups according to addition of AgNPs.

			P-value	Sig
Water bath	1day	0%AgNPs&0.2%AgNPs	0.038	S
		0%AgNPs&2%AgNPs	0.000	HS
		0.2%AgNPs&2%AgNPs	0.007	HS
	30days	0%AgNPs&0.2%AgNPs	0.001	HS
		0%AgNPs&2%AgNPs	0.000	HS
		0.2%AgNPs&2%AgNPs	0.001	HS
Autoclave	1day	0%AgNPs&0.2%AgNPs	0.005	HS
		0%AgNPs&2%AgNPs	0.000	HS
		0.2%AgNPs&2%AgNPs	0.000	HS
	30days	0%AgNPs&0.2%AgNPs	0.000	HS
		0%AgNPs&2%AgNPs	0.000	HS
		0.2%AgNPs&2%AgNPs	0.000	HS

S:significant at P≤0.05,HS:highly significant at P≤0.01

Table 4:Independent T-Test for compariosn the tensile strength between groups according to curing techniques.

			t-test	P-value	Sig.
0%AgNPs	1day	Water bath&Autoclave	2.064	0.054	NS
	30days	Water bath&Autoclave	1.960	0.066	NS
0.2%AgNPs	1day	Water bath&Autoclave	2.076	0.052	NS
	30days	Water bath&Autoclave	1.850	0.081	NS
2%AgNPs	1day	Water bath&Autoclave	1.865	0.079	NS
	30days	Water bath&Autoclave	1.981	0.063	NS

NS:non-significant at P>0.05

Table 5: Independent T-Test for comparsion the tensile strength between groups according to storagetimein distilled water.

			t-test	P-value	Sig
0%AgNPs	Water bath	1day&30days	4.139	0.001	HS
	Autoclave	1day&30days	5.177	0.000	HS
0.2%AgNPs	Water bath	1day&30days	6.567	0.000	HS
	Autoclave	1day&30days	8.648	0.000	HS
2%AgNPs	Water bath	1day&30days	2.905	0.009	HS
	Autoclave	1day&30days	4.843	0.000	HS

Discussion

Many studies pointed onAgNPseffect when added into acrylic for the treatmentof oral infections like denture stomatitis and other antifungal and antibacterial infections. So, the modification of denture resins by silver additive in nano-form to get the possible positive influence of its addition[3].Silver nanofillers are smaller in size andthey possess physical, chemical, and biological properties that are distinctive from those presented by traditional bulk materials. Finer size and larger surface area provide potent antibacterial impact at a low filler level, so determining AgNPs concentration necessary for its efficacy and avoiding negative effect on mechanical properties[22],so the decision was made to choose two percentages of AgNPs about 0.2% and 2% depending on the previous study that was revealedthe addition of different percentageof silver nanoparticles to acrylic resinabout 0.2 and 2% result in increasein the compressive strength of acrylic[9],other research conducted that the use of 0.2%,2% nano-silver with acrylic resin increases its thermal conductivity[7],the study was showedthere was decrease in tension properties as a result to addition of5%AgNPs[9].Furthermore, increase the percentage ofsilver nanoparticlesthat leads to adverse effect on properties of resin such as the addition ofsilver nano-filler lead to color change of acrylic because the fillers tend to fill any spaceswithin the polymer,and decrease the amount of transmitted light[23].As well as silver nano-fillers are metal fillers which are changing thecolor of acrylic resin that limits its application inthe esthetic zone that was increase with the use of more amount of nano-filler[7].

The result of effect of silver addition in nano-formon the tensile strength was decrease in this properties when compared with no addition, this was probably attributed to AgNPs acts as impurities and tensile strength would decrease by increasing their content.Anotherexplanation was the reductionof monomers reaction and increases the amount of unreacted monomer, behaving like a plasticizer[24].The plasticization effect of the resultant residual monomer will reduce the molecular binding force, that lead tomultiple micro-fracture in high

deformation upon stretching that weaken the resin[2]. In addition, there was an increase in impurity action of nanofillers which cause a stress concentrated points in the matrix and weakening the resin[25].This result in the brittleness of resin may be attributed to the dysfunctional effect of high percent of AgNPs because the low absorbed energy ion within fracture and Ag^{+}ions being reduced as the concentration of silver increase that was generating atom clusters and smaller particle size during the polymerization process[26].These findings are consistent with previous studies who reported that the mechanical and physical properties of the composite are influenced by silver nanofiller concentration since mechanical properties of composites decreased by increasing silver nanoparticles[27,4].

According to the result of this study, there was no difference between the curing in water bath and autoclave curing. This result in agreement with the findings of previous study that showed that there was non-significant difference between the autoclave and water-bath curing regarding tensile strength[28].This could be explained that "autoclave" utilized the temperature and pressure when water is heated in a sealed vessel such as an autoclaveand the pressure rises due to the constant volume of the container. The boiling point of water is then raised because the amount of energy needed to formssteam against the higher pressure is increased[29,30]. Another cause is high heat treating,could be attributed to increase in cross-linking that provides a sufficient number of bridges between linear macromolecules to form three-dimensional network that decreases water sorption, decreases solubility, and increases the strength and rigidity of resin, as well as the most important determinant of resin strength is the degree of polymerization exhibited by the material.As the degree of the polymerization increase, the strength of the resin also increases, the polymerization cycle employed with a heat activated resin[31].

On the other hand, the effect of the aging in distilled water on the tensile strength of the acrylicwas showed the decrease with increase the period of exposure,this result confined with the study that found the prolonged storage in water badly effecton acrylic resin[17], another research showed the aging in water or aqueoussolutions lead to decrease the mechanicalproperties of the resin, they explainedthe reasons by the use of water may affect the mechanical properties of the acrylicand cause a reduction in the denture strength. This could be attributed to the plasticizer, the materials become softer and tougher, with lower tensile strength[13],this may be due to the gap between polymer chains that wascaused distilled water penetration and resulted the change in the mechanical properties of the polymer[32].

Conclusion

There was weakening in the tensile strength of resin due to 0.2% and 2% silver addition in nano-form. On the other hand, the autoclave polymerization technique can be used as alternative method for processing denture resins, but the prolong storagein water decreased the tensile strength.

Conflict of Interest: non

Source of Finding: self

Ethical Clearness: non

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Formulation and Evaluation of Acetic Acid Lotion for the Treatment of Wound Infection

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Abstract

Acetic acid has been used as a topical agent for healing wound infections. However, no studies have been done to formulate acetic acid based lotion and investigate its role in wound dressing. Therefore, the current workinvolved study the antibacterial activity of acetic acid against pathogenic bacteria associated with wound infections in vitro. In addition to formulate acetic acid lotion and study its role in the treatment of infected wounds, using mice model.

The results show that acetic acid has antibacterial efficacy at different concentrations against pathogenic bacteria tested; *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Acinetobacter* sp, *Proteus*sp and *Salmonella* sp.

The application of acetic acid based lotion on wound infected with *P. aeruginosa*twice a day for 6 days leads to prevent bacterial infection and treat wounds.Herein, we reveal that acetic acid lotion has potent antibacterialefficacy and plays a significant role in wound healing.

***Key words**: Wound, bacterial infection, Acetic acid, wound healing.*

Introduction

Wound infection is a main problem contributing to mortality and morbidity due to the rise in the infections that are caused by multidrug resistant bacteria.To overcome this problem, variety alternatives have been suggested such as bacteriophages, vaccines, antimicrobial peptides, and plant extracts, etc. [1].Organic acids, such as acetic acids, are promising alternatives for infection inhibition [2].

Acetic acid has been used in medicine for thousands years.Many studies address antimicrobial activity of acetic acid against a wide range of pathogens.Acetic acid has been used to inhibit bacterial biofilms of both Gram negative and Gram positive bacteria such as *P. aeruginosa*, *K. pneumoniae*and *S. aureus* [3].In addition, it has been shown that using 6% acetic acid leads to reduce *Mycobacterium tuberculosis* after 30 min of exposure [4].

In literature, Acidic acid was used as a topical agent for healing war-wound infections caused by *P. aeruginosa* [5]. It has been reported that treating burn wounds with 5% acetic acid result in inhibit *P. aeruginosa* infection [6].

In addition to antibacterial activity, acetic acid has anti-fungal activity against pathogenic fungi. Recently, it has been found that low concentrations of acetic acid were active against Mucorales species [7].

Antimicrobial activity of acetic acid is attributed to low pH. However, it has been found that using another acids such as HCl does not show same antimicrobial effect as acetic acid even when they wereused at the same pH. Thus, the antimicrobial activity of acetic acid could be result of the acetic acid molecule itself [3].

To date, no study has been done to formulate acetic acid lotionand investigate its role in wound healing.Acetic acid is available, cheap, non-toxic and has antimicrobial activity. We propose suggest that initial application of Acetic acid lotion may represent an effective way to impede bacterial growth, and thus inhibit wound infection.

Materials and Method

Bacterial strains& Media

Pathogens cause wound infections such as

S. aureus, *E. coli*, *P. aeruginosa*, *Acinetobacter* sp, *Proteus*sp and *Salmonella* sp. were diagnosed and kindly provided by clinical laboratories at Al- Yarmouk hospital.*S. aureus* was grown on mannitol salt agar plates. Gram negative pathogens were grown on MacConkey agar plates at 37 °C. Agar well diffusion experiments were performed in Muller- Hinton agar.

In vitro, antibacterial effects of acetic acid.

Agar well diffusion method was used to determine antibacterial activity of the acetic acid. Acetic acid was diluted in sterile distilled water to prepare the following concentrations 5%, 4%, 3%, 2% and 1% (V/V).

Muller-Hinton agar was inoculated with one of the following bacteria (10^6 cfu/ml, adjusted to 0.5Mcfarlandstandard):*S. aureus*, *E. coli*, *P. aeruginosa*, *Acinetobacter* sp, *Proteus*sp and *Salmonella* sp. 100µl from each concentration was added into 6mm diameter wells. Amoxcillin- (30µg/disc) was used as a positive control. Plates were incubated at 37 ºC for 24 hours.

Formulation of acetic acid based lotion

Table (1) materials used in acetic acid lotion formula

Ingredients	Quantity per 100ml
Acetic acid	5 mL
Mineral oil	10 gm
Tween80+span 60	4 gm
Propylene glycol	5 ml
Xanthan gum	0.5 gm
Methyl paraben	0.03 gm
Propyl paraben	0.02 gm
triethanolamine	Q.S
Perfume	Sufficient quantity
Distilled water	Q.S to 100ml

Q.S: quantity sufficient

Preperation of acetic acid lotion

Oil in water emulsion based lotion was formulated .the emulsifier (span60) and other oil soluble components (mineral oil) dissolved together as oil phase and heated to 75 ºC. the prservatives (methyl paraben and propyl paraben and other water soluble(acetic acid, tween80, propylene glycol) dissolved in aqueous phase and heated to 75 ºC, after that aqueous phase added to oil phase in portions with continuous stirring until the lotion formed then put aside until cool. Xanthan gum prepared as asolution by adding 0.5 gm per 100ml then added to formed lotion with continuous stirring to give suitable consistency. triethanolamin added in drops to adjust the lotion pH at 5.5 which mimic to skin Ph and not cause any irritant [8].

Characterization of acetic acid lotion formula:

Visible inspection

Each emulsion was evaluated to detect visible modifications or instabilities such as color, creaming, coalescence, and/or separation of phases.

In vitro characterization of lotion formulation

1- Viscosity: measurement of viscosity was conducted using a Model Brookfield viscometer. A C-61 spindle was employed with a rotation rate of 2.5, 5, 6 rotation per minute (rpm). Temperature was set at 25°C ± 2 and these experiments were conducted in triplicate 2-detrmination of pH: Lotion pH was recorded with a digital pH meter (Mettler& Toledo, Giessen, Germany) by inserting probe into the lotion formulation and allowing it to equilibrate for 1 minute[9] [10].

The viscositiy was measured to determine rheological properties of formulations.

Brookfield Rheometer viscometer at 30˚C with a CPE 61 spindle at 30 rpm was used to

serve this purpose. Results were taken in triplicate and the average was taken in to

consideration.[1]

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Brookfield Rheometer viscometer at 30˚C with a CPE 61 spindle at 30 rpm was used to

serve this purpose. Results were taken in triplicate and the average was taken in to consideration.

Technique of application

6 mice (age 8 weeks, weight 30–35 g) were randomly divided into two groups. Group forAcetic acid lotion applicationand group as a control (no treatment). Mice were individually put in clean cages. Following shaving, a skin wound (10 mm x 10 mm) was excised from the dorsum part of mice. Wounds were infected with*P. aeruginosa* (10^6 cfu / ml).The application of acetic acid lotion was started after two hours of infection. Wounds treated with lotion twice a day. The experiment was repeated twice.

Statistical Analysis

Statistical analysis of values was performed with Graph Pad Prism version 5. Unpaired two-tailed t-test was used for statistical significance.

Data were stated as the mean ± SD. *$p < 0.05$.

Findings

Acetic acid displays antibacterial activity against the tested pathogenic bacteria.

In the current work, antibacterial effect of acetic acid was investigated on *S. aureus*, *E. coli*, *P. aeruginosa*, *Acinetobacter* sp, *Proteus*sp and *Salmonella* sp. Agar well diffusion method was used for detecting antibacterial potency. Antibacterial activity was evaluated by measuring an inhibition zone around the well containing acetic acid. Different concentrations of acetic acid (5%, 4%, 3%, 2% and 1%) (v/v) were used.

The results revealed that acetic acid has antibacterial activity against all tested bacteria. All concentrations exhibited antibacterial activity against *Acinetobacter*sp and *Salmonella* sp. The inhibitory effect shown for *Acinetobacter*sp by 5%, 4%, 3%, 2% and 1%) (v/v) was 36, 28,25, 23, and 19 mm, respectively. And the mean of inhibition zone recorded for *Salmonella*sp was 28, 26, 25, 18 and 10 mm, respectively. Acetic acid inhibits *E.coli*, *P. aeruginosa*, *S. aureus* growth at concentrations of 5%, 4%, 3%, and 2%. The mean of inhibition zone revealed for *E.coli* was 29, 28, 27 and 25mm, respectively. And the records for *P. aeruginosa* were 24, 21, 18, and 17mm, respectively. *S. aureus* was also sensitive to these concentrations. The mean of inhibition zones was 25, 20, 17 and 13 mm, respectively.

Only 5% and 4% exhibited antibacterial activity against *Proteus* sp. with mean of inhibition zone of 22 mm and 20 mm respectively. Amoxicillin –clavulate (30µg/ disc) inhibits *E.coli* and *Acinetobacter* sp. growth with mean of inhibition zone of 10 and 12 mm, respectively. Whereas, *Salmonella*sp, *Proteus*sp, *P.aeruginsa* and *S. aureus* shown resistance to this antibiotic (Table 2) & (Figure 1).

Table 2: Antibacterial activity of acetic acid against bacteria related to wound infections

Pathogenic bacteria	**Acetic acid concentrations(v/v) Inhibition zone mean (mm)±SD**					**Amoxcillin-clavulate 30µg/ disc**
	5%	4%	3%	2%	1%	
E. coli	29±1	28±1	27±1.52	25±1	0	10±0.57
Acinetobacter sp	36±1.53	28±1	25±1	23±1.15	19±1.52	12±0.58
Salmonella sp	28±1	26±0.57	25±1	18±1.15	10±1.32	R
Proteus sp	22±0.57	20±0.76	0	0	0	R
P. aeruginosa	24±0.58	21±0.57	18±0.57	17±1	0	R
S. aureus	25±0.57	20±0.28	17±0.57	13±1	0	R

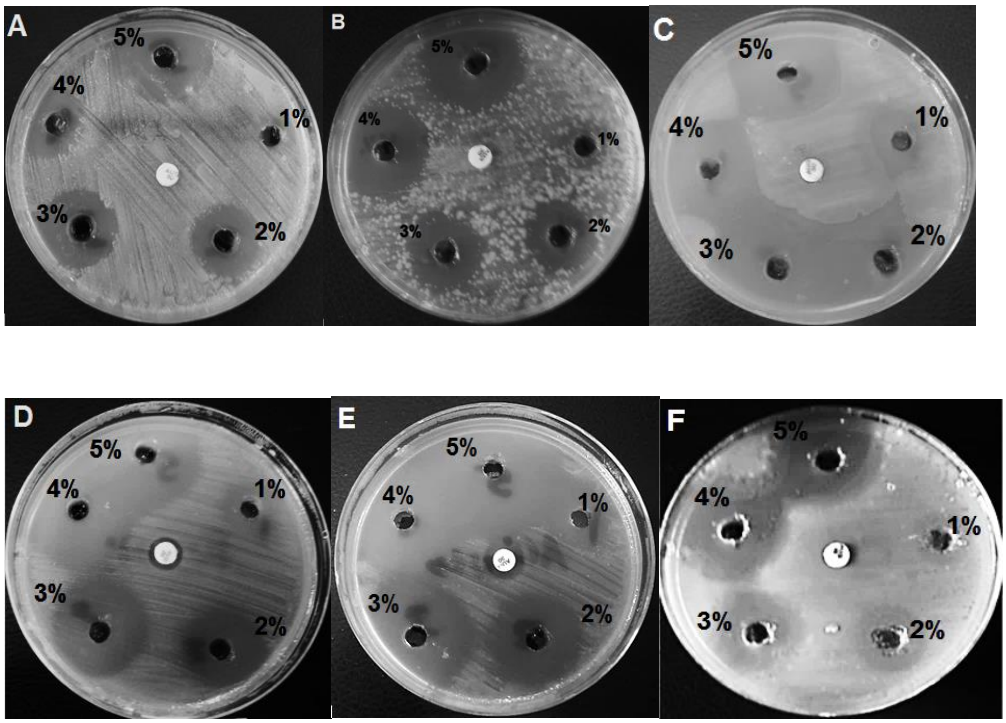


Figure (1): Antibacterial efficacy of Acetic acid.

The figure shows antibacterial activity of acetic acid against (A):*S. aureus,* (B):*P. aeruginosa*,(C):*Salmonella* sp.,(D):*E.coli*,(E): *Acinetobacter* sp. and (F): *Proteus* sp.

Application of acetic acid lotion twice a day for six days leads to prevent *P. aeruginosa* infection as well as wound healing. The results show marked differences between the treated mice and the control (no acetic acid lotion application) (Figure 2). Significant differences between the treated wound size and untreated wounds (Figure 3).

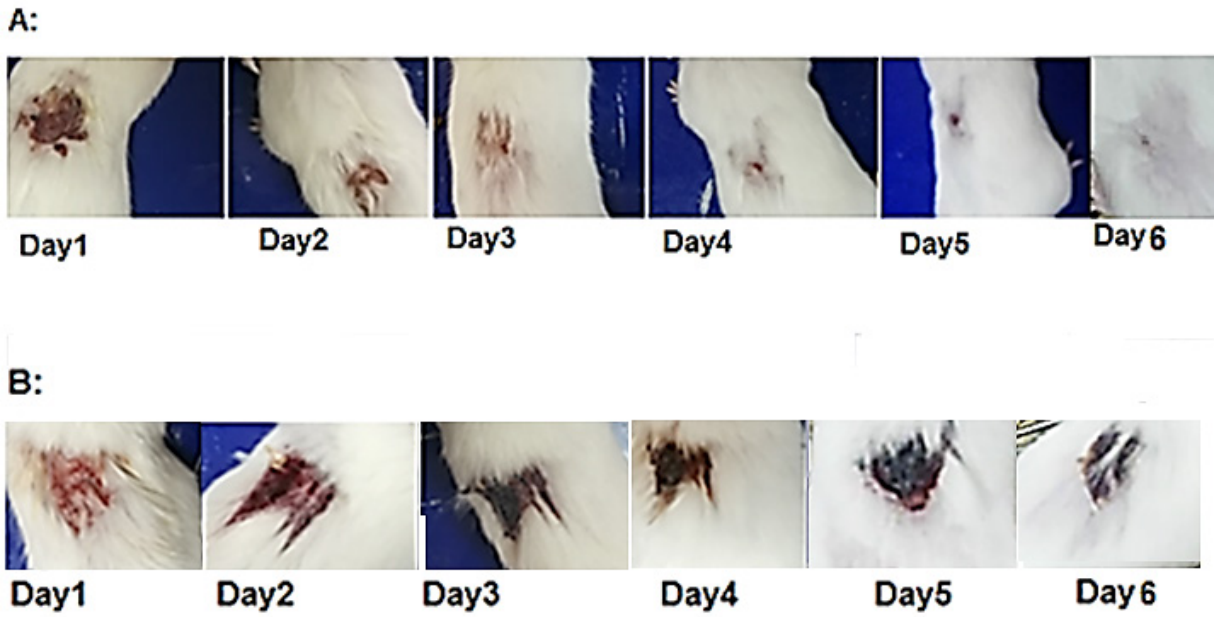


Figure2: Acetic acid based lotion for wound healing.

: Acetic acid lotion application on wound infected with *P. aeruginosa*.

: Control mice infected with *P. aeruginosa.*

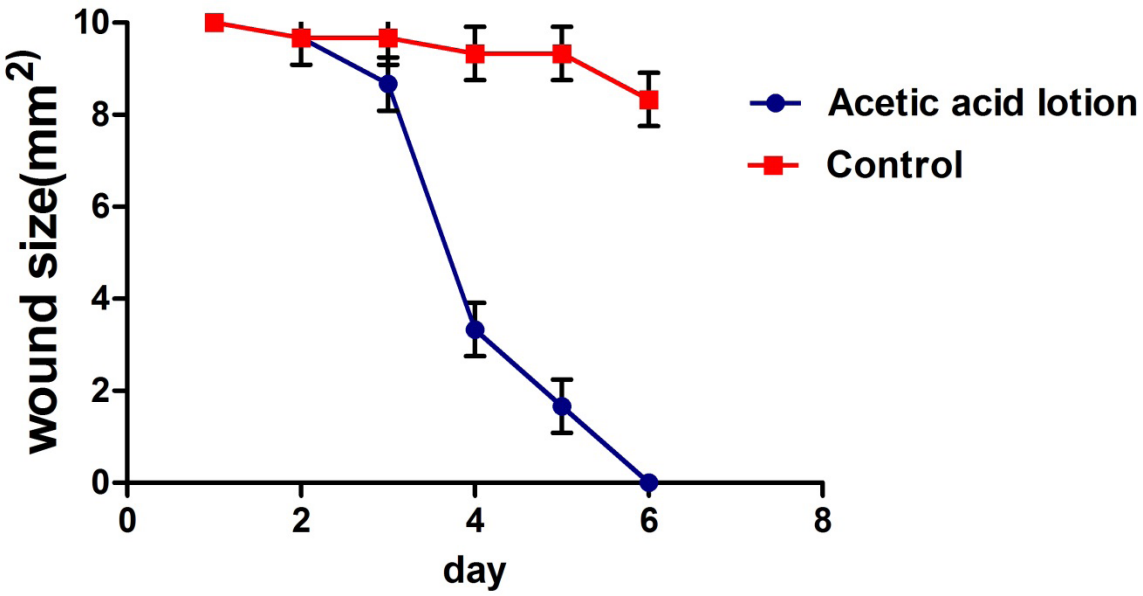


Figure 3: The treatment with Acetic acid lotion enhances wound healing.

Discussion

In the current study, the work involved using acetic acid to inhibit bacterial wound infection and formulate an acetic acid lotion to heal wounds. Pathogens infections are a key problem in the curative of chronic wounds. Usually, antibiotics have been used to treat wound infections, but in the majority of chronic wounds, these antibiotics are un useful. In addition to the cost and the resistance to antibiotics.,Acetic acid is available, cheap, non-toxic and has antimicrobial activity. Thus, we chose it to formulate acetic acid lotion and investigate its ability for wound dressing. In the current study the following pathogenic bacteria that cause wound infections were used: *S. aureus*, *E. coli*, *P. aeruginosa*, *Acinetobacter* sp, *Proteus*sp and *Salmonella* sp.Herein, different concentrations of acetic acid were used to inhibitbacterial growth.

In the current study, we found that acetic acid is effective againstall tested bacteria. Acetic acid demonstrated antibacterial activity against all pathogens. Many studies demonstrate the antibacterial activity of Acetic acid. Anti- bacterial activity of different concentrations of acetic acid (0.5—2%) was investigated against *P. aeruginosa*. The results revealed that 2% acetic acid exhibited the highest inhibition zone [11]. Acetic acid inhibits *E. coli* growth [14]**.** This inhibition was due to diffusion ofthe acetic acid molecule leads to lowering the cytoplasmic pH[15]. The pH is one of the crucial factors that affect bacterial growth.

Next step in our study was formulating acetic acid based lotion (5% acetic acid). The prepared oil in water emulsion based lotion was milky color, acceptable odor, homogenized and stable. The viscosity of acetic acid lotion measured in different rotation per minute (R.P.M) was 1344 centipoise at 2.5R.P.M, 1081centipoise at 5R.P.M and 938centipoise at 6R.P.M so it behave as psudoplastic and has viscosity within normal range. The pH of prepared lotion was 5.5.

To evaluate the role of Acetic acid lotion in wound dressing, acetic acid lotion was applied directly to the infected wounded skin. Wounds were infected *P. aeruginosa*. *P. aeruginosa* is the most frequent Gram negative pathogen that causes chronic wound infections [12]. The results show that the application of acetic acid lotion into the infected wounded skin twice daily for 6 days result in wound healing. 5% acetic acid is a harsh environment for bacterial growth. Thus, the lotion prevents bacterial growth. It has been shown that application of 1% acetic acid for 10-14 days in burn wounds leads to elimination *P. aeruginosa* infection [13].

It is well known that lowering the pH of the wound leads to wound healing. Low pH result in inhibit bacterial protease and decrease bacterial toxicity. In addition, low pH induces host macrophages activity. The pH of the formulated acetic acid lotion in the current work was adjusted to 5.5. This pH does not cause skin irritation since it is close to the pH of skin. In addition, adding Perfume leads to disappear cetic acid smell that makes it acceptable. Antibiotics resistant bacteria are a critical problem in wound healing process. Acetic acid lotion accelerates the treatment of the infected wounds .Thus, no needs to use antibiotics, especially with multidrug resistant bacteria. Since Acetic acid lotion has potential role for wound dressing. We suggest that the application of acetic acid lotion on infected wounds could be a good way to inhibit infections and induce wound healing.

Conclusion

Acetic acid lotion has potent antibacterial efficacy and accelerates the treatment of the infected wounds. Thus, we suggest that initial application of this lotion may represent an effective way to treat wounds especially with multidrug resistant bacteria.

Conflict of Interest: None.

Funding-self or other source: Al mustansiriyah university**.**

Ethical Clearance: all studies were conducted in accordance with the Ethical Committee of College of pharmacy/Al-Mustansiriyah University.

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Evaluation the Effects of Incorporation of Silver Nitrate on Some Mechanical Properties of Soft Liner Materials

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Abstract

Background:- Soft liners placed in dentures have been used as carrier for antifungal drugs in treating denture stomatitis.The aim of this study is to evaluate the effect of incorporated of silver nitrate in different volume into acrylic soft denture liner and to assessment the effect of these additions on some mechanical properties.

Materials and methods: One hundred and twenty (120) specimens were prepared from heat cure soft liner material and divided into three groups according to the test that carried out. Forty specimens for each (hardnesstest, compressive strength test, water sorption and solubility test) . Then each test subdivided into four subgroups according to the volume of the silver nitrate solutionincorporation. Controlgroup which have ten specimens without incorporation of silver nitrate and experimental groups which have thirty specimens with incorporation of(0.05ml ,0.1 ml and 0.2 ml) of silver nitrate solution. All specimens were constructed as in conventional method then stored in distilled water for seven days be ready for measurement.

Findings:- The results of this study showed that highly significant increase in the hardness tested groups also compressive strength group at 0.1 ml of silver nitrate incorporation while significant decrease in 0.05 and 0.2 ml groups.Watersorption and solubility showed that highly significant increase in all volumes of silver nitrate incorporation groups.

Conclusions:- Silver nitrate incorporation was significantly increases the hardness of soft lining material while Compressive strength was significantlyincreased after incorporation of 0.1 ml of silver nitrate .The incorporation of 0.05 and 0.2 ml of silver nitrate to soft liner material significantly was decreased. Regarding water sorption and solubility were significantly increased after incorporationof silver nitrate to soft lining material in all experimental groups.

Keyword*: silver nitrate, soft lining material, hardness, water sorption and solubility*

Introduction

Soft lining materials are able to form an absorbing layer on the part of the denture in contact with oral mucosa and this allow less traumatic transmission of occlusal forces[(1)].Soft liners are often used for patients who cannot tolerate a conventional denture base [(2)]. Disinfection of denture base materials[(3)] as well as denture liners was recommended as a methods of reduction in the microbial contamination or growth and reduces oral infection as well as cross contamination[(4)]. Silver is well known for its antimicrobial activity against different positive and Gram- negative fungi and certain viruses[(5)], and recently the antimicrobial properties of nanoparticles have drawer attention of researchers[(6)]. Smaller particle size results in greater surface area to volume ratio, which enhances its chemical and biological activity[(7)]. Silver ions have been reported to inactivate important enzymes and affect the application mechanism of the DNA in bacteria .It has been reported to attach to the outer membrane and affect the permeability as well as induce structure changes in the cell –ultimately leading to cell death .In addition ,silver does not cause resistant bacterial strains to develop[(8)].The incorporation of silver–supported antimicrobial agent into denture base materials to investigate the distribution and to study

the release mode of silver ions from the base[9].In this study silver nitrate used by three volume (0.05ml,0.1ml and 0.2 ml) were incorporated into acrylic based soft denture liner to evaluate whether this addition would significantly affect some of properties of the soft lining material such as hardness, compressive strength, water sorption and solubility test.

Materials and Method

Preparation of silver nitrate solution, 0.1 N silver nitrate preparations:

_Normality (N) =weight/equivalent weight×1/ volume by litter

_Equivalent weight =molecular weight/valance

_Molecular weight of silver nitrate=169, 8731.

_Valance of silver nitrate =1.

_N=16.990/169,8731×1/1=0.10001584=0.1N

Taken (16.990±0.0001 g) silver nitrate is electronic balance. 1litter of purified water is poured into the light –proof glass bottle. The solution is prepared by pouring the pre-scaled silver nitrate into purified water; the solution prepared between 6 to 10 minutes is diluted by mixing[10,11].

Specimens grouping:-

One hundred and twenty (120) specimens were prepared from heat cure soft liner material (Vertex) to be used in this study and divided into three groups according to the test that carried out.Forty specimens for hardness test, forty specimens for compressive strength test and forty specimens for water sorption and solubility. Then each test subdivided into four subgroups according to the volume of the silver nitrate solution incorporation (0, 05 ml, 0.1ml and 0.2 ml) .Each have ten specimens.

Hardness test specimens:

A soft liner disk with the dimension of (30mm diameter, 3mm thickness)[12, 13] was used for hardness test.

Incorporation of silver nitrate with soft liner material :-

The resilient lining liquid was added to the powder and the material was mixed in accordance to the manufacturer instructions, the volume of the silver nitrate and liquid that had been added to the monomer of soft liner was taking into account and subtracted from soft liner monomer volume to achieve correct P/L ratio.

The soft liner dough was packed as a conventional method. Curing was done as instructed by manufacturer (heating up to 70 C^{O} and kept for 90 minutes then the temperature was raised up to 100c and kept for 30 minutes)[14]. A sharp blade was used to remove all the excess materials, fine grit sand paper and fine grit silicone polishing bur was used to remove the flashes .Then the specimens placed into the distilled water for seven days in the incubator at 37C°[15].

Testing procedure:-

The shore adurometer was used to measure soft liner hardness specimens .The testing value was taken as an average of different reading that were taken directly from the scale reading of durometer by using pointed dibbing tool.

Compressive strength specimens test:

A metallic molds with thickness of (12.7mm in diameter and 19mm in length was constructed for compressive strength test[16].

Testing procedure:

The specimens were subjected to compressive strength load by using compressive strength test machine. The specimens were subjected to the load with cross head speed of 0.5 mm/minute using load cell with maximum capacity 250N according to the following formula:-

Compressivestrength =F/A=(MPa)

F: Maximum load A: Cross section area

Sorption and solubilityspecimens test:-

A metallic molds of (50±1mm diameter and 0.5±0.05mm thickness) were made for sorption and solubility test[17].

Testing procedure:

After processing and finishing, all disc –shaped specimens were dried in a desiccators containing dried silica gel.The desiccators stored in an incubator at 37 c± 2c for 24 hours, after that the specimens were removed at

room temperature for one hour, and then weighted with digital electronic balance. This cycle was repeated until constant weight was determined. This was considered to be the initial weight (W_1). The specimens were immersed in distilled water for 7 days at 37 ^{0}C ±2^{0}C .After this period of time ,each disc was removed from the water with tweezers ,wiped with clean, dry hand towel until free from visible moisture ,waved in the air for 15 seconds and weighed one minute after removal from the water .This weighted represents (W_2).After that the specimens dried by the desiccators and they were weighted every 24 hours until a constant weighted (±0.5 mg) wasobtained, this weighted represents (W_3). Water sorption and solubility measured as a relative sorption and solubility in (mg/cm^2).Calculations were made according to the following formulae:

Sorption (mg/cm^2) = w_2-w_1 /surface area.

Solubility (mg/cm^2) = w_1-w_3/surface area.

Findings

Hardness test:

Table (1) showed that majority mean value are accounted in (0.2 ml) group while low level are recorded in control group,

Table (1): Descriptive statistics for hardness test

Groups	No.	Mean N/ mm	S.D.	S.E.	95% C.I. for Mean		Min.	Max.
					L.B.	U.B.		
Control	10	91.590	2.660	0.841	89.687	93.493	88.7	95.1
Silver nitrate 0.05 ml	10	95.200	0.759	0.240	94.657	95.743	93.9	96.2
Silver nitrate 0.10 ml	10	97.680	1.326	0.419	96.732	98.628	95	99.4
Silver nitrate 0.20 ml	10	101.070	2.555	0.808	99.242	102.898	97.8	106

Table(2) Games Howell (GH) test observed that most comparisons are accounted highly significant differences at "P<0.01", and significant different at" P<0.05" between 0.1 ml, and 0.2ml groups.

Table (2): (Pair wise Comparisons) by "GH" test for hardness test

Group (I)	Group (J)	Statistics		
		Mean Diff. (I-J)	Sig. (*)	critical values
Control	Silver nitrate 0.05 ml	-3.610	0.009	2.655
	Silver nitrate 0.10 ml	-6.090	0.000	2.752
	Silver nitrate 0.20 ml	-9.480	0.000	3.297
Silver nitrate 0.05 ml	Silver nitrate 0.10 ml	-2.480	0.001	1.400
	Silver nitrate 0.20 ml	-5.870	0.000	2.553
Silver nitrate 0.10 ml	Silver nitrate 0.20 ml	-3.390	0.011	2.657

Compressive Strength test

Table (3) showed that majority mean value accounted with (0.1ml) group, while low level are recorded with (0.05ml) group.

Table (3): Statistics for compressive strength test

Groups	No.	Mean	S.D.	S.E.	95% C.I. for Mean		Min.	Max.
					L.B.	U.B.		
Control	10	1.945	0.054	0.017	1.906	1.983	1.882	2.056
Silver nitrate 0.05 ml	10	1.440	0.104	0.033	1.365	1.514	1.265	1.582
Silver nitrate 0.10 ml	10	1.977	0.140	0.044	1.877	2.077	1.74	2.215
Silver nitrate 0.20 ml	10	1.459	0.085	0.027	1.399	1.520	1.344	1.582

Results of Games Howell test show highly significant differences except comparison between 0.1ml and 0.2ml groups which reported no significant different at" P>0.05" as shown in table(4).

Table (4): Pair wise Comparisons by (GH) test for compressive strength test

Group (I)	Group (J)	Statistics		
		Mean Diff. (I-J)	Sig. (*)	critical values
Control	Silver nitrate 0.05 ml	-1.105	0.000	0.352
	Silver nitrate 0.10 ml	-0.796	0.000	0.354
	Silver nitrate 0.20 ml	-0.755	0.000	0.375
Silver nitrate 0.05 ml	Silver nitrate 0.10 ml	0.308	0.000	0.085
	Silver nitrate 0.20 ml	0.349	0.002	0.200
Silver nitrate 0.10 ml	Silver nitrate 0.20 ml	0.041	0.932	0.205

Water Sorption & Solubility test

Table (5) shows that high mean value are accounted in group with (0.05 ml) while low level are recorded within controlled group.

Table (5): statistics for Water Sorption & Solubility test

Groups	No.	Mean	S.D.	S.E.	95% C.I. for Mean		Min.	Max.
					L.B.	U.B.		
Control	**10**	**3.095**	**0.356**	**0.113**	**2.840**	**3.349**	**2.4**	**3.6**
0.05 ml	**10**	**4.199**	**0.040**	**0.013**	**4.171**	**4.228**	**4.1**	**4.3**
0.10 ml	**10**	**3.891**	**0.082**	**0.026**	**3.832**	**3.950**	**3.7**	**4.0**
0.20 ml	**10**	**3.850**	**0.202**	**0.064**	**3.706**	**3.994**	**3.6**	**4.3**

Games Howell method shows highly significant differences at P<0.01, except comparison between 0.1ml and 0.2ml groups which reported no significant different at P>0.05 as shown in table (6)

Table (6): Pair wise Comparisons by (GH) test

Group (I)	Group (J)	Statistics		
		Mean Diff. (I-J)	Sig. (*)	critical values
Control	Silver nitrate 0.05 ml	-1.105	0.000	0.352
	Silver nitrate 0.10 ml	-0.796	0.000	0.354
	Silver nitrate 0.20 ml	-0.755	0.000	0.375
0.05 ml	Silver nitrate 0.10 ml	0.308	0.000	0.085
	Silver nitrate 0.20 ml	0.349	0.002	0.200
0.10 ml	Silver nitrate 0.20 ml	0.041	0.932	0.205

Discussions

Hardnesstest:-

The results of this study showed high significant increase in the mean value of hardness for experimental groupsas shown in table (1), This findings can be explained by the fact that added silver nitrate into soft liner material may effect to the plasticizer ability for softening gel formation and its ability for polymeric chains penetration, it may act fillers that increase soft liner hardness and resistance when bonded inside it, silver nitrate may act fillers that increase or decrease soft liner hardness and resistance when dispersed inside it. And high significant increase mean value of hardness for silver nitrate groups could be the result of insufficient water absorption by these groups during the elongation and higher hardness value for specimens is explained by the incorporation of silver nitrate into soft liner material which may increase stiffness and reduce the flow of the material under load [14]. This explanation is in agreement with the work of others which showed the hardness significant increased as the result of leaching plasticizer with time for soft liner material by antifungal drugs [18].

Compressive strength:-

Denture bases would have a superior cushioning effect during occlusion and mastication .Many of these forces are compressive in nature ,and therefore effect of compression load on the test materials must be evaluated. In the methodology of this research ,determination of the compressive strength of the experimental material in compression with the control material was established ,the material were prepared in a cylindrical discs . During testing compressive load continued to compress

cylindrical discs, this design of testing is simulating in a degree compressive load during function of occlusion or mastication [12]. Statistical analysis showed high significant differences regarding ultimate compressive strength and deflection value .Higher compressive strength value recorded by the experimental material may give an indication of the rigidity in comparison with control material. Silver nitrate that is recorded by the experimental material indicated more rigid properties. By this study, the ultimate compressive strength as will showed that the compressive strength of the experimental material is significant high in (0.1ml) concentration than that of the control group material (table 3).The lower deflection value recorded by the experimental material indicated more rigid properties, this is attributed to the presence of silver nitrate polymer which made the experimental material more rigid. The compressive strength of the experimental material is high significant increase after 0.1ml concentration showed that of control material, but 0.05-0.2ml is high significant decrease with the control group (table 4). Lower compressive strength value recorded by the experimental material give an indication that the silver nitrate reduced water sorption and gave more rigidity to the experimental material in comparison with control material. This study is agreement with others work that showed reduce the molecular binding force between the reactant molecules and allows greater deformation upon stretching or flexion through exhibiting multiple micro fracture that weaken the silver nitrate loaded resin samples[19].

Water sorption and solubility:-

The results of sorption test showed that an increase in the mean value of soft liner material after incorporation with silver nitrate (table 5). This result obviously is due to leaching out of water –soluble ingredients, residualmonomer ,plasticizer and initiators from the soft liner in addition to silver nitrate ,during immersion in distilled water ;as a result there will be more micro porosity which will be eventually filled by water [20]. The findings of this study was done by incorporation of silver nitrate into soft liner material result high significant increase in mean value compare with control group(table 6).The chemical interact between soft liner material and silver nitrate explain the high water sorption of soft liner material after addition silver nitrate this is in agreement with the other work who suggested that variation in chemical composition could create some of structural spaces that might lead to higher water up take[21] .

Conclusions

Silver nitrate incorporation was significantly increases the hardness of soft lining material..

Compressive strength was significantlyincreased after incorporation of 0.1 ml of silver nitrate while incorporation of 0.05 and 0.2 ml of silver nitrate significantly was decreased.

Water sorption and solubility were significantly increased after incorporationof silver nitrate in all experimental groups.

Conflict of Interest: No

Source of Funding: Self

Ethical Clearance: No

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Evaluation of Transaminases,Total Bilirubin and Ferritin in Iraqi Thalassemia Patients

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Abstract

Background: Thalassemia is a hereditary disease which characterize by a severe form of anemia occurring early in life associated with splenomegaly and bones changes.

Aim: The aim of this study was to evaluate the serum levels of ALT (Alanine transaminase), AST (Aspartate transaminase), bilirubin and ferritin in Iraqi β-thalassemia patients.

Subjects and Method: Fifty Iraqi patients diagnosed clinically by hematology doctors as β-thalassemia major(TM) were enteredin this study, they conducted to Ibn AL-Baladi hospital/Baghdad during the period from December, 2017 to march, 2018.The age ranges of patients were (6-36) years,twenty healthy age match were used as control group(Cot). Blood samples (3-5) ml, were collected from the two groups under study TM and control group.Serum was separated, drawn in two plane test tubes, and kept frozen (-20 ◦c) till the use. Ferritin levels were measured by using Ferritin (Kit Ref 04491785 of cobas e 411 analyzer) according to the manufacturing company. Total Serum Bilirubin concentration(TSB),Transaminases (GOT&GPT) activity were also measured by colorimetric methods, according to ELITech kit,Ref. BITO-0250 France for Bilirubin,and according to ELITech kit,Ref.ALSL-0455 France, for Transaminases/ France,using flexor 150 apparatus.

Findings: Results indicated that serum GOT and GPT were significantly elevated in TM patients (47.560 ± 30.472) U/L and (58.755± 5.369) U/L respectively in comparisons to their levels in the control group (19.940 ±9.427) U/L and (8.231 ± 3.830) U/L respectively,also a significant increase in serum Ferritin concentration (2668.±1775.436) ng/dl in TM patients in comparison with control group (31.000±4.735) ng/dl,with an elevated levels in mean value of serum TSB in thalassemia patients (34.76 2 ± 18.526) in comparison to control group (8.231 ± 3.830) .

Conclusion: Increase ALT (Alanine transaminase), AST (Aspartate transaminase), bilirubin and ferritin inthalassemiapatients may refer to liver dysfunction.

Keywords: *Beta thalassemia major (TM), ALT (Alanine transaminase), AST (Aspartate transaminase), bilirubin and ferritin.*

Introduction

Thalassemia is a form of inherited autosomal recessive blood disorder which it characterized by abnormal formation of hemoglobin[1]results in the adequate oxygen transport and the destruction of red blood cells inthe bone marrow (ineffective erythropoiesis) and the peripheral circulation (hemolysis)[2]In normal cases,most of adult hemoglobin (HbA) is consist of 4 protein chains, two α and two β globin chains which arranged in a hetero- tetramer. Thalassemia patients have defects in either the α or β globin chain, causing production of an abnormal red blood cells[3]due tothe variant or the missing genes that affect hemoglobin(the protein in red blood cells that it carries oxygen) synthesis. The people with thalassemia have less hemoglobin and also have fewer circulating red blood cells than normal which result in mild or sever microcytic anemia[4]. Thalassemia word was derived from the Greek word *thalas*which means sea and *emia*that stands for the blood

anemia, indicating its prevalence in the regions around the Mediterranean Sea[5].For many patients who they were with chronic anemia,regular blood transfusions have affectively extended life suspense in thalassemia major patients [6]Blood transfusions contain red cells that reach the end of their life due to the aging or defects they are broken down, and then hemoglobin molecule broken up and the iron recycled. Humans are unable to eliminate the excess iron and regulate the body iron stores by limiting absorption [7]

Too much iron in the body of human is called iron overload [5]Iron was transported as transferrin to the liver or the spleen where it was stored as ferritin[8]. Serum ferritin levels were measured in patients as a part of the iron studies workup for the anemia. Ferritin is also used as a marker for the iron overload disorders, such as hemosiderosis, hemochromatosis and porphyria in which ferritin level may be abnormally raised[9] Iron accumulation (ferritin) in the liver and the heart worsening of hepatic fibrosis, and development of the cardiac fibrosis [10]

Beta-thalassemia major patients suffer from many problems rather than severe anemia including; increased susceptibility to bacterial infections which plays the major role in the patient's morbidity and mortality[11] Degradation of the hemeafter 120 days in the circulation to produce the green pigment biliverdinand the bilirubin. Bilirubin binding to the albumin and enters a hepatocyte then excreted to the bile.Bilirubin can be measured as direct or conjugated. Sometimes, total amount of the bilirubin in the blood measured [12]

Alanine Transaminase (ALT) which called also serum glutamate -pyruvate transaminase (SGPT). Alanine Transaminase is present in high concentration in the liver lesser extent in skeletal muscle, heart and kidney[13], measurement the activity of ALT in serum is used as an indicator of hepatocellular damage [13] Aspartate Transaminase (AST) enzyme is called also glutamate oxaloacetate transaminase (SGOT), which present in high concentration in the following organs: heart, skeletal muscle, liver, kidney and erythrocytes[14] The damage to any of these tissues may be result in the increased plasma AST [15].

The study was aimed to determination of serum transaminase (ASOT, GPT), ferritinand the total serum bilirubin levels in β-thalassemia patients receiving multiple blood transfusions.

Materials and Method

Subjects

Fifty Iraqi patients of both sexes (28 male and 22 female)which were diagnosed clinically with β-thalassemia major were participated in the present study, they conducted to Ibn AL-Baladi hospital during the period extended from December,2017 to March, 2018. Their age ranges were (6-36) years old; all the patients were having chelating therapy (desferrioxamine). Twenty healthy age match were used as a control group.

Samples collection

Blood samples (3-5) ml, were collected from the patient group and healthy control group, left to stand for an hour then centrifuged(2500r pm) for fifteen minutes . Serum was separated, drawn in two plane test tubes, and then kept frozen (-20 ◦c) till the testing day.

Determination of serum ferritin levels

Ferritin levels were measured by using Ferritin Kit Ref 04491785 of cobas e 411 analyzer according to manufacturing company (Roche Diagnostic).

Determination of serum liver function

Total Serum Bilirubin concentration (TSB),Transaminases (GOT&GPT)activity and Creatinine were measured by the colorimetric methods,according to the ELITech kit,Ref. BITO-0250 for Bilirubin,and according to the ELITech kit,Ref. ALSL-0455, for Transaminases, and according to the ELITechkit. Ref, CRCL-0250 France for Creatininedetermination,by using flexor 150 apparatus.

Statistical Analysis

Statistical analyses for this study done by using Microsoft office (SPSS version 10.01). The data were present as mean ±SD. Alsothe t-test for two independent means, *P* value 0.05 levels or less considered as a significant result.

Finding and discussion

In this study Fifty Iraqi patients were diagnosed clinically with the β-thalassemia major wasparticipated, they conducted to the Ibn AL-Baladi hospital during the period extended from December, 2017 to march, 2018.

Their age ranges were (6-36) years old; twenty healthy age match persons were used as a control group.

About (3-5)ml of the blood were collected from the two groups,and serum was used for the detections of transaminase [Glutamic Oxaloacetic (GOT),Glutamic Pyruvic Transaminase (GPT)]Total Serum bilirubin and the ferritin levels in both groups.

Table (1) showed findings of Ferritin,total serum bilirubin, and transaminase expressed as mean ±SD in 50 patients with the major thalassemia(TM) and 20 control group(Cot). As seen in Table(1)and figure (1) there was a significant increase in the serum Ferritinconcentration (2668.±1775.436) ng/dl in TM patients in comparison with the control group(31.000±4.735) ng/dl,(P≤0.05).

TSB titers were elevated in the TM patients(34.76 2 ± 18.526) mm/l compared with the control group(8.231 ± 3.830)mm/l,(P <0.001) table(1)and Figure (2).

Serum GOT and GPT were significantly elevated in the TM patients(47.560 ± 30.472)U/L and (58.755± 5.369)U/L, respectively in comparisons to their levels in the control group(19.940 ±9.427)U/Land (8.231 ± 3.830)U/L respectively,Table (1), Figure (3) and Figure (4).

Table (1):Mean±SD values of serum ferritin,TSB,GPT and GOT in β the thalassemia patients group (TM), and the control group (Cot).

Parameters	Cot(I) Mean±SD	TM(II) Mean±SD	p-value
Ferritin ng/dL	31.000±4.735	2668.880±1775.436	<0.001
TSB mm/L	8.231 ± 3.830	34.76 2 ± 18.526	<0.001
GPT U/L	17.600 ± 4.654	58.755± 5.369	0.0147
GOT U/L	19.940 ±9.427	47.560 ± 30.472	0.0065

TSB=Total serum bilirubin, Glutamic Oxaloacetic (GOT),Glutamic Pyruvic Transaminase (GPT).

From FigureS (1),(2), (3) and (4) we showed that the highly significant differences in TSB,GOT,GPT and serum Ferritin between the β-thalassemia infected group and the control group.

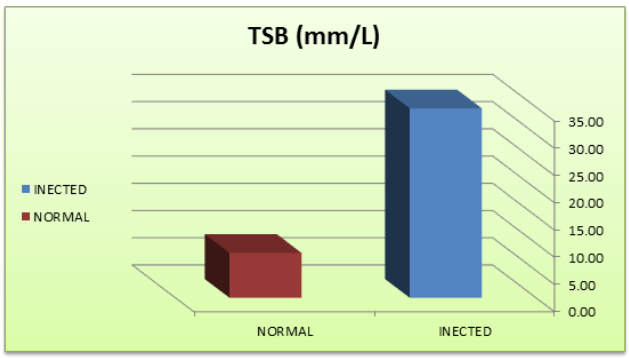


Figure -1: Mean differences of Total serum bilirubin(mm/L) between the thalassemia infected patients and the control .

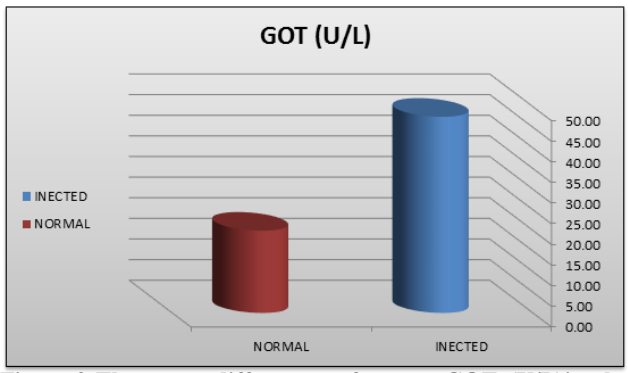


Figure-2:The mean differences of serum GOT (U/L)in the thalassemia infected patients and the control .

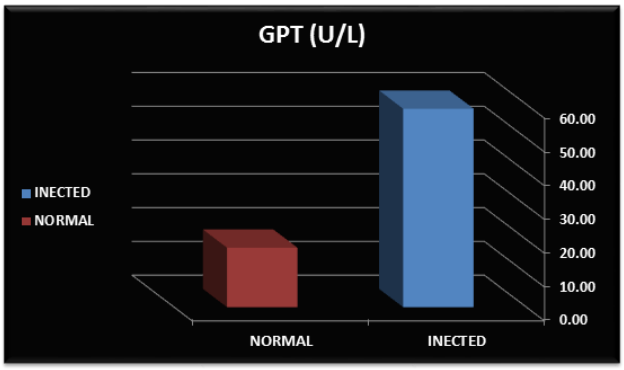


Figure -3:The differences of GPT value (U/L) in the normal and the thalassemia patients expressed as Mean±SD.

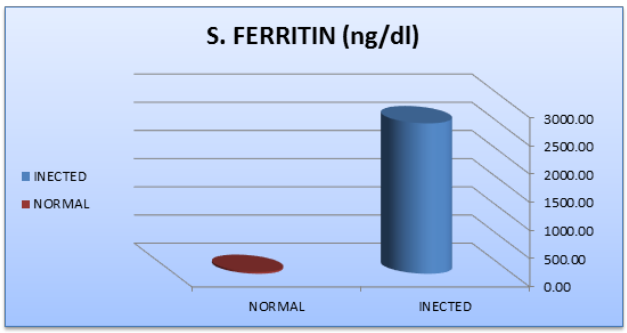


Figure -4: Mean value of serum ferritin level(ng/dl) inthe β-thalassemia patients and the control.

The findings showed significant increase ($p<0.05$) inthe ferritin levels ofthalassemia patients comparing with the healthy control group. Iron initially stored as ferritin, is deposited in organs as hemosiderinwhich is toxic to the tissue.Most humans avoid iron overload solely by regulating the iron absorption. Those who cannot regulate the absorption well enough get complaints of iron overload. In these diseases, the toxicity of the iron destroyed the body's ability to bind and store iron. Patients with thalassemia major accumulate body iron over time as a consequence of the continuous red blood cell transfusions which cause endocrine, hepatic and cardiac complications [16,17,18]. all of these studies are associated with the current study results.

The total bilirubin level measured sum of direct bilirubin and indirect bilirubin, when the total bilirubin level increased this indicted that increased both or only one of them [19]. Bilirubin, is the first point that helps tothe recognized jaundice,hemolysis induces deposition of the bilirubin causing intrahepatic cholestasis and the cholelithiasis[20,21]. This study had demonstrated a higher mean value of TSB in the thalassemia patients (34.76 2 ± 18.526) in comparison to its value in the control group(8.231 ± 3.830).These findings were disagreed with another study done by Chakravarti*et.al*, 2005 [22]. which found that the bilirubin levels were not significantly altered in these patients. The study findings were similar to the other findings reported by Sarkis, (2000)[23]. who stated that there was a higher mean value of the total serum bilirubin and a highly significant difference between the patients with HCV positive andthe patients with HCV seronegative.

The study results had demonstrated that the mean value of GPT, was (47.560± 30.472)U/L in the thalassemia patients, compared to (19.940 ±9.427)U/L in the control cases,and the difference statistically was significant ($P<0.002$). This was compatible with the other studies Wanachiwanawin*et.al*, 2000 [24]. which reported that the thalassemia patients had significantly abnormal level of the serum GPT.

Shindo*et.al,*1995 [25]. found that patients of anti-HCV positive who have elevated serum GPT level are more likely to have a significant liver disease than those who have normal level of serum GPT. Serum GPT elevation in anti-HCV positive individuals suggests the presence of the liver damage such as viral replication [25]. and iron overload .The study results have also demonstrated that there was significant difference in the GOT between the patients and the control group this findings was similar to Al Hawsawi,2000 [26] found that there was a highly significant difference in the GOT level between thalassemic patients with HCV seropositive and patients with HCV seronegative.

The thalassemic patients have a greater risk of liver damage (as indicated by the elevated aminotransferase and the serum bilirubin) compared to the control groups [27]. probably resulting from the infection, cholestasis, hemosiderosis or as a result of congestion due to the heart failure.

In addition, seropositive thalassemic patients have significantly higher levels of the aminotransferase enzymes and the serum bilirubin. This can be explained either by direct damage of the hepatocyte by viral invasion or by the development of an immune complex. Consequently it is necessary in these patients to measure the aminotransferase levels monthly for six months; if there is persistent elevation, it should be to considered as chronic hepatitis and liver biopsy is indicated[28].

Conclusion

Our results showed significant increase in the ferritin levels with higher mean value of TSB and GPT of thalassemia patients comparing with the healthy

control group.

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Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: All experiments were carried out in accordance with approved guidelines.Experimental protocols were approved under the Biology Department, College of Science, Mustansiriyah University, Iraq and

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Evaluation the Effect of Black Seed Oil and Taramira Oil on the Hardness and Surface Roughness of Heat Cure Acrylic Resin Denture base Material

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Abstract

Background: Separating medium is a layer of coat which is applied to a mouldsurface to avoidthe adhering the second surface to the first surface. The mould must be coated during acrylic resin processing to inhibit liquid resin from penetrating into the gypsum and water from gypsum leaking to acrylic resin. For several years, tin foil was the most acceptable separating medium, and because it's challenging to apply a tin-foil substitute, a cold mold seal is utilized.

Objective of this study: The aim of thecurrent study was to assess the effect of black seed oil and taramira oil on surface roughness and hardness of heat acrylic resins.

Materials and Method: Sixty samples were made from the heat acrylic resins and divided into two categories (30 samples in each categories) depended on test; surface roughness and hardness, each categories contain three groups: group 1;(10) samples of heat acrylic resins treated with cold mol seal (control group), group2; (10) samples of heat acrylic resins treated with black seed oil and group3;(10) samples of heat acrylic resins treated with taramira oil. The average of the hardness of the specimens has been determined with using the Shore D hardness device¸ also the average of the surface roughness of the specimens has been determined with using profilometer device.

Findings: The results showed that there was a statistically significant difference in the hardness and non-significant difference in surface roughness of heat acrylic resinsamong the testing groups.

Conclusion: In this study concluded that black seed oil gives more hardness in comparison with cold mold seal and taramira oil; also black seed oil gives more smoothness (less surface roughness) followed by taramiraoil.It is concluded, that black seed oil and taramira oil could beutilized as a separating medium.

Key wards*: Denture base,acrylic resin,black seed oil,taramira oil,cold mold seal.*

Introduction

Polymethylmethacrylate (PMMA) is the most popular dental material used in the construction of removable prostheses, it is necessary to apply separating medium to the gypsum surface before packing of PMMA[1].

Separating medium is a "coat of layer applied to surface to prevent a second surface from adherence to the first surface"[2]. A layer of gypsum impregnated with polymer remains would be attached to the denture surface If the mold surface is not separated with a separating material leading to an unaesthetic and poorly fitting denture base [3].Thus; the separating medium must be applied to the surface of the mold [4].

Many materials are used for dental stone separation; cold mold seal is one of commonly used separating medium. The literature indicated thatthe tin foil separating medium is the best, but it istime-consuming and difficult to apply. Consequently, the use of other separating medium has been developed[5].

Wally in 2014[6] used olive oil and found that non-significant difference between cold mold seal and olive oil regarding tensile strength of heat acrylic resins. While Mohammed in 2014[7] studied the influence of glycerin on the hardness of heat cure resin and found that glycerin gives highly hardness than cold mold seal. Altaie et al., in 2015[3]used olive oil, tin foil and cold mold seal as separating medium and found that using olive oil not affect on hardness of heat cure acrylic resin.

The purpose of this study was to evaluate the effect of black seed oil and taramira oil as a separating medium on hardness, and surface roughness of heat cure acrylic resin denture base materials

Material and Method

Samples grouping:

60 samples were made from heat cure acrylic resin (Superacryl Plus, Colombia)**;** Specimens were grouped into: 30 specimens made for hardness testand these where subdivided into:

*(10) samples of heat cure acrylic treated with cold mold seal (control group);

(Switzerland).

*(10) samples of heat cure acrylic treated with black seed oil, (Kingdom Saudi Arabia),

*(10) samples of heat cure acrylic treated with taramira oil **(**Pakistan).

30 samplesmade for surface roughness test and these where subdivided into:

*(10) samples of heat cure acrylic treated with cold mold seal (control group).

* (10) samples of heat cure acrylic treated with black seed oil.

*(10) samples of heat cure acrylic treated with taramira oil**.**

Preparation of the specimens:

Two metal patterns (stainless steel)were customized into desired shape and dimension using aturning machine:

A- Surface hardness test with dimension of (65 mmx10 mm x2.5mm) length, width and thickness respectively [7]**,** figure (1-A).

B- Surface roughness test with dimension of (80mm x 10mm x 2.5mm) length, width and thickness respectively [8],figure (1-B)

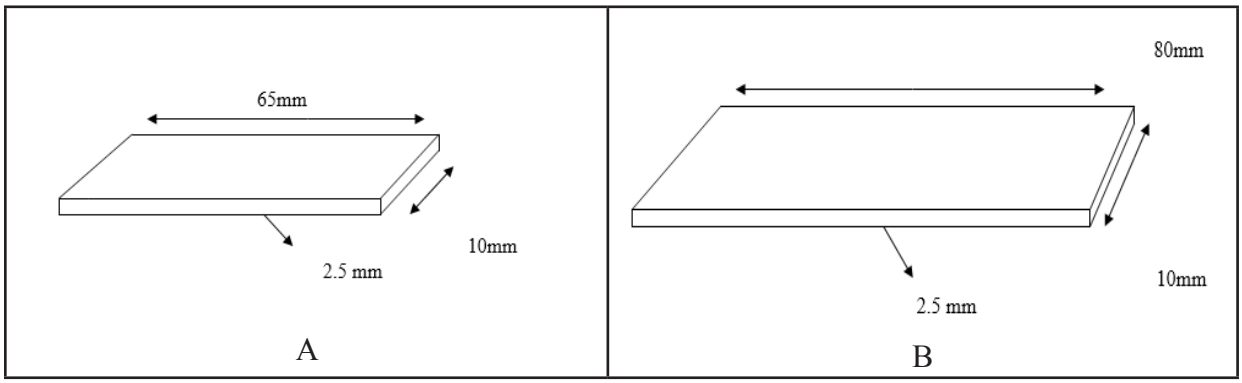


Figure (1):A-surface hardness test B- surface roughness test

The 2 metal pattern werelayered with separating medium.The lower part of a flask was covered with dental stone(Durguix, Spain). Once complete set of the stone surface, bothmetal patterns and stone were separated withcold mold seal. The upper part of the flask was positioned over the lower part, andthen filled with stone. The flask was left for 60minutes, after that the upper and lower parts were opened carefully and patterns were removed.A disposable syringewas utilized to measure 2cc of separating media (cold mold seal, black seed oil and taramira oil). The measured separating medium was applied onto the stone surface by a fine brush [9]. This

technique of applying material (cold mold seal, black seed oil and taramira oil) was repeated with all moulds of the specimens in this study.

Heat cured acrylic resin was mixedandpacked according to manufacturers instruction,and then the flask was positioned under the hydraulic pressand the pressure was applied slowly in order to make sure even flow of the acrylic dough throughout the mould space. Thenthe pressure was released and the flask was opened and the excess material (flash) was taken away. Then the two halves of the flask were finally put in contact and left under the press (1500psi) for 5 minutes. Then the flask was placed in a flask clamp.According to ADA specification, No.12 (1999), short curing cycle was conducted[10]. the flask was left to cool for thirty minutes at room temperature and then with tap water for 15 minutes. All acrylic specimens were then taken from the stone mould.

Acrylic patterns of surface roughness were cut into equal rectangular plates with an acrylic separating disk to obtain the final measurement of 20mmlength x10 mmwidthx2.5 mm thickness. Thethickness of 2.5mm represents the average thickness of acrylic denture base, while the length and width coincides for suitable measurements in the surface roughness tester [8].To remove all flashes of acrylic,the acrylic bur was utilizedfollowed by using sand paper (120 grain size)[9] in order to get smooth surface for the specimens used for hardness test. On the contrast, the specimens for surface roughness test, are not be polished.All specimens were kept in distilled water at 37Cº before testing [10], figure (3).

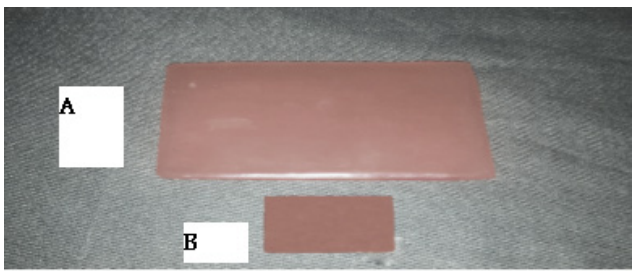


Figure (2) :(A): Hardness specimen. (B): Surface roughness specimen

Shore D hardness tester device (Italy) was used in this study for measuring procedure, figure5.According to the device instruction the hardness value is determined by the penetration of the Durometer indenter into the specimen. Three reading was done on different areas of each specimen and the mean of the three reading was calculated.



Figure (3): Shore D hardness tester device.

The surface roughness of each specimen was measured by using profilometer surface roughness device, figure (4). The profilometer was supplied with stylus made of diamond; the specimen's surfacewas fixed in a flat position to the base of the profilometer by glue. The stylus was moved for a distance of 1.7 mm across thesurface of the specimen in three different directions depending on apparatus design. Three reading was recordingfor each specimen, and the mean value for each specimen was the average of the reading. Then the data was collected and subjected to statistical analysis.



Figure (4): Profilometer surface roughness device

Findings

Surface hardness test**:**

All values of mean and standard deviation for each group is listed in table (1). The highest mean value is (79.340) for black seed oilgroup, followed by the taramira oil group which is (77.400), while the control group showed the lowest mean value (74.720), figure (5).

Table (1): Descriptive statistics test for surface hardness of studied group

Studied group	N	Mean	SD	SE	Min.	Max.
Control	10	74.720	1.6 80	.495	71.54	79.44
Black seed oil	10	79.340	2.196	.594	74.80	80.67
Taramira oil	10	77.400	1.540	.400	73.90	81.85

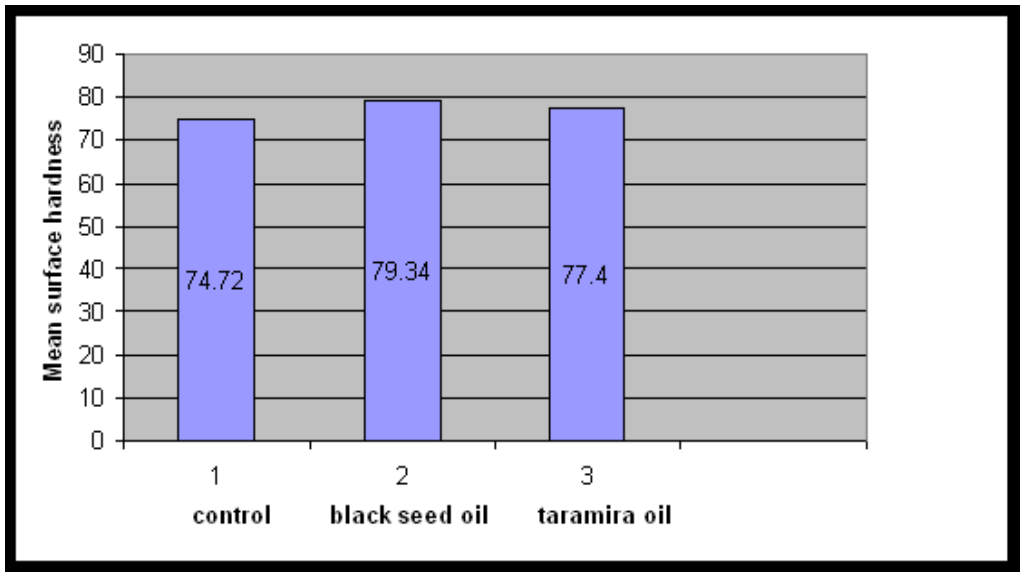


Figure (5): Bar chart of mean of surface hardness test

The ANOVA test indicated that there were significant differences for surface hardness among all groups as demonstrated in Table (2) where (P<0.001).

Table (2): ANOVA test for surface hardness among studied groups

	Sum ofSquares	**df**	**Mean Square**	**F**	**Sig.**
Between groups	107.635	2	53.817	10.866	.000 (HS)
Within groups	133.710	27	4.953		
Total	241.345	29			

Furthermore**,** therewas a highly significant difference (P<0.001) between each groups as demonstrated in table 3(The LSD test).

Table (3): LSD test for studied groups

Studied Groups P-value		**LSD (test)**	
		Sig.	
Control	Black seed oil	0.000	HS (P<0.001)
	Taramira oil	0.000	HS (P<0.001)
Black seed oil	Taramira oil	0.000	HS (P<0.001)

Surface roughness test:

The values of mean, standard deviation, standard error, minimum and maximum of surface roughness for all groups are list in table (4). The control group created the highest value of mean (1.349μm), while the black seed oil group produced the lowest value of mean (1.346μm), figure (8).

Table (4): Descriptive statistics test for surface roughness of studied group

Studied group	N	Mean(µm)	SD	SE	Min.	Max.
Control	10	1.349	0.241	0.073	1.020	1.610
Black seed oil	10	1.346	0.223	0.071	1.011	1.659
Taramira oil	10	1.347	0.232	0.096	1.077	1.660

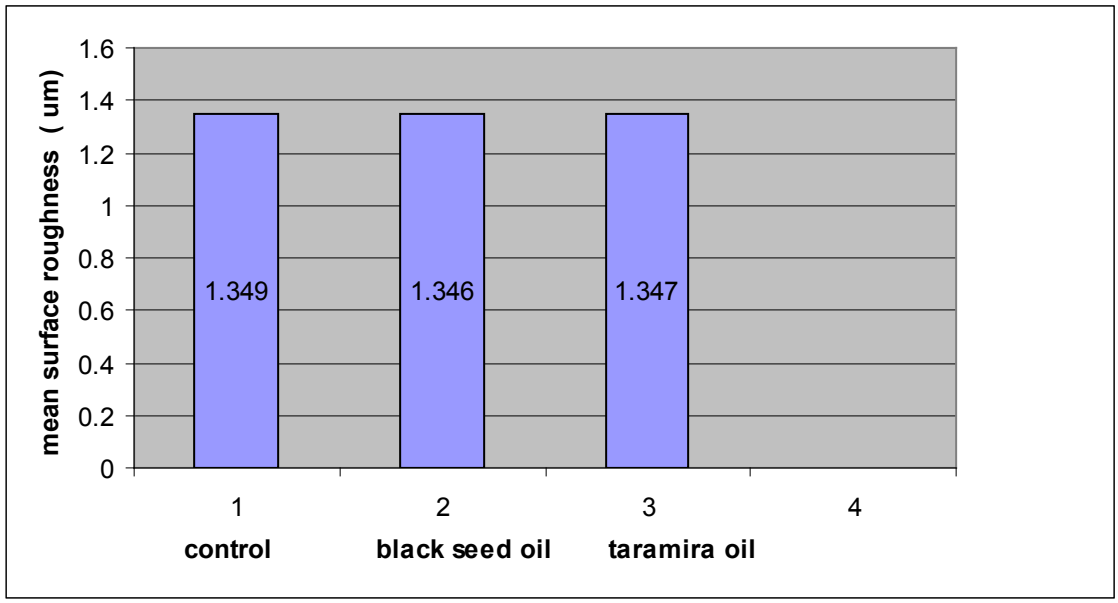


Figure (6): Bar chart of mean of surface roughness test

Among all groups , there were no significant differences as demonstrated in Table (5).

Table (5): ANOVA test for surface roughness

	Sum of Squares	df	Mean Square	F	Sig.
Between groups	.000	2	.000	.000	1.000 (NS)
Within groups	1.799	27	.067		
Total	1.799	29			

Discussion

Separating medium is considered as the mainfeature which influence thesuccess of dental because of its effect on the mechanical and physical properties of acrylic resin. For dental stone, many substances areutilized such as cold mold seal [11].

In this study, black seed oil and taramira oil used as separating materials with cold mold seal (control group) to evaluate their effect on the hardness and surface roughness of acrylic denture base material.

Surface hardness test:

The results of the current study revealed thatthe black seed oilgroup created the highest mean value followed by the taramira oil group, while the control group showed the lowest mean value (table 1), also the result showed highly significant difference among them (table 2,3). Black seed oil andtaramira oil improved the hardness of the acrylic resins, this could be explained

by water sorption phenomenon of methyl methacrylate denture base material that is mean the cold mold seal film is not fully water eliminator and this inhibit complete polymerization of acrylic [12,13]. Black seed oil showed highly significant difference than taramira oil this could be due to chemical composition of the major unsaturated fatty acids were linoleic acid followed by oleic and lignoceric acid in chemical composition of the black seed oil [14]. This result agrees with Hatim et al., [15] who found that addition of black seed and thyme oils improved the transverse strength and hardness of acrylic resins. Altaieet al., [3] used olive oil as separating medium, and revealed that therewere no significant differences between olive oil andcold mold seal on hardness of acrylic resin.

Surface roughness test:

Smooth surface of acrylic resin resists the buildup of stain, debris and plaque. Increase surface roughness has a detrimental effect on the aesthetic of the denture and health of oral tissues [4].

The results of the current study indicated that the cold mold seal (control) group hadgreatest mean value of surface roughness followed bytaramiraoil group, while the black seed oil group showed the lowest mean value (table 4), this decrease in the mean value of surface roughness may be due to the nature of oil which makes the surface smooth [3]. Also the result showed that there is a non significant difference among groups (table 5). This could be related to the present of glycerin in the composition of cold mold seal that is similar to the chemical oil nature of black seed and taramira oils [4].

However, there is no previous studies in this field to correlate the results of this study (hardness and surface roughness test) with it.

Conclusion

From the present study the following conclusion can be with drawn:

1-Black seed oil gives more hardness in comparison with cold mold seal, andtaramira oil which is gives more hardness than cold mold seal.

2- Black seed oil gives more smoothness (less surface roughness) in comparison with taramira oil and cold mold seal.

3- Instead of cold mold seal, black seed and taramira oils can be utilized as the separating medium

Conflict of Interest: None

Source of Funding: self

Ethical Clearance: None

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G- Protein Coupled Receptor Purification from Whole Blood of Iraqi Diabetic and Diabetic Nephropathy Patients

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Abstract

The study aimed to purified G- Protein Coupled Receptor (GPCR) from the whole blood of control ,G1, diabetic,G2, and diabetic nephropathy ,G3,patients by different chromatography techniques for the first time in world that may be important in early detection and active treatment in these patients.

The GPCR extracted from whole blood by precipitation of proteins with ammonium sulfate,then purified by ion exchange chromatography, as a first step using DEAE-Sepharose .A gel filtration chromatography was applied as a second step of purification using Sepharose 6B.The molecular weight and purity of GPCR was determined by electrophoresis.

Results of ion exchange chromatography for G1 showed two proteins peaks that appeared after elution by the gradient concentration of sodium chloride. Data indicated that GPCR is located in the first protein peak at fraction numbers between (6 and12). Results for G2 showed two proteins peaks that appeared after elution with the gradient concentration of sodium chloride .Then, fractions were collected and concentrated to be applied in gel filtration chromatography.Results showed a single active protein peak after eluted with elution buffer that was identical with the peak that presented GPCR concentrations at fractions number (14)for control group and show of single active protein peak that was identical with the peak that presented GPCR concentrations at fractions number (12)for G2and G3 .

The molecular weight of GPCR that estimated byelectrophoresis that two bands of GPCR appear in G1at (~ 30 KD) and (~ 51 KD) .Results ,also , showed appearance of three bands in G2 related to GPCR in (~ 29 KD) and (~ 47,49 KD) .

The conclusion could be drawn from this studythat GPCR appear in groups is a marker in detection and treatment of diabetic and diabetic nephropathy.This finding could be useful in the early detection and active treatment of diabetic and diabetic nephropathy patients based on type of GPCR that be identified .

Keywords: *GPCR Purification, Whole blood , Diabetic , Diabetic Nephropathy.*

Introduction

The (GPCRs) are receptors encoded by the human genome.Several GPCRs have been identified as a potential therapeutic targets for the treatment of diabetes and diabetes complications, including retinopathy, nephropathy, and neuropathy [(1,2)].

Study ,revealed that GPCRs are expressed in the pancreatic islets and may play an important role in the normal glucose homeostasis [(3)].

Many GPCRs are directly involved in the development of insulin resistance and β-cell dysfunction that can lead to T2DM[(4,5)] . Sweet taste receptor appear to dominate postprandial glucose-dependent insulin and GLP-1 release [(6)] .

Glucose-dependent stimulation of insulin secretion is observed with$G_{\alpha s}$and $G_{\alpha q}$-coupled receptors linked to protein kinase C activation and inositol triphosphate which linked to insulin secretion [(7,8)] .Researches demonstrated that these receptors are expressed in high

levels in pancreatic β-cells [9] .

Purification is a major challenge in the field of GPCR research because many GPCRs are denatured by detergents (due to the difficulty of purifying GPCRs) [10,11] .So,this study designated to purified GPCR from the whole blood of control, diabetic and diabetic nephropathy patients.

Material and Method

1- Extraction of GPCR from wholeblood :

One hundred fifty individuals with age ranged between (40-65) years were enrolled in this study.They divided into three groups (N=50 per each group) as follows: group 1(G1) represent control group .Group2 (G2) represent diabetic patients andgroup 3 (G3) represent diabetic nephropathy patients.

Blood that obtained from subjects were centrifuged at 2500g for 15 minutes to separate pack cell volumes . Supernatant plasma and buffy coat were discarded . RBCs were washed with (3) volume of normal saline and hemolysis by adding (5) volumes of water . After 20 minutes , hemolysis was centrifuged at 3500g for 20 minutes . Supernatant was collected and filtered through qualitative filter paper (whatmen-1) to remove left out cell debris . It was followed by precipitation of proteins with 50 – 75% ammonium sulfate . For precipitation an equal volume of saturated solution of $(NH_4)_2SO_4$ was mixed with filtrate and after 15 minutes , it was cooled and centrifuged at 3500g for 10 minutes . Finally , the pellet was dissolved in a minimum volume of (1.5 mM) of Phosphate Buffer Saline pH 7.3 .The Pellet cells were thawed and suspended in extraction buffer (1.5 mM PBS buffer, pH =7.3, 1 mM AEBSF) and then protease inhibitor cocktail (up 10 ml for 1ml) was added with gentle swirling on ice. The DDM(n-Dodecyl-B-D-Maltoside) (1%) was added to the lysed sample and stirred on ice for 1 hour.The dissolved pellet was dialyzed for 72 hours against 1500 ml of dialysis buffer (1.5 mM PB, pH 7.3) in a cold room .buffer was changed three times during 72 hours.

Protein concentration was estimated according to the Bradford method (1976)[12].

GPCR concentration was estimation by ELISA [13] using kit from Blue Gene Biotechnology, China .

2 - G-protein Coupled Receptor Purification:

GPCR that extracted from blood was purified by using ion exchange chromatography as a first step of purification, and gel filtration chromatography as a second step of purification.

2.1- Ion Exchange Chromatography[14]:

Five ml of crude extract was applied on the DEAE-sepharose column (2.5 x 8) cm . The column was equilibrate and washed with an equal volume of 50 mM of phosphate buffer saline contained DDM (pH=7.4) to wash uncharged and positive charged proteins in protein mixture of crude GPCR . The bound proteins were then eluted using NaCl (0.1- 0.5) M . Fraction were collected in 5 ml tube at a flow rate of 0.5 ml/min and eluted with gradient (0.1 – 0.5) of sodium chloride solution .Then GPCR crude was eluted with buffer.The fractions that gave the highest absorbance were collected. Protein and GPCR concentrations were estimated for each fraction .

2.2-Gel filtration chromatography[14] **:**

Aliquot of five mL of concentrated fraction was injected into sepharose 6B column (65 x 1.5) cm which previously equilibrated with 1.5 mM phosphate buffer saline (pH=7.4) , and eluted with elution buffer PBS pH =7.4 containing (0.5Mm) DDM . Flow rate was (1ml / min) with 5 ml for each fraction that monitored at 280 nm .Protein and GPCR concentration were determined for each fraction.Fractions which gave the highest absorbance and concentration of GPCR were collected.

3- Estimation of GPCR Molecular Weight [15]**:**by SDS-PAGE Electrophoresis .

Findings

Table (1) shows protein and GPCR concentrations for extraction and solubilization steps of lysate . Results show a decrease in protein and GPCR concentrations after extraction and solubilizationsteps .

Table (1): protein and GPCR concentrations for extraction, solubilization and precipitation steps of lysate

Control

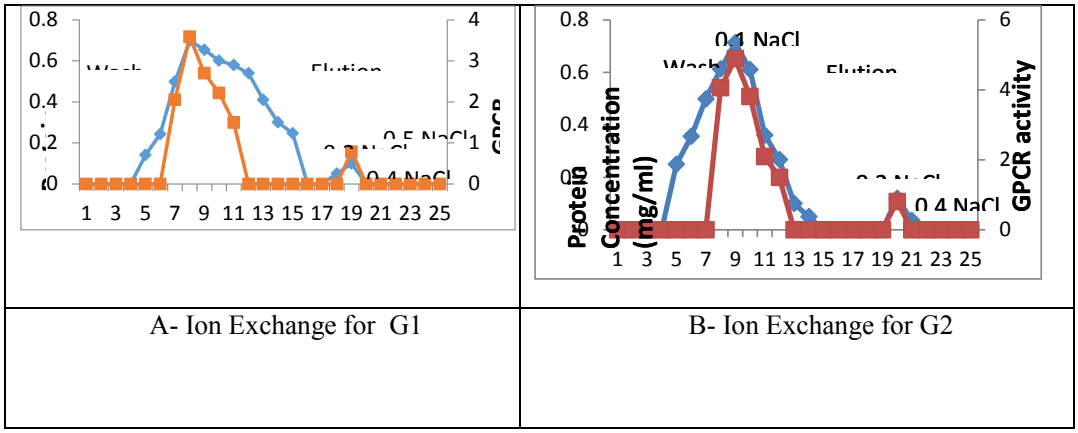
Sample	**Volume(ml)**	**Protein con.(mg/ml)**	**GPCR con.(ng/ml)**
Crude	30	0.89	6.61
Precipitate by $(NH_4)_2SO_4$ (50-75%)	15	0.718	5.34
Diabetic			
Sample	Volume(ml)	Protein con.(mg/ml)	GPCR con.(ng/ml)
Crude	30	0.92	6.19
Precipitate by $(NH_4)_2SO_4$ (50-75%)	15	0.799	6.052
Diabetic nephropathy			
Sample	Volume(ml)	Protein con.(mg/ml)	GPCR con.(ng/ml)
Crude	30	0.94	5.322
precipitate by $(NH_4)_2SO_4$ (50-75%)	14	0.801	4.95

Non –ionic detergent ,dodecal-β-D-maltoside (DDM) was used in the extraction and solubilization of GPCR based on previous study[16,17].

Purification of GPCR Extracted fromf blood

Ion Exchange chromatography[18,19]:

Results of G1 showed two proteins peaks ,figure (1-A) that appeared after elution by the gradient concentration of NaCl , while no protein peaks appeared in the washing fractions . The GPCR concentration were measured in the fractions of these two protein peaks . Data indicated that GPCR located in the first protein peak (eluted at 0.1 M of NaCl) at fraction numbers between (6 and12) . The second peaks (eluted at 0.2 M of NaCl) gave a peak between (18-20), thus its neglected .



A- Ion Exchange for G1

B- Ion Exchange for G2

Figure(1) : Ion Exchange for A- G1 B-G2

Results for G2 , figure (1-B), showed two proteins peaks that appeared after elution with the gradient concentration of sodium chloride , while no protein peaks appeared in the washing fractions . Data indicated that GPCR located in the first protein peak (eluted at 0.1 M of NaCl) at fraction numbers between (7 and13) . The second peaks (eluted at 0.2 M of NaCl) give peak between (18-20) .

Results for G3 in figure (2) showed two proteins peaks that appeared after elution by the gradient concentration of NaCl , while no protein peaks appeared in the washing fractions . Data indicated that GPCR located in the first protein peak (eluted at 0.1 M of NaCl) in fraction numbers between (7 and13) . The second peaks (eluted at 0.2 M of NaCl) give peak between (19-21) .

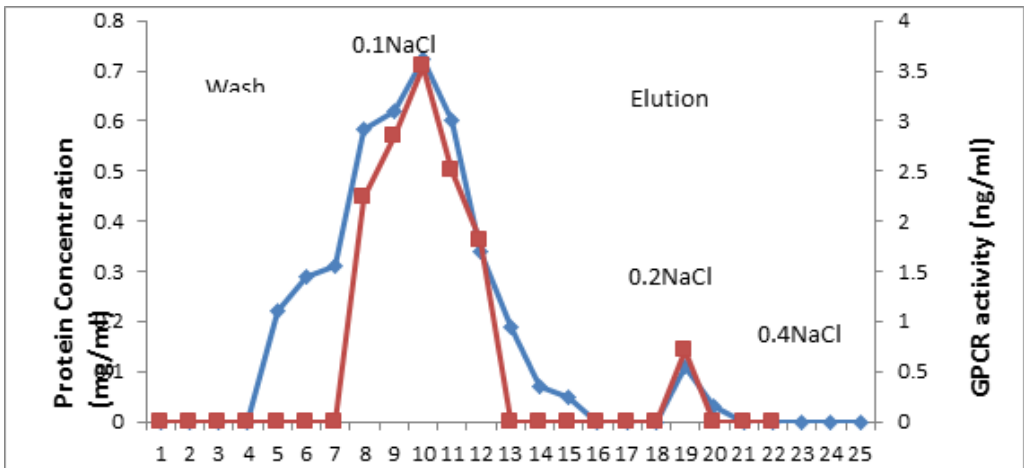
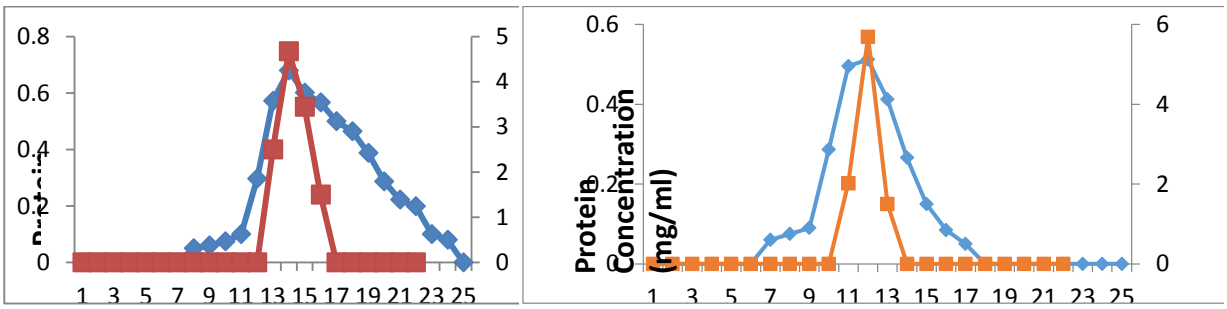


Figure (2) : Ion Exchange for G3

Gel filtration chromatography :

Results displayed in figures (3,4) which showed a single protein peak after eluted with elution buffer that was identical with the peak that presented GPCR concentrations at fractions number (14) for G1 and show of single active protein peak that was identical with the peak that presented GPCR concentrations at fractions number (12) for G2 which show a single active protein peak that was identical with the peak that presented GPCR concentrations at fractions number (12) for G3 .



A- Gel -filtration for G1 **B- Gel -filtration for G2**

Figure (3) : Gel -filtration for A-G1 B- G2

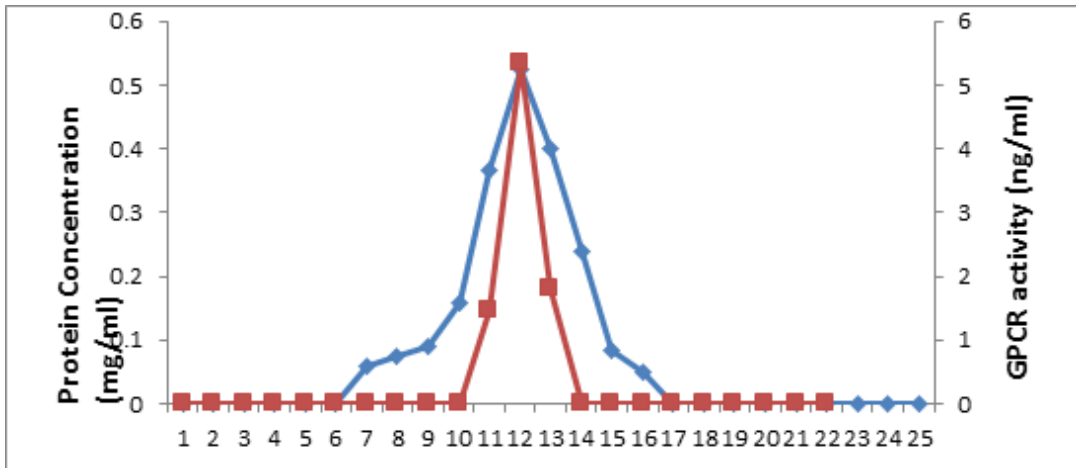


Figure (4) : Gel -filtration for G3

Table (2) : Volume , protein concentration , GPCR concentration , specific activity, purification fold for all purification steps of GPCR for G1,G2 and G3.

G1

Steps	Volume (ml)	Protein con.(mg/ml)	GPCR con. (ng/ml)	Specific activity (ng/mg)	Purification fold
Crude	30	0.89	6.61	7.42	1.0
Ion exchange	12	0.718	5.32	7.49	1.1
Gel filtration	8	0.32	3.26	10.18	1.37
G2					
Crude	30	0.92	6.19	6.72	1.0
Ion exchange	10	0.713	5.688	7.9	1.17
Gel filtration	8	0.512	4.89	9.55	1.42
G3					
Crude GPCR	30	0.94	5.322	5.66	1.0
Ion exchange	9	0.723	4.49	6.21	1.1
Gel filtration	7	0.525	3.52	6.7	1.18

Determination of purity and molecular weight of GPCR by SDS-PAGE:

The molecular weight and purity of GPCR that purified from G1,G2 and G3 were determined by sodium dodecyl sulfate –polyacrylamide gel electrophoresis (SDS-PAGE) ,as shown in figure(5) .

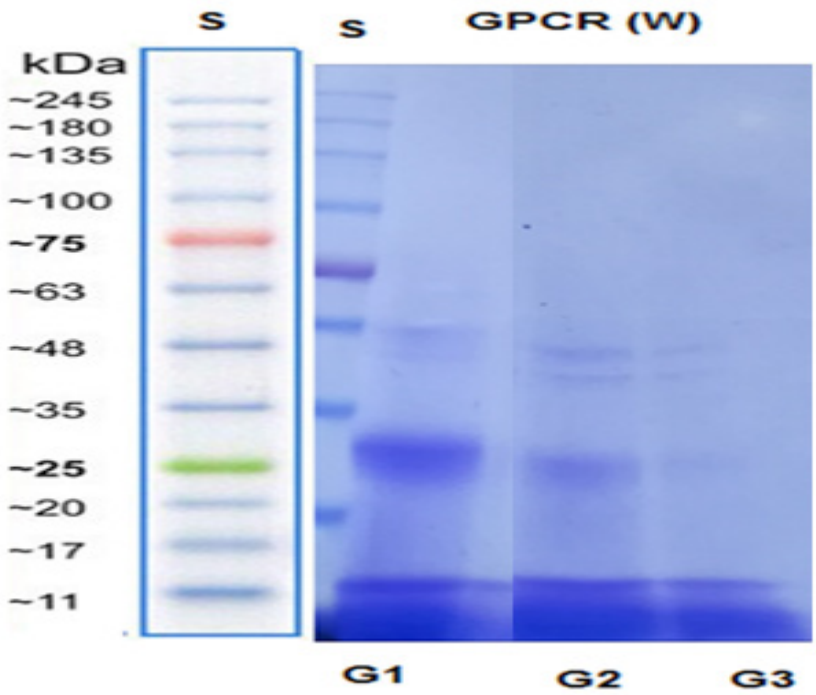


Figure (5) SDS-PAGE for purified GPCR in G1,G2 and G3

Results indicated the appearance of two bands of GPCR in G1at (~30 KD) and (~51 KD) . This could be due to the isoform of GPCR. As it was reported that the monomeric form is important to activate G-protein for binding , and they stated that further studies are required to understand the function of the dimerization of such receptor for its biological function [20].

Results ,also , showed the appearance of three bands in G2 that related to GPCR in (~ 29 KD) and (~ 47,49 KD) . In G3 the bands appeared similar to that in G2 but with highly clearance related to its highly concentration as show in table (2) .

The glucagon – like peptide -1 receptor (GLP1R)is a class B GPCR with molecular weight of 53 KD, that found in type two diabetes in previous study .According to the previous researches that improved molecular weight of GPCRs about ~30 and ~50 KD , such as GLP-1R (~53 KD), GPCR 40 (31.438), α_2- Adregeric receptor (~50 KD) ,β_2- Adregeric receptor (47.058KD) [21] . So, in this study may be one or more of the above receptors were purified in diabetic and diabetic nephropathy . further study is important to know amino acid sequences in the purified receptors to know the type of GPCR that purified in these patients exactly.

Conclusion

Conclusion that obtained from this study that 2 bands of GPCR appear in control group while there are three bands appeared in G2 and G3 with different concentrations which may be useful in early detection and active treatment to controlling diabetic and diabetic nephropathy patients .

Conflict of Interest : None

Funding-self or other source : Ibn-Al-Haitham College of Education for Pure Science / University of Baghdad

Ethical Clearance : All studies were conducted in accordance with the ethical committee of Ibn-Al-Haitham College of Education for Pure Science / University of Baghdad.

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The Role of Overexpression of Rab1A in Human Pancreatic Cancer and its Association with Poor Prognosis

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Abstract

Rab1 is a member of RAS oncogene family,its role ismediating vesicle transport between the endoplasmic reticulum (ER) and Golgi. Rab1A contributed to human prostate cancer,colorectal cancer (CRC), hepatocellular carcinoma(HCC), gliomasand tongue squamous carcinomas(TSCCs) tumor proliferation and migration.Because pancreatic carcinoma is one of the common human cancers with high lethal malignancy rate,we investigated the expression of Rab1A inpancreatic carcinoma.171 samples with normal pancreatic tissues and 176 samples of pancreatic cancer tissues were obtained and prepared atthe Pathology Clinic, Uppsala University Hospital (Uppsala, Sweden).This study was noticedthat Rab1A is overexpressed in pancreatic carcinoma tissues both in mRNA and protein levels. Moreover, survival analysis showed that Rab1Aoverexpression in human pancreatic carcinoma is associated withpoor prognosis ($p<0.05$). Strikingly,aberrantexpression of Rab1A in pancreatic carcinoma patients is associated with an elevated level of mTORC1 (p-S6K1) signaling. Our results demonstrate that Rab1A may have apotential role in pancreatic cancer progression in anmTORC1 dependent manner, and further emphasizes the role of Rab1A in human malignancies. Together, these results indicate that Rab1A overexpression couldpromote a new prognostic predictor for human pancreatic cancer.Thus, studying the regulation of Rab1A in pancreatic cancer is urgently needed.

Key words: *Rab1A, pancreatic cancer, prognostic marker, mTORC1*

Introduction

Pancreatic cancer is an aggressive and common leading cause of cancer related death after lung, breast or prostate and colorectal cancer worldwide.[1] Because the lack of the reliable diagnosis methods, the majority of patients are diagnosed too late with advanced disease. In general, there arefew curative options appreciably can change itsaggressivenessand lethality.[2,3] Thus, Survival rate with pancreatic cancer is fairly low, with one-year relative survival of less than 25%.[1,3] Genetic mutationsdrives pathogenesis in the pancreas with a total of 5%–10% of all pancreatic cancers.[4-6] Chronic pancreatitis seems to be associated with 4% of cancer cases. [7] Aside from mutations or pancreatitis, overexpression of certain oncogenes has been previously reported to promotethe development of human pancreatic cancer.[8] Becauseof the high lethality rate of pancreatic cancer, there is urgent need to identifynew target genes underlyingpancreatic cancer to improve treatment and survival.Rab1A is a member of RAS oncogene family which is highly conserved in mammals. It is a GTPase predominantly anchored to Golgi membrane and mediates ER to Golgi vesicular trafficking. [9]Beyond Rab1A role in vesicle trafficking, it has been found aberrant level ofRab1A act as anoncogenein colorectal cancer,which is associated with poor prognosis.[10]Overexpression of Rab1A has been linked to multiple human diseases particularlycancer including colorectal cancer (CRC) [10], hepatocellular carcinoma (HCC) [11], glioma[12], prostate cancer [13,14] tongue squamous carcinomas (TSCCs) [15] and cervical cancer.[16]Consistently with the role of ER-Golgi membrane system in cell signaling,Rab1A overexpression has been proposed to promote the pathogenesisof CRC and HCC by activating the mTORC1 signaling pathway.[10]mTORC1 is well known as a central regulator of cell growth and its elevated level

is associated with multiple human diseases particularly cancer.[10,17]The recent findings [10-16]indicate that Rab1A might be a new therapeutic target for cancer therapy. Despite the contributory role of Rab1A in different types of human malignancies,until now, Rab1A has not been deliberated in the context of pancreatic cancer studies. In this study, we investigated Rab1A expression in human primary tissues from pancreas adenocarcinoma, andassess the relationships between Rab1A expression and patient survival.

Material and Method

Patients and pancreatic tissue samples: 171 samples with normal pancreatic tissues and 176 samples of pancreatic cancer tissues were obtained from October 2015 to November 2018. The pancreatic tissue array was prepared by at the Pathology Clinic, Uppsala University Hospital (Uppsala, Sweden).The overall survival time was calculated from the day of therapyto the end of the follow-up or the date of death because of the recurrence andmetastasis. The median patients' follow-up was of 33 months (range: 2-80 months). Patients with low Rab1AmRNA expression were all alive while patients with high Rab1AmRNA expression were 84 alive and 92 dead.

Immunohistochemistry (IHC): The standard streptavidin-biotin-peroxidase complex method was used for IHC staining. Tissue sections were incubated with a Rab1A-specific antibody (Antibody HPA039442, Antibody CAB003838, Antibody CAB018346) or S6K1 specific antibody (Antibody HPA056141 andAntibody CAB005331). The intensity of the staining was calculated as follows: no staining (0 positive cells); weak staining (0-10% positive cells); intermediate staining (10-50%positive cells); high stainingin the tissue cells (50-100% positive cells).

Analysis of Rab1A mRNA and protein levels: The genomic data from The Human Protein Atlas databases (https://www.proteinatlas.org) was used to analyze Rab1A mRNA expression alteration and protein expression level in normal and primary pancreatic cancer tissues. The website (proteinatlas.xml.gz) was utilized to download data including protein expressionand RNA seq data.

RNA seq: The standard RNA-seq protocol was used for measuring mRNAquantity. In short,RNA was extracted from tissue samples using the RNeasy Mini Kit (Qiagen, Hilden, Germany).Samples of high-quality RNA were used in the sequencing.

Statistical Analysis: Survival analyses were carried outby Kaplan-Meier plots and the log-rank test. Results are considered significant when p value is less than 0.05.

Findings

Rab1A is overexpressed in human pancreatic tissues

Genomic findings from previous studies suggest that Rab1A gene acts as an oncogene and is amplified in many cancer cases. [1-4]Therefore this studyinvestigated Rab1A mRNA and protein expression in 176 pancreatic cancer samples and 171 normal pancreatic tissues available in The Human Protein Atlas database (https://www.proteinatlas.org).Analysis of the primary data shows Rab1A mRNA and protein levels are both higher in pancreatic cancer tissues compared to normal pancreatic tissues (Figure 1A, 1B and 1C). Since the increase in Rab1A occurs both at transcriptional and translational levels, this suggests Rab1A mRNA and proteinexpressions are positively correlated and that increased in Rab1A level is due to change in gene expression. Generally, our results indicate that high Rab1A expression level in pancreatic cancer resemble those seen in other studies with particularhuman tumors such as HCC and CRC. [10,11]Therefore,we think that the results of this study are useful for supporting evidence that may explain many of the findings related to the development of pancreatic cancer.

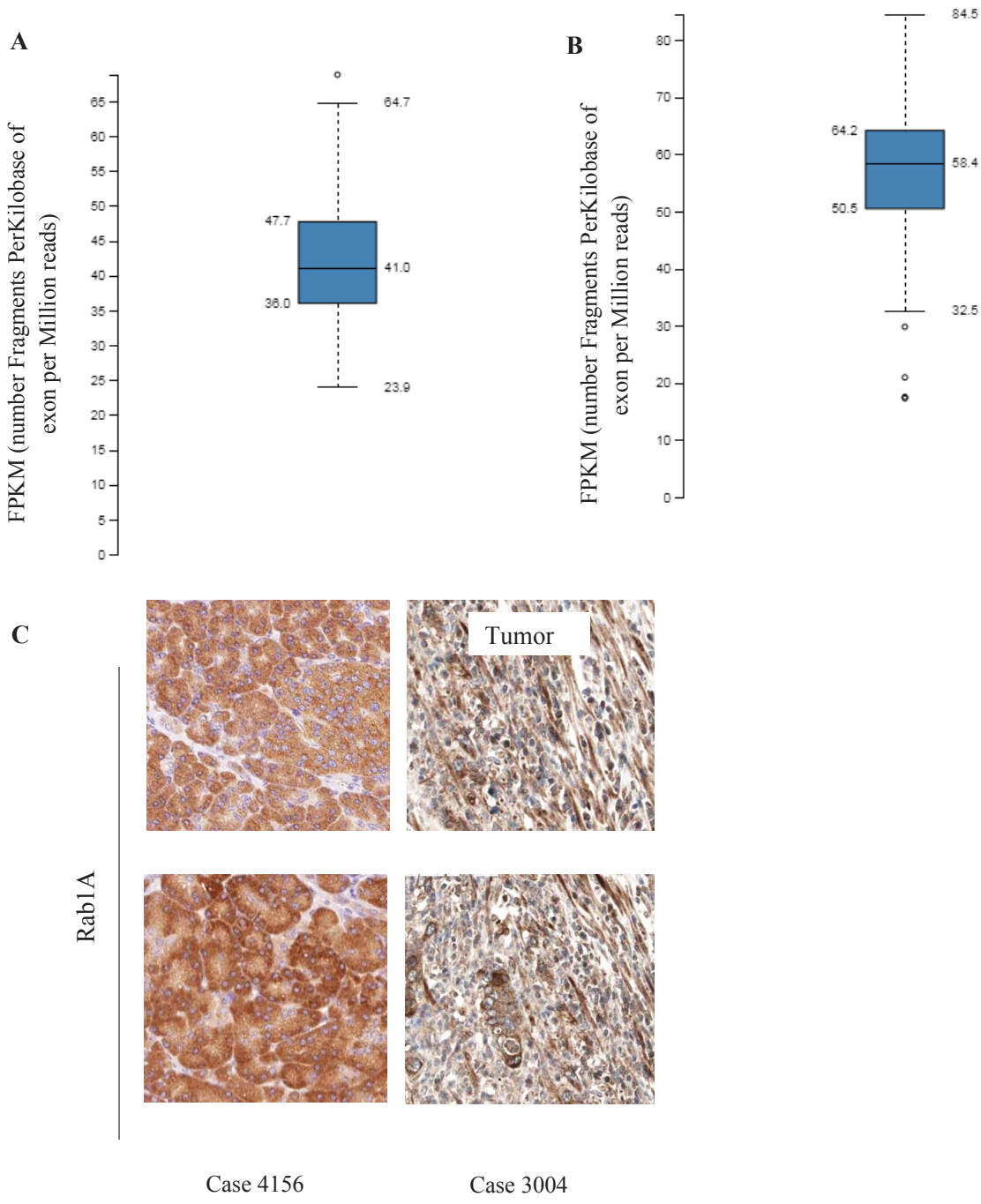


Figure 1: Rab1A is overexpressed in human pancreatic tissuesA.

RNA-seq data has been mapped usingthe number FragmentsPerKilobaseof exon per Million reads (FPKMs). Shown is mRNA level in 171 pancreatic normal tissues in The Human Protein Atlas database. (www.proteinatlas.org/ENSG00000138069-RAB1A/tissue/pancreas#cbox).**B.**RNA-seq data is proposed as average number Reads PerKilobase genemodel and Million mapped reads (FPKMs). Shown is mRNA level in pancreatic carcinoma 176 samples. Data is downloaded from The Human Protein Atlas database(www.proteinatlas.org/ENSG00000138069 RAB1A/pathology/tissue/pancreatic+cancer).**C.**IHC staining for the primary human pancreatic cancer and noncancerous tissuesin the The Human Protein Atlas database (www.proteinatlas.org/ENSG00000138069-RAB1A/tissue/pancreas#img) and (www.proteinatlas.

org/ENSG00000138069-RAB1A/pathology/tissue/pancreatic+cancer#img). Shown are representative images of Rab1A staining of tumor and non-cancerous tissue sections. Scale bar, 50 µm.

Rab1A overexpression is significantly associated with poor prognosis in pancreatic cancer patients

To evaluate the clinical significance of Rab1A overexpression in pancreatic cancer patients, we analyzed the relationship between Rab1A expression levels and patient survival.Kaplan-Meier survival analysis of pancreatic cancer patients was separated into two groups by the median value for Rab1A-positive staining then validated. Our analysis reveals that overall survival of pancreatic cancer patients with high Rab1A expression is significantly worse than those with low Rab1A expression in pancreatic patients (Figure2A). Thus, Rab1A level can provide predictive value for the outcome of pancreatic cancer patients and our observation resembles those seen in HCC and CRC. [10,11]Our analysis further supports the finding that Rab1A overexpression is significantly associated with an elevated risk of pancreatic cancer related death.These findings demonstrate that Rab1A is an independent prognostic signature of poor survival in pancreatic cancerpatients.

In support the task of high Rab1A expression in signaling pathways and oncogenesis[1-4], we investigated the level of P-S6K1, the effector of mTORC1, in pancreatic cancer patients. To investigate this phenomenon, we checked the P-S6K1protein levels of pancreatic cancer patients by using IHC primary data deposited in The Human Protein Atlas database. Protein primary data analysis reveals that P-S6K1 protein level is generally higher in pancreatic cancer tissues compared to normal pancreatic tissues (Figure 2B and 2C). Our results are useful as supporting evidence that may explain many of the findings related to the development of pancreatic cancer.Altogether these outcomesdemonstrate that enhancingmTORC1 signal may be crucial for Rab1A to advance the pathogenesis of pancreatic cancer and that Rab1A could be new guide for targeted cancer therapy as seen in other malignancies. [18]

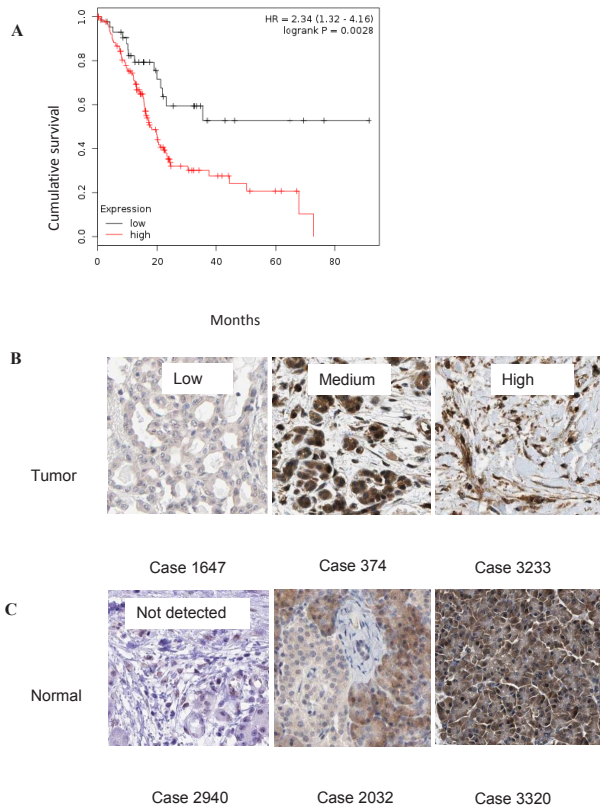


Figure 2: Overexpression of Rab1A in pancreatic cancer is associated with poor survivalA.

Kaplan-Meier survival analysis comparing the overall survival time of pancreatic cancer cases separated intotwo groups, low or high mRNA level of Rab1A. The p value was computed by log rank test.**B.**IHC staining for the primary human pancreatic cancer tissues in The Human Protein Atlas database (www.proteinatlas.org/ENSG00000108443-RPS6KB1/tissue/pancreas#img). Representatives are images of p-S6K1 staining of sections of tumor tissue. Scale bar, 50 µm.

C. IHC staining for the non-cancerous tissues in the The Human Protein Atlas database**(**www.proteinatlas.org/ENSG00000108443RPS6KB1/pathology/tissue/pancreatic+cancer#img). Shown are representative images of p-S6K1 staining of normal tissue sections. Scale bar, 50 µm.

Conclusion

Rab1 is aGTPase generally mediate vesicle shuttle betweenthe ER to Golgiapparatus.[19] Moreover, Rab1A involves in stimulating signaling pathways such as mTORC1 pathway.[10] To date, its role in human disease particularly oncogenesis remains unknown. Only until was Rab1Afound to be involved in oncogenic growth in many human cancer types. [1-3]Thepreviously mentioned

studies suggest that Rab1A could play important role in hyper-proliferative cancer.Sincepancreatic cancer is an aggressive disease, therefore we think that Rab1A could play important role ininitiation and development of pancreatic cancer.The present study finds that Rab1A is highly expressed in pancreatic cancer. These results further support the idea of that abnormal Rab1A expression could be a common phenomenon in certain human cancers.[11,20] Although our findingsdemonstrate that Rab1A is highly expressed in pancreatic tumors, the importance of elevation Rab1 expression in pancreatic cancer remained unclear.

Significantly, human pancreatic cancer patients with elevated Rab1A expression associate with poor survival. Log rank analysis demonstrates that mRNA level of Rab1A is anself-sufficient prognostic marker for pancreatic cancer patients.In contrast,low Rab1A expression associate withbettersurvival. These findings further support that Rab1 A hyperactivation can promote development of pancreatic cancer. [6]

mTORC1 is a principal regulator of signal transduction pathway in reaction to amino acid signals. [10] Recently, studies show amino acid signalsare capable of phosphorylatingS6K1, final effector target of mTORC1, in a mechanism is dependent on Rab1A.[10,11]Here we show that p-S6K1 is overexpressed in pancreatic cancer. This overexpression is closely correlated with Rab1 overexpression in primary pancreatic tissues. If that is true, these results may explain mechanisms of high Rab1A expression are in the cancer pathobiology.Thus, more studies need to be done to further investigate whether this common phenomenon drive oncogenic growth in pancreatic cancer. In addition, more analysis needs to be done to investigate whether Rab1A overexpression is correlated with pancreatic cancer sensitivity to rapamycin, mTORC1 inhibitor. Further investigation in this field could lead to a predictive marker for enhancing mTORC1-targeted therapy in pancreatic cancer.

Conflict of Interest: The author declares no conflict of interest.

Source of Fund: The author received no specific funding for this work.

Ethical Clearance: Written informed Consent for the Ethical use of The Human Protein Atlasarchived data in our Research was obtainedfromthe administrative coordinator of The Human Protein Atlas research ethics committee(a Swedish-based program fundedfrom the Knut and Alice Wallenberg foundation).

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Prevalence of Urinary Tract Infections in Adult and Child Patients

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Abstract

Urine Samples collected from three hospitals in Baghdad city from adult and child patients suffering from urinary tract infections for 6 months. The samples get reached 1152 , the patients old were between few days to 80 years after urine cultured isolation and diagnosis of bacteria done with a modern methods *Escherichia coli* reached the highest ratio reached 36.36% , In adults between . 49.35-50% , In child 42.56% followed by *Klebsiella spp*. In ratio . 11.08% , 6.06-12.98 in adult and 10.49% in child, followed by *Proteus mirabilis* 8.86% where they ranged from 6.93-9.09% in adult to 9.91% in child . Also recorded others species from Enterobacteriace in lowest ratio where they ranged from 0.16% to 3.48% Also observed Gram positive bacteria in highest ratio *Streptococcus spp*. 7.43% followed by *Staphylococcus aureus* in 5.53% , *Enterococcus* in 3.48% and in lowest ration . Species from .*Staphylococcus* between 0.16% -0.79% .Also observed .*Candida spp* were about 3.32% in adult and child .*Proteus mirabilis* were Selected because there different complications in UTIs Patients specially Stone formation , obstructed the catheter, and renal damage. These bacteria were diagnosis in API 20 E and Vitek2 , sensitivity test its performed depended on gender and age of patients *p .mirabilis* the highest percentage in the age groups 31-40, 41-50 .yeras old , 18.75% 25.0% respectively in adult both sexes .while in child the highest percentage in the age groups 10 years old ,55.88% in male than female , also observed highest ratio adult patients with Urinary catheter who are in hospital many significant differences when used different antibiotics. There was a significant impactor effects , for Impenim(IMP) and Meropenemin both sexes in adult and child. Also seen adult samples sensitive for Gentamicin, Cefoxitin,

Aztreonam and Ticracillin highest in male than Female, the same results shown in child samples .In addition sensitivity to others antibiotics such as Levofloxacin, Ceftazidim, Cefepime.Inadult,female samples were sensitive to pipracillin,ceftriaxone and Cefotetan highest than male .Many , significant differences were observed for *P. mirabilis* resistant to different antibiotics such as Cefepime,Cefotaxime, ceftriaxone, pipracillin, Levofloxacin,nitrofurantion,Cotrimaxz in adult male highest than adult female.While in child samples were resistant to Meropenam , Naldalie acid, Trimethprim . nitrofurantoin ,cifxime, Ticaracillin and ceftriaxone. Highest in male than female and female child resistant to Sulfanethoxazonl , highest than male.

Keywords: *UTIs bacteria, Antibiotic , Proteus mirabilis and UTI.*

Introduction

Urinary tract is the one of most common area of bacterial infection caused UTI occurring from the neonate to the geriatric age groups encounters in medicals today , especially in females. In men are less common may be occur after 50 years of age [1][2]. UTIs caused by bacterial colonization of the urethra. Bacteria normally colonized the urethral opening then colonize the urine [3][4].The most prevalent agent for UTI ***Escherichia coli*** which caused 80-90% of UTIs in adults[5]Followed by ***Klebsiella*** spp. and ***Proteus mirabilis*** which frequently contributed with stone disease [6][7], and other different species of Gram positive and negative [8].Urine is normally a sterile fluid,UTIs are two typesUpper UTIs (U-UTIs) and Lower UTIs (L-UTIs) [9][4]. Occurrence of UTIs in adult males aged under 50 years is low, with adult women being 30 times more than men. In most

cases of UTIs bacteria is the most common causes,while some cases of UTIs by fungi and viruses are rare[2][10][11]. In children up to 7% of girls and 2% of boys will have asymptomatic UTI. [12]. The prevalence of urinary tract infection depended on age and sex of children [8]. In infants is greater than younger age, and with7% among newborns[13]. Most UTIs in children produced by ascending infections and the hematogenous spread may be more common in the first 12 week of life[14].The most commonest UTIs in children ***Escherichia coli***60-80% of cases ***Proteus spp***. (common in boys and in children with renal stones) ***Enterococcus , Klebsiella***, and Coagulase–negative Staphylococci [15].Risk factors for UTI in children is limited, and it associated with constipation,bladder instability,encopresis[16][17].Bathing and back to front wiping[14].Reflux of urine from the bladder up to the ureter, is common in children with anatomic abnormalities of the urinary tract and may be caused ascending infection and kidney damage [2].In UTIs , sometimes the urethral catheter a closed sterile system that is consist from tube inserted via urethra is used as urinary drainage [18].Many types of bacteria can be colonized this catheter and caused catheter associated urinary tract infections (CAUTIs)[19][20][21]. Microorganism can invade and cause UTI through three major routes: lymphatic pathways , ascending ,and hematogenous[22][23].Urinary catheterization and cystoscopy the mean instrument that cause of hospital acquired UTIs in both sexes[22][24]. Hematogenous or blood borne route spread occurs as a result of bacteremia[22].WHO report that UTI bacteria resistant for antibiotic[25]. *Proteus mirabilis* bacteria caused many complications such as renal stone , catheter obstruction ,kidney damage[26][27][28]. Objectives of the study investigation bacterial species that caused UTIs , isolation and diagnosis *P. mirabilis* that caused complicated UTIs, and study *P. mirabilis* sensitivity for different antibiotics .

Method

Urine samples collection

Urine samples(1152) were collected from three sites, for 6month,from patients suffered from UTIs,mid stream urine samples were collected in sterile containers[29]. sampleswere cultured on blood agar and MacConkey agar plates.Gram negative bacteria isolates were identified byA.Different standard biochemical : 1.API20 E system 2.IMVC test 3.TSI4.Gelatin liquefaction 5.VITEK2 system for *Proteus mirabilis* B. Oxidase test and pigment production for *Pseudomonas* spp.

Gram positive isolates were identified by:1. catalase test 2.coagulase test 3.mannitol salt agar *S.aureus* .Tests were done according to Collee *et al* and Realonds[30][31].

Antibiotic sensitivity test

56 samples of *Proteus mirabilis* cultured in Mullar-Hinton agar then different antibiotic disc as shown in Table1were placed on the plates .

Table1: List of antibiotics with its abbreviation

Antibiotics	Company	Origin	Abbreviation
Cefotetan 30 µg	Biotech	UK	CIN
Gentamicin 30 mcg	Biolab	Budapest	GN
Amikacin 30µg	Biotech	UK	AK
Cefepime 30µg	Biotech	UK	FEP
Cefoxitin 30µg	Biotech	UK	FOX
Cefotaxime 30µg	Biotech	UK	CTX
Ceftraxone 30 mcg	Biolab	Budapest	CTR or CRO
Chloramphenicol 30 µg	MAST	UK	C
Pipracillin 30 mcg	Biolab	Budapest	PIP
Ceftazidime 30µg	Biotech	UK	CAZ
Ciprofloxacin 5µg	Biotech	UK	CIP
Tetrcycline 30µg	Biotech	UK	T or Te
Aztreonam 30 µg	MAST	UK	AT
Levofloxacin 5µg	Biotech	UK	LE or LEV

Cont... **Table1: List of antibiotics with its abbreviation**

Meropenem 10 µg	MAST	UK	MRT or Mem
Tobramycin 10µg	MAST	UK	Tob
Nitorfurantoin 100 mcg	Biolab	Budapest	F
Impenim 10µg	Biotech	UK	IMP
Ticaracillin 25 mcg	Biolab	Budapest	TIC
Ampicillin 25 mcg	Biolab	Budapest	AMP
Azithromycin 15µg	Biotech	UK	AZM
Cefepime 30 µg	Biotech	UK	CFP
Trimethoprim Sulfanethoxazol 1.25L23.75µg	MAST	UK	STX
Nalidixic acid 30 µg	MAST	UK	NA
Nltrofurodontin 100 mcg	MAST	UK	NIT
Ceftazidime 30 mcg	Biolab	Budapest	CAZ
Trimethprim 15 mcg	Biolab	Budapest	Tm or TTR
Aztreonam 30 µg	MAST	UK	ATM
Cifxime 30 µg	Biotech	UK	CFM

Statistic Analysis

The statistic analysis system-SAS (2012) program was used to clarity the effect of difference factors in study parameters .Chi –square test was used to significant compare percentage.

Findings

1152patients suffering from UTIs distributed in both sexes and different age between few days to eighty years old .In the current study, *Escherichia coli* is the largest causes of UTIs in different olds (46.36%) distributed in Child ,42.56% -50% in adults followed by *Klebsiella spp*. 11.08% distributed in adults 6.08%_12.08% , and 10.49% in child.Followed by *Proteus mirabilis* 8.86% ,6.93-9.09% in adult and 9.91%in child .*Enterobacter spp.*distributed as 3.48-3.90% in adult and 4.08% in child *Acinetobacter spp.*1.37-3.48 in adult while 5.25% in child *Citrobacter spp.,Serratia spp.* Was the lowest percentage 0.16% in adult and child respectively all these species from Enterobacteriaceae family.*Pseudomonas aeruginosa*8.06% distributed 4.54%-8.06% in adult and 8.16% in child while *Pseudomonas fluorescens*0.16% in child only *Morganella ,Burkholdericepecia*in 0.16% in adult and child respectively .All these species as Gram negative bacteria also isolated Gram positive bacteria such as *Staphylococcus aureus*5.53% distributed in 1.51-1.73% in adults and 8.74% in child ,*Staphylococcus haemolyticus* 0.79% and *Staphylococcus xylosus*0.32%, *Staphylococcus saprophyticus 0.16%* all in child , *Streptococcus spp.* 7.43% as6.06%-8.66% in adult to 6.70% in child , *Enterococcus spp.* 3.48% as 4.08% in child only and the last causes of UTIs *Candida spp. 3.32%* distributed as 5.19 -7.58% in adult and 1.16% in child only as show in Figure (1,2,3,4) .

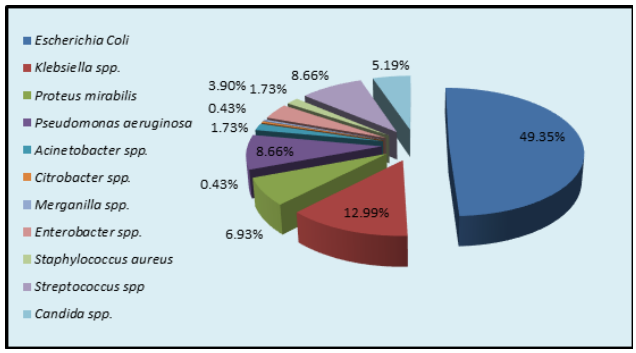


Figure (1) Distribution of bacterial specsies in three hospital isolated from UTIs

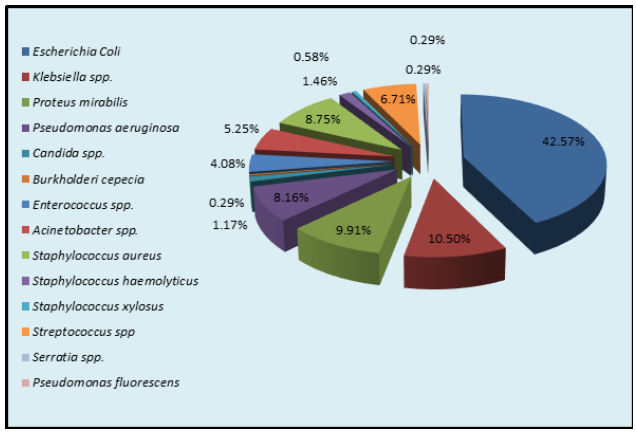


Figure (2) Distribution of bacterial species in Martyr Ghazi AL-Hriri hospital

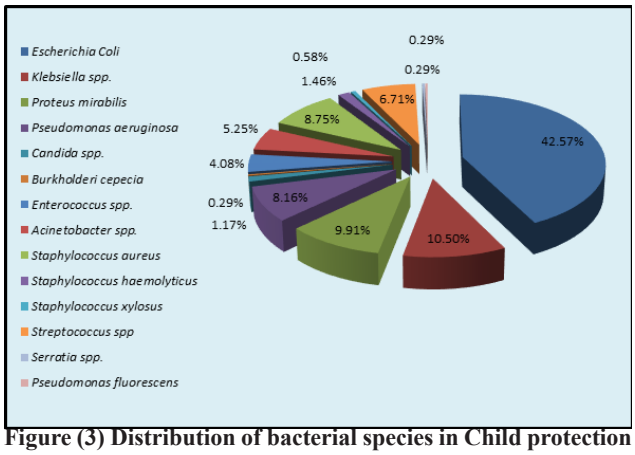


Figure (3) Distribution of bacterial species in Child protection hospital

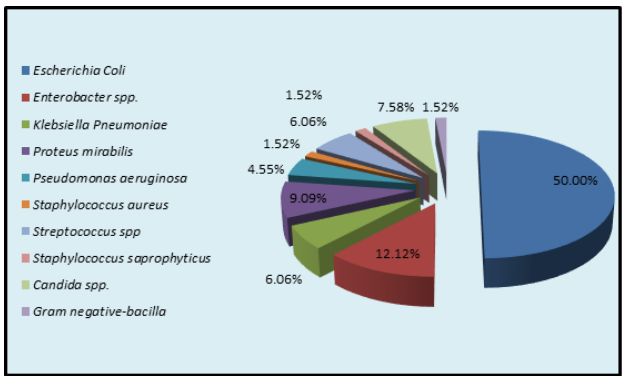


Figure (4) Distribution of bacterial species in Educational laboratoeries hospital

Proteus mirabilis 8.86% distributed in both sexes,the highest rate in adults age categories with highly significant value(**P<0.01) in 31-40 ,41-50 ,18.75% , 25.00%** the rate of infection in both sexes was equal , While in child the highest rate in age categories with highly significant value**(P<0.01) in 1 year – 10 year 55.88%**, the incidence of males was higher than females ,The highest rate with urinary catheter in **adult patients** than child.There are many significant differences**(P<0.01)**, **(P<0.05)**, when test different antibiotics depended on the gender and age, observed *proteus mirabilis* sensitive for Impenim, Meropenem. In both sexes to adult and child patients Also noted in adult patients *p. mirabilis* sensitive for Gentamicin ,Cefoxitin , Aztreonam,and Ticaracillin are higher in males than females . Moreover noted in child with same ratio for Gentamicin and Ticaracillin, Amikacin, Levofloxacin, Ceftazidim ,Ceftraxone ,and Cefepime. Also observed in adult females *p. mirabilis* sensitive for Pipracillin,Ceftraxone , Cefotetan higher than males.

Discussion

UTIs ,is one of common bacterial infection in adult and child in both sexes particularly in females than males[2][34]. Results of bacterial types infection in this study agree with WHO report for 2018 that which they pointed to increased the ratio of different types of bacteria to caused UTI complication and mortality vale of patients with UTIs[35].*Escherichia coli ,Klebsieella spp , Proteus mirabilis* respectively agreement with Ana et al[36]. This study were also agree with adult and with same the results of child and other Enterobacteaceae family members Karen[37].Gram-negative and Gram positive bacteria agreement with Wilson and Gaido[38]. The Recurrent UTI in different sexes specially pregnant women with higher percentage of *E. coli, P.mirabilis* and *klebsiella* than other women[39][40] . The study showed that child with highest ration UTI from adult specially in male than female in age **1-10 years** ,because male uncircumcised infants, anatomical abnormalities in urinary tract , poor toilet habits and hygiene[41] and obstructive anomalies , vesicoureteral reflux[42] .The similarities and differences in the type and distribution of uropathogens show a discrepancy from country to another due to many factors as environmental conditions , health practices , patient conditions, personal hygiene, number of patients examined, and laboratory procedures. *Proteus mirabilis* samples sensitive to Impenim (IMP) and Meropeneiem (MRT, MEM) in both sexes in adult and child , these results agreement with others study[43] [44][45][46].*P. mirabilis* also sensitive indifferent degree to other antibiotic in adult male for Gentamicin , Aztreonam, cefoxitin, Ticracillin , Amikacin and more ever in child also sensitive to Levofloxacin Ceftazidim, Cefepime,In different levels most result agree with AL-Jmaily and Zgaer and Mahmoud et al[46][47].In this study adult female highest sensitive more than male to Pipracillin, Ceftraxone agreement with Mahmoud et al[47] and Cefotetan.There are many different Significant in adult male resistant for antibiotics in this study Cefepime , Cefotaxime , Ceftriaxone, Pipracillin, Levofloxacin , nitrofurantion, Cotrimaxzol, Chloramphenicol , In child in both sexes Meropenam, Naldalic acid Trimethoprim , nitrofurantoin, Cifxime,Ticaracillin and child female more resistant than male for Sulfamethoxazole .There are many study proved that development of resistant for antibiotics or other drugs from *P .mirabilis* characterized as plasmid-borne drug resistance.[48]

Conclusion

1.*E. coli, Klebsiella, P. mirabilis* the highest rate of G-ve bacteria .

2. *P. mirabilis* infected both sexes in different age.

3. *P. mirabilis* resistant to different antibiotics depended in sexes.

Conflict of Interest : Non conflict of interest with any side

Source of Funding : Self source

Ethical Clearance: Oral approval was taken from patients for samples collected

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Assessment the Health Awareness of Pregnant Women's Concerning Toxoplasmosis Infection

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Abstract

A descriptive study was conducted on pregnant women to assess their health awareness concerning toxoplasmosis infection. Randomized samples were selected (100) pregnant women during various trimesters of gestations attending MCHC. Questionnaire from was designed and consist socio-demographic and reproductive data, general information and questions related to samples awareness regarding the toxoplasmosis infection. The data were collected by using interview method and descriptive statistical procedures were analyze the data. The result of the study revealed that the highest percentage of the study sample were in age group 20-29 years, primary school graduate, house wife ,had no previous history to toxoplasmosis infection, had no close contact with cats, in third trimester of gestation, have more than two children and had no history of abortion.Regarding the health awareness of the study sample about their general information ,signs and symptoms, and effects of toxoplasmosis infection were below cutoff point which mean poor awareness while their awareness of concerning methods of transmission and preventive behaviors about toxoplasmosis were above cutoff point which mean good awareness. The study recommended for the importance of health education about toxoplasmosis risk factors to women of child bearing age.

Key words: *Pregnant women ;Toxoplasmosis infection ; Awareness*

Introduction

Toxoplasma gondii is one of the infectious agents of congenital TORCH infections cause's severe clinical outcomes in fetus and newborn[1]. Toxoplasmosis is a parasitic disease caused by toxoplasma gondii[2].The infection is characterized by non-specific symptoms with the consequent formation of cysts that may remain latent form in many organs[3].

There are four groups of individuals in whom the diagnosis of toxoplasmosis is most critical:-Pregnant woman who acquire their infection during gestation, fetus and new born who are congenitally infected, immune compromised patients, and these with chorioretinitis[3,4]. It is one of the most prevalent chronic infections affecting one third of the world's human population. The prevalence of toxoplasma gondii infection varies among different geographical regions [3].Up to half of the world's population is infected with toxoplasmosis .In the united states about 23% are affected and in some areas of the world this is up to 95% .about 200,000 cases of congenital toxoplasmosis occur a year[2].It is most common in Central America and central Africa, and much less common in the US. This variation can be explained partly by climate since temperature and humidity affect how long toxoplasma cysts remain infectious [5,6].

The infection in pregnant woman may cause devastating effects in the fetus. If the infected tissue of an animal being consumed it acts as a transmission mode of infection [1].Awareness and practice regarding this disease and preventive measures in life style for this parasitic infection should be given to the pregnant woman [1].Therefore, this study aimed to evaluate the level of awareness and practices on toxoplasmosis among pregnant woman who visiting the antenatal clinics or hospitals.

Objectives of the study:- To assess the health awareness of pregnant women's concerning toxoplasmosis infection**.**

Materials and Method

Design of the study:A descriptive study was carried

out to assess the health awareness of pregnant women regarding the toxoplasmosis infection.

Setting and sample of the study :The study was conducted of (100) pregnant women selected randomly during various trimesters of gestation visiting antenatal care center**.**

Tools of the study :The questionnaire was constructed for the purpose of the study through review of available literature and relevant studies. The questionnaire covered respondents general information , symptoms, transmission methods ,risks and effects on fetus and newborn baby and preventive behaviors regarding toxoplasma infection .

Data collection :The data were collected by using interview method and self – report techniques with study participants after obtaining permission from each of them.

Statistical data analysis:Methods were used in analyzing the data of the study were included the measurement of the following:-Frequency (F), Percentages (%) ,Mean of score and standard deviation, Rating and scoring of the scale**(**Yes) for correct answerscored (2),and (No) for incorrect answer scored(1)

Evaluate the awareness of the study sample according to the Cutoff point 2 +1÷ 2=1.5

Mean score above 1.5 means good awareness (adequate) and mean score below 1.5 means poor awareness (inadequate).

Findings and discussion

Table (1) Distribution of the study sample according to socio-demographic and reproductive characteristics N=100

Variables	%
Age group / years	22%
<20	39%
20 -29	30%
30-39	9%
>40	
Mean ± SD 27.1± 3.84	
Education level	
Illiterate	5%
Primary school graduate	32%
Intermediate school graduate	22%
Secondary school graduate	18%
University graduate and above	23%

Cont... **Table (1) Distribution of the study sample according to socio-demographic and reproductive characteristics N=100**

Occupation	
Worker	15%
House wife	85%
Previous history to disease	
yes	30%
No	70%
Close contact with cats	
yes	10%
No	90%
Duration of gestation	
1st trimester	34%
2nd trimester	27%
3rd trimester	39%
No. of children	
None	25%
1	28%
>2	47%
History of abortion	
Yes	39%
No	61%

Table (1) showed that the highest percentage 39% of the study sample were in age group 20**–**29 years, while the lowest percentage 9% of them their age were above 40 years and mean with standard deviation (27.1 ± 3.84), this result is agree with the finding of study conducted on pregnant women from Malaysia their findings reveals that the majority of Malaysian pregnant women were in age group of 20-29 years[1].Regarding the education level the results reveals to the highest percentage 32% of the Study sample were primary school graduate while the lowest percentage 5% of them were illiterate, the majority of them 85% were house wife , and 70% of the study sample had no previous history to toxoplasmosis infection and 90% of them had no close contact with cats. Previous study reported that level of education play an important role in preventing toxoplasma infection[1].

The same table showed that the highest percentage 39% of the study sample in their third trimester of gestation, 47% of them have two and more children and this result agree with other study who found that the most of the study sample were in their third trimester, also reported that the trimester of pregnancy and the number of children play an important role in preventing toxoplasma infection and this may be for increased women's awareness and continuous follow up[1,7], and 61% of the study sample had no history

of abortion ,while 39% of them had history of abortion our finding is supported by a previous study who stated that women who become infected while they are pregnant more exposed to abortion or still birth or the infection could spread to the baby and cause serious complications[8].

Table (2) Distribution of the study sample according to their awareness about general information of toxoplasmosis.

Items	Yes		No		Total	MS*
	F	%	F	%		
1-Have you read , heard or seen any information about toxoplasmosis	74	74%	26	26%	100	1.74
2-Have you ever been tested for toxoplasmosis?	34	34%	66	66%	100	1.34
3-Is toxoplasmosis caused by an Infection	33	33%	67	67%	100	1.33
4- Is toxoplasmosis caused by a poison?	15	15%	85	85%	100	1.15
5- Is toxoplasmosis caused by parasite?	55	55%	45	45%	100	1.55
Grand mean	1.42 (Inadequate)					

*MS= Mean of score

Table (2) demonstrated the grand mean of score (1.42) for women's awareness about the general information of toxoplasmosis were below cutoff point which mean poor awareness (inadequate). this finding is consistent with the previous study who founded that in the respondents answers on the general knowledge of toxoplasmosis ,majority of these pregnant women have no awareness or unsure about this parasitic infection[9].This finding indicates the importance of educating the pregnant women with the preventive measures [1].

Table (3) Distribution of the study sample according to their awareness about signs and symptoms of toxoplasmosis.

Items	Yes		No		Total	MS*
	F.	%	F.	%		
Can toxoplasmosis in pregnant women cause? 1-Fever and fatigue	38	38%	62	62%	100	1.38
2- Feeling like influenza (Headache, sneezing).	46	46%	54	54%	100	1.46
3-loss of appetite	41	41%	59	59%	100	1.41
4-Vomiting and diarrhea	44	44%	56	56%	100	1.44
5-Swollen glands	37	37%	63	63%	100	1.37
Grand mean	1.41 (Inadequate)					

*MS= Mean of score

Table (3) this table showed that the grand mean of score (1.41) for women's awareness about signs and symptoms of toxoplasmosis were below cutoff point which mean poor awareness (inadequate). Our finding is supported by a previous study which found that the most of pregnant women 83% were not sure about the risk factors and symptoms of toxoplasmosis and medical staffs had lack of knowledge on this parasitic infection so an appropriate health education could then be provided to pregnant women and the health care related staff to better understand manifestation of this parasitic infection [1,10].

Table (4) Distribution of the study sample according to their awareness concerning methods of transmission.

Items	Yes		No		Total	MS*
	F.	%	F.	%		
Can people get toxoplasmosis by 1-direct contact with cats feces	76	76%	22	22%	100	1.76
2-Cats eating infected rodents , birds or other small animals.	74	74%	24	24%	100	1.74
3-Eating under cooked meat.	52	52%	45	45%	100	1.52
4-Receiving blood transfusion	63	63%	35	35%	100	1.63
5-Ingestion of raw or partly cooked meat.	54	54%	46	46%	100	1.54
6-Un washed fruits or vegetables contaminated with infected cat feces.	77	77%	23	23%	100	1.77
7-Mouth touch after gardening without gloves.	78	78%	20	20%	100	1.78
8-Changing cat litter box.	82	82%	12	12%	100	1.82
9- Drinking untreated water and milk (un boiled).	33	33%	67	67%	100	1.33
10- Receives a transplanted organ.	35	35%	65	65%	100	1.35
Grand mean	1.62(Adequate)					

*MS= Mean of score

Table(4) this table demonstrated the grand mean of score (1.62) for women's awareness concerning methods of transmission were above the cutoff point which mean good awareness (adequate) ,other study showing that having a close contact with cats and cleaning their litter may transmit the disease to pregnant women [11], while the results of present study were disagree of the finding of previous study who founded that there was a low level of awareness about methods of transmission[1].

Table (5) Distribution of the study sample according to their awareness about the effects of toxoplasmosis.

Items	Yes		No		Total	MS*
	F.	%	F.	%		
1-Can toxoplasmosis passed from mother to fetus through placenta	64	64%	36	36%	100	1.64
2-Can toxoplasmosis cause congenital malformations	33	33%	67	67%	100	1.33
3- Can toxoplasmosis cause damaged the baby's eyes	38	38%	62	62%	100	1.38
4- Can toxoplasmosis cause brain and nervous system damage (seizures)	44	44%	56	56%	100	1.44
5- Can toxoplasmosis cause fetus death	48	48%	52	52%	100	1.48
6- Can toxoplasmosis cause miscarriage	75	75%	25	25%	100	1.75
7-Can new born baby born with no symptoms but the symptoms developed after that	28	28%	72	72%	100	1.28
8- Can pregnant woman develop serious complications after infection with toxoplasmosis	55	55%	45	45%	100	1.55
Grand mean	1.48(Inadequate)					

*MS= Mean of score

Table (5) this table demonstrated the grand mean of score (1.48) for women's awareness about the effects of toxoplasmosis were below cutoff point which mean poor awareness (inadequate).Some studies have been reports that exposure to infected cats by these women could lead to severe out comes to her carried fetus [11,12]. Other previous studies high light the importance of health education among the pregnant women to reduce the seroprevalence of this disease hence minimizing the adverse effects of infection in the fetus or newborn [10].

Table (6) Distribution of the study sample according to their awareness regarding preventive behaviors.

Items	Yes		No		Total	MS*
	F.	%	F.	%		
Toxoplasmosis can be prevented by 1-Feeding your cat dry or commercial cat food and not letting it kill and eat rodents	75	75%	25	25%	100	1.75
2-Avoiding stray cats	85	85%	15	15%	100	1.85
3-Wear disposable gloves in changing cats litter box.	89	89%	11	11%	100	1.89
4-Making sure the cats litter box is changed daily.	88	88%	12	12%	100	1.88
5-Wash your hands after gardening	84	84%	16	16%	100	1.84
6- Washing all fruits and vegetables before eating	93	93%	7	7%	100	1.93

Cont... **Table (6) Distribution of the study sample according to their awareness regarding preventive behaviors.**

7-Cleaning all catting boards and utensils thoroughly after each use.	89	89%	11	11%	100	1.89
8-Wash your hands after handling raw meat.	84	84%	16	16%	100	1.84
9-Cook food to safe temperature.	85	85%	15	15%	100	1.85
Grand mean	1.86(Adequate)					

*MS= Mean of score

Table (6) this table demonstrate the grand mean of score (1.86) for women's awareness regarding preventive behaviors a bout toxoplasmosis were above cutoff point which mean good awareness (adequate). This finding is supported by a previous study in Malaysian and Thailand showed that pregnant women appear to have better precaution or preventive practices toward toxoplasmosis infection[13,14].Awareness about toxoplasmosis and its related preventive knowledge and behaviors may reduce the infection rate and its disease burden in pregnant women[1].

Conclusion

The study has concluded the following:-

The highest percentage of the study sample were in age group 20-29 years , primary school graduate , house wife , had no previous history to toxoplasmosis infection , had no close contact with cats , in third trimester of gestation , have more than two children and had no history of abortion

Regarding the health awareness of the study sample, the findings indicated that inadequate level of awareness about the general information, signs and symptoms, and effects of toxoplasmosis infection, while concerning methods of transmission and preventive behaviors about toxoplasmosis indicated adequate level of awareness.

Source of Funding :Self

Ethical Clearance :The data were collected from participants after obtaining permission from each of them.

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Cytotoxic Effect of *Vinca rosea* Aqueous Extracts on (L20B) Cell Line *In Vitro*

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Abstract

The present study investigated the cytotoxic effects of aqueous crude extracts of *Vinca rosea* leaves , flowers and seeds on cell line (L20B Cell line)*in vitro ,* by using double dilution series (concentration between 1.95 – 1000 µg/ ml.

The results showed that the cytotoxic effect of extract is dependent on type of extract, amount of dose and exposure time. The concentration 1000 µg/ml gave the highest growth inhibition (IR) (74 and 74%) to leaves and flowers respectively compared with control 100% after 24 hours exposure time, but seeds were (49%) after 48 hours. However, low concentrations of aqueous extracts were found to induced the L20B cells growth and proliferation (PR), which recorded (122, 123) % by treatment with flowers extract in 1.95 µg/ml after 72 hours. Crude aqueous extract of *Vinca rosea* had hormetic effect (Hormesis), because it also induced the proliferation of cancer cells by using low concentrations of the extract.

KeyWords: *L20B,* ***Vinca rosea****, cytotoxicity, Inhibitory Rate.*

Introduction

Cancer emerged as a leading cause of death in the world. It is a serious disease that kills millions of people every year, and during lifetime, it affects one in two men, one in three women, while it causes death of one in four women[1].Cancer remains a problem for scientists despite the existence of several methods of treatment. There are chemotherapy, physiotherapy and surgical therapies, but all of them were not convincing for doctors or the patient himself. Thus, research centers and researchers turned to find other alternative therapies for the existing treatments and took another approach that may have great hope to eliminate the disease. Commercial drugs cost large amounts to import, and their effectiveness is gradually lost by continuous use due to the resistance of cancer cells to these medicines [2]. Therefore, many countries worldwide paid much attention to their plants as the natural source of drugs [3]. The discovery of anticancer effect of alkaloids of *Vinca rosea* plant gave it a great medical importance, because these alkaloids are chemotherapeutical agents for different types of human cancers [4,5].

About 75 types of alkaloids have been discovered, some of which have anticancer effects, including vinblastine and vincristine [6], as well as the use of this plant for the treatment of diabetes [7]Several studies were also carried out to use the plant extract in the treatment of microbial diseases such as skin diseases[8].Mitosis inhibitors such as Vinca alkaloids, derived from the *Vinca rosea (Cathathanthus roseus)* occupy a special place among chemotherapeutical drugs used in the treatment of many types of cancer [4,9].In this sense, and in order to enhance the study of the effect of natural plant extracts found in the Iraqi environment against some cancerous and transformed cell lines as a first step to explore their counter effects, this study was designed (as a part of an extensive study of different cell types) to investigate the effect of crude extracts of the *Vinca rosea* plant in the local Iraqi environment in inhibiting the growth of the L20B mouse fibroblast cell line.

Materials and Method

• **Plant collection**: The *Vinca rosea* was collected as an ornamental plant in the gardens of the College of Education/University of Karbala, and the plant was classified by the Iraqi National Herbarium/

Public authority for the examination and certification of seeds of the Ministry of agriculture. After the plant was collected and cleaned, it was washed thoroughly by tap water, and the plant parts (leaves, flowers and seeds) were separated and left to dry in the dark and at room temperature in a well ventilated dry environment to prevent damage of the samples. After drying of these three parts, they were finely grinded with an electric mill, then preserved in clean plastic containers away from light, heat and moisture until use.

Preparation of crude aqueous extracts of *Vinca rosea*: The cold aqueous extract was prepared according to the method used by Harborne *et al*[10], by taking 50 g of the dry powder for each part of the plant and adding 250 ml of distilled water and left the mixture on the magnetic stirrer at room temperature for 3 days, then the mixture was filtered by gauze then by filter paper (Whatman No.1). After that, the supernatant was dried to get the dry powder from which the required concentrations were prepared.

Indicative chemical detection of effective compounds: The types of secondary chemical metabolites found in the studied plant extracts (alkaloids, terpenes, flavonoids and glycosides) were determined, depending on what is stated in [10].

Study toxic effects of *Vinca rosea* extracts on the growth of (L20B) cell line

Type of the studied cancer cells: The (L20B) mouse fibroblast cell line was used by passage (18). The cells were grown on tissue culture medium with Minimum Essential Media (MEM), supplied by Sigma (USA) company with 5% (Fetal Calf Serum / FCS) supplied by the company itself.

Cytotoxic effects: Multiple (96) tissue culture microtiter plates, flat bottom were used to perform this experiment, which included three stages:

Cell seeding:

- After the growth and multiplication of cells, the containers with monolayer were taken, then cells were harvested using Trypsin-Versin (T.V) solution.

- Twenty ml of the serum-containing culture medium was added to each container and mixed well. Then, the cells were counted by the (Haemocytometer) using the (1%) trypan blue dye according to what indicated by Freshney [11].

- By a micro pipette, (0.1) ml from the cell suspension was taken and placed in each well of the plate. Each well contained (1×10^4) cell / well. The surface of the plate was then covered with a special sterile transparent adhesive paper for this purpose and the plate was moved gently, after that incubated at ($37C^0$) until the next day to allow (cell attachment).

2- Exposure of cancer cells to the plant extract:

The next day of seeding, serial dilutions were done in sterilized test tubes for each type of plant extract using the MEM-Serum free media, and dilutions from 1/2 to (1/1024) started gradually, which yielded the concentrations from 1000 to 1.95 µg/ml) respectively, taking into account to prepare the dilutions simultaneously at work. The culture media was poured from the wells after lifting the adhesive paper. The column No. (1) was considered as a negative control, as 0.2 ml of the serum free culture medium was added to it, while to the columns from 2 to 12 the dilutions of the extract, which were prepared as (0.2 ml / well / concentration) were added, and then a new layer of adhesive paper was re-placed on the surface of the plate.

The plates were incubated at (37C), while exposure times were (24,48 and 72) per hour.

Cytotoxicity assay:

Crystal violet stain was used to detect the cytotoxic effect of the extracts on cells pursuant to the following:

After the end of each incubation period, the plates were taken and their contents were poured and then washed with Phosphate Buffer Saline (PBS) solution, and 0.1 ml of crystal violet stain.

was added to each well, and left for (20) minutes. The cells were then washed with PBS solution several times until the excess stain disappeared. After the plates were dried completely, the results were read using the ELISA microplate spectrophotometer at a wavelength of 492 nanometers. The mean inhibitory Rate / I.R was measured according to the equation indicated by [12], and the mean proliferation rate / PR was calculated according to[13].

Finding

Indicative detection of active chemical

compounds: Detection of chemical compounds in the *Vinca rosea* extract showed that they contained (alkaloids, terpenes, flavonoids and glycosides)**.**

Cytotoxic effect of *Vinca rosea* extract on (L20B) Cell Line

Cytotoxic effect of the leaf extract: The toxic effect of leaf extract was studied in the L20B cell line by passage (18). The results shown in figure (1), revealed that the inhibitory toxicity effect was on the first day of exposure because it gave the best results, when the highest percentage of inhibitory rate (IR) growth inhibition was 74% at the concentration of 1000 µg/ ml of the extract after the first 24 hours of exposure. After that, the inhibition decreases as the concentration decrease, however, it remains effective. The lowest concentration used of 1.95 µg / ml gave a 41% growth inhibition. It is also noticed that the inhibitory effect 48 to 72 hours after treatment with plant extract was generally similar to the treatment after 24 hours, although it began to decline over time, because the highest rate of growth inhibition was 61% and 40% (with a viability rate of 39% and 60%) at 1000 µg/ml concentration after 48 and 72 hours of treatment respectively.

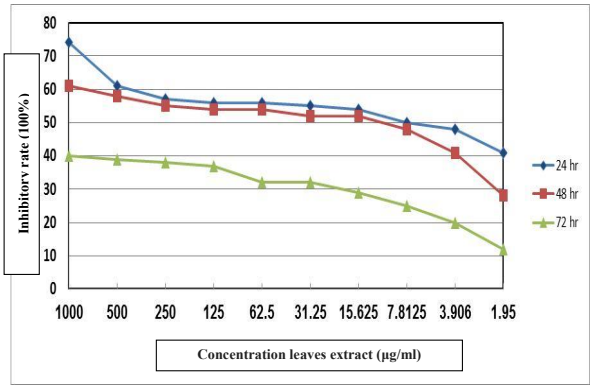


Figure (1): Effect of aqueous extract of the *Vinca rosea* leaves on the percentage of inhibitory rate on L20B cell line after different exposure time.

Cytotoxic effect of the flower extract: The results of the treatment of the L20B cell line with the *Vinca rosea* flower extract revealed that the inhibitory effect was similar for the three periods of time and gave a similar growth inhibition rates (IR) when using the first three high concentrations, reaching (74, 74, 65)% after 24 hours and (74, 73, 58)% after 48 hours and (71,62,56)% after 72 hours at the concentrations (1000, 500 , 250) µg / ml respectively. After that, the inhibition gradually began to decline with decreasing the concentration reaching to (8.3)% at 1.95 µg/ ml after 24 and 48 hours of exposure respectively as shown in figure (2). While the rate of cell growth was gradually increased beginning from 62.6 µg / ml making the proliferation rate reach to 123% at 1.95 µg / ml after 72 hours of treatment compared with control (100%).

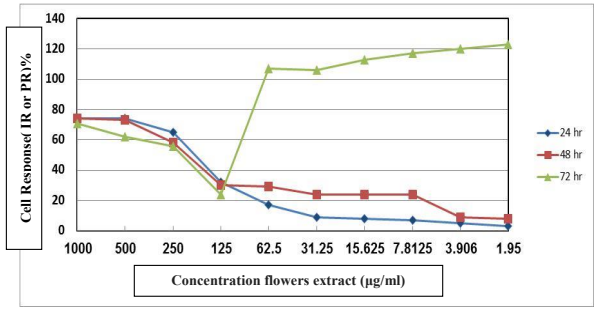


Figure (2): Effect of aqueous extract of the *Vinca rosea* flowers on the percentage of inhibitory rate onL20B cell line after different exposure time.

Cytotoxic effect of seed extract: There was less inhibition effect of the extract of *Vinca rosea* seeds on the L20B cell line compared with the two previous extracts (leaves and flowers). The best results were observed after 48 hours of exposure and then the rate of inhibition of growth decreased after 72 hours (increased cell viability). The toxic effect reached to 42% (cell viability 58%) after 24 hours of treatment at the highest used concentration of 1000 µg/ ml. In addition, the growth-stimulating effect appeared after 72 hours of treatment only, ranging from (110-122)%, and began to appear at the concentration of 7.8125 µg/ ml reaching to a minimal concentration of 1.95 µg/ ml respectively. figure (3).

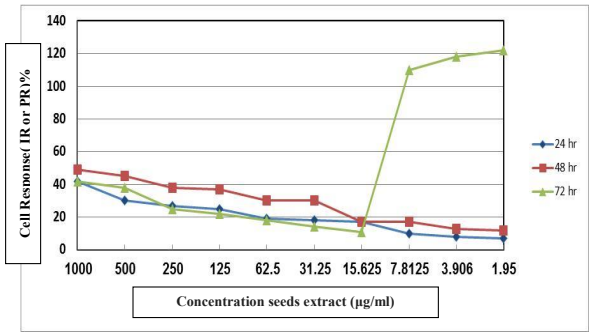


Figure (3): Effect of aqueous extract of the *Vinca rosea* seeds on the percentage of inhibitory rate onL20B cell line after different exposure time.

Comparison effect of the exposure time on the viability of the L20B cell line of the three studied extracts.

When a comparison between the viability of the three studied extracts (leaves, flowers and seeds) at each time of exposure, it was found that the first 24 hours of treatment showed the highest growth inhibition rates, as the viability of the cells was (26)%, (growth inhibition rate was 74%) for leaf and flower extracts and at the highest treated concentrations with 1000 µg/ ml (Fig. 4). In addition, results of 48 hour exposure were generally different from the 24 hour exposure, since the inhibition rate of leaves and flowers declined, while the highest rate appeared when the seed extract was used reaching to (49%), (51% viability) at 1000 µg/ ml concentration, and these rates decreased for all used concentrations compared with the exposure time of 24 hours (figure 5). The cell inhibitory rate within 72 hours of exposure was (40%, 71% and 42%) at 1000 µg/ml, (the viability rate was 60%, 29% and 58%) respectively, compared to control 100% (figure 6). It is observed that the viability rate of these cells begin to increase when low concentrations of flower and seed extracts are used to reach the highest viability rate (122 and 123)% respectively at 1.95 µg/ ml concentration. The results obtained showed that L20B cells were more sensitive to leaf and flower extracts and less sensitive to seed extract due to the high rate of cell viability.

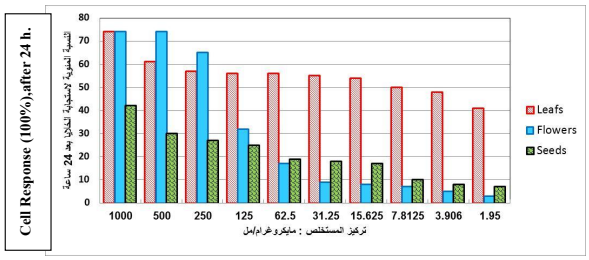


Figure (4): Comparison the effect of aqueous extracts of *Vinca rosea* on L20B cell viability after 24 h. exposure time.

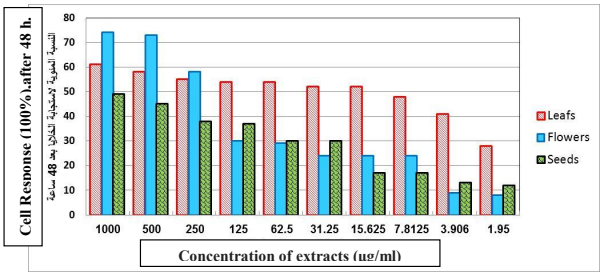


Figure (5): Comparison the effect of aqueous extracts of *Vinca rosea* on L20B cell viability after 48 h. exposure time.

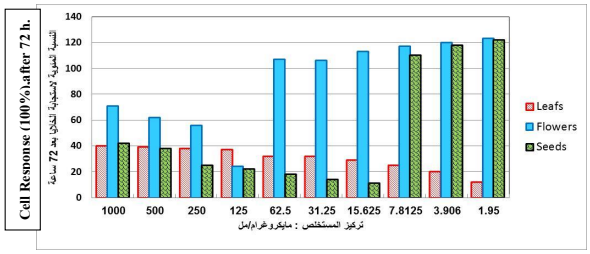


Figure (6): Comparison the effect of aqueous extracts of *Vinca rosea* on L20B cell viability after 72 h. exposure time.

Due to the importance of finding effective substances against cancer and finding more types of plants that possess these substances, the *Vinca rosea*, one of the locally available medicinal plants with different therapeutic properties, was [selected to identify the effects of crud aqueous extracts on L20B cell line] (as part of an extensive study in this field in many cancer cell lines) and the extent to which these extracts can be used as anticancer medical treatment in the future.The extracts of *Vinca rosea* contain many compounds and, as shown in the indicative chemical detection, the presence of alkaloids, terpenes, flavonoids and glycosides which may contribute to the better killing of cancer cells as a result of synergistic effect between them, which may reduce the toxicity of the used pure compounds.

The results showed that the crud extracts played a role in killing LB20 cells and inhibiting their growth and their division *in vitro*. The results indicated that the toxic effect of *Vinca rosea* on L20B cells was based mainly on the concentration used, exposure time and type of extract. The leaves extract had the best effect. On the other hand, it is observed that this type of cell, according to the results of this study, is sensitive to the prepared therapeutic aqueous extracts, as it inhibited the growth of cells, on contrary to the seed extract, which did not exceed the percentage of 49% inhibition after 48 hours of treatment using the high concentration of 1000 µg/ml, then the inhibitory effect is reduced when the exposure time is increased for all types of extracts. These results indicate that the effect of leaves and flower extracts is during the first 24 hours of exposure and at high concentrations, so when its effect is diminished, the living cells begin to reactivate and divide, showing the importance of giving repeated and continuous high doses to ensure the killing of all remaining cancer cells. The same thing occurs with the seed extract, which gives the best results after 48 hours of exposure and then the inhibition decreases and the cells reactivate.

A study performed by Yaseen *et al*[14]who compared between the two types of alcohol and aqueous extracts, and found that alcohol extracts are more effective than their aqueous counterparts on Hep-2 cells. This may be due to the fact that the ratio of the active substance extracted with ethanol (70%) is greater when using the aqueous extract, and this is reported by Harborne *et al*[10]. In two local studies on the same extracts in two cancer cell types - human cervical cancer cells (Hela-cells) [15] and human brain cancer cells (AMAG) [16], the results showed that both types of cancer cell lines were resistant to the aqueous *Vinca rosea* extracts (Leaves, flowers and seed), where low inhibition rates were recorded (not exceeding 46% in Hela cells and 64% in AMAG cells) using the highest concentrations (1000 µg/ml), while the L20B cells were shown to be sensitive to the same extracts. This is likely due to different receptors and antigenic determinants on the surface of each of the cancer and transformed cells.

The crud extracts of *Vinca rosea* contain a high percentage of alkaloids, which contain more than 75 types [17], as well as the presence of terpenes, phenols [18] and many mineral elements [19]. The proportion of secondary metabolic products in the plant varies according to the type of plant organ (leaves, flowers or seeds), and this is also affected by surrounding environmental factors[18]. Alkaloids are themost important and most effective substances in these extracts. The mechanism of their action is to inhibit the mitotic division, to keep the cells in the metaphase by inhibiting the polymerization of the protein Tubulin which is responsible for the formation of spindle fibers [9,20]. In addition, alkaloids inhibit the building of nucleic acids *in vitro*[21]. Several previous studies have also indicated that *Vinca rosea* alkaloids are effective against cancer cells, including human cervical cancer cells (Hela cells), because low concentrations cause inhibition to spindle fibers action [22,23]. On the other hand, Parekh and Simpkins [24] confirmed that these alkaloids affect on cancerous lymphocyte cells of rat and on human ovarian cancer cell line that are resistant to commonlychemotherapies used such as Cisplatin, as well as its being more effective than Taxol and Adriamycin.

Regarding the effectiveness of phenolic compounds, including flavonoids, which have an antioxidant effect by removing the generated free radicals and they direct the cell to enter apoptosis stage [25].

Many effective compounds effect on opposite directions depending on the concentration used. As noted by the above results, high concentrations inhibited the growth of L20B cells, while the low concentrations stimulated growth of these cells, increasing the viability by (122-123)% compared to the control (100%), indicating that the extract under study has a Biphasic effect [26], or Hormetic effect. There are many chemical therapeutical compounds, antibiotics, and toxins whose action is governed by the Hormesis phenomenon (abiological phenomenon common in toxicology), which act at low concentrations to stimulate, and may be useful to the organism, especially when the immune cells are activated, while high doses cause partial or total inhibition to the cells [27].

It is worth mentioning that the extract used in this study is crud extract, it contains many types of active compounds whose effectiveness was previously indicated or not mentioned, which supports the results of the emergence of antagonism in the influence on L20B cells depending on the concentration used. It is likely that its effect on the genetic material is in two directions, the first causes the inhibition of certain genes, while the other stimulates growth and multiplication.

Conclusion

The results showed that L20B cells were more sensitive to leaf and flower extracts and less sensitive to seed.

Conflict of Interest: Non

Funding: Self

Ethical Clearance: Non

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Detection of Human Papillomavirus in Cervical Mucus of Women with Spontaneous Abortion by Real-Time PCR

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Abstract

The aim of the study was to detect of human papillomavirus (HPV) in cervical mucus of women with spontaneous abortion by real-time PCR. Cervical mucus of 200 women with spontaneous abortion and 100 full term pregnant women were included in this cross-sectional which carried out in Kirkuk city-Iraq from beginning of 1st of October 2018 to the end of December 2018. HPV DNA was detected real-time PCR of genotype 16, 18 and 58 in cervical samples. The study showed that the highest rate of HPV DNA (29.5%) was detected in women with abortion comparing with pregnant women (12%) with highly significant relation of HPV with abortion (P. value: <0.05). The study stated that the highest rate of aborted women was infected with HPV 16 (37.29%) followed by HPV 58 (30.26%) while HPV 18 was found in 12.26% of those women and 13.56% of them was infected with both HPV 16 and HPV 58 genotypes. The study exhibited that 36.37% of aborted women with one time in their marriage age was infected with HPV followed by 28.995 in women with 2-3 time, the study presented that 52.5% of women with abortion was belonged to the age group 27-36 years.

Conclusion: Spontaneous abortion was highly associated with HPV infection specially with HPV 16 genotype.

Keywords: *Abortion; HPV; cervical mucus; real-time PCR*

Introduction

Recurrent miscarriage (RM) is defined as the occurrence of three or more consecutive losses of pregnancy. According to this definition, it affects about 1% of couples trying to have a baby [(1)]. However, many clinicians define RM as two or more losses; this increases the percentage of RM from 1% to 5% of all couples trying to conceive [(2)]. The role of infectious diseases in recurrent miscarriage is not clarified yet, but proposed an incidence of 0.5–5% [(3)]. There are some candidate infectious diseases such as *Listeria monocytogenes*, *Toxoplasma gondii*, rubella, herpes simplex virus (HSV), measles, cytomegalovirus, and coxsackie viruses. Infectious diseases may cause pregnancy loss by the following mechanisms such as direct infection of the uterus, fetus, or placenta, placental insufficiency, chronic endometritis, endocervicitis, amnionitis, or intrauterine miscellaneous infections[(4)]. Human papillomavirus (HPV) is one of the most prevalent sexually transmitted viral infections in men and women worldwide [(5)]. Human papilloma virus is a group of more than 200 related viruses, some of which are spread through vaginal, anal, or oral sex. Sexually transmitted human papilloma virus types fall into two groups, low risk and high risk[(3)]. Low-risk HPVs mostly cause no disease. However, a few low-risk HPV types can cause warts on or around the genitals, anus, mouth, or throat. In rare cases, they can cause recurrent respiratory papillomatosis, a condition in which benign tumors grow in the respiratory tract[(6)]. High-risk human papilloma virus can cause several types of cancer. There are about 14 high-risk human papilloma virus types. Two of these, HPV16 and HPV18, are responsible for most HPV-related cancers. The existence of more than 180 HPV genotypes has been reported [(7)]. According to the basis of oncogenic potential, HPV can be divided into 2 different groups-high-risk HPV (HR-HPV) and low-risk HPV (LR-HPV).

Generally, the HR-HPV included HVP16, HPV18, HPV31, HPV33, HPV35, HPV39, HPV45, HPV51, HPV52, HPV56, HPV58, HPV59, HPV66, and HPV68 [8]. It is well established that infections with HR-HPV can lead to cervical cancer. Moreover, recent evidence has shown that HPV infection is associated with the risk of colorectal, head, and oropharyngeal carcinomas [9]. To date, a succession of studies has been published to show the association between HPV infection and adverse pregnancy outcomes[6]. The aim of the study was to detect of human papillomavirus (HPV) in cervical mucus of women with spontaneous abortion

Methodology

A cross-sectional study was carried out in Kirkuk city-Iraq from beginning of 1st of October 2018 to the end of December 2018, including 200 women who attended to Kirkuk general hospital for curettage, and 100 controls (pregnant women at term of delivery) to find out DNA of HPV of HPV 16, 18 and 58 in cervical samples by real-time PCR (using Sacace biotechnology, HPV High Risk Screen Real-TM Quant). Women with positive TORCH serology IgM tests (against *T. gondii*, CMV, HSV) were excluded from the study. Cases were defined as women experiencing spontaneous abortion up to 20 weeks of gestation, who attended for medical attention and/or a curettage procedure. Controls were defined as women attending for delivery at term, with viable products.

Cervical swabs:

- Remove excess mucus from the cervical os and surrounding ectocervix using a cotton or polyester swab. Discard this swab.

- Insert the Sampling Cervical Brush 1.0-1.5 centimeters into the cervical os until the largest bristles touch the ectocervix. Do not insert brush completely into the cervical canal. Rotate brush 3 full turns in a counterclockwise direction, remove from the canal.

- Insert brush into the nuclease-free 2,0 ml tube with 0,3 mL of Transport medium (Sacace). Vigorously agitate brush in medium for 15-20 sec.

- Snap off shaft at scored line, leaving brush end inside tube, DNA were extracted and PCR was performed on all samples according to manufacture instructions. HPV DNAA is extracted from using RT-amplification and detected using fluorescent reporter dye probes specific for HPV or HPV IC. The HPV IC is an internal control and represents recombinant RNA-containing-structure which carried through all steps of analysis from nucleic acid extraction to PCR amplification-detection. The total reaction volume was 25 µl, the volume of RNA sample was 12.5 µl.

1. The reagents were thawed, and the tubes were vortexed and centrifuged briefly.

2. Requested quantity of reaction tubes were prepared including 3 extraction controls, negative amplification control and 4 standards.

3. The entire contents of the tube with RT-PCR-mix-2-FRT was added to the tube with DTT, thoroughly vortexed.

4. Tubes for samples, controls and standards were prepared. The results are interpreted by the presence (or absence) of the intercept between the fluorescence curve and the threshold line which determines the presence (or absence) of the Ct values for the sample. Based on the Ct values and on the specified values of the calibrators, QS1 HPV and QS2 HPV, the calibration line will give the values for the number of HCV cDNA copies (JOE channel) and for the number of internal control (FAM channel) in a PCR sample.

Statistical Analysis

Computerized statistically analysis was performed using IBM SPSS V23.0.0 statistic program. Comparison was carried out using; Chi square and T-Test.

Finding

The study showed that the highest rate of HPV DNA (29.5%) was detected in women with abortion comparing with pregnant women (12%) with highly significant relation of HPV with abortion (P. value: <0.05), Table 1.

Table 1: Detection of HPV DNA in mucus of cervix of aborted and pregnant women

HPV result	Aborted Women		Control group (Full term pregnant women)	
	No.	%	No.	%
HPV +ve	59	29.5	12	12
HPV -ve	141	70.5	88	88
Total	200	100	100	100

P. value: <0.05.

The study stated that the highest rate of aborted women was infected with HPV 16 (37.29%) followed by HPV 58 (30.26%) while HPV 18 was found in 12.26% of those women and 13.56% of them was coinfected with both HPV 16 and HPV 58 genotypes, Table 2.

Table 2: Coinfection between HPV genotypes (16,18 and 58) in women with abortion

HPV genotype	Aborted Women	
	No.	%
HPV16	22	37.29
HPV 18	9	12.26
HPV 58	18	30.51
HPV 16/18	1	1.69
HPV 16/58	8	13.56
HPV 16/18/58	1	1.69
Total	59	100

The current study exhibited that arte of 36.37% of admitted women who aborted one time in their marriage age was infected with human papilloma virus followed by 28.99% in women with 2-3 time of abortion with infection of human papilloma virus, Table 3.

Table 3: Distribution of HPV infection according to number of abortion

Number of previous abortion	Total No. (200)	Aborted Women	
		No (59).	%
1	88	32	36.37
2-3	69	20	28.99
More than 3	43	7	12.28

The study presented that 52.5% of women with abortion was belonged to the age group 27-36 years

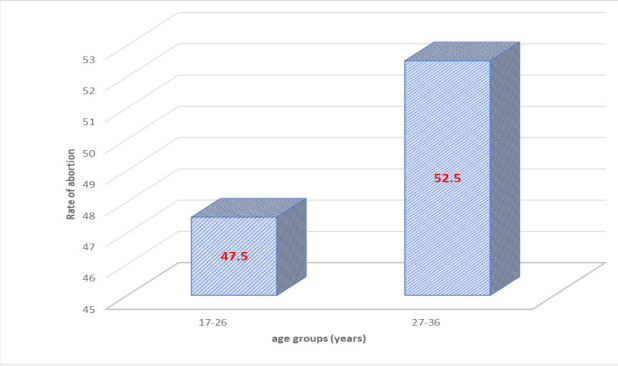


Figure 1: Distribution of women with abortion according to age

Discussion

It is important to study human papilloma virus detection in pregnancy, which represents a special immunological state that may be a risk factor for HPV infection [6]. Some studies have shown a higher frequency of human papilloma virus cervical infection in pregnant women compared to non-pregnant controls, possibly because of an effect of elevated estrogens which may affect the viral replication, or due to the altered immunity [7-9].

Human papilloma virus infection is common in the general population, including normal pregnant women. In normal full-term pregnancy, prevalence of HPV was reported to vary between 2.2 and 75% in the cervical tissue, with a summary estimate of 17.5% [5]. Correspondingly, the prevalence of human papilloma virus was significantly higher in the cervix and placental and aborted tissue of women who underwent spontaneous abortions [8]. Although the prevalence of HPV was significantly different in normal pregnancies and the spontaneous abortion group, our results based on 5 cohort studies and 3 case-control studies indicated that there was no significant association between human papilloma virus infection and spontaneous abortion. When the included studies reported HR-HPV infection alone. However, the pooled OR of 4 cohort/case-control studies [9-11] reported that the HR/LR–HPV infection indicated that HPV infection was a risk factor for spontaneous abortion. It was reported that there are 2 different pathways in the natural history of HPV infections, namely, the infectious virion producing pathway and the clonal transforming pathway [10]. The infectious virion producing pathway can lead to subfertility or early abortion and it is infectious. Oncogenic (HR) HPV types induce more rapid cell division arrest than LR-HPV or intermediate HR-HPV types. It takes the embryo longer to die after LR-HPV infection, which makes it possible to measure the spontaneous abortion [12].

In China, a 10.2% HPV prevalence was reported, with genotypes 16 and 58 being the most frequent (29% and 19% respectively) [13]. In the United States human papilloma virus prevalence reported was 35.6%, (11.6% low risk and 29.5% high risk types) [14]. Another study in the United States reported 29% prevalence, the most frequent genotypes being HPV16 (21%), HPV31 (12.7%), HPV18 (9%) and HPV51 (9%) and HPV6/11 (6%) [11]. In Spain, HPV prevalence found was 6.5%,

with HPV16 and HPV6/11 being the most frequent genotypes [15].

Coinfection with multiple HPV types has been associated with a higher risk of cervical abnormalities [16,17]. Longitudinal studies are needed in order to determine the risk associated with multiple infections in obstetric patients. Of relevance are the high risk genotypes, which may clear spontaneously after the inmmunological state is restored, or persist and may cause lesions. Also of importance are genotypes 6 and 11 identified in the mothers: if they are transmitted they could represent a risk for the newborn, because of the possible of development of laryngeal and respiratory papillomatosis later in childhood. The most common causes of pregnancy loss in the first trimester are of genetic origin [6]. Amongst other important risk factors are maternal age younger than 20 or older than 35 years old, placental inflammation and infection, but the etiology is often uncertain [5]. Conde-Ferráez *et al* [18] demonstrated that spontaneous abortion was associated to a previous pregnancy loss and to women's age older than 35 years old.

Conclusion

Spontaneous abortion was associated with HPV infection specially with HPV 16 genotype.

Conflict of Interest: non

Source of Findings: Self findings.

Ethical Clearance: This research was carried out with the patient's verbal and analytical approval before the sample was taken. According to this approval, all the samples were collected and the tests were carried out. A copy of the results of the tests was then given to the patients

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The Role of Proinfalmatory Cytokines (Interleukin-1 Beta and 6) in Pathogenesis of Breast Cancer

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Abstract

A cross-sectional study was carried out in Kirkuk city from of November 2017 to March 2018. The number of breast cancer women under study were 55 women whose ages were between 30-70 years old. These patients admitted to Kirkuk oncology center. The control group who were matched to the breast cancer patients studied, included 35 unaffected women and their ages were between 30-75 years old. These women presented Kirkuk General Hospital Four ml of blood was collected by vein puncture using Vacutainer tubes from each patient enrolled in this study for determination the level of IL-6 and IL-10 by using ELISA. The study showed that the highest mean level of IL-1 beta was found in women with breast cancer comparing with healthy control women (36.92±11.1 v.s. 10.1±3.7 pg/ml) (P: ≤0.05). The highest mean level of Il-6 was found in BC women comparing with control (97.13±14.7v.s. 22.13±6.91 pg/ml) (P: ≤0.05). The study showed that the highest mean level of IL-1 beta was found in women with breast cancer in the first stage of disease (33.2±9.1 pg/ml) and the level was still decreased to be the lowest level in the stage IV of breast cancer (20.18±2.9 pg/ml), the result was significant (P: ≤0.05). The study showed that the highest mean level of IL-6 was found in women with breast cancer in the first stage of disease (92.1±15.8 pg/ml) and the level was still decreased to be the lowest level in the stage IV of breast cancer (67.9±9.81 pg/ml), the result was significant (P: ≤0.05)

It was concluded that there was a highly significant relation of IL-1 beta and IL-6 with breast cancer and especially in first stage of disease

Keyword: *breast cancer; interleukin-1, interleukin-6*

Introduction

Breast cancer is the malignant tumor in which normal cells in the breast begin to grow without control and no longer die most commonly form the inner lining of milk ducts or the lobules that supply the ducts with milk [(1)]. In Iraq, breast cancer (BC) is the commonest type of female malignancy, accounting for approximately one third of the registered female cancers according to the latest Iraqi Cancer Registry [(2)]. As proposed by the World Health Organization (WHO), early detection and screening, especially when combined with adequate therapy, offer the most immediate hope for a reduction in breast cancer mortality [(3)].

Breast cancer is a heterogeneous disease witch results from a series of genetic and epigenetic events that lead to dysregulation of cell growth, circumvention of apoptosis, and development of the ability to invade the underlining tissue through the basement membrane[(4)]. The causes of these events remain largely unknown, although epidemiologic studies have implicated lifestyle, environmental, and germ-line genetic factors in predisposition to this disease. Familial forms comprise approximately 20% of all breast cancers and appear to have a distinctive pathogenesis dependent on the particular susceptibility gene involved[(5)]. Interleukin 6 (IL-6) is a proinflammatory cytokine, which is produced by a number of immune system cells; fibroblasts, macrophages, T and B Lymphocytes, endothelial cells, keratinocytes and tumor cells [(6)]. Interleukin 6 (IL-6), as major mediator of the inflammatory response, plays a primary role in the patho-physiology of cancer [(5)]. Cancer

cells exposed to IL-6 or which secrete the cytokine as an autocrine factor, show malignant features, such as an enhanced capacity to invade the extracellular matrix and an increased drug resistance [7]. Based on these data, the inhibition of the IL-6/IL-6 receptor interaction with specific antibodies has been proposed as a support cancer therapy [8,9]. The cytokines interleukin-6 (IL-6), tumor necrosis factor alpha (TNFalpha) and interleukin-1 beta (IL-1beta) are critical mediators of the inflammatory response. So the aim of the study was to estimate the level of IL-1 beta and IL-6 in women with breast cancer

Material and Method

A cross-sectional study was carried out in Kirkuk city from of November 2017 to March 2018. The number of breast cancer women under study were 55 women whose ages were between 30-70 years old. These patients admitted to Kirkuk oncology center. The control group who were matched to the breast cancer patients studied, included 35 unaffected women and their ages were between 30-75 years old. These women presented Kirkuk General Hospital Four ml of blood was collected by vein puncture using Vacutainer tubes from each patient enrolled in this study for determination the level of IL-6 and IL-1 beta by using ELISA technique.

Statistical Analysis

Computerized statistically analysis was performed using Mintab ver 18.0 statistic program. Comparison was carried out using Chi-square (X^2) for determination of the *P.* value.

Findings

The study showed that the highest mean level of IL-1 beta was found in women with breast cancer comparing with healthy control women (36.92±11.1 v.s. 10.1±3.7 pg/ml) (P: ≤0.05). The highest mean level of Il-6 was found in BC women comparing with control (97.13±14.7v.s. 22.13±6.91 pg/ml) (P: ≤0.05), Table 1.

Table 1: Level of IL-1 and IL-6 beta in breast cancer women and the control group.

Interleukins levels (Mean±SD) pg/ml	BC women	Control group	P. value
IL-1 beta	36.92±11.1	10.1±3.7	≤ 0.05
IL-6	97.13±14.7	22.13±6.91	≤ 0.05

The study showed that the highest mean level of IL-1 beta was found in women with breast cancer in the first stage of disease (33.2±9.1 pg/ml) and the level was still decreased to be the lowest level in the stage IV of breast cancer (20.18±2.9 pg/ml), the result was significant (P: ≤0.05). The study showed that the highest mean level of IL-6 was found in women with breast cancer in the first stage of disease (92.1±15.8 pg/ml) and the level was still decreased to be the lowest level in the stage IV of breast cancer (67.9±9.81 pg/ml), the result was significant (P: ≤0.05), Table 2.

Table 2: Comparison among Level of IL-1 and IL-6 beta levels regarding stage breast cancer

Interleukins levels (Mean±SD) pg/ml	Stage I	Stage II	Stage II	Stage IV	P. value
IL-1 beta	33.2±9.1	29.8±3.6	26.8±3.8	20.18±2.9	≤ 0.05
IL-6	92.1±15.8	80.6±13.2	77.8±10.8	67.9±9.81	≤ 0.05

Discussion

The role of other inflammatory cytokines (possibly TAM derived), IL- 1 was also addressed in breast carcinoma [10]. The role of the IL-1 system in human breast cancer is conflicting. Initial analyses regarding IL-1 indicated that its levels were significantly higher in invasive carcinoma than in ductal carcinoma in situ or in benign lesions, implying that elevated levels of IL-1 are directly correlated with a more advanced disease [6]. In addition, IL-1 has been shown to inhibit growth of breast cancer cells and to promote cellular differentiation in vitro, but it is equally known to stimulate the expression of several proteolytic enzymes in human cancer [11]. The consecutive degradation of extracellular matrix is a key element of local invasion and metastasis [12]. The mitogenic activity by IL-1 can be explained by induction of growthrelated oncogene (GRO) gene expression or induction of IL-8 expression via activation of the Nuclear factor B (NFκB) and activator protein (AP)-1 signal transduction pathways [13]. The robust response of the metastatic- or mesenchymal-appearing breast carcinoma cells to either IL-1 or TNF may be because of elevated expression of transcription factors needed for transcription of the IL-8 gene. TNF- B, a transcription factor, which can be activated by either IL-1, is an example of such a transactivator. Activated NF- B recognizes and binds to a consensus sequence in the promoter region of the IL-8 gene[14]. In this study, serum IL-6 level was evaluated in breast cancer patients as compared to healthy controls. Interleukin-6 is found to be elevated in various inflammatory and malignant diseases including metastatic breast cancer and their levels are found to correlate with the extent of the disease [9]. It is produced by some types of cancer cells and by normal stromal cells, such as fibroblasts and endothelial cells. By acting as growth factor, IL-6 is able to promote tumor cell proliferation through upregulation of anti-apoptotic and angiogenic proteins in tumor cells. Also IL-6, is a major mediator of the inflammatory response, plays a primary role in the pathophysiology of cancer [15]. The study results were in agreement with a recent study in Iraq made by Ayed [16] carried out on 75 breast cancer patients and 15 healthy controls. He found that serum IL-6 level for the patients was significantly higher than normal women and strongly correlated with disease progression. Also in Egypt, Ahmed *et al* [16] found that serum level of both IL-6 and IL-8 were found to be higher in patients than in healthy volunteers. In addition Sullivan [17] have mentioned that breast cancer patient serum and tumor IL-6 levels are clinically relevant, and therefore, should be routinely evaluated upon diagnosis . Statistically highly significant differences were seen in the Mean serum (IL-6) concentration of all disease stages as compared to the Mean (IL-6) serum concentration of the control group ($p < 0.01$). We suggest that higher mean serum (IL-6) level in early disease stage may be due to the high immune response of the body in this stage of the disease. It was reported that IL-6 antitumor activity was enhanced by induction of induction of T cell and B cell differentiation, stimulation of cytotoxic T cells and help in producing lymphokineactivated killer cells [18]. We thought that This immune response trigger synthesis and release of this cytokine leading to augmentation of its serum level that might be utilized as a marker of immunity status and immune system activation in prognosis and monitoring of the course of cancer [19]. This immune response might be attenuated with the progression of disease stage and cancer overwhelming which reflect decrease in (IL-6) synthesis. Our hypothesis could be supported by some literatures , mentioned that IL-6 and other IL-6-type cytokines are expressed in many primary breast tumors [20]. However, IL-6 expression is reduced in invasive breast carcinoma relative to normal mammary tissue and appears to be inversely associated with histological tumor grade [21]. The role of IL-6 in cancer progression is dependent on the balance of multiple pathways triggered simultaneously by the cytokine. However, concomitant stimulation of the cells by other endogenous or exogenous factors, even at low concentrations, may tip the balance toward one biological response, e.g., proliferation and antiapoptosis, or another, e.g., growth arrest and differentiation [22]. IL-6 has also been shown to influence the proliferation of normal and tumor-derived cells. IL-6 promote proliferation of hematopoietic progenitors, keratinocytes, myeloma/ plastocytoma, and Kaposi's sarcoma cells, whereas it inhibits the proliferation of M1 myeloid leukemia cells, early-stage melanoma cells, and lung and breast tumor cells. Thus, depending on the target cell, IL-6 induces various and sometimes contrasting biological responses[7-9].

Conclusions: There was a highly significant relation of IL-1 beta and IL-6 with breast cancer and especially in first stage of disease.

Conflict of interest: non

Source of Findings: Self findings.

Ethical Clearance: This research was carried out with the patient's verbal and analytical approval before the sample was taken. According to this approval, all the samples were collected and the tests were carried out. A copy of the results of the tests was then given to the patients

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Production of Iodine-125 in Useful Medical Energy Possibilities

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Abstract

The goal of the present work is to achieve the nuclear data for medically important radioisotope Iodine-125. The Measured data of excitation functions for direct reactionsof particle induced nuclear reactions, which produced ^{125}I, are available in EXFOR library have been evaluated and recommended in this work. This evaluation is used to calculate the integral yield of radioactive Iodine-125. The average values was derived and used to calculate the most useful reaction for the production of Iodine-125which is ^{124}Te(d,n)^{125}Ireaction with no impurity, yield 0.611MBq (0.02mCi)/μAh, and useful energy range 5.5→7.5MeV from cyclotron using high enrichment for ^{124}Te.

Keywords: *enrichment, excitation functions, I-125, useful energy, yield*

Introduction

Iodine-125 is a medical radioisotope of Iodine. Its half-life is 59.49 days and it decays by electron capture(isomeric transition) with daughter ^{125}Te of spin 5/2+ (stable isotope). This state is not the metastable ^{125m}Te, but rather a lower energy state that decays immediately by gamma decay with a maximum energy of 35keV[1]. Iodine-125 used as nuclear imaging tracers to evaluate the anatomic and physiologic function [2]. Many studies have been developed for using Iodine-125 by Goolden et al. (1968) [3];Venikov et al. (1993)[4]; Bastian et al. (2001) [5]; Hohn et al. (2001) [6]; Audi et al. (2003) [7], Weinreich and Knust (2005) [8]; Gul (2009) [9];Uddin et al. (2011) [10]; Augustine et al. (2013) [11]; Al-Alawy and Mohammed (2016) [12]and Solovev and Merkusheva (2017) [13] for different applications in diagnostic and treatments by studying the excitation functions, enrichments, differential and integral yields, useful energy and impurities levels.Iodine-125 is commonly used by radiation oncologists in low dose rate brachytherapy in the treatment of cancer at sites other than the thyroid (using positron emission tomography (PET)), especially in prostate cancer[14, 15].

Theoretical Basics

In the scope of this work, the stopping powers are programmed and calculated using the Ziegler formulae expressions valid for the energy range as follows [16, 17, and 18]:

1- Energy range (1-10)×10^{-3} MeV $-\frac{dE}{dx} = A_1 E^{1/2}$ (1)

2- Energy range (10-999) ×10^{-3} MeV

$$\left(-\frac{dE}{dx}\right)^{-1} = \left(-\frac{dE}{dx}\right)_{Low}^{-1} + \left(-\frac{dE}{dx}\right)_{High}^{-1} \quad (2)$$

$$\left(-\frac{dE}{dx}\right)_{Low} = A_2 E^{0.45} \text{ and } \left(-\frac{dE}{dx}\right)_{High} = \left(\frac{A_3}{E}\right)\ln\left[1+\left(\frac{A_4}{E}\right)+A_5 E\right] \quad (3)$$

3- Energy range (1000-100.000)×10^{-3} MeV

$$\left(-\frac{dE}{dx}\right) = \left(\frac{A_6}{\beta^2}\right)\left[\ln\left(\frac{A_7\beta^2}{1-\beta^2}\right) - \beta^2 - \sum_{i=0}^{4} A_{i+8}(\ln E)^i\right] \quad (4)$$

Where: E is the proton or deuteron energy in (MeV), A_i are the coefficients given by Ziegler, β is the ratio of incident corpuscle velocity and the velocity of light. Hence, the stopping powers are also programmed and calculated using the Ziegler formulae expressions valid for different energy range of incident alpha as follows[16, 17, and 18]:

1- Energy range 1kev – 10MeV $\left(-\frac{dE}{dx}\right)^{-1} = \left(-\frac{dE}{dx}\right)_{Low}^{-1} + \left(-\frac{dE}{dx}\right)_{High}^{-1}$ (5)

$$\left(-\frac{dE}{dx}\right)_{Low} = A_1 E^{A2} \text{ and } \left(-\frac{dE}{dx}\right)_{High} = \left(\frac{A_3}{E/1000}\right)\ln\left[1+\left(\frac{A_4}{E/1000}\right)+\left(\frac{A_5 E}{1000}\right)\right] \quad (6)$$

2- Energy range >10 MeV

$$\left(-\frac{dE}{dx}\right) = \left(A_6 + A_7 EE + A_8 EE^2 + A_9 EE^3\right) \quad (7)$$

Where $EE = \ln(1/E)$ and A_i (i =1 – 9) are the coefficients given by Ziegler [16, 18]: for incident alpha.For any energy E, the Yield of product nuclei (activity in Bq) can be expressed as the function of the cross section as[19]:

$$Yield = I(\phi\ n)\ H\ \left(1-e^{-\lambda t}\right)\int_{E_{out}}^{E_{in}} \sigma(E)\left(\frac{dE}{dx}\right)^{-1} \quad (8)$$

Where I is current of projectile in (μA), *ø*is beam flux in (s^{-1}), n is number of atoms per unit volume, N is Avogadro's number, A is the mass number of the target in (amu), H is isotopic abundance (or enrichment) of the target, λ is decay constant of the product in (h^{-1}), t is time of irradiation in (h), and $\sigma(E)$ is cross section at energy E in (mb).

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Data Reduction and Analysis

Table 1 shows the agreement of recommended energy range with the international EXFOR library energy range used in the present work for available measuring data for proton, deuteron and alpha particle induced reactions for the ^{125}I production. Table 2 shows the results of the calculated threshold energies and Q-values compared with the experimental values which are taken from National Nuclear Data Center (NNDC) [20]; both are in a very good agreement. The table also provides a natural and enriching abundance of the target material.

Table 1: Energy range recommended for iodine-125 production

Target Element	Reaction	Product	Energy Range (MeV)	Author's Ref. No.
^{125}Te	(p,n)	^{125}I	5.5−100.5 5.5−100.5	Hohn et al. (2001) [6] (pw)
^{124}Te	(d,n)		5.8−14.1 5.8−14.1	Bastian et al. (2001) [5] (pw)
^{123}Sb	(α,2n)		14.8−39.6 14.8−39.6	Uddin et al. (2011) [10] (pw)

Table 2: Nuclear properties of the reactions that produce iodine-125

Reaction Process used	Threshold Energy (MeV) [20]	Q-Value (MeV) [20]	Target Material		
			Isotope	Natural Abundance% [21]	Enrichment %
^{125}Te(p,n)	0.975926(0.0605) 1.487301(pw)	-0.968117(0.06) -1.475403 (pw)	^{125}Te	7.07	98.3[6]
^{124}Te(d,n)	0.0(0.0) 0.0(pw)	3.3762842(0.07) 2.874795 (pw)	^{124}Te	4.74	99.8[5]
^{123}Sb(α,2n)	14.34 15.608386 (pw)	-14.11 -15.116233 (pw)	^{123}Sb	42.7	98.28[10]

Method Used to Obtain the Recommended Cross Section

The interpolations of the nearest data for each energy interval as a function of the sets of experimental cross sections and their corresponding errors for each value (with different energy intervals) are re-arranged according to the energy interval 0.01MeV for each author. The normalization for the statistical distribution of cross sections errors to the corresponding cross section values for each author has been done. The interpolated values are calculated to obtain the recommended cross section which is based on the weighted average method[22]:

Findings and Discussion

Recommended Cross Sections

The experimental results in the International Atomic Energy Agency (IAEA); (EXFOR) library leaves little doubts that the hypothesis of cross section gives an excellent account of many diverse types of nuclear reactions. The features of iodine production nuclear reactions induced by protons, deuteron and alpha mainly on the $_{52}$Te and $_{51}$Sb target elements have been evaluated. It is important to note that the energy range of the reaction, taken from different authors, is not identical.

For this reason, the determination of the energy range has been processed. The results for each reaction are discussed as follows:

^{125}Te(p,n)^{125}I Reaction

The measured data for the cross sections of this reaction reported by Hohn et al. (2001) [6], interpolated, and recalculated in fine steps of 0.01MeV from 5.5MeV up to 100.5MeV for incident proton.

^{124}Te(d,n)^{125}I Reaction

The measured data for the cross sections of this reaction reported by Bastian et al. (2001) [5], interpolated, and recalculated in fine steps of 0.01MeV from 5.8MeV up to 14.1MeV for incident deuteron.

^{123}Sb(α,2n)^{125}I Reaction

The measured data for the cross section of this reaction reported by Uddinet al. (2011) [10], interpolated, and recalculated in fine steps of 0.01MeV from 14.8MeV up to 39.6MeV for incident alpha.

Our trails were directed to fit the evaluated cross sections for the data taken from EXFOR library. Using the recommended cross sections as an input data, a Matlab-8 has been executed to obtain a Polynomial fitting expression and the fitting parameter of the fit formula with lower chi squared value (χ^2_{min}).

Stopping Power and Calculated Yield

The stopping power of target elements for proton, deuteron and alpha particles has been calculated in the present work using SRIM (2003) [23], as an experimental results and Ziegler equations (1→7) as a theoretical calculation results. For (p,n), (d,n) and (α,2n) reactions calculations. Therefore, the calculated yield for ^{125}I has been calculated using equation (8). The main aim of this study is to increase calculated yield from these reactions by increasing the energy of proton, deuteron or alpha beams which can interact with different targets.

Useful Energy and the Production Yield

The excitation function for the production of iodine radioisotopes in natural Tellurium target for 10 to 35MeV of incident proton is measured byOropeza et al. (1994) [24] andArcerbitet al. (1974) [25]. Table 3 shows the cyclotron production of ^{125}I and the reaction contribution as a function of the energy range of incident particles on the Antimony ^{123}Sb and Tellurium (^{124}Te, ^{125}Te) targets elements. After certain degree target enrichment, the following sequences are to be performed: In radioisotope production from a nuclear reaction, the optimization of production routes is needed. This process involves a selection of the projectile energy range that will maximize the yield of the product and minimize that of the radioactive impurities. With particular emphasis on the data needed for the production of medicalsignificance radionuclide ^{125}I.

Table 3: Useful energy and the production yield for the production of iodine–125

Target Element	Reaction	Useful Energy (MeV)	Yield MBq(mCi)/μAh	Radioiodine impurity %	Author's Ref. No
^{123}Sb	(α,2n)	20→30 20→30	——— 1.64(0.044)	——— (0.059)^{126}I, (2.411)^{124}I, (0,23)^{126}I	[10] (PW)
^{124}Te	(d,n)	5.8→7.5	0.613 (0.017)	No Impurity	(PW)
^{125}Te	(p,n)	7→18 5.5→10	——— 2.63 (0.071)	——— No Impurity	[3] (PW)

Incident proton on enriched ^{125}Te target to produce ^{125}I

The production of $^{123,124,125}I$ has been carried out byHohn et al. (2001) [6]. Hohnet al. performed that the^{125}Te target was an isotopic enrichment with different compositions as; ^{120}Te(0.1%); ^{122}Te(<0.1%); ^{123}Te(0.5%); ^{124}Te(0.8%); ^{125}Te(98.3%); ^{126}Te(0.1%); and ^{130}Te(<0.1%). The recommended cross section of the^{125}Te (p,3n)^{123}I, ^{125}Te(p,2n)^{124}I, and ^{125}Te(p,n)^{125}I reactions over the entire energy range 21.5−68.2MeV, 10.6−100.5MeV, and the 5.5−100.5MeV respectively were calculated. The excitation functions are plotted in Figure1.

The useful energy range for the production of ^{124}I is carried out over the interval of E_P=15 to 20MeV, which is agree with the result of Koehler et al.(2010) [26]. The calculated yield should be 91.13*MBq* (2.46*mCi*)/*μAh*, which is also agree with Ref.[26]. Theproductionof ^{125}Iwithin this energy range is regarded to be as an impurity of 21% with ^{124}I.

The useful energy range for the production of ^{125}I is carried out over the interval of E_P=5.5 to 10MeV, with no impurity, but with very low calculated yield 3.35MBq (0.091mCi)/μAh. While the useful energy ranges for the production of ^{123}I may be carried out over the interval of E_P=30 to 40MeV, with an impurity of 44% of ^{124}I and 1.5% of ^{125}I. The calculated yield is 297.401MBq (8.04mCi)/μAh, for ^{123}I. This high impurity and high energy need high cost for cyclotrons.

Incident deuteron on enriched ^{124}Te target to produce ^{125}I

The production of ^{123}I ,^{124}I , and ^{125}I have been carried out by Firouzbakht et al. (1993) [27] and Bastian et al. (2001) [5]. The recommended cross section of ^{124}Te(d,n)^{125}I, ^{124}Te(d,2n)^{124}I, and ^{124}Te(d,3n)^{123}I reactions over the entire energy range 5.8−14MeV, 7.5−23.6MeV, and 7.5−23.6MeV respectively were calculated. The excitation functions are plotted in Figure2.

Bastian et al. performed that the^{124}Te target was an isotopic enrichment with different compositions as:^{123}Te (0.2%) and ^{124}Te (99.8%) for ^{124}Te(d,2n)^{124}I, and ^{124}Te(d,3n)^{123}I reactions. While Firouzbakht et al. gave no data for the enrichment. This useful energy range for the production of ^{123}I is Ed=18 to 22.5MeV. The calculated yield should be 45.9MBq (1.2mCi)/μAh. The production of ^{124}I in this energy range is regarded to be an impurity of 26% with ^{123}I. It can be seen from Figure2, that below 18MeV the contamination of ^{124}I is 100% while the energy range Ed=5.5 to 7.5MeV can be regarded as useful energy for the production of ^{125}I without any impurities.

Incident Alpha on enriched ^{123}Sb target to produce ^{125}I

The production of ^{123}I has been carried out by Ismail (1990) [28], Singh et al. (1991) [29], and Al-Alawy and Mohammed (2016) [12], while the production of ^{124}I has been carried out by Watson et al. (1973) [30], Ismail (1990) [28], Singh et al. (1991) [29], and Uddin et al. (2011) [10]. ^{125}I has been carried out by Uddin et al. (2011) [10], and Al-Alawy and Mohammed (2016) [31]. While the production of ^{126}I (half-life=13d) has been carried out by Ismail (1990) [28], Singh et al. (1991) [29], Singh et al. (2006) [32] and Uddin et al. (2011) [10]. The recommended cross section of ^{123}Sb(α,4n)^{123}I, ^{123}Sb(α,3n)^{124}I, ^{123}Sb(α,2n)^{125}I, ^{123}Sb(α,n)^{126}I reactions over the energy range 34.4−58.4MeV, 9.72−58.8MeV, 14.8−39.6MeV, and 9.7−40.2MeV were calculated. The excitation functions are plotted in Figure3.

Singh et al. used enriched (99.9%) for ^{123}Sb target, whileIsmail gave no data for enrichment. Watson et al. used enriched (99.999%), andUddin et al. used enriched (98.28%) of the target. It can be seen that the useful energy range for the production of ^{124}I is carried out over the interval of Eα=32 to 40MeV. The calculated yield should be 11.4*MBq* (0.31*mCi*)/*μAh*, which can be compared with the result obtained by Uddinet al. of 11.7*MBq* (0.32*cmCi*)/*μAh*. Therefore, below 32MeV, the production of ^{125}I and ^{126}I are regarded to be an impurity of 23% and 13.2%, respectively with ^{124}I. Above 40MeV, the production of ^{123}I is regarded to be an impurity of 101.2% with^{124}I. Hence, the useful energy ranges for the production of $^{124}I$is selected to be Eα=32 to 40MeV, with a minimum impurity 4.8%, 2% and0.2% of ^{123}I, ^{125}I, and ^{126}I respectively.

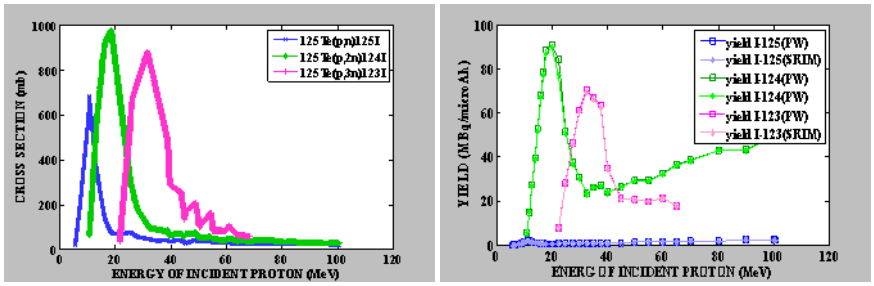


Figure1 Left side: Recommended cross sections of (p,n), (p,2n), and (p,3n) reactions on ^{125}Te, versus incident proton energy. Right side: Calculated yield of the incident proton in ^{125}Te.

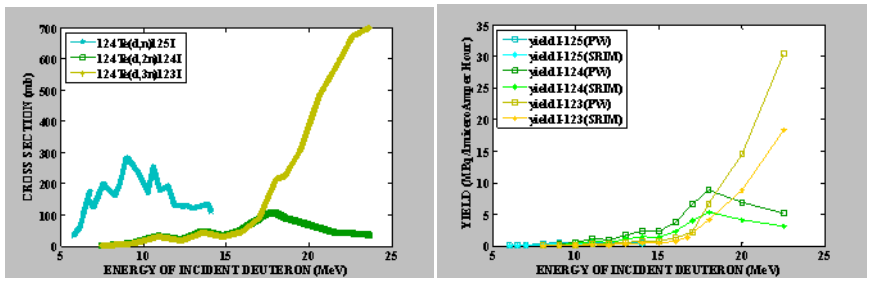


Figure2 Left side: Recommended cross sections of (d,n), (d,2n), and (d,3n) reactions on ^{124}Te, versus incident deuteron energy. Right side: Calculated yield of the incident deuteron in ^{124}Te.

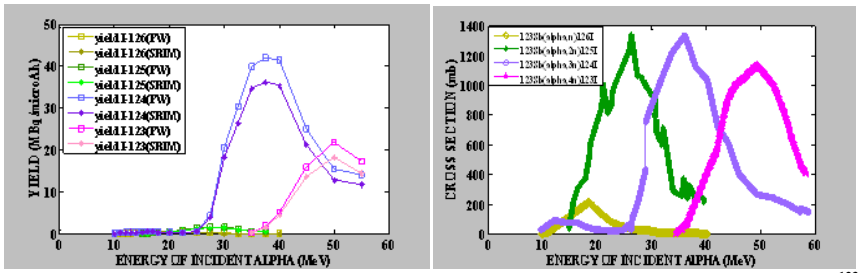


Figure3 Left side: Recommended cross sections of (α,4n), (α,3n), (α,2n), and (α,3n) reactions on ^{123}Sb, versus incident alpha energy. Right side: Calculated yield of the incident alpha in ^{123}Sb.

Conclusion

Although higher enrichment of the targets ($_{51}$Sb, $_{52}$Te) has been used, for the production of Iodine isotopes, to reduce the appearance of impurities, this impurity not disappears. So that, the area of the energy range for the cyclotron must be specify to obtain a higher production of radioactive Iodine required with less percentage of impurity.

The characteristic of the diagnosis and treatment radioisotopes is to ensure the access of radiation to the organ for diagnostic or treated without moving to the tissue. Therefore, among three reactions for the production of ^{125}I (^{125}Te (p,n), ^{124}Te(d,n), ^{123}Sb(α,2n)); the most useful reactions are:

For incident deuteron: The ^{124}Te(d,n)^{125}I reaction with no impurity, with yield 0.611MBq (0.02mCi)/μAh and the useful energy range 5.5→7.5MeV.

For incident proton: The ^{125}Te(p,n)^{125}I reaction with no impurity, with yield 3.35MBq (0.091mCi)/μAh and the useful energy range 5.5→10MeV.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Physics, College of Science, Mustansiriyah University, Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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Detection of Mycoplasma Pneumonia Infection in Sinusitis's Patient

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Abstract

"This study aims to detecting the probability of M. pneumonia prevalence in sinusitis patients the study in rolled (178) patients had a history of respiratory infection.Were included (135) patients suffering from sinusitis disease and (43)Control group of patients had no radiological evidence of sinusitis disease.The range age in cases was (18-62) years with a mean of(40) years , in controls it was 18-51 years witha mean of(34.5).

Blood samples were examined for M. pneumonia antibodies IgG and IgM by enzyme linked immune sorbent assay (ELISA). Elevated antibody titers were found in (124) patients (80%),and in 31control (20%). Acute and previous immunities "M. pneumonia IgM and IgG antibodies " were observed in (17%) and (67.7%) of cases, and (2.5%) and (12.2%) of controls, respectively.

Finding demonstrate that the predominant M. pneumonia antibodies type "IgG, IgM" in sinusitis patients and symptoms like headache and fever. The study showed that the positivity rate of M.pneumoniae infection reach peak level in crowding index (+4) and (3- 3.9) in both case and control.

Keywords : *M. pneumonia, antibodies , IgG, IgM, enzyme linked immune sorbent assay, sinusitis patients, crowding index.*

Introduction

"Mycoplasma pneumonia living bacteria which can cause upper respiratory tract infections, including pharyngitis, sinusitis, ear pain are extremely small self-replicating free-rhinorrhea and pneumonia[1][2]. *M. pneumonia*e is described as atypical and accounts for 1–29% of community-acquired pneumonia cases"[2]. "The causative bacteria can be transmitted through aerosols as well as in settings which promote close physical contact, such as homes, schools, military barracks and dormitories"[3]. "The post-exposure incubation period is between two to three weeks and infections are more prevalent among children and young adults"[4]. "Common risk factors include age (i.e. younger children or older adults), immune status (i.e. immuncompromised individuals with HIV or those undergoing chemotherapy or taking steroids), smoking and pre-existing lung disease"[5]."Sinusitis, also known as rhinosinusitis, is inflammation of the Paranasal sinuses. It can be due to infection, allergy, or autoimmune problem. Most cases are due to a viral infection and resolve over a course of 10 days. It is a common condition, with over 24 million cases in the unites states"[6]."Evidence of maxillary sinusitis has been found in human archeological specimens discovered in Africa, north America, and Europe"[7]."Reported association between the M. pneumonia and sinusitis a range of various disorder similar in nasal and Paranasal sinuses mucosa inflammation for as long at least 12 consecutive weeks are called chronic rhinosinusitis. *M. pneumonia* was previously detected in human nasal which implicates *M. pneumonia* as a causative agent in the etiology of sinusitis"[8].

"Because of our concern about the possibility of unrecognized *M. pneumonia* infection among different group of population and to determine the etiology of *M. pneumonia* among these groups the study aimed as following:

Prevalence study of *M. pneumonia* IgM and IgG antibodies by ELISA test.

A comparative study for the occurrence of *M. pneumonia* infection in different population groups."

Material and Method

Patients, controls, place, and time

"The study design consist of(178) patients had a history of respiratory infection with onset of symptoms (1 to 20) days before inclusion in the present study. (135) patients suffering from sinusitis disease attending ENT clinic and Baghdad hospital. Control group of (43) patients were visited an ENT clinic with comparable age and had not radiological evidence of sinusitis disease . All samples from patients and controls were collected from beginning of December 2017 to the end of July2018.**"**

Specimens :

Collection of serum sample:

"3-5ml of blood sample was collected, centrifuge for ten minutes x 3000 rpm. Serum dispensed in aliquots' of 0.5 ml. all sera were immediately frozen at -20c until used. This was used for detection of IgG and IgM antibodies to Mycoplasma pneumonia in human serum. The evaluation of specific M. pneumoniaIgG and IgM antibodies were carried out with commercial kits (Chemi-Con- Germany)."

Statistical Analysis:

"Quantitative variable were described as frequencies and percentage for each group. Statistical analysis including, Chi square values and p values were calculated for all categorical variables. "

Finding

Table(1) Seroprevalence of Mycoplasma pneumonia among study group

Study group	M.pneumonia IgG no.(%)	M.pneumonia IgM no.(%)	Total No.(%)
Patient	105(67.7)	19(12.2)	124(80)
Control	27(17)	4(2.5)	31(20)
Total	132(84.7)	23(14.7)	155(100)

Table (1)demonstrate that Acute infection IgM antibodies was detected in (12.2%) of cases and (2.5%) of controls. And for previous immunity IgG antibodies were (67.7%) and (17%), respectively

Table(2) clinical symptoms associated with Mycoplasma pneumonia

Symptoms	Patient		Control	
	M.pneumoniae IgG antibodies No(%)	M.pneumoniae IgM antibodies No(%)	M.pneumoniae IgG antibodies No(%)	M.pneumoniae IgM antibodies No(%)
Headache	56 (45)	25 (20)	6 (19.3)	3 (9.6)
Fever	43 (34.6)	11 (8.8)	18 (58)	8 (25.8)
Throat pain	17 (13.7)	6 (4.8)	4 (12.9)	-
Fatigue	32 (25.8)	12 (9.6)	7 (22.5)	2 (6.4)
Dry cough	88 (70.9)	31 (25)	-	-
sputum	12 (9.6)	2 (1.6)	9 (29)	4 (12.9)

Table (2) show the most common symptoms in patients with this atypical pathogen " M.pneumoniae" were headache

and dry cough in both IgG and IgM antibodies. While in control group the most common symptoms were fever and sputum.

Table(3) Distribution study group according to the crowding index

Crowding index	Patient		Control		total
	Positive M.pnumonia antibodies	Negative M.pnumonia antibodies	Positive M.pnumonia antibodies	Negative M.pnumonia antibodies	
1-1.9	21(16.9)	5 (45.5)	5(16.2)	6(50)	37(20.7)
2-2.9	16 (12.9)	4 (36.3)	3(9.6)	4(33.3)	27(15.2)
3-3.9	42 (33.9)	-	12(38.7)	2(16.7)	56(31.5
4+	45 (36.3)	2 (18.2)	11(35.5)	-	58(32.6)
Total	124(100)	11(100)	31(100)	12(100)	178(100)

As shown in table (3) that the high M. pneumoniae infection was seen insinusitis patients and control living with crowded family(3-3.9 and +4) .

Table (4) Respondent study group about practices regarding mycoplasma infection

practices	Patient		control	
	Yes No.(%)	No No.(%)	Yes No.(%)	No No.(%)
Stay away from people who have symptoms of mycoplasma	29(21.4)	106(78.6)	33(76.7)	10(23.3)
Wash hand before eating	113(83.7)	22(16.3)	40(93.1)	3(6.9)
Cover the nose and mouth when they sneeze or cough	17(12.6)	118(87.4)	29(67.4)	14(32.6)
Eat a balanced diet	98(72.6)	37(27.4)	32(74.4)	11(25.6)
Get 6-8 hrs. Of sleep night	54(40)	81(60)	15(34.8)	28(65.2)

With respect to some practices regarding Mycoplasma pneumoniae infection table (4) show that the Most of the study patients (87.4%) were answered no cover the nose and mouth when they sneeze or cough followed by 106(78.6%) the answered no stay away from people who have symptoms of mycoplasma pneumoniae infection.

Discussion

(80%) of the patients showed a fourfold or greater rise of antibodies to Mycoplasma pneumonia (table 1). In the control group, a corresponding rise in antibody titer was seen in 20%, acute infection (IgM)was detected in (12.2%) of cases and (2.5%) of controls. These number for previous immunity (IgG) were (67.7%) and (17%), respectively. Antibodies in serum (IgM, IgG) had shown significant difference (p>0.05) between case and control).

"Current study shows that M.pnumonia has a possible etiologic role in development of Sinusitis patients, Our result acceptable agreement with other

study that suggest the respiratory M. pneumonia may be potential etiological agent in a sinusitis alone or in combination with the common bacterial pathogens of sinusitis"[9].

"Other study finding that no significant difference between case and control"[10]." The incidence rate of mycoplasma antibody in our study is lower than that of other study that detected M. pneumonia in (93%) of sinusitis patients but was seen only in (14%) of the control group this may be due to we use serum instead of DNA- PCR for diagnosis of active M.pnumonia"[11]. "M. pneumonia is known to produce a gradual tracheobronchitis with malaise and non-productive cough, which can progress to pneumonia and extra pulmonary manifestations"[12][13].

"In our study dry cough and headache were the most common symptoms observed for patients with samples positive for M. pneumonia antibody IgM, IgG. However the fever and sputum the most predominant symptom found in control group. our study came in a agreements with other study that found that both cough and fever were the most common symptoms"[14].

"In this study, overcrowding were associated with a history of M. pneumonia infection (table 3), our study finding patients from household with 1 or 2 people per room were less likely to have M. pneumonia infection compared to patients from households with more than 3 people per room. other study found consistent evidence of an association between bed sharing with someone with cough in sever and non-sever pneumoniae"[15].

"This due to M. pneumonia is spread when a person who is sick cough or sneezes while in close contact with others who then breath in the bacteria. Most people who are exposed for a short amount of time do not get sick. However ,it›s common for this illness to spread between family members wholiving together"[1]." Regarding practice of mycoplasma infections, the present study revealed most of studygroup was noStay away from people who have symptoms of mycoplasmaAnd no Cover the nose and mouth when they sneeze or cough,the causative agent can be transmitted through aerosols as well as in setting which promote close physical contact, such as homes, schools, military barracks and dormitories"[2].

Conclusion

"M. pneumonia might be of importance in the etiology of sinusitis patients. Macrolides potential to reduce the virulence of some bacteria may be an important feature in reducing tissue damage in cases with chronic infection.ىc"

Conflict of Interest: Non

Source of Funding : Self

Ethical Clearance: Were taken Approval From the specialist doctor and patients.

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Immunopathological Study of *Brucellaabortus* in White Mice Immunize with Killed Antigen

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Abstract

The study was aimed to evaluate the protective efficiency of the formalin killed *Brucellaabortus*antigen against *Brucella* infection in mice . Inorder to achieve of thisgoal.Fifty white mice were divided into three groups randomly. The 1st group (20 mice) was immunized 0.3ml of formalin killed *Brucellaabortus*antigen, two doses, two weeks interval, the 2ndgroup (20 mice) was served as control positive while 3rd group (10 mice) was inoculated with 0.3ml of sterile normal saline and it served as control negative group.At 30 day post immunization, the 1st and 2nd group were inoculated I/P with 0.3ml of bacterial solution containing 1X10^{8}cfu/ml, I/P all animals were sacrificed at day 30 post infection,blood samples were collected for measurement IL 4,1L six and TNFa, and small pecies from internal organs were fixed in I0 percentage of formaline for histopathologicalexamination.The results showed that the serum levels of IL-4, IL-6and TNFα were (36.22±3.81),(29.74±2.79) and (161.214±2.98) respectevlly. The results of histopathological changes showed severe pathological changes including granulomatous lesions in the liver parenchyma and dilated of sinusoids with fibrin networks deposition, neutrophils infiltration in the lung and RBCs in thickness pleura,the spleen showed depletion of white pulp and congested red pulp as well as shownacute cellular degeneration in epithelial cells of kidney, atrophy of glomerula tufts, with dilated of Bomana spaces and hemorrhage in capsular region,while immunized infected animalswere showed mild to moderate cytopathological effect with mononuclear cells aggregation around blood vessels of examined organs particularly liver. we concluded that killed Brucellaabortous antigen can stimulated good cell mediated immune response against *Brucellaabortous* infection of mice.

Key Words:*Brucellaabortus , Immunopathological , Antigen ,Histopathological, Interleukin.*

Introduction

The epidemelogy of zoonotic disease brucellosis that caused by *Brucella*about(500,000) people in year[1]. Majar causal agent is*Brucellamelitensis*, *Brucellasuis*, and *Brucellaabortus*. There are different mode of infection method like inhalation of infected aerosols. Many studies concluded that airborne transmission consider major method of infected human with diseasethat result from bovine and porcine slaughterhouses, preparation of vaccines as well as rural places[2–6].*B. abortus*isis a pathogenic bacteriacan live in the intracellularenvironment. Inside cells, there exist adverse conditionsincluding acidic pH, proteases, and reactive oxygen species(ROS) and reactive nitrogen species (RNS) [7].This bacterium contain lipopolysaccharide (LPS) in cell wall structure that play important role in pathogenicity [8]. Lipid A protein contain large amount of fatty acidmoleculesthat act on decrese immune response of the human body through serve as a poor TLR4 agonist. O-polysaccharide portion that consider cytotoxic of macrophage is absence in content of lypopolysaccaride.The long chain of fatty acid in lipid A neded more experimntale evidences. Reduce activation of TLR4 led to enhanced uptake observedwith rough Brucellathrough enhanced activity of PI3K[9].

Vaccine play important role in activated two arms of immune response that play crucial role in eradication

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of Brucella infection, live attenuated vaccine elicited efficient protective immunity against Brucellaabortus but these vaccine may associated with persistent infection or reversion their virulence[10] ,therefore application other type of vaccine antigens are safety when used in the human immunization these vaccine include killed Brucella antigens ,crude extracts , subunit and DNA vaccine[11].Therefore the aim of the current study was to determine the efficiency of killed Brucellaabortousantigen in the stimulatedprotecive immune response against infection by virulent *Brucellaabortous* strain.

Materials and Method

1- Bacterial isolates

Brucellaabortus was obtained from advanced biotechnology lab. and diagnosed by biochemical tests according to [12].

2- Cultural media

Thecultural media were used this study brucella agar, blood agar,Tryptic soya agar. The media were prepared according to instruction of the producer company.**3-Antigens(killed Brucellaabortus antigen)**

Prepared by Hiallibartion and Blazkovec (1975)[13] as follows: The activated and purified bacteria was planted on the heart and brain broth and incubated at 37 ° C for 24 hours. Examine bacterial growth to ensure purity by preparing a glass slide and chromed dye.Transfer 4 ml of the broth and plant on the center of the acre and cut the heart and brain and distribute this quantity equally on the surface of the plant center by moving the dishes and then left to dry after the dishes were transferred to the incubator and left 48 hours. Take the non-contaminated dishes and the bacteria were harvested as follows:Harvested with PBS solution and placed in test tubes.The total number of bacterial harvesting was calculated in Colonies Forming UintCFU / ml[14].After washing the microbial growth by centrifugation at 3000 cycles / min for 30 minutes using PBS and two consecutive times and then discard the floating fluid.The neutralized formalin solution was added to the harvest to the original volume level and the implant was left for 24 hours to ensure homicide. The concentration was for the formalin solution (0.03% - 0.05%).Wash bacterial growth twice by PBS solution and using centrifuge at 3000 rpm for 15 minutes.Ensure that killing is done by taking part of the growth by means of a vector of germs and laying on the blood acar medium and it is ascertained that there is no bacterial growth.The precipitate was suspended using PBS solution and stored in sterile bottles until use.

4- Challenge dose

The *Brucellaabortus* was cultured ,growth and purification on the media of this study , the live bacterial cell counted according to [14].

5- Cytokine assessment

Interleukin-4, Interleukin-6 and TNFα Assay Procedure, The procedure is performed at room temperature according to manufacturer's instructions (Boster´s –Korea).

6- Experimental design

Fifty white mice were used (male and female), the ages (8-10weeks) and their weight ranged between (25-30gram), obtained from institute of sera and vaccines \ ministry of health, and reared in cages furnished clean sawdust , and fed concentrate feed during the duration of the experiment. The white mice were divided into three groups were first group includes 20 mice immunized inoculated with 0,3ml of formalin killed antigen,,two dose ,2weeks intervals at day 30 post immunization, and it was inoculated I/P with $1X10^8$cfu /ML.The second group includes 20 mice was considered as positive control.it was inoculated I/P with as 1stgroup. Third group includes 10 mice was inoculated I/P with 0.3ml ml of sterile normal saline ndservedas control negative group.At day 30 post infection ,all animals were sacrificed and blood samples were collected for determine cell mediated immune response by measurement of cytokines including TNF a,IL 4 and IL 6 and small pieces were fixed in 10 formalin for Histopathological examination according to [15].

Funding

Immune response

The cellular immune response

The results were revealed that serum levels of IL-4,IL-6 and TNF-α were 36.22±3.81, 29.74±2.79 and 161.214±2.98respectively as shown in table 1.

Table 1: Cytokine profile of*Brucellaabortus* in immunized mice post infection

groups	IL-4(pg/ml) mean±SE	IL-6(pg/ml) mean±SE	TNF-α (pg/ml) mean±SE
G1immunized group	36.22±3.81	29.74±2.79	161.214±2.98
G2 positive group	28.12±2.65	20.61±1.56	113.325±3.172
G3 negative group	4±0.23	2.5±0.31	21.4±0.578

Histopathological examination:

Non-immunized infected animals at day 30 post-infection

Section in the liver of animal at 30 days post infection showed of kupffer cells proliferation , with granulomatous lesions consisting from aggregation of active macrophages and lymphocytes in the liver parenchyma and dilated of sinusoids (Fig.1).

Lung Anatomy

After 30 days of infection, the anatomy of lung showed revealed fibrin networks deposition, neutrophils. infiltration and RBCs in thickness pleura (Fig.2).

Spleen Anatomy

After 30 days of infection, the anatomy of spleen showed depletion of white pulp and congested red pulp with inflammatory cells infiltration (Fig.3).

Kidney Anatomy

In antomy of kidney was clearly acute cellular degeneration of epithelial cells and shownatrophy of glomerula tufts, with dilated of Bomana spaces with hemorrhage in capsular region(Fig.4).

Immunized infected animals

In immunized infected animal, The pathological effect was were mild to moderate with mononuclear cells aggregation around blood vessels of examined organs particularly liver.

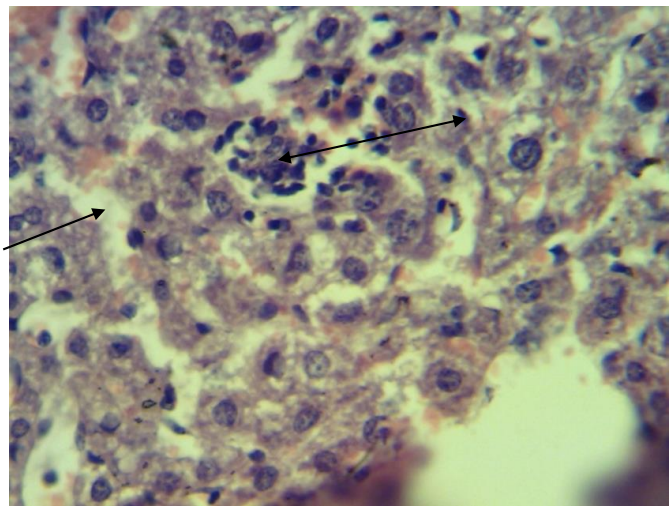


Figure 1. Anatomy of animal liver after infection that explanedproliferation of kupffer cells and granuloma that result from accumulation of active macrophages and lymphocytes in the liver parenchyma and dilated of sinusoids (H & E stain 400X).

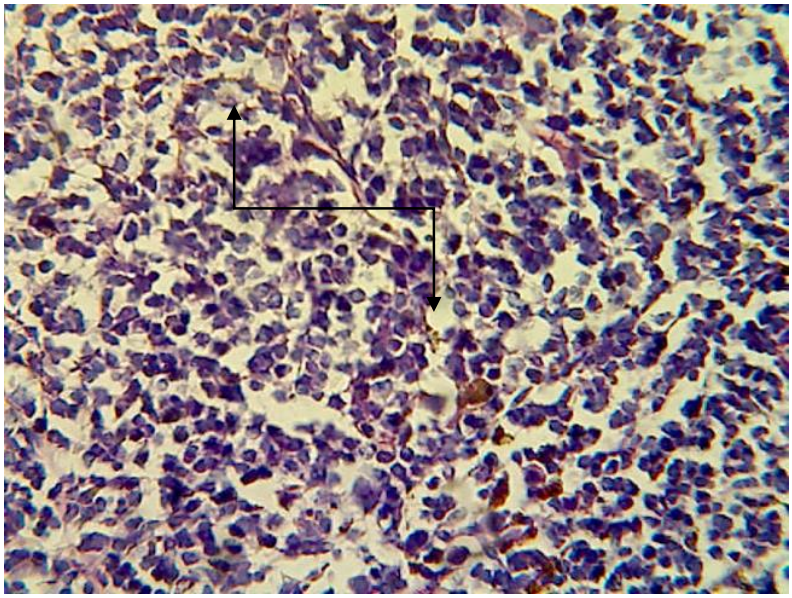


Figure3.Anatomy of animal spleen after infection showed depletion of white pulp and congested red pulp with inflammatory cells infiltration (H & E stain 400X)

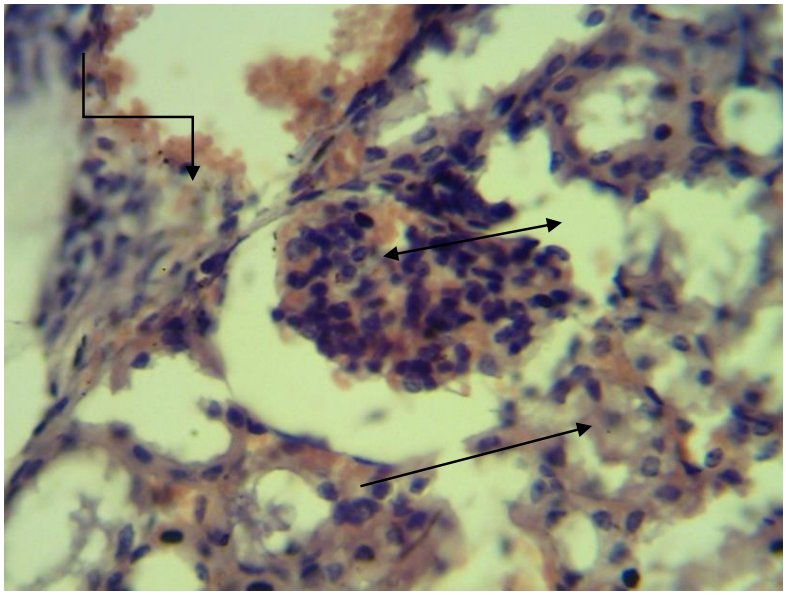


Figure4.Anatomy of animal kidneyafter infection interpreted of acute cellular degeneration in epithelial cells, atrophy of glomerular tufts, with dilated of Boman spaces with hemorrhage in capsular region (H & E stain 400X)

Discussion

Brucellaabortus is intracellular zoonotic pathogen cause brucellosis in human and wide range of animals [16] ,the pathogenesis of Brucella was dependent on its ability intracellular survival and replication in the vacuolar phagocytic compartments of macrophages [17], therefore cell mediated immunity play crucial role in eradicated the Brucellainfection. The current study revealed high levels of serum TNFa in immunized animals as comparedwith those levels in non immunized animals post infection,these result may indicated that the killed Brucella antigens may stimulated better cell mediated immune response against Brucellaabortous infection, these idea was agreent with [18] who demonstrated that the TNFa play important role in host defense mechanisms through activated microbicidalactivity of macrophages and neutrophils in addition it act on NK cells with IL 12 to produced INF y.protective immunity against Brucella can mediated by cytokines, INF y which produced by active Th1 cells that mediated by activated NK cells to produce INF y, these cytokine can facilitate differentiated of Tho cells to Th1 that additionally produce INFy, activator macrophages , also TNFa produced from macrophages and NK cells can maximally activated INF y [19].

The present result showed that the serum levels of TNF a in control positive animals were higher than those of control negative group ,these result may indicated these cytokines play role in inflammatory response against B.abortus infection and in clearance of these pathogens , these evidence was agreement with [20] who investigated that the important cytokines play role in scavenge Brucella consist from TNF a,IL six, INFy and IL 12.INF y and the TNF a secreted from NK cells can activated macrophages to kill Brucella . INF y,1L 12 and TNFa play role in control Brucella infection [20]. the role of TNF a was dependent on presence of INF y in early infection in which it activated macrophages during acute and early chronic phase [21]. INFy is rise in serum of infected mice at acute phase but less amount during chronic phase [22]. while IL six reached peak at acute phase and remain high at first 2 weeks of chronic phase [23] also in the immunized animals at middle chronic phase post infection. The present finding revealed high levels of serum IL six in immunized animals as compared with other groups, these result also indicated that formalin killed Brucella. antigen can elicited IL six that play role in resistance, due to Brucellaabortus is intracellular pathogen in which cell mediated immune response play role in killing these pathogen, the current idea was agreement with Zaitseva et al.[24] who revealed that immunized animals with heat killed B.abortuselicited strong TH1 response against infected by these pathogen,also[25], demonstrated that CD4 Th1 immune response play a major role in the protective host against Brucellaabortus ,however, high levels of IL six in immunized animals in the present study may indicated that activated CD4 Th1 cells stimulated production these cytokines ,these evidence was in consistent with [26].who found that CD4T cells can promote production of IL six.CD 4 T helper play important role in the protective immunity against Brucella infection in addition to cytotoxic T cells [27].

The rseults in current study showed that high levels of serum IL 4 in immunized animals as compared with control positive group but lower than levels of TNF a,, these result may gave indication that IL 4 may play role in immune response against Brucella infection in which both arms of immune responses can play role in protective host against these pathogens ,these idea was agreement with [28] who demonstrated that both type of immune response CMI and antibody play effective role against *Brucella* but CMI are more efficiency in protective host against intracellular pathogens [28] however, TH1 cells involved in the DTH and in CMT while TH2 cells can promote B cells to proliferation and differentiation into plasma production antibodies ,TH1 cells produced INF y,TNFa,IL 2 that mediated the immune related cytotoxic activity a,local inflammation and assist in antibody production ,also all above idea were agreement with present result due to the IL 4 play role in differentiation of Th0 to Th2 cells which produce additional IL 4.[29] that activated B cell and T cells proliferation and differentiation of B cells into plasma producing antibodies as well as decrease development of Th1 cells [30] also it play role in activated alternative macrophages M2 and inhibit classical macrophages and induced decline in the inflammatory reaction [31].

We concluded that killed *Brucellaabortous* antigen can stimulated good cell mediated immune response against *Brucellaabortous* infection of mice.

Conflict of Interest: Non

Source of Funding : Self

Ethical Clearance: Non

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Study of CD69 upon T-cells for SLE Iraqi Patients

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Abstract

Systemic lupus erythematosus (SLE) represented one of the chronic auto-immune multi systemic diseases affecting females more than males especially during childbearing age. A fluctuating nature of SLE disease activity deprive this disease from of any monitoring test, at likewise both of SLE disease activity index (SLEDAI) criteria or even the laboratory analyses do not confirm the disease activity, especially when a patient have normal serological results although during the disease activity (flare). This study done as a case control study, whereas the total sample size included 86 peripheral blood samples, which subdivided into: first the disease group comprised from 68 blood samples voluntary obtained from SLE patients. while the second group included 18 blood samples obtained from healthy individuals (controls) who matched in gender and age with the disease group. however, the disease group were be divided into active group (flare) and inactive group (remission) according to SLE disease activity index criteria by a specialized consultant. This study based on an immunological evaluation of CD69/CD3+ percentages of peripheral blood T-lymphocytes tested as SLE disease activity monitoring marker, owing to that purpose the CD69/CD3+ markers were be isolated from freshly blood T-lymphocytes. moreover in order to getting the best precise for Cluster Differentiation markers percentages CD69therefore were analyzed by Immunophenotyping flow cytometer of multi-color immunofluorescent staining. Whereas the CD69/CD3+ marker ratio can be obtained from data analysis (CY flowsoftware). such ratio set up CD69test as Comparison with SLEDAI criteria, as well as with age and gender factors. whereas CD69% described as early activation marker for T-lymphocytes, so tested for such aim. the results were gave insurance about over expression of CD69T-cells for the active (flare) group. Moreover the most important indicative parameter for disease activity that systemic lupus erythematosus disease activity index whereas CD69/CD3+% has a positive correlation matching with SLEDAI score for SLE disease groups,. Through these results about CD69 which proved as milestoneof SLE monitoring disease activity as independent parameter rather than SLEDAI criteria. Ultimately such results rewarded this study by finding cut off value for SLE disease activity described as CD69/CD3+ SLE activity≥ 21.5000%, within sensitivity71% and specificity 91.7% according to receiver operating characteristic curve. This study proven own aims through of the test named as CD69/CD3+ ratio marker that can be done as more easy, simplest, and accurate singular test instead of various decentralized a huge number of the clinical and laboratory investigations.

Key words: *CD69 upon T-cells, SLEDAI, Flowcytometre, CD3, SLE Iraqi patients.*

Introduction

Systemic lupus erythematosus defined as one of a complex, chronic, inflammatory autoimmune disease [(1)]. That has fickle manifestations follows a relapsing and remitting course. More than 90% of SLE cases affects females [(2)], predominantly at child bearing age [(3)]; with ratio 8:1female –per-male [(4)]. Characterized by impairment within tolerance to the self-antigen and formation of many different auto-antibodies [(5)],as well as the gender especially womenaffected at child-bearing age [(6)]. The chronic sterile inflammation and tissue destruction all these events occur as a result of auto-antigen responsiveness at (SLE) disease mechanisms [(6)]. Thus, T-lymphocytes have a positive correlation with (SLE) Disease Activity Index (SLEDAI) score [(7)]. The

T-cell receptor (TCR) is a complex of total membrane proteins essentially contribute in T-cells activation as a response to induced antigen, such antigens presented in the context of the MHC molecule by APCs. The probability of the increasing CD 69% on T-lymphocytes can be as pure reflection of the increasing CD3 popularity in SLEpatients [8].Already CD69 was described as earliest induced marker on the T-lymphocyte surface after TCR/CD3 complex activation, this expression and appearance of CD69 on plasma membrane of the activated lymphocytes [9]. The expression of CD69 on T-cells surfaces at peripheral blood may give novel insight indicator about monitoring of early activated T-cells population leading to level of T-cell mediated immune responses can also be expected in the body [10].

Materials and Method

-Study population: Whole samples population of such study were 86 individual samples subdivided into first part Disease group that included Active group and Inactive group their samples obtained from both of In-patients and out-patients whom attended AL-Yarmouk Teaching Hospital. As well as patients who attended Al- Al-Karama teaching hospital. and second part of the study wasHealthy group obtained from selected 18 healthy individuals. During the period between October/2017 to June/2018.

(a) Disease group:it wassubdivided according to SLEDAI into:

(a1) Active group (disease flare): The samples were being obtained from 32 patients; 1male and 31females with aging ranged13-60years systemic lupus erythematosus (SLE) patients diagnosed according to disease activity assessed with SLEDAIby specialized physicians.

(a2) Inactive group (SLE remission): these Samples were obtained from 36 patients; 3 males /33 females with aging ranged 13-60years diagnosed by the specialized physicians as SLE patients within remission status according to (SLEDAI).

(b) Healthy control group: The samples were being obtained from the 18 healthy Individuals 2 males, 16 females their age ranged 13-60years volunteer after take their conceptions.

Samples collection: All samples were be collected at the same manner from each individual, which described as 2.5ml of whole venous bloodhave been collected under sterile conditions then it was poured into heparin tube for CD3 & CD69 flow cytometric analyses.

The preparedantibodies againstCD3 marker was mouse IgG1 conjugated with FITCwhile suchprepared antibodiesagainst CD69 marker were mouse IgG1 conjugated with R-PE, Ultimately both markers were be diagnosed by BD FACs™ brand flow cytometer.

Flow cytometer: one improved table flow cytometer (Cy Flow) instrument used for detecting and analyzing of T-lymphocytes CD3 and CD69 markers, that must be equipped for appropriate fluorescence laser excitation at 405nm, 488nm, and 635nm with appropriate software (Cy View) software for data acquisition as well as analysis.

Flow- cytometer kits: I- CD3(SK7) monoclonal mouse anti-human, **II-**PE Mouse Anti-Human CD69Becton, Dickinson and company BD Bioscience, BD Bioscience Pharmingen™/USA.

Procedure:20 µl were used for both of CD3 fluorochrome- conjugated monoclonal- antibody and CD69 fluorochrome-conjugated monoclonal antibody then were added to 100µl of freshly whole blood in 12x75-mm capped polystyrene test tube;at the sametime. The tested sample was thoroughly vortexthenmustbe incubated 15-30 minutes in the dark place at room temperature 20°C-25°C.Anyway about 2µl of 1x BD FACS lysine solution also were added after incubation, then thoroughly vortex and incubated for 10 minutes in the dark place at 20°C-25°C. whereas tested sample was centrifuged at 300g for 5minutes. Washing 3times by adding buffer solution, yet supernatant were discharged. Finally2µl from (FITC) solution were addedto thesample. the samples were tested byPartec Cy Flow® instrument; then the tested results were displayed on data show within a special program named as (Cy View software).

Statistical analysis: Analyses of data were carried out using the available statistical package of SPSS-24. Data were presented in simple measures of frequency, percentage, mean, standard deviation, and range. The Students-t-test was used for difference between two independent means or Paired-t-test for difference of paired observations or ANOVA test for difference among more than two independent means. Statistical significance was considered whenever P value ≤ 0.05[11].

Findings

Frequency of CD69/CD3^{+}T-cells % Expression among this study groups

The distribution of such study groups displayed on Figure 1 explained the distribution of tested samples within each group according to CD69/CD3^{+}% of peripheral blood.

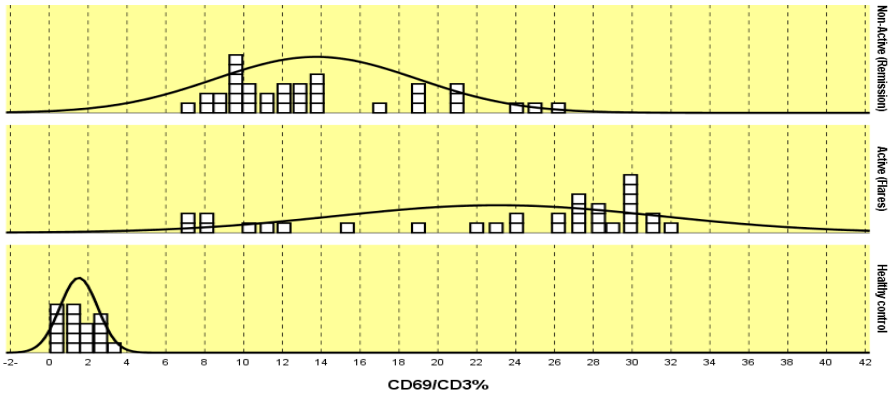


Figure1: Distribution of CD69/CD3^{+} ratio means± SD for studied groups within lighting highly significant differences among studied groups.

Comparison ofCD69/CD3^{+} frequency for the studied groups according to age and gender

Table1 shows the frequency of distributed groups according to age and gender with CD69 T-cells mean ±SD as a monitoring marker for SLE disease activity. the most highly significant means and standard divisions with age group <30 years for active group mean ±SD=26.80±0.34, likewise inactive group mean ±SD=11.56±1.83, finally healthy group mean ±SD=1.73±1.47. the tested marker CD69/CD3^{+}% pointed mean differences between male/female for each studied groups with highly significant differences p value 0.0001, P≤ 0.05.

Table1: CD69/CD3^{+}% frequency among studied groups as comparisons depending on age & gender

Parameters Active (Flares) Mean ±SD (Range)		**CD69/CD3^{+}%**			
		Non-Active (Remission)	**Healthy control**	**P- value**	
		Mean ±SD (Range)	**Mean ±SD (Range)**		
Age (years)	<30	26.80±0.34 (26.41-27.0)	11.56±1.83 (9.86-13.50)	1.73±1.47 (0.47-3.34)	0.0001#
	30--39	25.57±3.91 (19.0-30.0)	11.98±3.32 (6.95-19.0)	1.31±0.46 (0.92-1.82)	0.0001#
	40--49	20.01±9.84 (7.45-32.0)	13.80±5.61 (8.39-26.0)	1.52±1.21 (0.35-2.91)	0.0001#
	=>50	25.60±9.36 (6.83-31.14)	16.32±6.41 (8.36-25.0)	1.52±0.78 (0.25-2.38)	0.0001#
Gender	Male♂	25.34±	15.96±5.63 (9.89-21.0)	1.63±0.07 (1.58-1.68)	0.083
	Female♀	23.33±8.39 (6.83-32.00)	13.53±5.21 (6.95-26.0)	1.50±1.04 (0.25-3.34	0.0001#
*Significant difference between two independent means using Students-t-test at 0.05 level.					
#Significant difference among more than two independent means using ANOVA test at 0.05 level.					

CD69/CD3^{+}T-cells ratio frequency among studied groups according to SLE disease activity index scores

the correlation between CD69/CD3^{+}%T-cells with SLEDAI scores showed no shared points among the studied groups which displayed on Figure 2 follows:

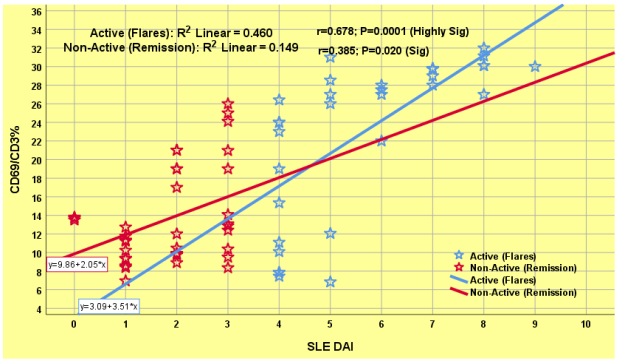


Figure 2 : Linear Regression of CD69/CD3^{+} depending on SLEDAI scores for each of SLE active group that indicated highly significant positive correlation while SLE in active g group low significant positive correlation.

Speculation sensitivity and specificity for CD69/CD3+T-lymphocytes of peripheral blood ratio marker according to ROC curve

According to Receiver Operating Characteristic (Roc) curve CD69/CD3+ ratio giving sensitivity 71.9%while marked specificity 91.7% both in at SLE flare group CD69/CD3+ ≥ 21.5000 % which considered as cut off SLE disease activity ratio.

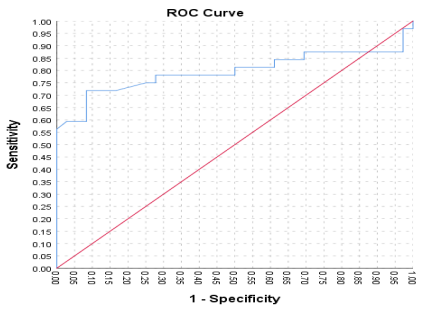


Figure 3: Receiver Operating Characteristic (ROC) curve indicating fundamental area under CD69/CD3+ curve.

Discussion

This study detects SLE disease age ranged from 21to 59 years among samples of SLE disease group patients. These results agreed with Al-Haidary was records the peak range of SLE Iraqi patients from20to69 years[12], while the range 14-61 years was recorded by Al-Saady [13], and Noori *et al*. reported the mean age of Iraqi SLE patients was±SD=27.8± 10.7[14]. also, This study results corresponds with Arabic researches about SLE disease like Al Dhanhani *et al*. who reported the Arab United Emirates mean age was ±SD=28.6± 12.4 years[15]. Moreover Ku *et al*. referred to range of Chine's' women age was 9-40[16]. actuallythis results agreed with Noori *et al*. who reported the percentages of the males 2.0% , and females 98% [14].these results pointed thecut off scorefor diseaseactivity was ≥4score. Whereas inactive group patients pointed at less than or equal 3 score ≤3 according to this study. However Bonelli *et al*. who reporting that the score of their patients was higher than usual score because they were have lupus nephritis ≥6 score, but also they reported about all previous studies opinions which considered the lower cut off disease activity at >3[17]. Compagno who reported there was a significant correlation between SLEDAI score and lupus nephritis[18]. Furthermore this study provides the percentagesbout some Iraqi SLE patients depending on SLEDAI scores. However there is no Iraqi study matched with SLEDAI scores% results. the current pointed highly significant correlation with SLE disease activity among groups under study depending on CD69/CD3^{+}T-cells ratio as immunological markerthat played an early inducible marker for T-lymphocytes activation and migration according to Radulovic *et al*. [19]. our results approved with Martin *et al*. who ensured that CD69 considered as early activation receptor within an intrinsic differentiation program where determined immune inflammatory process in SLE patients [20]. Whereas the previous researchers results corresponds with the current study, like Su *et al*. and Syh.Jae *et al*.[10,21].Finally, the previous researchers supported CD69/CD3+ T-cells % as accurate independent marker for SLE disease activity assessment.Also about American females SLE disease activity age ranged 20-30 years by Weckerle and Niewold [22]. Moreover Ku *et al*.claimed that optimum activity age was 28± 4.96 years[16]. Furthermore, although that SLE disease mostly effects females than males, which may be due to immune system differences by Weckerle and Niewold [22],Actually, SLE disease activity index consider as an essential requisite for CD69/CD3+% T-cells evaluation test whereas successfully signify highly correlation with its scores reached to mean ±SD >30± % at 9 score. also disease activity was assessed by measuring SLEDAI scores, the weighted average of SLEDI scores>10" by Kakati *et al*.[23]. So according to SLEDAI scores selection process done accordingto the patients of this study within scores lower than average >10 score in order to investigate the early activation process prior disease flare.Ultimately the ROC test was

gave cut off disease activity value ≥ 21.5000% for CD69/CD3$^+$%. This study suggested that CD69/CD3$^+$ratio can be considered as immunological laboratory test for SLE disease activity control as independent monitoring test rather than SLEDAI criteria. this study was deemed as the first study seeking about CD69/CD3$^+$ T-cells of peripheral blood for Iraqi SLE patients by using flow cytometer which detects cut off SLE disease activity. the conclusion: There is highly significant correlation between CD69ratio with age 21-59 years for female gender.this marker CD69/CD3$^+$% T lymphocytes of peripheral blood may be considered as accurate singular independent monitoring test for SLE disease activity (flare) within cut off value ≥ 22.5%.

Conflict of Interest: Non

Source of Finding: Self

Ethical Clearness: Non

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Effect of *Fusariumgraminarum* Silver Nanoparticles on IL-10 and IFN-γ cytokines in Mice after Infected by *Leishmaniadonovani*

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Abstract

Leishmaniasis remains one of the fatal diseases worldwide, and the conventional antileishmanial therapies are toxic and most are expensive. Biological silver nanoparticles possess broad-spectrum antimicrobial activities and could be a future alternative to current antimicrobial agents. In the present study an approach was made to synthesize silver nanoparticles using a *Fusariumgraminarum* fungus.To investigates the efficiency of silver nanoparticles against ***Leishmaniadonovani***compared with pentostam drug *in vivo* by measuring the levels of immune cytokines (IL-10 and IFN-γ) in serum infected mice and treated with AgNPs (0.1 ml / day) and comparisons with pentostam drug (0.01 / day) after 7,14 and 21 days of treatment. The results showed that the level of IFN-γ in grouptreated with AgNPs increased significantly in third weeks, compared withpentostamgroup.While treated the infected mice withpentostam/AgNPs together, gradualdecreaseoccured in the level of IFN-γ in all groups, compared with negative control. Also a significant increaseoccurs in the IL-10 level within 21days when mice were treated with AgNPs compared with pentostam.

Key word: *Leishmaniadonovani*, ***pentostam, silver nanoparticles, IL-10, IFN-γ***

Introduction

Leishmaniasis is one of the vector-borne diseases caused by obligate protozoan parasites of the genus *Leishmania*, they are transmitted by different species of sand flies belong the genus of *Phlebotomine* as extracellular flagellated promastigotes that replicate as an intracellular parasite (aflagellateamastigotes) in mononuclear cells of mammalian hosts[1]. Visceral leishmaniasis is considered as the second cause of mortality and the fourth cause of morbidity after malaria, schistosomiasis and African trypanosomiasis[2]. Pentavalentantimonials are a group of compounds used for the treatment of leishmaniasis. The compounds currently available for clinical use are sodium stibogluconate and meglumineantimonate. The Role of cytokines such as IFN-γ is to activate macrophages and enhance the microbicidal activity of these cells to kill intracellular pathogens through the generation of reactive oxygen species and reactive nitrogen species. IL-10 promotes intracellular infection, including human visceral leishmaniasis, by disabling Th1 cell type responses and/or deactivating parasitized tissue macrophages[3].

Nanotechnology continues to attract significant attention due to its impact on many currently important areas such as energy, medicine, electronics and the aerospace industry. Nanoparticles that possess one or more dimensions of the order of 100 nm or less continue to attract significant attention due to their unique properties in the realms of chemistry, optics, electronics and magnetism[4].

The use of eukaryotic organisms such as fungi, *Fusariumgraminarum* and other species offers considerable promise for large-scale metal nanoparticle production since the enzymes that are secreted by the fungi represent an essential ingredient for the biosynthesis of metal silver nanoparticles has attracted high interest

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due to their unique and excellent properties in addition to its therapeutic potential for the treatment of a variety of diseases that includes retinal neovascularization and acquired immunodeficiency syndrome due to human immunodeficiency virus [5].

Materials and Method

Silvernanoparticles (AgNPs) preparation:

Silvernanoparticles (AgNPs) preparation according to *Birla et al*.,l[6]methode**.**

Characterizationof nanoparticles

The exact configuration of the, size, concentration, morphology of crystals, aggregation state and even bioconjugation and was measuredby using particle the following techniques:Atomic force microscopy (AFM) (AA-3000, Angstrom, USA), X-Ray diffraction (XRD) (Shemadzu, Japan), Ultraviolet-visible spectroscopy (UV-VIS)(Shemadzu, Japan)[7].

Parasite strain and culture

Leishmaniadonovani was isolated from the bone marrow of an infected child , the strain was obtained from biotechnology center/ AL- Naharin University, it was cultured and maintained by serial passage in NNN media each 8 days and incubated at 26°C.

***Leishmania* antigen preparation**

One milliliter of promastigote culture in stationary phase washed three times with phosphate buffered saline by centrifuge 4000 rpm in 15 minutes then adjusted to concentration 1× parasite\ml.

Animals

Ninety six Male *albino* mice aged between 8-12 weeks, weighing 20-28 gm was obtained from The National Center for Drug Control and Research, housed under standard condition in animal house in the biology department in College of Science/AL-Mustansrya university . Seventy eight mice were infected with 1×10^7 parasite/ml *L. donovani*promastigotes by injectionintraperitonial[9]. Then the groups were inoculated as a follow:

- Group 1 : inoculated orally by stomach tube (0. 1ml/day) normal saline considers as control positive group.
- Group 2 : inoculated orally by stomach tube AgNPs (0.1ml/day) for 21 days considers as an AgNPs treatment group.
- Group 3: injected with (0.01 ml/day) from Pentostam drug by intramuscular each day for 21 days considers as Pentostam treatment group.
- Group 4 : inoculated orally by stomach tube AgNPs (0.1ml/day) and injected with (0.01ml/ day) from Pentostam drug by intramuscular for 21 days consider as AgNPs and Pentostam treatment group.
- Group 5: inoculated orally by stomach tube (0. 1ml/day) normal saline considers asnegative control without infecting by *L. donovani* parasite..
- **Blood collection and animal anatomy**

In the days 7th, 14th, 21th the blood samples were collected from all experiment, mice from facial vein collected 2 ml of blood in the sterile plane tube, then left at room temperature, after 35min centrifugation the clotting blood, obtained clear serum and stored at -20°C until the examination for immunologic test.

Determination of cytokine levels

The serum levels of IL-10 and IFN-γwere analyzed by ELISA (human Systems, Germany). The cytokines were quantified usingmanufacturer's protocol.

Statistical analysis

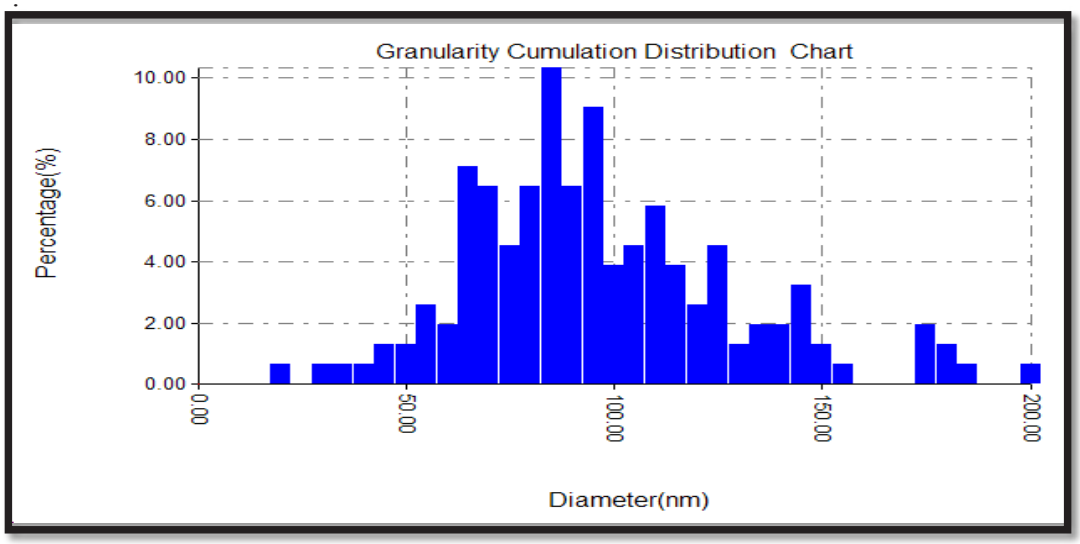
The Statistical Analysis System- SAS (2012) program was used to effect of different factors in study parameters. Least significant difference –LSD test (ANOVA) was used to significant compare between means in this study[9].

Findings

Detection of the existence of *Fusarium*AgNPs

After adding of silver nitrate ($AgNO_3$) to filtered cell, the color of the mixture changed from colorless to blackish brown compared with negative control remain clear (colorless), the changes in color which confirms the reduction of $AgNO_3$ by *F. graminarum*indicated the presence of AgNPs[10].

Morphology of*Fusarium*silver nanoparticles by atomic forcemicroscopy Determine *Fusarium* silver nanoparticles (AgNPs) sizes and surface morphology were measured ,using the software of the AFM , the images of AFM for *Fusarium*AgNPs in fig. (1)represents particle size distribution, where average diameter is 94 nm. While in fig.(2A,B) is AFM picture in three dimensions (3D) and two dimensions (2D), it explains structural shape for grains,found that the average roughness (Ra) is 9.33 nm and Root mean square (Sq) is 11.6 nm.



Figure(1):Granularity volume distribution chart of silver nanoparticles produced by *F. graminurum*

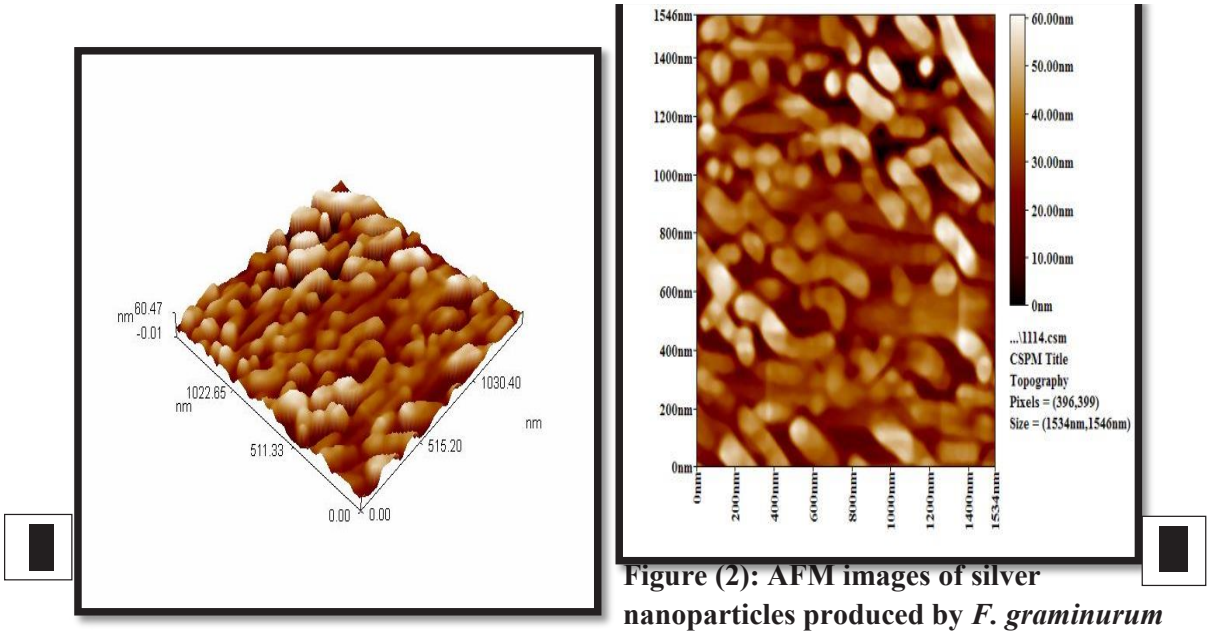


Figure (2): AFM images of silver nanoparticles produced by *F. graminurum* (A) three dimensions 3D and (B) two dimensions 2D

Characterization of *Fusarium*AgNPs by X-RayDiffraction

A typical XRD pattern of *Fusarium*AgNPs as shown in fig.(3), the diffraction peaks at 38.05°, 44.22°, 64.32 and 77.31° were correspond to the (111), (200), (220) and (311) facets of the face centered cubic crystal structure, therefore the average crystallite size was 28.225 nm.

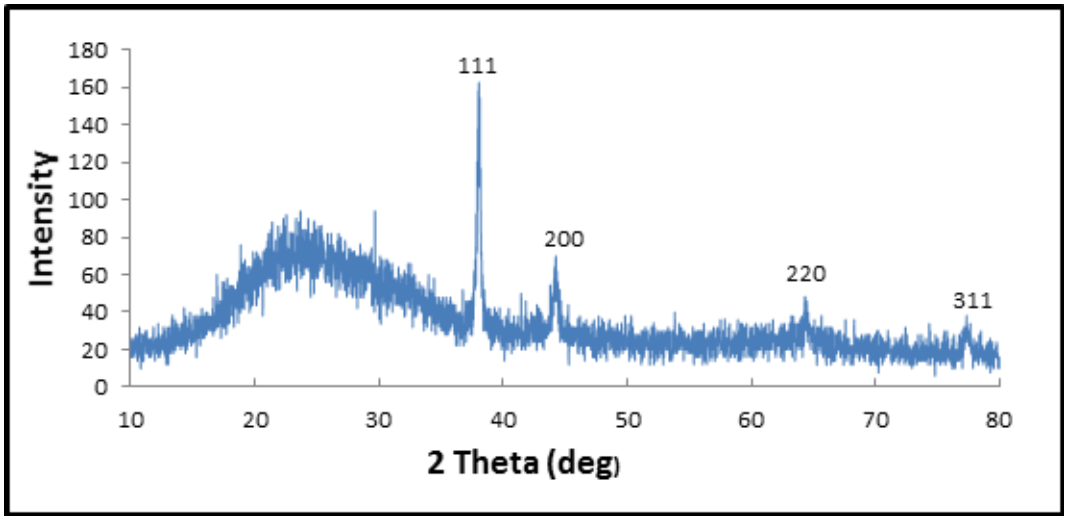


Figure (3): X-Ray pattern of silver nanoparticles produced by *F. graminurum*.

Optical properties of*Fusarium*AgNPs by UV–Visible Spectral:

This technique confirms the presence of *Fusarium*AgNPs by measuring the absorbance of the bioreduced solution at wavelengths between 300 and 800 nm. Extinction spectroscopy of ultraviolet (UV) and visible (Vis) light (UV–Vis spectrum) allows confirming the presence of *Fusarium*AgNPs because of the characteristic plasmon resonance, which showed an absorbance peak at 420 nm, fig (4)..**Figure (4):UV-Visible spectroscopy of silver nanoparticles produced by *F. graminurum***

Determine sera level of cytokines in mice serum

Serum level of Interferon-γ (INF-γ)

After mice are infected with *leishmania* parasite, the level of INF-γ was increased in the three weeks and after treated of these mice with pentostam and *Fusarium*AgNPs observed that the level of INF-γ has increased in all groups compared with the negative control group, shown in table (1) significant differences ($P<0.01$) between all groups compared with control .In control positive group the level of cytokine was elevated from the first week was (183 ± 13.44pg/ml). While the pentostam group was observed to increase occurredin the first week (305.17 ± 40.76 pg/ml). InAgNPs group the level of INF-γ has increased gradually over the three weeks (284.17 ± 42.97Pg/ml , 303.83 ± 51.98Pg/ml and 410.00 ± 10.52Pg/ml)respectively. In P/AgNPsgroup gradual decrease occurred since the first week (284.17 ± 42.97 pg/ml) ,and gradually continues to declinein second and third weeks (218 ± 36.63 pg/ml and169.50 ± 8.41 pg/ml) respectively .

Table 1.The serum level of INF-γin the experimental groups after three weeks (Mean ± SD)

The Groups	Time (day)			LSD value
	7	14	21	
Control(–ve)	115.67 ± 4.80	118.33 ± 5.04	123.33 ± 1.63	18.542 NS
Control(+ve)	183 ± 13.44	239.17 ± 4.35	323.17 ± 14.79	31.602 **
Pentostam	305.17 ± 40.76	301.83 ± 49.94	315.67 ± 61.46	26.524 NS
AgNPs	122.50 ± 8.87	303.83 ± 51.98	410.00 ± 10.52	37.277 **
P/AgNPs	284.17 ± 42.97	218.00 ± 36.63	169.50 ± 8.41	31.842 **
LSD value	42.668 **	47.073 **	61.905 **	---

****a significant difference at P<0.01 , NS: Non-Significant.**
Means having with the different small letters in same column differed significantly.

Serum level of Interleukin–10 (IL-10)

The serum levels of IL-10 in treated groups of the present study were high level in groupspentostam and *Fusarium*AgNPs infected with *leshmania*parasite were (338 ± 16.07 and 467.83 ± 34.43)respectively in the third week. While the level of IL-10 in control positive group was lower level (320.67 ± 6.37 pg/ml) in third weeks compared with other control negative group was (97.67 ± 6.62 pg/ml). As well as in the P/AgNPs group also elevated, but less than other treated groups in the third week (336.17 ± 22.06 pg/ml) as illustrated in table (2). There was significantly different ($p \leq 0.01$) between all groups compared with positive control.

Table 2.The serum level of IL-10in the experimental groups after three weeks (Mean ± SD)

Groups	Time (day)			LSD value
	7	14	21	
Control(-ve)	95.17 ± 2.31	96.33 ± 1.97	97.67 ± 6.62	11.547 NS
Control(ve+)	178.50 ± 8.87	232.50 ± 5.89	320.67 ± 6.37	28.761 **
Pentostam	290.83 ± 23.31	451 ±20.53	338.00 ± 16.07	32.804 **
AgNPs	112 ± 8.09	456 ±26.61	467.83 ± 34.43	41.952 **
P/AgNPs	121.83 ± 7.46	141.50 ± 2.88	336.17 ± 22.06	30.776 **
LSD value	27.336 **	42.602 **	41.735 **	---

**** mean significant difference at P<0.01 , NS: Non-Significant.**
Means having with the different small letters in same column differed significantly.

Disscusion

The synthesis of silver particles by using *Fusariumgraminarum*was observed during change the color of the mixture from colorless to blackish brown, the color change confirmed the formation of nanoparticles,these results corresponding withBawaskar*et al.*[11], Mahmoud *et al*[11] .

This study, the results are near to results of Shafiq*et al*.[12].showed that, the XRD diffraction measured in Ag-NPs resulted in four intense peaks and this further confirms that the Ag-NPs formed in the extracellular filtrate are present in the form silver nanocrystals. Vijayan*etal.*[13] observed that AFM topology is very helpful in revealing the exact size and shape of silver nanoparticles.Jebali and Kazemi[14]reported that highest anti-leishmanial drug was observed for Ag NPs, and AuNPs were in the second level, as well as they found that anti-leishmanial activity of metal nanoparticles is higher than metal oxide nanoparticles that may be due to oxidation capacity of metal nanoparticles, leading to moredamage to membranes, enzymes and DNA.

The results of cytokine indicated an increase occurs in serum level of IL-10 and INF-γduring three weeks post-infection as showed by Kamil*et al*.[15]reported a significantly increased serum level of IFN-γ and IL-10 in VL patients compared to healthy controls, also confirmed by Khoshdel*et a.l*[17] reported thatthe levels of the serum cytokines, IL-10, IL12, and IFN-γ were higher in patients than in family members and control individuals.

Also, in a previous studydemonstrate the elevation of both IFN-γand IL-10 mRNA levels in the lesional environment of thebone marrow in patients with kala-azar before therapy, findings which may be of importance in understanding how thisorganism is able to avoid immune-mediated destruction by itshost macrophages[17].Inactive visceral leishmaniasis, Al-Autabbi*et al.*[18]reported that the immune system is highly activated and produce both the macrophage-activating cytokines IFN-γ and the macrophage-deactivating cytokines IL-10.

IL-10 is able to inhibit Th1 cell and macrophage activation; therefore, higher levels in the sera of VL might be expected, IL-10 also plays an important role in regulation of inflammatory response, and is important for the survival and persistence of the parasite inside macrophages [19]. In other reports showed that, the data favor a role for IL-10 in conditioning the host cells so that they become poorly responsive to even high levels of IFN-γ for intracellular killing [20].

IFN-γ plays an essential role in macrophage-mediated antileishmanial activity, contributing to parasite elimination and the subsequent resolution of infection [21]. Also, IFN-γ cytokine is the main factor in inducing the transcription of inducible nitric oxide synthase (iNOS) and the production of nitric oxide (NO) [22].

Nanoparticles can undergo a series of processes, including binding and reacting with proteins, phagocytosis, deposition, clearance, and translocation. At the same time, nanoparticles can elicit a spectrum of tissue responses, such as cell activation, generation of reactive oxygen species, inflammation, and cell death[23]. A significant increase in the level of IFN-γ was detected in the serum of patients during treatment with pentostam when compared to its level before treatment, this explains that a successful drug therapy were restored T-cell proliferation and IL-2, IFN-γ production in response to *Leishmania*antigen [24].

Conclusion

Silver nanoparticles synthesis from *Fusariumgraminarum*is safety, nontoxic andit can be considered as a new antileishmanial agent. Also*Fusarium*AgNPslead to induce pro and anti-inflammatory cytokines.

Conflict of Interest: Non

Source of Funding- Self

Ethical Clearance: we have got admission from biotechnology center/ AL- Naharin University and the biology department in College of Science/AL-Mustansryauniversity.

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Antifungal Activity of *Boswellia serrata* Gum Extracts on Antifungal Drugs Resistant *Aspergillusfumigatus* Isolated From Diyala Patients

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Abstract

This study focused on antifungal activity of alcoholic extracts of *Boswellia* gum onthe potent antifungal resistant opportunistic pathogen for humans, *Aspergillus fumigatus*. The antifungals used were: Terbinafine, Nystatin and Clotrimazol.Antimicrobial susceptibility testingof alcoholic gum extracts of *Boswellia* was done by well diffusion methodagainst the mold. Results showed that Boswellia extracts had the ability to inhibit fungal growth *in vitro* and the statistics revealed different inhibition zones gradually increased with the increasing in the concentration of theextract and that acetonic extract was more effective than ethanolic. Confirming the presence of saponins,volatile oils,terpensand phenolic compounds in acetonic extract withphenolic compounds in ethanolic extract.

Key words: *Aspergillus fumigatus, Antifungal resistance, Boswellia extract*

Introduction

Aspergillus is an important pathogen of humans and animals,it is a leading cause of human fungal ailments with *A. fumigatus* as the main causative agent of invasive fungal diseases. *A. fumigatus*[1]. Aspergillosis is the name given to a wide variety of diseases caused by infection by this fungus, the majority of cases occur in people with tuberculosisor Chronic Obstructive Pulmonary Disease [2], but with otherwise healthyimmune systems[3][4].It is estimated that otitis externa make up 9 to 25% are caused by fungi, calledfungal otitis or otomycosis[5][6].However, antifungal resistance occurrence has to be considered independently for each antifungal class, fungal genus and epidemiological data regarding incidence of distributed worldwide [7].Despite improvement of antifungal therapies over the last 30 years, the phenomenon of antifungal resistance is still of major concern in clinical practice[8].Since the thousands of years, people used to take plant originated products and the natural extracts prepared from various species of *Boswellia* tree for the treatment of several diseases[9][10].Many previous studies indicated itsbiological therapeutic effectssuch as inflammation and antioxidant[11][12][13],anticancer[14] and antimicrobial[15].

Many of studies indicated its significant antifungal properties against toxigenic Aspergillii [16][17].We need the medicinal plants as antifungal agents instead of using artificial drugs which have several toxic and side effects. Therefore, the objective of this study was to estimate antifungal potential of *Boswellia* against selected mould species.

Materials and Method

Preparation of Plant extract: The gum resinsof *B. serrata*waspurchased from local market ofBaqubah, Diyala, Iraq. The extraction was prepared according to Matny*et al*[18] with slight modifications using Lyophilizing technique. The two extractswere stored in a well-closed containers, protected from light and kept at 4°C until use.

Phytochemical analysis: Screening of most secondary metabolites in the crude extracts of*B. serrata*was determined as following:

- Test for alkaloids and terpens was performed according to Njoku and Obi [19].
- Test for saponins, tannins and glycosides was

performed according to*Obasi et al*[20].

- Test for phenolic compoundswas carried out according to the method described byHarborne[21].
- Test for volatile oilsperformed according to Indian Herbal Pharmacopoeia[22].

PreparationofPlantExtractConcentrations: Stock solutions (200mg ml^{-1}) was prepared by mixing 2 g of the dried extract with 10 ml ethylene glycol50% (solvent used as diluents solution), and then it was sterilized with millipore filter membrane (0.22 µm),then different concentrations of(100,50)mg ml^{-1}were prepared by mixing known volume from the stock solution with ethylene glycol.

Antifungal drugs Preparation: The commercially available samples of antifungal drugswere:Terbinafine, Nystatin, and Clotrimazol. Each antifungal was prepared as an initial concentration ‘’working stock solution’’ of 10 mg ml^{-1}[23]

Preparation of tested microorganism: Twenty samples were collected from patients with Aspergillosis Otomycosis in Baqubah Teaching Hospital (Diyala Governorate). The samples were 8 of sputum, 2 nose swabs and 10 ear swabs. All specimens were collected from January to April 2018. The samples were examined directly under the light microscope objectives to detect fungi and their septate hyphae [24]. Then culturing on the Sabouraud dextrose agar to observe the macroscopic characteristics and the isolates were identified to the species level on the basis of microscopic characteristics[25] [26][27][28]. Fungal inoculum was prepared by the use of haemocytometer to count fungal conidia[29].

The activity of the antifungal drugs and plant extracts*in vitro*: Antifungal susceptibility testing was done by agar well diffusion method to detect anti-fungal effect for all *A. fumigatus* isolates towardantifungals(Nystatin, Terbinafine and Clotrimazol),andthe extractswere performed against only the antifungal drug resistant isolate. All tests were in triplicateusing the solventethylene glycol [30].

Statistical Analysis: The results were analyzed by using one-way variance analysis (ANOVA). All of our analysis were done by SPSS-18. Differences at $P < 0.05$ were considered statistically significant.

Findings

Physical and PhytochemicalInvestigation: Acetonic extract of *B. serrata* was viscous to colloidal texture with tan to brown color, not soluble in water and the percentage was14% of crude gum resin. While ethanolic extract was powdery texture with pale yellow in color, less soluble in water and the percentage was 6% of crude gum resin. Phytochemical analysis for active compounds was illustrated in table 1.

Isolation and Identification of *A. fumigatus:* Cultural and microscopic examination illustrates that the infections belonged to the fungus *A. fumigatus* in 20 specimens were 13 isolates. Figure (1) show the microscopical and cultural feature of the fungus.

The Sensitivity of *A. fumigatus* o the antifungal drugs*In Vitro*:The isolates were a variable in their sensitivity to drugs (figure 2). However one isolate was resistant to all antifungal drugs.

Antifungal activity of the plant extracts *In Vitro:* As shown in figure 3, the results of statistical analysis showed significant ($P \leq 0.05$**)** inall concentrations (200,100 and 50 mg ml^{-1}) of the acetonic extract of *B. serrata*gum resin which showed inhibitory activity against*A. fumigatus* incomparison to the ethylene glycol (control).While ethanolic extract shows the inhibitory activity at high concentrations (200 and 100 mg ml^{-1}) only with less efficient incomparison to acetonic extract(Figure 4).

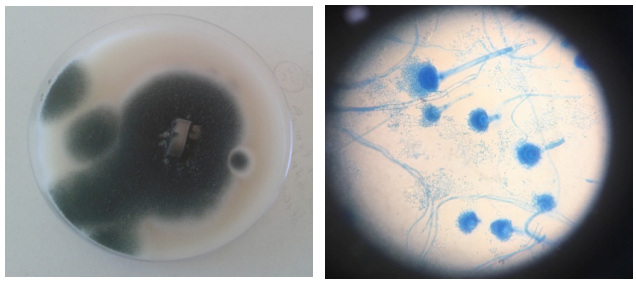


Figure 1: (a) *Aspergillus fumigatus* grown on SDA at 37°C after 7 days of incubation,(b) Microscopic feature of *A. fumigatus* stained with Lactophenol cotton blue.

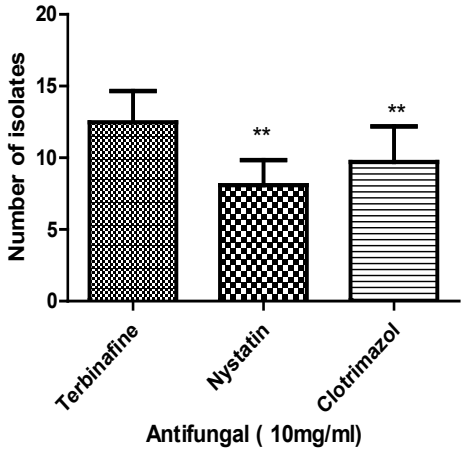


Figure 2: Sensitivity of *Aspergillus fumigatus* to antifungal drugs

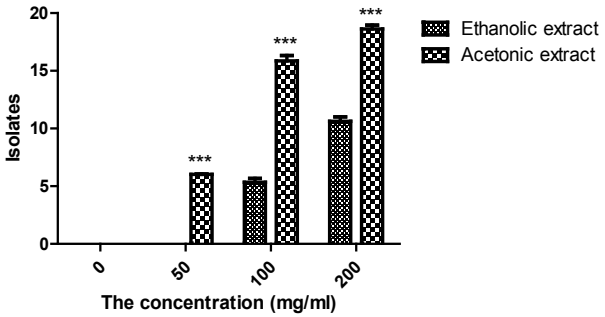


Figure 3: Effect of *Boswellia serrata* gum extracts on *Aspergillus fumigatus*

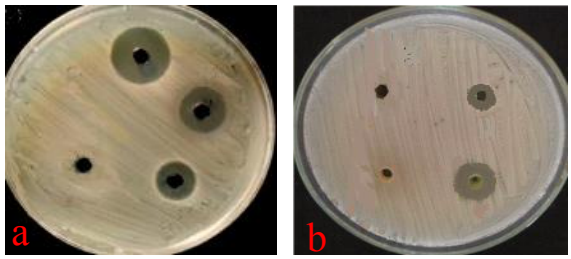


Figure 4: Effect of (a) acetonic and (b) ethanolic extract of *Boswellia serrata* gum on *A. fumigatus at the concentrations(200*,100, 50)mg** ml^{-1}**(1,2,3), C: control (ethylene glycol).**

Table. (1): Phytochemical analysis tests of *Boswellia serrata* gum alcoholic extracts

Phytochemical Constituents	Result	
	Acetonic extract	Ethanolic extract
Alkaloids	Negative	Negative
Saponins	Positive	Negative
Tannins	Negative	Negative
Glycosides	Negative	Negative
Terpens	Positive	Negative
Phenolic compounds	Positive	Positive
Volatile oils	Positive	Negative

***Cont...* Table. (1): Phytochemical analysis tests of *Boswellia serrata* gum alcoholic extracts**

Discussion

Phytochemical screening of many active materials of *B. serrata*acetonic extract showed positive. While, ethanolic extract was positive for phenolics only(Table 1).Many of studies were made about the chemical composition of this plant. In 2009,Upaganlawar and Ghule[31]isolated boswellic acid and many of terpenoids. Al-Ogaili *et al*[15], showed positive results for saponins and negative for phenolic compounds in on aqueous extract. Another studies showed that resins chiefly contain higher terpenoids which are mainly the former of its pharmacological effects [9][32].Methanolic and ethyl acetate extract of this plant showed the presence of tannins, phenols, steroids, flavonoids, and saponins [33].Venkatesh *et al*[34]extracted the essential oil from this plant. Study the plant extracts by polar solvents such as alcohol (acetone or ethanol) provided more consistent antifungal activity compared to those extracted by water; this might have resulted from the lack of solubility of the active constituents in aqueous solutions[35]. Further trials using solvents of various polarities will explore the effects of solvent composition on extract efficacy. While, alcohol extract showed some degree of antifungal activity. Therefore, Ethylene Glycol used in this study as a solvent, it is chemically colorless, odorless and possessed sweet taste alcohol used as solvent or co-solvent offers wide range of advantages such as; biocompatibility, biodegradable, stable, hygroscopic, non-toxic and more importantly water-solubility, it possess fungistatic properties thus acts as preservative [34]. In the present study, Ethylene glycol solution was used as a solvent for crude alcoholic extracts and to investigate the inhibitory activity of the crude extracts against antifungal drugs resistant *A. fumigatus*.

Aspergillus fumigatus biofilm associated infections are emerging as life-threatening infection with a very high mortality rate even after antimycotic therapy [36]. In spite of the extensive research dedicated to the

development of new therapeutic strategies, there are only a limited number of available drugs to fight against invasive fungal infections[37]. In this study, the effect of three antifungal agents (Terbinafine, Nystatin and Clotrimazol) on *A. fumigatus* was illustrated in (figure 2). Statistical analysis had shown significant difference at a level of probability P (< 0.05) between antifungal drugs and *A. fumigatus* isolates. This result was agreed with Brinboum [38]who concluded that Terbinafine was characterized by its impact on enzymatic activity of pathogenic fungi.Mechanisms leading to Clotrimazol (azole) resistance may be decrease in azole affinity for their target, increase in azole target copy number, alteration of ergosterol biosynthetic pathway after azoles action, and decrease in intracellular azole accumulation [37]. In this study, by increasing the concentration of alcoholic extract, inhibition zone around the well was increased (Figure 3 and 4). Antifungal activity of *B. serrata* may be due to the active components which are present in plant gum extracts (Table 1);Sharma *et al*[33] found that methanolic and ethyl acetate extract showed good antifungal activity against *A. niger* with a zone of inhibition 20 to 22 mm.Venkatesh *et al*[34]showed that the essential oil of *B. serrata* had fungicide activity against *A.fumigatus* at MIC (0.15 µg ml^{-1}) and MFC (5 µg ml^{-1}). Cowan[39] showed the mechanism that thought to be responsible for toxicity of plants active materials to microorganisms, he suggested that phenolic compounds mechanism includes enzyme inhibition by the oxidized compoundsthrough reaction with sulfhydryl groups or through more nonspecific interactions with the proteins and there is also evidence for direct inactivation of microorganisms: low tannin concentrations modify the morphology of germ tubes of fungi.

Conclusion

The present study demonstrated that the acetone extract of *B. serrata* hold an excellent potential as an antifungal agent. Further *in vivo* studies are necessary. More importantly there is need for detailed scientific studyto investigate other active compound in addition to essential oils of *B. serrata* that affects in the studied mold.

Conflict of Interest and Authorship Conformation: All authors have participated in analysis and interpretation of the data; they drafting the article or revising it critically for important intellectual content. And finally, this manuscript has not been submitted to another journal.

Source of Funded: This research is self-funded and the authors have no affiliation with any organization with a direct or indirect financial interest in the subject matter discussed in the manuscript.

Ethical Clearance: We undertake to follow the ethical principles and institutional requirements guiding (Baqubah hospital), this research and ensure that they sign the personal declaration of responsibility prior to their isolates involvement in the research.

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Prevalence of β-lactam Resistant Klebsiella Pneumoniae Isolates among Clinical Specimensin Baghdad Hospitals

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Abstract

One hundred forty three of *Klebsiellapneumoniae* isolates had been collected from some hospitals in Baghdad city. The isolates were taken from different clinical specimens.Antimicrobial susceptibility test was carried out towards fifteen antimicrobial agents by using Vitek2 system with Antimicrobial susceptibility test cards. The results of antibiogram showed that the local isolates were possess highly resistance towards most antimicrobial agents under study. The high resistance wastoAmpicillin while the low resistance was to Imipenem.Two methods were used for detection of Extended Spectrum Beta Lactamases (ESBLs) production; first methods by using of Vitek2 system,thesecondmethods by using of polymerase chain reaction (PCR) technique to discoveryESBL encoding gene *bla*CTX-M-1-all gene. The results revealed the prevalence of ESβL encoding genes in local isolatesof*K. pneumonia(bla*CTX-M) 93.1% oftheisolates while 6.99% isolates were not harbored this gen.

***Keywords**: KlebsiellaPneumoniae*, Resistant, β-lactam, ESβL,Cefepime,Imipenem, *bla*CTX-M, gene.

Introduction

Klebsiellapneumoniae is the most clinically pertinent Klebsiella species and is in charge of over 70% of human contaminations because of this genus[(1)]. In humans, *K. pneumonia*frequently colonizes the gastrointestinal tract, skin, and nasopharynx and is an imperative reason for genuine network beginning contaminations, for example, necrotizing pneumonia, pyogenic liver abscesses, and endogenous endophthalmitis[(2-3)].

The expanding predominanceof antibiotic obstruction and the absence of new antibiotic drug improvement has progressively decreased the treatment choices for bacterial diseases[(4-5)]. Extended-spectrum β-lactamases (ESBLs) keep on being a noteworthy issue in clinical setups the world over,resistant microorganismare developing worldwide as a danger to good result in the treatment of basic diseases in medical clinic settings. Amongst the wide exhibit of antibiotics, β-lactamis the most broadly utilized agents. Creation of β-lactamases is the greatest common cause of resistance to β-lactam antibiotics[(6-7)]. theproduction of β-Lactamase enzymes by the microorganisms hydrolyzedthe β-lactam ring amide bond. In latest years, there has been an growth in the rate and prevalence of ESBL producing infectious diseases. Two hindered or more types of extended spectrum β- lactamases (ESBLs) have been establish worldwide[(8)]. β-Lactam antibiotics are commonly used in the handling of infections caused by *K. pneumonia*. Medicinal isolates of this bacterium are disreputable for protecting a widespread range of β-lactamases and are obviously resistant to ampicillin and amoxicillin[(9-10)].

Material and Method

isolate collection

More than (392) clinical samples of *K. pneumoniae* isolates ware collected from some hospitals in Baghdad city from the period between October - December 2017. The isolates were taken from different clinical specimens including: sputum 12(8.39%) isolates, ear swabs 15(10.48%) isolates, burns 27(18.88%) isolates, blood 39(27.27%) isolates and urine 50(34.96%) isolates. Conventional methods (standardized biochemical methods) and Vitek2 system were used to identify the isolates.

Antibiotic susceptibility testing

The isolates were tested for 15 antimicrobial agents (Imipenem, Levofloxacin, Tazobactam, Ciprofloxacin, Nitrofurantoin, Clavulanic acid,Tobramycin, Gentamicin, sulbactam, Cefepime, Ceftazdime, Ceftriaxone, Sulfamethaxazole, Cefazolin and Ampicillin) by using of Vitek2 system with antimicrobial susceptibility test (AST 69) cards.Vitek2 system with the using of (AST69) cards was used for phenotypic detection of ESBLs production.

DNA extraction

Genomic DNA was extracted by (Geneaid GBB100) kit. DNA extraction was done according to the company instruction. Nanodrop framework was utilized to assess DNA fixation and immaculateness . Extraction DNA was stored at -20 ºC for PCR assay[11].

PCR Reaction Condition

MonoplexPCR was performed with GoTaq Green Master Mix. The primer which used to detect ESβL encoding gene was *blaCTX-M-1-all* (table 1). PCR mixture was set up for amplification of ESβL encoding gene *blaCTX-M-1-all* in a total volume of 25 µl contained within 12.5µl of Go Taq Green Master Mix, 4 µl of template DNA, 1 µl of the primer (10 picomole/ µl) and7.5 µl sterile nuclease free water.DNA amplification was completed with the accompanying warm cycling (initial denaturation 95 °C for 6 min, 35 cycles of amplification : denaturation 94 °C for 40 s, annealing 57 °C for 40 s, extension 72 °C for 50 s and final extension 72 °C for 6 min)[12].

Table 1: Sequences of the primer.

Primer	Sequences(5'…….. 3')	Product (bp)	Reference
CTX-M-1-all	F-ATGGTTAAAAAATCACTGCG R-TTACAAACCGTCGGTGACGAT	876	12

Finding and Discussion

Isolation and identification of *K. pneumoniae*

Out of 392 clinical samples only 143 samples were *K. pneumoniae*depending on colony morphology, Gram stain, biochemical test and Vitek2 system. Isolates ware collected from some hospitals in Baghdad city from the period between October - December 2017. A recent study by Ali and Sana'a (2019) found that Out of (140) clinical samples only (70) samples were *K. pneumonia* isolates[13]. The isolates were taken from different clinical specimens including: sputum 12(8.39%) isolates, ear swabs 15(10.48%) isolates, burns 27(18.88%) isolates, blood 39(27.27%) isolates and urine 50(34.96%) isolates (figure 1) show distribution of *K. pneumonia*e isolates in clinical specimens. The higher percentage was in urine while the lower percentage was in sputum.Study byIkeda*et al*.(14) establishmentof the 130 investigation cases, 68 and 62 cases showed the presence of *K. pneumoniae* in the sputum and urine, respectively[14].

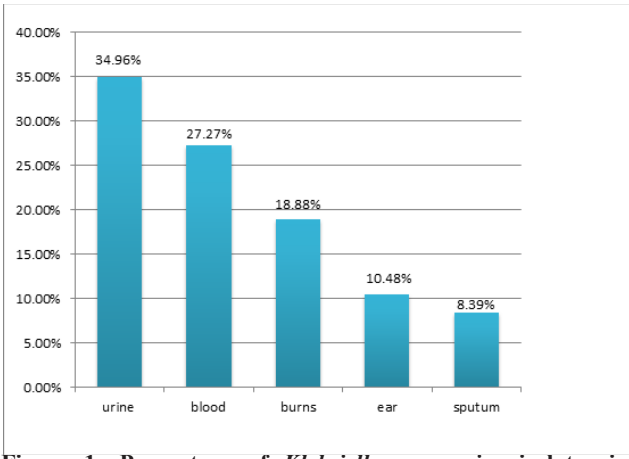


Figure 1: Percentage of *Klebsiellapneumonia*e isolates in clinical specimens

Antibiotic susceptibility

Antimicrobial susceptibility test was carried out towards 15 antimicrobial agents using by Vitek2 system with antimicrobial susceptibility test cardsnumber 69 (AST 69). The results showed that the local *K. pneumoniae* isolates were possess highly resistance towards most antimicrobial agents under

study. The patterns of resistance were as follows: 16.78% forImipenem, 24.47% for Levofloxacin, 26.57% forTazobactam andCiprofloxacin, 35.66% for Nitrofurantoin, 44.05% for Clavulanic acid, 58.04% for Tobramycin, 65.73% for Gentamicin, 81.11% for sulbactam, 84.61% for Cefepime,86.71% for Ceftazdime, CeftriaxoneandSulfamethaxazole, 88.11% forCefazolin, and 100% resistance for Ampicillin. All isolates were resistance toward ampicillin while the lower resistance percentage was toward imipenem as shown in figure 2.Study by Ali *et al*. (15) showed that the imipenem resistance was (58.97%) of *K.pneumoniae*isolates,the highest resistance rate was (100%)for ampicillin, ciprofloxacin was (10.26%) and levofloxacin reached to (7.69%)[15].

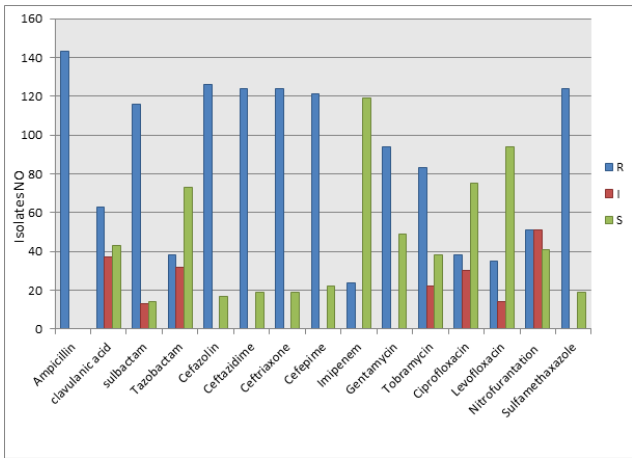


Figure 2: Antibioticssusceptibility for antimicrobial agents (R=Resistance, I= Intermediate and S= Sensitive).

Detection of ESβL encoding gene by amplification of *bla*CTX-M gene

Monoplex PCR technique was used for the detection of the*blaCTX-M* gene. The quick and strict diagnosis of the antibiotic resistance gene in the treatment is very important foravoiding the spread of infections. The present study aim was detectionof existence and prevalence of common ESβLs encoding genes(*blaCTX-M*)amongst143 clinical isolates of *K. pneumonia*. The results as in (figure 3)displayed the presence of *blaCTX-M* gene in 133 (93.1%) oftheisolates while 10(6.99%) isolates were not harbored this gen. while a study by Alyousef*et al.* (16)appear among the 97 *K. pneumoniae* isolates, 47.4% (*n* = 46) isolates demonstrated ESBL creation[16]. Expandingdevelopments of resistance to antibiotics due tocreation of β-lactamases. ESBL are the most across the board systems recognizable in *K. pneumoniae*.

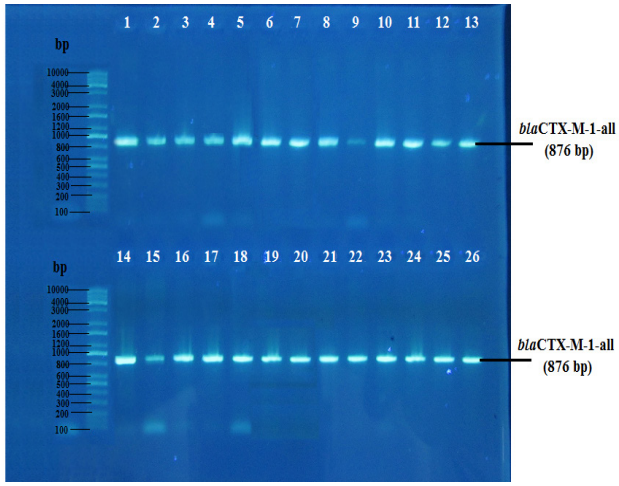


Figure 3: Gel electrophoresis (1% agarose,7v/cm² for 60 min) for PCR products *blaCTX-M-1-all* gene 876 bp lane M 100 bp DNA Ladder, lanes1-26: *K.pneumoniae* isolates. Detection was done on agarose gel (1.5%) at 5 V/cm for 1 hour, stained with RedSafe dye and visualized on a UV transiluminator documentation system.

Conclusion

From this research, it could be concluded that the higher percentage of *K. pneumoniae* isolates in urine and the lower percentage was in sputum,the local isolatesof*K. pneumoniae* were possess a highly resistance towards most antimicrobial agents under this study, all isolates were resistance toward ampicillin while there was low resistance percentage toward imipenem.high presence of *blaCTX-M* gene in theisolates.

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Conflict of Interest: Nil

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Ethical Clearance: All experimental protocols were approved under the Biology Department, College of Science, Mustansiriyah University, Iraq and all experiments were carried out in accordance with approved guidelines.

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Bond-Strength of Porcelain to Nobel and Non-Nobel Casting Alloys

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Abstract

Purpose: This study was designed to evaluate the bond strength of porcelain to white gold (Pd-Ag) and Nickel-Chromium (Ni-Cr) alloys. **Material and Method**: Rectangular-shaped specimens (25×3×0.5) mm were cast with white gold and Ni-Cr alloys and used as adherent materials. The Pd-Ag bonding surfaces were abraded with an airborne-alumina particle of 100 µm while that of Ni-Cr abraded with 250 µm. Specimens were fabricated by applying an opaquer and two dentin layer up to 1.1 mm in thickness at different cycling temperature. Bond strength for each group (n=7) was measured and compared statistically (α=0.05). **Results:** There were significant differences in bond strength of porcelain to Nobel and non-Nobel experimental alloys.

Conclusion: Based on the study results, it can be stated that the type of metal to ceramic alloys of different element composition may affect the porcelain bond-strength.

Keywords: *Bond-strength; porcelain; nobel alloy; non-nobel alloy; white Pd-Ag; and Ni-Cr*

Introduction

Metal to ceramic restoration has been widely used in the clinic since the 1950s. It provides a natural aesthetic of veneering porcelain alongside the marginal fit and the durability of metal casting alloy[(1-3).]

Metal-ceramic restoration may contain Nobel and non-Nobel alloys. Nobel white gold alloy made up of gold, silver, nickel or palladium and chromium plating. The color is whitish similar to that of platinum and silver. White gold is considered to be an alternative to yellow gold, silver or platinum. It characterized by superior castability, ductility, corrosion, and malleability. Also, it provides easiness in polishing with high biocompatibility affect, [(4)]. On the other hand, Nickel-Chromium (Ni-Cr) considered as one of the non-Nobel alloys. The major component of the Ni-Cr elements by weight is 90% of Ni-Cr (Ni: 70-80%; Cr: 12-20%), 3-6% molybdenum, 2-6% aluminum, 0.5% beryllium and 4-8% silicon and manganese[(5)]. Generally, the composition of the base alloy plays a major role in influencing on their properties such as surface hardness, Yield strength, and modulus of elasticity, corrosion, color, low weight, elongation and biocompatibility,[(2,6-8)].

In metal ceramic restoration, the demands for aesthetic restoration were increased,[(9,10)]. So, an application of porcelain opaque by mixing with the distilled water was used to block or mask the color of metal coping. This is to improve the natural color expression and to reduce the exposure of metal in the cervical area which aesthetically required. Also, it provides strength to marginal fit and limits the fracture in contactor areas,[(11-13)]. Clinically, the application of ceramic restorations have been increased, and the use of tooth-similar color materials made is possible to stimulate the appearance of the fabrication of highly aesthetic restorations,[(14,15)].

The strong bonding between the metal coping and the veneering porcelain is one of the essential requirements of clinically successful metal-ceramic restorations,[(16-17)]. The metal-ceramic bonding could either be chemically[(18-24)], mechanically[(25-28)] or due to generated forces such as Van Der Waals[(,29,30)] or coefficient of linear thermal expansion (CTE) between the metal and porcelain[(31-35)]. Therefore, this study was designed to assess the bond strength of the white gold alloy to porcelain in comparison with that of many Ni-Cr alloys at different casting treatment.

Material and Method

Material

In this study, the white gold was used as a Nobel alloy (Pd-Ag), while, the Ni-Cr of the different foundation was the non-Nobel alloy. The composition of the study alloys was detailed in table (1)

Table 1: The composition of the study alloys

White Gold Alloy (Pd-Ag) (Degussa, Germany)	**Super 11 Ni-Cr (Argen dental, USA)**	**Bego Ni-Cr (Bego, Germany)**	**Kera NH Ni-Cr (Kera, Germany)**	**EX-3 Ni-Cr (Noritake, Japan)**
Pd: 53.8%	Ni: 61.2%	Ni: 61.4%	Ni: 58.48%	Ni: 62.8%
Ag: 36.3%	Cr: 25.89%	Cr: 22.9%	Cr: 26.85%	Cr: 19.1%
Au: 0.7%	Mo: 11.09%	Mo: 8.8%	Mo: 12.73%	Mo: 7.1%
Sn: 7%	Si: 1.59%	Nb: 3.9%	Si: 1.72%	Ga: 1.9%
Ga: 2%	Mn: < 1%	Fe: 2.5%	Others: <0.1%	
Others: <0.2%	Fe: >1 %	Mn: 0.4%		
	C: >1 %,	Ti: 0.1%		
	Al: >1%			

Method

Sample preparation

A rectangular wax specimen design of (25x 3x 0.5) mm length, width, and thickness in dimension was prepared for bond-strength test,[4]. The wax patterns were connected to the plastic sprue cones at the middle line which in turn sealed to the plastic ring base that mounted on it to be ready to be invested.

The wax patterns were invested in using plastic rings. The vibrator was used to prevent the air bubbles to be trapped within the phosphate-bonded investment material (Rebi dental, Turkey). The investment was mixed and prepared according to manufacture instruction, then left for one hour for the final set.

After plastic ring removal, the set investment cylinder with wax patterns was placed in the furnace for wax burnout at 900°C and then left for one hour inside the furnace. According to the manufacturer instructions, the white gold and Ni-Cr metal alloys then were melted to be directed into the muffle mould entrance using casting centrifugal machine. After casting, the muffle was left to cool at room temperature and then the investment material was removed from the metal sample specimens.

The Pd-Ag specimens were finished using the abrasive wheel and the aluminum oxide (AL_2O_3) airborne-particle abrasion of 100 µm particle sizes. This applied for 20 seconds at air-pressure of 3 bars. To increase the surface area and enhance the porcelain wetting on the surface, the distance was of 20 mm from the metal specimen. On the other hand, the Ni-Cr specimens were abraded using of 250 µm of AL_2O_3 followed by ultrasonic cleaning in distilled water for 10min.

The Oxidizing layer was created for Pd-Ag group specimens while the degassing layer was performed for Ni-Cr groups as seen in figure (1).

Application of ceramic material

The porcelain was applied in layers (Vita-Germany) after mixing with distilled water (Salsal Company, Albasra, Iraq). An opaque (Op2, Vita-Germany) and two layers of dentin material (3L 2.5, Vita-Germany) were mixed with distilled water and applied using ceramic furnace (Ivoclar, Germany), and following the timetable

scheduled in the table (2) and as seen in figure (2). According to[4,36] the final thickness of 1.1 mm of the restoration was achieved by finishing and then finally polished specimen.



Figure 1: Oxidizing layer was created for Pd-Ag group specimens and the degassing layer was performed for Ni-Cr groups

Table 2: Scheduled timetable for application of ceramic to metal alloy study groups

Alloy	**Al_2O_3 Air-borne particles**	**Porcelain phase**	**Starting temperature (°C)**	**Heat rate (°C/min)**	**Firing temperature (°C)**	**Holding time (min)**	**Vacuum start (°C)**	**Vacuum end (°C)**
Pd-Ag	100 µm (20 Sec)	Oxidation	600	-	600	5	-	-
		Opaque	500	45	890	1	500	890
		Dentin	500	45	860	1	500	860
Super11 Ni-Cr	250 µm (20 Sec)	Degassing	550	45	980	5	550	980
Bego Ni-Cr		Opaque	450	60	920	1	450	920
Kera NH Ni-Cr		Dentine	550	60	900	1	550	900
Ex-3 Ni-Cr								

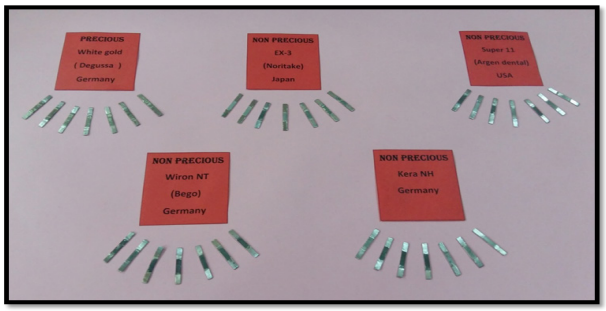


Figure 2: Firing of ceramic to metal alloys

Testing procedures

The specimens were tested using the computer-controlling universal testing machine (Laryee, China). According to ISO 9693 standards, the bond strength was calculated[,37,38].

Statistical Analysis

One-way analysis of variance (ANOVA) test was applied to analyze the study data using the SPSS (V-20),[39]. The statistical analysis revealed a significant difference among the means, and post hoc Games-Howell test was applied as seen in the table (3). Study tests were conducted at a confidence level of 95% (P<0.05).

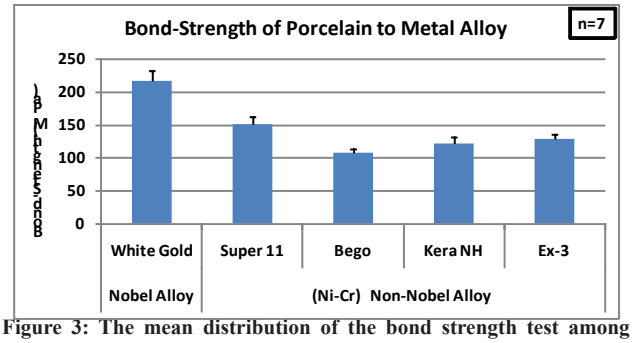


Figure 3: The mean distribution of the bond strength test among study groups

Table 3: Levene's test for study material

F	df1	df2	Sig.
2.795	4	30	.044

Results and Discussion

In this study and as seen in the table (4) and figure (3), the bond-strength of the porcelain to the white gold alloy was statistically significant than that of the Ni-Cr alloys (P<0.01). However, statistically non-significant differences were noticed between the Ni-Cr alloys of Kera NH and that of both Bego and EX-3 (P>0.05).

Table 4: One way ANOVA test for study groups

(I) Groups	(J) Groups	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
White Gold Alloy	Super 11 Ni-Cr alloy	66.1429*	7.22571	.000	42.7414	89.5443
	Bego Ni-Cr alloy	109.4286*	6.18809	.000	87.5884	131.2687
	Kera NH Ni-Cr alloy	95.7143*	6.92575	.000	72.9687	118.4599
	Ex-3 Ni-Cr alloy	88.8571*	6.43333	.000	66.8627	110.8516
Super 11 Ni-Cr Alloy	Bego Ni-Cr alloy	43.2857*	4.66861	.000	27.3968	59.1747
	Kera NH Ni-Cr alloy	29.5714*	5.60976	.002	11.6388	47.5041
	Ex-3 Ni-Cr alloy	22.7143*	4.98910	.007	6.3236	39.1050
Bego Ni-Cr Alloy	Kera NH Ni-Cr alloy	-13.7143-	4.18939	.056	-27.7344-	.3058
	Ex-3 Ni-Cr alloy	-20.5714-*	3.31252	.000	-31.2648-	-9.8781-
Kera NH Ni-Cr Alloy	Ex-3 Ni-Cr alloy	-6.8571-	4.54382	.578	-21.5769-	7.8626

This study was designed to identify the bond strength between porcelain to white gold and Ni-Cr alloys at different heat treatment. Study specimens were prepared by using conventional laboratory techniques, equipment's, and materials used for construction crown and bridge. A universal testing machine was used to evaluate adhesion durability of metal bonded porcelain. The metal surface treated with porcelain to strength the bonding, this test determines the best bond strength from interface adhesion after surface treatment with porcelain to white gold and Ni-Cr alloys.

According to [29], Chemical connection is one the most important factor among the mechanisms of metal to porcelain bonding rather than the mechanical one,[29]. This may influence the metal-ceramic interface by the formation of the oxide layer which in turn affected by the compassion alloy. The chemical bonding of the oxide layer could result from the ionic or covalent bond between the oxides inside the porcelain and those oxides diffused from the metal surface. This may in agreement with,[11,12] as they conducted that effect of bonding by oxides.

Economically, the replacement of gold alloy by an alternative metal-ceramic alloy is on the rise up. A noble Pd-Ag alloy may offer a high biocompatibility alongside physical properties. This could due to less damage or deformity caused by casting. Yet, insufficient studies were introduced for the clinical application of Pd-Ag alloy in the dental restoration. The bond-strength may determine the alloy potential for bonding with porcelain by their oxidation behavior,[20,23,24]. According to the researchers, the nature of the metal-porcelain adherence may be indicated by the form of the oxides during the degassing cycle which in turn reflect the quality of the bond to porcelain,[20-22].

The resistance to bonding failure may be enhanced by the metal-ceramic interface of an appropriate oxide layer. The firing of porcelain may help in completely remove of the thin oxide layer. In addition, a weaker bond strength may notice as a result of low cohesive strength to thick oxide layer,[34,35].

Stable oxide layers in white gold alloy incorporating some elements such as tin may increase the bond strength of porcelain to such alloys.

According to,[16,17] the degassing of Ni-Cr alloy at a high firing temperature above 950 °C may produce excessively thick oxide layer. Regardless the manufacturer standards, alloys may require a different oxidation process instead of the traditional degassing procedure.

In addition, the alloy surface topography may improve the bond strength as well. Metals that treated by airborne-particles could improve the energy at the surface and increase the wettability of the porcelain. However, in the present study reported that the Ni-Cr alloy that sandblasted by 250 µm Al_2O_3 airborne-particle decreases in bond strength than that of Pd-Ag alloy of 100 µm. This could disagree with[,25] which stated that the highest bond strength could be achieved by using large particle to abrade surfaces.

According to[,4,31] the bond strength of flat interface of metal-ceramic can only measure the forces directly imposed on this boundary. As a result, the present study was performed in accordance with the ISO 9693 standards[,37]. The thickness of a metal plate and porcelain layer was clinically acceptable[,36].

Conclusions

Despite the limitation of this study, the results were concluded that the type of metal-ceramic alloys may affect the porcelain bond-strength. Ni-Cr alloy revealed a significantly decreased in bond-strength to porcelain in comparison with white gold alloy.

Conflict of Interest: No

Source of Funding : Self

Ethical Clearance: None

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Textile Wastewater Treatment by Application of Advance Oxidation (AOPs) Process and Recycling for Industrial Uses

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Abstract

In the present study, the treatment of industrial wastewater and recycling for industrial uses. Photocatalytic degradation of dyes like methylene Blue dye has been used as technique for treatment in a batch reactor under solar light in heterogeneous slurry utilizing various concentrations of commercial powder TiO_2as photocatalysts semiconductors. Also the parameters have been studied catalyst type, catalyst concentration, pH of dye solution and dye concentration at the beginning. Therefore the results show that the best dose of TiO_2 is 4.5 gm/l , and the optimum pH is 6. But the percentage removal of chemical oxygen demand (COD) of the dye solutions were for higher than that of the degradation of dye for the same conditions of catalyst.

While the water quality of treated wastewater depends on a greatextent of the quality for the industrial water supply, nature of thewastes added during use, and the degree of treatment the wastewater has received. Then wastewater quality data routinely measured andreported at the wastewater treatment plant are mostly for treatedeffluent disposal or discharge requirements in terms of gross pollution parameter.

Keywords: *Advance Oxidation Process ; Industrial Wastewater Treatment ; TiO_2 Semiconductor*

Introduction

Photocatalytic processes to degrade organicpollutantsinwaterbyutilizingcatalysthavebeenthe subject of research recently. Semiconductoroxidessuchas ZnO and TiO_2 have been recognized to be preferable materials for photocatalyticprocesses, dueto their high photosensitivity, non-toxicnature, lowcost and chemical stability, so thesemiconductororphotocatalysisis initiated bythesurfacetrappingofphoto-generatedelectrons(e^-) and holes(h^+), whichinducesinterfacialelectron-transfer reactions withadsorbedsubstrates. However, because of the wide band gap of ZnO and TiO_2[1,3]. A considerable problems in treatment plants caused by dyes presents in textile industry wastewaters since those compounds are complex to degrade by biological methods. Some of the effective chemical and physical methods state a high activity of color removals such as coagulation-flocculation, advanced oxidation and electrochemical methods [4,5]. All these methods have operational problems such as high sludge formation in chemical ways in addition to that more expensive[6,7]. Adsorption can be considered an unattractive method for degradation objective because of the cost of adsorbent and regeneration requirement. However, recent studies specified the possibility of using some natural or low-cost adsorbents for color removal such as wood, ash and soil[8,9].

In the present paper, the photocatalytic degradation of Methylene Bluedye in aquatic solutions using commercial powder TiO_2 as aphotocatalysts has been tested and recycle wastewater has been treated for agricultural uses. The major aims of the study were compared thechange of the following parameters withrespect to the degradation efficiency.Effect of catalyst concentration ;effect of pH ; effect of initial concentration of the dye; kinetic of reaction; and COD removal

Materials and Method

Materials

In present studycommercial TiO_2 powder were gained from Merck Co. (Germany Company), Methylene Blue dye was taken up from Merck (Germany Company)

and was applied without further purification. Distilled water was used fora preparation of different solutions. HCl (0.1 N) and NaOH (0.1 N) were used for change pH of solution.

Instruments

Photochemical degradation was carried out in specially designed insulation walled reaction containers with volume 800 ml under UV-light chamber equipped with 8 UV tubes each of18W (Philips) having a wavelength of 365 nm, so the spectra were taken with UV–vis spectrophotometer (ShimadzuUV-2101 PC) and chemical oxygen demand (COD) was analyzed withCOD meter (HANA HI9146). But constant stirring of the solution was covered by using magnetic stirrers. Then the temperature was kept constant during the reaction time by spreading the water in the photocatalytic reactor vessels.

Irradiation experiments

For 500 ml of the dye solution (25 ppm), photocatalyst was added with different concentration and a suspension was anexhibit to irradiation. While experiments were carried out under UV-light. The aqueous suspension was magnetically stirred over the experiment. At different time periods,an aliquot was taken out with the help of a syringe and then filtered through Millipore syringe filter of 0.45 µm[10,11].

Absorption Measurements

The absorption spectrum was recorded using double beam UV-2101(Shmadzospectrophotometer)compared with distilled water as a reference liquid and the percentage rate of degradation was noticed in terms of change in intensity at λ_{max} of the dyes during irradiation time[12,13]. While the degradation efficiency (%) has been calculated as:

$$\% \text{ Degradation} = [Abs_0 - Abs_t) / Abs_0] * 100$$

Where:-

% Degradation is a percentage of dye disappearance.

Abs_0 is initial absorption of dye (at time = 0 min.)

Abs_t is absorption of dye (at time = t min.)

Therefore the similar experiments haveused different catalyst concentration (2–5 gm/l), to select the bestconcentration of catalyst TiO_2at the same dye concentration of the solution (25 ppm).

Results and Discussion

Effect of Photocatalyst Concentration

The effect of catalystconcentration on the degradation of Methylene Blue(50 ppm) was investigated using commercialTiO_2 from (2 to 5 gm\L) keeping another parameters like pH , temperature , light intensity and dye concentrationconstant. The results in theFigure 1 showed that the degradation percentage increased with an increase in TiO_2 commercial concentration up to (4.5 gm\L for TiO_2). This observation can be explained in terms of availability of active sites on the catalyst surface and the permeation of solar light into the suspension. The total active surface area increases with increasing catalyst dosage. At the same time, due to an increase in the turbidity of the suspension, there is a decrease in UV-light permeation as a result of increased scattering effect and hence the photoactivated volume of suspension decreases. Furthermore, at high catalyst loading, it is difficult to maintain the suspension homogenous due to particles agglomeration, which decreases the number of active sites [14,15]. Also the results also shows the maximum photodegradation for commercial TiO_2 (4.5 gm/L) achieved after 150minute (see Figure 1).

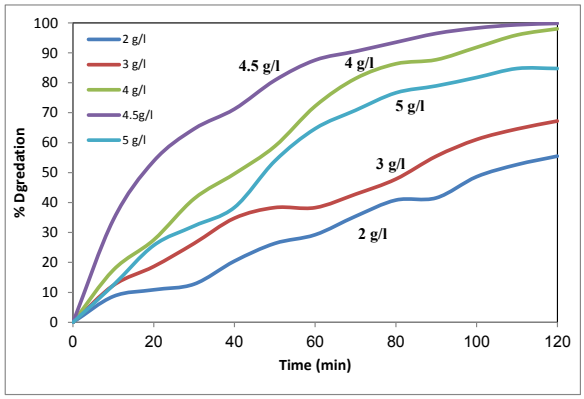


Figure 1 : Effect the catalyst dose of TiO_2 on degradation of Methylene Blue dye

Effect of pH on Solution Treatment

The wastewater is produced at different pH values, therefore, study of pH is very important on photodegradation of Methylene Bluedye. So experiments have been done at different values of pH varying from (4 to 12 for 20 mg/L) dye solution concentration and for the best of catalyst concentration (4.5 g/L)of TiO_2. But the figure 2 shows the percentage photodegradation

of against values of pH. It is clearly increasing in pH up to 11 for TiO_2because increasing in photodegradation activity [16]. Whilest the utilizing of TiO_2 as the catalyst is more appropriate at high pH values with the textile effluent. The interpretation of pH effects on the efficiency of the decolonization is a complex subject because many reactions can be occur to dye degradation such as "hydroxyl radical reaction, direct oxidation by the positive hole and direct reduction by the electron in the conducting band". Therefore the importance of each one depends upon the substrate nature and pH values[17,18].

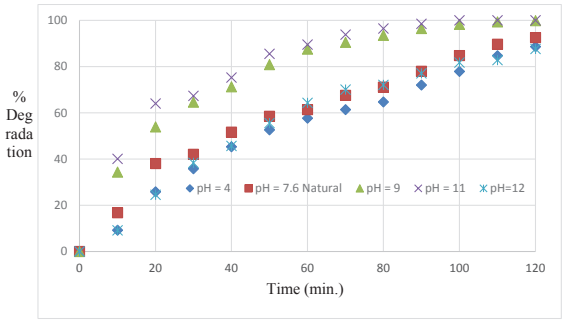


Figure 2: Effect the pH on degradation of Methylene Blue dye

Figure 2 : Effect the pH on degradation of Methylene Blue dye

Effect of Methylene Blue Dye Concentration

The photodegradation of Methylene Bluewas carried out by varying the initial concentration of the dye from (15 mg/L) in order to determine the effect of initial dye concentration on the best catalyst type and dose TiO_2. As the concentration of the dye was increased, the percentage of degradation decreased indicating for either to increase the catalyst concentration or time span for the complete removal. The figure3 depicts the time-dependent graphs of degradation of Methylene Blue at different concentrations of dye solutions(25–100 mg/L) . But in the case of dye solutions of (25 mg/L and 50 mg/L), 100% degradation occurred within 120 and 210minutes respectively. While in case of (75 and 100 mg/L) , the degradation with 240 minutes are 64% and 40%respectively,for the complete degradation of the dye and the percentage degradation further decreased on increasing the concentration of dye. Finally the reason for this behavior was the path length of the photons entering the solution decreases in highdye concentration that means the photochemical reaction is decreased but the number of photons absorbed by catalyst is high at low initial dye concentration the number of photon absorption by the catalyst in lower[19,20].

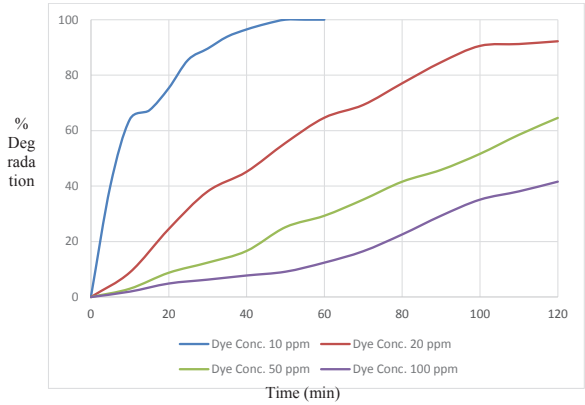


Figure 3 : Effect the dye concentration on degradation of Methylene Blue dye

Kinetic Study

Figure 4 shows the kinetic of the disappearance of Methylene Blue dye for an initial concentration of (50 mg/L). The results show that the photocatalytic degradation of Methylene Blue dye with commercial powder TiO_2concentration (1.3 gm/L)can be described by the first order kinetic model, $\ln (C_0/C) = kt$, where C_0 is the initial concentration and C is the concentration at any time t (y=0.0229x-0.2054). But the semi-logarithmic plots of the concentration data gave a straight line. Then the correlation constant for the fitted line was calculated to be $R^2 = 0.9739$ for commercial TiO_2[21,23].

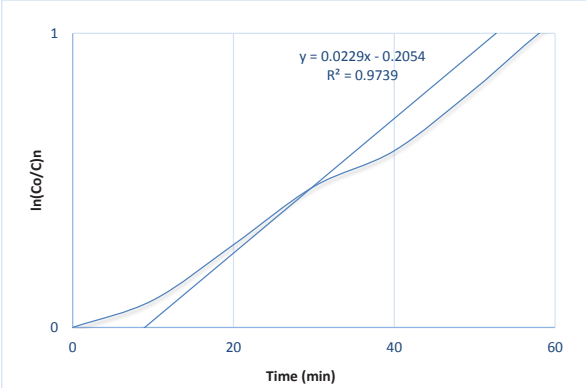


Figure 4 : Kinetic study of the disappearance of Methylene Blue dye

Conclusions

The photocatalytic degradation of aqueous solutions of Methylene Blue dye has been examined with the use of a UV-light-irradiated ZnO catalyst. It has been found that the process leads to decolorization and, eventually to complete mineralization of the dye solution. Also evolution of intermediates and final products on photocatalyst surface and the solution has been

monitored with a variety of techniques, which enable the identification of the reaction pathway, from adsorption of the dye molecule on the photocatalyst surface, to the formation of final products.Finally the photocatalytic degradation followed pseudo-first order kinetics.

Recommendation: We can develop this subject to covered agriculture uses or irrigation

Conflict of Interest: Non

Source of Funding : Self

Ethical Clearances: Nil

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Spa gene Typing among *Staphylococcus Aureus* Isolates in Microbiology Laboratories of Scientific Research Center

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Abstract

This study aimed to *S.aureus* typing using gene encoding protein A (*spa* gene typing) in some clinical and environmental samples collected from microbiology laboratories at scientific research center

A total of 50 different environmental and clinical samples were collected from laboratories of ministry of science & technology (25 samples from environmental surfaces (benches, tables, sink,), 10 samples from mobile and 15 clinical samples. during the period from March / 2018 to May / 2018.

Biochemical and morphological characterization tests showed that thirty five isolates were identified as *Staphylococcus aureus* of it 20 isolates from environmental surfaces, 5 isolates from mobiles, 10 isolates from researcher's hands.

Antibiotic susceptibility tests of all isolates towards eight antibiotics were carried out and results showed that many isolates (25 %) were multi-resistant, DNA was extracted by wizard DNA extraction kit and it was amplified by specific primer of polymorphic X region of spa, which were determined by Ridom Staph Type software.

spa typing was carried out on all positive isolates. A total of 14 spa types was detected from 35 *S. aureus* isolates. t008 was the most common spa type (8; 29.6%), followed by t346 (4; 14.8%), t189 (2; 7.4%), t688 (2; 7.4%), t002 (2; 7.4%). All other spa types were less than 1% of *S. aureus* isolates.

The most common types of spa in our region were t008 (8; 29.6%), which indicate prevalence of community acquired *S.aureus*(CA-*S.aureus*) followed by t346 (4; 14.8%) from 27 spa types which were identified in this study.

In conclusion, we have shown that the laboratory environment could be a reservoir contributing to dissemination of virulent *S. aureus*, and The proposed surveillance protocol successfully allowed the detection of *S.aureus* contaminating important high-touch surfaces in a representative microbiology Lab. Frequently contaminated surfaces must be targeted for routine cleaning and disinfection.

Key words *: spa gene,Staphylococcus aureus, PCR .*

Introduction

Staphylococcus aureus is the most common cause of human bacterial infections, it is a major global public health problem causing serious, often life threatening infections in the community and hospital setting that are becoming more difficult to manage with current antibiotics therapy regimens [(1)], *Staphylococcus aureus* is a commensal organism that colonizes nasal mucosa in 25-30% of the healthy human population [(2)], so it considered an opportunistic pathogenic bacterium due to its ability to take advantage of damaged cutaneous layers [(3)].

The pathology of a *S. aureus* infection is often dependent on which toxins are expressed and the virulence factors with which they are associated. It can cause infections ranging from mild skin irritation or a simple rash to severe illness including Toxic Shock Syndrome, abscesses, bone infections, and sepsis [(4)].

The primary cause of lower respiratory tract and surgical site infections and is the second leading cause of bacteremia, pneumonia, and cardiovascular infections.

The severity of infection is often dependent on which toxin genes are present, and the virulence factors associated with them[5].

S. aureus encodes many virulence factors including the surface Ig-binding protein A (*spa*) whose function is to capture IgG molecules in the inverted orientation and therefore prevent phagocytosis of the bacterial cells by the host immune system[6]**.** Genotypes known as "*spa*-types", based on highly variable Xr region sequences of the *spa*-gene, are frequently used to classify strains.

The purpose of this study was to examine the prevalence of *spa* gene of *S. aureus* in microbiology laboratories environment

Materials and Method

Sample Collection

Five microbiological laboratories were selected in ministry of science and technology, each sampling was selected based upon the most common areas touched by hands of staff working in the Lab, 25 samples from environmental surfaces (benches, tables, sink,), 10 samples from mobile and 15 clinical samples. during the period from(March / 2018 to May / 2018)were coded.

Samples Processing

Samples were collected using sterilized Swiffer pads as previously described. was it placed into a Whirl Pack™bag (Nasco, Fort Atkinson, WI), sealed, and added 50 ml peptone water ,then mixing well , after that was added 50 ml Baird Parker broth (2 times concentrations) with tellurite enrichment in 250 ml sterile screw cap jar and incubated for 18-24 hr at 37C. after incubation was inoculated onto Baird Parker agar and manitol salt agar and incubated 24-48 hr at 37C and examined for bacterial growth. Presumptive *S.aureus*(black colonies with clear halos on BPA) and then confirmed bydoing Gramstain, catalase test, coagulase test. Swabs were inoculated onto Baird Parker agar and manitol salt agar.

Antimicrobial Susceptibility Testing (AST)

S. aureus isolates were tested for susceptibility to benzylpenicillin, tetracycline, erythromycin, ciprofloxacin, trimethoprim-sulfamethoxazole, gentamicin, vancomycin, and nitrofurantoin using the Kirby-Bauer disk diffusion method on Mueller Hinton agar in accordance with the Clinical Laboratory Standards Institute standards and previously described methods[7].

Molecular Analysis

All isolates positive for *S.aureus* were selected for molecular testing.16SrRNA gene and nuc gene for the confirmation isolates, PCRwas carried out in a total volume of 25 µL[8]. For spa gene mixture to achieve 50 m LPCR products were run on a 1.5% agarose gel using electrophoresis, stained with gel red at 70 volts for 60 min and visualised under UV light using a gel documentation system .

Primers name	Sequences for (16SrRNA)	Product size(bp)
16SrRNA-R	5`-AGA CCC GGG AAC GTA TTC AC -3`	~800
16SrRNA-F	5`- GTG CCA GCA GCC GCG GTA A -3`	

Primers name	Sequences for (nuc) gene	Product size(bp)
Primer -R	**5′-GCGATTGATGGTGATAC-GGTT-3′**	**270**
Primer -F	**5′-AGCCAAGCCTTGAC-GAACTAAAGC-3**	

Determination of *spa* type was performed using published methods and primers . Based-Upon Repeat Pattern (BURP) analysis to identify *spa* cluster complexes (*spa*CC) was conducted using the RidomStaphType software using default parameters (version 2.2.1; Ridom, GmbH, Wurzburg, Germany).

The sequences of used primer are as follow:

Primers name	Sequences for (spa)	Product size(bp)
spa-1113f	**5'-ATC TGG TGG GGT AAC AACTG-3'**	1100
spa-1514r	5'-CGC TGC ACC TAA CGC TAA TG-3'	

Findings and Discussion

A total of 50 environmental and clinical samples

were collected from Five microbiological laboratories were selected in ministry of science and technology, The overall prevalence of *S. aureus* was 80% (20/25) for environmental samples, 50% (5/10) for mobile samples, 66.6% (10/15) for clinical samples respectively.

The most common places that were contaminated were areas touched showing up at 80% of total samples. This included bench,Sink, keyboards at the Laboratory. As environmental contamination increases, the prevalence of researcher hands carriage also increases [9]. This fact clarifies why these areas were the most contaminated[10]**.** The determinants that may have played a role in the areas that were most contaminated are hand hygiene among researcher [11], frequency of these areas being used, level of contamination among surfaces, and the amount of time and interaction that happens with environmental laboratory by researcher working in these areas[12].

There is a limited understanding of the dynamics and determinants of spread in this setting [13]with little research done in microbiology laboratory environments. Dynamics of *S.aureus* in hospitals have been sought, but the laboratory environment is still poorly understood[14].

Antibiotic susceptibility tests of all isolates towards eight antibiotics were carried out and results showed that many isolates (25 %) were multi-resistant. Overall (n=35), 94.2% (33/35) of isolates were resistant to penicillin, 65.7 % (23/35) were resistant to erythromycin, 60% (21/35) of isolates were resistant to meth prim, 48.5 % (17/35) were resistant to clindamycin , 40% (14/35) of isolates were resistant to tetracycline, 34.2% (12/35) of isolates were resistant to gentamicin, 22.8% (8/35) of isolates were resistant to chloramphenicol, 5.71% (2/35) of isolates were resistant to vancomycin. and 34.2.4% (12/35) were Multi-Drug Resistance (MDR) .

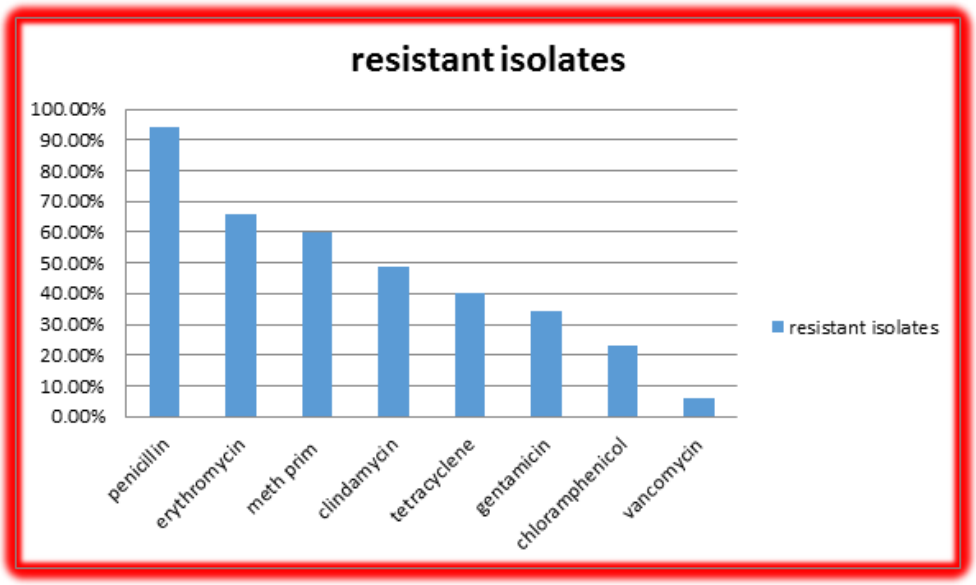


Figure-1- resistant isolates

Molecular characterization

Molecular characterization of all isolates were conducted by amplification of *spa* typing. The spa genewasamplifiedbyPCR forconfirmed *S. aureus* isolates . The control showed only one band of spa gene of 1100 bp (figure-4-)

14 spa types was detected from 35 *S. aureus* isolates. t008 was the most common spa type (8; 29.6%), followed by t346 (4; 14.8%), t189 (2; 7.4%), t688 (2; 7.4%), t002 (2; 7.4%). All other spa types were less than 1% of *S. aureus* isolates.

The most common types of spa in our region were t008 (8; 29.6%), which indicate prevalence of community acquired *S.aureus* (CA-*S.aureus*) followed by t346 (4; 14.8%) from 27 spa types which were identified in this study. (CA-*S.aureus*) appears to be more virulent than (HA-*S.aureus*). the clinical infections associated with it include severe skin and soft tissue infections and necrotizing pneumonia.

The concept of biosafety in laboratory practice is one that is of most important; and as such it must be given top priority at all times, and There is the need for biosafety to be placed in the first stage of issues in laboratory practice in over respective facilities [15]There must be a continuous concerted effort on the part of laboratories to ensure that their testing procedures are safe and in line with international best practices both for the safety of staff and patients and also to safeguard the immediate environment from potentially hazardous pathogens[16], The absence of appropriate biosafety policies and practices is one of the challenges facing researcher in laboratory

Table-1- *spa* gene typing

***Spa* typing item**	**No.of isolates**	**% of isolates with valid values**
t008	8	29.6%
t346	4	14.8%
t189	2	7.4%
t688	2	7.4%
t002	2	7.4%
t045	1	2.8%
t065	1	2.8%
t067	1	2.8%
t1149	1	2.8%
t1578	1	2.8%
t024	1	2.8%
t216	1	2.8%
t209	1	2.8%
t091	1	2.8%
t012	1	2.8%
t030	1	2.8%
t037	1	2.8%
t160	1	2.8%
t021	1	2.8%
t258	1	2.8%
t330	1	2.8%
t660	1	2.8%

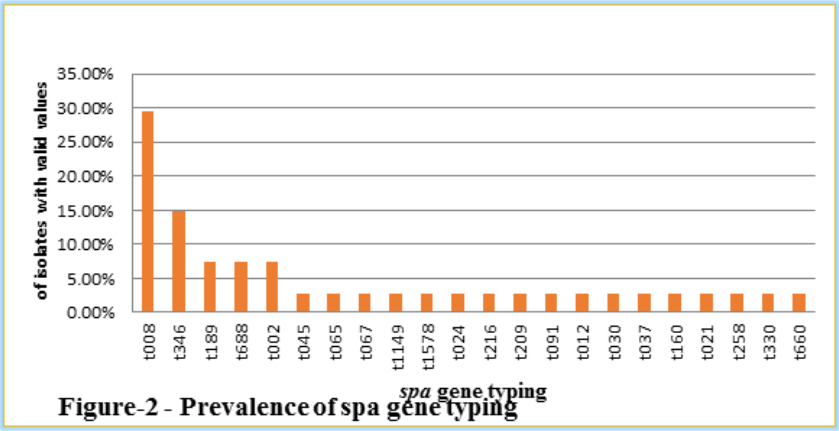


Figure-2 - Prevalence of spa gene typing

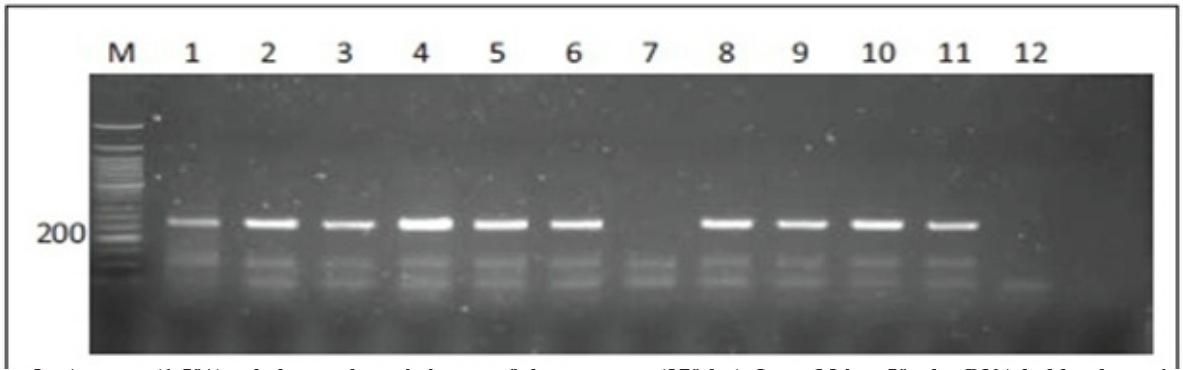


Figure – 3 - Agarose (1.5%) gel electrophoresis image of the nuc gene (270 bp). Lane M is a 50- bp DNA ladder, lanes 1 to 10 are test samples, lane 11 is a positive control and lane 12 is a negative control.



Figure – 4- Three percent agarose gel electrophoresis analysis of PCR amplificationproductsof spa gene of 1100bp, extracted from S. aureus PCR products for spa gene for positive MRSA samples. Lane L: DNA molecular size marker (100 bp ladder),

Recommendation and Conclusion

1- Rapid and accurate determination of the different spa gene prevalence of *Staphylococcus aureus* isolated microbiological laboratories are a great help in understanding the epidemiology of this bacteria in workplace area.

2- detection of bacterial contamination source in microbiology laboratories of all scientific research center using molecular typing.

3- comparison between microbiology and chemical Laboratory related bacterial contamination.

Conflict of Interest : None.

Source of Funding: Self funding **.**

Ethical Clearance: Scientific research projects of Ministry of Science of Technology.

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Nutritional Knowledge and Practices amongpregnant Women attending Primary Health Care Center in Baghdad City

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Abstract

Objective: To estimate the grade of knowledge and practice of nutrition among women of pregnancy. **Method:-**A cross-sectional study carried out in at al- Kadmayha& Bab-almoadham primary health care. The sample was selected by (non probability convenient sampling) and sample size was (100). Data was collected done by interview to take out demographic information. **Results:-** The result display that the multitude of cases were (45%) through age group (20-29) years. As for education (3%) were illiterate As for occupation (61%) were workers and about (39%) housewife. and this research explore that (67%) of gravid female had kindly knowing and about (56%) of gravid women had good practice on feeding pending pregnancy. Conclusions: This project displays the factors that found significant combination with nutrition knowledge.Consist of standard of awareness and nourishment acquaintance through conception and significant convenient relevance between the age group and nutrition habit during pregnancy.

***Key words**: knowledge, practice, factors, nutrition, pregnancy, Baghdad*

Introduction

Nutrition during preconception as long as throughout pregnancy has a central influence on the impactof pregnancy [1]. Balanced and adequate maternal assimilation of macro nutrition and micronutrients guaranty not only the health situation of the pregnant mum, the luxury of the foetus and the newborn but future soundness status of herself (safeguard of life) and her three descent (protection of progeny) [2, 3] .Besides, pauper and extravagant alimentation of gravid women may leading to maternal harm and death[4, 5]. Nutritional imponderables causes fail of the embryo to extent its full development prospect recognized as embryonic growth limitation, which is combined with child together little and long duration complications, mortality and mortality[6, 7].

On the inversion women who are suffering from malnutrition previous and throughout pregnancy are probable to experiment inverse pregnancy consequence. Before pregnancy the woman needs nutrients for growth and maintenance of her body. Good nutrition keeps her healthy. During pregnancy additional requirement for all nutrients occurs to enable the fetus to grow normally in the uterus [8].

Healthy eating behavior in pregnancy support to inhibit pregnancy complications, aids reform from childbirth, efficiently tolerate breastfeeding and also prevents the manifestation of diseases in maturity [9, 10]. The incidence of dietary supplement impairment as an outcome of dietary attitude and modality in pregnancy is major than during pregnancy than at any other juncture of the life period, It was shown that, nutrition knowing was oracular of alteration in dietary habits and health exhortation motivate expecting women to amelioration their food assimilation [11].

It was usually reasonable that the fetus was feed adequately at the expenditure of maternal storage and needs; however, it is becoming clear that this may not always be the case, and that fetal expansion can be less than optimal if certain nutrients are not obtainable during intrauterine life [12]. Therefore the advancement of female validity and other preventive health auspices practice should onset before birth, during intrauterine life and expand by means of various phases of their lives in order to incur their general as well as their reproductive health [13].

Method

Design of the Study:A cross sectional study design (convenient sampling) for pregnant women was conducted starting from (1st September 2018 to 1st of March 2019).

Setting of the Study: The study is conducted atal-Kadmayha& Bab-almoadham PHC centers.

The sample of the study: A convenient sampling, purposive sample of 100 female.The fact was collected by direct interview using special questionnaire to acquired socio-demographic information. (Age, education, occupation……..ect

Scales and scoring:

The items have rated and scored accord to the following patterns:

1. Knowledge scale: three points likert scales are applied for rating the knowing of study sample items as score of three for (correct answer), 2 for (don't know) and score 1 for (false answer).
2. Practice scales: three points are used for rating items as score of three for (always), 2 for (sometimes) and score one for (never).
3. Determination of a grades of the samples knowledge was Divide into three faces (poor, fair , and good)
4. $$\text{Rating Range of score} = \frac{\text{Max-Min}}{3} = \frac{3-1}{3} = 0.66$$
   - Poor knowledge score : 1-1.66 (<55%)
   - Fair knowledge score : 1-67-2.33 (56-78%)
   - Good knowledge score :2.34-3 (>78%).
   - Determination of a grades of the samples practice was be included three grades (poor, fair , and good):-
   - Poor practice e score : 1-1.66 (<55%)
   - Fair practice score : 1-67-2.33 (56-78%)
   - Good practice score :2.34-3 (>78%).

Data analysis by SPSS version 18, x^2 test was appliedfor significance of p value of <0.05 was considered significant.

Findings

Table 1:- Distribution of sample according to age, education level occupation, Receiving information and exporter of input and nutritional habits.

Variables		No 100.	%
Age	<20	17	17.0
	20-29	45	45.0
	30-39	38	38.0
Education level	Illiterate	3	3.0
	Read and write	4	4.0
	Primary	15	15.0
	Intermediate	11	11.0
	Secondary	18	18.0
	College and above	49	49.0
Occupation	workers	61	61.0
	housewife	39	39.0
Receiving information	Yes	94	94.0
	no	6	6.0
Sources of information	Health staff	47	47.0
	Pregnant women	11	11.0
	Friends	15	15.0
	Family and relative	14	14.0
	Media	13	13.0
	Total	100	100.0
***Nutritional habits**	Using salt to cook meal	22	22
	Eat fresh fruit	25	25
	Taking dark tea	11	11
	Snack food	10	10
	Drinking milk	55	55
	Eating milk product	56	56
	Eating meat	44	44
	Iron supply	77	77
	Folic acid supply	78	78

***nutritional habit collect answer range from all pregnant women**

Table (1) shows that of the (100) pregnant women there were (45%) in age group (20-29) years. As for education (3%) were illiterate while (49%) had higher education. As for occupation (61%) were workers and about (39%) housewife . Receiving information on nutrition about (94%) were yes, as for Sources of information (47%) were health staff, (78%) folic acid

supply (10%) was drinking dark tea.

Table 2:- summary of nutritional knowledge and practice score

Knowledge score	**Frequency**	**percent**
good	67	67.0
poor	33	33.0
Total	100	100.0
Practice score	Frequency	percent
good	56	56.0
poor	44	44.0
Total	100	100.0

Table (2) shows that (67%) of pregnant female have good knowledge regarding appropriate nutrition according pregnancy. While (56%) of pregnant women have good practice regarding appropriate nutrition during pregnancy..

Table(3): relation between Knowing Level and age of pregnant women, education and occupation

Variables		**KNOWLEDGE SCORE**						
	good		**poor**		**Total**			
	No	%	No	%	No	%	p-value	
Age	<20	10	14.9	7	21.2	17	17.0	
	20-29	35	52.2	10	30.3	45	45.0	**0.116**
	30-39	22	32.8	16	48.5	38	38.0	
	Total	67	100.0	33	100.0	100	100.0	
Education	Illiterate	1	1.5	2	6.1	3	3.0	
	Read and write	3	4.5	1	3.0	4	4.0	
	Primary	9	13.4	6	18.2	15	15.0	
	intermediate	9	13.4	2	6.1	11	11.0	**0.0016**
	Secondary	12	17.9	6	18.2	18	18.0	
	college	33	49.3	16	48.5	49	49.0	
Occupation	workers	41	61.2	20	60.6	61	61.0	0.955
	Housewife's	26	38.8	13	39.4	39	39.0	

Table (3) shows that good knowledge of pregnant women who were 20-29 years old is greater than those who were lower than 20 years and more than 29 years old. There. As for education that poor knowing of pregnant women whose education was illiteracy, There was statistically significant relationship between them with p-value <0.00. As for occupation shows that good knowledge who were workers was greater than those who were their housewife's.

Table(4): Relation between Knowledge Level and Receiving information

Variables		**KNO WLEGE SCOR**						
	good		**poor**		**Total**			
	No	%	No	%	No	%		
Receiving information	Yes	66	98.5	28	84.8	94	94.0	0.007
	No	1	1.5	5	15.2	6	6.0	
Sources of information	Health staff	32	47.8	15	45.5	47	47.0	0.745
	Pregnant women	7	10.4	4	12.1	11	11.0	
	friends	10	14.9	5	15.2	15	15.0	
	Family and relative	11	16.4	3	9.1	14	14.0	
	media	7	10.4	6	18.2	13	13.0	

Table (4) presentation that gravid women whose receiving information on nutrition had good knowledge about (98.5%).High statistically significant relevance between them with p-value <0.00.As for sources of information that good knowledge of gravid women who were health staff.

Table (5): Relationship between practice Level and age of pregnant women, education and occupation

		PRACTICE SCORE						
	good		**poor**		**Total**			
	No	%	No	%	No	%	p.v	
Age	<20	8	14.3	9	20.5	17	17.0	**0.063**
	20-29	31	55.4	14	31.8	45	45.0	
	30-39	17	30.4	21	47.7	38	38.0	
	Total	56	100	44	100	100	100.0	
Education level	illiterate	3	5.4	0	.0	3	3.0	**0.021**
	Read and write	2	3.6	2	4.5	4	4.0	
	Primary	8	14.3	7	15.9	15	15.0	
	Intermediate	6	10.7	5	11.4	11	11.0	
	Secondary	9	16.1	9	20.5	18	18.0	
	college	28	50.0	21	47.7	49	49.0	
Occupation	Workers	37	66.1	24	54.5	61	61.0	**0.241**
	Housewife's	19	33.9	20	45.5	39	39.0	

Table (5) shows that good practice of pregnant women who were 20-29 years old is great than those who were less than 20 years and more than 29 years old. As for education that good practice of pregnant women whose education was higher, As for occupation shows that good practice who were workers was higher than those who were their housewife's.

Table(6): Relations ofpractice Level

		PRACTICE SCORE						
	good		**poor**		**Total**			
	No	**%**	**No**	**%**	**No**	**%**		**p.v**
Receiving information	yes	54	96.4	40	90.9	94	94.0	**0249**
	no	2	3.6	4	9.1	6	6.0	
Sources of information	Health staff	29	51.8	18	40.9	47	47.0	**0.383**
	Pregnant women	6	10.7	5	11.4	11	11.0	
	friends	5	8.9	10	22.7	15	15.0	
	family	9	16.1	5	11.4	14	14.0	
	media	7	12.5	6	13.6	13	13.0	

Table (6) display that pregnant women whose receiving information on nutrition had good practice about (96.4%).As for sources of information that good practice of pregnant female who were health staff.

Discussion

The period of pregnancy is remarkable by enormous physiological variation that demands healthy dietary lifestyle option in arrangement to enhance the physical and psychological development of the unborn child [4]. The nutritional state of pregnant woman remains critical in determining healthy pregnancy outcomes. In this study, most of the pregnant women belongs to the age 20-29 years the finding of the current study is agreement with findings reported in Ethiopia [14], and in Nigeria [15], this may be because the extreme ages of reproductive years are well know about nutrition during pregnancy.

And almost about (49%) of them were collage education the finding of the attend study is agreement with findings reported in Nigeria [15],found a highest knowledge score were obtained by women of higher education. Health staff in this study was the source of information for 47% of the pregnant women. The outcome of this research was more than the study proceed in Gambia [16], that showed the provenance of acquaintance for the study participants were 35% being informed on nutrition and feed by their antenatal nutrition care providers .

Although the outcome of this research was additional than the study conducted in Gambia much effort was consequence needed to get better nutrition teaching to adequately supply the necessary information which is crucial to prevent the Intergenerational effect of malnutrition. The result of this study also present that the ratio of mothers who have appropriate knowledge on maternal nutrition during pregnancy was found to be 67%.

As a consequence of this study is similar with the study proceed in Ethiopia [14], in which great than semi of the women in the study had the basic and essential knowledge concerning prominence of nutrition during pregnancy . This result also similar the study completed in Malaysia[17], 65.7 % and Swaziland [18], 67% of mothers had compatible knowledge across maternal nutrition .

Whereas the finding of this research is more than the study finished in Ethiopia[19], 52.5% of mums had

compatible knowledge related maternal nutrition . A this discrepancy might be regarding to socioeconomic factors and cultural difference of the study participants. The peak level of nutrition knowledge demonstrated in our study maybe due to high educational level of the participants .

The finding of this study was also reveal that the proportion of gravid women with good pregnancy specific nutrition practice was set up to be 56%. Similarly the study conducted in Swaziland [18], reported that 51% pregnant women had good practice regarding nourishment during gravid . On the other hand a higher proportion of gravid women with good nutrition workout were notify from another study conducted in Malaysia 74% and Pakistan 65.5% [17, 20].

The potential reasons for these variation might be regarding to the diversity in socioeconomic status, cultural believes, access to nutrition and health services among the study participants. This study shows the age was not important predictor of knowledge of graved female in the research area. The results of the discuss are not comparable with the results from Ghana [21], where women aged 25 to 35 years had the elevated ratio of dietary knowledge, compared with those younger than 25 and older .The probable reason for observed discrepancy may be the difference in socio-cultural of the two-study population with respect to food and exposure to nutrition information during pregnancy.

Educational level, Nutrition information has been specified during pregnancy and the importance of women's knowledge of nutria during pregnancy among the study is similar to the one in Malaysia [22], demonstrated that women with preferable nutritional knowledge are significantly higher in educational level, nutritional formation .

The finding of the research stated that individuals with a higher educational standard had best nutrition knowledge in study may be explained by more access to internet, books and magazines as source of information in work area [22]. This study shows that there was statistically significant company between dietary practices of mothers and age the finding of the present discuss is disagreement with findings reported in Ethiopia [23],found that age had no combination with dietary practices of mothers. This could be explained by different in time and place of the study.

Conclusions

The finding of the study fixed that (67%) of pregnant women had good knowledge on nutrition during pregnancy. The results of the study particular that (56%) of pregnant women had good practice on nurture during pregnancy.

There was a correlation between you and a statistical indication between the level of education, information and nutrition there was significant positive relation between the age and nutrition practice during pregnancy.

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Ethical Clearance: Non

Conflict of Interest : None.

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Levels of Calcitonin and Procalcitonin in Different Types of Thyroid Cancer in Kirkuk City-Iraq

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Abstract

Thyroid cancer is the most common endocrine malignancy, accounting for 1.9% of all new malignant tumors. Thyroid cancer begins in the follicular cell of the thyroid gland. The aim of the study was to estimate the level of procalcitonin and thyroid tests in patients with different types of thyroid cancer. The number of thyroid cancer women under study were 40 women whose ages were between 25-75 years old were included in this cross-sectional study which carried out in Kirkuk city from the period of September 2016 to March 2017. These patients admitted to Kirkuk oncology center. The control group who were matched to the thyroid cancer patients studied, included 30 heathy individuals (blood donors). Blood was collected from patients and control for estimation of serum total TSH, T3, T4, FT3, FT4, and procalcitonin using immunefluorescent technique. The study showed that that the highest rate of increased PCT level was recorded among thyroid cancer patients comparing with the control group (25% *v.s.* 10%), the highest mean level of PCT was noticed among medullary thyroid cancer (8.22 ± 3.16 ng/ml) comparing with follicular and papillary thyroid cancer. The highest mean levels of TSH, T3 and T4 were noted among thyroid cancer patients (16.3± 4.22, 2.01 ± 0.55 and 144.1 ± 45.6) respectively comparing with the control group which showed the least means of TSH, T3 and T4 and with highly significant difference between the two groups. The study showed that the lowest mean of TSH was noted among MTC patients (0.88±0.61) comparing with FTC and PTC patients and the high means of FT3 and FT4 were noted among MTC patients (5.89±0.31and 19.25±2.48) respectively. Table 5 demonstrates that the lowest mean levels of FT3 noted among thyroid cancer patients comparing with the controls (2.99±10.91 *v.s.* 15.91±0.43). It was concluded that there was a highly significant relation procalcitonin and thyroid cancer specially medullary type.

Keyword: *Thyroid cancer, MTC, Procalcitonin, Thyroid.*

Introduction

Thyroid cancer is the most common endocrine malignancy, accounting for 1.9% of all new malignant tumors. Thyroid cancer begins in the follicular cell of the thyroid gland [(1)]. There are 2 types of cells located within the thyroid parenchyma: the follicular cells and the supporting cells (also called the *C cells*) [(2)]. Cancers derived from follicular cells are generally differentiated thyroid carcinomas (DTC). Although these cancers are not usually aggressive, they can eventually mutate into more aggressive variants. They have been traditionally classified as well differentiated thyroid carcinoma, including papillary thyroid carcinoma (80%) and follicular thyroid carcinoma (PTC and FTC, respectively) (10-15%)[(3)]. Medullary thyroid carcinoma (MTC) accounts for up to 5% of thyroid cancers, four in five cases occur as a sporadic and the remaining 20% are part of familial disorders [(4)]. The detection of MTC still represents a challenge and not infrequently MTC is only diagnosed histologically after surgery done for nodular goiter. This is due to several reasons[(1)]. In particular, several technical pitfalls can affect the measurement of serum calcitonin (CT) which represents the main presurgical and postoperative serum marker of MTC; no fixed CT thresholds to diagnose and exclude MTC are available and non-specific increase of CT in several non-thyroidal conditions may exist; MTC with undetectable CT is rarely reported [(5)]. Thus, further markers are

advocated to better manage MTC cases before and after their initial treatment. Traditionally, MTC patients are treated by thyroidectomy and central (with or without lateral) neck-dissection, and after surgery CT is the pivotal tumor marker[7,8]. However, several limits affect CT accuracy. High CT might be observed in C-cell hyperplasia, non-thyroidal neoplasia (neuroendocrine tumors, leukemias, systemic mastocytosis, small cell lung, breast and pancreatic cancer) renal failure, endocrine disfunctions [9]. The aim of the study was to estimate the level of procalcitonin and thyroid tests in patients with different types of thyroid cancer

Material and Method

The number of thyroid cancer women under study were 40 women whose ages were between 25-75 years old were included in this cross-sectional study which carried out in Kirkuk city from the period of September 2016 to March 2017. These patients admitted to Kirkuk oncology center. The control group who were matched to the thyroid cancer patients studied, included 30 heathy individuals (blood donors). 5 ml of blood was collected and placed in plane tubes, left for 30 minutes at 37 °C for clotting and centrifuged at 3000 rpm for 15 minutes, the obtained sera was aspirated using automatic micropipette and transferred to Eppendorf tubes and stored in deep freeze at -20°C for for estimation of serum total TSH, T3, T4, FT3, FT4, and procalcitonin using immunoflurescent technique (Minividas Immunofluorescent, France).

2.2. Statistical analysis: Computerized statistically analysis was performed using Mintab ver 18.0 statistic program. Comparison was carried out using Chi-square (X^2) for dtermination of The *P.* value.

Findings

Table 1 showed that the highest rate of increased PCT level was recorded among thyroid cancer patients comparing with the control group (25% *v.s.* 10%) with highly significant difference between the two groups regarding PCT level. In relation of PCT level with the type of thyroid cancer the study showed that the highest mean level of PCT was noticed among medullary thyroid cancer (8.22 ± 3.16 ng/ml) comparing with follicular and papillary thyroid cancer with significant differences among them(Table 2).

Table 1: Relation of PCT level with thyroid cancer patients and the control group.

Procalcitonin (PCT)* (ng/ml)	Thyroid cancer		Control	
	No.	%	No.	%
increased	10	25	3	10
Normal	30	75	25	90
Total	40	100	30	100

P. value: 0.031

Table 2: Differences of PCT levels among types of thyroid cancer

PCT ng/ml	Thyroid cancer (n:52)		
	Follicular (n:5)	Medullary (n:5)	Papillary (n:30)
Mean	0.49	8.22	0.93
S.D	0.12	3.16	0.45

P. value: 0.008

In Table 3, the highest mean levels of TSH, T3 and T4 were noted among thyroid cancer patients (16.3± 4.22, 2.01 ± 0.55 and 144.1 ± 45.6) respectively comparing with the control group which showed the least means of TSH, T3 and T4 and with highly significant difference between the two groups. The study showed that the lowest mean of TSH was noted among MTC patients (0.88±0.61) comparing with FTC and PTC patients and the high means of FT3 and FT4 were noted among MTC patients (5.89±0.31and 19.25±2.48) respectively, Table 4.

Table 3: Relation of thyroid hormones mean levels with thyroid cancer and the control group.

Parameters		**Thyroid cancer (n:40)**	**Control (n:30)**	***P. value***
TSH µU/ml	Mean	16.3	1.22	0.009
	S.D	4.22	0.81	
T3 pg/mL	Mean	2.01	2.477	0.035
	S.D	0.55	0.41	
T4	Mean	144.1	108.4	0.09
	S.D	45.6	33.9	

Table 4: Relation of thyroid hormones with cancer type

Parameters (mean ± SD)	**Thyroid cancer (n:40)**			***P. value***
	Follicular (n:5)	**Medullary (n:5)**	**Papillary (n:20)**	
TSH	13.5±6.9	0.88±0.61	18.3±8.2	0.74
T3	2.1±0.8	2.88±0.81	3.88±0.91	0.941
T4	83.5±6.1	144±12.1	128.3±51.7	0.48
FT3	3.44±1.55	5.89±0.31	2.91±1.22	0.37
FT4	7.22±3.18	20.6±2.34	113.2±4.9	0.22

Table 5 demonstrates that the lowest mean levels of FT3 noted among thyroid cancer patients comparing with the controls (2.99±10.91 *v.s.* 15.91±0.43) with highly significant relation, while FT4 was slightly decreased in thyroid cancer patients comparing with the controls (1.83±6.99 *v.s.* 2.61) with no significant difference between the two groups regarding FT4 levels.

Table 5: Relation of FT3 and FT4 mean levels with thyroid cancer and the control group.

Parameters		Thyroid cancer (n:40)	Control (n:30)	*P. value*
FT3	Mean	2.99	15.91	0.0002
	S.D	0.91	0.43	
FT4	Mean	13.83	16.33	0.26
	S.D	6.99	2.61	

Discussion

Procalcitonin is determined by several analytical tests with different immunore active isoforms and fragments which leads to poor comparability of results [7,8]. In addition, even if PCT stimulation may improve its reliability, there is high variability of results from different articles in different populations. For all these reasons, the management of MTC in clinical practice may hide some pitfalls. In example, some MTC patients show a persistent biochemical disease [7,8]. The studies of D'herbomez *et al* [10] emphasize the need of PCT assessment every time the results of CT measurement are unclear. The authors noted the interference between CT and PCT detection in the case of the use of a sensitive immunometric assay. Abilities of procalcitonin and calcitonin to distinguish MTC from other conditions, revealed comparable utility [11]. In previous studies better performance of PCT in comparison with CT have been recorded. Specifically, when the same antibodies were used, all of the commercial PCT assays yielded similar results[12]. One study noticed that the evaluation of PCT as a marker for the initial preoperative detection of MTC[13]. Kaczka *et al* [14] showed that PCT levels were higher in all active MTC patients mean PCT 3.5 ng/ml with active carcinoma which was markedly elevated levels and significantly higher than in the control group.

Antonelli *et al* [15] demonstrated that TSH, and other thyroid hormones levels were decreased among thyroid cancer patients specially in MTC type. This study supports that serum TSH concentration at presentation is an independent predictor of thyroid malignancy. We demonstrated that the risk of malignancy increased in parallel with serum TSH concentration at presentation which is in agreement with previously published data by Boelaert *et al* [16] Although our study included fewer patients when compared with Boelaert *et al* (1500 patients). Fiore *et al* [17] reported in their study that the serum TSH was significantly higher in PTC than in patients with benign nodular thyroid disease, whereas serum concentrations of both free T3 and free T4 were not significantly different, this observation is relevant on clinical grounds to define the risk of PTC in patients with nodular thyroid disease. In this regard, Rago *et al* [18] evaluated possible clinical and biochemical criteria useful to predict the likelihood of thyroid malignancy in patients with thyroid nodules. It stands to reason that if the levels of TSH are elevated in patients with thyroid cancer, it is possible that elevated levels of thyroxine (T4) and triiodothyronine (T3) may also be correlated with malignancy as well. Cho et al has shown that free T4 (fT4) is elevated in patients with thyroid cancer (odd's ratio (OR) of 1.73) [19]. However, the inverse has been shown to be true for total T3 (TT3) by Jonklaas *et al*[20]. Rinaldi *et al* [21] who non-significantly found high fT3 to be indicative of cancer risk. Given that this study has not found any evidence in support of either group, it is possible that it was not sufficiently powered to find such a correlation, or that no relationship exists between the two.

Conclusions

There was a highly significant relation procalcitonin and thyroid cancer specially medullary type.

Conflict of Interest: Non

Source of Findings: Self findings.

Ethical Clearance: This research was carried out with the patient's verbal and analytical approval before the sample was taken. According to this approval, all the samples were collected and the tests were carried out. A copy of the results of the tests was then given to the patients

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Detection of Klebicin Gene Cluster from *Klebsiella Pneumoniae* Isolated from Sputumat Baghdad City

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Abstract

Klebicins (bacteriocins) are natural antimicrobial peptides that produced by ribosomes of *Klebsiella* species. The fatal action of klebicin is directed to closely related bacteria to the producing strains. The present study aims todetect theklebicin genecluster in *Klebsiella pneumoniae isolates*.Thirty one *K. pneumonia*isolates were specified by biochemical and microbiological methods, eventually confirmed by API 20E system and VITEK-2 system.Antibiotic susceptibility test was done five antibiotics (Amikacin, Ampicillin, Augmentin, Azetreonam and Tetracycline). DNA extraction was carried out for 31 *K. pneumonia* isolates andklebicingene cluster was amplified from extracted DNA by PCR technique. Results of current study were shown that the resistance rate of studied antibiotics was registered as Amikacin 32.26%, Ampicillin 64.52%, Augmentin 51.61%, Azetreonam48.39% and Tetracycline 41.94%.Amplification results revealed that Klebicin gene cluster was isolated from15(48.39%) of *K. pneumoniae* isolates.

Keywords: *Bacteriocin,Klebicin, Antibacterial agents,Klebsiellapneumoniae.*

Introduction

K. pneumoniae is Gram-negative, non-motile encapsulated rod-shaped bacterium, facultative anaerobic andlactose-fermenting[(1)].*K. pneumonia*is a dangerousopportunistic pathogen due to their role in causing both nosocomial andcommunity acquired infections[(2)].In healthy human, it can be situatedasymptomatically in the intestine, skin, nose, and throat. On the other side, it can cause a large spectrumof infections including mostly pneumonia, wound, soft tissue, or urinary tract infections[(3)].Becausethey survive in the environment and require their competition with other microorganisms, whole bacteria yield antimicrobial peptides act as inhibitor or killer for other competing bacteria. These peptides are included two groups, the bacteriocins and the antibiotic peptides[(4)]. Since 1925, the first bacteriocin in *Escherichia coli* was discovered by Andre Gratia. In 1963, Hamon and Peron were first described bacteriocins of *Klebsiella*[(5)].

Klebicins or klebocins (Bacteriocins)are ribosomally synthesized natural antimicrobialpeptides. These peptides are excreted by most bacteria for killing other bacteria[(6)].They differ from classical antibiotics in having fatal action against only bacteria which are closely linked to the producing strains[(5)]. The action of Klebicin includes several steps for killing the sensitive bacteria. These steps starting with binding of klebicinto specific receptors, which are outer membrane proteins utilized for the entry of particular nutrients then transport through the outer membrane and pass across the periplasm by either the Tol or TonB systems[(7)]. Klebicins would reach their target and their action would do either by forming a voltage-dependent channel into the inner membrane or by utilizing their endonuclease activity on DNA, rRNA or tRNA[(8)].Klebicins were proteins encoded chromosomallyand byKlebocinogenic plasmid[(9)].

The present study aimed to detect klebicin (bacteriocin) genecluster among *K. pneumonia*isolated from sputum in Baghdad city.

Materials and Method

Samples Collection: Thirty one isolates of *K. pneumoniae* were isolated from sputum samples collected from patients suffered from pneumonia admitted at Baghdad Medical City (Baghdad Teaching Hospitaland Gazi Al-Hariri Hospital) during the period

from January/ 2015 to May/ 2015.

Identification of Isolates: The identification of all *K. pneumonia*isolates were carried out by inoculation on blood agar andMacConkey agar for primary identification. They were incubated aerobically at 37˚C for overnight. All *K. pneumonia*isolates were specified to genus and species level based on the standard biochemical and microbiological methods[10]. API-20 E system wasutilized to affirmthe identification[11]. The confirmative testshave been crowned byVITEK-2 System.

Antimicrobial Susceptibility Test: Antimicrobial susceptibility test was achieved against five antibiotics (Amikacin, Ampicillin,Augmentin, Azetreonamand Tetracycline) by using the disk diffusion methodand the outcomes were interpreted in based on the CLSI, 2014[12].

Amplification of klebicingene cluster: DNA extraction was carried out for 31*K. pneumonia*isolates by using ZR Fungal/Bacterial DNA MiniPrep™ kit.The klebicingene cluster was amplified from extracted DNA. A 2300bpklebicin gene cluster was amplified using the primer forward (5'-GCTCTGTAACCTTCAAGTTCTC-3') and reverse (5'-CAAGCAAGATTACGGTCTACTC-3')[8]. The PCR reaction mixture was composed of 12.5µl of green master mix, 3µl of template DNA, 2µl of each forward and reverse primer (10µM), then the volume completed to 25µl by free nuclease water.The PCR program was applied as the following: 10min at 94˚C (initial denaturation temperature);32 cycles including 1min at 94˚C (denaturation temperature), 40S at 54˚C (annealing temperature) and 2min at 72˚C (extension temperature);and 5min at 72˚C for finalextension. Amplified DNA productswere resolved by electrophoresis on 1% agarose gels containingRedSafe™ Nucleic acid staining.

Findings and Dscussion

K. pneumoniae is classified as most important "Gram negative bacteria"[13], because their pathogenic role in hospital acquired infections[14]. In the past decades, thepersistentrising in the incidence of bacterial infections has led to continuous and unlimited utilization of antimicrobial drugs as therapythroughout of the world. Subsequently, this cause increasing the emergence of "multidrug resistance" among *K. pneumoniae* and other strains of bacteria[15].

Antimicrobial susceptibility testing has givenvariouslevel of resistance against antibiotics as appeared in Table1.There is an evidence for increasing the antibiotic resistance.The higher percentage of resistance was recorded against ampicillin 64.52%,followed by augmentincame in second-step with 51.61%. On the other hand, the percentages of resistance against azetreonam and tetracyclinewere convergent (48.39%and 41.94% respectively), while the percentage was 32.26% for amikacin resistance. *K. pneumoniae* resistance to various antibiotics as discussed, this is thought to be in relation with Kaye *et al*[16].

Table 1: Antibiotic Resistanceamong*K. pneumoniae* isolates (n=31).

Antibiotics	Resistant K. pneumonia	
	No.	%
Amikacin	10	32.26%
Ampicillin	20	64.52%
Augmentin	16	51.61%
Azetreonam	15	48.39%
Tetracycline	13	41.94%

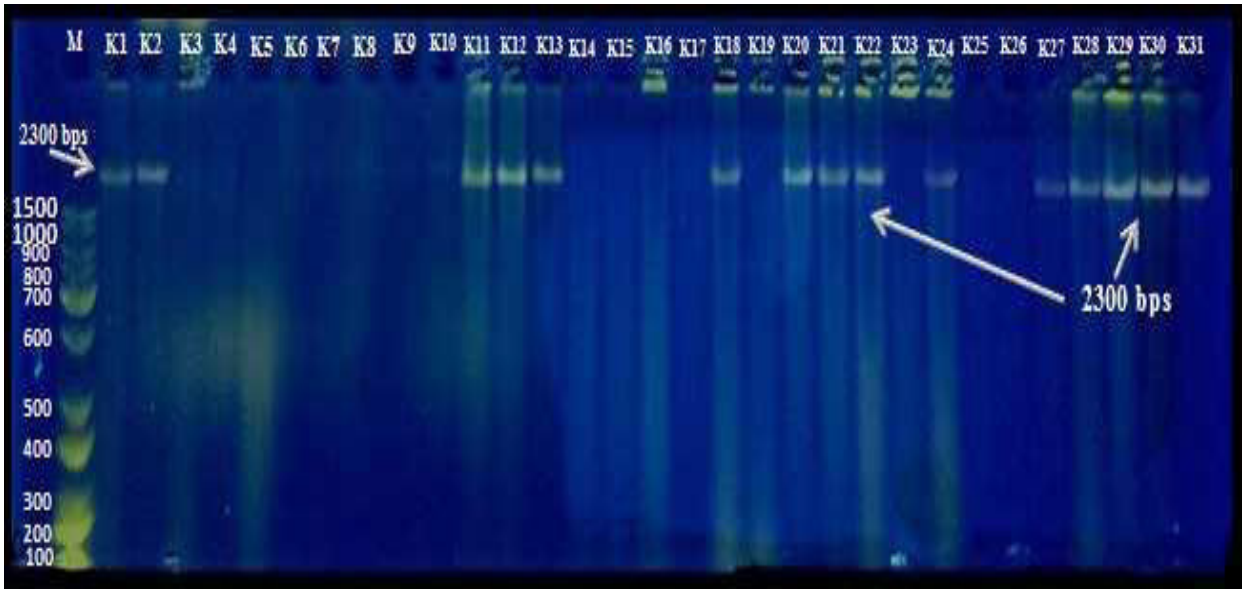


Figure (1): Analysis of *Klebicin gene cluster* of *Klebsiellapneomoniae* isolates. Lane(M): 100bp DNA Marker. Lane(K1,K2,K11-K13,K18, K20-K22, K24,K27-K31):*Klebsiellapneomoniae* isolatespositive for*Klebicin*gene cluster. All positive isolates for *Klebicin*gene clusterare generated (2300bp) PCR product.

Amikacinusually act bybinding to 30s ribosome leading to misreading of mRNA, eventually inhibiting of bacterial protein synthesis [17]. The study findings showed that ten *K. pneumoniae* isolates were resistant to amikacin with percentage (32.26%) which is close to the result (28.12%) that reported by Aljanaby and Alhasani, (2016) in Kufa city [18]. This result is lower than other studies documented by Bratu*et al*, 2005 (45%) and Castanheira*et al*, 2008 (53.3%) [19,20].Ampicillin belong to one group of "beta-lactam antibiotics" and consider as a member of the amino-penicillin family.The action of ampicillin occursby inhibition of the transpeptidase enzyme, therefore it categorized as cell wall inhibitor for bacteria [21].In present study, most isolates showed high degree of resistance to ampicillin (64.52%). These findings were in agreement with those reported by Alain *et al*[22], and Kevin *et al*[23].The study showed that 16(51.61%) of the isolated*K. pneumoniae*recorded resistance againstAmoxicillin/Clavulanic acid. Another result was documented in a study carried out byAljanaby and Alhasani (2016) in Iraq, on the *K. pneumoniae* isolates showed resistance (93.75%) to this antibiotic [18].*K. pneumoniae* isolates were showed high resistance to azetreonam. Fifteen*K. pneumonia*isolates (48.39%) were resistant to azetreonam. This prevalence rate ofazetreonam resistance was higher than these reported from 1998 to 2010 by Sanchez *et al*[24].

Tetracycline are a broad group of antibiotics that was isolated from different species of the genus Streptomyces. Tetracycline was discovered in 1945 by Benjamin Duggar[25]. Tetracycline act as inhibitor for protein synthesis by binding to the rRNA components of 30S ribosomal subunit and leading to inhibit the addition of aminoacyl-tRNAs to the ribosome [26].The study recorded that the tetracycline resistance was 41.94% which was higher than result reported by Aljanaby and Alhasani (2016), who found that the tetracycline resistant *K. pneumonia*was 34.37% [18].

The klebicins actionis homologous activity due to lethal action on limited spectrum of bacteria which are closely related to the producing isolates [27], and they have a broad antimicrobial spectrum that not limited by the genus and family [28]. Klebicins are divided into two types, A and B, according to cross resistance [29], their action on the goal cell, causing pores in the outer membrane of the target cell making ionic channels in it. The other endonucleases klebicins hydrolyze the nucleic acid of the target cell in the cytoplasm.Just two bacteriocins [klebicins B [30] and CCL (NCBI accession AF190857)] from *Klebsiella*have been sequenced[30]. Klebicin gene cluster among 31 of *K. pneumoniae*isolates were conducted using specific primers.Figure (1) shows the result of PCR amplification. PCR products corresponding to Klebicin gene cluster (2300bps) were appeared in 15 isolates (48.39%).

Ethical Clearance: Non

Source of Funding : Self

Conflict of Interest : None

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The impact of ZnO Fillers on the Tensile Strength of Self-Polymerizing Acrylic Resins Specific for Orthodontic Appliance

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Abstract

Background : self-polymerizing acrylic resins are the common materials used for the construction of orthodontic appliances. These materials have to be deficient some mechanical properties. The aim of the present research was to assess the impact of adding zinc oxide fillerstoself-polymerizing acrylic resins on their tensile strength.**Materials and method**: thirty samples were fabricated in total. They were made from self-polymerizing acrylic resin. 20 specimens were strengthened with zinc oxide powder at 1% and 2% by weight respectively, and the other ten specimens were considered as control. The tensile test was conducted for each specimen. The data were analyzed using SPSS v 20, and comparison between main groups was obtained by ANOVA and Duncan's test. **Results**: The results showed that the ZnO enhanced significantly the tensile strength of self-polymerizing acrylic resin compared to the control group. The ZnO 1 experimental group has the highest mean of tensile strength (6.97 N/mm2) followed by ZnO 2(5.91 N/mm2).**Conclusion**: the incorporating of ZnO powder to self-polymerizing acrylic resins affects significantly the tensile strength. It is suggested to add ZnO fillers with different concentrations to see whether there is any improvement in the mechanical properties of self-polymerizing acrylic resins or not.

Keywords*: self-polymerizing, Zinc oxide, tensile strength.*

Introduction

In dentistry, self-polymerizing acrylic resins are the most common restorative substances used for fabrication of orthodontic appliances [1, 2]. The advantage of such materials is that usually cheap and easy to be manipulated, and being chemically activated [3, 4]. However, the degree of polymerization of these materials is not perfect as heat polymerizing acrylic resins, results in a high unreacted residual monomer leading to lowering flexural strength of acrylic resin [5]. To overcome such problems, researches have been carried out by adding several reinforcements (i.e. titanium dioxide) to enhance the mechanical properties of acrylic resins. It was found in the literature that the addition of fillers enhanced the mechanical properties of acrylic resins [6]. However, others found that the addition of fillers has a negative impact on some mechanical properties of acrylic resins[7]. Zinc oxide powder is found as the mineral zincite and can be produced synthetically. It is white in colour with a formula of ZnO, which can insoluble in water [9]. The zinc is found in pure form as brittle metal and it is a white-blue coloured metal. The zinc, when heated, oxidizes results in a low-density metal oxide [10-11]. In dentistry, Zinc oxide has utilized in wide applications (i.e. root canal sealer) [12-13]. The present research was to assess the influence of incorporating ZnO fillers to self-polymerizing acrylic resins on their tensile strength

Materials and Method

Materials and samples groups:

In the present study, 30 Samples were prepared in total. There are 3 main groups and each group had ten samples. The experimental groups involved the adding the zinc oxide powder (Golchadent, Iran) with a concentration of 1% and 2% respectively. The control group involved fabrication of self-polymerizing acrylic samples (Spofadental, Czech Republic) without the addition of zinc oxide filler. The dental stone (Zhermack,

Italy) was utilized to fabricate the mould for acrylic samples.

Fabrication of self-polymerizing acrylic samples

A metal pattern with dimension of 65mm length, 12.5mm width and 2.5mm thickness was utilized to construct the acrylic samples for tensile strength test [14]. The specimen's preparation and procedure were done depending on ADA specification number 12 for denture base resin (1999) [15]. The process of fabrication of stone mould began by lubricating the lower part of the metal flask with a Vaseline to allow removal of stone mould following deflasking. The lower part was then filled with dental stone, and the metal pattern was placed gently into mid of stone surface with taking into consideration half of its thickness was exposed (figure 1).

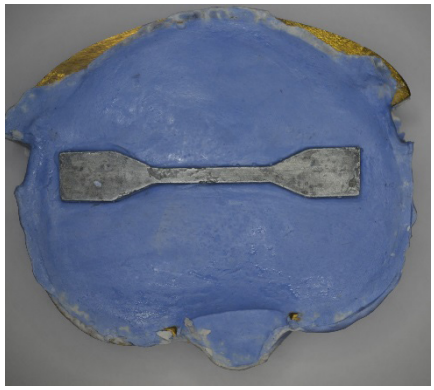


Fig1.Metal pattern located onto stone mould

The stone surface was left to set for one hour. It was then coated with a separating medium (ISODENT, Spofadental, Czech Republic). The upper half was separated with a Vaseline and filled with dental stone completely; the lower half was inverted over upper half gently and left to set for one hour. Then, the flask was carefully opened; and the pattern was taken away in order to be prepared for packing the acrylic resins.

Mixing and proportioning of acrylic resins:

In the present research, an electronic balance with an accuracy of (0.0001g) was used (fig 2). The amounts of acrylic polymer, monomer and ZnO nano-fillers are shown in table 1.

Table1. Proportioning and Mixing of the Acrylic resin

ZnO Percentage	Amount of ZnO.	Amount of PMMA.	Amount of monomer.
1%	0 .22 g	21.78 g	10 ml
2%	0.44 g	21.56 g	10 ml



Fig 2.An electronic balance used in the current study

According to manufacturers' instructions, the materials were hand -mixed in a clean and dry ceramic jar for 30 seconds. The mix was then left at the room temperature for 6 min. When it reached a dough stage, the acrylic dough was rolled and positioned in the mould. Then,the two halves of the flask were put in contact and positioned under press (up to 20 bar). Then the two halves of flask wereseparated and the excess materials were removed with wax knife. The two halves of the flask were put under pressure till metal to metal contact and left-handed under press for five minutes. The stone bursand sandpapers (120 grain size) were utilized to get a smooth surface. A bristle brush and pumice were used for polishing the acrylic samples. A wool brush and polishing soap were utilized to get a glossy surface. The specimens were conditioned for two weeksat (37°C)in distilled water [15].

Testing procedure: -

The Instron machine (Instron/ Germany) was used to test Acrylic samples (figure 3).

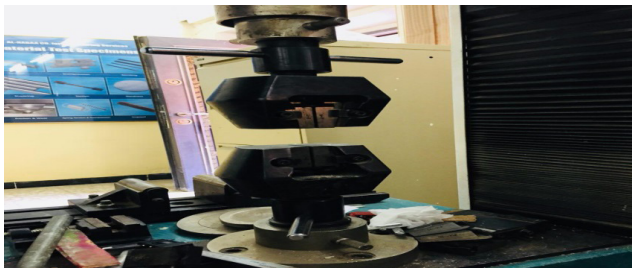


Fig3. Specimen under tensile strength test.

All acrylic samples were subjected to the force with a crosshead speed of 0.5 mm/min until fracture occurred and the values were recorded in kilograms (Kg) and then converted into Newton (N)[17]. Tensile strength values were then calculated by the formula below [18]:-Tensile strength(T.S) (N/mm2)= force at failure(F) / the area of cross-section at failure (A)

Results

The values of Mean and Standard deviation (SD) are listed in the table (2). The results indicated that the ZnO enhanced significantly the tensile strength of self-polymerizing acrylic resin compared to the control group. The ZnO 1 experimental group has the highest mean of tensile strength (6.97 N/mm2) followed by ZnO 2(5.91 N/mm2).

Table 2. Mean, standard deviation of groups for tensile strength.

Group	Number	Subset for alpha = 0.05		
		1	2	3
Control	10	5.18		
ZnO 1	10		5.91	
ZnO 2	10			6.97
Sig.		1.000	1.000	1.000

Furthermore, there is significant difference amongall group (P<0.001) as shown in Duncan multiple comparison test (table 3).

Table 3. comparison between the groups

group	mean	Standard deviation
control	5.18	.51
Experimental group ZnO 1	5.91	.76
Experimental group ZnO 2)	6.97	.12

In addition, there were significant differences among all samples groups(P<0.001)as illustrated in table 4(ANOVA test).

Table 4.ANOVA test.

ANOVA					
tensile					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	16.183	2	8.092	28.512	.000
Within Groups	7.662	27	.284		
Total	23.845	29			

Discussion

The present study has been conducted to evaluatethe influence of adding ZnO fillers to self-polymerizing acrylic resins ontheir tensile strength. In the literature, there were no published papers about the effect of ZnO fillers on mechanical properties of the self-polymerizing acrylic resins. The present study indicated that the addition of ZnO micro filler enhanced significantly the tensile strength shown in the table (3). The rise in tensile strength values following incorporating 1% and 2% of ZnO powder is because of good distribution of particles enable them to inter between liner macromolecules chains. The segmental motion of the macromolecular chains was restricted and lead to increase strength and rigidity of the resin. Consequently, this enhanced the

fractural resistance and lead to improve tensile strength [19,20].

Conclusion

From the present study, it is concluded that the incorporation of zinc oxide improves slightly the tensile strength of self- polymerizing acrylic resins. It is suggested to do more research using the ZnO fillers with different concentrations to see if there is any improvement in the mechanical properties of self-polymerizing acrylic resins.

Conflict of Interest: No

Source of Funding : Self

Ethical Clearance : Non

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Hormonal Changes in Sodium Fluoride Exposed Female Rats and its Amelioration by *Urticadioca* Leaf Extract

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Abstract

The present study was carried out to investigate the protective role of *Urticadioica*leaf extract on the hormonal profile in sodium fluoride exposed female rats. Thirty two mature female rats were randomly divided to four equal group and treated for 4th weeks as follows: control group administered tap water; group T1 administered tap water containing 100 ppm NaF; group T2 administered tap water containing 100 ppm NaF plus 300 mg/ kg *Urticadioica*leaf extract; group T3 administered 300 mg/ kg *Urticadioica*leaf extract only. Blood sample were obtained at zero and 28 days of the experiments for estimation of serum progesterone, estrogen, FSH,LHconcentration. The result revealed significant decrease in serum progesterone, estrogen, FSH, LH concentration in group T1 (NaF treated group). On the other hand, the result showed the beneficial effects of *Urticadioica* leaf extract to improvement the previous parameters against NaF(T2), through a significantincrease in hormonal profile concentration. Therefore, it could be conclude that *Urticadioica*extract has a potent ameliorative effects on hormonal profile in NaF stressed rats .

Keywords: *Hormonal profile, sodium fluoride, urticaleaf, rats*

Introduction

Fluoride surely exists in water, soil, and nutrition. Ingesting water that have high concentricity of fluoride, mainly from natural origin, is the major source of human environmental exposure throughout the world[1]. Fluoridation is a safe and efficient method for the preventing of dental caries[2,3]. In several countries, water fluoridation is used for this reasons. However, the advantageous will be narrow, and healthiness may be affected adversely if excessive fluoride be absorbed. Fluoride accumulation in soft tissues causes oxidative stress through inhibition of different enzymatic systems and increased generation of reactive oxygen species (ROS)[4]. As the case of the many chronic degenerative disease, increase of ROS and lipid peroxidation (LPO) has been considered to play an important role in the pathogenesis of fluoride toxicity[5]. NaF may have toxic effects on the brains of suckling mice[6], may impair learning and memory in rats[7,8],and may impairment of liver function[9].

Excessive exposure to environmental pollutants and chemicals is a main principle to reproductive health problems[10,11]. Fluoride is a common natural pollutant with certain toxic effects, and the association between long term fluoride exposure and fertility impairment has be attracted to concern[12,13].

It is well known that folk medicine was assistance in disease prevention and control have been attributed to antioxidant properties of their constituents, broadly termed as polyphenolic compounds. In addition to their role as antioxidants, these compounds have broad spectrum of medical property. It has been known that antioxidants protects the cell directly or indirectly from the damage caused by toxic radicals reactions through different mechanisms[14].*Urticadioica*belongs to the Urticaceaeitsthe chemical compounds are Lignans, sterols,flavonoids, polysaccharides, lectins and fatty acids also rich in vitamins A,C and D and such minerals as Magnesium and Calcium.*Urticadioica*has an antioxidants, anti inflammatory and anticancer properties, as well as, blood glucose and lipid lower effects[15]. Different effects of it plant have been notified in various worldwide districts. Therefore, the objective of this study was to explore the protective effect of *urticadioica*leaf extract on hormonal profile against sodium fluoride in female rats.

Materials and Method

The leaf were taken from north of Iraq. To prepare 70% ethyl alcohol,100 grams of dried leaves which was mixed with 500 ml of alcohol in each extract process by using magnetic stirrer at 40 °C for 24 hours[16,17], the extract have been filtered and the process have been repeated 3 times. The filtrate was concentrated by using incubator at 40 C° for 72 hr to obtained crude plant extract, the result kept at 4 C° in sterile and dark glass container until used.32adult female rats were randomly divided to 4 equal group and handles as follows for 4th weeks: control group were administered tap water; group T1rats of this group were allowed to *ad libitum* supply of drinking water containing 100 ppm of sodium fluoride**;**group T2rats of this group were allowed to *ad libitum* supply of drinking water containing 100 ppm of sodium fluorideplus ethanolic extract of*Urticadioica* (300 mg/kg)**,** groupT3rats of this group were receivedEthanolic extract of*Urticadioica*at dose of 300 mg/kgonly**;**Collected of blood sample were obtained via cardiac puncture from each anesthetized animal at zero and28 days of the experiments then centrifuged at 3000 rpm for 15 minutes, and sera was isolated and frozen at -18C° till analysis of serum estrogen,progesterone,FSH, LH concentrations by using immunoenzymometric assay kits (monobindInc, USA). Statistical analysis of data was performed on the basis of two way analysis of variance (ANOVA)using a significant level at($P<0.05$) and using Least Significant Differences (LSD)test for specific group differences[18]**.**

Finding and Discussion

Data pertaining to serum progesterone hormone concentration (table 1) showed a significant($P<0.05$) decline in NaF treated group after 4thweeks of experiments comparing to other treated groups.The results also clarified a significant($p<0.05$) increment in T2 as compared to T1 treated group. It was also noted highly significant ($p<0.05$) increase in this parameter in T3 group comparing to other treated groups.

In comparison within time for T2&T3 groups, recorded significant($p<0.05$) increment, whereas T1 group registered significant ($p<0.05$) decrement as compared to pretreated period.

Table 1:effects of alcoholic extract of *Urticadioica*on serum progesterone hormone concentration (ng/ml) in adult female rats exposed to sodium fluoride

Time Group	C	T1	T2	T3
Zero day	2.50±0.005 A a	**2.50±0.00** A a	2.48±0.01 A b	**2.49±0.01** **A b**
4th week	2.49±0.01 C a	1.17±0.00 D b	3.19±0.00 B a	3.29±0.01 A a

LSD 0.02 Value are expressed as mean ±SE, n=8 each ;C:control ;T1: administration 100 ppm of NaF;T2: administration 100 ppm of NaF plus300 mg/ kg*urticadioica* extract;T3: administration 300 mg/ kg*urticadioica* extract treated group; capital letters denotes differences between groups,$p<0.05$ and small letters denotes significant differences within group $p<0.05$

After 4th weeks of experiments, group T1 showed highly a significant ($p<0.05$) decrease in estrogen hormone concentration compared to other treated groups (table 2). Whereas, the result registered that oral intubation of extract concurrently with NaF normalized estrogen hormone near to control group after 4th weeks of treatment. On the other hand,estrogen hormone concentration in T3 group recorded significantly ($p<0.05$) elevated after 4th weeksof experimental periods comparing to other treated groups. Time dependent, a significant($p<0.05$) increment was observed after 4th weeks of treatment in T3 group, also a significant($p<0.05$) decrement in C,T1,T2 treated groups when compared with zero time.

Table 2:effects of alcoholic extract of *Urticadioica*on serum estrogen hormone concentration (ng/ml) in adult female rats exposed to sodium fluoride

Time Group	Control	T1	T2	T3
Zero day	**27.17±0.33** **A a**	**27.06±0.21** A a	27.40±0.25 A a	**27.14±0.08** **A b**
4th week	25.80±0.68 B b	21.52±0.45 C b	25.48 ±0.45 B b	32.66±0.93 A a

LSD 1.1

Note for details show table 1

Table(3)showed a significant($p<0.05$) decrement in FSH concentration NaFtreated group comparing to controlgroup.Whereas, highly significant increment in this parameter was observed in T3 group as comparing to other treated groups. Besides, there were a significant($p<0.05$) increase in FSH concentration in C,T2,T3 groups, while results showed a significant($p<0.05$)decrease in T1 treated group at end of experimentscomparing to zero time.

Table 3: effects of alcoholic extract of *Urticadioica*on serum follicular stimulating hormone concentration (FSH) (ng/ml) in adult female rats exposed to sodium fluoride

Time Group	Control	T1	T2	T3
Zero day	12.96±0.24 A b	13.12±0.19 A a	13.07±0.19 A b	12.94±0.23 A b
4th week	13.46±0.38 B a	10.41±0.19 C b	13.73±0.23 B a	16.95±0.19 A a

LSD 0.4

Note for details show table 1

Statistical analysis of LH concentration recorded a significant ($p<0.05$) decrease in groupT1comparing with other treated groups table 4.On the other hand, significant ($p<0.05$) elevation in same parameter in T3 treated group when comparing with other groups. Furthermore,there was no significant ($p>0.05$) differences in LH concentration in control &T2 compared with eachothers.Moreover,with exception of T3(which showed a significant ($p<0.05$)increase after 4th weeks), the results recorded a significant ($p<0.05$) decrease in C,T1 and T2 along the experiment period comparing to pretreated period.

Table 4: effects of alcoholic extract of *Urticadioica*on serum luteinizing hormone concentration (LH) (ng/ml) in adult female rats exposed to sodium fluoride

Time Group	Control	T1	T2	T3
Zero day	4.27±0.03 A a	4.32±0.02 A a	4.36±0.02 A a	4.34±0.02 A b
4th week	3.73±0.23 B b	2.81±0.23 C b	3.86±0.27 B b	6.15±0.31 A a

LSD 0.4

Note for details show table 1

The ovary it is an prominent target organ of many reproductive toxicants. Organ coefficients can better express organ toxicity follow exposure at toxic chemicals. Exposure to NaF is associated with deterioration of reproductive system organs functions specifically the Gonads (ovaries)[19]. The results have exhibit that NaF causes a significant ($P<0.05$) drop off in estrogen & progesterone concentration (T1) compared with control group, this reduction may produce direct effect of NaF on ovarian tissues specially the granulosa cells that have specialized receptors for FSH hormone, in order that these cells does not response to FSH hormone and the release of estrogen will be decrease[20]. To maintenance of fertility investigations have confirmed that steroid hormones, such as estrogen &progesterone, role in the growth and differentiation of reproductive tissues[21]. Estrogen can increase the sensibility of granulosa cells to FSH and LH, through rising the biosynthesis of progesterone by granulosa cells[22], E2 modulates steroidogenesis, promotes granulosa cell proliferation,and maintains follicular development[23]. Beside, NaF that caused significant($P<0.05$) decrease in cholesterol which considered as precursor of steroid hormone may be the second cause of this reduction in estrogen and progesterone concentration[24].

Its well-known that the secretion of reproductive hormones from the ovary is regulated by the release of LH and FSH from the anterior pituitary gland. Based on the reproductive the results obtained in this study, showed that FSH and LH secretion was significantly inhibited in the sodium fluoride-exposed groups[25]. The main function of FSH is to stimulate ovarian growth and promote follicular development. LH participates in ovarian regulation, plays a critical role in follicular maturation, ovulation, and corpus leutum development, and intervenes in the synthesis of steroid hormones[26]. As well, the present study the prevalent mechanism of action of the harmful effects of NaF occurs at the level of the hypothalamus–pituitary axis may be indicates that NaF inhibits the secretion of FSH and LH from the pituitary gland, thus weakening the promotional activity of FSH and LH on ovarian granular cells.

On the other hand, the result exhibited that the elevation of steroid hormones progesterone and close control group of estrogen hormone after treatment with NaF and *Urticadioica*(T2) may be due to role of plant extract to reduce the negative effects of toxicity of NaF[27]. Lignans, sterols and beta sitosterol are identified phytoestrogens in *Urticadioica*[28,29]. They suggested that nettle can be used in diet as an appropriate pharmaceutical alternative for synthetic prescription of estrogen hormone in patients with osteoporosis[29], besides, nettle extract improves levels of such minerals as calcium and magnesium that were decreased in patients with osteoporosis.Calcium plays a major role in reproduction. Deficiency in this macro mineral can affect fertility[30]. Calcium-dependent reproductive mechanisms include steroid biosynthesis in adrenal glands and ovaries. Calcium may also affect delivery of cholesterol or using cholesterol in mitochondria or stimulating conversion of pregnenolone to progesterone in steroidogenesis[31,32].

From results obtained it can be explained that *Urticadioica* have an important role in elevation of LH and FSH level. This elevation may be due to the active constituents of *Urticadioica* in activation of synthesis mechanisms of these hormones by stimulation of hypothalamus or pituitary glands to release and secretion

gonadotropin hormone[27].On the other hand, the increase of LH and FSH hormones may be due to the high constituents of *Urticadioica*from essential nutrients such as flavonoids, sterols, polysaccharides,fattyacid, also rich in vitamins and minerals,theseantioxidant nutrients may stimulate hypothalamus and pituitary gland to increase synthesis and release of these hormones[34].The increase of FSH and LH hormones in(T2) group compared with control group may be increase the follicular growth so that there were increase in the number of Graffian follicles which increase the synthesis and release of estrogen hormone [34]. Also the increase of LH hormone in (T2) group compared with control may be increase the level of estrogen because the high level of LH hormone leads to increase of its binding with the receptors on theca cells[35].

The increase of LH hormone is considered as a principle factor to stimulate the theca interna to elevate production of pregnenolone compound which converted by granulose cells to progesterone[35]**.** Also the increase of progesterone may be due to the role of LH hormone to stimulate the corpus leutum to production of progesterone[34]. In conclusion *Urticadioica*extract has a potent ameliorative effects on hormonal profile in NaF stressed rats.

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Application of Silver Nanoparticles (Silver NPs) in Assisted Reproductive Techniques (ART) as a Carrier Vehicles to Improve the Therapeutic Influence of Doum Extract for Sperm of Asthenozoospermic Patients

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Abstract

Assisted reproductive techniques are a tool practiced worldwide to help couples achieve pregnancy and preserve fertility. However ART reveals several limitations which needs for new alternatives to overcome these limitations. Over recent years, nanotechnology has been applied as a tool to improve strategies to enhance the outcome of ART. This study has investigated for the first time the impact effect of implication of silver NPs to boost therapeutic effect of Doum palm (*HyphaeneThebaica*) extract on enhancing sperm quality of asthenozoospermic patients. The findings of this study has showed the implication of silver NPs has significantly enhanced theSuperoxide dismutase activity, and reduced Malondialdehyde expression and sperm DND fragmentation percentage. These encouraging results suggest that nanotechnologies could be easily included in the routine procedures of ART to improve sperm quality and thus increase the rate of successful pregnancy and preserve fertility.

Keywords: *Asthenozoospermia, Silver nanoparticles, Doum palm (HyphaeneThebaica), Extract.*

Introduction

Asthenozoospermia (or asthenospermia) refers to decreases of sperm motility, which is one of the major causes of infertility or reduced fertility in men.Oxidative stress plays important role in causingdecreases of male fertility and has a significant roleon semen quality assessment. Oxidative stress is mainly caused as a result of accumulation of excessively reactive oxygen species (ROS) or reactive nitrogen species (RNS). ROS/RNS results in severe damage of sperm DNA, reduced sperm motility, reduce sperm fertilising ability, and decrease sperm membrane integrity via lipid peroxidation; all of which are underlying mechanisms lead to sperm dysfunction [1].

In reproductive medicine, the application of medicinal herbs has extensively investigatedfor their pharmacological therapeutic activities on improving sperm quality. Many medicinal plants have been reported to have beneficial effects in combination with assisted reproductive technology (ART) to increase the chances of pregnancy rate and reduce the cost of treatment. *Hyphaenethebaica* which, belongs to the family Palmae and this plant is commonly known as a Doum palm, has reported to has many medicinal therapeutic activities[2, 3]. In these studies, fruits of Doum showed antimicrobial, anti- oxidant, hypolipidemic, antidiabetic, and antihypertensive activities, suggesting that the active biological effectsof Doum fruits may ascribed to its active components [3, 4].

In fact, ART has been highly applied and practiced worldwide as a set of methodologies to cases related to infertility. However, ART still has some challenges, which still needparticular focus[5].Therefore, it is highly important for identifying new alternatives to overcome these challenges.Recent advances in nanotechnology have encouraged the application of nanoparticles (NPs), which has already been developed for non-human animals, in assisted reproduction in humans[5-7]. Nanoparticles characterised by various physical and chemical properties that make them more stable, soluble and more biologically effective to employed in the field of drug delivery. In fact, silver NPs are type of metallic NPs and have been frequently used in many

biomedical application due to their unique physical, chemical, and biological properties[8-10]. In fact, there is a little information is available about their activity in the reproductive system. Therefore, this study has adapted innovative different strategy to improve male fertility diagnosed with asthenozoospermia, particularly by enhancing sperm cell quality using silverNPs as a carrier vehicles for Doum extract components.

Materials and Method

Preparation dried extract of Doum palm (HyphaeneThebaica)

The Doumpalm fruit was dried and grinded, once it has been obtained from the local market. A 20gm of Doumpalm fruit powder was mixed with 100ml of distilled water and refluxed for 3hours. As the powder was completely dissolved, the mixture was filtrated by using a sheet of gauze in a clean suitable flask. Finally, the filtrated solution transferred to sterile petri dishes (Falcon, USA) and dried on an incubator at 73ºC [11].

Preparation of aqueous Doum palm (HyphaeneThebaica) extract for in vitro sperm activation

Following complete drying of extract of Doum palm, the aqueous working solution of Doum extract was prepared by dissolving 0.5mg of dried Doum extract with 10ml of phosphate buffer solution (PBS) (Sigma-Aldrich, USA) in plastic test tube (Falcon, USA) contained broad spectrum antibiotic. TheDoum aqueous working solution has prepared at 20% concentration by adding 2ml of the aqueous working solution of Doum extract to 8ml of PBS,to be used for the purpose of in vitro sperm activation experiment. The solution was filtered using Millipore (Millipore, USA) 0.45µM. Media was adjusted at pH 7.5-7.8 and stored at 25ºC.

Mixture preparation of silver nitrate nanoparticles with aqueous Doum extract for in vitro sperm activation

The aqueous Doum extract was mixed with silver nitrate nanoparticles by adding 0.58mg of silver nitrate to 50ml distal water. Then 10ml of aqueous Doum extract was added to the 50ml of silver nitrate solution. The final mixture of aqueous Doum extract and silver nitrate nanoparticles kept on magnetic stirrer until the brown colour of mixture changed to the brown red colour.

Experimental design

Semen samples were collected from ten patients diagnosed with asthenozoospermia, following the ethical approval and informed consent from all donors. Each semen sample was divided into three groups. The sperms in first group (i.e. control group) were treated with PBS, sperms in second group were treated Doum extract only (Extr. alone group) and sperms in third group were treated with Doum extract with silver NPs (i.e. Extr. +NPs group). Samples were incubated for 1-2hours at 37ºC in an incubator for further experiments.

Superoxide dismutase (DOS) activity assay

Using the commercially available colorimetric assays (Cohesion Biosciences. LTD. China) and following the methodology provided by the manufacturer DOS was detected in all sample groups. Briefly, sperm samples at 5x 10^6 were centrifuged. Following centrifugation, the supernatant was discarded and 1 ml of assaybuffer was added. Then, samples were sonicated (with power 20%, sonication 3s and intervention 10s, repeated 30 times) and centrifuged at 8000g 4°C for 10 minutes. Following centrifugation the supernatant was moved into a new centrifuge tube and kept on ice for further processing. 19µl of samples, stander and distilled water as (blank) were added into 96 well plate. Then, 30µl of reaction buffer, 100µlsubstrate, 1µl of enzyme and 50µldye reagent were added to samples, stander and blank. Finally, the plate was incubated at room temperature for 30 minutes and absorbance measured at 560nm.

Malondialdehyde (MDA) measurement assay

Using the commercially available colorimetric assays (Cohesion Biosciences. LTD. China) and following the methodology provided by the manufacturer MDA was detected in all sample groups. Briefly, sperm samples at 5x 10^6 were centrifuged. Following centrifugation, the supernatant was discarded and 1 ml of assay buffer was added. Samples were sonicated (with power 20%, sonication 3s and intervention 10s, repeated 30 times) and centrifuged at 8000g 4°C for 10 minutes.Following centrifugation the supernatant was placed into a new centrifuge tube and kept on ice for further processing. 100µl of samples were added into new micro centrifuge tubes with 200µl dye reagent and placed into oven with 90ºC for 30 minutes. Then, micro centrifuge tubes were placed on ice for few seconds and centrifuged at 10000g, 25°C for 10 minutes. 200µl of samples supernatant were

added to 96-well microplate absorbance measured at 532nm or 600nm.

DNA fragmentation assay

The assessment of sperm DNA normality was performed usingthe microscopicacridine orange (AO) test following the protocol described previously in 1984 by Tejada et al. [12]. Briefly, Smears of10 semen samples were fixed in Carnoy's solution (3:1,methanol:glacial acetic acid) at 4°C and left overnight , washed and air-dried. The slides were then immersed in AO working solution (0.19 mg/ml in 0.1 M citric acid and 0.3 Na2HPO4 7H2O, pH 4) for 10 minutes. Smears were assessed on the same day using fluorescent microscope (Zeiss Co., Germany) with a 460nm. Normal DNA (double stranded)emitted green fluorescent when stained with AO,whereas the stain emitted red fluorescent when it bind to fragmented DNA (single stranded).

Statistical analysis

GraphPad Prism 8.0.2 software was used for data analysis. Data of N=10 was tested for normal distribution using three different tests D'Agostino& Pearson test, Shapiro-Wilk test and Kolmogorov-Smirnov test.

Finding

According to The World Health Organization (WHO), couples may classify as infertile couples if they fail to achieve a clinical pregnancy after, at least, 1 year of regular unprotected sexual intercourse[13]. The application of ART methodologies to cases related to infertility is common and practiced worldwide. However, there are some challenges, which still require special attention[5].

Over the recent years, nanotechnology has been considered to help overcome some of challenges in reproductive medicine. NPs are owning unique physical and chemical propertiesmaking them a valuable and useful materials for various applications[5, 14]. The recent advancing in nanotechnologies have increased their possible applications in ART methodologies.

This study has investigated for the first time the influence of implication of silver NPs on improving the effect of Doum extract for enhancing sperm quality of asthenozoospermic patients. The results obtained by this study have showed that silver NPs have improved sperm motility. Sperm motility was examined using simple layer technique (data not shown).

In recent years, extensive studies have emphasis the role of oxidative stress on causing male infertility. The excessiveaccumulation of ROS or RNS lead to oxidative stress, which in turn has harmful effect on sperm functionality [15-17]. Oxidative stress is a keystone cause of sperm dysfunction,since, it underline several mechanisms that lead to sperm dysfunction including; extensive sperm DNA damage, reduced sperm motility, decline in sperm fertilising ability, and defective sperm membrane integrity via lipid peroxidation[18-21]. In infertile male, major sources of ROS and RNS are produce by mitochondria in the spermatozoa and activated inflammatory leukocytes. In fact the activated leukocytes produce 1000 times more ROS/RNS than the spermatozoa does [1].

This study has estimated the concentration of SOD in sperm following their treatment with Doum extractwith/without silver NPs. Interestingly, the data of this study has showed for the first time the application of silver NPs have boosted the antioxidant effects of Doum extract by increasing SOD concentration. The results showed significant increase in SOD concentration in treated sperms in both Doum extract with NPs group and Doum extract only group compared with control group (****$p<0.0001$, **$p= 0.0032$ respectively) (Figure -1). Although, Doum extract with NPs group had slightly higher influence on SOD concentration when compared with Doum extract only group, but this was not significant ($p= 0.1229$).

Inside human body, oxidative stress occurs due to an imbalance occurs, causing potentially serious health consequences. The body has several defends scavenging mechanisms to maintain normal balance of ROS and RNS. These mechanisms include a number of antioxidant enzymes and antioxidant molecules. SOD provide a very important antioxidant defense mechanism against oxidative stress in the body.There is a strong evidence suggesting that foodstuff has a potential source of antioxidant phytochemicals, which act to prevent or reduce oxidative stress by scavenging free radicals , such as vitamins and, in particular, the flavonoids, coumarins, hydroxycinnamates and lignin component. Many studies have reported that Doum extracts contain significant amounts of flavonoids which have demonstrated antioxidant and antibacterial activities[3, 22, 23]. Flavonoids possess a significant biochemical property to act as antioxidant. The mechanisms of antioxidant action of flavonoids can include; scavenging ROS and/or

RNS, upregulating or protection of antioxidant enzymes defenses, or by inhibition of enzymes involved in free radical generation [24-26].

Spermatozoa are susceptible to ROS-induced damagedue to contain large quantities of polyunsaturated fatty acids. Also, it has been suggested that ROS induce membrane lipid peroxidation in sperm[27, 28]. Since,MDA is one of toxic lipid peroxides that known to cause different impairments of sperm cells,therefore, this study has examined the level of Lipid peroxidation formMDA.

Pathological high level of ROS, which may originated from endogenous sources or exogenous sources can be potentially toxic to sperm, leads to curtail sperm damage and impaired sperm functionality. In fact, sperm dysfunction occursdue to the peroxidation of high polyunsaturated fatty acids found within the plasma membrane of spermatozoa[29]. This study has measured the level of MDA(as an indicator of lipid peroxidation) in sperm samples following their treatment with Doum extract with/without silver NPs. The results showed that silver NPs have significantly enhanced the uptake of Doum extract and consequently the Doum extract has significantly reduced the level of MDA when compared with the non-treated group (*p= 0.045) (Figure -2). This finding demonstrated the significant role of the implication of silver NPs to amplify Doum extract effect. Also, the finding has emphasised the antioxidant influence of Doum extract, asan antioxidant has an important role in reducing lipid peroxidation.The implication of silver NPs has enhanced the therapeutic effect of Doum extract on reducing MDA.However, the underlying mechanisms of action still uncovered, therefore, further investigation to fully understand the role of silver NPs and medicinal properties of Doum extract is required. This study suggest that the implication of nanotechnology in ART to treat infertile male has a significant impact effect on enhancing sperm quality and increase the chances for pregnancy.

Moreover, oxidative stress has serious effect on the integrity of sperm DNA. One of sperm DNA damage causes,is the presence of unbalanced ROS in semen plasm. Sperm DNA damage is the main cause to infertility, miscarriage and birth defects in the offspring[30].

The data obtained by this study has showed significant therapeutic effect of Doum extract on improving and reducing sperm DNA fragmentation. Moreover, the results showed there was significant higher therapeutic effect on improving and reducing in the percentage of DNA-fragmented spermatozoa when silver NPs was implicated with Doum extract. In fact, both treatment groups (Doum extract only group or Doum extract with NPs group) were significantly enhanced the percentage of DNA-fragmented spermatozoa when compared with non-treated group i.e. control group ***p = 0.0002, **** p <0.0001 respectively (Figure 3).Interestingly, the data of this study has showed for the first time the application of silver NPs with Doum extract have remarkable and significant influence on decreasingthe percentage of DNA-fragmented spermatozoa compared with group treated with Doum extract only **p= 0.0033 (Figure -3). Research has been reported that oxidative stress had a great role in the aetiology of this pathological condition. Based on this finding, the reduction in the percentage of DNA-fragmented spermatozoa may ascribed to the antioxidant activity of Doum extract. Many studies have suggested that the aqueous extract of Doum fruits had an antioxidant activity; this was attributed to the substantial amount of their flavone components. About five flavone glycosides were isolated and identified from Doum fruits these include: viz, luteolin 7-O-β-glucuronoide, apigenin 7-O-β-glucuronoide, luteolin O-β-glycoside, luteolin 7-O-rutinoside and chrysoeriol 7-O rutinoside[22]. Clearly, there is a need for future studies that could address the fundamental molecular basis of mechanisms of action of biological activities of Doum extract.

Conclusion

The study has demonstrated for the first time the application of nanotechnology for ART to enhance sperm quality has a beneficial impact.The study has proved that enhancing the levels of antioxidant defense mechanisms could improve sperm functionality. Actually, the study has showed that the antioxidant therapeutic activity of Doum extract has improved the level of SOD, reduced MDA and reduced the percentage of DNA-fragmented spermatozoa. It is worthy to mention that this antioxidant activity was significantly higher when silver NPs was implicated with Doum extract. Although, there is still need to understand the mechanisms of action that underlying the biological and therapeutically activities of Doum extract components but,clearly, the findings in this present study has provided an additional set of information and encourage the application of nanoparticles with ART to bridge the gap between traditional uses of medicinal herbs and nanotechnology.

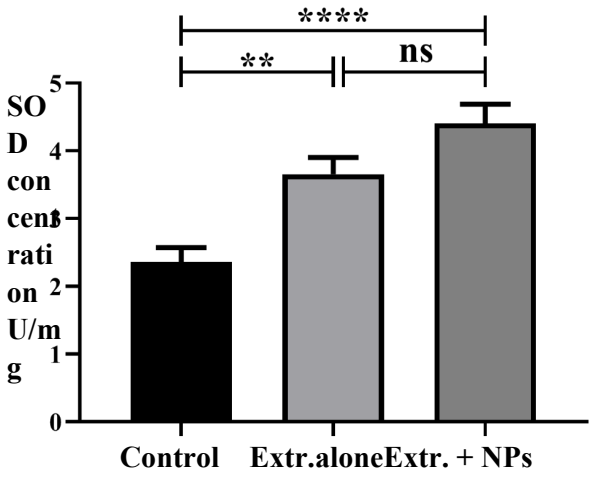


Figure 1: Silver NPs have significantly upgrade the antioxidant effect of Doum extract by elevating the level of SOD.

The level of SOD was measured using colorimetric assays. The differences between groups were tested for significance using Ordinary one-way ANOVA of One-way ANOVA with Sidak's multiple comparisons test. Data shown as M±SEM. *p* values of <0.05 were considered significant. (Extr. Alone= group were treated Doum extract only and Extr. +NPs = group were treated with Doum extract with silver NPs).

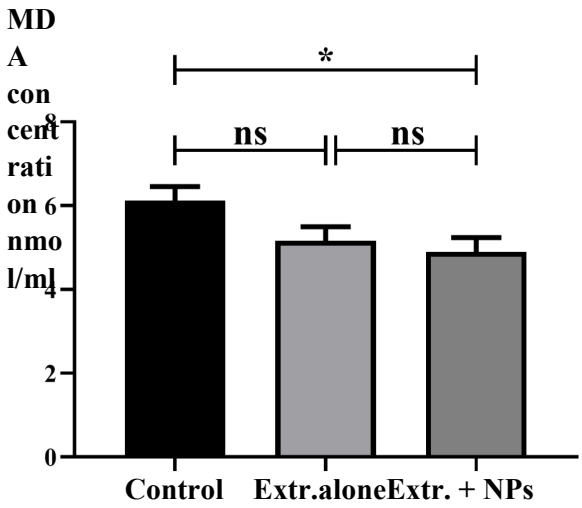


Figure 2: Silver NPs have significantly upgrade the antioxidant effect of Doum extract by reducing the level of MDA.

The concentration of MDA was measured using colorimetric assays. The differences between groups were tested for significance using Ordinary one-way ANOVA of One-way ANOVA with Sidak's multiple comparisons test. Data shown as M±SEM. *p* values of <0.05 were considered significant. (Extr. Alone= group were treated Doum extract only and Extr. +NPs =group were treated with Doum extract with silver NPs).

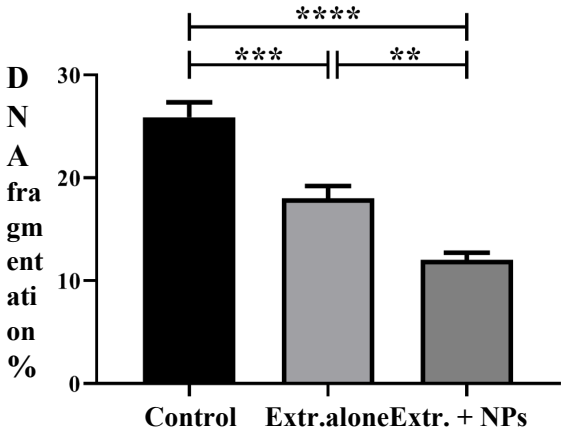


Figure 3: Silver NPs have significantly enhanced the effect of Doum extract on improving DNA fragmentation index.

The percentage of sperm DNA fragmentation was reduced when sperms were treated with Doum extract either with or without silver NPs. The differences between groups were tested for significance using Ordinary one-way ANOVA of One-way ANOVA with Sidak's multiple comparisons test. Data shown as M±SEM. *p* values of <0.05 were considered significant. (Extr. Alone= group were treated Doum extract only and Extr. +NPs =group were treated with Doum extract with silver NPs).

Conflict of Interest: No

Source of Findings: Self

Ethical Clearance: No

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Musculoskeletal Hand Manifestations in Patients with Diabetes Mellitus

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Abstract

A random sample of 505 patients with DM, evaluated in a discriptive study for the evidence of MSK hand manifestations of DM, they were collected attending diabetic centre, in Sulaimani city, from Novembor 2008 to February 2009 . All the patients were interviewed by using questionnaire forms . Comprehensive history, clinical examination, radiological, and laboratory studies performed to role out other causes of musculoskeletal hand manifestations . Chi- square and ANOVA procedure have used for management of statistical data. One hundred ninety six diabetic patients had MSK hand manifestations represents (39.52%), with nearly equal male and female involvement, majority of the patients with DM (84.2%) were type 2, while most of patients with hand manifestations (47.7%) were type 1 DM, (50.3%) of them had DM for less than 5 years, most of them (71.9%) use OHD for treatment of diabetes, and (51.1%) of them had uncontrolled glycemic control status. The relation of hand manifestations with gender, duration, type of treatment, and glycemic control status of DM was statistically significant (P value < 0.05) . Our patients got different hand manifestations with significant association with gender, duration, type of treatment and glycemic control status of DM . Majority of the patients with MSK hand manifestations had type 1 DM . MSK hand manifestations were more in patients with uncontrolled blood glucose, with almost equal male and female involvement .

***Key words**: Musculoskeletal hand; Diabetes mellitus; T2DM; MSK*

Introduction

Diabetes mellitus (DM) is a syndrome with disordered metabolism and inappropriate hyperglycemia due to either a deficiency of insulin secretion or to a combination of insulin resistance and inadequate insulin secretion to compensate. Diabetes mellitus is classified on the basis of the pathogenic process that leads to hyperglycemia, as opposed to earlier criteria such as age of onset or type of therapy [(1-3)]. The two broad categories of DM are designated type 1 and type 2. Both types of diabetes are preceded by a phase of abnormal glucose homeostasis as the pathogenic processes progresses. Type 1 diabetes is the result of complete or near-total insulin deficiency[(4-6)]. Type 2 DM is a heterogeneous group of disorders characterized by variable degrees of insulin resistance, impaired insulin secretion, and increased glucose production[(8-11)]. Diabetes mellitus is associated with a wide variety of musculoskeletal problems, some of which are unique to the disease [(7)] including Syndromes of limited joint mobility (Diabetic hand syndrome, Adhesive capsulitis, Trigger finger, Dupuytren's contractures), Osteoporosis, Diffuse idiopathic skeletal hyperostosis, Neuropathies (Charcot joints, diabetic osteoarthropathy [(12-14)], Carpal tunnel syndrome, Diabetic amyotrophy, Reflex sympathetic dystrophy,Various other neuropathies), and Diabetic muscle infarction [(15-17)] . As early as 1957, it was noticed that many people with diabetes complained of stiffness in the hands or stiff joints. This was eventually called limited joint mobility (LJM)[(18)] . LJM is also known as diabetic cheiroarthopathy (after the Greek word "cheiros" for hand)[(19)] or diabetic stiff hand syndrome[(14,15)] . In Dupuytren's contracture, a thickening and shortening of the palmar fascia occurs[(20-23)]. The aim of the current study was to find out the prevalence of MSK hand manifestations of DM to make early diagnosis, and to identify its relation with type, duration, and type of treatment of DM.

Materials and Method

Five hundred and five patients with DM were evaluated in this descriptive study The patients recruited consecutively with clinical diagnosis of DM by consultant physicians . They were attending diabetic centre in Sulaimani city, in a period of 4 months from Novembor 2008 to February 2009 .

Patients were interviewed, history taken, examination done for each case by using special questionnaire forms, patients with MSK hand manifestation sent to laboratory tested for (erythrocyte sedimentation rate, C reactive protein, rheumatoid factor, general urine examination, renal function test, liver function test) and conventional radiograph of hands to role out other causes of hand manifestations. The control status of DM assessed according to International Diabetes Federation (IDF)-2005 guidelines which considers that the patient is strictly glycemic controlled if HbA1c is < 6.5% or fasting blood sugar < 110 mg/dl or random blood sugar < 145 mg/dl (glycosylated hemoglobin HbA1c was not available, so we depend on fasting or random blood sugar).

Statistical analysis

Statistical package for social science (spss) program version 15 was used for statistical analysis, the frequency distributions were obtained, after the grouping of data to different variables.

Findings

The sample enrolled 505 patients with DM diagnosed by consultant physician, 175 (34.65%) patients were males and 330 (65.35%) were females (Figure 1), patient's ages ranged from 13 to 82 years with mean of ages 52.21 years and standard deviation 12.02 (Table 1) .

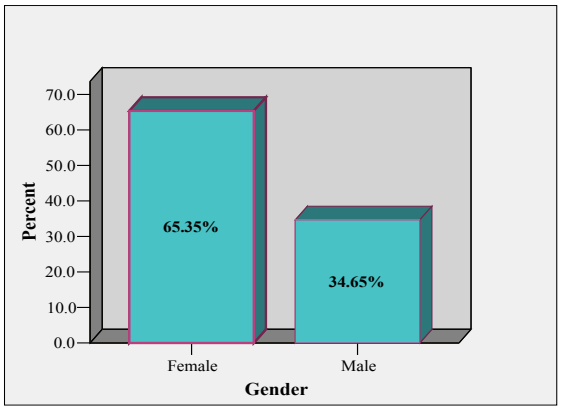


Figure 1: Sex distribution of DM

Table 1: mean age of diabetic patients

Variables	Minimum	Maximum	Mean	Std. Deviation
Age (Years)	13	82	52.21	12.02

Majority of diabetic patients was type 2, 452 (84.2%) . 363 (71.9%) of them were on oral hypoglycemic drugs and the others were on insulin, mixed therapy, or diet alone . About half of the patients 254 (50.3%) had diabetes mellitus (DM) for less than 5 years . According to the glycemic control status 247 (49.9%) were controlled while 258 (51.1%) were not . The family history of DM were almost equal, 243 (48.1%) had positive family history of DM, and 262 (51.9%) had negative history (Table 2) .

Table 2: Type, duration, treatment, control status, and family history of DM

Variables	Frequencies	Percentages
Type of DM		
Type 1	80	15.8
Type 2	425	84.2
Duration of DM		
Less than 5 years	254	50.3
6-10 years	118	23.4
11-15 years	59	11.7
16-20 years	38	7.5
More than 20 years	36	7.1
Treatment of DM		
Diet	23	4.6
Oral hypoglycemic drugs	363	71.9
Insulin	79	15.6
Mixed	40	7.9
DM control status		
Uncontrolled	258	51.1
Controlled	247	48.9
Family history of DM		
Negative	262	51.9
Positive	243	48.1

The MSK hand manifestations of DM are summarized in (Figure 4-2) which shows that 196 (39.52%) patients had MSK manifestations in the hand which were cheiroarthropathy, flexor tenosynovitis, Dupuytren's contracture, and CTS { 69 (13.91%), 48 (9.68%), 42 (8.47%), 37 (7.46%) } consecutively, while 309 (60.48%) patients had no MSK hand complications .

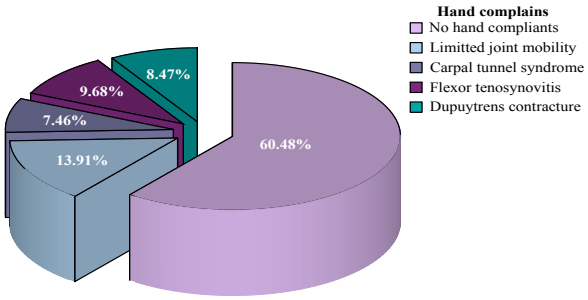


Figure 2: MSK hand manifestations of DM

In Table 3, we found a positive relation between MSK hand manifestations and duration of DM which is statistically highly significant (P value = 0.000), with a mean of (2.222 ± 1.304) showing that frequency of hand complications increase with duration of DM, while there is no relation with age (P value = 0.119) .

Table 3: Relation of MSK hand manifestations with age and duration of DM

Hand complains	Age		Duration of DM	
	Mean+ S.D	P value	Mean+ S.D	P value
No hand compliants Limited joint mobility Carpal tunnel syndrome Flexor tenosynovitis Dupuytrens contracture	51.46±12.01 53.25±12.54 49.76±10.88 53.44±11.45 55.76±12.73	0.119	1.74±1.10 2.04±1.29 2.16±1.40 2.50±1.29 2.67±1.44	**0.000**

Discussion

Diabetes mellitus (DM) is associated with a wide variety of musculoskeletal (MSK) problems, some of which are unique to the disease . The nomenclature of these conditions can be confusing, with some having more than one name in the medical literature. Out of 505 patients we found 196 (39.52%) had one or more types of MSK hand manifestations including (LJM in 13.91%, flexor tenosynovitis in 9.68%, Dupuytren's contracture in 8.47%, and CTS in 7.46%). This result is comparable to that of Sanjeeb *et al* [28] who recorded the LJM to be the most common MSK hand manifestations followed by flexor tenosynovitis, then Dupuytren's contracture, and lastly CTS . Sanjeeb *et al* mentioned the frequency for each hand manifestation but didn't mention the frequency of total number of MSK hand manifestations in his patients . In the other hand in a study done in Greece by Kim *et al* [29] found the prevalence of MSK hand manifestations as high as (82.6%) which is higher than ours.

In a recent study done in USA, Rachel P.K. et al.[11] claiming prevalence of LJM among diabetic patients to be (8 - 50%) which is very wide range, while in a study done by Grgic *et al* [30] the prevalence of LJM was (28.4%) . Triasman HS. et al.[31] reported the prevalence of LJM as (8.4%), while Das *et al* [32] reported it as high as (30-40%) . In Ardic *et al* [33] which is a study done in Turkey, found that non of his patients had LJM and this might be due to short duration of DM in patients he chose . The prevalence of flexor tenosynovitis in our study (9.68%) is lower than that of Mackenzie *et al* [34] in which the prevalence was (11-63%), and higher than that of Ardic F.et al.[33] who shows that (3.8%) of diabetic patients had flexor tenosynovitis . Rachel et al.[11], and Kozak *et al* [35] reported the frequency of Dupuytren's contracture continuant to be (16-42%) and (12-32%) consecutively, this figure having a wide range and higher than ours . Regarding the prevalence of CTS, it was (20%) in a study done by Rachel *et al* [11] which is higher than ours (7.46%), while it is only (1.3%) in that of Ardic *et al* [33] . The difference in the prevalence of MSK hand manifestations of DM may be belongs to the difference in the duration, type, and glycemic control status of DM between the patients included in each study . We found the relation of MSK hand manifestations with duration of DM is highly significant and shows that MSK hand manifestations increase with duration of DM and this is consistant with the results of Petrulewicz-Salamon *et al* [36], Enrico Cagliero *et al* [37], Aydeniz *et al* [38], Sanjeeb *et al* [28], Starkman *et al* [39], Rachel *et al* [11], and Yosipovitch [40] who all reported the MSK hand manifestations to be increased with duration of DM . Regarding gender the occurrence of MSK hand complications were had almost equal males and females with a significant statistical level in our

study, while other authors like Enrico Cagliero et al.[37] in a study done in USA recorded higher prevalence of hand complications in their female patients . A number of author looked at relation between type of DM and MSK hand complications . Douloumpakas *et al* [41] found that MSK hand complications is more in type 1 DM, while Petrulewicz-Salamon *et al* [36] found that it is more in type 2 DM, while in ours the relation of type of DM and MSK hand complications did not reach a significant level. Starkman *et al* [39] recorded that hand complications were more common among diabetic patients on insulin therapy. Glycemic control is being the key treatment of DM, according to our results there is a significant relation between MSK hand manifestations and glycemic control status (P value = 0.027) and shows that MSK hand manifestations were more common in patients with uncontrolled glycemic status .This result is comparable with that of Petrulewicz-Salamon I. et al.[36], a study done in turkey by Aydeniz *et al* [38], and a study done in India by Sanjeeb *et al* [28], while it is differ from that of Enrico Cagliero *et al* [37] which shows that there is no relation between glycemic state and hand manifestations .

Conclusion

Our patients got different hand manifestations with significant association with gender, duration, type of treatment and glycemic control status of DM . MSK hand manifestations were more in patients with uncontrolled blood glucose, with almost equal male and female involvement .

Conflict of Interest: non

Source of Findings: self findings.

Ethical Clearance: This research was carried out with the help of my colleagues mentioned with me. The oral and paper approval of the patients in this study, which included the withdrawal of blood samples from them and laboratory tests.

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Correlation Study between *H.pylori* Bacteria Qnd Biochemical Tests In Type 2 of Iraqi Diabetic Patients

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Abstract

Background/Aims: many important pathogenic bacteria as Helicobacter pylori (H. pylori) can infect diabetic patients and causing inflammation, therefore aimed of the current study was study the Correlated between a demographic characteristic and biochemical tests of H.pylori in type 2 of Iraqi diabetic patients. **Materials and Methods:** study was carried out on diabetic patients infected or non-infected with *H. pylori*, during period (February-July)2017,in specialized centre for endocrinology and diabetes, study group (Patients) , collected information from all patients by pretested questionnaires , biochemistry testes were done by enzymatic methods. **Results:** Out of the 185 patients of type 2 diabetes, *H. pylori* infection was found higher prevalence of *H. Pylori* infection in diabetics (38.4%) as compared to non diabetic patients (59.4%), as well as significant increase FBG(228 ± 27.9) ; HbAlc(8.1± 1.2) ; *S.*Creatinine(1.3 ± 0.4); Cholesterol(303.7± 9.8), HDL(40.6± 33.2) and LDL (146.4± 26) levels in *H. pylori* seropositive diabetic patients whilst increased level of WBCs (7.1±2.3); HB(13. 23± 0.9); S.Albumin(5.3 ± 0.1) and triglycerides (164.9 ± 17.4) in *H. pylori* seropositive non-diabetic patients. **Conclusion :**higher prevalence of *H. Pylori* infection in diabetics more than no diabetic patients , also high rate of *H. pylori* infection among age group (35-45) years , and significant increase FBG; HbAlc; *S.*Creatinine ; Cholesterol, HDL and LDL levels in *H. pylori* seropositive whilst increased level of WBCs ; Hb; Albumin and triglycerides in *H. pylori* seropositive non-diabetic patients.

Keywords: *H. pylori (Helicobacter pylori*);biochemical tests ; type 2 diabetic patients.

Introduction

Helicobacter pylori are considered as worldwide public health problems which more prevalent in the developing countries, mainly acquired in childhood by the oral-oral; fecal-oral; or gastro-oral route [(1)] .so *Helicobacter pylori* (*H. pylori*)- induced gastritis could potentially affect the secretion of important hormones such as ghrelin; leptin ; somatostatin ; gastrin, and somatostatin, that could affect insulin sensitivity and glucose homeostasis, also, other mechanisms may be involved in the possible causative correlated between infected of *H. pylori* and T2DM[(2).]

In worldwide, About 3.8 million deaths patients have type 2 diabetes mellitus [(3)] as well as many previous showed high correlated between *H. pylori* infection and T2DM[(4)] .Many important factors are important in the development of H. pylori-associated gastroduodenal diseases, such as host factor (as sex; age as well as genetic susceptibility); virulence antigens and environment-related factors[(5)].

Materials and Method

The study was carried from (February 201– July) 2018, in specialized centre for Endocrinology and diabetes , Collected 5 ml of blood from diabetic patients infected or non-infected *H. pylori* and for clotting , left at room temperature for (1) hour , the centrifuged at 3000 rpm for 10 minutes and serum was at – 20C until the used.

Biochemical test : the biochemistry testes were done in morning after fasting overnight (12hours), collected venous blood sample for testing : fasting blood sugar (FBS) level ; glycosylated haemoglobin (HbAlc); Total cholesterol ; HDL (high-density lipoprotein

cholesterol; Triglyceride; serum creatinine and FBG measured for both study and control group by routine enzymatic methods , used the diagnostic kit (Biolabo SA.;France), All testing were done in the laboratory of specialized center for Endocrinology and diabetes in Baghdad. Diagnosis of *H.Pylori* by used ELISA (IgG, EIA , Trinity Biotech , U.S.A).

Data Analysis

Values were expressed as mean ±SD, differences between the mean values were analyzed by chi- square test ,the criterion for significance was ($p \leq 0.05$) .

Finding

In table 1 appearance prevalence of *H.pylori* infections in diabetic patients were (15.6%) in the age group(35 45) years;(10.2%) in (25 – 35) years whilst in control group (non- diabetic patients) was 13% and 21.7 %, respectively which was founded significant ($P = 0.5$), and showed high percentage in age group (≥ 45) years , so in this table the gender high distribution in male (24.4 , 20.5)% in both groups (diabetic patients and healthy) compare to female (14, 14.7) % with and without diabetes mellitus .

Table (1): distribution of diabetic patients and Control Group(healthy) according to *H.pylori* infected .

Type Groups	*H.pylori*				Total (No.,%)
	(+)		(-)		
	No.	%	No.	%	
Study Group (diabetic patients)	35		57		92
Control Group	50		34		84

The present study found higher prevalence of *H. Pylori* infection in diabetics (38.4%) as compared to nondiabetic (59.4%) .

Table (2): Corelationshipe between biochemical test and *H.pylori* in diabetic and non- diabetic patients .

Biochemical test	Study group (diabetic patients No.= 185)		Control group (healthy voluntary No.= 185)		Normal value (mg/ dl)
	H.pylori		*H.pylori*		
	(+)	(-)	(+)	(-)	
F.B.G	228 ± 27.9	203.4 ± 22	95.0 ± 12.11	89.9± 12.3	60 -110
W.B.Cs	6.9 ± 1.5	6.5 ± 1.4	7.1±2.3	6.9 ±2.1	4.0 – 11.0
Hb	10.2± 0.7	10.6 ± 0.8	13. 23± 0.9	12.50± 0.12	
HbA_1c	8.1± 1.2	7.9 ± 0.7	4.96±0.43	4.1±0.43	3.0 – 6.0
S. Albumin	4.5 ± 0.5	4.2± 0.5	5.3 ± 0.1	4.3 ± 0.5	3.5 – 5.3
S. Creatinine	1.3 ± 0.4	0.9 ± 0.3	0.50 ± 0.08	0.61 ± 0.05	0.2 - 1.2
S.Triglycerides	151.9± 3.9	106.7± 13.2	164.9 ± 17.4	130.4± 3.2	< 150
Cholesterol	303.7± 9.8	236.1± 16.5	201.3 ± 5.2	209.7± 5.5	130- 200
HDL	40.6± 33.2	41 ± 18.8	42.9 ± 3.2	40.5 ± 3.0	< 40 male < 50 female
LDL	146.4± 26	134.2± 16.8	133.5 ± 20.3	135.6±21.0	< 100

The (mean values± S.D) of FBG ; WBCs ; HB ; HbAlc ; S.Albumin ; S.Creatinine ; triglycerides ; Cholesterol, HDL and LDL for diabetic patients type2 infected with H. pylori(+) and non infected(-) compare to control were illustrated in table(2).

The present results showed significant increase FBG(228 ± 27.9) ; HbAlc(8.1± 1.2) ; *S.*creatinine(1.3 ± 0.4); Cholesterol(303.7± 9.8), HDL(40.6± 33.2) and LDL (146.4± 26) levels in *H. pylori* seropositive diabetic patients whilst increased level of WBCs (7.1±2.3); HB(13. 23± 0.9); S.Albumin(5.3 ± 0.1) and triglycerides (164.9 ± 17.4) in *H. pylori* seropositive non-diabetic patients.

Chen and Blaser showed that H.*pylori* play directly or indirectly in increases HBA_{lc} levels in the adults[11], so Chen and Blaser ,2012 elucidate *H. pylori* regulates leptin and ghrelin, which play important role in energy homeostasis and metabolism[11], so several studies as [12,13] showed elevation or increased level of LDL in *H. pylori* infection, so [14] found in *H. pylori*-infected patients have higher serum cholesterol and lower HDL than in negative patients ,However regarding HDL, similar results were previously reported[15, 16, 17].

Aarabi*et al.,* 2010 appearance in his study level of triglyceride level was higher in *H. pylori* infection than in negatives[12]. However VolanenI *et al.,*2005found that serum triglyceride and HDL level can change during acute phase of bacterial infection[18].

Glycated haemoglobin (HbAlc) was correlated to glucose levels measurements obtaining that HbAlc could be used as an objective tool of glycemic control[19] other hands [7]elucidate increased levels of HbAlc associated with *H. pylori* infection in type 2 diabetes group[7] , As well as HbAlc in *H. pylori* infection among diabetics were greater than *H. Pylori* non diabetics[7] ,but [20] founded no correlated between *H. pylori* infection with HbAlc in men aged40-70 years with or without diabetes , Whilst [21] found that *H. pylori* eradication in type 1 diabetes does not affect glycemic control in patients as evidenced by HbAlc level and daily insulin requirement.

So Bajaj *etal*., 2014 study provides evidences that *H. Pylori* infection was associated with increase in LDL level and triglyceride but no effect on levels of both total cholesterol and HDL[7].

In healthy Korean adults was associated with lipid profile as increase in LDL ; total cholesterol and triglyceride, but decrease in HDL[22] .

Dursen *et al*., found no significant in lipid profile in both *H. pylori* infected in diabetics and non-diabetics[23,24].

Conclusions

H.pylori infections are one of the risk factor may be considered in the evaluation of diabetic patients .

H.pylori infections were higher in diabetic patients compare to healthy controls.

Serum cholesterol, FBG; HbAlc; *S.* Creatinine ; Cholesterol, HDL and LDL were higher level in *H. pylori*-positive diabetic group as compared to negative diabetics.

incidence of bacteria in smokers, and who drinking the coffee; tea and water also source of water (natural or minerals) in both groups (diabetic and non-diabetic), and highly prevalent in low income patients.

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Conflict of Interest : None

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Ethical Clearance: All samples taken after the patients' approval.

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Correlation of Serum Amylin Level to Polycystic Ovarian Syndrome

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Abstract

Background: Polycystic ovary syndrome (PCOS) is the most common endocrine disorder in women of reproductive age, affecting 6%–10% of women worldwide. Objective: The study aimed to assess the relation of serum amylin level in women with polycystic ovarian syndrome. **Materials and Methods:** A cross−sectional study was carried out in Salah Al-din City from 10th of November 2018 , to 20thof May 2019. The number of polycystic ovary syndrome women under study was 51 women whose ages were between 18 and 45 years old. These women admitted to obstetrics and gynecology unit at Salah Al-din Teaching Hospital. The control group who were matched to the patients studied included 37 women.F**inding :**The study showed that there is the significant difference between PCOS women and the control group concerning serum amylin level and the highest mean of amylin was occurred in PCOS women (183.12 ± 10.021 vs. 23.62 ± 1.97). There was a weak positive correlation between body mass index and amylin level among PCOS women in this study. The highest rate of PCOS women had irregular menstrual cycle. The study showed that most PCOS women included in the study had hirsutism. The high rate of acne recorded among PCOS women. **Conclusion:** It was concluded that there was a highly significant relation of amylin to PCOS.

Keywords: *Hirsutism, menstrual irregularity, polycystic ovary syndrome, amylin.*

Introduction

Polycystic ovary syndrome is the most common endocrine disorder in women of reproductive age, affecting 6%–10% of women worldwide.(1) Polycystic ovary syndrome is characterized by chronic anovulation, hyperandrogenism, and multiple small subscapular cystic follicles in the ovary on ultrasonography.(2)

Amylin is a 37 amino acids polypeptide hormone with a molecular weight of 3.9 kDa, was firstly isolated from amyloid deposit in pancreatic islets of type 2 diabetic patients.(3) Amylin is mainly co-secreted with insulin by pancreatic β-cells in response to stimulation of glucose, free fatty acids, and nutrient intake.(4) Amylin inhibits food intake and delays gastric emptying, leading to the reduction of blood glucose levels and body weight. Moreover, pramlintide, an amylin analogue also reduces body weight in humans.(5) However, studies assessing serum amylin levels in PCOS women have yielded inconsistent results(6).

Materials and Method

A cross-sectional study was carried out in Tikrit City from 10th of November 2018 to 20th of May 2019. The number of PCOS women under study was 51 women whose ages were between 18 and 45 years. The diagnosis of PCOS was based on Rotterdam Criteria: oligo and/or anovulation clinical and/or biochemical signs of hyperandrogenism, and polycystic ovaries in ultrasound, meaning presence of 12 or more follicles measuring 2 – 9 mm in diameter in each ovary and/or ovarian volume more than 10 cm^3. In addition the control group consisted of 37 apparently healthy volunteer females with regular menstrual cycles aged between 18 and 45 years. A volume of 5 mls of blood sample was taken by vein puncture from each subject enrolled in this study. Blood samples were placed into sterile test tubes, after blood clotting, the samples were centrifuged at 3000 rpm for 15 min then if a clot was developed, then was removed and re-centrifuged at 3000 for 10 min, and the obtained serum were aspirated using mechanical micropipette and transferred into clean plain tubes with

screw which labeled and stored in deep freeze at - 20 °C for the biochemical measurement of amylin by ELIZA.

Statistical Analysis

The statistical analysis was performed using Statistical Package for the Social Sciences version 23 (SPSS, IBM Company, Chicago, USA).

Finding

This study showed that there was a significant difference between PCOS women and the control group concerning serum amylin level. The mean serum amylin in PCOS women was 183.12 ± 10.021 vs. 23.62 ± 1.97 in control group, as shown in table 1. There was a weak positive correlations between body mass index (BMI) and serum amylin level among PCOS women in this study, figure 1. The highest rate of PCOS women had an irregular menstrual cycle (84.31%) and 15.69% of them had normal menstrual cycle, as shown in figure 2. The study showed that most PCOS women included in the study had hirsutism (66.70%), while only 33.30% were without hirsutism, as shown in figure 3. The high rate of acne recorded among PCOS women was 53% and 47% of PCOS women without acne, as shown in figure 4.

Table (1) : Serum level of amylin in women with PCOS and the control group.

Amylin level (pg/ml)	PCOS women	Control group	t. test	P. value
No.	51	37		
Mean	183.12	23.62	7.28	0.0001
SD	10.021	1.97		

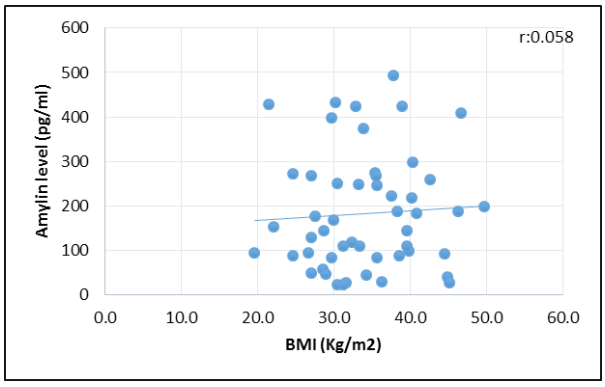


Figure (1): Correlation between amylin hormone and BMI of PCOS women.

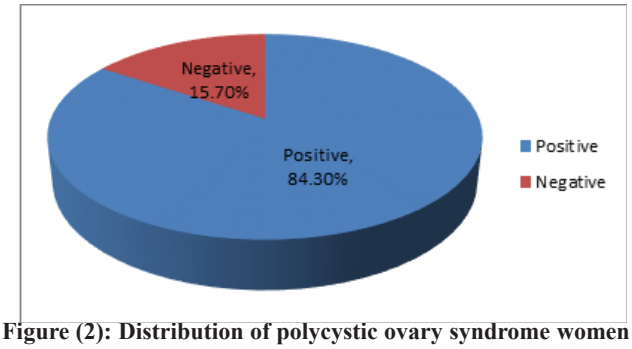


Figure (2): Distribution of polycystic ovary syndrome women according to irregularity of menstrual cycle.

Figure (3): Distribution of PCOS women according to hirsutism.

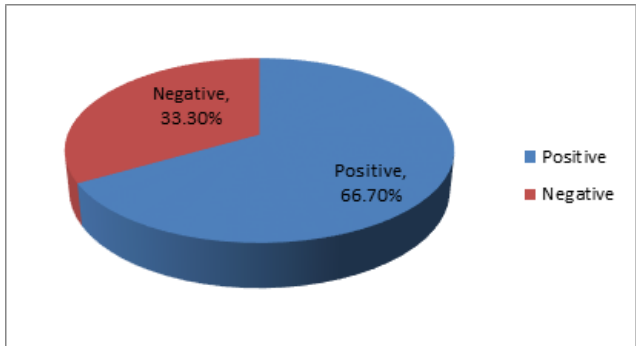


Figure (4): Distribution of PCOS women according to presence of acne.

Discussion

PCOS is an endocrine disorder with multifactorial etiology and various clinical manifestations. It is the most common cause of menstrual disorder and an ovulatory infertility in women.[7]This study showed that there is the significant difference between PCOS women and the control group concerning amylin level which was found to be significantly higher in women with PCOS comparing with the apparently healthy women at of less than 0.01, suggesting the presence of a hormonal disturbance in women with PCOS, which may reflecting a significant effect of the pancreatic hormones on the ovarian function. These results were in agreement with JAMES *et al,* [8] who found an increment in serum amylin level in women with PCOS. The precise mechanism of increased serum amylin levels in women with PCOS currently is unknown, PCOS is a complex disorder and carries an important pathophysiological role. Therefor women with PCOS have a higher chance for insulin resistance and compensatory hyperinsulinemia leading to an increased risk of obesity, type-II diabetes mellitus, metabolic syndrome, as well as hyperandrogenemia. Amylin may contribute to their progression of diabetes, and beyond their risk for diabetes, women with PCOS also have higher risk of developing dyslipidemia and

hypertension.[9]

This study showed that the rate of PCOS women to had an irregular menstrual cycle, hirsutism, and acne were higher in women with PCOS as compared with the control group.some studies report a prevalence of hirsutism in women with PCOS in the range of 50–76%. [10][11] Hirsuitism is defined as excessive hair growth in area usually associated with male sexual maturity, that is, on the face, chest, lineal alba, lower back, buttocks, and anterior thighs. Hirsuitism results from androgen effects on the pilosebaceous unit and is commonly associated with acne and oily skin. It is usually due to an increase in androgen production from the ovaries or adrenal glands.[12] The results noticed by this study were in agreement with Azziz *et al* [13] and Ovalle and Azziz, [14] they concluded the source of hyperandrogenism due to the genetic abnormalities in insulin receptor resulting in the thickening of the ovarian theca that increased the androgen production and inhibition of sex hormone binding globulin synthesis. The degree of hirsutism might be influenced by the relative activity of the 5α-reductase enzyme that convert testosterone to the more active metabolic dihydrotestosterone.[15] [16] The high concentrations of testosterone, one of the factors that contribute to some symptoms of PCOS such as infertility, polycystic ovaries, hirsutism, and acne.[17] Gowri *et al* [18] showed that the acne was seen in highest percentage (67.5%), followed by hirsutism (62.5%) in women with PCOS compared to healthy women of a comparable age group and fasting insulin levels was the most common hormonal abnormality seen along with both acne and hirsutism. Sharma *et al* [19] Majumdar and Singh [20] also showed that acne was the most common cutaneous manifestation in PCOS group.

In addition, women with PCOS are frequently obese and obesity is associated with menstrual cycle abnormalities in the general population.[21] The prevalence of these cycle abnormalities may vary in unselected women with PCOS because they reflect the subgroup of PCOS women who have sought medical attention and thus are more likely to demonstrate a more severe phenotype.[22] On the other hand, menstrual cycle irregularity is a relatively accurate surrogate of ovulation and is easily obtained from the medical history.[23] *Strowitzki et al* [24] reported that in women with PCOS, insulin resistance was significantly lead to an amenorrhea (cycle length > 6 mo) when compared with those with normal cycles.

Conclusion

In conclusion, women with PCOS had a higher serum level of amylin compared to other women without PCOS of a similar age group.

Conflict of Interest: Non

Source of Findings: Self

Ethical Clearance: Nil

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MMP-13 Gene Polymorphisms Associated with KOA in Iraqi Population

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Abstract

Knee osteoarthritis (KOA) is disease occur in knee joint characterize by cartilage degradation that mediate via pro-inflammatory marker such as matrix metalloproteinase-13 (MMP-13) . MMP-13 is enzyme expression in chondrocyte ,encoded by MMP-13 gene , act to degraded it and joint degenerative .This study explained association the rs2252070 single nucleotide polymorphisms (SNP) of MMP-13 gene in KOA . The result demonstrate that G alleles have significant association with KOA development . our results are the first ones reporting an association between MMP-13 and KOA in Iraqi populations .

Key words */ MMP-13 gene polymorphisms and Knee osteoarthritis (KOA).*

Introduction

Knee osteoarthritis (KOA) is the disease occur in the knee joint .It's degenerative arthritis in cartilage matrix of knee , is a group of overlapping distinct diseases, which may have different etiologies but with similar at biologic, morphologic, and clinical outcomes[(1)]. The most common form of arthritis is KOA , 6%of adults are affected it and the women more affected than men at age more than 45 years .KOA always has many soluble mediators for example prostaglandins and cytokines ,these mediators can stimulat matrix metalloproteinase-13 (MMP-13) in chondrocyte. MMP-13 production is consider the first step in theory of inflammation and degenerative knee joint[(2)] .

MMP-13 (also called collagenase) is enzymes that break the collagen peptide bonds in cartilage (Collagen, a key component of the extracellular matrix of chondrocyte) encoded by MMP-13 gene. MMP-13 is a protein of 81 875 Da and 739 amino acid residues as deduced from the DNA sequence analysis [(3)] . MMP-13 protein is synthesized in precursor form (preprocollagenase), then the signal peptide and pro region are removed and the resulting mature form is secreted. Plays a role in the degradation of extracellular matrix proteins(cartilage degradation) including fibrillar collagen and fibronectin .Cleaves triple helical collagens, including type I, type II and type III collagen, but has the highest activity with soluble type II collagen [(4)] .

Materials and Method

Study design : This study designed according to approved via Institutional Ethics Committee in Medical College / Al-Nahrain University / Iraq and it done in Rheumatology & Rehabilitation Consultation Unit in Al-Yarmouk Teaching Hospital / Iraq . The consents obtained from all patients and healthy persons that involved in the study . Diagnosis of cases with KOA was according to American College of Rheumatology (ACR), all the patients are classified as primary KOA will include in this study .The ACR depends on signs and symptoms of KOA that show on patients also depend on clinical examination and X- ray (anteroposterior (AP) view and skyline view) [(5)] . This study involved collected 50 primary KOA grade 1 (G1) and 50 grade 4 (G4) cases and 50 controls, age of the cases and controls were more than 40 years . Table 1.

Table 1 : Numbers and age of the KOA cases and controls

	Number	Age (years)
KOA (G1) cases	50	Mean ±SD (48.1± 5.8)
KOA (G4) cases	50	Mean ±SD (48.8± 6.1)
Controls	50	Mean ±SD (49.1± 6.6)

SD/ Standard deviation

Samples collection : Five ml of blood drawed from cases and controls collected it in EDTA tube .DNA was isolated from blood sample by DNA extraction kit (Zymo company / USA) according to special method at kit . The isolate DNA stored in -20 C until future use . The DNA sample had purity ratio 1.7 to 2 that used in PCR-RFLP method . The Gene Runner software (Version 3.05) was used to design of MMP-13 gene primer , all primer information in table 2.

Table 2: Data for analysis of SNP in the human MMP-13 gene.

Gene name	SNP	Primers	GC %	Restriction enzyme	Tm (C)	PCR product size (bp)
MMP-13	rs2252070	Forward 5'- GAT ACG TTC TTA CAG AAG GC- 3'	45	BsrI	50.4	445
		Reverse 5'-GAC AAA TCA TCT TCA TCA CC - 3'	40		48.7	

PCR used for DNA amplification : Polymerase Chain Reaction (PCR)The extracted used to amplification of DNA . PCR was applied on AURA TM PCR Cabinet (Labnet – Italy). The PCR reaction was consisted of 1.5µl of 110 ng DNA, 1μL of mM dNTPs , 10 pmols/µl (1µl) of forward and 10 pmols/µl(1µl) of reverse primer , 0.3 μL of 5U/µl iTaq DNA polymerase , 3 μL of Taq polymerase Buffer A , and 16.5 µl of deionized water . The thermal cycling conditions showed in table 3.

Table 3: The thermal cycling conditions

No.	Phase	Tm (^{o}C)	Time	No. of cycle
1-	Initial Denaturation	95^{o}C	3 min.	1 cycle
2-	Denaturation -2	95^{o}C	45sec	35 cycle
3-	Annealing	56^{o}C	45sec	
4-	Extension-1	72^{o}C	45sec	
5-	Extension -2	72^{o}C	7min.	1 cycle

The production of PCR were separated by use a 2% agarose gel containing 2 μL ethidium bromide. A 100 bp DNA marker was used as a size standard for each gel lane. The UV light used for visualization of gel

Restricted Fragment Length Polymorphism (RFLP) Analysis: The productions of PCR was digested by restriction enzyme , BsrI (Biolab/England). The digested fragments were electrophoresis on 2.5% agarose gel mixed with red stain. The genotype frequencies. found by RFLP analysis .

Statistical Analysis

The GraphPad PRISMstatistical software (version6 .0, San Diego, CA, USA) was used to data analyses . The Chi-square (χ 2) test used to find the difference between allelic frequencies and genotype in KOA cases and control. The odds ratio and confidence interval (CI) (95%) was used to calculate association between KOA cases and control's genotypic and allele frequencies . Odds ratio was used to statistically demonstrate a positive dose response relationship of mutant allels (G allele) with KOA .

Finding

A / KOA Patients: This study involved 50 patients with G1 KOA and 50 patients with G4 KOA ,and

studied Genotype frequencies by using PCR -RFLP to detect the found of SNP of MMP gene (rs2252070).

rs2802292 SNP is characterized by A>G in G1 KOA patients .The AA mutant type (homozygous) of genotype frequency was high (58.7%) , and GG mutant type was low (2.1%) also AG mutant type (heterozygous) was (39.1%) . This study calculated the allel frequencies by genotype frequencies and showed that A allele was high (79%) but G was low (21%) in G1 KOA patients .

rs2802292 SNP is characterized by A>G in G4 KOA patients .The AA mutant type (homozygous) of genotype frequency was (26%) , and GG mutant type was low (20%) also AG mutant type (heterozygous) was high (54%) . This study calculated the allel frequencies by genotype frequencies and showed that A allele was high (57%) but G was low (43 %) in G4 KOA patients .

B / Controls. This study involved 50 healthy persons and studied Genotype frequencies by using PCR -RFLP to detect the found of SNP of MMP gene (rs2252070) .

rs2802292 SNP is characterized by A>G in controls .The AA mutant type (homozygous) of genotype frequency was high (56%) , and GG mutant type was low (0%) also AG mutant type (heterozygous) was (44%) . This study calculated the allel frequencies by genotype frequencies and showed that A allele was high (78%) but G was low (22%) in controls .

C/ Association Studies : This study included compared between G1 KOA with controls and G4 KOA with controls . The results showed that χ 2 forG1 with controls were non significant but for G4 with controls were significant correlation. The odds ratio and Cl 95% forG1 with controls were non significant but for G4 with controls were significant correlation . As per genotype frequency analyzed data, KOA cases are more likely to have a AG allele as compared to AA and more likely to have a GG allele. These association depend on CI that consider significant when to be above 1.0. If GG allele can be considered as a higher exposure to G as compared to AG , then the above statistics demonstrate a positive dose-response relationship of G allele with KOA . Table 4, 5and 6 .

Table 4: Comparsation of control with G1according to MMP13 alleles polymorphisms

Polymorphism	Group								X^2	Sig.	P-value	CI 95%	OR	df
	Control N=50				G1 N=50									
	Observed	Percentage	Expected	Percentage	Observed	Percentage	Expected	Percentage						
AA	28	56	22.36	44.72	28	58.7	22.36	43.83	0.155	NS	0.6934	0.631 to 1.356	0.848	1
AG	22	44	26.9	53.8	20	39.13	25.80	52.74						
GG	0	0	0.74	1.48	2	2.174	1.90	3.435						
Total	50	100	50	100	50	100	50	100						
X^2	3.055				4.149									
Significant	NS				NS									
P-value	0.2171				0.1256									
Allele frequency														
A	0.78				0.79									
G	0.22				0.21									

Table 5: Comparsation of control with G4according to MMP13 alleles polymorphisms

Polymorphism	Group								X^2	Sig.	P-value	CI 95%	OR	df
	Control N=50				G4 N=50									
	Observed	Percentage	Expected	Percentage	Observed	Percentage	Expected	Percentage						
AA	**28**	**56**	**22.36**	**44.72**	**13**	**26**	**19.81**	**48.11**						
AG	22	44	26.9	53.8	27	54	21.7	**47.36**	**6.123**	*	**0.0133**	**1.091 to 2.197**	**3.253**	**1**
GG	0	0	0.74	1.48	10	20	8.5	4.6						
Total	50	100	50	100	50	100	50	100						
X^2	3.055				9.519									
Significant	NS				**									
P-value	0.2171				0.0086									
Allele frequency														
A	0.78				0.57									
G	0.22				0.43									

Table 6: Comparsation of G1 with G4according to MMP13 alleles polymorphisms

Polymorphism	Group								X^2	Sig.	P-value	CI 95%	OR	df
	G1 N=50				G4 N=50									
	Observed	Percentage	Expected	Percentage	Observed	Percentage	Expected	Percentage						
AA	**28**	**56**	**22.36**	**43.83**	**13**	**26**	**19.81**	**48.11**						
AG	**20**	**40**	**25.80**	**52.74**	**27**	**54**	**21.70**	**47.36**	**7.633**	**	**0.0057**	**1.152 to 2.534**	**3.833**	**1**
GG	**2**	**4**	**1.90**	**3.435**	**10**	**20**	**8.5**	**4.6**						
Total	**50**	**100**	**50**	**100**	**50**	**100**	**50**	**100**						
X^2	**4.149**				**9.519**									
Significant	**NS**				**									
P-value	**0.1256**				**0.0086**									
Allele frequency														
A	**0.79**				**0.57**									
G	**0.21**				**0.43**									

Discursion

The KOA is degenerative disease of cartilage in knee joint , it's inflammatory disease because it occur with inflammatory mediators and the age consider as risk factor to OA development therefore consider as within age related diseases [1].

The chondryocyte with age suffer of high expression of nitric oxide (NO) (high level of NO act as risk factor against survival of cell) this considered as factor for chondryocyte degredation and OA development due to the NO is one of triggers for MMP-13 in cell [6]. MMP-13 are enzymes that break the peptide bonds in collagen (Collagen, a key component of the animal extracellular matrix, is made through cleavage of pro-collagen by collagenase once it has been secreted from the cell) encoded by MMP-13 gene and it's act as mediator the cartilage degradation [7].

This study showed association between MMP-13 gene polymorphisms with KOA through the mutant of A>G . This association explained when compare control with G4 KOA and G1 with G4 KOA and obtained significant association in this comparisons. This result demonstrate that MMP-13 gene polymorphisms can develop the KOA , This effect occur by NO that mediate the MMP-13 expression.

NO act as 2nd messenger , such as reactive oxygen species , in cell for activation of many biological functions therefore it can activate the Guanylate cyclase (GC) . GC act to convert the GTP to cGMP .cGMP mediate the phosphorlation of protein kinase G (PKG) and activation it (8). PKG also act to phosphorlate the Core-binding factor alpha 1 (Cbfa1) in presence of cGMP exclusively ,this lead to activation of Cbfa-1 . Cbfa-1 is localize in cell nuclei , this lead to it effect on MMP-13 gene and elevate MMP-13 expression [9] . Therefore , the NO cGMP- PKG pathway promot MMP-13 expression .The NO cGMP- PKG pathway might drive Cbfa-1-dependent gene expression in chondryocte by regulating nuclear translocation of Cbfa-1. This can be stimulate and hyperactivation of proinflammatory cytokines (such as MMP-13) [10].

Our study for the first time shows that MMP-13 SNP (rs2252070) is significantly associated with KOA in Iraqi population . In addition to the highly significant association of MMP-13 and OA , based stratification also indicated that the mutant "G" allele has a much more pronounced risk rate of OA in Iraqi populations . Increase of G allele have association with elevate MMP-13 activity and KOA development . The our study is first time shows association between KOA and MMP-13 SNP (rs2252070) , and some study in China (Sun G1, Ba CL1 and et al . 2019) show same association but different allele , at Chinese population the A allele but in Iraqi G allel is risk factor in KOA development due to it can increase the encoded and activity of MMP-13 [11].

Conclusion

The our study conclude that genotype frequencies of KOA patients and controls were studied using PCR-RFLP technique to detect the presence of SNP of MMP-13 gene (rs2252070). The Chi-square test indicated significant positive relationship between KOA and TG and GG genotypes

Conflict of Interest: Non

Source of Findings: Self

Ethical Clearance: Non

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Rejuvenation of Under Eye by Nanofat Grafting

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Abstract

Over the past decade, we have seen unprecedented growth in the popularity of elective cosmetic surgery. In a prospective study, a total number of 22 female patients under the age of 40 years (range from 20-40 years) all complaining form dark pigmentation involving the lower eyelids in Kirkuk city in north of Iraq ,all patient had been treated by intradermal nanofat injection . Those patients were selected, evaluated and operated during the period from March to November 2018. In all cases the diagnosis confirmed clinically; none of these patients in this study received previous medical or surgical therapy. Their ages were ranging between (20 years to 40 years). All were treated by single stage nanofat injection in the lower eyelids ;Nanofat injected to improve the pigmentation and skin rejuvenation for all patients injected with intradermal nanofat ; all patients injected by nanofat using small sharp needle 27-gauge in repeated fan-shaped patterns intradermally with 1 cc of nanofat in each side followed by Simple digital massage over the lower eyelids ;at the end of the injections erythema and a yellowish discoloration was noticed in whole lower eyelids; this discoloration disappeared within 5 weeks by a gradual lightening of the skin. After an average follow-up of six months (range 3–9 months), Assessment of the results by the surgeon were good in 50%, fair 36.4 and poor 13.6, patients satisfaction were good in 59.1%, fair in 31.8% of cases and only 9.1 were poor as shown in. Only 2 patients (9.1%) in this study had prolong ecchymosis as postoperative complications , all other patient healing pass smoothly and uneventful .

Keyword: *Lower Eyelid Skin; Nanofat grafting; fat graft*

Introduction

Over the previous decade, unprecedented growth in the popularity of elective cosmetic surgery have been seen. According to the American Society for Aesthetic Plastic Surgery, there has been a approximately 8% elevation in plastic surgery[(1)]. different factors can cause dark circles around the eyes. One cause is excessive pigmentation due to dermal melanocytosis. This can be congenital or occur secondary to such conditions as atopic or allergic contact dermatitis [(2)]. Another common cause of dark circle is a thin, translucent lower eyelid skin overlying the orbicularis oculi muscle. Transparent eyelid skin allows visualization of the underlying subcutaneous vascular plexus or vasculature within the muscle [(3)]. Shadowing due to skin laxity and tear trough is another cause of infraorbital dark circle [(4)]. This can worsen with time because of age-related loss of subcutaneous fat and hollowness of the periorbital area. Many causative factors of the dark circles include translucent, thin skin with excessive pigmentation of the lower eyelids skin overlying the orbicularis oculi muscle and shadowing due to laxity of the skin and tear trough deformity, periorbital edema, superficial location of vasculature may also exacerbate the condition [(5)]. Etiologic factors likewise incorporate hereditary/ established, post provocative hyperpigmentation ,dermal melanin affidavit, hypersensitive contact dermatitis, optional to sickliness, stress, flawed propensities [(5)]. So this condition may be challenging to treat due to it complex etiopathogenesis, and lacking straightforward and repeatable therapeutic options [(6)]. Many treatment modality had been used like IPL, and Q-switched ruby laser, local creams ,Chemical peels, as well as fillers have all been tried for treatment but none have provided a satisfactory treatment [(7)]. All mentioned treatment option are not effective for patients with dark pigmentation in lower lid due to thin, translucent skin. In this type of dark pigmentation, injection of autologous fat has been reported as a good method [(8)]. A new treatment technique called Nanofat has been introduced by Tonnard *et al*. In which autologous fat graft harvested manually

by closed syringe lipoaspiration then it's emulsified mechanically until a liquid suspension is obtained and then superficially injected in intradermal plain with fine sharp needles [2]. Autologous fat grafting firstly reports in the early twentieth century and used clinically after the introduction of liposuction by Illouz in the 1980s as a lipofilling treatment in which fat injected deep subcutaneously [9]. Zuke *et al* determined that stem cells could be isolated from human adipose tissue obtained by suction-assisted lipectomy (liposuction) was processed to obtain a fibroblast-like stem cells [10]. In this clinical study, nanofat technique evaluated the reliability of a practical method in which intradermal nanofat injection used to rejuvenate skin and treat dark pigmentation in lower eyelids.

Material and method

2.1. Patients:

In a prospective study, a total number of 22 female patients under the age of 40years(rang from 20-40 years) all complaining form dark pigmentation involving the lower eyelids in Kirkuk city in north of Iraq ,all patient had been treated by intradermal nanofat injection. Those patients were selected, evaluated and operated during the period from March to November 2018. In all cases the diagnosis confirmed clinically; none of these patients in this study received previous medical or surgical therapy. Their ages were ranging between (20 years to 40 years).

To evaluate clinically the benefit of Nanofat injection for skin rejuvenation and dark pigmentation of the lower eyelids as an outpatient procedures with short term follow up. Preoperative evaluation in all 22 patients included medical history, a complete physical examination, thorough history and physical examination. Collected information about patient associated illnesses, smoking, drug use and medication history, and family history, preoperative photograph were taken to all patients in frontal view. Liposuction was performed and harvested from the lower abdomen after infiltration with a modified Klein solution, prepared by 1 liter of physiological solution (RL) + lidocaine 800 mg with adrenaline 1mg (1:1000).

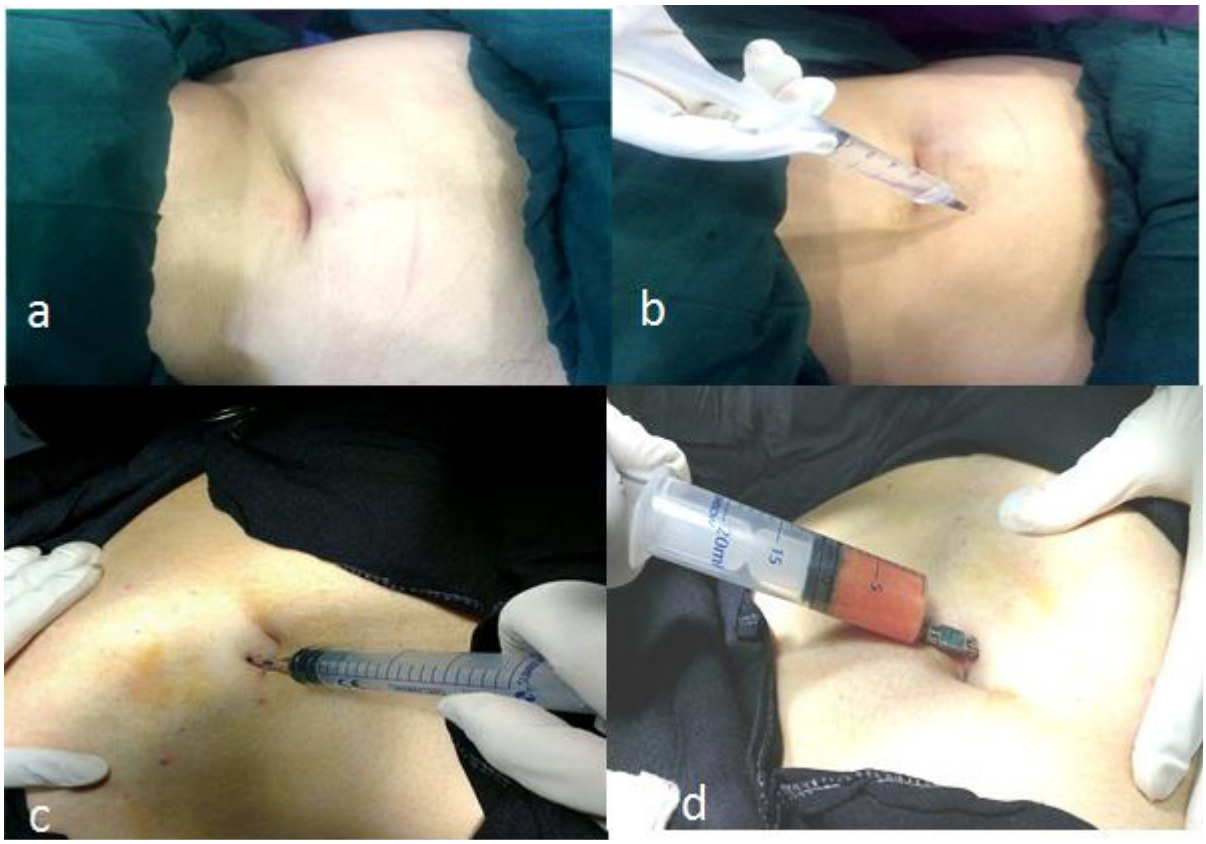


Fig 1. Operative procedure: (a)-Lower abdomen draping (b-c)- infiltration with a modified Klein solution (d)-Closed syringe liposuction.

Then the collected fat (Fig.2), in order to reduce any residual local anesthetic solution and red blood cells lipoaspirated fat was rinsed with sterile saline (Fig.2:2b), then by using Tonnard's technique [8] the lipoaspirate fat is mechanically emulsified this achieved by 30 passes shifting between two 10-cc syringes connected each other by a female-to-female Luer-Lock connector.

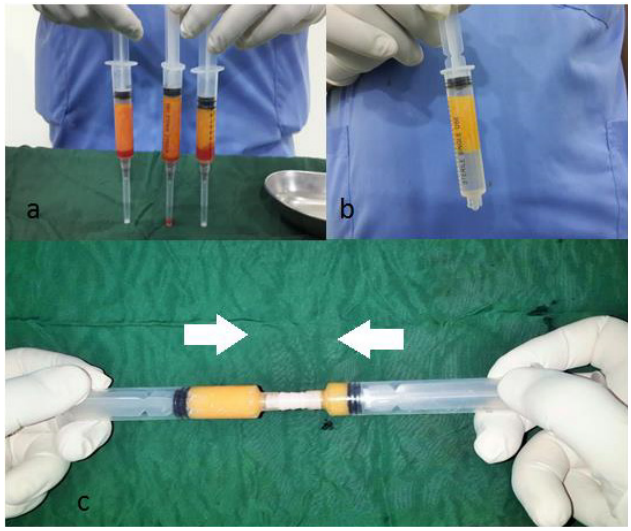


Fig 2: Nanofat preparation: (a) - Collected fat (b) - lipoaspirated fat was rinsed with sterile saline (c) - Emulsification of lipoaspirate fat by achieved mechanically by 30 passes shifting between two 10-cc syringes connected each other by a female-to-female Luer-Lock connector

Emulsification process liquefy fat to emulsion and changed it color from yellow to pale yellow white (Fig. 3b), the fat becomes liquid and emulsified so it can be injected easily by small needle 27-gauge intradermally (Fig. 3a) the injection started from medial aspect of the lower eyelids to lateral aspect (Fig. 3c-d) followed by simple digital massage to injected area (Fig. 3e) to prevent skin irregularity due to nanofat localization and also decrease post injection erythema and yellow discoloration

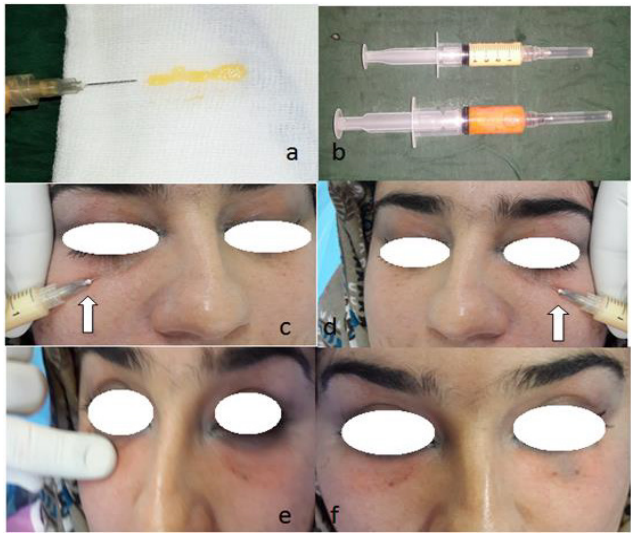


Fig 3 (a-f) Nanofat injection(a)- Nanofat infused effectively by little needle 27-measure (b)- Emulsification procedure modify fat shading from yellow to light yellow white (c-d)- Intradermal nanofat infusion in both left and right lower covers (e)- Simple computerized back rub to the infused region (f)- post infusion erythema and yellow staining.

2:5 Post-operative measure:

Dressing made with local eye ointment apply to the lower eyelids. Oral Antibiotics with local eye antibiotic ointment were continued for five days postoperatively, usually patients were return to normal life style on the 3th postoperative day. The patients were followed up (3 to 9 months post operatively) for the evaluation.

Findings

Twenty two female patients were included in this study ,there age range from 20 to 40 years as shown Table 1, Patients concern was variable between dark pigmentation alone or pigmentation with rejuvenation as shown in Figure 4; all were treated by single stage nanofat injection in the lower eyelids ;Nanofat injected to improve the pigmentation and skin rejuvenation for all patients who injected with intradermal nanofat ; all patients injected by nanofat using small sharp needle 27-gauge in repeated fan-shaped patterns intradermally with 1 cc of nanofat in each side followed by Simple digital massage over the lower eyelids ;at the end of the injections erythema and a yellowish discoloration was noticed in whole lower eyelids; this discoloration disappeared within 5 weeks by a gradual lightening of the skin. After an average follow-up of six months (range 3–9 months), Assessment of the results by the surgeon were good in 50%, fair 36.4 and poor 13.6, as shown in Table 2; patients satisfaction were good in 70%, fair in

25% of cases and only 5 were poor as shown in Table 3. There were no significant wound complications, no infections, no cysts, or permanent discolorations, or other side effects were observed right after the treatment and also at the follow up visit. ; Only 2 patients (9.1%) in this study had prolong ecchymosis as postoperative complications , all other patient healing pass smoothly and uneventful .

Table 1: Number and percentage of patients according to their ages

Age of patient	No. of Cases	Percentage
20-30 year	8	40
30-40 years	14	60

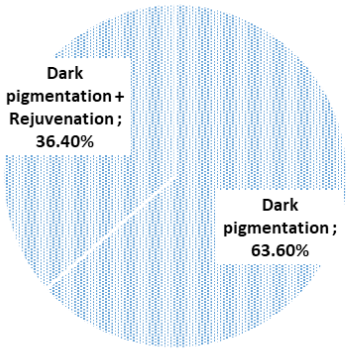


Figure 4: Rate of patients concern.

Assessment of the results by the surgeon as shown in table 3.3:

Table 2: Number and percent of surgeon assessment.

Result	No. of Cases	Percentage
Good	11	50 %
Fair	8	36.4%
Poor	3	13.6%

Table 3: Number and percent of Patients satisfaction.

Result	No. of Cases	Percentage
Good	14	70
Fair	5	25
Poor	1	5

Discussion

Dark circles under the orbital affect individuals of both sexes, all races, and a wide range of ages. Circumcision factors are known to cause the appearance of dark circles, including excessive pigmentation of the skin, thin, dry, thin skin that rises above the circular eye muscle, and shingles caused by skin laxity and tear pelvis. The most appropriate method of treatment varies according to the main causative factor of the dark circle. Topical skin lightening agents are the mainstay of treatment for hyperpigmentation [(10)]. Factors commonly used in hyperpigmentation include hydroquinone, retinoic acid, meicinol, azylic acid and corticosteroids [(11)]. Various combination therapies of these topical agents have been used to increase their efficacy while reducing side effects [(12)]. Autologous fat injection has been reported as an effective method for treatment dark lower lids pigmentation caused by thin, translucent skin in which many modalities of treatment cannot treat it [(13)]. But fat injection may cause visible lumps of fat, contour irregularities, or fat necrosis or fat loss as it injected subcutaneously [(14)]. Tonnard's *et al* change fat particles to semi liquid emulsify by mechanical emulsification process change fat particles to nanofat which completely disrupts the adipose tissue structure so it can be injected by small gauge needle intradermal not subcutaneously in order not to have a volume-adding effect. But the major benefit of nanofat injection is to relate to stem cell activity [(8)]. In the current study, nanofat grafting combined with microfat grafting produced satisfactory results in treating lower eyelid dark circles. Microfat grafting at the nasojugal folds compensated for the lack of volumetric effects of the nanofat grafting technique, and nanofat grafting at the lower eyelids improved the dark circles effectively, without any noticeable irregularity. This technique produces effects that are similar to those achieved by injecting purified stromal vascular fraction, but without the complicated technique or expensive laboratory equipment required for the latter. As well, the skin rejuvenating effects from stem cell activity are augmented by the fat graft acting as a soft tissue filler, to produce the final effect. In this study we have use nanofat injection by the same steps used by Tonnard's *et al*. in which they inject in each lower lids 1.6 cc of nanofat intradermally ;instead we use to inject 1 cc of nanofat in each lower eyelids and use simple digital massage to decrease postoperative erythema and pale yellowish skin discoloration which last for around

five week in compare to Tonnard's et al they notice that skin yellowish skin discoloration remained for 1 month postoperatively and eyelid skin erythema for three months after the procedure. In this study the final results was satisfactory, In all patients, healing was uneventful with no significant complications. The postoperative outcomes were satisfactory after an average follow-up of six months assessment of the results by the surgeon were accepted in more than 80% of all of the patients satisfaction also accepted in more than 80% of all the cases (good in 59.1%, fair in 31.8% of cases and only 9.1) and nearly the same results were obtained by other study. Most patients showed Satisfaction ranging from fair to good ,improvement in skin texture the lighting of dark skin color in the lower eyelids and this agreed with both Dong et al and Tonnard's *et al* which shows also good improvement and rejuvenation of skin and lighting of dark pigmentation; postoperative complications was minimal ,neither fat lumps nor texture irregularities were notice [14] and Tonnard's *et al* [8] also observed no significant complications. Intradermal Nanofat injection shows both rejuvenating affect and skin lighting due its Capability of stem cell production rather than volume build as in fat injection which injected in subcutaneous plain. As Tonnard's *et al* shows in there study that a number of good quality mesenchymal stem cells are still present in the nanofat sample [8].

Conclusion

our nanofat grafting technique provided substantial improvements.. Nano fat injection is one of the new modality of treatment which may consider an affordable option as an outpatient procedures that can be performed with ease in clinics to relive deep dark pigmentation and skin rejuvenation of the lower eyelids. This simple, cost effective procedure seems to be suitable for the correction of dark circles

Conflict of Interest: non

Source of Findings: self findings.

Ethical Clearance: This research was carried out with the patient's verbal and analytical approval before the sample was taken. According to this approval, all the samples were collected and the tests were carried out. A copy of the results of the tests was then given to the patients

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Synthesis, Characterization and Antimicrobial Activity of Pd(II) and Cu(II) Complexes of Schiff base Derived from Phenylethyl amine

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Abstract

Condensation of phenyl ethyl amine with 2-Hydroxy-3-naphthaldehyde yielded Schiff base derivative in good yield. Palladium and copper were selected for preparation of complexes. The structures of new compounds were assigned by FTIR and ^{1}H NMR spectroscopy. The synthesized compounds were tested for their antibacterial activity against Staphylococcus aureus, Escherichia coli, Bacillus cereus, and Klebsella pneumonia. Additionally, they evaluated for their antifungal activity against Candada albicans, Candada trobicalis, candida krusi, Aspergillus multi, and Aspergillus niger. All compounds revealed significant antibacterial and antifungal activity.

Key words: Phenylethyl amine, 2-Hydroxy-3-naphthaldehyde, Schiff base, Microbial activity, HSQC-NMR

Introduction

Phenylethylamine or β-phenethylamine is a trace amine, an organic compound, and a natural mono amine alkaloid. Phenylethyl amine well known for psychoactive drug and stimulant effects(1). It functions as a neuromodulator or neurotransmitter in the mammalian central nervous system(2). The carbon-nitrogen double bond chemistry plays a vital role in progresses of chemistry science. Schiff base reveals activity against tubercular, cancer, bacterial, fungal, analgesic, CNS depressant, inflammatory, convulsant, insecticidal, mouse hepatitis virus (MHV), herpes simplex virus type 1 (HSV-1) and adenovirus type 5 (Ad 5), mosquito larvae and herbicidal activities(3,4). Previously, the biological activity for Pd(II) complexes containing S and N donor ligands on several tumor lines was investigated(5). This work aimed to synthesis new complexes Schiff base derived from phenylethyl amine and 2-Hydroxy naphthaldehyde (Scheme l) and study their antimicrobial activity.

Material and Method

Physical measurements

The IR spectra were recorded on a Pye-Unicam SP3-300 spectrometer using KBr discs at Department of Chemistry, College of Education for Pure Sciences, University of Basrah, Iraq. 1H, 13C and 2D NMR spectra were measured on a Bruker at 600 MHz with TMS as internal reference at Konstanz University, Germany. Melting points were measured by a Philip Harris melting point apparatus at College of Veterinary medicine, University of Basrah, Iraq.

Synthesis

Synthesis of Schiff base[6] 1

Phenyl ethyl amine (0.4 g, 13.36 mmol) in ethanol(25ml) was added to (0.58g, 13.36 mmol) of hot ethanolic solution of 2-hydroxy naphthaldehyde. Then two drops of glacial acetic acid was added. Resulting solution was heated under reflux for 3h and stand overnight in refrigerator. After that the solid product obtained was filtered, washed with acetone, and recrystallized by using chloroform: ethanol (8:2 ratio) to yield yellow crystal of (E)-1-[(2-phenylethyl) carbonoimidoyl] naphthalene 2-ol.

Yield:80%,M.p.:192-194°C.

FT-IR (KBr, ν, cm^{-1}): 3300(OH); 3068,3024(CH-aromatic); 2929, 2858(CH- aliphatic); 1639-1537(C=C, C=N).

^{1}HNMR(600MHz,$CDCl_3$,δ,ppm):14.35(s,1H,OH); 8.39 (s, 1H, CH=N);6.80(d.1H,$H_{arom.}$ 3^-); 7.15-7.19(m,4H, $H_{arom.}$ 3,5,6^-,9);7.26(t,1H, $H_{arom.}$ 4);

7.29(t, 2H, $H_{arom.}$ 7^-,8^-);7.48(d.1H,$H_{arom.}$ 4^-);5.57(d.1H,$H_{arom.}$ 5^-);6.82(d.2H,$H_{arom.}$ 2,6)

3.73 (t, 2H, CH_2-N), 2.93 (t, 2H, CH_2-Ar).

^{13}C NMR (600 MHz, $CDCl_3$, δ, ppm), 37.40 (CH_2-Ar), 54.72 (CH_2-N), 106.48-137.96

(C-Ar), 158.01 (C-CH=N), 176.47 (C-OH).

Synthesis of copper complex 2

Schiff base (5mmol) was dissolved in 20ml of ethanol solution. Copper(II)chloride (2.5mmol) was then added. A stirrer was then inserted and the reaction mixture heated to 75-80^{0}C for 2h. After that, the precipitate was filtered, washed with ethanol, and dried in oven at 70^{0}C to yield green crystals of copper complex. Yield; 73%, M.P.= 202-205 ^{0}C. FT-IR (KBr, ν, cm^{-1}): 3400(OH); 3068,3022(CH-aromatic); 2927, 2862(CH-aliphatic); 1631-1530(C=C, C=N). ^{1}H NMR (600 MHz, DMSO 6d, δ, ppm):14.05(s,2H,OH); 9.03 (s, 2H, CH=N);6.71-7.72(m, 22H, Ar-H); 3.92 (t, 2H, CH_2-N), 2.99 (t, 2H, CH_2-Ar). ^{13}C NMR (600 MHz, DMSO 6d, δ, ppm), 36.96 (CH_2-

Ar), 52.64 (CH_2-N), 106.14-138.95 (C-Ar), 159.50 (C-CH=N), 177.77 (C-OH).

Synthesis of palladium complex 3

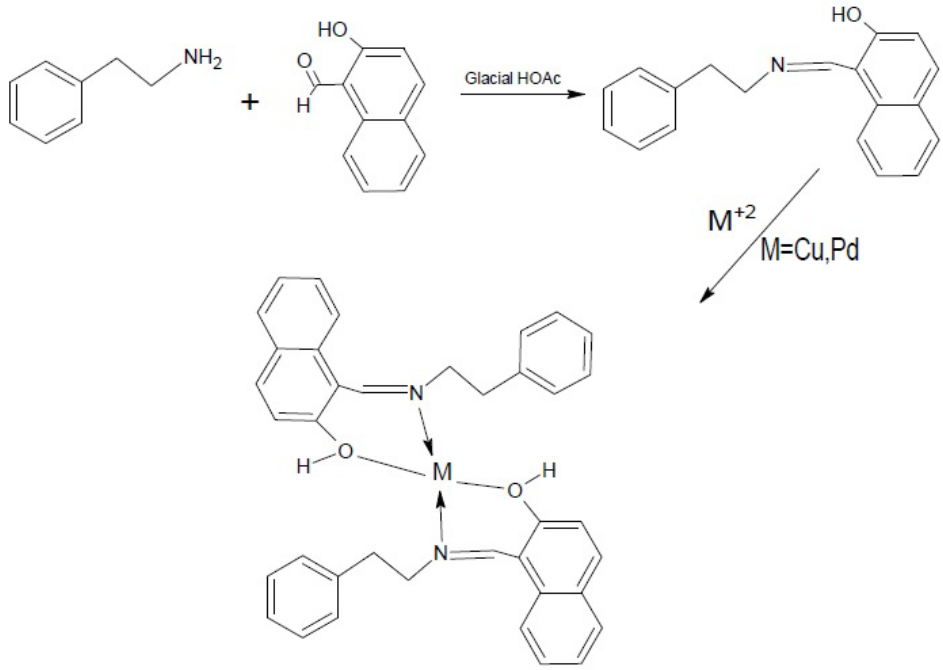
Palladium(II) complex was prepared using palladium(II)chloride instead of copper(II)chloride to yield yellow-brown crystals of palladium complex. Yield; 77%,

M.P.= 225-227 ^{0}C. FT-IR (KBr, ν, cm^{-1}): 3350(OH); 3065,3027(CH-aromatic); 2931,

2859(CH-aliphatic); 1637-1539(C=C, C=N). ^{1}H NMR (600 MHz, DMSO 6d, δ, ppm):12.00(s,2H,OH); 10.83 (s, 2H, CH=N);7.04-7.99(m, 22H, Ar-H); 3.17 (t, 2H,

CH_2-N), 2.07 (t, 2H, CH_2-Ar). ^{13}C NMR (600 MHz, DMSO 6d, δ, ppm), 36.58 (CH_2-Ar), 56.58 (CH_2-N), 110.54-141.76 (C-Ar), 160.10 (C-CH=N), 171.07 (C-OH).

Scheme 1: Preparation of palladium and cupper complexes derived from phenylethyl amine.



Antimicrobial activity

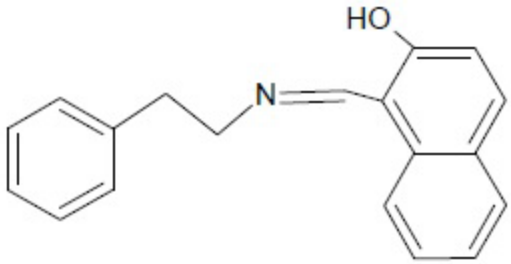
In vitro, the synthesized compounds (1-3) were tested for their antibacterial activity against Staphylococcus aureus, Escherichia coli, Streptococcus, Bacillus cerius, salmonella, klebsella, and Pseudomonas b y using disc-agar diffusion method[7]. For antibacterial activity, Muller Hinton Agar (20 ml) was used as culture media in petri dish. The synthesized compounds (1-3) were also tested for their activity against Candida albicans, Candida trobicalis, Candida krusi, Apergillus multi and Aspergillus niger by using the same method. For antifungal activity, Sabouraud's dextrose agar (20 ml) was used as culture media in petri dish. Concentrations at 100, 200 and 300 µg/ml of the test samples in DMSO solvent was introduced in the respective method. Filter paper (sterile Whatman No. I) disks (6mm in diameter) was soaked with the solution in dimethylsulfoxide (DMSO) and put on the Petri plates. I n negative control, a paper disc was soaked with (DMSO). The plates were then incubated a t 3 7 °C for 24 h and at 28°C for 72 h for bacteria and fungi, respectively. The inhibition zone diameters were measured in millimeters by using a caliper **vernia.**

Findings

In current study, Cu(II) and Pd(II) complexes of• Schiff bases was synthesized. To produce the Schiff base derivative (L) Scheme 1 in good yield, the reaction of ethyl phenyl amine with 2-hydroxy naphthaldehyde (1:1 ratio) was used. The ligand (L) reacted with metal ions(II), Cu, and Pd forming complexes was done (2:1 ratio). The FT IR and NMR spectral analysis were used to confirm their structures. The presence of the azomethine group (-CH=N) stretching with a sharp region around revealed by the FT IR spectra 1530-1539 cm-1 due to azomethine protons (CH=N) at 8.39, 9.03 and 10.83 ppm respectively, all compounds (1-3) showed signal by using1 H NMR spectra. The high field of complexes due to the high electronegativity of metals of all compounds showed a triplet at the range 2.07-2.99 ppm due to CH2-Ar and triplet at range 3.17-3.92 ppm due to CH2-N group. The region at 6.80- 7.99 ppm was due to aromatic protons. The synthesized compounds (1-3) showed singlet's at 14.35, 14.05, and 12.00 ppm, respectively due to phenolic groups Ar-OH. All compounds were measured in DMS0-d6 by using 1HNMR spectrum. In addition, the formation of these compounds was provided by 1HNMR spectra. The presence of CH=N group around 158.01-160.0 ppm was revealed by the spectra. The signals around 171.07-177.77 ppm was due to C-OH. These spectra data sports the structure of synthesized compounds. The 1H, 13C HSQC-NMR spectrum(8) of compound 1 showed a cross peak at δH/δC =14.35/178.4 ppm, belonged to Ar-OH. The cross peak at δH/δC =8.39/158 ppm due to azomethine group (N=CH), Thus, the correlation of protons and carbon in aromatic rings such as δH/δC = 7.57 /137, 7.48/129 ppm and other positions can be assigned to the protons and carbon atoms of the aromatic rings(9) (Table 1).While, the cross peak at δH/δC= 3.73/54.7 and δH/δC =2.93/37.4 ppm might be attributed to methylene groups(Table l, Figure 1). The 1H, 13C HSQC- NMR spectrum of copper complex 2 showed a cross peak at δH/δC = 9.03/159.5 ppm due to azomethine group (N=CH). Thus, the correlation of protons and carbon in aromatic rings such as δH/δC= 8.00 /118, 7.71/137.48 ppm and other positions can be assigned to the protons and carbon atoms of the aromatic rings (Table 2). While, the cross peak at δH/δC =3.90/52.64 and δH/δC =2.99/36. 96 ppm can be attributed to methylene groups, (Table 2, Figure 2).

Table1 : H, C -HSQC NMR data of 1-[

(2-phenylethyl) carbonoimidoyl] naphthalene2-ol.

Compound Structure	δH(ppm)	δC(ppm)	Position
	14.35	178.4	C-OH
	8.39	158	C,H(CH=N)
	7.57	137	C,H(3)
	7.48	**129**	C,H(4-)
	7.29	128.9	C,H(7-,8-)
	7.13	128	C,H(6-,9-)
	7.26	128.1	C,H(4)
	7.15	127.9	C,H(3,5)
	6.82	106.4	C,H(2,6)
	3.73	54.7	C,H(CH_2-N)
	2.93	37.4	C,H(CH_2-Ar)

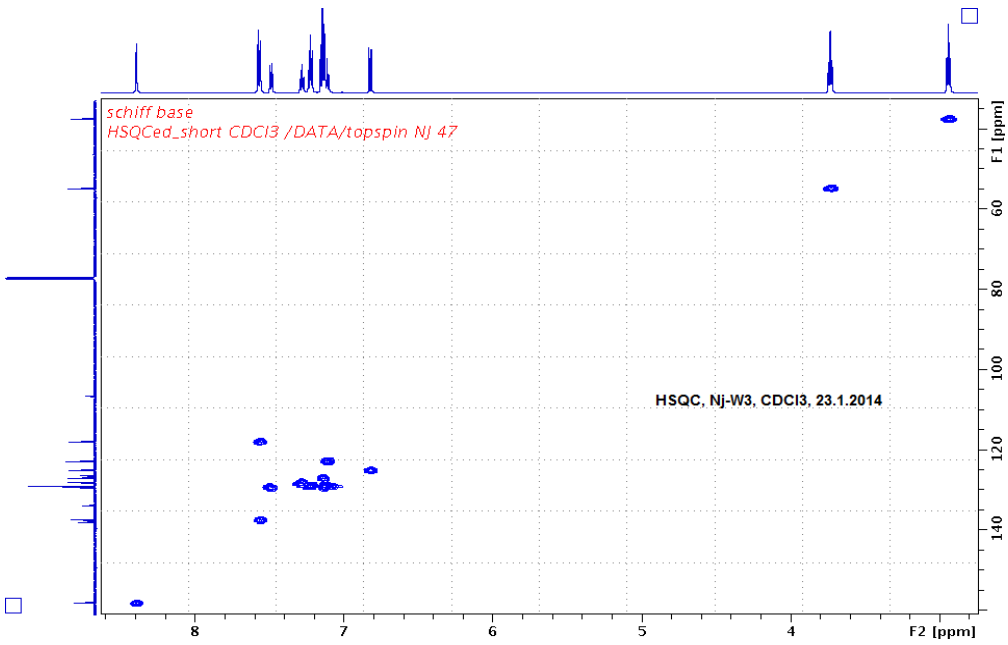


Fig 1: $^{1}H,^{13}C$-HSQC NMR data of 1-[(2-phenylethyl)carbonoimidoyl]naphthalene2-ol.

Table 2: 1H, 13 C- HSQC NMR data of copper complex

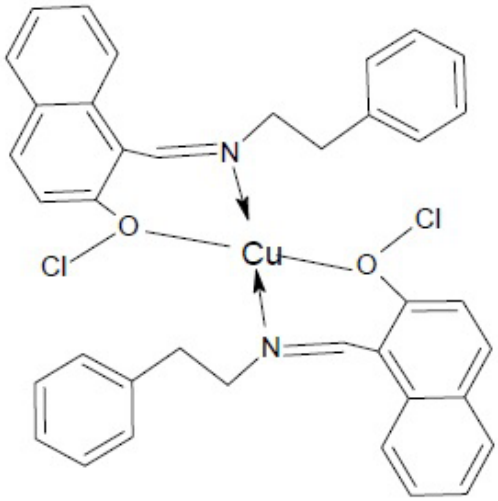
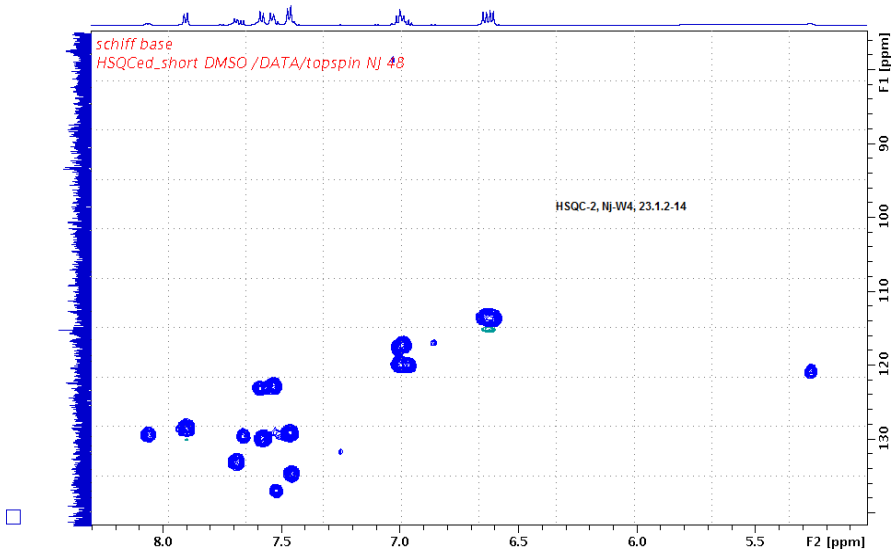
Compound Structure	δH(ppm)	δC(ppm)	Position
	9.03	159.5	C,H(CH=N)
	8.00	118.87	C,H(3-)
	7.71	137.48	C,H(4-)
	7.29	129.34	C,H(6-,9-)
	7.43	128	C,H(7-,8-)
	7.35	129.36	C,H(4)
	7.18	129.32	C,H(3,5)
	7.14	122.59	C,H(2,6)
	3.90	52.64	C,H(CH2-N)
	2.99	36.96	C,H(CH2-Ar)

Fig 2: ^{1}H, ^{13}C-HSQC NMR data of copper complex

The activity of the synthesized compounds against bacteria a n d fungi was evaluated by using the agar disk



diffusion method [7]. The current study revealed that the compounds activities elevate against bacteria and fungi

with an increase the solution concentration (Table 4 and Table 5). The synthesized compounds showed low activity against *E. coli,* S.*aureus,* and *Pseudomonas* for Schiff base (L) and copper complex, but palladium complex showed good antibacterial activity against *salmonella, klebsella* and *Pseudomonas*(Table 4).

Table 4: Antibacterial activityofthe Schiff-baseand it complexes

Comp.	Conc. µg/ml	S.aureus			*E.Coli*			Streptococcus			*B.Cerus*			Salmonella			pseudomonas			Klebsella		
		100	200	300	100	200	300	100	200	300	100	200	300	100	200	300	100	200	300	100	200	300
Ligand		-	-	7	-	-	7	-	-	-	-	-	7	-	-	-	-	-	7	-	-	-
Co(II) complex		-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-
Pd(II) complex		-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	-	7	9	-	-	10

***Results are expressed the diameter of inhibition zone in mm for different bacterial species**

Table 5: Antifungal activity ofthe Schiff-base and it complexes

Comp.	Conc. µg/ml	C.albicans			C.trobicals			C.krusi			A.multi			A.niger		
		100	200	300	100	200	300	100	200	300	100	200	300	100	200	300
Ligand		11	15	15	10	12	15	10	13	15	-	-	-	-	-	-
Co(II) complex		-	-	-	-	-	-	-	-	-	-	-	7	-	7	7
Pd(II) complex		-	-	11	-	-	12	-	-	10	-	-	10	-	7	10

***Results are expressed the diameter of inhibition zone in mm for different bacterial species**

Conclusion

A Schiff bases of phenyl ethyl amine and their copper and palladium complexes were characterized by using Infra red (FTIR) and nuclear magnetic resonance (NMR) spectroscopy. The antimicrobial activity and antifungal activities were evaluated against bacterial (seven strains) and fungal (five species), respectively. The Schiff base compound revealed better antifungal activity compare with metal complexes. These results are promoted us to continue the study such as, physiological parameters and histopathological study to complete the pharmaceutical studies.

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Ethical Clearance: All ethical guidelines have been adhered according to committee on the ethics of dealing with laboratory animals.

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Bacterial Isolate Isolated from Mobile Medical Staff of Immam Ali Hospital – Baghdad

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Abstract

Background: mobile phones used by medical staff of hospital often become carriers and may serve as important vectors play role in spread microorganisms special bacteria in hospital and causing many infections.

Material and Method: By rotating the swabs on 142 contaminated mobile phones which including all parts of phone and inoculated into transport medium (brain heart infusion) then incubated aerobically at(37°C) for 24 hours , then subcultures Macconkey and blood agar and were incubated aerobically a37°C for 24 hours.

Results : most common bacterial isolated from contaminated mobile phones were Coagulase-negative Staphylococci bacteria 16 (19.2 %), *S. aurous* 8 (10 %) and12 (14.4 %) for both isolate of mixed culture as *S. aureus + Bacillus spp* and single culture as *Bacillus spp.* As well as most bacterial isolates isolated from contaminated mobile of staff were high percentage as 12(14.5 %)from both Women's Internal Medicine and Emergency ,so isolated from female 46(55.5%) more than males 37 (44.5 %) , so high percentage of CONS as 6 (7.2%) isolated from male and high percentage of CONS and Bacillus spp. as 7 (8.5%) were isolated from both age group (15-25 and 35-45) years respectively, whilst 5 (6%) of all isolated *CONS* ; *S. epidermidis* and *Strep.sp* from the age group (25-35)years .

Conclusion : *Coagulase-negative Staphylococci* and mixed culture of *S. aureus + Bacillus spp* were most common bacterial isolated from contaminated mobile phones of staff from both Women's Internal Medicine and Emergency ,as well as most isolated from female than males ,also most isolate of CONS and *Bacillus* spp. from both age group (15-25 and 35-45) years respectively,

Introduction

In this time , mobile phones Considered important devices for both the social and professional of their users as doctors ; medical staff ; health care workers; patients and visitors , However, Medical Staff in hospitals, are play important factor via distribution the pathogenic and non pathogenic bacteria as well as Considered play role in increased acquired hospital infections because some of these users of mobile phone staff don't sterilized his mobile after used by antibacterial to make their mobile phones germ free at all times as well as prevent the possibility of phones as vehicles of transmission of both community and hospital acquired bacterial infections (Akinyemi *et al*.,2009), these bacteria may be caused multi-drug resistant (MDR) and caused difficult treatment (Angadi *etal.,* 2014).

In worldwide, millions people are suffering from the hospital acquired infections (H.A.I), So the all Contaminated of hospital environments and equipments are known as infections sources, also used Mobile phones in the hospitals without restrictions, caused increased the bacterial contamination in the hospital (Misgana *etal.,* 2014), in hospitals at least 90% of H.A.I were caused by the bacteria (Jain etal.,2007), source of infectious agents may be from exogenous or endogenous sources(Horan and Dudeck 2008).

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The healthcare staff and doctors who worked in the critical areas as operating units and intensive care units (ICUs) were highly exposed to the deadly to wide range of the pathogenic bacteria and multi-resistant microorganisms during the work , So the healthcare staff who used mobile phones often became carriers and may serve as vectors and spread bacterial contaminated (Kokate *etal.*,2012).

Material and Method

Sample collection :

using cotton swaps all samples were collected by rotating the swabs on 142 contaminated mobile phones which including all parts of phone .

Bacteriological diagnosis : The samples were collected aseptically using damp cotton swaps by rotating the swabs on all parts of mobile , and inoculated into transport medium (brain heart infusion) then incubated aerobically at(37°C) for 24 hours , then subcultures Macconkey and blood agar and were incubated aerobically a37°C for 24 hours(Forbes et al. ,2007) .

Statistical Analysis: Analysis of the data were performed by measuring percentage and means value, according to (McCall , 1980).

Results and Discussion

Table (1): Types of bacterial isolates isolated from the contaminated mobile phones.

Bacterial isolates	No.	(%)	No bacterial isolate
Coagulase-negative Staphylococci (CONS)	16	19.2	59
S. aureus	8	10	
S. aureus+ Bacillus spp.	12	14.4	
K. pneumonia	6	7.2	
K. pneumonia + CONS	2	2.4	
Proteus.sp	1	1.2	
Bacillus spp.	12	14.4	
E. coli	10	12	
S. epidermidis	11	13.2	
Strep.sp	3	3.6	
Pseudomonas aeruginosa	2	2.4	
Total	83	100	

In table (1) showed most common bacterial isolated from contaminated mobile phones were Coagulase-negative Staphylococci bacteria 16(19.2%), *S. aureus* 8(10%) and 12(14.4%) for both isolate of mixed culture as *S. aureus + Bacillus spp* and single culture as *Bacillus spp.* As well as 11 and 10 (13.2 , 12) % for both *S. epidermidis* and *E.coli* respectively .

Table (2): Types of bacterial isolates isolated from the contaminated mobile phones of medical staff according department.

Department	bacterial isolates	
	No.	%
Women's Internal Medicine	12	14.5
Emergency	12	14.5
Consultation clinic	11	13.2
General Surgery	11	13.2
General Medical Laboratories	10	12
Pharmacy	10	12
Men's Internal Medicine	10	12
Orthopedic surgery and fractures	7	8.6
Total	83	100

In table (2) showed out of 83 cases , most bacterial isolates isolated from contaminated mobile of staff according to department were high percentage as 12(14.5%)from both Women's Internal Medicine and Emergency followed by 11 (13.2%) from both Consultation clinic and General Surgery, whilst 10(12 %)from both Pharmacy and Men's Internal Medicine and low percentage 7 (8.6 %) from Orthopedic surgery and fractures.

Table (3): Types of bacterial isolates isolated from the contaminated mobile phones according to gender .

Bacterial isolates	Male No. (%)	Female No. (%)	Total No. (%)
CONS	6(7.2 %)	10(12%)	16(19%)
S. aureus	3(3.6%)	5(6.1%)	8(10%)
S. aureus+ Bacillus spp.	6(7.2%)	6(7.2%)	12(14.5%)
K. pneumonia	5(6.1%)	1(1.2%)	6(7.2%)
K. pneumoniae+ CONS	2(2.4%)	0 (0%)	2(2.4%)
Proteus.sp	1(1.2%)	0 (0%)	1(1.2%)
Bacillus spp.	4(4.8%)	8(10%)	12(14.5%)
E. coli	4(4.8%)	6(7.2%)	10(12%)
S. epidermidis	4(4.8%)	7(8.5%)	11(13.2%)
Strep.sp	1(1.2%)	2(2.4%)	3(3.6%)
Pseudomonas aeruginosa	1(1.2%)	1(1.2%)	2(2.4%)
Total	37(44.5 %)	46(55.5%)	83(100 %)

According to the staffs gender results shown in table 3.1, out of 83 cases , bacterial isolated from female 46(55.5%) more than males 37(44.5 %), so high percentage of CONS as 6(7.2%) isolated from male , whilst 10 (12 %) isolated from male , as well as 6 (7.2 %) isolated mix culture as *S. aureus*+ *Bacillus spp*. in both males and females.

Table (4): Types of bacterial isolates isolated from the contaminated mobile phones according to age .

Bacterial isolates	**Age group (years)**				
	15-25	**25-35**	**35-45**	**≤ 45**	**Total**
CONS	7(8.5%)	5(6%)	4(4.8%)	0(0%)	16(19.2%)
S. aureus	2(2.4%)	4(4.8%)	2(2.4%)	0(0%)	8(9.6%)
S. aureus + Bacillus spp.	5(6%)	4(4.8%)	1(%)	2(2.4%)	12(14.4%)
K. pneumoniae	4(4.8%)	2(2.4%)	0(0%)	0(0%)	6(7.2%)
K. pneumonia + CONS	0(0%)	2(2.4%)	0(0%)	0(0%)	2(2.4%)
Proteus.sp	1(1.2%)	0(0%)	0(0%)	0(0%)	1(1.2%)
Bacillus spp.	2(2.4%)	1(1.2%)	7(8.5%)	2(2.4%)	12(14.4%)
E.coli	2(2.4%)	4(4.8%)	1(1.2%)	0(0%)	10(12%)
S.epidermidis	4(4.8%)	5(6%)	0(0%)	0(0%)	11(13.2%)
Strep.sp	1(1.2%)	5(6%)	0(0%)	2(2.4%)	3(3.6%)
Pseudomonas.sp	2(2.4%)	0(0%)	0(0%)	0(0%)	2(2.4%)
Total	30(%)	32(%)	15(%)	6(%)	83(%)

According to the age groups , our results showed in table (4) Out of eighty - three cases , high percentage of CONS and *Bacillus spp*. as 7(8.5%) were isolated from both age group (15-25 and 35-45) years respectively, whilst 5(6%) of all isolated CONS ; *S. epidermidis* and *Strep.sp* from the age group (25-35) years.

Discussion

In this study, 142 contaminated mobile phones from 8 different departments of a health care setting were screened for the presence of bacterial contamination , highly contaminated of mobile phones by bacterial agents, most of them were found having one or more bacteria, Similar results were reported by Rana *etal.,*2013 who showed the contaminated mobile staff were *S. aureus(10)* , CONS(4), both and *Pseudomonas* spp. *E.coli only one.* so results by Raghavendra *etal.,*2014 revealed that mobile phones contaminated by *S. aureus (* 52%) , Whilst the results of Kokate *etal.,*2012) showed the dominant bacteria was CoNS as percentage (72%) followed diphtheroids as (22%) and only 2 (6%) for a*spergillus niger* , also Bhoonderowa *etal.,*2014) showed the most prevalent bacteria in mobile phones was CoNS (69 %).

The type of bacteria and level of the contamination depend on the geographical setting and clinical setting (Brady *etal.,*2009),most frequently observed in samples obtained from of the tested mobile phones laboratory (100%), followed (90%) dialysis units and(70%) triage , but 60 % from ICU (Selim *etal.,*2015), Whilst in Kuwait prevalence contaminated of mobile phone were highly in the NCUs ; PICUs and ICUs (Mohammed *etal.,*2015), whilst 94.5 % in phones of ICUs and operating rooms were contaminated(Ulger, 2009), and high percentage as 97.8 % in phones of all departments were contaminated(Ustun, 2012). Both women and men

shared pathogenic bacteria in mobile phones, women appeared to have a stronger bacterial connection in the phones than men (Meadow *etal*.,2014).

Conclusion

1- Coagulase-negative Staphylococci and mixed culture of *S. aureus* + *Bacillus spp* were most common bacterial isolated from contaminated mobile phones were

2- Most bacterial isolates isolated from contaminated mobile of staff according to department were 12(14.5%)from both Women's Internal Medicine and Emergency followed by 11(13.2%)from both Consultation clinic and General Surgery.

3- Bacterial isolated from female 46 (55.5 %) more than males 37 (44.5 %) , so high bacterial isolate were CONS as 6 (7.2 %) isolated from male , whilst 10 (12 %) isolated from male , as well as 6 (7.2 %) isolated mix culture as *S. aureus*+ *Bacillus spp*. in both males and females.

4- CONS and *Bacillus spp*. were high percentage as 7 (8.5%) of isolated from both age group (15-25 and 35-45) years respectively, whilst 5(6.1%) of all isolated *CONS* ; *S. epidermidis* and *Strep.sp* from the age group (25-35) years .

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